

8JSB - 8JSQ

stainless steel motors

User's manual

Version: **1.0 (2017-08-18)**

Model no.: **MAMOT6-ENG**

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1 General information

Document versions

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1.0	2017-08-18	First edition

1.1 About this manual

This user's manual describes all B&R synchronous servo motors that begin with the order codes 8JSB and 8JSQ and provides information regarding their use – from delivery to disposal.

Read this user's manual before you begin using the respective motor. This will ensure safe operation, help prevent errors and maximize the service life of the motor.

B&R does its best to continuously improve the quality of information in this manual. If you notice any errors or have suggestions for improvement, please contact B&R Support.

Be sure to observe the safety notices provided in this manual at all times.

Information:

This user's manual is not intended for end customers! It is the responsibility of the machine manufacturer or system provider to provide the safety guidelines relevant to end customers in the operating instructions for the end customer in the respective local language.

1.2 Safety guidelines

1.2.1 Organization of safety notices

Safety notices in this manual are organized as follows:

Safety notice	Description
Danger!	Disregarding these safety guidelines and notices can be life-threatening.
Warning!	Disregarding these safety guidelines and notices can result in severe injury or substantial damage to property.
Caution!	Disregarding these safety guidelines and notices can result in injury or damage to property.
Information:	This information is important for preventing errors.

Table 1: Description of the safety notices used in this documentation

1.2.2 Intended use

Intended use

Type 8JSB and 8JSQ servo motors are designed in particular to be used on machines for foodstuffs, cosmetics, pharmaceutical products, medicine and similar applications that place high demands on hygiene and dynamic behavior.

8JSB and 8JSQ motors are permitted to be used in applications with indirect contact to foodstuffs. In these applications, FDA-approved B&R motor cables must be used.

You are only permitted to use these motors under environmental conditions defined in this documentation.

Type 8JSB and 8JSQ motors are only intended to be controlled using ACOPOS servo drives via speed and/or torque control.

The motors are installed as components in electrical systems or machines and are only permitted to be put into operation as integrated components of the system.

The built-in thermal protection sensor in the motor windings must be monitored and evaluated.

Installed holding brakes are designed to work at a standstill and not suitable for continuous operational braking.

Conformity of the servo system to the standards listed in chapter "Standards and directives" is now ensured when the components supplied by us (servo drives, motors, cables, etc.) are used.

1.2.2.1 Unintended use

8JSB and 8JSQ motors are not permitted to be used in applications with continuous, direct contact to foodstuffs.

8JSB and 8JSQ motors are not permitted to be used in explosive atmospheres.

8JSB and 8JSQ motors are not permitted to be used in clean room applications.

8JSB and 8JSQ motors are not permitted to be installed with the shaft pointing upward. This prevents dirt and liquids from accumulating in area around the shaft seal.

8JSB motors are not permitted to be installed with the shaft pointing downward. This prevents dirt and liquids from accumulating on the back side of the flange.

Proper operation of the motor is not possible if the machine in which it is installed...

- Does not meet EC Machinery Directive requirements
- Does not meet EMC Directive requirements
- Does not meet Low Voltage Directive requirements

Information:

Using the built-in holding brake alone to ensure functional safety is not permitted.

1.2.3 General safety guidelines

B&R servo drives and servo motors have been designed, developed and manufactured for conventional use in industrial environments. They were not designed, developed and manufactured for any use involving serious risks or hazards that could lead to death, injury, serious physical damage or loss of any kind without the implementation of exceptionally stringent safety precautions.

In particular, such risks and hazards include the use of these devices to monitor nuclear reactions in nuclear power plants, their use in flight control or flight safety systems as well as in the control of mass transportation systems, medical life support systems or weapons systems.

This servo motor has been constructed in accordance with the current standards of safety technology and tested for operational safety prior to delivery.

To ensure proper installation and safe operation, be sure to read and observe:

- The installation and maintenance guidelines provided in this manual and any accompanying documentation
- The accompanying safety and installation guidelines
- The technical documentation for the respective product
- The installation and safety guidelines for the B&R ACOPOS drive being used
- The applicable work safety regulations
- National, local and plant-specific regulations for your end product

The following dangers must be taken into account when using this product:

Danger associated with

- Electric current
- Moving, rotating and hot parts
- Lifting and carrying
- EMC disturbances
- Mechanical and thermal overload

Note:

To prevent damage and injury and minimize any residual risks, observe the provided safety notices at all times.

1.2.3.1 Qualified personnel

Use of the products described in this manual is restricted to the following persons:

- Qualified personnel who are familiar with relevant drive technology products as well as applicable standards and regulations
- Qualified personnel who plan, develop, install and commission drive technology in machines and systems

Qualified personnel in the context of the products described in this manual are those who, because of their training, experience and instruction combined with their knowledge of relevant standards, regulations, accident prevention guidelines and operating conditions, are qualified to carry out essential tasks and recognize and avoid potentially dangerous situations.

The safety notices, information on connection conditions (type plate and documentation) and limit values specified in the technical data are to be read carefully before installation and commissioning and must always be observed.

In this regard, sufficient language skills are also required in order to be able to properly understand this manual.

Danger!

The improper handling of servo drives and servo motors can cause severe personal injury or damage to property!

1.2.3.2 Unauthorized modifications

Warning!

- **Unauthorized modifications to the servo motor are prohibited for reasons of safety. If necessary, contact B&R.**
- **Removing or disabling the servo motor's safety features is not permitted.**

Danger!

Improper control of motors can result in unintended hazardous movements! Such incorrect behavior can have various causes:

- **Incorrect installation or mishandling of components**
- **Improper or incomplete wiring**
- **Defective devices (servo drive, motor, position encoder, cables, brake)**
- **Incorrect control (e.g. caused by software error)**

Danger!

Electronic devices are never completely failsafe. If the servo drive fails, the user is responsible for ensuring that the connected motor is brought to a secure state!

Warning!

High temperatures can occur on the surface of the motors (>100°C). If necessary, protection against accidental contact must be installed!

1.2.3.3 Free convection

Caution!

- **Free convection on the motor housing must be guaranteed!**
- **In the case of motors cooled by external fans, it must be ensured that warm exhaust air cannot be drawn back into the intake!**

1.2.4 Safety guidelines - Transport and storage

Temperature and humidity specifications for transport and storage can be found in the section "General motor data: Storage and transport conditions."

1.2.4.1 Transport

When transporting 8JSB / 8JSQ motors, the following conditions must be met:

- **Climate category 2K3 per IEC 60721-3-2**
- **Temperature -25 to +70°C, max. fluctuation 20K/hour**
- **Only carried out by qualified personnel and in the manufacturer's original packaging**

- Hard impacts must be avoided, in particular to the end of the shaft
- If the packaging is damaged, the motor must be checked for visible damage. Inform the transport carrier and, if necessary, also B&R

1.2.5 Safety guidelines - Installation

Installation must be performed as described in this manual using suitable equipment and tools.

Devices are only permitted to be installed by qualified personnel without voltage applied. Before installation, voltage to the control cabinet must be switched off and prevented from being switched on again.

General safety guidelines and national accident prevention regulations for working with high voltage systems must be observed.

Electrical installation must be carried out in accordance with applicable guidelines (e.g. line cross sections, fuses, protective ground connections). Note the specifications provided in the "Technical data" chapter.

1.2.5.1 No direct mains connection

Warning!

B&R's three-phase synchronous motors are not permitted to be connected directly to the power mains, they are only permitted to be operated in combination with ACOPOS servo drive systems!

1.2.5.2 Damaged servo motor

Warning!

- Never install a damaged servo motor.
- Never operate a damaged servo motor.
- Never install a servo motor in a damaged machine.
- Before installation, ensure that the servo motor is suitable for your machine.

1.2.5.3 Overdetermined bearing

Caution!

When using add-on drive elements on the drive shaft, overdetermined bearings must be avoided. The necessarily occurring tolerances cause additional forces on the motor shaft bearings. This can damage or significantly reduce the service life of the bearings!

1.2.5.4 Axial forces

Warning!

Excessive axial forces on the motor shaft during installation can damage the bearings and weaken the motor holding brake until the braking effect is reduced or nonexistent. Encoder errors can also occur.

Therefore, excessive pressure or shocks to the front shaft end or the rear housing cover should be avoided under all circumstances.

Loads caused by a hammer definitely exceed the permissible values!

1.2.5.4.1 Axial load on shaft

Warning!

Axial loads are not permitted on shaft ends of motors with holding brakes. It is especially important to prevent axial forces in the direction of the B flange since these forces can cause the brake to fail!

Information:

Axial loads are not permitted on shaft ends of motors with EnDat encoders. It is especially important to prevent axial forces in the direction of the B flange since these forces can cause encoder errors!

1.2.5.5 No shocks or impacts

Caution!

Bearing elements must not be subjected to shocks or impacts! Incorrect handling will reduce the service life and result in damage to the bearings.

1.2.5.6 Connection of pinion gears

Note:

Use suitable clamping sets, pressure sleeves or other fastening elements to connect pinion gears, belt disks or similar machine actuators.

Machine actuators must be protected against unintentional removal.

1.2.5.7 Ensure proper connections

Caution!

The connectors must be connected and fastened correctly. Misalignment and subsequent pulling can cause disturbances and damage to the servo motor!

1.2.6 Safety guidelines - Operation

1.2.6.1 Responsibilities of the operator

Definition of the term "operator"

The operator is the person who uses the motor for commercial purposes, or who provides it for use by a 3rd party while carrying legal product responsibility for the protection of the user, personnel or other 3rd parties.

The operator is obligated

- to know and implement the applicable industrial safety regulations
- to know and implement the national, local and plant-specific regulations for the end product
- to conduct a risk assessment to identify hazards related to on-site working conditions
- to create a manual for operating the motor
- to periodically verify that operating instructions correspond with the current status of applicable regulations
- to clearly define and assign responsibilities for installation, operation, troubleshooting, maintenance and cleaning
- to ensure that all employees have read and understood the user's manual
- to provide personnel with regular training and inform them of hazards
- to provide personnel with the necessary protective equipment

1.2.6.2 Protection against touching electrical parts

Danger!

To operate servo drives, it is necessary for certain parts to carry dangerous voltages over 42 VDC. Touching one of these parts can result in a life-threatening electric shock. This could lead to death, severe injury or damage to property!

Before turning on a servo drive, it is important to ensure that the housing is properly connected to ground (PE rail). The ground connection must be established even when testing or operating the drive for a short time!

Before switching on the device, all parts that carry voltage must be securely covered. During operation, all covers and control cabinet doors must remain closed.

Control and power connections can still carry voltage even if the motor is not turning. Touching these connections while the device is switched on is prohibited. Before performing any work on servo drives, they must first be disconnected from the power system and prevented from being switched on again.

1.2.6.3 Protection against hazardous movements

Danger!

Improper control of motors can result in unintended hazardous movements! Such incorrect behavior can have various causes:

- **Incorrect installation or mishandling of components**
- **Improper or incomplete wiring**
- **Defective devices (servo drive, motor, position encoder, cables, brake)**
- **Incorrect control (e.g. caused by software error)**

Some of the errors listed above can be detected and prevented by the servo drive's internal monitoring. Nevertheless, it is still possible for the motor shaft to move any time after the device is switched on! For this reason, higher-level safety precautions need to be put in place to ensure that personnel and machines are protected.

The moving parts on machines must be shielded in such a way as to prevent unintentional access by personnel. This type of protection can be achieved by using stable mechanical protective equipment such as protective covers, protective fences, protective gates or photoelectric sensors.

Removing, bypassing or circumventing these protective measures and entering the area where movement takes place is prohibited.

A sufficient number of emergency stop buttons must be installed in direct proximity to the machine and be easily accessible at all times. This emergency stop equipment must be checked before the machine is put into operation.

On free running motors, the shaft key (if present), mounting screws or other mounting elements must be removed or measures taken to prevent them from being ejected.

The holding brake built into motors (if present) cannot prevent hoisting equipment from dropping hanging loads.

Danger!

Servo motors can be started automatically via remote control! If appropriate, a corresponding warning symbol must be applied, and protective measures must be implemented to prevent entry into the high-risk area.

1.2.6.4 Electromagnetic fields

Electromagnetic fields are generated by the operation of electrical power engineering equipment such as transformers, drives and motors.

The plant operator is responsible for taking appropriate measures (labels and hazard warnings) to adequately protect operating personnel against possible harm.

Danger!

Electromagnetic fields can interfere with the proper functionality of electronic devices. This includes the operation of cardiac pacemakers, which could potentially lead to injury or death. Wearers of pacemakers are therefore prohibited from entering these areas.

- Observe relevant national health and safety regulations.
- Post warning notices as needed.
- Place barriers around danger zones.
- Reduce electromagnetic fields at their source (using shielding, for example).

1.2.6.5 Shaft key

Caution!

The shaft key can become dislodged during heavy reverse operation. In extreme cases, this can cause the shaft end to break!

It is therefore preferable to use a smooth shaft.

1.2.6.6 Simultaneous loads on shaft end

Warning!

Simultaneously loading the shaft end with the maximum values of F_r and F_a is not permitted! Contact B&R if this occurs.

1.2.6.7 Not a working brake

Warning!

The holding brake is not intended for normal braking. The holding brake does not provide protection for personnel. The maximum motor torque far exceeds the holding torque for the brake.

1.2.7 Safety guidelines - Disposal

1.2.7.1 Rare-earth magnets

Caution!

B&R servo motors contain rare-earth magnets with increased density of magnetic energy!

1.2.7.2 Magnetized rotor

Warning!

A magnetized rotor must never be transported or delivered outside the stator!

1.3 8JSB and 8JSQ – Servo motors for hygienic applications



The B&R servo motors in the 8JSB and 8JSQ series feature a hygienic design that allows efficient cleaning in the areas of foodstuffs production and biomedical engineering. With a smooth surface and IP69K protection, these motors were developed in strict accordance with EHEDG hygiene standards. This makes them the optimal choice for harsh environmental conditions or areas where machines are working with aseptic processes. These motors are characterized by the highest power density in this class. The smooth stainless steel housing with a surface finish of less than 0.8 μm , rounded corners and seamless transitions have been designed to eliminate undercuts and protruding screws in order to prevent the collection of contaminants while allowing for simple, safe and efficient cleaning. With a laser-engraved type plate and IP69K protection, these motors are extremely suitable for efficient daily cleaning processes.

1.3.1 Advantages of B&R stainless steel motors for your application:

- Simplified installation and maintenance through plug-in connectors
- Robust B&R single cable solution with built-in hybrid connector for safe drives
- Complete hygienic design in accordance with EHEDG and FDA guidelines for optimal washdown
- 100% stainless steel (housing, flange, shaft and connectors)
- Innovative connectors with IP69K protection and hygienic design
- Food-safe and resistant to chemicals
- Ideal for machines with an open design
- B5 and B14 mounting methods

1.3.1.1 Connection type

The use of B&R's single cable (hybrid) solution with digital feedback reduces the number of feed-throughs to an absolute minimum. The connectors also have IP69K protection and meet hygiene standards. The hybrid cables with FDA approval are heat resistant up to 150°C and provide automatic pressure compensation. These features result in even higher operational safety while eliminating outages caused by the formation of corrosion or condensation inside the motor. The robust B&R single cable solution with built-in hybrid connector allows these motors to be seamlessly integrated in the B&R system environment, and their safety functionality opens up entirely new possibilities for automation in the foodstuffs and pharmaceutical industries.

1.3.1.2 Embedded parameter chip

All relevant mechanical and electrical information and data is stored in the EnDat encoder used for B&R motors. This means that the user does not have to configure settings on the servo drive. As soon as the encoder is connected to the servo drive and the power is applied to the electronics, the motor is automatically identified. The motor sends

its nominal parameters and limit parameters to the servo drive. The drive then automatically determines the current limits and current control parameters required for optimal control of the motor. The only things that the user has to optimize are the speed and position controllers. The integrated commissioning environment in B&R Automation Studio™ provides all necessary support.

In addition to assistance during commissioning, routine service work is also simplified, and motors can be exchanged without having to take extra time to set parameters.

1.3.2 8JSB - 8JSQ standards and directives

1.3.2.1 European directives and standards for plant manufacturers

8JSB and 8JSQ motors are components designed to be installed in industrial electrical systems or machines.

For installation in machines or systems, starting operation as intended is prohibited until it has been established that the machine or system meets all of the following requirements:

- EC Machinery Directive (2006/42/EC)
- EC EMC Directive (2004/108/EC)
- EC Low Voltage Directive 2006/95/EC

Standards for compliance with the EC Machinery Directive (2006/42/EC).

- DIN EN 60204-1: Safety and electrical equipment of machines
- DIN EN ISO 14159: Safety of machinery – Hygiene requirements for the design of machinery
- DIN EN 1672-2: Food processing machinery – Hygiene requirements

Information:

B&R 8JSB and 8JSQ series motors meet the requirements of these standards. Machine or system manufacturers must determine if their machines or systems need to meet other standards or directives in addition to the ones listed here.

Standards for compliance with the EC Low Voltage Directive (2006/95/EC).

- EN 60204-1: Safety and electrical equipment of machines
- EN 60439-1: Low-voltage switchgear and controlgear assemblies

Standards for compliance with the EC EMC directive (2004/108/EC).

- EN 61000-6-1 / 2: Immunity in residential or industrial environments
- EN 61000-6-3 / 4: Emissions in residential or industrial environments

Ensuring compliance with the limit values required by EMC legislation for the system or machine is the responsibility of the system or machine manufacturer.

1.4 Content of delivery

You will receive a box or wooden box with Instapak® foam packaging. It includes:

- 8JSB or 8JSQ series motor
- O-ring for the flange seal

1.4.1 Packaging

8JSB/8JSQ motors are delivered in cardboard boxes with Instapak® foam packaging.

Motor type	Packaging	Max. stacking height	Motor type	Packaging	Max. stacking height
8JSB3 / 8JSQ3	Cardboard box	6	8JSB5 / 8JSQ5	Cardboard box / Wooden box	6
8JSB4 / 8JSQ4	Cardboard box	6	8JSB6 / 8JSQ6	Wooden box	6

Table 2: Stacking height

Information:

The packages must be stacked horizontally (motor shaft to the side, not up or down)!

2 8JSB and 8JSQ - Technical data

2.1 General description

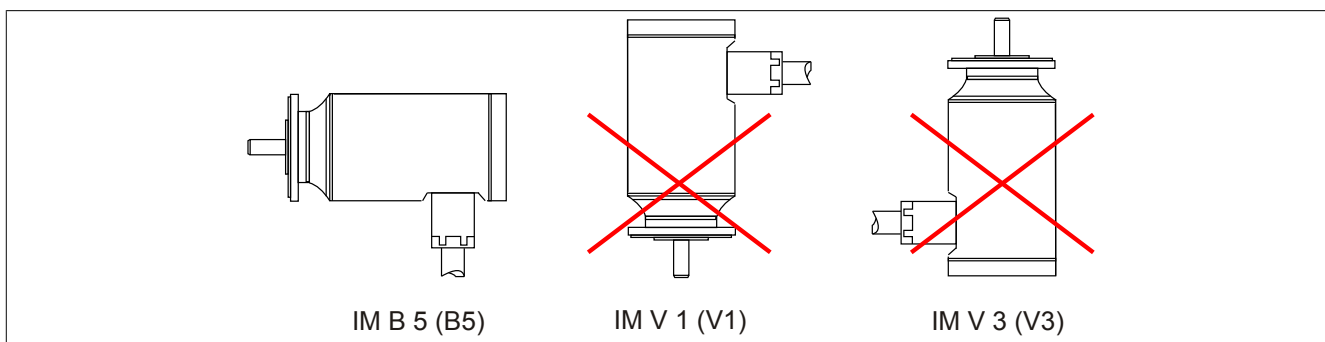
8JS series hygiene motors are available in versions for two different types of mounting. 8JSB stands for flange mounting and 8JSQ stands for front mounting.

8JSB / 8JSQ series motors use a straight "hybrid motor cable" connection meaning the power and encoder connections are in a single cable. The motors are equipped with inductive EnDat 2.2 encoders with a single-turn or multi-turn design. Other motor options: with or without holding brake, smooth shaft or keyed shaft. An oil seal is mandatory to achieve an IP96K rating.

2.1.1 Flange mounting - 8JSB

The basic design for flange mounting is construction type IM B5 per DIN EN 60034-7.

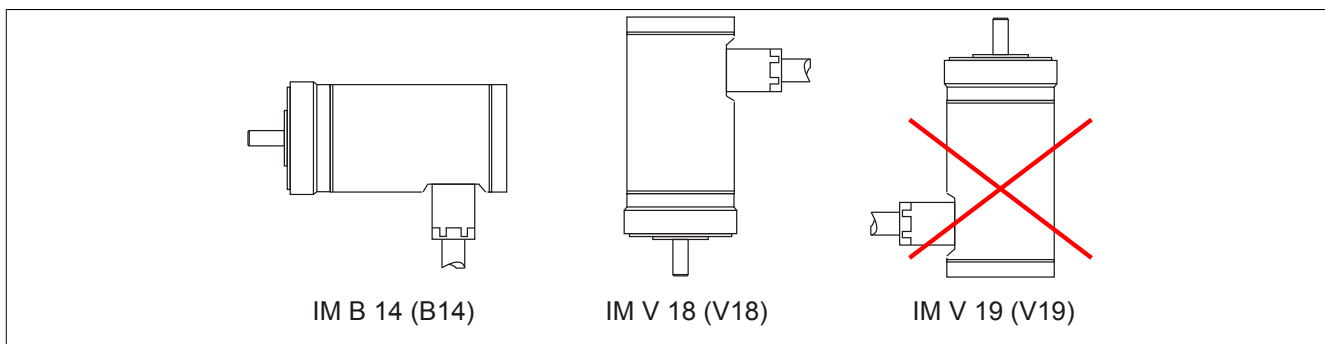
Place to seal for the O-ring (mounting kit) in the flange slot.



2.1.2 Front mounting - 8JSQ

The basic design for front mounting is construction type IM B14 per DIN EN 60034-7.

Place to seal for the O-ring (mounting kit) in the flange slot.



2.1.3 Materials

The motor series was developed specifically for use in the food and beverages industry and the design meets European hygiene guidelines. The materials visible from the outside are all FDA-compliant materials. Direct contact with unpackaged food is not permitted.

Materials used:

Surface	Stainless steel 1.4404, <0.8 µm surface finish
Mounting bolts	Stainless steel 1.4404, FDA 21 CFR 175.300 seal
O-rings	EPDM, FDA 21 CFR 177.2600
Shaft	Stainless steel 1.4404
Oil seal	Mineral-filled PTFE, single-lip, Mineral: FDA 21 CFR 175.300 PTFE: FDA 21 CFR 177.1500
Bearing grease	Food grade per FDA 21 CFR 178.3570
Nameplate	Laser marked housing
Built-in connector	Housing: Stainless steel 1.4404, <0.8 µm surface finish Seals: TPU

2.2 Motor options and special motor options

Motor options

8JSB / 8JSQ stainless steel servo motors can be delivered with the following options depending on the size and length:

- With various inductive EnDat 2.2 encoders
- With various nominal speeds
- With a smooth or keyed shaft end
- With or without a holding brake

2.2.1 Sizes

8JSB / 8JSQ three-phase synchronous motors are available in size 3, 4, 5 and 6.

They have different dimensions (especially flange dimensions) and power ratings. These different sizes are indicated by a number represented by (c) in the model number. The larger the number, the larger the flange dimensions and power rating for the respective motor.

Cooling / Construction type		Available sizes			
		3	4	5	6
8JS	B	Yes	Yes	Yes	Yes
	Q	Yes	Yes	Yes	Yes

Table 3: Available sizes

2.2.2 Lengths

8JSB / 8JSQ three-phase synchronous motors are available in five different lengths. They have different power ratings with identical flange dimensions. These different lengths are indicated by a number represented by (d) in the model number.

Overview

Length	Available sizes			
	3	4	5	6
1	Yes	Yes	Yes	---
2	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes
4	---	Yes	Yes	Yes
5	---	---	---	Yes

2.2.3 Nominal speeds

The stainless steel hygiene motors in the 8JSB / 8JSQ series are available with different nominal speeds:

Cooling overview / Construction types J and Q

Size	Lengths				
	1	2	3	4	5
3	5000	3000, 7000	2000, 4500	---	---
4	3000, 6000	3500, 6000	2500, 6000	2000, 5000	---
5	2500	1500, 3500	3000	1800, 3000	---
6	---	1800, 5000	1500, 4000	2000, 3000	2000

2.2.4 8JSB, 8JSQ connection direction

The 8JSB and 8JSQ series only have one connection direction: "straight, top" using a single-cable solution (hybrid).

2.2.5 Holding brake

8JSB / 8JSQ motors available with an optional built-in holding brake. Retrofitting is not possible. The spring action brake (24 VDC) blocks the rotor when power is not applied.

Name	Motor size			
	3	4	5	6
Holding torque M_{Br} [Nm]	2.5	5.3	14.5	25
Connection power P_{on} [W]	10.1	12.8	19.5	25.7
Connection current I_{on} [A]	0.42	0.53	0.82	1.07
Connection voltage U_{on} [V]	24	24	24	24
Activation delay t_{on} [ms]	0.01	0.015	0.015	0.02
Release delay t_{off} [ms]	0.025	0.035	0.08	0.105
Moment of inertia J_{Br} [kgcm ²]	0.014	0.068	0.173	0.605
Mass m_{Br} [kg]	0.35	0.63	1.1	2.0

Table 4: Technical data for the standard holding brake

Note:

The holding brakes are designed to work at a standstill and not suitable for continuous operational braking. If used for frequent operational braking, premature wear and failure of the holding brake can be expected.

Information:

Motors with a built-in holding brake have an increased length. The holding brakes can be controlled directly by the servo drive, but this is not functionally safe! Attenuation of the cutoff voltage for the brake winding is handled by the servo drive. Additional wiring is not required. The operating instructions for the servo drive must be observed. If the holding brake is not controlled directly by the servo drive, additional circuitry (e.g. a varistor) is necessary. If this is required, please contact our customer service.

Warning!

With suspended loads (vertical axes), the load can fall if the motor holding brake is released and, at the same time, the servo drive does not provide power! Risk of injury for the machine operator. Functional safety can only be achieved for vertical axes by using an additional external mechanical brake.

2.2.6 Design of the shaft end

The power is transmitted over the cylindrical shaft end, EN50347-compliant k6 fit with locking thread.

A keyed shaft is also available as an alternative. (The DIN 748-compliant keyway and the key correspond to DIN 6885 Form A, for stainless steel 1.4404.)

2.2.6.1 Load capacity of the shaft end

Radial force

If motors operate via a pinion gear or toothed belt, high radial forces occur. The permitted values at the end of the shaft in relation to speed can be found in the diagrams in chapter "Technical data".

Axial force

Axial forces occur when installing pinion gears or belt disks on the shaft and, for example, when operating angular gearboxes. The permitted values at the end of the shaft in relation to speed can be found in the diagrams in chapter "Technical data".

2.2.6.2 Oil seal

Applications, e.g. in the food and beverage and pharmaceutical industries, place high demands on hygiene and therefore also on the IP rating. 8JSB and 8JSQ motors are prepared for IP69K protection. The motor's mechanical and electrical interfaces are critical with regard to these requirements. The mechanical interface (flange and shaft) is usually on a gearbox or connected to a machine flange. The flange seal is protected here with an FDA-approved O-ring. If the 8JSB or 8JSQ is coupled to a gearbox, an additional shaft seal is not necessary. If the 8JSB or 8JSQ is coupled to a machine flange with an unprotected shaft, the optional oil seal provides IP69K protection. The oil seal is an FDA-approved, single-lip, mineral-filled Teflon ring.

2.3 Determining the order code for motor options (ff)

Motor options for 8JSB and 8JSQ stainless steel motors

Motor option				
Connection direction	Oil seal	Holding brake	Shaft end	Code for the order key (ff)
Straight, single-cable solution (hybrid)	Yes	---	Smooth	U6
	Yes	---	With key	U7
	Yes	Normal	Smooth	U8
	Yes	Normal	With key	U9

2.4 Motor encoder systems

8JSB/8JSQ hygiene motors can be delivered with inductive EnDat 2.2 encoders. The encoder system is listed as part of the model number in the form of a 2-digit code (ee).

2.4.1 EnDat 2.2 encoder

General information

Digital drive systems and position control loops require fast and highly secure transfer of data obtained from position measuring instruments. In addition, other data such as drive-specific characteristics, correction tables, etc. should also be available. To ensure a high level of system security, measuring instruments must be integrated in routines for detecting errors and be able to perform diagnostics.

The EnDat interface is a digital, bidirectional interface for measuring instruments. It is able to output position values from incremental and absolute measuring instruments and can also read and update information on the measuring instrument or store new data there. Because it relies on serial data transfer, only 4 signal lines are needed. Data is transferred synchronously to the clock signal defined by the subsequent electronics. The type of transfer used (e.g. for position values, parameters, diagnostics, etc.) is selected using mode commands sent to the measuring instrument by the subsequent electronics.

EnDat 2.2 encoders (single-turn or multi-turn) can be used depending on requirements.

EnDat 2.2 for motor size 3 and 4 - Technical data

Name	Order code (ee)	
	D8	D9
Operating principle	Inductive	Inductive
EnDat protocol	2.2	2.2
Position values per revolution	524 288 (19-bit)	524 288 (19-bit)
Distinguishable revolutions	-	4096 (12-bit)
Precision	±120"	±120"
Vibration during operation 55 < f ≤ 2000 Hz	Stator: ≤400 m/s ² , rotor: ≤600 m/s ² (EN 60068-2-6)	Stator: ≤400 m/s ² , rotor: ≤600 m/s ² (EN 60068-2-6)
Shock during operation, 6 ms duration	≤2000 m/s ² (EN 60068-2-27)	≤2000 m/s ² (EN 60068-2-27)
Manufacturer's website	www.heidenhain.de	
Manufacturer's product ID	ECI 1119	EQI 1131

EnDat 2.2 for motor size 5 and 6 - Technical data

Name	Order code (ee)	
	DA	DB
Encoder type	EnDat single-turn	EnDat multi-turn
Operating principle	Inductive	Inductive
EnDat protocol	2.2	2.2
Position values per revolution	524 288 (19-bit)	524 288 (19-bit)
Distinguishable revolutions	-	4096 (12-bit)
Precision	±65"	±65"
Vibration during operation 55 to 2000 Hz	Stator: ≤400 m/s ² , rotor: ≤600 m/s ² (EN 60068-2-6)	Stator: ≤400 m/s ² , rotor: ≤600 m/s ² (EN 60068-2-6)
Shock during operation, 6 ms duration	≤2000 m/s ² (EN 60068-2-27)	≤2000 m/s ² (EN 60068-2-27)
Manufacturer's website	www.heidenhain.de	
Manufacturer's product ID	ECI1319 FS	EQI1331 FS

2.5 8JSB, 8JSQ - Order key

	8JS	b	c	d	.	ee	nnn	ff	gg	-	h
Cooling / Construction type											
B ... Self-cooling, stainless steel, flange mounting											
Q ... Self-cooling, stainless steel, front mounting											
Sizes											
Valid values: 3, 4, 5, 6											
Length											
Valid values: 1, 2, 3, 4, 5											
Motor encoder system											
Motor sizes 3 and 4											
D8 ... EnDat 2.2 encoder, inductive, 19-bit single-turn											
D9 ... EnDat 2.2 encoder, inductive, 19-bit single-turn, 12-bit multi-turn											
Motor sizes 5 and 6											
DA ... EnDat 2.2 encoder, inductive, 19-bit single-turn											
DB ... EnDat 2.2 encoder, inductive, 19-bit single-turn, 12-bit multi-turn											
Nominal speed											
015 ... 1,500 rpm											
018 ... 1,800 rpm											
020 ... 2,000 rpm											
025 ... 2,500 rpm											
030 ... 3,000 rpm											
035 ... 3,500 rpm											
040 ... 4,000 rpm											
045 ... 4,500 rpm											
050 ... 5,000 rpm											
060 ... 6,000 rpm											
070 ... 7,000 rpm											
Motor options											
U6 ... Oil seal, smooth shaft end											
U7 ... Oil seal, keyed shaft end											
U8 ... Oil seal, smooth shaft end, holding brake											
U9 ... Oil seal, keyed shaft end, holding brake											
Special motor options											
00 ... No special motor options											
Motor version											
0 ... Version 0											

Note:

Order keys only provide limited information about which combinations are available.

Current information about combinations is available on the Internet in the CAD configurator under cad.br-automation.com.

2.5.1 Example order 1

A stainless steel three-phase synchronous motor of type **8JS** for flange mounting (order code "**B**") was selected for an application. The size/length should be **43**. An inductive single-turn encoder was chosen. The required speed is 2500 rpm. A brake is not required, the shaft is equipped with an oil seal, the output shaft should be smooth.

The code for the flange-mounted stainless steel motor **8JSB**.

The code for the size/length is **43**.

The code (ee) for the encoder system is **D8**.

The code (nnn) for a nominal speed of 2500 rpm is **025**.

All 8JSB motors are equipped with option "single cable solution (hybrid cable) connector, straight, top". The option code (ff) is therefore always "**U**". The no holding brake and smooth shaft without oil seal options result in "**6**", so the option code is "**U6**".

No special options (gg), the code is **00**.

The version has a fixed definition and is currently - **0**.

The model number for the required motor is therefore **8JSB43.D8025U600-0**.

2.5.2 Example order 2

A stainless steel three-phase synchronous motor of type **8JS** for front mounting (order code "**Q**") was selected for an application. The size/length should be **65**. An inductive multi-turn encoder was chosen. The required speed is 2000 rpm. A brake and oil seal are required (IP69K protection), the output shaft should be smooth.

The code for the flange-mounted stainless steel motor **8JSQ**.

The code for the size/length is **65**.

The code (ee) for the encoder system is **DB**.

The code (nnn) for a nominal speed of 2000 rpm is **020**.

All 8JSQ motors are equipped with option "single cable solution (hybrid cable) connector, straight, top". The option code (ff) is therefore always "**U**". The holding brake and smooth shaft with oil seal options result in "**8**", so the option code is "**U8**".

No special options (gg), the code is **00**.

The version has a fixed definition and is currently - **0**.

The model number for the required motor is therefore **8JSQ65.DB020U800-0**.

2.6 General motor data

General information	Cooling type B	Cooling type Q
C-UR-US listed	PRHZ2.E360421	PRHZ2.E360421
EHEDG	Certification in preparation	Certification in preparation
Electrical characteristics		
Mains input voltage on servo drive	3x 400 VAC ... 3x 480 VAC ± 10%	
Connection type Motor connection Encoder connection	htec circular connector from Intercontec, "single cable solution" (hybrid connector), size 1	
Thermal characteristics		
Class of the insulation system Per IEC 60085	F	
Methods of cooling	Self-cooled (IC 400/ IC 4A0A0)	Self-cooled (IC 400/ IC 4A0A0)
Thermal motor protection in accordance with EN 60034-11	KTY83-110 Maximum winding temperature is 140°C (limited for EnDat to 110°C by the thermal motor protection in the ACOPOS servo drive or the ACOPOSmulti drive system)	
Mechanical characteristics		
Vibration severity in accordance with EN 60034-14	Vibration severity level A	
Flange	In accordance with IEC 60072-1	
Shaft end	Cylindrical, with locking thread DIN 332-2 Form D, DIN SPEC 42955	
Key and keyway	The DIN 748-compliant keyway and the key correspond to DIN 6885 Form A, for stainless steel 1.4404.	
Balancing the shaft in accordance with DIN ISO 8821	Balanced in accordance with DIN ISO 1940/1, severity level G 6.3	
Bearing service life per DIN ISO281	20,000 h	
Motor housing material Surface roughness	Stainless steel 1.4404 <0.8 µm, which meets EHEDG specifications	
Operating conditions		
Rating class, operating mode in accordance with EN 60034-1	S1 - Continuous operation	
Environmental conditions during operation	0°C to +40°C	
Maximum installation elevation	1000 m	
EN 60034-5 protection (IP code)	IP69K	
Construction and mounting arrangement type in accordance with EN 60034-7 (IM code)	Only horizontal IMB5	Horizontal IMB14 or vertical IMV18
Reduction of I _N , M _N , I ₀ and M ₀ for installation elevations above 1000 m over sea level or for ambient temperatures above 40°C		
Elevation above sea level	6% up to 2000 m 17% up to 3000 m 30% up to 4000 m 55% up to 5000 m	
Ambient temperatures above 40°C, at installation elevations less than 1000 m above sea level	5% more per 5°C temperature increase	
At lower ambient temperatures from -20°C to +5°, take note of the information provided in section "Ambient temperature".		
Storage and transport conditions		
Storage temperature	-25 to +55°C max. change 20 K/h, climate class 1K4 (IEC60721-3-1)	
Relative humidity during storage	5% - 95%, non-condensing	
Transport temperature	-25 to +70°C max. change 20 K/h, climate class 2K3 (IEC60721-3-2)	
Relative humidity during transport	5% - 95%, non-condensing	

2.6.1 Formula symbols

Term	Symbol	Unit	Description
Nominal speed	n_N	rpm	Nominal speed of the motor
Nominal torque	M_N	Nm	The nominal torque is output by the motor ($n = n_N$) when the nominal current is being drawn. This is possible for any length of time if the environmental conditions are correct. (40° ambient temperature and a rise in temperature of 100 K)
Nominal power	P_N	kW	The nominal power is output by the motor when $n = n_N$. This is possible for any length of time if the environmental conditions are correct.
Nominal current	I_N	A	The nominal current is the RMS value for the phase current (current in the motor supply line) when generating the nominal torque at the nominal speed. This is possible for any length of time if the environmental conditions are correct. (40° ambient temperature and a rise in temperature of 100 K)
Stall torque	M_0	Nm	The stall torque is output by the motor at the speed n_0 and when the stall current is being applied. This is possible for any length of time if the environmental conditions are correct. The speed n_0 must be high enough so that the winding temperature in all windings is uniform and steady ($n_0 = 50$ rpm for B&R motors). The continuous torque is reduced when the motor is at a complete standstill.
Stall current	I_0	A	The stall current is the RMS value of the phase current (current in the motor supply line) for the generation of the stall torque at the speed n_0 . This is possible for any length of time if the environmental conditions are correct. The speed n_0 must be high enough so that the winding temperature in all windings is uniform and steady ($n_0 = 50$ rpm for B&R motors).
Peak torque	M_{\max}	Nm	The peak torque is briefly output by the motor when the peak current is being drawn.
Peak current	I_{\max}	A	The peak current is the RMS value of the phase current (current in the motor supply line) for generating the peak torque. This is only possible for a short time. The peak current is determined by the magnetic circuit. Exceeding this value for a short time can cause irreversible damage (demagnetization of the magnet material).
Maximum speed	n_{\max}	rpm	Maximum motor speed. This is a mechanical condition (centrifugal force, bearing wear).
Average speed	n_{Avg}	rpm	Average speed for one cycle
Torque constant	K_T	Nm/A	The torque constant determines the torque created by the motor with 1 A rms phase current. This value applies at a motor temperature of 25°C with a 100 K temperature increase.
Voltage constant	K_E	V/1000 rpm	The voltage constant determines the RMS value (phase-phase) of the counter EMF induced by the motor at a speed of 1000 rpm. This value applies at a motor temperature of 25°C (winding temperature).
Stator resistance	$R_{2\text{ph}}$	Ohm	Resistance measured in ohms between two motor leads (phase-phase) at 20°C winding temperature. On B&R motors, the windings use a star connection.
Stator inductance	$L_{2\text{ph}}$	mH	Winding inductance measured between two motor leads. Stator inductance depends on the rotor position.
Electrical time constant	t_{el}	ms	Corresponds to 1/5 of the time needed for the stator current to stabilize with constant operating conditions.
Thermal time constant	t_{therm}	min	Corresponds to 1/5 of the time needed for the motor temperature to stabilize with constant operating conditions.
Moment of inertia without brake	J	kgcm ²	Moment of inertia for a motor without a holding brake
Mass without brake	m	kg	Mass of motor without holding brake
Moment of inertia of brake	J_{Br}	kgcm ²	Moment of inertia for the built-in holding brake
Brake mass	m_{Br}	kg	Mass of built-in holding brake
Brake holding torque	M_{Br}	Nm	Minimum torque required to hold the rotor when the brake is activated
Installed load	P_{on}	W	Installed load for the built-in holding brake
Installed current	I_{on}	A	Installed current for the built-in holding brake
Connection voltage	U_{on}	V	Operating voltage for the built-in holding brake
Activation delay	t_{Bon}	ms	Delay time required for the holding torque of the brake to be established after the operating voltage has been removed from the holding brake
Release delay	t_{Boff}	ms	Delay time required until the holding torque of the holding brake is reduced by 90% (the brake is released) after operating voltage has been returned to the holding brake
Total moment of inertia of motor with brake	J_T	kgcm ²	Moment of inertia of motor with brake $J_T = J + J_B$
Total mass of motor with brake	m_T	kg	Mass of motor with brake $M_T = M + M_B$

2.7 8JSB and 8JSQ - Technical data

2.7.1 8JSB3 - Technical data

Model number	8JSB31.ee050ff00-0	8JSB32.ee030ffgg-0	8JSB32.ee070ffgg-0
Motor			
Nominal speed n_N [rpm]	5000	3000	7000
Number of pole pairs		4	
Nominal torque M_N [Nm]	0.86	1.482	1.045
Nominal power P_N [W]	450	466	766
Nominal current I_N [A]	1.02	1.059	1.432
Stall torque M_0 [Nm]	1	1.62	1.67
Stall current I_0 [A]	1.29	1.23	2.42
Maximum torque M_{max} [Nm]	4.41	6.84	7.04
Maximum current I_{max} [A]	6.9	5.7	11.3
Maximum speed n_{max} [rpm]		8000	
Torque constant K_T [Nm/A]	0.85	1.4	0.73
Voltage constant K_E [V/1000 rpm]	33.62	89.8	47.1
Stator resistance R_{2ph} [Ω]	21.417	23.8	6.34
Stator inductance L_{2ph} [mH]	37.5	46.5	12.8
Electrical time constant t_{el} [ms]	1.751	1.956	2.029
Thermal time constant t_{therm} [min]	24		32
Moment of inertia J [kgcm ²]	0.33		0.59
Mass without brake m [kg]	4.1		5
Holding brake			
Holding torque of the brake M_{Br} [Nm]		2.5	
Brake mass [kg]		0.7	
Moment of inertia for the brake J_{Br} [kgcm ²]		0.012	
Recommendations			
ACOPOSmulti 8BVLxxxx...	0014		0028
Cross section for B&R motor cables [mm ²]	1.5		2.5
Connector size	-		1.0

Model number	8JSB33.ee020ffgg-0	8JSB33.ee045ffgg-0
Motor		
Nominal speed n_N [rpm]	2000	4500
Number of pole pairs		4
Nominal torque M_N [Nm]	2.033	1.729
Nominal power P_N [W]	426	815
Nominal current I_N [A]	1.07	1.572
Stall torque M_0 [Nm]	2.13	2.2
Stall current I_0 [A]	1.2	2.1
Maximum torque M_{max} [Nm]	9.68	9.88
Maximum current I_{max} [A]	5.9	10.3
Maximum speed n_{max} [rpm]		8000
Torque constant K_T [Nm/A]	1.9	1.1
Voltage constant K_E [V/1000 rpm]	120	70.6
Stator resistance R_{2ph} [Ω]	26.6	9.03
Stator inductance L_{2ph} [mH]	53.6	18.5
Electrical time constant t_{el} [ms]	2.015	2.049
Thermal time constant t_{therm} [min]		40
Moment of inertia J [kgcm ²]		0.85
Mass without brake m [kg]		5.9
Holding brake		
Holding torque of the brake M_{Br} [Nm]		2.5
Brake mass [kg]		0.7
Moment of inertia for the brake J_{Br} [kgcm ²]		0.012
Recommendations		
ACOPOSmulti 8BVLxxxx...	0014	0028
Cross section for B&R motor cables [mm ²]		2.5
Connector size		1.0

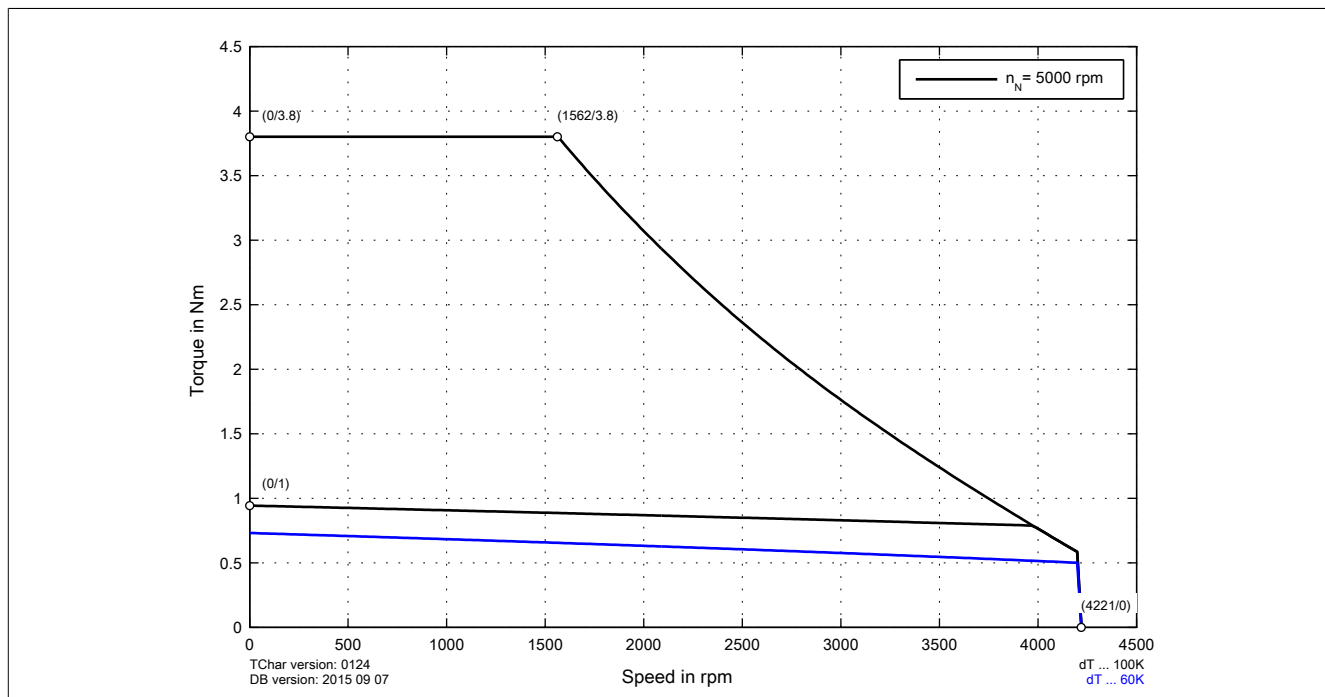
2.7.2 8JSQ3 - Technical data

Model number	8JSQ31.ee050ffgg-0	8JSQ32.ee030ffgg-0	8JSQ32.ee070ffgg-0
Motor			
Nominal speed n_N [rpm]	5000	3000	7000
Number of pole pairs		4	
Nominal torque M_N [Nm]	0.817	1.482	1.045
Nominal power P_N [W]	428	466	766
Nominal current I_N [A]	0.961	1.059	1.432
Stall torque M_0 [Nm]	0.943	1.62	1.67
Stall current I_0 [A]	1.22	1.23	2.42
Maximum torque M_{max} [Nm]	3.8	6.84	7.04
Maximum current I_{max} [A]	5.5	5.7	11.3
Maximum speed n_{max} [rpm]		8000	
Torque constant K_T [Nm/A]	0.85	1.4	0.73
Voltage constant K_E [V/1000 rpm]	54.5	89.8	47.1
Stator resistance R_{2ph} [Ω]	21.4	23.8	6.34
Stator inductance L_{2ph} [mH]	37.5	46.5	12.8
Electrical time constant t_{el} [ms]	1.751	1.956	2.029
Thermal time constant t_{therm} [min]	24		32
Moment of inertia J [kgcm ²]	0.33		0.59
Mass without brake m [kg]	4.1		5
Holding brake			
Holding torque of the brake M_{Br} [Nm]		2.5	
Brake mass [kg]		0.7	
Moment of inertia for the brake J_{Br} [kgcm ²]		0.012	
Recommendations			
ACOPOSmulti 8BVLxxxx...	0014		0028
Cross section for B&R motor cables [mm ²]		2.5	
Connector size		1.0	

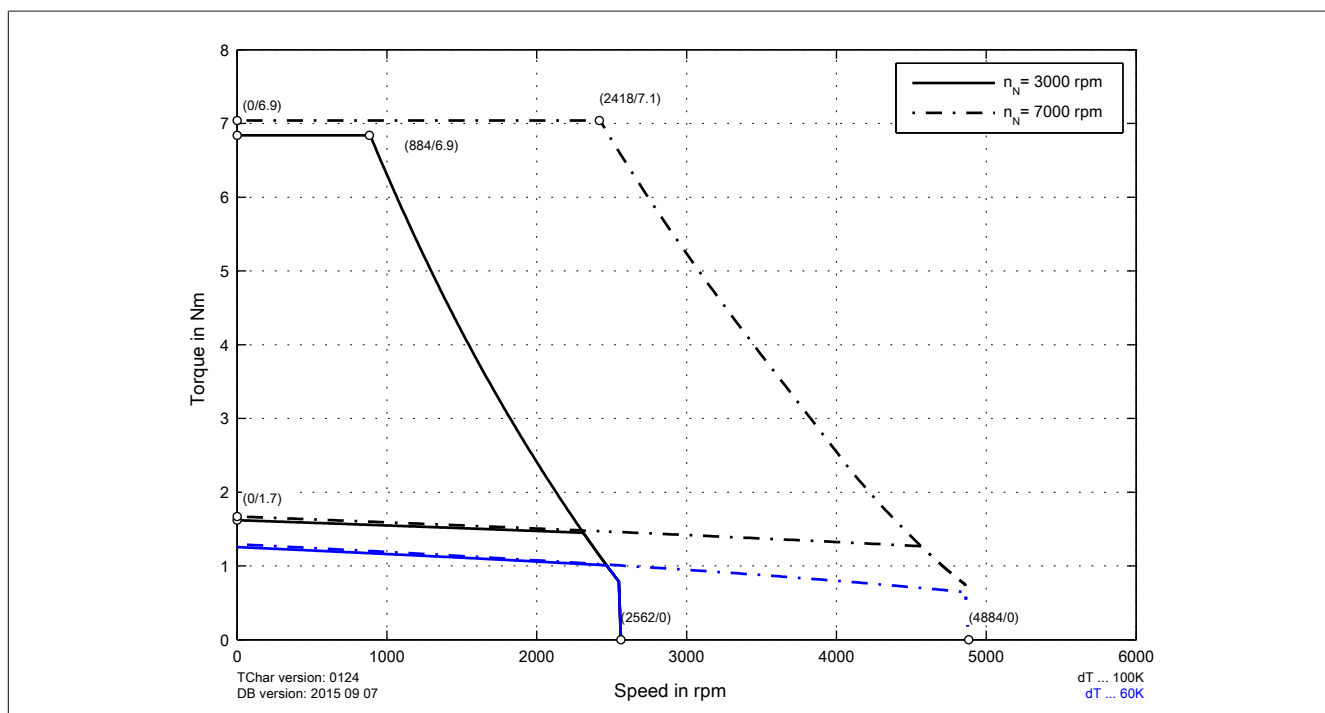
Model number	8JSQ33.ee045ffgg-0	8JSQ33.ee020ffgg-0
Motor		
Nominal speed n_N [rpm]	4500	2000
Number of pole pairs		4
Nominal torque M_N [Nm]	1.729	2.033
Nominal power P_N [W]	815	426
Nominal current I_N [A]	1.572	1.07
Stall torque M_0 [Nm]	2.2	2.13
Stall current I_0 [A]	2.1	1.2
Maximum torque M_{max} [Nm]	9.88	9.68
Maximum current I_{max} [A]	10.3	5.9
Maximum speed n_{max} [rpm]		8000
Torque constant K_T [Nm/A]	1.1	1.9
Voltage constant K_E [V/1000 rpm]	70.6	120
Stator resistance R_{2ph} [Ω]	9.03	26.6
Stator inductance L_{2ph} [mH]	18.5	53.6
Electrical time constant t_{el} [ms]	2.049	2.015
Thermal time constant t_{therm} [min]		40
Moment of inertia J [kgcm ²]		0.85
Mass without brake m [kg]		5.9
Holding brake		
Holding torque of the brake M_{Br} [Nm]		2.5
Brake mass [kg]		0.7
Moment of inertia for the brake J_{Br} [kgcm ²]		0.012
Recommendations		
ACOPOSmulti 8BVLxxxx...	0028	0014
Cross section for B&R motor cables [mm ²]		2.5
Connector size		1.0

2.7.3 Speed-torque characteristics at DC bus voltage of 325 VDC

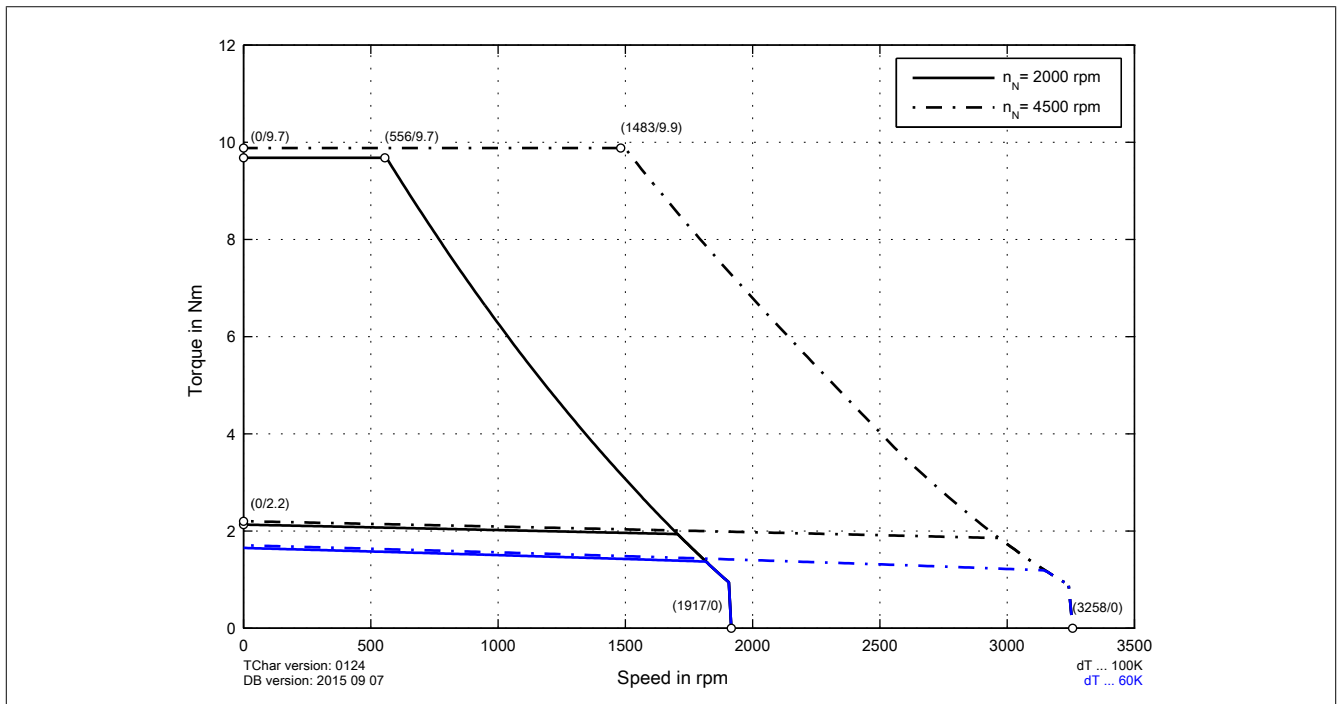
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8JSB32.eennnffgg-0, 8JSQ32.eennnffgg-0

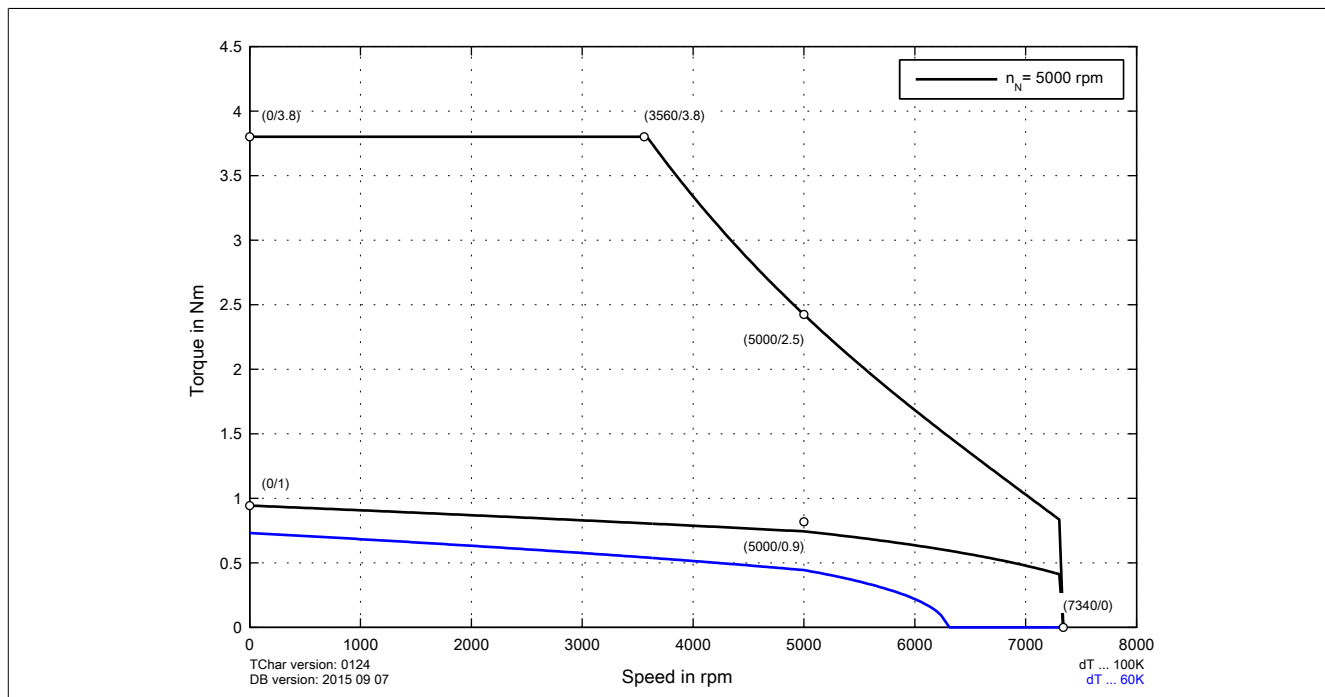


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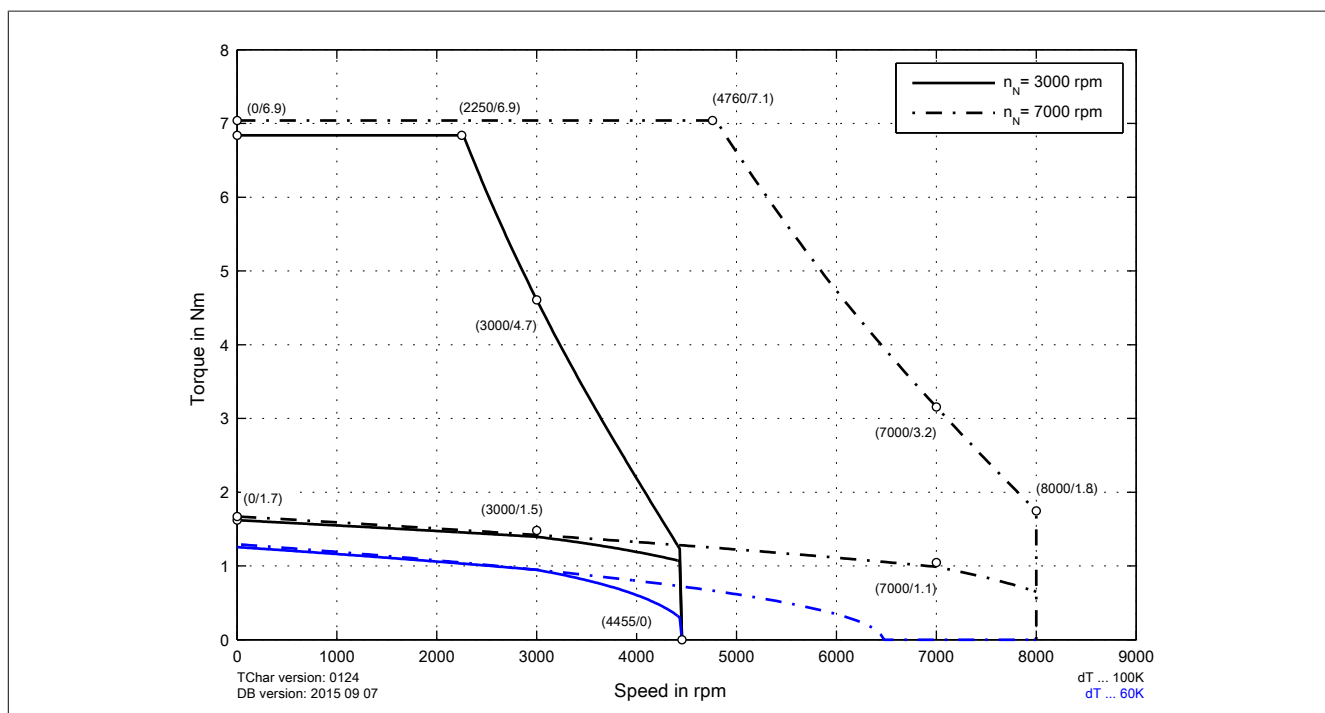


2.7.4 Speed-torque characteristic curves at 560 VDC bus voltage

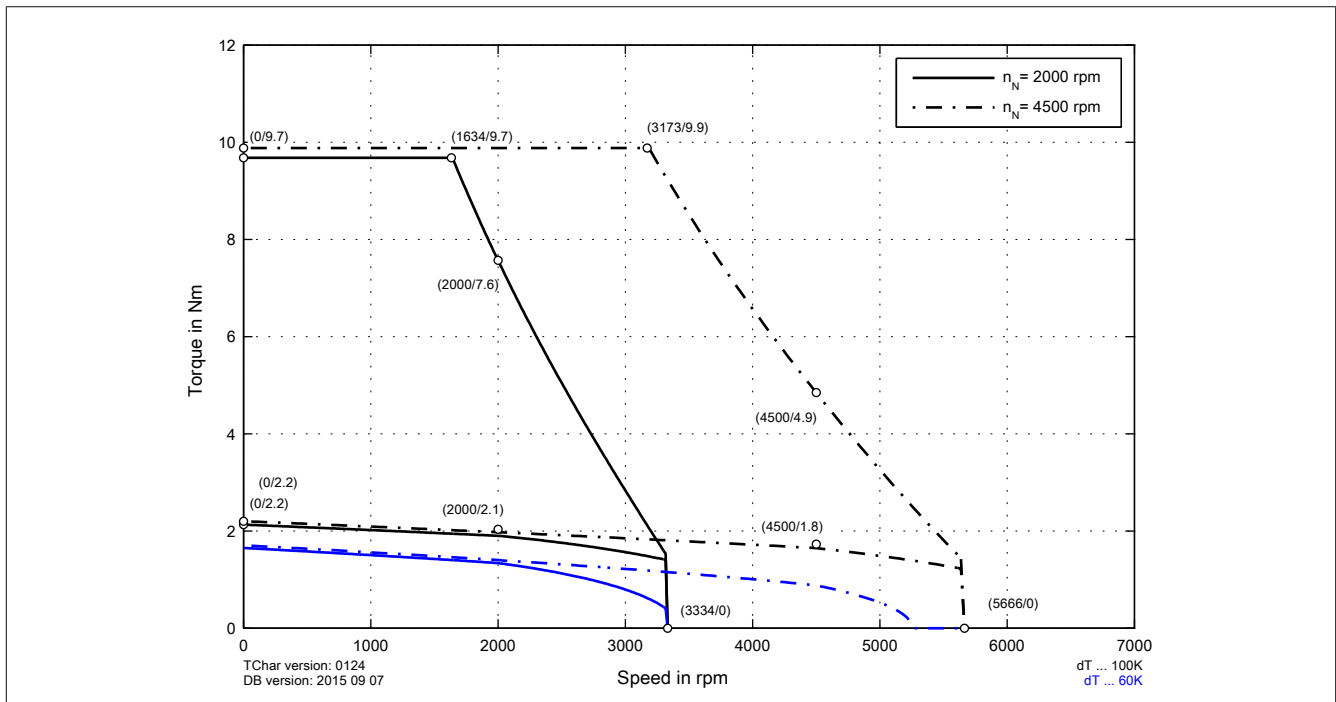
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8JSB32.eennnffgg-0, 8JSQ32.eennnffgg-0

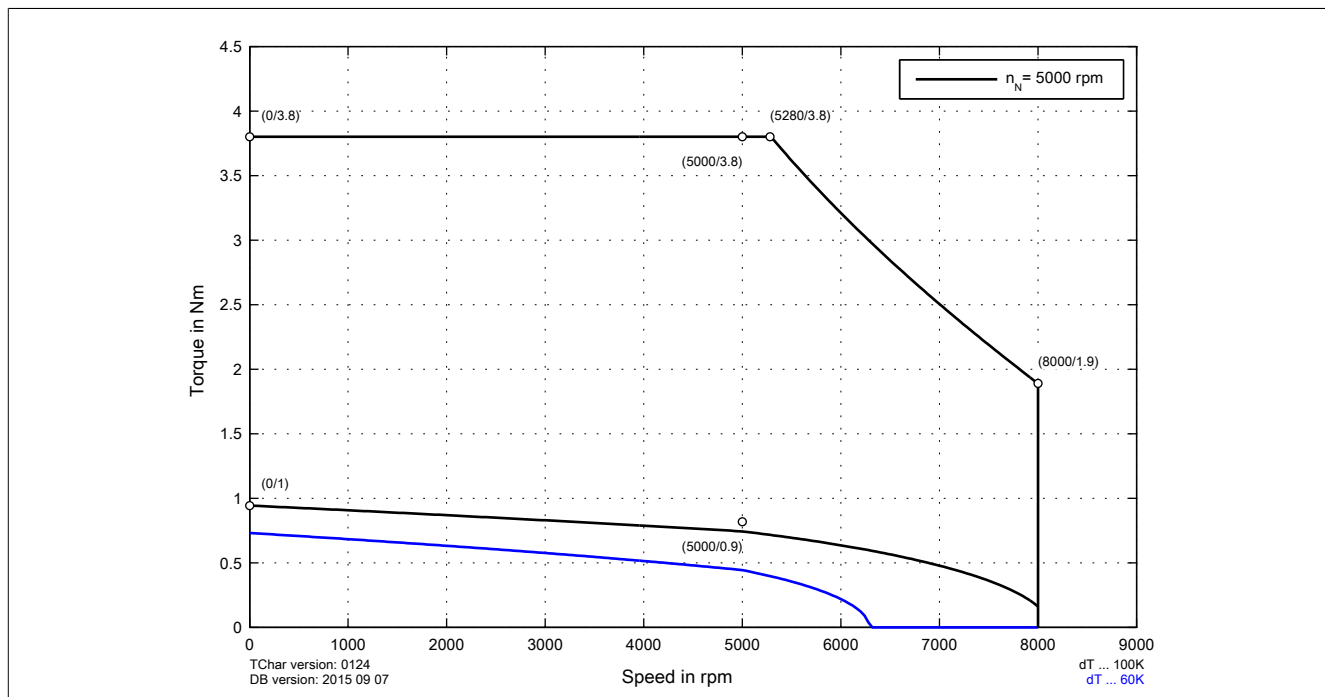


8JSB33.eennnffgg-0, 8JSQ33.eennnffgg-0

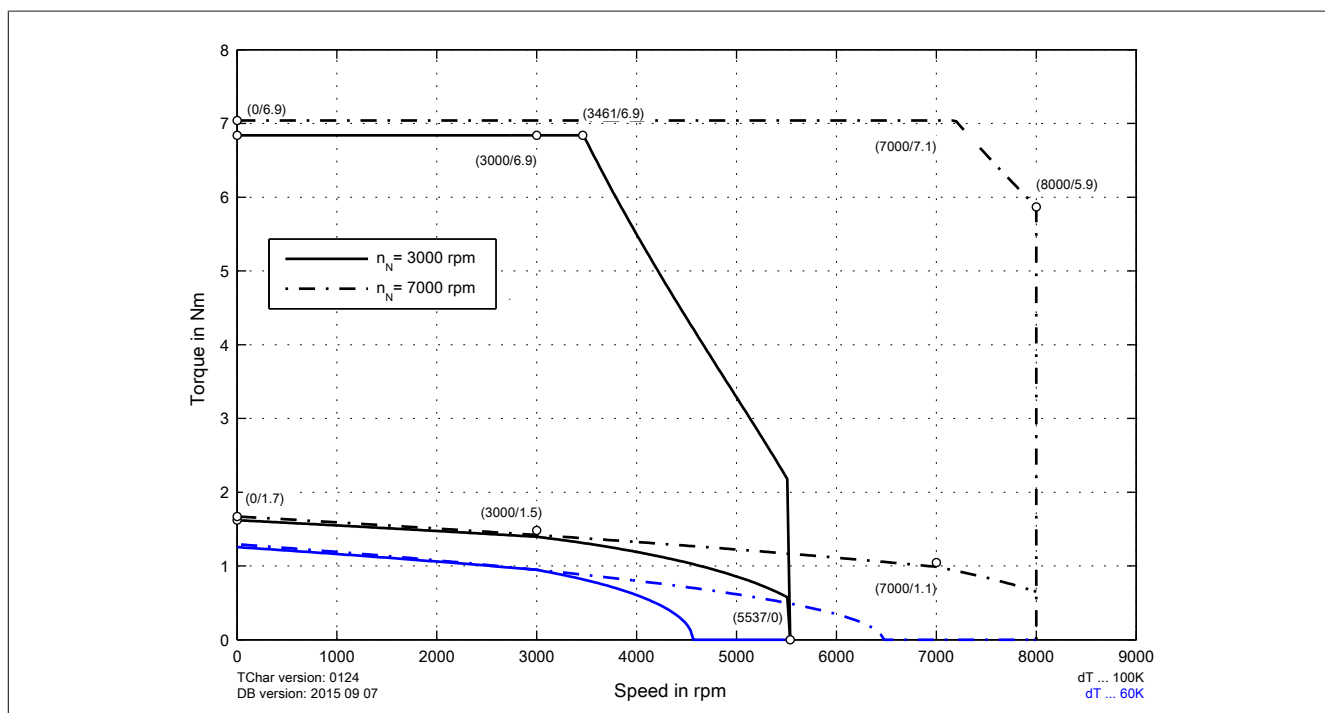


2.7.5 Speed-torque characteristic curves at 750 VDC bus voltage

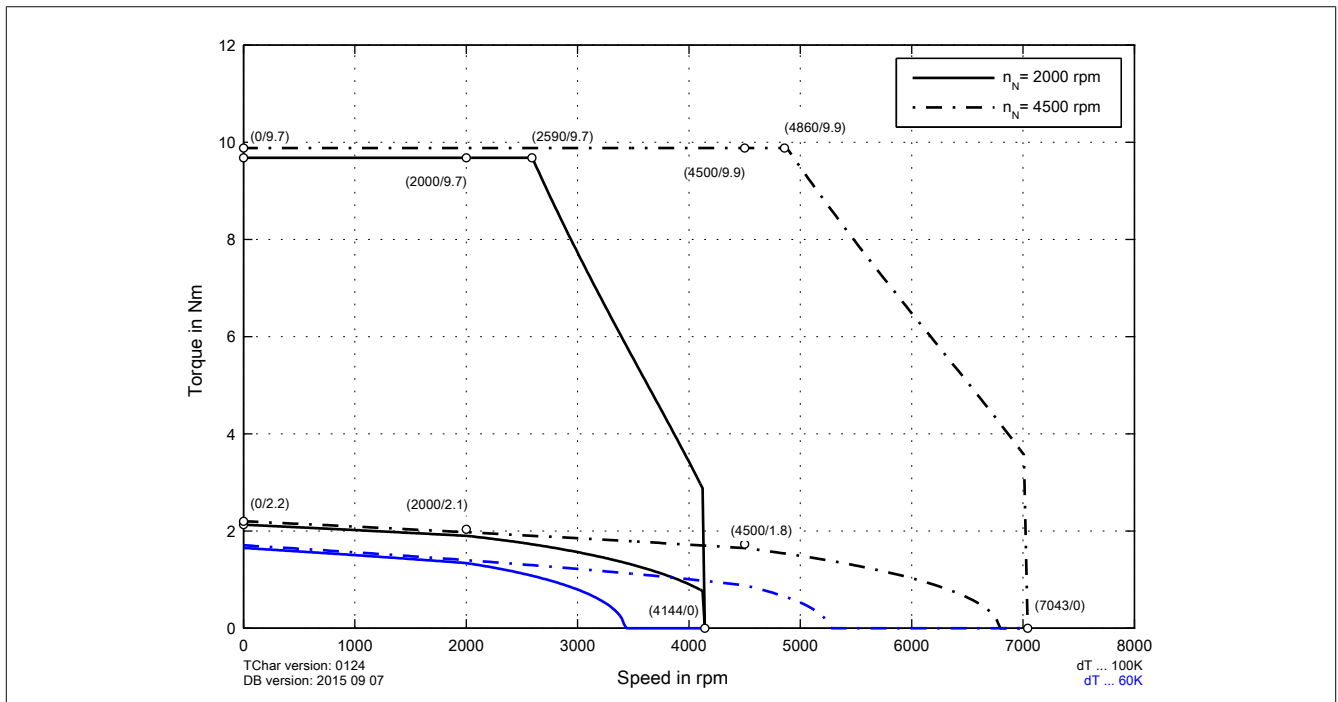
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8JSB32.eennnffgg-0, 8JSQ32.eennnffgg-0

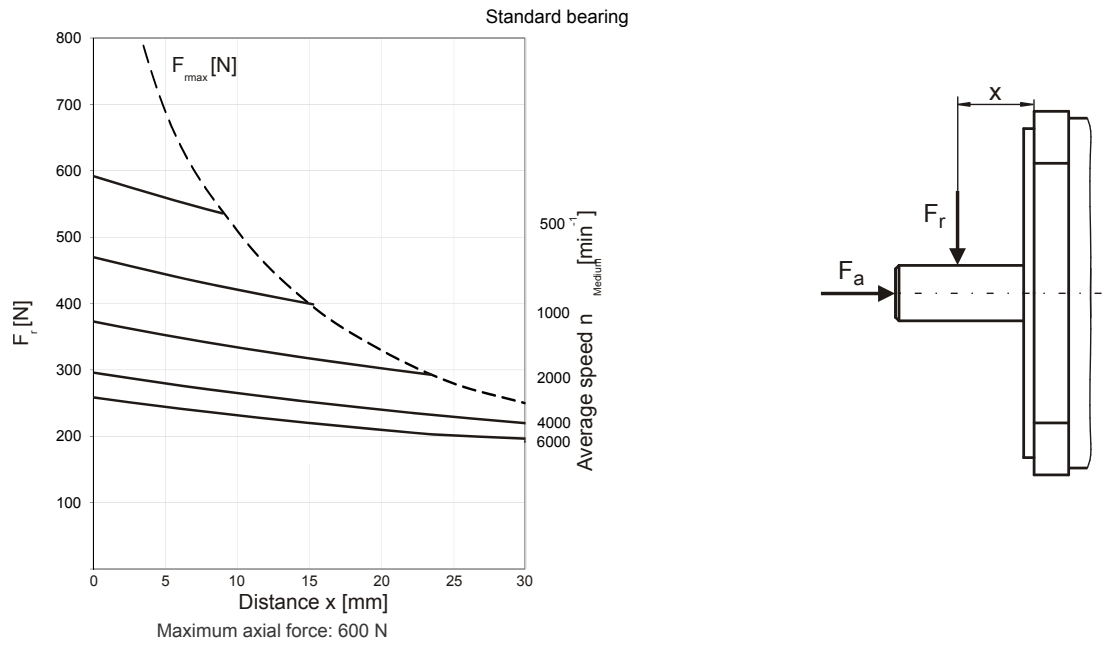


8JSB33.eennnffgg-0, 8JSQ33.eennnffgg-0

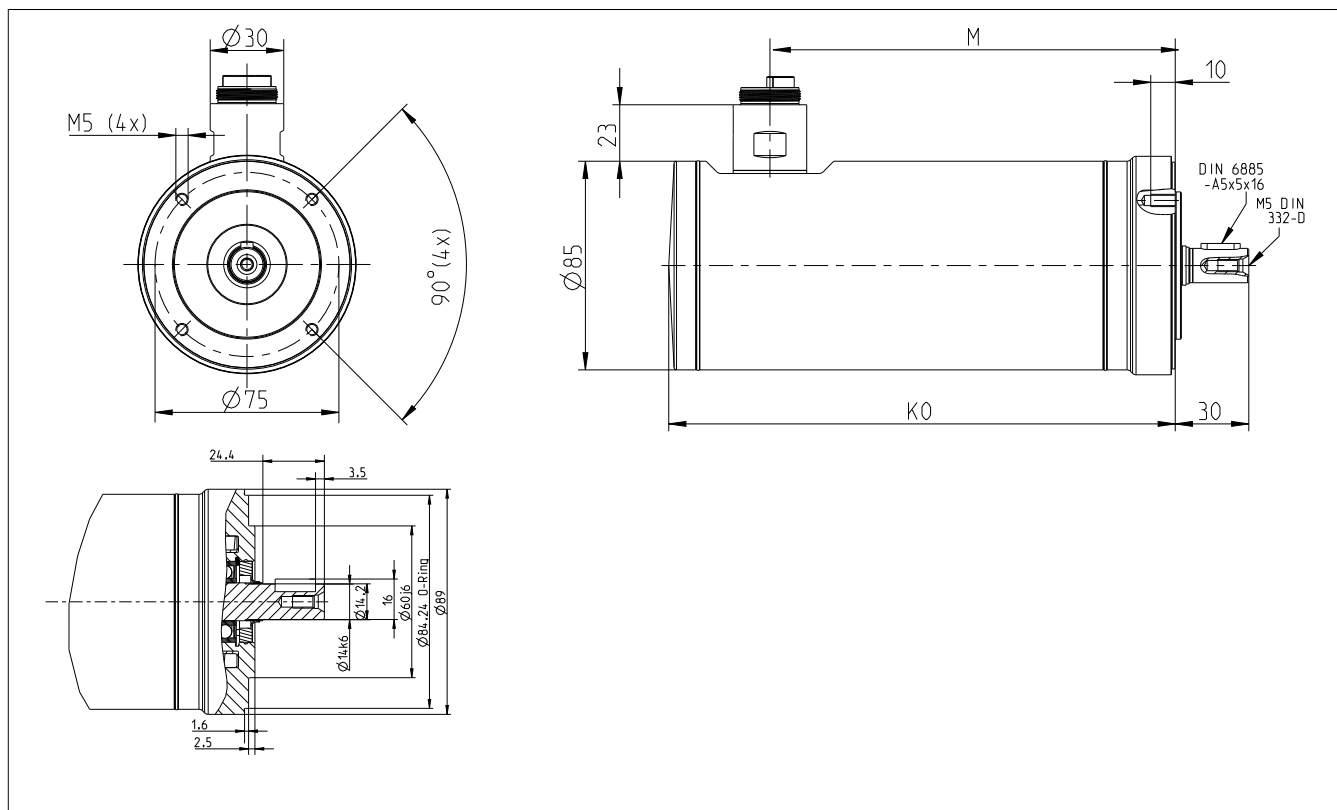


2.7.6 Maximum shaft load

The values in the diagram below are based on a mechanical service life of the bearings of 20,000 operating hours.



2.7.8 8JSQ3 - Dimensions



			Extension of K ₀ and M depending on the motor option [mm]
Model number	K ₀	M	Holding brake
8JSQ31.eennnffgg-0	175.6	134.4	19.3
8JSQ32.eennnffgg-0	206.6	165.3	19.3
8JSQ33.eennnffgg-0	237.6	196.3	19.3

2.7.9 8JSB4 - Technical data

Model number	8JSB41.ee030ffgg-0	8JSB41.ee060ffgg-0	8JSB42.ee035ffgg-0	8JSB42.ee060ffgg-0
Motor				
Nominal speed n_N [rpm]	3000	6000	3500	6000
Number of pole pairs	5			
Nominal torque M_N [Nm]	1.518	1.287	2.459	1.971
Nominal power P_N [W]	477	809	901	1238
Nominal current I_N [A]	1.168	1.813	1.891	3.285
Stall torque M_0 [Nm]	1.73	1.79	3.09	3.22
Stall current I_0 [A]	1.45	2.83	2.64	5.78
Maximum torque M_{max} [Nm]	5.65	5.77	10.7	10.8
Maximum current I_{max} [A]	5.8	11.4	11	23.4
Maximum speed n_{max} [rpm]	6000			
Torque constant K_T [Nm/A]	1.3	0.71	1.3	0.6
Voltage constant K_E [V/1000 rpm]	86.3	45.6	80.9	38.3
Stator resistance R_{2ph} [Ω]	21.3	6.04	7.8	1.67
Stator inductance L_{2ph} [mH]	66.1	18.4	26.8	6
Electrical time constant t_{el} [ms]	3.108	3.048	3.437	3.6
Thermal time constant t_{therm} [min]	40		51	
Moment of inertia J [kgcm ²]	0.81		1.45	
Mass without brake m [kg]	6.1		7.4	
Holding brake				
Holding torque of the brake M_{Br} [Nm]	6			
Brake mass [kg]	1.14			
Moment of inertia for the brake J_{Br} [kgcm ²]	0.068			
Recommendations				
ACOPOSmulti 8BVLxxxx...	0014	0028		0055
Cross section for B&R motor cables [mm ²]	2.5			
Connector size	1.0			

Model number	8JSB43.ee025ffgg-0	8JSB43.ee060ffgg-0	8JSB44.ee020ffgg-0	8JSB44.ee050ffgg-0
Motor				
Nominal speed n_N [rpm]	2500	6000	2000	5000
Number of pole pairs	5			
Nominal torque M_N [Nm]	3.511	2.178	4.385	2.781
Nominal power P_N [W]	919	1368	918	1456
Nominal current I_N [A]	2.041	2.447	2.149	2.624
Stall torque M_0 [Nm]	4.32	4.43	5.36	5.46
Stall current I_0 [A]	2.65	5.23	2.75	5.41
Maximum torque M_{max} [Nm]	15.2	15.4	19.3	19.5
Maximum current I_{max} [A]	11	21.6	11.4	22.4
Maximum speed n_{max} [rpm]	6000			
Torque constant K_T [Nm/A]	1.72	0.89	2.04	1.06
Voltage constant K_E [V/1000 rpm]	111	57.4	132	68
Stator resistance R_{2ph} [Ω]	8.63	2.12	8.66	2.25
Stator inductance L_{2ph} [mH]	32.6	8.75	34	9.05
Electrical time constant t_{el} [ms]	3.779	4.158	3.916	4.051
Thermal time constant t_{therm} [min]	63		74	
Moment of inertia J [kgcm ²]	2.09		2.73	
Mass without brake m [kg]	8.8		10.2	
Holding brake				
Holding torque of the brake M_{Br} [Nm]	6			
Brake mass [kg]	1.14			
Moment of inertia for the brake J_{Br} [kgcm ²]	0.068			
Recommendations				
ACOPOSmulti 8BVLxxxx...	0028	0055	0028	0055
Cross section for B&R motor cables [mm ²]	2.5			
Connector size	1.0			

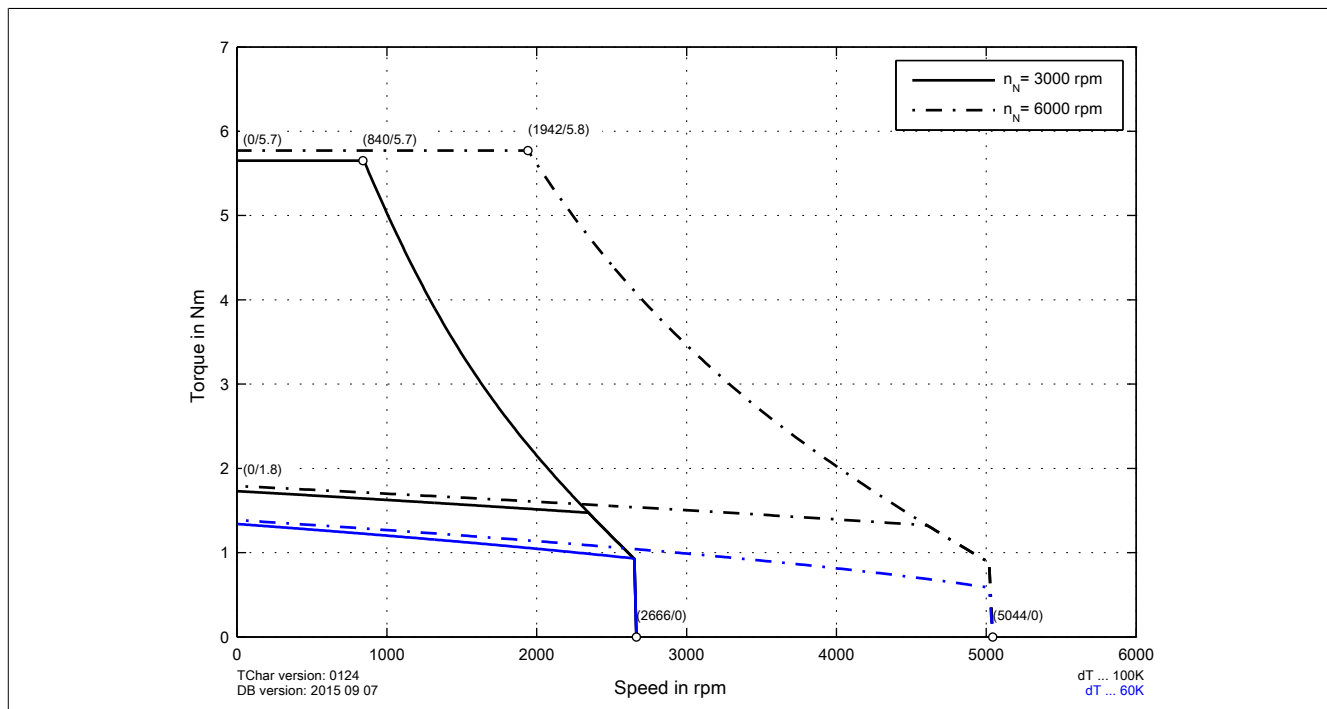
2.7.10 8JSQ4 - Technical data

Model number	8JSQ41.ee030ffgg-0	8JSQ41.ee060ffgg-0	8JSQ42.ee035ffgg-0	8JSQ42.ee060ffgg-0
Motor				
Nominal speed n_N [rpm]	3000	6000	3500	6000
Number of pole pairs	5			
Nominal torque M_N [Nm]	1.518	1.287	2.459	1.971
Nominal power P_N [W]	477	809	901	1238
Nominal current I_N [A]	1.168	1.813	1.891	3.285
Stall torque M_0 [Nm]	1.73	1.79	3.09	3.22
Stall current I_0 [A]	1.45	2.83	2.64	5.78
Maximum torque M_{max} [Nm]	5.65	5.77	10.7	10.8
Maximum current I_{max} [A]	5.8	11.4	11	23.4
Maximum speed n_{max} [rpm]	6000			
Torque constant K_T [Nm/A]	1.3	0.71	1.3	0.6
Voltage constant K_E [V/1000 rpm]	86.3	45.6	80.9	38.3
Stator resistance R_{2ph} [Ω]	21.3	6.04	7.8	1.67
Stator inductance L_{2ph} [mH]	66.1	18.4	26.8	6
Electrical time constant t_{el} [ms]	3.108	3.048	3.437	3.6
Thermal time constant t_{therm} [min]	40		51	
Moment of inertia J [kgcm ²]	0.81		1.45	
Mass without brake m [kg]	6.1		7.4	
Holding brake				
Holding torque of the brake M_{Br} [Nm]	6			
Brake mass [kg]	1.14			
Moment of inertia for the brake J_{Br} [kgcm ²]	0.068			
Recommendations				
ACOPOSmulti 8BVLxxxx...	0014	0028		0055
Cross section for B&R motor cables [mm ²]	2.5			
Connector size	1.0			

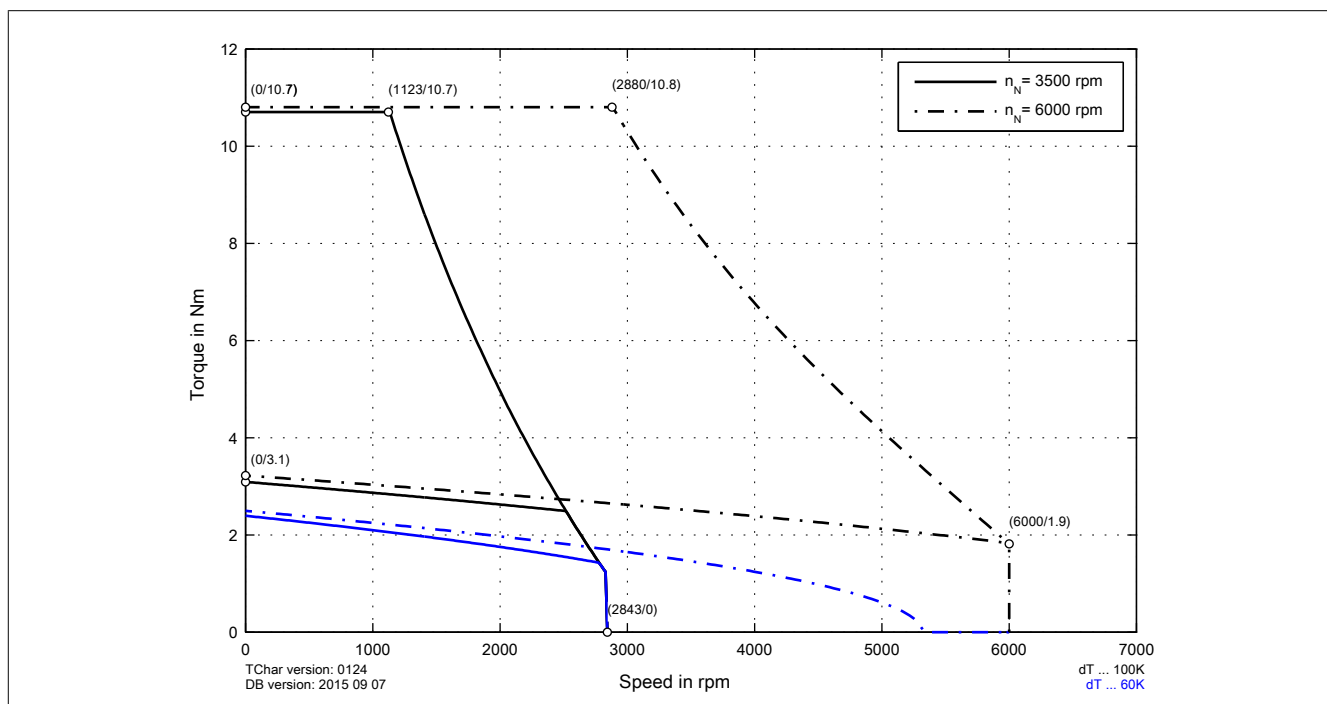
Model number	8JSQ43.ee025ffgg-0	8JSQ43.ee060ffgg-0	8JSQ44.ee020ffgg-0	8JSQ44.ee050ffgg-0
Motor				
Nominal speed n_N [rpm]	2500	6000	2000	5000
Number of pole pairs	5			
Nominal torque M_N [Nm]	3.511	2.178	4.385	2.781
Nominal power P_N [W]	919	1368	918	1456
Nominal current I_N [A]	2.041	2.447	2.149	2.624
Stall torque M_0 [Nm]	4.32	4.43	5.36	5.46
Stall current I_0 [A]	2.65	5.23	2.75	5.41
Maximum torque M_{max} [Nm]	15.2	15.4	19.3	19.5
Maximum current I_{max} [A]	11	21.6	11.4	22.4
Maximum speed n_{max} [rpm]	6000			
Torque constant K_T [Nm/A]	1.72	0.89	2.04	1.06
Voltage constant K_E [V/1000 rpm]	111	57.4	132	68
Stator resistance R_{2ph} [Ω]	8.63	2.12	8.66	2.25
Stator inductance L_{2ph} [mH]	32.6	8.75	34	9.05
Electrical time constant t_{el} [ms]	3.779	4.158	3.916	4.051
Thermal time constant t_{therm} [min]	63		74	
Moment of inertia J [kgcm ²]	2.09		2.73	
Mass without brake m [kg]	8.8		10.2	
Holding brake				
Holding torque of the brake M_{Br} [Nm]	6			
Brake mass [kg]	1.14			
Moment of inertia for the brake J_{Br} [kgcm ²]	0.068			
Recommendations				
ACOPOSmulti 8BVLxxxx...	0028	0055	0028	0055
Cross section for B&R motor cables [mm ²]	2.5			
Connector size	1.0			

2.7.11 Speed-torque characteristics at DC bus voltage of 325 VDC

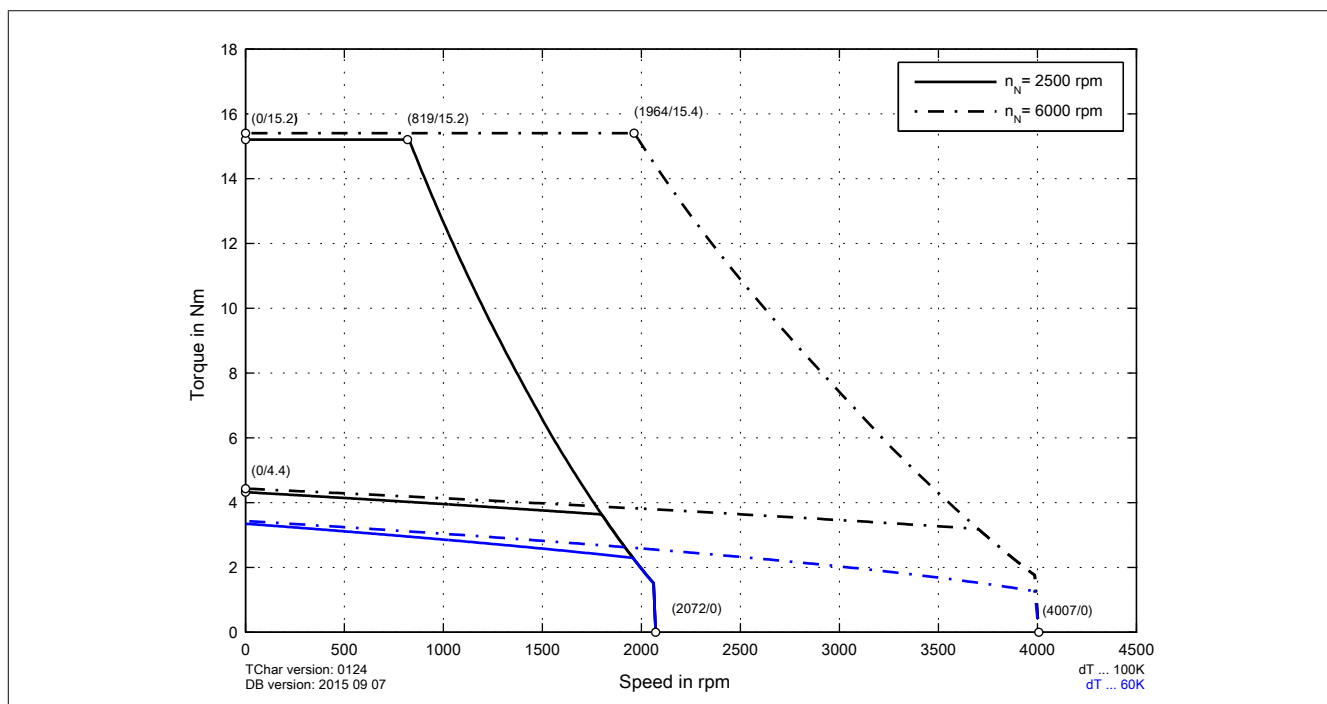
8JSB41.eennnffgg-0, 8JSQ41.eennnffgg-0



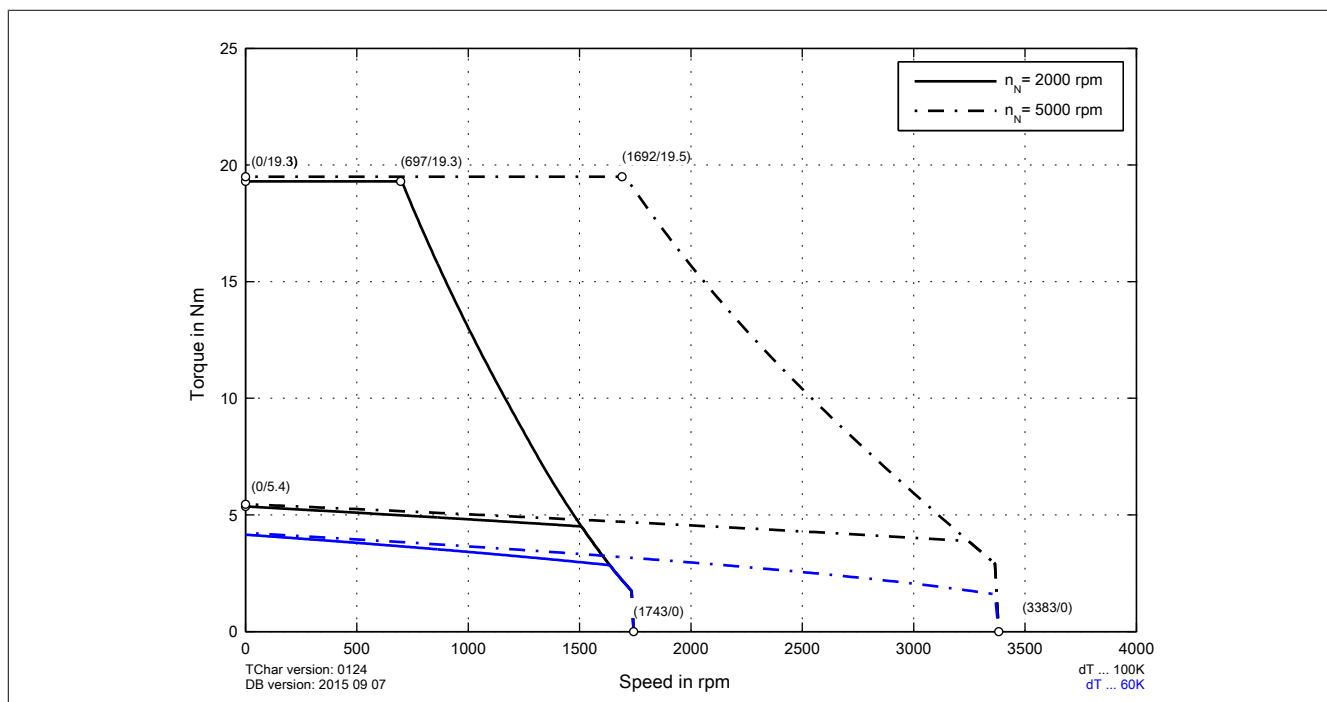
8JSB42.eennnffgg-0, 8JSQ42.eennnffgg-0



8JSB43.eennnffgg-0, 8JSQ43.eennnffgg-0

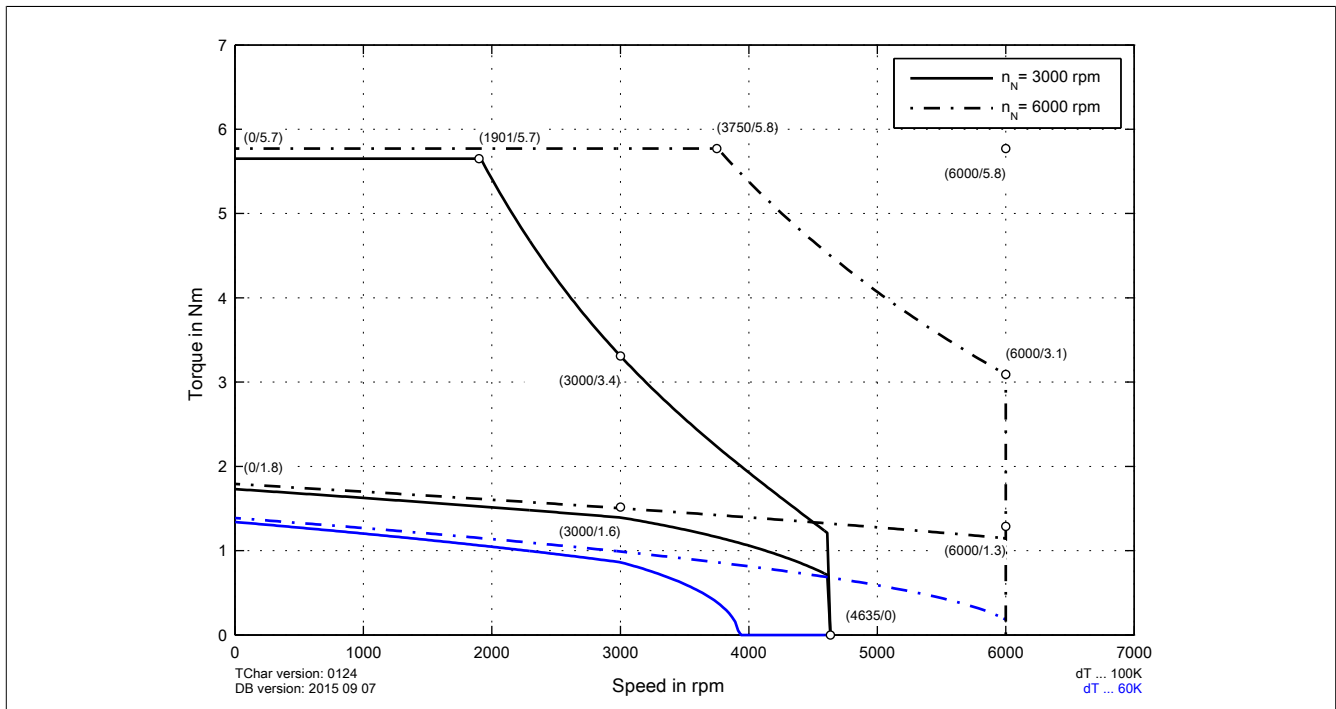


8JSB44.eennnffgg-0, 8JSQ44.eennnffgg-0

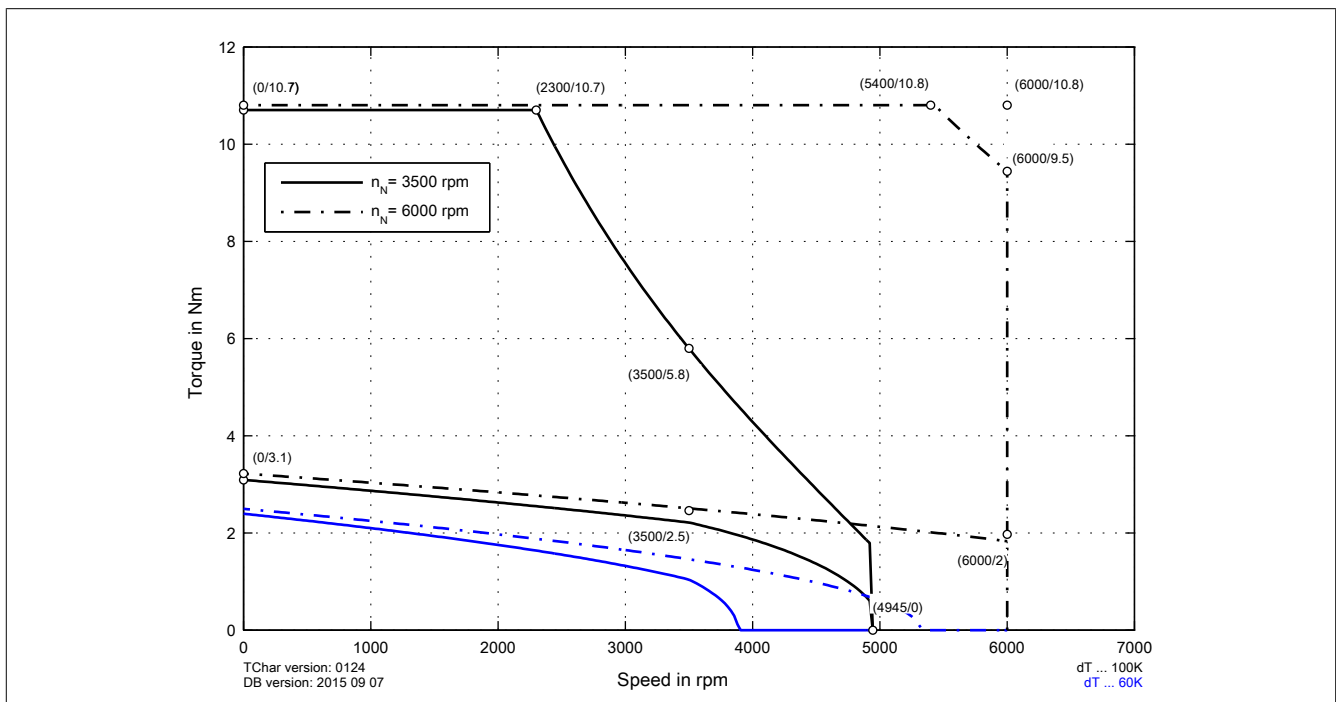


2.7.12 Speed-torque characteristic curves at 560 VDC bus voltage

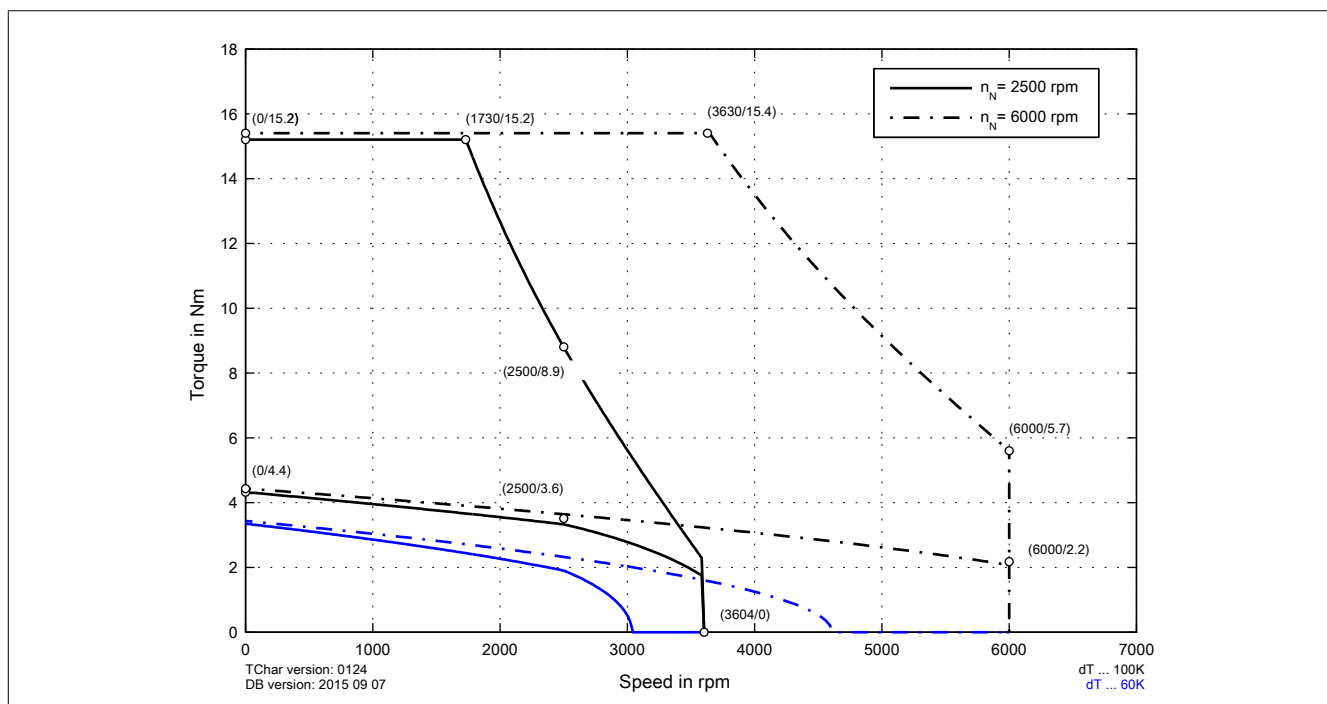
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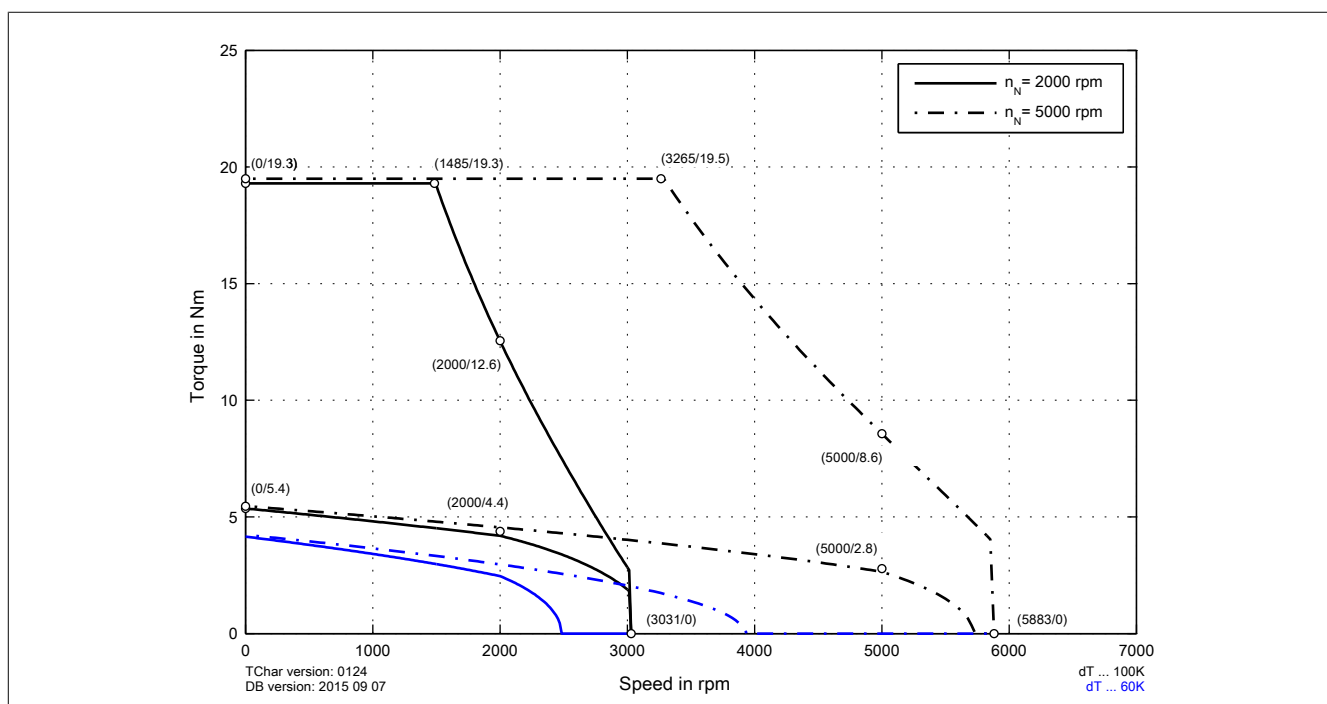
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8JSB43.eennnffgg-0, 8JSQ43.eennnffgg-0

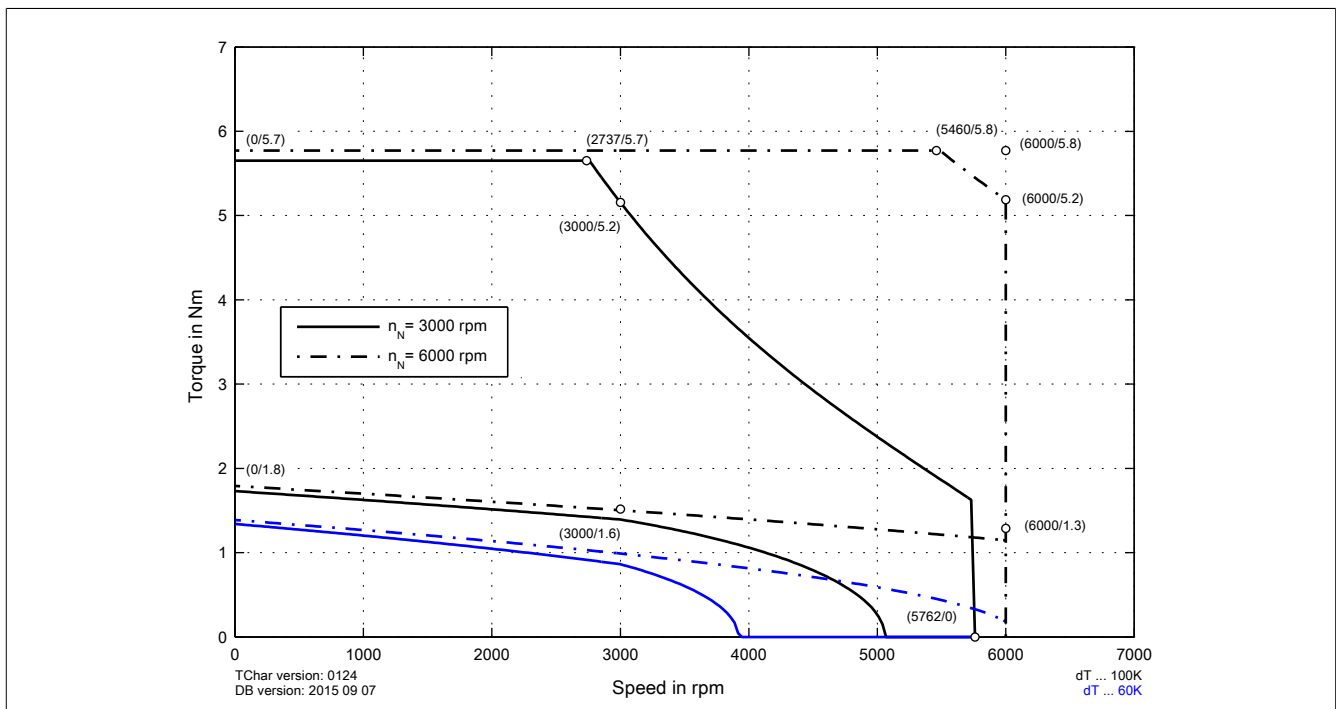


8JSB44.eennnffgg-0, 8JSQ44.eennnffgg-0

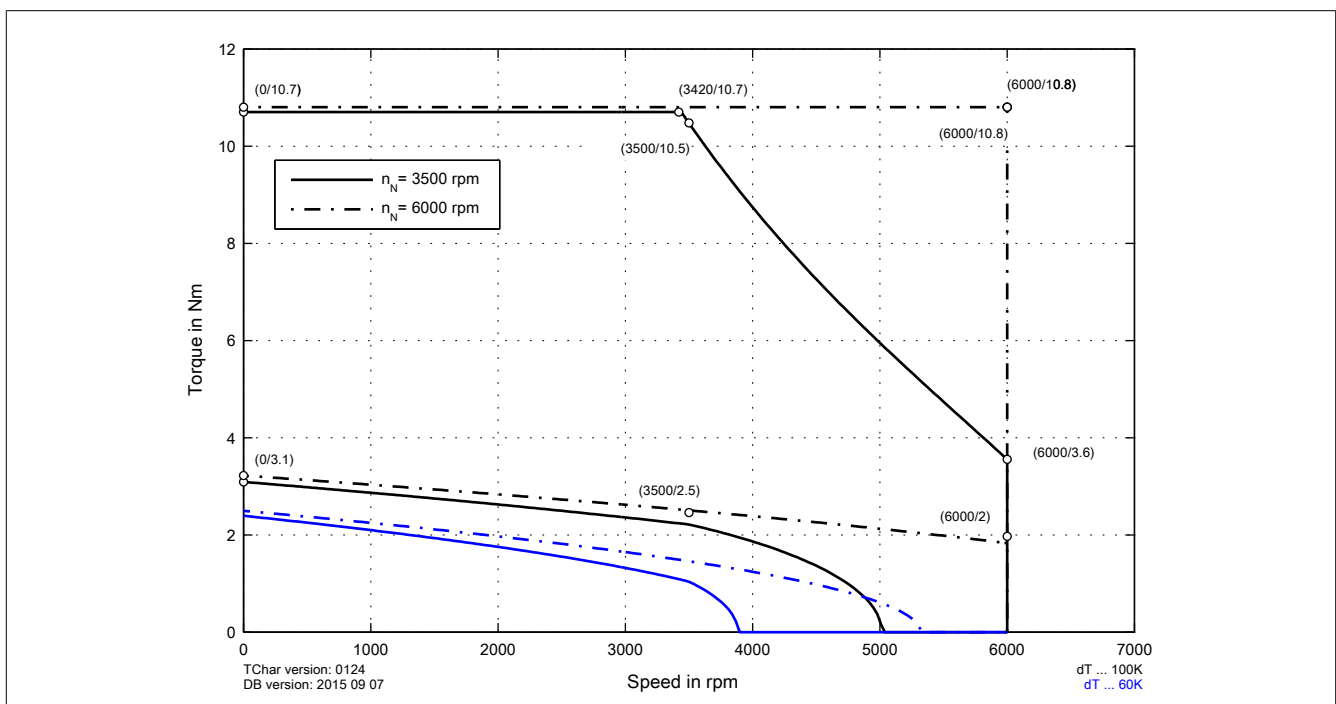


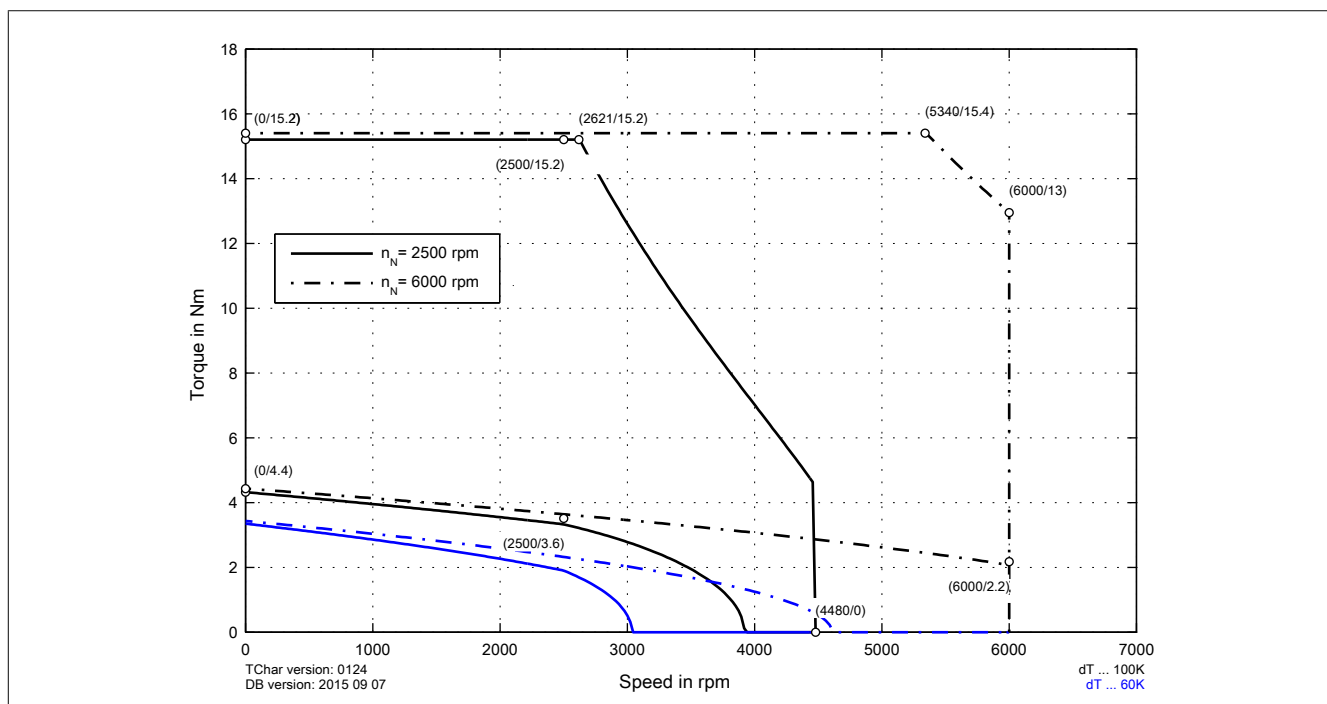
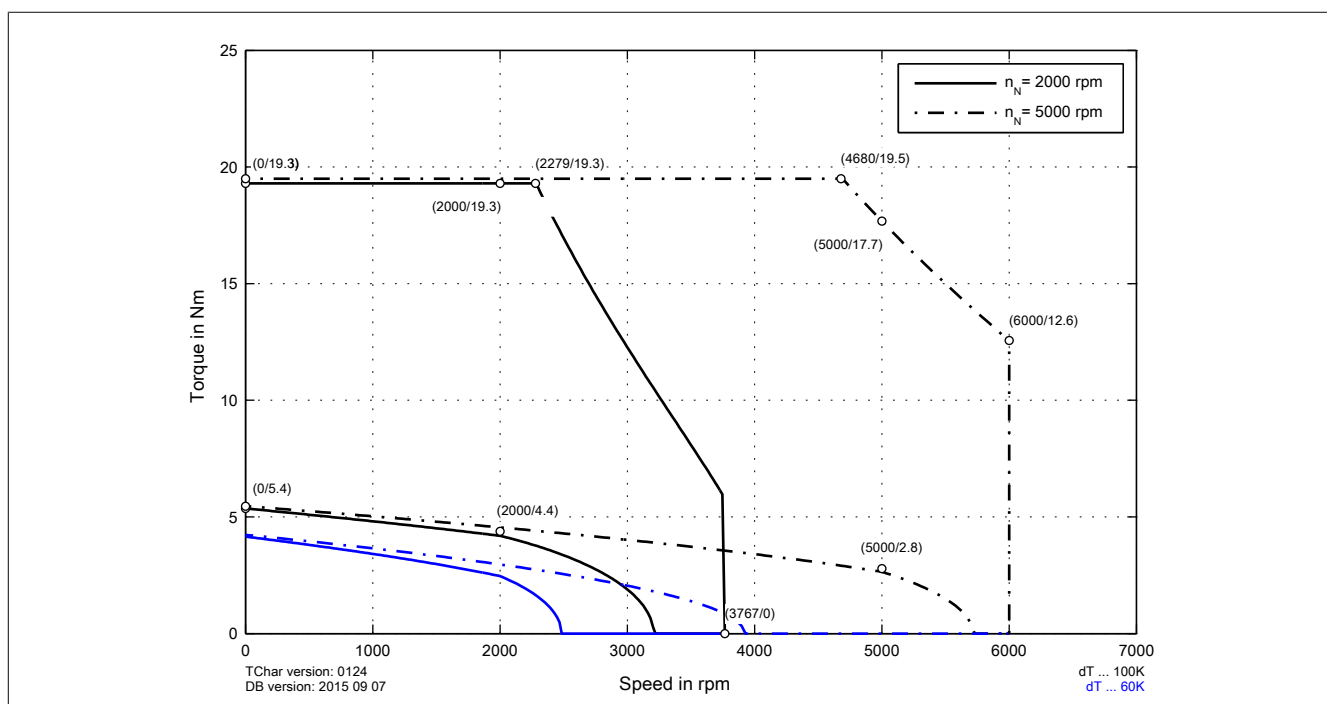
2.7.13 Speed-torque characteristic curves at 750 VDC bus voltage

8JSB41.eennnffgg-0, 8JSQ41.eennnffgg-0



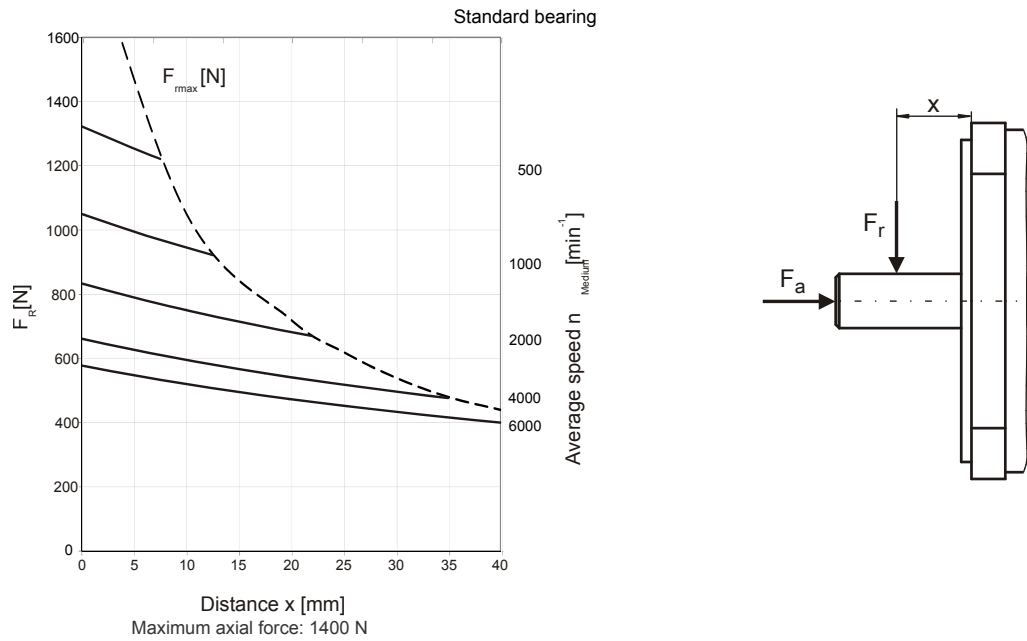
8JSB42.eennnffgg-0, 8JSQ42.eennnffgg-0



8JSB43.eennnffgg-0, 8JSQ43.eennnffgg-0**8JSB44.eennnffgg-0, 8JSQ44.eennnffgg-0**

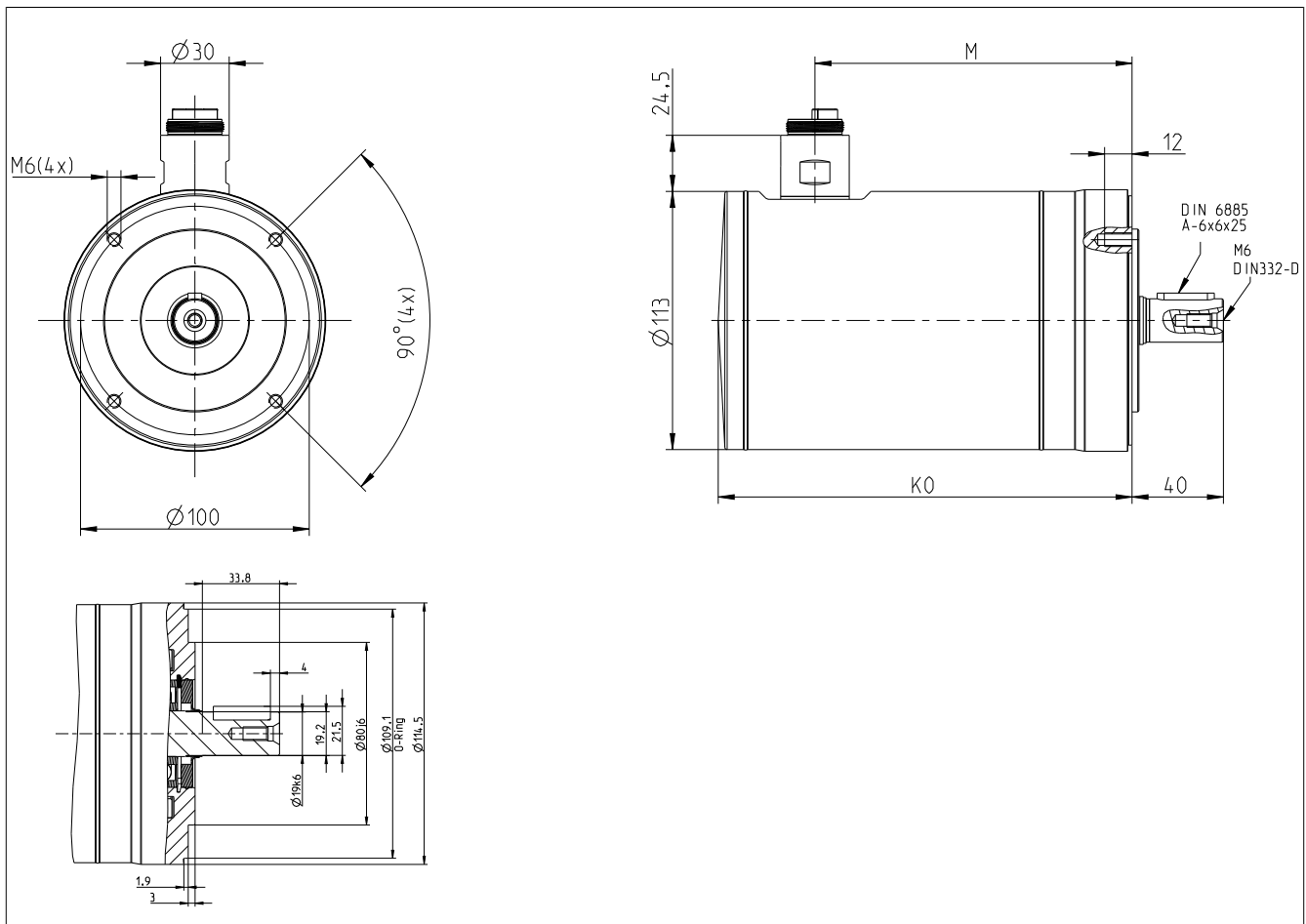
2.7.14 Maximum shaft load

The values in the diagram below are based on a mechanical service life of the bearings of 20,000 operating hours.





2.7.16 8JSQ4 - Dimensions



Model number	K_0	M	Extension of K_0 and M depending on the motor option [mm]
			Holding brake
8JSQ41.eennnffgg-0	181.1	138.8	20.2
8JSQ42.eennnffgg-0	210.1	167.8	20.2
8JSQ43.eennnffgg-0	239.1	196.8	20.2
8JSQ44.eennnffgg-0	268.1	225.8	20.2

2.7.17 8JSB5 - Technical data

Model number	8JSB51.ee025ffgg-0	8JSB52.ee015ffgg-0	8JSB52.ee035ffgg-0
Motor			
Nominal speed n_N [rpm]	2500	1500	3500
Number of pole pairs		5	
Nominal torque M_N [Nm]	2.626	5.045	3.165
Nominal power P_N [W]	688	792	1160
Nominal current I_N [A]	1.545	1.802	2.261
Stall torque M_0 [Nm]	3.1	5.8	5.94
Stall current I_0 [A]	2.16	2.3	4.5
Maximum torque M_{max} [Nm]	11	20.7	21
Maximum current I_{max} [A]	8.24	9	17.7
Maximum speed n_{max} [rpm]		6000	
Torque constant K_T [Nm/A]	1.7	2.8	1.4
Voltage constant K_E [V/1000 rpm]	110	179	92.7
Stator resistance R_{2ph} [Ω]	9	8.98	2.37
Stator inductance L_{2ph} [mH]	36.6	44.7	11.9
Electrical time constant t_{el} [ms]	4.068	4.98	5.028
Thermal time constant t_{therm} [min]	46		58
Moment of inertia J [kgcm ²]	3.42		6.22
Mass without brake m [kg]	8.9		11.1
Holding brake			
Holding torque of the brake M_{Br} [Nm]		14.5	
Brake mass [kg]		1.8	
Moment of inertia for the brake J_{Br} [kgcm ²]		0.173	
Recommendations			
ACOPOSmulti 8BVLxxxx...	0028		0055
Cross section for B&R motor cables [mm ²]		2.5	
Connector size		1.0	

Model number	8JSB53.ee030ffgg-0	8JSB54.ee018ffgg-0	8JSB54.ee030ffgg-0
Motor			
Nominal speed n_N [rpm]	3000	1800	3000
Number of pole pairs		5	
Nominal torque M_N [Nm]	3.751	7.125	2.282
Nominal power P_N [W]	1179	1343	717
Nominal current I_N [A]	2.084	2.74	2.075
Stall torque M_0 [Nm]	8.13	9.92	9.86
Stall current I_0 [A]	5	4.13	9.32
Maximum torque M_{max} [Nm]	29.4		36.9
Maximum current I_{max} [A]	19.8	16.5	37.5
Maximum speed n_{max} [rpm]		6000	
Torque constant K_T [Nm/A]	1.8	2.6	1.1
Voltage constant K_E [V/1000 rpm]	112	166	72.9
Stator resistance R_{2ph} [Ω]	2.12	3.22	0.69
Stator inductance L_{2ph} [mH]	11.4	18.3	3.55
Electrical time constant t_{el} [ms]	5.386	5.689	5.251
Thermal time constant t_{therm} [min]	69		80
Moment of inertia J [kgcm ²]	9.12		11.9
Mass without brake m [kg]	13.4		15.7
Holding brake			
Holding torque of the brake M_{Br} [Nm]		14.5	
Brake mass [kg]		1.8	
Moment of inertia for the brake J_{Br} [kgcm ²]		0.173	
Recommendations			
ACOPOSmulti 8BVLxxxx...	0055		0110
Cross section for B&R motor cables [mm ²]		2.5	
Connector size		1.0	

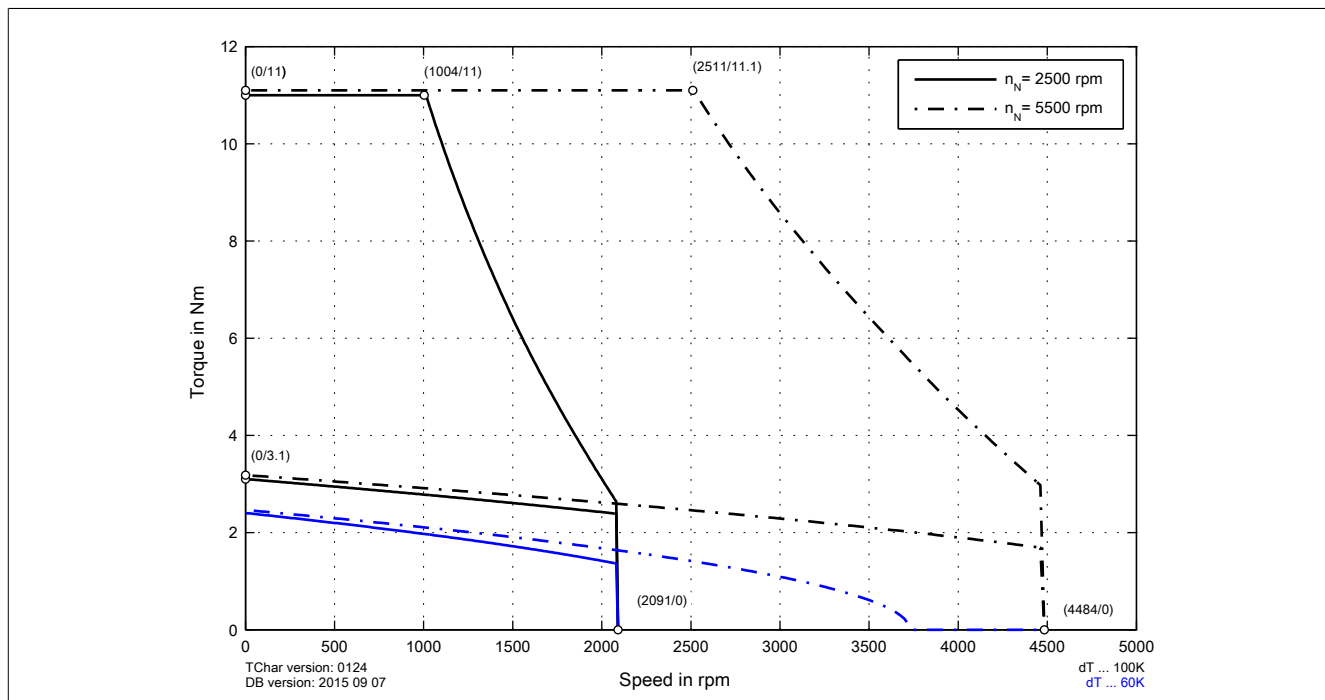
2.7.18 8JSQ5 - Technical data

Model number	8JSQ52.ee015ffgg-0	8JSQ51.ee025ffgg-0	8JSQ52.ee035ffgg-0
Motor			
Nominal speed n_N [rpm]	1500	2500	3500
Number of pole pairs		5	
Nominal torque M_N [Nm]	5.045	2.626	3.165
Nominal power P_N [W]	792	688	1160
Nominal current I_N [A]	1.802	1.545	2.261
Stall torque M_0 [Nm]	5.8	3.1	5.94
Stall current I_0 [A]	2.3	2.16	4.5
Maximum torque M_{max} [Nm]	20.7	11	21
Maximum current I_{max} [A]	9	8.24	17.7
Maximum speed n_{max} [rpm]		6000	
Torque constant K_T [Nm/A]	2.8	1.7	1.4
Voltage constant K_E [V/1000 rpm]	179	110	92.7
Stator resistance R_{2ph} [Ω]	8.98	9	2.37
Stator inductance L_{2ph} [mH]	44.7	36.6	11.9
Electrical time constant t_{el} [ms]	4.98	4.068	5.028
Thermal time constant t_{therm} [min]	58	46	58
Moment of inertia J [kgcm ²]	6.22	3.42	6.22
Mass without brake m [kg]	11.1	8.9	11.1
Holding brake			
Holding torque of the brake M_{Br} [Nm]		14.5	
Brake mass [kg]		1.8	
Moment of inertia for the brake J_{Br} [kgcm ²]		0.173	
Recommendations			
ACOPOSmulti 8BVLxxx...	0028		0055
Cross section for B&R motor cables [mm ²]		2.5	
Connector size		1.0	

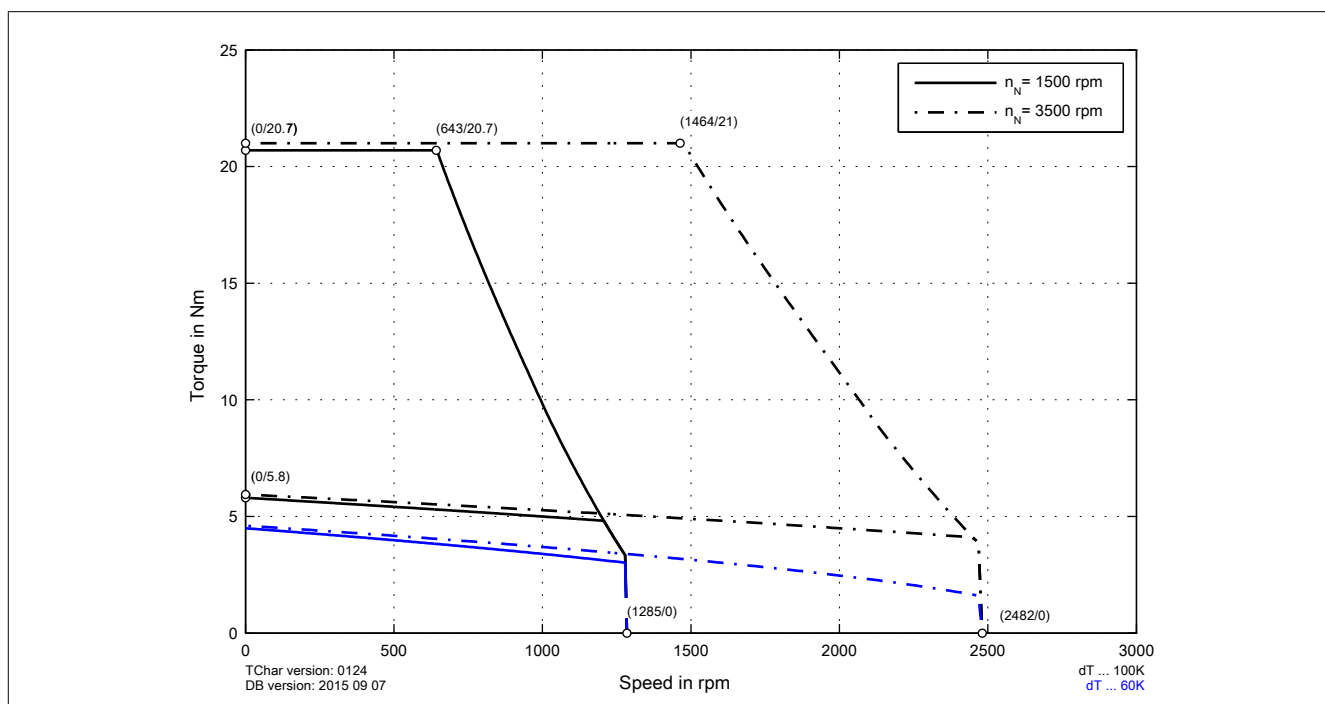
Model number	8JSQ53.ee030ffgg-0	8JSQ54.ee018ffgg-0	8JSQ54.ee030ffgg-0
Motor			
Nominal speed n_N [rpm]	3000	1800	3000
Number of pole pairs		5	
Nominal torque M_N [Nm]	3.751	7.125	2.282
Nominal power P_N [W]	1179	1343	717
Nominal current I_N [A]	2.084	2.74	2.075
Stall torque M_0 [Nm]	8.13	9.92	9.86
Stall current I_0 [A]	5	4.13	9.32
Maximum torque M_{max} [Nm]	29.4		36.9
Maximum current I_{max} [A]	19.8	16.5	37.5
Maximum speed n_{max} [rpm]		6000	
Torque constant K_T [Nm/A]	1.8	2.6	1.1
Voltage constant K_E [V/1000 rpm]	112	166	72.9
Stator resistance R_{2ph} [Ω]	2.12	3.22	0.69
Stator inductance L_{2ph} [mH]	11.4	18.3	3.55
Electrical time constant t_{el} [ms]	5.386	5.689	5.251
Thermal time constant t_{therm} [min]	69		80
Moment of inertia J [kgcm ²]	9.12		11.9
Mass without brake m [kg]	13.4		15.7
Holding brake			
Holding torque of the brake M_{Br} [Nm]		14.5	
Brake mass [kg]		1.8	
Moment of inertia for the brake J_{Br} [kgcm ²]		0.173	
Recommendations			
ACOPOSmulti 8BVLxxx...	0055		0110
Cross section for B&R motor cables [mm ²]		2.5	
Connector size		1.0	

2.7.19 Speed-torque characteristics at DC bus voltage of 325 VDC

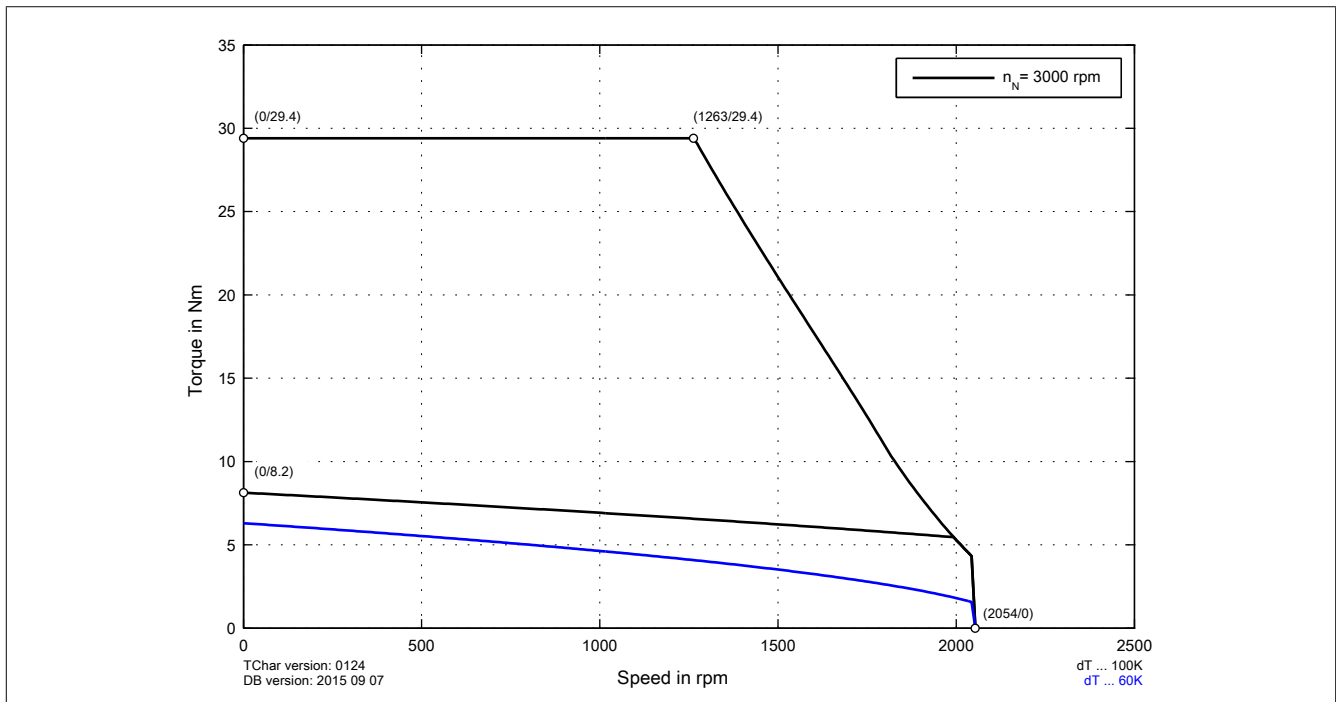
8JSB51.eennnffgg-0, 8JSQ51.eennnffgg-0



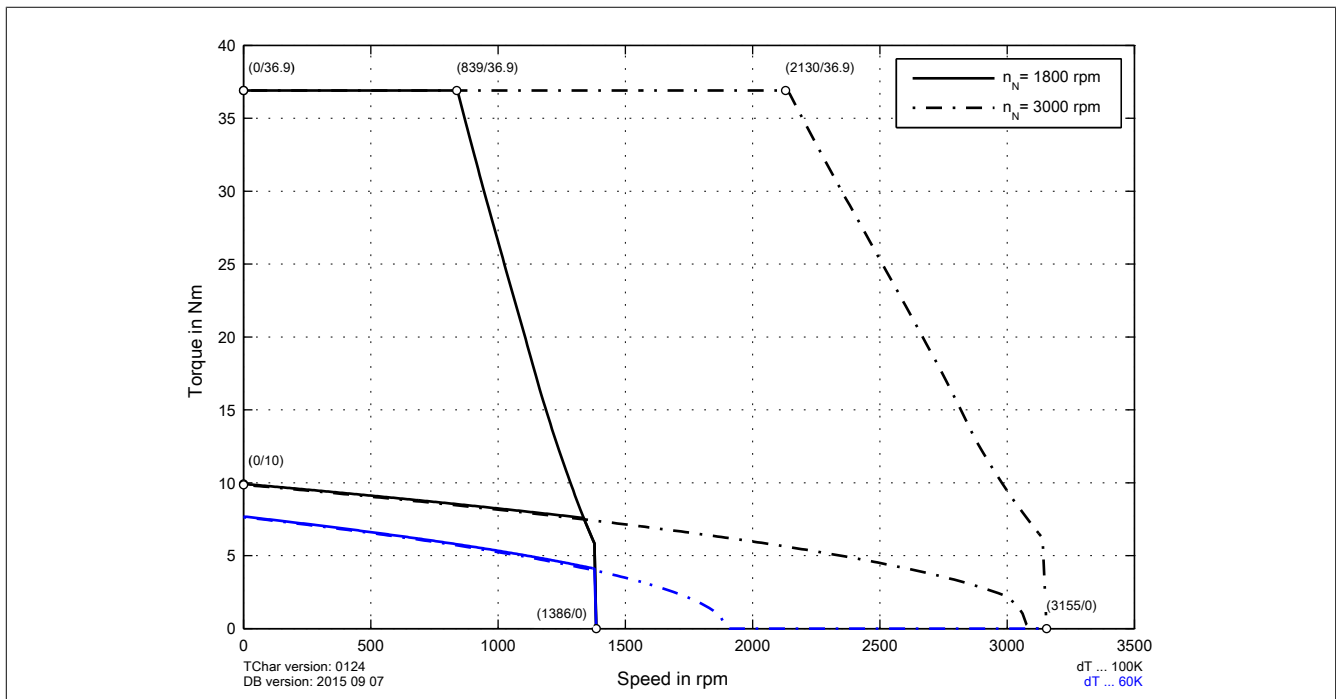
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8JSB53.eennnffgg-0, 8JSQ53.eennnffgg-0

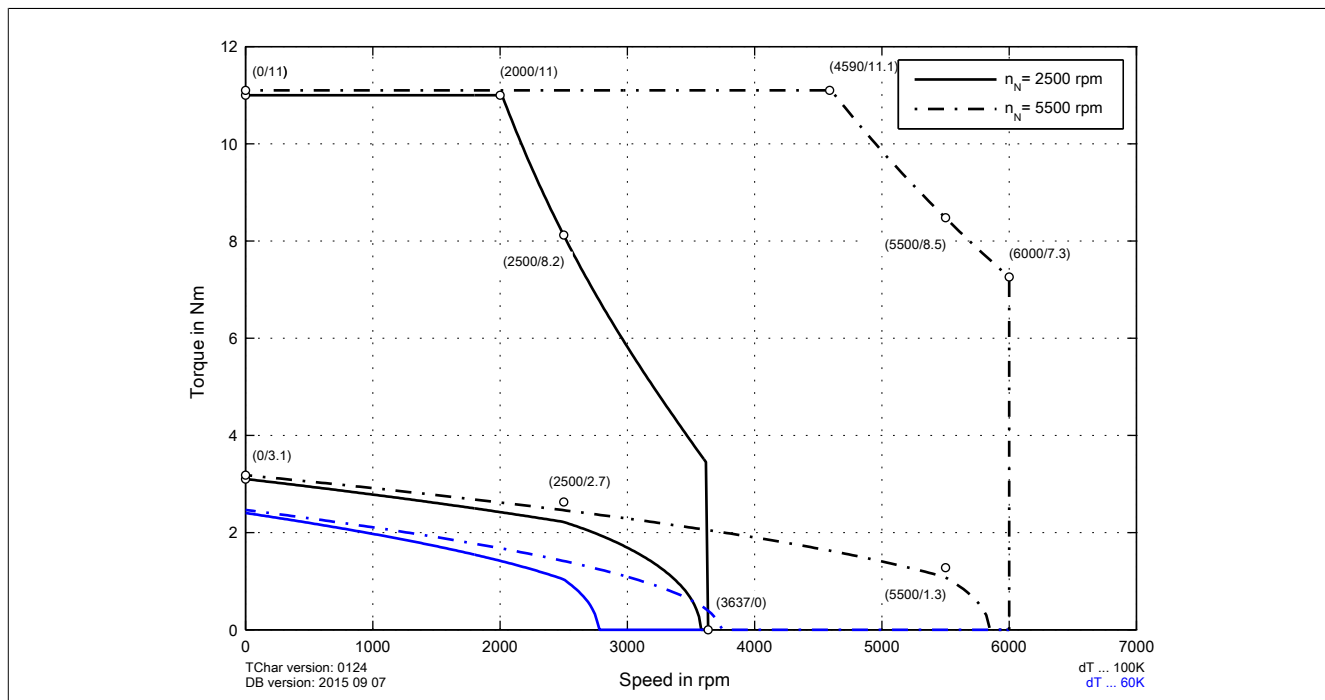


8JSB54.eennnffgg-0, 8JSQ54.eennnffgg-0

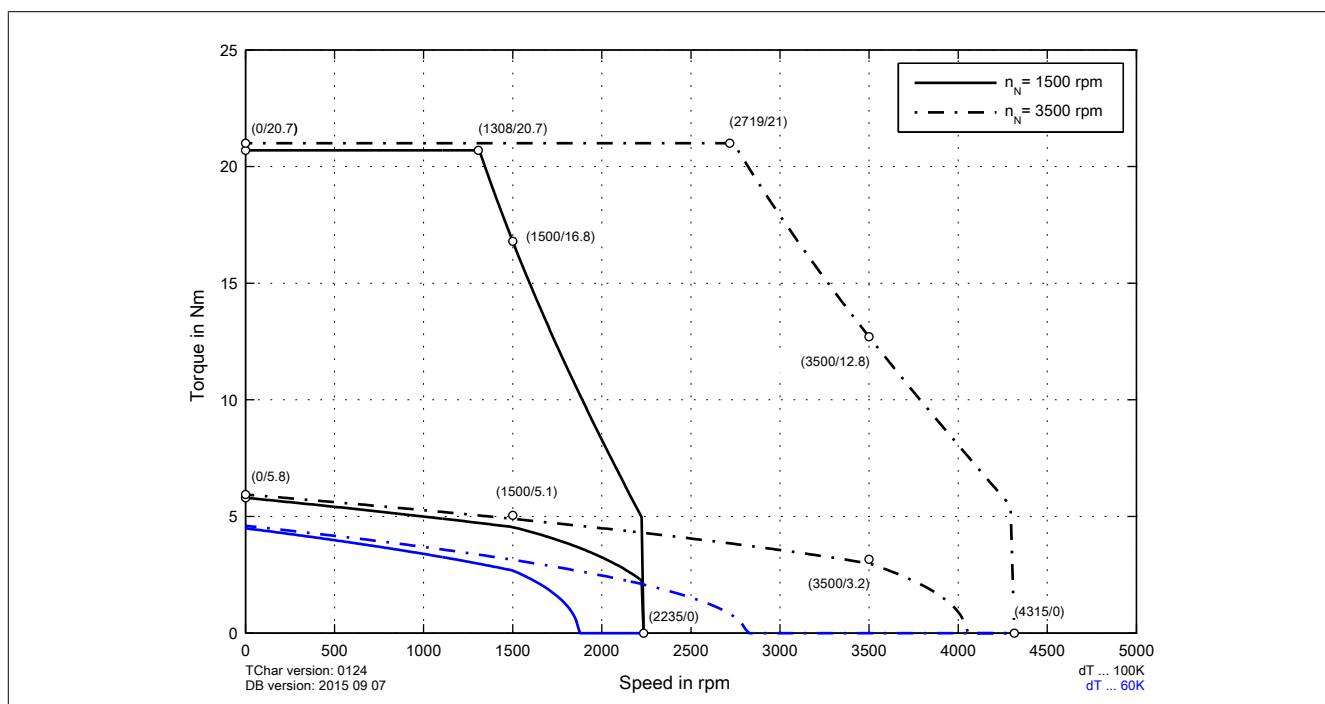


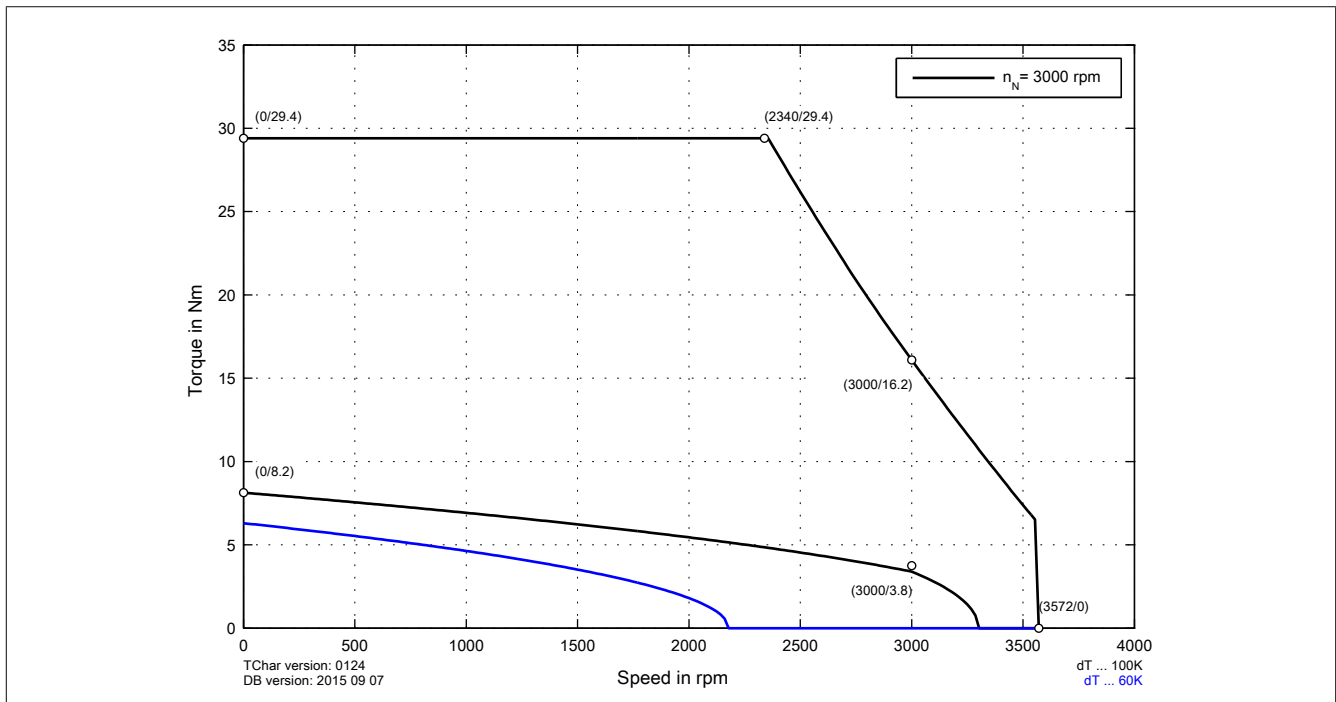
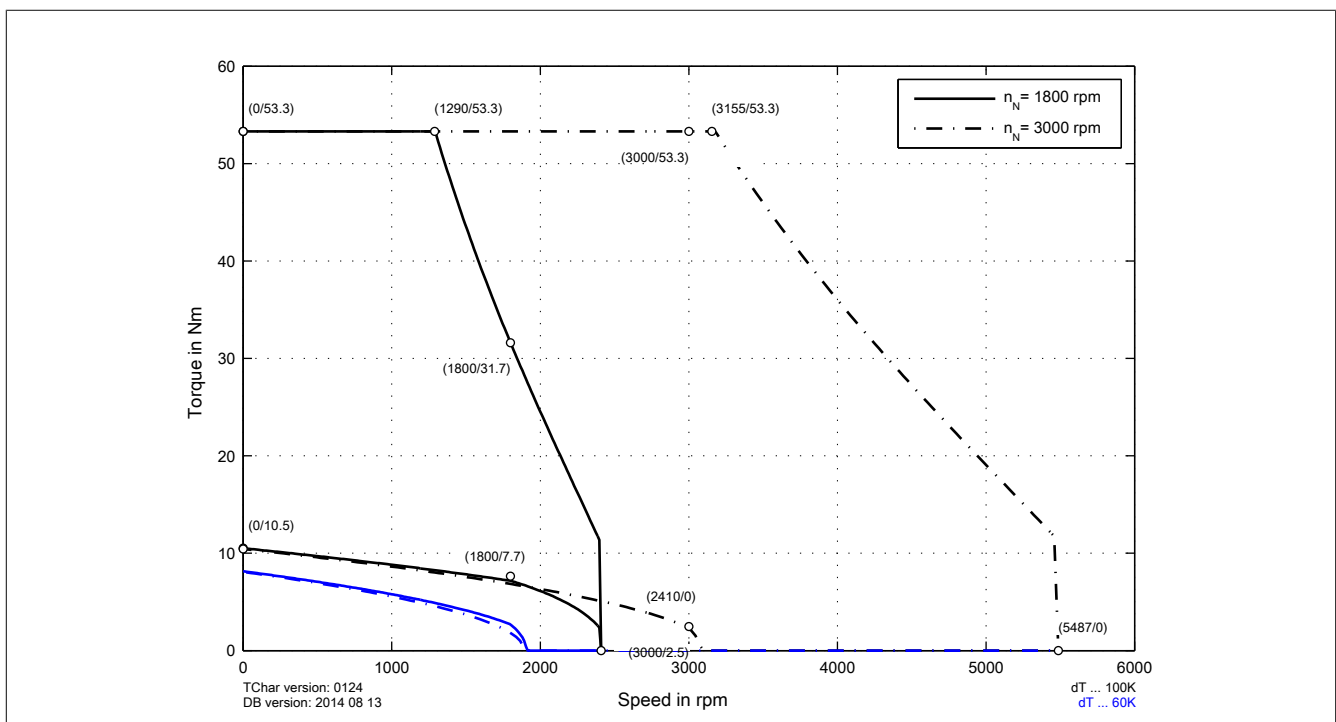
2.7.20 Speed-torque characteristics at DC bus voltage of 560 VDC

8JSB51.eennnffgg-0, 8JSQ51.eennnffgg-0



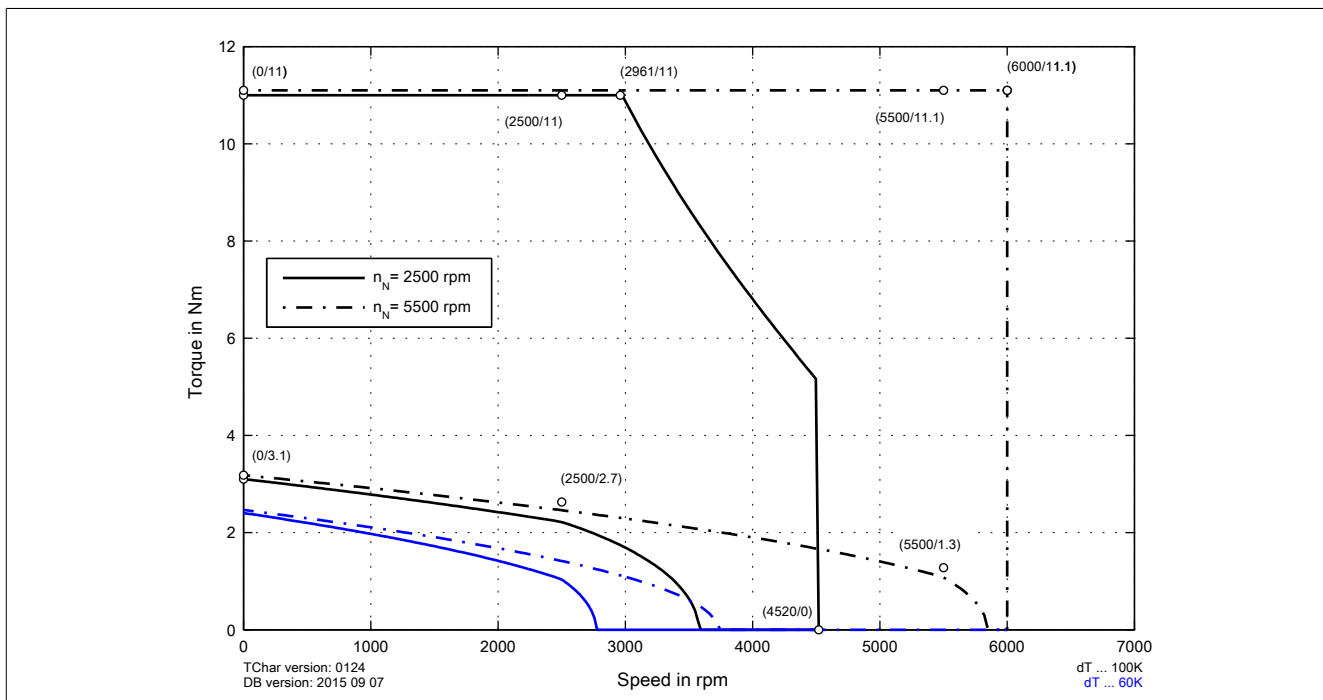
8JSB52.eennnffgg-0, 8JSQ52.eennnffgg-0



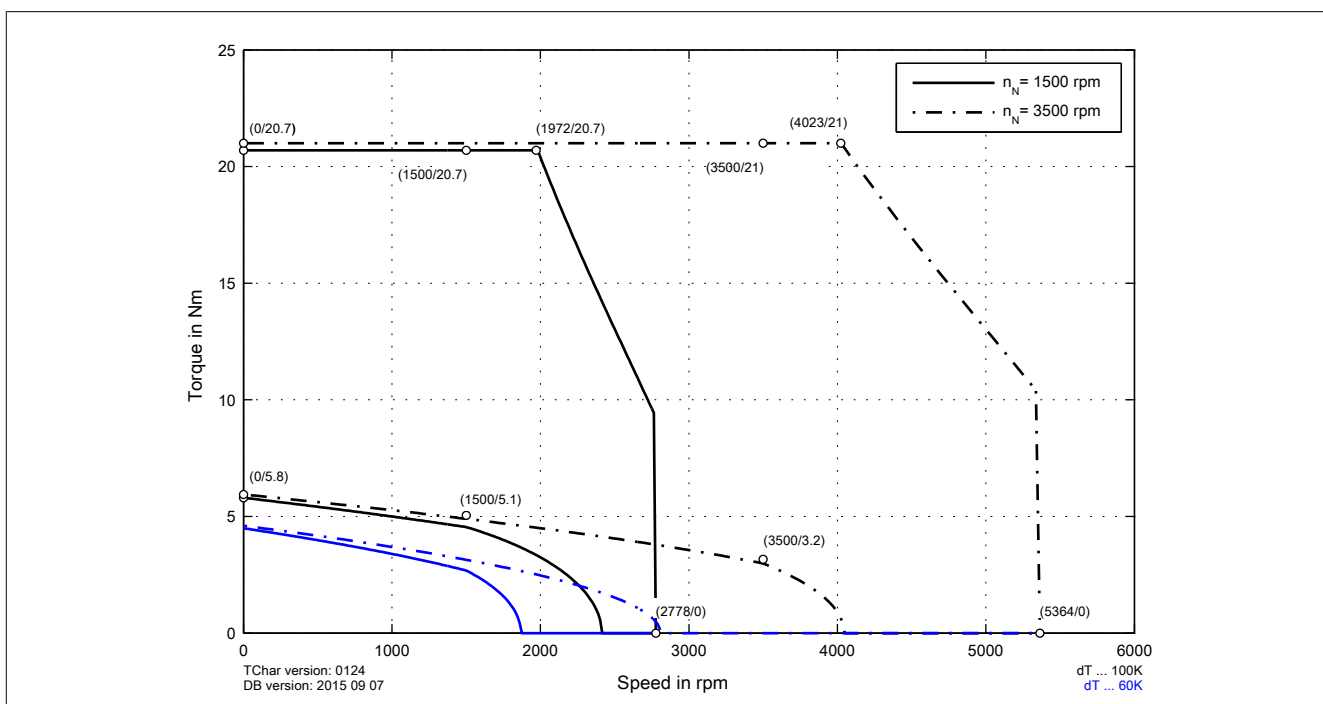
8JSB53.eennnffgg-0, 8JSQ53.eennnffgg-0**8JSB54.eennnffgg-0, 8JSQ54.eennnffgg-0**

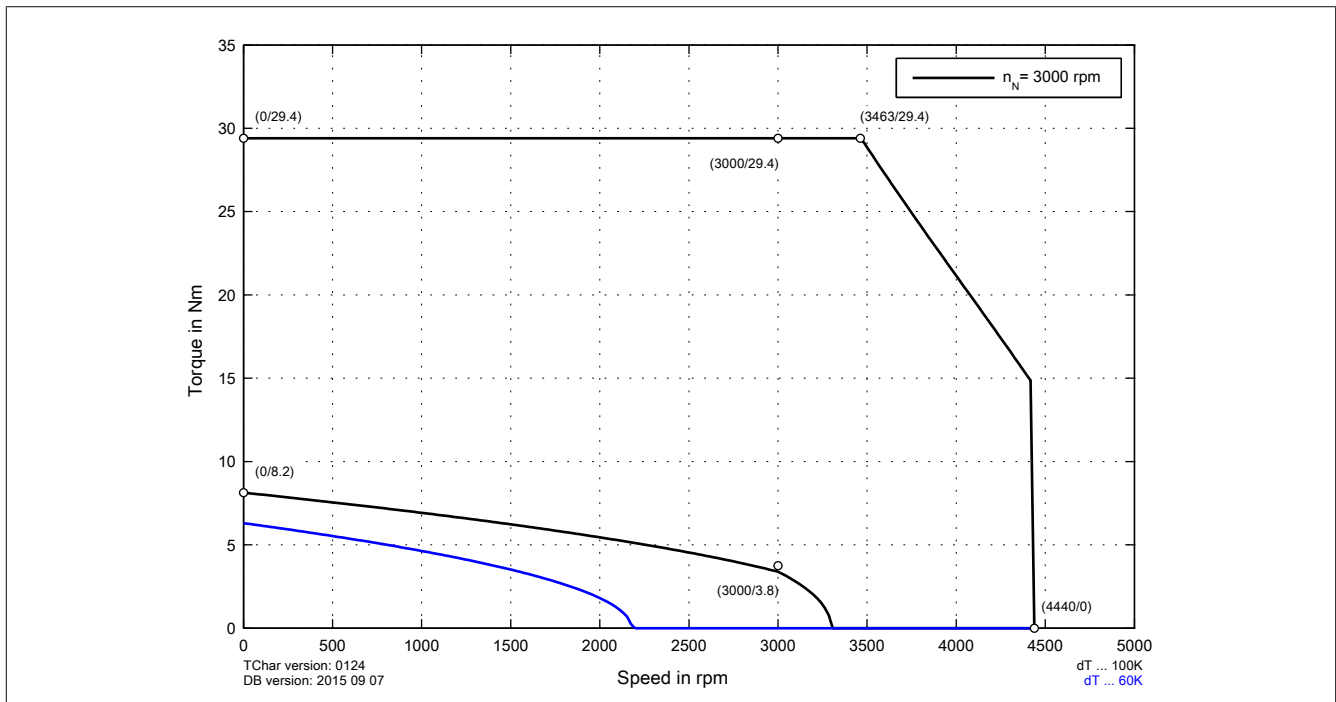
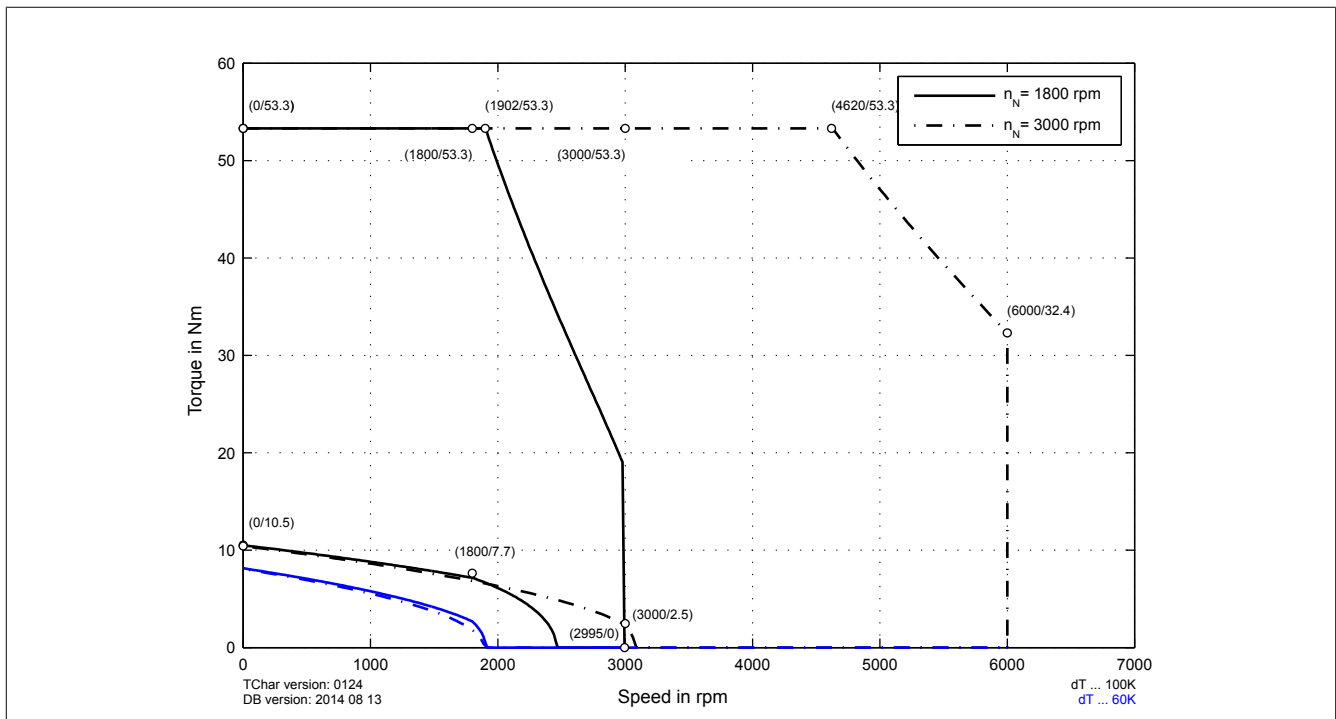
2.7.21 Speed-torque characteristics at DC bus voltage of 750 VDC

8JSB51.eennnffgg-0, 8JSQ51.eennnffgg-0



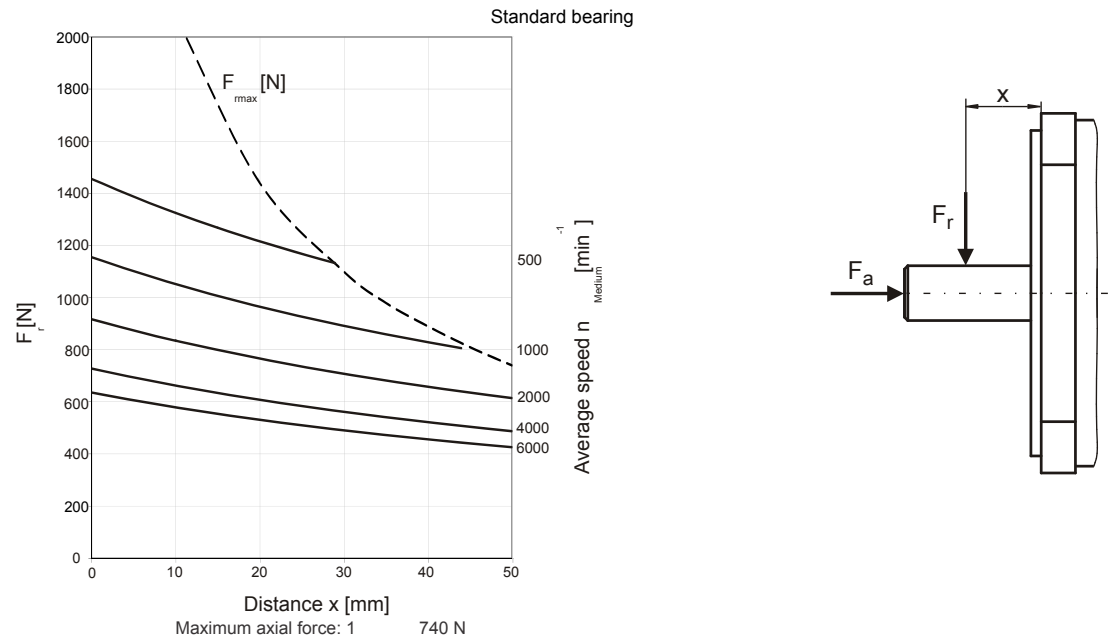
8JSB52.eennnffgg-0, 8JSQ52.eennnffgg-0



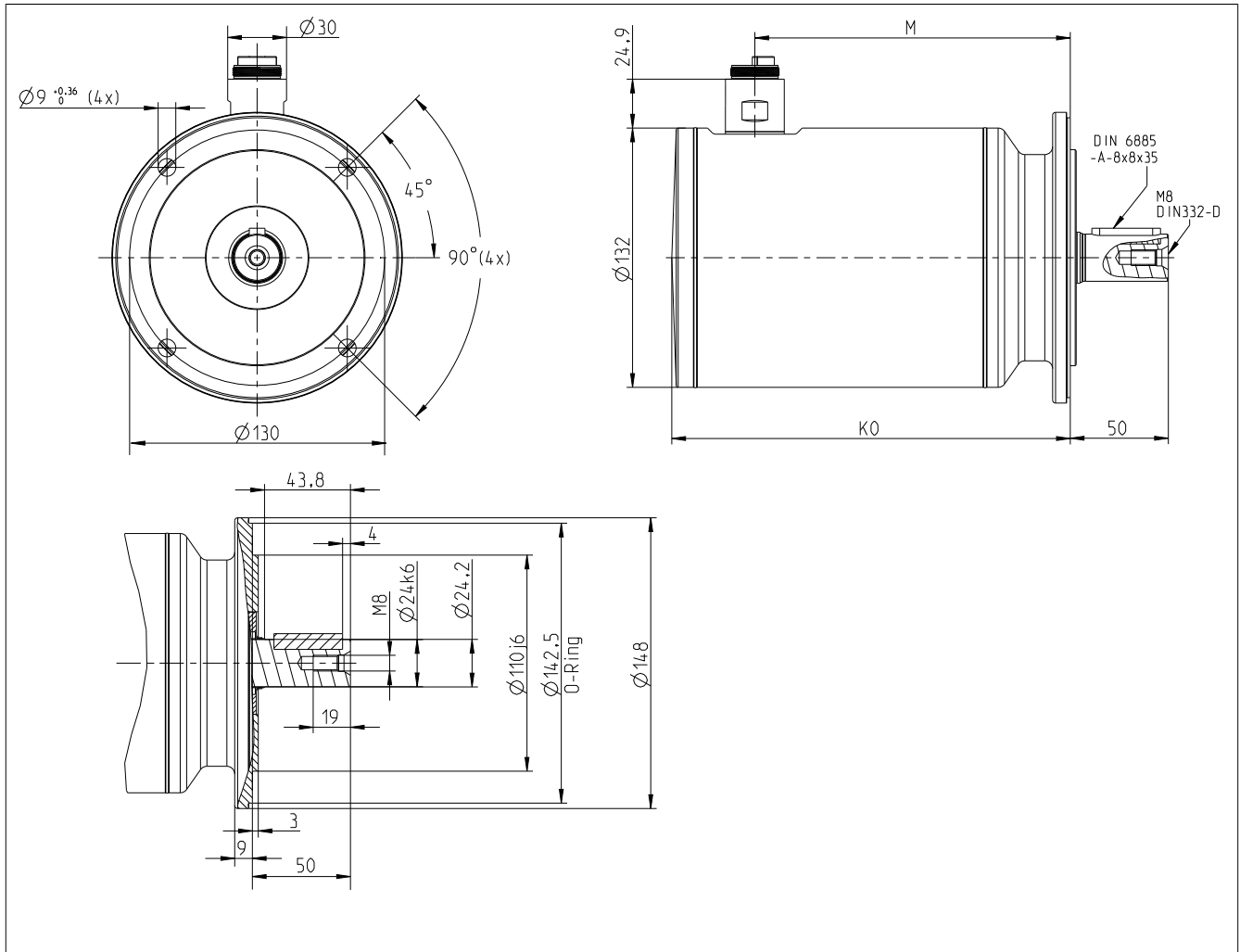
8JSB53.eennnffgg-0, 8JSQ53.eennnffgg-0**8JSB54.eennnffgg-0, 8JSQ54.eennnffgg-0**

2.7.22 Maximum shaft load

The values in the diagram below are based on a mechanical service life of the bearings of 20,000 operating hours.

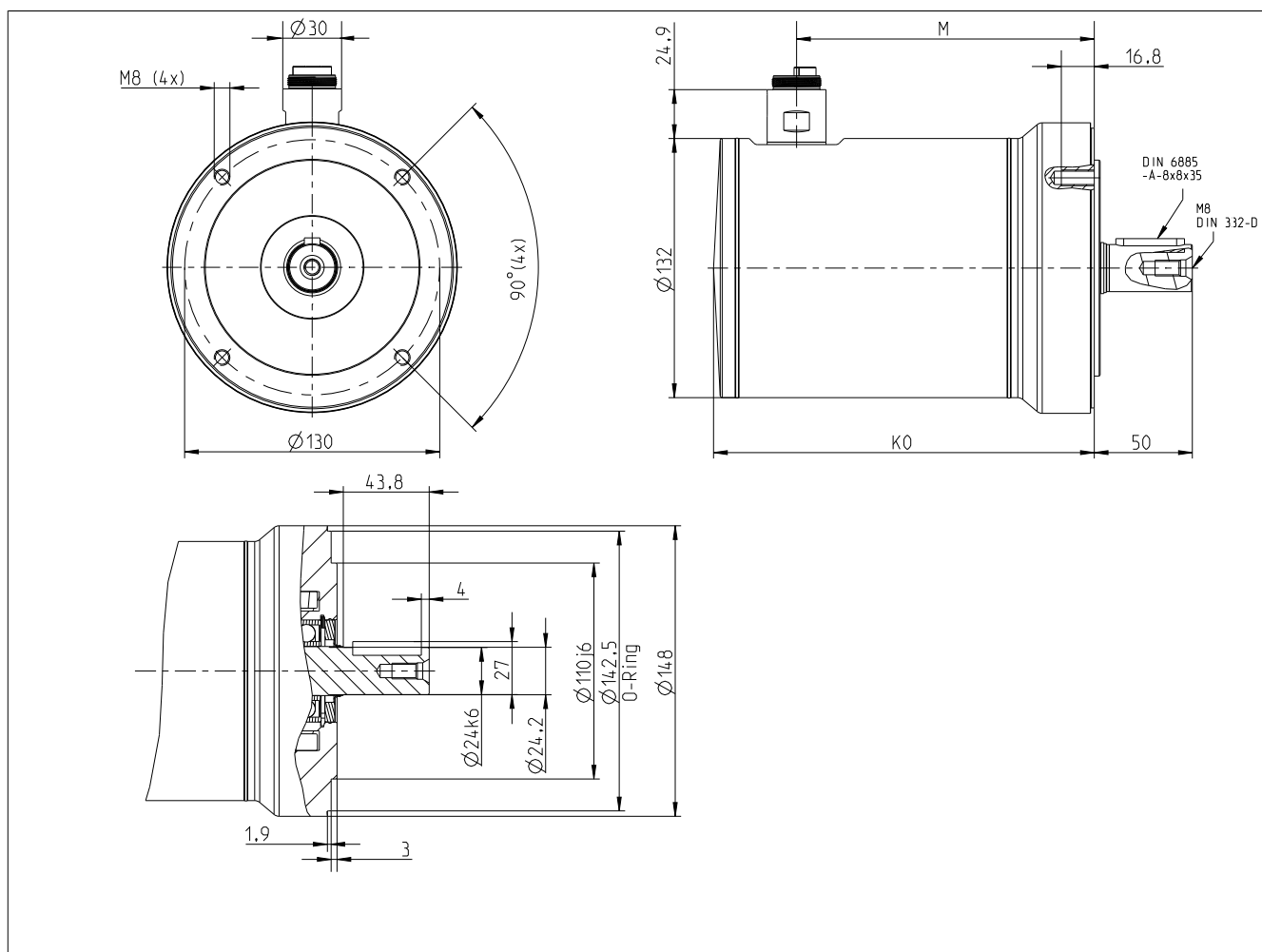


2.7.23 8JSB5 - Dimensions



Model number	K ₀	M	Extension of K ₀ and M depending on the motor option [mm]
			Holding brake
8JSB51.eennnffgg-0	194.1	151.8	34
8JSB52.eennnffgg-0	225.1	182.8	34
8JSB53.eennnffgg-0	256.1	213.8	34
8JSB54.eennnffgg-0	287.1	244.8	34

2.7.24 8JSQ5 - Dimensions



Model number	K_0	M	Extension of K_0 and M depending on the motor option [mm]
			Holding brake
8JSQ51.eennnffgg-0	194.1	151.8	34
8JSQ52.eennnffgg-0	225.1	182.8	34
8JSQ53.eennnffgg-0	256.1	213.8	34
8JSQ54.eennnffgg-0	287.1	214.8	34

2.7.25 8JSB6 - Technical data

Model number	8JSB62.ee018ffgg-0	8JSB62.ee050ffgg-0	8JSB63.ee015ffgg-0	8JSB63.ee040ffgg-0
Motor				
Nominal speed n_N [rpm]	1800	5000	1500	4000
Number of pole pairs	5			
Nominal torque M_N [Nm]	8.375	3.995	11.88	6.554
Nominal power P_N [W]	1579	2092	1866	2745
Nominal current I_N [A]	3.79	3.917	4	5.285
Stall torque M_0 [Nm]	9.98	10.2	13.81	14.2
Stall current I_0 [A]	5	11.1	5	12.3
Maximum torque M_{max} [Nm]	28.6	29.1	41.1	42
Maximum current I_{max} [A]	16.2	36	16.8	41.4
Maximum speed n_{max} [rpm]	6000			
Torque constant K_T [Nm/A]	2.21	1.02	2.97	1.24
Voltage constant K_E [V/1000 rpm]	142	65.5	192	79.9
Stator resistance R_{2ph} [Ω]	3.32	0.76	3.5	0.96
Stator inductance L_{2ph} [mH]	25.4	5.4	28.1	4.9
Electrical time constant t_{el} [ms]	7.658	7.137	8.153	7.82
Thermal time constant t_{therm} [min]	58		62	
Moment of inertia J [kgcm ²]	16.9		24.2	
Mass without brake m [kg]	19.6		23.1	
Holding brake				
Holding torque of the brake M_{Br} [Nm]	25			
Brake mass [kg]	3.4			
Moment of inertia for the brake J_{Br} [kgcm ²]	0.61			
Recommendations				
ACOPOSmulti 8BVLxxxx...	0055	0110	0055	0110
Cross section for B&R motor cables [mm ²]	2.5			
Connector size	1.0			

Model number	8JSB64.ee020ffgg-0	8JSB64.ee030ffgg-0	8JSB65.ee025ffgg-0
Motor			
Nominal speed n_N [rpm]	2000	3000	2500
Number of pole pairs	5		
Nominal torque M_n [Nm]	13.795	10.664	14.048
Nominal power P_N [W]	2889	3350	3678
Nominal current I_N [A]	6.05	6.424	6.786
Stall torque M_0 [Nm]	17.69	17.94	21
Stall current I_0 [A]	8.3	11.5	10.7
Maximum torque M_{max} [Nm]	52.5	53.1	64.2
Maximum current I_{max} [A]	27.5	38.4	36.6
Maximum speed n_{max} [rpm]	6000		
Torque constant K_T [Nm/A]	2.28	1.66	2.07
Voltage constant K_E [V/1000 rpm]	147	107	133
Stator resistance R_{2ph} [Ω]	1.43	0.77	0.91
Stator inductance L_{2ph} [mH]	11.8	6.22	7.55
Electrical time constant t_{el} [ms]	8.271	8.088	8.292
Thermal time constant t_{therm} [min]	75		88
Moment of inertia J [kgcm ²]	31.6		40
Mass without brake m [kg]	26.7		30.2
Holding brake			
Holding torque of the brake M_{Br} [Nm]	25		
Brake mass [kg]	3.4		
Moment of inertia for the brake J_{Br} [kgcm ²]	0.61		
Recommendations			
ACOPOSmulti 8BVLxxxx...	0110		
Cross section for B&R motor cables [mm ²]	2.5		
Connector size	1.0		

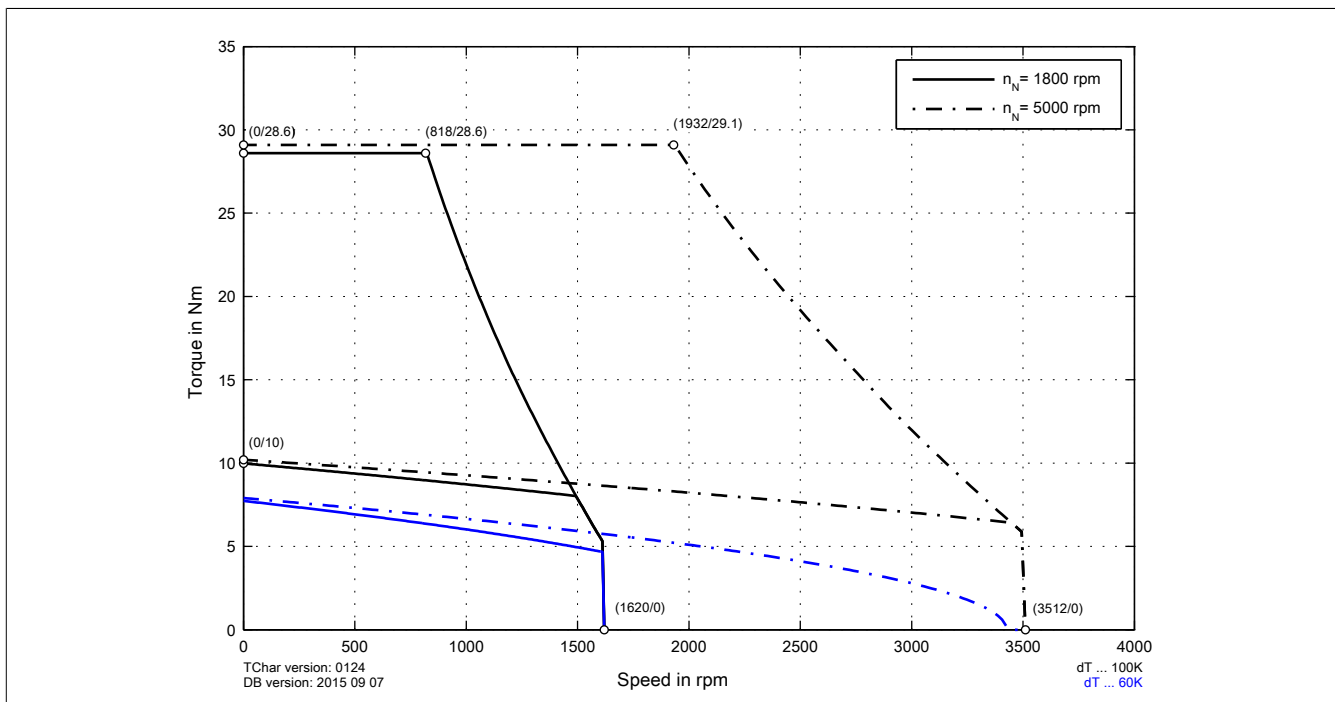
2.7.25.1 8JSQ6 - Technical data

Model number	8JSQ62.ee018ffgg-0	8JSQ62.ee050ffgg-0	8JSQ63.ee015ffgg-0	8JSQ63.ee040ffgg-0
Motor				
Nominal speed n_N [rpm]	1800	5000	1500	4000
Number of pole pairs	5			
Nominal torque M_N [Nm]	8.375	3.995	11.88	6.554
Nominal power P_N [W]	1579	2092	1866	2745
Nominal current I_N [A]	3.79	3.917	4	5.285
Stall torque M_0 [Nm]	9.98	10.2	13.81	14.2
Stall current I_0 [A]	5	11.1	5	12.3
Maximum torque M_{max} [Nm]	28.6	29.1	41.1	42
Maximum current I_{max} [A]	16.2	36	16.8	41.4
Maximum speed n_{max} [rpm]	6000			
Torque constant K_T [Nm/A]	2.21	1.02	2.97	1.24
Voltage constant K_E [V/1000 rpm]	142	65.5	192	79.9
Stator resistance R_{2ph} [Ω]	3.32	0.76	3.5	0.96
Stator inductance L_{2ph} [mH]	25.4	5.4	28.1	4.9
Electrical time constant t_{el} [ms]	7.658	7.137	8.153	7.82
Thermal time constant t_{therm} [min]	58		62	
Moment of inertia J [kgcm ²]	16.9		24.2	
Mass without brake m [kg]	19.6		23.1	
Holding brake				
Holding torque of the brake M_{Br} [Nm]	25			
Brake mass [kg]	3.4			
Moment of inertia for the brake J_{Br} [kgcm ²]	0.61			
Recommendations				
ACOPOSmulti 8BVLxxx...	0055	0110	0055	0110
Cross section for B&R motor cables [mm ²]	2.5			
Connector size	1.0			

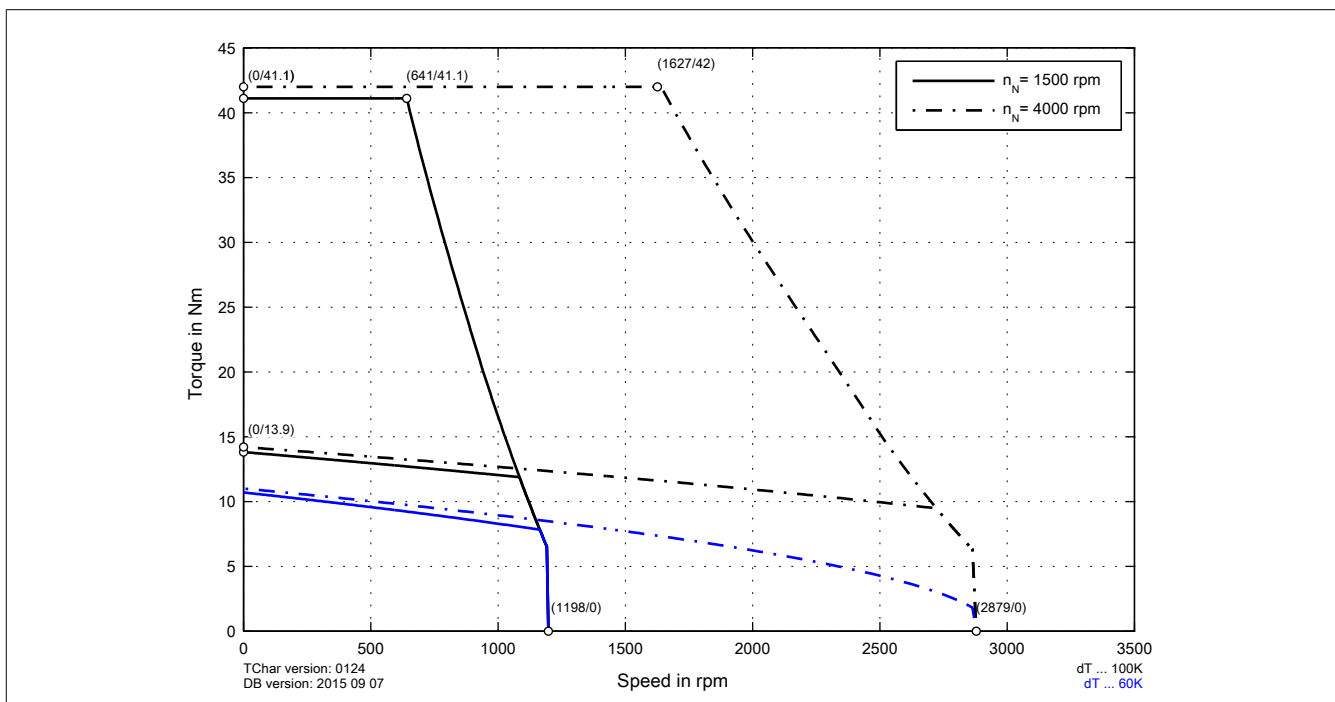
Model number	8JSQ64.ee020ffgg-0	8JSQ64.ee030ffgg-0	8JSQ65.ee025ffgg-0
Motor			
Nominal speed n_N [rpm]	2000	3000	2500
Number of pole pairs	5		
Nominal torque M_n [Nm]	13.795	10.664	14.048
Nominal power P_N [W]	2889	3350	3678
Nominal current I_N [A]	6.05	6.424	6.786
Stall torque M_0 [Nm]	17.69	17.94	21
Stall current I_0 [A]	8.3	11.5	10.7
Maximum torque M_{max} [Nm]	52.5	53.1	64.2
Maximum current I_{max} [A]	27.5	38.4	36.6
Maximum speed n_{max} [rpm]	6000		
Torque constant K_T [Nm/A]	2.28	1.66	2.07
Voltage constant K_E [V/1000 rpm]	147	107	133
Stator resistance R_{2ph} [Ω]	1.43	0.77	0.91
Stator inductance L_{2ph} [mH]	11.8	6.22	7.55
Electrical time constant t_{el} [ms]	8.271	8.088	8.292
Thermal time constant t_{therm} [min]	75		88
Moment of inertia J [kgcm ²]	31.6		40
Mass without brake m [kg]	26.7		30.2
Holding brake			
Holding torque of the brake M_{Br} [Nm]	25		
Brake mass [kg]	3.4		
Moment of inertia for the brake J_{Br} [kgcm ²]	0.61		
Recommendations			
ACOPOSmulti 8BVLxxxx...	0110		
Cross section for B&R motor cables [mm ²]	2.5		
Connector size	1.0		

2.7.26 Speed-torque characteristics at DC bus voltage of 325 VDC

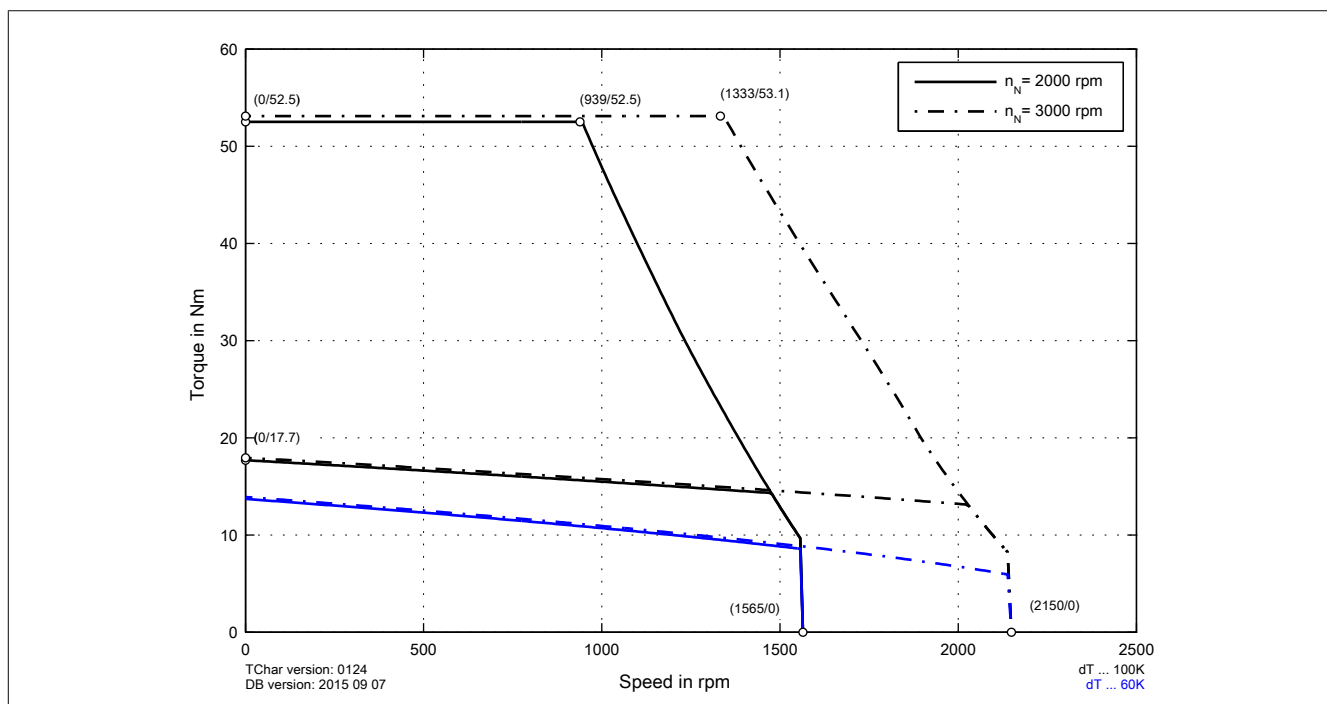
8JSB62.eennnffgg-0, 8JSQ62.eennnffgg-0



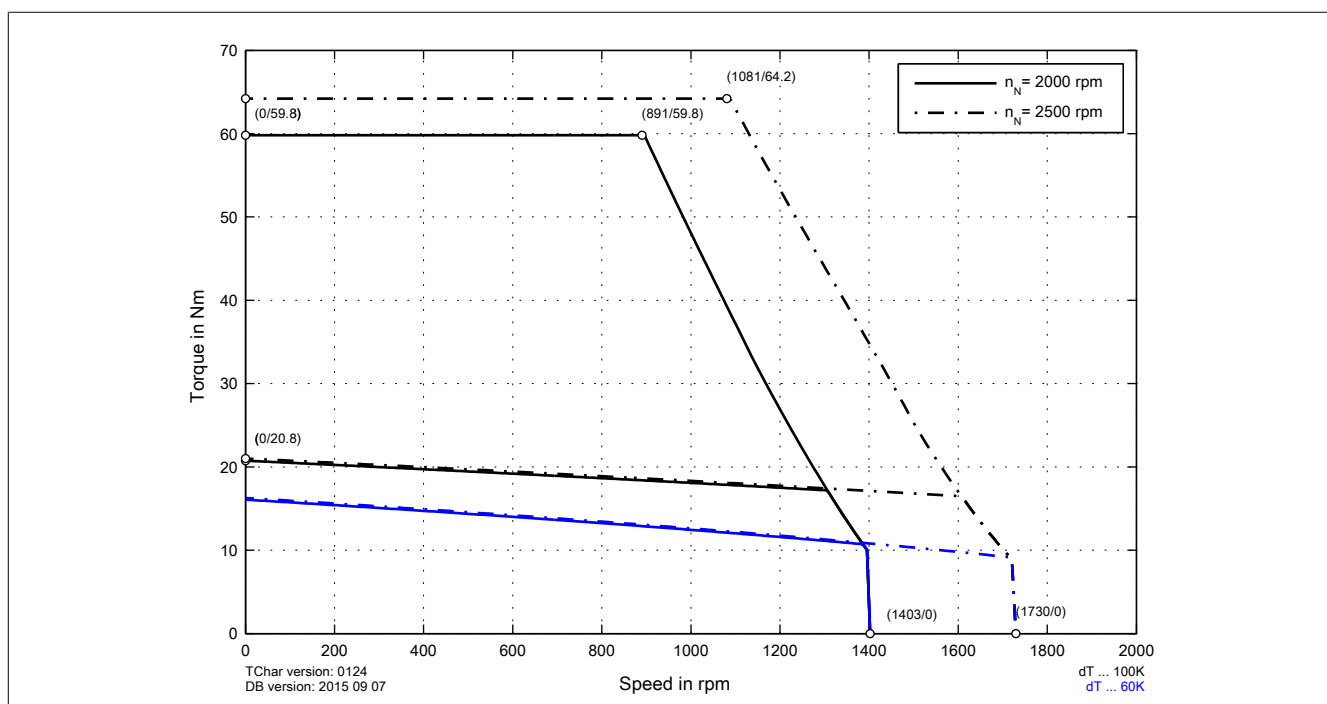
8JSB63.eennnffgg-0, 8JSQ63.eennnffgg-0



8JSB64.eennnffgg-0, 8JSQ64.eennnffgg-0

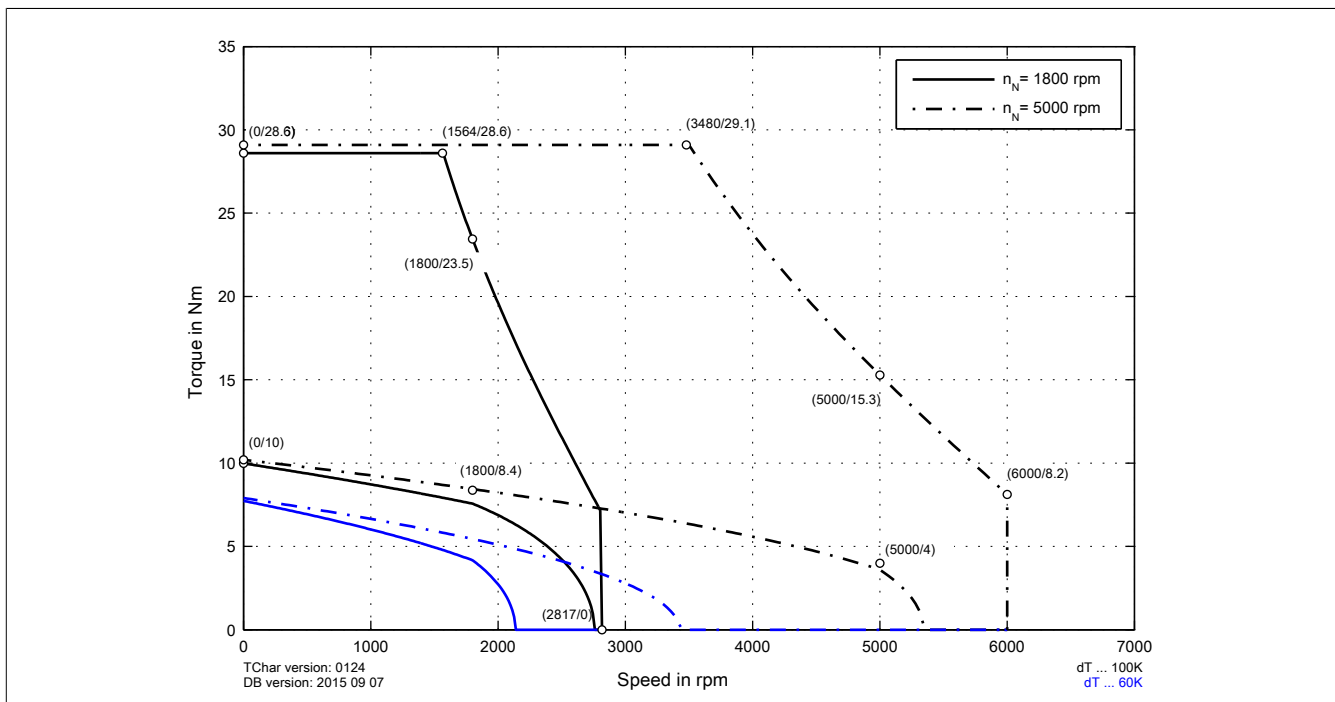


8JSB65.eennnffgg-0, 8JSQ65.eennnffgg-0

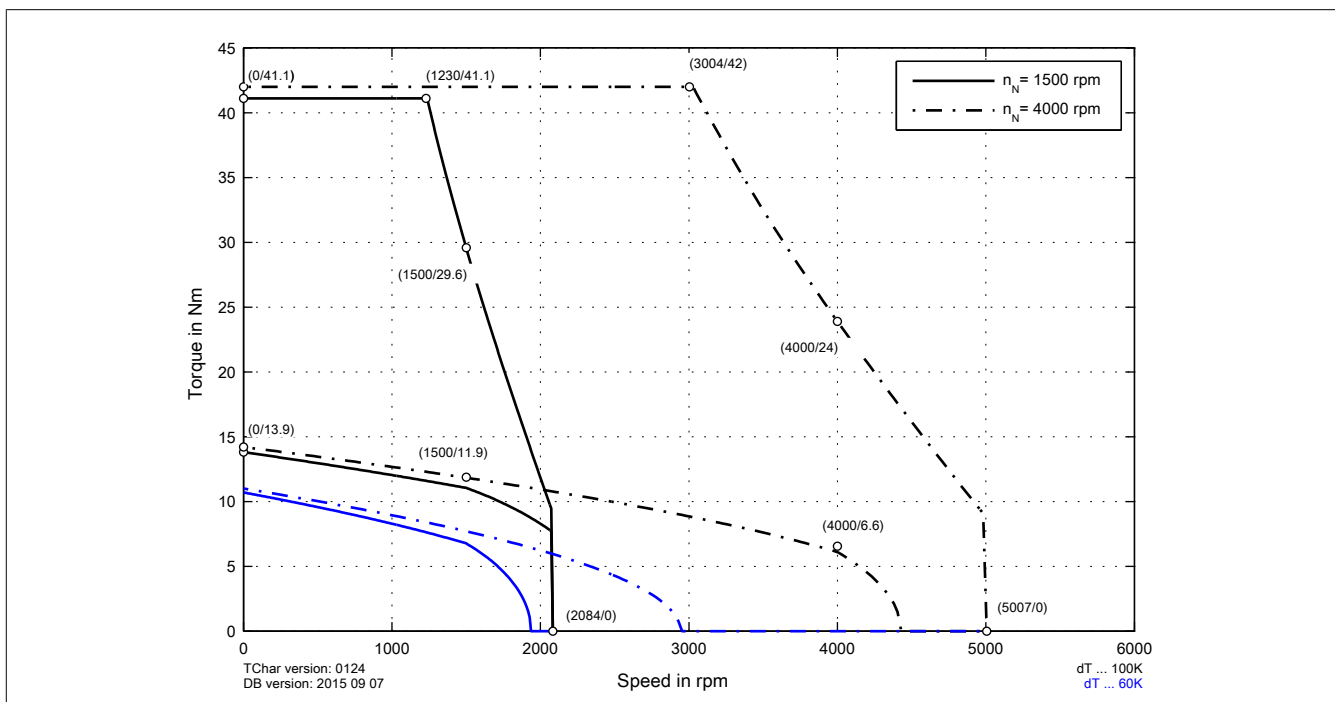


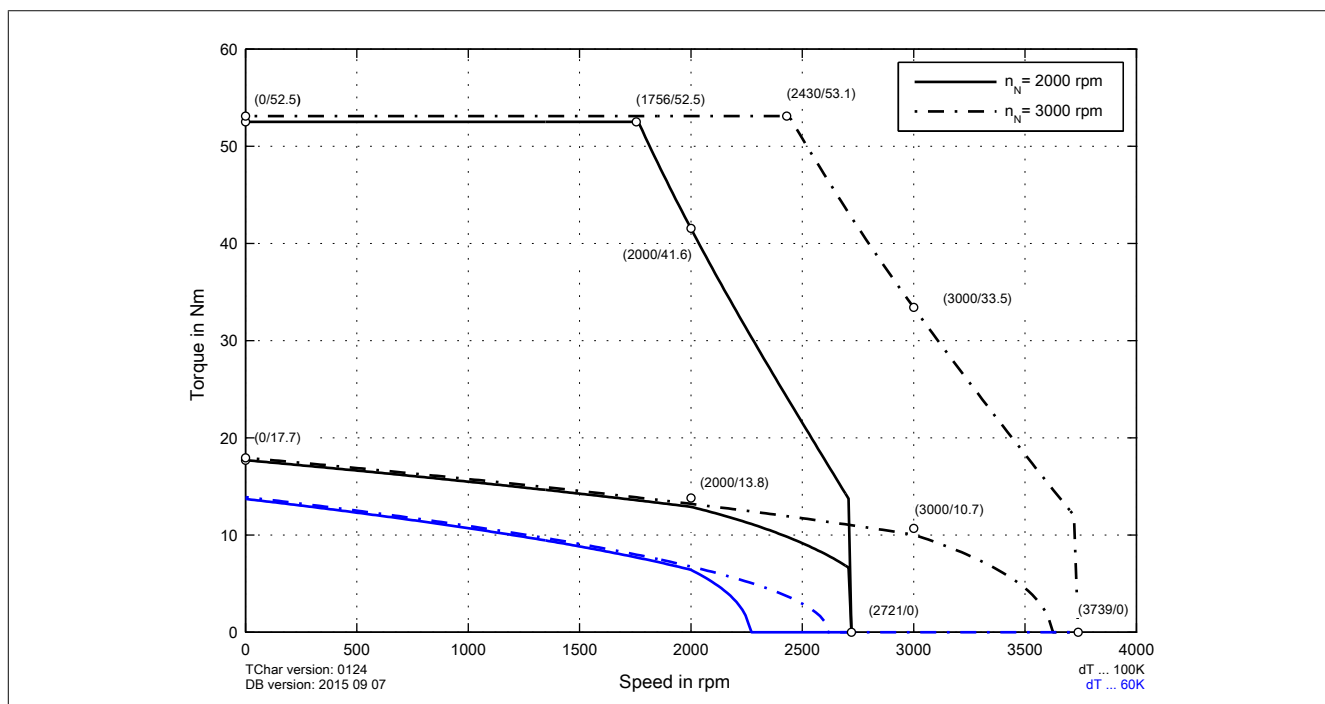
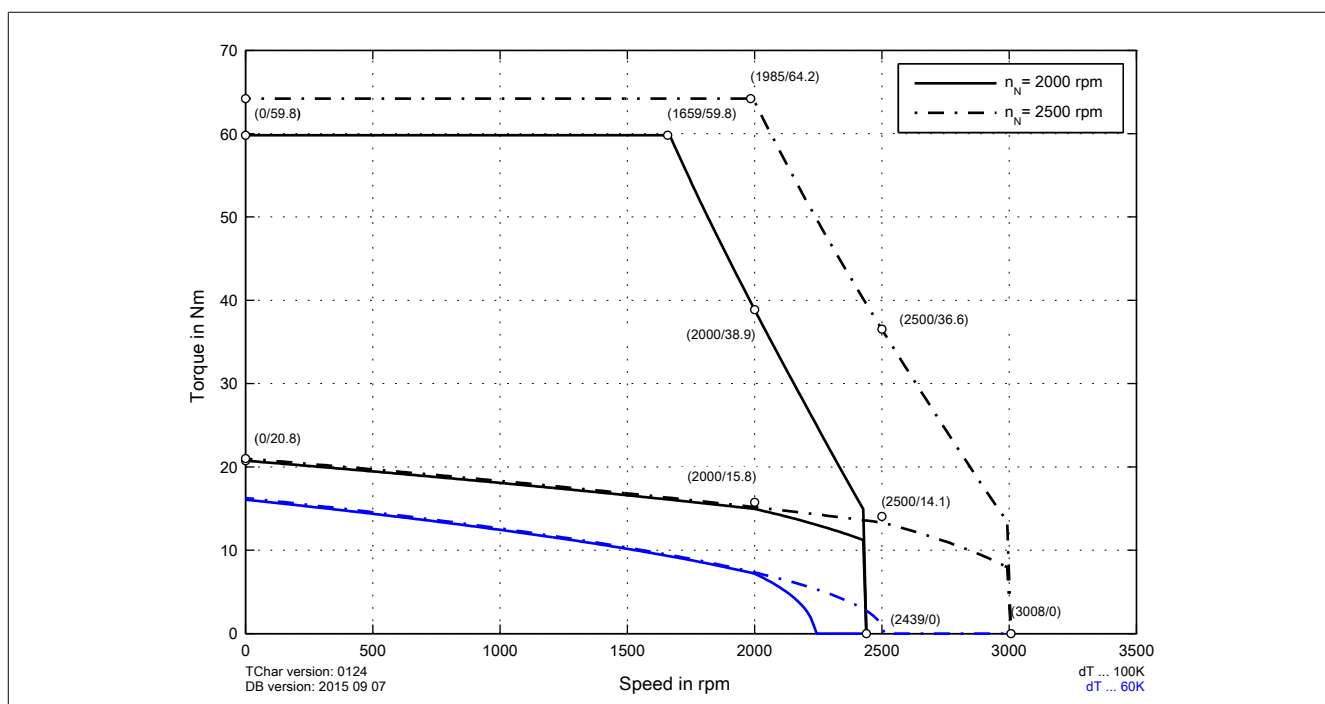
2.7.27 Speed-torque characteristics at DC bus voltage of 560 VDC

8JSB62.eennnffgg-0, 8JSQ62.eennnffgg-0



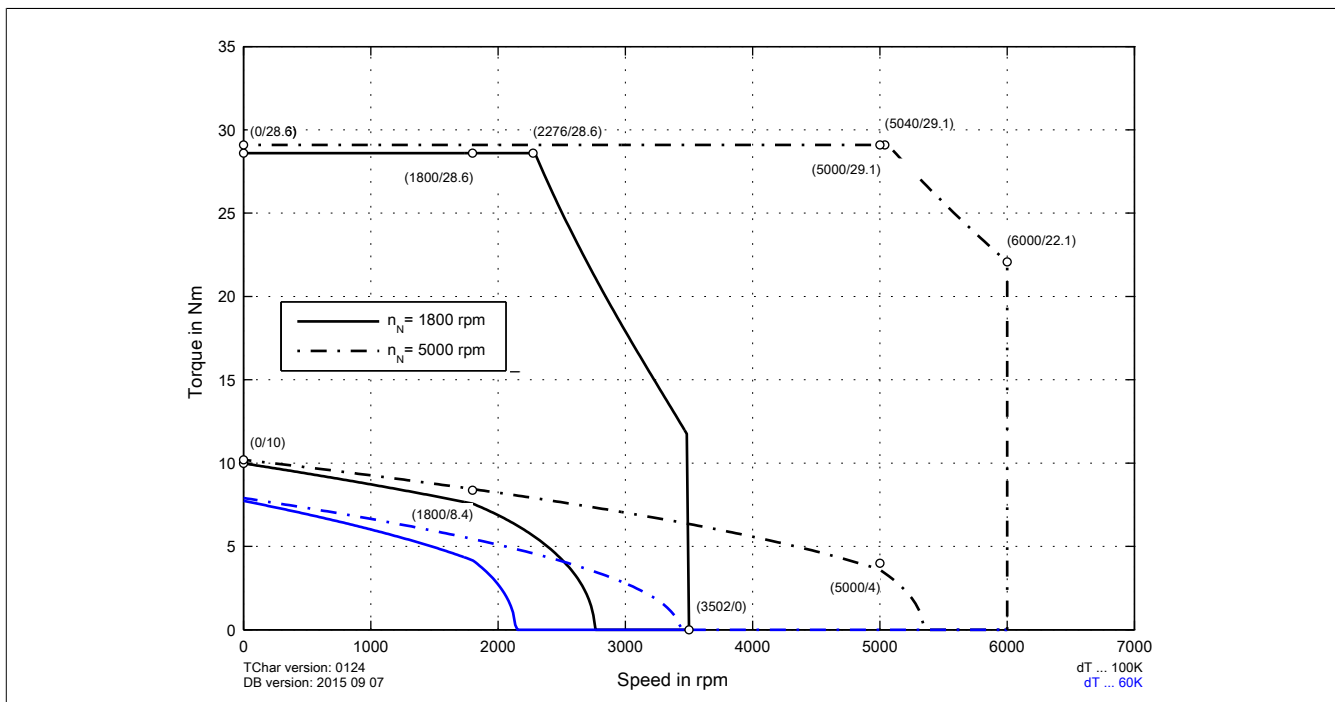
8JSB63.eennnffgg-0, 8JSQ63.eennnffgg-0



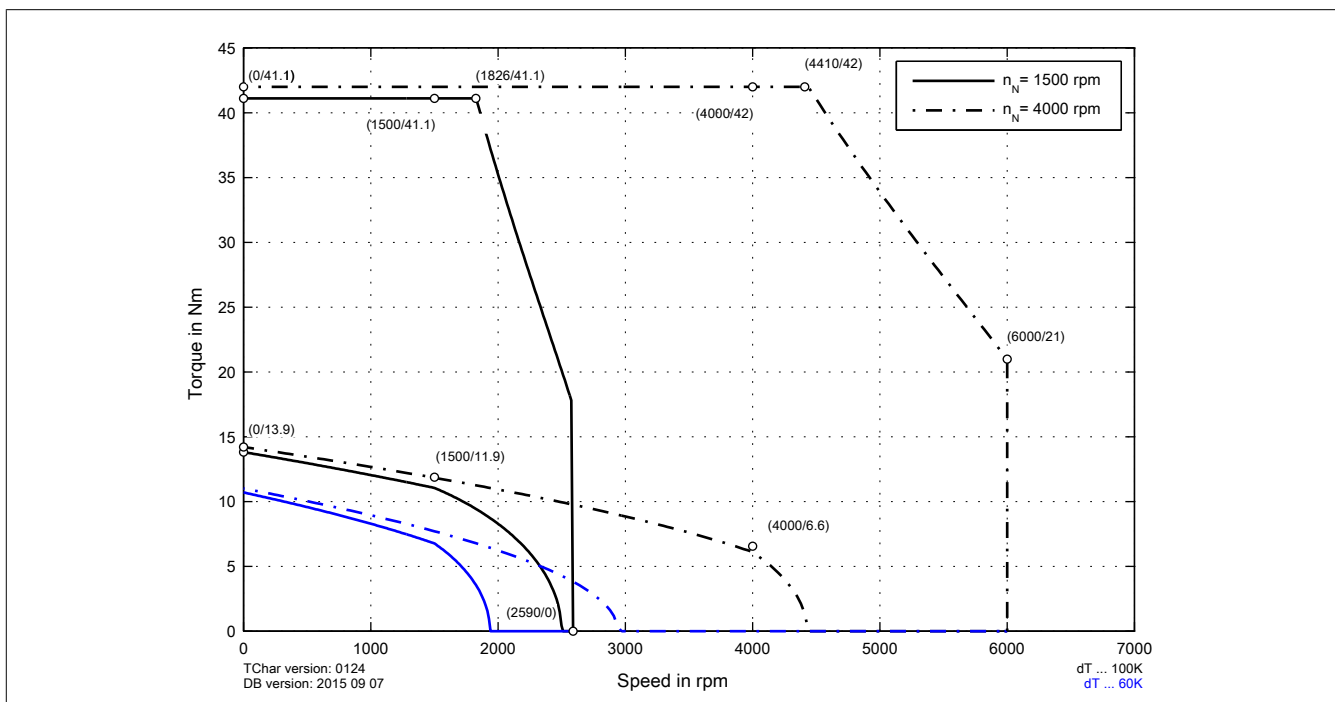
8JSB64.eennnffgg-0, 8JSQ64.eennnffgg-0**8JSB65.eennnffgg-0, 8JSQ65.eennnffgg-0**

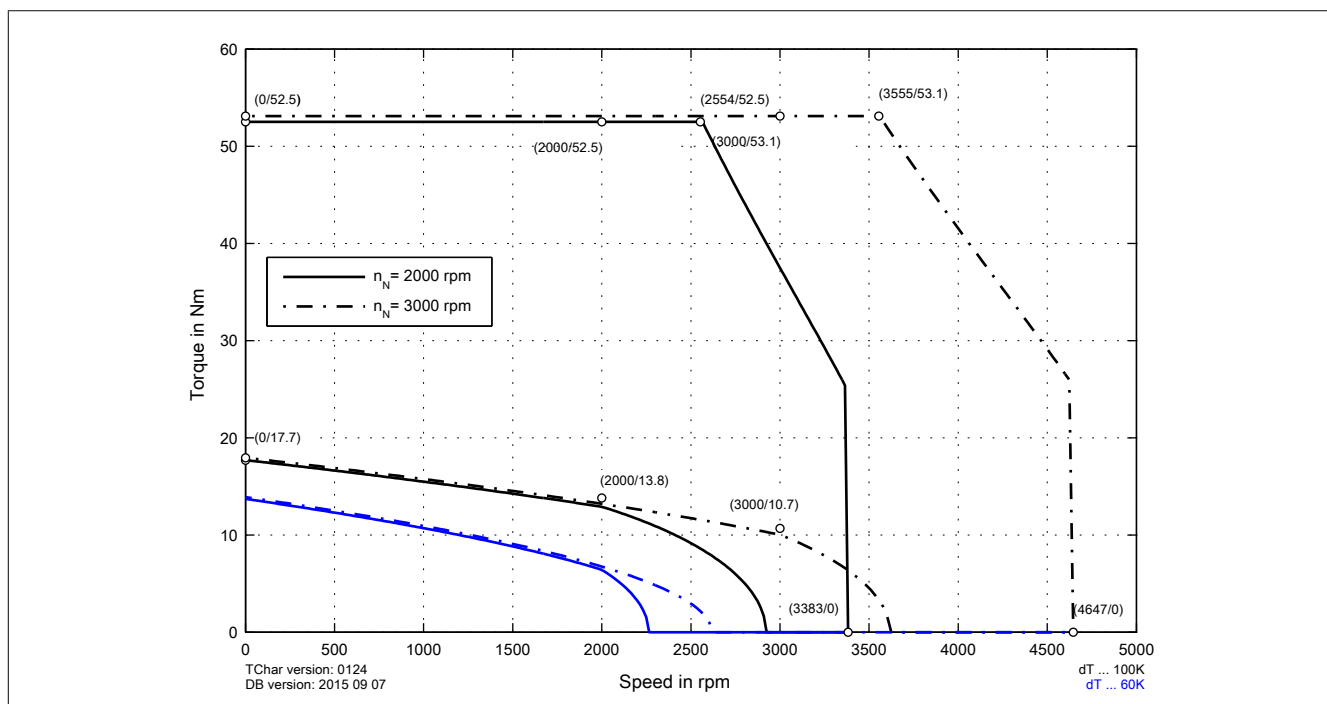
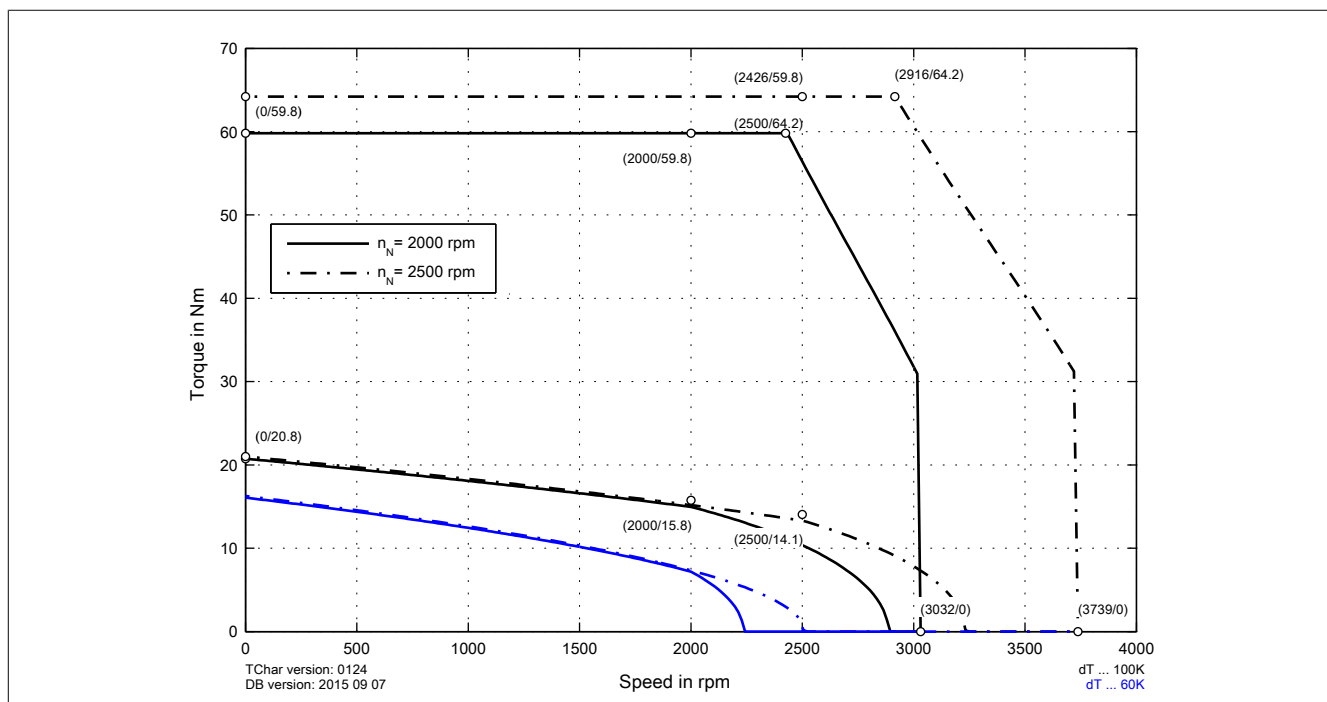
2.7.28 Speed-torque characteristics at DC bus voltage of 750 VDC

8JSB62.eennnffgg-0, 8JSQ62.eennnffgg-0



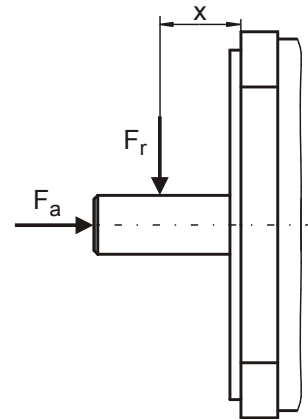
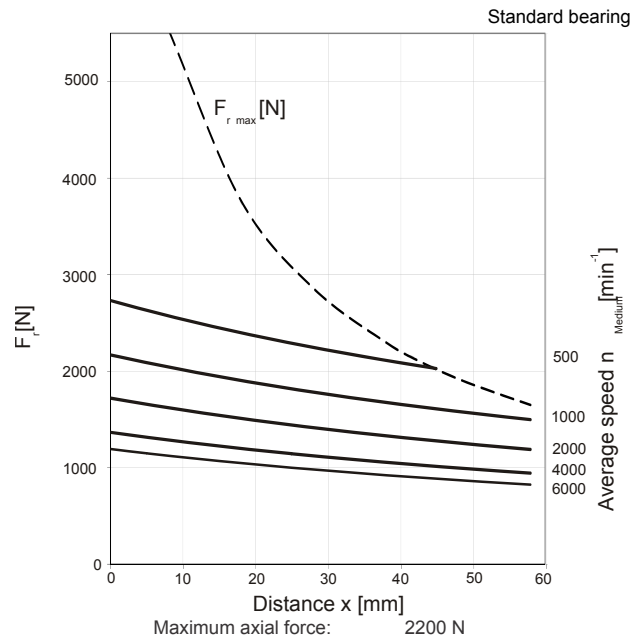
8JSB63.eennnffgg-0, 8JSQ63.eennnffgg-0



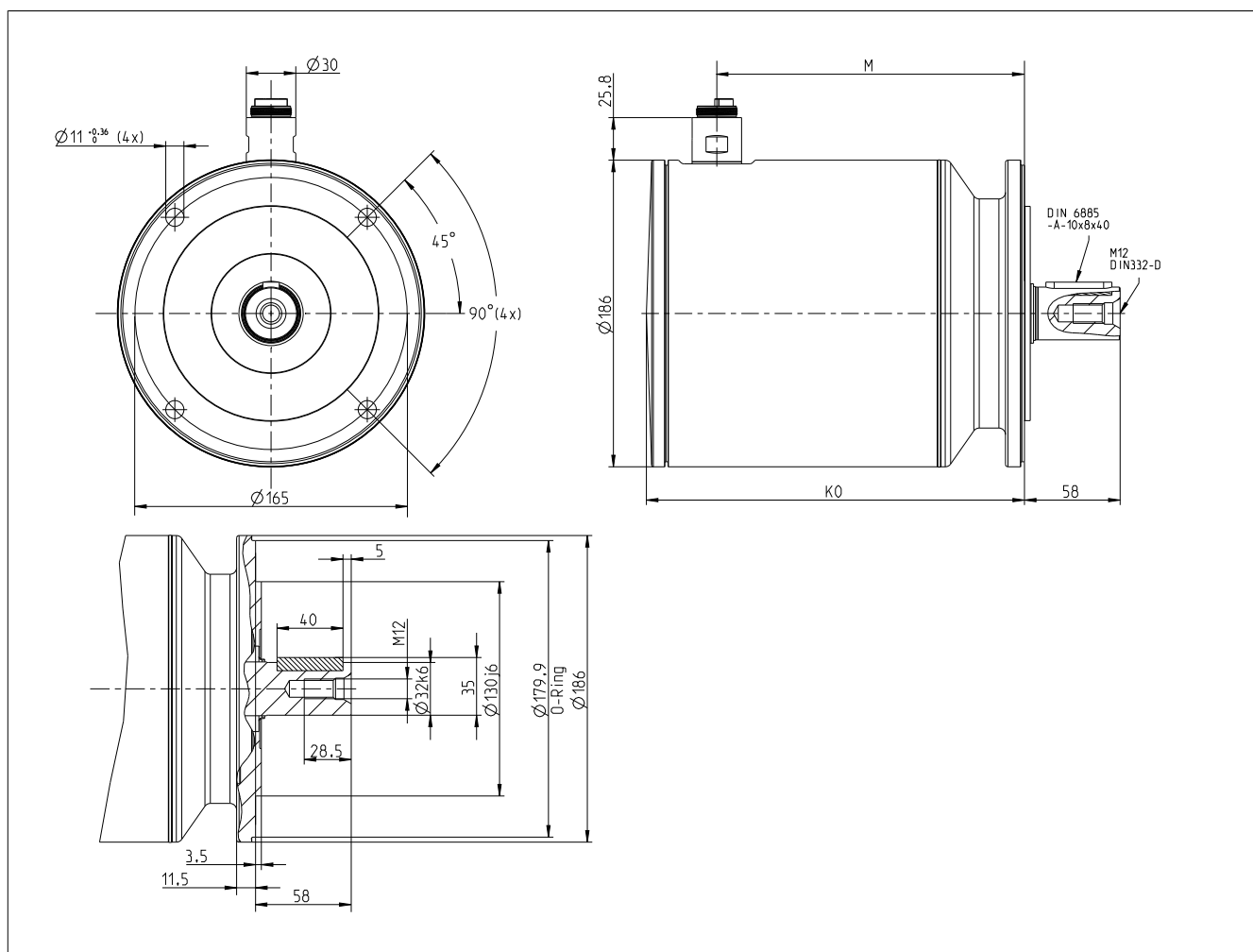
8JSB64.eennnffgg-0, 8JSQ64.eennnffgg-0**8JSB65.eennnffgg-0, 8JSQ65.eennnffgg-0**

2.7.29 Maximum shaft load

The values in the diagram below are based on a mechanical service life of the bearings of 20,000 operating hours.

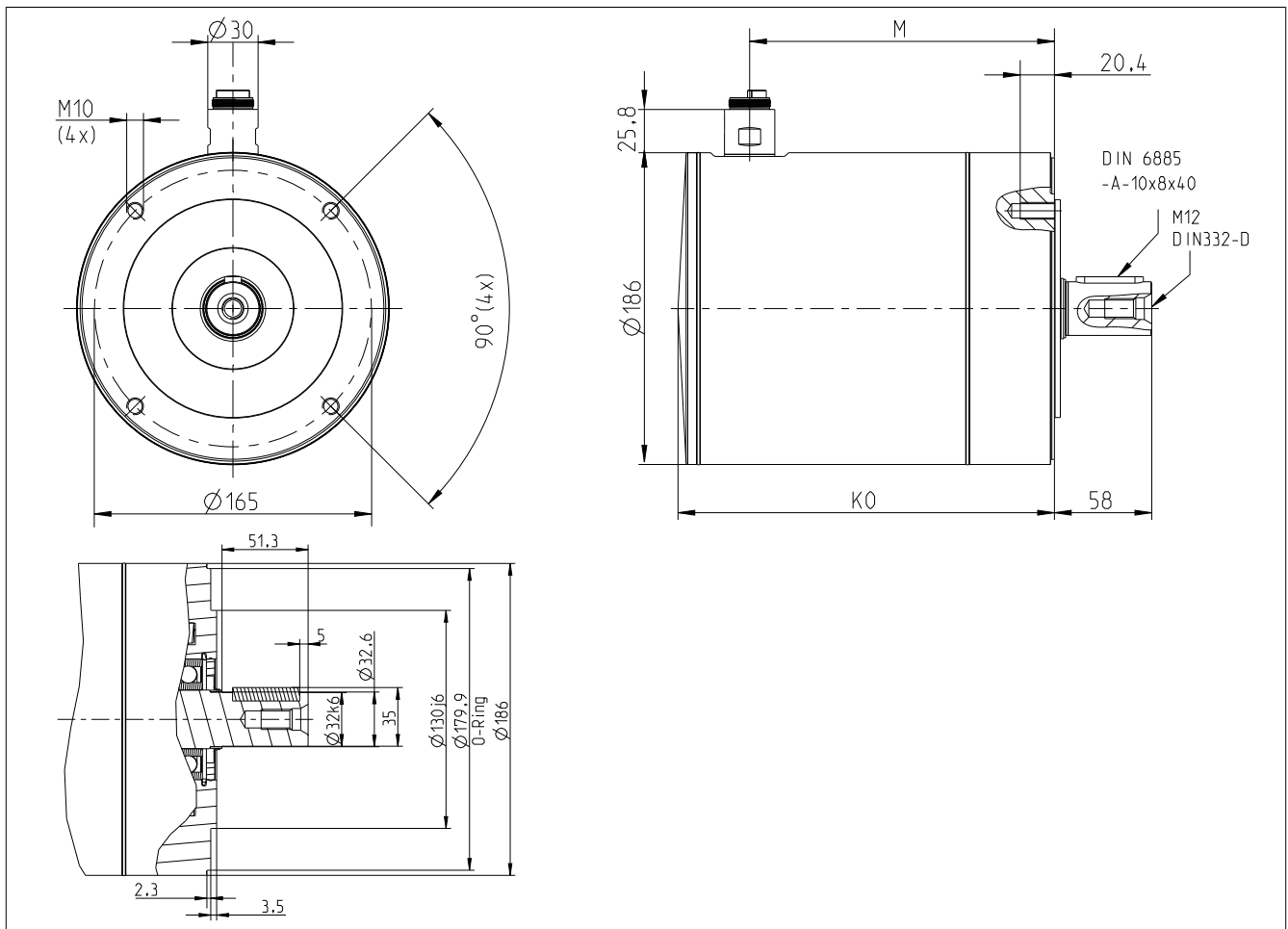


2.7.30 8JSB6 - Dimensions



Model number	K_0	M	Extension of K_0 and M depending on the motor option [mm]
			Holding brake
8JSB62.eennnffgg-0	224.4	181.7	36.9
8JSB63.eennnffgg-0	249.4	206.7	36.9
8JSB64.eennnffgg-0	274.4	231.7	36.9
8JSB65.eennnffgg-0	299.4	256.7	36.9

2.7.31 8JSQ6 - Dimensions



Model number	K_0	M	Extension of K_0 and M depending on the motor option [mm]
			Holding brake
8JSQ62.eennnffgg-0	224.4	181.7	36.9
8JSQ63.eennnffgg-0	249.4	206.7	36.9
8JSQ64.eennnffgg-0	274.4	231.7	36.9
8JSQ65.eennnffgg-0	299.4	256.7	36.9

3 Transport and storage

3.1 Safety guidelines

3.1.1 Lift the motor

Caution!

Do not lift the motor by the cable!

The cable grommet can come loose if the cable has to carry the weight of the motor. This can lead to motor failure or electric shock.

3.1.2 Suitable load suspension equipment

Warning!

Suitable load suspension equipment, such as straps, slings, etc., must be used. If provided, the lifting lugs on the motor can also be used. Terminal boxes or the motor connectors are not permitted to be used to secure devices during transport or as lifting lugs; the respective country-specific regulations must be observed during transport. Equipment used to lift, transport or suspend loads must comply with applicable regulations.

Danger!

Failure to comply with instructions, guidelines and regulations or use of unsuitable or damaged tools and equipment can result in serious injury and/or material damage.

3.1.3 Rare-earth magnets

Caution!

B&R servo motors contain rare-earth magnets with increased density of magnetic energy!

3.1.4 Magnetized rotor

Warning!

A magnetized rotor must never be transported or delivered outside the stator!

3.2 Transport

When transporting 8JSB / 8JSQ motors, the following conditions must be met:

- Climate category 2K3 per IEC 60721-3-2
- Temperature -25 to +70°C, max. fluctuation 20K/hour
- Only carried out by qualified personnel and in the manufacturer's original packaging
- Hard impacts must be avoided, in particular to the end of the shaft
- If the packaging is damaged, the motor must be checked for visible damage. Inform the transport carrier and, if necessary, also B&R

3.3 Storage

8JSB / 8JSQ motors must be stored as follows:

- Climate category 1K4 per IEC 60721-3-2
- Storage temperature -25 to +55°C, max. fluctuation 20K/hour
- Relative humidity 5% to 95%, non-condensing

- Only in the manufacturer's original packaging
- Maximum stack height: See table in chapter "Packaging"

Warning!

Damage caused by degraded material properties.

Storage for long periods of time or storage under improper conditions can cause certain materials to age prematurely, to have degraded properties and to become damaged. Damaged components can then result in further damage.

Recommendations to avoid damage during storage:

- Reduce the storage time to a minimum and do not exceed the maximum storage time of 2 years.
- Rotate the motor shaft a few turns at least every 6 months either by hand or at a low speed (max. 50 rpm). Bearing noise can occur during the run-in phase, which is perfectly normal and is not a sign of bearing damage.
- Apply a preservative coating to unprotected components such as the shaft end.
- Avoid contact corrosion.
- Use the original packaging.
- Use covers to protect against dust.
- Check the seals for damage when the item is issued or prior to use.

3.3.1 Safety guidelines

3.3.1.1 Rare-earth magnets

Caution!

B&R servo motors contain rare-earth magnets with increased density of magnetic energy!

4 Installation conditions

4.1 Safety guidelines

4.1.1 Free convection

Caution!

- Free convection on the motor housing must be guaranteed!

4.1.2 Damaged servo motor

Warning!

- Never install a damaged servo motor.
- Never operate a damaged servo motor.
- Never install a servo motor in a damaged machine.
- Before installation, ensure that the servo motor is suitable for your machine.

4.2 Environmental conditions

Ambient temperature

0°C to +40°C for installation elevations up to 1000 m above sea level.

Information:

At ambient temperatures above 40°C or with encapsulated installation of the motors, it is necessary to consult with our application department.

Effects of installation elevations on current and torque values

Reduction of I_N , M_N , I_0 and M_0 for installation elevations above 1000 m over sea level or for ambient temperatures above 40°C	
Elevation above sea level	6% up to 2000 m 17% up to 3000 m 30% up to 4000 m 55% up to 5000 m
Ambient temperatures above 40°C, at installation elevations less than 1000 m above sea level	5% more per 5°C temperature increase

Note:

When operating conditions are outside of the limits specified above, it is necessary to consult with B&R!

Operating at a reduced ambient temperature

At ambient temperatures from -20°C to 5°C there is a higher probability that the motors show one or more of the following symptoms:

- Increased static friction (increased torque needed to start movement)
- Increased bearing wear, can lead to premature failure
- Increased running noise because of reduced bearing play
- Increased condensation in all internal motor cavities
- Collection of impurities through heating and cooling cycles

5 Installation

The motor should be mounted so the motor cable outlet faces to the side or to the bottom of the motor. The cable should be routed in an arc so that cleaning fluid can drain.

An O-ring (mounting kit) must be used to seal the mounting flange.

Use seal bolts (mounting kit) to mount the motor.

Close the center hole in the shaft with a seal screw (mounting kit) if the shaft end is exposed.

Avoid direct metal to metal contact during installation and when making connections.

5.1 Mechanical installation

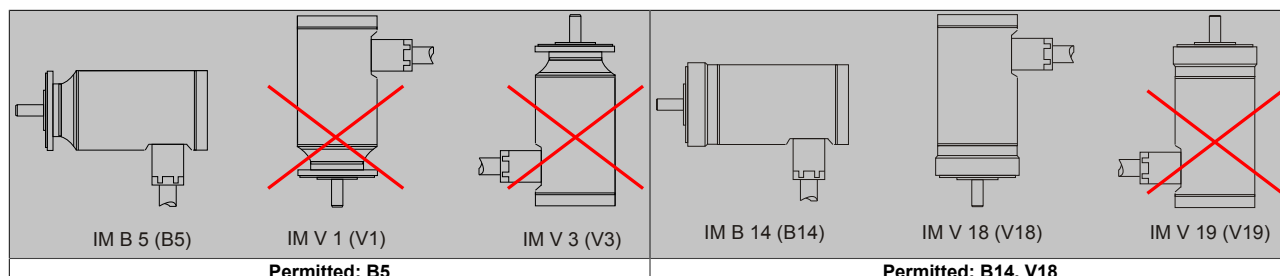
Note:

Dimension drawings can be found in chapter "Technical data"

Note:

Only specialist personnel with mechanical engineering skills are permitted to install the motor.

- Protect the motors and cables against impermissible loads
- During transport and handling, ensure components are not damaged
- Avoid scratches on the stainless steel surface
- 8JSB and 8JSQ motors are not permitted to be installed with the shaft pointing upward
- Installation per DIN EN 60034-7



- The O-ring included with the delivery must be used to seal the mounting flange
- Use seal bolts to mount the motor
- Close the center hole in the shaft with a seal screw if the shaft end is exposed
- The motor should be mounted so the motor cable outlet faces to the side or to the bottom of the motor
- Install strain relief if necessary
- Ensure proper ventilation of the motors and observe the permissible ambient and flange temperature values
- Consult with the B&R application department for ambient temperatures above 40°C
- Ensure sufficient heat dissipation in the environment and on the motor flange
- Flange and shaft are particularly at risk during storage and installation – applying raw force must therefore be avoided
- Always use the designated tightening threads in the motor shaft to install couplings, toothed gears or belt pulleys and, if possible, heat the output components
- Shocks or raw force will damage the ball bearings and shaft!
- If possible, only use frictionally engaged clamps or couplings that are free of play
- Ensure correct alignment of the coupling. An offset leads to impermissible vibrations and the destruction of ball bearings and the coupling!
- Avoid under all circumstances a mechanically overdetermined bearing on the motor shaft by using a rigid coupling and external bearing (e.g. in the gearbox)
- Avoid as much as possible an axial load on the motor shaft. An axial load will shorten the service life of the motor significantly.
- Check compliance with permissible radial and axial loads F_R and F_A .
- When using a toothed belt drive, the minimum permissible diameter of the pinion, for example, is calculated using the following equation: $d_{min} \geq (M_0/F_R) \times 2$

5.1.1 Safety guidelines

Danger!

The improper handling of servo drives and servo motors can cause severe personal injury or damage to property!

Warning!

Galvanic corrosion can lead to contamination of the product, irreparable damage to the motor mount and failure of the motor. A irreparably damaged motor mount could result in risk of electric shock caused by damage to the electrical connections or the motor cable. The motor housing is made of stainless steel. In order to prevent galvanic corrosion, avoid direct contact between the motor and more active metals such as aluminum or steel.

5.1.1.2 Overdetermined bearing

Caution!

When using add-on drive elements on the drive shaft, overdetermined bearings must be avoided. The necessarily occurring tolerances cause additional forces on the motor shaft bearings. This can damage or significantly reduce the service life of the bearings!

5.1.1.3 Connection of pinion gears

Note:

Use suitable clamping sets, pressure sleeves or other fastening elements to connect pinion gears, belt disks or similar machine actuators.

Machine actuators must be protected against unintentional removal.

5.1.1.4 Axial forces

Warning!

Excessive axial forces on the motor shaft during installation can damage the bearings and weaken the motor holding brake until the breaking effect is reduced or nonexistent. Encoder errors can also occur.

Therefore, excessive pressure or shocks to the front shaft end or the rear housing cover should be avoided under all circumstances.

Loads caused by a hammer definitely exceed the permissible values!

5.1.1.5 No shocks or impacts

Caution!

Bearing elements must not be subjected to shocks or impacts! Incorrect handling will reduce the service life and result in damage to the bearings.

5.1.1.6 No direct mains connection

Warning!

B&R's three-phase synchronous motors are not permitted to be connected directly to the power mains, they are only permitted to be operated in combination with ACOPOS servo drive systems!

5.1.1.7 Damaged servo motor

Warning!

- Never install a damaged servo motor.
- Never operate a damaged servo motor.
- Never install a servo motor in a damaged machine.
- Before installation, ensure that the servo motor is suitable for your machine.

5.1.1.8 Free convection

Caution!

- Free convection on the motor housing must be guaranteed!

5.1.1.9 Simultaneous loads on shaft end

Warning!

Simultaneously loading the shaft end with the maximum values of F_r and F_a is not permitted! Contact B&R if this occurs.

5.1.2 Flange mounting, front mounting

Information:

In order to comply with hygiene directives for flange mounting, use the optional 8JSB / 8JSQ mounting set and the appropriate seal bolts for the shaft and flange. (See chapter "Accessories").

8JSB - Flange mounting

The 8JSB motor is screwed on from the rear of the flange due to its construction.

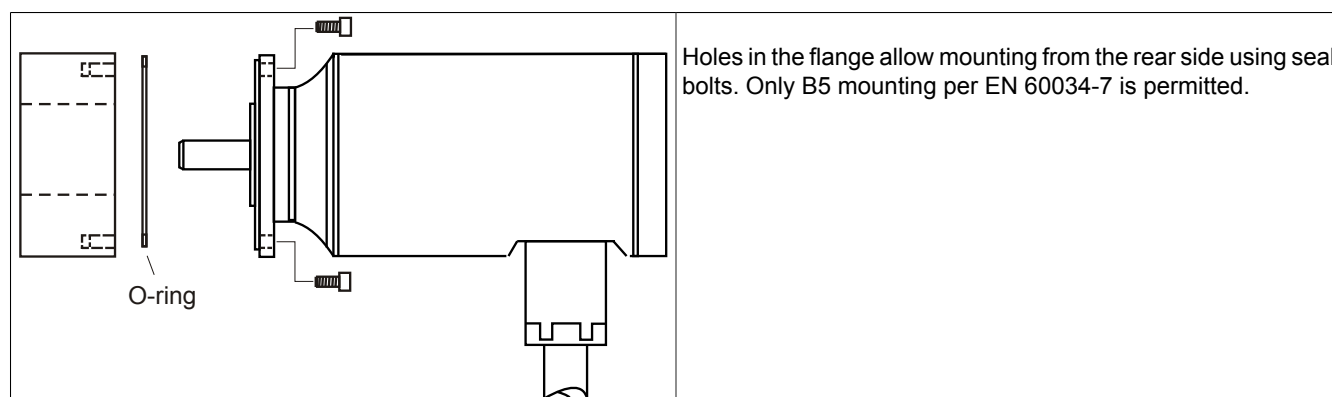
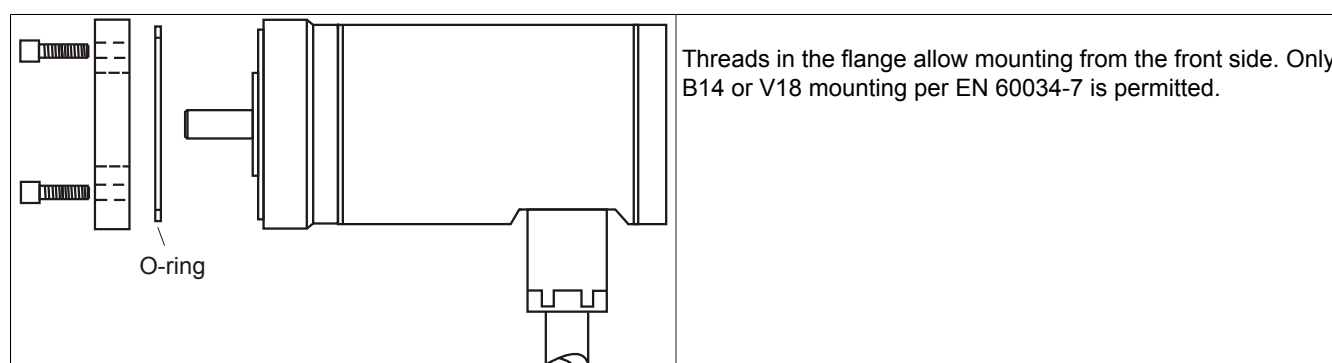


Table 5: Flange mounting

8JSQ - Front mounting

The 8JSQ motor is screwed on from the front side due to its construction.



O-ring seals

- Place the O-ring (included in delivery) in the groove in the motor flange (see image)
- Press the motor against the opposing flange (e.g. gearbox flange)
- Fasten the motor using the sealing screws

5.1.3 Accessories

The specified IEC mounting kits with screws for flange mounting and sealing the shaft hole are available using the following model numbers:

Model number	Description
8XMSJ3.IO-1	IEC mounting kit for 8JSB3 flange mounting
8XMSJ4.IO-1	IEC mounting kit – 8JSB4 flange mounting
8XMSJ5.IO-1	IEC mounting kit – 8JSB5 flange mounting
8XMSJ6.IO-1	IEC mounting kit – 8JSB6 flange mounting

5.2 Electrical installation

5.2.1 Safety guidelines

Information:

Only qualified personnel with training in electrical engineering are permitted to connect the motors.

Danger!

- Only wire the motors without power applied, i.e. operating voltages of devices being must be switched off.
- Touching exposed contacts could result in death or severe injury.
- Ensure that the control cabinet is safely secured (locks, warning signs, etc.).
- Only switch on the individual voltages when putting the system into service.
- Never remove the electrical connections of drive systems while voltage is applied. Risk of electric shock! In some cases, electric arcs may occur that can cause personal injury and/or damage to contacts.
- Residual charge in the capacitors of the servo drive can have dangerous values up to 10 minutes after switching off the supply voltage.
- Power connections can still carry voltage even if the motor is not turning. Measure the voltage on the DC bus and wait until the voltage has fallen below 60 V.

5.2.1.1 No direct mains connection

Warning!

B&R's three-phase synchronous motors are not permitted to be connected directly to the power mains, they are only permitted to be operated in combination with ACOPOS servo drive systems!

5.2.1.2 Ensure proper connections

Caution!

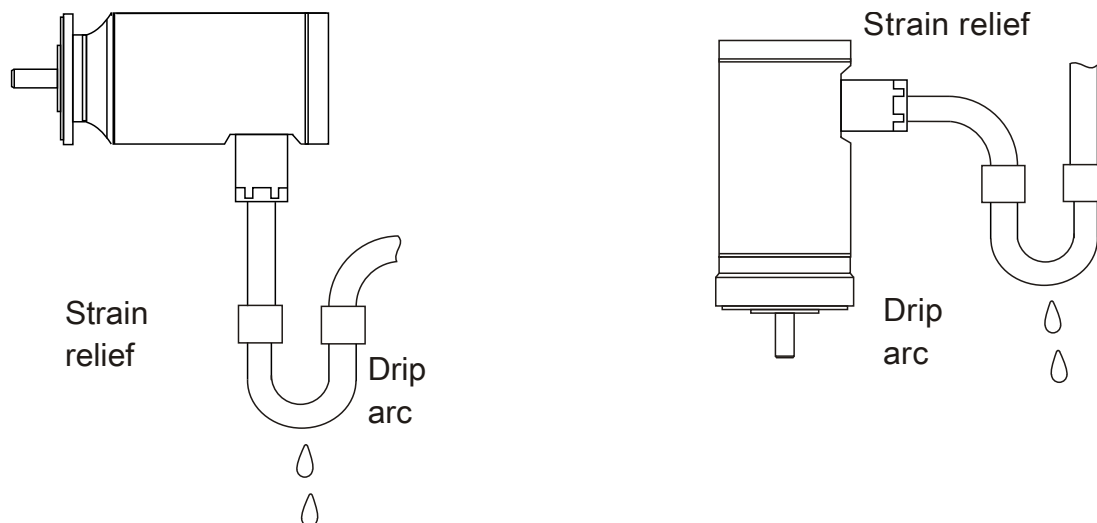
The connectors must be connected and fastened correctly. Misalignment and subsequent pulling can cause disturbances and damage to the servo motor!

Information:

Take note of the information in the connection diagrams provided in the operating instructions for the servo drive being used.

5.2.2 Cable installation

The motor should be mounted so the motor cable outlet faces to the side or to the bottom of the motor. The cable should be routed in an arc so that cleaning fluid can drain.



Caution!

- The cable grommet can come loose if strain relief is not used on the cable.
- This could lead to unexpected motor behavior and risk of electric shock because of exposed electrical connections.

5.2.2.1 Standard wiring

Standard wiring can be used in all applications except for the food and beverage industry. Observe the minimum bending radius of the cable (150 mm or 165 mm – see chapter "Connection options").

Note:

Before long-term use, evaluate compatibility of the cleaning agent being used with the motor cable.

5.2.3 Connection of motors

B&R delivers 8JSB and 8JSQ motors with a straight built-in connector. When installing the connector, please use the installation instructions from Intercontec for the "723 htec motor connection".

Information:

Using B&R connectors guarantees that the EMC limits for the connection are not exceeded. Make sure that connectors are assembled correctly and include a proper shield connection.

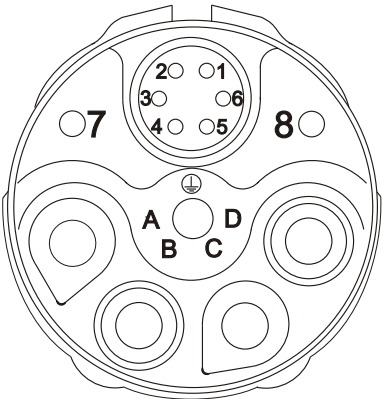
5.2.3.1 Guide for electrical installation

- Check correlation of the servo drive and the motor.
- Compare the nominal voltage and current of the devices.
- Ensure proper grounding of the servo drive and motor
- EMC-compliant shielding and grounding – See ACOPOS operating instructions
- Ground the mounting plate and the motor housing
- The shield must be connected to the servo drive (see also ACOPOS user's manual)
- Properly connect the shields (large area with low resistance) to metal connector housings or EMC-compliant cable connectors
- The connector must be attached to the motor in accordance with the installation instructions.

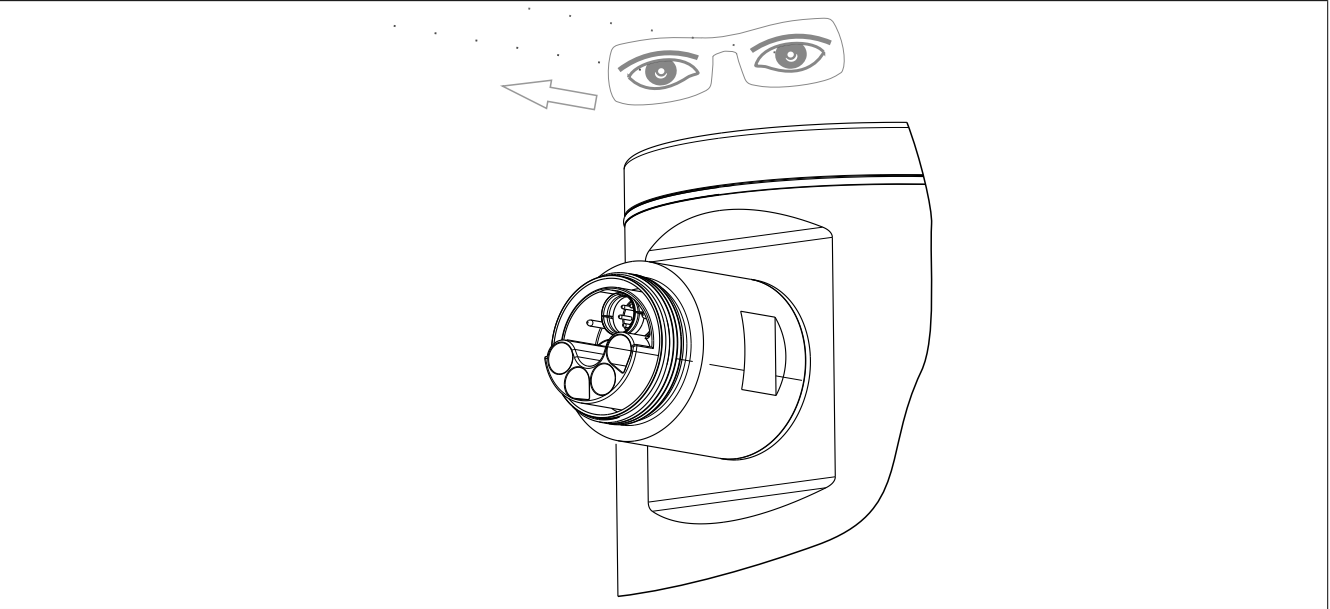
Note:

IP69K protection can only be achieved if the connector is mounted correctly. Incorrect alignment will cause leakage.

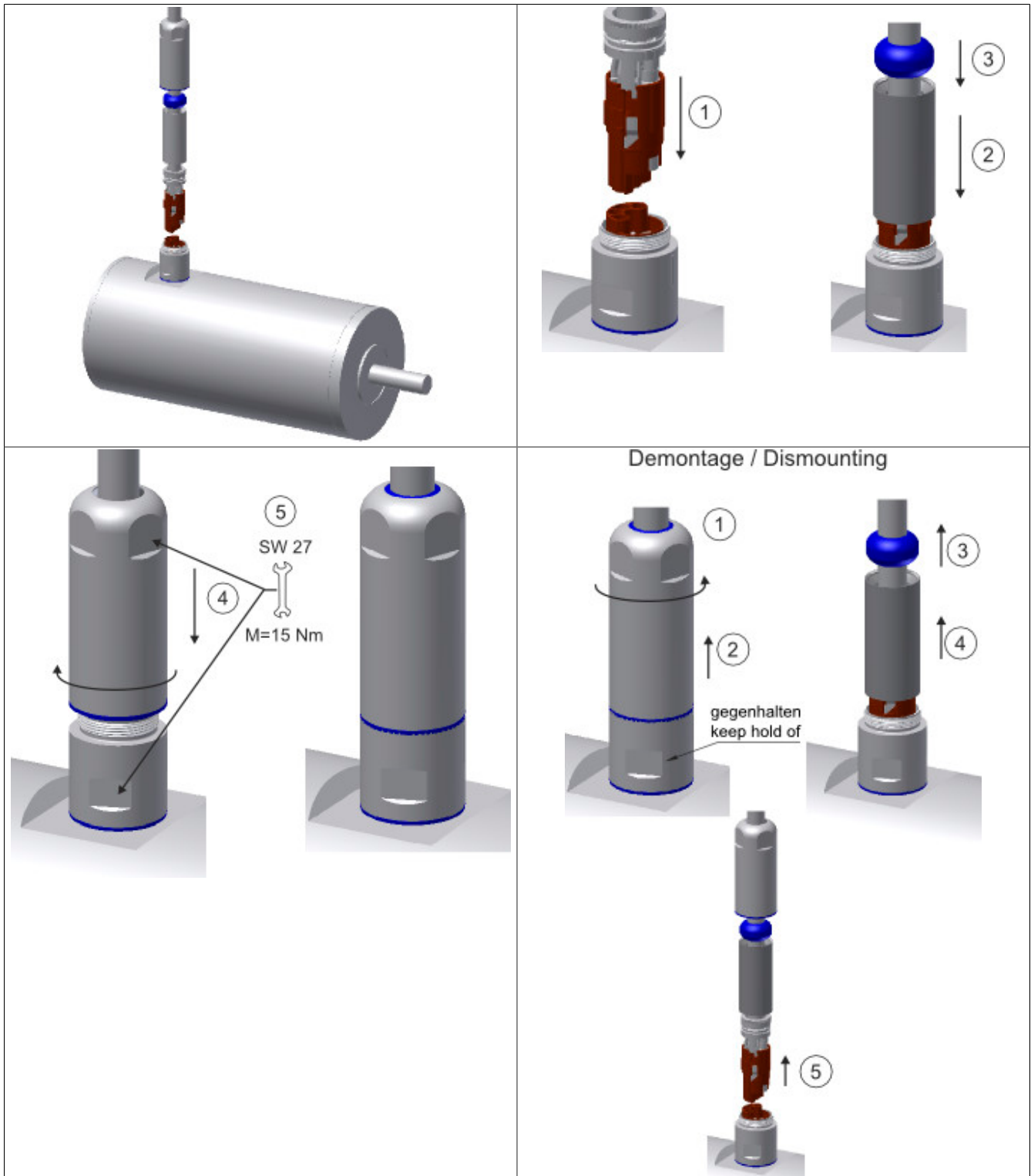
5.2.3.2 Pinout

	Pin		Signal
	A		U
	B		V
	C		W
	D		--
	7		Brake -
	8		Brake +
	PE		Grounding
	1		U _P
	2		Ground
	3		Data
	4		Data
	5		Clock input
	6		Clock input inverted

Viewed towards pinout



5.2.3.3 Intercontec 723 htec mounting instructions



Source: INTERCONTEC Y4.698.00 with changes form 2014-11-03

5.2.3.4 IP69 protection

Note:

IP69K protection can only be achieved if the connector is mounted correctly. Incorrect alignment will cause leakage.

6 Commissioning and operation

6.1 Commissioning

6.1.1 Safety guidelines

6.1.1.1 Danger of death by electric shock

Danger!

Voltages up to 900 V occur. There is danger of death by electric shock! Check if all voltage-carrying connectors are protected to prevent coming into contact with them. Never remove the electrical connections of the motors while voltage is applied. Residual charge in the capacitors of the servo drive can have dangerous values up to 10 minutes after switching off the supply voltage. Control and power connections can still carry voltage even if the motor is not turning. Measure the voltage on the DC bus and wait until the voltage has fallen below 60 V.

6.1.1.2 Unplanned movement

Caution!

During commissioning, it is not possible to rule out that the motor performs an unplanned movement. Make sure that moving the motor is not a risk to persons or property even in the case of unintentional movement. The measures that you have to implement in your application result from the risk assessment for the application.

6.1.2 Qualified personnel

Information:

Only qualified personnel with extensive knowledge in the areas of electrical engineering and drive technology are permitted to carry out commissioning ACOPOS drives / 8JSB or 8JSQ motors.

6.1.3 Commissioning checklist

The commissioning procedure is described in the form of an example. A different approach might be useful and necessary depending on how the devices are being used.

- Check for correct mounting and alignment of the motor.
- Check the drive components (coupling, gearbox, belt pulley) for a proper fit and adjustment (take permissible radial and axial forces into account).
- Check the ACOPOS wiring and connections. Ensure proper grounding.
- Check operation of the holding brake, if equipped. (Apply 24 V, brake must release).
- Check that the rotor of the motor can turn freely (release brake beforehand if necessary). Check for scraping noises.
- Check if all the required measures to protect against coming into contact with electrified parts, hot surfaces, rotating and moving parts and assemblies are in place.
- Complete any additional tests necessary for your specific system.
- With multi-axis systems, commission each ACOPOS drive / 8JSB or 8JSQ motor individually.
- Put the drive into service in accordance with the commissioning instructions for ACOPOS drive.

6.1.4 Break-in procedure

The following break-in procedure is recommended to ensure the oil seal functions correctly:

- 30 minutes of load-free operation in the clockwise direction at maximum speed
- Allow the motor to cool down for 30 minutes
- 30 minutes of load-free operation in the counterclockwise direction at maximum speed
- Allow the motor to cool down for 30 minutes

This cycle should be repeated three times.

Note:

This break-in procedure can result in abrasive wear of the Teflon material, which is normal behavior and not a material error.

6.2 Operation

6.2.1 Safety guidelines

Warning!

High temperatures can occur on the surface of the motors ($>100^{\circ}\text{C}$). If necessary, protection against accidental contact must be installed!

6.2.1.1 Unplanned movement

Caution!

During commissioning, it is not possible to rule out that the motor performs an unplanned movement. Make sure that moving the motor is not a risk to persons or property even in the case of unintentional movement. The measures that you have to implement in your application result from the risk assessment for the application.

6.2.2 Faults during operation

There can be many different causes for a fault occurring that depend on the conditions in your plant. The error sources that affect the motor directly are primarily described here. Any abnormalities in control behavior are usually caused by a faulty configuration of the servo drive. For information about this, see the corresponding ACOPOS documentation and commissioning software. With multi-axis systems, other hidden error sources can exist.

Warning!

- Only allow troubleshooting and fault elimination to be carried out by qualified personnel
- Do not disable protective equipment – even during trial operation.
- Only connect and disconnect cables without voltage applied and with the system in a safe state
- Observe the 5 safety rules for "Activation" (see chapter " Installation - Electrical connection)
- Surfaces may be hot.

Information:

General guidelines in the event of faults during operation:

- Observe the operating instructions for the machine/plant
- Observe the operating instructions for the inverter
- Consult with B&R when necessary

Information:

Have the following information at hand:

- Type plate data
- Type and extent of fault
- Circumstances under which the fault occurred
- Application data (cycle of torque, speed and forces over time, environmental conditions)

6.2.3 Fault table

Fault table

Fault	Possible cause	Fix
Motor will not start	<ul style="list-style-type: none"> • Servo drive not enabled • Setpoint line not connected • Motor phases swapped • Brake is not released • Drive is mechanically blocked 	<ul style="list-style-type: none"> • Apply ENABLE signal • Check setpoint line • Motor phases connected correctly • Check brake controller • Check mechanical components
<i>Motor runaway</i>	Motor phases swapped	Motor phases connected correctly
Motor is oscillating	<ul style="list-style-type: none"> • Shielding feedback line not connected • Gain too high 	<ul style="list-style-type: none"> • Replace the motor • Use default values for the motor
Brake error message	<ul style="list-style-type: none"> • Short circuit in the power supply for the motor holding brake • Defective motor holding brake 	<ul style="list-style-type: none"> • Eliminate the short circuit • Replace the motor
Output stage error message	<ul style="list-style-type: none"> • Motor cable has a short circuit or ground fault • Motor has a short circuit or ground fault 	<ul style="list-style-type: none"> • Replace the motor • Replace the motor
Motor temperature error message	<ul style="list-style-type: none"> • Motor thermal switch activated • Feedback connector loose • Feedback line not connected 	<ul style="list-style-type: none"> • Wait until the motor has cooled down. Then check why the motor overheats • Check the connector • Replace the motor
Brake does not engage	<ul style="list-style-type: none"> • Required holding torque too high • Motor shaft axial overload • Brake defective 	<ul style="list-style-type: none"> • Check configuration • Check axial load, reduce it • Replace the motor

7 Maintenance and cleaning

7.1 Safety guidelines

7.1.1 Working on the servo motor

Warning!

Working on the servo motor:

- Working on the servo motor is only permitted when the motor is at a standstill, free of voltage and cooled down.
- Before resuming operation, be sure to replace any screws or other parts that were removed.
- While working on the servo motor, be sure to observe the technical notes in the respective sections in the installation and maintenance guidelines.
- An optional built-in holding brake is not permitted to be used to secure the system during the work on the motor (e.g. holding loads).

Warning!

When performing maintenance, observe the same safety guidelines that apply when commissioning the motor. (see chapter "Commissioning and operation")

7.2 Maintenance

Note:

Maintenance and cleaning of 8JSB / 8JSQ motors is only to be carried out by qualified personnel.

In normal operation, an 8JSB, 8JSQ motor is virtually maintenance-free. Some of the components should however be checked regularly.

Annual maintenance of oil seals

- Check for proper fit
- Check for visible wear and damage that could impair functionality
- In the event of damage or after 2 years of operation, replace the oil seal

Annual maintenance of O-rings

- Check for proper fit
- Check for visible wear and damage that could impair functionality
- In the event of damage, replace the O-rings (flange seal, end cap seal).

Note:

If the O-ring is damaged between the flange and the motor housing, the motor must be replaced.

Annual maintenance plan

- Check for ball bearing noise (once a year or every 2500 operating hours, whichever comes first)
- Annually: Check for cable damage. Replace if cuts or damage are found

Note:

If noise is detected, the motor must not be operated further. The bearings must be replaced by the manufacturer.

Note:

After 20,000 operating hours under nominal conditions, the ball bearings must be replaced by the manufacturer.

Note:

Opening the motors voids the warranty.

7.3 Cleaning

Information:

- Cleaning must be carried out by qualified personnel
- Cleaning is only permitted when power is removed from the drive
- The limits in the IP69K standard for pressure, temperature, angle and distance of the sprayed cleaning agent must be observed
- Using a wire brush or scraper to clean the motor surface and cables is not permitted
- Remove dirt by spraying or wiping the surface.

7.4 Repair

The motor is only permitted to be repaired by the manufacturer, and opening a device voids the warranty.

Send the motor to B&R for repairs.

8 Disposal

The servo motor must be disposed of in accordance with applicable national and local regulations.

Caution!

B&R servo motors contain rare-earth magnets with increased density of magnetic energy!

Warning!

A magnetized rotor must never be transported or delivered outside the stator!