SINAMICS S120

1FT7 synchronous motors

Configuration Manual · 07/2011

SINAMICS

SIEMENS

SIEMENS

SINAMICS S120

1FT7 Synchronous Motors

Configuration Manual

(PFT7S), 07/2011

6SN1197-0AD13-0BP4

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

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

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

⚠CAUTION
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION
without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE
indicates that an unintended result or situation can occur if the relevant information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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℗ 08/2011

Preface

Motor documentation

The motor documentation is organized in the following categories:

- General documentation e.g. catalogs
- Manufacturer/service documentation e.g. Operating Instructions and Configuration Manuals

More information

Information on the following topics is available under the link:

- Ordering documentation/overview of documentation
- Additional links to download documents
- Using documentation online (find and search in manuals/information)

http://www.siemens.com/motioncontrol/docu

Please send any questions about the technical documentation (e.g. suggestions for improvement, corrections) to the following e-mail address:

docu.motioncontrol@siemens.com

My Documentation Manager

The following link provides information on how to create your own individual documentation based on Siemens content, and adapt it for your own machine documentation:

http://www.siemens.com/mdm

Training

The following link provides information on SITRAIN - training from Siemens for products, systems and automation engineering solutions:

http://siemens.com/sitrain

FAQs

You can find Frequently Asked Questions in the Service&Support pages under **Product Support**:

http://support.automation.siemens.com

Internet addresses for drive technology

Internet address for motors: http://www.siemens.com/motors

Internet address for products: http://www.siemens.com/motioncontrol

Internet address for SINAMICS: http://www.siemens.com/sinamics

Target group

This documentation addresses project planners and project engineers as well as machine manufacturers and commissioning engineers.

Benefits

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

Standard scope

The scope of the functionality described in this document can differ from the scope of the functionality of the drive that is actually supplied.

- Other functions not described in this documentation might be able to be executed in the drive. However, no claim can be made regarding the availability of these functions when the equipment is first supplied or in the event of servicing.
- The documentation can also contain descriptions of functions that are not available in a particular product version of the drive. The functionalities of the supplied drive should only be taken from the ordering documentation.
- Extensions or changes made by the machine manufacturer are documented by the machine manufacturer.

For reasons of clarity, this documentation does not contain all of the detailed information on all of the product types. This documentation cannot take into consideration every conceivable type of installation, operation and service/maintenance.

Technical Support

For technical support telephone numbers for different countries, go to:

http://www.siemens.com/automation/service&support

EC Declarations of Conformity

The EC Declaration of Conformity for the EMC Directive can be found/obtained

- in the Internet:

  http://support.automation.siemens.com under entry ID 24520672 or
- with the responsible local Siemens office

Danger and warning information

DANGER

Commissioning is absolutely prohibited until it has been completely ensured that the machine, in which the components described here are to be installed, is in full compliance with the provisions of the EC Machinery Directive.

Only appropriately qualified personnel may commission the SINAMICS units and the motors.

These personnel must carefully observe the technical customer documentation associated with this product and be have knowledge of and carefully observe the danger and warning notices.

Operational electrical equipment and motors have parts and components which are at hazardous voltage levels. All of the work carried out on the electrical machine or system must be carried out with it in a no-voltage condition.

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

SINAMICS devices may only be connected to the power supply via residual current devices if it has been verified (in accordance with EN 61800-5-1) that the device is compatible with the residual current device.

In combination with the drive system, the motors are generally approved for operation on TN and TT systems with grounded neutral and on IT systems.

In operation on IT systems, the occurrence of a first fault between an active part and ground must be signaled by a monitoring device. In accordance with IEC 60364-4-41, it is recommended that the first fault be eliminated as quickly as is practically possible.

In systems with a grounded external conductor, an isolating transformer with grounded neutral (secondary side) must be connected between the supply and the drive system to protect the motor insulation from excessive stress. The majority of TT systems have a grounded phase conductor, so in this case an isolating transformer must be used.

WARNING

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

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

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

CAUTION

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

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

When connecting up cables, please observe that they
– are not damaged
– are not subject to tensile stress
– cannot be touched by rotating components.

CAUTION

Motors should be connected in accordance with the operating instructions. They must not be connected directly to the three-phase supply because this will damage them.

SINAMICS units and motors are subjected to a voltage test during routine testing. It is not permitted to perform an additional high-voltage test on the motor; such a test can destroy electronic components such as the temperature sensor or encoder.

CAUTION

Motors with a DRIVE-CLiQ interface have an electronic rating plate containing motor and encoder-specific data. For this reason, encoder modules with a DRIVE-CLiQ interface or mounted Sensor Modules may only be operated on the original motor - and may not be mounted onto other motors or replaced by Sensor Modules from other motors.

The DRIVE-CLiQ interface has direct contact to components that can be damaged/destroyed by electrostatic discharge (ESDS). Neither hands nor tools that could be electrostatically charged should come into contact with the connections.

Note

When operational and in dry operating rooms, SINAMICS units with motors fulfill the Low-Voltage Directive.

In the configurations specified in the associated EC Declaration of Conformity, SINAMICS units with motors fulfill the EMC Directive.

ESDS instructions and electromagnetic fields

CAUTION

An **e**lectrostatic-**s**ensitive **d**evice (ESDS) is an individual component, integrated circuit, or module that can be damaged by electrostatic fields or discharges.

ESDS regulations for handling boards and equipment:

When handling components that can be destroyed by electrostatic discharge, it must be ensured that personnel, the workstation and packaging are well grounded!

Personnel in ESD zones with conductive floors may only touch electronic components if they are
– grounded through an ESDS bracelet and
– wearing ESDS shoes or ESDS shoe grounding strips.

Electronic boards may only be touched when absolutely necessary.

Electronic boards may not be brought into contact with plastics and articles of clothing manufactured from man-made fibers.

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

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

Measurements may only be carried-out on electronic boards and modules if
– the measuring instrument is grounded (e.g. via a protective conductor) or
– before making measurements with a potential-free measuring device, the measuring head is briefly discharged (e.g. by touching an unpainted blank piece of metal on the control cabinet).

DANGER

It may be dangerous for people to remain in the immediate proximity of the product – especially for those with pacemakers, implants or similar – due to electric, magnetic and electromagnetic fields (EMF) occurring as a consequence of operation.

The machine/system operator and the people present near the product must observe the relevant guidelines and standards! These are, for example, in the European Economic Area (EEA) the Electromagnetic Fields Directive 2004/40/EC and the standards EN 12198-1 to 12198-3 and in the Federal Republic of Germany the Employer's Liability Insurance Association Regulations for the Prevention of Industrial Accidents BGV 11, with the relevant rule BGR 11 "Electromagnetic Fields".

Then a risk assessment must be carried out for every workplace, activities for reducing dangers and exposure for people decided upon and implemented, as well as determining and observing exposure and danger areas.

Information regarding third-party products

NOTICE

This document contains recommendations relating to third-party products. This involves third-party products whose fundamental suitability is familiar to us. It goes without saying that equivalent products from other manufacturers may be used. Our recommendations are to be seen as helpful information, not as requirements or regulations. We cannot accept any liability for the quality and properties/features of third-party products.

Environmental compatibility

- Environmental aspects during development

  When selecting supplier parts, environmental compatibility was an essential criteria.

  Special emphasis was placed on reducing the envelope dimensions, mass and type variety of metal and plastic parts.

  Effects of paint-wetting impairment substances can be excluded (PWIS test)

- Environmental aspects during production

  Supplier parts and the products are predominantly transported in re-usable packing. Transport for hazardous materials is not required.

  The packing materials themselves essentially comprise paperboard containers that are in compliance with the Packaging Directive 94/62/EC.

  Energy consumption during production was optimized.

  Production has low emission levels.

- Environmental aspects for disposal

  Motors must be disposed of carefully taking into account domestic and local regulations in the normal recycling process or by returning to the manufacturer.

  The following must be taken into account when disposing of the motor:

  Oil according to the regulations for disposing of old oil (e.g. gear oil when a gearbox is mounted)

  Not mixed with solvents, cold cleaning agents of remains of paint

  Components that are to be recycled should be separated according to:

  – Electronics scrap (e.g. encoder electronics, sensor modules)

  – Iron to be recycled

  – Aluminum

  – Non-ferrous metal (gearwheels, motor windings)

Residual risks of power drive systems

When carrying out a risk assessment of the machine in accordance with the EU Machinery Directive, the machine manufacturer must consider the following residual risks associated with the control and drive components of a power drive system (PDS).

1. Unintentional movements of driven machine components during commissioning, operation, maintenance, and repairs caused by, for example:
   - Hardware defects and/or software errors in the sensors, controllers, actuators, and connection technology
   - Response times of the controller and drive
   - Operating and/or ambient conditions not within the scope of the specification
   - Parameterization, programming, cabling, and installation errors
   - Use of radio devices / cellular phones in the immediate vicinity of the controller
   - External influences / damage
2. Exceptional temperatures as well as emissions of light, noise, particles, or gas caused by, for example:
   - Component malfunctions
   - Software errors
   - Operating and/or ambient conditions not within the scope of the specification
   - External influences / damage
3. Hazardous shock voltages caused by, for example:
   - Component malfunctions
   - Influence of electrostatic charging
   - Induction of voltages in moving motors
   - Operating and/or ambient conditions not within the scope of the specification
   - Condensation / conductive contamination
   - External influences / damage
4. Electrical, magnetic and electromagnetic fields generated in operation that can pose a risk to people with a pacemaker, implants or metal replacement joints, etc. if they are too close.
5. Release of environmental pollutants or emissions as a result of improper operation of the system and/or failure to dispose of components safely and correctly.

More extensive information concerning the residual risks associated with the PDS is provided in the relevant chapters of the technical user documentation.

Table of contents

Description of the motors 1

1.1 Features

Overview

1FT7 synchronous motors are permanent magnet synchronous motors with very compact dimensions. Quick, easy mounting of the motors is possible due to the well proven cross-profile.

The 1FT7 motors satisfy the highest demands in terms of dynamic response and speed setting range, including field weakening, radial eccentricity, and positioning accuracy. They are equipped with state-of-the-art encoder technology and optimized for operation on our completely digitally designed drive and control systems.

Figure 1-1 1FT7 Synchronous Motors

In terms of cooling methods, natural cooling, forced ventilation, or liquid cooling are available for selection. While the heat loss created during natural cooling is discharged over the surface into the ambient air, during forced ventilation a mounted-on fan provides a constant airflow, which forcibly dissipates the heat loss. Maximum cooling and, therefore, maximum power can be achieved by using liquid cooling.

Benefits

1FT7 motors offer:

- High concentricity quality and low torque ripple for the best possible surface finish on the workpiece
- Minimized downtimes due to high dynamic performance
- High overload capability (4 x M_0 naturally cooled)
- Compact design
- High degree of protection
- Sturdy, vibration-isolated encoder mounting
- Simple encoder replacement on site without alignment
- Quick and easy mounting due to cross-profile
- Rotatable connector with quick-release lock
- New flange design with recessed flange surface, particularly suitable for toothed belt output and IM V3 frame size (1FT6-compatible flange can be ordered as an option)
- Very high efficiency

Fields of application

- High-performance machine tools
- Machines with stringent requirements in terms of dynamic response and precision, such as packaging machines, textile machines, foil extractor machines, printing machines and production machines.

1.2 Torque overview

1FT7 Compact

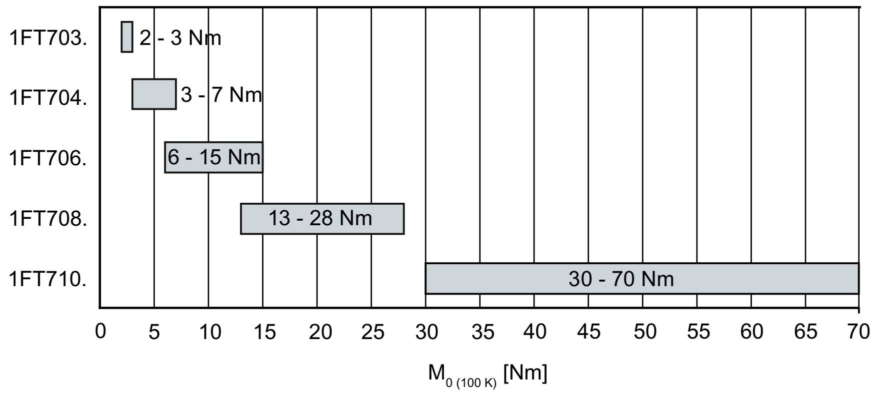


Figure 1-2 Static torque 1FT7 Compact, natural cooling

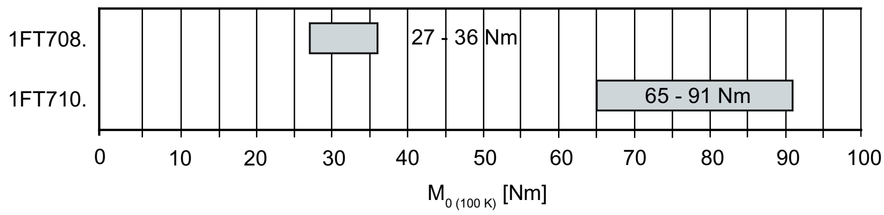


Figure 1-3 Static torque 1FT7 Compact, forced ventilation

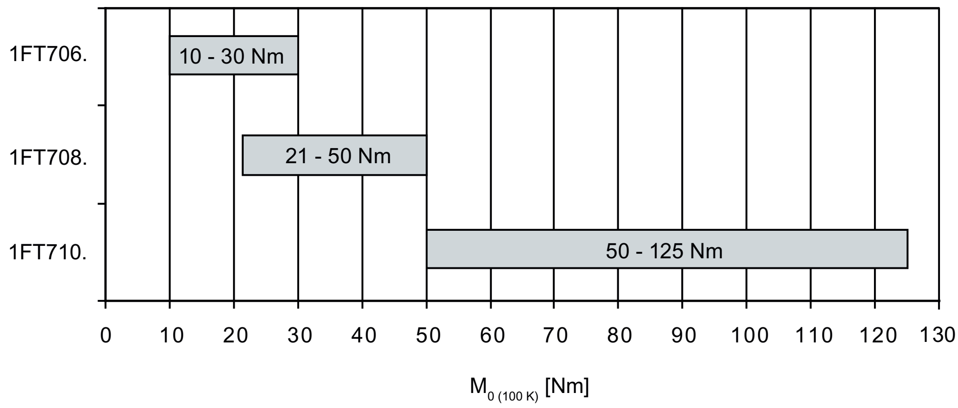


Figure 1-4 Static torque 1FT7 Compact, liquid cooling

1FT7 High Dynamic

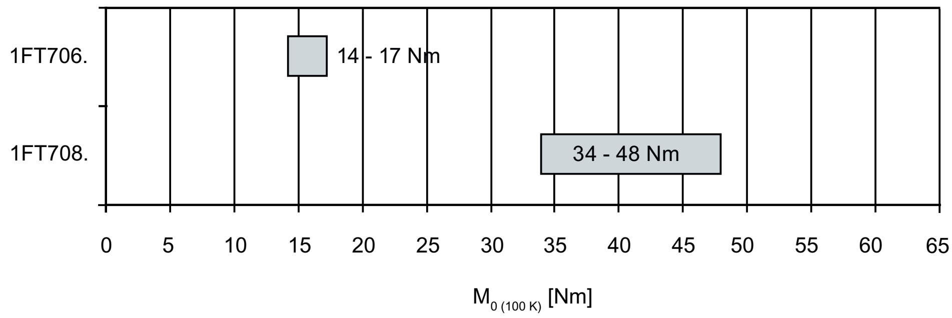


Figure 1-5 Static torque High Dynamic, forced ventilation

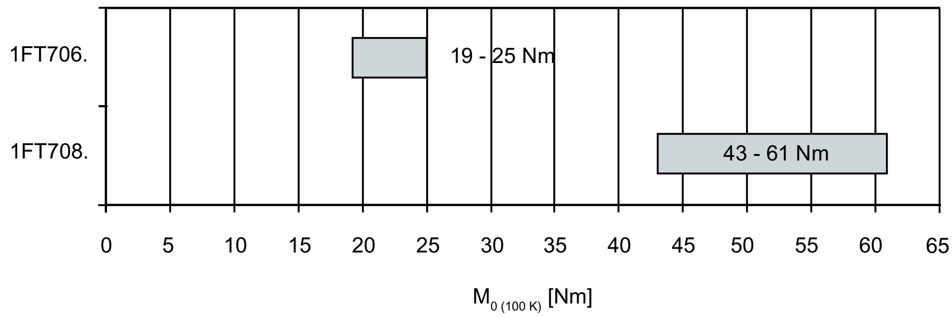


Figure 1-6 Static torque 1FT7 High Dynamic, liquid cooling

1.3 Technical features

Table 1- 1 Technical features

Motor type	Permanent-magnet synchronous motor
Magnet material	Rare-earth magnetic material
Insulation of the stator winding according to EN 60034–1 (IEC 60034–1)	Temperature class 155 (F) for a winding overtemperature of ΔT = 100 K at an ambient temperature of +40 °C (naturally cooled, forced ventilation) or a coolant temperature of +30 °C (liquid-cooled)
Cooling	Natural cooling, forced ventilation, and liquid cooling
Installation altitude for naturally-cooled and force-ventilated motors according to EN 60034-1 (IEC 60034-1)	≤ 1000 m above sea level, otherwise power derating
Type of construction according to EN 60034–7 (IEC 60034–7)	IM B5 (IM V1, IM V3)
Degree of protection according to EN60034–5 (IEC 60034–5)	IP65 (fan with forced venilation IP54)
Temperature monitoring in accordance with EN 60034-11 (IEC 60034-11)	KTY 84 temperature sensor in stator winding
Paint finish	Pearl dark gray (similar to RAL 9023)
Drive shaft end according to DIN 748-3 (IEC 60072-1)	Smooth shaft (without keyway)
Radial eccentricity, concentricity, and axial eccentricity acc. to DIN 42955 (IEC 60072-1)	Tolerance N (normal)
Vibration severity grade according to EN 60034–14 (IEC 60034–14)	Grade A is observed up to rated speed
Sound pressure level acc. to DIN EN ISO 1680 Tolerance + 3 dB(A)	Natural cooling: 1FT703□ to 1FT706□: 65 dB(A) 1FT708□ to 1FT710□: 70 dB(A) Forced ventilation: 1FT708□ to 1FT710□: 73 dB(A) Water cooling: 1FT706□: 65 dB(A) 1FT708□ to 1FT710□: 70 dB(A)
Integrated encoder system for motors without DRIVE-CLiQ interface	• IC2048S/R 1) incremental encoder sin/cos 1 Vpp, 2048 S/R 1) with C and D tracks • AM2048S/R 1) absolute encoder 2048 S/R 1), singleturn, 4096 revolutions multiturn with EnDat interface

Integrated encoder system for motors with DRIVE-CLiQ interface	• IC22DQ incremental encoder 22 bit (resolution 4194304, in the encoder 2048 S/R [1]) + commutation position 11 bit • AM22DQ absolute encoder 22 bit singleturn (resolution 4194304, in the encoder 2048 S/R [1]) + 12 bit multiturn (traversing range 4096 revolutions) • AS24DQI absolute encoder 24 bit singleturn (resolution 16777220, in the encoder 2048 S/R [1]) • AM24DQI absolute encoder 24 bit singleturn (resolution 16777220, in the encoder 2048 S/R [1]) + 12 bit multiturn (traversing range 4096 revolutions)
Connection	Connectors for signals and power
Options	• Flange 1 (compatible with 1FT6) • Drive shaft end with feather key and keyway (half-key balancing) • Integrated holding brake • Degree of protection IP64, IP67 • Sealing air connection (only in conjunction with IP67) • Vibration severity grade R • Radial eccentricity, concentricity and axial eccentricity: Tolerance R • Planetary gearbox, built-on • Motors with connector size 3 allow a terminal box version as an alternative

[1] S/R = Signals/revolution

1.4 Rating plate

The rating plate contains the technical data relevant to the motor. A second rating plate is provided loose with the motor when it is delivered.

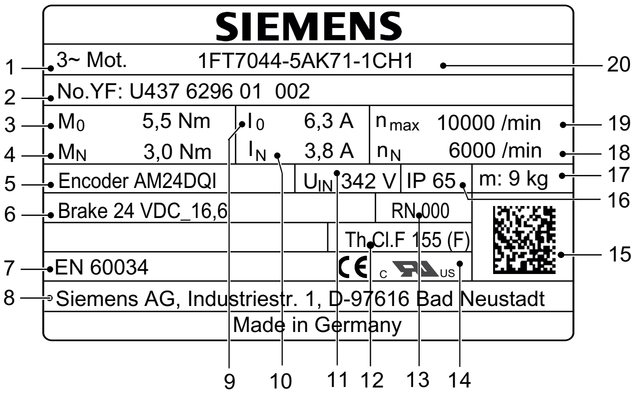


Figure 1-7 Schematic layout of rating plate

Table 1- 2 Description of the rating plate data

Position	Description / Technical data
1	Motor type: Synchronous motors
2	ID no., serial number
3	Static torque M_0 (100 K) [Nm]
4	Rated torque M_N [Nm]
5	Code, encoder type
6	Holding brake data: Typical, voltage, power consumption
7	Standard for all rotating electrical machines
8	Production address
9	Stall current I_0 [A]
10	Rated current I_N [A]
11	Induced voltage at rated speed V_{IN} [V]
12	Temperature class
13	Motor version
14	Standards and regulations
15	2D code
16	Degree of protection
17	Motor weight m [kg]
18	Rated speed n_N [rpm]
19	Maximum speed n_{max} [rpm]
20	SIEMENS motor type/order number

1.5 Selection and ordering data

1FT7 Compact natural cooling, core type

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	1FT7 Compact synchronous motors **Core type**	Number of pole pairs	Moment of inertia of rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K			J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
Natural cooling									
2000	100	5.03 (6.75)	30 (22.1)	24 (17.7)	10	**1FT7102-1AC7❑-1 ❑ ❑ 1**	5	91.4 (80.9)	26.1 (57.5)
		7.96 (10.7)	50 (36.9)	38 (28)	15	**1FT7105-1AC7❑-1 ❑ ❑ 1**	5	178 (157)	44.2 (97.5)
3000	48	1.35 (1.81)	5.0 (3.7)	4.3 (3.2)	2.6	**1FT7044-1AF7❑-1 ❑ ❑ 1**	3	5.43 (4.81)	7.2 (15.9)
	63	1.7 (2.28)	6.0 (4.4)	5.4 (4.0)	3.9	**1FT7062-1AF7❑-1 ❑ ❑ 1**	5	7.36 (6.51)	7.1 (15.7)
		2.39 (3.20)	9.0 (6.6)	7.6 (5.6)	5.2	**1FT7064-1AF7❑-1 ❑ ❑ 1**	5	11.9 (10.5)	9.7 (21.4)
	80	3.24 (4.34)	13 (9.6)	10.3 (7.60)	6.6	**1FT7082-1AF7❑-1 ❑ ❑ 1**	5	26.5 (23.4)	14 (30.9)
		4.56 (6.11)	20 (14.8)	14.5 (10.7)	8.5	**1FT7084-1AF7❑-1 ❑ ❑ 1**	5	45.1 (39.9)	20.8 (45.9)
		5.65 (7.58)	28 (20.7)	18 (13.3)	11	**1FT7086-1AF7❑-1 ❑ ❑ 1**	5	63.6 (56.2)	27.5 (60.6)
4500	80	4.82 (6.46)[1)]	20 (14.8)	11.5 (8.48)[1)]	10.1[1)]	**1FT7084-1AH7❑-1 ❑ ❑ 1**	5	45.1 (39.9)	20.8 (45.9)
		4.71 (6.32)	28 (20.7)	10 (7.4)	10	**1FT7086-1AH7❑-1 ❑ ❑ 1**	5	63.6 (56.2)	27.5 (60.6)
6000	36	0.88 (1.18)	2.0 (1.5)	1.4 (1.0)	2.1	**1FT7034-1AK7❑-1 ❑ ❑ 1**	3	0.85 (0.75)	3.8 (8.38)
	63	2.13 (2.86)[2)]	6.0 (4.4)	3.7 (2.73)[2)]	5.9[2)]	**1FT7062-1AK7❑-1 ❑ ❑ 1**	5	7.36 (6.51)	7.1 (15.7)
		2.59 (3.47)[3)]	9.0 (6.6)	5.5 (4.06)[3)]	6.1[3)]	**1FT7064-1AK7❑-1 ❑ ❑ 1**	5	11.9 (10.5)	9.7 (21.4)

Type of construction IM B5:	IM B5	Flange 0 Flange 1 (compatible with 1FT6)	0 1
Encoder systems for motors <u>without</u> DRIVE-CLiQ interface:	Encoder IC2048S/R Encoder AM2048S/R		N M
Encoder systems for motors <u>with</u> DRIVE-CLiQ interface:	Encoder AS24DQI Encoder AM24DQI Encoder IC22DQ Encoder AM22DQ		B C D F
Shaft extension: Plain shaft Plain shaft	**Shaft and flange accuracy:** Tolerance N Tolerance N	**Holding brake:** Without With	 G H
Vibration magnitude: Grade A	**Degree of protection:** IP65		1

1FT7 Compact natural cooling, core type

Motor type (repeated)	Efficiency[4]	Static current	Calculated power P_{calc}[7]	SINAMICS S120 Motor Module Rated output current[5]	SINAMICS S120 Motor Module **Booksize format** For additional versions and components, see SINAMICS S120 drive system	Power cable with complete shield Motor connection (and brake connection) via power connector Power connector	Cable cross-section[6]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} for M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Order No.	Size	mm^2	Order No.
1FT7102-1AC7...	93	12.5	6.28 (8.42)	18	**6SL312□-□TE21-8AA3**	1.5	4 × 1.5	**6FX□002-5□N21-....**
1FT7105-1AC7...	93	18	10.47 (14.0)	18	**6SL312□-□TE21-8AA3**	1.5	4 × 2.5	**6FX□002-5□N31-....**
1FT7044-1AF7...	92	2.8	1.57 (2.11)	3	**6SL312□-□TE13-0AA3**	1	4 × 1.5	**6FX□002-5□N01-....**
1FT7062-1AF7...	91	3.9	1.88 (2.52)	5	**6SL312□-□TE15-0AA3**	1	4 × 1.5	**6FX□002-5□N01-....**
1FT7064-1AF7...	93	5.7	2.83 (3.80)	9	**6SL312□-□TE21-0AA3**	1	4 × 1.5	**6FX□002-5□N01-....**
1FT7082-1AF7...	93	7.6	4.08 (5.47)	9	**6SL312□-□TE21-0AA3**	1	4 × 1.5	**6FX□002-5□N01-....**
1FT7084-1AF7...	93	11	6.28 (8.42)	18	**6SL312□-□TE21-8AA3**	1	4 × 1.5	**6FX□002-5□N01-....**
1FT7086-1AF7...	93	15.5	8.80 (11.8)	18	**6SL312□-□TE21-8AA3**	1.5	4 × 2.5	**6FX□002-5□N31-....**
1FT7084-1AH7...	93	15.6	9.42 (12.6)	18	**6SL312□-□TE21-8AA3**	1.5	4 × 2.5	**6FX□002-5□N31-....**
1FT7086-1AH7...	91	22.4	13.19 (17.7)	30	**6SL312□-1 TE23-0AA3**	1.5	4 × 4	**6FX□002-5□N41-....**
1FT7034-1AK7...	90	2.7	1.26 (1.69)	3	**6SL312□-□TE13-0AA3**	1	4 × 1.5	**6FX□002-5□N01-....**
1FT7062-1AK7...	90	8.4	3.77 (5.06)	9	**6SL312□-□TE21-0AA3**	1	4 × 1.5	**6FX□002-5□N01-....**
1FT7064-1AK7...	91	9	5.65 (7.58)	9	**6SL312□-□TE21-0AA3**	1	4 × 1.5	**6FX□002-5□N01-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake core	**D**
Length code	**....**

Information about application, configuration and cable extensions can be found under Connection system MOTION-CONNECT.

[1] These values refer to n = 4000 rpm.
[2] These values refer to n = 5500 rpm.
[3] These values refer to n = 4500 rpm.
[4] Optimum efficiency in continuous dut y.
[5] With default setting of the pulse frequency
[6] The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).
[7] $P_{calc}\ [kW] = \frac{M_0\ [Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\ [HP] = \frac{M_0\ [lb_f\text{-}in] \times n_{rated}}{63000}$

1FT7 Compact natural cooling, standard type

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**1FT7 Compact synchronous motors** **Standard type**	Number of pole pairs	Moment of inertia of rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K			J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
Natural cooling									
1500	100	4.08 (5.47)	30 (22.1)	26 (19.2)	8	**1FT7102-5AB7❑-1❑❑❑**	5	91.4 (80.9)	26.1 (57.5)
		6.60 (8.85)	50 (36.9)	42 (31.0)	13	**1FT7105-5AB7❑-1❑❑❑**	5	178 (157)	44.2 (97.5)
		9.58 (12.8)	70 (51.6)	61 (45.0)	16	**1FT7108-5AB7❑-1❑❑❑**	5	248 (219)	59.0 (130)
2000	80	2.39 (3.20)	13 (9.6)	11.4 (8.4)	4.9	**1FT7082-5AC7❑-1❑❑❑**	5	26.5 (23.5)	14 (30.9)
		3.54 (4.75)	20 (14.8)	16.9 (12.5)	8.4	**1FT7084-5AC7❑-1❑❑❑**	5	45.1 (39.9)	20.8 (45.9)
		4.71 (6.32)	28 (20.7)	22.5 (16.6)	9.2	**1FT7086-5AC7❑-1❑❑❑**	5	63.6 (56.3)	27.5 (60.6)
	100	5.03 (6.75)	30 (22.1)	24.0 (17.7)	10	**1FT7102-5AC7❑-1❑❑❑**	5	91.4 (80.9)	26.1 (57.5)
		7.96 (10.7)	50 (36.9)	38.0 (28.0)	15	**1FT7105-5AC7❑-1❑❑❑**	5	178 (157)	44.2 (97.5)
		10.47 (14.0)	70 (51.6)	50.0 (36.9)	18	**1FT7108-5AC7❑-1❑❑❑**	5	248 (219)	59 (130)
3000	48	0.85 (1.14)	3.0 (2.2)	2.7 (2.0)	2.1	**1FT7042-5AF7❑-1❑❑❑**	3	2.81 (2.49)	4.6 (10.1)
		1.35 (1.81)	5.0 (3.7)	4.3 (3.2)	2.6	**1FT7044-5AF7❑-1❑❑❑**	3	5.43 (4.81)	7.2 (15.9)
		1.76 (2.36)	7.0 (5.2)	5.6 (4.1)	3.5	**1FT7046-5AF7❑-1❑❑❑**	3	7.52 (6.66)	9.3 (20.5)
	63	1.70 (2.28)	6.0 (4.4)	5.4 (4.0)	3.9	**1FT7062-5AF7❑-1❑❑❑**	5	7.36 (6.51)	7.1 (15.7)
		2.39 (3.20)	9.0 (6.6)	7.6 (5.6)	5.2	**1FT7064-5AF7❑-1❑❑❑**	5	11.9 (10.5)	9.7 (21.4)
		2.92 (3.92)	12.0 (8.9)	9.3 (6.9)	7.2	**1FT7066-5AF7❑-1❑❑❑**	5	16.4 (14.5)	12.3 (27.1)
		3.42 (4.59)	15.0 (11.1)	10.9 (8.0)	6.7	**1FT7068-5AF7❑-1❑❑❑**	5	23.2 (20.5)	16.3 (35.9)
	80	3.24 (4.34)	13.0 (9.6)	10.3 (7.6)	6.6	**1FT7082-5AF7❑-1❑❑❑**	5	26.5 (23.5)	14.0 (30.9)
		4.55 (6.10)	20.0 (14.8)	14.5 (10.7)	8.5	**1FT7084-5AF7❑-1❑❑❑**	5	45.1 (39.9)	20.8 (45.9)
		5.65 (7.58)	28.0 (20.7)	18 (13.3)	11	**1FT7086-5AF7❑-1❑❑❑**	5	63.6 (56.3)	27.5 (60.6)
	100	6.28 (8.42)	30.0 (22.1)	20 (14.8)	12	**1FT7102-5AF7❑-1❑❑❑**	5	91.4 (80.9)	26.1 (57.5)
		8.80 (11.8)	50.0 (36.9)	28 (20.7)	15	**1FT7105-5AF7❑-1❑❑❑**	5	178 (157)	44.2 (97.5)
		6.28 (8.42)	70.0 (51.6)	20 (14.8)	12	**1FT7108-5AF7❑-1❑❑❑**	5	248 (220)	59.0 (130)

Type of construction IM B5:	IM B5	Flange 0	0
		Flange 1 (compatible with 1FT6)	1

Encoder systems for motors without DRIVE-CLiQ interface:	Encoder IC2048S/R	N
	Encoder AM2048S/R	M
Encoder systems for motors with DRIVE-CLiQ interface:	Encoder AS24DQI	B
	Encoder AM24DQI	C
	Encoder IC22DQ	D
	Encoder AM22DQ	F

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Fitted key and keyway	Tolerance N	Without	A
Fitted key and keyway	Tolerance N	With	B
Fitted key and keyway	Tolerance R	Without	D
Fitted key and keyway	Tolerance R	With	E
Plain shaft	Tolerance N	Without	G
Plain shaft	Tolerance N	With	H
Plain shaft	Tolerance R	Without	K
Plain shaft	Tolerance R	With	L

Vibration magnitude:	**Degree of protection:**	
Grade A	IP64	0
Grade A	IP65	1
Grade A	IP67	2
Grade R	IP64	3
Grade R	IP65	4
Grade R	IP67	5

1FT7 Compact natural cooling, standard type

Motor type (repeated)	Efficiency[1] η %	Static current I_0 at M_0 ΔT=100 K A	Calculated power P_{calc}[4] for M_0 ΔT=100 K kW (HP)	SINAMICS S120 Motor Module: Rated output current[2] I_{rated} A	SINAMICS S120 Motor Module: Booksize format (For additional versions and components, see SINAMICS S120 drive system) Order No.	Power cable with complete shield (Motor connection (and brake connection) via power connector): Power connector Size	Cable cross-section[3] mm^2	Pre-assembled cable Order No.
1FT7102-5AB7...	93	9	4.71 (6.32)	9	**6SL312❑-❑TE21-0AA3**	1.5	4 × 1.5	**6FX❑002-5❑N21-....**
1FT7105-5AB7...	93	15	7.85 (10.5)	18	**6SL312❑-❑TE21-8AA3**	1.5	4 × 1.5	**6FX❑002-5❑N21-....**
1FT7108-5AB7...	93	18	10.99 (14.7)	18	**6SL312❑-❑TE21-8AA3**	1.5	4 × 2.5	**6FX❑002-5❑N31-....**
1FT7082-5AC7...	93	5	2.72 (3.65)	5	**6SL312❑-❑TE15-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7084-5AC7...	93	9	4.19 (5.62)	9	**6SL312❑-❑TE21-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7086-5AC7...	93	10.6	5.86 (7.86)	18	**6SL312❑-❑TE21-8AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7102-5AC7...	93	12.5	6.28 (8.42)	18	**6SL312❑-❑TE21-8AA3**	1.5	4 × 1.5	**6FX❑002-5❑N21-....**
1FT7105-5AC7...	93	18	10.47 (14.0)	18	**6SL312❑-❑TE21-8AA3**	1.5	4 × 2.5	**6FX❑002-5❑N31-....**
1FT7108-5AC7...	93	25	14.66 (19.7)	30	**6SL312❑-1 TE23-0AA3**	1.5	4 × 4	**6FX❑002-5❑N41-....**
1FT7042-5AF7...	92	2.1	0.94 (1.26)	3	**6SL312❑-❑TE13-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7044-5AF7...	92	2.8	1.57 (2.11)	3	**6SL312❑-❑TE13-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7046-5AF7...	92	4	2.20 (2.95)	5	**6SL312❑-❑TE15-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7062-5AF7...	91	3.9	1.88 (2.52)	5	**6SL312❑-❑TE15-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7064-5AF7...	93	5.7	2.83 (3.80)	9	**6SL312❑-❑TE21-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7066-5AF7...	92	8.4	3.77 (5.06)	9	**6SL312❑-❑TE21-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7068-5AF7...	92	8.3	4.71 (6.32)	9	**6SL312❑-❑TE21-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7082-5AF7...	93	7.6	4.08 (5.47)	9	**6SL312❑-❑TE21-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7084-5AF7...	93	11	6.28 (8.42)	18	**6SL312❑-❑TE21-8AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7086-5AF7...	93	15.5	8.80 (11.8)	18	**6SL312❑-❑TE21-8AA3**	1.5	4 × 2.5	**6FX❑002-5❑N31-....**
1FT7102-5AF7...	93	18	9.42 (12.6)	18	**6SL312❑-❑TE21-8AA3**	1.5	4 × 2.5	**6FX❑002-5❑N31-....**
1FT7105-5AF7...	94	26	15.71 (21.0)	30	**6SL312❑-1 TE23-0AA3**	1.5	4 × 4	**6FX❑002-5❑N41-....**
1FT7108-5AF7...	93	36	21.99 (29.5)	45	**6SL312❑-1 TE24-5AA3**	1.5	4 × 6	**6FX❑002-5❑N54-....**

Cooling:
Internal air cooling **0**
External air cooling **1**

Motor Module:
Single Motor Module **1**
Double Motor Module **2**

Power cable:
MOTION-CONNECT 800 **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake cores **D**

Length code **....**

Information about application, configuration and cable extensions can be found under Connection system MOTION-CONNECT.

[1] Optimum efficiency in continuous dut y.

[2] With default setting of the pulse frequency.

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

[4] $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[HP] = \frac{M_0\,[lb_f\text{-}in] \times n_{rated}}{63000}$

1FT7 Compact natural cooling, standard type

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**1FT7 Compact synchronous motors Standard type**	Number of pole pairs	Moment of inertia of rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K			J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
Natural cooling									
4500	48	1.32 (1.77)[1]	7.0 (5.2)	3.6 (2.66)[1]	4.7[1]	**1FT7046-5AH7❑-1❑❑❑**	3	7.52 (6.66)	9.3 (20.5)
	63	2.55 (3.42)[2]	12 (8.9)	6.1 (4.50)[2]	7.5[2]	**1FT7066-5AH7❑-1❑❑❑**	5	16.4 (14.5)	12.3 (27.1)
	80	3.77 (5.06)	13 (9.6)	8.0 (5.9)	7.8	**1FT7082-5AH7❑-1❑❑❑**	5	26.5 (23.5)	14.0 (30.9)
		4.82 (6.46)[2]	20 (14.8)	11.5 (8.48)[2]	10.1[2]	**1FT7084-5AH7❑-1❑❑❑**	5	45.1 (39.9)	20.8 (45.9)
		4.71 (6.32)	28 (20.7)	10 (7.4)	10	**1FT7086-5AH7❑-1❑❑❑**	5	63.6 (56.3)	27.5 (60.6)
6000	36	0.88 (1.18)	2.0 (1.5)	1.4 (1.0)	2.1	**1FT7034-5AK7❑-1❑❑❑**	3	0.85 (0.75)	3.8 (8.38)
		1.07 (1.43)	3.0 (2.2)	1.7 (1.3)	2.4	**1FT7036-5AK7❑-1❑❑❑**	3	1.33 (1.18)	5.0 (11.0)
	48	1.26 (1.69)	3.0 (2.2)	2.0 (1.5)	3	**1FT7042-5AK7❑-1❑❑❑**	3	2.81 (2.49)	4.6 (10.1)
		1.41 (1.89)[3]	5.0 (3.7)	3.0 (2.21)[3]	3.6[3]	**1FT7044-5AK7❑-1❑❑❑**	3	5.43 (4.81)	7.2 (15.9)
	63	2.13 (2.86)[4]	6.0 (4.4)	3.7 (2.73)[4]	5.9[4]	**1FT7062-5AK7❑-1❑❑❑**	5	7.36 (6.51)	7.1 (15.7)
		2.59 (3.47)[3]	9.0 (6.6)	5.5 (4.06)[3]	6.1[3]	**1FT7064-5AK7❑-1❑❑❑**	5	11.9 (10.5)	9.7 (21.4)

Type of construction IM B5:	IM B5		Code
		Flange 0	0
		Flange 1 (compatible with 1FT6)	1

Encoder systems for motors without DRIVE-CLiQ interface:		Code
	Encoder IC2048S/R	N
	Encoder AM2048S/R	M

Encoder systems for motors with DRIVE-CLiQ interface:		Code
	Encoder AS24DQI	B
	Encoder AM24DQI	C
	Encoder IC22DQ	D
	Encoder AM22DQ	F

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	Code
Fitted key and keyway	Tolerance N	Without	A
Fitted key and keyway	Tolerance N	With	B
Fitted key and keyway	Tolerance R	Without	D
Fitted key and keyway	Tolerance R	With	E
Plain shaft	Tolerance N	Without	G
Plain shaft	Tolerance N	With	H
Plain shaft	Tolerance R	Without	K
Plain shaft	Tolerance R	With	L

Vibration magnitude:	**Degree of protection:**	Code
Grade A	IP64	0
Grade A	IP65	1
Grade A	IP67	2
Grade R	IP64	3
Grade R	IP65	4
Grade R	IP67	5

1FT7 Compact natural cooling, standard type

Motor type (repeated)	Efficiency[5] η %	Static current I_0 at M_0 ΔT=100 K A	Calculated power P_{calc}[8] P_{calc} for M_0 ΔT=100 K kW (HP)	SINAMICS S120 Motor Module: Rated output current[6] I_{rated} A	SINAMICS S120 Motor Module: Booksize format (For additional versions and components, see SINAMICS S120 drive system) Order No.	Power cable with complete shield (Motor connection (and brake connection) via power connector): Power connector Size	Cable cross-section[7] mm^2	Pre-assembled cable Order No.
1FT7046-5AH7...	90	8.1	3.30 (4.43)	9	**6SL312❑-❑TE21-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7066-5AH7...	90	13.6	5.65 (7.58)	18	**6SL312❑-❑TE21-8AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7082-5AH7...	93	12.3	6.13 (8.22)	18	**6SL312❑-❑TE21-8AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7084-5AH7...	93	15.6	9.42 (12.6)	18	**6SL312❑-❑TE21-8AA3**	1.5	4 × 2.5	**6FX❑002-5❑N31-....**
1FT7086-5AH7...	91	22.4	13.19 (17.7)	30	**6SL312❑-1TE23-0AA3**	1.5	4 × 4	**6FX❑002-5❑N41-....**
1FT7034-5AK7...	90	2.7	1.26 (1.69)	3	**6SL312❑-❑TE13-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7036-5AK7...	90	4.0	1.88 (2.52)	5	**6SL312❑-❑TE15-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7042-5AK7...	91	3.9	1.88 (2.52)	5	**6SL312❑-❑TE15-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7044-5AK7...	91	5.7	3.14 (4.21)	9	**6SL312❑-❑TE21-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7062-5AK7...	90	8.4	3.77 (5.06)	9	**6SL312❑-❑TE21-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**
1FT7064-5AK7...	91	9	5.65 (7.59)	9	**6SL312❑-❑TE21-0AA3**	1	4 × 1.5	**6FX❑002-5❑N01-....**

Cooling:
- Internal air cooling **0**
- External air cooling **1**

Motor Module:
- Single Motor Module **1**
- Double Motor Module **2**

Power cable:
- MOTION-CONNECT 800 **8**
- MOTION-CONNECT 500 **5**

- Without brake cores **C**
- With brake core **D**

Length code **....**

Information about application, configuration and cable extensions can be found under Connection system MOTION-CONNECT.

[1] These values refer to n = 3500 rpm.
[2] These values refer to n = 4000 rpm.
[3] These values refer to n = 4500 rpm.
[4] These values refer to n = 5500 rpm.
[5] Optimum efficiency in continuous dut y.
[6] With default setting of the pulse frequency.
[7] The current carrying capacity of the power cables complies with EN 60204-1 for installation type C, for continuous duty at an ambient air temperature of 40 °C (104 °F).
[8] $P_{calc}\,[kW] = \frac{M_0\,[Nm] \times n_{rated}}{9550}$ $\quad P_{calc}\,[HP] = \frac{M_0\,[lb_f\text{-}in] \times n_{rated}}{63000}$

1FT7 Compact forced ventilation, standard type

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**1FT7 Compact synchronous motors** **Standard type**	Number of pole pairs	Moment of inertia of rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K			J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
Forced ventilation									
2000	80	5.0 (6.71)	27 (19.9)	24 (17.7)	13.5	**1FT7084-5SC7❑-1 ❑❑❑**	5	45 (39.8)	25 (55.1)
		6.7 (8.98)	36 (26.6)	32 (23.6)	17	**1FT7086-5SC7❑-1 ❑❑❑**	5	64 (56.6)	36 (79.4)
	100	11.7 (15.7)	65 (47.9)	56 (41.3)	29	**1FT7105-5SC7❑-1 ❑❑❑**	5	178 (158)	50 (110)
		15.3 (20.5)	91 (67.1)	73 (53.8)	33	**1FT7108-5SC7❑-1 ❑❑❑**	5	248 (219.5)	64 (141.1)
3000	80	7.2 (9.66)	27 (19.9)	23 (17.0)	18.5	**1FT7084-5SF7❑-1 ❑❑❑**	5	45 (39.8)	25 (55.1)
		9.1 (12.2)	36 (26.6)	29 (21.4)	24	**1FT7086-5SF7❑-1 ❑❑❑**	5	64 (56.6)	36 (79.4)
	100	15.1 (20.2)	65 (47.9)	48 (35.4)	35	**1FT7105-5SF7❑-❑❑❑❑**	5	178 (158)	50 (110)
		18.8 (25.1)	91 (67.1)	60 (44.3)	38	**1FT7108-5SF7❑-❑❑❑❑**	5	248 (220)	64 (141)
4500	80	9.9 (13.3)	27 (19.9)	21 (15.5)	24.5	**1FT7084-5SH7❑-1 ❑❑❑**	5	45 (39.8)	25 (55.1)
		11.8 (15.8)	36 (26.6)	25 (18.4)	25	**1FT7086-5SH7❑-1 ❑❑❑**	5	64 (56.6)	36 (79.4)

Type of construction IM B5:	IM B5	Flange 0	0
		Flange 1 (compatible with 1FT6)	1
Connector outlet direction:	Connector size 1 and 1.5	Connector can be rotated	1
	Connector size 3[1)]	Transverse right	1
		Transverse left	2
		Axial NDE	3
		Axial DE	4
Terminal box/ cable entry:[1)]	Top/transverse from right		5
	Top/transverse from left		6
	Top/axial from NDE		7
	Top/axial from DE		8
Encoder systems for motors <u>without</u> DRIVE-CLiQ interface:	Encoder IC2048S/R		N
	Encoder AM2048S/R		M
Encoder systems for motors <u>with</u> DRIVE-CLiQ interface:	Encoder AS24DQI		B
	Encoder AM24DQI		C
	Encoder IC22DQ		D
	Encoder AM22DQ		F
Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Fitted key	Tolerance N	Without	A
Fitted key	Tolerance N	With	B
Fitted key	Tolerance R	Without	D
Fitted key	Tolerance R	With	E
Plain shaft	Tolerance N	Without	G
Plain shaft	Tolerance N	With	H
Plain shaft	Tolerance R	Without	K
Plain shaft	Tolerance R	With	L
Vibration magnitude:	**Degree of protection:**[2)]		
Grade A	IP64		0
Grade A	IP65		1
Grade R	IP64		3
Grade R	IP65		4

1FT7 Compact forced ventilation, standard type

Motor type (repeated)	Effi-ciency[3]	Static current	Calculated power P_{calc}[6]	SINAMICS S120 Motor Module		Power cable with complete shield Motor connection (and brake connection) via power connector		
				Rated output current[4]	**Booksize format** For additional versions and components, see SINAMICS S120 drive system	Power connector	Cable cross-section[5]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} for M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Order No.	Size	mm²	Order No.
1FT7084-5SC7...	93	15	5.7 (7.64)	18	**6SL312□-□TE21-8AA3**	1.5	4 × 1.5	**6FX□002-5□N21-....**
1FT7086-5SC7...	93	19.5	7.5 (10.1)	30	**6SL312□-1 TE23-0AA3**	1.5	4 × 2.5	**6FX□002-5□N31-....**
1FT7105-5SC7...	93	31	13.6 (18.2)	45	**6SL312□-1 TE24-5AA3**	1.5	4 × 6	**6FX□002-5□N54-....**
1FT7108-5SC7...	93	39	19.1 (25.6)	45	**6SL312□-1 TE24-5AA3**	1.5	4 × 16	**6FX□002-5□N64-....**
1FT7084-5SF7...	94	21	8.5 (11.4)	30	**6SL312□-1 TE23-0AA3**	1.5	4 × 2.5	**6FX□002-5□N31-....**
1FT7086-5SF7...	93	29	11.3 (15.2)	30	**6SL312□-1 TE23-0AA3**	1.5	4 × 6	**6FX□002-5□N51-....**
1FT7105-5SF7...	94	45	20.4 (27.4)	45	**6SL312□-1 TE24-5AA3**	3	4 × 10	**6FX□002-5□S14-....**
1FT7108-5SF7...	94	57	28.6 (38.4)	60	**6SL312□-1 TE26-0AA3**	3	4 × 16	**6FX□002-5□S23-....**
1FT7084-5SH7...	94	30.5	12.7 (17.0)	30	**6SL312□-1 TE23-0AA3**	1.5	4 × 6	**6FX□002-5□N51-....**
1FT7086-5SH7...	93	34	17.0 (22.8)	45	**6SL312□-1 TE24-5AA3**	1.5	4 × 6	**6FX□002-5□N54-....**

Cooling:
Internal air cooling **0**
External air cooling **1**

Motor Module:
Single Motor Module **1**
Double Motor Module **2**

Power cable:
MOTION-CONNECT 800 **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake core **D**

Length code **....**

Information about application, configuration and cable extensions can be found under Connection system MOTION-CONNECT.

[1] Connector size 3 cannot be rotated. Terminal box can be chosen alternatively only for connector size 3.

[2] The degree of protection refers to the motor. The built-in fan meets the requirements of degree of protection IP54.

[3] Optimum efficiency in continuous duty.

[4] With default setting of the pulse frequency.

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

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

1FT7 Compact liquid cooling, standard type

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**1FT7 Compact synchronous motors Standard type**	Number of pole pairs	Moment of inertia of rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K			J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
Water cooling									
1500	100	7.9 (10.6)	50 (36.9)	50 (36.9)	20.3	**1FT7102-5WB7□-1 □□□**	5	98.9 (87.5)	36.6 (80.7)
		14.1 (18.9)	90 (66.4	90 (66.4)	29.5	**1FT7105-5WB7□-1 □□□**	5	191 (169)	54.8 (121)
		19.6 (26.3)	125 (92.2)	125 (92.2)	40.3	**1FT7108-5WB7□-1 □□□**	5	265 (235)	68.6 (151)
2000	80	4.4 (5.90)	21 (15.5)	21 (15.5)	11	**1FT7082-5WC7□-1 □□□**	5	28.9 (25.6)	20.7 (45.6)
		7.33 (9.83)	35 (25.8)	35 (25.8)	17	**1FT7084-5WC7□-1 □□□**	5	48.3 (42.8)	27.5 (60.6)
		10.5 (14.1)	50 (36.9)	50 (36.9)	24	**1FT7086-5WC7□-1 □□□**	5	67.8 (60.0)	34.1 (75.2)
	100	10.4 (13.9)	50 (36.9)	49.5 (36.5)	29.3	**1FT7102-5WC7□-1 □□□**	5	98.9 (87.5)	36.6 (80.7)
		18.8 (25.2)	90 (66.4)	90 (66.4)	40.8	**1FT7105-5WC7□-1 □□□**	5	191 (169)	54.8 (121)
		26.2 (35.1)	125 (92.2)	125 (92.2)	47.5	**1FT7108-5WC7□-□□□□**	5	265 (235)	69.6 (154)

Type of construction IM B5:	IM B5	Flange 0		0
		Flange 1 (compatible with 1FT6)		1
Connector outlet direction:	Connector size 1 and 1.5	Connector can be rotated		1
	Connector size 3[1)]	Transverse right		1
		Transverse left		2
		Axial NDE		3
		Axial DE		4
Terminal box/ cable entry:[1)]	Top/transverse from right			5
	Top/transverse from left			6
	Top/axial from NDE			7
	Top/axial from DE			8
Encoder systems for motors without DRIVE-CLiQ interface:	Encoder IC2048S/R			N
	Encoder AM2048S/R			M
Encoder systems for motors with DRIVE-CLiQ interface:	Encoder AS24DQI			B
	Encoder AM24DQI			C
	Encoder IC22DQ			D
	Encoder AM22DQ			F
Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**		
Fitted key and keyway	Tolerance N	Without		A
Fitted key and keyway	Tolerance N	With		B
Fitted key and keyway	Tolerance R	Without		D
Fitted key and keyway	Tolerance R	With		E
Plain shaft	Tolerance N	Without		G
Plain shaft	Tolerance N	With		H
Plain shaft	Tolerance R	Without		K
Plain shaft	Tolerance R	With		L
Vibration magnitude:	**Degree of protection:**			
Grade A	IP64			0
Grade A	IP65			1
Grade A	IP67			2
Grade R	IP64			3
Grade R	IP65			4
Grade R	IP67			5

1FT7 Compact liquid cooling, standard type

Motor type (repeated)	Efficiency[2]	Static current	Calculated power P_{calc}[5]	SINAMICS S120 Motor Module: Rated output current[3]	SINAMICS S120 Motor Module: Booksize format. For additional versions and components, see SINAMICS S120 drive system	Power cable with complete shield. Motor connection (and brake connection) via power connector: Power connector	Cable cross-section[4]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} for M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Order No.	Size	mm^2	Order No.
1FT7102-5WB7...	93	17.8	7.9 (10.6)	18	**6SL312❑-❑TE21-8AA3**	1.5	4 × 2.5	**6FX❑002-5❑N31-....**
1FT7105-5WB7...	94	28	14.1 (18.9)	30	**6SL312❑-1 TE23-0AA3**	1.5	4 × 4	**6FX❑002-5❑N41-....**
1FT7108-5WB7...	94	39	19.6 (26.3)	45	**6SL312❑-1 TE24-5AA3**	1.5	4 × 10	**6FX❑002-5❑N64-....**
1FT7082-5WC7...	93	10.7	4.4 (5.90)	18	**6SL312❑-❑TE21-8AA3**	1.5	4 × 1.5	**6FX❑002-5❑N21-....**
1FT7084-5WC7...	94	16.5	7.3 (9.79)	18	**6SL312❑-❑TE21-8AA3**	1.5	4 × 2.5	**6FX❑002-5❑N31-....**
1FT7086-5WC7...	94	23	10.5 (14.1)	30	**6SL312❑-1 TE23-0AA3**	1.5	4 × 4	**6FX❑002-5❑N41-....**
1FT7102-5WC7...	94	25.5	10.5 (14.1)	30	**6SL312❑-1 TE23-0AA3**	1.5	4 × 4	**6FX❑002-5❑N41-....**
1FT7105-5WC7...	94	39	18.8 (25.2)	45	**6SL312❑-1 TE24-5AA3**	1.5	4 × 10	**6FX❑002-5❑N64-....**
1FT7108-5WC7...	95	45.3	26.2 (35.1)	45	**6SL312❑-1 TE24-5AA3**	3	4 × 10	**6FX❑002-5❑S14-....**

Cooling:
Internal air cooling **0**
External air cooling **1**

Motor Module:
Single Motor Module **1**
Double Motor Module **2**

Power cable:
MOTION-CONNECT 800 **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake cores **D**

Length code **....**

Information about application, configuration and cable extensions can be found under Connection system MOTION-CONNECT.

1) Connector size 3 cannot be rotated. Terminal box can be chosen alter natively only for connector size 3.

2) Optimum efficiency in continuous dut y.

3) With default setting of the pulse frequency.

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

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

1FT7 Compact liquid cooling, standard type

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	**1FT7 Compact synchronous motors** **Standard type**	Number of pole pairs	Moment of inertia of rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K			J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Order No.		10^{-4} kgm² (10^{-3} lb_f-in-s²)	kg (lb)
Water cooling									
3000	63	3.1 (4.16)	10 (7.38)	10 (7.38)	7.8	**1FT7062-5WF7❑-1❑❑❑**	5	8.1 (7.17)	11 (24.3)
		5 (6.71)	16 (11.8)	16 (11.8)	12.5	**1FT7064-5WF7❑-1❑❑❑**	5	12.9 (11.4)	13.7 (30.2)
		6.2 (8.31)	20 (14.8)	19.6 (14.5)	14.4	**1FT7066-5WF7❑-1❑❑❑**	5	17.7 (15.7)	16.3 (35.9)
		9.3 (12.5)	30 (22.1)	29.5 (21.8)	19.6	**1FT7068-5WF7❑-1❑❑❑**	5	24.8 (22.0)	20.1 (44.3)
	80	6.28 (8.42)	21 (15.5)	20.5 (15.1)	16	**1FT7082-5WF7❑-1❑❑❑**	5	28.9 (25.6)	20.7 (45.6)
		11 (14.8)	35 (25.8)	35 (25.8)	24.2	**1FT7084-5WF7❑-1❑❑❑**	5	48.3 (42.8)	27.5 (60.6)
		15.4 (20.7)	50 (36.9)	49 (36.1)	36	**1FT7086-5WF7❑-1❑❑❑**	5	67.8 (60.0)	34.1 (75.2)
	100	14.3 (19.2)	50 (36.9)	45.5 (33.6)	38.8	**1FT7102-5WF7❑-1❑❑❑**	5	98.9 (87.5)	36.6 (80.7)
		24.8 (33.3)	90 (66.4)	79 (58.3)	49.5	**1FT7105-5WF7❑-❑❑❑❑**	5	164 (145)	55.9 (123)
		34.2 (45.9)	125 (92.2)	109 (80.4)	60	**1FT7108-5WF7❑-❑❑❑❑**	5	265 (235)	69.6 (153)
4500	63	9.1 (12.2)	20 (14.8)	19.4 (14.0)	20.8	**1FT7066-5WH7❑-1❑❑❑**	5	17.7 (15.7)	16.3 (35.9)
	80	8.95 (12.0)	21 (15.5)	19 (14.0)	23.9	**1FT7082-5WH7❑-1❑❑❑**	5	28.9 (25.6)	20.7 (45.6)
		14.6 (19.6)	35 (25.8)	32 (23.6)	34.5	**1FT7084-5WH7❑-1❑❑❑**	5	48.3 (42.8)	27. 5 (60.6)
		20.3 (27.2)	50 (36.9)	43 (31.7)	38	**1FT7086-5WH7❑-1❑❑❑**	5	67.8 (60.0)	34.1 (75.2)
6000	63	5.8 (7.78)	10 (7.38)	9.2 (6.79)	12.7	**1FT7062-5WK7❑-1❑❑❑**	5	8.1 (7.17)	11 (24.3)
		8.9 (11.9)	16 (11.8)	14.2 (10.5)	20	**1FT7064-5WK7❑-1❑❑❑**	5	12.9 (11.4)	13.7 (30.2)

Type of construction IM B5:	IM B5	Flange 0	0
		Flange 1 (compatible with 1FT6)	1
Connector outlet direction:	Connector size 1 and 1.5	Connector can be rotated	1
	Connector size 3[1)]	Transverse right	1
		Transverse left	2
		Axial NDE	3
		Axial DE	4
Terminal box/ cable entry:[1)]	Top/transverse from right		5
	Top/transverse from left		6
	Top/axial from NDE		7
	Top/axial from DE		8
Encoder systems for motors without DRIVE-CLiQ interface:	Encoder IC2048S/R		N
	Encoder AM2048S/R		M
Encoder systems for motors with DRIVE-CLiQ interface:	Encoder AS24DQI		B
	Encoder AM24DQI		C
	Encoder IC22DQ		D
	Encoder AM22DQ		F
Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	
Fitted key and keyway	Tolerance N	Without	A
Fitted key and keyway	Tolerance N	With	B
Fitted key and keyway	Tolerance R	Without	D
Fitted key and keyway	Tolerance R	With	E
Plain shaft	Tolerance N	Without	G
Plain shaft	Tolerance N	With	H
Plain shaft	Tolerance R	Without	K
Plain shaft	Tolerance R	With	L
Vibration magnitude:	**Degree of protection:**		
Grade A	IP64		0
Grade A	IP65		1
Grade A	IP67		2
Grade R	IP64		3
Grade R	IP65		4
Grade R	IP67		5

1FT7 Compact liquid cooling, standard type

Motor type (repeated)	Effi-ciency[2]	Static current	Calculated power P_{calc}[6]	SINAMICS S120 Motor Module: Rated output current[3]	SINAMICS S120 Motor Module: Booksize format. For additional versions and components, see SINAMICS S120 drive system	Power cable with complete shield. Motor connection (and brake connection) via power connector: Power connector	Cable cross-section[4]	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} for M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Order No.	Size	mm^2	Order No.
1FT7062-5WF7...	91	7.4	3.1 (4.16)	9	6SL312❑-❑TE21-0AA3	1	4 × 1.5	6FX❑002-5❑N01-....
1FT7064-5WF7...	91	11.9	5.0 (6.71)	18	6SL312❑-❑TE21-8AA3	1	4 × 1.5	6FX❑002-5❑N01-....
1FT7066-5WF7...	91	14	6.3 (8.45)	18	6SL312❑-❑TE21-8AA3	1	4 × 1.5	6FX❑002-5❑N01-....
1FT7068-5WF7...	93	19	9.4 (12.6)	18[5]	6SL312❑-❑TE21-8AA3	1	4 × 2.5	6FX❑002-5❑N11-....
1FT7082-5WF7...	94	16	6.6 (8.85)	18	6SL312❑-❑TE21-8AA3	1.5	4 × 2.5	6FX❑002-5❑N31-....
1FT7084-5WF7...	94	23	11.0 (14.8)	30	6SL312❑-1 TE23-0AA3	1.5	4 × 4	6FX❑002-5❑N41-....
1FT7086-5WF7...	94	34	15.7 (21.1)	45	6SL312❑-1 TE24-5AA3	1.5	4 × 6	6FX❑002-5❑N54-....
1FT7102-5WF7...	95	40	15.7 (21.1)	45	6SL312❑-1 TE24-5AA3	1.5	4 × 10	6FX❑002-5❑N64-....
1FT7105-5WF7...	94	53.2	28.3 (38.0)	60	6SL312❑-1 TE26-0AA3	3	4 × 16	6FX❑002-5❑S23-....
1FT7108-5WF7...	95	65	39.3 (52.7)	85	6SL312❑-1 TE28-5AA3	3	4 × 16	6FX❑002-5❑G23-....
1FT7066-5WH7...	91	19.7	9.4 (12.6)	30	6SL312❑-1 TE23-0AA3	1	4 × 2.5	6FX❑002-5❑N11-....
1FT7082-5WH7...	94	24	9.9 (13.3)	30	6SL312❑-1 TE23-0AA3	1.5	4 × 4	6FX❑002-5❑N41-....
1FT7084-5WH7...	94	34.3	16.5 (22.1)	45	6SL312❑-1 TE24-5AA3	1.5	4 × 6	6FX❑002-5❑N54-....
1FT7086-5WH7...	94	40.5	23.6 (31.6)	45	6SL312❑-1 TE24-5AA3	1.5	4 × 10	6FX❑002-5❑N64-....
1FT7062-5WK7...	92	12.5	6.3 (8.5)	18	6SL312❑-❑TE21-8AA3	1	4 × 1.5	6FX❑002-5❑N01-....
1FT7064-5WK7...	92	20.2	10.1 (13.5)	30	6SL312❑-1 TE23-0AA3	1	4 × 2.5	6FX❑002-5❑N11-....

Cooling:
Internal air cooling **0**
External air cooling **1**

Motor Module:
Single Motor Module **1**
Double Motor Module **2**

Power cable:
MOTION-CONNECT 800 **8**
MOTION-CONNECT 500 **5**

Without brake cores **C**
With brake cores **D**

Length code **....**

Information about application, configuration and cable extensions can be found under Connection system MOTION-CONNECT.

1) Connector size 3 cannot be rotated. Terminal box can be chosen alternatively only for connector size 3.

2) Optimum efficiency in continuous duty.

3) With default setting of the pulse frequency.

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

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

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

1FT7 High Dynamic

Rated speed	Shaft height	Rated power	Static torque	Rated torque	Rated current	1FT7 High Dynamic synchronous motors **Standard type**	Number of pole pairs	Moment of inertia of rotor (without brake)	Weight (without brake)
n_{rated}	SH	P_{rated} at ΔT=100 K	M_0 at ΔT=100 K	M_{rated} at ΔT=100 K	I_{rated} at ΔT=100 K			J	m
rpm		kW (HP)	Nm (lb_f-ft)	Nm (lb_f-ft)	A	Order No.		10^{-4} kgm^2 (10^{-3} lb_f-in-s^2)	kg (lb)
Forced ventilation									
3000	63	3.8 (5.10)	14 (10.3)	12 (8.85)	10.5	**1FT7065-7SF7❑-1❑❑❑**	5	6.4 (5.66)	19 (41.9)
		4.4 (5.90)	17 (12.5)	14 (10.3)	13	**1FT7067-7SF7❑-1❑❑❑**	5	8.3 (7.35)	23 (50.7)
	80	7.2 (9.66)	34 (25.1)	23 (17.0)	20	**1FT7085-7SF7❑-1❑❑❑**	5	20.7 (18.3)	34 (75.0)
		10.4 (13.9)	48 (35.4)	33 (24.3)	29	**1FT7087-7SF7❑-1❑❑❑**	5	27.4 (24.3)	42 (92.6)
4500	63	5.2 (6.97)	14 (10.3)	11 (8.11)	13.5	**1FT7065-7SH7❑-1❑❑❑**	5	6.4 (5.66)	19 (41.9)
		6.1 (8.18)	17 (12.5)	13 (9.59)	15	**1FT7067-7SH7❑-1❑❑❑**	5	8.3 (7.35)	23 (50.7)
	80	8.2 (11.0)	34 (25.1)	17.5 (12.9)	22.5	**1FT7085-7SH7❑-1❑❑❑**	5	20.7 (18.3)	34 (75.0)
		10.8 (14.5)	48 (35.4)	23 (17.0)	24	**1FT7087-7SH7❑-❑❑❑❑**	5	27.4 (24.3)	43 (94.8)
Water cooling									
3000	63	5.7 (7.64)	19 (14.0)	18 (13.3)	15	**1FT7065-7WF7❑-1❑❑❑**	5	6.4 (5.66)	16 (35.3)
		7.4 (9.92)	25 (18.4)	23.5 (17.3)	21	**1FT7067-7WF7❑-1❑❑❑**	5	8.3 (7.35)	22 (48.5)
	80	11.9 (16.0)	43 (31.7)	38 (28.0)	32	**1FT7085-7WF7❑-1❑❑❑**	5	20.7 (18.3)	32 (70.6)
		16.0 (21.5)	61 (45.0)	51 (37.6)	43	**1FT7087-7WF7❑-❑❑❑❑**	5	27.4 (24.3)	41 (90.4)
4500	63	7.8 (10.5)	19 (14.0)	16.5 (12.2)	20	**1FT7065-7WH7❑-1❑❑❑**	5	6.4 (5.66)	16 (35.3)
		10.4 (13.9)	25 (18.4)	22 (16.2)	25	**1FT7067-7WH7❑-1❑❑❑**	5	8.3 (7.35)	22 (48.5)
	80	15.6 (20.9)	43 (31.7)	33 (24.3)	48	**1FT7085-7WH7❑-❑❑❑❑**	5	20.7 (18.3)	32 (70.6)
		21.7 (29.1)	61 (45.0)	46 (33.9)	53	**1FT7087-7WH7❑-❑❑❑❑**	5	27.4 (24.3)	41 (90.4)

			Code
Type of construction:	IM B5	Flange 0	0
		Flange 1 (compatible with 1FT6)	1
Connector outlet direction:	Connector size 1 and 1.5	Connector can be rotated	1
	Connector size 3[1]	Transverse right	1
		Transverse left	2
		Axial NDE	3
		Axial DE	4
Terminal box/ cable entry:[1]	Top/transverse from right		5
	Top/transverse from left		6
	Top/axial from NDE		7
	Top/axial from DE		8
Encoder systems for motors without DRIVE-CLiQ interface:	Encoder AM2048S/R		N
	Encoder AM2048S/R		M
Encoder systems for motors with DRIVE-CLiQ interface: (Only with water cooling)	Encoder AS24DQI		B
	Encoder AM24DQI		C
	Encoder IC22DQ		D
	Encoder AM22DQ		F

Shaft extension:	**Shaft and flange accuracy:**	**Holding brake:**	Code
Fitted key and keyway	Tolerance N	Without	A
Fitted key and keyway	Tolerance N	With	B
Fitted key and keyway	Tolerance R	Without	D
Fitted key and keyway	Tolerance R	With	E
Plain shaft	Tolerance N	Without	G
Plain shaft	Tolerance N	With	H
Plain shaft	Tolerance R	Without	K
Plain shaft	Tolerance R	With	L

Vibration magnitude:	**Degree of protection:**	Code
Grade A	IP64	0
Grade A	IP65	1
Grade A	IP67 (Only with water cooling)	2
Grade R	IP64	3
Grade R	IP65	4
Grade R	IP67 (Only with water cooling)	5

1FT7 High Dynamic

Motor type (repeated)	Effi-ciency 2)	Static current	Calculated power P_{calc} 5)	SINAMICS S120 Motor Module: Rated output current 3)	SINAMICS S120 Motor Module: Booksize format. For additional versions and components, see SINAMICS S120 drive system	Power cable with complete shield. Motor connection (and brake connection) via power connector: Power connector	Cable cross-section 4)	Pre-assembled cable
	η	I_0 at M_0 ΔT=100 K	P_{calc} for M_0 ΔT=100 K	I_{rated}				
	%	A	kW (HP)	A	Order No.	Size	mm²	Order No.
1FT7065-7SF7...	92	12	4.4 (5.90)	18	**6SL312□-□TE21-8AA3**	1.5	4 × 1.5	**6FX□002-5□N21-....**
1FT7067-7SF7...	94	15	5.3 (7.11)	18	**6SL312□-□TE21-8AA3**	1.5	4 × 1.5	**6FX□002-5□N21-....**
1FT7085-7SF7...	92	28	10.7 (14.3)	30	**6SL312□-1 TE23-0AA3**	1.5	4 × 4	**6FX□002-5□N41-....**
1FT7087-7SF7...	93	40	15.1 (20.2)	45	**6SL312□-1 TE24-5AA3**	1.5	4 × 10	**6FX□002-5□N64-....**
1FT7065-7SH7...	92	16	6.6 (8.85)	18	**6SL312□-□TE21-8AA3**	1.5	4 × 2.5	**6FX□002-5□N31-....**
1FT7067-7SH7...	94	19	8.0 (10.7)	30	**6SL312□-1 TE23-0AA3**	1.5	4 × 2.5	**6FX□002-5□N31-....**
1FT7085-7SH7...	92	40	16.0 (21.5)	45	**6SL312□-1 TE24-5AA3**	1.5	4 × 10	**6FX□002-5□N64-....**
1FT7087-7SH7...	93	45	22.6 (30.3)	45	**6SL312□-1 TE24-5AA3**	3	4 × 10	**6FX□002-5□S14-....**
1FT7065-7WF7...	92	16	6.0 (8.05)	18	**6SL312□-□TE21-8AA3**	1.5	4 × 2.5	**6FX□002-5□N31-....**
1FT7067-7WF7...	94	22	7.9 (10.6)	30	**6SL312□-1 TE23-0AA3**	1.5	4 × 4	**6FX□002-5□N41-....**
1FT7085-7WF7...	93	36	13.5 (18.1)	45	**6SL312□-1 TE24-5AA3**	1.5	4 × 6	**6FX□002-5□N54-....**
1FT7087-7WF7...	94	51	19.2 (25.7)	60	**6SL312□-1 TE26-0AA3**	3	4 × 16	**6FX□002-5□S23-....**
1FT7065-7WH7...	92	22	9.0 (12.1)	30	**6SL312□-1 TE23-0AA3**	1.5	4 × 4	**6FX□002-5□N41-....**
1FT7067-7WH7...	94	28	11.8 (15.8)	30	**6SL312□-1 TE23-0AA3**	1.5	4 × 4	**6FX□002-5□N41-....**
1FT7085-7WH7...	94	58	20.3 (27.2)	60	**6SL312□-1 TE26-0AA3**	3	4 × 16	**6FX□002-5□S23-....**
1FT7087-7WH7...	94	67	28.7 (38.5)	85	**6SL312□-1 TE28-5AA3**	3	4 × 25	**6FX□002-5DG33-....**

Cooling:	
Internal air cooling	**0**
External air cooling	**1**
Motor Module:	
Single Motor Module	**1**
Double Motor Module	**2**

Power cable:	
MOTION-CONNECT 800	**8**
MOTION-CONNECT 500	**5**
Without brake cores	**C**
With brake cores	**D**
Length code	**....**

Information about application, configuration and cable extensions can be found under Connection system MOTION-CONNECT.

1) Connector size 3 cannot be rotated. Terminal box can be chosen alter natively only for connector size 3.

2) Optimum efficiency in continuous dut y.

3) With default setting of the pulse frequency.

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

5) $P_{calc}\,[\text{kW}] = \dfrac{M_0\,[\text{Nm}] \times n_{rated}}{9550}$ $\quad P_{calc}\,[\text{HP}] = \dfrac{M_0\,[\text{lb}_f\text{-in}] \times n_{rated}}{63000}$

1.6 Motor overview/Assignment of Motor Module

Table 1- 3 Naturally cooled motors

Motor type	n_N [rpm]	$M_{N\ (100K)}$ [Nm]	$I_{N\ (100K)}$ [A]	$M_{0\ (100K)}$ [Nm]	$I_{0\ (100K)}$ [A]	$n_{max\ mech}$ [rpm]	SINAMICS Motor Module	
							I_N [A]	Order no.
1FT7034-❑AK7	6000	1.4	2.1	2	2.7	10000	3	6SL112❑-❑TE13-0AA❑
1FT7036-❑AK7	6000	1.7	2.4	3	4	10000	5	6SL112❑-❑TE15-0AA❑
1FT7042-❑AF7	3000	2.7	2.1	3	2.1	9000	3	6SL112❑-❑TE13-0AA❑
1FT7042-❑AK7	6000	2	3	3	3.9	9000	5	6SL112❑-❑TE15-0AA❑
1FT7044-❑AF7	3000	4.3	2.6	5	2.8	9000	3	6SL112❑-❑TE13-0AA❑
1FT7044-❑AK7	6000	2	2.5	5	5.7	9000	9	6SL112❑-❑TE21-0AA❑
1FT7046-❑AF7	3000	5.6	3.5	7	4	9000	5	6SL112❑-❑TE15-0AA❑
1FT7046-❑AH7	4500	2.4	3.2	7	8.1	9000	9	6SL112❑-❑TE21-0AA❑
1FT7062-❑AF7	3000	5.4	3.9	6	3.9	9000	5	6SL112❑-❑TE15-0AA❑
1FT7062-❑AK7	6000	3.3	5.4	6	8.4	9000	9	6SL112❑-❑TE21-0AA❑
1FT7064-❑AF7	3000	7.6	5.2	9	5.7	9000	9	6SL112❑-❑TE21-0AA❑
1FT7064-❑AK7	6000	2.9	3.4	9	9	9000	9	6SL112❑-❑TE21-0AA❑
1FT7066-❑AF7	3000	9.3	7.2	12	8.4	9000	9	6SL112❑-❑TE21-0AA❑
1FT7066-❑AH7	4500	5	6.3	12	13.6	9000	18	6SL112❑-❑TE21-8AA❑
1FT7068-❑AF7	3000	10.9	6.7	15	8.3	9000	9	6SL112❑-❑TE21-0AA❑
1FT7082-❑AC7	2000	11.4	4.9	13	5	8000	5	6SL112❑-❑TE15-0AA❑
1FT7082-❑AF7	3000	10.3	6.6	13	7.6	8000	9	6SL112❑-❑TE21-0AA❑
1FT7082-❑AH7	4500	8	7.8	13	12.3	8000	18	6SL112❑-❑TE21-8AA❑
1FT7084-❑AC7	2000	16.9	8.4	20	9	8000	9	6SL112❑-❑TE21-0AA❑
1FT7084-❑AF7	3000	14.5	8.5	20	11	8000	18	6SL112❑-❑TE21-8AA❑
1FT7084-❑AH7	4500	9.5	7.8	20	15.6	8000	18	6SL112❑-❑TE21-8AA❑
1FT7086-❑AC7	2000	22.5	9.2	28	10.6	8000	18	6SL112❑-❑TE21-8AA❑
1FT7086-❑AF7	3000	18	11	28	15.5	8000	18	6SL112❑-❑TE21-8AA❑
1FT7086-❑AH7	4500	10	10	28	22.4	8000	30	6SL112❑-❑TE23-0AA❑
1FT7102-❑AB7	1500	26	8	30	9	6000	9	6SL112❑-❑TE21-0AA❑
1FT7102-❑AC7	2000	24	10	30	12.5	6000	18	6SL112❑-❑TE21-8AA❑
1FT7102-❑AF7	3000	20	12	30	18	6000	18	6SL112❑-❑TE21-8AA❑
1FT7105-❑AB7	1500	42	13	50	15	6000	18	6SL112❑-❑TE21-8AA❑
1FT7105-❑AC7	2000	38	15	50	18	6000	18	6SL112❑-❑TE21-8AA❑
1FT7105-❑AF7	3000	28	15	50	26	6000	30	6SL112❑-❑TE23-0AA❑
1FT7108-❑AB7	1500	61	16	70	18	6000	18	6SL112❑-❑TE21-8AA❑
1FT7108-❑AC7	2000	50	18	70	25	6000	30	6SL112❑-❑TE23-0AA❑
1FT7108-❑AF7	3000	20	12	70	36	6000	45	6SL312❑-1TE24-5AA□

MLFB for SINAMICS Motor Module 6SL312 □ - □TE□ - □AA□

0 = Internal air cooling
1 = External air cooling

1 = Motor Module in 1-axis version
2 = Motor Module in 2-axis version
(possible up to 18 A)

Table 1- 4 Motors with forced ventilation

Motor type	n_N [rpm]	$M_{N\ (100K)}$ [Nm]	$I_{N\ (100K)}$ [A]	$M_{0\ (100K)}$ [Nm]	$I_{0\ (100K)}$ [A]	$n_{max\ mech}$ [rpm]	SINAMICS Motor Module	
							I_N [A]	Order no.
1FT7084-5SC7	2000	24	13.5	27	15	8000	18	6SL312❑-❑TE21-8AA3
1FT7084-5SF7	3000	23	18.5	27	21	8000	30	6SL312❑-❑TE23-0AA3
1FT7084-5SH7	4500	21	24.5	27	30.5	8000	30	6SL312❑-❑TE23-0AA3
1FT7086-5SC7	2000	32	17	36	19.5	8000	30	6SL312❑-❑TE23-0AA3
1FT7086-5SF7	3000	29	24	36	29	8000	30	6SL312❑-❑TE23-0AA3
1FT7086-5SH7	4500	25	25	36	34	8000	45	6SL312❑-1TE24-5AA3
1FT7105-5SC7	2000	56	29	65	31	6000	45	6SL312❑-1TE24-5AA3
1FT7105-5SF7	3000	48	35	65	45	6000	45	6SL312❑-1TE24-5AA3
1FT7108-5SC7	2000	73	33	91	39	6000	45	6SL312❑-1TE24-5AA3
1FT7108-5SF7	3000	60	38	91	57	6000	60	6SL312❑-1TE26-0AA3

MLFB for SINAMICS Motor Module 6SL312 ❑ - ❑TE❑ - ❑AA❑

0 = Internal air cooling
1 = External air cooling

1 = Motor Module in 1-axis version
2 = Motor Module in 2-axis version
(possible up to 18 A)

Table 1- 5 Liquid cooled motors

Motor type	n_N [rpm]	$M_{N\ (100K)}$ [Nm]	$I_{N\ (100K)}$ [A]	$M_{0\ (100K)}$ [Nm]	$I_{0\ (100K)}$ [A]	$n_{max\ mech}$ [rpm]	SINAMICS Motor Module	
							I_N [A]	Order no.
1FT7062-5WF7	3000	10	7.8	10	7.4	9000	9	6SL312❑-❑TE21-8AA3
1FT7062-5WK7	6000	9.2	12.7	10	12.5	9000	18	6SL312❑-❑TE21-8AA3
1FT7064-5WF7	3000	16	12.5	16	11.9	9000	18	6SL312❑-❑TE21-8AA3
1FT7064-5WK7	6000	14.2	20	16	20.2	9000	30	6SL312❑-❑TE23-0AA3
1FT7066-5WF7	3000	19.6	14.4	20	14.0	9000	18	6SL312❑-❑TE21-8AA3
1FT7066-5WH7	4500	19.4	20.8	20	19.7	9000	30	6SL312❑-❑TE23-0AA3
1FT7068-5WF7	3000	29.6	19.6	30	19.0	9000	18	6SL312❑-❑TE21-8AA3
1FT7082-5WC7	2000	21	11	21	10.7	8000	18	6SL312❑-❑TE21-8AA3
1FT7082-5WF7	3000	20.5	16	21	16	8000	18	6SL312❑-❑TE21-8AA3
1FT7082-5WH7	4500	19	23.9	21	24	8000	30	6SL312❑-1TE23-0AA3
1FT7084-5WC7	2000	35	17	35	16.5	8000	18	6SL312❑-❑TE21-8AA3
1FT7084-5WF7	3000	35	24.2	35	23	8000	30	6SL312❑-1TE23-0AA3
1FT7084-5WH7	4500	32	34.5	35	34.3	8000	45	6SL312❑-1TE24-5AA3
1FT7086-5WC7	2000	50	24	50	23	8000	30	6SL312❑-1TE23-0AA3
1FT7086-5WF7	3000	49	36	50	34	8000	45	6SL312❑-1TE24-5AA3
1FT7086-5WH7	4500	43	38	50	40.5	8000	45	6SL312❑-1TE24-5AA3
1FT7102-5WB7	1500	50	20.3	50	17.8	6000	18	6SL312❑-❑TE21-8AA3
1FT7102-5WC7	2000	49.5	29.3	50	25.5	6000	30	6SL312❑-1TE23-0AA3
1FT7102-5WF7	3000	45.5	38.8	50	40.0	6000	45	6SL312❑-1TE24-5AA3
1FT7105-5WB7	1500	90	29.5	90	28.2	6000	30	6SL312❑-1TE23-0AA3

Motor type	n_N [rpm]	$M_{N\ (100K)}$ [Nm]	$I_{N\ (100K)}$ [A]	$M_{0\ (100K)}$ [Nm]	$I_{0\ (100K)}$ [A]	$n_{max\ mech}$ [rpm]	SINAMICS Motor Module	
							I_N [A]	Order no.
1FT7105-5WC7	2000	90	40.8	90	39.0	6000	45	6SL312❑-1TE24-5AA3
1FT7105-5WF7	3000	79	49.5	90	53.2	6000	60	6SL312❑-1TE26-0AA3
1FT7108-5WB7	1500	125	40.3	125	39.0	6000	45	6SL312❑-1TE24-5AA3
1FT7108-5WC7	2000	125	47.5	125	45.3	6000	45	6SL312❑-1TE24-5AA3
1FT7108-5WF7	3000	109	60.0	125	65.0	6000	85	6SL312❑-1TE28-5AA3

MLFB for SINAMICS Motor Module 6SL312 □ - □TE□ - □AA□

0 = Internal air cooling
1 = External air cooling

1 = Motor Module in 1-axis version
2 = Motor Module in 2-axis version
(possible up to 18 A)

Table 1- 6 1FT7 High Dynamic, motors with forced ventilation and liquid-cooled motors

Motor type	n_N [rpm]	$M_{N\ (100K)}$ [Nm]	$I_{N\ (100K)}$ [A]	$M_{0\ (100K)}$ [Nm]	$I_{0\ (100K)}$ [A]	$n_{max\ mech}$ [rpm]	SINAMICS Motor Module	
							I_N [A]	Order no.
Motors with forced ventilation								
1FT7065-7SF7	3000	12	10.5	14	12	9000	18	6SL312❑-❑TE21-8AA3
1FT7065-7SH7	4500	5.2	13.5	14	16	9000	18	6SL312❑-❑TE21-8AA3
1FT7067-7SF7	3000	14	13	17	15	9000	18	6SL312❑-❑TE21-8AA3
1FT7067-7SH7	4500	13	15	17	19	9000	18	6SL312❑-❑TE21-8AA3
1FT7085-7SF7	3000	23	20	34	28	8000	30	6SL312❑-1TE23-0AA3
1FT7085-7SH7	4500	17.5	22.5	34	40	8000	45	6SL312❑-1TE24-5AA3
1FT7087-7SF7	3000	33	29	48	40	8000	45	6SL312❑-1TE24-5AA3
1FT7087-7SH7	4500	23	24	48	45	8000	45	6SL312❑-1TE24-5AA3
Liquid cooled motors								
1FT7065-7WF7	3000	18	15	19	16	9000	18	6SL312❑-❑TE21-8AA3
1FT7065-7WH7	4500	16.5	20	19	22	9000	30	6SL312❑-1TE23-0AA3
1FT7067-7WF7	3000	23.5	21	25	22	9000	30	6SL312❑-1TE23-0AA3
1FT7067-7WH7	4500	22	25	25	28	9000	30	6SL312❑-1TE23-0AA3
1FT7085-7WF7	3000	38	32	43	36	8000	45	6SL312❑-1TE24-5AA3
1FT7085-7WH7	4500	33	48	43	58	8000	60	6SL312❑-1TE26-0AA3
1FT7087-7WF7	3000	51	43	61	51	8000	60	6SL312❑-1TE26-0AA3
1FT7087-7WH7	4500	46	53	61	67	8000	85	6SL312❑-1TE28-5AA3

MLFB for SINAMICS Motor Module 6SL312 □ - □TE□ - □AA□

0 = Internal air cooling
1 = External air cooling

1 = Motor Module in 1-axis version
2 = Motor Module in 2-axis version
(possible up to 18 A)

2 Configuration

2.1 Configuration tool SIZER for SIEMENS Drives

Overview

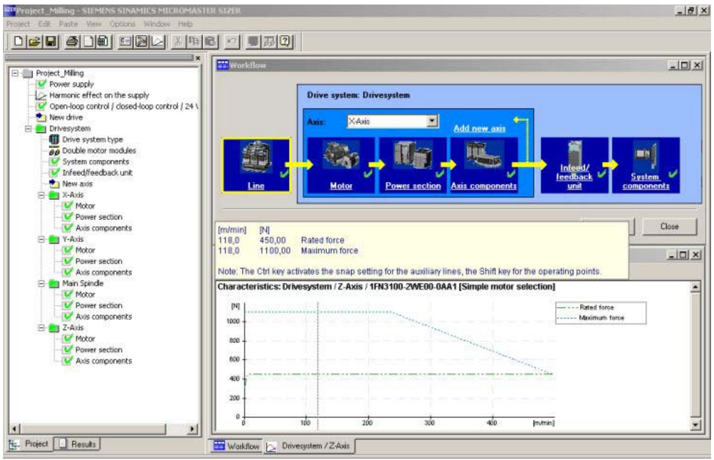


Figure 2-1 SIZER for SIEMENS Drives

The user-friendly configuration of the SINAMICS drive family is carried out using the configuration tool SIZER for SIEMENS Drives. It provides support for the technical planning of the hardware and firmware components required for a drive task. SIZER for SIEMENS Drives covers the full range of operations required to configure a complete drive system, from simple single drives to complex multi-axis applications.

SIZER for SIEMENS Drives supports all the configuration steps in a single workflow:

- Configuring the power supply
- Designing the motor and gearbox, including calculation of mechanical transmission elements
- Configuring the drive components
- Compiling the required accessories
- Selection of the line-side and motor-side power options

When SIZER for SIEMENS Drives was being designed, particular importance was placed on a high degree of usability and a holistic, function-based approach to the drive application. The extensive user navigation makes it easy to use the tool. Status information keeps you continually informed about how engineering is progressing.

The SIZER for SIEMENS Drives user interface is available in German and English. The drive configuration is saved in a project. In the project, the components and functions used are displayed in a hierarchical tree structure. The project view permits the configuration of drive systems and the copying/inserting/modifying of drives already configured.

The configuration process produces the following results:

- Parts list of components required (Export to Excel)
- Technical specifications of the system
- Characteristics
- Comments on system reactions
- Location diagram of drive and control components and dimension drawings

These results are displayed in a results tree and can be reused for documentation purposes. User support is provided by technological online help, which provides the following information:

- Detailed technical data
- Information about the drive systems and their components
- Decision-making criteria for the selection of components.

Table 2- 1 Order number for SIZER for SIEMENS Drives

Configuration tool	Order number (MLFB) of the DVD
SIZER for SIEMENS Drives German/English	6SL3070-0AA00-0AG0

Minimum system requirements

- PC or PG with Pentium™ III 800 MHz (recommended > 1 GHz)
- 512 MB RAM (1 GB recommended)
- At least 4.1 GB free hard disk space
- In addition, 100 MB free hard disk space on the Windows system drive
- Screen resolution 1024 × 768 pixels (1280 x 1024 pixels recommended)
- Windows™ XP Prof SP2, XP Home SP2, XP 64 Bit SP2, Vista Business
- Microsoft Internet Explorer 5.5 SP2

2.2 STARTER drive/commissioning software

The STARTER commissioning tool provides

- Commissioning
- Optimization
- Diagnostics

Table 2- 2 Order number for STARTER

Commissioning tool	Order number (MLFB) of the DVD
STARTER German, English, French, Italian, Spanish	6SL3072-0AA00-0AG0

Minimum system requirements

- Hardware
  - PG or PC with Pentium III min. 800 MHz (recommended > 1 GHz)
  - 512 MB RAM (1 GB recommended)
  - Screen resolution 1024 × 768 pixels, 16-bit color depth
  - Free hard disk memory: min. 2 GB;
- Software
  - Microsoft Windows 2000 SP4
  - Microsoft Windows Server 2003 SP1 and SP2 (PCS7)
  - Microsoft Windows XP Professional SP2 and SP3
  - Microsoft Windows VISTA Business SP1 *)
  - Microsoft Windows VISTA Ultimate SP1 *)
  - Microsoft Internet Explorer V6.0 or higher

*) DCC cannot be used.
STARTER can be used on these operating systems only if it does not include the DCC option.

2.3 SinuCom commissioning tool

The simple-to-use commissioning software SinuCom is used for the commissioning of SINUMERIK controls in combination with the SINAMICS S120 drives and SIMODRIVE 611 digital.

Table 2- 3 Order number for SinuCom

Commissioning tool	Order number (MLFB) of the DVD
SinuCom German, English, French, Italian, Spanish	6FC5862-2YC00-0YA0

2.4 Procedure when engineering

Motion control

Drives are optimized for motion control applications. They execute linear or rotary movements within a defined movement cycle. All movements should be optimized in terms of time.

As a result, drives must meet the following requirements:

- High dynamic response, i.e. short rise times
- Capable of overload, i.e. a high reserve for accelerating
- Wide control range, i.e. high resolution for precise positioning.

The following table "Configuring procedure" is valid for synchronous and induction motors.

General configuring procedure

The function description of the machine provides the basis when configuring the drive application. The definition of the components is based on physical interdependencies and is usually carried out as follows:

Table 2- 4 Configuring procedure

Step	Description of the configuring activity	
1.	Clarification of the type of drive	Refer to the next chapter
2.	Definition of supplementary conditions and integration into an automation system	
3.	Definition of the load, calculation of the maximum load torque and selection of the motor	
4.	Selection of the SINAMICS Motor Module	Refer to catalog
5.	Steps 3 and 4 are repeated for additional axes	
6.	Calculation of the required DC link power and selection of the SINAMICS Line Module	
7.	Selection of the line-side options (main switch, fuses, line filters, etc.)	
8.	Specification of the required control performance and selection of the Control Unit, definition of component cabling	
9.	Definition of other system components (e.g. braking resistors)	
10.	Calculation of the current demand of the 24 V DC supply for the components and specification of the power supplies (SITOP devices, Control Supply Modules)	
11.	Selection of the components for the connection system	
12.	Configuration of the drive line-up components	
13.	Calculation of the required cable cross sections for power supply and motor connections	
14.	Inclusion of mandatory installation clearances	

2.4.1 Clarification of the type of drive

The motor is selected on the basis of the required torque, which is defined by the application, e.g. traveling drives, hoisting drives, test stands, centrifuges, paper and rolling mill drives, feed drives or main spindle drives. Gearboxes to convert motion or to adapt the motor speed and motor torque to the load conditions must also be considered.

As well as the load torque, which is determined by the application, the following mechanical data is among those required to calculate the torque to be provided by the motor:

- Masses to be moved
- Diameter of the drive wheel
- Leadscrew pitch, gear ratios
- Frictional resistance
- Mechanical efficiency
- Traversing paths
- Maximum velocity
- Maximum acceleration and maximum deceleration
- Cycle time

2.4.2 Defining the supplementary conditions and integration into an automation system

You must decide whether synchronous or induction motors are to be used.

Synchronous motors are the best choice if it is important to have low envelope dimensions, low rotor moment of inertia and therefore maximum dynamic response ("Servo" control type).

Induction motors can be used to increase maximum speeds in the field weakening range. Induction motors for higher power ratings are also available.

The following factors are especially important when engineering a drive application:

- The line system configuration, when using specific types of motor and/or line filters on IT systems (non-grounded systems)
- The utilization of the motor in accordance with rated values for winding temperature rise 60 K or 100 K (for synchronous motors).
- The ambient temperatures and the installation altitude of the motors and drive components.
- Heat dissipation from the motors through natural ventilation, forced ventilation or water cooling

Other constraints apply when integrating the drives into an automation environment such as SINUMERIK or SIMOTION.

For motion control and technology functions (e.g. positioning), as well as for synchronous operation functions, the corresponding automation system, e.g. SIMOTION D, is used.

2.4.3 Definition of the load, calculation of max. load torque and definition of the motor

The motor-specific limiting characteristics provide the basis for defining the motors.

These define the torque or power characteristic versus the speed and take into account the motor limits based on the DC link voltage. The DC link voltage is dependent on the line voltage. In the case of torque drive the DC link voltage is dependent on the type of Line Module and the type of infeed module or infeed/regenerative feedback module.

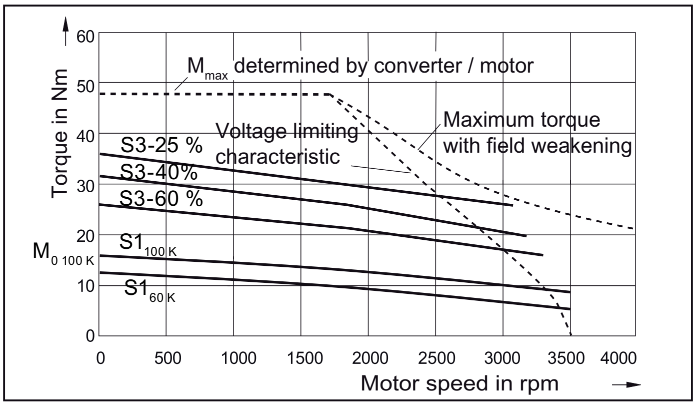


Figure 2-2 Limit characteristics for synchronous motors

The motor is selected based on the load which is specified by the application. Different characteristic curves must be used for different load events.

The following operating scenarios have been defined:

- Load duty cycle with constant ON period
- Load duty cycles with varying ON period
- Free duty cycle

The objective is to identify characteristic torque and speed operating points, on the basis of which the motor can be selected depending on the particular load.

Once the operating scenario has been defined and specified, the maximum motor torque is calculated. Generally, the maximum motor torque is required when accelerating. The load torque and the torque required to accelerate the motor are added.

The maximum motor torque is then verified with the limiting characteristic curves of the motors.

The following criteria must be taken into account when selecting the motor:

- The dynamic limits must be adhered to, i.e., all speed-torque points of the relevant load event must lie below the relevant limiting characteristic curve.
- The thermal limits must be adhered to, i.e. the RMS motor torque at the average motor speed resulting from the duty cycle must lie below the S1 characteristic curve (continuous duty).

Load duty cycles with constant on period

For duty cycles with constant ON period, there are specific requirements for the torque characteristic curve as a function of the speed, for example:

M = constant, M ~ n^2, M ~ n or P = constant.

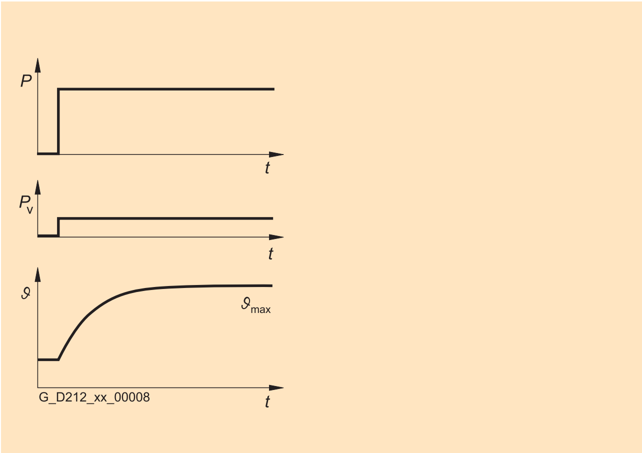


Figure 2-3 S1 duty (continuous operation)

These drives typically operate at a specific operating point. Drives such as these are dimensioned for a base load. The base load torque must lie below the S1 characteristic curve. In the event of transient overloads (e.g. when accelerating) an overload has to be taken into consideration. The overload current must be calculated relative to the required overload torque. The peak torque must lie below the voltage limiting characteristic.

In summary, the motor is selected as follows:

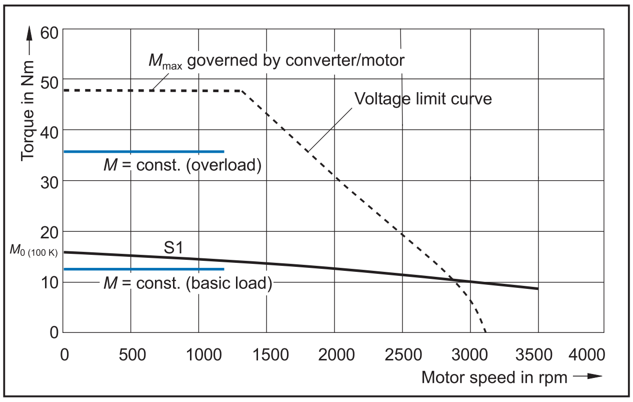


Figure 2-4 Selection of motors for load duty cycles with constant on period (examples)

Load duty cycles with varying on period

As well as continuous duty (S1), standard intermittent duty types (S3) are also defined for load duty cycles with varying on periods. This involves operation that comprises a sequence of similar load cycles, each of which comprises a time with constant load and an off period.

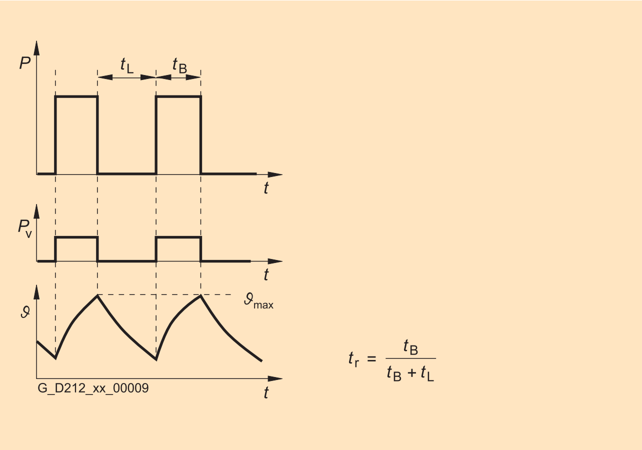


Figure 2-5 S3 duty (intermittent operation without influencing starting)

Fixed variables are usually used for the relative on period:

- S3 – 60%
- S3 – 40%
- S3 – 25%

The corresponding motor characteristics are provided for these specifications. The load torque must lie below the corresponding thermal limiting characteristic curve of the motor. An overload must be taken into consideration for load duty cycles with varying on periods.

Free duty cycle

A load duty cycle defines the characteristics of the motor speed and the torque with respect to time.

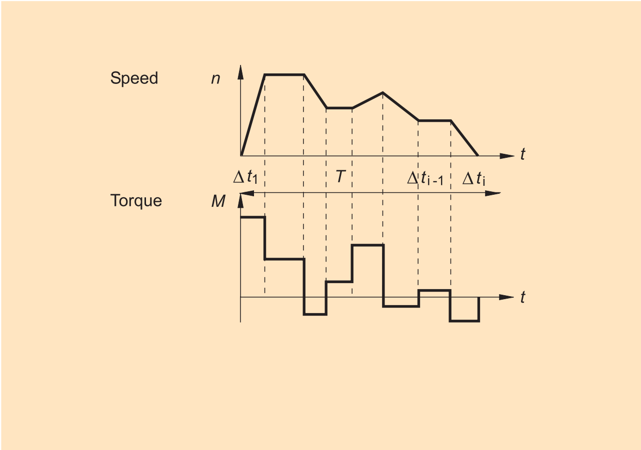


Figure 2-6 Example of a load duty cycle

A load torque is specified for each time period. In addition to the load torque, the average load moment of inertia and motor moment of inertia must be taken into account for acceleration. It may be necessary to take into account a frictional torque that opposes the direction of motion.

When a gearbox is mounted:
The gear ratio and gear efficiency must be taken into account when calculating the load and/or accelerating torque to be provided by the motor. A higher gear ratio increases positioning accuracy in terms of encoder resolution. For any given motor encoder resolution, as the gear ratio increases, so does the resolution of the machine position to be detected.

Note

The following formulas can be used for duty cycles outside the field weakening range. For duty cycles in the field weakening range, the drive system must be engineered using the SIZER engineering tool.

For the motor torque in a time slice Δt_i the following applies:

$$M_{\text{Mot, i}} = \left(J_M + J_G\right) \bullet \frac{2\pi}{60} \bullet \frac{\Delta n_{\text{Last, i}}}{\Delta t_i} \bullet i + \left(J_{\text{Last}} \bullet \frac{2\pi}{60} \bullet \frac{\Delta n_{\text{Last, i}}}{\Delta t_i} + M_{\text{Last, i}} + M_R\right) \bullet \frac{1}{i \bullet \eta_G}$$

The motor speed is:

$$n_{\text{Mot, i}} = n_{\text{Last, i}} \bullet i$$

The RMS torque is obtained as follows:

$$M_{\text{Mot, eff}} = \sqrt{\frac{\sum M_{\text{Mot, i}}^2 \bullet \Delta t_i}{T}}$$

The average motor speed is calculated as follows:

$$n_{\text{Mot, mittel}} = \frac{\sum \frac{n_{\text{Mot, k, A}} + n_{\text{Mot, k, E}}}{2} \bullet \Delta t_i}{T}$$

J_M	Motor moment of inertia
J_G	Gearbox moment of inertia
J_{load}	Load moment of inertia
n_{Load}	Load speed
i	Gear ratio
η_G	Gearbox efficiency
M_{load}	Load torque
M_R	Frictional torque
T	Cycle time, clock cycle time
A; E	Initial value, final value in time slice Δt_i
t_e	ON period
Δt_i	Time interval

The RMS torque M_{rms} must lie below the S1 curve.

The maximum torque M_{max} is produced during the acceleration operation. M_{max} must lie below the voltage limiting characteristic curve. In summary, the motor is selected as follows:

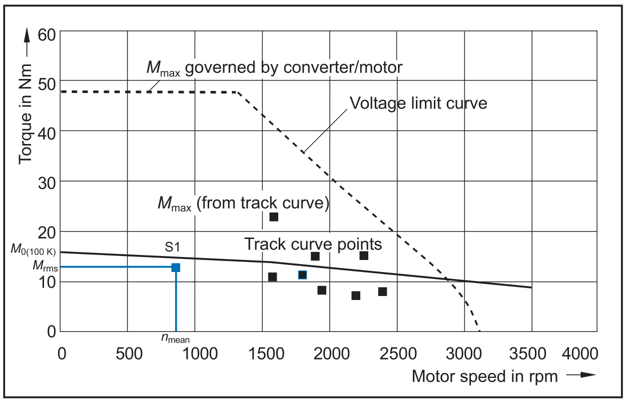


Figure 2-7 Selecting motors depending on the load duty cycle (example)

Specification of the motor

Through variation, it is now possible to identify a motor which meets the requirements of the application (duty cycle).

In a second step, a check is made as to whether the thermal limits are maintained. To do this, the motor current at the base load must be calculated. The calculation depends on the type of motor used (synchronous motor, induction motor) and the particular application (duty cycle). When configuring according to duty cycle with constant ON period with overload, the overload current must be calculated relative to the required overload torque.

Finally, the other motor features must be defined by configuring the motor options.

Mechanical properties of the motors 3

3.1 Cooling

3.1.1 Natural cooling

For naturally cooled motors, the heat loss is dissipated through thermal conduction, radiation and natural convection. As a consequence, adequate heat dissipation must be guaranteed by suitably mounting the motor.

To ensure sufficient cooling, a minimum clearance of 100 mm from adjacent components must be observed on three sides.

The rated data only applies when the ambient temperature does not exceed 40 °C (104 °F) as a result of the installation conditions.

3.1.2 Forced ventilation

This cooling method is implemented by means of a separate ventilation module equipped with a ventilator that operates independently of the motor. The fan is available with degree of protection IP54.

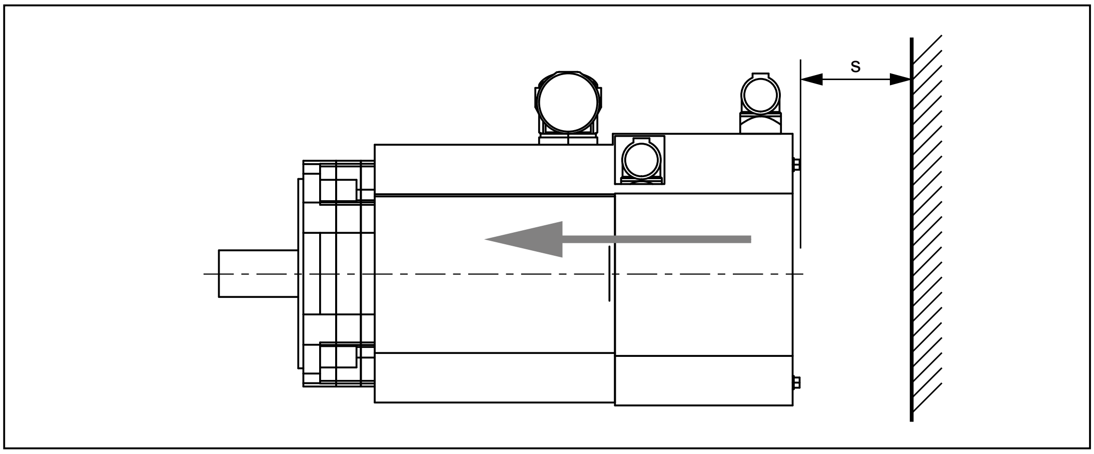
DANGER

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

NOTICE

Steps must be taken to ensure that the motor is always operated in conjunction with the separately driven fan.

The motors must be arranged in such a way that the cooling air can flow in and out without obstruction and that the minimum clearance s between the inlet/outlet air openings and adjacent components is maintained (see "Minimum clearance" diagram below).



s A minimum clearance of 30 mm applies for SH 63 and SH 80.
A minimum clearance of 50 mm applies for SH 100.

Figure 3-1 Minimum clearance s

Steps must be taken to ensure that hot outlet air cannot be drawn back into the system. The direction of air flow is from the non-drive end (NDE) to the drive end (DE). The fan may only be operated with normal ambient air, as air containing chemical or conductive impurities could cause the fan to fail prematurely. Deposits from contaminated air could result in poor heat transfer at the motor or could cause the cooling-air duct to become clogged, leading to an overheated motor.

To remove the fan cover and connect the signal connector when the motor is installed, a minimum clearance of 125 mm must be available.

WARNING

Suction hazard

There is a danger of being drawn into the machine (by means of hair, ties, loose items, etc.) at the air inlet. Suitable protective measures must be taken to guard against this: wear a hairnet, take off ties, keep the suction area clear, etc.

Mechanical changes to the motors compared to natural cooling

- The power connector is about 12 mm higher.
- A sheet metal envelope is pushed over the motor frame from the non-drive end. The axial fan is mounted in this sheet metal envelope. There is a cut-out in the sheet metal envelope at the connector positions. This means that the motor is only partially cooled by the air flow (three-sided ventilation).
- For the motor dimensions, refer to the dimension drawings.
- With forced ventilation, the signal connector is not rotatable (seeConnecting the external fan).

3.1.3 Liquid cooling

⚠ WARNING
The equipment must be safely disconnected from the supply before any installation or service work is carried out on cooling water circuit components. Only qualified personnel may design, install and commission the cooling circuit.

3.1.3.1 Cooling circuit

The electrochemical processes that take place in a cooling system must be minimized by choosing the right materials. For this reason, mixed installations, i.e. a combination of different materials, such as copper, brass, iron, or halogenated plastic (PVC hoses and seals), should not be used or limited to the absolutely essential minimum.

A differentiation is made between 3 different cooling circuits:

- Closed cooling circuit
- Semi-open cooling circuit
- Open cooling circuit

Table 3- 1 Description of the various cooling circuits

Definition	Description
Closed cooling circuit	The pressure equalizing tank is closed (oxygen cannot enter the system) and has a pressure relief valve. The coolant is only routed in the motors and converters as well as the components required to dissipate heat.
Semi-open cooling circuit	Oxygen can only enter the cooling system through the pressure equalization tank, otherwise the same as "closed cooling circuit".
Open cooling circuit (tower system)	The coolant is cooled in a tower. In this case, there is intensive oxygen contact.

Note

Cooling circuits

Only closed and semi-open cooling circuits are permissible for motors. Converter systems must be connected before the motors in the cooling circuit.

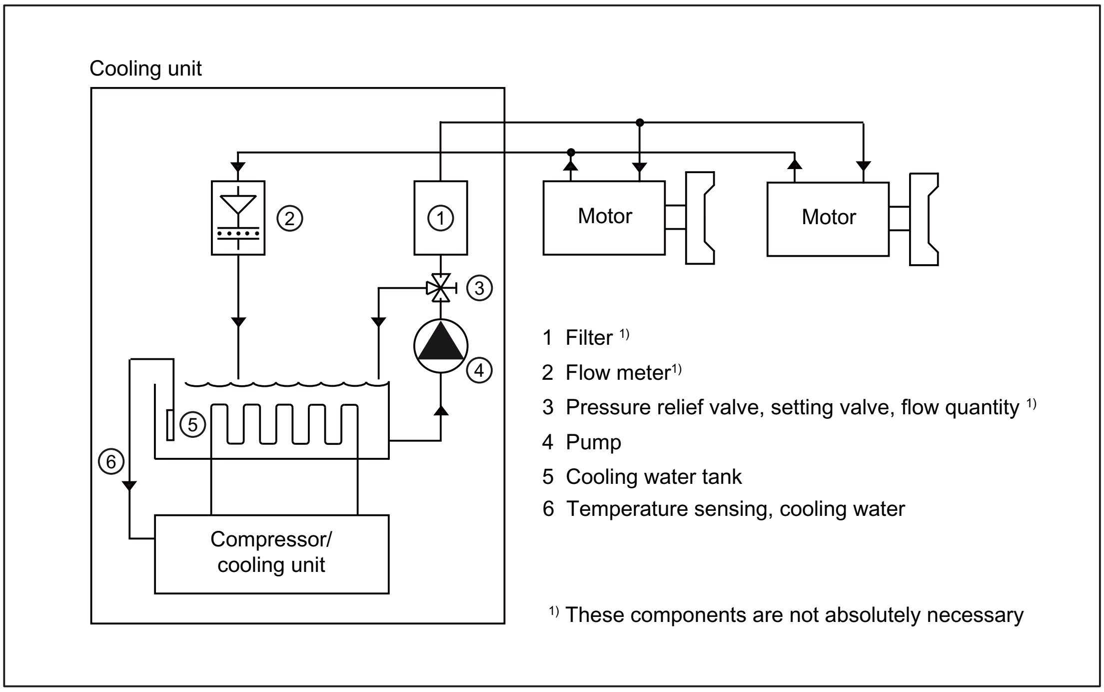


Figure 3-2 Example of a semi-open cooling circuit

Equipotential bonding

All components in the cooling system (motor, heat exchanger, piping system, pump, pressure equalization tank, etc.) must be connected to an equipotential bonding system. This is implemented using a copper bar or finely stranded copper cable with the appropriate cable cross-sections.

NOTICE
Under no circumstances may the cooling water pipes come into contact with live components. There must always be an isolating clearance of > 13 mm! The pipes must be securely mounted and checked for leaks.

Materials used in the motor cooling circuit

The materials used in the cooling circuit must be coordinated with the materials in the motor.

Table 3- 2 Materials used in the motor cooling circuit

Shaft height	Bearing shield	Pipes in the stator
1FT706x	Cast iron (EN-GJL-200)	Stainless steel
1FT708x	Cast iron (EN-GJL-200)	Stainless steel
1FT710x	Cast iron (EN-GJL-200)	Stainless steel

Materials and components in the cooling circuit

The following table lists a wide variety of materials and components which may or may not be used in a cooling circuit.

Table 3- 3 Materials and components of a cooling circuit

Material	Used as	Description
Zinc	Pipes, valves and fittings	Use is not permitted.
Brass	Pipes, valves and fittings	Can be used in closed circuits with inhibitor.
Copper	Pipes, valves and fittings	Can be used only in closed circuits with inhibitors in which the heat sink and copper component are separated (e.g. connection hose on units).
Common steel (e.g. St37)	Pipes	Permissible in closed circuits and semi-open circuits with inhibitors or Antifrogen N, check for oxide formation, inspection window recommended.
Cast steel, cast iron	Pipes, motors	Closed circuit and use of strainers and flushback filters. Fe separator for stainless heat sink.
High-alloy steel, Group 1 (V2A)	Pipes, valves and fittings	Can be used for drinking or municipal water with a chloride content up to < 250 ppm, suitable according to definition in Section "Cooling water definition".
High-alloy steel, Group 2 (V4A)	Pipes, valves and fittings	Can be used for drinking or municipal water with a chloride content up to < 500 ppm, suitable according to definition in Section "Cooling water definition".
ABS (**A**crylnitrile**B**utadiene**S**tyrene)	Pipes, valves and fittings	Suitable according to the definition in Section "Cooling water definition". Suitable for mixing with inhibitor and/or biocide as well as Antifrogen N.
Installation comprising different materials (mixed installation)	Pipes, valves and fittings	Use is not permitted.
PVC	Pipes, valves, fittings and hoses	Use is not permitted.
Hoses		Reduce the use of hoses to a minimum (device connection). Must not be used as the main pipe for the whole system. Recommendation: EPDM hoses with an electrical resistance > 10^9 Ω (e.g. Semperflex FKD supplied from Semperit or DEMITTEL; from PE/EPD, supplied from Telle).
Gaskets	Pipes, valves and fittings	Use of FPM (Viton), AFM34, EPDM is recommended.
Hose connections	Transition Hose - pipe	Secure with clips conforming to DIN 2817, available e.g. from Telle.

The following recommendation applies in order to achieve an optimum motor heatsink (enclosure) lifetime:

- Engineer a closed cooling circuit with cooling unit manufactured out of stainless steel that dissipates the heat through a water-water heat exchanger.
- All other components such as cooling circuit cables and fittings manufactured out of ABS, stainless steel or general construction steel.

Cooling system manufacturers

BKW Kälte-Wärme-Versorgungstechnik GmbH	http://www.bkw-kuema.de
DELTATHERM Hirmer GmbH	http://www.deltatherm.de
Glen Dimplex Deutschland GmbH	http://www.riedel-cooling.com
Helmut Schimpke und Team Industriekühlanlagen GmbH + Co. KG	http://www.schimpke.org
Hydac System GmbH	http://www.hydac.com
Hyfra Industriekühlanlagen GmbH	http://www.hyfra.de
KKT Kraus Kälte- und Klimatechnik GmbH	http://www.kkt-kraus.de
Pfannenberg GmbH	http://www.pfannenberg.com
Rittal GmbH & Co. KG	http://www.rittal.de

Note

It goes without saying that equivalent products from other manufacturers may be used. Our recommendations are to be seen as helpful information, not as requirements or regulations. We cannot accept any liability for the quality and properties/features of third-party products.

3.1.3.2 Engineering the cooling circuit

Pressure

The operating pressure must be set according to the flow conditions in the supply and return lines of the cooling circuit. The required cooling water flow rate per time unit must be set according to the technical data of the equipment and motors.

The maximum permissible pressure with respect to atmosphere in the heat sink and thus in the cooling circuit must not exceed 0.6 MPa (6 bar) If a pump that can achieve a higher pressure is used, suitable measures must be provided on the system side (e.g. safety valve p ≤ 0.6 MPa, pressure control etc.) to ensure that the maximum pressure is not exceeded.

The lowest possible differential pressure between the cooling water in the supply and return lines should be selected to allow pumps with a flat characteristic to be used.

An additional flushback filter should be used in the circuit in order to help prevent blockages and corrosion. This allows any material deposits to be flushed out in operation.

Pressure drop in the motor

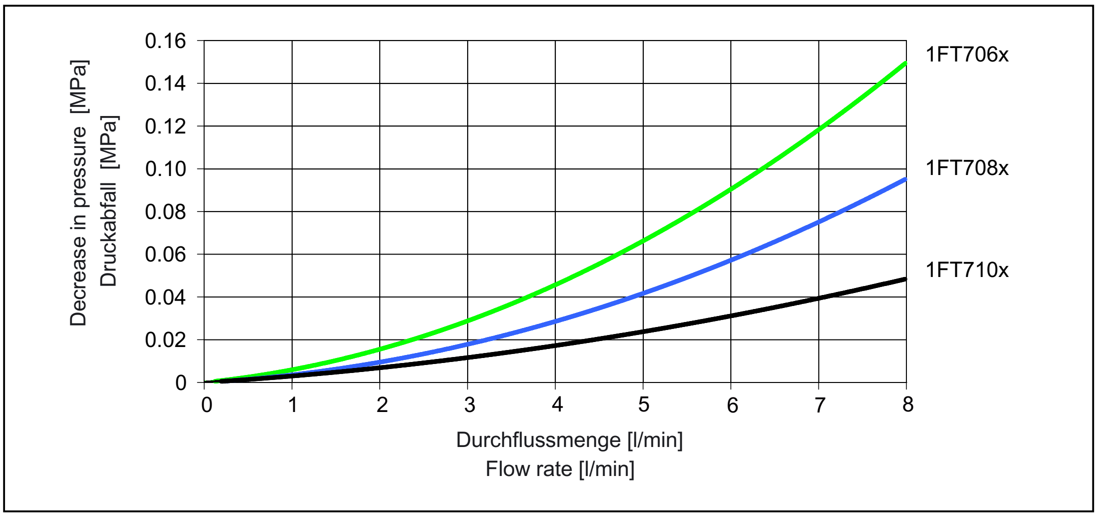


Figure 3-3 Pressure drop 1FT7

The nominal coolant flows specified in the following table must be maintained in order to ensure sufficient cooling.

Table 3- 4 Pressure drop at the nominal coolant flow

Shaft height	Flow rate	Pressure drop
1FT706x	3 l/min	0.03 MPa
1FT708x	4 l/min	0.03 MPa
1FT710x	5 l/min	0.025 MPa

Pressure equalization

If various components are connected up in the cooling circuit, it may be necessary to provide pressure equalization.

Note

Reactor elements must be fitted at the cooling water outlet of the motor or the relevant component!

Avoiding cavitation

During uninterrupted duty, the pressure drop by a converter or motor must not exceed 0.2 MPa (2 bar). Otherwise, the high flow rate results in damage due to cavitation and/or abrasion.

Connecting motors in series

For the following reasons, connecting motors in series can only be conditionally recommended:

- The required flow rates of the motors must be approximately the same (< a factor of 2)
- An increase in the cooling water temperature can result in having to derate the second or third motor if the maximum cooling water inlet temperature is exceeded.

Cooling water inlet temperature

Note

The cooling water inlet temperature must be selected so that condensation does not form on the surface of the motor: $T_{cooling} > T_{ambient}$ - 5 K.

Cooling water temperatures which are lower than the ambient temperature tend to result in increased water condensation. The difference between the cooling water inlet temperature and the ambient temperature should therefore not exceed a maximum of 5 K (Kelvin). Furthermore, the inflow of cooling water must be interrupted when the motor is idle for prolonged periods.

The motors are designed for operation up to a cooling water inlet temperature of +30 °C, as long as all of the specified motor data is maintained. If the cooling water inlet temperature deviates from this, the continuous torque will change (see the table titled "Derating factors").

Table 3- 5 Derating factors

Cooling water inlet temperature	≤ 30 °C	35 °C	40 °C	45 °C
Derating factor	1.00	0.97	0.95	0.92

Cooling power to be dissipated

The specified values refer to operation at the rated speed with rated torque. The cooling water temperature must be < 30 °C.

Table 3- 6 Cooling power to be dissipated 1FT7 Compact

Motor type	Cooling power to be dissipated [W]
1FT7062-5WF7	450
1FT7062-5WK7	600
1FT7064-5WF7	650
1FT7064-5WK7	950
1FT7066-5WF7	700
1FT7066-5WH7	1000
1FT7068-5WF7	750
1FT7082-5WC7	500
1FT7082-5WF7	600
1FT7082-5WH7	800
1FT7084-5WC7	800
1FT7084-5WF7	1000
1FT7084-5WH7	1300
1FT7086-5WC7	1000
1FT7086-5WF7	1400
1FT7086-5WH7	1600
1FT7102-5WB7	1000
1FT7102-5WC7	1200
1FT7102-5WF7	1400
1FT7105-5WB7	1200
1FT7105-5WC7	1600
1FT7105-5WF7	1900
1FT7108-5WB7	1500
1FT7108-5WC7	1800
1FT7108-5WF7	1900

Table 3- 7 Cooling power to be dissipated 1FT7 High Dynamic

Motor type	Cooling power to be dissipated [W]
1FT7065-7WF7	700
1FT7065-7WH7	750
1FT7067-7WF7	800
1FT7067-7WH7	900
1FT7085-7WF7	1100
1FT7085-7WH7	1200
1FT7087-7WF7	1300
1FT7087-7WH7	1500

3.1.3.3 Cooling water

Table 3- 8 Specification for cooling water

	Quality of the water used as coolant for motors with aluminum, stainless steel tubes + cast iron or steel jacket
Chloride ions	< 40 ppm, can be achieved by adding deionized water.
Sulfate ions	< 50 ppm
Nitrate ions	< 50 ppm
pH value	6 ... 9 (for aluminum 6 ... 8)
Electrical conductivity	< 500 μS/cm
Total hardness	< 170 ppm

Note

It is recommended to use deionized water with reduced conductivity (5 ... 10 μS/cm) (if required, ask the water utility for the values). According to 98/83/EC, drinking water may contain up to 2500 ppm of chloride!

Manufacturers of chemical additives can provide support when analyzing the water that is available on the plant side.

Table 3- 9 Quality of cooling water

	Coolant quality
Cooling water	According to the table "Specification for cooling water"
Corrosion protection	0.2 to 0.25% inhibitor Nalco TRAC100 (previously 0GE056) 1)
Anti-freeze protection	When required, 20 - 30% Antifrogen N (manufactured by Clariant)2)
Dissolved solids	< 340 ppm
Size of particles in the coolant	< 100 µm

1) The inhibitor is not required if it is ensured that the concentration of Antifrogen N is > 20%.

2) Derating is required for an anti-freeze protection component of > 30%

Other coolants (not water-based)

When using other coolants (e.g. oil, cooling lubricating medium) derating may be required in order that the thermal motor limit is not exceeded. The derating can be determined using the following data at a temperature of 30 °C:

Density	ρ	[kg/m^3]
Specific thermal capacitance	c_p	[J/(kg•K)]
Thermal conductivity	λ	[W/(K•m)]
Kinematic viscosity	v	[m^2/s]
Flow rate	V	[rpm]

An inquiry must be set to the manufacturer's plant (Siemens Service Center).

Note

Oil-water mixtures with more than 10% require derating.

Biocide

Closed cooling circuits with soft water are susceptible to microbes. The risk of corrosion caused by microbes is virtually non-existent in chlorinated drinking water systems.

Antifrogen N has a biocidal effect even at the minimum required concentration of > 20 %. No strain of bacteria can survive if >20 % Antifrogen N is added.

The suitability of a biocide depends on the type of microbe. The following types of microbes are encountered in practice:

- Slime-forming bacteria
- Corrosive bacteria
- Iron-depositing bacteria

At least one water analysis per annum is recommended to determine the number of bacterial colonies. Suitable biocides are available from the manufacturer Nalco for example. The manufacturer's recommendations must be followed regarding the concentration and compatibility with any inhibitor used.

NOTICE
Biocides and Antifrogen N must not be mixed.

There are other manufacturers of chemical additives in the market. Equivalent products from other manufacturers may be used. The suitability must be checked by testing.

Manufacturers of chemical additives

Tyforop Chemie GmbH	http://www.tyfo.de
Clariant Produkte Deutschland GmbH	http://www.antifrogen.de
Cimcool Industrial Products	http://www.cimcool.net
FUCHS PETROLUB AG	http://www.fuchs-oil.com
Hebro chemie GmbH	http://www.hebro-chemie.de
HOUGHTON Deutschland GmbH	http://www.houghton.com
Nalco Deutschland GmbH	http://www.nalco.com
Schweitzer-Chemie GmbH	http://www.schweitzer-chemie.de

NOTICE
It goes without saying that equivalent products from other manufacturers may be used. Our recommendations are to be seen as helpful information, not as requirements or regulations. We cannot accept any liability for the quality and properties/features of third-party products.

The motor is connected to the cooling circuit by means of two female threads on the rear of the motor. Which one is the inlet and which one is the outlet can be freely connected.

Cooling water connection for 1FT7: G 1/4 "

The units should be connected with hoses to provide mechanical decoupling (refer to the table "Materials and components of a cooling circuit").

3.1.3.4 Commissioning

When required, before connecting the motors and converters to the cooling circuit, the pipes should be flushed in order to avoid dirt entering the motors and converters.

After the units have been installed in the plant, the coolant circuit must be commissioned before the electrical systems.

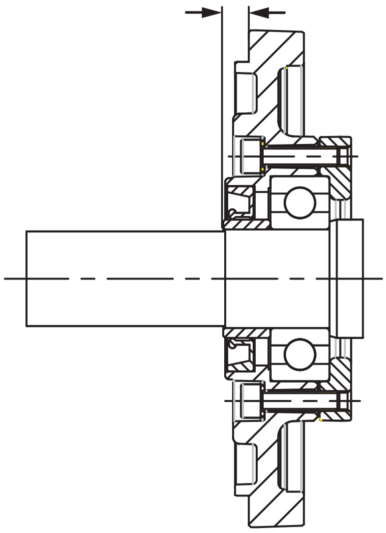
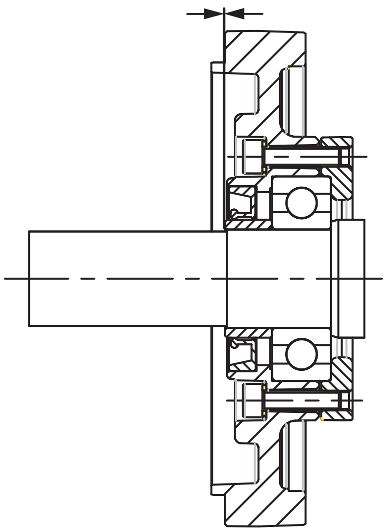
Maintenance and service

It is recommended that the filling level and discoloration or cloudiness of the cooling water is checked at least once a year. Furthermore, every year it must be checked that the cooling water still meets the permissible specification.

If the cooling water level has dropped, the loss should be corrected on closed or semi-open circuits with a prepared mixture of deionized water and inhibitor or Antifrogen N.

3.2 Flange forms

Table 3- 10 Flange forms

Designation	Representation	Description
Flange 0		Flange 0, recessed 1FT7□□□-□□□□0-□□□□
Flange 1		Flange 1, compatible with 1FT6 motors 1FT7□□□-□□□□1-□□□□

3.3 Degree of protection

Degree of protection designation

The degree of protection designation in accordance with EN 60034-5 (IEC 60034-5) is described using the letters "IP" and two digits (e.g. IP64).

IP = International Protection
1st digit = protection against ingress of foreign bodies
2nd digit = protection against harmful ingress of water

Since most cooling lubricants used in machine tools and transfer machines are oily, creep-capable, and/or corrosive, protection against water alone is insufficient. The motors must be protected by suitable covers.

Attention must be paid to providing suitable sealing of the motor shaft for the selected degree of protection for the motor.

Sealing air connection

Note

For critical applications with highly creep-capable media, the 1FT7 motors can be ordered with a sealing air connection (only in conjunction with IP67) via the Z option Q12.

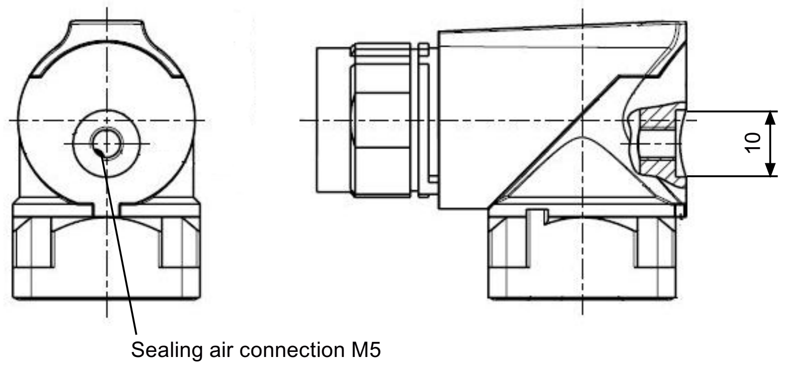


Figure 3-4 Sealing air connection

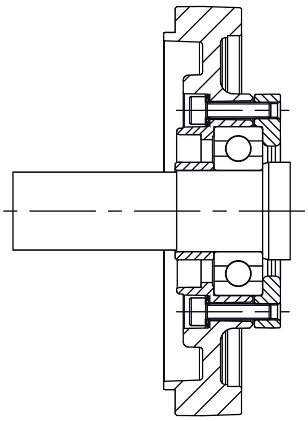
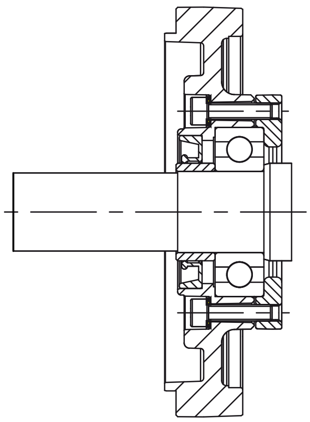
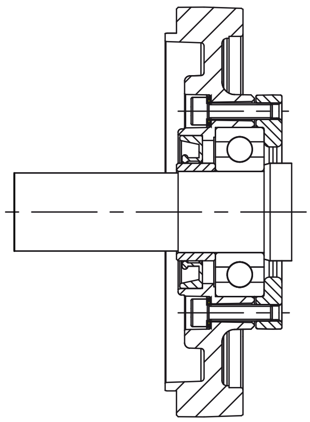
As delivered from the factory, the sealing air connection is sealed with a plastic plug.

Technical data for sealing air connection

- Connecting thread M5
- Gauge pressure from 0.05 mbar to 0.1 bar
- Compressed air must be dried and cleaned (entrained particles > 3 μm not permissible)

Sealing of the motor shaft

Table 3- 11 Motor shaft sealing

IP64	IP65	IP67
		
Labyrinth seal It is not permissible that there is any moisture in the area around the shaft and the flange. Note: For IP 64 degree of protection it is not permissible that liquid collects in the flange.	Radial shaft sealing ring without annular spring Shaft outlet seal to protect against spray water and cooling-lubricating medium. It is permissible that the radial shaft sealing ring runs dry. Lifetime approx. 25000 h (nominal value). For IP65 degree of protection it is not permissible that liquid collects in the flange.	Radial shaft sealing ring For gearbox mounting (for gearboxes that are not sealed) to seal against oil. The sealing lip must be adequately cooled and lubricated by the gearbox oil in order to guarantee reliable function. Lifetime approx. 10000 h (nominal value). If a radial shaft sealing ring runs dry, then this has a strong negative impact on the functionality and the lifetime.

3.4 Bearing version

The 1FT7 motors are equipped with greased-for-life deep-groove ball bearings. The location bearing is at the DE.

3.5 Radial and axial forces

3.5.1 Calculating the belt pre-tension

F_V [N] = 2 • M_0 • c / d_R $F_V \leq F_{R,\ perm}$

Table 3- 12 Explanation of the formula abbreviations

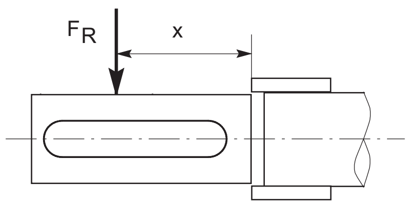
Formula abbreviations	Unit	Description
F_V	N	Belt pre-tension
M_0	Nm	Motor static torque
c	—	Pre-tensioning factor: this factor is an empirical value provided by the belt manufacturer. It can be assumed to be as follows: for toothed belts: c = 1.5 to 2.2 for flat belts c = 2.2 to 3.0
d_R	m	Effective diameter of the belt pulley
$F_{R,\ perm}$	N	Permissible radial force

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

3.5.2 Radial force loading

Point of application of radial forces F_R at the shaft end

- for average operating speeds
- for a nominal bearing lifetime of 25,000 h



Maß x:
Abstand zwischen dem Angriffspunkt der Kraft F_R und der Wellenschulter in mm.
Dimension x:
Distance between the point of application of the force F_R and the shaft shoulder in mm.

Figure 3-5 Force application point at the DE

3.5.3 Radial force diagrams

Radial force 1FT7, SH 36

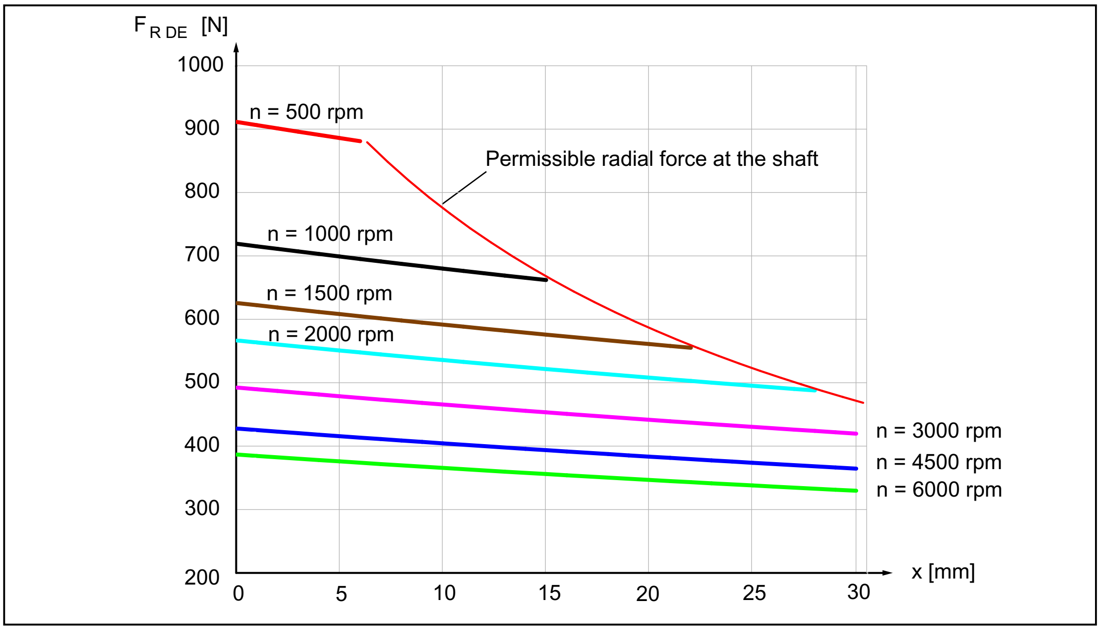


Figure 3-6 Radial force F_R at a distance x from the shaft shoulder for a statistical bearing lifetime of 25000 h

Radial force 1FT7, SH 48

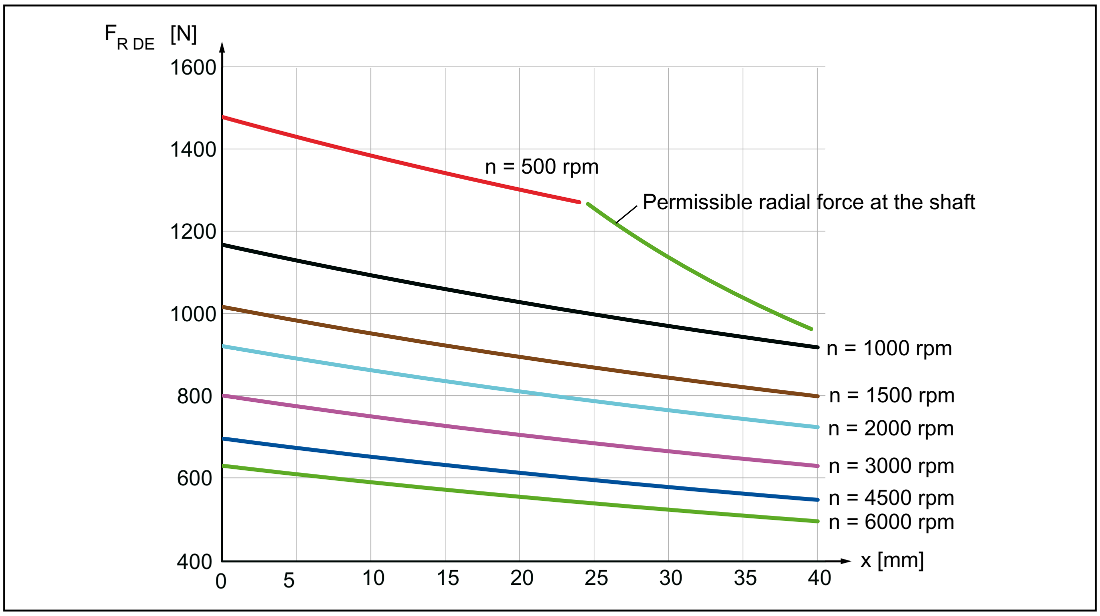


Figure 3-7 Radial force F_R at a distance x from the shaft shoulder for a statistical bearing lifetime of 25000 h

Radial force 1FT7, SH 63

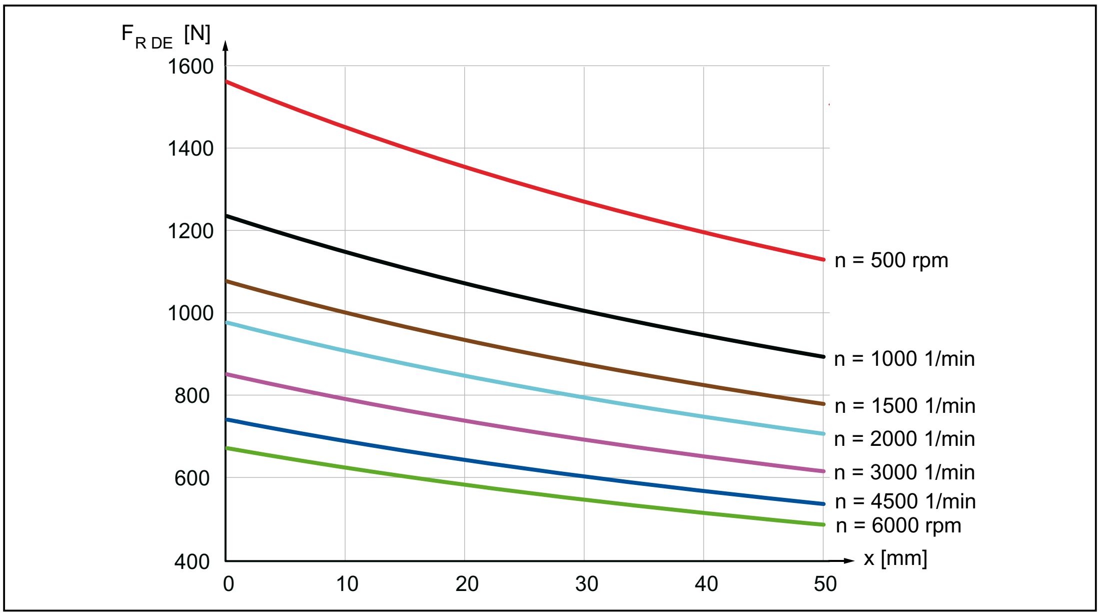


Figure 3-8 Radial force F_R at a distance x from the shaft shoulder for a statistical bearing lifetime of 25000 h

Radial force 1FT7, SH 80

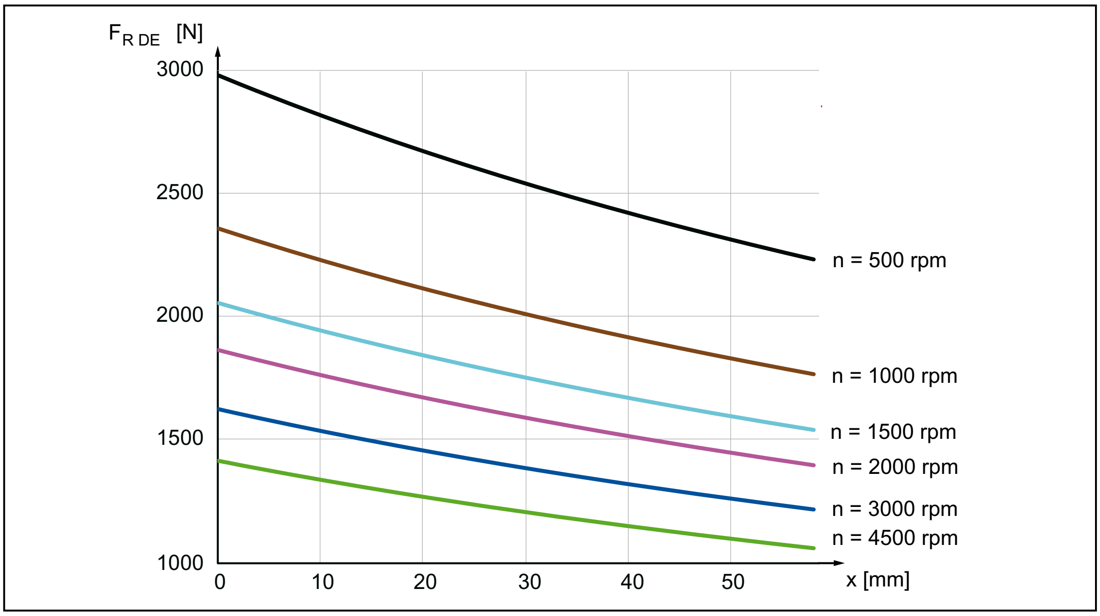


Figure 3-9 Radial force F_R at a distance x from the shaft shoulder for a statistical bearing lifetime of 25000 h

Radial force 1FT7, SH 100

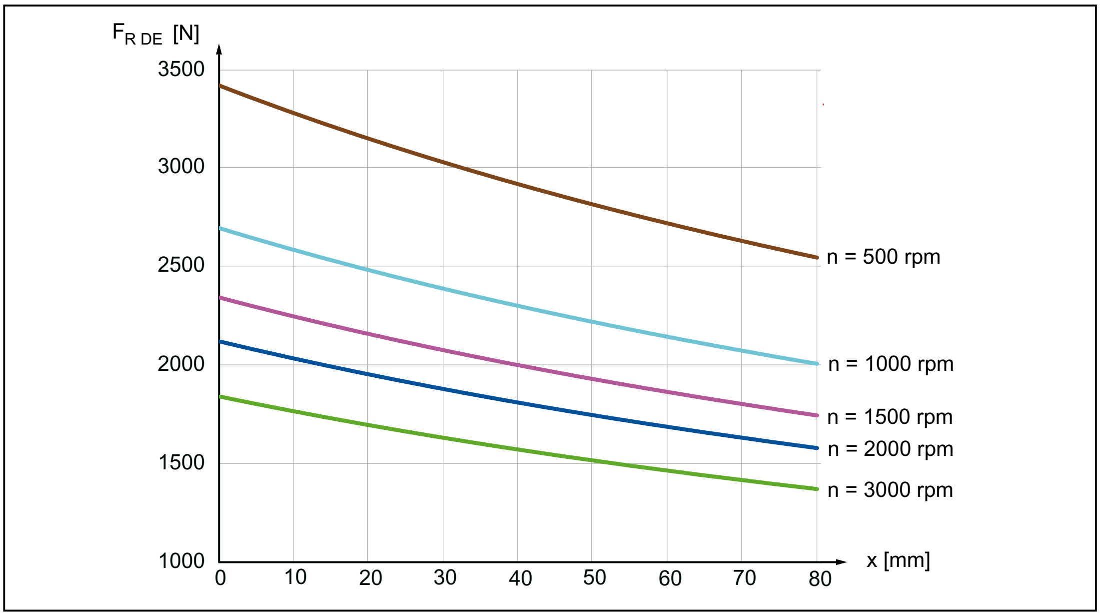


Figure 3-10 Radial force F_R at a distance x from the shaft shoulder for a statistical bearing lifetime of 25000 h

3.5.4 Axial force stressing

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

Shaft height	Displacement
36 and 48	Approx. 0.2 mm
63 to 100	Approx. 0.35 mm

An axial force as large as the spring-loading is not permitted (100 ... 500 N). Premature failure is the result when the bearing is not pre-tensioned.

Calculating the permissible axial force: $F_A = F_R \cdot 0.35$

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

3.6 Smooth running, concentricity and axial eccentricity

The shaft and flange accuracies are checked according to DIN 42955, IEC 60072-1. Any specifications deviating from these values are stated on the dimension drawings.

Table 3- 13 Radial eccentricity tolerance of the shaft to the frame axis (referred to cylindrical shaft ends)

Shaft height	Standard N	Option R
36	0.035 mm	0.018 mm
48, 63	0.04 mm	0.021 mm
80, 100	0.05 mm	0.025 mm

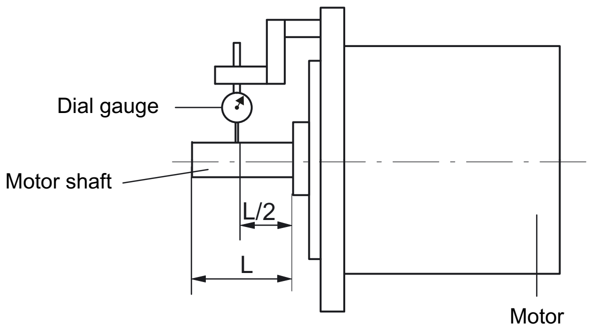


Figure 3-11 Checking the radial eccentricity

Table 3- 14 Concentricity and axial eccentricity tolerance of the flange surface to the shaft axis (referred to the centering diameter of the mounting flange)

Shaft height	Standard N	Option R
36, 48	0.08 mm	0.04 mm
63, 80, 100	0.1 mm	0.05 mm

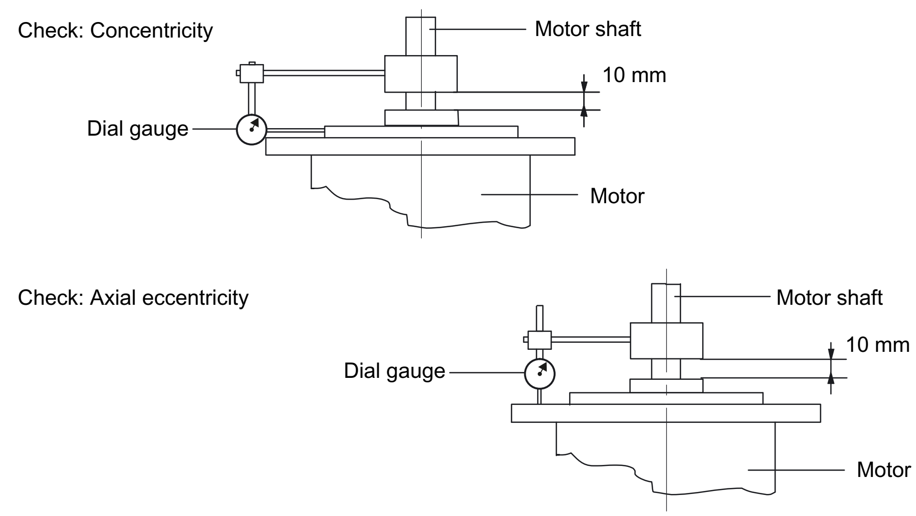


Figure 3-12 Checking the concentricity and axial eccentricity

3.7 Shaft end

The drive shaft end is cylindrical in accordance with DIN 748 Part 3, IEC 60072-1. The force-locked shaft-hub coupling is preferred for fast acceleration and reversing operation of the drives.

Standard: plain shaft

Option: keyway and key (half-key balancing)

3.8 Balancing

The motors are balanced according to DIN ISO 8821.

Motors with featherkey in the shaft are half-key balanced. The mass equalization for the protruding half key must be taken into account for the output elements.

3.9 Vibration response

Motors with a keyway are balanced with a half feather key by the manufacturer. The vibration response of the system at the location of use is influenced by output elements, any built-on parts, the alignment, the installation, and external vibrations. As a result, the motor's vibration values may change.

The motors conform to vibration severity grade A in accordance with EN 60034-14 (IEC 60034-14).

The values indicated refer only to the motor. These values can be increased at the motor due to the overall vibration characteristics of the complete system after the drive has been installed.

The vibration level is maintained up to the rated speed (n_N).

Standard: Vibration severity grade A

Option: Vibration severity grade R (compliance with vibration severity grades A and R up to n_N)

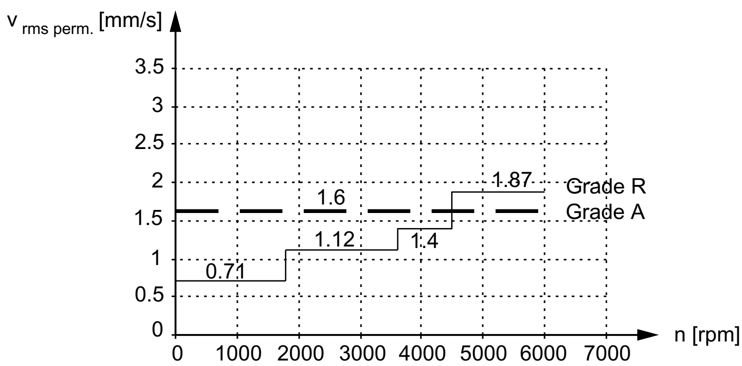


Figure 3-13 Vibration severity grades

3.10 Noise emission

When operated in the speed range 0 to rated speed, 1FT7 motors can reach the following measuring-surface sound pressure level Lp(A):

Table 3- 15 Sound pressure level

Cooling method	Shaft height	Measuring-surface sound pressure level Lp(A)
Natural cooled	1FT703 to 1FT706 1FT708 to 1FT710	65 dB(A) + 3 dB tolerance 70 dB(A) + 3 dB tolerance
Forced ventilation	1FT706 to 1FT710	73 dB(A) + 3 dB tolerance
Water cooled	1FT706 1FT708 to 1FT710	65 dB(A) + 3 dB tolerance 70 dB(A) + 3 dB tolerance

The motors are certified for a wide range of installation and operating conditions. These conditions, such as rigid or vibration-isolated foundation design, influence noise emission, sometimes significantly.

3.11 Paint finish

If no special color is selected, the 1FT7 motors are painted in the standard color pearl dark grey (RAL 9023).

Table 3- 16 Order codes of special colors (option)

Designation	Order code
RAL 9005, jet black	X01
RAL 9001, cream	X02
RAL 6011, reseda green	X03
RAL 7032, pebble grey	X04
RAL 5015, sky blue	X05
RAL 1015, light ivory	X06
RAL 7016, anthracite grey	X09

Technical data and characteristic curves 4

4.1 Operating range and characteristics

Permissible operating range

The permissible operating range is limited by thermal, mechanical, and electromagnetic boundaries. The data in this documentation apply to the following temperatures:

- For naturally cooled motors: up to 40 °C ambient temperature
- For liquid-cooled motors: up to 30 °C coolant inlet temperature

The temperature rise of the motor is caused by the losses generated in the motor (current-dependent losses, no-load losses, friction losses). The utilization of the motor depends on the cooling method (naturally cooled, forced ventilation, liquid-cooled). To adhere to the temperature limits, the permissible torque decreases with increasing speed, starting from static torque M_0.

Permissible temperature range, characteristics $S1_{(100\ K)}$ and $S1_{(60\ K)}$

1FT7 motors can be operated up to an average winding temperature of 145 °C.

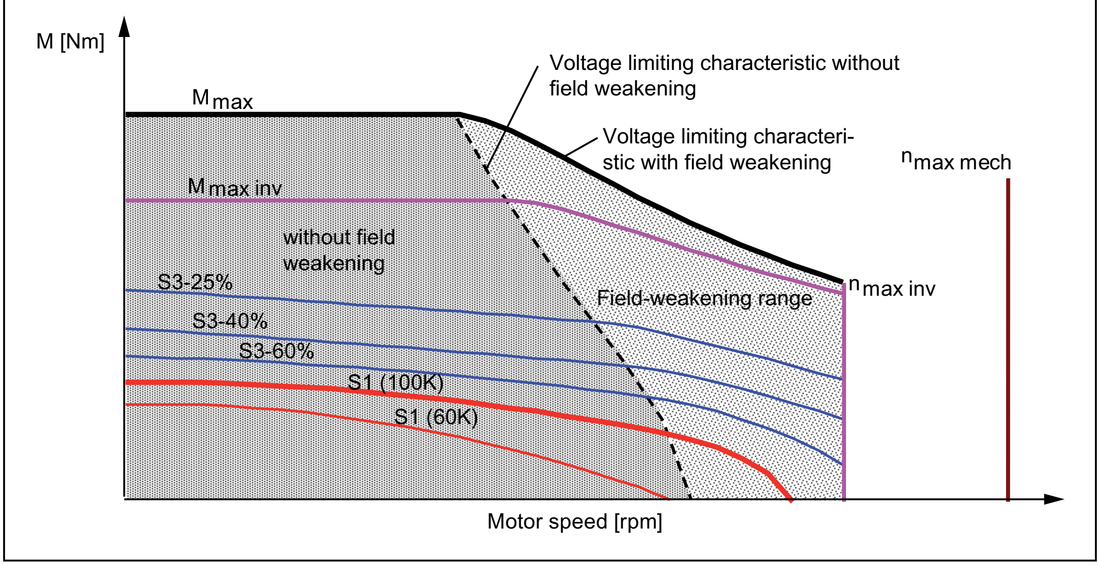


Figure 4-1 Torque characteristics of synchronous motors

For continuous operation, the limits of this permissible temperature range are represented by the S1 characteristic identified as 100 K. This corresponds to utilization according to temperature class 155 (F).

If a lower temperature class is necessary, for example

- If the temperature of the enclosure/housing must lie below 90° C for safety reasons
- If the motor temperature rise would have a negative impact on the machine

the S1 characteristic identified as 60 K can be chosen. In this case the motor conforms to temperature class 130 (B).

CAUTION
Continuous duty above the $S1_{(100\ K)}$ characteristic is not thermally permitted for the motor.

Periodic intermittent operation, characteristics $S3_{25\%/40\%/60\%}$ and M_{max}

In periodic intermittent operation the motor can be subjected to higher loading as a function of the ON period (see also chapter headed "Engineering"). The S3 characteristics identified with the respective ON period (25%, 40% and 60%) apply.

As a general rule the cycle time is 10 minutes. The overtemperature is 100 K.

As an exception, for small motors a cycle time of 1 minute is specified and noted in the characteristic curves. A transient, high overload capacity up to the characteristic M_{max} is provided over the complete speed setting range.

Recommended Motor Module

In the chapter titled "Motor overview/Assignment of Motor Module" a Motor Module is recommended for each motor in accordance with its stall current. The maximum achievable torque is shown in the characteristic $M_{max\ Inv}$.

When configuring intermittent or overload operation, you must check whether a larger Motor Module may be required in order to provide the necessary peak current.

Speed limits $n_{max\ mech}$ and $n_{max\ Inv}$

The speed range is limited by the mechanical limit speed $n_{max\ mech}$ (centrifugal forces at the rotor, bearing service life) or the electrical limit speed $n_{max\ Inv}$ (withstand voltage of the converter or max. frequency of the converter).

The maximum permissible speed n_{max} is therefore the minimum of $n_{max\ mech}$ and $n_{max\ Inv}$.

CAUTION
The maximum permissible speed (mechanical) $n_{max\ mech}$ must not be exceeded.

CAUTION

When the machine is running (with shaft operated by motor or separately driven) at speeds higher than $n_{max\ Inv}$, a voltage in excess of the maximum permissible converter voltage might be induced in the winding. This can cause irreparable damage to the converter. No operation is therefore permissible above the speed $n_{max\ Inv}$ without protective measures or other additional measures. Siemens AG accepts no liability for any damage occurring as a result of failure to pay heed to this danger warning.

Torque limit when operating on a SINAMICS S120 drive system with field weakening

The field weakening function is active as standard on the SINAMICS S120 drive system. A field-weakening current is injected in such a way as to enable operation to the right of or above the voltage limiting characteristic. The shape of the voltage limiting characteristic for field weakening is determined by the winding version (armature circuit) and the magnitude of the converter output voltage. The voltage limiting characteristic is calculated for a motor at operating temperature.

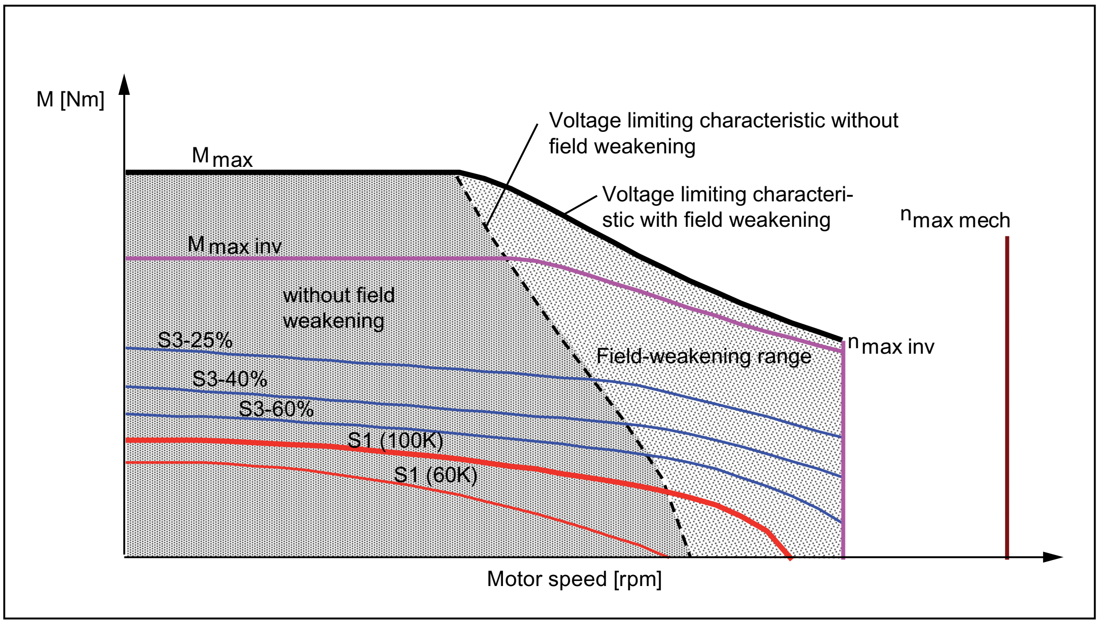


Figure 4-2 Shape of the voltage limiting characteristic with/without field weakening

The characteristic curve is plotted for each winding version in a separate data sheet. The torque-speed diagrams for different converter output voltages are assigned to each data sheet:

Table 4- 1 Converter output voltages

Diagram	Converter output voltage V_{mot}	Infeed module	Line voltage
Diagram [a]	380 V	SINAMICS SLM	400 V
Diagram [b]	425 V	SINAMICS ALM	400 V
Diagram [c]	460 V	SINAMICS SLM	480 V

For different converter output voltages the voltage limiting characteristic must be shifted (offset) accordingly. See "Offset of the voltage limit characteristic"

Torque limit when operating on a SINAMICS S120 drive system without field weakening

It is possible to deactivate the field weakening function with the SINAMICS S120 drive system. This reduces the available operating range.

The shape of the voltage limiting characteristic is determined by the winding version (armature circuit) and the magnitude of the converter output voltage. The voltage limiting characteristic is calculated for a motor at operating temperature.

The voltage induced in the motor winding increases as the speed increases. The difference between the DC link voltage of the converter and the induced motor voltage can be used to apply the current.

This limits the applicable current level. This causes the torque to drop off quickly at high speeds. All operating points that can be achieved with the motor lie to the left of the voltage limiting characteristic shown as a dashed line.

The characteristic curve is plotted for each winding version in a separate data sheet. The torque-speed diagrams for different converter output voltages are assigned to each data sheet:

Table 4- 2 Converter output voltages

Diagram	Converter output voltage V_{mot}	Infeed module	Line voltage
Diagram [a]	380 V	SINAMICS SLM	400 V
Diagram [b]	425 V	SINAMICS ALM	400 V
Diagram [c]	460 V	SINAMICS SLM	480 V

For different converter output voltages the voltage limiting characteristic must be shifted (offset) accordingly. See "Offset of the voltage limit characteristic"

Winding versions

Several winding versions (armature circuits) for different rated speeds n_N are possible within a motor frame size.

Table 4- 3 Code letter, winding version

Rated speed n_N [1/min]	Winding version (10. position of the Order No.)
1500	B
2000	C
3000	F
4500	H
6000	K

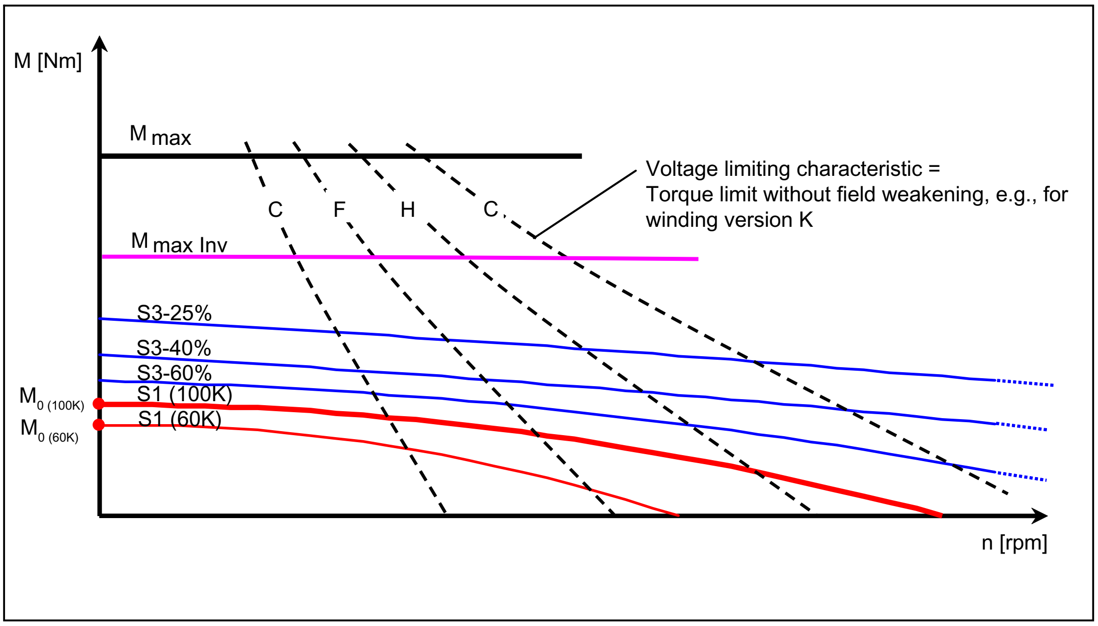


Figure 4-3 Speed-torque diagram

Note

The voltage limit characteristic of a motor with 6000 RPM rated speed lies far above that of the same motor type with 2000 RPM. However, for the same torque, this motor requires a significantly higher current.

For this reason, you should select the rated speed such that it does not lie too far above the maximum speed required for the application.

The size (rating) of the converter module (output current) can be minimized in this fashion

Shifting the voltage limiting characteristic curve (only relevant when field weakening is deactivated)

In order to identify the limits of the motor for a converter output voltage (V_{mot}) other than 380 V, 425 V, or 460 V, the relevant voltage limiting characteristic curve must be shifted (offset) for the particular new output voltage ($V_{mot,\ new}$).

NOTICE
The offset of the voltage limiting characteristic only applies to linear limiting characteristics, e.g. for the 1FT7 motors. The voltage limiting characteristic can be offset only if the condition $U_{mot\ new} > U_{iN}$ is fulfilled. Read the induced voltage U_{iN} from the motor rating plate or calculate it from the characteristic curve: $U_{iN} = k_E \bullet n_N / 1000$

The degree of offset is obtained as follows:

For an output voltage of $U_{mot,\ new}$, an offset is obtained along the X axis (speed) by a factor of:

$$n_{new} = \frac{U_{Mot,\ new}}{U_{Mot}}$$

$U_{mot,\ new}$ = new converter output voltage

U_{mot} = drive converter output voltage from the characteristic curve for 380 V, 425 V, or 460 V

Calculating the new limit torque with the new limiting characteristic

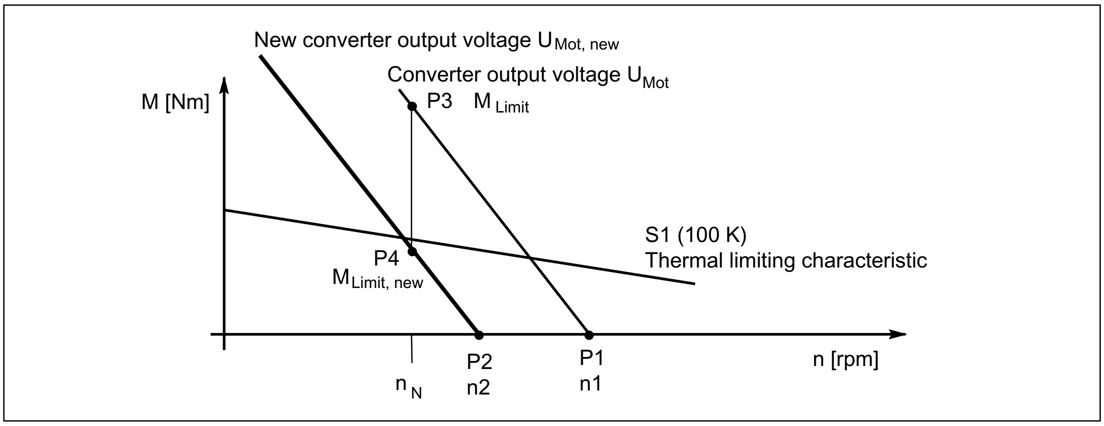


Figure 4-4 Offset of voltage limiting characteristic from U_{mot} to $U_{mot\ new}$

P1 Intersection between voltage limiting characteristic and x axis: Read off or calculate the speed

$$n_1 \text{ [rpm]} = \frac{U_{Mot}}{k_E \cdot 0.95}$$

P2 The point where the voltage limiting characteristic intersects with the x axis is shifted from n_1 to n_2.

$$n_2 \text{ [rpm]} = n_1 \cdot \frac{U_{mot,\ new}}{U_{Mot}}$$

P3 Read-off M_{limit} on the voltage limiting characteristic curve specified for V_{mot}.

P4 Calculate $M_{limit,\ new}$

$$M_{limit,\ new} = \frac{U_{Mot,\ new} - U_{iN}}{U_{Mot} - U_{iN}} \cdot \text{Mlimit}$$

The offset voltage limiting characteristic curve is obtained with points P2 and P4.

Example of offset of voltage limiting characteristic curve without field weakening

Motor 1FT7042-5AF71; n_N = 3000 rpm; k_E = 87 V/1000 rpm

$U_{mot\ new}$ = 290 V; calculated with U_{mot} = 380 V (diagram [a])

$U_{iN} = k_E \cdot n_N/1000$; $U_{iN} = 87 \cdot 3000/1000 = 261$ V

Condition $U_{mot,\ new} > U_{iN}$ is fulfilled.

Calculation P1: $n_1 = \frac{380}{87 \cdot 0.95} \cdot 1000 \text{ rpm} = 4597 \text{ rpm}$

Calculation P2: $n_2 = \frac{290}{380} \cdot 4597 \text{ rpm} = 3508 \text{ rpm}$

Calculation P3: M_{Limit} for 380 V and n_N = 3000 rpm calculation = 8.8 Nm

Calculation P4: $M_{Limit,\ new} = \frac{290 - 261}{380 - 261} \cdot 8.8 \text{ Nm} = 2.14 \text{ Nm}$

Enter and connect points P2 and P4. This line is the new voltage limiting characteristic for $U_{mot\ new}$= 290 V.

Typical M-I characteristic

Because of saturation effects, the achievable torque cannot be calculated linearly from the current (particularly at high currents).

Figure 4-5 Torque-current characteristic curve for self-cooled motors

From M_0 (or I_0), the following formula can be used to determine the torque or the torque constant as a function of the current:

$$k_T(I) = \frac{M}{I}(I) = \frac{M_0}{I_0} + \frac{I - I_0}{I_{max} - I_0} \bullet \left(\frac{M_{max}}{I_{max}} - \frac{M_0}{I_0} \right)$$

Tolerance data

The data shown in the data sheets are nominal values that are subject to natural scatter. The following tolerances apply:

Table 4- 4 Tolerance data in the motor list data

Motor list data		Typ. value	Guaranteed value
Stall current	I_0	± 3 %	± 7.5 %
Electrical time constant	T_{el}	± 5 %	± 10 %
Torque constant	k_T	± 3 %	± 7.5 %
Voltage constant	k_E	± 3 %	± 7.5 %
Winding resistance	R_{ph}	± 5 %	± 10 %
Moment of inertia	J_{mot}	± 2 %	± 10 %

Effects of the temperature influence and parameter scatter on the characteristic

The torque-speed characteristics specified in the following chapter relate to the nominal values at operating temperature (shown as characteristic 3 in the chart below).

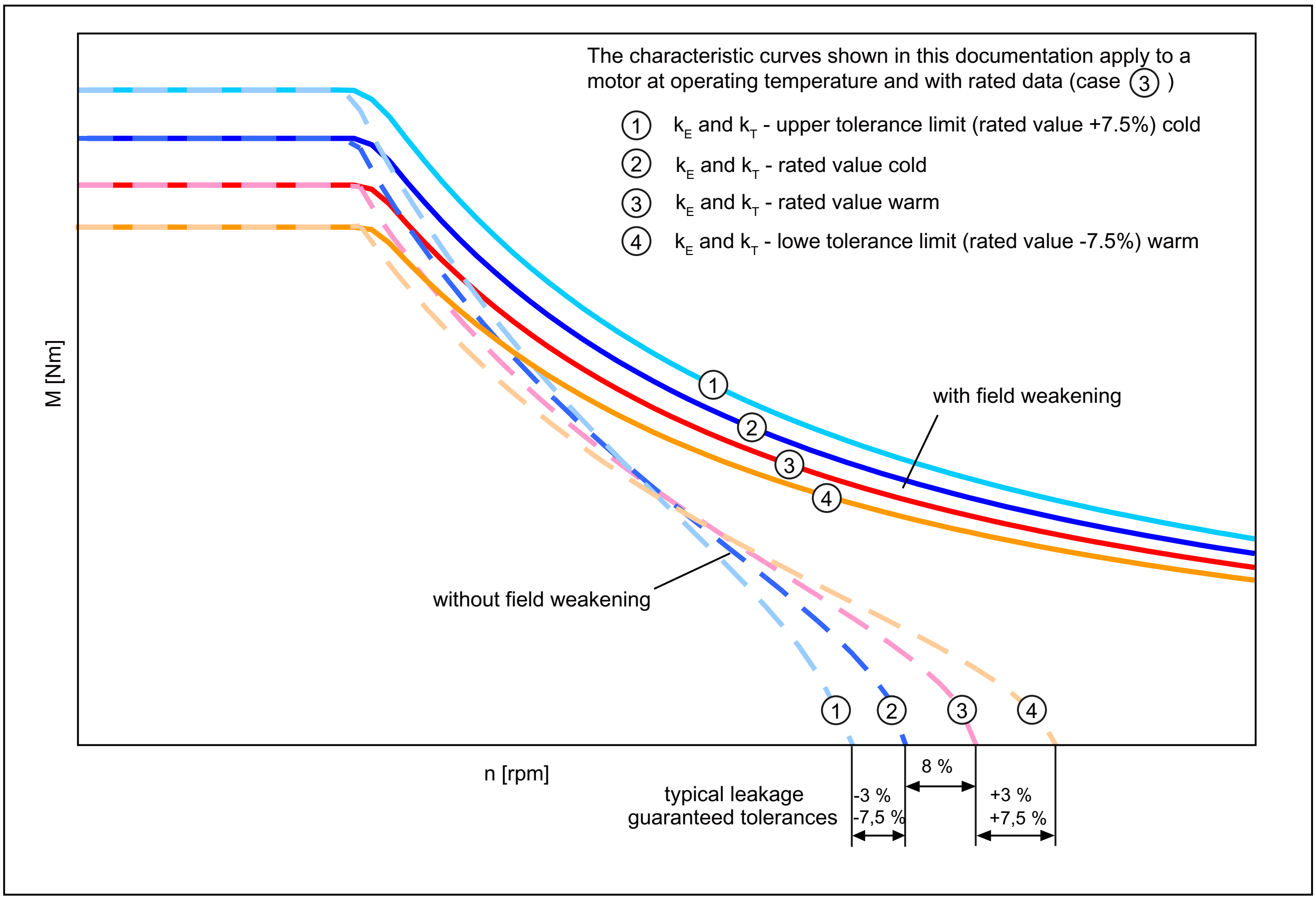


Figure 4-6 Effect of scatter

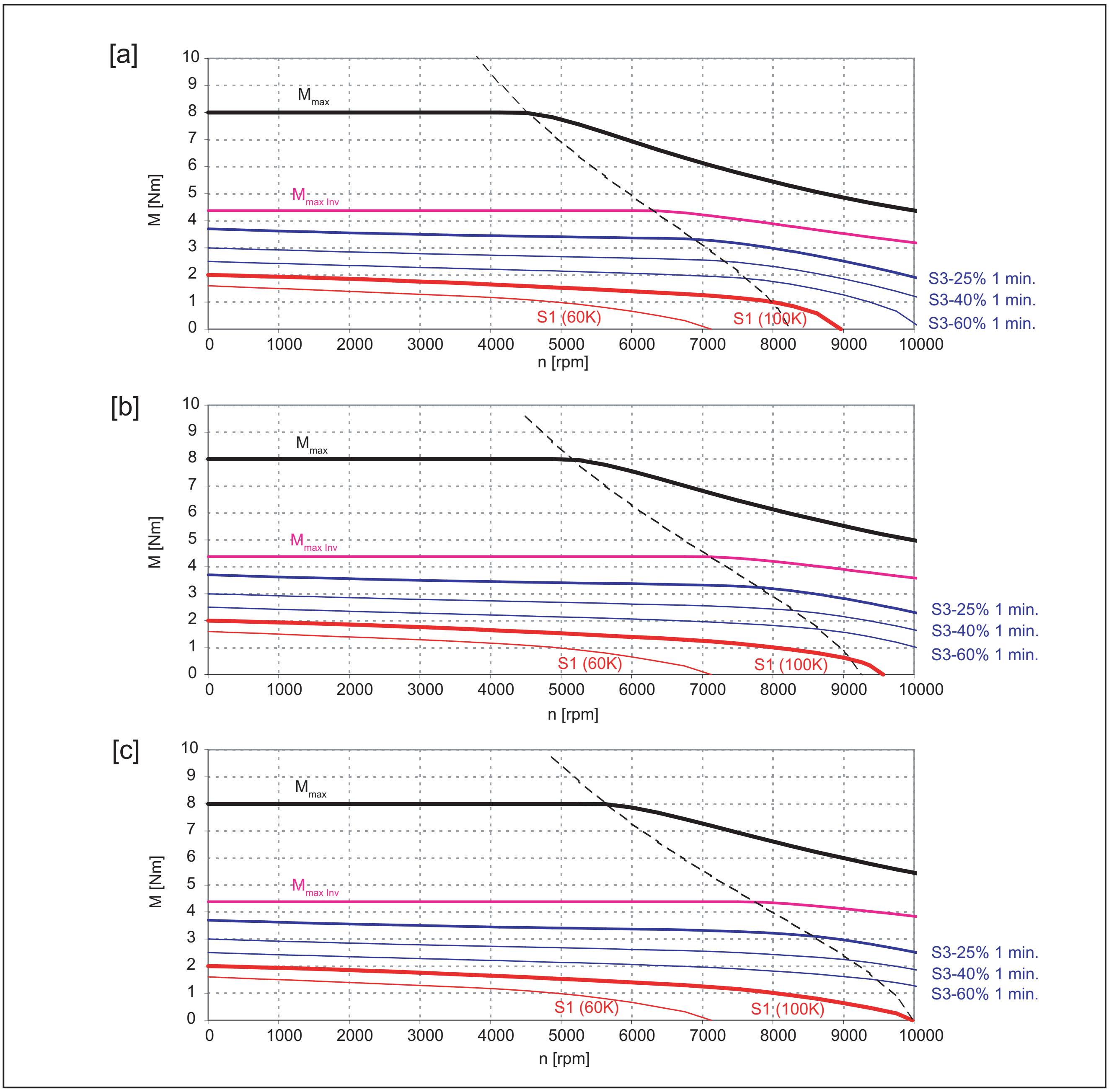
NOTICE
The motor temperature results in a clear displacement of the voltage limiting characteristic in the upper speed range. This must be taken into consideration during engineering (especially for applications in which the cold motor has to produce maximum speeds) with converter systems without field weakening.

4.2 Torque-speed characteristics

4.2.1 1FT7 synchronous motors with natural cooling

Table 4- 5 1FT7034-□AK7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	6000
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N (100 K)}$	Nm	1.4
Rated current	I_N	A	2.1
Static torque (60 K)	$M_{0 (60 K)}$	Nm	1.6
Static torque (100 K)	$M_{0 (100 K)}$	Nm	2
Stall current (60 K)	$I_{0 (60 K)}$	A	2.2
Stall current (100 K)	$I_{0 (100 K)}$	A	2.7
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	0.98
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	0.85
Optimum operating point			
Optimum speed	n_{opt}	rpm	6000
Optimum power	P_{opt}	kW	0.88
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	10000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	10000
Maximum torque	M_{max}	Nm	7.7
Maximum current	I_{max}	A	11
Physical constants			
Torque constant	k_T	Nm/A	0.74
Voltage constant	k_E	V/1000 rpm	49
Winding resistance at 20 °C	R_{Str}	Ω	2.4
Rotating field inductance	L_D	mH	9.7
Electrical time constant	T_{el}	ms	4.0
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	25
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	3700
Weight with brake	m_{MotBr}	kg	4.2
Weight without brake	m_{Mot}	kg	3.8
Recommended Motor Module 6SL112□-□TE13-0AA□			
Rated converter current	$I_{N\ Inv}$	A	3
Maximum converter current	$I_{max\ Inv}$	A	6
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	4.3



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

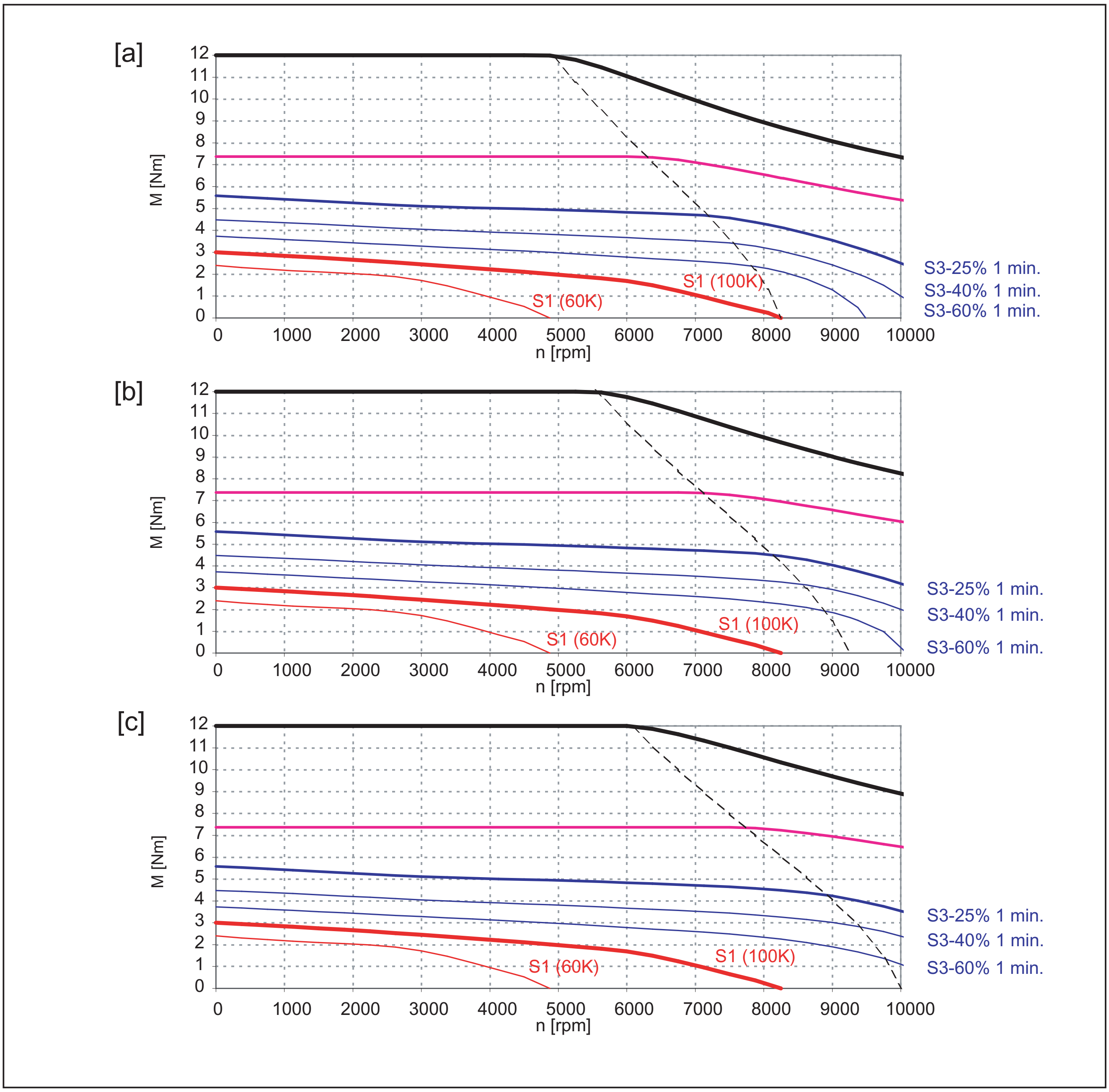
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-7 1FT7034-□AK7

Table 4- 6 1FT7036-□AK7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	6000
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	1.7
Rated current	I_N	A	2.4
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	2.4
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	3
Stall current (60 K)	$I_{0\ (60\ K)}$	A	3.1
Stall current (100 K)	$I_{0\ (100\ K)}$	A	4
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	1.45
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	1.33
Optimum operating point			
Optimum speed	n_{opt}	rpm	6000
Optimum power	P_{opt}	kW	1.07
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	10000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	10000
Maximum torque	M_{max}	Nm	11
Maximum current	I_{max}	A	15
Physical constants			
Torque constant	k_T	Nm/A	0.75
Voltage constant	k_E	V/1000 rpm	49
Winding resistance at 20 °C	R_{Str}	Ω	1.4
Rotating field inductance	L_D	mH	5.9
Electrical time constant	T_{el}	ms	4.2
Mechanical time constant	T_{mech}	ms	1.0
Thermal time constant	T_{th}	min	30
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	3100
Weight with brake	m_{MotBr}	kg	5.4
Weight without brake	m_{Mot}	kg	5
Recommended Motor Module 6SL112□-□TE15-0AA□			
Rated converter current	$I_{N\ Inv}$	A	5
Maximum converter current	$I_{max\ Inv}$	A	10
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	7.3



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

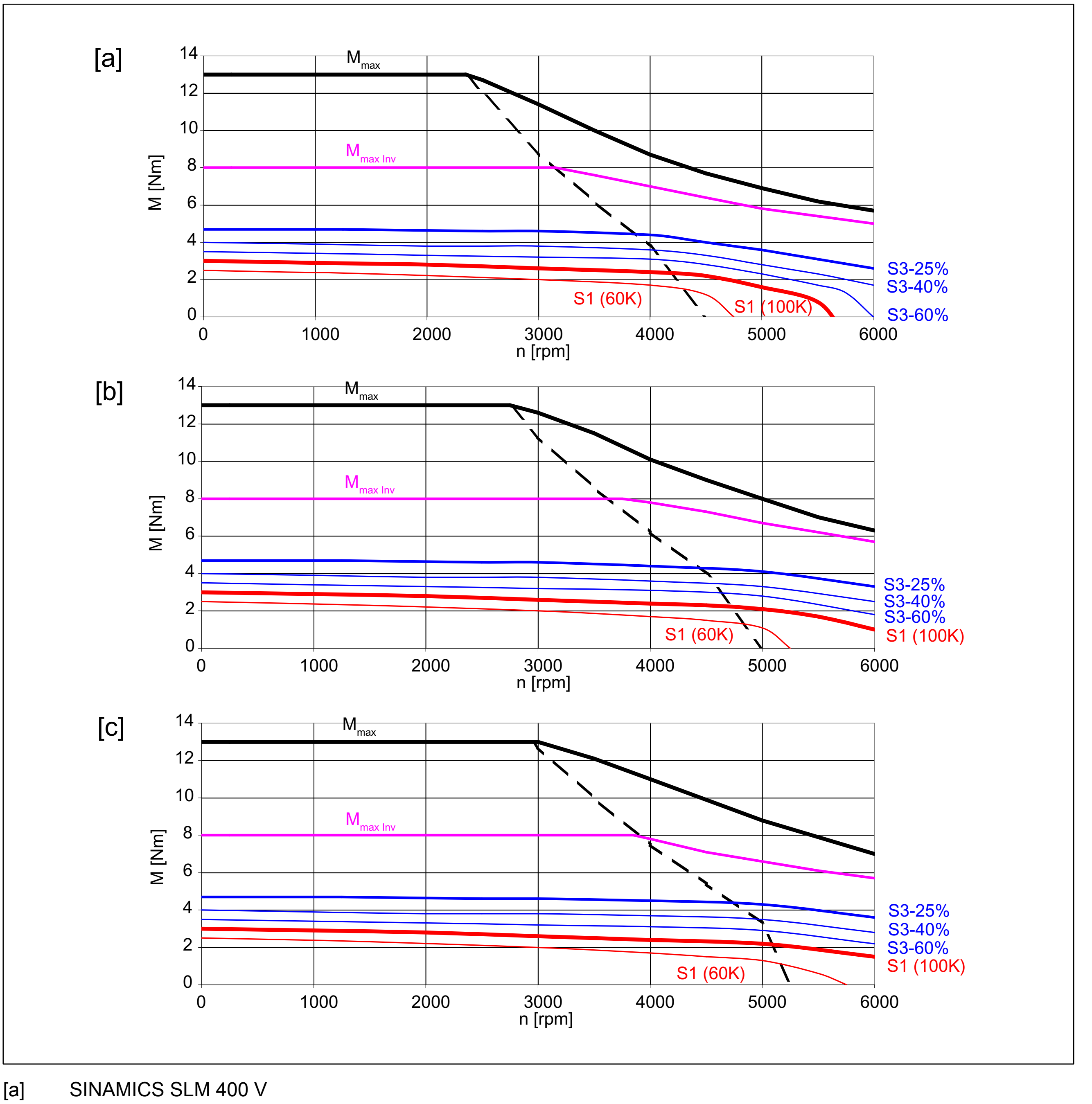
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-8 1FT7036-□AK7

Table 4- 7 1FT7042-□AF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	2.7
Rated current	I_N	A	2.1
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	2.5
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	3
Stall current (60 K)	$I_{0\ (60\ K)}$	A	1.7
Stall current (100 K)	$I_{0\ (100\ K)}$	A	2.1
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	3.68
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	2.81
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	0.85
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	6600
Maximum torque	M_{max}	Nm	13
Maximum current	I_{max}	A	11
Physical constants			
Torque constant	k_T	Nm/A	1.43
Voltage constant	k_E	V/1000 rpm	87
Winding resistance at 20 °C	R_{Str}	Ω	3.5
Rotating field inductance	L_D	mH	21.4
Electrical time constant	T_{el}	ms	6
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	20
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	11700
Weight with brake	m_{MotBr}	kg	5.5
Weight without brake	m_{Mot}	kg	4.6
Recommended Motor Module 6 SL112□-□TE13-0AA□			
Rated converter current	$I_{N\ Inv}$	A	3
Maximum converter current	$I_{max\ Inv}$	A	6
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	8



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

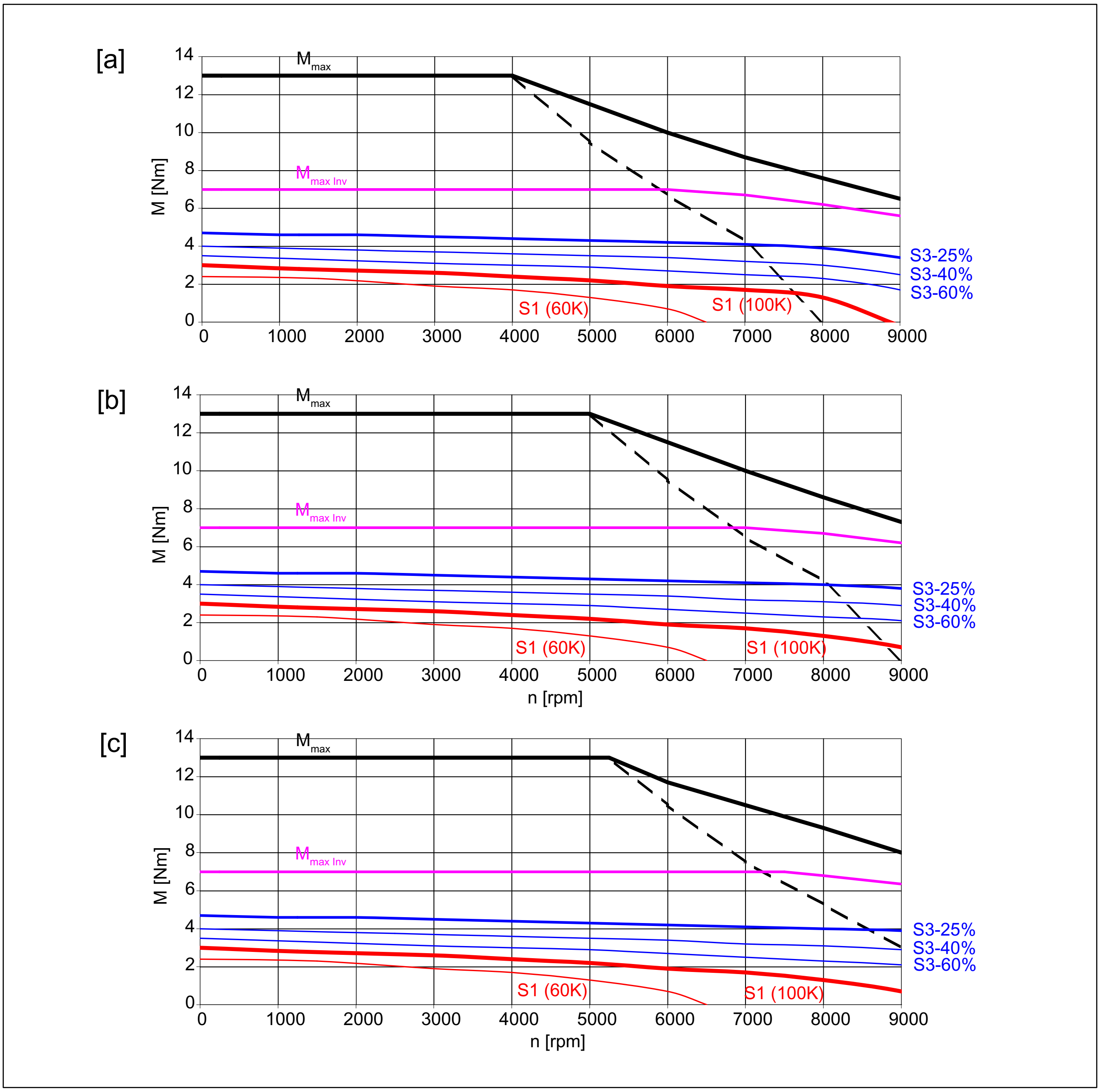
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-9 1FT7042-□AF7

Table 4- 8 1FT7042-□AK7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	6000
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	2
Rated current	I_N	A	3
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	2.4
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	3
Stall current (60 K)	$I_{0\ (60\ K)}$	A	3.1
Stall current (100 K)	$I_{0\ (100\ K)}$	A	3.9
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	3.68
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	2.81
Optimum operating point			
Optimum speed	n_{opt}	rpm	6000
Optimum power	P_{opt}	kW	1.26
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	11800
Maximum torque	M_{max}	Nm	13
Maximum current	I_{max}	A	21
Physical constants			
Torque constant	k_T	Nm/A	0.77
Voltage constant	k_E	V/1000 rpm	49
Winding resistance at 20 °C	R_{Str}	Ω	1.12
Rotating field inductance	L_D	mH	6.5
Electrical time constant	T_{el}	ms	6
Mechanical time constant	T_{mech}	ms	1.6
Thermal time constant	T_{th}	min	20
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	11700
Weight with brake	m_{MotBr}	kg	5.5
Weight without brake	m_{Mot}	kg	4.6
Recommended Motor Module 6SL112□-□TE15-0AA□			
Rated converter current	$I_{N\ Inv}$	A	5
Maximum converter current	$I_{max\ Inv}$	A	10
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	7



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

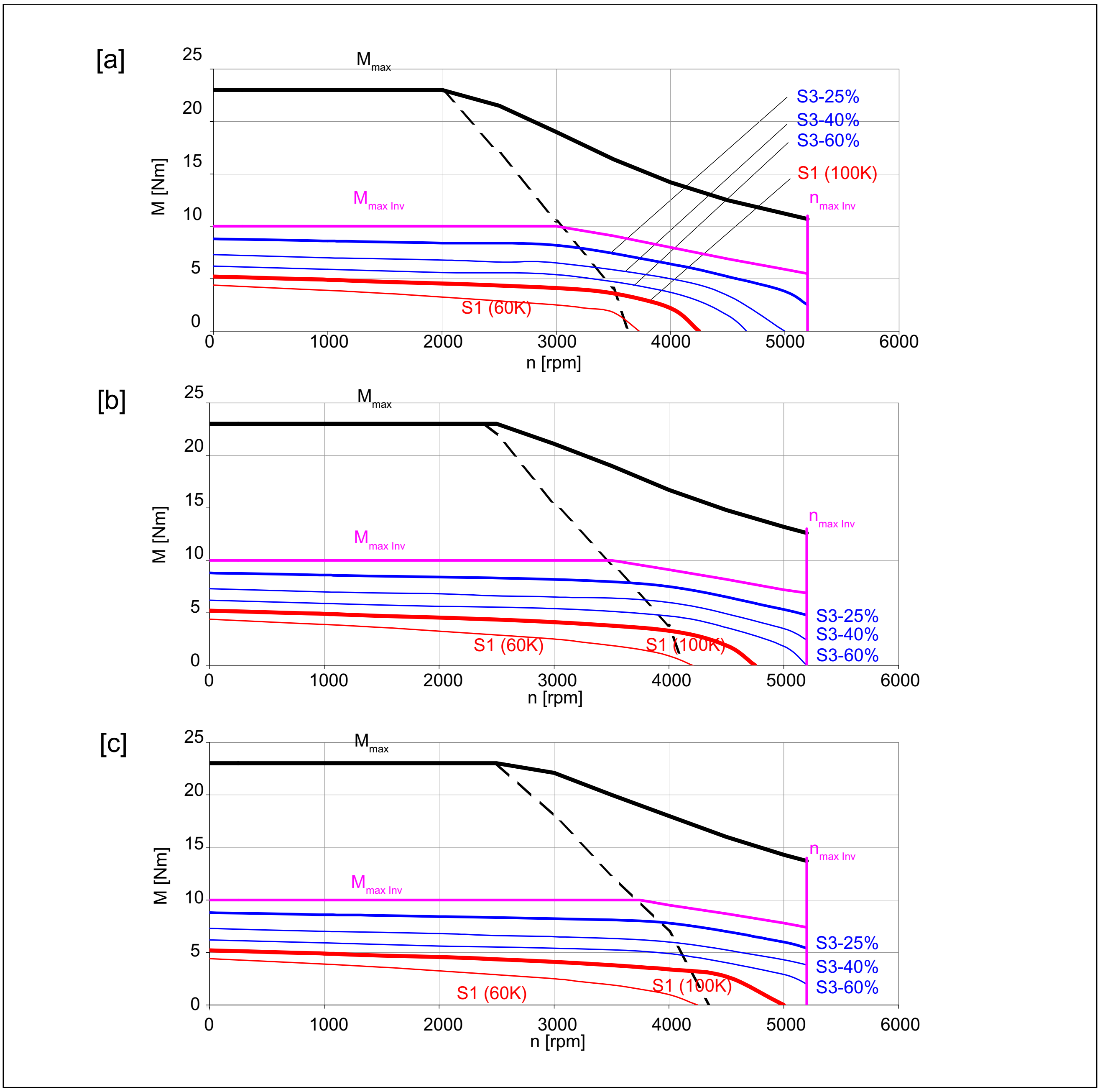
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-10 1FT7042-□AK7

Table 4- 9 1FT7044-□AF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	4.3
Rated current	I_N	A	2.6
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	4.4
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	5
Stall current (60 K)	$I_{0\ (60\ K)}$	A	2.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	2.8
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	6.3
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	5.43
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	1.35
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	5200
Maximum torque	M_{max}	Nm	23
Maximum current	I_{max}	A	16
Physical constants			
Torque constant	k_T	Nm/A	1.79
Voltage constant	k_E	V/1000 rpm	111
Winding resistance at 20 °C	R_{Str}	Ω	2.3
Rotating field inductance	L_D	mH	15
Electrical time constant	T_{el}	ms	7
Mechanical time constant	T_{mech}	ms	1.2
Thermal time constant	T_{th}	min	35
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	9500
Weight with brake	m_{MotBr}	kg	8.1
Weight without brake	m_{Mot}	kg	7.2
Recommended Motor Module 6SL112□-□TE13-0AA□			
Rated converter current	$I_{N\ Inv}$	A	3
Maximum converter current	$I_{max\ Inv}$	A	6
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	10



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

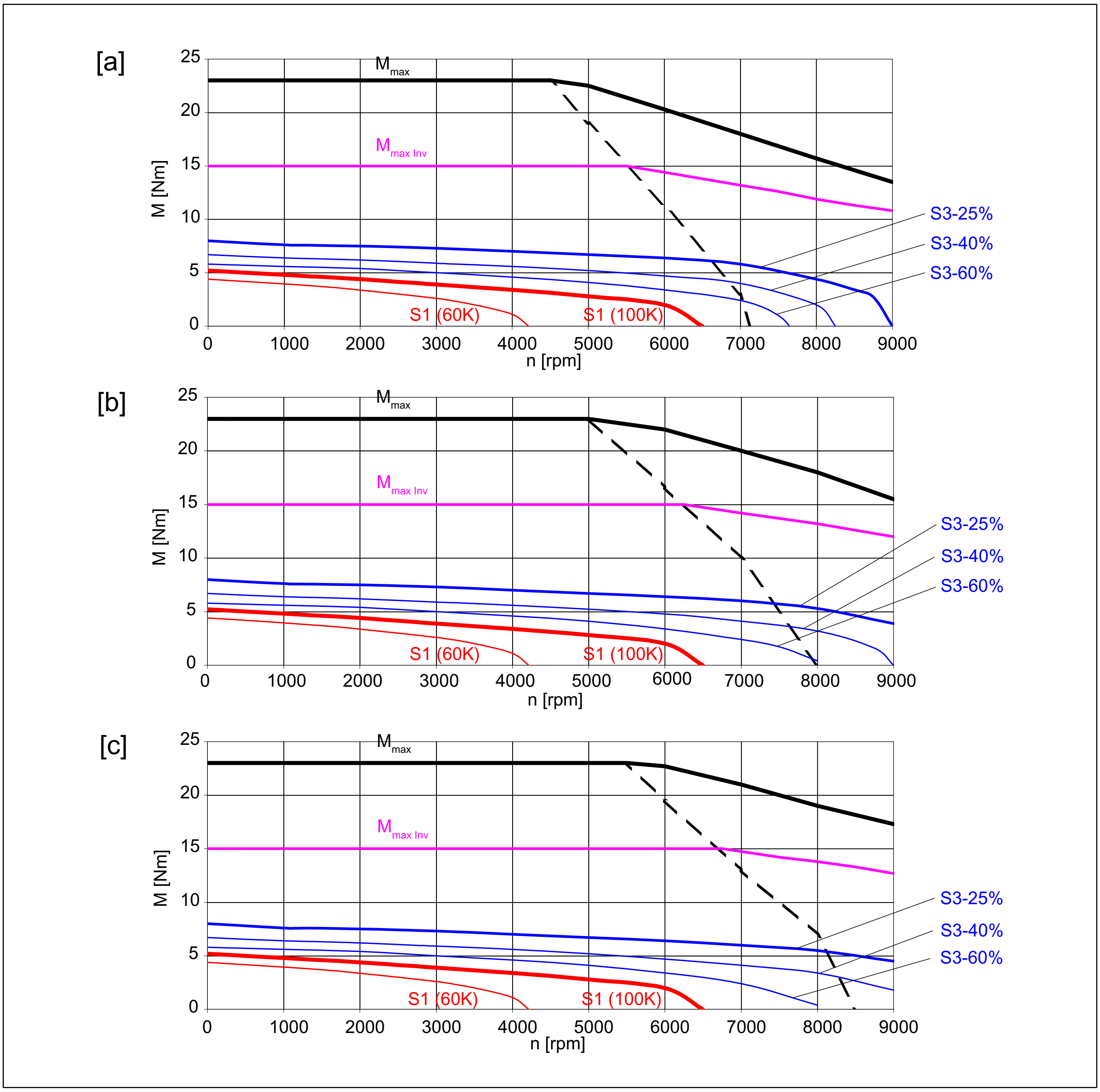
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-11 1FT7044-□AF7

Table 4- 10 1FT7044-□AK7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	6000
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	2
Rated current	I_N	A	2.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	4.4
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	5
Stall current (60 K)	$I_{0\ (60\ K)}$	A	4.8
Stall current (100 K)	$I_{0\ (100\ K)}$	A	5.7
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	6.3
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	5.43
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	1.41
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	10100
Maximum torque	M_{max}	Nm	23
Maximum current	I_{max}	A	30
Physical constants			
Torque constant	k_T	Nm/A	0.88
Voltage constant	k_E	V/1000 rpm	57
Winding resistance at 20 °C	R_{Str}	Ω	0.61
Rotating field inductance	L_D	mH	4.2
Electrical time constant	T_{el}	ms	7
Mechanical time constant	T_{mech}	ms	1.3
Thermal time constant	T_{th}	min	35
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	9500
Weight with brake	m_{MotBr}	kg	8.1
Weight without brake	m_{Mot}	kg	7.2
Recommended Motor Module 6SL112□-□TE21-0AA□			
Rated converter current	$I_{N\ Inv}$	A	9
Maximum converter current	$I_{max\ Inv}$	A	18
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	15



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

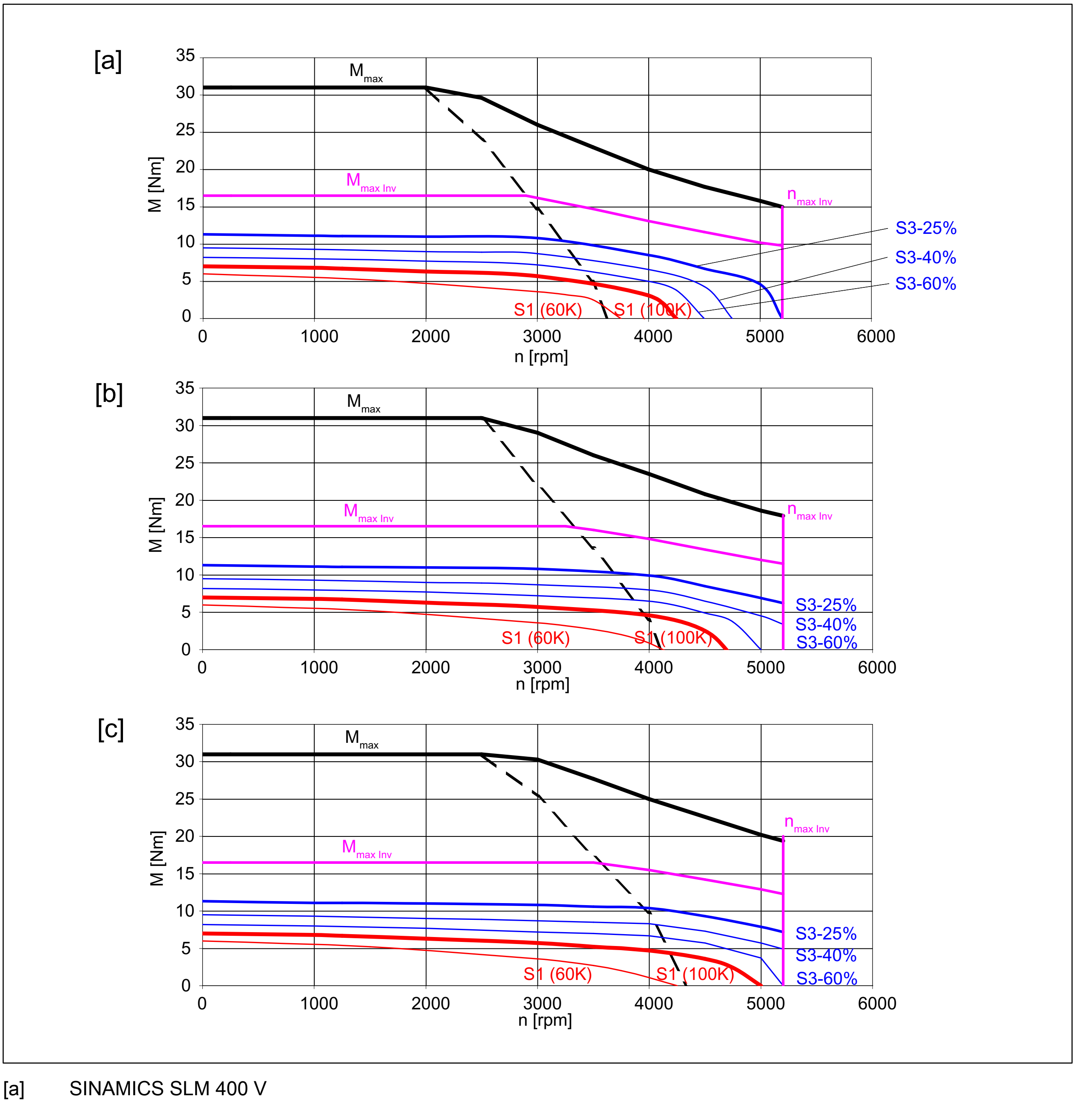
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-12 1FT7044-□AK7

Table 4- 11 1FT7046-□AF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	5.6
Rated current	I_N	A	3.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	6
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	7
Stall current (60 K)	$I_{0\ (60\ K)}$	A	3.3
Stall current (100 K)	$I_{0\ (100\ K)}$	A	4
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	8.39
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	7.52
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	1.76
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	5200
Maximum torque	M_{max}	Nm	31
Maximum current	I_{max}	A	19
Physical constants			
Torque constant	k_T	Nm/A	1.75
Voltage constant	k_E	V/1000 rpm	111
Winding resistance at 20 °C	R_{Str}	Ω	1.55
Rotating field inductance	L_D	mH	11
Electrical time constant	T_{el}	ms	7
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	35
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	8200
Weight with brake	m_{MotBr}	kg	10.2
Weight without brake	m_{Mot}	kg	9.3
Recommended Motor Module 6SL112□-□TE15-0AA□			
Rated converter current	$I_{N\ Inv}$	A	5
Maximum converter current	$I_{max\ Inv}$	A	10
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	16.5



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

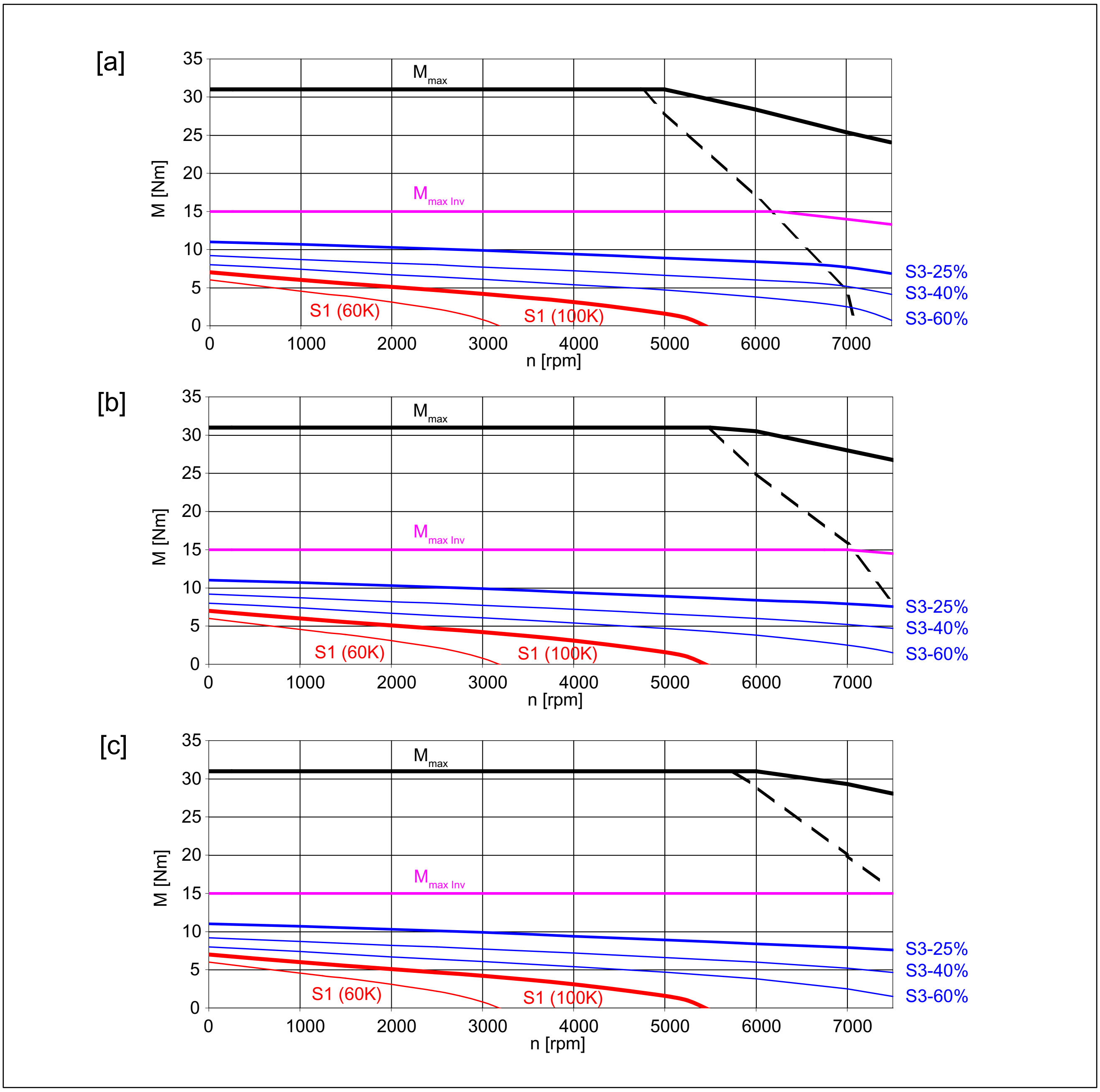
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-13 1FT7046-□AF7

Table 4- 12 1FT7046-□AH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	2.4
Rated current	I_N	A	3.2
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	6
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	7
Stall current (60 K)	$I_{0\ (60\ K)}$	A	6.7
Stall current (100 K)	$I_{0\ (100\ K)}$	A	8.1
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	8.39
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	7.52
Optimum operating point			
Optimum speed	n_{opt}	rpm	3500
Optimum power	P_{opt}	kW	1.32
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	10100
Maximum torque	M_{max}	Nm	31
Maximum current	I_{max}	A	38
Physical constants			
Torque constant	k_T	Nm/A	0.86
Voltage constant	k_E	V/1000 rpm	57
Winding resistance at 20 °C	R_{Str}	Ω	0.42
Rotating field inductance	L_D	mH	2.9
Electrical time constant	T_{el}	ms	7
Mechanical time constant	T_{mech}	ms	1.3
Thermal time constant	T_{th}	min	35
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	8200
Weight with brake	m_{MotBr}	kg	10.2
Weight without brake	m_{Mot}	kg	9.3
Recommended Motor Module 6SL112□-□TE21-0AA□			
Rated converter current	$I_{N\ Inv}$	A	9
Maximum converter current	$I_{max\ Inv}$	A	18
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	15



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

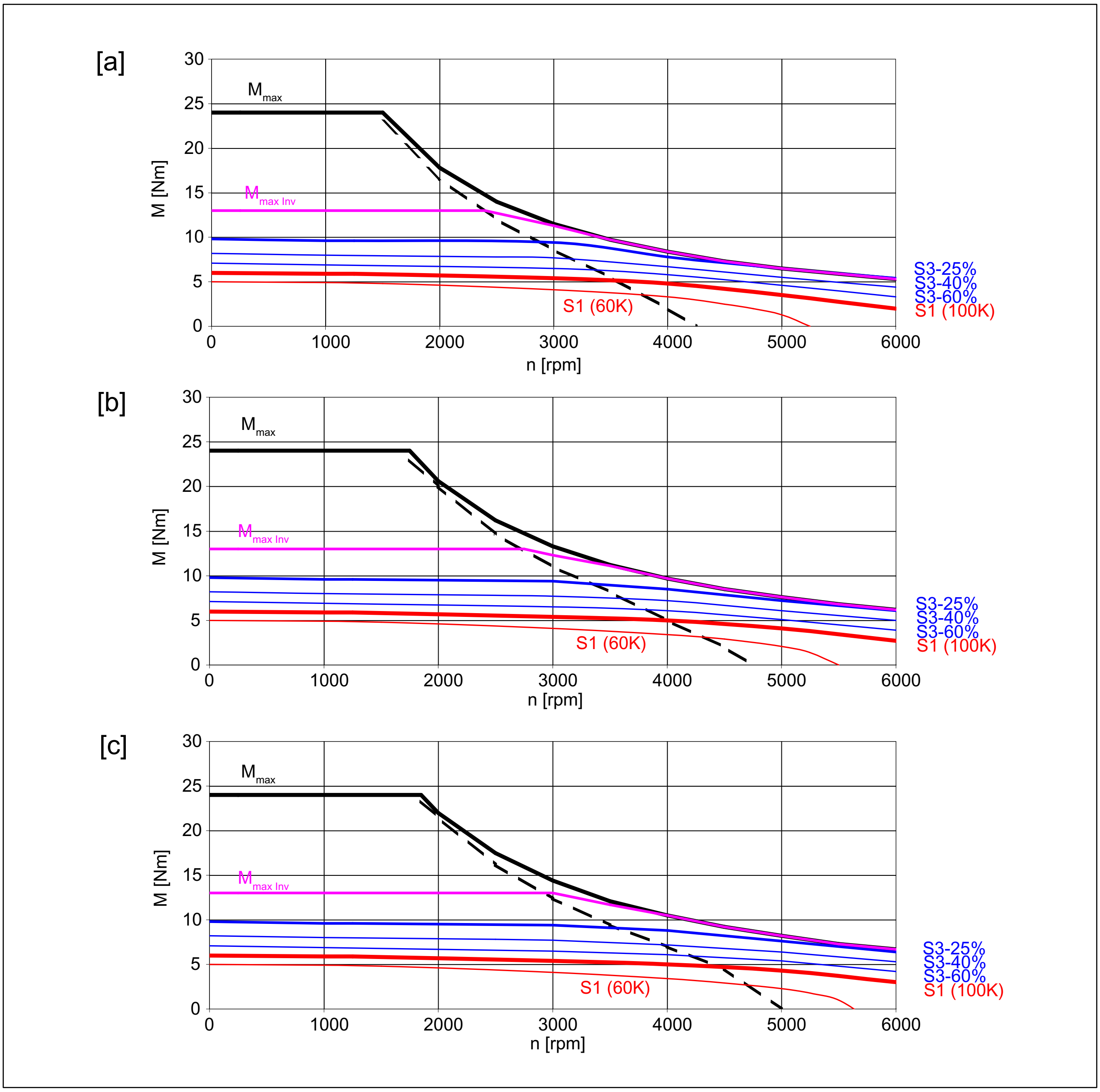
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-14 1FT7046-□AH7

Table 4- 13 1FT7062-□AF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	5.4
Rated current	I_N	A	3.9
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	5
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	6
Stall current (60 K)	$I_{0\ (60\ K)}$	A	3.2
Stall current (100 K)	$I_{0\ (100\ K)}$	A	3.9
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm²	10.2
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm²	7.36
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	1.70
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	6100
Maximum torque	M_{max}	Nm	24
Maximum current	I_{max}	A	22
Physical constants			
Torque constant	k_T	Nm/A	1.54
Voltage constant	k_E	V/1000 rpm	95
Winding resistance at 20 °C	R_{Str}	Ω	1.57
Rotating field inductance	L_D	mH	15.2
Electrical time constant	T_{el}	ms	10
Mechanical time constant	T_{mech}	ms	1.5
Thermal time constant	T_{th}	min	25
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	28000
Weight with brake	m_{MotBr}	kg	8.8
Weight without brake	m_{Mot}	kg	7.1
Recommended Motor Module 6SL112□-□TE15-0AA□			
Rated converter current	$I_{N\ Inv}$	A	5
Maximum converter current	$I_{max\ Inv}$	A	10
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	13



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

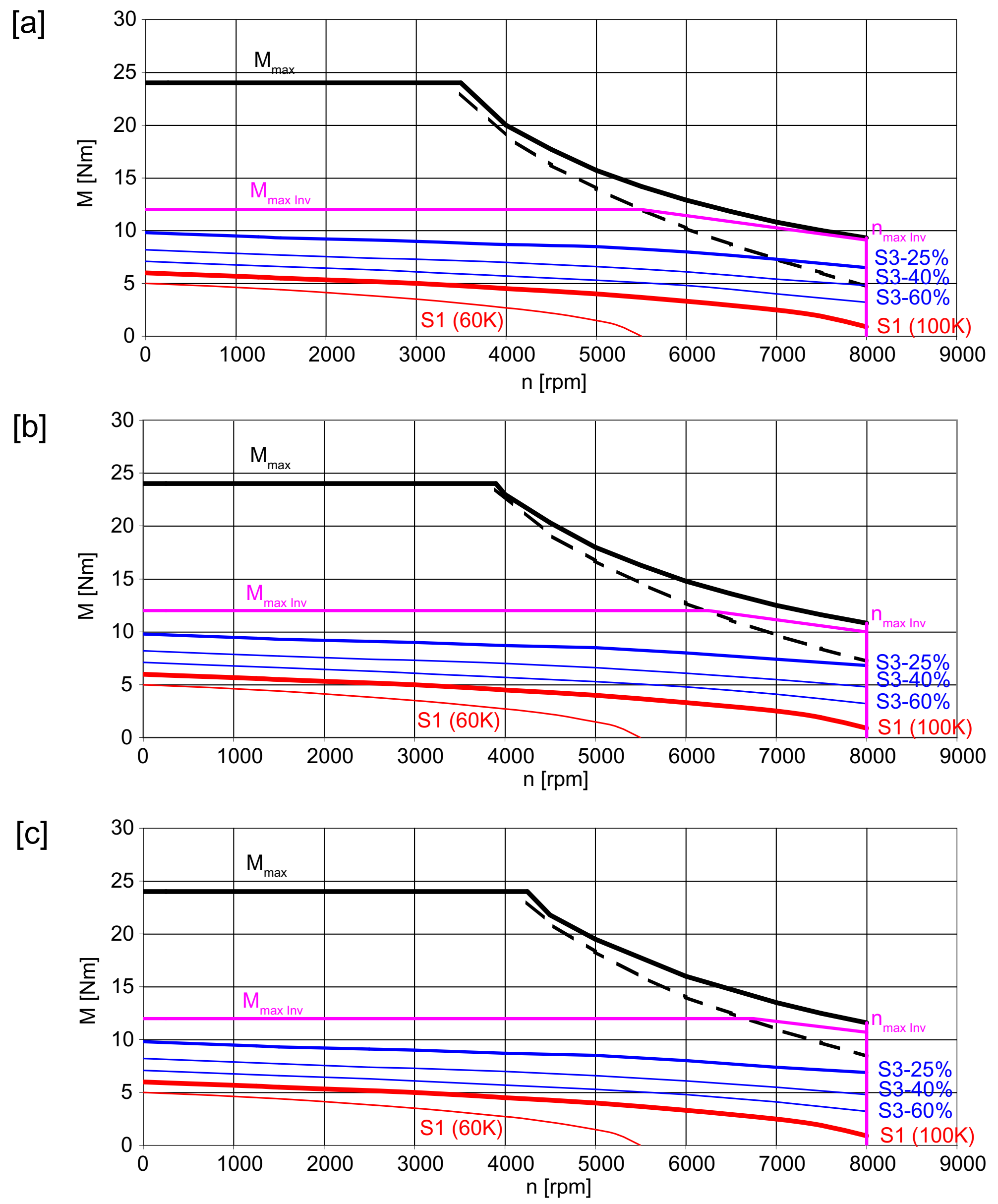
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-15 1FT7062-□AF7

Table 4- 14 1FT7062-□AK7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	6000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	3.3
Rated current	I_N	A	5.4
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	5
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	6
Stall current (60 K)	$I_{0\ (60\ K)}$	A	6.9
Stall current (100 K)	$I_{0\ (100\ K)}$	A	8.4
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	10.2
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	7.36
Optimum operating point			
Optimum speed	n_{opt}	rpm	5500
Optimum power	P_{opt}	kW	2.13
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	24
Maximum current	I_{max}	A	47
Physical constants			
Torque constant	k_T	Nm/A	0.71
Voltage constant	k_E	V/1000 rpm	45
Winding resistance at 20 °C	R_{Str}	Ω	0.34
Rotating field inductance	L_D	mH	3.4
Electrical time constant	T_{el}	ms	10
Mechanical time constant	T_{mech}	ms	1.5
Thermal time constant	T_{th}	min	25
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	28000
Weight with brake	m_{MotBr}	kg	8.8
Weight without brake	m_{Mot}	kg	7.1
Recommended Motor Module 6SL112□-□TE21-0AA□			
Rated converter current	$I_{N\ Inv}$	A	9
Maximum converter current	$I_{max\ Inv}$	A	18
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	12



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

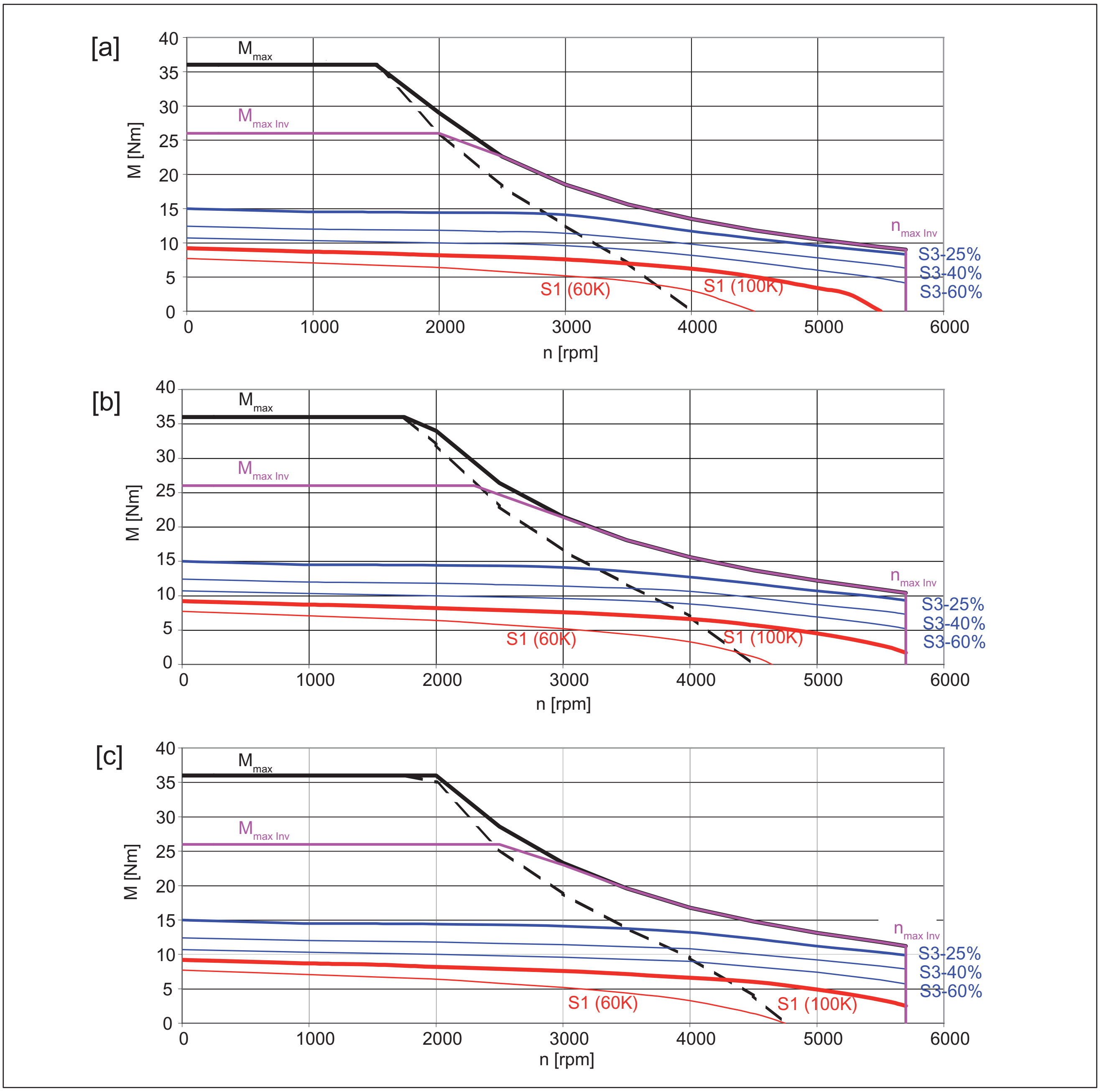
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-16 1FT7062-□AK7

Table 4- 15 1FT7064-□AF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	7.6
Rated current	I_N	A	5.2
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	7.7
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	9
Stall current (60 K)	$I_{0\ (60\ K)}$	A	4.7
Stall current (100 K)	$I_{0\ (100\ K)}$	A	5.7
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	14.7
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	11.9
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	2.39
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	5700
Maximum torque	M_{max}	Nm	36
Maximum current	I_{max}	A	29
Physical constants			
Torque constant	k_T	Nm/A	1.58
Voltage constant	k_E	V/1000 rpm	100
Winding resistance at 20 °C	R_{Str}	Ω	0.9
Rotating field inductance	L_D	mH	10
Electrical time constant	T_{el}	ms	11
Mechanical time constant	T_{mech}	ms	1.3
Thermal time constant	T_{th}	min	30
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	26000
Weight with brake	m_{MotBr}	kg	11.4
Weight without brake	m_{Mot}	kg	9.7
Recommended Motor Module 6SL112□-□TE21-0AA□			
Rated converter current	$I_{N\ Inv}$	A	9
Maximum converter current	$I_{max\ Inv}$	A	18
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	26



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

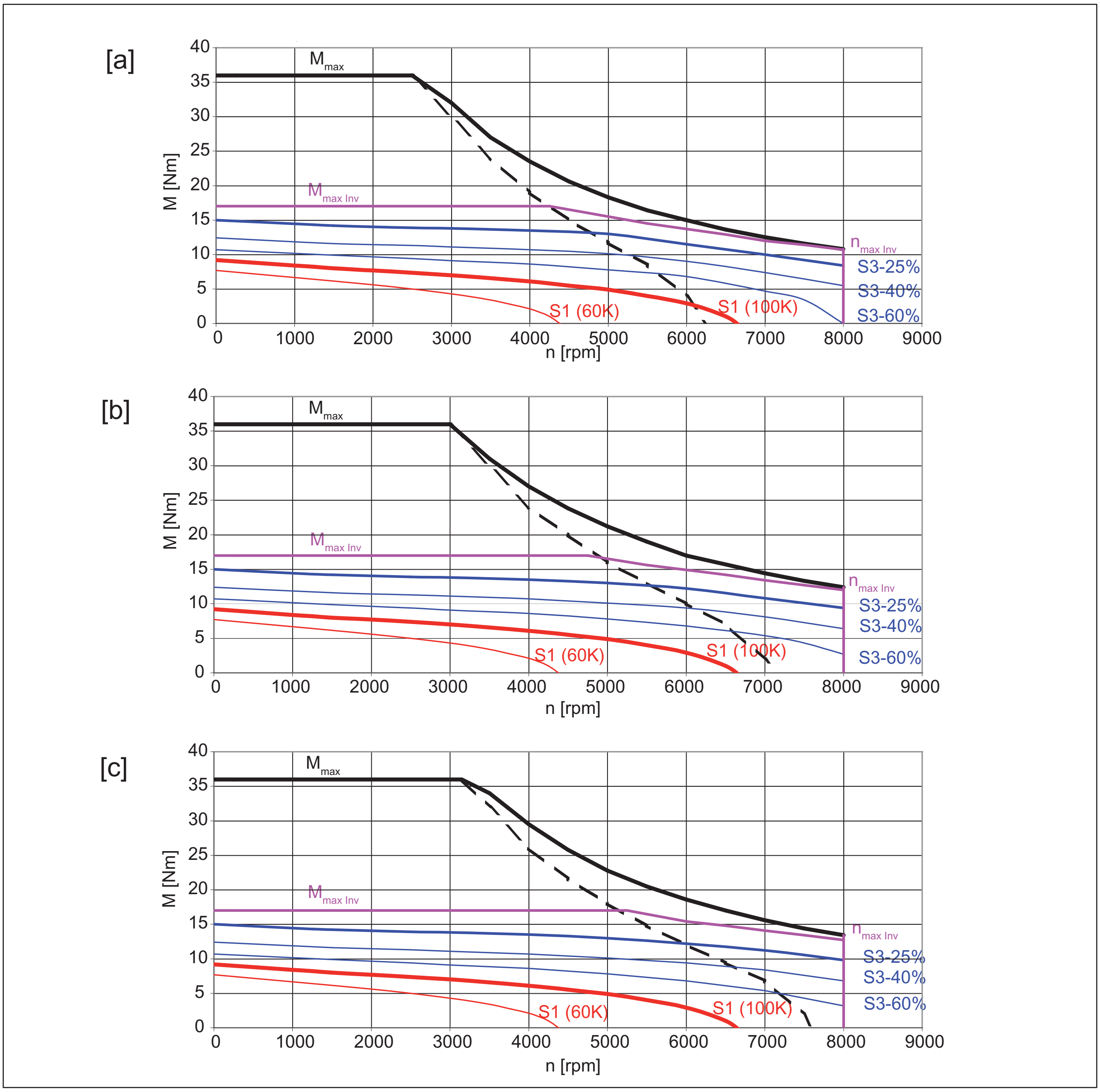
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-17 1FT7064-□AF7

Table 4- 16 1FT7064-□AK7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	6000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	2.9
Rated current	I_N	A	3.4
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	7.7
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	9
Stall current (60 K)	$I_{0\ (60\ K)}$	A	7.4
Stall current (100 K)	$I_{0\ (100\ K)}$	A	9
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	14.7
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	11.9
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	2.59
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	36
Maximum current	I_{max}	A	45
Physical constants			
Torque constant	k_T	Nm/A	1.00
Voltage constant	k_E	V/1000 rpm	64
Winding resistance at 20 °C	R_{Str}	Ω	0.38
Rotating field inductance	L_D	mH	4.1
Electrical time constant	T_{el}	ms	11
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	30
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	26000
Weight with brake	m_{MotBr}	kg	11.4
Weight without brake	m_{Mot}	kg	9.7
Recommended Motor Module 6SL112□-□TE21-0AA□			
Rated converter current	$I_{N\ Inv}$	A	9
Maximum converter current	$I_{max\ Inv}$	A	18
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	17



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

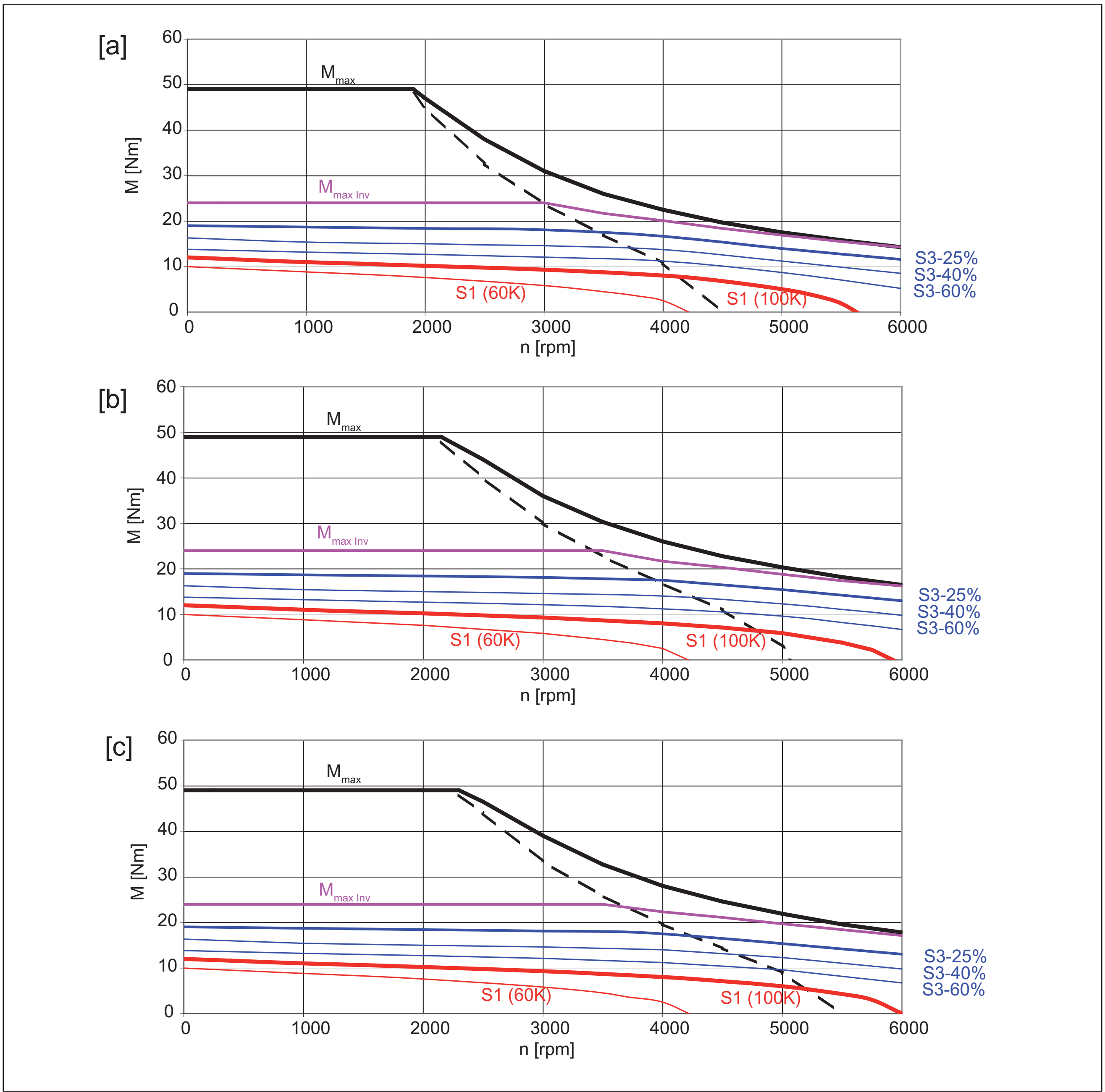
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-18 1FT7064-□AK7

Table 4- 17 1FT7066-□AF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	9.3
Rated current	I_N	A	7.2
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	10
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	12
Stall current (60 K)	$I_{0\ (60\ K)}$	A	7
Stall current (100 K)	$I_{0\ (100\ K)}$	A	8.4
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	19.3
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	16.4
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	2.92
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	6500
Maximum torque	M_{max}	Nm	49
Maximum current	I_{max}	A	44
Physical constants			
Torque constant	k_T	Nm/A	1.43
Voltage constant	k_E	V/1000 rpm	89.5
Winding resistance at 20 °C	R_{Str}	Ω	0.49
Rotating field inductance	L_D	mH	5.5
Electrical time constant	T_{el}	ms	11
Mechanical time constant	T_{mech}	ms	1.2
Thermal time constant	T_{th}	min	40
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	24000
Weight with brake	m_{MotBr}	kg	14.1
Weight without brake	m_{Mot}	kg	12.3
Recommended Motor Module 6SL112□-□TE21-0AA□			
Rated converter current	$I_{N\ Inv}$	A	9
Maximum converter current	$I_{max\ Inv}$	A	18
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	24



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

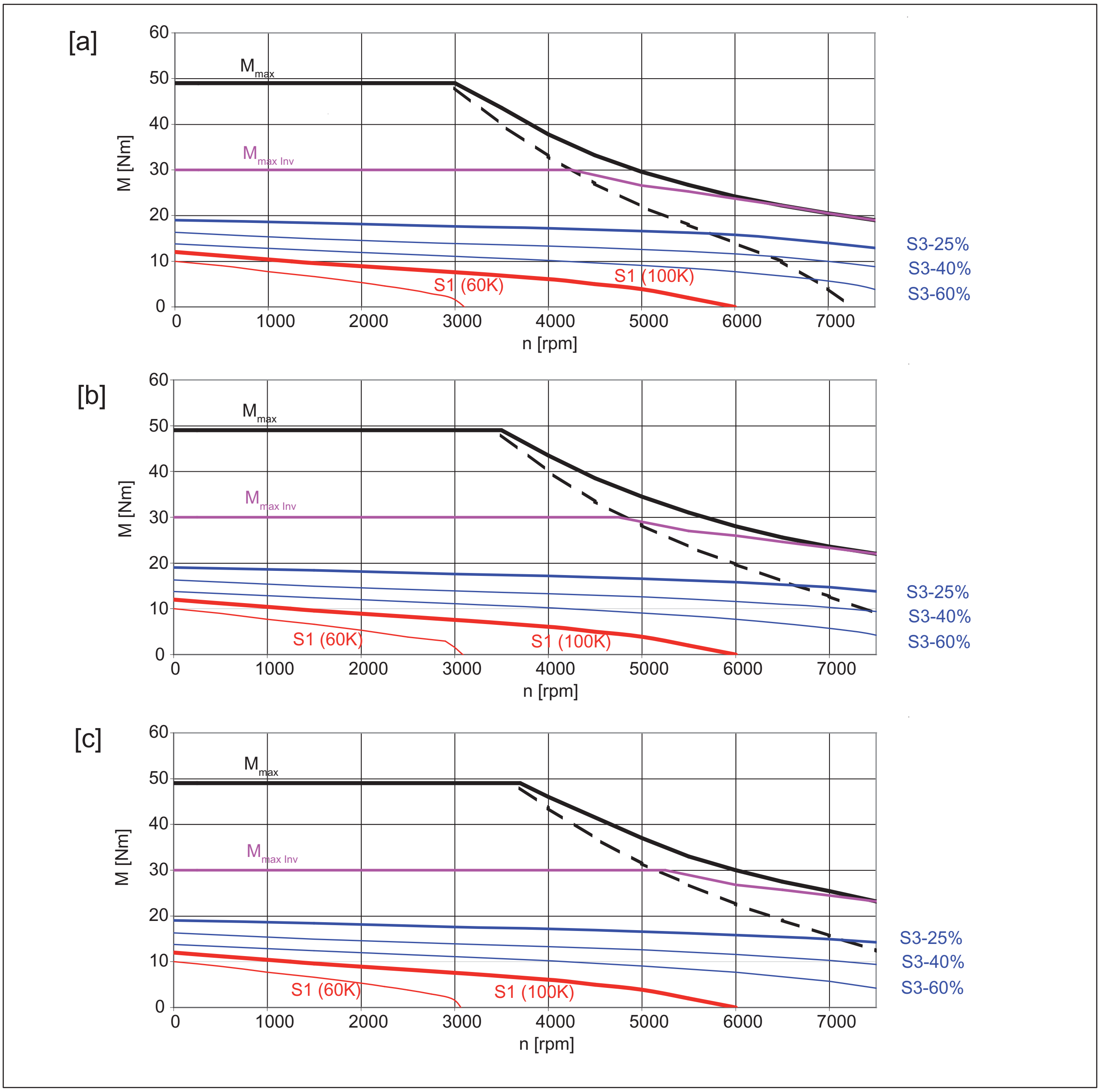
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-19 1FT7066-□AF7

Table 4- 18 1FT7066-□AH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	5
Rated current	I_N	A	6.3
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	10
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	12
Stall current (60 K)	$I_{0\ (60\ K)}$	A	10.1
Stall current (100 K)	$I_{0\ (100\ K)}$	A	13.6
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm²	19.3
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm²	16.4
Optimum operating point			
Optimum speed	n_{opt}	rpm	4000
Optimum power	P_{opt}	kW	2.55
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	49
Maximum current	I_{max}	A	70
Physical constants			
Torque constant	k_T	Nm/A	0.88
Voltage constant	k_E	V/1000 rpm	56.5
Winding resistance at 20 °C	R_{Str}	Ω	0.185
Rotating field inductance	L_D	mH	2.3
Electrical time constant	T_{el}	ms	12
Mechanical time constant	T_{mech}	ms	1.2
Thermal time constant	T_{th}	min	40
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	24000
Weight with brake	m_{MotBr}	kg	14.1
Weight without brake	m_{Mot}	kg	12.3
Recommended Motor Module 6SL112□-□TE21-8AA□			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	30



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

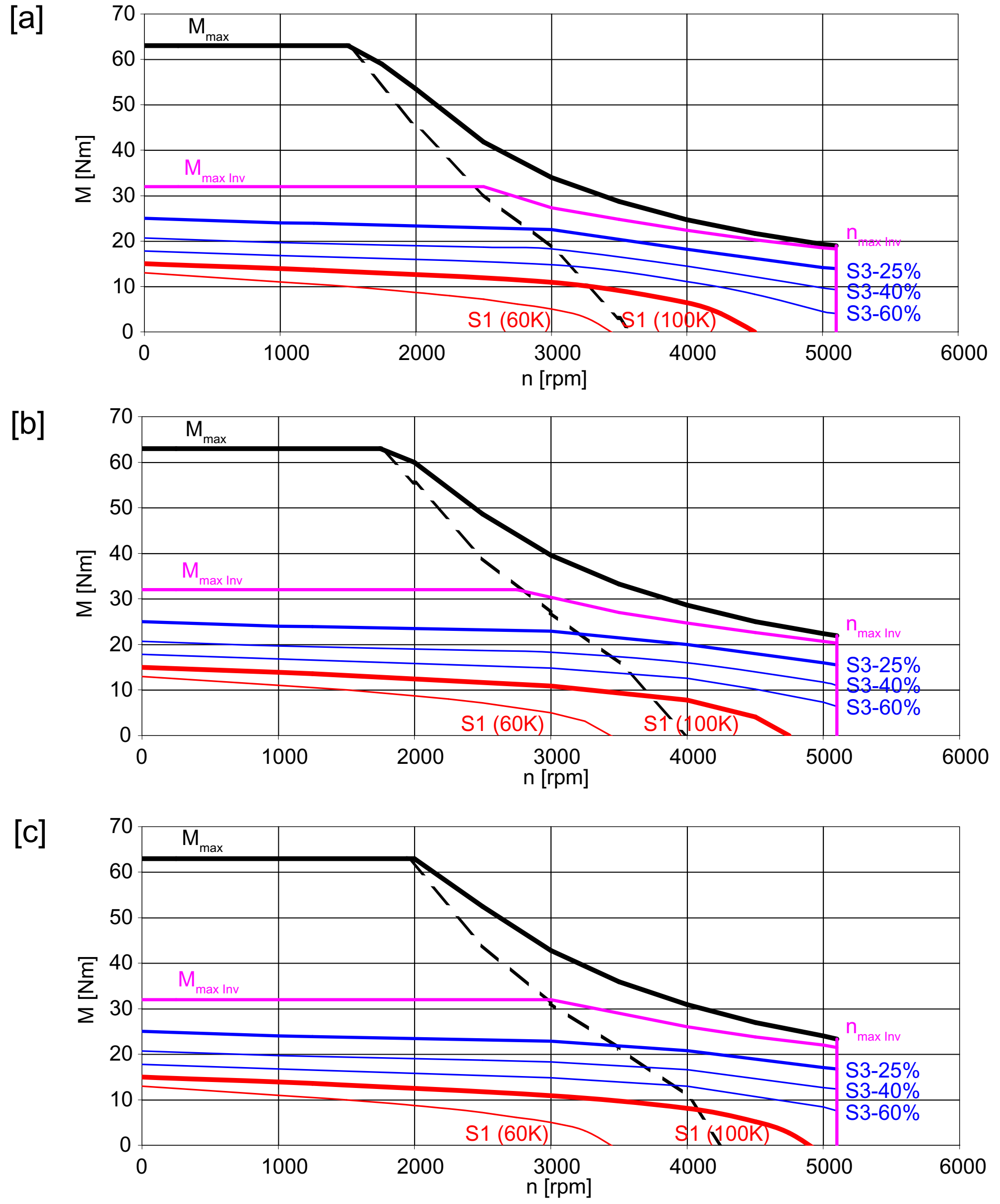
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-20 1FT7066-□AH7

Table 4- 19 1FT7068-□AF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	10.9
Rated current	I_N	A	6.7
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	13
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	15
Stall current (60 K)	$I_{0\ (60\ K)}$	A	7.1
Stall current (100 K)	$I_{0\ (100\ K)}$	A	8.3
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm²	26.1
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm²	23.2
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	3.42
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	5100
Maximum torque	M_{max}	Nm	63
Maximum current	I_{max}	A	43
Physical constants			
Torque constant	k_T	Nm/A	1.81
Voltage constant	k_E	V/1000 rpm	114
Winding resistance at 20 °C	R_{Str}	Ω	0.53
Rotating field inductance	L_D	mH	6.4
Electrical time constant	T_{el}	ms	12
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	45
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	21400
Weight with brake	m_{MotBr}	kg	18
Weight without brake	m_{Mot}	kg	16.3
Recommended Motor Module 6SL112□-□TE21-0AA□			
Rated converter current	$I_{N\ Inv}$	A	9
Maximum converter current	$I_{max\ Inv}$	A	18
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	32



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

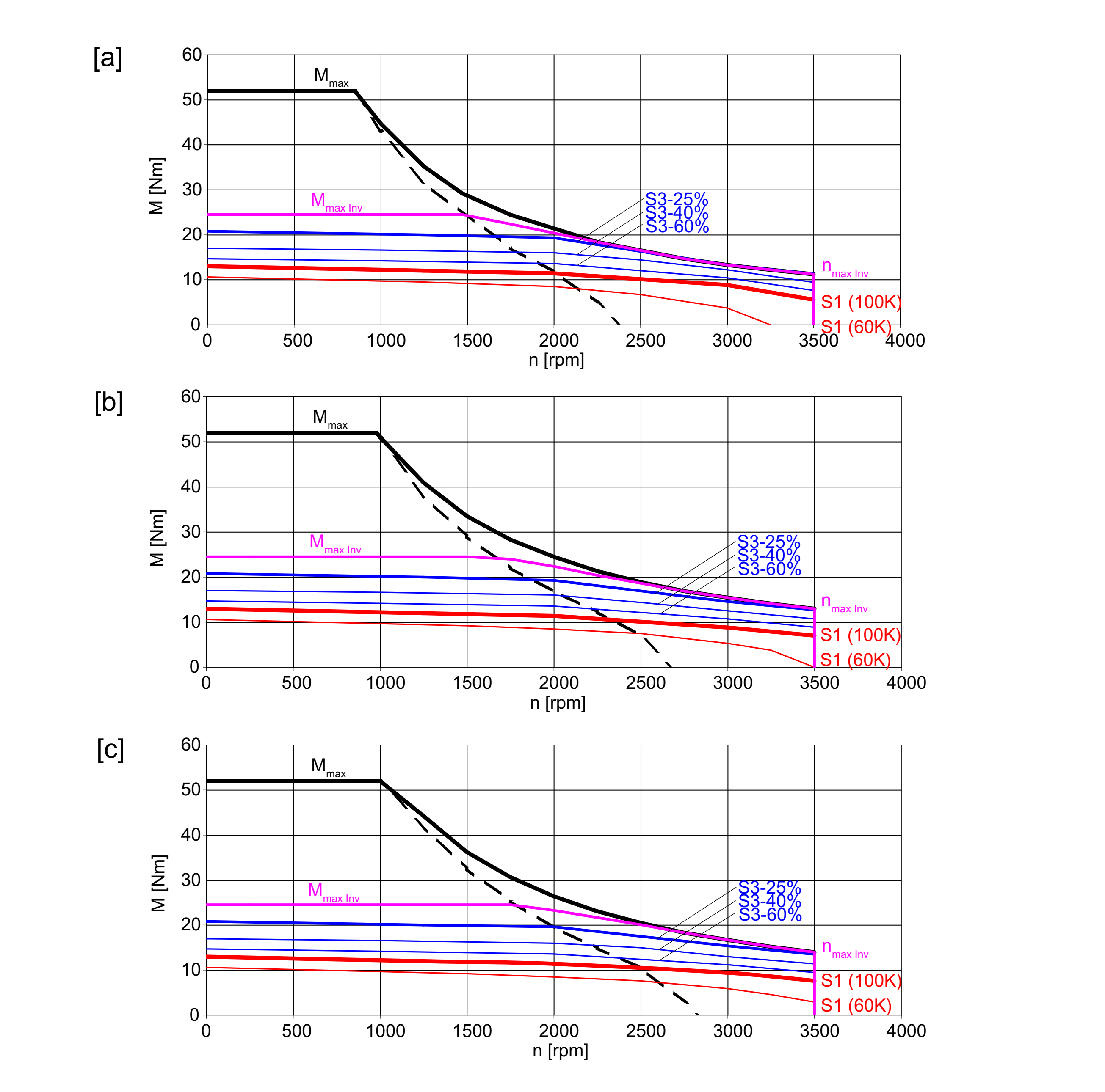
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-21 1FT7068-□AF7

Table 4- 20 1FT7082-□AC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	11.4
Rated current	I_N	A	4.9
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	10.6
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	13
Stall current (60 K)	$I_{0\ (60\ K)}$	A	4
Stall current (100 K)	$I_{0\ (100\ K)}$	A	5
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	41.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	26.5
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	2.39
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	3500
Maximum torque	M_{max}	Nm	52
Maximum current	I_{max}	A	26
Physical constants			
Torque constant	k_T	Nm/A	2.60
Voltage constant	k_E	V/1000 rpm	162
Winding resistance at 20 °C	R_{Str}	Ω	1.38
Rotating field inductance	L_D	mH	21
Electrical time constant	T_{el}	ms	15
Mechanical time constant	T_{mech}	ms	1.7
Thermal time constant	T_{th}	min	40
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	75700
Weight with brake	m_{MotBr}	kg	18.3
Weight without brake	m_{Mot}	kg	14
Recommended Motor Module 6SL112□-□TE15-0AA□			
Rated converter current	$I_{N\ Inv}$	A	5
Maximum converter current	$I_{max\ Inv}$	A	10
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	24



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

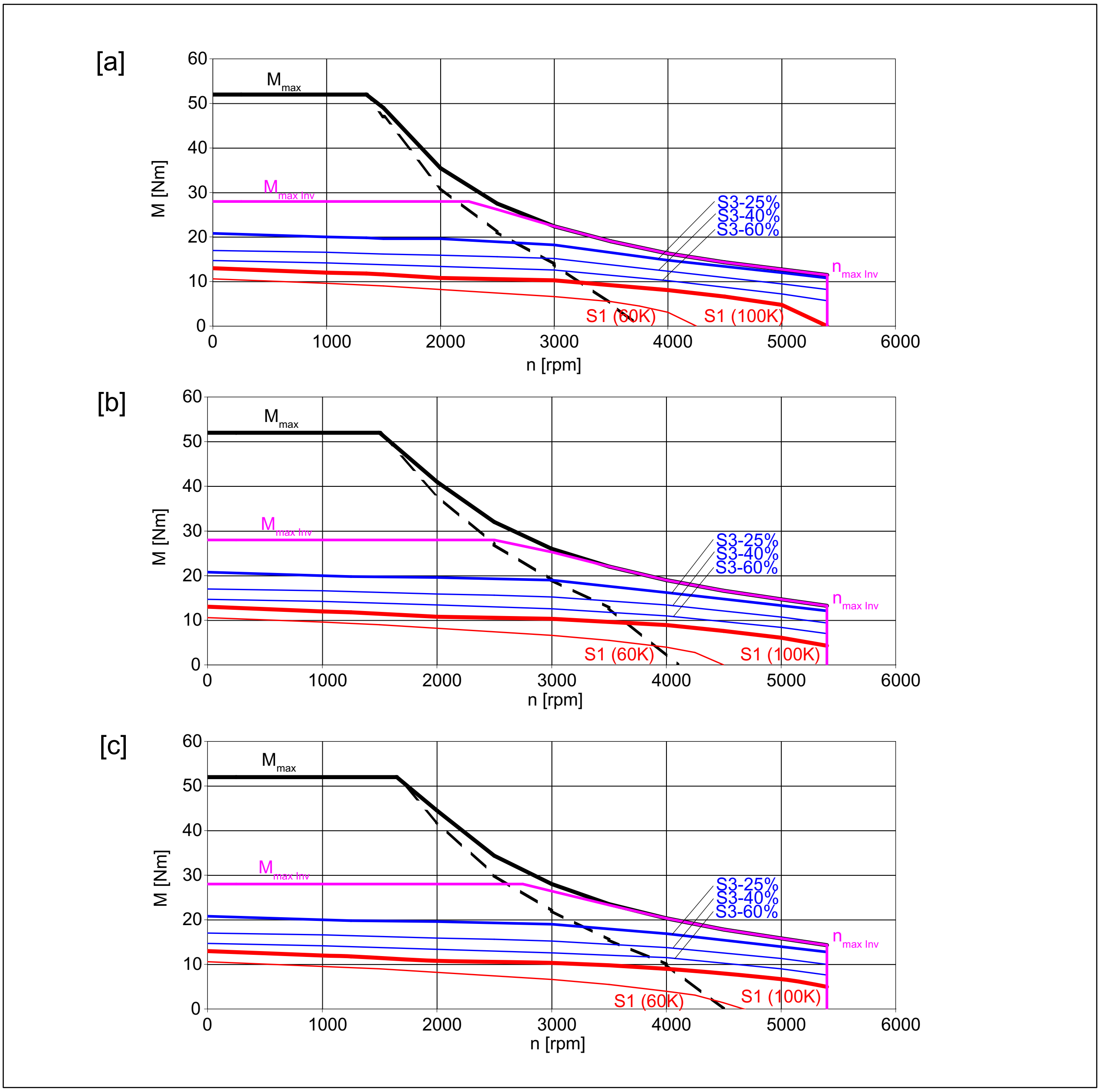
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-22 1FT7082-□AC7

Table 4- 21 1FT7082-□AF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	10.3
Rated current	I_N	A	6.6
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	10.6
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	13
Stall current (60 K)	$I_{0\ (60\ K)}$	A	6.1
Stall current (100 K)	$I_{0\ (100\ K)}$	A	7.6
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	41.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	26.5
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	3.24
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	5400
Maximum torque	M_{max}	Nm	52
Maximum current	I_{max}	A	39
Physical constants			
Torque constant	k_T	Nm/A	1.71
Voltage constant	k_E	V/1000 rpm	108
Winding resistance at 20 °C	R_{Str}	Ω	0.59
Rotating field inductance	L_D	mH	9.3
Electrical time constant	T_{el}	ms	16
Mechanical time constant	T_{mech}	ms	1.6
Thermal time constant	T_{th}	min	40
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	75700
Weight with brake	m_{MotBr}	kg	18.3
Weight without brake	m_{Mot}	kg	14
Recommended Motor Module 6SL112□-□TE21-0AA□			
Rated converter current	$I_{N\ Inv}$	A	9
Maximum converter current	$I_{max\ Inv}$	A	18
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	28



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

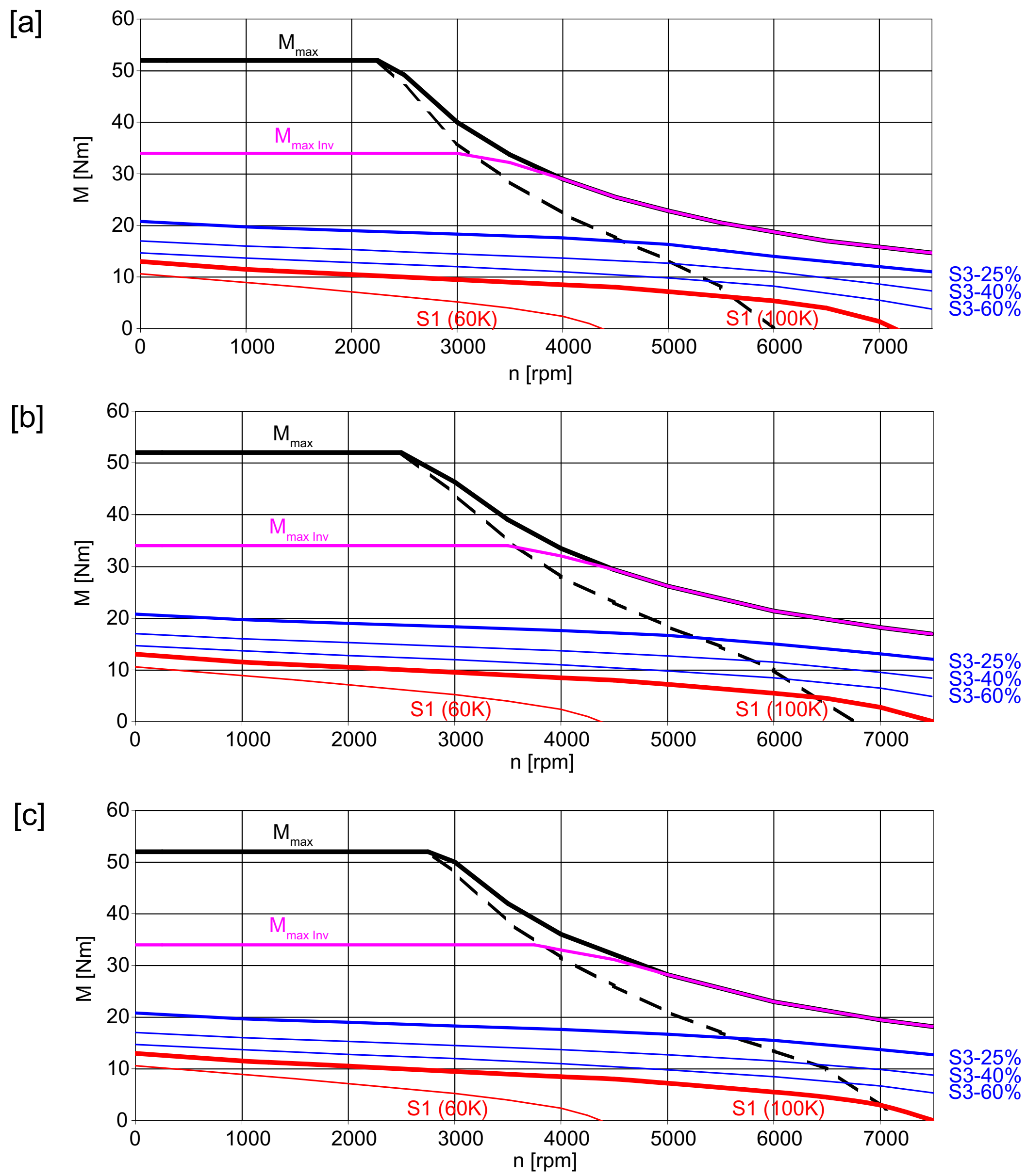
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-23 1FT7082-□AF7

Table 4- 22 1FT7082-□AH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	8
Rated current	I_N	A	7.8
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	10.6
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	13
Stall current (60 K)	$I_{0\ (60\ K)}$	A	10
Stall current (100 K)	$I_{0\ (100\ K)}$	A	12.3
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	41.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	26.5
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	3.77
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	52
Maximum current	I_{max}	A	63
Physical constants			
Torque constant	k_T	Nm/A	1.06
Voltage constant	k_E	V/1000 rpm	66.5
Winding resistance at 20 °C	R_{Str}	Ω	0.23
Rotating field inductance	L_D	mH	3.5
Electrical time constant	T_{el}	ms	15
Mechanical time constant	T_{mech}	ms	1.6
Thermal time constant	T_{th}	min	40
Shaft torsional stiffness	c_t	Nm/rad	75700
Weight with brake	m_{MotBr}	kg	18.3
Weight without brake	m_{Mot}	kg	14
Recommended Motor Module 6SL112□-□TE21-8AA□			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	34



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

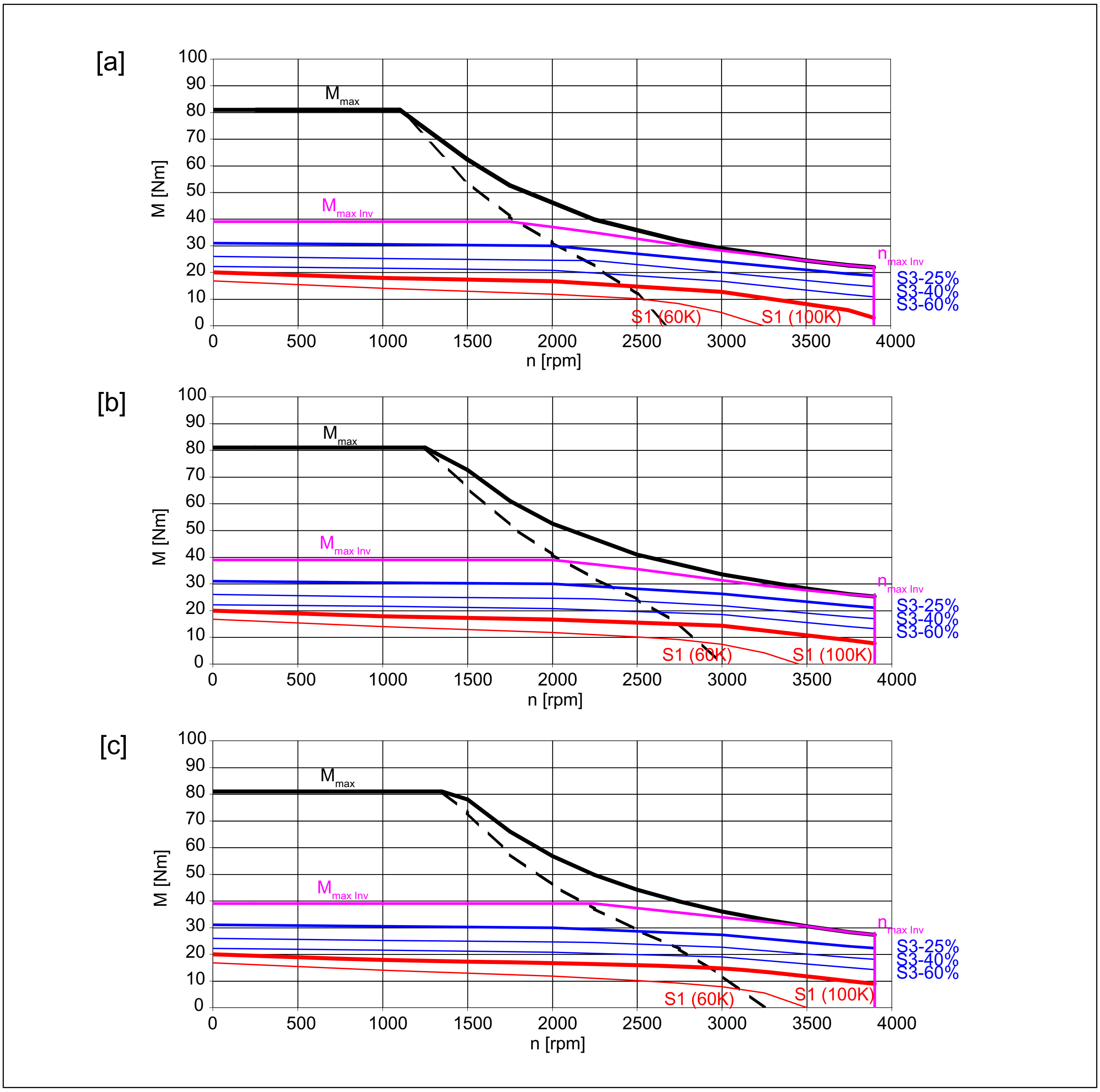
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-24 1FT7082-□AH7

Table 4- 23 1FT7084-□AC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	16.9
Rated current	I_N	A	8.4
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	16.8
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	20
Stall current (60 K)	$I_{0\ (60\ K)}$	A	7.4
Stall current (100 K)	$I_{0\ (100\ K)}$	A	9
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	60.4
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	45.1
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	3.54
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	4200
Maximum torque	M_{max}	Nm	81
Maximum current	I_{max}	A	46
Physical constants			
Torque constant	k_T	Nm/A	2.22
Voltage constant	k_E	V/1000 rpm	138
Winding resistance at 20 °C	R_{Str}	Ω	0.52
Rotating field inductance	L_D	mH	8.5
Electrical time constant	T_{el}	ms	16
Mechanical time constant	T_{mech}	ms	1.5
Thermal time constant	T_{th}	min	55
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	65100
Weight with brake	m_{MotBr}	kg	25.1
Weight without brake	m_{Mot}	kg	20.8
Recommended Motor Module 6SL112□-□TE21-0AA□			
Rated converter current	$I_{N\ Inv}$	A	9
Maximum converter current	$I_{max\ Inv}$	A	18
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	36



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

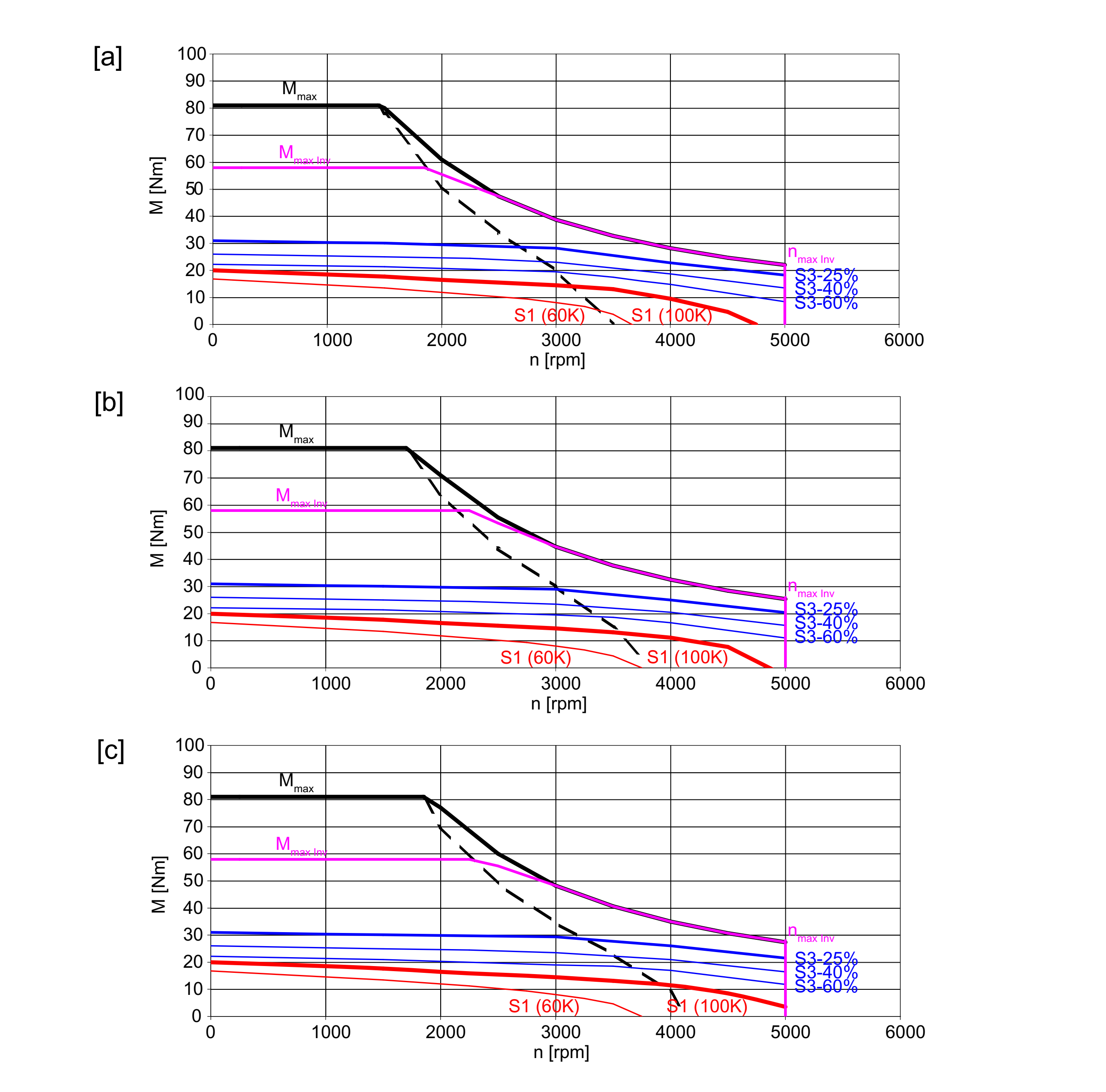
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-25 1FT7084-□AC7

Table 4- 24 1FT7084-□AF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	14.5
Rated current	I_N	A	8.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	16.8
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	20
Stall current (60 K)	$I_{0\ (60\ K)}$	A	8.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	11
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	60.4
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	45.1
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	4.55
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	5000
Maximum torque	M_{max}	Nm	81
Maximum current	I_{max}	A	55
Physical constants			
Torque constant	k_T	Nm/A	1.82
Voltage constant	k_E	V/1000 rpm	116
Winding resistance at 20 °C	R_{Str}	Ω	0.34
Rotating field inductance	L_D	mH	6
Electrical time constant	T_{el}	ms	18
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	55
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	65100
Weight with brake	m_{MotBr}	kg	25.1
Weight without brake	m_{Mot}	kg	20.8
Recommended Motor Module 6SL112□-□TE21-8AA□			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	58



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

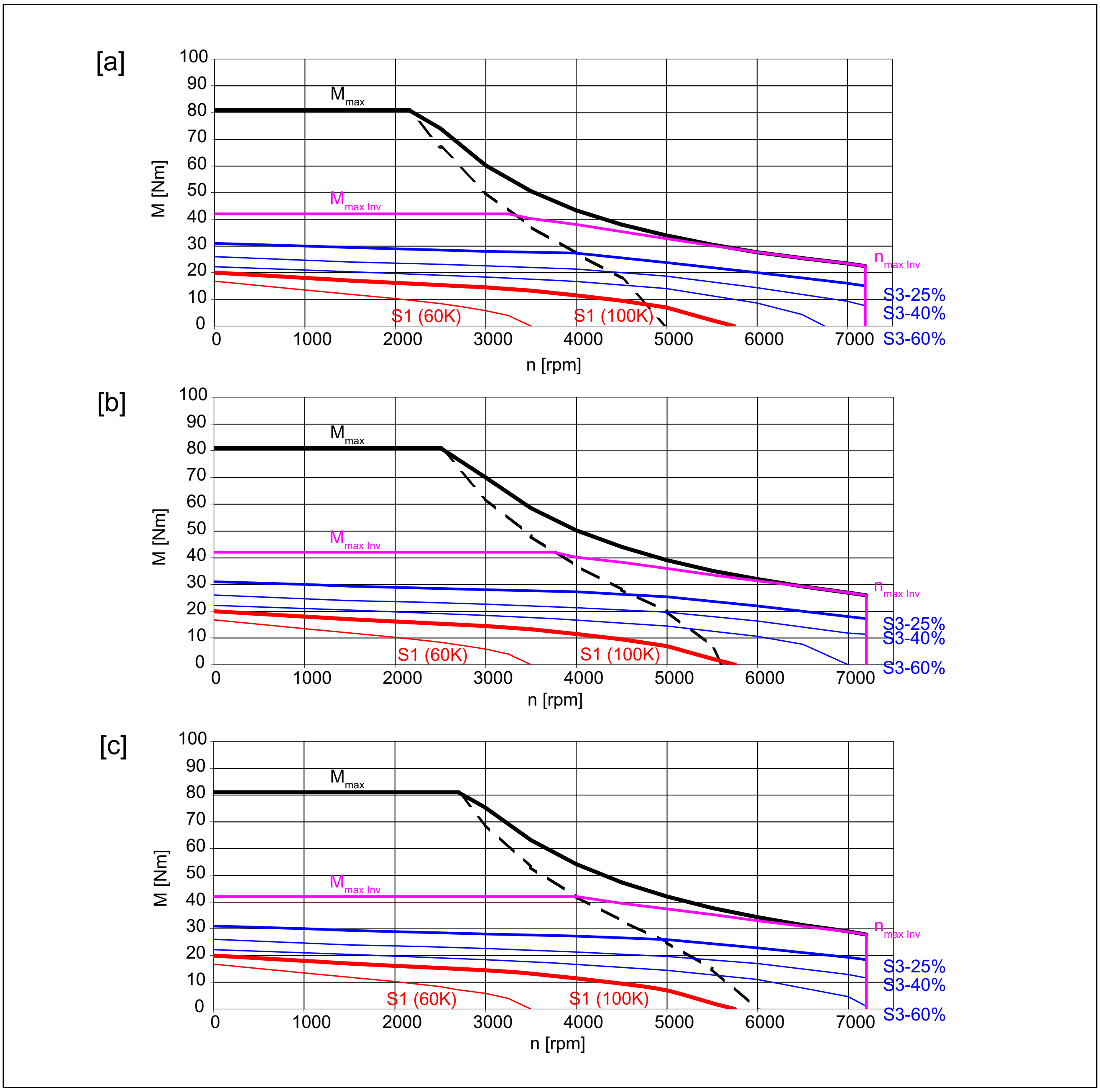
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-26 1FT7084-□AF7

Table 4- 25 1FT7084-□AH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	9.5
Rated current	I_N	A	7.8
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	16.8
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	20
Stall current (60 K)	$I_{0\ (60\ K)}$	A	13
Stall current (100 K)	$I_{0\ (100\ K)}$	A	15.6
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	60.4
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	45.1
Optimum operating point			
Optimum speed	n_{opt}	rpm	4000
Optimum power	P_{opt}	kW	4.82
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7200
Maximum torque	M_{max}	Nm	81
Maximum current	I_{max}	A	80
Physical constants			
Torque constant	k_T	Nm/A	1.28
Voltage constant	k_E	V/1000 rpm	80
Winding resistance at 20 °C	R_{Str}	Ω	0.17
Rotating field inductance	L_D	mH	2.9
Electrical time constant	T_{el}	ms	17
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	55
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	65100
Weight with brake	m_{MotBr}	kg	25.1
Weight without brake	m_{Mot}	kg	20.8
Recommended Motor Module 6SL112□-□TE21-8AA□			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	42



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

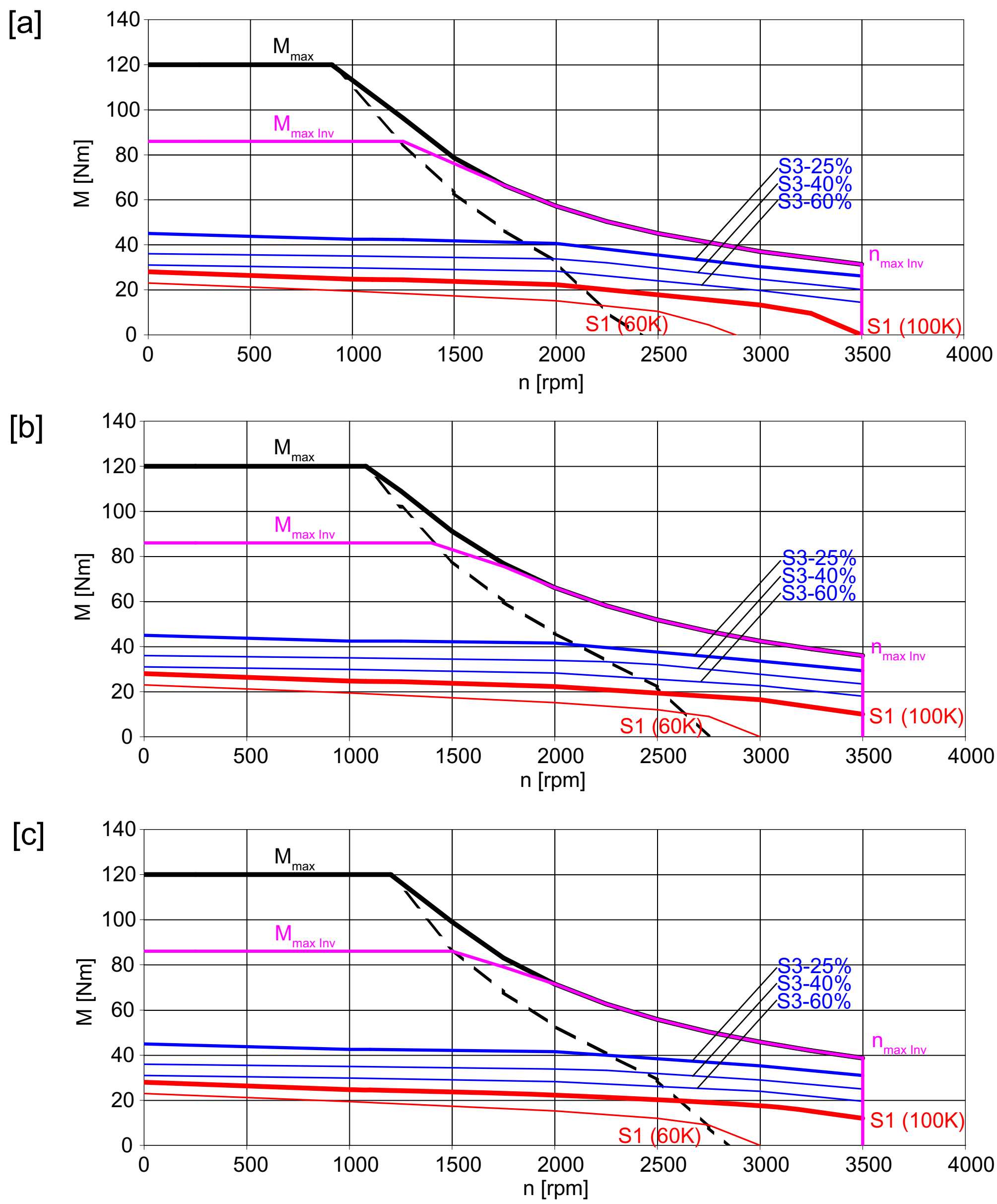
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-27 1FT7084-□AH7

Table 4- 26 1FT7086-□AC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	22.5
Rated current	I_N	A	9.2
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	23
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	28
Stall current (60 K)	$I_{0\ (60\ K)}$	A	8.6
Stall current (100 K)	$I_{0\ (100\ K)}$	A	10.6
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	79
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	63.6
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	4.71
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	3500
Maximum torque	M_{max}	Nm	120
Maximum current	I_{max}	A	54
Physical constants			
Torque constant	k_T	Nm/A	2.64
Voltage constant	k_E	V/1000 rpm	166
Winding resistance at 20 °C	R_{Str}	Ω	0.46
Rotating field inductance	L_D	mH	8.5
Electrical time constant	T_{el}	ms	18
Mechanical time constant	T_{mech}	ms	1.3
Thermal time constant	T_{th}	min	60
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	57000
Weight with brake	m_{MotBr}	kg	31.8
Weight without brake	m_{Mot}	kg	27.5
Recommended Motor Module 6SL112□-□TE21-8AA□			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	86



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

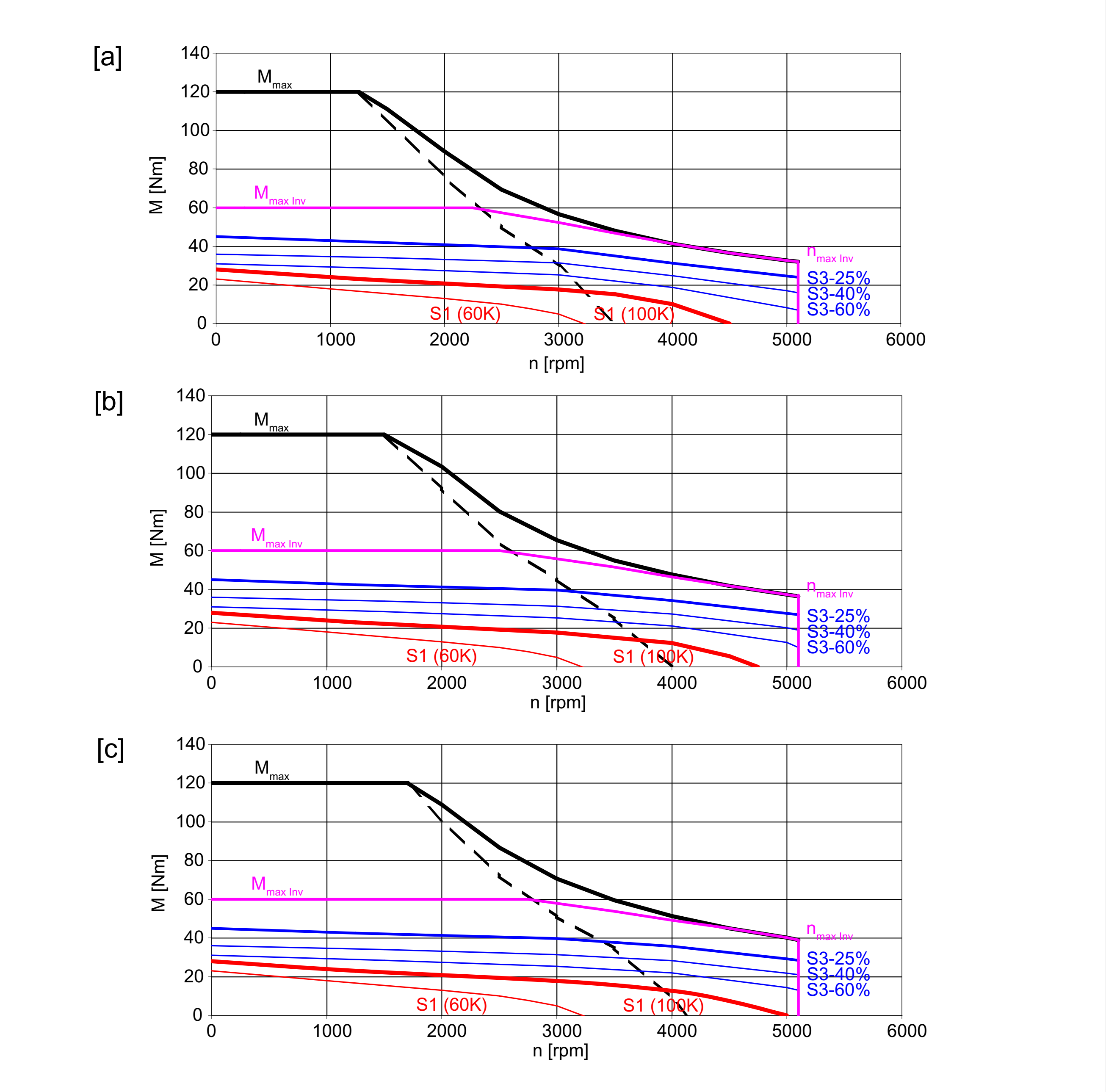
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-28 1FT7086-□AC7

Table 4- 27 1FT7086-□AF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	18
Rated current	I_N	A	11
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	23
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	28
Stall current (60 K)	$I_{0\ (60\ K)}$	A	12.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	15.5
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	79
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	63.6
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	5.65
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	5100
Maximum torque	M_{max}	Nm	120
Maximum current	I_{max}	A	78
Physical constants			
Torque constant	k_T	Nm/A	1.81
Voltage constant	k_E	V/1000 rpm	114
Winding resistance at 20 °C	R_{Str}	Ω	0.23
Rotating field inductance	L_D	mH	4
Electrical time constant	T_{el}	ms	17
Mechanical time constant	T_{mech}	ms	1.3
Thermal time constant	T_{th}	min	60
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	57000
Weight with brake	m_{MotBr}	kg	31.8
Weight without brake	m_{Mot}	kg	27.5
Recommended Motor Module 6SL112□-□TE21-8AA□			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	60



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

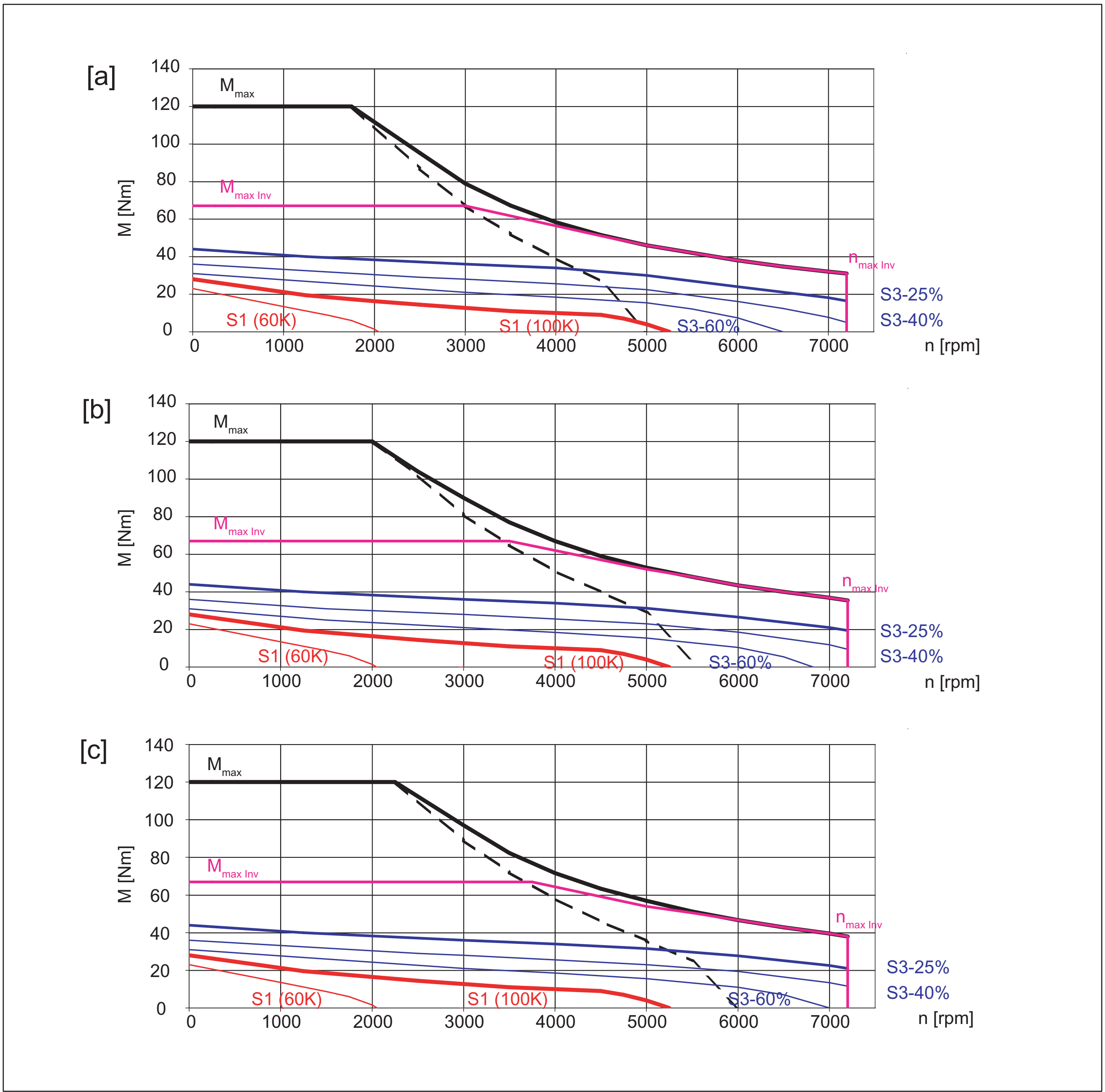
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-29 1FT7086-□AF7

Table 4- 28 1FT7086-□AH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	10
Rated current	I_N	A	10
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	23
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	28
Stall current (60 K)	$I_{0\ (60\ K)}$	A	18
Stall current (100 K)	$I_{0\ (100\ K)}$	A	22.4
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	79
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	63.6
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	4.71
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7200
Maximum torque	M_{max}	Nm	120
Maximum current	I_{max}	A	110
Physical constants			
Torque constant	k_T	Nm/A	1.25
Voltage constant	k_E	V/1000 rpm	80
Winding resistance at 20 °C	R_{Str}	Ω	0.11
Rotating field inductance	L_D	mH	2
Electrical time constant	T_{el}	ms	18
Mechanical time constant	T_{mech}	ms	1.3
Thermal time constant	T_{th}	min	60
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	57000
Weight with brake	m_{MotBr}	kg	31.8
Weight without brake	m_{Mot}	kg	27.5
Recommended Motor Module 6SL112□-□TE23-0AA□			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	67



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

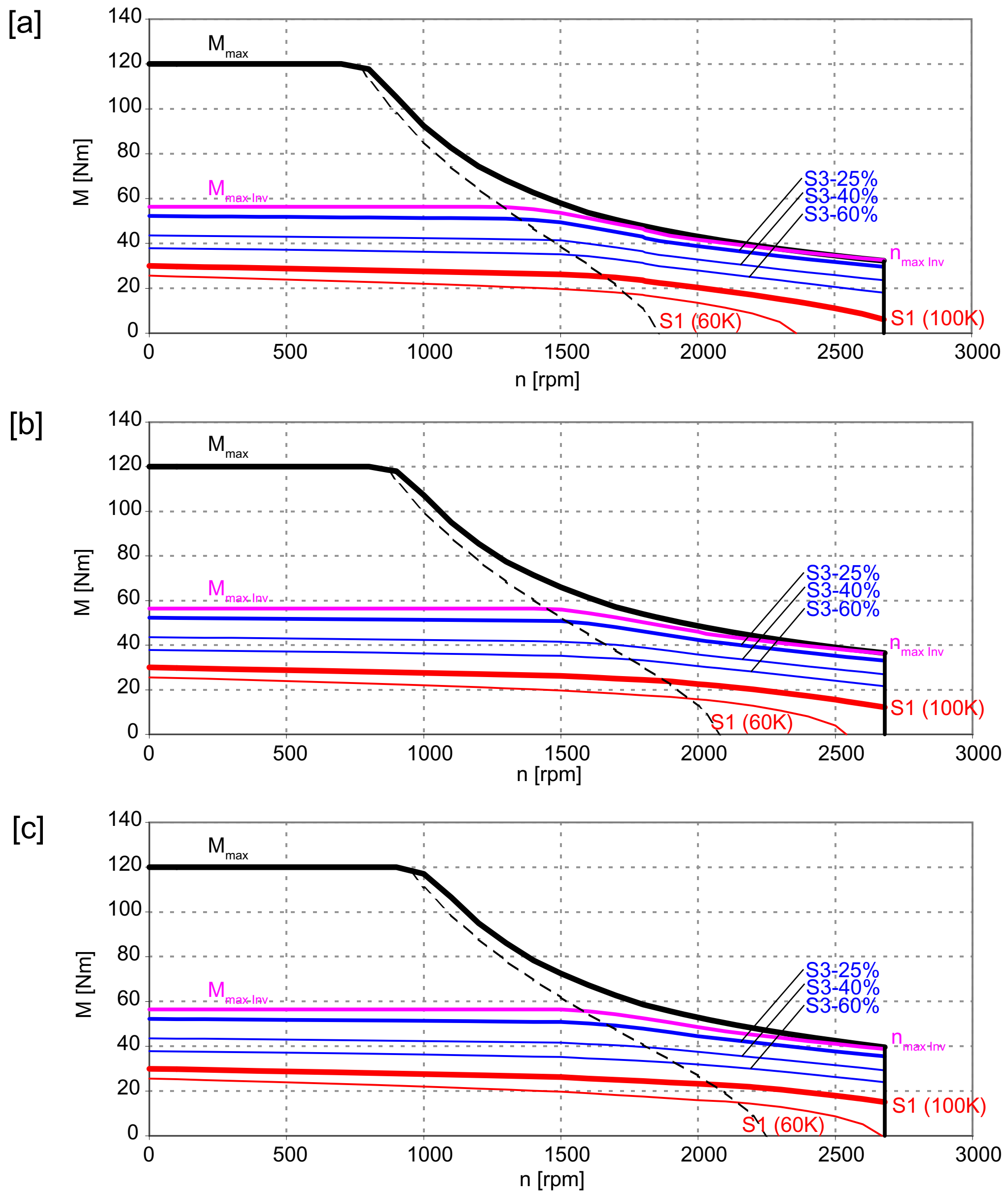
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-30 1FT7086_AH7

Table 4- 29 1FT7102-□AB7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	1500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	26
Rated current	I_N	A	8
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	25
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	30
Stall current (60 K)	$I_{0\ (60\ K)}$	A	7.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	9
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	119
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm^2	91.4
Optimum operating point			
Optimum speed	n_{opt}	rpm	1500
Optimum power	P_{opt}	kW	4.08
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	2680
Maximum torque	M_{max}	Nm	120
Maximum current	I_{max}	A	45
Physical constants			
Torque constant	k_T	Nm/A	3.33
Voltage constant	k_E	V/1000 rpm	216
Winding resistance at 20 °C	R_{Str}	Ω	0.59
Rotating field inductance	L_D	mH	12.5
Electrical time constant	T_{el}	ms	21
Mechanical time constant	T_{mech}	ms	1.5
Thermal time constant	T_{th}	min	70
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	124000
Weight with brake	m_{MotBr}	kg	32.3
Weight without brake	m_{Mot}	kg	26.1
Recommended Motor Module 6SL112□-□TE21-0AA□			
Rated converter current	$I_{N\ Inv}$	A	9
Maximum converter current	$I_{max\ Inv}$	A	18
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	56



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

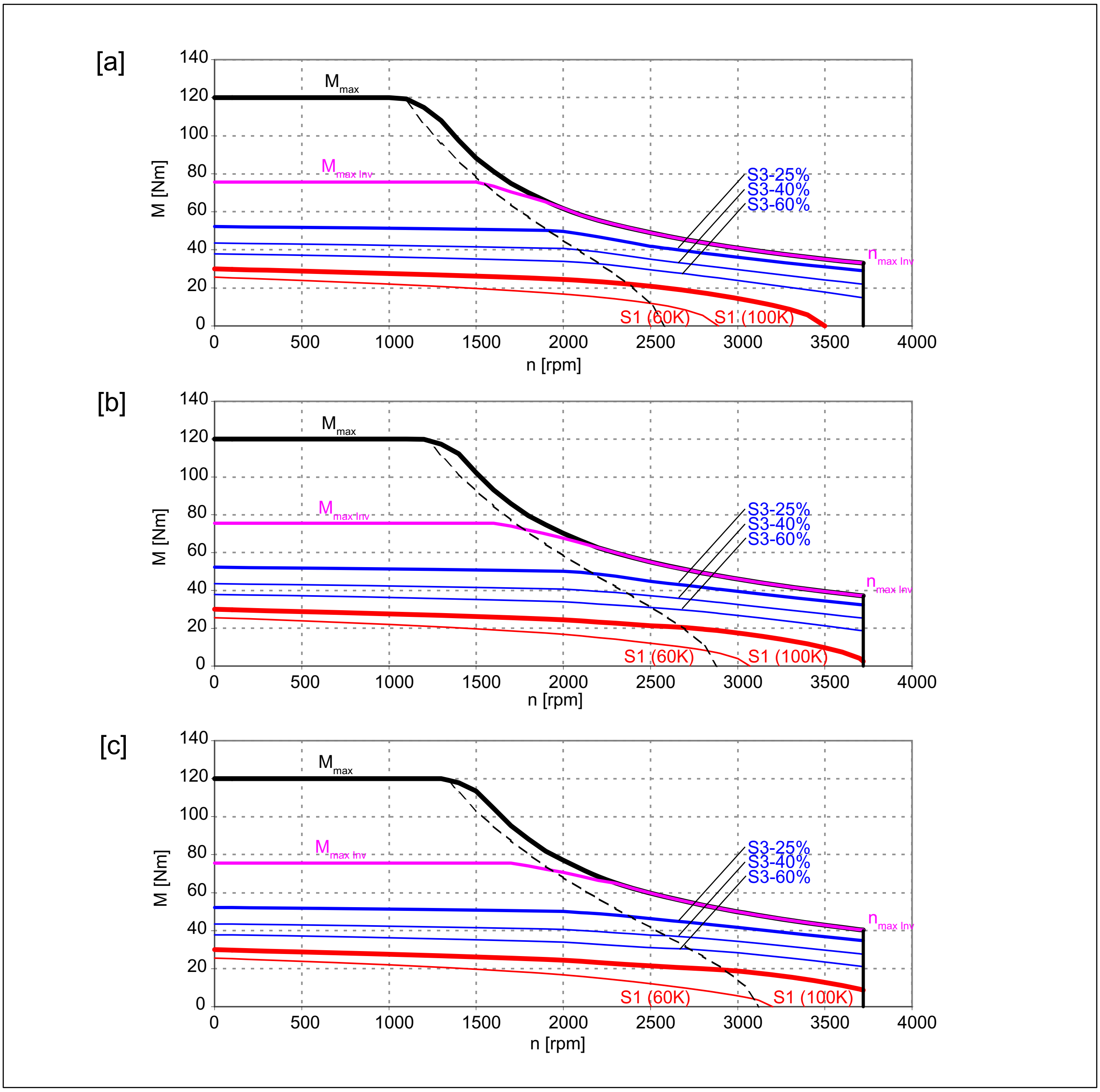
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-31 1FT7102-□AB7

Table 4- 30 1FT7102-□AC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	24
Rated current	I_N	A	10
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	25
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	30
Stall current (60 K)	$I_{0\ (60\ K)}$	A	10.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	12.5
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	119
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	91.4
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	5.03
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	3800
Maximum torque	M_{max}	Nm	120
Maximum current	I_{max}	A	64
Physical constants			
Torque constant	k_T	Nm/A	2.40
Voltage constant	k_E	V/1000 rpm	152
Winding resistance at 20 °C	R_{Str}	Ω	0.3
Rotating field inductance	L_D	mH	6.2
Electrical time constant	T_{el}	ms	21
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	70
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	124000
Weight with brake	m_{MotBr}	kg	32.3
Weight without brake	m_{Mot}	kg	26.1
Recommended Motor Module 6SL112□-□TE21-8AA□			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	74



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

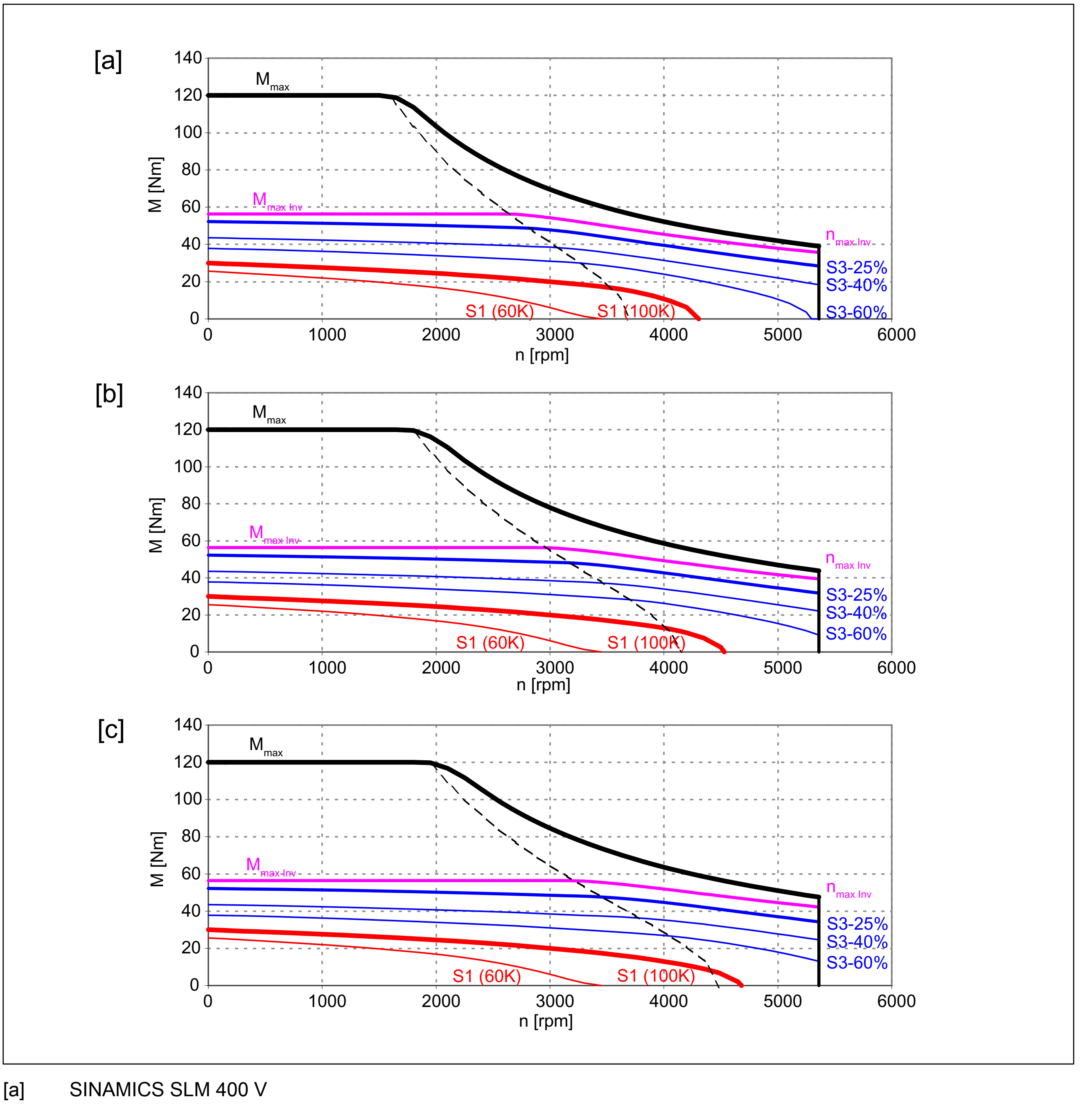
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-32 1FT7102-□AC7

Table 4- 31 1FT7102-□AF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	20
Rated current	I_N	A	12
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	25
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	30
Stall current (60 K)	$I_{0\ (60\ K)}$	A	15
Stall current (100 K)	$I_{0\ (100\ K)}$	A	18
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	119
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	91.4
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	6.28
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	5360
Maximum torque	M_{max}	Nm	120
Maximum current	I_{max}	A	90
Physical constants			
Torque constant	k_T	Nm/A	1.67
Voltage constant	k_E	V/1000 rpm	108
Winding resistance at 20 °C	R_{Str}	Ω	0.15
Rotating field inductance	L_D	mH	3.1
Electrical time constant	T_{el}	ms	21
Mechanical time constant	T_{mech}	ms	1.5
Thermal time constant	T_{th}	min	70
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	124000
Weight with brake	m_{MotBr}	kg	32.3
Weight without brake	m_{Mot}	kg	26.1
Recommended Motor Module 6SL112□-□TE21-8AA□			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	56



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

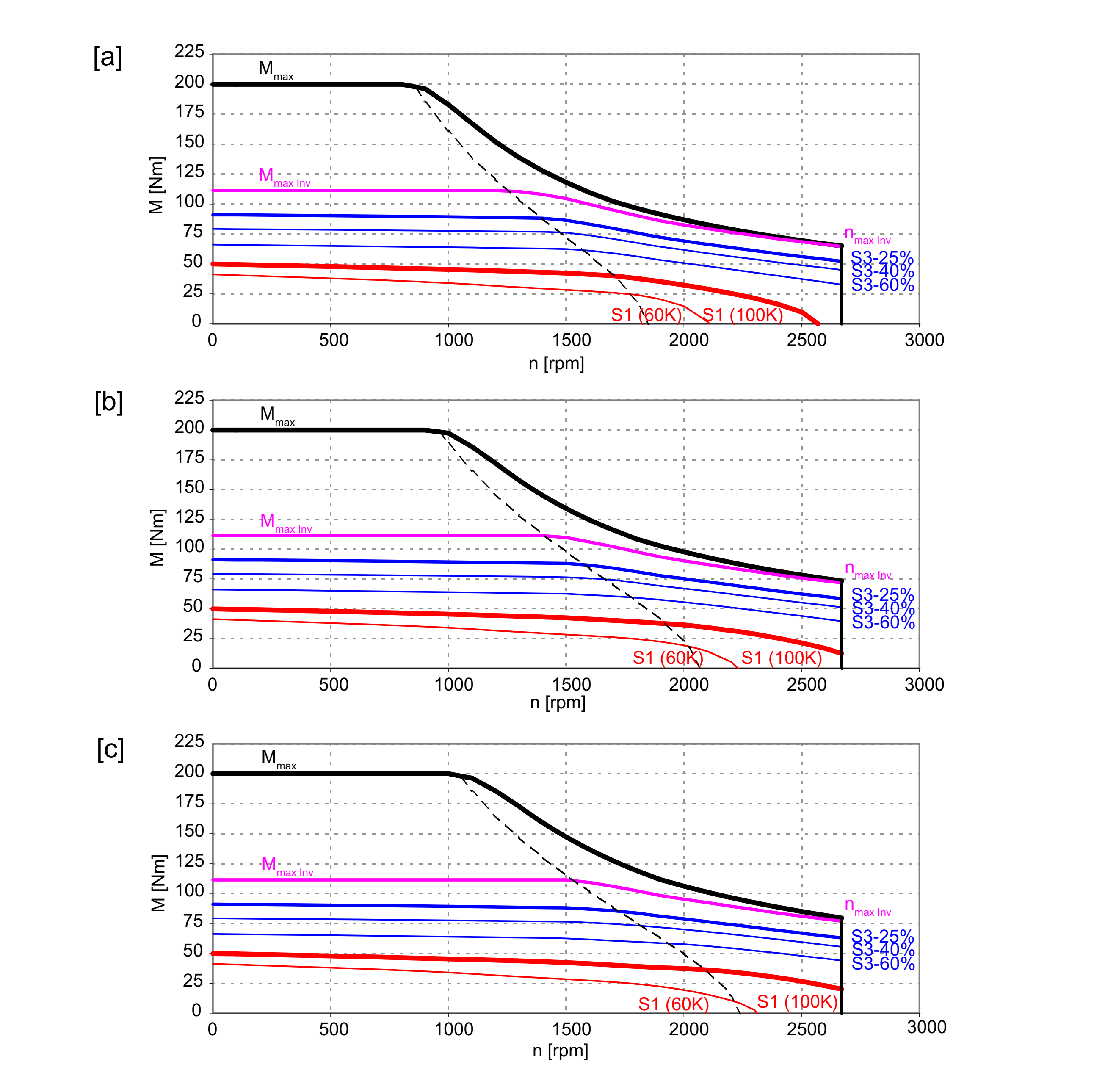
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-33 1FT7102-□AF7

Table 4- 32 1FT7105-□AB7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	1500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	42
Rated current	I_N	A	13
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	41
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	50
Stall current (60 K)	$I_{0\ (60\ K)}$	A	12
Stall current (100 K)	$I_{0\ (100\ K)}$	A	15
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	206
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	178
Optimum operating point			
Optimum speed	n_{opt}	rpm	1500
Optimum power	P_{opt}	kW	6.60
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	2670
Maximum torque	M_{max}	Nm	200
Maximum current	I_{max}	A	67
Physical constants			
Torque constant	k_T	Nm/A	3.33
Voltage constant	k_E	V/1000 rpm	217
Winding resistance at 20 °C	R_{Str}	Ω	0.25
Rotating field inductance	L_D	mH	6.8
Electrical time constant	T_{el}	ms	27
Mechanical time constant	T_{mech}	ms	1.2
Thermal time constant	T_{th}	min	80
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	107000
Weight with brake	m_{MotBr}	kg	50.4
Weight without brake	m_{Mot}	kg	44.2
Recommended Motor Module 6SL112□-□TE21-8AA□			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	112



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

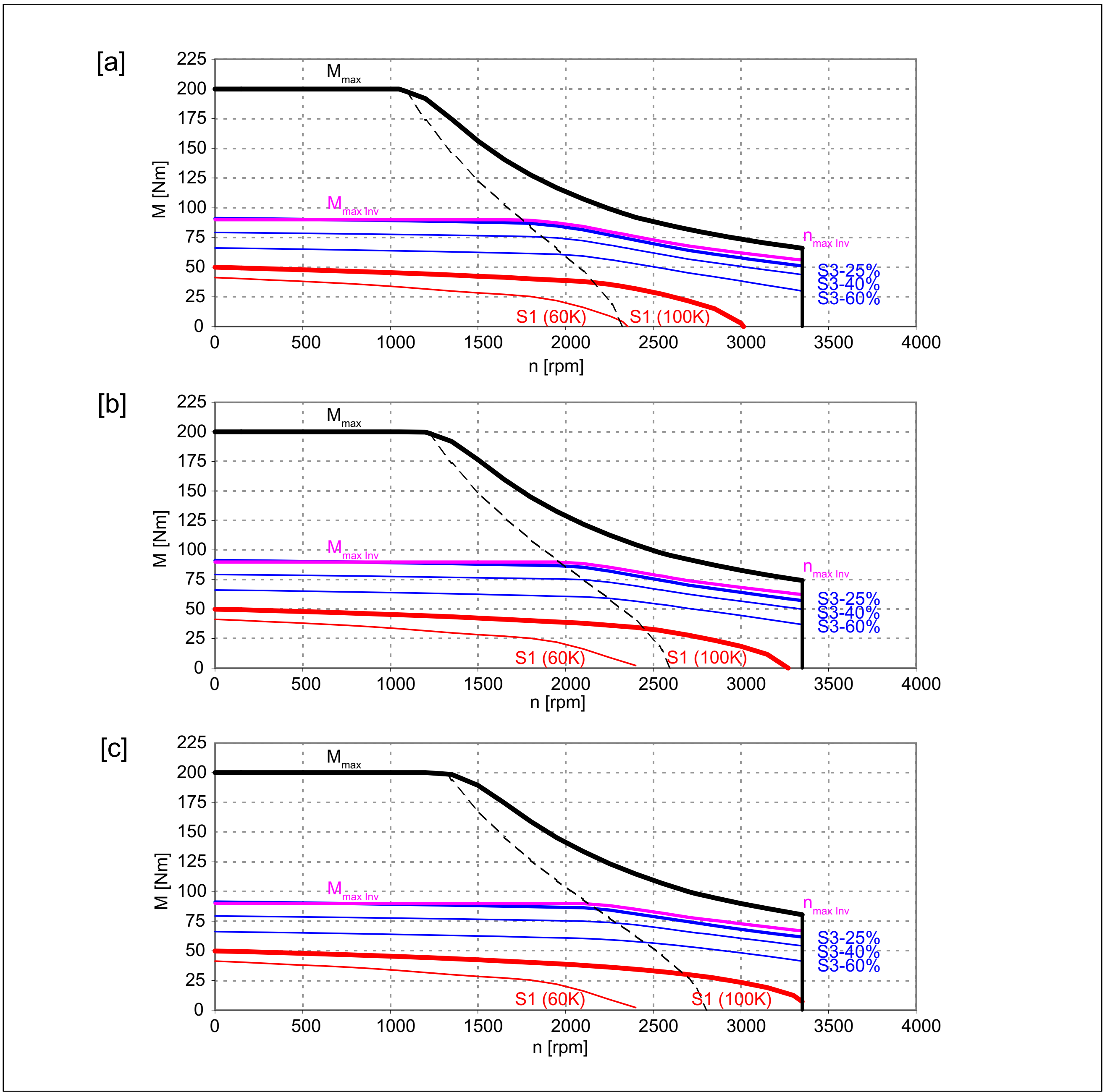
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-34 1FT7105-□AB7

Table 4- 33 1FT7105-□AC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	38
Rated current	I_N	A	15
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	41
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	50
Stall current (60 K)	$I_{0\ (60\ K)}$	A	15
Stall current (100 K)	$I_{0\ (100\ K)}$	A	18
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	206
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	178
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	7.96
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	3350
Maximum torque	M_{max}	Nm	200
Maximum current	I_{max}	A	84
Physical constants			
Torque constant	k_T	Nm/A	2.78
Voltage constant	k_E	V/1000 rpm	173
Winding resistance at 20 °C	R_{Str}	Ω	0.15
Rotating field inductance	L_D	mH	4.3
Electrical time constant	T_{el}	ms	29
Mechanical time constant	T_{mech}	ms	1.0
Thermal time constant	T_{th}	min	80
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	107000
Weight with brake	m_{MotBr}	kg	50.4
Weight without brake	m_{Mot}	kg	44.2
Recommended Motor Module 6SL112□-□TE21-8AA□			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	90



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

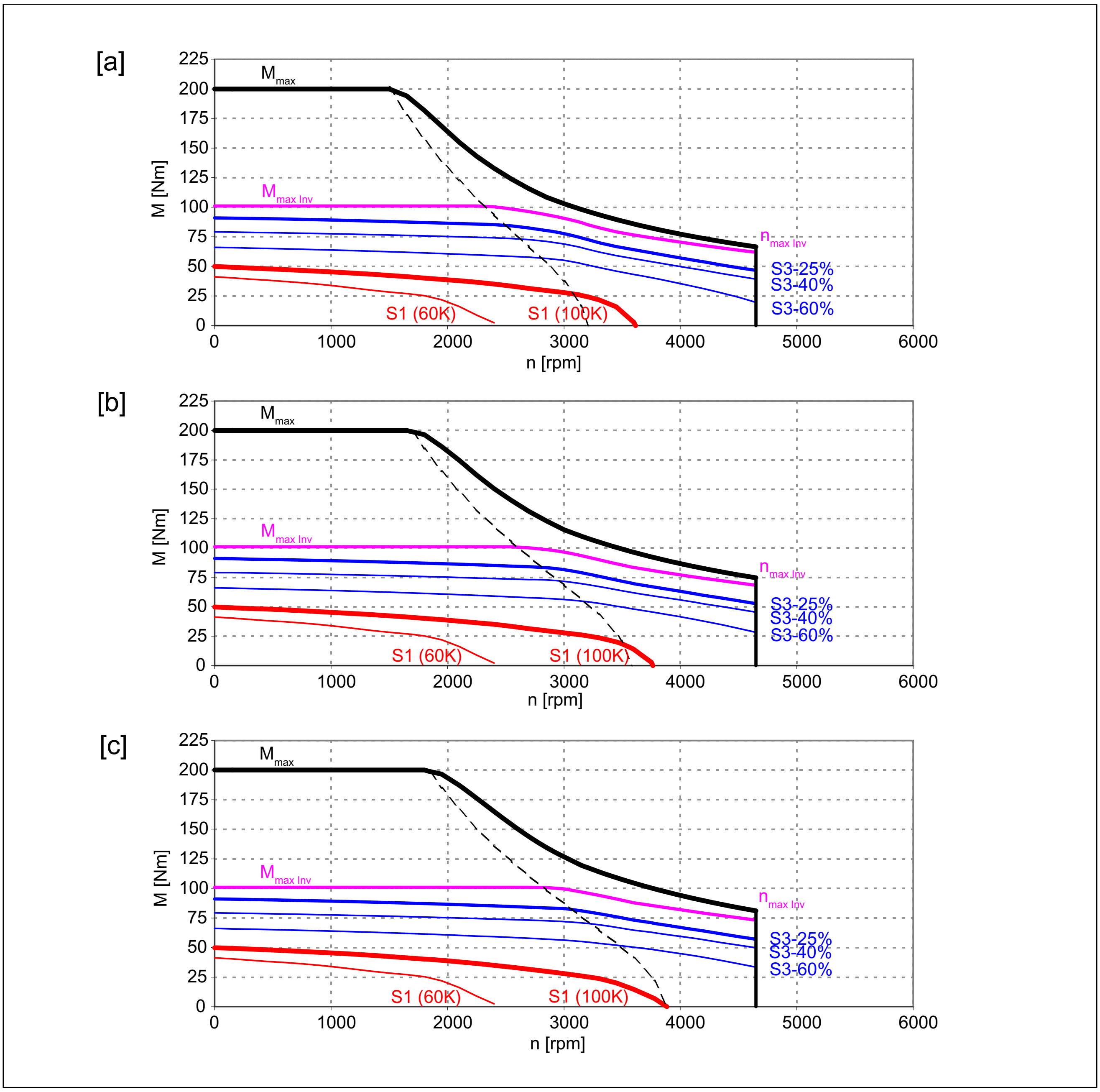
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-35 1FT7105-□AC7

Table 4- 34 1FT7105-□AF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	28
Rated current	I_N	A	15
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	41
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	50
Stall current (60 K)	$I_{0\ (60\ K)}$	A	21
Stall current (100 K)	$I_{0\ (100\ K)}$	A	26
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm²	206
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm²	178
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	8.8
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	4630
Maximum torque	M_{max}	Nm	200
Maximum current	I_{max}	A	116
Physical constants			
Torque constant	k_T	Nm/A	1.92
Voltage constant	k_E	V/1000 rpm	125
Winding resistance at 20 °C	R_{Str}	Ω	0.08
Rotating field inductance	L_D	mH	2.3
Electrical time constant	T_{el}	ms	29
Mechanical time constant	T_{mech}	ms	1.2
Thermal time constant	T_{th}	min	80
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	107000
Weight with brake	m_{MotBr}	kg	50.4
Weight without brake	m_{Mot}	kg	44.2
Recommended Motor Module 6SL112□-□TE23-0AA□			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	102



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

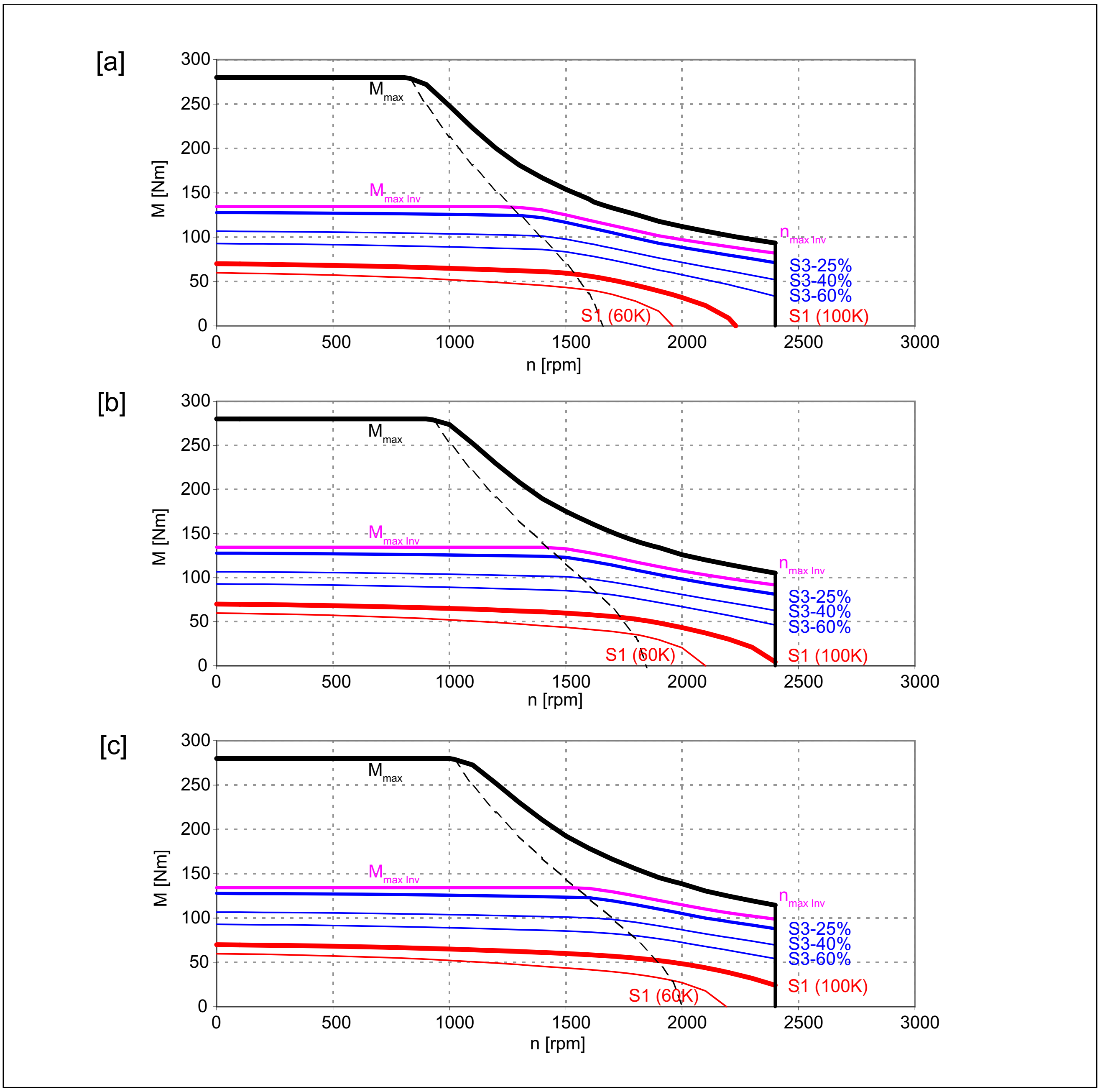
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-36 1FT7105-□AF7

Table 4- 35 1FT7108-□AB7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	1500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	61
Rated current	I_N	A	16
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	58
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	70
Stall current (60 K)	$I_{0\ (60\ K)}$	A	15
Stall current (100 K)	$I_{0\ (100\ K)}$	A	18
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm²	276
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm²	248
Optimum operating point			
Optimum speed	n_{opt}	rpm	1500
Optimum power	P_{opt}	kW	9.58
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	2390
Maximum torque	M_{max}	Nm	280
Maximum current	I_{max}	A	87
Physical constants			
Torque constant	k_T	Nm/A	3.89
Voltage constant	k_E	V/1000 rpm	242
Winding resistance at 20 °C	R_{Str}	Ω	0.2
Rotating field inductance	L_D	mH	6
Electrical time constant	T_{el}	ms	30
Mechanical time constant	T_{mech}	ms	1.0
Thermal time constant	T_{th}	min	95
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	95700
Weight with brake	m_{MotBr}	kg	65.1
Weight without brake	m_{Mot}	kg	59
Recommended Motor Module 6SL112□-□TE21-8AA□			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	134



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

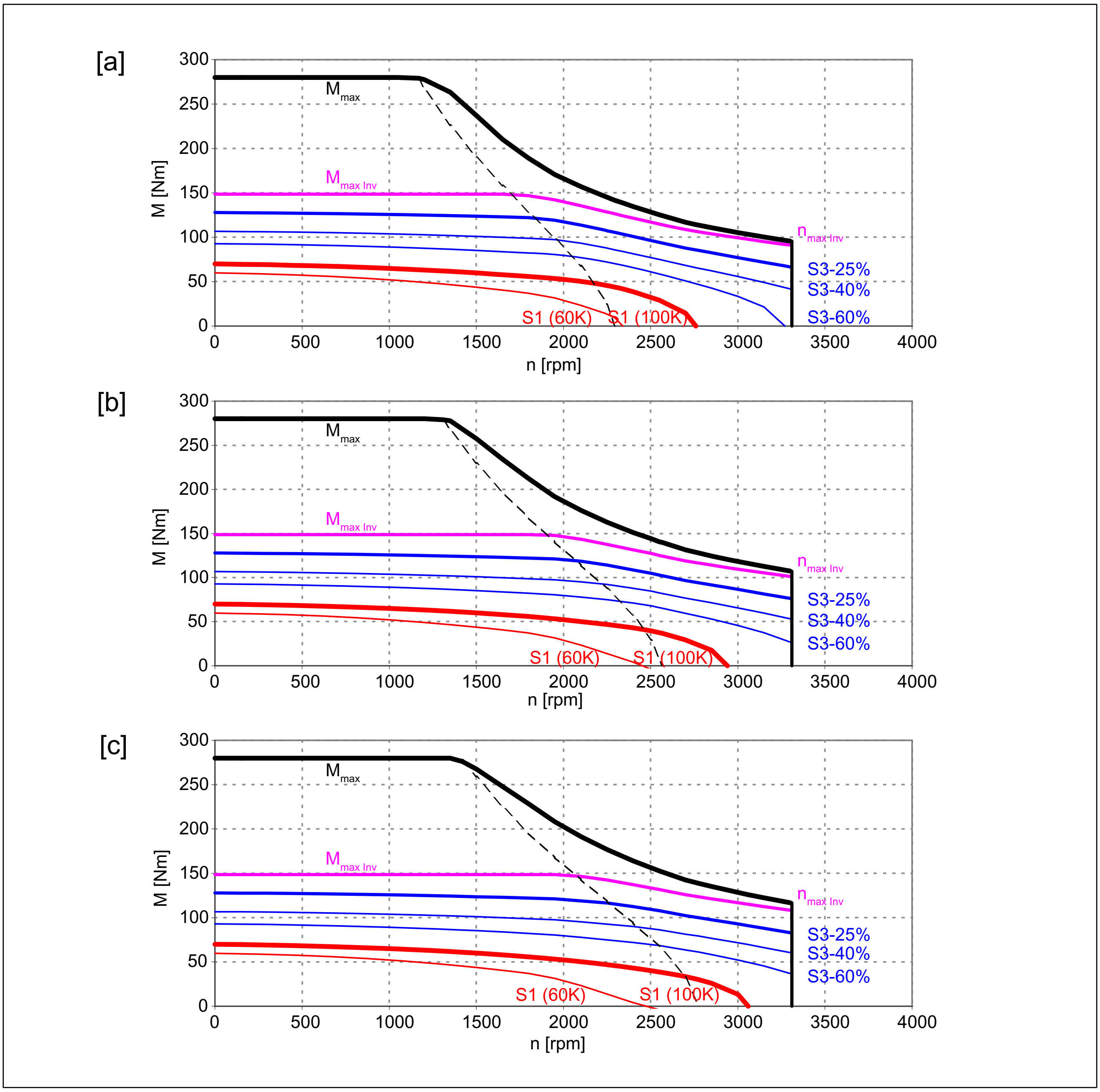
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-37 1FT7108-□AB7

Table 4- 36 1FT7108-□AC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	50
Rated current	I_N	A	18
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	58
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	70
Stall current (60 K)	$I_{0\ (60\ K)}$	A	21
Stall current (100 K)	$I_{0\ (100\ K)}$	A	25
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	276
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	248
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	10.5
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	3310
Maximum torque	M_{max}	Nm	280
Maximum current	I_{max}	A	120
Physical constants			
Torque constant	k_T	Nm/A	2.80
Voltage constant	k_E	V/1000 rpm	175
Winding resistance at 20 °C	R_{Str}	Ω	0.11
Rotating field inductance	L_D	mH	3.1
Electrical time constant	T_{el}	ms	28
Mechanical time constant	T_{mech}	ms	1.0
Thermal time constant	T_{th}	min	95
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	95700
Weight with brake	m_{MotBr}	kg	65.1
Weight without brake	m_{Mot}	kg	59
Recommended Motor Module 6SL112□-1TE23-0AA□			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	149



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

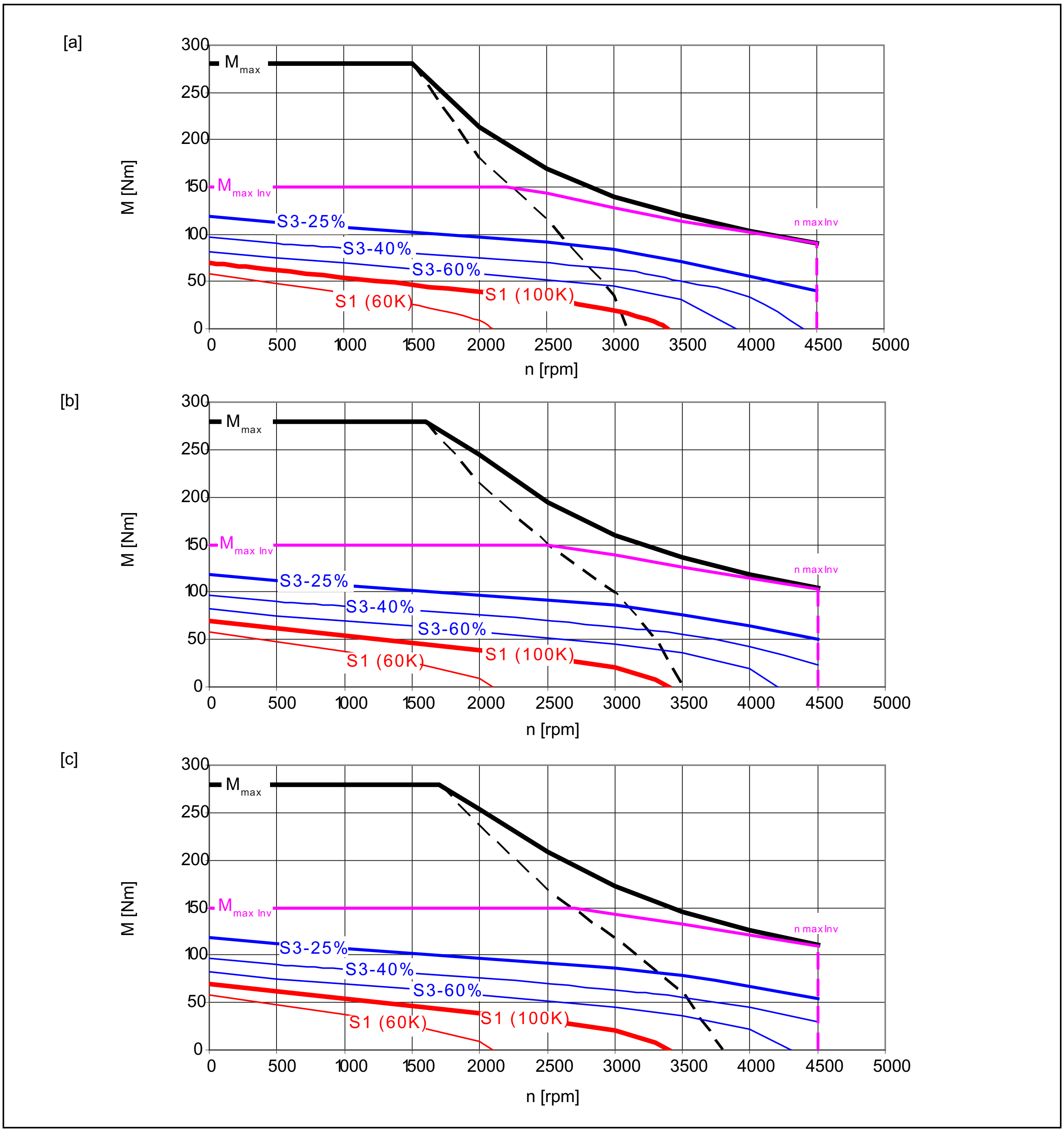
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-38 1FT7108-□AC7

Table 4- 37 1FT7108-□AF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	20
Rated current	I_N	A	12
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	58
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	70
Stall current (60 K)	$I_{0\ (60\ K)}$	A	28
Stall current (100 K)	$I_{0\ (100\ K)}$	A	36
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	276
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	248
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	8.2
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	4500
Maximum torque	M_{max}	Nm	280
Maximum current	I_{max}	A	165
Physical constants			
Torque constant	k_T	Nm/A	1.94
Voltage constant	k_E	V/1000 rpm	128
Winding resistance at 20 °C	R_{Str}	Ω	0.065
Rotating field inductance	L_D	mH	1.7
Electrical time constant	T_{el}	ms	26
Mechanical time constant	T_{mech}	ms	1.3
Thermal time constant	T_{th}	min	95
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	95700
Weight with brake	m_{MotBr}	kg	65.1
Weight without brake	m_{Mot}	kg	59
Recommended Motor Module 6SL312□-□1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	150



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

[c] SINAMICS SLM 480 V

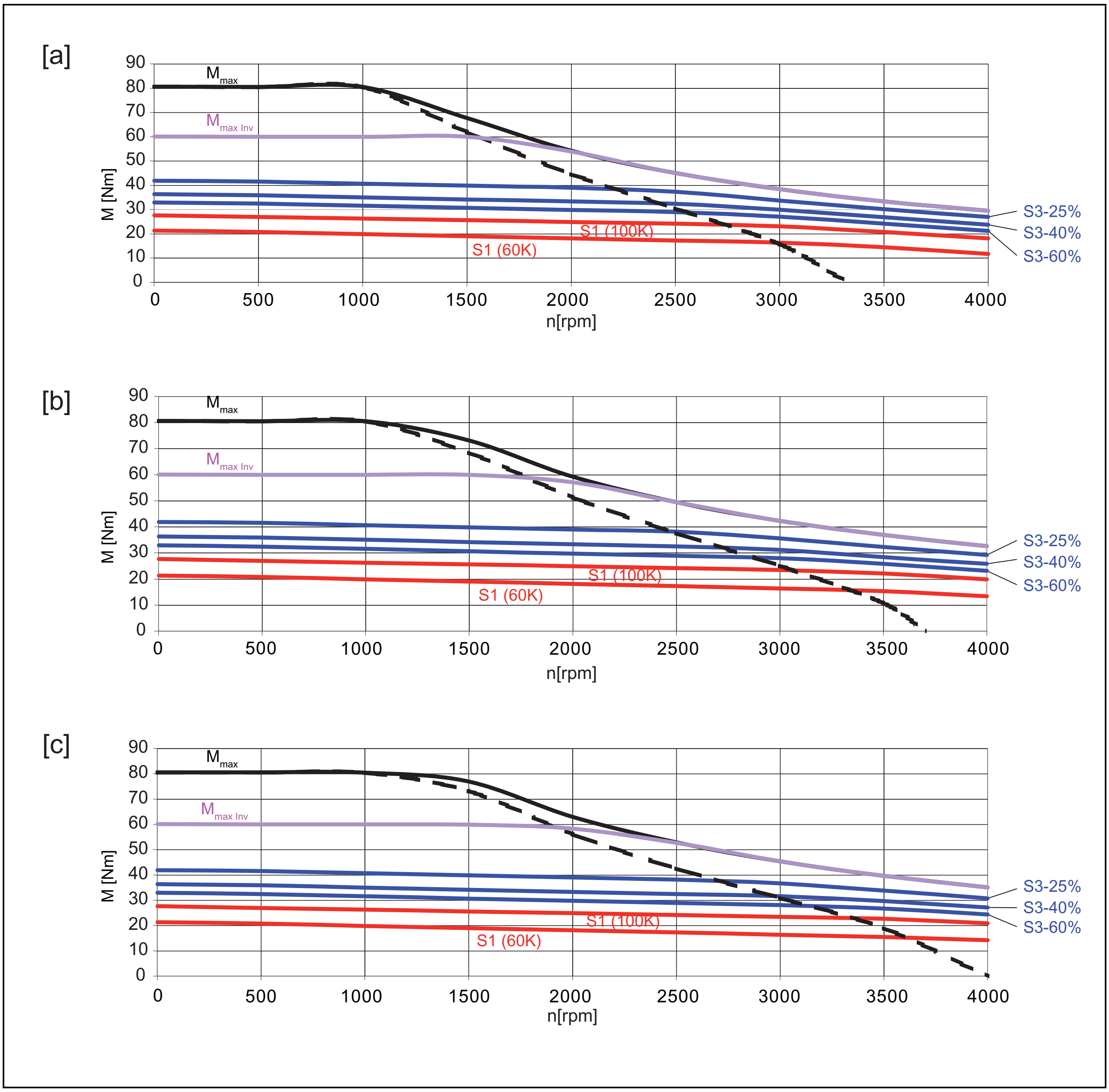
The characteristic curves are only valid for optimized converter setting data

Figure 4-39 1FT7108-□AF

4.2.2 1FT7 synchronous motors with forced ventilation

Table 4- 38 1FT7084-5SC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	24
Rated current (100 K)	$I_{N\ (100\ K)}$	A	13.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	21.5
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	27
Stall current (60 K)	$I_{0\ (60\ K)}$	A	12
Stall current (100 K)	$I_{0\ (100\ K)}$	A	15
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	60
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	45
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	5.0
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	5000
Maximum torque	M_{max}	Nm	81
Maximum current	I_{max}	A	55
Physical constants			
Torque constant	k_T	Nm/A	1.80
Voltage constant	k_E	V/1000 rpm	115
Winding resistance at 20 °C	R_{Str}	Ω	0.34
Rotating field inductance	L_D	mH	5.4
Electrical time constant	T_{el}	ms	16
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	35
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	65100
Weight with brake	m_{MotBr}	kg	29
Weight without brake	m_{Mot}	kg	25
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	60



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

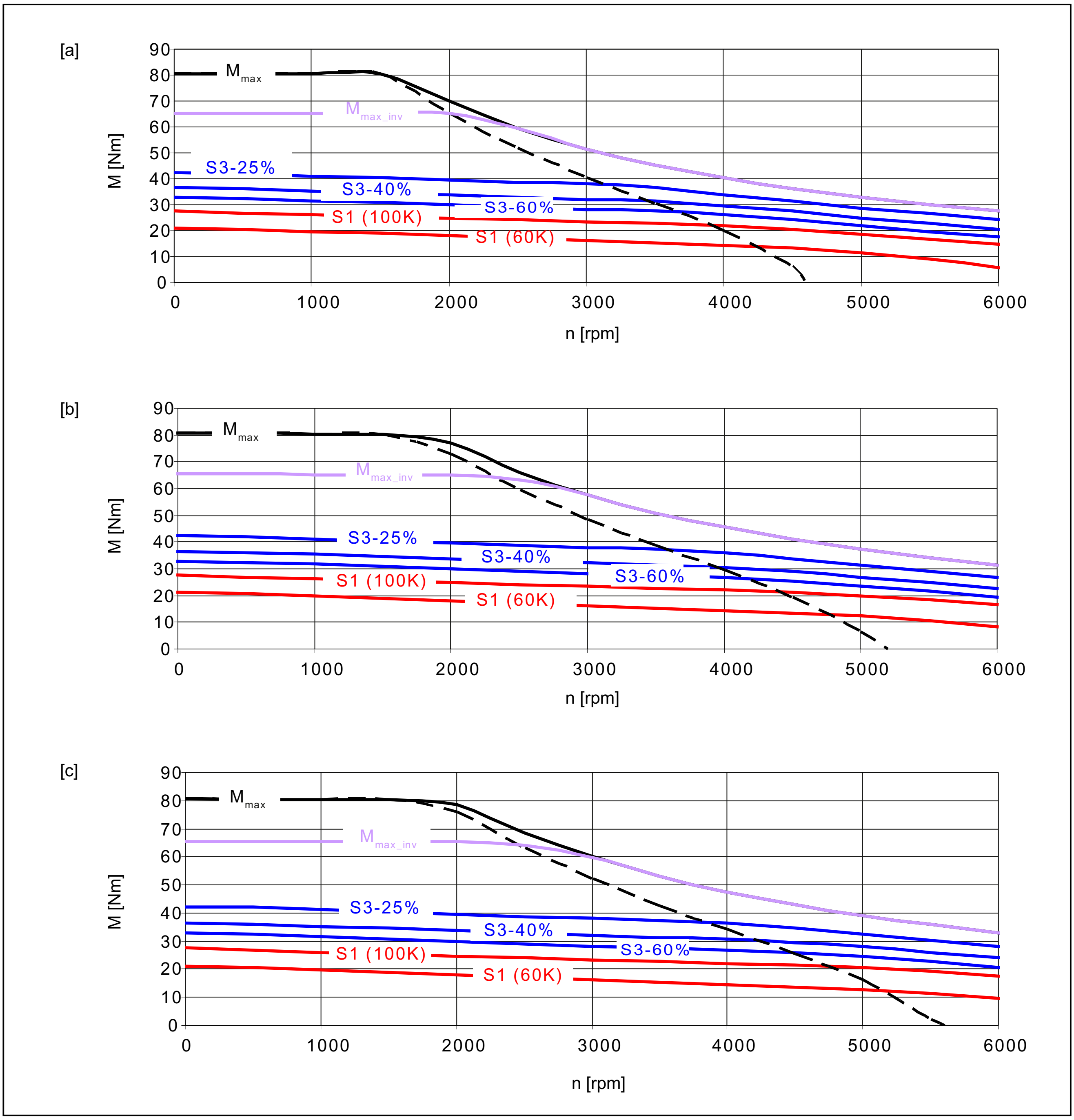
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-40 1FT7084-5SC7

Table 4- 39 1FT7084-5SF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	23
Rated current (100 K)	$I_{N\ (100\ K)}$	A	18.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	21.5
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	27
Stall current (60 K)	$I_{0\ (60\ K)}$	A	16.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	21
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	60
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	45
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	7.20
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7000
Maximum torque	M_{max}	Nm	81
Maximum current	I_{max}	A	77
Physical constants			
Torque constant	k_T	Nm/A	1.30
Voltage constant	k_E	V/1000 rpm	83
Winding resistance at 20 °C	R_{Str}	Ω	0.18
Rotating field inductance	L_D	mH	2.8
Electrical time constant	T_{el}	ms	16
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	35
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	65100
Weight with brake	m_{MotBr}	kg	29
Weight without brake	m_{Mot}	kg	25
Recommended Motor Module 6SL312□-1TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	65



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

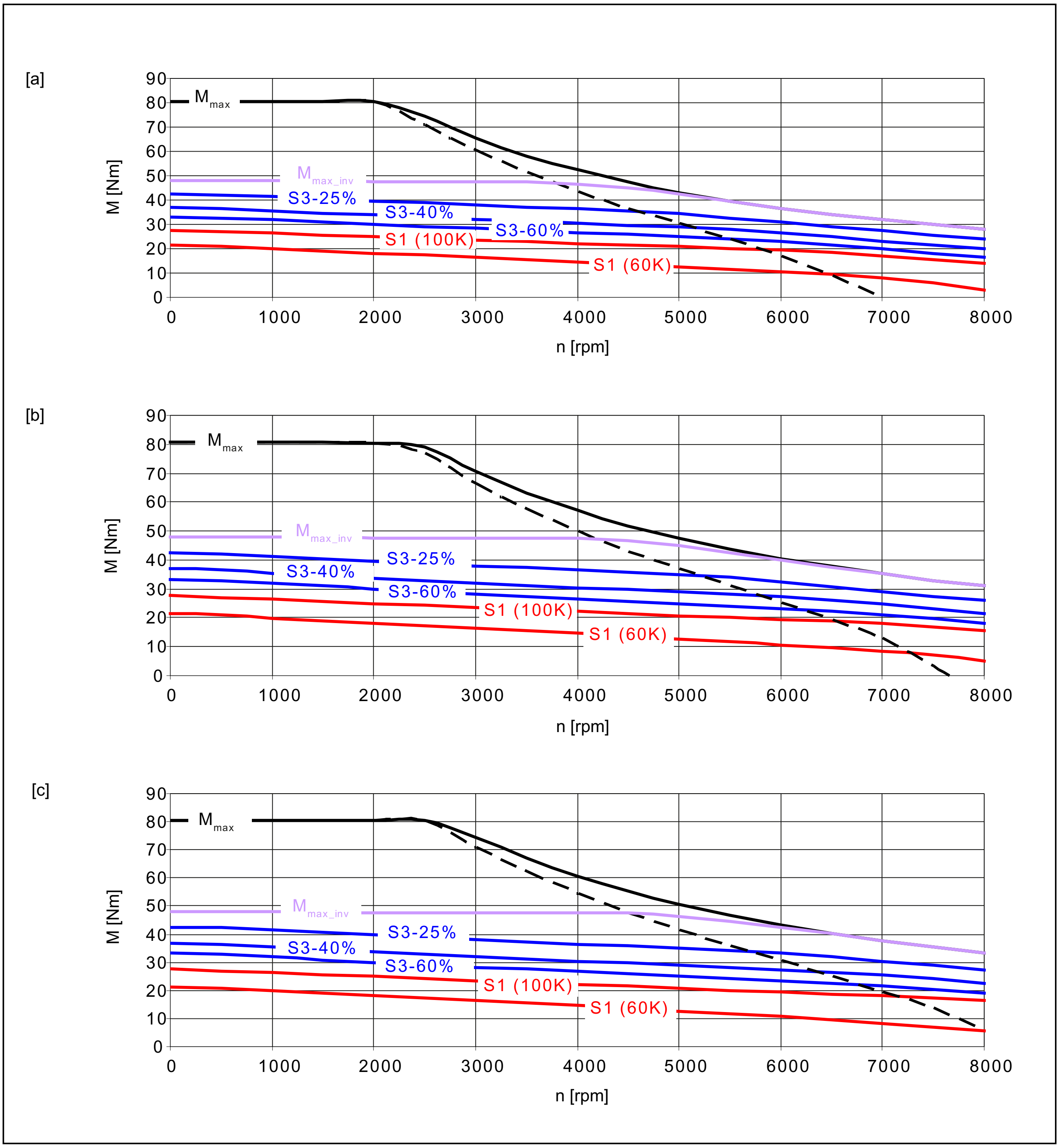
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-41 1FT7084-5SF7

Table 4- 40 1FT7084-5SH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	21
Rated current (100 K)	$I_{N\ (100\ K)}$	A	24.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	21.5
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	27
Stall current (60 K)	$I_{0\ (60\ K)}$	A	24
Stall current (100 K)	$I_{0\ (100\ K)}$	A	30.5
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	60
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	45
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	9.90
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	81
Maximum current	I_{max}	A	114
Physical constants			
Torque constant	k_T	Nm/A	0.88
Voltage constant	k_E	V/1000 rpm	56
Winding resistance at 20 °C	R_{Str}	Ω	0.08
Rotating field inductance	L_D	mH	1.4
Electrical time constant	T_{el}	ms	18
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	35
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	65100
Weight with brake	m_{MotBr}	kg	29
Weight without brake	m_{Mot}	kg	25
Recommended Motor Module 6SL312□-1TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	47



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

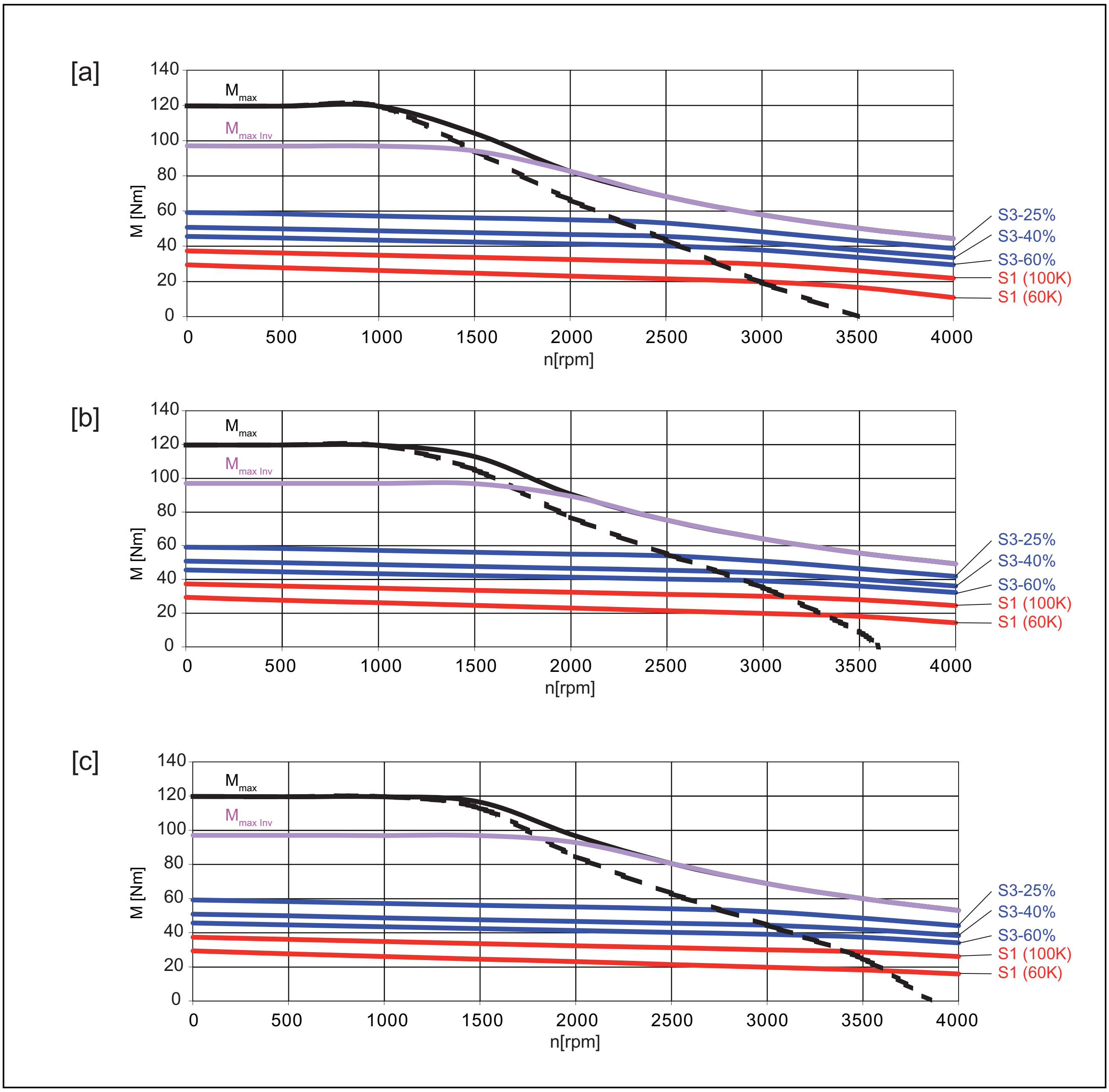
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-42 1FT7084-5SH7

Table 4- 41 1FT7086-5SC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	32
Rated current (100 K)	$I_{N\ (100\ K)}$	A	17
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	30
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	36
Stall current (60 K)	$I_{0\ (60\ K)}$	A	16
Stall current (100 K)	$I_{0\ (100\ K)}$	A	19.5
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	79
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	64
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	6.7
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	4900
Maximum torque	M_{max}	Nm	120
Maximum current	I_{max}	A	74
Physical constants			
Torque constant	k_T	Nm/A	1.86
Voltage constant	k_E	V/1000 rpm	119
Winding resistance at 20 °C	R_{Str}	Ω	0.24
Rotating field inductance	L_D	mH	4.4
Electrical time constant	T_{el}	ms	18
Mechanical time constant	T_{mech}	ms	1.3
Thermal time constant	T_{th}	min	40
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	57000
Weight with brake	m_{MotBr}	kg	32
Weight without brake	m_{Mot}	kg	36
Recommended Motor Module 6SL312□-□TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	96



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

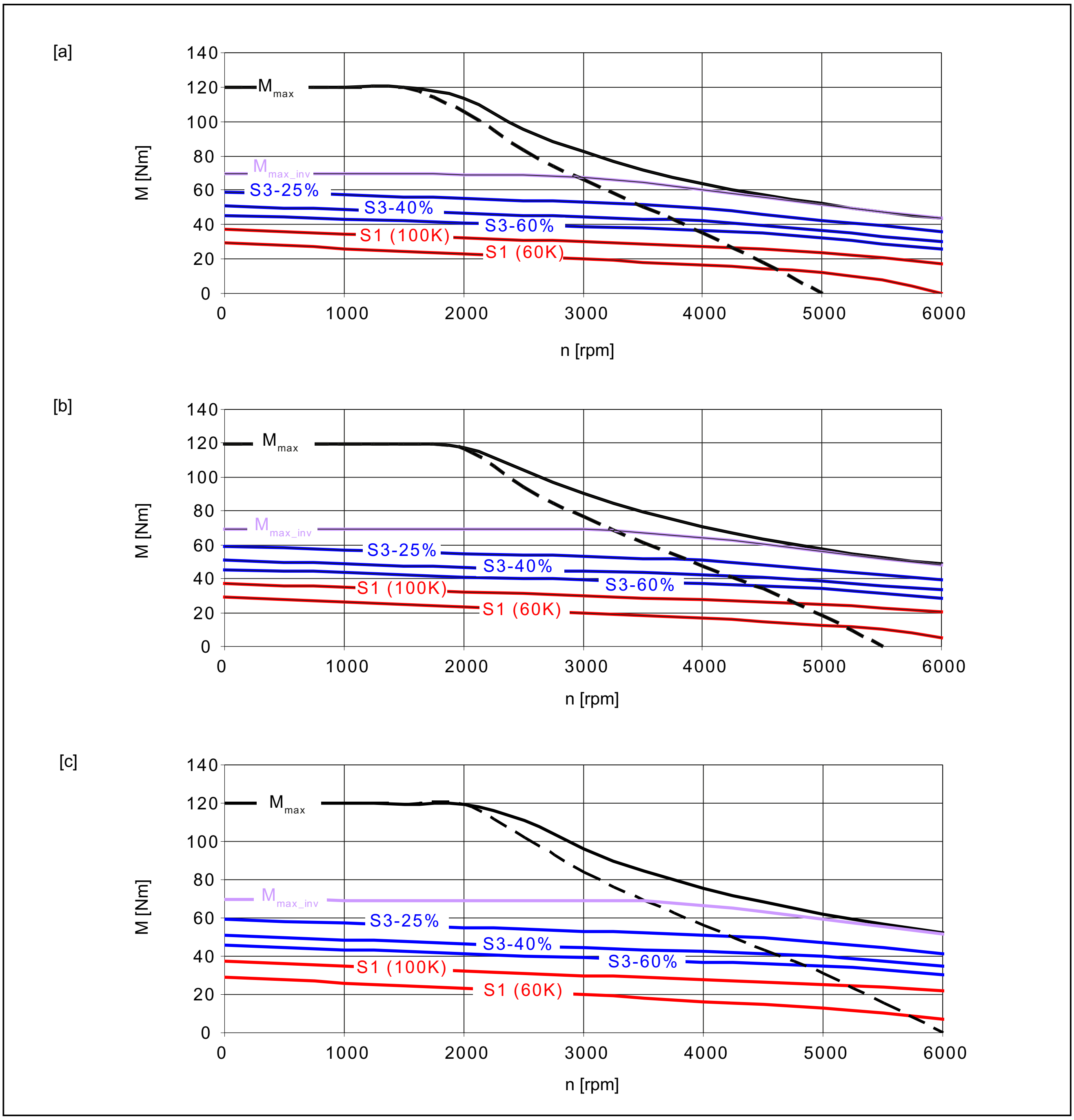
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-43 1FT7086-5SC7

Table 4- 42 1FT7086-5SF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	29
Rated current (100 K)	$I_{N\ (100\ K)}$	A	24
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	30
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	36
Stall current (60 K)	$I_{0\ (60\ K)}$	A	24
Stall current (100 K)	$I_{0\ (100\ K)}$	A	29
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm²	79
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm²	64
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	9.1
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7200
Maximum torque	M_{max}	Nm	120
Maximum current	I_{max}	A	110
Physical constants			
Torque constant	k_T	Nm/A	1.25
Voltage constant	k_E	V/1000 rpm	80
Winding resistance at 20 °C	R_{Str}	Ω	0.11
Rotating field inductance	L_D	mH	2
Electrical time constant	T_{el}	ms	18
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	40
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	57000
Weight with brake	m_{MotBr}	kg	32
Weight without brake	m_{Mot}	kg	36
Recommended Motor Module 6SL312□-□TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	69



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

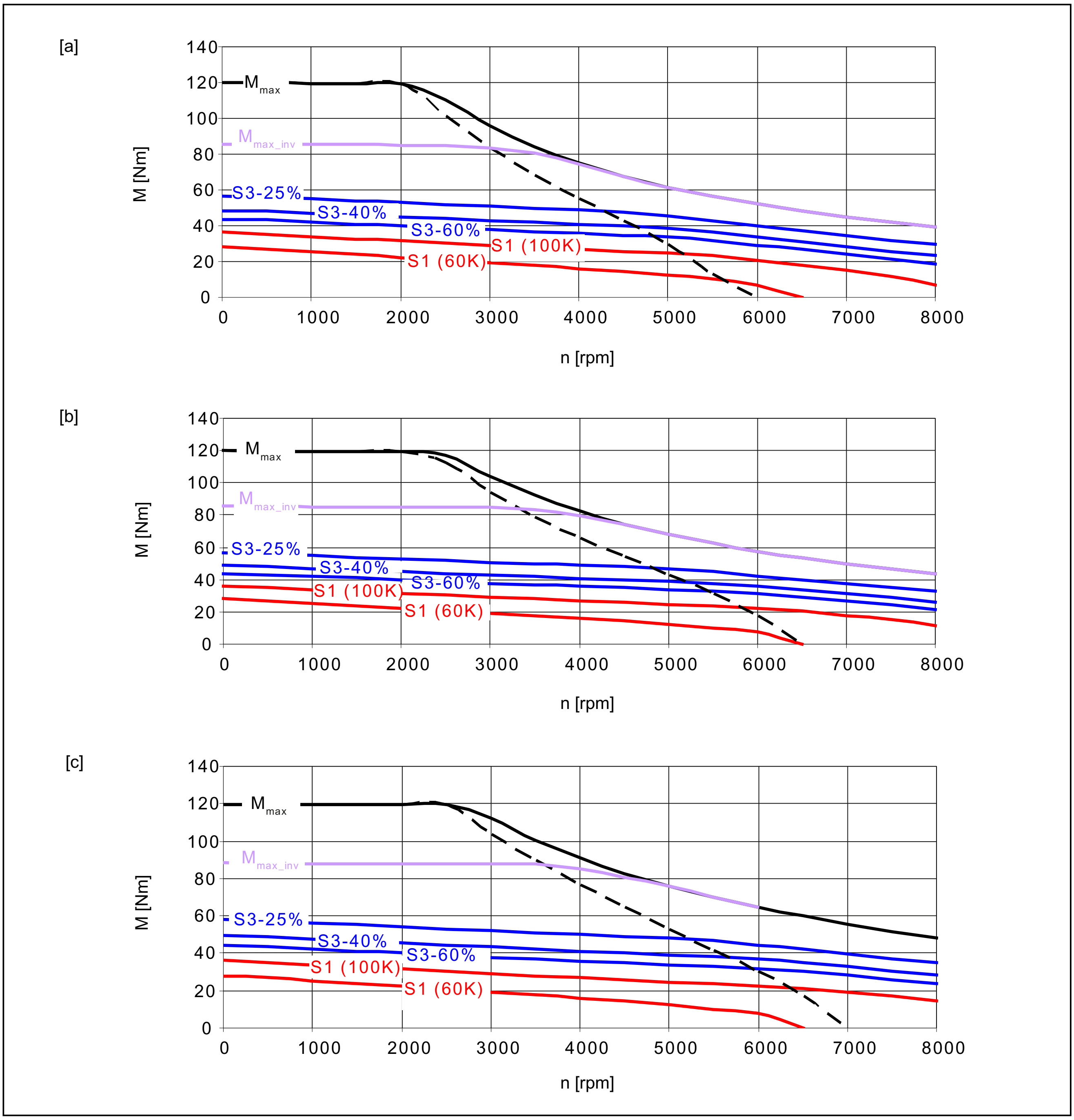
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-44 1FT7086-5SF7

Table 4- 43 1FT7086-5SH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	25
Rated current (100 K)	$I_{N\ (100\ K)}$	A	25
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	30
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	36
Stall current (60 K)	$I_{0\ (60\ K)}$	A	28
Stall current (100 K)	$I_{0\ (100\ K)}$	A	34
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	79
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	64
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	11.8
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	120
Maximum current	I_{max}	A	131
Physical constants			
Torque constant	k_T	Nm/A	1.05
Voltage constant	k_E	V/1000 rpm	67
Winding resistance at 20 °C	R_{Str}	Ω	0.08
Rotating field inductance	L_D	mH	1.4
Electrical time constant	T_{el}	ms	18
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	40
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	57000
Weight with brake	m_{MotBr}	kg	32
Weight without brake	m_{Mot}	kg	36
Recommended Motor Module 6SL312□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	85



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

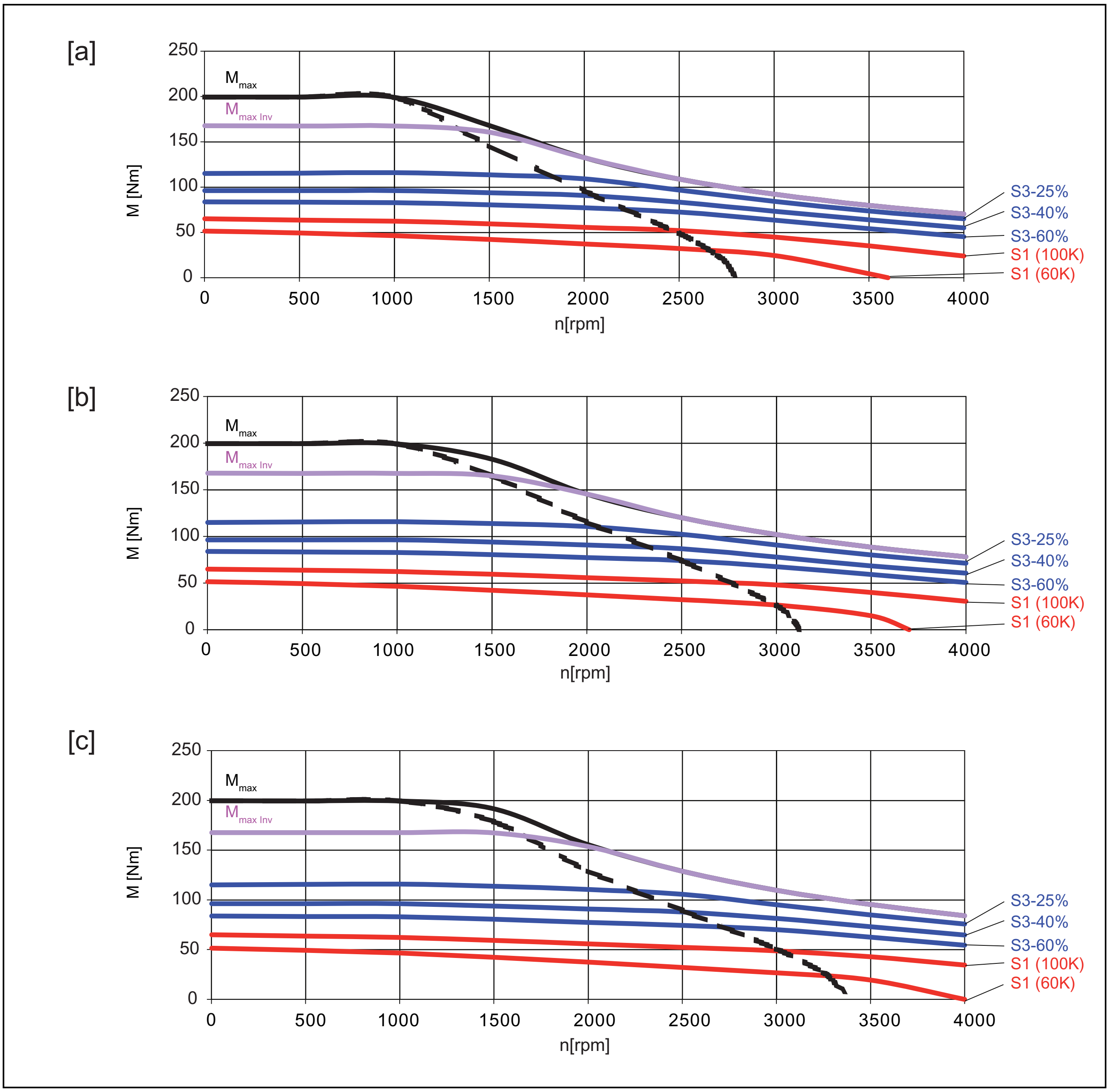
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-45 1FT7086-5SH7

Table 4- 44 1FT7105-5SC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	56
Rated current (100 K)	$I_{N\ (100\ K)}$	A	29
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	51
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	65
Stall current (60 K)	$I_{0\ (60\ K)}$	A	24
Stall current (100 K)	$I_{0\ (100\ K)}$	A	31
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	206
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	178
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	11.7
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	4250
Maximum torque	M_{max}	Nm	200
Maximum current	I_{max}	A	107
Physical constants			
Torque constant	k_T	Nm/A	2.13
Voltage constant	k_E	V/1000 rpm	136
Winding resistance at 20 °C	R_{Str}	Ω	0.1
Rotating field inductance	L_D	mH	2.7
Electrical time constant	T_{el}	ms	27
Mechanical time constant	T_{mech}	ms	1.2
Thermal time constant	T_{th}	min	50
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	107000
Weight with brake	m_{MotBr}	kg	56
Weight without brake	m_{Mot}	kg	50
Recommended Motor Module 6SL312□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	168



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

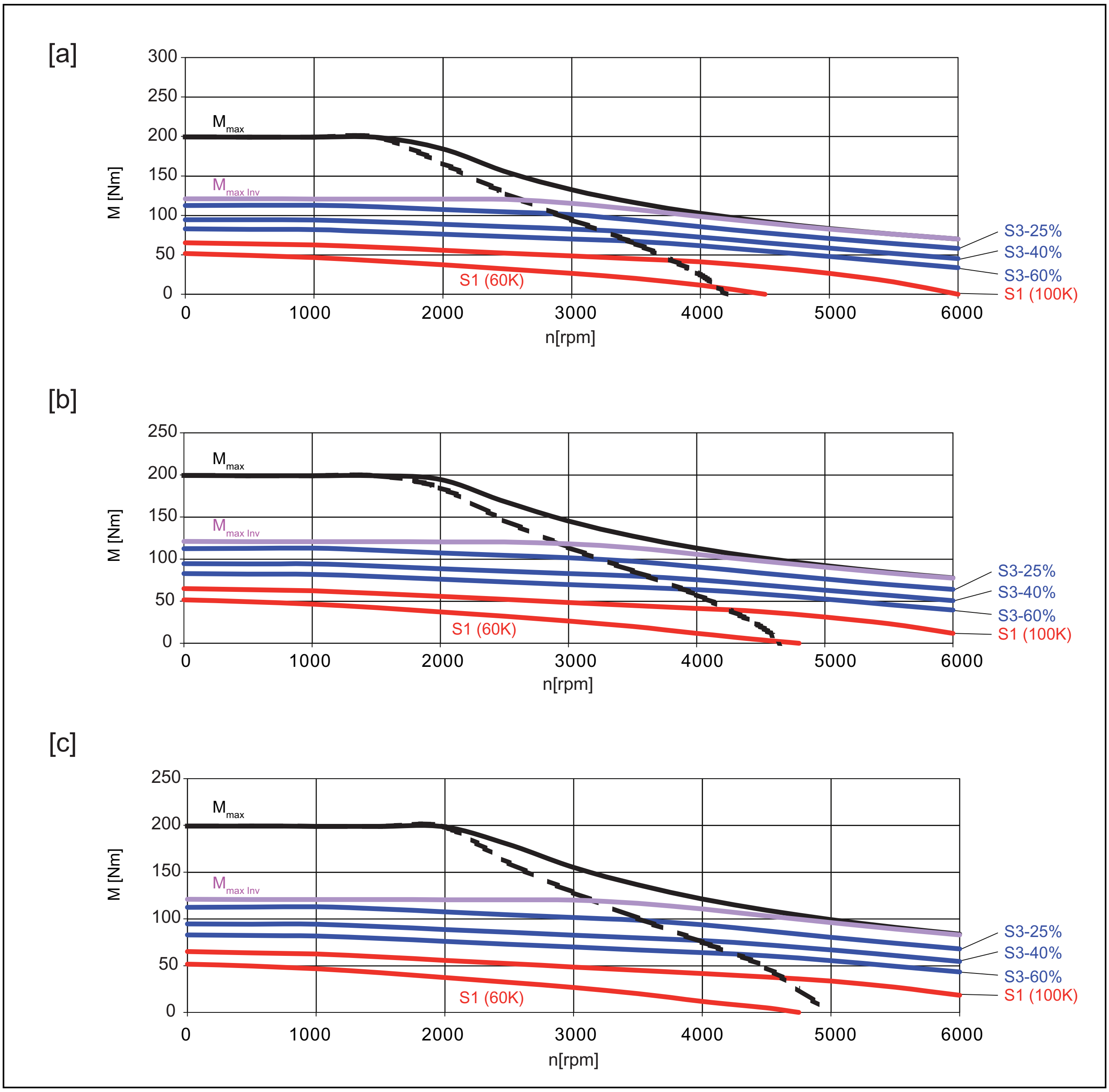
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-46 1FT7105-5SC7

Table 4- 45 1FT7105-5SF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	48
Rated current (100 K)	$I_{N\ (100\ K)}$	A	35
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	51
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	65
Stall current (60 K)	$I_{0\ (60\ K)}$	A	36
Stall current (100 K)	$I_{0\ (100\ K)}$	A	45
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	206
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	178
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	15.1
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	6000
Maximum torque	M_{max}	Nm	200
Maximum current	I_{max}	A	158
Physical constants			
Torque constant	k_T	Nm/A	1.43
Voltage constant	k_E	V/1000 rpm	92
Winding resistance at 20 °C	R_{Str}	Ω	0.05
Rotating field inductance	L_D	mH	1.25
Electrical time constant	T_{el}	ms	25
Mechanical time constant	T_{mech}	ms	1.3
Thermal time constant	T_{th}	min	50
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	107000
Weight with brake	m_{MotBr}	kg	56
Weight without brake	m_{Mot}	kg	50
Recommended Motor Module 6SL312□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	120



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

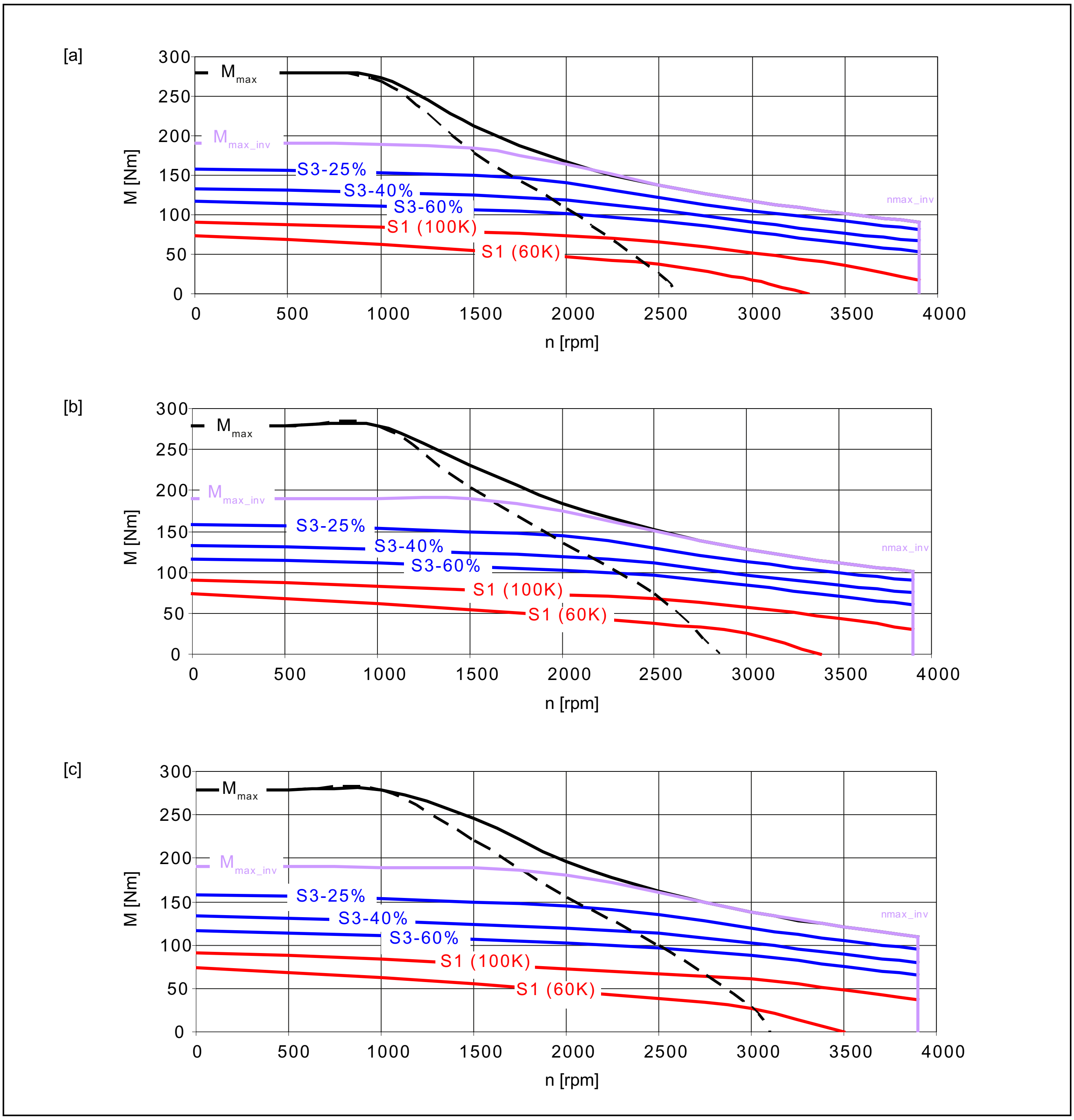
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-47 1FT7105-5SF7

Table 4- 46 1FT7108-5SC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	73
Rated current (100 K)	$I_{N\ (100\ K)}$	A	33
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	74
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	91
Stall current (60 K)	$I_{0\ (60\ K)}$	A	32
Stall current (100 K)	$I_{0\ (100\ K)}$	A	39
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	276
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	248
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	16.3
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	3900
Maximum torque	M_{max}	Nm	280
Maximum current	I_{max}	A	142
Physical constants			
Torque constant	k_T	Nm/A	2.33
Voltage constant	k_E	V/1000 rpm	149
Winding resistance at 20 °C	R_{Str}	Ω	0.08
Rotating field inductance	L_D	mH	2.35
Electrical time constant	T_{el}	ms	29
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	60
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	96000
Weight with brake	m_{MotBr}	kg	70
Weight without brake	m_{Mot}	kg	64
Recommended Motor Module 6SL312□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	190

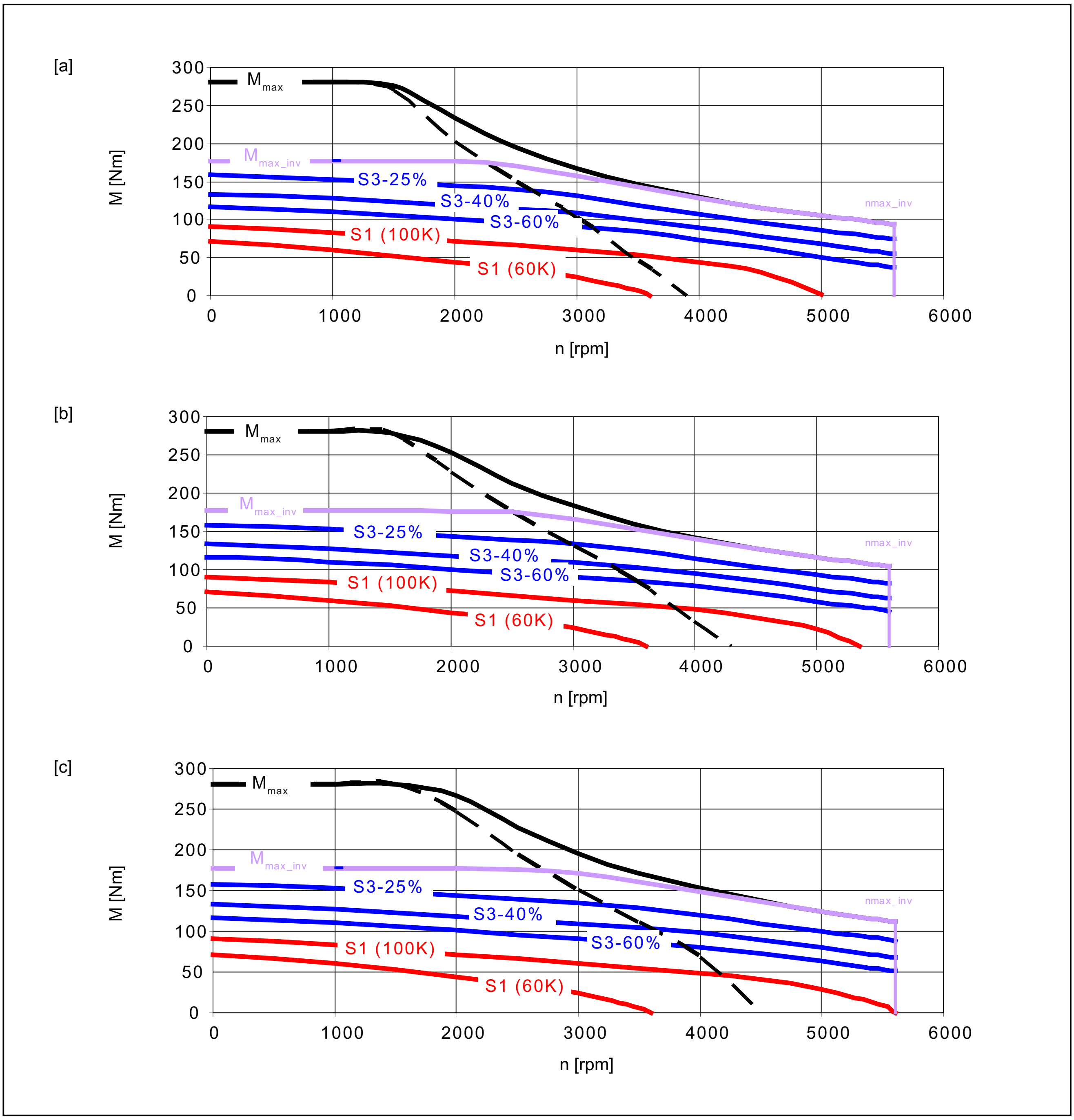


[a] SINAMICS SLM 400 V
[b] SINAMICS ALM 400 V
[c] SINAMICS SLM 480 V
The characteristic curves are only valid for optimized converter setting data

Figure 4-48 1FT7108-5SC7

Table 4- 47 1FT7108-5SF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	60
Rated current (100 K)	$I_{N\ (100\ K)}$	A	38
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	74
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	91
Stall current (60 K)	$I_{0\ (60\ K)}$	A	45
Stall current (100 K)	$I_{0\ (100\ K)}$	A	57
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	276
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	248
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	20.7
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	5600
Maximum torque	M_{max}	Nm	280
Maximum current	I_{max}	A	205
Physical constants			
Torque constant	k_T	Nm/A	1.61
Voltage constant	k_E	V/1000 rpm	103
Winding resistance at 20 °C	R_{Str}	Ω	0.04
Rotating field inductance	L_D	mH	1.1
Electrical time constant	T_{el}	ms	28
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	60
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	96000
Weight with brake	m_{MotBr}	kg	70
Weight without brake	m_{Mot}	kg	64
Recommended Motor Module 6SL312□-1TE26-0AA3			
Rated converter current	$I_{N\ Inv}$	A	60
Maximum converter current	$I_{max\ Inv}$	A	113
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	177



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

[c] SINAMICS SLM 480 V

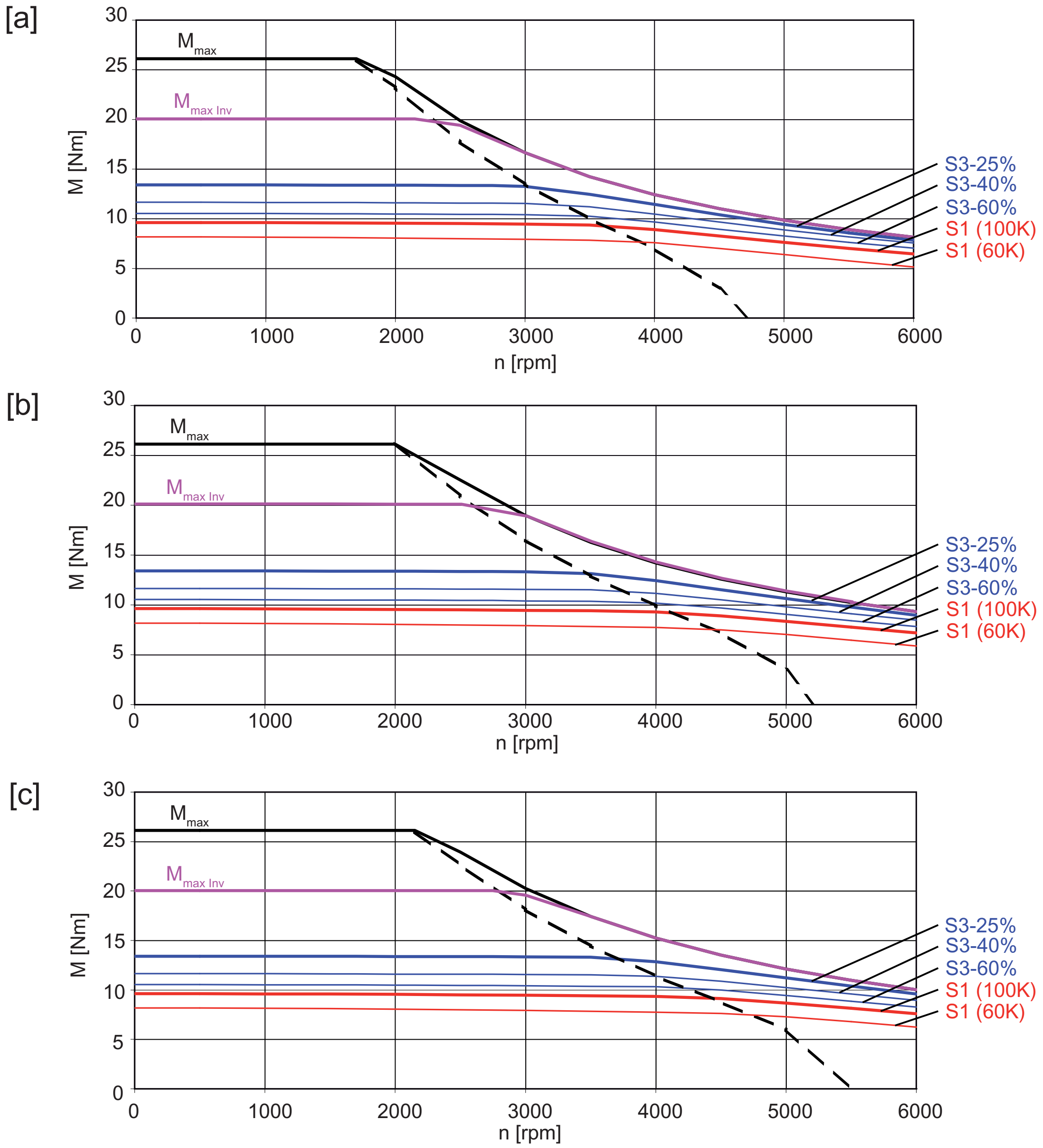
The characteristic curves are only valid for optimized converter setting data

Figure 4-49 1FT7108-5SF7

4.2.3 1FT7 synchronous motors with liquid cooling

Table 4- 48 1FT7062-5WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	10
Rated current	I_N	A	7.8
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	8
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	10
Stall current (60 K)	$I_{0\ (60\ K)}$	A	5.9
Stall current (100 K)	$I_{0\ (100\ K)}$	A	7.4
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	10.6
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	8.1
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	3.14
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	6700
Maximum torque	M_{max}	Nm	26
Maximum current	I_{max}	A	27.2
Physical constants			
Torque constant	k_T	Nm/A	1.35
Voltage constant	k_E	V/1000 rpm	86
Winding resistance at 20 °C	R_{Str}	Ω	0.99
Rotating field inductance	L_D	mH	9.1
Electrical time constant	T_{el}	ms	9
Mechanical time constant	T_{mech}	ms	1.3
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	28700
Weight with brake	m_{MotBr}	kg	12.2
Weight without brake	m_{Mot}	kg	11
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	9
Maximum converter current	$I_{max\ Inv}$	A	18
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	20



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

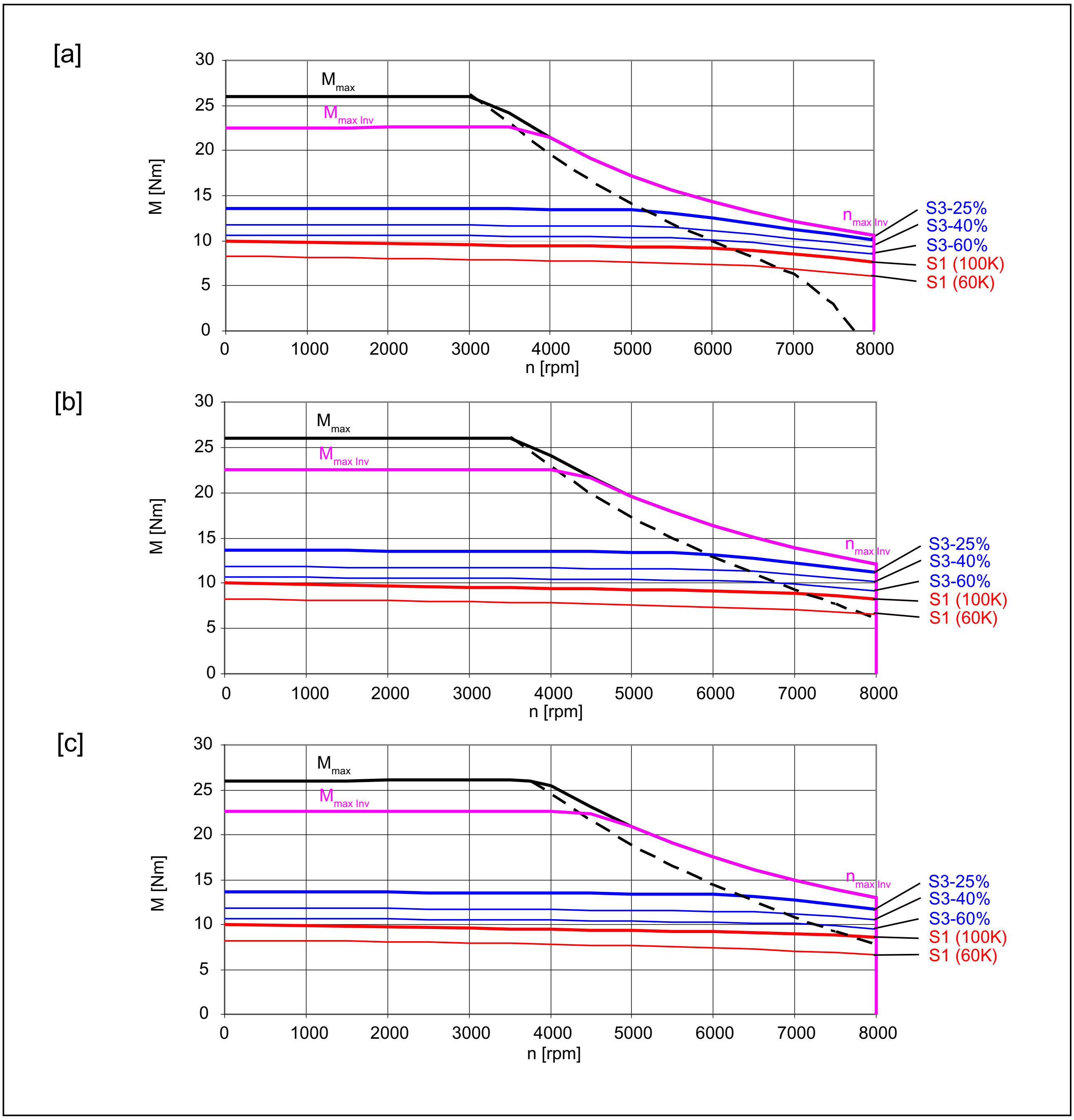
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-50 1FT7062-5WF7

Table 4- 49 1FT7062-5WK7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	6000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	9.2
Rated current	I_N	A	12.7
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	8
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	10
Stall current (60 K)	$I_{0\ (60\ K)}$	A	10.0
Stall current (100 K)	$I_{0\ (100\ K)}$	A	12.5
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm²	10.6
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm²	8.1
Optimum operating point			
Optimum speed	n_{opt}	rpm	6000
Optimum power	P_{opt}	kW	5.78
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	26
Maximum current	I_{max}	A	45.7
Physical constants			
Torque constant	k_T	Nm/A	0.8
Voltage constant	k_E	V/1000 rpm	51
Winding resistance at 20 °C	R_{Str}	Ω	0.35
Rotating field inductance	L_D	mH	3.2
Electrical time constant	T_{el}	ms	9
Mechanical time constant	T_{mech}	ms	1.3
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	28700
Weight with brake	m_{MotBr}	kg	12.2
Weight without brake	m_{Mot}	kg	11
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	22.5



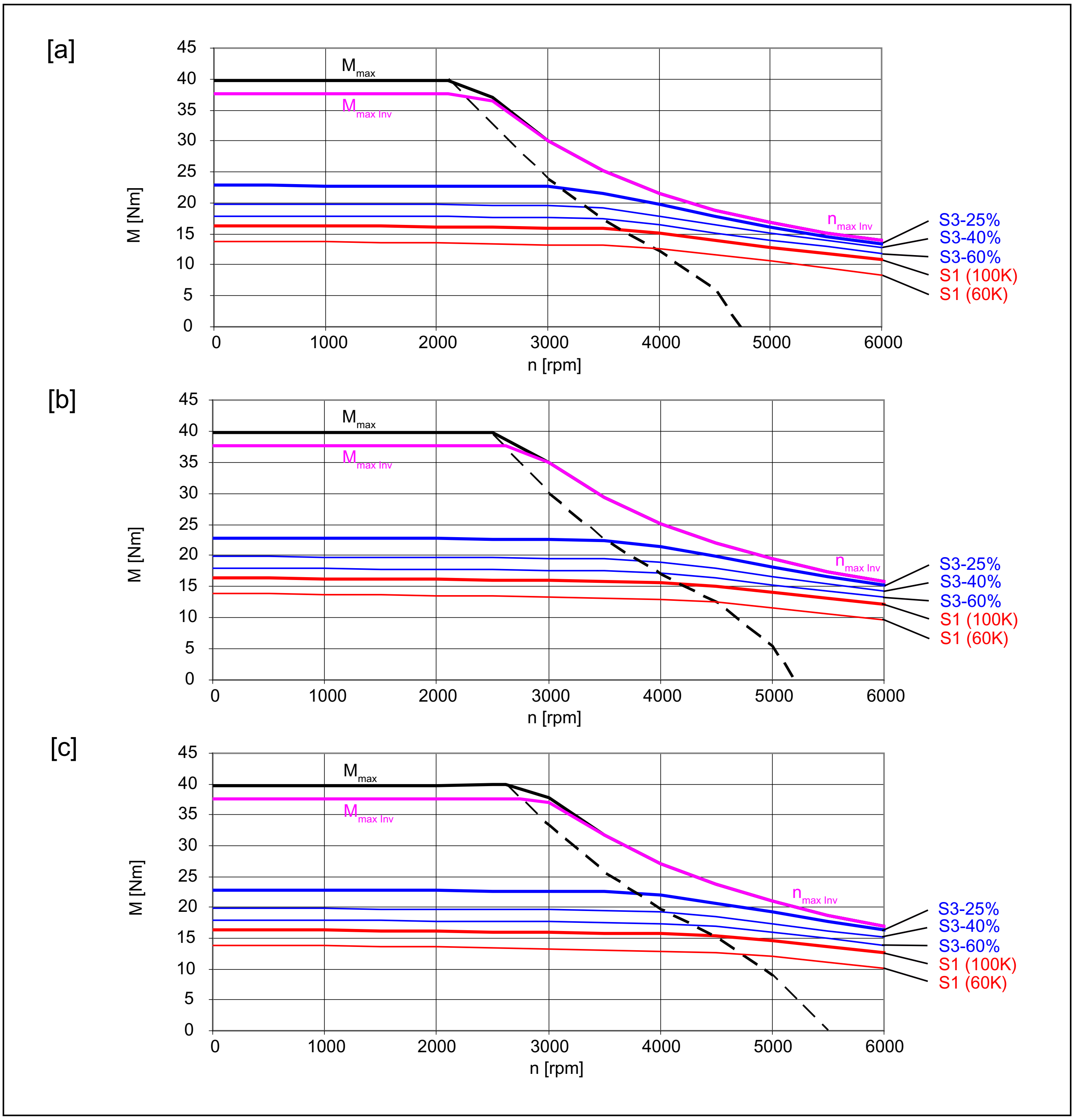
[a] SINAMICS SLM 400 V
[b] SINAMICS ALM 400 V
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-51 1FT7062-5WK7

Table 4- 50 1FT7064-5WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	16
Rated current	I_N	A	12.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	12.8
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	16
Stall current (60 K)	$I_{0\ (60\ K)}$	A	9.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	11.9
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	15.4
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	12.9
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	5.03
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	6800
Maximum torque	M_{max}	Nm	40
Maximum current	I_{max}	A	39.3
Physical constants			
Torque constant	k_T	Nm/A	1.35
Voltage constant	k_E	V/1000 rpm	85
Winding resistance at 20 °C	R_{Str}	Ω	0.49
Rotating field inductance	L_D	mH	5.3
Electrical time constant	T_{el}	ms	11
Mechanical time constant	T_{mech}	ms	1.0
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	26300
Weight with brake	m_{MotBr}	kg	14.8
Weight without brake	m_{Mot}	kg	13.7
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	37.5



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

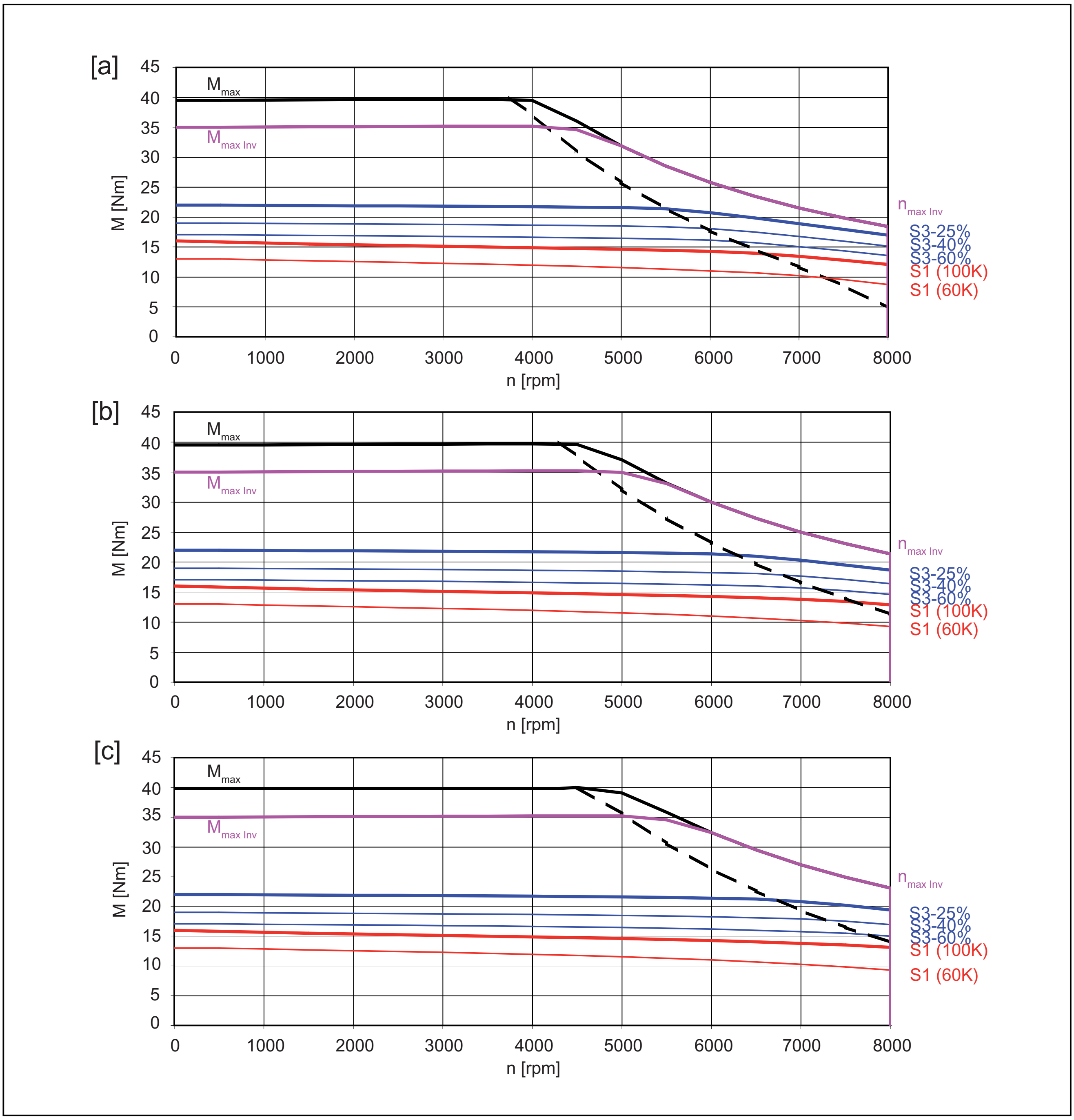
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-52 1FT7064-5WF7

Table 4- 51 1FT7064-5WK7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	6000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	14.2
Rated current	I_N	A	20.0
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	12.8
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	16
Stall current (60 K)	$I_{0\ (60\ K)}$	A	16.1
Stall current (100 K)	$I_{0\ (100\ K)}$	A	20.2
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm²	15.4
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm²	12.9
Optimum operating point			
Optimum speed	n_{opt}	rpm	6000
Optimum power	P_{opt}	kW	8.92
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	40
Maximum current	I_{max}	A	67
Physical constants			
Torque constant	k_T	Nm/A	0.79
Voltage constant	k_E	V/1000 rpm	50
Winding resistance at 20 °C	R_{Str}	Ω	0.18
Rotating field inductance	L_D	mH	1.75
Electrical time constant	T_{el}	ms	10
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	26300
Weight with brake	m_{MotBr}	kg	14.8
Weight without brake	m_{Mot}	kg	13.7
Recommended Motor Module 6SL312□-1TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	35



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

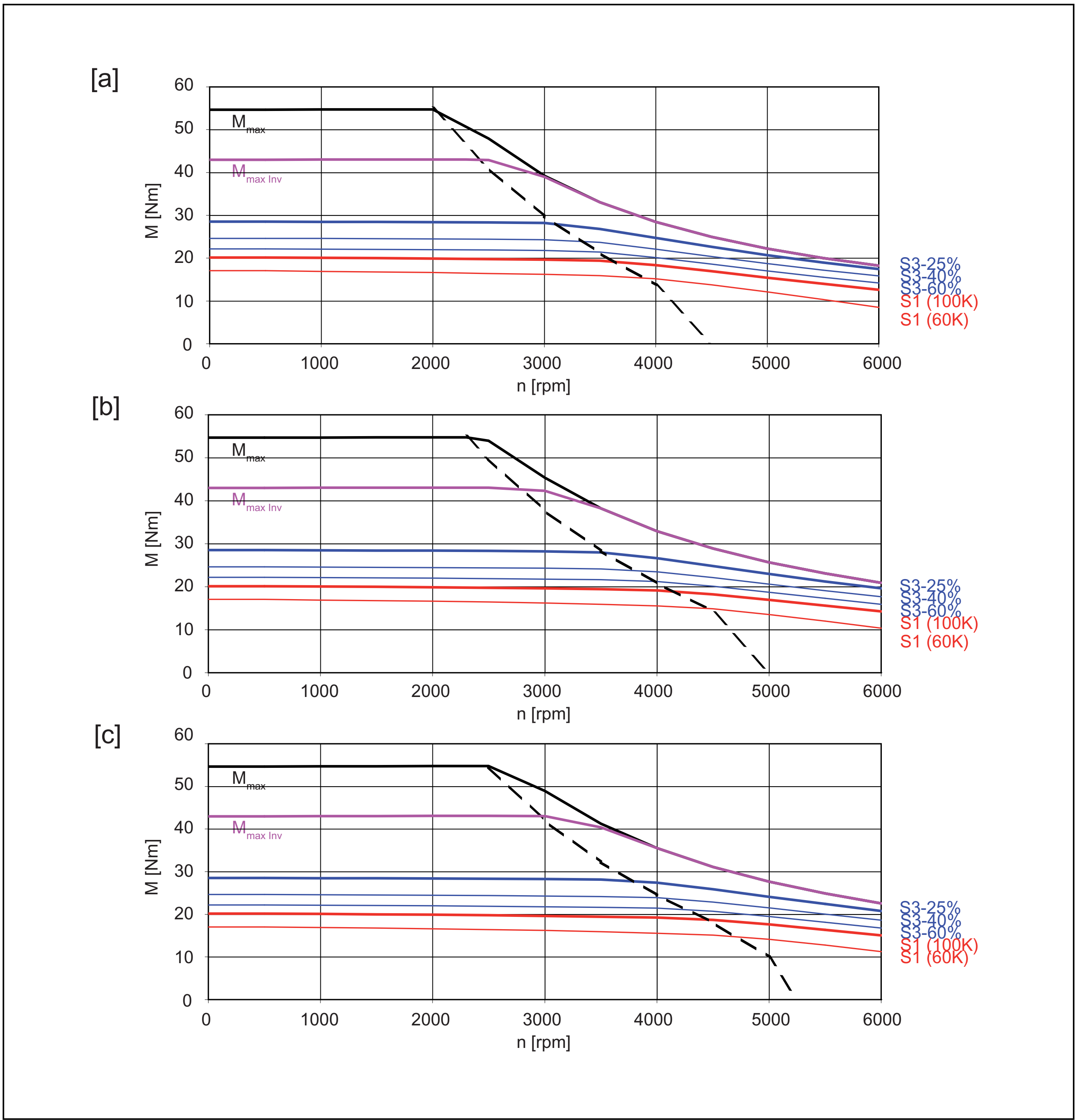
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-53 1FT7064-5WK7

Table 4- 52 1FT7066-5WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	19.6
Rated current	I_N	A	14.4
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	16
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	20
Stall current (60 K)	$I_{0\ (60\ K)}$	A	11.2
Stall current (100 K)	$I_{0\ (100\ K)}$	A	14.0
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	20.2
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	17.7
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	6.16
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	6400
Maximum torque	M_{max}	Nm	55
Maximum current	I_{max}	A	50
Physical constants			
Torque constant	k_T	Nm/A	1.43
Voltage constant	k_E	V/1000 rpm	90
Winding resistance at 20 °C	R_{Str}	Ω	0.39
Rotating field inductance	L_D	mH	4.07
Electrical time constant	T_{el}	ms	11
Mechanical time constant	T_{mech}	ms	1.0
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	24200
Weight with brake	m_{MotBr}	kg	17.4
Weight without brake	m_{Mot}	kg	16.3
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	43



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

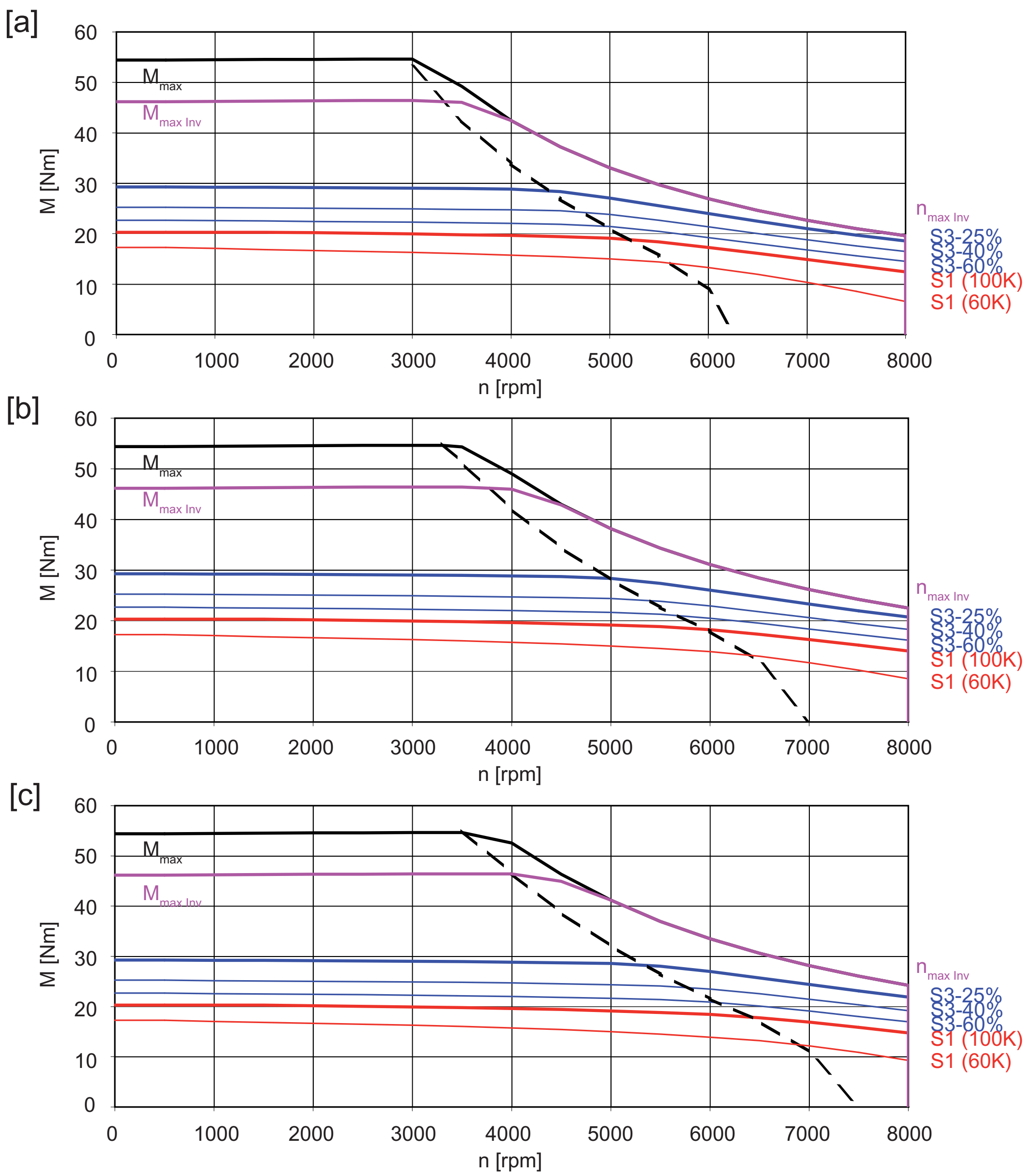
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-54 1FT7066-5WF7

Table 4- 53 1FT7066-5WH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	19.4
Rated current	I_N	A	20.8
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	16
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	20
Stall current (60 K)	$I_{0\ (60\ K)}$	A	15.7
Stall current (100 K)	$I_{0\ (100\ K)}$	A	19.7
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	20.2
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	17.7
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	9.14
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	55
Maximum current	I_{max}	A	70.5
Physical constants			
Torque constant	k_T	Nm/A	1.02
Voltage constant	k_E	V/1000 rpm	64
Winding resistance at 20 °C	R_{Str}	Ω	0.19
Rotating field inductance	L_D	mH	2.05
Electrical time constant	T_{el}	ms	11
Mechanical time constant	T_{mech}	ms	1.0
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	24200
Weight with brake	m_{MotBr}	kg	17.4
Weight without brake	m_{Mot}	kg	16.3
Recommended Motor Module 6SL312□-1TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	46



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

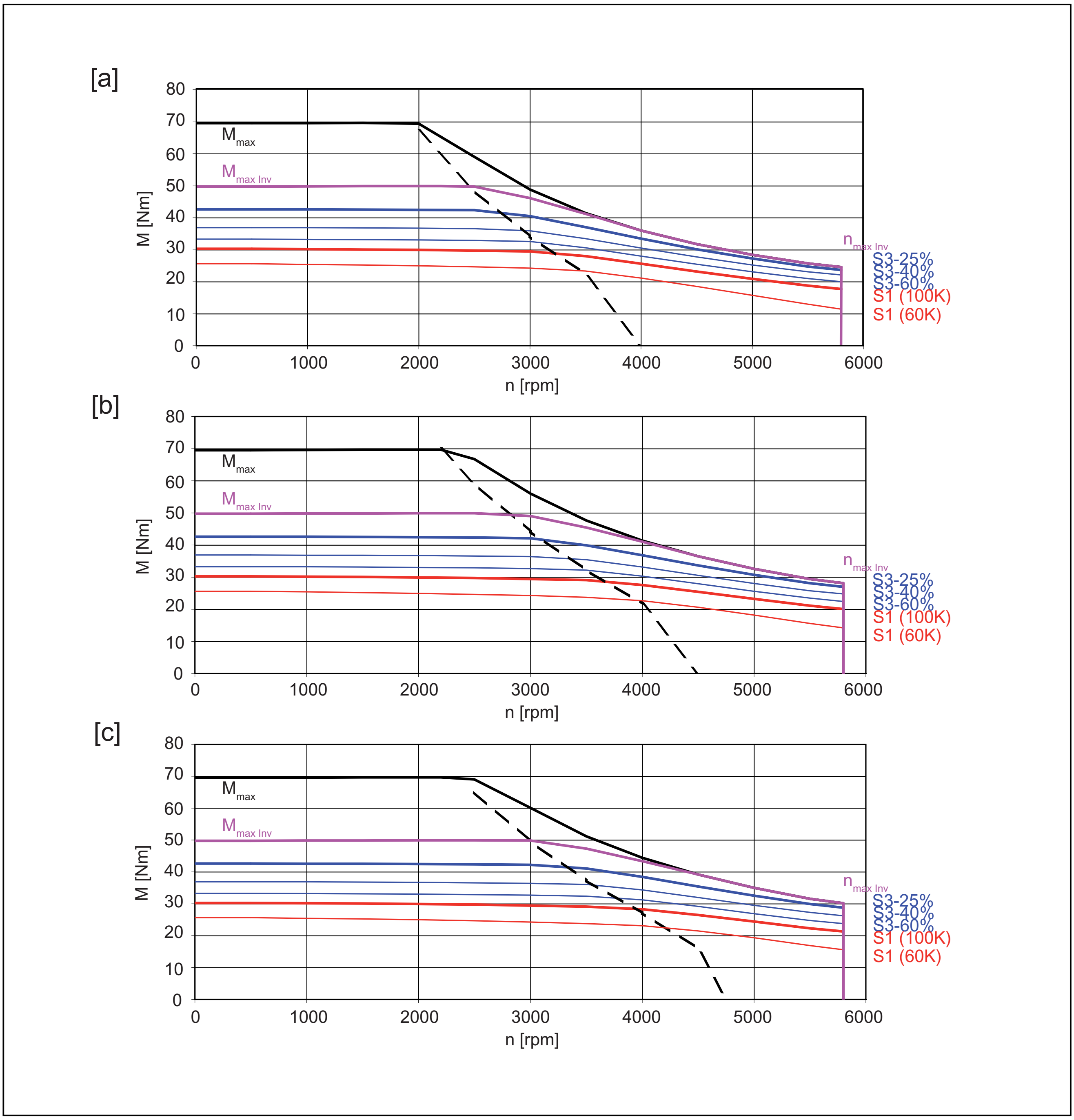
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-55 1FT7066-5WH7

Table 4- 54 1FT7068-5WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	29.5
Rated current	I_N	A	19.6
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	24
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	30
Stall current (60 K)	$I_{0\ (60\ K)}$	A	15.2
Stall current (100 K)	$I_{0\ (100\ K)}$	A	19.0
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	27.4
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	24.8
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	9.27
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	5800
Maximum torque	M_{max}	Nm	70
Maximum current	I_{max}	A	55.5
Physical constants			
Torque constant	k_T	Nm/A	1.58
Voltage constant	k_E	V/1000 rpm	99.5
Winding resistance at 20 °C	R_{Str}	Ω	0.31
Rotating field inductance	L_D	mH	3.35
Electrical time constant	T_{el}	ms	11
Mechanical time constant	T_{mech}	ms	0.9
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	21700
Weight with brake	m_{MotBr}	kg	21.3
Weight without brake	m_{Mot}	kg	20.1
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	49.5



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

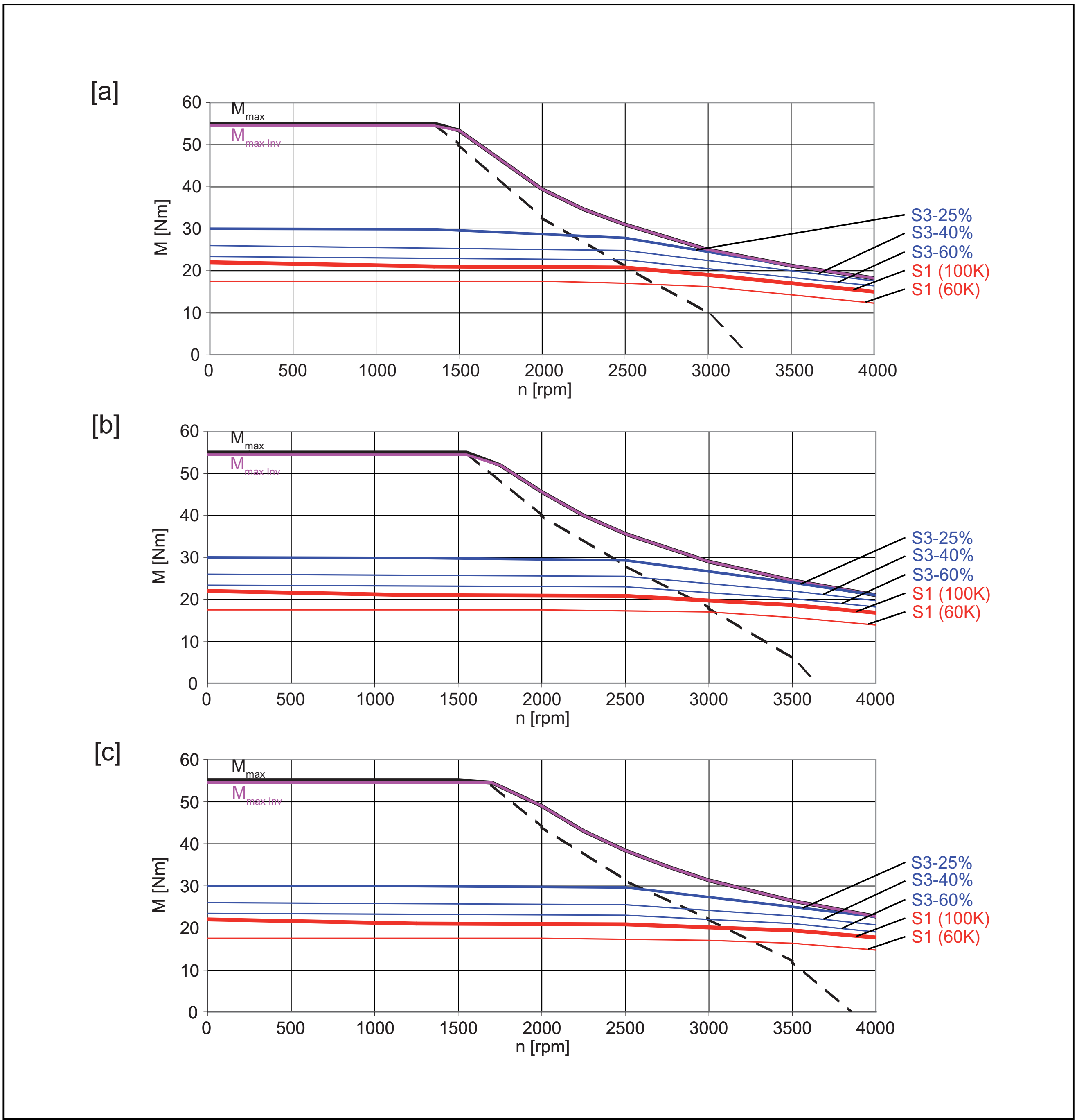
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-56 1FT7068-5WF7

Table 4- 55 1FT7082-5WC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	21
Rated current	I_N	A	11
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	17.5
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	21
Stall current (60 K)	$I_{0\ (60\ K)}$	A	8.9
Stall current (100 K)	$I_{0\ (100\ K)}$	A	10.7
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm²	43
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm²	28.9
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	4.40
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	4700
Maximum torque	M_{max}	Nm	55
Maximum current	I_{max}	A	36.3
Physical constants			
Torque constant	k_T	Nm/A	1.96
Voltage constant	k_E	V/1000 rpm	123
Winding resistance at 20 °C	R_{Str}	Ω	0.611
Rotating field inductance	L_D	mH	9.15
Electrical time constant	T_{el}	ms	15
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	75800
Weight with brake	m_{MotBr}	kg	23.7
Weight without brake	m_{Mot}	kg	20.7
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	54.5



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

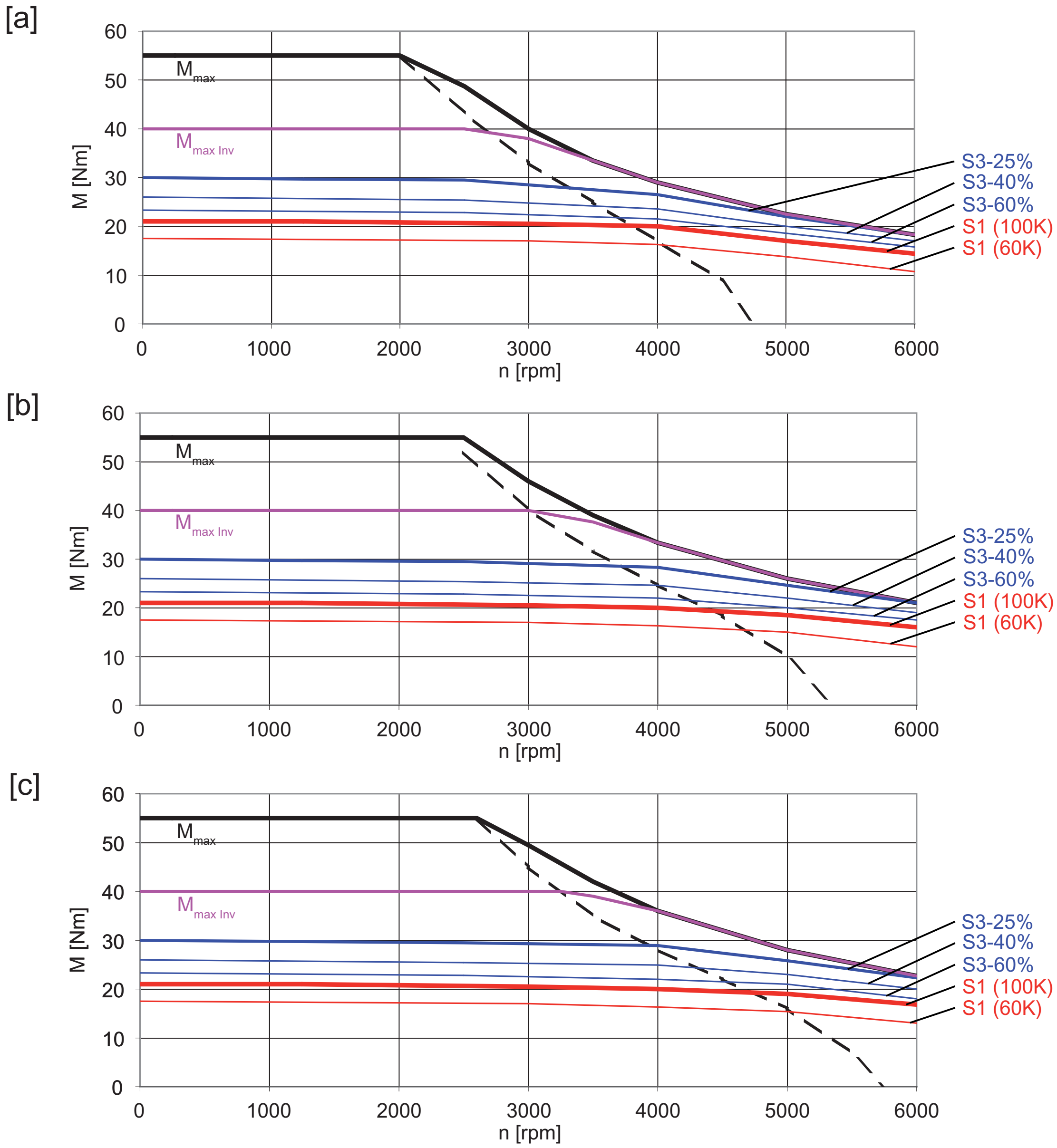
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-57 1FT7082-5WC7

Table 4- 56 1FT7082-5WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	20.5
Rated current	I_N	A	16
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	17.5
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	21
Stall current (60 K)	$I_{0\ (60\ K)}$	A	13.3
Stall current (100 K)	$I_{0\ (100\ K)}$	A	16
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	43
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	28.9
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	6.44
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7000
Maximum torque	M_{max}	Nm	55
Maximum current	I_{max}	A	54
Physical constants			
Torque constant	k_T	Nm/A	1.31
Voltage constant	k_E	V/1000 rpm	83
Winding resistance at 20 °C	R_{Str}	Ω	0.285
Rotating field inductance	L_D	mH	4.15
Electrical time constant	T_{el}	ms	15
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	75800
Weight with brake	m_{MotBr}	kg	23.7
Weight without brake	m_{Mot}	kg	20.7
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	40



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

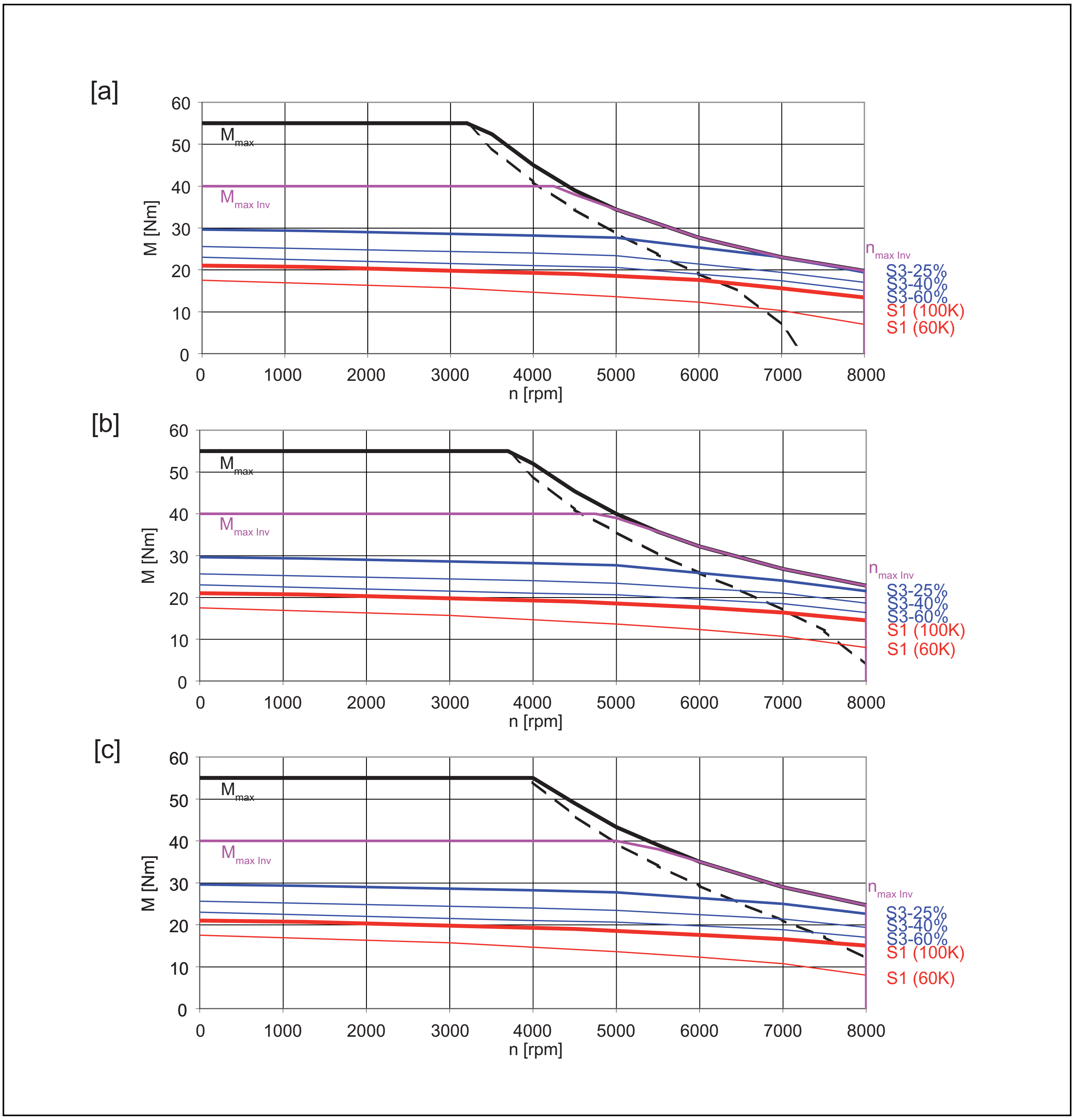
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-58 1FT7082-5WF7

Table 4- 57 1FT7082-5WH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	19
Rated current	I_N	A	23.9
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	17.5
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	21
Stall current (60 K)	$I_{0\ (60\ K)}$	A	20
Stall current (100 K)	$I_{0\ (100\ K)}$	A	24
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	43
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	28.9
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	8.95
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	55
Maximum current	I_{max}	A	82
Physical constants			
Torque constant	k_T	Nm/A	0.87
Voltage constant	k_E	V/1000 rpm	54.5
Winding resistance at 20 °C	R_{Str}	Ω	0.122
Rotating field inductance	L_D	mH	1.79
Electrical time constant	T_{el}	ms	15
Mechanical time constant	T_{mech}	ms	1.4
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	75800
Weight with brake	m_{MotBr}	kg	23.7
Weight without brake	m_{Mot}	kg	20.7
Recommended Motor Module 6SL312□-□TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	40

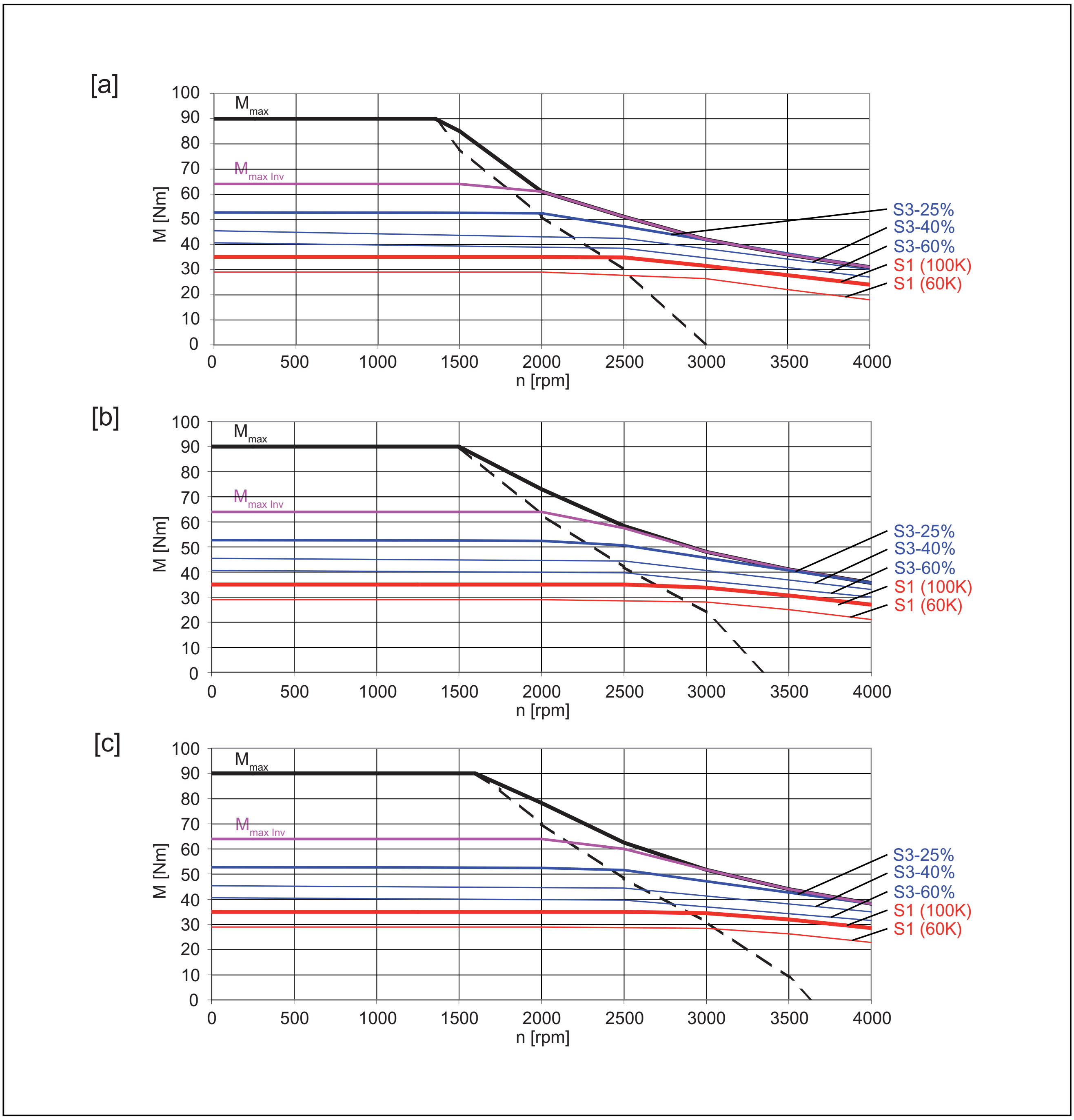


[a] SINAMICS SLM 400 V
[b] SINAMICS ALM 400 V
[c] SINAMICS SLM 480 V
The characteristic curves are only valid for optimized converter setting data

Figure 4-59 1FT7082-5WH7

Table 4- 58 1FT7084-5WC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	35
Rated current	I_N	A	17
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	29
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	35
Stall current (60 K)	$I_{0\ (60\ K)}$	A	13.7
Stall current (100 K)	$I_{0\ (100\ K)}$	A	16.5
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	62.5
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	48.3
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	7.33
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	4400
Maximum torque	M_{max}	Nm	90
Maximum current	I_{max}	A	56
Physical constants			
Torque constant	k_T	Nm/A	2.12
Voltage constant	k_E	V/1000 rpm	133
Winding resistance at 20 °C	R_{Str}	Ω	0.345
Rotating field inductance	L_D	mH	5.9
Electrical time constant	T_{el}	ms	17
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	65200
Weight with brake	m_{MotBr}	kg	30.5
Weight without brake	m_{Mot}	kg	27.5
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	64



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

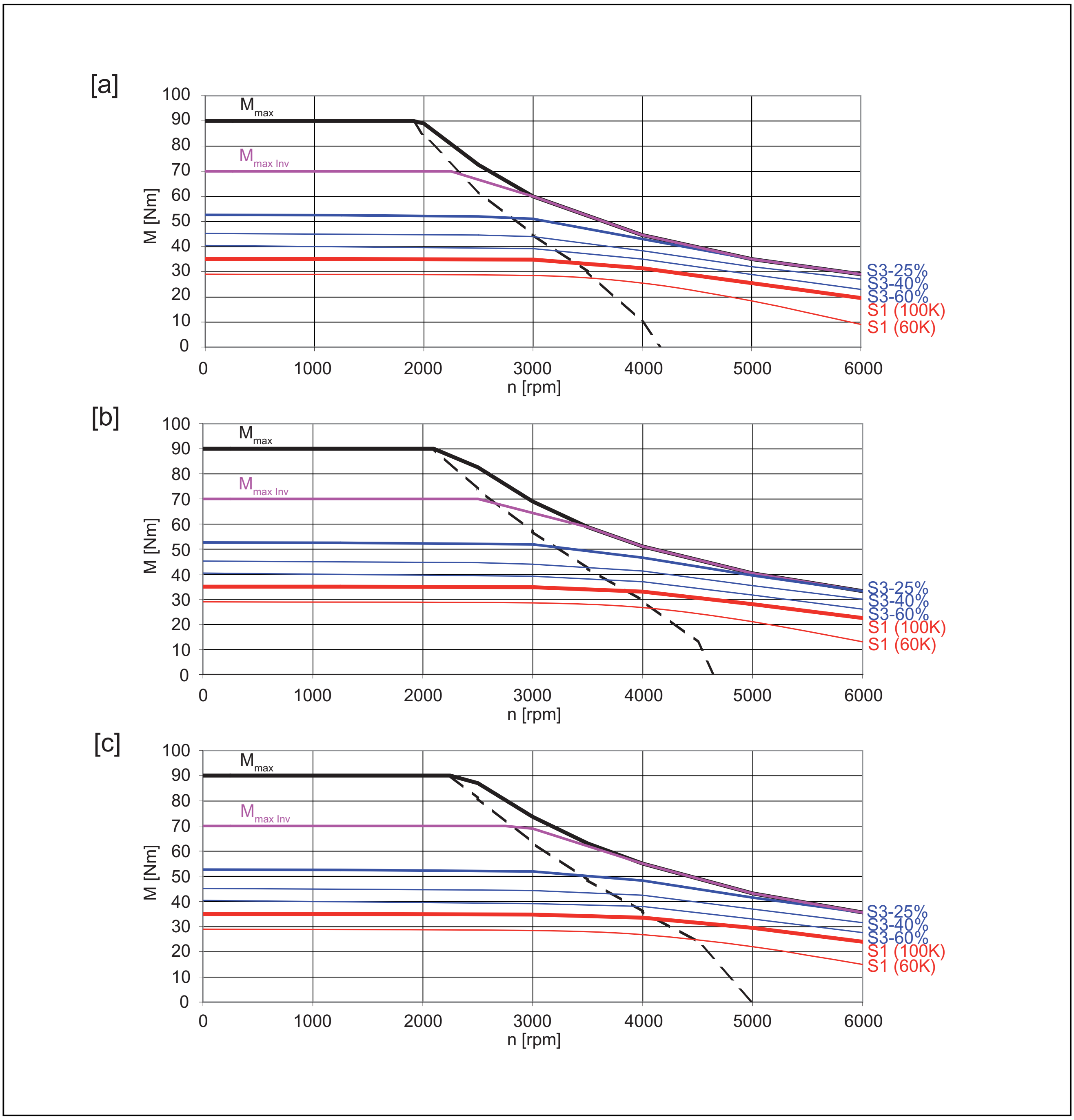
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-60 1FT7084-5WC7

Table 4- 59 1FT7084-5WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	35
Rated current	I_N	A	24.2
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	29
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	35
Stall current (60 K)	$I_{0\ (60\ K)}$	A	19.1
Stall current (100 K)	$I_{0\ (100\ K)}$	A	23
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	62.5
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	48.3
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	11.0
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	6100
Maximum torque	M_{max}	Nm	90
Maximum current	I_{max}	A	78
Physical constants			
Torque constant	k_T	Nm/A	1.52
Voltage constant	k_E	V/1000 rpm	95
Winding resistance at 20 °C	R_{Str}	Ω	0.182
Rotating field inductance	L_D	mH	3.1
Electrical time constant	T_{el}	ms	17
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	65200
Weight with brake	m_{MotBr}	kg	30.5
Weight without brake	m_{Mot}	kg	27.5
Recommended Motor Module 6SL312□-1TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	70



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

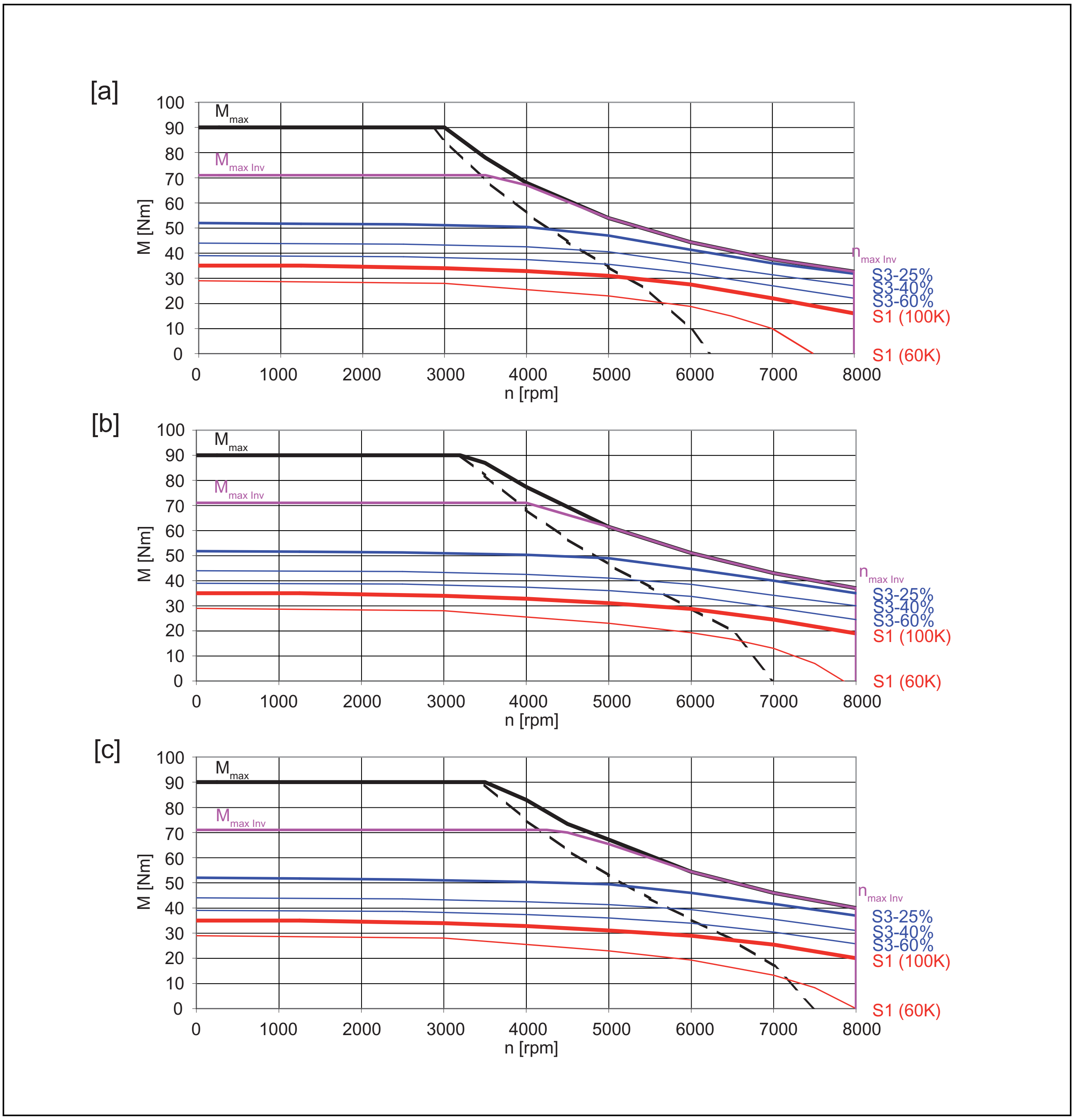
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-61 1FT7084-5WF7

Table 4- 60 1FT7084-5WH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	32
Rated current	I_N	A	34.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	29
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	35
Stall current (60 K)	$I_{0\ (60\ K)}$	A	28.4
Stall current (100 K)	$I_{0\ (100\ K)}$	A	34.3
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	62.5
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	48.3
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	15.1
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	90
Maximum current	I_{max}	A	116
Physical constants			
Torque constant	k_T	Nm/A	1.02
Voltage constant	k_E	V/1000 rpm	64
Winding resistance at 20 °C	R_{Str}	Ω	0.085
Rotating field inductance	L_D	mH	1.4
Electrical time constant	T_{el}	ms	16
Mechanical time constant	T_{mech}	ms	1.2
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	65200
Weight with brake	m_{MotBr}	kg	30.5
Weight without brake	m_{Mot}	kg	27.5
Recommended Motor Module 6SL312□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	71



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

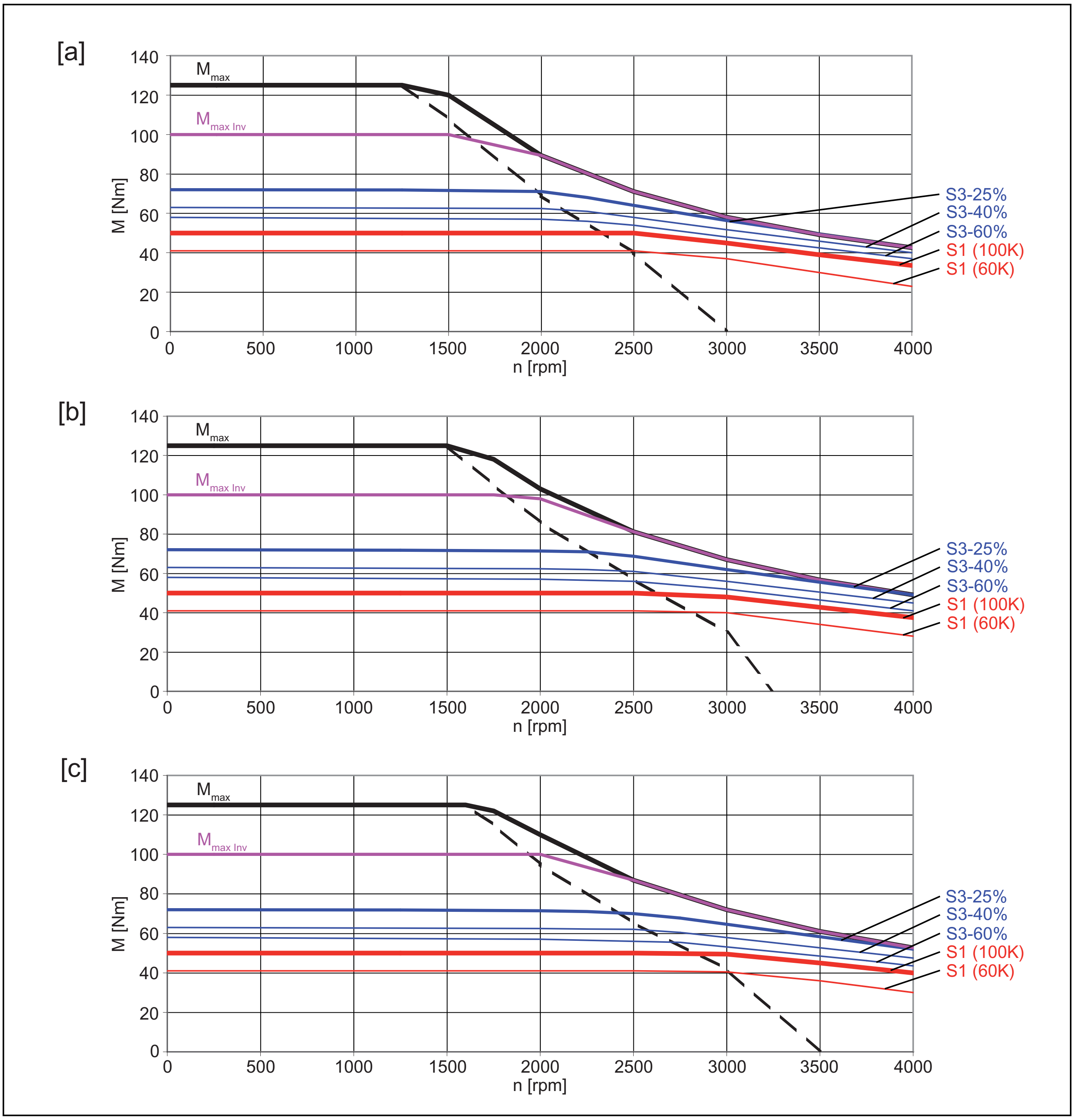
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-62 1FT7084-5WH7

Table 4- 61 1FT7086-5WC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\,(100\,K)}$	Nm	50
Rated current	I_N	A	24
Static torque (60 K)	$M_{0\,(60\,K)}$	Nm	41
Static torque (100 K)	$M_{0\,(100\,K)}$	Nm	50
Stall current (60 K)	$I_{0\,(60\,K)}$	A	19
Stall current (100 K)	$I_{0\,(100\,K)}$	A	23
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	81.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	67.8
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	10.5
Limiting data			
Max. permissible speed (mech.)	$n_{max\,mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\,Inv}$	rpm	4300
Maximum torque	M_{max}	Nm	125
Maximum current	I_{max}	A	75
Physical constants			
Torque constant	k_T	Nm/A	2.17
Voltage constant	k_E	V/1000 rpm	136
Winding resistance at 20 °C	R_{Str}	Ω	0.245
Rotating field inductance	L_D	mH	4.8
Electrical time constant	T_{el}	ms	20
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\,Mot}$	Nm/rad	57100
Weight with brake	m_{MotBr}	kg	37.1
Weight without brake	m_{Mot}	kg	34.1
Recommended Motor Module 6SL312□-1TE23-0AA3			
Rated converter current	$I_{N\,Inv}$	A	30
Maximum converter current	$I_{max\,Inv}$	A	56
Max. torque at $I_{max\,Inv}$	$M_{max\,Inv}$	Nm	100



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

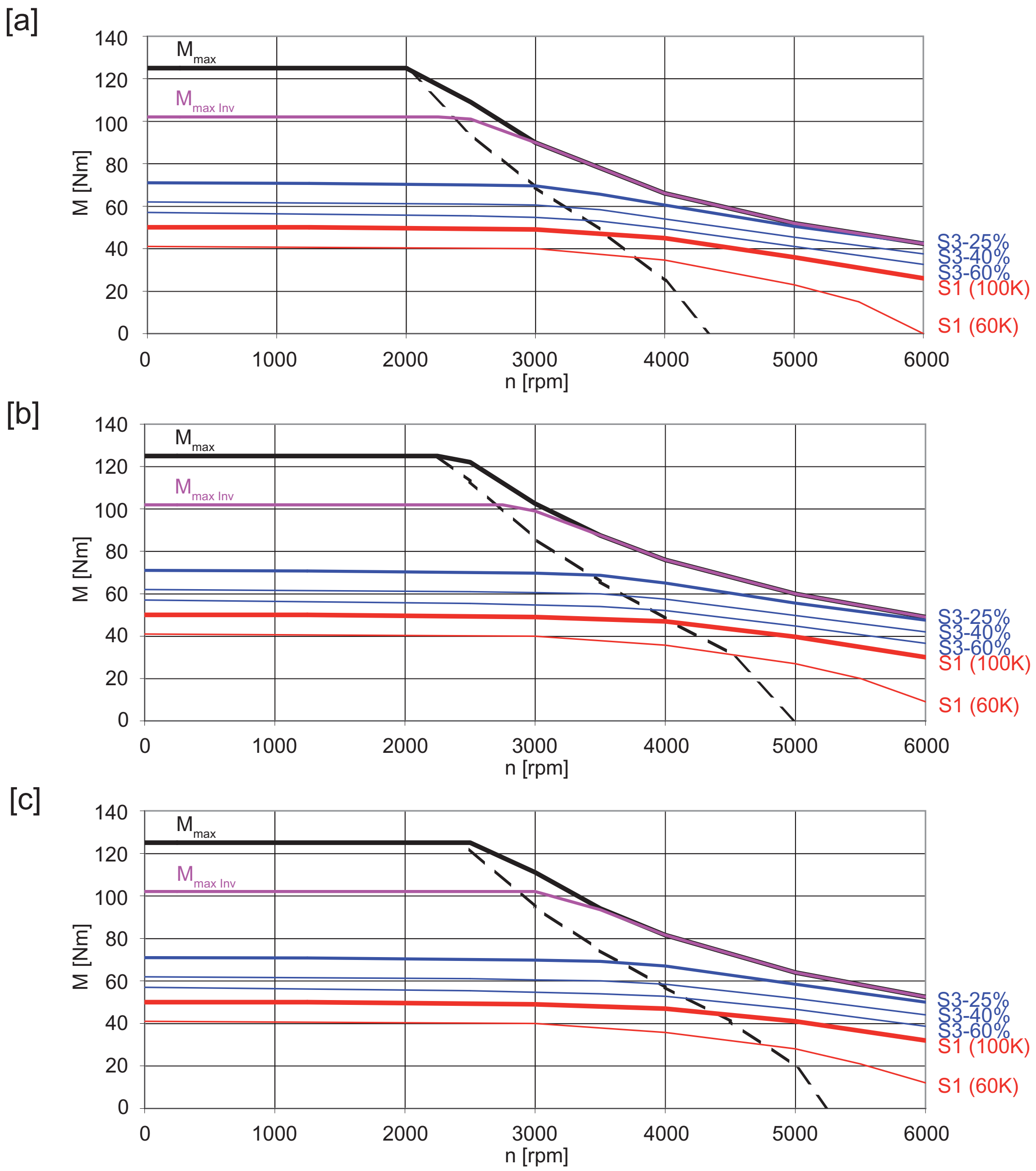
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-63 1FT7086-5WC7

Table 4- 62 1FT7086-5WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	49
Rated current	I_N	A	36
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	41
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	50
Stall current (60 K)	$I_{0\ (60\ K)}$	A	27.9
Stall current (100 K)	$I_{0\ (100\ K)}$	A	34
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	81.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	67.8
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	15.4
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	6300
Maximum torque	M_{max}	Nm	125
Maximum current	I_{max}	A	111
Physical constants			
Torque constant	k_T	Nm/A	1.47
Voltage constant	k_E	V/1000 rpm	92
Winding resistance at 20 °C	R_{Str}	Ω	0.113
Rotating field inductance	L_D	mH	2.2
Electrical time constant	T_{el}	ms	19
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	57100
Weight with brake	m_{MotBr}	kg	37.1
Weight without brake	m_{Mot}	kg	34.1
Recommended Motor Module 6SL312□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	102



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

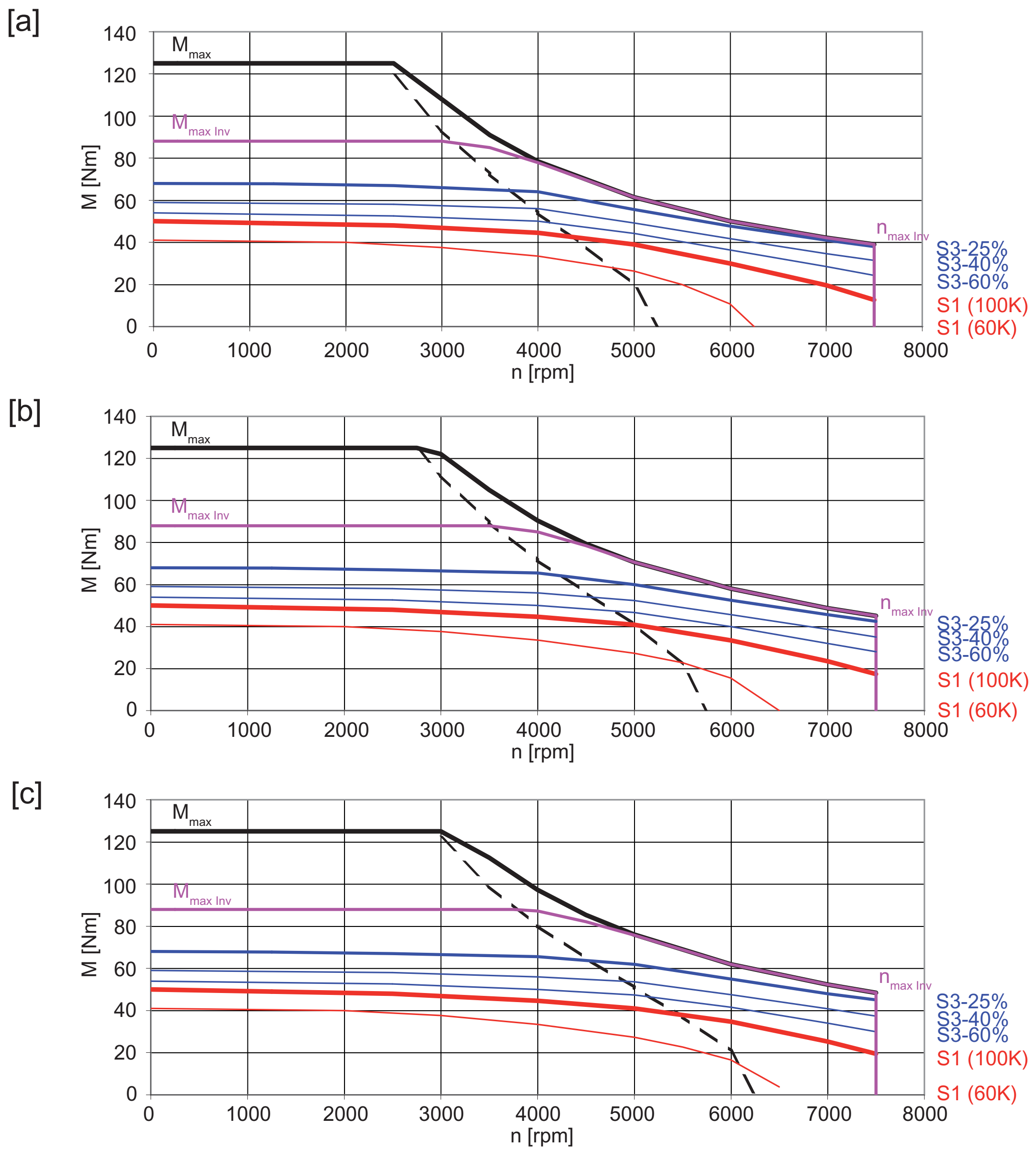
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-64 1FT7086-5WF7

Table 4- 63 1FT7086-5WH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	43
Rated current	I_N	A	38
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	41
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	50
Stall current (60 K)	$I_{0\ (60\ K)}$	A	33.2
Stall current (100 K)	$I_{0\ (100\ K)}$	A	40.5
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	81.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	67.8
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	20.3
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7500
Maximum torque	M_{max}	Nm	125
Maximum current	I_{max}	A	133
Physical constants			
Torque constant	k_T	Nm/A	1.24
Voltage constant	k_E	V/1000 rpm	77
Winding resistance at 20 °C	R_{Str}	Ω	0.085
Rotating field inductance	L_D	mH	1.5
Electrical time constant	T_{el}	ms	18
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	57100
Weight with brake	m_{MotBr}	kg	37.1
Weight without brake	m_{Mot}	kg	34.1
Recommended Motor Module 6SL312□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	88



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

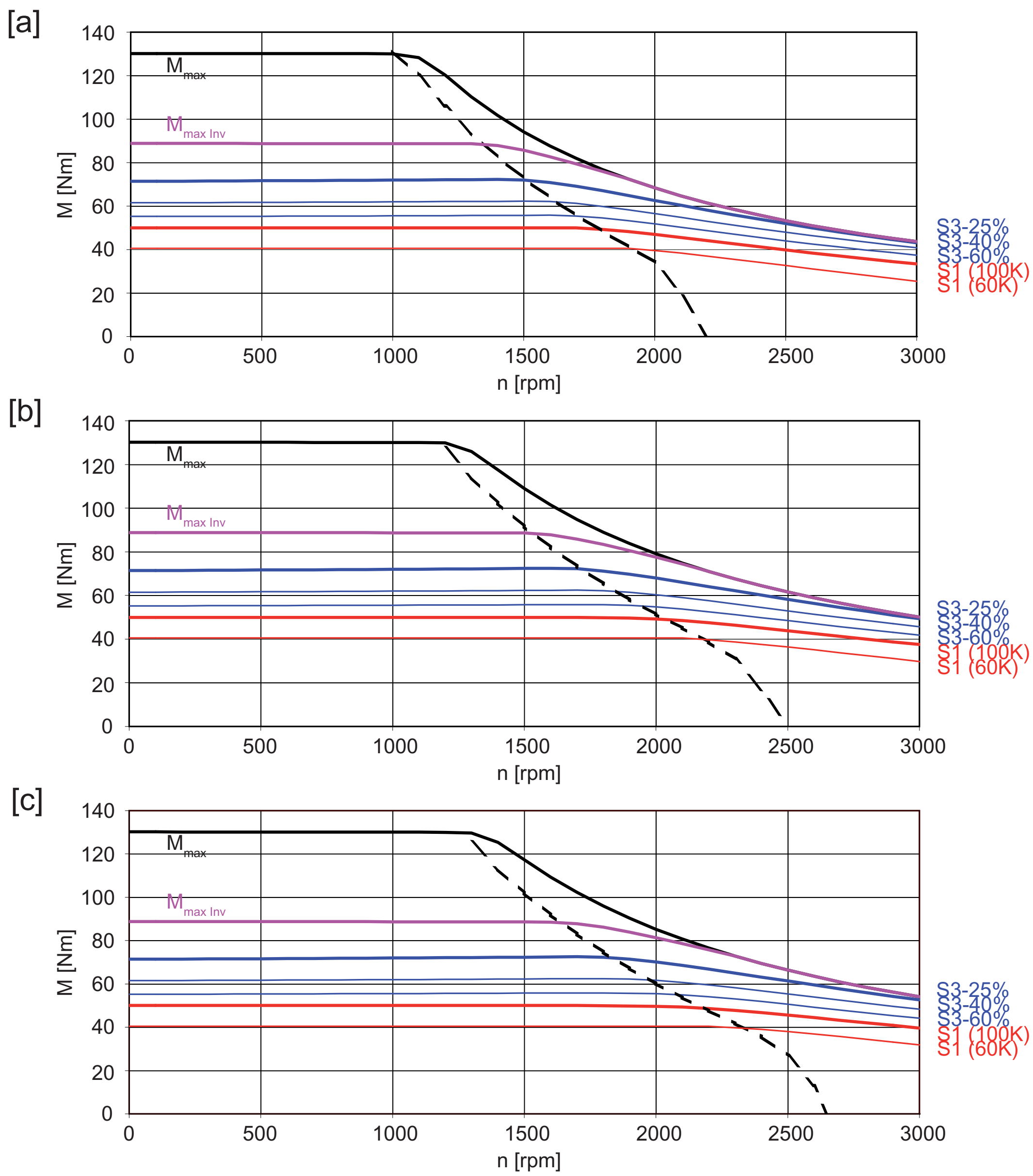
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-65 1FT7086-5WH7

Table 4- 64 1FT7102-5WB7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	1500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	50
Rated current	I_N	A	20.3
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	40
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	50
Stall current (60 K)	$I_{0\ (60\ K)}$	A	14.2
Stall current (100 K)	$I_{0\ (100\ K)}$	A	17.8
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm²	125
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm²	98.9
Optimum operating point			
Optimum speed	n_{opt}	rpm	1500
Optimum power	P_{opt}	kW	7.85
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	3200
Maximum torque	M_{max}	Nm	130
Maximum current	I_{max}	A	59
Physical constants			
Torque constant	k_T	Nm/A	2.81
Voltage constant	k_E	V/1000 rpm	179
Winding resistance at 20 °C	R_{Str}	Ω	0.31
Rotating field inductance	L_D	mH	6.2
Electrical time constant	T_{el}	ms	20
Mechanical time constant	T_{mech}	ms	1.2
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	124000
Weight with brake	m_{MotBr}	kg	40.9
Weight without brake	m_{Mot}	kg	36.6
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	89



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

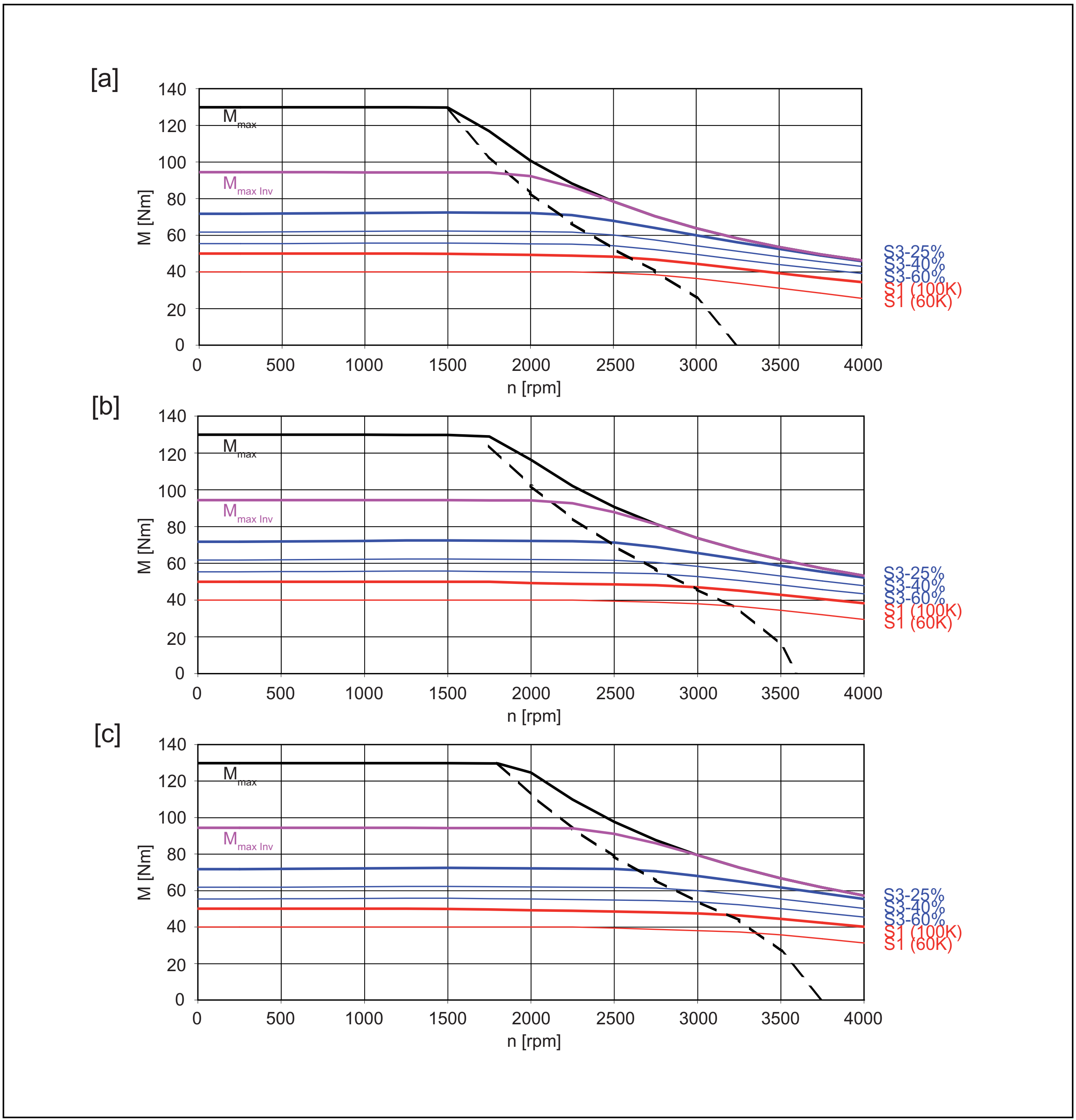
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-66 1FT7102-5WB7

Table 4- 65 1FT7102-5WC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	49.5
Rated current	I_N	A	29.3
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	40
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	50
Stall current (60 K)	$I_{0\ (60\ K)}$	A	20.4
Stall current (100 K)	$I_{0\ (100\ K)}$	A	25.5
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	125
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	98.9
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	10.4
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	4700
Maximum torque	M_{max}	Nm	130
Maximum current	I_{max}	A	84.5
Physical constants			
Torque constant	k_T	Nm/A	1.96
Voltage constant	k_E	V/1000 rpm	124
Winding resistance at 20 °C	R_{Str}	Ω	0.15
Rotating field inductance	L_D	mH	3.0
Electrical time constant	T_{el}	ms	20
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	124000
Weight with brake	m_{MotBr}	kg	40.9
Weight without brake	m_{Mot}	kg	36.6
Recommended Motor Module 6SL312□-1TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	94.5



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

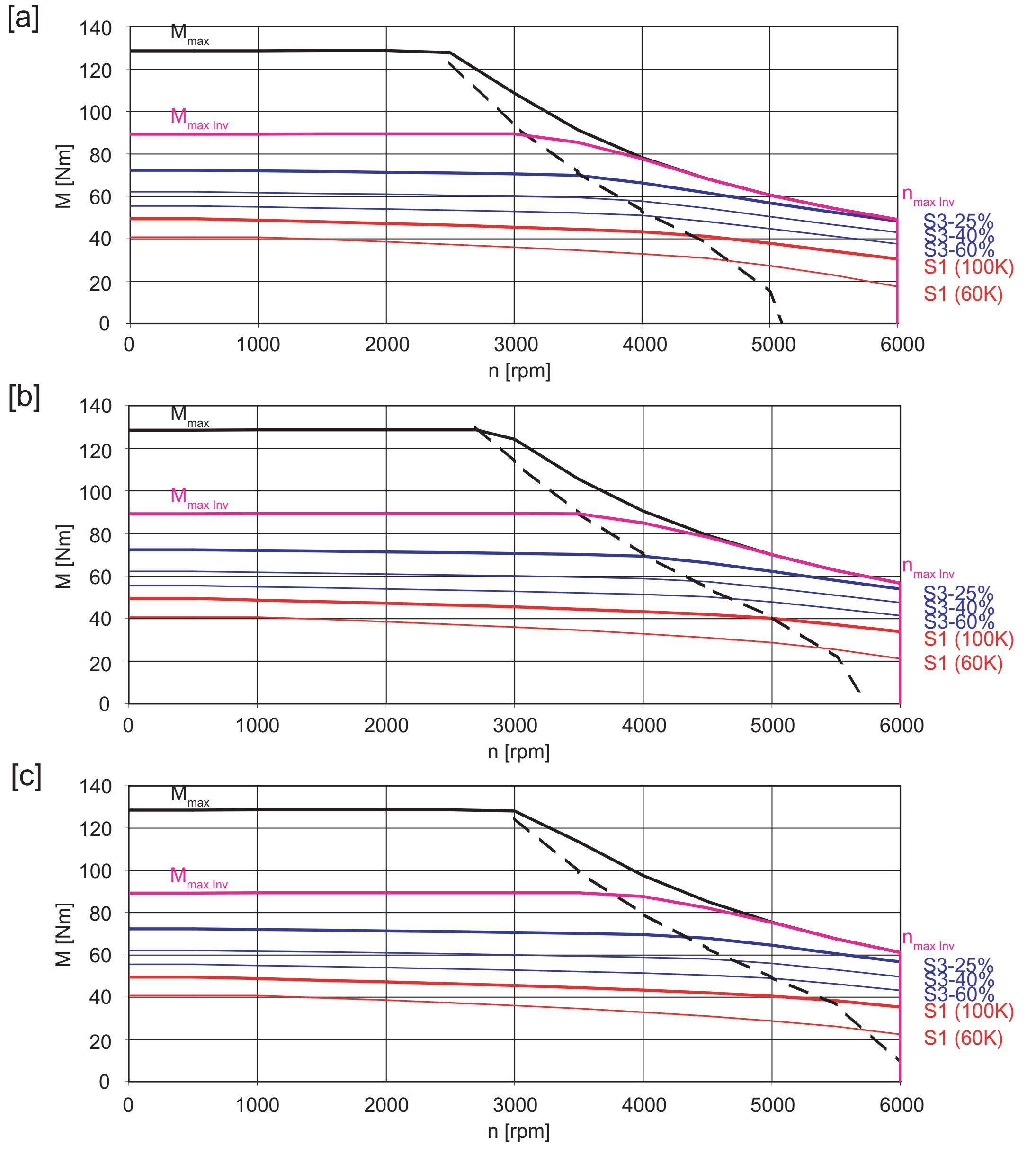
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-67 1FT7102-5WC7

Table 4- 66 1FT7102-5WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	45.5
Rated current	I_N	A	38.8
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	40
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	50
Stall current (60 K)	$I_{0\ (60\ K)}$	A	32.0
Stall current (100 K)	$I_{0\ (100\ K)}$	A	40.0
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	125
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	98.9
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	14.3
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	6000
Maximum torque	M_{max}	Nm	130
Maximum current	I_{max}	A	135
Physical constants			
Torque constant	k_T	Nm/A	1.25
Voltage constant	k_E	V/1000 rpm	78
Winding resistance at 20 °C	R_{Str}	Ω	0.06
Rotating field inductance	L_D	mH	1.18
Electrical time constant	T_{el}	ms	20
Mechanical time constant	T_{mech}	ms	1.1
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	124000
Weight with brake	m_{MotBr}	kg	40.9
Weight without brake	m_{Mot}	kg	36.6
Recommended Motor Module 6SL312□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	89.5



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

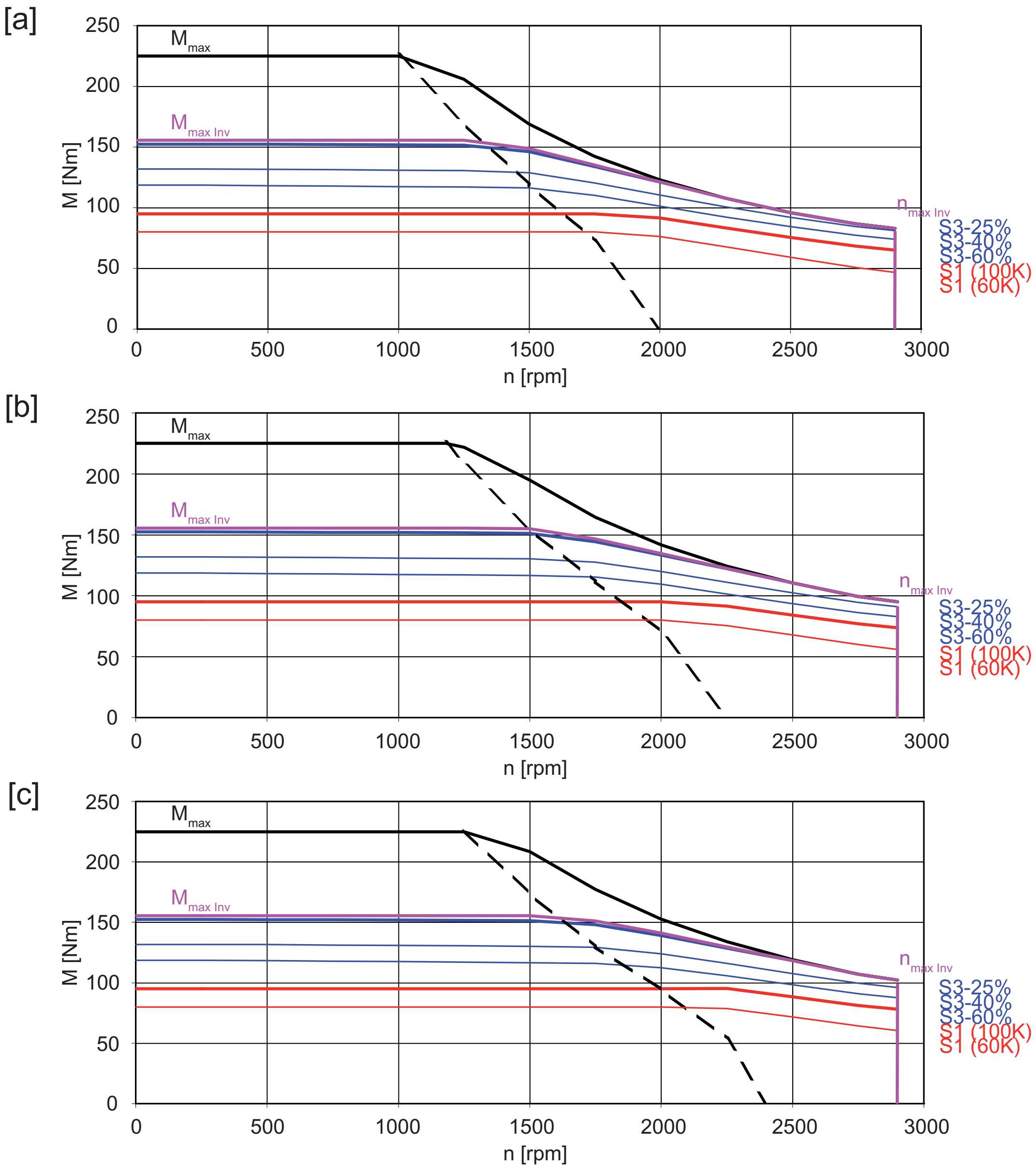
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-68 1FT7102-5WF7

Table 4- 67 1FT7105-5WB7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	1500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	90
Rated current	I_N	A	29.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	72
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	90
Stall current (60 K)	$I_{0\ (60\ K)}$	A	22.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	28.2
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	217
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	191
Optimum operating point			
Optimum speed	n_{opt}	rpm	1500
Optimum power	P_{opt}	kW	14.1
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	2900
Maximum torque	M_{max}	Nm	230
Maximum current	I_{max}	A	87
Physical constants			
Torque constant	k_T	Nm/A	3.19
Voltage constant	k_E	V/1000 rpm	198
Winding resistance at 20 °C	R_{Str}	Ω	0.16
Rotating field inductance	L_D	mH	3.67
Electrical time constant	T_{el}	ms	24
Mechanical time constant	T_{mech}	ms	0.9
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	106000
Weight with brake	m_{MotBr}	kg	59.1
Weight without brake	m_{Mot}	kg	54.8
Recommended Motor Module 6SL312□-1TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	155.5



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

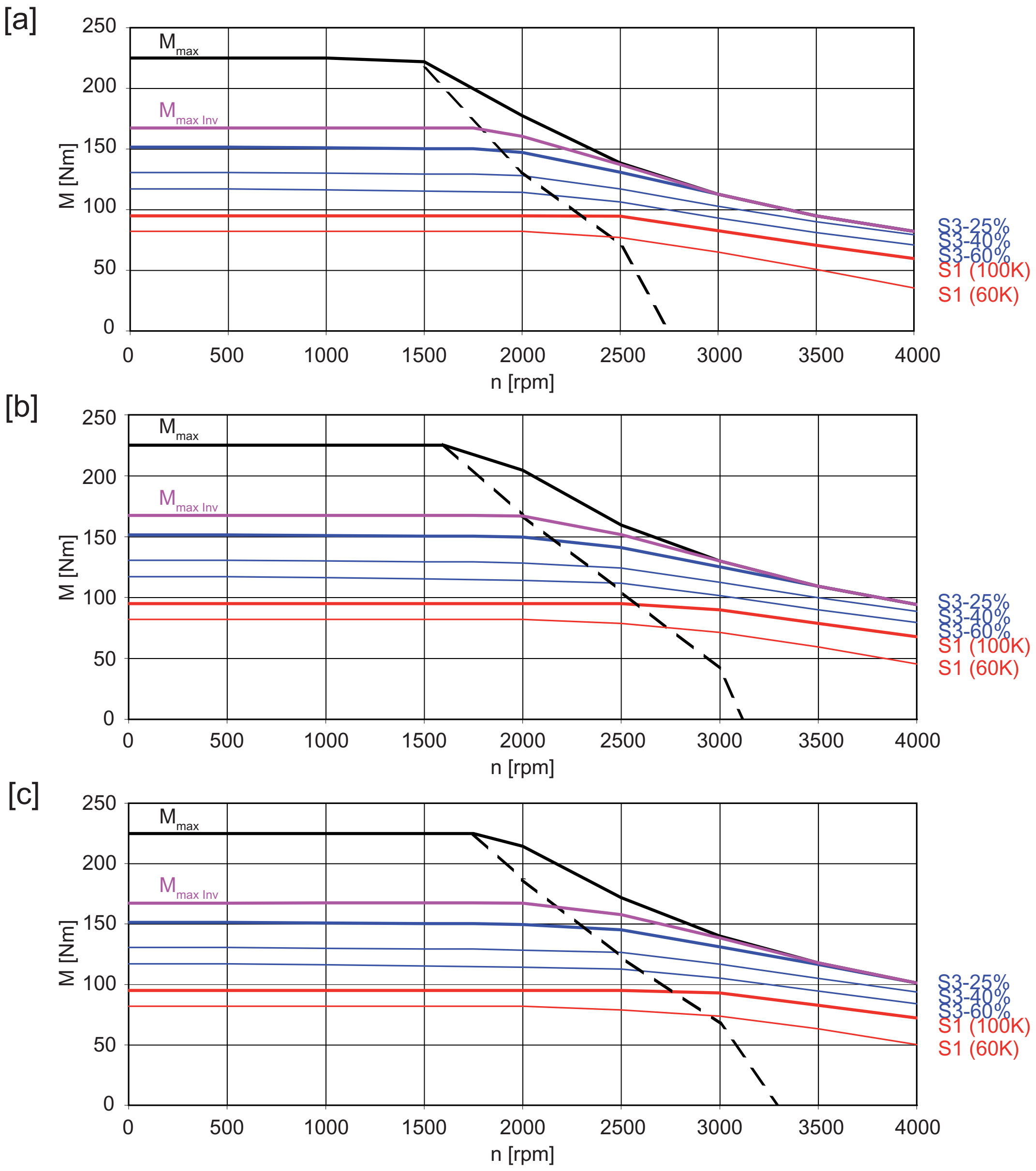
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-69 1FT7105-5WB7

Table 4- 68 1FT7105-5WC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	90
Rated current	I_N	A	40.8
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	72
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	90
Stall current (60 K)	$I_{0\ (60\ K)}$	A	31.2
Stall current (100 K)	$I_{0\ (100\ K)}$	A	39
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	217
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	191
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	18.8
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	4100
Maximum torque	M_{max}	Nm	230
Maximum current	I_{max}	A	120.5
Physical constants			
Torque constant	k_T	Nm/A	2.31
Voltage constant	k_E	V/1000 rpm	143
Winding resistance at 20 °C	R_{Str}	Ω	0.084
Rotating field inductance	L_D	mH	1.92
Electrical time constant	T_{el}	ms	23
Mechanical time constant	T_{mech}	ms	0.9
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	106000
Weight with brake	m_{MotBr}	kg	59.1
Weight without brake	m_{Mot}	kg	54.8
Recommended Motor Module 6SL312□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	167.5



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

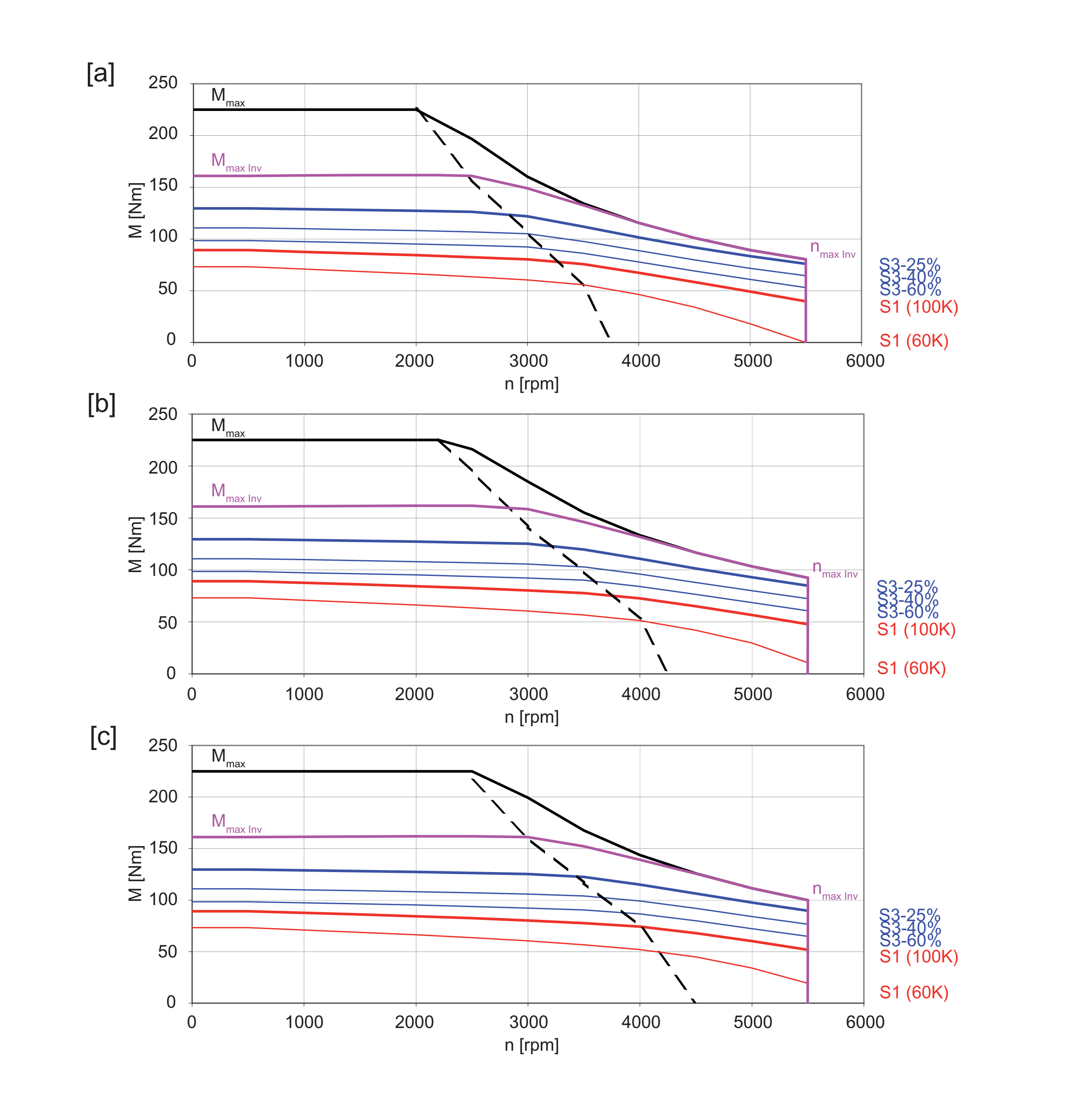
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-70 1FT7105-5WC7

Table 4- 69 1FT7105-5WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	79
Rated current	I_N	A	49.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	72
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	90
Stall current (60 K)	$I_{0\ (60\ K)}$	A	42.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	53.2
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	217
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	191
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	24.8
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	5500
Maximum torque	M_{max}	Nm	230
Maximum current	I_{max}	A	164
Physical constants			
Torque constant	k_T	Nm/A	1.69
Voltage constant	k_E	V/1000 rpm	105
Winding resistance at 20 °C	R_{Str}	Ω	0.049
Rotating field inductance	L_D	mH	1.04
Electrical time constant	T_{el}	ms	21
Mechanical time constant	T_{mech}	ms	1.0
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	106000
Weight with brake	m_{MotBr}	kg	59.1
Weight without brake	m_{Mot}	kg	54.8
Recommended Motor Module 6SL312□-1TE26-0AA3			
Rated converter current	$I_{N\ Inv}$	A	60
Maximum converter current	$I_{max\ Inv}$	A	113
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	161



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

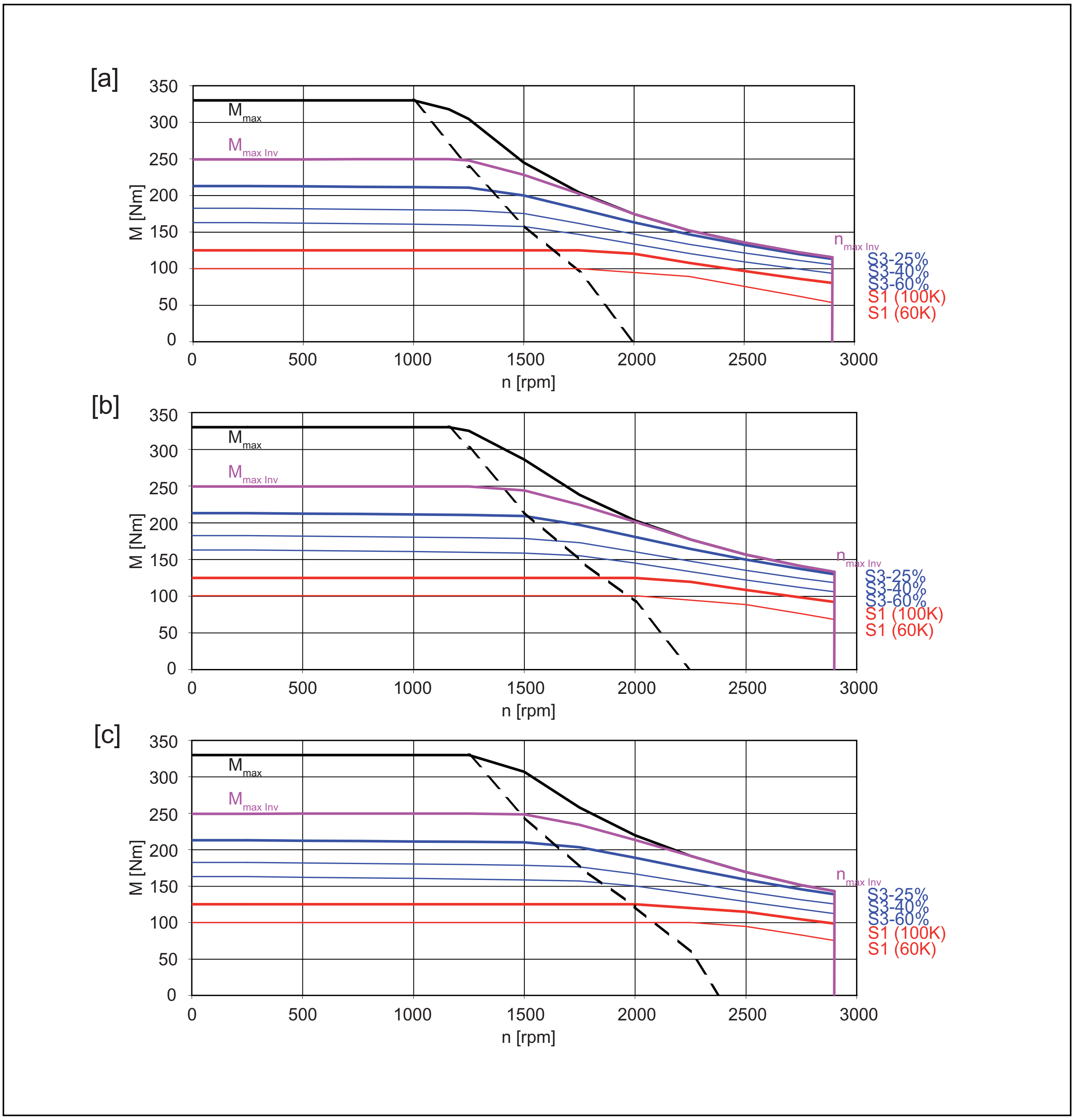
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-71 1FT7105-5WF7

Table 4- 70 1FT7108-5WB7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	1500
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	125
Rated current	I_N	A	40.3
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	100
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	125
Stall current (60 K)	$I_{0\ (60\ K)}$	A	31.2
Stall current (100 K)	$I_{0\ (100\ K)}$	A	39
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	291
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	265
Optimum operating point			
Optimum speed	n_{opt}	rpm	1500
Optimum power	P_{opt}	kW	19.6
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	2900
Maximum torque	M_{max}	Nm	330
Maximum current	I_{max}	A	120.5
Physical constants			
Torque constant	k_T	Nm/A	3.21
Voltage constant	k_E	V/1000 rpm	200
Winding resistance at 20 °C	R_{Str}	Ω	0.111
Rotating field inductance	L_D	mH	2.65
Electrical time constant	T_{el}	ms	24
Mechanical time constant	T_{mech}	ms	0.9
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	96000
Weight with brake	m_{MotBr}	kg	72.9
Weight without brake	m_{Mot}	kg	68.6
Recommended Motor Module 6SL□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	249.5



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

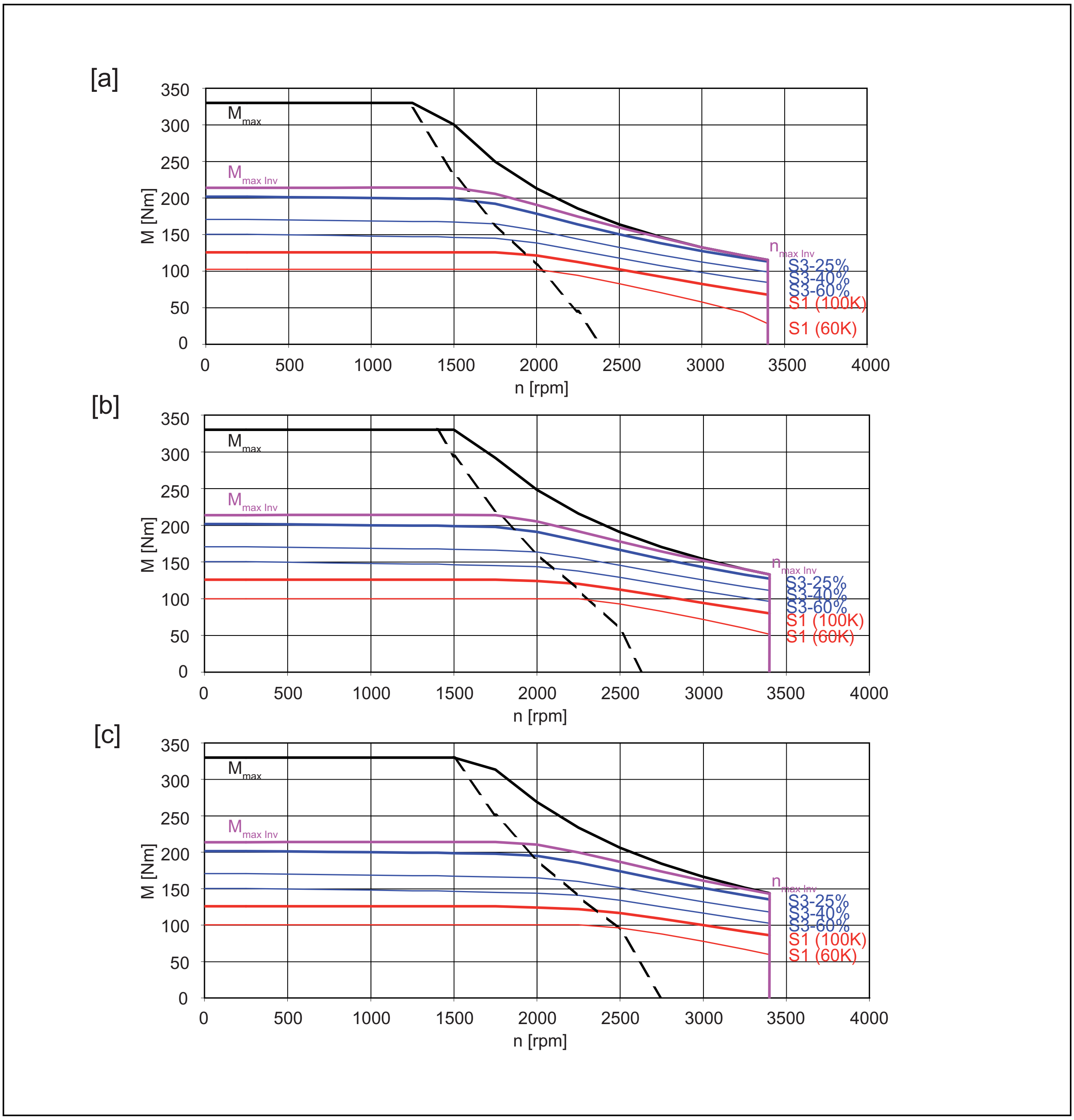
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-72 1FT7108-5WB7

Table 4- 71 1FT7108-5WC7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	2000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	125
Rated current	I_N	A	47.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	100
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	125
Stall current (60 K)	$I_{0\ (60\ K)}$	A	36.3
Stall current (100 K)	$I_{0\ (100\ K)}$	A	45.3
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	291
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	265
Optimum operating point			
Optimum speed	n_{opt}	rpm	2000
Optimum power	P_{opt}	kW	26.2
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	3400
Maximum torque	M_{max}	Nm	330
Maximum current	I_{max}	A	141.5
Physical constants			
Torque constant	k_T	Nm/A	2.76
Voltage constant	k_E	V/1000 rpm	171
Winding resistance at 20 °C	R_{Str}	Ω	0.081
Rotating field inductance	L_D	mH	1.93
Electrical time constant	T_{el}	ms	24
Mechanical time constant	T_{mech}	ms	0.8
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	96000
Weight with brake	m_{MotBr}	kg	72.9
Weight without brake	m_{Mot}	kg	68.6
Recommended Motor Module 6SL□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	214



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

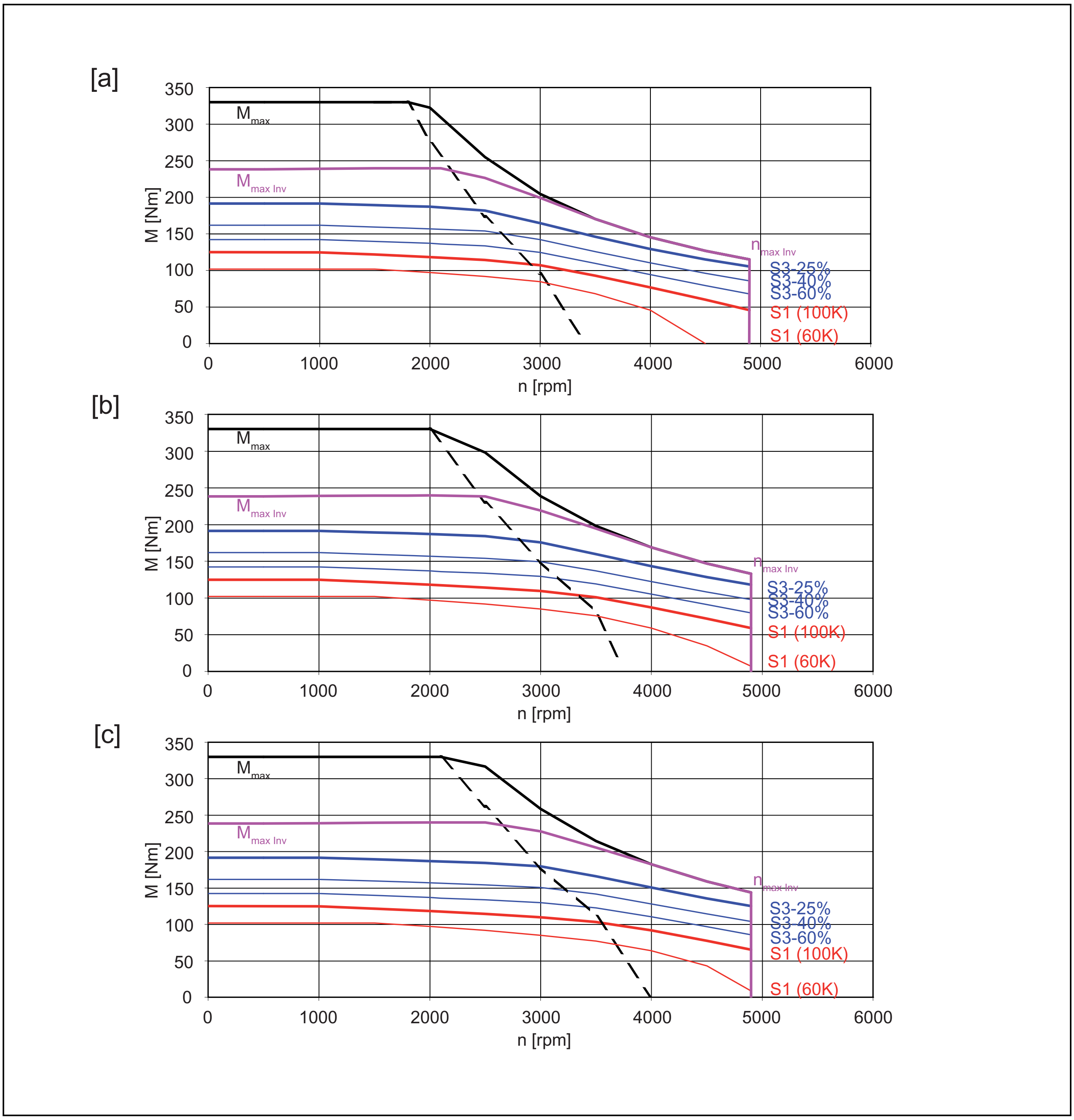
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-73 1FT7108-5WC7

Table 4- 72 1FT7108-5WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	10
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	109
Rated current	I_N	A	60.0
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	100
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	125
Stall current (60 K)	$I_{0\ (60\ K)}$	A	52.0
Stall current (100 K)	$I_{0\ (100\ K)}$	A	65.0
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	291
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	265
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	34.2
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	6000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	4900
Maximum torque	M_{max}	Nm	330
Maximum current	I_{max}	A	205
Physical constants			
Torque constant	k_T	Nm/A	1.92
Voltage constant	k_E	V/1000 rpm	118
Winding resistance at 20 °C	R_{Str}	Ω	0.042
Rotating field inductance	L_D	mH	0.92
Electrical time constant	T_{el}	ms	22
Mechanical time constant	T_{mech}	ms	0.9
Thermal time constant	T_{th}	min	1.5
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	96000
Weight with brake	m_{MotBr}	kg	72.9
Weight without brake	m_{Mot}	kg	68.6
Recommended Motor Module 6SL□-1TE28-5AA3			
Rated converter current	$I_{N\ Inv}$	A	85
Maximum converter current	$I_{max\ Inv}$	A	141
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	238.5



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

[c] SINAMICS SLM 480 V

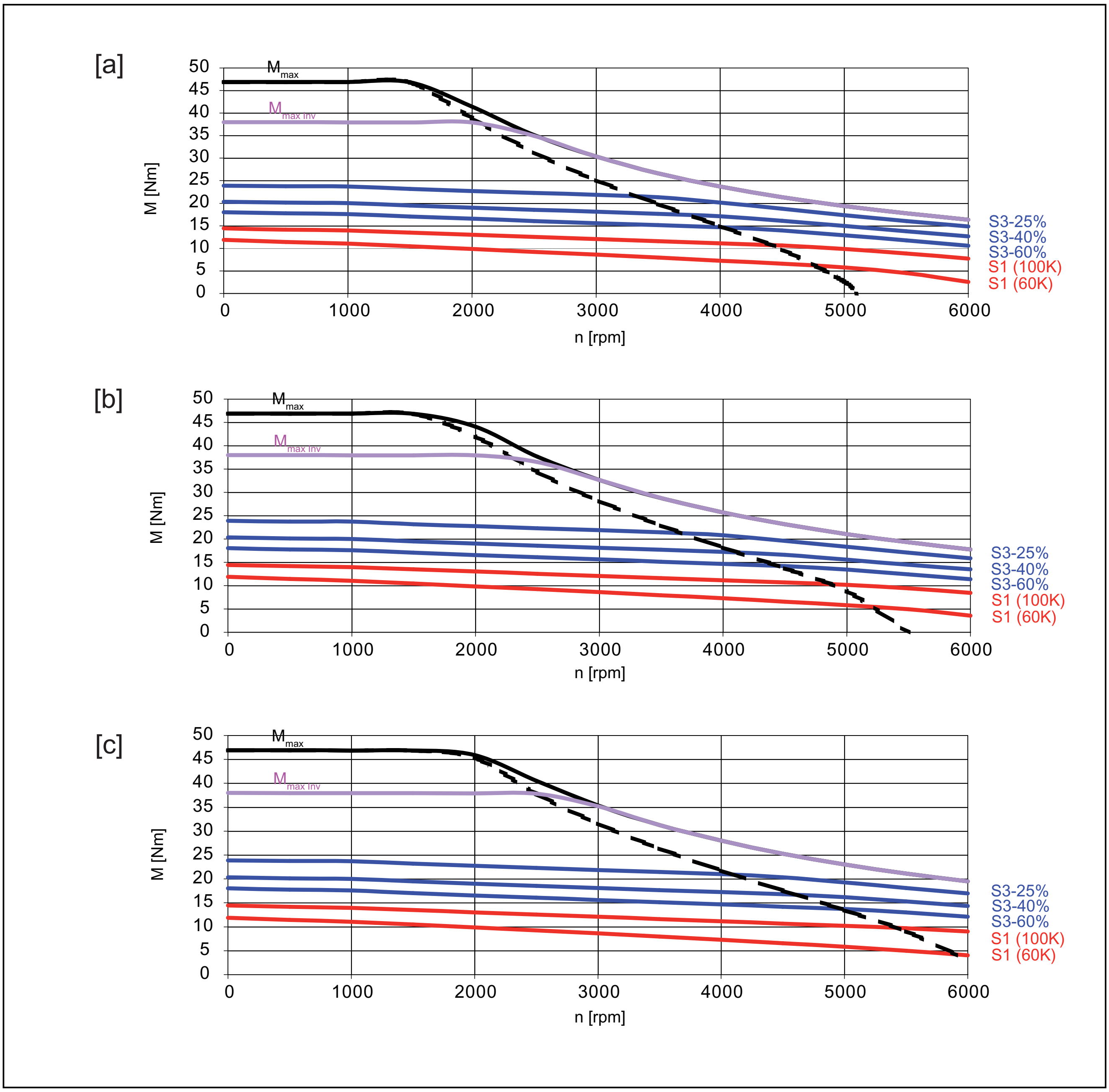
The characteristic curves are only valid for optimized converter setting data

Figure 4-74 1FT7108-5WF7

4.2.4 1FT7 High Dynamic synchronous motors with forced ventilation

Table 4- 73 1FT7065-7SF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	12
Rated current (100 K)	$I_{N\ (100\ K)}$	A	10.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	11
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	14
Stall current (60 K)	$I_{0\ (60\ K)}$	A	9.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	12
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	6.4
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	3.8
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7700
Maximum torque	M_{max}	Nm	45
Maximum current	I_{max}	A	49
Physical constants			
Torque constant	k_T	Nm/A	1.17
Voltage constant	k_E	V/1000 rpm	75
Winding resistance at 20 °C	R_{Str}	Ω	0.45
Rotating field inductance	L_D	mH	8.2
Electrical time constant	T_{el}	ms	18
Mechanical time constant	T_{mech}	ms	0.6
Thermal time constant	T_{th}	min	20
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	27500
Weight with brake	m_{MotBr}	kg	20
Weight without brake	m_{Mot}	kg	19
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	38



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

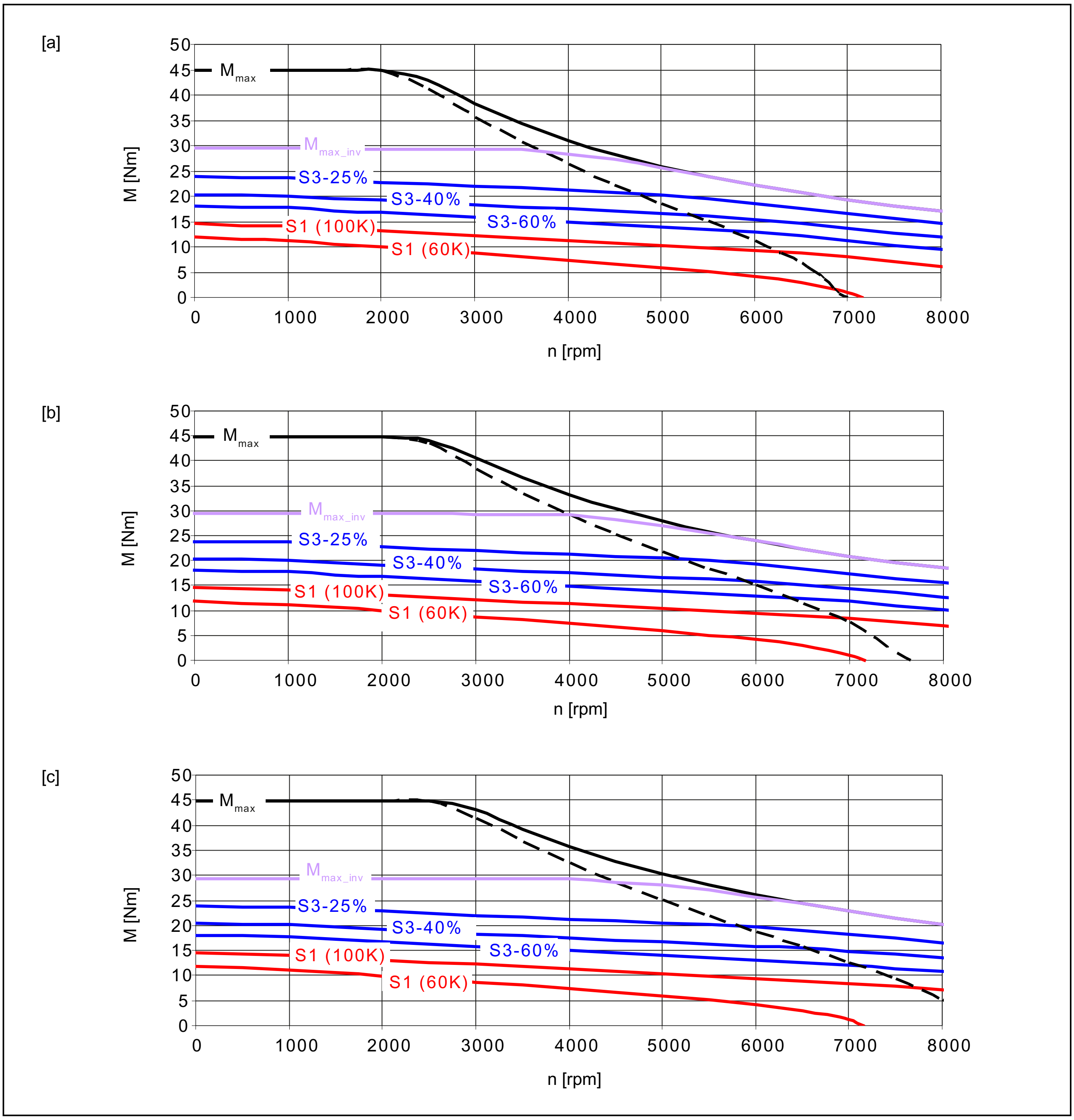
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-75 1FT7065-7SF7

Table 4- 74 1FT7065-7SH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	11
Rated current (100 K)	$I_{N\ (100\ K)}$	A	13.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	11
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	14
Stall current (60 K)	$I_{0\ (60\ K)}$	A	13
Stall current (100 K)	$I_{0\ (100\ K)}$	A	16
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	6.4
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	5.2
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	9000
Maximum torque	M_{max}	Nm	45
Maximum current	I_{max}	A	67
Physical constants			
Torque constant	k_T	Nm/A	0.86
Voltage constant	k_E	V/1000 rpm	55
Winding resistance at 20 °C	R_{Str}	Ω	0.23
Rotating field inductance	L_D	mH	4.4
Electrical time constant	T_{el}	ms	19
Mechanical time constant	T_{mech}	ms	0.6
Thermal time constant	T_{th}	min	20
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	27500
Weight with brake	m_{MotBr}	kg	20
Weight without brake	m_{Mot}	kg	19
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	29



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

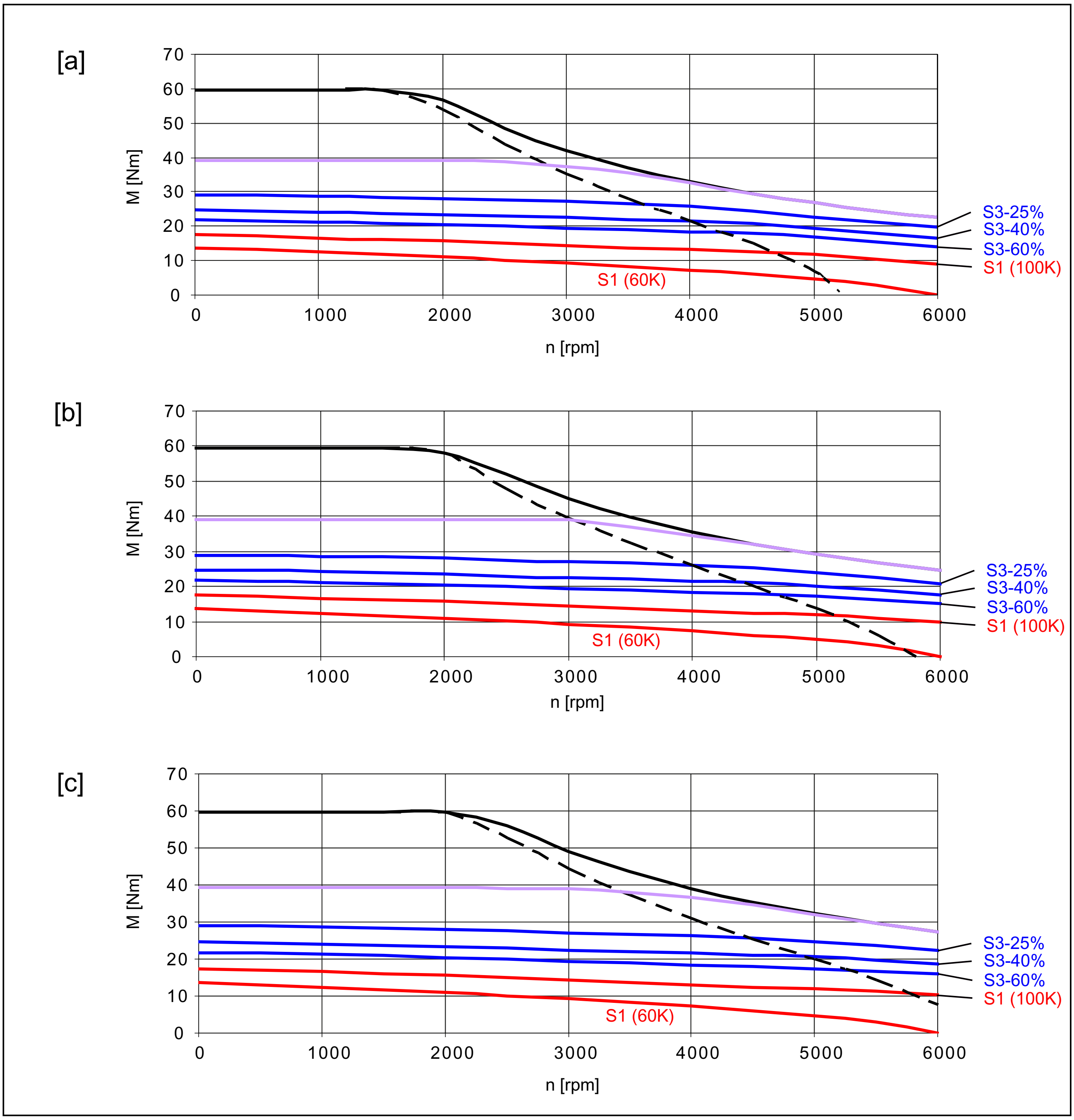
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-76 1FT7065-7SH7

Table 4- 75 1FT7067-7SF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	14
Rated current (100 K)	$I_{N\ (100\ K)}$	A	13
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	14
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	17
Stall current (60 K)	$I_{0\ (60\ K)}$	A	12.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	15
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	10.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	8.3
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	4.4
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7900
Maximum torque	M_{max}	Nm	60
Maximum current	I_{max}	A	63
Physical constants			
Torque constant	k_T	Nm/A	1.14
Voltage constant	k_E	V/1000 rpm	73
Winding resistance at 20 °C	R_{Str}	Ω	0.3
Rotating field inductance	L_D	mH	5.7
Electrical time constant	T_{el}	ms	19
Mechanical time constant	T_{mech}	ms	0.6
Thermal time constant	T_{th}	min	20
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	21600
Weight with brake	m_{MotBr}	kg	24
Weight without brake	m_{Mot}	kg	23
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	39



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

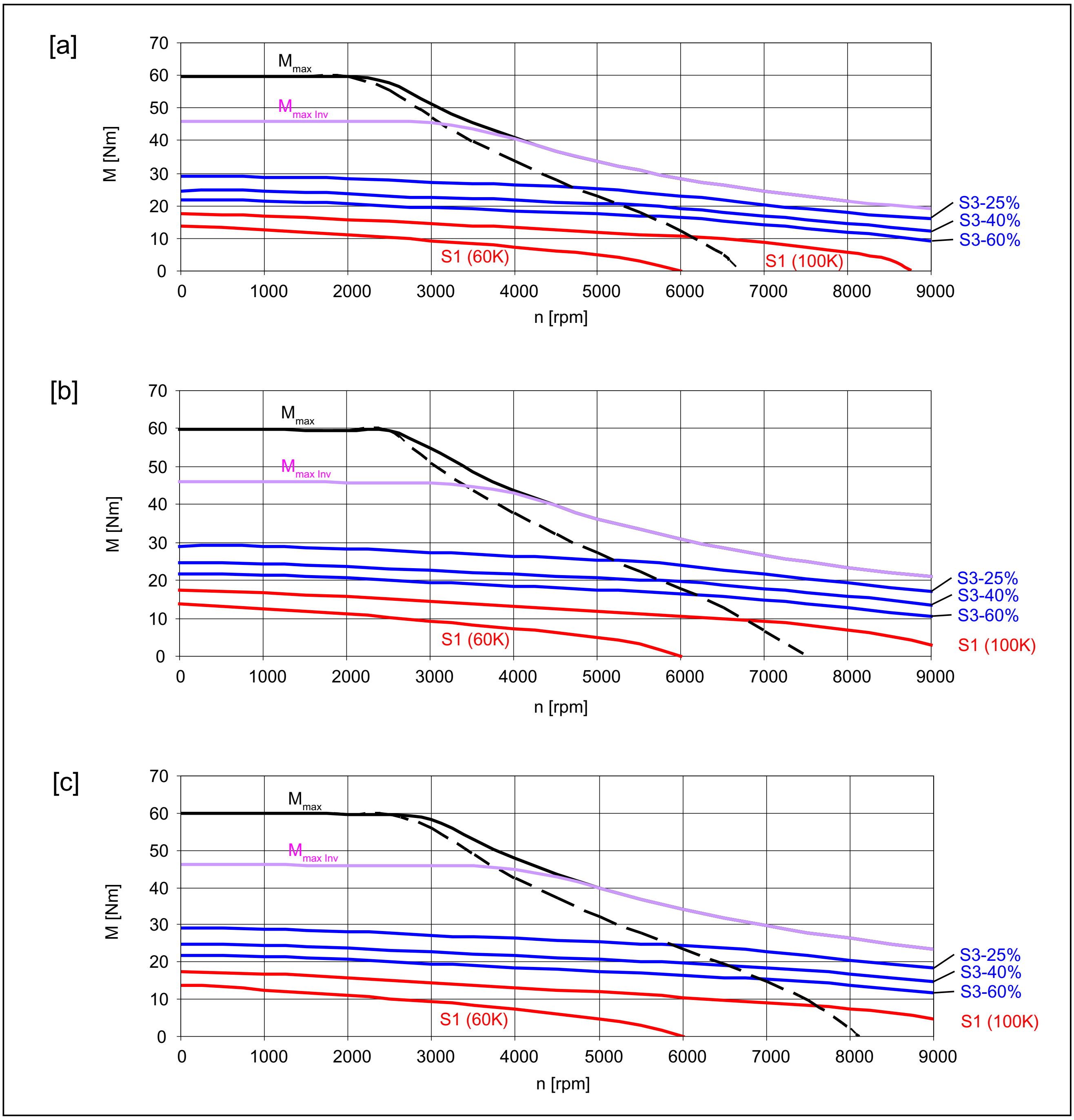
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-77 1FT7067-7SF7

Table 4- 76 1FT7067-7SH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	13
Rated current (100 K)	$I_{N\ (100\ K)}$	A	15
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	13
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	17
Stall current (60 K)	$I_{0\ (60\ K)}$	A	14.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	19
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	10.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	8.3
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	6.1
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	9000
Maximum torque	M_{max}	Nm	60
Maximum current	I_{max}	A	80
Physical constants			
Torque constant	k_T	Nm/A	0.89
Voltage constant	k_E	V/1000 rpm	57
Winding resistance at 20 °C	R_{Str}	Ω	0.18
Rotating field inductance	L_D	mH	3.5
Electrical time constant	T_{el}	ms	19
Mechanical time constant	T_{mech}	ms	0.6
Thermal time constant	T_{th}	min	20
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	21600
Weight with brake	m_{MotBr}	kg	24
Weight without brake	m_{Mot}	kg	23
Recommended Motor Module 6SL312□-1TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	46



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

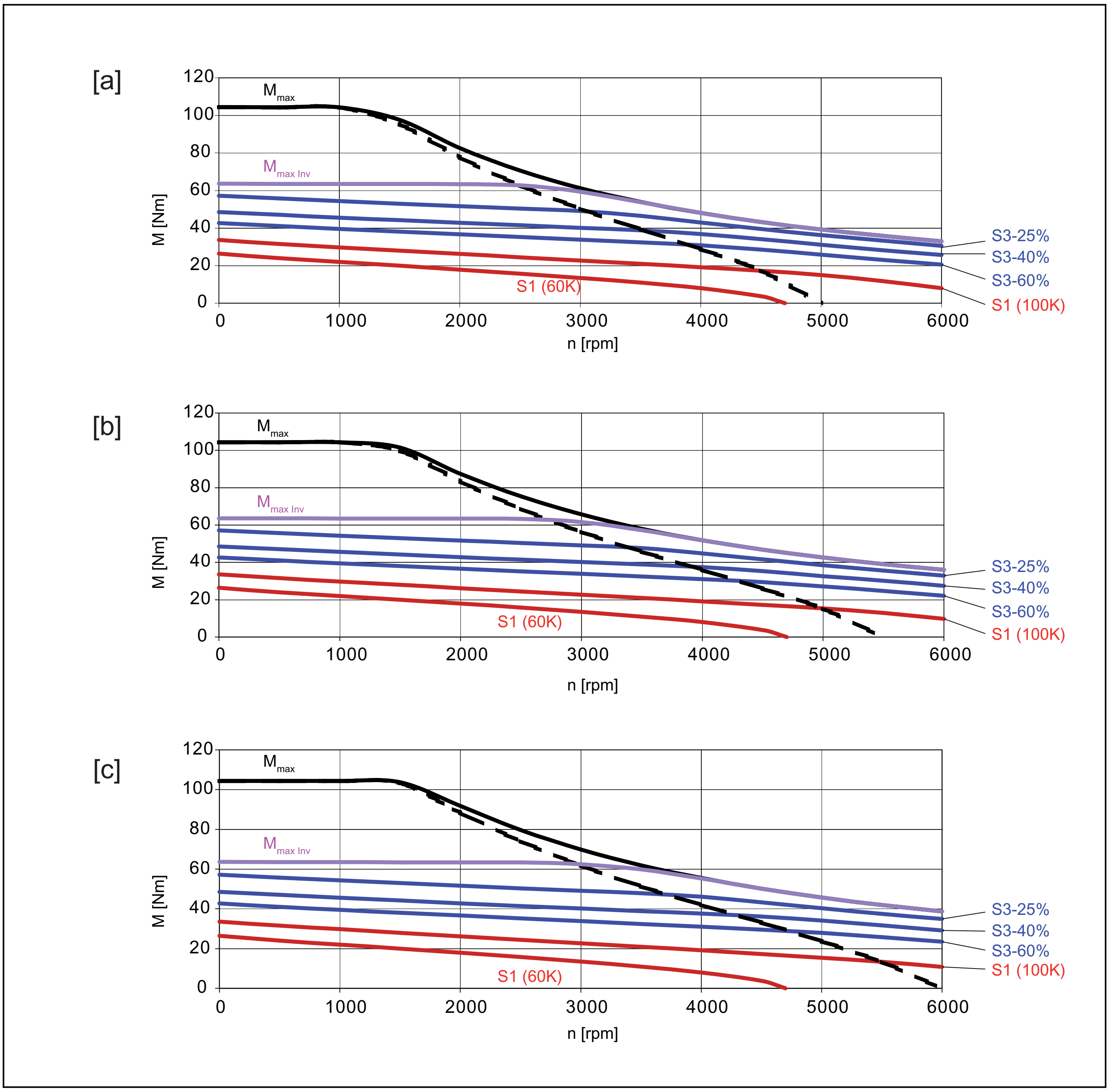
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-78 1FT7067-7SH7

Table 4- 77 1FT7085-7SF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	8
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	23
Rated current (100 K)	$I_{N\ (100\ K)}$	A	20
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	26
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	34
Stall current (60 K)	$I_{0\ (60\ K)}$	A	22
Stall current (100 K)	$I_{0\ (100\ K)}$	A	28
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	34.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	20.7
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	7.2
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7500
Maximum torque	M_{max}	Nm	105
Maximum current	I_{max}	A	126
Physical constants			
Torque constant	k_T	Nm/A	1.20
Voltage constant	k_E	V/1000 rpm	77
Winding resistance at 20 °C	R_{Str}	Ω	0.12
Rotating field inductance	L_D	mH	3.1
Electrical time constant	T_{el}	ms	26
Mechanical time constant	T_{mech}	ms	0.5
Thermal time constant	T_{th}	min	24
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	51100
Weight with brake	m_{MotBr}	kg	37
Weight without brake	m_{Mot}	kg	34
Recommended Motor Module 6SL312□-1TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	64



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

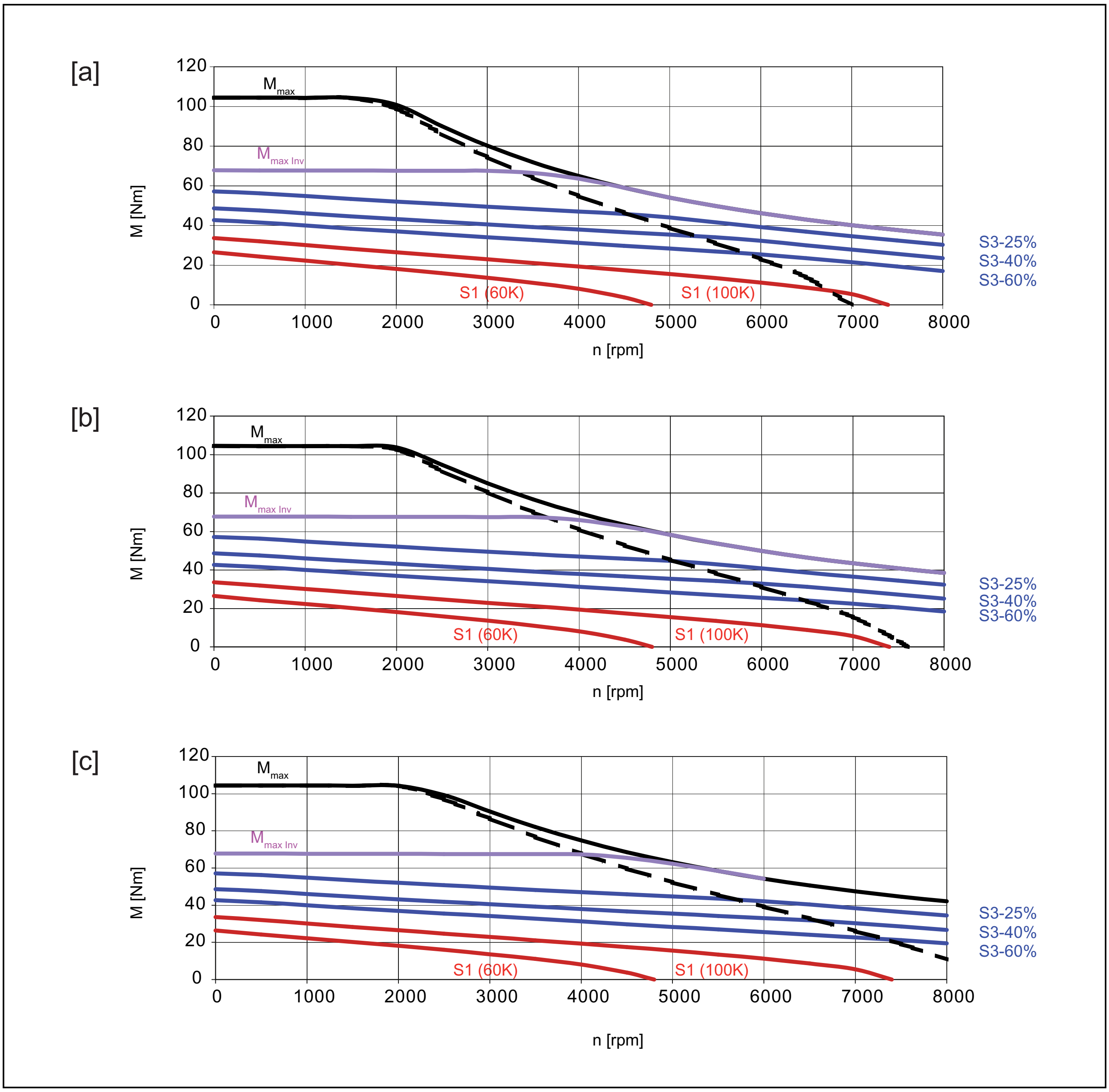
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-79 1FT7085-7SF7

Table 4- 78 1FT7085-7SH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	8
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	17.5
Rated current (100 K)	$I_{N\ (100\ K)}$	A	22.5
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	26
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	34
Stall current (60 K)	$I_{0\ (60\ K)}$	A	30
Stall current (100 K)	$I_{0\ (100\ K)}$	A	40
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	34.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	20.7
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	8.2
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	105
Maximum current	I_{max}	A	178
Physical constants			
Torque constant	k_T	Nm/A	0.86
Voltage constant	k_E	V/1000 rpm	55
Winding resistance at 20 °C	R_{Str}	Ω	0.06
Rotating field inductance	L_D	mH	1.6
Electrical time constant	T_{el}	ms	27
Mechanical time constant	T_{mech}	ms	0.5
Thermal time constant	T_{th}	min	24
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	51100
Weight with brake	m_{MotBr}	kg	37
Weight without brake	m_{Mot}	kg	34
Recommended Motor Module 6SL312□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	68



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

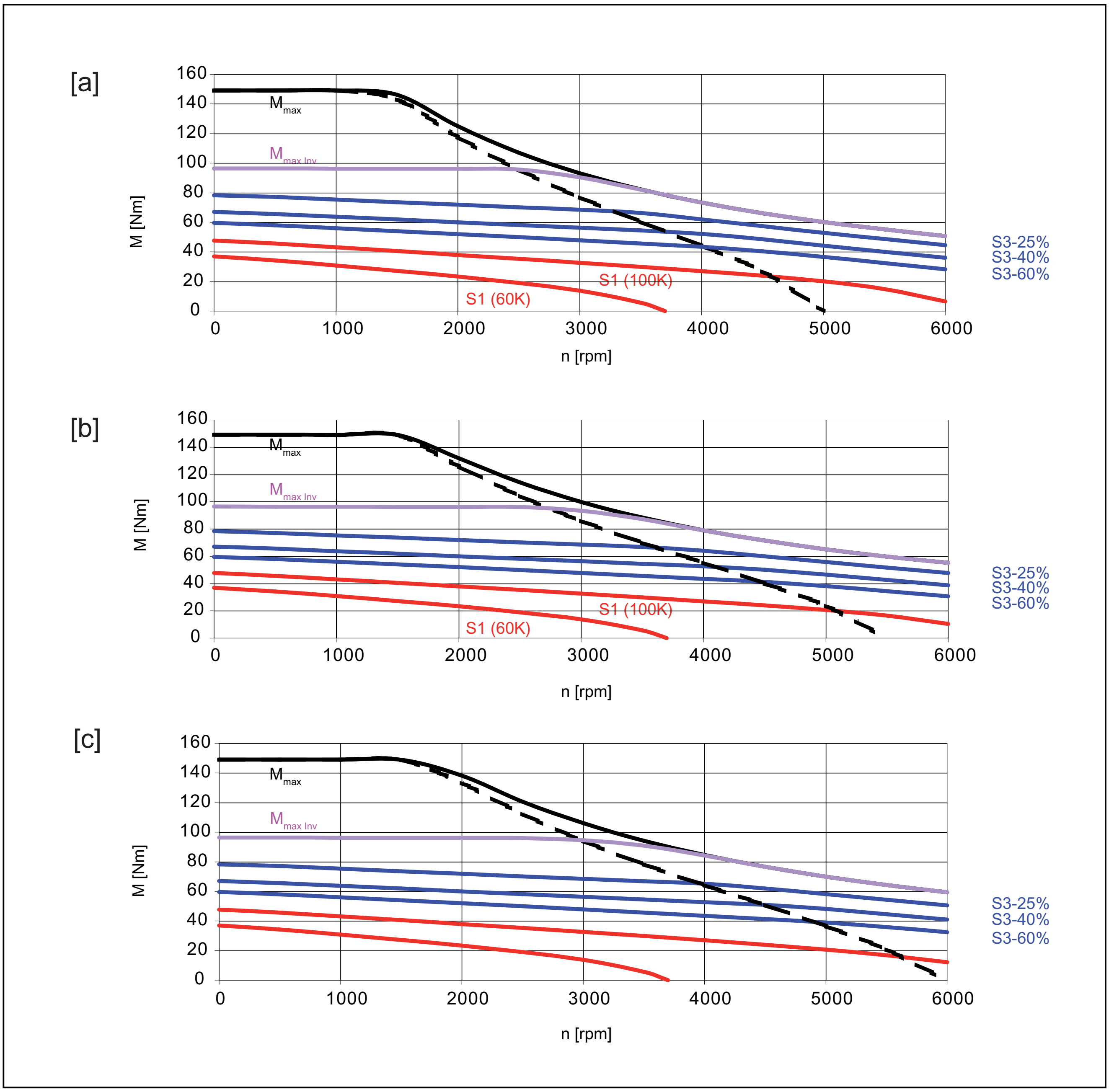
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-80 1FT7085-7SH7

Table 4- 79 1FT7087-7SF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	8
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	33
Rated current (100 K)	$I_{N\ (100\ K)}$	A	29
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	37
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	48
Stall current (60 K)	$I_{0\ (60\ K)}$	A	31
Stall current (100 K)	$I_{0\ (100\ K)}$	A	40
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	41.6
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	27.4
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	10.4
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7500
Maximum torque	M_{max}	Nm	150
Maximum current	I_{max}	A	170
Physical constants			
Torque constant	k_T	Nm/A	1.20
Voltage constant	k_E	V/1000 rpm	77
Winding resistance at 20 °C	R_{Str}	Ω	0.08
Rotating field inductance	L_D	mH	2.1
Electrical time constant	T_{el}	ms	26
Mechanical time constant	T_{mech}	ms	0.5
Thermal time constant	T_{th}	min	25
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	45300
Weight with brake	m_{MotBr}	kg	45
Weight without brake	m_{Mot}	kg	42
Recommended Motor Module 6SL312□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	96



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

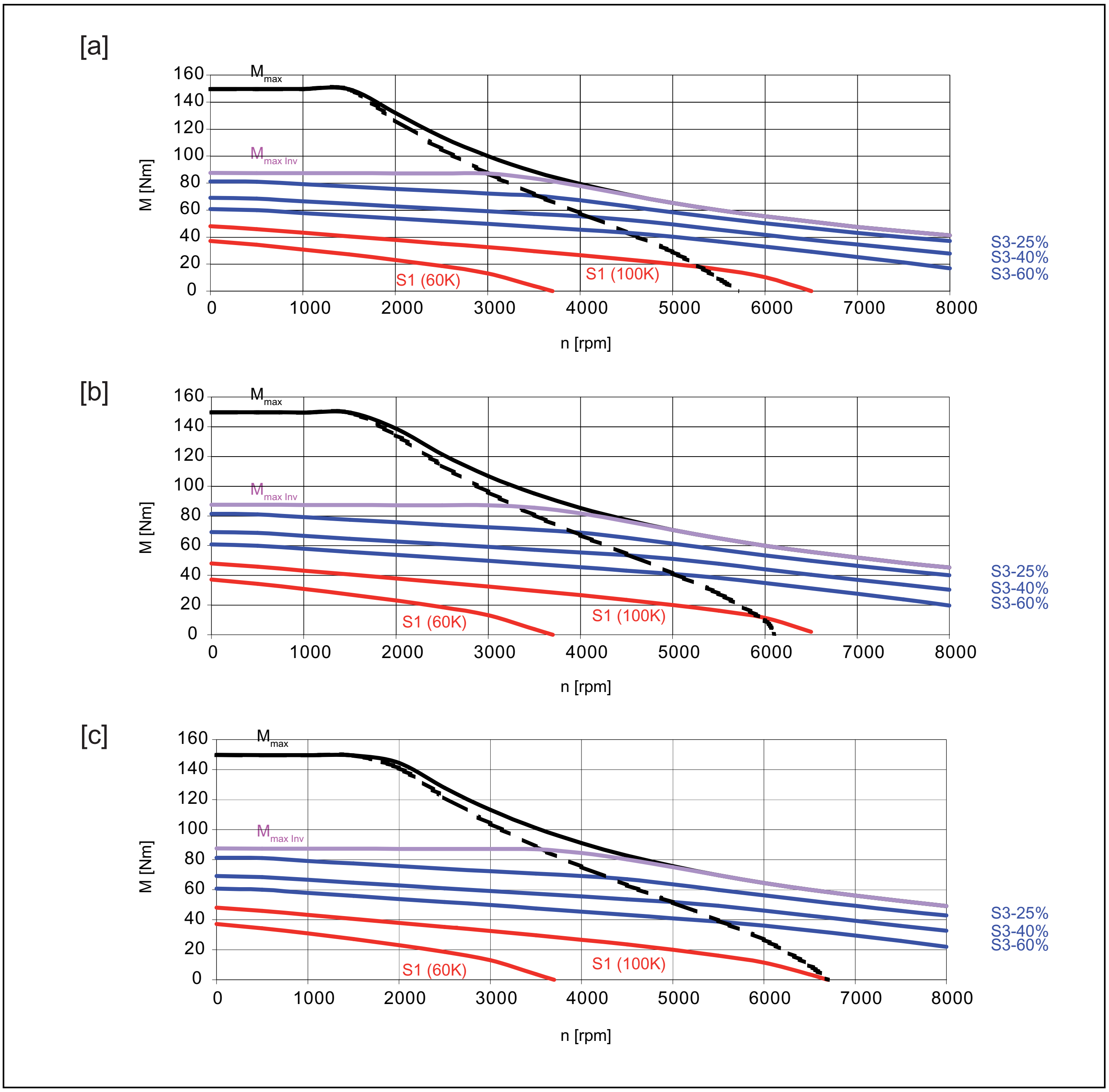
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-81 1FT7087-7SF7

Table 4- 80 1FT7087-7SH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	8
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	23
Rated current (100 K)	$I_{N\ (100\ K)}$	A	24
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	37
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	48
Stall current (60 K)	$I_{0\ (60\ K)}$	A	35
Stall current (100 K)	$I_{0\ (100\ K)}$	A	45
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	41.6
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	27.4
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	10.8
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	150
Maximum current	I_{max}	A	195
Physical constants			
Torque constant	k_T	Nm/A	1.06
Voltage constant	k_E	V/1000 rpm	68
Winding resistance at 20 °C	R_{Str}	Ω	0.06
Rotating field inductance	L_D	mH	1.7
Electrical time constant	T_{el}	ms	28
Mechanical time constant	T_{mech}	ms	0.4
Thermal time constant	T_{th}	min	25
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	45300
Weight with brake	m_{MotBr}	kg	46
Weight without brake	m_{Mot}	kg	43
Recommended Motor Module 6SL312□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	85



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

[c] SINAMICS SLM 480 V

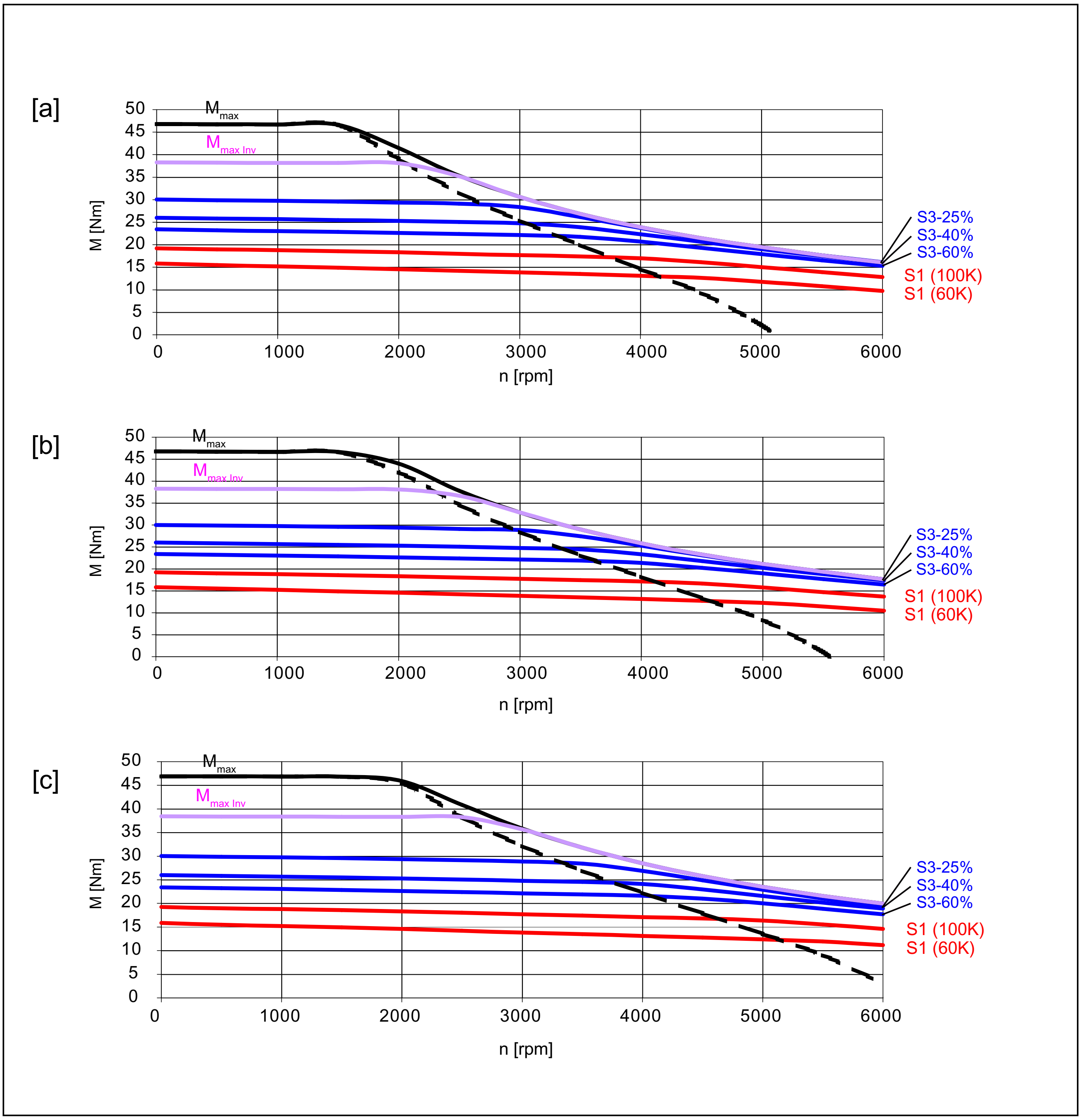
The characteristic curves are only valid for optimized converter setting data

Figure 4-82 1FT7087-7SH7

4.2.5 1FT7 High Dynamic synchronous motors with liquid cooling

Table 4- 81 1FT7065-7WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	18
Rated current (100 K)	$I_{N\ (100\ K)}$	A	15
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	16
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	19
Stall current (60 K)	$I_{0\ (60\ K)}$	A	14
Stall current (100 K)	$I_{0\ (100\ K)}$	A	16
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	6.4
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	5.7
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7700
Maximum torque	M_{max}	Nm	45
Maximum current	I_{max}	A	49
Physical constants			
Torque constant	k_T	Nm/A	1.17
Voltage constant	k_E	V/1000 rpm	75
Winding resistance at 20 °C	R_{Str}	Ω	0.43
Rotating field inductance	L_D	mH	8.2
Electrical time constant	T_{el}	ms	19
Mechanical time constant	T_{mech}	ms	0.6
Thermal time constant	T_{th}	min	9
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	23700
Weight with brake	m_{MotBr}	kg	17
Weight without brake	m_{Mot}	kg	16
Recommended Motor Module 6SL312□-□TE21-8AA3			
Rated converter current	$I_{N\ Inv}$	A	18
Maximum converter current	$I_{max\ Inv}$	A	36
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	39



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

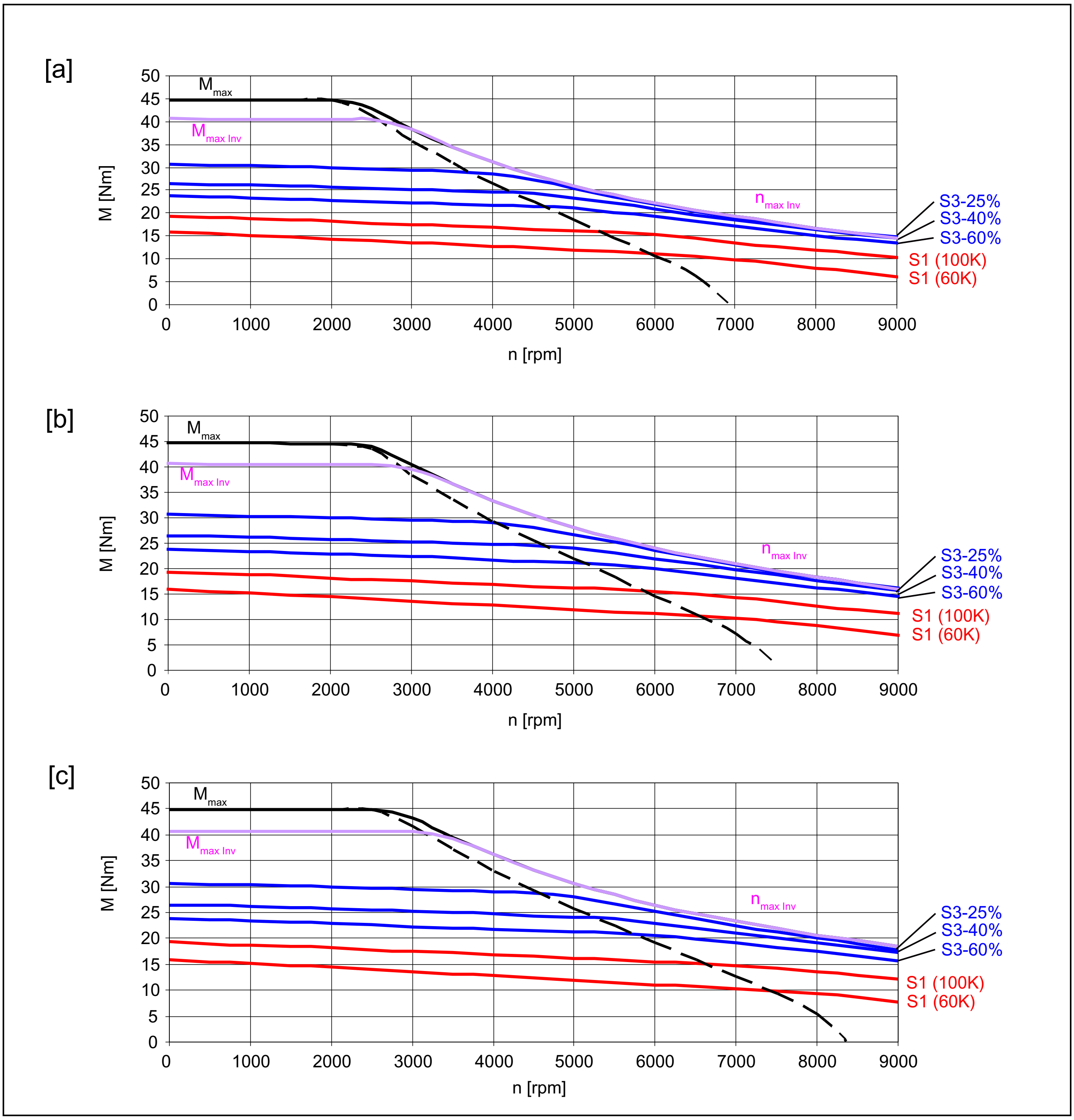
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-83 1FT7065-7WF7

Table 4- 82 1FT7065-7WH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	16.5
Rated current (100 K)	$I_{N\ (100\ K)}$	A	20
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	16
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	19
Stall current (60 K)	$I_{0\ (60\ K)}$	A	18.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	22
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	6.4
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	7.8
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	9000
Maximum torque	M_{max}	Nm	45
Maximum current	I_{max}	A	67
Physical constants			
Torque constant	k_T	Nm/A	0.86
Voltage constant	k_E	V/1000 rpm	55
Winding resistance at 20 °C	R_{Str}	Ω	0.23
Rotating field inductance	L_D	mH	4.4
Electrical time constant	T_{el}	ms	19
Mechanical time constant	T_{mech}	ms	0.6
Thermal time constant	T_{th}	min	9
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	23700
Weight with brake	m_{MotBr}	kg	17
Weight without brake	m_{Mot}	kg	16
Recommended Motor Module 6SL312□-1TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	41

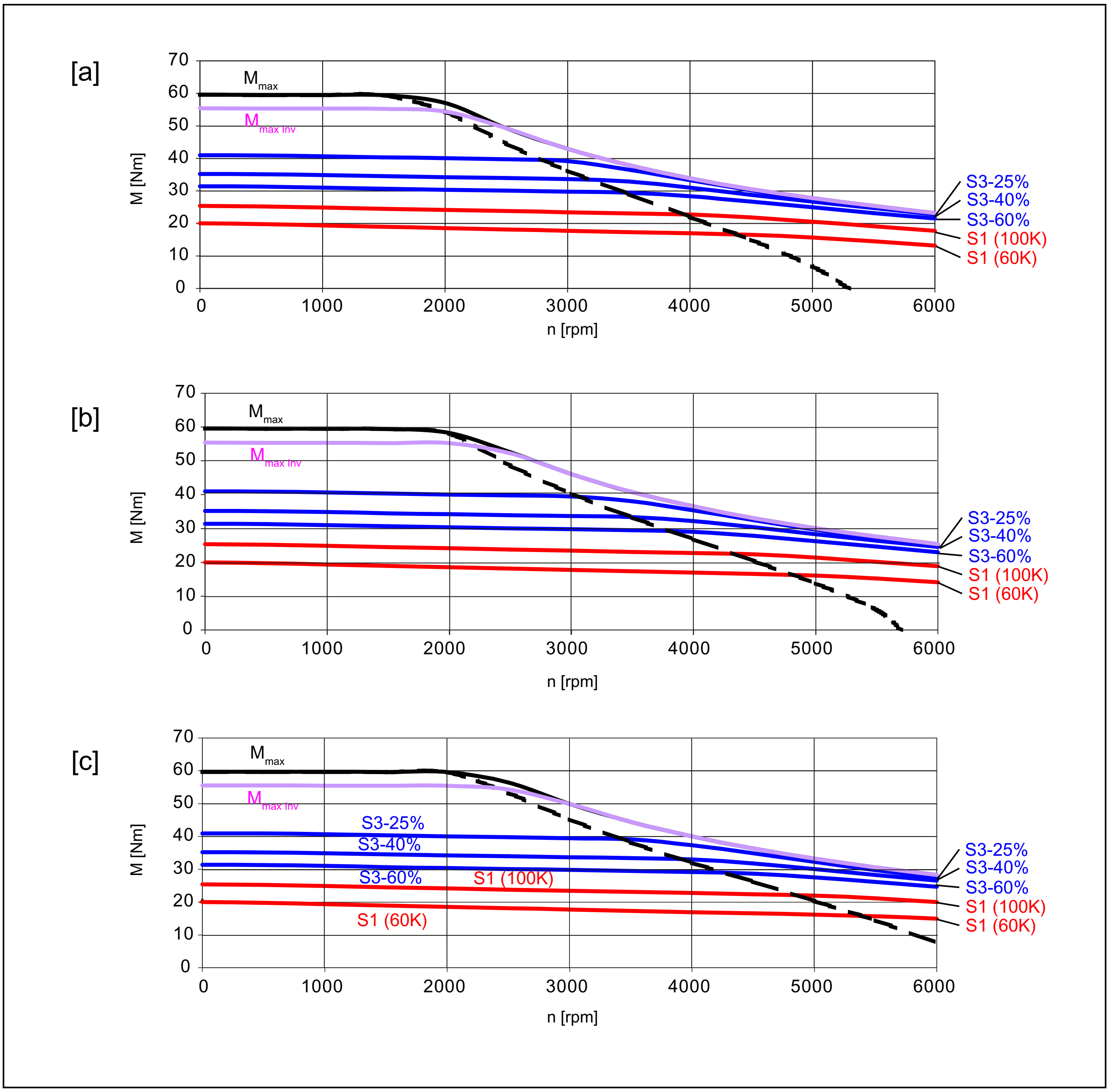


[a] SINAMICS SLM 400 V
[b] SINAMICS ALM 400 V
[c] SINAMICS SLM 480 V
The characteristic curves are only valid for optimized converter setting data

Figure 4-84 1FT7065-7WH7

Table 4- 83 1FT7067-7WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	23.5
Rated current (100 K)	$I_{N\ (100\ K)}$	A	21
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	20
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	25
Stall current (60 K)	$I_{0\ (60\ K)}$	A	17.5
Stall current (100 K)	$I_{0\ (100\ K)}$	A	22
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	10.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	8.3
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	7.4
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7900
Maximum torque	M_{max}	Nm	60
Maximum current	I_{max}	A	63
Physical constants			
Torque constant	k_T	Nm/A	1.14
Voltage constant	k_E	V/1000 rpm	73
Winding resistance at 20 °C	R_{Str}	Ω	0.3
Rotating field inductance	L_D	mH	5.7
Electrical time constant	T_{el}	ms	19
Mechanical time constant	T_{mech}	ms	0.6
Thermal time constant	T_{th}	min	11
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	21600
Weight with brake	m_{MotBr}	kg	23
Weight without brake	m_{Mot}	kg	22
Recommended Motor Module 6SL312□-1TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	56



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

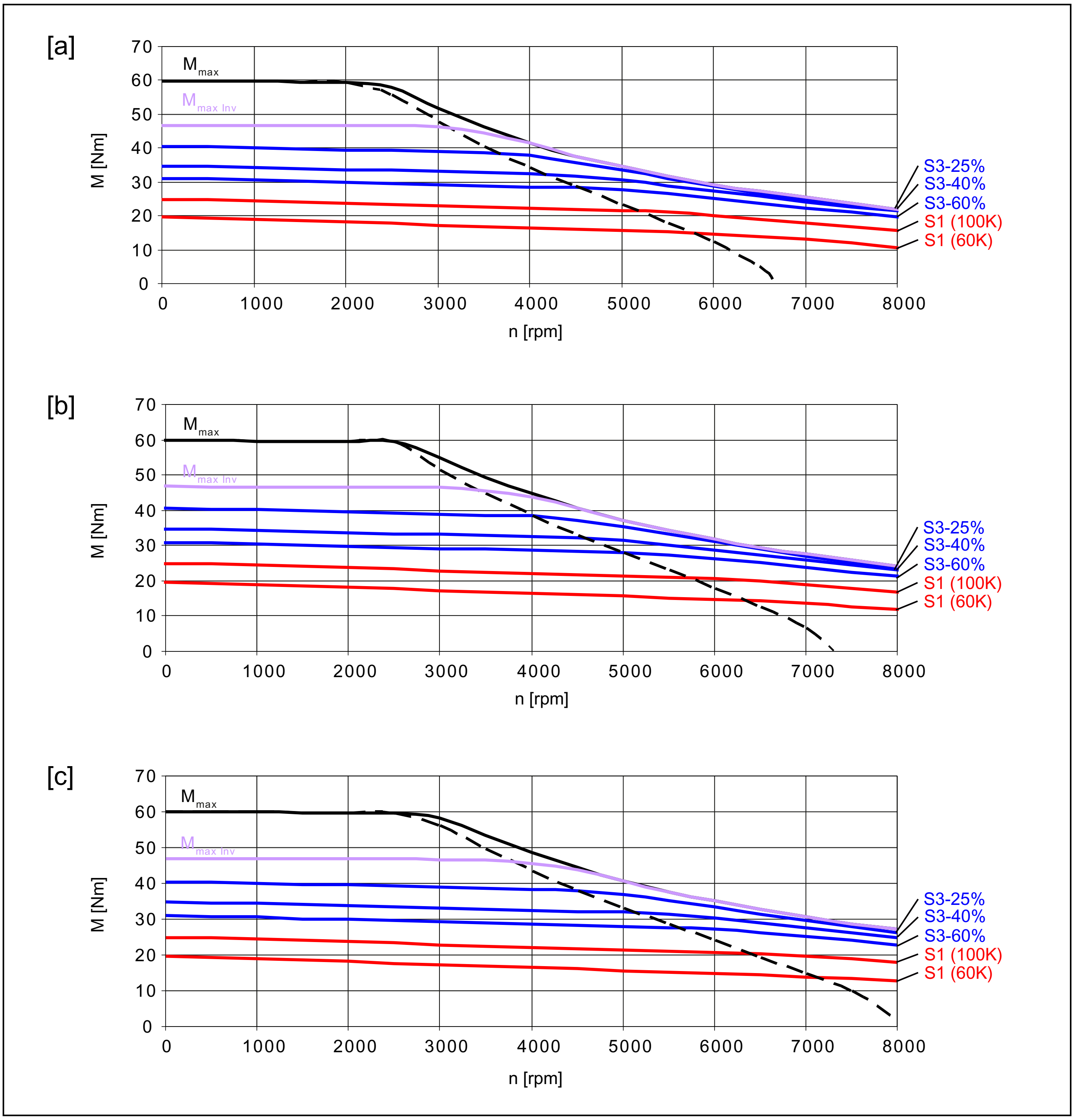
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-85 1FT7067-7WF7

Table 4- 84 1FT7067-7WH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	6
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	22
Rated current (100 K)	$I_{N\ (100\ K)}$	A	25
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	20
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	25
Stall current (60 K)	$I_{0\ (60\ K)}$	A	20
Stall current (100 K)	$I_{0\ (100\ K)}$	A	28
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	10.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	8.3
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	10.4
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	9000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	9000
Maximum torque	M_{max}	Nm	60
Maximum current	I_{max}	A	80
Physical constants			
Torque constant	k_T	Nm/A	0.89
Voltage constant	k_E	V/1000 rpm	57
Winding resistance at 20 °C	R_{Str}	Ω	0.18
Rotating field inductance	L_D	mH	3.5
Electrical time constant	T_{el}	ms	19
Mechanical time constant	T_{mech}	ms	0.6
Thermal time constant	T_{th}	min	11
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	21600
Weight with brake	m_{MotBr}	kg	23
Weight without brake	m_{Mot}	kg	22
Recommended Motor Module 6SL312□-1TE23-0AA3			
Rated converter current	$I_{N\ Inv}$	A	30
Maximum converter current	$I_{max\ Inv}$	A	56
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	47



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

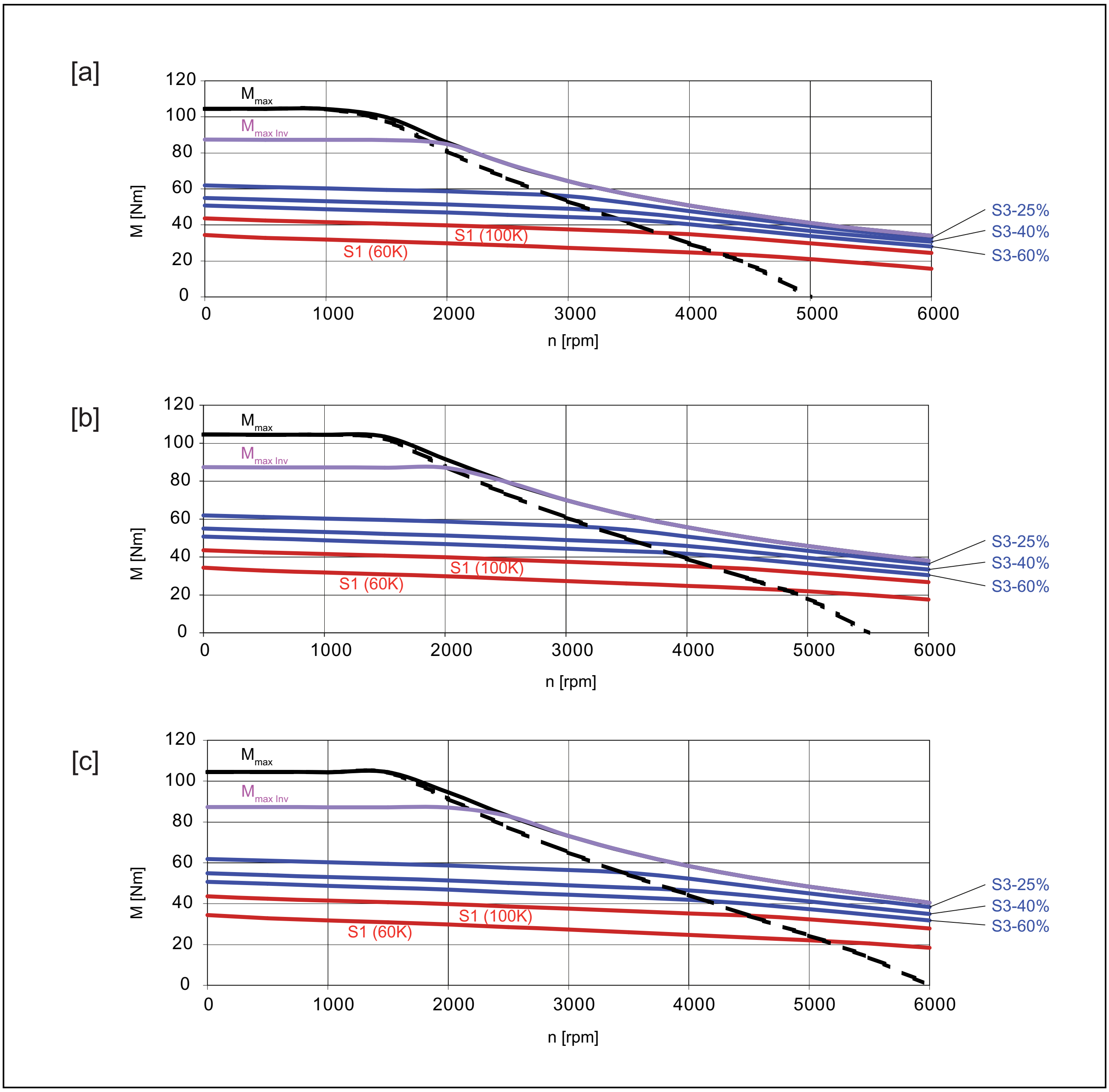
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-86 1FT7067-7WH7

Table 4- 85 1FT7085-7WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	8
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	38
Rated current (100 K)	$I_{N\ (100\ K)}$	A	32
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	34
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	43
Stall current (60 K)	$I_{0\ (60\ K)}$	A	28
Stall current (100 K)	$I_{0\ (100\ K)}$	A	36
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	34.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	20.7
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	11.9
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7500
Maximum torque	M_{max}	Nm	105
Maximum current	I_{max}	A	126
Physical constants			
Torque constant	k_T	Nm/A	1.20
Voltage constant	k_E	V/1000 rpm	77
Winding resistance at 20 °C	R_{Str}	Ω	0.12
Rotating field inductance	L_D	mH	3.1
Electrical time constant	T_{el}	ms	26
Mechanical time constant	T_{mech}	ms	0.5
Thermal time constant	T_{th}	min	10
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	51100
Weight with brake	m_{MotBr}	kg	35
Weight without brake	m_{Mot}	kg	32
Recommended Motor Module 6SL312□-1TE24-5AA3			
Rated converter current	$I_{N\ Inv}$	A	45
Maximum converter current	$I_{max\ Inv}$	A	85
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	88



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

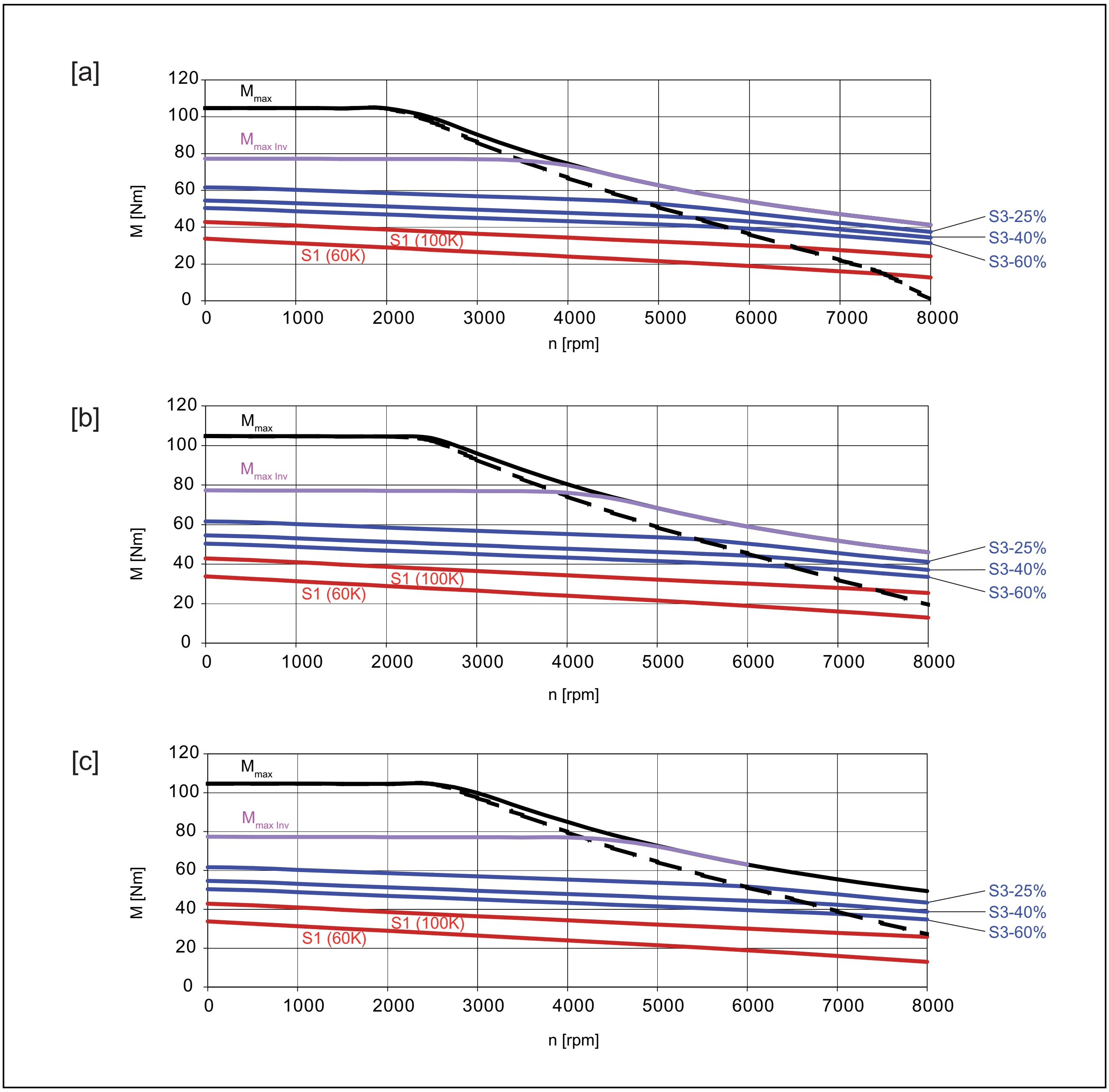
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-87 1FT7085-7WF7

Table 4- 86 1FT7085-7WH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	8
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	33
Rated current (100 K)	$I_{N\ (100\ K)}$	A	48
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	34
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	43
Stall current (60 K)	$I_{0\ (60\ K)}$	A	46
Stall current (100 K)	$I_{0\ (100\ K)}$	A	58
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	34.9
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	20.7
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	15.5
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	105
Maximum current	I_{max}	A	205
Physical constants			
Torque constant	k_T	Nm/A	0.74
Voltage constant	k_E	V/1000 rpm	47.5
Winding resistance at 20 °C	R_{Str}	Ω	0.046
Rotating field inductance	L_D	mH	1.2
Electrical time constant	T_{el}	ms	26
Mechanical time constant	T_{mech}	ms	0.5
Thermal time constant	T_{th}	min	10
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	51100
Weight with brake	m_{MotBr}	kg	35
Weight without brake	m_{Mot}	kg	32
Recommended Motor Module 6SL312❑-1TE26-0AA3			
Rated converter current	$I_{N\ Inv}$	A	60
Maximum converter current	$I_{max\ Inv}$	A	113
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	77



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

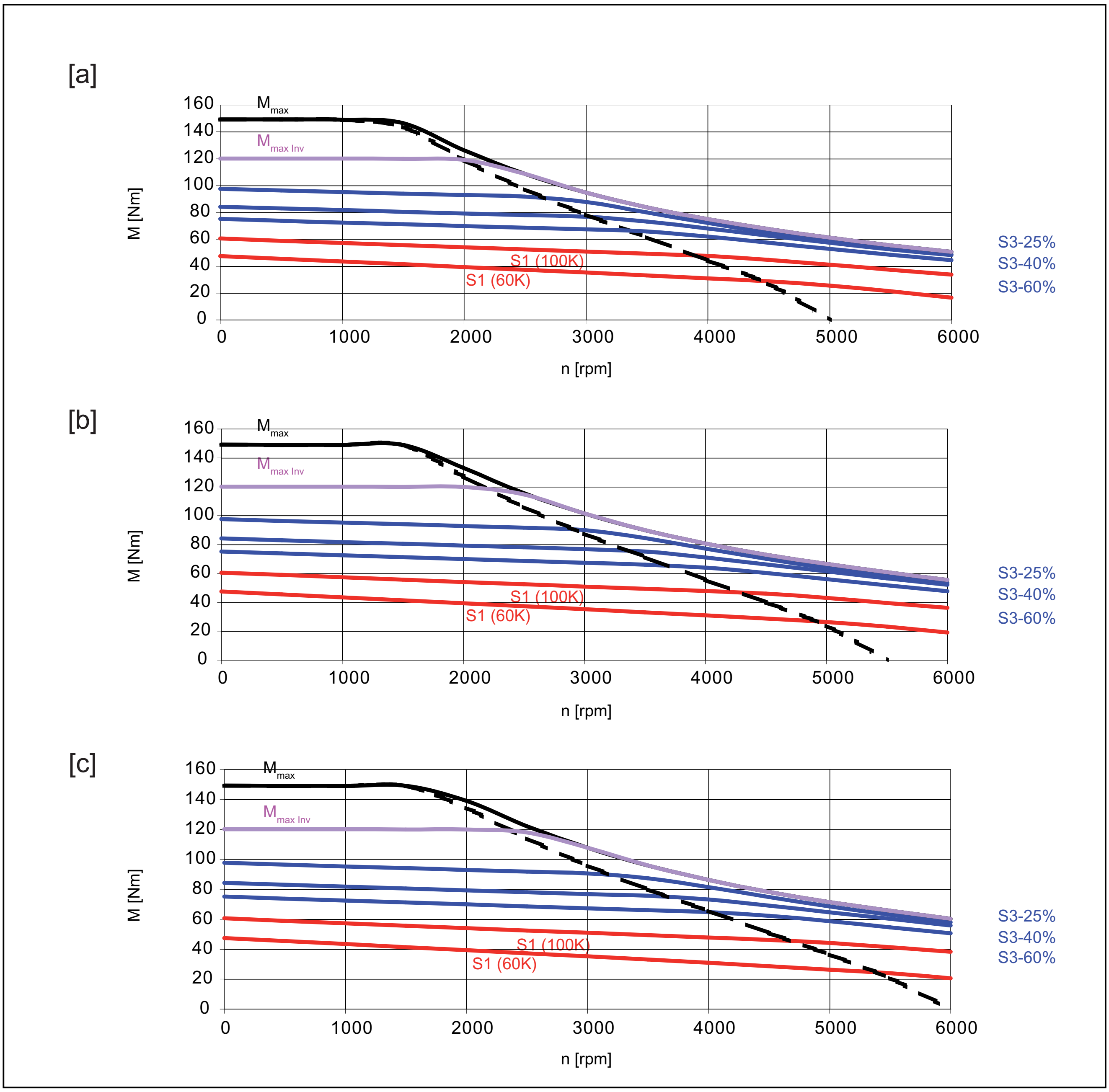
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-88 1FT7085-7WH7

Table 4- 87 1FT7087-7WF7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	3000
Number of poles	2p	---	8
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	51
Rated current (100 K)	$I_{N\ (100\ K)}$	A	43
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	48
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	61
Stall current (60 K)	$I_{0\ (60\ K)}$	A	40
Stall current (100 K)	$I_{0\ (100\ K)}$	A	51
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	41.6
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	27.4
Optimum operating point			
Optimum speed	n_{opt}	rpm	3000
Optimum power	P_{opt}	kW	16.0
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	7500
Maximum torque	M_{max}	Nm	150
Maximum current	I_{max}	A	170
Physical constants			
Torque constant	k_T	Nm/A	1.20
Voltage constant	k_E	V/1000 rpm	77
Winding resistance at 20 °C	R_{Str}	Ω	0.08
Rotating field inductance	L_D	mH	2.1
Electrical time constant	T_{el}	ms	26
Mechanical time constant	T_{mech}	ms	0.5
Thermal time constant	T_{th}	min	11
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	45300
Weight with brake	m_{MotBr}	kg	44
Weight without brake	m_{Mot}	kg	41
Recommended Motor Module 6SL312❑-1TE26-0AA3			
Rated converter current	$I_{N\ Inv}$	A	60
Maximum converter current	$I_{max\ Inv}$	A	113
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	120



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

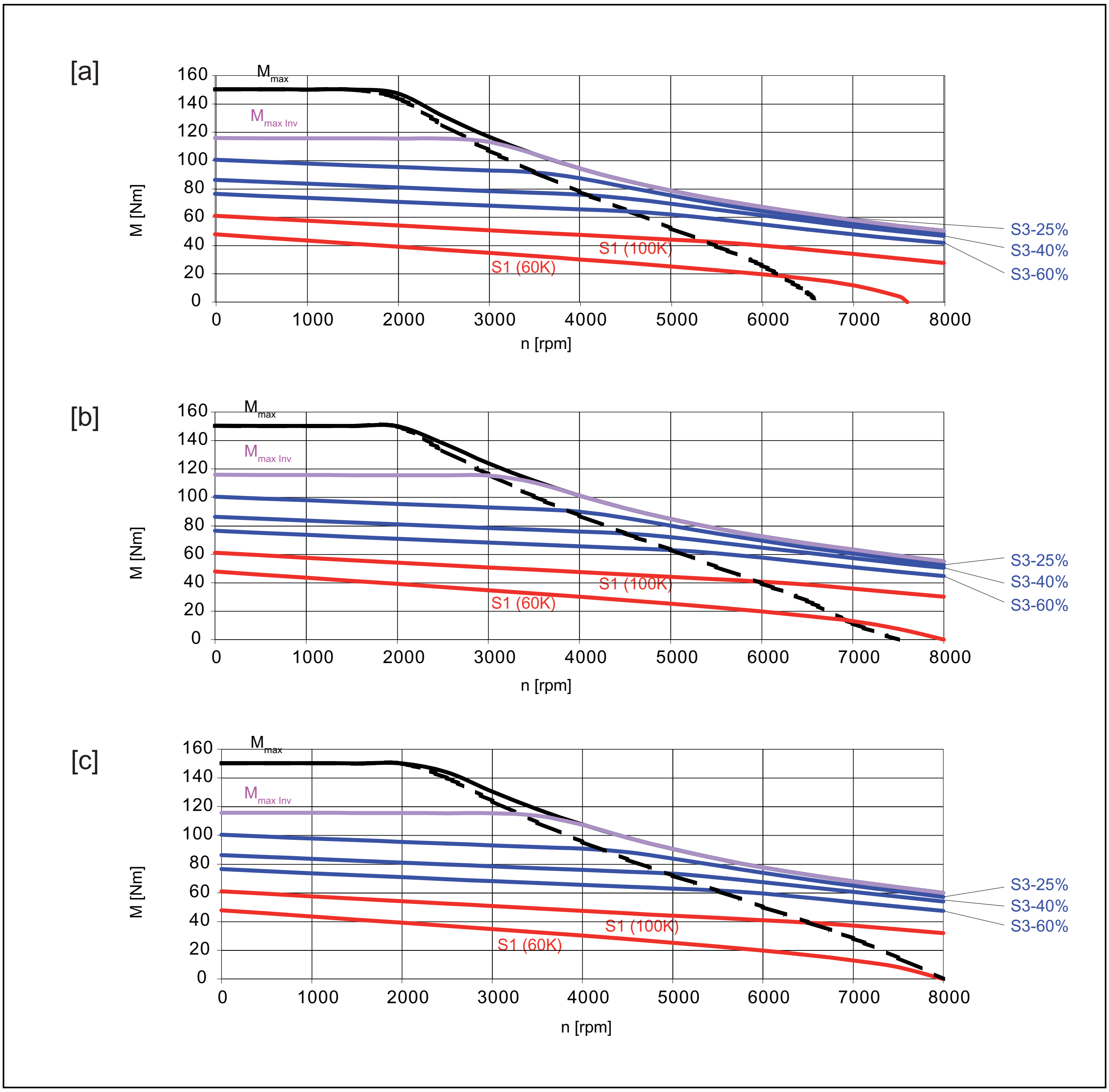
[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-89 1FT7087-7WF7

Table 4- 88 1FT7087-7WH7

Technical data	Code	Unit	Value
Configuration data			
Rated speed	n_N	rpm	4500
Number of poles	2p	---	8
Rated torque (100 K)	$M_{N\ (100\ K)}$	Nm	46
Rated current (100 K)	$I_{N\ (100\ K)}$	A	53
Static torque (60 K)	$M_{0\ (60\ K)}$	Nm	48
Static torque (100 K)	$M_{0\ (100\ K)}$	Nm	61
Stall current (60 K)	$I_{0\ (60\ K)}$	A	53
Stall current (100 K)	$I_{0\ (100\ K)}$	A	67
Moment of inertia (with brake)	J_{MotBr}	10^{-4} kgm^2	41.6
Moment of inertia (without brake)	J_{Mot}	10^{-4} kgm^2	27.4
Optimum operating point			
Optimum speed	n_{opt}	rpm	4500
Optimum power	P_{opt}	kW	21.7
Limiting data			
Max. permissible speed (mech.)	$n_{max\ mech}$	rpm	8000
Max. permissible speed (converter)	$n_{max\ Inv}$	rpm	8000
Maximum torque	M_{max}	Nm	150
Maximum current	I_{max}	A	225
Physical constants			
Torque constant	k_T	Nm/A	0.91
Voltage constant	k_E	V/1000 rpm	58
Winding resistance at 20 °C	R_{Str}	Ω	0.046
Rotating field inductance	L_D	mH	1.2
Electrical time constant	T_{el}	ms	26
Mechanical time constant	T_{mech}	ms	0.5
Thermal time constant	T_{th}	min	11
Shaft torsional stiffness	$c_{t\ Mot}$	Nm/rad	45300
Weight with brake	m_{MotBr}	kg	44
Weight without brake	m_{Mot}	kg	41
Recommended Motor Module 6SL312□-1TE28-5AA3			
Rated converter current	$I_{N\ Inv}$	A	85
Maximum converter current	$I_{max\ Inv}$	A	141
Max. torque at $I_{max\ Inv}$	$M_{max\ Inv}$	Nm	116



[a] SINAMICS SLM 400 V

[b] SINAMICS ALM 400 V

[c] SINAMICS SLM 480 V

The characteristic curves are only valid for optimized converter setting data

Figure 4-90 1FT7087-7WH7

4.3 Dimension drawings

CAD CREATOR

Thanks to its easy to understand interface, the CAD CREATOR allows you to find the following quickly

- dimension drawings
- 2D/3D CAD data

and supports you when generating plant/system documentation regarding project-specific information. The data for motors, drives and CNC controls is currently available in the online version.

You can find further information on the Internet at: http://www.siemens.com/cadcreator

Motors

- 1FK7, 1FT7, 1FT6 synchronous motors
- 1FE1 built-in synchronous motors
- 1FW3 complete torque motors
- 1FW6 built-in torque motors
- 1FK7, 1FT7, 1FT6 geared motors
- 1PH8 synchronous/induction motors
- 1PH7, 1PH4, 1PL6, 1PM4, 1PM6 induction motors
- 2SP1 motor spindles
- 1FN3 linear motors

SINAMICS S120

- Control Units
- Power Modules (blocksize, chassis)
- Line Modules (booksize, chassis)
- Line-side components
- Motor Modules (booksize, chassis)
- DC link components
- Additional system components
- Load-side power components
- Encoder system connection
- MOTION-CONNECT connection system

SIMOTION

- SIMOTION D
- SIMOTION C

SINUMERIK solution line

- Control systems
- Operator components for CNC controls

How up-to-date are the dimension drawings

Note

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

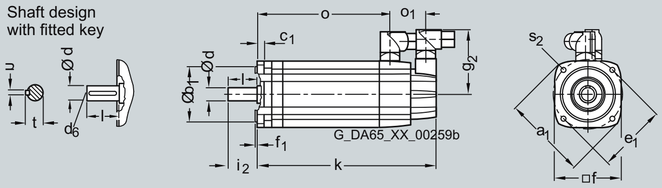
1FT7 Compact without/with DRIVE-CLiQ natural cooling

For motor		Dimensions in mm (inches)										Flange 1 (1FT6-compatible)				
													without brake		with brake	
Shaft height	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	g_2 –	o_1 –	s_2 S	i_2 –	k LB	o –	k LB	o –
1FT7 Compact, type of construction IM B5, natural cooling with connector, without/with brake																
36	1FT7034		90 (3.54)	60 (2.36)	8 (0.31)	75 (2.95)	72 (2.83)	3 (0.12)	80 (3.15)	48 (1.89)	6.5 (0.26)	30 (1.18)	195 (7.68)	133 (5.24)	222 (8.74)	160 (6.30)
	1FT7036												243 (9.57)	181 (7.13)	270 (10.63)	208 (8.19)
48	1FT7042		120 (4.72)	80 (3.15)	10 (0.39)	100 (3.94)	96 (3.78)	3 (0.12)	93 (3.66)	53 (2.09)	6.5 (0.26)	40 (1.57)	169 (6.65)	102 (4.02)	201 (7.91)	134 (5.28)
	1FT7044												219 (8.62)	152 (5.98)	251 (9.88)	184 (7.24)
	1FT7046												259 (10.20)	192 (7.56)	291 (11.46)	224 (8.82)
63	1FT7062		155 (6.10)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	108 (4.25)	53 (2.09)	9 (0.35)	50 (1.97)	173 (6.81)	106 (4.17)	208 (8.19)	141 (5.55)
	1FT7064												205 (8.07)	137 (5.39)	240 (9.45)	173 (6.81)
	1FT7066												236 (9.29)	169 (6.65)	272 (10.71)	204 (8.03)
	1FT7068												284 (11.18)	216 (8.50)	319 (12.56)	252 (9.92)

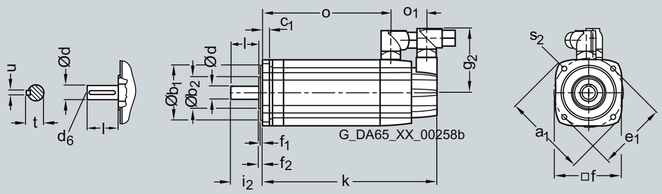
			Flange 0							DE shaft extension				
						without brake		with brake						
Shaft height	Type	DIN IEC	b_2 –	f_2 –	i_2 –	k LB	o –	k LB	o –	d D	d_6 –	l E	t GA	u F
36	1FT7034		36 (1.42)	5.5 (0.22)	36.5 (1.44)	189 (7.44)	127 (5.00)	216 (8.50)	154 (6.06)	14 (0.55)	M5	30 (1.18)	16 (0.63)	5 (0.20)
	1FT7036					237 (9.33)	175 (6.89)	264 (10.39)	202 (7.95)					
48	1FT7042		46 (1.81)	5.5 (0.22)	46 (1.81)	163 (6.42)	96 (3.78)	195 (7.68)	128 (5.04)	19 (0.75)	M6	40 (1.57)	21.5 (0.85)	6 (0.24)
	1FT7044					213 (8.39)	146 (5.75)	245 (9.65)	178 (7.01)					
	1FT7046					253 (9.96)	186 (7.32)	285 (11.22)	218 (8.58)					
63	1FT7062		51 (2.01)	6 (0.24)	56.5 (2.22)	167 (6.57)	99 (3.90)	202 (7.95)	135 (5.31)	24 (0.94)	M8	50 (1.97)	27 (1.06)	8 (0.31)
	1FT7064					198 (7.80)	131 (5.16)	233 (9.17)	166 (6.54)					
	1FT7066					230 (9.06)	162 (6.38)	265 (10.43)	198 (7.80)					
	1FT7068					277 (10.91)	210 (8.27)	312 (12.28)	245 (9.65)					

Flange 1
(1FT6-compatible)
1FT703
1FT704
1FT706

Shaft design
with fitted key



Flange 0
1FT703
1FT704
1FT706



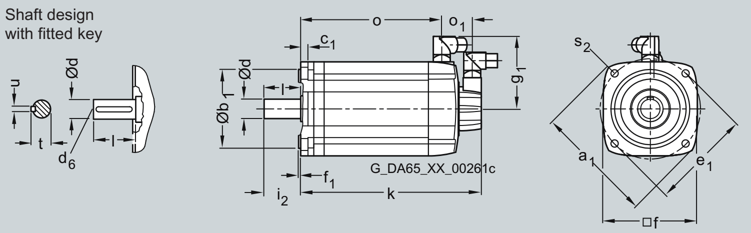
1FT7 Compact without/with DRIVE-CLiQ natural cooling

For motor		Dimensions in mm (inches)							Connector					Flange 1 (1FT6-compatible)			
									Size 1	Size 1.5				without brake		with brake	
Shaft height	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	g_1 –	g_1 –	o_1 –	s_2 S	i_2 –	k LB	o –	k LB	o –
1FT7 Compact, type of construction IM B5, natural cooling, with connector, without/with brake																	
80	1FT7082		195 (7.68)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	119 (4.69)	141 (5.55)	51 (2.01)	11 (0.43)	58 (2.28)	196 (7.72)	130 (5.12)	248 (9.76)	183 (7.20)
	1FT7084													247 (9.72)	182 (7.17)	299 (11.77)	234 (9.21)
	1FT7086													299 (11.77)	234 (9.21)	351 (13.82)	286 (11.26)
100	1FT7102		245 (9.65)	180 (7.09)	13 (0.51)	215 (8.46)	196 (7.72)	4 (0.16)	–	161 (6.34)	56 (2.20)	14 (0.55)	80 (3.15)	221 (8.70)	151 (5.94)	273 (10.75)	203 (7.99)
	1FT7105													307 (12.09)	238 (9.37)	360 (14.17)	290 (11.42)
	1FT7108													377 (14.84)	307 (12.09)	429 (16.89)	359 (14.13)

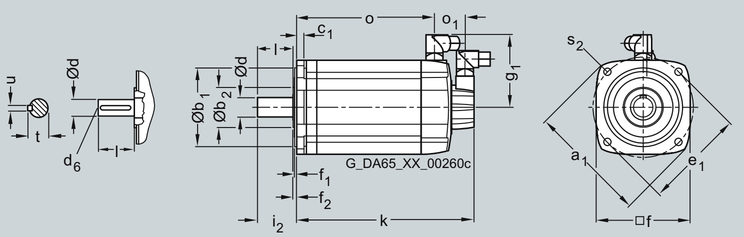
			Flange 0							DE shaft extension				
						without brake		with brake						
Shaft height	Type	DIN IEC	b_2 –	f_2 –	i_2 –	k LB	o –	k LB	o –	d D	d_6 –	l E	t GA	u F
80	1FT7082		66 (2.60)	6 (0.24)	64.5 (2.54)	189 (7.44)	124 (4.88)	241 (9.49)	176 (6.93)	32 (1.26)	M12	58 (2.28)	35 (1.38)	10 (0.39)
	1FT7084					241 (9.49)	175 (6.89)	293 (11.54)	228 (8.98)					
	1FT7086					292 (11.50)	227 (8.94)	345 (13.58)	279 (10.98)					
100	1FT7102		81 (3.19)	6.5 (0.26)	87 (3.43)	214 (8.43)	144 (5.67)	266 (10.47)	196 (7.72)	38 (1.50)	M12	80 (3.15)	41 (1.61)	10 (0.39)
	1FT7105					301 (11.85)	231 (9.09)	353 (13.90)	283 (11.14)					
	1FT7108					370 (14.57)	300 (11.81)	422 (16.61)	352 (13.86)					

Flange 1
(1FT6-compatible)
1FT708
1FT710

Shaft design
with fitted key



Flange 0
1FT708
1FT710



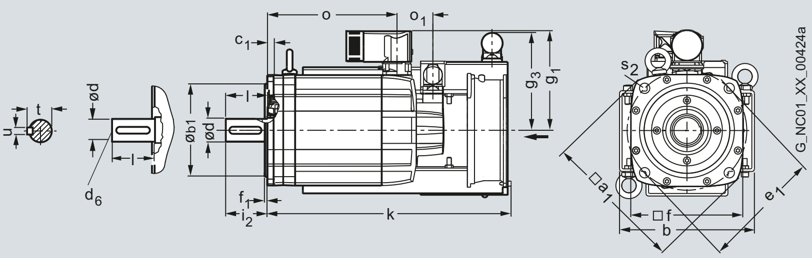
1FT7 Compact without/with DRIVE-CLiQ forced ventilation

For motor; Dimensions in mm (inches)

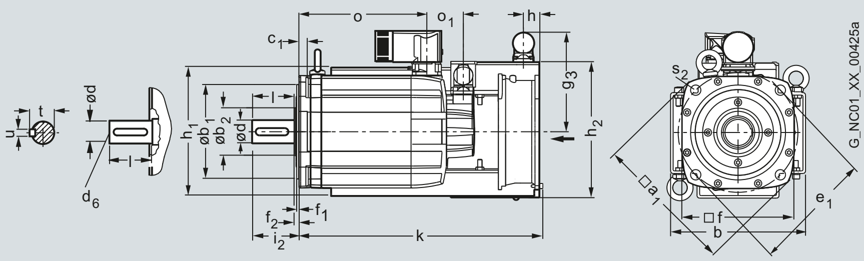
Shaft height	Type	DIN / IEC: a1 / P	b / –	b1 / N	c1 / LA	e1 / M	f / AB	f1 / T	Connector Size 1.5: g1 / –	Connector Size 3: g1 / –	g3 / –	h / H	h1 / –	Fan: h2 / –	o1 / –	s2 / S
1FT7 Compact, type of construction IM B5, forced ventilation, with connector, without/with brake																
80	1FT7084	194 (7.64)	186 (7.32)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	139 (5.47)	–	137.5 (5.41)	27 (1.06)	177 (6.97)	186.5 (7.34)	50 (1.97)	11 (0.43)
	1FT7086															
100	1FT7105	245 (9.65)	224 (8.82)	180 (7.09)	13 (0.51)	215 (8.46)	196 (7.72)	4 (0.16)	159 (6.26)	187 (7.36)	151 (5.94)	27 (1.06)	220 (8.66)	222 (8.74)	55 (2.17)	14 (0.55)
	1FT7108															

Shaft height	Type	Flange 1 (1FT6-compatible): DIN / IEC: i2 / –	Flange 1 without brake: k / LB	Flange 1 without brake: o / –	Flange 1 with brake: k / LB	Flange 1 with brake: o / –	Flange 0: b2 / –	Flange 0: f2 / –	Flange 0: i2 / –	Flange 0 without brake: k / LB	Flange 0 without brake: o / –	Flange 0 with brake: k / LB	Flange 0 with brake: o / –	DE shaft extension: d / D	d6 / –	l / E	t / GA	u / F
80	1FT7084	58 (2.28)	342 (13.46)	182 (7.17)	394 (15.51)	234 (9.21)	66 (2.60)	6 (0.24)	64.5 (2.54)	335.5 (13.21)	175 (6.89)	387.5 (15.26)	228 (8.98)	32 (1.26)	M12	58 (2.28)	35 (1.38)	10 (0.39)
	1FT7086		393.5 (15.49)	234 (9.21)	446 (17.56)	286 (11.26)				387 (15.24)	227 (8.94)	439.5 (17.30)	279 (10.98)					
100	1FT7105	80 (3.15)	403.5 (15.89)	238 (9.37)	455.5 (17.93)	290 (11.42)	81 (3.19)	6.5 (0.26)	87 (3.43)	396.5 (15.61)	231 (9.09)	448.5 (17.66)	283 (11.14)	38 (1.50)	M12	80 (3.15)	41 (1.61)	10 (0.39)
	1FT7108		473 (18.62)	307 (12.09)	525 (20.57)	359 (14.13)				466 (18.35)	300 (11.81)	518 (20.39)	352 (13.86)					

Flange 1
(1FT6-compatible)
1FT708
1FT710



Flange 0
1FT708
1FT710



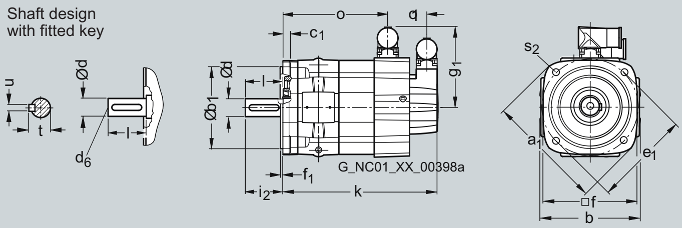
1FT7 Compact without/with DRIVE-CLiQ water cooling

For motor		Dimensions in mm (inches)							Connector			Connector			
									Size 1	Size 1.5	Size 3	Size 1	Size 1.5	Size 3	
Shaft height	Type	DIN a_1 IEC P	b –	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	g_1 –	g_1 –	g_1 –	o_1 –	o_1 –	o_1 –	s_2 S
1FT7 Compact, type of construction IM B5, water cooling, with connector, without/with brake															
63	1FT7062 1FT7064 1FT7066 1FT7068	155 (6.10)	135 (5.31)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	108 (4.25)	–	–	52 (2.05)	–	–	9 (0.35)
80	1FT7082 1FT7084 1FT7086	195 (7.68)	165 (6.50)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	–	140 (5.51)	–	–	50 (1.97)	–	11 (0.43)
100	1FT7102	245 (9.65)	206 (8.11)	180 (7.09)	13 (0.51)	215 (8.46)	196 (7.72)	4 (0.16)	–	160 (6.30)	–	–	55 (2.17)	–	14 (0.55)
	1FT7105 1FT7108									–	187 (7.36)		–	72 (2.83)	

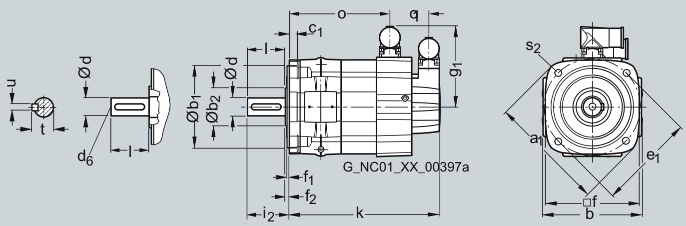
		Flange 1 (1FT6-compatible)				Flange 0							DE shaft extension				
			without/with brake						without/with brake								
				Connector						Connector							
				Size 1	Size 1.5	Size 3					Size 1	Size 1.5	Size 3				
Shaft height	Type	DIN i_2 IEC –	k LB	o –	o –	o –	b_2 –	f_2 –	i_2 –	k LB	o –	o –	o –	d D	d_6 –	l E	t GA	u F
63	1FT7062	50 (1.97)	208 (8.19)	141 (5.55)	–	–	51 (2.01)	6 (0.24)	56.5 (2.22)	202 (7.95)	135 (5.31)	–	–	24 (0.94)	M8	50 (1.97)	27 (1.06)	8 (0.31)
	1FT7064		240 (9.45)	173 (6.81)	–	–				233 (9.17)	166 (6.54)	–	–					
	1FT7066		272 (10.71)	204 (8.03)	–	–				265 (10.43)	198 (7.80)	–	–					
	1FT7068		319 (12.56)	252 (9.92)	–	–				312 (12.28)	245 (9.65)	–	–					
80	1FT7082	58 (2.28)	248 (9.76)	–	183 (7.20)	–	66 (2.60)	6 (0.24)	64.5 (2.54)	241 (9.49)	–	176 (6.93)	–	32 (1.26)	M12	58 (2.28)	35 (1.38)	10 (0.39)
	1FT7084		299 (11.77)	–	234 (9.21)	–				293 (11.54)	–	228 (8.98)	–					
	1FT7086		351 (13.82)	–	286 (11.26)	–				345 (13.58)	–	279 (10.98)	–					
100	1FT7102	80 (3.15)	273 (10.75)	–	203 (7.99)	–	81 (3.19)	6.5 (0.26)	87 (3.43)	266 (10.47)	–	196 (7.72)	–	38 (1.50)	M12	80 (3.15)	41 (1.61)	10 (0.39)
	1FT7105		360 (14.17)	–	290 (11.42)	273 (10.75)				353 (13.90)	–	283 (11.14)	266 (10.47)					
	1FT7108		429 (16.89)	–	359 (14.13)	342 (13.46)				422 (16.61)	–	352 (13.86)	335 (13.19)					

Flange 1
(1FT6-compatible)
1FT706
1FT708
1FT710

Shaft design
with fitted key



Flange 0
1FT706
1FT708
1FT710

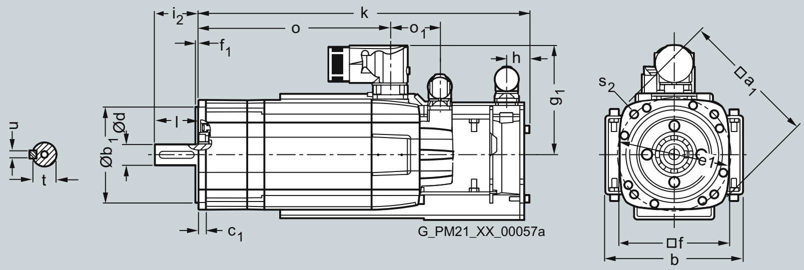


1FK7 High Dynamic without/with DRIVE-CLiQ forced ventilation

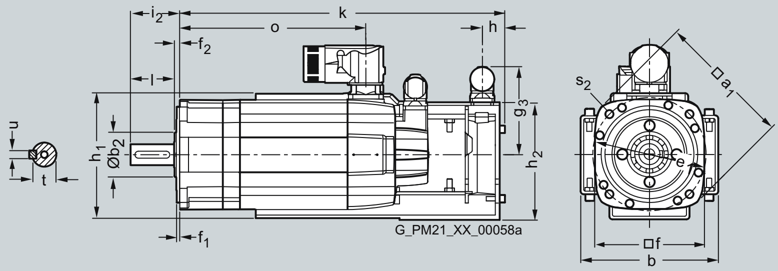
For motor		Dimensions in mm (inches)								Con-nector Size 1.5				Fan		
Shaft height	Type	DIN IEC	a_1 P	b A	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	g_1 –	g_3 –	h H	h_1 –	h_2 –	o_1 –	s_2 S
1FT7 High Dynamic, forced ventilation, with connector, without/with brake																
63	1FT7065		155 (6.10)	158 (6.22)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	125 (4.92)	101.5 (4.00)	26 (1.02)	143 (5.63)	135 (5.31)	57 (2.24)	9 (0.35)
	1FT7067															

			Flange 1 (1FT6-compatible)					Flange 0											
				without brake		with brake					without brake		with brake		DE shaft extension				
Shaft height	Type	DIN IEC	i_2 –	k LB	o –	k LB	o –	b_2 –	f_2 –	i_2 –	k LB	o –	k LB	o –	d D	d_6 –	l E	t GA	u F
63	1FT7065		50 (1.97)	380 (14.96)	220 (8.66)	380 (14.96)	220 (8.66)	51 (2.01)	6 (0.24)	56.5 (2.22)	373.5 (14.70)	214 (8.43)	373.5 (14.70)	214 (8.43)	24 (0.94)	M8	50 (1.97)	27 (1.06)	8 (0.31)
	1FT7067			420 (16.54)	260 (10.24)	420 (16.54)	260 (10.24)				413.5 (16.28)	254 (10.00)	413.5 (16.28)	254 (10.00)					

Flange 1
(1FT6-compatible)
1FT706



Flange 0
1FT706



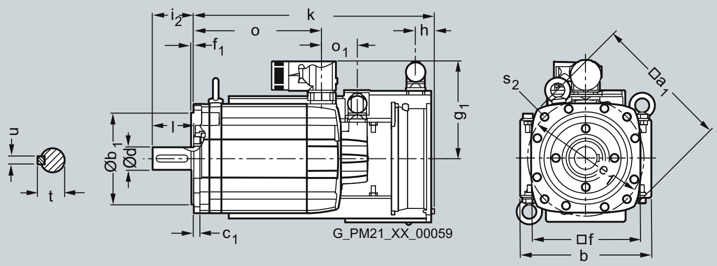
1FK7 High Dynamic without/with DRIVE-CLiQ forced ventilation

For motor — Dimensions in mm (inches)

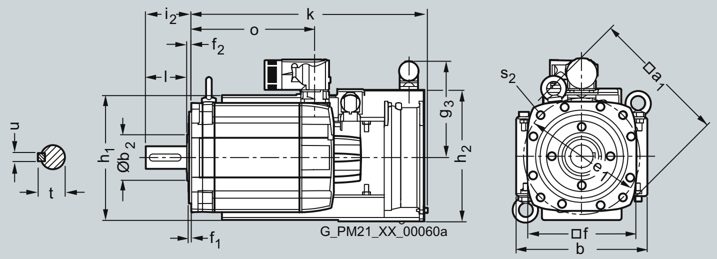
Shaft height	Type	DIN / IEC	a1 / P	b / A	b1 / N	c1 / LA	e1 / M	f / AB	f1 / T	Connector Size 1: g1 / –	Connector Size 3: g1 / –	g3 / –	h / H	h1 / –	Fan: h2 / –	o1 / –	s2 / S
1FT7 High Dynamic, forced ventilation, with connector, without/with brake																	
80	1FT7085		194 (7.64)	186 (7.32)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	139 (5.47)	166.5 (6.56)	137.5 (5.41)	27 (1.06)	177 (6.97)	186.5 (7.34)	50 (1.97)	11 (0.43)
	1FT7087										166.5 (6.56)						

Shaft height	Type	DIN / IEC	Flange 1 (1FT6-compatible): i2 / –	Flange 1, without brake: k / LB	Flange 1, without brake: o / –	Flange 1, with brake: k / LB	Flange 1, with brake: o / –	Flange 0: b2 / –	Flange 0: f2 / –	Flange 0: i2 / –	Flange 0, without brake: k / LB	Flange 0, without brake: o / –	Flange 0, with brake: k / LB	Flange 0, with brake: o / –	DE shaft extension: d / D	d6 / –	l / E	t / GA	u / F
80	1FT7085		58 (2.28)	414 (16.30)	254 (10.00)	414 (16.30)	254 (10.00)	66 (2.60)	6 (0.24)	64.5 (2.54)	407.5 (16.04)	247 (9.72)	407.5 (16.04)	247 (9.72)	32 (1.26)	M12	58 (2.28)	35 (1.38)	10 (0.39)
	1FT7087			474 (18.66)	314 (12.36)	474 (18.66)	314 (12.36)				467.5 (18.41)	307 (12.09)	467.5 (18.41)	307 (12.09)					

Flange 1
(1FT6-compatible)
1FT708



Flange 0
1FT708

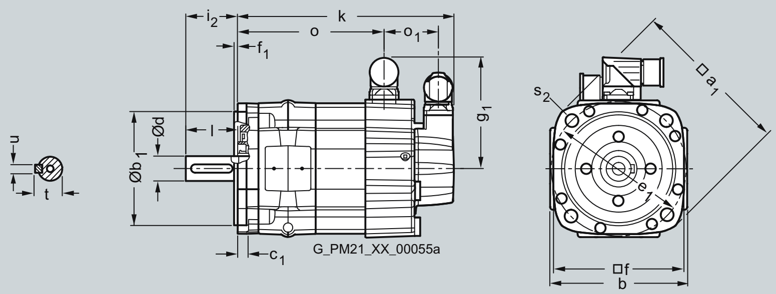


1FK7 High Dynamic without/with DRIVE-CLiQ water cooling

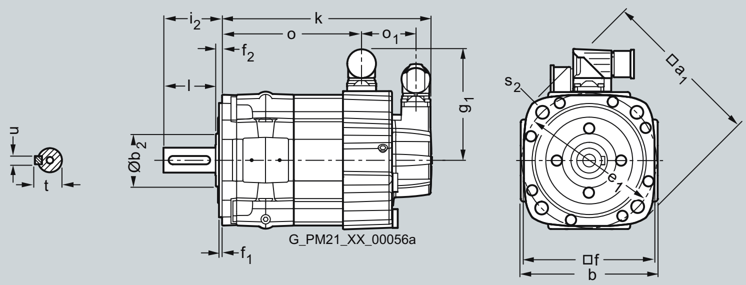
For motor		Dimensions in mm (inches)								Connector Size 1.5	Connector Size 3		
Shaft height	Type	DIN IEC	a_1 P	b A	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	g_1 –	g_1 –	o_1 –	s_2 S
1FT7 High Dynamic, water cooling, with connector, without/with brake													
63	1FT7065		155 (6.10)	135 (5.31)	110 (4.33)	10 (0.39)	130 (5.12)	126 (4.96)	3.5 (0.14)	132.5 (5.22)	–	57 (2.24)	9 (0.35)
	1FT7067												
80	1FT7085		194 (7.64)	165 (6.50)	130 (5.12)	11.5 (0.45)	165 (6.50)	155 (6.10)	3.5 (0.14)	140.5 (5.53)	168.5 (6.63)	50 (1.97)	11 (0.43)
	1FT7087												

			Flange 1 (1FT6-compatible)	without brake		with brake		Flange 0			without brake		with brake		DE shaft extension				
Shaft height	Type	DIN IEC	i_2 –	k LB	o –	k LB	o –	b_2 –	f_2 –	i_2 –	k LB	o –	k LB	o –	d D	d_6 –	l E	t GA	u F
63	1FT7065		50 (1.97)	292 (11.50)	220 (8.66)	292 (11.50)	220 (8.66)	51 (2.01)	6 (0.24)	56.5 (2.22)	285.5 (11.24)	214 (8.43)	285.5 (11.24)	214 (8.43)	24 (0.94)	M8	50 (1.97)	27 (1.06)	8 (0.31)
	1FT7067			332 (13.07)	260 (10.24)	332 (13.07)	260 (10.24)				325.5 (12.81)	254 (10.00)	325.5 (12.81)	254 (10.00)					
80	1FT7085		58 (2.28)	319 (12.56)	254 (10.00)	319 (12.56)	254 (10.00)	66 (2.60)	6 (0.24)	64.5 (2.54)	312.5 (12.30)	247 (9.72)	312.5 (12.30)	247 (9.72)	32 (1.26)	M12	58 (2.28)	35 (1.38)	10 (0.39)
	1FT7087			379 (14.92)	314 (12.36)	379 (14.92)	314 (12.36)				372.5 (14.67)	307 (12.09)	372.5 (14.67)	307 (12.09)					

Flange 1
(1FT6-compatible)
1FT706
1FT708



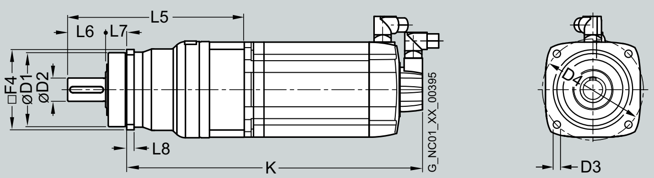
Flange 0
1FT706
1FT708



1FT7 Compact without/with DRIVE-CLiQ with planetary gearbox SP+, 1-stage

For motors				Dimensions in mm (inches)									
												Encoder system: Incremental encoder Absolute encoder	
			Planetary gearbox									without brake	with brake
Shaft height	Type	F4	Type	D1	D2	D3	D4	L5	L6	L7	L8	K	K
1FT7 with SP+ planetary gearbox, single-stage, type of construction IM B5, natural cooling, with connector, without/with brake													
36	1FT7034	62 (2.44)	SP060S-MF1	60 (2.36)	16 (0.63)	5.5 (0.22)	68 (2.68)	142 (5.59)	28 (1.10)	20 (0.79)	6 (0.24)	347 (13.66)	374 (14.72)
	1FT7034	76 (2.99)	SP075S-MF1	70 (2.76)	22 (0.87)	6.6 (0.26)	85 (3.35)	163.8 (6.45)	36 (1.42)	20 (0.79)	7 (0.28)	361 (14.21)	388 (15.28)
	1FT7036											297 (11.69)	324 (12.76)
48	1FT7042							167.5 (6.59)				275 (10.83)	307 (12.09)
	1FT7044											325 (12.80)	357 (14.06)
	1FT7046											365 (14.37)	397 (15.63)
	1FT7046	101 (3.98)	SP100S-MF1	90 (3.54)	32 (1.26)	9 (0.35)	120 (4.72)	210 (8.27)	58 (2.28)	30 (1.18)	10 (0.39)	375 (14.76)	407 (16.02)
63	1FT7062							217 (8.54)				296 (11.65)	331 (13.03)
	1FT7064											327 (12.87)	362 (14.25)
	1FT7066											359 (14.13)	394 (15.51)
	1FT7068											406 (15.98)	441 (17.36)
	1FT7068	141 (5.55)	SP140S-MF1	130 (5.12)	40 (1.57)	11 (0.43)	165 (6.50)	274.3 (10.80)	82 (3.23)	30 (1.18)	12 (0.47)	439 (17.28)	474 (18.66)
80	1FT7082							283.3 (11.15)				361 (14.21)	413 (16.26)
	1FT7084											412 (16.22)	464 (18.27)
	1FT7086											464 (18.27)	516 (20.31)
	1FT7086	182 (7.17)	SP180S-MF1	160 (6.30)	55 (2.17)	13.5 (0.53)	215 (8.46)	310 (12.20)	82 (3.23)	30 (1.18)	15 (0.59)	491 (19.33)	543 (21.38)
100	1FT7102											412 (16.22)	464 (18.27)
	1FT7105											498 (19.61)	550 (21.65)
	1FT7108											568 (22.36)	620 (24.41)
	1FT7105	215 (8.46)	SP210S-MF1	180 (7.09)	75 (2.95)	17 (0.67)	250 (9.84)	385 (15.16)	105 (4.13)	38 (1.50)	17 (0.67)	542 (21.34)	594 (23.39)
	1FT7108											612 (24.09)	664 (26.14)

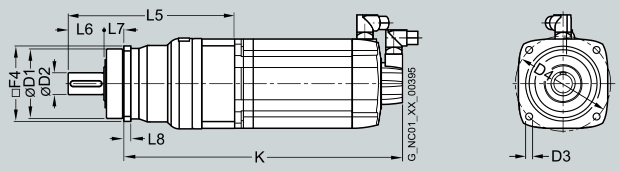
1FT703
1FT704
1FT706
1FT708
1FT710



1FT7 Compact without/with DRIVE-CLiQ with planetary gearbox SP+, 2-stage

For motor				Dimensions in mm (inches)								Encoder system: Incremental encoder Absolute encoder	
			Planetary gearbox									without brake	with brake
Shaft height	Type	F4	Type	D1	D2	D3	D4	L5	L6	L7	L8	K	K
1FT7 with SP+ planetary gearbox, two-stage, type of construction IM B5, natural cooling, with connector, without/with brake													
36	1FT7034	76 (2.99)	SP075S-MF2	70 (2.76)	22 (0.87)	6.6 (0.26)	85 (3.35)	179.4 (7.06)	36 (1.42)	20 (0.79)	7 (0.28)	376 (14.80)	403 (15.87)
	1FT7036											312 (12.28)	339 (13.35)
48	1FT7042							192 (7.56)				331 (13.03)	331 (13.03)
36	1FT7034	101 (3.98)	SP100S-MF2	90 (3.54)	32 (1.26)	9 (0.35)	120 (4.72)	230.3 (9.07)	58 (2.28)	30 (1.18)	10 (0.39)	395 (15.55)	422 (16.61)
	1FT7036											331 (13.03)	358 (14.09)
48	1FT7042							234 (9.21)				341 (13.43)	341 (13.43)
	1FT7044											359 (14.13)	391 (15.39)
	1FT7046											431 (16.97)	431 (16.97)
	1FT7044	141 (5.55)	SP140S-MF2	130 (5.12)	40 (1.58)	11 (0.43)	165 (6.50)	298.3 (11.74)	82 (3.23)	30 (1.18)	12 (0.47)	399 (15.71)	431 (16.97)
	1FT7046											471 (18.54)	471 (18.54)

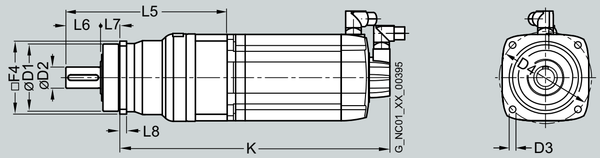
1FT703
1FT704



1FT7 Compact without/with DRIVE-CLiQ with planetary gearbox SP+, 2-stage

For motor				Dimensions in mm (inches)								Encoder system: Incremental encoder / Absolute encoder	
			Planetary gearbox									without brake	with brake
Shaft height	Type	F4	Type	D1	D2	D3	D4	L5	L6	L7	L8	K	K
1FT7 with SP+ planetary gearbox, two-stage, type of construction IM B5, natural cooling, with connector, without/with brake													
63	1FT7062	101 (3.98)	SP100S-MF2	90 (3.54)	32 (1.26)	9 (0.35)	120 (4.72)	252 (9.92)	58 (2.28)	30 (1.18)	10 (0.39)	331 (13.03)	366 (14.41)
	1FT7064											362 (14.25)	397 (15.63)
	1FT7062	141 (5.55)	SP140S-MF2	130 (5.12)	40 (1.57)	11 (0.43)	165 (6.50)	305 (12.01)	82 (3.23)	30 (1.18)	12 (0.47)	360 (14.17)	395 (15.55)
	1FT7064											391 (15.39)	426 (16.77)
	1FT7066											458 (18.03)	458 (18.03)
	1FT7068											505 (19.88)	505 (19.88)
80	1FT7082							332 (13.07)				410 (16.14)	462 (18.19)
	1FT7084											461 (18.15)	513 (20.20)
63	1FT7064	182 (7.17)	SP180S-MF2	160 (6.30)	55 (2.17)	13.5 (0.53)	215 (8.46)	346 (13.62)	82 (3.23)	30 (1.18)	15 (0.59)	432 (17.01)	467 (18.39)
	1FT7066											499 (19.65)	499 (19.65)
	1FT7068											546 (21.50)	546 (21.50)
80	1FT7082							355 (13.98)				433 (17.05)	485 (19.09)
	1FT7084											536 (21.10)	536 (21.10)
	1FT7086											536 (21.10)	588 (23.15)
100	1FT7102											457 (17.99)	509 (20.04)
80	1FT7084	215 (8.46)	SP210S-MF2	180 (7.09)	75 (2.95)	17 (0.67)	250 (9.84)	415 (16.34)	105 (4.13)	38 (1.50)	17 (0.67)	565 (22.24)	565 (22.24)
	1FT7086											617 (24.29)	617 (24.29)
100	1FT7102											538 (21.18)	538 (21.18)
	1FT7105											572 (22.52)	624 (24.57)
	1FT7108											694 (27.32)	694 (27.32)
80	1FT7086	245 (9.65)	SP240S-MF2	200 (7.87)	85 (3.35)	17 (0.67)	290 (11.42)	467.5 (18.41)	130 (5.12)	40 (1.57)	20 (0.79)	643 (25.31)	643 (25.31)
100	1FT7102											512 (20.16)	564 (22.20)
	1FT7105											598 (23.54)	650 (25.59)
	1FT7108											668 (26.30)	720 (28.35)

1FT706
1FT708
1FT710



5 Motor components

5.1 Thermal motor protection

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

Table 5- 1 Features and technical data

Type	KTY 84 (PTC thermistor)
Resistance when cold (20 °C)	Approx. 580 Ω
Resistance when hot (100 °C)	Approx. 1000 Ω
Connection	via signal cable

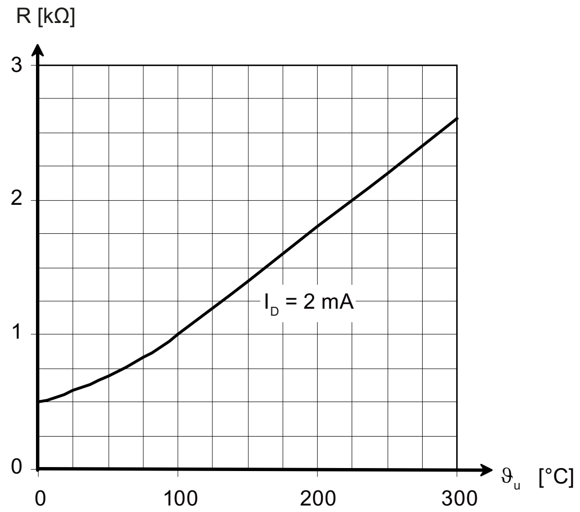


Figure 5-1 Resistance characteristic

The evaluation of the winding temperature is carried out in the converter. When a fault occurs, an appropriate message is output at the drive converter. When the motor temperature increases, a message "Alarm motor overtemperature" is output; this must be externally evaluated. If this signal is ignored, the drive converter shuts down with the appropriate fault message after a preset time period or when the motor limiting temperature or the shutdown temperature is exceeded.

> **CAUTION**
>
> The integrated temperature sensor only protects the synchronous motors to a certain extent against overloads
>
> Shaft heights 36 and 48 up to 2 • $I_{0\ (60\ K)}$ and speed ≠ 0
> from shaft height 63: up to 3 • $I_{0\ (60\ K)}$ and speed ≠ 0
>
> For load applications that are critical from a thermal perspective, e.g. overload when the motor is stationary or an overload of M_{max} longer than 4 s, adequate protection is no longer available. The "thermal motor model i^2t monitoring" function must be activated in the converter.

The temperature sensor is part of a SELV circuit, which can be destroyed if high voltage is applied. The temperature sensor is designed so that the DIN/EN requirement for "protective separation" is fulfilled.

5.2 Encoders

5.2.1 Encoder selection

Encoder systems with DRIVE-CLiQ interface

For motors with an integrated DRIVE-CLiQ interface, the analog encoder signal is internally converted to a digital signal. No further conversion of the encoder signal in the drive system is necessary. Motors with a DRIVE-CLiQ interface simplify commissioning and diagnostics, as the motor and encoder system are identified automatically.

Encoder systems without a DRIVE-CLiQ interface

For motors without an integrated DRIVE-CLiQ interface, the analog encoder signal is first converted into a digital signal in the drive system. For these motors as well as external encoders, the encoder signals must be connected to SINAMICS S120 via Sensor Modules.

Table 5- 2 Encoders for 1FT7 motors

Without DRIVE-CLiQ			With DRIVE-CLiQ			Absolute position within a rotation (single-turn)	Absolute position over 4096 revolutions (multi-turn)	Can be used for Safety Integrated Extended Functions
Encoders	Marking in the MLFB		Encoders	Marking in the MLFB				
-	-		AS24DQI	B		Yes	No	Yes
-	-		AM24DQI	C		Yes	Yes	Yes
AM2048S/R	M		AM22DQ	F		Yes	Yes	Yes
IC2048S/R	N		IC22DQ	D		No	No	Yes

Replacing an encoder

- General

For 1FT7 motors, the encoder module can be easily changed without having to re-adjust the encoder.

The motors concerned can be identified by the 14th position in the order number.

£Incremental encoders are referenced every time the system is started up.

NOTICE
Absolute value encoders must be referenced again after the encoder has been replaced.

- Motors with DRIVE-CLiQ

NOTICE
Motor data (electronic rating plate)
You must ensure that the new encoder contains the correct motor data. If it does not, the motor may perform uncontrolled motions, leading to considerable material damage.

You can purchase a preprogrammed encoder module from the Siemens Service Center by quoting the relevant order number and serial number. If your encoder module is not preprogrammed, it must be programmed with the correct motor data prior to use.

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

5.2.2 Encoder connection for motors with a DRIVE-CLiQ interface

Motors with DRIVE-CLiQ have an internal Sensor Module. This includes an electronic rating plate. This simplifies commissioning for the SINAMICS S120 drive system, since all the motor parameters are set automatically.

WARNING
Encoder modules with a DRIVE-CLiQ interface or Sensor Module contain motor and encoder-specific data as well as an electronic rating plate. This is why it may only be operated on the original motor - and must not be mounted onto other motors or replaced by modules from other motors. The contacts of the DRIVE-CLiQ interface have direct contact to components that can be damaged/destroyed by electrostatic discharge (ESDs). Neither hands nor tools that could be electrostatically charged should come into contact with the connections.

5.2.3 Encoder connection for motors without a DRIVE-CLiQ interface

Motors without an integrated DRIVE-CLiQ interface are connected via the 17-pin flange socket (see the section titled "Connection system").

5.2.4 Incremental encoders

Description

This encoder senses relative movements and does not supply absolute position information. In combination with evaluation logic, a zero point can be determined via the integrated reference mark, which can be used in turn to calculate the absolute position.

The encoder outputs sine and cosine signals. These can be interpolated using evaluation logic (usually 2048 points) and the direction of rotation can be determined. In the version with a DRIVE-CLiQ interface, this evaluation logic is already integrated in the encoder.

Function and technical data

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

Table 5- 3 Technical data for incremental encoders

Encoders	Code	Operating voltage	Max. current consumption	A-B track: Resolution incremental (sin/cos periods per revolution)	C-D track: Rotor/commutation position (sin/cos periods per revolution)	Angle error
without DRIVE-CLiQ interface						
Incremental encoder sin/cos 1 Vpp, 2048 S/R with C and D tracks	IC2048S/R	5 V ± 5%	140 mA	2048 S/R (1 Vpp)	1 S/R (1 Vpp)	± 40 "
with DRIVE-CLiQ interface						
Incremental encoder 22 bits (resolution 4,194,304, internal 2048 S/R) + commutation position 11 bits	IC22DQ	24 V	180 mA	4.194.304 (=22 bits)	2048 (=11 bits)	± 40 "

Mech. speed limit for all incremental encoders: 12000 rpm

Note: The "Single-turn absolute value encoders" are other encoders which can be used as incremental encoders in the SINAMICS drive system.

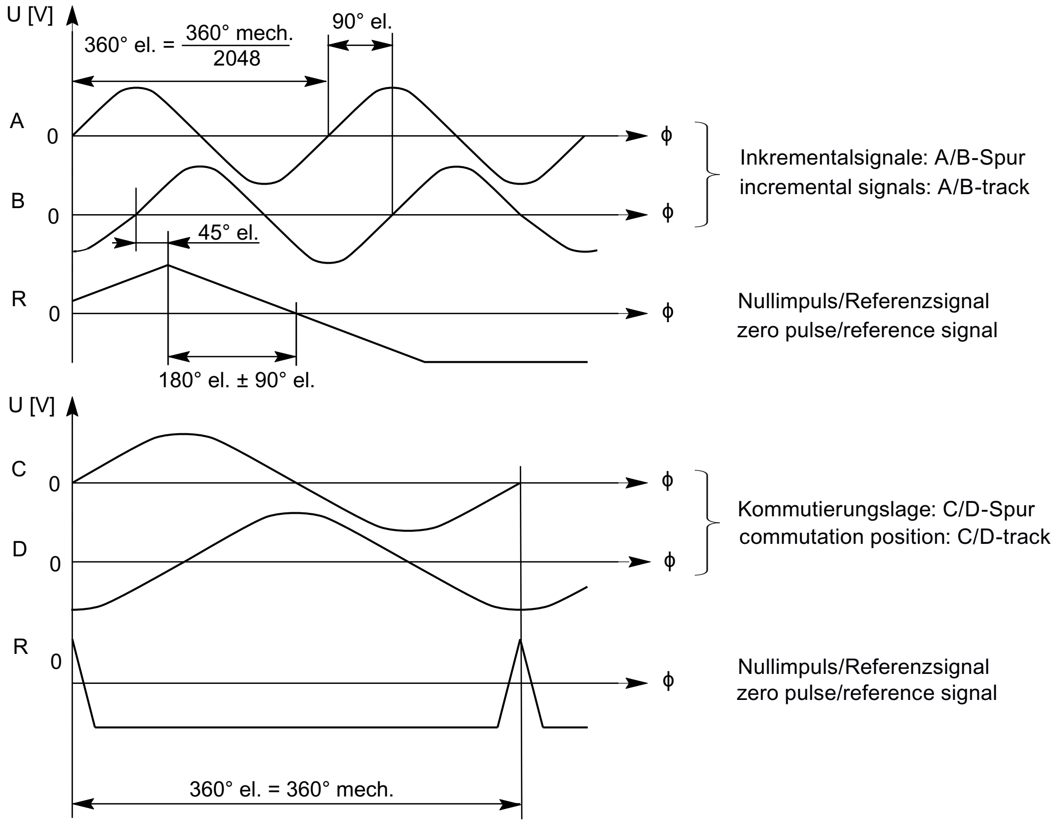


Figure 5-2 Signal sequence and assignment for encoder IC2048S/R without a DRIVE-CLiQ interface, for a positive direction of rotation

For encoder connection, pin assignment, and cables, refer to the section titled "Connection system"

5.2.5 Absolute encoder

Description: Multi-turn absolute value encoder

This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. Furthermore, an internal measuring gearbox enables it to differentiate 4096 rotations. So with a ball screw, for example, the absolute position of the slide can be determined over a long distance.

Description: Single-turn absolute value encoder

This encoder outputs an absolute angular position between 0° and 360° in the specified resolution. In contrast to the multi-turn absolute value encoder, it has no measuring gearbox and can therefore only supply the position value within one revolution. It does not have a traversing range.

Function and technical data

- Angular measuring system for the commutation
- Speed actual value sensing
- Indirect measuring system for absolute position determination within a revolution
- Indirect measuring system for absolute position determination within a traversing range of 4096 revolutions
- For multi-turn encoders: Indirect measuring system for absolute position determination within a traversing range
- Indirect incremental measuring system for position control loop

Table 5- 4 Technical data, absolute value encoder without DRIVE-CLiQ interface

Description	Code	Operating voltage	Max. current consumption	Absolute resolution (single-turn)	Traversing range (multi-turn)	A-B track: Incremental resolution (sin/cos periods per revolution)	Angle error
Serial absolute position interface: EnDat 2.1							
Absolute value encoder 2048 S/R, (4096 revolutions, multi-turn, with EnDat interface)	AM2048S/R	5 V ± 5%	200 mA	8192 (=13 bits)	4096 (=12 bits)	2048 S/R (1 Vpp)	±40"

Table 5- 5 Technical data, absolute value encoder with DRIVE-CLiQ interface

Description	Code	Operating voltage	Max. current consumption	Absolute resolution (single-turn)	Traversing range (multi-turn)	Angle error
Serial absolute position interface: DRIVE-CLiQ						
Absolute value encoder, single-turn, 24 bits	AS24DQI	24 V	110 mA	16,777,216 (=24 bits)	-	±40"
Absolute value encoder 24 bits + 12 bits multi-turn	AM24DQI	24 V	110 mA	16,777,216 (=24 bits)	4096 (=12 bits)	±40"
Absolute value encoder 22 bits + 12 bits multi-turn	AM22DQ	24 V		4,194,304 (=22 bits)	4096 (=12 bits)	±40"

Mech. speed limit for all absolute value encoders: 12000 rpm

Signal sequence and assignment of the A/B track; refer to Fig. "Incremental encoders".

5.3 Holding brake (option)

5.3.1 Properties

- The holding brake is used to clamp the motor shaft when the motor is at a standstill. The holding brake is **not** a working brake that is used to brake a motor that is still rotating.
- Restricted Emergency Stop operation is permissible. Up to 2000 braking operations can be executed with 300% rotor moment of inertia as external moment of inertia from a speed of 3000 RPM without the brake being subject to an inadmissible amount of wear. The specific highest switching work for each emergency braking operation may not be exceeded.
- The rated voltage of the holding brake is 24 VDC.

CAUTION

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

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

NOTICE

Motors with or without holding brake cannot be subsequently retrofitted!

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

5.3.2 Permanent-magnet brake

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

When 24 V DC rated voltage is connected to the brake, the solenoid – through which current flows – establishes an opposing field. As a result the force of the permanent magnets is neutralized and the brake opens without residual torque on account of the spring return. The permanent magnet brake has torsion-proof connection to the rotor of the motor. This is the reason that this brake is almost without any play.

CAUTION

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

5.3.3 Motor-side connection of the holding brake

In combination with the MOTION CONNECT power cable with integrated brake connection cable, the holding brake in the motor is intended for direct connection to the SINAMICS Motor Module. Since safe electrical isolation from the motor winding is guaranteed for the brake cable in the motor and the power cable is designed as an enforced insulation, no further protection circuits are required in this case.

5.3.4 Protective circuitry for the brake

The brake can be activated via an external power supply. Since safe electrical isolation from the motor winding is guaranteed for the brake cable in the motor and the power cable is designed as an enforced insulation, this can also be a PELV (PELV = protective extra low voltage) supply. The relay K1, located between coil and contact, must also have enforced insulation in order to protect the internal logic voltage.

In the case of an external activation, the brake has to be provided with a protective circuit (see Fig. "Suggested circuit for the external power supply"). This protective circuit avoids parasitic voltage peaks and guarantees the switching times indicated (see Table "Technical data of holding brakes used").

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

$\Delta U\ [V] = 0.042 \cdot (l/q) \cdot I_{brake}$

l = Cable length [m]

q = Brake core cross section [mm^2]

I_{brake}= Direct current of the brake [A]

CAUTION
In order to avoid overvoltages when shutting down and the possible negative impact on the plant or system environment, a protective circuit must be integrated into the feeder cable (see figure below)

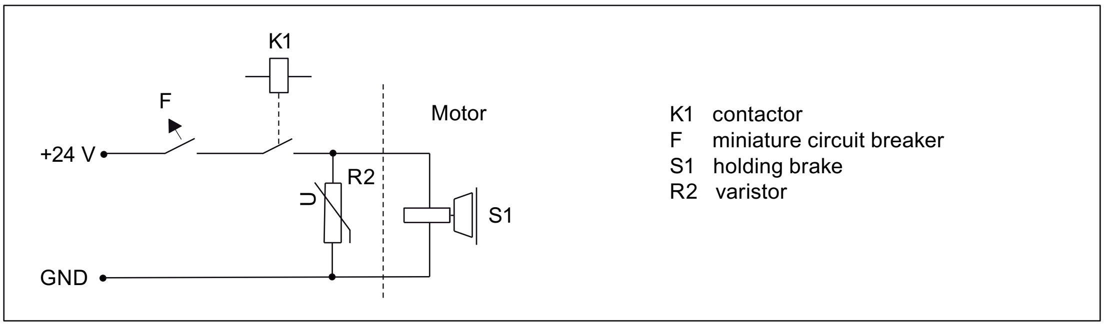


Figure 5-3 Suggested circuit for the external power supply with protective circuit

Table 5- 6 Example: Electronic components for the recommended circuit

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

5.3.5 Technical data of the holding brake

Table 5- 7 Technical data of the holding brakes used for 1FT7 motors

Motor type	Holding torque M_4 at 120 °C	Dyn. braking torque M_1	Direct current at 20 °C	Opening time with varistor	Closing time with varistor	Highest switching energy
	[Nm]	[Nm]	[A]	[ms]	[ms]	[J]
1FT703□	3	1.5	0.3	60	25	30
1FT704□	8	5	0.6	90	30	270
1FT706□	18	11	0.8	150	50	880
1FT708□	48	25	1.0	220	65	1900
1FT710□	85	35	1.6	250	70	5300

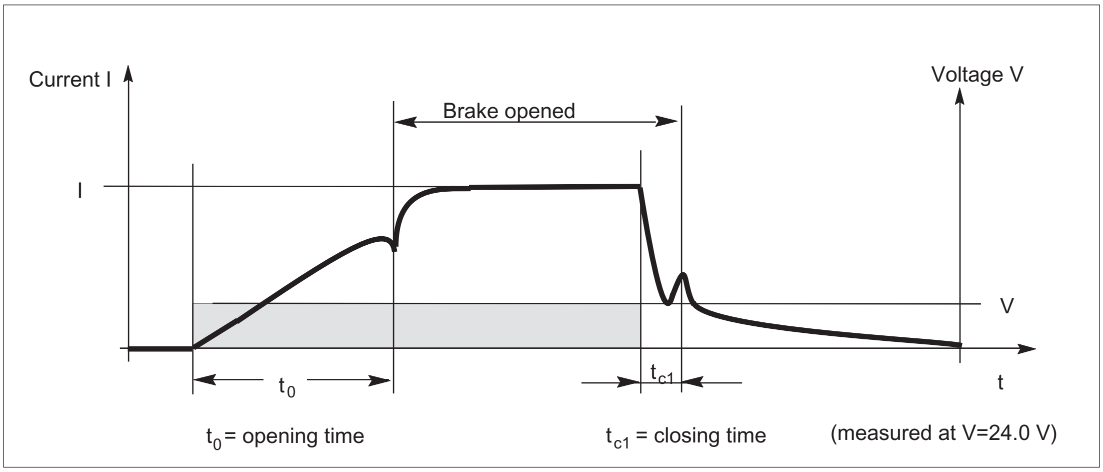


Figure 5-4 Terminology (time) for holding operation

Holding torque M_4

The holding torque M_4 is the highest permissible torque with which the closed brake can be loaded in steady-state operation without slip (holding function when motor is stationary).

Dynamic braking torque M_1

The dynamic braking torque M_1 is the smallest mean dynamic braking torque that can occur in emergency stop operation.

5.4 Gearbox

5.4.1 Dimensioning the gearbox

Overview

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

Dimensioning for S3 duty

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

$M_{Mot} = M_{out} / (i \bullet \eta_G)$

The motor and gearbox are assigned as follows: $M_{max,\ gear} \geq M_{0\ (100\ K)} \bullet i \bullet f$

$M_{max,\ gear}$	Max. permissible drive torque
$M_{0\ (100\ K)}$	Motor static torque
i	Gear ratio
f	Supplementary factor $f = f_1 \bullet f_2$

$f_1 = 2$		for motor accelerating torque	
$f_2 = 1$		for ≤1000 gearbox switching cycles / h	
$f_2 > 1$		for > 1000 switching cycles / h (refer to the gearbox catalog)	
	e.g.	$f_2 = 1.5$	for 3000 switching cycles / h
		$f_2 = 1.8$	for 5000 switching cycles / h
		$f_2 = 2.0$	for 8000 switching cycles / h

NOTICE
Switching cycles can also be superimposed vibration! The supplementary factor (f_2) is then not sufficient when dimensioning the gearbox and gearboxes may fail. The complete system should be optimized so that the higher-level vibration is minimized.

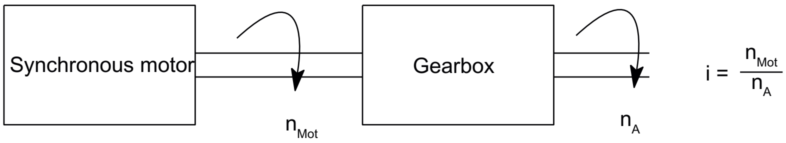


Figure 5-5 Gear ratio

The load torque and the required start-up velocity define the gearbox output torque, the output speed and therefore the output power.

The required drive power is calculated from this:

P_{out} [W] = P_{mot} [W] • η_G = (π/30) • M_{mot} [Nm] • n_{mot} [rpm] • η_G

Dimensioning for S1 duty

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

The required motor torque is calculated as follows:

$$M_{Mot} = \sqrt{\left(\frac{M_{ab}}{i \cdot \eta_G} + M_V\right)^2 - M_V^2} \quad \text{mit} \quad M_V = a \cdot b \cdot \frac{n_{Mot}}{60}(1 - \eta_G) \cdot \frac{k_T^2}{R_{Strw}}$$

M_{Mot}	Motor torque [Nm]
M_V	Calculated "torque loss" [Nm]
a	π/3 for 1FT7/1FK7 motors supplied with sinusoidal current
b	Weighting factor for gearbox losses (without dimensions); b = 0.5
η_G	Gearbox efficiency
i	Gearbox ratio (i > 1)
k_T	Torque constant [Nm/A]
M_{out}	Gearbox output torque [Nm]
n_A	Output speed of gearbox [rpm]
n_{Mot}	Motor speed [rpm]
R_{Strw}	Resistance when hot of the motor phase [Ω]; R_{Strw} = 1.4 • R_{Str} (see chapter headed "Technical data and characteristics")
P_{out}	Gearbox output power [W]
P_{Mot}	Motor power [W]
π	pi = 3.1416

Change to the characteristic when a gearbox is mounted

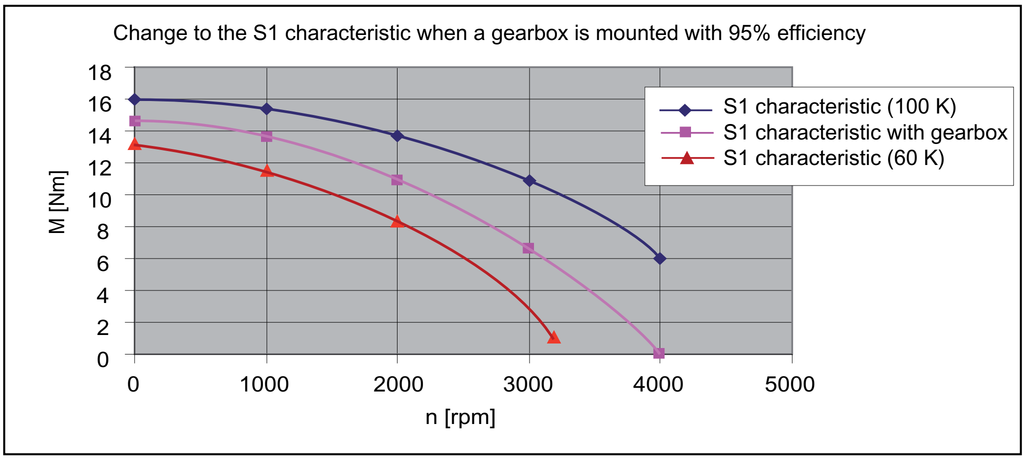


Figure 5-6 S1 characteristics (example)

Information for additional characteristics: $S1_{gearbox} = S1_{100\ K} - (S1_{100\ K} - S1_{60\ K}) / 2$

Starting behavior of a motor when a gearbox is mounted

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

5.4.2 Motors with planetary gearbox

Overview

1FT703❑ to 1FT710❑ motors can be supplied ex factory (Siemens AG) complete with a planetary gearbox. The gearboxes are flanged directly to the drive end of the motors.

When selecting the gearbox, ensure that its rated speed is not exceeded by the maximum speed of the motor. In the case of high operating frequencies, allowance must be made for the withstand ratio f_2. The frictional losses of the gearbox must always be taken into account when engineering geared drives.

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

Benefits

- High efficiency; single-stage: > 97 %, 2-stage: > 94 %
- Minimal torsional backlash; single-stage: ≤ 4 arcmin, 2-stage: ≤ 6 arcmin
- Power transmission from the central sun wheel via planet wheels
- No shaft deflections in the planet wheel set due to symmetrical force distribution
- Very low moment of inertia and thus short acceleration times of the motors
- The gearboxes are connected to the motor shaft via an integrated clamping hub A plain motor shaft end is necessary for this purpose. Shaft and flange accuracy tolerance N in accordance with DIN42955 and vibration magnitude grade A in accordance with EN 60034-14 are sufficient. The motor flange is adapted by means of adapter plates.
- Output shaft of gearbox exactly coaxial with the motor
- The gearboxes are sealed (seal between the gearbox and motor) and filled with oil at the factory. They are lubricated and sealed for their service life. The gearboxes are suitable for all mounting positions.
- Degree of protection of gearbox: IP65
- Small dimensions
- Low weight

Integration

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

The motor/gearbox combinations listed in the selection tables below are mainly intended for cyclic operation S3 - 60% (ON period ≤ 60% and ≤ 20 min). Reduced maximum motor speeds and output torques apply for use in S1 continuous duty (ON period > 60% or > 20 min). The gearbox temperature may not exceed 90 °C

1FT7 motors to be implemented as follows for mounting to a gearbox:

- Flange "1"
- Plain motor shaft extension
- Shaft and flange accuracy tolerance N
- Vibration severity grade A
- IP65 degree of protection

Selection and ordering data for single-stage planetary gear, SP+ series

Motor	Planetary gearbox single-stage			Available gear ratio i =				Motor speed, max. S3-60 %	Output torque, max. S3-60 %	Radial output shaft loading, max.[1)]	Axial output shaft loading, max.[1)]
Type	Type	Torsional backlash	Gearbox weight, approx.	4	5	7	10	n_{G1} (n_1)	M_{G2} (T_{2B})	F_r (F_{2Rmax})	F_a (F_{2Amax})
		arcmin	kg (lb)					rpm	Nm (lb_f-ft)	N (lb_f)	N (lb_f)
1FT7034	SP 060S-MF1	≤ 4	1.9 (4.2)	✔	✔	✔	–	6000	40 (29.5)	2700 (607)	2400 (540)
1FT7034	SP 075S-MF1	≤ 4	3.9 (8.6)	–	–	–	✔	6000	110 (81.1)	4000 (899)	3350 (753)
1FT7036				✔	✔	✔	✔		(90 for i = 10)		
1FT7042				✔	✔	✔	✔				
1FT7044				✔	✔	✔	✔				
1FT7046				✔	✔	✔	–				
1FT7046	SP 100S-MF1	≤ 3	7.7 (17.0)	–	–	–	✔	4500	300 (221)	6300 (1416)	5650 (1270)
1FT7062				✔	✔	✔	✔		(225 for i = 10)		
1FT7064				✔	✔	✔	✔				
1FT7065				✔	✔	✔	✔				
1FT7066				✔	✔	✔	✔				
1FT7067				✔	✔	✔	–				
1FT7068				✔	✔	✔	–				
1FT7067	SP 140S-MF1	≤ 3	17.2 (37.9)	–	–	–	✔	4000	600 (443)	9450 (2124)	9870 (2219)
1FT7068				–	–	–	✔		(480 for i = 10)		
1FT7082				✔	✔	✔	✔				
1FT7084				✔	✔	✔	✔				
1FT7085				✔	✔	✔	–				
1FT7086				✔	✔	✔	–				
1FT7087				✔	✔	–	–				
1FT7085	SP 180S-MF1	≤ 3	34 (75)	–	–	–	✔	3500	1100 (811)	14700 (3305)	14150 (3181)
1FT7086				–	–	–	✔		(880 for i = 10)		
1FT7087				–	–	✔	✔				
1FT7102				✔	✔	✔	✔				
1FT7105				✔	✔	✔	–				
1FT7108				✔	✔	✔	–				
1FT7105	SP 210S-MF1	≤ 3	56 (123)	–	–	–	✔	2500	2500 (1844) (2400 for i = 7 1900 for i = 10)	21000 (4721)	30000 (6744)
1FT7108				–	–	–	✔				
	Gear shaft			Order code							
	With fitted key			J02	J03	J05	J09				
	Without fitted key			J22	J23	J25	J29				

Preconditions:

With the following motor versions, SP+ planetary gearboxes can be mounted:

- Flange 1
- Plain motor shaft extension, shaft and flange accuracy tolerance N, without/with holding brake
- Vibration magnitude grade A/IP65 degree of protection

SP+ planetary gearbox can therefore only be ordered with these 1FT7 motors:
1FT7...-5..71-..G1
1FT7...-5..71-..H1
1FT7...-7..71-..G1
1FT7...-7..71-..H1

When ordering a motor with gearbox, -Z should be added to the order number.

Example:

1FT7042 motor without holding brake
with single-stage SP+ planetary gearbox
with i = 5 and gear shaft without fitted key.
1FT7042-5AF71-1NG1-Z
J23

Planetary gearbox with 1FT7 motor								
Single-stage Type	Gear ratio	Motor speed	Output torque	Moments of inertia of gearbox (referred to the drive)				
		Continuous duty S1 [1)]		1FT703.	1FT704.	1FT706.	1FT708.	1FT710.
		n_{N1}	M_{N2} (T_{2N})	J_1	J_1	J_1	J_1	J_1
		rpm	Nm	kgcm^2	kgcm^2	kgcm^2	kgcm^2	kgcm^2
			(lb_f-ft)	(lb_f-in^2)	(lb_f-in^2)	(lb_f-in^2)	(lb_f-in^2)	(lb_f-in^2)
SP 060S-MF1	4	3300	26 (19.2)	0.22 (0.08)	–	–	–	
	5	3300	26 (19.2)	0.20 (0.07)	–	–	–	
	7	4000	26 (19.2)	0.18 (0.06)	–	–	–	
SP 075S-MF1	4	2900	75 (55.3)	0.61 (0.21)	0.78 (0.27)	–	–	
	5	2900	75 (55.3)	0.51 (0.17)	0.68 (0.23)	–	–	
	7	3100	75 (55.3)	0.42 (0.14)	0.59 (0.20)	–	–	
	10	3100	52 (38.4)	0.38 (0.13)	0.54 (0.19)	–	–	
SP 100S-MF1	4	2500	180 (133)	–	–	3.04 (1.04)	–	
	5	2500	175 (129)	–	–	2.61 (0.89)	–	
	7	2800	170 (125)	–	–	2.29 (0.78)	–	
	10	2800	120 (88.5)	–	1.38 (0.47)	2.07 (0.71)	–	
SP 140S-MF1	4	2100	360 (266)	–	–	–	11.0 (3.76)	
	5	2100	360 (266)	–	–	–	9.95 (3.40)	
	7	2600	360 (266)	–	–	–	9.01 (3.08)	
	10	2600	220 (162)	–	–	5.28 (1.80)	8.44 (2.88)	
SP 180S-MF1	4	1500	750 (553)	–	–	–	–	33.9 (11.6)
	5	1500	750 (553)	–	–	–	–	27.9 (9.53)
	7	2300	750 (553)	–	–	–	–	22.2 (7.59)
	10	2300	750 (553)	–	–	–	19.2 (6.56)	19.2 (6.56)
SP 210S-MF1	10	2000	1000 (738)	–	–	–	–	53.1 (18.1)

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

Selection and ordering data for two-stage planetary gear, SP+ series

Planetary gearbox with 1FT7 motor								
Two-stage Type	Gear ratio	Motor speed	Output torque	Moments of inertia of gearbox (referred to the drive)				
		Continuous duty S1 [1)]		1FT703 .	1FT704.	1FT706.	1FT708.	1FT710.
		n_{N1} rpm	M_{N2} (T_{2N}) Nm (lb_f-ft)	J_1 kgcm² (lb_f-in²)	J_1 kgcm² (lb_f-in²)	J_1 kgcm² (lb_f-in²)	J_1 kgcm² (lb_f-in²)	J_1 kgcm² (lb_f-in²)
SP 075S-MF2	16	3500	75 (55.3)	0.23 (0.08)	0.55 (0.19)	–	–	–
	20	3500	75 (55.3)	0.20 (0.07)	–	–	–	–
	28	3500	75 (55.3)	0.18 (0.06)	–	–	–	–
SP 100S-MF2	16	3100	180 (133)	–	0.81 (0.28)	2.18 (0.75)	–	–
	20	3100	180 (133)	0.54 (0.19)	0.70 (0.24)	2.07 (0.71)	–	–
	28	3100	180 (133)	0.43 (0.15)	0.60 (0.21)	–	–	–
	40	3100	180 (133)	0.38 (0.13)	0.55 (0.19)	–	–	–
	50	3500	175 (129)	0.38 (0.13)	0.54 (0.19)	–	–	–
SP 140S-MF2	16	2900	360 (265)	–	–	3.19 (1.09)	10.3 (3.52)	–
	20	2900	360 (265)	–	–	2.71 (0.93)	9.77 (3.34)	–
	28	2900	360 (265)	–	1.65 (0.56)	2.34 (0.80)	–	–
	40	2900	360 (265)	–	1.40 (0.48)	2.10 (0.72)	–	–
	50	3200	360 (265)	–	1.39 (0.48)	2.08 (0.71)	–	–
SP 180S-MF2	16	2700	750 (553)	–	–	–	12.4 (4.24)	13.5 (4.61)
	20	2700	750 (553)	–	–	–	10.9 (3.73)	12.0 (4.10)
	28	2700	750 (553)	–	–	6.32 (2.16)	9.48 (3.24)	–
	40	2700	750 (553)	–	–	5.51 (1.88)	8.67 (2.96)	–
	50	2900	750 (553v	–	–	5.45 (1.86)	8.61 (2.94)	–
SP 210S-MF2	16	2500	1500 (1106)	–	–	–	–	34.5 (11.8)
	20	2500	1500 (1106)	–	–	–	–	31.5 (10.8)
	28	2500	1500 (1106)	–	–	–	30.0 (10.3)	30.0 (10.3)
	40	2500	1500 (1106)	–	–	–	28.5 (9.74)	–
	50	2500	1500 (1106)	–	–	–	28.3 (9.67)	–
SP 240S-MF2	20	2500	2500 (1844)	–	–	–	–	34.6 (11.8)
	28	2500	2500 (1844)	–	–	–	–	30.5 (10.4)
	40	2500	2500 (1844)	–	–	–	–	28.2 (9.64)
	50	2500	2500 (1844)	–	–	–	27.9 (9.53)	27.9 (9.53)

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

Planetary gearbox with 1FT7 motor								
Two-stage Type	Gear ratio	Motor speed	Output torque	Moments of inertia of gearbox (referred to the drive)				
		Continuous duty S1 [1)]		1FT703 .	1FT704.	1FT706.	1FT708.	1FT710.
		n_{N1}	M_{N2} (T_{2N})	J_1	J_1	J_1	J_1	J_1
		rpm	Nm (lb$_f$-ft)	kgcm^2 (lb$_f$-in^2)	kgcm^2 (lb$_f$-in^2)	kgcm^2 (lb$_f$-in^2)	kgcm^2 (lb$_f$-in^2)	kgcm^2 (lb$_f$-in^2)
SP 075S-MF2	16	3500	75 (55.3)	0.23 (0.08)	0.55 (0.19)	–	–	–
	20	3500	75 (55.3)	0.20 (0.07)	–	–	–	–
	28	3500	75 (55.3)	0.18 (0.06)	–	–	–	–
SP 100S-MF2	16	3100	180 (133)	–	0.81 (0.28)	2.18 (0.75)	–	–
	20	3100	180 (133)	0.54 (0.19)	0.70 (0.24)	2.07 (0.71)	–	–
	28	3100	180 (133)	0.43 (0.15)	0.60 (0.21)	–	–	–
	40	3100	180 (133)	0.38 (0.13)	0.55 (0.19)	–	–	–
	50	3500	175 (129)	0.38 (0.13)	0.54 (0.19)	–	–	–
SP 140S-MF2	16	2900	360 (265)	–	–	3.19 (1.09)	10.3 (3.52)	–
	20	2900	360 (265)	–	–	2.71 (0.93)	9.77 (3.34)	–
	28	2900	360 (265)	–	1.65 (0.56)	2.34 (0.80)	–	–
	40	2900	360 (265)	–	1.40 (0.48)	2.10 (0.72)	–	–
	50	3200	360 (265)	–	1.39 (0.48)	2.08 (0.71)	–	–
SP 180S-MF2	16	2700	750 (553)	–	–	–	12.4 (4.24)	13.5 (4.61)
	20	2700	750 (553)	–	–	–	10.9 (3.73)	12.0 (4.10)
	28	2700	750 (553)	–	–	6.32 (2.16)	9.48 (3.24)	–
	40	2700	750 (553)	–	–	5.51 (1.88)	8.67 (2.96)	–
	50	2900	750 (553v	–	–	5.45 (1.86)	8.61 (2.94)	–
SP 210S-MF2	16	2500	1500 (1106)	–	–	–	–	34.5 (11.8)
	20	2500	1500 (1106)	–	–	–	–	31.5 (10.8)
	28	2500	1500 (1106)	–	–	–	30.0 (10.3)	30.0 (10.3)
	40	2500	1500 (1106)	–	–	–	28.5 (9.74)	–
	50	2500	1500 (1106)	–	–	–	28.3 (9.67)	–
SP 240S-MF2	20	2500	2500 (1844)	–	–	–	–	34.6 (11.8)
	28	2500	2500 (1844)	–	–	–	–	30.5 (10.4)
	40	2500	2500 (1844)	–	–	–	–	28.2 (9.64)
	50	2500	2500 (1844)	–	–	–	27.9 (9.53)	27.9 (9.53)

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

5.5 Brake resistances (armature short-circuit braking)

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

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

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

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

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

The optimum braking torque of the servomotor in regenerative operation can be obtained using armature short-circuit with a matching external resistor circuit.

Possible ordering address: http://www.frizlen.com

Note

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

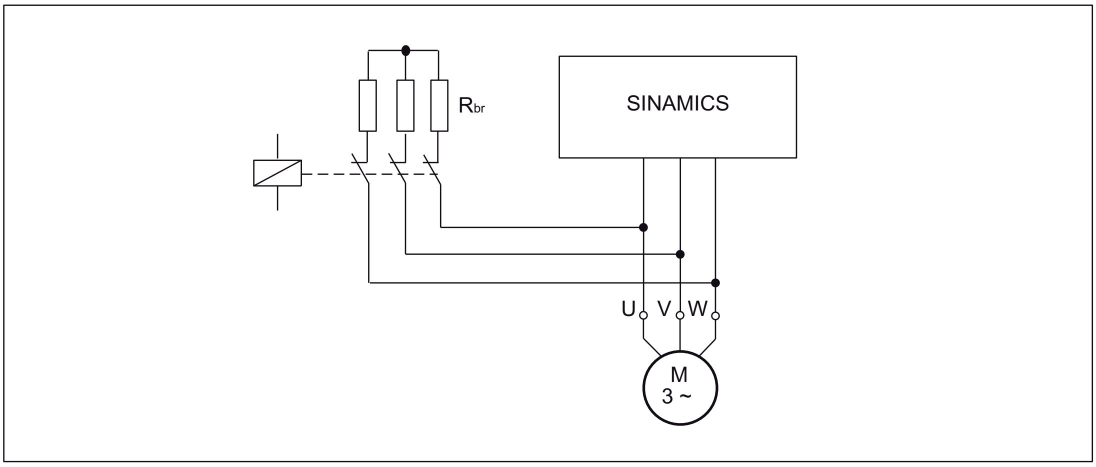


Figure 5-7 Circuit (schematic) with brake resistors

Rating

The ratings of the resistors must match the particular I^2t load capability. The resistors can be dimensioned so that a surface temperature of 300° C can occur briefly (max. 500 ms). In order to prevent the resistors from being destroyed, braking from the rated speed can occur max. every 2 minutes. Other braking cycles must be specified when ordering the resistors. The external moment of inertia and the intrinsic motor moment of inertia are decisive when dimensioning these resistors.

The kinetic energy must be specified when ordering in order to determine the resistor rating.

$$W = \frac{1}{2} \cdot J \cdot \omega^2$$

$$\omega = \frac{2 \cdot \pi}{60} \cdot n$$

W = kinetic energy [Ws]
J = Moment of inertia [kgm^2]
ω = Angular speed [s^{-1}]
n = Speed [rpm]

Calculating the braking time

Braking time: $t_B = \frac{J_{tot} \cdot n}{9.55 \cdot M_B}$

Moment of inertia: $J_{tot} = J_{mot} + J_{external}$

t_B = Braking time [s]
n = operating speed [rpm]
M_B = average braking torque [Nm]
J_{tot} = moment of inertia [kgm^2]
J_{mot} = motor moment of inertia [kgm^2]
$J_{external}$ = external moment of inertia [kgm^2]

NOTICE
When determining the run-on distance, the friction (taken into account as allowance in M_B) of the mechanical transmission elements and the switching delay times of the contactors must be taken into consideration. In order to prevent mechanical damage, mechanical end stops should be provided at the end of the absolute traversing range of the machine axes.

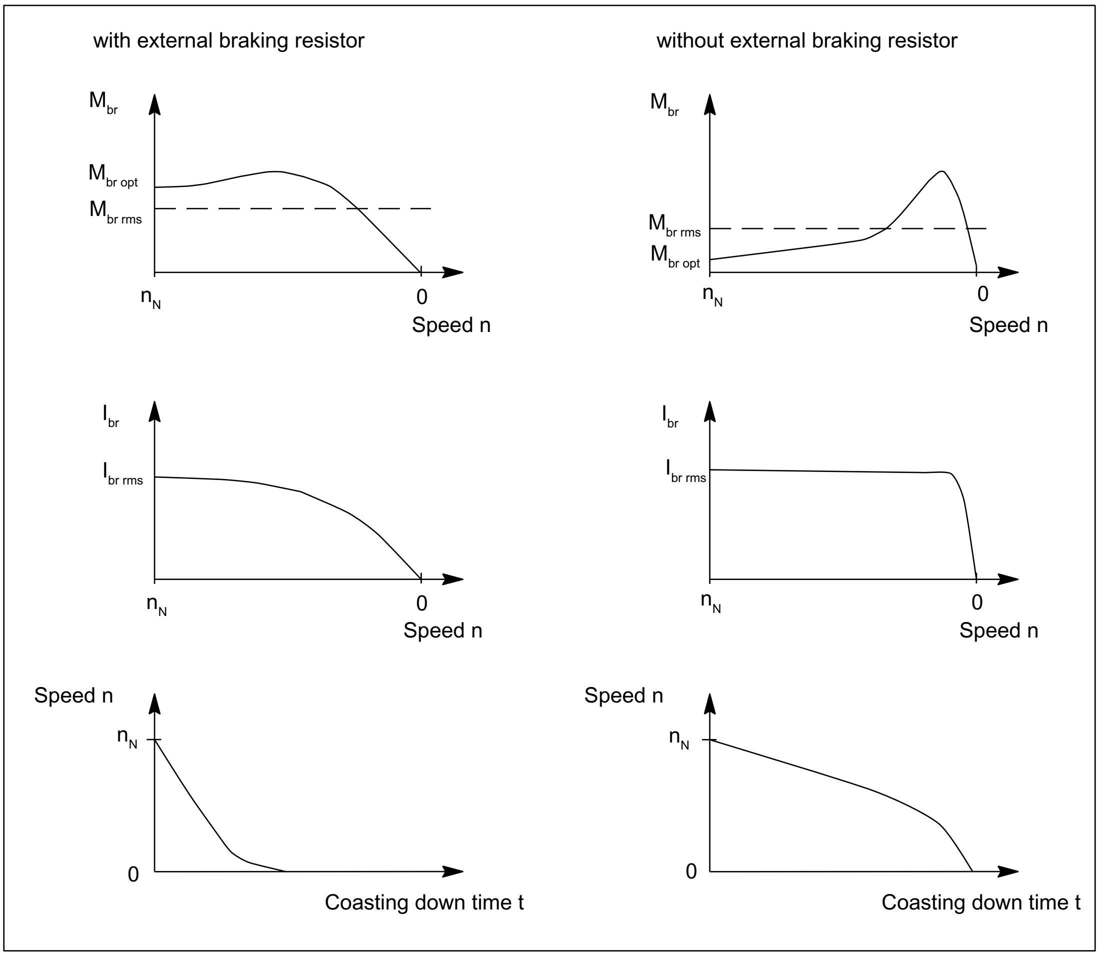


Figure 5-8 Armature short-circuit braking

Dimensioning of braking resistors

The correct dimensioning ensures an optimum braking time. The braking torques which are obtained are also listed in the tables. The data applies for braking from the rated speed and moment of inertia $J_{external} = J_{Mot}$. If the drive is braked from another speed, then the braking time cannot be proportionally reduced. However, longer braking times cannot occur if the speed at the start of braking is less than the rated speed.

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

1FT7 Compact, natural cooling

Table 5- 8 Armature short-circuit braking with/without external braking resistors

Motor type	External braking resistor R_{opt} [Ω]	Average braking torque $M_{Br\ eff}$ [Nm]		Max. braking torque $M_{Br\ max}$ [Nm]	Effective braking current $I_{Br\ eff}$ [A]	
		Without external braking resistor	With external braking resistor		Without external braking resistor	With external braking resistor
1FT7034-□AK7	6.7	2.0	3.0	3.8	9.2	8.3
1FT7036-□AF7	4.2	3.2	5.0	6.2	15.1	13.7
1FT7042-□AF7	6.6	3.3	4.3	5.4	7.4	6.7
1FT7042-□AK7	5.0	2.5	4.5	5.6	13.8	12.4
1FT7044-□AF7	4.8	7.4	10.0	12.5	13.4	12.2
1FT7044-□AK7	3.3	4.6	9.5	11.8	24.9	22.3
1FT7046-□AF7	3.6	9.7	13.7	17.0	18.3	16.6
1FT7046-□AH7	1.6	8.0	13.7	17.0	35.9	32.3
1FT7062-□AF7	10.4	1.9	4.4	5.4	6.9	6.2
1FT7062-□AK7	5.0	1.2	4.4	5.4	14.6	13.1
1FT7064-□AF7	7.0	3.0	7.3	9.1	11.0	9.9
1FT7064-□AK7	6.1	1.9	7.3	9.1	17.2	15.4
1FT7066-□AF7	3.8	4.3	10.7	13.3	17.9	16.0
1FT7066-□AH7	2.5	2.9	10.2	12.7	27.1	24.2
1FT7068-□AF7	4.5	5.7	14.9	18.5	19.6	17.6
1FT7082-□AC7	9.6	4.0	9.2	11.4	8.5	7.6
1FT7082-□AF7	6.7	3.0	9.2	11.4	12.8	11.5
1FT7082-□AH7	3.9	2.3	9.3	11.5	20.9	18.7
1FT7084-□AC7	3.9	6.8	16.4	20.4	17.9	16.0
1FT7084-□AF7	4.4	4.9	16.5	20.5	21.3	19.1
1FT7084-□AH7	3.2	3.7	16.2	20.1	30.4	27.2
1FT7086-□AC7	4.0	9.1	23.8	29.6	21.5	19.3
1FT7086-□AF7	2.9	7.2	23.8	29.6	31.4	28.1

Motor type	External braking resistor R_{opt} [Ω]	Average braking torque $M_{Br\ eff}$ [Nm]		Max. braking torque $M_{Br\ max}$ [Nm]	Effective braking current $I_{Br\ eff}$ [A]	
		Without external braking resistor	With external braking resistor		Without external braking resistor	With external braking resistor
1FT7086-□AH7	2.2	5.1	23.5	29.2	44.1	39.4
1FT7102-□AB7	4.3	11.5	27.4	34.0	19.0	17.0
1FT7102-□AC7	2.9	9.7	27.3	34.0	27.0	24.2
1FT7102-□AF7	2.3	7.4	27.6	34.3	38.4	34.4
1FT7105-□AB7	2.4	18.1	50.8	63.1	35.1	31.5
1FT7105-□AC7	2.1	14.4	51.1	63.5	44.3	39.7
1FT7105-□AF7	1.7	10.5	49.9	61.9	59.9	53.6
1FT7108-□AB7	2.2	23.9	71.6	89.0	44.4	39.8
1FT7108-□AC7	1.5	20.7	72.5	90.1	62.2	55.7
1FT7108-□AF7	1.3	15.9	70.7	87.9	83.0	74.3

1FT7 Compact, forced ventilation

Table 5- 9 Armature short-circuit braking with/without external braking resistors

Motor type	External braking resistor R_{opt} [Ω]	Average braking torque $M_{Br\ eff}$ [Nm]		Max. braking torque $M_{Br\ max}$ [Nm]	Effective braking current $I_{Br\ eff}$ [A]	
		Without external braking resistor	With external braking resistor		Without external braking resistor	With external braking resistor
1FT7084-5SC7	2.5	7	18	22	23	21
1FT7084-5SF7	2.0	6	18	22	33	29
1FT7084-5SH7	1.6	4	17	20	44	39
1FT7086-5SC7	2.1	9	24	29	30	27
1FT7086-5SF7	2.2	5	24	29	44	39
1FT7086-5SH7	1.6	5	24	29	53	47
1FT7105-5SC7	1.3	15	50	62	56	50
1FT7105-5SF7	0.9	12	50	62	81	73
1FT7108-5SC7	1.1	19	69	86	70	63
1FT7108-5SF7	0.8	15	71	88	103	92

1FT7 Compact, liquid cooling

Table 5- 10 Armature short-circuit braking with/without external braking resistors

Motor type	External braking resistor R_{opt} [Ω]	Average braking torque $M_{Br\ eff}$ [Nm]		Max. braking torque $M_{Br\ max}$ [Nm]	Effective braking current $I_{Br\ eff}$ [A]	
		Without external braking resistor	With external braking resistor		Without external braking resistor	With external braking resistor
1FT7062-5WF7	5.5	3.2	6.6	8.2	11.5	10.3
1FT7062-5WK7	4.2	2.0	6.6	8.2	19.3	17.3
1FT7064-5WF7	3.3	4.8	10.9	13.6	19.3	17.3
1FT7064-5WK7	2.4	3.2	11.0	13.7	33.2	29.7
1FT7066-5WF7	2.7	6.7	15.3	19.0	25.5	22.9
1FT7066-5WH7	2.1	5.1	15.6	19.4	36.5	32.7
1FT7068-5WF7	2.1	10.6	24.0	29.8	36.1	32.4
1FT7082-5WC7	3.0	8.3	16.0	19.8	19.4	17.5
1FT7082-5WF7	2.2	6.6	16.1	19.9	29.0	26.0
1FT7082-5WH7	1.5	5.0	16.0	19.9	44.2	39.5
1FT7084-5WC7	2.2	12.3	27.0	33.5	30.4	27.2
1FT7084-5WF7	1.8	9.5	26.6	33.1	42.1	37.7
1FT7084-5WH7	1.2	7.3	26.6	33.1	62.4	55.9
1FT7086-5WC7	1.6	16.7	37.7	46.9	41.6	37.3
1FT7086-5WF7	1.2	13.0	38.0	47.2	62.0	55.5
1FT7086-5WH7	1.3	10.2	37.8	47.0	73.8	66.0
1FT7102-5WB7	1.8	21.1	44.1	54.8	36.9	33.1
1FT7102-5WC7	1.2	17.6	43.9	54.6	53.1	47.6
1FT7102-5WF7	0.7	13.6	44.2	54.9	85.0	76.1
1FT7105-5WB7	1.1	39.0	89.6	111	67.9	60.8
1FT7105-5WC7	0.8	32.3	89.3	111	93.8	83.9
1FT7105-5WF7	0.7	25.6	89.1	111	127	114
1FT7108-5WB7	0.8	54.0	127	158	95.3	85.4
1FT7108-5WC7	0.8	45.0	128	159	112	100
1FT7108-5WF7	0.6	36.1	128	159	163	145

1FT7 High Dynamic, forced ventilation

Table 5- 11 Armature short-circuit braking with/without external braking resistors

Motor type	External braking resistor R_{opt} [Ω]	Average braking torque $M_{Br\ eff}$ [Nm]		Max. braking torque $M_{Br\ max}$ [Nm]	Effective braking current $I_{Br\ eff}$ [A]	
		Without external braking resistor	With external braking resistor		Without external braking resistor	With external braking resistor
1FT7065-7SF7	3.4	3.5	8	10	17	15
1FT7065-7SH7	2.9	2.5	8	10	23	21
1FT7067-7SF7	2.4	4.5	11	14	24	21
1FT7067-7SH7	2.3	3.5	11	14	30	27
1FT7085-7SF7	1.8	4.5	18	22	34	31
1FT7085-7SH7	1.5	3.5	17	22	47	42
1FT7087-7SF7	1.2	7.0	26	32	51	45
1FT7087-7SH7	1.5	5.0	25	31	55	49

1FT7 High Dynamic, liquid cooling

Table 5- 12 Armature short-circuit braking with/without external braking resistors

Motor type	External braking resistor R_{opt} [Ω]	Average braking torque $M_{Br\ eff}$ [Nm]		Max. braking torque $M_{Br\ max}$ [Nm]	Effective braking current $I_{Br\ eff}$ [A]	
		Without external braking resistor	With external braking resistor		Without external braking resistor	With external braking resistor
1FT7065-7WF7	3.4	3.5	8	10	17	15
1FT7065-7WH7	2.9	2.5	8	10	23	21
1FT7067-7WF7	2.4	4.5	11	14	24	21
1FT7067-7WH7	2.3	3.5	11	14	30	27
1FT7085-7WF7	1.8	4.5	18	22	34	31
1FT7085-7WH7	1.1	3.5	17	21	55	49
1FT7087-7WF7	1.2	7.0	26	32	51	45
1FT7087-7WH7	1.1	5.0	26	32	67	60

Connection system

6

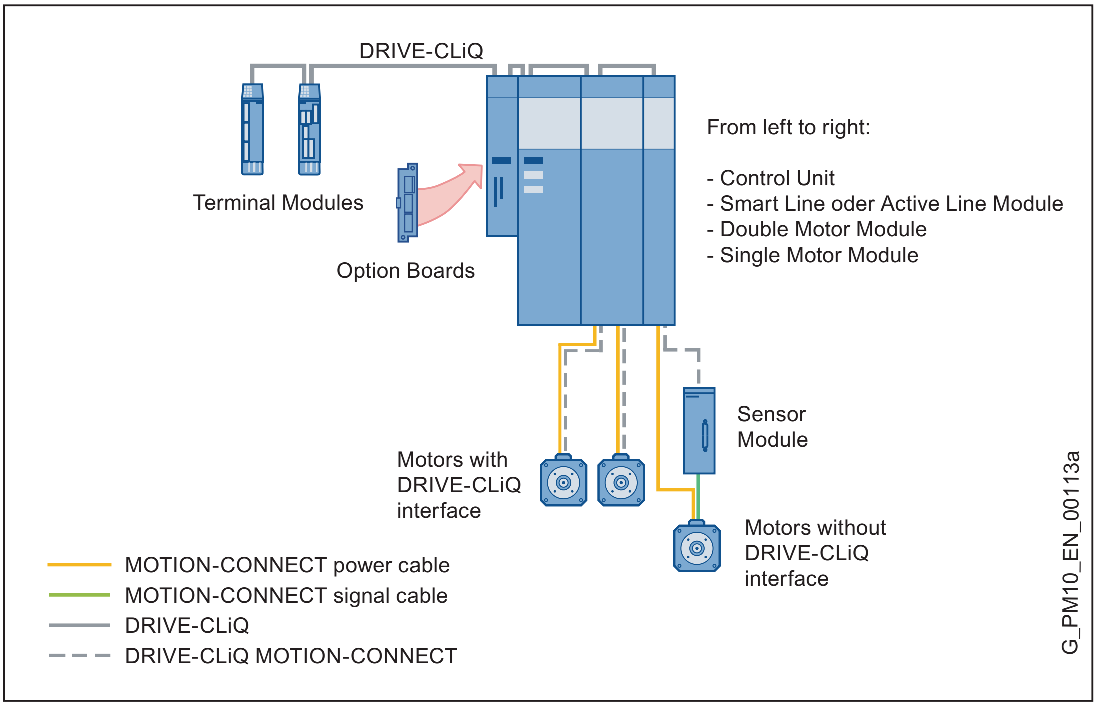


Figure 6-1 SINAMICS S120 system overview

6.1 Power connection

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

Connector types

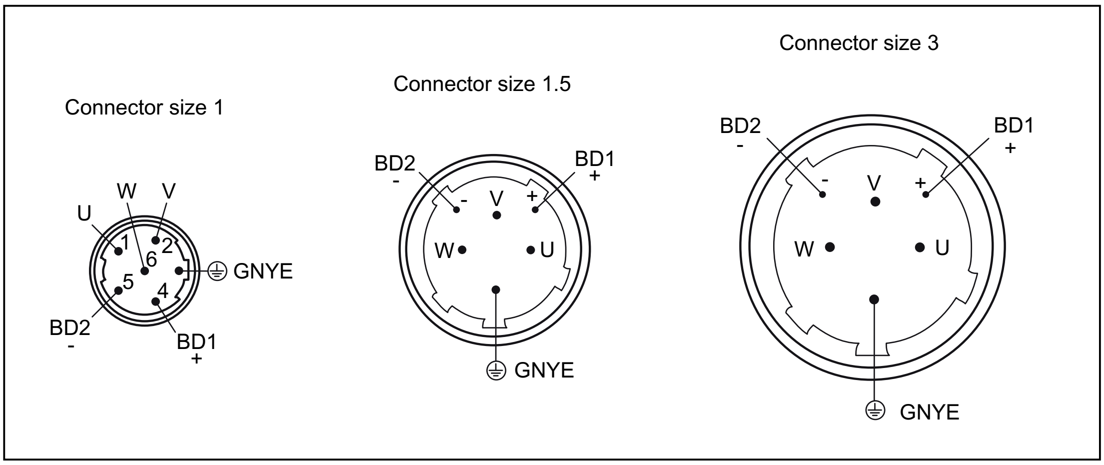


Figure 6-2 Power connector

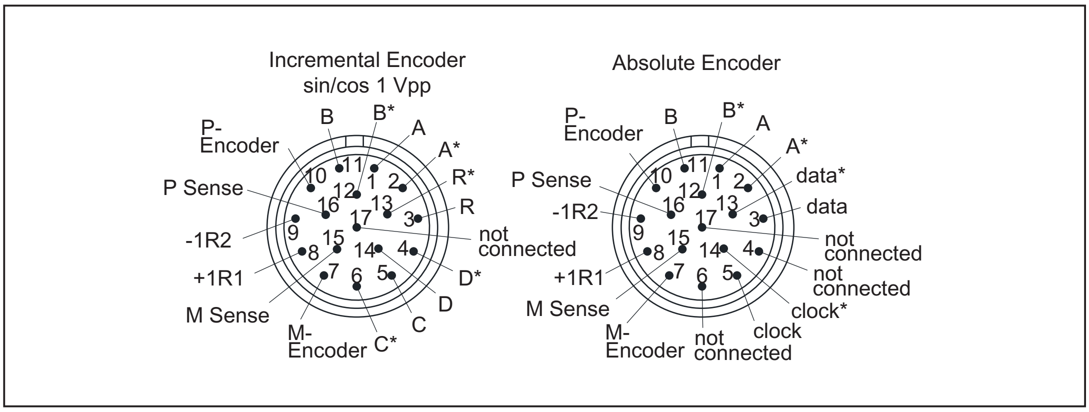


Figure 6-3 Signal connector (motor without DRIVE-CLiQ interface)

Power connection via terminal box

- The terminal assignment in the terminal box must be implemented according to the diagram.
- The PE conductor must be connected.
- Cable lugs must be used in accordance with DIN 46234.
- Connect optional brake (see figure).

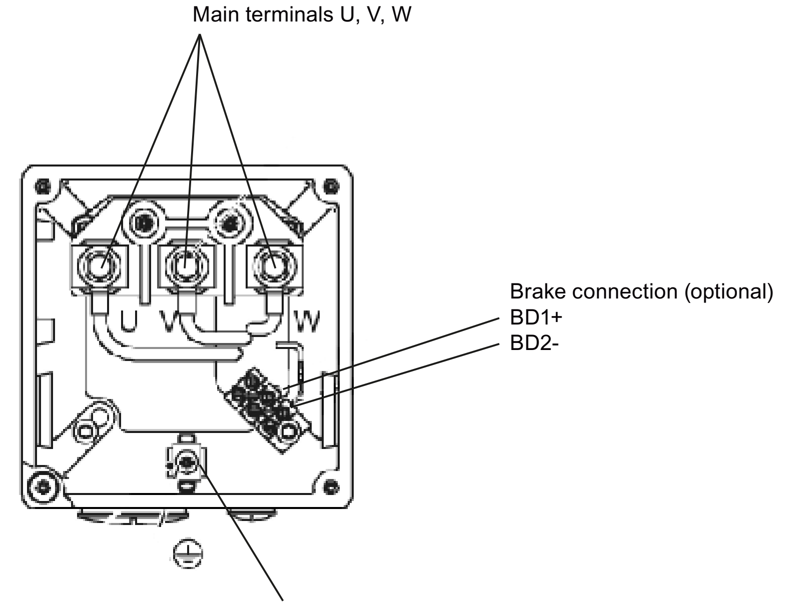


Figure 6-4 Terminal box gk230

Table 6- 1 Connections for terminal box

Terminal box type	gk230
Cable entry	1 x PG 29 / 1 x PG 9
Max. outer cable diameter 1)	30 mm
RMS current per terminal 2)	66 A
Nuber of main terminals U, V, W	3 x M5
Max. cross-section per terminal	1 x 16 mm^2
Ground connection	M4
Tightening torque [Nm]	0.8 - 1.2
Brake connection 3)	1.5 mm^2

1) Dependent on the seal used

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

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

Connecting-up information

⚠ WARNING
Before carrying out any work on the AC motor, please ensure that it is powered-down and the system is locked-out so that the motor cannot re-start! Please observe the data on the rating plate (type plate) and the circuit diagram in the terminal box.

Note

The overall system compatibility is only guaranteed when using shielded power cables.

Shields must be incorporated in the protective grounding concept. Protective ground should be connected to conductors that are open-circuit and that are not being used and also electrical cables that can be touched. If the brake feeder cables in the SIEMENS cable accessories are not used, then the brake conductor cores and shields must be connected to the cabinet ground (open-circuit cables result in capacitive charges!).

Note the following information regarding connections:

- Twisted or three-core cables with additional ground conductor should be used as motor feeder cables. The insulation should be removed from the ends of the conductors so that the remaining insulation extends up to the cable lug or terminal.
- The connecting cables should be freely arranged in the terminal box so that the protective conductor has an overlength and the cable conductor insulation cannot be damaged. Connecting cables should be appropriately strain relieved.
- Please ensure that the following minimum air distances are maintained: Supply voltages up to 500 V: Minimum air distance 4.5 mm
- After connecting up, the following should be checked:
  - The inside of the terminal box must be clean and free of any cable pieces
  - All of the terminal screws must be tight
  - The minimum air distances must be maintained
  - The cable glands must be reliably sealed
  - Unused cable glands must be closed and the plugs must be tightly screwed in place
  - All of the sealing surfaces must be in a perfect condition

Current-carrying capacity for power and signal cables

The current-carrying capacity of PVC/PUR-insulated copper cables is specified for routing types B1, B2 and C under continuous operating conditions in the table with reference to an ambient air temperature of 40 °C. For other ambient temperatures, the values must be corrected by the factors from the "Derating factors" table.

Table 6- 2 Cable cross section and current-carrying capacity

Cross section	Current-carrying capacity rms; AC 50/60 Hz or DC for routing type		
[mm²]	B1 [A]	B2 [A]	C [A]
Electronics (according to EN 60204-1)			
0.20	-	4.3	4.4
0.50	-	7.5	7.5
0.75	-	9	9.5
Power (according to EN 60204-1)			
0.75	8.6	8.5	9.8
1.00	10.3	10.1	11.7
1.50	13.5	13.1	15.2
2.50	18.3	17.4	21
4	24	23	28
6	31	30	36
10	44	40	50
16	59	54	66
25	77	70	84
35	96	86	104
50	117	103	125
70	149	130	160
95	180	165	194
120	208	179	225
Power (according to IEC 60364-5-52)			
150	-	-	259 1)
185	-	-	296 1)
> 185	Values must be taken from the standard		

1) Extrapolated values

Table 6- 3 Derating factors for power and signal cables

Ambient air temperature [°C]	Derating factor according to EN 60204-1 Table D1
30	1.15
35	1.08
40	1.00
45	0.91
50	0.82
55	0.71
60	0.58

6.2 Signal connection

DRIVE-CLiQ is the preferred method for connecting the encoder systems to SINAMICS.

Motors with a DRIVE-CLiQ interface can be ordered for this purpose. Motors with a DRIVE-CLiQ interface can be directly connected to the associated motor module via the available MOTION-CONNECT DRIVE-CLiQ cables. The MOTION-CONNECT DRIVE-CLiQ cable is connected to the motor in degree of protection IP67. The DRIVE-CLiQ interface supplies power to the motor encoder via the integrated 24 VDC supply and transfers the motor encoder and temperature signals and the electronic type plate data, e.g. a unique identification number, rating data (voltage, current, torque) to the control unit. The MOTION-CONNECT DRIVE-CLiQ cable is used universally for connecting the various encoder types. These motors simplify commissioning and diagnostics, as the motor and encoder type are identified automatically.

Encoder connection on motors with DRIVE-CLiQ

Motors with DRIVE-CLiQ can be directly connected to the corresponding Motor Module via the available DRIVE-CLiQ cables (MOTION-CONNECT). This data is transferred directly to the Control Unit.

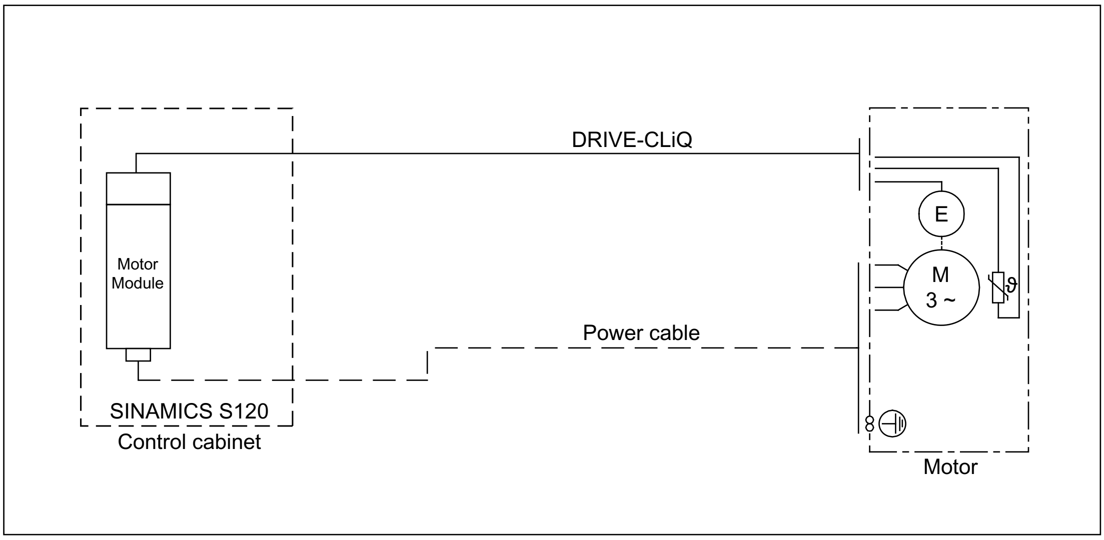


Figure 6-5 Encoder interface with DRIVE-CLiQ

Cables on motors with DRIVE-CLiQ

With DRIVE-CLiQ, the same cable is used for all encoder types. Only prefabricated cables from Siemens (MOTION-CONNECT) may be used.

Table 6- 4 Prefabricated cable

6FX	□	002	-	□DC□□	-	□□□	0
	↓					↓ ↓ ↓	
	↓					Length	
	5 MOTION-CONNECT 500					max. cable length 100 m	
	8 MOTION-CONNECT 800					max. cable length 50 m	

Encoder connection on motors without DRIVE-CLiQ

If a motor is not equipped with a DRIVE-CLiQ interface, the speed encoder and temperature sensor are connected via a signal connector.

Motors without DRIVE-CLiQ require a Sensor Module Cabinet (SMC) for operation with a SINAMICS S120 drive system. The motor is connected to the SMC via a signal line. The SMC is connected to the Motor Module via a DRIVE-CLiQ cable (MOTION-CONNECT).

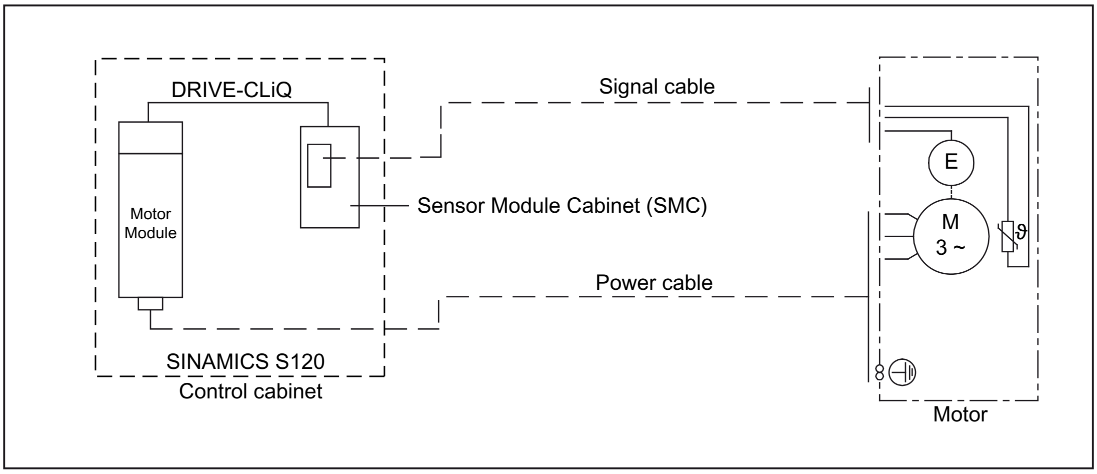
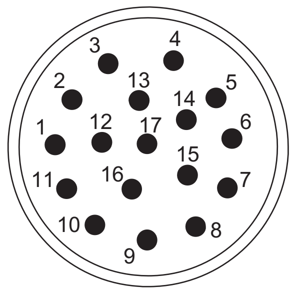


Figure 6-6 Encoder interface without DRIVE-CLiQ

Encoder without DRIVE-CLiQ

Table 6- 5 Pin assignment for 17-pin angle plug with pin contacts

<table>
<tr><th>PIN No.</th><th>Incremental encoder IC2048S/R</th><th>Absolute encoder AM2048S/R</th><th></th></tr>
<tr><td>1</td><td>A</td><td>A</td><td rowspan="17">

When viewing the plug-in side (pins)</td></tr>
<tr><td>2</td><td>A*</td><td>A*</td></tr>
<tr><td>3</td><td>R</td><td>data</td></tr>
<tr><td>4</td><td>D*</td><td>not connected</td></tr>
<tr><td>5</td><td>C</td><td>clock</td></tr>
<tr><td>6</td><td>C*</td><td>not connected</td></tr>
<tr><td>7</td><td>M encoder</td><td>M encoder</td></tr>
<tr><td>8</td><td>+1R1</td><td>+1R1</td></tr>
<tr><td>9</td><td>–1R2</td><td>–1R2</td></tr>
<tr><td>10</td><td>P encoder</td><td>P encoder</td></tr>
<tr><td>11</td><td>B</td><td>B</td></tr>
<tr><td>12</td><td>B*</td><td>B*</td></tr>
<tr><td>13</td><td>R*</td><td>data*</td></tr>
<tr><td>14</td><td>D</td><td>clock*</td></tr>
<tr><td>15</td><td>0 V sense</td><td>0 V sense</td></tr>
<tr><td>16</td><td>5 V sense</td><td>5 V sense</td></tr>
<tr><td>17</td><td>not connected</td><td>not connected</td></tr>
</table>

Cables

It is recommended to use prefabricated cables from Siemens (MOTION-CONNECT). These offer many advantages over cables made by other manufacturers in terms of operational reliability, quality, and cost.

Table 6- 6 Pre-assembled cable for incremental encoder

<table>
<tr><th>6FX</th><th>□</th><th>002</th><th>-</th><th>2CA31</th><th>-</th><th>□□□</th><th>0</th></tr>
<tr><td></td><td colspan="5">↓
5 MOTION-CONNECT®500
8 MOTION-CONNECT®800</td><td colspan="2">↓ ↓ ↓
Length, max. cable length 50 m</td></tr>
</table>

Table 6- 7 Prefabricated cable for absolute encoder

6FX	□	002	-	2EQ10	-	□□□	0
	↓ 5 MOTION-CONNECT®500 8 MOTION-CONNECT®800					↓ ↓ ↓ Length, max. cable length 50 m	

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

6.3 Connecting the separately-driven fan

Table 6- 8 Supply data for separately-driven fans

Shaft height	Max. current consumption at:	
	230 V/50 Hz 1AC (±10%)	230 V/60 Hz 1AC (+5%/-10%)
63	< 0.1 A	< 0.1 A
80 to 100	0.40 A	0.45 A

Note the following information regarding connections:

- Only use cables that comply with the relevant installation regulations regarding voltage, current, insulation material, and load-carrying capacity.
- Before connecting the device, make sure that the line voltage matches the device voltage.
- Check whether the data on the fan rating plate matches the connection data.
- Connection cables must not be subject to excessive tensile stress.
- Connect the protective conductor (PE).
- Make sure that the fan is switched on when the motor is running.

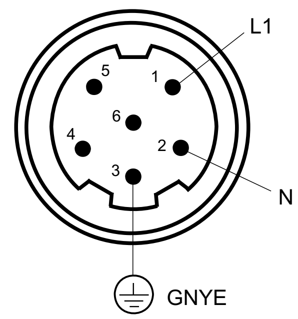


Figure 6-7 Connecting the separately-driven fan by means of the connector

Table 6- 9 Order numbers

	Order number (MLFB)
Connector connection with SPEED-CONNECT	6FX2003-0LU30
Pre-assembled cable with SPEED-CONNECT	6FX5002-5CN01-□□□0

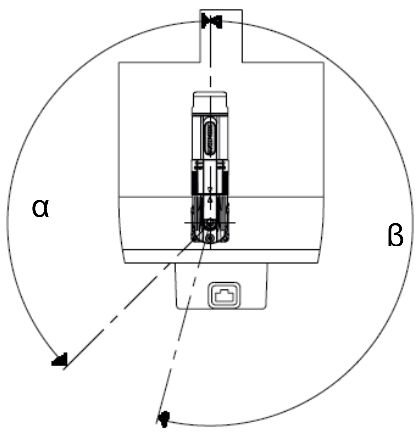
6.4 Rotating the connectors

Power connectors and signal connectors can be rotated to a limited extent. A suitable socket connector can be used to rotate the angle plug. Make sure that the socket connector is completely screwed on to avoid damaging the pin contacts. For encoders with integrated Sensor Modules (DQI) the cable outlet towards the top is fixed and cannot be changed.

> **NOTICE**
>
> **Rotating the connectors**
>
> - It is not permissible that the specified rotation range is exceeded.
> - In order to guarantee the degree of protection, max. 10 revolutions are permissible.
> - Connectors should be rotated using the appropriate mating connector located on the connector thread. Only rotate Sensor Modules by hand. The use of pipe wrenches, hammers, or similar is not permitted.

Ability to rotate the power connector for 1FT7□□□-□□□□□-□X□□; X = B, C motors

Table 6- 10 Rotation range of the power connector

Motor	Angle α	Angle β	Connector size	Drawing
1FT703	122°	208°	1	
1FT704 1FT706 1FT708	135°	195°	1	
1FT708 1FT710	195°	140°	1.5	

Ability to rotate the connectors for motors without a DRIVE-CLiQ interface and for motors with DRIVE-CLiQ interface via Sensor Modules
1FT7□□□-□□□□□-□X□□; X = M, N, D, F

Table 6- 11 Rotation range of the power connector

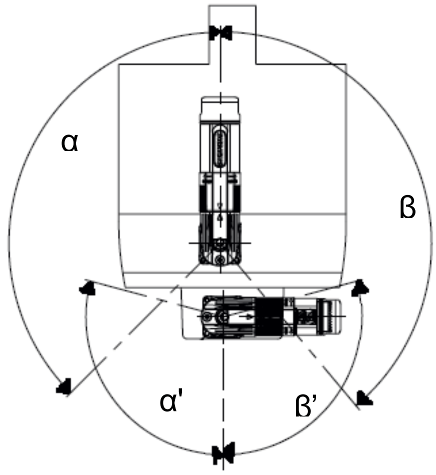
Motor	Angle α	Angle β	Connector size	Drawing
1FT703	130°	160°	1	
1FT704	125°	140°	1	
1FT706 1FT708	130°	140°	1	
1FT708 1FT710	195°	130°	1.5	

Table 6- 12 Rotation range of the signal connector

Motor	with DRIVE-CLiQ via Sensor Module		connector without DRIVE-CLiQ		Drawing
	Angle α´	Angle β´	Angle α´	Angle β´	
1FT703	130°	120°	160°	135°	See Table, "Power connectors"
1FT704	145°	135°	145°	135°	
1FT706	110°	110°	150°	135°	
1FT708 1FT710	90°	90°	90°	90°	

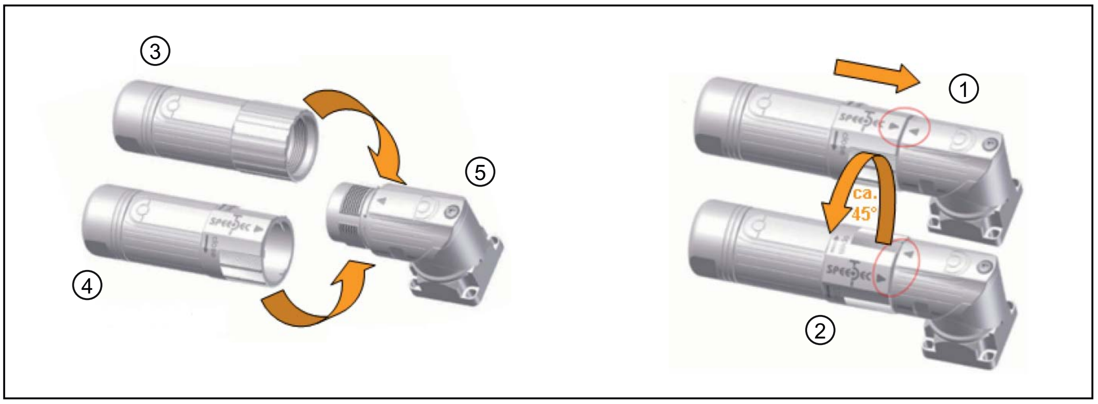
Table 6- 13 Max. torque when rotating

Connector	Max. torque when rotating
Power connector, size 1	12 Nm
Power connector, size 1.5	20 Nm
Signal connector (without DRIVE-CLiQ)	12 Nm
Signal connector (with DRIVE-CLiQ)	8 Nm

A size 3 power connector cannot be rotated. This connector size should be ordered with the required outlet direction.

6.5 Quick-release lock

The motors can be connected via a quick-release catch (SPEED-CONNECT). The motor connectors are designed in such a way that both the new quick-release lock cables and the conventional cables with screw-type connection can be used.



1+2 Establishing a contact with the SPEED-CONNECT connector
3 Screw-type connection
4 SPEED-CONNECT
5 Motor connectors with SPEED-CONNECT

Figure 6-8 Quick-release lock

6.6 Routing cables in a damp environment

NOTICE
If the motor is mounted in a humid environment, the power and signal cables must be routed as shown in the following figure.

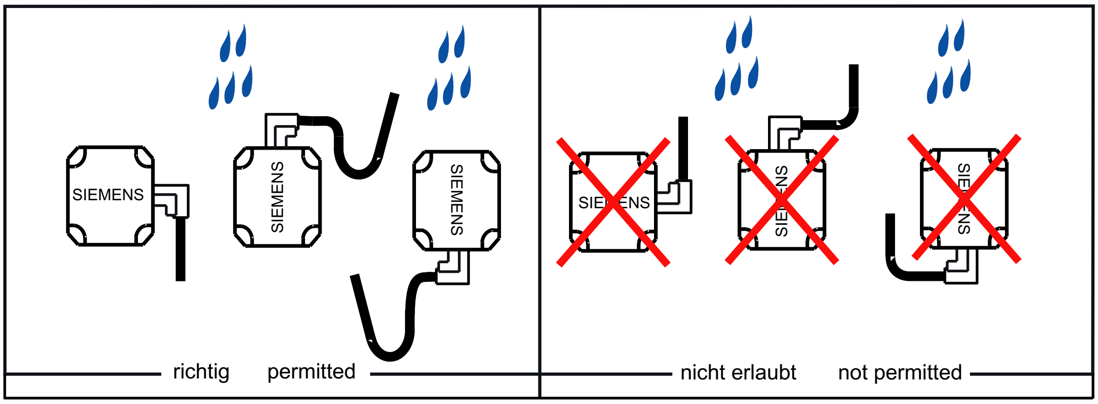


Figure 6-9 Principle cable routing in a moist environment

Information on the application of motors 7

7.1 Transport / storage before use

During transport and if the motors are out of operation for a long period of time, the cooling circuit must be completely drained to protect against frost damage and corrosion.

The motors should be stored indoors in dry conditions with low-dust and low vibration levels (v_{eff} < 0.2 mm/s). The motors should not be stored longer than two years at room temperature (+5° C to +40° C) to retain the service life of the grease.

Observe the additional notes regarding transport and storage in the operating instructions.

7.2 Environmental conditions

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

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

Under conditions other than those specified above (ambient temperature > 40°C or installation altitude > 1000 m above sea level), the permissible torque/power must be determined using the factors from the following table.

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

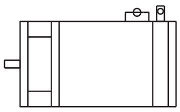
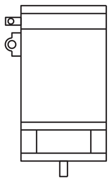
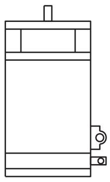
Table 7- 1 Factors to reduce the torque/power (de-rating)

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

In addition, the derating of the converter output currents depending on the installation height must be taken into account. This may have effects on the possible limiting characteristic of the motors. See Equipment Manual SINAMICS S120.

7.3 Construction types

Table 7- 2 Designation of the types of construction acc. to IEC 60034-7

Designation	Representation	Description
IM B5		Standard
IM V1		Note: When configuring the IM V1 and IM V3 type of construction, attention must be paid to the permissible axial forces (weight force of the drive elements) and especially to the necessary degree of protection. For IM V3 preferably flange form 0 1FT7□□□-□□□□0-□□□□ Attention must be paid to suitable coverage of the motor shaft (splash water).
IM V3		

7.4 Mounting conditions

Some of the motor power loss is dissipated through the flange when the motor is connected to the mounting flange.

Non-thermally insulated mounting

The following mounting conditions apply for the specified motor data:

Table 7- 3 Non-thermally insulated mounting conditions

Shaft height	Steel plate, width x height x thickness [mm]	Mounting surface[m^2]
36 and 48	120 x 100 x 40	0.012
63 to 100	450 x 370 x 30	0.17

For larger mounting surfaces, the heat dissipation conditions improve.

Thermally insulated mounting without additionally mounted components

For non-ventilated and force-ventilated motors, the static motor torque must be reduced by between 5% and 15%. We recommend configuring the motor using the $M_{0\ (60\ K)}$ values. As the speed increases, the reduction factor rises (see Fig. "Effect of the mounting conditions on the S1 characteristic").

Thermally insulated mounting with additionally mounted components

- Holding brake (integrated in the motor). No additional torque reduction required
- Gearbox; the torque has to be reduced (see Fig. "Effect of the mounting conditions on the S1 characteristics")

Basic effect of thermally non-insulated/insulated mounting without and with gearbox

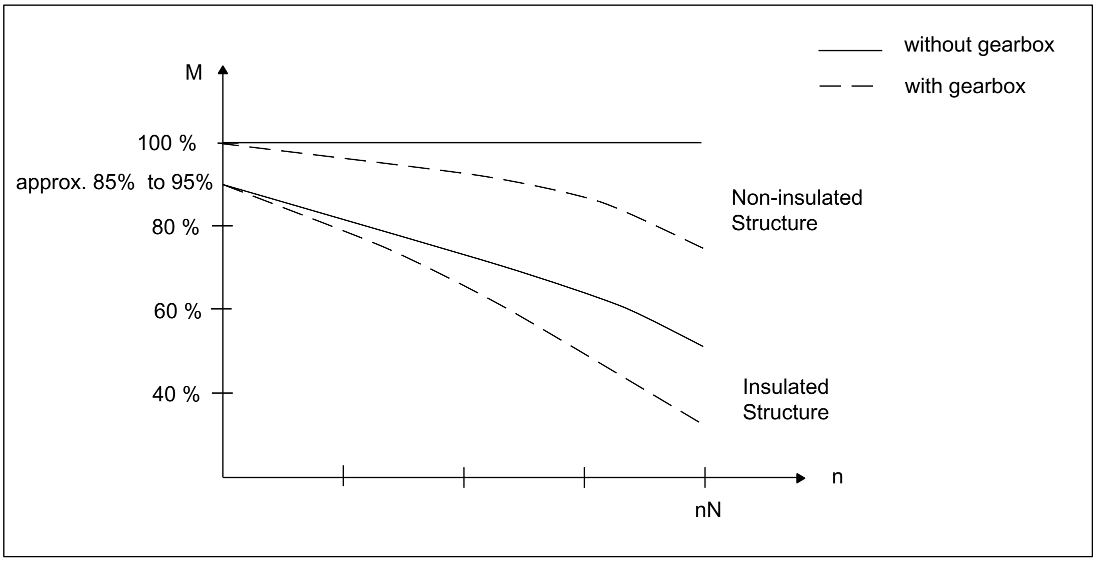


Figure 7-1 Basic effect of the mounting conditions on the S1 characteristic; M corresponds to the utilization of the torque

7.5 Vibratory load

For perfect function and to comply with the motor specification (particularly the bearing service life) the vibration values specified in the following table must not be exceeded.

Table 7- 4 Vibration values

Vibration speed v_{rms} according to ISO 10816	Max. 4.5 mm/s
Vibration acceleration a_{peak} axial 1)	25 m/s²
Vibration acceleration a_{peak} radial 1)	50 m/s²

1) For motors with separately driven fans, the limit value for axial and radial vibration acceleration is limited to 10 m/s².

The measurement points should be selected in accordance with ISO 10816-1 Paragraph 3.2. The vibration values must not exceed the specified limits at any measurement point.

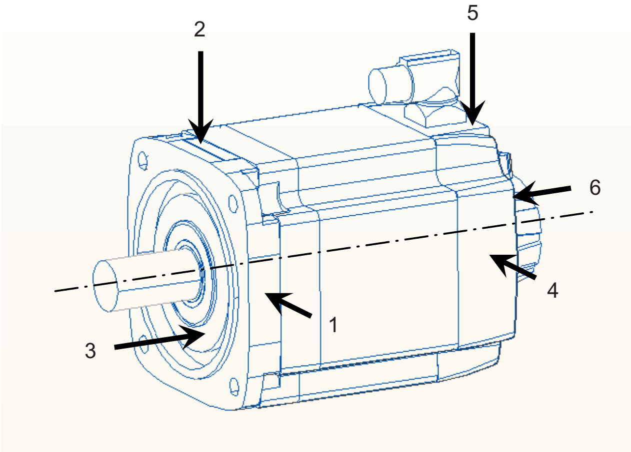


Figure 7-2 Vibration values at the measurement points

The **vibration acceleration** must be measured in a frequency band of 10 to 2000 Hz. The maximum peak value in the time range is to be considered.

To measure the **vibration speed**, the measuring equipment must fulfill the requirements of ISO 2954.

7.6 Drive coupling

Function description

In order to achieve optimum drive-out characteristics, ROTEX® GS couplings supplied by KTR should be used. The advantages of ROTEX® GS couplings include:

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

They must be optimally harmonized with existing machine masses, the mounted mechanical system, the machine stiffness, etc.

KTR provides assistance in the selection of the coupling, refer to http://www.ktr.com

7.7 Permissible line system configurations

In combination with the drive system, the motors are generally approved for operation on TN and TT systems with grounded neutral and on IT systems.

In operation on IT systems, the occurrence of a first fault between an active part and ground must be signaled by a monitoring device. In accordance with IEC 60364-4-41 it is recommended that the first fault should be eliminated as quickly as practically possible.

In systems with a grounded external conductor, an isolating transformer with grounded neutral (secondary side) must be connected between the line supply and the drive system to protect the motor insulation from excessive stress. The majority of TT systems have a grounded external conductor, so in this case an isolating transformer must be used.

Appendix A

A.1 Description of terms

Braking resistance R_{opt}

R_{opt} corresponds to the optimum resistance value per phase that is switched in series external to the motor winding for the armature short-circuit braking function.

Braking torque $M_{br\ eff}$

$M_{br\ eff}$ corresponds to the average braking torque for armature short-circuit braking that is achieved through the upstream braking resistor R_{opt}.

Cyclic inductance L_D

The cyclic inductance is the sum of the air gap inductance and leakage inductance relative to the single-strand equivalent circuit diagram. It consists of the self-inductance of a phase and the coupled inductance to other phases.

DE

Drive end = Drive end of the motor

Electrical time constant T_{el}

Quotient obtained from the rotating field inductance and winding resistance. $T_{el} = L_D/R_{Str}$

Max. current I_{max}

This current limit is only determined by the magnetic circuit. Even if this is briefly exceeded, it can result in an irreversible de-magnetization of the magnetic material. Specification of the RMS value of a sinusoidal current.

Maximum converter current $I_{max\ conv}$

RMS converter output current (per phase) that can be supplied temporarily by the recommended motor module

Maximum permissible speed at converter $n_{max\ conv}$

The maximum permissible operating speed for operation at a converter is $n_{max\ conv}$ (e.g. limited by withstand voltage, maximum frequency).

Maximum permissible speed (mechanical) n_{max}.

The maximum mechanically permissible speed is $n_{max\ mech}$. It is defined by the centrifugal forces and frictional forces in the bearing.

Maximum speed n_{max}

The maximum mechanically permissible operating speed n_{max} is the lesser of the maximum mechanically permissible speed and the maximum permissible speed at the converter.

Maximum torque M_{max}

Torque that is generated at the maximum permissible current. The maximum torque is briefly available for high-speed operations (dynamic response to quickly changing loads).

The maximum torque is limited by the closed-loop control parameters.

Maximum torque (limited by converter) $M_{max\ conv}$

The maximum torque that can be applied (temporarily) for operation on the recommended motor module.

Mechanical time constant T_{mech}

The mechanical time constant is obtained from the tangent at a theoretical ramp-up function through the origin.

$T_{mech} = 3 \bullet R_{Str} \bullet J_{Mot}/k_T^2$ [s]

J_{Mot} = Servomotor moment of inertia [kgm^2]

R_{Str} = Phase resistance of the stator winding [Ohm]

k_T = Torque constant [Nm/A]

Moment of inertia J_{Mot}

Moment of inertia of rotating motor parts. J_{Mot} = without brake, J_{MotBr} = with brake.

NDE

Non-drive end = Non-drive end of the motor

Optimum operating point

Operating point at which the maximum continuous output of the motor is normally provided at high efficiency (see figure below).

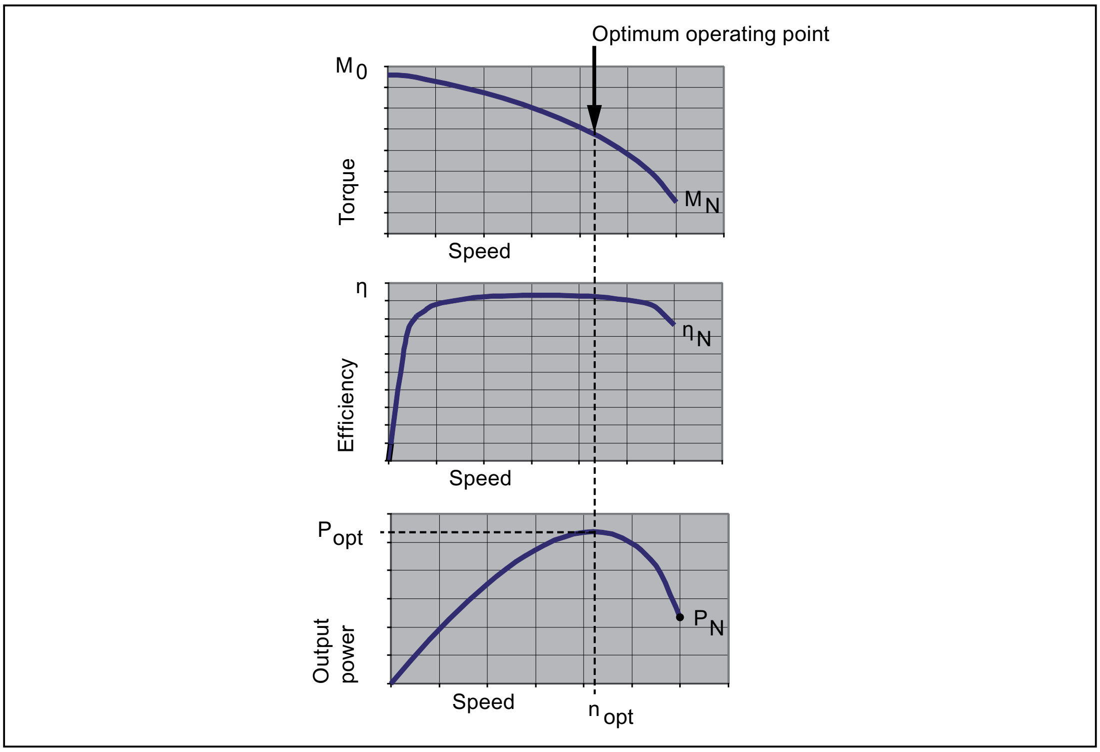


Figure A-1 Optimum operating point

Optimum power P_{opt}

Power achieved at the optimum speed.

The rated speed is the optimum speed (see optimum speed), the optimum power corresponds to the rated power.

Optimum speed n_{opt}

Speed at which the optimum motor power is output.

If the rated speed is less than the optimum speed, the rated speed is indicated.

Number of poles 2p

Number of magnetic north and south poles on the rotor. p is the number of pole pairs.

Rated converter current $I_{N\ conv}$

RMS converter output current (per phase) that can be supplied on a continuing basis by the recommended Motor Module The recommended Motor Module is determined with the stall current $I_{0\ (100K)}$.

Rated current I_N

RMS motor phase current for generating the particular rated torque. Specification of the RMS value of a sinusoidal current.

Rated speed n_N

The characteristic speed range for the motor is defined in the speed-torque diagram by the rated speed.

Rated torque M_N

Thermally permissible continuous torque in S1 duty at the rated motor speed.

Shaft torsional stiffness $c_{t\ Mot}$

This specifies the shaft torsional stiffness from the center of the rotor laminated core to the center of the shaft end. $c_{t\ Mot}$ = without brake, $c_{t\ MotBr}$ = with brake.

Stall current I_0

Motor phase current to generate the particular stall torque ($M_0 = k_T \cdot I_0$). Specification of the RMS value of a sinusoidal current.

Static torque M_0

Thermal limit torque at motor standstill corresponding to utilization according to 100 K or 60 K. This can be output for an unlimited time when n = 0 rpm. M_0 is always greater than the rated torque M_N.

Thermal time constant T_{th}

Defines the increase in the motor frame temperature when the motor load is suddenly increased (step function) to the permissible S1 torque. The motor has reached 63% of its final temperature after T_{th}.

Torque constant k_T (value for a 100 K average winding temperature rise)

Quotient obtained from the static torque and stall current.

Calculation: $k_T = M_{0,\ 100\ K} / I_{0,\ 100\ K}$

The constant applies up to approx. $2 \cdot M_{0,\ 60\ K}$ in the case of self-cooled motors

---

Note

This constant is not applicable when configuring the necessary rated and acceleration currents (motor losses!).

The steady-state load and the frictional torques must also be included in the calculation.

Voltage constant k_E (value at 20° C rotor temperature)

Rms value of the induced motor voltage at a speed of 1000 rpm and a rotor temperature of 20 °C.

Winding resistance R_{Str} at 20 °C winding temperature

The resistance of a phase at a winding temperature of 20° C is specified. The winding has a star circuit configuration.

A.2 Declaration of conformity

SIEMENS

EG-Konformitätserklärung
EC Declaration of Conformity
No. 664.20034.21

Hersteller: *Manufacturer:*	**Siemens Aktiengesellschaft** Industrie Sector DT MC EWN
Anschrift: *Address:*	Industriestraße 1 97615 Bad Neustadt a. d. Saale Germany
Produktbezeichnung: *Description of the product:*	**Drehstrom – Synchronmotor, Servoantrieb Typ 1FT7...** *Three-phase synchronous servo-motor, type 1FT7…*

Die bezeichneten Produkte stimmen in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinie überein:
The products described above in the form as delivered are in conformity with the provisions of the following European Directive:

2006/95/EG Richtlinie des Europäischen Parlaments und de Rates vom 12.Dezember 2006 zur Angleichung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen.
Directive of the European Parliament and the Council of 12. December 2006 on the approximation of the laws of the Member States related to electrical equipment designed for use within certain voltage limits.

Die Konformität mit der Richtlinie wird nachgewiesen durch die Einhaltung folgender Normen:
Conformity to the Directive is assured through the application of the following Standards:

EN 60034-1*): 2004 EN 60204-1 : 2006
) mit allen relevanten Teilen / *with all relevant parts

Die Sicherheitshinweise und Betriebsanleitungen sind zu beachten.
The safety and manual documentation have to be considered in detail.

Erste CE - Kennzeichnung: 2006 */ first CE - marking: 2006*

Die bezeichneten Produkte sind zum Einbau in andere Maschinen bestimmt. Die Inbetriebnahme ist solange untersagt, bis die Konformität des Endproduktes mit der Richtlinie 2006/42/EG festgestellt ist.
Alle Sicherheitshinweise der zugehörenden Produktdokumentation sind zu beachten sowie dem Endanwender zur Kenntnis zu geben.
Diese Erklärung stellt keine Beschaffenheits- und Haltbarkeitsgarantie gemäß § 443 BGB dar.
The products supplied are intended exclusively for installation in a machine. Commissioning is prohibited until it has been established that the end product conforms with the Directive 2006/42/EU. All safety instructions in the associated product documentation must be observed and given to the end user for his/her information.
This declaration contains no condition and durability guarantee to § 443 BGB (German Civilian Code).

Bad Neustadt, den 10. 02. 2010
Siemens Aktiengesellschaft

i.V. [signature] i.V. [signature]

Frank Michael,
Head of the Electric Motor Factory, Bad Neustadt

Dr. Jan Dainat,
Head von Engineering Department (KT)

Diese Erklärung bescheinigt die Übereinstimmung mit der genannten Richtlinie, ist jedoch keine Zusicherung von Eigenschaften.
This declaration certifies the conformity to the specified Directive, but contains no assurance of properties.

Ersatz für / *Substitute for* 664.20034.21 Stand / *Status*: 11/2006

Ausgabestand / *Status*: 02/2010
Erstausgabe / *first document*: 11/2006

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Index

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