Catalog

Synchronous Servomotors
CMP40 – CMP100, CMPZ71 – CMPZ100
CFM71 – CFM112

Edition 09/2009

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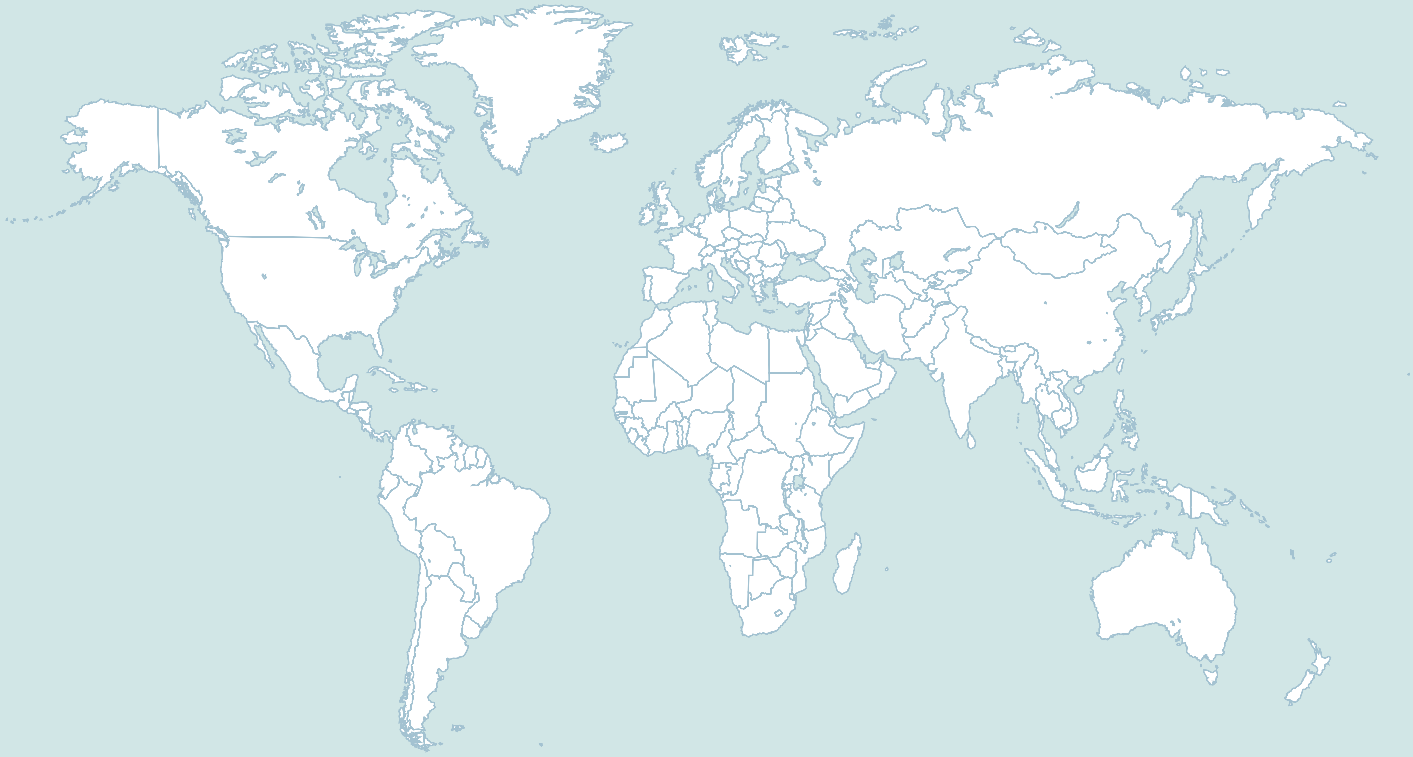


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1 Introduction

1.1 The SEW-EURODRIVE group of companies

Global presence

Driving the world with innovative drive solutions for all branches and for every application. Products and systems from SEW-EURODRIVE are used in a multitude of applications worldwide. SEW-EURODRIVE products are found in a variety of industries, including automotive, building materials, food and beverage as well as metal-processing. The decision to use drive technology "made by SEW-EURODRIVE" stands for safety in functionality and investment.

We are represented in the most important branches of industry all over the world: with 12 manufacturing plants, 67 assembly plants in 47 countries and our comprehensive range of services, which we consider an integrative service that continues our commitment to outstanding quality.

Always the right drive

The SEW-EURODRIVE modular concept offers millions of combinations. This wide selection enables you to choose the correct drive for all applications, each based on the required speed and torque range, space available and the ambient conditions. Gear units and gearmotors offering a unique and finely tuned performance range and the best economic prerequisites to face your drive challenges.

The gearmotors are powered by MOVITRAC® frequency inverters, MOVIDRIVE® inverters and MOVIAXIS® multi-axis servo inverters, a combination that blends perfectly with the existing SEW-EURODRIVE program. As in the case for mechanical systems, the development, production and assembly is also carried out completely by SEW-EURODRIVE. In combination with our drive electronics, these drives will provide the utmost in flexibility.

Products of the servo drive system, such as low backlash servo gear units, compact servomotors or MOVIAXIS® multi-axis servo inverters provide precision and dynamics. From single-axis or multi-axis applications all the way to synchronized process sequences, servo drive systems by SEW-EURODRIVE offer a flexible and customized implementation of your application.

For economical, decentralized installations, SEW-EURODRIVE offers components from its decentralized drive system, such as MOVIMOT®, the gearmotor with integrated frequency inverter or MOVI-SWITCH®, the gearmotor with integrated switching and protection function. SEW-EURODRIVE hybrid cables have been designed specifically to ensure cost-effective solutions, independent of the philosophy behind or the size of the system. The latest developments from SEW-EURODRIVE: MOVITRANS® system components for contactless energy transfer, MOVIPRO®, the decentralized drive control and MOVIFIT®, the new decentralized intelligence.

Power, quality and sturdy design combined in one standard product: With high torque levels, industrial gear units from SEW-EURODRIVE realize major movements. The modular concept will once again provide optimum adaptation of industrial gear units to meet a wide range of different applications.

Your ideal partner

Its global presence, extensive product range and broad spectrum of services make SEW-EURODRIVE the ideal partner for the machinery and plant construction industry when it comes to providing drive systems for demanding applications in all branches of industries and applications.

1.2 Products and systems from SEW-EURODRIVE

The products and systems from SEW-EURODRIVE are divided into 4 product groups. These 4 product groups are:

1. Gearmotors and frequency inverters
2. Servo drive systems
3. Decentralized drive systems
4. Industrial gear units

Products and systems used in several group applications are listed in a separate group "Products and systems covering several product groups". Consult the following tables to locate the products and systems included in the respective product group:

1. Gearmotors and frequency inverters		
Gear units/gearmotors	**Motors**	**Frequency inverters**
• Helical gear units/helical gearmotors • Parallel-shaft helical gear units/parallel-shaft helical gearmotors • Helical-bevel gear units/helical-bevel gearmotors • Helical-worm gear units/helical-worm gearmotors • SPIROPLAN® right-angle gearmotors • EMS Drives • Geared torque motors • Pole-changing gearmotors • Variable speed gear units/variable speed gearmotors • Aseptic gearmotors • Gear units/gearmotors to ATEX standard • Variable speed gear units/variable speed gearmotors to ATEX standard	• Asynchronous AC motors/AC brakemotors • Pole-changing AC motors/AC brakemotors • Energy-efficient motors • Explosion-proof AC motors/AC brakemotors • Torque motors • Single-phase motors/single-phase brakemotors • Asynchronous linear motors	• MOVITRAC® frequency inverters • MOVIDRIVE® inverters • Control, technology and communication options for inverters

2. Servo drive systems		
Servo gear units/servo gearmotors	**Servomotors**	**Servo drive inverters/servo inverters**
• Low backlash planetary servo gear units/planetary gearmotors • Low backlash helical-bevel servo gear units/helical-bevel gearmotors • Explosion-proof servo gear units/servo gearmotors	• Asynchronous servomotors/servo brakemotors • Synchronous servomotors/servo brakemotors • Explosion-proof servomotors/servo brakemotors • Synchronous linear motors	• MOVIDRIVE® servo inverters • MOVIAXIS® multi-axis servo inverters • Control, technology and communication options for servo drive inverters and servo inverters

3. Decentralized drive systems		
Decentralized drives	**Communication and installation**	**Contactless energy transfer**
• MOVIMOT® gearmotors with integrated frequency inverter • MOVIMOT® motors/brakemotors with integrated frequency inverter • MOVI-SWITCH® gearmotors with integrated switching and protection function • MOVI-SWITCH® motors/brakemotors with integrated switching and protection function • Explosion-proof MOVIMOT® and MOVI-SWITCH® gearmotors	• Fieldbus interfaces • Field distributors for decentralized installation • MOVIFIT® product range – MOVIFIT®-MC to control MOVIMOT® drives – MOVIFIT®-SC with integrated electronic motor switch – MOVIFIT®-FC with integrated frequency inverter	• MOVITRANS® system – Stationary components for energy supply – Mobile components for energy consumption – Line cables and installation material

4. Industrial gear units
• Helical gear units • Helical-bevel gear unit • Planetary gear unit

Products and systems covering several product groups
• Operator terminals • MOVI-PLC® drive-based control system

In addition to products and systems, SEW-EURODRIVE offers a comprehensive range of services. These include:

- Technical consulting
- Application software
- Seminars and training
- Extensive technical documentation
- International customer service

Visit our homepage at

→ **www.sew-eurodrive.com**

The website provides comprehensive information and services.

1.3 Additional documentation

Contents of this publication

This motor catalog provides a detailed description of the following product group from SEW-EURODRIVE:

- Synchronous servomotors of the CMP and CMPZ series
- Synchronous servomotors of the CFM series
- Options and accessories for motors

This catalog/price catalog contains the following information:

- Unit designations
- Product descriptions
- Project planning information
- Technical data
- Technical data of options and additional features
- Information about the dimension sheets
- Dimension sheets
- Information on brakes from SEW-EURODRIVE
- Information on prefabricated cables
- Price catalog Prices and option pricing of options and accessories

Complementary publication

Information about motor/inverter combinations and dynamic and thermal limit characteristic curves necessary for project planning are listed in the "AC Motors" manual. This manual contains additional content relevant for this catalog.

Additional documentation

The following price catalogs/catalogs are available from SEW-EURODRIVE in addition to this motor catalog:

- AC motors
- DR gearmotors
- Synchronous servo gearmotors

The price catalogs and catalogs offer the following information:

- Product descriptions
- Unit designations
- Project planning instructions for drives and gear units
- Visual representation of mounting positions
- Explanation on the order information
- Design and operating notes
- Important information about tables and dimension sheets
- Description of the different types
- Overview of all permitted combinations
- Selection tables for gearmotors
- Gearmotor dimension sheets

- Technical data
- Price catalog: Prices and option pricing for additional features and options

Please note that the complete range of technical documentation is available on our home page:

www.sew-eurodrive.com

1.4 Notation of motor types

This catalog covers the motor types CMP and CMPZ among others.

If information refers to both CMP and CMPZ motors, the notation CMP. motors is used.

If information refers to either CMP or CMPZ motors, the motor type is stated explicitly.

1.5 Product names and trademarks

The brands and product names in this catalog are trademarks or registered trademarks of the titleholders.

1.6 Copyright

2 General Product Description – CMP Servomotors

2.1 CMP synchronous servomotors

The CMP servomotor series combines high dynamics, high torques, and precision in a compact design.

Their innovative design with the latest in winding and magnet technology offers a motor system with optimum dynamics and the best control characteristics at the smallest space. The cast stator protects the motor against vibrations and humidity.

Characteristics of SEW-EURODRIVE synchronous servomotors:

- Static torque from 0.5 to 47 Nm.
- High dynamics (ratio between rated torque and mass moment of inertia of the motor).
- High level of enclosure (IP65)
- Robust encoder system (resolver)
- The optimal encoder system with sine/cosine encoder allows for a very wide setting range and absolute position detection.
- High continuous torque at low speeds and at standstill, without forced cooling fan
- High overload capability
- NeFeB magnets, permanent magnets with high magnetic flux density.

The CMP servomotors can be combined with the MOVIDRIVE® inverter and the MOVIAXIS® multi-axis servo inverter.

2.2 CMPZ – variant with additional flywheel mass

CMPZ synchronous servomotors are equipped with an internal additional flywheel mass. These motors combine high torques and precision in a compact design and provide particularly favorable control characteristics with high external masses. Furthermore, the internal higher moment of inertial allows for a smaller gear ratio.

In addition to the above mentioned features of the CMP motors, CMPZ motors are optionally available with a powerful working brake with high working capacity and optional manual brake release.

2.3 Characteristics – CMP servomotors

Synchronous servomotors with permanent magnets offer highest dynamic overload capacity.

State-of-the-art winding and magnet technology enable a compact motor system with great dynamic qualities, smooth running and excellent control characteristics.

Standard characteristics:

Synchronous servomotors of the CMP series constitute a drive system which comprises the following elements in its basic variant:

- Resolver as encoder
- Thermal motor protection through temperature sensing
- Connection via adjustable plug connectors
- High degree of rotational accuracy
- High vibration class (DIN EN 60034-14 grade B),

Optional product characteristics

The CMP motors can be expanded with:

- Forced cooling fan,
- Connection via radial plug connectors
- Connection with mating connector
- Connection via terminal box
- Prefabricated cables
- Holding brake with DC 24 V brake voltage
- BY working brake with manual brake release
- UL or UL/CSA approval
- Can be mounted to SEW gear units directly with a B5 flange.

Alternatives can be selected instead of the elements of the basic variant, e.g. absolute encoder with HIPERFACE® instead of the resolver and electronic nameplate.

Torque

The 6 available sizes with a total of 17 levels cover a torque range from 0.5ßNm to 47ßNm.

The dynamic peak torque reaches 1.9 Nm to 178 Nm.

Rated speeds

The optimized winding makes it possible to select one of three speeds:

- 3000 1/min
- 4500 1/min
- 6000 1/min

Direct mounting

CMP servomotors can be mounted directly to the respective SEW-EURODRIVE gear units without adapter.

The following gear units can be selected:

- BS.F helical-bevel servo gear units
- PS.F and PS.C planetary servo gear units
- R.. helical gear units
- F.. parallel-shaft helical gear units
- K.. helical-bevel gear units
- S.. helical-worm gear units
- SPIROPLAN® gear units W37 and W47

Output variants

CMP servomotors are available with the following output types:

- Stand-alone motors with standardized flange,
- with square flange for mounting to the gear unit types BS.F, PS.F, PS.C,
- with LIA flange for mounting to the gear unit types R, F, K, S, W.

Noise

The noise levels of all motors from SEW-EURODRIVE are well within the maximum permitted noise levels set forth in IEC/EN 60034-9.

Paint

CMP motors are painted with ßblackß machine paint RAL 9005 as per DIN 1843 as standard. Special coatings and other colors are available on request.

Surface and corrosion protection

If required, all motors from SEW-EURODRIVE can also be supplied with special surface protection for applications in extremely humid and chemically aggressive environments.

Air admission and accessibility

The motors/brakemotors must be mounted on the driven machine in such a way that both axially and radially there is enough space left for unimpeded air admission and for maintenance of the brake. Please also refer to the notes in the motor dimension sheets.

Brakemotors

On request, the motors can be supplied with an integrated mechanical brake. The SEW-EURODRIVE brake is an electromagnetic disk brake with a DC coil that releases electrically and brakes using spring force. Due to its operating principle, the brake is applied if the power fails. It meets the basic safety requirements. The brake can also be released mechanically if equipped with manual brake release. A lockable hand lever with automatic reset is included in the delivery. The brake is controlled by a brake controller that is either installed in the inverter or separately in the control cabinet.

A characteristic feature of the brakes is their very short design. The brake bearing end shield is a part of both the motor and the brake. The integrated construction of the SEW-EURODRIVE brakemotor permits particularly compact and sturdy solutions.

International markets

On request, SEW-EURODRIVE supplies motors registered for the North American market or certified motors with connection conditions according to the relevant regulations.

2.4 Corrosion and surface protection

General information

SEW-EURODRIVE offers various optional protective measures for operating motors under special environmental conditions.

The protective measures comprise two groups:

- KS corrosion protection
- OS surface protection

For motors, optimum protection is offered by a combination of KS corrosion protection and surface OS protection.

In addition, special optional protective measures for the output shafts are also available.

KS corrosion protection

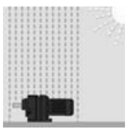
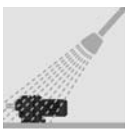
KS corrosion protection for motors comprises the following measures:

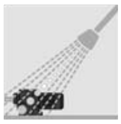
- All retaining screws that are loosened during operation are made of stainless steel.
- A top coating is applied to various motor parts.
- The flange contact surfaces and shaft ends are treated with a temporary anti-corrosion agent.
- Additional measures for brakemotors.

A sticker labeled "KORROSIONSSCHUTZ" (corrosion protection) on the stator housing or on the fan guard indicates that special treatment was applied.

OS surface protection

In addition to standard surface protection, motors and gear units also available with surface protection OS1 to OS4. The special procedure "Z" is also available. Special procedure "Z" means that large surface recesses are sprayed with a rubber filling prior to painting.

Surface protection[1)]		**Ambient conditions**	**Sample applications**
Standard		Suitable for machines and systems in buildings and rooms indoors with neutral atmospheres. According to corrosivity category [2)]: • C1 (negligible)	• Machines and systems in the automobile industry • Transport systems in logistics • Conveyor belts on airports
OS1		Suited for environments prone to condensation and atmospheres with low humidity or contamination, such as applications outdoors under roof or with protection. According to corrosivity category [2)]: • C2 (low)	• Systems in saw mills • Hall gates • Agitators and mixers
OS2		Suitable for environments with high humidity or mean atmospheric contamination, such as applications outdoors subject to direct weathering. According to corrosivity category [2)]: • C3 (moderate)	• Applications in amusement parks • Funiculars and chair-lifts • Applications in gravel plants • Systems in nuclear power plants
OS3		Suitable for environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasionally acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt load. According to corrosivity category [2)]: • C4 (high)	• Sewage treatment plants • Port cranes • Mining applications

Surface protection[1]		Ambient conditions	Sample 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. According to corrosivity category [2]: • C5-1 (very high)	• Drives in malting plants • Wet areas in the beverage industry • Conveyor belts in the food industry

1) Motors/brakemotors in IP56 or IP66 design are only available with OS2, OS3, or OS4 surface protection

2) to DIN EN ISO 12944-2 classification of ambient conditions

Extended storage

Note the following when storing a motor for an extended period of time:

- The service life of the ball bearing grease is reduced after storage periods exceeding one year.
- SEW-EURODRIVE recommends to have the motor inspected by SEW Service after 4 years in storage to check the ball bearing grease for signs of ageing.
- Check whether the servomotor has absorbed moisture as a result of being stored for a long time. Measure the insulation resistance with a measurement voltage of DC 500 V.

2.5 Operating temperatures

Motors of the CMP series are designed for use in a temperature range between -20 °C and +40 °C.

Motors for cold storage applications can be used down to -40 °C. The temperature range from -40 °C to +10 °C is listed on the nameplate.

Contact SEW-EURODRIVE if the motors are operated outside the specified temperature range.

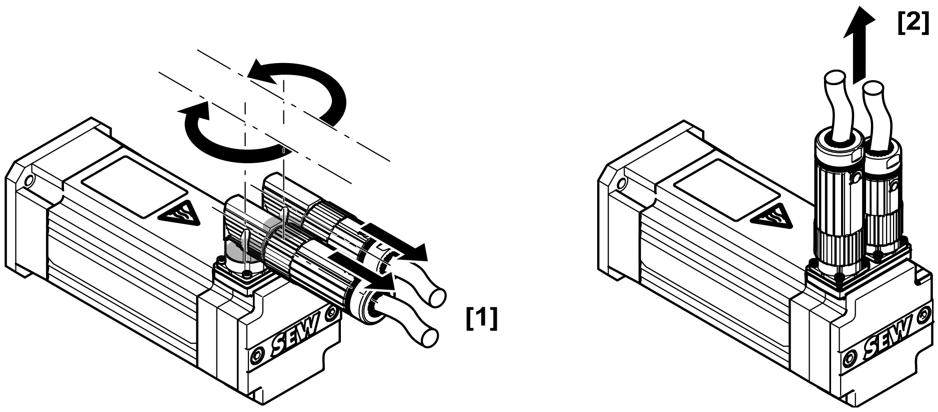
2.6 Important order information

Connection with plug connector

The power or powerß+ßbrake of the CMP motors are connected to the motor as standard with an adjustable, right-angle connector.

An "adjustable" position has been defined for right-angle connectors [1]. If not specified otherwise, the connector position "adjustable" is delivered in the 270° variant.

A "radial" position has been defined for the straight connector housing (radial output). Radial connectors [2] are optional.



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[1] Connector position "adjustable"

[2] Connector position "radial"

Connection with terminal box

Position of terminal box and cable entry

The product standard EN 60034 specifies that the following designations have to be used for terminal box positions:

- As viewed onto the output shaft = A-end
- Designation as R (right), B (bottom), L (left) and T (top)

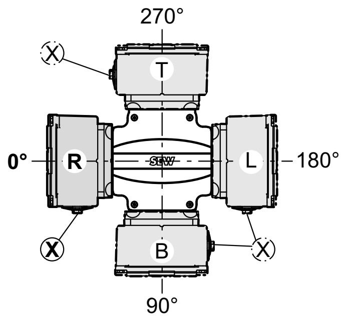
This new designation applies to motors without a gear unit in mounting position B3 (= M1). The previous designation is maintained for gearmotors.

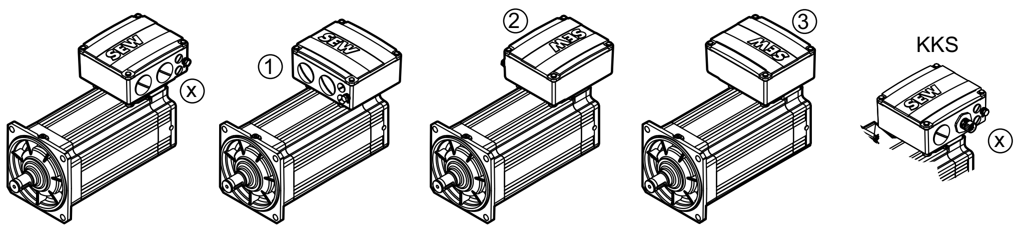
The position of the motor terminal box has so far been specified with 0°, 90°, 180° or 270° as viewed onto the fan guard = B-end.

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

The cable entry position is specified with x, 1, 2, 3.

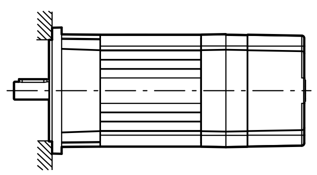
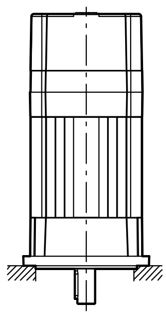
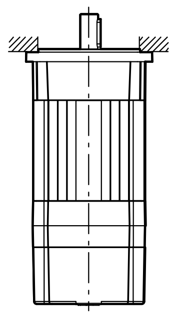
Unless other information is provided regarding the terminal box, the 270° type with "x" cable entry will be supplied.





Mounting positions

Mounting positions of the CMP servomotors

IM B5	IM V1	IM V3
		
Flange mounting on the input side of the flange	Flange mounting on the input side of the flange, input side at the bottom	Flange mounting on the input side of the flange, input side at the top

2.7 Overview of motors

CMP servomotors

Motor type	M_0 [Nm]	M_{pk} [Nm]	J_{Mot} CMP.. [10^{-4} kgm^2]	J_{Mot} CMPZ.. [10^{-4} kgm^2]
CMP40S	0.5	1.9	0.10	-
CMP40M	0.8	3.8	0.15	-
CMP50S	1.3	5.2	0.42	-
CMP50M	2.4	10.3	0.67	-
CMP50L	3.3	15.4	0.92	-
CMP63S	2.9	11.1	1.15	-
CMP63M	5.3	21.4	1.92	-
CMP63L	7.1	30.4	2.69	-
CMP.71S	6.4	19.2	3.01	11.02
CMP.71M	9.4	30.8	4.06	12.07
CMP.71L	13.1	46.9	6.16	14.17
CMP.80S	13.4	42.1	8.39	30.88
CMP.80M	18.7	62.6	11.51	34
CMP.80L	27.5	106.9	17.72	40.21
CMP.100S	25.5	68.3	19.34	84.99
CMP.100M	31	108.2	26.25	91.9
CMP.100L	47	178.8	40	105.65

CFM servomotors

Motor type	M_0 [Nm]	M_{pk} [Nm]	J_{Mot} [10^{-4} kgm^2]
CFM71S	5	16.5	4.89
CFM71M	6.5	21.5	6.27
CFM71L	9.5	31.4	9.02
CFM90S	11	39.6	17.4
CFM90M	14.5	52.2	22.3
CFM90L	21	75.6	32.1
CFM112S	23.5	82.3	68.4
CFM112M	31	108.5	88.2
CFM112L	45	157.5	128
CFM112H	68	238	190

3 General Project Planning Information

3.1 Standards and directives

3

Conformity with standards

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

- IEC 60034-1, EN 60034-1
  Rotating electrical machines, rating and performance.
- IEC 60034-2, EN 60034-2
  Rotating electrical machines, determining losses and efficiency.
- IEC 60034-9, EN 60034-9
  Rotating electrical machines, noise limits.
- 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 performance of rotating electrical machines.
- EN 50262
  Metric threads of cable glands.
- EN 50347
  Standardized dimensions and power ranges.

Conformity with directives

Servo (brake)motors from SEW-EURODRIVE comply with the following directives:

- Low voltage directive 2006/95/EC
- Machinery directive 98/37/EC
- EMC Directive 2004/108/EC
- CSA C22.2 Nr.100-04
- UL 1004

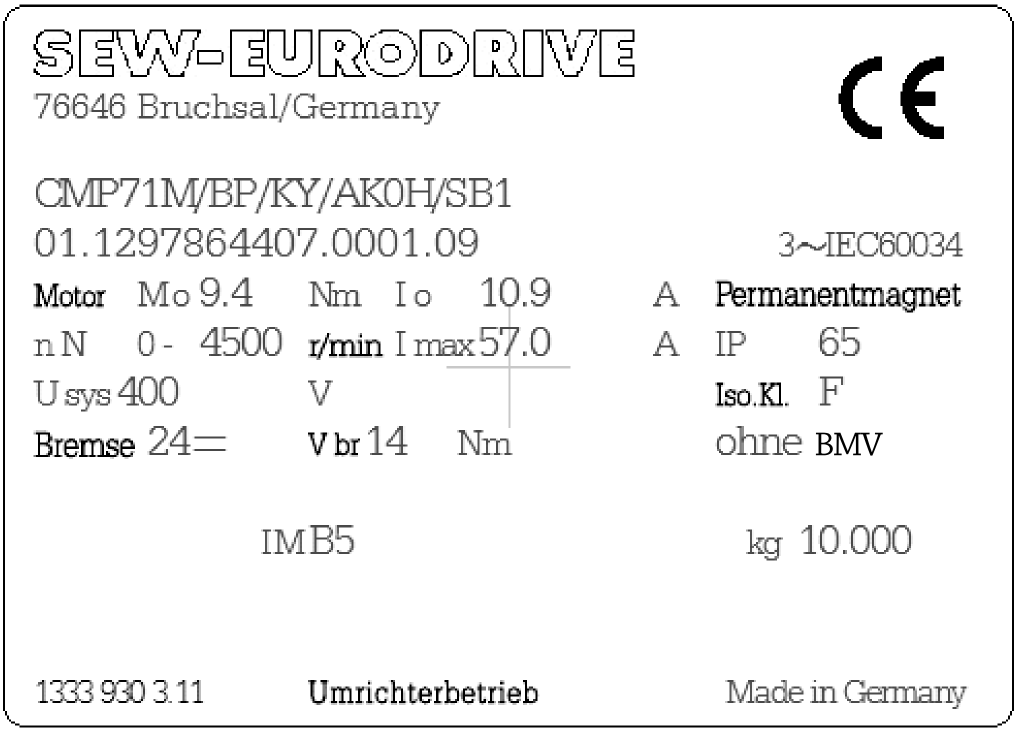
Rated data

The specific data of a synchronous servomotor are:

- Size
- Static torque
- Rated speed
- Rated current
- Peak current
- System voltage
- Degree of protection
- Thermal class

This data is indicated on the nameplate of the motor. In accordance with IEC34 (EN 60034), the nameplate data apply to a maximum ambient temperature of 40 °C and a maximum altitude of 1000 m above sea level.

Example: Nameplate for a CMP servomotor



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3.2 Circuit breakers and protective equipment

Preventive measures

Synchronous servomotors must be protected against overloads and short circuits.

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

The surface temperature can exceed 100 °C during operation in accordance with thermal classification F. Therefore, measures must be taken to prevent inadvertent contact.

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

The temperature is measured by KTY 84-130 temperature sensors installed as standard. The correct motor 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.

EMC measures

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

Routing brake cables

The brake and power cables may only be routed together if either the brake cable or the power cable is shielded. We recommend that you use prefabricated cables, see page 203 and subsequent pages.

Notes on the encoder connection

Observe the following instructions when connecting an encoder:

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

Thermal motor protection

The cables can only be routed together if either the KTY cable or the power cable is shielded. We recommend that you use prefabricated cables, see page 203 and subsequent pages.

4 Unit Designation

4.1 List of unit designations

Synchronous servomotors

Designation	
CMP...	Flange motor sizes 40, 50, 63, 71, 80, 100
CMPZ...	Flange motor sizes 71, 80, 100 with heavy rotor
S - L	S = short / M = medium / L = long

Mechanical attachments

Designation	Option
/BP	Holding brake for CMP40 - 100
/BY	Working brake for CMPZ71 - 100
/HR	BY manual brake release for CMPZ71 - 100, automatic disengaging function

Temperature sensor/temperature detection

Designation	Option
/KY	Temperature sensor (standard)

Encoder

Designation	Option
/RH1M	Resolver (standard)
/ES1H	Single-turn HIPERFACE® encoder, spread shaft, high resolution for CMP50 and CMP63
/AS1H	Multi-turn HIPERFACE® encoder, spread shaft, high resolution for CMP50 and CMP63
/EK0H	Single-turn HIPERFACE® encoder, cone shaft, for CMP40
/AK0H	Multi-turn HIPERFACE® encoder, cone shaft, for CMP40 - 100
/EK1H[1)]	Single-turn HIPERFACE® encoder, cone shaft, high resolution for CMP71 - 100
/AK1H[1)]	Multi-turn HIPERFACE® encoder, cone shaft, high resolution for CMP71 - 100

1) In preparation

Connection variants

Designation	Option
/SM1, /SMB	Motor plug connector, socket on motor end only, pluggable motor and encoder cables (standard)
/SB1, /SBB	Plug connector motor + brake, socket on motor end only, pluggable motor and encoder cables (standard)
/KK	Terminal box for CMP50[1], CMP63[1], CMP71 - 100, clampable motor and encoder cable
/KKS:	Terminal box for CMP71 - 100, clampable motor cable and pluggable encoder cable

1) In preparation

Ventilation

Designation	Option
/VR	Forced cooling fan

4.2 Serial number

01. 12212343 01. 0001. 09

- 09 – End digits of the year of manufacture (2 digits)
- 0001. – Quantity (4 digit)
- 01. – Order item (2 digits)
- 12212343 – Order number (8 digits)
- 01. – Sales organization

4.3 Sample unit designation

Motor variant	**Unit designation of the motor variant**									
Explosion-proof motors										
Explosion protection	**-**	/II3GD	/II3D							
Connection options										
Connection options	**/SB1**	/SMB	/SM1	/SBB	/KK	/KKS:				
Ventilation										
Forced cooling fan	**VR**									
Encoder										
Encoder	**/RH1M**	/ES1H	/AS1H	/EK0H	/AK0H	/EK1H	/AK1H			
Temperature sensor/temperature detection										
Temperature sensor	**/KY**									
Mechanical attachments										
Holding brake	**-**	/BP								
Manual brake release	**/HR**									
Working brake	**/BY**									
Synchronous servomotors of the series										
Length	**S**	M	L							
Size	**71**	40	50	63	71	80	100			
Additional flywheel mass	**Z**									
Series	**CMP**									

5 CMP Servomotors

5.1 Key to the data tables

The following table lists the short symbols used in the "Technical Data" table.

n_N	Rated speed
M_0	Standstill torque (thermal continuous torque at low speeds)
I_0	Standstill current
M_{pk}	Maximum limit torque of the servomotor
I_{max}	Maximum permitted motor current
M_{0VR}	Standstill torque with forced cooling fan
I_{0VR}	Standstill current with forced cooling fan
J_{mot}	Mass moment of inertia of the motor
J_{bmot}	Mass moment of inertia of the brakemotor
M_{B1}	Standard braking torque
M_{B2}	Optional braking torque
L_1	Inductance between connection phase and star point
R_1	Resistance between connection phase and star point
U_{p0} cold	Internal voltage at 1000 min^{-1}

5.2 Technical data – Synchronous servomotors CMP, CMP /BP

System voltage: 400 V

n_N	Motor	M_0	I_0	M_{pk}	I_{max}	M_{0VR}	I_{0VR}	m	J_{mot}
[min^{-1}]		[Nm]	[A]	[Nm]	[A]	[Nm]	[A]	[kg]	[10^{-4} kgm^2]
	CMP40S	0.5	1.2	1.9	6.1	-	-	1.3	0.1
	CMP40M	0.8	0.95	3.8	6.0	-	-	1.6	0.15
	CMP50S	1.3	0.96	5.2	5.1	1.7	1.25	2.3	0.42
	CMP50M	2.4	1.68	10.3	9.6	3.5	2.45	3.3	0.67
	CMP50L	3.3	2.2	15.4	13.6	4.8	3.2	4.1	0.92
	CMP63S	2.9	2.15	11.1	12.9	4	3	4.0	1.15
	CMP63M	5.3	3.6	21.4	21.6	7.5	5.1	5.7	1.92
	CMP63L	7.1	4.95	30.4	29.7	10.3	7.2	7.5	2.69
3000	**CMP71S**	6.4	4.9	19.2	25	8.7	6.7	7	3.04
	CMP71M	9.4	7.5	30.8	39	13.7	10.9	8.4	4.08
	CMP71L	13.1	9.4	46.9	58	21	15.1	11.4	6.18
	CMP80S	13.4	10	42.1	47	18.5	13.8	12.8	8.78
	CMP80M	18.7	13.4	62.6	69	27	19.3	16.5	11.9
	CMP80L	27.5	18.7	107	107	44	30	21.4	18.1
	CMP100S	25.5	19.6	68.3	73	36	27.5	19.8	19.34
	CMP100M	31	21.8	108	102	47	33	24.8	26.25
	CMP100L	47	32.3	178.8	167	70	48	34.6	40
	CMP40S	0.5	1.2	1.9	6.1	-	-	1.3	0.1
	CMP40M	0.8	0.95	3.8	6.0	-	-	1.6	0.15
	CMP50S	1.3	1.32	5.2	7.0	1.7	1.7	2.3	0.42
	CMP50M	2.4	2.3	10.3	13.1	3.5	3.35	3.3	0.67
	CMP50L	3.3	3.15	15.4	19.5	4.8	4.6	4.1	0.92
	CMP63S	2.9	3.05	11.1	18.3	4	4.2	4.0	1.15
	CMP63M	5.3	5.4	21.4	32.4	7.5	7.6	5.7	1.92
	CMP63L	7.1	6.9	30.4	41.4	10.3	10	7.5	2.69
4500	**CMP71S**	6.4	7.3	19.2	38	8.7	9.9	7	3.04
	CMP71M	9.4	10.9	30.8	57	13.7	15.9	8.4	4.08
	CMP71L	13.1	14.1	46.9	87	21	22.5	11.4	6.18
	CMP80S	13.4	15.3	42.1	73	18.5	21	12.8	8.78
	CMP80M	18.7	20.1	62.6	103	27	29	16.5	11.9
	CMP80L	27.5	27.8	107	159	44	44.5	21.4	18.1
	CMP100S	25.5	30	68.3	111	36	42.5	19.8	19.34
	CMP100M	31	33.1	108	154	-	-	24.8	26.25
	CMP100L	47	48.4	178.8	251	-	-	34.6	40
	CMP40S	0.5	1.2	1.9	6.1	-	-	1.3	0.1
	CMP40M	0.8	1.1	3.8	6.9	-	-	1.6	0.15
	CMP50S	1.3	1.7	5.2	9.0	1.7	2.2	2.3	0.42
	CMP50M	2.4	3	10.3	17.1	3.5	4.4	3.3	0.67
	CMP50L	3.3	4.2	15.4	26	4.8	6.1	4.1	0.92
	CMP63S	2.9	3.9	11.1	23.4	4	5.4	4.0	1.15
6000	**CMP63M**	5.3	6.9	21.4	41.4	7.5	9.8	5.7	1.92
	CMP63L	7.1	9.3	30.4	55.8	10.3	13.5	7.5	2.69
	CMP71S	6.4	9.6	19.2	50	8.7	13.1	7	3.04
	CMP71M	9.4	14.7	30.8	76	13.7	21.5	8.4	4.08
	CMP71L	13.1	18.8	46.9	115	21	30	11.4	6.18
	CMP80S	13.4	20	42.1	95	18.5	27.5	12.8	8.78
	CMP80M	18.7	26.4	62.6	135	27	38	16.5	11.9
	CMP80L	27.5	37.6	107	215	-	-	21.4	18.1

n_N [min^{-1}]	Motor	L_1 [mH]	R_1 [Ω]	U_{p0} cold [V]	m_{bmot} [kg]	J_{bmot} [10^{-4} kgm^2]	M_{B1} [Nm]	M_{B2} [Nm]
	CMP40S	23	11.94	27.5	1.7	0.13	0.95	-
	CMP40M	46	19.93	56	2.0	0.18	0.95	-
	CMP50S	71	22.49	86	2.9	0.48	3.1	4.3
	CMP50M	38.5	9.96	90	3.9	0.73	4.3	3.1
	CMP50L	30.5	7.42	98	4.7	0.98	4.3	3.1
	CMP63S	36.5	6.79	90	5.0	1.49	7	9.3
	CMP63M	22	3.56	100	6.7	2.26	9.3	7
	CMP63L	14.2	2.07	100	8.5	3.03	9.3	7
3000	**CMP71S**	15.7	1.48	87.5	9	3.44	7	14
	CMP71M	9.7	0.81	85	10.4	4.5	14	7
	CMP71L	7.3	0.56	96	13.4	6.6	14	7
	CMP80S	7.2	0.54	91	16.8	10.04	16	31
	CMP80M	5	0.345	94	20.5	13.16	31	16
	CMP80L	3.35	0.21	99	24.4	19.36	31	16
	CMP100S	3.9	0.215	88	22.8	21.34	24	47
	CMP100M	3.05	0.142	95.5	27.8	28.25	47	24
	CMP100L	1.9	0.081	98	37.6	42	47	24
	CMP40S	23	11.94	27.5	1.7	0.13	0.95	-
	CMP40M	46	19.93	56	2.0	0.18	0.95	-
	CMP50S	37	11.61	62	2.9	0.48	3.1	4.3
	CMP50M	20.5	5.28	66	3.9	0.73	4.3	3.1
	CMP50L	14.6	3.57	68	4.7	0.98	4.3	3.1
	CMP63S	18.3	3.34	64	5.0	1.49	7	9.3
	CMP63M	9.8	1.48	67	6.7	2.26	9.3	7
	CMP63L	7.2	1.07	71	8.5	3.03	9.3	7
4500	**CMP71S**	7.1	0.72	59	9	3.44	7	14
	CMP71M	4.55	0.385	58	10.4	4.5	14	7
	CMP71L	3.25	0.24	64	13.4	6.6	14	7
	CMP80S	3.05	0.22	59	16.8	10.04	16	31
	CMP80M	2.25	0.148	63	20.5	13.16	31	16
	CMP80L	1.54	0.085	67	24.4	19.36	31	16
	CMP100S	1.68	0.086	58	22.8	21.34	24	47
	CMP100M	1.32	0.058	63	27.8	28.25	47	24
	CMP100L	0.84	0.038	65	37.6	42.82	47	24
	CMP40S	23	11.94	27.5	1.7	0.13	0.95	-
	CMP40M	34	14.95	48.5	2.0	0.18	0.95	-
	CMP50S	22.5	7.11	48.5	2.9	0.48	3.1	4.3
	CMP50M	12	3.21	50.5	3.9	0.73	4.3	3.1
	CMP50L	8.2	1.91	51	4.7	0.98	4.3	3.1
	CMP63S	11.2	2.1	50	5.0	1.49	7	9.3
6000	**CMP63M**	5.9	0.92	52	6.7	2.26	9.3	7
	CMP63L	4	0.62	53	8.5	3.03	9.3	7
	CMP71S	4.15	0.395	45	9	3.44	7	14
	CMP71M	2.55	0.205	43.5	10.4	4.5	14	7
	CMP71L	1.84	0.145	48	13.4	6.6	14	7
	CMP80S	1.8	0.136	46	-	-	-	-
	CMP80M	1.3	0.087	48	-	-	-	-
	CMP80L	0.84	0.051	50	-	-	-	-

5.3 Technical data – Synchronous servomotors CMPZ, CMPZ /BY

System voltage: 400 V

n_N	Motor	M_0	I_0	M_{pk}	I_{max}	M_{0VR}	I_{0VR}	m	J_{mot}
[min^{-1}]		[Nm]	[A]	[Nm]	[A]	[Nm]	[A]	[kg]	[10^{-4} kgm^2]
3000	**CMPZ71S**	6.4	4.9	19.2	25	8.7	6.7	8.6	11.02
	CMPZ71M	9.4	7.5	30.8	39	13.7	10.9	10	12.07
	CMPZ71L	13.1	9.4	46.9	58	21	15.1	13	14.17
	CMPZ80S	13.4	10	42.1	47	18.5	13.8	15.8	30.88
	CMPZ80M	18.7	13.4	62.6	69	27	19.3	19.5	34
	CMPZ80L	27.5	18.7	107	107	44	30	24.4	40.21
	CMPZ100S	25.5	19.6	68.3	73	36	27.5	24.2	84.99
	CMPZ100M	31	21.8	108	102	47	33	29.2	91.9
	CMPZ100L	47	32.3	178.8	167	70	48	39	105.65
4500	**CMPZ71S**	6.4	7.3	19.2	38	8.7	9.9	8.6	11.02
	CMPZ71M	9.4	10.9	30.8	57	13.7	15.9	10	12.07
	CMPZ71L	13.1	14.1	46.9	87	21	22.5	13	14.17
	CMPZ80S	13.4	15.3	42.1	73	18.5	21	15.8	30.88
	CMPZ80M	18.7	20.1	62.6	103	27	29	19.5	34
	CMPZ80L	27.5	27.8	107	159	44	44.5	24.4	40.21
	CMPZ100S	25.5	30	68.3	111	36	42.5	24.2	84.99
	CMPZ100M	31	33.1	108	154	-	-	29.2	91.9
	CMPZ100L	47	48.4	178.8	251	-	-	39	105.65
6000	**CMPZ71S**	6.4	9.6	19.2	50	8.7	13.1	8.6	11.02
	CMPZ71M	9.4	14.7	30.8	76	13.7	21.5	10	12.07
	CMPZ71L	13.1	18.8	46.9	115	21	30	13	14.17
	CMPZ80S	13.4	20	42.1	95	18.5	27.5	15.8	30.88
	CMPZ80M	18.7	26.4	62.6	135	27	38	19.5	34
	CMPZ80L	27.5	37.6	107	215	-	-	24.4	40.21

n_N [min^{-1}]	Motor	L_1 [mH]	R_1 Ω	U_{p0} cold [V]	m_{bmot} [kg]	J_{bmot} [10^{-4} kgm^2]	M_{B1} [Nm]	M_{B2} [Nm]
3000	**CMPZ71S**	15.7	1.48	87.5	11.2	12.74	14	10
	CMPZ71M	9.7	0.81	85	12.6	13.79	20	14
	CMPZ71L	7.3	0.56	96	15.6	15.89	20	14
	CMPZ80S	7.2	0.54	91	20.8	34.65	28	20
	CMPZ80M	5	0.345	94	24.5	37.33	40	28
	CMPZ80L	3.35	0.21	99	29.4	43.98	40	28
	CMPZ100S	3.9	0.215	88	34.7	89.43	55	40
	CMPZ100M	3.05	0.142	95.5	39.7	96.34	80	55
	CMPZ100L	1.9	0.081	98	49.5	110.09	80	55
4500	**CMPZ71S**	7.1	0.72	59	11.2	12.74	14	10
	CMPZ71M	4.55	0.385	58	12.6	13.79	20	14
	CMPZ71L	3.25	0.24	64	15.6	15.89	20	14
	CMPZ80S	3.05	0.22	59	20.8	34.65	28	20
	CMPZ80M	2.25	0.148	63	24.5	37.33	40	28
	CMPZ80L	1.54	0.085	67	29.4	43.98	40	28
	CMPZ100S	1.68	0.086	58	34.7	89.43	55	40
	CMPZ100M	1.32	0.058	63	39.7	96.34	80	55
	CMPZ100L	0.84	0.038	65	49.5	110.09	80	55
6000	**CMPZ71S**	4.15	0.395	45	11.2	12.74	14	10
	CMPZ71M	2.55	0.205	43.5	12.6	13.79	20	14
	CMPZ71L	1.84	0.145	48	15.6	15.89	20	14
	CMPZ80S	1.8	0.136	46	-	-	-	-
	CMPZ80M	1.3	0.087	48	-	-	-	-
	CMPZ80L	0.84	0.051	50	-	-	-	-

6 Project Planning

6.1 Thermal characteristics

Notes on selecting synchronous servomotors

Project planning for a servomotor involves the following tasks for determining the thermal and dynamic load on the motor:

- Calculating the **effective operating point** for checking the thermal load on the motor.
- Calculating the **maximum operating point** for determining the motor/inverter combination.
- Determining the **inertia ratio** J_{ext} / J_{Mot} for checking the stability of the speed control.
  - J_{ext} = Mass moment of inertia, reduced on motor shaft
  - J_{Mot} = Mass moment of inertia of the motor

Procedure

- Determining the maximum speed based on aspects of the inertia ratio **J_{ext} / J_{Mot} < 10 – 15**.
- Maximum required torque M_{max} at maximum speed n_{max} (maximum operating point).

  M_{max} < M_{dyn_Mot} at **n_{max}**

  M_{dyn_Mot} corresponds to the maximum torque for the specific motor/inverter combination. This operating point must lie below the characteristic curve for the maximum torque of the motor/MOVIDRIVE®/MOVIAXIS® combination.
- Effective torque requirement at average speed of the application (effective operating point).

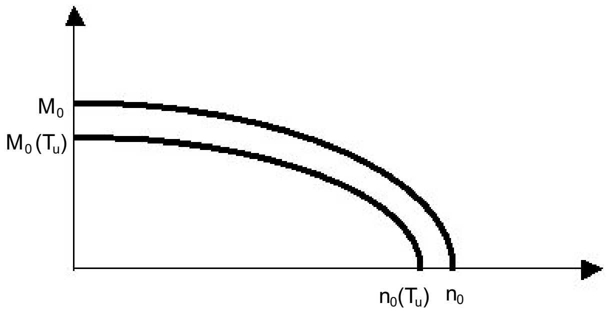
  M_{eff} < M_{N_Mot} at **n_{mean}**

  This operating point must lie below the characteristic curve for continuous torque to ensure thermal stability of the drive.

6.2 Derating for increased ambient temperatures

For projecting the CMP synchronous servomotors with permanent-magnet excitation, the following derating applies in the ambient temperature range +40 °C to +60 °C:

- The thermal speed/limit torque characteristic curve is re-scaled towards the origin (minimized). The thermal operating point based on effective torque and thermally effective speed of the application must be below the re-scaled characteristic curve.



$$M_0\,(T_U) = M_0 \times \left(\sqrt{\frac{145°C - T_U}{105°C}}\right)$$

$$n_0\,(T_U) = K_e \times n_0 \times \left(\sqrt{\frac{145°C - T_U}{105°C}}\right)$$

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T_U	Ambient temperature °C
M_0	Static torque under nominal conditions
$M_0(T_U)$	Standstill torque at increased temperatures 40 °C < T_U < 60°C
n_0	Thermal limit speed under nominal conditions
$n_0(T_U)$	Thermal limit speed at increased temperatures 40 °C < T_U < 60°C
K_e	Encoder factor for resolver = 1; for electronic encoder (e.g. Hiperface® encoder) = 0.9

INFORMATION

The CMP servomotors are designed for a maximum ambient temperature of 40 °C as standard. Please contact SEW-EURODRIVE if the motors are used at higher ambient temperatures.

Motors cold storage applications can be used down to -40 °C. The temperature range from -40 °C to +10 °C is listed on the nameplate.

6.3 Mechanical and electrical characteristics

Speed classes The speed classes of the synchronous servomotors:

- 3000 min^{-1}
- 4500 min^{-1}
- 6000 min^{-1}

As synchronous servomotors operate as controlled drives, it is necessary to consider the inertia ratio between the load and the motor. This ratio has a decisive effect on the control quality. The inertia ratio should not exceed the values listed in the table below.

Reduction of the inertia ratio using the motor speed (the selected gear unit reduction ratio) offers hardly any advantage with respect to closed-loop control starting at the value $\mathbf{J_{ext} / J_{Mot} < 8}$.

Backlash and elasticity negatively influence the possible dynamic response of the driveline and must be kept to a minimum.

As a result, the maximum speed should be selected such that the following criteria are met:

Driveline	Control characteristics	Inertia ratio J_{ext}/ / J_{Mot}
Forged gear rack, reduced backlash gear unit	Low backlash and low elasticity drive	J_{ext} / J_{Mot} < 15
Toothed belt, reduced backlash gear unit	Common servo applications	J_{ext} / J_{Mot} < 15
Toothed belt, standard gear unit	Standard applications, couplings with torque buffer (elasticity)	J_{ext} / J_{Mot} < 10

Type	CMP40 / 50 / 63 / 71 / 80 / 100	
	Standard	Optional
Degree of protection	IP65	IP66
Thermal class	155 (F)	-
Motor protection	KTY	-
Connection	Adjustable plug connector	radial plug connector, terminal box
Shaft end	Smooth	With key, domed type A
Ambient temperature	-20 °C to +40 °C	-20 °C to +60 °C -40 °C to +10 °C
Mounting position	270 °	random
Standard/regulations	CE VDE	CSA/UL UL
Noise levels according to EN 60034	Below specified value	-
Feedback	2-pole resolver	Hiperface® encoder
Brake	-	BP, BY
Cooling	Convection	Forced cooling fan for CMP50 - CMP100
Vibration class	"B" to EN 60034-14	

Degrees of protection according to EN 60034 (IEC 60034-5)

Synchronous servomotors are supplied with IP65 enclosure as standard.

IP	1. digit		2. digit
	Touch guard	Protection against foreign objects	Protection against water
0	No protection	No protection	No protection
1	Protected against access to hazardous parts with the back of your hand	Protection against solid foreign objects ∅ 50 mm and larger	Protection against dripping water
2	Protected against access to hazardous parts with a finger	Protection against solid foreign objects ∅ 12 mm and larger	Protection against dripping water if the housing is tilted by up to 15°
3	Protected against access to hazardous parts with a tool	Protection against solid foreign objects ∅ 2.5 mm and larger	Protection against spraying water
4	Protected against access to hazardous parts with a wire	Protection against solid foreign objects ∅ 1 mm and larger	Protection against splashing water
5		Dust-proof	Protection against water jets
6		Dust-proof	Protection against powerful water jets
7	-	-	Protection against temporary immersion in water
8	-	-	Protection against permanent immersion in water
9	-	-	Protection against water penetration from any direction even under increased pressure against the housing.

Applications

High accelerations

The rotor of the CMP synchronous servomotor is designed to be low-inertia. These motors are the optimum choice in very dynamic applications. For high accelerations and accelerations in the millisecond range, the synchronous servomotor is usually the technically and economically best solution.

Additional flywheel mass

The rotor of the CMPS synchronous servomotor is equipped with an additional flywheel mass. This additional flywheel mass allows for handling large external masses.

Cogging

The motors produce small torque ripple due to the servo drive design. which is corrected by the inverter.

6.4 Overhung loads and axial loads

The following overhung loads are determined by subjecting the shaft to a load with the rated torque.

The permitted overhung loads F_R at point x are determined via the following diagrams. "x" is the distance between the shaft shoulder and the force application, see figure on page 35.

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

Motor type	Nominal bearing service life
CMP40	L_{10h} = 25000 h
CMP50	L_{10h} = 25000 h
CMP63	L_{10h} = 20000 h
CMP.71	L_{10h} = 25000 h
CMP.80	L_{10h} = 25000 h
CMP.100	L_{10h} = 25000 h

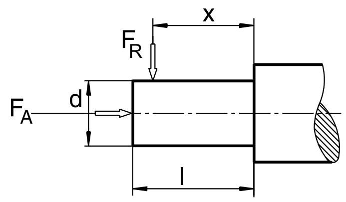
Permitted ball bearing types

The following table shows the permitted ball bearing types:

Motor type	A-side bearing	B-side bearing
CMP40	6002-2Z-C3	6001-2Z-C3
CMP50	6004-2Z-C3	6001-2Z-C3
CMP63	6005-2Z-C3	6003-2Z-C3
CMP.71	6206-2Z-J-C3	6202-2Z-J-C3
CMP.80	6307-2Z-J-C3	6304-2Z-J-C3
CMP.100	6309-2Z-J-C3	6304-2Z-J-C3

The grease fill and the bearing sealing can vary depending on the operational environment.

Permitted overhung and axial loads for x = l / 2 (shaft center)



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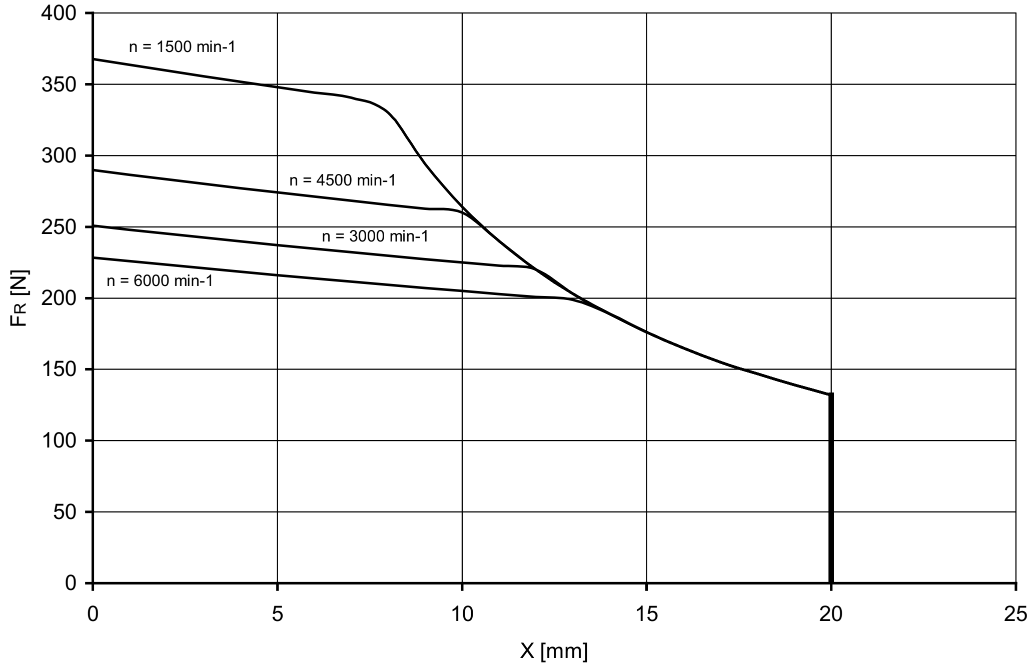
Motor type	$F_{R\,max}$ [N] / F_A [N]	Mean speed[1)] [min^{-1}] 1500	3000	4500	6000
CMP40S	$F_{R\,max}$	264	260	225	205
	F_A	109	86	74	68
CMP40M	$F_{R\,max}$	264	264	245	220
	F_A	116	92	81	73
CMP50S	$F_{R\,max}$	400	315	250	200
	F_A	157	104	83	66
CMP50M	$F_{R\,max}$	400	355	275	220
	F_A	168	117	91	73
CMP50L	$F_{R\,max}$	400	370	280	225
	F_A	182	122	92	74
CMP63S	$F_{R\,max}$	578	460	360	290
	F_A	170	115	90	72.5
CMP63M	$F_{R\,max}$	578	500	380	300
	F_A	188	125	95	75
CMP63L	$F_{R\,max}$	578	560	445	360
	F_A	208	140	111	90
CMP.71S	$F_{R\,max}$	1050	832	724	636
	F_A	346	277	240	212
CMP.71M	$F_{R\,max}$	1121	888	747	659
	F_A	373	296	250	219
CMP.71L	$F_{R\,max}$	1213	928	777	681
	F_A	404	309	258	227
CMP.80S	$F_{R\,max}$	1834	1454	1270	1132
	F_A	611	485	423	377
CMP.80M	$F_{R\,max}$	1962	1555	1325	1169
	F_A	654	518	442	390
CMP.80L	$F_{R\,max}$	2124	1635	1372	1208
	F_A	708	544	457	402
CMP.100S	$F_{R\,max}$	2982	2364	2064	-
	F_A	903	788	688	-
CMP.100M	$F_{R\,max}$	3174	2515	2195	-
	F_A	1058	838	732	-
CMP.100L	$F_{R\,max}$	3413	2694	2278	-
	F_A	1033	897	759	-

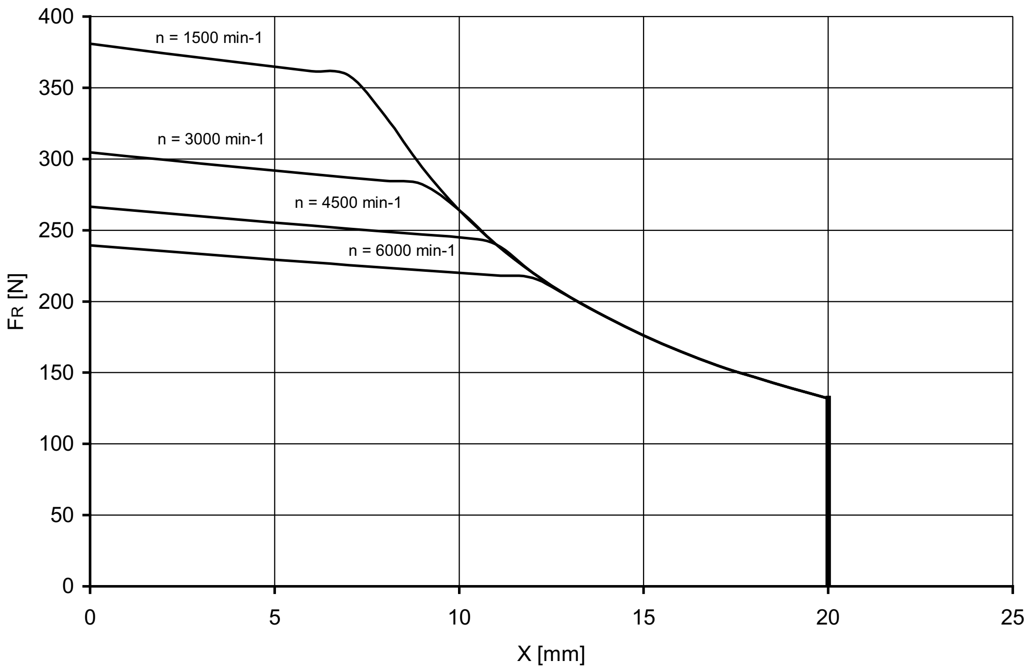
1) The mean speed must, for example, be determined from the travel diagram.

Permitted overhung load for CMP40S



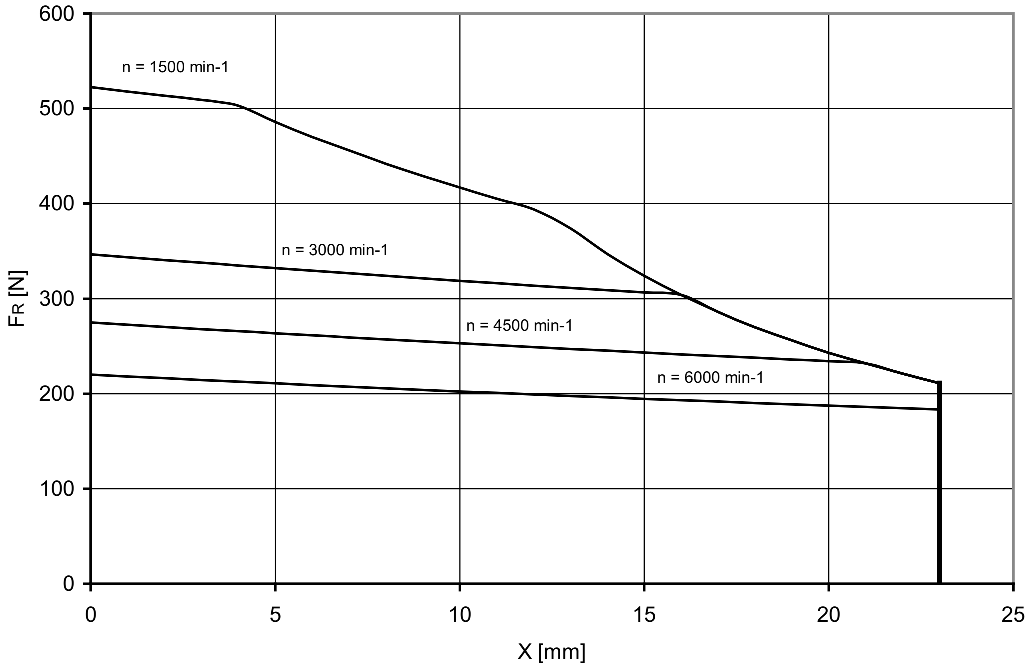
58648axx

Permitted overhung load for CMP40M



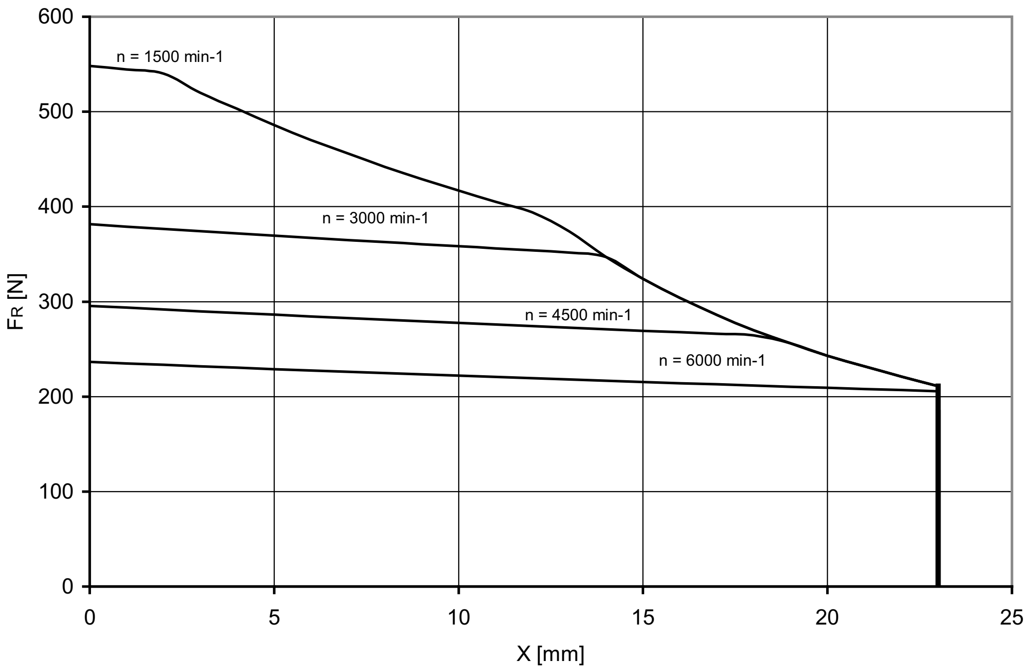
58649axx

Permitted overhung load for CMP50S



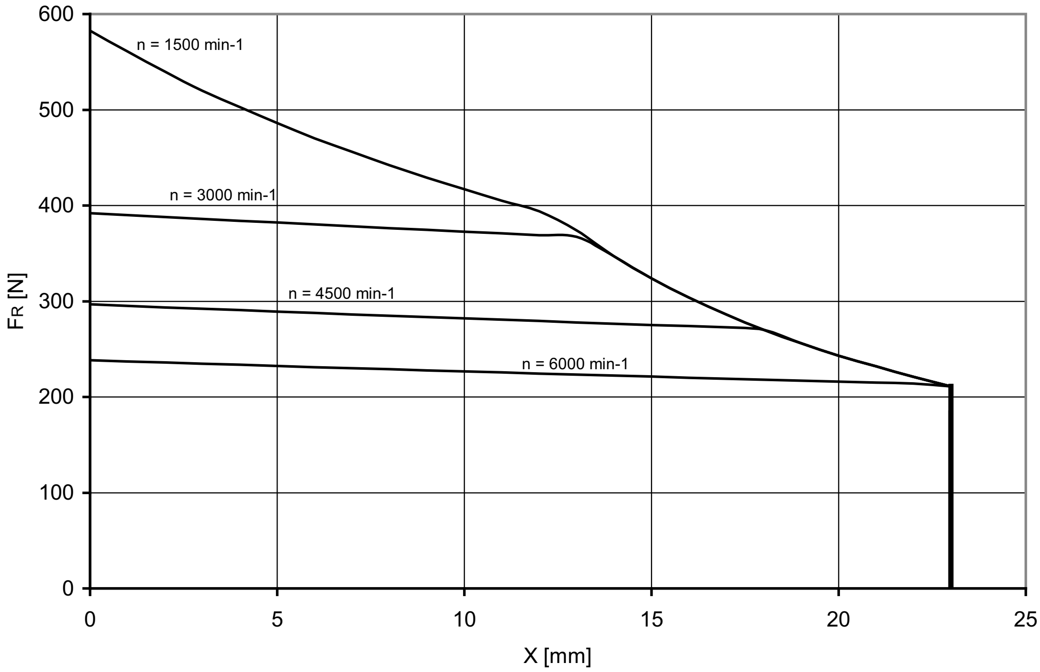
58650axx

Permitted overhung load for CMP50M



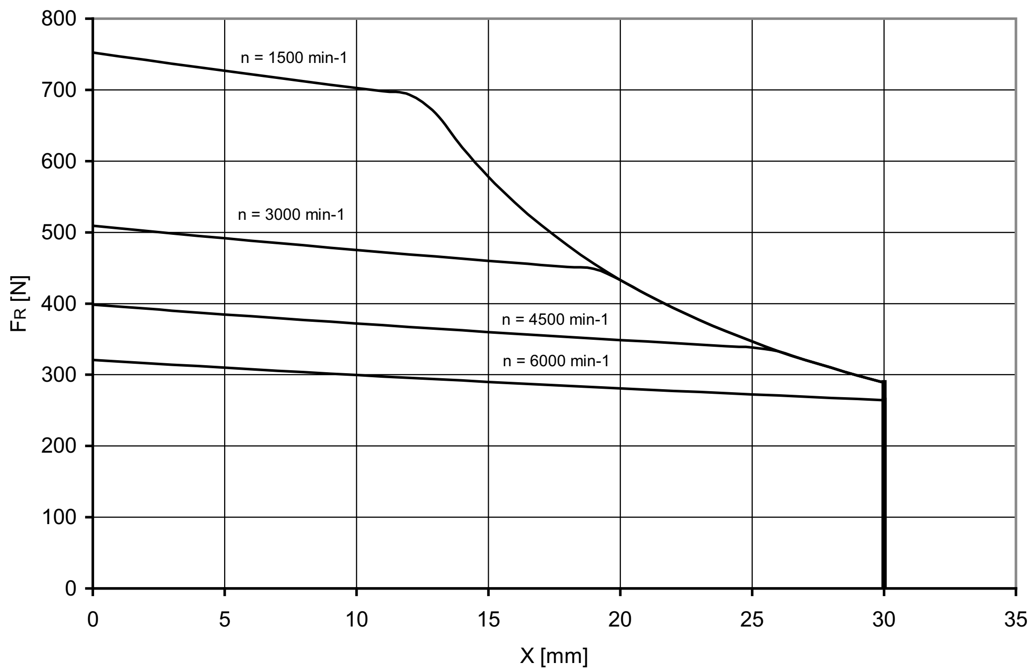
58651axx

Permitted overhung load for CMP50L



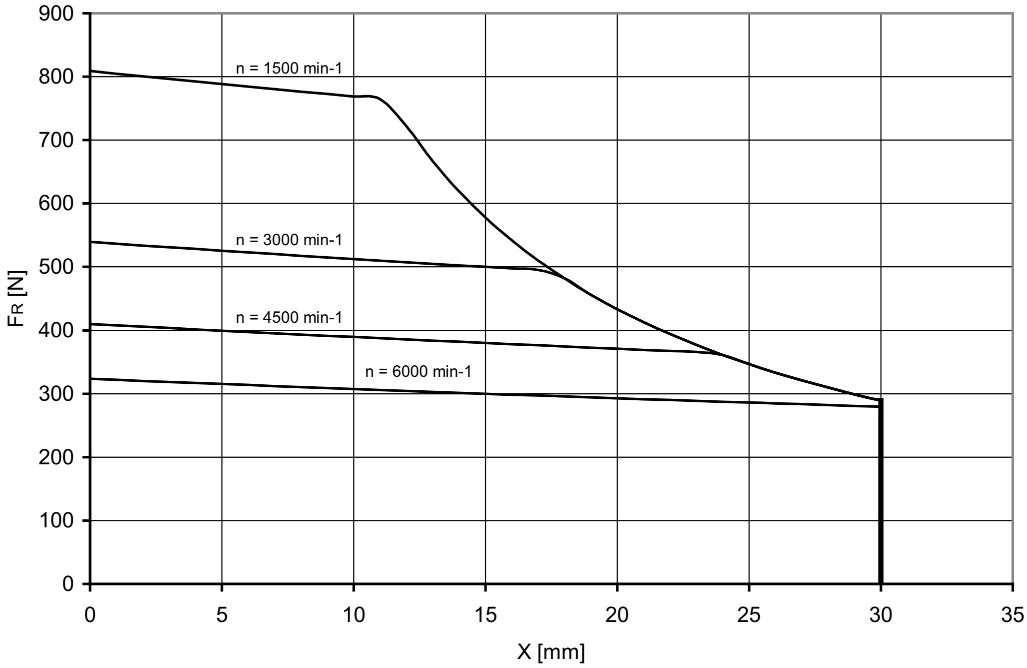
58652axx

Permitted overhung load for CMP63S



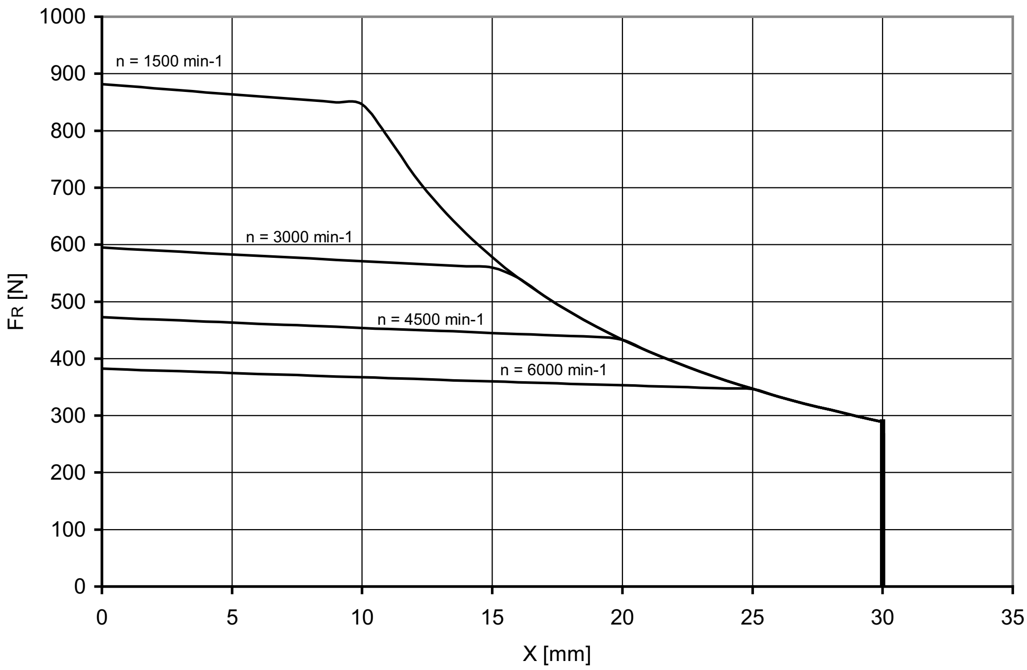
58653axx

Permitted overhung load for CMP63M



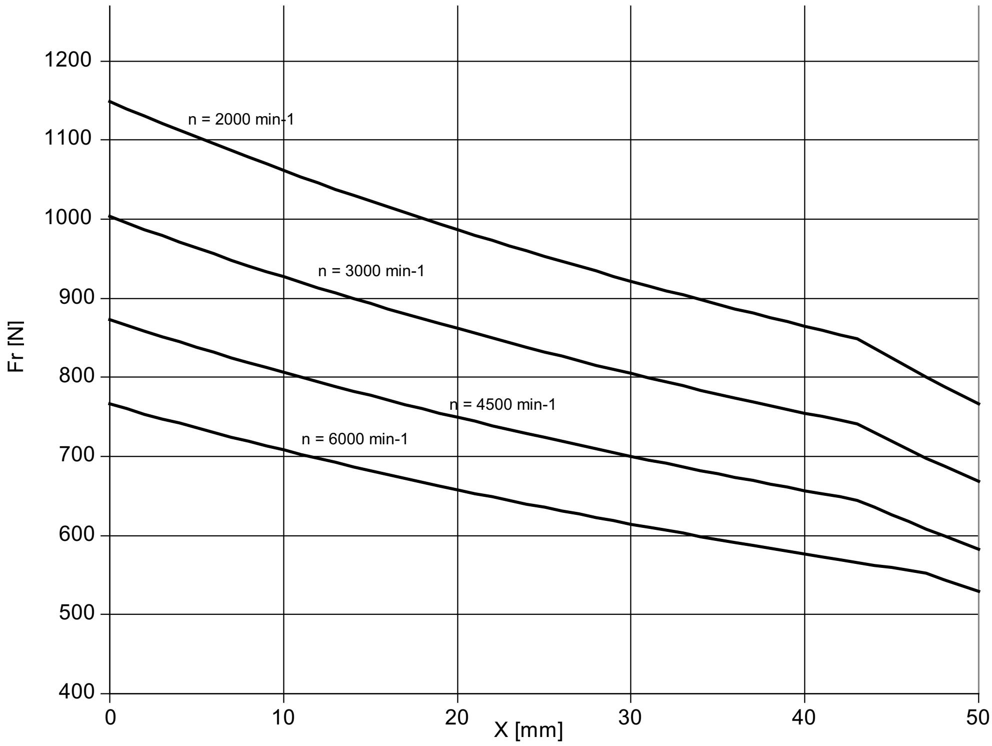
58654axx

Permitted overhung load for CMP63L



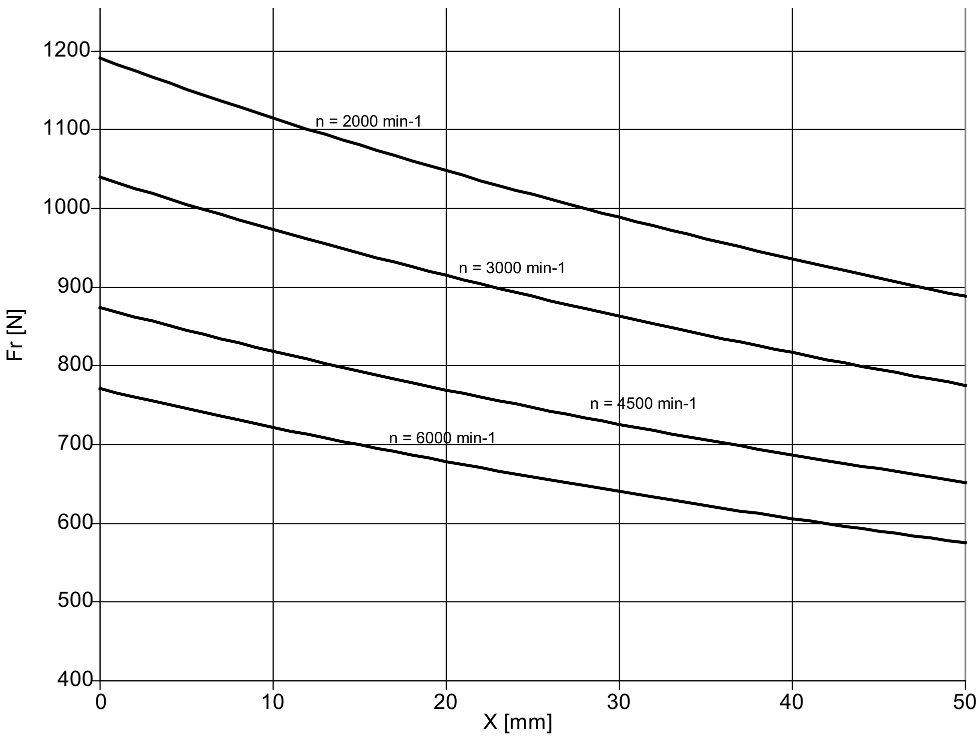
58655axx

Permitted overhung load for CMP71S



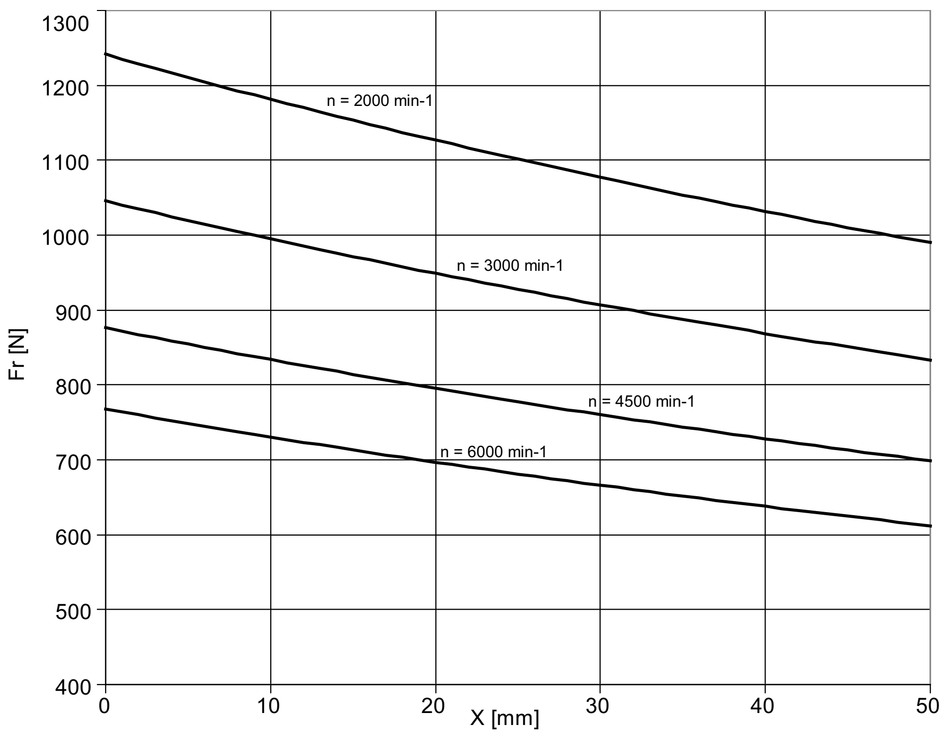
64123axx

Permitted overhung load for CMP71M



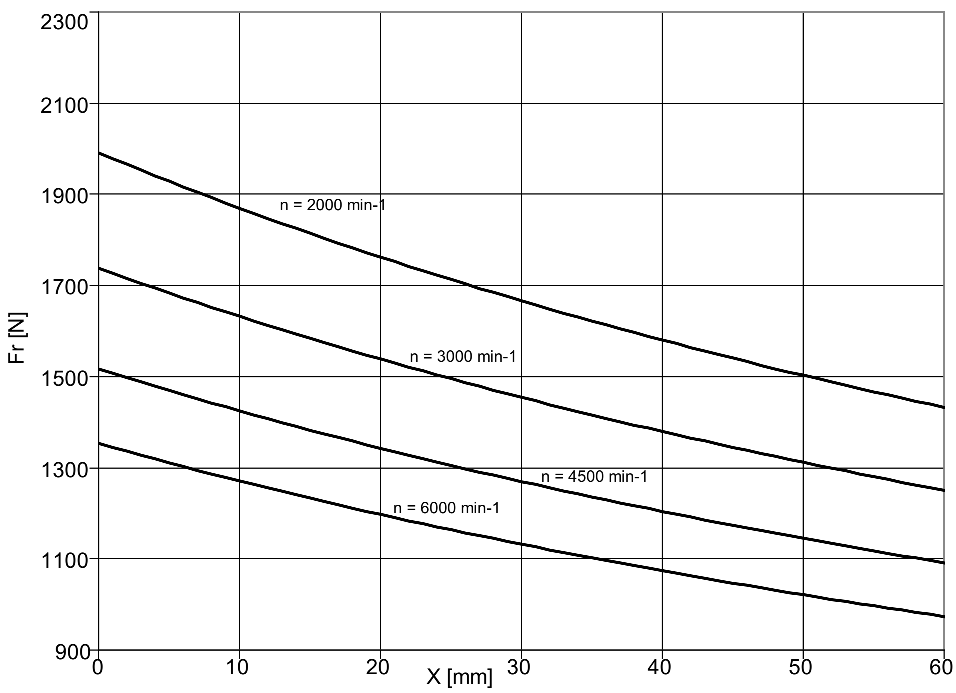
64124axx

Permitted overhung load for CMP71L



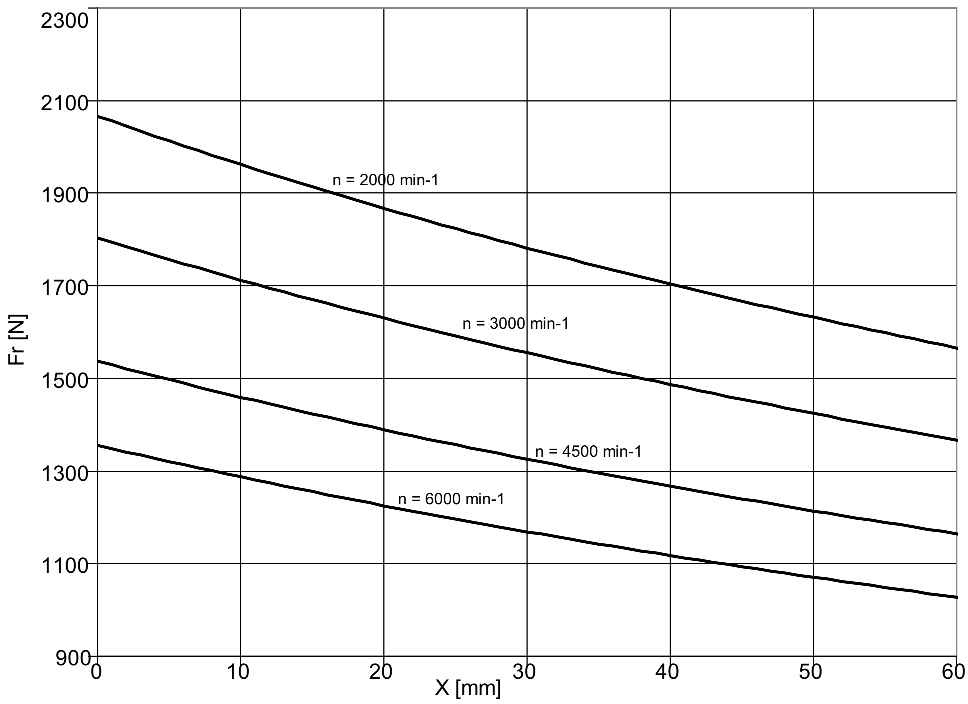
64125axx

Permitted overhung load for CMP80S



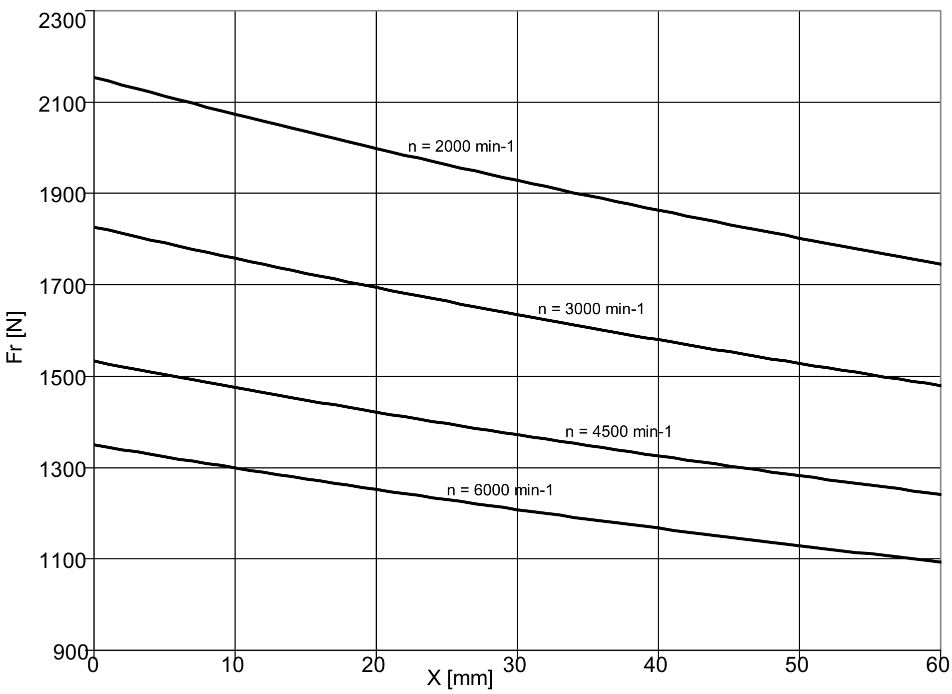
64126axx

Permitted overhung load for CMP80M



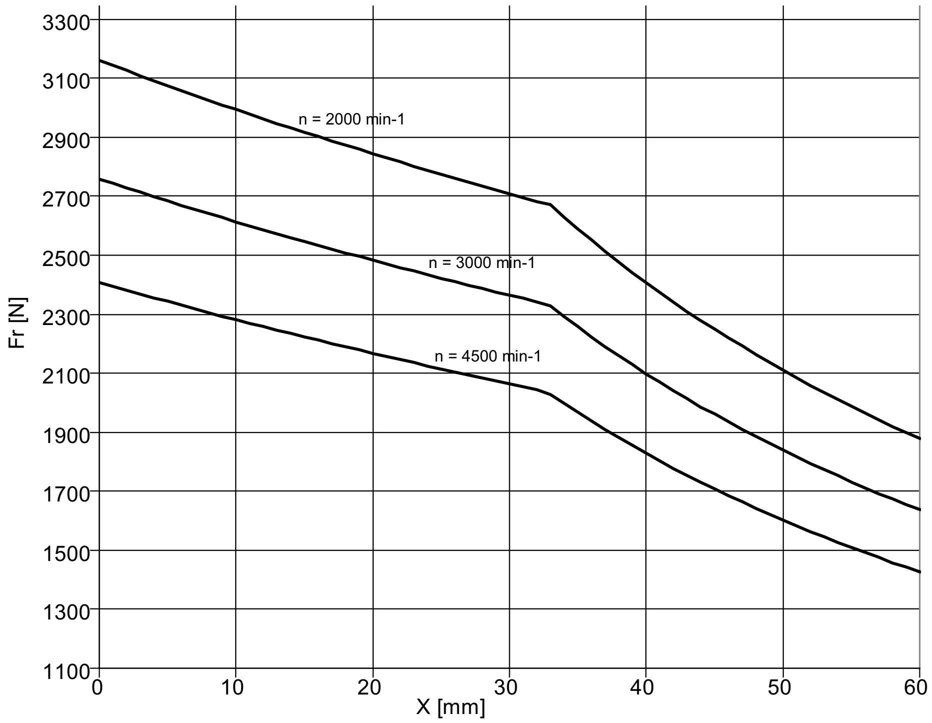
64127axx

Permitted overhung load for CMP80L



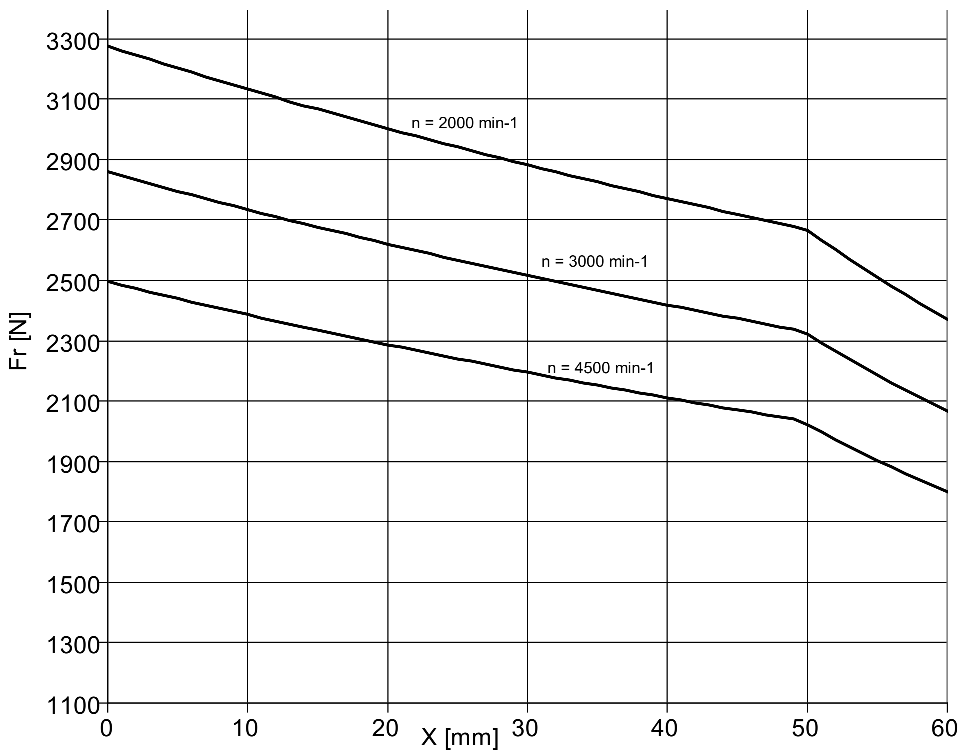
64128axx

Permitted overhung load for CMP100S



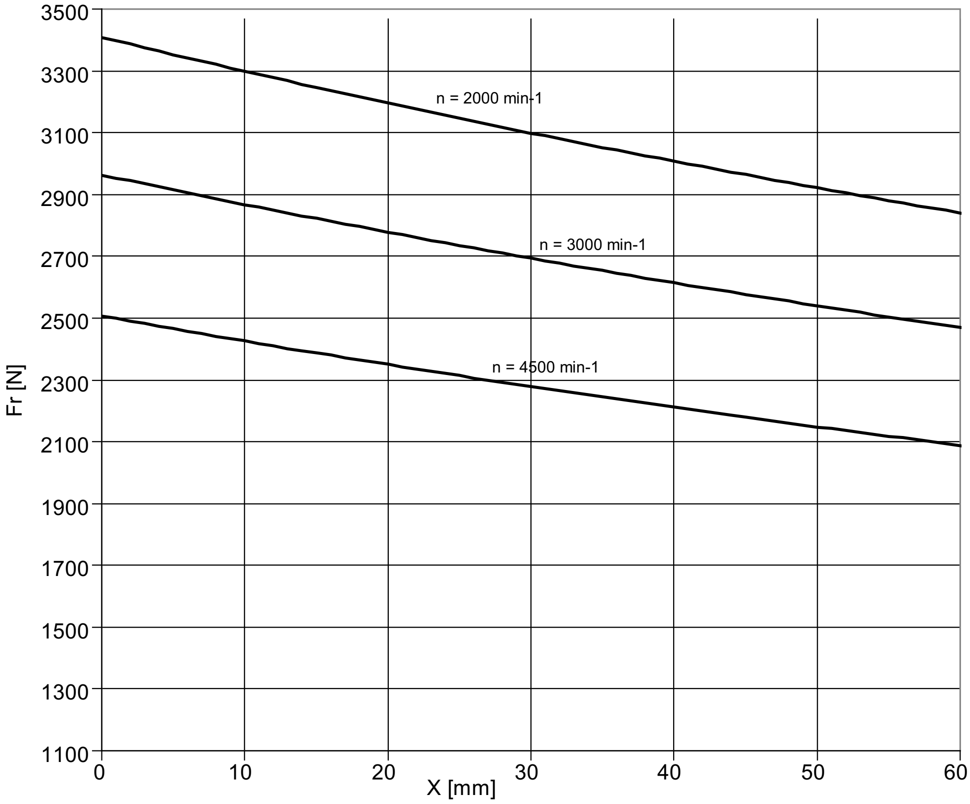
64129axx

Permitted overhung load for CMP100M



64130axx

Permitted overhung load for CMP100L



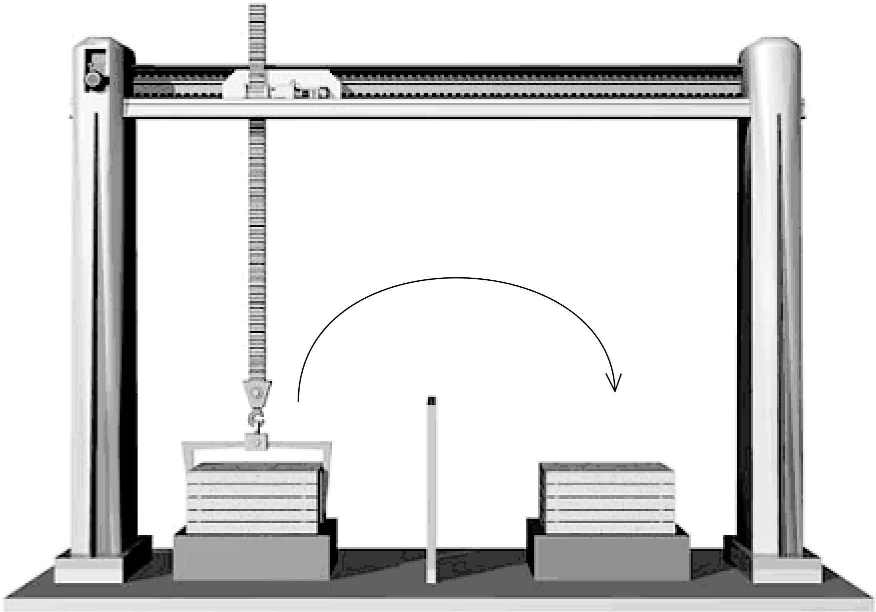
64131axx

6.5 Project planning example

This sample calculation is for a gantry with synchronous servomotors.

X-axis planning (travel axis)

Figure: Gantry with servo drives travel axis



61220axx

Reference data:

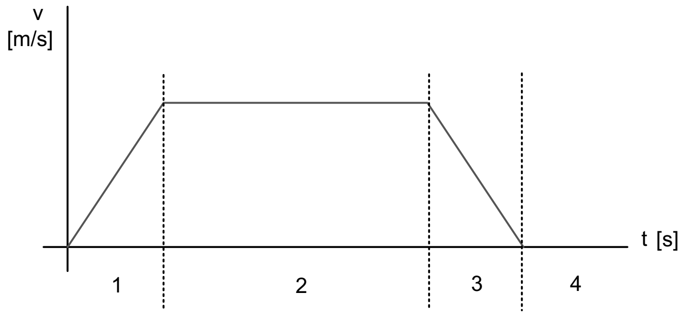
- Total moved mass: m_L = 50 kg
- Diameter of the belt pulley: d_0 = 75 mm
- Friction coefficient of the axis: μ = 0.01
- Traveling velocity: v_{max} = 2 m/s
- Maximum occurring acceleration/deceleration: a_{max} = 10 m/s^2
- Cycle time: t_z = 3 s
- Rest period: t_p = 1.8 s
- Load efficiency: h_L= 0.9
- Mounting position of the gear unit: IM = M1

For the drive, a PC.C gear unit is designed to be mounted directly to a CMP servomotor.

The overhung load is to act on the shaft center.

Power is transmitted via a belt pulley.

Travel sections Diagram: Travel sections 1 - 4



61222axx

Acceleration time in travel section 1, deceleration time in travel section 3

$$t_1 = t_3 = \frac{v_{max}}{a_{max}} = \frac{2\ m/s}{10\ m/s^2} = 0.2\,s$$

Travel time for constant travel in travel section 2

$$t_2 = t_z - t_p - t_1 - t_3$$
$$t_2 = 3\,s - 1.8\,s - 0.2\,s - 0.2\,s$$
$$t_2 = 0.8s$$

M_{stat} *for all travel sections*

$$M_{stat} = \frac{(m \cdot g \cdot \mu) \cdot \frac{d_0}{2}}{\eta_L}$$
$$M_{stat} = \frac{50kg \cdot 9.81\frac{m}{s^2} \cdot 0.01 \cdot \frac{0.075m}{2}}{0.9}$$
$$M_{stat} = 0.2043Nm$$

M_{dyn} *during acceleration in travel section 1*

$$M_{dyn} = \frac{(m \cdot a) \cdot \frac{d_0}{2}}{\eta_L}$$
$$M_{dyn} = \frac{50kg \cdot 10\frac{m}{s^2} \cdot \frac{0.075m}{2}}{0.9}$$
$$M_{dyn} = 20.83Nm$$

M_{dyn} during deceleration in travel section 3

$$M_{dyn} = m \cdot a \cdot \frac{d_0}{2} \cdot \eta_L$$
$$M_{dyn} = 50kg \cdot (-10\frac{m}{s^2}) \cdot \frac{0.075m}{2} \cdot 0.9$$
$$M_{dyn} = -16.875Nm$$

M_{max} during acceleration in travel section 1

$$M_{\max} = M_{stat} + M_{dyn1}$$
$$M_{\max} = 0.2043\,Nm + 20.8333Nm$$
$$M_{\max} = 21.04Nm$$

M_{max} during deceleration in travel section 3

$$M_{\max} = M_{stat} + M_{dyn3}$$
$$M_{\max} = 0.2043\,Nm + (-16.87Nm)$$
$$M_{\max} = -16.6657Nm$$

Output speed

$$n_{a\max} = \frac{v_{\max}}{d_0 \cdot \pi} \cdot 60$$
$$n_{a\max} = \frac{2\frac{m}{s}}{0.075m \cdot \pi} \cdot 60$$
$$n_{a\max} = 509.295\frac{1}{\min}$$

Gear ration including 10% motor speed reserve
n_N = 4500 1/min is an assumption

$$i = \frac{n_N \cdot 0.9}{n_{a\max}}$$
$$i = \frac{4500\frac{1}{\min} \cdot 0.9}{509.295\frac{1}{\min}}$$
$$i = 7.95$$

Maximum input speed

$$n_{max} = n_{a\,max} \cdot i$$

$$n_{max} = 509.295 \frac{1}{min} \cdot 7$$

$$n_{max} = 3565.065 \frac{1}{min}$$

Project planning for servo gear units

The gear unit is selected on the basis of the table below:

	i	M_{amax} [Nm]	M_{apk} [Nm]	$M_{aNotaus}$ [Nm]	n_{ak} [1/min]	J_G 10^{-4} kgm²	c_T PSC [Nm/']	F_{Ra} PSC [N]	F_{Rapk} PSC [N]
PSC221 1	3	29	40	60	1500	0.172	3.46	1170	2000
	5	34	42	63	720	0.0578	3.44	1390	2000
	7	32	**39**	59	800	**0.03**	3.28	1550	2000
	10	30	37	56	700	0.0144	2.92	1750	2000

	i	n_{epk} [1/min]	η [%]	M1;M3;M5-6 a_0	M1;M3;M5-6 a_1	M1;M3;M5-6 a_2	M2 a_0	M2 a_1	M2 a_2	M4 a_0	M4 a_1	M4 a_2	φ [']
PSC221 1	3	7000	99	101.00	-0.093	0	106.00	-0.104	0	109.00	-0.110	0	10
	5	7000	99	160.00	-0.181	0	163.00	-0.190	0	167.00	-0.200	0	10
	7	**7000**	**99**	186.00	-0.257	0	187.00	-0.264	0	186.00	-0.267	0	10
	10	7000	99	158.00	-0.178	0	161.00	-0.184	0	164.00	-0.194	0	10

Selection condition:

$$M_{max} \le M_{apk}$$

$$21.04 Nm \le 39 Nm$$

$$n_{max} \le n_{epk}$$

$$3565 \frac{1}{min} \le 7000 \frac{1}{min}$$

Condition is fulfilled.

Mean output speed

$$n_{am} = \frac{n_1 \cdot t_1 + \ldots + \ldots n_n \cdot t_n}{t_1 + \ldots + \ldots t_n}$$

$$n_{am} = \frac{\dfrac{509.295 \frac{1}{\min}}{2} \cdot 0.2s + 509.295 \frac{1}{\min} \cdot 0.8s + \dfrac{509.295 \frac{1}{\min}}{2} \cdot 0.2s}{0.2s + 0.8s + 0.2s + 1.8s}$$

$$n_{am} = 169.765 \frac{1}{\min}$$

Selection condition:

$$n_{am} \leq n_{ak}$$

$$169.765 \frac{1}{\min} \leq 809 \frac{1}{\min}$$

Condition is fulfilled.

Effective torque of the servo gear unit

$$M_{aeff} = \sqrt[8]{\frac{n_1 \cdot t_1 \cdot |M_1|^8 + \ldots + \ldots n_n \cdot t_n \cdot |M_n|^8}{n_1 \cdot t_1 + \ldots + n_n \cdot t_n}}$$

$$M_{aeff} = \sqrt[8]{\frac{\dfrac{509.295 \frac{1}{\min}}{2} \cdot 0.2s \cdot |21.04Nm|^8 + 509.295 \frac{1}{\min} \cdot 0.8s \cdot |0.2043Nm|^8 + \dfrac{506.295 \frac{1}{\min}}{2} \cdot 0.2s \cdot |-16.67Nm|^8}{0.2s \cdot 254.64 \frac{1}{\min} + 0.8s \cdot 509.295 \frac{1}{\min} + 0.2s \cdot 254.64 \frac{1}{\min}}}$$

$$M_{aeff} = 16.065Nm$$

Selection condition:

$$M_{aeff} \leq M_{a\max}$$

$$16.065Nm \leq 32Nm$$

Condition is fulfilled.

Thermal torque of the servo gear unit

$$M_{ath} = \sqrt[1.2]{\frac{n_1 \cdot t_1 \cdot |M_1|^{1.2} + ... + ... n_n \cdot t_n \cdot |M_n|^{1.2}}{n_1 \cdot t_1 + ... + n_n \cdot t_n}}$$

$$M_{ath} = \sqrt[1.2]{\frac{\frac{509.295 \frac{1}{\min}}{2} \cdot 0.2s \cdot |21.04Nm|^{1.2} + 509.295 \frac{1}{\min} \cdot 0.8s \cdot |0.2043Nm|^{1.2} + \frac{506.295 \frac{1}{\min}}{2} \cdot 0.2s \cdot |-16.67Nm|^{1.2}}{0.2s \cdot 254.64 \frac{1}{\min} + 0.8s \cdot 509.295 \frac{1}{\min} + 0.2s \cdot 254.64 \frac{1}{\min}}}$$

$$M_{ath} = 5.009\,Nm$$

Thermal factors for mounting position M1

a_0=186

a_1=-0,257

a_3=0

$$M_{Therm} = a_0 + a_1 \cdot n_{am} + \frac{a_2}{n_{am}^{1.2}}$$

$$M_{Therm} = 186 + (-0.257 \cdot 169.765 \frac{1}{\min}) + \frac{0}{169.765^{1,2}}$$

$$M_{Therm} = 142.37\,Nm$$

Selection condition:

$$M_{ath} \le M_{Therm}$$

$$5.035\,Nm \le 142.37\,Nm$$

Condition is fulfilled.

Overhung load calculation

$$F_{R\max} = \frac{M_{\max}}{\frac{d_0}{2}} \cdot f_z$$

$$F_{R\max} = \frac{21.04\,Nm}{\frac{0.075\,m}{2}} \cdot 2.5$$

$$F_{R\max} = 1402\,N$$

The force application point is the center of the output shaft.

Selection condition:

$$F_{R\max} \le F_{RaPk}$$

$$1402\,N \le 2000\,N$$

Condition is fulfilled.

Calculation of the overhung load on the shaft end

$$M_{akub} = \sqrt[3]{\frac{n_1 \cdot t_1 \cdot |M_1|^3 + ... + ... n_n \cdot t_n \cdot |M_n|^3}{n_1 \cdot t_1 + ... + n_n \cdot t_n}}$$

$$M_{akub} = \sqrt[3]{\frac{\frac{509.295\frac{1}{\min}}{2} \cdot 0.2s \cdot |21.04Nm|^3 + 509.295\frac{1}{\min} \cdot 0.8s \cdot |0.2043Nm|^3 + \frac{506.295\frac{1}{\min}}{2} \cdot 0.2s \cdot |-16.67Nm|^3}{0.2s \cdot 254.64\frac{1}{\min} + 0.8s \cdot 509.295\frac{1}{\min} + 0.2s \cdot 254.64\frac{1}{\min}}}$$

$$M_{akub} = 11.172\,Nm$$

$$F_{Rkub} = \frac{M_{akub}}{\frac{d_0}{2}} \cdot f_z$$

$$F_{Rkub} = \frac{11.12Nm}{\frac{0.075m}{2}} \cdot 2.5$$

$$F_{Rkub} = 744.8N$$

Selection condition:

$$F_{Rkub} \leq F_{R\max}$$
$$744.8N \leq 1402N$$

Condition is fulfilled.

Load torques in travel sections 1 to 3

Travel section 1

$$M_{e\max 1} = \frac{M_{dyn1}}{i \cdot \eta_G}$$

$$M_{e\max 1} = \frac{21.04Nm}{7 \cdot 0.99}$$

$$M_{e\max 1} = 3.036Nm$$

Travel section 2

$$M_{e\max 2} = \frac{M_{stat}}{i \cdot \eta_G}$$

$$M_{e\max 2} = \frac{0.2043Nm}{7 \cdot 0.99}$$

$$M_{e\max 2} = 0.0294Nm$$

Travel section 3

$$M_{e\max 3} = \frac{M_{dyn3} \cdot \eta_G}{i}$$

$$M_{e\max 3} = \frac{-16.67\,Nm \cdot 0.99}{7}$$

$$M_{e\max 3} = -\,2.357\,Nm$$

Motor selection Preliminary determination of motor using torque M_{pk}.

n_N	Motor	M_0	I_0	M_{pk}	I_{max}	M_{0VR}	I_{0VR}	J_{mot}	J_{bmot}	M_{B1}	M_{B2}	L_1	R_1	U_{p0} cold
[min^{-1}]		[Nm]	[A]	[Nm]	[A]	[Nm]	[A]	[$kgcm^2$]		[Nm]		[mH]	Ω	[V]
4500	CMP40S	0.5	1.2	1.9	6.1	-	-	0.1	0.13	0.85	--	23	11.94	27.5
	CMP40M	0.8	0.95	3.8	6.0	-	-	0.15	0.18	0.95	--	45.5	19.92	56
	CMP50S	1.3	1.32	5.2	7.0	1.7	1.7	0.42	0.48	3.1	4.3	37	11.6	62
	CMP50M	2.4	2.3	10.3	13.1	3.5	3.35	0.67	0.73	4.3	3.1	20.5	5.29	66
	CMP50L	3.3	3.15	15.4	19.5	4.8	4.6	0.92	0.99	4.3	3.1	14.6	3.56	68
	CMP63S	2.9	3.05	11.1	18.3	4	4.2	1.15	1.49	7	9.3	18.3	3.34	64
	CMP63M	5.3	5.4	21.4	32.4	7.5	7.6	1.92	2.26	9.3	7	9.8	1.49	67
	CMP63L	7.1	6.9	30.4	41.4	10.3	10	2.69	3.03	9.3	7	7.2	1.07	71

Selected motor:

CMP63M

M_{pk}= 21.4 Nm

J_{mot}= 1.92×10^{-4} kgm^2

Determining the inertia ratio "k"

$$J_{ext} = 91.2 \cdot m \cdot \left(\frac{v_{max}}{n_{max}}\right)^2 + J_G$$

$$J_{ext} = 91.2 \cdot 50kg \cdot \frac{\left(2\frac{m}{s}\right)^2}{3565.065\frac{1}{\min}} + 0.03 \cdot 10^{-4}\,kgm^2$$

$$J_{ext} = 14.38125 \cdot 10^{-4}\,kgm^2$$

J_{ext} is thus in relation to the motor shaft.

$$k = \frac{J_{ext}}{J_{Motor}}$$

$$k = \frac{14.38125 \cdot 10^{-4}\,kgm^2}{1.92 \cdot 10^{-4}\,kgm^2}$$

$$k = 7.49$$

Selection condition:

$$k \le 15$$

$$7.49 \le 15$$

Condition is fulfilled.

Intrinsic acceleration or deceleration of motor in sections 1 and 3

$$M_{Eigen} = (J_G + J_{Mot}) \cdot \frac{n_{max}}{9.55 \cdot t}$$

$$M_{Eigen} = \left(0.03 \cdot 10^{-4}\,kgm^2 + 1.92 \cdot 10^{-4}\,kgm^2\right) \cdot \frac{3565.065 \frac{1}{\min}}{9.55 \cdot 0.2s}$$

$$M_{Eigen} = 0.3639Nm$$

Maximum motor torques in sections 1 and 3

Travel section 1

$$M_{t1} = M_{e\max 1} + M_{Eigen}$$
$$M_{t1} = 3.036Nm + 0.3639Nm$$
$$M_{t1} = 3.3999Nm$$

Travel section 2

$$M_{t3} = M_{e\max 3} + M_{Eigen}$$
$$M_{t3} = -2.357Nm + 0.3639Nm$$
$$M_{t3} = -1.9931Nm$$

Effective motor torque

$$M_{eff} = \sqrt{\frac{1}{t_z}\left(M_1^2 \cdot t_1 + \ldots + M_n^2 \cdot t_n\right)}$$

$$M_{eff} = \sqrt{\frac{(3.399Nm)^2 \cdot 0.2s + (0.0294Nm)^2 \cdot 0.8s + (-1.9931Nm)^2 \cdot 0.2s}{3s}}$$

$$M_{eff} = 1.0174Nm$$

Thermal effective motor speed

$$n_{eff} = \sqrt[1.5]{\frac{n_1^{1.5} \cdot t_1 + \ldots + n_n^{1.5} \cdot t_n}{t_z}}$$

$$n_{eff} = \sqrt[1.5]{\frac{\left(\frac{3565.065 \frac{1}{\min}}{2}\right)^{1.5} \cdot 0.2s + \left(3565.065 \frac{1}{\min}\right)^{1.5} \cdot 0.8s + \left(\frac{3565.065 \frac{1}{\min}}{2}\right)^{1.5} \cdot 0.2s}{3s}}$$

$$n_{eff} = 1646.3 \frac{1}{\min}$$

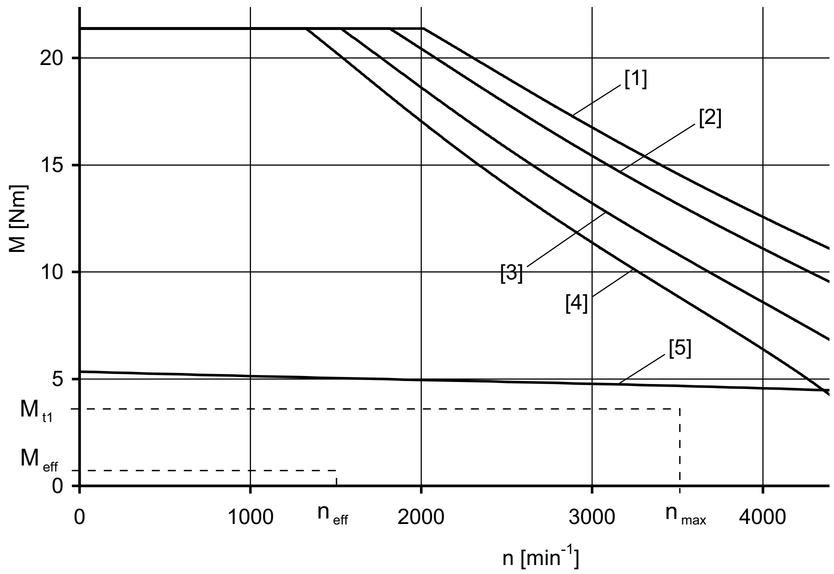
Determining the dynamic and thermal motor operating points

- The thermal operating point must be below or exactly on the thermal limit characteristic curve:

$$M_{eff} \leq M_{Nenn}$$

- The dynamic limit torque must be checked:

$$M_{\max Mot} \leq M_{pk}$$



[1] $M_{dynamic}$ (n) 500 V
[2] $M_{dynamic}$ (n) 460 V
[3] $M_{dynamic}$ (n) 400 V
[4] $M_{dynamic}$ (n) 360 V
[5] M $S1_{thermal}$ (derating)

Inverter assignment

The inverter assignment of CMP servomotors to MOVIAXIS® and MOVIDRIVE® can be found in the "CMP40/50/63 Synchronous Servomotors" catalog.

Calculating the braking resistance

Peak braking power in travel section 3

$$P_{Br\_pk} = \frac{M_{tn} \cdot n_{tn} \cdot \eta_{Last}}{9550}$$

$$P_{Br\_pk} = \frac{1.9931 Nm \cdot 3565 \frac{1}{\min} \cdot 0.9}{9550}$$

$$P_{Br\_pk} = 0.6696 kW$$

Mean braking power in travel section 3

$$P_{Br} = \frac{M_{tn} \cdot n_{tn} \cdot \eta_{Last}}{9550}$$

$$P_{Br} = \frac{1.9931 Nm \cdot \frac{3565 \frac{1}{\min}}{2} \cdot 0.9}{9550}$$

$$P_{Br} = 0.3348 kW$$

Effective braking power

$$P_{Br\_eff} = \frac{P_{Br} \cdot t_3}{t_z}$$

$$P_{Br\_eff} = \frac{0.3348 kW \cdot 0.2 s}{3 s}$$

$$P_{Br\_eff} = 0.223 kW$$

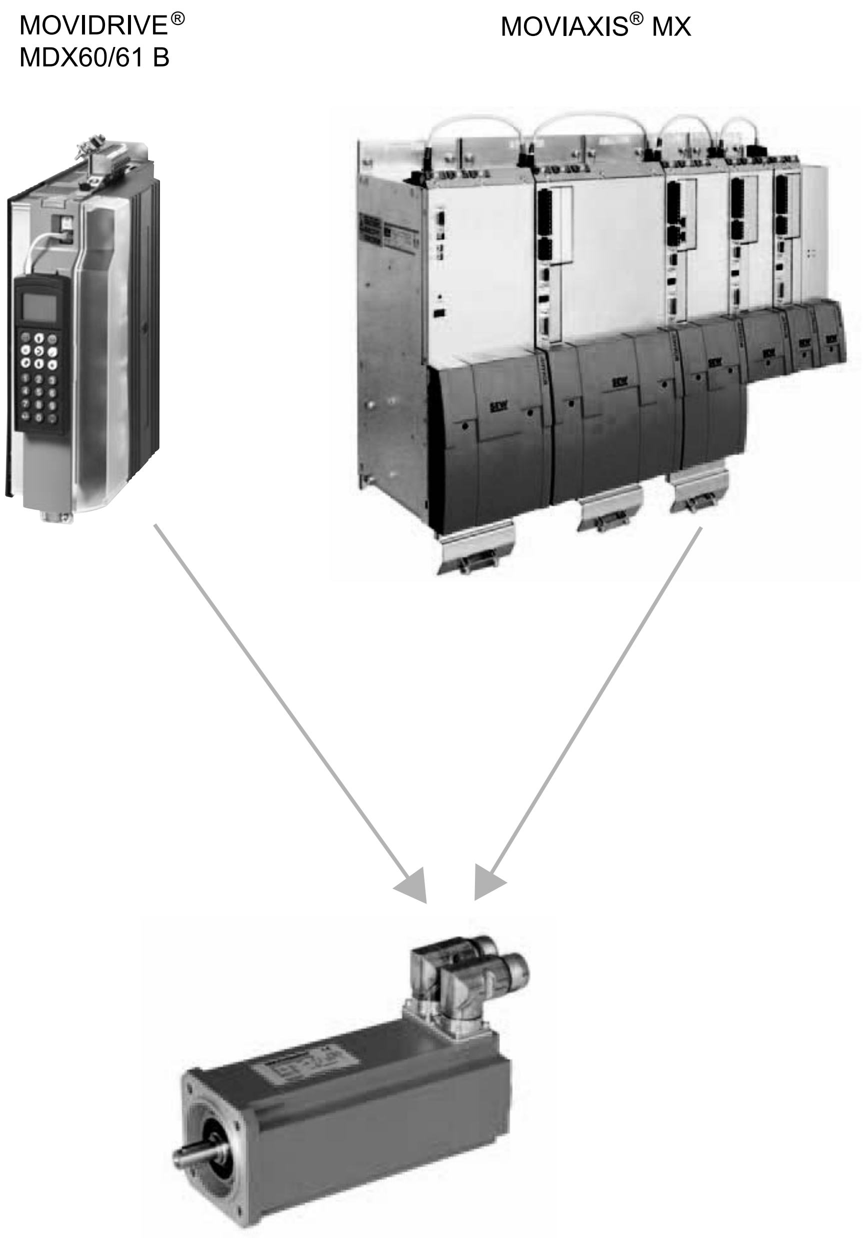
The selection of the braking resistor depends, among other factors, on which braking resistor may be connected to the respective inverter. If you use a MOVIDRIVE® inverter, refer to the system manual for relevant notes.

If you use a MOVIAXIS® servo inverter, a suitable braking resistor must be determined using "SEW Workbench".

6.6 Inverter operation

The following products are available from SEW-EURODRIVE for operating the synchronous servomotors on inverters:

- The drive inverter MOVIDRIVE® MDX60B/61B
- The multi-axis servo inverter MOVIAXIS® MX



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Product characteristics

The following table lists the most important product characteristics for the various inverter series. You can choose the inverter series matching your application based on these product features.

Product features	MOVIDRIVE® MDX60/61B	MOVIAXIS® MX
Voltage range	3 × AC 380 - 500 V 3 × AC 200 - 240 V (limited power range)	3 × AC 380 - 500 V
Input power range	0.55 160 kW	10 75 kW
Rated current range of the axis modules	4 - 250 A	2 - 133 A
Overload capacity	150% I_N[1)] briefly and 125% I_N permanently during operation without overload	250% for max. 1 second
4Q capable	Yes, with integrated brake chopper as standard.	
Integrated line filter	For sizes 0, 1 and 2 according to limit class A	Yes, according to limit class A.
TF input	Yes	
Control modes	U/f or voltage-controlled flux vector control (VFC), with speed feedback speed control and current-controlled flux vector control (CFC).	Current-controlled flux vector control
System resolution	4096	65536
Speed feedback	Option	Integrated in basic unit
Integrated positioning and sequence control system	Standard	
Serial interfaces	System bus (SBus) and RS-485	CAN-based system bus, optional EtherCAT-based system bus
Fieldbus interfaces	Optional PROFIBUS-DP, INTERBUS, INTERBUS LWL, CANopen, DeviceNet, Ethernet	Optional PROFIBUS-DP, EtherCAT,
Technology options	Input/output card Synchronous operation Absolute encoder card IEC-61131 control	Synchronous operation, electronic gear, touch probe, event control, electronic cam, virtual encoder, single-axis positioning
Max. speed	6000 1/min	10000 1/min
Safe stop	Yes	Option
Certifications	UL and cUL approval, C-tick	

1) Only for MOVIDRIVE® MDX60/61B: The temporary overload capacity of size 0 units (0005 ß 0014) is 200% I_N.

6.7 Combinations: CMP with MOVIDRIVE®

1. Rated speed n_N = 3000 1/min, size 0 - 2:

Motor			MOVIDRIVE® MDX61B...-5_3 in SERVO operating modes (P700)										
			0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
Type	I_N	[A]	2	2,4	3,1	4	4	5,5	7	9,5	12,5	16	24
	I_{max}	[A]	4	4,8	6,2	8	6	8,25	10,5	14,3	18,8	24	36
CMP40S	I_{max}	$\% I_N$	200	200	197		150	111					
	M_{pk}	Nm	1.5	1.7	1.9		1.9	1.9					
CMP40M	I_{max}	$\% I_N$	200	200	194		150						
	M_{pk}	Nm	3.0	3.3	3.8		3.8						
CMP50S	I_{max}	$\% I_N$	200	200	165		128						
	M_{pk}	Nm	4.5	5.0	5.2		5.2						
CMP50M	I_{max}	$\% I_N$	200	200	200	200	150	150	137				
	M_{pk}	Nm	5.4	6.3	7.7	9.3	7.6	9.4	10.3				
CMP50L	I_{max}	$\% I_N$	200	200	200	200	150	150	150	143			
	M_{pk}	Nm	5.9	6.9	8.7	10.7	8.4	11.0	13.1	15.4			
CMP63S	I_{max}	$\% I_N$	200	200	200	200	150	150	150	136			
	M_{pk}	Nm	5.2	6.0	7.3	8.7	7.1	8.8	10.1	11.1			
CMP63M	I_{max}	$\% I_N$	200	200	200	200	150	150	150	150	150	135	
	M_{pk}	Nm	6.0	7.1	8.9	11.1	8.7	11.3	13.7	17.0	20.0	21.4	
CMP63L	I_{max}	$\% I_N$			200	200	150	150	150	150	150	150	124
	M_{pk}	Nm			9.0	11.3	8.7	11.6	14.4	18.6	23.0	27.0	30.4
CMP71S	I_{max}	$\% I_N$			166	166	125	125	125	125	125	123	
	M_{pk}	Nm			6.9	8.6	6.7	8.9	10.9	13.8	16.3	18	
CMP71M	I_{max}	$\% I_N$				166	125	125	125	125	125	125	125
	M_{pk}	Nm				8.4	6.4	8.7	10.9	14.5	18.3	22.0	27.5
CMP71L	I_{max}	$\% I_N$						125	125	125	125	125	125
	M_{pk}	Nm						9.5	12.1	16.3	21.2	26.5	36.3
CMP80S	I_{max}	$\% I_N$						125	125	125	125	125	125
	M_{pk}	Nm						8.9	11.5	15.7	20.6	25.8	34.6
CMP80M	I_{max}	$\% I_N$							125	125	125	125	125
	M_{pk}	Nm							12.3	16.6	21.8	27.6	39.4
CMP80L	I_{max}	$\% I_N$								125	125	125	125
	M_{pk}	Nm								17.4	22.8	29.1	42.8
CMP100S	I_{max}	$\% I_N$									125	125	125
	M_{pk}	Nm									20.4	26.1	38.1
CMP100M	I_{max}	$\% I_N$									125	125	125
	M_{pk}	Nm									22.2	28.5	42.6
CMP100L	I_{max}	$\% I_N$											125
	M_{pk}	Nm											44.0

Sizes 3 - 6

Motor			MOVIDRIVE® MDX61B...-5_3 in SERVO operating modes (P700)									
			0150	0220	0300	0370	0450	0550	0750	0900	1100	1320
Type	I_N	[A]	32	46	60	73	89	105	130	170	200	250
	I_{max}	[A]	48	69	90	109,5	133,5	157,5	195	255	300	375
CMP71L	I_{max}	% I_N	118									
	M_{pk}	Nm	41.2									
CMP80S	I_{max}	% I_N	125									
	M_{pk}	Nm	39.2									
CMP80M	I_{max}	% I_N	125	117								
	M_{pk}	Nm	48.7	57								
CMP80L	I_{max}	% I_N	125	125	125							
	M_{pk}	Nm	55.7	75	89.9							
CMP100S	I_{max}	% I_N	125	125	125	107						
	M_{pk}	Nm	48.3	61.1	68.9	70.3						
CMP100M	I_{max}	% I_N	125	125	125	119						
	M_{pk}	Nm	55.9	76.2	91.7	99.7						
CMP100L	I_{max}	% I_N	125	125	125	125	125	123				
	M_{pk}	Nm	58.4	82.7	104.8	123.1	142	155.8				

2. *Rated speed n_N = 4500 1/min, size 0 - 2:*

Motor			MOVIDRIVE® MDX61B...-5_3 in SERVO operating modes (P700)										
			0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
Type	I_N	[A]	2	2,4	3,1	4	4	5,5	7	9,5	12,5	16	24
	I_{max}	[A]	4	4,8	6,2	8	6	8,25	10,5	14,3	18,8	24	36
CMP40S	I_{max}	% I_N	200	200	197		150	111					
	M_{pk}	Nm	1.5	1.7	1.9		1.9	1.9					
CMP40M	I_{max}	% I_N	200	200	194		150						
	M_{pk}	Nm	3.0	3.3	3.8		3.8						
CMP50S	I_{max}	% I_N	200	200	200	175	150	127					
	M_{pk}	Nm	3.5	4.1	4.8	5.2	4.7	5.2					
CMP50M	I_{max}	% I_N	200	200	200	200	150	150	150	138			
	M_{pk}	Nm	4.1	4.8	6.0	7.4	5.9	7.6	9.0	10.3			
CMP50L	I_{max}	% I_N	200	200	200	200	150	150	150	150	150	122	
	M_{pk}	Nm	4.2	5.0	6.3	7.9	6.1	8.2	10.0	12.7	15.1	15.4	
CMP63S	I_{max}	% I_N	200	200	200	200	150	150	150	150	146		
	M_{pk}	Nm	3.8	4.5	5.6	6.8	5.4	7.0	8.2	9.9	11.1		
CMP63M	I_{max}	% I_N			200	200	150	150	150	150	150	150	135
	M_{pk}	Nm			6.2	7.8	6.0	8.0	9.9	12.7	15.6	18.3	21.4
CMP63L	I_{max}	% I_N				200	150	150	150	150	150	150	150
	M_{pk}	Nm				8.3	6.4	8.6	10.7	14.1	17.8	21.6	28.2
CMP71S	I_{max}	% I_N				166	125	125	125	125	125	125	122
	M_{pk}	Nm				6.0	4.6	6.2	7.7	10.1	12.6	14.9	18.0
CMP71M	I_{max}	% I_N						125	125	125	125	125	125
	M_{pk}	Nm						6.0	7.6	10.2	13.2	16.4	22.5
CMP71L	I_{max}	% I_N								125	125	125	125
	M_{pk}	Nm								10.9	14.4	18.3	26.5
CMP80S	I_{max}	% I_N								125	125	125	125
	M_{pk}	Nm								10.1	13.5	17.3	25.3
CMP80M	I_{max}	% I_N									125	125	125
	M_{pk}	Nm									14.6	18.7	27.6
CMP80L	I_{max}	% I_N										125	125
	M_{pk}	Nm										19.7	29.3
CMP100S	I_{max}	% I_N										125	125
	M_{pk}	Nm										17.2	25.6
CMP100M	I_{max}	% I_N											125
	M_{pk}	Nm											28.2

Sizes 3 - 6

Motor			MOVIDRIVE® MDX61B...-5_3 in SERVO operating modes (P700)									
			0150	0220	0300	0370	0450	0550	0750	0900	1100	1320
Type	I_N	[A]	32	46	60	73	89	105	130	170	200	250
	I_{max}	[A]	48	69	90	109,5	133,5	157,5	195	255	300	375
CMP63L	I_{max}	% I_N	129									
	M_{pk}	Nm	30.4									
CMP71S	I_{max}	% I_N										
	M_{pk}	Nm										
CMP71M	I_{max}	% I_N	125	95								
	M_{pk}	Nm	26.5	27.5								
CMP71L	I_{max}	% I_N	125	123								
	M_{pk}	Nm	33.5	41.2								
CMP80S	I_{max}	% I_N	125	125	102							
	M_{pk}	Nm	31.7	38.3	39.2							
CMP80M	I_{max}	% I_N	125	125	125	110						
	M_{pk}	Nm	35.7	47.3	55.2	57.0						
CMP80L	I_{max}	% I_N	125	125	125	125	125					
	M_{pk}	Nm	38.7	54.0	67.7	78.7	89.8					
CMP100S	I_{max}	% I_N	125	125	125	125	125	114				
	M_{pk}	Nm	33.7	46.1	55.8	62.4	68.1	70.3				
CMP100M	I_{max}	% I_N	125	125	125	125	125	125	102			
	M_{pk}	Nm	37.5	53.2	67.4	78.8	90.3	99.3	99.7			
CMP100L	I_{max}	% I_N	125	125	125	125	125	125	125	114		
	M_{pk}	Nm	39.1	56.1	72.6	87.1	103.9	119.2	139.6	155.8		

3. *Rated speed n_N = 6000 1/min, size 0 - 2:*

Motor			MOVIDRIVE® MDX61B...-5_3 in SERVO operating modes (P700)										
			0005	**0008**	**0011**	**0014**	**0015**	**0022**	**0030**	**0040**	**0055**	**0075**	**0110**
Type	I_N	**[A]**	**2**	**2,4**	**3,1**	**4**	**4**	**5,5**	**7**	**9,5**	**12,5**	**16**	**24**
	I_{max}	**[A]**	**4**	**4,8**	**6,2**	**8**	**6**	**8,25**	**10,5**	**14,3**	**18,8**	**24**	**36**
CMP40S	I_{max}	$\% I_N$	200	200	197		150	111					
	M_{pk}	Nm	1.5	1.7	1.9		1.9	1.9					
CMP40M	I_{max}	$\% I_N$	200	200	200	173	150	125					
	M_{pk}	Nm	2.6	3.0	3.6	3.8	3.5	3.8					
CMP50S	I_{max}	$\% I_N$	200	200	200	200	150	150	129				
	M_{pk}	Nm	2.9	3.3	4.1	4.8	4.0	4.9	5.2				
CMP50M	I_{max}	$\% I_N$	200	200	200	200	150	150	150	150	137		
	M_{pk}	Nm	3.2	3.8	4.8	6.0	4.6	6.1	7.4	9.2	10.3		
CMP50L	I_{max}	$\% I_N$		200	200	200	150	150	150	150	150	150	108
	M_{pk}	Nm		3.8	4.8	6.1	4.7	6.3	7.8	10.2	12.5	14.7	15.4
CMP63S	I_{max}	$\% I_N$	200	200	200	200	150	150	150	150	150	146	
	M_{pk}	Nm	3.1	3.6	4.5	5.6	4.4	5.8	6.9	8.6	10.0	11.1	
CMP63M	I_{max}	$\% I_N$				200	150	150	150	150	150	150	150
	M_{pk}	Nm				6.3	4.8	6.5	8.0	10.4	13.0	15.6	20.0
CMP63L	I_{max}	$\% I_N$						150	150	150	150	150	150
	M_{pk}	Nm						6.5	8.1	10.8	13.8	17.0	23.3
CMP71S	I_{max}	$\% I_N$						125	125	125	125	125	125
	M_{pk}	Nm						4.8	6.0	8.0	10.1	12.3	16.1
CMP71M	I_{max}	$\% I_N$								125	125	125	125
	M_{pk}	Nm								7.7	10.0	12.6	18.0
CMP71L	I_{max}	$\% I_N$								125	125	125	125
	M_{pk}	Nm								8.2	10.8	13.8	20.4
CMP80S	I_{max}	$\% I_N$									125	125	125
	M_{pk}	Nm									10.2	13.2	19.8
CMP80M	I_{max}	$\% I_N$										125	125
	M_{pk}	Nm										14.2	21.3
CMP80L	I_{max}	$\% I_N$											125
	M_{pk}	Nm											21.8

Sizes 3 - 6

Motor			MOVIDRIVE® MDX61B...-5_3 in SERVO operating modes (P700)									
			0150	**0220**	**0300**	**0370**	**0450**	**0550**	**0750**	**0900**	**1100**	**1320**
Type	I_N	**[A]**	**32**	**46**	**60**	**73**	**89**	**105**	**130**	**170**	**200**	**250**
	I_{max}	**[A]**	**48**	**69**	**90**	**109,5**	**133,5**	**157,5**	**195**	**255**	**300**	**375**
CMP63M	I_{max}	$\% I_N$	129									
	M_{pk}	Nm	21.4									
CMP63L	I_{max}	$\% I_N$	150	121								
	M_{pk}	Nm	28.1	30.4								
CMP71S	I_{max}	$\% I_N$	120									
	M_{pk}	Nm	18.0									
CMP71M	I_{max}	$\% I_N$	125	125	98							
	M_{pk}	Nm	22.3	27.3	27.5							
CMP71L	I_{max}	$\% I_N$	125	125	125	103						
	M_{pk}	Nm	26.5	35.3	41.2	41.2						
CMP80S	I_{max}	$\% I_N$	125	125	125	110						
	M_{pk}	Nm	25.8	33.7	38.3	39.2						
CMP80M	I_{max}	$\% I_N$	125	125	125	125	119					
	M_{pk}	Nm	28.0	38.5	47.1	53.1	57.0					
CMP80L	I_{max}	$\% I_N$	125	125	125	125	125	125	116			
	M_{pk}	Nm	28.9	41.0	52.3	62.1	72.9	82.2	89.8			

6.8 Combinations: CMP with MOVIAXIS®

1. Rated speed n_N = 3000 1/min

Motor			Assignment to MOVIAXIS® MXA									
	Size		1			2		3		4	5	6
Type	I_N	[A]	2	4	8	12	16	24	32	48	64	100
	I_{max}	[A]	5	10	20	30	40	60	80	120	160	250
CMP40S	I_{max}	% I_N	250	153								
	M_{pk}	Nm	1.7	1.9								
CMP40M	I_{max}	% I_N	250	150								
	M_{pk}	Nm	3.4	3.8								
CMP50S	I_{max}	% I_N	250	128								
	M_{pk}	Nm	5.1	5.2								
CMP50M	I_{max}	% I_N	250	240								
	M_{pk}	Nm	6.5	10.3								
CMP50L	I_{max}	% I_N	250	250	170							
	M_{pk}	Nm	7.2	12.7	15.4							
CMP63S	I_{max}	% I_N	250	250	161							
	M_{pk}	Nm	6.2	9.9	11.1							
CMP63M	I_{max}	% I_N		250	250	180						
	M_{pk}	Nm		13.2	20.6	21.4						
CMP63L	I_{max}	% I_N		250	250	248						
	M_{pk}	Nm		13.8	24	30.4						
CMP71S	I_{max}	% I_N		250	250	212						
	M_{pk}	Nm		12.1	18	19.2						
CMP71M	I_{max}	% I_N			250	250	244					
	M_{pk}	Nm			22	27.5	30.8					
CMP71L	I_{max}	% I_N			250	250	250	241				
	M_{pk}	Nm			26.5	36.3	42.2	46.9				
CMP80S	I_{max}	% I_N			250	250	250	198				
	M_{pk}	Nm			25.8	34.6	39.2	42.1				
CMP80M	I_{max}	% I_N				250	250	250	215			
	M_{pk}	Nm				39.3	48.6	59.4	62.6			
CMP80L	I_{max}	% I_N					250	250	250	224		
	M_{pk}	Nm					55.5	77.2	93	106.9		
CMP100S	I_{max}	% I_N					250	250	228			
	M_{pk}	Nm					48.5	62.7	68.3			
CMP100M	I_{max}	% I_N						250	250	212		
	M_{pk}	Nm						79	95.7	108.2		
CMP100L	I_{max}	% I_N							250	250	250	167
	M_{pk}	Nm							110.8	149.2	174.8	178.8

2. *Rated speed n_N = 4500 1/min*

Motor			Assignment to MOVIAXIS® MXA									
	Size		1			2		3		4	5	6
Type	I_N	[A]	2	4	8	12	16	24	32	48	64	100
	I_{max}	[A]	5	10	20	30	40	60	80	120	160	250
CMP40S	I_{max}	% I_N	250	153								
	M_{pk}	Nm	1.7	1.9								
CMP40M	I_{max}	% I_N	250	150								
	M_{pk}	Nm	3.4	3.8								
CMP50S	I_{max}	% I_N	250	175								
	M_{pk}	Nm	4.2	5.2								
CMP50M	I_{max}	% I_N	250	250	164							
	M_{pk}	Nm	5	8.7	10.3							
CMP50L	I_{max}	% I_N		250	244							
	M_{pk}	Nm		9.6	15.4							
CMP63S	I_{max}	% I_N		250	229							
	M_{pk}	Nm		8	11.1							
CMP63M	I_{max}	% I_N			250	250	203					
	M_{pk}	Nm			16.3	20.6	21.4					
CMP63L	I_{max}	% I_N			250	250	250	173				
	M_{pk}	Nm			18.7	25.2	29.9	30.4				
CMP71S	I_{max}	% I_N			250	250	237					
	M_{pk}	Nm			14.9	18	19.2					
CMP71M	I_{max}	% I_N				250	250	238				
	M_{pk}	Nm				22.4	26.4	30.8				
CMP71L	I_{max}	% I_N				250	250	250	250	180		
	M_{pk}	Nm				25.6	33.4	42.2	45.8	46.9		
CMP80S	I_{max}	% I_N				250	250	250	227			
	M_{pk}	Nm				25.3	31.7	38.9	42.1			
CMP80M	I_{max}	% I_N					250	250	250	215		
	M_{pk}	Nm					35.7	48.6	56.7	62.6		
CMP80L	I_{max}	% I_N						250	250	250	248	
	M_{pk}	Nm						56.1	71.3	93.6	106.9	
CMP100S	I_{max}	% I_N						250	250	232		
	M_{pk}	Nm						47.9	58.3	68.3		
CMP100M	I_{max}	% I_N							250	250	241	
	M_{pk}	Nm							71.3	95.1	108.1	
CMP100L	I_{max}	% I_N								250	250	250
	M_{pk}	Nm								110.8	138.1	178.5

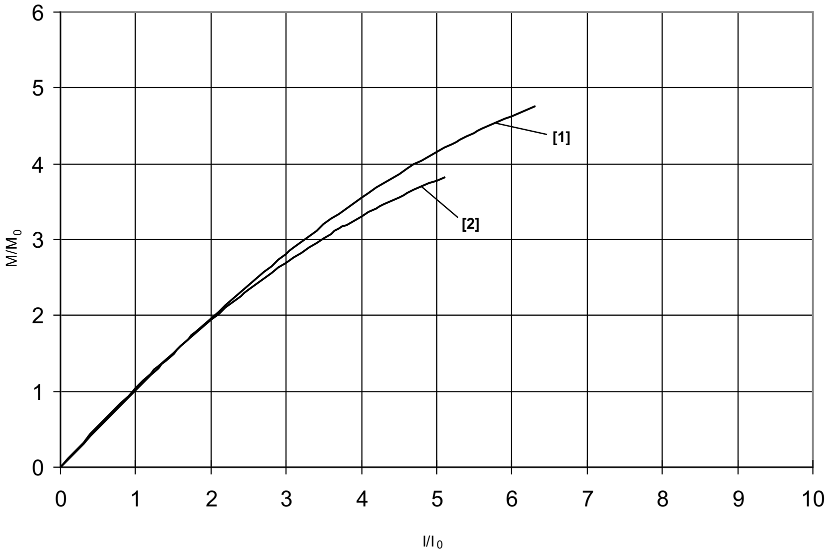
3. *Rated speed n_N = 6000 1/min*

Motor			Assignment to MOVIAXIS® MXA									
	Size			1		2		3		4	5	6
Type	I_N	[A]	2	4	8	12	16	24	32	48	64	100
	I_{max}	[A]	5	10	20	30	40	60	80	120	160	250
CMP40S	I_{max}	% I_N	250	153								
	M_{pk}	Nm	1.7	1.9								
CMP40M	I_{max}	% I_N	250	173								
	M_{pk}	Nm	3.1	3.8								
CMP50S	I_{max}	% I_N	250	225								
	M_{pk}	Nm	3.5	5.2								
CMP50M	I_{max}	% I_N		250	241							
	M_{pk}	Nm		7.2	10.3							
CMP50L	I_{max}	% I_N		250	250	217						
	M_{pk}	Nm		7.5	13.1	15.4						
CMP63S	I_{max}	% I_N		250	250	195						
	M_{pk}	Nm		6.7	10.4	11.1						
CMP63M	I_{max}	% I_N			250	250	250	173				
	M_{pk}	Nm			13.7	18	21	21.4				
CMP63L	I_{max}	% I_N			250	250	250	233				
	M_{pk}	Nm			14.6	20.4	25.1	30.4				
CMP71S	I_{max}	% I_N			250	250	250	207				
	M_{pk}	Nm			12.3	16.1	18.1	19.2				
CMP71M	I_{max}	% I_N				250	250	250	239			
	M_{pk}	Nm				18	22.3	27.7	30.8			
CMP71L	I_{max}	% I_N					250	250	250	241		
	M_{pk}	Nm					26.5	36.3	42.2	46.9		
CMP80S	I_{max}	% I_N					250	250	250	198		
	M_{pk}	Nm					25.8	34.6	39.2	42.1		
CMP80M	I_{max}	% I_N						250	250	250	211	
	M_{pk}	Nm						39.8	49.1	59.8	62.8	
CMP80L	I_{max}	% I_N							250	250	250	215
	M_{pk}	Nm							55.5	77.2	93	106.9

6.9 *Torque/current characteristic curves – CMP*

The following characteristic curves refer to unventilated motors.

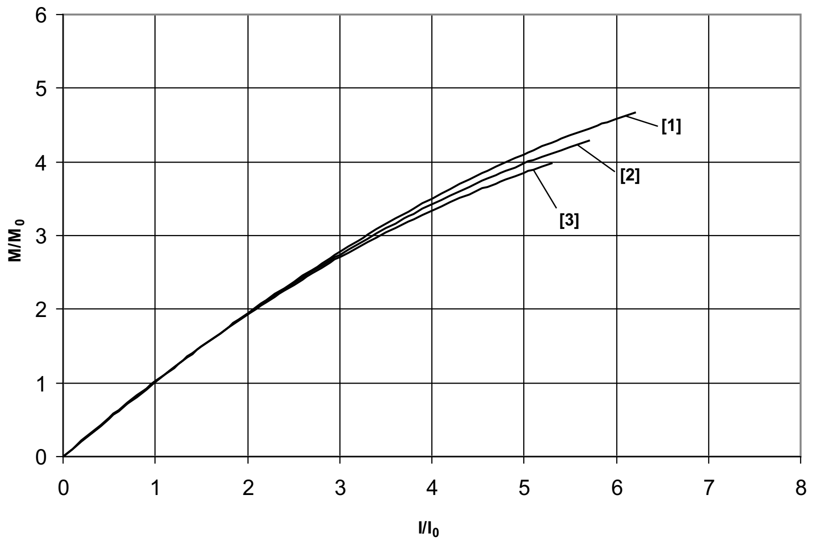
CMP40S/M



58573AXX

[1] CMP40M
[2] CMP40S

CMP50S / M / L

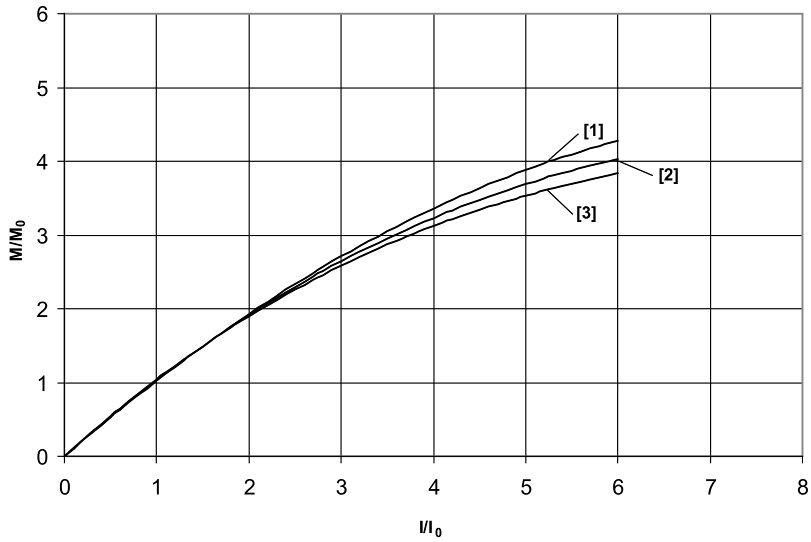


58574AXX

[1] CMP50L
[2] CMP50M
[3] CMP50S

6

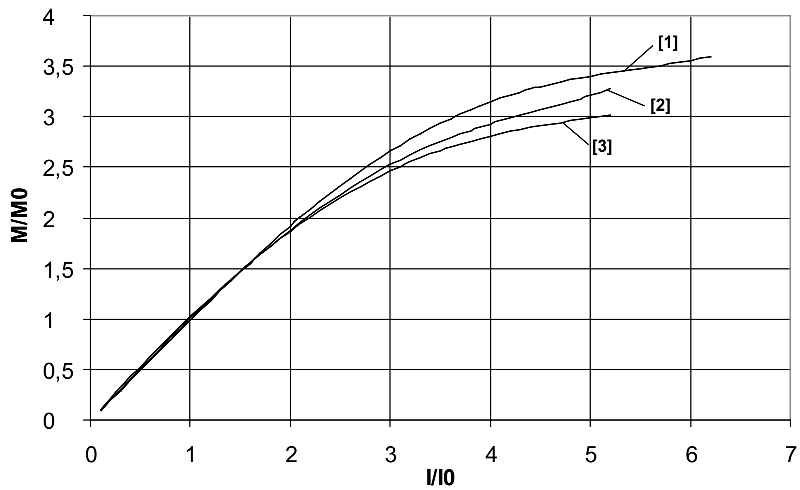
CMP63S / M / L



58575BXX

[1] CMP63L
[2] CMP63M
[3] CMP63S

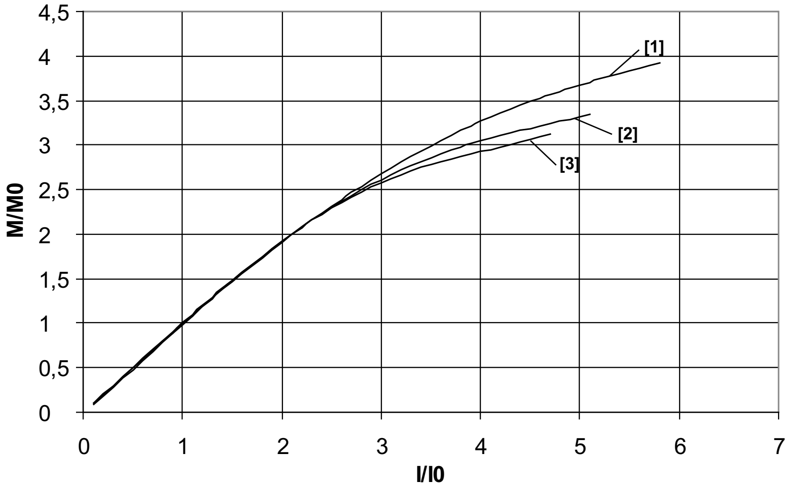
CMP71S / M / L



64101AXX

[1] CMP71L
[2] CMP71M
[3] CMP71S

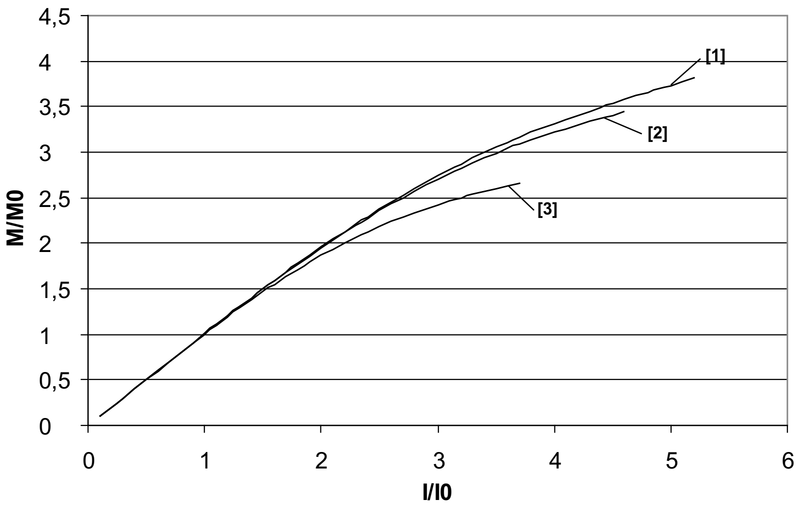
CMP80S/M/L



64102AXX

[1]	CMP80L
[2]	CMP80M
[3]	CMP80S

CMP100S/M/L



64103AXX

[1]	CMP100L
[2]	CMP100M
[3]	CMP100S

6.10 Dynamic and thermal limit characteristic curves – CMP

Definition:

- M = maximum dynamic torque for a maximum supply voltage on the inverter of 360 V, 400 V, 460 V or 500 V,
- M S1 (derating) = thermal limit characteristic curve in S1 - 100% operation,

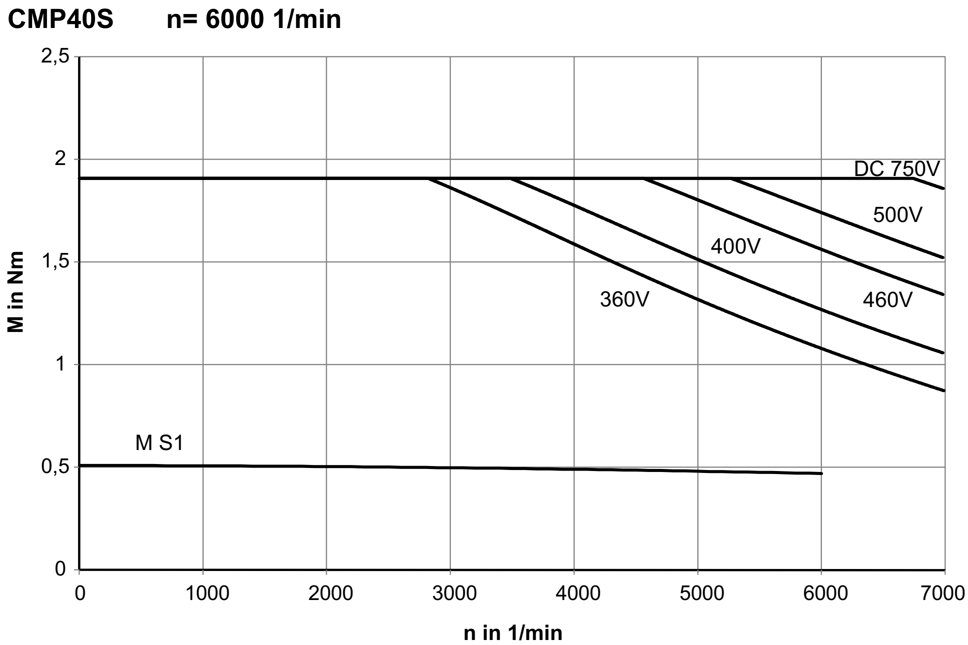
INFORMATION

For the available maximum torque, refer to the combination overview "CMP with MOVIDRIVE®" on page and "CMP with MOVIAXIS®" on page 63.

Key

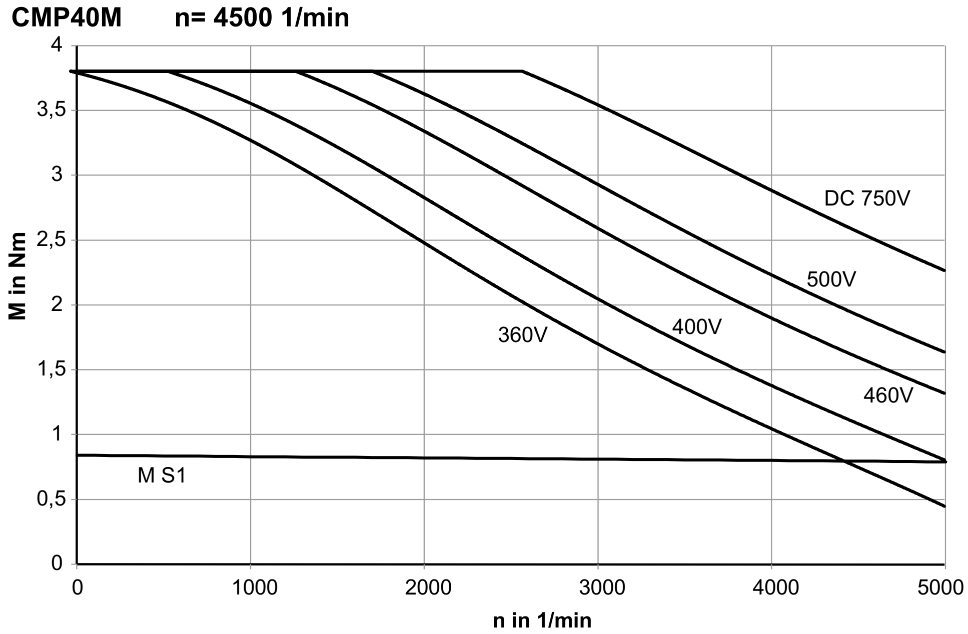
M S1	M $S1_{thermal}$ (derating)	460 V	460 V line voltage, non-controlled
DC 750 V	controlled on DC 750 V constant	400 V	400 V line voltage, non-controlled
500 V	500 V line voltage, non-controlled	360 V	360 V line voltage, non-controlled

Dynamic and thermal limit characteristic curve for CMP40S n_N = 3000, 4500, 6000 1/min



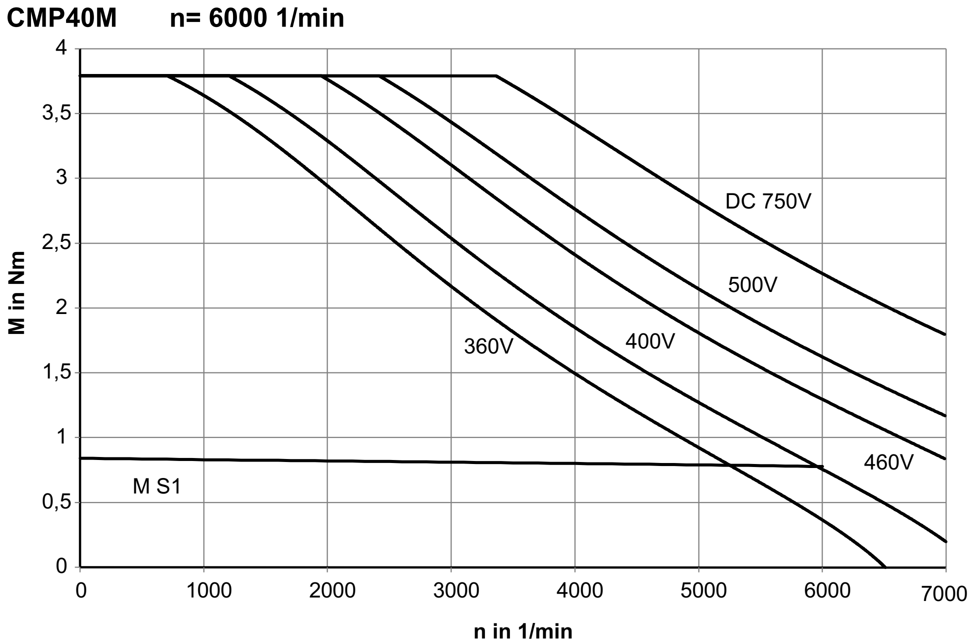
67569axx

Dynamic and thermal limit characteristic curve for CMP40M n_N = 3000, 4500 1/min



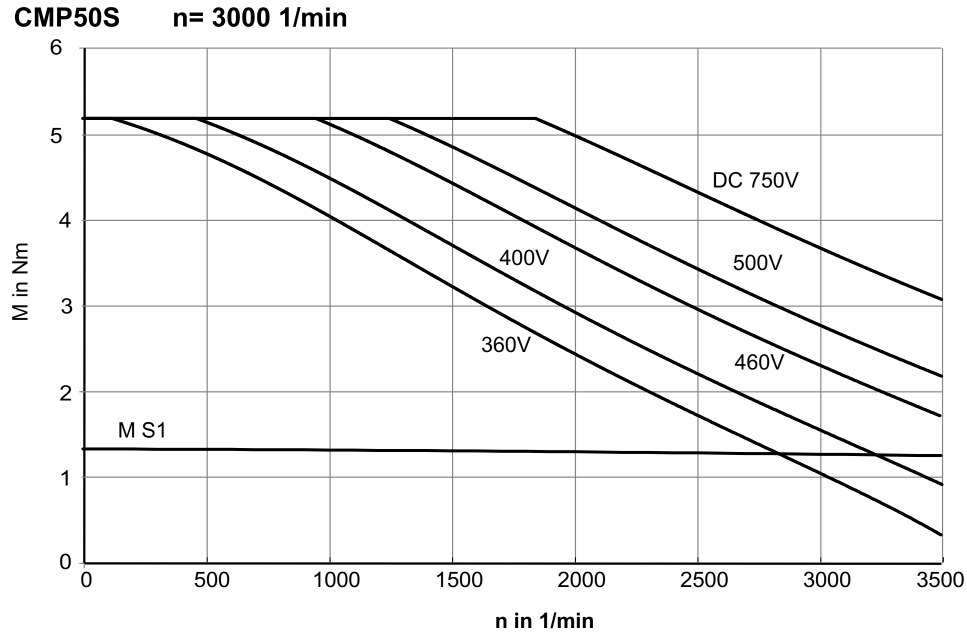
67567axx

Dynamic and thermal limit characteristic curve for CMP40M n_N = 6000 1/min



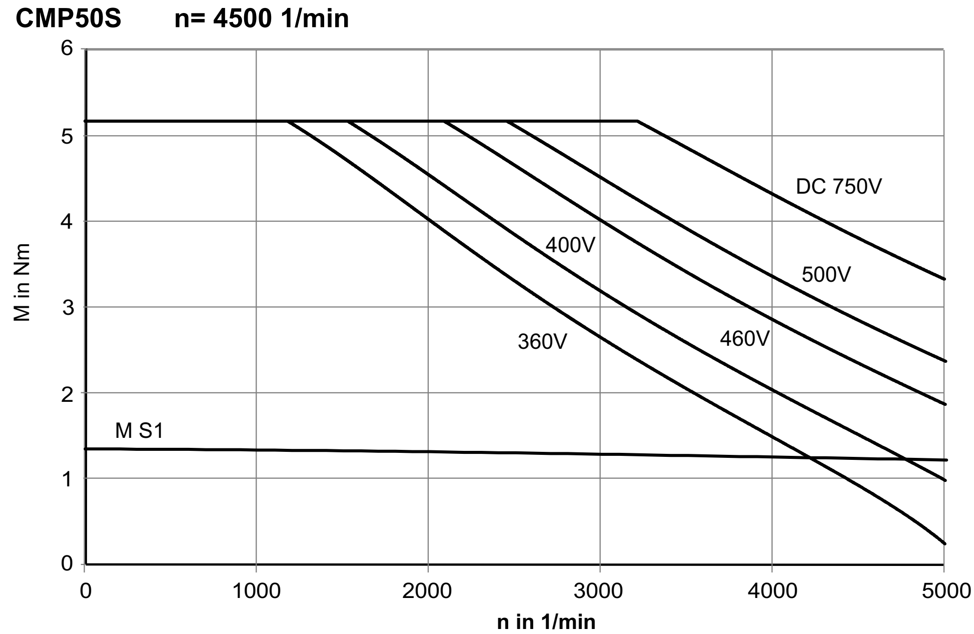
67568axx

Dynamic and thermal limit characteristic curve for CMP50S n_N = 3000 1/min



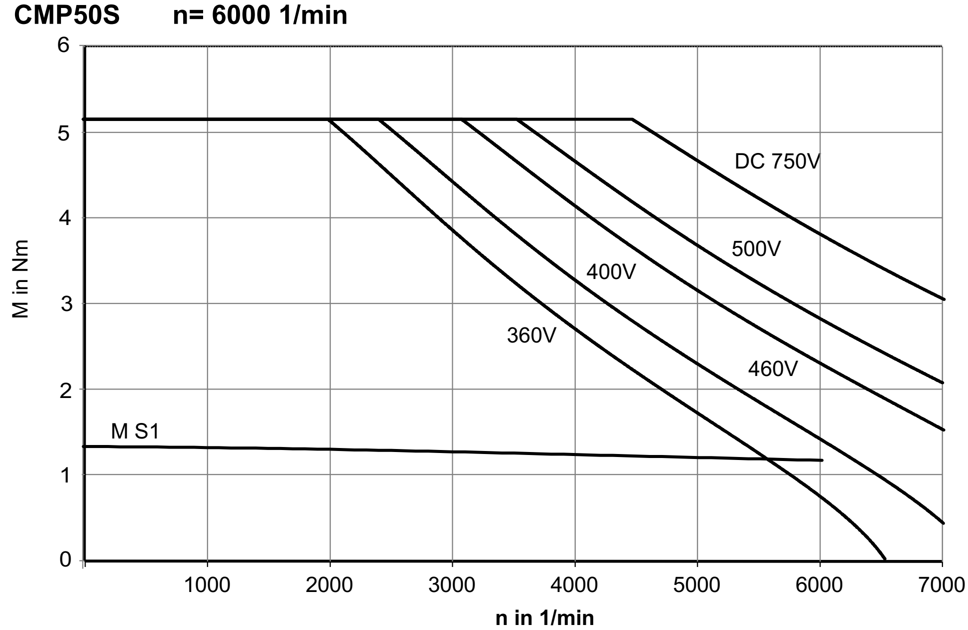
67576axx

Dynamic and thermal limit characteristic curve for CMP50S n_N = 4500 1/min



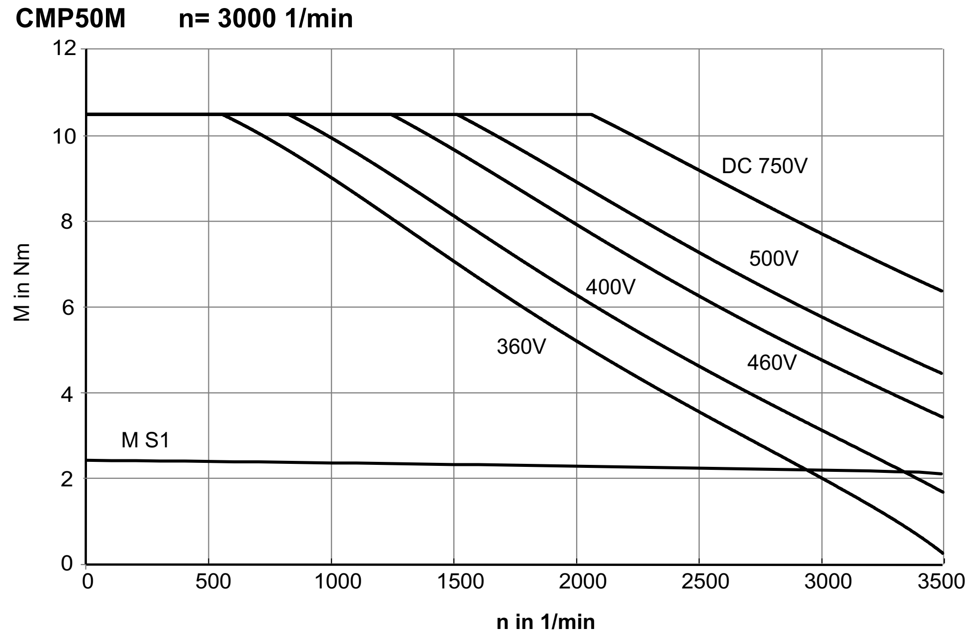
67577axx

Dynamic and thermal limit characteristic curve for CMP50S n_N = 6000 1/min



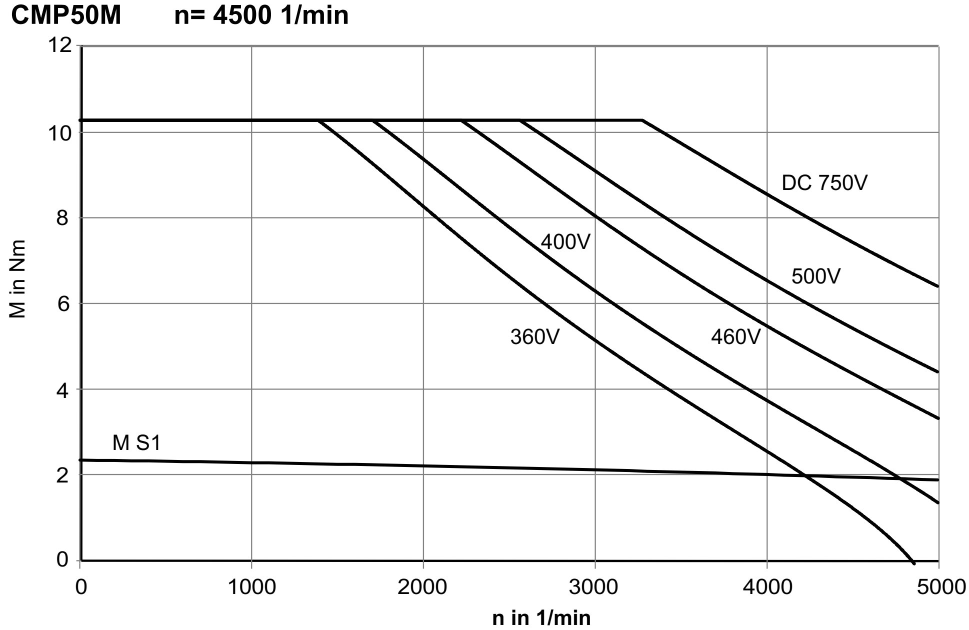
67578axx

Dynamic and thermal limit characteristic curve for CMP50M n_N = 3000 1/min



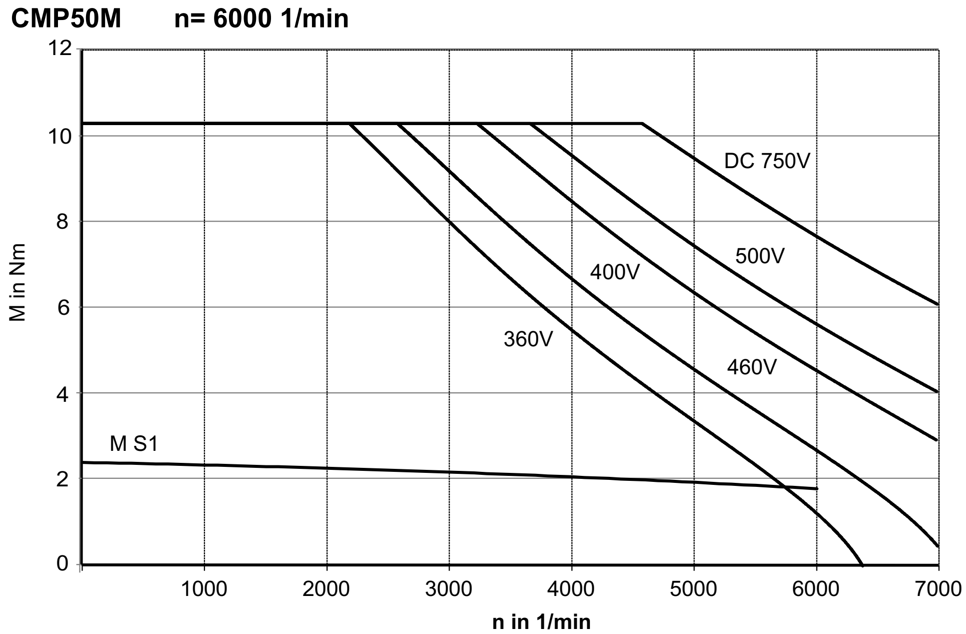
67573axx

Dynamic and thermal limit characteristic curve for CMP50M n_N = 4500 1/min



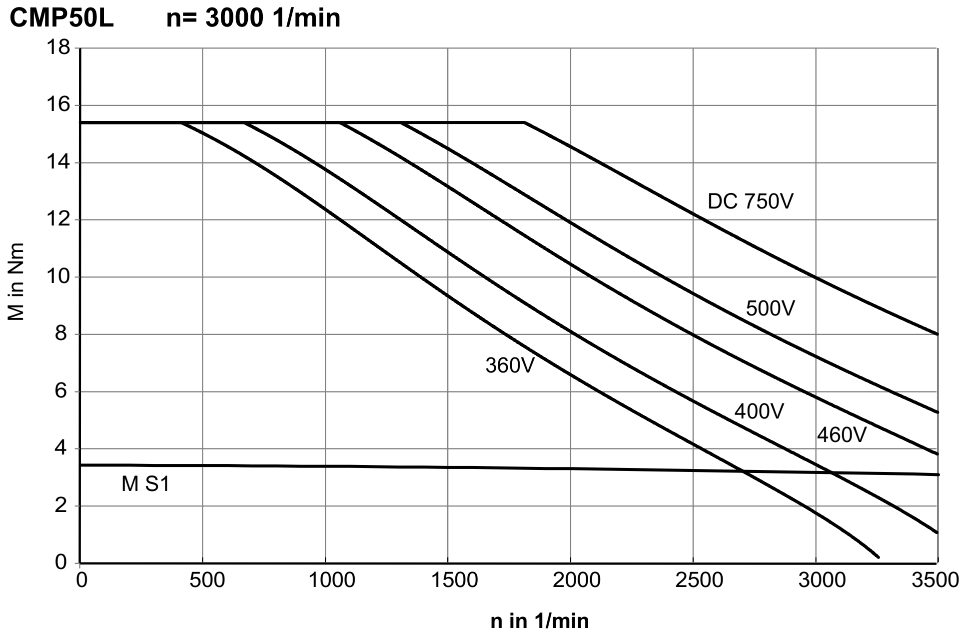
67574axx

Dynamic and thermal limit characteristic curve for CMP50M n_N = 6000 1/min



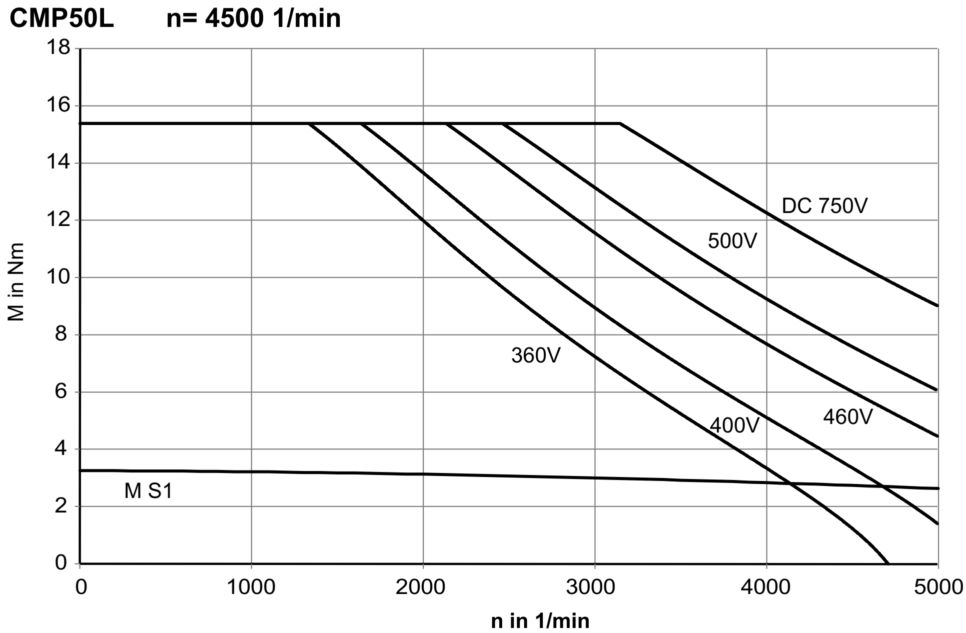
67575axx

Dynamic and thermal limit characteristic curve for CMP50L n_N = 3000 1/min



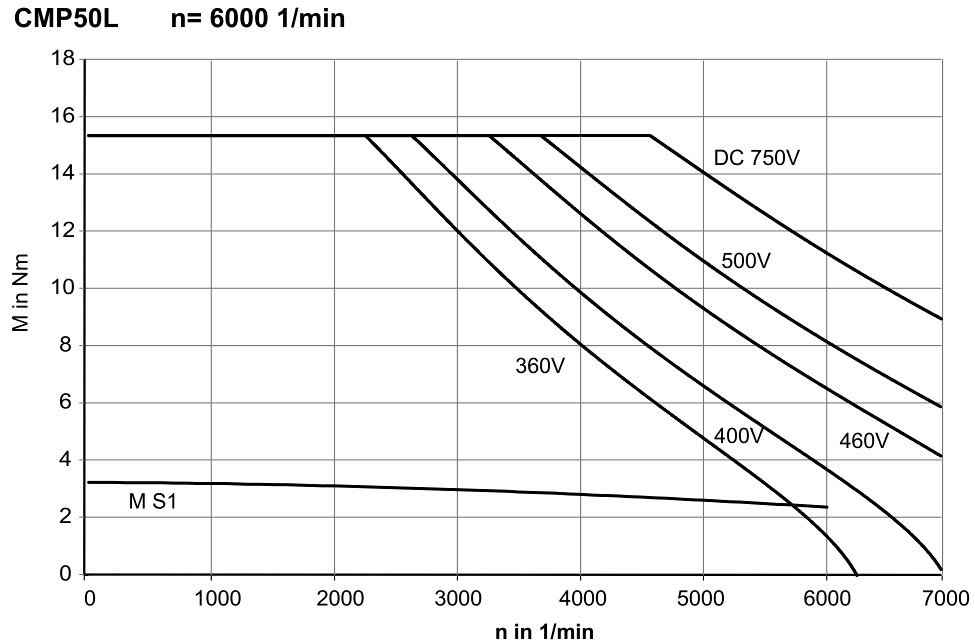
67570axx

Dynamic and thermal limit characteristic curve for CMP50L n_N = 4500 1/min



67571axx

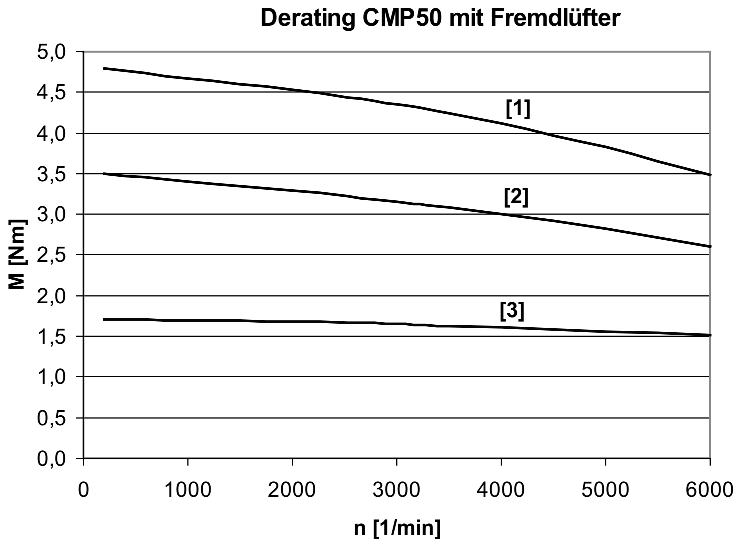
Dynamic and thermal limit characteristic curve for CMP50L n_N = 6000 1/min



67572axx

Thermal limit characteristic curve for CMP50 / VR

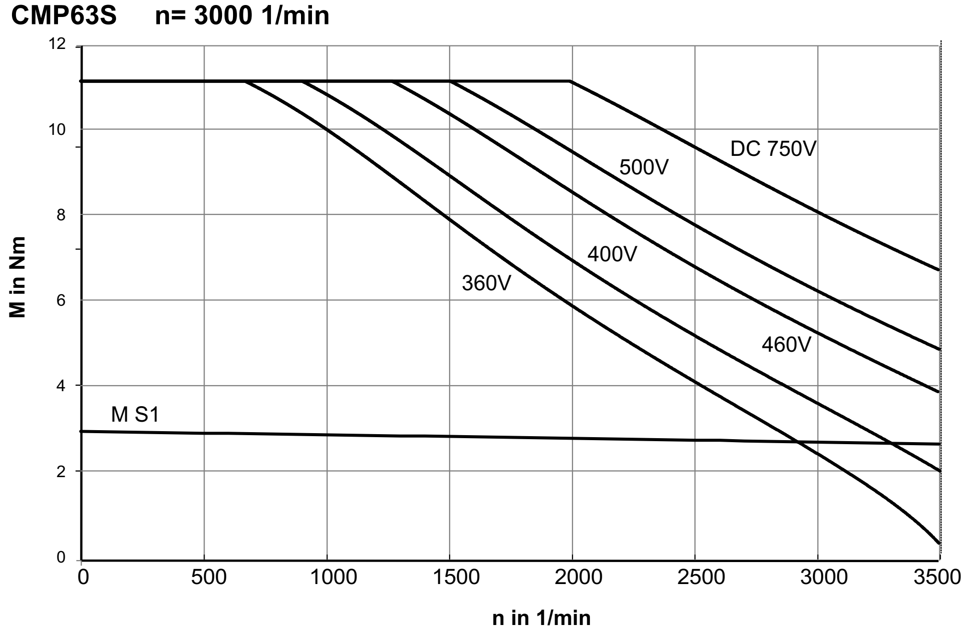
ϑ_A = -20 to +40 °C



58896axx

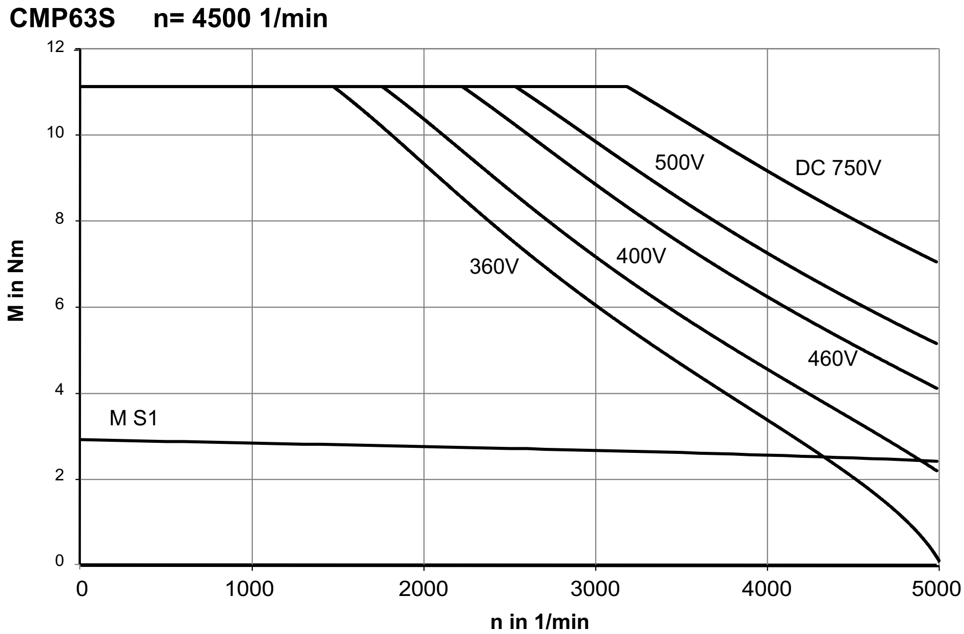
[1] CMP50L / VR
[2] CMP50M / VR
[3] CMP50S / VR

Dynamic and thermal limit characteristic curve for CMP63S n_N = 3000 1/min



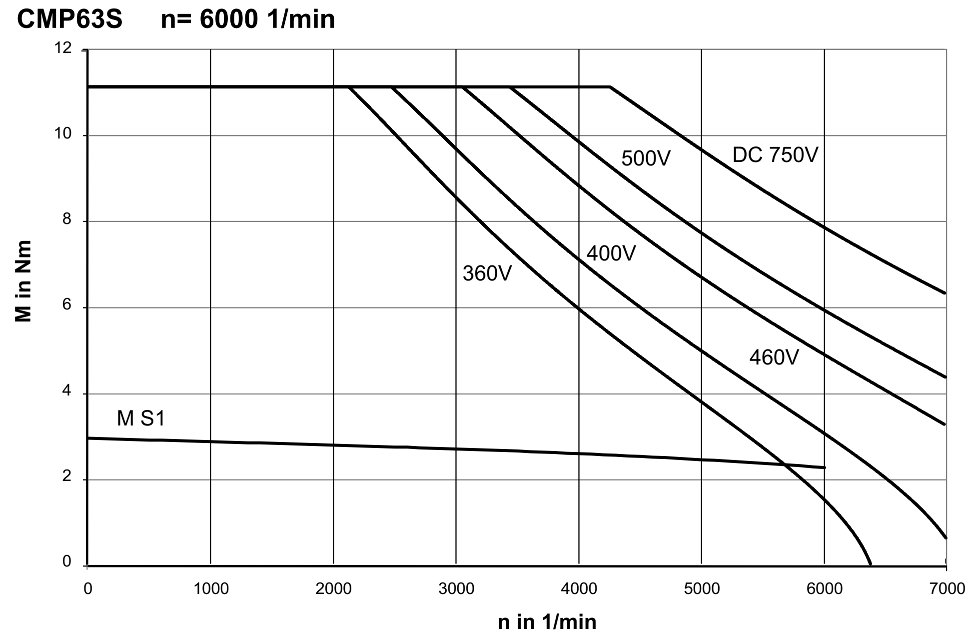
67585axx

Dynamic and thermal limit characteristic curve for CMP63S n_N = 4500 1/min



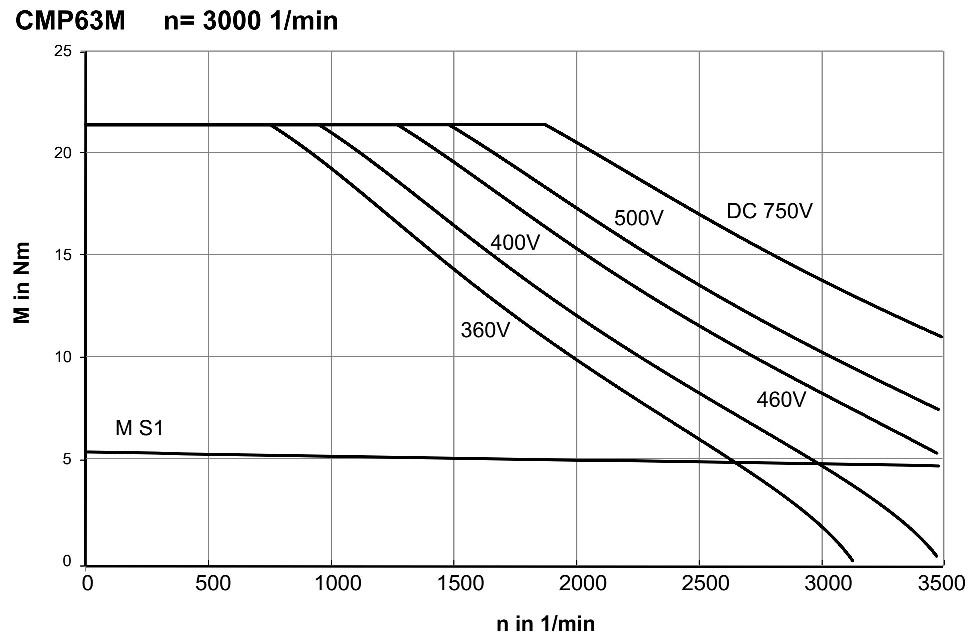
67586axx

Dynamic and thermal limit characteristic curve for CMP63S n_N = 6000 1/min



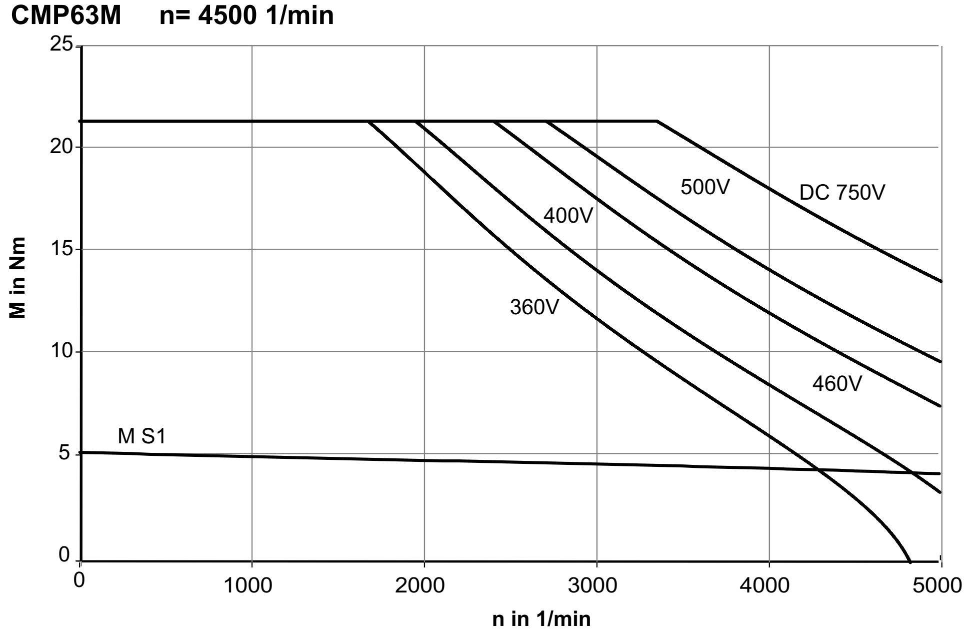
67587axx

Dynamic and thermal limit characteristic curve for CMP63M n_N = 3000 1/min



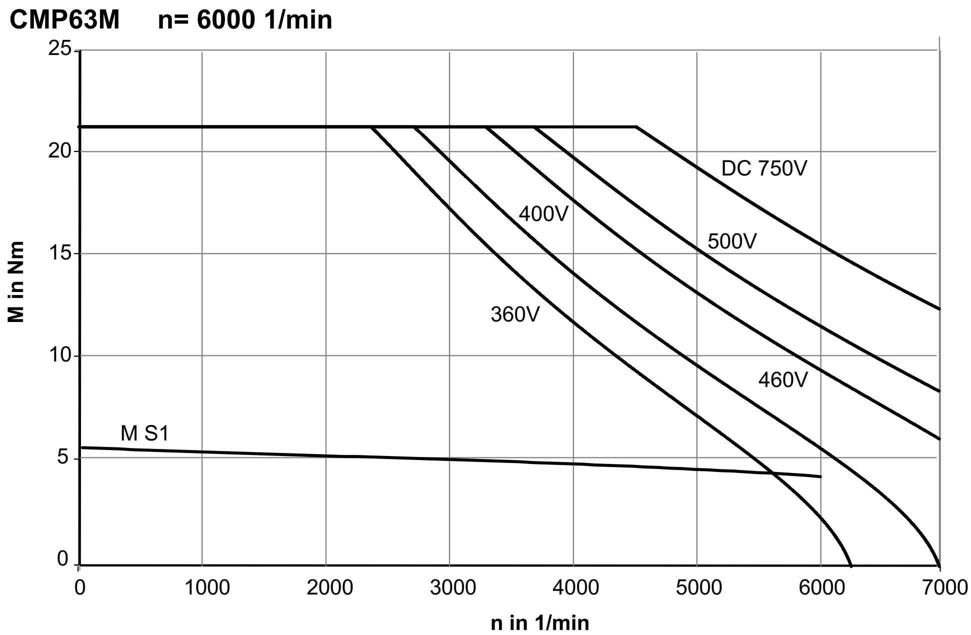
67582axx

Dynamic and thermal limit characteristic curve for CMP63M n_N = 4500 1/min



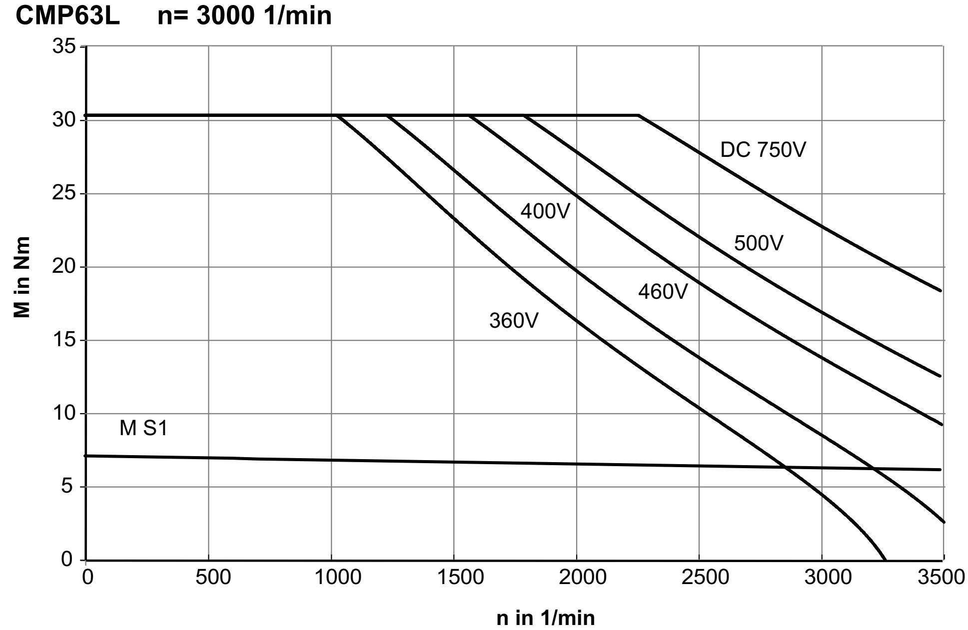
67583axx

Dynamic and thermal limit characteristic curve for CMP63M n_N = 6000 1/min



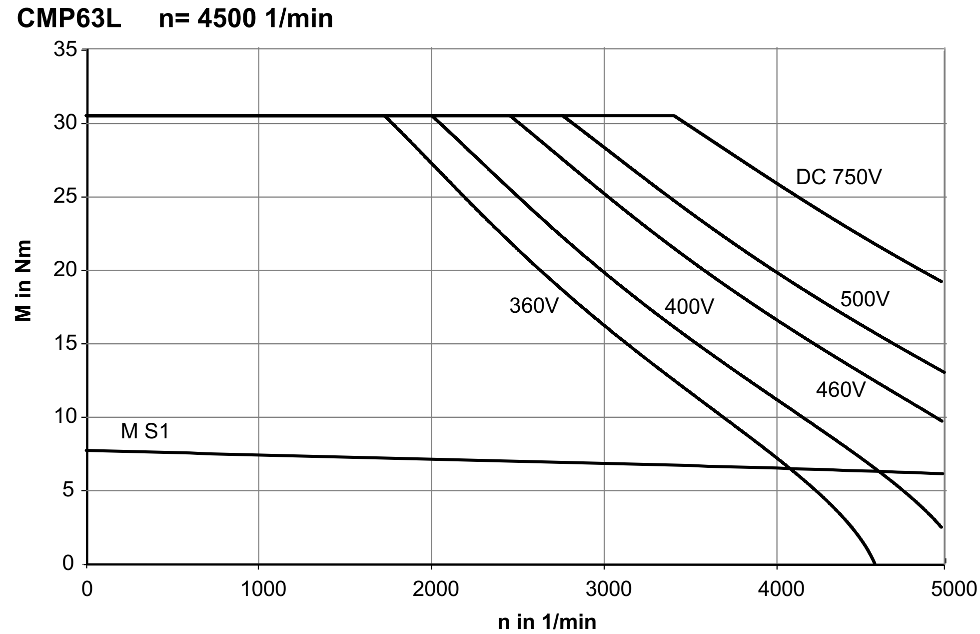
67584axx

Dynamic and thermal limit characteristic curve for CMP63L n_N = 3000 1/min



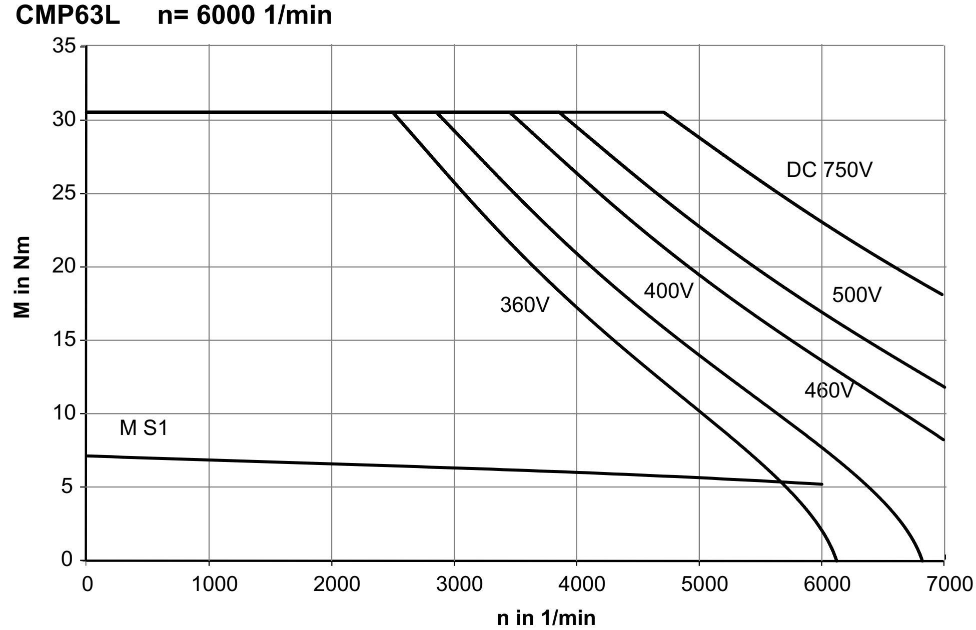
67579axx

Dynamic and thermal limit characteristic curve for CMP63L n_N = 4500 1/min



67580axx

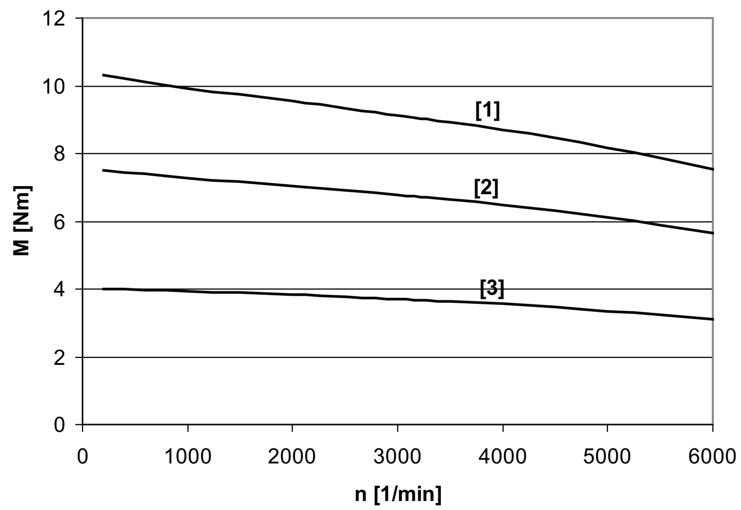
Dynamic and thermal limit characteristic curve for CMP63L n_N = 6000 1/min



67581axx

Thermal limit characteristic curve for CMP63 / VR

ϑ_A = -20 to +40 °C

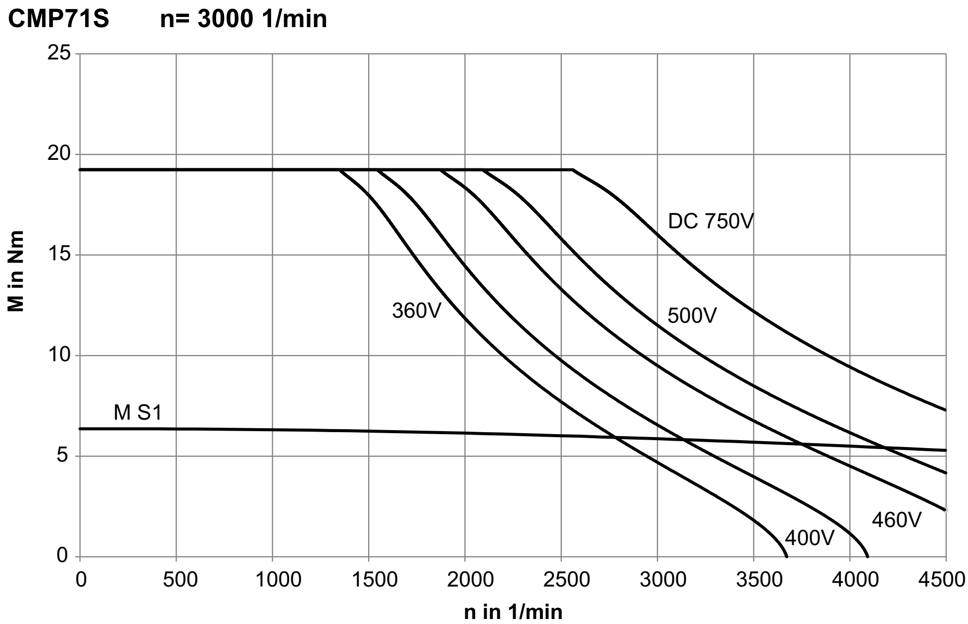


58898axx

[1]	CMP63L / VR
[2]	CMP63M / VR
[3]	CMP63S / VR

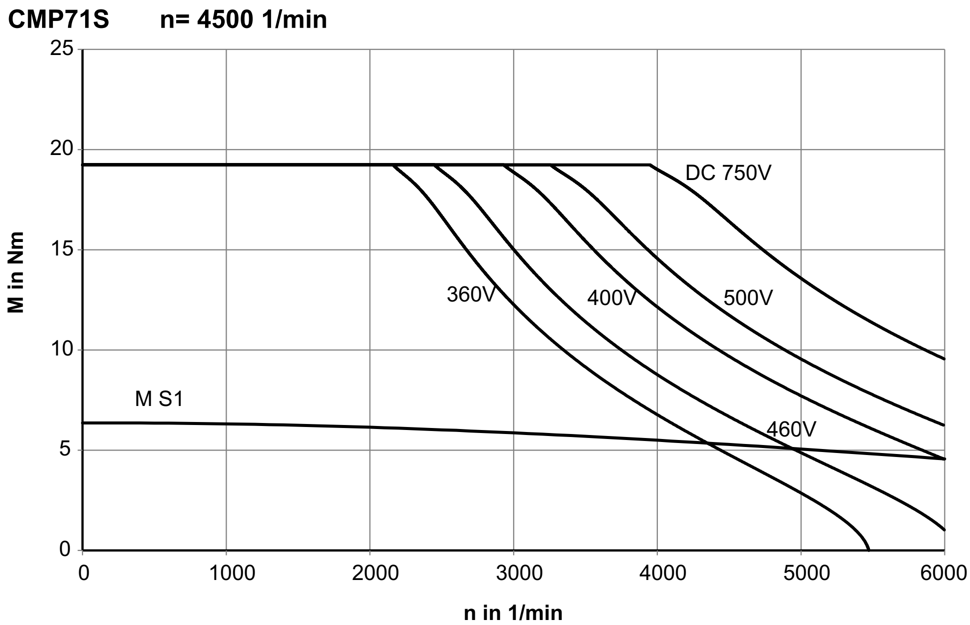
6

Dynamic and thermal limit characteristic curve for CMP71S n_N = 3000 1/min



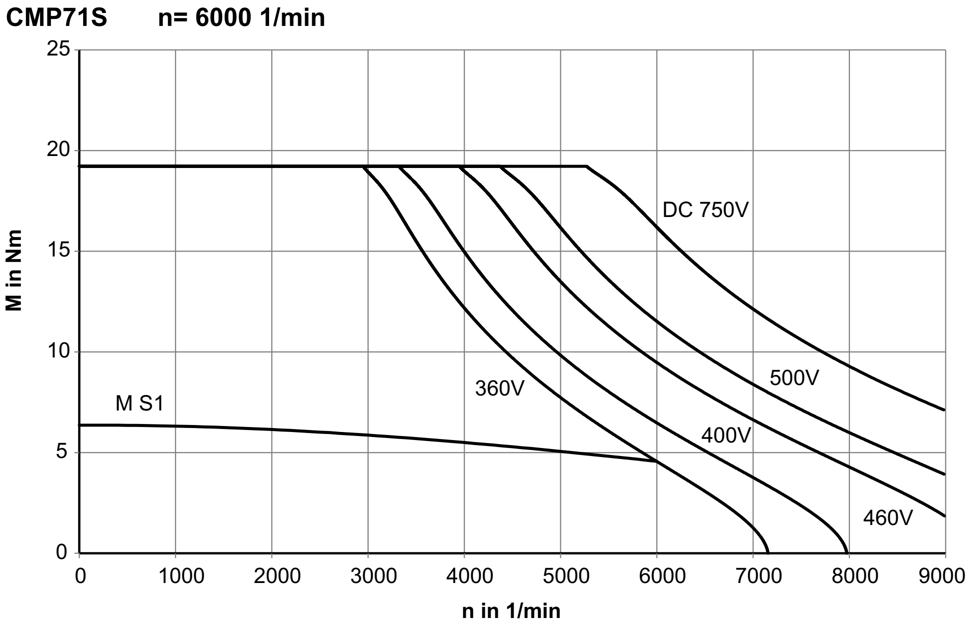
67543axx

Dynamic and thermal limit characteristic curve for CMP71S n_N = 4500 1/min



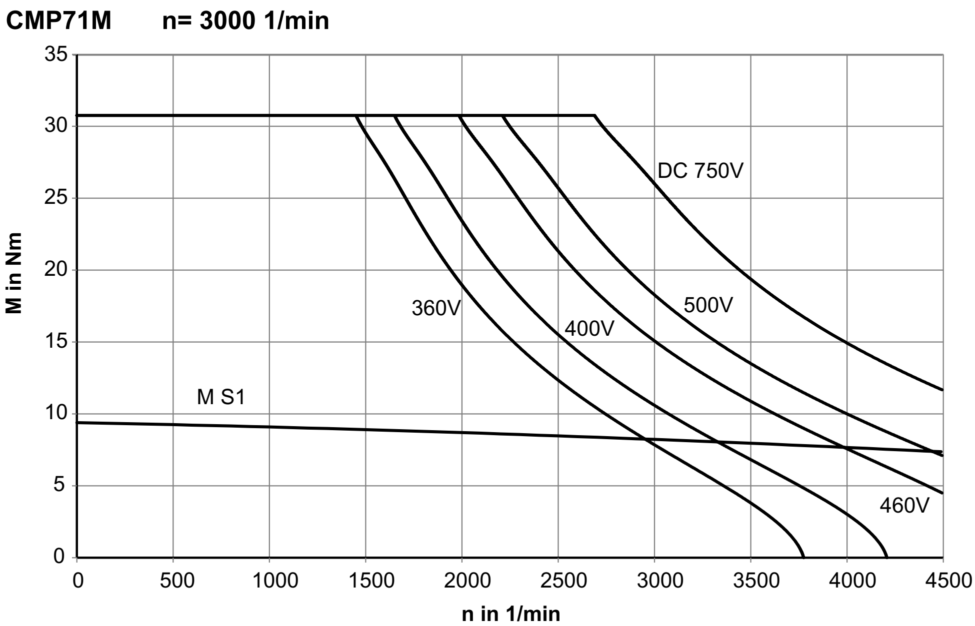
67544axx

Dynamic and thermal limit characteristic curve for CMP71S n_N = 6000 1/min



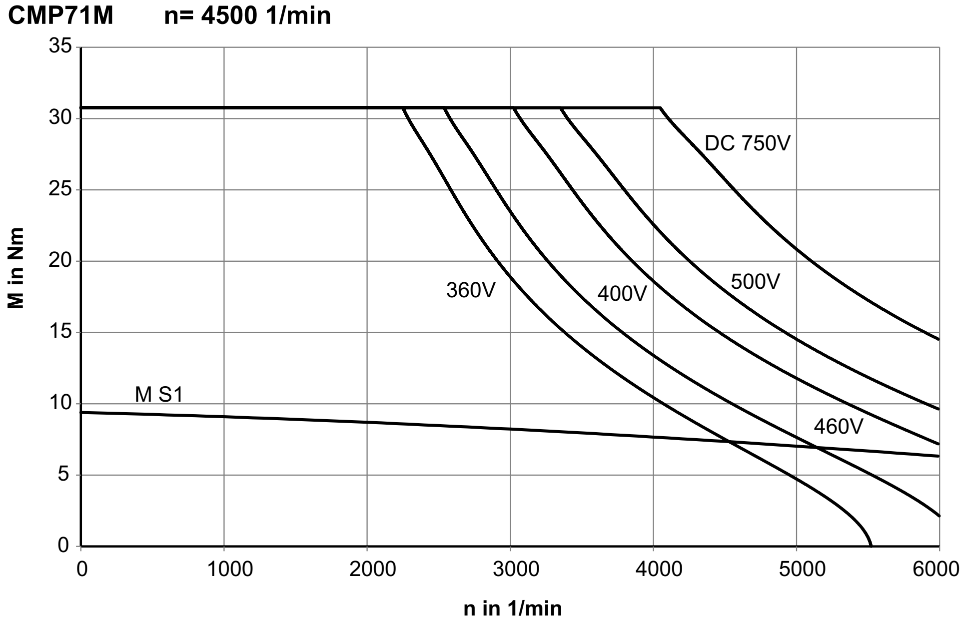
67545axx

Dynamic and thermal limit characteristic curve for CMP71M n_N = 3000 1/min



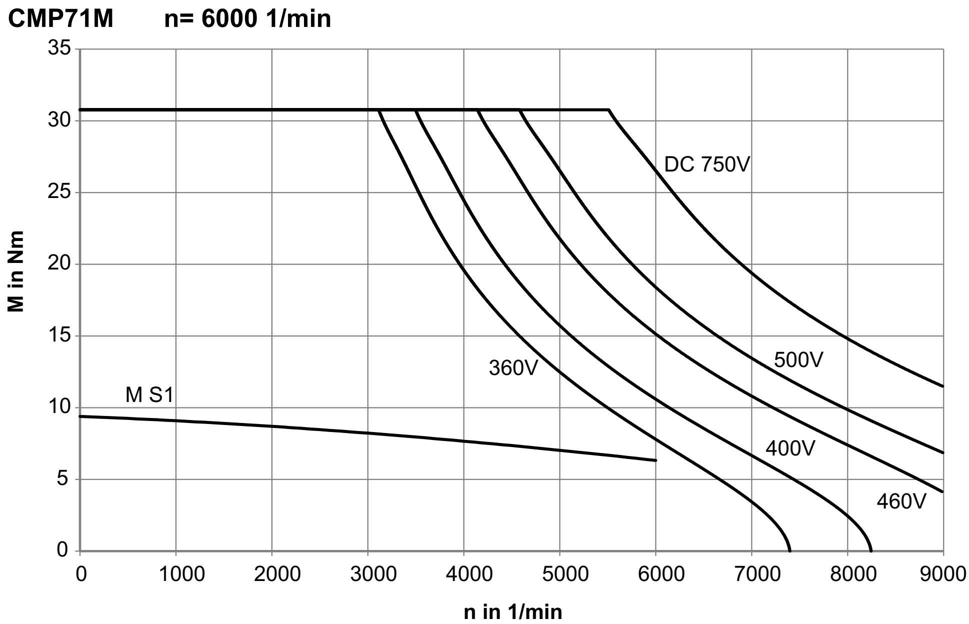
67539axx

Dynamic and thermal limit characteristic curve for CMP71M n_N = 4500 1/min



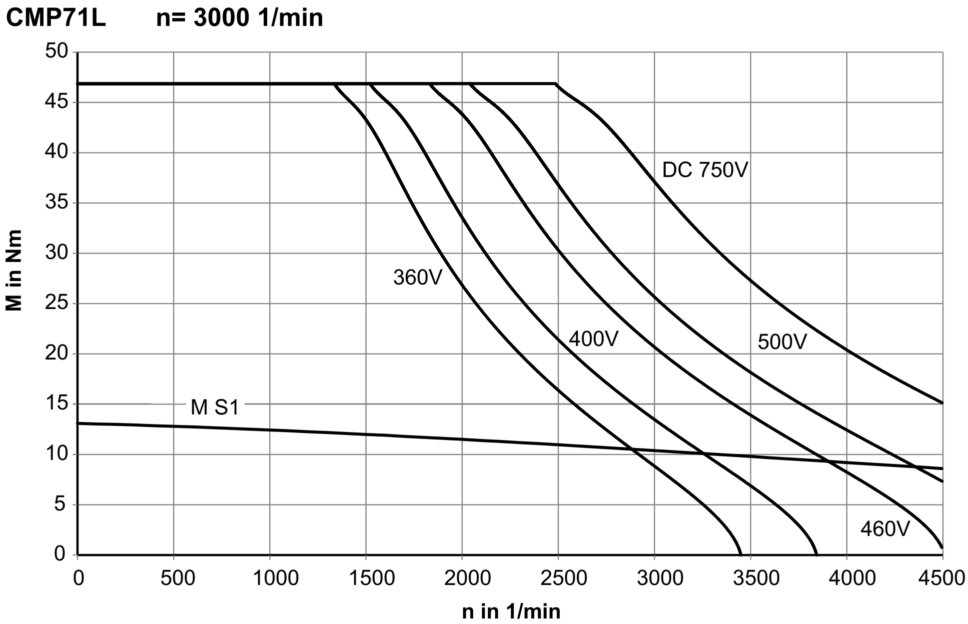
67540axx

Dynamic and thermal limit characteristic curve for CMP71M n_N = 6000 1/min



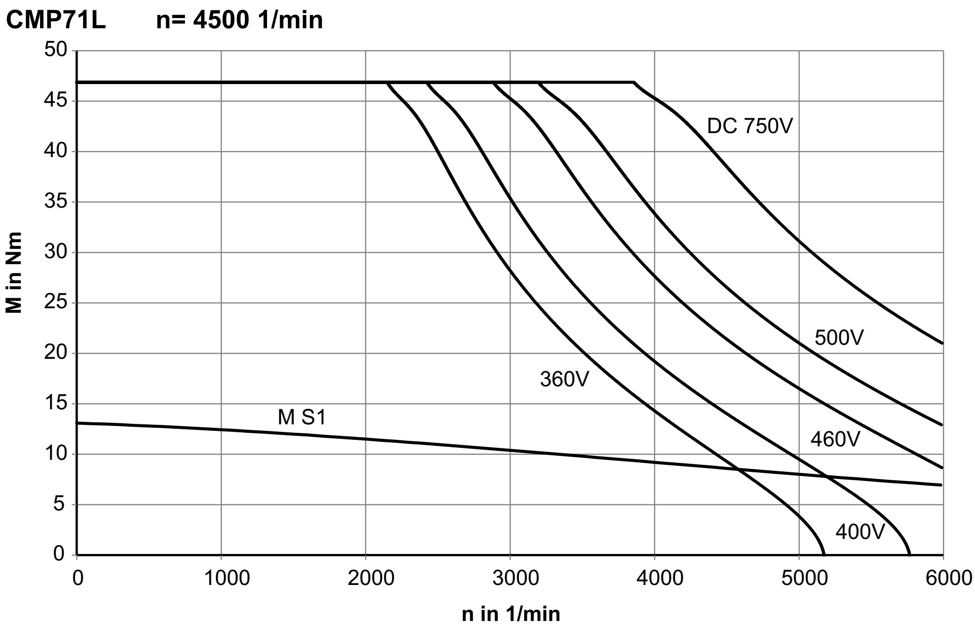
67541axx

Dynamic and thermal limit characteristic curve for CMP71L n_N = 3000 1/min



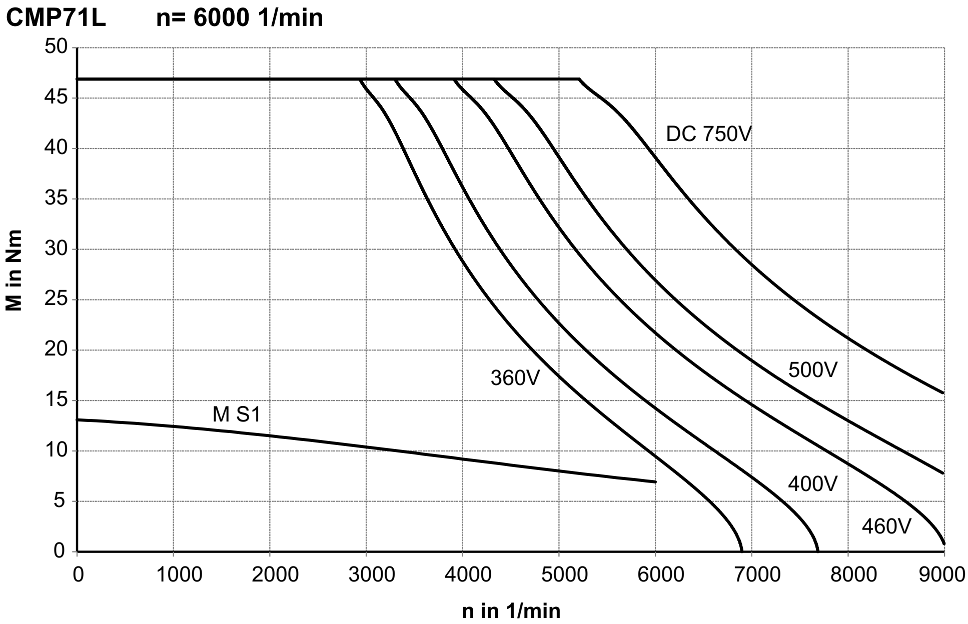
67535axx

Dynamic and thermal limit characteristic curve for CMP71L n_N = 4500 1/min



67536axx

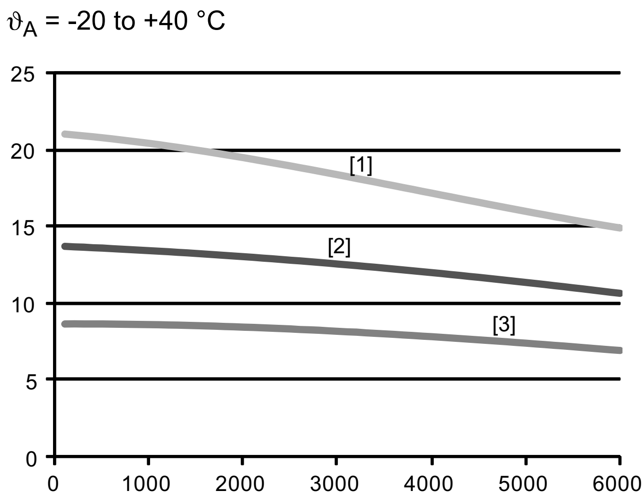
Dynamic and thermal limit characteristic curve for CMP71L n_N = 6000 1/min



67537axx

Thermal limit characteristic curve for CMP71 / VR

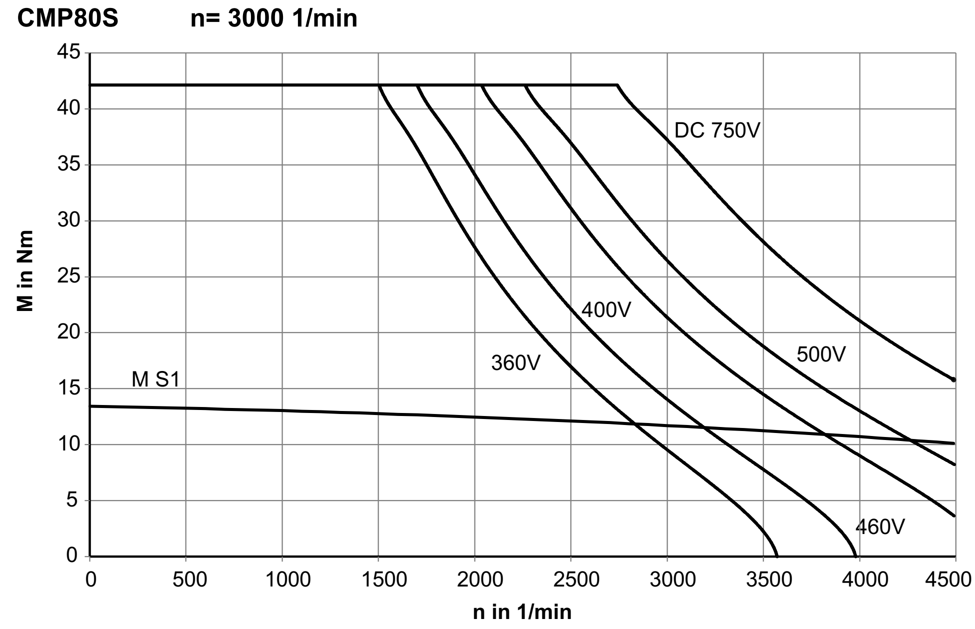
ϑ_A = -20 to +40 °C



65772axx

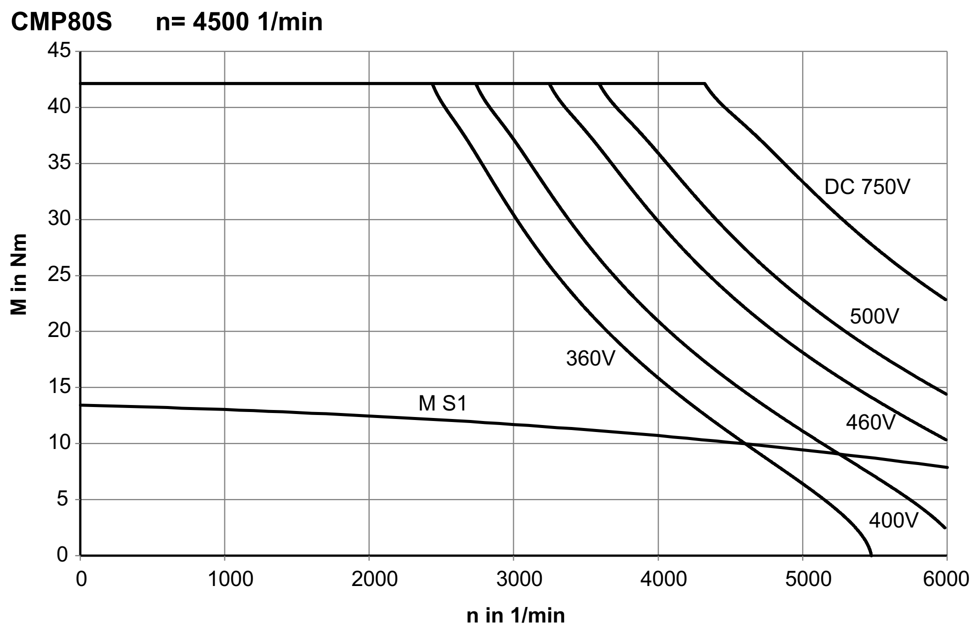
[1] CMP71L / VR
[2] CMP71M / VR
[3] CMP71S / VR

Dynamic and thermal limit characteristic curve for CMP80S n_N = 3000 1/min



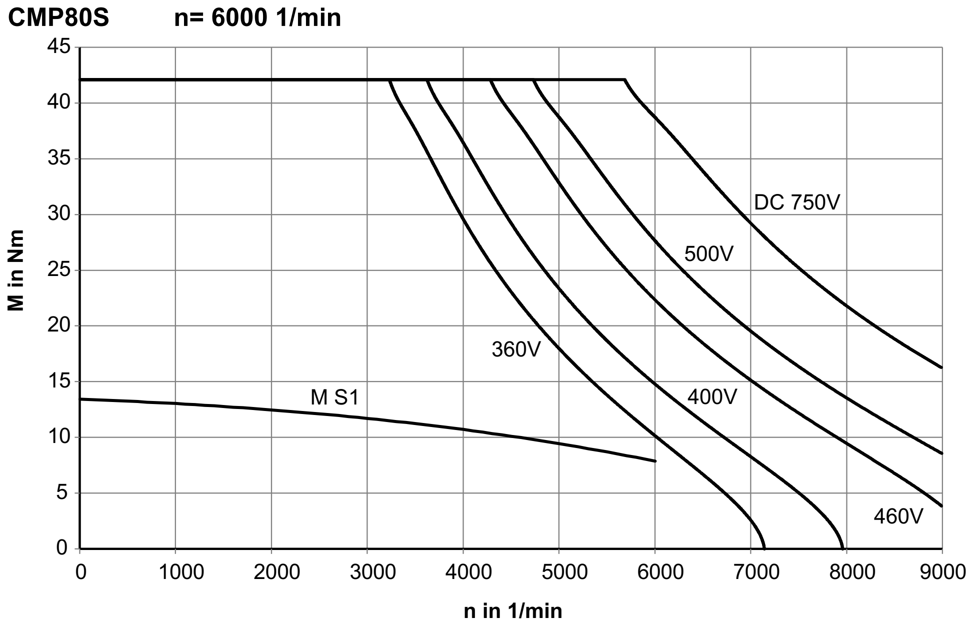
67555axx

Dynamic and thermal limit characteristic curve for CMP80S n_N = 4500 1/min



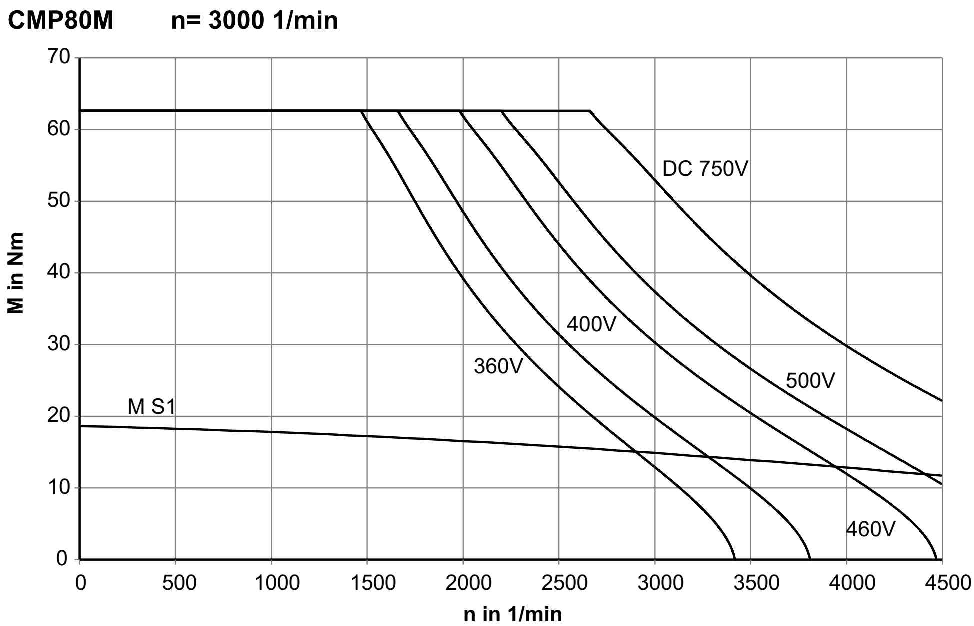
67556axx

Dynamic and thermal limit characteristic curve for CMP80S n_N = 6000 1/min



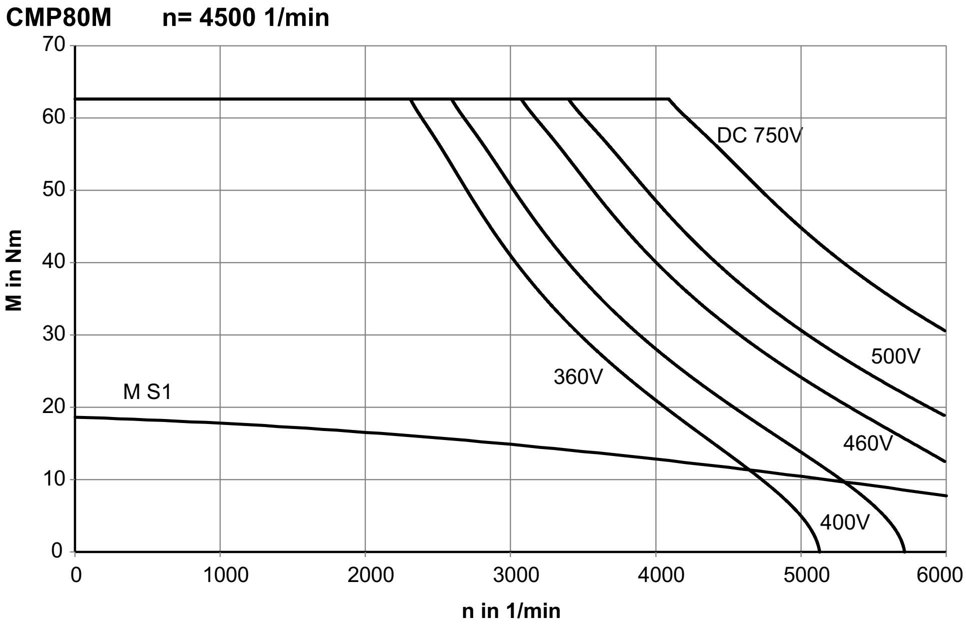
67557axx

Dynamic and thermal limit characteristic curve for CMP80M n_N = 3000 1/min



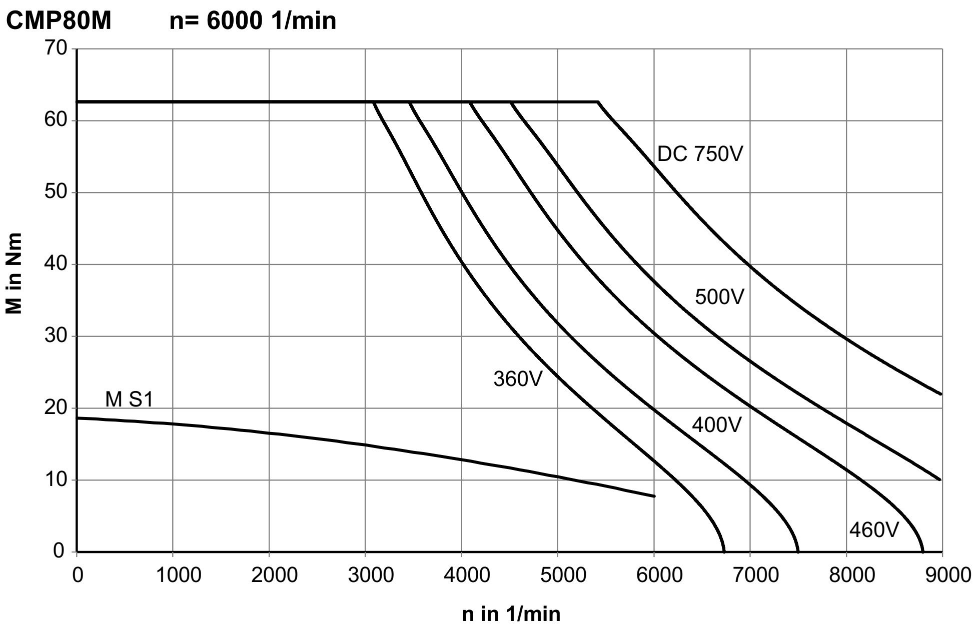
67551axx

Dynamic and thermal limit characteristic curve for CMP80M n_N = 4500 1/min



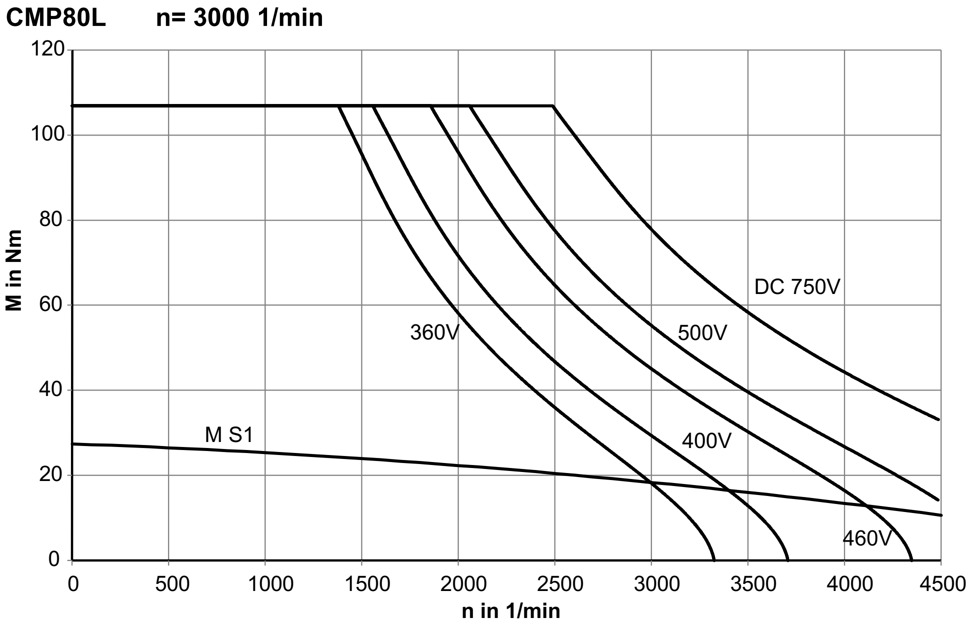
67552axx

Dynamic and thermal limit characteristic curve for CMP80M n_N = 6000 1/min



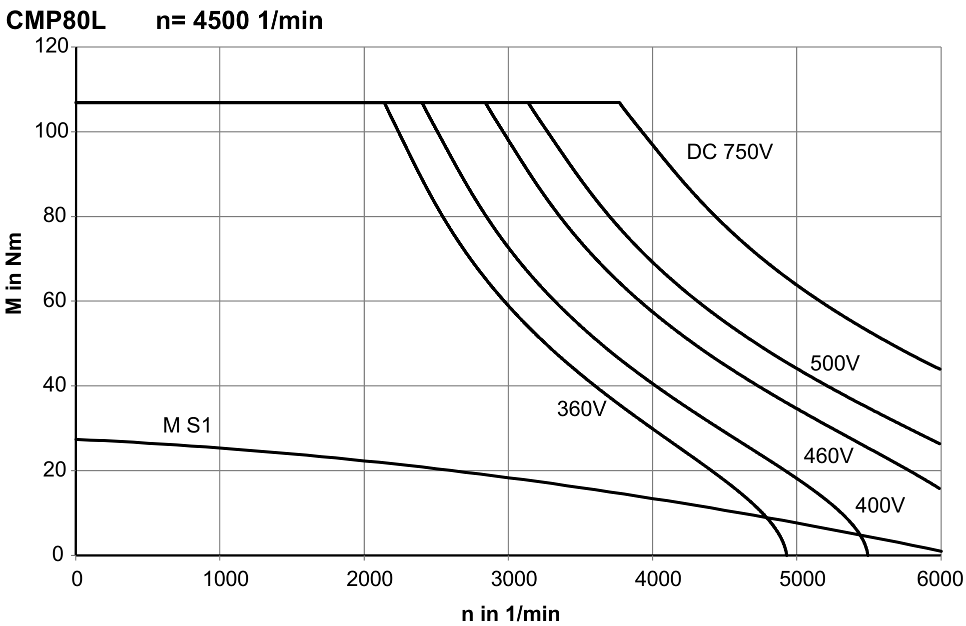
67553axx

Dynamic and thermal limit characteristic curve for CMP80L n_N = 3000 1/min



67547axx

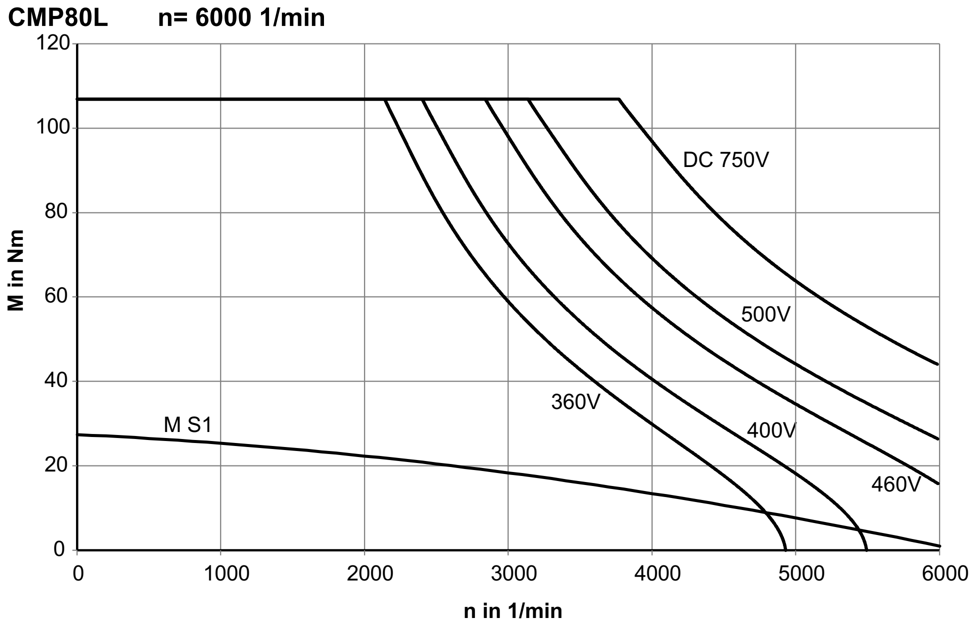
Dynamic and thermal limit characteristic curve for CMP80L n_N = 4500 1/min



67548axx

[1]	M $S1_{thermal}$ (derating)	[4]	460 V line voltage, non-controlled
[2]	DC 750 V direct voltage, controlled	[5]	400 V line voltage, non-controlled
[3]	500 V line voltage, non-controlled	[6]	360 V line voltage, non-controlled

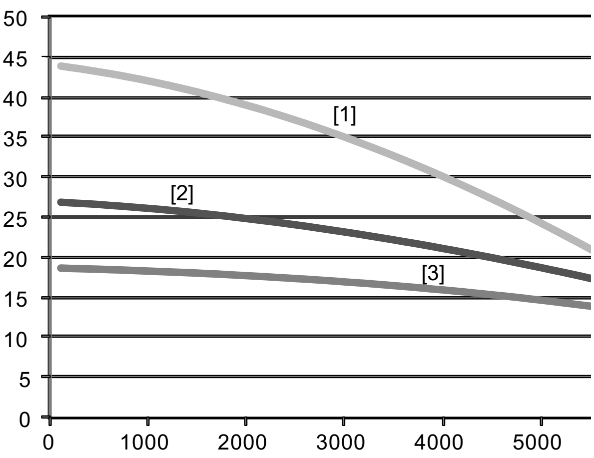
Dynamic and thermal limit characteristic curve for CMP80L n_N = 6000 1/min



67549axx

Thermal limit characteristic curve for CMP80 / VR

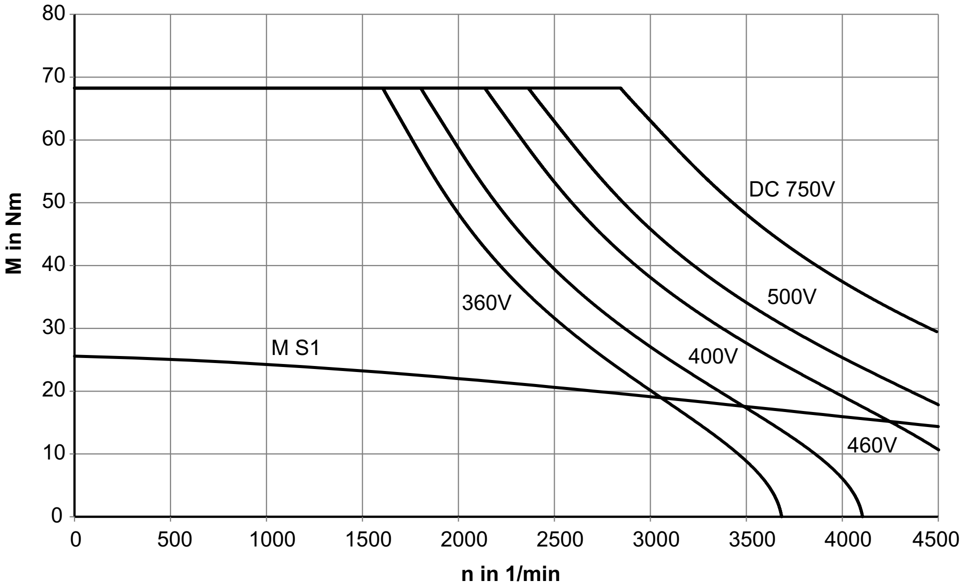
ϑ_A = -20 to +40 °C



65773axx

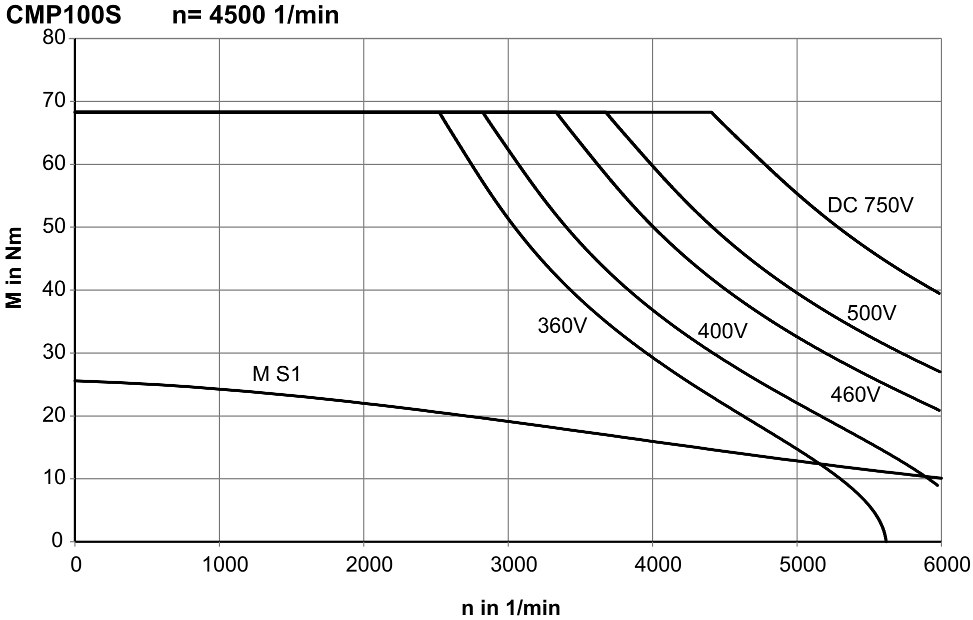
[1]	CMP80L / VR
[2]	CMP80M / VR
[3]	CMP80S / VR

Dynamic and thermal limit characteristic curve for CMP100S n_N = 3000 1/min



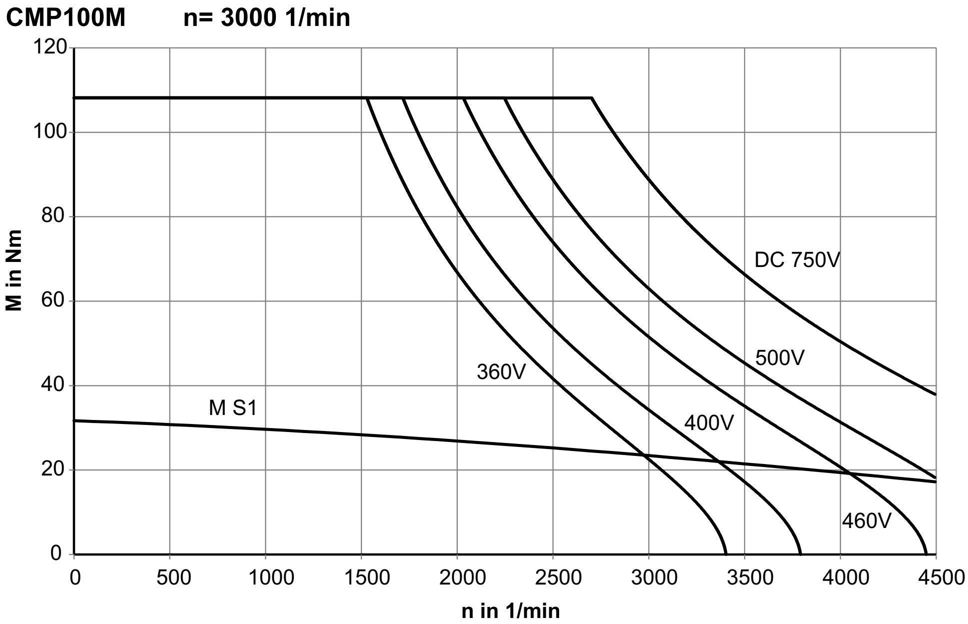
67565axx

Dynamic and thermal limit characteristic curve for CMP100S n_N = 4500 1/min



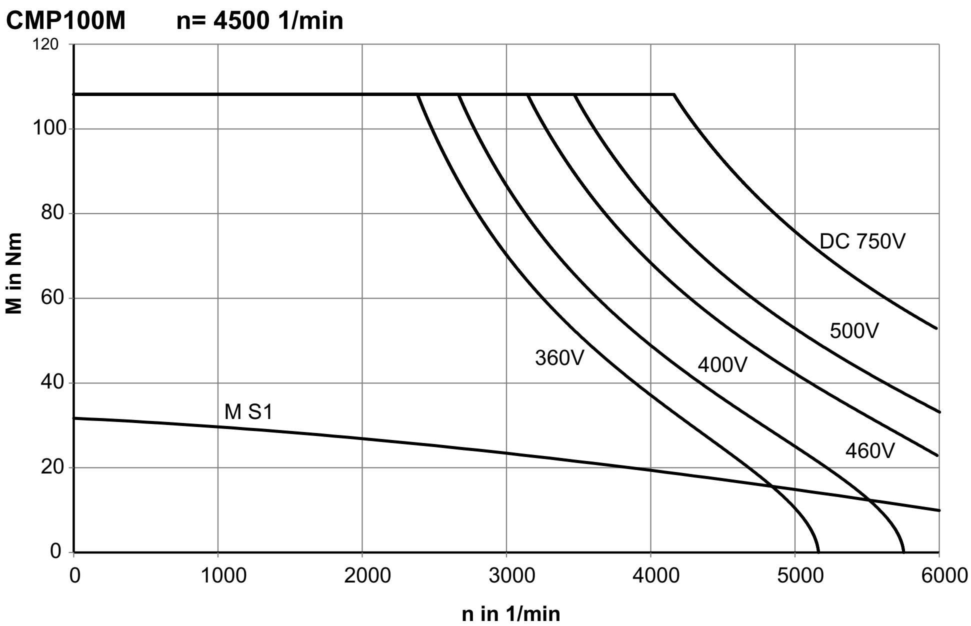
67566axx

Dynamic and thermal limit characteristic curve for CMP100M n_N = 3000 1/min



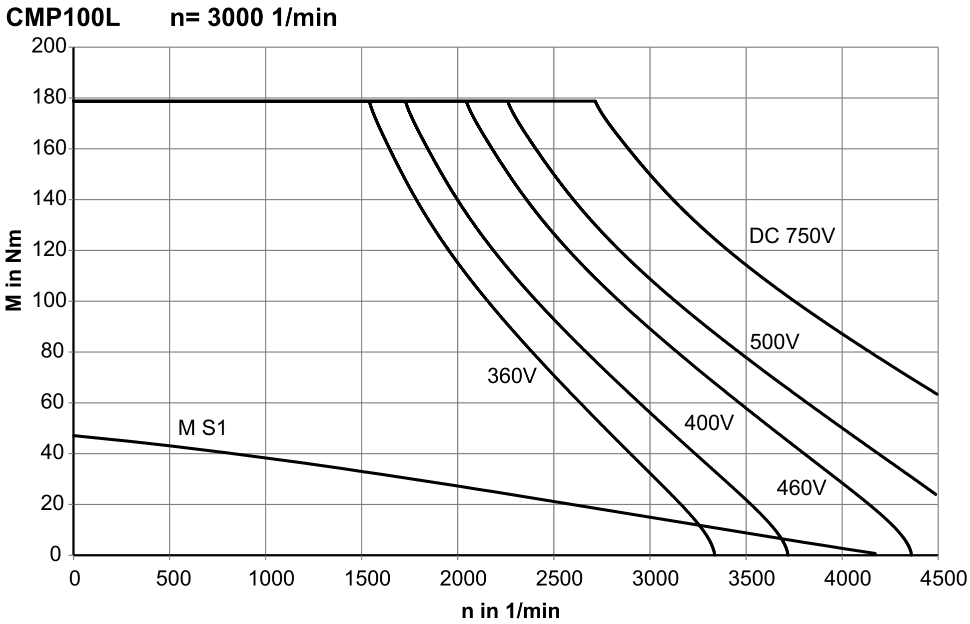
67562axx

Dynamic and thermal limit characteristic curve for CMP100M n_N = 4500 1/min



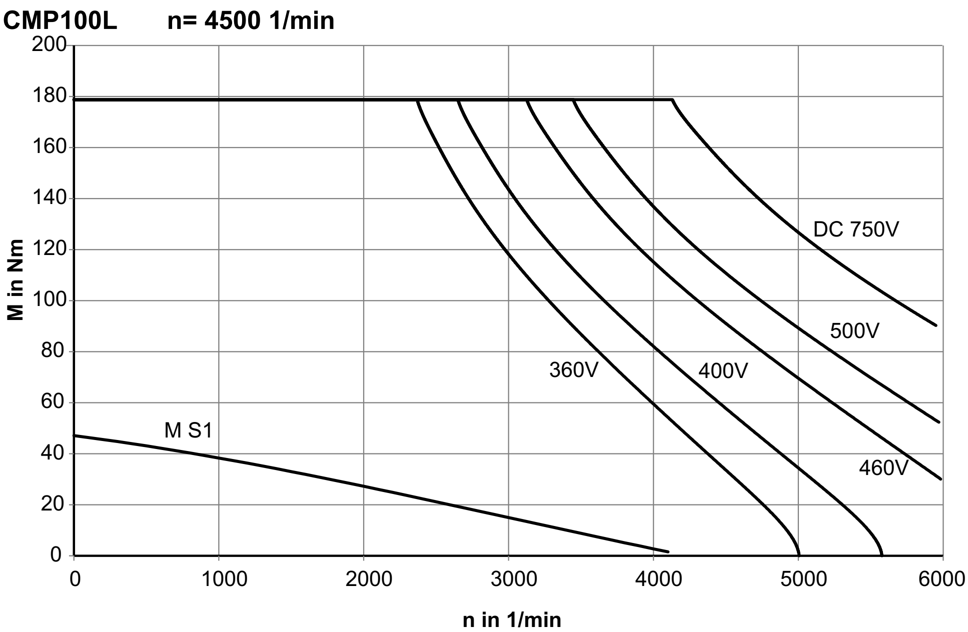
67563axx

Dynamic and thermal limit characteristic curve for CMP100L n_N = 3000 1/min



67559axx

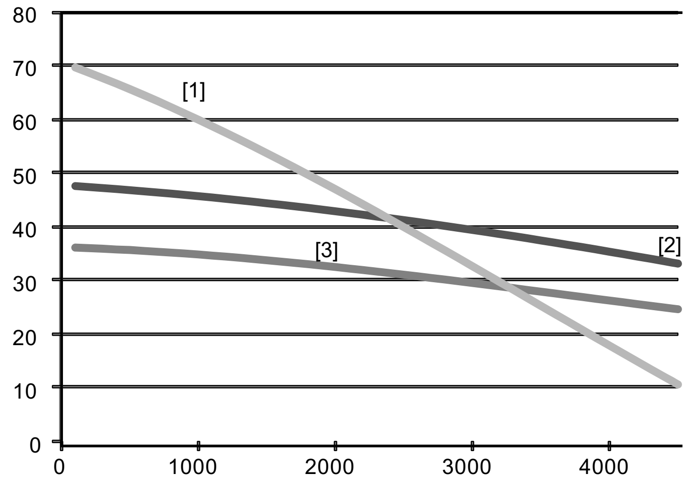
Dynamic and thermal limit characteristic curve for CMP100L n_N = 4500 1/min



67560axx

Thermal limit characteristic curve for CMP100 / VR

ϑ_A = -20 to +40 °C



65774axx

[1] CMP100L / VR

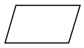
[2] CMP100M / VR

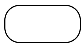
[3] CMP100S / VR

7 Dimension Sheets – CMP Servomotors/CMP Servo Brakemotors

7.1 Notes on the dimension sheets

Scope of delivery

 = Standard parts supplied by SEW-EURODRIVE.

 = Standard parts not supplied by SEW-EURODRIVE.

Tolerances

Shaft heights

The following tolerances apply to the indicated dimensions:

h	≤ 250 mm	→ -0,5 mm
h	> 250 mm	→ -1 mm

Shaft ends of solid shafts

Center bores according to DIN 332, shape DR:

∅	= 7 - 10 mm	→ M3
∅	> 10 - 13 mm	→ M4
∅	> 13 - 16 mm	→ M5
∅	> 16 - 21 mm	→ M6
∅	> 21 - 24 mm	→ M8
∅	> 24 - 30 mm	→ M10
∅	> 30 - 38 mm	→ M12
∅	> 38 - 50 mm	→ M16
∅	> 50 - 85 mm	→ M20
∅	> 85 - 130 mm	→ M24
∅	> 130 mm	→ M30

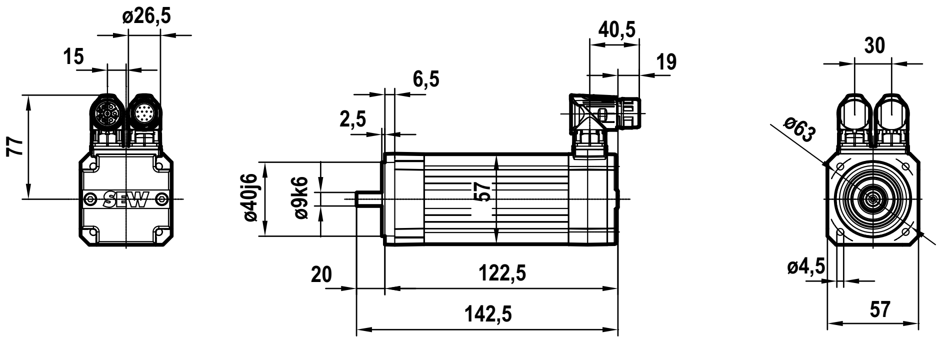
Keys: according to DIN 6885 (domed type).

7.2 Dimension sheets

CMP40S / M synchronous servomotors

CMP40S **08 527 00 09**

SM1 **/RH1M**



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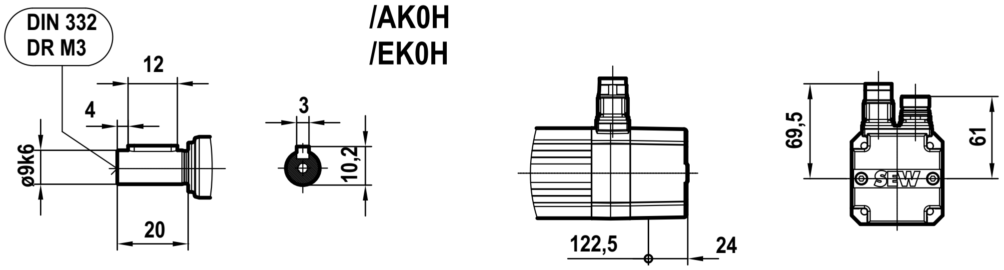
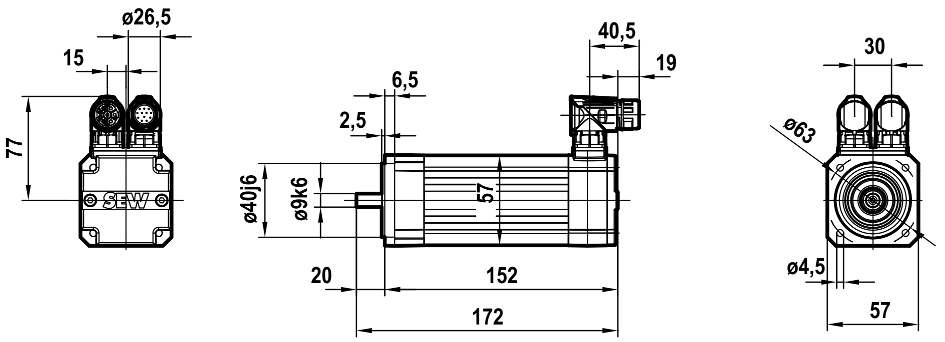
/EK0H



CMP40S **09 389 00 09**
BP01
SB1 **/RH1M**



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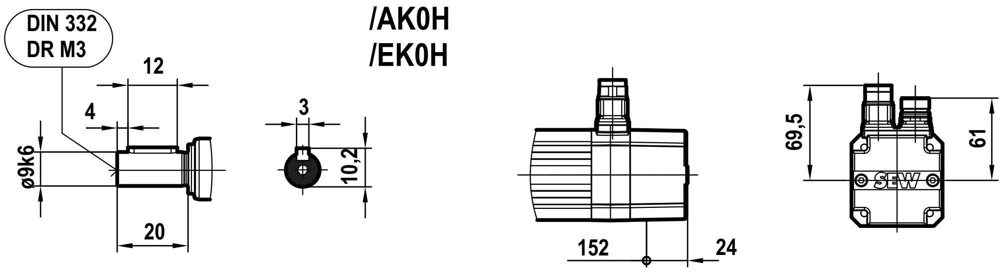
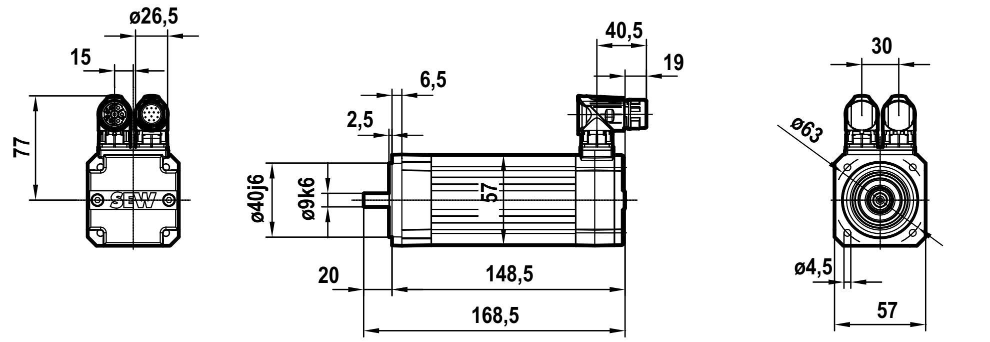


CMP40M 08 528 00 09

SM1 **/RH1M**



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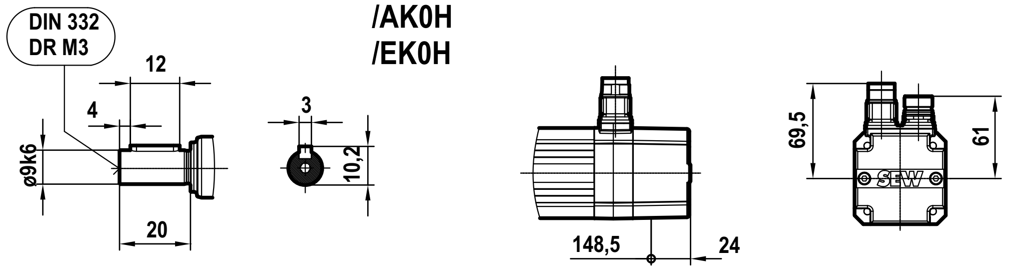
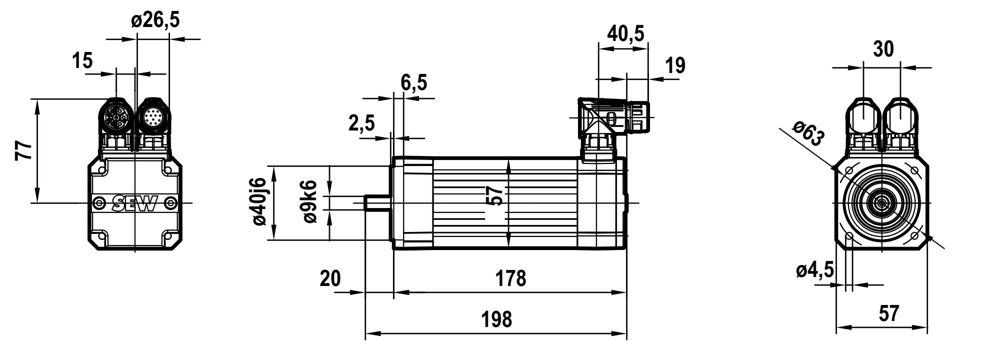


CMP40M
BP01
SB1 **/RH1M** 09 390 00 09



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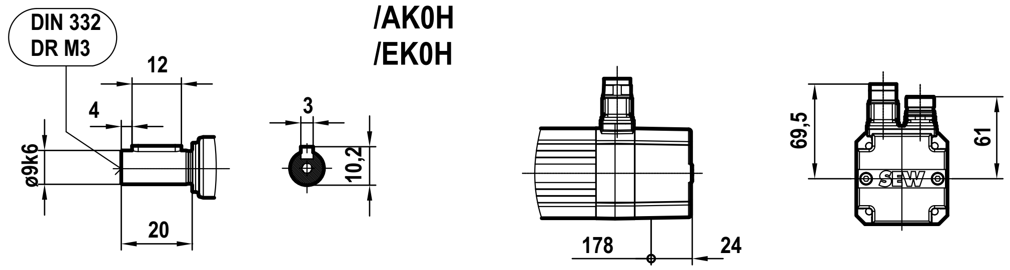
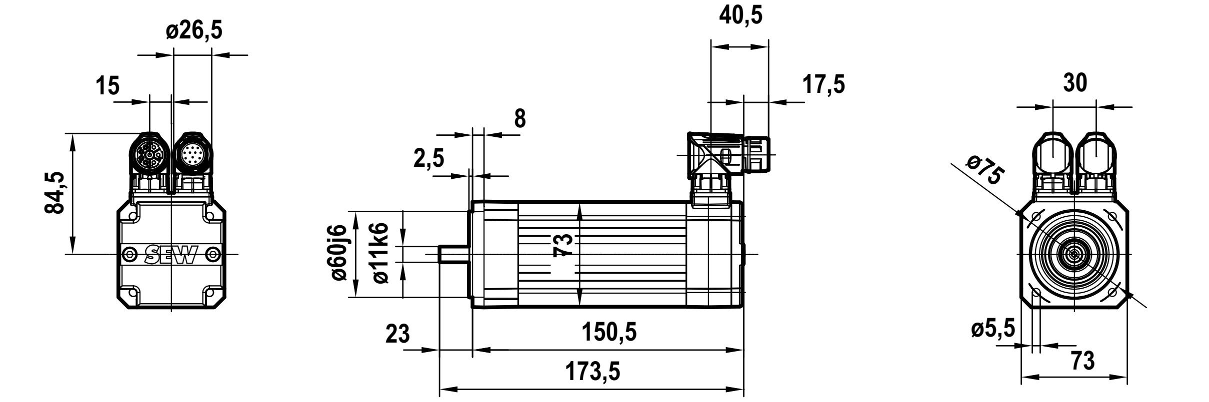


CMP50S / M / L synchronous servomotors

CMP50S 08 529 00 09

SM1 **/RH1M**



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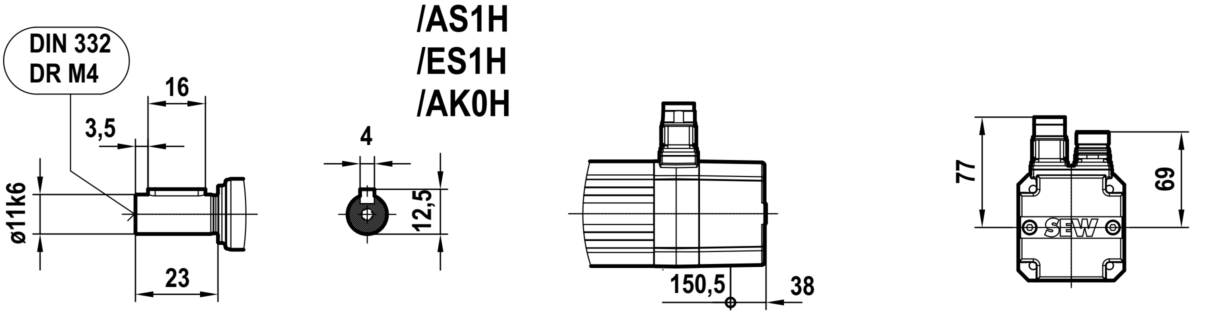

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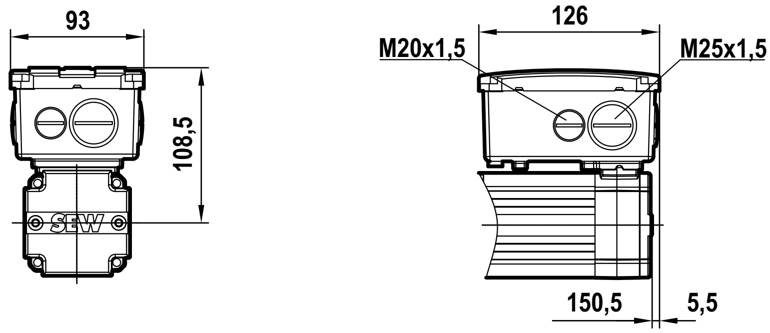

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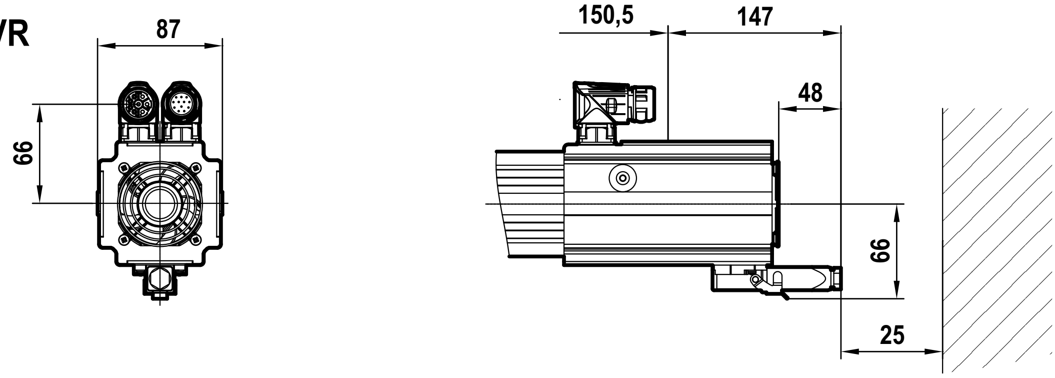
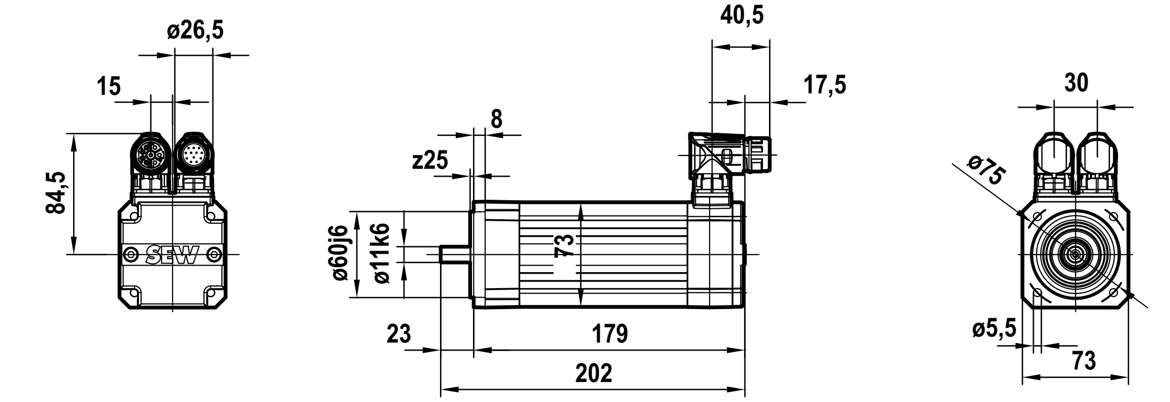


CMP50S
BP04
SB1

09 391 00 09

/RH1M



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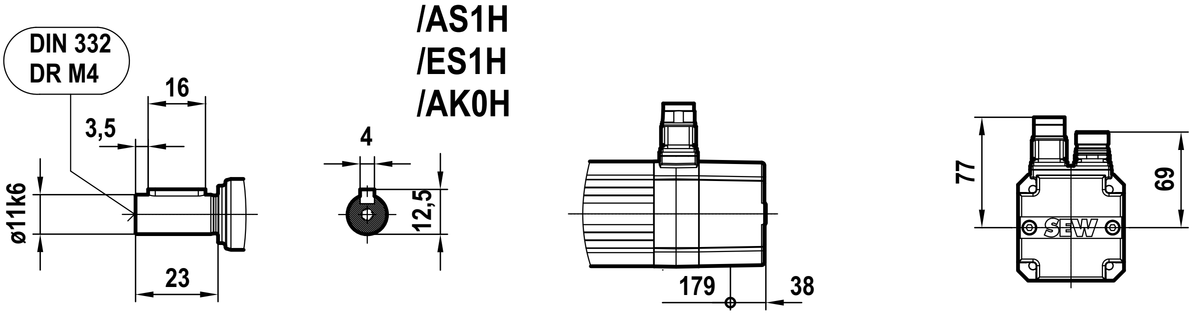

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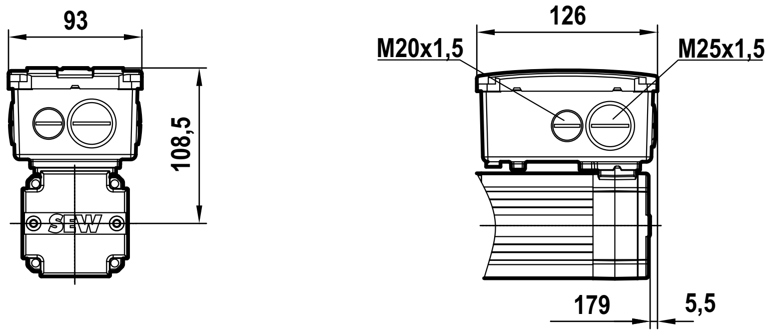

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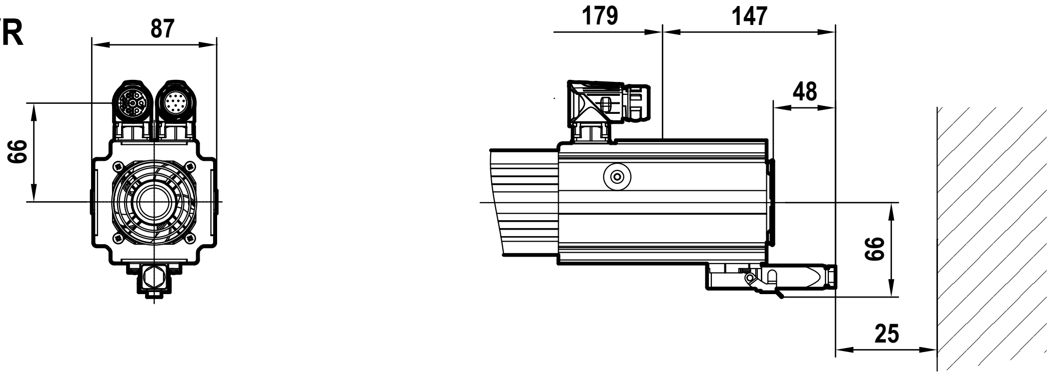


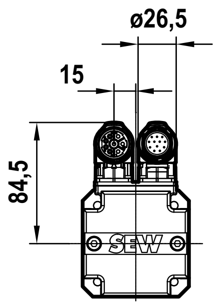
7

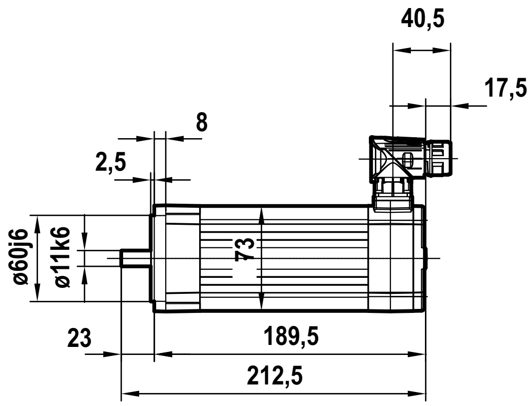
CMP50M

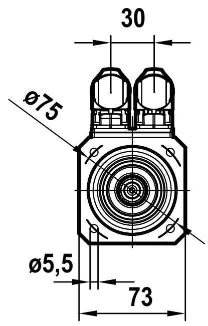
08 530 00 09

SM1

/RH1M







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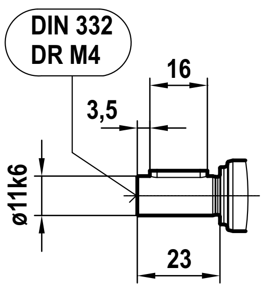

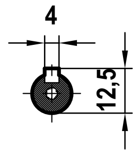

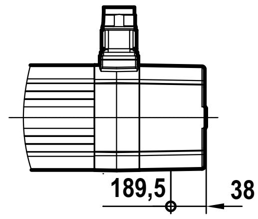

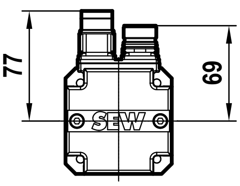

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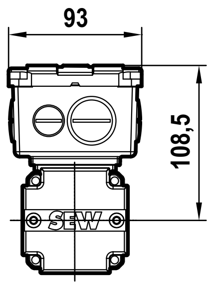

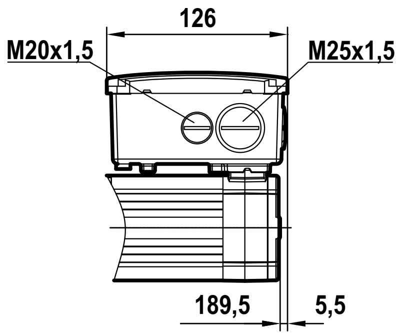

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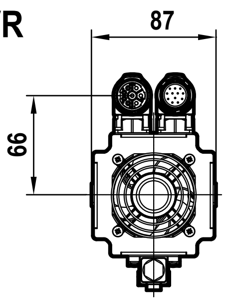
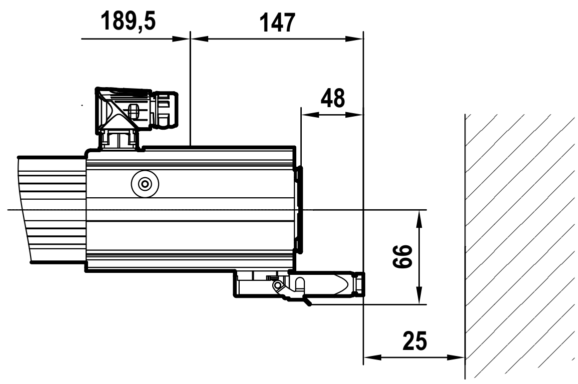
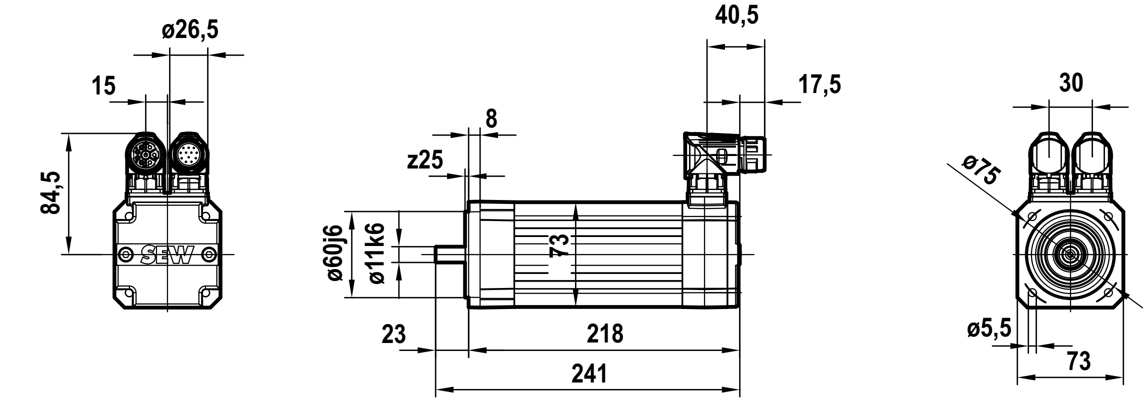




CMP50M
BP04
SB1

09 392 00 09

/RH1M



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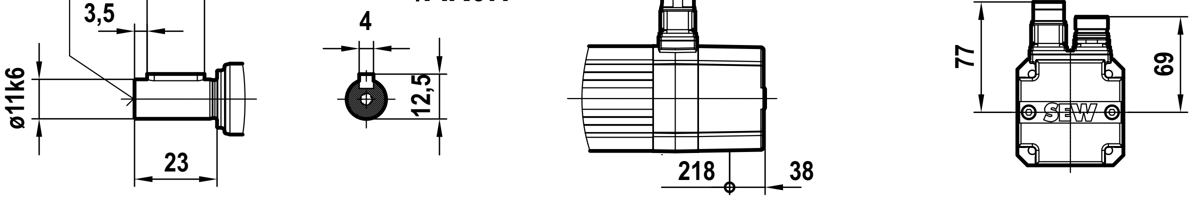

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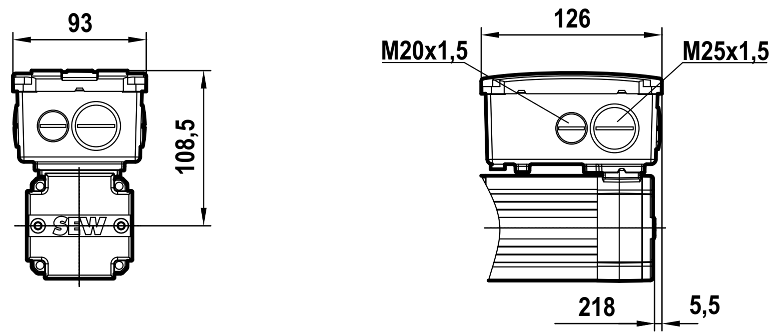

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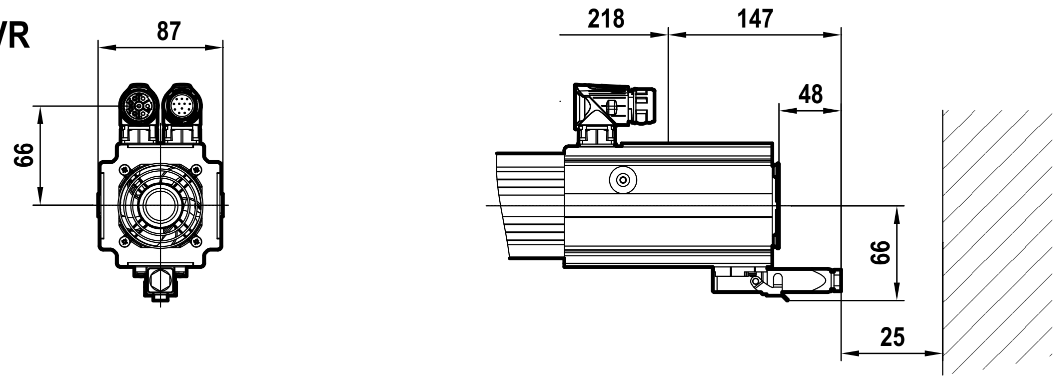
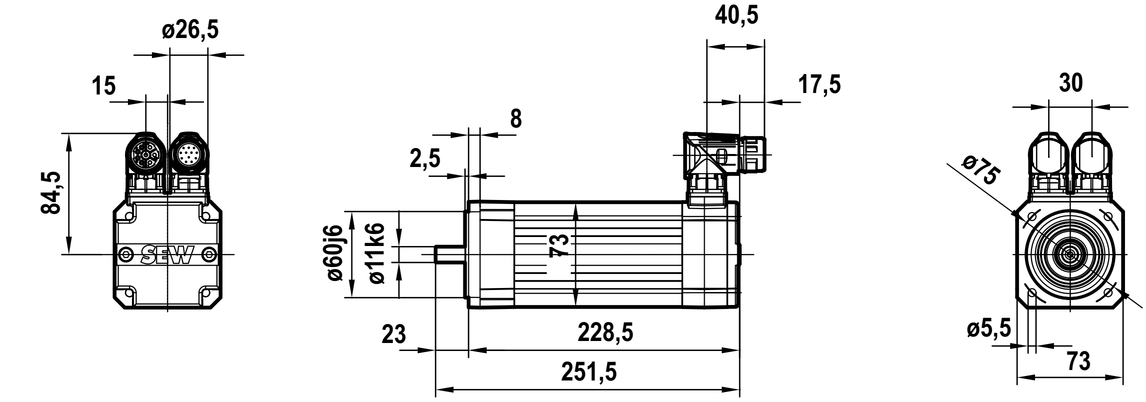


CMP50L

08 531 00 09

SM1 **/RH1M**



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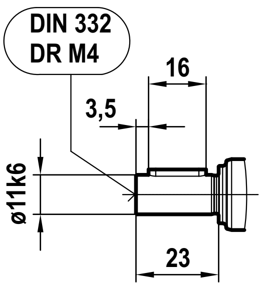

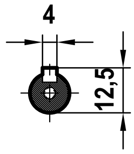

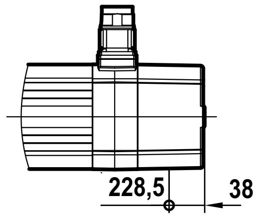

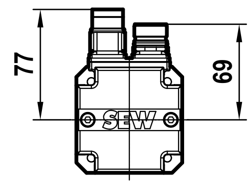

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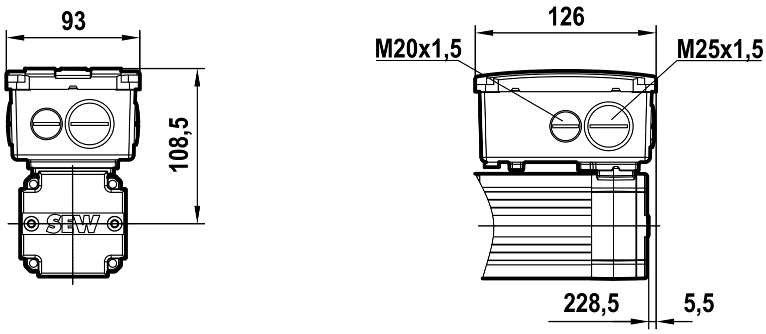

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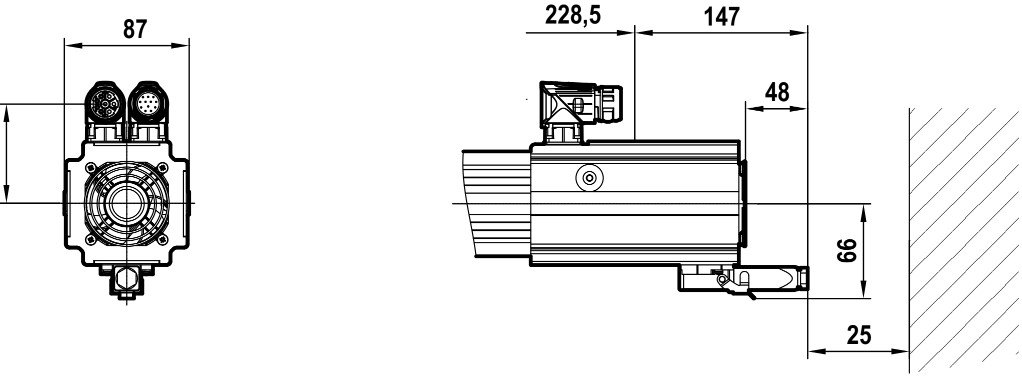

CMP50L
BP04
SB1

09 393 00 09

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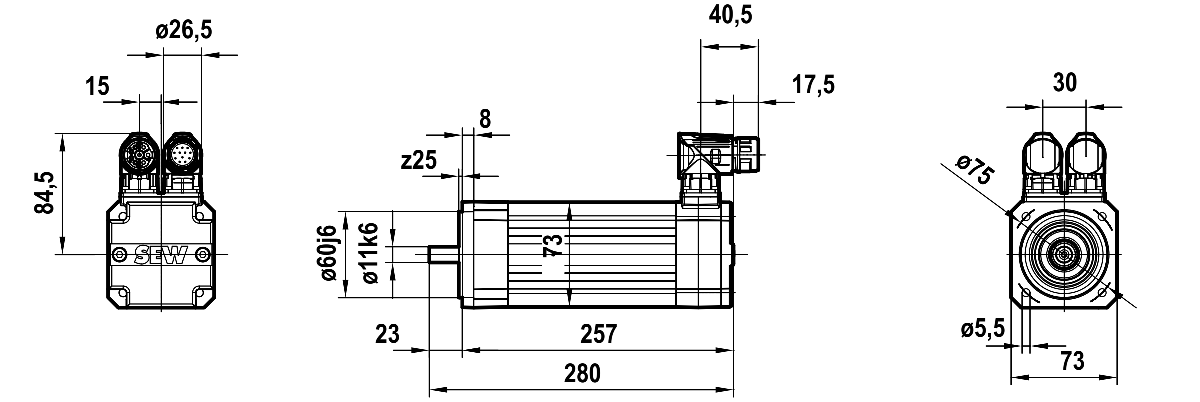

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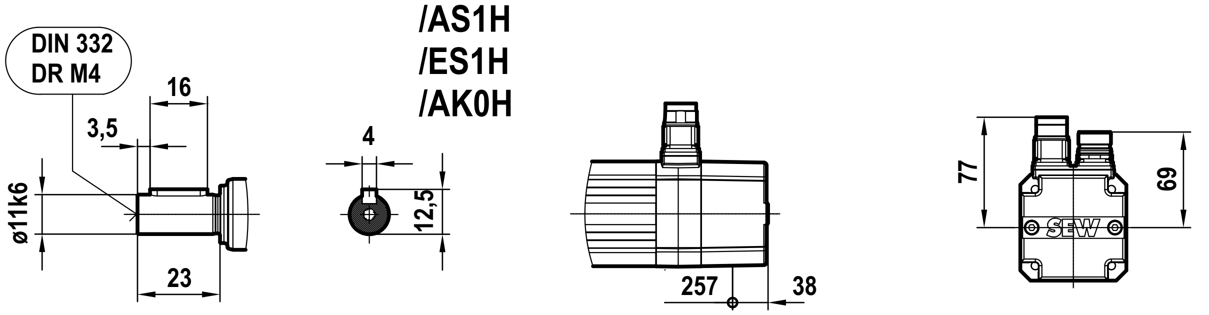

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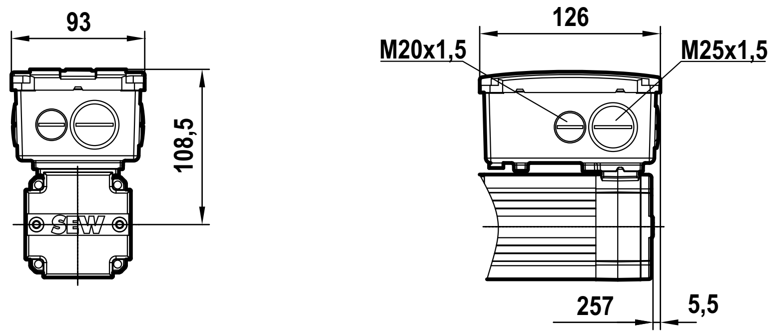

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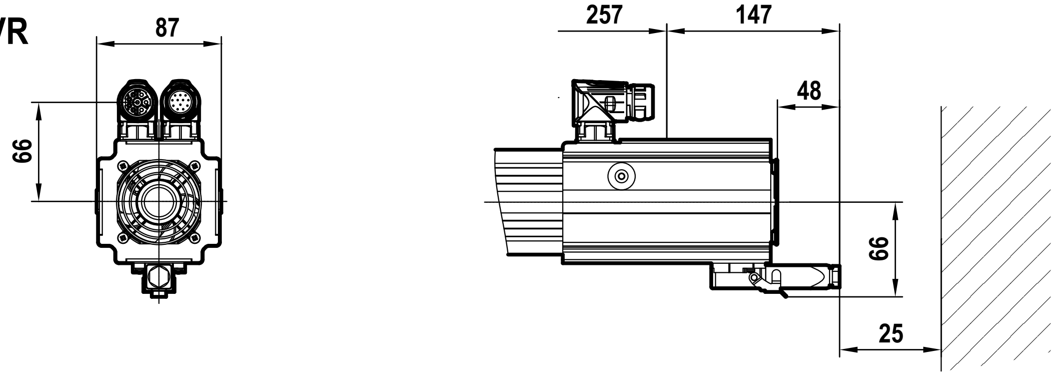


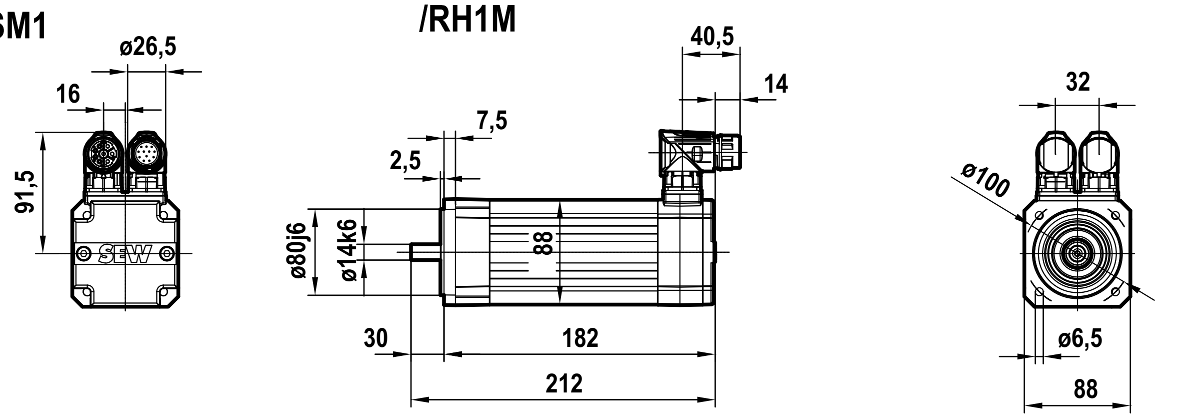
CMP63S / M / L synchronous servomotors

CMP63S

08 532 00 09

SM1

/RH1M



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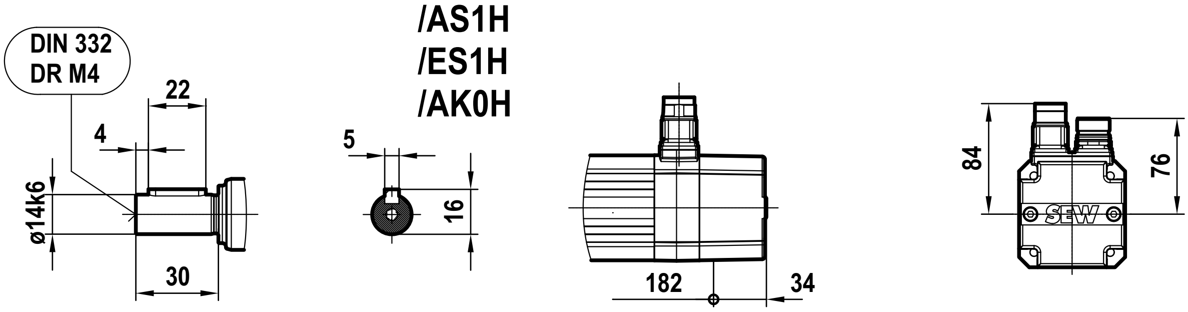

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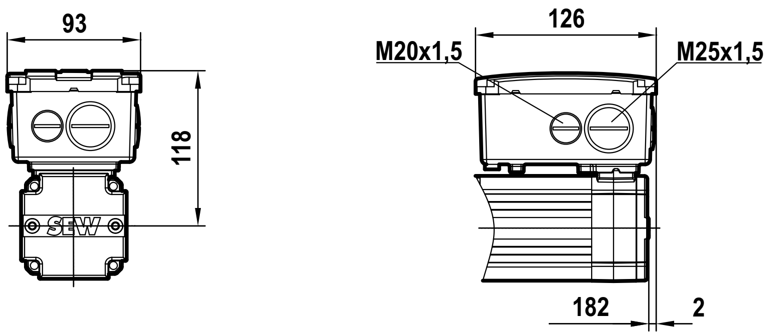

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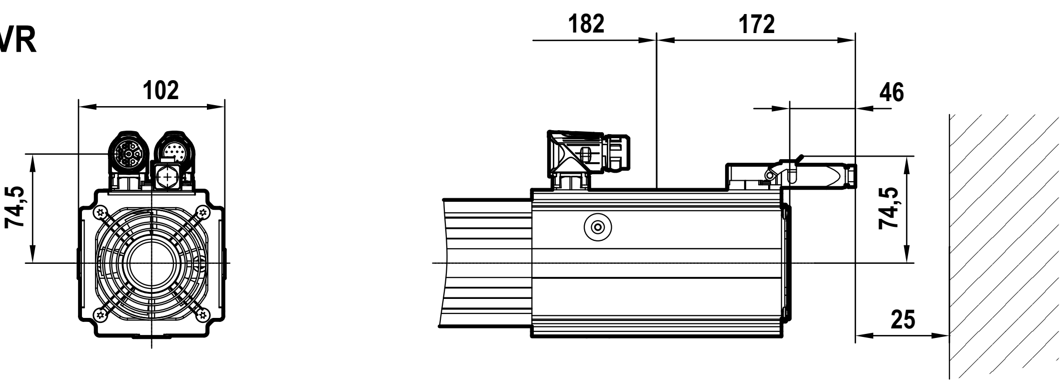
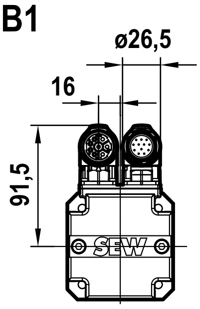
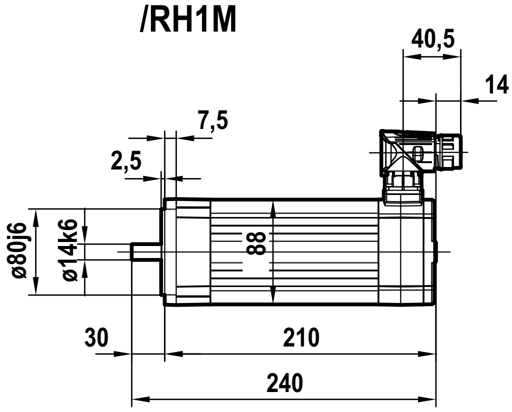
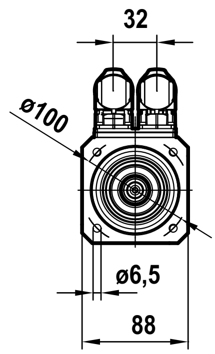


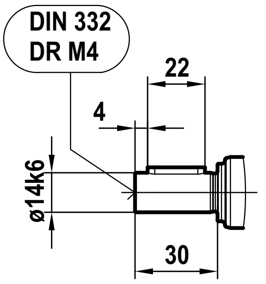
CMP63S **09 394 00 09**
BP09
SB1

/RH1M









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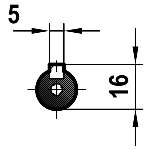

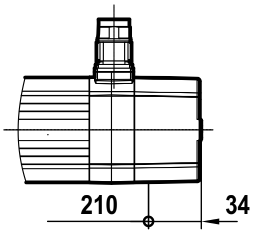

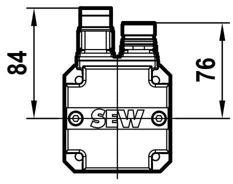

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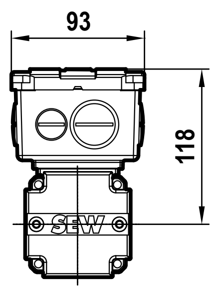

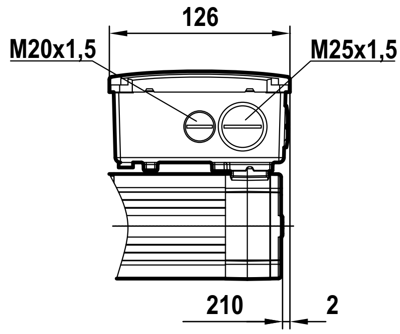

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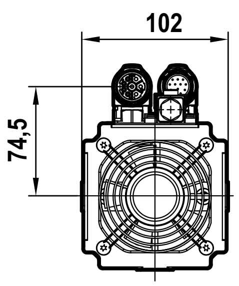
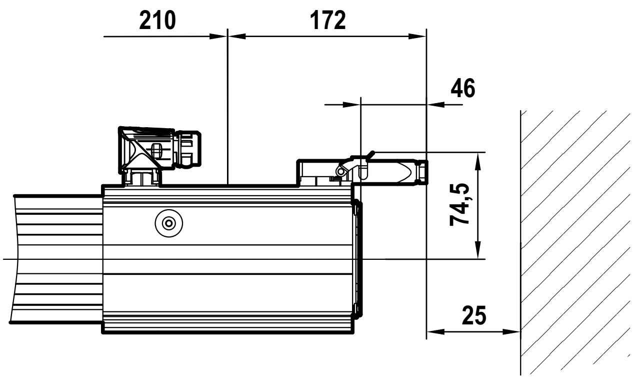
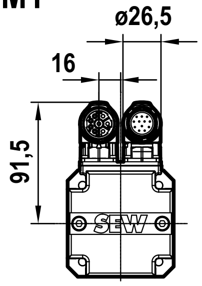




CMP63M **08 533 00 09**

SM1



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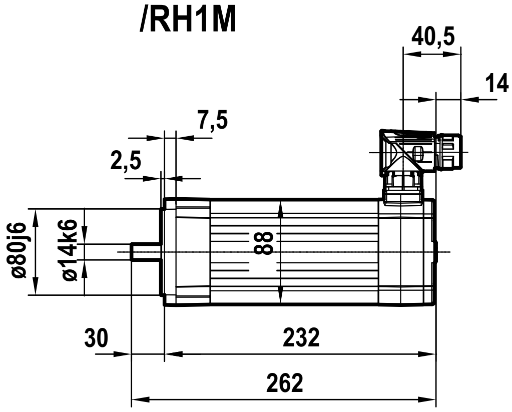

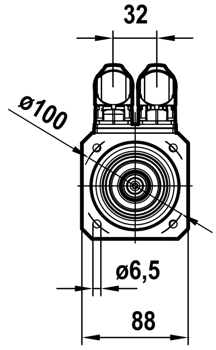

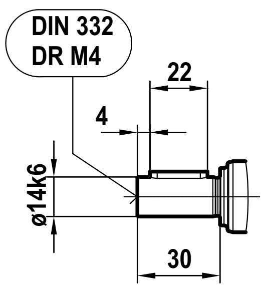

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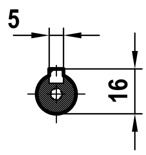

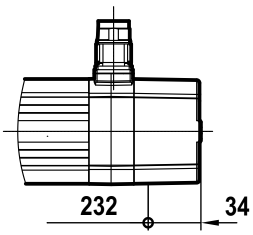

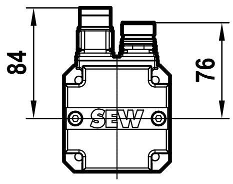

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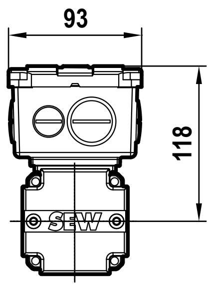

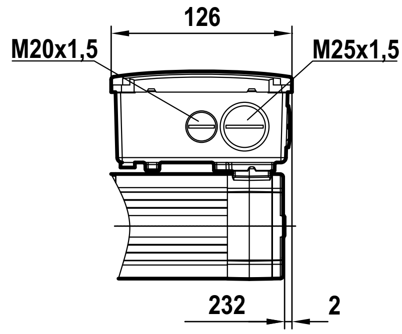

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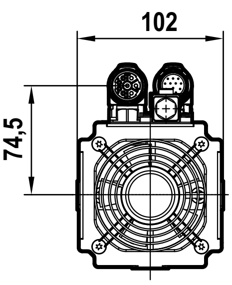

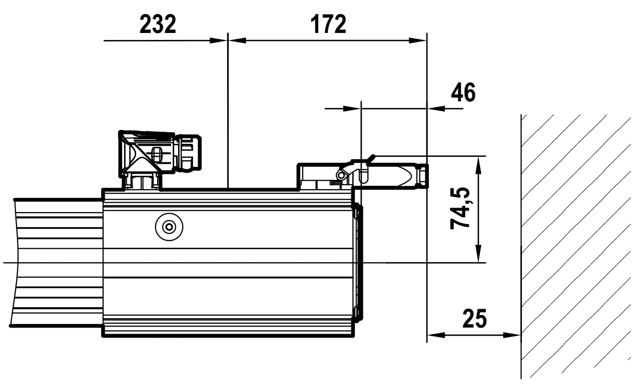

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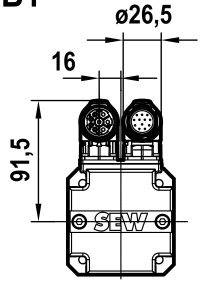

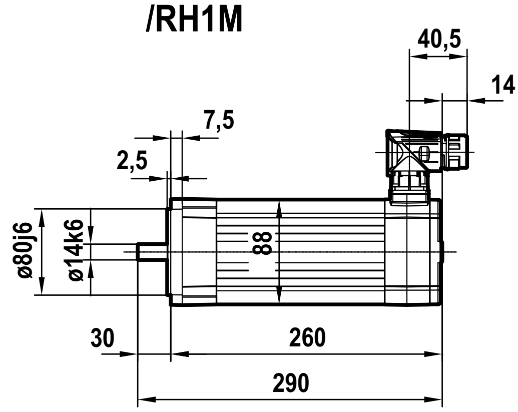

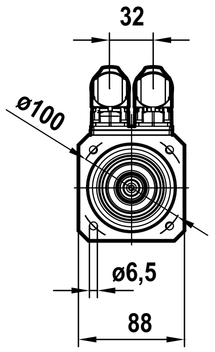

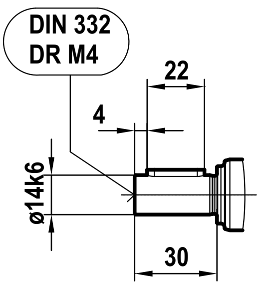

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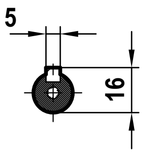

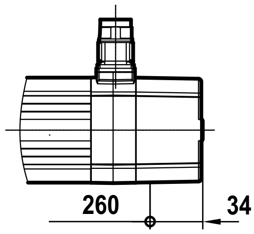

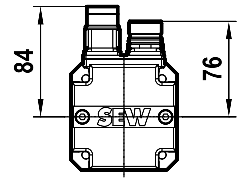

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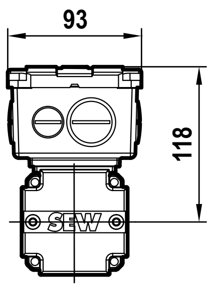

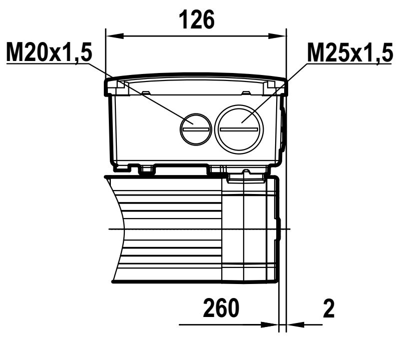

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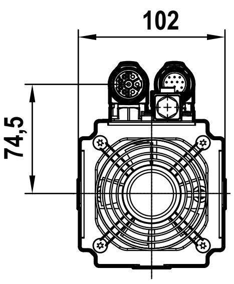

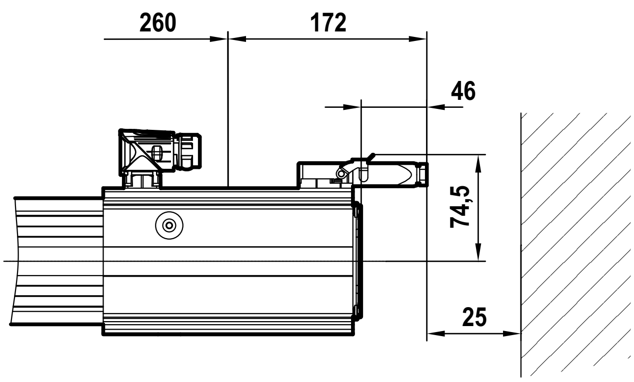

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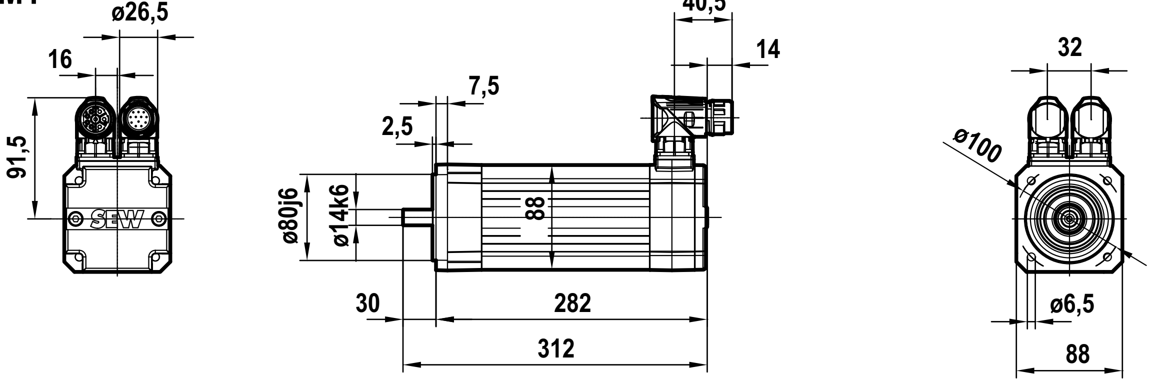

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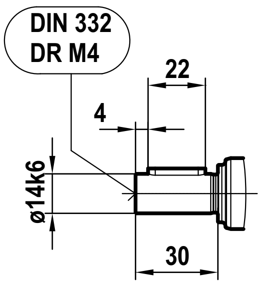

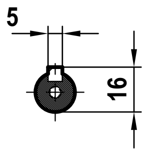

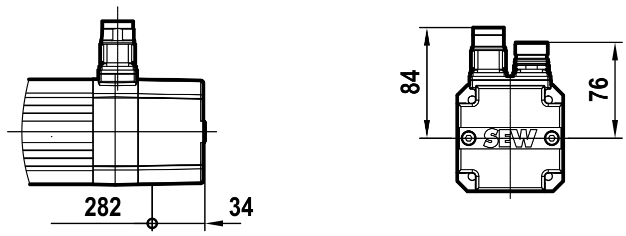

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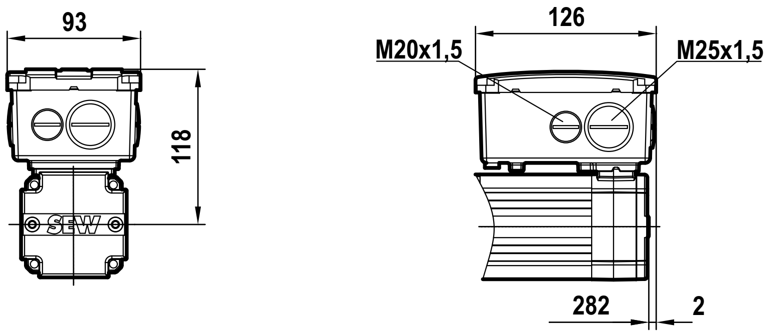

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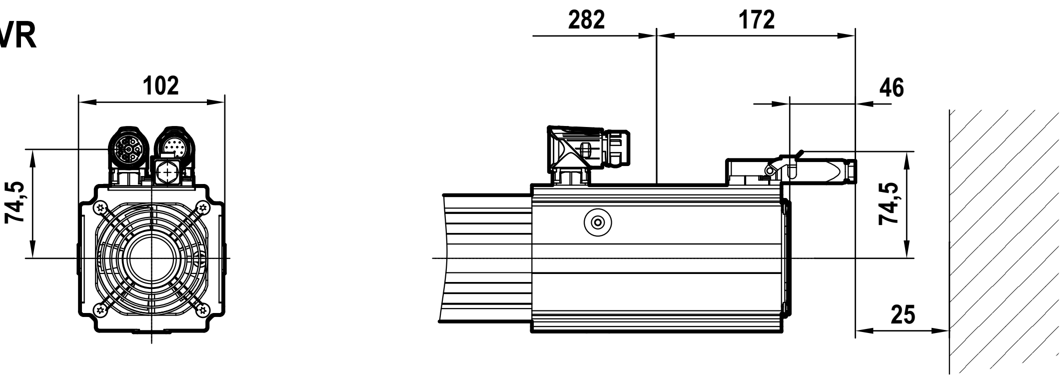

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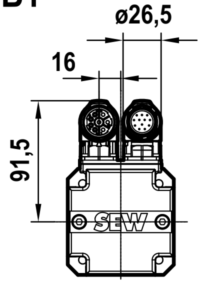

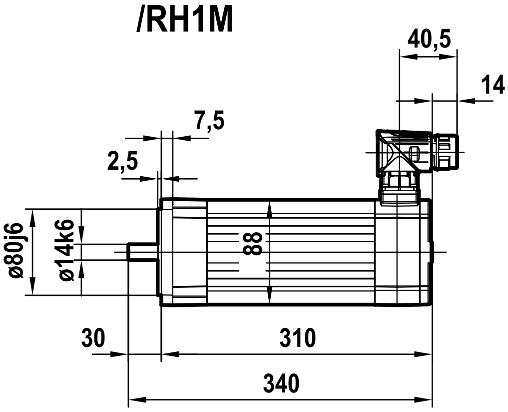

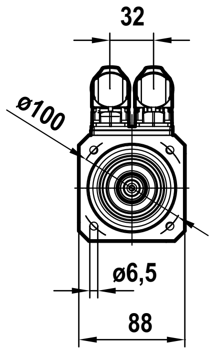

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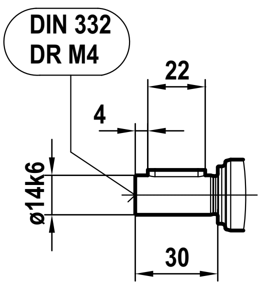

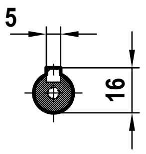

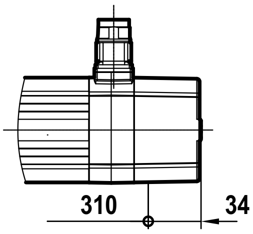

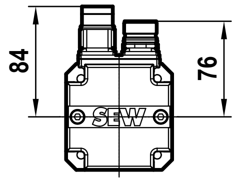

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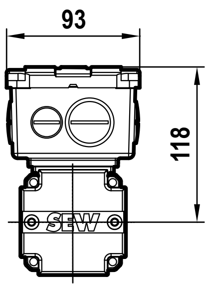

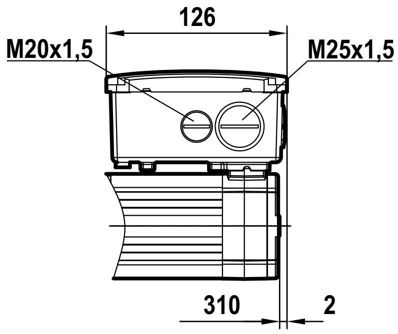

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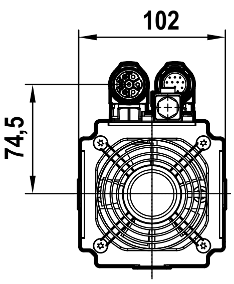

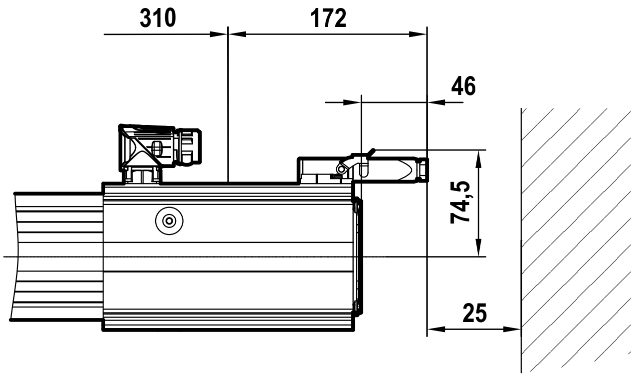

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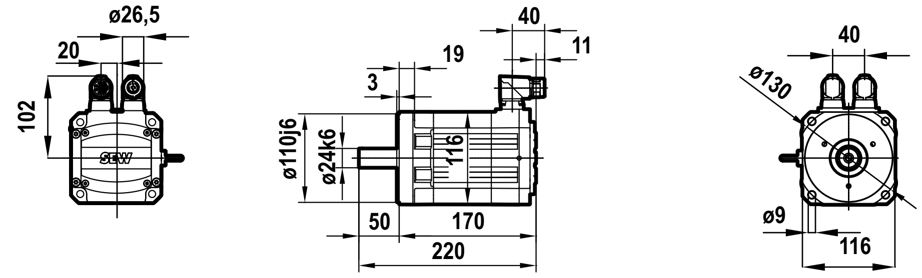

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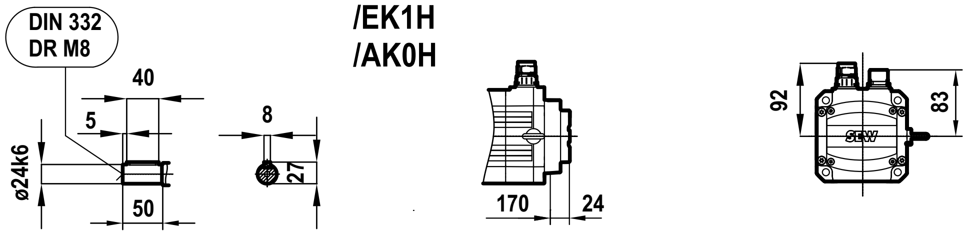

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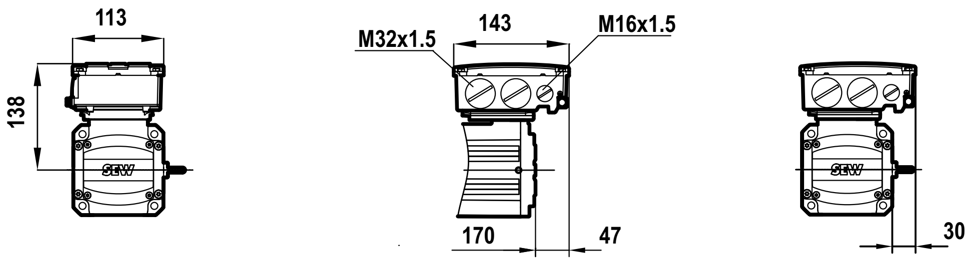

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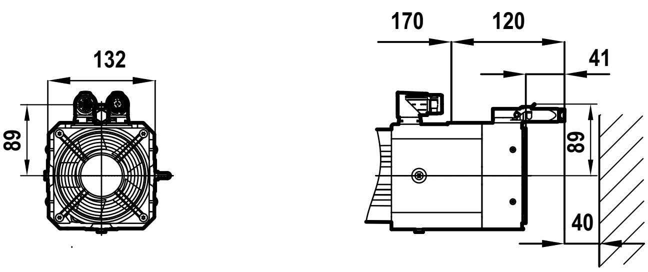

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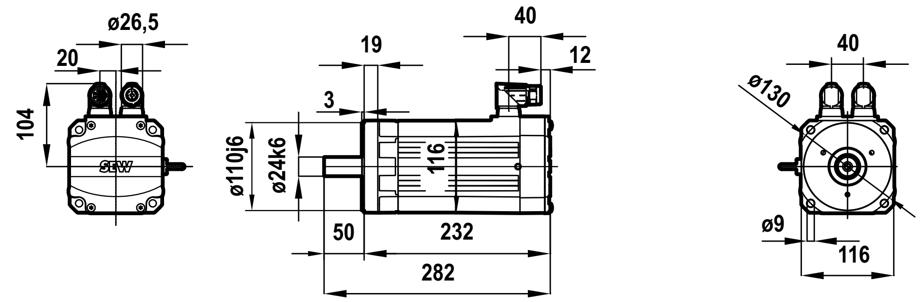

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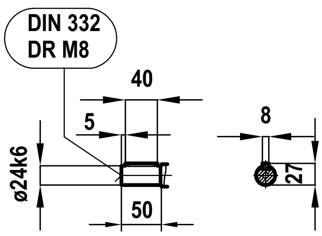

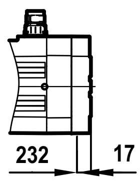

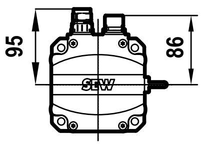

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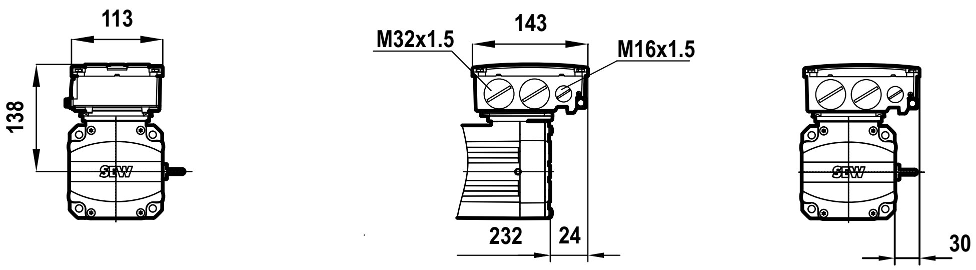

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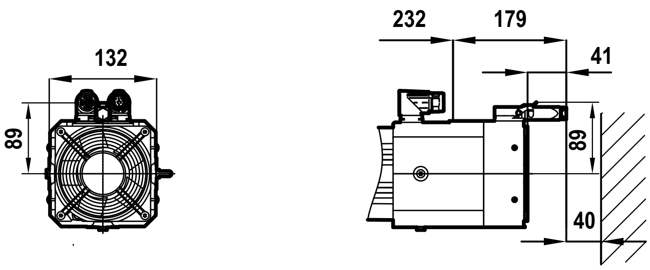

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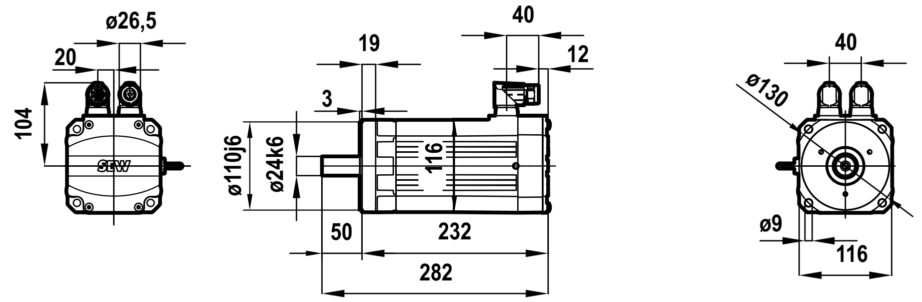

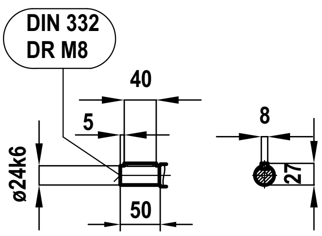

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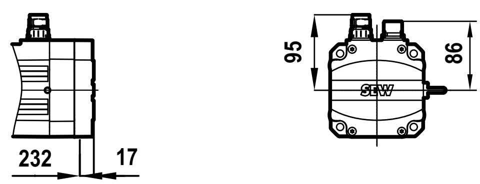

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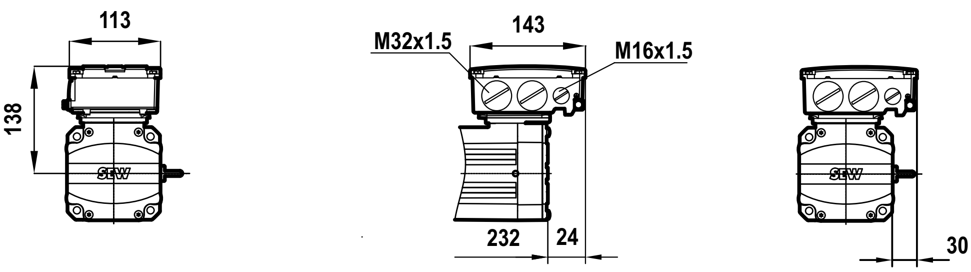

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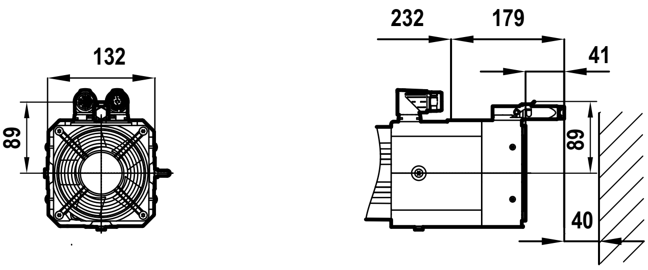

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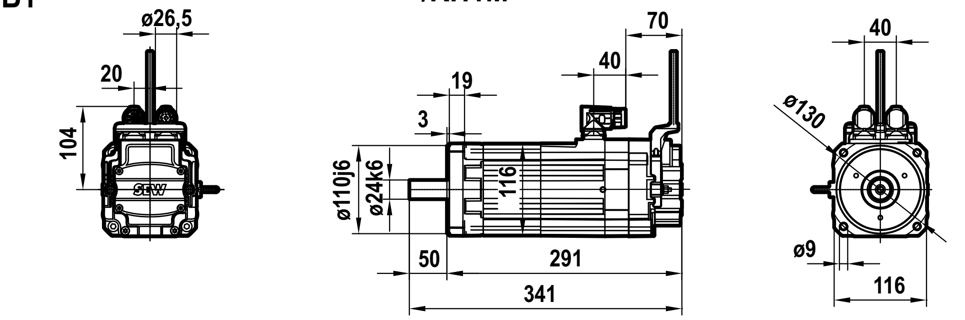

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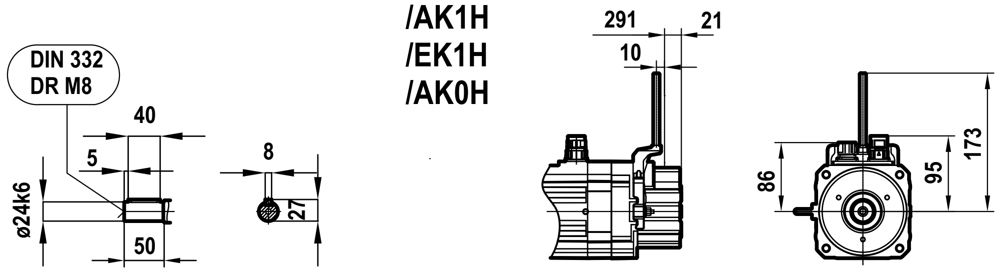

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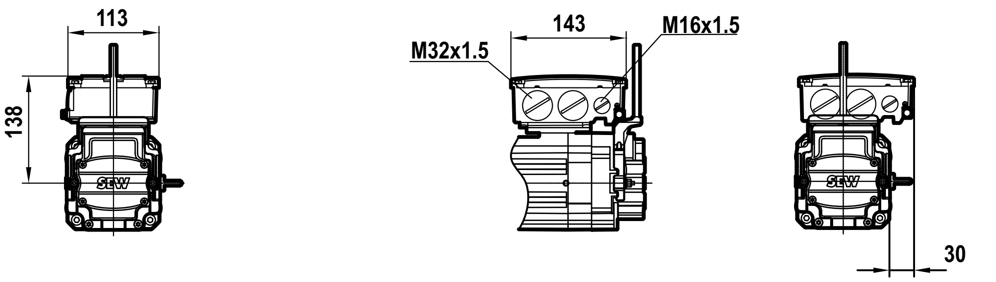

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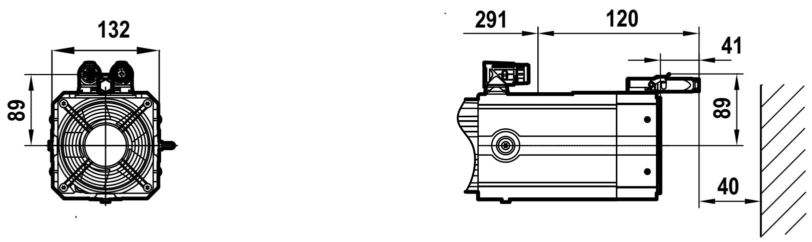

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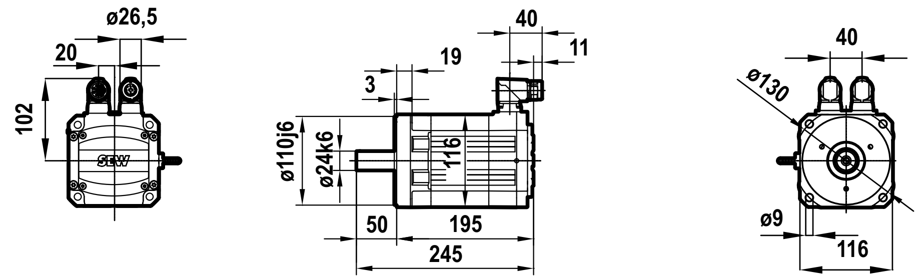

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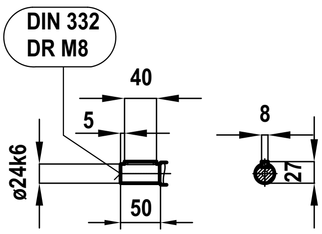

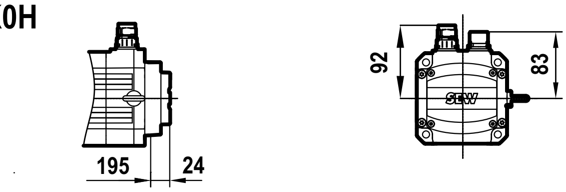

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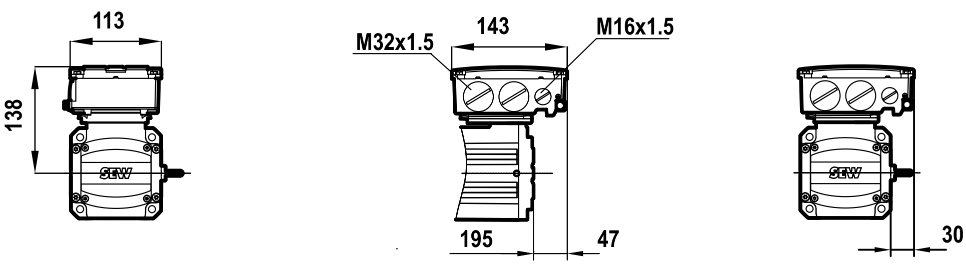

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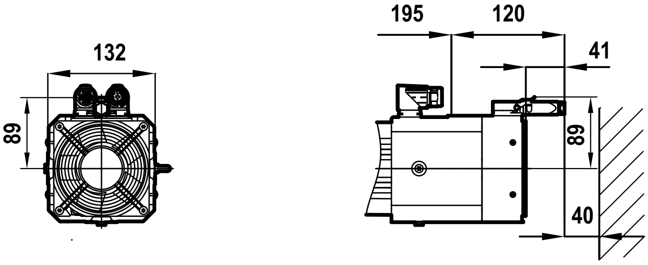

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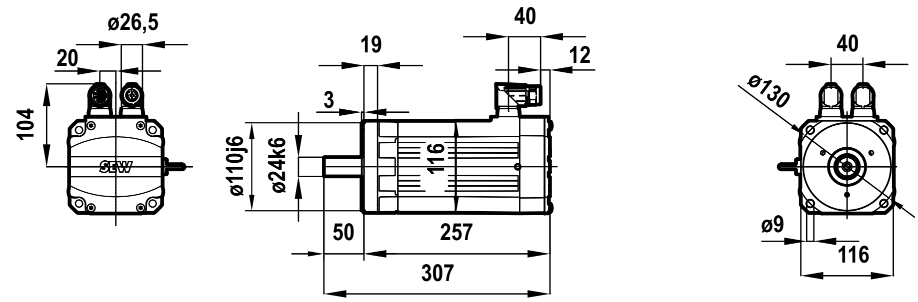

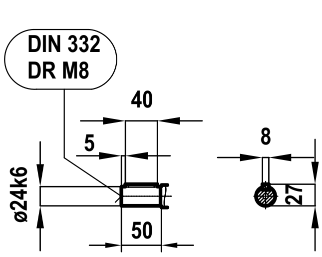

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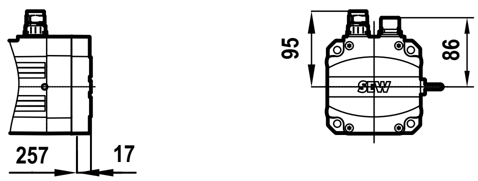

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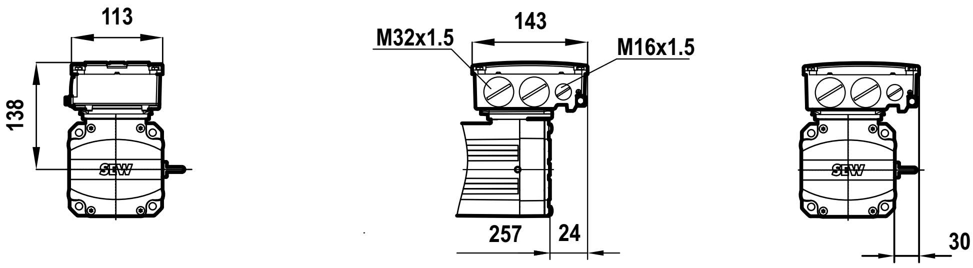

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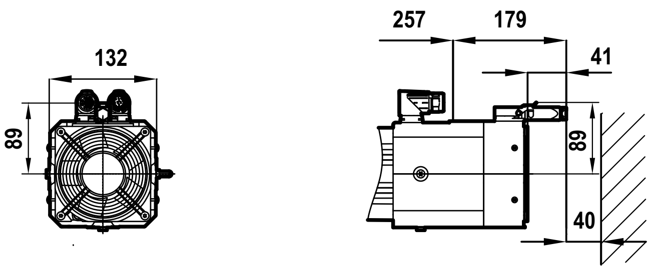

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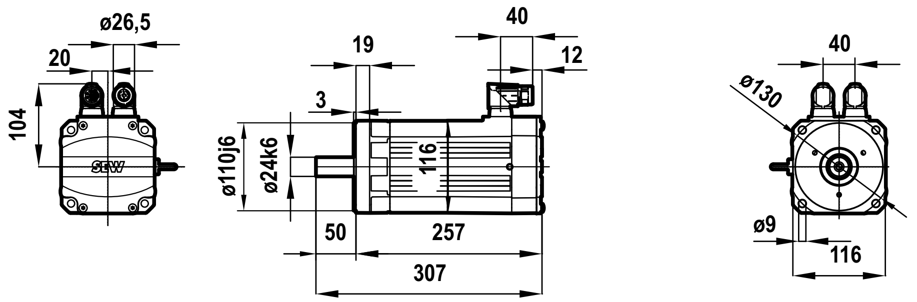

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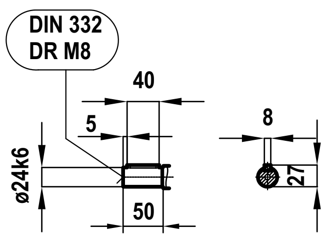

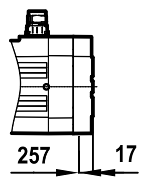

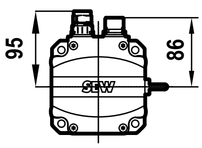

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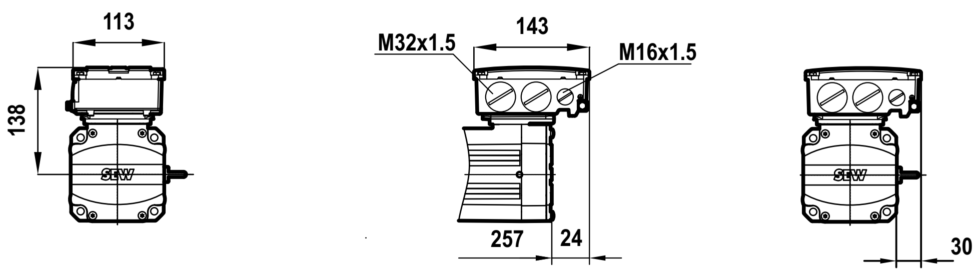

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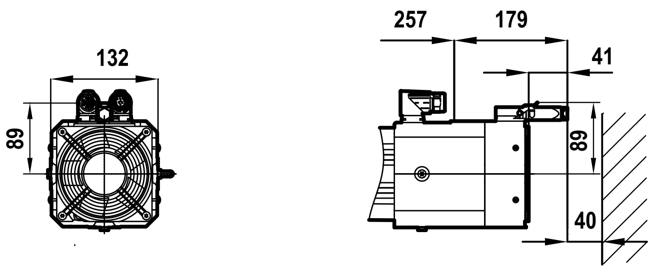

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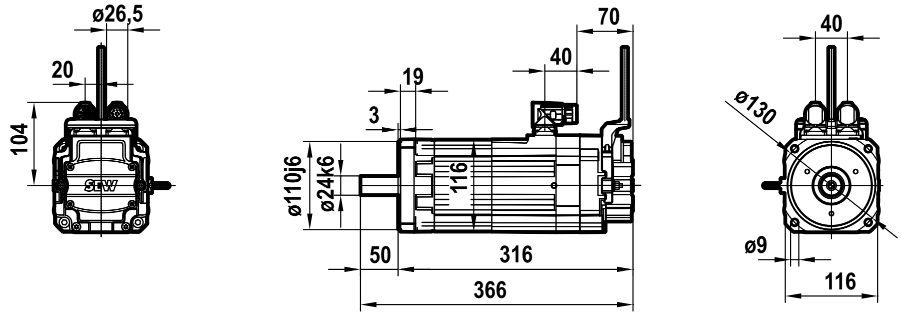

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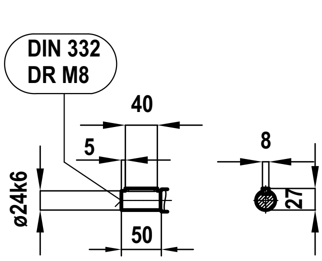

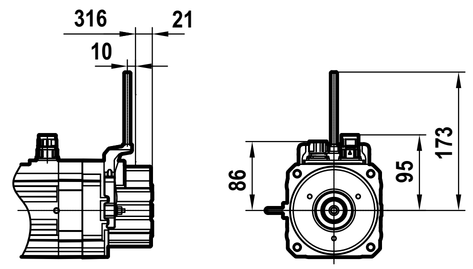

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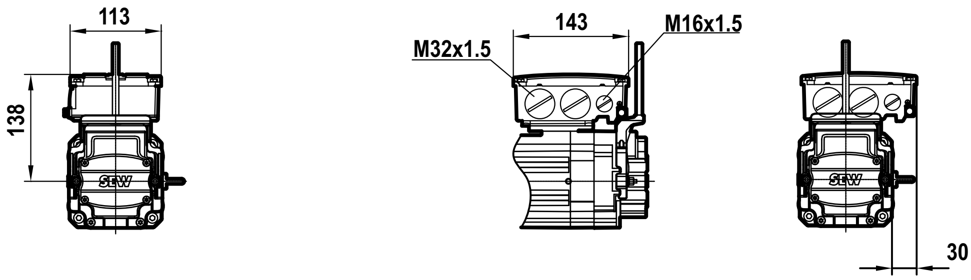

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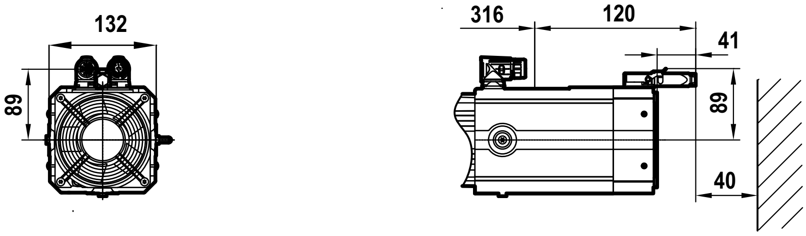

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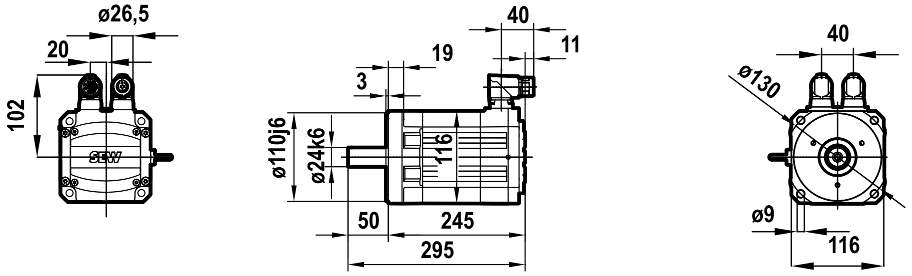

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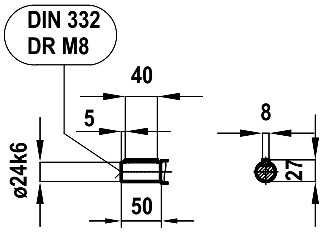

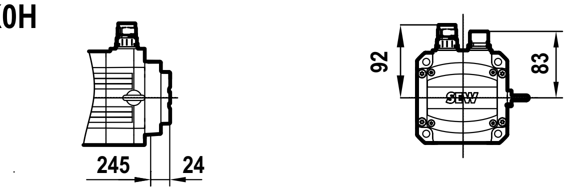

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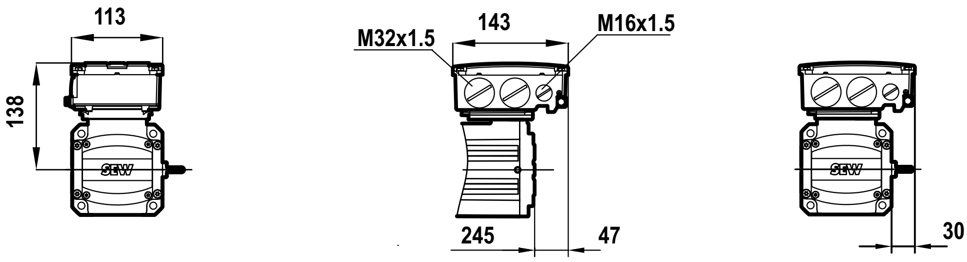

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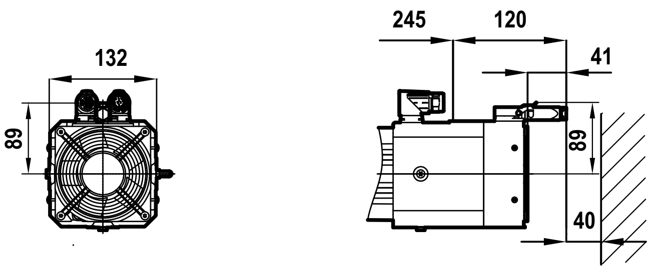

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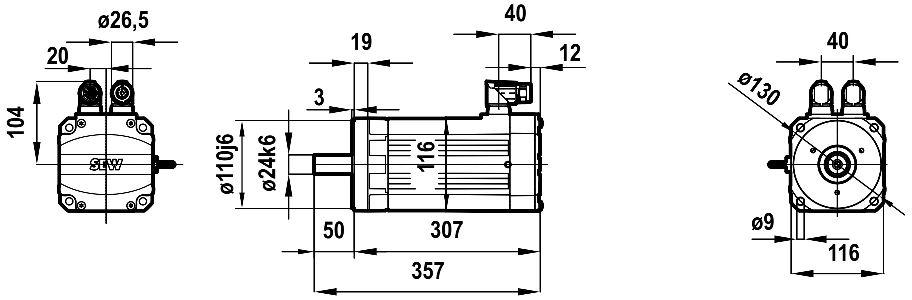

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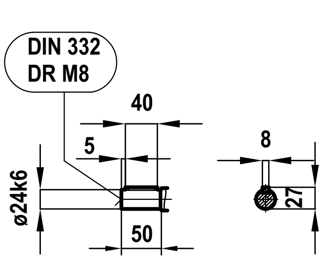

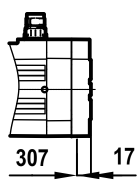

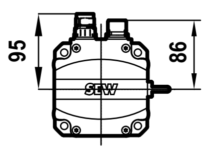

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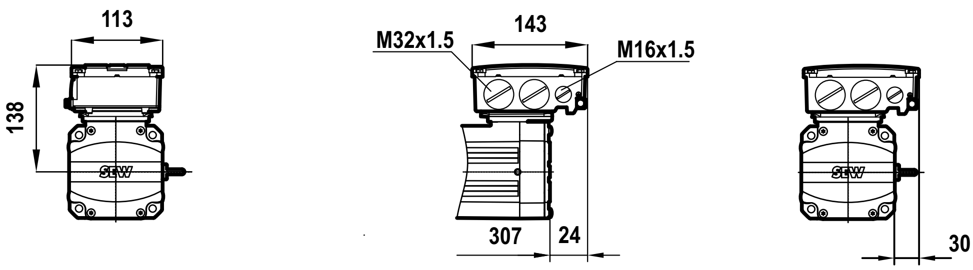

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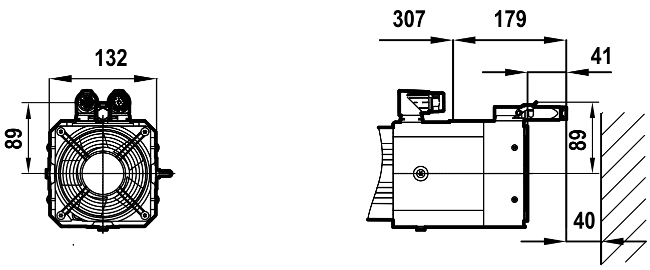

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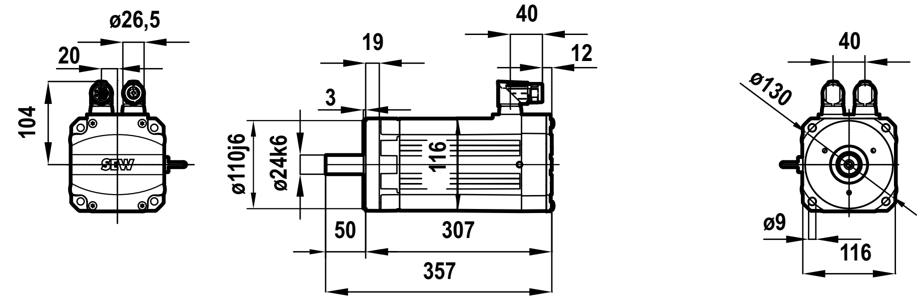

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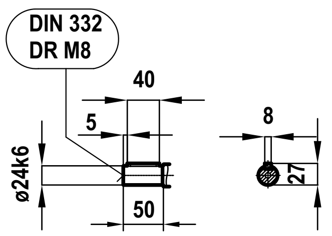

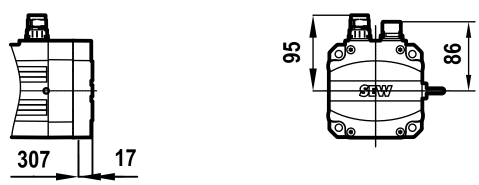

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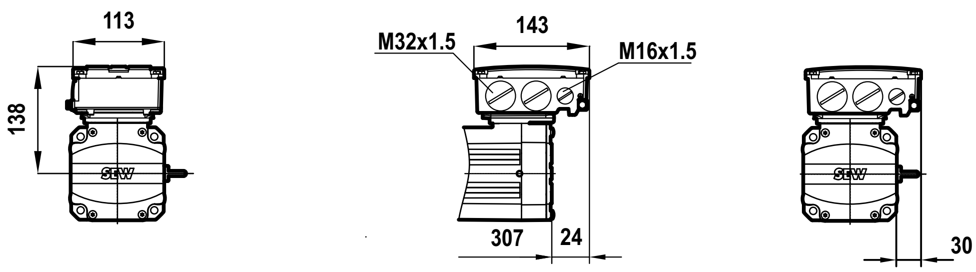

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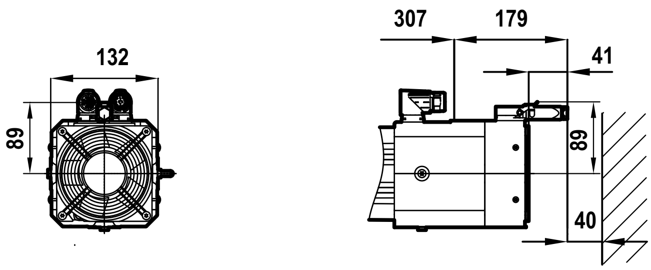

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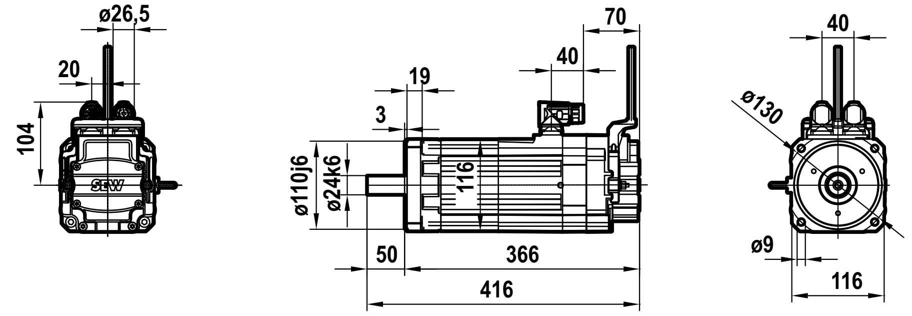

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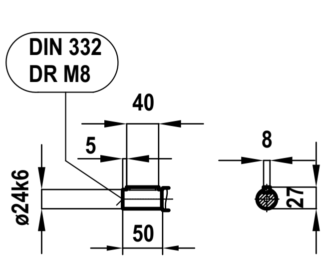

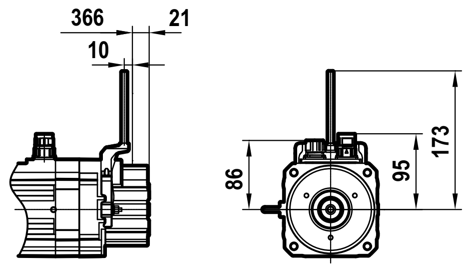

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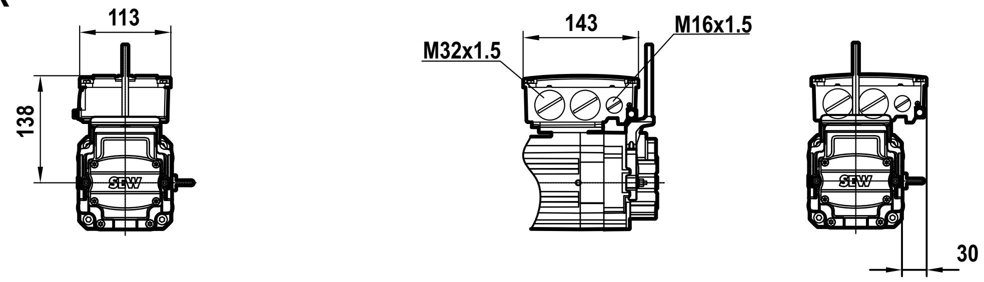

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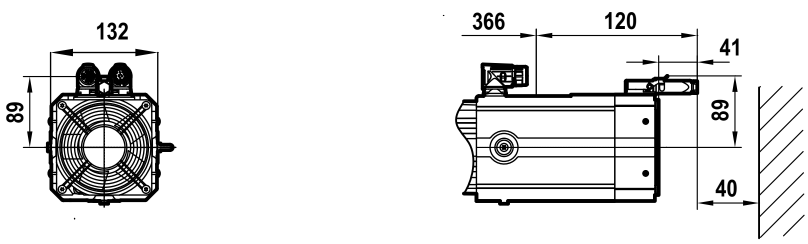

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CMP80S 08 471 01 08

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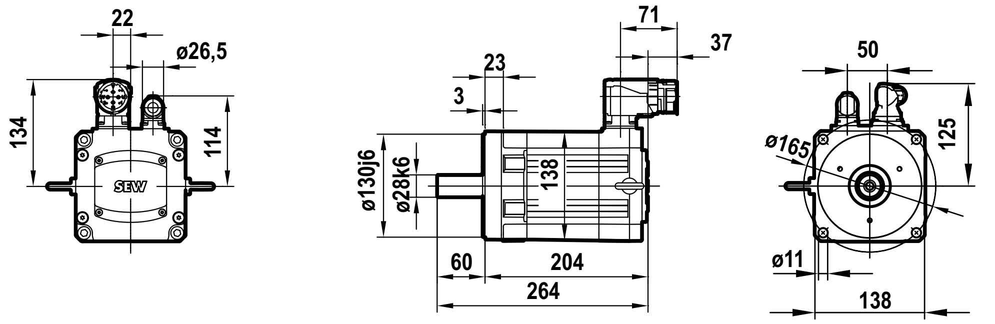

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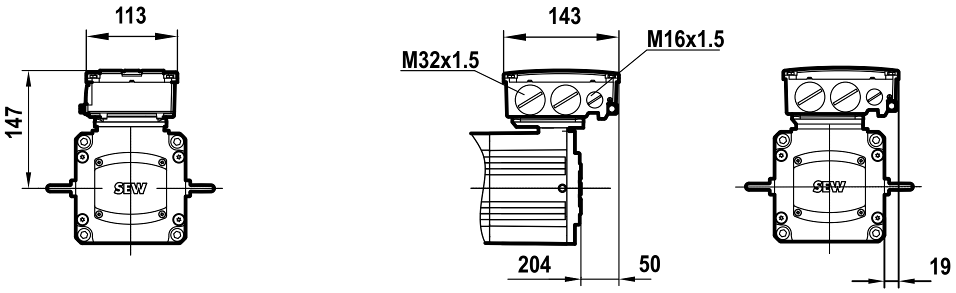

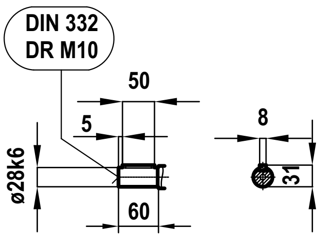

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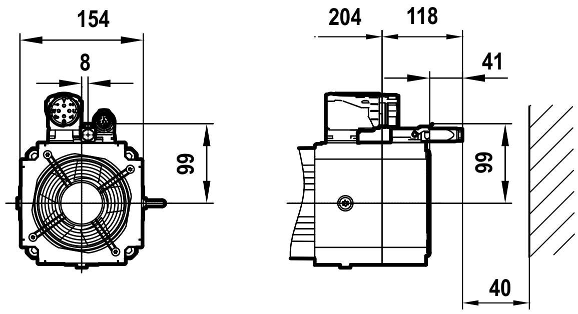

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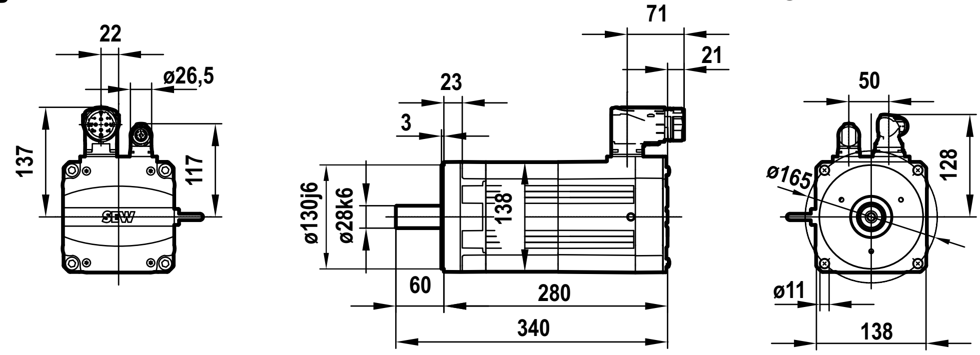
SBB /RH1M SB1



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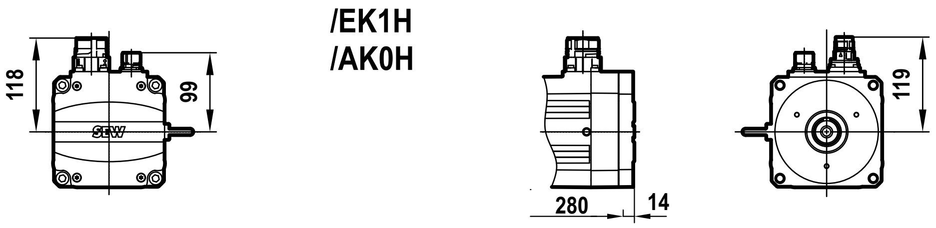

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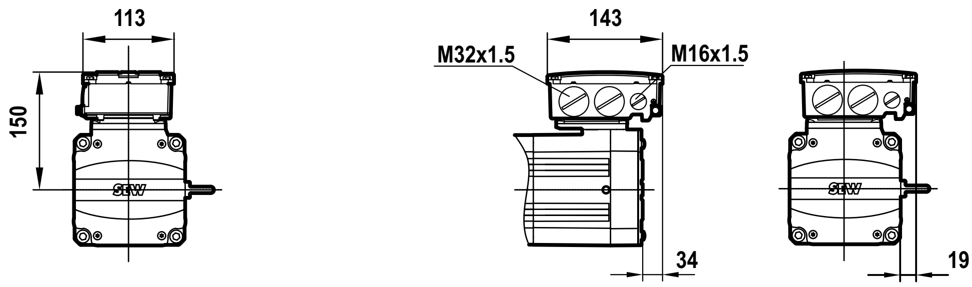

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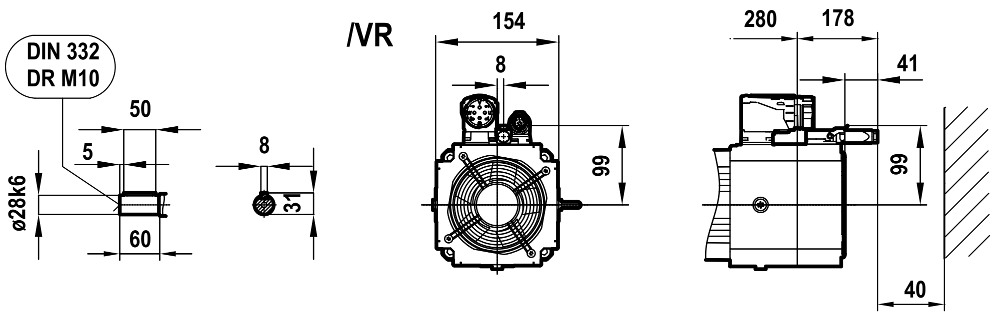

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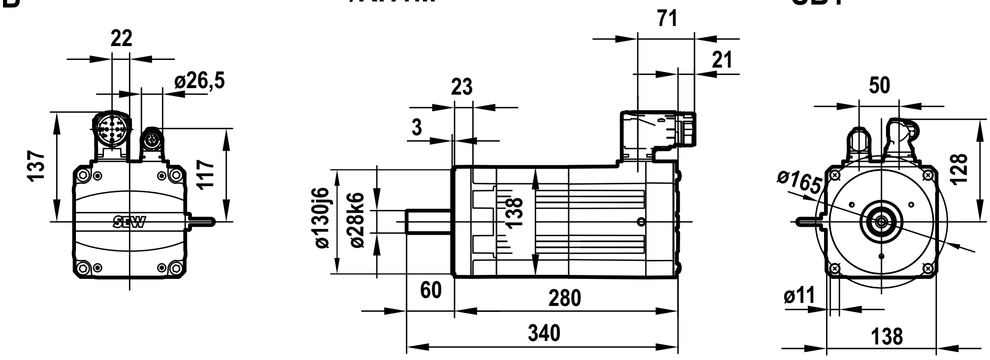

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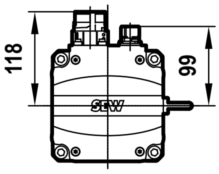

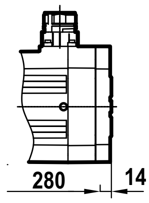

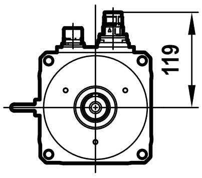

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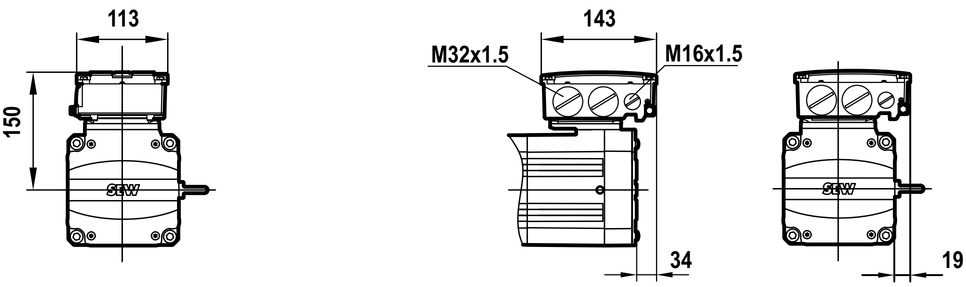

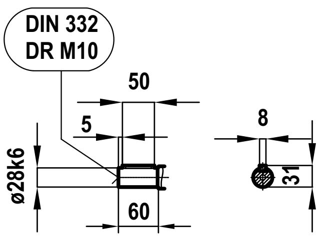

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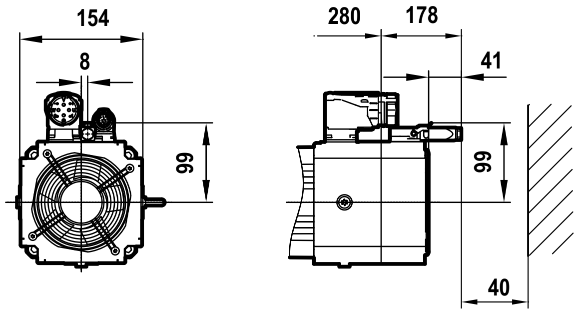

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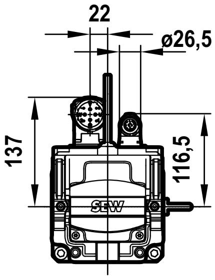

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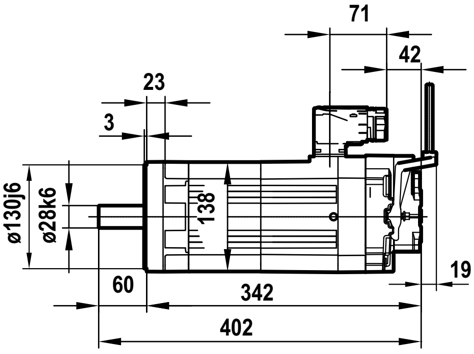

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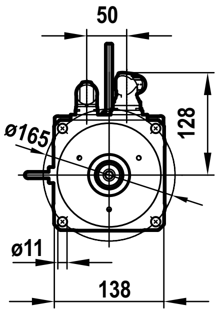

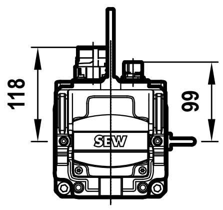

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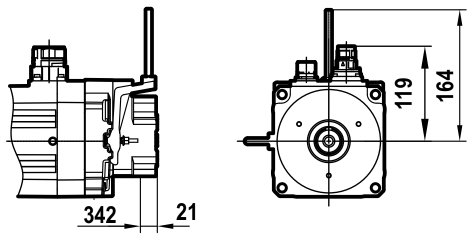

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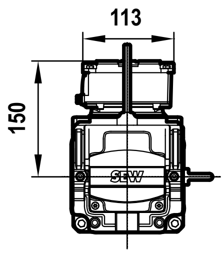

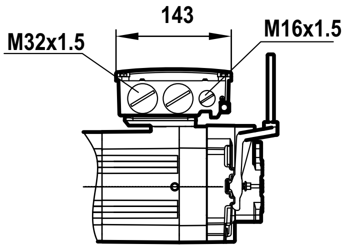

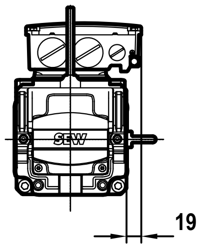

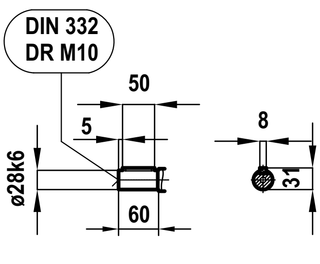

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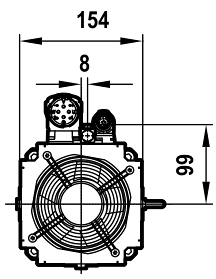

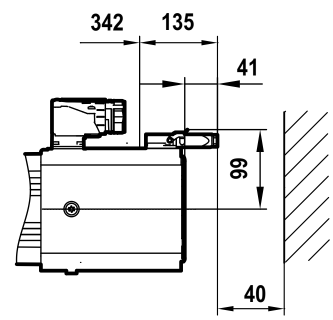

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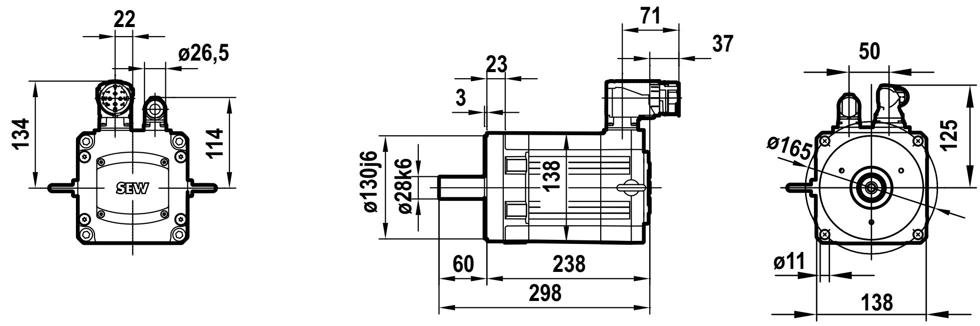

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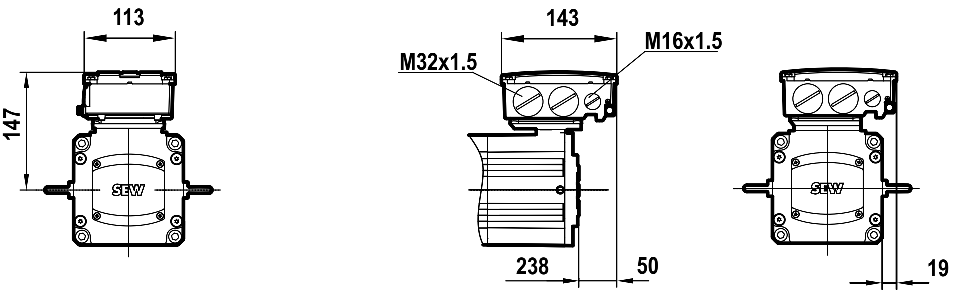

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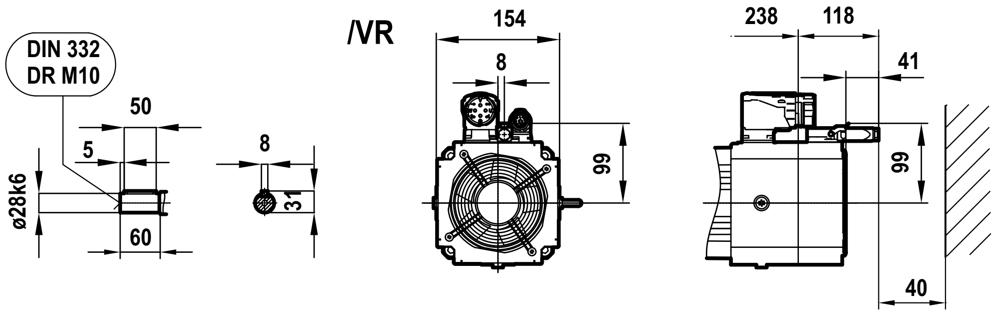

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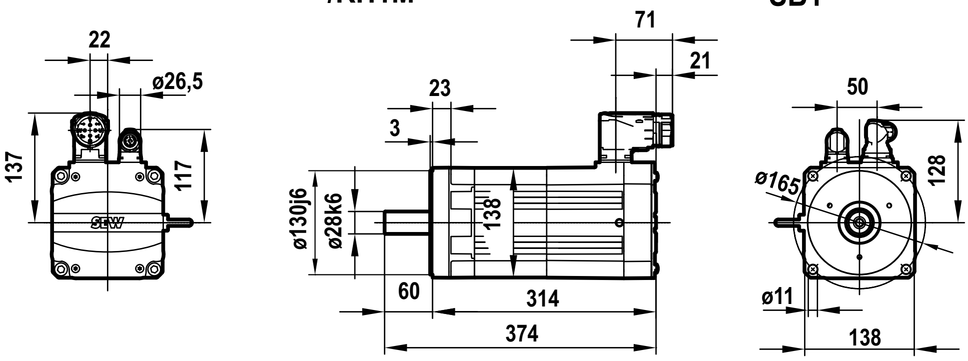

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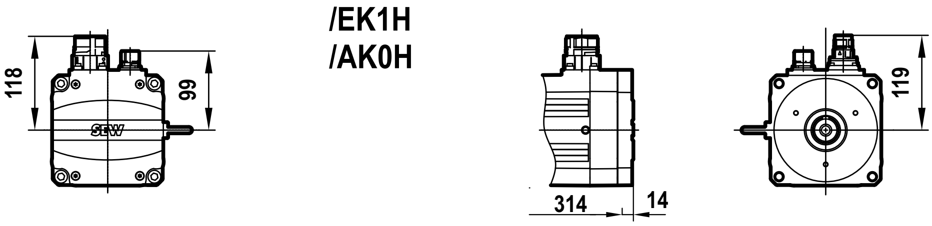

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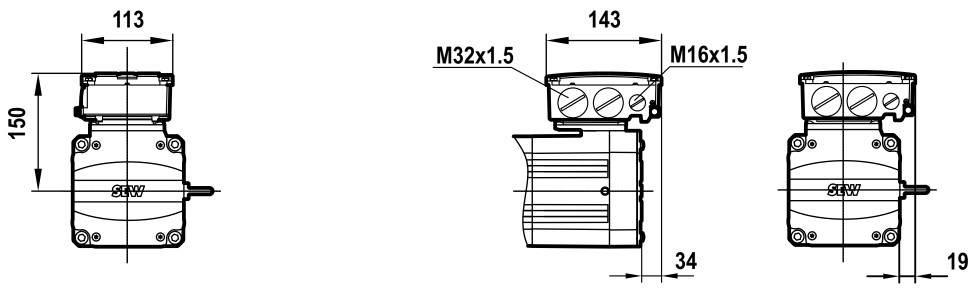

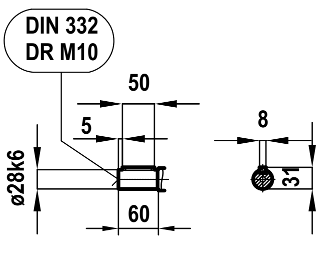

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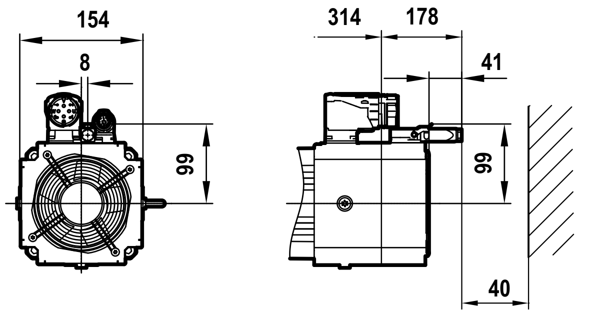

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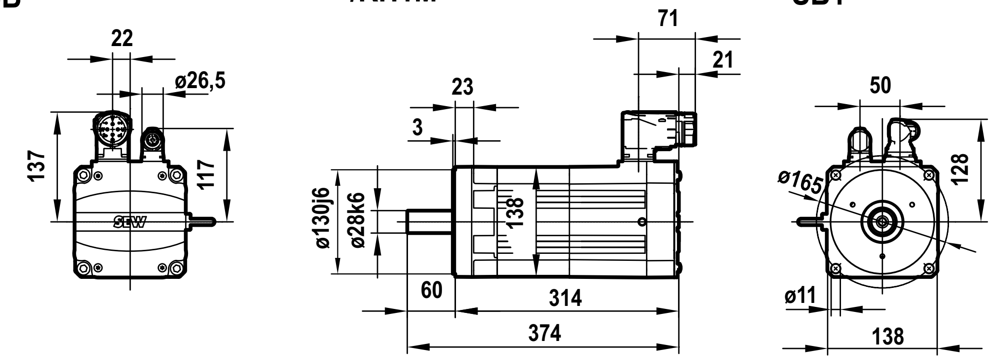

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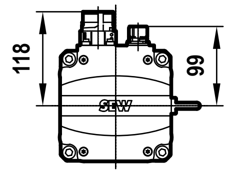

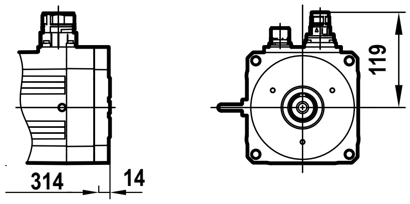

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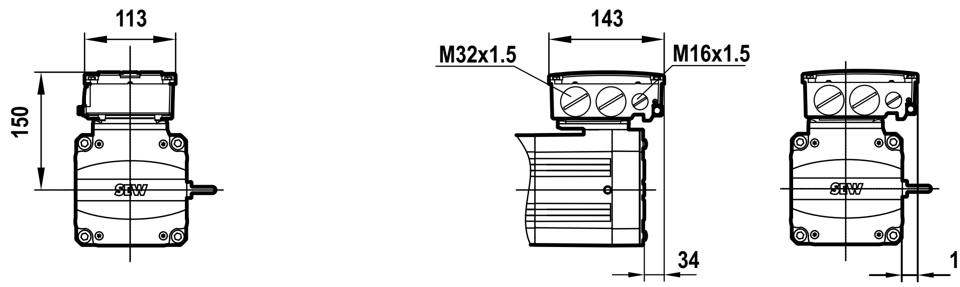

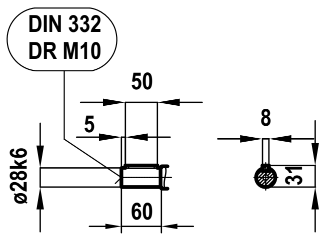

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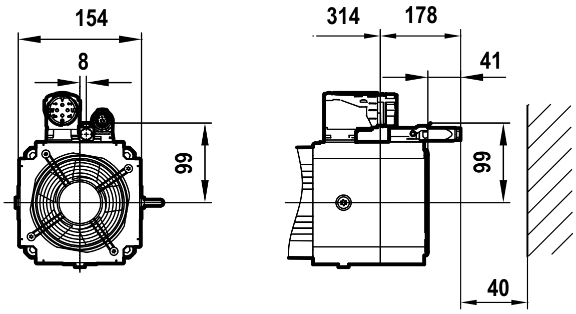

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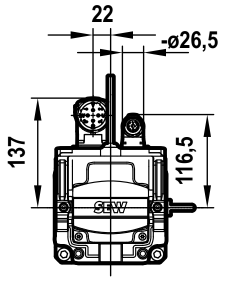

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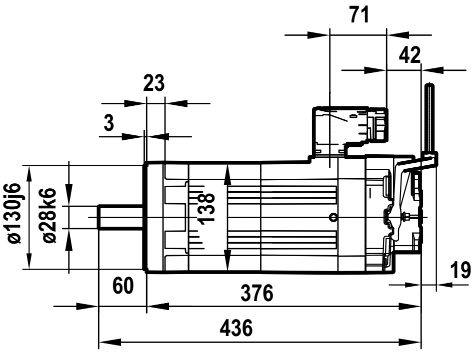

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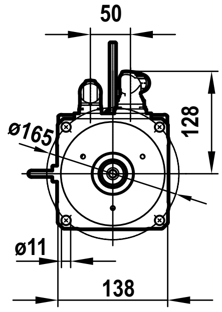

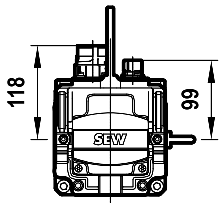

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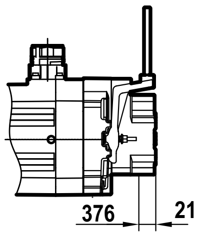

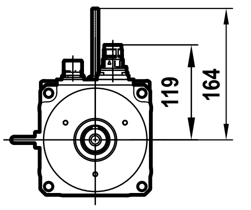

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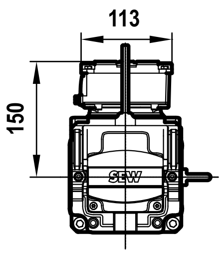

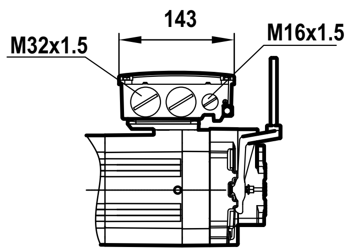

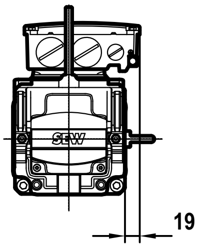

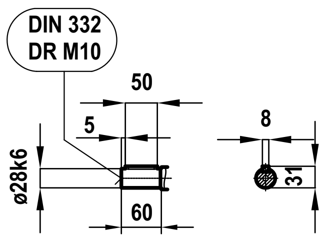

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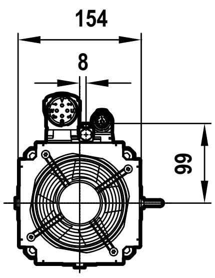

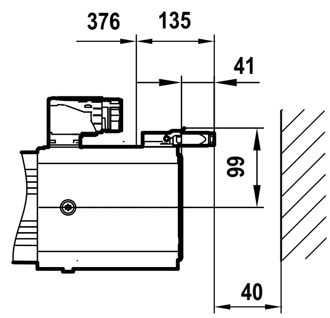

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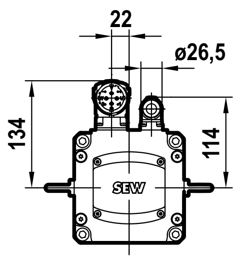

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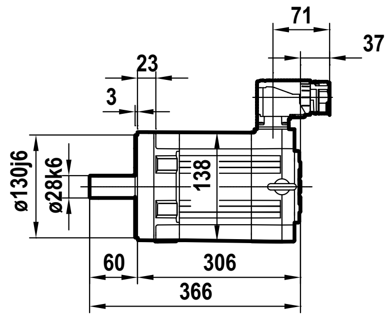

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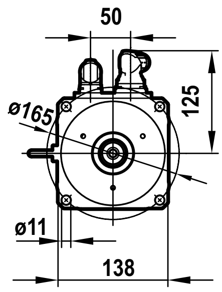

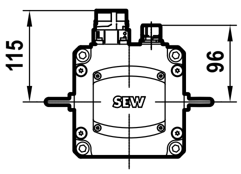

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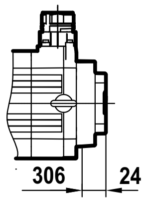

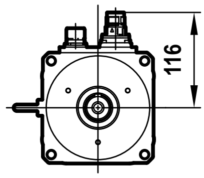

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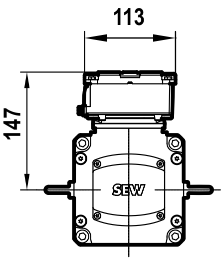

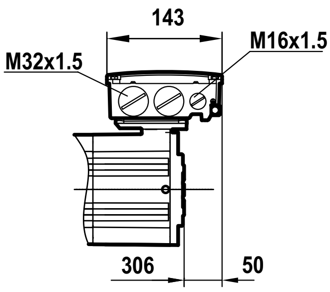

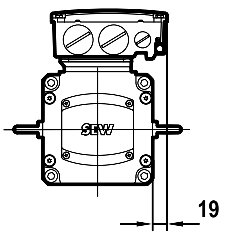

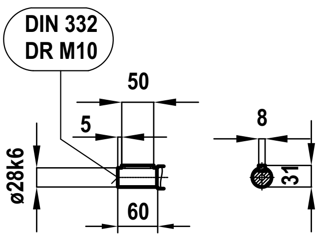

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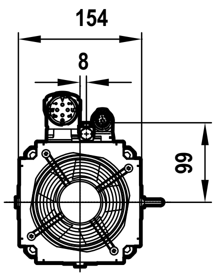

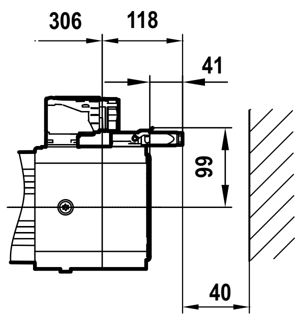

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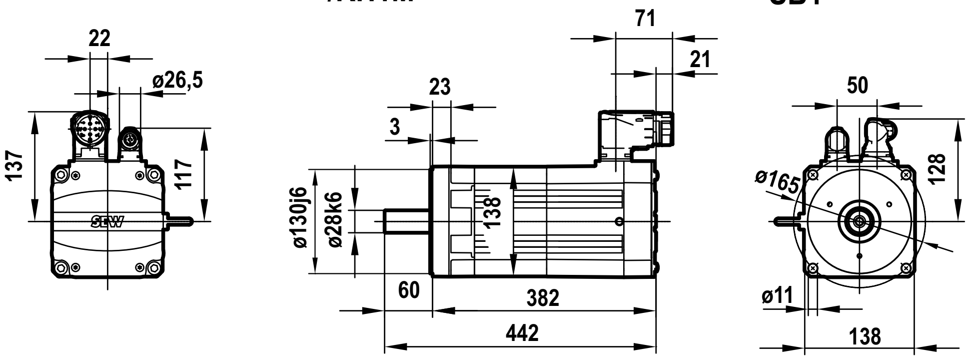

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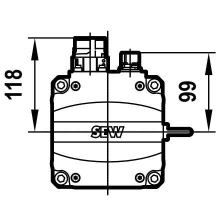

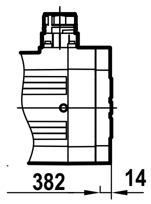

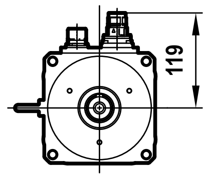

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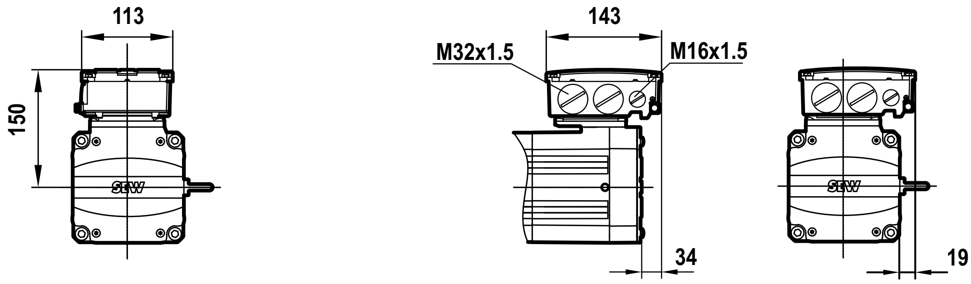

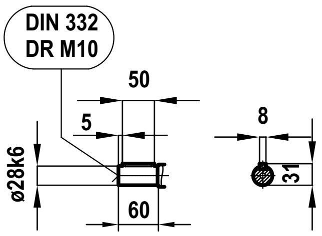

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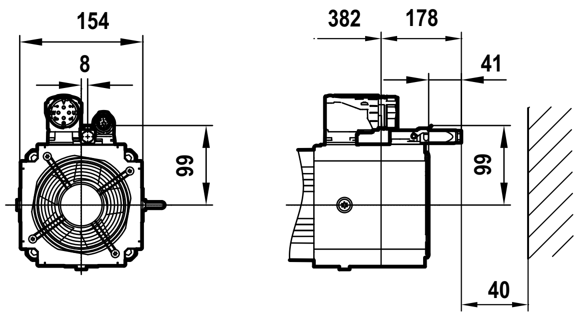

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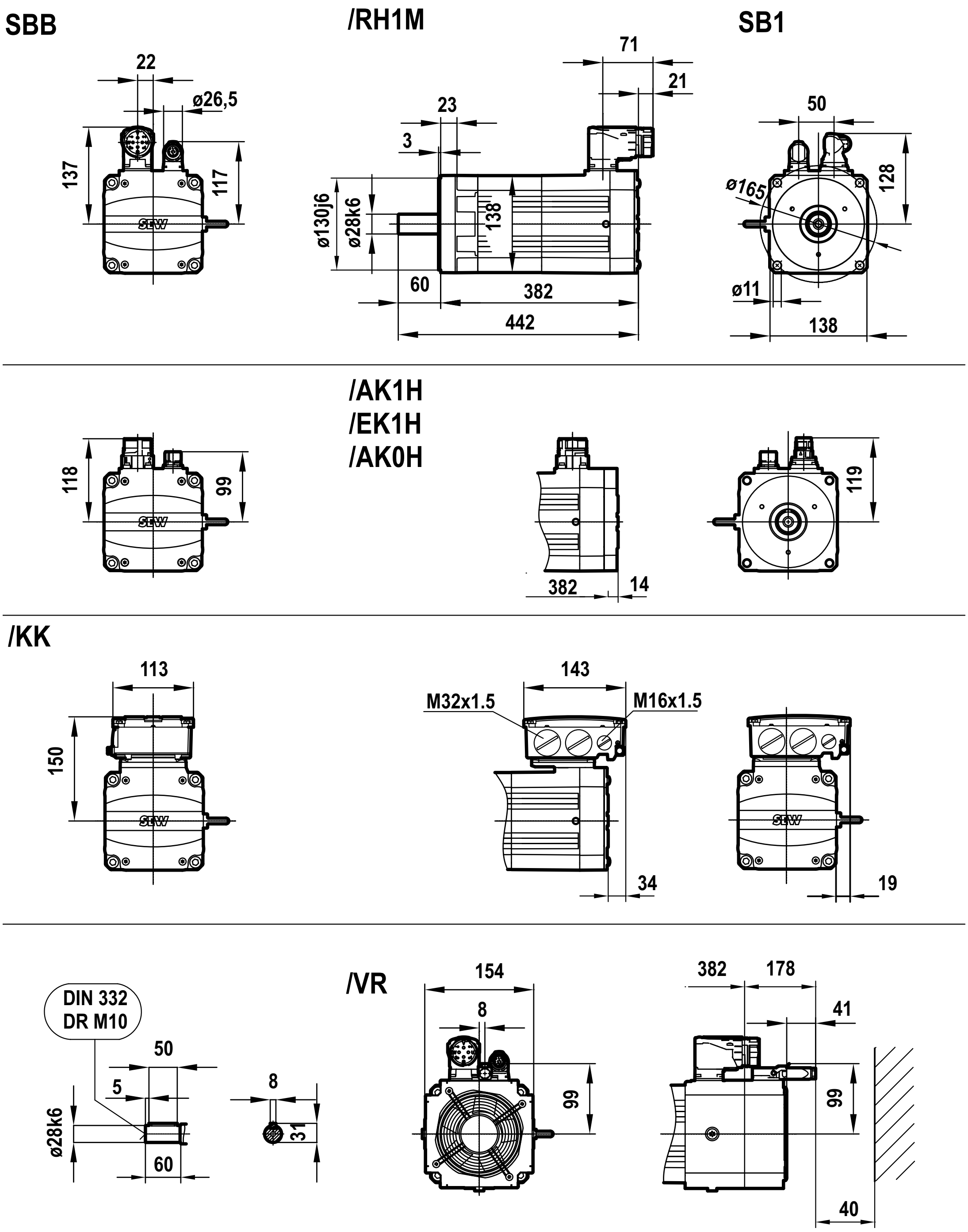

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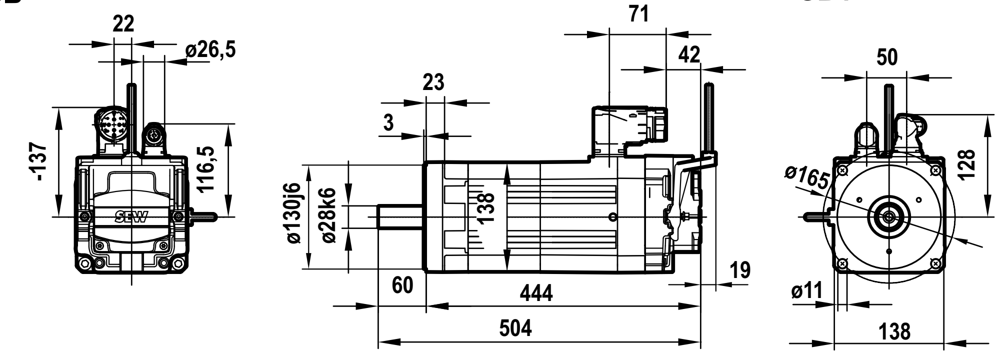

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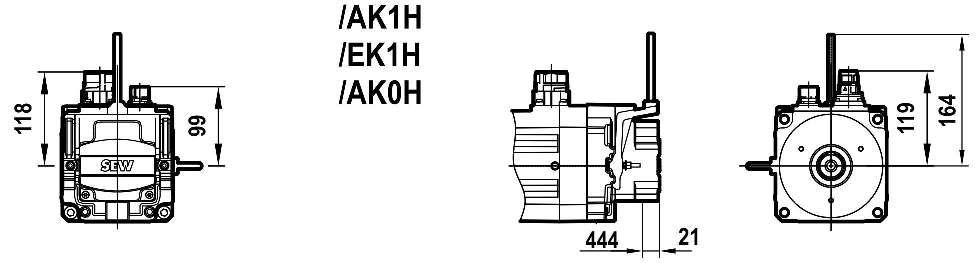

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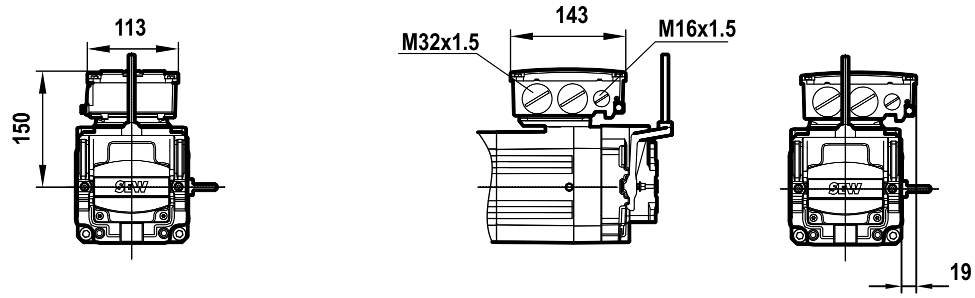

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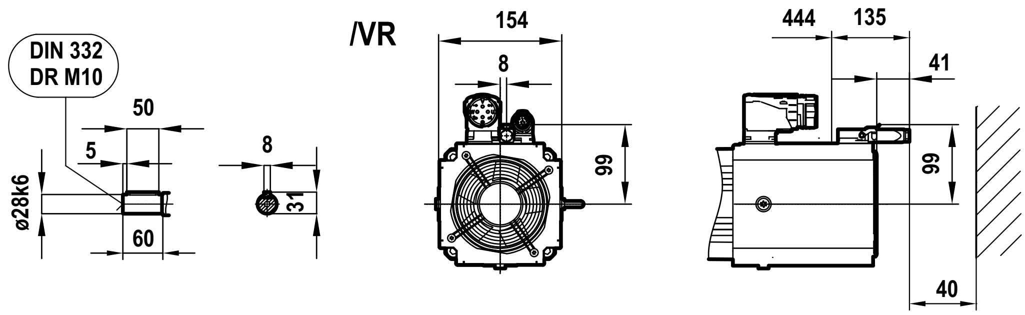

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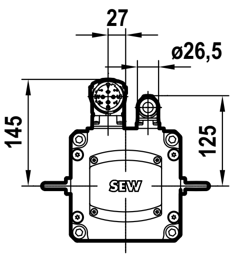

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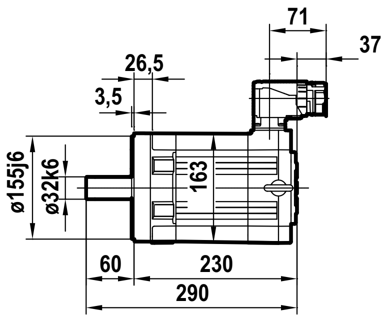

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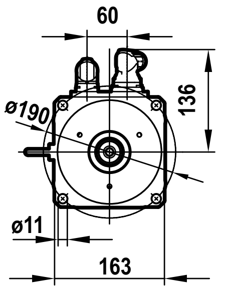

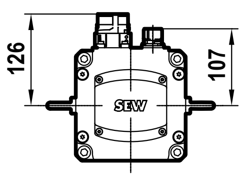

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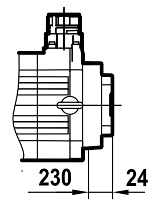

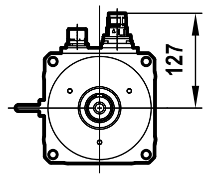

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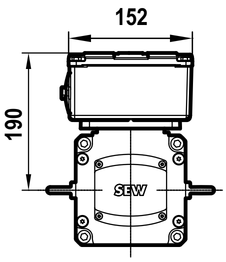

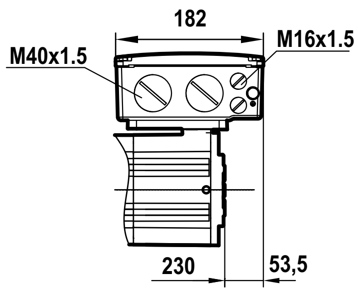

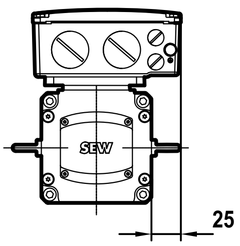

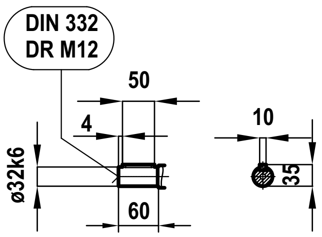

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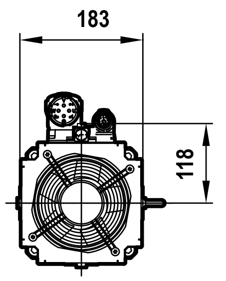

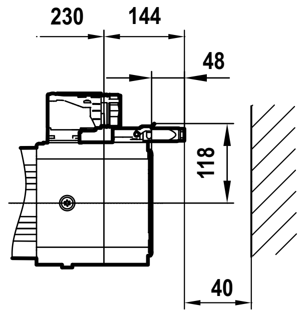

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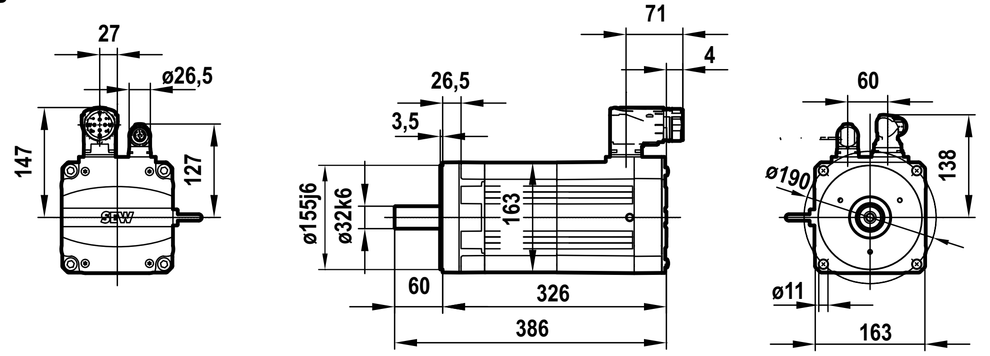

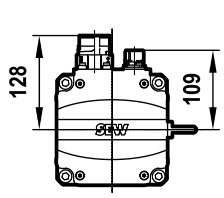

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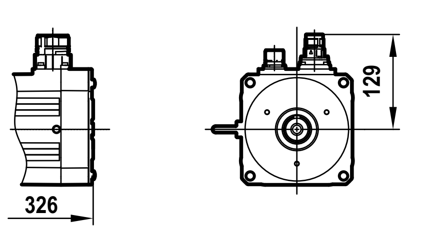

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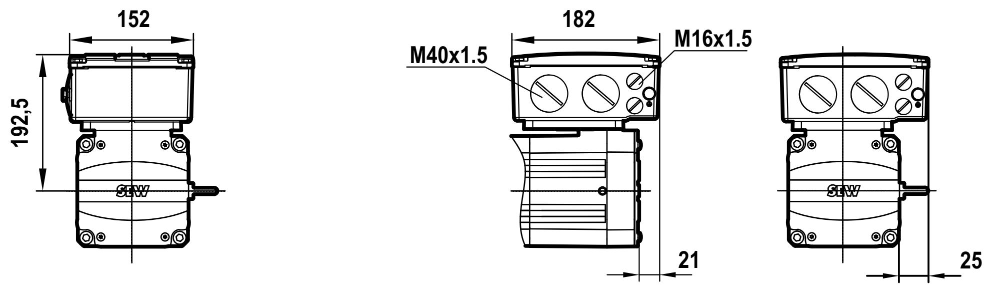

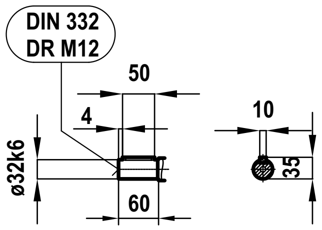

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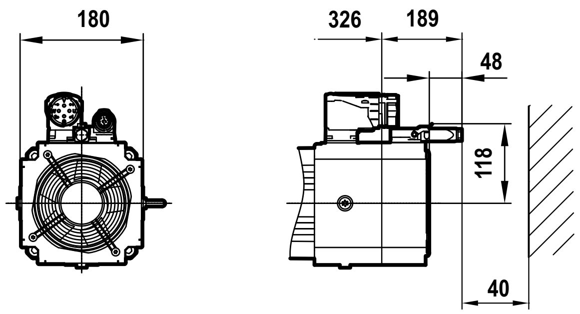

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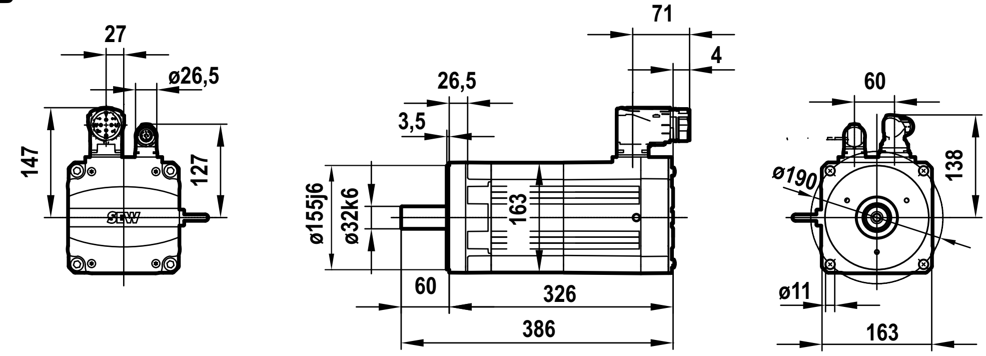

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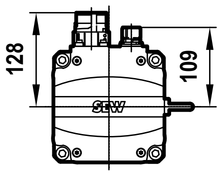

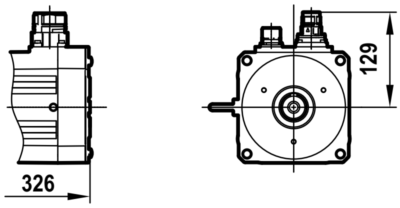

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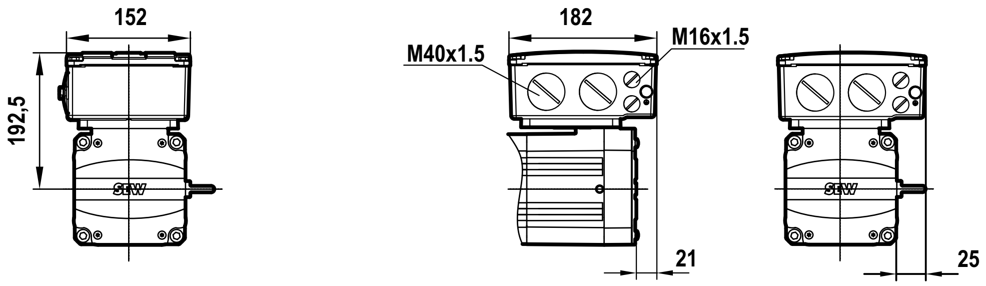

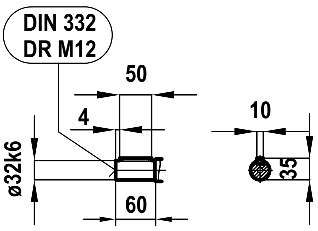

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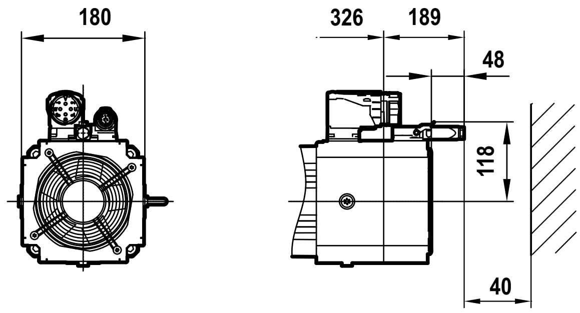

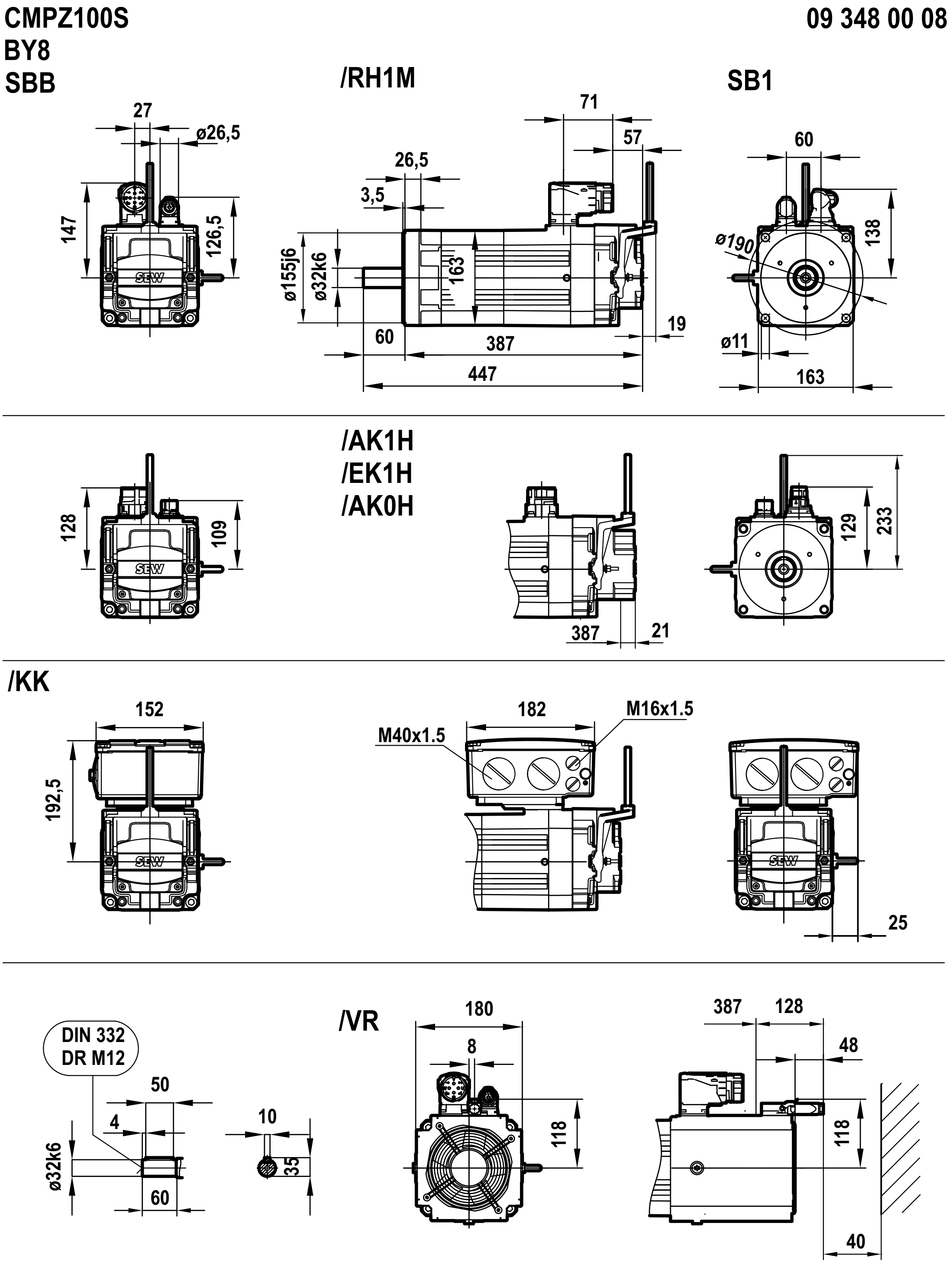
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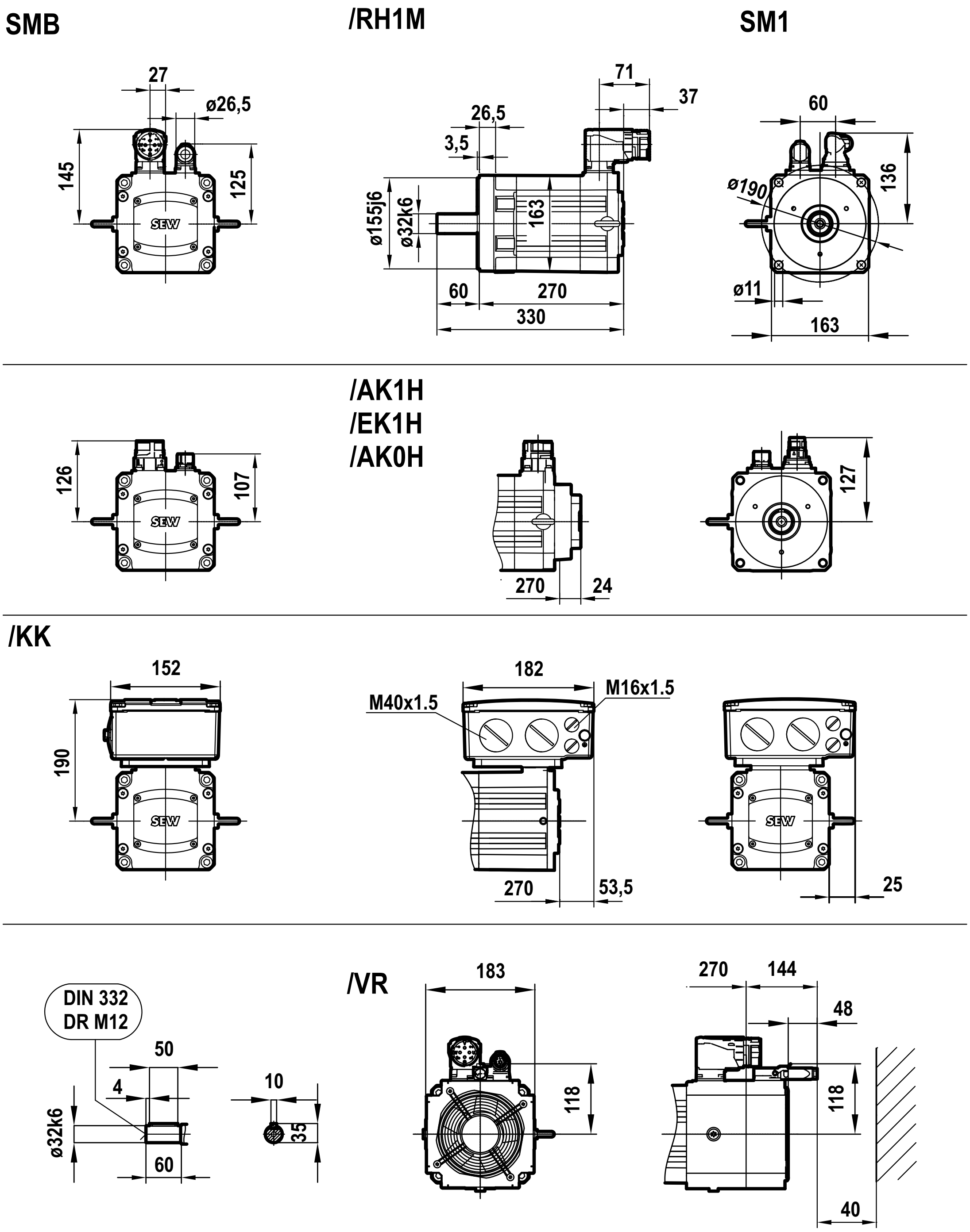

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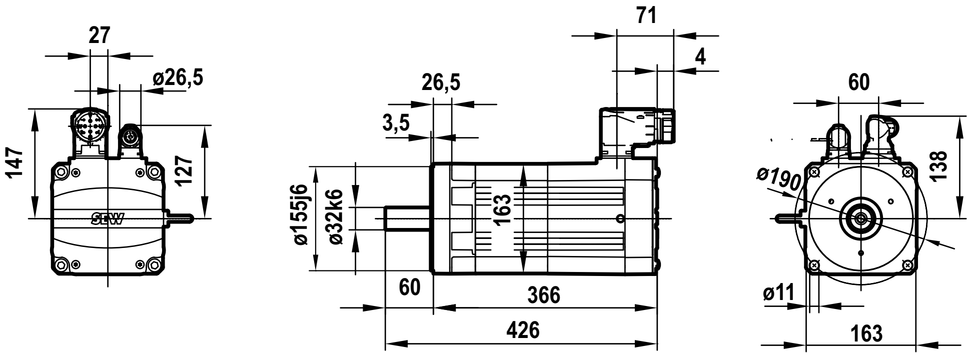

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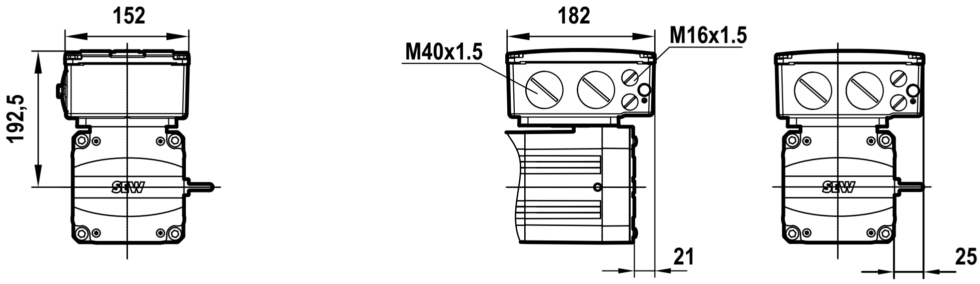

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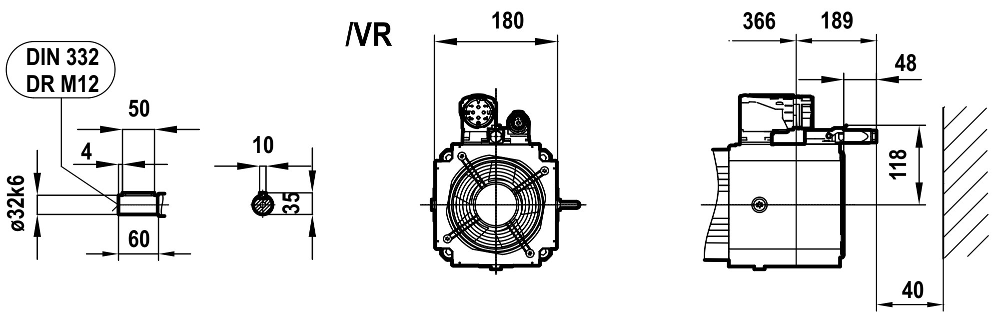

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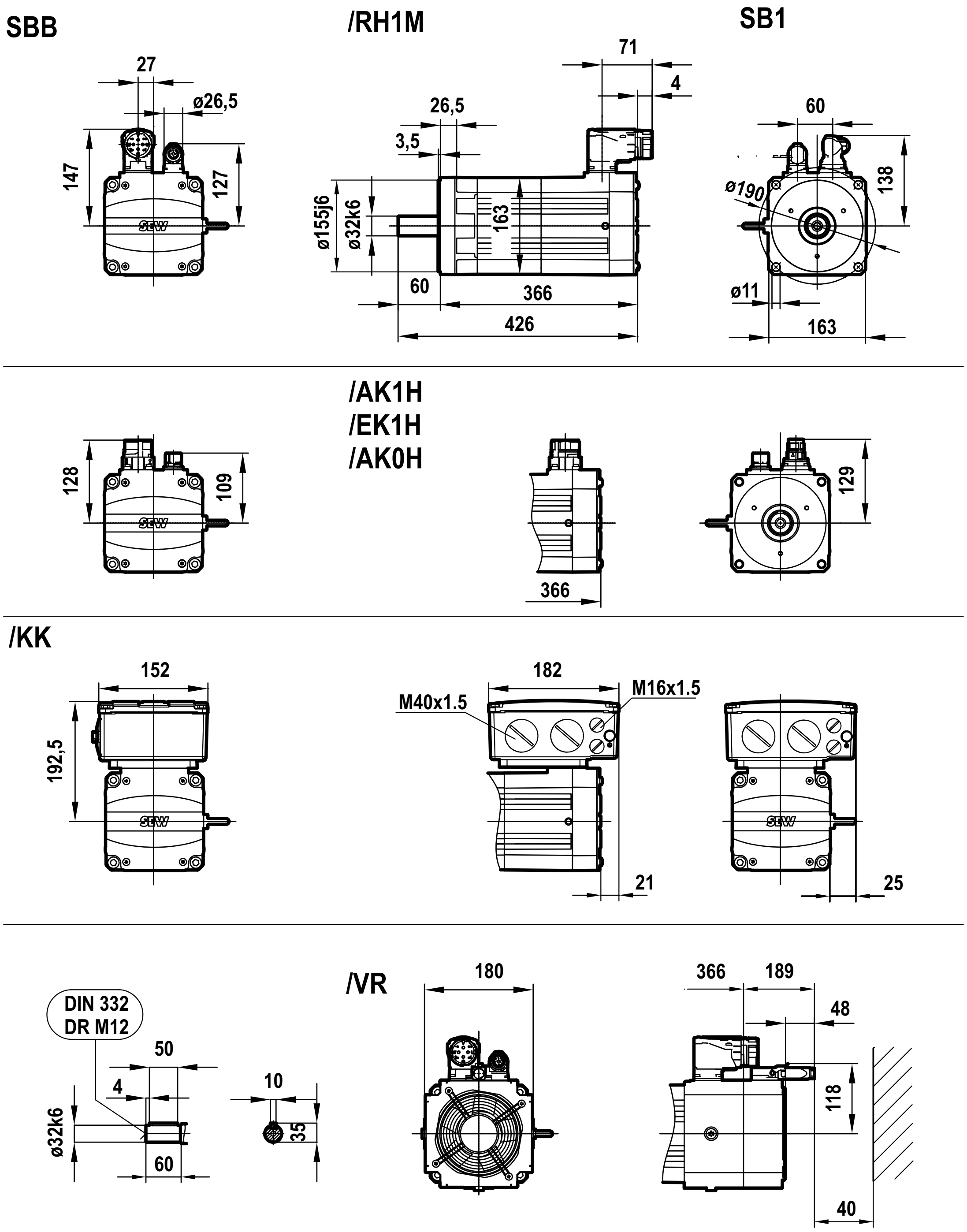

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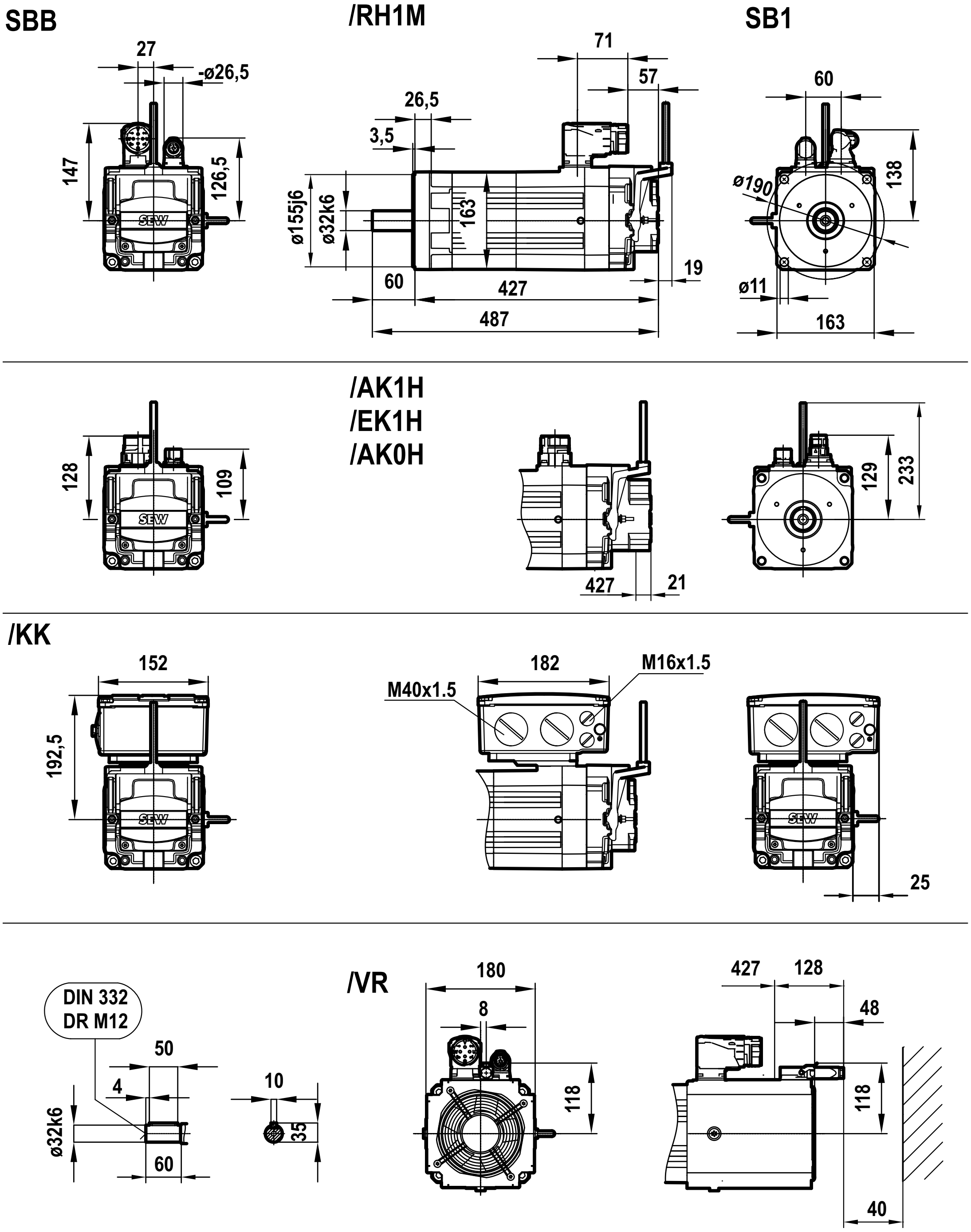

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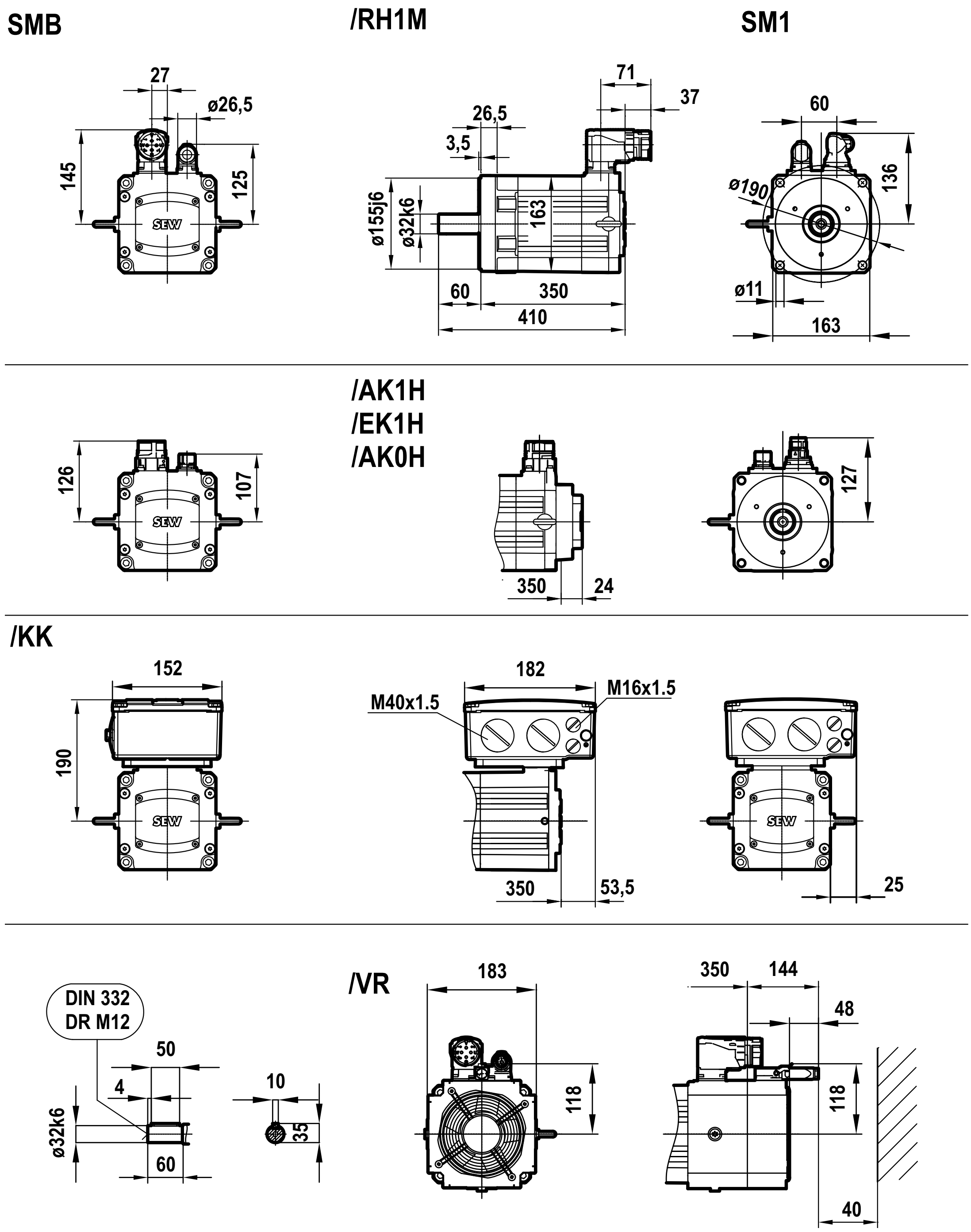

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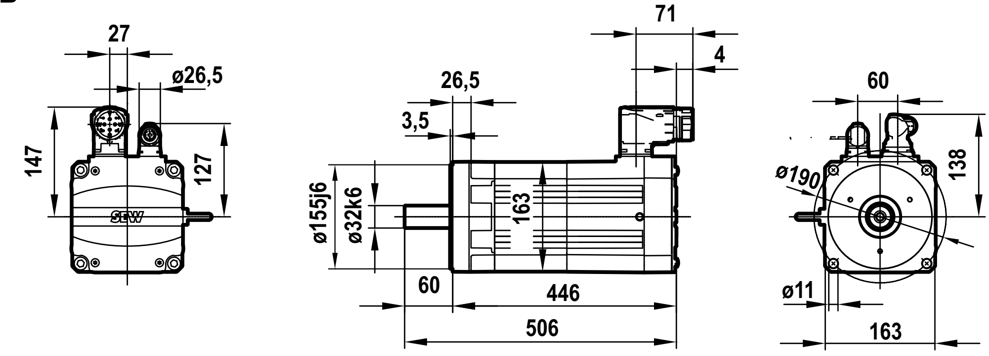

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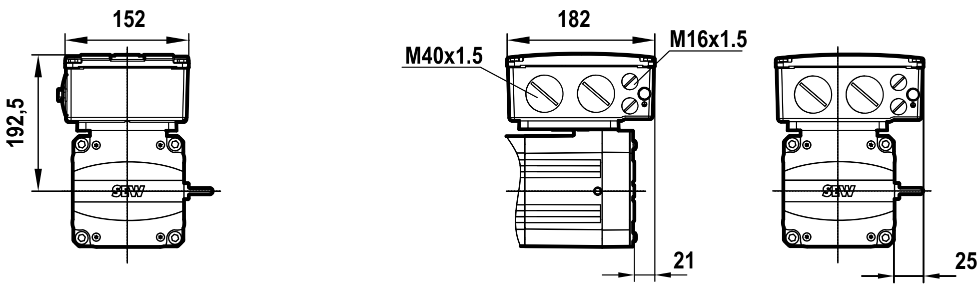

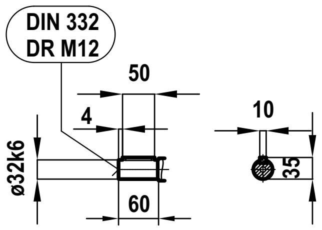

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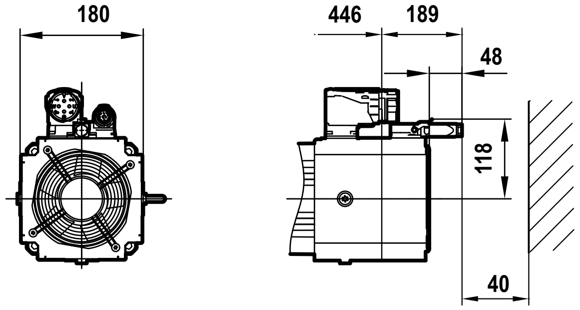

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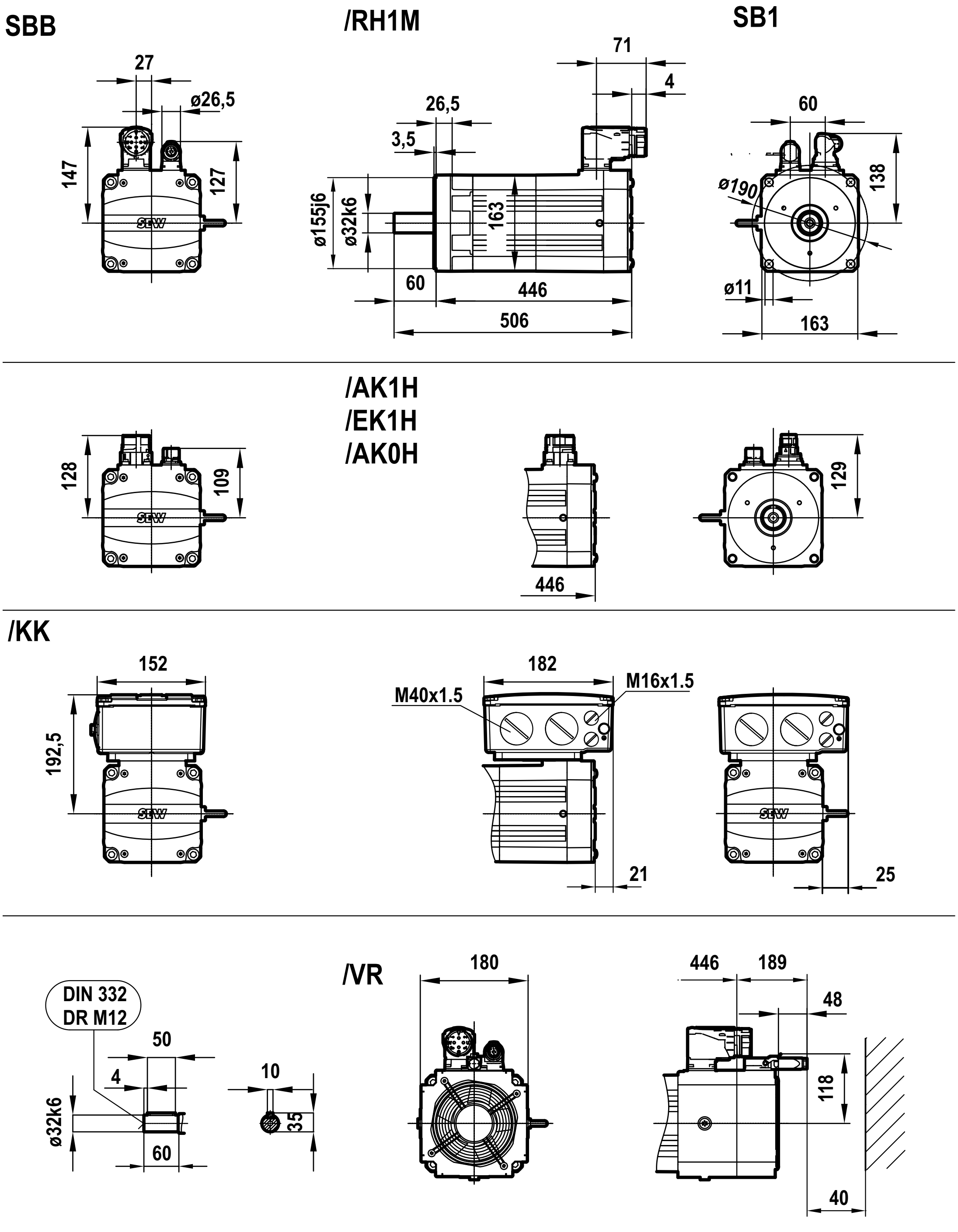

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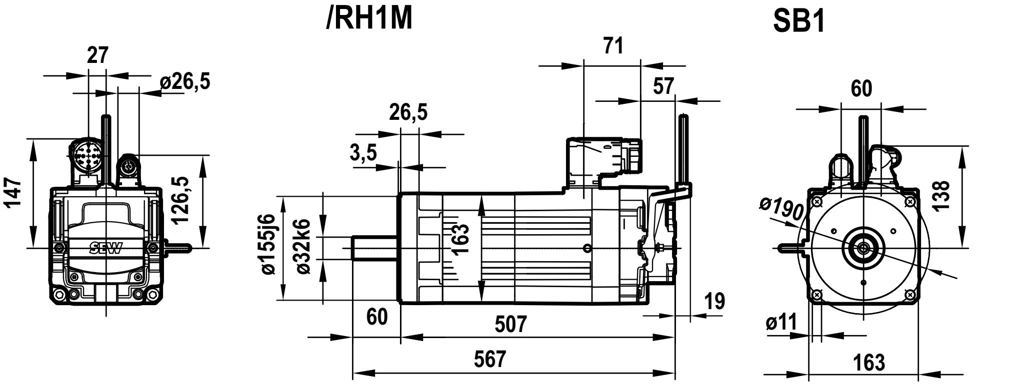

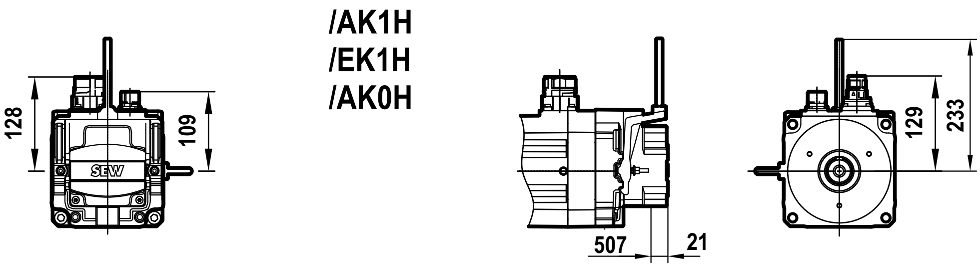

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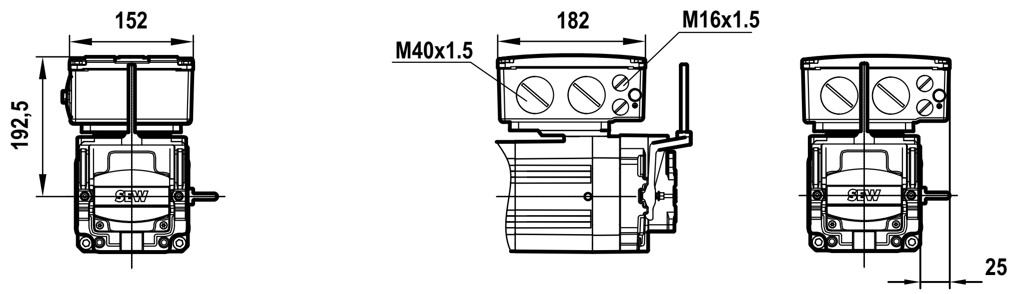
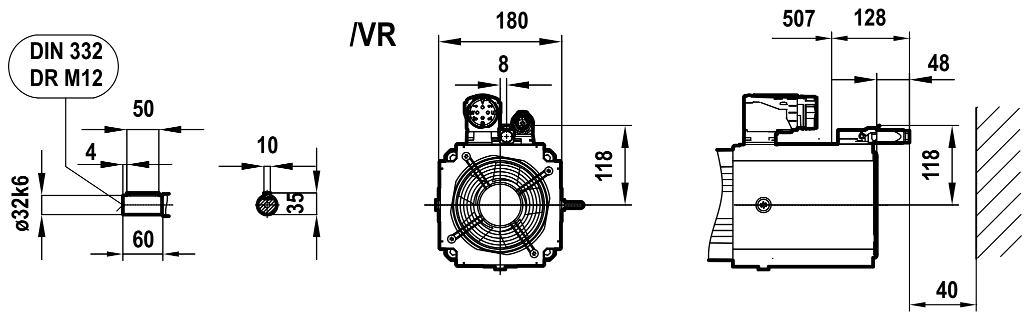




8 BP Brake

8.1 Description of the BP brake

BP holding brake

The mechanical brake is a holding brake implemented as a spring-loaded brake.

The brake has a standard supply voltage of DC 24 V and operates with one or two braking torque ratings for each motor size. For assignment, see page 155.

The brake cannot be retrofitted and usually operates without brake rectifier or brake control unit.

If the servomotors are operated on the MOVIAXIS® servo inverter, overvoltage protection is provided.

If the servomotors are operated on MOVIDRIVE® or inverters from other manufacturers, overvoltage protection must be implemented by the customers themselves using, for example, varistors.

Observe the notes in the relevant operating instructions for the inverters concerning the switching sequence of motor enable and brake control during standard operation.

The BP brake can be used for the following rated speeds depending on the motor size:

Motor type	Brake type	Speed class
CMP40	BP01	3000 / 4500 / 6000
CMP50S	BP04	
CMP50M/L		
CMP63S	BP09	
CMP63M/L		
CMP71S	BP1	
CMP71M/L		
CMP80S	BP3	3000 / 4500
CMP80M/L		
CMP100S	BP5	
CMP100M/L		

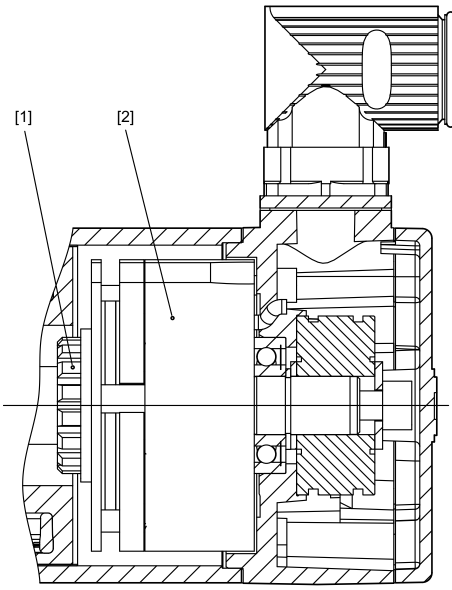
8.2 Principles of the BP brake

Basic structure

The SEW brake is an electromagnetic disk brake with a DC coil that releases electrically and brakes using spring force.

The system meets all fundamental safety requirements: The brake is applied automatically if the power fails.

Principle structure of the 24 V spring-loaded brake:



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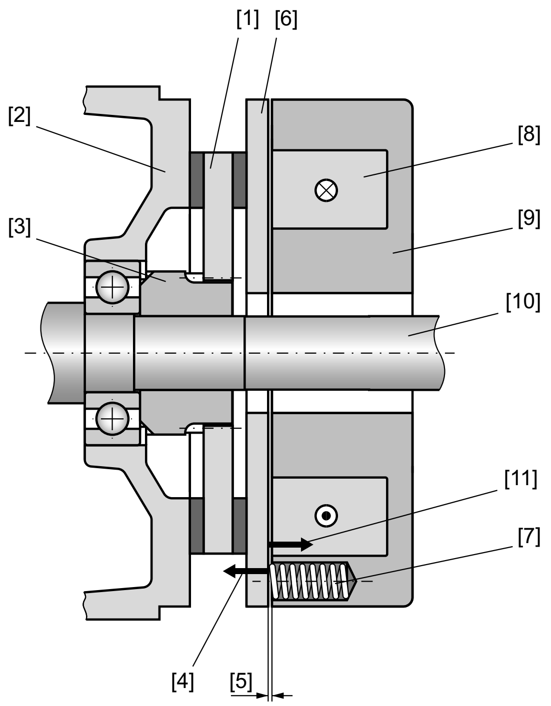
[1] Driver [2] Complete brake

Basic functions

The pressure plate is forced against the brake disk by the brake springs when the electromagnet is deenergized. The brake is applied to the motor. Braking torque determined by number and type of brake springs. When the brake coil [8] is connected to the corresponding DC voltage, the force of the brake springs [4] is overcome by magnetic force [11], thereby bringing the pressure plate into contact with the magnet. The brake disc moves clear and the rotor can turn.



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

8.3 General information

The size of the brakemotor and its electrical connection must be selected carefully to ensure the longest possible service life.

The following aspects described in detail must be taken into account:

1. Selecting the braking torque in accordance with the project planning data, see page 149.
2. Dimensioning and routing the cable, see page 150.
3. Selecting the brake contactor, if applicable, see page 150.
4. Important design information, see page 151.

8.4 Selecting the brake according to the project planning data

The braking torque is determined when the drive motor is selected. The drive type or application areas and the standards that have to be taken into account are used for the brake selection.

Selection criteria:

- Servomotor
- Amount of braking torque (soft braking"/hard braking")

Selecting the brake

The brake type is selected on the basis of the braking torque. For assignments of motor/brake type/braking torque, go to page 155.

Working capacity in case of EMERGENCY STOP

Braking work per braking cycle in case of EMERGENCY STOP:

$$W_1 = \frac{J_{ges} \times n^2 \times M_B}{182.4 \times (M_B \pm M_L)}$$

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Z	= Number of braking operations
W_{ges}	= Total braking work [J]
W_1	= Braking work per braking operation [J]
J_{ges}	= Total mass moment of inertia (related to the motor shaft) in [kg m^2]
n	= Motor speed [1/min]
M_B	= Braking torque [Nm]
M_L	= Load torque [Nm] (note the sign) +: for vertical upward and horizontal movement -: for vertical downward movement

Braking torque for hoist applications

The BP brake is suitable for hoist applications with restrictions.

For higher braking torques and braking work, see BY brake page 158 et seq.

8.5 Dimensioning and routing the cable

a) Selecting the cable

Select the cross section of the brake cable according to the currents in your application. Observe the inrush current of the brake when selecting the cross section. When taking the voltage drop into account due to the inrush current, the value must not drop below 90 % of the rated voltage. The data sheets for the brakes provide information on the possible supply voltages and the result operating currents.

For a quick source of information about dimensioning the cable cross sections and cable lengths, refer to chapter "Assignment table of cables and CMP servomotors", page 205 and subsequent pages.

Wire cross sections of max. 2.5 mm^2 **can be connected to the terminals of the brake control systems. Intermediate terminals must be used if the cross sections are larger.**

b) Routing information

Brake cables must always be routed separately from other power cables with phased currents unless they are shielded.

Ensure adequate equipotential bonding between the drive and the control cabinet (for an example, see the documentation Drive Engineering - Practical Implementation ãEMC in Drive Engineering").

Power cables with phased currents are in particular

- Output cables from frequency inverters and servo controllers, soft start units and brake units
- Supply cables to braking resistors

8.6 Selecting the brake contactor

In view of the high current loading and the DC voltage to be switched at inductive load, the switchgear for the brake voltage has to have a special DC contactor.

It is simple to select the brake contactor for supply system operation:

- The contactor is configured for DC3 operation with DC 24 V.

If the system complies with the specifications for direct brake control, a BP brake can also be controlled directly via the brake output of a MOVIAXIS® servo inverter.

However, the brakes of motors CMP80 and CMP100 can never be directly connected to MOVIAXIS®. For detailed information, refer to the "MOVIAXIS® Multi-Axis Servo Inverter" project planning manual.

8.7 Important design information

a) EMC (Electromagnetic compatibility)

The EMC instructions in the servo controller documentation must also be taken into account for the operation of SEW servomotors with brake.

Observe the instructions regarding the cable routing (see above).

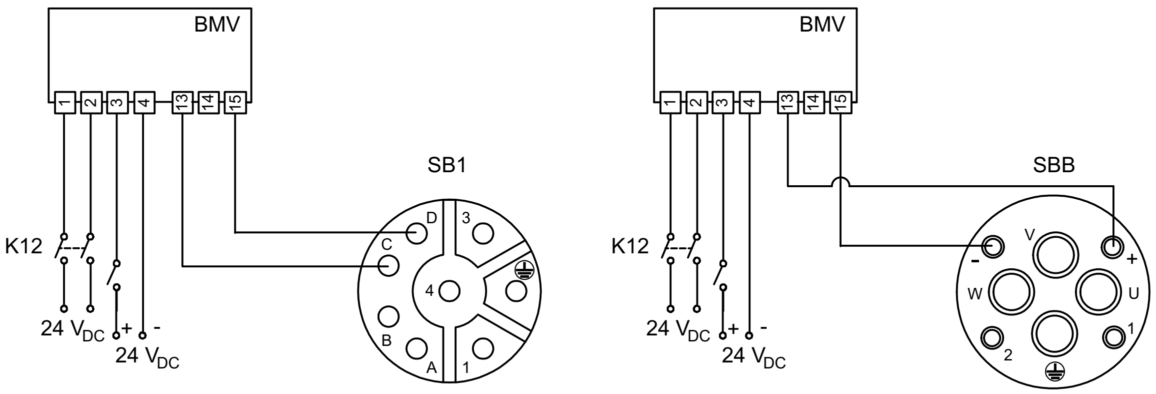
b) Maintenance intervals

The time to maintenance is determined on the basis of the expected brake wear. This value is important for setting up the maintenance schedule for the machine to be used by the customer's service personnel (machine documentation).

8.8 Block diagram of the brake control – plug connectors

In every application, the BP holding brake can be controlled via the BMV brake relay or a customer relay with varistor overvoltage protection.

BMV brake rectifier



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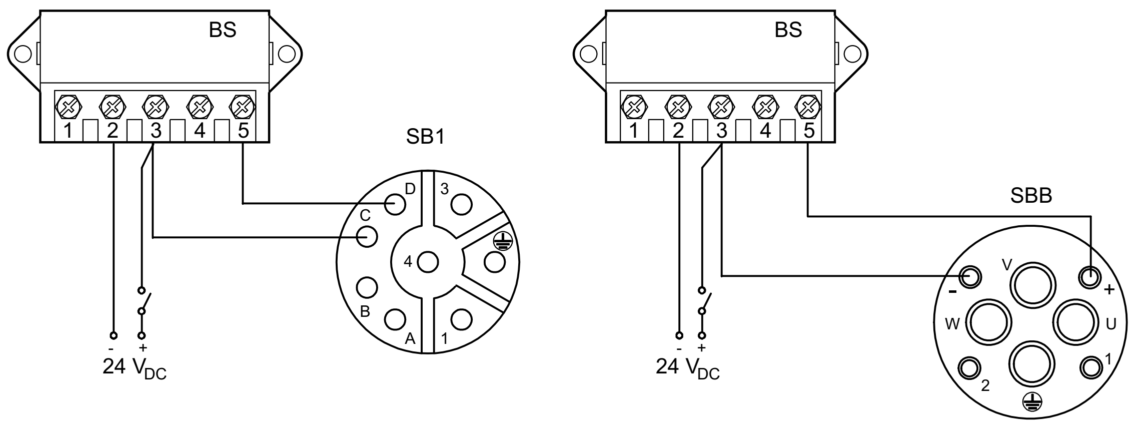
Connection 1, 2	Energy supply
Connection 3, 4	Signal (inverter)

BS brake rectifier



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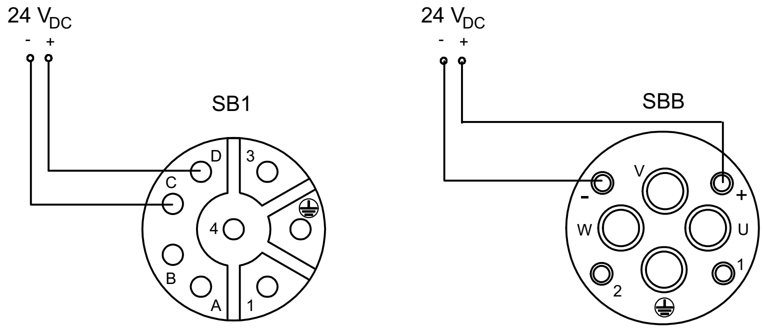
Direct 24 V brake supply



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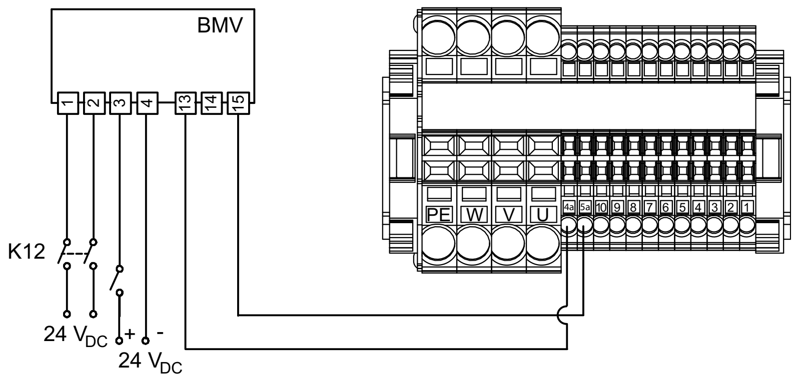
The brake must be protected from overvoltage, e.g. by a varistor protection circuit, in the following cases:

- Operation on non-SEW inverters,
- If the brake is not directly supplied from the SEW inverter.

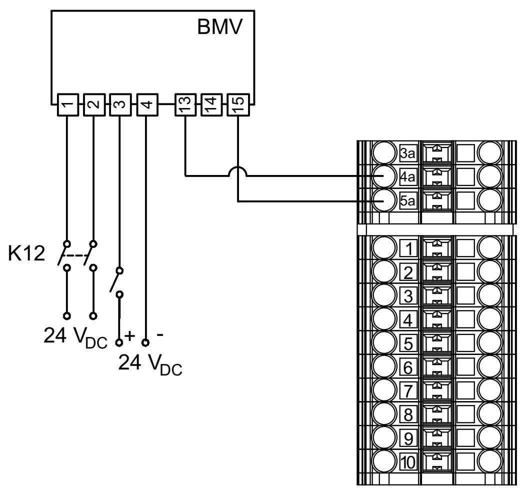
8.9 Block diagram of the brake control – terminal box

BMV brake rectifier for CMP50, CMP63



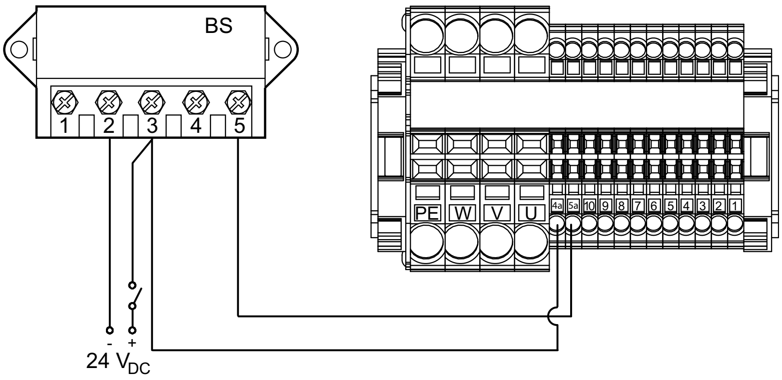
Connection 1, 2 Energy supply
Connection 3, 4 Signal (inverter)

BMV brake rectifier for CMP71 - CMP100

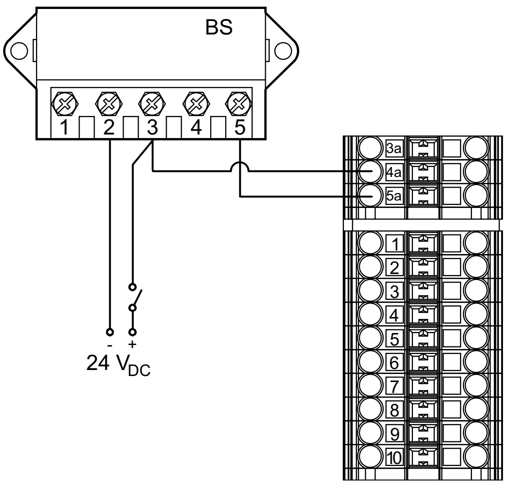


Connection 1, 2 Energy supply
Connection 3, 4 Signal (inverter)

BS brake rectifier for CMP50, CMP63



BS brake control unit for CMP71 - CMP100



8.10 BP brake – technical data

The following table lists the technical data of the brakes. The type and number of brake springs determines the level of the braking torque. If not specified otherwise, the preferred braking torque for motor lengths "M" and "L" is the maximum braking torque $M_{B\ max}$, for motor lengths "S" the optional braking torque $M_{B\ red}$. Other brake spring combinations can result in reduced braking torque values $M_{B\ red}$.

Brake type	M_{Bmax} [Nm]	$M_{B\ red}$ [Nm]	W_1 [kJ]	W_2 [kJ]	W_{insp} [10^3 kJ]	P [W]	t_1 [ms]	t_2 [ms]
BP01	0.95	-	0.4	4.8	1	7	25	15
BP04	4.3	3.1	0.6	7.2	1.5	10.2	60	15
BP09	9.3	7	1	10	2.5	16	60	15
BP1	14	7	1.4	16.8	3.5	19.5	50	15
BP3	31	15	2.2	26.4	5.5	28	70	15
BP5	47	24	3.6	43.2	9	33	110	15

$M_{B\ max}$ = Maximum braking torque
$M_{B\ red}$ = Optional braking torque
W_1 = Permitted braking work per cycle
W_2 = Permitted braking work per hour
W_{insp} = permitted total braking work (braking work until service)
P = Power consumption of the coil
t_1 = Response time
t_2 = Application time

INFORMATION

The response and application times are recommended values in relation to the maximum braking torque.

Motor assignment

The following table shows the standard assignments of motors and brakes:

Motor type	Brake type	M_{B1} [Nm]	M_{B2} [Nm]	Speed class
CMP40	BP01	0.95	-	3000 / 4500 / 6000
CMP50S	BP04	3.1	4.3	
CMP50M/L		4.3	3.1	
CMP63S	BP09	7	9.3	
CMP63M/L		9.3	7	
CMP71S	BP1	7	14	
CMP71M/L		14	7	
CMP80S	BP3	15	31	3000 / 4500
CMP80M/L		31	15	
CMP100S	BP5	24	47	
CMP100M/L		47	24	

M_{B1} Preferred braking torque
M_{B2} Optional braking torque

8.11 Operating currents for the BP brake

		BP01	BP04	BP09	BP1	BP3	BP5
Max. braking torque [Nm]		0.95	4.3	9.3	14	31	47
Braking power [W]		7	10.2	16	19.5	28	33
Rated voltage V_N							
	V_{DC}	**I [A_{DC}]**	**I [A_{DC}]**	**I [A_{DC}]**	**I [A_{DC}]**	**I [A_{DC}]**	**I [A_{DC}]**
	24 (21.6 - 26.4)	0.29	0.42	0.67	0.81	1.17	1.38

I Operating current

V_N Rated voltage (rated voltage range)

8.12 Resistance of BP brake coils

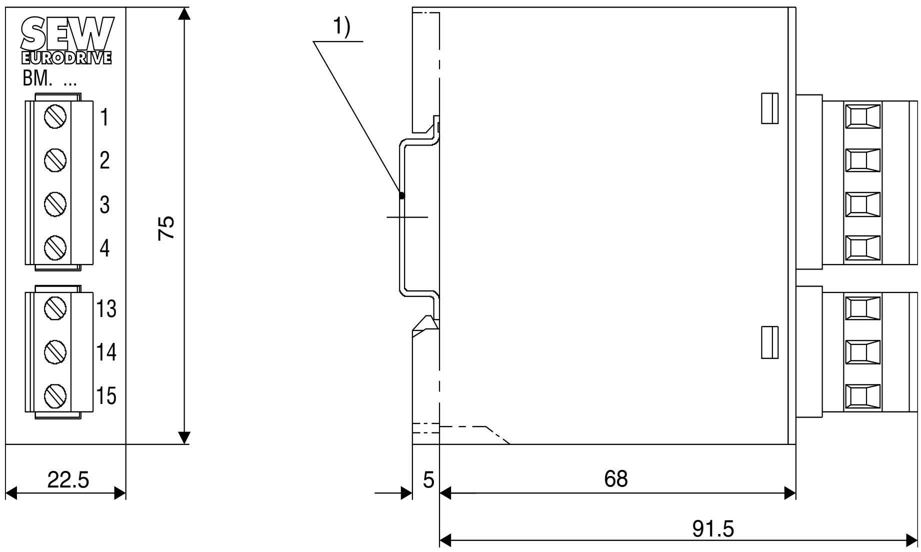
		BP01	BP04	BP09	BP1	BP3	BP5
Max. braking torque [Nm]		0.95	4.3	9.3	14	31	47
Braking power [W]		7	10.2	16	19.5	28	33
Rated voltage V_N							
	V_{DC}	**R [Ω]**	**R [Ω]**	**R [Ω]**	**R [Ω]**	**R [Ω]**	**R [Ω]**
	24 (21.6 - 26.4)	84	56.5	35	29.4	20.5	17.3

R Coil resistance at 20 °C

V_N Rated voltage (rated voltage range)

8.13 Dimension drawings of the BP brake control

BMV For information regarding the use of the BMV brake control, refer to section "Block diagram of the brake control" on page 151.



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[1] Support rail mounting EN 50022-35-7.5

9 BY Brake

9.1 Description of the BY brake

On request, SEW-EURODRIVE motors can be supplied with an integrated mechanical brake. The brake is a DC-operated electromagnetic disk brake with a high working capacity that is released electrically and applied using spring force. The brake is applied in case of a power failure. It meets the basic safety requirements.

The brake can also be released mechanically if equipped with manual brake release. The manual brake release function is self-reengaging (..HR). A hand lever is supplied.

The HR manual brake release option is not available in combination with a VR forced cooling fan in standard design.

The brake is controlled by a brake controller that is either installed in the control cabinet or in the terminal box.

A main advantage of brakes from SEW-EURODRIVE is their very short design. The integrated construction of the brakemotor permits particularly compact and sturdy solutions.

Observe the notes in the relevant operating instructions concerning the switching sequence of motor enable and brake control during standard operation.

The BY brake can be used for the following rated speeds depending on the motor size:

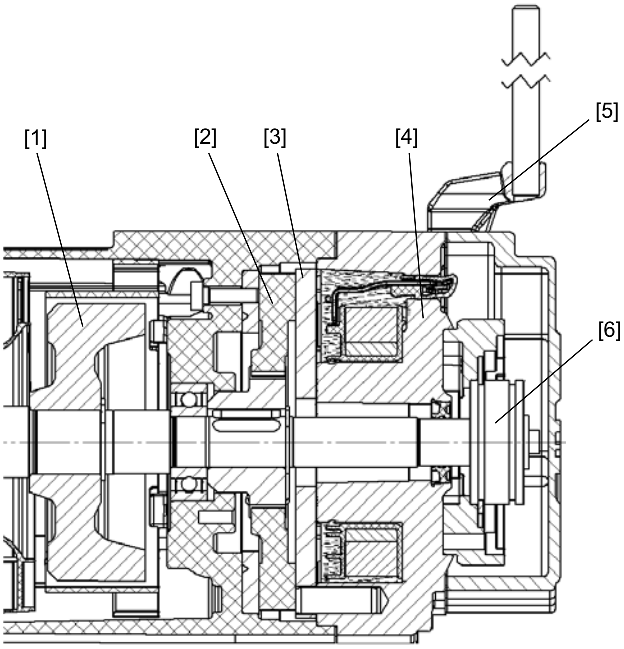
Motor type	Brake type	Speed class
CMPZ71S	BY2	3000, 4500, 6000
CMPZ71M/L		
CMPZ80S	BY4	3000, 4500
CMPZ80M/L		
CMPZ100S	BY8	3000, 4500
CMPZ100M/L		

9.2 Principles of the BY brake

Basic functions

The pressure plate is forced against the brake disk by the brake springs when the electromagnet is deenergized. The brake is applied to the motor. Braking torque determined by number and type of brake springs. When the brake coil is connected to the corresponding DC voltage, the force of the brake springs is overcome by magnetic force, thereby bringing the pressure plate into contact with the magnet. The brake disk moves clear and the rotor can turn.

Basic structure of the working brake:



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[1]	Additional flywheel mass	[4]	Magnets, complete
[2]	Brake disk	[5]	Releasing lever
[3]	Pressure plate	[6]	RH1M encoder

9.3 General information

The BY working brake can only be mounted to the motors CMPZ71 - CMPZ100 (motor variant with additional additional flywheel mass).

The size of the brakemotor and its electrical connection must be selected carefully to ensure the longest possible service life.

The following aspects described in detail must be taken into account:

1. Selecting the braking torque in accordance with the project planning data, see page 160.
2. Dimensioning and routing the cable, see page 165.
3. Selecting the brake contactor, if applicable, see page 165.
4. Important design information, see page 166.

9.4 Selecting the brake according to the project planning data

The mechanical components, brake type and braking torque, are determined when the drive motor is selected. The drive type or application areas and the standards that have to be taken into account are used for the brake selection.

Selection criteria:

- Servomotor - motor size.
- Number of braking operations during service and number of emergency braking operations.
- Working brake or holding brake.
- Amount of braking torque ("soft braking"/"hard braking").
- Hoist application.
- Minimum/maximum deceleration.

Values determined/calculated during brake selection:

Basic specification	Link / supplement / comment
Motor type	Brake type/Brake control system
Braking torque[1)]	Brake springs
Brake application time	Connection type of the brake control system (important for the electrical design for wiring diagrams)
Braking time **Braking distance** **Braking deceleration** **Braking accuracy**	The required data can only be observed if the aforementioned parameters meet the requirements

1) The braking torque is determined from the requirements of the application with regards to the maximum deceleration and the maximum permitted distance or time.

For detailed information on selecting the size of the brakemotor and calculating the braking data, refer to the documentation "Drive Engineering - Practical Implementation Ð Project Planning for Drives".

Selecting the brake

The brake suitable for the relevant application is selected by means of the following main criteria:

- Required braking torque
- Required working capacity

Braking torque

The braking torque is usually selected according to the required deceleration.

The table "Brake assignment" (page 175) shows the possible braking torque stepping.

Braking torque for hoist applications

The selected braking torque must be greater by at least factor 2 than the maximum load torque.

Working capacity

The working capacity of the brake is determined by the permitted braking work W_1 per braking operation and the total permitted braking work W_{insp} until the next inspection of the brake.

For the permitted total braking work W_{insp}, refer to the table on page 175 .

9

Permitted number of braking operations until maintenance of the brake:

$$NB = \frac{W_{insp}}{W_1}$$

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Braking work per braking operation:

$$W_1 = \frac{J_{ges} \times n^2 \times M_B}{182.4 \times (M_B \pm M_L)}$$

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NB	= Number of braking operations until service
W_{insp}	= Total braking work until service [J]
W_1	= Braking work per braking operation [J]
J_{ges}	= Total mass moment of inertia (related to the motor shaft) in [kg m^2]
n	= Motor speed [1/min]
M_B	= Braking torque [Nm]
M_L	= Load torque [Nm] (note the sign) +: for vertical upward and horizontal movement -: for vertical downward movement

EMERGENCY STOP features

The permitted maximum braking work (refer to the table on page 176) must not be exceeded even in the event of an EMERGENCY STOP.

9.5 Determining the brake voltage

The brake voltage should always be selected on the basis of the available AC supply voltage or motor operating voltage. This means the user is always guaranteed the most cost-effective installation for lower braking currents.

The standard brake voltages are listed in the following table:

Brakes	**BY2, BY4, BY8**
	Brake voltage
Rated voltage[1)]	DC 24 V AC 110 V AC 230 V AC 400 V AC 460 V

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

The maximum current during the brake release is 7 times the holding current. The voltage at the brake coil must not drop below 90% of the rated voltage.

9.6 *Selection of the brake control*

Only SEW brake control systems are used for controlling the brake. All brake control systems are fitted as standard with varistors to protect against overvoltage.

The brakes are available with DC and AC voltage connection.

- AC voltage connection:
  - **BME**, equipped with DIN rail profile
- DC voltage connection:
  - **BSG**

There are two possible ways of electrical disconnection:

- Normal application times: Cut-off in the AC circuit.
- Particularly short application times: Cut-off in the AC and DC circuits.

The brake control systems are mounted in the control cabinet. They are not included in the scope of delivery.

The following options are available:

- AC supply, cut-off in the AC and DC circuits without additional switch contact, particularly short application times: **BMP**.
- AC supply, brake heating function when switched off: **BMH**.
- The **BMK/BMKB/BMV** control system energizes the brake coil if the supply system and a DC 24 V signal (e.g. from the PLC) are present simultaneously. The brake is applied if one condition is not being met. BMK/BMKB/BMV allow for shortest response and application times.

INFORMATION

A disconnection of all poles is required for EMERGENCY STOP and for hoists in general (terminal 1 and 2 of the brake rectifier).

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

Brake control	Function	Voltage	Holding current I_{Hmax} (A)	Type	Part number	Color code
BME	One-way rectifier with electronic switching function	AC 150 - 500 V	1.5	BME 1.5	825 722 1	Red
		AC 42 - 150 V	3.0	BME 3	825 723 X	Blue
BMH	One-way rectifier with electronic switching and heating function	AC 150 - 500 V	1.5	BMH 1.5	825 818 X	Green
		AC 42 - 150 V	3	BMH 3	825 819 8	Yellow
BMP	One-way rectifier with electronic switching, integrated voltage relay for cut-off in the DC circuit	AC 150 - 500 V	1.5	BMP 1.5	825 685 3	White
		AC 42 - 150 V	3.0	BMP 3	826 566 6	Light blue
BMK	One-way rectifier with electronic switch mode, DC 24 V control input and separation in the DC circuit	AC 150 - 500 V	1.5	BMK 1.5	826 463 5	Water blue
		AC 42 - 150 V	3.0	BMK 3	826 567 4	Light red
BMKB	One-way 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	828 160 2	Water blue
BSG	Control unit for DC 24 V connection with electronic switch mode	DC 24 V	5.0	BSG	825 459 1	White
BMV	Electronic switch mode, DC 24 V control input and cut-off in the DC circuit	DC 24 V	5.0	BMV	1 300 006 3	White

Short response times

A characteristic feature of the SEW brake is the patented two-coil system. This system consists of accelerator coil and coil section. The special SEW brake control system ensures that the accelerator coil is switched on with a high current inrush when the brake is released, after which the coil section is switched on. The result is a particularly short response time when releasing the brake. The brake disk moves clear very swiftly and the motor starts up with hardly any brake friction.

This principle of the two coil system also reduces self-induction so that the brake is applied more rapidly. The result is a reduced braking distance. The SEW brake can be cut off in the DC and AC circuits to achieve particularly short response times when applying the brake, for example for hoists.

9.7 Dimensioning and routing the cable for terminal box terminal box

a) Selecting the cable

Select the cross section of the brake cable according to the currents in your application. Observe the inrush current of the brake when selecting the cross section. When taking the voltage drop into account due to the inrush current, the value must not drop below 90 % of the rated voltage. The data sheets for the brakes provide information on the possible supply voltages and the result operating currents.

For a quick source of information about dimensioning the cable cross sections and cable lengths, refer to chapter "Assignment table of cables and CMP servomotors", page 205.

Wire cross sections of max. 2.5 mm_2 **can be connected to the terminals of the brake control systems. Intermediate terminals must be used if the cross sections are larger.**

b) Routing information

Brake cables must always be routed separately from other power cables with phased currents unless they are shielded.

Ensure adequate equipotential bonding between the drive and the control cabinet (for an example, see the documentation Drive Engineering - Practical Implementation ãEMC in Drive Engineering").

Power cables with phased currents are in particular

- Output cables from frequency inverters and servo controllers, soft start units and brake units
- Supply cables to braking resistors

9.8 Selecting the brake contactor

- In view of the high current loading and the DC voltage to be switched at inductive load, contactors in utilization category ACß3 (EN 60947-4-1) must always be used for controlling the brake rectifiers.
- Brake control via BSG and BMV requires contactors of utilization category DC 3 (EN 60947-4-1).

Standard design

If not specified otherwise, the CMPZ are delivered with with BME for the AC connection.

Connection via contactor

Brake size	AC connection	DC 24 V connection
BY2	BME	BSG
BY4		
BY8		

Control via inverter

Brake size	AC connection	DC 24 V connection
BY2	BMK	BMV
BY4		
BY8		

9.9 Important design information

a) EMC (Electromagnetic compatibility)

The EMC instructions in the servo controller documentation must also be taken into account for the operation of SEW servomotors with brake.

You must always adhere to the cable routing instructions (see page 150).

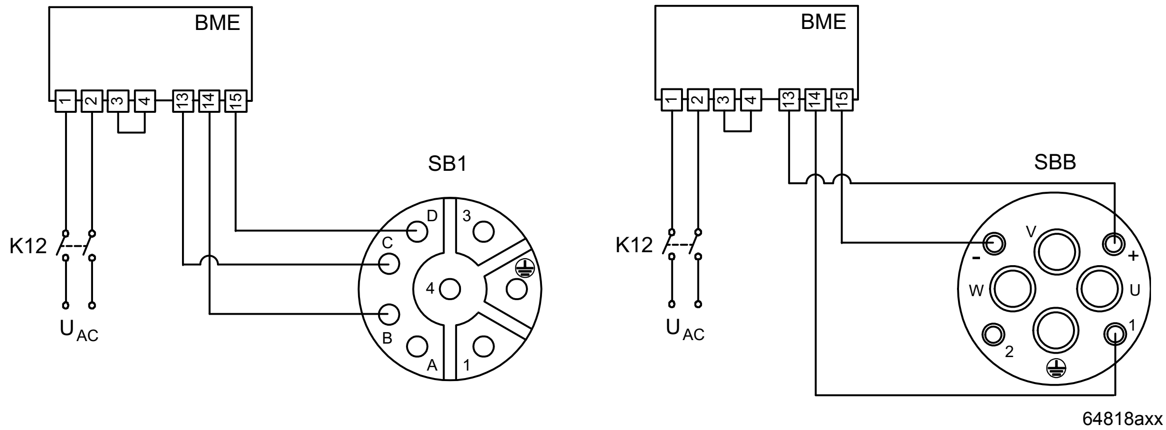
b) Maintenance intervals

The time to maintenance is determined on the basis of the expected brake wear. This value is important for setting up the maintenance schedule for the machine to be used by the customer's service personnel (machine documentation).

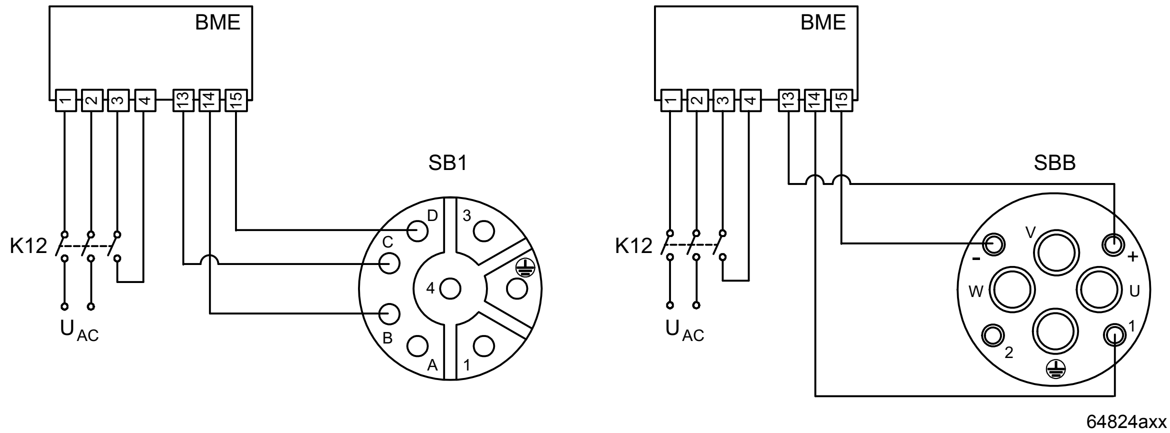
9.10 Block diagram of the brake control – plug connector

BME brake rectifier

Cut-off in the AC circuit/normal application of the brake.

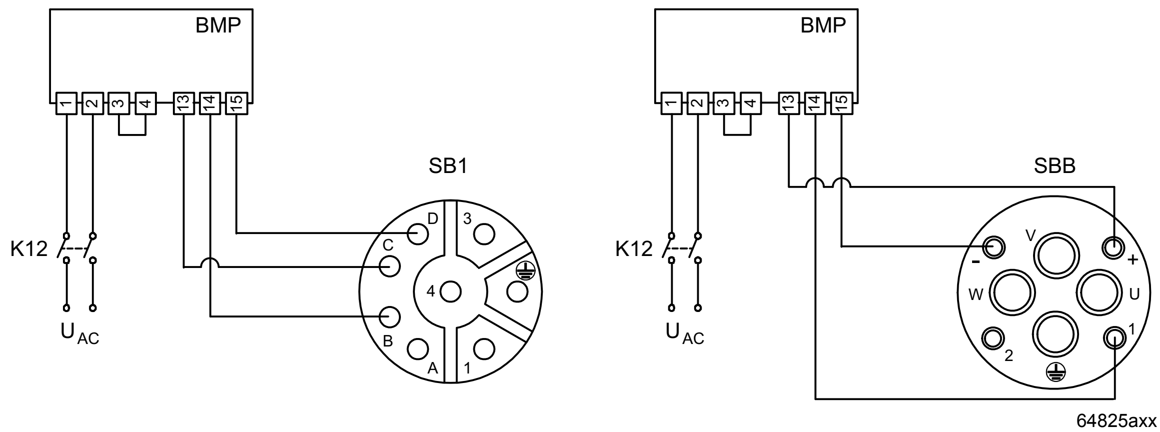


Cut-off in the DC and AC circuits/rapid application of the brake.



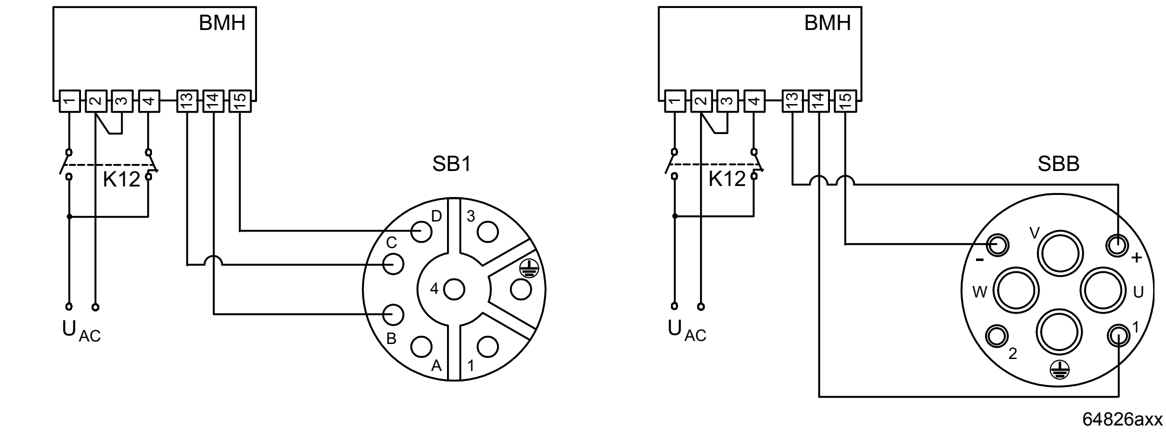
BMP brake rectifier

Cut-off in the DC and AC circuits/rapid application of the brake/integrated voltage relay.

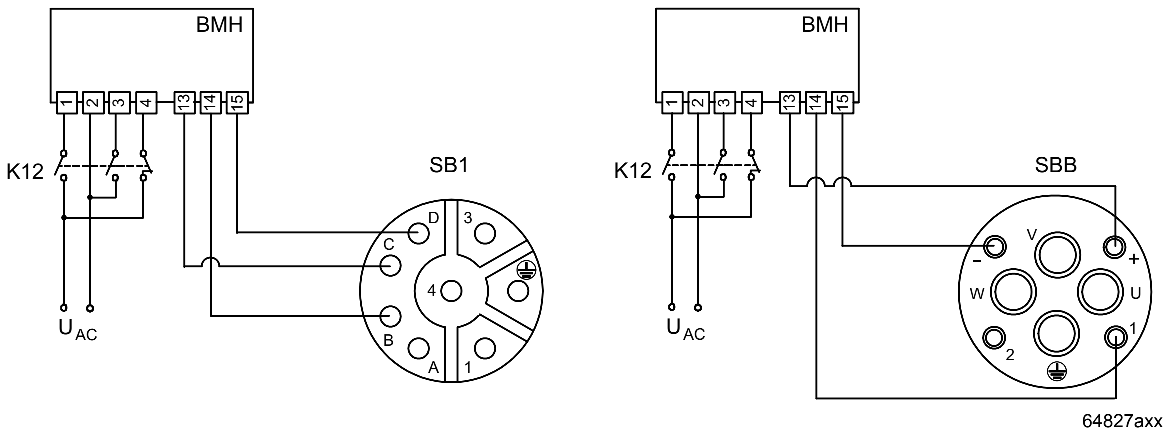


BMH brake rectifier

Cut-off in the AC circuit/normal application of the brake.

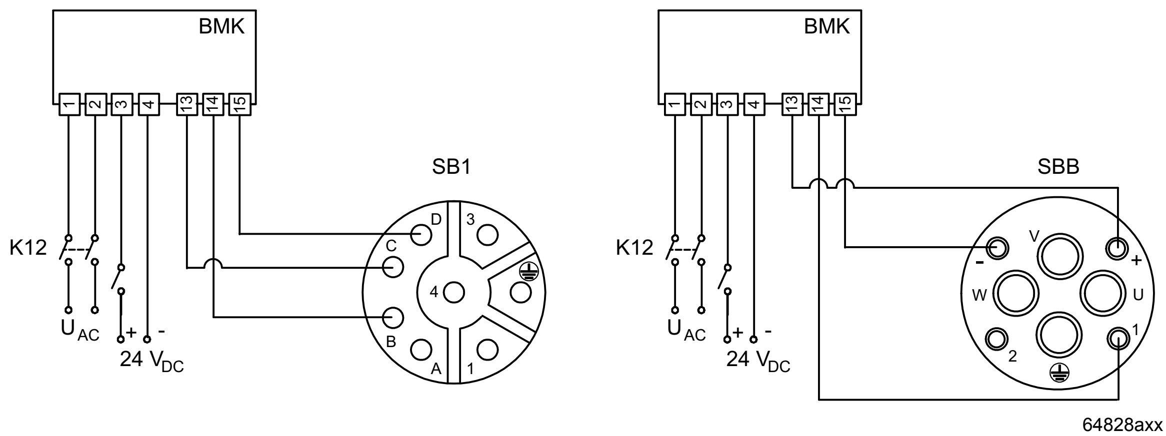


Cut-off in the DC and AC circuits/rapid application of the brake.



BMK brake rectifier

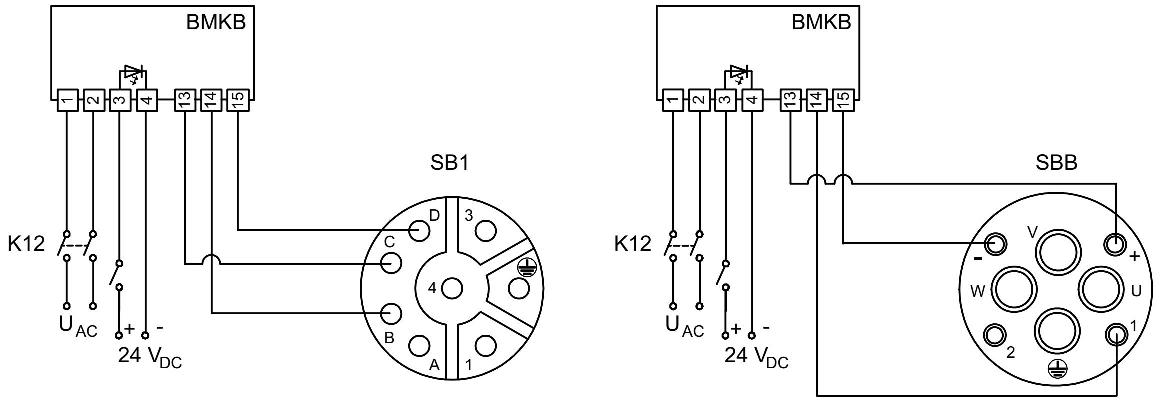
Cut-off in the DC and AC circuits/rapid application of the brake/integrated voltage relay/integrated DC 24 V control input.



Connection 1, 2	Energy supply
Connection 3, 4	Signal (inverter)

BMKB brake rectifier

Cut-off in the DC and AC circuits/rapid application of the brake/integrated voltage relay/integrated DC 24 V control input/diode displays readiness for operation.



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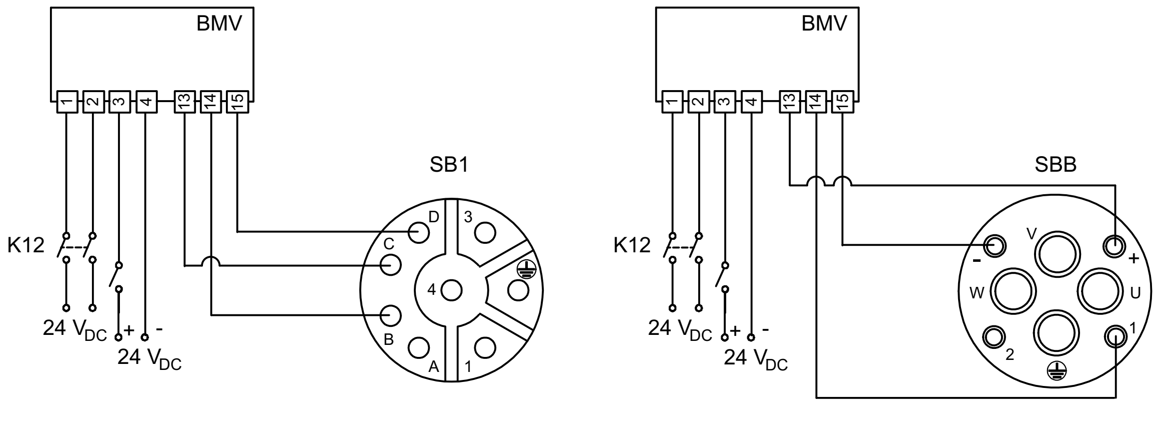
Connection 1, 2	Energy supply
Connection 3, 4	Signal (inverter)

BMV brake rectifier

Cut-off in the DC and AC circuits/rapid application of the brake/integrated DC 24 V control input.



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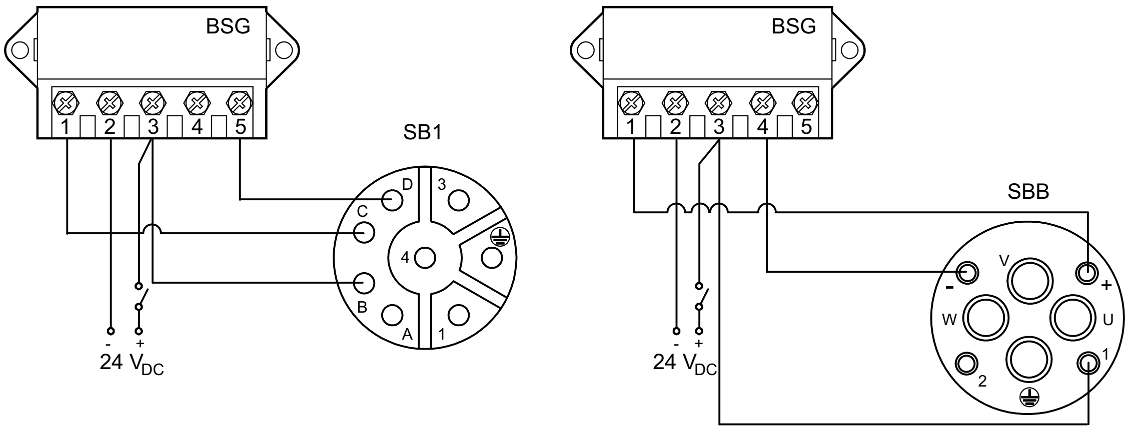
Connection 1, 2	Energy supply
Connection 3, 4	Signal (inverter)

BSG brake control unit

For DC voltage supply with DC 24 V.



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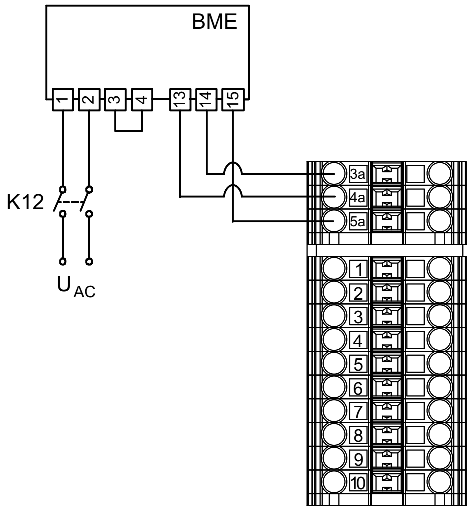
9.11 Block diagram of the brake control – terminal box

BME brake rectifier

Cut-off in the AC circuit/normal application of the brake.



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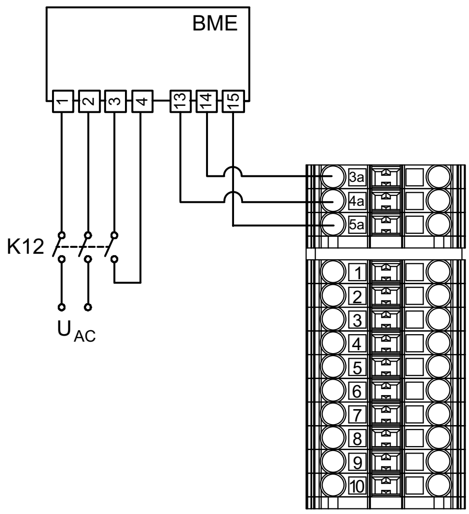
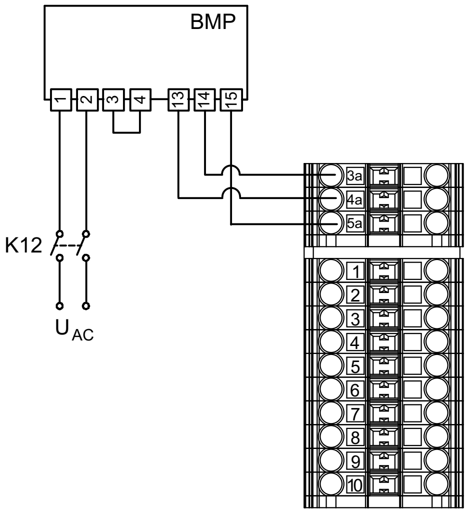
Cut-off in the DC and AC circuits/rapid application of the brake.



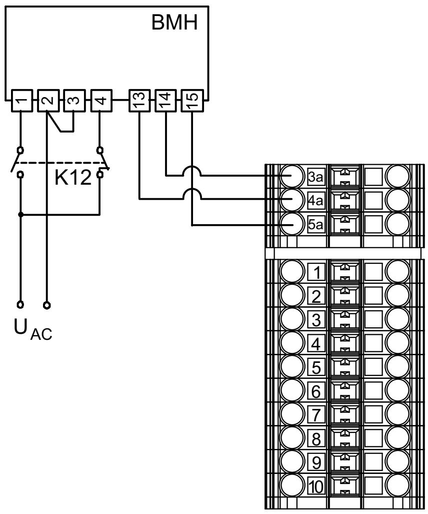
BMP brake rectifier

Cut-off in the DC and AC circuits/rapid application of the brake/integrated voltage relay.

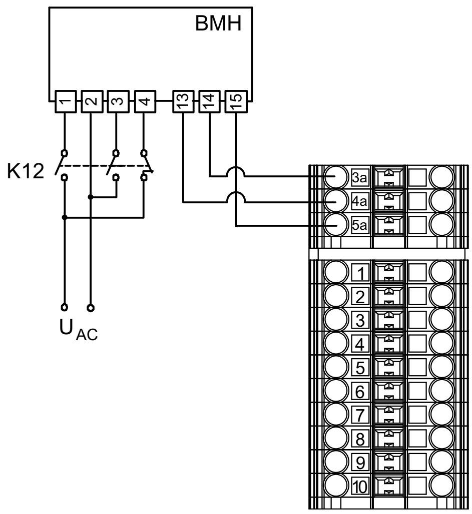


BMH brake rectifier

Cut-off in the AC circuit/normal application of the brake.

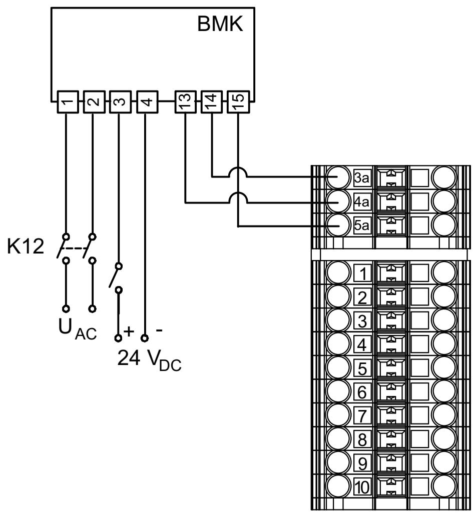


Cut-off in the DC and AC circuits/rapid application of the brake.



BMK brake rectifier

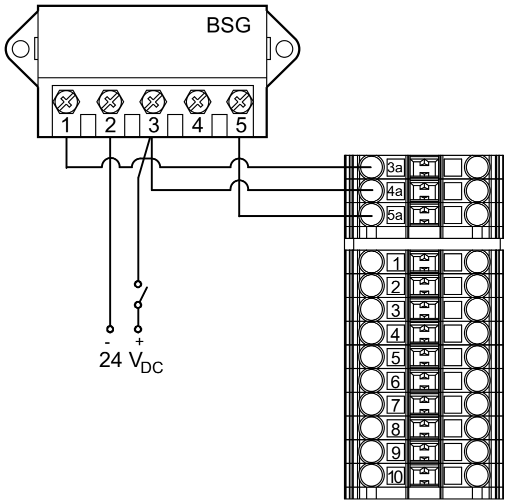
Cut-off in the DC and AC circuits/rapid application of the brake/integrated voltage relay.



Connection 1, 2	Energy supply
Connection 3, 4	Signal (inverter)

BSG brake control unit

For DC voltage supply with DC 24 V.



9.12 *Technical data of the BY brake*

The following tables list the technical data of the brakes. The type and number of brake springs determines the level of the braking torque. Maximum braking torque $M_{B\ max}$ is installed as standard, unless specified otherwise in the order. Other brake spring combinations can result in reduced braking torque values $M_{B\ red}$.

Brake type	M_{Bmax} [Nm]	$M_{B\ red}$ [Nm]	W_{insp} [10^3 kJ]	P [W]	t_1 [ms]	t_2 [ms]	t_3 [ms]
BY2	20	10	60	30	40	15	90
BY4	40	20	90	40	40	15	110
BY8	80	40	120	50	60	30	140

$M_{B\ max}$ = Maximum braking torque
$M_{B\ red}$ = Optional braking torque
W_{insp} = permitted total braking work (braking work until service)
P = Power consumption of the coil
t_1 = Response time
t_2 = Application time AC/DC
t_3 = Application time AC

INFORMATION

The response and application times are recommended values in relation to the maximum braking torque.

Motor assignment

The following table shows the standard assignments of motors and brakes:

Motor type	Brake type	M_{B1} [Nm]	M_{B2} [Nm]	Speed class
CMPZ71S	BY2	14	10	3000, 4500, 6000
CMPZ71M/L		20	14	
CMPZ80S	BY4	28	20	3000, 4500
CMPZ80M/L		40	28	
CMPZ100S	BY8	55	40	3000, 4500
CMPZ100M/L		80	55	

M_{B1} Preferred braking torque
M_{B2} Optional braking torque

Maximum permitted friction work

The following table shows the permitted friction work depending on the application speed the braking process is triggered at. The lower the speed, the higher the permitted braking work.

INFORMATION

For horizontal motion like in travel drive applications, higher braking work might be permitted per cycle in emergency stop situation under certain conditions. The specific wear of the brake lining significantly increases in an emergency stop situation and the real dynamic braking torque effective during the braking process reduces due to the increased temperature of the brake lining.

Consult SEW-EURODRIVE to obtain these values.

Rated speed [1/min]	Brake type	M_{Bmax} [Nm]	W_1 [kJ]
3000	BY2	7	20
		10	18
		14	14
		20	11
	BY4	14	20
		20	15
		28	10
		40	4.5
	BY8	28	36
		40	32
		55	18
		80	7
4500	BY2	7	16
		10	14
		14	10
		20	6
	BY4	14	15
		20	9
		28	5
		40	3
	BY8	28	22
		40	18
		55	11
		80	4
6000	BY2	7	14
		10	13
		14	8
		20	4.5

$M_{B\,max}$ = Maximum braking torque

W_1 = Permitted braking work per cycle

9.13 Operating currents for the BY brake

The following tables list the operating currents of the brakes at different voltages. The following values are specified:

- Inrush current ratio I_B/I_H; I_B = accelerator current, I_H = holding current
- Holding current I_H
- Rated voltage V_N

The accelerator current I_B (= inrush current) only flows for a short time (ca. 120 ms) when the brake is released or during voltage dips below 70 % of rated voltage.

The values for the holding currents I_H are r.m.s. values (arithmetic mean value at DC 24 V). Use suitable measuring instruments for current measurements.

	BY2	BY4	BY8
Max. braking torque [Nm]	20	40	80
Braking power [W]	30	40	50
Inrush current ratio I_B/I_H	6	6.5	7

Rated voltage V_N		I_H [A_{AC}]	I_G [A_{DC}]	I_H [A_{AC}]	I_G [A_{DC}]	I_H [A_{AC}]	I_G [A_{DC}]
V_{AC}	V_{DC}						
	24 (21.6 - 26.4)	-	1.4	-	1.6	-	2.1
110 (99 - 121)		0.47	-	0.63	-	0.8	-
230 (218 - 243)		0.21	-	0.28	-	0.355	-
400 (380 - 431)		0.12	-	0.16	-	0.2	-
460 (432 - 484)		0.11	-	0.14	-	0.18	-

I_H Holding current, r.m.s. value in the supply cable to the SEW brake rectifier

I_G Direct current with direct DC voltage supply

V_N Rated voltage (rated voltage range)

9.14 Resistance of BY brake coils

	BY2	BY4	BY8
Max. braking torque [Nm]	20	40	80
Braking power [W]	30	40	50

Rated voltage V_N		R_B [Ω]	R_T [Ω]	R_B [Ω]	R_T [Ω]	R_B [Ω]	R_T [Ω]
V_{AC}	V_{DC}						
	24 (21.6 - 26.4)	3.9	18.85	2.6	13.91	1.9	11.05
110 (99 - 121)		12.3	59.6	8.1	43.98	6	34.94
230 (218 - 243)		61.6	298.7	40.6	220.4	30.1	175.1
400 (380 - 431)		194.8	944.6	128.4	697	95.2	553.7
460 (432 - 484)		245.2	1189.1	161.6	877.4	119.8	697.1

R_B Resistance of accelerator coil at 20 °C

R_T Coil section resistance at 20 °C

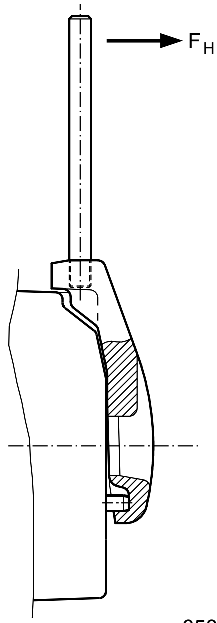
V_N Rated voltage (rated voltage range)

9.15 Braking work and braking torque

Brake Type	Braking work until Maintenance [10^6 J]	Order number of pressure plate	Braking torque settings				
			Braking torque [Nm]	Type and number of brake springs normal	Type and number of brake springs Red	Order number of brake springs normal	Order number of brake springs Red
BY2	60	1644 3632	20	6	-	0186 6621	0183 7427
			14	4	2		
		1644 7824	10	3	-		
			7	2	2		
BY4	90	1644 5856	40	6	-	0186 663X	0184 0037
			28	4	2		
		1644 7840	20	3	-		
			14	2	2		
BY8	120	1644 4876	80	6	-	1644 6011	1644 6038
			55	4	2		
		1644 7859	40	3	-		
			28	2	2		

9.16 Manual brake release

In brakemotors with the ../HR "brake with self-re-engaging manual brake release", you can release the brake manually using the provided lever. The following table specifies the actuation force required at maximum braking torque to release the brake manually. The values are based on the assumption that you operate the lever at the upper end.

Brake type	Motor size	Actuation force F_H [N]	
BY2	**CMPZ71**	50	
BY4	**CMPZ80**	70	
BY8	**CMPZ100**	90	

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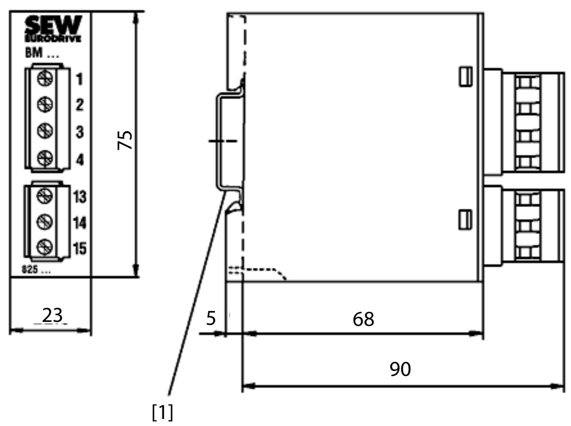
Retrofit set for manual brake release

The manual brake release of the BY brake can be retrofitted with the following retrofit kits:

Retrofit set	Part number
BY2	**1750 842 8**
BY4	**1750 852 5**
BY8	**1750 862 2**

9.17 Dimension drawings of the BY brake control

Dimension drawing BME, BMP, BMH, BMK, BMKB, BMV



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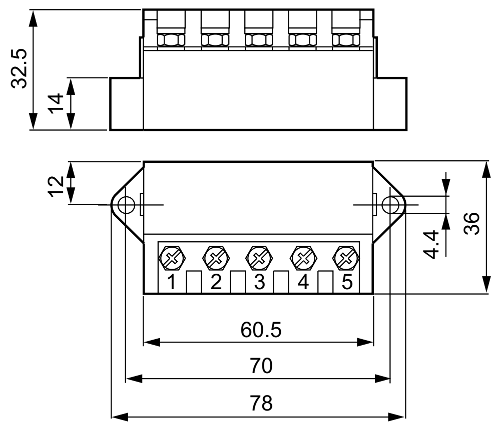
[1] DIN rail mounting EN 50022-35 x 7.5

Dimension drawing BSG



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10 Motor Designs – CMP Servomotors

10.1 Standard design encoders

Resolver

Unit designation /RH1M

Description SEW servomotors are delivered with 2-pole resolvers as standard. Further information on other resolvers is available on request.

Option: HIPERFACE® encoder

Unit designation /ES1H, /AS1H, /AK0H, /EK0H, /AK1H[1)], /EK1H[1)]

Designation SEW-EURODRIVE offers HIPERFACE® encoders also as multi-turn absolute encoders as an alternative to the resolver. They are also available for positive connections. Encoders with a high resolution are also available in addition to the standard encoders.

When prefabricating the encoder cables, ensure correct polarity for the supply outputs.

CMP servomotors are delivered with a RH1M resolver as standard.

The following HIPERFACE® multi/single-turn encoders can be mounted as an option:

Designation	Specification [periods/revolution]	Motor type
EK0H	128	CMP40
AK0H	128	CMP40 - CMP100
ES1H, AS1H	1024	CMP50 - 63
EK1H[1)], AK1H[1)]	1024	CMP71 - 100

1) In preparation

Encoders – technical data

Resolver

/RH1M

Part number for RH1M	CMP40 1335 3861	CMP50, 63 0199 0314	CMP71 - 100 1644 5619
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	± 6'		
Temperature range	-55 °C to +150 °C		

1) In preparation

Option: HIPERFACE® encoder

/EK0H, /AK0H

Type Attachable to encoder	EK0H 0199 742 4 CMP40	AK0H 0199 583 9 CMP40 - 100
Supply voltage	DC 7 - 12 V polarity reversal protected	
Maximum current consumption (without load)	120 mA	
Maximum operating frequency	26 kHz	
Pulses (sine cycles) per revolution	128	
Output amplitude per track	0.8 - 1.1 V_{SS} sin/cos	
Single-turn resolution	4096 increments/revolution (15 bit)	
Multi-turn resolution	-	4096 revolutions (12 bits)
Transmission protocol	HIPERFACE®	
Serial data output	Driver according to EIA RS-485	
Vibration resistance (10 - 2000 Hz)	≤ 100 m/s² (DIN IEC 68-2-6)	
Maximum speed	12000 min⁻¹	9000 min⁻¹
Connection	12-pin round connector	
Temperature range	-20 °C to +110 °C	

Option: HIPERFACE® encoder

/ES1H, /AS1H

Type Attachable to encoder	ES1H 1335 4965 CMP50, CMP63	AS1H 1335 4957
Supply voltage	DC 7 - 8 - 12 V polarity reversal protected	
Max. current consumption	140 mA	
Maximum operating frequency	200 kHz	
Pulses (sine cycles) per revolution	1024	
Output amplitude per track	0.9 - 1.1 V_{SS} sin/cos	
Single-turn resolution	32768 increments/revolution (15 bit)	
Multi-turn resolution	-	4096 revolutions (12 bits)
Transmission protocol	HIPERFACE®	
Serial data output	Driver according to EIA RS-485	
Vibration resistance (10 - 2000 Hz)	≤ 200 m/s² (DIN IEC 68-2-6)	
Maximum speed	12000 min⁻¹	
Connection	12-pin round connector (Intercontec)	
Temperature range	-20 °C to +110 °C	

/EK1H, /AK1H

Type	EK1H[1]	AK1H[1]
	1644 463 9	1333 760 2
Attachable to encoder	**CMP71 - 100**	
Supply voltage	DC 7 - 8 - 12 V polarity reversal protected	
Max. current consumption	140 mA	
Maximum operating frequency	200 kHz	
Pulses (sine cycles) per revolution	1024	
Output amplitude per track	0.9 - 1.1 V_{SS} sin/cos	
Single-turn resolution	32768 increments/revolution (15 bit)	
Multi-turn resolution	-	4096 revolutions (12 bits)
Transmission protocol	HIPERFACE®	
Serial data output	Driver according to EIA RS-485	
Vibration resistance (10 - 2000 Hz)	≤ 200 m/s^2 (DIN IEC 68-2-6)	
Maximum speed	12000 min^{-1}	
Connection	12-pin round connector (Intercontec)	
Temperature range	-20 °C to +110 °C	

1) In preparation

10.2 Standard design – motor protection

Thermal motor information with KTY

Unit designation /KY

Description This type detects the motor temperature continuously using a semi-conductor sensor for further processing in the inverter / controller.

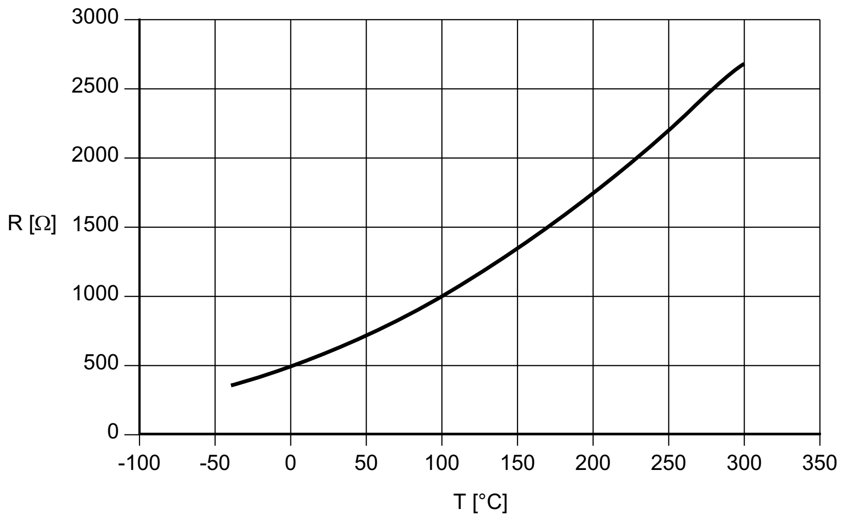
The inverter + /KY option can only take on the function of motor protection when it is used in combination with an inverter containing the thermal motor model.

Thermal motor information with KTY technical data

/KY The temperature sensor KTY84 - 130 continuously detects the motor temperature.

Technical data	KTY84 - 130
Connection	Red (+) Blue (-)
Total resistance at 20 - 25 °C	540 Ω < R < 640 Ω
Test current	< 3 mA

Typical characteristic curve of KTY:



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10.3 Standard design – connection variants

Assignment table for connectors and terminal boxes to CMP servomotors

System voltage 400 V, without forced cooling fan

Motor type	Rated speed	Plug connector / terminal box without brake		Plug connector / terminal box with brake	
CMP40S	3000	SM1		SB1	
CMP40S	4500				
CMP40S	6000				
CMP40M	3000	SM1		SB1	
CMP40M	4500				
CMP40M	6000				
CMP50S	3000	SM1	KK	SB1	KK
CMP50S	4500				
CMP50S	6000				
CMP50M	3000	SM1	KK	SB1	KK
CMP50M	4500				
CMP50M	6000				
CMP50L	3000	SM1	KK	SB1	KK
CMP50L	4500				
CMP50L	6000				
CMP63S	3000	SM1	KK	SB1	KK
CMP63S	4500				
CMP63S	6000				
CMP63M	3000	SM1	KK	SB1	KK
CMP63M	4500				
CMP63M	6000				
CMP63L	3000	SM1	KK	SB1	KK
CMP63L	4500				
CMP63L	6000				
CMP.71S	3000	SM1	KK, KKS	SB1	KK, KKS
CMP.71S	4500				
CMP.71S	6000				
CMP.71M	3000	SM1	KK, KKS	SB1	KK, KKS
CMP.71M	4500				
CMP.71M	6000				
CMP.71L	3000	SM1	KK, KKS	SB1	KK, KKS
CMP.71L	4500				
CMP.71L	6000				
CMP.80S	3000	SM1, SMB	KK, KKS	SB1, SBB	KK, KKS
CMP.80S	4500				
CMP.80S	6000				
CMP.80M	3000	SM1, SMB	KK, KKS	SB1, SBB	KK, KKS
CMP.80M	4500				
CMP.80M	6000	SMB		SBB	

Table continued on next page.

Motor type	Rated speed	Plug connector / terminal box without brake		Plug connector / terminal box with brake	
CMP.80L	3000	SM1, SMB	KK, KKS	SB1, SBB	KK, KKS
CMP.80L	4500	SMB		SBB	
CMP.80L[1]	6000				
CMP.100S	3000	SM1, SMB	KK, KKS	SB1, SBB	KK, KKS
CMP.100S	4500	SMB		SBB	
CMP.100M	3000	SM1, SMB	KK, KKS	SB1, SBB	KK, KKS
CMP.100M	4500	SMB		SBB	
CMP.100L	3000	SMB	KK, KKS	SBB	KK, KKS
CMP.100L[1]	4500				

1) CSA approval only possible with terminal box

System voltage 400 V, with forced cooling fan

Motor type	Rated speed	Plug connector / terminal box without brake		Plug connector / terminal box with brake	
CMP50S/VR	3000	SM1	KK	SB1	KK
CMP50S/VR	4500				
CMP50S/VR	6000				
CMP50M/VR	3000	SM1	KK	SB1	KK
CMP50M/VR	4500				
CMP50M/VR	6000				
CMP50L/VR	3000	SM1	KK	SB1	KK
CMP50L/VR	4500				
CMP50L/VR	6000				
CMP63S/VR	3000	SM1	KK	SB1	KK
CMP63S/VR	4500				
CMP63S/VR	6000				
CMP63M/VR	3000	SM1	KK	SB1	KK
CMP63M/VR	4500				
CMP63M/VR	6000				
CMP63L/VR	3000	SM1	KK	SB1	KK
CMP63L/VR	4500				
CMP63L/VR	6000				
CMP.71S /VR	3000	SM1	KK, KKS	SB1	KK, KKS
CMP.71S /VR	4500				
CMP.71S /VR	6000				
CMP.71M /VR	3000	SM1	KK, KKS	SB1	KK, KKS
CMP.71M /VR	4500				
CMP.71M /VR	6000				

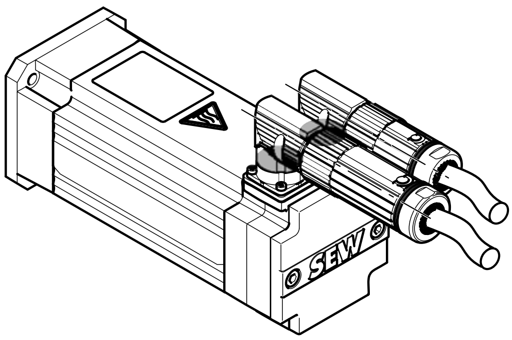
Table continued on next page.

Motor type	Rated speed	Plug connector / terminal box without brake		Plug connector / terminal box with brake	
CMP.71L /VR	3000	SM1	KK, KKS	SB1	KK, KKS
CMP.71L /VR[1]	4500				
CMP.71L /VR[1]	6000				
CMP.80S /VR	3000	SM1, SMB	KK, KKS	SB1, SBB	KK, KKS
CMP.80S /VR	4500				
CMP.80S /VR[2]	6000				
CMP.80M /VR	3000	SM1, SMB	KK, KKS	SB1, SBB	KK, KKS
CMP.80M /VR[2]	4500				
CMP.80M /VR	6000	SMB		SBB	
CMP.80L /VR[2]	3000	SM1, SMB	KK, KKS	SB1, SBB	KK, KKS
CMP.80L /VR	4500	SMB		SBB	
CMP.100S /VR[2]	3000	SM1, SMB	KK, KKS	SB1, SBB	KK, KKS
CMP.100S /VR	4500	SMB		SBB	
CMP.100M /VR	3000	SMB	KK, KKS	SBB	KK, KKS
CMP.100L /VR[3]	3000	SMB	KK, KKS	SBB	KK, KKS

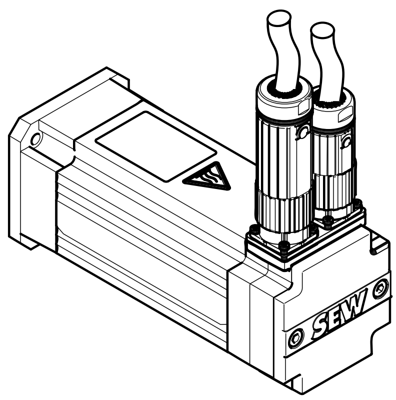
1) UL and CSA approval only possible with terminal box
2) UL and CSA approval only possible with SMB/SBB or terminal box
3) CSA approval only possible with terminal box

Connection variant with plug connectors

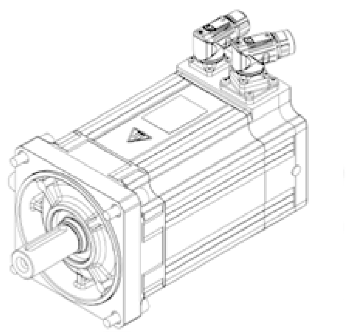
Plug connector "adjustable" and "radial".

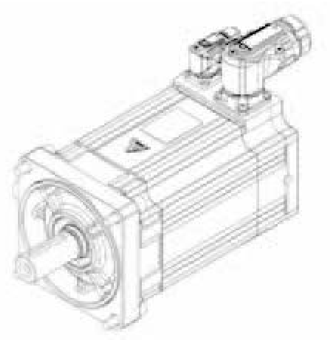


SM1 / SB1 plug connector



SMB/SBB connector type





Power cables and plug connectors for CMP motors

Cable type		Connector type	Thread size	Cable cross section [mm^2]	Part number: Prefabricated cables	Part number: Spare power plug*
Fixed installation	Motor cable	SM11	M23	4 x 1.5 mm^2	0590 4544	0198 6740
		SM12		4 x 2.5 mm^2	0590 4552	0198 6740
		SM14		4 x 4 mm^2	0590 4560	0199 1639
		SMB6	M40	4 x 6 mm^2	1335 0269	1334 9856
		SMB10		4 x 10 mm^2	1335 0277	1334 9864
		SMB16		4 x 16 mm^2	1335 0285	1334 9872
	Brakemotor cable[1] BP brake	SB11	M23	4 x 1.5 mm^2 + 2 x 1 mm^2	1335 4345	0198 6740
		SB12		4 x 2.5 mm^2 + 2 x 1 mm^2	1335 4353	0198 6740
		SB14		4 x 4 mm^2 + 2 x 1 mm^2	1335 4361	0199 1639
		SBB6	M40	4 x 6 mm^2 + 2 x 1.5 mm^2	1335 0196	1334 9856
		SBB10		4 x 10 mm^2 + 2 x 1.5 mm^2	1335 0218	1334 9864
		SBB16		4 x 16 mm^2 + 2 x 1.5 mm^2	1335 0226	1334 9872
Table continued on next page.						
Cable carrier installation	Motor cable	SM11	M23	4 x 1.5 mm^2	0590 6245	0198 6740
		SM12		4 x 2.5 mm^2	0590 6253	0198 9197
		SM14		4 x 4 mm^2	0590 4803	0199 1639
		SMB6	M40	4 x 6 mm^2	1335 0293	1334 9856
		SMB10		4 x 10 mm^2	1335 0307	1334 9864
		SMB16		4 x 16 mm^2	1335 0315	1334 9872
	Brakemotor cable[1] BP brake	SB11	M23	4 x 1.5 mm^2 + 2 x 1 mm^2	1335 4388	0198 9197
		SB12		4 x 2.5 mm^2 + 2 x 1 mm^2	1335 4396	0198 9197
		SB14		4 x 4 mm^2 + 2 x 1 mm^2	1342 1603	0199 1639
		SBB6	M40	4 x 6 mm^2 + 2 x 1.5 mm^2	1335 0234	1334 9856
		SBB10		4 x 10 mm^2 + 2 x 1.5 mm^2	1335 0242	1334 9864
		SBB16		4 x 16 mm^2 + 2 x 1.5 mm^2	1335 0250	1334 9872

1) BP brake: 3-core cable, only 2 cores are used

* The complete connector service pack always includes the following parts:

- Power connector,
- Insulation inserts,
- Socket contacts.

Power cables and plug connectors for CMPZ motors

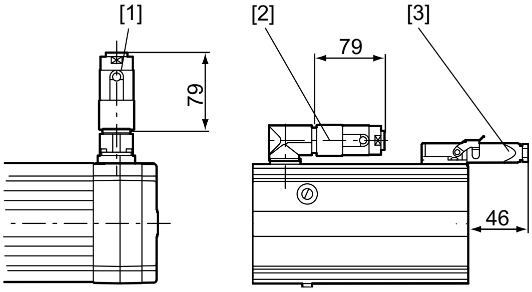
Cable type		Connector type	Thread size	Cable cross section [mm^2]	Part number: Prefabricated cables	Part number: Spare power plug*
Fixed installation	Motor cable	SM11	M23	4 x 1.5 mm^2	0590 4544	0198 6740
		SM12		4 x 2.5 mm^2	0590 4552	0198 6740
		SM14		4 x 4 mm^2	0590 4560	0199 1639
		SMB6	M40	4 x 6 mm^2	1335 0269	1334 9856
		SMB10		4 x 10 mm^2	1335 0277	1334 9864
		SMB16		4 x 16 mm^2	1335 0285	1334 9872
	Brakemotor cable for BY brake	SB11	M23	4 x 1.5 mm^2 + 3 x 1 mm^2	1335 4272	0198 6740
		SB12		4 x 2.5 mm^2 + 3 x 1 mm^2	1335 4280	0198 6740
		SB14		4 x 4 mm^2 + 3 x 1 mm^2	1335 4299	0199 1639
		SBB6	M40	4 x 6 mm^2 + 3 x 1.5 mm^2	1335 0129	1334 9856
		SBB10		4 x 10 mm^2 + 3 x 1.5 mm^2	1335 0137	1334 9864
		SBB16		4 x 16 mm^2 + 3 x 1.5 mm^2	1335 0145	1334 9872
Table continued on next page.						
Cable carrier installation	Motor cable	SM11	M23	4 x 1.5 mm^2	0590 6245	0198 6740
		SM12		4 x 2.5 mm^2	0590 6253	0198 9197
		SM14		4 x 4 mm^2	0590 4803	0199 1639
		SMB6	M40	4 x 6 mm^2	1335 0293	1334 9856
		SMB10		4 x 10 mm^2	1335 0307	1334 9864
		SMB16		4 x 16 mm^2	1335 0315	1334 9872
	Brakemotor cable for BY brake	SB11	M23	4 x 1.5 mm^2 + 3 x 1 mm^2	1335 4302	0198 9197
		SB12		4 x 2.5 mm^2 + 3 x 1 mm^2	1335 4310	0198 9197
		SB14		4 x 4 mm^2 + 3 x 1 mm^2	1335 4329	0199 1639
		SBB6	M40	4 x 6 mm^2 + 3 x 1.5 mm^2	1335 0153	1334 9856
		SBB10		4 x 10 mm^2 + 3 x 1.5 mm^2	1335 0161	1334 9864
		SBB16		4 x 16 mm^2 + 3 x 1.5 mm^2	1335 0188	1334 9872

* The complete connector service pack always includes the following parts:

- Power connector,
- Insulation inserts,
- Socket contacts.

Plug connector connection variant – technical data

Illustration of the mating connectors:



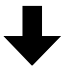
59395axx

[1] Radial mating connector

[2] Angled mating connector

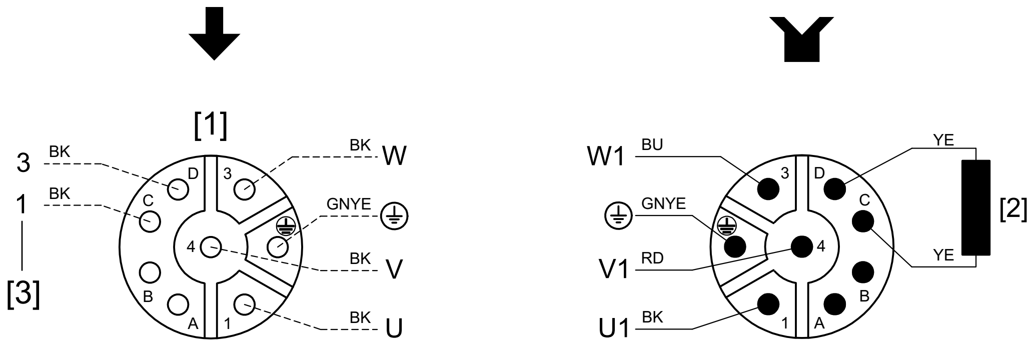
[3] Mating connector for forced cooling fan

Symbols used

	Plug connector upper part (top view on flange socket) To be connected by the customer
	Plug connector lower part, Connected at the factory

SM1/SB1 power plug connector (M23)

Wiring diagram with/without BP brake



64623axx

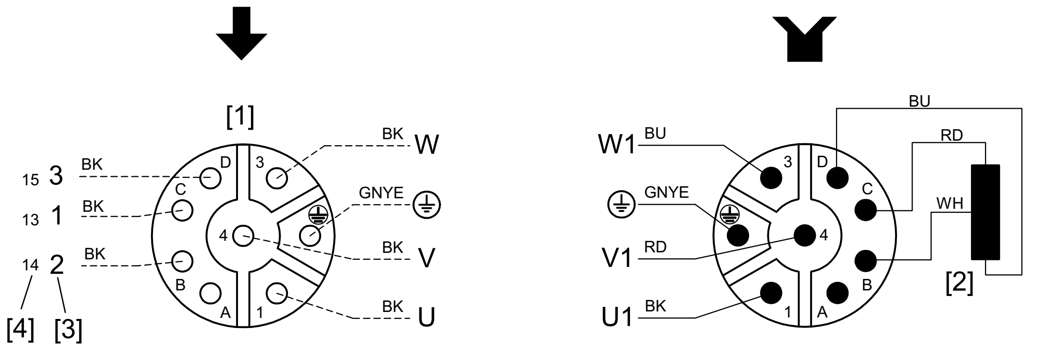
[1] BP brake (optional)

[2] Brake coil

[3] Motor cable labeling

SM1/SB1 power plug connector (M23)

Wiring diagram with/without BY brake

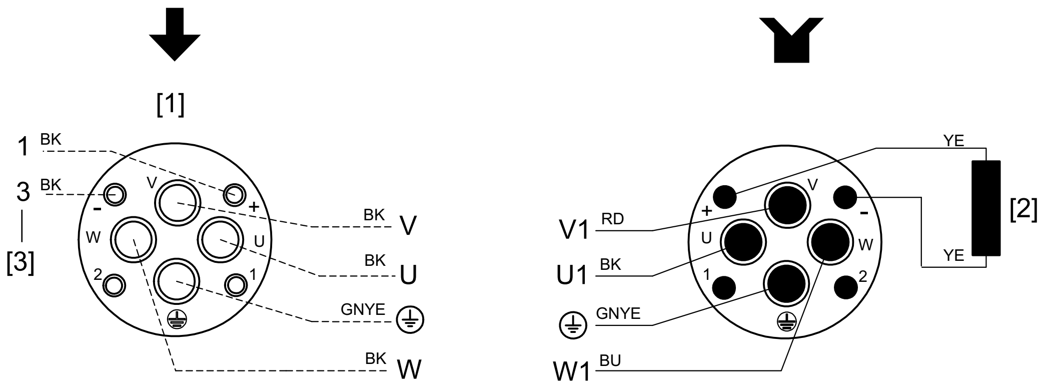


64624axx

[1] BY brake (optional)
[2] Brake coil
[3] Motor cable labeling
[4] Brake rectifier labeling

SMB/SBB power plug connector (M40)

Wiring diagram with/without BP brake

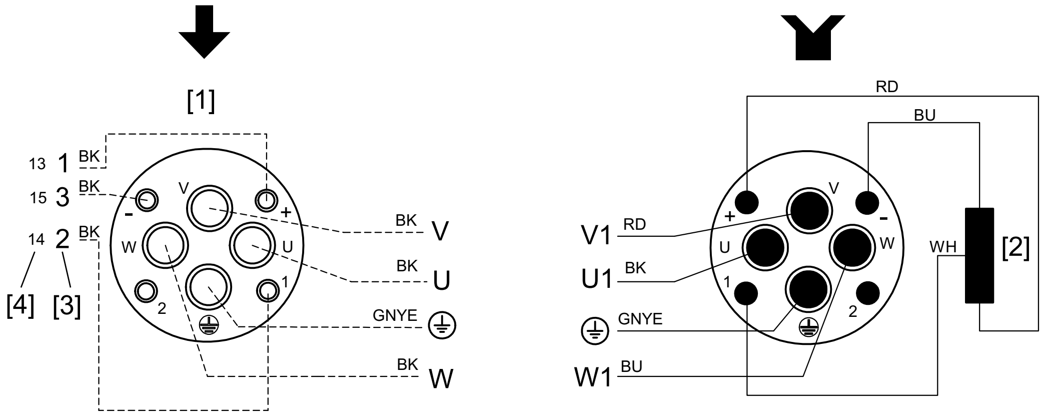


64625axx

[1] BP brake (optional)
[2] Brake coil
[3] Motor cable labeling

SMB/SBB power plug connector (M40)

Wiring diagram with/without BY brake



64626axx

[1] BY brake (optional)

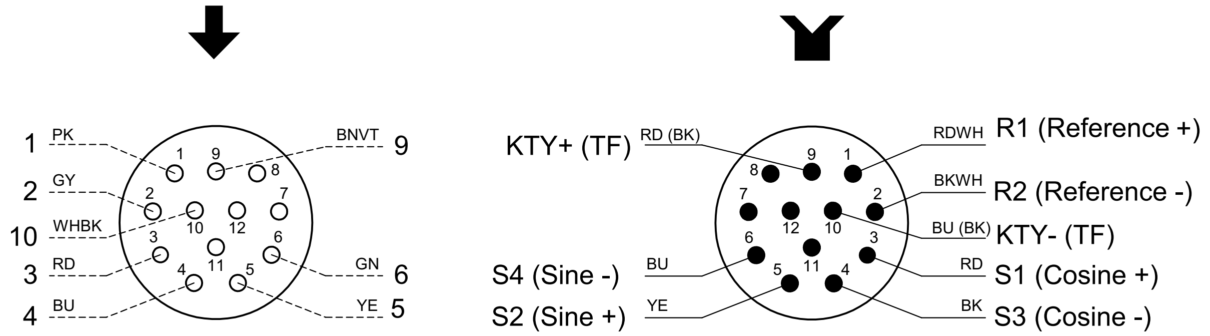
[2] Brake coil

[3] Motor cable labeling

[4] Brake rectifier labeling

RH1M resolver signal plug connector

Wiring diagram



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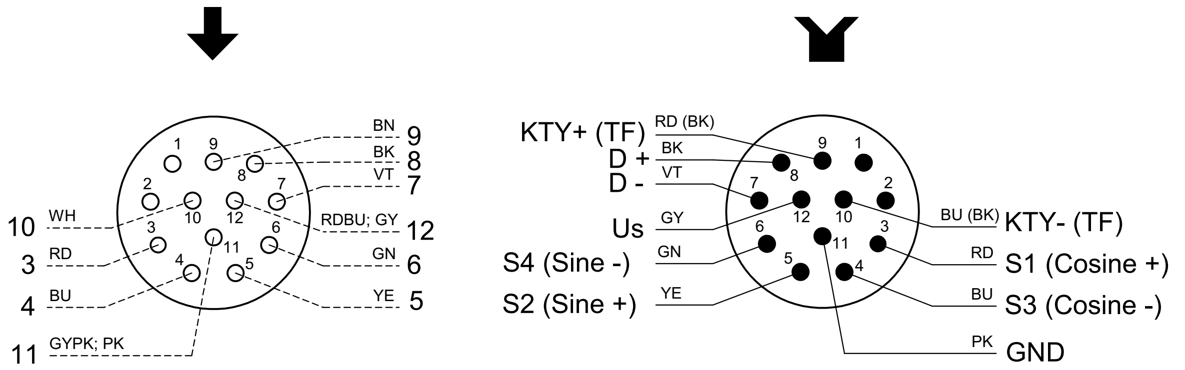
Contact assignment of the plug connector lower part

Pin	Color code	Connection
1	RD / WH	R1 (reference +)
2	BK / WH	R2 (reference -)
3	RD	S1 (cosine +)
4	BK	S3 (cosine -)
5	YE	S2 (sine +)
6	BU	S4 (sine -)
7	-	-
8	-	-
9	RD	KTY +
10	BU	KTY -
11	-	-
12	-	-

ES1H, AS1H, AK0H, EK0H, AK1H encoder signal plug connector[1], EK1H[1]

Wiring diagram



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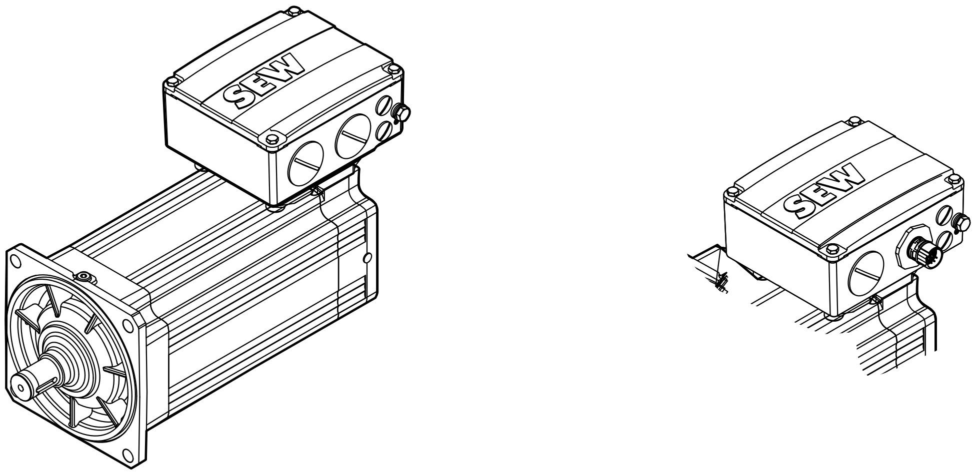
Contact assignment of the plug connector lower part

Pin	Color code	Connection
1	-	-
2	-	-
3	RD	S1 (cosine +)
4	BU	S3 (cosine -)
5	YE	S2 (sine +)
6	GN	S4 (sine -)
7	VT	D -
8	BK	D +
9	RD	KTY +
10	BU	KTY -
11	PK	Voltage reference (GND)
12	GY	Supply voltage Vs

1) In preparation

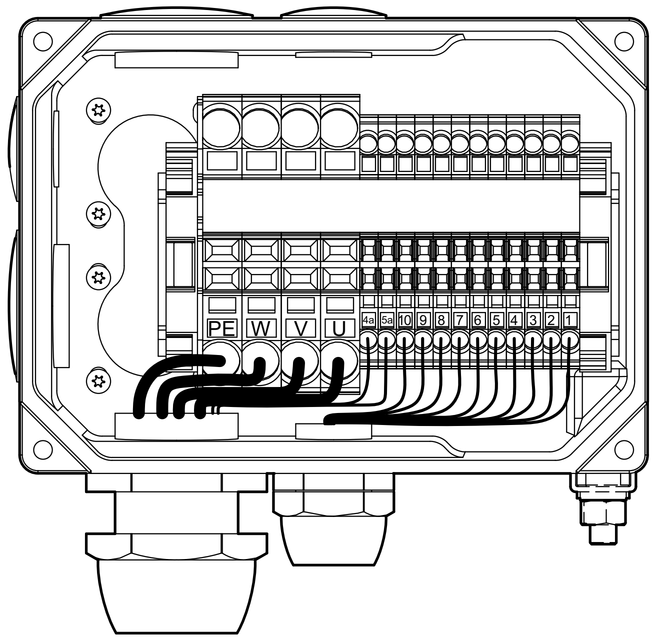
Terminal box – connection variant



Connection cross section

Motor type	Power connection			Encoder/resolver/thermal motor protection	
	Connection	Maximum connection cross section	Cable entry	Connection	Cable entry
CMP50, CMP63	Spring terminals	6 mm^2	M25	Spring terminals	M16
CMP71, CMP80	M6 stud	10 mm^2	M32		
CMP100	M8 stud	25 mm^2	M40		

CMP50 and CMP63



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Power

Pin	Core identification	Connection
U	(BK/WH) Black with white lettering U, V, W	U
V		V
W		W
PE	(GN/YE) Green/Yellow	Protective earth

BP brake

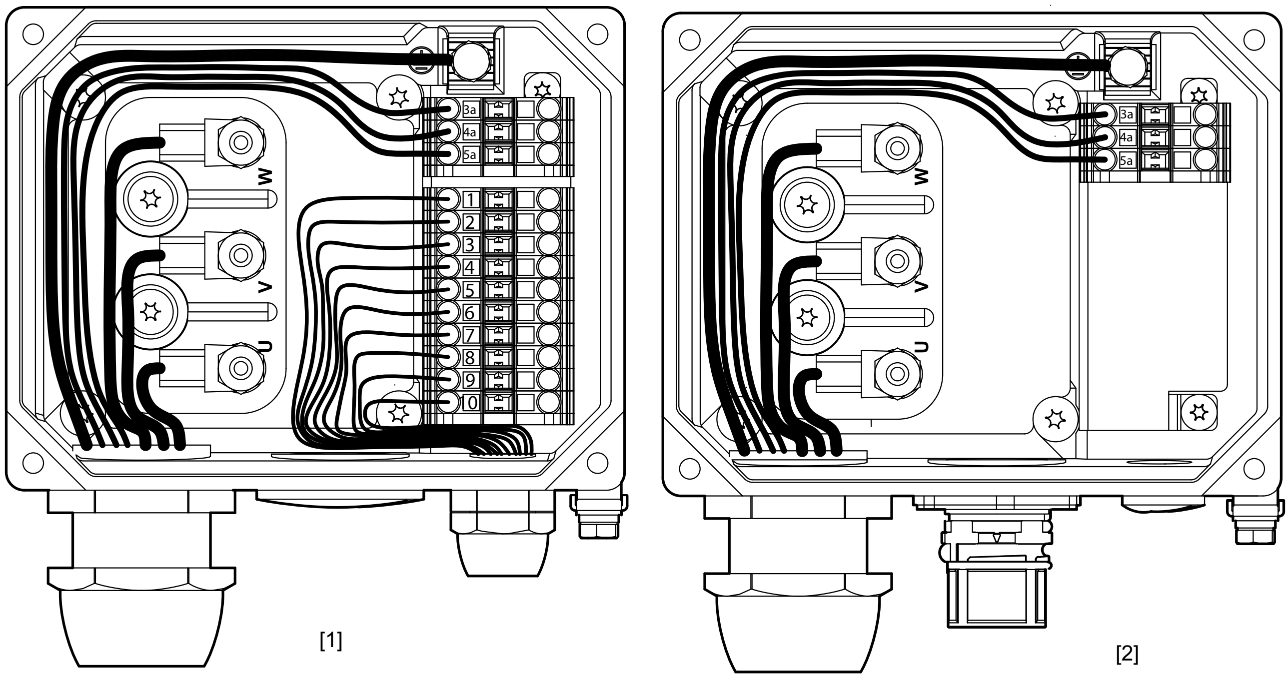
Auxiliary terminal contacts	Core identification	BMV brake rectifier connection	BS brake control unit
4a	(BK/WH) Black with white lettering 1, 2, 3	13	3
5a		15	5

The brake has a standard supply voltage of DC 24 V.

Signal

Resolver			Encoders		
1	ref +	Reference	1	cos +	Cosine
2	ref -		2	ref cos	Reference
3	cos +	Cosine	3	sin+	Sine
4	cos-		4	ref sin	Reference
5	sin+	Sine	5	D -	DATA
6	sin-		6	D +	DATA
7	-	-	7	GND	Ground
8	-	-	8	Us	Supply voltage
9	TF/KTY +	Motor protection	9	TF/KTY +	Motor protection
10	TF/KTY -		10	TF/KTY -	

CMP71 – CMP100



[1]	KK terminal box
[2]	KKS terminal box

Power

Pin	Core identification	Connection
U	(BK/WH) Black with white lettering U, V, W	U
V		V
W		W
PE	(GN/YE) Green/Yellow	Protective earth

BP brake

Auxiliary terminal contacts	Core identification	BMV brake rectifier connection	BS brake control unit
4a	(BK/WH) Black with white lettering 1, 2, 3	13	3
5a		15	5

The brake has a standard supply voltage of DC 24 V.

BY brake

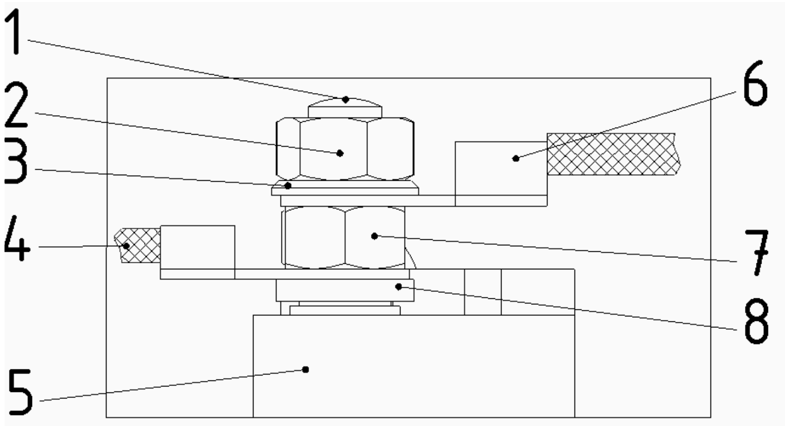
Auxiliary terminal contacts	Core identification	Connection of BME, BMP, BMH, BMK brake rectifiers	BSG brake control unit
3a	(BK/WH) Black with white lettering 1, 2, 3	14	1
4a		13	3
5a		15	5

Signal

Resolver			Encoders		
1	ref +	Reference	1	cos +	Cosine
2	ref -		2	ref cos	Reference
3	cos +	Cosine	3	sin+	Sine
4	cos-		4	ref sin	Reference
5	sin+	Sine	5	D -	DATA
6	sin-		6	D +	DATA
7	-	-	7	GND	Ground
8	-	-	8	Us	Supply voltage
9	TF/KTY +	Motor protection	9	TF/KTY +	Motor protection
10	TF/KTY -		10	TF/KTY -	

Terminal box connection variant – technical data

The following figure shows the power connection in the terminal box.



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[1]	Terminal stud	[5]	Terminal block
[2]	Upper nut	[6]	Customer's cable
[3]	Washer	[7]	Lower nut
[4]	Motor cable	[8]	Lock washer

For designing the terminal box, positions 4, 6 and 7 are regarded as current-carrying.

10.4 Additional feature: ventilation

Forced cooling fan

Unit designation /VR

Description Synchronous servomotors can be equipped with a forced cooling fan if requested. The VR forced cooling fan is available for DC 24 V (CMP50 - CMP100).

The motors can also be fitted equipped with a forced cooling fan later using a retrofit set.

INFORMATION

The forced cooling fan can only be used up to a maximum oscillation and shock load of 1 g.

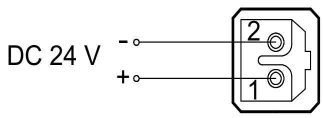
Mechanical installation Mounting the fan guard for the VR forced cooling fan:

Motor	Screws	Tightening torque
CMP50, CMP63	M4 × 8, self-tapping	4 Nm
CMP.71	M6 × 20	4 Nm[1)]
CMP.80, CMP.100	M8 × 20	10 Nm[1)]

1) Additional Loctite® thread lock fluid

Electrical connection The VR forced cooling fan is only available for 24 V DC voltage.

- DC 24 V ± 20%
- Plug connector connection
- Maximum connection cross section 2 x 1 mm^2
- Cable gland Pg7 with inside diameter 7 mm



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Connector contact	Connection
1	24 V +
2	0 V

Retrofit set for CMP50/CMP63

	INFORMATION
i	The forced cooling fan retrofit set for the motors CMP50 - CMP63 may only be mounted by staff authorized by SEW-EURODRIVE.

Forced cooling fan – technical data

/VR

Forced cooling fan type	VR				
Motor size	**CMP50**	**CMP63**	**CMP.71**	**CMP.80**	**CMP.100**
Supply voltage DC	24 V ± 10%				
Current consumption DC	0.15 A	0.25 A	0.88 A	0.88 A	1.67 A
Power consumption	3.5 W	6 W	21 W	21 W	40 W
Air discharge rate	56 m^3/h	80 m^3/h	275 m^3/h	275 m^3/h	540 m^3/h
Ambient temperature	-20 °C to + 60 °C				
Degree of protection	IP54/IP55				
Electrical connection	Plug connector				
Max. cable cross section	3 × 1 mm^2				
Inner diameter of the cable gland	7 mm				

UWU52A switched-mode power supply

The AC voltage type includes a VR forced cooling fan and the UWU52A switched-mode power supply.

Input: AC 110 - 240 V; 1.04 - 0.63 A; 50 / 60 Hz

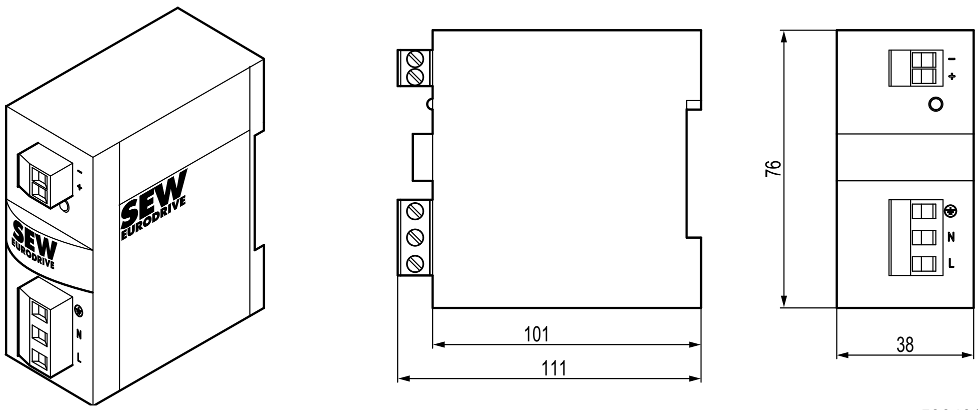
Output: DC 24 V; 2.5 A (40 °C); 2.0 A (55 °C)

Connection: Screw terminals 0.2 - 2.5 mm^2, separable.

Degree of protection: IP20; attachment to EN 60715 TH35 support rail in the control cabinet.

Part number: 0188 1817.

Dimensions of the UWU52A switched-mode power supply:



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Forced cooling fan, cpl.

Forced cooling fan for motor type	Part number
CMP50	1332 8697
CMP63	1332 7569
CMP71	1333 7114
CMP.71 /BP1 /BY2	1644 7697
CMP80	1644 4841
CMP80 /BP3	1644 7751
CMPZ80 /BY4	1644 7735
CMP100	1644 4973
CMP.100 /BP5 /BY8	1644 7808

Retrofit set for CMP50 - 100

INFORMATION

The forced cooling fan retrofit set for the motors CMP50/63 may only be mounted by staff authorized by SEW-EURODRIVE.

Retrofit set	Part number	Retrofit set	Part number	Retrofit set	Part number
CMP50 VR kit	**1333 2414**	**CMP63 VR kit**	**1333 2422**	**CMP71 VR kit**	**1335 5228**
				CMP.71 /BP1 /BY2	**1335 5236**
Forced cooling fan cpl.		Forced cooling fan, cpl.		Forced cooling fan, cpl.	
Machine screw M4x8-Tx-ST-A2F		Machine screw M4x8-Tx-ST-A2F		M6x20-8.8-ADB3 machine screw	
Lock washer		Lock washer		Grommet	
CMP50 / AS1H / ES1H / RH1M housing cover		CMP63 / AS1H / ES1H / RH1M housing cover		Sleeve	
Screw		Screw		Washer	
Washer		Washer			
Housing cover seal for CMP50		Housing cover seal for CMP63			
CMP80 VR kKit	**1335 5244**	**CMP100 VR kit**	**1335 5279**		
CMP80 /BP3	**1335 5252**	**CMP.100 /BP5 /BY8**	**1335 5287**		
CMPZ80 /BY4	**1335 5260**				
Forced cooling fan, cpl.		Forced cooling fan, cpl.			
M6x20-8.8-ADB3 machine screw		M6x20-8.8-ADB3 machine screw			
Grommet		Grommet			
Sleeve		Sleeve			
Washer		Washer			

The forced cooling fan retrofit set is supplied as follows:

- Forced cooling fan, cpl.
- Accessory bag

11 Prefabricated Cables – CMP Servomotors

11.1 Description

SEW-EURODRIVE offers pre-fabricated cables with plugs for straightforward and reliable motor connection.

Cable and contact are connected using the crimp technique. The following cables are available in 1 m steps:

- Motor cable
- Brakemotor cable
- Resolver/motor protection cable
- Absolute encoder/motor protection cable
- Forced cooling fan cable

Prefabricated cables are divided into:

- Power cables (motor cable, brakemotor cable, extension cable)
- feedback cables (resolver cable, encoder cable, extension cable).

Preselection of cables

Prefabricated cables were preselected by SEW-EURODRIVE according to the standard EN 60204. The routing types "fixed installation" and "cable carrier installation" were considered.

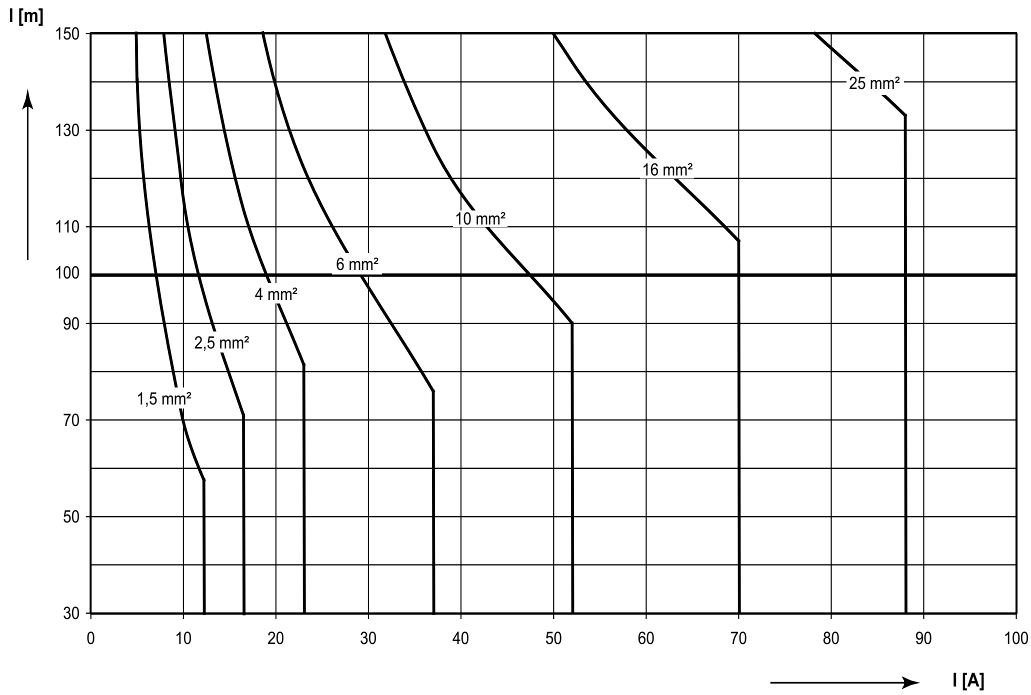
Using other standards for the machine construction can result in diverging cross sections.

11.2 Dimensioning the cable cross section

Project planning for cable cross section

Cable selection according to EN 60204

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



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Hybrid cables with cross sections of 1.5 mm^2 to 10 mm^2 can be ordered from SEW-EURODRIVE.

Cable load table

Cable load through current **I** in [A] according to EN 60204-1 table 5, ambient temperature 40 °C

Cable cross section [mm^2]	Three-core sheathed cable in pipe or cable [A]	Three-core sheathed cable on top of each other on wall [A]	Three-core sheathed cable lined up horizontally [A]
1,5	12,2	15,2	16,1
2,5	16,5	21,0	22
4	23	28,0	30
6	29	36,0	37
10	40	50,0	52
16	53	66,0	70
25	67	84,0	88
35	83	104,0	114

These data are merely recommended values and are **no substitute for the detailed project planning** of the cables depending on the concrete application considering the applicable regulations.

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

11.3 Assignment tables: cables to CMP servomotors

Servomotors without brake

The following table is used to select power cables for CMP servomotors without brake and with 400 V system voltage.

The values in the following table are based on the values with a gray background in the "cable load table" on page 204.

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

- 1.5 mm^2 - 4 mm^2: S.1
- 6 mm^2 - 16 mm^2: S.B

For the connector assignment, refer to page 211.

Motor	Rated speed	Standstill current I_0	to cable length	Core cross section	Cable part no. Fixed installation	Cable carrier installation	Cable carrier extension[1)]
	[min^{-1}]	[A]	[m]	[mm^2]	Stand-alone motor		
CMP40S	3000	1.2	100	1.5	0590 4544	0590 6245	1333 2457
CMP40S	4500	1.2	100	1.5	0590 4544	0590 6245	1333 2457
CMP40S	6000	1.2	100	1.5	0590 4544	0590 6245	1333 2457
CMP40M	3000	0.95	100	1.5	0590 4544	0590 6245	1333 2457
CMP40M	4500	0.95	100	1.5	0590 4544	0590 6245	1333 2457
CMP40M	6000	1.1	100	1.5	0590 4544	0590 6245	1333 2457
CMP50S	3000	0.96	100	1.5	0590 4544	0590 6245	1333 2457
CMP50S	4500	1.32	100	1.5	0590 4544	0590 6245	1333 2457
CMP50S	6000	1.7	100	1.5	0590 4544	0590 6245	1333 2457
CMP50M	3000	1.68	100	1.5	0590 4544	0590 6245	1333 2457
CMP50M	4500	2.3	100	1.5	0590 4544	0590 6245	1333 2457
CMP50M	6000	3	100	1.5	0590 4544	0590 6245	1333 2457
CMP50L	3000	2.2	100	1.5	0590 4544	0590 6245	1333 2457
CMP50L	4500	3.15	100	1.5	0590 4544	0590 6245	1333 2457
CMP50L	6000	4.2	100	1.5	0590 4544	0590 6245	1333 2457
CMP63S	3000	2.15	100	1.5	0590 4544	0590 6245	1333 2457
CMP63S	4500	3.05	100	1.5	0590 4544	0590 6245	1333 2457
CMP63S	6000	3.9	100	1.5	0590 4544	0590 6245	1333 2457
CMP63M	3000	3.6	100	1.5	0590 4544	0590 6245	1333 2457
CMP63M	4500	5.4	100	1.5	0590 4544	0590 6245	1333 2457
CMP63M	6000	6.9	95	1.5	0590 4544	0590 6245	1333 2457
CMP63M	6000	6.9	100	2.5	0590 4552	0590 6253	1333 2465
CMP63L	3000	4.95	100	1.5	0590 4544	0590 6245	1333 2457
CMP63L	4500	6.9	95	1.5	0590 4544	0590 6245	1333 2457
CMP63L	4500	6.9	100	2.5	0590 4552	0590 6253	1333 2465
CMP63L	6000	9.3	75	1.5	0590 4544	0590 6245	1333 2457
CMP63L	6000	9.3	100	2.5	0590 4552	0590 6253	1333 2465
CMP71S	3000	4.9	100	1.5	0590 4544	0590 6245	1333 2457
CMP71S	4500	7.3	95	1.5	0590 4544	0590 6245	1333 2457
CMP71S	4500	7.3	100	2,5	0590 4552	0590 6253	1333 2465
CMP71S	6000	9.6	70	1.5	0590 4544	0590 6245	1333 2457
CMP71S	6000	9.6	100	2,5	0590 4552	0590 6253	1333 2465

Table continued on next page.

Motor	Rated speed	Stand-still current I_0	to cable length	Core cross section	Cable part no.		
					Fixed installation	Cable carrier installation	Cable carrier extension[1)]
	[min⁻¹]	[A]	[m]	[mm²]	Stand-alone motor		
CMP71M	3000	7.5	90	1.5	0590 4544	0590 6245	1333 2457
CMP71M	3000	7.5	100	2,5	0590 4552	0590 6253	1333 2465
CMP71M	4500	10.9	65	1.5	0590 4544	0590 6245	1333 2457
CMP71M	4500	10.9	100	2,5	0590 4552	0590 6253	1333 2465
CMP71M	6000	14.7	80	2.5	0590 4552	0590 6253	1333 2465
CMP71M	6000	14.7	100	4	0590 4560	0590 4803	1333 2473
CMP71L	3000	9.4	80	1.5	0590 4544	0590 6245	1333 2457
CMP71L	3000	9.4	100	2,5	0590 4552	0590 6253	1333 2465
CMP71L	4500	14.1	85	2.5	0590 4552	0590 6253	1333 2465
CMP71L	4500	14.1	100	4	0590 4560	0590 4803	1333 2473
CMP71L	6000	18.8	100	4	0590 4560	0590 4803	1333 2473
CMP80S	3000	10	70	1.5	0590 4544	0590 6245	1333 2457
CMP80S	3000	10	100	2,5	0590 4552	0590 6253	1333 2465
CMP80S	4500	15.3	80	2.5	0590 4552	0590 6253	1333 2465
CMP80S	4500	15.3	100	4	0590 4560	0590 4803	1333 2473
CMP80S	6000	20	95	4	0590 4560	0590 4803	1333 2457
CMP80S	6000	20	100	6	1335 0269	1335 0293	1335 0021
CMP80M	3000	13.4	90	2.5	0590 4552	0590 6253	1333 2465
CMP80M	3000	13.4	100	4	0590 4560	0590 4803	1333 2473
CMP80M	4500	20.1	95	4	0590 4560	0590 4803	1333 2457
CMP80M	4500	20.1	100	6[2)]	1335 0269	1335 0293	1335 0021
CMP80M	6000	26.4	100	6	1335 0269	1335 0293	1335 0021
CMP80L	3000	18.7	100	4	0590 4560	0590 4803	1333 2457
CMP80L	4500	27.8	100	6	1335 0269	1335 0293	1335 0021
CMP80L	6000	37.6	100	10	1335 0277	1335 0307	1335 0048
CMP100S	3000	19.6	95	4	0590 4560	0590 4803	1333 2457
CMP100S	3000	19.6	100	6[2)]	1335 0269	1335 0293	1335 0021
CMP100S	4500	30	98	6	1335 0269	1335 0293	1335 0021
CMP100S	4500	30	100	10	1335 0277	1335 0307	1335 0048
CMP100M	3000	21.8	85	4	0590 4560	0590 4803	1333 2457
CMP100M	3000	21.8	100	6[2)]	1335 0269	06650293	1335 0021
CMP100M	4500	33.1	90	6	1335 0269	1335 0293	1335 0021
CMP100M	4500	33.1	100	10	1335 0277	1335 0307	1335 0048
CMP100L	3000	32.3	90	6	1335 0269	1335 0293	1335 0021
CMP100L	3000	32.3	100	10	1335 0277	1335 0307	1335 0048
CMP100L	4500	48.4	98	10	1335 0277	1335 0307	1335 0048
CMP100L	4500	48.4	100	16	1335 0285	1335 0315	1335 0056

1) Currently there are only cable carrier extension cables

2) Change from S.1 to S.B

11.4 Assignment tables: cables to CMP servomotors with BP brake

Servo brakemotors with BP brake

The following table is used to select power cables for CMP servo brakemotors with 400 V system voltage and BP holding brake.

The values in the following table are based on the values with a gray background in the "cable load table" on page 204.

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

- 1.5 mm^2 - 4 mm^2: S.1
- 6 mm^2 - 16 mm^2: S.B

For the connector assignment, refer to page 211.

Motor type	Rated speed	Standstill current I_0	to cable lengths	Core cross section	Cable part no.		
					Fixed installation	Cable carrier installation	Cable carrier extension[1)]
	[min^{-1}]	[A]	[m]	[mm^2]	Brakemotor		
CMP40S/BP	3000	1.2	100	1.5	1335 4345	1335 4388	1335 4221
CMP40S/BP	4500	1.2	100	1.5	1335 4345	1335 4388	1335 4221
CMP40S/BP	6000	1.2	100	1.5	1335 4345	1335 4388	1335 4221
CMP40M/BP	3000	0.95	100	1.5	1335 4345	1335 4388	1335 4221
CMP40M/BP	4500	0.95	100	1.5	1335 4345	1335 4388	1335 4221
CMP40M/BP	6000	1.1	100	1.5	1335 4345	1335 4388	1335 4221
CMP50S/BP	3000	0.96	100	1.5	1335 4345	1335 4388	1335 4221
CMP50S/BP	4500	1.32	100	1.5	1335 4345	1335 4388	1335 4221
CMP50S/BP	6000	1.7	100	1.5	1335 4345	1335 4388	1335 4221
CMP50M/BP	3000	1.68	100	1.5	1335 4345	1335 4388	1335 4221
CMP50M/BP	4500	2.3	100	1.5	1335 4345	1335 4388	1335 4221
CMP50M/BP	6000	3	100	1.5	1335 4345	1335 4388	1335 4221
CMP50L/BP	3000	2.2	100	1.5	1335 4345	1335 4388	1335 4221
CMP50L/BP	4500	3.15	100	1.5	1335 4345	1335 4388	1335 4221
CMP50L/BP	6000	4.2	100	1.5	1335 4345	1335 4388	1335 4221
CMP63S/BP	3000	2.15	100	1.5	1335 4345	1335 4388	1335 4221
CMP63S/BP	4500	3.05	100	1.5	1335 4345	1335 4388	1335 4221
CMP63S/BP	6000	3.9	100	1.5	1335 4345	1335 4388	1335 4221
CMP63M/BP	3000	3.6	100	1.5	1335 4345	1335 4388	1335 4221
CMP63M/BP	4500	5.4	100	1.5	1335 4345	1335 4388	1335 4221
CMP63M/BP	6000	6.9	95	1.5	1335 4345	1335 4388	1335 4221
CMP63M/BP	6000	6.9	100	2.5	1335 4353	1335 4396	1335 4248
CMP63L/BP	3000	4.95	100	1.5	1335 4345	1335 4388	1335 4221
CMP63L/BP	4500	6.9	95	1.5	1335 4345	1335 4388	1335 4221
CMP63L/BP	4500	6.9	100	2.5	1335 4353	1335 4396	1335 4248
CMP63L/BP	6000	9.3	75	1.5	1335 4345	1335 4388	1335 4221
CMP63L/BP	6000	9.3	100	2.5	1335 4353	1335 4396	1335 4248
CMP71S /BP	3000	4.9	80	1.5	1335 4345	1335 4388	1335 4221
CMP71S /BP	4500	7.3	80	1.5	1335 4345	1335 4388	1335 4221
CMP71S /BP	6000	9.6	70	1.5	1335 4345	1335 4388	1335 4221
CMP71S /BP	6000	9.6	80	2,5	1335 4353	1335 4396	1335 4248

Table continued on next page.

Motor type	Rated speed	Standstill current I_0	to cable lengths	Core cross section	Cable part no.		
					Fixed installation	Cable carrier installation	Cable carrier extension[1)]
	[min^{-1}]	[A]	[m]	[mm^2]	Brakemotor		
CMP71M /BP	3000	7.5	80	1.5	1335 4345	1335 4388	1335 4221
CMP71M /BP	4500	10.9	65	1.5	1335 4345	1335 4388	1335 4221
CMP71M /BP	4500	10.9	80	2,5	1335 4353	1335 4396	1335 4248
CMP71M /BP	6000	14.7	80	2.5	1335 4353	1335 4396	1335 4248
CMP71L /BP	3000	9.4	80	1.5	1335 4345	1335 4388	1335 4221
CM 71L /BP	4500	14.1	80	2.5	1335 4353	1335 4396	1335 4248
CMP71L /BP	6000	18.8	80	4	1335 4361	13421603	1335 4337
CMP80S /BP	3000	10	55	1.5	1335 4345	1335 4388	1335 4221
CMP80S /BP	4500	15.3	55	2.5	1335 4353	1335 4396	1335 4248
CMP80S /BP	6000	20	55	4	1335 4361	13421603	1335 4337
CMP80M /BP	3000	13.4	55	2.5	1335 4353	1335 4396	1335 4248
CMP80M /BP	4500	20.1	55	4	1335 4361	13421603	1335 4337
CMP80L /BP	3000	18.7	55	4	1335 4361	13421603	1335 4337
CMP80L /BP	4500	27.8	85	6	1335 0196	1335 0234	1335 0099
CMP100S /BP	3000	19.6	45	4	1335 4361	13421603	1335 4337
CMP100S /BP	3000	19.6	70	6	1335 0196	1335 0234	1335 0099
CMP100S /BP	4500	30	70	6	1335 0196	1335 0234	1335 0099
CMP100S /BP	4500	30	70	10	1335 0218	1335 0242	1335 0102
CMP100M /BP	3000	21.8	45	4	1335 4361	13421603	1335 4337
CMP100M /BP	3000	21.8	70	6	1335 0196	03350234	1335 0099
CMP100M /BP	4500	33.1	70	6	1335 0196	1335 0234	1335 0099
CMP100M /BP	4500	33.1	70	10	1335 0218	1335 0242	1335 0102
CMP100L /BP	3000	32.3	70	6	1335 0196	1335 0234	1335 0099
CMP100L /BP	3000	32.3	70	10	1335 0218	1335 0242	1335 0102
CMP100L /BP	4500	48.4	70	10	1335 0218	1335 0242	1335 0102

1) Currently there are only cable carrier extension cables

11.5 Assignment tables: cables to CMP servomotors with BY brake

Servo brakemotors with BY brake

The following table allows for selecting power cables for CMP servo brakemotors with a system voltage of 400 V and a BY working brake with 400 V, 230 V or 110 V brake voltage.

An additional length is specified in the brackets for cases where the permitted cable length for 110 V is shorter than for 400 V/230 V.

The values in the following table are based on the values with a gray background in the "cable load table" on page 204.

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

- 1.5 mm^2 - 4 mm^2: S.1
- 6 mm^2 - 16 mm^2: S.B

For the connector assignment, refer to page 211.

Motor type	Rated speed	Stand-still current I_0	to cable lengths	Core cross section	Cable part no. Fixed installation	Cable carrier installation	Cable carrier extension[1)]
	[min^{-1}]	[A]	[m]	[mm^2]	Brakemotor		
CMPZ71S /BY	3000	4.9	100	1.5	1335 4272	1335 4302	1335 4221
CMPZ71S /BY	4500	7.3	95	1.5	1335 4272	1335 4302	1335 4221
CMPZ71S /BY	4500	7.3	100	2,5	1335 4280	1335 4310	1335 4248
CMPZ71S /BY	6000	9.6	70	1.5	1335 4272	1335 4302	1335 4221
CMPZ71S /BY	6000	9.6	100	2,5	1335 4280	1335 4310	1335 4248
CMPZ71M /BY	3000	7.5	90	1.5	1335 4272	1335 4302	1335 4221
CMPZ71M /BY	3000	7.5	100	2,5	1335 4280	1335 4310	1335 4248
CMPZ71M /BY	4500	10.9	65	1.5	1335 4272	1335 4302	1335 4221
CMPZ71M /BY	4500	10.9	100	2,5	1335 4280	1335 4310	1335 4248
CMPZ71M /BY	6000	14.7	80	2.5	1335 4280	1335 4310	1335 4248
CMPZ71M /BY	6000	14.7	100	4	1335 4299	1335 4329	1335 4337
CMPZ71L /BY	3000	9.4	80	1.5	1335 4272	1335 4302	1335 4221
CMPZ71L /BY	3000	9.4	100	2,5	1335 4280	1335 4310	1335 4248
CMPZ 71L /BY	4500	14.1	85	2.5	1335 4280	1335 4310	1335 4248
CMPZ 71L /BY	4500	14.1	100	4	1335 4299	1335 4329	1335 4337
CMPZ71L /BY	6000	18.8	100	4	1335 4299	1335 4329	1335 4337
CMPZ80S /BY	3000	10	70	1.5	1335 4272	1335 4302	1335 4221
CMPZ80S /BY	3000	10	100 (75)	2,5	1335 4280	1335 4310	1335 4248
CMPZ80S /BY	4500	15.3	80 (75)	2.5	1335 4280	1335 4310	1335 4248
CMPZ80S /BY	4500	15.3	100 (75)	4	1335 4299	1335 4329	1335 4337
CMPZ80M /BY	3000	13.4	90 (75)	2.5	1335 4280	1335 4310	1335 4248
CMPZ80M /BY	3000	13.4	100 (75)	4	1335 4299	1335 4329	1335 4337
CMPZ80M /BY	4500	20.1	95 (75)	4	1335 4299	1335 4329	1335 4337
CMPZ80M /BY	4500	20.1	100	6	1335 0129	1335 0153	1335 4337
CMPZ80L /BY	3000	18.7	100 (75)	4	1335 4299	1335 4329	1335 4337
CMPZ80L /BY	4500	27.8	100	6	1335 0129	1335 0153	1335 0099

Table continued on next page.

Motor type	Rated speed	Standstill current I_0	to cable lengths	Core cross section	Cable part no.		
					Fixed installation	Cable carrier installation	Cable carrier extension[1)]
	[min^{-1}]	[A]	[m]	[mm^2]	Brakemotor		
CMPZ100S /BY	3000	19.6	95 (55)	4	1335 4299	1335 4329	1335 4337
CMPZ100S /BY	3000	19.6	100 (80)	6	1335 0129	1335 0153	1335 0099
CMPZ100S /BY	4500	30	98 (80)	6	1335 0129	1335 0153	1335 0099
CMPZ100S /BY	4500	30	100 (80)	10	1335 0137	1335 0161	1335 0102
CMPZ100M /BY	3000	21.8	85 (55)	4	1335 4299	1335 4329	1335 4337
CMPZ100M /BY	3000	21.8	100 (80)	6	1335 0129	1335 0153	1335 0099
CMPZ100M /BY	4500	33.1	90 (80)	6	1335 0129	1335 0153	1335 0099
CMPZ100M /BY	4500	33.1	100 (80)	10	1335 0137	1335 0161	1335 0102
CMPZ100L /BY	3000	32.3	90 (80)	6	1335 0129	1335 0153	1335 0099
CMPZ100L /BY	3000	32.3	100 (80)	10	1335 0137	1335 0161	1335 0102
CMPZ100L /BY	4500	48.4	98 (80)	10	1335 0137	1335 0161	1335 0102
CMPZ100L /BY	4500	48.4	100 (80)	16	1335 0145	1335 0188	1335 0110

1) Currently there are only cable carrier extension cables

Permitted cable length for DC 24 V BY working brake are especially reduced. Note the following guidelines:

CMPZ71 . /BY: maximum 8 m

CMPZ80 . /BY: between 6.4 and 9 m depending on the cable cross section

CMPZ100 . /BY: between 4,5 and 7 m depending on the cable cross section

For project planning with DC 24 V BY working brake, consult SEW-EURODRIVE.

11.6 *Assignment tables: connectors to CMP servomotors*

System voltage 400 V, without forced cooling fan

Motor type	Rated speed	Plug connector	BP brake	Plug connector	BY brake	Plug connector
CMP40S	3000	SM1	BP01	SB1	-	-
CMP40S	4500					
CMP40S	6000					
CMP40M	3000	SM1	BP01	SB1	-	-
CMP40M	4500					
CMP40M	6000					
CMP50S	3000	SM1	BP04	SB1	-	-
CMP50S	4500					
CMP50S	6000					
CMP50M	3000	SM1	BP04	SB1	-	-
CMP50M	4500					
CMP50M	6000					
CMP50L	3000	SM1	BP04	SB1	-	-
CMP50L	4500					
CMP50L	6000					
CMP63S	3000	SM1	BP09	SB1	-	-
CMP63S	4500					
CMP63S	6000					
CMP63M	3000	SM1	BP09	SB1	-	-
CMP63M	4500					
CMP63M	6000					
CMP63L	3000	SM1	BP09	SB1	-	-
CMP63L	4500					
CMP63L	6000					
CMP.71S	3000	SM1	BP1	SB1	BY2	SB1
CMP.71S	4500					
CMP.71S	6000					
CMP.71M	3000	SM1	BP1	SB1	BY2	SB1
CMP.71M	4500					
CMP.71M	6000					
CMP.71L	3000	SM1	BP1	SB1	BY2	SB1
CMP.71L	4500					
CMP.71L	6000					

System voltage 400 V, without forced cooling fan

Motor type	Rated speed	Plug connector	BP brake	Plug connector	BY brake	Plug connector
CMP.80S	3000	SM1/SMB	BP3	SB1/SBB	BY4	SB1/SBB
CMP.80S	4500					
CMP.80S	6000		-	-	-	-
CMP.80M	3000	SM1 / SMB	BP3	SB1/SBB	BY4	SB1 / SBB
CMP.80M	4500					
CMP.80M	6000	SMB	-	-	-	-
CMP.80L	3000	SM1/SMB	BP3	SB1/SBB	BY4	SB1/SBB
CMP.80L	4500	SMB				
CMP.80L	6000		-	-	-	-
CMP.100S	3000	SM1 / SMB	BP5	SB1 / SBB	BY8	SB1 / SBB
CMP.100S	4500	SMB		SBB		SBB
CMP.100M	3000	SM1 / SMB	BP5	SB1 / SBB	BY8	SB1 / SBB
CMP.100M	4500	SMB		SBB		SBB
CMP.100L	3000	SMB	BP5	SBB	BY8	SBB
CMP.100L	4500	SMB				

11.7 Assignment of the encoder cables for the KKS connection variant

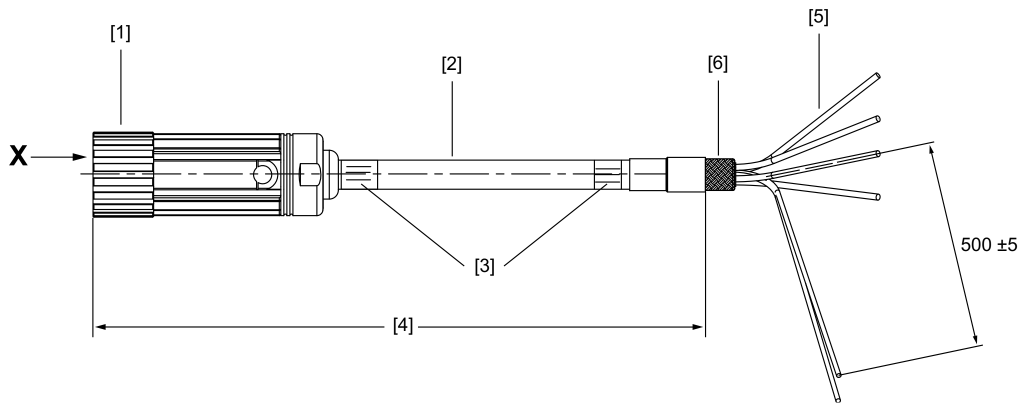
Encoder	Connection to		Cable part no.			
	MOVIDRIVE®	MOVIAXIS®	Fixed installation	Cable carrier installation	Fixed extension	Cable carrier extension
RH1M	X15		0199 4875	0199 3194	0199 5421	0199 5413
		X13	1332 7429	1332 7437		
AS1H, ES1H AK1H, EK1H AK0H, EK0H	X15		1332 4535	1332 4551	0199 5391	0199 5405
		X13				

11.8 Assignment of the encoder cables for the KK connection variant

Encoder	Connection to		Cable part no.	
	MOVIDRIVE®	MOVIAXIS®	Fixed installation	Cable carrier installation
RH1M	X15		1335 6259	1335 6267
		X13	1335 6356	1335 6364
AK1H, EK1H AK0H	X15		1335 6291	1335 6305
		X13		

11.9 Structure of the prefabricated cables for CMP servomotors

Motor cables/brakemotor cables for CMP servomotors



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[1] Connector: Intercontec BSTA 078
[2] SEW-EURODRIVE logo printed on cable
[3] Nameplate
[4] Cable length ≤ 10 m: Tolerance +200 mm.
Cable length ≥ 10 m: Tolerance +2%.
Permitted cable length according to the technical documents.
[5] Pre-fabricated cable end for inverter.
Required loose parts are supplied with the cable.
[6] Shielding pulled back approx. 20 mm +5 mm.

Motor side

The power cables on the motor side consist of an 8-pin plug connector and socket contacts.

The shield is connected in the connector housing according to EMC requirements. All plug connectors seal the plug on the cable end with a lamellar seal and ensure cable relief according to EN 61884.

Prefabrication on inverter end

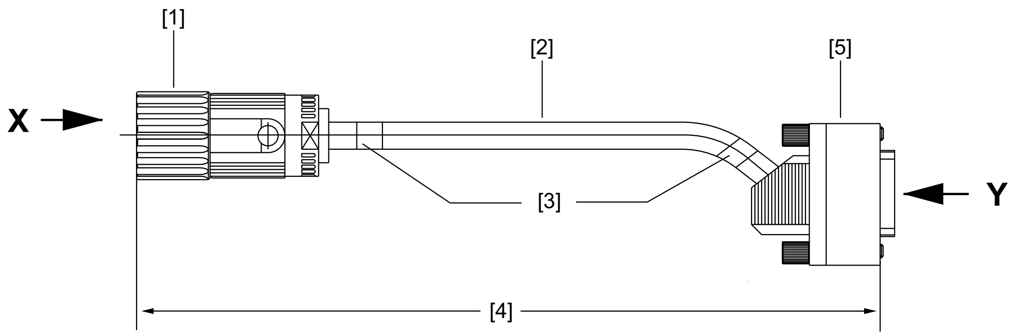
The individual cable cores of the motor and brakemotor cables are exposed and the shield is prepared for connection in the control cabinet. The cable for the inverter end still has to be prefabricated. The loose parts required are supplied with the cable in a separate bag.

Loose parts

The following loose parts are supplied in accordance with the core cross sections for connection to the power terminals on the inverter:

Bag no.	Content
1	4 x conductor end sleeves 1.5 mm^2 , insulated 4 x M6 U-shaped cable lugs 1.5 mm^2
2	4 x conductor end sleeves 2.5 mm^2 , insulated 4 x M6 U-shaped cable lugs 2.5 mm^2
3	4 x conductor end sleeves 4 mm^2 , insulated 4 x M6 U-shaped cable lugs 4 mm^2

Feedback cable



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[1] Connector: Intercontec ASTA
[2] Printed on connector: SEW-EURODRIVE
[3] Nameplate
[4] Cable length ≤ 10 m: Tolerance +200 mm
Cable length ≥ 10 m: Tolerance +2%
Permitted cable length according to the technical documents.
[5] D-sub plug

Motor side

A 12-pin EMC signal plug connector from Intercontec with socket contacts is used on the motor end for RH.M/AS1H/ES1H. The shield is connected in the connector housing according to EMC requirements. All plug connectors seal the plug on the cable end with a lamellar seal.

Prefabrication on inverter end

A commercial D-sub EMC connector with pin contacts is used on the inverter end. A 9-pin or 15-pin connector matching the inverter is used.

Hybrid cables

The outer cable sheath on the motor and inverter end bears a nameplate with part number and logo of the prefabricated cable manufacturer. The ordered length and permitted tolerance are interrelated as follows:

- Cable length ≤ 10 m: Tolerance 200 mm.
- Cable length ≥ 10 m: + 2 % tolerance

INFORMATION

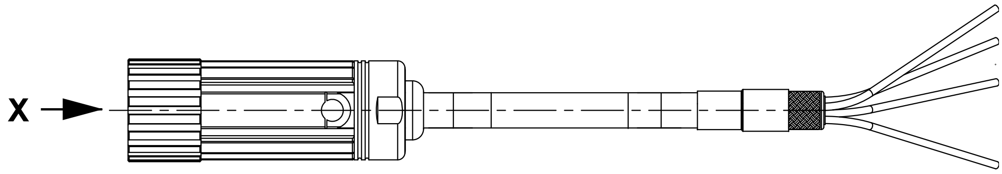
Refer to the system manual of the inverter for determining the maximum cable length.

Make sure that an EMC-compliant environment is maintained during project planning.

11.10 Power cables

Motor cable

CMP motor cable



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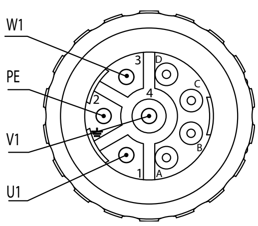
CMP motor cable types

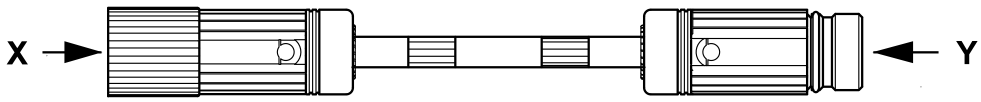
Plug connector type	Number of cores and cable cross-section	Part number	Installation
SM11	4 × 1.5 mm^2	0590 4544	Fixed installation
SM11	4 × 1.5 mm^2	0590 6245	Cable carrier installation
SM12	4 × 2.5 mm^2	0590 4552	Fixed installation
SM12	4 × 2.5 mm^2	0590 6253	Cable carrier installation
SM14	4 × 4 mm^2	0590 4560	Fixed installation
SM14	4 × 4 mm^2	0590 4803	Cable carrier installation
SMB6	4 × 6 mm^2	1335 0269	Fixed installation
SMB6	4 × 6 mm^2	1335 0293	Cable carrier installation
SMB10	4 × 10 mm^2	1335 0277	Fixed installation
SMB10	4 × 10 mm^2	1335 0307	Cable carrier installation
SMB16	4 × 16 mm^2	1335 0285	Fixed installation
SMB16	4 × 16 mm^2	1335 0315	Cable carrier installation

Pin assignment of the CMP motor cable

Plug connector view X	Pin	Cable core color	Assigned	Extra
BSTA 078 	1	(BK) Black	U	Bag of loose parts
	2	(GN/YE) Green / Yellow	PE	
	3	(BK) Black	W	
	4	(BK) Black	V	

11

CMP motor extension cable



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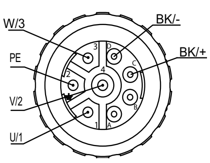
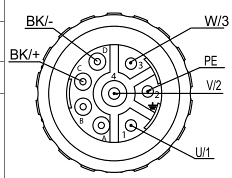
CMP motor extension cable types

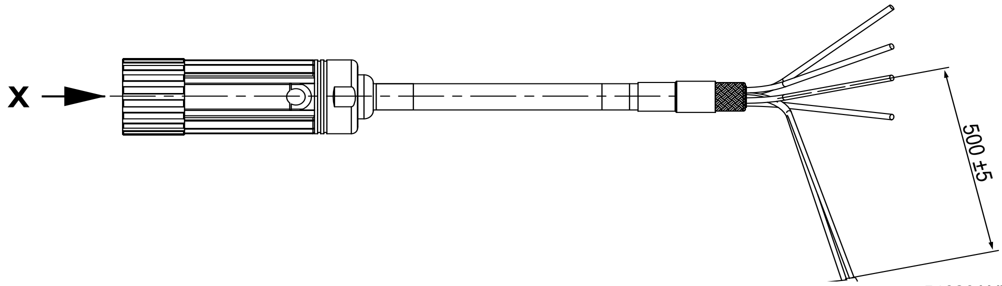
Plug connector type	Number of cores and line cross section	Part number	Installation
SB11	4 × 1.5 mm^2	1333 2457	Cable carrier installation
SM12	4 × 2.5 mm^2	1333 2465	Cable carrier installation
SM14	4 × 4 mm^2	1333 2473	Cable carrier installation
SMB6	4 × 6 mm^2	1335 0021	Cable carrier installation
SMB10	4 × 10 mm^2	1335 0048	Cable carrier installation
SMB16	4 × 16 mm^2	1335 0056	Cable carrier installation

Pin assignment of CMP motor extension cable

Plug connector view X	Pin	Cable core color	Assigned	Pin	Plug connector view Y
BSTA 078 	1	(BK/WH) Black with white lettering U, V, W	U	1	**BKUA 199** 
	4		V	4	
	3		W	3	
	2	(GR/YE) Green/Yellow	PE	2	

Brakemotor cable for BP brake

CMP brakemotor cable



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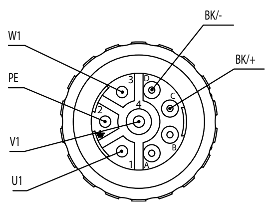
Types of CMP brakemotor cables

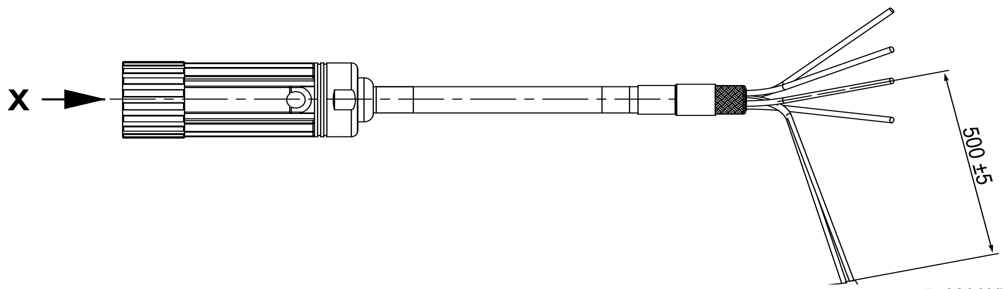
Plug connector type	Number of cores and line cross section	Part number	Installation
SB11	4×1.5 mm^2 + 3×1 mm^2	1335 4345	Fixed installation
SB11	4×1.5 mm^2 + 3×1 mm^2	1335 4388	Cable carrier installation
SB12	4×2.5 mm^2 + 3×1 mm^2	1335 4353	Fixed installation
SB12	4×2.5 mm^2 + 3×1 mm^2	1335 4396	Cable carrier installation
SB14	4×4 mm^2 + 3×1 mm^2	1335 4361	Fixed installation
SB14	4×4 mm^2 + 3×1 mm^2	1342 1603	Cable carrier installation
SBB6	4×6 mm^2 + 3×1.5 mm^2	1335 0196	Fixed installation
SBB6	4×6 mm^2 + 3×1.5 mm^2	1335 0234	Cable carrier installation
SBB10	4×10 mm^2 + 3×1.5 mm^2	1335 0218	Fixed installation
SBB10	4×10 mm^2 + 3×1.5 mm^2	1335 0242	Cable carrier installation
SBB16	4×16 mm^2 + 3×1.5 mm^2	1335 0226	Fixed installation
SBB16	4×16 mm^2 + 3×1.5 mm^2	1335 0250	Cable carrier installation

Pin assignment of the CMP brakemotor cable

Plug connector view X	Pin	Cable core color	Assigned	Extra
BSTA 078 	1	(BK/WH) Black with white lettering U, V, W	U	Bag of loose parts
	4		V	
	3		W	
	2	(GN/YE) Green/Yellow	PE	
	A	-	n. c.	
	B	-	2.	
	C	(BK/WH) Black with white lettering	1	
	D		3	

Brakemotor cable for BY brake

CMP brakemotor cable



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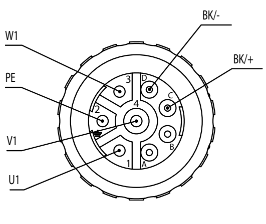
Types of CMP brakemotor cables

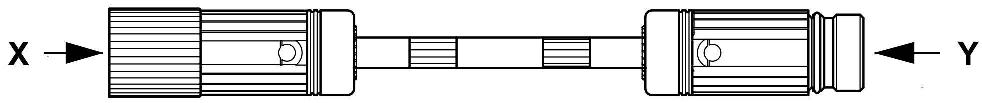
Plug connector type	Number of cores and line cross section	Part number	Installation
SB11	$4 \times 1.5\ mm^2 + 3 \times 1\ mm^2$	1335 4272	Fixed installation
SB11	$4 \times 1.5\ mm^2 + 3 \times 1\ mm^2$	1335 4302	Cable carrier installation
SB12	$4 \times 2.5\ mm^2 + 3 \times 1\ mm^2$	1335 4280	Fixed installation
SB12	$4 \times 2.5\ mm^2 + 3 \times 1\ mm^2$	1335 4310	Cable carrier installation
SB14	$4 \times 4\ mm^2 + 3 \times 1\ mm^2$	1335 4299	Fixed installation
SB14	$4 \times 4\ mm^2 + 3 \times 1\ mm^2$	1342 4329	Cable carrier installation
SBB6	$4 \times 6\ mm^2 + 3 \times 1.5\ mm^2$	1335 0129	Fixed installation
SBB6	$4 \times 6\ mm^2 + 3 \times 1.5\ mm^2$	1335 0153	Cable carrier installation
SBB10	$4 \times 10\ mm^2 + 3 \times 1.5\ mm^2$	1335 0137	Fixed installation
SBB10	$4 \times 10\ mm^2 + 3 \times 1.5\ mm^2$	1335 0161	Cable carrier installation
SBB16	$4 \times 16\ mm^2 + 3 \times 1.5\ mm^2$	1335 0145	Fixed installation
SBB16	$4 \times 16\ mm^2 + 3 \times 1.5\ mm^2$	1335 0188	Cable carrier installation

Pin assignment of the CMP brakemotor cable

Plug connector view X	Pin	Cable core color	Assigned	Extra
BSTA 078	1	(BK/WH) Black with white lettering U, V, W	U	Bag of loose parts
	4		V	
	3		W	
	2	(GN/YE) Green/Yellow	PE	
	A	-	n. c.	
	B	-	2.	
	C	(BK/WH) Black with white lettering	1	
	D		3	

Extension cable for BP and BY brake

CMP brakemotor extension cable



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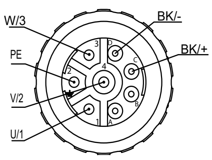
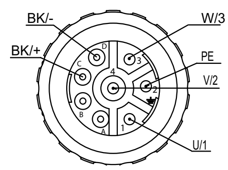
CMP brakemotor extension cable types

Plug connector type	Number of cores and cable cross-section	Part number	Installation
SB11	$4 \times 1.5\ mm^2 + 3 \times 1\ mm^2$	1335 4221	Cable carrier installation
SB12	$4 \times 2.5\ mm^{2\ +\ 3} \times {}^{1\ mm2}$	1335 4248	Cable carrier installation
SB14	$4 \times 4\ mm^2 + 3 \times 1\ mm^2$	1335 4337	Cable carrier installation
SBB6	$4 \times 6\ mm^2 + 3 \times 1.5\ mm^2$	1335 0099	Cable carrier installation
SBB10	$4 \times 10\ mm^2 + 3 \times 1.5\ mm^2$	1335 0102	Cable carrier installation
SBB16	$4 \times 16\ mm^2 + 3 \times 1.5\ mm^2$	1335 0110	Cable carrier installation

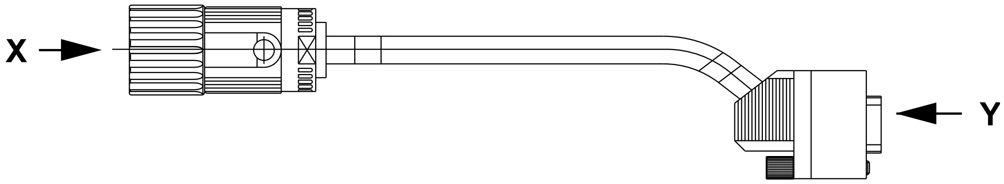
Pin assignment of the CMP brakemotor extension cable

<table>
<tr><th>Plug connector view X</th><th>Pin</th><th>Cable core color</th><th>Assigned</th><th>Pin</th><th>Plug connector view Y</th></tr>
<tr><td rowspan="8">BSTA 078

</td><td>1</td><td rowspan="3">(BK/WH)
Black with
white lettering
U, V, W</td><td>U</td><td>1</td><td rowspan="8">BKUA 199

</td></tr>
<tr><td>4</td><td>V</td><td>4</td></tr>
<tr><td>3</td><td>W</td><td>3</td></tr>
<tr><td>2</td><td>(GN/YE) Green/Yellow</td><td>PE</td><td>2</td></tr>
<tr><td>A</td><td>-</td><td>n. c.</td><td>A</td></tr>
<tr><td>B</td><td>-</td><td>2.</td><td>B</td></tr>
<tr><td>C</td><td rowspan="2">(BK/WH) Black with white lettering</td><td>1</td><td>C</td></tr>
<tr><td>D</td><td>3</td><td>D</td></tr>
</table>

11.11 Encoder cables

Resolver

Resolver cable RH.M for MOVIDRIVE® MDX60B/61B



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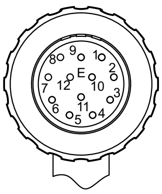
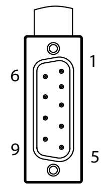
RH.M resolver cable types for MOVIDRIVE® MDX60B/61B

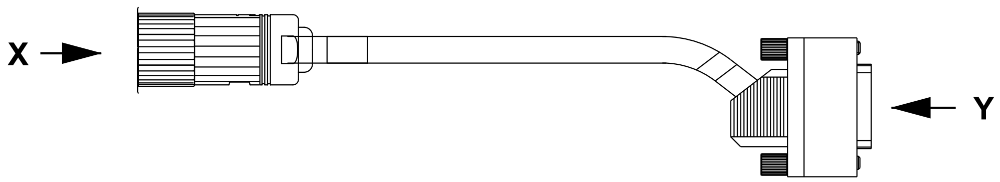
Type	Number of cores and cable cross-section	Part number	Installation
CMP	5 × 2 × 0.25 mm^2	0199 4875	Fixed installation
CMP	5 × 2 × 0.25 mm^2	0199 3194	Cable carrier installation

Pin assignment of resolver cable RH.M for MOVIDRIVE® MDX60B/61B

Motor connection side					MOVIDRIVE® B connection	
Plug connector view X	Pin no.	Description	Cable core color	Description	Pin no.	Plug connector view Y
ASTA 021FR **0198 6732** 12-pin with socket contacts 	1	R1 (reference +)	(PK) Pink	R1 (reference +)	3	**D-sub** 9-pin 
	2	R2 (reference -)	(GY) Gray	R2 (reference -)	8	
	3	S1 (cosine +)	(RD) Red	S1 (cosine +)	2	
	4	S3 (cosine -)	(BU) Blue	S3 (cosine -)	7	
	5	S2 (sine +)	(YE) Yellow	S2 (sine +)	1	
	6	S4 (sine -)	(GN) Green	S4 (sine -)	6	
	7	n. c.	-	-	-	
	8	n. c.	-	-	-	
	9	TF/KTY +	(BN) Brown/(VT) Violet[1)]	TF (KTY+)	9	
	10	TF/ KTY -	(WH) White/(BK) Black[1)]	TF/ KTY -	5	
	11	n. c.	-	-	-	
	12	n. c.	-	n. c.	4	

1) Double assignment to increase cross section

RH.M resolver cable for MOVIAXIS® MX



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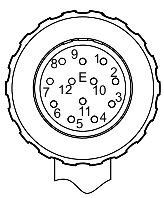
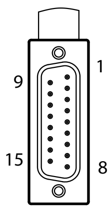
RH.M resolver cable tables for MOVIAXIS® MX

Type	Number of cores and cable cross-section	Part number	Installation
CMP	$5 \times 2 \times 0.25\ mm^2$	1332 7429	Fixed installation
CMP	$5 \times 2 \times 0.25\ mm^2$	1332 7437	Cable carrier installation

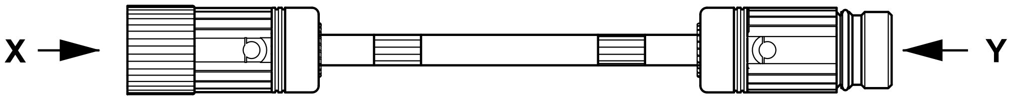
Pin assignment of RH.M resolver cable for MOVIAXIS® MX

Motor connection side					Connection MOVIAXIS® MX	
Plug connector view X	Pin no.	Description	Cable core color	Description	Pin no.	Plug connector view Y
ASTA 021FR **0198 6732** 12-pin with socket contacts 	1	R1 (reference +)	(PK) Pink	R1 (reference +)	5	**D-sub** 15-pin 
	2	R2 (reference -)	(GY) Gray	R2 (reference -)	13	
	3	S1 (cosine +)	(RD) Red	S1 (cosine +)	2	
	4	S3 (cosine -)	(BU) Blue	S3 (cosine -)	10	
	5	S2 (sine +)	(YE) Yellow	S2 (sine +)	1	
	6	S4 (sine -)	(GN) Green	S4 (sine -)	9	
	7	n. c.	-	n. c.	3	
	8	n. c.	-	n. c.	4	
	9	TF/KTY +	(BN) Brown/(VT) Violet[1)]	TF/KTY +	14	
	10	TF/ KTY -	(WH) White/(BK) Black[1)]	TF/ KTY -	6	
	11	n. c.	-	n. c.	7	
	12	n. c.	-	n. c.	8	
		-	-	n. c.	11	
		-	-	n. c.	12	
		-	-	n. c.	15	

1) Double assignment to increase cross section

All connectors are shown with view onto the pins.

Extension cable for RH.M resolver



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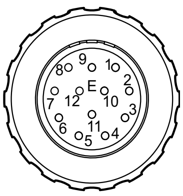
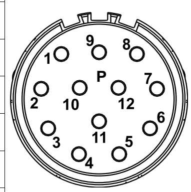
Extension cable types for RH.M resolver

Type	Number of cores and cable cross-section	Part number	Installation
CMP	5 × 2 × 0.25 mm^2	0199 5421	Fixed installation
CMP	5 × 2 × 0.25 mm^2	0199 5413	Cable carrier installation

Pin assignment of extension cable for resolver RH.M

Plug connector view X	Pin no.	Description	Cable core color	Description	Pin no.	Plug connector view Y
ASTA 021FR **198 673 2** 12-pin with socket contacts 	1	R1 (reference +)	(PK) Pink	R1 (reference +)	1	**AKUA 020MR** **199 647 9** 12-pin with pin contacts 
	2	R1 (reference -)	(GY) Gray	R1 (reference -)	2	
	3	S1 (cosine +)	(RD) Red	S1 (cosine +)	3	
	4	S3 (cosine -)	(BU) Blue	S3 (cosine -)	4	
	5	S2 (sine +)	(YE) Yellow	S2 (sine +)	5	
	6	S4 (sine -)	(GN) Green	S4 (sine -)	6	
	7	n. c.	-	n. c.	7	
	8	n. c.	-	n. c.	8	
	9	TF/KTY +	(BN) Brown/(VT) Violet[1]	TF/KTY +	9	
	10	TF/ KTY -	(WH) White/(BK) Black[1]	TF/ KTY -	10	
	11	n. c.	-	n. c.	11	
	12	n. c.	-	n. c.	12	

1) Double assignment to increase cross section

The extension cable has the same pin assignment as all other contacts.

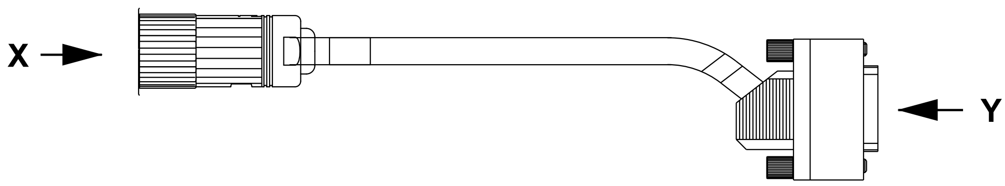
Alternative plug connector for resolver cable RH.M

Signal plug connector with socket contacts (complete)

Type	Connectable cross sections	Part no.
RH.M	6 x 2 x 0.06 - 1 mm^2	0198 6732

HIPERFACE® encoder

HIPERFACE® encoder cable for MOVIDRIVE® B and MOVIAXIS® MX



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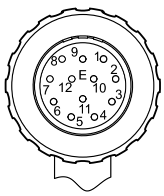
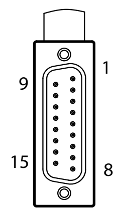
HIPERFACE® encoder cable types for MOVIDRIVE® B and MOVIAXIS® MX

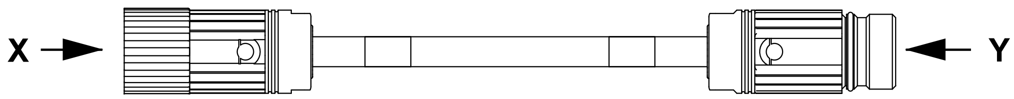
Type	Number of cores and cable cross-section	Part number	Installation
CMP	$6 \times 2 \times 0.25$ mm²	1332 4535	Fixed installation
CMP	$6 \times 2 \times 0.25$ mm²	1332 4551	Cable carrier installation

Pin assignment of ***HIPERFACE® cables for AK0H/EK0H/AS1H/ES1H encoders***

Motor connection side					MOVIAXIS® MX, MOVIDRIVE® B connection	
Plug connector view X	**Pin no.**	**Description**	**Cable core color**	**Description**	**Pin no.**	**Plug connector view Y**
ASTA 021FR **0198 6732** 12-pin with socket contacts 	1	n. c.	n. c.	n. c.	3	**D-sub** 15-pole 
	2	n. c.	n. c.	n. c.	5	
	3	S1 (cosine +)	(RD) Red	S1 (cosine +)	1	
	4	S3 (cosine -)	(BU) Blue	S3 (cosine -)	9	
	5	S2 (sine +)	(YE) Yellow	S2 (sine +)	2	
	6	S4 (sine -)	(GN) Green	S4 (sine -)	10	
	7	DATA-	(VT) Violet	DATA-	12	
	8	DATA+	(BK) Black	DATA+	4	
	9	TF/KTY +	(BN) Brown	TF/KTY +	14	
	10	TF/ KTY -	(WH) White	TF/ KTY -	6	
	11	GND	(GY/PK) Gray/Pink[1)]	GND	8	
	12	U_s	(RD/BU) Red/Blue[1)]	U_s	15	
		-	-	n. c.	7	
		-	-	n. c.	11	
		-	-	n. c.	13	

1) Double assignment to increase cross section

Extension cable for HIPERFACE® AK0H/EK0H/AS1H/ES1H encoders



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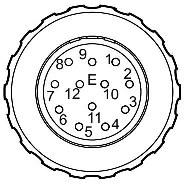
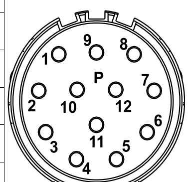
Extension cable types for HIPERFACE® AK0H/EK0H/AS1H/ES1H encoders

Type	Number of cores and cable cross-section	Part number	Installation
CMP	$6 \times 2 \times 0.25$ mm²	0199 5391	Fixed installation
CMP	$6 \times 2 \times 0.25$ mm²	0199 5405	Cable carrier installation

Pin assignment for extension cable for HIPERFACE® AK0H/EK0H/AS1H/ES1H encoders

Plug connector view X	Pin no.	Description	Cable core color	Description	Pin no.	Plug connector view Y
ASTA 021FR **198 673 2** 12-pin with socket contacts 	1	n. c.	-	n. c.	1	**AKUA 020MR** **199 647 9** 12-pin with pin contacts 
	2	n. c.	-	n. c.	2	
	3	S1 (cosine +)	(RD) Red	S1 (cosine +)	3	
	4	S3 (cosine -)	(BU) Blue	S3 (cosine -)	4	
	5	S2 (sine +)	(YE) Yellow	S2 (sine +)	5	
	6	S4 (sine -)	(GN) Green	S4 (sine -)	6	
	7	DATA-	(VT) Violet	DATA-	7	
	8	DATA+	(BK) Black	DATA+	8	
	9	TF/KTY +	(BN) Brown	TF/KTY +	9	
	10	TF/ KTY -	(WH) White	TF/ KTY -	10	
	11	GND	(GY/PK) (Gray/Pink/(PK) Pink	GND	11	
	12	U_s	(RD/BU) Red/Blue/(GY) Gray	U_s	12	

The extension cable has the same pin assignment as all other contacts.

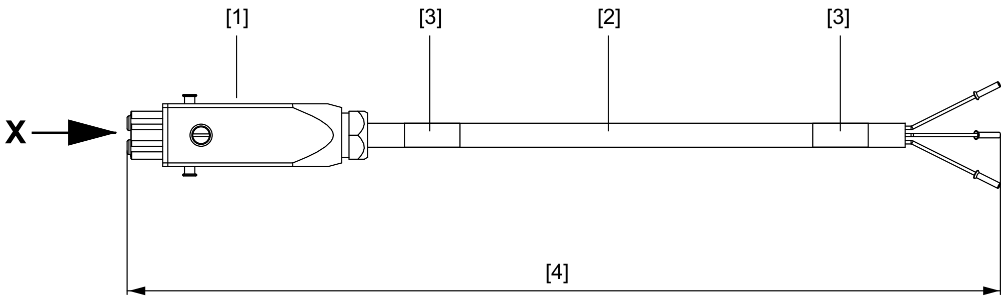
Alternative plug connector cable for HIPERFACE® AK0H/EK0H/AS1H/ES1H encoders

Signal plug connector with socket contacts (complete)

Type	Connectable cross sections	Part no.
AK0H	6 x 2 x 0.06 - 1 mm²	0198 6732
EK0H		
AS1H		
ES1H		

11.12 Forced cooling fan cable

Cable for motors with VR forced cooling fan



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[1] Connector: STAK 200
[2] Printed on connector: SEW-EURODRIVE
[3] Nameplate
[4] Cable length ≤ 5 m: Tolerance +200 mm
Cable length ≥ 5 m: Tolerance +2%
Permitted cable length according to the technical documents.

Cable types for motors with VR forced cooling fan

Type	Cross section	Installation	Part number
CMP	3 × 1 mm^2 (AWG 18)	Fixed installation	0198 6341
CMP		Cable carrier installation	0199 560X

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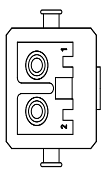
Pin assignment of cables for motors with VR forced cooling fan

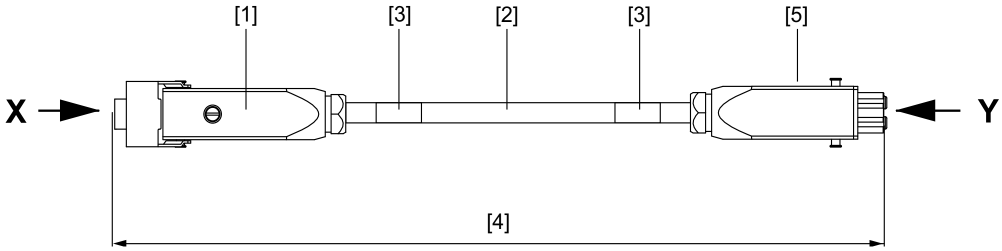
STAK 200 plug connector view X	Pin	Core identification	Assigned	Pin	Connection type
Connector with two socket contacts 	1	Digit 1	24 V +	Cut-off, length ca. 250 mm	Conductor end sleeves
	2	Digit 2	0 V		

Alternative connector for cable for the VR forced cooling fan

Signal plug connector with socket contacts (complete)

Type	Connectable cross section	Installation	Part number
VR	3 x 1 mm^2 (AWG 18)	Fixed installation/cable carrier installation	0198 4985

Extension cable for motors with VR forced cooling fan



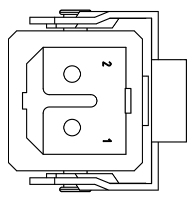
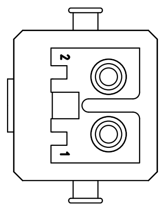
54646AXX

[1] Connector: STAS 200
[2] Printed on connector: SEW-EURODRIVE
[3] Nameplate
[4] Cable length ≤ 5 m: Tolerance +200 mm
Cable length ≥ 5 m: Tolerance +2%
Permitted cable length according to the technical documents.
[5] Socket: STAK 200

Extension cable types for motors with VR forced cooling fan

Type	Cross section	Installation	Part number
CMP	3 × 1 mm^2 (AWG 18)	Fixed installation	0199 5618
CMP		Cable carrier installation	0199 5626

Pin assignment of extension cables for motors with VR forced cooling fan

STAS 200 plug connector view X	Pin	Core identification	Assigned	Pin	STAK 200 connection type view Y
Connector with two pin contacts 	1	Digit 1	24 V +	1	**Connector with two socket contacts** 
	2	Digit 2	0 V	2	

The extension cable has the same pin assignment as all other contacts.

Alternative connector for cable for the VR forced cooling fan

Signal plug connector with pin contacts (complete)

Type	Connectable cross section	Part no.
VR	3 x 1 mm^2	0198 5693

11.13 Cable specifications for the power cables

Fixed installation

Motor cable

Installation		**Fixed**				
Cable cross section		**4 x 1.5 mm^2 (AWG 16)**	**4 x 2.5 mm^2 (AWG 14)**	**4 x 4 mm^2 (AWG 12)**	**4 x 6 mm^2 (AWG 10)**	**4 x 10 mm^2 (AWG 8)**
Manufacturer		**HELUKABEL**				
Manufacturer designation		LI9YCY				
Operating voltage V_0/V AC	[V]	600 / 1000				
Temperature range	[°C]	Fixed installation -40 to +80				
Max. temperature	[°C]	+80				
Min. bending radius	[mm]	45	55	65	73	85
Diameter D	[mm]	9.0 ± 0.2	11 ± 0.2	13 ± 0.2	14.3 ± 0.3	17.0 ± 0.6
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange, similar to RAL 2003				
Approval(s)		DESINA/VDE/UL				
Capacitance core/shielding	[nF/km]	110	110	118	125	125
Capacitance core/core	[nF/km]	70	70	75	80	80
Halogen-free		no				
silicon-free		yes				
CFC-free		yes				
Inner insulation (core)		PP				
Outer insulation (sheath)		PVC				
Flame-inhibiting/self-extinguishing		no				
Conductor material		Cu				
Shielding		Tinned Cu				
Weight (cable)	[kg/km]	134	202	262	332	601

Brakemotor cable

Installation		Fixed				
Cable cross section		**4 x 1.5 mm^2 (AWG 16) + 3 x 1 mm^2 (AWG 18)**	**4 x 2.5 mm^2 (AWG 14) + 3 x 1 mm^2 (AWG 18)**	**4 x 4 mm^2 (AWG 12) + 3 x 1 mm^2 (AWG 18)**	**4 x 6 mm^2 (AWG 10) + 3 x 1.5 mm^2 (AWG 16)**	**4 x 10 mm^2 (AWG 8) + 3 x 1.5 mm^2 (AWG 16)**
Manufacturer		**HELUKABEL**				
Manufacturer designation		LI9YCY				
Operating voltage V_0/V AC	[V]	600 / 1000				
Temperature range	[°C]	Fixed installation: -40 to +80				
Max. temperature	[°C]	+80				
Min. bending radius	[mm]	60	68	75	85	100
Diameter D	[mm]	11.8 ± 0.4	13.4 ± 0.4	15.0 ± 0.5	17.0 ± 0.6	20.0 ± 1.0
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange similar to RAL 2003				
Approval(s)		DESINA/VDE/UL				
Capacitance core / shielding	[nF/km]	105	105	110	115	120
Capacitance core / core	[nF/km]	60	60	70	75	78
Halogen-free		no				
silicon-free		yes				
CFC-free		yes				
Inner insulation (core)		PP				
Outer insulation (sheath)		PVC				
Flame-inhibiting/self-extinguishing		yes				
Conductor material		Cu				
Shielding		Tinned Cu				
Weight (cable)	[kg/km]	229	292	393	542	938

Cable carrier installation

Motor cable

Installation		Cable carrier				
Cable cross section		**4 x 1.5 mm^2 (AWG 16)**	**4 x 2.5 mm^2 (AWG 14)**	**4 x 4 mm^2 (AWG 12)**	**4 x 6 mm^2 (AWG 10)**	**4 x 10 mm^2 (AWG 8)**
Manufacturer		**Nexans**				
Manufacturer designation		PSL(LC)C11Y-J 4 x - mm^2		PSL11YC11Y-J 4 x - mm^2		
Operating voltage V_0/V AC	[V]	600 / 1000				
Temperature range	[°C]	-20 to +60				
Max. temperature	[°C]	+90 (on conductor)				
Min. bending radius	[mm]	134	140	135	155	180
Diameter D	[mm]	12.8 + 0.6 / -0.7	15.7 ± 0.3	13.2 ± 0.4	15.4 ± 0.4	17.8 ± 0.5
Maximum acceleration	[m/s^2]	20				
Max. velocity	[m/min]	200 at max. travel distance of 5 m				
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange similar to RAL 2003				
Approval(s)		DESINA/VDE/UL / cRUus				
Capacitance core / shielding	[nF/km]	95	95	170	170	170
Capacitance core / core	[nF/km]	65	65	95	95	95
Halogen-free		yes				
silicon-free		yes				
CFC-free		yes				
Inner insulation (core)		Polyolefin		TPM		
Outer insulation (sheath)		TPU (PUR)				
Flame-inhibiting/self-extinguishing		yes				
Conductor material		E-Cu blank				
Shielding		Braided tinned Cu shield (optically covered > 85 %)				
Weight (cable)	[kg/km]	249	373	311	426	644
Min. bending cycles		≥ 5 million				

Brakemotor cable

Installation		Cable carrier				
Cable cross section		**4 x 1.5 mm^2 (AWG 16) + 3 x 1 mm^2 (AWG 18)**	**4 x 2.5 mm^2 (AWG 14) + 3 x 1 mm^2 (AWG 18)**	**4 x 4 mm^2 (AWG 12) + 3 x 1 mm^2 (AWG 18)**	**4 x 6 mm^2 (AWG 10) + 3 x 1.5 mm^2 (AWG 16)**	**4 x 10 mm^2 (AWG 8) + 3 x 1.5 mm^2 (AWG 16)**
Manufacturer		**Nexans**				
Manufacturer designation		PSL(LC)C11Y-J 4x... +3A.../C		PSL11YC11Y-J 4x... +3A.../C		
Operating voltage V_0 / V AC	[V]	600/1000				
Temperature range	[°C]	-20 to +60				
Max. temperature	[°C]	+90 (conductor)				
Min. bending radius	[mm]	159	170	155	175	200
Diameter D	[mm]	15.0 ± 0.9	16.5 ± 0.7	15.3 ± 0.5	17.4 ± 0.5	20.5 ± 0.5
Maximum acceleration	[m/s^2]	20				
Max. velocity	[m/min]	200 at max. travel distance of 5 m				
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange similar to RAL 2003				
Approval(s)		DESINA/VDE/UL / cRUus				
Capacitance core/shielding	[nF/km]	105	105	170	170	170
Capacitance core/core	[nF/km]	65	65	95	95	95
Halogen-free		yes				
silicon-free		yes				
CFC-free		yes				
Inner insulation (cable)		TPM				
Outer insulation (sheath)		Polyolefin		TPU (PUR)		
Flame-inhibiting / self-extinguishing		yes				
Conductor material		E-Cu blank				
Shielding		Braided tinned Cu shield (optically covered > 85 %)				
Weight (cable)	[kg/km]	335	433	396	522	730
Min. bending cycles		≥ 5 million				

11.14 Cable specifications for the encoder cables

Fixed installation of feedback cables

Accessory designation		**AS1H / ES1H /AK0H /EK0H /AK1H /EK1H**	**RH1M**
Cable cross section		**6 x 2 x 0.25 mm^2**	**5 x 2 x 0.25 mm^2**
Manufacturer		**HELUKABEL**	
Manufacturer designation		LI9YCY	
Operating voltage V_0/V AC	[V]	230 / 350	
Temperature range	[°C]	Fixed installation -40 to +80	
Max. temperature	[°C]	+ 80	
Min. bending radius	[mm]	43	36.5
Diameter D	[mm]	8.6 ± 0,2	7.3 ± 0,2
Core identification		DIN 47 100	
Sheath color		Green, similar to RAL 6018	
Approval(s)		DESINA/VDE/cULus	
Capacitance core/shielding	[nF/km]	110	
Capacitance core/core	[nF/km]	70	
Halogen-free		no	
Silicone-free		yes	
CFC-free		yes	
Inner insulation (core)		PP	
Outer insulation (sheath)		PVC	
Flame-inhibiting/self-extinguishing		no	
Conductor material		Cu blank	
Shielding		Braided tinned Cu	
Weight (cable)	[kg/km]	107	78

Cable carrier installation of feedback cables

Accessory designation		**AS1H / ES1H /AK0H /EK0H /AK1H /EK1H**	**RH1M**
Cable cross section		**6 x 2 x 0.25 mm^2**	**5 x 2 x 0.25 mm^2**
Manufacturer		**Nexans**	
Manufacturer designation		SSL18YC11Y 6 x 2 x 0.25/ SSL11YC11Y 5 x 2 x 0.25	
Operating voltage V_0/V AC	[V]	300	
Temperature range	[°C]	-20 to +60	
Max. temperature	[°C]	+90 (on conductor)	
Min. bending radius	[mm]	100	95
Diameter D	[mm]	9.8 ± 0.2	9,5 ± 0.2
Maximum acceleration	[m/s^2]	20	
Max. velocity	[m/min]	200	
Core identification		WH/BN, GN/YE, GY/PK, BU/RD, BK/VT, GY-PK/RD-BU	WH/BN, GN/YE, GY/PK, BU/RD, BK/VT
Sheath color		Green similar to RAL 6018	
Approval(s)		DESINA/VDE/cULus	
Capacitance core/shielding	[nF/km]	100	
Capacitance core/core	[nF/km]	55	
Halogen-free		yes	
Silicone-free		yes	
CFC-free		yes	
Table continued on next page			

Accessory designation		AS1H / ES1H /AK0H /EK0H /AK1H /EK1H	RH1M
Cable cross section		**6 x 2 x 0.25 mm^2**	**5 x 2 x 0.25 mm^2**
Manufacturer		**Nexans**	
Inner insulation (core)		PP	
Outer insulation (sheath)		TPE-U	
Flame-inhibiting/self-extinguishing		yes	
Conductor material		E-Cu blank	
Shielding		Braided tinned Cu	
Weight	[kg/km]	130	120
Min. bending cycles		≥ 5 million	

11.15 Cable specifications for the forced cooling fan cable

Fixed installation of the forced cooling fan cable

Accessory designation		VR
Cable cross section		**3 x 1 mm^2**
Manufacturer		**Lapp**
Manufacturer designation		Ölflex 110 Classic
Operating voltage V_0/V AC	[V]	300 / 500
Temperature range	[°C]	-30 to +70
Max. temperature	[°C]	+ 70
Min. bending radius	[mm]	24
Diameter D	[mm]	6.0 ± 0.3
Core identification		VDE 0293
Sheath color		Silver gray, RAL 7001
Approval(s)		VDE
Capacitance core/shielding	[nF/km]	-
Capacitance core/core	[nF/km]	-
Halogen-free		no
Silicone-free		yes
CFC-free		yes
Inner insulation (core)		PVC
Outer insulation (sheath)		PVC
Flame-inhibiting/self-extinguishing		no
Conductor material		Cu blank
Shielding		-
Weight (cable)	[kg/km]	65

Cable carrier installation for forced cooling fan cable

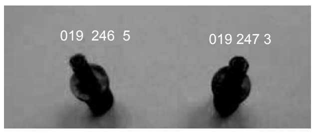
Accessory designation		**VR**
Cable cross section		**3 x 1 mm^2**
Manufacturer		**Nexans**
Manufacturer designation		PSL 3 x 1.0
Operating voltage V_0/V AC	[V]	300
Temperature range	[°C]	- 30 to + 70
Max. temperature	[°C]	+90 (on conductor)
Min. bending radius	[mm]	45
Diameter D	[mm]	5,7 ± 0.2
Maximum acceleration	[m/s^2]	10
Max. velocity	[m/min]	50
Core identification		2 x WH with digit + 1 x GN/YE
Sheath color		Black RAL 9005
Approval(s)		VDE/UL
Capacitance core/shielding	[nF/km]	-
Capacitance core/core	[nF/km]	-
Halogen-free		yes
Silicone-free		yes
CFC-free		yes
Inner insulation (core)		TPM
Outer insulation (sheath)		TPE-U
Flame-inhibiting/self-extinguishing		yes
Conductor material		E-Cu blank
Shielding		-
Weight	[kg/km]	50
Min. bending cycles		≥ 5 million

11.16 Crimping tools

An alternative for purchasing the prefabricated cables from SEW-EURODRIVE for motors with plug connectors is to purchase the required plug connectors.

In this case, the customers have to wire the plug connectors themselves. SEW-EURODRIVE offers the matching crimping tools to ensure correct connection of cable core and contact. Please quote the required part number in your order.

Power and brake contacts of CMP servomotors

Tools required for assembly			
Type	**for**	**SEW part number**	**Figure**
Crimping tool		019 243 0	
For SM1/SB1 power connector			
Positioning tool	Motor contact 2 mm ∅ Core cross section 0.35 - 4 mm^2	019 245 7	
	Brake contact 1 mm ∅ Core cross section 0.14 - 1 mm^2	019 244 9	
For SMB/SBB power connector			
Crimping tool		016 243 0	
Positioning tool	Motor contact 2 mm ∅ Core cross section 0.35 - 4 mm^2	019 245 7	
Crimping tool		029 461 65	
Positioning tool	Brake contact 1 mm ∅ Core cross section 1.5 - 4 mm^2	032 560 65	
Positioning tool	Brake contact 1 mm ∅ Core cross section 6 - 10 mm^2	032 560 65	
Tools required for removal			
Removal tool	Motor contact 2 mm ∅	019 247 3	
	Brake contact 1 mm ∅	019 246 5	
Removal tool[1]	Insulator	019 248 1	

1) The removal tool is **only required for removal on the motor end**.

RH1M resolver, Hiperface® AS1H and ES1H single- and multi-turn encoder system

Tools required for assembly			
Type	**for**	**SEW part number**	**Figure**
Crimping tool		019 243 0	
Positioning tool	Contact 1 mm ∅ Core cross section 0.06 - 1 mm^2	019 244 9	
Tools required for removal			
Removal tool	Contact 1 mm ∅ Core cross section 0.06 - 1 mm^2	019 246 5	
Removal tool[1)]	Insulator	019 248 1	

1) The removal tool is **only required for removal on the motor end**.

12 CFM Servomotors

12.1 Key to the data tables

The following table lists the short symbols used in the "Technical Data" table.

n_N	Speed class
M_0	Static torque
I_0	Standstill current
M_{DYN}	Dynamic limit torque of the servomotor
I_{max}	Maximum permitted motor current
M_{0VR}	Standstill torque with forced cooling fan
I_{0VR}	Standstill current with forced cooling fan
J_{mot}	Mass moment of inertia of the motor
J_{bmot}	Mass moment of inertia of the brakemotor
M_{B1}	Standard braking torque
M_{B2}	Reduced braking torque
W_{max1}	Maximum possible braking work with standard braking torque until service
W_{max2}	Maximum possible braking work with reduced braking torque until service
L_1	Inductance of the winding
R_1	Ohmic resistance of the winding
U_{p0}	Internal voltage at 1000 min^{-1}
m_{mot}	Mass of the motor
m_{bmot}	Mass of the brakemotor

12.2 Technical data – CFM synchronous servomotors; 400 V system voltage

n_N	Motor	M_0	I_0	M_{DYN}	I_{max}	M_{0VR}	I_{0VR}	J_{mot}	J_{bmot}	M_{B1}	M_{B2}	W_{max1}	W_{max2}
[min^{-1}]		[Nm]	[A]	[Nm]	[A]	[Nm]	[A]	[10^{-4} kgm^2]		[Nm]		[kJ]	
2000	**CFM71S**	5	2.2	16.5	8.8	7.3	3.2	4.89	6.65	10	5	18	22
	CFM71M	6.5	3	21.5	12	9.4	4.2	6.27	8.03	14	7	15	20
	CFM71L	9.5	4.2	31.4	16.8	13.8	6.1	9.02	10.8	14	10	15	18
	CFM90S	11	4.9	39.6	19.6	16	7.1	17.4	21.2	28	14	17	24
	CFM90M	14.5	6.9	52.2	28	21	10	22.3	26.1	40	20	10.5	19.5
	CFM90L	21	9.9	75.6	40	30.5	14.4	32.1	35.9	40	28	10.5	17
	CFM112S	23.5	10	82.3	40	34	14.5	68.4	84	55	28	32	48
	CFM112M	31	13.5	108.5	54	45	19.6	88.2	104	90	40	18	44
	CFM112L	45	20	157.5	80	65	29	128	143	90	55	18	32
	CFM112H	68	30.5	238	122	95	42.5	190	209	90	55	18	32
3000	**CFM71S**	5	3.3	16.5	13.2	7.3	4.8	4.89	6.65	10	5	14	20
	CFM71M	6.5	4.3	21.5	17.2	9.4	6.2	6.27	8.03	14	7	11	18
	CFM71L	9.5	6.2	31.4	25	13.8	9	9.02	10.8	14	10	11	14
	CFM90S	11	7.3	39.6	29	16	10.6	17.4	21.2	28	14	10	20
	CFM90M	14.5	10.1	52.2	40	21	14.6	22.3	26.1	40	20	4.5	15
	CFM90L	21	14.4	75.6	58	30.5	21	32.1	35.9	40	28	4.5	10
	CFM112S	23.5	15	82.3	60	34	22	68.4	84	55	28	18	36
	CFM112M	31	20.5	108.5	82	45	30	88.2	104	90	40	7	32
	CFM112L	45	30	157.5	120	65	44	128	143	90	55	7	18
	CFM112H	68	43	238	172	95	60	190	209	90	55	7	18
4500	**CFM71S**	5	4.9	16.5	19.6	7.3	7.2	4.89	6.65	10	5	10	16
	CFM71M	6.5	6.6	21.5	26	9.4	9.6	6.27	8.03	14	7	6	14
	CFM71L	9.5	9.6	31.4	38	13.8	14	9.02	10.8	14	10	6	10
	CFM90S	11	11.1	39.6	44	16	16.2	17.4	21.2	28	14	5	15
	CFM90M	14.5	14.7	52.2	59	21	21.5	22.3	26.1	40	20	3	9
	CFM90L	21	21.6	75.6	86	30.5	31.5	32.1	35.9	40	28	3	5
	CFM112S	23.5	22.5	82.3	90	34	32.5	68.4	84	55	25	11	22
	CFM112M	31	30	108.5	120	45	44	88.2	104	90	40	4	18
	CFM112L	45	46	157.5	184	65	67	128	143	90	55	4	11
	CFM112H	68	66	238	264	95	92	190	209	90	55	4	11
6000	**CFM71S**	5	6.5	16.5	26	7.3	9.5	4.89	6.65	-	-	-	-
	CFM71M	6.5	8.6	21.5	34	9.4	12.5	6.27	8.03	-	-	-	-
	CFM71L	9.5	12.5	31.4	50	13.8	18.2	9.02	10.8	-	-	-	-
	CFM90S	11	14.5	39.6	58	16	21	17.4	21.2	-	-	-	-
	CFM90M	14.5	19.8	52.2	79	21	29	22.3	26.1	-	-	-	-
	CFM90L	21	29.5	75.6	118	30.5	43	32.1	35.9	-	-	-	-

n_N [min^{-1}]	Motor	L_1 [mH]	R_1 [mΩ]	U_{p0} [V/1000 min^{-1}]	m_{mot} [kg]	m_{bmot} [kg]
2000	**CFM71S**	52	7090	151	9.5	11.8
	CFM71M	36	4440	148	10.8	13.0
	CFM71L	24	2500	152	13.0	15.3
	CFM90S	18	1910	147	15.7	19.6
	CFM90M	12.1	1180	141	17.8	21.6
	CFM90L	8.4	692	146	21.9	26.5
	CFM112S	10	731	155	26.2	31.8
	CFM112M	7.5	453	153	30.5	36.0
	CFM112L	4.6	240	151	39.3	44.9
	CFM112H	2.6	115	147	54.2	59.8
3000	**CFM71S**	23	3150	101	9.5	11.8
	CFM71M	16	2000	100	10.8	13.0
	CFM71L	11	1120	102	13.0	15.3
	CFM90S	8.1	838	98	15.7	19.6
	CFM90M	5.7	533	96	17.8	21.6
	CFM90L	3.9	324	99	21.9	26.5
	CFM112S	4.6	325	103	26.2	31.8
	CFM112M	3.1	193	99	30.5	36.0
	CFM112L	2	103	101	39.3	44.9
	CFM112H	1.3	57	104	54.2	59.8
4500	**CFM71S**	10	1380	66	9.5	11.8
	CFM71M	6.9	828	64	10.8	13.0
	CFM71L	4.9	446	65	13.0	15.3
	CFM90S	3.45	358	64	15.7	19.6
	CFM90M	2.65	249	65	17.8	21.6
	CFM90L	1.73	148	66	21.9	26.5
	CFM112S	2	149	69	26.2	31.8
	CFM112M	1.5	92	68	30.5	36.0
	CFM112L	0.85	44	66	39.3	44.9
	CFM112H	0.54	24	67	54.2	59.8
6000	**CFM71S**	5.75	780	50	9.5	-
	CFM71M	3.93	493	49	10.8	-
	CFM71L	2.68	277	50	13.0	-
	CFM90S	2.03	212	49	15.7	-
	CFM90M	1.48	136	48	17.8	-
	CFM90L	0.93	77	48	21.9	-

12.3 Technical data – CFM synchronous servomotors; 230 V system voltage

n_N	Motor	M_0	I_0	M_{DYN}	I_{max}	M_{0VR}	I_{0VR}	J_{mot}	J_{bmot}	M_{B1}	M_{B2}	W_{max1}	W_{max2}
[min^{-1}]		[Nm]	[A]	[Nm]	[A]	[Nm]	[A]	[10^{-4} kgm^2]		[Nm]		[kJ]	
2000	**CFM71S**	5	3.95	16.5	15.8	7.3	5.7	4.89	6.65	10	5	18	22
	CFM71M	6.5	5.3	21.5	21	9.4	7.7	6.27	8.03	14	7	15	20
	CFM71L	9.5	7.4	31.4	29.5	13.8	10.7	9.02	10.8	14	10	15	18
	CFM90S	11	8.7	39.6	35	16	12.6	17.4	21.2	28	14	17	24
	CFM90M	14.5	12.1	52.2	48.5	21	17.5	22.3	26.1	40	20	10.5	19.5
	CFM90L	21	17.1	75.6	68	30.5	25	32.1	35.9	40	28	10.5	17
	CFM112S	23.5	18	82.3	72	34	26	68.4	84	55	28	32	48
	CFM112M	31	24.5	108.5	98	45	35.5	88.2	104	90	40	18	44
	CFM112L	45	35.5	157.5	142	65	51	128	143	90	55	18	32
	CFM112H	68	52	238	208	95	73	190	209	90	55	7	18
3000	**CFM71S**	5	5.9	16.5	23.5	7.3	8.6	4.89	6.65	10	5	14	20
	CFM71M	6.5	7.6	21.5	30.5	9.4	11	6.27	8.03	14	7	11	18
	CFM71L	9.5	11.1	31.4	44.5	13.8	16.1	9.02	10.8	14	10	11	14
	CFM90S	11	12.7	39.6	51	16	18.4	17.4	21.2	28	14	10	20
	CFM90M	14.5	17.4	52.2	70	21	25	22.3	26.1	40	20	4.5	15
	CFM90L	21	25.5	75.6	102	30.5	37	32.1	35.9	40	28	4.5	10
	CFM112S	23.5	27	82.3	108	34	39	68.4	84	55	28	18	36
	CFM112M	31	35	108.5	140	45	51	88.2	104	90	40	7	32
	CFM112L	45	48	157.5	192	65	70	128	143	90	55	7	18
	CFM112H	68	73	238	292	95	102	190	209	90	55	7	18
4500	**CFM71S**	5	8.5	16.5	34	7.3	12.3	4.89	6.65	10	5	10	16
	CFM71M	6.5	11.3	21.5	45	9.4	16.4	6.27	8.03	14	7	6	14
	CFM71L	9.5	17.1	31.4	68	13.8	25	9.02	10.8	14	10	6	10
	CFM90S	11	18.9	39.6	76	16	27.5	17.4	21.2	28	14	5	15
	CFM90M	14.5	26	52.2	104	21	37.5	22.3	26.1	40	20	3	9
	CFM90L	21	39	75.6	156	30.5	57	32.1	35.9	40	28	3	5
	CFM112S	23.5	38.5	82.3	154	34	56	68.4	84	55	25	11	22
	CFM112M	31	54	108.5	216	45	78	88.2	104	90	40	4	18
6000	**CFM71S**	5	11.6	16.5	46.5	7.3	16.8	4.89	6.65	-	-	-	-
	CFM71M	6.5	14.1	21.5	56	9.4	20.5	6.27	8.03	-	-	-	-
	CFM71L	9.5	21.5	31.4	86	13.8	31	9.02	10.8	-	-	-	-
	CFM90S	11	23.5	39.6	94	16	34	17.4	21.2	-	-	-	-
	CFM90M	14.5	37	52.2	148	21	54	22.3	26.1	-	-	-	-
	CFM90L	21	51	75.6	204	30.5	74	32.1	35.9	-	-	-	-

n_N [min^{-1}]	Motor	L_1 [mH]	R_1 [mΩ]	U_{p0} [V/1000 min^{-1}]	m_{mot} [kg]	m_{bmot} [kg]
2000	**CFM71S**	16.3	2188	85	9.5	11.8
	CFM71M	11.4	1394	83	10.8	13.0
	CFM71L	7.7	802	86	13.0	15.3
	CFM90S	5.7	593	83	15.7	19.6
	CFM90M	3.95	382	81	17.8	21.6
	CFM90L	2.80	236	85	21.9	26.5
	CFM112S	3.10	225	86	26.2	31.8
	CFM112M	2.25	127	84	30.5	36.0
	CFM112L	1.46	76	85	39.3	44.9
	CFM112H	0.88	38	86	54.2	59.8
3000	**CFM71S**	7.2	973	57	9.5	11.8
	CFM71M	5.2	642	57	10.8	13.0
	CFM71L	3.45	347	57	13.0	15.3
	CFM90S	2.7	271	57	15.7	19.6
	CFM90M	1.91	182	56	17.8	21.6
	CFM90L	1.24	105	56	21.9	26.5
	CFM112S	1.42	100	57	26.2	31.8
	CFM112M	1.08	67	58	30.5	36.0
	CFM112L	0.78	35	63	39.3	44.9
	CFM112H	0.45	20	61	54.2	59.8
4500	**CFM71S**	3.30	449	38	9.5	11.8
	CFM71M	2.35	278	37.5	10.8	13.0
	CFM71L	1.55	149	36.5	13.0	15.3
	CFM90S	1.19	124	37.5	15.7	19.6
	CFM90M	0.84	81	36.5	17.8	21.6
	CFM90L	0.53	48	36.5	21.9	26.5
	CFM112S	0.68	50	40.5	26.2	31.8
	CFM112M	0.465	28	38	30.5	36.0
6000	**CFM71S**	1.80	243	28	9.5	-
	CFM71M	1.47	175	30	10.8	-
	CFM71L	0.91	89	29	13.0	-
	CFM90S	0.77	78	30	15.7	-
	CFM90M	0.42	42	25.5	17.8	-
	CFM90L	0.31	26	28	21.9	-

12.4 Unit designation

Example

CFM 112S /BR /TF /AS1H /SB50

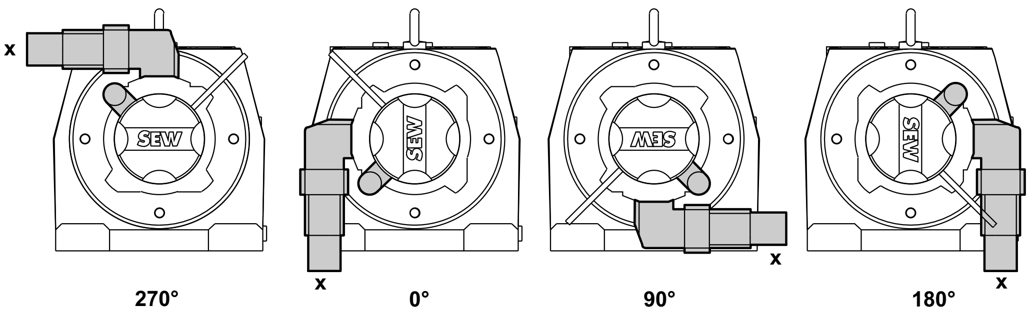
- /SB50 – Plug connector as standard
- /AS1H – Hiperface® multi-turn encoder (motor option)
- /TF – TF thermistor as standard equipment
- /BR – Motor option: brake
- 112S – Size 112S
- CFM – Flange-mounted motor CFM series

12.5 Important order information

Plug connectors for CFM motors

Position of the power connector and the cable entry

Possible positions of the power plug connector are 0°, 90°, 180° or 270° as viewed onto the B side of the motor (as viewed onto the fan end).

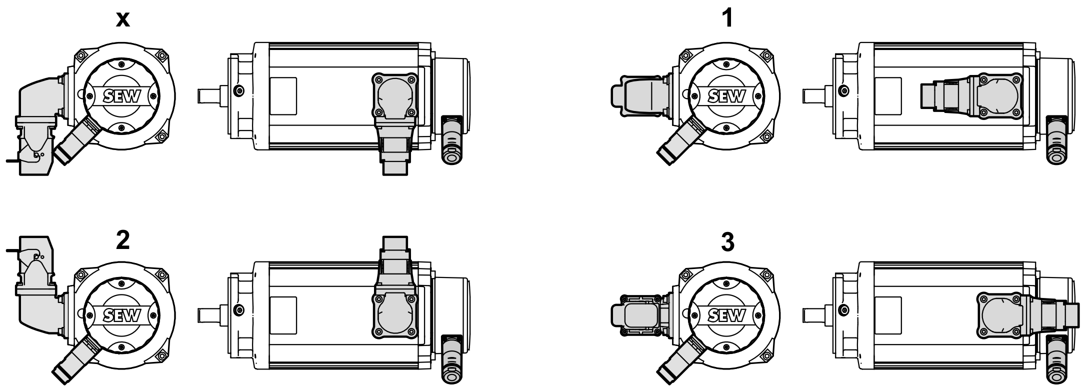


62884axx

Position of the cable entry

Positions "X", "1", "2" or "3" are possible with CFM motors ("X" = standard).

Cable entry position for CM..S.5:



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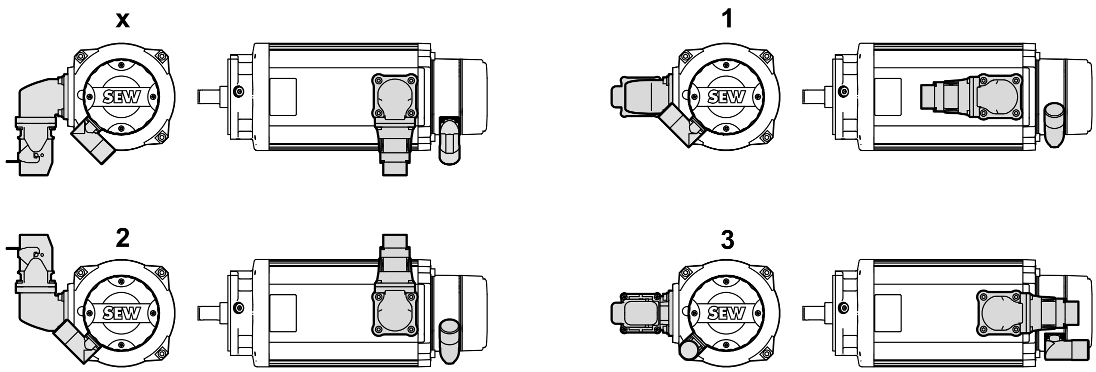
Cable entry position for CM..S.6



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Unless indicated otherwise, you will receive the power plug connector type 270° position with cable entry "3" and radial encoder plug (CM..S.5).

Terminal box

Position of the terminal box and the cable entry

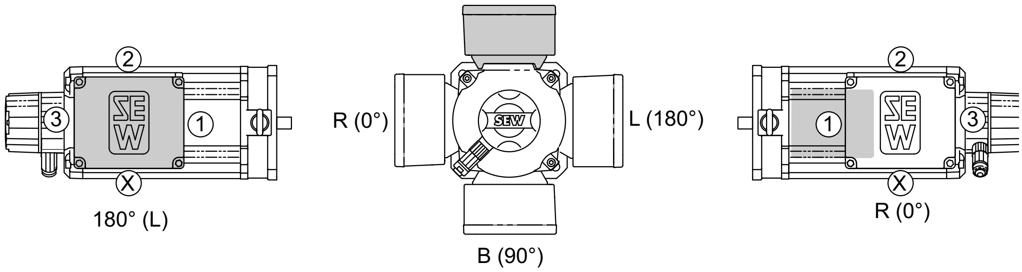
The product standard EN 60034 specifies that the following designations have to be used for terminal box positions:

- As viewed onto the output shaft = A-end
- Designation as R (right), B (bottom), L (left) and T (top)

This new designation applies to motors without a gear unit in mounting position B3 (= M1). The previous designation is maintained for gearmotors.

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-end.

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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Unless indicated otherwise, you will receive the terminal box type 0° with "X" cable entry, see page 242.

We recommend selecting cable entry "2" with mounting position M3.

INFORMATION

- The terminal box can only be rotated with the entire motor: 0°, 90° and 180°.
- The terminal box has a cable entry with positions "2", "3" and "X".
- The CM112H synchronous servomotor can only be ordered with terminal box.

Position of the terminal box	R (0°)	B (90°)	L (180°)	T (270°)
Possible cable entries	X, 3	X, 1, 3	1, 2	X, 1, 3

12.6 Standards and directives

Conformance to standards

Synchronous servomotors from SEW-EURODRIVE conform to the relevant standards and regulations, in particular to:

- IEC 34-1, EN 60034-1
  Rotating electrical machines, rating and performance.
- EN 60529
  Degrees of protection provided by enclosures (IP code).
- EN 50 262
  Metric threads of cable glands.
- DIN 42925
  Terminal box cable entries for three-phase AC motors.
- DIN 44082 / DIN 44081
  Thermistors; PTC, technical terms and tests.

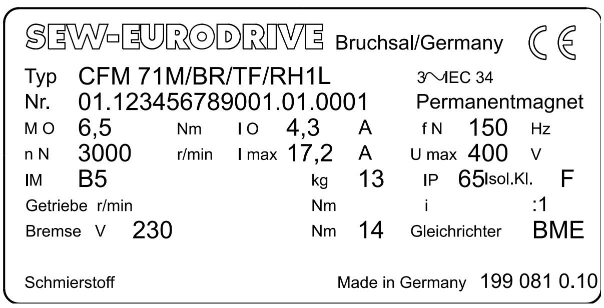
Rated data

The specific data of a synchronous servomotor are:

- Size
- Torque at standstill
- Rated speed
- Rated current
- Enclosure
- Thermal classification

This data is given on the nameplate of the motor. In accordance with IEC34 (EN 60034), the nameplate data apply to a maximum ambient temperature of 40 °C and a maximum altitude of 1000 m above sea level.

Motor nameplate



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12.7 Circuit breakers and protective equipment

Preventive measures

Permanent-field synchronous servomotors must be protected against overloads and short circuits.

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

The surface temperature may be in excess of 100 °C during operation. The brake housing can heat up to 90 °C with released brake and deenergized motor. This is why you must provide for preventive measures against accidental contact.

The motors are available with temperature detection (TF or KTY) to protect the motor winding against overheating.

As a standard, the motors are equipped with **TF temperatures**.

TF temperature sensors comply with DIN 44081 or DIN 44082. Motor sizes CFM71 - CFM112 are also available with **KTY temperature sensors**.

The TF signal can be evaluated directly in the inverter when using a MOVIDRIVE® drive inverter.

Temperature sensors will respond at the maximum permitted winding temperature. Integrate the contacts of the temperature monitoring device into the monitoring circuit.

EMC measures

SEW-EURODRIVE synchronous servomotors are components for installation in machinery and systems. The designer of the machine or system is responsible for complying with the EMC Directive 89/336/EEC. Refer to the SEW publication "Drive Engineering - Practical Implementation, Drive Planning" for detailed information about this topic.

Brakemotors

Install the brake cables of brakemotors separately from the other power cables, maintaining a distance of at least 200 mm. Joint installation is only permitted if either the brake cable or the power cable is shielded.

Encoder connection

Observe the following instructions when connecting an encoder:

- Use a shielded cable with twisted pair conductors only.
- Connect the shield to the PE potential on both ends over a large surface area.
- Route signal cables separately from power cables or brake cables (minimum distance 200 mm).

Thermal motor protection

Install the connecting lead of TF / KTY separately from other power cables, maintaining a distance of at least 200 mm. Joint installation is only permitted if either the TF/KTY cable or the power cable is shielded.

12.8 Mechanical/electrical characteristics

Type	CFM71-112	
	Standard	Optional
Degree of protection	IP65	-
Thermal class	F	-
Motor protection	TF	KTY
Connection	Plug connector	Terminal box
shaft end	Smooth	With key, domed type A RZ Others on request
Ambient temperature	-20 °C to + 40 °C	-40 °C to + 60 °C
Mounting position	270 °	any
Standardization	CE VDE	CSA NEMA UL
Noise levels (EN 60034)	Below specified value	-
Feedback	2-pole resolver	6-pole resolver 2-pole resolver[1)] Encoder
Brake	-	BR
Cooling	self-cooling	VR forced cooling fan
2. shaft end	-	with key
Vibration class	"N" to EN/IEC 60034....	
Cogging torque	≤ 3% M_0	-

1) phase-optimized

12.9 Combinations: CFM with MOVIAXIS®, 400 V system voltage

Combinations: synchronous servomotors/servo inverters for 400 V system voltage, peak torque in Nm

1 Rated speed n_N = 2000 1/min

Motor			**Assignment to MOVIAXIS® MXA size**									
			1			**2**		**3**		**4**	**5**	**6**
Type	I_N	**[A]**	**2**	**4**	**8**	**12**	**16**	**24**	**32**	**48**	**64**	**100**
	I_{max}	**[A]**	**5**	**10**	**20**	**30**	**40**	**60**	**80**	**120**	**160**	**250**
CM71S	I_{max}	% I_N	250	220								
	M_{max}	Nm	10.9	16.5								
CM71M	I_{max}	% I_N		250	150							
	M_{max}	Nm		19.2	21.5							
CM71L	I_{max}	% I_N		250	210							
	M_{max}	Nm		21.6	31.4							
CM90S	I_{max}	% I_N		250	245							
	M_{max}	Nm		22.1	39.4							
CM90M	I_{max}	% I_N			250	229						
	M_{max}	Nm			40.3	51.8						
CM90L	I_{max}	% I_N			250	250	247					
	M_{max}	Nm			41.8	60.6	75.1					
CM112S	I_{max}	% I_N			250	250	250					
	M_{max}	Nm			46.3	66.3	81.9					
CM112M	I_{max}	% I_N				250	250	225				
	M_{max}	Nm				67.4	86.6	108.0				
CM112L	I_{max}	% I_N					250	250	250			
	M_{max}	Nm					88.7	126.9	156.8			
CM112H	I_{max}	% I_N						250	250	250	191	
	M_{max}	Nm						132.0	171.4	234.4	237.0	

2 Rated speed n_N = 3000 1/min

Motor			**Assignment to MOVIAXIS® MXA size**									
			1			**2**		**3**		**4**	**5**	**6**
Type	I_N	**[A]**	**2**	**4**	**8**	**12**	**16**	**24**	**32**	**48**	**64**	**100**
	I_{max}	**[A]**	**5**	**10**	**20**	**30**	**40**	**60**	**80**	**120**	**160**	**250**
CM71S	I_{max}	% I_N		250	165							
	M_{max}	Nm		13.8	16.5							
CM71M	I_{max}	% I_N		250	215							
	M_{max}	Nm		14.5	21.5							
CM71L	I_{max}	% I_N			250	208						
	M_{max}	Nm			27.4	31.5						
CM90S	I_{max}	% I_N			250	242						
	M_{max}	Nm			29.1	39.2						
CM90M	I_{max}	% I_N			250	250	250	169				
	M_{max}	Nm			28.3	41.1	51.6	52.0				
CM90L	I_{max}	% I_N				250	250	242				
	M_{max}	Nm				43.1	56.2	75.6				
CM112S	I_{max}	% I_N				250	250	250				
	M_{max}	Nm				46.3	60.1	81.9				
CM112M	I_{max}	% I_N					250	250	250	171		
	M_{max}	Nm					59.7	85.7	106.3	108.0		
CM112L	I_{max}	% I_N						250	250	250		
	M_{max}	Nm						88.7	115.0	156.8		
CM112H	I_{max}	% I_N								250	250	172
	M_{max}	Nm								180.7	225.7	237.0

3 Rated speed n_N = 4500 1/min

Motor			Assignment to MOVIAXIS® MXA size									
				1		2		3		4	5	6
Type	**I_N**	**[A]**	**2**	**4**	**8**	**12**	**16**	**24**	**32**	**48**	**64**	**100**
	I_{max}	**[A]**	**5**	**10**	**20**	**30**	**40**	**60**	**80**	**120**	**160**	**250**
CM71S	I_{max}	% I_N		250	245							
	M_{max}	Nm		9.9	16.5							
CM71M	I_{max}	% I_N			250	221						
	M_{max}	Nm			17.9	21.5						
CM71L	I_{max}	% I_N			250	250	241					
	M_{max}	Nm			19.2	26.8	31.5					
CM90S	I_{max}	% I_N				250	250	185				
	M_{max}	Nm				28.7	36.5	39.5				
CM90M	I_{max}	% I_N				250	250	246				
	M_{max}	Nm				29.2	38.1	52.1				
CM90L	I_{max}	% I_N						250	250	179		
	M_{max}	Nm						56.4	71.5	75.2		
CM112S	I_{max}	% I_N						250	250	188		
	M_{max}	Nm						60.1	75.5	81.9		
CM112M	I_{max}	% I_N						250	250	250		
	M_{max}	Nm						61.1	79.3	108.0		
CM112L	I_{max}	% I_N								250	250	184
	M_{max}	Nm								112.9	142.3	156.8
CM112H	I_{max}	% I_N									250	250
	M_{max}	Nm									160.0	228.5

4 Rated speed n_N = 6000 1/min

Motor			Assignment to MOVIAXIS® MXA size									
				1		2		3		4	5	6
Type	**I_N**	**[A]**	**2**	**4**	**8**	**12**	**16**	**24**	**32**	**48**	**64**	**100**
	I_{max}	**[A]**	**5**	**10**	**20**	**30**	**40**	**60**	**80**	**120**	**160**	**250**
CM71S	I_{max}	% I_N			250	217						
	M_{max}	Nm			14.0	16.5						
CM71M	I_{max}	% I_N			250	250	216					
	M_{max}	Nm			14.5	19.8	21.5					
CM71L	I_{max}	% I_N				250	250	208				
	M_{max}	Nm				21.8	27.3	31.4				
CM90S	I_{max}	% I_N				250	250	242				
	M_{max}	Nm				22.4	29.2	39.4				
CM90M	I_{max}	% I_N					250	250	247			
	M_{max}	Nm					28.9	41.8	51.9			
CM90L	I_{max}	% I_N						250	250	246		
	M_{max}	Nm						42.1	55.0	75.2		

12.10 Combinations: CFM with MOVIDRIVE®, 400 V system voltage

Combinations: synchronous servomotors/servo inverters for 400 V system voltage, peak torque in Nm

1 Rated speed n_N = 2000 1/min:

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V units) in SERVO operating modes (P700)															
		0005	**0008**	**0011**	**0014**	**0015**	**0022**	**0030**	**0040**	**0055**	**0075**	**0110**	**0150**	**0220**	**0300**	**0370**	**0450**
CM71S	M_{max} Nm	8.9	10.5	13.1	15.6	12.7	15.9	16.5									
CM71M	M_{max} Nm	8.6	10.3	13.1	16.2	12.7	16.7	19.8	21.5								
CM71L	M_{max} Nm		10.8	13.9	17.7	13.5	18.2	22.5	28.4	31.4							
CM90S	M_{max} Nm			13.9	17.8	13.4	18.4	23.2	30.6	38.2	39.4						
CM90M	M_{max} Nm				16.8	12.6	17.3	21.9	29.5	38.0	46.9	52.5					
CM90L	M_{max} Nm						17.5	22.2	30.1	39.3	49.6	70.3	75.8				
CM112S	M_{max} Nm						19.3	24.6	33.4	43.6	54.8	76.2	81.9				
CM112M	M_{max} Nm							23.9	32.6	42.9	54.7	79.3	99.6	108.0			
CM112L	M_{max} Nm									42.0	53.9	80.3	104.9	141.5	156.8		
CM112H	M_{max} Nm										53.2	80.1	106.5	150.3	189.2	220.1	237.0

2 Rated speed n_N = 3000 1/min:

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V units) in SERVO operating modes (P700)								
		0005	**0008**	**0011**	**0014**	**0015**	**0022**	**0030**	**0040**	**0055**
CM71S	M_{max} Nm	6.0	7.2	9.2	11.6	8.9	11.9	14.3	16.5	
CM71M	M_{max} Nm		7.2	9.3	11.9	9.0	12.2	15.1	19.1	21.5
CM71L	M_{max} Nm			9.5	12.2	9.2	12.6	15.9	21.0	26.2
CM90S	M_{max} Nm				12.0	9.0	12.4	15.7	21.2	27.4
CM90M	M_{max} Nm						11.8	15.0	20.4	26.6
CM90L	M_{max} Nm								20.7	27.3
CM112S	M_{max} Nm								22.2	29.3
CM112M	M_{max} Nm									28.2

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V units) in SERVO operating modes (P700)								
		0075	**0110**	**0150**	**0220**	**0300**	**0370**	**0450**	**0550**	**0750**
CM71L	M_{max} Nm	30.8	31.5							
CM90S	M_{max} Nm	34.0	39.2							
CM90M	M_{max} Nm	33.7	47.8	51.6						
CM90L	M_{max} Nm	34.7	51.1	65.6	75.6					
CM112S	M_{max} Nm	37.4	54.8	69.8	81.9					
CM112M	M_{max} Nm	36.2	54.0	70.7	95.7	108.0				
CM112L	M_{max} Nm	35.8	53.9	71.6	101.0	126.9	147.4	156.8		
CM112H	M_{max} Nm		56.6	75.7	108.6	139.9	167.0	197.1	223.2	237.0

3 Rated speed n_N = 4500 1/min:

Motor			MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V units) in SERVO operating modes (P700)							
			0005	**0008**	**0011**	**0014**	**0015**	**0022**	**0030**	**0040**
CM71S	M_{max}	Nm			6.3	8.1	6.1	8.3	10.4	13.4
CM71M	M_{max}	Nm				7.9	5.9	8.1	10.2	13.6
CM71L	M_{max}	Nm						8.2	10.4	14.0
CM90S	M_{max}	Nm							10.4	14.1
CM90M	M_{max}	Nm								14.0

Motor			MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V units) in SERVO operating modes (P700)											
			0055	**0075**	**0110**	**0150**	**0220**	**0300**	**0370**	**0450**	**0550**	**0750**	**0900**	**1100**
CM71S	M_{max}	Nm	16.1	16.5										
CM71M	M_{max}	Nm	17.1	20.3	21.3									
CM71L	M_{max}	Nm	18.1	22.5	30.3	31.2								
CM90S	M_{max}	Nm	18.4	23.4	33.6	39.2								
CM90M	M_{max}	Nm	18.4	23.5	34.6	44.5	52.1							
CM90L	M_{max}	Nm	18.2	23.3	34.7	45.8	63.4	75.0						
CM112S	M_{max}	Nm	19.5	25.0	37.4	49.2	67.5	81.9						
CM112M	M_{max}	Nm		24.6	37.1	49.4	69.6	87.4	101.5	108.0				
CM112L	M_{max}	Nm			35	46.8	67.2	86.9	104.1	123.5	140.7	156.8		
CM112H	M_{max}	Nm					70.9	92.5	112.1	135.5	157.7	189.4	231.6	237.0

4 Rated speed n_N = 6000 1/min:

Motor			MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V units) in SERVO operating modes (P700)															
			0005	**0008**	**0011**	**0014**	**0015**	**0022**	**0030**	**0040**	**0055**	**0075**	**0110**	**0150**	**0220**	**0300**	**0370**	**0450**
CM71S	M_{max}	Nm				6.1	4.6	6.3	8.0	10.6	13.3	15.8	16.5					
CM71M	M_{max}	Nm						6.2	7.9	10.6	13.7	16.8	21.3					
CM71L	M_{max}	Nm							8.0	10.8	14.1	17.9	25.2	30.7	31.4			
CM90S	M_{max}	Nm								10.8	14.2	18.1	26.6	34.2	39.4			
CM90M	M_{max}	Nm									13.7	17.5	26.1	34.3	46.9	51.9		
CM90L	M_{max}	Nm										17.1	25.6	33.9	48.0	60.9	71.3	75.2

12.11 Combinations: CFM with MOVIDRIVE®, 230 V system voltage

Combinations: synchronous servomotors/servo inverters for 230 V system voltage, peak torque in Nm

1 Rated speed n_N = 2000 1/min:

Motor			MOVIDRIVE® MDX61B...-2_3 (AC 230 V units) in SERVO operating modes (P700)								
			0015	0022	0037	0055	0075	0110	0150	0220	0300
CM71S	M_{max}	Nm	12.9	14.6	16.5						
CM71M	M_{max}	Nm	13.1	15.1	21.4						
CM71L	M_{max}	Nm	14.0	16.3	25.6	31.3					
CM90S	M_{max}	Nm	13.8	16.2	26.8	38.0	39.6				
CM90M	M_{max}	Nm	13.1	15.4	25.8	38.2	48.1	52.0			
CM90L	M_{max}	Nm		15.8	26.6	40.0	51.9	70.9	74.9		
CM112S	M_{max}	Nm			28.3	42.7	55.1	74.7	81.9		
CM112M	M_{max}	Nm			27.4	41.6	54.6	76.8	94.4	108.0	
CM112L	M_{max}	Nm				41.7	55.0	79.2	100.2	139.3	156.8
CM112H	M_{max}	Nm					56.6	82.2	105.5	153	177.9

2 Rated speed n_N = 3000 1/min:

Motor			MOVIDRIVE® MDX61B...-2_3 (AC 230 V units) in SERVO operating modes (P700)								
			0015	0022	0037	0055	0075	0110	0150	0220	0300
CM71S	M_{max}	Nm	9.1	10.6	15.8	16.5					
CM71M	M_{max}	Nm	9.3	10.9	17.2	21.5					
CM71L	M_{max}	Nm	9.4	11.0	18.2	25.8	31.0	31.4			
CM90S	M_{max}	Nm	9.5	11.2	18.7	27.7	35.1	39.5			
CM90M	M_{max}	Nm			18.1	27.2	35.3	48.4	52.2		
CM90L	M_{max}	Nm			17.9	27.1	35.5	50.5	63.1	75.2	
CM112S	M_{max}	Nm			18.8	28.7	37.7	53.4	66.3	81.9	
CM112M	M_{max}	Nm				29.1	38.4	55.3	69.9	97.0	108.0
CM112L	M_{max}	Nm					40.6	58.9	75.4	108.8	125.9
CM112H	M_{max}	Nm						58.4	75.3	111.1	131.1

3 Rated speed n_N = 4500 1/min:

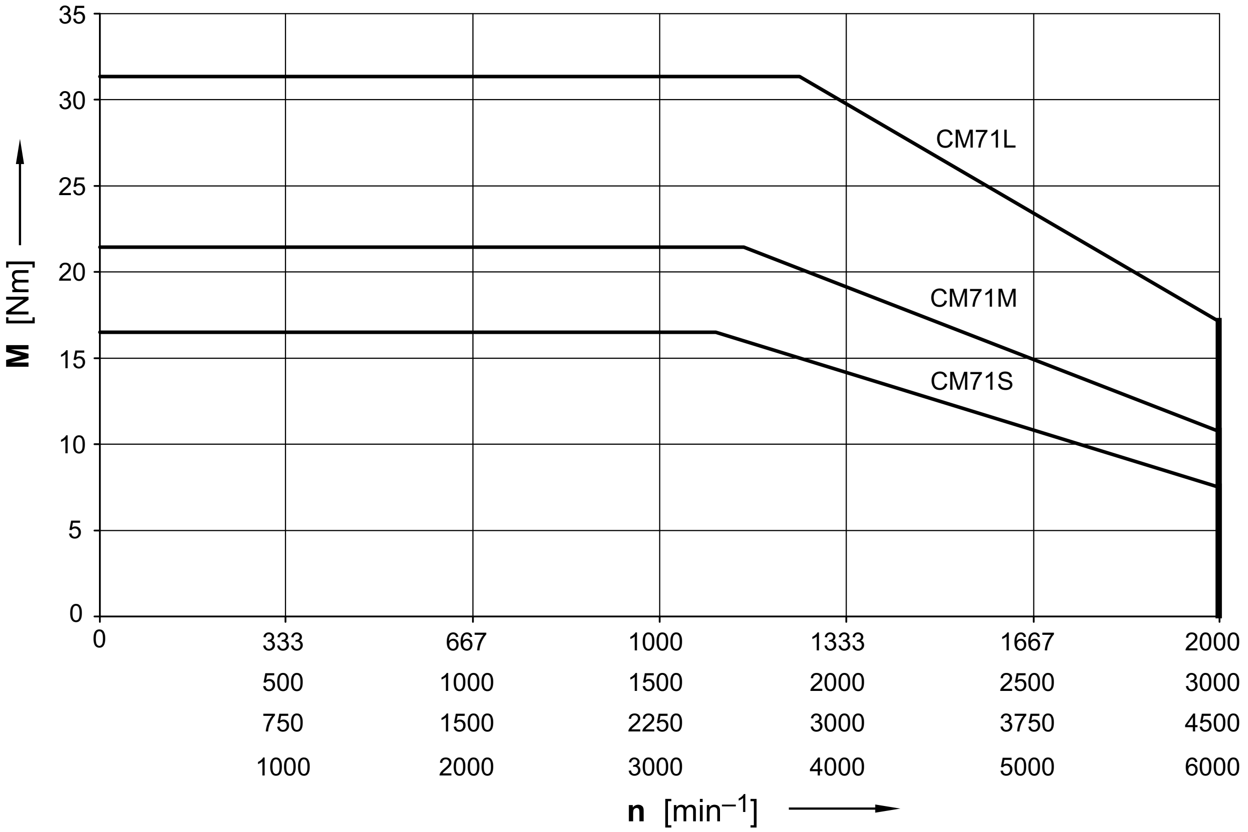
Motor			MOVIDRIVE® MDX61B...-2_3 (AC 230 V units) in SERVO operating modes (P700)								
			0015	0022	0037	0055	0075	0110	0150	0220	0300
CM71S	M_{max}	Nm	6.4	7.5	12.1	16.3	16.5				
CM71M	M_{max}	Nm	6.3	7.4	12.2	17.4	21.0	21.4			
CM71L	M_{max}	Nm		7.2	12.1	17.9	22.8	29.9	31.3		
CM90S	M_{max}	Nm			12.6	19.0	24.8	34.4	39.6		
CM90M	M_{max}	Nm			12.1	18.3	24.1	34.3	42.8	52.0	
CM90L	M_{max}	Nm				17.7	23.4	33.7	42.9	61.4	70.5
CM112S	M_{max}	Nm				20.0	26.5	38.2	48.6	68.3	77.7
CM112M	M_{max}	Nm					24.8	36.1	46.3	67.4	78.5

4 Rated speed n_N = 6000 1/min:

Motor			MOVIDRIVE® MDX61B...-2_3 (AC 230 V units) in SERVO operating modes (P700)								
			0015	0022	0037	0055	0075	0110	0150	0220	0300
CM71S	M_{max}	Nm	4.7	5.6	9.2	13.2	15.9	16.6			
CM71M	M_{max}	Nm	5.0	5.9	9.9	14.6	18.2	21.4			
CM71L	M_{max}	Nm			9.6	14.5	18.7	25.6	30.3	31.4	
CM90S	M_{max}	Nm			10.2	15.4	20.1	28.5	35.3	39.4	
CM90M	M_{max}	Nm				12.9	17.0	24.5	31.2	44.3	50.6
CM90L	M_{max}	Nm					17.9	25.9	33.1	48.3	56.5

12.12 Dynamic and thermal limit characteristic curves

CFM71 Dynamic limit torques



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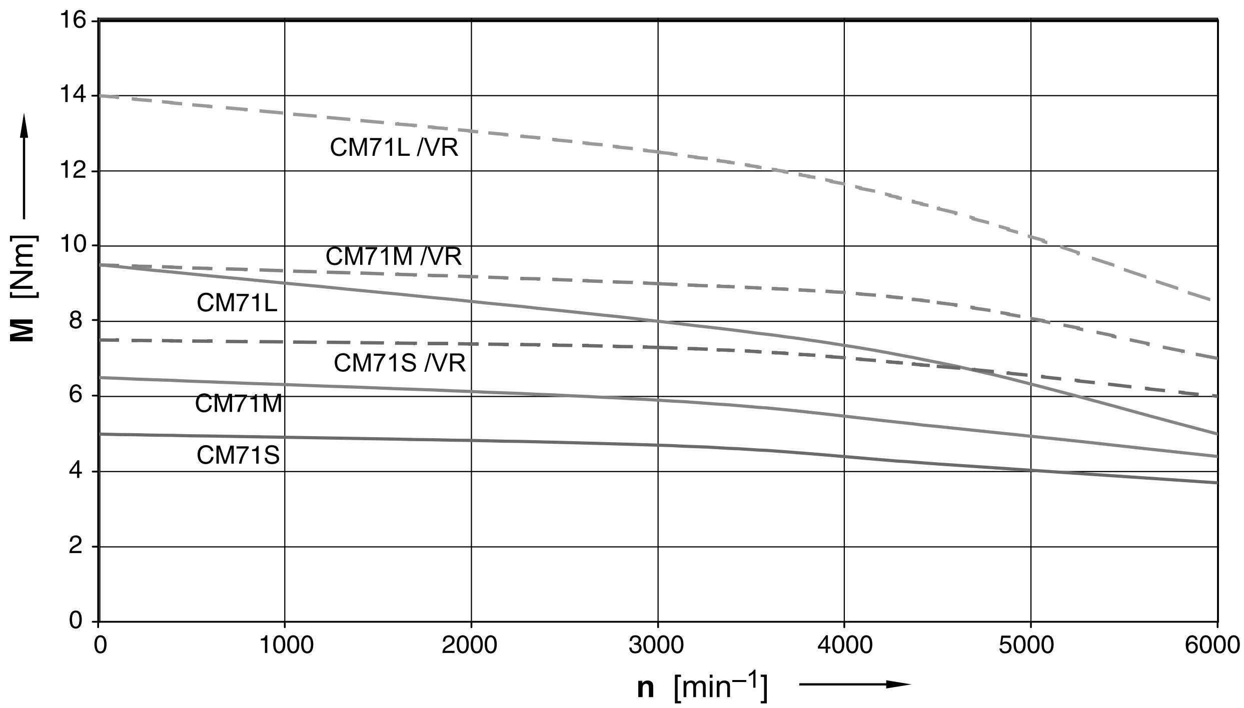
Thermal limit torques



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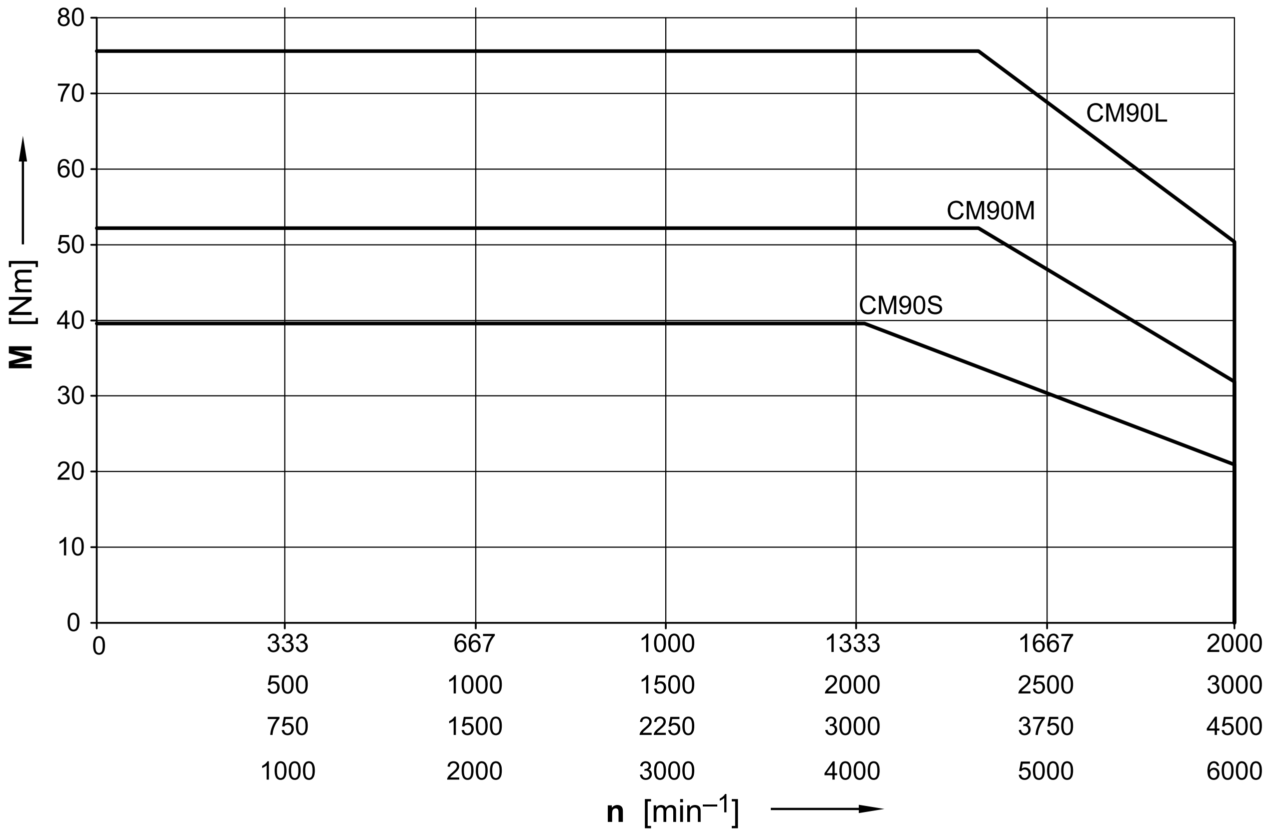
CFM90 Dynamic limit torques



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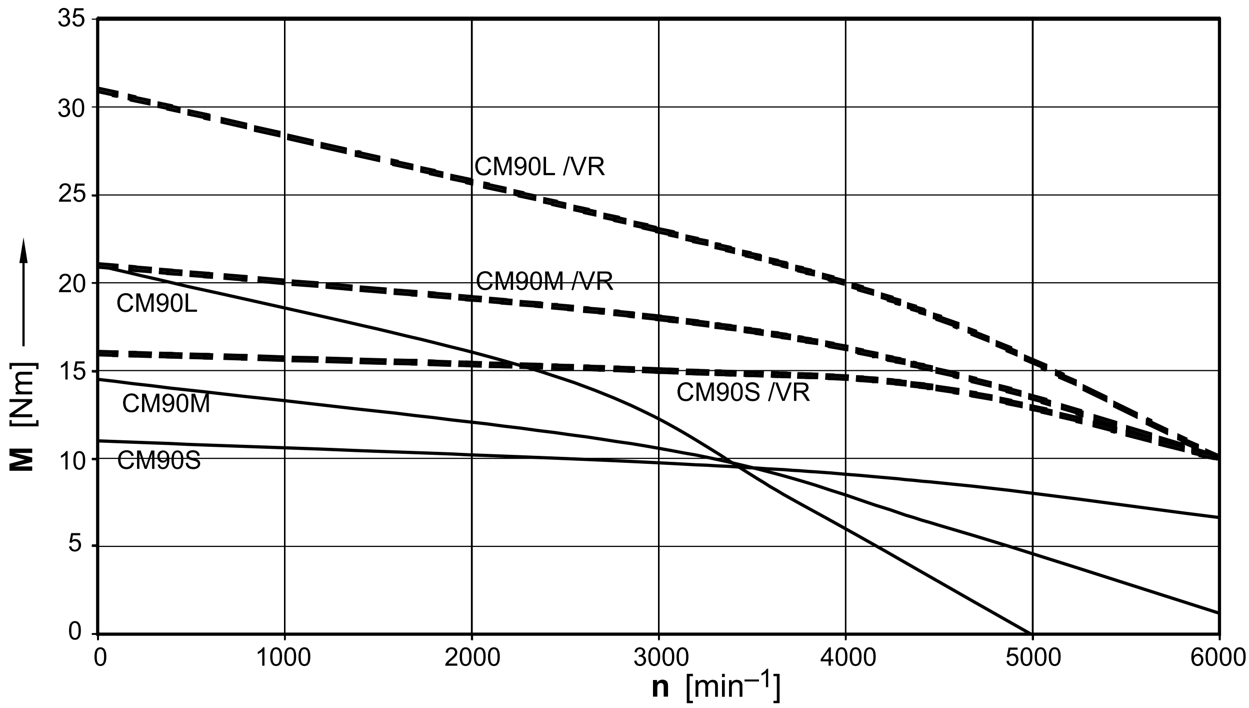
Thermal limit torques



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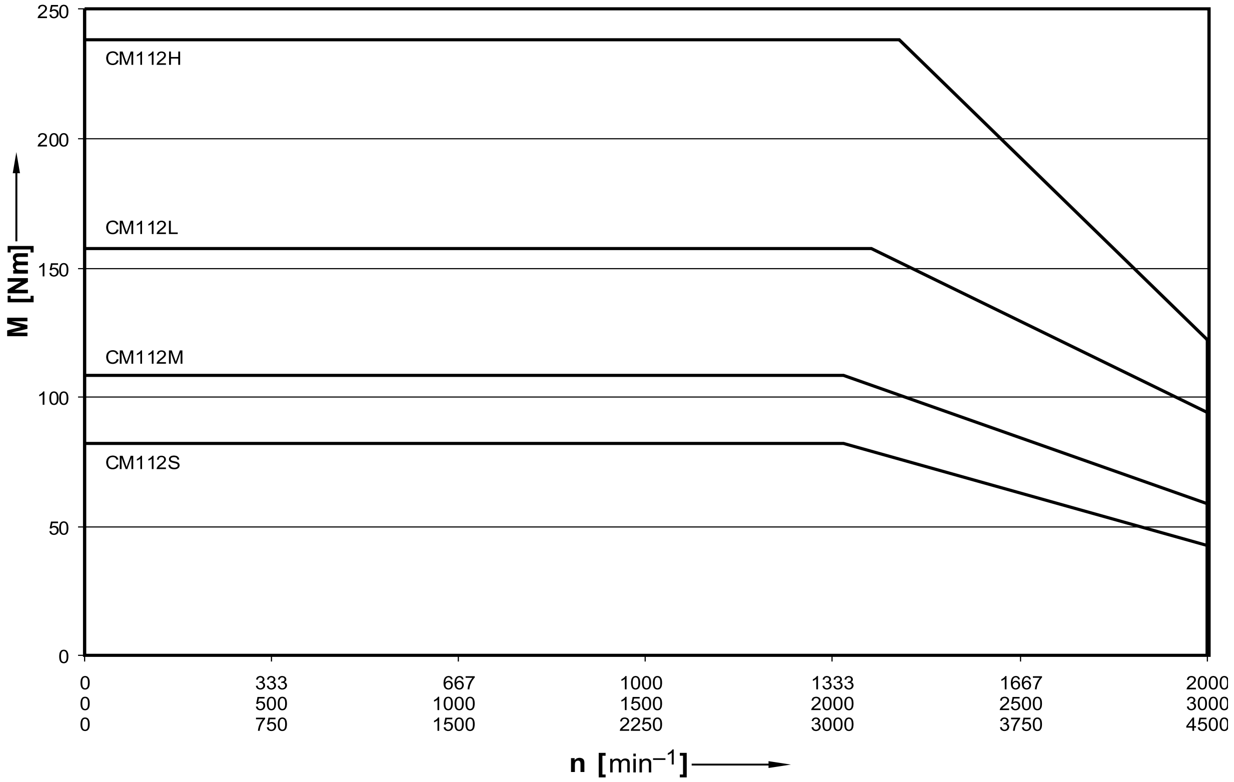
CFM112 Dynamic limit torques



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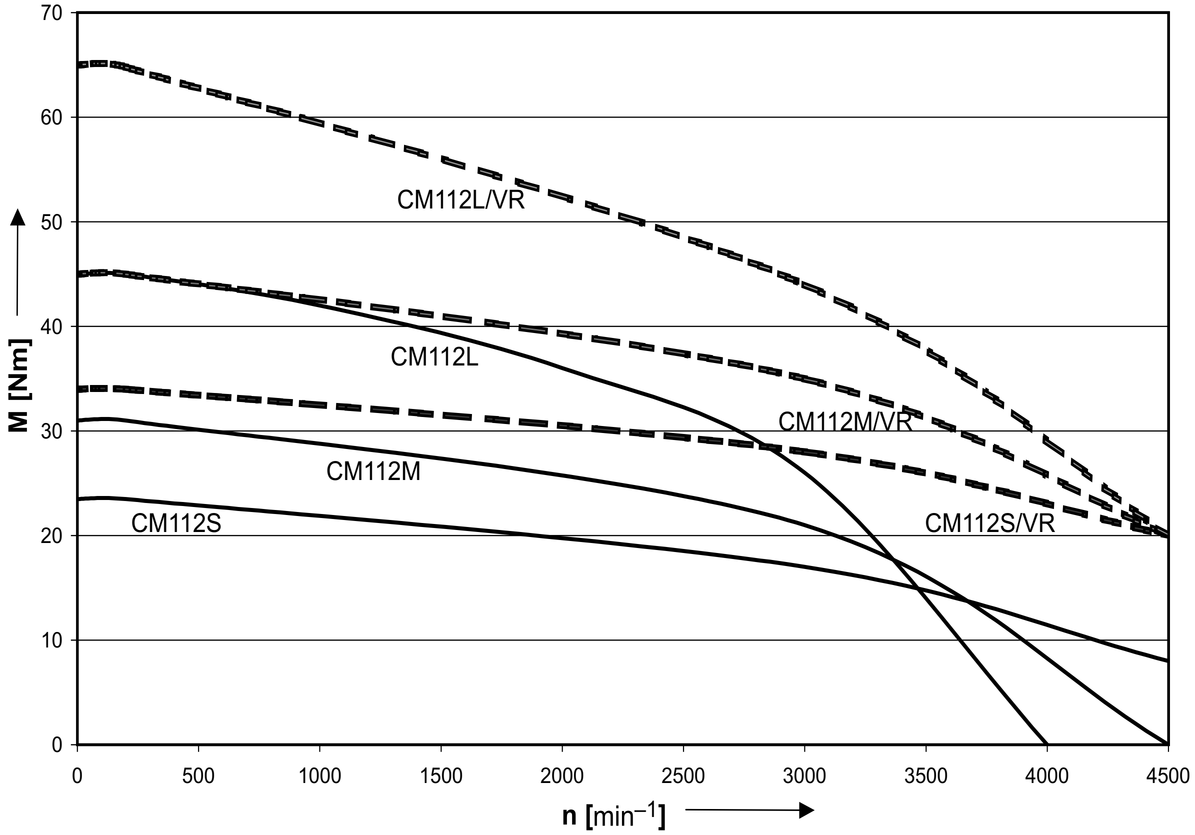
Thermal limit torques for CM112S-L



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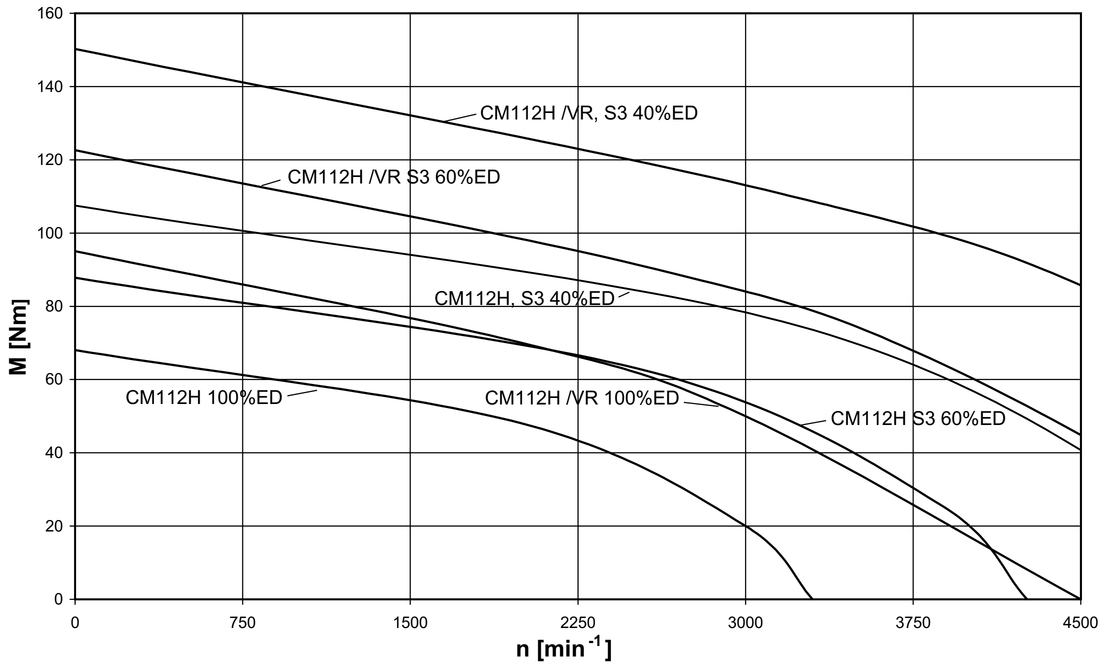
Thermal limit torques for CM112H



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12.13 Derating for increased ambient temperatures

The following applies to determining a first approximation of a random thermal limit characteristic curve: The thermal limit characteristic curve for higher ambient temperatures must be reduced in all points (speed-related limit torque) by ΔM_{TH}:

$$\Delta M_{TH} = M_{TH} \times \left(1 - \sqrt{\frac{145 - T_A}{105}}\right)$$

$$M_{TH\_re} = M_{TH} - \Delta M_{TH}$$

Example CM 112 H:

T_A = 60 °C

M_{TH} = 48 Nm

n = 2000 min^{-1}

$$\Delta M_{TH} = 48 \times \left(1 - \sqrt{\frac{145 - 60}{105}}\right) [Nm]$$

$$\Delta M_{TH} = 9.14 \text{ Nm}$$

$$M_{TH\_re} = 48 - 9.14 \text{ [Nm]} = 38.86 \text{ [Nm]}$$

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ΔM_{TH}	Thermal limit torque [Nm] difference
M_{TH}	Thermal limit torque [Nm]
T_A	Ambient temperature °C
M_{TH_re}	Reduced thermal limit torque [Nm]

12.14 Overhung and axial loads

Refer to section 3.6 "Overhung and axial loads" for general information about overhung loads.

Determining overhung load

The permitted overhung loads FR at point x (distance from the shaft shoulder to the application point) are determined using the diagrams below. The diagrams are based on a nominal bearing service life of L_{10h}=12 500 h.

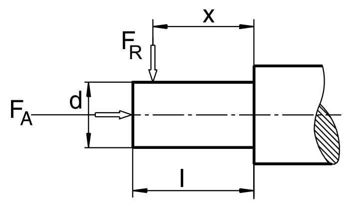

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Figure 1: Determining the overhung load F_R

n = 2000 min^{-1}

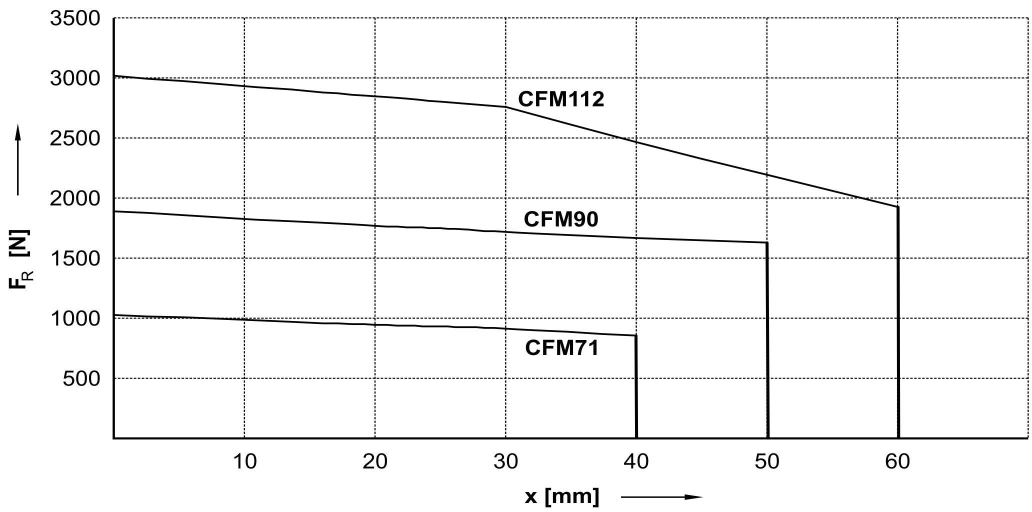

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Figure 2: Permitted overhung load F_R at n = 2000 min $^{-1}$

Permitted axial load F_A at 2000 min $^{-1}$:

CFM71: 300 N CFM90: 550 N CFM112: 900 N

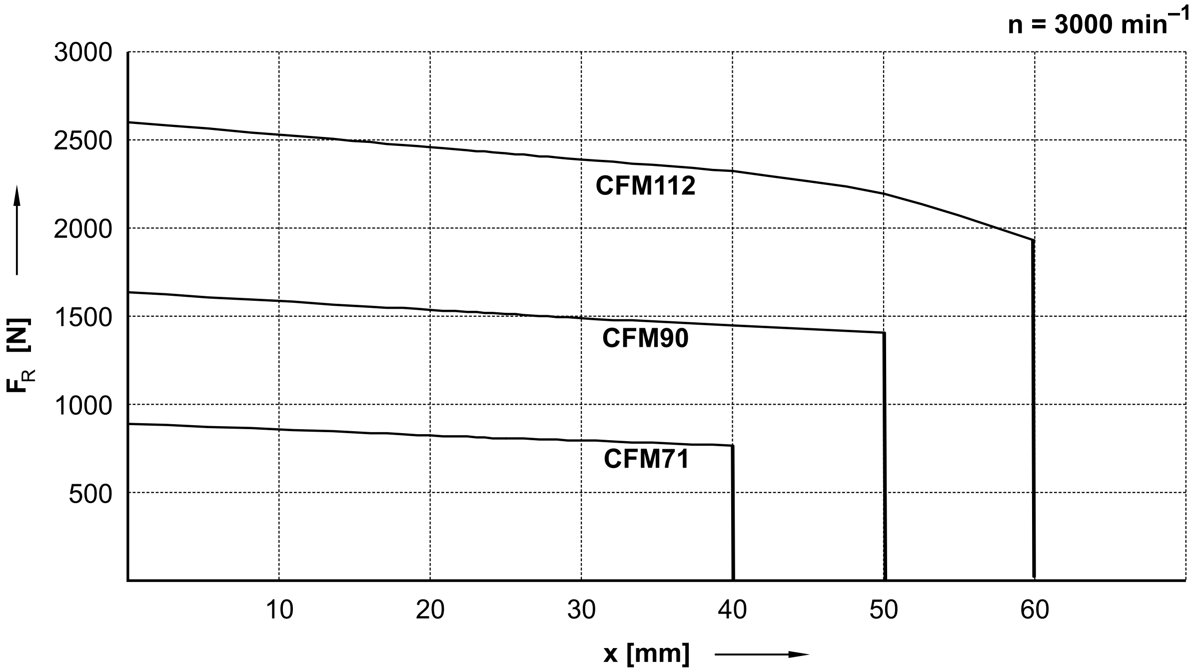

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Figure 3: Permitted overhung load F_R at n = 3000 min $^{-1}$

Permitted axial load F_A at 3000 min $^{-1}$:

CFM71: 250 N   CFM90: 500 N   CFM112: 800 N

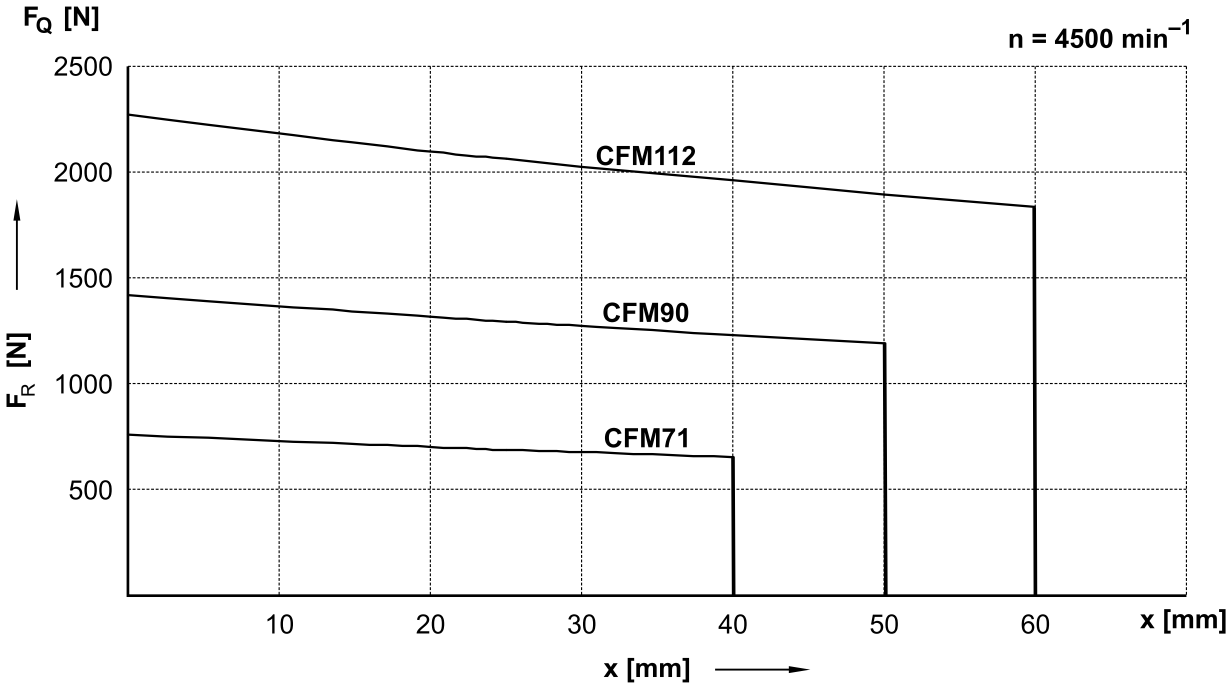

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Figure 4: Permitted overhung load F_R at n = 4500 min $^{-1}$

Permitted axial load F_A at 4500 min $^{-1}$:

CFM71: 200 N   CFM90: 400 N   CFM112: 600 N

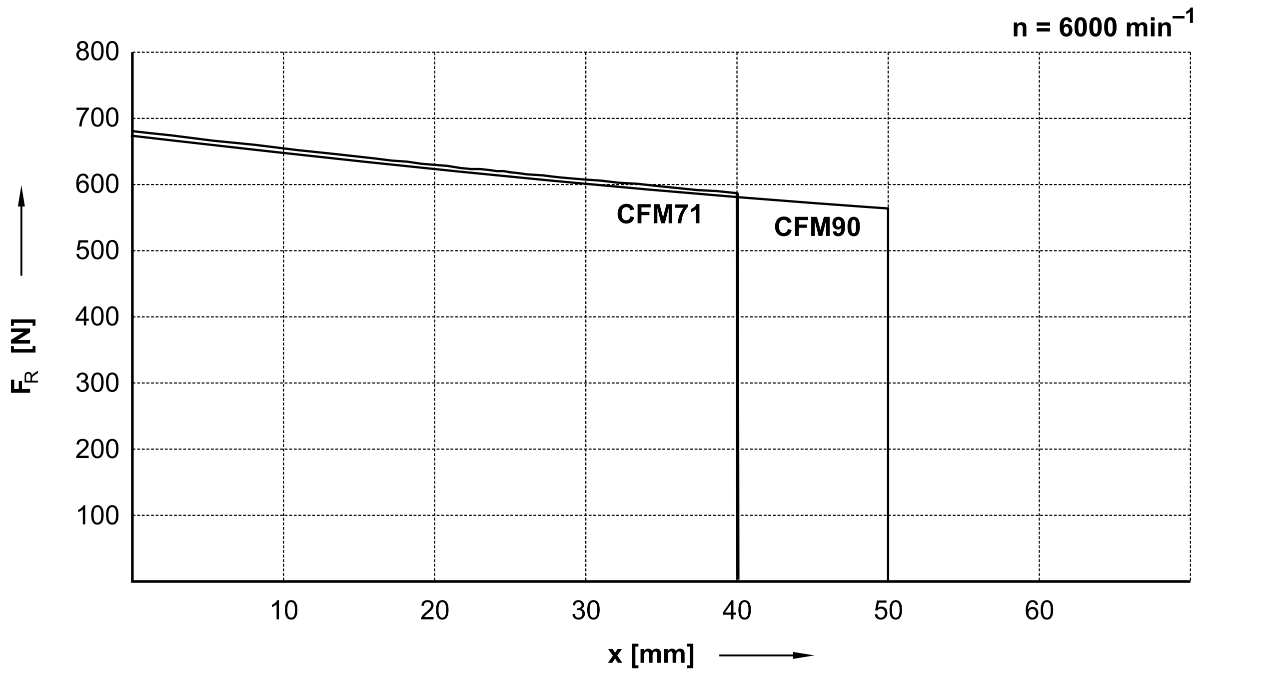

Figure 5: Permitted overhung load F_R at n = 6000 min $^{-1}$

Permitted axial load F_A at 6000 min $^{-1}$:

CFM71: 160 N   CFM90: 300 N

Used motor bearings

Motor type	A-side bearing	B-side bearing
CFM71	6205-2Z-J	6303-2Z-J
CFM90	6207-2Z-J	6305-2Z-J
CFM112	6308-2Z-J	6207-2Z-J

12.15 Motor equipment

The following motor options are available for CFM71 - 112 motors:

1. SM/SB plug connector
2. Terminal box KK/KK5/KK6
3. B/BR brake
4. H1M/RH1L resolver
5. ES1H/AS1H absolute HIPERFACE® encoder.
6. AV1Y, AV1H, EV1H absolute encoder
7. VR forced cooling fan

Other motor options are available on request.

1. SM/SB plug connector

CFM motors are connected via a rectangular plug connector (C148U, by Amphenol). This connector system offers the following advantages:

- One connector size for all connection cross sections from 1.5 mm^2 to 10 mm^2.
- Metallic housing to ensure EMC
- Assembly without requiring special tools
- Control contacts in addition to the motor power contacts in one connector housing
- Separate insulation elements for power and control contacts
- UL certified

The other control contacts are assigned by SEW-EURODRIVE for connecting the BR brake. Socket contacts for core cross sections from 1 mm^2 or 1.5 mm^2 are used for this purpose.

Type designation

A four-digit type designation is assigned to the power plug connector and the encoder plug connector. The second position indicates whether only the motor power is connected, or the motor power combined with the brake. The fourth digit represents a code for the core cross section to be connected or indicates that the motor was delivered without mating connector.

1st ch:	**S**	Connection via plug connector
2nd ch:	**M**	Motor
	B	Brakemotor
3rd ch:	**5**	Connector housing size and type of encoder cable entry (radial)
	6	Connector housing size and type of encoder cable entry (axial)
4th chr:	**0**	Delivered without mating plug

2nd character M =	1:	4 x 1.5 mm^2
	2:	4 x 2.5 mm^2
	4:	4 x 4 mm^2
	6:	4 x 6 mm^2
	9:	4 x 10 mm^2

2nd character B = 1: 4 x 1.5 mm^2 + 3 x 1 mm^2
2: 4 x 2,5 mm^2 + 3 x 1 mm^2
4: 4 x 4 mm^2 + 3 x 1 mm^2
6: 4 x 6 mm^2 + 3 x 1.5 mm^2
9: 4 x 10 mm^2 + 3 x 1.5 mm^2

Example

S B 5 9

- 9: 4 x 10 mm^2 motor core cross section and 3 x 1.5 mm^2 brake core cross section
- 5: Indicates the connector housing size and radial encoder cable entry
- B: Motor and brake
- S: Plug connector

In the basic version, SEW-EURODRIVE delivers CFM motors with the flange socket on the motor end and without SM50/SB50 mating connector. The encoder cable entry is radial.

2. Connection with terminal box (KK)

Motor type	Power connection			Encoder/resolver/thermal motor protection	
	Connection	maximum connection cross section	Cable entry	Connection	Cable entry
CFM71..	3 x M5	4 x 6 mm^2	M25 x 1.5	Spring cage terminal in the encoder housing	M16 x 1.5
CFM90../112S	3 x M6	4 x 10 mm^2	M32 x 1.5		M16 x 1.5
CFM112M/H	3 x M8	4 x 25 mm^2	M50 x 1.5		M16 x 1.5

EMC compliant cabling

Make sure that

- the line type corresponds to the applicable regulations (rated currents are indicated on the nameplate),
- the signal lines consist of twisted pair wires and are collectively shielded (resolver lead as example: one pair each for reference, sine and cosine signals),
- the brake cables are routed separately from power cables, or that power cables and, if necessary, also brake cables are shielded to protect the brake against electromagnetic interference.

Motor power connection

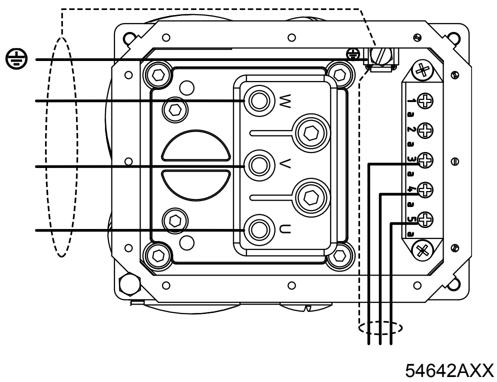

Figure 6: CFM motor connection

Pin	Core identification	Connection
U	Black with white lettering U, V, W	U
V		V
W		W
PE	Green/yellow	Protective earth

Contact of the auxiliary terminal strip	Core identification	Connection of BME, BMH, BMK, BMP brake rectifiers	BSG brake control unit
3a	Black with white lettering 1, 2, 3	14	1
4a		13	3
5a		15	5

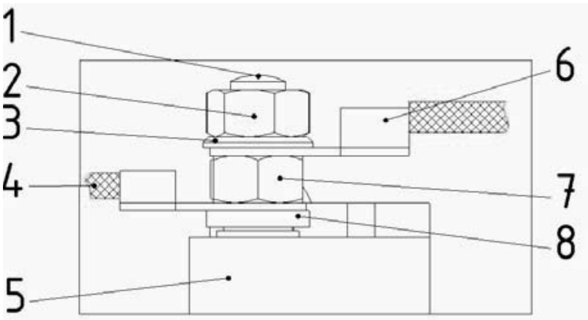

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Figure 7: Power connection in the terminal box

1	Terminal stud	5	Terminal block
2	Upper nut	6	Customer's cable
3	Washer	7	Lower nut
4	Motor cable	8	Lock washer

For designing the terminal box, positions 6, 7 and 4 are regarded as current-carrying.

Resolver connection to CFM motor

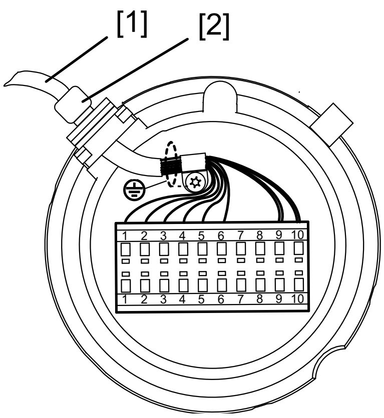

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Figure 8: Connection of an RH1M resolver

1	Feedback cable
2	Cable gland

Encoder in delivery state

The housing is closed with an M16 × 1.5 screw plug ϖερσχηλοσσεν. Ποσιτιον 1 υνδ 2 σινδ νιχητ ιμ Λιεφερυμφανγ εντηαλτεν.

Pin	RH1M/RH1L connection	AS1H/ES1H connection
1	R1 (reference +)	cos +
2	R2 (reference -)	ref cos
3	S1 (cosine +)	sin+
4	S3 (cosine -)	ref sin
5	S2 (sine +)	D -
6	S4 (sine -)	D +
7		GND
8		Us
9[1)]	TF (KTY+)	TF (KTY+)
10[1)]	TF (KTY-)	TF (KTY-)

1) Double assignment to increase cross section

2. Connection with terminal box variant KK5/KK6

The extended terminal box variant KK5/KK6 for the CM motors comprises the terminal box for the power and the plug connector for the signal evaluation.

3. Brakes

The optional BR disc brake from SEW-EURODRIVE is integrated in the motor. It operates as a DC-operated fail-safe brake, which means the brake is released electrically. The brake is applied automatically when the voltage is switched off or there is a power outage.

Note

Due to the high peak current load and the DC voltage to be switched at inductive load, you always have to use contactors in utilization category ACß3 (EN 60947-4-1) to control the brake rectifiers or the BSG brake control unit.

Motor size CFM 71, 90, 112

As standard, the brakes are available for AC 110 V, AC 230 V, AC 400 V, AC 460 V and DC 24 V supply voltages. If no supply voltage is indicated for the brake, the brake will be delivered with a supply voltage of AC 400 V.

Speed classes

The BR brake for CFM71, CFM90 and CFM112 motors can be operated **up to a maximum of 4500 min^{-1}**.

Standard design

As standard, CFM.. /BR synchronous servomotors with BME brake control are supplied for AC connection or BSG control unit for DC 24 V connection. The motors are completely ready for connection.

Brake control (only size 71, 90, 112)

Only SEW brake control systems are used for controlling the brake. All brake control systems are fitted as standard with varistors to protect against overvoltage.

For detailed information on brakes from SEW-EURODRIVE, refer to the publication "Drive Engineering Practical Implementation, SEW Disk Brakes".

The brakes are available with DC and AC voltage connection.

- AC voltage connection:
  - **BME**, equipped with DIN rail profile
- DC voltage connection:
  - **BSG**

There are two possible ways of electrical disconnection:

- Normal application times: Cut-off in the AC circuit.
- Particularly short application times: Cut-off in the AC and DC circuits.

The brake control systems are mounted in the control cabinet. They are not included in the scope of delivery.

The following options are available:

- AC supply, cut-off in the AC and DC circuits without additional switch contact, particularly short application times: **BMP**.
- AC supply, brake heating function when switched off: **BMH**.
- The **BMK/BMV** control system energizes the brake coil if the supply system and a DC 24 V signal (e.g. from the PLC) are present simultaneously. The brake is applied if one condition is not being met. BMK allows for shortest response and application times.

Control cabinet

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

Brake control	Function	Voltage	Holding current I_{Hmax} (A)	Type	Part number	Color code
BME	One-way rectifier with electronic switching function	AC 150 - 500 V	1.5	BME 1.5	825 722 1	Red
		AC 42 - 150 V	3.0	BME 3	825 723 X	Blue
BMH	One-way rectifier with electronic switching and heating function	AC 150 - 500 V	1.5	BMH 1.5	825 818 X	Green
		AC 42 - 150 V	3	BMH 3	825 819 8	Yellow
BMP	One-way rectifier with electronic switching, integrated voltage relay for cut-off in the DC circuit	AC 150 - 500 V	1.5	BMP 1.5	825 685 3	White
		AC 42 - 150 V	3.0	BMP 3	826 566 6	Light blue
BMK	One-way rectifier with electronic switch mode, DC 24 V control input and separation in the DC circuit	AC 150 - 500 V	1.5	BMK 1.5	826 463 5	Water blue
		AC 42 - 150 V	3.0	BMK 3	826 567 4	Light red
BSG	Control unit for DC 24 V connection with electronic switch mode	DC 24 V	5.0	BSG	825 459 1	White
BMV	Electronic switch mode, DC 24 V control input and cut-off in the DC circuit	DC 24 V	5.0	BMVS	1 300 006 3	White

Short response times

A characteristic feature of the SEW brake is the patented two-coil system. This system consists of accelerator coil and coil section. The special SEW brake control system ensures that the accelerator coil is switched on with a high current inrush when the brake is released, after which the coil section is switched on. The result is a particularly short response time when releasing the brake. The brake disk moves clear very swiftly and the motor starts up with hardly any brake friction.

This principle of the two coil system also reduces self-induction so that the brake is applied more rapidly. The result is a reduced braking distance. The SEW brake can be cut off in the DC and AC circuits to achieve particularly short response times when applying the brake, for example for hoists.

Basic structure of sizes 71, 90, 112

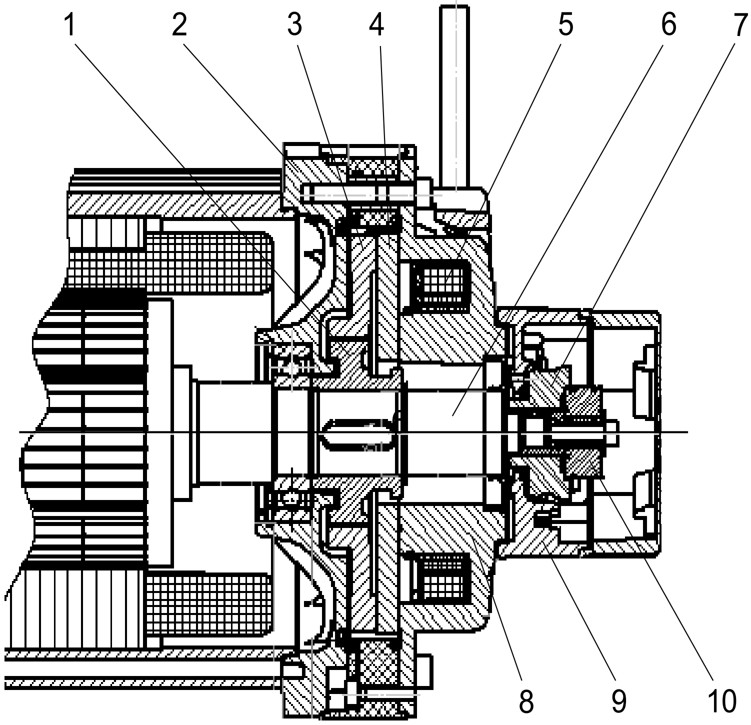

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Figure 9: Basic structure of the brake with RH1L resolver

1	Driver	6	Motor shaft
2	Brake endshield	7	Spacer
3	Brake disk	8	Brake coil body
4	Pressure plate	9	Encoder housing
5	Brake coil	10	RH1L resolver

Technical data

The following table shows the technical data of SEW brakes. The type and number of brake springs determines the level of the braking torque. Unless specified otherwise in the order, the maximum braking torque MB1 is installed as standard. Other brake spring combinations can result in reduced braking torque values M_{B2}.

Motor type	M_{B1} [Nm]	M_{B2} [Nm]	W_{insp} [10^3 kJ]	t_1 [10^{-3}s]	t_2II [10^{-3}s]	t_2I [10^{-3}s]
CFM71S /BR1	10	5	60	20	40	100
CFM71M /BR1	14	7	60	25	30	90
CFM71L /BR1	14	10	60	30	20	80
CFM90S /BR2	28	14	90	30	35	120
CFM90M /BR2	40	20	90	35	25	90
CFM90L /BR2	40	28	90	40	25	90
CFM112S /BR8	55	28	180	35	50	140
CFM112M /BR8	90	40	180	40	40	120
CFM112L /BR8	90	55	180	45	35	100
CFM112H /BR8	90	55	180	45	85	100

M_{B1} Maximum braking torque
M_{B2} Reduced braking torque
W_{insp} Braking work until maintenance
t_1 Response time
t_2II Brake application time for cut-off in the DC and AC circuits
t_2I Brake application time for cut-off in the AC circuit

The response and application times are recommended values in relation to the maximum braking torque.

Current and braking torque

Cut-off in the AC circuit

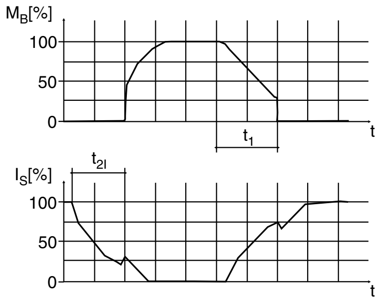

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Figure 10: Current and braking torque for cut-off in the AC circuit

Cut-off in the DC and AC circuits

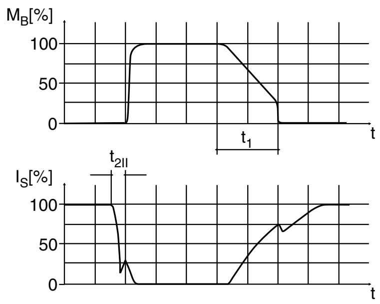

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Figure 11: Current and braking torque for cut-off in the DC and AC circuits

M_B	=	Braking torque
I_S	=	Coil current

Operating current

The following tables list the operating currents of the brakes at different voltages. The following values are specified:

- Inrush current ratio I_B/I_H; I_B = accelerator current, I_H = holding current
- Holding current I_H
- Rated voltage U_N

The accelerator current I_B (= inrush current) only flows for a short time (ca. 120 ms) when the brake is released or during voltage dips below 70 % of rated voltage.

The values for the holding currents I_H are r.m.s. values (arithmetic mean value at DC 24 V). Use suitable measuring instruments for current measurements.

Brake		**BR1**	**BR2**	**BR8**
for motor		CFM71	CFM90	CFM112
MBmax [Nm]		20	40	90
PB [W]		45	55	75
Inrush current ratio I_B/I_H		4.0	4.0	6.3
Rated voltage V_N (...) Voltage tolerances		**IH [A_{AC}]**	**IH [A_{AC}]**	**IH [A_{AC}]**
[V_{AC}]	**[V_{DC}]**			
	24 (24-25)	1.5	1.7	2.6
110 (99-121)		0.71	0.9	1.2
230 (218-243)		0.31	0.39	0.53
400 (380-431)		0.18	0.22	0.29
460 (432-484)		0.16	0.21	0.26

Cross section of the brake cable

Select the cross section of the brake cables according to the currents in your application. Remember to take the inrush current of the brake into account when selecting the cross section. When taking the voltage drop into account due to the inrush current, the value must not drop below 90 % of the rated voltage.

Note

Wire cross sections of max. 2.5 mm^2 can be connected to the terminals of the brake control systems. Use intermediate terminals if the cross sections of the brake cable are larger than this value. Keep the distance between the intermediate terminal and the brake control system as short as possible.

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

The permitted tolerance for the rated voltage outside the range limit is ± 5% (BR1, BR2, BR8).

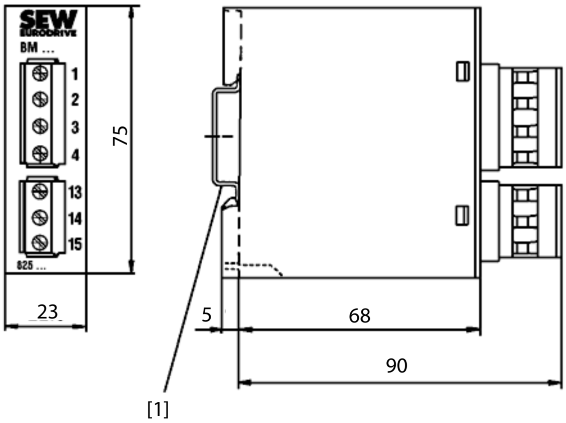
Manual brake release

A manual brake release kit according to the brake size can be ordered for retrofitting the manual brake release.

Part number	**Content**
BR1 man. brake rel. kit 0 196 602 2	1 releasing lever 1 hand lever 2 hex nuts
BR2 man. brake rel. kit 0 196 603 0	
BR8 man. brake rel. kit 0 196 604 9	

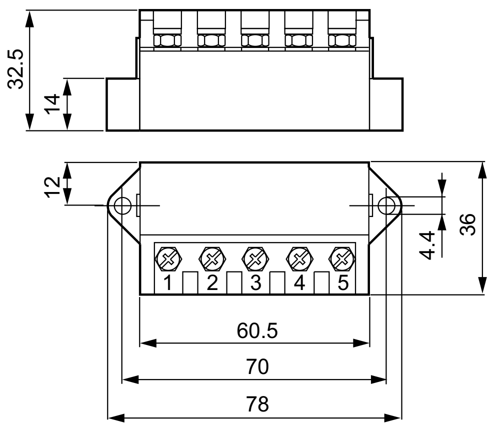
Brake connection For brake control block diagrams, refer to page 167.

Dimension drawing *BME, BMP, BMH, BMK, BMKB, BMV*



[1] DIN rail mounting EN 50022-35 x 7.5

Dimension drawing BSG



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4. Resolvers

Resolver for motor size CFM71 - 112

Type	RH1M/RH1L
	0199 031 4
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 +j 120 Ω
Output impedance ± 15%	200 +j 270 Ω
Input resistance ± 10%	82 Ω
Output resistance ± 10%	68 Ω
Maximum electrical fault	± 6'
Temperature range	-55°C to +150°C

SEW geared servomotors are supplied with 2-pole resolvers as standard. Further information on other resolvers is available on request.

5. AS1H/ES1H Hiperface encoder

SEW-EURODRIVE offers Hiperface® encoders as an alternative to resolvers.

Type		ES1H	AS1H
		0199 443 3	**0199 442 5**
Supply voltage	U_B	DC 7 - 8 - 12 V polarity reversal protected	
Max. current consumption	I_{in}	140 mA	
Maximum operating frequency	f_{Grenz}	200 kHz	
Pulses (sine cycles) per revolution	A, B	1024	
Output amplitude per track		1 V_{SS} sin/cos	
Single-turn resolution		32768 increments/revolution (15 bit)	
Multi-turn resolution		-	4096 revolutions (12 bits)
Transmission protocol		Hiperface	
Serial data output		Driver according to EIA RS-485	
Vibration (55...2000 Hz)		≤ 200 m/s^2 (DIN IEC 68-2-6)	
Maximum speed	n_{max}	6000 min^{-1}	
Connection		12-pin round connector (Intercontec)	

6. AV1Y, AV1H, EV1H absolute encoders

Type		AV1Y 0198 889 1	AV1H 0187 189 7	EV1H 0187 287 7
Supply voltage	U_B	DC 10 - 15 - 24 - 30 V polarity reversal protected	DC 7 - 12 V polarity reversal protected	
Max. current consumption	I_{in}	250 mA	80 mA	
Maximum operating frequency	f_{Grenz}	≥ 100 kHz	200 kHz	
Pulses (sine cycles) per revolution	A, B	512	1024	
Output amplitude per track		1 V_{SS} sin/cos		
Scanning code		Gray code	-	
Single-turn resolution		4096 increments/revolution	32768 increments/revolution	
Multi-turn resolution		4096 revolutions (12 bits)		-
Data transmission absolute values		synchronous, serial (SSI)	Hiperface	
Serial data output		Driver according to EIA RS-485		
Serial clock input		Optocoupler, recommended driver to EIA RS-485	-	
Clock frequency		Permitted range: 90 - 300 - 1100 kHz (max. 100 m cable length with 300 kHz)	-	
Clock-pulse space period		12 - 35 µs	-	
Vibration (55...2000 Hz)		≤ 100 m/s^2 (DIN 150 68-2-6)	200 m/s^2 (DIN 150 68-2-6)	
Maximum speed	n_{max}	6000 min^{-1}		
Weight	m	0,30 kg	0,55 kg	
Operating temperature	ϑ_B	-15°C to +60°C (EN 60721-3-3, class 3K3)	-20°C to +85°C (EN 60721-3-3, class 3K3)	
Degree of protection		IP66 (EN 60529)		
Connection		1 m (3.3 ft) cable with 17-pin round connector, suitable for female connector SPUC 17B FRAN	1 m (3.3 ft) cable with 12-pin round connector (Intercontec)	

7. VR forced cooling fan

CFM synchronous servomotors can be equipped with a forced cooling fan if required. The VR forced cooling fan is available for DC 24 V and AC 100 V.

Forced cooling fan type	**VR**		
for motor size	CFM71	CFM90	CFM112
Supply voltage DC [V]	24 ± 10 %		
Current consumption [DC A]	0.46		0.75
Power consumption [W]	11		18
Air discharge rate [m^3/h]	118	118	275
Ambient temperature °C	-20 to +60		
Degree of protection	IP54/IP55		
Electrical connection	Plug connector		
Max. cable cross section [mm^2]	3 × 1		
Connection cable, max. Ø	7 mm		

UWU51A switched-mode power supply

The AC voltage type includes a VR forced cooling fan and the UWU51A switched-mode power supply.

Input: AC 100 to 240 V 6%/+10 %, 50/60 Hz.

Output: DC 24 V -1%/+2%, 1.3 A.

Connection: Screw terminals 0.2 - 2.5 mm^2, separable.

Degree of protection: IP20; installation on support rail EN 50022 in the control cabinet.

Part number: 187 441 1.

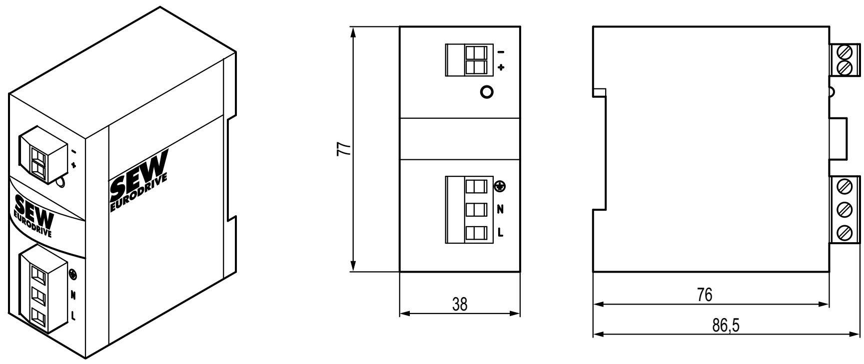


Figure 12: UWU51A switched-mode power supply

Forced cooling fan, cpl.

Forced cooling fan for motor type	**Part number**
24 V, CFM71	0 187 380 6
24 V, CFM71BR	0 187 381 4
24 V, CFM90	0 187 382 2
24 V, CFM90BR	0 187 479 9
24 V, CFM112	0 187 384 9
24 V, CFM112BR	0 187 383 0
24 V, CFM71BR KK	0 187 622 8
24 V, CFM90BR KK	0 187 624 4

Retrofitting forced cooling fan

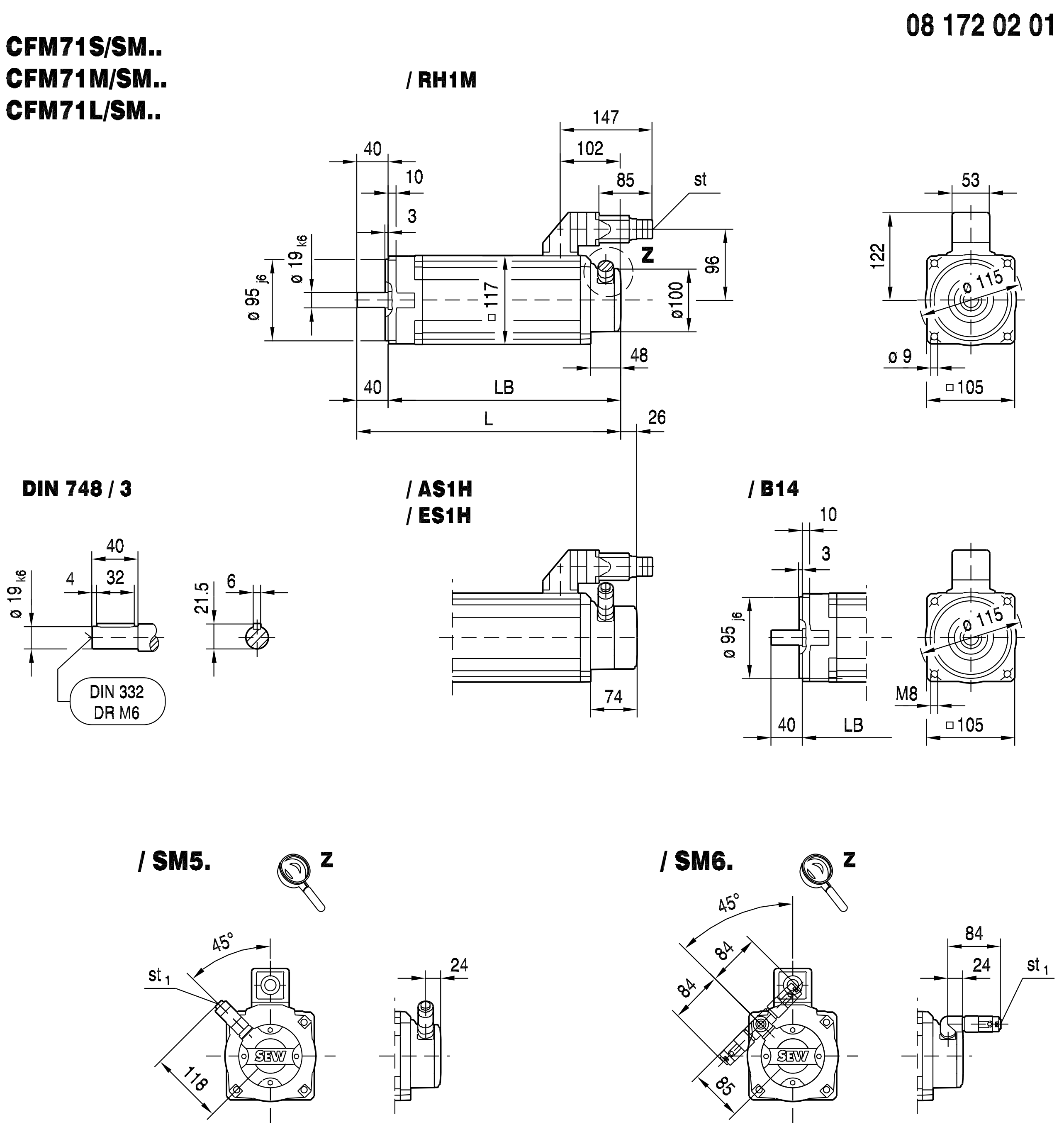
An accessory bag must be ordered for retrofitting a forced cooling fan.

Accessory bag for motor type	Part number
CFM71	0 187 945 6
CFM90	0 199 322 4
CFM112	0 199 323 2
CFM71 - 112BR	0 199 324 0

Refer to the operating instructions of the motor for details on retrofitting a forced cooling fan.

13 Dimension Sheets – CFM Servomotors/CFM Servo Brakemotors

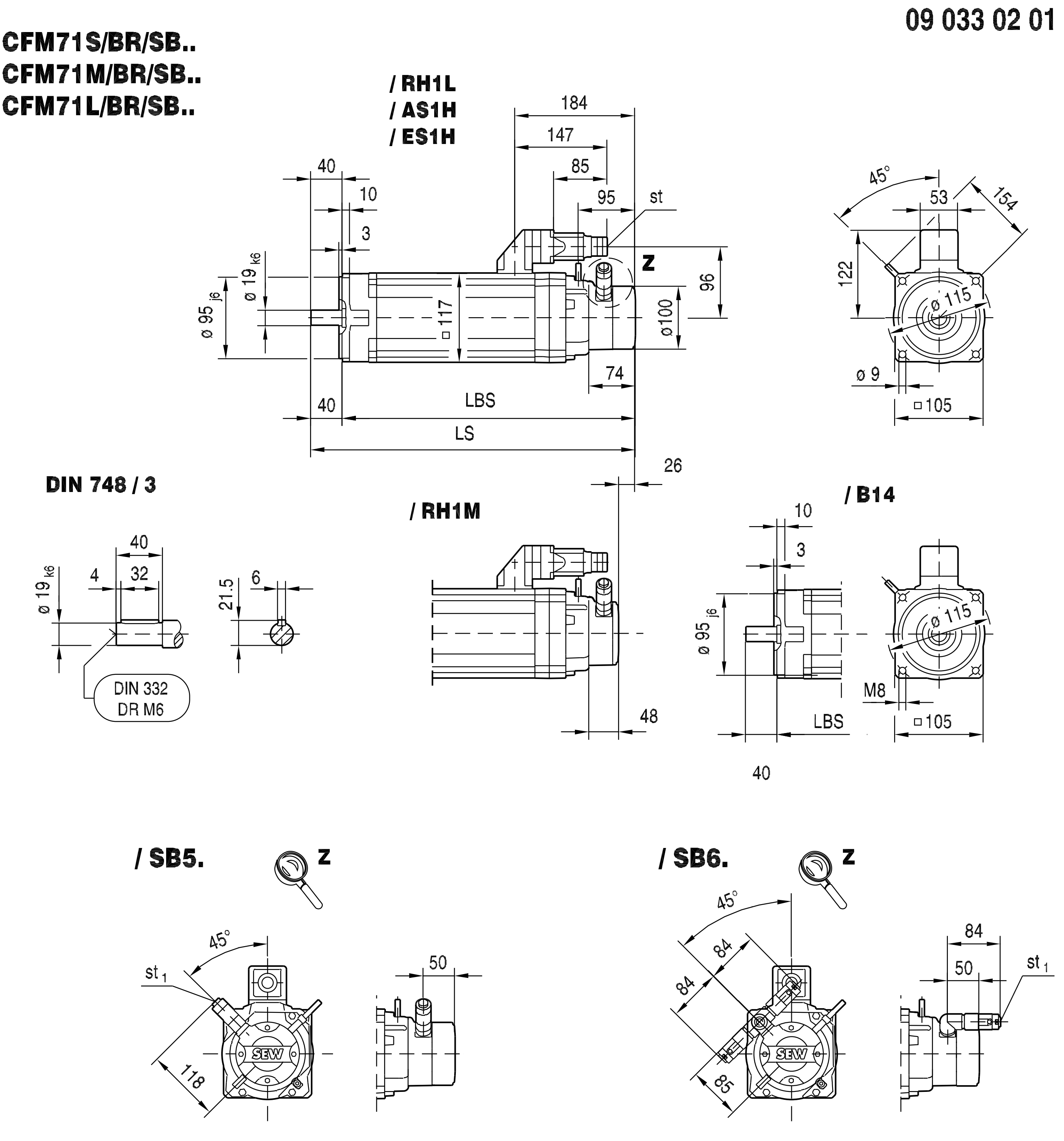
Synchronous servomotors CFM71.. with plug connector and absolute encoder/resolver



	CFM71S/SM..	CFM71M/SM..	CFM71L/SM..
L	289	309	349
LB	249	269	309
st[1]	8 ...14	14 ...17	14 ...17
st_1	5.5 ... 10.5	5.5 ... 10.5	5.5 ... 10.5

1) Diameter of cable to be connected

CFM71/BR.. synchronous servo brakemotors with plug connector and absolute encoder/resolver

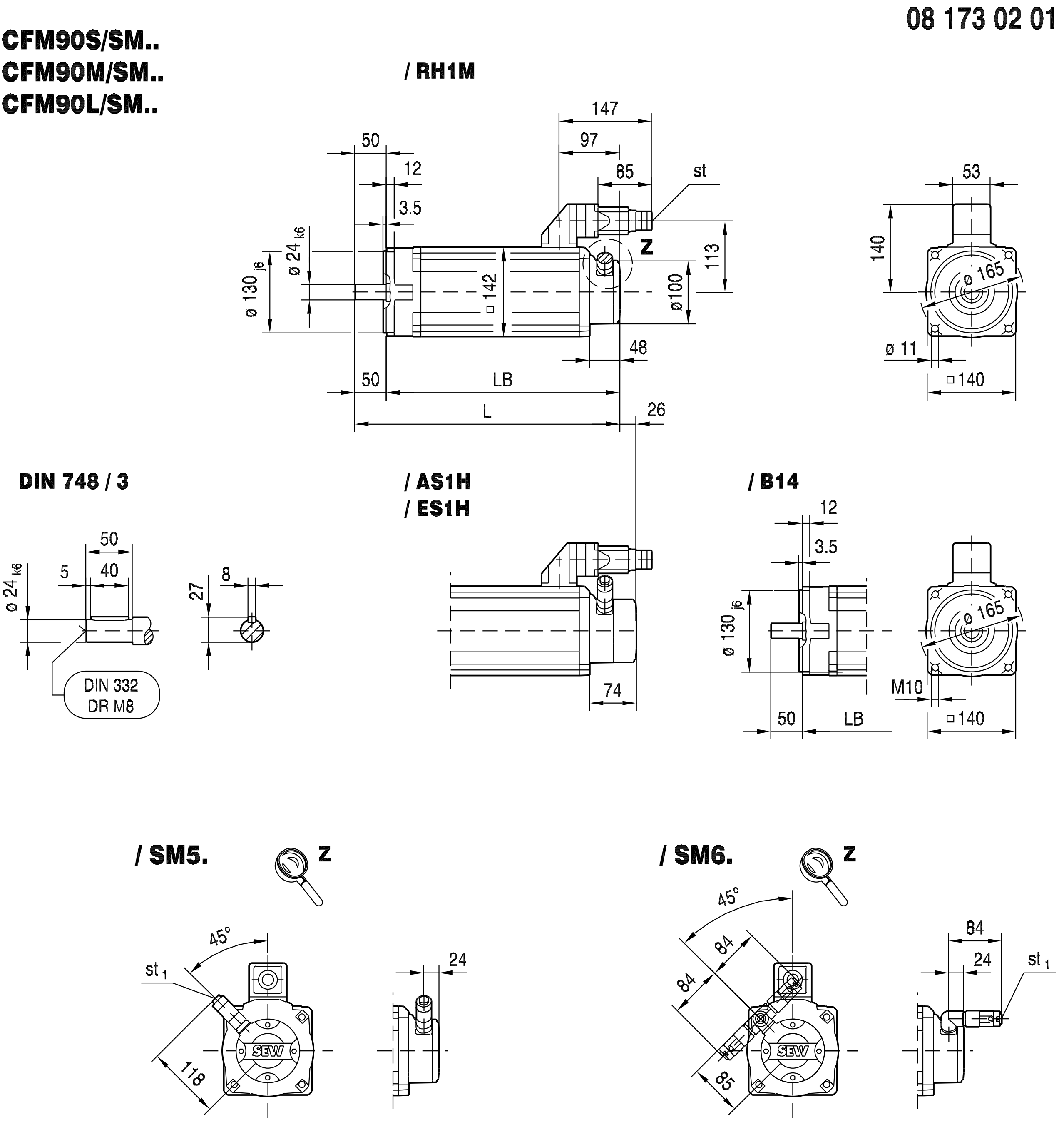


	CFM71S/BR/SB..	CFM71M/BR/SB..	CFM71L/BR/SB..
LS	371	391	431
LBS	331	351	391
st[1)]	8 ...14	14 ...17	14 ...17
st_1	5.5 ... 10.5	5.5 ... 10.5	5.5 ... 10.5

1) Diameter of cable to be connected

13

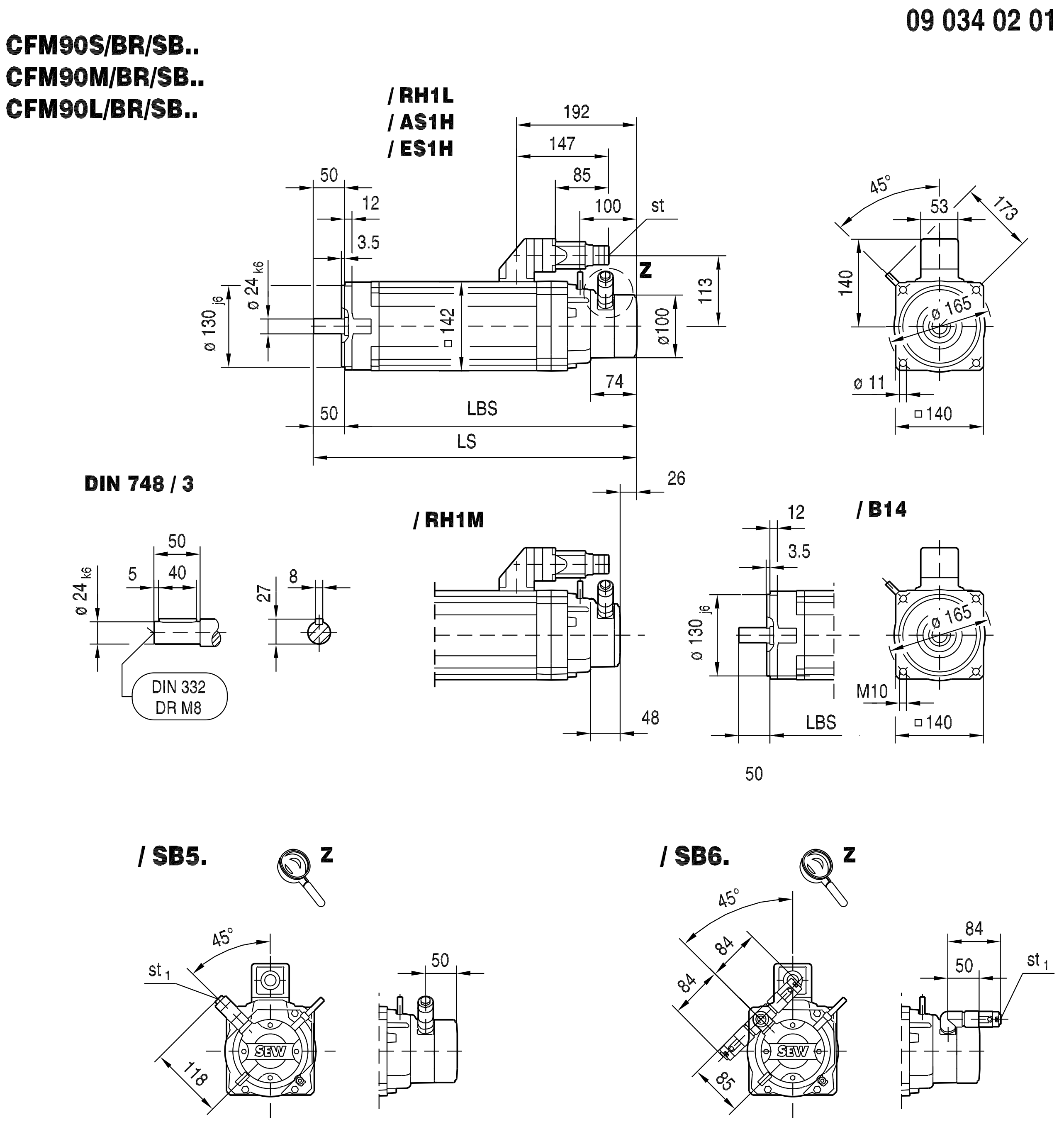
Synchronous servomotors CFM90.. with plug connector and absolute encoder/resolver



	CFM90S/SM..	CFM90M/SM..	CFM90L/SM..
L	341	368	422
LB	291	318	372
st[1)]	8 ...14	14 ...17	14 ... 17
st_1	5.5 ... 10.5	5.5 ... 10.5	5.5 ... 10.5

1) Diameter of cable to be connected

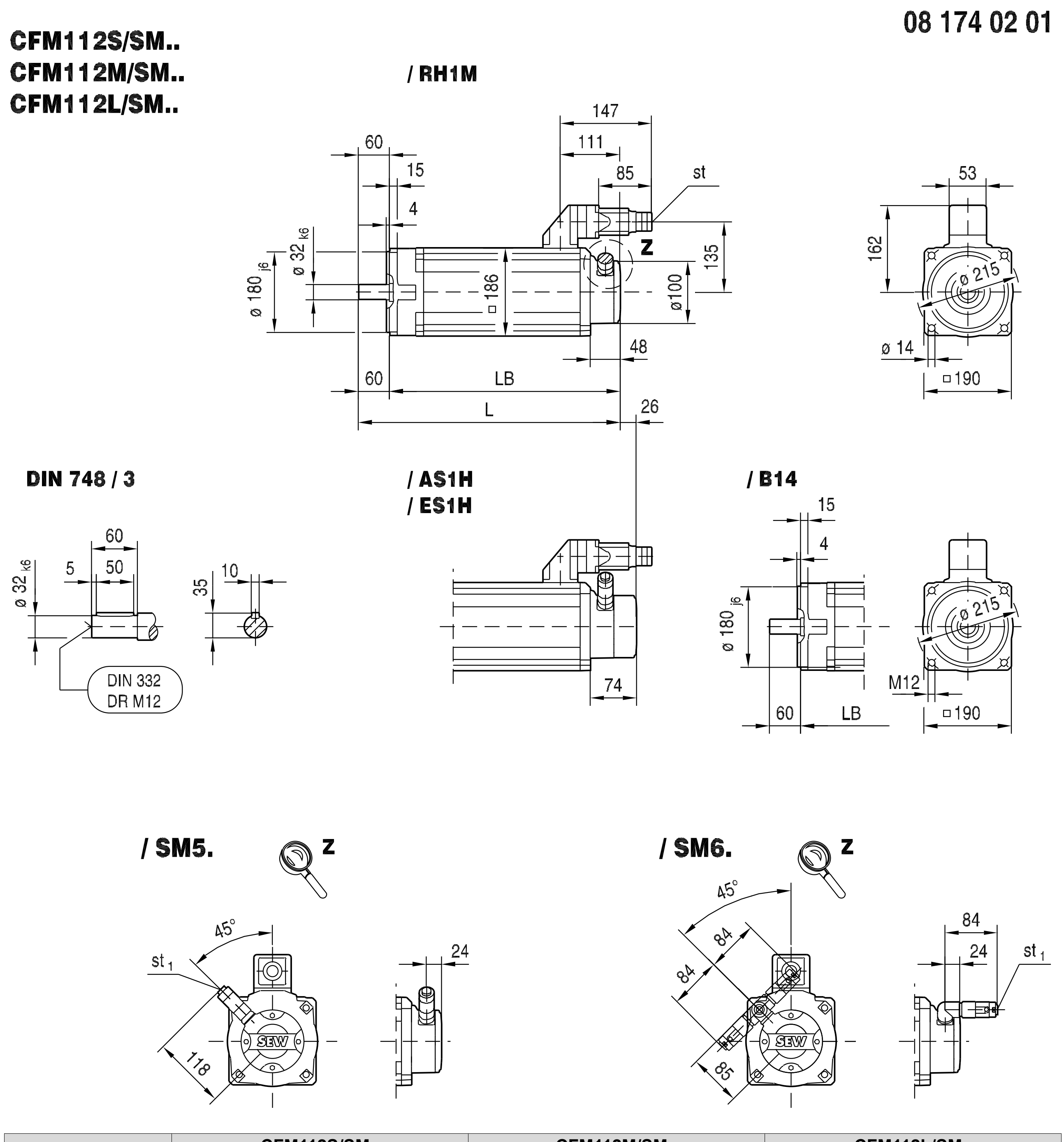
CFM90/BR.. synchronous servo brakemotors with plug connector and absolute encoder/resolver



	CFM90S/BR/SB..	CFM90M/BR/SB..	CFM90L/BR/SB..
LS	436	463	517
LBS	386	413	467
st[1)]	8 ...14	14 ...17	14 ... 17
st_1	5.5 ... 10.5	5.5 ... 10.5	5.5 ... 10.5

1) Diameter of cable to be connected

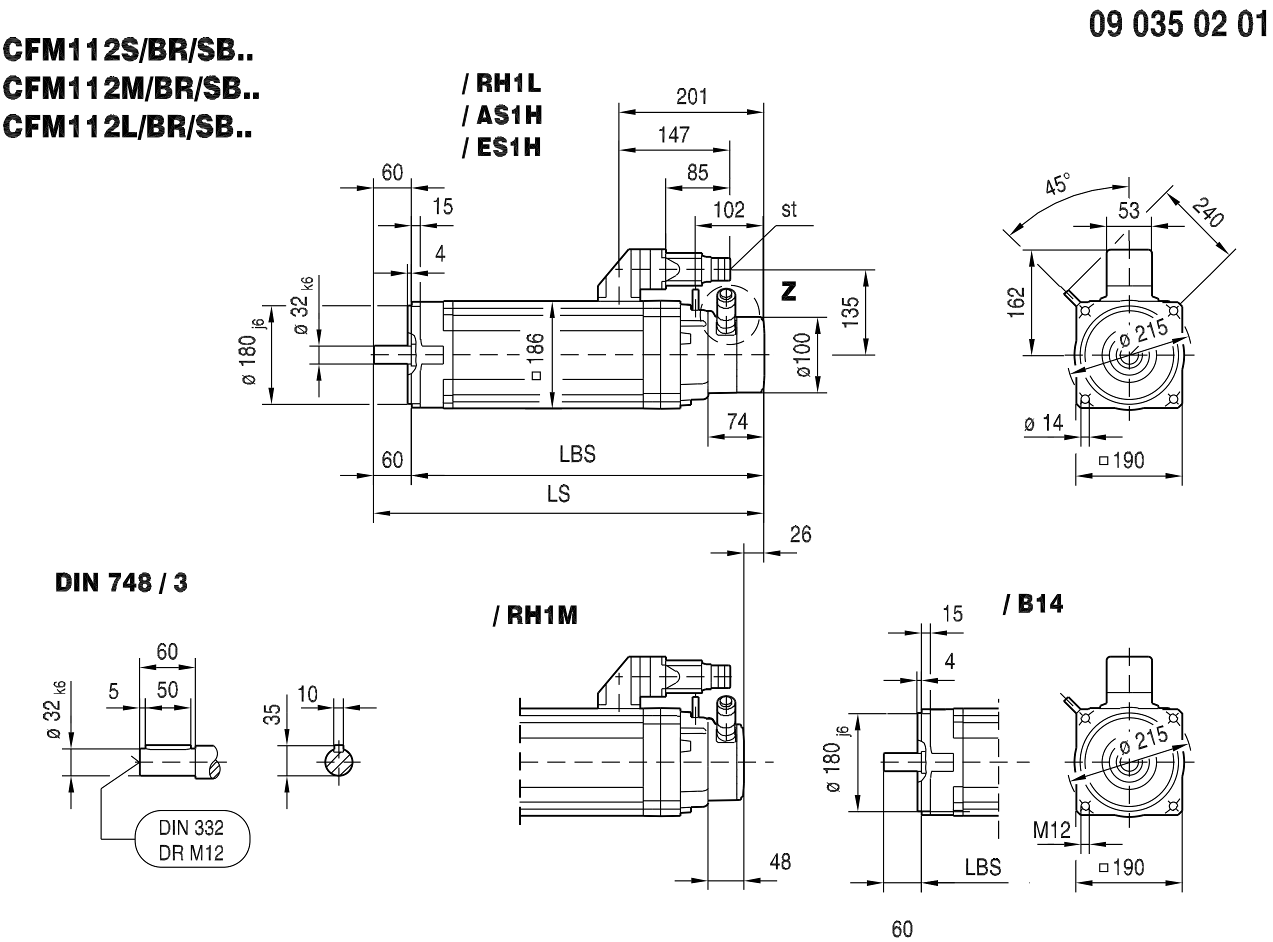
Synchronous servomotors CFM112.. with plug connector and absolute encoder/resolver

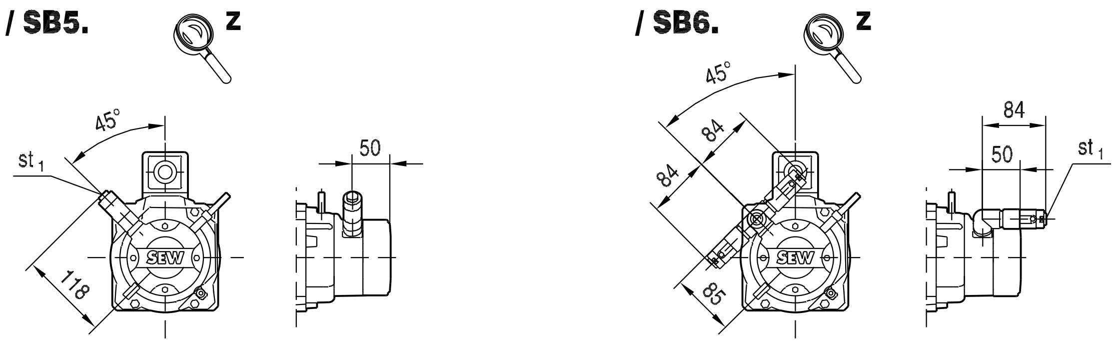


	CFM112S/SM..	CFM112M/SM..	CFM112L/SM..
L	379	406	460
LB	319	346	400
st[1)]	14 ...17	17 ... 23	17 ...23
st_1	5.5 ... 10.5	5.5 ... 10.5	5.5 ... 10.5

1) Diameter of cable to be connected

CFM112/BR.. synchronous servo brakemotors with plug connector and absolute encoder/resolver





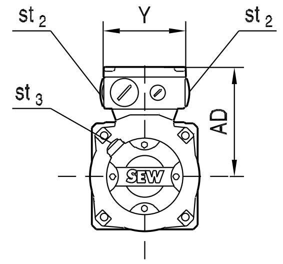
	CFM112S/BR/SB..	CFM112M/BR/SB..	CFM112L/BR/SB..
LS	469	496	550
LBS	409	436	490
st[1)]	14 ...17	17 ... 23	17 ...23
st_1	5.5 ... 10.5	5.5 ... 10.5	5.5 ... 10.5

1) Diameter of cable to be connected

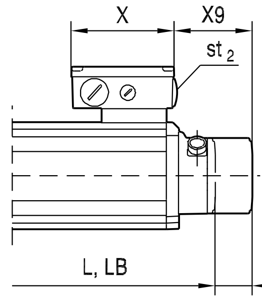
CFM.. synchronous servo brakemotors with terminal box and absolute encoder/resolver/brake

08 178 01 01

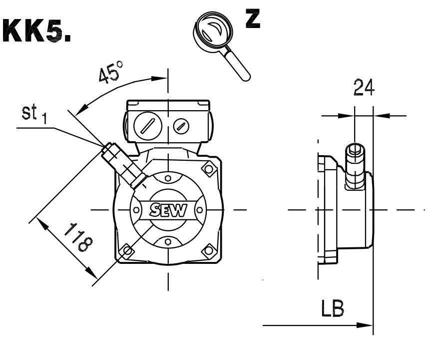
CFM../KK..



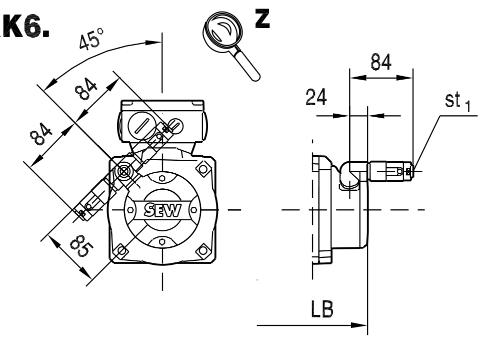
/ RH1M
/ AS1H
/ ES1H



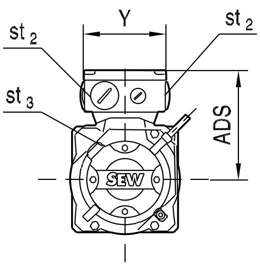
/ KK5.



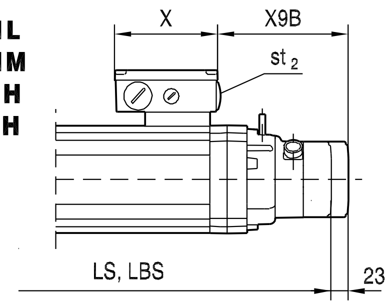
/ KK6.



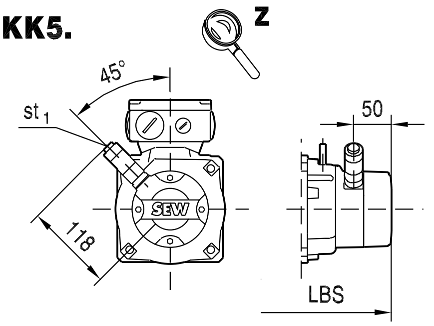
CFM../BR/KK..



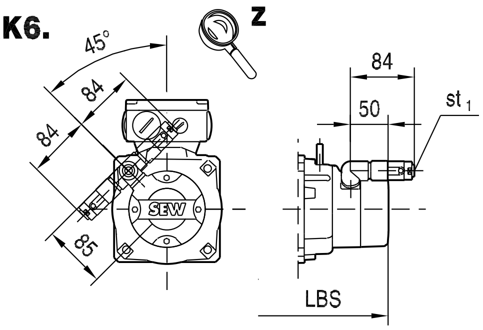
/ RH1L
/ RH1M
/ AS1H
/ ES1H



/ KK5.

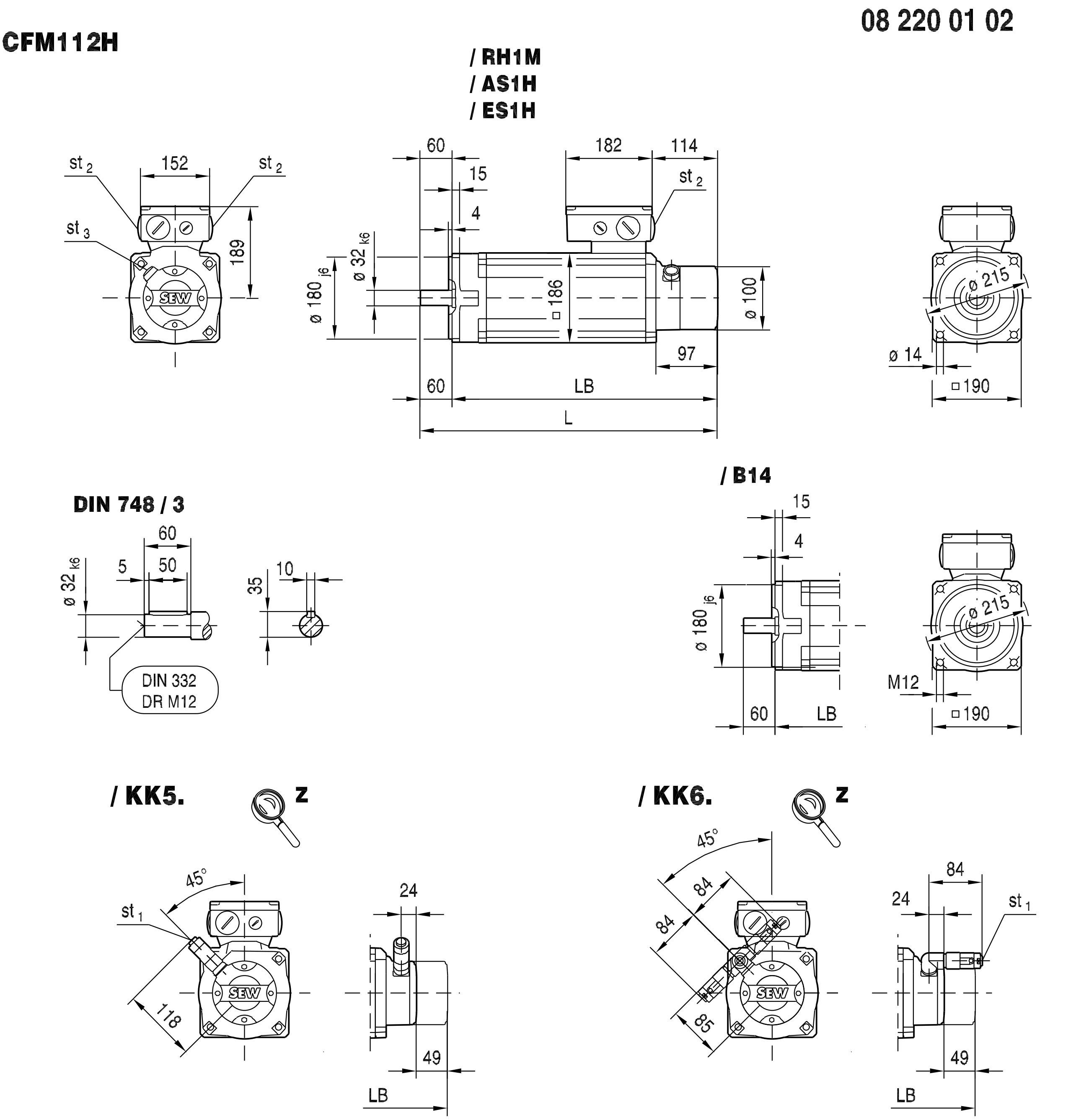


/ KK6.



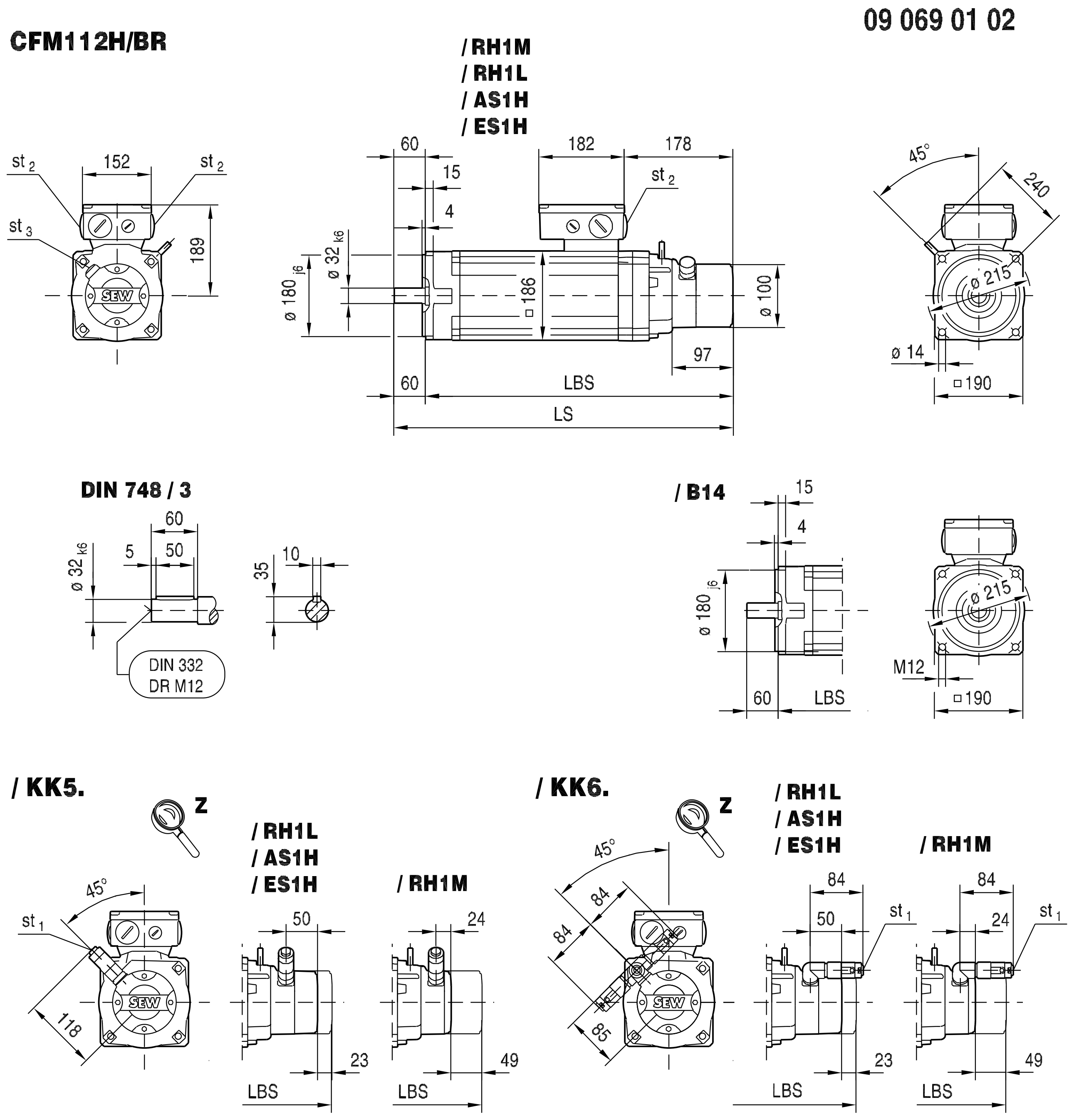
	CFM71S..	CFM71M..	CFM71L..	CFM90S..	CFM90M..	CFM90L..	CFM112S..	CFM112M..	CFM112L..
AD, ADS	125	125	125	139	139	139	161	190	190
st_2	1xM25x1.5 1xM16x1.5	1xM25x1.5 1xM16x1.5	1xM25x1.5 1xM16x1.5	1xM32x1.5 1xM16x1.5	1xM32x1.5 1xM16x1.5	1xM32x1.5 1xM16x1.5	1xM32x1.5 1xM16x1.5	1xM50x1.5 1xM16x1.5	1xM50x1.5 1xM16x1.5
st_3	1xM16x1.5	1xM16x1.5	1xM16x1.5	1xM16x1.5	1xM16x1.5	1xM16x1.5	1xM16x1.5	1xM16x1.5	1xM16x1.5
X	127	127	127	139	139	139	139	182	182
X9	114	114	114	107	107	107	121	114	114
X9B	170	170	170	176	176	176	185	178	178
Y	97	97	97	109	109	109	109	152	152

Synchronous servomotors CFM112H.. with terminal box and absolute encoder/resolver



	CFM112H/KK..		
L	590		
LB	530		
st_2	1xM50x1.5 1xM16x1.5		
st_3	1xM16x1.5		

CFM112H/BR.. synchronous servo brakemotors with terminal box and absolute encoder/resolver



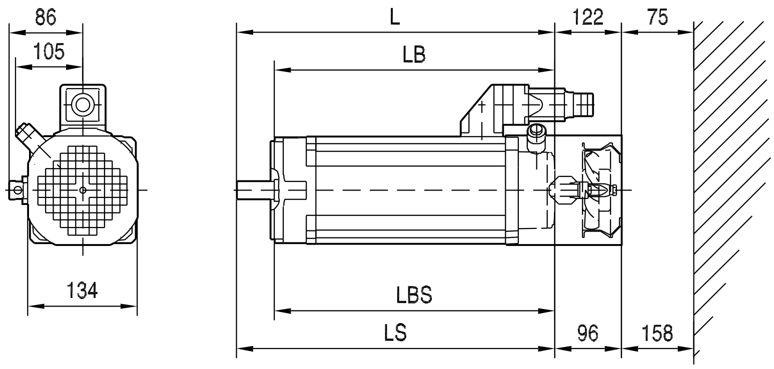
	CFM112H/BR/KK..		
LS	655		
LBS	595		
st_2	1xM50x1.5 1xM16x1.5		
st_3	1xM16x1.5		

Synchronous servo (brake) motors CFM..(IBR) with forced cooling fan

08 177 01 01

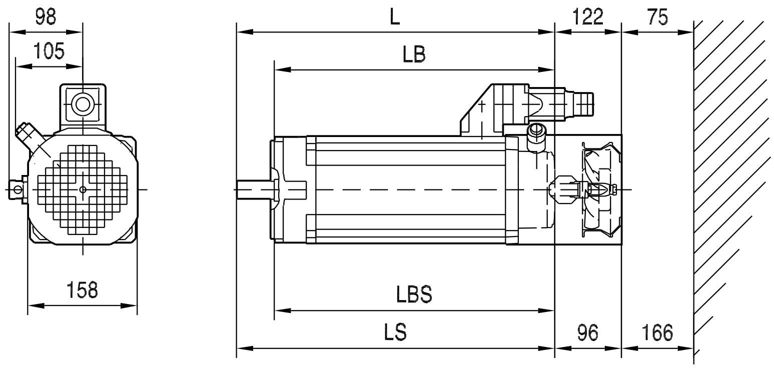
CFM71.. /VR

CFM71.. /BR /VR



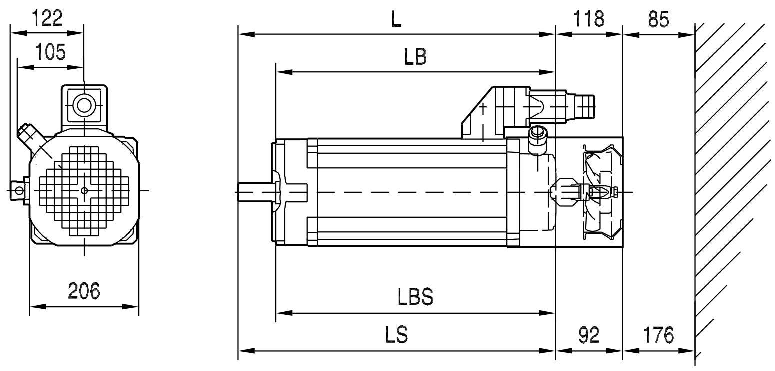
CFM90.. /VR

CFM90.. /BR /VR



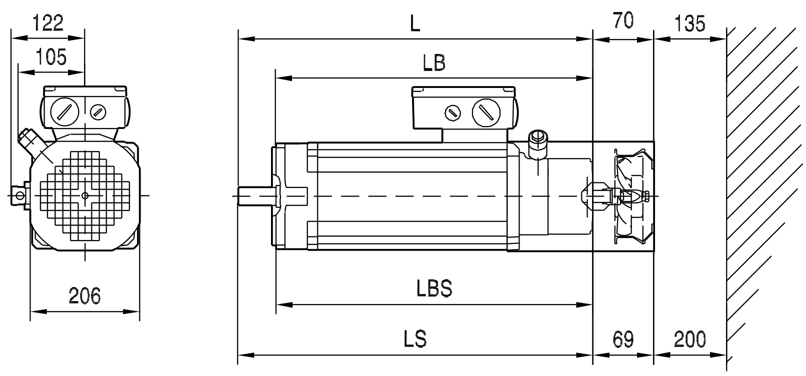
CFM112.. /VR

CFM112.. /BR /VR



CFM112H.. /VR

CFM112H.. /BR /VR

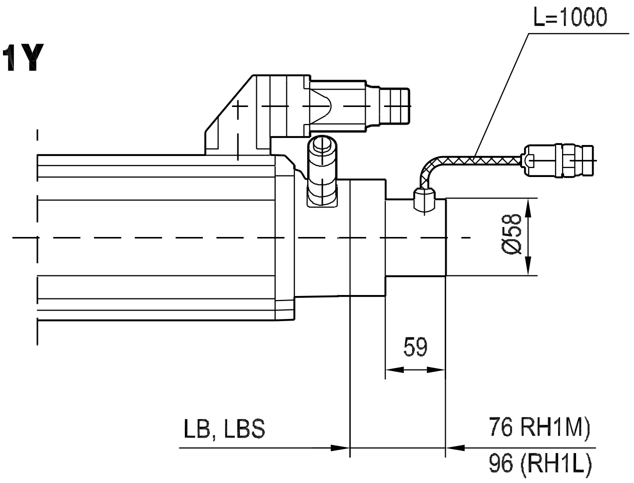


Synchronous servo (brake) motors CFM.. (/B.) with resolver/encoder

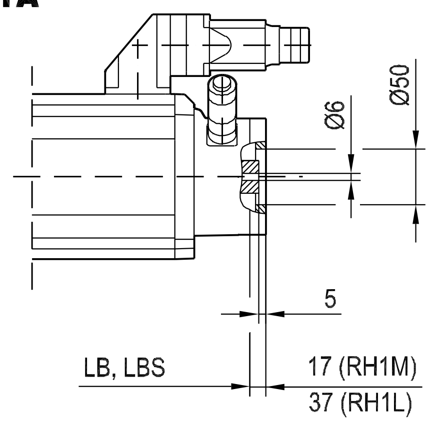
CFM...

08 241 00 04

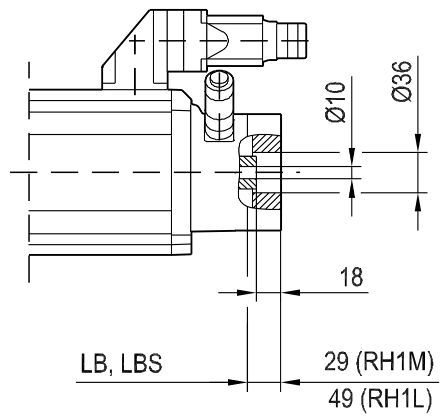
/ AV1Y



/ AV1A
/ EV1A

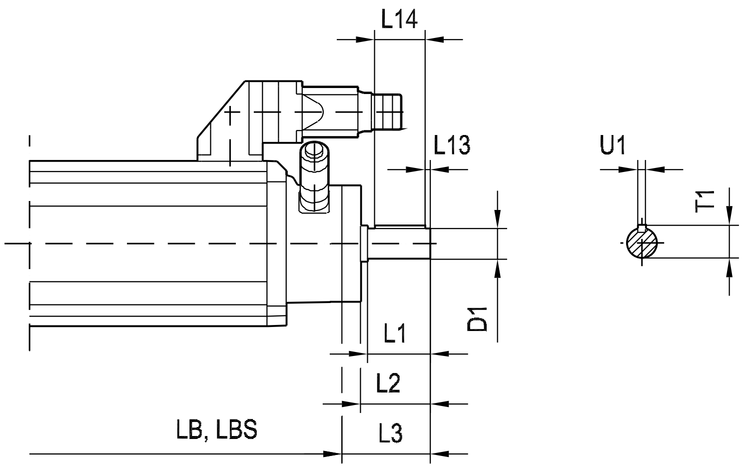


/ XV2A



Synchronous servo (brake) motors CFM.. with 2nd shaft end and RH1M resolver

CFM... 08 243 00 04



	CFM71..	CFM90..	CFM112..
D1	14	19	28
L1	30	40	60
L2	35	46	67
L3	50	61	85
L13	4	4	5
L14	22	32	50
U1	5	6	8
T1	16	21.5	31

14 Prefabricated Cables – CFM Servomotors

Prefabricated cables

SEW-EURODRIVE offers pre-fabricated hybrid cables with plugs for straightforward and reliable motor connection. Cable and contact are connected using the crimp technique. The following cables are available in 1 m steps:

- Motor power
- Motor power + brake
- Resolver/motor protection
- Absolute encoder/motor protection
- forced cooling fan.

Cables from Lapp are used for fixed installation, cables from Nexans are used in cable carriers.

For cable specifications, such as bending radius, certification and temperature range, refer to the cable specification section on page 311 and subsequent pages.

The size of the plug connector depends on the current level and the maximum cable length according to the speed (see page 291).

Hybrid cables are divided into:

- Power cables (motor cable, brakemotor cable, extension cable)

and into

- feedback cables (resolver cable, encoder cable, extension cable).

Structure of power cables for CFM motors

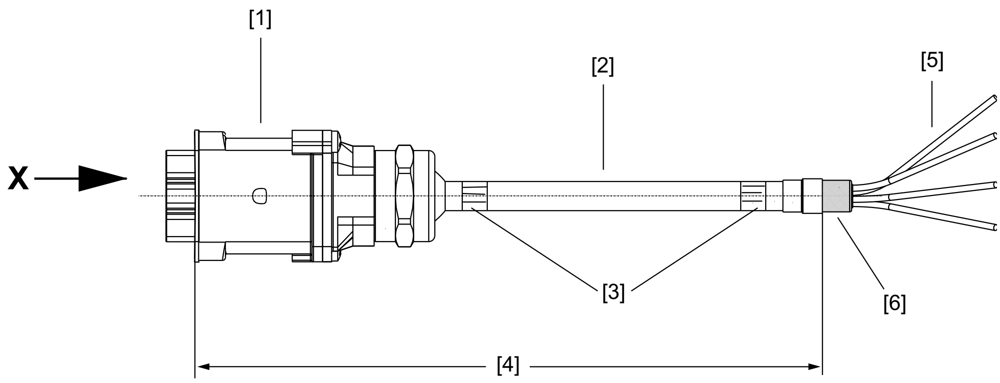


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Figure 13: Motor cable for CFM motor

[1] Connector: Amphenol
[2] SEW-EURODRIVE logo printed on cable
[3] Nameplate
[4] Cable length ≤ 10 m: Tolerance +200 mm.
Cable length ≥ 10 m: Tolerance +2%.
Permitted cable length according to the technical documents.
[5] Pre-fabricated cable end for inverter.
Required loose parts are supplied with the cable.
[6] Shielding pulled back approx. 20 mm +5 mm.

Motor side

The power cables on the motor end have a 6-pin EMC Amphenol plug connector and socket contacts.

The shield is connected in the connector housing according to EMC requirements. All plug connectors seal the plug on the cable end with a lamellar seal and ensure cable relief according to EN 61884.

Inverter side

The individual cable cores of the power and brake power cables are exposed and the shield is prepared for connection in the control cabinet. The cable for the inverter end has yet to be assembled. The loose parts required are supplied with the cable in a separate bag.

Loose parts

The following loose parts are supplied in accordance with the core cross sections for connection to the power terminals on the inverter:

Bag no.	Content
1	4 x conductor end sleeves 1.5 mm^2, insulated 4 x M6 U-shaped cable lugs 1.5 mm^2
2	4 x conductor end sleeves 2.5 mm^2, insulated 4 x M6 U-shaped cable lugs 2.5 mm^2
3	4 x conductor end sleeves 4 mm^2, insulated 4 x M6 U-shaped cable lugs 4 mm^2 4 x M10 U-shaped cable lugs 4 mm^2
4	4 x M6 U-shaped cable lugs 6 mm^2 4 x M10 U-shaped cable lugs 6 mm^2
5	4 x M6 U-shaped cable lugs 10 mm^2 4 x M10 ring-type cable lugs 10 mm^2

Structure of the feedback cables

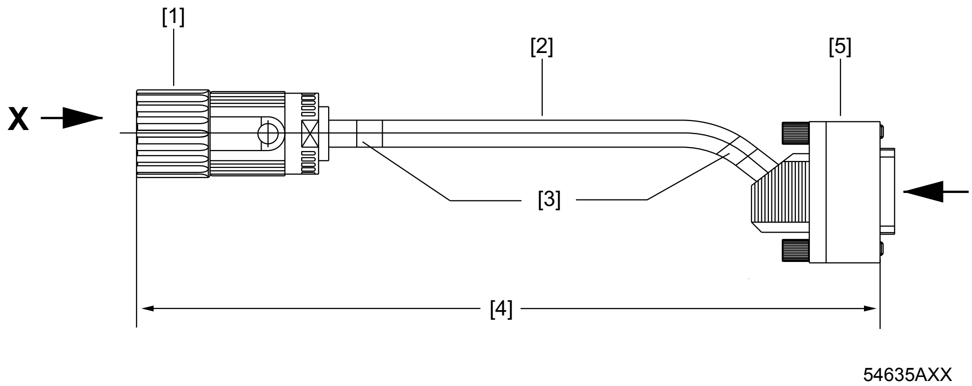

Figure 14: Resolver plug connector

[1] Connector: Intercontec ASTA
[2] Printed on connector: SEW-EURODRIVE
[3] Nameplate
[4] Cable length ≤ 10 m: Tolerance +200 mm.
Cable length ≥ 10 m: Tolerance +2%.
Permitted cable length according to the technical documents.
[5] Sub D plug

Motor side

A 12-pin EMC signal plug connector from Intercontec with socket contacts is used on the motor end for RH.M/RH.L/AS1H/ES1H. The shield is connected in the connector housing according to EMC requirements. All plug connectors seal the plug on the cable end with a lamellar seal.

A feedback cable is alternatively available for the corresponding terminal box. The individual cable strands are exposed and prepared for connection to the terminal box.

Inverter side

A commercial D-sub EMC connector with pin contacts is used on the inverter end. A 9-pin or 15-pin connector is used adjusted to the inverter.

Hybrid cables

The outer cable sheath on the motor and inverter end bears a nameplate with part number and logo of the prefabricated cable manufacturer. The ordered length and permitted tolerance are interrelated as follows:

- Cable length ≤ 10 m: Tolerance 200 mm.
- Cable length ≥ 10 m: +2% tolerance

INFORMATION

Refer to the system manual of the inverter for determining the maximum cable length.

Make sure that an EMC-compliant environment is maintained during project planning.

Cable cross section – pProject planning

Cable dimensioning according to EN 60402

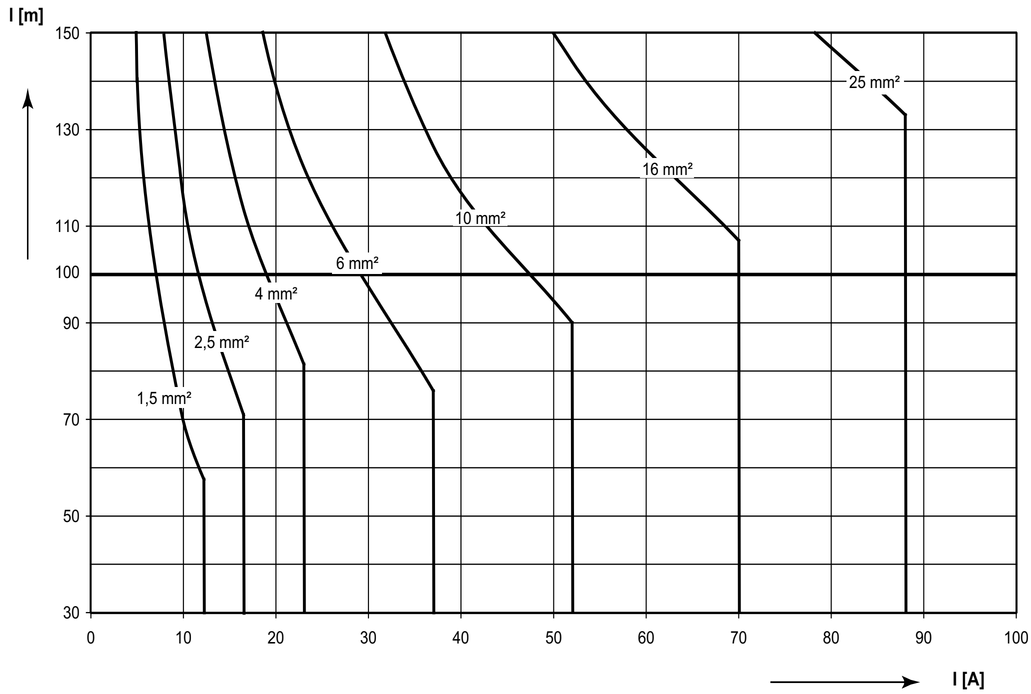

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Figure 15: Minimum required cable cross section depending on cable length l [m] and current I]A[

Hybrid cables with cross sections of 1.5 mm^2 to 10 mm^2 can be ordered from SEW-EURODRIVE.

Cable load through current I in [A] according to EN 60204-1 table 5, ambient temperature 40 °C

Cable cross section [mm^2]	Three-core sheathed cable in duct or cable [A]	Three-core sheathed cable on top of each other on wall [A]	Three-core sheathed cable next to each other [A]
1,5	12,2	15,2	16,1
2,5	16,5	21,0	22
4	23	28,0	30
6	29	36,0	37
10	40	50,0	52
16	53	66,0	70
25	67	84,0	88
35	83	104,0	114

These data are merely recommended values and are **no substitute for the detailed project planning** of the cables depending on the concrete application considering the applicable regulations.

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

Assignment of servomotor and cable cross section

n_N [min^{-1}]	Motor	M_0 [Nm]	I_0 [A]	SM SB
2000	**CFM71S**	5	2.2	51
	CFM71M	6.5	3	51
	CFM71L	9.5	4.2	51
	CFM90S	11	4.9	51
	CFM90M	14.5	6.9	51
	CFM90L	21	9.9	51
	CFM112S	23.5	10	51
	CFM112M	31	13.5	52
	CFM112L	45	20	54
3000	**CFM71S**	5	3.3	51
	CFM71M	6.5	4.3	51
	CFM71L	9.5	6.2	51
	CFM90S	11	7.3	51
	CFM90M	14.5	10.1	51
	CFM90L	21	14.4	52
	CFM112S	23.5	15	52
	CFM112M	31	20.5	54
	CFM112L	45	30	56
4500	**CFM71S**	5	4.9	51
	CFM71M	6.5	6.6	51
	CFM71L	9.5	9.6	51
	CFM90S	11	11.1	51
	CFM90M	14.5	14.7	52
	CFM90L	21	21.6	54
	CFM112S	23.5	22.5	54
	CFM112M	31	30	56
	CFM112L	45	46	59
6000	**CFM71S**	5	6.5	51
	CFM71M	6.5	8.6	51
	CFM71L	9.5	12.5	52
	CFM90S	11	14.5	52
	CFM90M	14.5	19.8	54
	CFM90L	21	29.5	56

The assignments of SM / SB plug connectors are not binding. Given the dynamic properties in the system, other cross sections can also be implemented.

Power cable for CFM

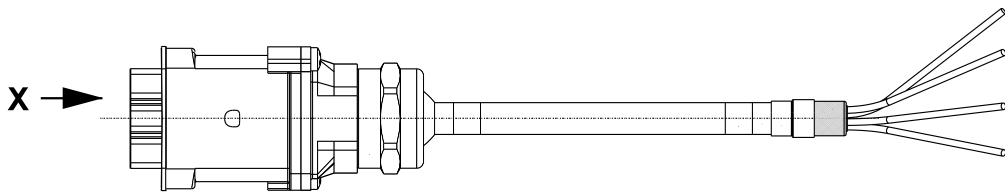

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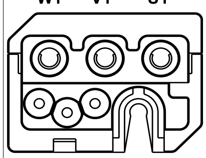
Figure 16: CFM motor cable

Pin assignment motor cable

Plug connector	Pin	Core identification	Assigne d	Contact type	Extra
C148U connector with socket con-tacts	U1	Black with white lettering U, V, W	U	Cut-off, length ca. 250 mm	Bag of loose parts
	V1		V		
	W1		W		
 **View X**	PE	Green/yellow	(protec-tive earth)		

Motor cable types

The cables are equipped with a plug for motor connection and conductor end sleeves for inverter connection.

Plug connector type	Number of cores and cable cross-section	Part number	Installation type
SM 51 / SM 61	**4 × 1.5 mm² (AWG 16)**	199 179 5	Fixed installation
SM 52 / SM 62	**4 × 2.5 mm² (AWG 12)**	199 181 7	
SM 54 / SM 64	**4 × 4 mm² (AWG 10)**	199 183 3	
SM 56 / SM 66	**4 × 6 mm² (AWG 10)**	199 185 X	
SM 59 / SM 69	**4 × 10 mm² (AWG 8)**	199 187 6	
SM 51 / SM 61	**4 × 1.5 mm² (AWG 16)**	199 180 9	Cable carrier installation
SM 52 / SM 62	**4 × 2.5 mm² (AWG 12)**	199 182 5	
SM 54 / SM 64	**4 × 4 mm² (AWG 10)**	199 184 1	
SM 56 / SM 66	**4 × 6 mm² (AWG 10)**	199 186 8	
SM 59 / SM 69	**4 × 10 mm² (AWG 8)**	199 188 4	

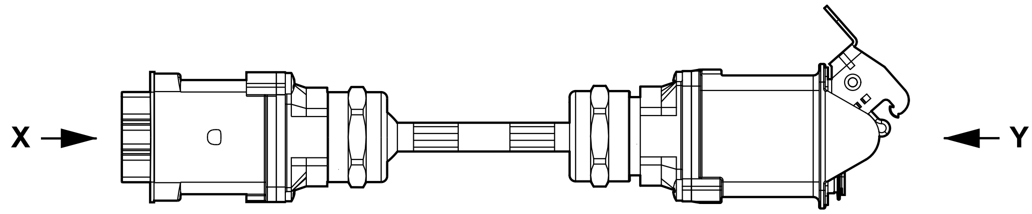
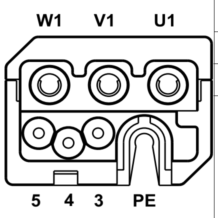
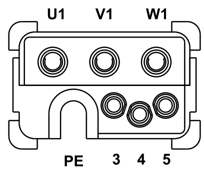


Figure 17: Motor extension cable

Pin assignment motor extension cable

Plug connector	Pin	Core identification	Pin	Plug connector
C148U coupling with socket contacts	U1	Black with white lettering U, V, W	U1	**C148U plug with pin contacts**
	V1		V1	
	W1		W1	
 **View X**	PE	Green/yellow	PE	 **View Y**
	3	Black with white lettering 1, 2, 3	3	
	4		4	
	5		5	

The motor extension cable is a 1:1 connection of all pins.

Types of motor extension cables

The cables are equipped with a plug and adapter for extending the CFM motor cable.

Plug connector type	Number of cores and cable cross-section	Part number	Installation type
SM 51 / SM 61	**4 × 1.5 mm² (AWG 16)**	199 549 9	Fixed installation
SM 52 / SM 62	**4 × 2.5 mm² (AWG 12)**	199 551 0	
SM 54 / SM 64	**4 × 4 mm² (AWG 10)**	199 553 7	
SM 56 / SM 66	**4 × 6 mm² (AWG 10)**	199 555 3	
SM 59 / SM 69	**4 × 10 mm² (AWG 8)**	199 557 X	
SM 51 / SM 61	**4 × 1.5 mm² (AWG 16)**	199 550 2	Cable carrier installation
SM 52 / SM 62	**4 × 2.5 mm² (AWG 12)**	199 552 9	
SM 54 / SM 64	**4 × 4 mm² (AWG 10)**	199 554 5	
SM 56 / SM 66	**4 × 6 mm² (AWG 10)**	199 556 1	
SM 59 / SM 69	**4 × 10 mm² (AWG 8)**	199 558 8	

Alternative plug connectors

Plug connectors for power supply with socket contacts (complete):

Type	Cross sections	Part no.
SM51 / SM61	4 x 1,5 mm²	199 135 3
SM52 / SM62	4 x 2.5 mm²	199 136 1
SM54 / SM64	4 x 4 mm²	199 137 X
SM56 / SM66	4 x 6 mm²	199 138 8
SM59 / SM69	4 x 10 mm²	199 139 6

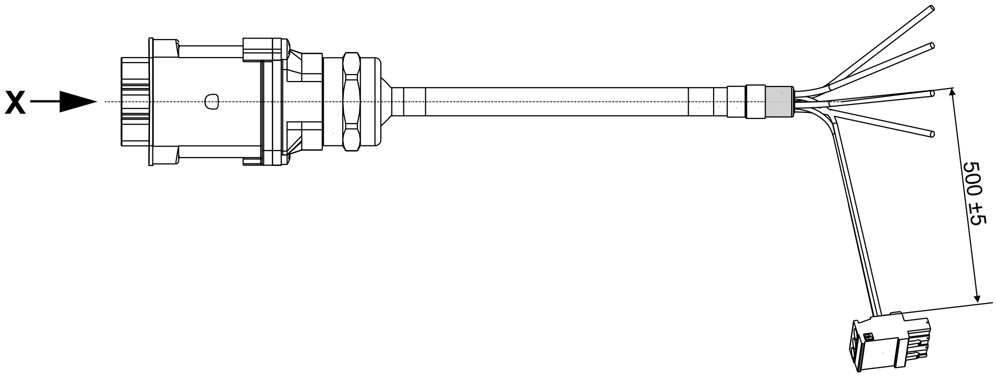


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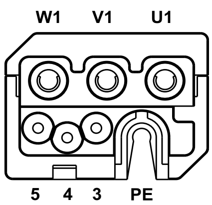
Figure 18: CFM brake motor cable

Pin assignment brakemotor cable

The brake motor cable is fabricated for the BME, BMP, BMH, BMK and BMV brake rectifiers. For the BSG control unit, the customers have to assemble the cable themselves.

Plug connector	Pin	Core identification	Assigned	Contact type	Extra
C148U connector with socket contacts	U1	Black with white lettering U, V, W	U	Cut-off, length ca. 250 mm	Bag of loose parts
	V1		V		
	W1		W		
 **View X**	PE	Green/yellow	(protective earth)		
	3	Black with white lettering 1, 2, 3	1	with Phoenix plug connector GMVSTBW 2.5/3ST	
	4		2		
	5		3		

Types of brakemotor cables

Plug connector type, complete	Number of cores and cable cross-section	Part number	Installation type
SB 51 / SB 61	**4 × 1.5 mm^2 + 3 × 1.0 mm^2**	199 189 2	Fixed installation
SB 52 / SB 62	**4 × 2.5 mm^2 + 3 × 1.0 mm^2**	199 191 4	
SB 54 / SB 64	**4 × 4 mm^2 + 3 × 1.0 mm^2**	199 193 0	
SB 56 / SB 66	**4 × 6 mm^2 + 3 × 1.5 mm^2**	199 195 7	
SB 59 / SB 69	**4 × 10 mm^2 + 3 × 1.5 mm^2**	199 197 3	
SB 51 / SB 61	**4 × 1.5 mm^2 + 3 × 1.0 mm^2**	199 190 6	Cable carrier installation
SB 52 / SB 62	**4 × 2.5 mm^2 + 3 × 1.0 mm^2**	199 192 2	
SB 54 / SB 64	**4 × 4 mm^2 + 3 × 1.0 mm^2**	199 194 9	
SB 56 / SB 66	**4 × 6 mm^2 + 3 × 1.5 mm^2**	199 196 5	
SB 59 / SB 69	**4 × 10 mm^2 + 3 × 1.5 mm^2**	199 198 1	

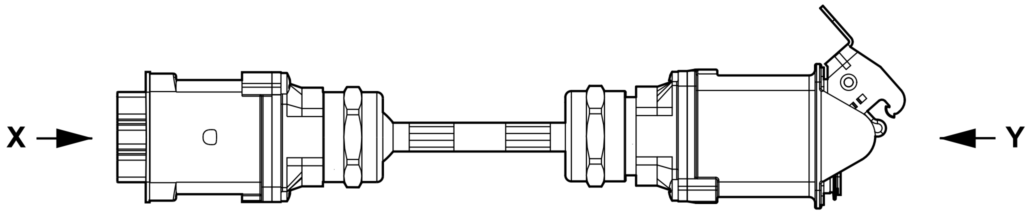


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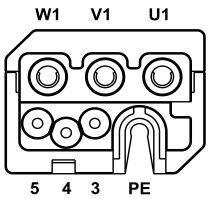
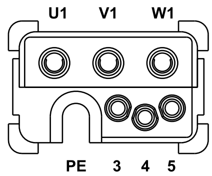
Figure 19: Brakemotor extension cable

Pin assignment brake motor extension cable

Plug connector	Pin	Core identification	Pin	Plug connector
C148U coupling with socket contacts	U1	Black with white lettering U, V, W	U1	**C148U plug with pin contacts**
	V1		V1	
	W1		W1	
 **View X**	PE	Green/yellow	PE	 **View Y**
	3	Black with white lettering 1, 2, 3	3	
	4		4	
	5		5	

The brakemotor extension cable is a 1:1 connection of all pins.

Types of brake motor extension cables

Plug connector type, complete	Number of cores and cable cross-section	Part number	Installation type
SK 51 / SK 61	**4 × 1.5 mm² + 3 × 1.0 mm²**	199 199 X	Fixed installation
SK 52 / SK 62	**4 × 2.5 mm² + 3 × 1.0 mm²**	199 201 5	
SK 54 / SK 64	**4 × 4 mm² + 3 × 1.0 mm²**	199 203 1	
SK 56 / SK 66	**4 × 6 mm² + 3 × 1.5 mm²**	199 205 8	
SK 59 / SK 69	**4 × 10 mm² + 3 × 1.5 mm²**	199 207 4	
SK 51 / SK 61	**4 × 1.5 mm² + 3 × 1.0 mm²**	199 200 7	Cable carrier installation
SK 52 / SK 62	**4 × 2.5 mm² + 3 × 1.0 mm²**	199 202 3	
SK 54 / SK 64	**4 × 4 mm² + 3 × 1.0 mm²**	199 204 X	
SK 56 / SK 66	**4 × 6 mm² + 3 × 1.5 mm²**	199 206 6	
SK 59 / SK 69	**4 × 10 mm² + 3 × 1.5 mm²**	199 208 2	

Alternative plug connectors

Plug connectors for power supply with socket contacts (complete).

Type	Cross sections	Part no.
SB51 / SB61	**4 × 1.5 mm^2 + 3 × 1.0 mm^2**	199 142 6
SB52 / SB62	**4 × 2.5 mm^2 + 3 × 1.0 mm^2**	199 143 4
SB54 / SB64	**4 × 4 mm^2 + 3 × 1.0 mm^2**	199 144 2
SB56 / SB66	**4 × 6 mm^2 + 3 × 1.5 mm^2**	199 145 0
SB59 / SB69	**4 × 10 mm^2 + 3 × 1.5 mm^2**	199 146 9

Feedback cable

Resolver cable, plug connector, MOVIDRIVE®

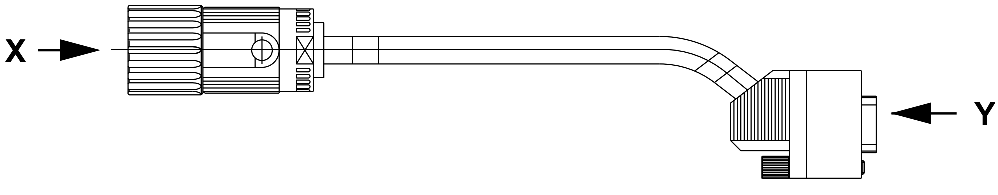


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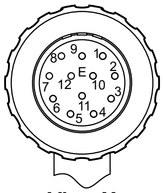
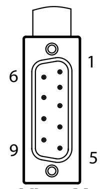
Figure 20: Resolver cable plug connector MOVIDRIVE® MDX..B

Type	Installation	Part number
CFM	Fixed installation	199 487 5
CFM	Cable carrier installation	199 319 4

Pin assignment resolver cable RH.M/RH.L

RH1M resolver cable pin assignment						
Motor connection side					Connection MOVIDRIVE® MDX..B	
Plug connector	**Pin no.**	**Description**	**Cable core colors**	**Description**	**Pin no.**	**Plug connector**
ASTA021FR **0198 6732** 12-pin with socket contacts  **View X**	1	R1 (reference +)	Pink (PK)	R1 (reference +)	3	**Sub-D 9-pin**  **View Y**
	2	R2 (reference -)	Gray (GY)	R2 (reference -)	8	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	2	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	7	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	1	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	6	
	7	n.c.	-	-	-	
	8	n.c.	-	-	-	
	9	TF/KTY +	Brown (BN)/violet (VT)	TF (KTY+)	9	
	10	TF/KTY -	White (WH) black (BK)	TF/KTY -	5	
	11	n.c.	-	-	-	
	12	n.c.	-	n.c.	4	

Resolver cable, plug connector, MOVIAXIS®

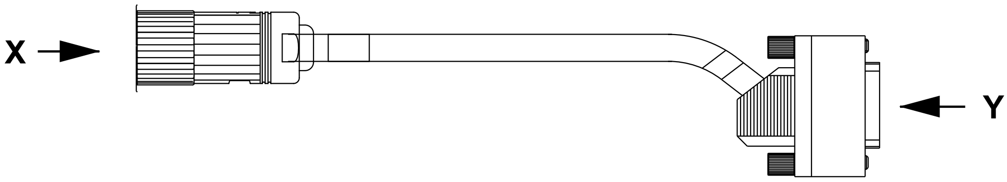


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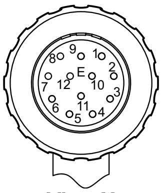
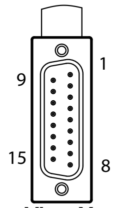
Figure 21: Resolver cable plug connector MOVIAXIS® MXA

Type	Installation	Part number
CFM	Fixed installation	1332 742 9
CFM	Cable carrier installation	1332 743 7

Pin assignment resolver cable RH.M/RH.L

RH1M resolver cable pin assignment						
Motor connection side				Connection MOVIAXIS® MXA		
Plug connector	Pin no.	Description	Cable core color	Description	Pin no.	Plug connector
ASTA021FR **0198 6732** 12-pin with socket contacts  **View X**	1	R1 (reference +)	Pink (PK)	R1 (reference +)	5	Sub-D 15-pin  **View Y**
	2	R2 (reference -)	Gray (GY)	R2 (reference -)	13	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	2	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	10	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	1	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	9	
	7	n.c.	-	n.c.	3	
	8	n.c.	-	n.c.	4	
	9	TF/KTY +	Brown (BN)/violet (VT)[1]	TF/KTY +	14	
	10	TF/KTY -	White (WH) black (BK)[1]	TF/KTY -	6	
	11	n.c.	-	n.c.	7	
	12	n.c.	-	n.c.	8	
		-	-	n.c.	11	
		-	-	n.c.	12	
		-	-	n.c.	15	

1) Double assignment to increase cross section

All connectors are shown with view onto the pins.

Extension cable for resolver RH.M/RH.L

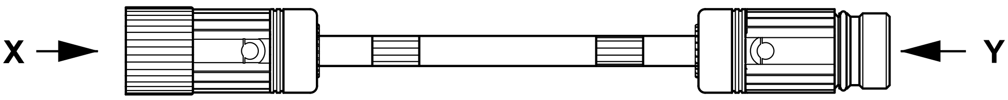


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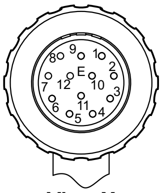
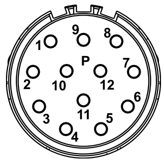
Figure 22: Extension cable for resolver RH.M/RH.L

Type	Installation	Part number
CFM	Fixed installation	199 542 1
CFM	Cable carrier installation	199 541 3

Pin assignment extension cable for resolver RH.M/RH.L

Pin assignment of extension cable for resolver RH.M/RH.L						
Plug connector	**Pin no.**	**Description**	**Cable core colors**	**Description**	**Pin no.**	**Plug connector**
ASTA021FR **0198 6732** 12-pin with socket contacts  **View X**	1	R1 (reference +)	Pink (PK)	R1 (reference +)	1	AKUA020MR **199 647 9** 12-pin with pin contacts  **View Y**
	2	R1 (reference -)	Gray (GY)	R1 (reference -)	2	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	3	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	4	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	5	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	6	
	7	n. c.	-	n. c.	7	
	8	n. c.	-	n. c.	8	
	9	TF/KTY +	Brown (BN)/violet (VT)[1]	TF/KTY +	9	
	10	TF/KTY -	White (WH) black (BK)[1]	TF/KTY -	10	
	11	n. c.	-	n. c.	11	
	12	n. c.	-	n. c.	12	

1) Double assignment to increase cross section

The extension cable has the same pin assignment as all other contacts.

Alternative plug connectors

Signal plug connector with socket contacts (complete)

Type	Connectable cross sections	Part no.
RH.M/RH.L	6 x 2 x 0.06 to 1 mm^2	198 673 2

Resolver cable, terminal box, CFM for MOVIDRIVE® with DC 5 V supply

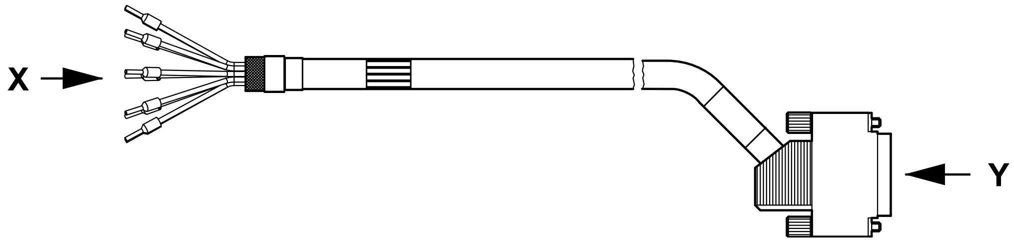


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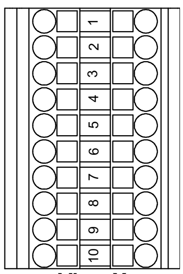
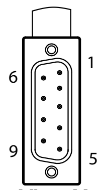
Figure 23: Resolver cable, terminal box, for MOVIDRIVE® MDX..B

Type	Installation	Part number
CFM	Fixed installation	199 589 8
CFM	Cable carrier installation	199 590 1

Pin assignment resolver cable RH.M/RH.L

Resolver cable terminal box connection, RH1M resolver for DFS/CFM motors						
Motor connection side					Connection MOVIDRIVE® MDX..B	
Terminal strip	Pin no.	Description	Cable core color	Description	Pin no.	Plug connector
 View X	1	R1 (reference +)	Pink (PK)	R1 (reference +)	3	Sub-D 9-pin  View Y
	2	R2 (reference -)	Gray (GY)	R2 (reference -)	8	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	2	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	7	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	1	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	6	
	7	n.c.	-	n.c.	4	
	8	n.c.	-	-	-	
	9	TF/KTY +	Brown (BN)/violet (VT)[1]	TF/KTY +	9	
	10	TF/KTY -	White (WH) black (BK)[1]	TF/KTY -	5	

1) Double assignment to increase cross section

14

Resolver cable, terminal box, CFM for MOVIAXIS®

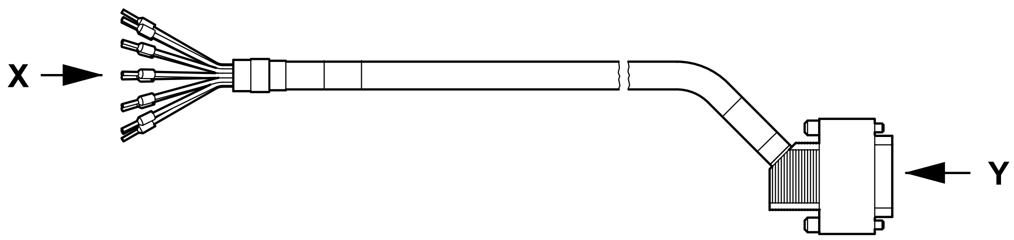


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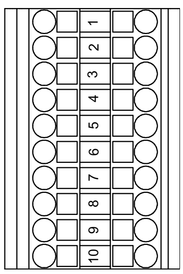
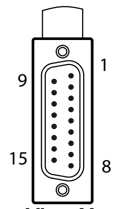
Figure 24: Resolver cable, terminal box with MOVIAXIS® MXA

Type	Installation	Part number
CFM	Fixed installation	1332 762 3
CFM	Cable carrier installation	1332 763 1

Pin assignment resolver cable RH.M/RH.L

Resolver cable terminal box connection, RH.M/RH.L resolver MOVIAXIS® MXA with DFS/CFM motors						
Motor connection side					Connection MOVIAXIS® MXA	
Terminal strip	Pin no.	Description	Cable core color	Description	Pin no.	Plug connector
 View X	1	R1 (REF +)	Pink (PK)	R1 (reference +)	5	Sub-D 15-pin  View Y
	2	R2 (REF -)	Gray (GY)	R2 (reference -)	13	
	3	S1 (COS +)	Red (RD)	S1 (cosine +)	2	
	4	S3 (COS -)	Blue (BU)	S3 (cosine -)	10	
	5	S2 (SIN +)	Yellow (YE)	S2 (sine +)	1	
	6	S4 (SIN -)	Green (GN)	S4 (sine -)	9	
	7	n. c	-	n. c	3	
	8	n. c	-	n. c	4	
	9	TF/TH/KTY +	Brown (BN)/violet (VT)	TF/TH/KTY +	14	
	10	TF/TH/KTY -	White (WH) black (BK)	TF/TH/KTY -	6	
	11	-	-	n. c	7	
	12	-	-	n. c	8	
	13	-	-	n. c	11	
	14	-	-	n. c	12	
	15	-	-	n. c	15	

HIPERFACE® encoder cable, plug connector MOVIAXIS®, MOVIDRIVE®

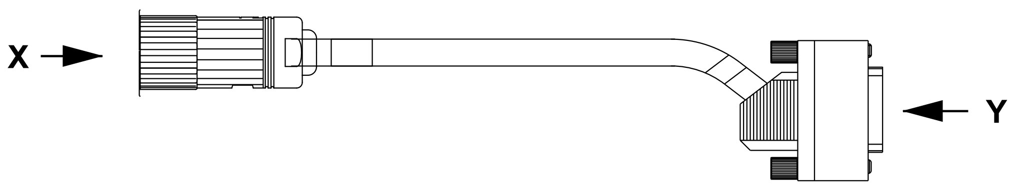
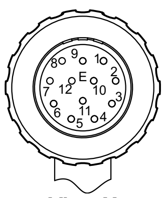
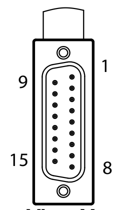


Figure 25: HIPERFACE® encoder cable for plug connector

Type	Installation	Part number
CFM	Fixed installation	1332 453 5
CFM	Cable carrier installation	1332 455 1

Cable pin assignment for HIPERFACE® encoder AS1H/ES1H/AV1H

Pin assignment of cable for HIPERFACE® encoders AS1H/ES1H/AV1H						
Motor connection side					Connection MOVIAXIS® MXA MOVIDRIVE®MDX..B	
Plug connector	**Pin no.**	**Description**	**Cable core color**	**Description**	**Pin no.**	**Plug connector**
ASTA021FR **0198 6732** 12-pin with socket contacts  **View X**	1	n. c.	n. c.	n. c.	3	D-sub 15-pin  **View Y**
	2	n. c.	n. c.	n. c.	5	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	1	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	9	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	2	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	10	
	7	DATA-	Violet (VT)	DATA-	12	
	8	DATA+	Black (BK)	DATA+	4	
	9	TF/KTY +	Brown (BN)	TF/KTY +	14	
	10	TF/KTY -	White (WH)	TF/KTY -	6	
	11	GND	Gray/pink (GY/PK)1)	GND	8	
	12	U_s	Red/blue (RD/BU)1)	U_s	15	
		-	-	n. c.	7	
		-	-	n. c.	11	
		-	-	n. c.	13	

1) Double assignment to increase cross section

Extension cable for HIPERFACE® encoder AS1H/ES1H/AV1H

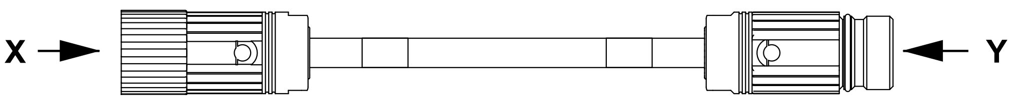
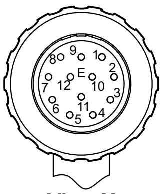
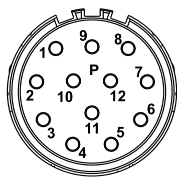


Figure 26: Extension cable for HIPERFACE® encoder

Type	Installation	Part number
CFM	Fixed installation	199 539 1
CFM	Cable carrier installation	199 540 5

Pin assignment extension cable for HIPERFACE® encoder AS1H/ES1H/AV1H

Pin assignment of extension cable for RH.M resolver						
Plug connector	**Pin no.**	**Description**	**Cable core color**	**Description**	**Pin no.**	**Plug connector**
ASTA021FR	1	n.c.	-	n.c.	1	AKUA020MR
0198 6732	2	n.c.	-	n.c.	2	**199 647 9**
12-pin with socket contacts	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	3	12-pin with pin contacts
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	4	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	5	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	6	
	7	DATA-	Violet (VT)	DATA-	7	
	8	DATA+	Black (BK)	DATA+	8	
	9	TF/KTY +	Brown (BN)	TF/KTY +	9	
View X	10	TF/KTY -	White (WH)	TF/KTY -	10	
	11	GND	Gray/pink (GY/PK)/pink (PK)	GND	11	
	12	U_s	Red/blue (RD/BU)/gray (GY)	U_s	12	**View Y**

The extension cable has the same pin assignment as all other contacts.

Alternative plug connectors

Signal plug connector with socket contacts (complete)

Type	Connectable cross sections	Part no.
AS1HES1H AV1H	6 x 2 x 0.06 to 1 mm^2	198 673 2

HIPERFACE® encoder cable, terminal box, CFM for MOVIAXIS®, MOVIDRIVE®

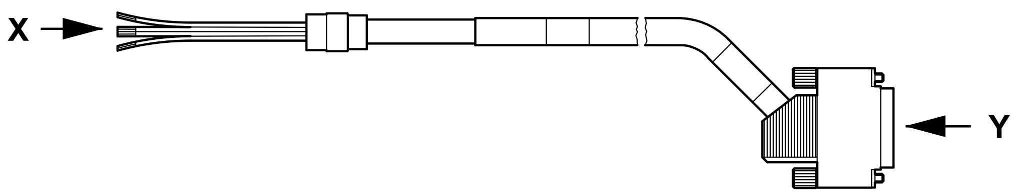
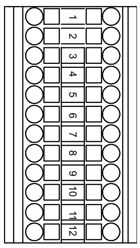
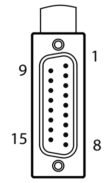


Figure 27: HIPERFACE® encoder cable with terminal connection on motor end for CFM motors

Type	Installation	Part number
CFM	Fixed installation	1332 457 8
CFM	Cable carrier installation	1332 454 3

Pin assignment HIPERFACE® encoder cable AS1H/ES1H

HIPERFACE® cable, terminal box connection MOVIAXIS® MXA, MOVIDRIVE® MDX..B with CFM motors						
Motor connection side					**Connection MOVIAXIS® MXA MOVIDRIVE® MDX..B**	
Terminal strip	**Pin no.**	**Description**	**Cable core color**	**Description**	**Pin no.**	**Plug connector**
 View X	6	Data +	Black (BK)	Data +	4	Sub-D 15-pin  View Y
	5	Data -	Violet (VT)	Data -	12	
	1	S1 (COS +)	Red (RD)	S1 (COS +)	1	
	2	S3 (COS -)	Blue (BU)	S3 (COS -)	9	
	3	S2 (SIN +)	Yellow (YE)	S2 (SIN +)	2	
	4	S4 (SIN -)	Green (GN)	S4 (SIN -)	10	
	7	GND	Gray pink (GYPK)/pink (PK)	GND	8	
	8	Us	Red blue (RDBU)	Us	15	
	9	TF/TH/KTY +	Brown (BN)	TF/TH/KTY +	14	
	10	TF/TH/KTY -	White (WH)	TF/TH/KTY -	6	

Encoder cable AV1Y/DIP11A/B for MOVIDRIVE®

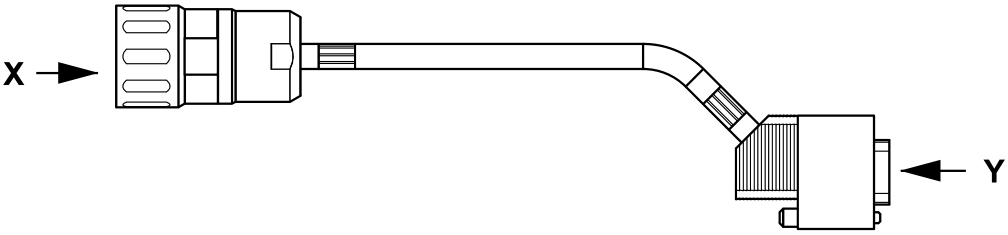


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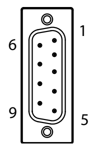
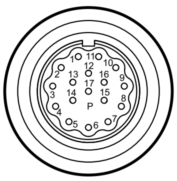
Figure 28: Encoder cable AV1Y/DIP11A/B

Type	Installation	Part number
CFM	Fixed installation	0198 929 4
CFM	Cable carrier installation	0198 930 8

Pin assignment encoder cable AV1Y/DIP11A/B

Pin assignment						
Motor connection side					**Connection MOVIDRIVE® MDX..B**	
Round connector	**Pin no.**	**Resolver signal**	**Cable core color**	**Resolver signal**	**Pin no.**	**Plug connector**
SPUC 17H FRON 005 17-pole	1	n. c	-	n. c	-	Sub-D 9-pin
	2	n. c	-	n. c	-	
	3	n. c	-	n. c	-	
	4	n. c	-	n. c	-	
	5	n. c	-	n. c	-	
	6	n. c	-	n. c	-	
	7	UB	White (WH)	UB	9	
	8	T+	Pink (PK)	T+	3	
	9	T-	Gray (GY)	T-	8	
	10	GND	Brown (BN)	GND	5	**View Y**
	11	n. c	-	n. c	-	
	12	n. c	-	n. c	-	
	13	n. c	-	n. c	-	
View X	14	D +	Yellow (YE)	D +	1	
	15	n. c	-	n. c	-	
	16	n. c	-	n. c	-	
	17	D -	Green (GN)	D -	6	

Encoder cable AV1Y for MOVIDRIVE®

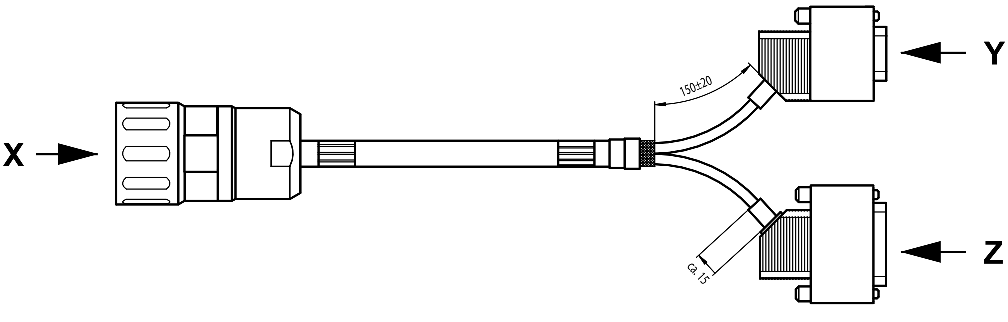
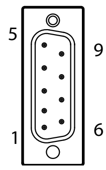
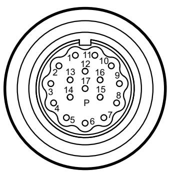
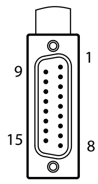


Figure 29: Encoder cable AV1Y MOVIDRIVE® MDX..B

Type	Installation	Part number
CFM	Fixed installation	1332 813 1
CFM	Cable carrier installation	1332 812 3

Pin assignment encoder cable AV1Y MOVIDRIVE®

Pin assignment						
Motor connection side					Connection MOVIDRIVE® MDX..B	
Round connector	Pin no.	Encoder signal	Cable core color	Encoder signal	Pin no.	Plug connector
SPUC 17H FRON 005 17-pole	1	n. c	-	n. c	-	Sub-D 9-pin
	2	n. c	-	n. c	-	
	3	n. c	-	n. c	-	
	4	n. c	-	n. c	-	
	5	n. c	-	n. c	-	
	6	n. c	-	n. c	-	
	7	UB	White (WH)	UB	9	
	8	T+	Pink (PK)	T+	3	View Y
	9	T-	Gray (GY)	T-	8	
	10	GND	Brown (BN)	GND	5	Sub-D 15-pin
	11	n. c	-	n. c	-	
View X	14	D +	Black (BK)	D +	1	
	17	D -	Violet (VT)	D -	6	
	12	B	Red (RD)	B	2	
	13	B	Blue (BU)	B	10	
	15	A	Yellow (YE)	A	1	
	16	A	Green (GN)	A	9	View Z

Extension cable for AV1Y encoder

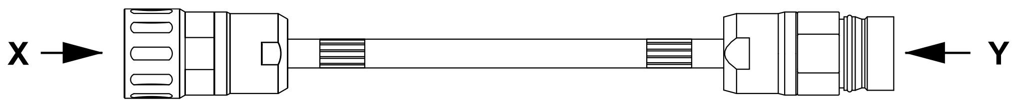


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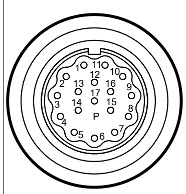
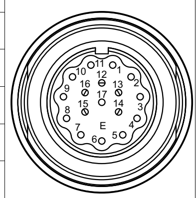
Figure 30: Extension cable for AV1Y encoder

Type	Installation	Part number
CFM	Cable carrier installation	0593 968 2

Pin assignment extension cable for AV1Y encoder

Pin assignment						
Plug connector	**Pin no.**	**Resolver signal**	**Cable core color**	**Resolver signal**	**Pin no.**	**Plug connector**
Round connector SPUC 17H 0198 886 7 17-pin contact socket  **View X**	1	n. c.	-	n. c.	1	**SRUC 17G adapter** 0593 403 6 17-pin with pin contacts  **View Y**
	2	n. c.	-	n. c.	2	
	3	n. c.	-	n. c.	3	
	4	n. c.	-	n. c.	4	
	5	n. c.	-	n. c.	5	
	6	n. c.	-	n. c.	6	
	7	UB	White (WH)	UB	7	
	8	T+	Pink (PK)	T+	8	
	9	T-	Gray (GY)	T-	9	
	10	GND	Brown (BN)	GND	10	
	11	n.c.	-	n.c.	11	
	12	B	Red (RD)	B	12	
	13	B	Blue (BU)	B	13	
	14	D +	Black (BK)	D +	14	
	15	A	Yellow (YE)	A	15	
	16	A	Green (GN)	A	16	
	17	D -	Violet (VT)	D -	17	

The extension cable has the same pin assignment as all other contacts.

Cable for VR forced cooling fan

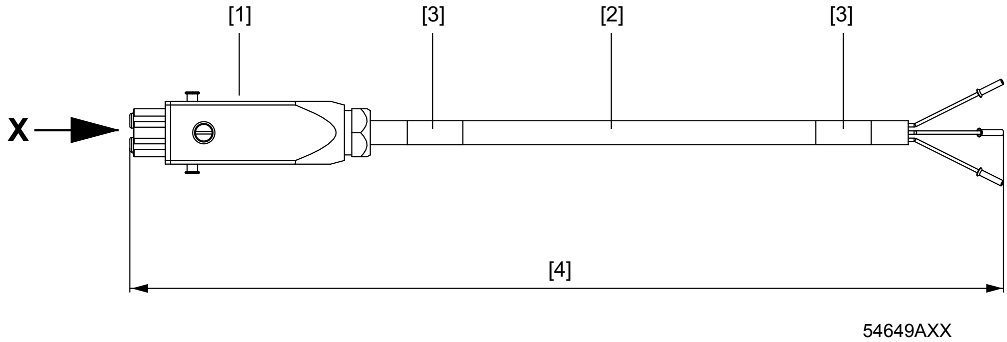
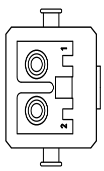


Figure 31: Cable for VR forced cooling fan

[1] Connector: STAK 200
[2] Printed on connector: SEW-EURODRIVE
[3] Nameplate
[4] Cable length ≤ 5 m: Tolerance +200 mm
Cable length ≥ 5 m: Tolerance +2%
Permitted cable length according to the technical documents.

Type	Installation	Part number
CFM	Fixed installation	198 634 1
CFM	Cable carrier installation	199 560 X

Pin assignment cable for VR forced cooling fan

STAK 200 plug connector	Pin	Core identification	Assigned	Pin	Connection type
 **View X Connector with two socket contacts**	1	Digit 1	24 V +	Cut-off, length ca. 250 mm	Conductor end sleeves
	2	Digit 2	0 V		

Extension cable for VR forced cooling fan

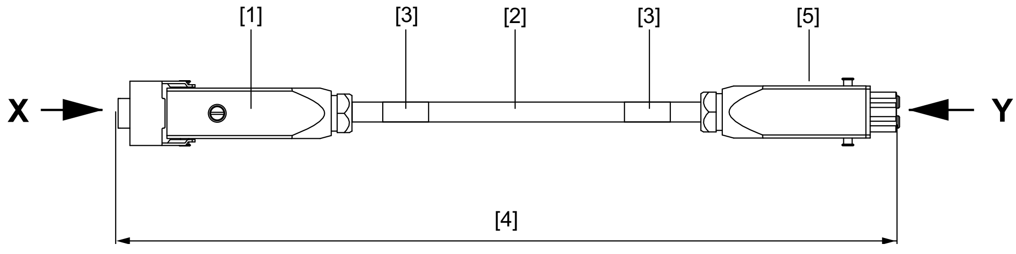
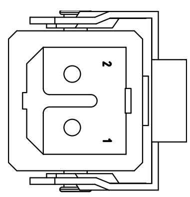
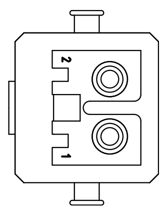


Figure 32: Extension cable for VR forced cooling fan

[1] Connector: STAS 200
[2] Printed on connector: SEW-EURODRIVE
[3] Nameplate
[4] Cable length ≤ 5 m: Tolerance +200 mm
Cable length ≥ 5 m: Tolerance +2%
Permitted cable length according to the technical documents.
[5] Socket: STAK 200

Type	Installation	Part number
CFM	Fixed installation	199 561 8
CFM	Cable carrier installation	199 562 6

Pin assignment extension cable for forced cooling fan

STAS 200 plug connector	Pin	Core identification	Assigned	Pin	Connection type STAK 200
 **View X Connector with two pin contacts**	1	Digit 1	24 V +	1	 **View Y Connector with two socket contacts**
	2	Digit 2	0 V	2	

The extension cable has the same pin assignment as all other contacts.

Alternative plug connector for CFM71, CFM90, CFM112

Signal plug connector with socket contacts (complete)

Type	Connectable cross sections	Part no.
VR	3 x 1 mm^2	198 498 5

14.1 Cable specification

Power cables – fixed installation

Manufacturer		Lapp				
Cable cross sections		**4 x 1.5 mm²**	**4 x 2.5 mm²**	**4 x 4 mm²**	**4 x 6 mm²**	**4 x 10 mm²**
Manufacturer designation		TPE/CY				
Operating voltage Vo/	[V_{AC}]	600/1000				
Temperature range	[°C]	Fixed installation -10 to +90 (-40 to +176)				
Max. temperature	[°C]	90	90	90	90	90
Min. bending radius	[mm]	44	48	56	61	84
Diameter D	[mm]	9.3 ± 0,3	10 ± 0.3	12.3 ± 0,3	13.6 ± 0.4	17.0 ± 0.6
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange, similar to RAL 2003				
Approval(s)		DESINA/VDE/UL				
Capacitance core/shielding	[nF/km]	135	140	150	155	155
Capacitance core/core	[nF/km]	75	85	90	95	95
Halogen-free		no				
Silicone-free		yes				
CFC-free		no				
Inner insulation (core)		TPE				
Outer insulation (sheath)		PVC				
Flame-inhibiting/self-extinguishing		no				
Conductor material		Cu				
Shielding		Tinned Cu				
Weight (cable)	[kg/km]	196	254	371	472	825

Power cables – cable carrier installation

Manufacturer		Nexans				
Cable cross sections		**4 x 1.5 mm²**	**4 x 2.5 mm²**	**4 x 4 mm²**	**4 x 6 mm²**	**4 x 10 mm²**
Manufacturer designation		PSL(LC)C11Y-J 4 x ... mm²		PSL11YC11Y-J 4 x ... mm²		
Operating voltage Vo/	[V_{AC}]	600/1000				
Temperature range	[°C]	- 20 to + 60				
Max. temperature	[°C]	+90 (on conductor)				
Min. bending radius	[mm]	135	170	130	155	180
Diameter D	[mm]	12.4 ± 1.1	15.1 ± 1.6	13.1 ± 0.4	15.3 ± 0.4	17.7 ± 0.5
Maximum acceleration	[m/s^2]	20 (travel distance: 4 m horizontal, 1.5 m vertical)				
Max. velocity	[m/min]	200 at a max. travel distance of 5 m				
Bending cycles		min. 5 million				
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange similar to RAL 2003				
Approval(s)		DESINA/VDE/UL / cULus				
Capacitance core/shielding≤	[nF/km]	95	95	170	170	170
Capacitance core/core≤	[nF/km]	65	65	95	95	95
Halogen-free		yes				
Silicone-free		yes				
CFC-free		yes				
Inner insulation (core)		TPO		TPM		
Outer insulation (sheath)		TPU (PUR)				

Table continued on next page

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Manufacturer		Nexans				
Cable cross sections		4 x 1.5 mm^2	4 x 2.5 mm^2	4 x 4 mm^2	4 x 6 mm^2	4 x 10 mm^2
Flame-inhibiting/self-extinguishing		yes				
Conductor material		E-Cu blank				
Shielding		Braided tinned Cu shield (optically covered > 85 %)				
Weight (cable)	[kg/km]	190	300	320	420	640

Brake power cables – fixed installation

Manufacturer		Lapp				
Cable cross sections		4 x 1.5 mm^2 + 3 x 1 mm^2	4 x 2.5 mm^2 + 3 x 1 mm^2	4 x 4 mm^2 + 3x 1 mm^2	4 x 6 mm + 3 x 1.5 mm^2	4 x 10 mm^2 + 3x 1.5 mm^2
Manufacturer designation		TPE/CY				
Operating voltage Vo/	[V_{AC}]	600 /1000				
Temperature range	[°C]	Fixed installation: -10 to +90				
Max. temperature	[°C]	90	90	90	90	90
Min. bending radius	[mm]	54	57	64	72	92
Diameter D	[mm]	11.8 ± 0,4	13.4 ± 0,5	15.0 ± 0.5	17.0 ± 0.6	20.0 ± 0.5
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange similar to RAL 2003				
Approval(s)		DESINA/VDE/UL				
Capacitance core/shielding	[nF/km]	135	145	150	155	155
Capacitance core/core	[nF/km]	75	85	90	95	95
Halogen-free		no				
Silicone-free		yes				
CFC-free		no				
Inner insulation (core)		TPE				
Outer insulation (sheath)		PVC				
Flame-inhibiting/self-extinguishing		no				
Conductor material		Cu				
Shielding		Tinned Cu				
Weight (cable)	[kg/km]	300	370	476	625	1024

Brake power cables – cable carrier installation

Manufacturer		Nexans				
Cable cross sections		4 x 1.5 mm^2 + 3 x 1 mm^2	4 x 2.5 mm^2 + 3 x 1 mm^2	4 x 4 mm^2 + 3x 1 mm^2	4 x 6 mm + 3 x 1.5 mm^2	4 x 10 mm^2 + 3x 1.5 mm^2
Manufacturer designation		PSL(LC)C11Y-J 4 x ... mm^2		PSL11YC11Y-J 4x... +3A.../C		
Operating voltage Vo/	[V_{AC}]	600/1000				
Temperature range	[°C]	- 20 to + 60				
Max. temperature	[°C]	+ 90 (conductor)				
Min. bending radius	[mm]	165	170	155	175	200
Diameter D	[mm]	15.1 ± 1.6	16.3 ± 0.8	15.3 ± 0.5	17.4 ± 0,5	20.5 ± 0.5
Maximum acceleration	[m/s^2]	20 (travel distance: 4 m horizontal, 1.5 m vertical)				
Max. velocity	[m/min]	200 at a max. travel distance of 5 m				
Bending cycles		min. 5 million				
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange similar to RAL 2003				
Approval(s)		DESINA/VDE/UL /				
Table continued on next page						

Manufacturer / Cable cross sections		Nexans				
		4 x 1.5 mm² + 3 x 1 mm²	4 x 2.5 mm² + 3 x 1 mm²	4 x 4 mm² + 3x 1 mm²	4 x 6 mm + 3 x 1.5 mm²	4 x 10 mm² + 3x 1.5 mm²
Capacitance core/shielding≤	[nF/km]	95	95	170	170	170
Capacitance core/core≤	[nF/km]	65	65	95	95	95
Halogen-free		yes				
Silicone-free		yes				
CFC-free		yes				
Inner insulation (cable)		TPO		TPM		
Outer insulation (sheath)		TPU (PUR)				
Flame-inhibiting/self-extinguishing		yes				
Conductor material		E-Cu blank				
Shielding		Braided tinned Cu shield (optically covered > 85 %)				
Weight (cable)	[kg/km]	280	380	410	540	750

Additional cables – fixed installation

Accessory designation		AS1H/ES1H	RH.M/RH.L	VR
Manufacturer		Lapp		
Cable cross sections		6 x 2 x 0.25 mm²	5 x 2 x 0.25 mm²	3 x 1 mm²
Manufacturer designation		TPE/CY		Ölflex 110 Classic
Operating voltage Vo/	[V_{AC}]	300		300/500
Temperature range	[°C]	- 10 to + 80		- 30 to + 70
Max. temperature	[°C]	+ 80		+ 70
Min. bending radius	[mm]	41.5	37.5	24
Diameter D	[mm]	8.3 ± 0,3	7.5 ± 0,3	6.0 ± 0.3
Core identification		DIN 47 100		VDE 0293
Sheath color		Green, similar to RAL 6018		Silver gray, RAL 7001
Approval(s)		DESINA/VDE/cULus		VDE
Capacitance core/shielding	[nF/km]	110		-
Capacitance core/core	[nF/km]	83		-
Halogen-free		no		
Silicone-free		yes		
CFC-free		no		
Inner insulation (core)		TPE		PVC
Outer insulation (sheath)		PVC		
Flame-inhibiting/self-extinguishing		no		
Conductor material		Cu blank		
Shielding		Braided tinned Cu		-
Weight (cable)	[kg/km]	131	103	65

Additional cables – cable carrier installation

Accessory designation		AS1H/ES1H	RH.M/RH.L	VR
Manufacturer			**Nexans**	
Cable cross sections		**6 x 2 x 0.25 mm^2**	**5 x 2 x 0.25 mm^2**	**3 x 1 mm^2**
Manufacturer designation		SSL11YC11Y ... x 2 x 0.25		PSL 3 x 1.0
Operating voltage Vo/	[V_{AC}]	300		300
Temperature range	[°C]	-20 to +60		- 30 to + 70
Max. temperature	[°C]	+90 (on conductor)		+90 (on conductor)
Min. bending radius	[mm]	100	95	45
Diameter D	[mm]	9.8 ± 0.2	9,5 ± 0.2	5,7 ± 0.2
Maximum acceleration	[m/s^2]	20		10
Max. velocity	[m/min]	200		50
Core identification		WH/BN, GN/YE, GY/PK, BU/RD, BK/VT, GY-PK/RD-BU	WH/BN, GN/YE, GY/PK, BU/RD, BK/VT	2 x WH with digit + 1 x GN/YE
Sheath color		Green similar to RAL 6018		Black RAL 9005
Approval(s)		DESINA/VDE/cULus		VDE/UL
Capacitance core/shielding	[nF/km]	100		-
Capacitance core/core	[nF/km]	55		-
Halogen-free		yes		yes
Silicone-free		yes		yes
CFC-free		yes		yes
Inner insulation (core)		PP		TPM
Outer insulation (sheath)		TPE-U		TPE-U
Flame-inhibiting/self-extinguishing		yes		yes
Conductor material		E-Cu blank		E-Cu blank
Shielding		Braided tinned Cu		-
Weight	[kg/km]	130	120	50

15 Appendix

15.1 Cable dimension units according to AWG

AWG stands for **A**merican **W**ire **G**auge and refers to the size of the wires. This number specifies the diameter or cross section of a wire in code. This type of cable designation is usually only used in the USA. However, the designations can also be seen in catalogs or data sheets in Europe.

AWG designation	Cross section in mm^2
000000 (6/0)	185
00000 (5/0)	150
0000 (4/0)	120
000 (3/0)	90
00 (2/0)	70
0 (1/0)	50
1	50
2	35
3	25
4	25
5	16
6	16
7	10
8	10
9	6
10	6
11	4
12	4
13	2.5
14	2.5
15	2.5
16	1.5
16	1
18	1
19	0.75
20	0.5
21	0.5
22	0.34
23	0.25
24	0.2

15.2 Index

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Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew- eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew- eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267891 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478398 Fax +86 27 84478388
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 88241718 Fax +86 29 68686296 logistic-xa@sew-eurodrive.cn

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sewcol@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 255 709 601 Fax +420 220 121 237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
Technical Offices	**Brno**	SEW-EURODRIVE CZ S.R.O. Křenová 52 CZ -60200 Brno	Tel. +420 543 256 151 +420 543 256 163 Fax +420 543 256 845
	Hradec Králové	SEW-EURODRIVE CZ S.R.O. Čechova 498 CZ-50202 Hradec Králové	Tel. +420 495 510 141 Fax +420 495 521 313
	Plzeň	SEW-EURODRIVE CZ S.R.O. Areal KRPA a.s. Zahradni 173/2 CZ-32600 Plzeň	Tel. +420 378 775 300 Fax +420 377 970 710
	Ostrava	SEW-EURODRIVE CZ S.R.O. Studenská 6202/17 CZ-708 00 Ostrava-Poruba	Tel. +420 738 339 044 Mobile +420 724 889 965

Czech Republic			
	Klatovy	SEW-EURODRIVE CZ S.R.O. Technická kancelář Klatovy Domažlická 800 CZ-33901 Klatovy	Tel. +420 376 310 729 Fax +420 376 310 725
Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 + 1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg
Service	**Sharjah**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah **United Arabian Emirates**	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae
Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee
Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi
Technical Offices	**Helsinki**	SEW-EURODRIVE OY Luutnantintie 5 FIN-00410 Helsinki	Tel. +358 201 589-300 Fax + 358 9 5666-311 sew@sew.fi
	Vaasa	SEW-EURODRIVE OY Hietasaarenkatu 18 FIN-65100 Vaasa	Tel. +358 201 589-300 Fax +358 6 3127-470 sew@sew.fi
	Rovaniemi	SEW-EURODRIVE OY Valtakatu 4 A FIN-96100 Rovaniemi	Tel. +358 201 589-300 Fax +358 201 589-239 sew@sew.fi
Production **Assembly**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi
Gabon			
Sales	**Libreville**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059
Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Great Britain			
Technical Offices	**London**	SEW-EURODRIVE Ltd. 764 Finchely Road, Temple Fortune GB-London N.W.11 7TH	Tel. +44 20 8458-8949 Fax +44 20 8458-7417
	Midlands	SEW-EURODRIVE Ltd. 5 Sugar Brook court, Aston Road, Bromsgrove, Worcs B60 3EX	Tel. +44 1527 877-319 Fax +44 1527 575-245
	Scotland	SEW-EURODRIVE Ltd. Scottish Office No 37 Enterprise House Springkerse Business Park GB-Stirling FK7 7UF Scotland	Tel. +44 17 8647-8730 Fax +44 17 8645-0223
	Northern Ireland	Heyn Engineering (NI) Ltd. 1 Corry Place, Belfast, BT3 9AH	Tel. +44 02890350022 Fax +44 02890350012 info@heyn.co.uk http://www.heyn.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr
Technical Office	**Thessaloniki**	Christ. Boznos & Son S.A. Asklipiou 26 562 24 Evosmos, Thessaloniki	Tel. +30 2 310 7054-00 Fax +30 2 310 7055-15 info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

Iceland			
Sales	**Reykjavik**	Vélaverk ehf. Bolholti 8, 3h. IS - 105 Reykjavik	Tel. +354 568 3536 Fax +354 568 3537 velaverk@velaverk.is

India			
Registered Office **Assembly** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@seweurodriveindia.com
Assembly **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 c.v.shivkumar@seweurodriveindia.com

India			
Technical Offices	**Ahmedabad**	SEW-EURODRIVE India Private Limited 306, Shaan office complex, Behind Sakar-IV, Ellisebridge, Ashram Road Ahmedabad – Gujarat	Tel. +91 79 40072067/68 Fax +91 79 40072069 bankim.barot@seweurodriveindia.com
	Bengaluru	SEW-EURODRIVE India Private Limited 308, Prestige Centre Point 7, Edward Road Bengaluru - 560052 - Karnataka	Tel. +91 80 22266565 Fax +91 80 22266569 salesbang@seweurodriveindia.com ganesh@seweurodriveindia.com
	Chandigarh	SEW EURODRIVE India Private Limited Sujit Kumar Mishra H.No.5464/3 Modern Housing Complex Manimajra Chandigarh -160101	Tel. +91 9878469579 Fax +91 1722738664 saleschand@seweurodriveindia.com
	Chennai	SEW-EURODRIVE India Private Limited 2nd Floor, Josmans Complex, No. 5, McNichols Road, Chetpet Chennai - 600031 - Tamil Nadu	Tel. +91 44 42849813 Fax +91 44 42849816 saleschen@seweurodriveindia.com c.v.shivkumar@seweurodriveindia.com
	Coimbatore	SEW-EURODRIVE India Private Limited Office No 60 Arpee Centre (Opp Annapoorna Hotel) 420 N, NSR Road, Saibaba Colony Coimbatore 641 0111 - Tamil Nadu	Tel. +91 422 2455420 Fax +91 422 2443988 salescmb@seweurodriveindia.com p.selvakumar@seweurodriveindia.com
	Cuttack	SEW-EURODRIVE India Private Limited Plot No.- 1764, Nuasahi, Nayapalli Bhubaneswar-12 Orissa	Tel. +91 9937446333 manoranjan.sahoo@seweurodriveindia. com
	Hyderabad	SEW-EURODRIVE India Private Limited 408, 4th Floor, Meridian Place Green Park Road Amerpeet Hyderabad - 500016 - Andhra Pradesh	Tel. +91 40 23414698 Fax +91 40 23413884 saleshyd@seweurodriveindia.com ma.choudary@seweurodriveindia.com
	Jamshedpur	SEW-EURODRIVE India Private Limited Flat No.: B/2, B.S. Apartment Road No.: 4, Contractor's area, Bistupur Jamshedpur 831 001 - Chhattisgarh	Tel. +91 9934123671 siddaratha.mishra@seweurodriveindia. com
	Kolkata	SEW EURODRIVE India Private Limited 2nd floor, Room No. 35 Chowringhee Court 55, Chowringhee Road Kolkata - 700 071 - West Bengal	Tel. +91 33 22827457 Fax +91 33 22894204 saleskal@seweurodriveindia.com a.j.biswas@seweurodriveindia.com
	Lucknow	SEW-EURODRIVE India Private Limited 69, Shiv Vihar Colony Vikas Nagar-5 Lucknow 226022 - Uttar Pradesh	Tel. +91 9793627333 amit.nigam@seweurodriveindia.com
	Madgaon	SEW-EURODRIVE India Private Limited Flat No.-G1, Shivas-Laxmi Prasad Co-Operative Housing Society, Padmanarayan Estate, Near Jivottaam Math, Gagole Madgao, Goa - 403 602	samrat.chakravorty@seweurodriveindia .com

India			
	Mumbai	SEW-EURODRIVE India Private Limited 312 A, 3rd Floor, Acme Plaza, J.B. Nagar, Andheri Kurla Road, Andheri (E) Mumbai - 400059 - Maharashtra	Tel. +91 22 28348440 Fax +91 22 28217858 salesmumbai@seweurodriveindia.com p.s.ray@seweurodriveindia.com
	New Delhi	SEW-EURODRIVE India Private Limited 418-419, Suneja Tower-1 District Centre, Janak Puri New Delhi 110 058	Tel. +91 11 25544111 Fax +91 11 25544113 salesdelhi@seweurodriveindia.com vikram.juneja@seweurodriveindia.com
	Pune	SEW-EURODRIVE India Private Limited Lunawat Prism 4th floor, S. No. 148, Neena Co-Operative Housing Society, Paud Road, Pune 411038 - Maharashtra	Tel. +91 20 25380730 / 735 Fax +91 20 25380721 salespune@seweurodriveindia.com praveen.hosur@seweurodriveindia.com
	Raipur	SEW-EURODRIVE India Private Limited A-42, Ashoka Millenium Complex, Ring Road-1, Raipur 492 001 - Chhattisgarh	Tel. +91 771 4090765 Fax +91 771 4090765 sutanu.sarkar@seweurodriveindia.com

Indonesia			
Represented by	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it
Technical Offices	**Bologna**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via della Grafica, 47 I-40064 Ozzano dell'Emilia (Bo)	Tel. +39 051 65-23-801 Fax +39 051 796-595
	Caserta	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Carlo III Km. 23,300 I-81020 S. Nicola la Strada (Caserta)	Tel. +39 0823 219011 Fax +39 0823 421414
	Pescara	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Europa,132 I-65010 Villa Raspa di Spoltore (PE)	Tel. +39 085 41-59-427 Fax +39 085 41-59-643
	Torino	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Filiale Torino c.so Unione Sovietica 612/15 - int. C I-10135 Torino	Tel. +39 011 3473780 Fax +39 011 3473783
	Verona	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via P. Sgulmero, 27/A I-37132 Verona	Tel. +39 045 89-239-11 Fax +39 045 97-6079

Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
Technical Offices	**Fukuoka**	SEW-EURODRIVE JAPAN CO., LTD. C-go, 5th-floor, Yakuin-Hiruzu-Bldg. 1-5-11, Yakuin, Chuo-ku Fukuoka, 810-0022	Tel. +81 92 713-6955 Fax +81 92 713-6860 sewkyushu@jasmine.ocn.ne.jp
	Osaka	SEW-EURODRIVE JAPAN CO., LTD. Higobashi Shimizu Bldg. 10th flor 1-3-7 Tosabori, Nishi-ku Osaka, 550-0001	Tel. +81 6 6444--8330 Fax +81 6 6444--8338 sewosaka@crocus.ocn.ne.jp
	Tokyo	SEW-EURODRIVE JAPAN CO., LTD. Omarimon Yusen Bldg. 13th floor 3-23-5 Nishinbashi, Minato-ku Tokyo 105-0003	Tel. +81 3 3239-0469 Fax +81 3 3239-0943 sewtokyo@basil.ocn.ne.jp

Kazakhstan			
Sales	**Almaty**	SEW-EURODRIVE LLP Raimbek Ave. 348 KZ-050061 Almaty	Tel.+7 (727) 334 1880 Fax +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master@sew-korea.co.kr
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr
Technical Offices	**Daegu**	SEW-EURODRIVE KOREA Co., Ltd. No.1108 Sungan officetel 87-36, Duryu 2-dong, Dalseo-ku Daegu 704-712	Tel. +82 53 650-7111 Fax +82 53 650-7112
	DaeJeon	SEW-EURODRIVE KOREA Co., Ltd. No. 1502, Hongin officetel 536-9, Bongmyung-dong, Yusung-ku Daejeon 305-301	Tel. +82 42 828-6461 Fax +82 42 828-6463
	Kwangju	SEW-EURODRIVE KOREA Co., Ltd. 4fl., Dae-Myeong B/D 96-16 Unam-dong, Buk-ku Kwangju 500-170	Tel. +82 62 511-9172 Fax +82 62 511-9174
	Seoul	SEW-EURODRIVE KOREA Co., Ltd. No.504 Sunkyung officetel 106-4 Kuro 6-dong, Kuro-ku Seoul 152-054	Tel. +82 2 862-8051 Fax +82 2 862-8199

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 ssacar@inco.com.lb
	Beirut	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 philipppe.acar@medrives.com

Lithuania			
Sales	**Alytus**	UAB Irseva Naujoji 19 LT-62175 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Technical Offices	**Kota Kinabalu**	SEW-EURODRIVE Sdn Bhd (Kota Kinabalu Branch) Lot No. 2,1st Floor, Inanam Baru Phase III, Miles 5.1 /2, Jalan Tuaran, Inanam 89350 Kota Kinabalu Sabah, Malaysia	Tel. +60 88 424792 Fax +60 88 424807
	Kuala Lumpur	SEW-EURODRIVE Sdn. Bhd. No. 2, Jalan Anggerik Mokara 31/46 Kota Kemuning Seksyen 31 40460 Shah Alam Selangor Darul Ehsan	Tel. +60 3 5229633 Fax +60 3 5229622 sewpjy@po.jaring.my
	Kuching	SEW-EURODRIVE Sdn. Bhd. Lot 268, Section 9 KTLD Lorong 9, Jalan Satok 93400 Kuching, Sarawak East Malaysia	Tel. +60 82 232380 Fax +60 82 242380
	Penang	SEW-EURODRIVE Sdn. Bhd. No. 38, Jalan Bawal Kimsar Garden 13700 Prai, Penang	Tel. +60 4 3999349 Fax +60 4 3999348 seweurodrive@po.jaring.my

Mauritania			
Sales	**Zouérate**	AFRICOM - SARL En Face Marché Dumez P.B. 88 Zouérate	Tel. +222 54 40134 Fax +222 54 40538 cybertiris@mauritel.mr

Mexico			
Assembly **Sales** **Service**	**Quéretaro**	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Morocco			
Sales	**Casablanca**	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 522618372 Fax +212 522618351 ali.alami@premium.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu
		VECTOR Aandrijftechniek B.V. Gelderhorst 10 NL-7207 BH Zutphen Industrieterrein de Revelhorst	Tel. +31 575 57 44 94 Fax +31 575 57 24 43 oost@vector.nu
		VECTOR Aandrijftechniek B.V. Mercuriusweg 8A NL-5971 LX Grubbenvorst	Tel. +31 77 36 61 873 Fax +31 77 36 62 109 zuid@vector.nu
		VECTOR Aandrijftechniek B.V. Weberstraat 74 NL-1446 VV Purmerend Industrieterrein "De Baanstee"	Tel. +31 299 66 63 38 Fax +31 299 47 60 55 noordwest@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Technical Office	**Palmerston North**	SEW-EURODRIVE NEW ZEALAND LTD. C/-Grant Shearman, RD 5, Aronui Road Palmerston North	Tel. +64 6 355-2165 Fax +64 6 355-2316 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Philippines			
Represented by	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 676 53 00 Fax +48 42 676 53 45 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
		24 Hour Service	Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl
Technical Office	**Tychy**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Fabryczna 5 PL-43-100 Tychy	Tel. +48 32 32 32 610 Fax +48 32 32 32 647
	Bydgoszcz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Fordońska 246 PL-85-959 Bydgoszcz	Tel. +48 52 3606590 Fax +48 52 3606591
	Poznan	SEW-EURODRIVE Polska Sp.z.o.o. ul. Romana Maya 1 PL-61-371 Poznań	Tel. +48 61 8741640 Fax +48 61 8741641
	Radom	SEW-EURODRIVE Polska Sp.z.o.o. ul. Słowackiego 84 PL-26-600 Radom	Tel. +48 48 365 40 50 Fax +48 48 365 40 51
	Szczecinek	SEW-EURODRIVE Polska Sp.z.o.o. ul. Mickiewicza 2 PL-78-400 Szczecinek	Tel. +48 94 3728820 Fax +48 94 3728821

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
Technical Offices	**Lisboa**	SEW-EURODRIVE, LDA. Núcleo Empresarial I de São Julião do Tojal Rua de Entremuros, 54 Fracção I P-2660-533 São Julião do Tojal	Tel. +351 21 958-0198 Fax +351 21 958-0245 esc.lisboa@sew-eurodrive.pt
	Porto	SEW-EURODRIVE, LDA. Av. 25 de Abril, 68 4440-502 Valongo	Tel. +351 229 350 383 Fax +351 229 350 384 MobilTel. +351 9 32559110 esc.porto@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucureşti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Technical Office	**Yekaterinburg**	ZAO SEW-EURODRIVE Kominterna Str. 16 Office 614 RUS-620078 Ekaterinburg	Tel. +7 343 310 3977 Fax +7 343 310 3978 eso@sew-eurodrive.ru
	Irkutsk	ZAO SEW-EURODRIVE 5-Armii Str., 31 RUS-664011 Irkutsk	Tel. +7 3952 25 5880 Fax +7 3952 25 5881 iso@sew-eurodrive.ru
	Moskau	ZAO SEW-EURODRIVE RUS-107023 Moskau	Tel. +7 495 9337090 Fax +7 495 9337094 mso@sew-eurodrive.ru
	Novosibirsk	ZAO SEW-EURODRIVE pr. K Marksa, d.30 RUS-630087 Novosibirsk	Tel. +7 383 3350200 Fax +7 383 3462544 nso@sew-eurodrive.ru
	Togliatti	ZAO SEW-EURODRIVE Sportivnaya Str. 4B, office 2 Samarskaya obl. RUS-445057 Togliatti	Tel. +7 8482 710529 Fax +7 8482 810590

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn

Serbia			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.co.yu

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 cfoster@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaco Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za
Technical Offices	**Port Elizabeth**	SEW-EURODRIVE PTY LTD. 8 Ruan Access Park Old Cape Road Greenbushes 6000 Port Elizabeth	Tel. +27 41 3722246 Fax +27 41 3722247 dtait@sew.co.za
	Richards Bay	SEW-EURODRIVE PTY LTD. 103 Bulion Blvd Richards Bay P.O. Box 458 Richards Bay, 3900	Tel. +27 35 797-3805 Fax +27 35 797-3819 jswart@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es
Technical Offices	**Barcelona**	Delegación Barcelona Avenida Francesc Maciá 40-44 Oficina 4.2 E-08208 Sabadell (Barcelona)	Tel. +34 93 7162200 Fax +34 93 7233007
	Lugo	Delegación Noroeste Apartado, 1003 E-27080 Lugo	Tel. +34 639 403348 Fax +34 982 202934
	Madrid	Delegación Madrid Gran Via. 48-2° A-D E-28220 Majadahonda (Madrid)	Tel. +34 91 6342250 Fax +34 91 6340899
	Seville	MEB Pólogono Calonge, C/A Nave 2 - C E-41.077 Sevilla	Tel. +34 954 356 361 Fax +34 954 356 274 mebsa.sevilla@mebsa.com

Spain			
	Valencia	MEB Músico Andreu i Piqueres, 4 E-46.900 Torrente (Valencia)	Tel. +34 961 565 493 Fax +34 961 566 688 mebsa.valencia@mebsa.com
Sri Lanka			
Sales	**Colombo**	SM International (Pte) Ltd 254, Galle Raod Colombo 4, Sri Lanka	Tel. +94 1 2584887 Fax +94 1 2582981
Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se
Sales	**Göteborg**	SEW-EURODRIVE AB Gustaf Werners gata 8 S-42132 Västra Frölunda	Tel. +46 31 70968 80 Fax +46 31 70968 93 goteborg@sew.se
	Stockholm	SEW-EURODRIVE AB Björkholmsvägen 10 S-14146 Huddinge	Tel. +46 8 44986 80 Fax +46 8 44986 93 stockholm@sew.se
	Malmö	SEW-EURODRIVE AB Borrgatan 5 S-21124 Malmö	Tel. +46 40 68064 80 Fax +46 40 68064 93 malmo@sew.se
	Skellefteå	SEW-EURODRIVE AB Trädgårdsgatan 8 S-93131 Skellefteå	Tel. +46 910 7153 80 Fax +46 910 7153 93 skelleftea@sew.se
Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch
Technical Offices	**Rhaetian Switzerland**	André Gerber Es Perreyres CH-1436 Chamblon	Tel. +41 24 445 3850 Fax +41 24 445 4887
	Bern / Solothurn	Rudolf Bühler Muntersweg 5 CH-2540 Grenchen	Tel. +41 32 652 2339 Fax +41 32 652 2331
	Central Switzerland and Ticino	Beat Lütolf Baumacher 11 CH-6244 Nebikon	Tel. +41 62 756 4780 Fax +41 62 756 4786
	Central Switzerland, Aargau	Armin Pfister Stierenweid CH-4950 Huttwill, BE	Tel. +41 62 962 54 55 Fax +41 62 962 54 56
	Zürich, Ticino	Gian-Michele Muletta Fischerstrasse 61 CH-8132 Egg bei Zürich	Tel. +41 44 994 81 15 Fax +41 44 994 81 16
	Bodensee and East Switzerland	Markus Künzle Eichweg 4 CH-9403 Goldach	Tel. +41 71 845 2808 Fax +41 71 845 2809
Taiwan (R.O.C.)			
Sales	**Nan Tou**	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878

Taiwan (R.O.C.)			
	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Hwa South Road, Taipei	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 sewtwn@ms63.hinet.net

Thailand			
Assembly Sales Service	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Technical Offices	**Bangkok**	SEW-EURODRIVE (Thailand) Ltd. 6th floor, TPS Building 1023, Phattanakarn Road Suanluang Bangkok,10250	Tel. +66 2 7178149 Fax +66 2 7178152 sewthailand@sew-eurodrive.com
	Hadyai	SEW-EURODRIVE (Thailand) Ltd. Hadyai Country Home Condominium 59/101 Soi.17/1 Rachas-Utid Road. Hadyai, Songkhla 90110	Tel. +66 74 359441 Fax +66 74 359442 sewthailand@sew-eurodrive.com
	Khonkaen	SEW-EURODRIVE (Thailand) Ltd. 4th Floor, Kaow-U-HA MOTOR Bldg, 359/2, Mitraphab Road. Muang District Khonkaen 40000	Tel. +66 43 225745 Fax +66 43 324871 sew-thailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn

Turkey			
Assembly Sales Service	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 4419164 Fax +90 216 3055867 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr
Technical Offices	**Adana**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Kizilay Caddesi 8 Sokak No 6 Daðtekin Is Merkezi Kat 4 Daire 2 TR-01170 SEYHAN / ADANA	Tel. +90 322 359 94 15 Fax +90 322 359 94 16
	Ankara	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Özcelik Is Merkezi, 14. Sok, No. 4/42 TR-06370 Ostim/Ankara	Tel. +90 312 385 33 90 Fax +90 312 385 32 58
	Bursa	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Üçevler Mah. Bayraktepe Sok. Akay İş Merkezi Kat:3 No: 7/6 TR Nilüfer/Bursa	Tel. +90 224 443 45 60 Fax +90 224 443 45 58
	Izmir	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. 1203/11 Sok. No. 4/613 Hasan Atli Is Merkezi TR-35110 Yenisehir-İzmir	Tel. +90 232 469 62 64 Fax +90 232 433 61 05

Ukraine			
Sales **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
Sales	**Kiev**	SEW-EURODRIVE GmbH S. Oleynika str. 21 02068 Kiev	Tel. +380 44 503 95 77 Fax +380 44 503 95 78 kso@sew-eurodrive.ua
	Donetsk	SEW-EURODRIVE GmbH 25th anniversary of RKKA av. 1-B, of. 805 Donetsk 83000	Tel. +380 62 38 80 545 Fax +380 62 38 80 533 dso@sew-eurodrive.ua

Uruguay			
Sales	**Montevideo**	SEW-EURODRIVE Uruguay, S. A. Jose Serrato 3569 Esqina Corumbe CP 12000 Montevideo	Tel. +598 2 21181-89 Fax +598 2 21181-89 sewuy@sew-eurodrive.com.uy

USA			
Production **Assembly** **Sales** **Service** **Corporate Offices**	**Southeast Region**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**Northeast Region**	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net

Inquiry/Order

SEW EURODRIVE

Customer data:

Company: ____________________ Customer no.: ____________________
Department: ____________________
Name: ____________________ Phone: ____________________
Street/P.O. Box: ____________________ Fax: ____________________
____________________ Email: ____________________
ZIP code/city: ____________________

Your contact partner at SEW:

Name: ____________________ Phone: ____________________
Technical Office: ____________________ Fax: ____________________

Technical data:

Quantity: ________ Requested delivery date: ____________________
Catalog designation: ____________________

Gear unit type:

☐ Helical ☐ Parallel shaft helical ☐ Helical-bevel ☐ Helical-worm ☐ Spiroplan®
☐ Multi-stage ☐ Servo ☐ Variable speed ☐ EMS ☐ Other: ________

Power: ________ kW **Output speed:** ________ rpm **Output torque:** ________ Nm

Cycles/h: ____________ c/h **Cyclic duration factor:** S ________ / ________ % cdf
☐ 1-shift operation ☐ 2-shift operation ☐ 3-shift operation
☐ Uniform ☐ Non-uniform ☐ Extremely non-uniform

Mounting position:
M1 ☐ M2 ☐ M3 ☐ M4 ☐ M5 ☐ M6 ☐ Pivoting ☐

Housing type:
☐ Foot-mounted ☐ Flange (bore) ☐ Flange (thread)
☐ Torque arm ☐ Other: ____________________

Shaft type:
☐ Solid shaft with key ☐ Shrink disk Shaft/hollow shaft ∅: ________ mm
☐ Hollow shaft with key ☐ TorqLOC® Flange ∅: ________ mm

Shaft position (right-angle units): ☐ A | ☐ B | ☐ AB

Terminal box position: ☐ 0°(R) ☐ 90°(B) | ☐ 180°(L) | ☐ 270°(T)

Cable entry: ☐X ☐1 | ☐2 | ☐3

Degree of protection:
IP54 ☐ IP55 ☐ IP56 ☐ IP65 ☐ IP66 ☐ IP69K ☐

Thermal class:
130(B) ☐ 155(F) ☐ 180(H) ☐

Surface/corrosion protection:
KS ☐ OS1 ☐ OS2 ☐ OS3 ☐ OS4 ☐

Mains voltage: ____________ V
Mains frequency: ☐ 50Hz ☐ 60Hz

Connection type:
☐ Δ ☐ Y ☐ YY ☐ Y/Y

☐ For inverter operation: Max. frequency: ________ Hz | **Control range:** ____________

Required options:
☐ Brake: voltage ________ V Braking torque: ________ Nm
☐ Manual brake release: ☐ HR or ☐ HF
☐ Forced cooling fan: Forced cooling fan voltage: ____________ V
☐ Motor protection: ☐ TF or ☐ TH
☐ Encoder: ____________________
☐ Plug connection: ____________________
☐ Inverter: ____________________
☐ RAL 7031 or ☐ RAL ____________

Other options:

Special ambient conditions:
Temperature from ________ °C to ________ °C | ☐ Outdoor use | ☐ Installation >1000m above msl
Other ambient conditions: ____________________
Other: ____________________

Place, date ____________________ **Signature:** ____________________




SEW EURODRIVE

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