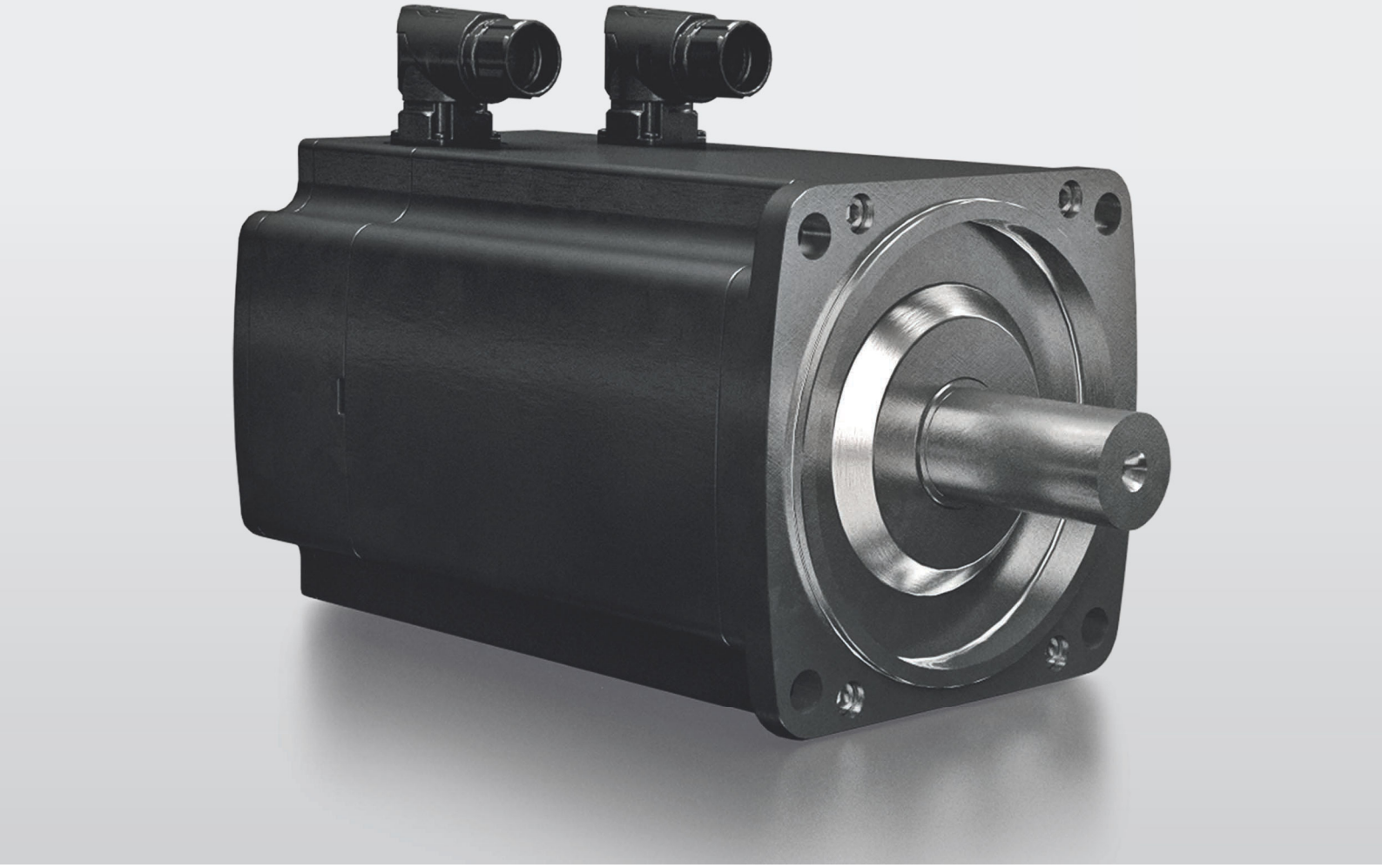
BAUMÜLLER



DSC2-071

Instruction handbook
Three-phase synchonous motor

E | 5.22013.02

Read the Instruction handbook before starting any work!

Language: **English** (Translation)
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1

GENERAL

1.1 Safety

This electric motor was built referring to the current state of the art of safety technology and was checked on its operational safety before it left the company.

Please, consider the following to ensure a proper commissioning as well as the safe use:

- The present commissioning and maintenance instruction and its enclosed additional parts
- The enclosed safety and commissioning instructions
- The technical documents of the product
- The commissioning and safety notes of the manufacturer of the converter
- The national, local and plant-specific regulations related to the finished product
- The technical instruction TAM 00697 when using the safety-related applications

When using this product the following dangers must be considered:

Dangers due to

- Lifting and transport processes
- Electrical current
- Moving parts
- Hot surfaces
- EMC interferences
- Mechanical overload
- Thermal overload

1.2 Key to symbols

In order to avoid dangers against persons and material assets or to minimize existing risks please regard all safety notes especially those which are marked by symbols.



DANGER!

....points out an immediately dangerous situation that will lead to severe injuries or death if not avoided.



DANGER due to electrical current!

....points out a directly dangerous situation caused by electrical current that will lead to severe injuries or death, if not avoided.



Prohibition of action likely to increase or cause danger!

…failure to comply can cause serious injuries.



WARNING!

....points out a potentially dangerous situation that could lead to severe injuries or death if not avoided.



CAUTION!

....points out a potentially dangerous situation that can lead to minor or slight injuries, if not avoided.



NOTICE!

....points out a potentially dangerous situation, that can lead to material damage, if not avoided.



Hot surface warning!

Failure to observe can lead to severe injuries.



Magnetic field warning!

Failure to observe can lead to severe injuries or damage to property.



Electrostatically sensitive components!

Failure to observe can lead to damage to the system or peripheral equipment.

Recommendations



NOTE!

....highlights useful hints and recommendations, as well as information for the efficient and trouble-free use.

1.3 Appropriate use

The motor must only be used appropriately. In this context, the motor must only be used for the applications described in the technical documentation under strict observance of all the notes in these instruction handbook.

All assembly, commissioning, maintenance, and operating tasks must be carried out by **qualified personnel** only.

Within the context of these safety instructions, qualified personnel refers to persons who are trained and authorized in the specialized area, who are authorized to set up, assemble, commission, and operate units, systems, and circuits under application of the applicable safety standards (EN 50110-1).

Inappropriate behavior can result in **serious injury** and **damage** to property.

The **motor** is designed to be **used for industrial applications** and is subject to a number of **standards** and **directives**, including the following:

Standards

EN 60034-1, EN 60034-5, EN 60034-6, EN 60034-9, EN 60034-14, EN 61800-5
EN 60204-1

EU Low Voltage Directive

The motors in this series fully comply with the requirements of the Low Voltage Directive EU 2014/35/EU (conformity).

EU Machinery Directive

Motors are components which are intended to be installed in machines as described in the Machinery Directive. Commissioning is not permitted until such time as the conformity of the finished product with this directive has been established (see EN 60204-1 „Electrical Equipment of Machines“).

EU EMC Directive

When the motor is used as intended, its operation must comply with the safety requirements laid down in the EMC Directive 2014/30/EU. Proper installation (e. g. physical isolation of signal and power cables, shielded wiring and cable etc.) is the responsibility of the system installer and system vendor. With systems which have converters, the EMC notes from the manufacturers of the converter-, encoder- and brake-manufacturer must be observed.

Furthermore, all the national, local, and system-specific regulations must be observed!

Motor design with rare earth magnets:



Please be aware of the following risks in the vicinity of a retracted or exposed rotor with a strong magnetic field:

- People with electronic or metallic implants (such as cardiac pacemakers, hearing aids, plates or pins) are at risk, if the distance between the implant and the magnetic pin is less than 0.5 m.
- Due to the strong attraction forces exerted on ferromagnetic parts there is a risk of:
  - Bruises
  - Damage to measuring and assembly tools, credit cards, watches etc.
  - Contamination of the Rotor assembly due to attracting metal debris or powder.



Beware of risk of burns!

The surface temperatures on the motors can exceed 70 °C. If necessary, provide guards!

Temperature-sensitive parts, such as normal cables or electronic components, must not be placed on or fixed to the hot surfaces.

Thermal overloading can destroy the winding and the bearing and can cause demagnetization of the rare-earth magnets. A thermal sensor should be used to monitor the temperature.

1.4 Prohibition of unauthorized modifications and changes



For safety reasons, unauthorized modifications and changes to the motor are not permitted. If such modifications/changes are necessary, please contact the motor manufacturer.

No safety devices may be dismantled or decommissioned when operating the motor.

1.5 Signs and labels



WARNING!

Risk of injury due to illegible symbols!

- Over the course of time, stickers and symbols on the device can become dirty or otherwise unrecognizable.

Therefore:

Maintain all safety, warning and operating labels on the device in easily readable condition.



CAUTION!

Risk of injury due to hot surface!

When in operation, the top of the device can heat up to temperatures > 70 °C!

Therefore:

- Wear safety gloves



- It is not allowed that temperature sensitive parts, e. g. standard cables or electronic parts are touch or be mounted to hot surfaces.
- A thermal overload of the motors can lead to damage of the winding, the bearing and to the demagnetization of the rare-earth magnets.



Electrical voltage

Only qualified personnel may work in work areas that identified with this.

Unauthorized persons may not touch working materials marked correspondingly.

1.6 Limitation of liability

All specifications and notes in these instruction handbook were compiled taking into account the applicable standards and regulations, the state of the art and our knowledge and experience of many years.

The manufacturer assumes no liability for damages due to:

- noncompliance with the instruction handbook
- usage for other than the intended purpose
- usage by untrained personnel

The actual scope of delivery can vary in case of optional equipment, laying claim to additional order options, or on account of the latest technical changes to the explanations and representations described herein.

The user bears the responsibility for performing service and initial operation in accordance with the safety regulations of the applicable standards and all other relevant governmental or local regulations concerning the dimensioning and protection of conductors, grounding, disconnectors, overcurrent protection, etc.

The person who carried out the mounting or installation is liable for any damage incurred when assembling or connecting the device.

1.7 Copyright protection

The instruction handbook must be treated confidentially. It is to be used exclusively by personnel who work with the device. The consignment of the instruction handbook to third persons without the written permission of the manufacturer is prohibited.



NOTE!

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NOTE!

Please note, that BAUMÜLLER is not responsible to examine whether any (industrial property) rights of third parties are infringed by the application-specific use of the BAUMÜLLER products/components or the execution.

1.8 Spare parts



WARNING!

False or flawed spare parts can lead to damage, malfunction or complete failure, thus endangering safety.

Therefore:

- Only use original spare parts of the manufacturer.

Procure spare parts through an authorized dealer or directly from the manufacturer.

1.9 Disposal

Insofar as no take-back or disposal agreement has been made, please disassemble units correctly and properly recycle the constituent parts.

Refer to ▹ Demounting and Disposal ◃ on page 99.

1.10 Guarantee provisions

The guarantee provisions are stated in a separate document of the sales documents. The devices described herein may only be operated in accordance with the stipulated methods, procedures and conditions. Anything else not presented here, including the operation in other mounted positions, is not permitted and must be cleared. If the devices are operated in any other manner than as described within these instruction handbook, then all guarantee and warranty rights are rendered null and void.

1.11 Customer service

Our customer service is available to provide you with information. Info on the responsible contact persons is available at all times via telephone, fax, mail or the Internet.

2

TECHNICAL DATA



NOTICE!

If the delivered motor does not correspond to the standard version according to the technical list or if special agreements have been made in the contract, technical deviations may occur.

In this case, request the corresponding technical additions.

Construction type	M B5	Horizontal mounting
	IM V1	Vertical mounting, shaft end down
	IM V3	Vertical mounting, shaft end up



NOTICE!

The shaft exit must be protected against water and dirt at vertical mounting IM V3 and type of protection IP 64.

Type of protection (EN 60034-5)



NOTICE!

All mentioned degrees of protection are reached only, if the plug connectors are mounted completely and the terminal box is completely closed.

Considering the shaft exit

IP 64	Standard: without shaft seal ring
IP 65	Option: with shaft seal ring

	Without consideration of shaft exit	
	IP 67	For unventilated or water-cooled types (IC410 and IC 3W7); not for motors with terminal box
	IP 65	For surface-ventilated types (IC416)
	IP 65	Types with terminal box
Methods of cooling (EN 60034-6)	IC 410	Standard: Completely closed motor type, self-cooled without fan
	IC 416	Option: Completely closed motor type, surface-cooled with fan, air-direction from B- to A-end of the motor
	IC 3W7	Option: Completely closed motor type, water-cooled, cooling circuit connection in direction NDE



NOTE!

Electrical connection via angled, rotatably mounted flange.

The main connection is done via terminal box at standstill currents I_0 > 36 A.

Main connection	Flange (8-pin) or terminal box (I_0 > 36 A)		
	Standard:	U V W + temperature sensor	
	Option:	Brake	
Encoder connection	Flange (rotatable)		
	Standard:	Resolver	12-pin
	Option:	Absolute encoder	12 /17-pin
		Encoder + temperature sensor	12 /17-pin
		Hiperface interface	12-pin
		Endat 2.1 interface	17-pin
		Endat 2.2 interface	9-pin



NOTE!

Main-, encoder- and fan-connection only available with speedtec connector.
Electrical connections (see ▷ Pin assignment control connections ◁ on page 73) via angled (2x90°) rotatable flanges.

Thermal motor protection (EN 60034-11)	Temperature sensor PT1000 in stator winding		
Winding insulation (EN 60034-1)	Insulation class F ($\Delta\theta$ = 105 K)		
Roller bearing with for-life grease lubrication	Standard:	(shaft height 71)	deep groove ball bearing
	Option:	(shaft height 71)	cylindrical roller bearing (A end)
Service life of bearing	L_{10H} 20.000 h, (four point bearing dependent on no. of cycles)		
Vibration resistance (EN 60034-14)	Standard:	A	
	Special:	B (with deep groove ball bearing)	
Concentricity (DIN 42955)	Standard:	N	
	Special:	R (reduced)	
Vibration resistance	See ▹ Vibrations and resistance to vibrations ◃ from page 64		
Holding brake	Option		
Actual speed encoder	Standard:	2-pin resolver (high-quality type on request)	
	Option:	Absolute encoder with Hiperface interface Absolute encoder with Endat interface	
Weight	8.5 - 34 kg		
Approvals	CE, cURus, UKCA, CEL		

Liquid-cooled motors

Type of cooling / type of protection	IC3 W7 / IP 64	water-cooled motor



NOTICE!

All mentioned degrees of protection are reached only, if the plug connectors are mounted completely and the terminal box is completely closed.

Terminal box	B end	on top
Coolant inlet temperature	10°C to 25 °C	max. 5 K lower than ambient temperature
Water inlet	B end	behind

Ventilated motors

Type of cooling / type of protection	IC 416 / IP 64	surface-ventilated motor with fan



NOTICE!

All mentioned degrees of protection are reached only, if the plug connectors are mounted completely and the terminal box is completely closed.

Connection fan motor	Integrated fan motor	Connector 6-pin
Terminal box	B end	on top

2.1 Winding insulation

The motors are designed for operation with converters with a DC link voltage of up to 640 V. The motors can be operated at higher DC link voltages.

At higher DC link voltages, ensure that voltage peaks of >1200 V at the motor terminals are prevented by taking appropriate measures. This can be achieved, for example, by installing suitable filters in the motor supply cable. When operating braked applications, it must also be ensured during the braking process that the voltage at the motor terminals never exceeds 1200 V.

This ensures that the winding insulation is not damaged, thus preventing short circuits.

2.2 Installation conditions

Environment



WARNING!

The use in hazardous areas is forbidden, unless explicitly provided for this purpose (regard additional notes). Furthermore, there may not be flammable gas mixes and dangerous dust concentrations in the vicinity of the electric motor. Voltage-carrying and hot motor parts could cause fire and severe injuries and material damages.

If there should be the special case of the use in systems which are not industrial, higher demands are required (e.g. protection against children's fingers), these conditions must be ensured at installation of the system.



NOTE!

Please, take note of any deviating details specified on the type plate or in the technical documentation. The conditions at the place of use must correspond to the details on the rating plate.

The motor can be installed in roofed rooms complying with the degree of protection in dusty or damp environment and under normal climatic conditions.

Unless different arrangements have been made, the motor is designed by default for the following climatic conditions:

- Ambient temperature 0 °C bis 40 °C
- Installation height ≤1000 m above sea level
- Relative humidity 5 % to 85 %
- Absolute humidity from 1 g/m² to 25 g/m²

All other allowed application conditions have to correspond to DIN EN 60721-3-3 (class 3K3/3Z12).

It is absolutely imperative to comply with these climatic conditions when installing the motor.

Aggressive, corrosive, abrasive and plastic-dissolving solutions should be kept well away from the motor and the air that is used to cool it.

Consultation with the motor manufacturer is essential in the case of installation outdoors.

2.2.1 Air cooling

Type of cooling IC 410 - self-cooled **without** fan (unventilated)

Type of cooling IC 416 - surface-cooled motor **with** fan (surface-ventilated)

The following must be observed:

- The installation conditions must not impair thermal convection and radiation.
- The cooling air used for forced ventilation must be able to flow in freely and the hot air must be able to flow out freely. The hot exhaust air must not be sucked back in.

- A clearance of at least 100 mm must be observed in relation to neighboring machine parts.
- If installed in very dirty locations, the housing surface and airways must be cleaned regularly.

2.2.2 Flange mounting

By attaching the motor to the mounting surface, a part of the motor loss performance is lead away via the flange.

The dimensions of the mounting surface based on their axis height are listed in the following table. This information provides minimum values for the safe heat dissipation via the motor flange surfaces.

Axis height	Steel plate: width x height x thickness in mm	Mounting surface in m^2
71	450 x 400 x 30	0.18

The heat dissipation approve on larger mounting surfaces.



NOTICE!

Danger of damage due to overheating

An insulated mounting of the motors is not permitted!

2.3 Specifications for water-cooling



The safety regulations of the accordant corrosion and nucleation protection manufacturer must be observed.

Coolants from operating processes may not be used to cool the motor!

In view of harmful deposits the filling of a closed cooling system should be made in the cooling channels or cables using filtering at all times (filtering resolution < 0,1 mm). At the open cooling system in any case a filtering must be provided.

Only closed and semi-open cooling circuits are permitted for engines.



NOTE!

The system manufacturer is responsible for the engineering of the entire cooling system.

Condensation of water must be avoided in any case.



Parts of the cooling system (e.g. sealing) can be overloaded by water surge pressure. The maximal pressure values shown in ▹ Specifications referring to the required cooling flows ◃ on page 19 must not be exceeded.

To avoid water surge pressure or reduce their effects, it is recommended:

- Control valve in water supply, placed as far away as possible from the motor
- Use of suitable pressure relief valves (bypass)

2.3.1 Specifications referring to the required cooling flows

Motor DSC2-	Volume current [l/min]	Pressure drop ± 15% [bar]	Heating [K]	Max. coolant pressure [bar]	Connection (G–inside thread)
071**AA** .. **W** ..	5	0.5	2	6	Stainless steel tube Ø8x1
071**BB** .. **W** ..					
071**CC** .. **W** ..					
071**DD** .. **W** ..					
071**EE** .. **W** ..					
071**FF** .. **W** ..					

2.3.2 Motor cooling

Additions of corrosion and nucleation protections may be used in closed cooling systems performed accordingly to the coolant's characteristic complying with ▹ Specification of cooling water ◃ on page 21). Type and quantity is based upon the accordant recommendations of the manufacturer and of the prevailing environmental conditions.

The following media-contacting materials are used in the motor:

- Cooling system: Stainless steel tube

2.3.3 Cooling circuits

Reduction factors for water as a coolant, refer to ▹ Definition of performance for water-cooled machines ◃ on page 24.

Closed cooling circuit

In the closed cooling circuit (see figure below), the cooling water tank is closed and thus no oxygen can enter the circuit.

This ensures very low water consumption and stable water quality.

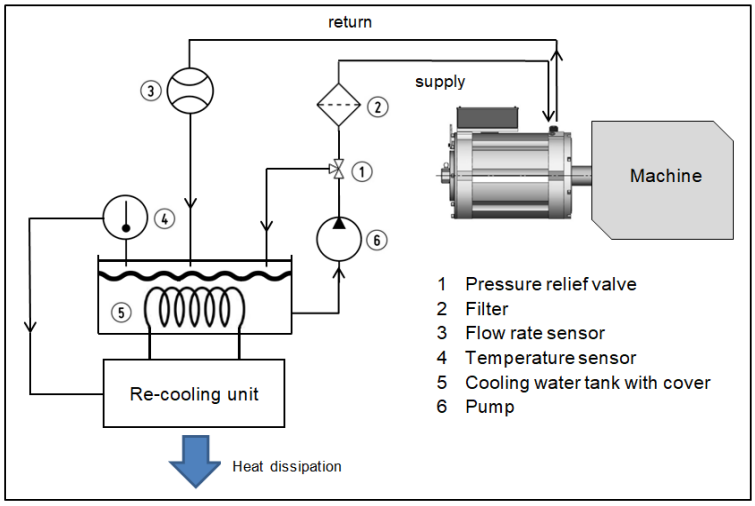


Figure 1: Example of a closed cooling circuit

Semi-open cooling circuit

The semi-open cooling circuit (see figure below) has an open cooling water tank and is otherwise constructed like the closed cooling circuit.

This prevents the accumulation of corrosion products in the circuit.

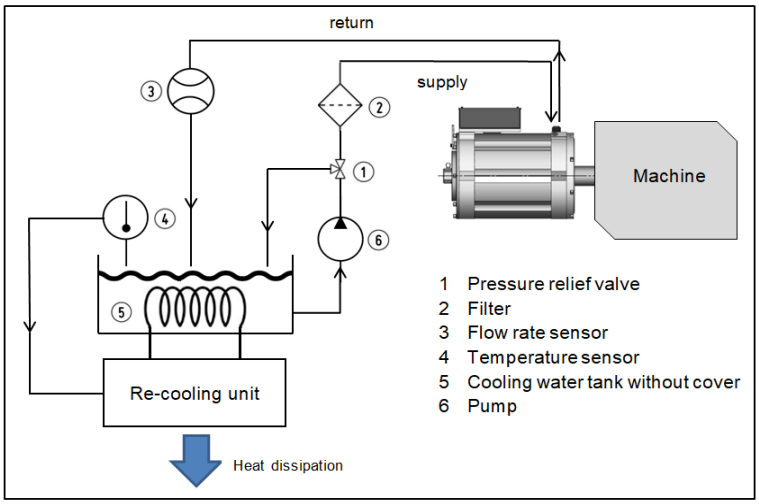


Figure 2: Example of a semi-open cooling circuit

Overview of refrigeration unit manufacturers

- ait-deutschland GmbH www.kkt-chillers.com
- BKW Kälte-Wärme-Versorgungstechnik GmbH www.bkw-kuema.de
- DELTATRHERM Hirmer GmbH www.deltatherm.de
- Glen Dimplex Deutschland GmbH www.riedel-cooling.com
- Helmut Schimpke und Team Industriekühlanlagen www.schimpke.org
- Hydac System GmbH www.hydac.com
- Hyfra Industriekühlanlagen GmbH www.hyfra.de
- Parker Hannifin GmbH www.ph.parker.com
- Pfannenberg GmbH www.pfannenberg.com
- Technotrans SE www.technotrans.de



NOTE!

You can also use equivalent cooling units from other manufacturers.

The responsibility for the quality of third-party products lies with the plant manufacturer.

2.3.4 Specification of cooling water

The cooling water must comply with the following requirements:

	Unit	Value
Permitted system pressure at maximum	bar	6
Temperature of coolant for motor	°C	10 to 25
pH value (at 20 °C)	---	6,5 to 9
Total hardness	mmol / l	1.43 to 2.5
Chloride - Cl	mg / l	< 200
Sulfate - SO_4^{2}	mg / l	< 200
Oil	mg / l	< 1
Permissible particle size, solid bodies, particles (e.g. sand)	mm	< 0.1

Clear water free of suspended particles and dirt must be used as the coolant.

Sufficient additives must be added for corrosion protection and germ protection. The type and amount of additives to be added depends on the respective recommendations of the manufacturers of these additives and the respective environmental conditions.

2.3.5 Minimum coolant temperature in dependence of the environmental conditions.

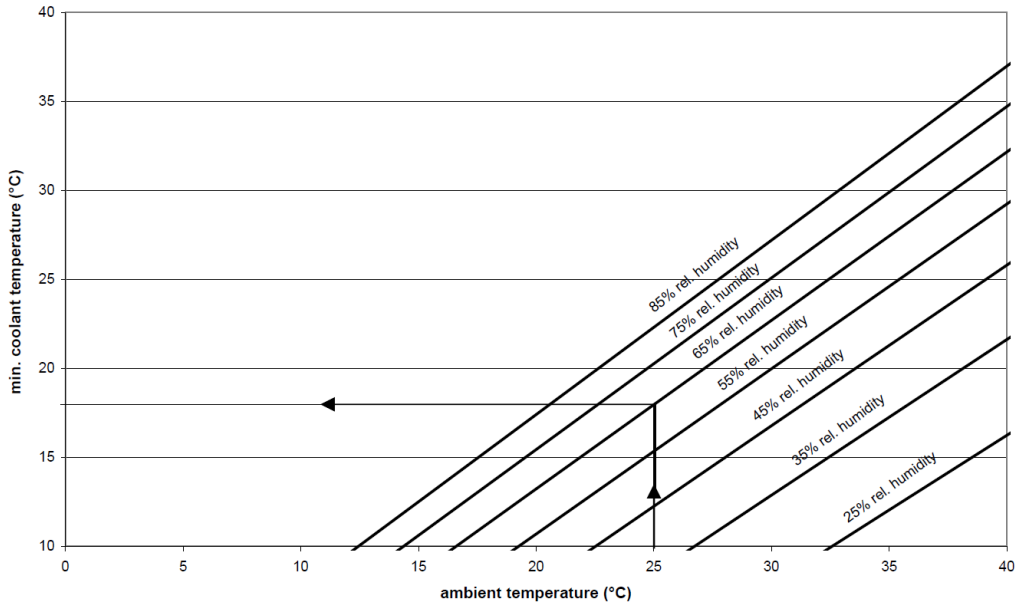


Figure 3: Evaluation of coolant temperature

The permitted temperature of the coolant is dependent of the relative humidity during the operation and the ambient temperature. For example a minimum coolant inlet temperature of 18 °C is permitted at an ambient temperature of 25°C and a relative humidity of 65 %. The presented characteristics in the diagrams are limit characteristics. Therefore, in the example a coolant inlet temperature of greater 18°C should be selected.

If the minimum permitted coolant entry temperature is fallen below, the 2-point controller of the Baumüller drive electronics must be used, to avoid condensation

NOTE!

At a longer standstill of the motor the coolant supply must be interrupted (avoidance of condensation).

At a longer standstill ambient temperatures <3 °C can occur, the coolant is to be drained as a precautionary measure (Avoidance of frost damage).

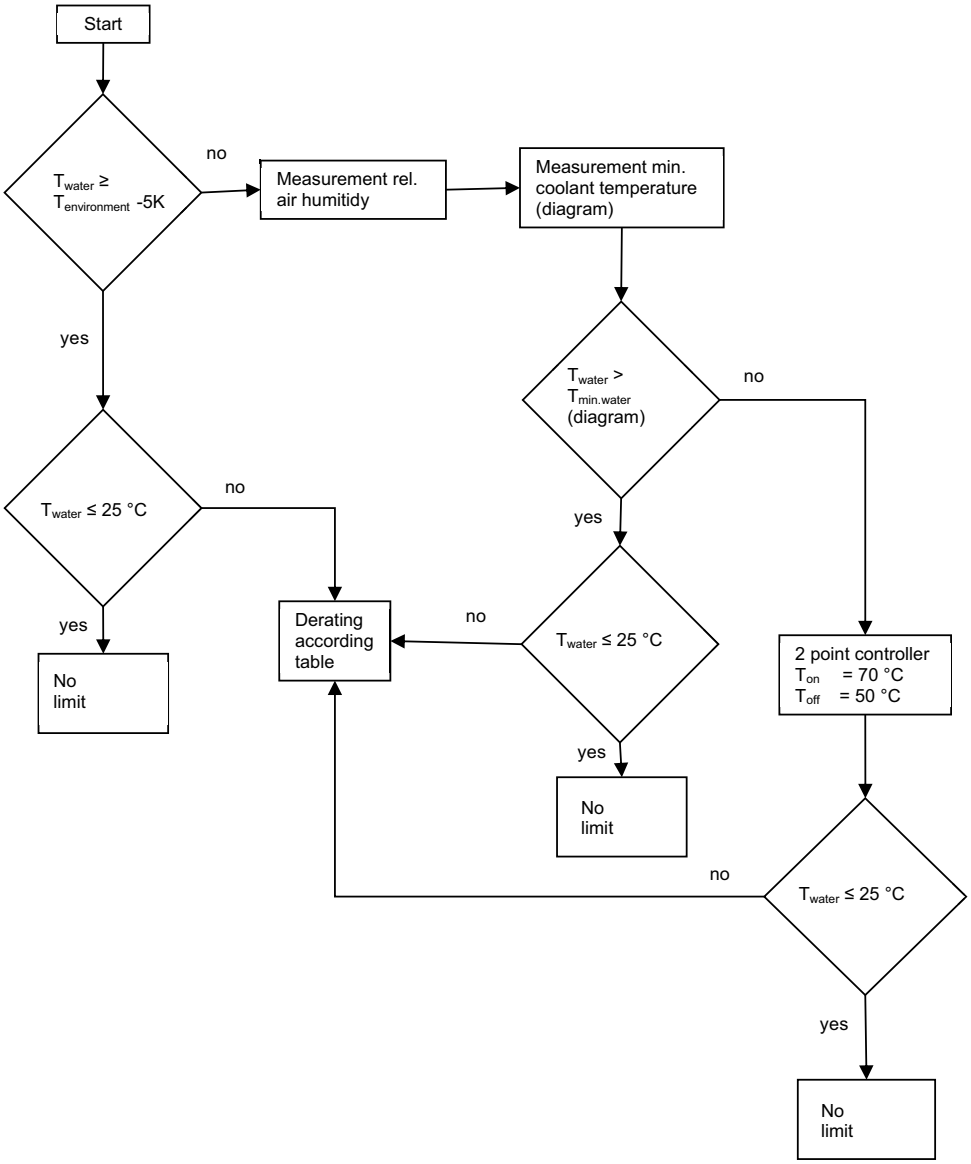


Figure 4: Function chart coolant entry temperature

2.4 Definition of performance

2.4.1 Definition of performance for unventilated and surface-ventilated machines

The mentioned performances (torques) apply to the continuous operation S1 with rated speed at a max. ambient temperature of 40°C and a installation height below 1000 m above MSL.

If motors are to be operated in an ambient temperature of more than 40 °C or altitudes above 1000 m MSL, the required list nominal power (list nominal torque Mn) can be calculated from the product of the factors k1, k2 and the required power P (torque M).

Ambient temperature	40°C	45°C	50°C	55°C
Correction factor k1	1	1.06	1.13	1.22

Height above MSL	1000 m	2000 m	3000 m	4000 m
Correction factor k2	1	1.07	1.16	1.27

Consult our applications department for ambient temperatures above 40°C and encapsulated mounting of the motors, perhaps constructive measures are necessary.

If the ambient temperature drops approx. 10 °C per 1000 m increase in height, there is no additional power correction necessary (note min. operation temperature).

2.4.2 Definition of performance for water-cooled machines

The mentioned performances (torques) apply to the continuous operation S1 with rated speed as long as the demands to the cooling system for water-cooled motors are complied with!

During the operation of the motors with higher coolant inlet temperatures the reduction factors below must be considered:

Coolant supply temperature	25 °C	30 °C	35 °C	40 °C	45 °C
Percentage of power (torque)	100 %	97 %	95 %	92 %	89 %

- If the specific heat capacity is reduced, for example by adding glycol, this will result in a reduction in performance depending on the mixing ratio, which must be checked with the manufacturer.
- When using hydraulic oil (HLP 46), there is a reduction in rated power of 20 to 25% compared to water cooling, depending on the overall length and speed.
- The basis is an inlet temperature of 35 °C for both cooling media and an identical volume flow. The pressure drop is higher when using hydraulic oil. If the HLP46 inlet temperature is higher than 35 °C, the following additional derating applies:

- Oil-cooled drives:

HLP46 inlet temperature	35 °C	40 °C	45 °C	50 °C
Percentage of rated power (torque)	100 %	93 %	88 %	82 %

  - These adjustment rates are valid for all motors up to a speed of 3,000 rpm. For higher speeds, the operating point and the corresponding derating must be determined separately.
  - The exact performance specifications and data sheets for oil-cooled drives are available on request.

2.5 Motor data

Explanation of motor data

n_N	Rated speed [min^{-1}]
M_0	Standstill torque [Nm] at speed ≥ 1 min^{-1} zor an unlimited period of time
I_0	Standstill rms current [A] at M_0
$M_{0,max}$	Maximum standstill torque [Nm] at maximum current [A] and speed = 0, for a short time
$I_{0,max}$	Standstill current [A] at $M_{0,max}$; $I_{0,max}$ is rms value
P_N	Rated poser [kW] at M_N and n_N (see power definition)
M_N	Rated torque [Nm]
I_N	Rated rms current [A]
$K_{E/KALT}$	Voltage constant (EMK) [V/1000 min^{-1}]
f_N	Rated frequency [Hz]
J	Rotor moment of inertia [kgcm²]
m	Motor mass [kg]

The specified rated power and torque at rated speed are achieved during converter operation with a clock frequency in the power section of ≥ 4 kHz. A clock frequency of > 6 kHz is recommended.

The possibility of field weakening is assumed for the converters to be used. The **sizemaXX** drive configurator at www.baumueller.de is available for designing the motors and the entire drive system.

2.5.1 DSC2-071 ... 64U without fan

Mains voltage 3 x 400V_{AC} for converters with unregulated supply

Motor	n min^{-1}	M_0 Nm	I_0 A	$M_{0,max}$ Nm	$I_{0,max}$ A	P_N kW	M_N Nm	I_N A	$K_{E/kalt}$ V/1000 min^{-1}	f_N Hz	J kgcm²	m kg
DSC2-071AA64U-10-54	1000	12.6	3.5	26	11.6	1.21	11.6	3.2	249	116.7	9.5	8.5
DSC2-071BB64U-10-54		23	5.2	55	17.8	2.2	21	4.8	304		17.3	11.7
DSC2-071CC64U-10-54		32	6.7	82	22.9	3.1	29	6.2	319		25.2	14.8
DSC2-071DD64U-10-54		41	11.5	110	40.3	3.9	37	10.2	242		33.1	18
DSC2-071EE64U-10-54		51	13.6	140	49.1	4.5	43	11.6	248		41	21.1
DSC2-071FF64U-10-54		51	12.6	170	55	4.2	40	10	269		48.9	24.3
DSC2-071AA64U-20-54	2000	12.6	6.7	26	22	2.2	10.5	5.5	131	233.3	9.5	8.5
DSC2-071BB64U-20-54		23	10.1	55	34.4	3.9	18.4	7.9	158		17.3	11.7
DSC2-071CC64U-20-54		32	12.6	82	42.9	4.9	23	9.2	170		25.2	14.8
DSC2-071DD64U-20-54		41	20	110	71	5.9	28	13.7	137		33.1	18
DSC2-071EE64U-20-54		51	23.4	140	84	6.5	31	14.4	145		41	21.1
DSC2-071FF64U-20-54		51	20.6	170	90	4.4	21	8.7	164		48.9	24.3
DSC2-071AA64U-30-54	3000	12.6	9.7	26	31.8	2.9	9.4	7.1	90.7	350	9.5	8.5
DSC2-071BB64U-30-54		23	15.3	54	52	4.5	14.2	9.3	104		17.3	11.7
DSC2-071CC64U-30-54		32	18	82	61	4.4	13.9	8	119		25.2	14.8
DSC2-071DD64U-30-54		41	28.5	110	100	4.6	14.6	10.3	97.5		33.1	18
DSC2-071EE64U-30-54		51	27.7	140	100	4.2	13.3	7.7	122		41	21.1
DSC2-071AA64U-40-54	4000	12.6	13	26	42.6	3.4	8.1	8.3	67.6	466.7	9.5	8.5
DSC2-071BB64U-40-54		23	18.9	54	64	3.6	8.7	7.2	84.2		17.3	11.7
DSC2-071AA64U-50-54	5000	12.6	16.4	26	54	3.6	6.9	9	53.4	583.3	9.5	8.5
DSC2-071BB64U-50-54		23	24	54	82	0.98	1.9	2.5	66.2		17.3	11.7

2.5.2 DSC2-071 ... 64O surface-ventilated (with fan)

Mains voltage 3 x 400V_{AC} for converters with unregulated supply

Motor	n min^{-1}	M_0 Nm	I_0 A	$M_{0,max}$ Nm	$I_{0,max}$ A	P_N kW	M_N Nm	I_N A	$K_{E/kalt}$ V/1000 min^{-1}	f_N Hz	J kgcm²	m kg
DSC2-071AA64O-10-54	1000	14.9	4.2	27	11.6	1.53	14.6	4.1	249	116.7	9.5	11.7
DSC2-071BB64O-10-54		29	6.6	55	17.8	2.9	28	6.4	304		17.3	14.85
DSC2-071CC64O-10-54		43	9.1	83	22.9	4.2	40	8.6	319		25.2	18
DSC2-071DD64O-10-54		55	15.5	110	40.3	5.3	50	14.1	242		33.1	21.15
DSC2-071EE64O-10-54		66	18.1	140	49.1	6.1	58	15.8	248		41	24.3
DSC2-071FF64O-10-54		77	19.6	170	55	6.8	65	16.3	269		48.9	27.45
DSC2-071AA64O-20-54	2000	14.9	8	26	22	2.9	14	7.6	131	233.3	9.5	11.7
DSC2-071BB64O-20-54		29	12.8	55	34.4	5.6	27	11.7	158		17.3	14.85
DSC2-071CC64O-20-54		43	17	83	42.9	7.8	37	14.9	170		25.2	18
DSC2-071DD64O-20-54		55	27.3	110	71	9	43	21.2	137		33.1	21.15
DSC2-071EE64O-20-54		66	31.2	140	84	9.4	45	21	145		41	24.3
DSC2-071FF64O-20-54		77	32	170	90	9.2	44	17.9	164		48.9	27.45
DSC2-071AA64O-30-54	3000	14.9	11.5	26	31.8	4.2	13.3	10.4	90.7	350	9.5	11.7
DSC2-071BB64O-30-54		29	19.4	54	52	7.8	25	16.5	104		17.3	14.85
DSC2-071CC64O-30-54		43	24.4	82	61	10.5	33	19.3	119		25.2	18
DSC2-071DD64O-30-54		55	38.4	110	100	10.4	33	23	97.5		33.1	21.15
DSC2-071EE64O-30-54		66	37	140	100	8.2	26	14.6	122		41	24.3
DSC2-071AA64O-40-54	4000	14.9	15.4	26	42.6	5.2	12.4	13	67.6	466.7	9.5	11.7
DSC2-071BB64O-40-54		29	23.9	54	64	9.4	22	18.4	84.2		17.3	14.85
DSC2-071CC64O-40-54		43	28.3	82	71	11.5	28	19.6	103		25.2	18
DSC2-071DD64O-40-54		55	38.4	110	100	8.5	20	14.6	97.5		33.1	21.15
DSC2-071AA64O-50-54	5000	14.9	19.5	26	54	5.8	11.2	14.9	53.4	583.3	9.5	11.7
DSC2-071BB64O-50-54		29	30.4	54	82	10.3	19.6	20.5	66.2		17.3	14.85
DSC2-071CC64O-50-54		43	33.5	82	84	11.5	22	19.6	86.5		25.2	18

2.5.3 DSC2-071 ... 64W water-cooled

Mains voltage 3 x 400V_{AC} for converters with unregulated supply

Motor	n min^{-1}	M_0 Nm	I_0 A	$M_{0,max}$ Nm	$I_{0,max}$ A	P_N kW	M_N Nm	I_N A	$K_{E/kalt}$ V/1000 min^{-1}	f_N Hz	J kgcm²	m kg
DSC2-071AA64W-10-54	1000	18.9	5.5	27	11.6	1.94	18.5	5.4	249	116.7	9.5	10.8
DSC2-071BB64W-10-54		39	9.2	56	17.8	3.8	36	9.1	304		17.3	15.25
DSC2-071CC64W-10-54		61	13.5	84	22.9	5.8	55	13.3	319		25.2	19.7
DSC2-071DD64W-10-54		82	24.1	115	40.3	8.5	81	23.7	242		33.1	24.15
DSC2-071EE64W-10-54		105	29.3	145	49.1	10.6	100	28.9	248		41	28.6
DSC2-071FF64W-10-54		115	29	175	55	11.3	110	27.7	269		48.9	33.05
DSC2-071AA64W-20-54	2000	18.9	10.5	27	22	3.8	18	10.1	131	233.3	9.5	10.8
DSC2-071BB64W-20-54		39	17.9	55	34.4	7.5	36	17.2	158		17.3	15.25
DSC2-071CC64W-20-54		61	25.3	83	42.9	11.2	54	24.2	170		25.2	19.7
DSC2-071DD64W-20-54		82	42.4	110	71	16.3	78	40.5	137		33.1	24.15
DSC2-071EE64W-20-54		105	50	140	84	20	97	48	145		41	28.6
DSC2-071FF64W-20-54		115	47.3	170	90	20	97	42.4	164		48.9	33.05
DSC2-071AA64W-30-54	3000	18.9	15.2	26	31.8	5.5	17.5	14.2	90.7	350	9.5	10.8
DSC2-071BB64W-30-54		39	27.1	55	52	11.1	35	25.1	104		17.3	15.25
DSC2-071CC64W-30-54		61	36	83	61	16	51	33.1	119		25.2	19.7
DSC2-071DD64W-30-54		82	60	110	100	23	74	54	97.5		33.1	24.15
DSC2-071EE64W-30-54		105	60	140	100	27	85	54	122		41	28.6
DSC2-071AA64W-40-54	4000	18.6	20	26	42.6	7.1	16.8	18.5	67.6	466.7	9.5	10.8
DSC2-071BB64W-40-54		39	33.4	55	64	13.9	33	29.5	84.2		17.3	15.25
DSC2-071CC64W-40-54		61	41.9	82	71	18.9	45	36	103		25.2	19.7
DSC2-071DD64W-40-54		82	60	110	100	26	62	50	97.5		33.1	24.15
DSC2-071AA64W-50-54	5000	18.9	25.8	26	54	8.5	16.2	22.6	53.4	583.3	9.5	10.8
DSC2-071BB64W-50-54		39	42.5	55	82	16.6	32	35.2	66.2		17.3	15.25
DSC2-071CC64W-50-54		61	49.7	82	84	22	41	39.4	86.5		25.2	19.7

2.6 Temperature sensor

The connection of the temperature sensor of the DSD2 series is implemented via the main connection.

An option is the connection via the encoder socket., see ▷ Type code ◁ from page 45.

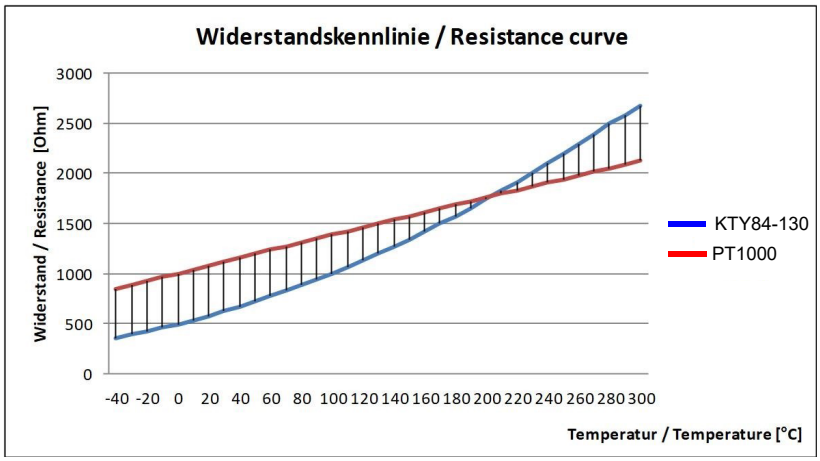


Figure 5: Resistance curve temperature sensor

The temperature sensor PT1000 continuously monitors the motor temperature. If the sensor is supplied with a measured current of 2 mA the above shown resistance curve results.

2.7 Balancing, output elements and vibrations



Don’t stress the shaft and the bearings with shocks.

Axial forces aren’t permitted during the mounting and demounting of output elements.

The required measures referring to the contact protection of the output elements in general must be regarded.

If a motor is put into operation without output elements then the featherkey must be protected against being ejected.



NOTE!

Regard the identification of the balancing type at the shaft end face:

H = Balancing with half the featherkey	**Standard type**
F = Balancing with the complete featherkey	Special type

Balancing

In the standard version with featherkey the rotor is dynamically balanced with a half featherkey (accordant to EN 60034-14 / ISO 8821 / ISO 21940).

Output elements

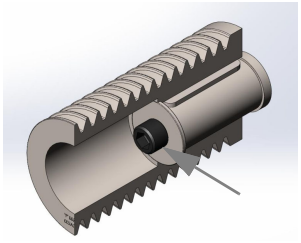
When mounting the output elements the accordant balancing must be considered. The output elements must be balanced complying with ISO 21940.

When fitting and removing the output elements (e.g. coupling disks, rack-wheels, pulley wheels) adequate facilities must be used.

- Use thread hole in the end of the shaft.
- During removal use spacing washers to mechanically protect the shaft.
- If required before fitting warm up the output elements (max. permitted temperature at the shaft end is 150 °C for a short time).

NOTICE!

- At the shaft version without featherkey the drive elements are to be fixed on the output shaft **by means of appropriate clamping sets**.
- At shaft versions with featherkey it must be considered that the **output elements are applied to the shaft shoulder**.
  Note: The bevel and the radius at the output element and the shaft radius towards the shoulder (accordant to DIN748-1) must be compatible.
- If the threaded hole in the shaft end is used to protect the output elements axially (e.g. pulley wheels), the tightening torques in following table may not be exceeded:



Thread	Tightening torque in Nm
M3	1,1
M4	2,6
M5	5,0
M6	9,0
M8	22,0
M10	44,0

Figure 6: Tightening torques using the example of a locking bolt S of a pulley wheel

NOTE!

Appropriate measures are to be used to protect the screws!

Vibrations

Notice!

The system's vibration response at the location caused by output elements, installation options, alignment and setup as well as influences of external vibrations can cause an increase of vibration values at the motor.

Considering a correct functioning of the motor and a long bearing service life the permitted vibration values accordant to EN 60034-14 may not be exceeded. It may be necessary to balance the complete rotor with the drive element (according to ISO 21940).

The limited vibration loads and accelerations after mounting are not to be exceeded, see ▹ Vibrations and resistance to vibrations ◃ on page 64.

At changes compared with the normal operation – e.g. increased temperatures, noises, vibrations – the motor is to be switched off in case of doubt, the cause is to be evaluated and the manufacturer is to be contacted if required.

2.8 Radial force diagrams

All bearings are designed for a service life of 20,000 h L_{10h}. The load values specified below may thereby not be exceeded. The permissible radial forces F_r are valid only for the horizontal installation of the motor without

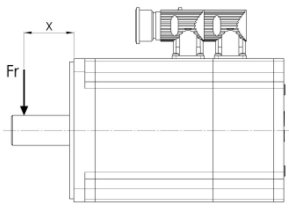
additional axial forces.

Furthermore, the specified average speeds must be adhered to reach the grease consumption period of 20,000 h under the following conditions:

- Low-vibration applications
- Horizontal installation
- Oscillatory bearing motion in which at least one pivot angle of 180° is performed
- Continuous bearing temperatures <120° C.

Axial loading on the motor shaft is generally not permitted. No axial forces may develop when mounting clutches, pulleys, etc. on the motor shaft!

Sample diagram



Force application x = 30 mm from the shaft shoulder
Bearing service life 20000 h

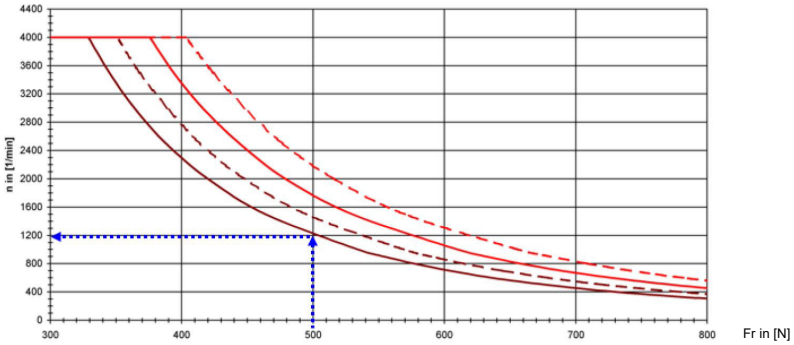


Figure 7: Sample diagram radial force ball bearing

The potential maximum speed of the bearing can be calculated via radial force F_r of the application in characteristic "ball bearing".
At a radial force of 500 N with a force application point of x = 30 mm from the shaft shoulder, a maximum speed of 1200 rpm results.

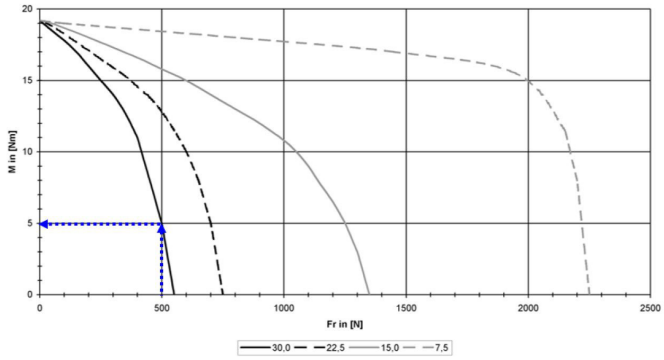


Figure 8: Sample diagram radial force shaft

The maximum torque to be still transmitted results from the characteristic "shaft".
At a centrifugal force of 500 N with a driving force point of x = 30 mm from the shaft shoulder, a torque to be still transmitted of 5 Nm results.

Radial force diagrams Ball bearing

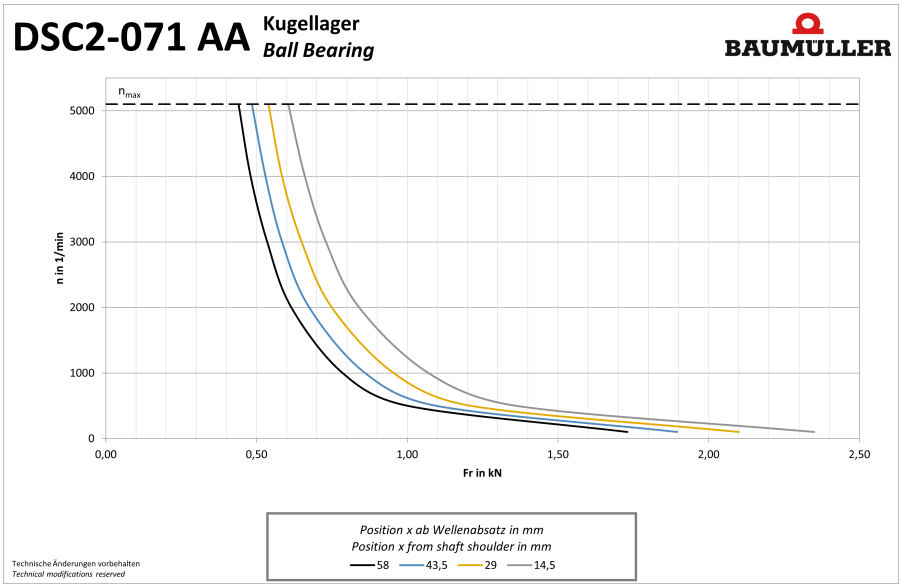


Figure 9: Radial force diagram ball bearing DSC2-071AA

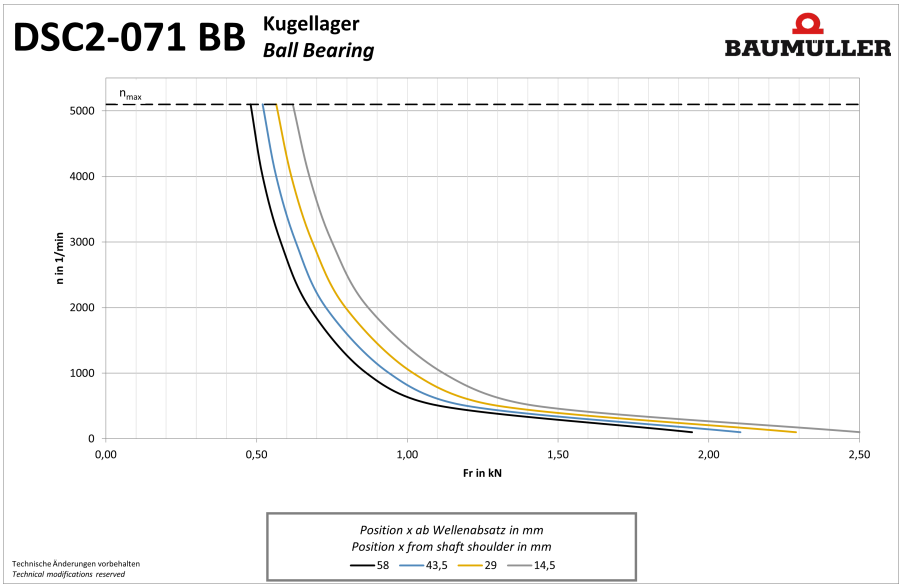


Figure 10: Radial force diagram ball bearing DSC2-071BB

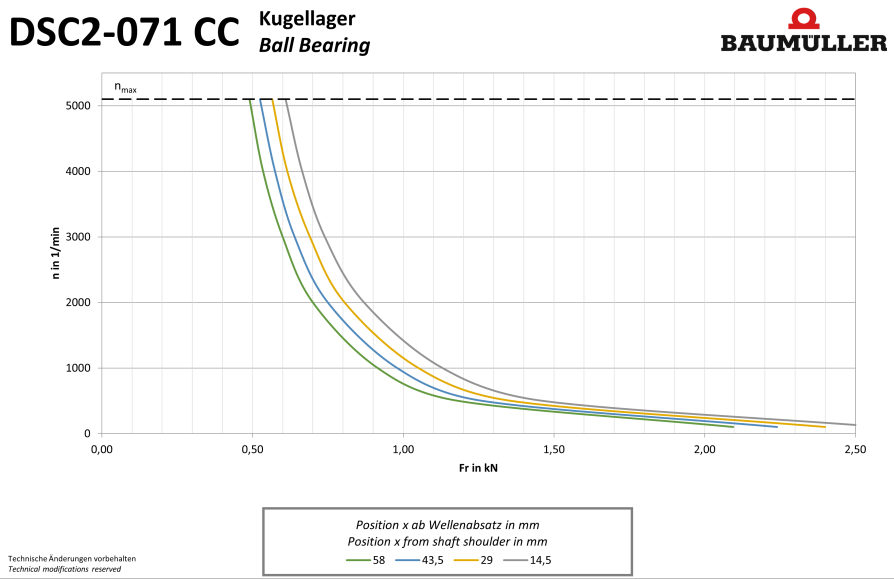


Figure 11: Radial force diagram ball bearing DSC2-071CC

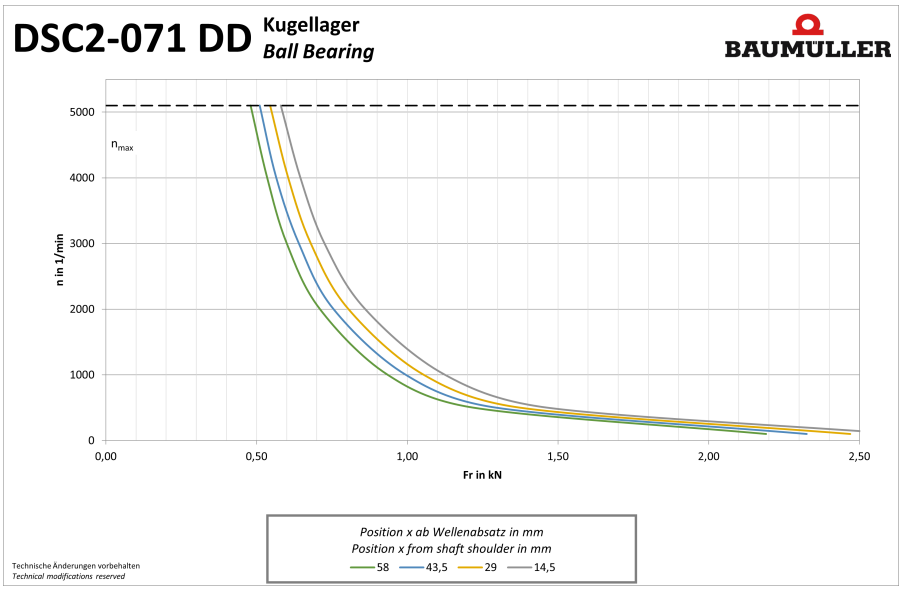


Figure 12: Radial force diagram ball bearing DSC2-071DD

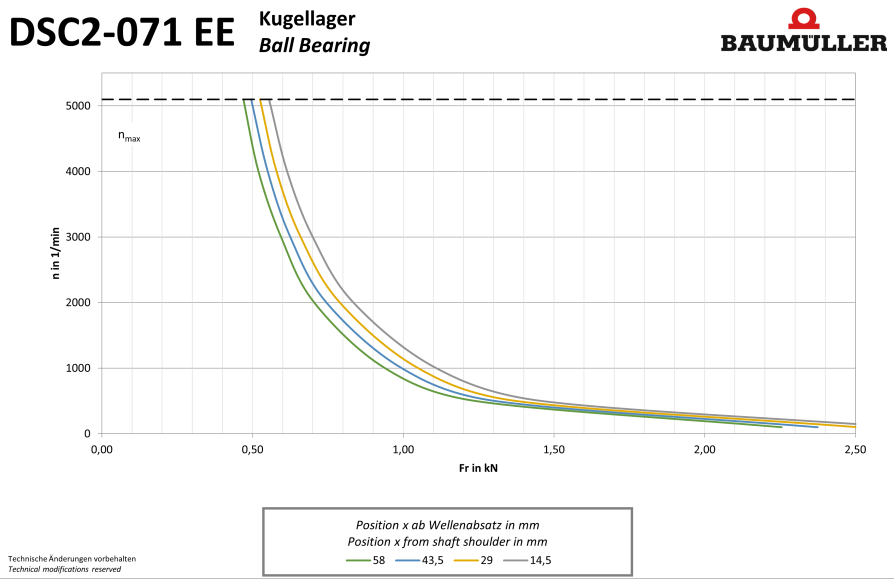


Figure 13: Radial force diagram ball bearing DSC2-071EE

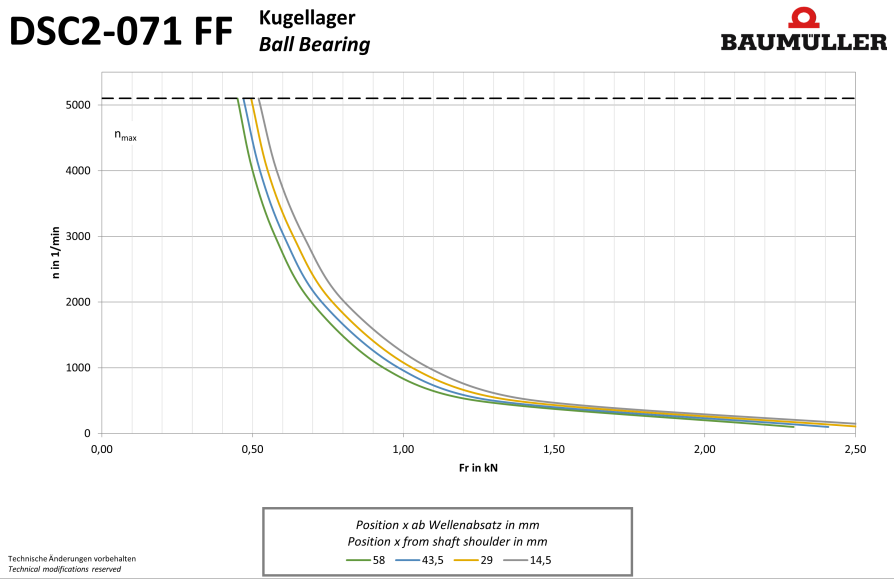


Figure 14: Radial force diagram roller bearing DSC2-071FF

Radial force diagrams Roller bearing

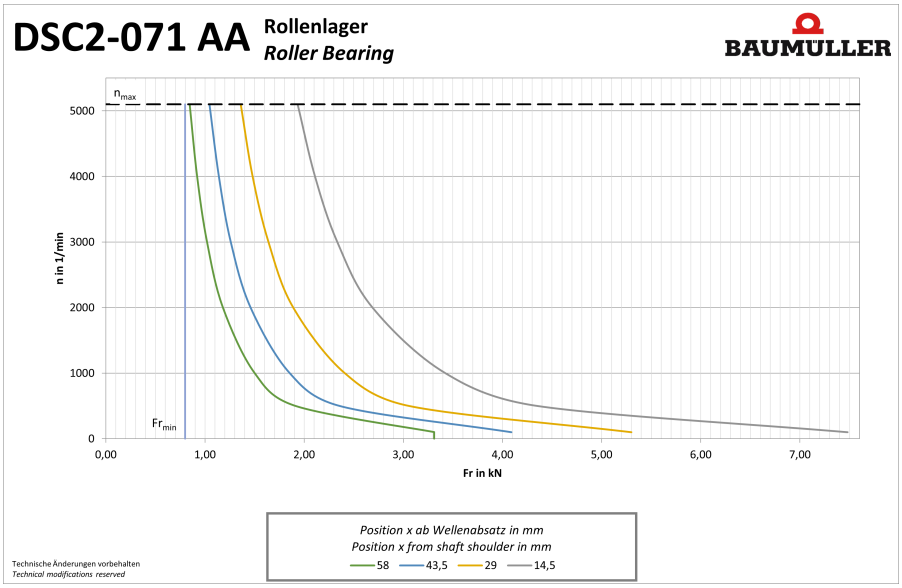


Figure 15: Radial force diagram roller bearing DSC2-071AA

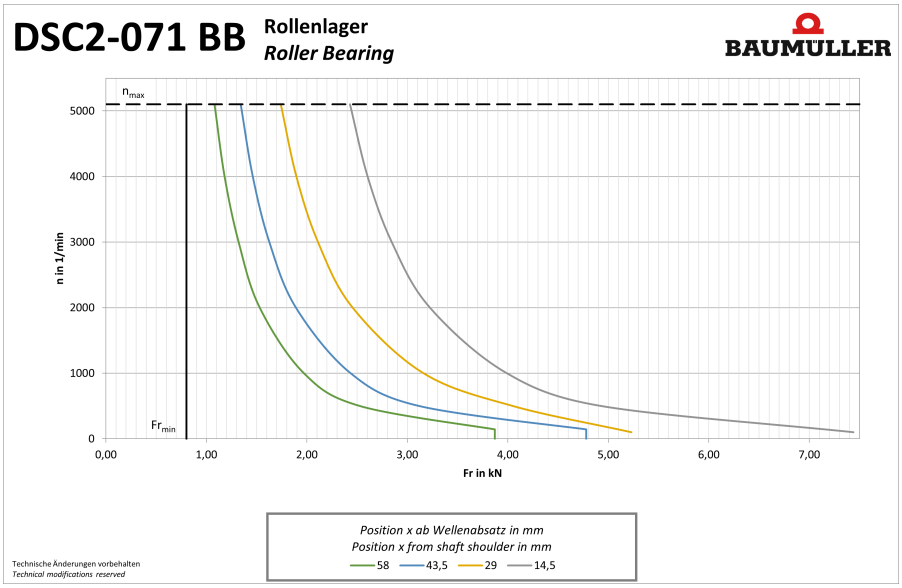


Figure 16: Radial force diagram roller bearing DSC2-071BB

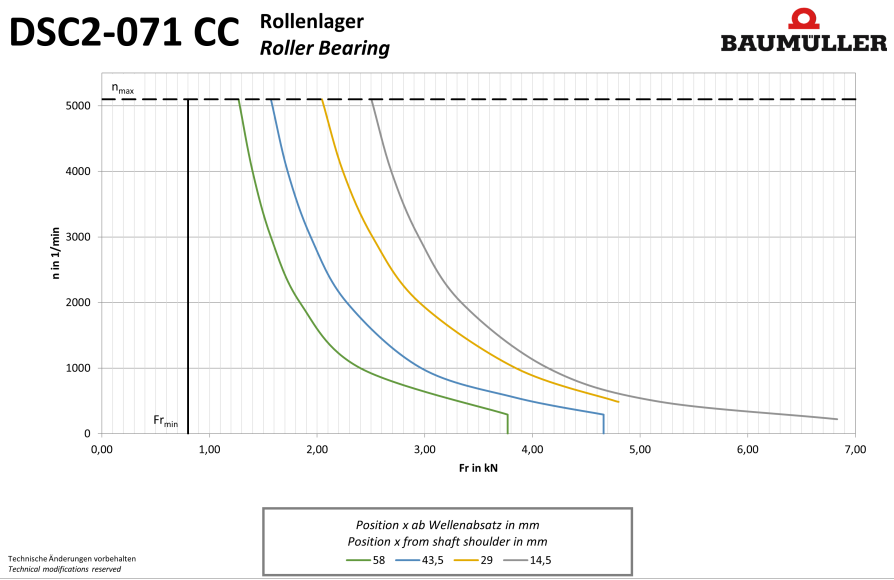


Figure 17: Radial force diagram roller bearing DSC2-071CC

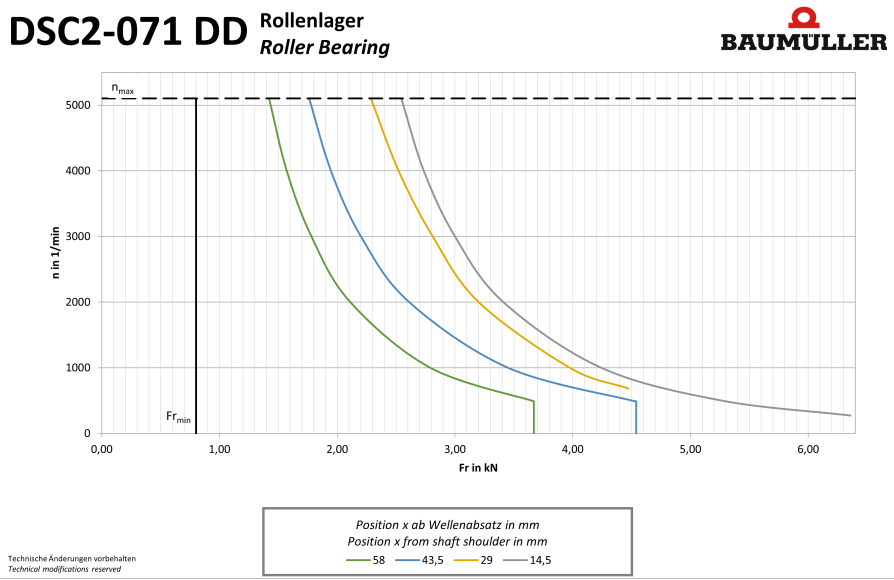


Figure 18: Radial force diagram roller bearing DSC2-071DD

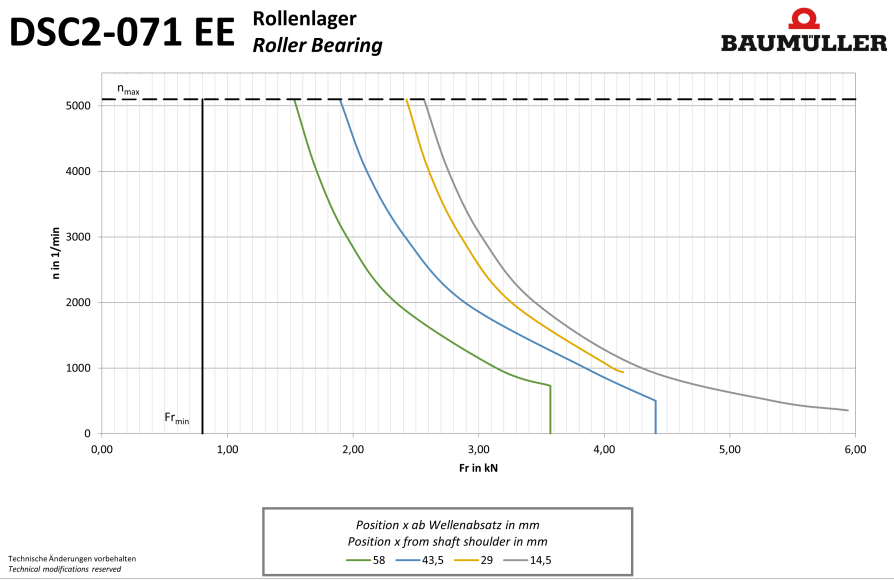


Figure 19: Radial force diagram roller bearing DSC2-071EE

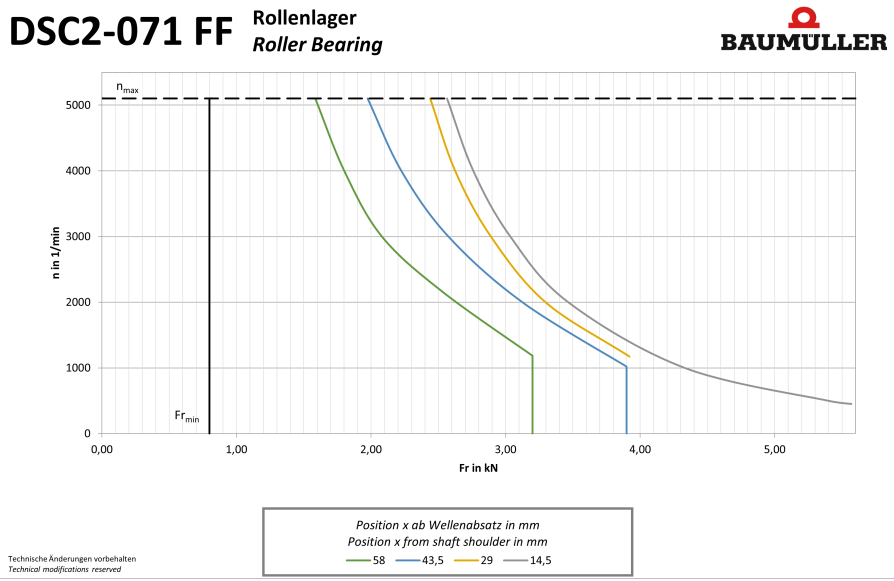


Figure 20: Radial force diagram roller bearing DSC2-071FF

Torque-radial force diagrams

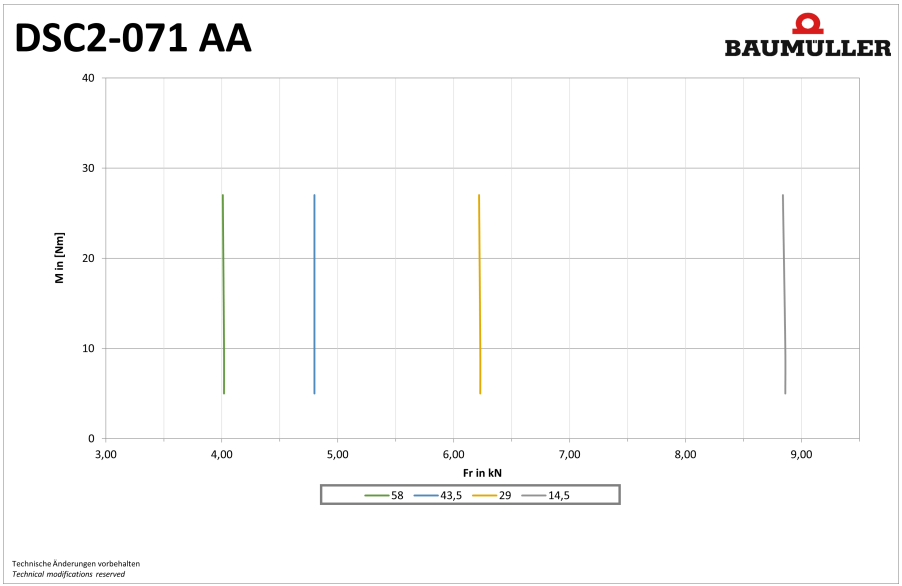


Figure 21: Torque-radial force diagram DSC2-071AA

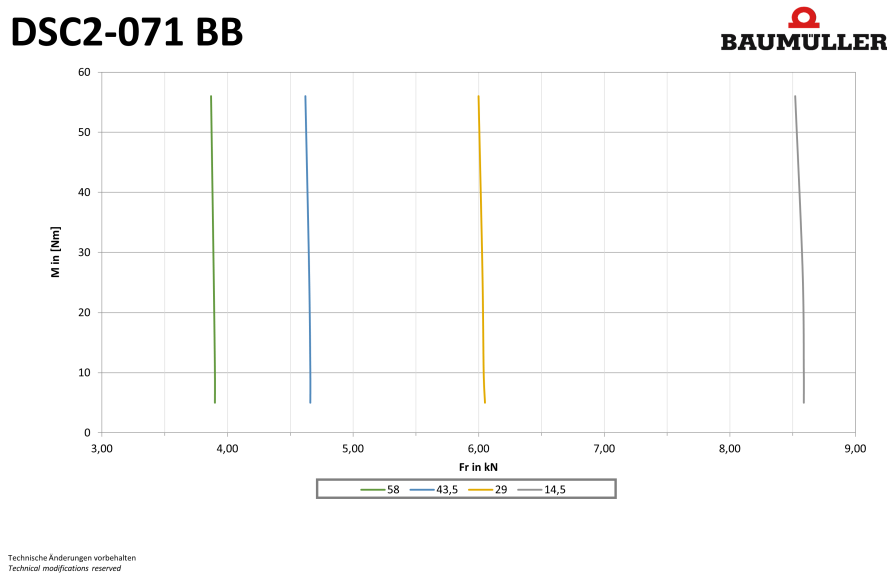


Figure 22: Torque-radial force diagram DSC2-071BB

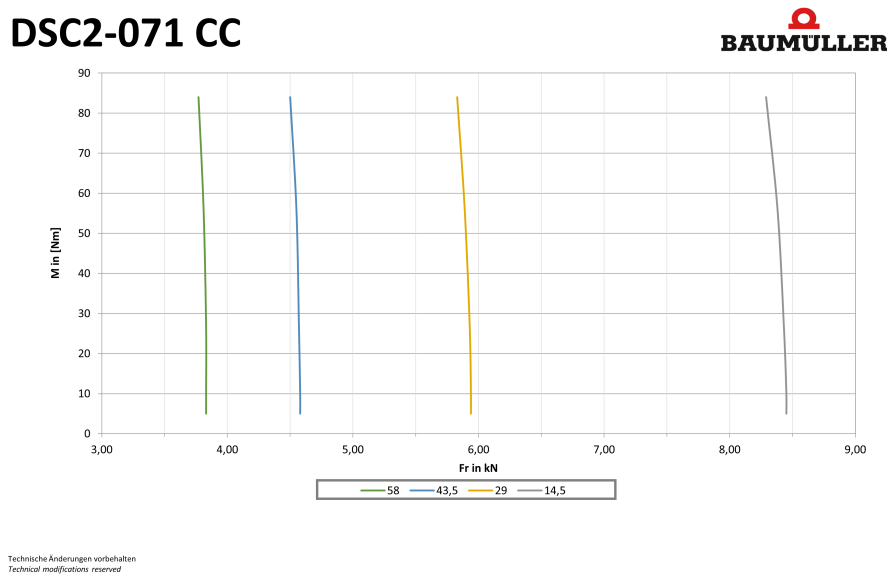


Figure 23: Torque-radial force diagram DSC2-071CC

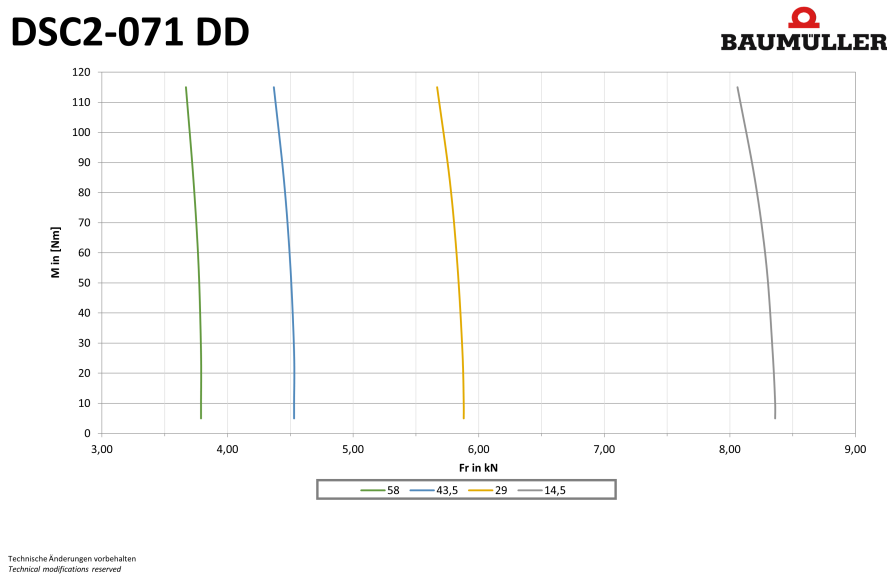


Figure 24: Torque-radial force diagram DSC2-071DD

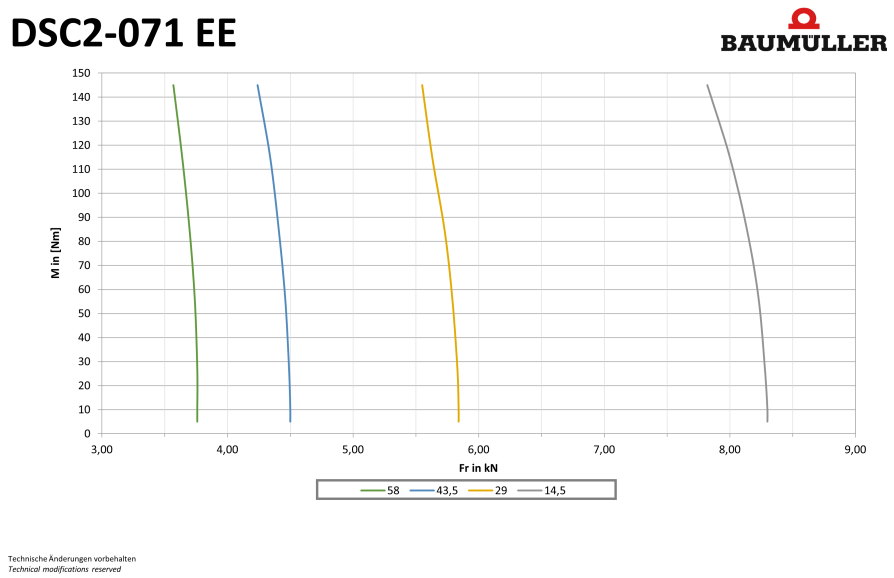


Figure 25: Torque-radial force diagram DSC2-071EE

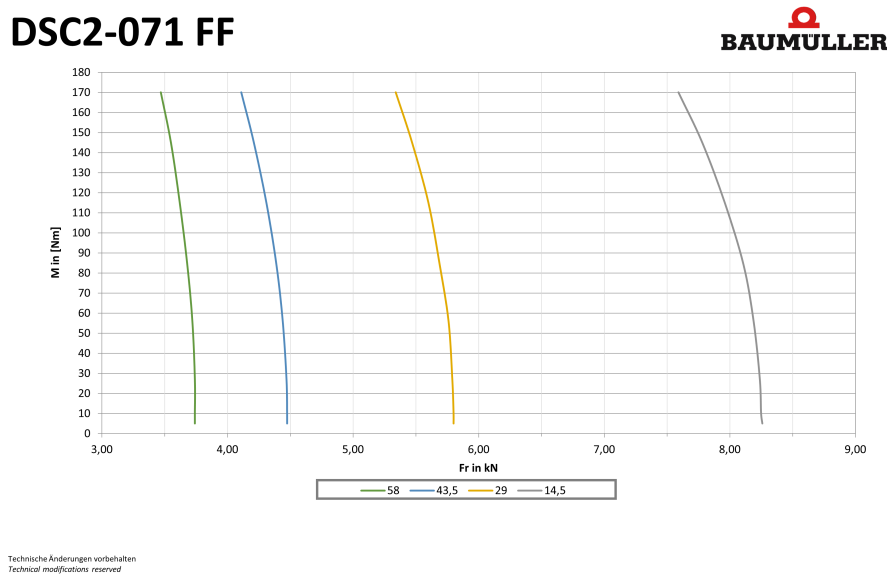


Figure 26: Torque-radial force diagram DSC2-071FF

2.9 Holding brake

The motors can be optionally equipped with a holding brake. The holding brake is a backlash-free permanent magnetic brake. The brakes work according to the closed current principle, i.e. the brake is applied when switched off (or at a failure of the operating voltage). The brakes are designed for an operating voltage of 24 V_{DC}. The specifications by the brake manufacturer apply at room temperature.

The motors are available with the following holding brakes:

Motor	DSC2-071
Minimal static holding torque [Nm] at 120 °C	45
Rated dynamic holding torque [Nm] at 120 °C	25
Maximum switching energy [J] per braking from n = 3,000 rpm	1400
Connection values [V] (+6 % / -10 %)	24
Power consumption [W]	28
Moment of inertia [kgcm^2]	7.9
Switching time On [ms] Releasing brake; with basic air gap	100
Switching time Off [ms] Braking; with basic air gap	40

None of the brakes are safety brakes in the sense that torque reduction cannot occur due to uncontrollable disruptive factors. Depending on the application, the relevant accident prevention regulations, the basic safety and health requirements of Annex I of the Machinery Directive, and the harmonized European standards must be observed.

Approximately 2000 braking operations can be performed for emergency stops or in the event of a power failure.
(Condition: maximum external moment of inertia = motor moment of inertia and n_{max} type-related; max. braking operations/hour < 20; evenly distributed).

3

DESIGN AND OPERATION

This chapter describes the **DSC2-071** and explains the type code of this motor.

3.1 Description of the product

The new DSC servo motors provide a torque motor with servo functionality.

This types provide better power data because of a higher torque density and a compactness compared with standard servo motors (30 percent lower construction volume). However the typical speed range of servo motors up to 6000 U/min is provided.

The **DSC2-071** provides a smooth housing surface protected against dirt, it is especially quick and easy to mount and it provides a high type of protection.

3.2 Type plate

The type plate is the identifier for each Baumüller motor. Especially, the accordant motor number is distinctive for each electric motor – this number is essential to make a backtracking in our company possible. Therefore the type plate always must be readable. Never remove the type plate from your motor.

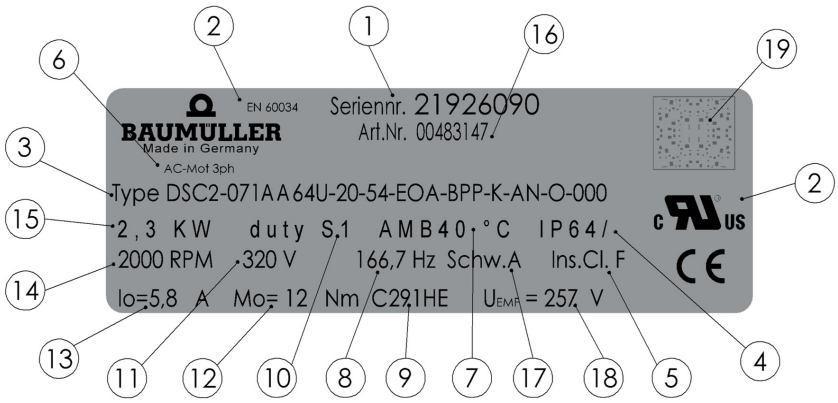


Figure 27: Type plate

1	Motor number	**11**	Rated voltage U_N
2	Standards and approvals	**12**	Standstill torque M_0
3	Motor type / designation	**13**	Standstill current I_0
4	Type of protection	**14**	Rated speed n_N
5	Temperature class (insulating material class VDE)	**15**	Rated power P_N
6	Motor type: 3 phase motor	**16**	Part No.
7	Permitted ambient temperature	**17**	Vibration resistance
8	Rated frequency	**18**	Rotor voltage
9	Insulation system UL	**19**	Barcode
10	Motor operation mode		

3.3 Type code

DSC2-XXXXXXXX-XX-XX-XXXX-XXX-XXX-X-XXX	Motor type (Three phase synchronous compact) 2nd generation
DSC2-**XXX**XXXXX-XX-XX-XXXX-XXX-XXX-X-XXX	Size 071
DSC2-XXX**XX**XXX-XX-XX-XXXX-XXX-XXX-X-XXX	Length AA BB CC DD EE FF
DSC2-XXXXX**XX**X-XX-XX-XXXX-XXX-XXX-X-XXX	Type of protection 64 - IP64 65 - IP65
DSC2-XXXXXXX**X**-XX-XX-XXXX-XXX-XXX-X-XXX	Colling U - Uncooled, without fan, IC 410 O - Surface cooled with fan, IC 416 W - Water-cooled IC 3W7
DSC2-XXXXXXXX-**XX**-XX-XXXX-XXX-XXX-X-XXX	Nominal speed 10 - 1000 min^{-1} 20 - 2000 min^{-1} 30 - 3000 min^{-1} 40 - 4000 min^{-1} 50 - 5000 min^{-1}
DSC2-XXXXXXXX-XX-**XX**-XXXX-XXX-XXX-X-XXX	U_{zk} - DC 54 - 540 V

DSC2-XXXXXXXX-XX-XX-**X**XXX-XXX-XXX-X-XXX	Encoder type A - Resolver (option safety) B - EDS35 C - EDM35 D - SRS50 (option safety) E - SRM50 (option safety) F - ECN1313 G - EQN1325 H - ECN1325 (option safety) I - EQN1337 (option safety) J - EES37 K - EEM37 L - SEK37 M - SEL37 P - ECI1319 gen. 3 Q - EQI1331 gen. 3 W - SKS36 X - SKM36 a - EKS36 b - EKM36
DSC2-XXXXXXXX-XX-XX-X**X**XX-XXX-XXX-X-XXX	Encoder option O - Without option E - With electronic Baumüller type plate F With electronic customer specific type plate S - Safety T - With electronic Baumüller type plate + safety
DSC2-XXXXXXXX-XX-XX-XX**X**X-XXX-XXX-X-XXX	Brake O - Without brake B - With PE brake
DSC2-XXXXXXXX-XX-XX-XXX**X**-XXX-XXX-X-XXX	Shaft option A - Smooth shaft B - With featherkey
DSC2-XXXXXXXX-XX-XX-XXXX-**X**XX-XXX-X-XXX	Type of main connection B - Mounting socket Speedtec (PT1000 on main connection) D - Mounting socket Speedtec (PT1000 on encoder) K - Terminal box (with PT1000) N - Terminal box (PT1000 on encoder)

DSC2-XXXXXXXX-XX-XX-XXXX-X**X**X-XXX-X-XXX	Position main connection T - On top L - On the left, viewing direction DE toward shaft end R - On the right, viewing direction DE toward shaft end D - DE N - NDE P - Pivoted
DSC2-XXXXXXXX-XX-XX-XXXX-XX**X**-XXX-X-XXX	Position encoder connection O - Without encoder connection T - On top L - On the left, viewing direction DE toward shaft end R - On the right, viewing direction DE toward shaft end D - DE N - NDE P - Pivoted
DSC2-XXXXXXXX-XX-XX-XXXX-XXX-**X**XX-X-XXX	Bearing K - Ball bearing DE R - Roller bearing DE V - Roller bearing DE, for higher radial forces
DSC2-XXXXXXXX-XX-XX-XXXX-XXX-X**X**X-X-XXX	Vibration resistance A - Vibration resistance A B - Vibration resistance B
DSC2-XXXXXXXX-XX-XX-XXXX-XXX-XX**X**-X-XXX	Concentricity N - Normal R - Reduced
DSC2-XXXXXXXX-XX-XX-XXXX-XXX-XXX-**X**-XXX	Gear / pump mounting O - Without gear and without pump mounting A - BPE - gear B - BPEF - gear C - BPEA - gear D - BPN - gear E - BPNA - gear F - BPNF - gear G - BPV - gear H - BPVF - gear

DSC2-XXXXXXXX-XX-XX-XXXX-XXX-XXX-X-**XXX**	Special version 000 - No special version AJ1 - Water connection with John-Guest connector AP1 - Water connection with cutting ring screw connection DA1 - Standard shaft sealing OS1 - Fan with 115 V_{AC} connection voltage OS2 - Fan with 24 V_{DC} connection voltage XXX - Special version (internal code) Special version code is alphanumeric

4

TRANSPORT AND PACKAGING

4.1 Safety notes for transport



NOTICE!

Damage due to unauthorized transport!

Transport handled by untrained personnel can lead to a substantial amount of material damage.

Therefore:

- The unloading of the packages upon delivery as well as the in-house transport should only be done by trained personnel.
- Contact Baumüller Nürnberg GmbH sales office if necessary.



WARNING!

Danger of mechanical hazard!

Secure devices against falling down.

Therefore:

- Take suitable measures, such as supports, hoists, straps, etc., to ensure that devices cannot fall down.
- Use appropriate handling material.



NOTICE!

Water-cooled motor!

In order to avoid frost damage it must be ensured that there is no coolant in the motor- during the transport or at a temporary storage at environmental temperatures < 3 °C. The coolant can be purged with compressed air.

4.2 Scope of supply

The supply is compiled order-related.

- Damage that incurred during transit must immediately be reported to the transport company.
- Immediately after receiving the delivery compare the performance data of the delivered motor with your ordering data. If visible defects or insufficient delivery is determined then immediately contact the responsible Baumüller subsidiary or the main Baumüller company in Nuremberg.



WARNING!

The motor must not be commissioned in case of a visible transport damage.

4.3 Transport notes



The permitted environmental conditions that may act on the motor during the transport is to be taken of DIN EN 60721-3-2 (class 2K2/2M1). The permitted temperature range was contrary to the DIN reduced to –15 °C to +60 °C.

Suitable load carrying devices are to be used as for example belt straps, single slings etc. If the motor provides lifting lugs they must be used for lifting.

The terminal boxes and motor connectors may not be used as transport safety or as lifting lugs.

During transport the correspondent country-specific regulations must be complied with. Lifting devices, transport and load bearing devices must comply with the regulations.

The connection areas must be protected against corrosion. The motor have to be transported with the provided protection. Avoid damage of the connection areas.

Bearing lock



NOTICE!

Bearing lock!

On motors with cylinder roller bearings, the runner must be blocked at the end of the shaft in order to prevent damage during transit.

The transport protector **must** be used every time the machine is moved.

If this lock no longer can be used due to mounting of a drive element, other suitable means must be employed for axial fixing of the rotor for transport.

4.4 Intermediate storage

If a motor is not to be commissioned immediately after delivery, it should be stored inside a building in a dry, dust-free and low-vibration room ($V_{eff} \leq$ 0.2 mm/s).

The motors should not be stored longer than 2 years at a consistent temperature which is within the temperature range of -15 to +60 °C. Elevated storage temperatures within the framework of the working temperature accelerate the rate at which seals and bearing grease deteriorate and therefore have a negative impact on the service life even before the unit has been commissioned. Direct exposure to incident solar radiation, UV light and ozone also lead to an aging of the gaskets and must be avoided!

Please note that the warranty periods commence from the date of delivery. For this reason, we recommend that storage periods are kept to a minimum.

Should nevertheless a longer storage be necessary, the environmental conditions according to DIN EN 60721-3-1 (class 1K2/1M1) have to be observed. Contrary to the DIN, an extended temperature range of -15 °C to + 60 °C is permitted.



NOTE!

Water-cooled motor

At a transport or intermediate storage temperature <3 °C, the coolant has to be drained as a precautionary measure to avoid of frost damage. The cooling water can be blown out with compressed air.

4.5 Unpacking

After having received the still packaged device:

- Avoid transport shocks and hard jolts, e.g. when putting an item down.

If no transport damage is visible:

- Open the packaging of the device.
- Verify the delivery scope based on the delivery note.

File a claim with the responsible Baumüller representative if the delivery is incomplete.



NOTE!

Claim each individual deficiency as soon as it has been detected. Damage claims can only be validly asserted within the claim registration period.

4.6 Disposal of the packaging

The packaging consists of cardboard, plastic, metal parts, corrugated cardboard and/or wood.

- When disposing of the packaging, comply with the national regulations.

5

MOUNTING



NOTE!

Mounting shall only be performed by employees of the manufacturer or by other qualified personnel.

Qualified personnel are persons who – on account of their occupational training, experience, instruction and knowledge of relevant standards and stipulations, accident prevention regulations and operating conditions – are authorized by the persons responsible for the safety of the facilities to perform the respective activities that are necessary, while at the same time recognizing and preventing any potential risks. The qualifications necessary for working with the device are, for example:

- Occupational training or instruction in accordance with the standards of safety engineering for the care and use of appropriate safety equipment.



WARNING!

Danger as a result of incorrect mounting!

The mounting requires qualified personnel with adequate experience. Incorrect mounting can lead to life-threatening situations or substantial material damage.

Therefore:

- Only allow mounting to be performed by employees of the manufacturer or by other qualified personnel.



WARNING!

Danger of mechanical impact!

Secure devices against falling down.

- Before mounting



WARNING!

Never mount or commission a damaged motor.

Never install the motor in a damaged machine.

Before mounting the motor, make sure it is suitable for your machine.

- During mounting



WARNING!

Only mount the motor using the fastening features provided.

The motor should not be exposed to knocks, e. g., with a hammer, or shocks when mounting.

Make sure that all covers and safety devices are mounted. All safety devices must comply with the latest regulations (e. g. EN 60204).

Water-cooling:

In order to avoid damages of the housing screw-in glands with cylindrical internal thread may be used for the water connections (inlet / outlet), only.

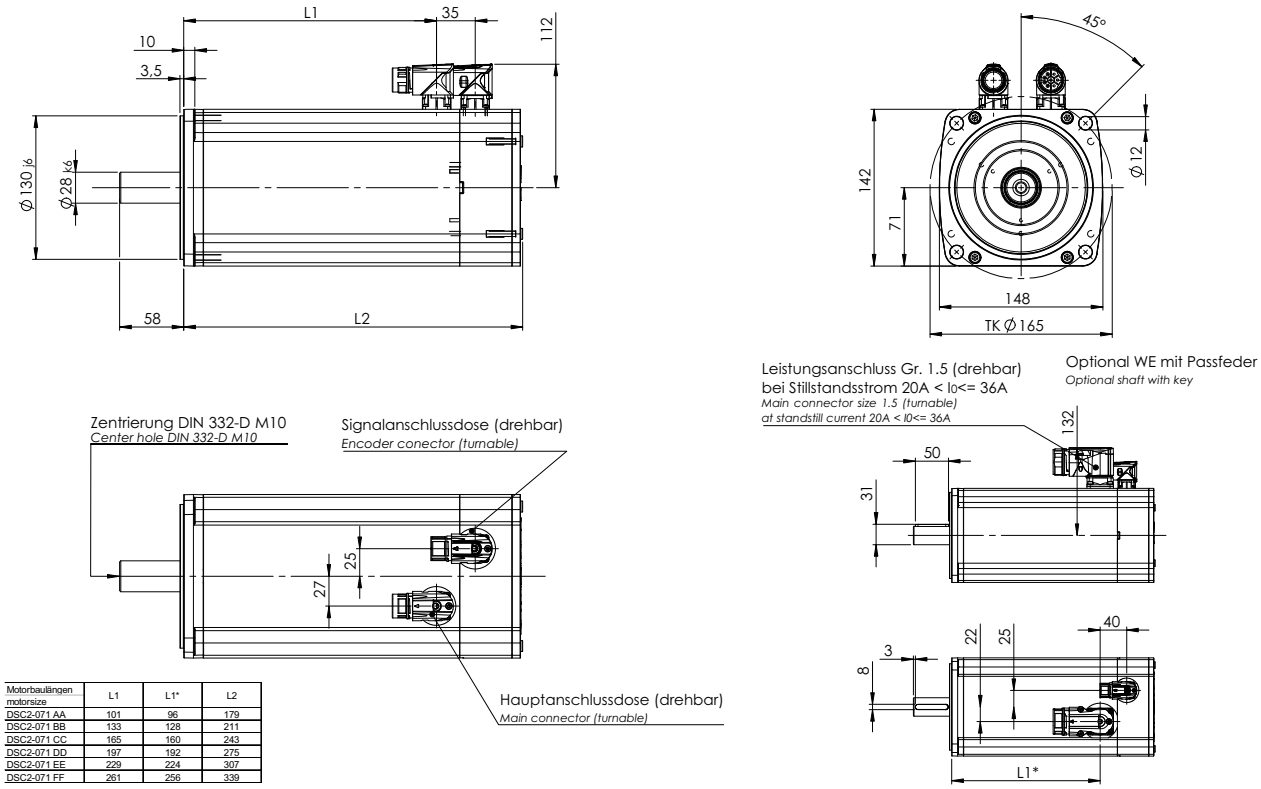
From cooling pipes tensile loads, compression loads and torsional loads may not be applied to the motor connections.

The connection may only be executed by specialists. Thereby, the motor must be without current and voltage.

It must be considered that the cooling liquid doesn't reach the motor terminal box when coupling and uncoupling the cooling cables.

5.1 Dimensions

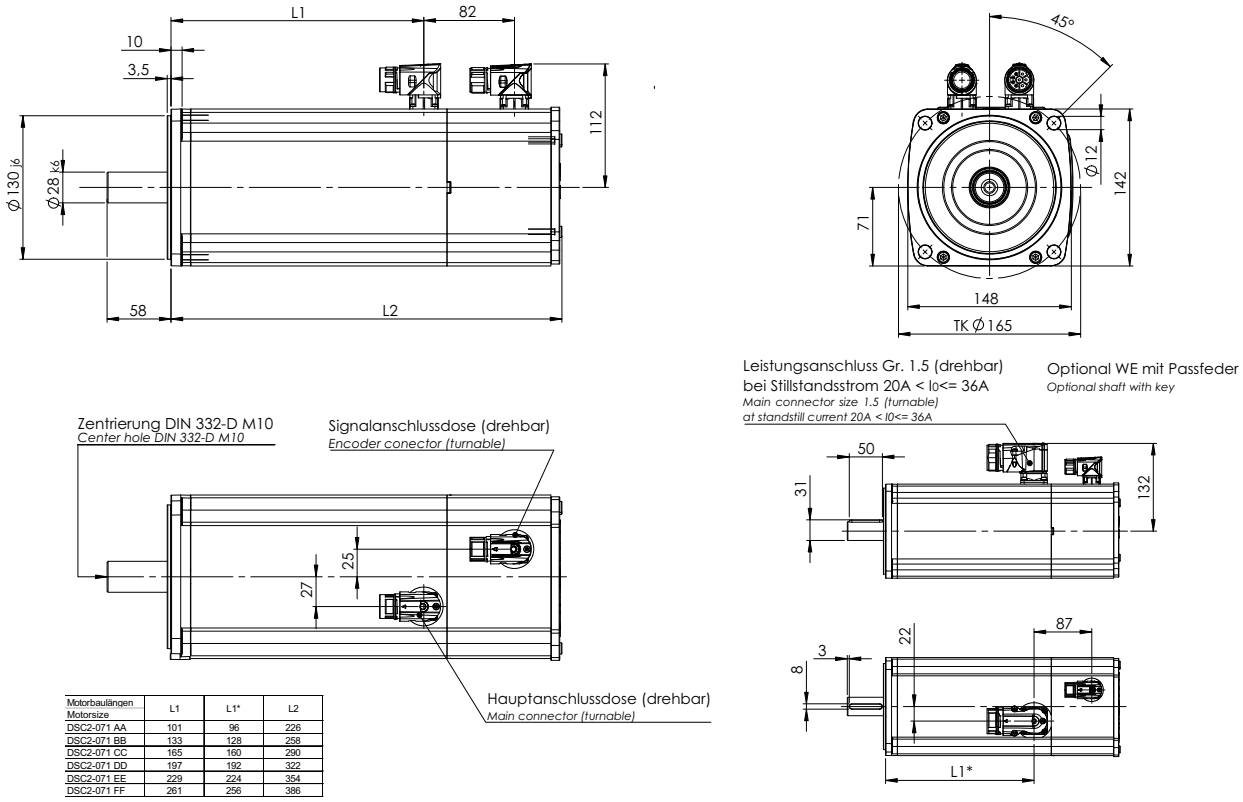
5.1.1 DSC2-071..U (without brake)



Motorbaulängen motorsize	L1	L1*	L2
DSC2-071 AA	101	96	179
DSC2-071 BB	133	128	211
DSC2-071 CC	165	160	243
DSC2-071 DD	197	192	275
DSC2-071 EE	229	224	307
DSC2-071 FF	261	256	339

Figure 28: Dimension DSC2-071..U

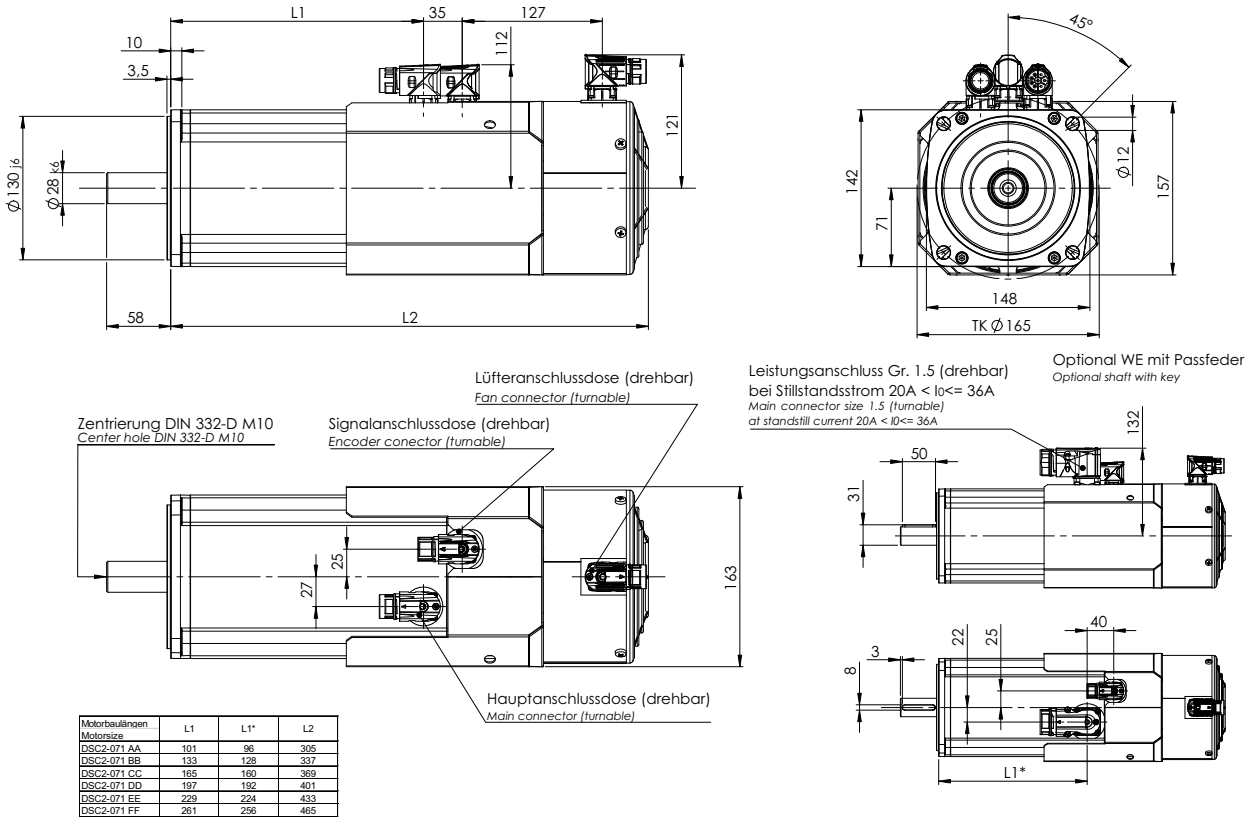
5.1.2 DSC2-071..U..B (without brake)



Motorbaulängen Motorsize	L1	L1*	L2
DSC2-071 AA	101	96	226
DSC2-071 BB	133	128	258
DSC2-071 CC	165	160	290
DSC2-071 DD	197	192	322
DSC2-071 EE	229	224	354
DSC2-071 FF	261	256	386

Figure 29: Dimension DSC2-071..U..B

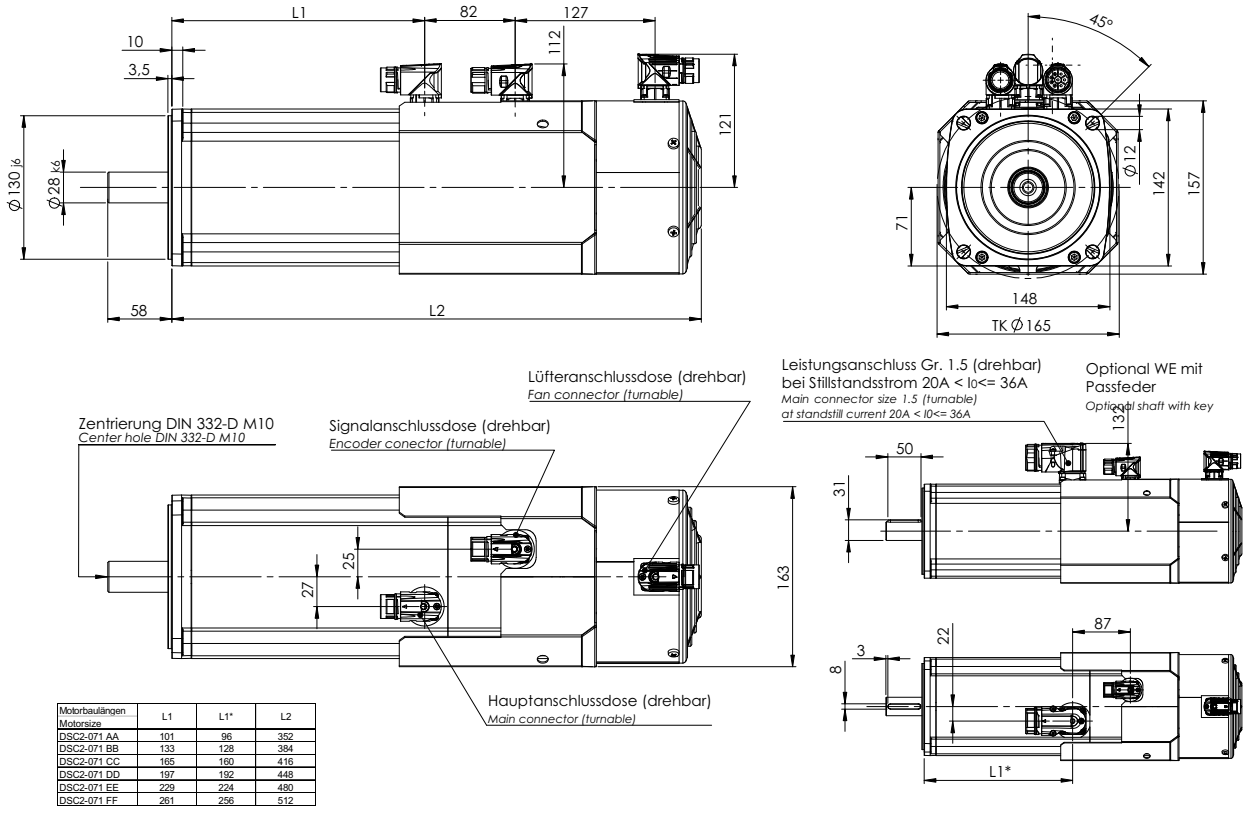
5.1.3 DSC2-071..O (without brake)



Motorbaulängen Motorsize	L1	L1*	L2
DSC2-071 AA	101	96	305
DSC2-071 BB	133	128	337
DSC2-071 CC	165	160	369
DSC2-071 DD	197	192	401
DSC2-071 EE	229	224	433
DSC2-071 FF	261	256	465

Figure 30: Dimension DSC2-071..O

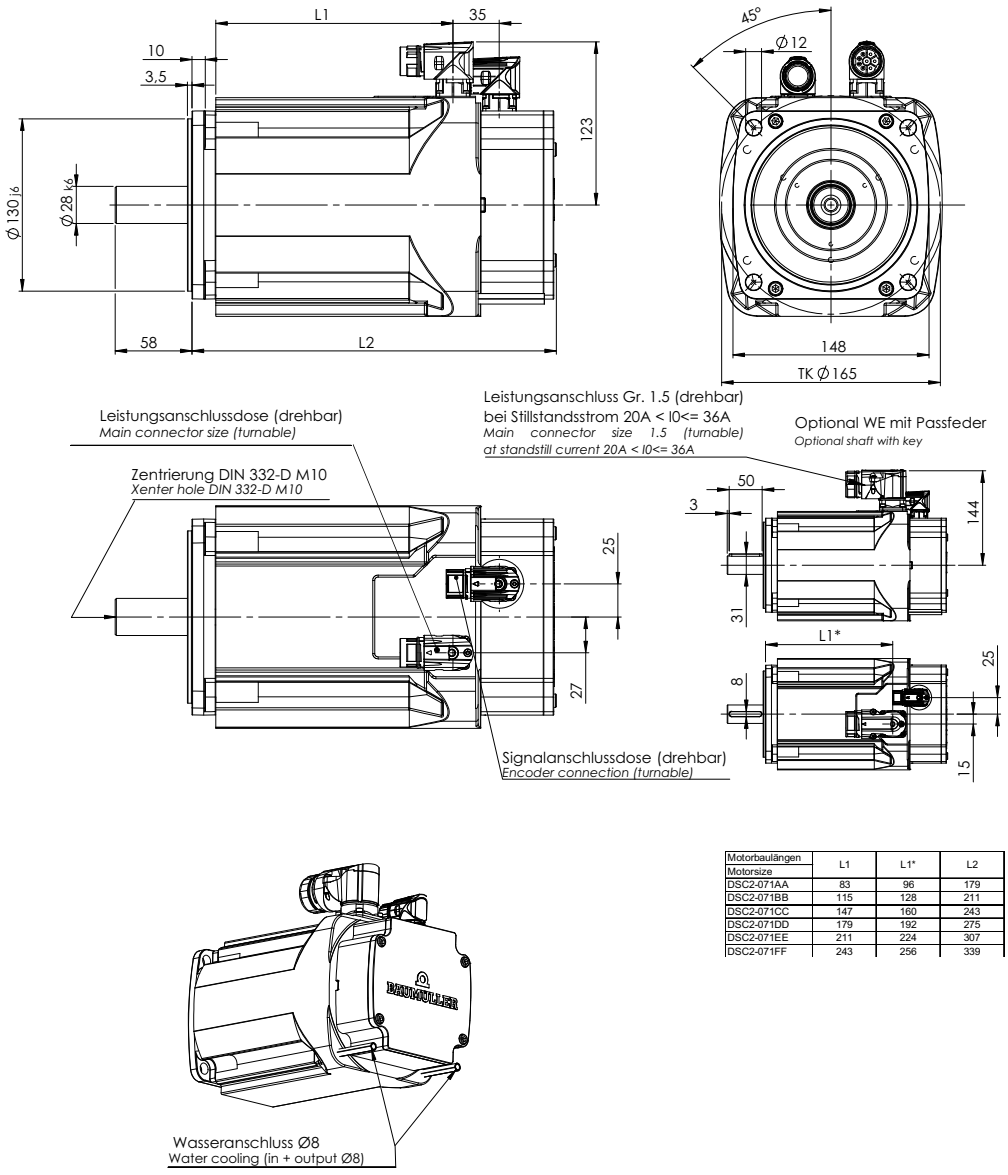
5.1.4 DSC2-071..O..B (with brake)



Motorbaulängen Motorsize	L1	L1*	L2
DSC2-071 AA	101	96	352
DSC2-071 BB	133	128	384
DSC2-071 CC	165	160	416
DSC2-071 DD	197	192	448
DSC2-071 EE	229	224	480
DSC2-071 FF	261	256	512

Figure 31: Dimension DSC2-071..O..B

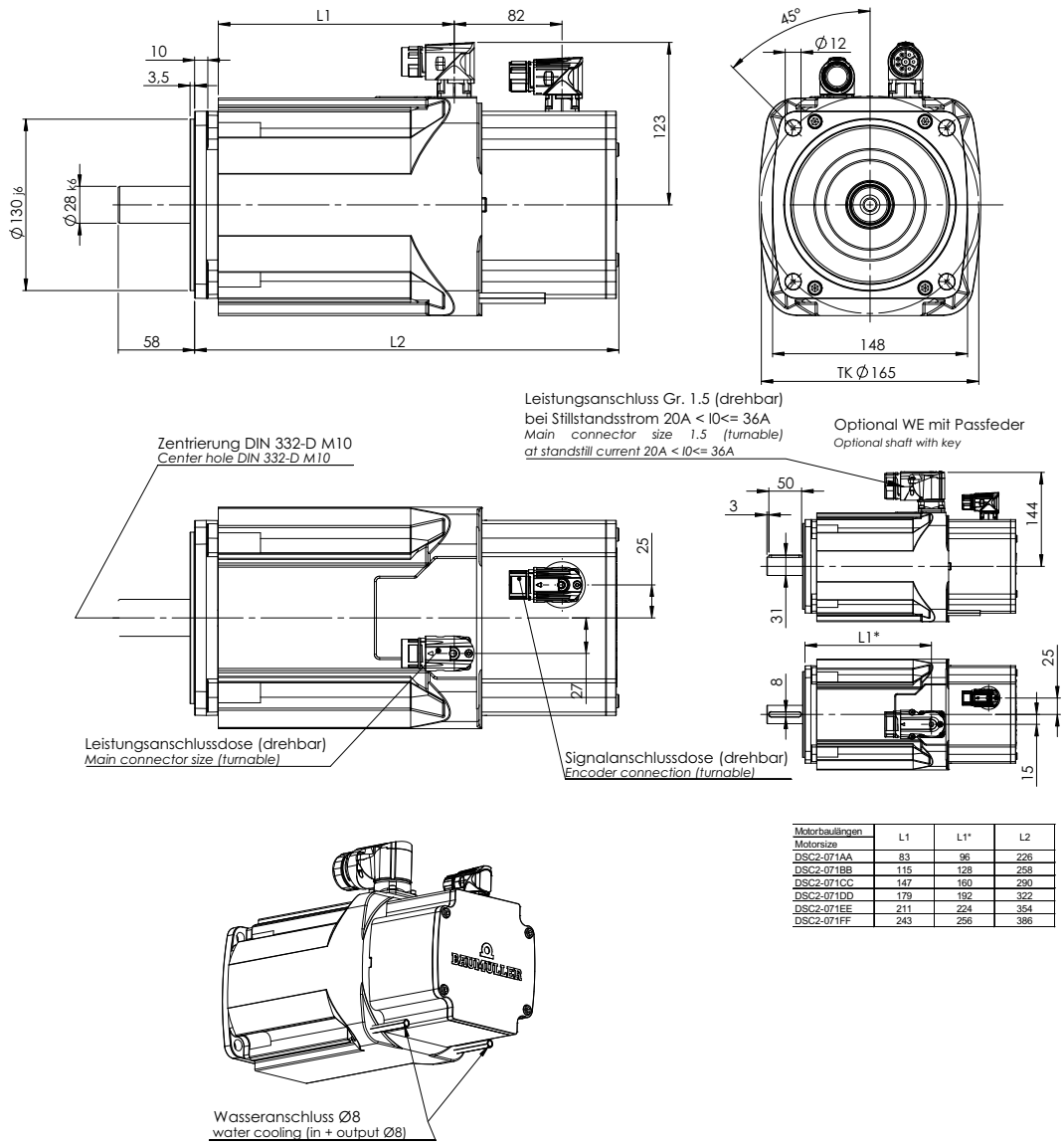
5.1.5 DSC2-071..W (without brake)



Motorbaulängen / Motorsize	L1	L1*	L2
DSC2-071AA	83	96	179
DSC2-071BB	115	128	211
DSC2-071CC	147	160	243
DSC2-071DD	179	192	275
DSC2-071EE	211	224	307
DSC2-071FF	243	256	339

Figure 32: Dimension DSC2-071..W

5.1.6 DSC2-071..W..B (with brake)

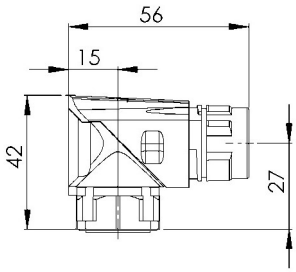


Motorbaulängen Motorsize	L1	L1*	L2
DSC2-071AA	83	96	226
DSC2-071BB	115	128	258
DSC2-071CC	147	160	290
DSC2-071DD	179	192	322
DSC2-071EE	211	224	354
DSC2-071FF	243	256	386

Figure 33: Dimension DSC2-071..W..B

5.1.7 Dimension of main connection

Speedtec - Rotary angle socket
(size 1 for current I_0 up to 20 A



Speedtec - Mating connector
(size 1 for current I_0 up to 20 A)

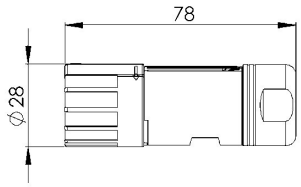
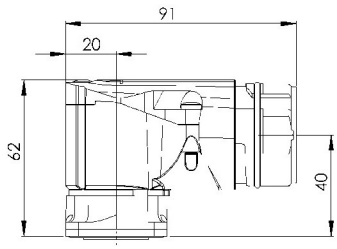


Figure 34: Dimension of main connection size 1

Speedtec - Rotary angle socket
(size 1,5 for current I_0 up to 36 A)



Speedtec - Mating connector
(size 1,5 for current I_0 up to 36 A)

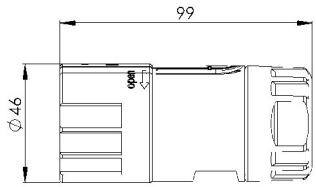
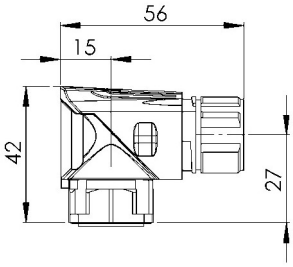


Figure 35: Dimension of main connection size 1,5

5.1.8 Dimension of encoder connection

Speedtec - Rotary angle socket



Speedtec - Mating connector

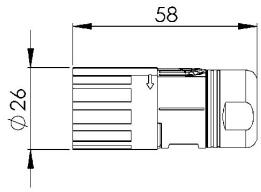


Figure 36: Dimensions of encoder connector

5.2 Tightening torques



NOTE!

The tightening torques mentioned below are general specification. Single specifications, e.g. tightening torques in motor specific dimension sheets or data sheets, have to be complied with first.

Tightening torques in Nm, tolerance +/- 10 %

	M4	M5	M6	M8	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56
Torque in Nm [1)]	1.3	2.6	4.5	11	22	38	92	180	310	620	1080	1700	2600	4200
Torque in Nm [2)]	3	5	8	20	40	70	170	340	600	1200	2000	3100	4700	7500

1) For screws of strength category 8.8 according to ISO 898-1 in components with lower strength (e. g. aluminum).

2) For screws of strength category 8.8 or A4-70 according to ISO 898-1 in components with higher strength (e.g. steel, gray cast iron).

5.3 Installation, mounting

Prior to and during mounting, check that:

- The motor is not damaged (e. g. the shaft sealing ring must not have sustained any damage at all from sharp or pointed objects).
- The motor is not mounted in the danger zone of other equipment.
- The motor is used in accordance with its intended purpose:
  Observe type plate details, warning labels, and signs.
- Anti-corrosion agents have been fully removed from the shaft ends.
  If a common solvent such as acetone or a cleaning solvent is used, it must not be allowed to wet the shaft sealing ring.
- The motor is designed for the ambient conditions and environmental influences on site (see ▷ Installation conditions ◁ on page 17).
- The mounting space in the machine is suitable for the cooling method employed for the motor. The space for installing of the cooling connections must be provided.

- In order to connect the motor and to execute inspection and maintenance workings there must be enough space in the machine.
  The mounting dimensions of the motor including the tolerance specifications can be taken from ▷ Dimensions ◁ on page 55.
- The motor can be mounted and operated with the available fastening options.
  When flanging to the motor a good and even contact area must be regarded. The guide fittings and contact areas must be undamaged and clean. They should be in the exact position to the shafts to be connected, to avoid harmfully loads due to offset of the bearings, shafts and housings in the entire system. When tightening the flange screws (at least strength class 8.8) avoid distortions at the flange connection.
- At a vertical assembly with the shaft end to the top assure that there is a protection against ingress of liquids onto the upper bearings.
- The permitted radial forces may not exceed the accordant performance characteristics of the technical documents of the product (if required clarify by a Baumüller subsidiary). If there are axial forces this must be approved by the motor manufacturer.
- The rotor must be able to turn uniformly and without chafing noise. The brake must be released beforehand if the motor has an integrated brake.
- The installation and type of the motor and encoder cables must comply with the operation handbook.
- The output elements as well as the drive elements must be protected.
- The complete cooling system must be sealed and functionally as well as protected against objects which fall into.
- The surface of the motor is unpolluted.

5.4 Mounting notes water-cooling



Cooling system connection:

On the motor connections from the coolant pipes no tensile loads, thrust loads or torsional stress may be applied.

The connection may be executed by qualified personnel only. Thereby the motor must be without current or voltage.

When coupling or decoupling the coolant pipes it must be observed that no cooling liquid gets into the motor terminal box.



Sealing test according EN 50178:

The sealing of the cooling system must be tested before commissioning by a pressure-test with the coolant (water). The testing pressure must be twice the operating pressure (minimum test pressure 1 bar). The used coolant must thereby not be at operating temperature. The pressure must be maintained (minimum testing time 10 minutes).

5.5 Vibrations and resistance to vibrations

The vibration response of the entire system at the place of use, caused by output elements, mounting conditions, alignment and installation as well as by influences of external vibrations, can lead to an increase in the vibration values at the motor. Under certain circumstances a complete balancing of the rotor with the output element becomes necessary.

In order to be able to guarantee perfect function and service life the specified vibration values based on DIN ISO 10816 must not be exceeded at the specified measuring points of the motor (see figure below).

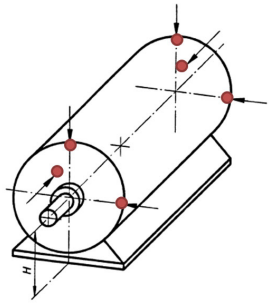


Figure 37: Measuring points for vibration

The specified maximum radial and axial vibration values must be adhered to at the same time. They apply to substructures which can be described as elastic. An elastic substructure is present if the lowest natural frequency of the overall system (machine and base) in the measuring direction is at least 25 % below the essential excitation frequency. All of the other substructures can be described as rigid. In case of rigid substructures, the manufacturer must be consulted.

Maximum radial vibration load:

Peak vibration acceleration 1 g	> 250 Hz
Peak vibration displacement ≤ 0.16 mm	< 6.3 Hz
Effective vibration speed ≤ 4.5 mm/s	6.3 Hz - 250 Hz

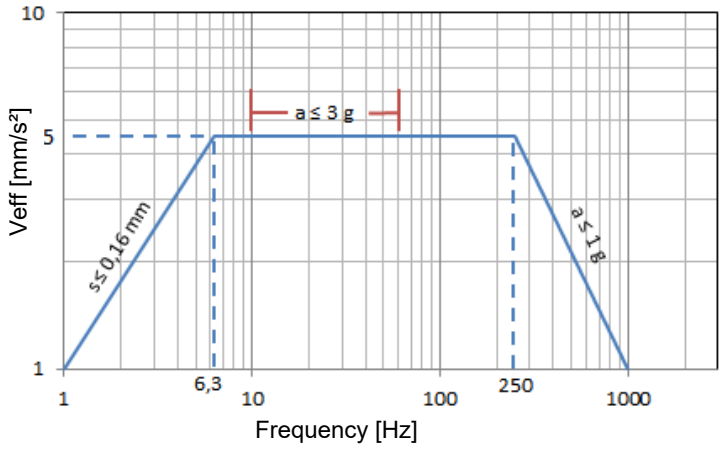


Figure 38: Permitted radial vibration load

Maximum axial vibration load:

Peak vibration acceleration 0.225 g	> 55 Hz
Peak vibration displacement ≤ 0.16 mm	< 6.3 Hz
Effective vibration speed ≤ 4.5 mm/s	6.3 Hz - 55 Hz

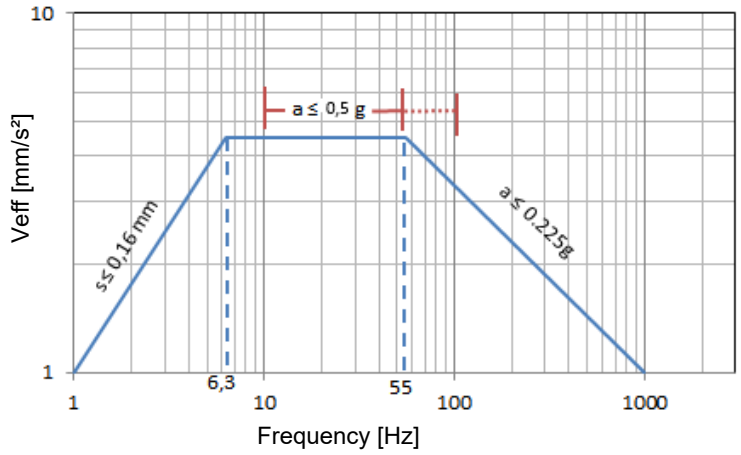


Figure 39: Permitted axial vibration load

Additional vibration resistance:

Shaft height 45 to 100 3 g radial and 2 g axial 10 Hz to 100 Hz

The specified vibrations are additionally endured by the motor. However, the service life of wear parts (such as bearings) can be reduced.

Shock load:

If there are increased vibration loads in the form of shocks, measurements on the installed machine are necessary.
Based on this, constructive revisions and evaluations are carried out with the company Baumüller.

To evaluate the vibration speed, the measuring equipment shall meet the requirements of ISO 2954. The vibration acceleration shall be evaluated in the time range in the frequency band from 10 Hz to 2 kHz.

If significant vibration excitations above 2 kHz are to be expected, such as meshing frequencies, the measuring range must be adapted accordingly. The permissible maximum values thereby do not change.

6

INSTALLATION

6.1 Safety notes



All work must be carried out by specially trained personnel.

Work must only be carried out when the system is electrically isolated and secured against unintentional restarting (also auxiliary circuits).

Work must only be carried out once the motor has come to a standstill.

In the case of three-phase synchronous motors with permanent magnet excitation, voltages of > 60 V can occur at the motor contacts with the rotor running.

Regulations for working in electrical plants must be observed!

The safety regulations for work on electro technical systems in accordance with EN 50110-1 must be followed:

- ☐ Isolate
- ☐ Secure against unintentional restarting
- ☐ Verify safe isolation from the supply
- ☐ Grounding and short-circuiting
- ☐ Safeguard or cover adjacent live parts



The motor must be operated by a correspondingly designed converter. A direct connection to the three-phase power system can destroy the motor.

Ensure that the phase sequence and the pin assignment are correct!

Electrical connections, protective conductor connections, and screen connections (when using screened cables) must be permanently secure!

6.2 Electrical installation

- The person setting up the system is responsible for the correct electrical installation.
- The motor data on the type plate must be observed.
- Connection cables and connectors must be correctly rated for the voltages and currents and must be suitable for the method of installation.
- The motor and its modules (encoder etc.) must be connected in accordance with the details on the wiring diagrams (see enclosed **wiring diagrams** and ▷ Pin assignment control connections ◁ from page 73).
- Screened power and encoder cables must be used to protect against electromagnetic EMC interference from motor cables and their effects on the encoder and control systems.
  Please refer to the EMC notes provided by the supplier of the converter.
- In the interest of ensuring operational safety, we recommend that you use connecting cables assembled by Baumüller.
- Before connection, the plugs, sockets and the terminal boxes must be checked for damage, corrosion, dirt and dampness.
- Connectors and terminal box connections must not be exposed to mechanical stress. If necessary, protect against strain, shearing, twisting and kinking.
- Ensure the connections are made correctly and are tight. Seals and sealing faces on the connectors and the terminal boxes maintain the type of protection.



NOTE!

The turnable connection box should be turned not more than 5 times to ensure the type of protection.

Please, pay attention to the following at the main connection via the terminal box:

- The cable ends must be stripped so far as the isolation nearly reaches the cable lugs and terminals. Protruding wiring ends must be avoided.
- The cable lugs must be matched to the dimension and cross sections of the terminals and cables.
- The screw connections of the electrical connection must be tightened by the specified tightening torque to ensure the type of protection.



NOTE!

All inlets which are not required must be closed with metallic fastening elements. The sealing elements of the terminal box must be fully functional and undamaged.

6.3 Electrical connections



NOTE!

The signals **1R1** and **1R2** are not available if the option temperature sensor via encoder cable is provided.

6.3.1 Overview of available connection types

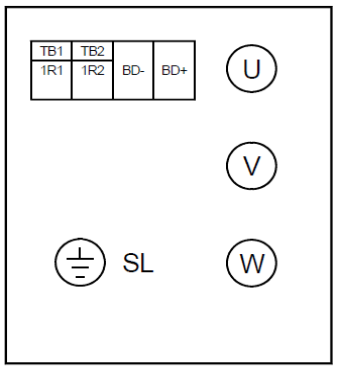
DSC2-071 ... 64U
without fan

	Speed	Main connection	Single cable available
DSC2-071AA64U-10-54	1000	Stecker Gr. 1	✓
DSC2-071AA64U-20-54	2000	Stecker Gr. 1	✓
DSC2-071AA64U-30-54	3000	Stecker Gr. 1	✓
DSC2-071AA64U-40-54	4000	Stecker Gr. 1	✓
DSC2-071AA64U-50-54	5000	Stecker Gr. 1	✓
DSC2-071BB64U-10-54	1000	Stecker Gr. 1	✓
DSC2-071BB64U-20-54	2000	Stecker Gr. 1	✓
DSC2-071BB64U-30-54	3000	Stecker Gr. 1	✓
DSC2-071BB64U-40-54	4000	Stecker Gr. 1	✓
DSC2-071BB64U-50-54	5000	Stecker Gr. 1	✓
DSC2-071CC64U-10-54	1000	Stecker Gr. 1	✓
DSC2-071CC64U-20-54	2000	Stecker Gr. 1	✓
DSC2-071CC64U-30-54	3000	Stecker Gr. 1	✓
DSC2-071DD64U-10-54	1000	Stecker Gr. 1	✓
DSC2-071DD64U-20-54	2000	Stecker Gr. 1	✓
DSC2-071DD64U-30-54	3000	Stecker Gr. 1,5	✓
DSC2-071EE64U-10-54	1000	Stecker Gr. 1	✓
DSC2-071EE64U-20-54	2000	Stecker Gr. 1,5	✓
DSC2-071EE64U-30-54	3000	Stecker Gr. 1,5	✓
DSC2-071FF64U-10-54	1000	Stecker Gr. 1	✓
DSC2-071FF64U-20-54	2000	Stecker Gr. 1,5	✓
DSC2-071FF64U-30-54	3000	Stecker Gr. 1,5	✓

DSC2-071 ... 64O surface-ventilated (with fan)

	Speed	Main connection	Single cable available
DSC2-071AA64O-10-54	1000	Stecker Gr. 1	✓
DSC2-071AA64O-20-54	2000	Stecker Gr. 1	✓
DSC2-071AA64O-30-54	3000	Stecker Gr. 1	✓
DSC2-071AA64O-40-54	4000	Stecker Gr. 1	✓
DSC2-071AA64O-50-54	5000	Stecker Gr. 1	✓
DSC2-071BB64O-10-54	1000	Stecker Gr. 1	✓
DSC2-071BB64O-20-54	2000	Stecker Gr. 1	✓
DSC2-071BB64O-30-54	3000	Stecker Gr. 1	✓
DSC2-071BB64O-40-54	4000	Stecker Gr. 1,5	✓
DSC2-071BB64O-50-54	5000	Stecker Gr. 1,5	✓
DSC2-071CC64O-10-54	1000	Stecker Gr. 1	✓
DSC2-071CC64O-20-54	2000	Stecker Gr. 1	✓
DSC2-071CC64O-30-54	3000	Stecker Gr. 1,5	✓
DSC2-071CC64O-40-54	4000	Stecker Gr. 1,5	✓
DSC2-071CC64O-50-54	5000	Stecker Gr. 1,5	✓
DSC2-071DD64O-10-54	1000	Stecker Gr. 1	✓
DSC2-071DD64O-20-54	2000	Stecker Gr. 1,5	✓
DSC2-071DD64O-30-54	3000	Klemmenkasten	○
DSC2-071DD64O-40-54	4000	Klemmenkasten	○
DSC2-071DD64O-50-54	5000	Klemmenkasten	○
DSC2-071EE64O-10-54	1000	Stecker Gr. 1	✓
DSC2-071EE64O-20-54	2000	Stecker Gr. 1,5	✓
DSC2-071EE64O-30-54	3000	Stecker Gr. 1,5	✓
DSC2-071EE64O-40-54	4000	Klemmenkasten	○
DSC2-071EE64O-50-54	5000	Klemmenkasten	○
DSC2-071FF64O-10-54	1000	Stecker Gr. 1	✓
DSC2-071FF64O-20-54	2000	Stecker Gr. 1,5	✓
DSC2-071FF64O-30-54	3000	Klemmenkasten	○
DSC2-071FF64O-40-54	4000	Klemmenkasten	○
DSC2-071FF64O-50-54	5000	Klemmenkasten	○

6.3.2 Main connection via terminal box



U V W	**Power connection**
1R1/ 1R2	**Temperature sensor**
BD+ / BD-	**Brake**
⏚	**Protective earth conductor**

Figure 40: Main connection standard with temperature sensor and brake

We recommend to use EMC screw connections at the fittings for the cable entries.

While tightening the clamping screw we recommend to hold up at the conductor to avoid a deformation of the mounting rail and to keep the base of the terminal free of torsional forces.

The following terminal box versions for the terminals are available including the tightening torques which are to be complied with:

Size of terminal box	Cable entry	No. of main connection terminals	Tightening torques of main connection terminals [Nm]
156	1 x M40 + 1 x M25	3 x M6	3.0
196	1 x M40 + 1 x M25	3 x M8	6.0

6.3.3 Main connection via connector

NOTE!

The connector size depends on the standstill current I_0.

Motors with a standstill current $\leq$ 20 A are equipped with a main connection size 1.

Motors with a standstill current 20 A < $I_0 \leq$ 36 A are equipped with a main connection size.

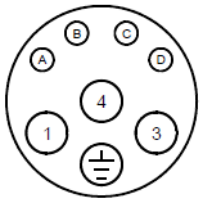
Motors with a standstill current I_0 > 36 A are equipped with a terminal box.

NOTE!

The signals **R1** and **R2-** are not available if the option temperature sensor via encoder cable is provided.

Cables see ▷ Safety notes ◁ from page 66.

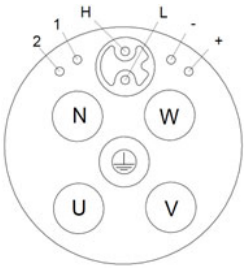
Size 1: $I_0 \leq 20$ A



View on the contact side of the mounting socket

Pin	Signal	Color / labeling
1	Phase U	U
⏚	Protective earth conductor	green/yellow
3	Phase V	V V
4	Phase W	W W W
A	B+	red
B	B-	black
C	R1	white
D	R2	yellow

Size 1,5: $I_0 \leq 36$ A



View on the contact side of the mounting socket

Pin	Signal	Color / labeling
U	Phase U	U
V	Phase V	V V
W	Phase W	W W W
⏚	Protective earth conductor	green/yellow
+	B+	red
-	B-	black
1	R1	white
2	R2	yellow

6.4 Fan connection

24 V DC

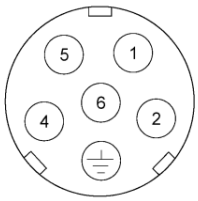
	Pin	Signal
 View on the contact side of the mounting socket	1	
	2	
	3	
	4	L+ (+24 V)
	5	L- (0 V)
	6	
	⏚	Protective earth conductor

Figure 41: Fan connection 24 V

115 V AC

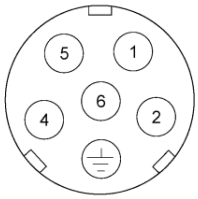
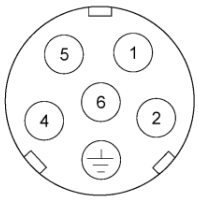
	Pin	Signal
 View on the contact side of the mounting socket	1	
	2	N
	3	
	4	
	5	
	6	U
	⏚	Protective earth conductor

Figure 42: Fan connection 115 V

230 V AC



View on the contact side of the mounting socket

Pin	Signal
1	U
2	N
3	
4	
5	
6	
⏚	Protective earth conductor

Figure 43: Fan connection 230 V

6.5 Pin assignment control connections



CAUTION!

Encoders are sensitive to electrostatic charges.



NOTE!

Please, take the pole assignment from the accordingly enclosed connection diagrams or from the technical documents concerning encoder types which were not mentioned here.

The specifications of the technical data were provided by the encoder manufacturer and we assume no liability for its correctness.

6.5.1 Resolver

Pole pair number	1
Transmission ratio	0,5 ±0,05
Frequency	5 kHz
Nominal input voltage	7 V_{rms}
Effective input power at no-load speed	112 mW
Current consumption at no-load speed	50 mA
Max. output voltage at no-load speed	3,5 V ±10 %
Stator impedance with short circuit and maximum coupling	61 mV/°
Phase shift	0° ±3°
Zero voltage	30 mV
Angle error in relation to $(\Delta\varphi_{max}+\Delta\varphi_{min})/2$	±6'
Shock according to DIN EN 60068-2-27 (11ms)	≤ 101 g
Vibration according to DIN EN 60068-2-6 (55 – 2000Hz)	≤ 50 g

View on the contact side
of the mounting socket

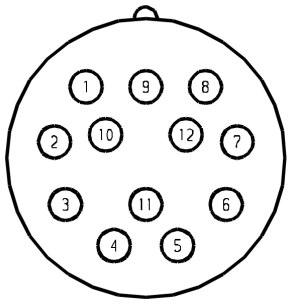


Figure 44: Pin assignment resolver

Pin	Signal
1	cos -
2	
3	
4	
5	sin -
6	sin +
7	
8	cos +
9	
10	Ref +
11	
12	Ref -

6.5.2 Resolver Safety

Pole pair number	1
Transmission ratio	0,5 ±0,05
Frequency	5 kHz
Sicherheits-Integritätslevel	SIL 3 (IEC 61508) with b maXX 5000/6000
Performance Level	PL e (EN ISO 13849) with b maXX 5000/6000
Maximum angular acceleration	100.000 rad/s²
Nominal input voltage	7 V_{rms}
Effective input power at no-load speed	112 mW
Current consumption at no-load speed	50 mA
Max. output voltage at no-load speed	3,5 V ±10 %
Stator impedance with short circuit and maximum coupling	61 mV/°
Phase shift	0° ±3°
Zero voltage	30 mV
Angle error in relation to $(\Delta\varphi_{max}+\Delta\varphi_{min})/2$	±6'
Shock according to DIN EN 60068-2-27 (11ms)	≤ 101 g
Vibration according to DIN EN 60068-2-6 (55 – 2000Hz)	≤ 50 g

View on the contact side
of the mounting socket

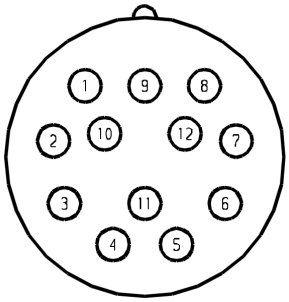


Figure 45: Pin assignment resolver

Pin	Signal
1	cos -
2	
3	
4	
5	sin -
6	sin +
7	
8	cos +
9	
10	Ref +
11	
12	Ref -

6.5.3 SEK/SEL 37 (SICK)

	SEK 37	SEL 37
Number of sine, cosine periods per revolution	16	
Measuring step for the interpolation of the sine, cosine periods such as 12 bi	20“	
Number of absolute completed revolutions	1	4096
Code type for the absolute value	Binary	
Error limits for evaluating the sine, cosine periods, integral non-linearity	±288"	
Non-linearity within a sine, cosine, differential non-linearity at nominal position ±0.1 mm	±144"	
Maximum speed at which the absolute position can be defined	6000 min^{-1}	
Maximum operating speed	12000 min^{-1}	
Output signal	Serial RS 485 asynchronous, half duplex	
Power supply range	7 - 12 V	
Max. operating current without Last	50 mA	
Shock according to DIN EN 60068-2-27 (10 ms)	100 g	
Vibration according to DIN EN 60068-2-6 (10-2000 Hz)	50 g	
SEK/SEL37 – with mechanical adaption	The notch position is 0° (identical to SEK/SEL52 encoder)	

View on the contact side of the mounting socket

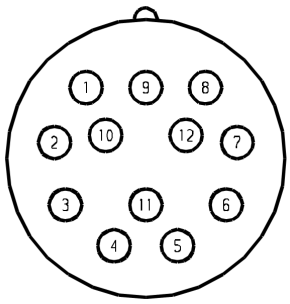


Figure 46: Pin assignment SEK/SEL 37

Pin	Signal	Option with PT1000 (R1/R2) on encoder socket
1	cos -	cos -
2	+ 485	+ 485
3		R1
4		R2
5	sin +	sin +
6	sin -	sin -
7	- 485	- 485
8	cos +	cos +
9		
10	GND	GND
11		
12	- U	- U

NOTE
Encoders are ESD sensitive devices. The technical data is specification from the encoder manufacturer.

6.5.4 SRS/SRM 50 (SICK)

	SRS 50	SRM 50
Number of sine, cosine periods per revolution	1024	
Number of increments per revolution	32768	
Number of absolute completed revolutions	1	4096
Code type for the absolute value	Binary	
Output frequency of the sine, cosine signals	0 - 200 kHz	
Fault limits in evaluation of the sine, cosine signals; Integral non-linearity	±45°	
Non-linearity within a sine or cosine period. Differential non-linearity ±0,1mm	±7°	
Maximum speed at which the absolute position can be defined	6000 min^{-1}	
Maximum operating speed	12000 min^{-1}	
Output signals; 2x90° offset sinusoidal signals	1 V_{SS}	
Output signal	Serial RS 485 asynchronous, half duplex	
Power supply range	7 - 12 V	
Max. operating current without load	80 mA	
Shock according to DIN EN 60068-2-27 (10 ms)	100 g	
Vibration according to DIN EN 60068-2-6 (10-2000 Hz)	50 g	

View on the contact side of the mounting socket

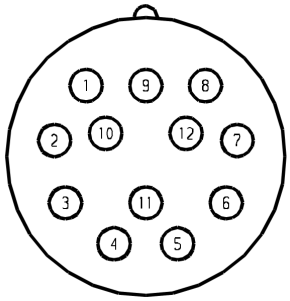


Figure 47: Pin assignment SRS/SRM 50

Pin	Signal	Option with PT1000 (R1/R2) on encoder socket
1	cos -	cos -
2	+ 485	+ 485
3		R1
4		R2
5	sin +	sin +
6	sin -	sin -
7	- 485	- 485
8	cos +	cos +
9		
10	GND	GND
11		
12	- U	- U

NOTE
Encoders are ESD sensitive devices. The technical data is specification from the encoder manufacturer.

6.5.5 SRS/SRM 50 Safety (SICK)

	SRS 50-S	SRM 50-S
Safety integrity level	SIL2 (IEC 61508), SILCL2 (IEC 62061)	
Category	3 (EN ISO 13849)	
Performance Level	PL d (EN ISO 13849)	
Maximum angular acceleration	200.000 rad/s^2	
Number of sine, cosine periods per revolution	1024	
Number of increments per revolution	32768	
Number of absolute completed revolutions	1	4096
Code type for the absolute value	Binary	
Output frequency of the sine, cosine signals	0-200 kHz	
Fault limits in evaluation of the sine, cosine signals; Integral non-linearity	±45°	
Non-linearity within a sine or cosine period. Differential non-linearity ±0,1mm	±7°	
Maximum speed at which the absolute position can be defined	6000 min^{-1}	
Maximum operating speed	12000 min^{-1}	
Output signals; 2x90° offset sinusoidal signals	1 V_{SS}	
Output signal	Serial RS 485 asynchronous, half duplex	
Power supply range	7 - 12 V	
Max. operating current without load	80 mA	
Shock according to DIN EN 60068-2-27 (10 ms)	100 g	
Vibration according to DIN EN 60068-2-6 (10-2000 Hz)	20 g	

View on the contact side of the mounting socket

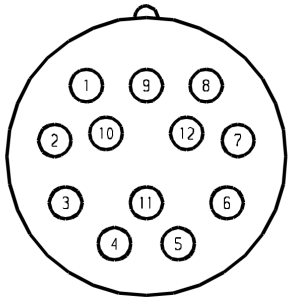


Figure 48: Pin assignment SRS/SRM 50-S

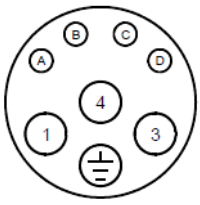
Pin	Signal	Option with PT1000 (R1/R2) on encoder socket
1	cos -	cos -
2	+ 485	+ 485
3		R1
4		R2
5	sin +	sin +
6	sin -	sin -
7	- 485	- 485
8	cos +	cos +
9		
10	GND	GND
11		
12	- U	- U

NOTE
Encoders are ESD sensitive devices. The technical data is specification from the encoder manufacturer. The technical data is the specifications of the encoder manufacturer. The configuration options for the safety encoders with different engine versions can be found in
the product configurator. The combination SRS/SRM50-S with add-on gearbox is available by request.

6.5.6 EES 37/EEM 37 Hiperface DSL® (SICK)

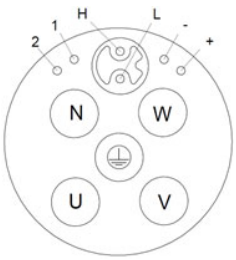
	EES 37	EEM 37
Number of absolute completed revolutions	1 (15 bit)	4096 (15 bit)
Code type for the absolute value	Binary	
Interface signals	Digital, RS485	
Position values / revolution	32768	
Maximum angular acceleration	500 000 rad/s²	
Maximum operating speed	12000 min^{-1}	
Power supply range	7 - 12 V	
Current consumption without load	≤150 mA	
Shock according to DIN EN 60068-2-27 (10 ms)	100 g	
Vibration according to DIN EN 60068-2-6 (10-2000 Hz)	50 g	
Working temperature	-40 °C .. +115 °C	

View on the contact side of the socket, size 1



Pin	Signal
1	Phase U
⏚	Ground
3	Phase V
4	Phase W
A	B+
B	B-
C	DSL+
D	DSL-

View on the contact side of the socket, size 1,5



Pin	Signal
U	Phase U
V	Phase V
W	Phase W
⏚	Ground
+	B+
-	B-
1	
2	
H	+U / DSL+
L	GND / DSL-

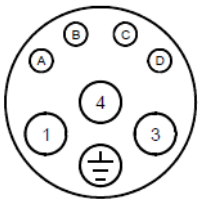
Figure 49: Pin assignment EES 37/ EEM 37

NOTE
Encoders are ESD sensitive devices. The technical data is specification from the encoder manufacturer. The configuration options of the Hiperface DSL® encoder with various motor versions are to be taken from the product configurator. The encoder can be used up to a cable length of 60 m.

6.5.7 EDS 35/EDM 35 Hiperface DSL® (SICK)

	EDS 35	EDM 35
Number of absolute completed revolutions	1 (24 bit)	4096 (24 bit)
Code type for the absolute value	Binary	
Interface signals	Digital, RS485	
System accuracy	±20“	
Maximum angular acceleration	160 000 rad/s²	
Maximum operating speed	9 000 min^{-1}	
Power supply range	7 - 12 V	
Current consumption without load	≤150 mA	
Shock according to DIN EN 60068-2-27 (6 ms)	100 g	
Vibration according to DIN EN 60068-2-6 (10-2000 Hz)	50 g	
Working temperature	-40 °C ... +125°C	

View on the contact side of the socket, size 1



Pin	Signal
1	Phase U
⏚	Ground
3	Phase V
4	Phase W
A	B+
B	B-
C	DSL+
D	DSL-

View on the contact side of the socket, size 1,5

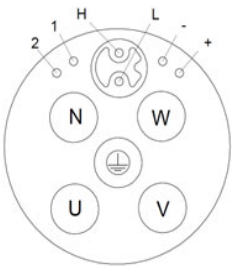


Figure 50: Pin assignment EDS 35/ EDM 35

Pin	Signal
U	Phase U
V	Phase V
W	Phase W
⏚	Ground
+	B+
-	B-
1	Shielding
2	
H	+U / DSL+
L	GND / DSL-

NOTE
Encoders are ESD sensitive devices. The technical data is specification from the encoder manufacturer. The configuration options of the Hiperface DSL® encoder with various motor versions are to be taken from the product configurator. The encoder can be used up to a cable length of 60 m.

6.5.8 ECN 1313 / EQN 1325 (Heidenhain)

	ECN 1313	EQN 1325
Number of sine, cosine periods per revolution	2048	
System accuracy	±20“	
Number of absolute completed revolutions	1	4096 (12 bit)
Code type for the absolute value	EnDat 2.1	
Sampling limit frequency or limit frequency	0 - 200 kHz	
Position values / revolution	8192 (13 bit)	
Maximum speed at which the absolute position can be defined	12000 min^{-1}	
Maximum operating speed	12000 min^{-1}	
Power supply	3,6 - 14 V	
Current consumption without load	≤160 mA	
Shock according to DIN EN 60068-2-27 (10 ms)	≤204 g	
Vibration according to DIN EN 60068-2-6 (10-2000 Hz)	≤31 g	

View on the contact side of the mounting socket

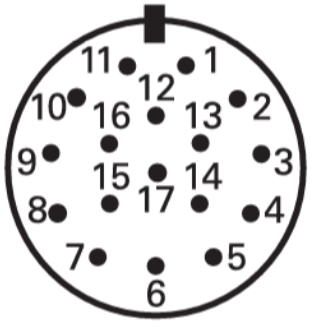


Figure 51: Pin assignment ECN 1313/ EQN 1325

Pin	Signal	Option with PT1000 (R1/R2) on encoder socket
1	U_P	U_P
2		
3		
4	0V	0V
5		R1
6		R2
7	U_P	U_P
8	Clock	Clock
9	Clock inv.	Clock inv.
10	0V	0V
11		
12	B+	B+
13	B-	B-
14	Data	Data
15	A+	A+
16	A-	A-
17	Data inv.	Data inv.

NOTE
Encoders are ESD sensitive devices. The technical data is specification from the encoder manufacturer.

6.5.9 ECN 1325 / EQN 1337 (Heidenhain)

	ECN 1325	EQN 1337
Number of sine, cosine periods per revolution	2048	
System accuracy	±20“	
Number of absolute completed revolutions	1	4096 (12 bit)
Code type for the absolute value	EnDat 2.2	
Position values / revolution	33.554.432 (25 bit)	
Maximum speed at which the absolute position can be defined	12000 min^{-1}	
Maximum operating speed	12000 min^{-1}	
Power supply	3,6 - 14 V	
Current consumption without load	≤160 mA	
Shock according to DIN EN 60068-2-27 (10 ms)	≤203 g	
Vibration according to DIN EN 60068-2-6 (10-2000 Hz)	≤30 g	

View on the contact side
of the mounting socket (M23)

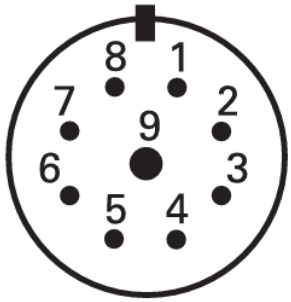


Figure 52: Pin assignment ECN 1325 / EQN 1337

Pin	Signal
1	Clock
2	Clock inv.
3	Up
4	0 V
5	Data
6	Data inv.
7	Sensor Up
8	Sensor 0 V
9	-

NOTE
Encoders are ESD sensitive devices. The technical data is specification from the encoder manufacturer.

6.5.10 ECN 1325 Safety / EQN 1337 Safety (Heidenhain)

	ECN 1325-S	EQN 1337-S
Safety integrity level	SIL 2 according to EN 61508	
Category	3 (EN ISO 13849)	
Performance Level	PL d (EN ISO 13849)	
Maximum angular acceleration	50.000 rad/s^2	
Number of sine, cosine periods per revolution	2048	
System accuracy	±20“	
Number of absolute completed revolutions	1	4096 (12 bit)
Code type for the absolute value	EnDat 2.2	
Position values / revolution	33.554.432 (25 bit)	
Maximum speed at which the absolute position can be defined	12000 min^{-1}	
Maximum operating speed	12000 min^{-1}	
Power supply	3,6 - 14 V	
Current consumption without load	≤160 mA	
Shock according to DIN EN 60068-2-27 (10 ms)	≤203 g	
Vibration according to DIN EN 60068-2-6 (10-2000 Hz)	≤30 g	

View on the contact side
of the mounting socket (M23)

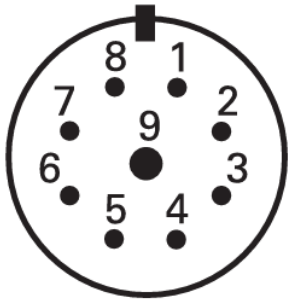


Figure 53: Pin assignment ECN 1325-S / EQN 1337-S

Pin	Signal
1	Clock
2	Clock inv.
3	Up
4	0 V
5	Data
6	Data inv.
7	Sensor Up
8	Sensor 0 V
9	-

NOTE
Encoders are ESD sensitive devices. The technical data is specification from the encoder manufacturer. Die The configuration options for the safety encoders with different engine versions can be found in the product configurator.

6.5.11 ECI 1319 / EQI 1331 (Heidenhain)

	ECI 1319	EQI 1331
No. of increments	-	
System accuracy	±65“	
Number of absolute completed revolutions	1	4096 (12 bit)
Code type for the absolute value	EnDat 2.2	
Position values / revolution	524 2882 (19 bit)	
Maximum speed at which the absolute position can be defined	15000 min^{-1}	
Maximum operating speed	15000 min^{-1}	12000 min^{-1}
Power supply	3,6 - 14 V	
Current consumption at 5 V typical, without load	95 mA	
Shock according to DIN EN 60068-2-27 (10 ms)	≤203 g	
Vibration according to DIN EN 60068-2-6 (10-2000 Hz)	≤40 g	

View on the contact side
of the mounting socket (M23)

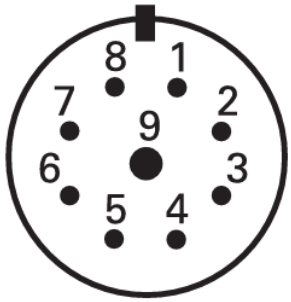


Figure 54: Pin assignment ECI 1319 / EQI 1331

Pin	Signal
1	Clock
2	Clock inv.
3	Up
4	0 V
5	Data
6	Data inv.
7	Sensor Up
8	Sensor 0 V
9	-

NOTE
Encoders are ESD sensitive devices. The technical data is specification from the encoder manufacturer.

NOTE!

Refer to the details on the wiring diagrams and technical documentation in case the encoder used is not described above or the temperature sensor is provided at the encoder cable.

7

COMMISSIONING, OPERATION

7.1 Safety notes

Working on the motor



Work must not be carried out on the electric motor until the motor has come to a standstill, is electrically isolated and cooled down. All connections, such as screw connections, that were loosened when working on the motor must be tightened again prior to commissioning.

When carrying out work on the motor, please observe the technical instructions and notes in the respective sections in this Instruction handbook.



DANGER!

The (optional) integrated brake functions only as a parking brake, during work on the motor it **must not** have a protective function (e.g. holding loads).

Danger of life due to electric shock



Make sure that the motor is disconnected and electrically isolated.

Never disconnect the motor connections during operation.

Only connect measuring instruments when the motor is disconnected from the power supply and electrically isolated.

Only commence work on the motor connections when you are sure the motor is electrically isolated and there is no potential.



When in operation, electric potential can be found at the motor terminals / con-tacts and at the motor windings. Never touch these modules / elements while the motor is in operation.

Installing and uninstalling safety devices



The motor may not be commissioned without mounted the safety devices.

The motor must be put out of operation when installing and dismantling components and systems which are provided for monitoring the motor for safe operation.

Danger on physical contact



Make sure that the electric motor has come to a standstill and is secured against accidental restarting before you touch it.

Only touch the output shaft when the motor is electrically isolated and it has come to a standstill. Otherwise there is a risk due to the rotating rotor.



Danger of burns!

Never touch the motor housing when the motor is running at rated load. The surface temperatures on the motors may exceed 70 °C.



NOTICE!

Environmental conditions that do not meet the requirements.

Environmental conditions that are non-compliant can lead to property damage.

Therefore:

- Ensure that the environmental conditions are kept compliant during operation (see ▹ Installation conditions ◃ on page 17, ▹ Specifications for water-cooling ◃ from page 18).



WARNING!

Risk of injury due to insufficient qualifications!

Inevitably, when operating this electrical device, certain parts of this device are energized with hazardous voltage. Improper handling can lead to significant personal injury and material damage.

Therefore:

- Only qualified personnel may work on this device!

7.2 Checks prior to commissioning

- The motor is not damaged and is not within the danger area of another installation.
- The motor has been properly installed and aligned.
  All fixing screws, connection elements, and electrical connections have been tightened to the specified tightening torques.
  Not used threads are closed.
- All safety devices (mechanic, thermal, electric) are installed.
- The motor connections are installed.
- The cables do not touch the motor surface.
- The protective system is installed and function-checked.
- The drive is not blocked.
- Emergency stop function is checked.
- The cooling lines are installed, the water-cooling is function-checked.

7.3 Commissioning

The commissioning must be done by qualified personnel. The technical documentation of the converter and of the cooling system have to be observed.



WARNING!

- The brake is a holding brake with emergency stop function (Voltage failure ? emergency stop).
- Use as a working brake is prohibited!

Checks during commissioning

- Have all modules of the motor such as the encoder, the cooling and so on been tested on functioning and are all application conditions observed.
- Have all electrical connections and terminals been properly completed and fastened. (refer also to ▹ Installation ◃ from page 66 and enclosed connection diagrams)
- Have all protective measures been met and operating correctly preventing the touching of energized parts, hot surfaces, rotating and moving parts and modules.
- Were all output elements mounted and set complying with the specifications of the manufacturer.
- Is ensured that the maximum permitted speed n_{max} of the motor cannot be exceeded. The maximum permitted speed n_{max} is the highest short-term permissible operating speed.

7.4 Operation

Checks during operation

- Pay attention to unusual noises.
- If scratching and scraping noises, grinding noises or the like occur shut down the drive immediately and find out the causes.
- Check the motor surface and connection lines for pollutions for example dust deposits, oil pollution, humidity, leakage etc.
- Check the maintenance intervals
- The flow rate and the pressure ratios of the cooling system must be checked at regular cleaning intervals.

7.5 Malfunction



The error detection and the troubleshooting made be executed by qualified personnel only.

Don't take the protective equipment out of operation – neither in the testing operation. Demount the cooling lines in the unpressurized state.



The connection cables must be de-energized and in a safe state before connection or disconnection.

Note the 5 safety regulations for work on electro technical systems (see ▹ Safety notes ◃ on page 66).



Pay attention to hot surfaces!

Observe to the following at failures

- Observe the operation instruction of the machine/installation
- Observe the operation instruction of the converter
- If required contact the manufacturer of the motor or converter

Keep the following parameters ready:

- Type plate data
- Type and extent of the failure
- Surrounding circumstances of the failure
- Application data (cycle of torque; speed and forces via the time, environmental conditions)

The following list could help in case of failures:

Failure	Error cause	Troubleshooting
Motor does not turn	Controller release is missing	Activate controller release
	Controller generates message encoder error	Read error list of converter or controller, correct error
	Voltage supply is missing	Check connection and voltage supply
	Rotating field	Check phase sequence and exchange mains connection if needed
Irregular running	Shielding in the connection lines is insufficient	Check shield connection and grounding
	Controller parameter too high	Optimize controller parameters
Vibrations	Coupling elements or driven machines were incorrectly balanced	Balancing
	Incorrect alignment of the powertrain control	Realign machine set
	Fastening screws are loose	Check screw connections and fasten them
Running noises	Foreign particles in the motor	Repair by manufacturer
	Bearing damage	
Motor warms up too much Motor temperature monitoring responds	Drive overload	Check motor load and compare it with the type plate data
	Water-cooling inactive	Check and switch on if required
	Cooling supply insufficient - Filter is very dirty - Deposits in the cooling channels - Failures in the external cooling system	Check water circuit
	Small space	Check ▹ Installation conditions ◃ from page 17
	Brake does not release - grinding brake	Repair at motor manufacturer
Overpressure in the cooling system	Strongly polluted coolant	Filter coolant
	Cooling channels blocked	Check and clean if required
	Failures in the external cooling system	Refer to notes of the plant manufacturer
Current input too high, motor torque too low	Notch position incorrect	Check notch position and set if required

8

SPARE PARTS

8.1 Motor cables

The motor cables are highly flexible trailing cables with overall shielding, They comply with VDE, UL, and CSA regulations. The control cables are integrated in star quad formation. The connector for brake control and the temperature sensor is available via main connection.

The cables are particularly suitable for the optimum use of cable racks thanks to their low cross-section, low weight and non-impeding surface. It also allows for an efficient use of the cables in drag chains. It is an EMC uncritical cable because of the overall shielding with > 85 % optical covering.

Technical data

- Cable sheath resists to mediums as for coolants and lubricants, machine or gear box oil
- Abrasion resistant surface for cable chains and drag chains
- Cable highly flexible, trailing cable, min. bending radius 12 x D at flexible use
- Sheath surface not blocking, silk mat
- Overall shielding of Cu copper braid > 85 % optical covering
- TPE or polyester wire insulation, sheath PUR - non-halogen cable
- Cable no FCKW and no silicone
- Halogen-free and flame-resistant
- Cable color RAL 1028, melon yellow
- Labeled with Baumüller company logo, VDE, UL and CSA

Nominal voltage

- Uo/U 600 / 1000 V (power wires)
- 24 V_{DC} (control wires)

Wire labeling

- Power wires U, VV, WWW
- Colored control cable pairs as star quads in red, white, black, yellow

Assignments of the pairs

Note polarity!

- red - black (brake)
- white - yellow (temperature sensor)

Main connection via connector

Cable cross section	Nominal current I_N [A][1)]	I_N [A] for c UL us approved motors	Connector size at 540 V	Cable diameter [mm]
4×1.5 mm² + 4×0.75 mm²	15	12	1	11.7-12.3
4x2.5 mm² + 4×0.75 mm²	20	16	1	12.7-14.6
4x4 mm² + 4×0.75 mm²	28	22.4	1.5	14.2-15.4
4x6 mm² + 4×0.75 mm²	36	28.8	1.5	16.6-17.9
4x10 mm² + 4x0.75 mm²	50	40	1.5	20.5-21.5
4x16 mm² + 4x0.75 mm²	66	52.8	-	23.0-25.8
4x25 mm² + 2x(2x1.5 mm²)	84	67.2	-	26.3-29.7
4x35 mm² + 2x(2x1.5 mm²)	104	83.2	-	30.8-32.5

1) Current carrying capacity acc. to Table 5, laying type C or E VDE 0113/EN 60204 Part 1 issue 1997) Ambient temperature 40 °C

Application notes

- Operating temperature
  The cables can be operated within a temperature range of between -20 °C and +80 °C.
- Cable laying at the motor
  The cables must not touch the motor surface.
- Smallest permissible bending radii
  12x outer cable diameter.

Main connection cables

Nominal current: 15 A	
Cable 4 x 1,5 mm² + 4x 0,75 mm² with connector size 1	
Length [m]	Part No. (Speedtec)
5	445872
7	445887
10	445889
15	447675
20	447676
25	447677
30	447678
35	447679
40	447680
50	447681
75	447682
100	447683

Nominal current: 28 A	
Cable 4 x 4 mm² + 4x 0,75 mm² with connector size 1,5	
Length [m]	Part No. (Speedtec)
5	448063
7	448064
10	448065
15	448066
20	448067
25	448069
30	448070
35	448071
40	448072

Nominal current: 20 A	
Cable 4 x 2,5 mm² + 4x 0,75 mm² with connector size 1	
Length [m]	Part No. (Speedtec)
5	447684
7	447687
10	447688
15	447692
20	447698
25	447852
30	447853
35	447854
40	447855
50	447856
75	447857
100	447858

Nominal current: 36 A	
Cable 4 x 6 mm² + 4x 0,75 mm² with connector size 1,5	
Length [m]	Part No. (Speedtec)
5	448080
7	448118
10	448119
15	448120
20	448121
25	448122
30	448123
35	448124
40	448125

Nominal current: 21 A	
Cable 4 x 2,5 mm² + 4x 0,75 mm² with connector size 1	
Length [m]	Part No. (Speedtec)
5	447686
7	447689
10	447690
15	447691
20	447693
25	447694
30	447695
35	447696
40	447697
50	447699
75	448060
100	448061

Nominal current: 50 A	
Cable 4 x 6 mm² + 4x 0,75 mm² with connector size 1,5	
Length [m]	Part No. (Speedtec)
5	448129
7	448131
10	448132
15	448133
20	448134
25	448135
30	448136
35	448137
40	448138

Mating connector		
	Type	Part No. (Speedtec)
Size 1	4x1,5 mm^2 o. 4x2,5 mm^2	445486
Size 1	4x2,5 mm^2 bis 4x4 mm^2	500064
Size 1,5	4x2,5 mm^2 bis 4x6 mm^2	445487
Size 1,5	4x10 mm^2	445488

Different regulations apply to the current rating of c UL us approved engines.

8.2 Encoder cables for b maXX 5000/6000

A prefabricated encoder cable is used for all encoder systems.

The connection at the motor end consists of a 12-pole circular signal connector on resolvers and Hiperface® encoder, a 17-pole circular signal connector on ECN1313/EQN1325.

The connection at the controller side consists of a 26-pole D-Sub connector. Alternatively, the signal connector on the motor side is available in a Speedtec version.

Technical data

Dragable for resolver

- Li9YC, 1x(2x0.25)+Li9Y, 2x(2x0.25)+Li9YC11Y, 1x(2x0.34), copper strand, twisted pairs
- PUR sheat, green; inscription with Baumüller Nürnberg and encoder cable resolver
- 1st side: 12-pole circular signal plug connector with 12 socket contacts
- 2nd side: 26-pole Sub-D plug connector with pin contacts and locking screws 4-40UNC
- Outer diameter 7.3 mm (+/- 0.3 mm)
- Bending radius: r ≥ 4 x D (fixed routing), r ≥ 10 x D (flexible use)

Dragable for SinCos Hiperface® interface and SinCos - and TTL incremental encoders

- Li9YC, 3x(2x0.25)+Li9Y, 3x(2x0.25)+Li9YC11Y, 1x(2x0.34), copper strand, twisted pairs
- PUR sheat, green; inscription with Baumüller Nürnberg and encoder cable Hiperface or Incremental
- 1st side: 12-pole circular signal plug connector with 12 socket contacts
- 2nd side: 26-pole Sub-D plug connector with pin contacts and locking screws 4-40UNC
- Outer diameter 9.6 mm (+/- 0.3 mm)
- Bending radius: r ≥ 4 x D (fixed routing), r ≥ 10 x D (flexible use)

Dragable for EnDat® 2.1 interface

- Li9YC, 3x(2x0.25)+Li9Y, 3x(2x0.25)+Li9YC11Y, 1x(2x0.34), copper strand, twisted pairs
- PUR sheat, green; inscription with Baumüller Nürnberg and encoder cable Endat 2.1
- 1st side: 17-pole circular signal plug connector with 17 socket contacts
- 2nd side: 26-pole Sub-D plug connector with pin contacts and locking screws 4-40UNC
- Outer diameter 9.6 mm (+/- 0.3mm)
- Bending radius: r ≥ 4 x D (fixed routing), r ≥ 10 x D (flexible use)

Dragable hybrid cable for Hiperface DSL®

- Hybrid cable
- Shielding braid Copper wires, tinned
- PUR sheath, orange, flame-retardant, self-extinguishing
- 1st side:
  metal round plug Speedtec M23 hybrid socket 8-pole for wire with 4G1.5 and 4G2.5
  metal round plug Speedtec M40 hybrid socket 5+4-pole + 2 -pole insulating body for wire with 4G2.5, 4G4 and 4G6
- 2nd side: Metal 45°-D-Sub plug, 26-pole with electronics

Application references

- Operating temperature of encoder cable resolver; SinCos Hiperface® interface; EnDat® 2.1 interface and SinCos- and TTL incremental encoders

Limit temperature	on the surface
Storage temperature	- 40 °C to + 80 °C
Permanent movement	- 20 °C to + 60 °C

- Routing of cable on motor

The cables must not touch the surface of the motor.

Order information for encoder cables

Encoder cable - prefabricated with plug

For Resolver	
Length [m]	Part No. (Speedtec)
1	448746
2	448747
3	448748
5	448749
7	448750
10	448751
15	448752
20	448753
25	448754
30	448755
35	448756
40	448757
50	448758
75	448759

For SinCos Hiperface® interface	
Length [m]	Part No. (Speedtec)
1	448761
2	448762
3	448763
5	448764
7	448765
10	448766
15	448767
20	448768
25	448769
30	448770
35	448772
40	448773
50	448774
75	448775

For SinCos - and TTL- incremental encoders	
Length [m]	Part No. (Speedtec)
1	448777
2	448778
3	448779
5	448780
7	448781
10	448782
15	448783
20	448784
25	448785
30	448786
35	448787
40	448788
50	448789
75	448790

For SinCos EnDat® 2.1 interface	
Length [m]	Part No. (Speedtec)
1	448796
2	448797
3	448798
5	448799
7	448800
10	448801
15	448802
20	448803
25	448804
30	448805
35	448806
40	448807
50	448808
75	448809

For Hiperface DSL® hybrid cables size 1		
	Nominal current 15 A 4G1.5+(2x0,75)+(2x22AWG)	Nominal current 20 A 4G2.5+(2x1.0)+(2x22AWG)
Length [m]	Part No.	Part No.
3	464201	464217
5	464202	464218
7	464203	464219
10	464204	464220
15	464205	464221
20	464206	464222
25	464207	464223
30	464208	464224
35	464209	464225
40	464210	464226
50	464211	464227
60	464212	464228

For Hiperface DSL® hybrid cables size 1,5			
	Nominal current 21A 4G2.5+(2x1.0)+(2x22AWG)	Nominal current 28A 4G4.0+(2x1.0)+(2x22AWG)	Nominal current 36A 4G6.0+(2x1.0)+(2x22AWG)
Length [m]	Part No.	Part No.	Part No.
3	464235	464278	464294
5	464236	464279	464295
7	464237	464280	464296
10	464238	464281	464297
15	464239	464282	464298
20	464240	464283	464299
25	464241	464284	464300
30	464242	464285	464301
35	464243	464286	464302
40	464244	464287	464303
50	464245	464288	464304
60	464246	464289	464305

9

MAINTENANCE



WARNING!

Risk of injury due to improperly performed maintenance work!

Improper maintenance can lead to severe personal injury and material damage.

Therefore:

- Before beginning work, make sure that there is enough space for mounting.
- Make sure that the mounting area is kept clean and orderly. Parts and tools that are loosely stacked or lying around are a potential accident source.

Working at the motor



Execute the works at the motor only if the motor is at standstill, de-energized and has cooled off. Fasten all lose connections such as screws, cables etc. after the inspection or maintenance again.

Observe the technical notes in the accordant chapters of this commissioning and maintenance instruction (see ▷ Safety notes ◁ from page 66).

DANGER!

The (optional) integrated brake functions only as a parking brake, during work on the motor it **must not** have a protective function (e.g. holding loads).

9.1 Inspection

Accordant to the local degree of pollution regular cleaning must be made to ensure a permanent adequate dissipation of the heat loss. Thereby, the volume rate and the pressure ratio of the cooling system must be checked.

If, optionally a shaft sealing ring is used check it regularly for its proper functioning (leakage).

9.2 Maintenance

Dependent of the operating conditions (such as operation mode, temperature, speed load, mounting position) very different times of service life can are referring to the lubricants and sealing elements.

We recommend the following maintenance guide values at a fault-free operation:

- Change the **bearing** after the bearing service life, see ▷ Technical Data ◁ from page 13.
- Check the proper function of the shaft seal regularly because the shaft seal is a wear part.

Brake

The optional brake must be replaced as soon as the wear limit is reached.

Relubrication

Relubrication at opened grease leakage only.

- The service life of bearing and the type of protection can only be guaranteed if the grease leakage is closed with the supplied screw plugs.
- For Relubrication interval and grease quantity see an extra label on the motor.



NOTICE!

- Unscrew the two srew plugs G1/2 of the grease discharge opening before starting relubrication.
- Relubricate the bearing when motor is rotating only.
- After relubrication the motor must be operated 2-4 hours (while bearing rotation the used grease is discharged via the grease discharge opening).
- The grease discharge opening must be closed by the screw plugs again.

The maintenance work the operator is responsible for, includes:

- The cleaning of the motor surface and the air ducts. Do not use aggressive cleaning products or high-pressure cleaner in order to avoid damage of surface coating and sealing.
- The replacing or cleaning of filter mats when using dust filter:
  - Dust filter should normally be cleaned or replaced after 100 operating hours. In case of a heavy air pollution the maintenance intervals are to be shortened.
  - Filters with dry dirt can be cleaned by beating, vacuum-cleaning or blowing compressed air through.
  - Filters with wet dirt can be washed in hand-hot water with commercial scouring agents and then dried.



NOTE!

- It is recommended to use original replacement filters from the motor manufacturer. The original filters can be ordered from Baumüller (motor No. and part No. required).

The maintenance work should be done by Baumüller or a specialized company authorized by Baumüller.



DANGER!

The specifications of the technical instructions TAM 00697 must be followed during maintenance and servicing on motors which are used for safety-oriented applications.

9.3 Repairs

In case of device damage, please inform your sales office or:

Baumüller Nürnberg GmbH

Ostendstr. 80 - 90
90482 Nuremberg
Germany

Tel. +49 9 11 54 32 - 0
Fax: +49 9 11 54 32 - 1 30

Mail: mail@baumueller.com
Internet: www.baumueller.com

10

DEMOUNTING AND DISPOSAL

10.1 Demounting

Refer to safety notes in chapter mounting (from ▹Page 53◃) and installation (from ▹Page 66◃).

10.2 Disposal



NOTE!

Baumüller products are not subject to the scope of application of the EU's Waste Electrical and Electronic Equipment Directive (WEEE, 2012/19/EU). Hence, Baumüller is not obligated to bear any costs for taking back and disposing of old devices.

The motor must be disposed in the normal recyclable material process by complying with the national and local regulations.

The encoder electronics (if an absolute value encoder is built-in) must be disposed as electronic waste.

Disposal facilities/ authorities

Ensure that the disposal is handled in compliance with the disposal policies of your company, as well as with all national regulations of the responsible disposal facilities and authorities. In case of doubt, consult the bureau of commerce or environmental protection authority responsible for your company.

A

APPENDIX A - MOTOR CHARACTERISTIC CURVES

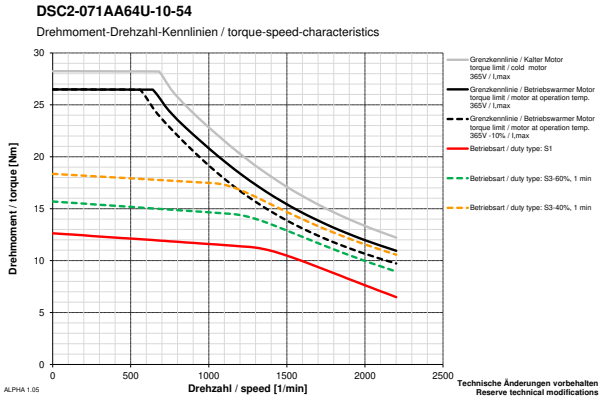
Definition

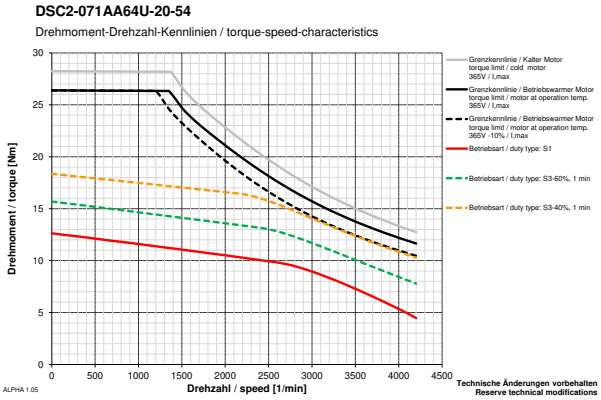
Cold motor = Environmental temperature (0 °C bis 40 °C)

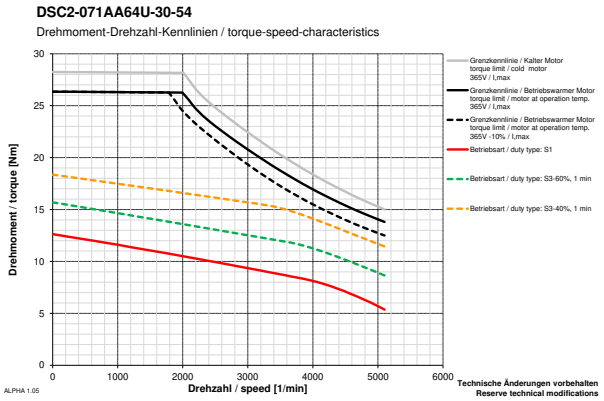
Motor at operating temperature = Continuous operation (S1) with nominal data of the motor or cyclical operation with corresponding effective output

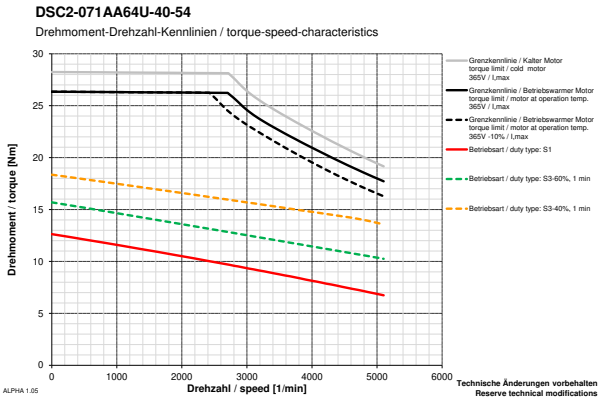
⇒ Environmental temperature + Delta temperature rise (105 K)

A.1 DSC2-071 .. U .. without fan









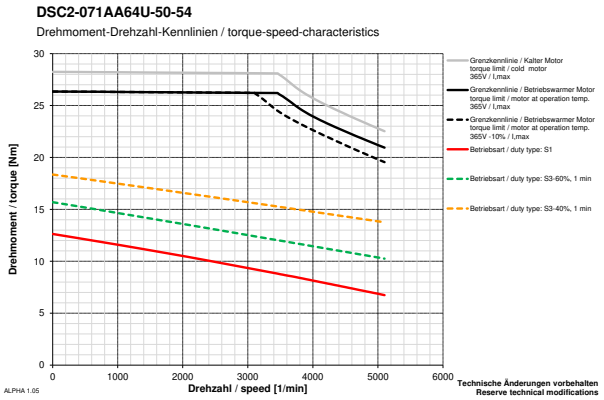
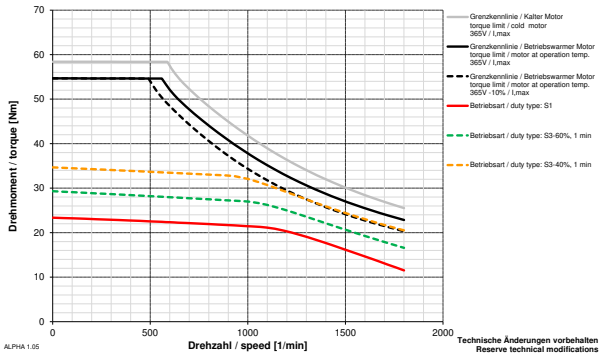


Figure 55: Motor characteristic curves DSC2-071AA .. U .. unventilated

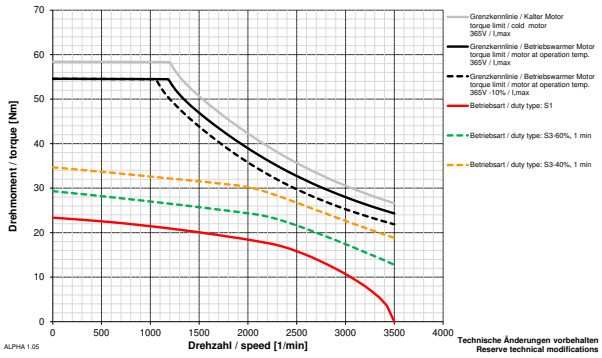
DSC2-071BB64U-10-54

Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics



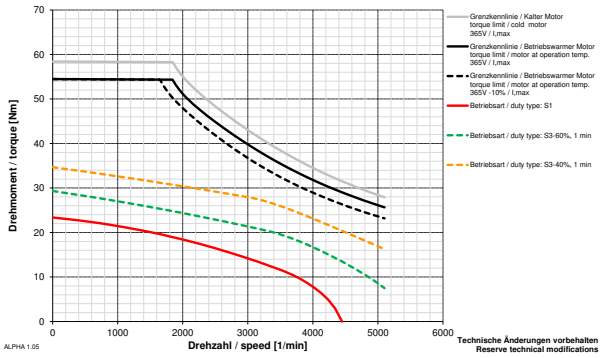
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Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics



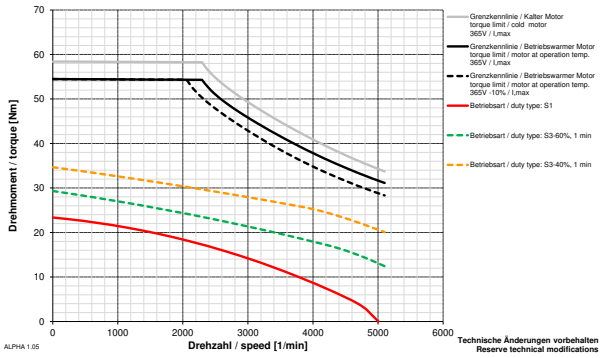
DSC2-071BB64U-30-54

Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics



DSC2-071BB64U-40-54

Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics



DSC2-071BB64U-50-54

Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics

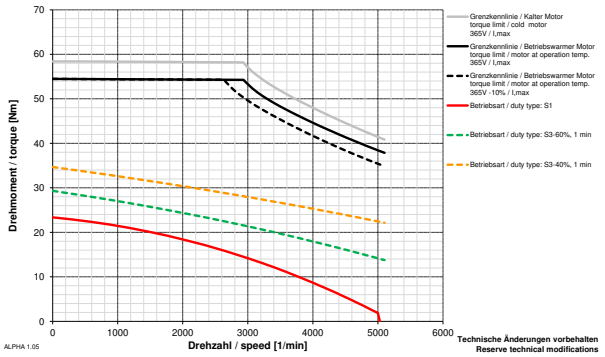


Figure 56: Motor characteristic curves DSC2-071BB .. U .. unventilated

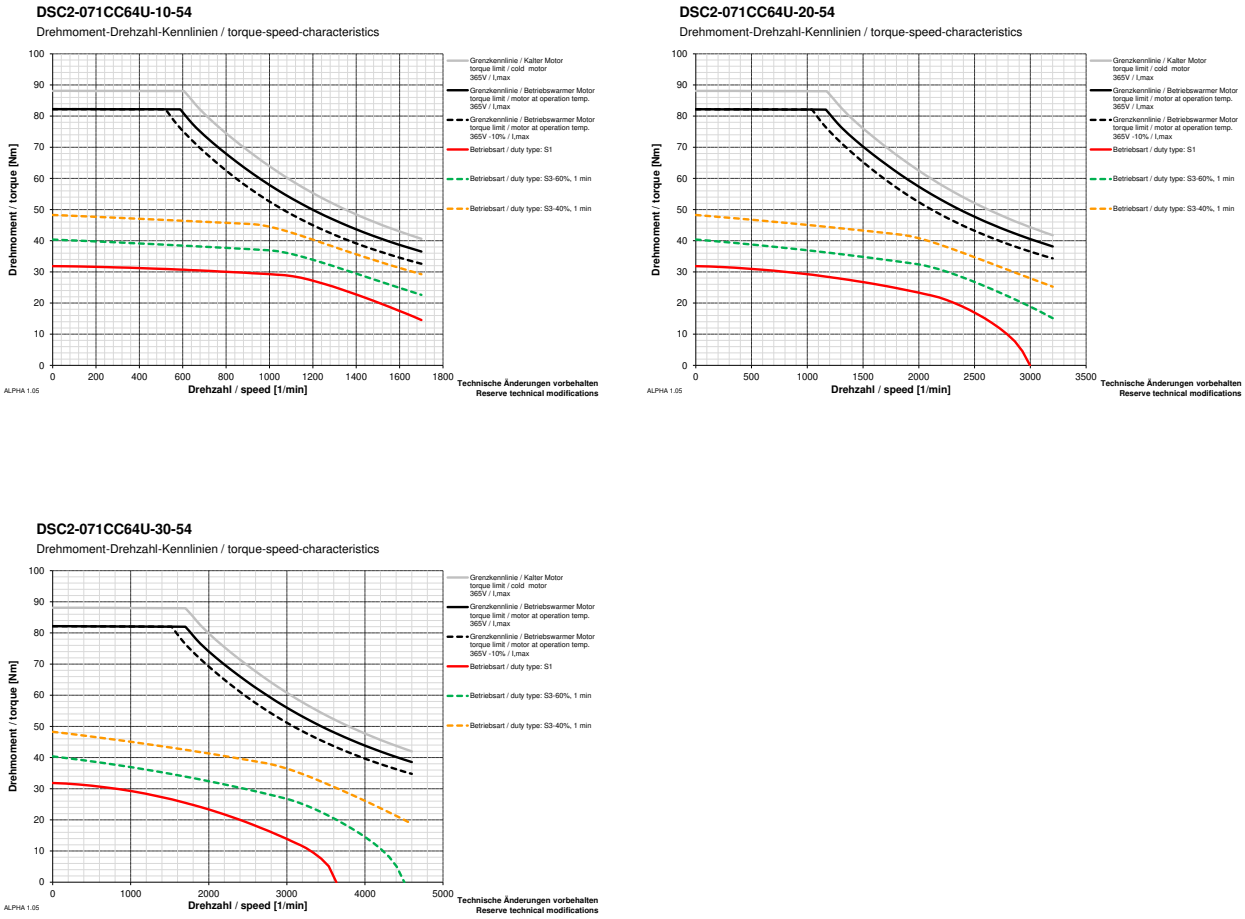


Figure 57: Motor characteristic curves DSC2-071CC .. U .. unventilated

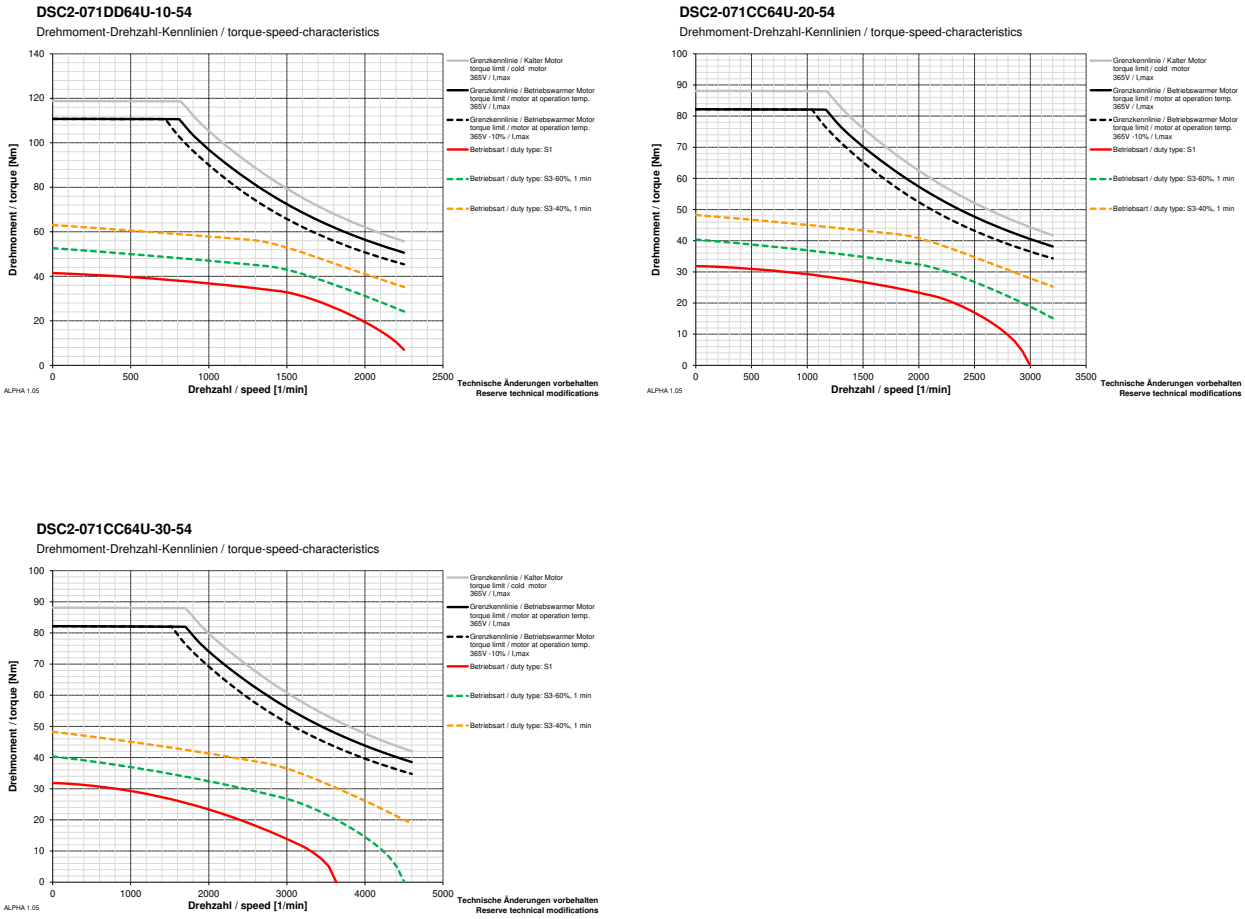


Figure 58: Motor characteristic curves DSC2-071DD .. U .. unventilated

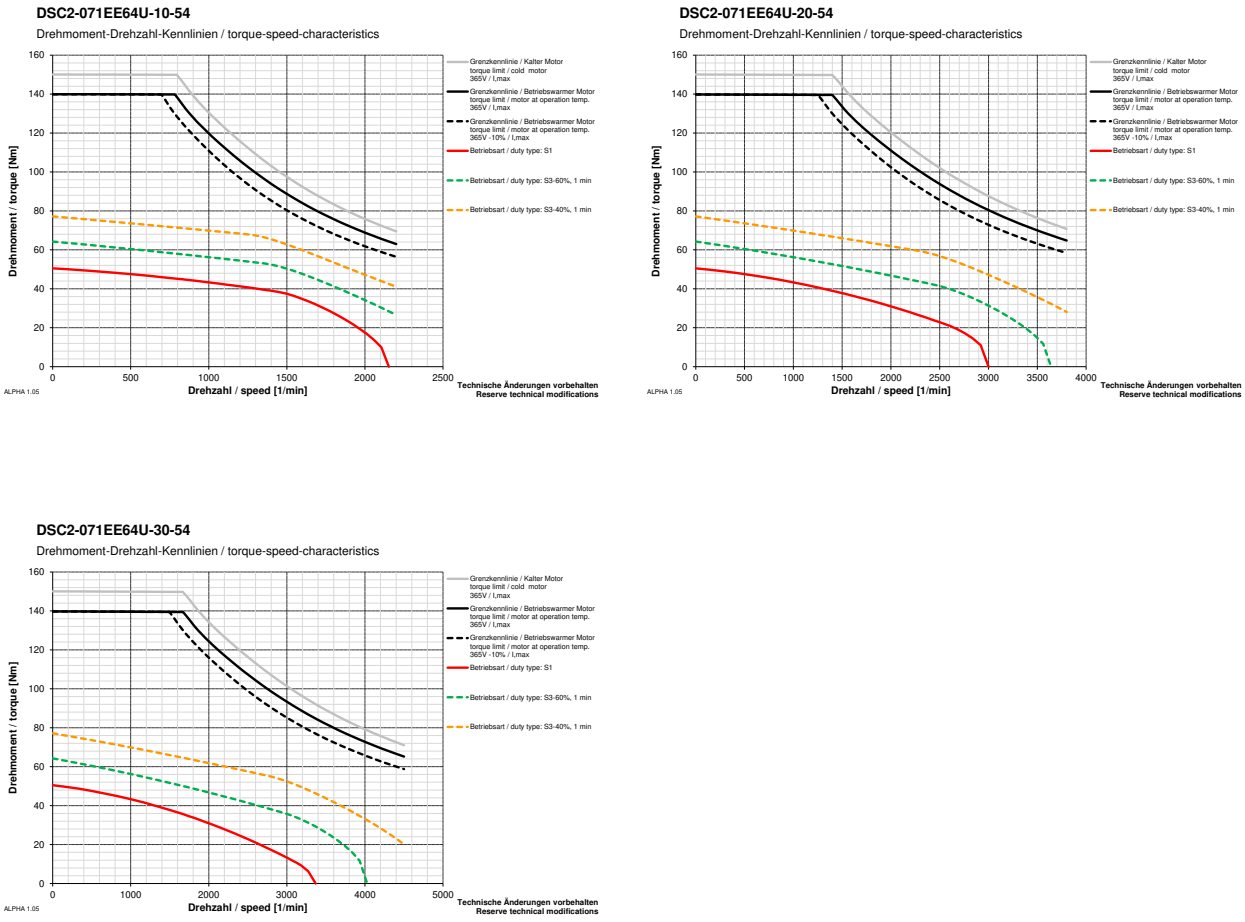
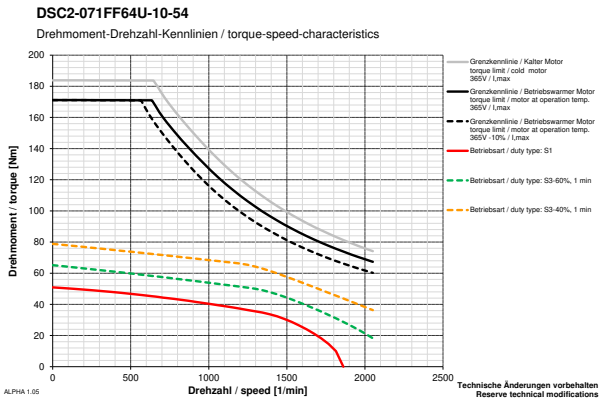
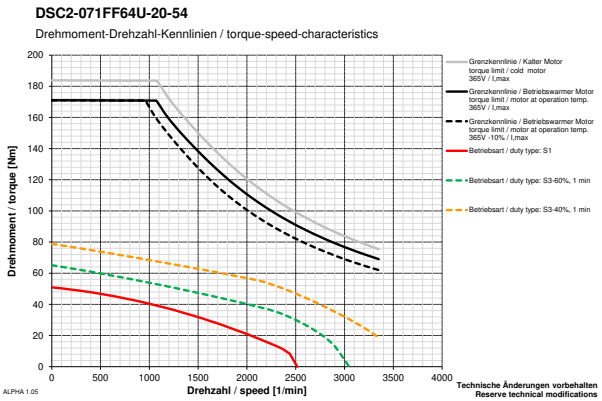


Figure 59: Motor characteristic curves DSC2-071EE .. U .. unventilated





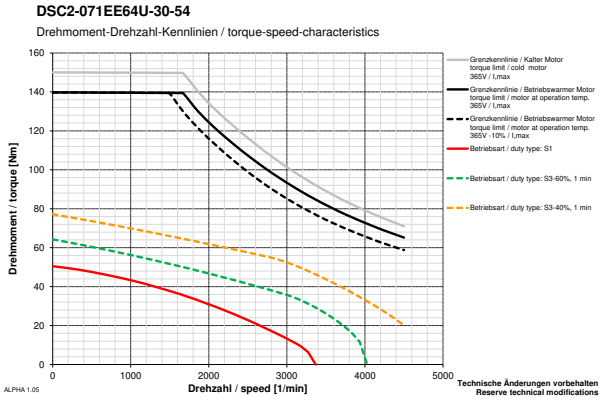
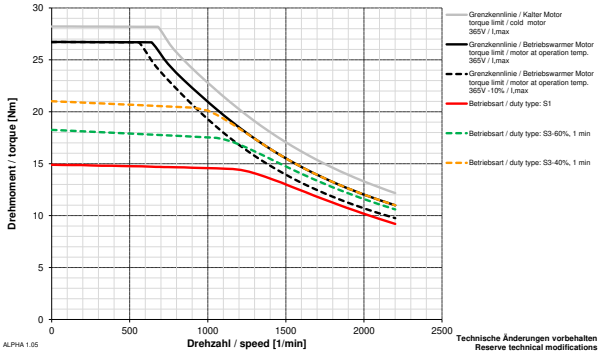


Figure 60: Motor characteristic curves DSC2-071FF .. U .. unventilated

A.2 DSC2-071 .. O .. surface-ventilated (with fan)

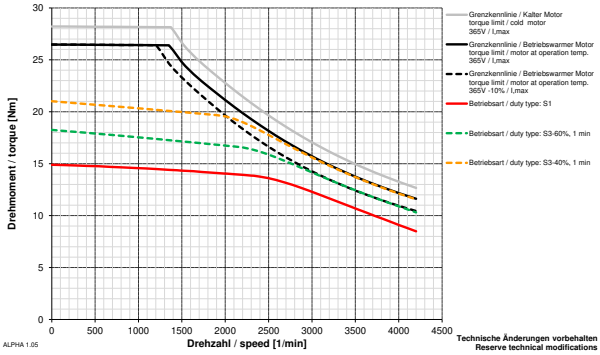
DSC2-071AA64O-10-54

Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics



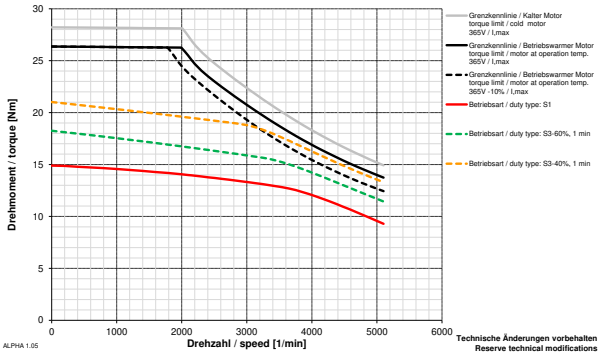
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Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics



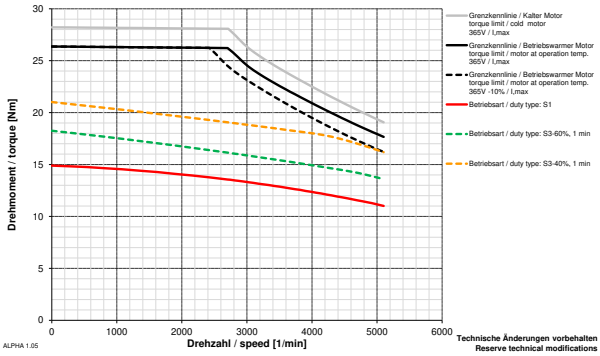
DSC2-071AA64O-30-54

Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics



DSC2-071AA64O-40-54

Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics



DSC2-071AA64O-50-54

Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics

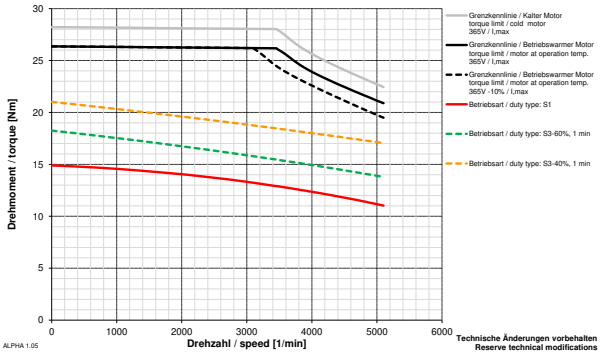
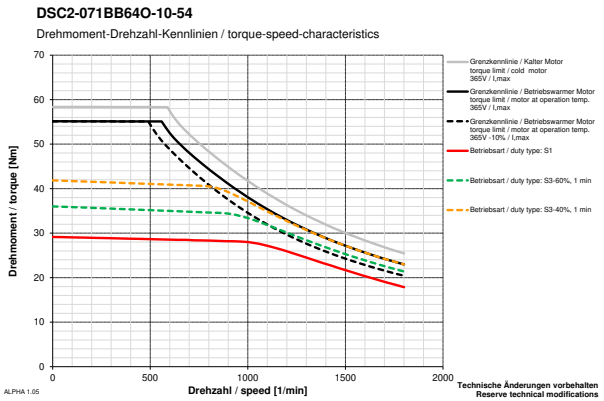
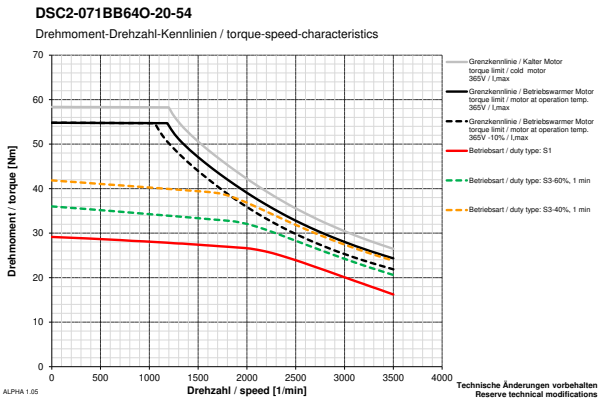
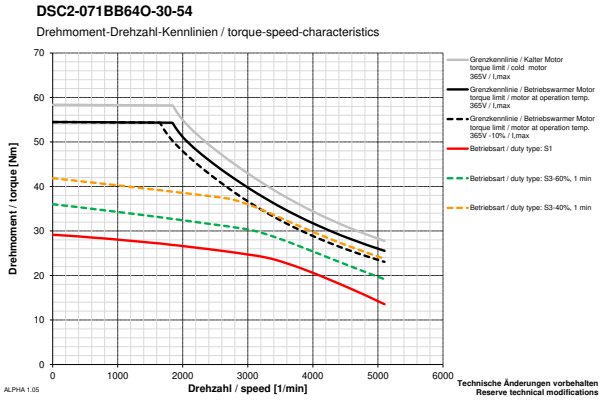
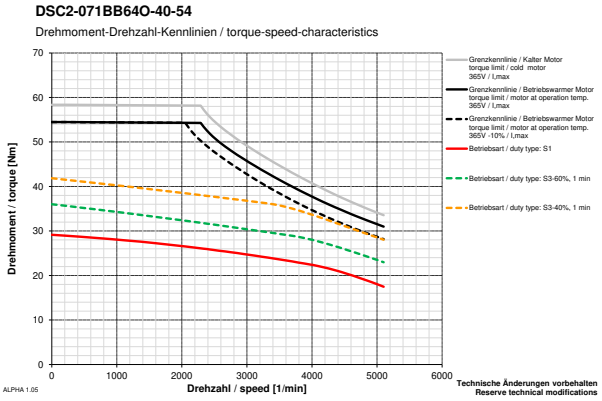


Figure 61: Motor characteristic curves DSC2-071AA .. O .. surface-ventilated









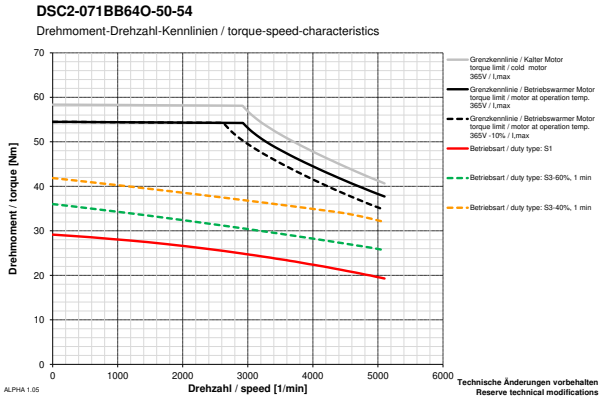
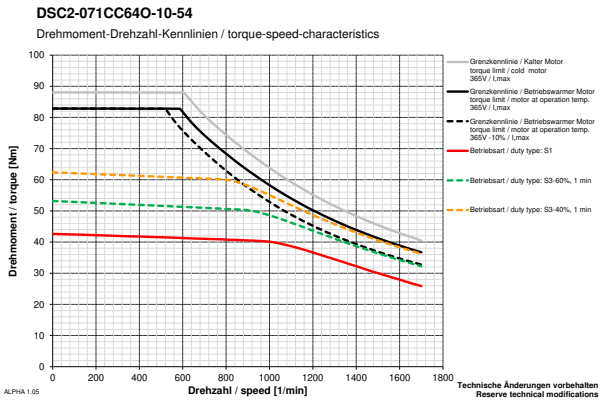
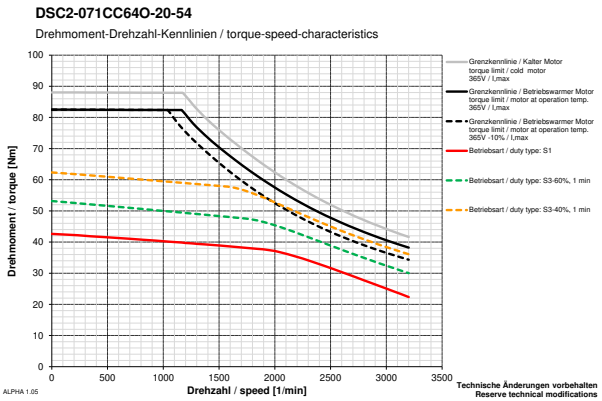
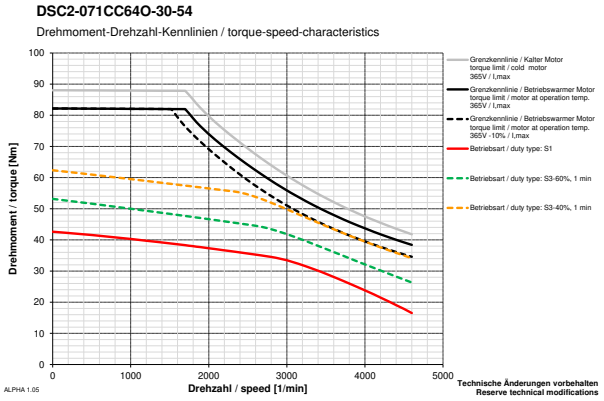
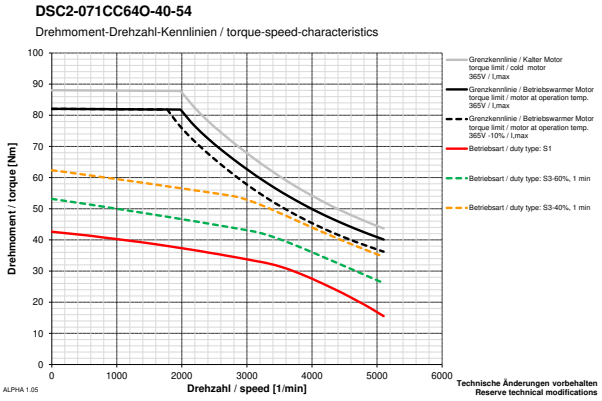


Figure 62: Motor characteristic curves DSC2-071BB .. O .. surface-ventilated









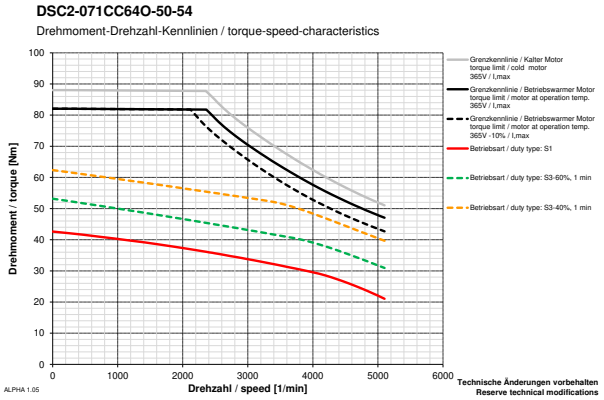
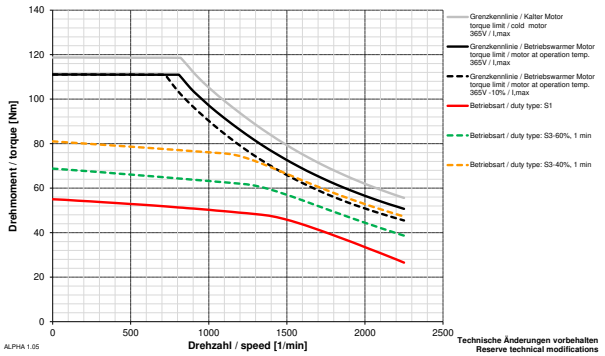


Figure 63: Motor characteristic curves DSC2-071CC .. O .. surface-ventilated

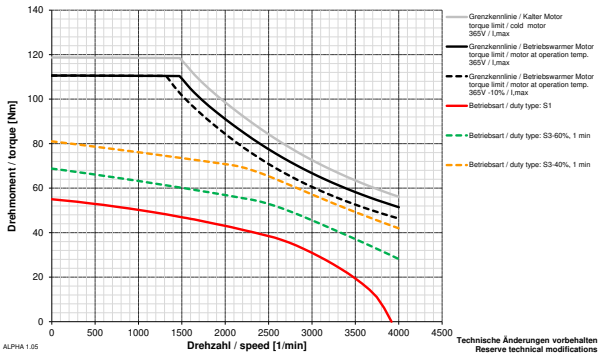
DSC2-071DD64O-10-54

Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics



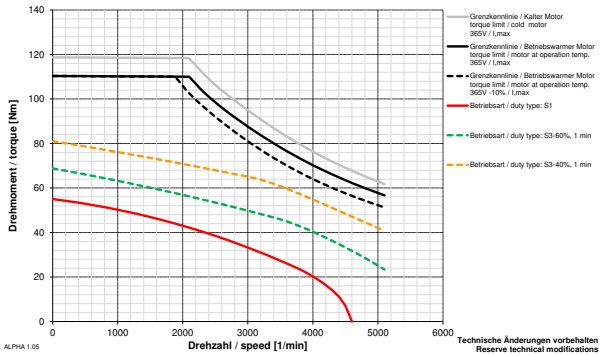
DSC2-071DD64O-20-54

Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics



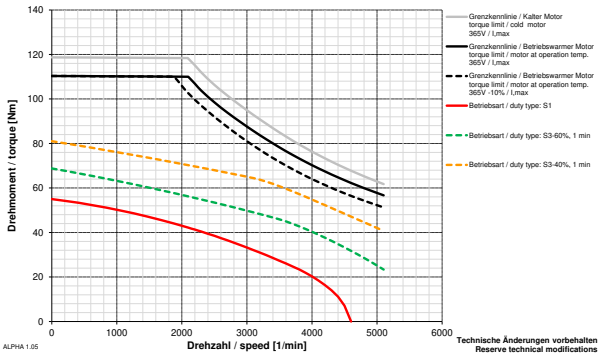
DSC2-071DD64O-30-54

Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics



DSC2-071DD64O-40-54

Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics



DSC2-071DD64O-50-54

Drehmoment-Drehzahl-Kennlinien / torque-speed-characteristics

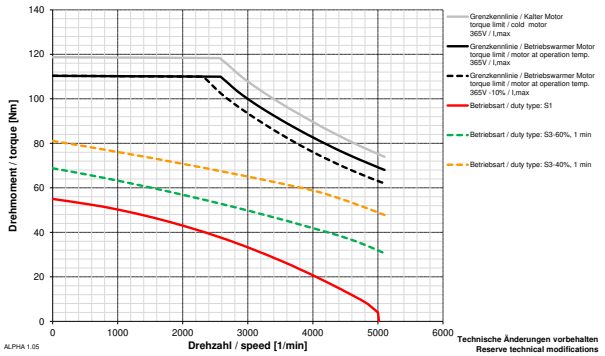


Figure 64: Motor characteristic curves DSC2-071DD .. O .. surface-ventilated

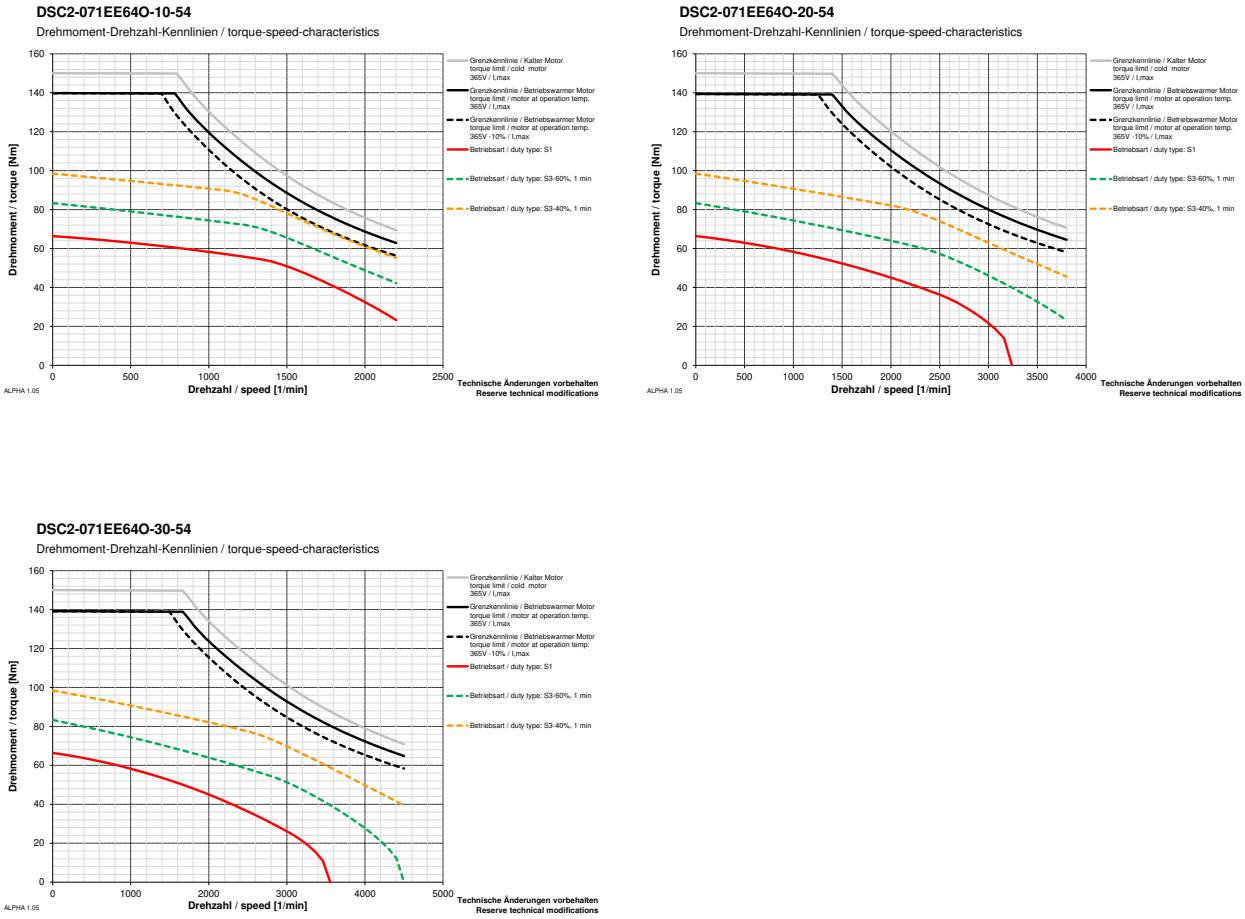


Figure 65: Motor characteristic curves DSC2-071EE .. O .. surface-ventilated

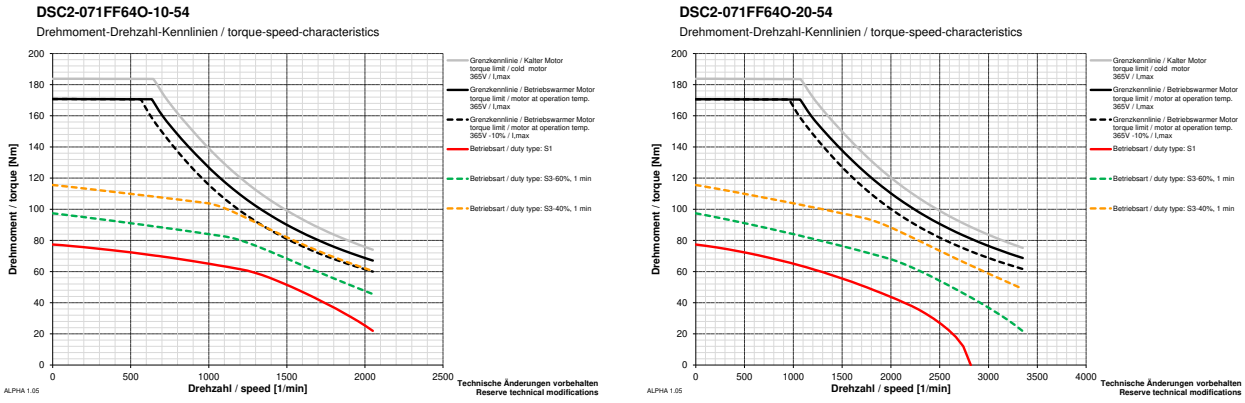


Figure 66: Motor characteristic curves DSC2-071FF .. O .. surface-ventilated

A.3 DSC2-071 .. W .. water-cooled

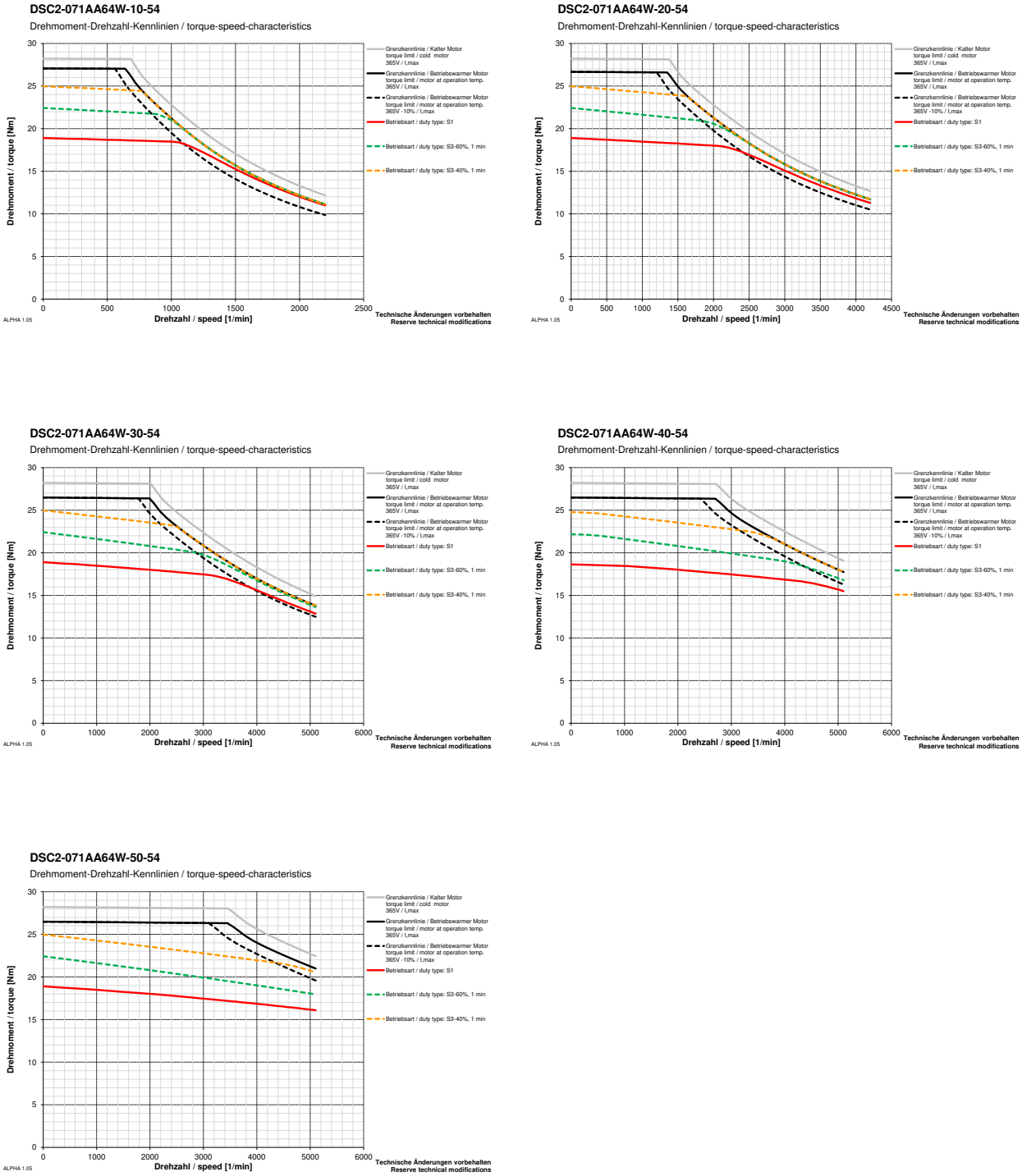
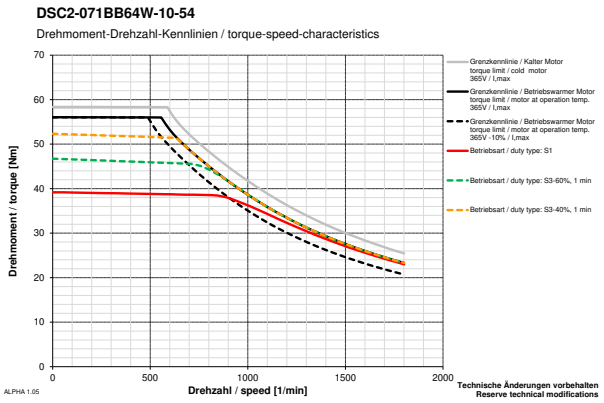
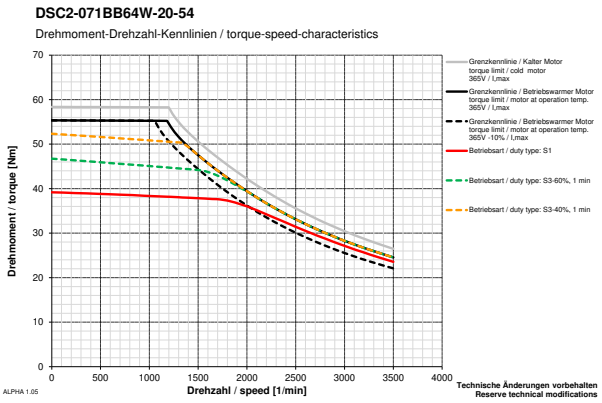
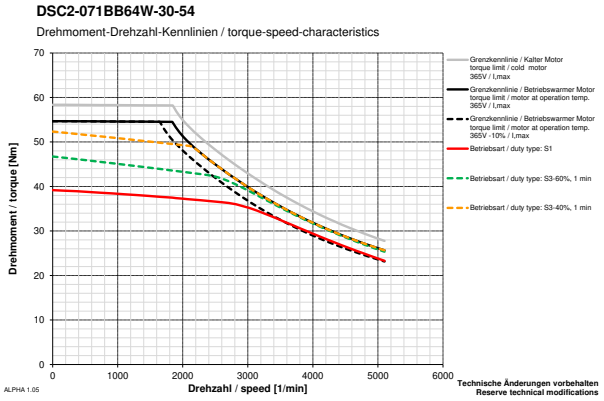
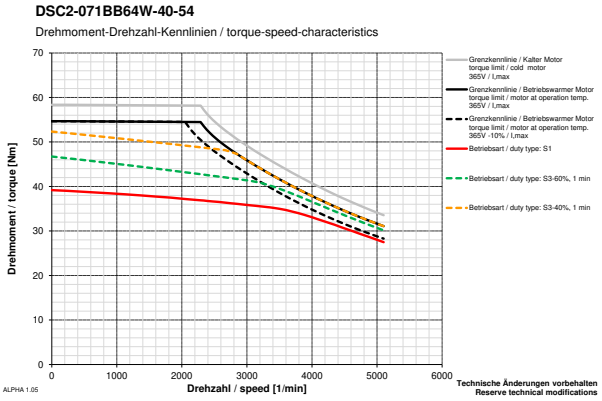


Figure 67: Motor characteristic curves DSC2-071AA .. W .. water-cooled









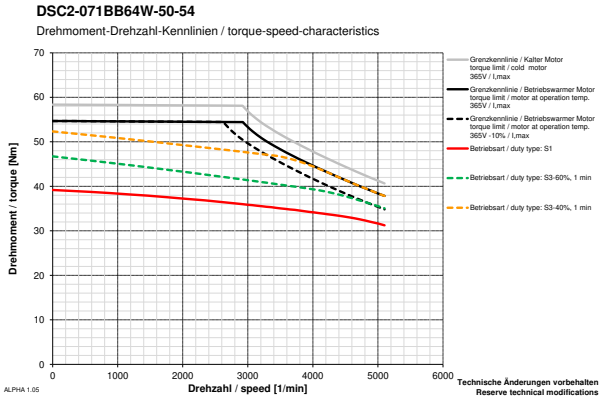
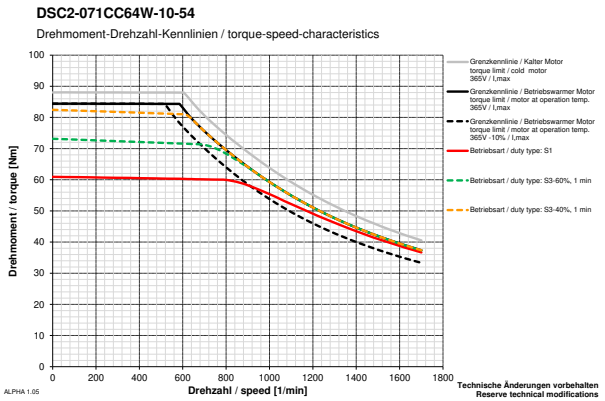
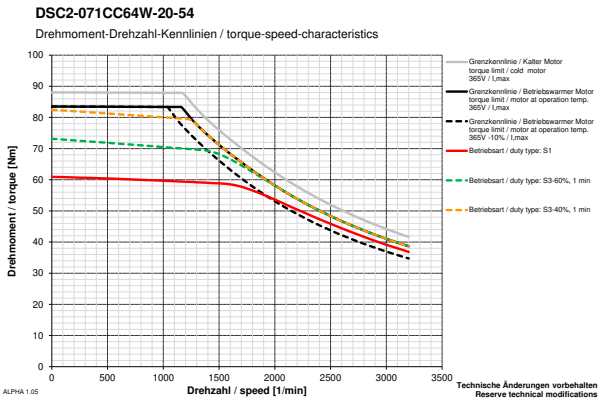
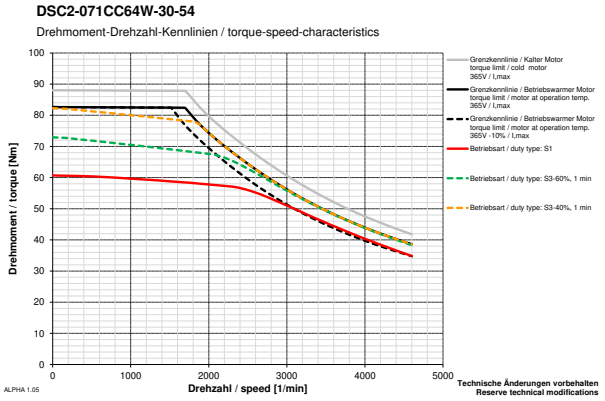
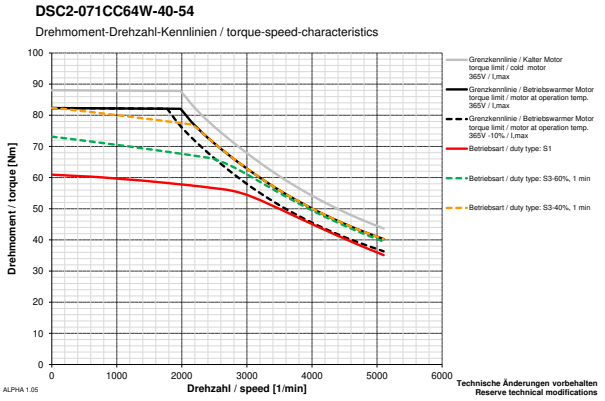


Figure 68: Motor characteristic curves DSC2-071BB .. W .. water-cooled









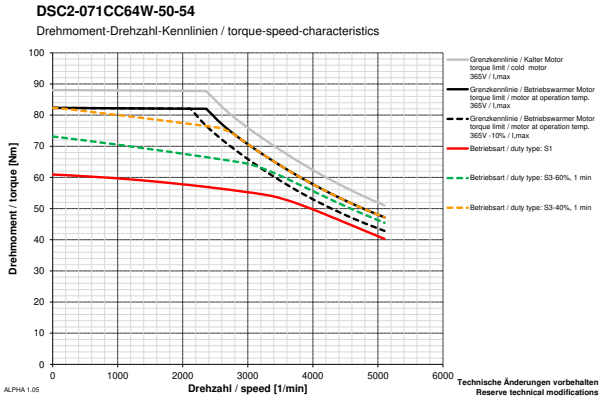


Figure 69: Motor characteristic curves DSC2-071CC .. W .. water-cooled

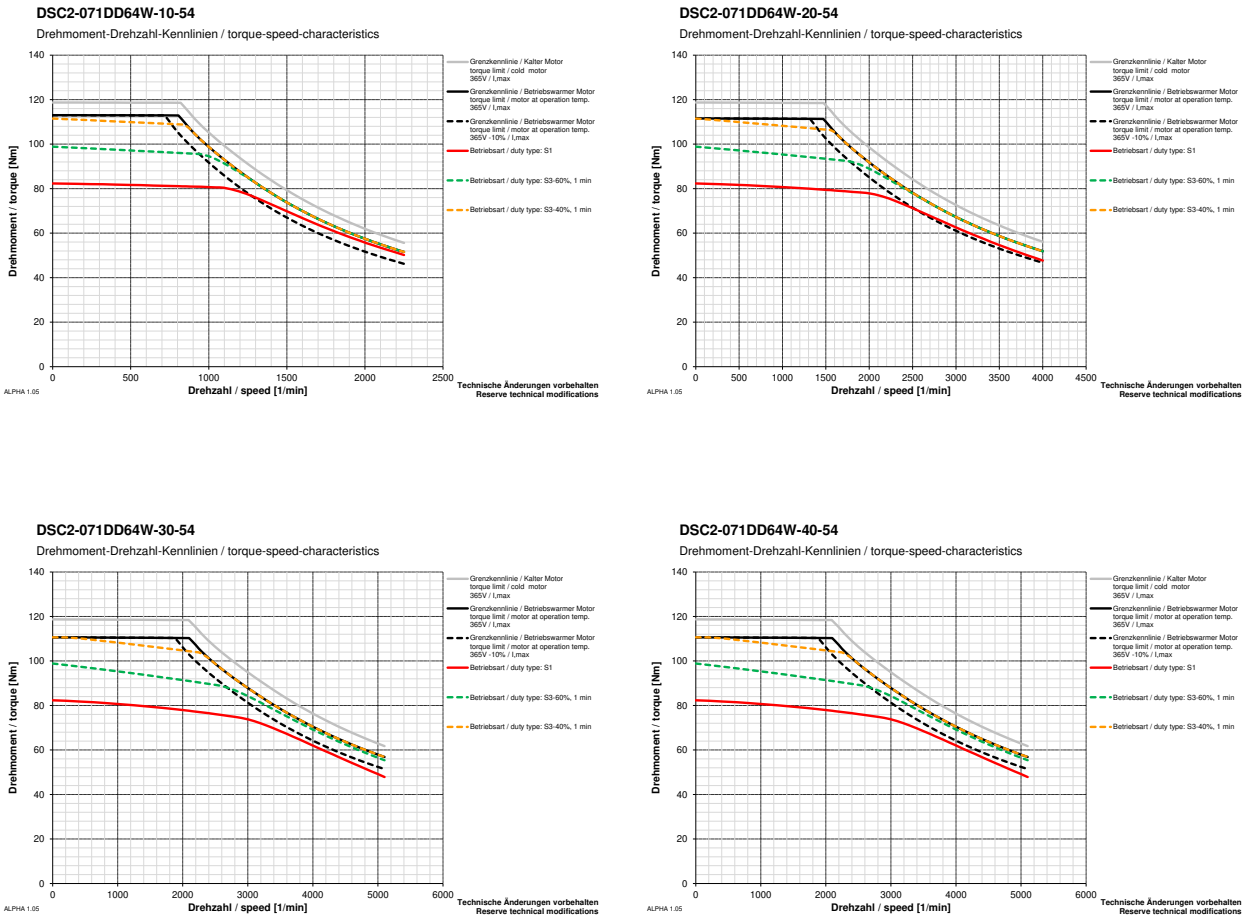
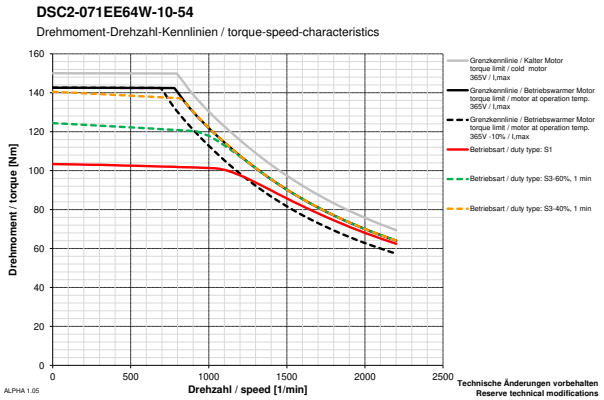
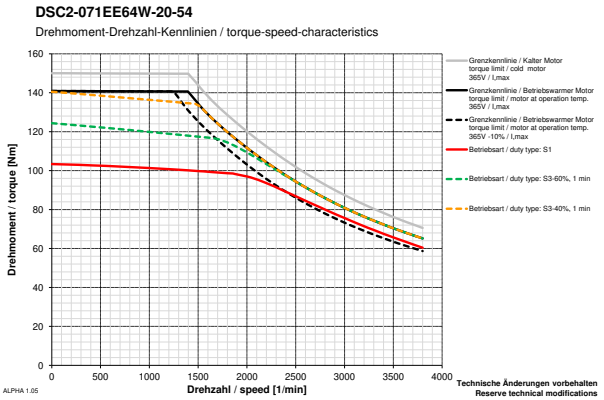


Figure 70: Motor characteristic curves DSC2-071DD .. W .. water-cooled





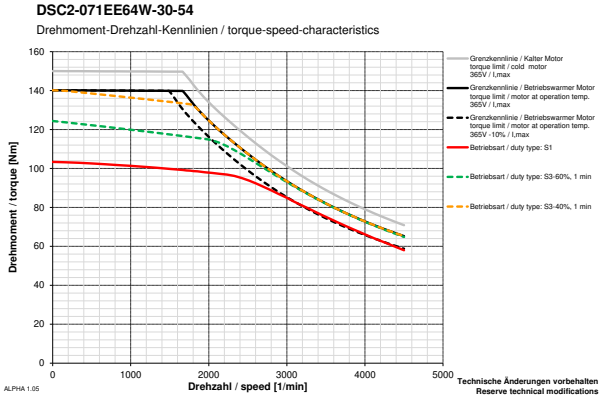
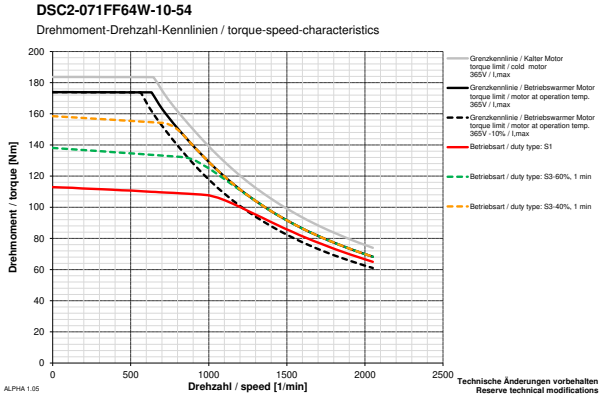


Figure 71: Motor characteristic curves DSC2-071EE .. W .. water-cooled



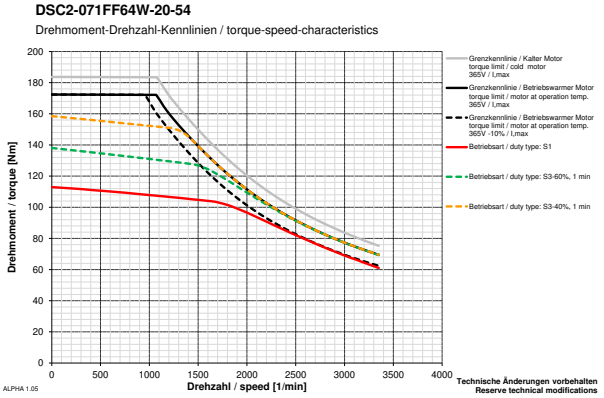


Figure 72: Motor characteristic curves DSC2-071FF .. W .. water-cooled

B

APPENDIX B - DECLARATION OF CONFORMITY

CE

BAUMÜLLER

EU-Konformitätserklärung
gemäß

- **Richtlinie 2014/35/EU (Niederspannungsrichtlinie)**

  Richtlinie 2014/30/EU (EMV-Richtlinie)

  Richtlinie 2011/65/EU (RoHS-Richtlinie)

Hersteller

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Hiermit erklären wir, dass die nachfolgend genannten Produkte aufgrund ihrer Konzeption, Konstruktion und Bauart in der von uns in Verkehr gebrachten Ausführung den Anforderungen der oben genannten Richtlinien einschließlich der zum Zeitpunkt der Erklärung geltenden Änderungen entsprechen.

Hinweise:

1. Bei Umbau oder Änderungen am Produkt verliert diese Erklärung mit sofortiger Wirkung ihre Gültigkeit.

2. Diese Erklärung bescheinigt die Übereinstimmung mit der genannten Richtlinie, stellt aber keine Zusicherung von darüber hinaus gehenden Produkteigenschaften dar.

3. Diese Konformitätserklärung wird unter der alleinigen Verantwortung des Herstellers ausgestellt.

Angewandte harmonisierte Normen:

- EN 60034-1:2010 + Cor.:2010
  Drehende elektrische Maschinen – Teil 1:
  Bemessung und Betriebsverhalten
- EN 60034-5:2001 + A1:2007
  Drehende elektrische Maschinen – Teil 5:
  Schutzarten aufgrund der Gesamtkonstruktion von drehenden elektrischen Maschinen (IP-Code) – Einteilung
- EN 60034-6:1993
  Drehende elektrische Maschinen – Teil 6:
  Einteilung der Kühlverfahren (IC-Code)

(Wird fortgesetzt auf der nächsten Seite ...)

EU-Declaration of Conformity
according

- **Directive 2014/35/EU (Low-voltage-directive)**

  Directive 2014/30/EU (EMC-directive)

  Directive 2011/65/EU (RoHS-directive)

Manufacturer

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Internet: www.baumueller.de

We declare, that the products referred to in the following conform in their concept, construction and design as lauched by us to the above mentioned directives and their respective changes which were valid at the point of declaration.

Notes:

1. By modifying or alternating the device(s) this declaration immediately becomes invalid.

2. This declaration confirms the compliance with the directive listed, but it is no covenant of any further product properties.

3. This declaration of conformity is issued under the sole responsibility of the manufacturer.

Applied harmonised standards:

- EN 60034-1:2010 + Cor.:2010
  Rotating electrical machines – Part 1:
  Rating and performance
- EN 60034-5:2001 + A1:2007
  Rotating electrical machines – Part 5:
  Degree of protection provided by the integral design of rotating electrical machines (IP-Code) – Classification
- EN 60034-6:1993
  Rotating electrical machines – Part 6:
  Methods of cooling (IC-Code)

(To be continued on the next page ...)

(... Fortsetzung von der vorherigen Seite)

- EN 60034-9:2005 + A1:2007
  Drehende elektrische Maschinen – Teil 9:
  Geräuschgrenzwerte
- EN IEC 60034-14:2018
  Drehende elektrische Maschinen – Teil 14:
  Mechanische Schwingungen von bestimmten Maschinen mit einer Achshöhe von 56 mm und höher – Messung, Bewertung und Grenzwerte der Schwingstärke
- EN 61800-5-1:2007 + A1:2017
  Elektrische Leistungsantriebssysteme mit einstellbarer Drehzahl – Teil 5-1:
  Anforderungen an die Sicherheit – Elektrische, thermische und energetische Anforderungen
- EN 60204-1:2018
  Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen - Teil 1:
  Allgemeine Anforderungen

(... continued from the previous page)

- EN 60034-9:2005 + A1:2007
  Rotating electrical machines – Part 9:
  Noise limits
- EN IEC 60034-14:2018
  Rotating electrical machines – Part 14:
  Mechanical vibration of certain machines with shaft heights 56 mm and higher – Measurement, evaluation and limits of vibration severity
- EN 61800-5-1:2007 + A1:2017
  Adjustable speed electrical power drive systems – Part 5-1:
  Safety requirements – Electrical, thermal and energy
- EN 60204-1:2018
  Safety of machinery - Electrical equipment of machines - Part 1:
  General requirements

Markenname: Baumüller
Produktbezeichnung: Drehstrommotor

Brand Name: Baumüller
Product Name: AC motor

Produkt / Product (x): optionaler Buchstabe / optional character (x, y): alternative Buchstaben oder Zahlen / alternative characters	**Jahr der erstmaligen CE-Kennzeichnung / Year of first CE marking**
DSC2-071XXXXX-XX-XX-XXX-XXX-X-XX-X-XXX	**2022**

Nürnberg, 03.05.2022

i.V. Michael Veeh

Entwicklungsleiter Motoren
Manager R&D Motors

Dr.-Ing. Michael Wengler

Geschäftsführer
Director

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Revision survey

Version	Status	Changing
5.22013.02	19.01.2026	First release, Instruction handbook and Technical documentation from shared files

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All data/information in this documentation are non-binding customer information, subject to constant further development and are constantly updated by our permanent modification service. Warranty and liability claims against the company Baumüller Nürnberg GmbH are excluded if in particular one or more of the following causes have caused the damage:

- You disregarded instructions in this documentation.
- The system wasn't used for the intended use.
- The system
  - was incorrectly mounted, connected, put into operation, operated as well as not maintained,
  - was mounted, connected, put into operation, and operated and / or maintained by unqualified personnel,
  - is overloaded,
  - is operated with
    - defective safety equipment,
    - not properly fixed or without safety equipment,
    - not functioning safety and protective equipment,
  - is not operated within the specified environmental conditions.

- You modified the system without having a written approval of the company Baumüller Nuremberg.
- You disregarded the instructions referring to the maintenance in the component descriptions.
- You monitored the parts, which are subject to wear, inadequately.
- You performed a repair incorrectly.
- You combined the system incorrectly with products of other manufacturers.
- You combined the drive system with faulty and / or incorrect documented products of other manufacturers.

The latest version of the "Terms and Conditions of Sale and Delivery" of the company Baumüller Nürnberg GmbH applies.

These were provided at the latest upon conclusion of contract.

HOUSE OF AUTOMATION



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