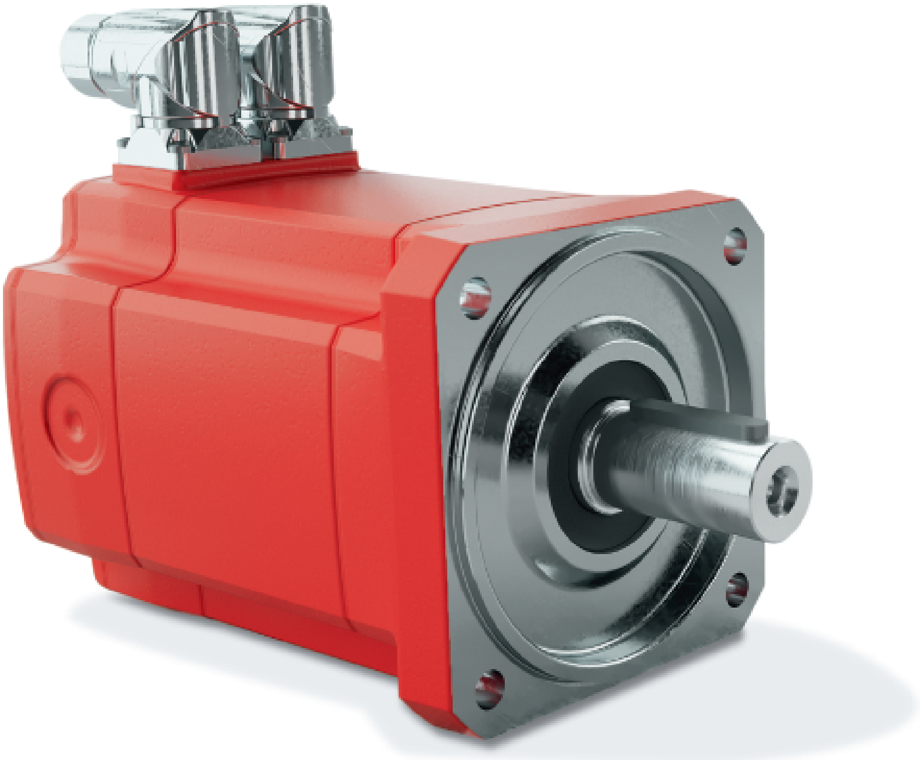
CM3C63 – CM3C100
Synchronous Servomotors
Medium Inertia Line

29194652/EN

Edition 07/2020

CM3C63 – CM3C100 Synchronous Servomotors

Medium Inertia Line



Who are we?
The reliable partner at your side!

For almost 90 years, the owner-operated family business SEW-EURODRIVE has stood for a diverse range of values, including everything from a personal, partnership-based approach, solutions and services to responsibility, quality, tradition, innovation and a whole lot more besides.

As a market leader in drive and automation technology, we don't just power countless applications in virtually every industry. With over 17 000 employees, we're also playing a key role in shaping the future of drive technology, for you. Ensuring you, your systems and machines are always at the cutting edge. Not just now, but in the future as well. We want you to achieve success with us.

52 Countries

17 Production plants

81 Drive Technology Centers

Over **18 000** employees

Global service

Countless industries

Where can you find us?
Always near you!

Our 17 production plants and 81 Drive Technology Centers in 52 countries mean we are at your service on every continent and in every corner of the world, always working with you as an equal partner and ensuring everything runs smoothly.

What makes us truly stand out from other manufacturers? With our broad customer support and service network worldwide, you never have to wait long for spare parts, repairs or professional advice.

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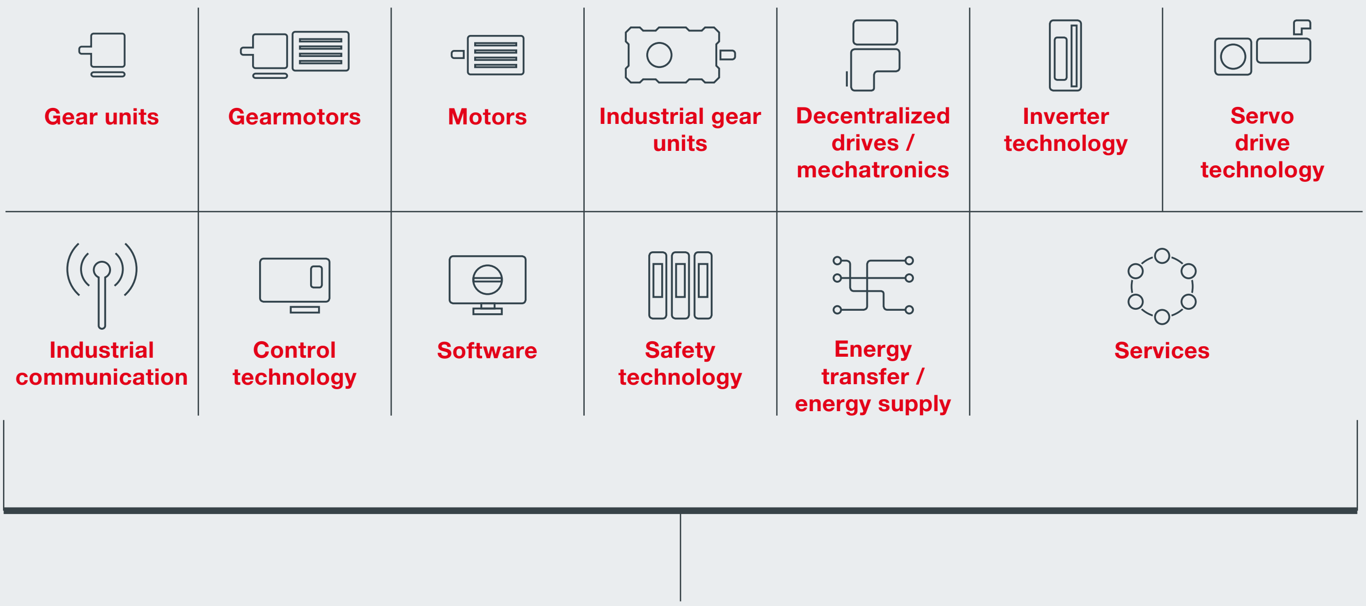
What do we offer?

State-of-the-art drive technology and automation solutions from a single source!

Looking to update your processes or need a new system? We offer you one of the widest ranges of drive technology products, solutions and services on the market. One contact person for everything – sounds good, doesn't it?

The SEW-EURODRIVE modular system



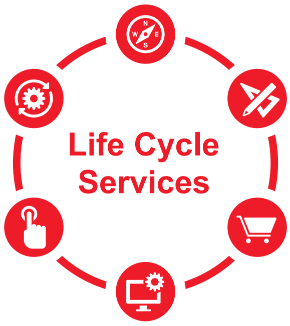
Complete drive solutions for factory and machine automation

From the very outset, our customers have been able to rely on our high quality, committed advice and support and fast delivery times. We offer a portfolio of modular solutions that are comprehensive and unique and meet every possible need:

- Perfect combination options and solutions for every application
- Energy efficiency that can be extended to IE4
- Quick and easy selection process and project planning
- Comprehensive portfolio – from drives and motors for continuous operation to high-precision servo drives
- Special designs in stainless steel, with explosion protection, or for electrified monorail systems
- Ideal solutions for every application
- Complete automation solutions for your machine or factory and many other areas

However big or small your project and however strict or complex your requirements, we rise to the challenge, working with you to develop the perfect solution for you – including an all-round service package throughout your entire system life cycle on request.

Right now, predictive maintenance is one of the top service trends. Early diagnosis and end-to-end condition monitoring have been an essential part of our offering for many years. The only thing that counts is your satisfaction and driving forward your processes – from planning and the operation phase all the way to modernization. Where necessary, we also take care of drives from other manufacturers.



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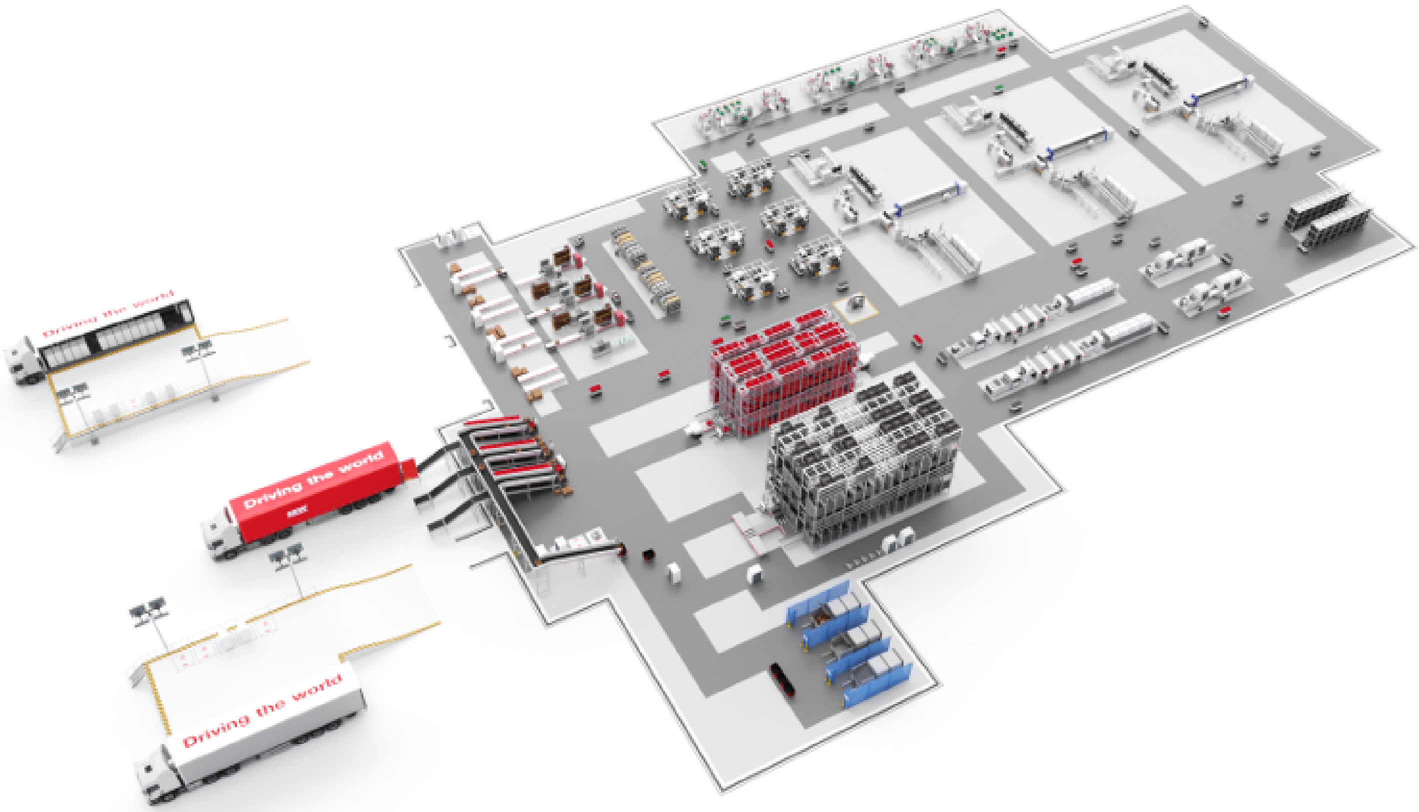
What are the goals we want to reach with you?
We want to take you to the top!

Nothing excites us more than the future of production. We're already using Industry 4.0 principles to transform our manufacturing operations. As far as we're concerned, Industry 4.0 ceased to be a distant vision long ago – it is already a successful reality thanks to our smart factory. As a result, we've become one of the world's pioneers in this field.

Yet we don't just focus on increasing our performance to ever greater levels. We also pass on to you the expertise, experience and technical solutions we have gathered in implementing Industry 4.0 in our production halls. Why not find out more?


Driving the world
Driving the world
Driving the world


SEW
EURODRIVE

Why should you choose SEW-EURODRIVE?

Because these ten reasons speak for themselves:

You're more flexible

However much the requirements for your processes and production systems increase, we're there for you every step of the way. With rapid conversions, short delivery times, enhanced capacity and faster format changeovers, we're at your side – from evaluating your needs and implementing an appropriate solution all the way to Life Cycle Services.

You're more satisfied

Our name stands for the best quality. But we don't rest on our laurels. Quite the contrary, in fact. To ensure we meet all standards – both ours and yours – we undergo annual testing, including certification processes. That's because only one thing matters to us – the satisfaction and trust of our customers.

You know more

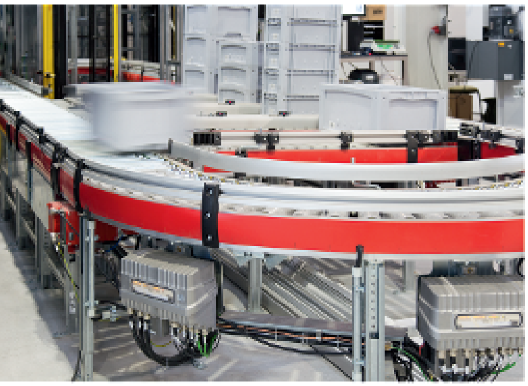
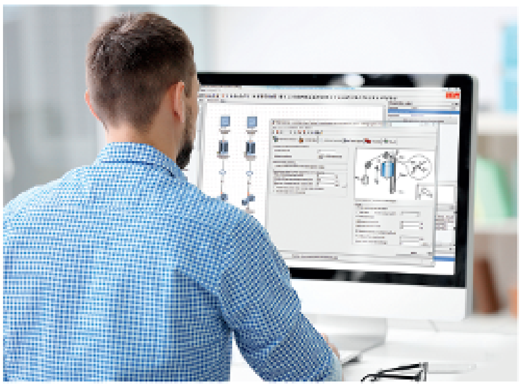
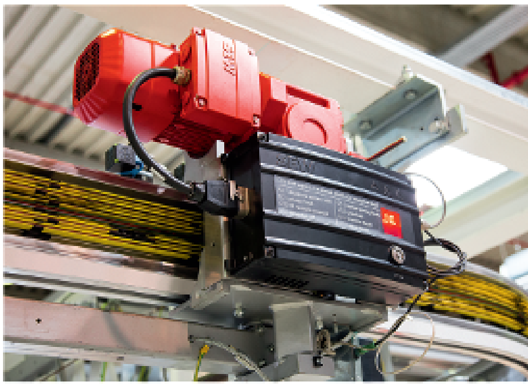
We're happy to share with you the industry and application expertise we have gained over decades and extending far beyond drive technology areas. We work with you to plan and put into practice your tailored solutions in a process where you constantly evolve in tandem with us.

You're more future-proof

We take responsibility for our employees, customers and business partners but also the environment in which we live and work. As a family business, we think in generations and always look beyond today and tomorrow. With us, you too can drive the future.

You're more successful

Like you, we cannot afford to stand still. We provide continuous training for our employees and customers. We constantly expand our horizons and enhance our products, solutions and services, and thus your processes. You can only continue to be successful in the future with optimized workflows.

You're more energy-efficient

We go out of our way to find new approaches and make our drives more efficient while always staying well ahead of international regulations. And, if you wish, we work with you to plan your systems and machines so that you can make the best possible use of energy recovery.

You're more innovative

What's the point of innovations if they remain out of your reach? We listen to you, which makes us fully aware of your future challenges, and we respond accordingly. With our approximately 600 developers, we drive forward innovative technologies and help bring your processes up to date.

You're more cost-efficient

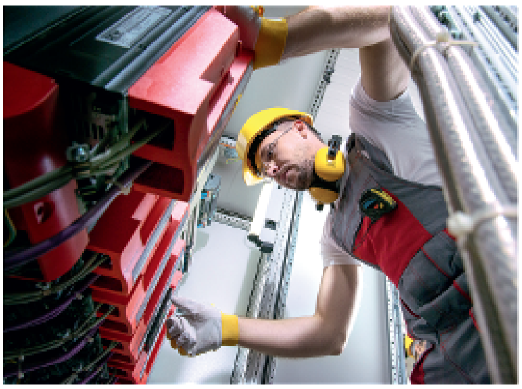
With us, you cut your overall operating costs. After all, it isn't just a matter of procurement expenses. Your TCO is significantly determined by the subsequent utilization and service life of your drive technology. We provide you with comprehensive advice on how to reduce your costs through sustainable operations.

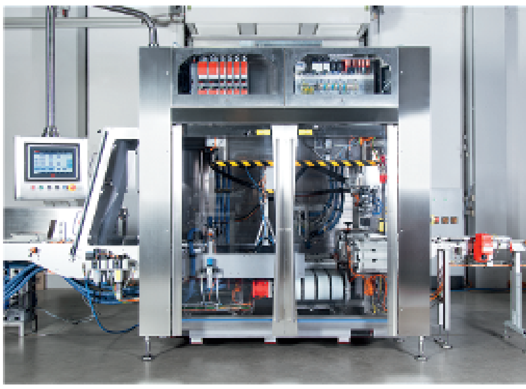
You're nearby

Wherever in the world your system is running, our comprehensive service network and experts mean we're always ready to provide advice and practical assistance when you need it. All-in-one, on-site service that knows no bounds and significantly reduces or even eliminates downtimes.

You're faster

Throughout the world, our service staff ensure spare parts get to you fast, and faulty drives – including third-party products – are collected and repaired quickly. Software tools make engineering and startup easier for you. Services covering your entire system life cycle help make you faster and more efficient.





SEW EURODRIVE

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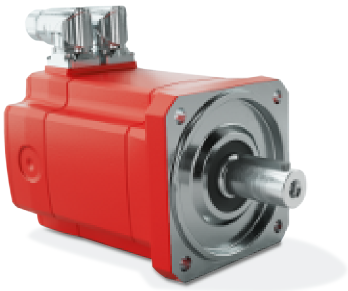
1 Products, solutions and services by SEW-EURODRIVE

Our products stand for variety, quality, reliability, and innovative strength. These characteristics are at the heart of our entire product portfolio. As one of the leading producers for drive and automation technology worldwide, we offer them to you. Take us at our word, and choose the perfect drive solution from our modular system.

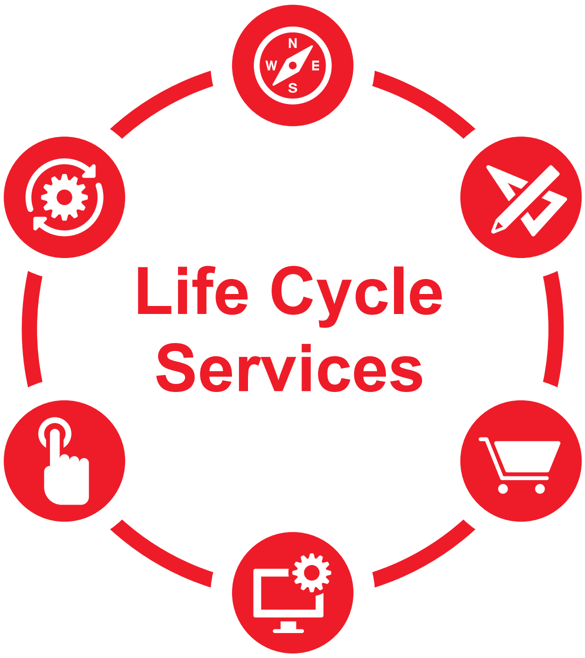


CM3C servomotor series (medium inertia)

The CM3C servomotors seamlessly integrate into the product range of SEW-EURODRIVE and offer the overall security of a globally active market leader for drive and automation technology.

Our services for your success

Another module in our portfolio are the comprehensive Life Cycle Services by SEW-EURODRIVE. These services enable us to offer tailor-made solutions from a single source and thus meet your specific requirements throughout the entire life cycle.



Everything from a single source

You are provided with services that are closely linked to our portfolio of products and solutions – all from a single source.

Procurement and delivery

We offer "extra" process efficiency and consulting in the procurement process. For example, electronic data exchange and barcode labels on the products.

Installation and startup

You can ensure the functionality of your system with a certified installation, optimization and startup. Doing this, you have the support of our service experts and engineers who will provide you with installation consulting, application programming and startup.

Safety

You receive quick and reliable assistance to guarantee the safety of your production process. With a worldwide service network that is available 24/7.

Planning and engineering

We will provide you with optimum planning – even before you place an order. You will be supported by technical experts who have an in-depth understanding of your industry and applications.

Utilization phase

We support you during production, so that your system availability and productivity are constantly improved.

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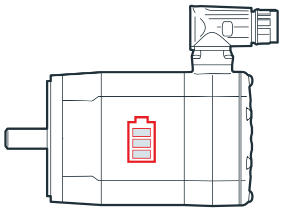
2 The new CM3C.. synchronous servomotor

2.1 Product features

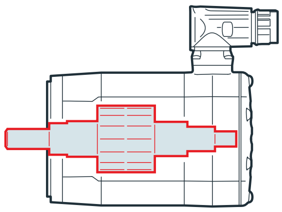
2.1.1 Efficiency



The new CM3C.. servomotors are characterized by a maximum energy efficiency and an outstanding overall efficiency in comparison to conventional asynchronous technology.

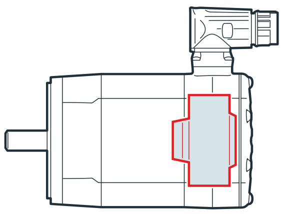
By including the latest winding and magnet technology combined with the use high-performance materials, the products reach efficiency levels that partially even surpass the requirements of efficiency class IE5 significantly.

2.1.2 Rotor inertia



The design of the CM3M.. servomotors has an increased inertia. This makes these motors the perfect solution for applications that require more control, positioning accuracy and synchronism due to their high external loads.

2.1.3 Brake systems

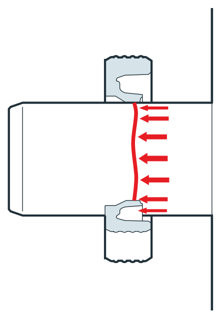


Always the optimal brake system. Different applications pose different challenges to the respective brake system. In order to provide the optimal solution for each situation, the CM3C.. modular motor concept allows for using two different braking systems as an option.

The backlash-free BK.. permanent magnet holding brake especially proves it's strengths in the fields of handling technology and robotics due to its power density, relatively low weight, and almost infinite number of switching cycles.

On the other hand the BZ.. spring-loaded holding brake with increased working capacity and optional manual brake release allows for a safe deceleration in case of an emergency stop, even with high external loads. These brakes are therefore especially suitable for hoist applications.

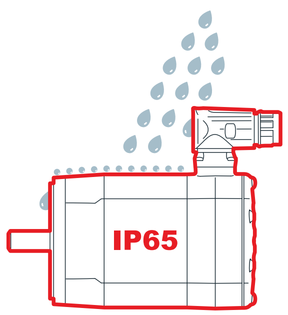
2.1.4 Sealing systems



The service life of the oil seal is crucial for the durability of the servo gearmotor. For this reason the exclusive Premium Sine Seal is used with CM3C.. servo gearmotors as standard.

The sinusoidal shape of the sealing lip increases the contact surface between sealing lip and shaft surface. Due to the reduced pretension, wear is reduced and the service life is doubled in comparison to conventional oil seals.

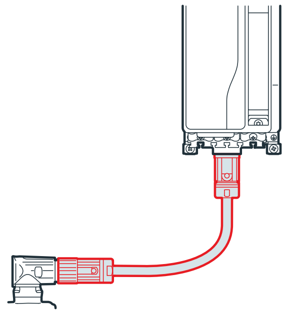
2.1.5 Hygiene-friendly design



As standard, the CM3C.. servomotors have the high IP65 degree of equipment protection and also feature a hygiene-friendly design.

This protects the motor from entering dust and water jets, as well as prevents dirt accumulation effectively. In addition, the optional degree of protection IP66 is also available for the motors. This allows for operating the motors even when they are subject to strong water jets.

2.1.6 Digital motor integration

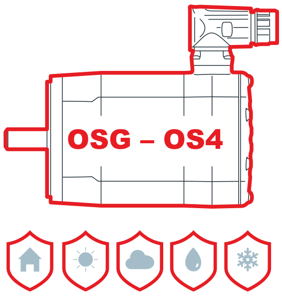


With the digital motor integration the motor itself becomes part of the network via the fully digital MOVILINK® DDI interface. During operation, the motor provides any motor data, such as encoder data, temperature data, startup data, and data of other sensors to the inverter and the connected networks at any time. You can use the provided information to perform an automatic startup, as well as record detailed operating data and create maintenance forecasts.

As the type designations, serial numbers and logistics data associated with motors are identified and supplied automatically, an inventory of all the drives in a plant can be created automatically at the touch of a button. Repairs, replacements and enhancements can be tracked and traced at any time. The use of a hybrid cable that is standardized for all motor families facilitates the intelligent, digital connection between motor and application inverter.

2.1.7 Surface and corrosion protection

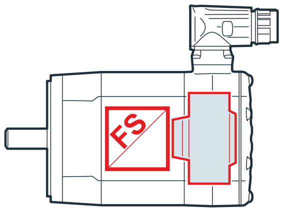
To ensure that the drive is optimally protected from environmental influences affecting it externally, SEW-EURODRIVE offers a multi-stage surface protection concept (OSG – OS4) that is tailored to your requirements.



Whether your system is operated inside a building and is protected from weather conditions, or your application is operated outdoors and directly affected by the elements, your drive will always be protected.

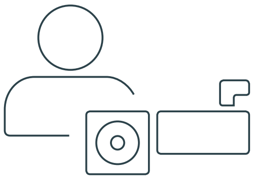
2.1.8 Functional safety (FS, in preparation)

To easily realize protection against personal injury in your system you can also request the motors from the CM3C.. series with safety brake and safety encoder.



In this case the functionally safe options can be used individually or in combination and therefore contribute to a safe plant concept.

2.2 Benefits of the modular concept

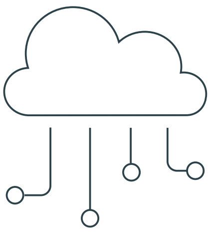


SEW-EURODRIVE – your contact for servo technology

In contrast to many other manufacturers of servomotors on the market, we at SEW-EURODRIVE understand ourselves to be a supplier of complete solutions for the entire drive train. This includes everything from the motor to the gear unit, to cables, the servo inverter, and the controller.

This is an advantage for the customer, as for example, the product properties of motor and gear unit can be optimally coordinated and their interactions can be taken into consideration during configuration/project planning.

- Almost 90 years of experience in the field of drive technology
- We provide solutions for the entire world of drive technology
- A global network with more than 18 000 employees worldwide



Ready for the future with Industry 4.0

As delivery times get shorter and shorter, and the modular system offers a high variance, new and flexible concepts are required for production and assembly.

Intelligent procedures and processes are being coordinated so that we can achieve a standard delivery time of 5 days. The focused implementation of lean principles and Industry 4.0 approaches paves the way for perfectly networked, modular and highly efficient production – even in a batch size of one.

SEW-EURODRIVE has a significant procurement volume of steel, seals, bearings, and other materials, this makes us an important customer in many industries. Reliable delivery is an important factor for selecting suppliers.

High production capacities in all plants, as well as a high global turnover of materials, allow for brief production and assembly times, even when the demand on the markets is high.

- Short delivery times
- High availability and quick replacement
- Consistently high quality standards for series and individual products

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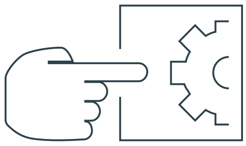
Leading innovator for details – long service life

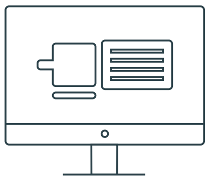


Due to industrial partnerships with large manufacturers/suppliers we can obtain a high level of innovation during development and realization of new products.

Therefore, components and parts can be used for the CM3C.. servomotors that were especially developed in collaboration with our industrial partners to be used in servomotors or servo gearmotors. This ensures that the promised service life of the individual components is safely met.

- Availability of the latest technologies
- Use of exclusive machine elements (bearings, sealing systems, lubricants, etc.)
- Continuously long product service life

Technical product excellence – compactness

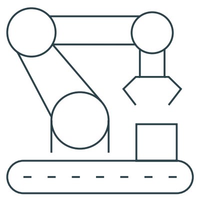


Many new possibilities of simulation and calculation support the development and construction process from the very beginning. This is the basis for a continuously high level of transparency throughout the individual development steps.

The result is a compact design that, combined with the latest production processes, allows for high torques with very small installation spaces.

- High power density over a long service life
- Constant operating behavior throughout the life cycle

Versatile and flexible



CM3C.. servomotors have numerous options throughout all sizes. These options can be selected in virtually any combination.

The various encoder systems, types of cooling, connection variants, output designs and brake versions, as well as the extensive modular gear motor system, provide numerous means to tailor the products optimally to how you use them.

- Scalable modular gearmotor design
- Larger diversity of options help find a solution quickly

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2.3 Drive designs and options

Synchronous servomotors

Designation	
CM3C..	CM3C.. series (medium inertia)
63, 71, 80, 100	Sizes
S, M, L	Lengths
-20, -30, -45, -60	Speed classes: -20 = 2000 min^{-1} -30 = 3000 min^{-1} -45 = 4500 min^{-1} -60 = 6000 min^{-1}
A	System voltage: A = 400 V
-N, -K, -P, -E	Shaft design: -N = Shaft without key -K = Shaft with key -P = Shaft with pinion shaft end -E = Shaft with push-in pinion

Mechanical attachments

Designation	Option
/BK	Permanent magnet holding brake
/BZ[1], /BZD[1, 2]	Spring-loaded holding brake with increased working capacity
/HR[3]	Manual brake release, re-engaging

1 Also available in design for functional safety (in preparation).
2 For a direct DC voltage supply.
3 Available only for /BZ and /BZD.

Temperature sensor/temperature detection

Designation	Option
/PK	PT1000 temperature sensor

Encoder

Designation	Option
/RH1M	Single-turn encoder, medium class, resolver (standard)
/AK0H[1]	Multi-turn encoder, high class, HIPERFACE®
/EZ2Z	Single-turn encoder, medium class, MOVILINK® DDI
/AZ2Z	Multi-turn encoder, medium class, MOVILINK® DDI
/EZ4Z[1, 2]	Single-turn encoder, high class, MOVILINK® DDI
/AZ4Z[1, 2]	Multi-turn encoder, high class, MOVILINK® DDI

1 Also available in design for functional safety (in preparation).
2 In preparation.

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Connection variants

Designation	Option
/SM1	M23 motor plug connector, socket on motor side only, pluggable motor and encoder cables
/SMB	M40 motor plug connector, socket on motor side only, pluggable motor and encoder cables
/SB1	M23 brakemotor plug connector, socket on motor side only, pluggable motor and encoder cables
/SBB	M40 brakemotor plug connector, socket on motor side only, pluggable motor and encoder cables (standard)
/SD1	M23 hybrid plug connector motor/brakemotor (power and data) for MOVILINK® DDI, socket on motor side
/SDB	M40 hybrid plug connector motor/brakemotor (power and data) for MOVILINK® DDI, socket on motor side
/KK	Terminal box for CM3C63 – 100, pluggable motor and encoder cable

Ventilation

Designation	Option
/VR	Forced cooling fan[1]

1 In preparation.

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2.4 Type designation

The structure of the type designation of the CM3C.. servomotors is shown in the following section.

CM3C71S-20A-P/BZ/DI/PK/AZ2Z/SD1

CM3C71S-20A-P/BZ/DI/PK/AZ2Z/SD1	Series	• CM3C.. servomotor (medium inertia)
CM3C**71**S-20A-P/BZ/DI/PK/AZ2Z/SD1	Size	• 71 = Size 71
CM3C71**S**-20A-P/BZ/DI/PK/AZ2Z/SD1	Length	• S = Small
CM3C71S-**20**A-P/BZ/DI/PK/AZ2Z/SD1	Speed class	• 20 = 2000 min^{-1}
CM3C71S-20**A**-P/BZ/DI/PK/AZ2Z/SD1	System voltage	• A = 400 V
CM3C71S-20A-**P**/BZ/DI/PK/AZ2Z/SD1	Shaft design	• P = Shaft with pinion shaft end
CM3C71S-20A-P/**BZ**/DI/PK/AZ2Z/SD1	Brake design	• BZ = Spring-loaded holding brake with increased working capacity
CM3C71S-20A-P/BZ/**DI**/PK/AZ2Z/SD1	MOVILINK® interface	• DI = Digital motor integration with MOVILINK® DDI interface
CM3C71S-20A-P/BZ/DI/**PK**/AZ2Z/SD1	Temperature detection	• PK = PT1000 temperature sensor
CM3C71S-20A-P/BZ/DI/PK/**AZ2Z**/SD1	Encoder	• AZ2Z = Multi-turn encoder, MOVILINK® DDI
CM3C71S-20A-P/BZ/DI/PK/AZ2Z/**SD1**	Connection variant	• SD1 = Motor plug connector, M23, Socket on the motor side only, hybrid plug connector for motor, brake, and communication MOVILINK® DDI

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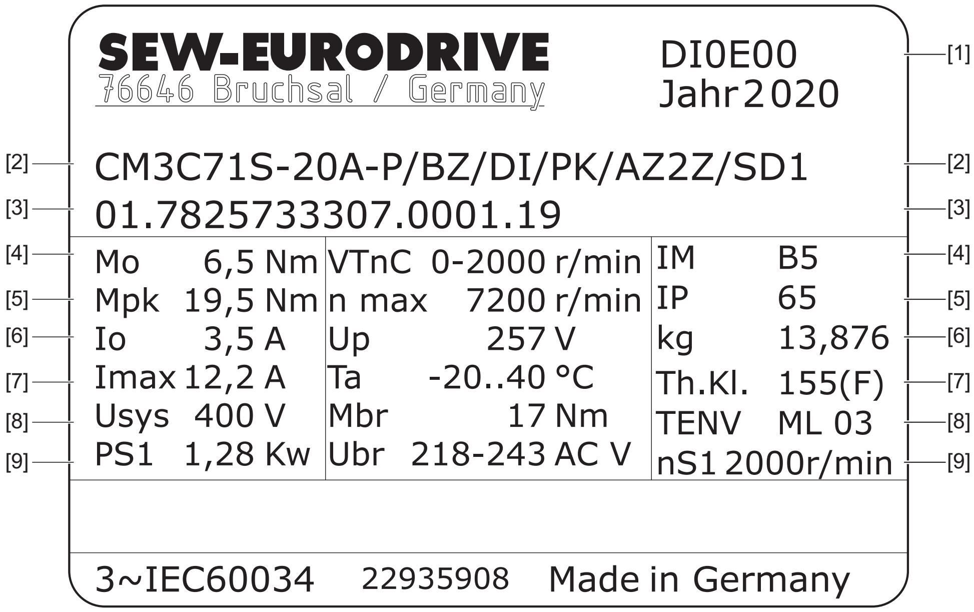
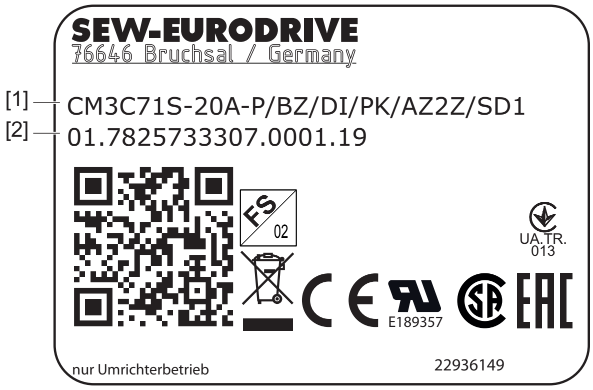
2.5 Nameplate on the motor

The following figure shows the 1st nameplate of a CM3C.. motor:



Line	Specifications (from left to right)
[1]	• MOVILINK® DDI code
[2]	• Type designation
[3]	• Serial number
[4]	• Standstill torque • Variable torque • Speed class • Mounting position
[5]	• Dynamic limit torque of the servomotor • Maximum permitted speed • Degree of protection according to IEC 60034-5
[6]	• Standstill current • Voltage at the open terminals of the motor at rated speed • Mass
[7]	• Maximum permitted current • Ambient temperature • Thermal class
[8]	• System voltage, voltage of the supplying inverter • Nominal braking torque • TENV (Totally Enclosed Non-Ventilated) • Mounting Location (Plant code)
[9]	• Rated power continuous duty • Brake voltage • Rated speed continuous duty

The following figure shows the 2nd nameplate of a CM3C.. motor:



Line	Information
[1]	• Type designation
[2]	• Serial number

The following table lists all the markings that can be provided on a nameplate or attached to the motor, and an explanation of what they mean.

CE	CE mark to state compliance with European guidelines, such as the Low Voltage Directive.
FS 02	FS logo with 2-digit number for identification of installed functional safety motor options.
	UR logo to confirm that UL (Underwriters Laboratory) is informed about the registered components; register number by UL: E189357.
MC170602	CSA mark to confirm the market conformity of the Canadian Standard Association (CSA).
EAC	EAC mark (EurAsian Conformity) Confirms compliance with the technical regulations of the economic and customs union of Russia, Belarus, Kazakhstan, Armenia.
UA.TR. 013	UA.TR mark to confirm compliance with the technical regulations of the country Ukraine.
	Motors and accessories may fall within the scope of the country-specific application of the WEEE Directive. Dispose of the product and of it's accessories according to the national regulations of your country.
	Product label with QR code. The QR code can be scanned. You will be redirected to the digital services of SEW-EURODRIVE. There, you have access to product-specific data, documents and further services.

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2.6 Possible use and target applications

2.6.1 Storage/retrieval system

To achieve as high a cycle rate as possible, high dynamics together with high positioning accuracy are a basic prerequisite for storage and retrieval systems. Thanks to the high overload capacity in combination with a precise controllability, even with high external loads, CM3C motors are perfectly suited for this area of application. The optional BZ.. spring-loaded holding brake with increased working capacity allows for safe deceleration in case of an emergency stop.

CM3C.. characteristics

- Very fast accelerations even with high loads thanks to a high overload capacity.
- Optimal controllability even with high loads thanks to adapted rotor inertia.
- The optional spring-loaded holding brake with increase working capacity allows for safe stopping and deceleration in case even with high loads.

Your benefits

- High cycle rates due to shorts acceleration times allow for economic and highly efficient operation of the high-bay warehouse.
- Precision and repeat accuracy of the storing and retrieving processes allow for fault-free operation of the system.
- Safe Brake Hold and deceleration of the application in case of an emergency helps preventing damage to the machine.

2.6.2 Handling gantries

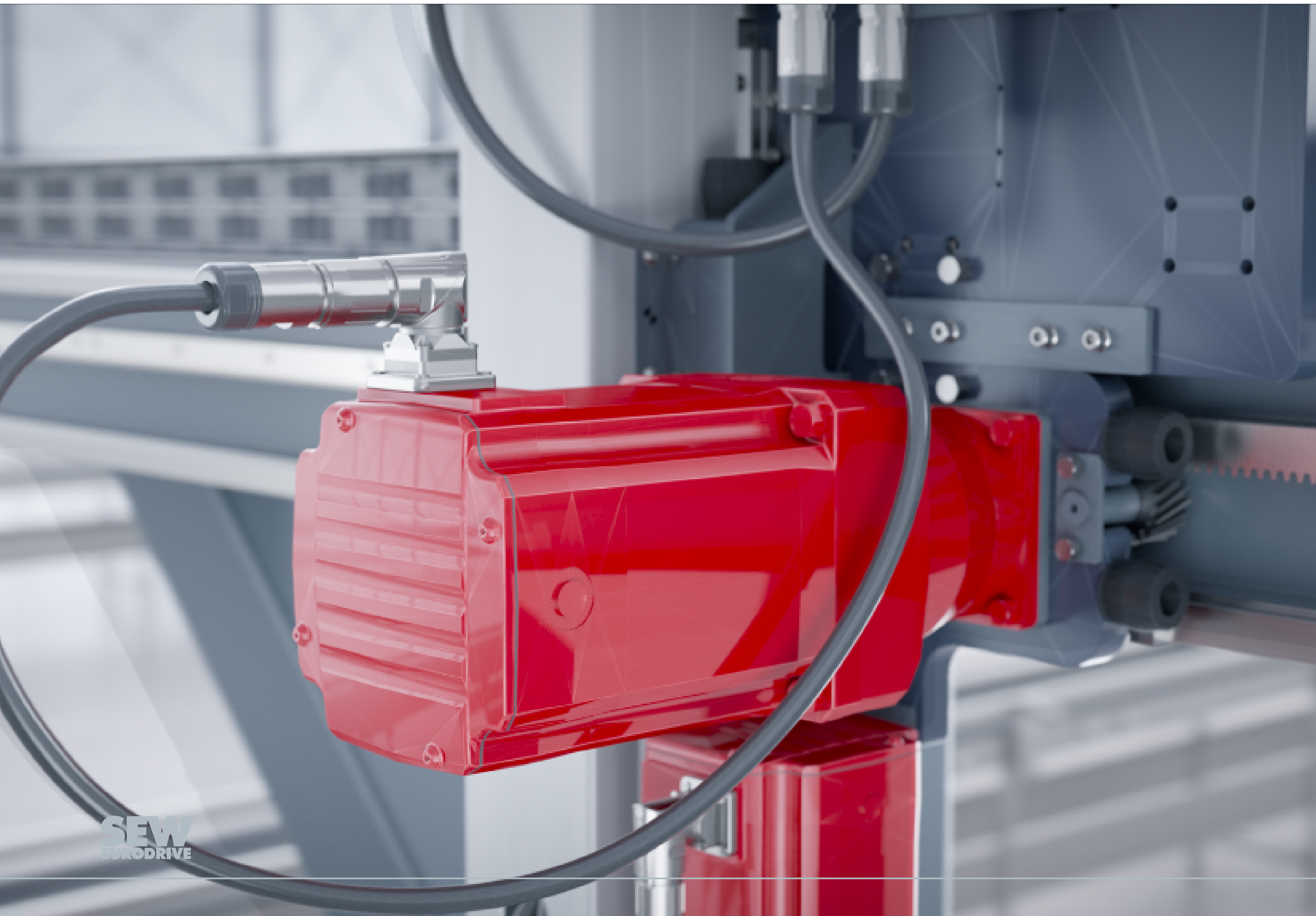
Gantry robots are being used whenever an application needs to transport workpieces from one machine tool to the next. This makes it possible to realize a high degree of freedom with several moving axes. The compact and powerful CM3C.. motors are the ideal solution.

CM3C.. characteristics

- The high torque density of the motors allows for compact machine structures.
- The fully digital MOVILINK® DDI data interface allows for use of the single cable technology even if the cables are longer than 100 m.
- Precise synchronization of the CM3C.. motors thanks to good controllability and high-precision encoder systems.

Your benefits

- Saves spaces, time and expenditures regarding wiring.
- Parallel use of several gantry arms allows for a high throughput and increased cost-efficiency of the system.
- Automated startup with auto tuning functions shortens installation times while reducing costs.



2.6.3 Materials handling technology/intralogistics

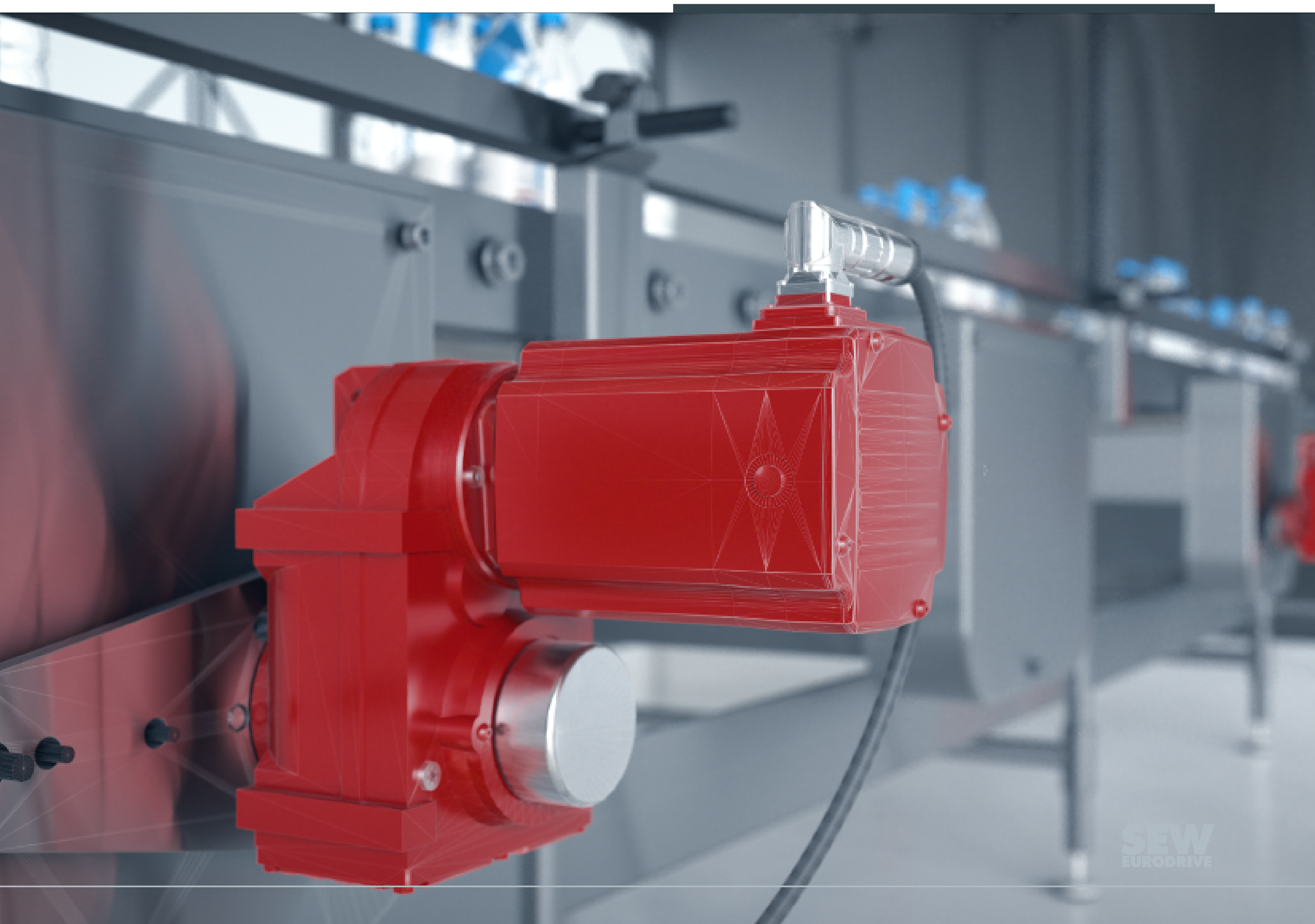
In applications of the materials handling technology and intralogistics, energy efficiency, reducing installation space and flexible system configuration are immensely important. The energy-efficient CM3C.. servomotors have high saving potentials and allow for cost-efficient solutions.

CM3C.. characteristics

- Maximum energy efficiency results in a significant energy saving.
- Compact design for efficient machine structures.
- The diverse range of options in the gear unit modular system allows for a high degree of flexibility in system configuration.
- Motors can be cleaned quick and simple thanks to the hygiene-friendly design.

Your benefits

- Due to the compact drive units installation is even possible when little space is available for installing.
- Best integration capability of the drives allow for a variable machine structure.
- Significantly reduced energy costs due to highly efficient drive technology.
- Simple and quick cleaning of the machine by preventing dirt build-up.



2.7 Standards and regulations

2.7.1 Standard conformity

Servo (brake)motors from SEW-EURODRIVE conform to the relevant standards and regulations, in particular to:

- IEC 60034-1, EN 60034-1

  Rotating electrical machinery, rating and performance.
- IEC 60034-5, EN 60034-5

  Rotating electrical machines, degrees of protection provided by integral design of rotating electrical machines (IP code).
- IEC 60034-9, EN 60034-9

  Rotating electrical machines, noise limits.
- IEC 60034-11, EN 60034-11

  Rotating electrical machines, thermal protection.
- IEC 60034-14, EN 60034-14

  Rotating electrical machines, vibration levels.
- EN 60529, IEC 60034-5, EN 60034-5

  IP degrees of protection for enclosures.
- IEC 60072

  Dimensions and output series for rotating electrical machines.
- EN 50347

  Standardized dimensions and power ranges.

In connection with terminal box:

- EN 62444:2013

  Cable glands for electrical installations (IEC 6244:2010, modified)

2.7.2 Conformity with directives

Servo (brake)motors from SEW-EURODRIVE conform to the relevant standards and regulations, in particular to:

- Low Voltage Directive 2014/35/EU
- Machinery Directive 2006/42/EC
- EMC Directive 2014/30/EU
- RoHS Directive 2011/65/EU
- CSA C22.2 no.100
- UL 1004-1
- UL 1004-6

2.8 Circuit breaker and protective equipment

2.8.1 Preventive measures

Synchronous servomotors must be protected against overload and short circuit.

Install the motors with sufficient space for air to cool them.

The surface temperature may be in excess of 100 °C during operation in accordance with thermal classification F. Therefore, measures to prevent inadvertent contact are essential.

The motors are equipped with temperature detection to protect the motor winding against overheating.

The temperature is measured by temperature sensors KTY 84 to 130 installed as standard, or, for sizes 71 to 112 by optionally available /TF temperature sensors. The correct model must be activated in the servo inverter to enable thermal motor protection (I^2t, effective current monitoring). For information on the procedure, refer to the documentation of the servo inverter.

2.8.2 EMC measures

SEW-EURODRIVE synchronous servomotors are intended as components for installation in machinery and systems. The designer of the machine or system is responsible for complying with EMC Directive 2004/108/EC.

Routing brake cables

The brake and power cables may only be routed together if either the brake cables or the power cables are shielded. SEW-EURODRIVE recommends the use of prefabricated cables (see chapter "Prefabricated cables for two-cable technology" (▸ 132)).

Notes on encoder connection

Observe the following notes when connecting an encoder:

- Use only a shielded cable with twisted pair conductors.
- Connect the shield to the PE potential on both ends over a large surface area.

Thermal motor protection

Laying together is only permitted if either the cable of the /PK temperature sensor (PT1000) or the power cable is shielded. SEW-EURODRIVE recommends the use of prefabricated cables. For prefabricated cables refer to chapter "Prefabricated cables for two-cable technology" (▸ 132).

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2.9 Operating conditions

2.9.1 Ambient temperature and installation altitude

According to IEC 60034 (EN 60034) the performance data of CM3M.. motors apply to the following ambient conditions:

- Ambient temperature -20 °C to +40 °C
- Installation altitude up to 1000 m above sea level

In case the specified limit values are exceeded the performance data of the motors must be reduced. For further information, refer to chapter "Derating for increased ambient temperature and installation altitude" (▸ 32).

In case of operation conditions as low as -40 °C the motors can be equipped with suitable accessories. In such cases, the temperature range of -40 °C to +10 °C is specified accordingly on the nameplate.

2.9.2 Derating for increased ambient temperature and installation altitude

In case the CM3C.. motors are operated within the ambient temperature range of +40 °C to +60 °C, or at an installation altitude between 1000 m and 4000 m, adjust the operating points.

The effective operating point for this installation altitude and increased ambient temperature is determined by factor f_{AU} in the following table, as well as by the correlation:

$$M_{AU,eff} = \frac{1}{\sqrt{f_{AU}}} \times M_{eff}$$

$$n_{AU,eff} = \frac{1}{K_e \times f_{AU}} \times n_{eff}$$

M_{eff}	=	Effective motor torque based on the load profile	$[M_{eff}]$ = Nm
$M_{AU,eff}$	=	Effective torque based on the load profile, installation altitude and/or increased ambient temperature taken into consideration	$[M_{AU,eff}]$ = Nm
n_{eff}	=	Mean thermal motor speed based on the load profile	$[n_{eff}]$ = min^{-1}
$n_{AU,eff}$	=	Effective speed based on the load profile, under consideration of installation altitude and/or increased ambient temperature	$[\eta_{AU}]$ = min^{-1}
f_{AU}	=	Derating factor for installation altitude and/or increased ambient temperature	$[f_{AU}]$ = 1
K_e	=	Encoder factor for resolvers = 1; for electronic encoders (e.g. HIPERFACE® encoders) = 0.9	$[K_e]$ = 1

f_{AU}	+40° C	+45° C	50 °C	55 °C	60 °C
1000 m	1	0.95	0.9	0.86	0.81
2000 m	0.9	0.86	0.81	0.77	0.73
3000 m	0.8	0.76	0.72	0.69	0.65
4000 m	0.7	0.67	0.63	0.6	0.57

Table 1: Derating factor f_{AU} depending on installation altitude and ambient temperature

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Example for a motor with the following framework conditions:

- Ambient temperature 50 °C
- Installation altitude 3000 m
- Resolver
- From the configuration or load profile: M_{eff} = 5 Nm and n_{eff} = 1500 min^{-1}

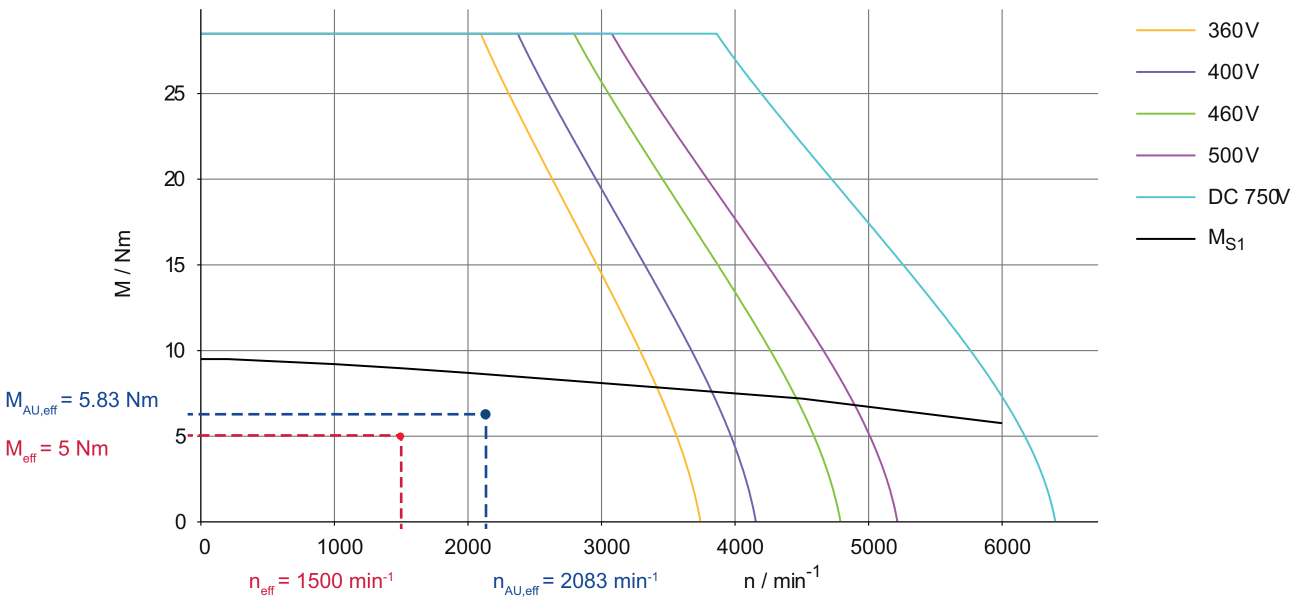
The previous table determines the derating factor: f_{AU} = 0.72.

The effective operating point under consideration of the installation altitude and ambient temperature is therefore:

$$M_{AU,eff} = \frac{1}{\sqrt{0.72}} \times 5Nm = 5.89Nm$$

$$n_{AU,eff} = \frac{1}{1 \times 0.72} \times 1500 min^{-1} = 2083 min^{-1}$$

If this point is below the MS1 characteristic of the motor, you can operate the motor continuously under the described conditions.



2.9.3 Other thermal influencing factors

Besides the ambient temperature and/or installation altitude the thermal capacity of the servomotor is also influenced by the mounting conditions. If the mounting conditions deviate from the specified rated flange information ("Information on the technical data – conditions" (▶ 162)), e.g. in case of thermally insulated mounting to the application, it might be necessary to reduce the motor's performance data. For further information, please contact SEW-EURODRIVE.

2.10 Technical features

Design	CM3C63 / CM3C71 / CM3C80 / CM3C100	
	Standard design	Optional
Number of poles	8	–
Motor protection	PK temperature sensor (PT1000)	–
Ambient temperature	-20 °C to +40 °C	-20 °C to +60 °C -40 °C to +10 °C
Cooling	Convection, radiation	Forced cooling fan[1]
Connection technology	Adjustable plug connector	Radial plug connector, terminal box
Painting	Machine paint in color "jet black" (RAL 9005)	Additional colors are available upon request
Shaft end (according to IEC 60072-1)	Smooth	With key, domed type A
Mounting position (according to IEC 600034-7)	IM B5 (IM V1, IM V3)	–
Degree of protection (according to IEC 600034-5)	IP65	IP66
Thermal class (according to IEC 600034-1)	155 (F)	–
Noise characteristics (according to IEC 60034-9)	Below specified value	–
Oscillating quantity stage (according to IEC 600034-14)	Stage A	–

1 In preparation.

2.11 Maximum motor speeds

The following mechanically permitted speeds apply to CM3C.. motors and brakemotors:

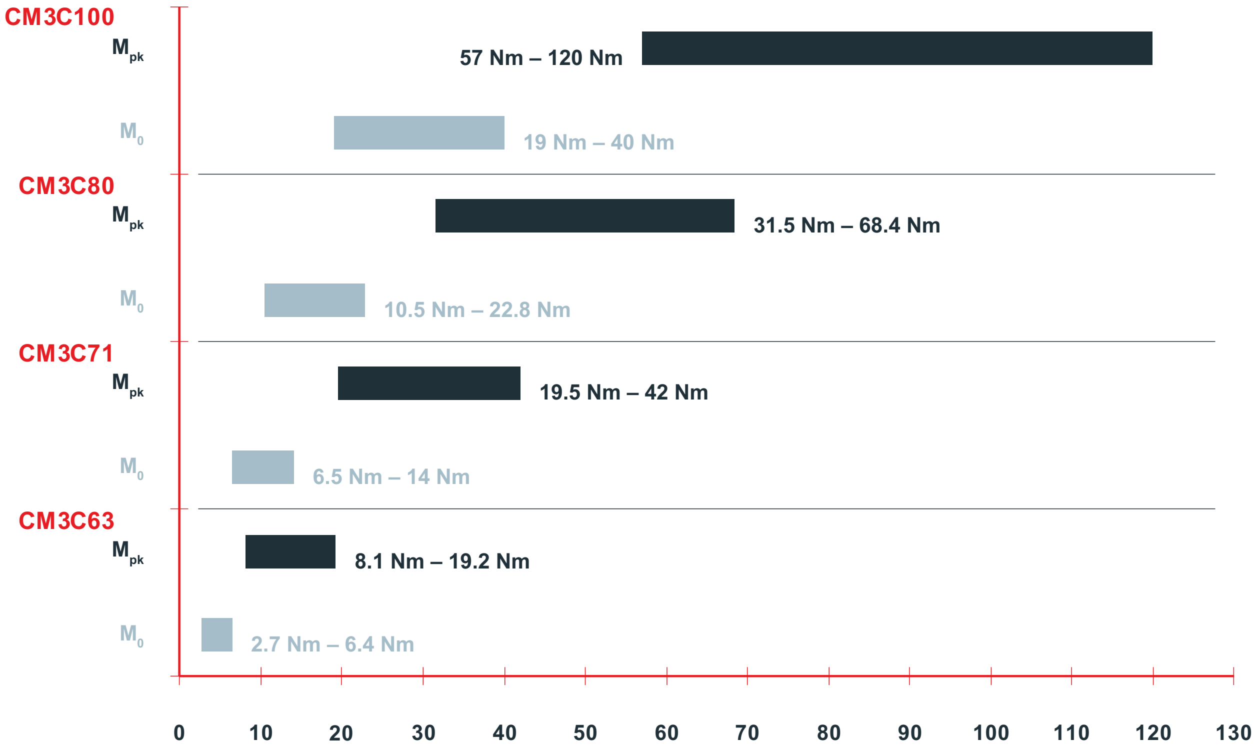
Motor	Maximum speed in min^{-1} without/with brake
CM3C63	7200
CM3C71	7200
CM3C80	7200
CM3C100	5400

3 Technical data of CM3C.. servomotors

For further information regarding the technical data and dimension sheets, refer to chapter "Appendix" (▶ 162).

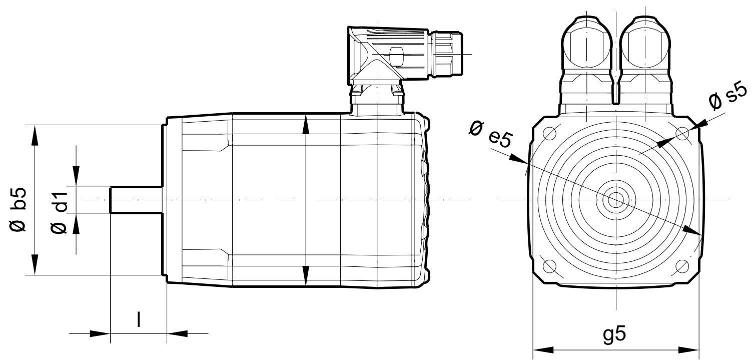
3.1 Overview of torques

The following illustration shows the possible speed ranges of the servomotors CM3C63 to CM3C100.

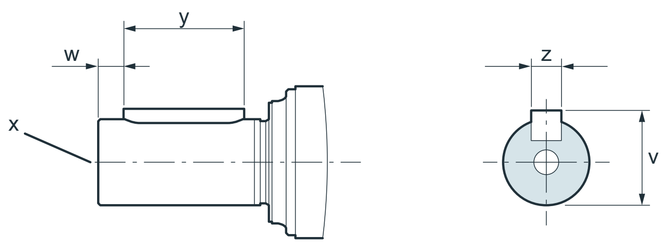


3.2 Overview of motor dimensions

The following illustration shows the dimensions of the output side of the standard CM3C.. motor. The design with keyway and key is optional.



Motor	d1 Shaft Ø mm	l Shaft length mm	b5 Centering Ø mm	e5 Hole circle Ø mm	s5 Bore Ø mm	g5 Flange square mm
CM3C63	14	30	80	100	6.5	88
CM3C71	24	50	110	130	9	116
CM3C80	28	60	130	165	11	138
CM3C100	32	60	155	190	11	163



Key motor	x Centering	y Key length mm	z Key width mm	v Shaft height mm	w Key distance mm
CM3C63	DIN332 DR M5	22	5	16	4
CM3C71	DIN332 DR M8	40	8	27	5
CM3C80	DIN332 DR M8	50	8	31	5
CM3C100	DIN332 DR M12	50	10	35	4

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3.3 CM3C63

3.3.1 Technical data

			CM3C63S			CM3C63M			CM3C63L		
Speed class	n_c	min^{-1}	3000	4500	6000	3000	4500	6000	3000	4500	6000
Standstill torque	M_0	Nm	2.7			4.9			6.4		
Standstill current	I_0	A	2.17	2.94	3.71	3.27	4.63	6.14	4.04	5.72	7.35
Dynamic limit torque	M_{pk}	Nm	8.1	8.1	8.1	14.7	14.7	14.7	19.2	19.2	19.2
Maximum motor current	I_{max}	A	7.16	9.69	12.2	10.7	15.1	20	12.6	17.8	22.9
Inductance (phase)	L_1	mH	16.1	8.76	5.49	11.1	5.53	3.15	7.3	3.64	2.2
Resistance (phase) at 20 °C	R_1	Ω	6.77	3.61	2.28	3.9	1.92	1.16	2.79	1.38	0.866
Internal voltage at 1000 min^{-1}	$U_{p0\ kalt}$	V	83.1	61.4	48.6	101	71.2	53.7	107	75.3	58.6
Mechanical data of motor											
Number of poles			8								
Maximum perm. radial load	F_{Ramax}	N	477	411	372	495	423	378	489	414	366
Maximum perm. axial load	F_{Aamax}	N	159	137	124	165	141	126	163	138	122
Mass of the motor	m_{mot}	kg	3.16			4.51			5.85		
Mass moment of inertia	J_{mot}	10^{-4} kgm²	1.3			2.5			3.6		

Mechanical data of the brakemotor

			CM3C63S				CM3C63M				CM3C63L			
Brake type			BZ05	BZ05 D	BK05	BK06	BZ05	BZ05 D	BK05	BK06	BZ05	BZ05 D	BK05	BK06
Mass moment of inertia of the brakemotor	J_{bmot}	10^{-4} kgm²	1.79	1.79	1.7	1.86	2.99	2.99	2.9	3.06	4.09	4.09	4	4.16
Mass of the brakemotor	m_{bmot}	kg	6.8	6.8	3.9	4.1	8.1	8.1	5.3	5.5	9.5	9.5	6.6	6.8

Technical data of the brake

			BZ05	BZ05D	BK05	BK06
Brake application speed in case of emergency stop	$n_{max,1}$	min^{-1}	6000	6000	6000	6000
Nominal voltage of brake, AC	U_N	AC V	110/230/400/460	-	-	-
Nominal voltage of brake, DC	U_N	DC V	24	24	24	24
Nominal braking torque	$M_{4,100°C}$	Nm	2.5/3.2/4.5/6	2.5/3.2	3.8	7.1

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3.3.2 Dynamic and thermal limit characteristic curves

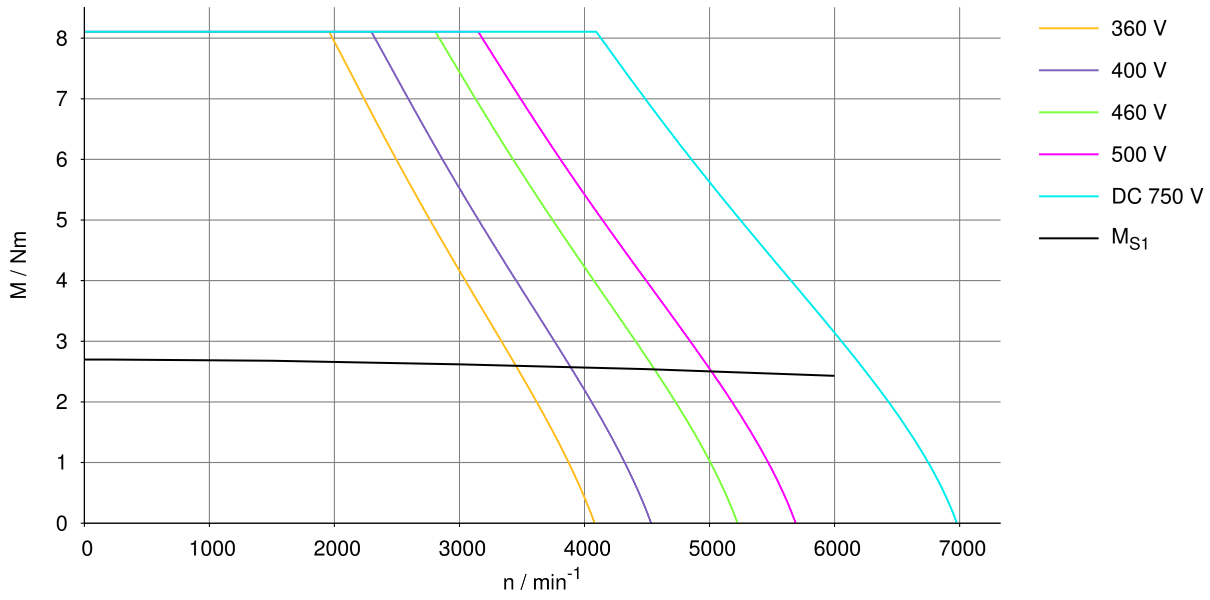

Illustration 1: CM3C63S, 3000 min^{-1}

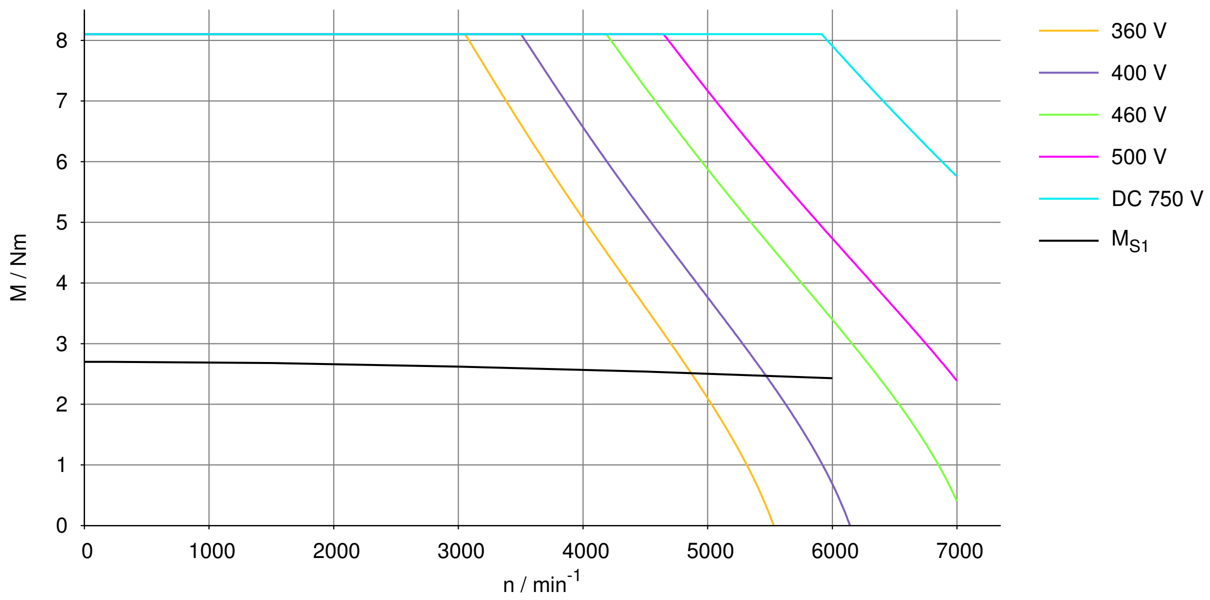

Illustration 2: CM3C63S, 4500 min^{-1}

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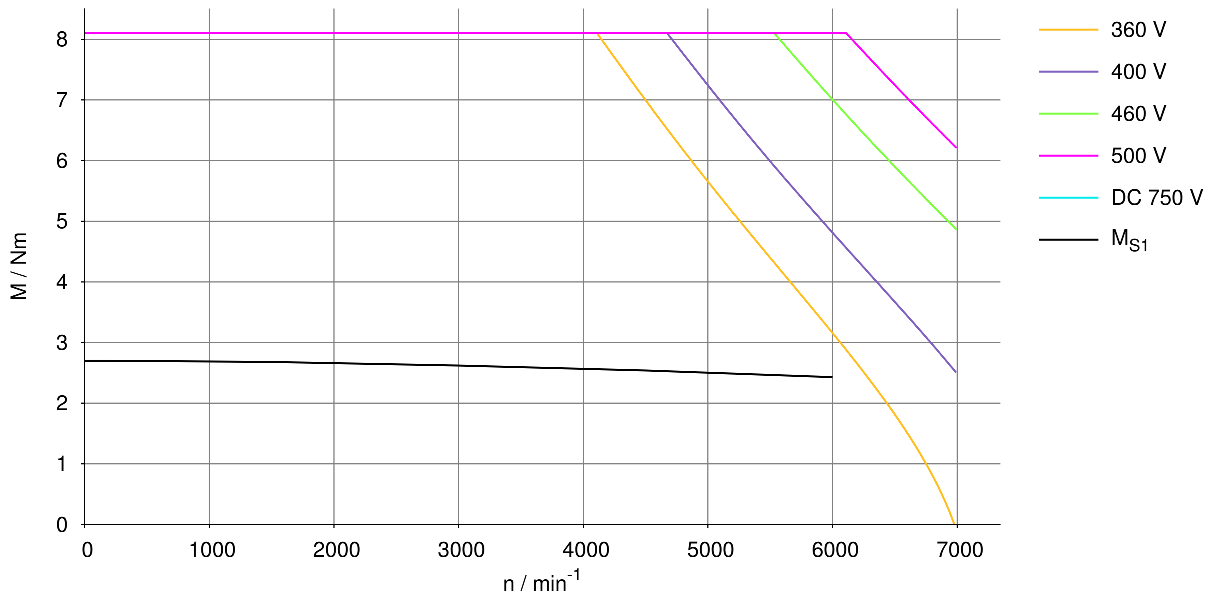

Illustration 3: CM3C63S, 6000 min^{-1}

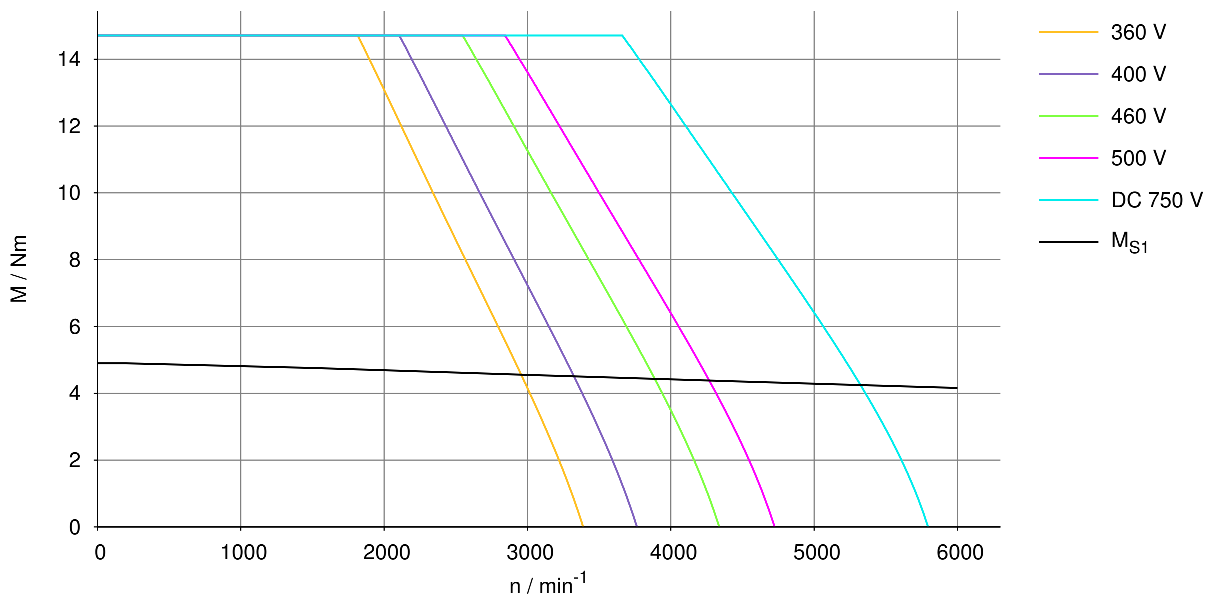

Illustration 4: CM3C63M, 3000 min^{-1}

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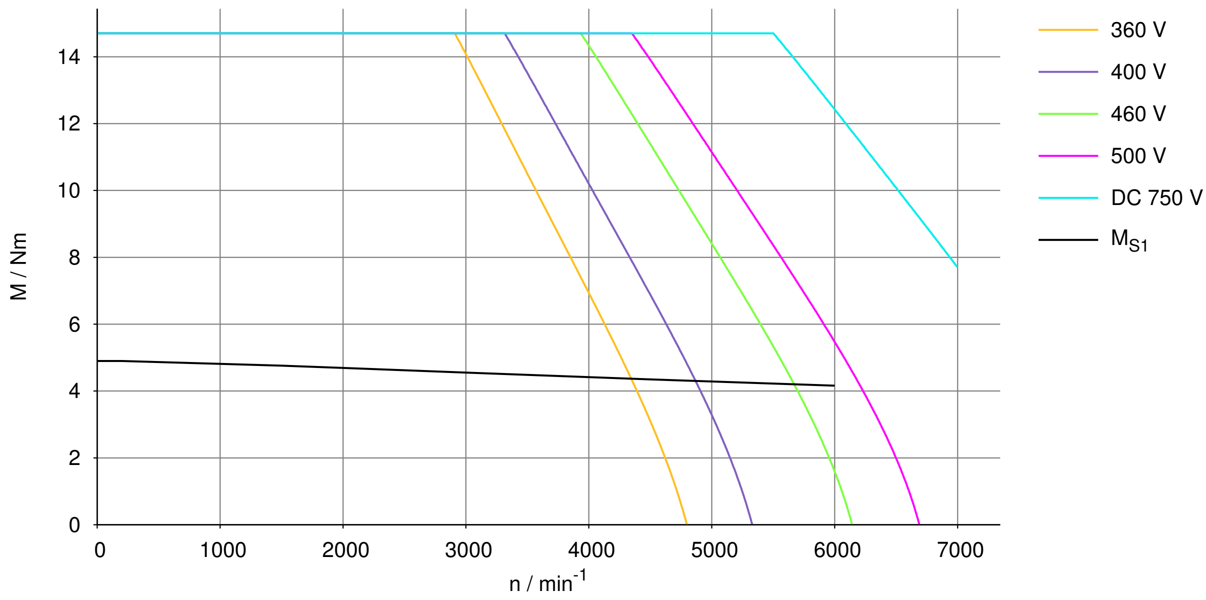

Illustration 5: CM3C63M, 4500 min^{-1}

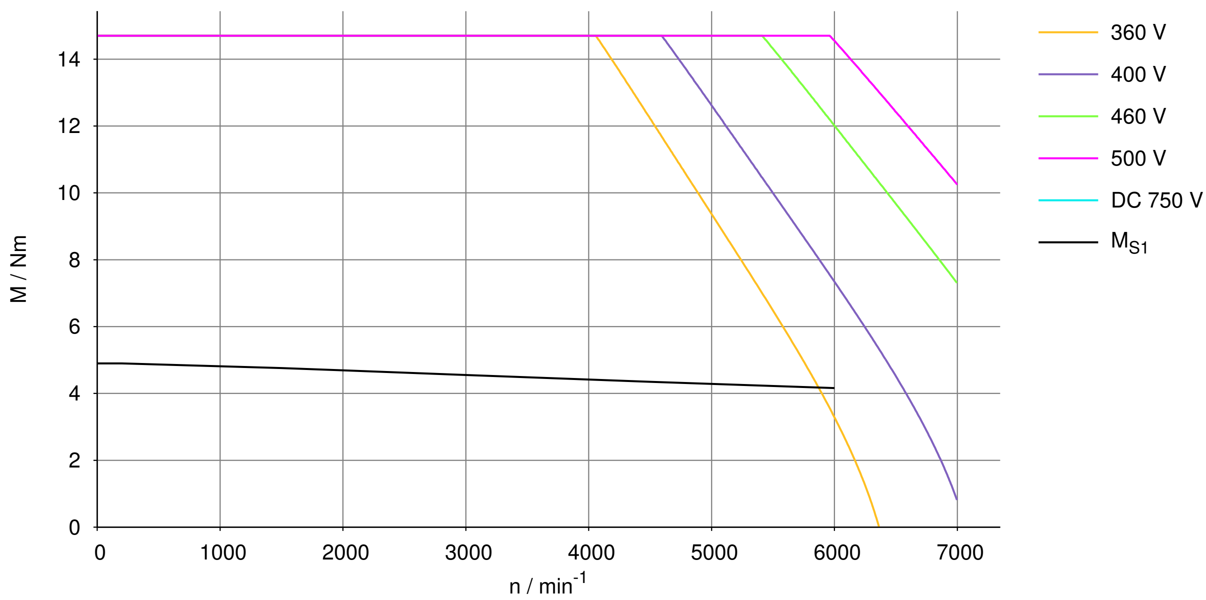

Illustration 6: CM3C63M, 6000 min^{-1}

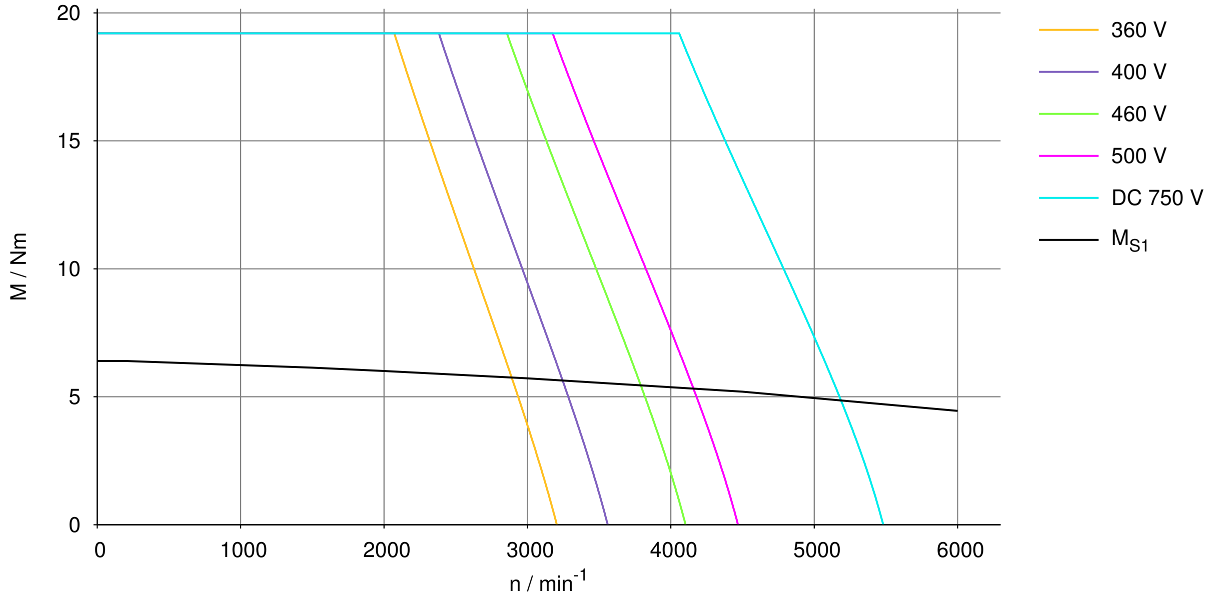

Illustration 7: CM3C63L, 3000 min^{-1}

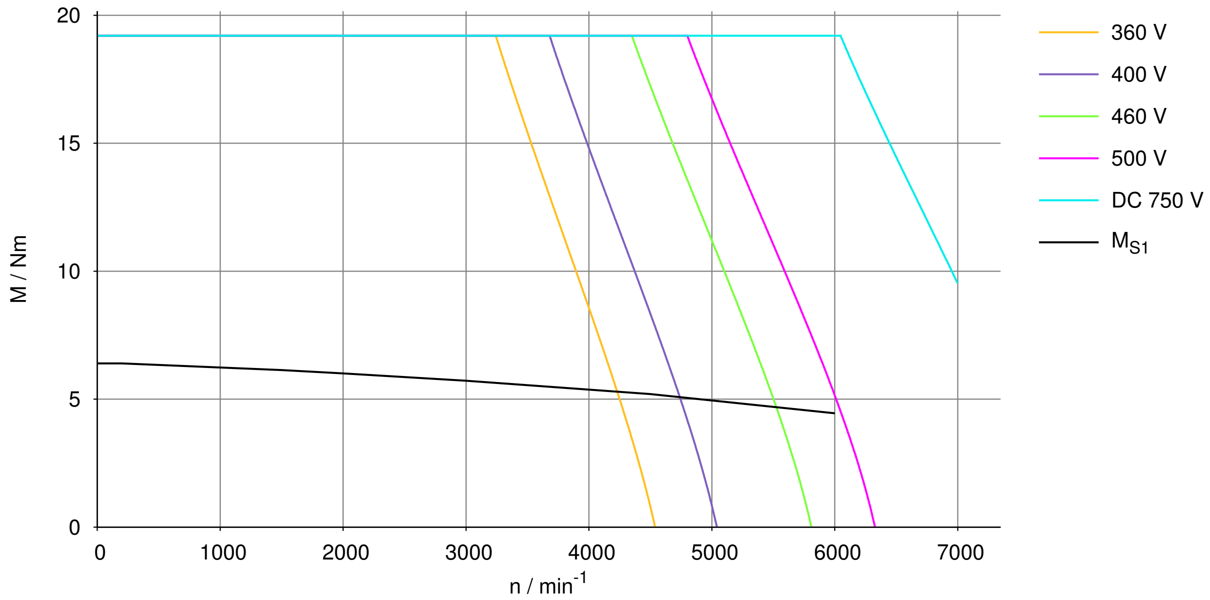

Illustration 8: CM3C63L, 4500 min^{-1}

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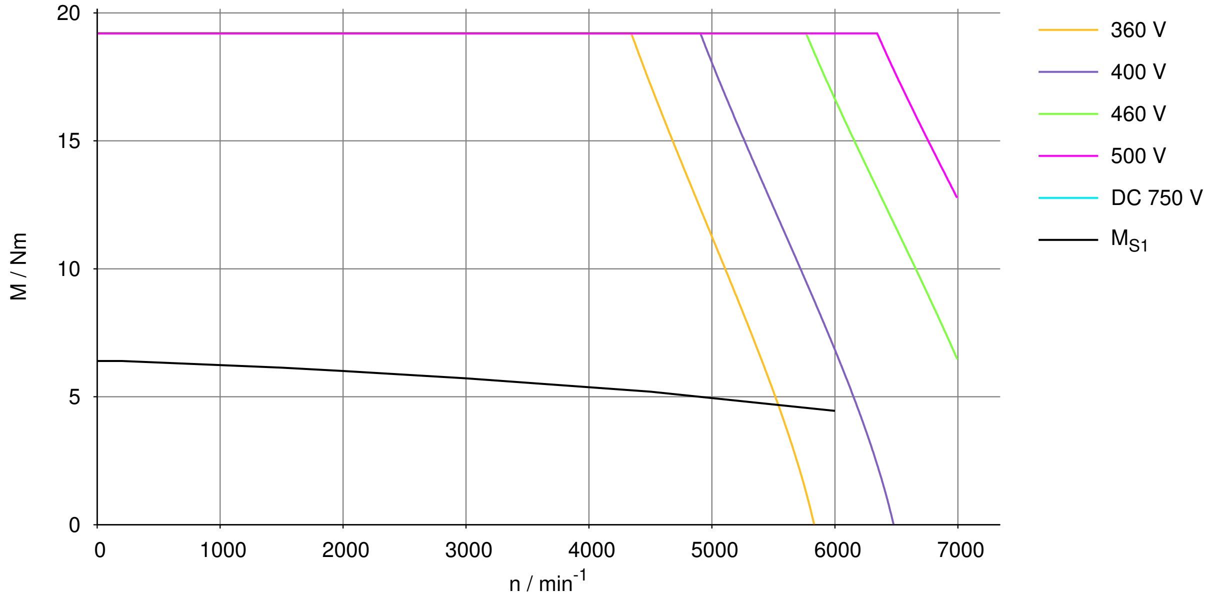
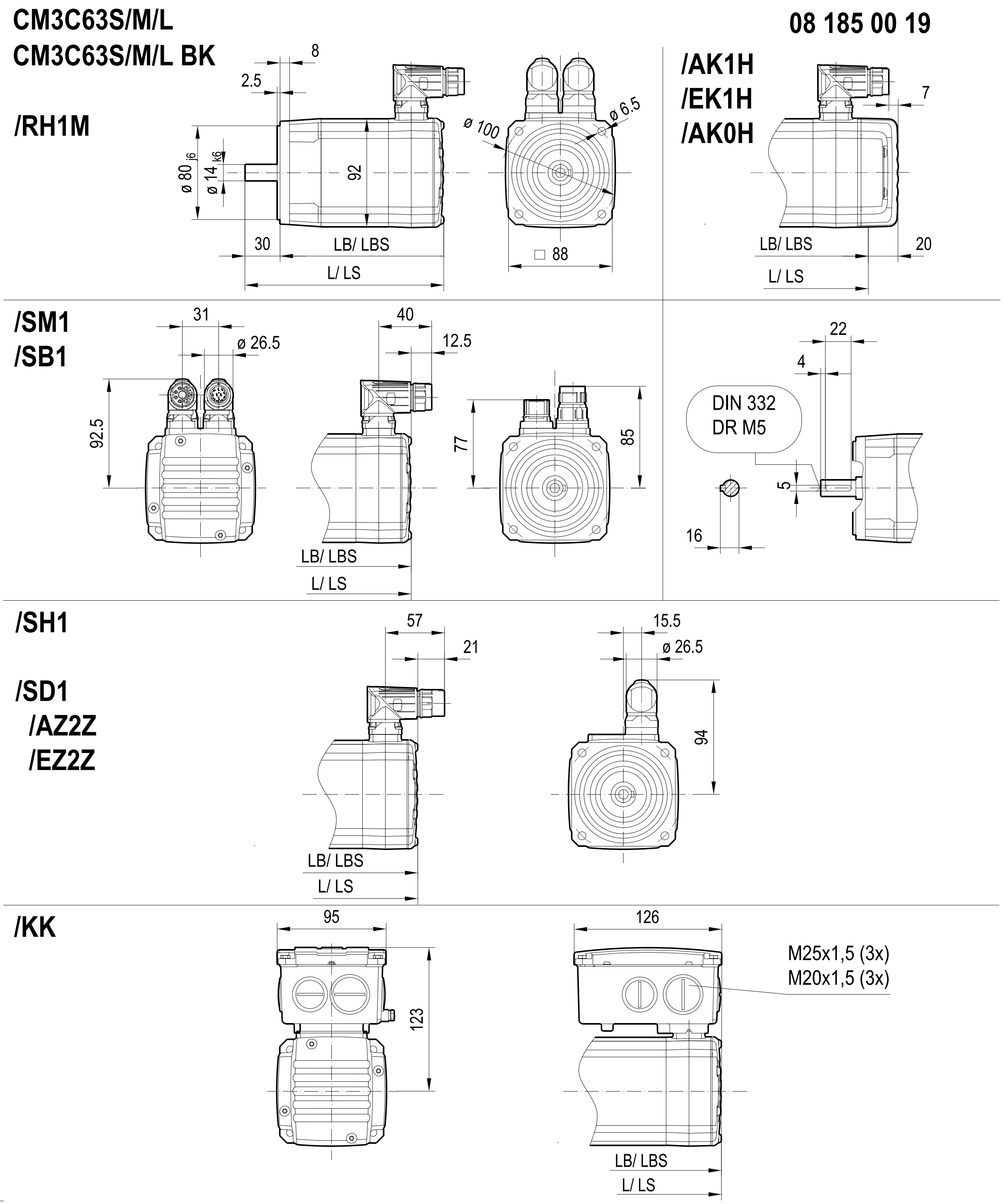


Illustration 9: CM3C63L, 6000 min^{-1}

3.3.3 Dimension sheets

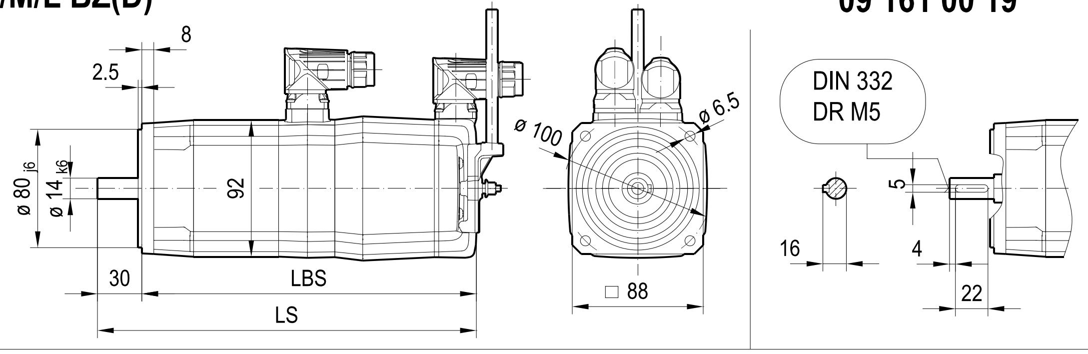


(→ 📖 6.1)	CM3C63							
	S	M	L					
LB	140	178	216					
L	170	208	246					
LBS	180	218	256					
LS	210	248	286					

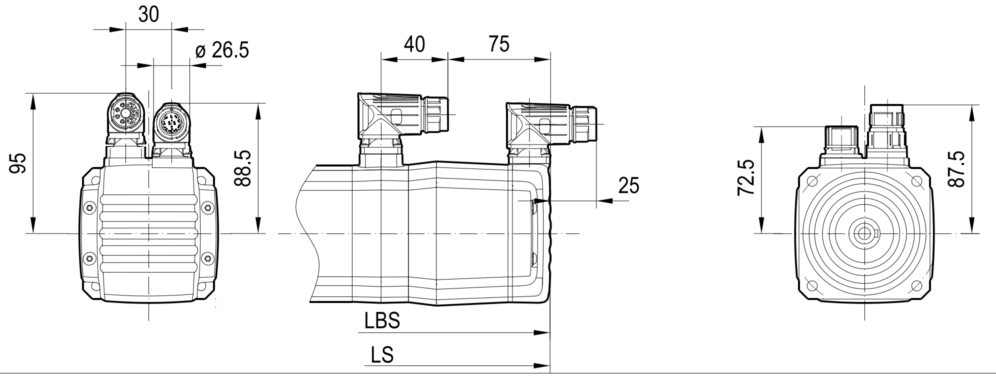
CM3C63S/M/L BZ(D)

09 161 00 19

/RH1M
/AK1H
/EK1H
/AK0H

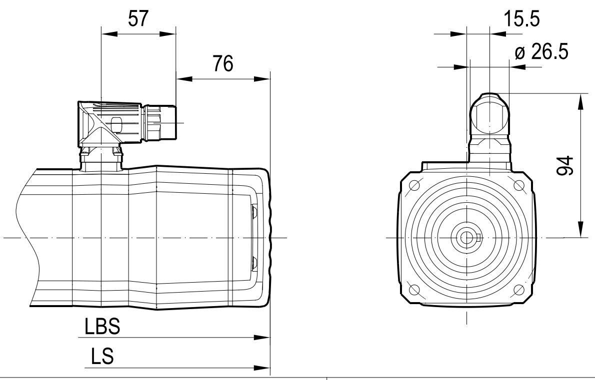


/SB1

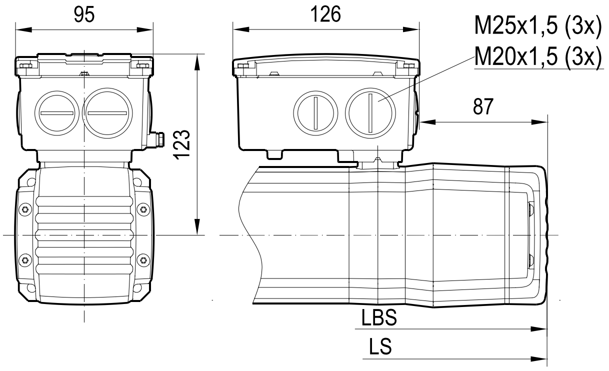


/SH1

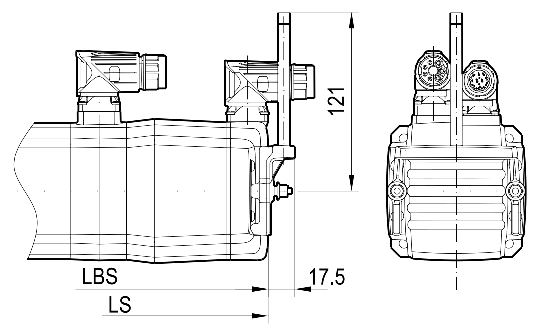
/SD1
/AZ2Z
/EZ2Z



/KK



/HR



(→ 📖 6.1)	CM3C63							
	S	M	L					
LBS	223	261	299					
LS	253	291	329					

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3.3.4 Overhung and axial loads for motor shaft ends

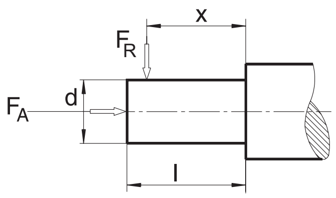
Permitted axial load

Determine the maximum permitted axial load F_A by multiplying the maximum permitted overhung load F_R with the factor 0.3:

$$F_A = 0.3 \times F_R$$

Permitted overhung load

Determine the permitted overhung loads F_R at point x via the following diagrams. "x" is the distance between the shaft shoulder and the force application:



For further information regarding the general conditions of the overhung load diagrams, refer to chapter "Notes on overhung load diagrams" (▸ 163).

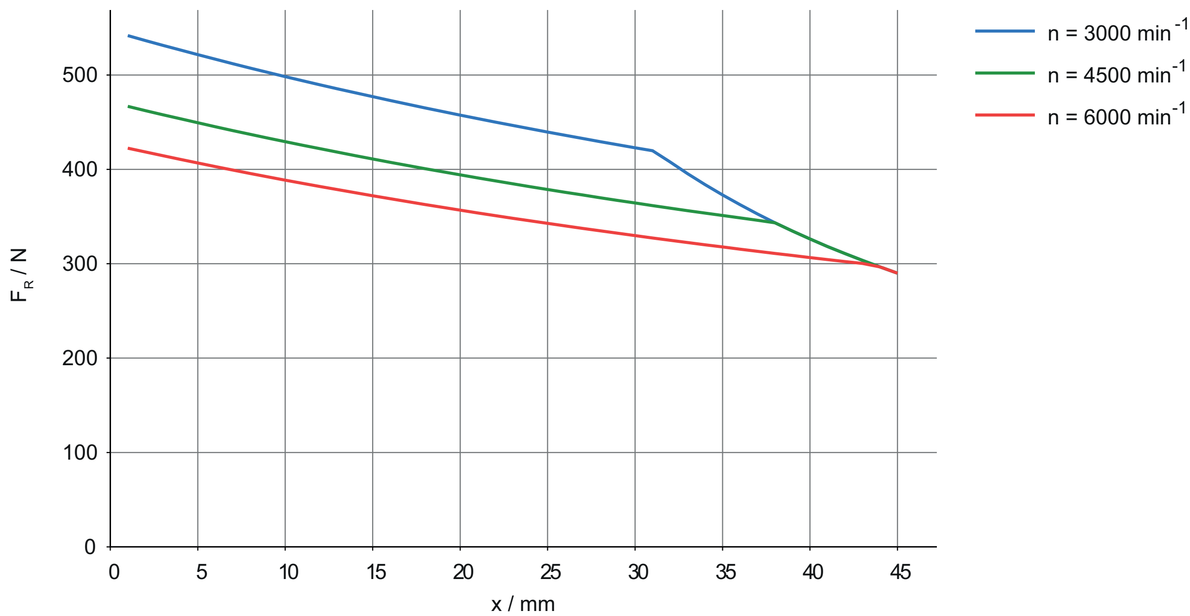


Illustration 10: CM3C63S, shaft Ø14 × 30 mm

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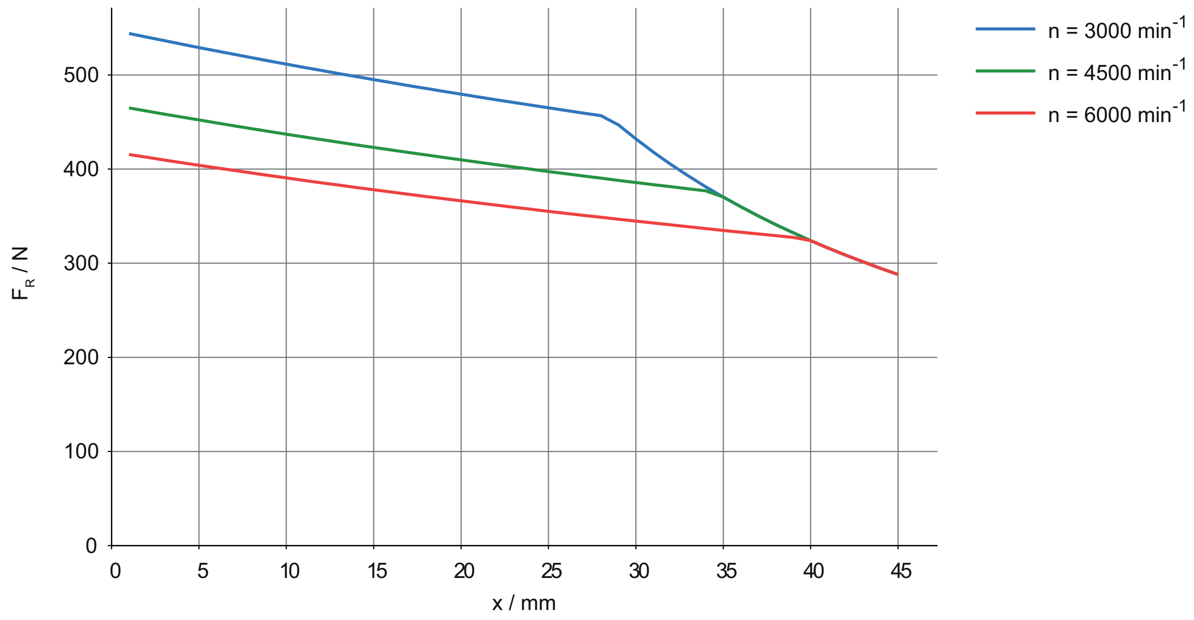

Illustration 11: CM3C63M, shaft Ø14 × 30 mm

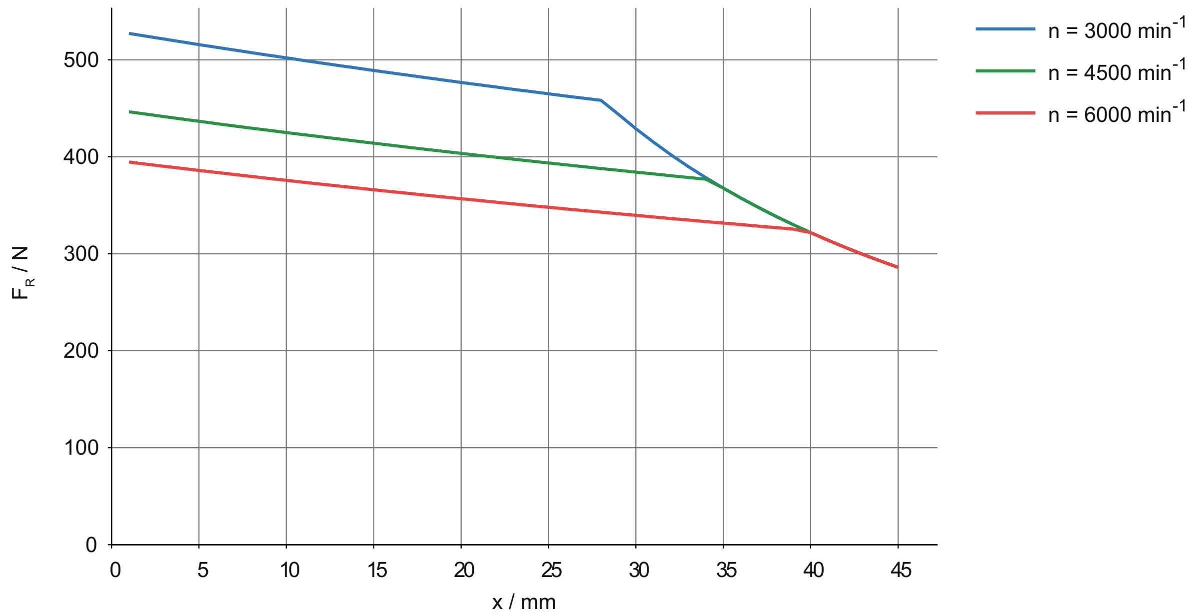

Illustration 12: CM3C63L, shaft Ø14 × 30 mm

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3.3.5 Torque-current characteristics

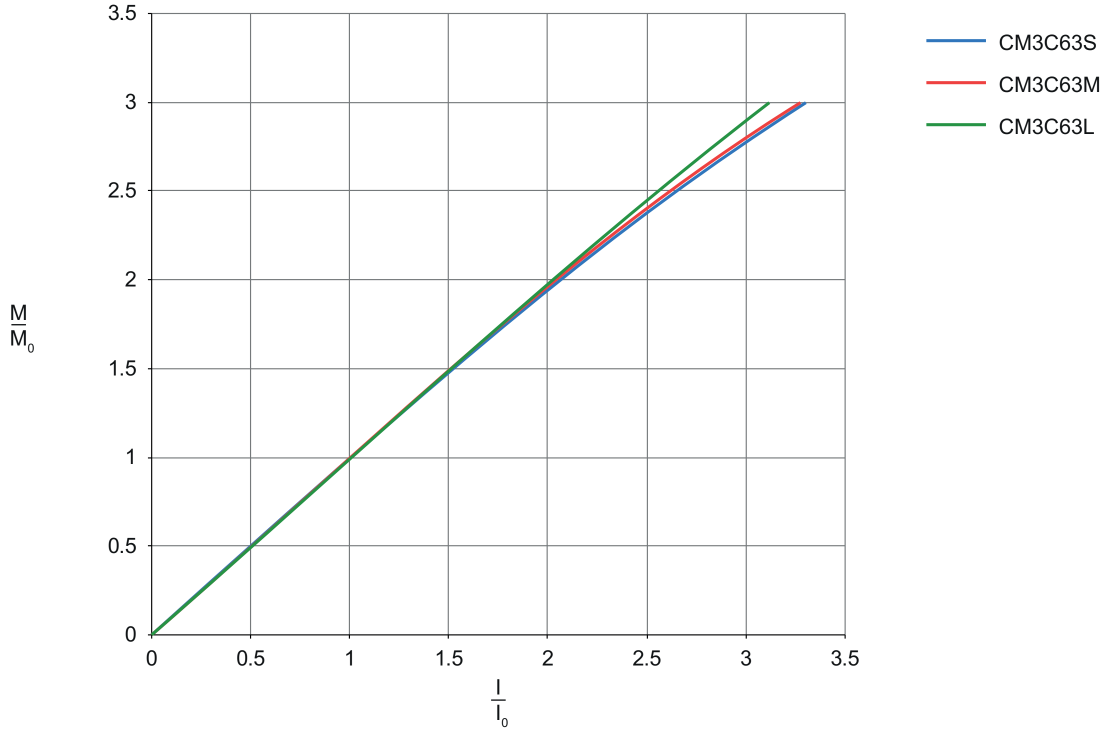

Illustration 13: Torque-current characteristic CM3C63

3.4 CM3C71

3.4.1 Technical data

			CM3C71S				CM3C71M				CM3C71L			
Speed class	n_c	min^{-1}	2000	3000	4500	6000	2000	3000	4500	6000	2000	3000	4500	6000
Standstill torque	M_0	Nm	6.5				9.5				14			
Standstill current	I_0	A	3.5	5	7.2	9.5	5.1	7	10.2	13.5	6.4	9.5	13.9	18.5
Dynamic limit torque	M_{pk}	Nm	19.5	19.5	19.5	19.5	28.5	28.5	28.5	28.5	42	42	42	42
Maximum motor current	I_{max}	A	12.2	17.3	25	33	18.4	25.2	36.8	48.6	21.3	31.6	46.1	61.4
Inductance (phase)	L_1	mH	17.4	8.58	4.11	2.37	11.4	6.06	2.85	1.63	8.85	4.01	1.88	1.06
Resistance (phase) at 20 °C	R_1	Ω	3.27	1.62	0.699	0.426	1.91	0.99	0.488	0.266	1.34	0.586	0.286	0.164
Internal voltage at 1000 min^{-1}	$U_{p0\ kalt}$	V	128	90.2	62.4	47.4	128	93.5	64.1	48.5	151	101	69.5	52.1
Mechanical data of motor														
Number of poles			8											
Maximum perm. radial load	F_{Ramax}	N	870	756	654	591	915	789	681	612	951	816	696	621
Maximum perm. axial load	F_{Aamax}	N	290	252	218	197	305	263	227	204	317	272	232	207
Mass of the motor	m_{mot}	kg	6.42				7.87				10.7			
Mass moment of inertia	J_{mot}	10^{-4} kgm²	7.4				10.7				17.1			

Mechanical data of the brakemotor

			CM3C71S				CM3C71M				CM3C71L			
Brake type			BZ1	BZ1D	BK08	BK1	BZ1	BZ1D	BK08	BK1	BZ1	BZ1D	BK08	BK1
Mass moment of inertia of the brakemotor	J_{bmot}	10^{-4} kgm²	9.05	9.05	8.25	8.82	12.4	12.4	11.6	12.1	18.8	18.8	18	18.5
Mass of the brakemotor	m_{bmot}	kg	12	12	7.9	8.3	13	13	9.4	9.8	16	16	12	13

Technical data of the brake

			BZ1	BZ1D	BK08	BK1
Brake application speed in case of emergency stop	$n_{max,1}$	min^{-1}	6000	6000	6000	6000
Nominal voltage of brake, AC	U_N	AC V	110/230/400/460	-	-	-
Nominal voltage of brake, DC	U_N	DC V	24	24	24	24
Nominal braking torque	$M_{4,100°C}$	Nm	6/8.4/12/17	6/8.4	7.8	16

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3.4.2 Dynamic and thermal limit characteristic curves

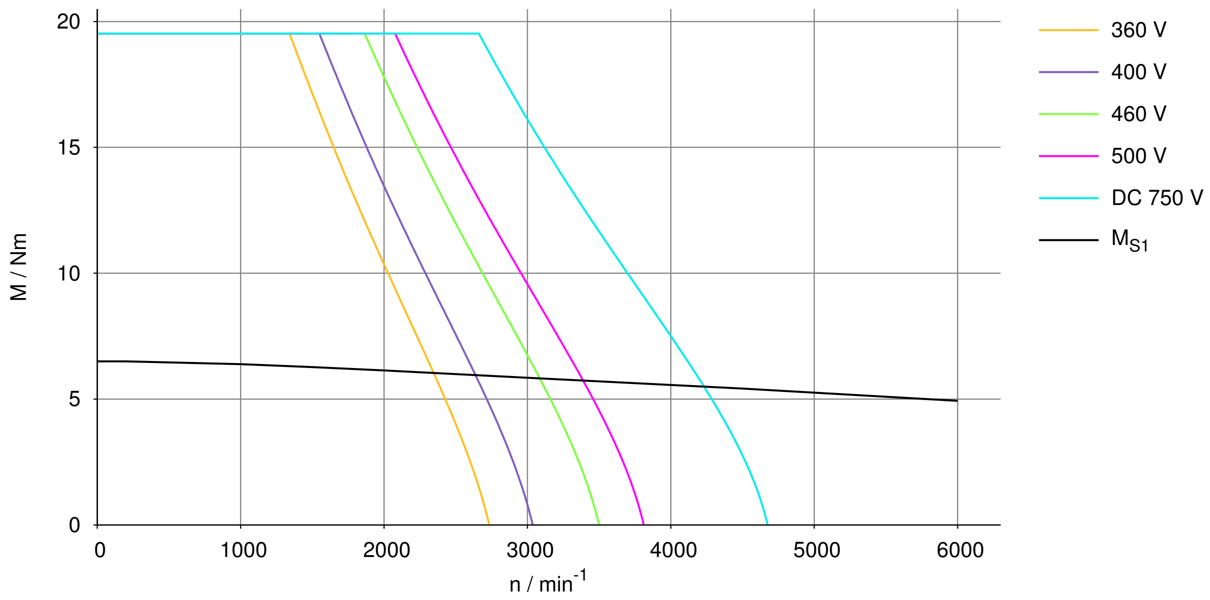

Illustration 14: CM3C71S, 2000 min^{-1}

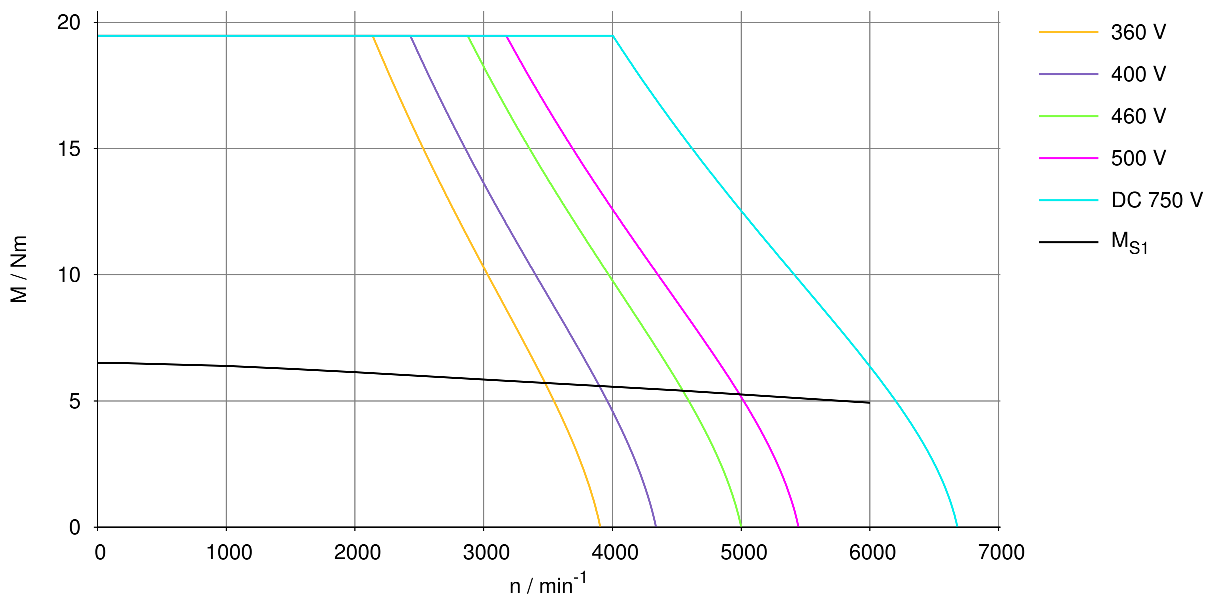

Illustration 15: CM3C71S, 3000 min^{-1}

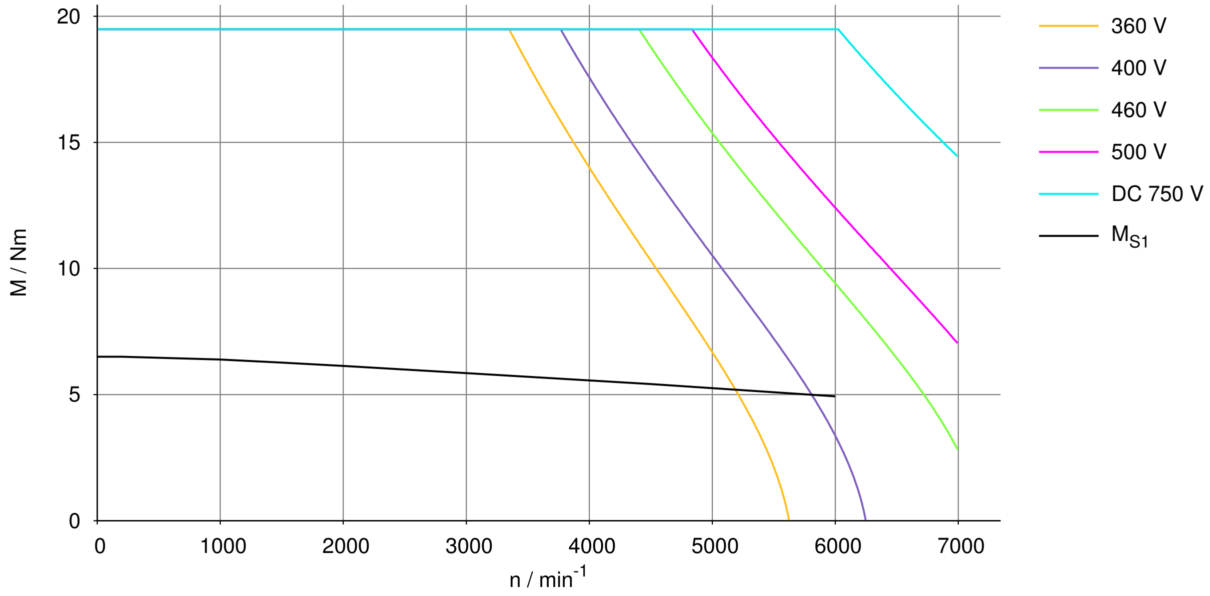

Illustration 16: CM3C71S, 4500 min^{-1}

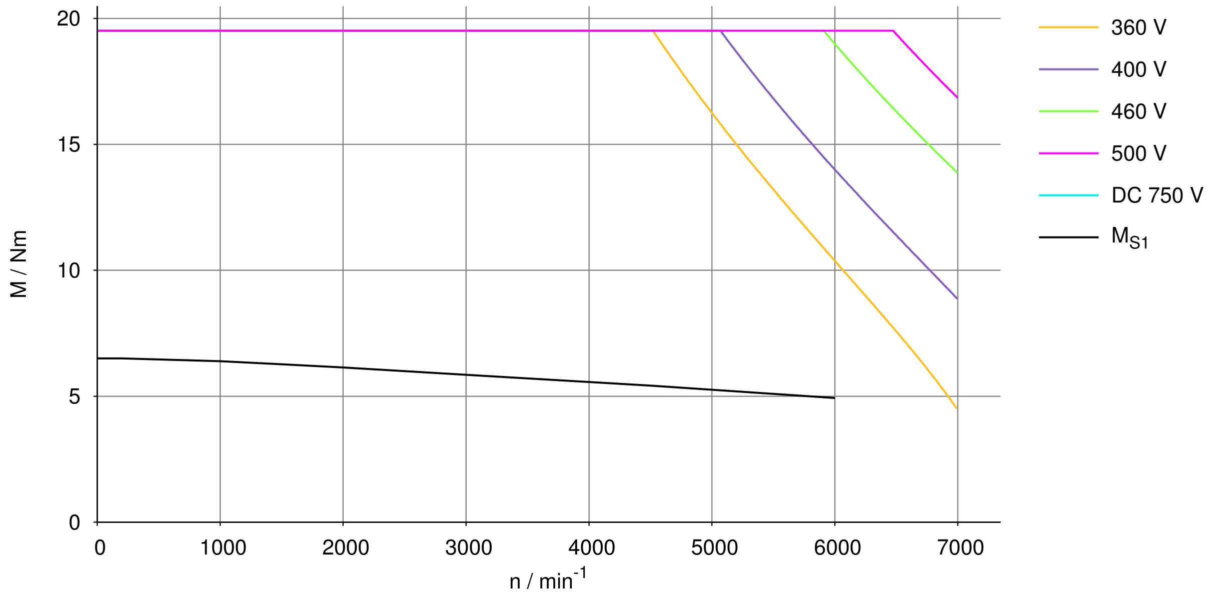

Illustration 17: CM3C71S, 6000 min^{-1}

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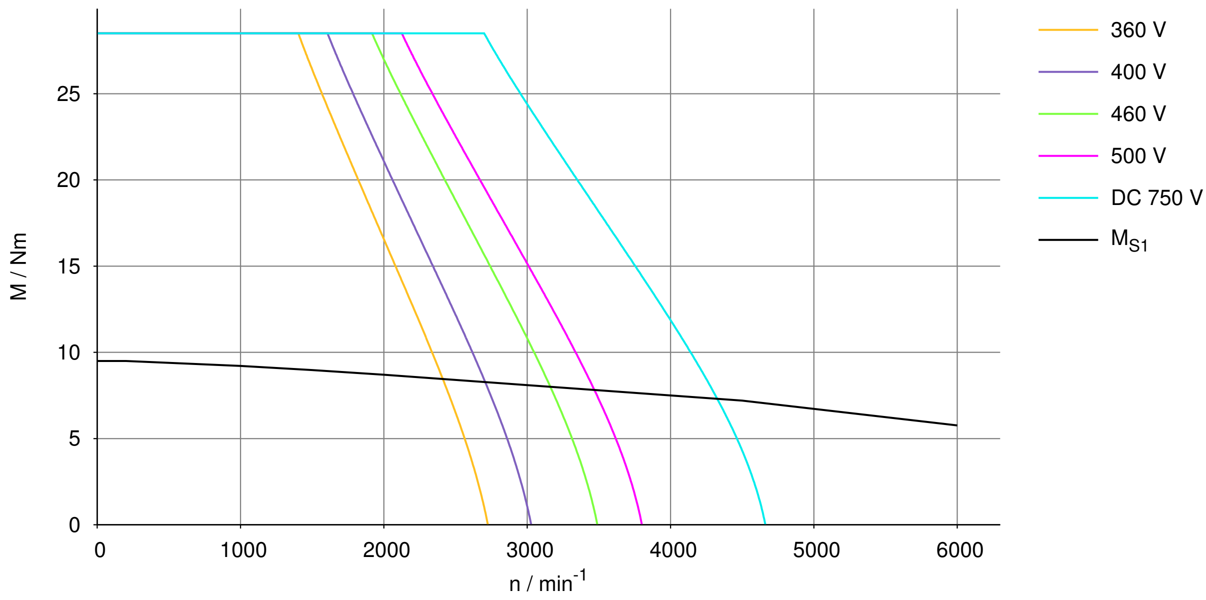

Illustration 18: CM3C71M, 2000 min^{-1}

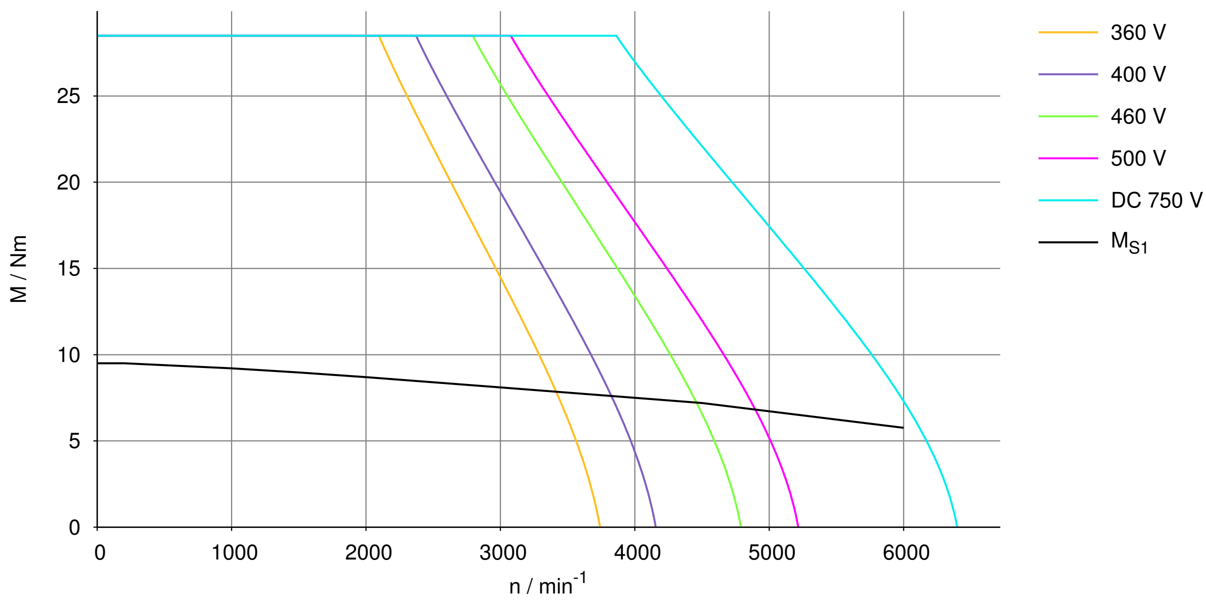

Illustration 19: CM3C71M, 3000 min^{-1}

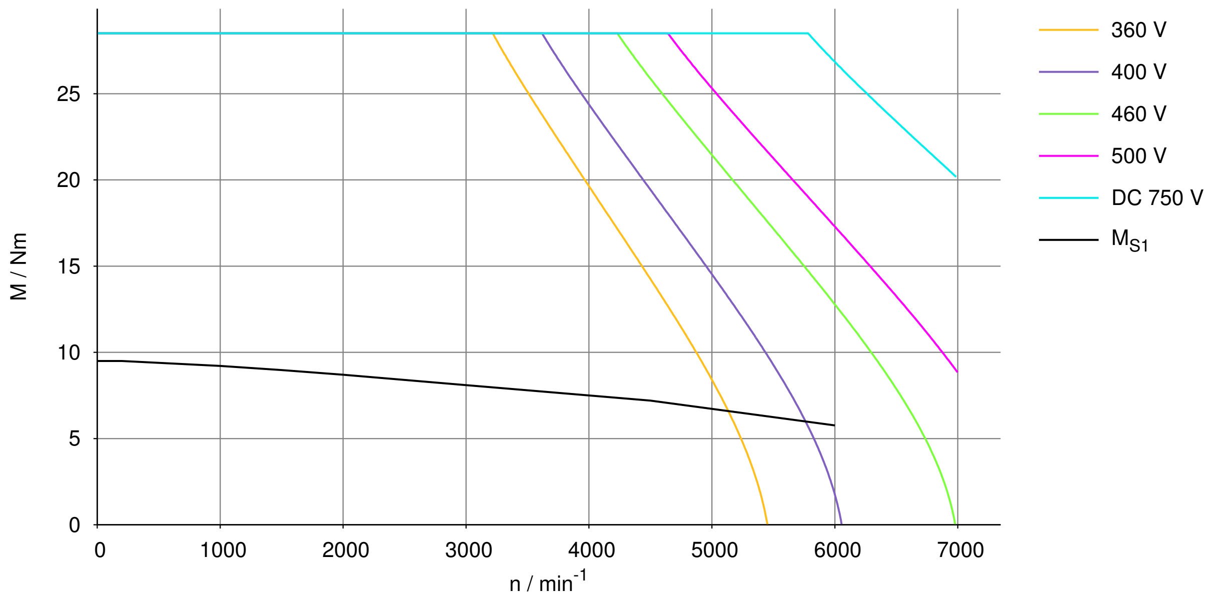

Illustration 20: CM3C71M, 4500 min^{-1}

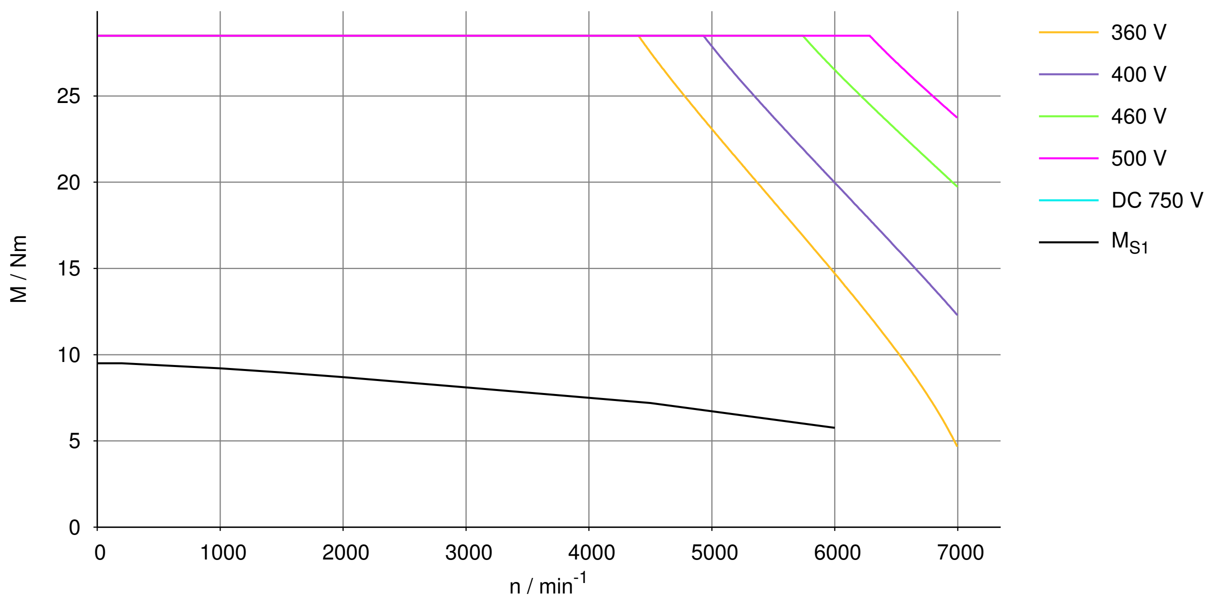

Illustration 21: CM3C71M, 6000 min^{-1}

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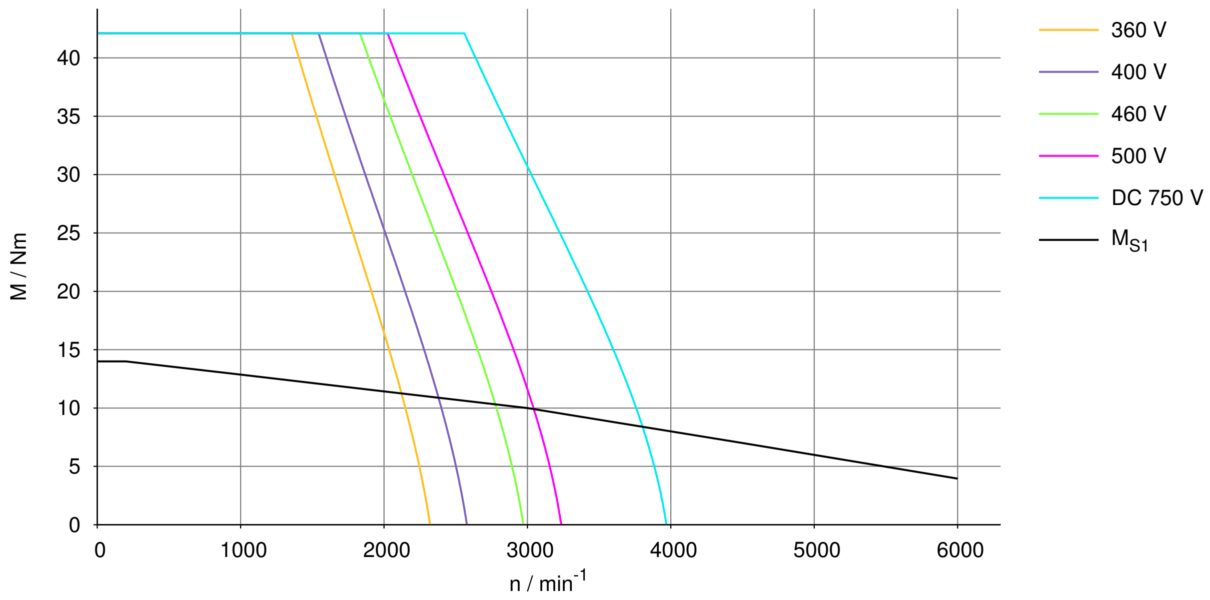

Illustration 22: CM3C71L, 2000 min^{-1}

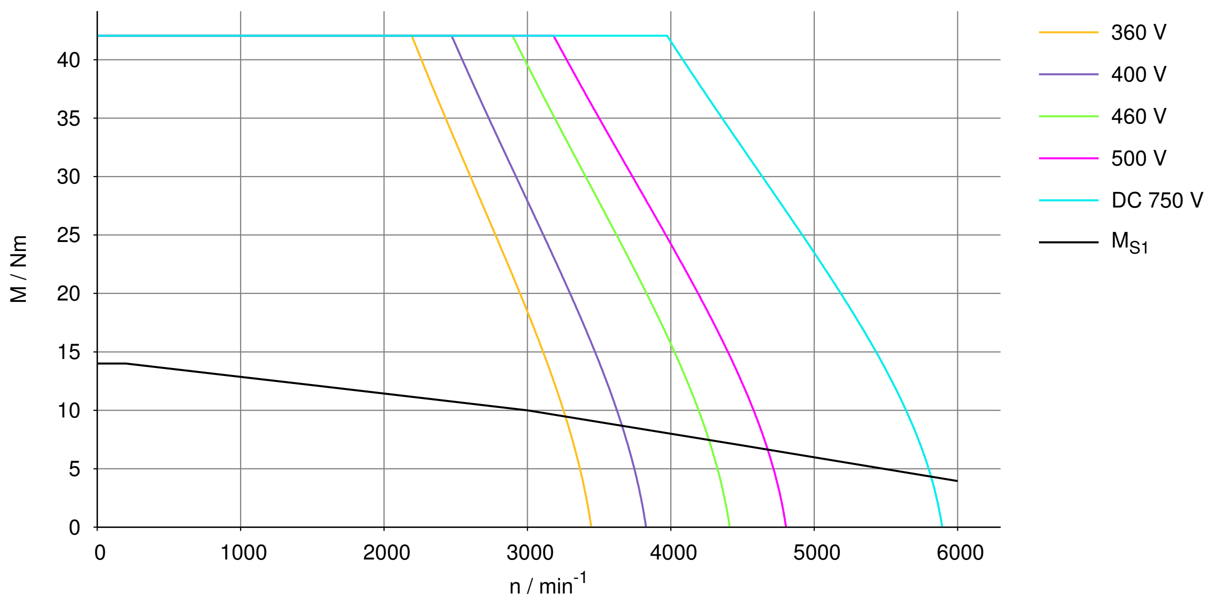

Illustration 23: CM3C71L, 3000 min^{-1}

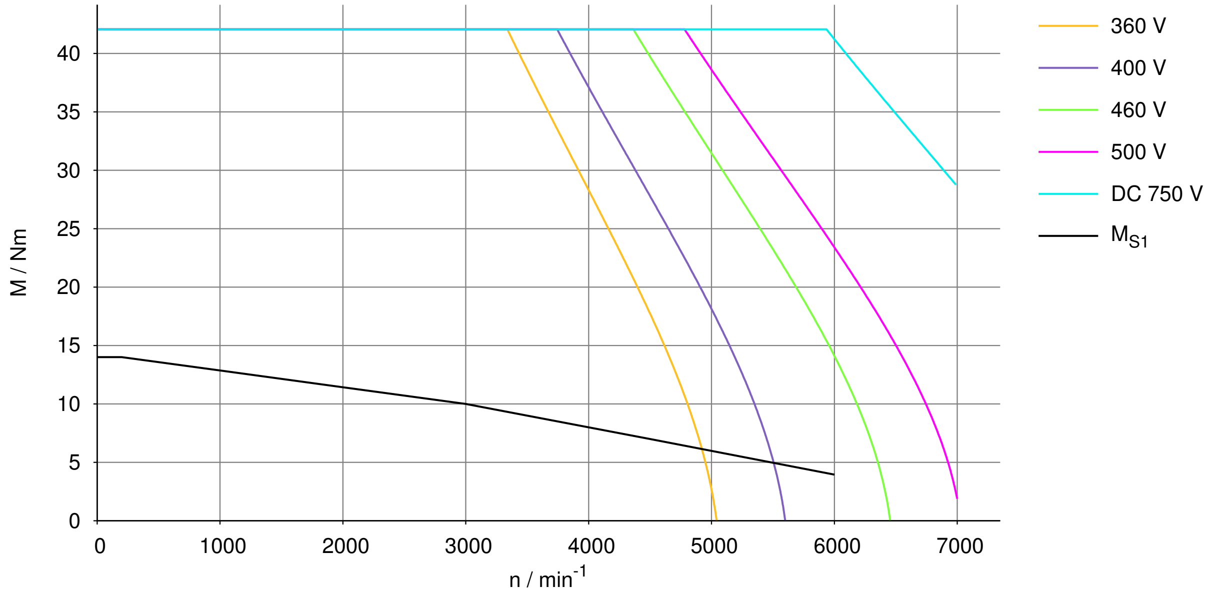

Illustration 24: CM3C71L, 4500 min^{-1}

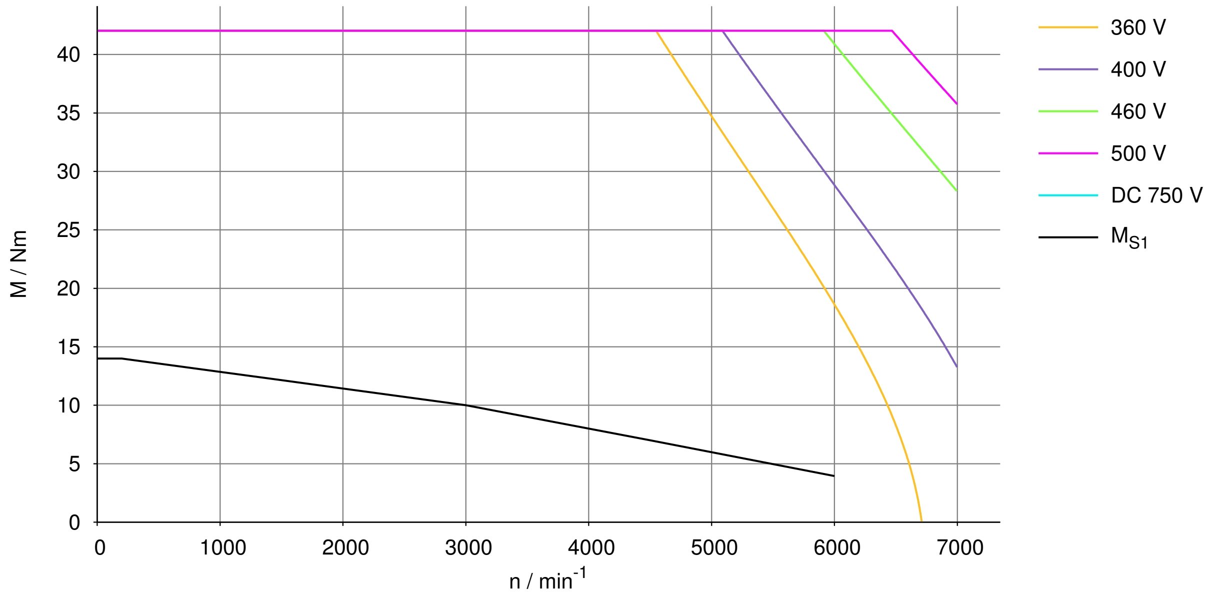

Illustration 25: CM3C71L, 6000 min^{-1}

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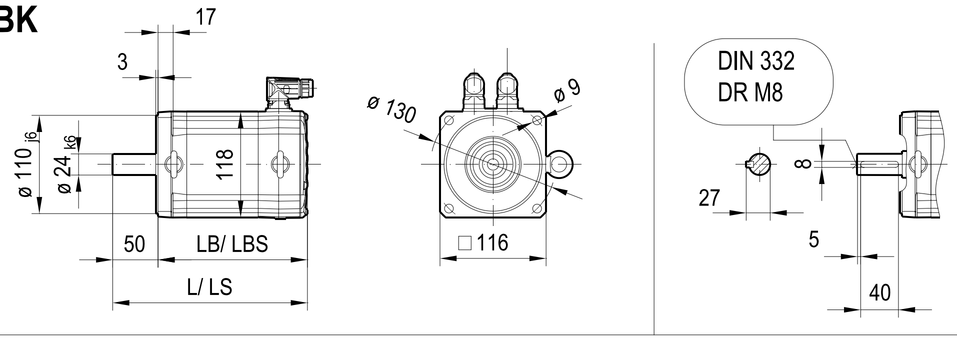
3.4.3 Dimension sheets

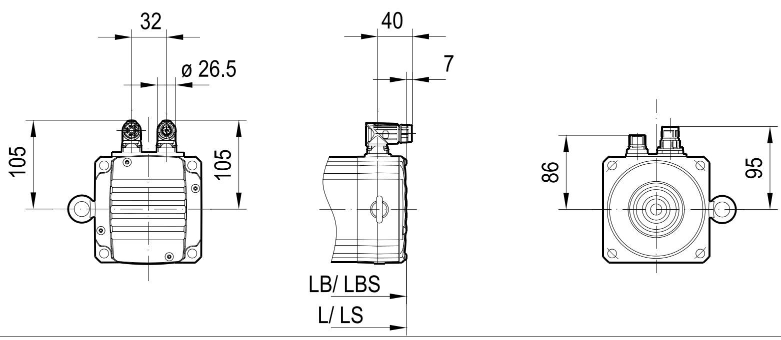
CM3C71S/M/L
CM3C71S/M/L BK

08 186 00 19

/RH1M
/AK1H
/EK1H
/AK0H

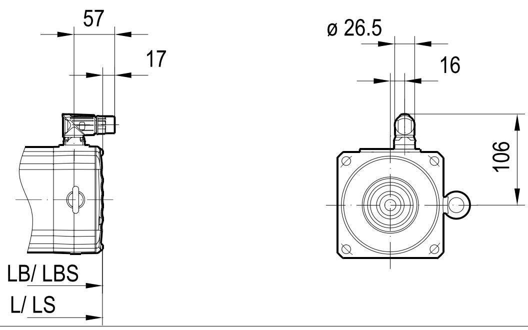


/SM1
/SB1

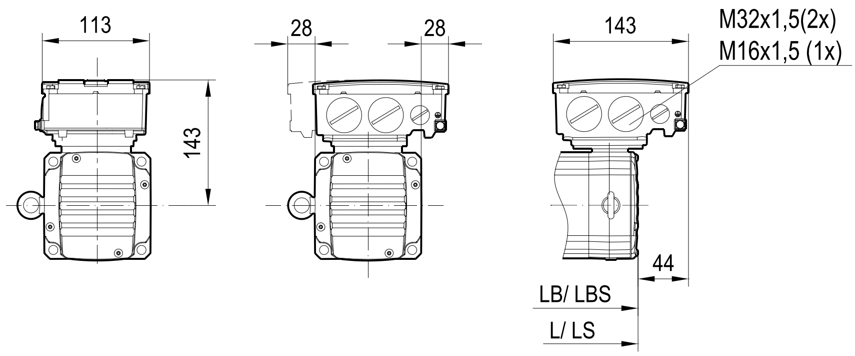


/SH1

/SD1
/AZ2Z
/EZ2Z



/KK



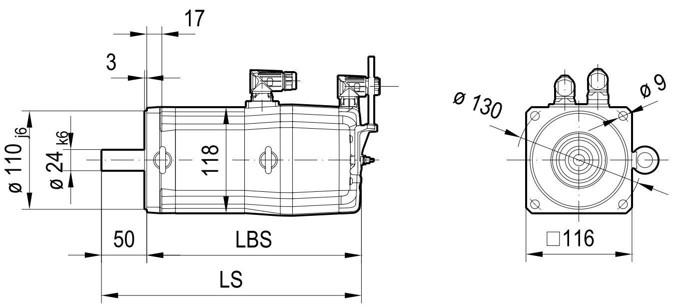
(→ 📖 6.1)	CM3C71							
	S	M	L					
LB	170	192	237					
L	220	242	287					
LBS	236	258	303					
LS	286	308	353					

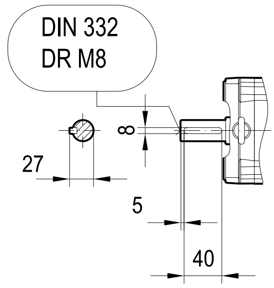
SEW EURODRIVE

CM3C71S/M/L BZ(D)

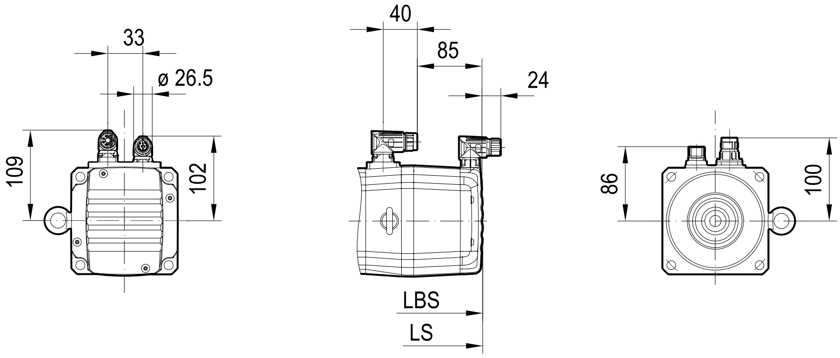
09 163 00 19

/RH1M
/AK1H
/EK1H
/AK0H



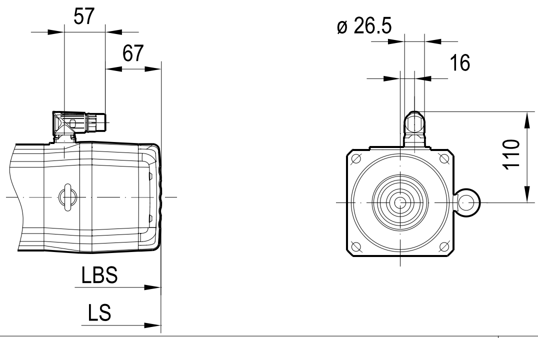


/SB1

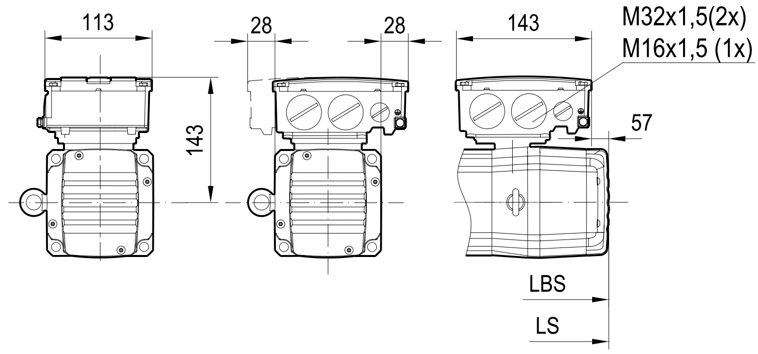


/SH1

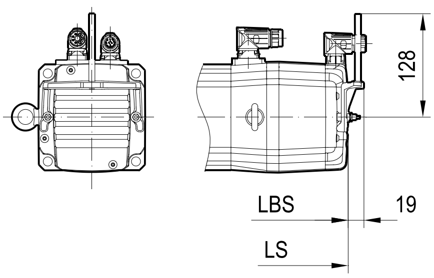
/SD1
/AZ2Z
/EZ2Z



/KK



/HR



(→ 📖 6.1)	CM3C71							
	S	M	L					
LBS	258	280	325					
LS	308	330	375					

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3.4.4 Overhung and axial loads for motor shaft ends

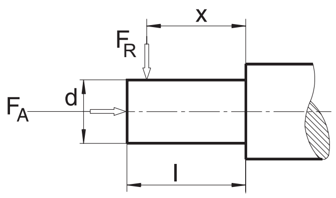
Permitted axial load

Determine the maximum permitted axial load F_A by multiplying the maximum permitted overhung load F_R with the factor 0.3:

$$F_A = 0.3 \times F_R$$

Permitted overhung load

Determine the permitted overhung loads F_R at point x via the following diagrams. "x" is the distance between the shaft shoulder and the force application:



For further information regarding the general conditions of the overhung load diagrams, refer to chapter "Notes on overhung load diagrams" (▶ 163).

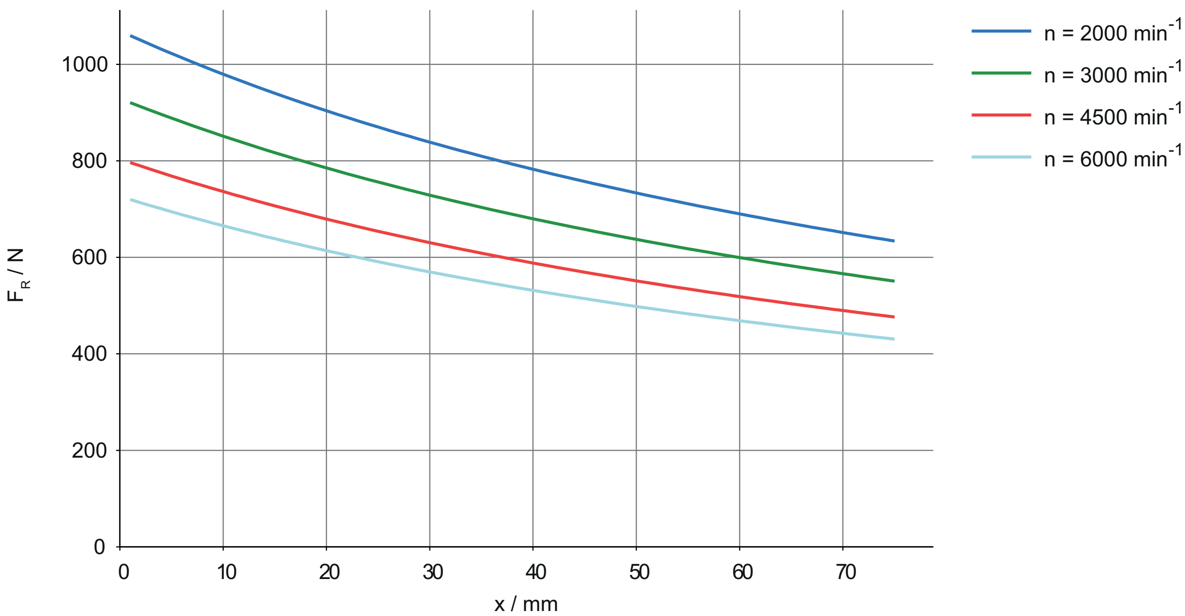


Illustration 26: CM3C71S, shaft Ø24 × 50 mm

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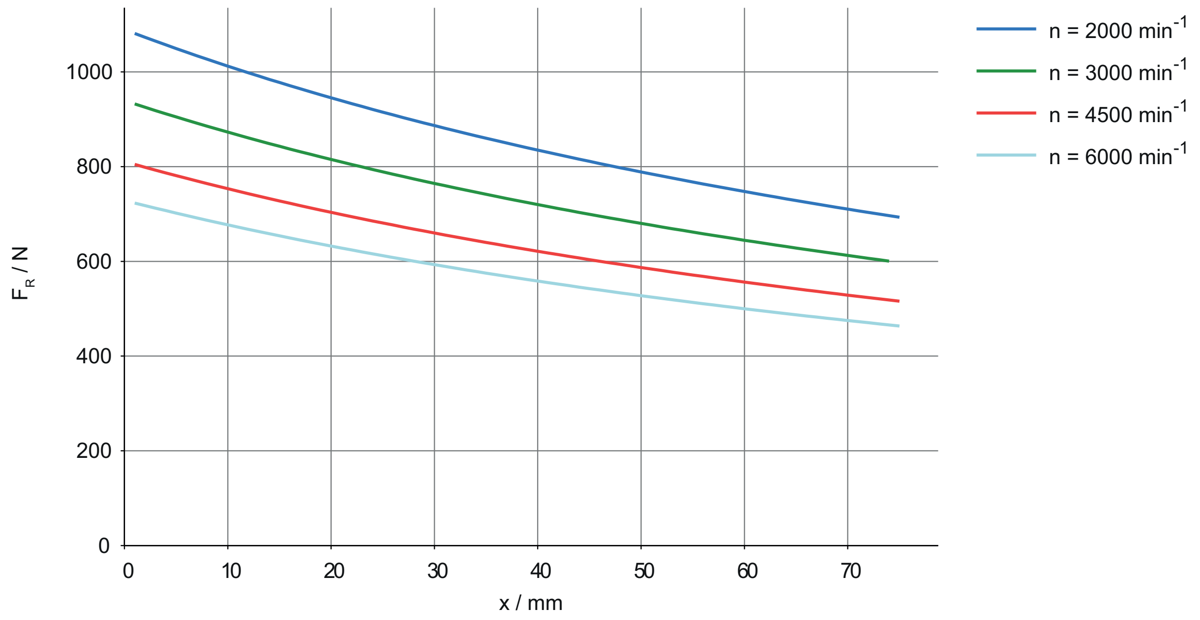

Illustration 27: CM3C71M, shaft Ø24 × 50 mm

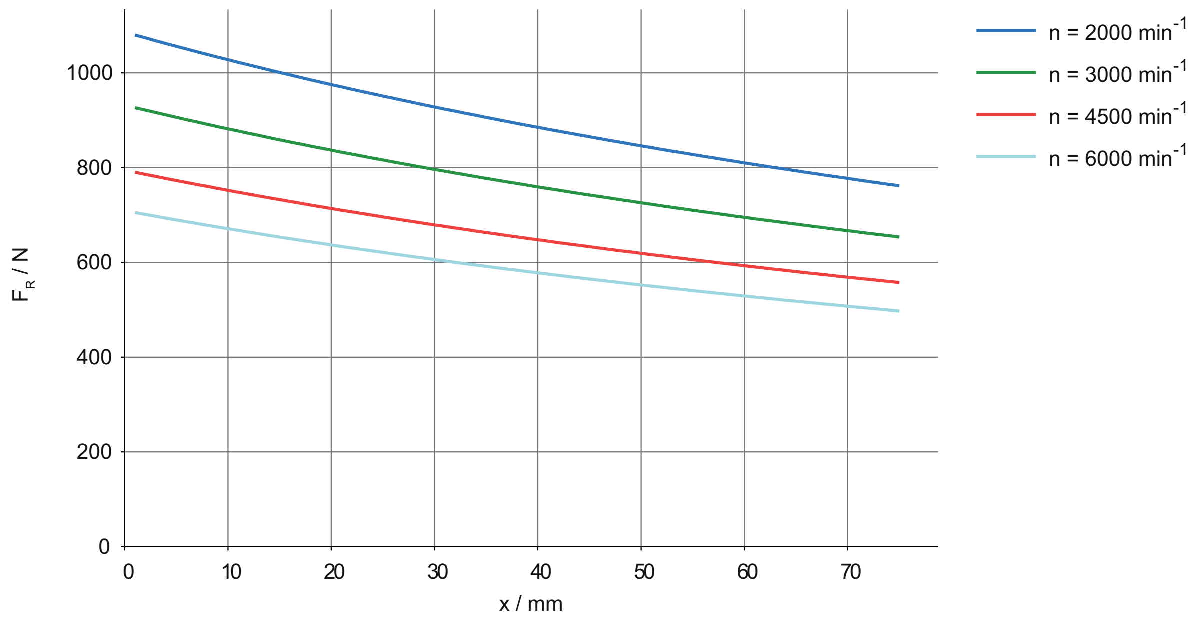

Illustration 28: CM3C71L, shaft Ø24 × 50 mm

3.4.5 Torque-current characteristics

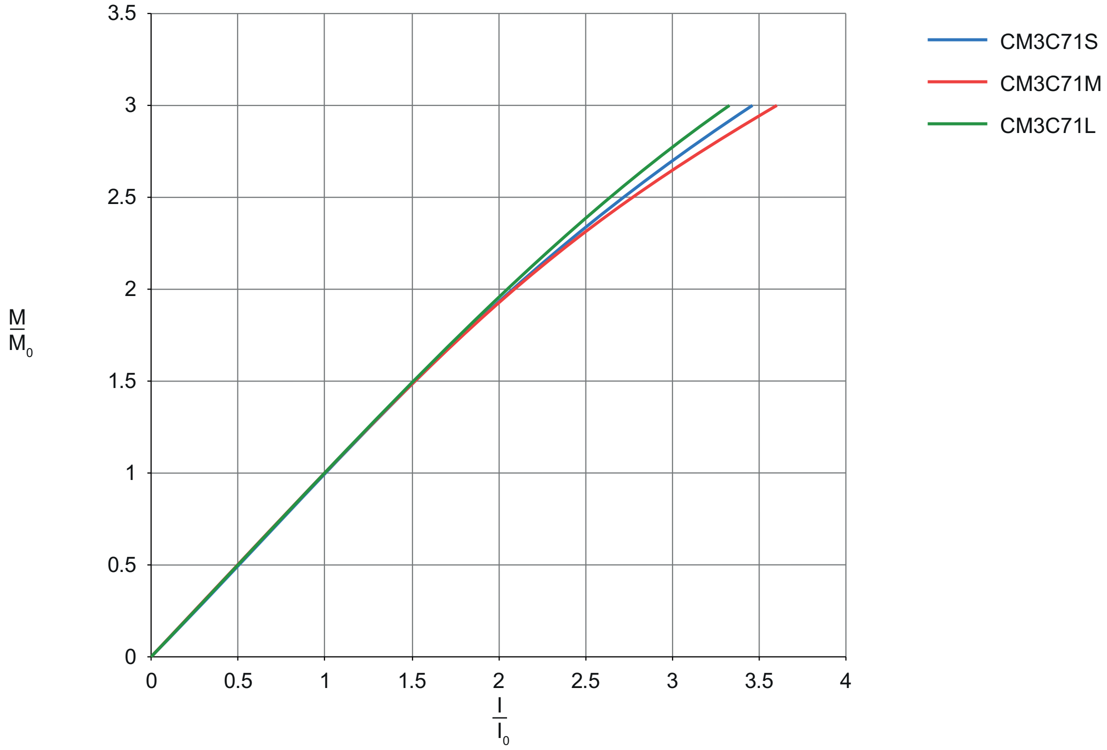

Illustration 29: Torque-current characteristic CM3C71

3.5 CM3C80

3.5.1 Technical data

			CM3C80S				CM3C80M				CM3C80L			
Speed class	n_c	min^{-1}	2000	3000	4500	6000	2000	3000	4500	6000	2000	3000	4500	6000
Standstill torque	M_0	Nm	10.5				15.6				22.8			
Standstill current	I_0	A	5.78	8.24	11.7	15.9	7.85	10.9	16.3	21.2	11.2	16.1	23.1	30.8
Dynamic limit torque	M_{pk}	Nm	31.5	31.5	31.5	31.5	46.8	46.8	46.8	46.8	68.4	68.4	68.4	68.4
Maximum motor current	I_{max}	A	20	28.5	40.5	55	25.7	35.6	53.5	69.5	34.9	50.1	72	96
Inductance (phase)	L_1	mH	10.9	5.36	2.65	1.44	7.36	3.84	1.71	1.01	4.24	2.06	0.996	0.56
Resistance (phase) at 20 °C	R_1	Ω	1.55	0.786	0.354	0.208	1.05	0.546	0.225	0.135	0.559	0.265	0.131	0.0706
Internal voltage at 1000 min^{-1}	$U_{p0\ kalt}$	V	129	90.6	63.8	47	137	99.1	66	50.8	141	98.1	68.3	51.2
Mechanical data of motor														
Number of poles			8											
Maximum perm. radial load	F_{Ramax}	N	1536	1332	1155	1044	1614	1395	1203	1083	1686	1449	1239	1110
Maximum perm. axial load	F_{Aamax}	N	512	444	385	348	538	465	401	361	562	483	413	370
Mass of the motor	m_{mot}	kg	10.6				13				18			
Mass moment of inertia	J_{mot}	10^{-4} kgm^2	17.6				25.2				40.6			

Mechanical data of the brakemotor

			CM3C80S				CM3C80M				CM3C80L			
Brake type			BZ3	BZ3D	BK2	BK3	BZ3	BZ3D	BK2	BK3	BZ3	BZ3D	BK2	BK3
Mass moment of inertia of the brakemotor	J_{bmot}	10^{-4} kgm^2	22.4	22.4	20.9	23.2	30	30	28.5	30.8	45.4	45.4	43.9	46.2
Mass of the brakemotor	m_{bmot}	kg	19	19	13	14	22	22	16	16	27	27	21	21

Technical data of the brake

			BZ3	BZ3D	BK2	BK3
Brake application speed in case of emergency stop	$n_{max,1}$	min^{-1}	6000	6000	6000	6000
Nominal voltage of brake, AC	U_N	AC V	110/230/400/460	-	-	-
Nominal voltage of brake, DC	U_N	DC V	24	24	24	24
Nominal braking torque	$M_{4,100°C}$	Nm	7.8/11/16/23/32	11/16	18	30

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3.5.2 Dynamic and thermal limit characteristic curves

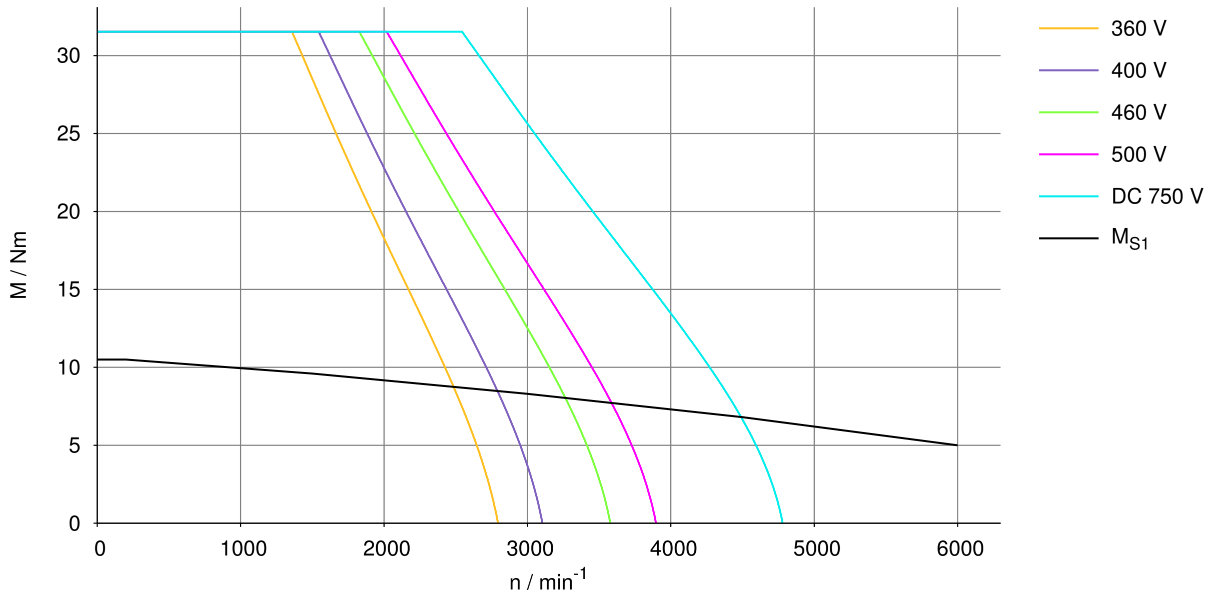

Illustration 30: CM3C80S, 2000 min-1

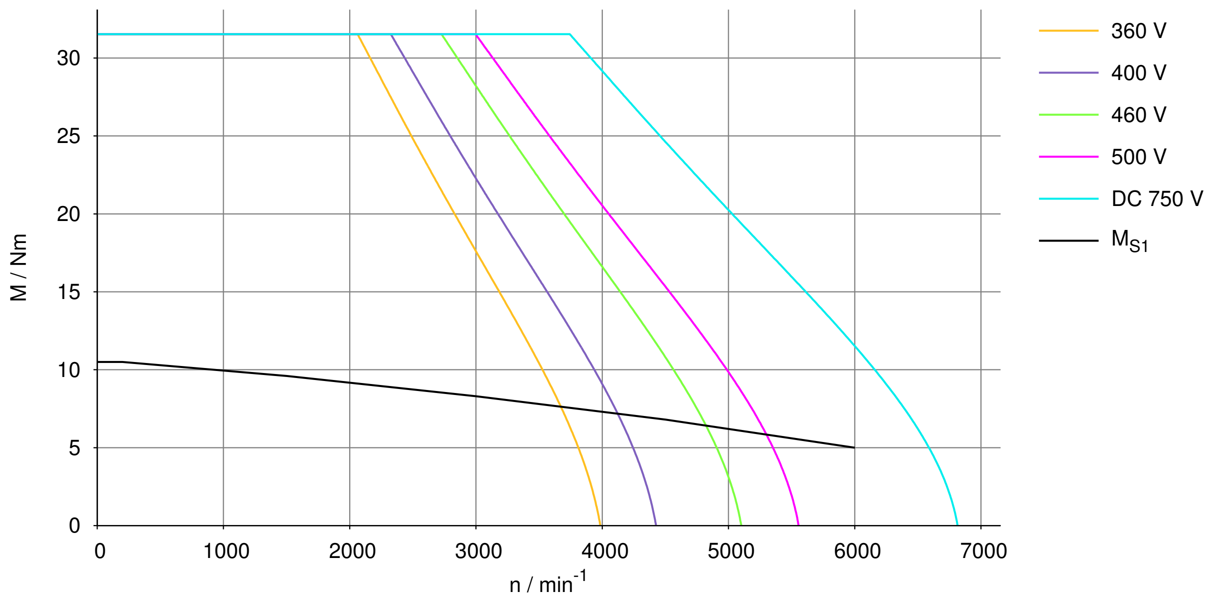

Illustration 31: CM3C80S, 3000 min-1

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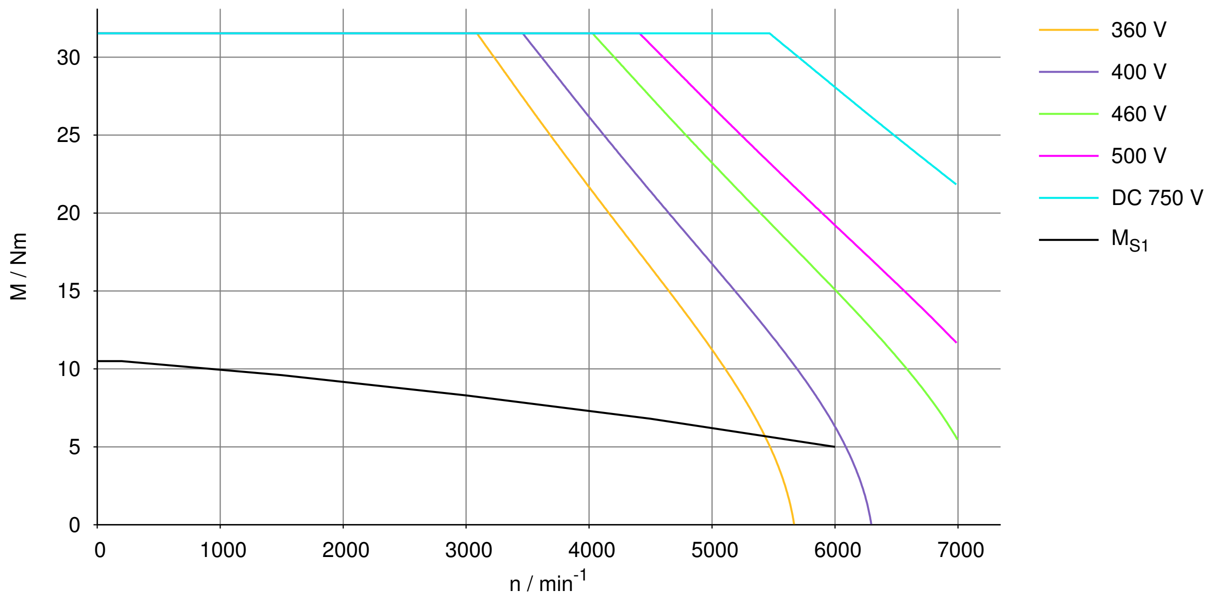

Illustration 32: CM3C 80S, 4500 min^{-1}

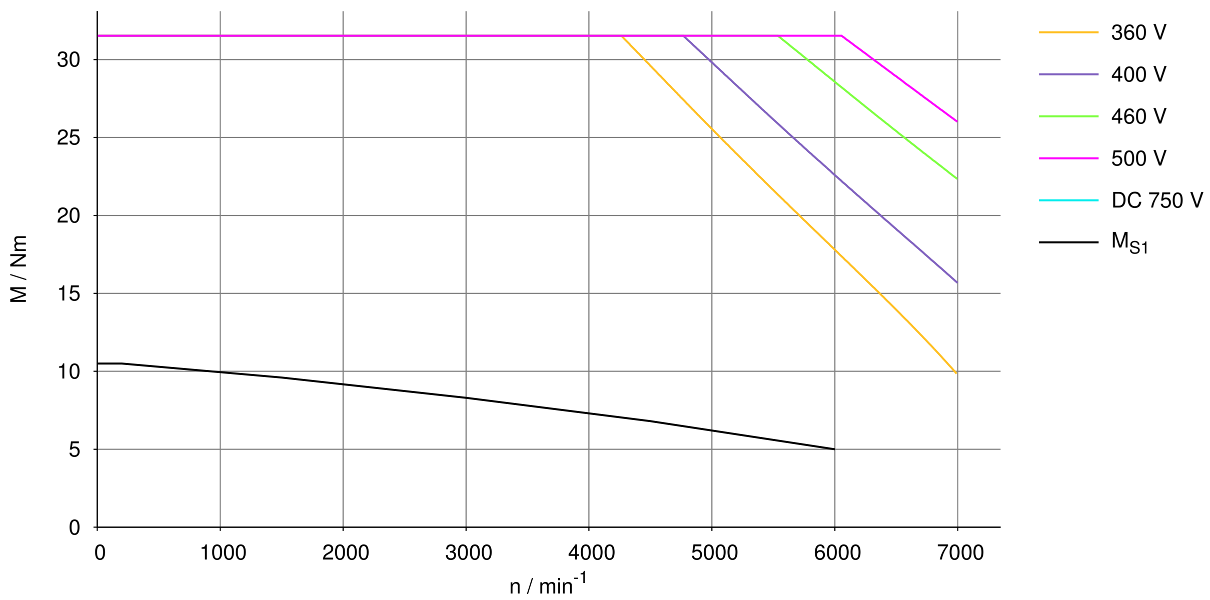

Illustration 33: CM3C 80S, 6000 min^{-1}

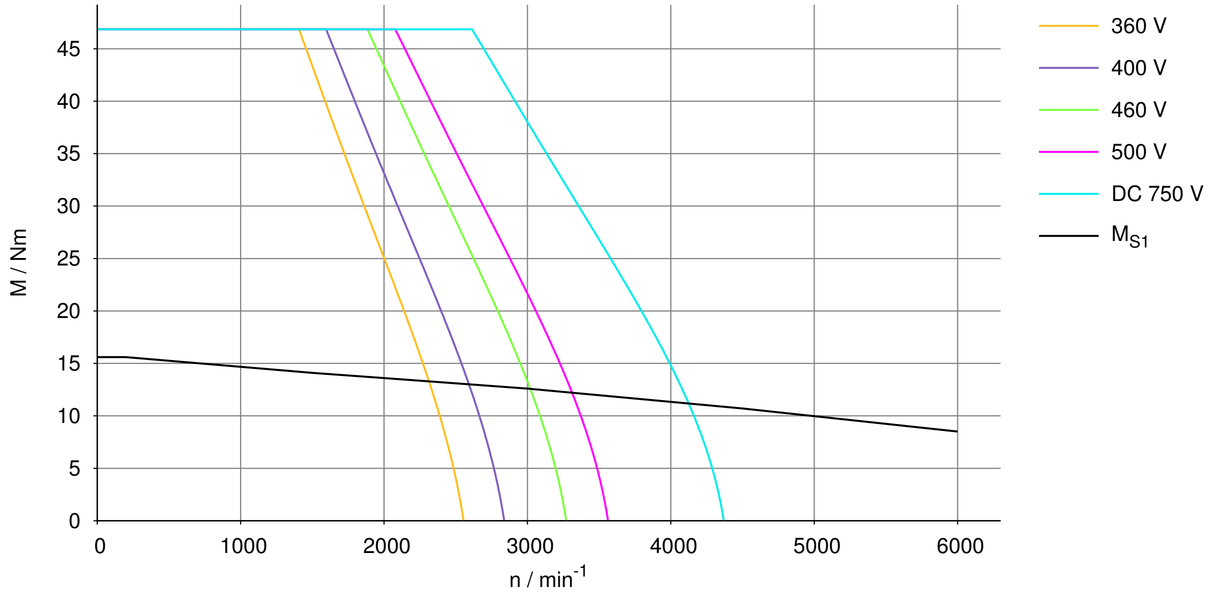

Illustration 34: CM3C 80M, 2000 min^{-1}

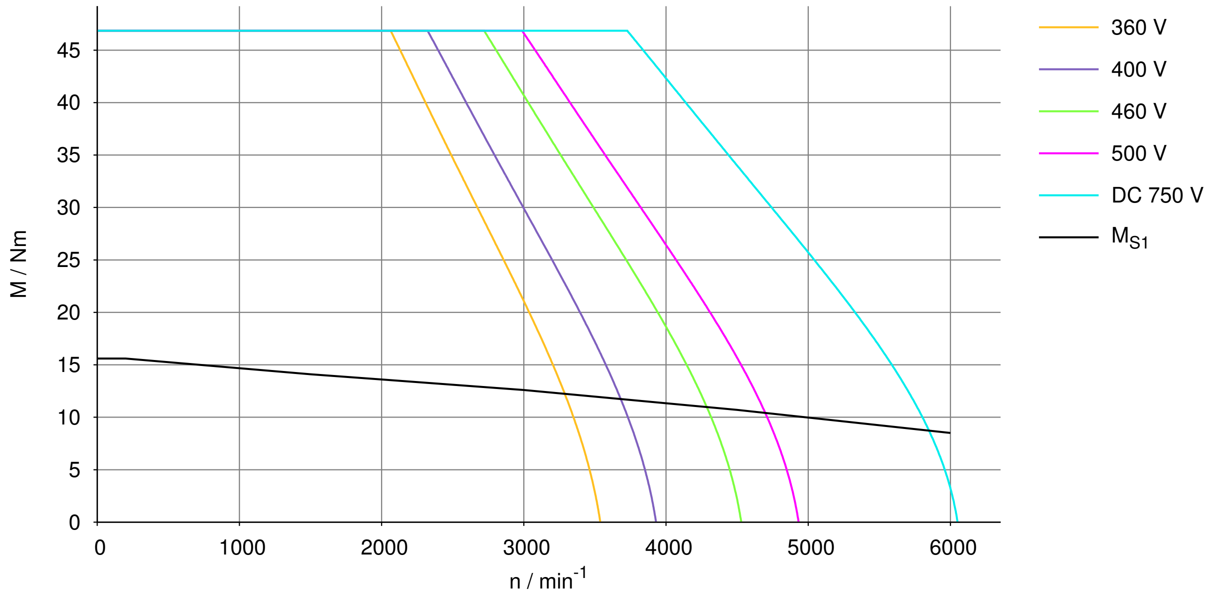

Illustration 35: CM3C 80M, 3000 min^{-1}

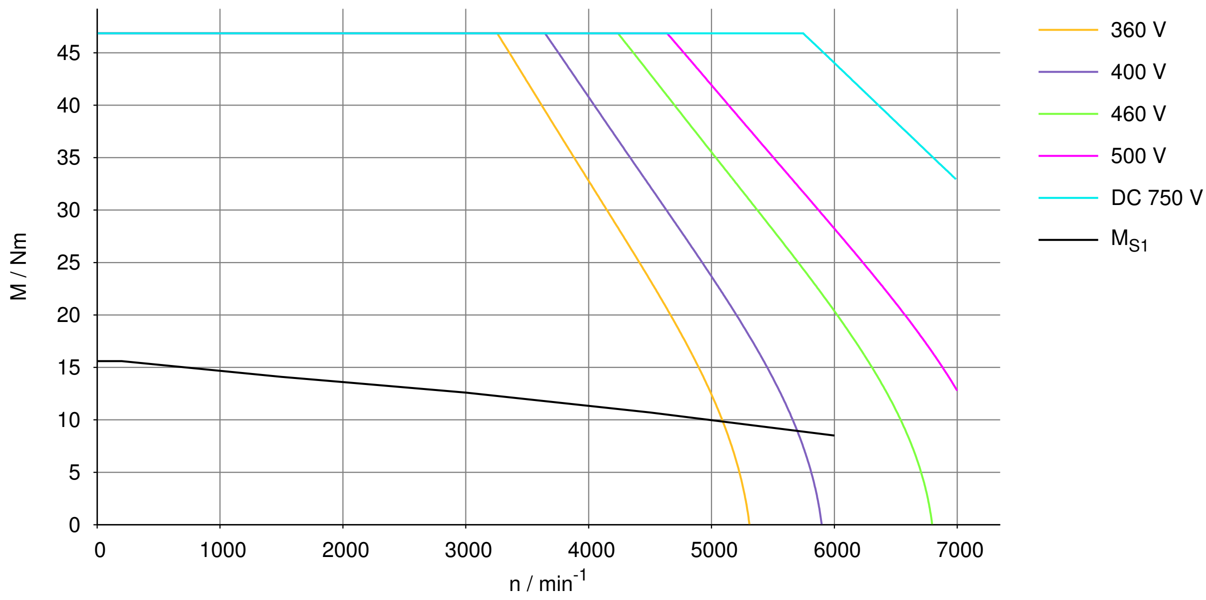

Illustration 36: CM3C 80M, 4500 min^{-1}

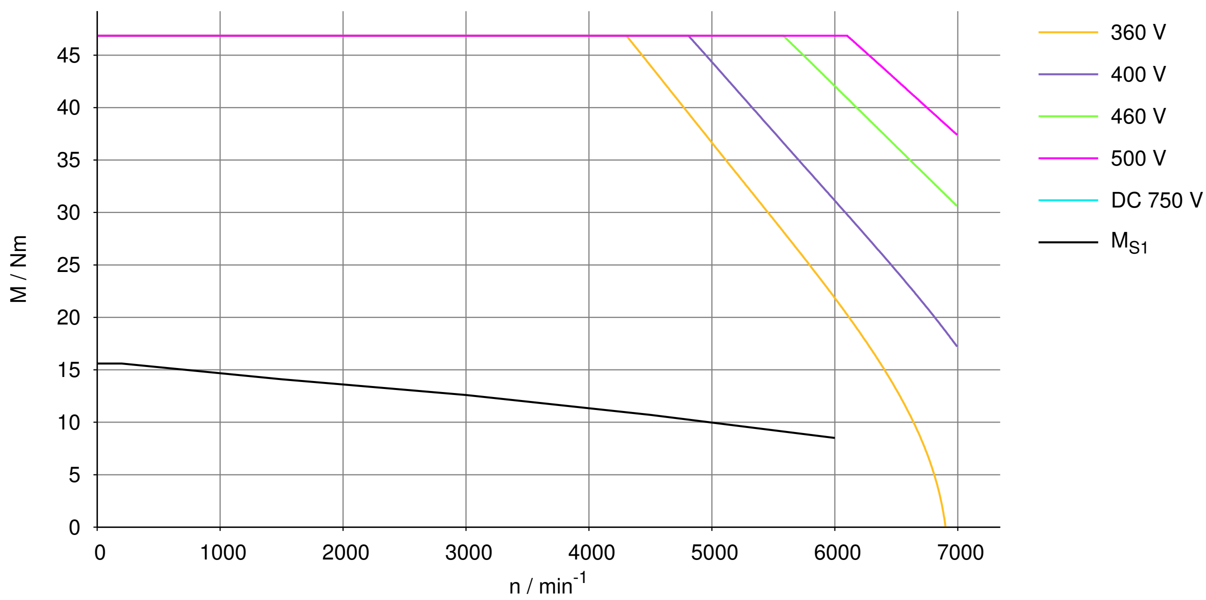

Illustration 37: CM3C 80M, 6000 min^{-1}

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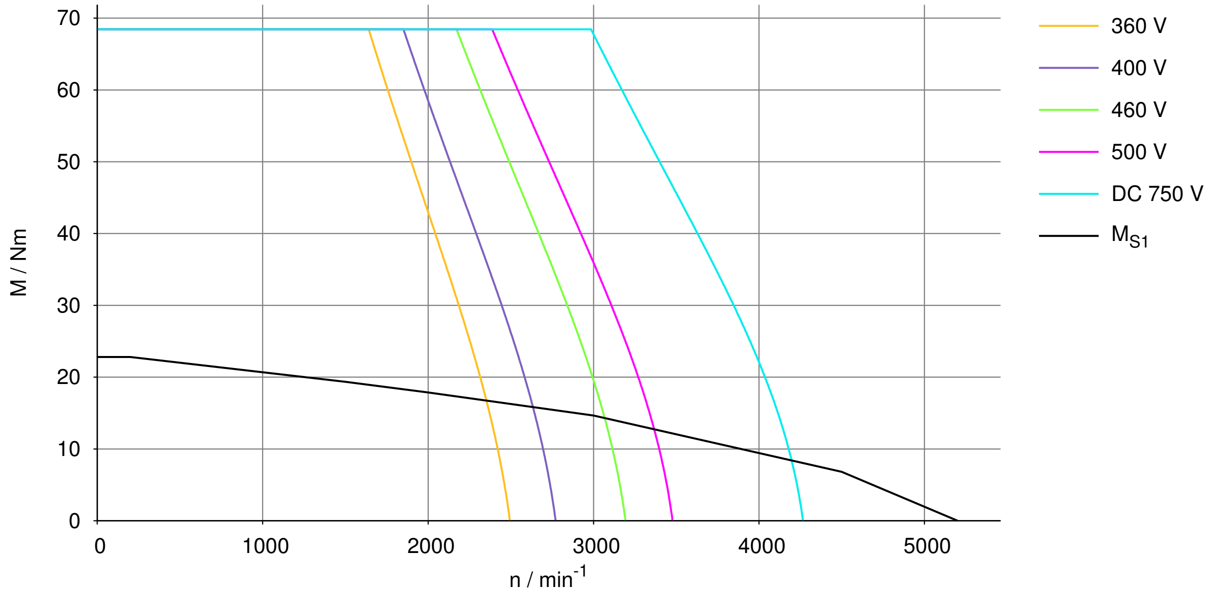

Illustration 38: CM3C80L, 2000 min^{-1}

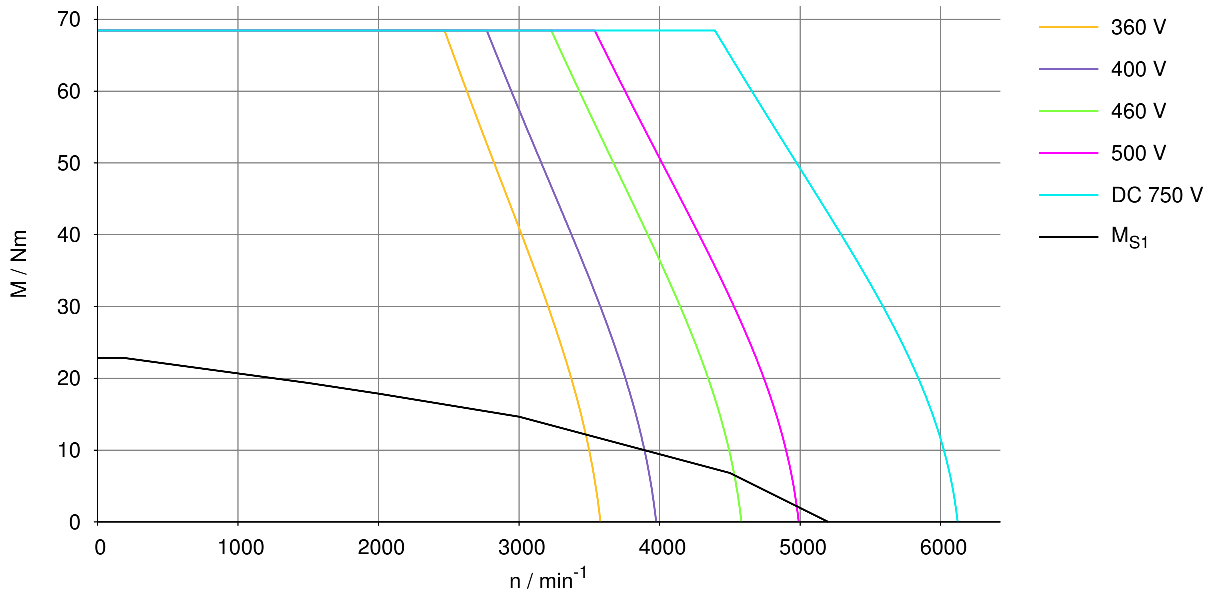

Illustration 39: CM3C80L, 3000 min^{-1}

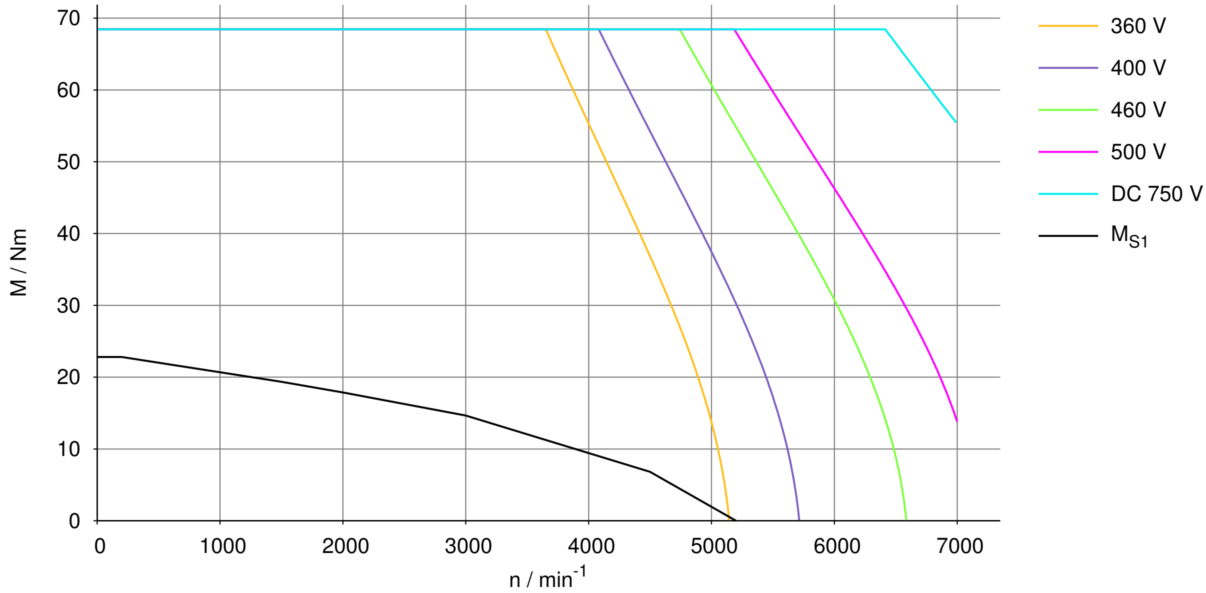

Illustration 40: CM3C80L,4500 min^{-1}

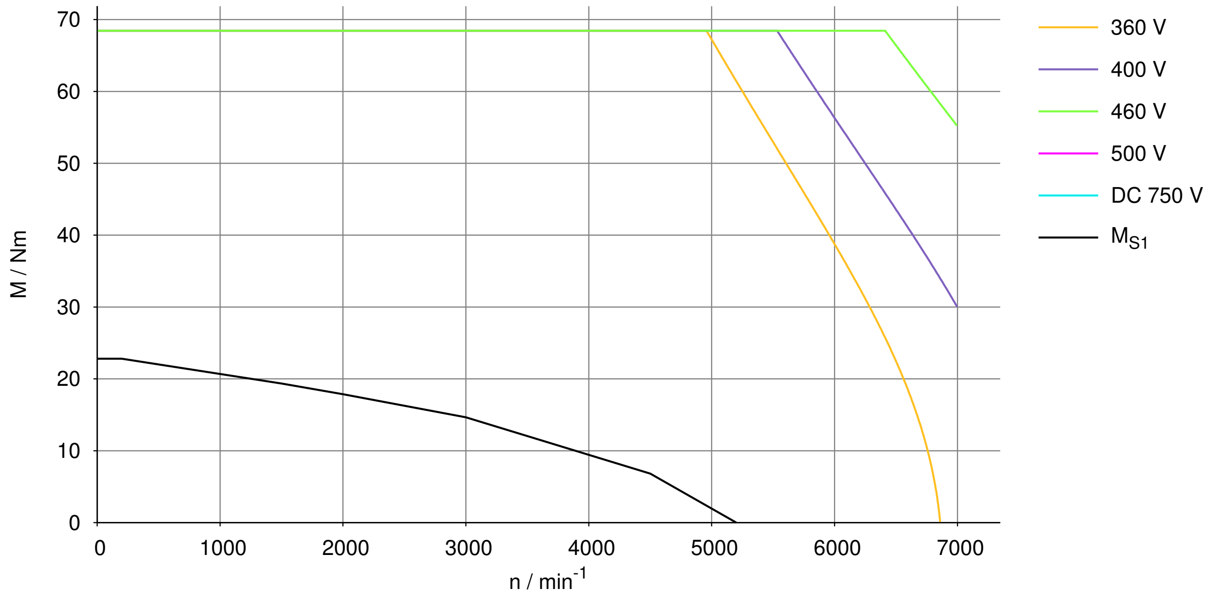

Illustration 41: CM3C80L, 6000 min^{-1}

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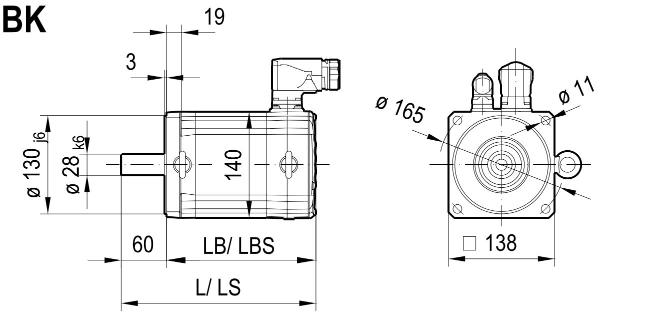
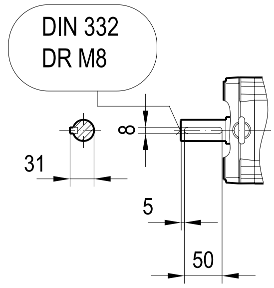
3.5.3 Dimension sheets

CM3C80S/M/L
CM3C80S/M/L BK

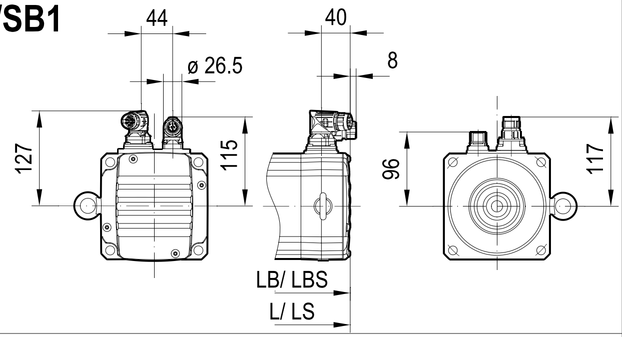
08 187 00 19

/RH1M
/AK1H
/EK1H
/AK0H

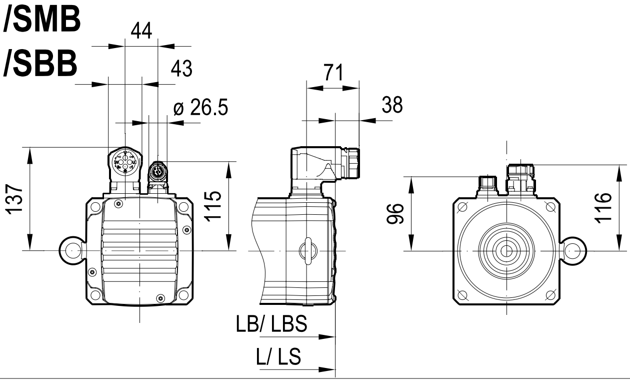




/SM1
/SB1



/SMB
/SBB



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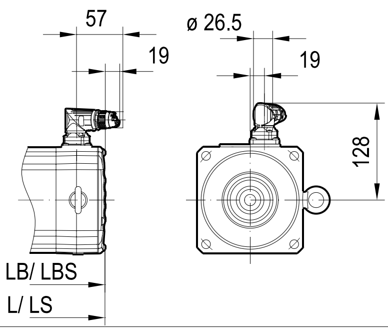
/SD1
/AZ2Z
/EZ2Z



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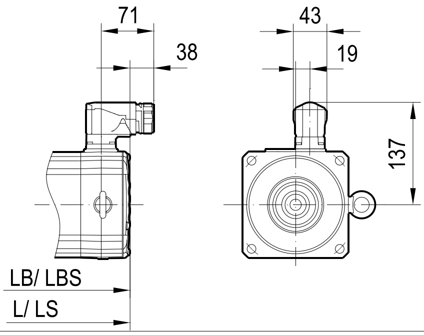
/EZ2Z



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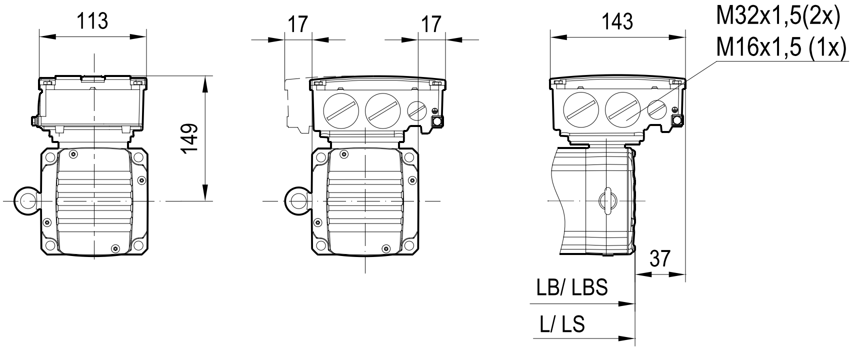

(→ 📖 6.1)	CM3C80							
	S	M	L					
LB	198	224	277					
L	258	284	337					
LBS	266	292	345					
LS	326	352	405					

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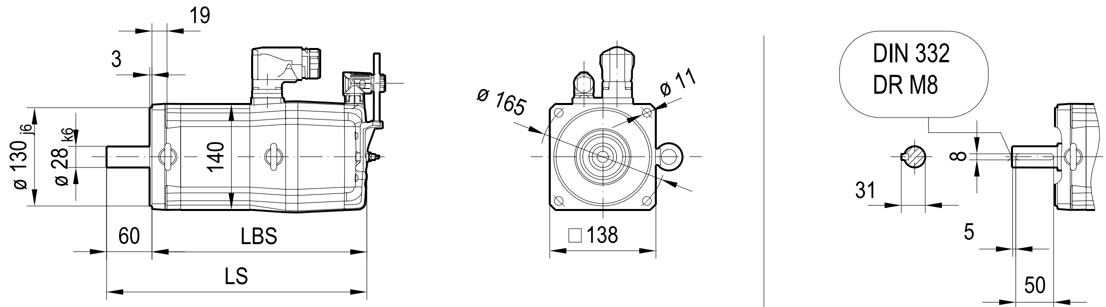
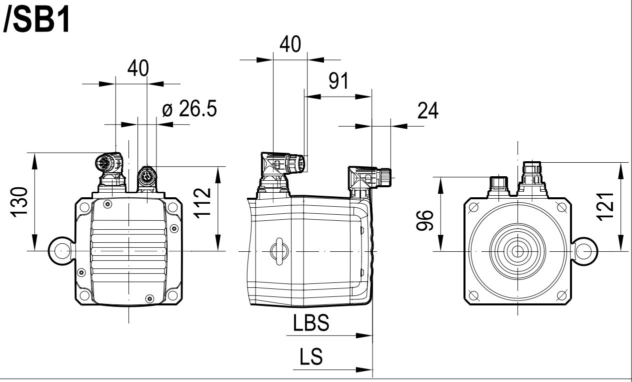
CM3C80S/M/L BZ(D)

09 165 00 19

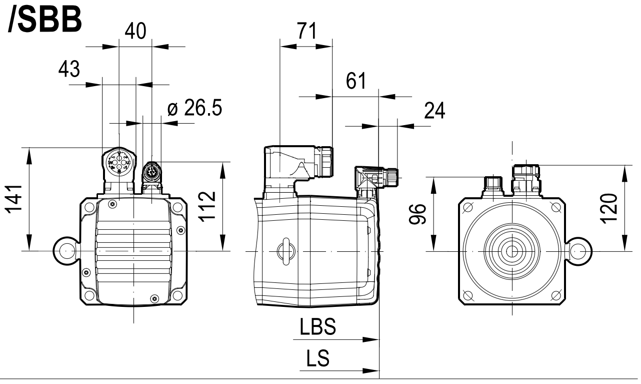
/RH1M
/AK1H
/EK1H
/AK0H



/SB1



/SBB



/SH1

/SD1
/AZ2Z
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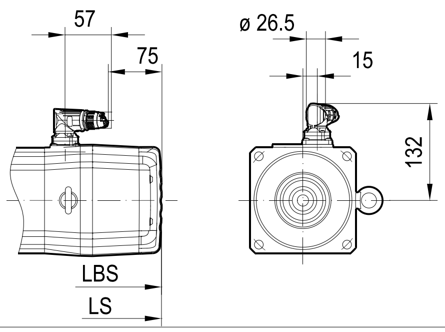

/SHB

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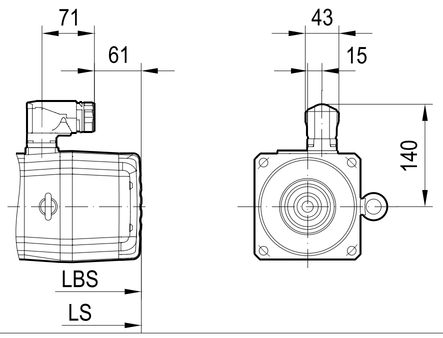
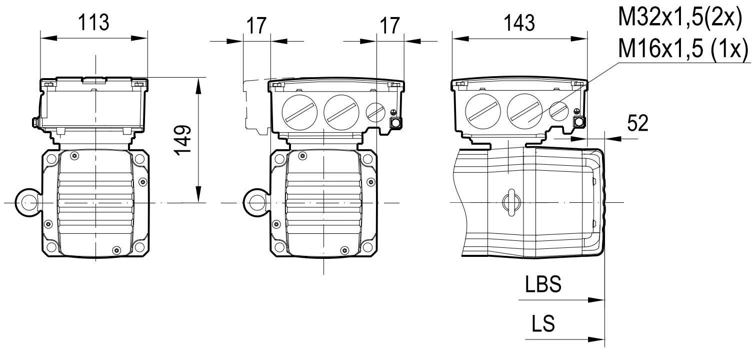
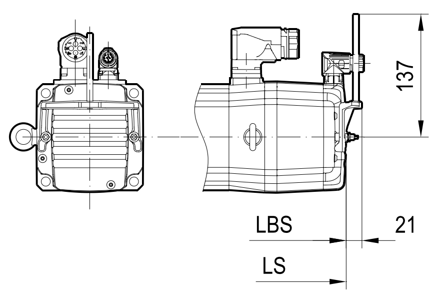


/KK



/HR



(→ 📖 6.1)	CM3C80							
	S	M	L					
LBS	288	314	367					
LS	348	374	427					

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3.5.4 Overhung and axial loads for motor shaft ends

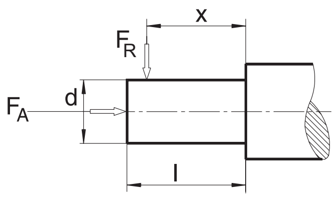
Permitted axial load

Determine the maximum permitted axial load F_A by multiplying the maximum permitted overhung load F_R with the factor 0.3:

$$F_A = 0.3 \times F_R$$

Permitted overhung load

Determine the permitted overhung loads F_R at point x via the following diagrams. "x" is the distance between the shaft shoulder and the force application:



For further information regarding the general conditions of the overhung load diagrams, refer to chapter "Notes on overhung load diagrams" (▸ 163).

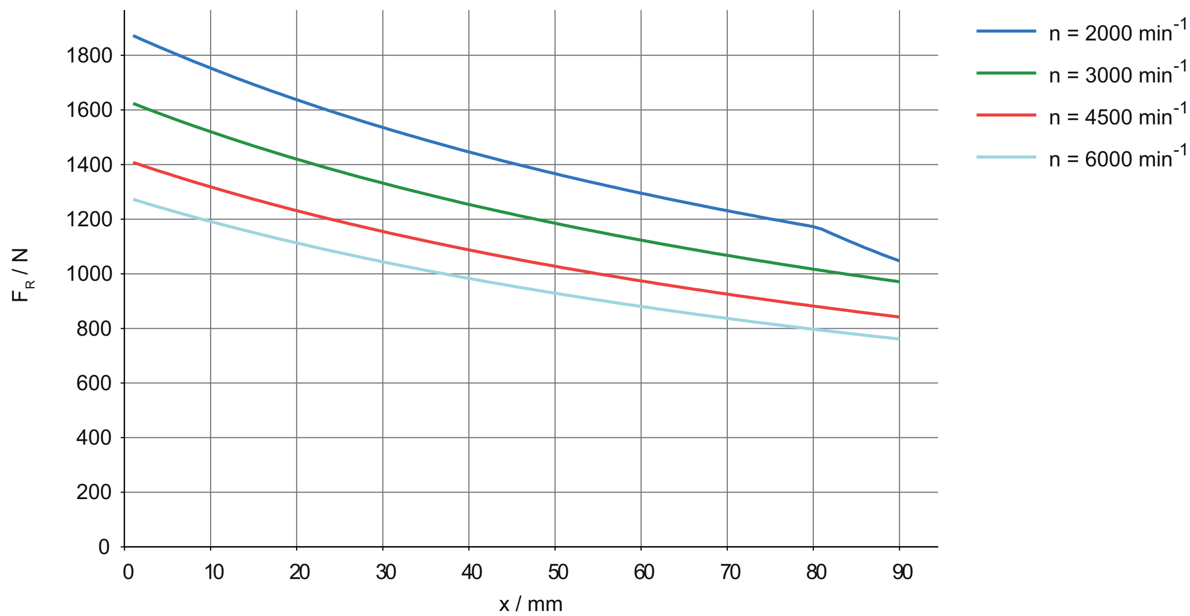


Illustration 42: CM3C80S, shaft Ø28 × 60 mm

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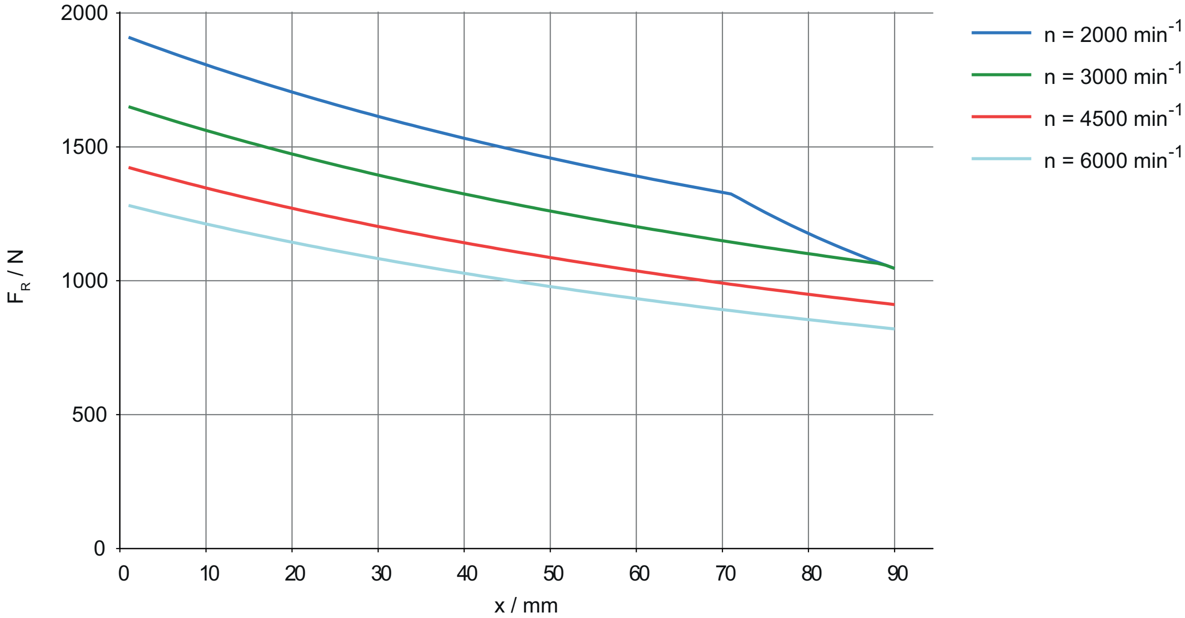

Illustration 43: CM3C80M, shaft Ø28 × 60 mm

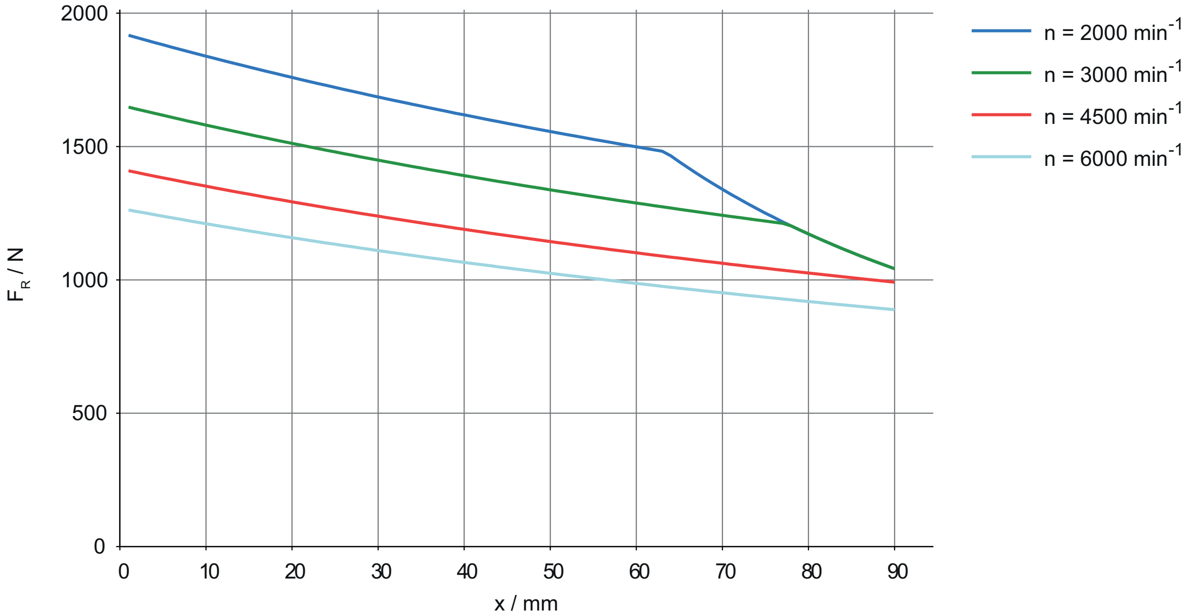

Illustration 44: CM3C80L, shaft Ø28 × 60 mm

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3.5.5 Torque-current characteristics

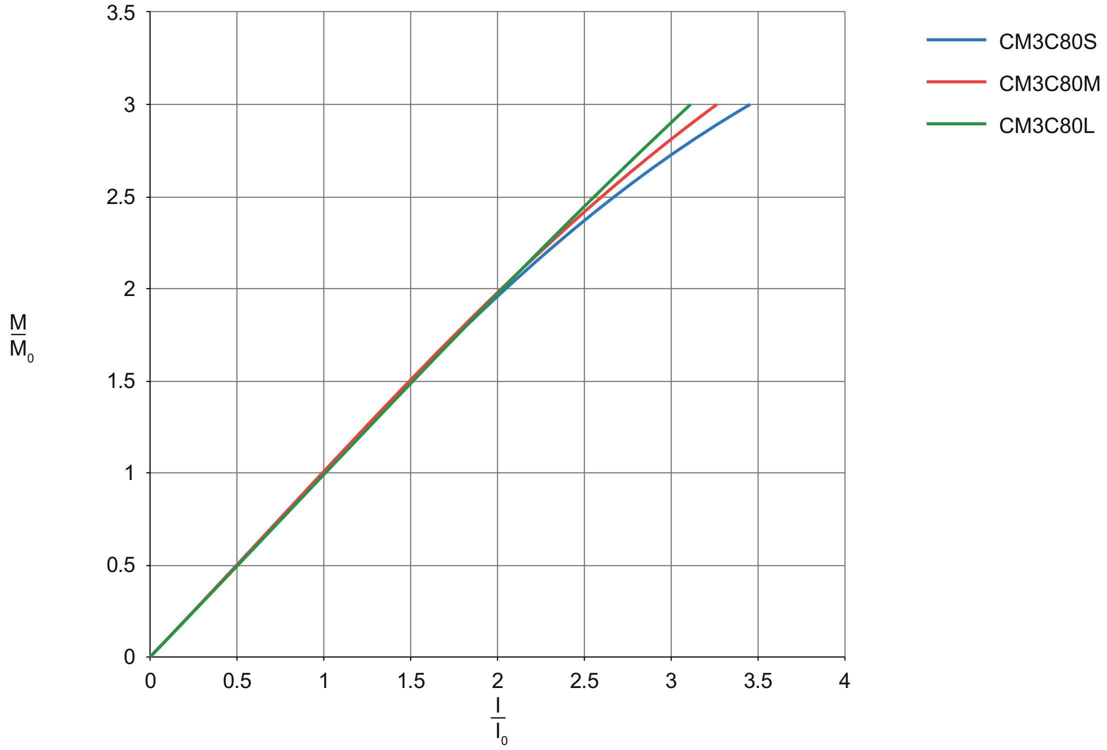

Illustration 45: Torque-current characteristic CM3C80

3.6 CM3C100

3.6.1 Technical data

			CM3C100S			CM3C100M			CM3C100L		
Speed class	n_c	min^{-1}	2000	3000	4500	2000	3000	4500	2000	3000	4500
Standstill torque	M_0	Nm	19			26.8			40		
Standstill current	I_0	A	8.63	12.8	18.9	12.5	17.8	27.6	17.5	27.2	37.7
Dynamic limit torque	M_{pk}	Nm	57	57	57	80.4	80.4	80.4	120	120	120
Maximum motor current	I_{max}	A	31.5	46.5	69	43.7	62.1	96.2	56.8	88.4	122
Inductance (phase)	L_1	mH	8.47	3.88	1.76	5.13	2.55	1.06	3.14	1.3	0.677
Resistance (phase) at 20 °C	R_1	Ω	0.814	0.352	0.161	0.485	0.232	0.0962	0.28	0.116	0.06
Internal voltage at 1000 min^{-1}	$U_{p0\ kalt}$	V	150	102	68.6	145	102	66.1	157	101	72.9
Mechanical data of motor											
Number of poles			8								
Maximum perm. radial load	F_{Ramax}	N	2517	2187	1896	2631	2280	1974	2751	2370	2040
Maximum perm. axial load	F_{Aamax}	N	839	729	632	877	760	658	917	790	680
Mass of the motor	m_{mot}	kg	16.5			20.2			27.7		
Mass moment of inertia	J_{mot}	10^{-4} kgm^2	40			57.3			92.1		

Mechanical data of the brakemotor

			CM3C100S				CM3C100M				CM3C100L			
Brake type			BZ5	BZ5D	BK4	BK6	BZ5	BZ5D	BK4	BK6	BZ5	BZ5D	BK4	BK6
Mass moment of inertia of the brakemotor	J_{bmot}	10^{-4} kgm^2	50.8	50.8	45.9	55.7	68.1	68.1	63.2	73	103	103	98	108
Mass of the brakemotor	m_{bmot}	kg	30	30	20	21	34	34	24	25	41	41	31	32

Technical data of the brake

			BZ5	BZ5D	BK4	BK6
Brake application speed in case of emergency stop	$n_{max,1}$	min^{-1}	4500	4500	4500	4500
Nominal voltage of brake, AC	U_N	AC V	110/230/400/460	-	-	-
Nominal voltage of brake, DC	U_N	DC V	24	24	24	24
Nominal braking torque	$M_{4,100°C}$	Nm	22/32/44/63	22/32	30	46

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3.6.2 Dynamic and thermal limit characteristic curves

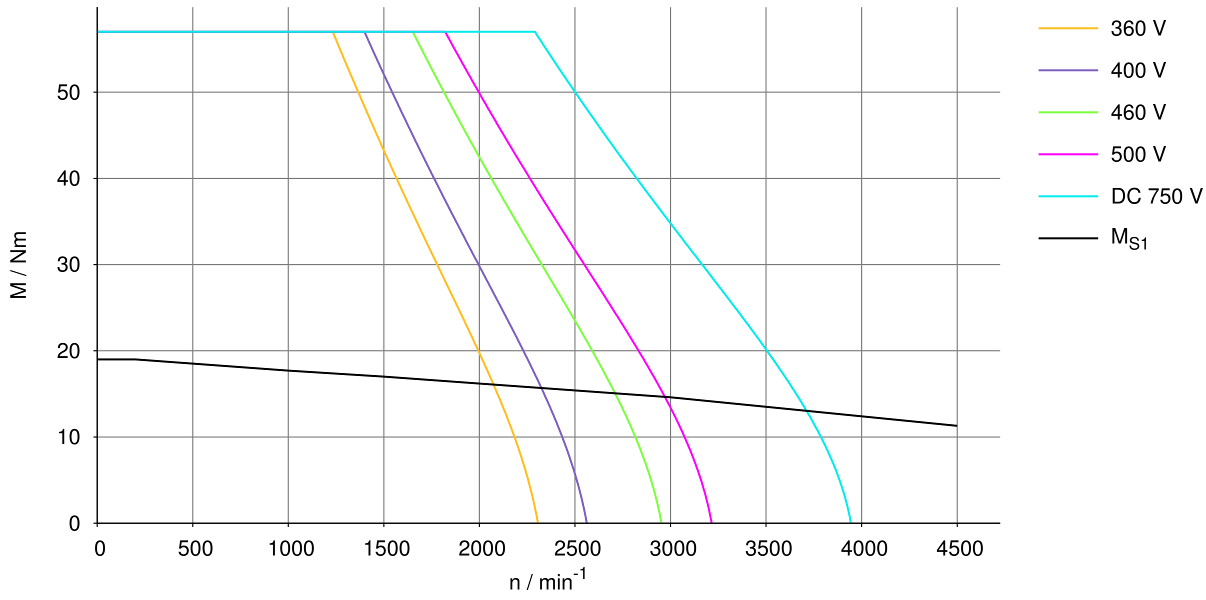

Illustration 46: CM3C 100S, 2000 min^{-1}

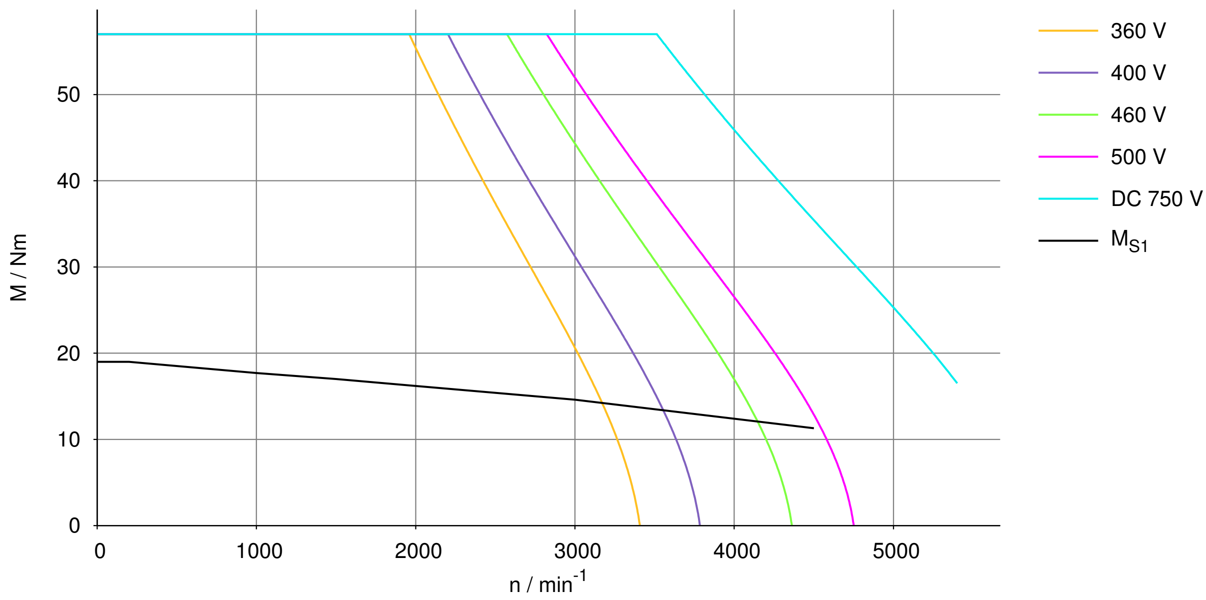

Illustration 47: CM3C 100S, 3000 min^{-1}

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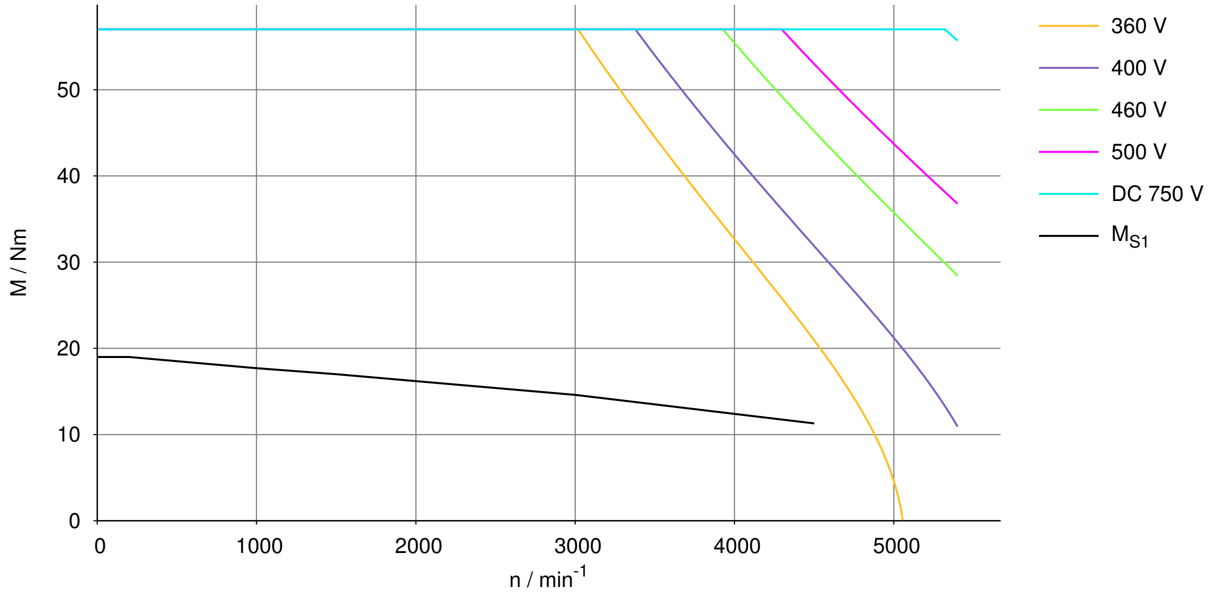

Illustration 48: CM3C 100S, 4500 min^{-1}

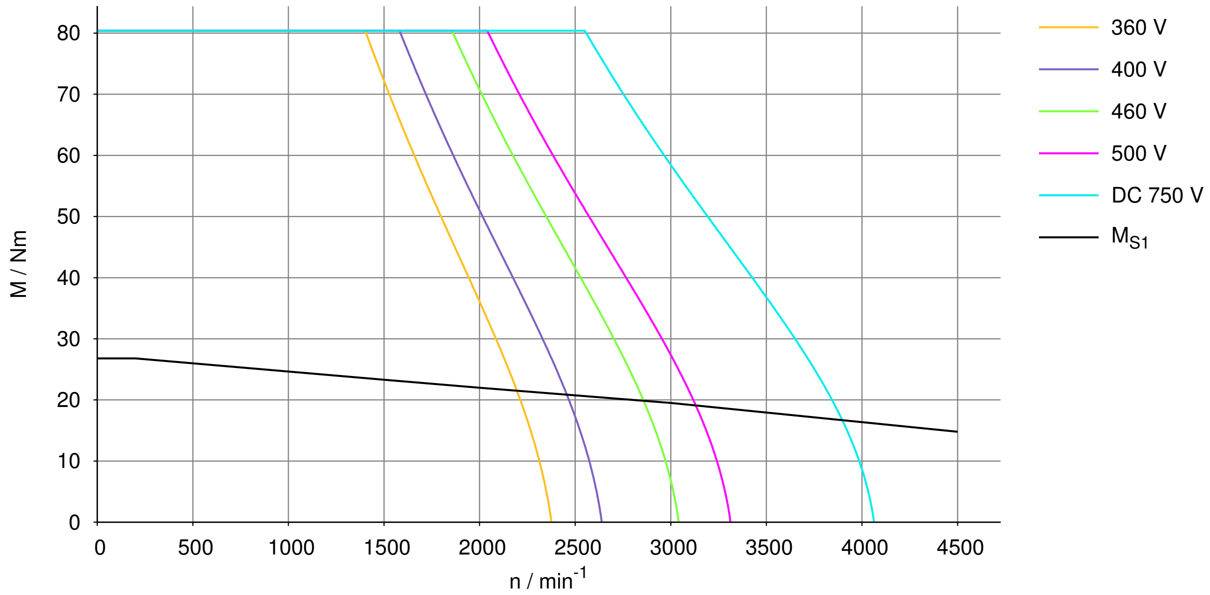

Illustration 49: CM3C 100M, 2000 min^{-1}

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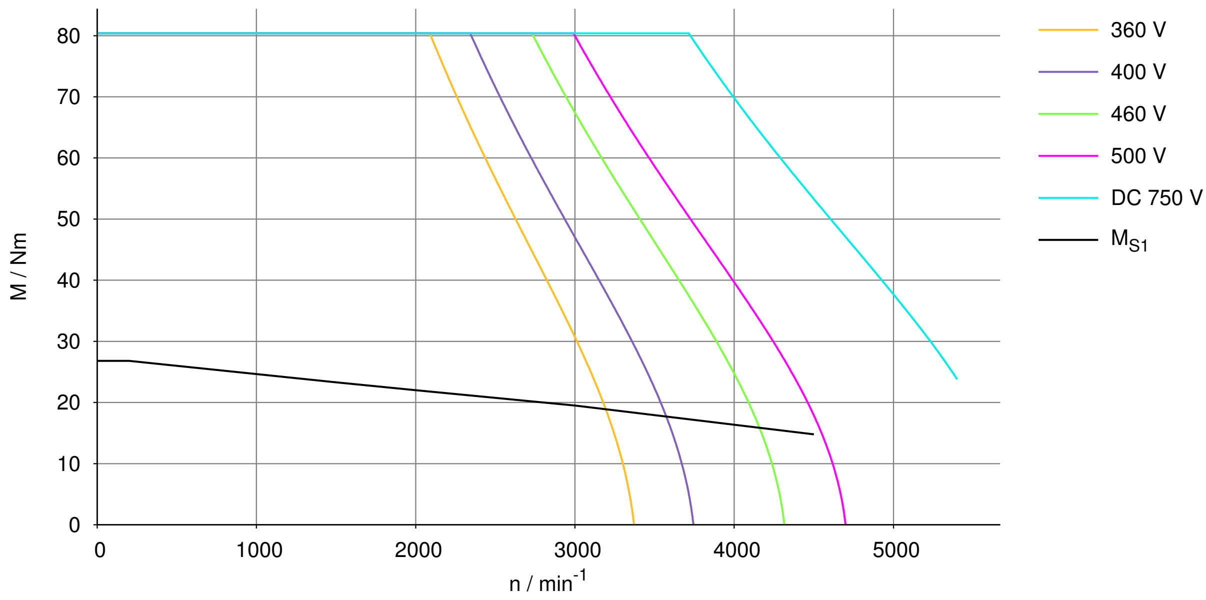


Illustration 50: CM3C 100M, 3000 min^{-1}

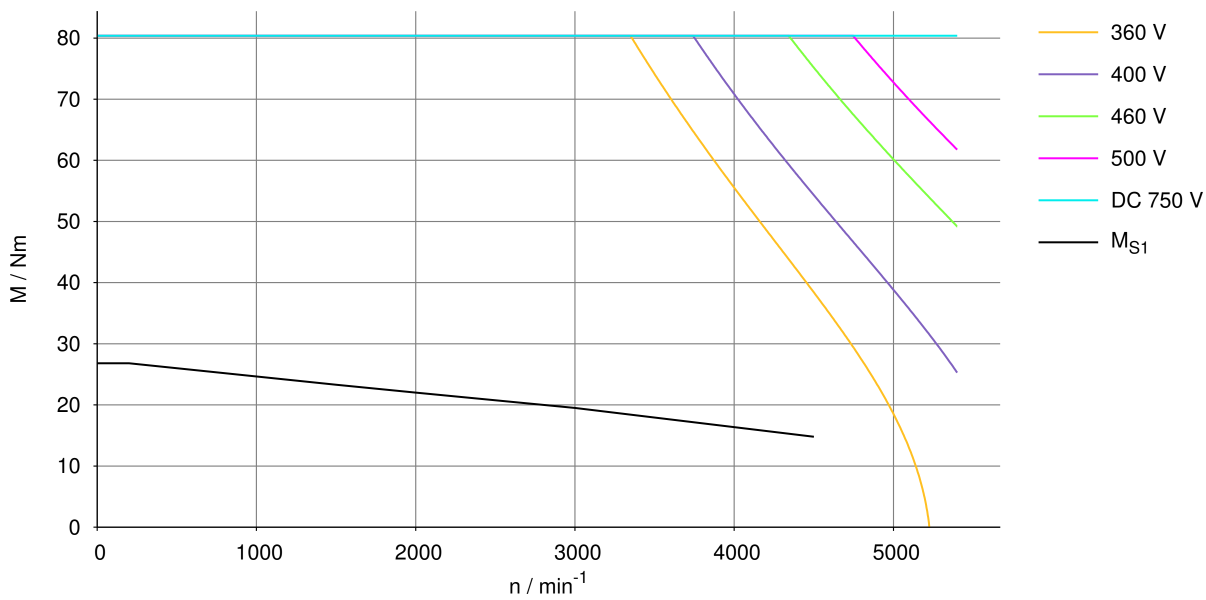


Illustration 51: CM3C 100M, 4500 min^{-1}

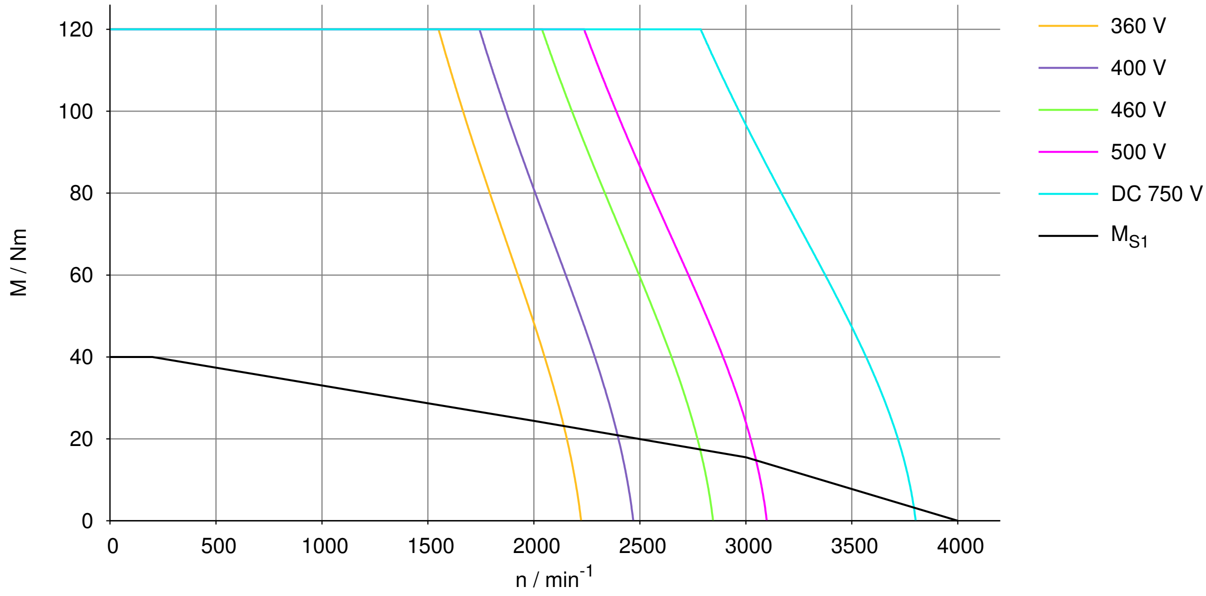


Illustration 52: CM3C 100L, 2000 min^{-1}

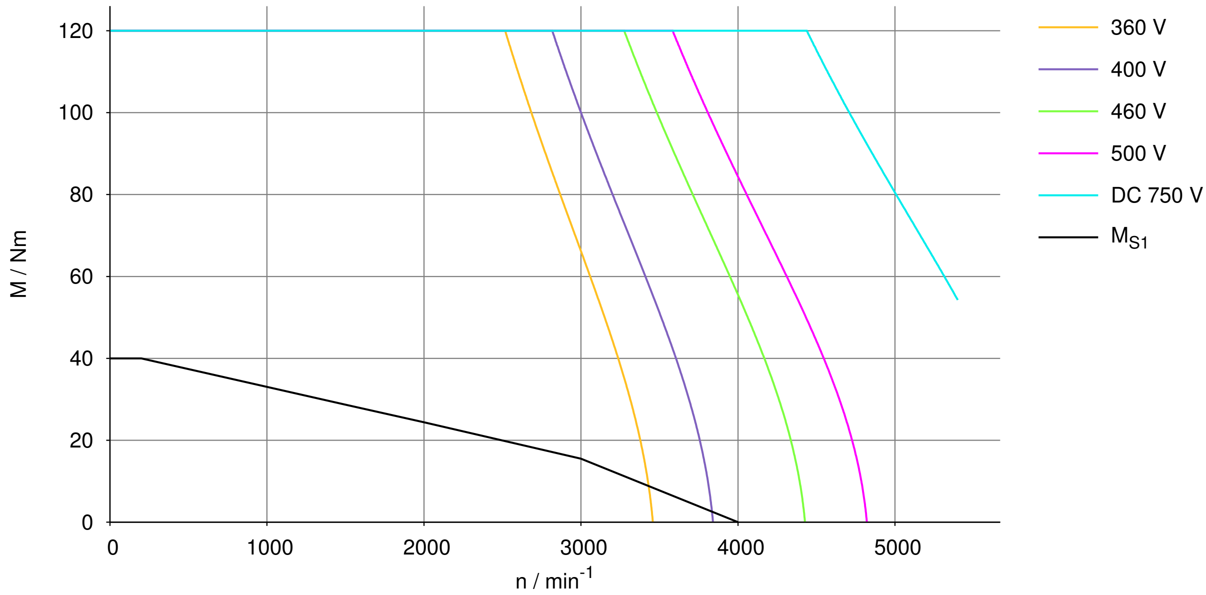


Illustration 53: CM3C 100L, 3000 min^{-1}

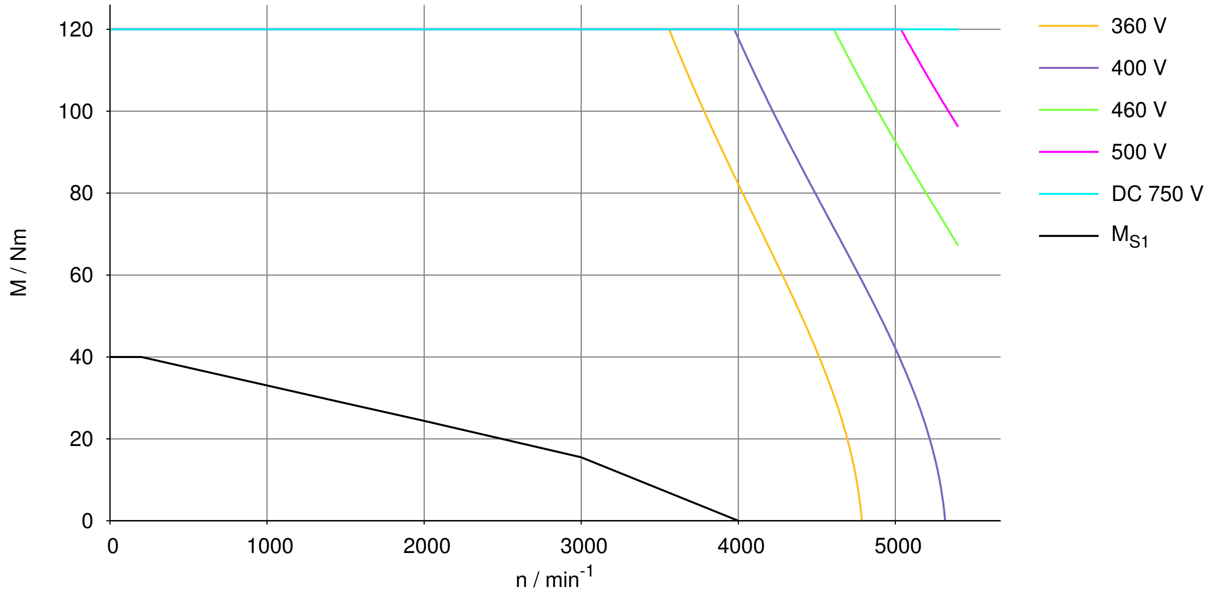


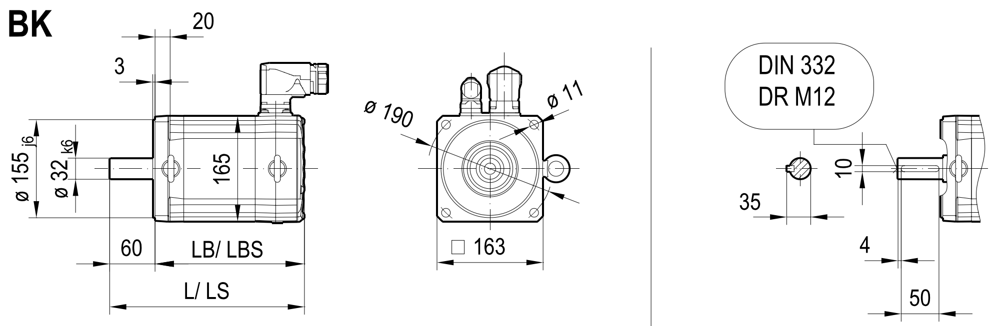
Illustration 54: CM3C 100L, 4500 min^{-1}

3.6.3 Dimension sheets

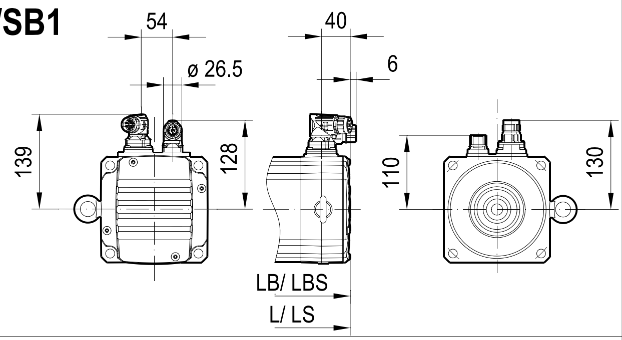
CM3C100S/M/L
CM3C100S/M/L BK

08 188 00 19

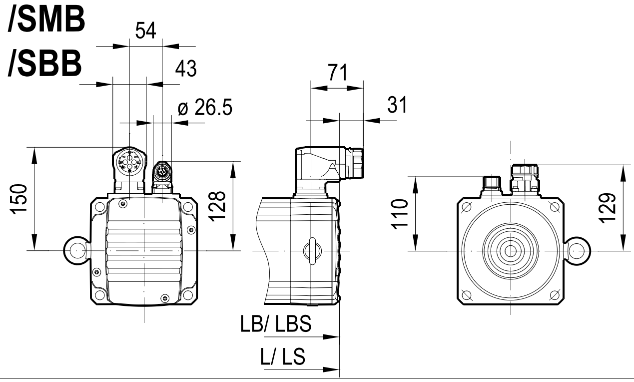
/RH1M
/AK1H
/EK1H
/AK0H



/SM1
/SB1

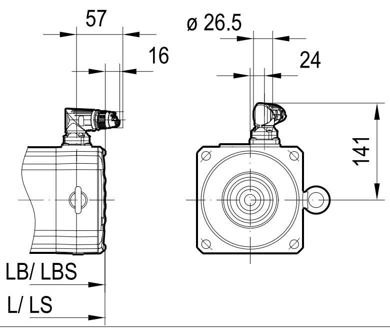


/SMB
/SBB



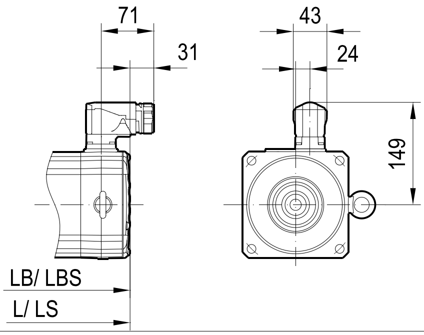
/SH1

/SD1
/AZ2Z
/EZ2Z



/SHB

/SDB
/AZ2Z
/EZ2Z



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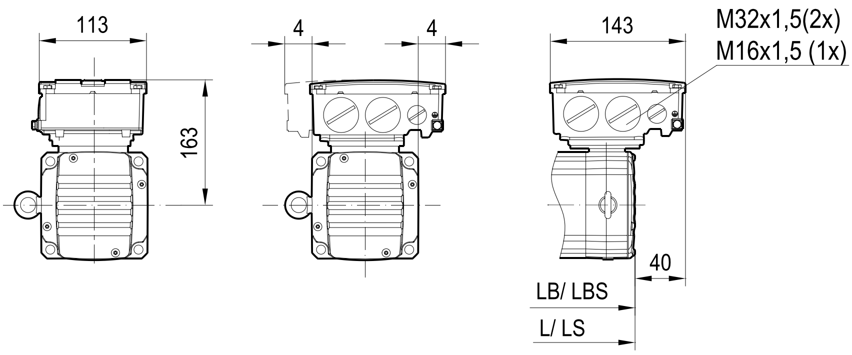
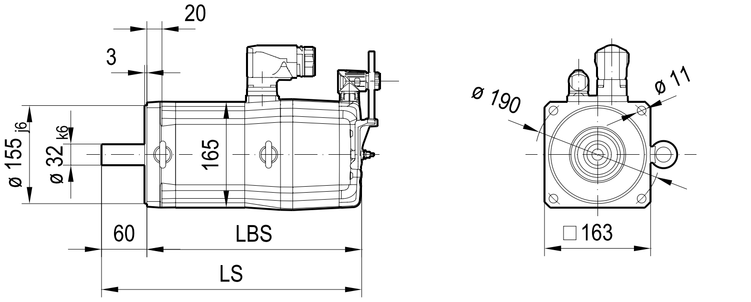


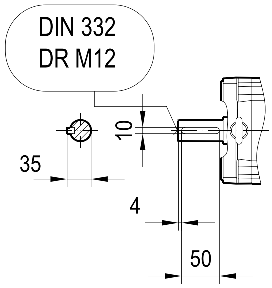
(→ 📖 6.1)	CM3C100							
	S	M	L					
LB	216	244	301					
L	276	304	361					
LBS	290	318	375					
LS	350	378	435					

CM3C100S/M/L BZ(D)

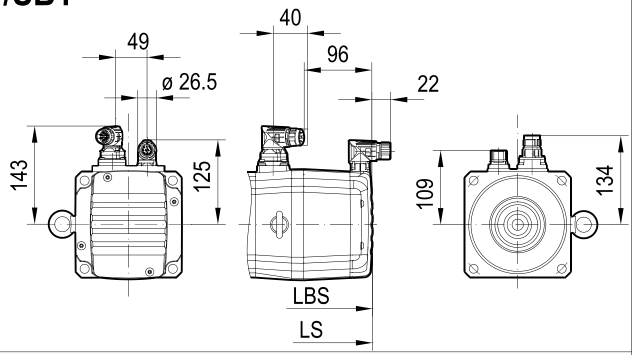
09 167 00 19

/RH1M
/AK1H
/EK1H
/AK0H





/SB1



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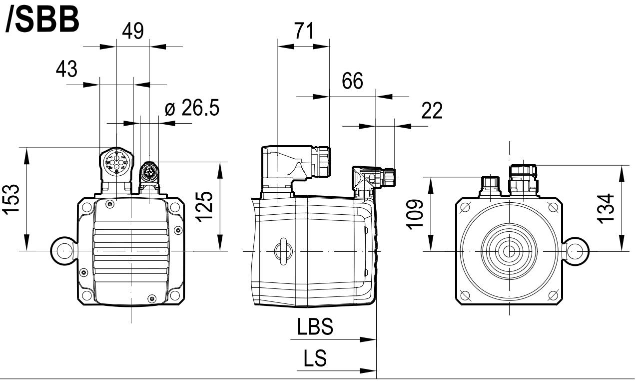
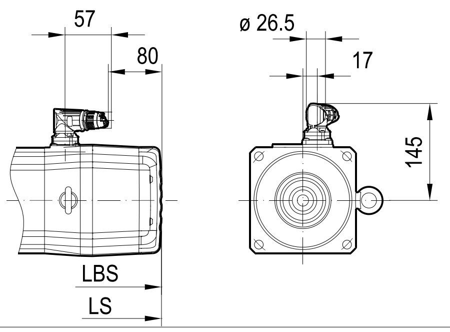


/SH1

/SD1
/AZ2Z
/EZ2Z



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/SDB
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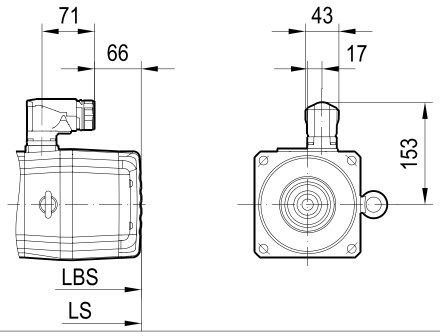
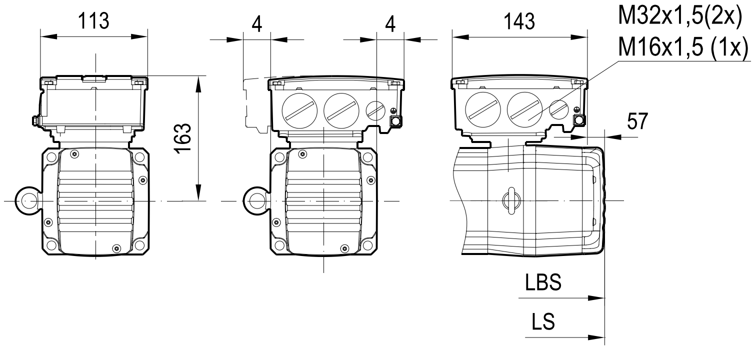
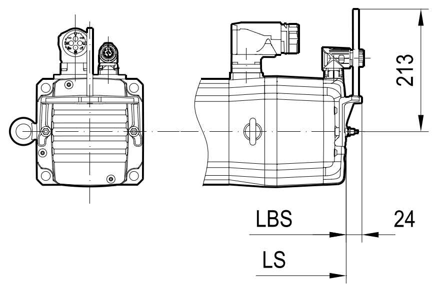
/EZ2Z



/KK



/HR



(→ 📖 6.1)	CM3C100							
	S	M	L					
LBS	312	340	397					
LS	372	400	457					

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3.6.4 Overhung and axial loads for motor shaft ends

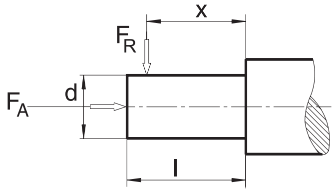
Permitted axial load

Determine the maximum permitted axial load F_A by multiplying the maximum permitted overhung load F_R with the factor 0.3:

$$F_A = 0.3 \times F_R$$

Permitted overhung load

Determine the permitted overhung loads F_R at point x via the following diagrams. "x" is the distance between the shaft shoulder and the force application:



For further information regarding the general conditions of the overhung load diagrams, refer to chapter "Notes on overhung load diagrams" (▸ 163).

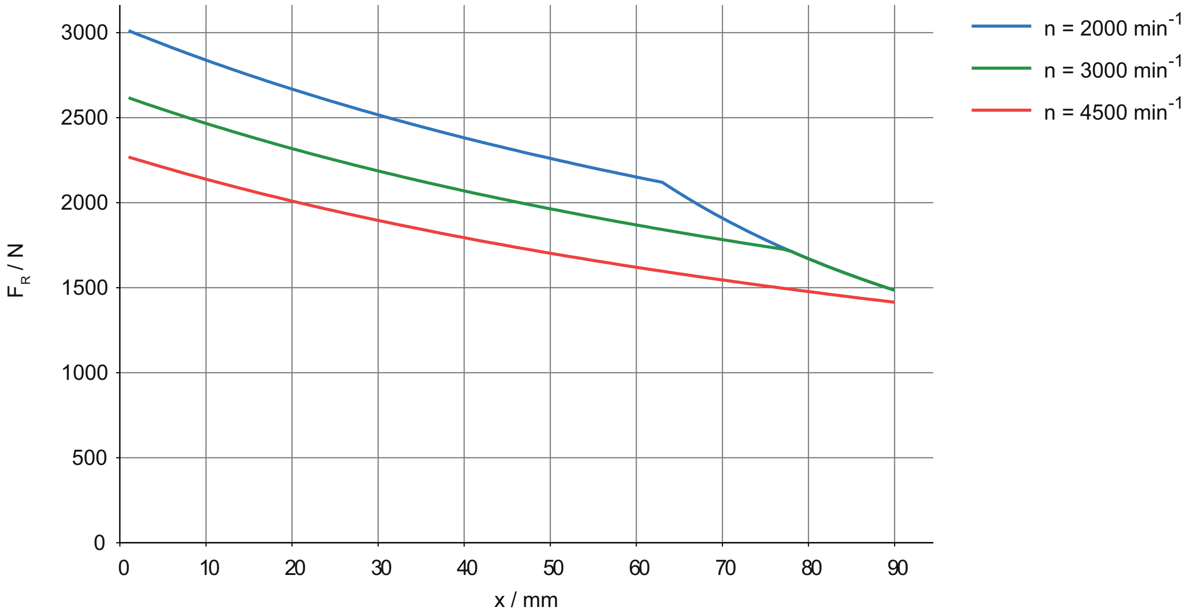


Illustration 55: CM3C100S, shaft Ø32 × 60 mm

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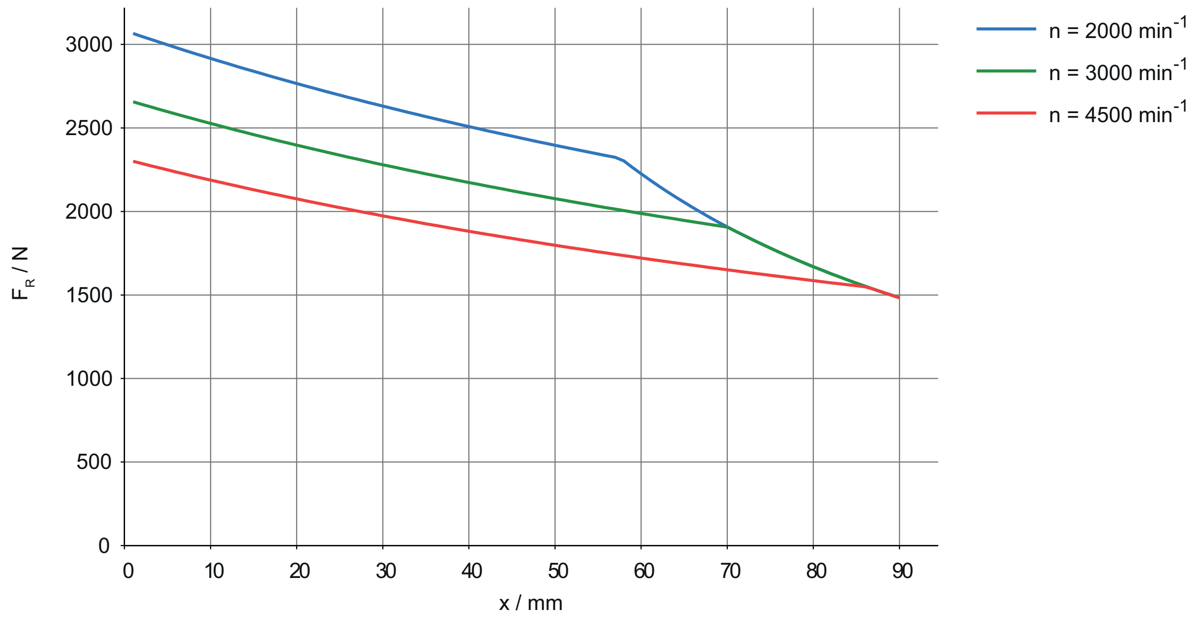

Illustration 56: CM3C100M, shaft Ø32 × 60 mm

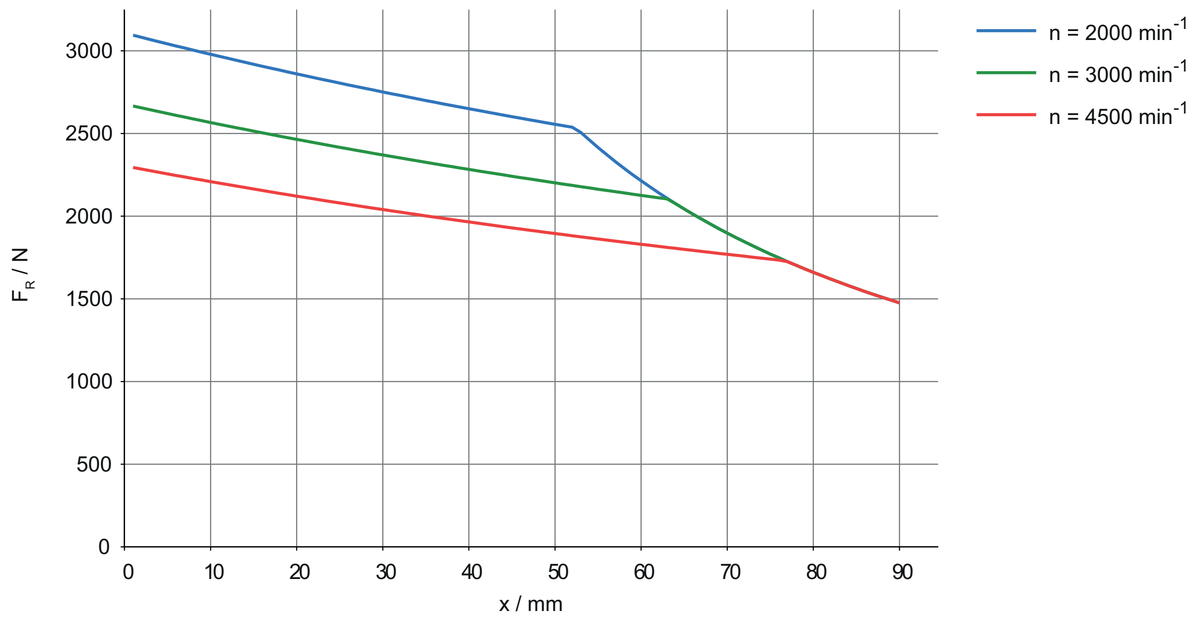

Illustration 57: CM3C100L, shaft Ø32 × 60 mm

3.6.5 Torque-current characteristics

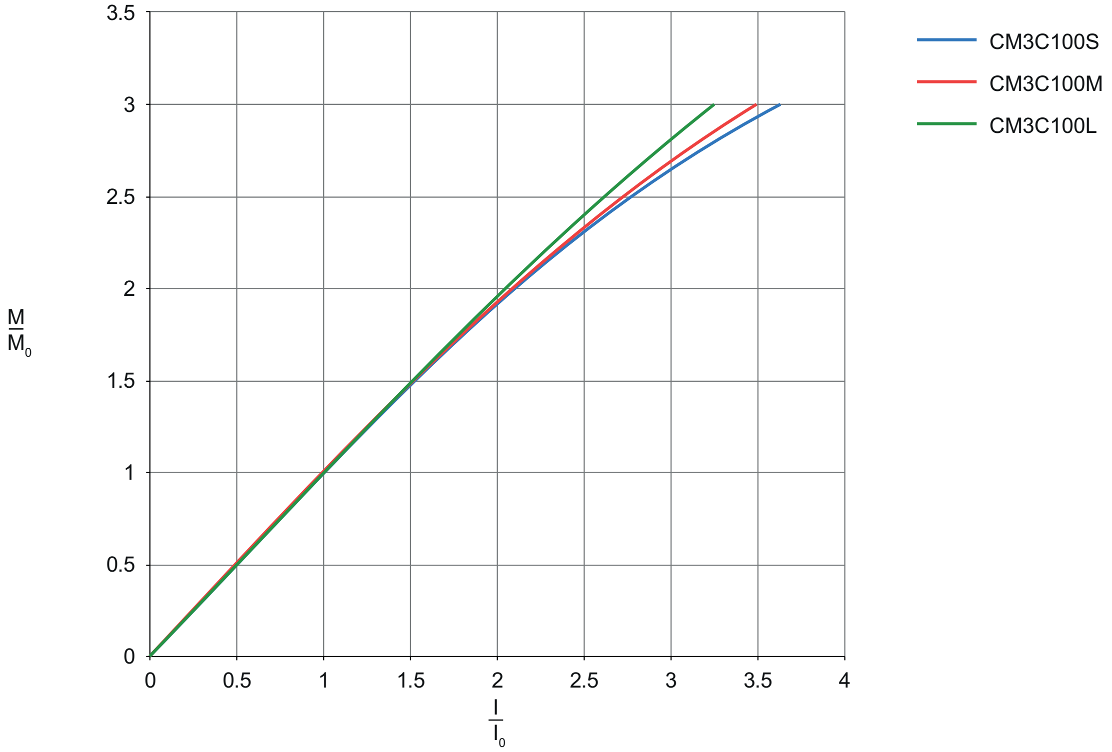

Illustration 58: Torque-current characteristic CM3C100

4 Options and accessories of CM3C.. servomotors

For further information regarding the technical data, refer to chapter "Appendix" (▸ 162).

4.1 Brakes

For the product range of CM3C.. synchronous servomotors SEW-EURODRIVEhas designed a modular brake system that can be scaled precisely to the requirements of the application.

The electromechanical BK.. and BZ.. brake series are available for different applications where it is necessary to mechanically stop or hold the drive in various situations.

Based on the operation profile of the inverter-operated servomotors, it is assumed that the brake will primarily be used for holding when at standstill (holding brake).

Brake application from a speed only takes place in the event of emergency stop braking (non-controlled stopping of the drive, comparable with stop category 0 in accordance with EN 60204-1). Normally, the brake is activated after controlled stopping (stop category 1 in accordance with EN 60204-1) at speeds of < 20 min^{-1}.

4.1.1 Potential use of the brake

BZ../BZ..D brakes

Thanks to their proven functional principle, the BZ.. and BZ..D spring-loaded brakes are the first choice for classic lifting and travel applications that call for a high degree of durability combined with excellent emergency-stop load capacity.

The brakes open electrically and are applied by spring force. The brake is applied in case of a power failure and decelerates the motion until standstill. It is therefore suited for basic safety requirements in travel and hoist applications (e.g. according to EN 115).

BZ.. and BZ..D brakes are also available in the optional design as safety brake. As options they can be incorporated into a broad variety of safety concepts up to PL e.

Based on our broad range of control products spring-loaded brakes by SEW-EURODRIVE can be integrated into many electrical connection environments to meet your requirements. Solutions for AC supply systems, DC supply systems or supply via a frequency inverter are available.

BK.. brakes

In addition to the BZ.. and BZ..D brakes, the low-inertia holding brakes in the BK.. series are also available.

Thanks to their compact design, the permanent magnet brakes in the BK.. series are the first choice for dynamic handling applications that call for high cycle times or high switching frequency, a low rotational clearance and light motor weight, and a short design length.

The brakes are designed to be operated in DC 24 V supply systems as standard. This has many benefits for planning electrical systems.

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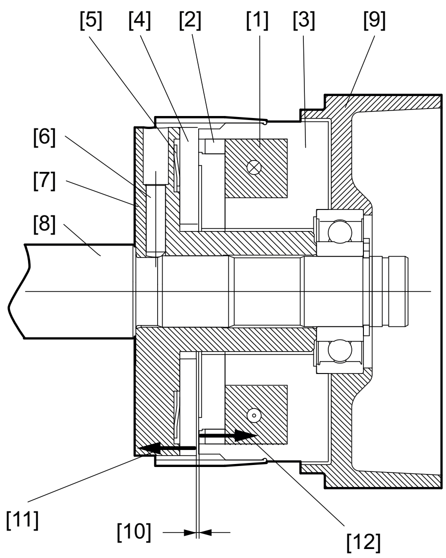
4.1.2 BK.. brake

Basic design of permanent-magnet brakes

The brakes of the BK.. series are permanent magnet brakes with DC coil that are released electrically and used the magnetic force of their permanent magnets for deceleration. The following points are basic parts of the braking system:

- The armature hub [7] is non-positively connected to the motor shaft [8]
- The pressure plate [4] rests on the armature hub [7] via the return spring [5] and can move axially
- The electromagnet is held in one position and connected to the endshield [9]

The electromagnet consists of the magnet body [3] with an integrated brake coil [1] and the permanent magnets [2].



[1]	Brake coil
[2]	Permanent magnet
[3]	Magnet body
[4]	Pressure plate
[5]	Return spring
[6]	Set screw
[7]	Armature hub
[8]	Motor shaft
[9]	Endshield
[10]	Working air gap
[11]	Force of the return spring
[12]	Force of the permanent magnet

Basic function of the brake

The pressure plate [4] is forced against the magnet body [3] by the permanent magnetic force [12] of the permanent magnet [2] when the brake coil [1] is deenergized. The friction torque thus created is transferred to the motor shaft [8] by the return spring [5] and the armature hub [7]. This decelerates the motor shaft [8].

If the brake coil [1] is subject to a suitable DC voltage an electromagnetic field is generated in the magnet body [3]. This electromagnetic field cancels the field of the permanent magnets [12] at the pressure plate [4].

The force of the return springs [11] pulls the pressure plate [4] axially to the armature hub [7]. This opens the working air gap [10] and the motor shaft [8] is able to rotate.

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The working air gap [10] of the permanent magnet brake is created by the manufacturing dimensions of the individual parts and the position of the brake within the endshield [9]. The working air gap [10] does not require adjustment.

Benefits of permanent magnet brakes

- Compact motor design
- Low intrinsic inertia due to the compact aluminum armature hub
- Free from residual torque, as defined in the operating principle, due to the design with one friction surface
- Armature design without rotational clearance
- Suitable for high cycle rates and short switching cycles
- Simple switching technology without brake control facilitated by the DC 24 V design (e.g. with direct supply from the frequency inverter)

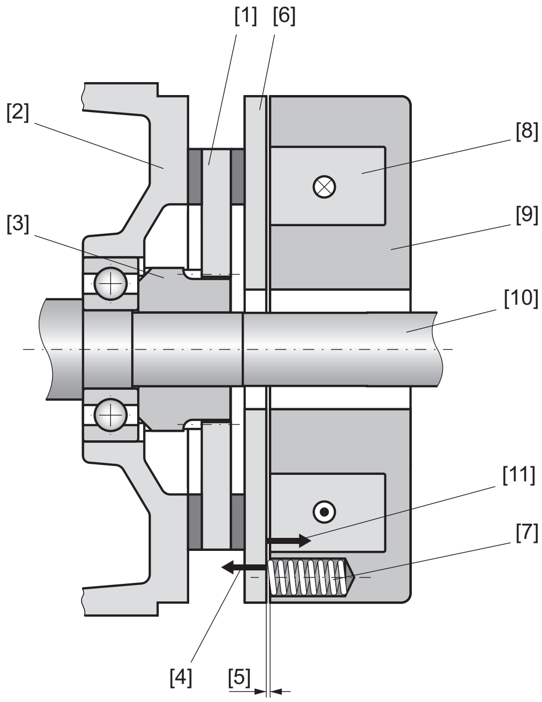
4.1.3 BZ../BZ..D brake

Basic design of spring-loaded brakes

The brakes of the BZ.. and BZ..D series are spring-loaded brakes with DC coil that are released electrically and used the spring force for deceleration. The following points are basic parts of the braking system:

- The brake lining carrier [1] is positively connected to the motor shaft [10] by the driver [3]
- The pressure plate [6] is guided by the housing screws and can move axially.
- The brake endshield [2] is on the motor side
- The electromagnet is held in one position with inserted brake springs [7]

  The electromagnet consists of the magnet body [9] with an integrated brake coil [8].



[1] Brake lining carrier
[2] Brake endshield
[3] Driver
[4] Spring force
[5] Working air gap
[6] Pressure plate
[7] Brake spring
[8] Brake coil
[9] Magnet body housing
[10] Motor shaft
[11] Electromagnetic force

Basic function of the brake

The pressure plate [6] is forced against the brake lining carrier [1] by the spring force [4] of the brake springs [7] when the brake coil [8] is deenergized. The friction torque thus created is transferred to the motor shaft [10] by the driver [3]. This decelerates the motor shaft [10].

If a suitable DC voltage is applied to the brake coil [8] an electromagnetic field is generated in the magnet body housing [9]. The electromagnetic force [11] created by this overcomes the spring force [4]. The pressure plate [6] is lifted from the brake lining carrier [1] and seals the working air gap [5]. The brake lining carrier [1] is freed and the motor shaft [10] can rotate.

The working air gap [5] of the spring-loaded brake is created by the manufacturing dimensions of the individual parts and does not need to be set.

Benefits of spring-loaded brakes

- Structure according to the normally energized principle; this ensures a forced brake application in deenergized state
- High working capacity due to the design with several friction surfaces and organic friction linings
- Durable design with enclosed housing
- Quick response times and adjustable to many supply system environments (e.g. AC systems, DC systems, and frequency inverter supply) due to the two-coil system by SEW-EURODRIVE with the BZ..
- Maintenance-friendly construction in B-side motor mounting (BZ.. and BZ..D)
- Suitable as safety brake for applications up to PL e

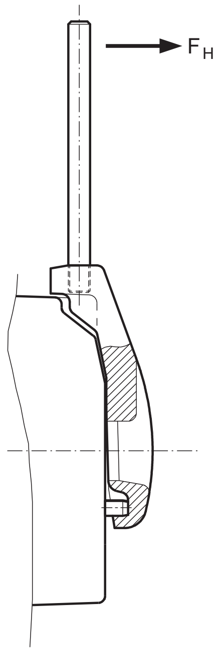
Acceleration function

The BZ.. brake is equipped with the patented two-coil system from SEW-EURODRIVE. It works particularly rapid and wear-free in combination with brake controls from SEW-EURODRIVE with acceleration function. When using the two-coil system, BZE.. brakes are suitable for high switching frequencies as they are required for fast cycle applications for example.

While operation of the brake is possible without acceleration function with a direct DC 24 V voltage supply without SEW-EURODRIVE brake control for BZ.D brakes, BZ.. brakes are optimized for using the two-coil system. This allows for particularly energy-efficient operation as the power loss can be reduced in stop state. For brakes without two-coil system, the magnetic circuit has to be dimensioned larger for implementing the same braking torque and wear distance.

Manual brake release

In brakemotors with /HR option “Manual brake release with automatic reengaging function,” you can release the brake manually using the provided lever. The following table shows the required actuating force applied to the lever at maximum braking torque. The values are based on the assumption that you operate the lever at the upper end.



Brake	Motor	Actuating force F_H N
BZ05	CM3C63	100
BZ1	CM3C71	160
BZ3	CM3C80	160
BZ5	CM3C100	250

4.1.4 Selection and project planning

Each brake developed for the servomotor product range by SEW-EURODRIVE offers specific benefits. These different benefits enable the user to find the optimal braking solution for any kind of application.

Based on the specified consideration of requirements, a **brake should first be preselected according to the properties**.

Based on this selection, it is important for an optimal drive selection to then observe the 3 crucial configuration steps for the brake system. These steps serve to ensure a problem-free application and smooth system integration:

1. **Mechanical brake configuration** with the following goals:
   - Selecting the functionally most suitable braking torque
   - Verifying the resulting working load of the brake with emergency stop events
   - Determining the effects on the applications (braking distance, deceleration, torque load while braking)
2. **Electrical project planning of brake and control environment** that considers the dimensioning of the voltage supply, switching and protection device, as well as the electrical supply cables.
3. **Project planning of solutions for brake diagnostics** that ensures that the state of the brake ca be diagnosed throughout it's service life to evaluate the functionality or readiness to perform safety requirements.

The manual "Project Planning for BK.., BP.., BR.., BY.., BZ.. brakes" provides users with explanations of basic relations, as well as clear criteria for testing and selection that enable the users for an immediate verification of the functional characteristics that can be expected during operation.

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4.1.5 Selection aids to determine the brake series

To avoid iteration loops during selection and project planning a careful preselection of the most suitable brake series under consideration of basic characteristics is crucial.

Based on the functional principles described previously and on the strengths of the individual series, we gain the following perspective of the brake range of products from SEW-EURODRIVE with regard to common demand for product properties:

Motor series	Brake series	Length/ weight	High cycle times	Low rotational clearance	High emer-gency stop braking work	High safety requirements
CM3C..	BK..	+	++	++	–	–
	BZ..	0	–	0	++	++

The individual benefits of the different series affect whether or not a series is suitable for certain application types. The table below provides a basic overview:

Motor series	Brake series	Travel axes	Lifting axes	Rotary axes	Handling axes
CM3C..	BK..	–	–	+	++
	BZ..	++	++	+	0

The values in the tables are general recommendations by SEW-EURODRIVE, based on many years of practical expertise. Should you require assistance with the preselection of the brake series for your individual application, SEW-EURODRIVE will gladly assist you.

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4.1.6 Technical data for the brakes

For further information regarding the technical data and indices, refer to the "Appendix" (▸ 162).

Technical data of the BZ.. brake

Brake			CM3C63 BZ05				CM3C71 BZ1			
Static braking torque	$M_{4,100\,°C}$	Nm	2.5	3.2	4.5	6	5.9	8.4	12	17
Dynamic braking torque	M_1	Nm	2.5	3.2	4.5	6	5.9	8.4	12	17
Response time of the brake with high-speed excitation	$t_{1,II}$	ms	30				40			
Brake application time in case of AC cut-off	$t_{2,I}$	ms	80				80			
Brake application time in case of AC/DC or DC cut-off	$t_{2,II}$	ms	15				15			
Maximum permitted braking work per braking in case of emergency stop	$W_{per,N}$	kJ	21.5				48.2			
Permitted braking work until maintenance	W_{insp}	kJ	17000				39000			
Permitted mechanical speed	$n_{max,0}$	min^{-1}	7200				7200			
Permitted brake application speed in case of emergency stop	$n_{max.1}$	min^{-1}	6000				6000			
Inrush current ratio	ESV	1	5.1				5.3			

Nominal DC brake voltage (Rating range)			Nominal DC holding current of the brake I_H A	
24[1] (21.6 – 26.4)	U_N	V	0.59	0.85

1 The DC 24 V brake voltage requires a high current and is only possible with a limited cable length.

Nominal AC brake voltage (Rating range)			Nominal AC holding current of the brake I_H A	
110 (99 – 121)	U_N	V	0.25	0.37
230 (218 – 243)			0.12	0.16
400 (380 – 431)			0.06	0.09
460 (432 – 484)			0.06	0.08

Brake			CM3C80 BZ3				CM3C100 BZ5			
Static braking torque	$M_{4,100\,°C}$	Nm	11	16	23	32	22	32	44	63
Dynamic braking torque	M_1	Nm	11	16	23	32	22	32	44	63
Response time of the brake with high-speed excitation	$t_{1,II}$	ms	60				100			

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Brake			CM3C80 BZ3	CM3C100 BZ5
Brake application time in case of AC cut-off	$t_{2,I}$	ms	100	120
Brake application time in case of AC/DC or DC cut-off	$t_{2,II}$	ms	20	30
Maximum permitted braking work per braking in case of emergency stop	$W_{per,N}$	kJ	53.5	102
Permitted braking work until maintenance	W_{insp}	kJ	43000	46000
Permitted mechanical speed	$n_{max,0}$	min^{-1}	7200	5400
Permitted brake application speed in case of emergency stop	$n_{max.1}$	min^{-1}	6000	4500
Inrush current ratio	ESV	1	5.3	5.2

Nominal DC brake voltage (Rating range)			Nominal DC holding current I_H A	
24[1] (21.6 – 26.4)	U_N	V	1.08	1.37

1 The DC 24 V brake voltage requires a high current and is only possible with a limited cable length.

Nominal AC brake voltage (Rating range)			Nominal AC holding current I_H A	
110 (99 – 121)	U_N	V	0.46	0.59
230 (218 – 243)			0.20	0.26
400 (380 – 431)			0.12	0.15
460 (432 – 484)			0.11	0.14

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Technical data of the BZ..D brake

Brake			CM3C63 BZ05D		CM3C71 BZ1D	
Static braking torque	$M_{4,100\,°C}$	Nm	2.5	3.2	5.9	8.4
Dynamic braking torque	M_1	Nm	2.5	3.2	5.9	8.4
Nominal brake voltage (rating range)	U_N	DC V	24 (21.6 – 26.4)			
Nominal holding current	I_H	DC A	0.87		1.02	
Response time of the brake without high-speed excitation	$t_{1,II}$	ms	180		240	
Brake application time in case of DC cut-off	$t_{2,I}$	ms	20		20	
Maximum permitted braking work per braking in case of emergency stop	$W_{per,N}$	kJ	21.5		48.2	
Permitted braking work until maintenance	W_{insp}	kJ	17000		39000	
Permitted mechanical speed	$n_{max,0}$	min^{-1}	7200		7200	
Permitted brake application speed in case of emergency stop	$n_{max,1}$	min^{-1}	6000		6000	

Brake			CM3C80 BZ3D		CM3C100 BZ5D	
Static braking torque	$M_{4,100\,°C}$	Nm	11	16	22	32
Dynamic braking torque	M_1	Nm	11	16	22	32
Nominal brake voltage (rating range)	U_N	DC V	24 (21.6 – 26.4)			
Nominal holding current	I_H	DC A	1.01		1.24	
Response time of the brake without high-speed excitation	$t_{1,II}$	ms	270		280	
Brake application time in case of DC cut-off	$t_{2,I}$	ms	30		40	
Maximum permitted braking work per braking in case of emergency stop	$W_{per,N}$	kJ	53.5		102	
Permitted braking work until maintenance	W_{insp}	kJ	43000		46000	
Permitted mechanical speed	$n_{max,0}$	min^{-1}	7200		5400	
Permitted brake application speed in case of emergency stop	$n_{max,1}$	min^{-1}	6000		4500	

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Technical data of the BK.. brake

Brake			CM3C63		CM3C71	
			BK05	BK06	BK08	BK1
Static braking torque	$M_{4,100\,°C}$	Nm	3.8	7.1	7.8	16
Dynamic braking torque	M_1	Nm	2.4	3.9	5	11.6
Nominal brake voltage (rating range)	U_N	DC V	24 (21.6 – 26.4)			
Nominal holding current	I_H	DC A	0.56	0.63	0.63	0.75
Response time of the brake without high-speed excitation	$t_{1,II}$	ms	50	70	90	100
Brake application time in case of DC cut-off	$t_{2,I}$	ms	30	30	25	50
Maximum permitted braking work per braking in case of emergency stop	$W_{per,N}$	kJ	0.37	0.74	0.37	0.55
Permitted braking work until maintenance	W_{insp}	kJ	742	1480	742	1100
Permitted mechanical speed	$n_{max,0}$	min^{-1}	7200	7200	7200	7200
Permitted brake application speed in case of emergency stop	$n_{max,1}$	min^{-1}	6000	6000	6000	6000

Brake			CM3C80		CM3C100	
			BK2	BK3	BK4	BK6
Static braking torque	$M_{4,100\,°C}$	Nm	18	30	30	46
Dynamic braking torque	M_1	Nm	10.7	23.8	23.8	33.6
Nominal brake voltage (rating range)	U_N	DC V	24 (21.6 – 26.4)			
Nominal holding current	I_H	DC A	0.80	0.94	0.94	1.0
Response time of the brake without high-speed excitation	$t_{1,II}$	ms	100	200	200	220
Brake application time in case of DC cut-off	$t_{2,I}$	ms	40	60	60	60
Maximum permitted braking work per braking in case of emergency stop	$W_{per,N}$	kJ	0.85	1.2	1.2	2.7
Permitted braking work until maintenance	W_{insp}	kJ	1700	2400	2400	5400
Permitted mechanical speed	$n_{max,0}$	min^{-1}	7200	7200	5400	5400
Permitted brake application speed in case of emergency stop	$n_{max,1}$	min^{-1}	6000	6000	4500	4500

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4.1.7 Control environments

The brakes by SEW-EURODRIVE require a voltage source for operation to provide the brake with DC voltage or rectified AC voltage. Depending on the functional principle of the brake and application environment, the following possibilities exist:

AC voltage supply

This supply concept for gearmotors has been known for years, has been tried and tested in the field of mechanical engineering and system manufacturing, and is used for spring-loaded brakes with increased emergency stop working capacity.

In this case a brake control is used that rectifies thee AC voltage of the local supply system. Together with the tried and tested SEW two-coil system, this enables a rapid releasing of the brake.

Connection topologies with AC supply system and control cabinet rectifier offer the following application benefits:

- Connection to the local low voltage supply system without additional power supply unit
- High torque density of the brake can be realized with simultaneously large wear reserve
- Energy-efficient coil design due to two-coil system by SEW-EURODRIVE with high-speed excitation and holding current derating
- Suitable for cable lengths > 100 m due to low holding currents
- Brake control with integrated powerful varistor overvoltage protection
- Additional function "Heating" via BMH. brake control for low-temperature applications

DC voltage supply

This supply concept is especially tailored to the requirements of machine automation. With permanent magnet brakes in particular as well as with light spring-loaded brakes, this supply concept has become the standard.

In this case the brake is connected to a DC 24 V voltage source either directly or via a BMV5.0 brake control, a component that is often installed in large control cabinets.

Connection topologies with DC supply system offer the following application benefits:

- Uniform coil design independently from the local low voltage supply system
- Benefits regarding to insulation and voltage distances (protective extra-low voltage)
- No additional brake control is required
- Quick brake application without additional switch contacts as standard
- Suitable for mobile systems with extra-low voltage on-board supply system

Supplied via the frequency inverter

The connection to a suitable frequency inverter may provide further possible connection options, in that case the frequency inverter itself acts as voltage source:

- BST.. safe brake control

  For spring-loaded brakes with SEW two-coil system operated in applications with higher demands on the safety technology, you can rely on the brake controls of the BST.. product family. These are connected directly to the DC link of the frequency inverter and generate a clocked DC voltage to supply the brake using pulse width modulation.

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With regard to high-speed excitation, holding current derating, and a functional control input the products match the operating principle of the control cabinet devices from the BMK. series for installation in AC supply systems.

Thanks to their certified, safety-related design and the additional safe control input, for example for the safety function SBC (Safe Brake Control), the products can be included perfectly into your safety concept and help you realize safe disconnection of the brake from the supply voltage.

- MOVIAXIS® and MOVIDRIVE® modular

  Combined with the inverter families from the product lines MOVIAXIS® (MXA.) and MOVIDRIVE® modular (MDA. and MDD.) the holding brakes of the BK.. series gain the possibility to supply the brake using the brake output of the frequency inverter. The frequency inverter serves as control and protection circuit. This reduces the installation effort for the brake as neither a local DC voltage source nor additional switching and protection are required.

Determining the control type and brake voltage

The following table provides an overview of control designs that can be realized for BZ.. and BK.. brakes.

Brake	Brake voltage	Rating range	Supply of the brake coil				
			AC supply system	DC grid		Frequency inverter	
			BME.. BMP.. BMK.. BMH..	Directsupply	BMV..	BST..	MOVIAXIS® (MXA), MOVIDRIVE® modular (MDA, MDD)
BZ..	**AC 110 V**	99 – 121	X	–	–	–	–
	AC 230 V	218 – 243	X	–	–	X	–
	AC 400 V	380 – 431	X	–	–	X	–
	AC 460V	432 – 484	X	–	–	X	–
	DC 24 V	21.6 – 26.4	–	–	X	–	–
BZ..D	**DC 24 V**	21.6 – 26.4	–	X	X	–	–
BK..	**DC 24 V**	21.6 – 26.4	–	X	X	–	X[1]

1 Available for CM3C63 with BK05 and BK06 brake.

X Available
– Not available

Observe the following points for correct operation of the brake:

- The supply voltage applied on the motor side of the brake (meaning supply voltage minus the voltage drop of the supply cable) must constantly be within the rated range.
- Brief fluctuations in the supply voltage must be within the tolerance range of +/-5% of the limits for the rated voltage range.

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- When the BZ.. brake is released, overexcitation generates a brief inrush current that can be up to 5.2 times higher than the operational holding current. Dimension the power supply and incoming cable sufficiently to ensure the predefined rating ranges and tolerance ranges can be adhered to even during switching procedures.
- Especially the DC 24 V brake voltage usually requires high currents and is therefore only possible with a limited cable length.
- The brake holding currents specified in chapter "Technical data for the brakes" (▸ 91) always are nominal values that refer to a supply at nominal voltage and a coil temperature of +20 °C.

For further information and technical data, refer to the manual "Project Planning for BK.., BP.., BR.., BY.., BZ.. brakes".

4.1.8 Technical data of the brake control

The following table lists brake control systems by SEW-EURODRIVE for installation in the control cabinet: The different housings have different colors (= color code) to make them easier to distinguish.

Brake control	Function	Nominal voltage U_N	Nominal output current DC A	Type	Part number	Color code
BME	Half-wave rectifier with electronic switching	AC 150 – 500 V	1.5	BME 1.5	8257221	Red
		AC 42 – 150 V	3.0	BME 3	825723X	Blue
BMH	Half-wave rectifier with electronic switching and heating function	AC 150 – 500 V	1.5	BMH 1.5	825818X	Green
		AC 42 – 150 V	3	BMH 3	8258198	Yellow
BMP	Half-wave rectifier with electronic switching, integrated voltage relay for cut-off in the DC circuit.	AC 150 – 500 V	1.5	BMP 1.5	8256853	White
		AC 42 – 150 V	3.0	BMP 3	8265666	Light blue
BMK	Half-wave rectifier with electronic switching, 24 V DCcontrol input, and cut-off in the DC circuit	AC 150 – 500 V	1.5	BMK 1.5	8264635	Water blue
		AC 42 – 150 V	3.0	BMK 3	8265674	Light red
BMKB	Half-wave rectifier with electronic switch mode, DC 24 V control input, cut-off in the DC circuit and a diode to signal the readiness for operation	AC 150 – 500 V	1.5	BMKB 1.5	8281602	Water blue
BMV	Electronic switching, DC 24 V control input and cut-off in the DC circuit	DC 24 V	5.0	BMV	13000063	White

The following table lists functionally safe brake control systems by SEW-EURODRIVE for installation in the control cabinet:

Brake control	Function	Nominal voltage DC link supply	Nominal brake voltage (BST.. output voltage)	Nominal output current DC A	Type	Part number
BST…-00	Safe brake control with electronic switching, DC 24 V control input and safe DC 24 V control input. Supply via the DC link of the inverter	DC 350 –750 V	AC 460 V (DC 171 – 209 V)	0.6	BST0.6S-460V-00	08299714
			AC 400 V (DC 150 – 184 V)	0.7	BST0.7S-400V-00	13000772
			AC 230 V (DC 86 – 106 V)	1.2	BST1.2S-230V-00	13001337
BST…-0B	Safe brake control with electronic switching, DC 24 V control input and safe DC 24 V control input. Supply via the DC link of the inverter. With additional TF/TH terminal	DC 350 –750 V	AC 460 V (DC 171 – 209 V)	0.6	BST0.6S-460V-0B	18255191
			AC 400 V (DC 150 – 184 V)	0.7	BST0.7S-400V-0B	18255205
			AC 230 V (DC 86 – 106 V)	1.2	BST1.2S-230V-0B	18255213

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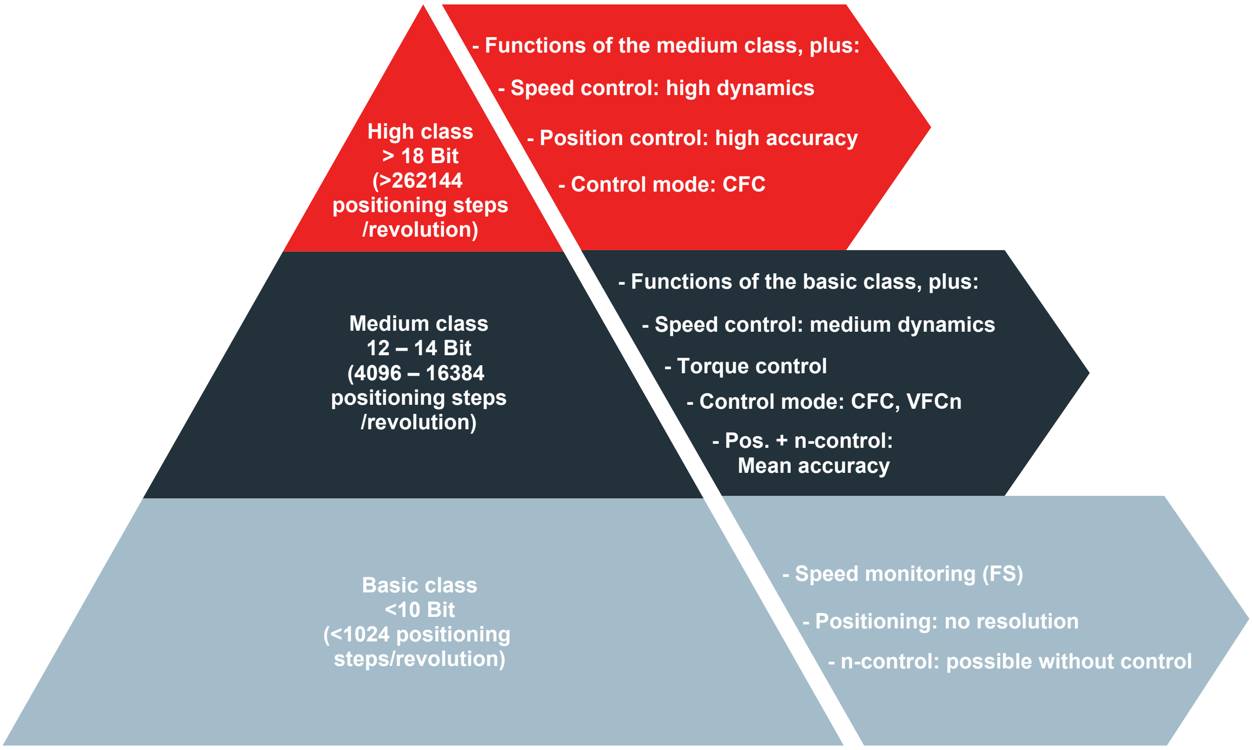
4.2 Encoder

4.2.1 Ability classes

Encoder systems by SEW-EURODRIVE are categorized into ability classes. With synchronous synchronous servomotors only encoders of at least medium ability class are used.



The categorization into different ability classes provides an overview regarding which encoder can be used for what application. This allows for an optimal preselection.

In case of special applications, SEW-EURODRIVE will gladly assist you with the selection.

4.2.2 Overview of encoder systems

Synchronous servomotors from the CM3C.. series are available in optional designs with various encoder systems to meet all requirements regarding dynamic positioning, speed and torque control, as well as regarding combinations with different frequency inverters and controllers.

Class	Encoder interface	Encoder designation	Type	Benefits
Basic Class	–	Without encoder	–	• Speed control without encoder
Medium Class	Analog, modulated	RH1M	Resolver	• Standard encoder system of medium ability class • Maximum durability under all operating conditions • No additional motor derating at operating temperatures below 40 °C
	MOVILINK® DDI	EZ2Z	Single-turn	• Single-cable technology with hybrid cabling • Fully digital MOVILINK® DDI interface • Automatic startup at inverters by SEW-EURODRIVE from the modular system MOVI-C® (control cabinet and decentralized technology) • Integrated motor temperature evaluation
		AZ2Z	Multi-turn	• Like EZ2Z • Additional multi-turn technology
High Class	HIPERFACE®	AK0H	Multi-turn	• Standardized HIPERFACE® interface for operation at frequency inverters by SEW-EURODRIVE and third parties • Optional design with functional safety
	MOVILINK® DDI	EZ4Z[1]	Single-turn	• Like EZ2Z • High ability class
		AZ4Z[1]	Multi-turn	• Like EZ2Z • High ability class • Additional multi-turn technology

1 In preparation.

Additional encoder systems (e.g. with interfaces for HIPERFACE DSL®, EnDat2.2 and Drive-CLiQ) are available upon request.

4.2.3 Technical data

Built-in encoders

Encoder	EZ2Z	AZ2Z	EZ4Z[1]	AZ4Z[1]
Motor	CM3C..			
Frequency inverter	MOVIDRIVE® and MOVITRAC® control cabinet devices from the MOVI-C® portfolio			
Ability classes	Medium Class		High Class	
Encoder type	Single-turn	Multi-turn	Single-turn	Multi-turn
Encoder sensors	Magnetic		Magnetic, inductive	
Analog resolution, incremental	–			
Digital resolution, absolute single-turn	12 bit		18 bit	
Digital resolution, absolute multi-turn	–	16 bit	–	16 bit
Electrical interface	MOVILINK® DDI, external to motor			
Connection technology	Single-cable technology: • M23/M40 direct hybrid plug (power and data) • Terminal box with hybrid plug or cable gland[1]			
Electronic nameplate	Yes			
Functional safety	–		SIL2, PL d	
Explosion protection 2014/34/EU (ATEX) / IECEx	–			

1 In preparation.

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Add-on encoders

Encoder	RH1M	AK0H
Motor	CM3C..	
Frequency inverter	• MOVIDRIVE® B, MOVIAXIS® • MOVIDRIVE® control cabinet devices from the MOVI-C® portfolio • Third-party inverter	
Ability classes	Medium Class	High Class
Encoder type	Single-turn	Multi-turn
Encoder sensors	Inductive, resolver	Optical, magnetic
Analog resolution, incremental	1 period/revolution modulated, interpolatable 12 – 14 bit	128 sin/cos periods/revolution, interpolatable 16 – 18 bit
Digital resolution, absolute single-turn	–	12 bit
Digital resolution, absolute multi-turn	–	12 bit
Electrical interface	sin/cos, modulated	HIPERFACE® (sin/cos + RS458)
Connection technology	Two-cable technology: • M23 direct data plug + M23/M40 power plug • Terminal box with data plug or cable glands with terminals	
Electronic nameplate	–	Yes
Functional safety	–	SIL2, PL d
Explosion protection 2014/34/EU (ATEX) / IECEx	II3GD	–

Specifications on resolvers and encoders with HIPERFACE® interface

Encoder Can be mounted to the motor	RH1M CM3C63 – 100
Number of poles	2
Primary	Rotor
Input voltage	7 V
Input frequency	7 kHz
Gear ratio ±10%	0.5
Phase shift ±5°	+13°
Input impedance ±15%	130 + j120 Ω
Output impedance ±15%	200 + j270 Ω
Input resistance ±10%	82 Ω
Output resistance ±10%	68 Ω
Maximum electrical fault	±10 ''
Temperature range	-55 °C to +150 °C

Encoder Can be mounted to the motor	AK0H CM3C63 – 100
Supply voltage	DC 7 – 12 V polarity reversal protected
Maximum current consumption (without load)	120 mA
Limit frequency	26 kHz
Pulses (sine cycles) per revolution	128
Output amplitude per track	0.8 – 1.1 V_{pp} sin/cos
Single-turn resolution	4096 increments/revolution
Multi-turn resolution	4096 revolutions (12 bits)
Transmission protocol	HIPERFACE®
Serial data output	Driver to EIA RS485
Vibration resistance (10 – 2000 Hz)	≤ 100 m/s^2 (DIN IEC 68-2-6)
Maximum speed	9000 min^{-1}
Temperature range	-20 °C to +110 °C

For design as safety encoder, refer to the characteristic safety values in chapter "Safety encoder" (▸ 108).

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4.3 Cooling

4.3.1 Convection

As standard, CM3C.. servomotors are designed as self-cooling motors. Self-cooling motors dissipate excess heat to the surrounding air by convection and radiation. In addition, the heat conduction of the machine construction is heated.

The rated data specified on the nameplate are reached at an ambient temperature of maximally 40 °C. Make sure the motor is cooled sufficiently. Adhere to the minimum clearance of 100 mm to other components. In addition, a heavy contamination of the motor surface can reduce heat dissipation and therefore cause thermal overload of the motor.

4.3.2 Forced cooling fan (in preparation)

To increase the thermal capacity, CM3C.. servomotors can be optionally equipped with a forced cooling fan. Motors with forced air cooling additionally discharge heat using a fan operating independently from the motor. Make sure motors with forced cooling are also cooled sufficiently. Ensure the flow of warm excess air is not obstructed by adhering to the minimum clearance of 100 mm to the machine environment.

4.4 PT1000 thermal motor protection

4.4.1 Description

Thermal motor protection in combination with the corresponding evaluation electronics prevents the motor from overheating and consequently from being damaged. A temperature sensor provides only indirect protection as only one sensor value is determined.

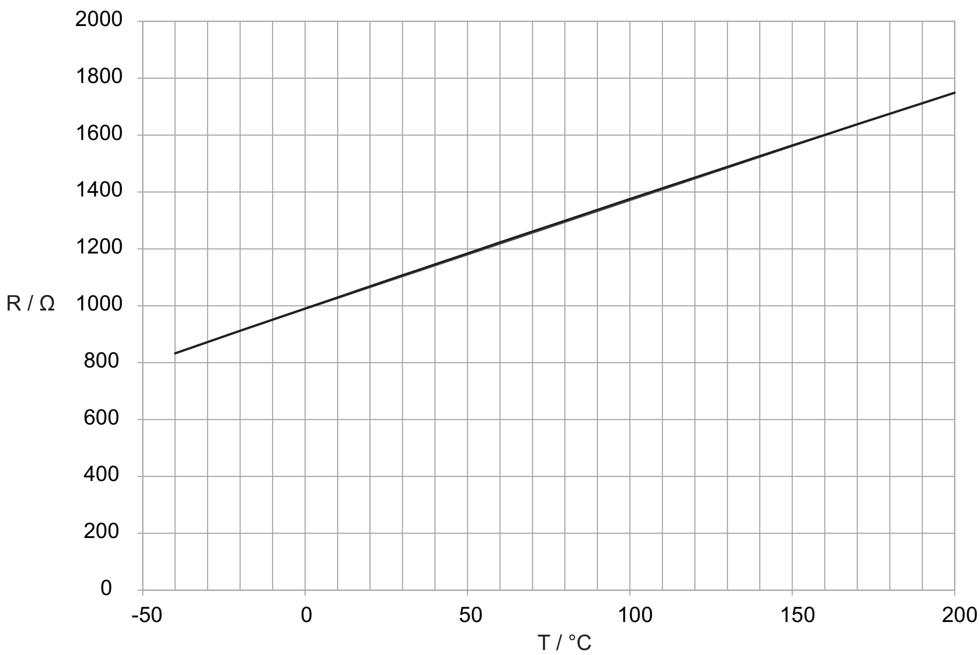
The /PK motor design consists of a platinum sensor PT1000 installed in one of the three motor windings. Unlike the /KY semiconductor sensor used in previous motor generations, the platinum sensor has an almost linear characteristic curve and is more accurate. In combination with a frequency inverter containing the thermal model of the motor, the frequency inverter can also provide a motor protection function because of the /PK temperature sensor.

4.4.2 Technical data

The PT1000 temperature sensor continuously detects the motor temperature.

PT1000	
Connection	Black – red
Total resistance at 20 – 25 °C	1050 Ω < R < 1150 Ω
Test current	< 3 mA

Typical characteristic curve of PT1000



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4.5 Functional safety (FS, in preparation)

You can also request motors from the CM3C.. series with a safety brake and safety encoder. These can be integrated into the servomotor individually or in combination.

SEW-EURODRIVE always indicates functional safety options on the nameplate using the FS logo and number. The number includes the code for installed safety components.

The following table shows the assignment of the numbers to the respective safety components:

FS logo	Available functionally safe motor option		
	Decentralized inverters	Safety brake	Safety encoder
FS 01	X		
FS 02		X	
FS 04			X
FS 07	X		X
FS 11		X	X

If for example the FS logo on the nameplate includes the code "FS 11", the motor includes a combination of safety brake and safety encoder.

For specific information regarding the operation of drives with functional safety components, refer to the relevant addendum to the operating instructions. The addendums to the operating instructions are included in the delivery of all drives with functionally safe components as is prescribed.

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4.5.1 Safety brake

SEW-EURODRIVE can provide you with the BZ.. and BZ..D brakes as safety brake for a CM3C.. servomotor.

With a safety brake, the following safety functions can be implemented to force a drive into idle and safely hold the drive in place:

- SBA (safe brake actuation)
- SBH (safe brake hold)

Characteristic safety values for BZ../BZ..D safety brakes

The following table shows the characteristic safety values for BZ../BZ..D safety brakes:

BZ../BZ..D		**Characteristic safety values according to EN ISO 13849-1**	
Classification		Category 1 (cat. 1)	
System structure		1-channel	
Operating mode		High demand	
Safe state		Brake applied	
Safety function		SBA – Safe Brake Actuation	
		SBH – Safe Brake Hold	
Service life		20 years, or T_{10D} value (depending on which value applies first)	
T_{10D} value		Calculation via 0.1 × $MTTF_D$	
$MTTF_d$ value		Calculation via B_{10D} value	
B_{10d} value	CM3C63S/M	BZ05/BZ05D	15×10^6
	CM3C71S/M	BZ1/BZ1D	15×10^6
	CM3C80S/M	BZ3/BZ3D	12×10^6
	CM3C100S/M	BZ5/BZ5D	9×10^6

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4.5.2 Safety encoder

AK0H HIPERFACE® encoders are optionally available in a design as safety encoder. Using safety encoders, safety functions regarding rotational speed, direction of rotation, standstill and relative position can be realized, such as SS1, SS2, SOS, SLA, SLS, SDI and SLI according to IEC 61800-5-2.

Certain demands on the mechanical coupling of the encoder system to the motor must be met so that the encoder can be used for safety-relevant tasks. SEW-EURODRIVE assumes responsibility for the delivered motor with safety encoder in terms of compliance with the functional safety regulations. Upon delivery, a locking compound is applied to safety-relevant connecting elements. Observe this fact in case of maintenance work.

Characteristic safety values for AK0H safety encoders

The following table shows the characteristic safety values of the AK0H safety encoders:

	Characteristic values in accordance with	
	EN 62061 / IEC 61508	**EN ISO 13849-1**
Classification/underlying standards	SIL2	PL d
Structure	HFT = 1	2 channels (corresponds to category 3)
Probability of a dangerous failure per hour (PFH_D value)[1]	$1.3 \times 10^{-8}\ h^{-1}$	
Mean time to dangerous failure ($MTTF_d$ value)	–	100 years
Mission time / service life	20 years	
Proof test interval	Not required	–
Safe fault coverage (SSF)	90%	–
Motor/encoder connection	In the drive with FS logo, fault exclusion according to EN ISO 13849	

1 The specified value refers to a diagnostic coverage of 90% that must be achieved by an encoder evaluation unit with at least SIL2. Diagnostics must be performed within the process response time.

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4.6 Surface and corrosion protection

To optimally protect motors that are subject to severe environmental effects, SEW-EURODRIVE offers measures to increase the resistance of highly stressed surfaces.

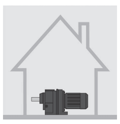
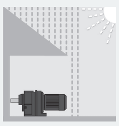
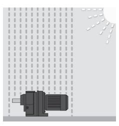
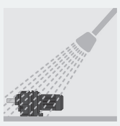
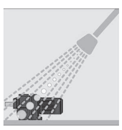
- Surface protection option /OS
- Corrosion protection option /KS

Additional optional protective measures for the output shafts are also available.

4.6.1 Surface protection

As an option for standard surface protection, motors and gear units are also available with surface protection /OS.

The special measure "Z" is also available. During this procedure, large contour recesses are filled with rubber before the coat is applied.

Surface protection		Ambient conditions	Sample applications
Default		Suitable for machines and systems in buildings and rooms indoors with neutral atmospheres. Based on corrosivity category: • C1 (negligible)	• Machines and systems in the automotive industry • Transport systems in logistics • Conveyor belts at airports
OS1		Suitable for environments prone to condensation and atmospheres with low humidity or contamination, such as applications outdoors under roof or with protection device. Based on corrosivity category: • C2 (low)	• Systems in saw mills • Hall gates • Agitators and mixers
OS2		Suitable for environments with high humidity or moderate atmospheric contamination, such as applications outdoors subject to direct weathering. Based on corrosivity category: • C3 (moderate)	• Applications in amusement parks • Cable cars and chairlifts • Applications in gravel plants • Systems in nuclear power plants
OS3		Suitable for environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasional acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt load. Based on corrosivity category: • C4 (high)	• Sewage treatment plants • Port cranes • Mining applications
OS4		Suitable for environments with permanent humidity or severe atmospheric or chemical contamination. Regular acidic and caustic wet cleaning, also with chemical cleaning agents. Based on corrosivity category: • C5-1 (very high)	• Drives in malting plants • Wet areas in the beverage industry • Conveyor belts in the food industry

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- Drives with surface protection OS2 – OS4 are always equipped with /KS corrosion protection.
- Drives in degree of protection IPX6 are always equipped with /KS corrosion protection.
- Drives with surface protection OS4 are always additionally equipped with preventive measure "Z", meaning all surface recesses have been sprayed with elastic rubber compound.
- Corrosivity category according to ISO 12944-2 classification of ambient conditions

4.6.2 Corrosion protection

The option description "Corrosion protection" lists all measures to increase the corrosion resistance that refer to treatment of outer surfaces.

A label with the word "KORROSIONSSCHUTZ" (corrosion protection) on the motor indicates that special treatment has been applied.

Technical details

The corrosion protection measures are described in the brochure "We have the very thing against corrosion: Surface and corrosion protection". If you have any questions, contact SEW-EURODRIVE.

4.6.3 Paint

As standard, the motors are painted with RAL 9005 "jet black". Special coatings and other colors are available on request.

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4.7 Degree of protection according to IEC 60034-5

Degree of protection according to IEC 60034-5 describes the degree of protection for electrical equipment against contact and foreign objects, such as dust (1st code number) and water (2nd code number). In case a CM3C.. motor is mounted to a gear unit using an adapter the degree of protection is not affected or reduced.

Synchronous servomotors by SEW-EURODRIVE are supplied with degree of protection IP65 as standard.

<table>
<tr><th rowspan="2">IP</th><th colspan="2">1st digit</th><th>2nd digit</th></tr>
<tr><th>Touch guard</th><th>Protected against foreign objects</th><th>Protected against water</th></tr>
<tr><td>0</td><td>No special protection</td><td>No special protection</td><td>No special protection</td></tr>
<tr><td>1</td><td>Protected against access to hazardous parts with the back of your hand.</td><td>Protected against solid foreign objects Ø 50 mm and larger.</td><td>Protected against dripping water.</td></tr>
<tr><td>2</td><td>Protected against access to hazardous parts with a finger.</td><td>Protected against solid foreign objects Ø 12 mm and larger.</td><td>Protected against dripping water when tilted up to 15°.</td></tr>
<tr><td>3</td><td>Protected against access to hazardous parts with a tool.</td><td>Protected against solid foreign objects Ø 2.5 mm and larger.</td><td>Protected against spraying water.</td></tr>
<tr><td>4</td><td rowspan="3">Protected against access to hazardous parts with a wire.</td><td>Protected against solid foreign objects Ø 1 mm and larger.</td><td>Protected against splashing water.</td></tr>
<tr><td>5</td><td>Dust-protected</td><td>Protected against water jets.</td></tr>
<tr><td>6</td><td>Dust-tight</td><td>Protected against powerful water jets.</td></tr>
<tr><td>7</td><td>–</td><td>–</td><td>Protected against temporary immersion in water.</td></tr>
<tr><td>8</td><td>–</td><td>–</td><td>Protected against permanent immersion in water.</td></tr>
<tr><td>9</td><td>–</td><td>–</td><td>Protected against water penetration from any direction even under increased pressure against the housing.</td></tr>
</table>

4.8 Connection variants

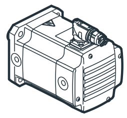
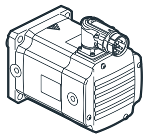
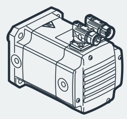
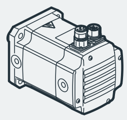
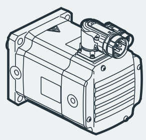
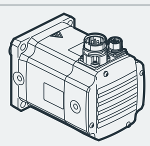
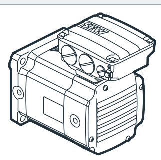
4.8.1 Overview of connection variants

As standard, the electrical connection of CM3C.. synchronous servomotors is realized using plug connectors with two-cable technology.

When combined with the fully digital MOVILINK® DDI interface by SEW-EURODRIVE CM3C.. synchronous servomotors are available with single-cable technology.

The plug connectors are designed with the SpeedTec quick-lock system as standard. For easier connection, refer to the suitable cables in chapter "Prefabricated cables for two-cable technology" (▶ 132).

As an alternative, you can also connect the motor via the terminal box.

Connection type	Designation			Plug size	Interlocking
Single-cable technology with MOVILINK® DDI	SD1		Adjustable right-angle connector	Performance/data: M23	Standard: SpeedTec
	SDB		Adjustable right-angle connector	Performance/data: M40	Standard: SpeedTec
Two-cable technology	SM1 (without brake) / SB1 (with brake)		Adjustable right-angle connector	Performance/ encoder: M23	Standard: SpeedTec Optional: SpeedTec-ready
			Radial plug connector		
	SMB (without brake) / SBB (with brake)		Adjustable right-angle connector	Performance: M40 Encoder: M23	Standard: SpeedTec Optional: SpeedTec-ready
			Radial plug connector		
Terminal box	KK		Terminal box	Performance/ encoder: Terminal board	–

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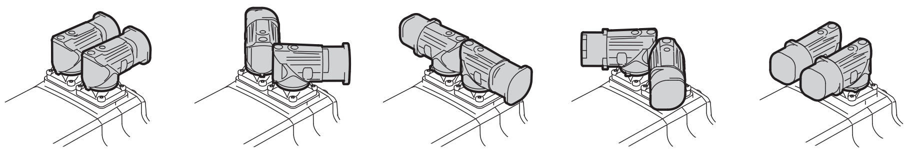
4.8.2 Connecting the two-cable technology

As standard, the power supply with or without brake supply is connected to motor via the the quick-lock (SpeedTec) SM./SB. plug connector system.

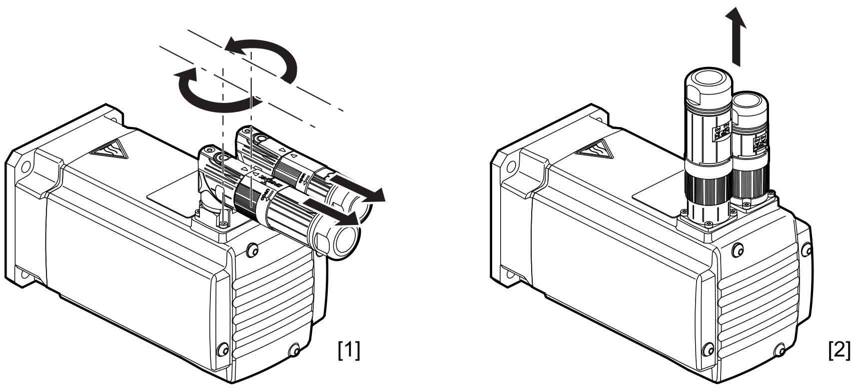
In the basic version, SEW-EURODRIVE delivers electric motors with a connector on the motor end and without mating connector. The encoder system is connected using a separate 12-pin round circular connector (M23).

The mating connectors can be ordered separately or together with the motor.

The right-angle plug connectors SM1/SB1 and SMB/SBB can be rotated to achieve any required position. The following figure shows examples of the differently adjusted plug connectors SM1/SB1, SMB/SBB:



A "radial" position has been defined for the straight plug connectors. Radial plug connectors [2] are optional:



[1] "Adjustable" connector position
[2] "Radial" connector position

The different plug connectors of the individual motor sizes are available in the following designs:

Connector position		Plug connectors	
		SM1/SB1	SMB/SBB
Between axes		X	X
Adjustable	Steplessly adjustable positions	X	X

X Available
– Not available

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Connecting SM1/SB1 power plug connectors (M23)

The following table shows information about this connection:

The wiring diagram of the plug connector depicts the contact end of the connections.

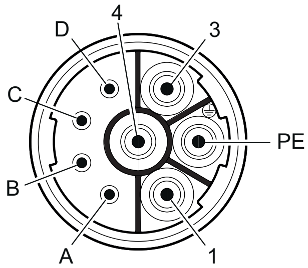
Function

Power connection

Connection type

M23, TE Connectivity - Intercontec Products, series 923, SEW insert, SpeedTec equipment, coding ring: without, male

Connection diagram



Assignment for motor without brake

Contact	Signal	Description
A	Reserved	Do not connect
B	Reserved	Do not connect
C	Reserved	Do not connect
D	Reserved	Do not connect
PE	PE	PE connection
1	U	Motor connection phase U
3	W	Motor connection phase W
4	V	Motor connection phase V

Assignment for brakemotors with BK.. brake

Contact	Signal	Description
A	Reserved	Do not connect
B	Reserved	Do not connect
C	Brake +	BK brake +
D	Brake -	BK brake -
PE	PE	PE connection
1	U	Motor connection phase U
3	W	Motor connection phase W
4	V	Motor connection phase V

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Assignment for brakemotors with BZ../BZ..D brake

Contact	Signal	Description
A	Reserved	Do not connect
B	Brake	Connection for BZ.. brake (do not connect BZ..D brakes)
C	Brake	Connection for BZ.. brake
D	Brake	Connection for BZ.. brake
PE	PE	PE connection
1	U	Motor connection phase U
3	W	Motor connection phase W
4	V	Motor connection phase V

Connection SMB/SBB power plug connector (M40)

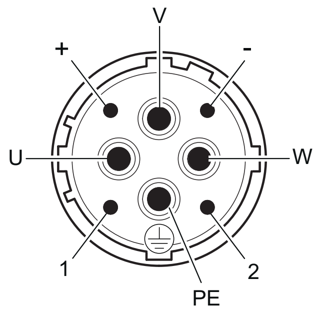
The following table shows information about this connection:

The wiring diagram of the plug connector depicts the contact end of the connections.

Function
Power connection

Connection type
M40, TE Connectivity - Intercontec Products, series 940, SEW insert, SpeedTec equipment, coding ring: without, male

Connection diagram



Assignment for motor without brake

Contact	Signal	Description
+	Reserved	Do not connect
–	Reserved	Do not connect
1	Reserved	Do not connect
2	Reserved	Do not connect
PE	PE	PE connection
U	U	Motor connection phase U
V	V	Motor connection phase V
W	W	Motor connection phase W

Assignment for brakemotors with BK.. brake

Contact	Signal	Description
+	Brake +	BK brake +
–	Brake -	BK brake -
1	Reserved	Do not connect
2	Reserved	Do not connect
PE	PE	PE connection
U	U	Motor connection phase U
V	V	Motor connection phase V
W	W	Motor connection phase W

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Assignment for brakemotors with BZ../BZ..D brake

Contact	Signal	Description
+	Brake	Connection for BZ.. brake
–	Brake	Connection for BZ.. brake
1	Brake	Connection for BZ.. brake (do not connect BZ..D brakes)
2	Reserved	Do not connect
PE	PE	PE connection
U	U	Motor connection phase U
V	V	Motor connection phase V
W	W	Motor connection phase W

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Connection of SM./SB. signal plug connector

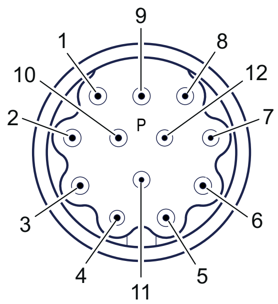
The following table shows information about this connection:

The wiring diagram of the plug connector depicts the contact end of the connections.

Function
Signal connection

Connection type
M23, TE Connectivity - Intercontec Products, series 923, SEW insert, SpeedTec equipment, coding ring: without, male

Connection diagram



Assignment for motor with RH1M resolver

Contact	Signal	Description
1	R1 Ref +	Reference +
2	R2 Ref-	Reference -
3	S1 Cos+	Cosine +
4	S3 Cos -	Cosine -
5	S2 Sin +	Sine +
6	S4 Sin -	Sine -
7	Reserved	Do not connect
8	Reserved	Do not connect
9	PK	Motor protection
10	PK	Motor protection
11	Reserved	Do not connect
12	Reserved	Do not connect

Assignment for motor with AK0H encoder

Contact	Signal	Description
1	Reserved	Do not connect
2	Reserved	Do not connect
3	S1 Cos+	Cosine +
4	S3 Cos -	Cosine -
5	S2 Sin +	Sine +
6	S4 Sin -	Sine -
7	D -	Data -
8	D +	Data +
9	PK	Motor protection

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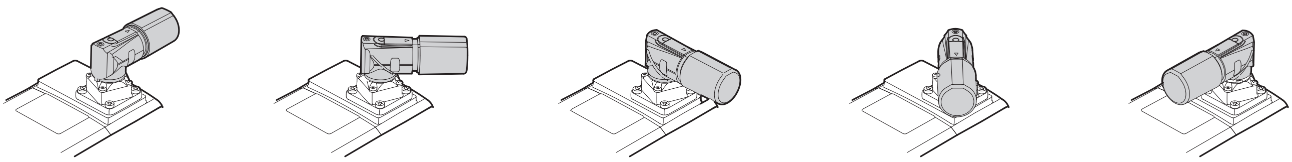
Assignment for motor with AK0H encoder

Contact	Signal	Description
10	PK	Motor protection
11	GND	Protective earth
12	US	Voltage

4.8.3 Connecting single-cable technology

By using the fully digital MOVILINK® DDI interface by SEW-EURODRIVE you can connect CM3C.. synchronous servomotors via single-cable technology. With this technology, all data of the motor, such as encoder data, temperature data, startup data, and data of further sensors is digitally transferred via a hybrid cable.

The right-angle SD1/SDB plug connectors can be rotated to achieve the required positions:



Connecting SD1 hybrid plug connectors (M23) – Single-cable technology

The wiring diagram of the plug connector depicts the contact end of the connections.

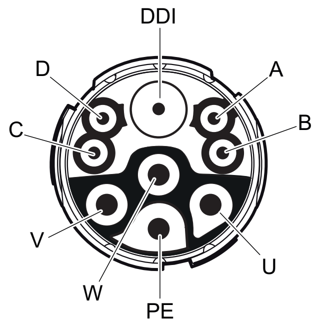
Function

Motor connection for motors with MOVILINK® DDI interface

Connection type

M23, male, male thread, TE Connectivity - Intercontec Products, series 723, SEW insert, SpeedTec equipment, coding ring: without, protected against contact

Connection diagram



Assignment for motor without brake

Contact	Signal	Description
U	U	Motor connection phase U
V	V	Motor connection phase V
W	W	Motor connection phase W
A	Reserved	Do not connect
B	Reserved	Do not connect
C	Reserved	Do not connect
D	Reserved	Do not connect
PE	PE	PE connection
DDI	DDI	MOVILINK® DDI

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Assignment for brakemotors with BK.. brake

Contact	Signal	Description
U	U	Motor connection phase U
V	V	Motor connection phase V
W	W	Motor connection phase W
A	Brake -	Brake connection -
B	Reserved	Do not connect
C	Reserved	Do not connect
D	Brake +	Brake connection +
PE	PE	PE connection
DDI	DDI	MOVILINK® DDI

Assignment for brakemotors with BZ.. brake

No.	Name	Function
U	U	Motor connection phase U
V	V	Motor connection phase V
W	W	Motor connection phase W
A	Res.	Reserved
B	15	Brake connection 15
C	13	Brake connection 13
D	14	Brake connection 14
PE	PE	PE connection
1	DDI	MOVILINK® DDI

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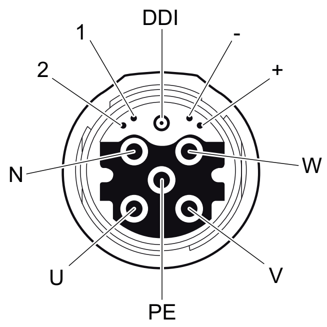
Connecting SDB hybrid plug connectors (M40) – Single-cable technology

The wiring diagram of the plug connector depicts the contact end of the connections.

Function
Motor connection for units with digital interface (MOVILINK® DDI)

Connection type
M40, male, male thread, TE Connectivity - Intercontec Products, series 740, SEW insert, SpeedTec equipment, coding ring: without, protected against contact

Connection diagram



Assignment for motor without brake

Contact	Signal	Description
U	U	Motor connection phase U
V	V	Motor connection phase V
W	W	Motor connection phase W
1	Reserved	Do not connect
+	Reserved	Do not connect
N	Reserved	Do not connect
2	Reserved	Do not connect
PE	PE	PE connection
DDI	DDI	MOVILINK® DDI

Assignment for brakemotors with BK.. brake

Contact	Signal	Description
U	U	Motor connection phase U
V	V	Motor connection phase V
W	W	Motor connection phase W
1	Brake -	Brake connection -
+	Reserved	Do not connect
N	Reserved	Do not connect
2	Brake +	Brake connection +
PE	PE	PE connection
DDI	DDI	MOVILINK® DDI

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Assignment for brakemotors with BZ.. brake

No.	Name	Function
U	U	Motor connection phase U
V	V	Motor connection phase V
W	W	Motor connection phase W
A	Res.	Reserved
B	15	Brake connection 15
C	13	Brake connection 13
D	14	Brake connection 14
PE	PE	PE connection
1	DDI	MOVILINK® DDI

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4.8.4 Connection with terminal box

Connection cross section

Motor	Power connection			Encoder / resolver / thermal motor protection	
	Connection	Maximum connection cross section	Cable entry	Connection	Cable entry
CM3C63	Spring terminals	4 mm^2	M25	Spring terminals	M20
CM3C71, CM3C80, CM3C100	M6 stud	10 mm^2	M32		M16

Position of terminal box and cable entry

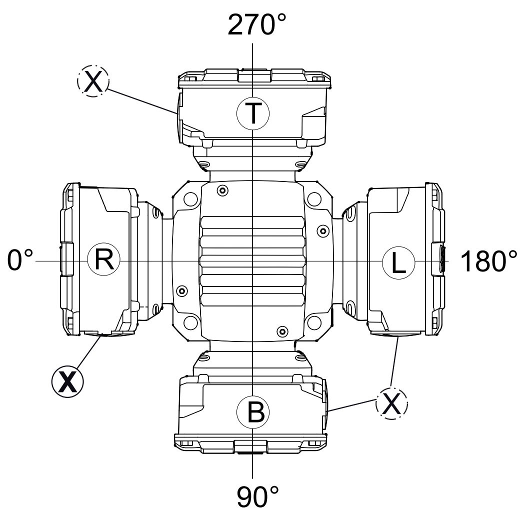
Product standard EN 60034 prescribes the following designations for terminal boxes positioned facing towards the output shaft (A-side):

- R (right)
- B (bottom)
- L (left)
- T (top)

This designation applies to motors without a gear unit in mounting position B3 (= M1).

The position of the motor terminal box has so far been specified with 0°, 90°, 180° or 270° as viewed onto the fan guard (B-side). For gearmotors, the previous designation is maintained.

The following figure shows both designations. Where the mounting position of the motor changes, R, B, L and T are rotated accordingly.



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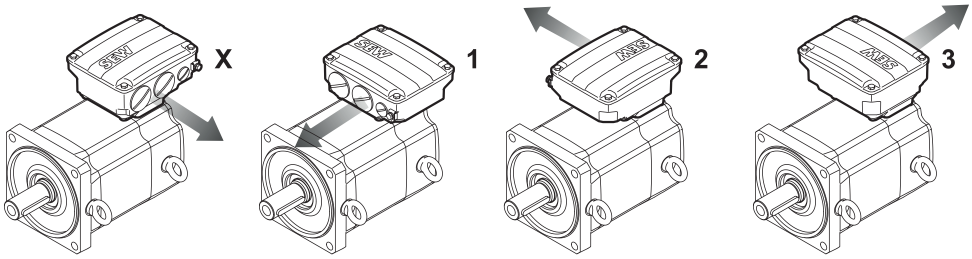
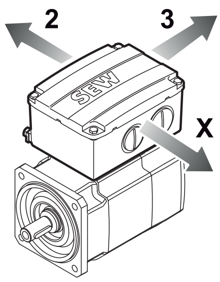
The cable entry position is specified with X, 1, 2, 3. As standard, the terminal box is delivered in the 270° design with cable entry "X".

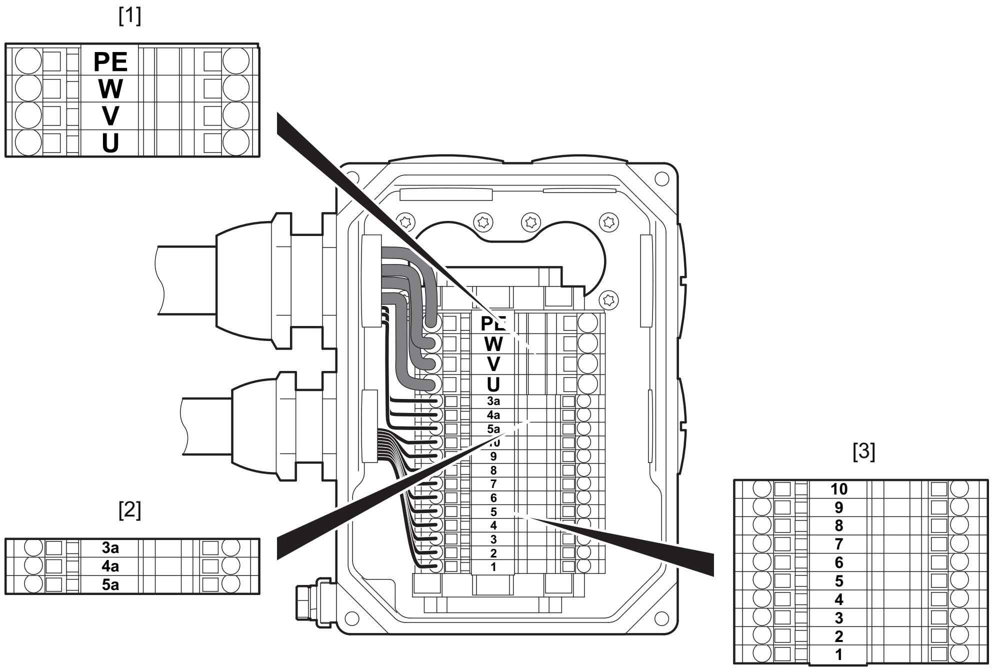


As depicted below, with motor size CM3C63 is available only with terminal box position "X". Cable entry is possible from 3 sides.



Observe that the terminal box position is defined when the motor is ordered. The terminal box must not be turned afterwards. Contact SEW-EURODRIVE, if required.

Terminal assignment terminal box CM3C63



Assignment Terminal [1]	No.	Connection
Supply system	U	Line connection phase U
	V	Line connection phase V
	W	Line connection phase W
	PE	PE connection

Assignment Terminal [2]	Type	No.	Brake control connection			
			BMV..	BS24	BME.., BMP.., BMH.., BMK.., BST..	BSG..
Brake	BK.. brake BZ..D brake	4a	13	3	–	–
		5a	15	5	–	–
	BZ.. brake	3a	–	–	14	1
		4a	–	–	13	5
		5a	–	–	15	3

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Assignment

Terminal [3]	Type	No.	Connection	Note
Signal	RH1M resolver	1	R1 Ref +	Reference +
		2	R2 Ref -	Reference -
		3	S1 Cos +	Cosine +
		4	S3 Cos -	Cosine -
		5	S2 Sin +	Sine +
		6	S4 Sin -	Sine -
		7	–	–
		8	–	–
		9	PK	Motor protection
		10	PK	Motor protection

The connection diagram and signal logics of the RH1M resolver are identical for CMP.. and CM3C.. motors. Due to the installation design, the color coding of the cores might vary.

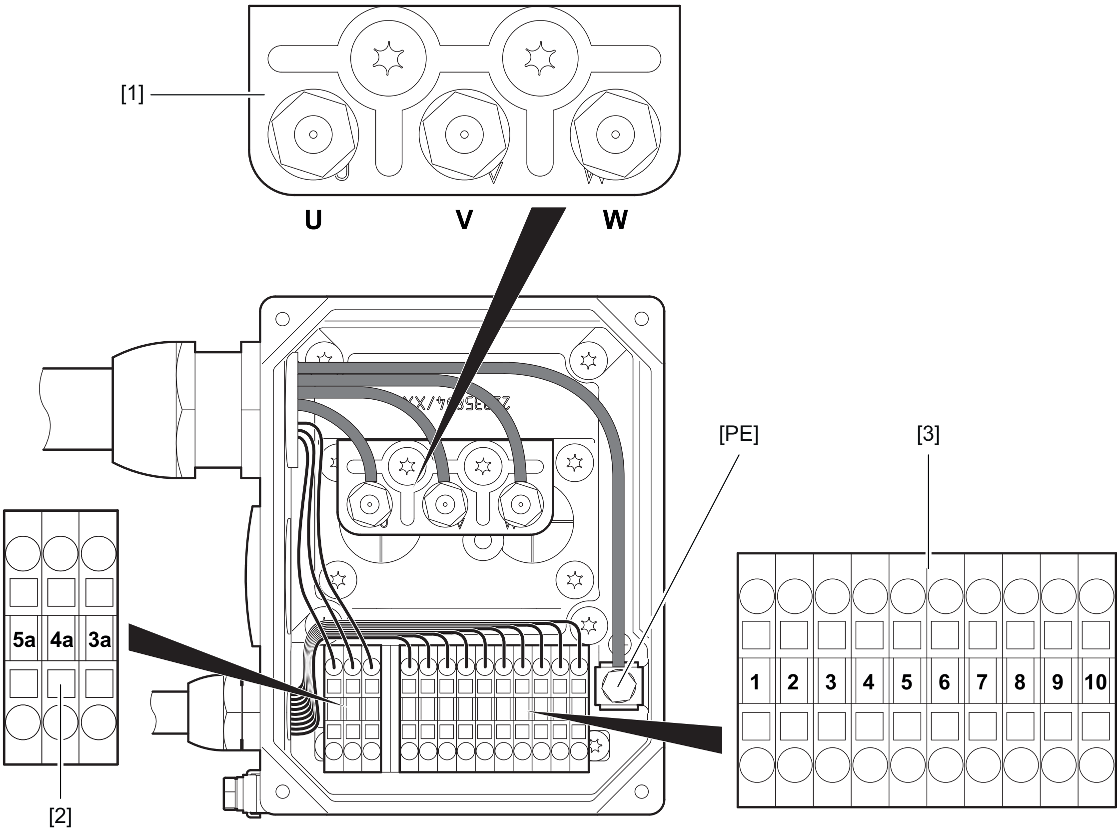
Assignment

Terminal [3]	Type	No.	Connection	Note
Signal	Encoder AK1H EK1H AK0H	1	cos +	Cosine +
		2	ref cos	Reference
		3	sin+	Sine +
		4	ref sin -	Reference
		5	D -	DATA
		6	D +	DATA
		7	GND	Mass
		8	Us	Voltage
		9	PK	Motor protection
		10	PK	Motor protection

Power

Contact	Core identification	Connection
U	(BK/WH) Black with white lettering U, V, W	U
V		V
W		W
PE	(GNYE) green/yellow	Protective earth

Terminal assignment terminal box CM3C71 – 100



Assignment Terminal [1]	No.	Connection
Supply system	U	Line connection phase U
	V	Line connection phase V
	W	Line connection phase W
	PE	PE connection

Assignment Terminal [2]	Type	No.	Brake control connection			
			BMV..	BS24	BME.., BMP.., BMH.., BMK.., BST..	BSG..
Brake	BK.. brake BZ..D brake	4a	13	3	–	–
		5a	15	5	–	–
	BZ.. brake	3a	–	–	14	1
		4a	–	–	13	5
		5a	–	–	15	3

Assignment

Terminal [3]	Type	No.	Connection	Note
Signal	RH1M resolver	1	R1 Ref +	Reference +
		2	R2 Ref -	Reference -
		3	S1 Cos +	Cosine +
		4	S3 Cos -	Cosine -
		5	S2 Sin +	Sine +
		6	S4 Sin -	Sine -
		7	–	–
		8	–	–
		9	PK	Motor protection
		10	PK	Motor protection

The connection diagram and signal logics of the RH1M resolver are identical for CMP.. and CM3C.. motors. Due to the installation design, the color coding of the cores might vary.

Assignment

Terminal [3]	Type	No.	Connection	Note
Signal	Encoder AK0H	1	S1 Cos +	Cosine +
		2	S3 Cos -	Cosine -
		3	S4 Sin +	Sine +
		4	S2 Sin -	Sine -
		5	D -	Data -
		6	D +	Data +
		7	GND	Mass
		8	Us	Voltage
		9	PK	Motor protection
		10	PK	Motor protection

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4.8.5 Assignment table for connection technology

System voltage 400 V, without forced cooling fan

CM3C63

Connection technology	Approval	CM3C63S			CM3C63M			CM3C63L		
		3000	4500	6000	3000	4500	6000	3000	4500	6000
SM1/SB1/SD1 (M23)	IEC	X	X	X	X	X	X	X	X	X
	UL	X	X	X	X	X	X	X	X	X
	CSA	X	X	X	X	X	X	X	X	X
SMB/SBB/SDB (M40)	IEC	–	–	–	–	–	–	–	–	–
	UL	–	–	–	–	–	–	–	–	–
	CSA	–	–	–	–	–	–	–	–	–
KK	IEC	X	X	X	X	X	X	X	X	X
	UL	X	X	X	X	X	X	X	X	X
	CSA	X	X	X	X	X	X	X	X	X

CM3C71

Connection technology	Approval	CM3C71S				CM3C71M				CM3C71L			
		2000	3000	4500	6000	2000	3000	4500	6000	2000	3000	4500	6000
SM1/SB1/SD1 (M23)	IEC	X	X	X	X	X	X	X	X	X	X	X	X
	UL	X	X	X	X	X	X	X	X	X	X	X	X
	CSA	X	X	X	X	X	X	X	X	X	X	X	X
SMB/SBB/SDB (M40)	IEC	–	–	–	–	–	–	–	–	–	–	–	–
	UL	–	–	–	–	–	–	–	–	–	–	–	–
	CSA	–	–	–	–	–	–	–	–	–	–	–	–
KK	IEC	X	X	X	X	X	X	X	X	X	X	X	X
	UL	X	X	X	X	X	X	X	X	X	X	X	X
	CSA	X	X	X	X	X	X	X	X	X	X	X	X

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CM3C80

Connection technology	Approval	CM3C80S				CM3C80M				CM3C80L			
		2000	3000	4500	6000	2000	3000	4500	6000	2000	3000	4500	6000
SM1/SB1/SD1 (M23)	IEC	X	X	X	X	X	X	X	X	X	X	–	–
	UL	X	X	X	X	X	X	X	X	X	X	–	–
	CSA	X	X	X	X	X	X	X	X	X	X	–	–
SMB/SBB/SDB (M40)	IEC	X	X	X	X	X	X	X	X	X	X	X	X
	UL	X	X	X	X	X	X	X	X	X	X	X	X
	CSA	X	X	X	X	X	X	X	X	X	X	X	X
KK	IEC	X	X	X	X	X	X	X	X	X	X	X	X
	UL	X	X	X	X	X	X	X	X	X	X	X	X
	CSA	X	X	X	X	X	X	X	X	X	X	X	X

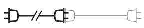
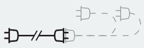
CM3C100

Connection technology	Approval	CM3C100S			CM3C100M			CM3C100L		
		2000	3000	4500	2000	3000	4500	2000	3000	4500
SM1/SB1/SD1 (M23)	IEC	X	X	X	X	X	–	X	–	–
	UL	X	X	X	X	X	–	X	–	–
	CSA	X	X	X	X	X	–	X	–	–
SMB/SBB/SDB (M40)	IEC	X	X	X	X	X	X	X	X	X
	UL	X	X	X	X	X	X	X	X	X
	CSA	X	X	X	X	X	X	X	X	–
KK	IEC	X	X	X	X	X	X	X	X	X
	UL	X	X	X	X	X	X	X	X	X
	CSA	X	X	X	X	X	X	X	X	X

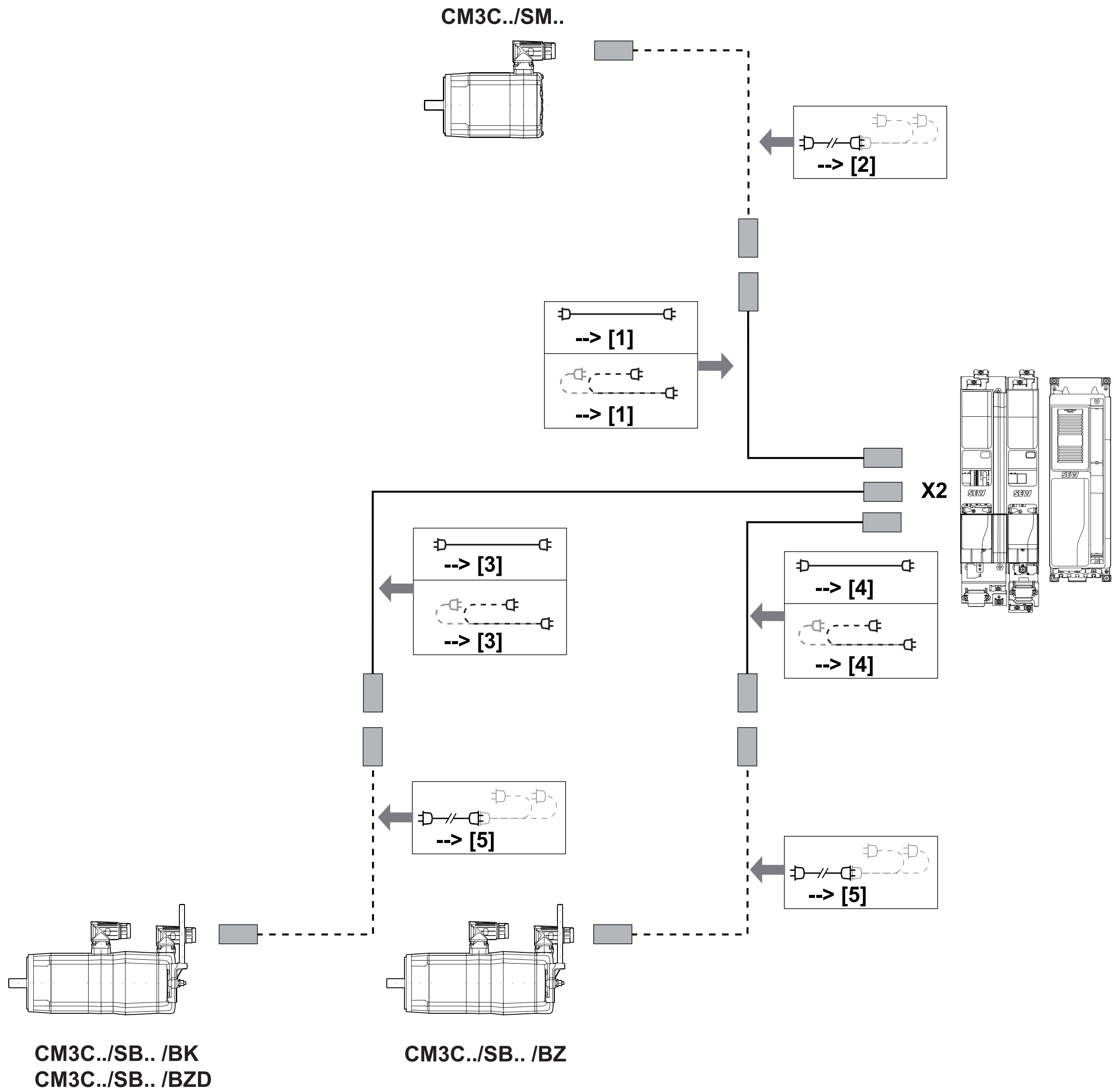
X Designs possible
– Design not possible

4.9 Prefabricated cables for two-cable technology

4.9.1 Meaning of the symbols

Symbol	Meaning
	Connection cable: Connector → connector for fixed installation
	Connection cable: Connector → connector for cable carrier installation
	Connection cable: Connector → open end for fixed installation
	Connection cable: Connector → open end for cable carrier installation
	Connection cable extension: Connector → connector for fixed installation
	Connection cable extension: Connector → connector for cable carrier installation

4.9.2 Overview of power cables for CM3C.. motors



[1] Motor cable ../SM.. (▸ 134)

[2] Motor extension cable ../SM.. (▸ 135)

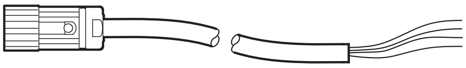
[3] Brakemotor cable ../SB.. for /BK and /BZD brakes (▸ 138)

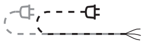
[4] Brakemotor cable ../SB.. for /BZ brakes (▸ 137)

[5] Brakemotor extension cable ../SB.. for /BK, /BZD and /BZ brakes (▸ 138)

Motor cable ../SM..

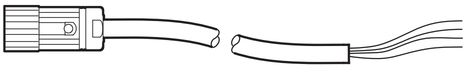
Design





Cable type	Connector type/size (Motor side)	Cable cross section	Connector type/size (Inverter side)	Part number: Fixed installation	Part number: Cable carrier installation
Motor cables	SM1 / M23 SpeedTec	4 × 1.5 mm²	Open end	28125002	28125010
		4 × 2.5 mm²		28125029	28125037
		4 × 4 mm²		28125045	28125053
	SMB / M40 SpeedTec	4 × 6 mm²		28125061	28125088
		4 × 10 mm²		28125096	28125118
		4 × 16 mm²		28125126	28125134

Connection



Contact M23	Contact M40	Signal	Core color	Conductor color IEC 60757	Identification	Assembly	Description
A	2	–	–	–	–	–	–
B	1	–	–	–	–	–	–
C	+	–	–	–	–	–	–
D	–	–	–	–	–	–	–
1	U	U	Black	BK	U/L1	Not prefabricated	Motor connection phase U
2	PE	PE	Green/yellow	GNYE	–	Not prefabricated	PE connection
3	W	W	Black	BK	W/L3	Not prefabricated	Motor connection phase W
4	V	V	Black	BK	V/L2	Not prefabricated	Motor connection phase V

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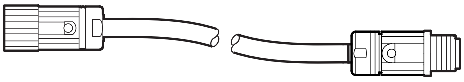
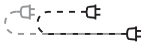
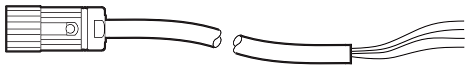
Motor extension cable ../SM..

Design

	Motor side  Inverter side			Fixed installation 	Cable carrier installation 
Cable type	**Connector type/size**	**Cable cross section**	**Connector type/size**	**Part number**	
Motor extension cable	SM1 / M23 SpeedTec	4 × 1.5 mm²	SM1 / M23 SpeedTec	–	28125142
		4 × 2.5 mm²		–	28125150
		4 × 4 mm²		–	28125169
	SMB / M40 SpeedTec	4 × 6 mm²	SMB / M40 SpeedTec	–	28125177
		4 × 10 mm²		–	28125185
		4 × 16 mm²		–	28125193

Brakemotor cable ../SB.. for /BK and /BZD brakes

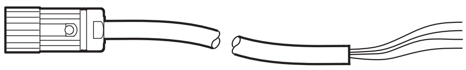
Design



	Motor side		Inverter side	Fixed installa-tion	Cable carrier installation
Cable type	**Connector type/size**	**Cable cross section**	**Connector type/size**	**Part number**	
Brakemotor cable[1] for BK.. and BZ..D brakes	SB1 / M23 SpeedTec	4 × 1.5 mm² + 3 × 1 mm²	Open end	28125207	28125215
		4 × 2.5 mm² + 3 × 1 mm²		28125223	28125231
		4 × 4 mm² + 3 × 1 mm²		28125258	28125266
	SBB / M40 SpeedTec	4 × 6 mm² + 3 × 1.5 mm²		28125274	28125282
		4 × 10 mm² + 3 × 1.5 mm²		28125290	28125304
		4 × 16 mm² + 3 × 1.5 mm²		28125312	28125320

1 The cable contains 3 cores but only 2 cores are used.

Connection



Contact		Motor side			Inverter side		
M23	**M40**	**Signal**	**Core color**	**Conductor color IEC 60757**	**Identification**	**Assembly**	**Description**
A	2	–	–	–	–	–	–
B	1	–	–	–	–	–	–
C	+	Brake	Black	BK	BK(1)	Not prefabricated	Brake connection +/13
D	–	Brake	Black	BK	BK (3)	Not prefabricated	Brake connection -/15
1	U	U	Black	BK	U/L1	Not prefabricated	Motor connection phase U
2	PE	PE	Green/yellow	GNYE	–	Not prefabricated	PE connection
3	W	W	Black	BK	W/L3	Not prefabricated	Motor connection phase W
4	V	V	Black	BK	V/L2	Not prefabricated	Motor connection phase V

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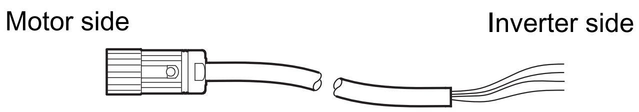
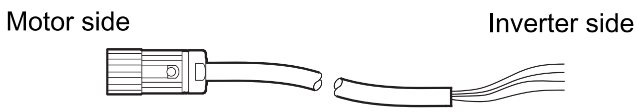
Brakemotor cable ../SB.. for /BZ brakes

Design



Cable type	Connector type/size	Cable cross section	Connector type/size	Part number Fixed installation	Part number Cable carrier installation
Brakemotor cable BZ.. brake	SB1 / M23 SpeedTec	4 × 1.5 mm² + 3 × 1 mm²	Open end	28125339	28125347
		4 × 2.5 mm² + 3 × 1 mm²		28125355	28125363
		4 × 4 mm² + 3 × 1 mm²		28125371	28125398
	SBB / M40 SpeedTec	4 × 6 mm² + 3 × 1.5 mm²		28125401	28125428
		4 × 10 mm² + 3 × 1.5 mm²		28125436	28125444
		4 × 16 mm² + 3 × 1.5 mm²		28125452	28125460

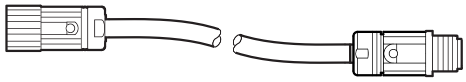
Connection



Contact M23	Contact M40	Signal	Core color	Conductor color IEC 60757	Identification	Assembly	Description
A	2	–	–	–	–	–	–
B	1	Brake	Black	BK	BK (2)	Prefabricated	Brake connection 14
C	+	Brake	Black	BK	BK (1)	Prefabricated	Brake connection 13
D	–	Brake	Black	BK	BK (3)	Prefabricated	Brake connection 15
1	U	U	Black	BK	U/L1	Not prefabricated	Motor connection phase U
2	PE	PE	Green/yellow	GNYE	–	Not prefabricated	PE connection
3	W	W	Black	BK	W/L3	Not prefabricated	Motor connection phase W
4	V	V	Black	BK	V/L2	Not prefabricated	Motor connection phase V

Brakemotor extension cable ../SB.. for /BK, /BZD and /BZ brakes

Design



Cable type	Connector type/size (Motor side)	Cable cross section	Connector type/size (Inverter side)	Part number: Fixed installation	Part number: Cable carrier installation
Brakemotor extension cable for BK../BZ..D/BZ.. brakes	SB1 / M23 SpeedTec	4 × 1.5 mm^2 + 3 × 1 mm^2	SM1 / M23 SpeedTec	–	28125479
		4 × 2.5 mm^2 + 3 × 1 mm^2		–	28125487
		4 × 4 mm^2 + 3 × 1 mm^2		–	28125495
	SBB / M40 SpeedTec	4 × 6 mm^2 + 3 × 1.5 mm^2	SMB / M40 SpeedTec	–	28125509
		4 × 10 mm^2 + 3 × 1.5 mm^2		–	28125517
		4 × 16 mm^2 + 3 × 1.5 mm^2		–	28125525

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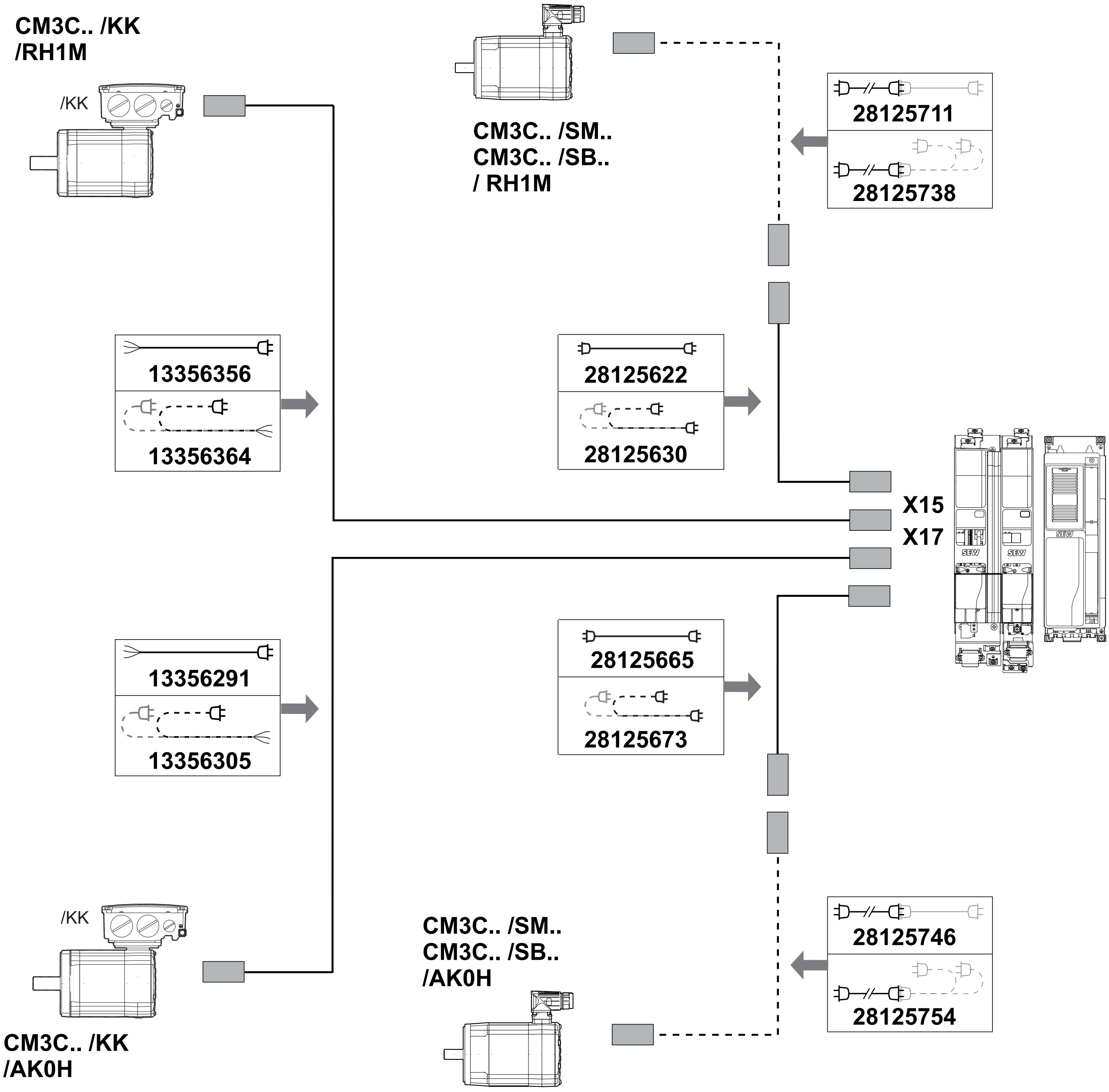
4.9.3 Overview of encoder cables for MOVI-C® and MOVIAXIS® inverters



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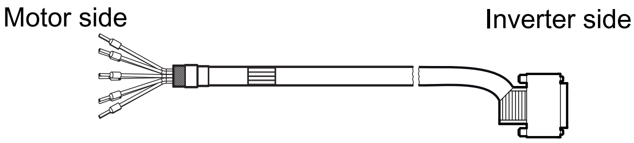
Encoder cable from RH1M resolver, terminal box to MOVI-C® and MOVIAXIS® inverters

Connection

Terminal strip



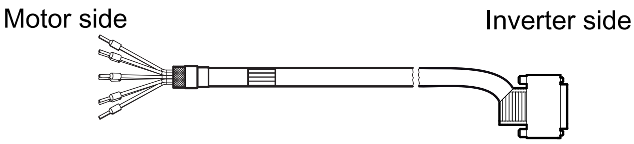
D-sub 15-pin

Contact	Signal	Core color	Conductor color IEC 60757	Contact
1	R1 (reference +)	Pink	PK	5
2	R2 (reference -)	Gray	GY	13
3	S1 (cosine +)	Red	RD	2
4	S3 (cosine -)	Blue	BU	10
5	S2 (sine +)	Green	CN	1
6	S4 (sine -)	Yellow	YE	9
7	n.c.	n.c.	n.c.	n.c.
8	n.c.	n.c.	n.c.	n.c.
9	PK	Brown/violet	BN/VT	14
10	PK	White/black	WH/BK	6

Encoder cable from AK0H HIPERFACE® encoder to MOVI-C® and MOVIAXIS® inverters

Connection

Terminal strip



D-sub 15-pin

Contact	Signal	Core color	Conductor color IEC 60757	Contact
1	S1 (COS +)	Red	RD	1
2	S3 (COS -)	Blue	BU	9
3	S2 (SIN +)	Yellow	YE	2
4	S4 (SIN -)	Green	GN	10
5	Data -	Violet	VT	12
6	Data +	Black	BK	4
7	GND	Gray-pink/pink	GYPK/PK	8
8	Us	Red-blue/gray	RDBU/GY	15
9	PK	Brown	BN	14

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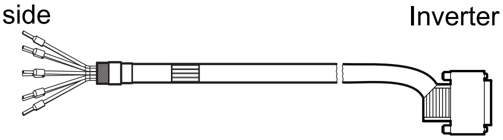
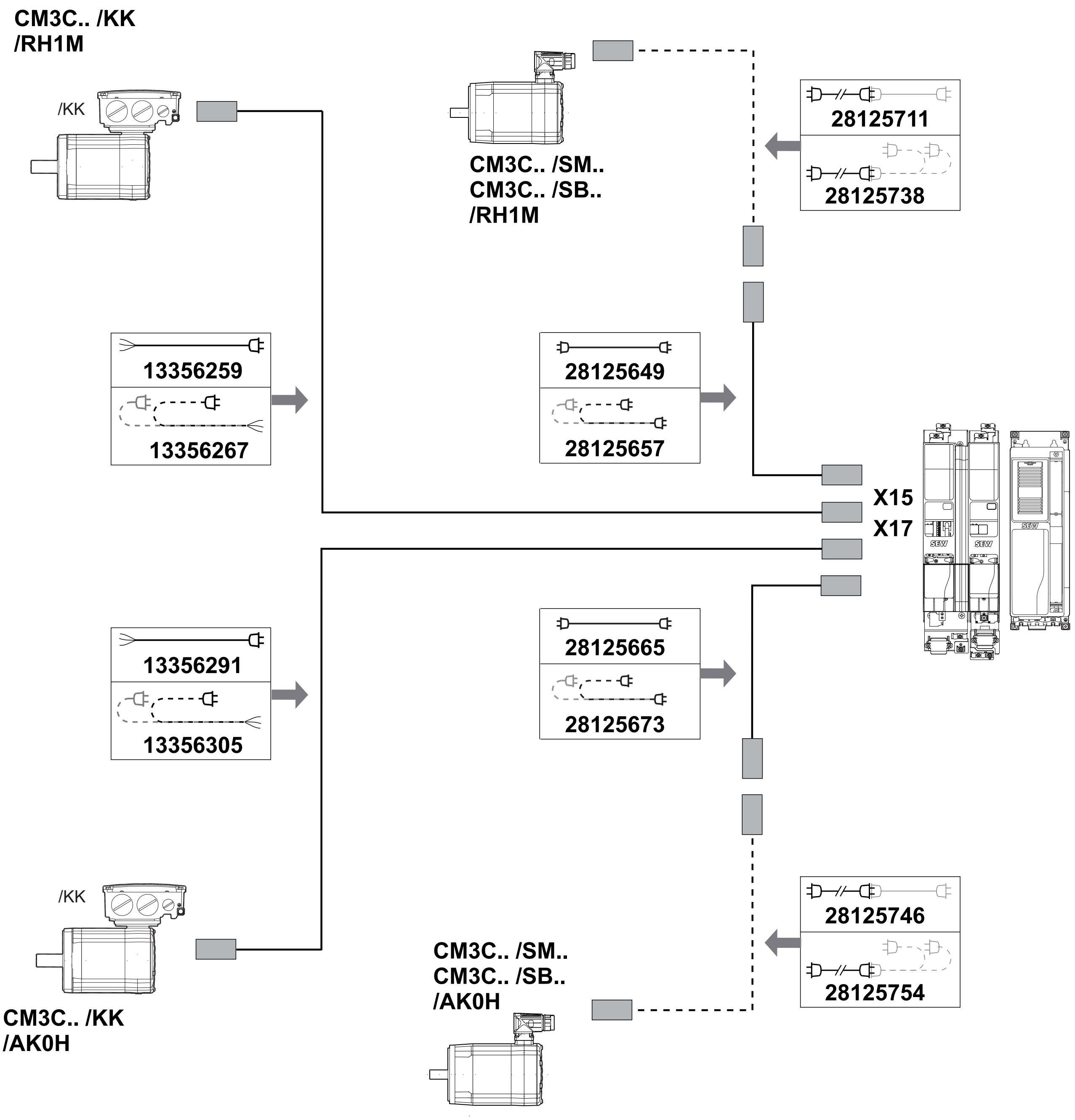
Terminal strip	Motor side		Inverter side	D-sub 15-pin
				
Contact	Signal	Core color	Conductor color IEC 60757	Contact
10	PK	White	WH	6

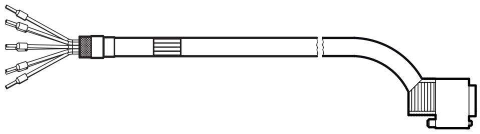
4.9.4 Overview of encoder cables for MOVIDRIVE® B inverters



Encoder cable from RH1M resolver, terminal box to MOVIDRIVE®

Connection

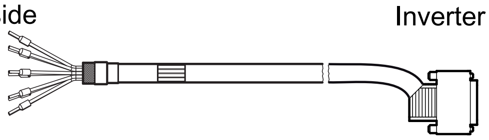
Terminal strip	Motor side		Inverter side	D-sub 9-pin
Contact	Signal	Core color	Conductor color IEC 60757	Contact
1	R1 (reference +)	Pink	PK	3
2	R2 (reference -)	Gray	GY	8
3	S1 (cosine +)	Red	RD	2
4	S3 (cosine -)	Blue	BU	7
5	S2 (sine +)	Green	GN	1
6	S4 (sine -)	Yellow	YE	6
7	n.c.	n.c.	n.c.	n.c.
8	n.c.	n.c.	n.c.	n.c.
9	PK	Brown/violet	BN/VT	9
10	PK	White/black	WH/BK	5



Encoder cable from AK0H HIPERFACE® encoder to MOVIDRIVE® B inverter

Connection

Terminal strip	Motor side		Inverter side	D-sub 15-pin
Contact	Signal	Core color	Conductor color IEC 60757	Contact
1	S1 (COS +)	Red	RD	1
2	S3 (COS -)	Blue	BU	9
3	S2 (SIN +)	Yellow	YE	2
4	S4 (SIN -)	Green	GN	10
5	Data -	Violet	VT	12
6	Data +	Black	BK	4
7	GND	Gray-pink + pink (Alternative: pink[1]	GYPK + PK (Alternative: PK[1])	8
8	Us	Red-blue + gray (Alternative: gray[1])	RDBU + GY (Alternative: GY[1])	15
9	PK	Brown	BN	14
10	PK	White	WH	6



1 The dual assignment becomes invalid if the reeled cables are changed, e.g. (6 × 2 × 0.25) → (4 × 2 × 0.25 + 2 × 0.5).

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4.9.5 Assembling the cables

Observe the following when you assemble the cables yourself:

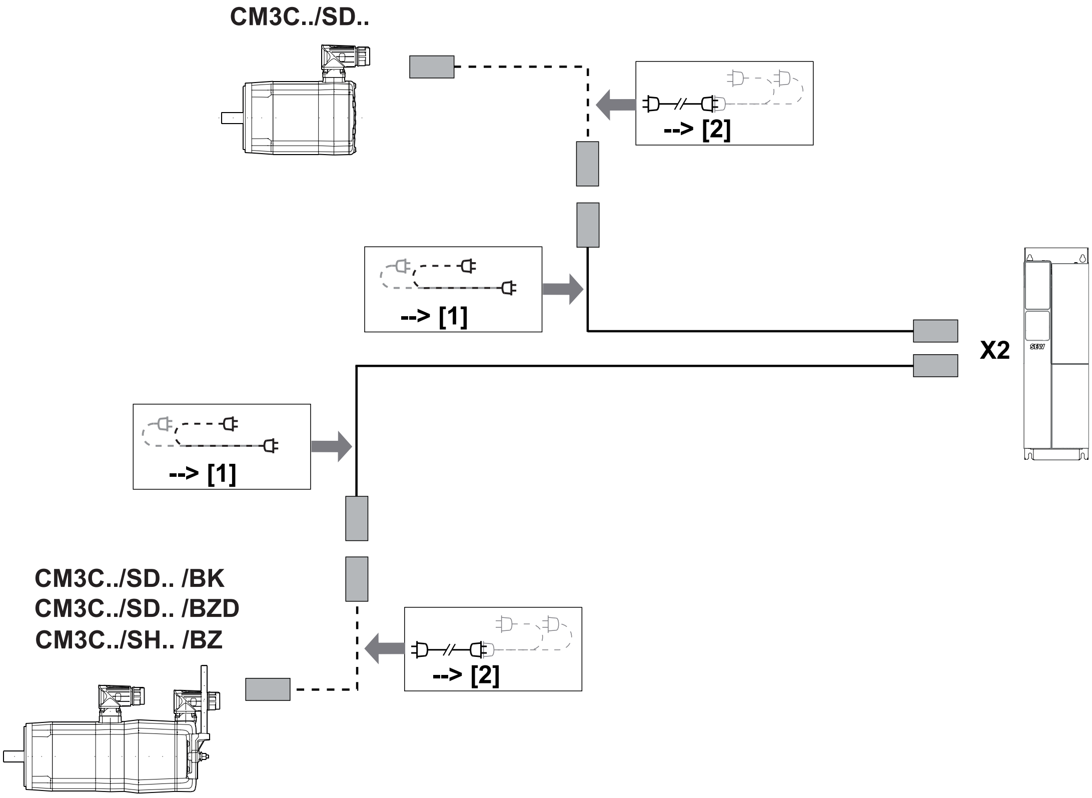
- The socket contacts for the motor connection are implemented as crimping contacts. Only use suitable tools for crimping.
- Insulate the connecting wires. Cover the connections with heat shrink tubings.
- Incorrectly installed socket contacts can be removed without removal tools.

4.10 Prefabricated cables for single-cable technology (MOVILINK® DDI)

4.10.1 Meaning of the symbols

Symbol	Meaning
	Connection cable: Connector → open end for cable carrier installation
	Connection cable extension: Connector → connector for cable carrier installation

4.10.2 Overview of hybrid motor cables – MOVILINK® DDI single-cable technology



[1] Motor/brakemotor cable (▸ 145)

[2] Extension cable (▸ 147)

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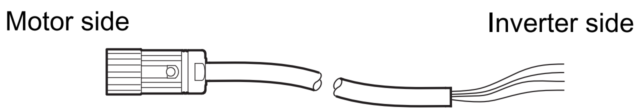
Motor/brakemotor cable ../SD..

Design

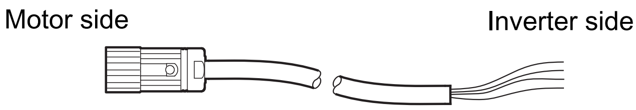


Fixed installation

Cable carrier installation

Cable type	Connector type/size	Cable cross section	Connector type/size	Part number – Fixed installation	Part number – Cable carrier installation
Motor cable/ brakemotor cable	SD1 / M23	4 × 1.5 mm^2 + 4 × 1 mm^2 + RG58	Open end	28123808	28123743
		4 × 2.5 mm^2 + 4 × 1 mm^2 + RG58		28123816	28123751
		4 × 4 mm^2 + 4 × 1 mm^2 + RG58		28123824	28123778
	SDB / M40	4 × 6 mm^2 + 4 × 1 mm^2 + RG58		28123832	28123786
		4 × 10 mm^2 + 4 × 1 mm^2 + RG58		28123840	28123794

Connection without a brake



Contact M23	Contact M40	Signal	Core color	Conductor color IEC 60757	Identification	Assembly	Description
U	U	U	Black	BK	U/L1	Not prefabricated	Motor connection phase U
V	V	V	Black	BK	V/L2	Not prefabricated	Motor connection phase V
W	W	W	Black	BK	W/L3	Not prefabricated	Motor connection phase W
A	1	Reserved	–	–	A	Not prefabricated	Do not connect
B	+	Reserved	–	–	B	Not prefabricated	Do not connect
C	N	Reserved	–	–	C	Not prefabricated	Do not connect
D	2	Reserved	–	–	D	Not prefabricated	Do not connect
PE	PE	PE	Yellow/green	GNYE		Not prefabricated	PE connection
DDI	DDI	DDI	Violet	VT		Coaxial connector	MOVILINK® DDI

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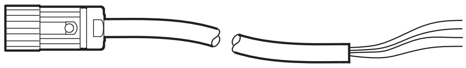
Connection with a /BK or /BZD brake

Motor side Inverter side



Contact		Signal	Core color	Conductor color IEC 60757	Identification	Assembly	Description
M23	M40						
U	U	U	Black	BK	U/L1	Not prefabricated	Motor connection phase U
V	V	V	Black	BK	V/L2	Not prefabricated	Motor connection phase V
W	W	W	Black	BK	W/L3	Not prefabricated	Motor connection phase W
A	1	Brake -	Yellow	YE	A	Not prefabricated	Brake connection -
B	+	Reserved	Orange	OG	B	Not prefabricated	Do not connect
C	N	Reserved	Pink	PK	C	Not prefabricated	Do not connect
D	2	Brake +	Violet	VT	D	Not prefabricated	Brake connection +
PE	PE	PE	Yellow/green	GNYE		Not prefabricated	PE connection
DDI	DDI	DDI	Violet	VT		Coaxial connector	MOVILINK® DDI

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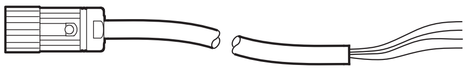
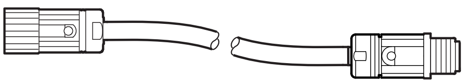
Connection with a /BZ brake

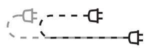


Contact M23	Contact M40	Signal	Core color	Conductor color IEC 60757	Identification	Assembly	Description
U	U	U	Black	BK	U/L1	Not prefabricated	Motor connection phase U
V	V	V	Black	BK	V/L2	Not prefabricated	Motor connection phase V
W	W	W	Black	BK	W/L3	Not prefabricated	Motor connection phase W
A	1	Reserved	Yellow	YE	A	Not prefabricated	Do not connect
B	+	15	Orange	OG	B	Not prefabricated	Brake connection 15
C	N	13	Pink	PK	C	Not prefabricated	Brake connection 13
D	2	14	Violet	VT	D	Not prefabricated	Brake connection 14
PE	PE	PE	Yellow/green	GNYE		Not prefabricated	PE connection
DDI	DDI	DDI	Violet	VT		Coaxial connector	MOVILINK® DDI

Extension cable ../SD..

Design





Cable type	Connector type/size	Cable cross section	Connector type/size	Part number: Fixed installation	Part number: Cable carrier installation
Extension cable	SD1 / M23	4 × 1.5 mm² + 4 × 1 mm² + RG58	SD1 / M23	28123905	28123859
		4 × 2.5 mm² + 4 × 1 mm² + RG58		28123913	28123867
		4 × 4 mm² + 4 × 1 mm² + RG58		28123921	28123875
	SDB / M40	4 × 6 mm² + 4 × 1 mm² + RG58	SDB / M40	28123948	28123883
		4 × 10 mm² + 4 × 1 mm² + RG58		28123956	28123891

5 Project planning

5.1 Data for drive selection

5.1.1 Determining the application data

Drive selection requires data of the driven machine (mass, rotational speed, speeds, direction of movement, type of transmission element, setting range, etc.) as well as information on the customer requirements.

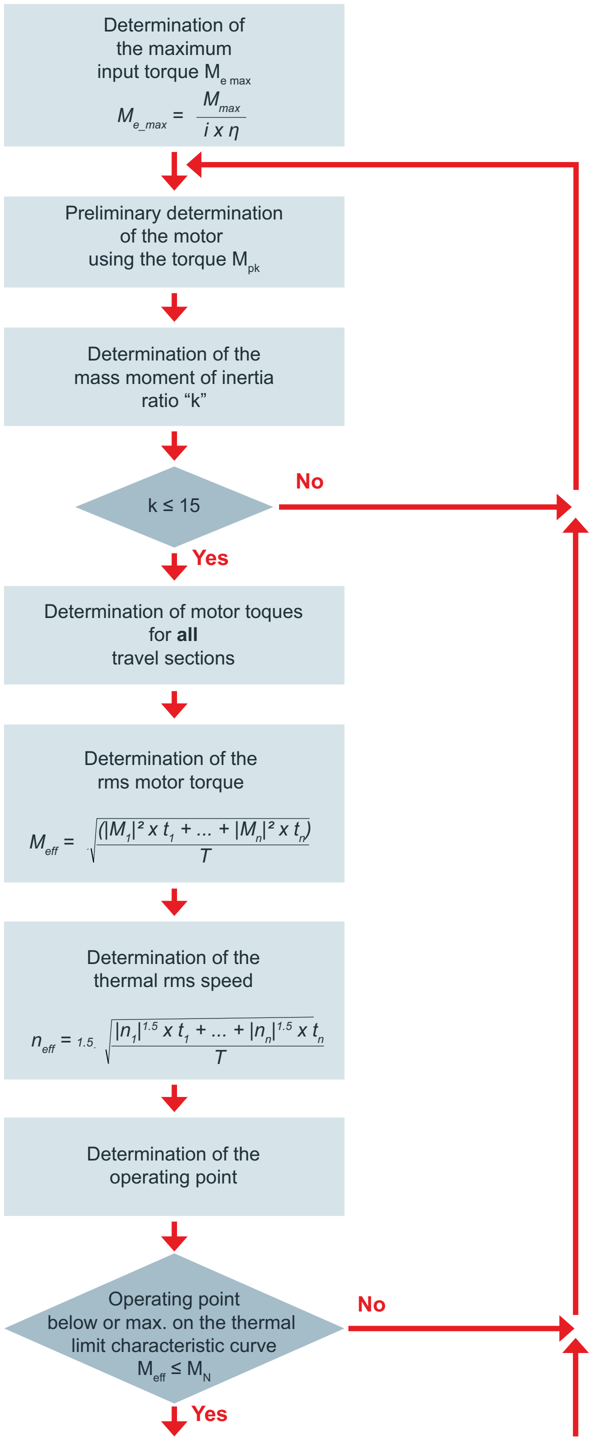
This data helps to determine the required torques and speeds. Refer to the publication "Drive Engineering – Practical Implementation / Drive Planning" or the project planning tool "SEW-Workbench" by SEW-EURODRIVE for assistance.

5.1.2 Selecting the correct drive

The appropriate drive can be selected once the torques and speeds of the drive have been calculated, and with regard to mechanical requirements.

5.2 Project planning procedure for servomotors

For an explanation of the used formula symbols, refer to chapter "Abbreviations and descriptions" (▸ 164).



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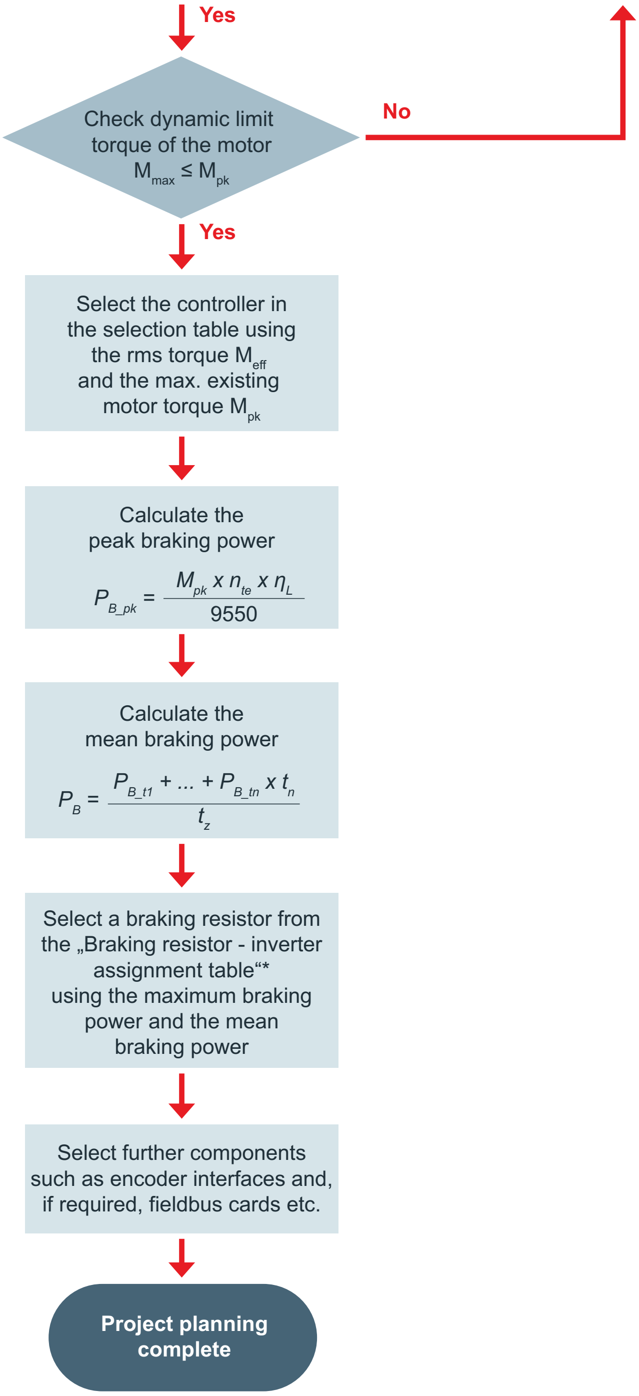

* Product manuals of the application inverters from the brand MOVI-C®, MOVIDRIVE® B, MOVIAXIS®.

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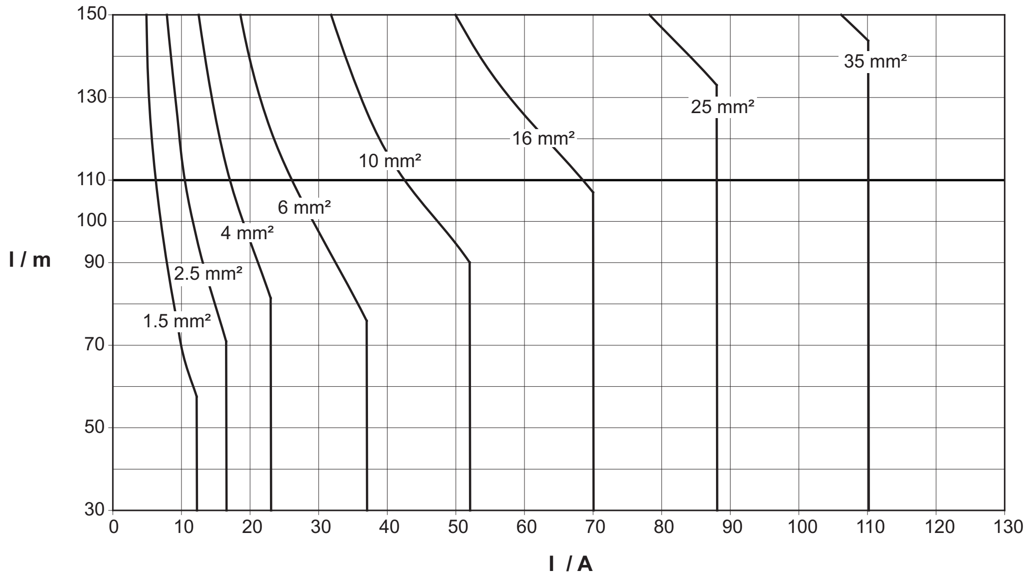
For further information regarding brake configuration, refer to the manual "Project Planning for BK.., BP.., BR.., BY.., BZ.. brakes".

5.3 Project planning for cable cross section

5.3.1 Cable dimensioning to EN 60204

The following figure shows the minimum required cable cross section depending on cable length and permitted current.



5.3.2 Cable load table

Cable load through current I in ampere according to EN 60204-1 (2019 edition), table 6, ambient temperature 40 °C.

Cable cross section	Three-core sheathed cable in pipe or cable (B2)	Three-core sheathed cable on top of each other on wall (C)	Three-core sheathed cable lined up horizontally (E)
mm^2	A	A	A
1.5	**13.1**	15.2	16.1
2.5	**17.4**	21	22
4	**23**	28	30
6	30	36	**37**
10	40	50	**52**
16	54	66	**70**
25	70	84	**88**
35	86	104	**110**
50	103	125	**133**
70	130	160	**171**

These data are merely recommended values and are **no substitute for the detailed configuration** of the in-coming cables depending on the concrete application considering the applicable regulations.

The permitted cable loads according to IEC 60364-5-52 must be adjusted by the following correcting factors, depending on the ambient temperature of the air:

Ambient temperature of the air **°C**	**Correction factor**
30	1.15
35	1.08
40	1.00
45	0.91
50	0.82
55	0.71
60	0.58

Observe the voltage drop that occurs along the cable in particular with the DC 24 V brake coil (BZ.. brake with 24 V brake voltage) when dimensioning the cross sections for the brake cable. The acceleration current is decisive for the calculation.

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5.4 Cable assignment for two-cable technology, system voltage 400 V

5.4.1 General information on cable assignment tables

The values in the cable assignment table are based on the values highlighted as bold in the table in chapter "Cable load table" (▸ 151).

For the connector assignment, refer to the assignment table in chapter "Assignment table for connection technology" (▸ 130).

The cable length limits derive from the normative specifications on voltage drop at I_0/I_{0VR} (< 5%) for cables according to EN 60204-1 (edition 2019).

When the plant requires a UL certification, the power cables between motor and inverter must be designed with a minimum cross section of 2.5 mm² (AWG14) according to NEC 430.22 (National Fire Protection Association; Edition 2011).

5.4.2 Cable assignment for motor cables

The part numbers refer to the smallest connector that can be used:

- 1.5 mm² – 4 mm²: SM1
- 6 mm² – 16 mm²: SMB

Motor	Plug connector	Speed class	Standstill current I_{M0}	Cable length up to	Core cross section	Cable part number Fixed installation	Cable carrier installation	Cable carrier extension
		min⁻¹	A	m	mm²	For motors without brake		
CM3C63S	SM1	3000	2.17	100	1.5	28125002	28125010	28125142
CM3C63S	SM1	4500	2.94	100	1.5	28125002	28125010	28125142
CM3C63S	SM1	6000	3.71	100	1.5	28125002	28125010	28125142
CM3C63M	SM1	3000	3.27	100	1.5	28125002	28125010	28125142
CM3C63M	SM1	4500	4.63	100	1.5	28125002	28125010	28125142
CM3C63M	SM1	6000	6.14	100	1.5	28125002	28125010	28125142
CM3C63L	SM1	3000	4.04	100	1.5	28125002	28125010	28125142
CM3C63L	SM1	4500	5.72	100	1.5	28125002	28125010	28125142
CM3C63L	SM1	6000	7.35	90	1.5	28125002	28125010	28125142
CM3C63L	SM1	6000	7.35	100	2.5	28125029	28125037	28125150
CM3C71S	SM1	2000	3.5	100	1.5	28125002	28125010	28125142
CM3C71S	SM1	3000	5	100	1.5	28125002	28125010	28125142
CM3C71S	SM1	4500	7.2	95	1.5	28125002	28125010	28125142
CM3C71S	SM1	4500	7.2	100	2.5	28125029	28125037	28125150
CM3C71S	SM1	6000	9.5	70	1.5	28125002	28125010	28125142
CM3C71M	SM1	2000	5.1	100	1.5	28125002	28125010	28125142
CM3C71M	SM1	3000	7	95	1.5	28125002	28125010	28125142

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Motor	Plug connector	Speed class	Standstill current I_{M0}	Cable length up to	Core cross section	Cable part number		
						Fixed installation	Cable carrier installation	Cable carrier extension
		min^{-1}	A	m	mm^2	For motors without brake		
CM3C71M	SM1	3000	7	100	2.5	28125029	28125037	28125150
CM3C71M	SM1	4500	10.2	65	1.5	28125002	28125010	28125142
CM3C71M	SM1	4500	10.2	100	2.5	28125029	28125037	28125150
CM3C71M	SM1	6000	13.5	85	2.5	28125029	28125037	28125150
CM3C71M	SM1	6000	13.5	100	4	28125045	28125053	28125169
CM3C71L	SM1	2000	6.4	100	1.5	28125002	28125010	28125142
CM3C71L	SM1	3000	9.5	70	1.5	28125002	28125010	28125142
CM3C71L	SM1	3000	9.5	100	2.5	28125029	28125037	28125150
CM3C71L	SM1	4500	13.9	80	2.5	28125029	28125037	28125150
CM3C71L	SM1	4500	13.9	100	4	28125045	28125053	28125169
CM3C71L	SM1	6000	18.5	100	4	28125045	28125053	28125169
CM3C80S	SM1	2000	5.78	100	1.5	28125002	28125010	28125142
CM3C80S	SM1	3000	8.24	80	1.5	28125002	28125010	28125142
CM3C80S	SM1	3000	8.24	100	2.5	28125029	28125037	28125150
CM3C80S	SM1	4500	11.7	60	1.5	28125002	28125010	28125142
CM3C80S	SM1	4500	11.7	100	2.5	28125029	28125037	28125150
CM3C80S	SM1	6000	15.9	70	2.5	28125029	28125037	28125150
CM3C80S	SM1	6000	15.9	100	4	28125045	28125053	28125169
CM3C80M	SM1	2000	7.85	85	1.5	28125002	28125010	28125142
CM3C80M	SM1	2000	7.85	100	2.5	28125029	28125037	28125150
CM3C80M	SM1	3000	10.9	60	1.5	28125002	28125010	28125142
CM3C80M	SM1	3000	10.9	100	2.5	28125029	28125037	28125150
CM3C80M	SM1	4500	16.3	70	2.5	28125029	28125037	28125150
CM3C80M	SM1	4500	16.3	100	4	28125045	28125053	28125169
CM3C80M	SM1	6000	21.2	85	4	28125045	28125053	28125169
CM3C80M	SMB	6000	21.2	100	6	28125061	28125088	28125177
CM3C80L	SM1	2000	11.2	60	1.5	28125002	28125010	28125142
CM3C80L	SM1	2000	11.2	100	2.5	28125029	28125037	28125150
CM3C80L	SM1	3000	16.1	70	2.5	28125029	28125037	28125150
CM3C80L	SM1	3000	16.1	100	4	28125045	28125053	28125169
CM3C80L	SMB	4500	23.1	100	6	28125061	28125088	28125177
CM3C80L	SMB	6000	30.8	90	6	28125061	28125088	28125177
CM3C80L	SMB	6000	30.8	100	10	28125096	28125118	28125185
CM3C100S	SM1	2000	8.63	75	1.5	28125002	28125010	28125142
CM3C100S	SM1	2000	8.63	100	2.5	28125029	28125037	28125150
CM3C100S	SM1	3000	12.8	50	1.5	28125002	28125010	28125142
CM3C100S	SM1	3000	12.8	90	2.5	28125029	28125037	28125150
CM3C100S	SM1	3000	12.8	100	4	28125045	28125053	28125169
CM3C100S	SM1	4500	18.9	95	4	28125045	28125053	28125169

Motor	Plug connector	Speed class	Standstill current I_{M0}	Cable length up to	Core cross section	Cable part number Fixed installation	Cable carrier installation	Cable carrier extension
		min^{-1}	A	m	mm^2	For motors without brake		
CM3C100S	SMB	4500	18.9	100	6	28125061	28125088	28125177
CM3C100M	SM1	2000	12.5	55	1.5	28125002	28125010	28125142
CM3C100M	SM1	2000	12.5	90	2.5	28125029	28125037	28125150
CM3C100M	SM1	2000	12.5	100	4	28125045	28125053	28125169
CM3C100M	SM1	3000	17.8	100	4	28125045	28125053	28125169
CM3C100M	SMB	4500	27.6	100	6	28125061	28125088	28125177
CM3C100L	SM1	2000	17.5	100	4	28125045	28125053	28125169
CM3C100L	SMB	3000	27.2	100	6	28125061	28125088	28125177
CM3C100L	SMB	4500	37.7	100	10	28125096	28125118	28125185

5.4.3 Cable assignment for BK../BZ..D brakemotor cables

The part numbers refer to the smallest connector that can be used:

- 1.5 mm^2 – 4 mm^2: SB1
- 6 mm^2 – 16 mm^2: SBB

Motor	Plug connector	Speed class	Standstill current I_{M0}	Cable length up to	Core cross section	Cable part number SB1/SBB Fixed installation	Cable part number SB1/SBB Cable carrier installation	Cable part number SB1/SBB Cable carrier extension
		min^{-1}	A	m	mm^2	For motors/brakemotors with BK../BZ..D brake		
CM3C63S	SB1	3000	2.17	100	1.5	28125339	28125347	28125479
CM3C63S	SB1	4500	2.94	100	1.5	28125339	28125347	28125479
CM3C63S	SB1	6000	3.71	100	1.5	28125339	28125347	28125479
CM3C63M	SB1	3000	3.27	100	1.5	28125339	28125347	28125479
CM3C63M	SB1	4500	4.63	100	1.5	28125339	28125347	28125479
CM3C63M	SB1	6000	6.14	100	1.5	28125339	28125347	28125479
CM3C63L	SB1	3000	4.04	100	1.5	28125339	28125347	28125479
CM3C63L	SB1	4500	5.72	100	1.5	28125339	28125347	28125479
CM3C63L	SB1	6000	7.35	90	1.5	28125339	28125347	28125479
CM3C63L	SB1	6000	7.35	100	2.5	28125355	28125363	28125487
CM3C71S	SB1	2000	3.5	100	1.5	28125339	28125347	28125479
CM3C71S	SB1	3000	5	100	1.5	28125339	28125347	28125479
CM3C71S	SB1	4500	7.2	95	1.5	28125339	28125347	28125479
CM3C71S	SB1	4500	7.2	100	2.5	28125355	28125363	28125487
CM3C71S	SB1	6000	9.5	70	1.5	28125339	28125347	28125479
CM3C71M	SB1	2000	5.1	100	1.5	28125339	28125347	28125479
CM3C71M	SB1	3000	7	95	1.5	28125339	28125347	28125479
CM3C71M	SB1	3000	7	100	2.5	28125355	28125363	28125487
CM3C71M	SB1	4500	10.2	65	1.5	28125339	28125347	28125479
CM3C71M	SB1	4500	10.2	100	2.5	28125355	28125363	28125487
CM3C71M	SB1	6000	13.5	85	2.5	28125355	28125363	28125487
CM3C71M	SB1	6000	13.5	100	4	28125371	28125398	28125495
CM3C71L	SB1	2000	6.4	100	1.5	28125339	28125347	28125479
CM3C71L	SB1	3000	9.5	70	1.5	28125339	28125347	28125479
CM3C71L	SB1	3000	9.5	100	2.5	28125355	28125363	28125487
CM3C71L	SB1	4500	13.9	80	2.5	28125355	28125363	28125487
CM3C71L	SB1	4500	13.9	100	4	28125371	28125398	28125495
CM3C71L	SB1	6000	18.5	100	4	28125371	28125398	28125495
CM3C80S	SB1	2000	5.78	100	1.5	28125339	28125347	28125479
CM3C80S	SB1	3000	8.24	80	1.5	28125339	28125347	28125479
CM3C80S	SB1	3000	8.24	100	2.5	28125355	28125363	28125487
CM3C80S	SB1	4500	11.7	60	1.5	28125339	28125347	28125479

Motor	Plug connector	Speed class	Standstill current I_{M0}	Cable length up to	Core cross section	Cable part number SB1/SBB Fixed i installation	Cable carrier installation	Cable carrier extension
						For motors/brakemotors with BK../BZ..D brake		
		min^{-1}	A	m	mm^2			
CM3C80S	SB1	4500	11.7	100	2.5	28125355	28125363	28125487
CM3C80S	SB1	6000	15.9	70	2.5	28125355	28125363	28125487
CM3C80S	SB1	6000	15.9	100	4	28125371	28125398	28125495
CM3C80M	SB1	2000	7.85	85	1.5	28125339	28125347	28125479
CM3C80M	SB1	2000	7.85	100	2.5	28125355	28125363	28125487
CM3C80M	SB1	3000	10.9	60	1.5	28125339	28125347	28125479
CM3C80M	SB1	3000	10.9	100	2.5	28125355	28125363	28125487
CM3C80M	SB1	4500	16.3	70	2.5	28125355	28125363	28125487
CM3C80M	SB1	4500	16.3	100	4	28125371	28125398	28125495
CM3C80M	SB1	6000	21.2	85	4	28125371	28125398	28125495
CM3C80M	SBB	6000	21.2	100	6	28125401	28125428	28125509
CM3C80L	SB1	2000	11.2	60	1.5	28125339	28125347	28125479
CM3C80L	SB1	2000	11.2	100	2.5	28125355	28125363	28125487
CM3C80L	SB1	3000	16.1	70	2.5	28125355	28125363	28125487
CM3C80L	SB1	3000	16.1	100	4	28125371	28125398	28125495
CM3C80L	SBB	4500	23.1	100	6	28125401	28125428	28125509
CM3C80L	SBB	6000	30.8	90	6	28125401	28125428	28125509
CM3C80L	SBB	6000	30.8	100	10	28125436	28125444	28125517
CM3C100S	SB1	2000	8.63	75	1.5	28125339	28125347	28125479
CM3C100S	SB1	2000	8.63	100	2.5	28125355	28125363	28125487
CM3C100S	SB1	3000	12.8	50	1.5	28125339	28125347	28125479
CM3C100S	SB1	3000	12.8	90	2.5	28125355	28125363	28125487
CM3C100S	SB1	3000	12.8	100	4	28125371	28125398	28125495
CM3C100S	SB1	4500	18.9	95	4	28125371	28125398	28125495
CM3C100S	SBB	4500	18.9	100	6	28125401	28125428	28125509
CM3C100M	SB1	2000	12.5	55	1.5	28125339	28125347	28125479
CM3C100M	SB1	2000	12.5	90	2.5	28125355	28125363	28125487
CM3C100M	SB1	2000	12.5	100	4	28125371	28125398	28125495
CM3C100M	SB1	3000	17.8	100	4	28125371	28125398	28125495
CM3C100M	SBB	4500	27.6	100	6	28125401	28125428	28125509
CM3C100L	SB1	2000	17.5	100	4	28125371	28125398	28125495
CM3C100L	SBB	3000	27.2	100	6	28125401	28125428	28125509
CM3C100L	SBB	4500	37.7	100	10	28125436	28125444	28125517

5.4.4 Cable assignment of BZ.. brakemotor cables

The part numbers refer to the smallest connector that can be used:

- 1.5 mm² – 4 mm²: SB1
- 6 mm² – 16 mm²: SBB

Motor	Plug connector	Speed class	Standstill current I_{M0}	Cable length up to	Core cross section	Cable part number SB1/SBB Fixed i installation	Cable carrier installation	Cable carrier extension
		min⁻¹	A	m	mm²	For motors with BZ.. brake		
CM3C63S	SB1	3000	2.17	100	1.5	28125339	28125347	28125479
CM3C63S	SB1	4500	2.94	100	1.5	28125339	28125347	28125479
CM3C63S	SB1	6000	3.71	100	1.5	28125339	28125347	28125479
CM3C63M	SB1	3000	3.27	100	1.5	28125339	28125347	28125479
CM3C63M	SB1	4500	4.63	100	1.5	28125339	28125347	28125479
CM3C63M	SB1	6000	6.14	100	1.5	28125339	28125347	28125479
CM3C63L	SB1	3000	4.04	100	1.5	28125339	28125347	28125479
CM3C63L	SB1	4500	5.72	100	1.5	28125339	28125347	28125479
CM3C63L	SB1	6000	7.35	90	1.5	28125339	28125347	28125479
CM3C63L	SB1	6000	7.35	100	2.5	28125355	28125363	28125487
CM3C71S	SB1	2000	3.5	100	1.5	28125339	28125347	28125479
CM3C71S	SB1	3000	5	100	1.5	28125339	28125347	28125479
CM3C71S	SB1	4500	7.2	95	1.5	28125339	28125347	28125479
CM3C71S	SB1	4500	7.2	100	2.5	28125355	28125363	28125487
CM3C71S	SB1	6000	9.5	70	1.5	28125339	28125347	28125479
CM3C71M	SB1	2000	5.1	100	1.5	28125339	28125347	28125479
CM3C71M	SB1	3000	7	95	1.5	28125339	28125347	28125479
CM3C71M	SB1	3000	7	100	2.5	28125355	28125363	28125487
CM3C71M	SB1	4500	10.2	65	1.5	28125339	28125347	28125479
CM3C71M	SB1	4500	10.2	100	2.5	28125355	28125363	28125487
CM3C71M	SB1	6000	13.5	85	2.5	28125355	28125363	28125487
CM3C71M	SB1	6000	13.5	100	4	28125371	28125398	28125495
CM3C71L	SB1	2000	6.4	100	1.5	28125339	28125347	28125479
CM3C71L	SB1	3000	9.5	70	1.5	28125339	28125347	28125479
CM3C71L	SB1	3000	9.5	100	2.5	28125355	28125363	28125487
CM3C71L	SB1	4500	13.9	80	2.5	28125355	28125363	28125487
CM3C71L	SB1	4500	13.9	100	4	28125371	28125398	28125495
CM3C71L	SB1	6000	18.5	100	4	28125371	28125398	28125495
CM3C80S	SB1	2000	5.78	100	1.5	28125339	28125347	28125479
CM3C80S	SB1	3000	8.24	80	1.5	28125339	28125347	28125479
CM3C80S	SB1	3000	8.24	100	2.5	28125355	28125363	28125487
CM3C80S	SB1	4500	11.7	60	1.5	28125339	28125347	28125479
CM3C80S	SB1	4500	11.7	100	2.5	28125355	28125363	28125487

Motor	Plug connector	Speed class	Standstill current I_{M0}	Cable length up to	Core cross section	Cable part number SB1/SBB Fixed i installation	Cable carrier installation	Cable carrier extension
		min⁻¹	A	m	mm²	For motors with BZ.. brake		
CM3C80S	SB1	6000	15.9	70	2.5	28125355	28125363	28125487
CM3C80S	SB1	6000	15.9	100	4	28125371	28125398	28125495
CM3C80M	SB1	2000	7.85	85	1.5	28125339	28125347	28125479
CM3C80M	SB1	2000	7.85	100	2.5	28125355	28125363	28125487
CM3C80M	SB1	3000	10.9	60	1.5	28125339	28125347	28125479
CM3C80M	SB1	3000	10.9	100	2.5	28125355	28125363	28125487
CM3C80M	SB1	4500	16.3	70	2.5	28125355	28125363	28125487
CM3C80M	SB1	4500	16.3	100	4	28125371	28125398	28125495
CM3C80M	SB1	6000	21.2	85	4	28125371	28125398	28125495
CM3C80M	SBB	6000	21.2	100	6	28125401	28125428	28125509
CM3C80L	SB1	2000	11.2	60	1.5	28125339	28125347	28125479
CM3C80L	SB1	2000	11.2	100	2.5	28125355	28125363	28125487
CM3C80L	SB1	3000	16.1	70	2.5	28125355	28125363	28125487
CM3C80L	SB1	3000	16.1	100	4	28125371	28125398	28125495
CM3C80L	SBB	4500	23.1	100	6	28125401	28125428	28125509
CM3C80L	SBB	6000	30.8	90	6	28125401	28125428	28125509
CM3C80L	SBB	6000	30.8	100	10	28125436	28125444	28125517
CM3C100S	SB1	2000	8.63	75	1.5	28125339	28125347	28125479
CM3C100S	SB1	2000	8.63	100	2.5	28125355	28125363	28125487
CM3C100S	SB1	3000	12.8	50	1.5	28125339	28125347	28125479
CM3C100S	SB1	3000	12.8	90	2.5	28125355	28125363	28125487
CM3C100S	SB1	3000	12.8	100	4	28125371	28125398	28125495
CM3C100S	SB1	4500	18.9	95	4	28125371	28125398	28125495
CM3C100S	SBB	4500	18.9	100	6	28125401	28125428	28125509
CM3C100M	SB1	2000	12.5	55	1.5	28125339	28125347	28125479
CM3C100M	SB1	2000	12.5	90	2.5	28125355	28125363	28125487
CM3C100M	SB1	2000	12.5	100	4	28125371	28125398	28125495
CM3C100M	SB1	3000	17.8	100	4	28125371	28125398	28125495
CM3C100M	SBB	4500	27.6	100	6	28125401	28125428	28125509
CM3C100L	SB1	2000	17.5	100	4	28125371	28125398	28125495
CM3C100L	SBB	3000	27.2	100	6	28125401	28125428	28125509
CM3C100L	SBB	4500	37.7	100	10	28125436	28125444	28125517

5.5 Cable assignment for single-cable technology, system voltage 400 V

5.5.1 Cable assignment for motor/brakemotor cable

The part numbers refer to the smallest connector that can be used:

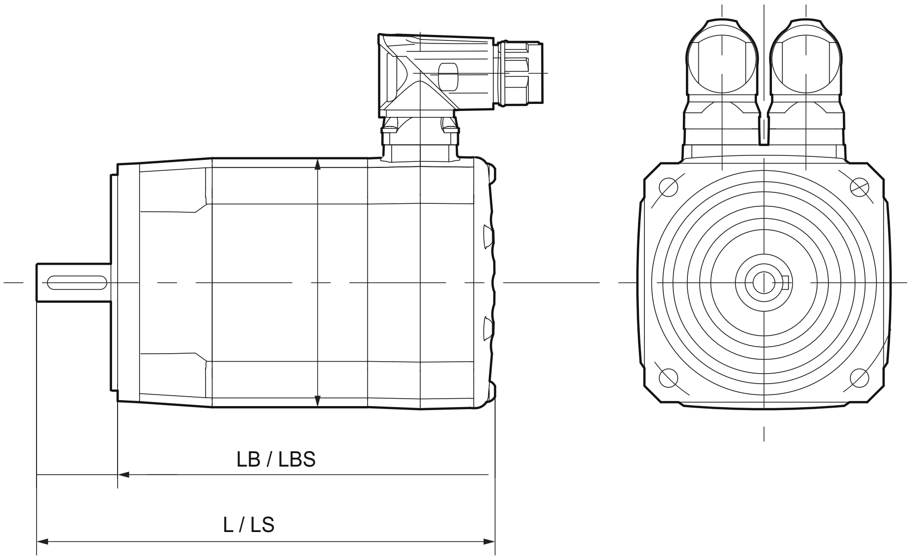
- 1.5 mm^2 – 4 mm^2: SD1
- 6 mm^2 – 16 mm^2: SDB

Motor	Plug connector	Speed class	Standstill current I_{M0}	Cable length up to	Core cross section	Cable part number SD1/SDB			
						Fixed installation	Cable carrier installation	Fixed extension	Cable carrier extension
		min^{-1}	A	m	mm^2	For motors with and without brakes			
CM3C63S	SD1	3000	2.17	100	1.5	28123808	28123743	28123905	28123859
CM3C63S	SD1	4500	2.94	100	1.5	28123808	28123743	28123905	28123859
CM3C63S	SD1	6000	3.71	100	1.5	28123808	28123743	28123905	28123859
CM3C63M	SD1	3000	3.27	100	1.5	28123808	28123743	28123905	28123859
CM3C63M	SD1	4500	4.63	100	1.5	28123808	28123743	28123905	28123859
CM3C63M	SD1	6000	6.14	100	1.5	28123808	28123743	28123905	28123859
CM3C63L	SD1	3000	4.04	100	1.5	28123808	28123743	28123905	28123859
CM3C63L	SD1	4500	5.72	100	1.5	28123808	28123743	28123905	28123859
CM3C63L	SD1	6000	7.35	90	1.5	28123808	28123743	28123905	28123859
CM3C63L	SD1	6000	7.35	100	2.5	28123816	28123751	28123912	28123867
CM3C71S	SD1	2000	3.5	100	1.5	28123808	28123743	28123905	28123859
CM3C71S	SD1	3000	5	100	1.5	28123808	28123743	28123905	28123859
CM3C71S	SD1	4500	7.2	95	1.5	28123808	28123743	28123905	28123859
CM3C71S	SD1	4500	7.2	100	2.5	28123816	28123751	28123912	28123867
CM3C71S	SD1	6000	9.5	70	1.5	28123808	28123743	28123905	28123859
CM3C71M	SD1	2000	5.1	100	1.5	28123808	28123743	28123905	28123859
CM3C71M	SD1	3000	7	95	1.5	28123808	28123743	28123905	28123859
CM3C71M	SD1	3000	7	100	2.5	28123816	28123751	28123912	28123867
CM3C71M	SD1	4500	10.2	65	1.5	28123808	28123743	28123905	28123859
CM3C71M	SD1	4500	10.2	100	2.5	28123816	28123751	28123912	28123867
CM3C71M	SD1	6000	13.5	85	2.5	28123816	28123751	28123912	28123867
CM3C71M	SD1	6000	13.5	100	4	28123824	28123778	28123921	28123875
CM3C71L	SD1	2000	6.4	100	1.5	28123808	28123743	28123905	28123859
CM3C71L	SD1	3000	9.5	70	1.5	28123808	28123743	28123905	28123859
CM3C71L	SD1	3000	9.5	100	2.5	28123816	28123751	28123912	28123867
CM3C71L	SD1	4500	13.9	80	2.5	28123816	28123751	28123912	28123867
CM3C71L	SD1	4500	13.9	100	4	28123824	28123778	28123921	28123875
CM3C71L	SD1	6000	18.5	100	4	28123824	28123778	28123921	28123875
CM3C80S	SD1	2000	5.78	100	1.5	28123808	28123743	28123905	28123859
CM3C80S	SD1	3000	8.24	80	1.5	28123808	28123743	28123905	28123859

Motor	Plug connector	Speed class	Standstill current I_{M0}	Cable length up to	Core cross section	Cable part number SD1/SDB Fixed installation	Cable carrier installation	Fixed extension	Cable carrier extension
		min^{-1}	A	m	mm^2	For motors with and without brakes			
CM3C80S	SD1	3000	8.24	100	2.5	28123816	28123751	28123912	28123867
CM3C80S	SD1	4500	11.7	60	1.5	28123808	28123743	28123905	28123859
CM3C80S	SD1	4500	11.7	100	2.5	28123816	28123751	28123912	28123867
CM3C80S	SD1	6000	15.9	70	2.5	28123816	28123751	28123912	28123867
CM3C80S	SD1	6000	15.9	100	4	28123824	28123778	28123921	28123875
CM3C80M	SD1	2000	7.85	85	1.5	28123808	28123743	28123905	28123859
CM3C80M	SD1	2000	7.85	100	2.5	28123816	28123751	28123912	28123867
CM3C80M	SD1	3000	10.9	60	1.5	28123808	28123743	28123905	28123859
CM3C80M	SD1	3000	10.9	100	2.5	28123816	28123751	28123912	28123867
CM3C80M	SD1	4500	16.3	70	2.5	28123816	28123751	28123912	28123867
CM3C80M	SD1	4500	16.3	100	4	28123824	28123778	28123921	28123875
CM3C80M	SD1	6000	21.2	85	4	28123824	28123778	28123921	28123875
CM3C80M	SDB	6000	21.2	100	6	28123832	28123786	28123948	28123883
CM3C80L	SD1	2000	11.2	60	1.5	28123808	28123743	28123905	28123859
CM3C80L	SD1	2000	11.2	100	2.5	28123816	28123751	28123912	28123867
CM3C80L	SD1	3000	16.1	70	2.5	28123816	28123751	28123912	28123867
CM3C80L	SD1	3000	16.1	100	4	28123824	28123778	28123921	28123875
CM3C80L	SDB	4500	23.1	100	6	28123883	28123883	28123883	28123883
CM3C80L	SDB	6000	30.8	90	6	28123883	28123883	28123883	28123883
CM3C80L	SDB	6000	30.8	100	10	28123840	28123794	28123956	28123891
CM3C100S	SD1	2000	8.63	75	1.5	28123808	28123743	28123905	28123859
CM3C100S	SD1	2000	8.63	100	2.5	28123816	28123751	28123912	28123867
CM3C100S	SD1	3000	12.8	50	1.5	28123808	28123743	28123905	28123859
CM3C100S	SD1	3000	12.8	90	2.5	28123816	28123751	28123912	28123867
CM3C100S	SD1	3000	12.8	100	4	28123824	28123778	28123921	28123875
CM3C100S	SD1	4500	18.9	95	4	28123824	28123778	28123921	28123875
CM3C100S	SDB	4500	18.9	100	6	28123883	28123883	28123883	28123883
CM3C100M	SD1	2000	12.5	55	1.5	28123808	28123743	28123905	28123859
CM3C100M	SD1	2000	12.5	90	2.5	28123816	28123751	28123912	28123867
CM3C100M	SD1	2000	12.5	100	4	28123824	28123778	28123921	28123875
CM3C100M	SD1	3000	17.8	100	4	28123824	28123778	28123921	28123875
CM3C100M	SDB	4500	27.6	100	6	28123883	28123883	28123883	28123883
CM3C100L	SD1	2000	17.5	100	4	28123824	28123778	28123921	28123875
CM3C100L	SDB	3000	27.2	100	6	28123883	28123883	28123883	28123883
CM3C100L	SDB	4500	37.7	100	10	28123891	28123891	28123891	28123891

6 Appendix

6.1 Key to the dimension sheets



L	Total length of the motor without brake
LB	Length of the motor without brake
LS	Total length of the motor with BK.. or BZ..D brake
LBS	Length of the motor with BK.. or BZ..D brake

6.2 Information on the technical data – conditions

The technical data of the CM3C.. servomotors apply under the following conditions:

- Maximum ambient temperature 40 °C
- System voltage 400 V
- Pulse width modulation frequency (PWM frequency) at least 8 kHz
- Flange surface made from aluminum, painted black, measuring 375 mm × 375 mm × 12 mm
- Housing is painted
- Maximum winding temperature 145 °C
- Motor mounting position IM B5 according to IEC/EN 60034-7 or mounting position M1 according to the SEW-EURODRIVE definition for gearmotors

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6.3 Notes on overhung load diagrams

6.3.1 Loads and bearing service life

The specifications regarding the overhung load are based on the following data:

- Torque M_0
- Rotational speed at speed class

The diagrams are based on the following nominal bearing service life:

Motor	Nominal bearing service life
CM3C63	L_{10h} = 25000 h
CM3C71	
CM3C80	
CM3C100	

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SEW EURODRIVE

6.4 Abbreviations and descriptions

Designation	Formula symbol	Unit	Description
Maximum permitted axial load	F_{Aamax}	N	Maximum permitted axial load at the motor shaft with centered force application, and without any present radial load.
Maximum permitted radial load	F_{Ramax}	N	Maximum permitted radial load at the motor shaft and without any present axial load. The center of the shaft end is the load application point.
Standstill current	I_0	A	Current consumed to achieve standstill torque
Gear unit ratio	i	1	Ratio of the gear unit
Holding current of the brake	I_H	A	Holding current of the brake
Maximum motor current	I_{max}	A	Maximum current of the motor
Nominal current	I_N	A	Rated motor current
Mass inertia of the brakemotor	J_{bmot}	kg m^2	Mass inertia of the brakemotor
Mass moment of inertia	J_{mot}	kg m^2	Mass moment of inertia of the motor
Mass moment of inertia ratio	k	–	Inertia ratio J_{ext} / J_{Mot}
Inductance between connection phase and neutral conductor	L_1	mH	Inductance between connection phase and neutral conductor
Standstill torque	M_0	Nm	Thermal continuous torque at low speeds
Characteristic value of the dynamic braking torque	M_1	Nm	Statistically lowest occurring value of the dynamic braking torque during emergency stop braking
Characteristic value of the static braking torque	$M_{4,100C}$	Nm	Statistically lowest occurring value of the static braking torque during holding brake operation, based on a friction surface temperature of +100 °C
Effective torque	M_{eff}	Nm	Effective torque
Mass of the brakemotor	m_{bmot}	kg	Mass of the brakemotor
Maximum torque	$M_{e\ max}$	Nm	Maximum torque, determined based on the configuration of the customer application
Mass of the motor	m_{mot}	kg	Mass of the motor
Dynamic limit torque	M_{pk}	Nm	Dynamic limit torque of the motor
Nominal motor torque	M_N	Nm	Nominal motor torque
Mechanically permitted brakemotor speed	$n_{max,0}$	min^{-1}	Maximum permitted mechanical speed of the brakemotor
Permitted speed for brake application in the event of an emergency stop	$n_{max,1}$	min^{-1}	Maximum permitted speed of the brakemotor for brake application in the event of an emergency stop
rms speed	n_{eff}	min^{-1}	rms speed
Thermal rms torque	n_{te}	min^{-1}	Time-weighted and thus effective rotational speed of the application travel profile
Regenerative braking power	P_B	W	Occurring (braking) power during regenerative motor operation

Designation	Formula symbol	Unit	Description
Regenerative peak braking power	P_{pk}	W	Maximum occurring, short-time (braking) power during regenerative motor operation
Resistance value between connection phase and neutral conductor	R_1	Ω	Resistance between connection phase and neutral conductor
Period duration	D	ms	Cycle duration
Response time of the brake (standard excitation)	$t_{1,I}$	ms	Response time of the brake for standard excitation
Response time of the brake (high-speed excitation)	$t_{1,II}$	ms	Response time of the brake for high-speed excitation
Brake application time in case of AC cut-off	$t_{2,I}$	ms	Brake cut-off in the AC circuit with normal application time
Brake application time in case of DC and AC/DC cut-off	$t_{2,II}$	ms	Cut-off in the DC circuits, as well as DC and AC circuits of the brake with shortened application time
Ambient temperature	T_{amb}	°C	Ambient temperature
Brake voltage	U_N	V	Nominal voltage of the brake
Internal voltage	U_{P0kalt}	V	Voltage induced into the stator winding by the exciter (magnet wheel) during no-load operation
Permitted braking work until maintenance	W_{insp}	J	Work until brake inspection
Permitted braking work in the event of an emergency stop	$W_{per,N}$	J	Maximum permitted braking work per braking in case of emergency stop
Gear unit efficiency	η	1	Efficiency of the gear unit
Load efficiency	η_L	1	Replacement value to describe the loss values of the application (e.g. friction at ropes) that cannot be clearly determined as concrete values

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