SEW EURODRIVE

Operating instructions



AC motors

DRN.., DRU.., DR2S.., DR2L.., DR2M..

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1 General information

1.1 About this documentation

The documentation at hand is the original.

This documentation is an integral part of the product. The documentation is intended for all employees who perform work on the product.

Make sure this documentation is accessible and legible. Ensure that persons responsible for the systems and their operation as well as persons who work on the product independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation or if you require further information, contact SEW-EURODRIVE.

1.2 Structure of the safety notes

1.2.1 Meaning of signal words

The following table shows the graduation and meaning of the signal words in the safety notes.

Signal word	Meaning	Consequences if not observed
⚠ **DANGER**	Imminent danger	Death or severe injuries
⚠ **WARNING**	Possibly dangerous situation	Death or severe injuries
⚠ **CAUTION**	Possibly dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the product or its environment
INFORMATION	Useful information or tip: Simplifies handling of the product.	

1.2.2 Structure of section-related safety notes

Section-related safety notes do not apply to a specific action but to several actions pertaining to one subject. The hazard symbols used either indicate a general hazard or a specific hazard.

This is the formal structure of a safety note for a specific section:



SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

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Meaning of the hazard symbols

The hazard symbols in the safety notes have the following meaning:

Hazard symbol	Meaning
	General hazard
	Warning of hot surfaces
	Warning of automatic restart

1.2.3 Structure of embedded safety notes

Embedded safety notes are directly integrated into the instructions just before the description of the dangerous step.

This is the formal structure of an embedded safety note:

⚠ **SIGNAL WORD!** Type and source of danger. Possible consequence(s) if disregarded. Measure(s) to prevent danger.

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1.3 Rights to claim under limited warranty

Read the information in this documentation. This is essential for fault-free operation and fulfillment of any rights to claim under limited warranty. Read the documentation before you start working with the product.

1.4 Product names and trademarks

The product names mentioned in this documentation are trademarks or registered trademarks of the respective titleholders.

1.5 Copyright notice

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1.6 Other applicable documentation

Observe the corresponding documentation for all additional components.

1.6.1 DR..56 – 315 AC motors

Observe the following additional documents:

- Wiring diagrams included with the motor
- "Gear Unit Series R..7, F..7, K..7, K..9, S..7, SPIROPLAN® W" operating instructions for gearmotors
- AC motors catalogs
- Gearmotors catalogs
- Addendum to the operating instructions "Safety Encoders and Safety Brakes, AC Motors DR.., DRN.., DR2.., EDR.., EDRN.. – Functional Safety"
- Addendum to the "AC Motors with MOVILINK® DDI Interface" operating instructions
- "Project Planning for BE.. Brakes" manual – DR.., DRN.., DR2.., EDR.., EDRN.. AC Motors – Standard Brake/Safety Brake"
- If required "MOVIMOT® MM..D Functional Safety" manual

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2 Safety notes

2.1 Preliminary information

The following general safety notes serve the purpose of preventing injury to persons and damage to property. They primarily apply to the use of products described in this documentation. If you use additional components, also observe the relevant warning and safety notes.

2.2 Duties of the user

As the user, you must ensure that the basic safety notes are observed and complied with. Make sure that persons responsible for the machinery and its operation as well as persons who work on the device independently have read through the documentation carefully and understood it.

As the user, you must ensure that all of the work listed in the following is carried out only by qualified specialists:

- Setup and installation
- Installation and connection
- Startup
- Maintenance and repairs
- Shutdown
- Disassembly

Ensure that the persons who work on the product pay attention to the following regulations, conditions, documentation, and information:

- The national and regional regulations governing safety and the prevention of accidents
- Product safety label on the product
- All other associated project planning documents, installation and startup instructions, as well as connection and wiring diagrams
- Do not assemble, install, or operate damaged products
- All system-specific specifications and regulations

Ensure that systems in which the product is installed are equipped with additional monitoring and protection devices. Observe the applicable safety regulations and legislation governing technical work equipment and accident prevention regulations.

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2.3 Target group

Specialist for mechanical work

Any mechanical work may be performed only by adequately qualified specialists. Specialists in the context of this documentation are persons who are familiar with the design, mechanical installation, troubleshooting, and maintenance of the product, and who possess the following qualifications:

- Qualifications in the field of mechanics in accordance with the national regulations
- Familiarity with this documentation

Specialist for electrotechnical work

Any electrotechnical work may be performed only by electrically skilled persons with a suitable education. Electrically skilled persons in the context of this documentation are persons who are familiar with electrical installation, startup, troubleshooting, and maintenance of the product, and who possess the following qualifications:

- Qualifications in the field of electrical engineering in accordance with the national regulations
- Familiarity with this documentation

Additional qualifications

In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives, and laws specified in this documentation.

The persons must have the express authorization of the company to operate, program, parameterize, label, and ground devices, systems, and circuits in accordance with the standards of safety technology.

Instructed persons

All work in the areas of transport, storage, installation, operation and waste disposal may only be carried out by persons who are trained and instructed appropriately. These instructions must enable the persons to carry out the required activities and work steps safely and in accordance with regulations.

2.4 Designated use

The product is intended for use in industrial and commercial systems.

In the case of installation in electrical systems or machines, it is prohibited to start the proper operation of the product until it is determined that the machine meets the requirements stipulated in the local laws and directives.

The standards given in the declaration of conformity apply to the product.

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2.5 Transportation/storage

Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. If the product or the packaging is damaged, do not assemble, install, connect, or start up the product. If the packaging is damaged, the product itself may also be damaged.

The lifting eyebolts are designed to carry only the weight of the motor without gear unit. Tighten installed lifting eyebolts. Mounted gear units have separate suspension attachments, which must be used according to the gear unit operating instructions when lifting the gearmotor. Do not mount any additional loads.

The installed lifting eyebolts are in accordance with DIN 580. Observe the loads and regulations specified there. The tension force vector of the slings must not exceed a 45° angle in accordance with DIN 580.

If necessary, use suitable, sufficiently dimensioned handling equipment.

Observe the following notes when transporting the device:

- Always use all attachment points if available. The attachment points are designed to carry only the mass of the product. Do not apply any additional loads.
- Ensure that the product is not subject to mechanical impact.

If the product is not immediately installed, it must be stored in a dry and dust-free location. The product can be stored for up to 9 months without requiring any special measures before startup. Do not store the product outdoors.

Do not transport or store the product on the fan guard.

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2.6 Installation/assembly

Note the following points during installation:

- Make sure that the supports are even, the foot and flange mounting is correct and if there is direct coupling, align with precision.
- Avoid resonance between the rotational frequency and the double supply system frequency.
- Release the brake (for motors with mounted brake).
- Turn the rotor by hand and listen for unusual grinding noise.
- Check the direction of rotation in decoupled state.
- Only install or remove belt pulleys and couplings using suitable devices (heat up). Cover the belt pulleys and couplings with a touch guard. Avoid unacceptable belt tension.
- Establish any necessary pipe connections.
- Mounting positions with the shaft end pointing upward must be equipped with a cover to prevent foreign objects from falling into the fan. Ensure that ventilation openings are not obstructed and that used air cannot be drawn in again straight away. The same applies to air from adjacent units.

See also the information in chapter "Mechanical installation" (→ 🗎 38).

2.6.1 Restrictions of use

The following applications are prohibited unless the device is explicitly designed for such use:

- Use in potentially explosive areas
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, and radiation
- Use at ambient temperatures below -20 °C or above +40 °C
- Use at installation altitudes above 1000 m above sea level

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2.7 Electrical work

2.7.1 Carrying out electrical work safely

Observe the following information to carry out electrical work safely during installation and maintenance:

- Electrical work may only be carried out by electrically skilled persons.
- Always adhere to the 5 safety rules for working on electrical components:
  - Disconnect
  - Secure the drive against restart
  - Check that no voltage is applied
  - Ground and short-circuit it
  - Cover or safeguard neighboring live parts
- When the device is switched on, dangerous voltages are present on all power connections as well as on any connected cables and terminals. This also applies even when the product is inhibited and the motor is in an idle state.

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2.8 Startup/operation

Risk of burns: The surface temperature of the product can exceed 60 °C during operation. Do not touch the product during operation. Let the product cool down before touching it.

Do not deactivate monitoring and protection devices of the machine or system, even for a test run.

Depending on the degree of protection, products may have live, uninsulated, and sometimes moving or rotating parts as well as hot surfaces during operation.

Make sure that any existing transport protection is removed.

In the event of deviations from normal operation, switch off the product. Possible deviations are increased temperatures, noise, or vibration, for example. Determine the cause. Contact SEW-EURODRIVE if necessary.

Ensure that the terminal box is closed and screwed down before applying the supply voltage.

Additional preventive measures may be required for applications with increased hazard potential. Be sure to check the effectiveness of the protection devices after every modification.

Mechanical blocking or internal protective functions of the product can cause a motor standstill. Removing the cause of this problem or performing a reset can result in the machine or the system re-starting on its own. First, disconnect the product from the supply system before you start troubleshooting.

Overheating of motors with backstop /RS

With low motor speeds, the centrifugal forces are so low that the backstop sprags brush against the inner and outer ring. This causes overheating of the friction surfaces.

- Do not permanently operate motors with backstop /RS below lift-off speed.

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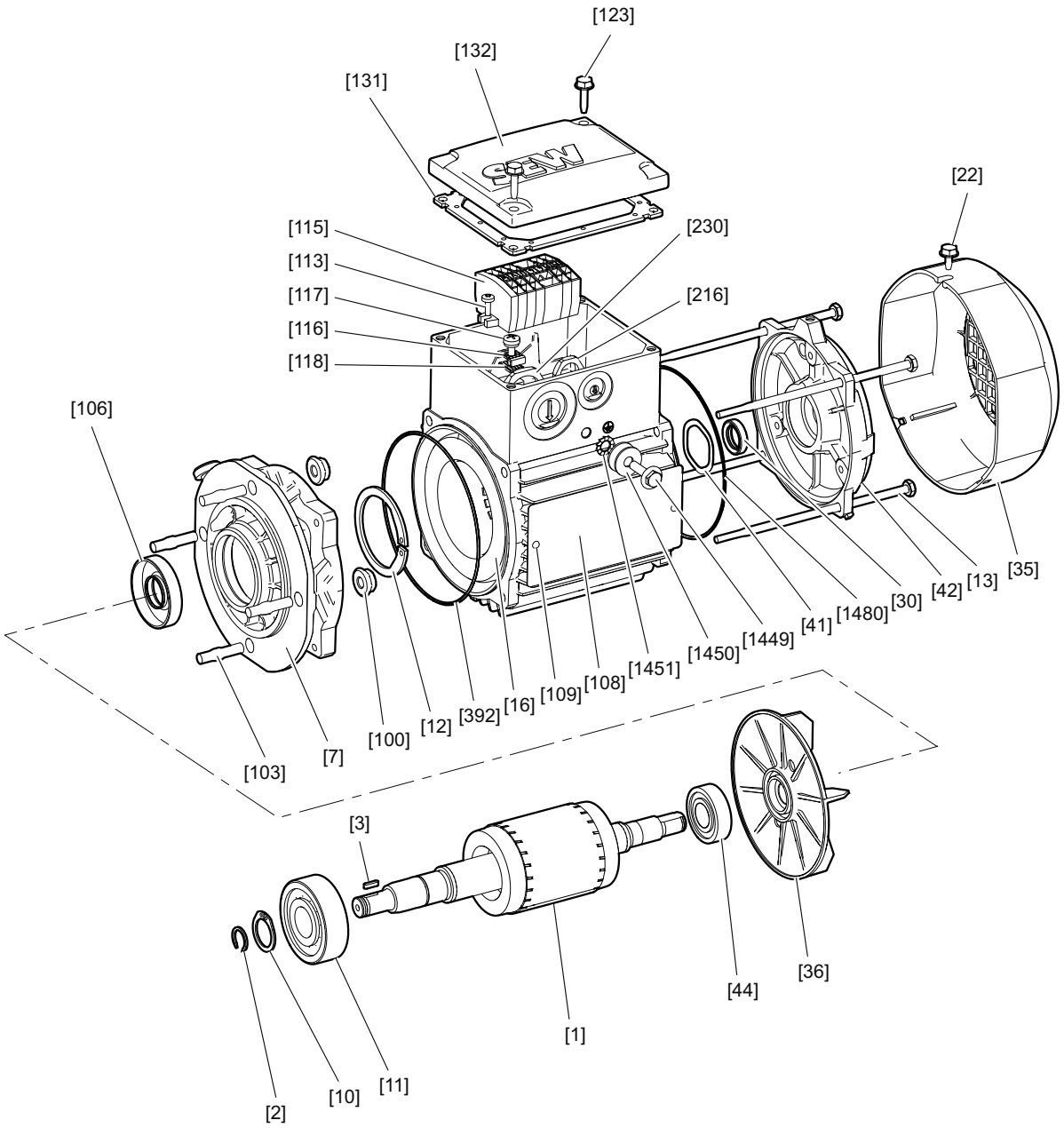
3 Motor structure

3.1 Basic structure

The following figures are schematic representations. Deviations are possible depending on the size and design.

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3.2 Basic structure of DR..56 motors

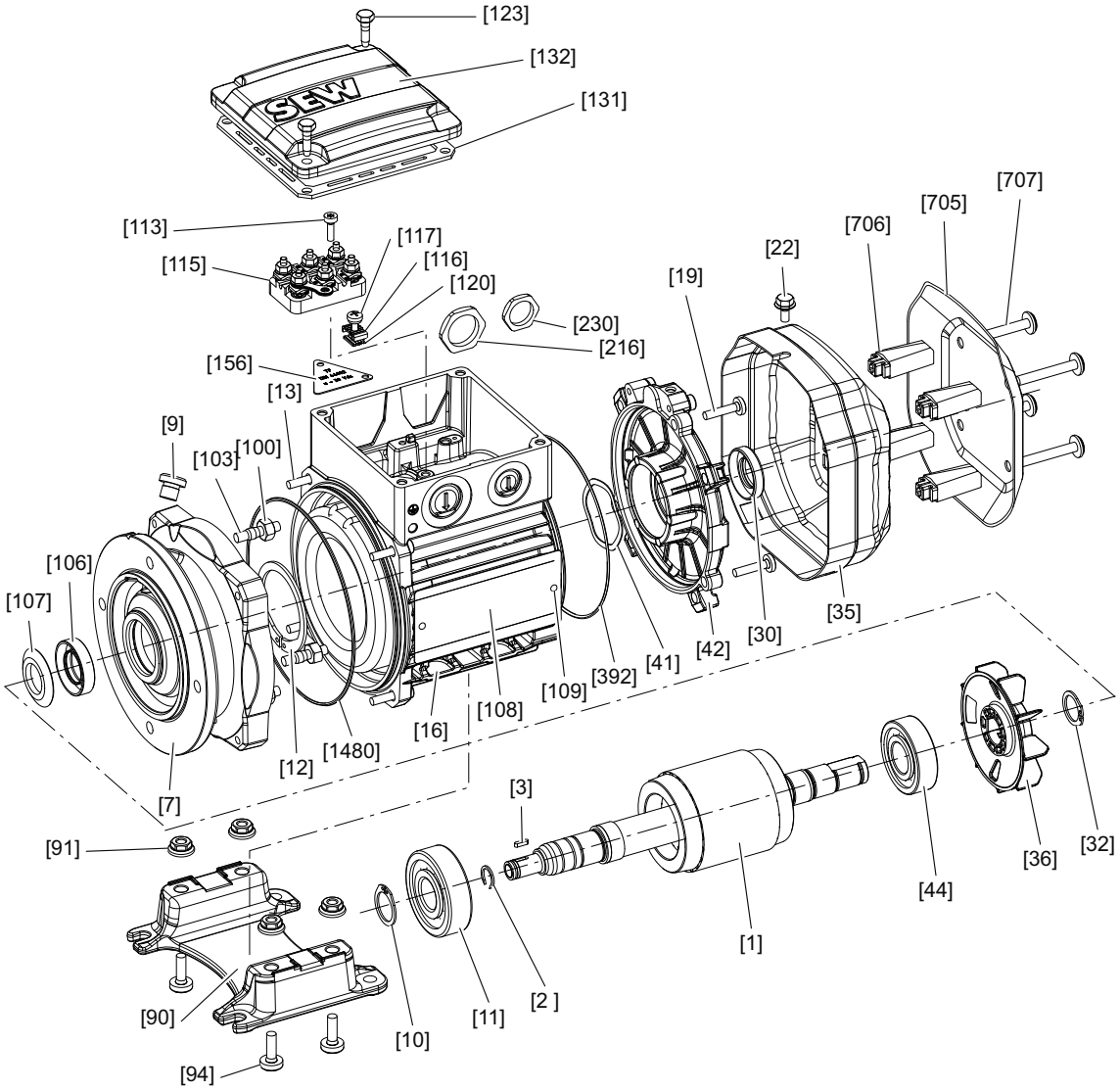


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[1]	Rotor	[22]	Hex head screw	[106]	Oil seal	[131]	Gasket for cover
[2]	Retaining ring	[30]	Oil seal	[108]	Nameplate	[132]	Terminal box cover
[3]	Key	[35]	Fan guard	[109]	Grooved pin	[216]	Hex nut
[7]	Flanged endshield	[36]	Fan	[113]	Cylinder head screw	[230]	Hex nut
[10]	Retaining ring	[41]	Equalizing ring	[115]	Terminal board	[392]	O-ring
[11]	Deep groove ball bearing	[42]	Rear endshield	[116]	Terminal clip	[1449]	Hex head screw
[12]	Retaining ring	[44]	Deep groove ball bearing	[117]	Flat head screw	[1450]	Washer
[13]	Cap screw	[100]	Hex nut	[118]	Washer	[1451]	Serrated lock washer
[16]	Stator	[103]	Stud	[123]	Hex head screw	[1480]	O-ring

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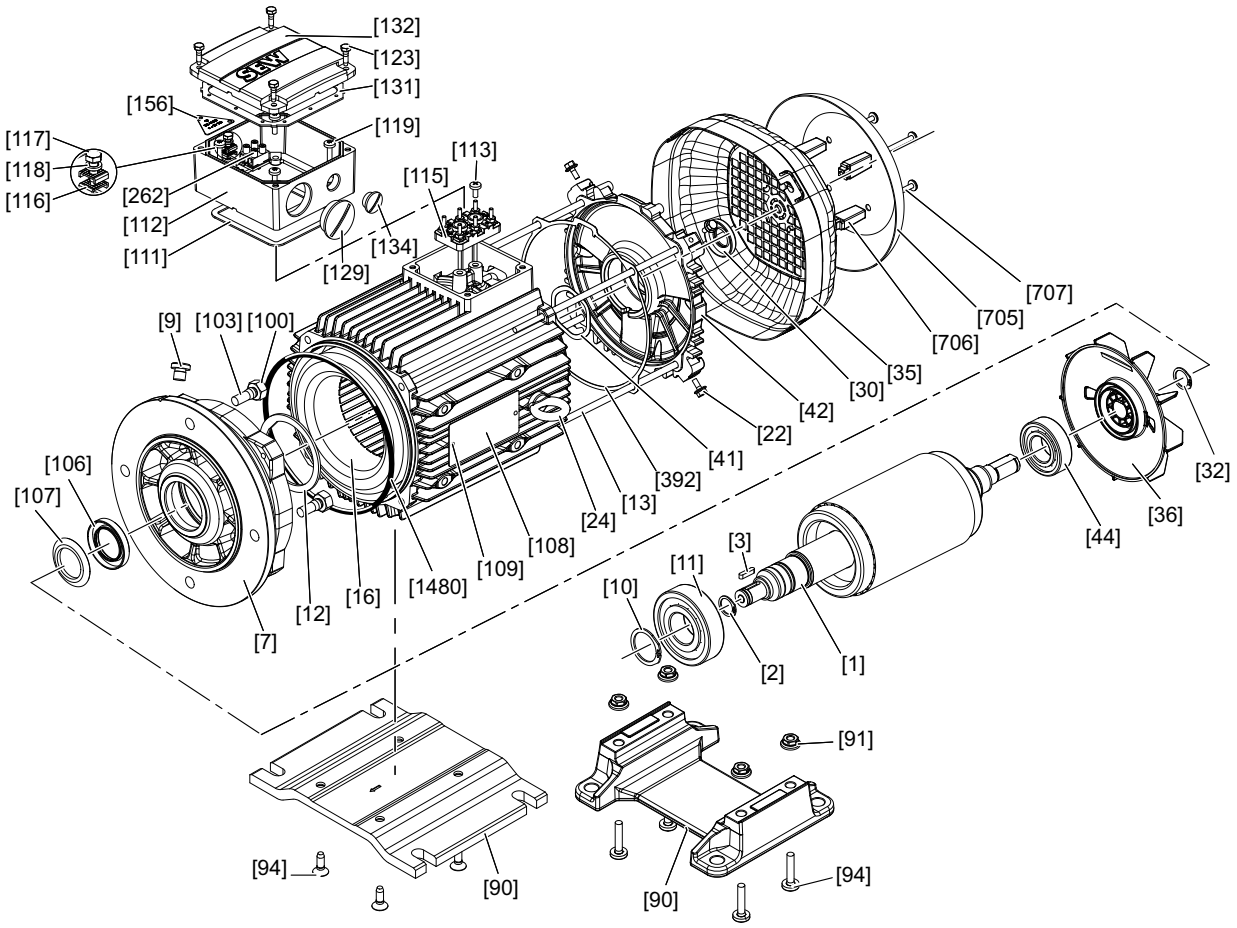
3.3 Basic structure of DR..63 motors



22297409803

[1]	Rotor	[22]	Hex head screw	[100]	Hex nut	[123]	Hex head screw
[2]	Retaining ring	[30]	Oil seal	[103]	Stud	[131]	Gasket for cover
[3]	Key	[32]	Retaining ring	[106]	Oil seal	[132]	Terminal box cover
[7]	Flanged endshield	[35]	Fan guard	[107]	Oil flinger	[156]	Information sign
[9]	Screw plug	[36]	Fan	[108]	Nameplate	[216]	Hex nut
[10]	Retaining ring	[41]	Equalizing ring	[109]	Grooved pin	[230]	Hex nut
[11]	Deep groove ball bearing	[42]	B-side endshield	[113]	Cylinder head screw	[392]	O-ring
[12]	Retaining ring	[44]	Deep groove ball bearing	[115]	Terminal board	[705]	Canopy
[13]	Cap screw	[90]	Bed plate	[116]	Terminal clip	[706]	Spacer
[16]	Stator	[91]	Hex nut	[117]	Flat head screw	[707]	Hex head screw
[19]	Pan head screw	[94]	Flat head screw	[120]	Support plate	[1480]	O-ring

3.4 Basic structure of DR..71 – 132S motors

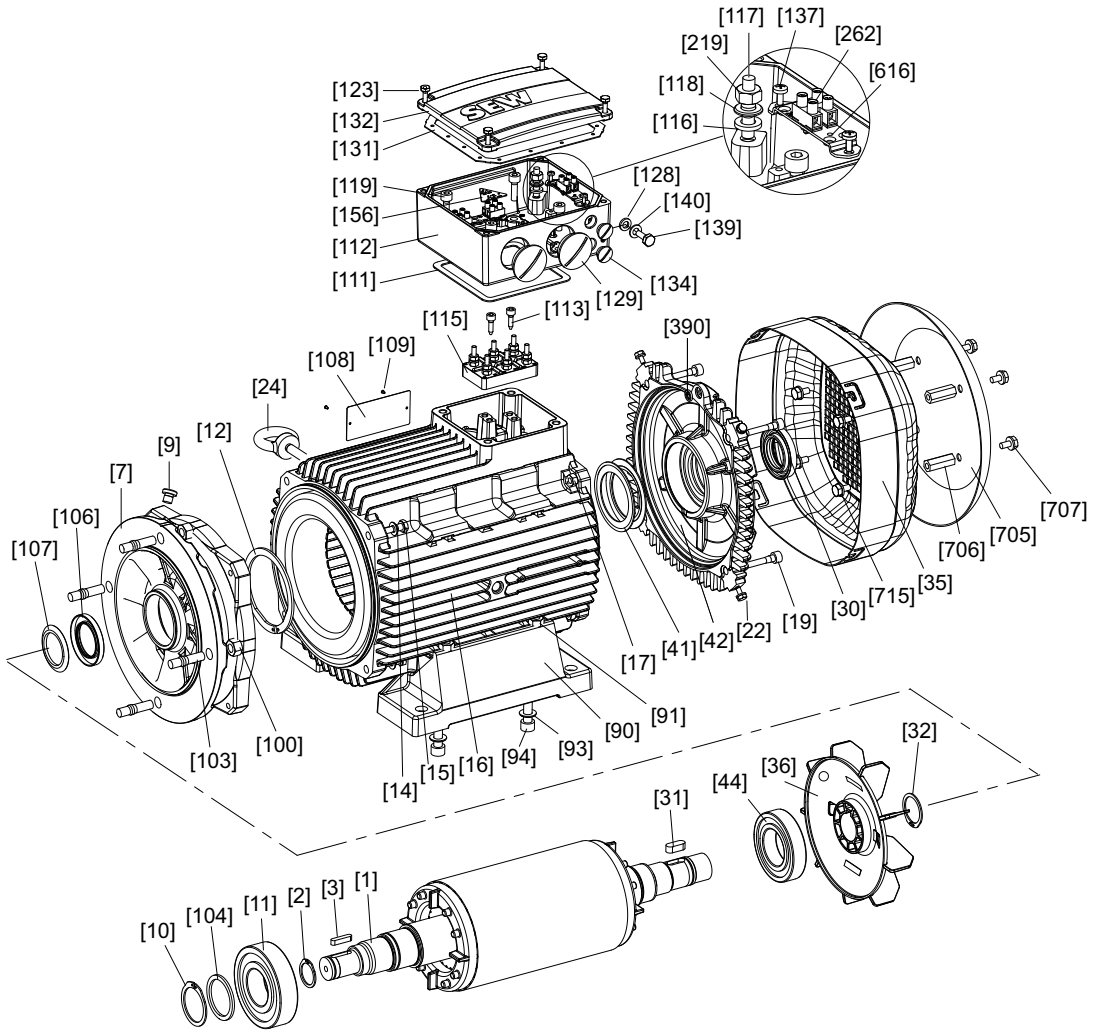


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[1]	Rotor	[32]	Retaining ring	[107]	Oil flinger	[123]	Hex head screw
[2]	Retaining ring	[35]	Fan guard	[108]	Nameplate	[129]	Screw plug with O-ring
[3]	Key	[36]	Fan	[109]	Grooved pin	[131]	Gasket for cover
[7]	Flanged endshield	[41]	Shim	[111]	Gasket for lower part	[132]	Terminal box cover
[9]	Screw plug	[42]	B-side endshield	[112]	Terminal box lower part	[134]	Screw plug with O-ring
[10]	Retaining ring	[44]	Deep groove ball bearing	[113]	Pan head screw	[156]	Information sign
[11]	Deep groove ball bearing	[90]	Bed plate	[115]	Terminal board	[262]	Connection terminal
[12]	Retaining ring	[91]	Hex nut	[116]	Terminal clip	[392]	Gasket
[13]	Cap screw	[94]	Screw			[705]	Canopy
[16]	Stator	[100]	Hex nut	[117]	Hex head screw	[706]	Spacer
[22]	Hex head screw	[103]	Stud	[118]	Lock washer	[707]	Pan head screw
[24]	Eyebolt	[106]	Oil seal	[119]	Pan head screw	[1480]	O-ring
[30]	Oil seal						

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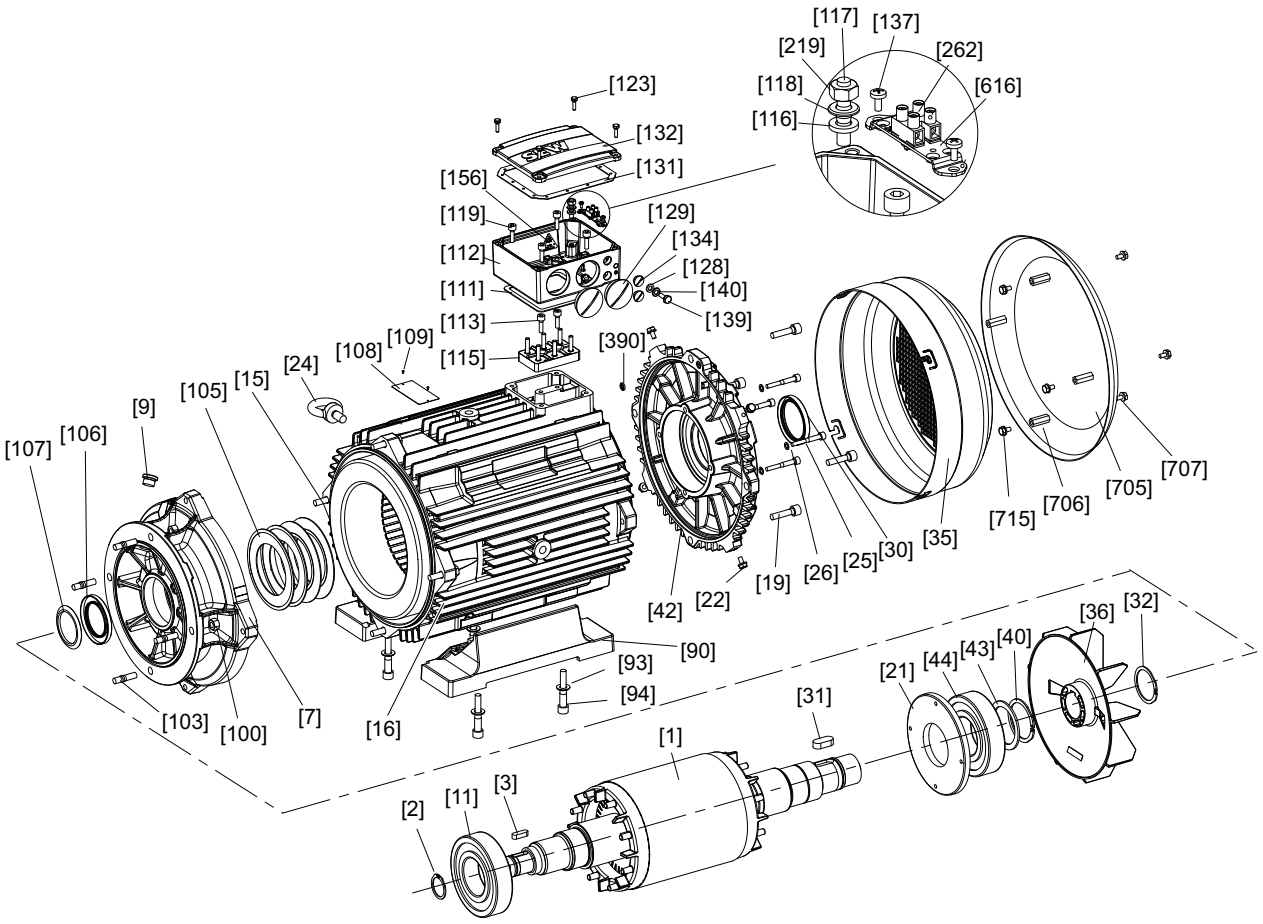
3.5 Basic structure of DR..132M – 180 motors



27021598291545611

[1]	Rotor	[31]	Key	[108]	Nameplate	[132]	Terminal box cover
[2]	Retaining ring	[32]	Retaining ring	[109]	Grooved pin	[134]	Screw plug with O-ring
[3]	Key	[35]	Fan guard	[111]	Gasket for lower part	[137]	Screw
[7]	Flange	[36]	Fan	[112]	Terminal box lower part	[139]	Hex head screw
[9]	Screw plug	[41]	Cup spring	[113]	Screw	[140]	Washer
[10]	Retaining ring	[42]	Rear endshield	[115]	Terminal board	[156]	Information sign
[11]	Deep groove ball bearing	[44]	Deep groove ball bearing	[116]	Serrated lock washer	[219]	Hex nut
[12]	Retaining ring	[90]	Foot	[117]	Stud	[262]	Connection terminal
[14]	Washer	[91]	Hex nut	[118]	Washer	[390]	O-ring
[15]	Hex head screw	[93]	Washer	[119]	Cap screw	[616]	Retaining plate
[16]	Stator	[94]	Cap screw	[123]	Hex head screw	[705]	Canopy
[17]	Hex nut	[100]	Hex nut	[128]	Serrated lock washer	[706]	Spacer
[19]	Cap screw	[103]	Stud	[129]	Screw plug with O-ring	[707]	Hex head screw
[22]	Hex head screw	[104]	Supporting ring	[131]	Gasket for cover	[715]	Hex head screw
[24]	Lifting eyebolt	[106]	Oil seal				
[30]	Sealing ring	[107]	Oil flinger				

3.6 Basic structure of DR..200 – 225 motors

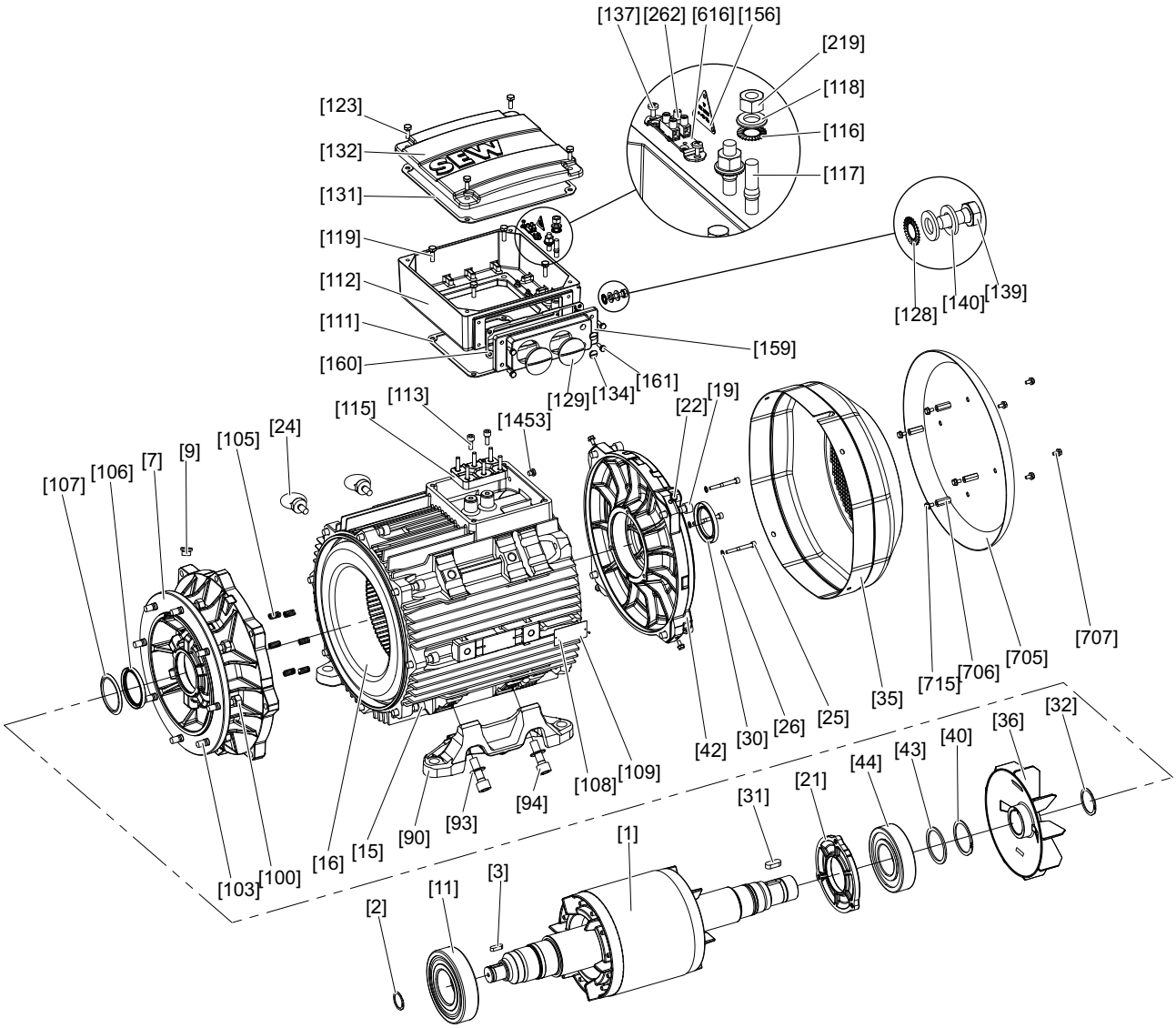


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[1]	Rotor	[31]	Key	[107]	Oil flinger	[132]	Terminal box cover
[2]	Retaining ring	[32]	Retaining ring	[108]	Nameplate	[134]	Screw plug
[3]	Key	[35]	Fan guard	[109]	Grooved pin	[137]	Screw
[7]	Flange	[36]	Fan	[111]	Gasket for lower part	[139]	Hex head screw
[9]	Screw plug	[40]	Retaining ring	[112]	Terminal box lower part	[140]	Washer
[11]	Deep groove ball bearing	[42]	Rear endshield	[113]	Cap screw	[156]	Information sign
[15]	Hex head screw	[43]	Supporting ring	[115]	Terminal board	[219]	Hex nut
[16]	Stator	[44]	Deep groove ball bearing	[116]	Serrated lock washer	[262]	Connection terminal
[19]	Cap screw	[90]	Foot	[117]	Stud	[390]	O-ring
[21]	Oil seal flange	[93]	Washer	[118]	Washer	[616]	Retaining plate
[22]	Hex head screw	[94]	Cap screw	[119]	Cap screw	[705]	Canopy
[24]	Lifting eyebolt	[100]	Hex nut	[123]	Hex head screw	[706]	Spacer bolt
[25]	Cap screw	[103]	Stud	[128]	Serrated lock washer	[707]	Hex head screw
[26]	Shield ring	[105]	Cup spring	[129]	Screw plug	[715]	Hex head screw
[30]	Oil seal	[106]	Oil seal	[131]	Gasket for cover		

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3.7 Basic structure of DR..250 – 280 motors

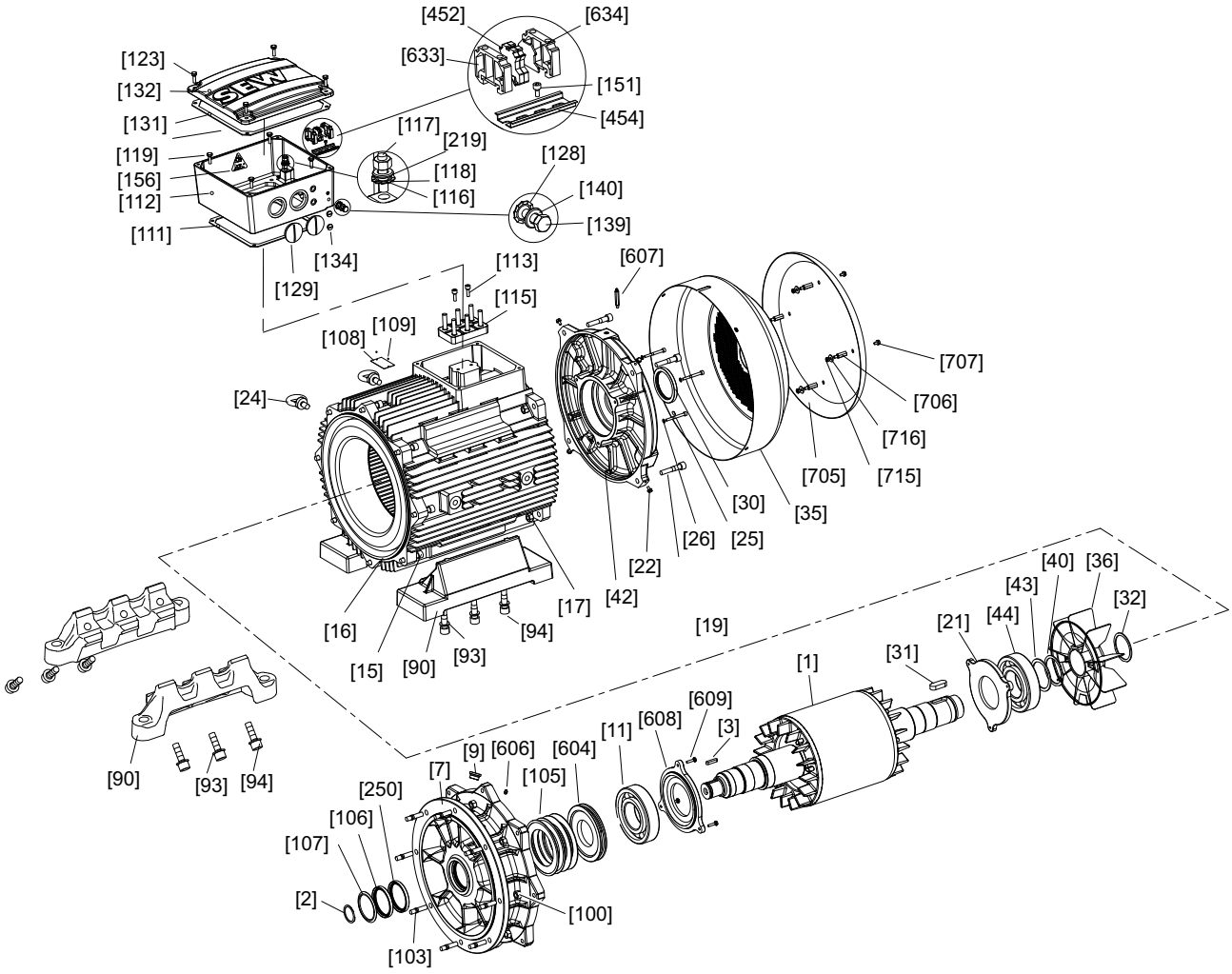


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[1]	Rotor	[32]	Retaining ring	[108]	Nameplate	[134]	Screw plug
[2]	Retaining ring	[35]	Fan guard	[109]	Grooved pin	[137]	Screw
[3]	Key	[36]	Fan	[111]	Gasket for lower part	[139]	Hex head screw
[7]	Flange	[40]	Retaining ring	[112]	Terminal box lower part	[140]	Washer
[9]	Screw plug	[42]	Rear endshield	[113]	Cap screw	[156]	Information sign
[11]	Deep groove ball bearing	[43]	Supporting ring	[115]	Terminal board	[159]	Connection piece
[15]	Cap screw	[44]	Deep groove ball bearing	[116]	Serrated lock washer	[160]	Connection piece seal
[16]	Stator	[90]	Foot	[117]	Stud	[161]	Hex head screw
[19]	Cap screw	[93]	Washer	[118]	Washer	[219]	Hex nut
[21]	Oil seal flange	[94]	Cap screw	[119]	Hex head screw	[262]	Connection terminal
[22]	Hex head screw	[100]	Hex nut	[123]	Hex head screw	[616]	Retaining plate
[24]	Lifting eyebolt	[103]	Stud	[128]	Serrated lock washer	[705]	Canopy
[25]	Cap screw	[105]	Compression spring	[129]	Screw plug	[706]	Spacer bolt
[26]	Shield ring	[106]	Oil seal	[131]	Gasket for cover	[707]	Hex head screw
[30]	Oil seal	[107]	Oil flinger	[132]	Terminal box cover	[715]	Hex head screw
[31]	Key					[1453]	Screw plug

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3.8 Basic structure of the DR..315 motors



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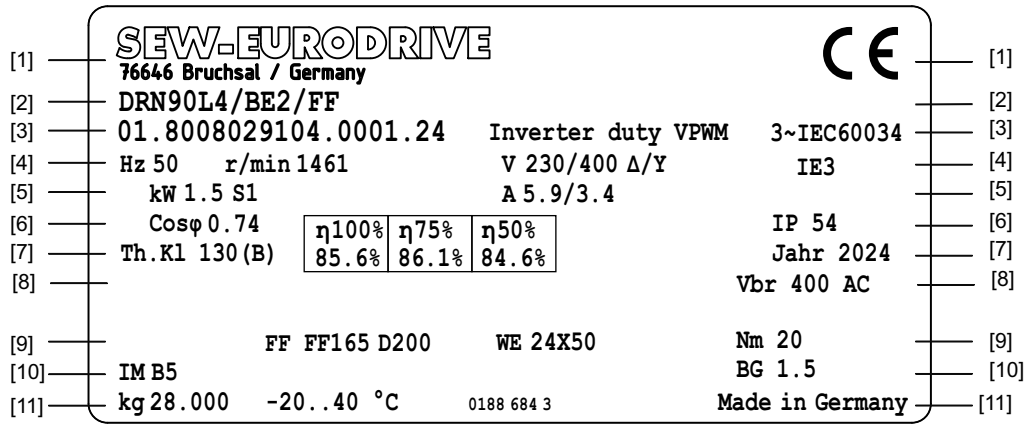
[1]	Rotor	[32]	Retaining ring	[111]	Gasket for lower part	[156]	Information sign
[2]	Retaining ring	[35]	Fan guard	[112]	Terminal box lower part	[219]	Hex nut
[3]	Key	[36]	Fan	[113]	Cap screw	[250]	Oil seal
[7]	Flange	[40]	Retaining ring	[115]	Terminal board	[452]	Terminal strip
[9]	Screw plug	[42]	Rear endshield	[116]	Serrated lock washer	[454]	Mounting rail
[11]	Rolling bearing	[43]	Supporting ring	[117]	Stud	[604]	Lubrication ring
[15]	Cap screw	[44]	Rolling bearing	[118]	Washer	[606]	Grease nipple
[16]	Stator	[90]	Foot	[119]	Hex head screw	[607]	Grease nipple
[17]	Hex nut	[93]	Washer	[123]	Hex head screw	[608]	Oil seal flange
[19]	Cap screw	[94]	Cap screw	[128]	Serrated lock washer	[609]	Hex head screw
[21]	Oil seal flange	[100]	Hex nut	[129]	Screw plug	[633]	End bracket
[22]	Hex head screw	[103]	Stud	[131]	Gasket for cover	[634]	End plate
[24]	Lifting eyebolt	[105]	Cup spring	[132]	Terminal box cover	[705]	Canopy
[25]	Cap screw	[106]	Oil seal	[134]	Screw plug	[706]	Spacer bolt
[26]	Shield ring	[107]	Oil flinger	[139]	Hex head screw	[707]	Hex head screw
[30]	Oil seal	[108]	Nameplate	[140]	Washer	[715]	Hex nut
[31]	Key	[109]	Grooved pin	[151]	Cap screw	[716]	Washer

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3.9 Nameplate

3.9.1 DRN.. motor nameplate

The following figure shows an example of a nameplate:

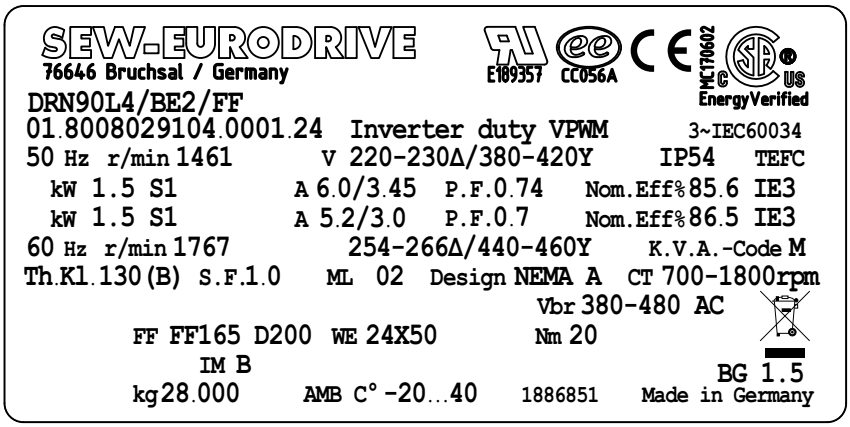


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Line	Information
[1]	• Manufacturer, address • CE label
[2]	• Type designation
[3]	• Serial number • Suitability for inverter operation • Number of phases and underlying rating and performance standards (EN/IEC 60034-X and/or equivalent national standard)
[4]	• Rated frequency • Rated speed • Nominal voltage • Energy efficiency class according to IEC 60034-30-1
[5]	• Rated power and operating mode • Rated current
[6]	• Power factor • Degree of protection according to IEC 60034-5
[7]	• Thermal class • Rated efficiency for motors included in the validity of the IEC 60034-30-1 standard • Year of manufacture
[8]	• Brake voltage
[9]	• Flange • Shaft end • Braking torque
[10]	• Mounting position • Brake rectifier

Line	Information
[11]	• Mass • Permitted ambient temperature range • Part number nameplate • Country of manufacture

3.9.2 DRN.. global motor nameplate



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3.9.3 Markings

The following table shows the markings on the nameplate.

CE	CE marking to state compliance with European directives, (see EU declaration of conformity or EU declaration of incorporation).
UKCA	The UKCA mark indicates compliance with British directives (see UK declaration of conformity or UK declaration of incorporation).
c UL us LISTED	The UL and cUL mark indicates UL approval. cUL is equally eligible for approval by the CSA.
c UL us LISTED	The UL and cUL mark indicates the granting of UL approval. cUL is equal to approval according to CSA. The UL/cUL mark is currently in preparation.
	Products and accessories may fall within the scope of the country-specific transposition of the WEEE Directive. Dispose of the product and its accessories in accordance with the national regulations of your country.

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3.9.4 Serial number

The following table shows an example structure of a serial number:

Example: 01. 12212343 01. 0001. 25	
01.	Sales organization
12212343	Order number (8 digits)
01.	Order item (2 digits)
0001	Running part no./unit number (4 digits)
25	End digits of the year of manufacture (2 digits)

3.10 Type designation

The following table shows an example of a type designation:

DRN132M4/BE11/HR/FI/TF	
DRN	Motor series
132	Motor size
M	Motor length
4	Number of poles
BE11	Brake with size specification
HR	Manual brake release
FI	Motor design
TF	Thermal motor protection

3.10.1 Designation of the motors

Designation	Description
DR2S..	Standard motor, Standard efficiency IE1 (2nd generation)
DRN..	Energy-efficient motor, Premium Efficiency IE3
DRU..	Energy-efficient motor, Super Premium Efficiency IE4
DR2L..	Asynchronous servomotor (2nd generation)
DR2M..	Torque motor: AC motor for operation at speed n = 0 (2nd generation)
56 – 315	Sizes: 56, 63, 71, 80, 90, 100, 112, 132, 160, 180, 200, 225, 250, 280, 315
K, S, M, L, ME, MS, MK, H, LS, LM	Lengths
R, Q, P, I, B	Power identification (identification of motors of the same size but with different power ratings)
2, 4, 6, 8, 8/2, 8/4, 4/2, 12/2	Number of poles

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INFORMATION

The DRU.. motor is identical in construction to the DRN.. motor. For this reason, all of the information listed here regarding the DRN.. motor can also be applied to the DRU.. motor.

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3.11 Designs, options, and accessories

3.11.1 Motor design

Code in the type designation	Description
/F.A, /F.B	(/F.A = motor feet enclosed in delivery, /F.B = motor feet mounted at the factory)
/F.A, /F.B	(/F.A = motor feet enclosed in delivery, /F.B = motor feet mounted at the factory)
/FF	IEC flange-mounted motor with through bores
/FE	IEC flange-mounted motor with through bores and IEC feet
/FT	IEC flange-mounted motor with threads
/FY	IEC flange-mounted motor with thread and IEC feet
/FC	C-face flange-mounted motor, dimensions in inches
/FG	Integral motor, as stand-alone motor
/FM	Integral motor with IEC feet
/FL	Flange-mounted motor (other than IEC)
/FK	Flange-mounted motor (other than IEC) with feet

3.11.2 Oil seals

Material

Code in the type designation	Description
None	Oil seal made of FKM
None	Oil seal made of NBR

Design

Code in the type designation	Description
None	Premium Sine Seal
None	Premium Sine Seal conductive

3.11.3 Bearings

Code in the type designation	Description
/NIB	Current-insulated rolling bearings (B-side, NDE)
/ERF	Reinforced bearings (A-side, DE) with roller bearing
/NS	Relubrication device

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3.11.4 Winding

Thermal class

Code in the type designation	Description
None	Thermal class B
None	Thermal class F
None	Thermal class H

Insulation

Code in the type designation	Description
/RI	Reinforced winding insulation
/RI2	Reinforced winding insulation with increased resistance against partial discharge

3.11.5 Condition monitoring

Thermal monitoring

Code in the type designation	Description
/TF	Temperature sensor (PTC thermistor or PTC resistor)
/TH	Thermostat (bimetallic switch)
/PK	Pt1000 sensor
/PT	Pt100 sensor

Brake

Code in the type designation	Description
/DUE	Diagnostic Unit Eddy Current = function/wear monitoring for BE1 to BE122 brake

Vibration

Code in the type designation	Description
None	Preparation for accommodating SPM measuring nipples

3.11.6 Terminal box

Material

Code in the type designation	Description
None	Aluminum terminal box

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Code in the type designation	Description
None	Terminal box made of gray cast iron

Connection

Code in the type designation	Description
None	Gray cast iron terminal box with connection piece

3.11.7 Connection

Terminal board

Code in the type designation	Description
None	Terminal board – 6 terminals
None	Terminal board – 9 terminals
None	Terminal board – 12 terminals

Cage clamp terminals

Code in the type designation	Description
/KCC	6-pole terminal strip with cage clamp contacts
/KC1	C1 profile-compliant connection of the electrified monorail system drive (according to VDI guideline 3643)
/KCW	6-pole series terminal

Integrated plug connector

Code in the type designation	Description
/IS	Integrated connector with terminal block in the upper part of the terminal box
/ISU	Integrated connector without terminal block in the upper part of the terminal box

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Mounted plug connector

Code in the type designation	Description
/ASE.	Mounted Han® 10ES connector on terminal box with single locking latch (cage clamp contacts on the motor side)
/ASB.	Mounted Han® 10ES connector on terminal box with double locking latch (cage clamp contacts on the motor side)
/ACE.	Mounted Han® 10E connector on the terminal box with single locking latch (crimp contacts on the motor side)
/ACB.	Mounted Han® 10E connector on terminal box with double locking latch (crimp contacts on the motor side)
/AME.	Mounted Han Modular® 10B connector on terminal box with single locking latch (crimp contacts on the motor side)
/ABE.	Mounted Han-Modular® 10B connector on terminal box with single locking latch (crimp contacts on the motor side)
/ADE.	Mounted Han Modular® 10B connector on terminal box with single locking latch (crimp contacts on the motor side)
/AKE.	Mounted Han Modular® 10B connector on terminal box with single locking latch (crimp contacts on the motor side)
/AMB.	MountedHan-Modular® 10B connector on terminal box with double locking latch (crimp contacts on the motor side)
/ABB.	Mounted Han-Modular® 10B connector on terminal box with double locking latch (crimp contacts on the motor side)
/ADB.	MountedHan-Modular® 10B connector on terminal box with double locking latch (crimp contacts on the motor side)
/AKB.	MountedHan-Modular® 10B connector on terminal box with double locking latch (crimp contacts on the motor side)
/AND.	Harting Han® Q8/0, single locking latch
/IV	Other industrial connectors according to customer specifications

3.11.8 Ventilation

Fan guard design

Code in the type designation	Description
None	Noise-reducing fan guard made of plastic
None	Fan guard made of sheet steel
/LN	Noise-reducing fan guard

Type of ventilation

Code in the type designation	Description
None	Fan-cooled

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Code in the type designation	Description
/V	Forced cooling fan
/U	Non-ventilated (without fan)
/OL	Non-ventilated (closed B-side)

Fan

Code in the type designation	Description
None	Fan made of plastic
/AL	Aluminum fan
/Z	Additional flywheel mass (heavy fan)

3.11.9 Brake and backstop

Brake

Code in the type designation	Description
/BE..[1)]	Spring-loaded brake with size specification
/BE.H..	Holding brake with increased braking torque for inverter-operated motors with size specification

1) Optionally available as safety brake.

Brake options

Designation	Description
HR	Manual brake release, with automatic re-engaging
HF	Manual brake release, lockable

Backstop

Code in the type designation	Description
/RS	Backstop

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3.11.10 Encoders

Built-in encoders

Code in the type designation	Description
/EI7C[1)]	Built-in incremental encoder with HTL interface, 24 periods
/EI76	Built-in incremental encoder with HTL interface and 6/2/1 period(s)
/EI72	
/EI71	
/EI8R	Built-in incremental encoder with TTL interface and 1024 periods (4096 increments)
/EI8C	Built-in incremental encoder with HTL interface and 1024 periods (4096 increments)
/EI8Z	Built-in incremental encoder with MOVILINK® DDI interface (12 bit incremental)

1) Optionally available as safety encoder for sizes 71MS – 132S.

Add-on encoders

Code in the type designation	Description
/EK8S[1)]	Add-on encoder with sin/cos interface
/EV8S	
/EK8R	Add-on encoder with TTL (RS422) interface
/EV8R	
/EK8C	Add-on encoder with HTL interface
/EV8C	
/EK8X	Add-on encoder with HTL interface and adjustable resolution
/EK8Z	Add-on incremental and single-turn encoder with MOVILINK® DDIinterface (18 bit incremental)
/AK8W[1)]	Add-on absolute encoder with sin/cos and RS485 interface (multi-turn)
/AV8W	
/AK8Y[1)]	Add-on absolute encoder with sin/cos and SSI interface (multi-turn)
/AV8Y	
/AK8H	Add-on absolute encoder with sin/cos and RS485 interface and HIPERFACE® protocol
/AV8H	
/AK8Z	Add-on absolute encoder with MOVILINK® DDI interface (18 bit incremental, 16 bit multi-turn)
/RK8M	Add-on resolver

1) Optionally available as safety encoder.

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Encoder mounting adapters

Code in the type designation	Description
/EK8A	Mounting adapter for encoders from the SEW-EURODRIVE portfolio
EI7A	Mounting adapter for EI7 built-in encoder.
EI8A	Mounting adapter for EI8 built-in encoder.
/XV8A	Mounting adapter for encoders from the SEW-EURODRIVE portfolio in fan guard with encoder mount design
/XV.A	Mounting adapter for third-party encoders
/XH1.	Mounted third-party encoders
/XV..	

3.11.11 Digital motor integration

Interfaces

Code in the type designation	Description
/DI	MOVILINK® DDI

Mounted plug connectors

Code in the type designation	Description
/KD1	M23 hybrid connector (cable cross section 1.5 mm² – 4 mm²)
/KD	Hybrid cable gland M25/M32 (cable cross section 1.5 mm² – 10 mm²)
/KDB	M40 hybrid connector (cable cross section 6 mm² – 10 mm²)
/KDD	Power cable gland and M23 signal connector (MOVILINK® DDI)

Built-in encoder

Code in the type designation	Description
/EI8Z	Built-in incremental encoder with MOVILINK® DDI interface (12 bit incremental)

Add-on encoders

Code in the type designation	Description
/EK8Z	Add-on incremental and single-turn encoder with MOVILINK® DDI interface (18 bit incremental)

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Code in the type designation	Description
/AK8Z	Add-on absolute encoder with MOVILINK® DDI interface (18 bit incremental, 16 bit multi-turn)

Brake rectifier

Code in the type designation	Description
BG1Z[1)]	Integrated brake control with MOVILINK® DDI interface and brake diagnostics as well as brake wear detection

1) Is coded using the DDI type code and is therefore not listed in the type designation of the motor.

3.11.12 Functional safety

Brake

Code in the type designation	Description
/BE..	Spring-loaded brake with size specification

Brake options

Code in the type designation	Description
HR	Manual brake release, with automatic re-engaging

Built-in encoders

Code in the type designation	Description
/EI7C	Built-in incremental encoder with HTL interface, 24 periods

Add-on encoders

Code in the type designation	Description
/AK8W	Add-on absolute encoder with sin/cos and RS485 interface (multi-turn)
/AK8Y	Add-on absolute encoder with sin/cos and SSI interface (multi-turn)
/EK8S	Add-on encoder with sin/cos interface

3.11.13 Brake

Code in the type designation	Description
/BE..	Spring-loaded brake with size specification

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3.11.14 Decentralized technology

Code in the type designation	Description
/MM03 – MM40	MOVIMOT®
/MO	MOVIMOT® options
/MI	Motor identification module for MOVIMOT®
/MSW	MOVI-SWITCH®
/D..	MOVIMOT® advanced

3.11.15 environmental influences

IP degree of protection

Code in the type designation	Description
None	IP 54
None	IP 55
None	IP 56
None	IP 65
None	IP 66

Winding protection

Code in the type designation	Description
None	Encapsulated stator winding
None	Moisture and acid protection
None	Tropicalization

Surface protection

Code in the type designation	Description
None	Unpainted design
None	Base coat OSG
None	Surface protection OS1 to OS4

Corrosion protection

Code in the type designation	Description
None	KS corrosion protection

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Miscellaneous instructions

Code in the type designation	Description
None	Anti-condensation heating
/DH	Condensation drain hole
/C	Canopy for the fan guard

3.11.16 Other motor designs

Code in the type designation	Description
/2W	Second shaft end on the motor
None	Motor design according to recommendation VE01 of the VIK (Verband der Industriellen Energie- und Kraftwirtschaft e.V. – German Association of Industrial Energy Consumers)

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3.12 Functional safety

Motors from SEW-EURODRIVE are optionally available with functionally safe motor options. These are designed for implementing safety functions.

SEW-EURODRIVE labels a functionally safe motor option on the drive with an FS logo and a 2-digit number on the motor nameplate. The number is a code that indicates which components in the drive are safety-related. This makes it possible to uniquely identify an available functional safety motor option via the motor nameplate.

Make sure you observe any present FS logo on the nameplate and its meaning according to the following table:

FS logo	Available functionally safe motor option		
	Decentralized inverters	Safety brake	Safety encoders
FS 01	✓	–	–
FS 02	–	✓	–
FS 04	–	–	✓
FS 07	✓	–	✓
FS 11	–	✓	✓

✓ The motor option is functionally safe.

– The motor option is not available.

If the FS logo is present on the motor nameplate, e.g. with the code "FS 11", the motor includes a combination of safety encoder and safety brake. Drives can also be equipped with 2 encoders, e.g. a built-in encoder and an add-on encoder. In such cases, the FS logo for the safety encoder always relates to the add-on encoder. If an FS logo is available, adhere to the information specified in the corresponding documentation.

If the drive bears the FS logo on the nameplate, adhere to the information in the following documentation:

- Addendum to the "Built-In Encoders, Add-On Encoders and Safety Encoders – DR.., DRN.., DRU.., DR2.., EDR.., EDRN.. AC Motors" operating instructions
- Addendum to the "Safety Brakes – DR.., DRN.., DRU.., DR2.., EDR.., EDRN.. AC Motors" operating instructions

For the characteristic safety values used to determine the safety level for systems and machines, refer to chapter "Characteristic safety values" in the corresponding operating instructions.

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4 Mechanical installation

4.1 Before you start

Only install the device if the following conditions are met:

- Observe the information on the nameplate.
- The information on the nameplate of the drive corresponds to the voltage supply system or to the output voltage of the inverter.
- The drive is undamaged (no damage caused by transportation or storage).
- All transport protection has been removed.
- Ambient temperature is as specified on the nameplate.

  Note that the temperature range of the mounted gear unit might also be restricted (see operating instructions of the gear unit).
- You have ensured that there are no oils, acids, gases, vapors, radiation, etc. present.
- Options, such as encoder and brake, are suitable for the for the ambient conditions.
- The installation altitude is max. 1000 m above sea level. For altitudes above 1000 m above sea level, please refer to the chapter on performance reduction in the catalog “AC motors DRN63 – 315, DR2S56 – 225, DR2L71 – 225”.
- If the product is equipped with functionally safe options, please note the indications in the corresponding operating instructions.

  You can recognize a product with functional safety by the FS logo on the nameplate.

The specifications listed above refer to the standard designs. The requirements for special designs might vary from the standard. Refer to the order confirmation for deviating conditions. Make sure that the drive is designed according to the ambient conditions.

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4.2 Preliminary work after longer periods of storage

Depending on the duration and ambient conditions during storage, corrosion, aging of lubricants, embrittlement of sealing elements, and moisture absorption in the insulation can occur.

Perform the measures described below on any drives that have been stored for longer than 9 months.

Corrosion

1. Check for damage to the motor and/or components (coating, shafts, connection and fastening parts).
2. Correct the corrosion damage.

Embrittlement of seals

3. Visually inspect seals and look for fissures, hardening, and embrittlement.
4. Replace any damaged seals.

Reduced grease service life

If the drives are stored for longer than a year, the service life of the bearing grease is reduced due to aging and de-oiling of the lubricant.

5. Check the condition and usability of the rolling bearings.
6. Replace any damaged rolling bearings.

Reduced grease quantity

7. If motors with relubrication devices are stored for longer than 5 years, relubricate the motor as specified on the lubrication plate.

Moisture absorption

8. Check to see that the wiring space of the motor is dry and clean.
9. Remove moisture and dirt.
10. If the motor has absorbed moisture, measure the insulation resistance (see chapter "Measuring the insulation resistance" (→ 🗎 40)) and dry the motor (see chapter "Drying the motor" (→ 🗎 41)).

4.2.1 Checking the brake

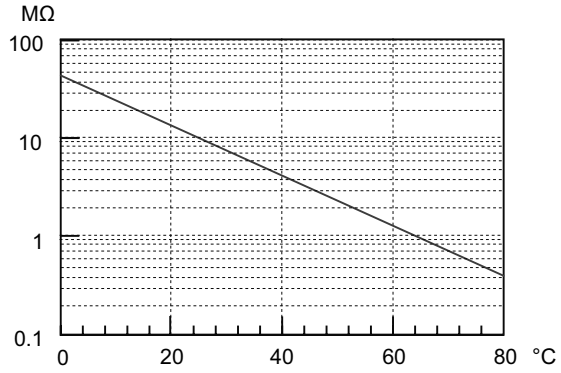
If motors with brake have been stored or non-operational for longer than 9 months, check their function before taking them into operation.

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4.2.2 Measuring the insulation resistance

The insulation resistance (see following figure) varies greatly depending on the temperature.

If the measured resistance is within the range of the limit characteristic curve (depending on the ambient temperature), the insulation resistance is sufficient. If the value is below the limit characteristic curve, dry the motor.



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4.2.3 Drying the motor

Use either warm air or an isolation transformer to dry the motor.

INFORMATION

The motors of size 56 may only be dried with warm air.

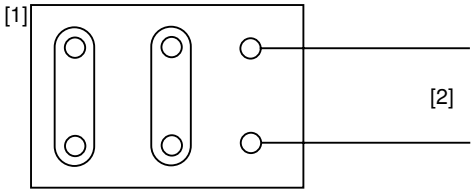
Drying the motor with warm air

1. Dry the motor with warm air.
2. End the drying process when the minimum insulation resistance is exceeded.

Drying the motor with an isolation transformer

1. If possible, disconnect the stator from the rotor.
2. Connect the windings in series.
3. The auxiliary AC voltage must not exceed 10% of the nominal voltage with max. 20% of the rated current.

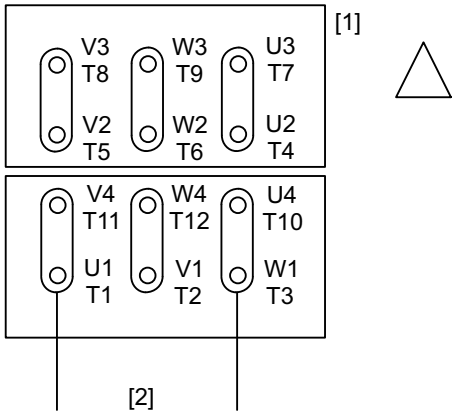
Connect the windings in series: Wiring diagram R13



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[1] Motor terminal board [2] Transformer

Connect the windings in series: Wiring diagram R72

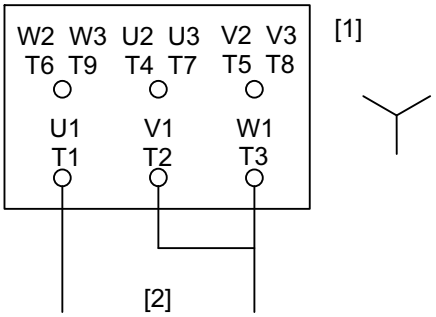


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[1] Motor terminal boards [2] Transformer

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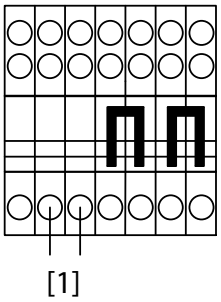
Connect the windings in series: Wiring diagram R76



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[1] Motor terminal board [2] Transformer

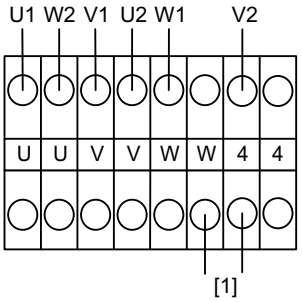
Connect the windings in series: Wiring diagram C13



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[1] Transformer

Connect the windings in series: Wiring diagram A13



27511350155

[1] Transformer

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4.3 Motor installation notes

- Insert the key into the keyway.
- Pull a protective tubing over the shaft.
- Motor shaft ends, output shafts, and flange surfaces must be thoroughly cleaned of anti-corrosion agents, contamination, or similar. Use a commercially available solvent for this purpose. The solvent must not get into the bearings or sealing rings as this can damage the material.
- Only install the device in the specified mounting position on a level and torsionally rigid support structure.
- Observe the information on the nameplate.
- Ensure that the cooling air supply to the motor is unobstructed.
- Make sure that no warm exhaust air from other devices is drawn in.
- Align the device and driven machine carefully so that the output shaft is not subjected to impermissible load. Observe the permitted overhung and axial loads.
- Do not jolt or hammer the shaft end.
- Install covers (canopy) if necessary.
- Balance parts to be subsequently mounted on the shaft only with a half key (motor shafts are balanced with a half key).
- Make sure that any existing condensate drain holes are sealed with a plug. If contaminated, the condensation drain holes must be checked for functionality on a regular basis and cleaned if necessary.

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4.3.1 Mounting the motor with aluminum feet

To mount motors with a foot made of aluminum, you have to use washers with an outer diameter that is at least twice the screw diameter (e.g. DIN EN ISO 7090).

The screws must correspond to strength class 8.8 up to max. 10.9.

The tightening torque applies according to VDI 2230-1.

Motors	Maximum permitted screw lengths
DR..63 – 71	M6 × 20
DR..80 – 90	M8 × 20
DR..100 – 132S	M10 × 25

DRN/DR2..63 motors

With DRN/DR2..63 motors, the aluminum foot is slotted in the front due to the limited space.

Position the screws beforehand or fasten the foot with stud bolts.

4.3.2 Installation in damp locations or outdoors

- Use suitable cable glands for the incoming cable (use reducing adapters if necessary) according to the installation instructions.
- If possible, arrange the terminal box in such a way that the cable entries are pointing downwards.
- Seal the cable entry properly.
- Clean the sealing surfaces of the terminal box and the terminal box cover carefully before re-assembly; replace embrittled gaskets.
- If required, touch up the corrosion protection (especially at the eyebolts).
- Check the degree of protection.
- Protect the shaft against corrosion using a suitable anti-corrosion agent.

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4.4 Installation tolerances

Shaft end	Flanges
Diameter tolerance according to EN 50347 • ISO j6 with Ø ≤ 28 mm • ISO k6 with Ø ≥ 38 mm up to ≤ 48 mm • ISO m6 with Ø ≥ 55 mm • Centering bore according to DIN 332, shape DR	Centering shoulder tolerance according to EN 50347 • ISO j6 with Ø ≤ 250 mm • ISO h6 with Ø ≥ 300 mm

4.5 Assembling the input elements

Drive components that are installed on the motor shaft end, e.g. pinions, must be warmed up prior to assembly in order to prevent damage, e.g. to the encoder of stand-alone motors.



⚠ WARNING

Unsecured key flung out of the keyway.

Severe or fatal injuries.

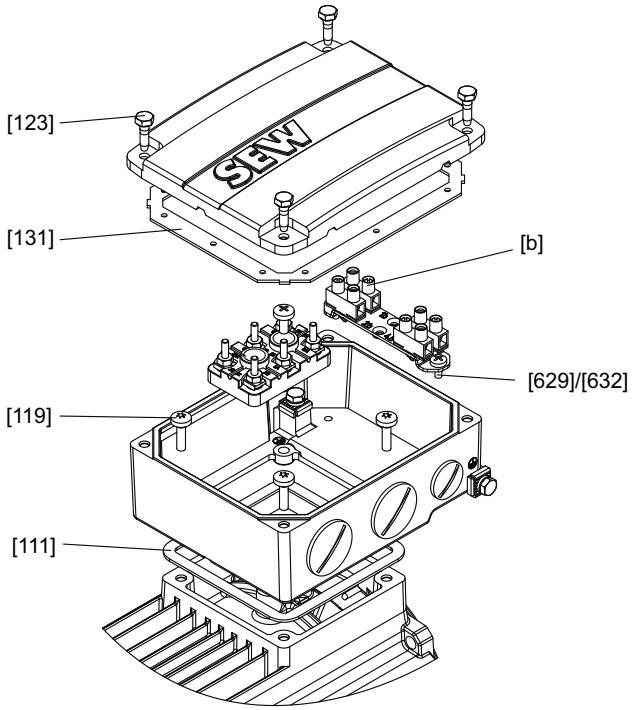
- Only operate the motor with attached customer output element (e.g. gear unit), or with a suitably secured key.

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4.6 Terminal box

4.6.1 Turning the terminal box

The following figure shows the terminal box structure in the design with a terminal board:



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[111] Gasket
[119] Terminal box lower part
hex head screws (4 x)
[123] Terminal box cover
hex head screws (4 x)
[131] Gasket
[b] Terminal
[629]/[632] Screws

Proceed as follows to turn the terminal box:

1. Loosen the screws [123] of the terminal box cover. Remove the terminal box cover.
2. Remove the screws [629]/[632].
3. Remove the terminal [b].
4. Remove the retaining screws [119] of the terminal box.
5. Clean the sealing surfaces at the stator shoulder, terminal box lower part and terminal box cover.
6. Check the gaskets [111] and [131] for damage.
7. Replace any damaged gaskets.
8. ⚠ **DANGER!** Electric shock due to damaged cables. Severe or fatal injuries. When installing the terminal box lower part or the terminal board, make sure the cables are not crushed or twisted. Do not use sharp or pointed objects to align the cables.
   Turn the terminal box to the required position.
9. Make sure that the gasket [111] is positioned correctly.

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10. Attach the terminal box lower part.
11. Apply the corresponding tightening torque to tighten the screws [119] of the lower part of the terminal box.
12. Refer to chapter "Appendix" (→ 🗎 260) for the arrangement of the auxiliary terminals.
13. Secure terminal [b] with screws [629]/[632].
14. Make sure that the gasket [131] is positioned correctly.
15. Attach the terminal box cover to the terminal box lower part.
16. Apply the corresponding tightening torque to tighten the screw [123] of the terminal box cover.
17. To make sure that the cables have not been damaged, perform an insulation test after reassembly, see chapter "Preliminary work after longer periods of storage" (→ 🗎 39).

Tightening torques of the lower part of the terminal box

Motor	Screw	Tightening torque
		Nm
DR..71 – 132S	[119]	5
DR..132M – 225	[119]	27.3
DR..250 – 315	[119]	54

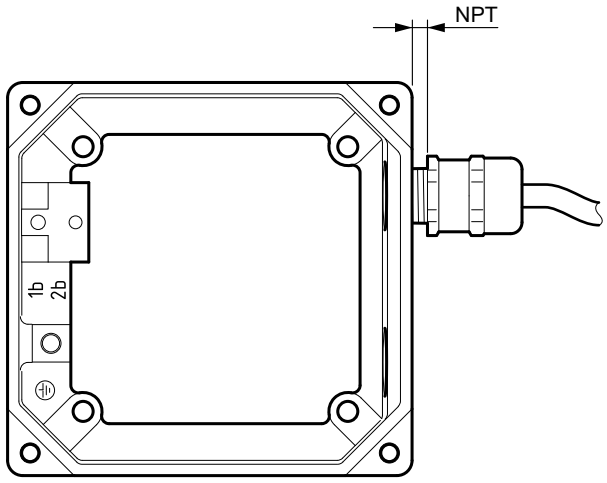
Tightening torques of terminal box cover

Motor	Screw	Tightening torque
		Nm
DR..56	[123]	3
DR..63 – 132S	[123]	4
Aluminum DR..132M – 225	[123]	11.3
Gray cast iron DR..132M – 225	[123]	27.3
DR..250 – 315	[123]	54

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4.6.2 Terminal box with NPT thread

In terminal boxes with NPT thread, cable glands cannot always be screwed in all the way (up to the O-ring).



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For applications in wet areas, SEW-EURODRIVE recommends using metric screw fittings.

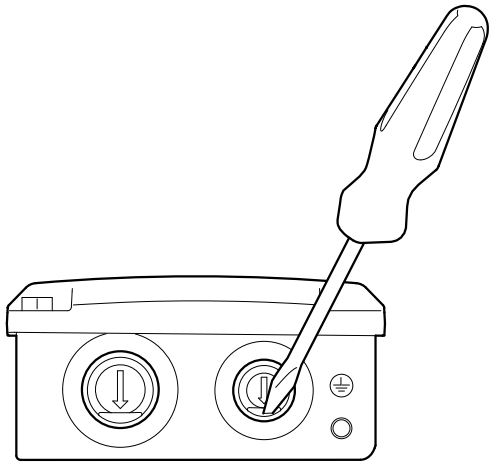
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4.6.3 Breaking open knock-outs

In order to be able to insert cables into the terminal box, the prepared knock-outs must be broken open.

✓ Required tools: Screwdriver or chisel.

1. **NOTICE!** Damage to the terminal box or fragments inside the motor. Possible damage to property. Carefully break the knockout open.
   Break open the knock-out [K] by using a chisel or screwdriver.
2. Check the opening for residual burr. If any residual burr is present, remove it by using a suitable tool.



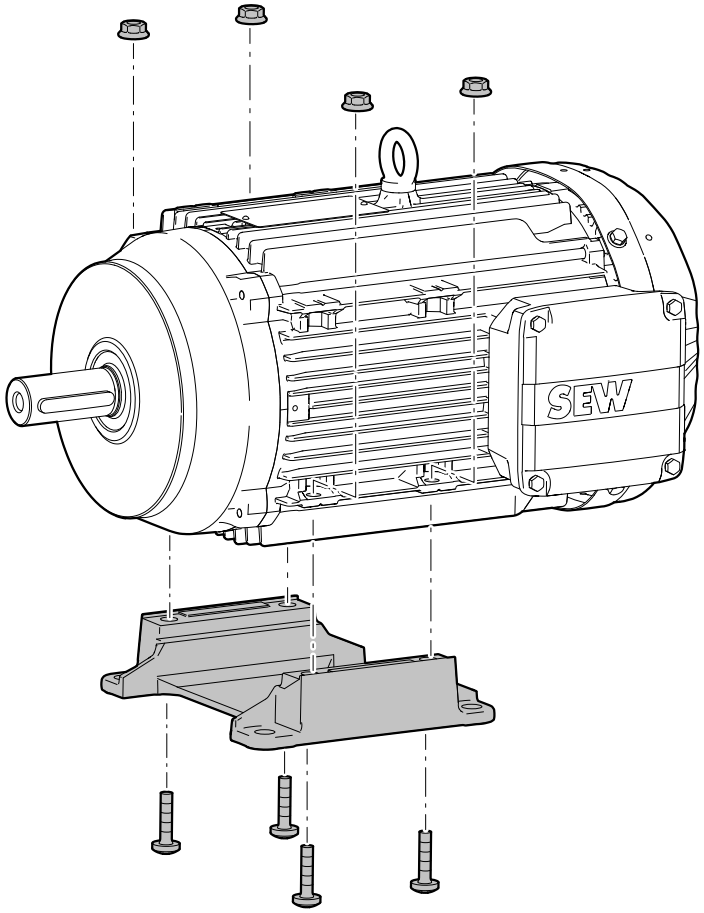
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4.7 Retrofitting or modifying motor feet

4.7.1 DR..71 – 132S motors

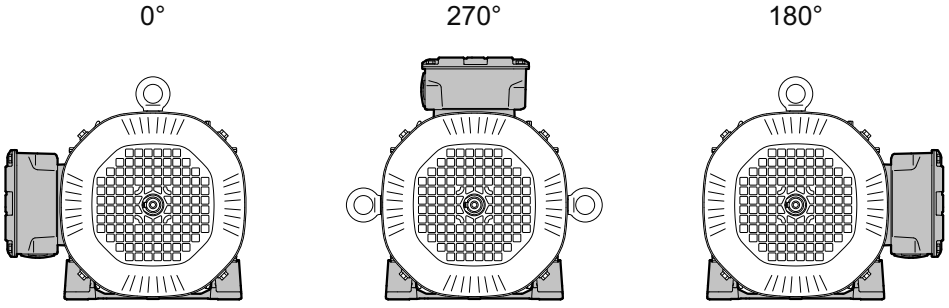
The following figure shows a motor with option /F.A (retrofit foot).



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✓ The contact surfaces at the foot [90] and stator [16] are painted.

1. Observe the following figure when selecting the contact surfaces. The figure illustrates the possible terminal box positions with reference to the retrofittable motor feet.



22845056011

2. Remove the paint from the stator [16] contact surface where the foot is to be screwed on.
3. Apply a thin layer of corrosion protection to the contact surfaces after the paint has been removed.
4. Remove the paint from the contact surfaces of the foot [90].

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5. Apply a thin layer of corrosion protection to the contact surfaces after the paint has been removed.
6. Attach the foot [90] to the motor using the screws [94] and washers [91]. Tighten the screws in diametrically opposite sequence. The screws are micro-encapsulated. This is why you have to screw in and tighten the screws quickly.
7. If necessary, you can apply paint or corrosion protection at the joint after attaching the foot [90].

Changing the motor foot position

For converting the motor foot to another position, observe the following points:

- After removing the screws [94], check for damage to the thread or other similar damage.
- When changing the position of the motor foot, apply corrosion protection to unpainted surfaces.

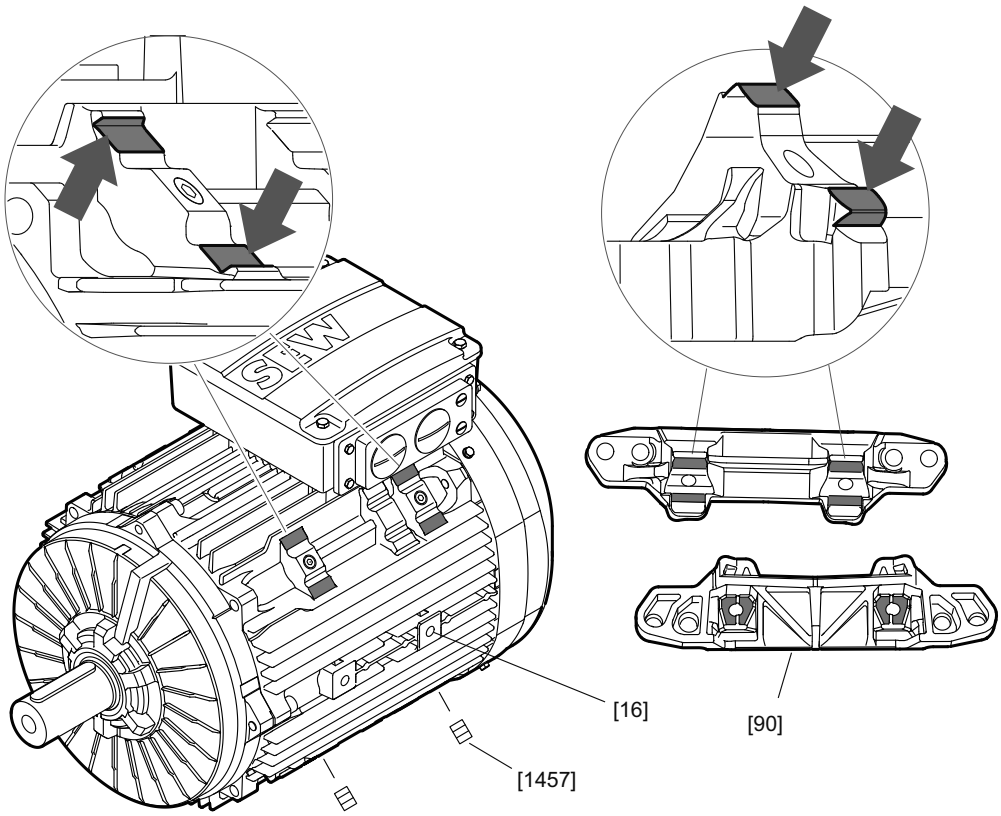
Tightening torques

Motor	Screw	Tightening torque
DR..71 – 90	M6	11.3 Nm
DR..100 – 132S	M8	27.3 Nm

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4.7.2 DR..250 – 315 motors

The following figure shows a motor with option /F.A (retrofit feet).

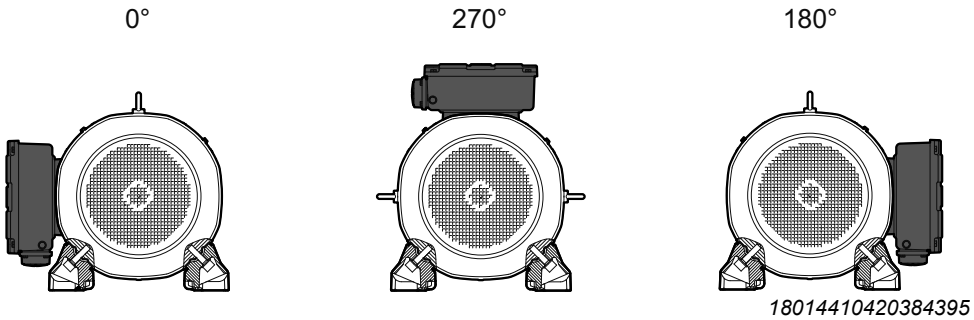


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[16]	Stator	[1457]	Set screw
[90]	Foot		Remove the paint from the marked surfaces

✓ The tapped holes of the foot mounting surfaces are closed with set screws [1457]. The contact surfaces at the feet [90] and stator [16] are painted.

1. Observe the following figure when selecting the contact surfaces. The figure illustrates the possible terminal box positions with reference to the retrofittable motor feet.



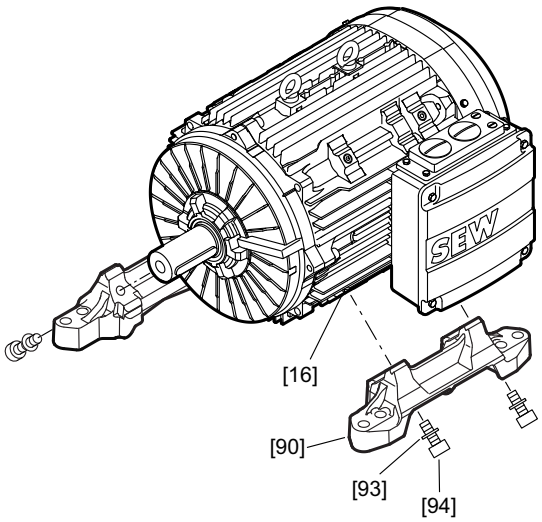
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2. Remove the set screws [1457] from those threads into which you will screw the foot screws [94].
   - ⇨ Size 225 – 280: 8 set screws
   - ⇨ Size 315: 12 set screws

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3. Remove the paint from the contact surfaces of the stator [16] where the feet are to be screwed on.
   - ⇨ Size 225 – 280: 8 surfaces
   - ⇨ Size 315: 12 surfaces
4. Apply a thin layer of corrosion protection to the contact surfaces after the paint has been removed.
5. Remove the paint from the contact surfaces of the feet [90].
6. Apply a thin layer of corrosion protection to the contact surfaces after the paint has been removed.
7. Attach the feet [90] to the motor using the screws [94] and washers [93]. The screws are micro-encapsulated. This is why you have to screw in and tighten the screws quickly.
8. Apply paint or corrosion protection at the parting line after attaching the feet [90].

Changing motor feet positions



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[16] Stator
[90] Foot
[93] Washer
[94] Screw

For converting the motor feet to another position, observe the following points:

- After removing the screws [94], check for damage to the thread or other similar damage.
- Remove the old micro-encapsulation.
- Clean the threads of the screws [94].
- Apply a high-strength thread locker to the screw threads [94] before inserting the screws again.
- The set screws removed from the new mounting position can be reused for the bores of the old mounting position. After inserting the set screw [1457] into the open tapped holes in the stator [16], paint or corrosion protection can be applied on the bare joining surfaces of the stator.
- When the position of the motor feet is changed, apply corrosion protection to the unpainted surfaces.

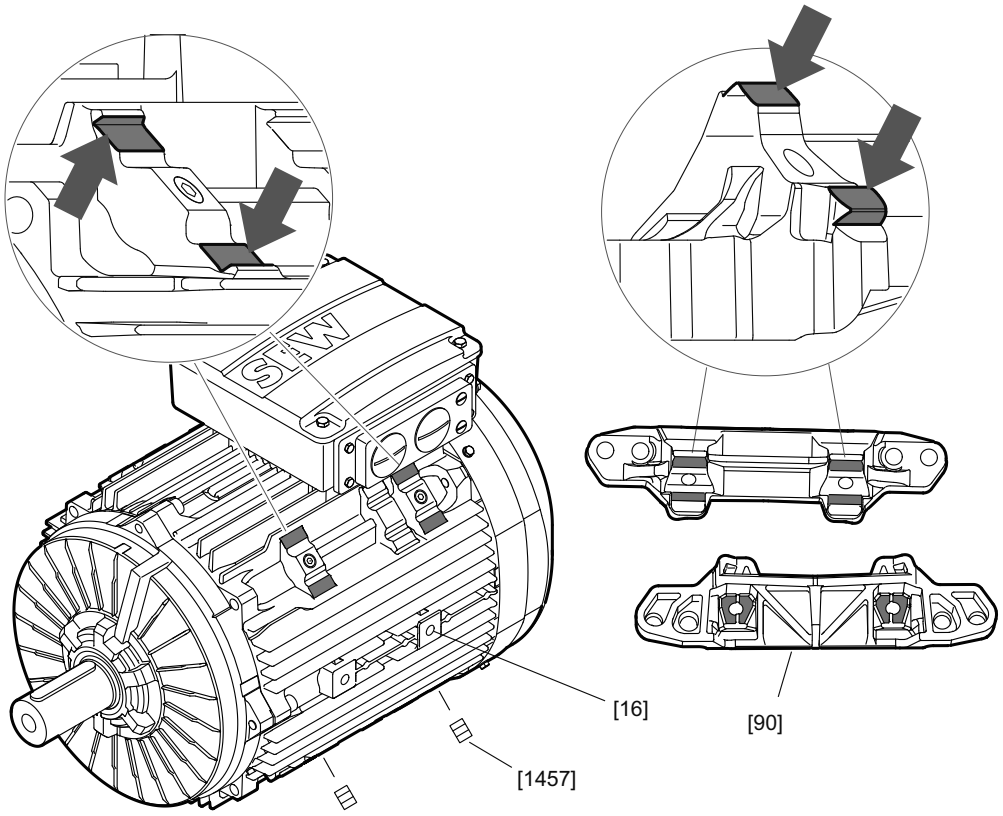
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Tightening torques

Motor	Screw	Tightening torque
DR..225	M16	230 Nm
DR..250 – 315	M20	464 Nm

4.7.3 DR..250 – 315, DRN..225 – 315 motors

The following figure shows a motor with option /F.A (retrofit feet).

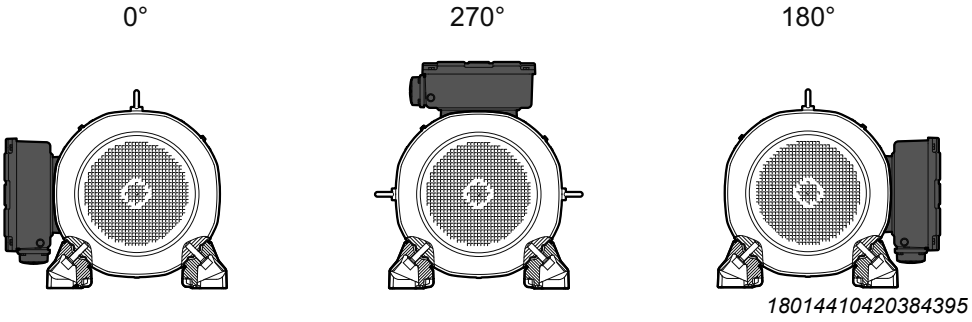


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[16]	Stator	[1457]	Set screw
[90]	Foot		Remove the paint from the marked surfaces

✓ The tapped holes of the foot mounting surfaces are closed with set screws [1457]. The contact surfaces at the feet [90] and stator [16] are painted.

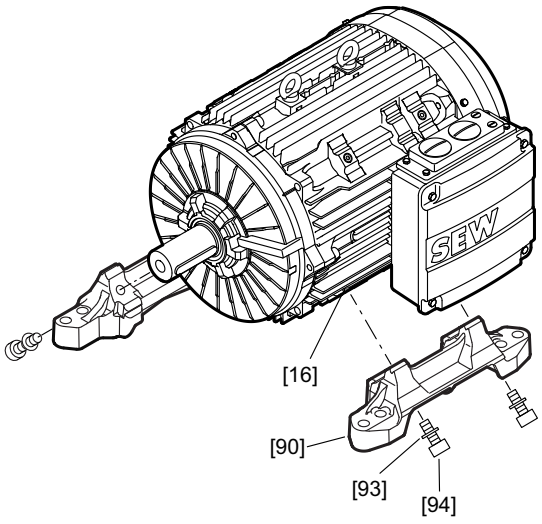
1. Observe the following figure when selecting the contact surfaces. The figure illustrates the possible terminal box positions with reference to the retrofittable motor feet.



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2. Remove the set screws [1457] from those threads into which you will screw the foot screws [94].
   - ⇨ Size 225 – 280: 8 set screws
   - ⇨ Size 315: 12 set screws
3. Remove the paint from the contact surfaces of the stator [16] where the feet are to be screwed on.
   - ⇨ Size 225 – 280: 8 surfaces
   - ⇨ Size 315: 12 surfaces
4. Apply a thin layer of corrosion protection to the contact surfaces after the paint has been removed.
5. Remove the paint from the contact surfaces of the feet [90].
6. Apply a thin layer of corrosion protection to the contact surfaces after the paint has been removed.
7. Attach the feet [90] to the motor using the screws [94] and washers [93]. The screws are micro-encapsulated. This is why you have to screw in and tighten the screws quickly.
8. Apply paint or corrosion protection at the parting line after attaching the feet [90].

Changing motor feet positions



9007206996709387

[16] Stator
[90] Foot
[93] Washer
[94] Screw

For converting the motor feet to another position, observe the following points:

- After removing the screws [94], check for damage to the thread or other similar damage.
- Remove the old micro-encapsulation.
- Clean the threads of the screws [94].
- Apply a high-strength thread locker to the screw threads [94] before inserting the screws again.
- The set screws removed from the new mounting position can be reused for the bores of the old mounting position. After inserting the set screw [1457] into the open tapped holes in the stator [16], paint or corrosion protection can be applied on the bare joining surfaces of the stator.
- When the position of the motor feet is changed, apply corrosion protection to the unpainted surfaces.

Tightening torques

Motor	Screw	Tightening torque
DRN225	M16	230 Nm
DR..250/DRN250	M20	464 Nm
DR..280/DRN280	M20	464 Nm
DR..315/DRN315	M20	464 Nm

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4.8 Direct mounting of a motor on a gear unit

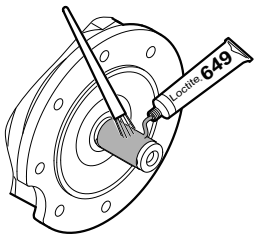
INFORMATION

Secure all pinions on the motor or input shaft with Loctite® 649, even if a retaining ring is additionally present.

If the pinion is already fastened to the shaft, start cleaning the sealing surface (step 6).

Joining the pinion to the motor or input shaft

1. Clean and degrease the shaft and the bore of the pinion.
2. Apply Loctite® 649 to the shaft behind the groove over the entire area of the circumference. For information on Loctite®, refer to "Selecting and using Loctite®" (→ 🗎 60).



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3. Warm the pinion up to **at least** 100 °C to a **maximum of** 130 °C.
4. Push the pinion onto the shaft.
5. Secure the pinion on the shaft with the retaining ring.

Cleaning the sealing surfaces

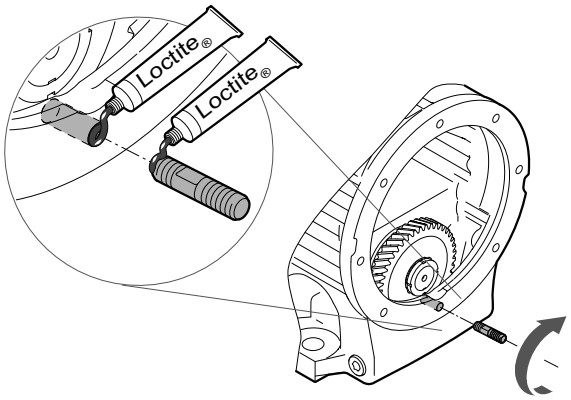
6. Remove oils, grease, irregularities of the surface, rust, and old Loctite® residue from the flange surfaces.

Sealing threads that lead into the housing interior

To prevent oil from escaping after installation, flange threads that lead into the housing interior must be sealed!

7. Clean and degrease the thread through bores that lead into the housing interior and their studs.
8. Apply Loctite® 574 or Loctite® 5188 in a continuous ring on the upper threads of the flange thread and the stud. For information on Loctite®, refer to chapter "Selecting and using Loctite®" (→ 🗎 60).

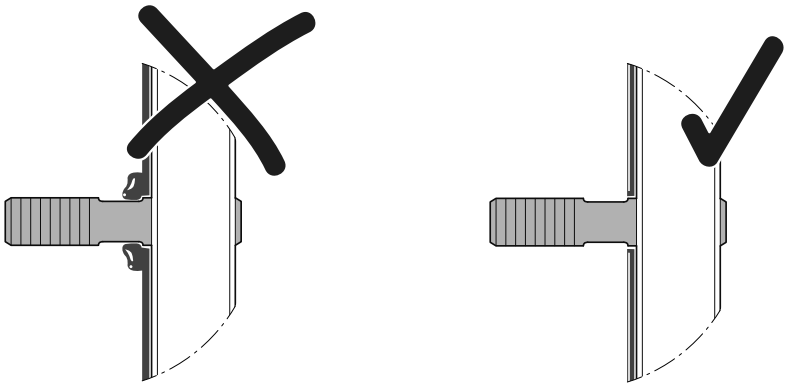
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Screwing in the studs

9. Screw the studs into the thread up to the shoulder.
10. Remove any excess Loctite® from the sealing surface 60 minutes after screwing in at the latest.



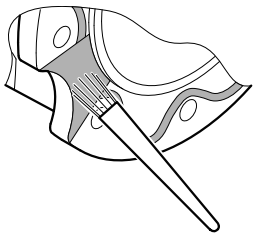
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Sealing the flange surface

INFORMATION

Always apply the sealant over a large area in narrow places and on the gear units R97, R107, R127, F97 or F107.

11. Spread Loctite® 574 or Loctite® 5188 only over one of the sealing surfaces. Apply the sealant in beads or over a large area without gaps. **Always apply the sealant over a large area in case of narrow places or with R97, R107, R127, F97 and F107 gear units.** Use a suitable application tool that does not contaminate the sealing surface, for example, a non-shedding brush or a short-hair lamb's wool roller. For information on Loctite®, refer to chapter "Selecting and using Loctite®" (→ 🗎 60).



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Joining flange surfaces

12. Join the flange surfaces together. Next, **immediately** tighten the nuts with the specified torque. If you tighten the nuts too late, the sealing film can tear. For information on the tightening torques, refer to chapter "Tightening torques for direct mounting of a motor to a gear unit" (→ 🗎 60).
13. The sealant must harden for 30 minutes and must not come into contact with the gear oil during this time.

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4.8.1 Tightening torques for direct mounting of a motor to a gear unit

For notes on tightening, observe the notes in chapter "Notes concerning tightening torques".

Screw/nut	Tightening torque ±15% Nm
M6	12
M8	28
M10	56
M12	96
M16	235

4.8.2 Selecting and using Loctite®

Selecting and using Loctite®

Sealant	Use	Suitability	Batch size	Part number
Loctite® 649	Locking agent for pinions	All gear units	50 ml	09120998
Loctite® 574	Surface sealant	All gear units except R97 – R127, R87 with CM3C – R127 with CM3C, F97, F107, F87 with CM3C – F107 with CM3C	7 ml	09102558
Loctite® 5188		R97 – R127, R87 with CM3C – R127 with CM3C, F97, F107, F87 with CM3C – F107 with CM3C	50 ml	03207013

When mounting CM3C.. motors to gear unit sizes R87 – R127 and F87 – F107 with mandatory activator use. Activator Loctite® 7649 must be applied to the entire surface of the gear unit sealing surface and Loctite® 5188 must be applied to the entire surface of the aluminum flange. Additionally apply Loctite® in beads at the critical points of the bearing eyes. The motor and gear unit must be attached and screwed together without any interruption in work, as the activator used greatly accelerates the bonding of the sealant and starts immediately.

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4.9 Options

4.9.1 /HR, /HF Manual brake release

The option manual brake release /HR, /HF is preinstalled and set at the factory for some brake sizes. If your drive was not delivered with manual brake release and you wish to retrofit it, observe the instructions in chapter "Retrofitting the /HR, /HF manual brake release" (→ 🗎 212).

Activating and loosening the /HF manual brake release



⚠ WARNING

No brake function due to activated manual brake release.

Severe or fatal injuries.

- Before startup, make sure that the hand lever has been removed or secured against unintentional activation to prevent unintentional brake release during operation.

You can use the option /HF (lockable manual brake release) to continuously mechanically release the BE.. brake with a set screw and a releasing lever.

On delivery, the set screw is inserted far enough to not fall out and to not affect the brake performance. The set screw is self-locking. This prevents it from unintended turning in or from falling out.

In case of BE03 brakes, the set screw is stored in the grommets between the stator fins.

Activating the /HF manual brake release with BE03 brake

Proceed as follows:

1. Screw in the set screw until there is no more clearance at the releasing lever.
2. To release the brake manually, screw in the set screw by 1/2 – 1 turn.

Activating the /HF manual brake release with BE05 – BE122 brake

Proceed as follows:

1. Screw in the set screw until there is no more clearance at the releasing lever.
2. To release the brake manually, screw in the set screw by 1/4 – 1/2 turn.

Loosening the /HF manual brake release with BE03 brake

Proceed as follows:

1. Remove the set screw completely from the thread.
2. Fasten the set screw between the stator fins with both grommets.

Loosening the /HF manual brake release with BE05 – BE122 brake

Proceed as follows:

1. Loosen the set screw at least until the floating clearance of the manual brake release has completely returned, see chapter "Retrofitting the /HR, /HF manual brake release" (→ 🗎 212).

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Activating and loosening the /HR manual brake release



⚠ WARNING

No brake function due to activated manual brake release.

Severe or fatal injuries.

- Before startup, make sure that the hand lever has been removed or secured against unintentional activation to prevent unintentional brake release during operation.

You can use the option /HF manual brake release to mechanically release the BE.. brake for a short time via a combination of releasing lever and hand lever. It is designed with a spring mechanism, so that it reengages automatically.

During assembly, the mechanics inside the fan guard is preset at the factory. A hand lever is included in the delivery that is attached to the stator housing or otherwise captive.

Activating the /HR manual brake release

Proceed as follows:

1. Remove the hand lever from the stator housing.
2. Screw the thread of the hand lever completely into the thread of the releasing lever.
3. To release the brake, pull the hand lever in the direction away from the terminal box. The correct direction of use is indicated by an arrow symbol on the fan guard or on the closing part on the fan guard opening.

Loosening the /HR manual brake release



INFORMATION

The releasing procedure can be performed with usual force application, do not apply too much force to the lever to avoid damage to the drive.

Proceed as follows:

1. Let go of the lever in the actuated state. The lever automatically reengages to the initial position and the brake is applied.
2. Screw out the hand lever and keep it safe. With motors of sizes 63 – 280, you can attach the hand lever to the stator housing with the provided grommets or clamps.
3. In designs with a hand lever that is glued in at the factory (captive), the hand lever can remain screwed in. In these cases, apply additional measures (e.g. a barrier or additional interlocks against movement) to make sure that the manual brake release in the application is protected against accidental activation.

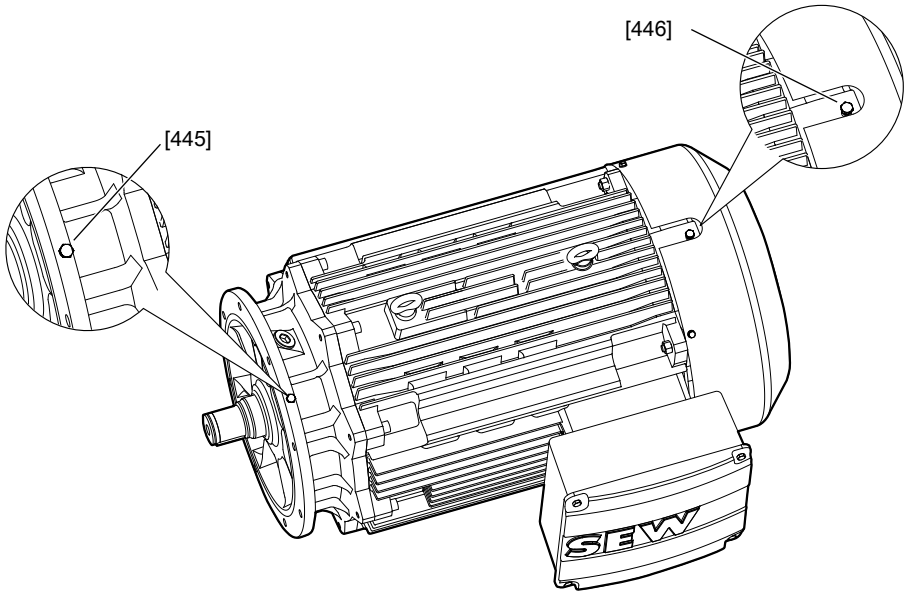
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4.9.2 Mounting adapter for measuring nipple

SEW-EURODRIVE delivers the drives as follows, depending on the order specifications:

- With tapped hole
- With tapped hole and included measuring nipples for vibration measurement

The following figure shows an example of a motor with tapped holes and mounted measuring nipples [445] and [446]:



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[445] A-side measuring nipple
[446] B-side measuring nipple

Do the following to connect the customer's measuring device:

1. Remove the closing plugs [1199] (A-side) and [1200] (B-side) from the tapped holes.
   ⇨ If present, install the closing plug [1415]/[1799] from the fan guard.
2. Screw the measuring nipples [445] and [446] into the tapped holes on the motor.
   ⇨ Tightening torque 15 Nm
3. Plug the mounting adapter of the measuring unit onto the measuring nipples.

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4.9.3 Second shaft end with optional cover

SEW-EURODRIVE delivers motors with the 2nd shaft end option /2W with the key inserted and secured by transport protection.

⚠ WARNING

Unsecured key flung out of the keyway.

Severe or fatal injuries due to flying parts.

- Only operate the motor with a suitably secured key.

⚠ WARNING

Rotating shaft end or attachments.

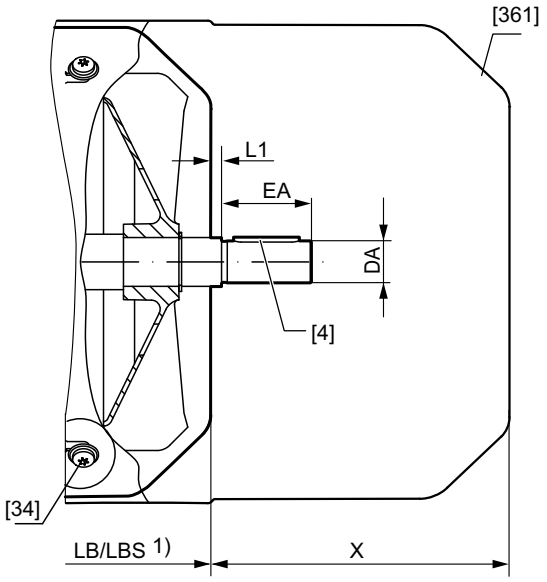
Severe or fatal injuries.

- Only start the motor with installed protective cover at the second shaft end.

The protection cover must meet the impact resistance requirements of EN 60079-0 (VDE 0170-1):2014-06, chapter 26.4.2.

As an option, SEW-EURODRIVE can also provide the safety cover [361] for the 2nd motor shaft end already installed at the DR..63 – 280 motor. This is not included in the delivery as standard.

The following figure shows the dimensions of the optional cover.



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[4] Keyway
[34] Tapping screw
[361] Safety cover
LB/LBS Length of the motor/brakemotor
1) Refer to the "AC Motors" catalog for dimensions

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Dimensions

Motors	DA	EA	L1	X
DR..	mm	mm	mm	mm
DR..63	11	23	2	78
DR..63 /BE				
DR..71	11	23	2	91.5
DR..71 /BE				88
DR..80	14	30	2	95.5
DR..80 /BE				94.5
DR..90	14	30	2	88.5
DR..90 /BE				81
DR..100	14	30	2	87.5
DR..100 /BE				81
DR..112 – 132S	19	40	3.5	125
DR..112 – 132S /BE				120.5
DR..132M/L	28	60	4	193
DR..132M/L /BE				187
DR..160 – 180	38	80	4	233
DR..160 – 180 /BE				236
DR..200 – 225	48	110	5	230
DR..200 – 225 /BE				246
DR..250 – 280	55	110	3	243.5
DR..250 – 280 /BE				

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5 Electrical installation

5.1 Before you start

- Observe the 5 safety rules before commencing the work: Disconnect. Secure the device against a restart. Check that no voltage is applied. Ground and short-circuit it. Cover or cordon off neighboring live parts.
- Secure the motor against unintended power-up.
- Let the unit cool down sufficiently before you start working on it.
- Repairs or modifications to the product may only be performed by trained specialists. Contact SEW-EURODRIVE Service when performing work on the unit.
- Use switch contacts in utilization category DC-3 according to EN 60947-4-1 for switching the brake with DC 24 V.
- Use switch contacts to switch the brake. Depending on the brake type and design, the switch contacts must meet the specifications in the following utilization categories.
  - Switch contacts for the supply voltage for operation with AC voltage: AC-3 in accordance with EN 60947-4-1 or AC-15 in accordance with EN 60947-5-1.
  - Switch contacts for the supply voltage for operation with DC voltage: Preferably AC-3 or DC-3 in accordance with EN 60947-4-1. As an alternative, contacts in utilization category DC-13 in accordance with EN 60947-5-1 are also permitted.
  - Switch contacts for optional cut-off in the DC circuit: AC-3 in accordance with EN 60947-4-1.
- In the case of inverter supplied motors, observe the wiring instructions issued by the inverter manufacturer.

5.2 Electrical connection

The connection must be a permanently secure electrical connection (no protruding wire ends). Use the corresponding cable end equipment. Establish a safe protective earth connection. When the motor is connected, the distances to non-insulated and live parts must not be shorter than the minimum values according to IEC 60664 and to national regulations. With low voltage, the distances should be no shorter than the following values, in compliance with IEC 60664:

Nominal voltage V_N	Distance
≤ 500 V	3 mm
≤ 690 V	5.5 mm

The terminal box must be free from foreign objects, dirt and humidity. Unused cable entry openings and the connection box itself must be sealed so that they are dust- and water-proof.

Secure the key(s) for the test run without output elements.

When operating low-voltage machines with brakes, check that the brake is functioning properly before startup.

Observe the notes in chapter "Electrical installation".

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5.3 Wiring diagrams and terminal assignment diagrams

Connect the motor as shown in the wiring connection diagrams provided with the motor. You can obtain the valid wiring diagrams free of charge from SEW-EURODRIVE.

INFORMATION

Do not connect or start up the motor if the wiring diagram is missing.

5.4 Wiring notes

During installation observe the safety notes in chapter 2 and 5.

5.4.1 Protecting the brake control system against interference

Brake cables must always be routed separately from other unshielded power cables with phased currents to prevent interference with brake control. In particular, power cables with phased currents include:

- Output cables from frequency inverters and servo inverters, soft start units and brake units
- Supply cables for braking resistors and similar options

For line-operated motors and when using AC and DC circuit cut-off, the connection between the brake rectifier and the external switch contact must be in a different power cable that is separate from the motor power supply.

5.4.2 Protecting the motor protection devices against interference

Adhere to the following points to protect motor protection devices by SEW-EURODRIVE against interference:

- Route separately shielded feeder cables together with switched-mode power lines in one cable
- Do not route unshielded feeder cables together with switched-mode power lines in one cable.

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5.5 Special aspects for operation with a frequency inverter

When motors are powered from inverters, you must observe the wiring instructions issued by the inverter manufacturer. You must also observe the operating instructions for the frequency inverter.

5.5.1 Motors with SEW-EURODRIVE frequency inverter

Standard-design energy-efficient motors from SEW-EURODRIVE are suitable for operation on frequency inverters from SEW-EURODRIVE. SEW-EURODRIVE motors in standard design with standard insulation meet the requirements in accordance with DIN CLC/TS 60034-25 VDE V 0530-25:2006-01).

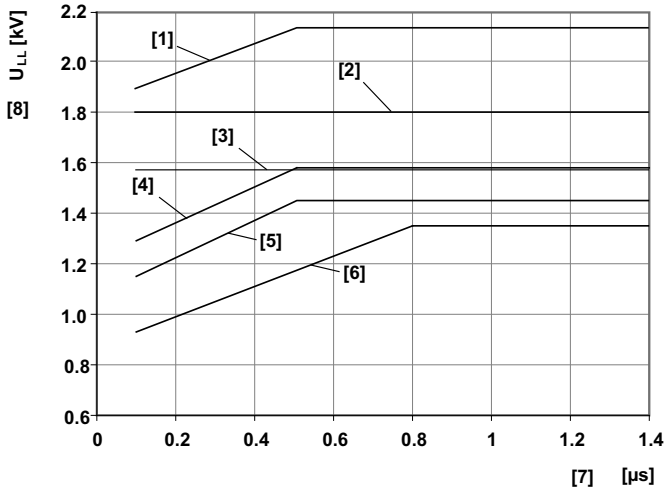
For more intense stress, SEW-EURODRIVE motors with adapted insulation material systems are available. Also observe the overview in chapter "Motor with third-party inverter" (→ 🗎 69). Voltage limiting values for each insulation material system are specified in this chapter.

For pulse rise times of less than 0.5 µs of the pulse voltage at the motor connection terminals, the permitted pulse voltage is reduced according to the overview in chapter "Motor with third-party inverter" (→ 🗎 69).

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5.5.2 Motor with third-party inverter

Operating SEW-EURODRIVE motors on third-party frequency inverters is permitted if the pulse voltages at the motor terminals indicated in the following figure are not exceeded:



18014402490073227

[1] Permitted pulse voltage for DR.., DRN.. motors with reinforced insulation and increased resistance against partial discharge (/RI2)
[2] Permitted pulse voltage for DR.., DRN.. motors with reinforced insulation (/RI)
[3] Permitted pulse voltage according to NEMA MG1 part 31, $V_N \leq 500$ V
[4] Permitted pulse voltage according to IEC 60034-25, limit value curve A for nominal voltage $V_N \leq 500$ V, star connection
[5] Permitted pulse voltage according to IEC 60034-25, limit value curve A for nominal voltage $V_N \leq 500$ V, delta connection
[6] Permitted pulse voltage according to IEC 60034-17
[7] Voltage rise time
[8] Permitted pulse voltage

The insulation class depends on the voltage.

- ≤ 500 V = standard insulation
- ≤ 600 V = /RI
- > 600 V – 690 V = /RI2

INFORMATION

Compliance with the following limit values must be checked and considered:

- The supply voltage level at the third-party inverter
- The threshold of the brake chopper voltage
- The operating mode of the motor (motor mode/generator mode)

→ If the permitted pulse voltage is exceeded, you must install limiting measures, such as filters, chokes or special motor cables. Consult the manufacturer of the frequency inverter.

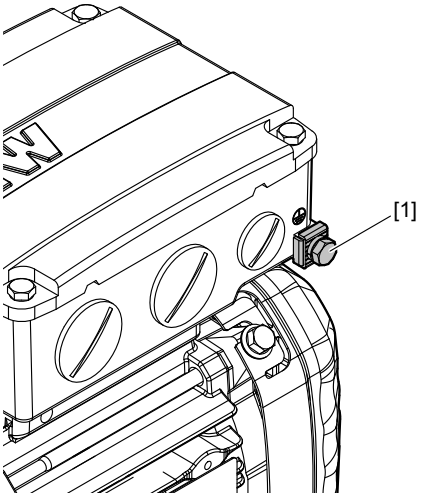
5.6 Exterior grounding at the terminal box, LF grounding

In addition to the interior PE connection, a LF grounding cable can be attached to the outside of the terminal box. It is not installed as standard.

LF grounding can be ordered as completely pre-installed at the factory. For this, an aluminum or gray cast iron terminal box designed for brake connections is required for DR..71 – 132S motors. For DR..132M – 225 motors, this option can be combined with all terminal box types.

The option can be combined with "HF grounding".

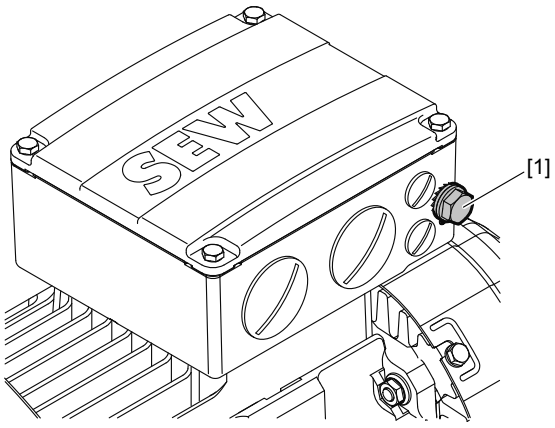
DR..71 – 132S motors



18014406533810571

[1] LF grounding at the terminal box

DR..160 – 225 motors



9007207281679371

[1] LF grounding at the terminal box

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5.7 Improving the grounding (EMC), HF grounding

For improved, low-impedance grounding at high frequencies, we recommend using the following connections with corrosion protected connection elements:

HF grounding is not installed as standard.

The HF grounding option can be combined with LF grounding at the terminal box.

If you require LF grounding in addition to HF grounding, you can connect the conductor to the same point.

The HF grounding option can be ordered as follows:

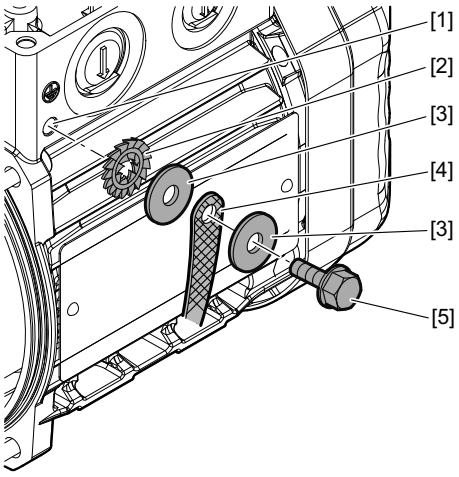
- Completely pre-assembled at the factory
- As "grounding terminal" kit for customer installation; part numbers listed in the following table.

Motors	Part number of the "Grounding terminal" kit
DR..56 – 63	21014817
DR..71 – 100LS	21015988
DR..100LM – 132S	13633945
DR..132M – 225 with aluminum terminal box	

INFORMATION

If 2 or more ground straps are used, you have to attach them with a longer screw. The specified tightening torques refer to a strap thickness of t ≤ 3 mm.

5.7.1 DR..56 – 63 motors with HF(+LF) grounding

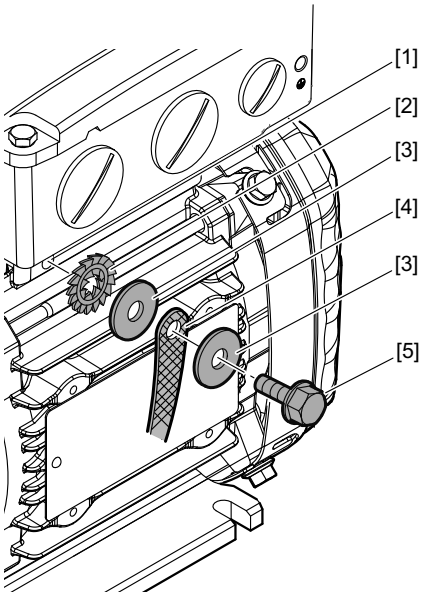


9007221552147851

[1] Use of the pre-cast bore on the stator housing
[2] Serrated lock washer
[3] Washer ISO 7093
[4] Ground strap (not included in the scope of delivery)
[5] Self-tapping screw M5 × 16, tightening torque 5 Nm

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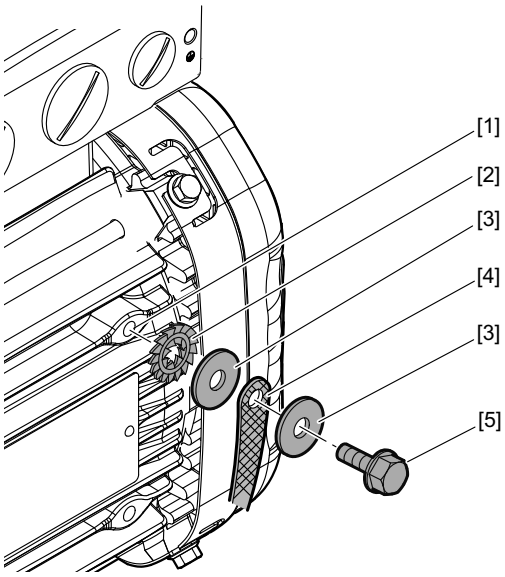
5.7.2 DR..71 – 80 motors with HF(+LF) grounding



9007207281509003

[1] Use of the pre-cast bore on the stator housing
[2] Serrated lock washer
[3] Washer ISO 7093
[4] Ground strap (not included in the scope of delivery)
[5] Self-tapping screw M6 × 16, tightening torque 10 Nm

5.7.3 DR..90 motors with HF (+LF) grounding

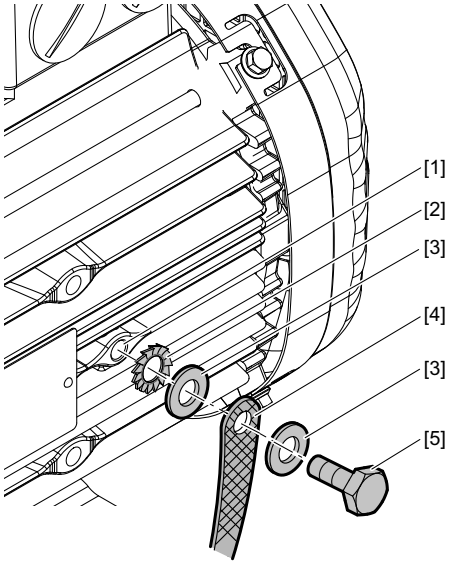


9007207281514123

[1] Use of the pre-cast bore on the stator housing
[2] Serrated lock washer
[3] Washer ISO 7093
[4] Ground strap (not included in the scope of delivery)
[5] Self-tapping screw M6 × 16, tightening torque 10 Nm

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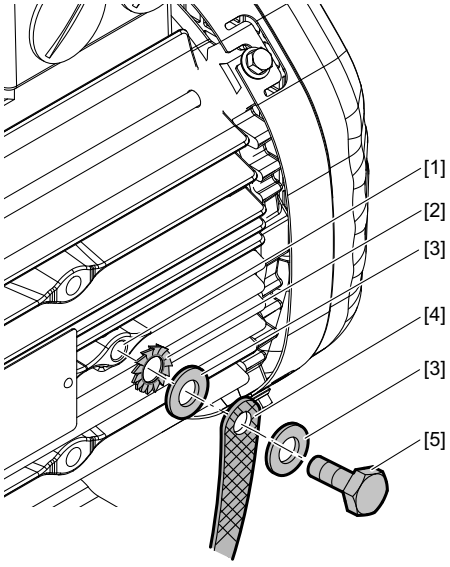
5.7.4 DR..100LS motors with HF (+LF) grounding



27021601319292939

[1] Use of the pre-cast bore on the stator housing
[2] Serrated lock washer
[3] Washer ISO 7093
[4] Ground strap (not included in the scope of delivery)
[5] Self-tapping screw M6 × 16, tightening torque 10 Nm

5.7.5 DR..100LM – 132S motors with HF(+LF) grounding

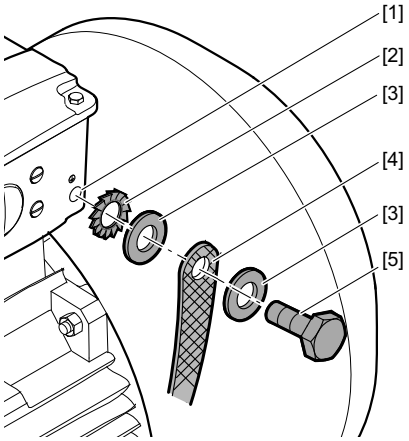


27021601319292939

[1] Use of tapped hole for lifting eyes
[2] Serrated lock washer DIN 6798
[3] Washer ISO 7089/ISO 7090
[4] Ground strap (not included in the scope of delivery)
[5] Hex head screw ISO 4017 M8 × 18, tightening torque 10 Nm

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5.7.6 DR..132M – 315 motors with HF(+LF) grounding



27021601331150091

[1] Use of the tapped hole on the terminal box
[2] Serrated lock washer
[3] Washer ISO 7089/ISO 7090
[4] Ground strap (not included in the scope of delivery)
[5]
- Hex head screw ISO 4017 M8 × 18 (with aluminum terminal boxes of DR..160 – 225, DRN132M – 225 motors), tightening torque 10 Nm
- Hex head screw ISO 4017 M10 × 25 (with gray cast iron terminal boxes of DR..160 – 225, DRN132M – 225 motors), tightening torque 10 Nm
- Hex head screw ISO 4017 M12 x 30 (terminal boxes of DR../DRN250 – 315 motors), tightening torque 15.5 Nm

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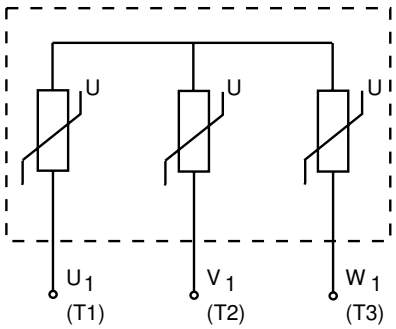
5.8 Special aspects in switching operation

When the motors are used in switching operation, possible interference of the switchgear must be excluded by ensuring suitable wiring. According to EN 60204 (electrical equipment of machines), motor windings must have interference suppression to protect the numerical or programmable logic controllers. As it is primarily switching operations that cause interference, SEW-EURODRIVE recommends installing protection circuits in the switching devices.

If the drive has been delivered with a suppressor circuitry in the motor, you must observe the provided wiring diagram.

5.9 Special aspects of torque motors and low-speed motors

Due to the design of DRM.., DR2M.. torque motors and low-speed motors, very high induction voltages may be generated when they are switched off. Consequently, SEW-EURODRIVE recommends using the varistor circuit shown below for protection. The size of the varistors depends, amongst other factors, on the starting frequency.



9007201709307147

5.10 Notes regarding the connection of the motor

INFORMATION

It is essential to comply with the valid wiring diagram. Do not connect or start up the motor if this wiring diagram is missing. You can obtain the valid wiring diagrams free of charge from SEW-EURODRIVE.

⚠ WARNING



Danger due to contaminated terminal box.

Severe or fatal injuries.

- Seal the terminal box and unused cable entries against dust and humidity.
- Remove present foreign objects, dirt and humidity from the terminal box.

Observe the following when connecting the motor:

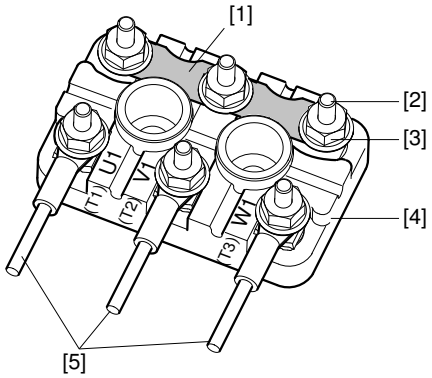
- Check the cable cross section
- Correctly arrange the terminal link
- Screw the connections and protective earth securely
- To prevent damage to the wire insulation, connection leads must not be cramped
- Observe air gaps, see chapter "Electrical connection"
- In the terminal box: Check winding connections and tighten if necessary
- Connect according to the enclosed wiring diagram
- Avoid protruding wire ends
- Connect the motor according to the specified direction of rotation

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5.11 Connecting the motor via terminal block

5.11.1 According to wiring diagram R13

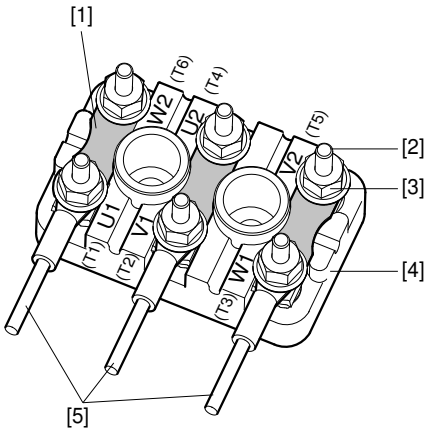
Arrangement of terminal links with ⅄ connection



36028797257896715

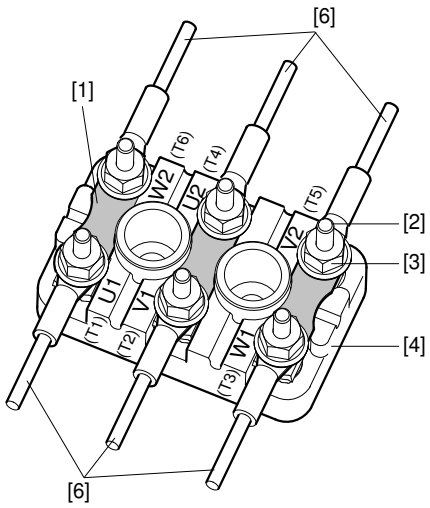
Arrangement of terminal links for △ connection

DR..63 – 280 motors
(single-sided supply):



18014398748413067

DR..250 – 315 motors
(double-sided supply):



18014398989593739

[1] Terminal link
[2] Terminal stud
[3] Flange nut
[4] Terminal board
[5] Customer connection
[6] Customer connection with split connection cable

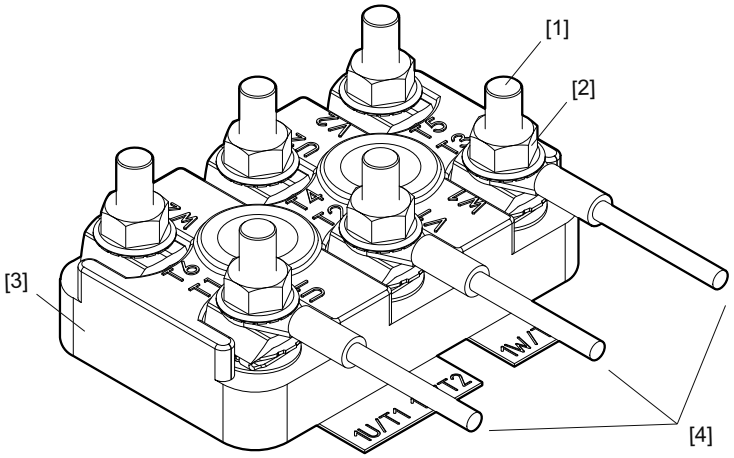
INFORMATION

For DR..250 – 315 motors, SEW-EURODRIVE recommends a double-sided supply for load currents higher than

- M12: 250 A
- M16: 315 A

5.11.2 According to wiring diagram R33

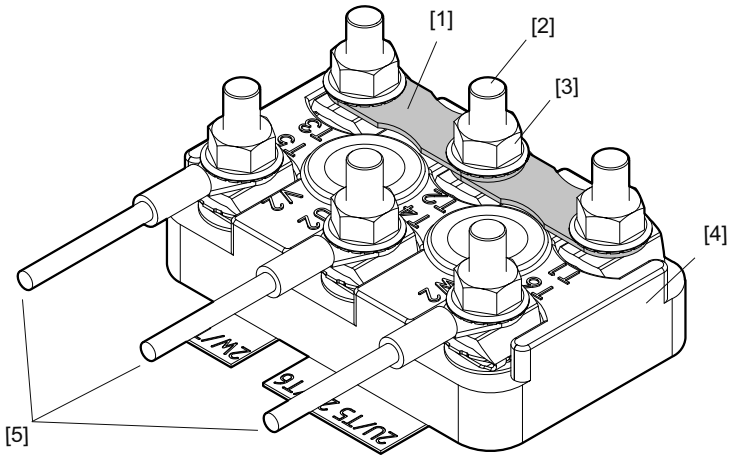
Arrangement of the terminal links for △ connection (Dahlander connection, low speed)



55951506059

[1] Terminal stud
[2] Flange nut
[3] Terminal board
[4] Customer connection

Arrangement of the terminal links for ⅄⅄ connection (Dahlander connection, high speed)



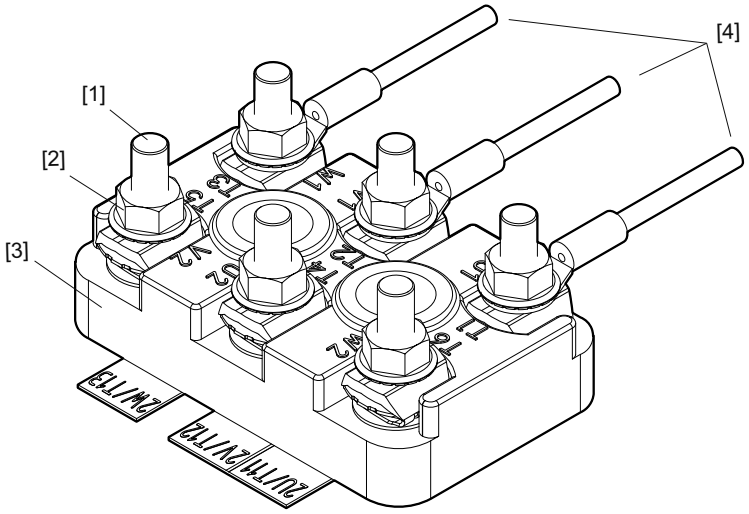
55951510923

[1] Terminal link
[2] Terminal stud
[3] Flange nut
[4] Terminal board
[5] Customer connection

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5.11.3 According to wiring diagram R43

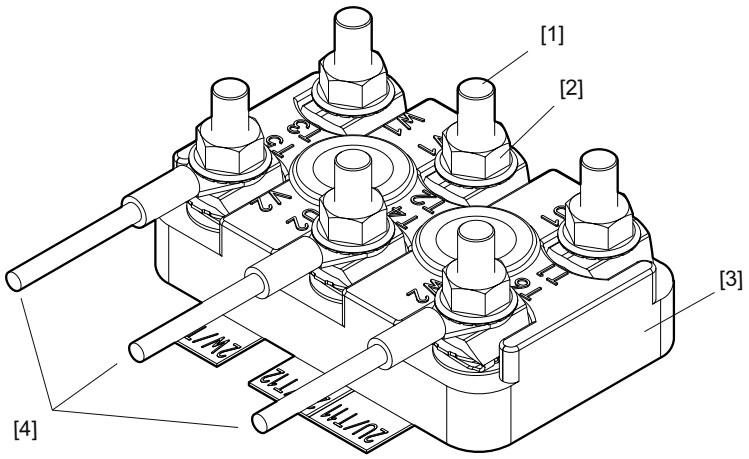
Arrangement of the terminal links for ⅄ connection (separate winding, low speed)



55951513355

[1] Terminal stud
[2] Flange nut
[3] Terminal board
[4] Customer connection

Arrangement of terminal links for ⅄ connection (separate winding, high speed)



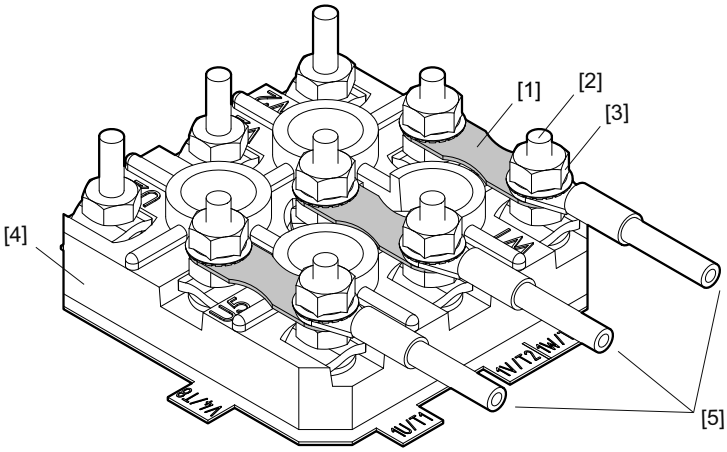
55951508491

[1] Terminal stud
[2] Flange nut
[3] Terminal board
[4] Customer connection

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5.11.4 According to wiring diagram R53

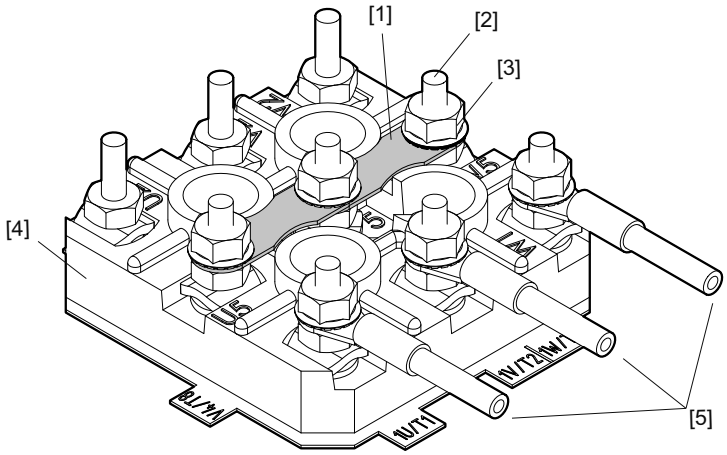
Arrangement of terminal links for △ connection (Dahlander connection, 9 terminals, low speed)



55951515787

[1] Terminal link
[2] Terminal stud
[3] Flange nut
[4] Terminal board
[5] Customer connection

Arrangement of the terminal links for ⅄ connection (Dahlander connection, 9 terminals, low speed)

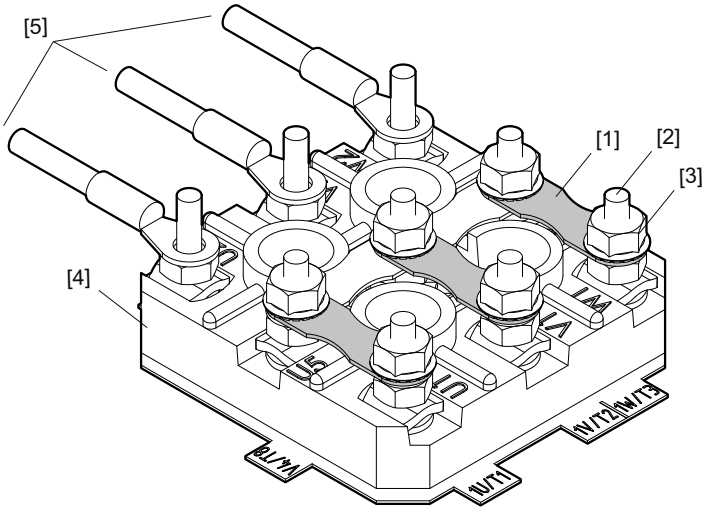


55951518219

[1] Terminal link
[2] Terminal stud
[3] Flange nut
[4] Terminal board
[5] Customer connection

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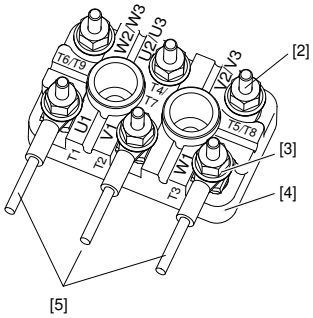
Arrangement of terminal links for ⅄⅄ connection (Dahlander connection, 9 terminals, high speed)



[1] Terminal link
[2] Terminal stud
[3] Flange nut
[4] Terminal board
[5] Customer connection

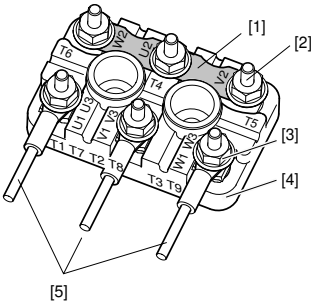
5.11.5 According to wiring diagram R76

Arrangement of terminal links with 人 connection



9007201573816075

Arrangement of terminal links for 人人 connection



18014400845841803

[1] Terminal link
[2] Terminal stud
[3] Flange nut
[4] Terminal board
[5] Customer connection

INFORMATION

Three winding lead ends must be rewired to change from high to low voltage:

The lines designated U3 (T7), V3 (T8) and W3 (T9) must be reconnected.

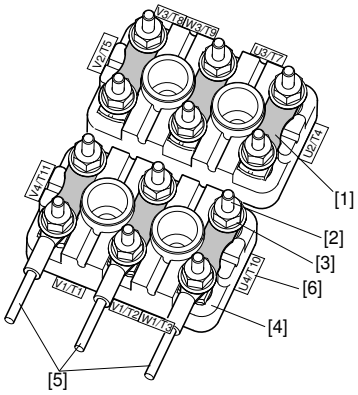
- U3 (T7) from U2 (T4) to U1 (T1)
- V3 (T8) from V2 (T5) to V1 (T2)
- W3 (T9) from W2 (T6) to W1 (T3)

→ Changing from low to high voltage is carried out in reverse order. In both cases, the customer connection is made to U1 (T1), V1 (T2) and W1 (T3). You can change the direction of rotation by interchanging 2 supply cables.

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5.11.6 According to wiring diagram R72

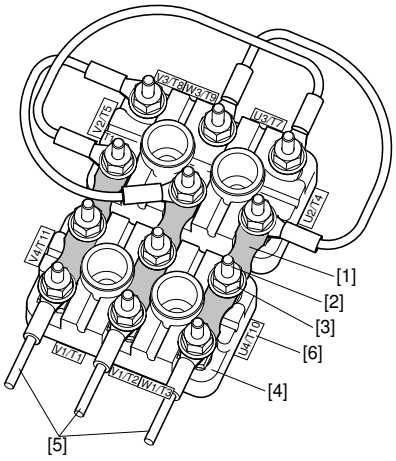
Arrangement of terminal links with △ connection



27021600083296139

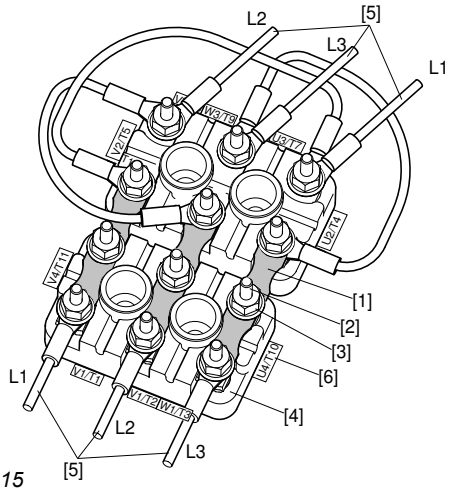
Arrangement of terminal links with △△ connection

DR..71 – 280, DRN63 – 280, DR2..63 – 80 motors
(single-sided supply):



18014400845874315

DR../DRN250 – 315 motors
(double-sided supply):



9007208157343883

[1] Terminal link
[2] Terminal studs
[3] Flange nut
[4] Terminal board
[5] Customer connection
[6] Wiring designation plate
L1 Conductor 1
L2 Conductor 2
L3 Conductor 3

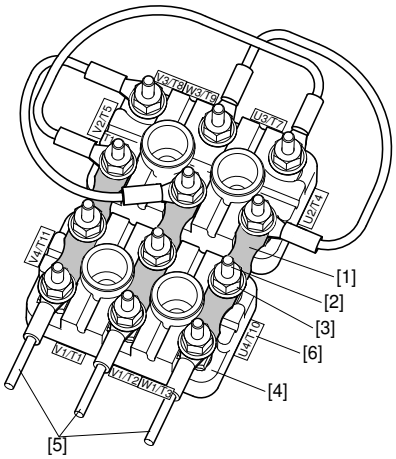
INFORMATION

For DR../DRN250 – 315 motors, SEW-EURODRIVE recommends a double-sided supply for load currents higher than

- M10: 160 A

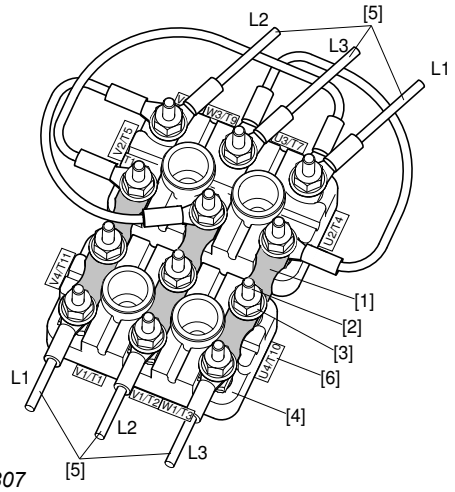
Arrangement of terminal links with △△ connection

DR..63 – 280 motors
(single-sided supply):



27021600100615307

DR..250 – 315 motors
(double-sided supply):



18014407412084875

[1] Terminal link
[2] Terminal stud
[3] Flange nut
[4] Terminal board
[5] Customer connection
[6] Wiring designation plate
L1 Conductor 1
L2 Conductor 2
L3 Conductor 3

INFORMATION

For DR..250 – 315 motors, SEW-EURODRIVE recommends a double-sided supply for load currents higher than

- M10: 160 A

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5.11.7 Connection designs via terminal board

The motors are supplied and connected in different ways depending on their electrical design. The terminal links are to be arranged according to the wiring diagram and screwed securely in place. Observe the tightening torques in the following tables.

DR..63 motors							
Terminal stud	**Hex nut tightening torque**	**Connection**	**Design**	**Connection type**	**Scope of delivery**	**PE connection screw**	**PE design**
Ø		**Cross section**				**Ø**	
M4	**1.6 Nm**	**≤ 1.5 mm²**	**1a**	**Wire ferrule**	**Terminal links, pre-assembled**	M4	6
		≤ 2.5 mm²	**1a**	**Solid wire**	**Terminal links, pre-assembled**		
		≤ 6 mm²	**1b**	**Ring cable lug**	**Terminal links, pre-assembled**		
		≤ 6 mm²	2	Ring cable lug	Connection accessories enclosed		

DR..71 – 100 motors							
Terminal stud	**Hex nut tightening torque**	**Connection**	**Design**	**Connection type**	**Scope of delivery**	**PE connection screw**	**PE design**
Ø		**Cross section**				**Ø**	
M4	**1.6 Nm**	**≤ 1.5 mm²**	**1a**	**Wire ferrule**	**Terminal links, pre-assembled**	M5	4
		≤ 2.5 mm²	**1a**	**Solid wire**	**Terminal links, pre-assembled**		
		≤ 6 mm²	**1b**	**Ring cable lug**	**Terminal links, pre-assembled**		
		≤ 6 mm²	2	Ring cable lug	Connection accessories enclosed		
M5	2.0 Nm	≤ 2.5 mm²	1a	Solid wire Wire ferrule	Terminal links, pre-assembled		
		≤ 16 mm²	1b	Ring cable lug	Terminal links, pre-assembled		
		≤ 16 mm²	2	Ring cable lug	Connection accessories enclosed		
M6	3.0 Nm	≤ 35 mm²	3	Ring cable lug	Connection accessories enclosed		

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DR..112 – 132S motors							
Terminal stud	**Hex nut tightening torque**	**Customer connection**	**Design**	**Connection type**	**Scope of delivery**	**PE connection screw**	**PE design**
Ø		**Cross section**				**Ø**	
M5	**2.0 Nm**	**≤ 2.5 mm²**	**1a**	**Solid wire Wire ferrule**	**Terminal links, preassembled**	M5	4
		≤ 16 mm²	**1b**	**Ring cable lug**	**Terminal links, preassembled**		
		≤ 16 mm²	2	Ring cable lug	Connection accessories enclosed		
M6	3.0 Nm	≤ 35 mm²	3	Ring cable lug	Connection accessories enclosed		
DR..132M motors							
Terminal stud	**Hex nut tightening torque**	**Customer connection**	**Design**	**Connection type**	**Scope of delivery**	**PE connection screw**	**PE design**
Ø		**Cross section**				**Ø**	
M5	**2.0 Nm**	**≤ 2.5 mm²**	**1a**	**Solid wire Wire ferrule**	**Terminal links, preassembled**	M8	5
		≤ 16 mm²	**1b**	**Ring cable lug**	**Terminal links, preassembled**		
		≤ 16 mm²	2	Ring cable lug	Connection accessories enclosed		
M6	3.0 Nm	≤ 35 mm²	3	Ring cable lug	Connection accessories enclosed		

DR..132L motors							
Connection bolt	**Hex nut tightening torque**	**Customer connection**	**Design**	**Connection type**	**Scope of delivery**	**PE connection screw**	**PE design**
Ø		**Cross section**				**Ø**	
M6	**3.0 Nm**	**≤ 35 mm²**	**3**	**Ring cable lug**	**Connection accessories enclosed**	M8	5
M8	6.0 Nm	≤ 70 mm²	3	Ring cable lug	Connection accessories enclosed	M10	5

DR..160 – 225 motors							
Terminal stud	**Hex nut tightening torque**	**Customer connection**	**Design**	**Connection type**	**Scope of delivery**	**PE terminal stud**	**PE design**
Ø		**Cross section**				**Ø**	
M8	**6.0 Nm**	**≤ 70 mm²**	**3**	**Ring cable lug**	**Connection accessories enclosed**	M8	5
M10	10 Nm	≤ 95 mm²	3	Ring cable lug	Connection accessories enclosed	M10	5
M12	15.5 Nm	≤ 95 mm²	3	Ring cable lug	Connection accessories enclosed	M10	5

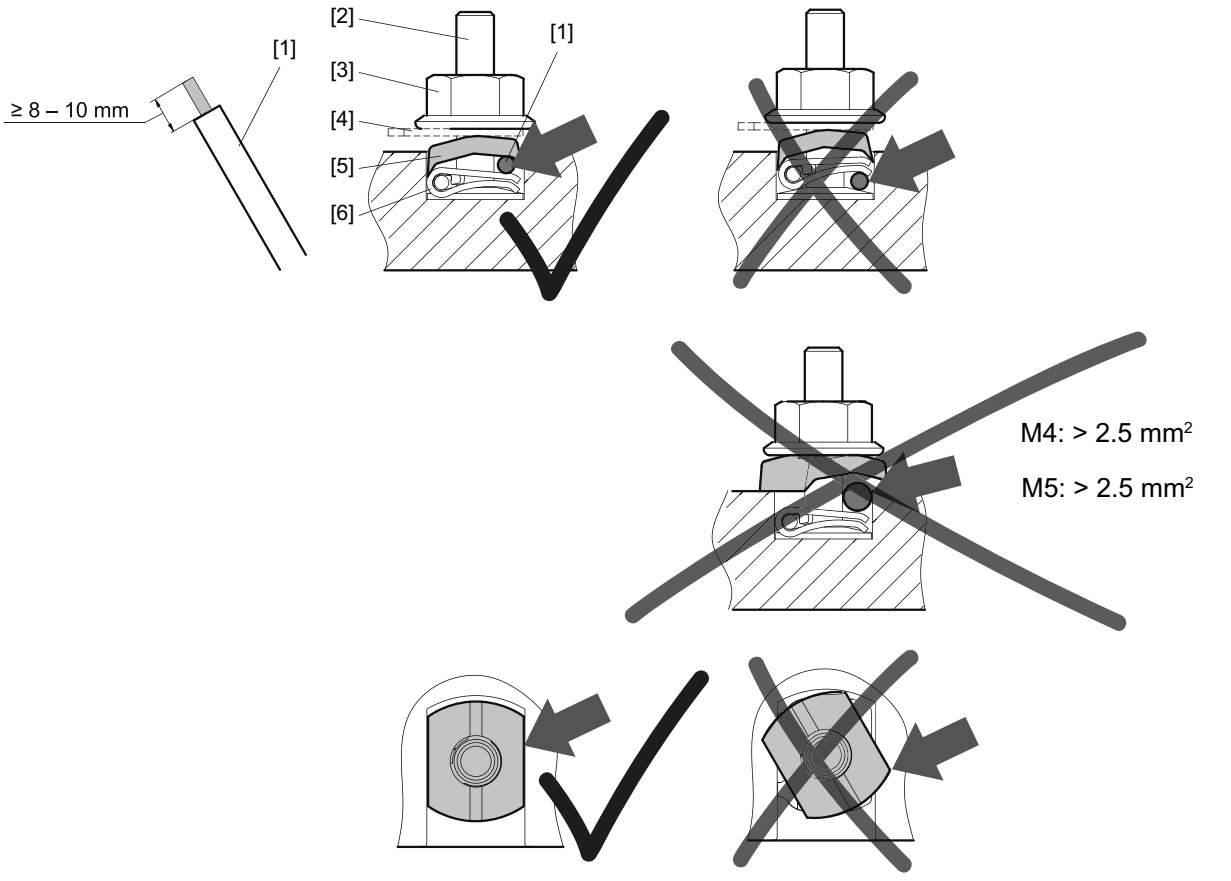
DR..250 – 280 motors							
Terminal stud	**Hex nut tightening torque**	**Customer connection**	**Design**	**Connection type**	**Scope of delivery**	**PE terminal stud**	**PE design**
Ø		**Cross section**				**Ø**	
M10	**10 Nm**	**≤ 95 mm²**	**3**	**Ring cable lug**	**Connection accessories enclosed**	M12	5
M12	**15.5 Nm**	**≤ 95 mm²**	**3**	**Ring cable lug**	**Connection accessories enclosed**	M12	5

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DR..315 motors							
Terminal stud	**Hex nut tightening torque**	**Customer connection**	**Design**	**Connection type**	**Scope of delivery**	**PE terminal stud**	**PE design**
Ø		**Cross section**				**Ø**	
M12	**15.5 Nm**	**≤ 95 mm²**	**3**	**Ring cable lug**	**Connection parts preassembled**	M12	5
M16	**30 Nm**	**≤ 120 mm²**					

The designs in bold print apply to S1 operation for the standard voltages and standard frequencies according to the data in the catalog. Other designs may have different connections, e.g. different terminal stud diameters and/or a different scope of delivery.

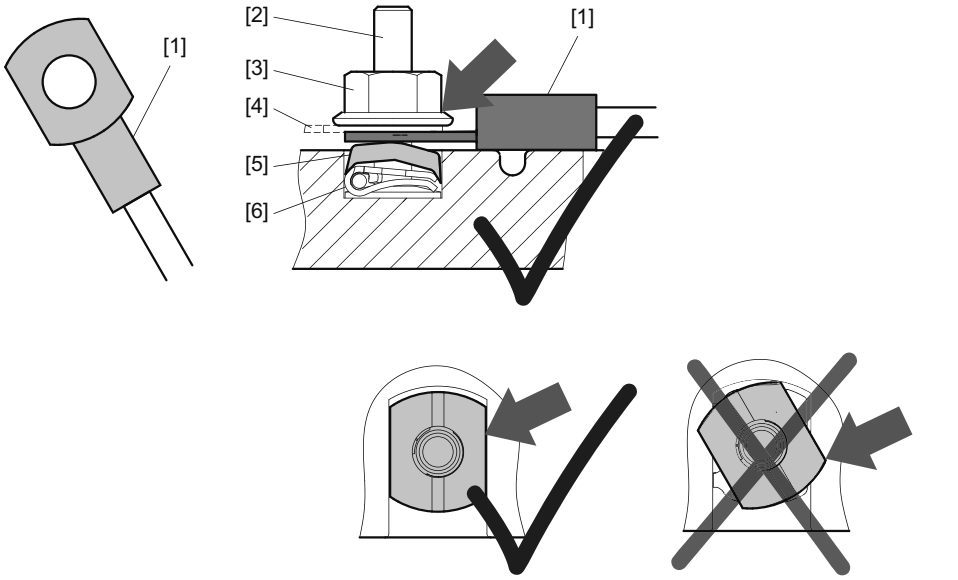
Variant 1a



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[1] External connection
[2] Terminal stud
[3] Flange nut
[4] Terminal link
[5] Terminal washer
[6] Winding connection with Stocko terminal

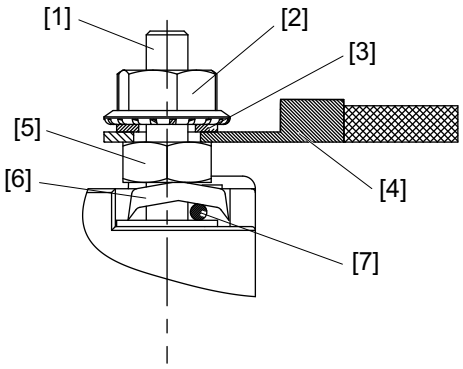
Variant 1b:



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[1] External connection with ring cable lug, according to DIN 46237 or DIN 46234, for example
[2] Terminal stud
[3] Flange nut
[4] Terminal link
[5] Terminal washer
[6] Winding connection with Stocko terminal

Variant 2

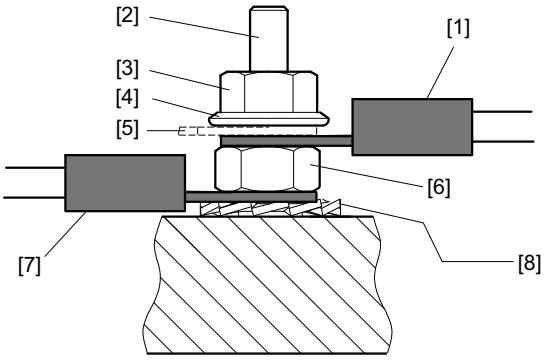


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[1] Terminal board
[2] Flange nut
[3] Terminal link
[4] External connection with ring cable lug, according to DIN 46237 or DIN 46234, for example
[5] Bottom nut
[6] Terminal washer
[7] Winding connection

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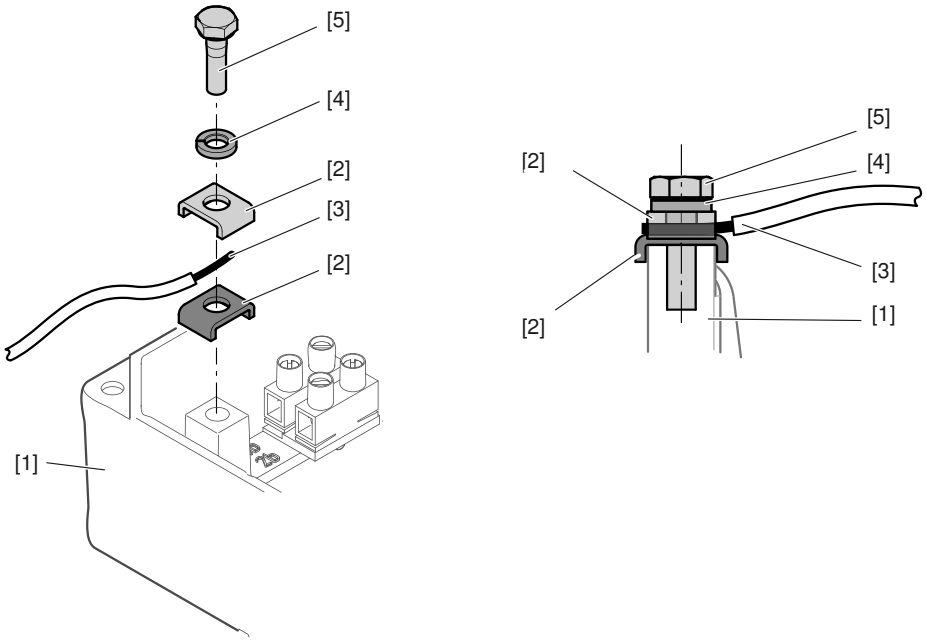
Variant 3



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[1] External connection with ring cable lug, according to DIN 46237 or DIN 46234, for example
[2] Terminal stud
[3] Upper nut
[4] Washer
[5] Terminal link
[6] Bottom nut
[7] Winding connection with ring cable lug
[8] Serrated lock washer

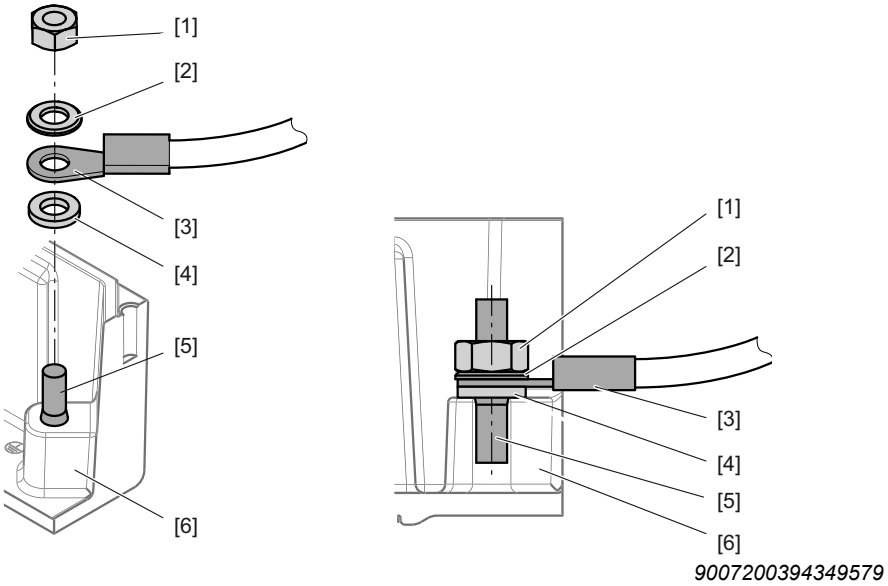
Variant 4



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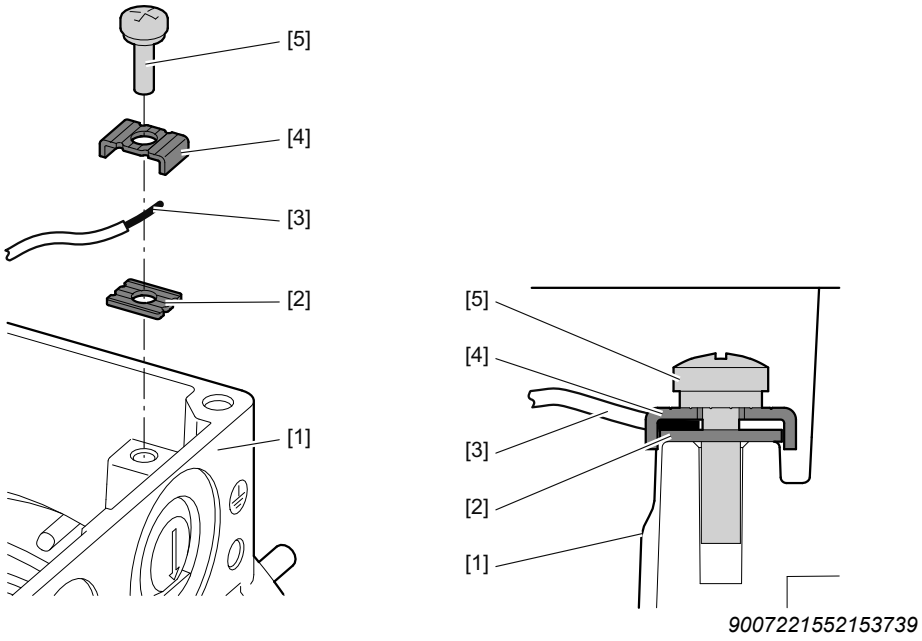
[1] Terminal box
[2] Terminal clip
[3] PE conductor
[4] Lock washer
[5] Hex head screw

Variant 5



[1] Hex nut
[2] Washer
[3] PE conductor on cable lug
[4] Serrated lock washer
[5] Stud
[6] Terminal box

Variant 6

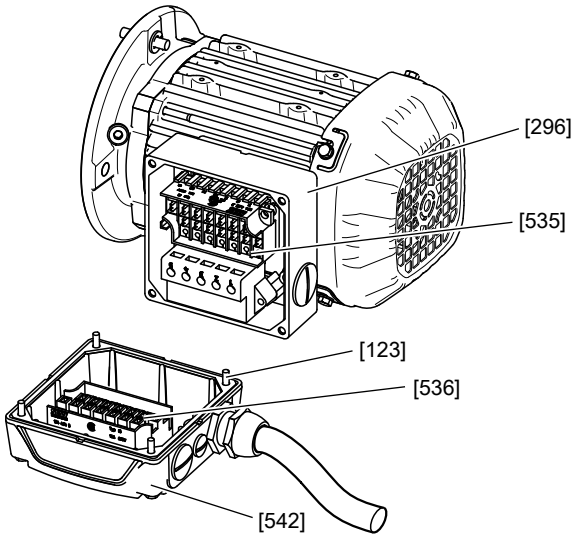


[1] Terminal box
[2] Support plate
[3] PE conductor
[4] Terminal clip
[5] Flat head screw

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5.12 Connecting the motor plug connector

5.12.1 IS/ISU plug connector



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The lower (male) part [535] of the /IS, /ISU connector option is delivered prewired, including the additional features such as brake control.

The upper (female) part [536] of the /IS option is included in the scope of delivery and must be connected according to the wiring diagram.

The /ISU option is delivered without the upper part of the connector [536].

Cable cross section

The rated currents are specified on the nameplate of the motor.

1. Make sure that the type of cable complies with the applicable regulations.
2. Use the cable cross sections as specified in the following table:

Without variable terminal link	With variable terminal link	Bridge cable	Double assignment (Motor and brake /SR)
0.25 – 4.0 mm^2	0.25 – 2.5 mm^2	max. 1.5 mm^2	max. 1 × 2.5 and 1 × 1.5 mm^2

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Connecting the upper section of the plug connector

To connect the upper section of the plug connector, proceed as follows:

1. Unscrew the screws [123] of the housing cover [542].
2. Remove the housing cover [542]. In doing so, separate the upper and lower section of the plug connector.
3. Unscrew the retaining screws of the upper section of the plug connector [536].
4. Remove the upper section of the plug connector [536] from the cover.
5. Strip the insulation off the connection cable.
6. Strip 9 mm of insulation from the connection leads of the connection cable.
7. Route the connection cable through the cable gland of the housing cover [542].
8. Connect the connection cable according to the corresponding wiring diagram and the descriptions in the following chapters.

Connect according to wiring diagram R83

1. Connect the cores of the connection cable according to wiring diagram R83.
2. Tighten the clamping screws.
   ⇨ Tightening torque 0.5 Nm
3. Install the upper section of the plug connector [536] (see chapter "Installing the plug connector" (→ 🗎 96)).

Connect according to wiring diagram R81, R81A, R81B, R81E, R81F

Wiring diagram	Motor design	Connection type	Number of motor cables to be connected	Variable terminal link in the upper part	Additional conductors (bridges)
R81	One speed	⅄/△	6[1)]	No	–
R81	One speed	⅄ or △	3	Yes	–
R81A	One speed	⅄ or △ BSR phase-to-neutral voltage	3	Yes, separated	4
R81B	One speed	⅄ BSR phase-to-phase voltage	3	Yes, separated	4
R81E	One speed	⅄ or △	3	Yes	3
R81F	One speed	⅄Phase-to-phase voltage	3	Yes	3
R80	One speed, multi-voltage	⅄	3	No	–
R84	One speed, multi-voltage	⅄⅄	3	Yes	–
R82	Pole-changing, Dahlander	△ / ⅄⅄	6	No	–

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Wiring diagram	Motor design	Connection type	Number of motor cables to be connected	Variable terminal link in the upper part	Additional conductors (bridges)
R83	Pole-changing, separate winding	人/人	6	No	–

1) When implementing 6 cables, the customer is responsible for creating the corresponding connection type.

For 人/△ startup:

✓ The star or delta connection type must be realized in the control cabinet by the customer.

1. Insert the bridge if required (see table).
2. Connect the upper part of the connector with 6 conductors.
3. Tighten the clamping screws.
   ⇨ Tightening torque 0.5 Nm
4. Install the upper section of the plug connector [536] (see chapter "Installing the plug connector" (→ 🗎 96)).

For 人 or △ operation:

5. Connect the conductors according to the wiring diagram.
6. Install the upper section of the plug connector [536] (see chapter "Installing the plug connector" (→ 🗎 96)).

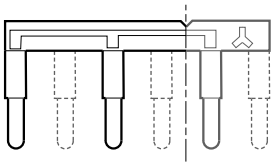
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Brake control system BSR – preparing the variable terminal link

For ⅄ operation:

✓ Required tool: Pliers or small metal saw and file.

1. Separate the terminal link at the recess on the ⅄ side with the aid of the tool.
2. Deburr the point of separation.

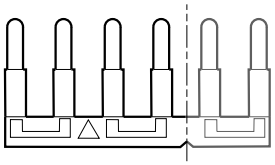


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For △ operation:

✓ Required tool: Pliers or small metal saw and file.

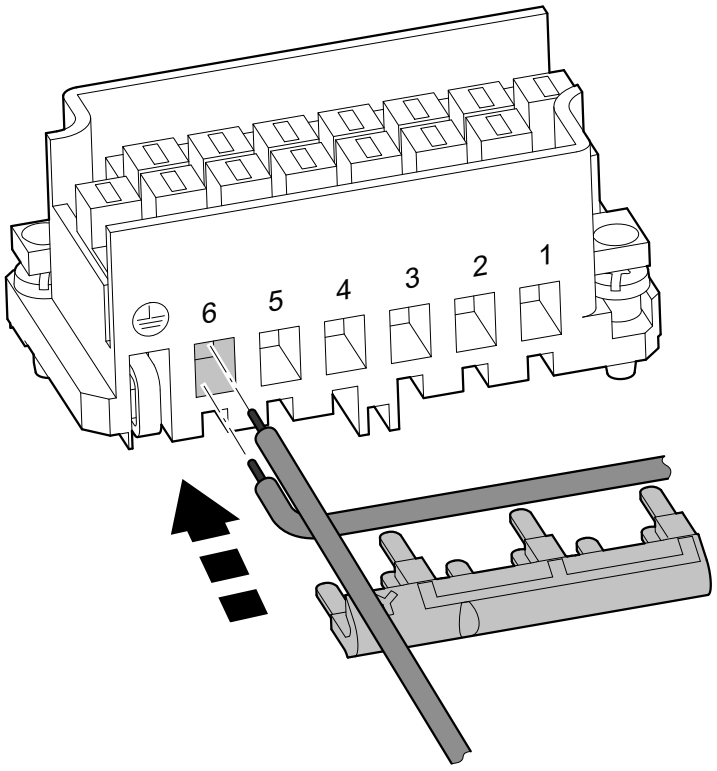
3. Separate the terminal link at the recess on the △ side with the aid of the tool.
4. Deburr the point of separation.



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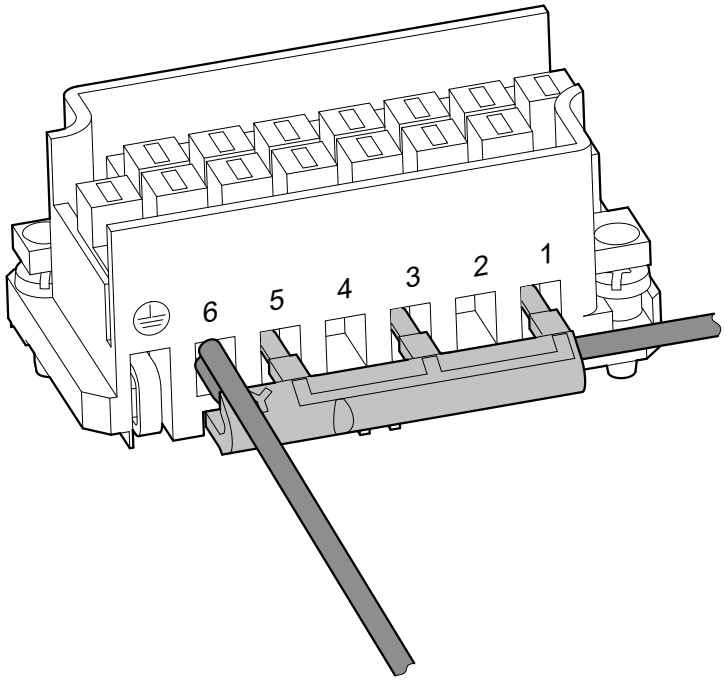
Connect according to wiring diagram R81, R81A, R81B, R81E, R81F for ⅄ or △ operation with double terminal assignment

1. Connect the bridge cable to the terminal for double assignment.



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2. For ⅄ or △ operation, insert the bridge cable into the prepared variable terminal link, see chapter "Brake control system BSR – preparing the variable terminal link" (→ 🗎 94).
3. Insert the variable terminal link into the upper section of the plug connector.
4. Connect the motor cable to the terminal for double assignment above the variable terminal link.
5. Connect the other conductors according to wiring diagram R81.
6. Install the upper section of the plug connector [536] (see chapter "Installing the plug connector" (→ 🗎 96)).



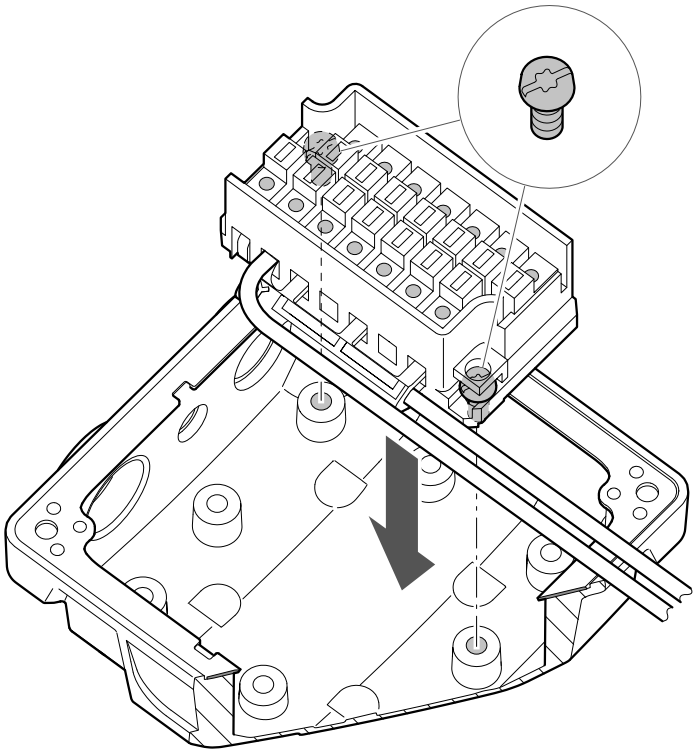
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Installing the upper section of the plug connector

You can set the position of the cable outlet by rotating the housing cover [542] and mounting it on the lower housing part again. For this purpose, the upper part of the connector [536] in the housing cover must be removed, turned, and reinstalled in order to be plugged back onto the lower section of the connector [296], see chapter "Position of the upper section of the plug connector in the housing cover" (→ 🗎 97)

1. Set the required position of the cable outlet.
2. Connect the upper part of the connector, see chapter "Connecting the upper section of the plug connector" (→ 🗎 92).
3. Fasten the upper part of the connector [536] in the required position in the housing cover [542] using the screws that are integrated in the upper part of the connector. In doing so, make sure that the screws also create the contact of the protective earth.
   ⇨ Tightening torque 2.25 Nm ± 15%



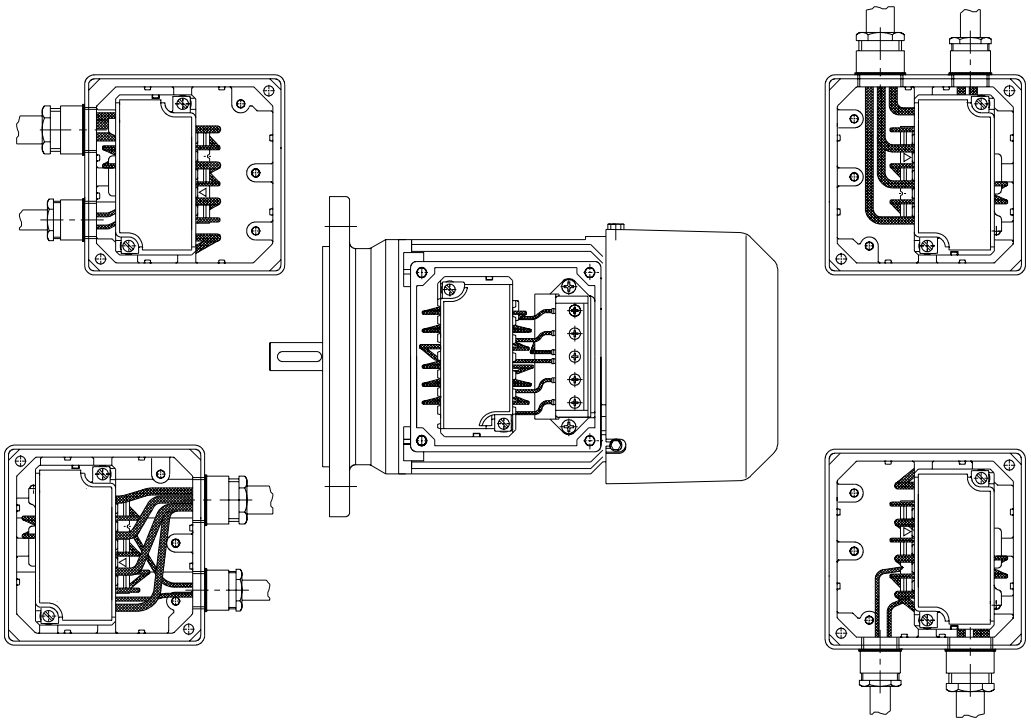
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4. Check all screws of tightening and contact connections for tight fit.
5. Close the connector by connecting the upper part and the lower part of the connector.
6. Screw in the screws [123].
   ⇨ Tightening torque 4 Nm
7. Tighten the cable gland.
   ⇨ Observe the cable gland manufacturer's specifications for the tightening torque.

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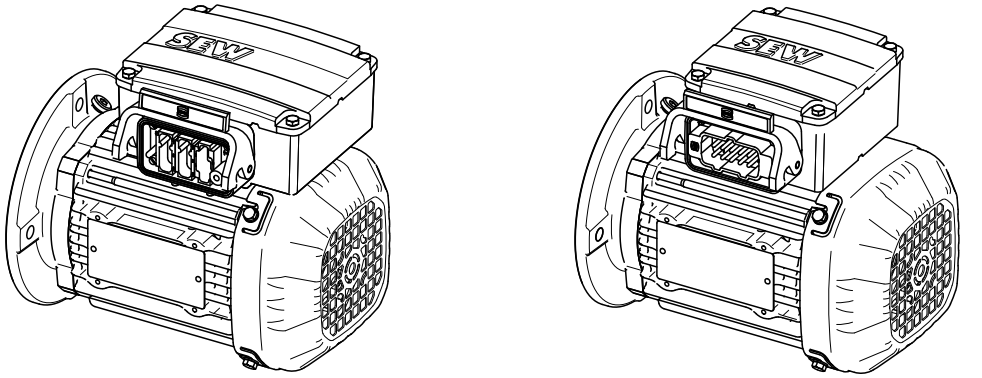
Position of the upper section of the plug connector in the housing cover

The following figure shows the possible positions of the upper section of the plug connector in the housing cover:



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5.12.2 AB.., AD.., AM.., AK.., AC.., AS.. plug connectors



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The attached connector systems AB.., AD.., AM.., AK.., AC.. and AS.. are based on Harting connector systems.

- AB.., AD.., AM.., AK.. Han Modular®
- AC.., AS.. Han 10E / 10ES

The connectors are located on the side of the terminal box. They are locked onto the terminal box with one or two clips.

The internal motor wiring is performed at the factory according to the order information. The mating connector must be prefabricated by the user.

The mating connector (grommet housing) with socket contacts is not included in the scope of delivery.

The degree of protection is only guaranteed if the mating connector is plugged in and locked.

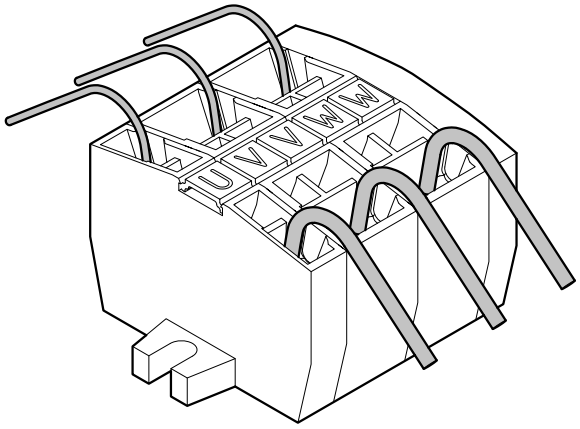
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5.13 Connecting the motor via terminal strip

5.13.1 According to wiring diagram R10

1. Connect the motor according to the enclosed wiring diagram.
2. Check the maximum cable cross section.
   - ⇨ 2.5 mm² rigid
   - ⇨ 2.5 mm² flexible
   - ⇨ 1.5 mm² flexible with conductor end sleeve
3. The stripping length must be 8 – 9 mm.
4. Connect the protective earth as described in chapter "Variant 6" (→ 🗎 90).

Arrangement of the terminal leads for 人 connection

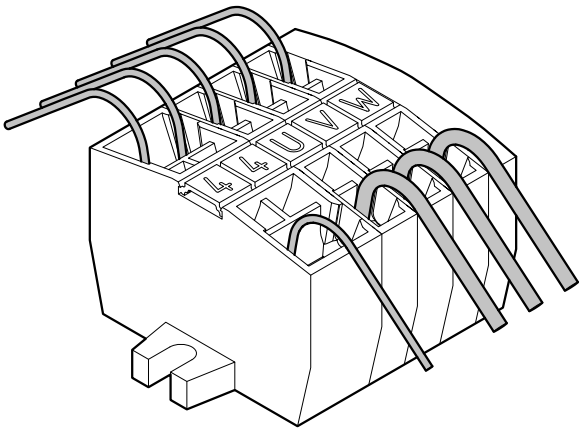


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5.13.2 According to wiring diagram R12

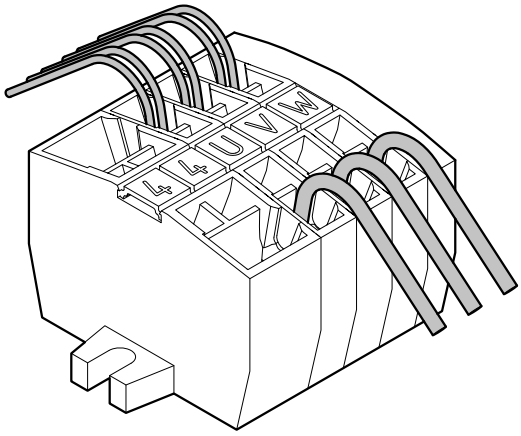
1. Connect the motor according to the enclosed wiring diagram.
2. Check the maximum cable cross section.
   - ⇨ 2.5 mm² rigid
   - ⇨ 2.5 mm² flexible
   - ⇨ 1.5 mm² flexible with conductor end sleeve
3. The stripping length must be 8 – 9 mm.
4. Connect the protective earth as described in chapter "Variant 6" (→ 🗎 90).

Arrangement of the terminal leads for ⅄ connection



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Arrangement of the terminal leads for △ connection



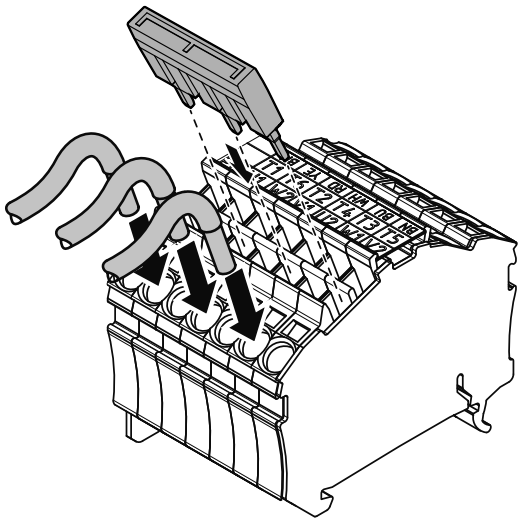
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5.13.3 According to wiring diagram C13 with terminal strip /KCC

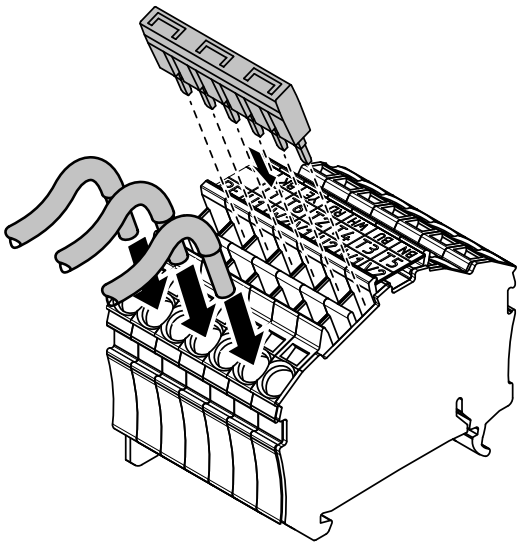
1. Connect the motor according to the enclosed wiring diagram.
2. Check the maximum cable cross section.
   - ⇨ 4 mm² rigid
   - ⇨ 4 mm² flexible
   - ⇨ 2.5 mm² flexible with conductor end sleeve
3. Check the winding connections in the terminal box and tighten them, if necessary.
4. The stripping length must be 10 – 12 mm.

Arrangement of terminal links with ⅄ connection



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Arrangement of terminal links with △ connection



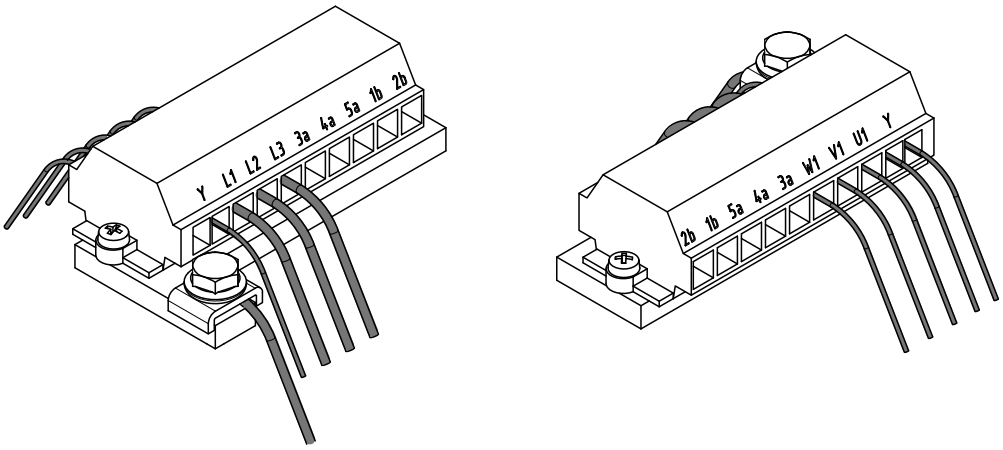
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5.13.4 According to wiring diagram C12 with KC1 terminal strip

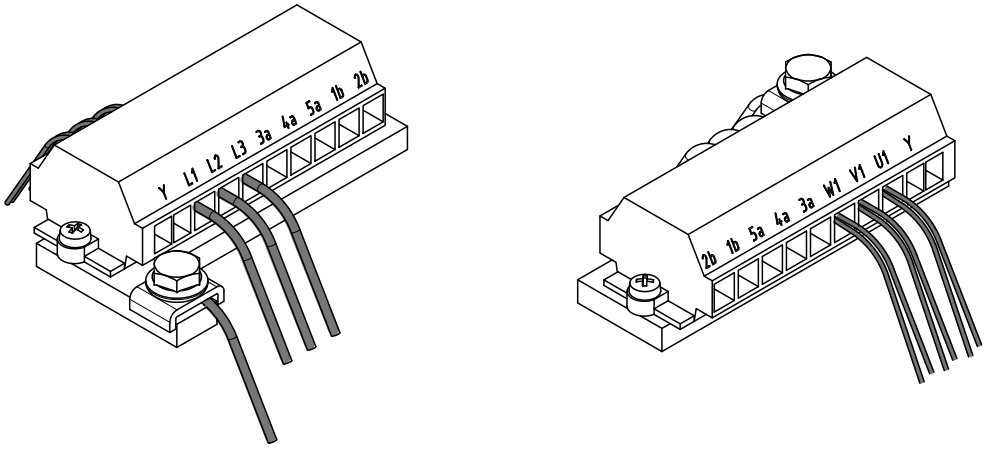
1. Connect the motor according to the enclosed wiring diagram.
2. Check the maximum cable cross section.
   - ⇨ 2.5 mm² rigid
   - ⇨ 2.5 mm² flexible
   - ⇨ 1.5 mm² flexible with conductor end sleeve
3. The stripping length must be 8 – 9 mm.

Arrangement of the terminal leads for ⅄ connection



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Arrangement of the terminal leads for △ connection



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5.14 Connecting the brake

BE.. brakes are powered by energized DC voltage and are released electrically. The brake is applied mechanically when the voltage supply is disconnected.

⚠ WARNING



Delayed brake application or unintentional brake release due to incorrect control or connection.

Severe or fatal injuries, e.g. due to falling hoist.

- Comply with the applicable regulations issued by the relevant employer's liability insurance association regarding phase failure protection and the associated circuit/circuit modification.
- Connect the brake according to the enclosed wiring diagram.
- In case of emergency off, always disconnect all poles of the brake control from the supply voltage.
- Only use suitable contactors with sufficient contact rating (utilization category according to IEC 60947-4-1/IEC 60947-5-1, see chapter "Brake voltage supply" (→ 🗎 105)).
- For contactor selection, observe the inductive load to switch, and the high current load while switching the brake.

5.14.1 Connecting the brake control

The brake is powered by a brake control system with protection circuit. The brake control is either installed in the motor's terminal box or in the control cabinet. If the motor is prepared for the brake control in the control cabinet, the brake supply cables are connected to a terminal strip in the motor terminal box.

Screw terminals are usually used as terminals on the terminal strip or on the brake control. Terminals with cage clamp technology can also be used.

The connectable cable cross sections are restricted to 2.5 mm^2. If you use larger cable cross sections due to application reasons, additional intermediate terminals must be used.

The brake is internally connected to the motor PE. An additional connection for the brake is not necessary.

⚠ WARNING



Delayed brake application or unintentional brake release due to incorrect control or connection.

Severe or fatal injuries, e.g. due to falling hoist.

- Observe the specifications of this documentation for connecting the brake.
- If you are uncertain about brake control, voltage supply type and design, or overvoltage and short circuit protection, contact the plant manufacturer or SEW-EURODRIVE.

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5.14.2 Permitted brake controls



⚠ WARNING

Death or severe injuries

Great and unexpected elongation of the stopping distance.

- Operate each brake with a separate brake control.



INFORMATION

The following specifications refer to motors designed for operation at ambient temperatures of -20 °C to +40 °C, and with thermal class 130 (B) or 155 (F). Deviations may occur depending on the installed motor options.

In individual cases, always also observe the additional specifications in the order confirmation and on the motor nameplate.

The brake is designed for operation with AC voltage or DC voltage, depending on the design. An SEW-EURODRIVE brake control system is used that is either installed in the motor terminal box or in the control cabinet.

The BE02 – 2 and BE1H – BE2H brakes can also be operated with DC voltage without an SEW-EURODRIVE brake control. Observe the information on the nameplate in this regard. In this case, a suitable overvoltage protection must be installed at the terminal strips in the terminal box using varistors. The varistors are not included in the scope of delivery of the motor. Observe the project planning notes from SEW-EURODRIVE.

The following brake control types are not permitted:

- Operation with AC voltage without an SEW-EURODRIVE brake control with BE02 – 122 or BE1H – BE2H brakes.
- Operation with DC voltage without brake control by SEW-EURODRIVE with BE5 – BE122 brakes.
- Operation with third-party brake control systems.

For an overview of available brake controls by SEW-EURODRIVE and of the technical data, refer to chapter "Brake control" (→ 🗎 239).

5.14.3 Optional separation of DC and AC circuits

In the case of brakes operated with AC voltage, make sure the connection type designated by the manufacturer is applied correctly during the brake connection. The following types are distinguished:

- Cut-off in the AC circuit (AC cut-off) with normal application time
- Cut-off in the AC circuit and the DC circuit (AC/DC cut-off) with shortened application time

The correct switch-off type must be ensured through appropriate wiring. Certain brake control systems from SEW-EURODRIVE realize the same cut-off in the DC circuit and in the AC circuit via integrated switching relays (e.g. BMP1.5), or via mounted switching relays (e.g. BSR or BUR).

The connection type is specified on the included wiring diagrams by a pictogram.

During project planning, consider the required cut-off type and the effects on the expected stopping distance in particular.

Only use the faster cut-off in the DC and AC circuit for hoists and hoist-like applications.

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If it is unclear whether the application is a hoist-like application, contact SEW-EURODRIVE.

5.14.4 Brake voltage supply

The brake voltage supply must match the values specified on the nameplate of the motor. The brake must be supplied via the designated brake control.

The specifications on the nameplate have a tolerance of +/-5% of the stated nominal value or of the upper and lower limit values of the stated connection range. Observe order-specific deviations.

Make sure the voltage supply is sufficiently stable by using cable cross sections and voltage sources that are dimensioned accordingly. Make sure the supply voltage does not drop below 90% of the nominal value during starting. This may be caused by an increased inrush current, see chapter "Operating currents" (→ 🗎 232).

In case of single-speed drives (not pole-changing) operated directly at the supply system (meaning without frequency inverter or soft start devices), the brake supply voltage can also be taken from the terminal board of the motor. Observe the following restrictions when doing so:

- The nominal brake voltage must either match the phase-to-neutral voltage, or the phase-to-phase voltage of the motor (observe nameplate and motor switching type).
- In case of hoists or hoist-like applications, the BSR.. brake control must be used for cut-off in the DC and AC circuits.
- For combinations with BMP3.1 brake control (BE60 – 122) a voltage supply via the terminal board is not permitted.

INFORMATION



In variable-speed motors and motors operated with soft start devices, the brake voltage must not be picked up from the terminal board because the voltage there is not constant.

5.14.5 Switching equipment

The high electrical load during switching of the brake (inductive load) requires suitable contactors/switch contacts to have the brake function properly.

Depending on the brake type and design, the switch contacts must meet the specifications in the following utilization categories:

- Switch contacts for the supply voltage for operation with AC voltage: AC-3 according to IEC 60947-4-1 or AC-15 according to IEC 60947-5-1.
- Switch contact for the supply voltage for operation with DC voltage: Preferably AC-3 or DC-3 according to IEC 60947-4-1. As an alternative, contacts in utilization category DC-13 according to IEC 60947-5-1 are also permitted.
- Switch contacts for optional cut-off in the DC circuit: AC-3 according to IEC 60947-4-1.

Observe the specifications on the provided wiring diagram.

Using a semi-conductor relay is not permitted.

5.14.6 Brake controls with functional control input

In addition to the voltage supply, the BMK.., BMKB.. and BMV.. brake controls offer a control input for a DC 24 V signal with which the brakes can be switched via a PLC.

It is a purely functional input that is not "functionally safe" with respect to safety technology.

Due to their operating principle, fault states can occur in these devices that lead to unintentional ongoing brake release, even if the control voltage has been switched off.

⚠ WARNING



Unintentional ongoing brake release due to unrecognized malfunction of the brake control.

Severe or fatal injuries, e.g. due to falling hoist or extended coasting.

- For emergency stop, emergency off, hoists and hoist-like applications, always switch off the supply and control voltage together and with all poles.
- Ensure that a malfunction of the control input can be detected through additional, suitable diagnostic measures e.g. by monitoring the braking current to meet increased safety and reliability requirements.
- For functional safety applications, use a safety-related brake module, e.g. the SBM.. brake module.
- If you have any questions regarding the handling of the control input, contact SEW-EURODRIVE.

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5.14.7 Damage protection against overvoltage and short circuit

To obtain protection against overvoltage damages (e.g. due to short circuit), a sufficiently dimensioned fusing must be used at the supply cables.

Observe the notes on dimensioning in the catalog, or contact SEW-EURODRIVE.

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5.14.8 Connecting the diagnostic unit /DUE option for function and wear monitoring

The /DUE diagnostic unit (Diagnostic Unit Eddy Current) is a contactless measuring system for function and wear monitoring of the brake and the continuous measurement of the current working air gap.

The measuring system consists of:

- Sensor, integrated in the magnet body of the brake
- Evaluation unit in the motor terminal box that is supplied via a DC 24 V voltage.

If the diagnostic unit /DUE was ordered, the function and wear monitoring is preinstalled and calibrated at the factory. The customer must connect the diagnostic unit, see wiring diagram. The switching point of the wear monitoring is preset to the maximum permitted value. According to the table in chapter "Evaluation unit" (→ 🗎 215), a reduced value can also be set.

For the status of the evaluation unit, refer to chapter "Retrofitting the /DUE diagnostic unit for function and wear monitoring" (→ 🗎 214).

Information on retrofitting the /DUE diagnostic unit can be found in chapter "Retrofitting the /DUE diagnostic unit for function and wear monitoring" (→ 🗎 214).

Connecting the evaluation unit

The maximum permitted cable cross section at terminals "k" of the evaluation unit is 1.5 mm^2 with conductor end sleeve without plastic collar, 0.75 mm^2 with plastic collar. The recommended cable cross section at terminals "k" is 0.5 mm^2 with conductor end sleeve with plastic collar.

INFORMATION

Use shielded cables to wire the evaluation unit. Connect the shield to the GND potential, or use the shield plate at the user's signal evaluation.

SEW-EURODRIVE recommends routing the power cable of the drive and the cable of the diagnostic unit separately.

- Unless they are shielded, sensor cables must always be routed separately from other power cables with phased currents.
- Provide the appropriate equipotential bonding between drive and control cabinet.

Important characteristics of the cable to be used are:

- Total shielding (outer shield) of the cable
- 100 m maximum length for fixed installation
- 50 m maximum length for cable carrier installation

The required number of cores depends on the type of function/signals that are to be transferred to the higher-level controller and then processed.

At the factory, the diagnostic unit /DUE is pre-installed, calibrated and set to the wear limit permitted for the brake. The diagnostic unit has to be calibrated again after service or maintenance work such as sensor replacement or replacement of the evaluation electronics. The calibration can be performed directly at the evaluation electronics (at the terminal box) or alternatively via the higher-level controller. In the second case, the required signals for calibration have to be routed to the higher-level controller.

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The reference ground GND and the reference ground analog output AGND have the same potential. In case this potential is not treated separately in the application, AGND is not necessary.

Number of required cores	Function	Abbreviation
3	Voltage supply	DC 24 V
	Reference ground	GND
	Digital output function	FCT
3	Voltage supply	DC 24 V
	Reference ground	GND
	Digital output wear	WEAR
4	Voltage supply	DC 24 V
	Reference ground	GND
	Digital output function	FCT
	Digital output wear	WEAR
4	Voltage supply	DC 24 V
	Reference ground	GND
	Analog output current air gap	OUT
	Reference ground analog output	AGND
6	Voltage supply	DC 24 V
	Reference ground	GND
	Digital output function	FCT
	Digital output wear	WEAR
	Analog output current air gap	OUT
	Reference ground analog output	AGND
8	Voltage supply	DC 24 V
	Reference ground	GND
	Digital output function	FCT
	Digital output wear	WEAR
	Analog output current air gap	OUT
	Reference ground analog output	AGND
	Calibration zero value	ZERO
	Calibration of infinite value	INF

INFORMATION

If the calibration inputs ZERO and/or INF are routed to the outside to a PLC or a controller, they have to be continuously connected to AGND in normal operation to avoid EMC interferences in the calibration cables.

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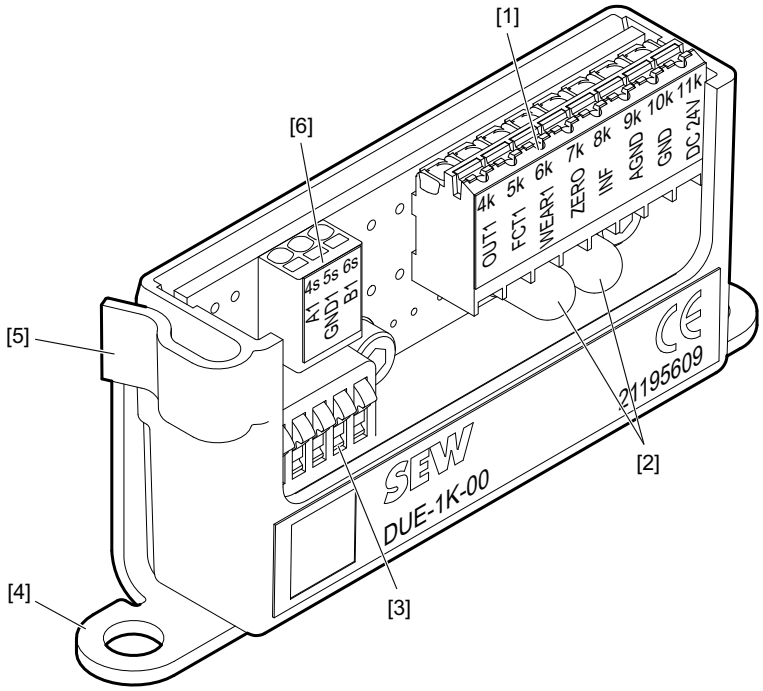
INFORMATION

Signal outputs of the evaluation unit /DUE that are switched may not be used as voltage supply for other evaluation units /DUE or comparable systems. Each evaluation unit /DUE has to be supplied with voltage separately.

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Designation of the components

The system comprises a sensor and single-channel evaluation unit. The function monitoring of the brake is realized via a digital signal (NO contact). A digital output (NC contact) signals if the wear limit was reached. Further, a current output allows for continuous monitoring of the brake wear.



14950549515

[1] Terminals 4k – 11k
[2] LEDs for function and wear, brake
[3] DIP switches S1 – S5
[4] Fastening of terminal box (PE)
[5] Line clip
[6] Terminals 4s – 6s

The connection designation of the terminals are as follows:

Terminal	Designation	Description	Color coding
4s	A1	Sensor 1 connection 1	Brown (BN)
5s	GND1	Sensor 1 shield	Black (BK)
6s	B1	Sensor 1 connection 2	White (WH)

Terminal	Designation	Description
4k	OUT1	Analog output working air gap brake
5k	FCT1	Digital output function brake
6k	WEAR1	Digital output wear brake
7k	ZERO	Input calibration zero value
8k	INF	Input calibration infinite value
9k	AGND	Signal ground AGND
10k	GND	Ground potential GND
11k	DC 24 V	DC 24 V supply

The LEDs have the follow meaning:

LEDs	Designation	Description
Green [2]	FCT1	The brake is open. Electromagnet is active. Pressure plate is in contact with magnet body.
Red [2]	WEAR1	The current working air gap of the brake reached or exceeded the preset maximum working air gap.

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5.15 Options

Connect the options as shown in the wiring connection diagrams provided with the motor. You can obtain the valid wiring diagrams free of charge from SEW-EURODRIVE.

INFORMATION

Do not connect any options if the wiring diagram is missing.

5.15.1 /TF temperature sensor

NOTICE

Impermissible heating of the motor due to defective /TF temperature sensor.

Damage to property.

- Do not connect any voltages > 30 V to the /TF temperature sensor.
- Observe the enclosed wiring diagram when connecting the /TF temperature sensor.

The PTC thermistor temperature sensors comply with DIN 44082.

Resistance measurement (measuring device with U ≤ 2.5 V or I < 1 mA):

- Standard measured values: 20 – 500 Ω, hot resistance > 4000 Ω

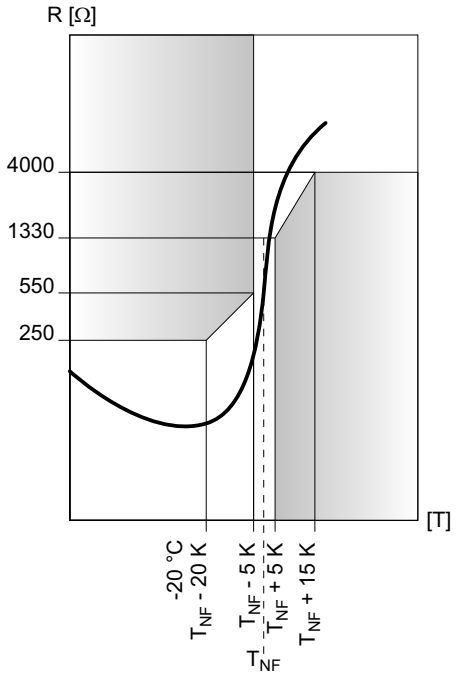
When using the temperature sensor for thermal monitoring, the evaluation function must be activated to maintain reliable insulation of the temperature sensor circuit. The thermal protection function must become active in case of overtemperature.

If there is a 2nd terminal box for the /TF temperature sensor, the temperature sensor must be connected in this box.

It is essential that you observe the enclosed wiring diagram when connecting the /TF temperature sensor. If the wiring diagram is not enclosed, it can be obtained free of charge from SEW-EURODRIVE.

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The figure below shows the characteristic curve of the /TF with reference to the nominal response temperature (referred to as T_{NF}):



9007204724894475

5.15.2 Winding thermostats /TH

The thermostats are connected in series as standard and open when the permitted winding temperature is exceeded. They can be connected in the drive monitoring loop.

	AC V	DC V	
Voltage U in V	250	60	24
Current (cos ϕ = 1.0) in A	2.5	1.0	1.6
Current (cos ϕ = 0.6) in A	1.6		
Contact resistance max. 1 Ω at DC 5 V/1 mA			

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5.15.3 Temperature sensor /PT (Pt100)

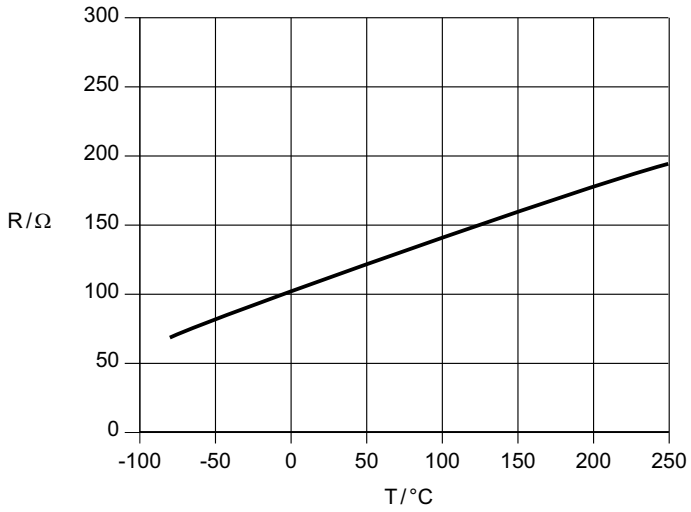
NOTICE

Damage to the insulation of the temperature sensor and the motor winding due to excessive self-heating of the temperature sensor.

Possible damage to the drive system.

- The current in the circuit must not exceed 3 mA.
- Observe the correct connection of the Pt100 to ensure correct evaluation of the temperature detection system.

The characteristic curve in the following figure shows the resistance curve as a function of the motor temperature.



9007200400579339

Technical Data	Pt100
Connection	Red and white
Resistance at 20 – 25 °C per Pt100	107.8 Ω < R < 109.7 Ω
Test current	< 3 mA

5.15.4 Temperature sensor /PK (Pt1000)

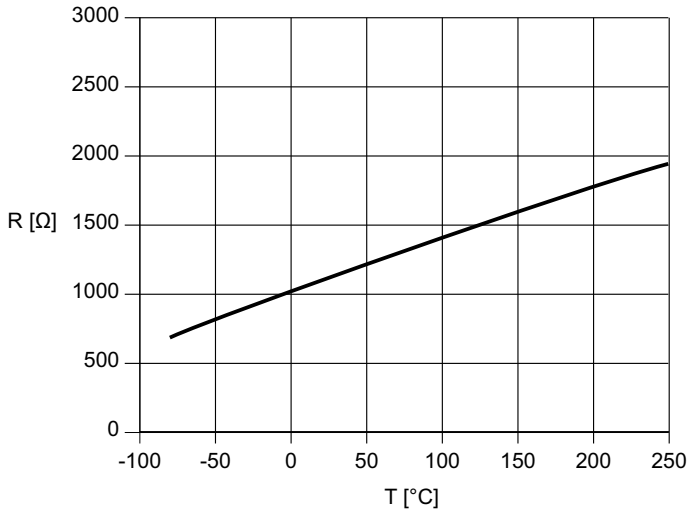
NOTICE

Damage to the insulation of the temperature sensor and the motor winding due to excessive self-heating of the temperature sensor.

Possible damage to the drive system.

- The current in the circuit must not exceed 3 mA.
- Observe the correct connection of the Pt1000 to ensure correct evaluation of the temperature sensor.

The characteristic curve in the following figure shows the resistance curve as a function of the motor temperature.



9007216790221195

Technical Data	Pt1000
Connection	Red-black
Resistance at 20 – 25 °C per Pt1000	1077 Ω < R < 1098 Ω
Test current	< 3 mA

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5.15.5 Forced cooling fan /V

- Connection in separate terminal box
- Max. connection cross section 3 × 1.5 mm² (3 × AWG 15)
- Cable gland M16 × 1.5

Motors	Operating mode/connection	Frequency Hz	Voltage V
DR..71 – 132	1 ~ AC[1] (△)	50	100 to 127
DR..71 – 132	3 ~ AC ⅄	50	175 to 220
DR..71 – 132	3 ~ AC △	50	100 to 127
DR..71 – 180	1 ~ AC[1] (△)	50	230 to 277
DR..71 – 315	3 ~ AC ⅄	50	346 to 500
DR..71 – 315	3 ~ AC △	50	200 to 290

1) Steinmetz circuit

Motors	Operating mode/connection	Frequency Hz	Voltage V
DR..71 – 132	1 ~ AC[1] (△)	60	100 to 135
DR..71 – 132	3 ~ AC ⅄	60	175 to 230
DR..71 – 132	3 ~ AC △	60	100 to 135
DR..71 – 180	1 ~ AC[1] (△)	60	230 to 277
DR..71 – 315	3 ~ AC ⅄	60	380 to 575
DR..71 – 315	3 ~ AC △	60	220 to 330

1) Steinmetz circuit

Motors	Operating mode/connection	Voltage V
DR..71 – 132	DC 24 V	24

INFORMATION

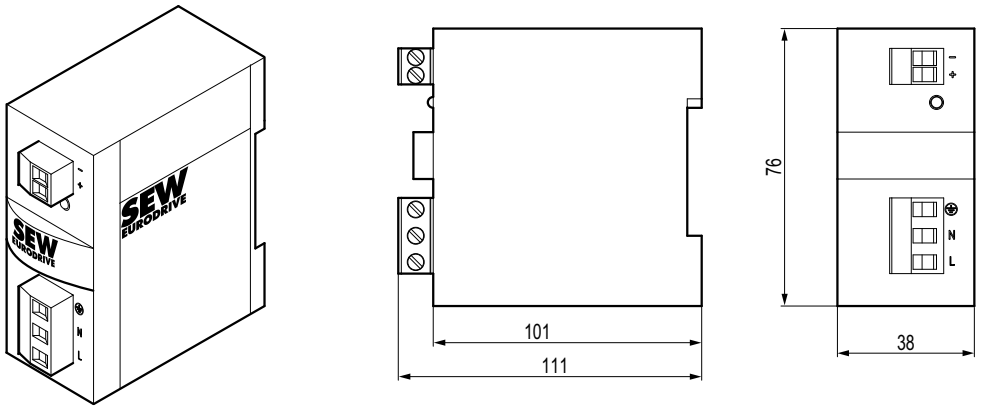
For information on how to connect the /V forced cooling fan, refer to chapter "Forced cooling fan /V" (→ 🗎 275).

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5.15.6 UWU52A switched-mode power supply

The forced cooling fan design V for DC 24 V furthermore includes the UWU52A switched-mode power supply, if you have ordered it. It can be ordered using the part number from SEW-EURODRIVE, even after the order has been placed.

The following figure depicts the UWU52A switched-mode power supply:



576533259

Input	AC 110 – 240 V 1.04 – 0.61 A 50/60 Hz
	DC 110 – 300 V 0.65 – 0.23 A
Output	DC 24 V 2.5 A (40 °C)
	DC 24 V 2.0 A (55 °C)
Connection	Screw terminals 1.5 – 2.5 mm^2, separable
Degree of protection	IP20 Mounting on EN 60715 TH35 mounting rail in the control cabinet
Part number	01881817

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5.15.7 Encoders

For information on the available encoders, refer to the manual and the operating instructions "Built-in encoders, add-on encoders and safety encoders – DR.., DRN.., DRU.., DR2.., EDR.., EDRN.. AC Motors".

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5.15.8 Overview of optical status messages for built-in encoders

INFORMATION

Refer to the wiring diagram for information on how to connect the built-in encoder.

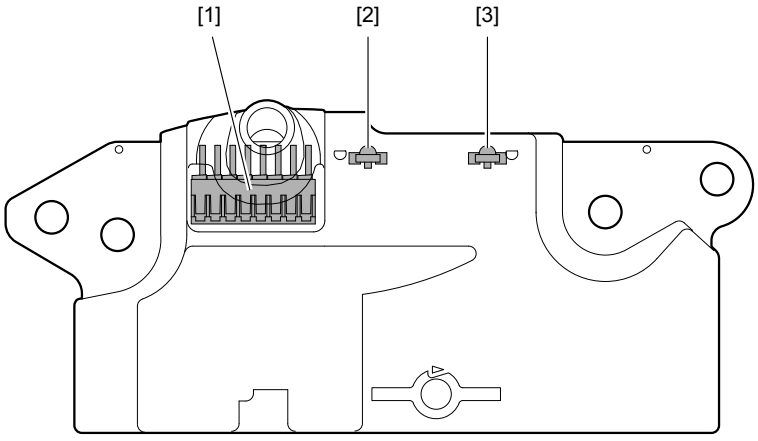
- Observe the information in chapter "Wiring diagrams" (→ 🗎 260) for connection via terminal strip.
- Refer to the enclosed wiring diagram when connecting the EI7. built-in encoder via the M12 connector.
- Refer to the enclosed wiring diagram when connecting the EI8. built-in encoder via the M23 connector.

Encoders	Motors	Supply in DC V	Signals
EI71	DR..71 – 132S DR..63 (EI7C only)	9 – 30	HTL 1 period/rev
EI72		9 – 30	HTL 2 periods/rev
EI76		9 – 30	HTL 6 periods/rev
EI7C		9 – 30	HTL 24 periods/rev
EI8R	DR..71 – 132S	7 – 30	TTL (RS-422) 1024 periods/rev
EI8C	DR..71 – 132S	7 – 30	HTL 1024 periods/rev

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Visual feedback of EI7. built-in encoders

The EI7. encoders use 2 duo LEDs (red + green in each case) to provide visual feedback on the operating state.



9007239132326411

[1] Connector

[2] Duo LED – H1

[3] Duo LED – H2

LED H1 – Status and fault

The green LED indicates the status or the configuration of the encoder. It is designed to be flashing. The flashing frequency indicates the set number of periods.

LED H1 green	
Flash code	**Status/configuration**
LED off	Encoder de-energized or defective
0.6 Hz	EI71 (1 period per revolution)
1.2 Hz	EI72 (2 periods per revolution)
3 Hz	EI76 (6 periods per revolution)
15 Hz	EI7C (24 periods per revolution)
LED continuously on	Defective encoder

Errors detected by the encoder activate the red LED.

LED H1 red	
Flash code	**Meaning**
10 s with 1 Hz and 2 s continuously	No valid period number can be set
Miscellaneous	Output driver reports an fault (e.g. due to short circuit, overtemperature)

LED H2 – Signal track state

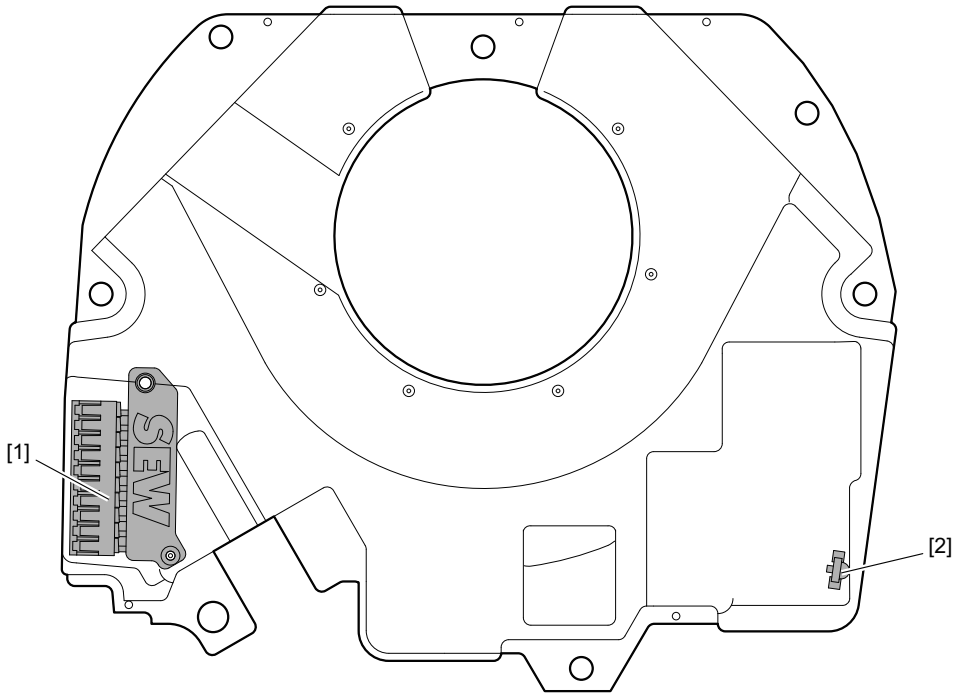
LED color	Track A	Track B	Track /A	Track /B
Orange (green and red)	0	0	1	1
Red	0	1	1	0

LED color	Track A	Track B	Track /A	Track /B
Green	1	0	0	1
Off	1	1	0	0

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Visual feedback of EI8C, EI8R built-in encoders

The EI8. built-in encoders report their operating state visually via a duo LED.



9007239132221835

[1] Connector

[2] Duo LED

Flash code	Meaning
Off	Encoder not supplied or defective
Permanently green	Encoder operational, no faults
Red/orange, permanent or flashing	Encoder reports self-diagnostic information or a fault. The meaning depends on the color and the frequency.

Diagnostics LED color orange/red	Meaning and measures
Red	Encoder diagnostics has detected an error. Permanently lit: Error regarding the internal encoder sensors (incremental sensors) Flashes 5 Hz: Error regarding the internal encoder sensors (index sensors): • Check the encoder and pole ring for damage or magnetizable contamination. Replace or clean the fan if necessary. • Check the fan to ensure it is seated correctly and check the distance between the pole ring and encoder. If necessary, adjust and secure the fan and pole ring (see chapter "Removing and mounting built-in encoder EI8."). Flashes 1 Hz: Error regarding the encoder module electrical interface: • Short circuit/overcurrent of the signal tracks: Eliminate the short circuit or limit the output current of the encoder module. • Interference on the signal tracks: Eliminate the external interference. Observe the information regarding connection technology.
Orange	Encoder diagnostics signals a warning (function of the encoder is given, maintenance may be required). Permanently lit: Warning regarding the internal encoder sensors (incremental sensors). • If necessary, implement any necessary measures; see "Diagnostics red" as maintenance measures. Flashes 1 Hz: Warning regarding the internal memory (encoder signal correction). • The encoder signal correction is reinitialized every time the encoder is started.

If none of the measures are successful, contact SEW-EURODRIVE Service. In this case, decommission the built-in encoder.

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5.15.9 Anti-condensation heating

To protect a switched-off motor from freezing (rotor blockage) or condensation (formation of condensation inside the motor), the motor can optionally be equipped with anti-condensation heating. The anti-condensation heating consists of strip heaters that are integrated in the winding overhang and supplied with voltage when the motor is switched off. The motor is heated by way of the current in the strip heaters.

The strip heaters are controlled according to the following principle:

- Motor switched off → anti-condensation heating activated
- Motor switched on → anti-condensation heating deactivated

Observe the permitted voltage according to the nameplate and the enclosed terminal assignment diagram.

Technical details

The anti-condensation heating connection voltage is AC 115 V or AC 230 V.

The following differences arise depending on the motor size:

They are connected to an auxiliary terminal strip in the terminal box.

Motors	Power in W	At 230 V	At 115 V
DR..63 – DR..100	28	0.12	0.24
DR..112 – DR..132S	42	0.18	0.37
DR..132M – DR..225M	56	0.24	0.49
DR..250 – DR..315	150	0.65	1.30

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6 Startup

6.1 Before you start

Ensure the following before startup:

- The drive must be undamaged and not blocked.
- All transport protection has been removed.
- After an extended storage period (independent of the ambient conditions), observe the information in chapter "Startup after storage".
- All connections, especially the PE, have been made correctly.
- Use switch contacts in utilization category DC-3 according to EN 60947-4-1 for switching the brake with DC 24 V.
- Observe the operating instructions of the frequency inverter.
- Limit the maximum current on the frequency inverter.
- The brake may only be applied when the speed is ≤ 20 min^{-1}. For greater speeds, contact SEW-EURODRIVE.
- Only operate the brake as a holding brake.
- The direction of rotation of the motor is correct.
- All protection covers are installed correctly.
- All motor protection devices are activated.
- There are no other sources of danger.
- Loose elements are appropriately secured.
- The brake is not manually released.
  - The set screw of /HF option is loosened correctly.
  - The hand lever of the /HR option has been removed and correctly attached to the stator using the designated clamps.

6.2 Motors with reinforced bearing

NOTICE

Damage to bearings due to impermissible heating of bearing and motor.

Bearing damage.

- Do not operate cylindrical roller bearings without overhung load.

6.3 Motors with backstop /RS

An /RS backstop is used to block/prevent a direction of rotation of the motor. The direction of rotation is indicated by an arrow on the fan guard of the motor or on the device housing.

Observe the direction of rotation of the end shaft and the number of stages when you mount the motor to the gear unit. Do not start up the motor in blocking direction (note the correct phase angle when connecting the motor). For inspection purposes, you can operate the backstop once with half the motor voltage in blocking direction.

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If a conversion is required to change the blocking direction, follow the instructions in chapter "Altering the blocking direction on motors with a backstop" (→ 🗎 224).

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7 Inspection/maintenance

7.1 Before you start

Ensure the following before inspection/maintenance:

- Observe the 5 safety rules before commencing the work: Disconnect. Secure the device against a restart. Check that no voltage is applied. Ground and short-circuit it. Cover or cordon off neighboring live parts.
- Secure the motor against unintended power-up.
- Wear a respirator of class FFP2 when performing work in the terminal box of brakemotors.
- Avoid swirling of the brake abrasion.
- Remove the brake abrasion with suitable extraction systems or damp cloths that bind dust.
- Make sure that there is adequate ventilation in the work environment.
- Let the unit cool down sufficiently before you start working on it.
- Ensure that ambient temperature and the temperature of the oil seals are not below 0 °C.
- Before assembly, apply grease to the sealing lip area of the oil seals.
- Friction disks at brakemotors may only be replaced by the SEW-EURODRIVE service.
- Repairs or modifications to the product may only be performed by trained specialists. Contact SEW-EURODRIVE Service when performing work on the unit.
- Make sure that the regulations are adhered to before restarting the motor.
- Perform a safety and functional check following all maintenance and repair work (thermal protection).

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7.2 Inspection and maintenance intervals

The following table shows the intervals for inspection and maintenance:

Unit/part of unit	Time interval	Required steps
Brake BE02	• **If used as a working brake:** At least every 3000 operating hours[1)] • **If used as a holding brake:** Every 0.5 to 4 years, depending on the load conditions[1)]	Inspect the brake • Measure thickness of brake lining carrier • Inspect switch contacts, replace if necessary (e.g. in case of burn-out)
Brake BE03	• **If used as a working brake:** At least every 3000 operating hours[1)] • **If used as a holding brake:** Every 0.5 to 4 years, depending on the load conditions[1)]	Inspect the brake • Measure working air gap • Inspect switch contacts, replace if necessary (e.g. in case of burn-out)
Brake BE05 – BE122 Brake BE1H – BE2H	• **If used as a working brake:** At least every 3000 operating hours[1)] • **If used as a holding brake:** Every 0.5 to 4 years, depending on the load conditions[1)]	Inspect the brake: • Measure thickness of brake lining carrier • Brake lining carrier, brake • Measure and set working air gap • Pressure plate • Driver/gearing • Pressure rings • Vacuum any abrasion • Inspect switch contacts, replace if necessary (e.g. in case of burn-out)
Motor	• **Every 10 000 operating hours**[2)3)]	Inspect the motor: • Check rolling bearings, replace if necessary • Replace oil seals • Clean the cooling air ducts
Drive	• Varying[3)]	• Touch up or renew the surfaces/corrosion protection coating • Check and clean air filter • If existent, clean condensation drain holes at the lowest point of the fan guard • clean clogged bores

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Unit/part of unit	Time interval	Required steps
Connection cable	• as for the motor	Inspect cables • Check for damage. If necessary, replace connection cable. • Check all cable glands and retighten them, if necessary.

1) Wear times are subject to many factors and can be quite short. The required intervals for inspection and maintenance must be individually calculated by the system manufacturer in accordance with the project planning documents.
2) For the DR../DRN225 – 315 motors with relubrication device, note the shortened relubrication periods in the chapter "Bearing lubrication".
3) The interval depends on external influences and can be quite short, e.g. in the event of high dust levels in the environment.

If the motor compartment is opened during inspection or maintenance, it must be cleaned before closing.

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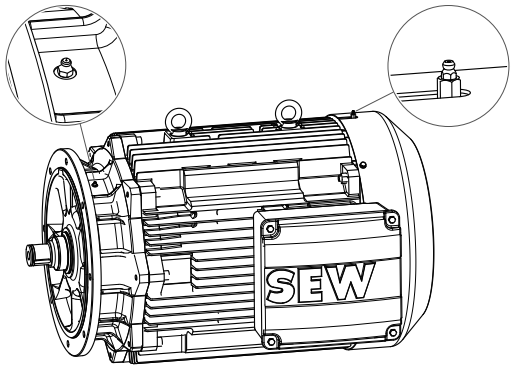
7.3 Bearing lubrication

7.3.1 Bearing lubrication DR..56 – 315 motors

In standard design, the bearings are lubricated for life.

7.3.2 Bearing lubrication DR..225 – 315 motors with relubrication device /NS

Motors of nominal sizes 225, 250, 280, and 315 can be equipped with a relubrication device. The following figure shows the positions of the lubrication devices.



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Under normal operating conditions and at an ambient temperature between -20 °C to +40 °C, SEW-EURODRIVE uses Mobil Polyrex EM (K2P-20 DIN 51825), a polyurea-based mineral high-performance, high-temperature grease for initial lubrication.

For motors in the low temperature range up to -40 °C, SEW-EURODRIVE uses SKF GXN or LGHP2, which are also a polyurea-based mineral greases.

Re-lubrication period

For the relubrication intervals of the bearings, adhere to the requirements stated in the table:

- Ambient temperature: -20 °C to +40 °C
- Rated speed that corresponds to that of a 4-pole AC motor
- Normal load

In case of higher ambient temperatures, higher speeds, or larger loads, the relubrication intervals are shorter. Use 1.5 times of the stated quantity for the initial filling.

The relubrication channels leading the grease from the grease nipples to the bearings must always be filled with grease. This is usually ensured by adhering to the relubrication intervals. During maintenance work, the grease may remain in the channels and does not need to be removed.

Motors with option	Horizontal mounting position		Vertical mounting position	
	Duration	Quantity	Duration	Quantity
DR..225 – 315 /NS	5000 h	50 g	3000 h	70 g
DR..225 – 315 /ERF /NS	3000 h	50 g	2000 h	70 g

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Relubrication

The grease can be purchased from SEW-EURODRIVE in 400 g cartridges. For the relevant order information, refer to chapter "Order information for lubricants, anti-corrosion agents and sealants" (→ 🗎 250).

INFORMATION

Only mix lubricants of the same thickness type, the same base oil and the same consistency (NLGI class).

Grease the motor bearings in accordance with the information on the lubricant plate. The used grease collects inside the motor and should be removed every 6 to 8 relubrication cycles during an inspection. Each time you relubricate, ensure that the bearing is two-thirds full.

After relubricating the motors, you should start up slowly, if possible, so that the grease is distributed evenly.

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7.4 Reinforced bearings

NOTICE

Damage to bearings due to impermissible heating of bearing and motor.

Bearing damage.

- Do not operate cylindrical roller bearings without overhung load.

In the /ERF (reinforced bearing) option, cylindrical rolling bearings are installed on the A-side. The reinforced bearings must have overhung load applied to them and must never be operated without overhung load.

The reinforced bearings are only offered with the /NS (relubrication) option so as to facilitate optimal lubrication of the bearing.

For lubricating the bearings, observe the notes in chapter "Bearing lubrication DR..225 – 315 motors with relubrication device /NS" (→ 🗎 131).

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7.5 Motor and brake maintenance – preliminary work



⚠ WARNING

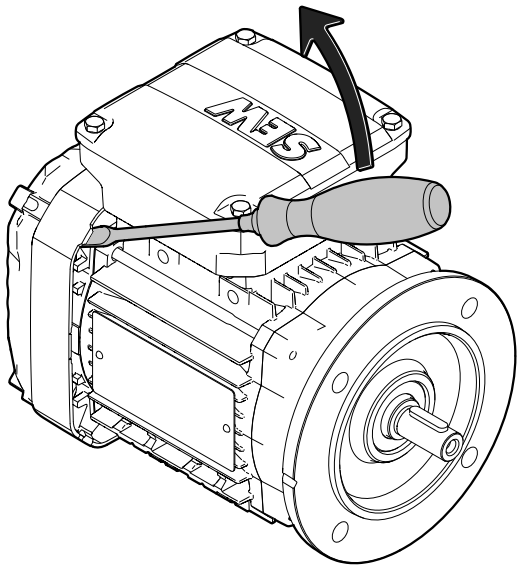
Risk of injury if the drive starts up unintentionally.

Severe or fatal injuries.

- Before you start working on the unit, disconnect the motor and all connected options from the power supply.
- Secure the motor against unintended power-up.

7.5.1 Removing/installing the fan guard for DR..63 – 71 motors

The fan guard for DR..63 – 71 motors is attached using snap-on fasteners.



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Removing the fan guard

Proceed as follows to remove the fan guard:

1. Using a suitable tool, lever out at least 2 adjacent snap hooks.
   - ⇨ **With EI.. encoder option**: Lever out the snap hook pair opposite of the terminal box.
2. Pull the snap hooks over the cams of the endshield.
   - ⇨ In case of DR..63, loosening all 4 fan guard connections may be required to remove the fan guard, depending on the option.

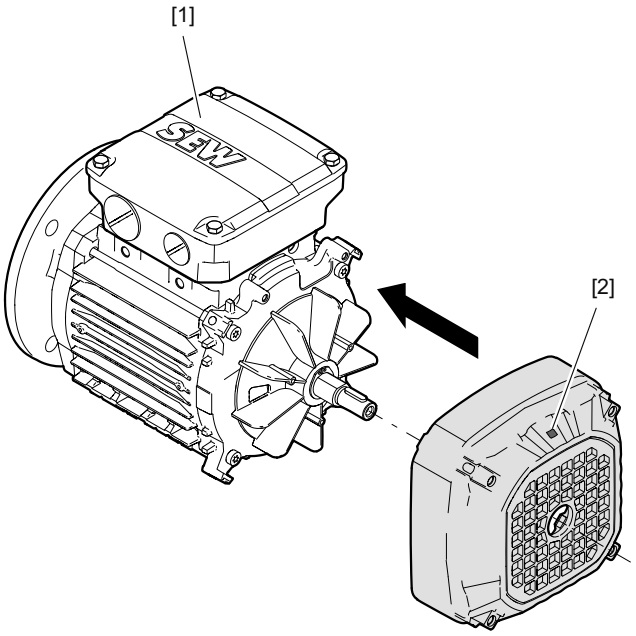
To request for a replacement in case the fan guard is damaged, contact SEW-EURODRIVE.

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Reassembly

✓ The rectangular marking on the fan guard [2] must point in direction of the terminal box [1].

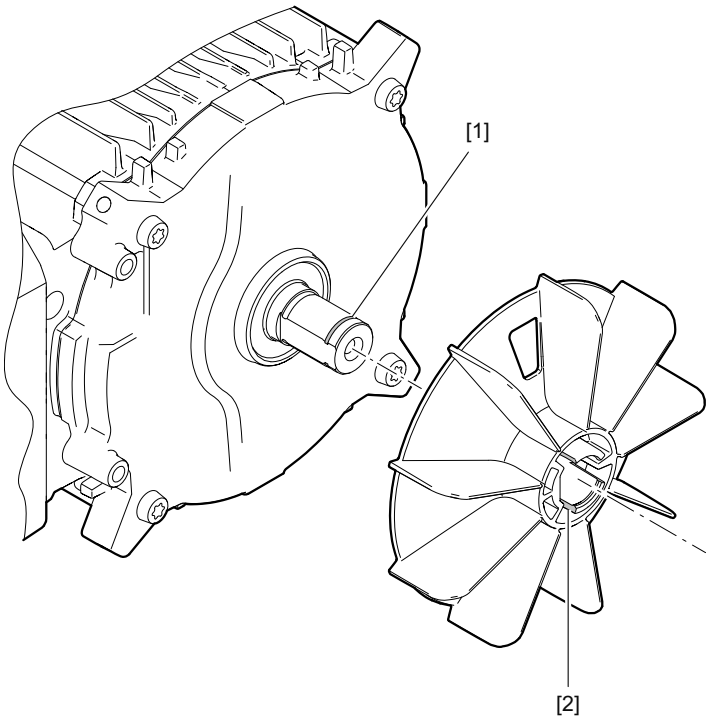
1. Evenly push the snap hooks of the fan guard onto the latching cams until they snap in.



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7.5.2 Removing/installing plastic fans for DR..56 – 71

The plastic fan [2] for DR..56 – 71 motors is attached using snap-on fasteners.



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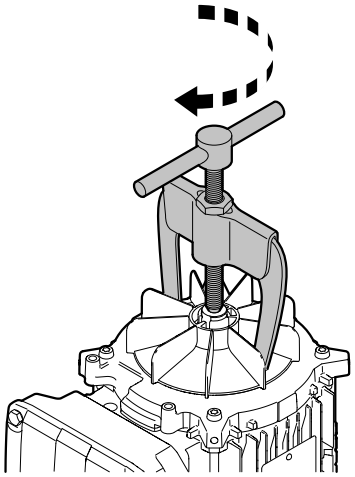
Removing the fan

Proceed as follows to remove the plastic fan:

✓ Required tools: 1 puller.

1. Pull off the fan [2] from the shaft [1] using the puller.
   ⇨ The snap hook is pulled from the slot.
2. Check that the snap hook of the fan is not damaged.

To request a replacement in case the fan is damaged, please contact SEW-EURODRIVE.

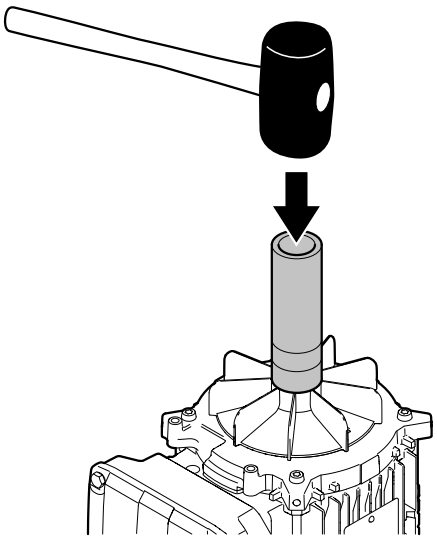


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Reassembly

✓ Required tools: 1 hammer, 1 hammer insertion tool.

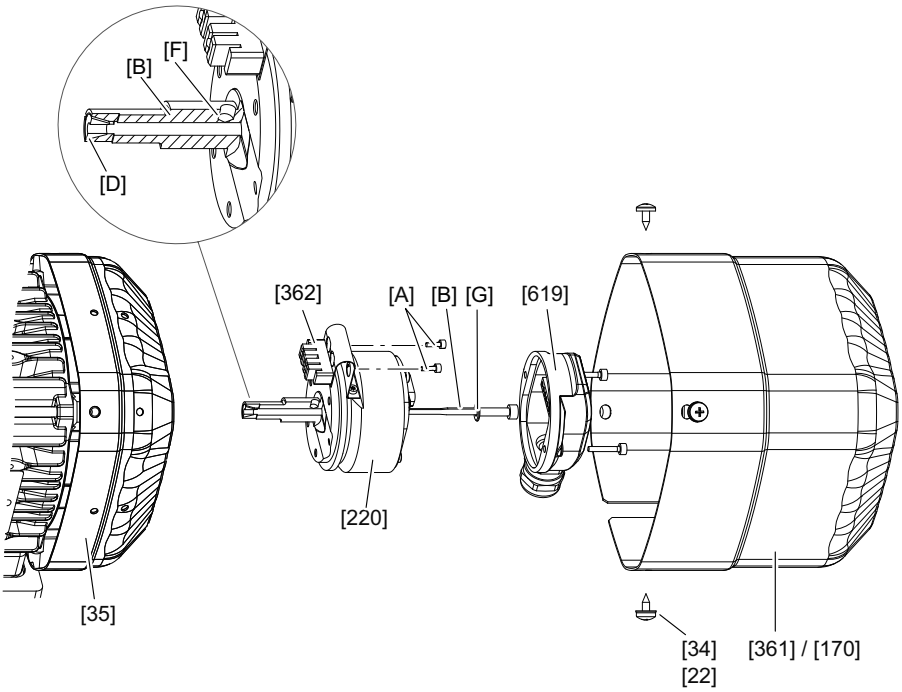
1. Position the fan centrally on the shaft using the precentering.
2. Mount the fan to the shaft using the plain hammer insertion tool and the hammer. Do not place the hammer insertion tool onto the snap hook. It must have a larger diameter.
   ⇨ When the snap hook snaps into the groove, a click can be clearly heard.
3. Check if the snap hook is snapped into the groove.



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7.5.3 Removing rotary encoders ES7., AS7.

The following figure illustrates the disassembly procedure using the ES7. rotary encoder as an example:



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[22]	Screw	[619]	Connection cover
[34]	Tapping screw	[A]	Retaining screws for torque bracket
[35]	Fan guard	[B]	Central retaining screw
[220]	Encoder	[D]	Cone
[361]	Safety cover	[F]	Bore
[170]	Forced cooling fan	[G]	Tooth lock washer
[362]	Expansion anchor		

Removing ES7./AS7.

1. Remove the safety cover [361] or the forced cooling fan [170] if applicable.
2. Loosen the screws of the connection cover [619] and remove it. Do not disconnect the encoder cable.
3. Make sure the cone [D] does not fall out while the central retaining screw [B] is loosened. Loosen the central retaining screw [B] by 2 – 3 turns. Loosen the cone [D] by tapping lightly onto the screw head.
4. To loosen the expansion anchor [362], remove the retaining screw of the torque bracket [A]. Carefully pull the encoder [220] from the rotor bore.
5. For safety encoders: Dispose of the expansion anchor [362].

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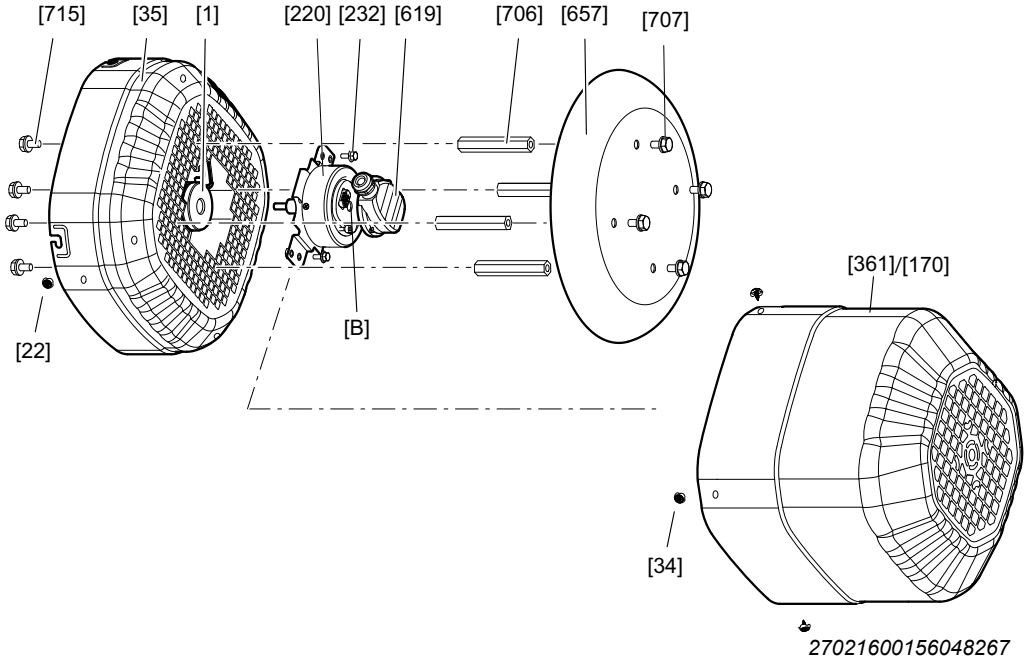
Installing ES7./AS7.

1. Apply a contact corrosion prevention compound, e.g. NOCO-Paste, to the encoder pins.
2. Attach the expansion anchor [362] to the torque bracket of the encoder.
   ⇨ For safety encoders: Use a new expansion anchor.
3. Push the encoder to the stop of the shaft end.
4. Tighten the central retaining screw [B].
   ⇨ Tightening torque 2.75 Nm ± 6%
5. Press the expansion anchor [362] into the fan guard [35] and check if it is seated correctly.
6. Screw the retaining screws of the torque bracket [A] into the expansion anchor [362] up to the stop. Tighten the retaining screws of the torque bracket [A].
   ⇨ Tightening torque 1.6 Nm ± 10%
7. Screw on the connection cover [619].
   ⇨ Tightening torque 2.25 Nm
8. For safety encoders: Perform a wobble measurement.
9. Mount the safety cover [361] or the forced cooling fan [170] if applicable.
   ⇨ For screw [22]: Tightening torque 3.3 Nm
   ⇨ For screw [34]: Tightening torque 2 Nm

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7.5.4 Removing/installing rotary encoder EG7./AG7. (DR..132M – 280 motors)

The following figure illustrates the disassembly procedure using the EG7. rotary encoder as an example:



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[1]	Rotor	[619]	Connection cover
[34]	Tapping screw	[657]	Canopy
[35]	Fan guard	[706]	Spacer bolt
[220]	Encoders	[707] [715]	Screws
[232]	Screws	[B]	Central retaining screw
[361]	Safety cover		

Removing EG7., AG7.

1. Proceed as follows, depending on the design:
   - ⇨ **With canopy:** Remove the screws [707] to disassemble the canopy [657]. If required, counter using a hexagon wrench SW13 on the spacer bolt [706].
   - ⇨ **Without canopy:** Remove the screws [22]/[34] to disassemble the safety cover [361] or the forced cooling fan [170].
2. Loosen the screws of the connection cover [619] and remove it. Do not disconnect the encoder cable.
3. Unscrew the retaining screws [232] of the torque bracket.
4. Loosen the screw [B] by 2 – 3 revolutions to pull off the encoder [220].

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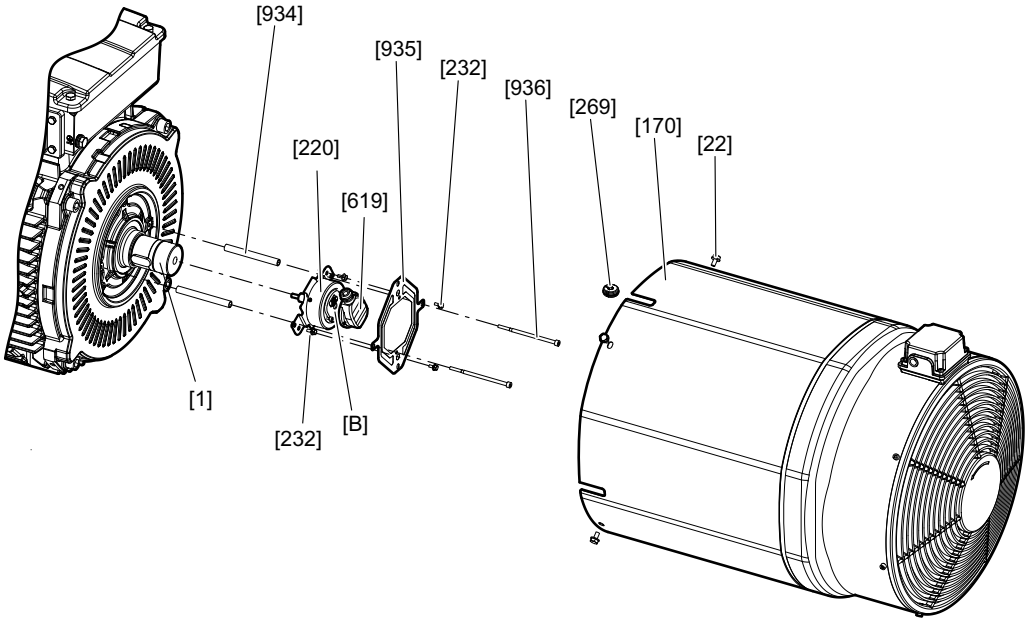
Installing EG7., AG7.

1. Apply a contact corrosion prevention compound, e.g. NOCO-Paste, to the encoder pins.
2. Push the encoder to the stop of the shaft end.
3. Tighten the central retaining screw [B].
   ⇨ Tightening torque 8 Nm ± 5%
4. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
5. Tighten the retaining screws [232] of the torque bracket..
   ⇨ Tightening torque 6 Nm ± 10%
6. Screw on the connection cover [619].
   ⇨ Tightening torque 2.25 Nm ± 10%
7. Mount the safety cover [361] or the forced cooling fan [170] if applicable.
   ⇨ Tightening torque for screw [22]: M6 = 11 Nm, M8 = 27 Nm
   ⇨ Tightening torque for screw [34]: 3.5 Nm
8. If necessary, mount the canopy [657] using the screws [707].
   ⇨ Tightening torque 27 Nm

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7.5.5 Removing/installing rotary encoder EG7./AG7. (DR..132M – 315 motors) – with forced cooling fan /V

The following figure illustrates the disassembly procedure using the EG7. rotary encoder as an example:



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[22]	Screw	[935]	Torque arm
[170]	Forced cooling fan cover	[936]	Screw
[232]	Screws	[934]	Spacer bushing
[269]	Grommet	[220]	Encoders

Removing EG7., AG7.

1. Remove the screws [22] to disassemble the forced cooling fan [170].
2. Remove the cable grommet [269] with the encoder cable from the forced cooling fan [170].
3. Remove the screws [232] and [936] to disassemble the torque bracket [935].
4. Loosen the screws of the connection cover [619] and remove it. Do not disconnect the encoder cable.
5. Loosen the screw [B] by 2 – 3 revolutions to pull off the encoder [220].

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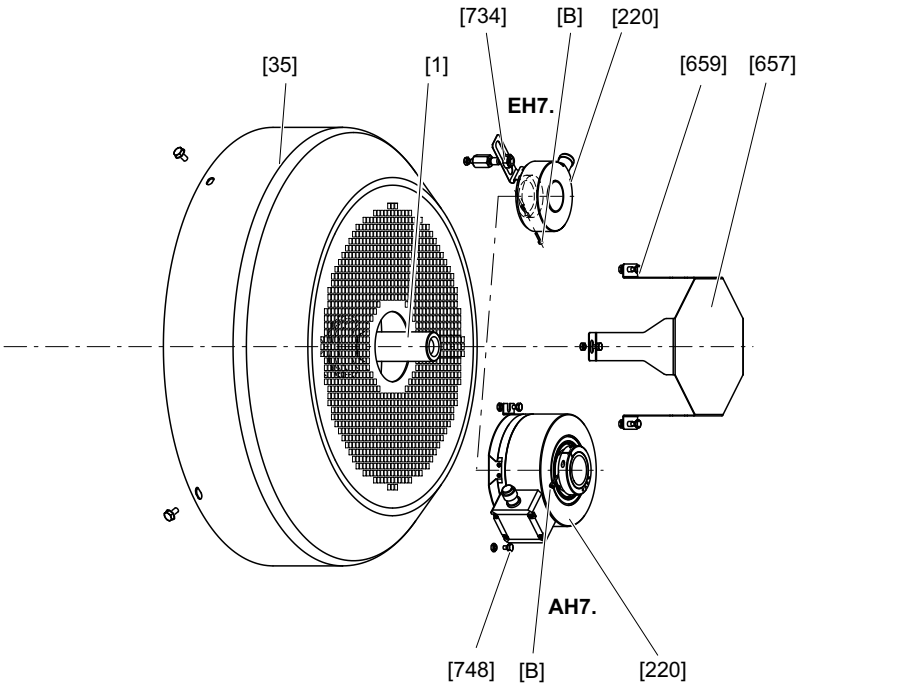
Installing EG7., AG7.

1. Apply a contact corrosion prevention compound, e.g. NOCO-Paste, to the encoder pins.
2. Push the encoder to the stop of the shaft end.
3. Tighten the central retaining screw [B].
   ⇨ Tightening torque 8 Nm ± 5%
4. Place the torque bracket [935] onto the spacer bushing [934] and tighten the screws [936].
   ⇨ Tightening torque: M6 = 11 Nm, M8 = 27 Nm
   ⇨ For safety encoders: M6 = 11 Nm ±10%, M8 = 27 Nm ±10%
5. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
6. Tighten the retaining screws [232] of the torque bracket..
   ⇨ Tightening torque 6 Nm ± 10%
7. Screw on the connection cover [619].
   ⇨ Tightening torque 2.25 Nm ± 10%
8. Insert the cable grommet [269] into the forced cooling fan [170].
9. Mount the forced cooling fan [170] and tighten the screws [22].
   ⇨ Tightening torque 28 Nm

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7.5.6 Removing the rotary encoder from DR..315 motors

The following figure illustrates the disassembly procedure using the EH7. and AH7. rotary encoders as an example:



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[35]	Fan guard	[659]	Screw
[220]	Encoder	[734]	Nut
[B]	Central retaining screw	[748]	Screw
[657]	Cover plate		

Removing EH7., AH7.

1. Remove the screws [659] to disassemble the cover plate [657].
2. Depending on the design, remove the encoder [220] from the fan guard [35] as follows:
   - ⇨ **EH7.:** Remove the nut [734].
   - ⇨ **AH7.:** Remove screw [748].
3. Loosen the screw [B] by 2 – 3 revolutions to pull off the encoder [220].

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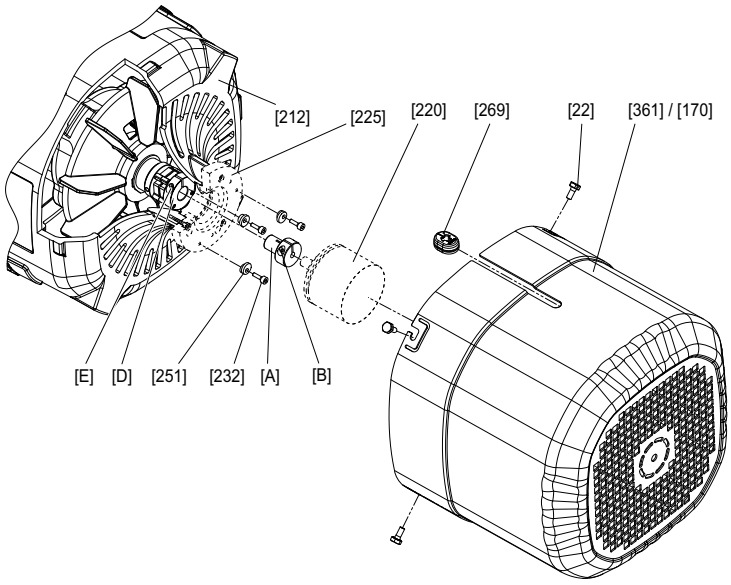
Installing EH7., AH7.

1. Push the encoder to the stop of the shaft end.
2. Tighten the screw [B].
   ⇨ Tightening torque 3 Nm
3. Proceed as follows, depending on the encoder:
   ⇨ **EH7.:** Install the nut [734].
   ⇨ Tightening torque 3 Nm
   ⇨ **AH7.:** Insert and tighten the screw [748].
   ⇨ Tightening torque 12 Nm
4. Mount the cover plate [657] using the screws [659]/[1711].
   ⇨ Tightening torque 11 Nm

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7.5.7 Mounting/removing the rotary encoder with XV../EV../AV.. mounting adapter for DR..71 – 225 motors

The following figure illustrates the disassembly procedure using a third-party encoder as an example:



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[22]	Screw	[361]	Safety cover (normal/long)
[170]	Forced cooling fan guard	[269]	Cable grommet
[212]	Fan guard with encoder mount	[A]	Adapter
[220]	Encoder	[B]	Clamping screw
[225]	Intermediate flange (not with XV1A)	[D]	Coupling (spread- or solid shaft coupling)
[232]	Retaining screws (enclosed with XV1A and XV2A)	[E]	Clamping screw
[251]	Conical spring washers (enclosed with XV1A and XV2A)		

Removing EV../AV../XV..

1. Remove the safety cover [361] or the forced cooling fan [170] if applicable.
2. Loosen the retaining screws [232] and turn the conical spring washers [251] outwards.
3. Loosen the clamping screw [233] of the coupling.
4. Remove adapter [A] and encoder [220].

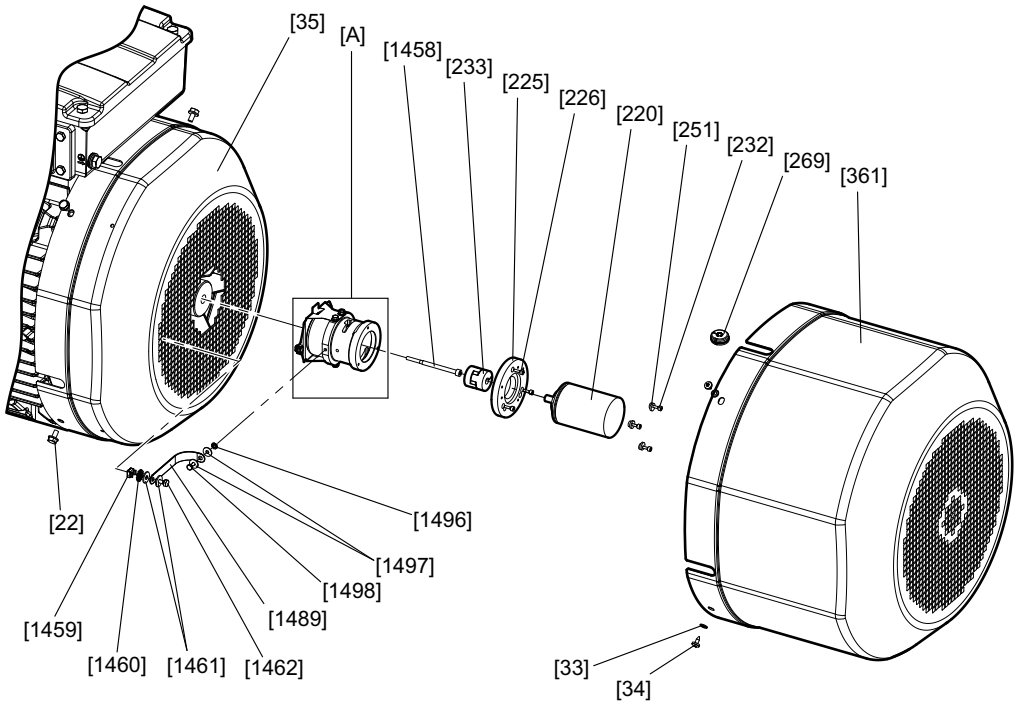
Installing EV../AV../XV..

1. Mount the intermediate flange [225] to the encoder mounting adapter [A] using screws [226].
2. Install the encoder [220]; refer to the chapter about installing encoders.
3. Secure the safety cover [361] or the forced cooling fan [170] in place by using the screws [22] and washers [211].

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7.5.8 Mounting/removing the rotary encoder with XV../EV../AV.. mounting adapter for DR..250 – 280 motors

The following figure illustrates the disassembly procedure using a third-party encoder as an example:



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[22]	Screw	[361]	Safety cover (normal/long)
[33]	Washer	[1458]	Screw
[34]	Screw	[1459]	Cage nut
[35]	Fan guard	[1460]	Serrated lock washer
[220]	Encoder	[1461]	Washer
[225]	Intermediate flange (optional)	[1462]	Screw
[226]	Screw	[1489]	Ground strap
[232]	Screws (enclosed with .V1A and .V2A)	[1496]	Serrated lock washer
[233]	Coupling	[1497]	Washer
[251]	Conical spring washers (enclosed with .V1A and .V2A)	[1498]	Screw
[269]	Cable grommet	[A]	Encoder mounting adapter

Removing the encoder mounting adapter

1. Remove the screws [34] to disassemble the safety cover [361].
2. Remove the encoder [220], see chapter "Removing EV.., AV.. encoders" (→ 🗎 148).
3. In order to remove the ground strap [1489] from the encoder mounting adapter [A], loosen the serrated lock washer [1496], washer [1497], and screw [1498].
4. Remove the screws [22] to disassemble the fan guard [35].
5. Loosen the screw [1458] to remove the encoder mounting adapter [A].
   - ⇨ **If the encoder mounting adapter cannot easily be removed:** Screw an M6 set screw (length 20 – 35 mm) hand tight in the rotor bore. Screw an M8 set screw (length > 10 mm) into the same bore and push the encoder mounting adapter [A] off the rotor [1]. Remove the M6 set screw from the rotor bore.

Removing EV.., AV.. encoders

1. Remove the screws [34] to disassemble the safety cover [361].
2. Pull out the cable grommet [269] together with the encoder cable from the safety cover [361].
3. Loosen the retaining screws [232] and turn the conical spring washers [251] outwards.
4. Loosen the screw at the coupling clamping hub [233] at the encoder end, the screw can be accessed through the slots of the encoder mounting adapter [A].
5. Remove the encoder [220] from the encoder mounting adapter [A] or the intermediate flange [225].

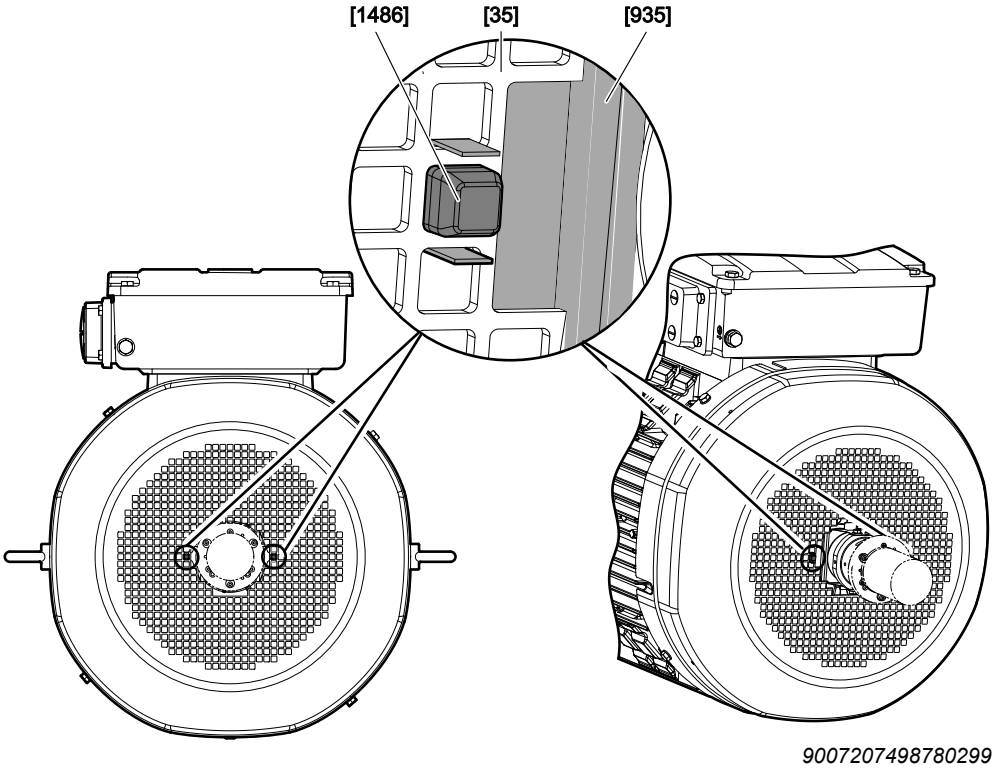
Reassembly

1. Proceed as described in chapter "Encoder mounting adapter" to mount the encoder.

INFORMATION

When re-installing the fan guard [35], make sure that the torque is supported:

The damping elements [1486] on both sides of the encoder mounting adapter [A] must engage with the ventilation grid (see figure below). The torque plate [935] must protrude from the grid to the left and to the right of the damping element.

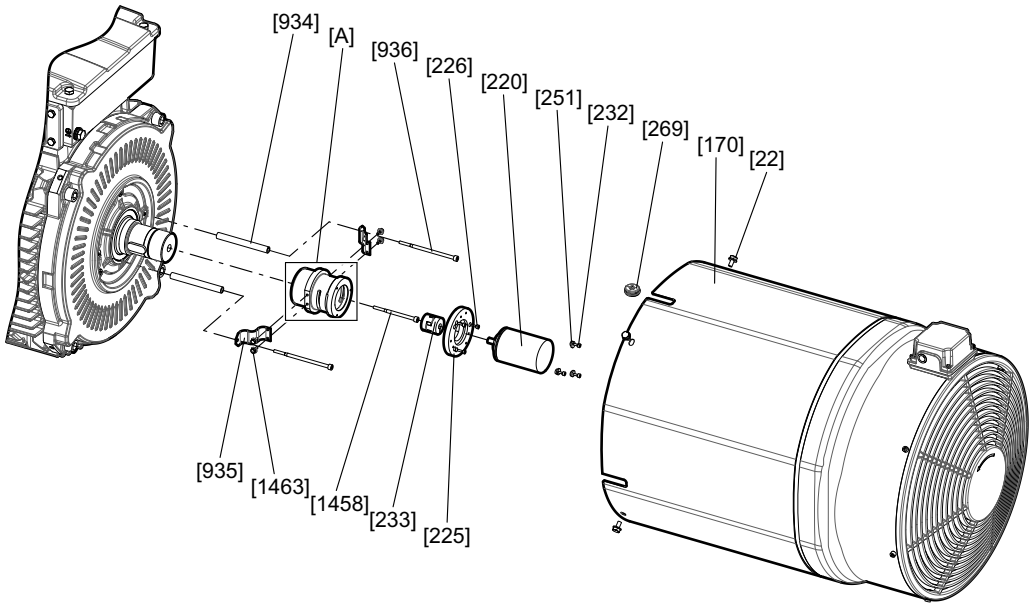


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7.5.9 EV../AV../XV.. rotary encoder (DR..250 – 280 motors) – with encoder mounting adapter with forced cooling fan /V

The following figure illustrates the disassembly procedure using a third-party encoder as an example:



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[22]	Screw	[269]	Cable grommet
[170]	Forced cooling fan guard	[934]	Spacer bushing
[220]	Encoder	[935]	Torque bracket
[225]	Intermediate flange (optional)	[936]	Screw
[226]	Screw	[1458]	Screw
[232]	Screws (enclosed with .V1A and .V2A)	[1463]	Screw
[233]	Coupling	[A]	Encoder mounting adapter
[251]	Conical spring washers (enclosed with .V1A and .V2A)		

Removing the encoder mounting adapter

1. Remove the screws [22] to disassemble the forced cooling fan [170].
2. Remove the cable grommet [269] with the encoder cable from the forced cooling fan [170].
3. Loosen the retaining screws [232] and turn the conical spring washers [251] outwards.
4. Loosen the screw at the coupling clamping hub [233] at the encoder end, the screw can be accessed through the slots of the encoder mounting adapter [A].
5. Remove the encoder [220] from the encoder mounting adapter [A] or the intermediate flange [225].
6. Loosen the screws [1458] and [936] to remove the encoder mounting adapter [A]. The torque brackets [935] and screws [1463] can remain at the encoder mounting adapter [A].
   - ⇨ **If the encoder mounting adapter cannot easily be removed:** Screw an M6 set screw (length 20 – 35 mm) hand tight in the rotor bore. Screw an M8 set screw (length > 10 mm) into the same bore and push the encoder mounting adapter [A] off the rotor [1]. Remove the M6 set screw from the rotor bore.

Removing EV../AV../XV..

1. Remove the screws [22] to disassemble the forced cooling fan [170].
2. Remove the cable grommet [269] with the encoder cable from the forced cooling fan [170].
3. Loosen the retaining screws [232] and turn the conical spring washers [251] outwards.
4. Loosen the screw at the coupling clamping hub [233] at the encoder end, the screw can be accessed through the slots of the encoder mounting adapter [A].
5. Remove the encoder [220] from the encoder mounting adapter [A] or the intermediate flange [225].

Installing EV../AV../XV..

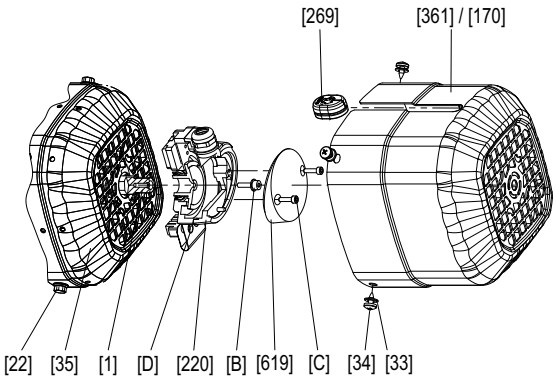
1. Mount the intermediate flange [225] to the encoder mounting adapter [A] using screws [226].
2. Install the encoder [220]; refer to the chapter about installing encoders.
3. Secure the safety cover [361] or the forced cooling fan [170] in place by using the screws [22] and washers [211].

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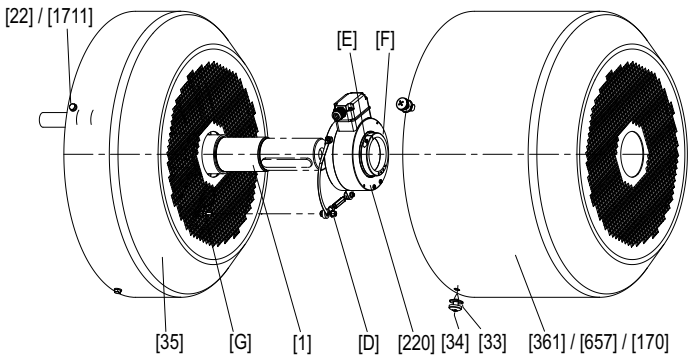
7.5.10 Mounting/removing hollow shaft encoders with XH.A encoder mounting adapter for DR..71 – 225 motors

The following figure illustrates the disassembly procedure using a third-party encoder as an example:

Encoder mounting with XH1A encoder mounting adapter



Encoder mounting with XH7A and XH8A encoder mounting adapter



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[1]	Rotor	[B]	Central retaining screw
[33]	Tapping screw	[619]	Connection cover
[34]	Washer	[C]	Screw connection cover
[35]	Fan guard	[D]	Torque bracket screws
[170]	Forced cooling fan guard	[E]	Screw
[220]	Encoder	[F]	Clamping ring
[269]	Cable grommet	[G]	Nut of the torque bracket
[361]	Safety cover		

Removing XH1A

1. Remove the safety cover [361] or the forced cooling fan [170] if applicable.
2. Loosen the screws of the connection cover [619] and remove it. Do not disconnect the encoder cable.
3. Screw out the central retaining screw [B].
4. Remove the torque bracket screws [D].
5. Pull the torque bracket off.
6. Remove the encoder [220] from the shaft end.

Removing XH7A, XH8A

1. Remove the safety cover [361] or the forced cooling fan [170] if applicable.
2. Loosen the screw [E] from clamping ring [F].
3. Remove the torque bracket screws [D].
4. Remove the encoder [220] from the shaft end.

Installing XH1A

1. Push the encoder [220] onto the shaft end.
2. Screw in the screws [D] to mount the torque bracket.
   ⇨ Tightening torque 1.6 Nm ± 10%
3. Tighten the screw [B].
   ⇨ Tightening torque 2.9 Nm
4. Screw on the connection cover [619].
   ⇨ Tightening torque 3 Nm
5. Mount the safety cover [361] or the forced cooling fan [170] if applicable.
   ⇨ Tightening torque 3 Nm

Installing XH7A, XH8A

1. Push the encoder [220] onto the shaft end.
2. Screw in the screws [D] to mount the torque bracket.
   ⇨ Tightening torque 6 Nm
3. Tighten the screw [E] of the clamping ring [F].
   ⇨ Tightening torque 5 Nm
4. Mount the safety cover [657] or the forced cooling fan [170].
   ⇨ Screw [1711]: Tightening torque 11 Nm
   ⇨ Screw [22]: Tightening torque 28 Nm

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7.5.11 Encoder mounting adapter EK8A

The encoder mounting adapter EK8A...

Content of the accessory bag [1634]

- Screws [232] for fastening the torque arm of the encoder [220]
- from size DRN180: Insulation coupling [1891]

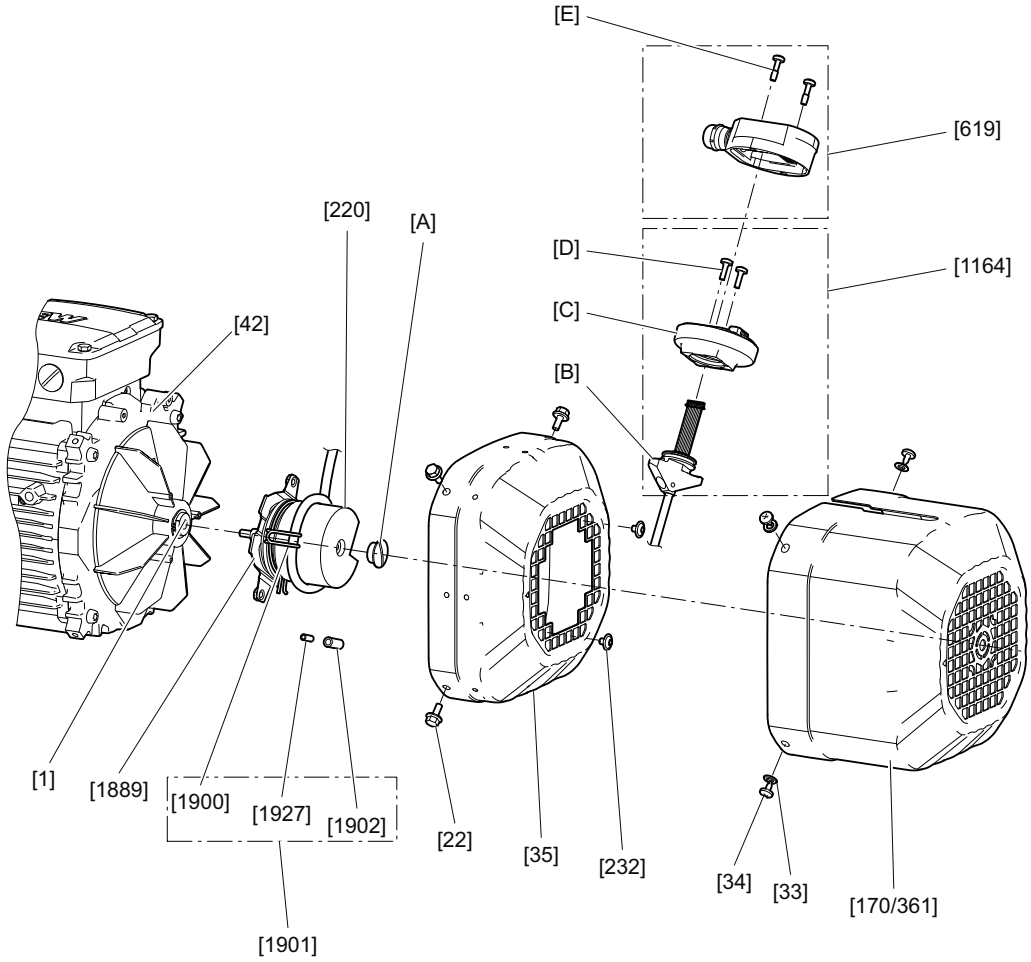
Preparing encoder mounting adapter EK8A (DRN355 motors)

1. Unscrew the screws [34] and [22].
2. Remove the safety cover [361]/[657] or the forced cooling fan [170] from the motor. When doing this, slide the connection adapter [U] out of the recess.
3. With a forced cooling fan: Unscrew the screws [22].
4. Remove the fan guard [35] from the motor.
5. Remove the closing plug [950] from the rotor [1].
   ⇨ Dispose of the closing plug [950].

Then proceed with the installation process as described in the chapters "Mounting EK8./AK8. cone shaft encoders".

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7.5.12 Removing and mounting cone shaft encoders of DR..71 – 132S motors



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[1]	Rotor	[1889]	Torque bracket
[22]	Screw (hexagonal)	[1900]	Cable retainer
[33]	Washer	[1901]	Accessory bag
[34]	Screw (cross recess)	[1902]	Threaded sleeve
[35]	Fan guard	[1927]	Set screw
[42]	Rear endshield		
[170]	Forced cooling fan	[A]	Screw plug
[220]	Encoder	[B]	T-slot nut
[232]	Screw (hexalobular)	[C]	Lower part
[361]	Safety cover	[D]	Screw
[619]	Connection cover	[E]	Screw
[1164]	Connection adapter		

Removing EK8./EK9./AK8./AK9./RK8M – Add-on encoder set with integrated A1GA encoder connector with connection cover or without A2GA connection cover

1. Unscrew the screws [E].
2. Remove the connection cover [619] from the connection adapter [U].
3. Loosen the screws [D] in the lower part [C].
   ⇨ Only unscrew the screws [D] to such an extent that the connection adapter [U] can be moved in the recess of the safety cover [657]/forced cooling fan [170].
4. With forced cooling fan: Unscrew the screws [22].

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5. Without forced cooling fan: Unscrew the screws [34]/[1711].
6. Remove the safety cover [361]/[657] or the forced cooling fan [170] from the motor. When doing this, slide the connection adapter [U] out of the recess.
7. With forced cooling fan: Remove the signal cable from the slot/3 wings of the cable retainer [1900].
8. Unscrew the screws [232].
9. Remove the fan guard [35] over the encoder [220]. Guide the connection adapter [U] with the signal cable through the cutout of the fan guard [35].
10. For size 132M – 355 with forced cooling fan: Remove the screw [936], the nuts [734]/[937], the spacer bushing [934], and the torque bracket [935].

NOTICE



In the case of encoders RK8M, EK8W, AK8H, AK8W, EK8Z, EK9Z, and AK8Z on DR2C.. motors, loosening the central retaining screw [A] of the encoder [220] or loosening the insulation coupling [1891] of the motor or encoder shaft desynchronizes the encoder and motor rotor.

Higher motor losses and lower torques.

- Perform a new adjustment.

11. Unscrew the screw plug [A] of the encoder [220].
12. Loosen the central retaining screw of the encoder [220]. Use a tool that is at least 45 mm long for this.
    ⇨ If the central retaining screw of the encoder [220] cannot be loosened, counter-tighten the spanner flat SW10 of the encoder shaft.
13. Loosen the cone connection.
    ⇨ Encoder EK8., AK8W, AK8Y, RK8M: To loosen the cone connection, continue turning the central retaining screw of the encoder [220] counterclockwise.
    ⇨ Encoder AK8H: Continue turning the central retaining screw of the encoder [220] counterclockwise. To loosen the conical connection, screw an M6 screw (≥ 70 mm long) into the bore.
14. Remove the encoder [220] from the rotor [1] or from the coupling [233]/[1891].

Installing EK8./EK9./AK8./AK9./RK8M – Add-on encoder set with integrated A1GA encoder connector with connection cover or without A2GA connection cover

1. For size 355: Connect the two halves of the coupling [233] by plugging them together using the coupling star. The coupling [233] must be firmly connected. Make sure that the encoder is centered [220].
2. For size 63 – 315: Clean the cone of the encoder [220].
3. For size 355: Clean the cone of the encoder [220] and the coupling [233].
4. Remove the screw plug [A] of the encoder.
5. For size 355: Place the coupling [233] onto the bolt [3012]. Tighten the retaining screw at the clamping hub on the motor side to fasten the coupling.
    ⇨ Tightening torque 3.3 Nm
6. Retrofitting insulation coupling on the encoder mounting adapter: Insert the insulation coupling [1891] into the conical bore of the rotor [1] and tighten the central retaining screw.
    ⇨ Tightening torque 2.25 Nm

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7. Use solvent to remove the residual adhesive from the central retaining screw.
8. For AK8H safety encoders: Wet the central retaining screw that is required in the following step with LOCTITE® 241.
9. Insert the encoder [220] into the conical bore of the rotor [1] or the coupling [233]/ [1891].
10. To secure the encoder [220] in place, tighten the central retaining screw. Use a tool that is at least 45 mm long for this.
    - ⇨ Counter-tighten the spanner flat SW27 of the coupling and SW10 of the encoder shaft.
    - ⇨ Tightening torque 3.3 Nm
    - ⇨ For safety encoders: Tightening torque 3.3 Nm ± 8%

NOTICE



For encoders RK8M, EK8W, AK8H, AK8W, EK9Z and AK8Z on DR2C.. motors, a calibration process must be carried out for flawless operation. See "Additional work for the RK8M encoder on the DR2C.. motor" and "Additional work for EK8W, AK8H, AK8W, EK9Z, and AK8Z encoders on the DR2C.. motor".

Failure to calibrate results in greater motor losses and reduced torque. In the worst-case scenario, the motor will not run.

11. To seal the encoder [220], screw in the screw plug [A].
    - ⇨ Tightening torque 1.8 Nm
12. For size 355 with forced cooling fan: Mount the spacer bolts [934].
13. For size 132M – 355 with forced cooling fan: Guide the torque bracket [935] over the connection adapter [U] and the encoder [220].
14. For size 132M – 355 with forced cooling fan: When mounting the torque bracket [935], make sure it is aligned centrally to the encoder [220]. Screw in the screw [936] with the spacer bushings [934].
    - ⇨ Tightening torque 12 Nm
15. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
16. Retrofitting insulation coupling on the encoder mounting adapter: Replace the support ring [1895] with the spacer ring [1895] and screw it securely in place with the new M5×10 screws [1896].
    - ⇨ Tightening torque 7 Nm
17. For size 132M – 355 with forced cooling fan: Screw the torque bracket of the encoder [1889] with the screws [232] through the bores of the torque bracket [935].
    - ⇨ Tightening torque 3.3 Nm
18. For size 63 – 355 without forced cooling fan: Mount the fan guard [35] over the encoder [220] with the screws [22]. When doing this, guide the connection adapter [U] with the signal cable through the central grille cutout of the fan guard [35].
    - ⇨ For size 63 – 132S: Tightening torque 3.3 Nm
    - ⇨ For size 132M/L: Tightening torque 11 Nm
    - ⇨ For size 160 – 355: Tightening torque 27 Nm
19. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.

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20. For size 63 – 132S: Screw the screws [232] through the grille of the fan guard [35] and into the nuts of the torque bracket [1889].
    - ⇨ Tightening torque 3.3 Nm
21. For size 132M – 355 without forced cooling fan: Screw the screws [232] through the grille of the fan guard [35] or the central opening of the support ring [1895] and into the nuts of the torque bracket [1889].
    - ⇨ Tightening torque 3.3 Nm
    - ⇨ For safety encoders: Tightening torque 3.3 Nm ±10%
22. For size 132M – 355 with forced cooling fan: Screw the screws [232] through the torque bracket [935] and into the nuts of the torque bracket of the encoder [1889].
    - ⇨ If you need to turn the encoder [220] in order for the screws to reach the nuts of the torque bracket, turn the encoder [220] clockwise.
    - ⇨ Make sure the signal cable is of a sufficient length so that the connection adapter [U] can be inserted into the recess of the safety cover [361]/[657] of the forced cooling fan [170].
    - ⇨ Tightening torque 3.3 Nm
    - ⇨ For safety encoders: Tightening torque 3.3 Nm ±10%
23. Before you install the safety cover [361]/[657] or the forced cooling fan [170], slide the connection adapter [U] into the recess.
24. For size 63 – 280 without forced cooling fan: Place the safety cover [361] onto the fan guard [35].
25. For size 315 – 355: Place the safety cover [657] onto the metal brackets [1710].
26. For size 315 – 355: Secure the safety cover [657] in place by using the screws [1711].
    - ⇨ Tightening torque 12 Nm
27. With forced cooling fan: Place the forced cooling fan [170] onto the screws [22].
28. Slide the connection adapter [U] into the recess of the safety cover [361] or the forced cooling fan [170] up to the stop. The standard alignment of the recess points towards the terminal box.
    - ⇨ The arrow that is cast in the lower part [C] of the connection adapter [U] indicates the direction of the subsequent cable outlet for the connection cover [619].
    - ⇨ If you wish to change the direction of the cable outlet: Unscrew the screws [D]. Twist the lower part [C] against the T-slot nut [B]. Screw in the screws [D]. When doing so, only tighten the screws [D] lightly.
29. With forced cooling fan: Secure the forced cooling fan [170] with the screws [22].
    - ⇨ For size 71 – 132S: Tightening torque 3.3 Nm
    - ⇨ For size 132M/L: Tightening torque 11 Nm
    - ⇨ For size 160 – 355: Tightening torque 27 Nm
30. For size 71 – 132S with forced cooling fan: Additionally secure the forced cooling fan [170] in place by using the screws [34] and washers [33].
    - ⇨ Tightening torque 2 Nm
31. Without forced cooling fan: Secure the safety cover [361] in place by using the screws [34] and washers [33].
    - ⇨ For size 63 – 132S: Tightening torque 2 Nm
    - ⇨ For size 132M – 280: Tightening torque 3.5 Nm

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32. Turn the connection adapter [U] clockwise up to the stop.
33. Secure the connection adapter [U] in place by tightening the screws [D].
    ⇨ Tightening torque 2 Nm
    ⇨ For safety encoders: Tightening torque 2 Nm ± 10%
34. Place the connection cover [619] onto the connection adapter [U].
35. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
36. Screw the screws [E] through the bores in the connection cover [619] and into the bores in the connection adapter [U].
    ⇨ Tightening torque 2.25 Nm

Removing EK8./AK8./RK8M – with forced cooling fan

1. Unscrew the screws [E].
2. Remove the connection cover [619] from the connection adapter [U].
3. Loosen the screws [D] in the lower part [C].
   ⇨ Only unscrew the screws [D] to such an extent that the connection adapter [1164] can be moved in the recess of the forced cooling fan [170].
4. Loosen the screws [22].
5. For size 71–315: Unscrew the screws [34].
6. Remove the forced cooling fan [170] from the motor. When doing this, slide the connection adapter [1164] out of the recess.
7. Unscrew the screws [232].
8. With forced cooling fan: Remove the signal cable from the slot/3 wings of the cable retainer [1900].
9. With a forced cooling fan: Unscrew the screws [22].
10. Remove the fan guard [35] over the encoder [220]. Guide the connection adapter [U] with the signal cable through the cutout of the fan guard [35].



NOTICE

In the case of encoders RK8M, EK8W, AK8H, AK8W, EK8Z, EK9Z, and AK8Z on DR2C.. motors, loosening the central retaining screw [A] of the encoder [220] or loosening the insulation coupling [1891] of the motor or encoder shaft desynchronizes the encoder and motor rotor.

Higher motor losses and lower torques.

- Perform a new adjustment.

11. Unscrew the screw plug [A] of the encoder [220].
12. Loosen the central retaining screw of the encoder [220]. Use a tool that is at least 45 mm long for this.
    ⇨ If the central retaining screw of the encoder [220] cannot be loosened, counter-tighten the spanner flat SW10 of the encoder shaft.
13. Loosen the cone connection.
    ⇨ Encoder EK8., AK8W, AK8Y, RK8M: To loosen the cone connection, continue turning the central retaining screw of the encoder [220] counterclockwise.

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⇨ Encoder AK8H: Continue turning the central retaining screw of the encoder [220] counterclockwise. To loosen the conical connection, screw an M6 screw (≥ 70 mm long) into the bore.

14. Remove the encoder [220] from the rotor [1] or from the coupling [233]/[1891].

Installing EK8./AK8./RK8M – with forced cooling fan

1. For size 63 – 315: Clean the cone of the encoder [220].
2. Remove the screw plug [A] of the encoder.
3. Insert the encoder [220] into the conical bore of the rotor [1] or the coupling [233]/[1891].
4. To secure the encoder [220] in place, tighten the central retaining screw. Use a tool that is at least 45 mm long for this.
   ⇨ Counter-tighten the spanner flat SW10 of the encoder shaft.
   ⇨ Tightening torque 3.3 Nm
   ⇨ For safety encoders: Tightening torque 3.3 Nm ± 8%



NOTICE

For encoders RK8M, EK8W, AK8H, AK8W, EK9Z and AK8Z on DR2C.. motors, a calibration process must be carried out for flawless operation. See "Additional work for the RK8M encoder on the DR2C.. motor" and "Additional work for EK8W, AK8H, AK8W, EK9Z, and AK8Z encoders on the DR2C.. motor".

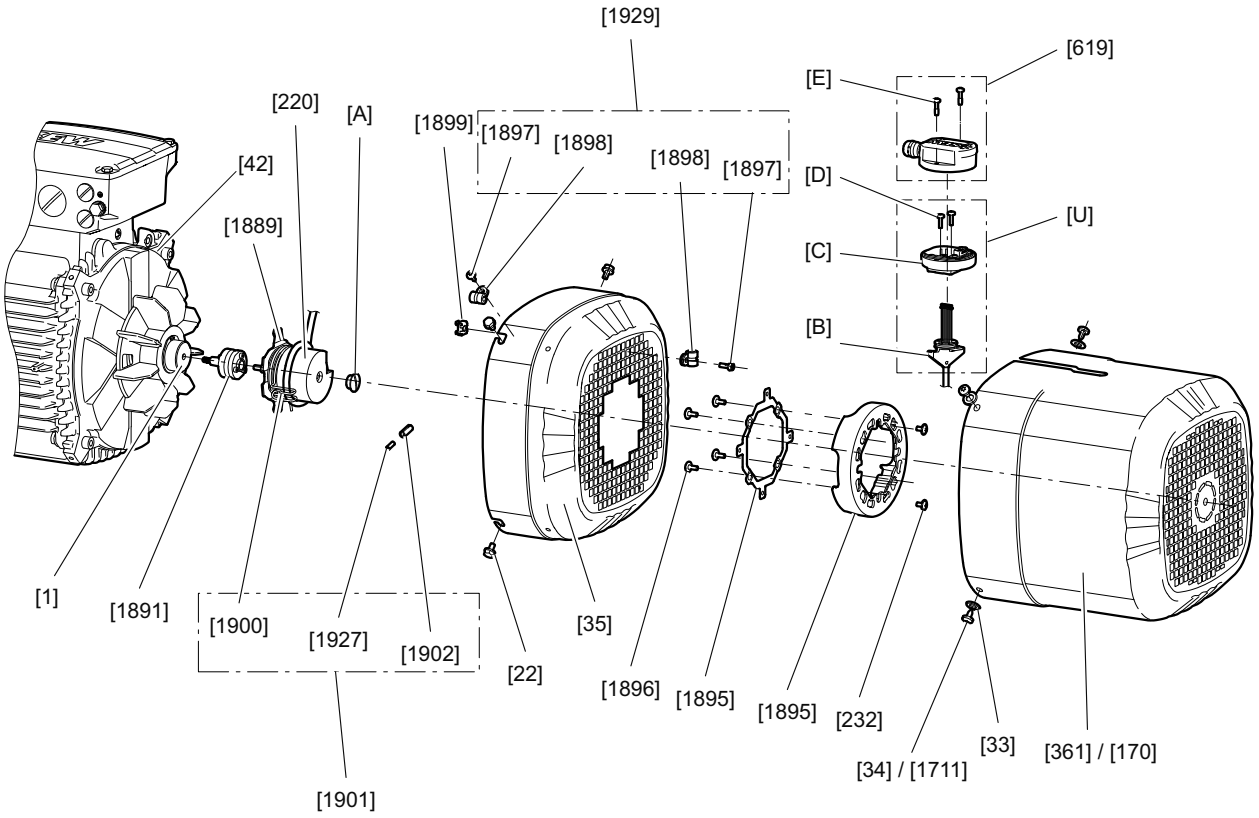
Failure to calibrate results in greater motor losses and reduced torque. In the worst-case scenario, the motor will not run.

5. To seal the encoder [220], screw in the screw plug [A].
   ⇨ Tightening torque 1.8 Nm
   ⇨ For safety encoders: Tightening torque 1.8–17% + 28% (1.49 – 2.3 Nm)
6. For size 63 – 355 without forced cooling fan: Mount the fan guard [35] over the encoder [220] with the screws [22]. When doing this, guide the connection adapter [U] with the signal cable through the central grille cutout of the fan guard [35].
7. Attach the screws [22] of the fan guard [35] to the rear endshield or brake endshield [42] of the motor.
   ⇨ For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
8. For size 63 – 132S: Screw the screws [232] through the grille of the fan guard [35] and into the nuts of the torque bracket [1889].
   ⇨ If you need to turn the encoder [220] in order for the screws to reach the nuts of the torque bracket, turn the encoder [220] clockwise.
   ⇨ Make sure the signal cable is of a sufficient length so that the connection adapter [1164] can be inserted into the recess of the forced cooling fan [170].
   ⇨ Tightening torque 3.3 Nm
   ⇨ For safety encoders: Tightening torque 3.3 Nm ± 20% (2.64 – 3.96 Nm)
9. **⚠ CAUTION!**
   Improper mounting can cause damage to the equipment. Damage to the signal cable. Insert the signal cable of the encoder [220] into the curve of the cable support [1900] so that the signal cable does not touch the rotating forced cooling fan.

10. For size 71–315 and insulation coupling: To turn the cable retainer [1900], loosen the set screw [1927].
11. For size 71–315 and insulation coupling: To secure the cable retainer [1900] in place, tighten the set screw [1927].
    - ⇨ Tightening torque 1.8 Nm
12. Place the forced cooling fan [170] onto the fan guard [35].
13. Insert the connection adapter [1164] into the recess of the forced cooling fan [170]. The standard alignment of the recess points towards the terminal box.
    - ⇨ The arrow that is cast in the lower part [C] of the connection adapter [U] indicates the direction of the subsequent cable outlet for the connection cover [619].
    - ⇨ If you wish to change the direction of the cable outlet: Unscrew the screws [D]. Twist the lower part [C] against the T-slot nut [B]. Screw in the screws [D]. When doing so, only tighten the screws [D] lightly.
14. With a forced cooling fan: Use the screws [22] to secure the fan guard [35] to the rear endshield or brake endshield [42] of the motor.
    - ⇨ For metal hoods: The tightening torque is 3.3 Nm.
15. Fasten the forced cooling fan with the screws [34] and washers [33].
    - ⇨ Tightening torque 2 Nm
16. Slide the connection adapter [U] into the recess of the safety cover [361] or the forced cooling fan [170] up to the stop. The standard alignment of the recess points towards the terminal box.
17. Turn the connection adapter [U] clockwise up to the stop.
18. Secure the connection adapter [U] in place by tightening the screws [D].
    - ⇨ Tightening torque 2 Nm
    - ⇨ For safety encoders: Tightening torque 2 Nm ± 10% (1.8 – 2.2 Nm)
19. Place the connection cover [619] onto the connection adapter [U].
20. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
21. Screw the screws [E] through the bores in the connection cover [619] and into the bores in the connection adapter [U].
    - ⇨ Tightening torque 2.25 Nm ± 15%
    - ⇨ For safety encoders: Tightening torque 2.25 Nm - 25% + 15% (1.69 – 2.59 Nm)

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7.5.13 Removing and mounting cone shaft encoders of DR..132M – 315 motors

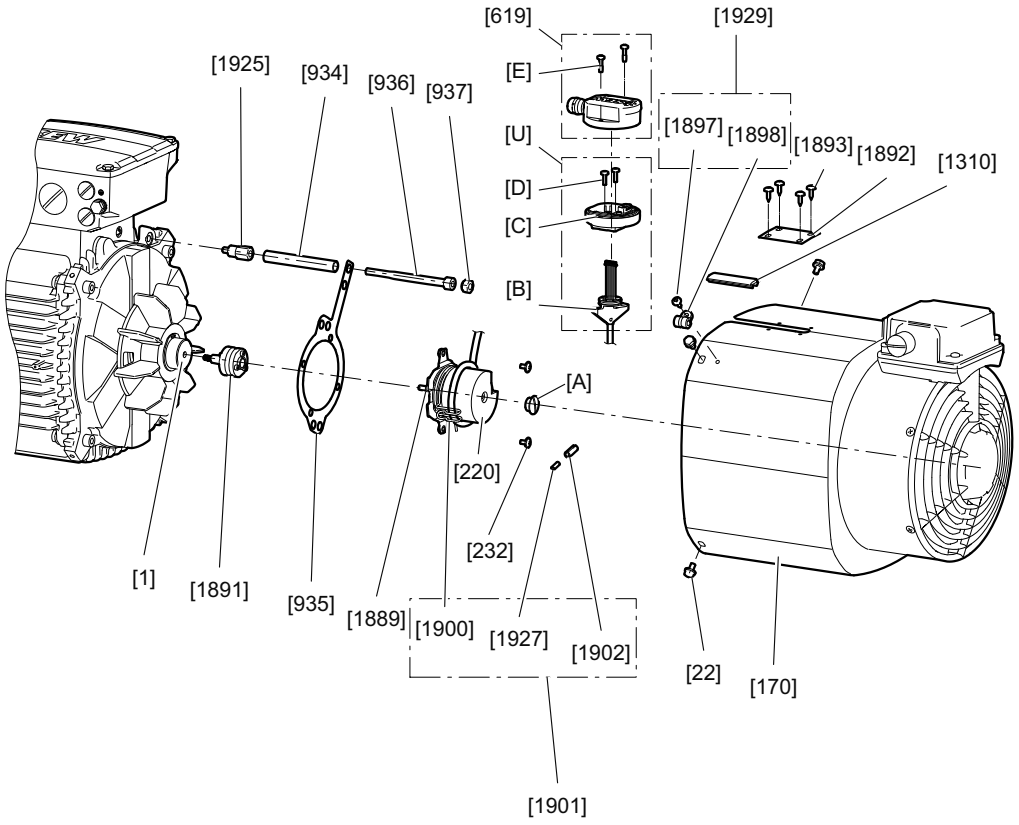


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[1]	Rotor	[1896]	Screw (hexalobular)
[22]	Screw (hexagonal)	[1897]	Screw (hexagon socket)
[33]	Washer	[1898]	Clamp
[34]	Screw (cross recess)	[1899]	Cage nut
[35]	Fan guard	[1900]	Cable retainer
[42]	B-side endshield	[1901]	Accessory bag
[170]	Forced cooling fan	[1902]	Threaded sleeve
[220]	Encoder	[1927]	Set screw
[232]	Screw (hexalobular)	[1929]	Accessory bag
[361]	Safety cover		
[619]	Connection cover	[A]	Screw plug
[U]	Connection adapter	[B]	T-slot nut
[1711]	Screw (hexagonal)	[C]	Lower part
[1889]	Torque bracket	[D]	Screw
[1891]	Insulation coupling	[E]	Screw
[1895]	Support ring/spacer ring		
[1]	Rotor	[1892]	Support plate
[22]	Screw (hexagonal)	[1893]	Screw (cross recess)
[33]	Washer	[1897]	Screw (hexagon socket)
[34]	Screw (cross recess)	[1898]	Clamp
[170]	Forced cooling fan	[1900]	Cable retainer
[220]	Encoder	[1901]	Accessory bag
[232]	Screw (hexalobular)	[1902]	Threaded sleeve
[361]	Safety cover	[1925]	Spacer bolt
[619]	Connection cover	[1927]	Set screw
[934]	Spacer bushing	[1929]	Accessory bag
[935]	Torque bracket	[A]	Screw plug

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[936]	Cap screw	[B]	T-slot nut
[937]	Hex nut	[C]	Lower part
[1310]	Sealing profile	[D]	Screw
[1889]	Torque bracket	[E]	Screw
[1891]	Insulation coupling	[U]	Connection adapter



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Removing encoder EK8./AK8.

1. Unscrew the screws [E].
2. Remove the connection cover [619] from the connection adapter [U].
3. Loosen the screws [D] in the lower part [C].
   ⇨ Only unscrew the screws [D] to such an extent that the connection adapter [U] can be moved in the recess of the safety cover [657]/forced cooling fan [170].
4. For size 71–315: Unscrew the screws [34].
5. Remove the safety cover [361] from the motor. When doing this, slide the connection adapter [1164] out of the recess.
6. Unscrew the screws [232].
7. With a forced cooling fan: Unscrew the screws [22].
8. Remove the fan guard [35] over the encoder [220]. Guide the connection adapter [U] with the signal cable through the cutout of the fan guard [35].
9. Unscrew the screw plug [A] of the encoder [220].
10. Loosen the central retaining screw of the encoder [220]. Use a tool that is at least 45 mm long for this.
    ⇨ If the central retaining screw of the encoder [220] cannot be loosened, counter-tighten the spanner flat SW10 of the encoder shaft.

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11. Loosen the cone connection.
    - ⇨ Encoder EK8., AK8W, AK8Y, RK8M: To loosen the cone connection, continue turning the central retaining screw of the encoder [220] counterclockwise.
    - ⇨ Encoder AK8H: Continue turning the central retaining screw of the encoder [220] counterclockwise. To loosen the conical connection, screw an M6 screw (≥ 70 mm long) into the bore.
12. Remove the encoder [220] from the rotor [1] or from the coupling [233]/[1891].
13. For optional insulation coupling: Remove the encoder [220] from the insulation coupling [1891].

Mounting encoder EK8./AK8.

1. For size 63 – 315: Clean the cone of the encoder [220].
2. For optional insulation coupling: Clean the cones of the insulation coupling [1891].
3. Remove the screw plug [A] of the encoder.
4. For optional insulation coupling: The insulation coupling [1891] must be mounted before the encoder is mounted. Insert the insulation coupling [1891] into the conical bore of the rotor [1]. To secure the insulation coupling in place, tighten the central retaining screw.
    - ⇨ Counter-tighten the spanner flat SW 10 of the encoder shaft.
    - ⇨ Tightening torque 3.3 Nm
5. Insert the encoder [220] into the conical bore of the rotor [1] or the coupling [233]/[1891].
6. In the case of the insulation coupling option: Insert the encoder [220] into the conical bore of the insulation coupling [1891].
7. To secure the encoder [220] in place, tighten the central retaining screw. Use a tool that is at least 45 mm long for this.
    - ⇨ Counter-tighten the spanner flat SW10 of the encoder shaft.
    - ⇨ Tightening torque 3.3 Nm
8. To seal the encoder [220], screw in the screw plug [A].
    - ⇨ Tightening torque 1.8 Nm
9. For size 63 – 355 without forced cooling fan: Mount the fan guard [35] over the encoder [220] with the screws [22]. When doing this, guide the connection adapter [U] with the signal cable through the central grille cutout of the fan guard [35].
10. With a forced cooling fan: Use the screws [22] to secure the fan guard [35] to the rear endshield or brake endshield [42] of the motor.
    - ⇨ DR..132M – L: Tightening torque 11.3 Nm
    - ⇨ DR..160 – 280: Tightening torque 27.3 Nm
    - ⇨ DR..315: Secure the screws [22] in place with medium-strength thread locker. The tightening torque is 5 Nm.
11. Screw the screws [232] through the support ring/spacer ring [1895] or the grille on the fan guard [35] into the nuts on the torque arm [1889].
    - ⇨ Make sure the signal cable is of a sufficient length so that the connection adapter [U] can be inserted into the recess of the safety cover [361]/[657] of the forced cooling fan [170].
    - ⇨ Tightening torque 3.3 Nm

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12. For size 71 – 315: Place the safety cover [361] onto the fan guard [35].
    - ⇨ The standard alignment of the recess points towards the terminal box.
    - ⇨ The arrow that is cast in the lower part [C] of the connection adapter [U] indicates the direction of the subsequent cable outlet for the connection cover [619].
    - ⇨ If you wish to change the direction of the cable outlet: Unscrew the screws [D]. Twist the lower part [C] against the T-slot nut [B]. Screw in the screws [D]. When doing so, only tighten the screws [D] lightly.
13. Without forced cooling fan: Secure the safety cover [361] in place by using the screws [34] and washers [33].
    - ⇨ Tightening torque 4.5 Nm
14. Slide the connection adapter [U] into the recess of the safety cover [361] or the forced cooling fan [170] up to the stop. The standard alignment of the recess points towards the terminal box.
15. Turn the connection adapter [U] clockwise up to the stop.
16. Secure the connection adapter [U] in place by tightening the screws [D].
    - ⇨ Tightening torque 2 Nm
17. Place the connection cover [619] onto the connection adapter [U].
18. Screw the screws [E] through the bores in the connection cover [619] and into the bores in the connection adapter [U].
    - ⇨ Tightening torque 2.25 Nm ± 15%

Removing encoder EK8./AK8. with optional forced cooling fan

1. In motors of sizes 250 – 315: If the screws [1893] are available, unscrew the screws. Remove the supporting plate [1892]. Push the sealing profile [1310]/[1965] out of the cutout.
2. Unscrew the screws [E].
3. Remove the connection cover [619] from the connection adapter [U].
4. Loosen the screws [D] in the lower part [C].
    - ⇨ Only unscrew the screws [D] to such an extent that the connection adapter [1164] can be moved in the recess of the forced cooling fan [170].
5. With a forced cooling fan: Unscrew the screws [22].
6. Remove the forced cooling fan [170] from the motor. When doing this, slide the connection adapter [1164] out of the recess.
7. Unscrew the screws [232].
8. With forced cooling fan: Remove the signal cable from the slot/3 wings of the cable retainer [1900].
9. To remove the torque bracket [935], loosen the screw [936]/hex nut [937]. Guide the connection adapter [1164] with the signal cable through the cutout of the torque bracket [935].
10. Loosen the central retaining screw of the encoder [220]. Use a tool that is at least 45 mm long for this.
    - ⇨ If the central retaining screw of the encoder [220] cannot be loosened, counter-tighten the spanner flat SW10 of the encoder shaft.

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11. Loosen the cone connection.
    - ⇨ Encoder EK8., AK8W, AK8Y, RK8M: To loosen the cone connection, continue turning the central retaining screw of the encoder [220] counterclockwise.
    - ⇨ Encoder AK8H: Continue turning the central retaining screw of the encoder [220] counterclockwise. To loosen the conical connection, screw an M6 screw (≥ 70 mm long) into the bore.
12. Remove the encoder [220] from the rotor [1] or from the coupling [233]/[1891].
13. For optional insulation coupling: Remove the encoder [220] from the insulation coupling [1891].

Mounting encoder EK8./AK8. with optional forced cooling fan

1. For size 63 – 315: Clean the cone of the encoder [220].
2. For optional insulation coupling: Clean the cones of the insulation coupling [1891].
3. Remove the screw plug [A] of the encoder.
4. For optional insulation coupling: The insulation coupling [1891] must be mounted before the encoder is mounted. Insert the insulation coupling [1891] into the conical bore of the rotor [1]. To secure the insulation coupling in place, tighten the central retaining screw.
    - ⇨ Counter-tighten the spanner flat SW10 of the encoder shaft.
    - ⇨ Tightening torque 3.3 Nm
5. Insert the encoder [220] into the conical bore of the rotor [1] or the coupling [233]/[1891].
6. In the case of the insulation coupling option: Insert the encoder [220] into the conical bore of the insulation coupling [1891].
7. To secure the encoder [220] in place, tighten the central retaining screw. Use a tool that is at least 45 mm long for this.
    - ⇨ Counter-tighten the spanner flat SW10 of the encoder shaft.
    - ⇨ Tightening torque 3.3 Nm
8. To seal the encoder [220], screw in the screw plug [A].
    - ⇨ Tightening torque 1.8 Nm
9. Guide the torque arm [935] over the connection adapter [1164] and the encoder [220].
10. For optional insulation coupling: Mount the spacer bolt [1625].
    - ⇨ M6 screw: Tightening torque 11.3 Nm
    - ⇨ M8 screw: Tightening torque 27.3 Nm
11. When mounting the torque arm [935], make sure it is aligned centrally to the encoder [220]. Screw in the screw [936]/hex nut [937] with the spacer bushings [934].
    - ⇨ M6 screw: Tightening torque 11.3 Nm
    - ⇨ M8 screw: Tightening torque 27.3 Nm
12. ⚠ **CAUTION!**
    Improper mounting can cause damage to the equipment. Damage to the signal cable. Insert the signal cable of the encoder [220] into the curve of the cable support [1900] so that the signal cable does not touch the rotating forced cooling fan.
13. For size 71–315 and insulation coupling: To turn the cable retainer [1900], loosen the set screw [1927].

14. For size 71–315 and insulation coupling: To secure the cable retainer [1900] in place, tighten the set screw [1927].
    ⇨ Tightening torque 1.8 Nm
15. To secure the torque arm [1889] of the encoder in place, screw the screws [232] into the bores of the torque arm [935].
    ⇨ Make sure the signal cable is of a sufficient length so that the connection adapter [1164] can be inserted into the recess of the forced cooling fan [170].
16. Place the forced cooling fan [170] onto the rear endshield or brake endshield [42].
17. Insert the connection adapter [1164] into the recess of the forced cooling fan [170]. The standard alignment of the recess points towards the terminal box.
    ⇨ The arrow that is cast in the lower part [C] of the connection adapter [U] indicates the direction of the subsequent cable outlet for the connection cover [619].
    ⇨ If you wish to change the direction of the cable outlet: Unscrew the screws [D]. Twist the lower part [C] against the T-slot nut [B]. Screw in the screws [D]. When doing so, only tighten the screws [D] lightly.
18. Fasten the forced cooling fan [170] with the screws [22] on the rear or brake endshield [42] of the motor.
    ⇨ DR..132M – L: Tightening torque 11.3 Nm
    ⇨ DR..160 – 280: Tightening torque 27.3 Nm
    ⇨ DR..315: Secure the screws [22] in place with medium-strength thread locker. The tightening torque is 5 Nm.
19. Slide the connection adapter [U] into the recess of the safety cover [361] or the forced cooling fan [170] up to the stop. The standard alignment of the recess points towards the terminal box.
20. In motors of sizes 250 – 315: To fasten the supporting plate [1892], screw in the screws [1893]. Push the sealing profile [1310]/[1965] into the cutout.
21. Secure the connection adapter [U] in place by tightening the screws [D].
    ⇨ Tightening torque 2 Nm
22. Place the connection cover [619] onto the connection adapter [U].
23. Screw the screws [E] through the bores in the connection cover [619] and into the bores in the connection adapter [U].
    ⇨ Tightening torque 2.25 Nm ± 15%

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7.5.14 Removing and mounting encoder EV8./AV8. with coupling from DR..71 – 225 motors

Removing encoder EV8./AV8. with coupling

1. Unscrew the screws [E].
2. Remove the connection cover [619] from the connection adapter [U].
3. Loosen the screws [D] in the lower part [C].
   ⇨ Only unscrew the screws [D] to such an extent that the connection adapter [U] can be moved in the recess of the safety cover [657]/forced cooling fan [170].
4. With a forced cooling fan: Unscrew the screws [22].
5. Remove the safety cover [361]/[657] or the forced cooling fan [170] from the motor. When doing this, slide the connection adapter [U] out of the recess.
6. Unscrew the screws [232].
7. Remove the eccentric disks [251] from the circumferential groove of the encoder [220].
8. Unscrew the screw plug [A] of the encoder [220].
9. Loosen the central retaining screw of the encoder [220]. Use a tool that is at least 45 mm long for this.
   ⇨ If the central retaining screw of the encoder [220] cannot be loosened, exert counter-pressure at the Ø 4.1 mm bore of the rear coupling half.
10. Remove the encoder [220] from the coupling [233].

Mounting encoder EV8./AV8. with coupling

1. Remove the screw plug [A] of the encoder.
2. If the closing plate [646] is present: Unscrew the screws [232] and remove the closing plate [646].
3. Clean the cone of the rotor [1], the encoder [220] and the coupling [233].
4. Insert the coupling [233] into the conical bore of the rotor.
5. To secure the coupling [233] in place, screw in the central retaining screw [F].
   ⇨ Tightening torque 4 Nm
   ⇨ Exert counter-pressure at the Ø 4.1 mm bore of the rear coupling half.
6. To remove the torque arm [1889] from the encoder, unscrew the screws [1888].
7. Remove the screw plug [A] of the encoder.
   ⇨ For size DR..132M/L: Place the spacer ring [225] between the encoder [220] and the fan guard with encoder mount [212].
8. For size 355: Insert the encoder [220] into the coupling half with conical bore [233].
9. To secure the encoder [220] in place, tighten the central retaining screw. Use a tool that is at least 45 mm long for this.
   ⇨ Tightening torque 3.3 Nm
   ⇨ Exert counter-pressure at the Ø 4.1 mm bore of the rear coupling half.
10. To seal the encoder [220], screw in the screw plug [A].
    ⇨ Tightening torque 1.8 Nm
11. Insert the screws [232] to fasten the conical spring washers [251].

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12. Tighten the screws [232] while turning the eccentric disks [251] in clockwise direction into the groove of the encoder [220].
    - ⇨ Tightening torque 2.25 Nm
    - ⇨ Make sure the signal cable is of a sufficient length so that the connection adapter [U] can be inserted into the recess of the safety cover [361]/[657] of the forced cooling fan [170].
13. Insert the connection adapter [1164] into the recess of the safety cover [361]. The standard alignment of the recess points towards the terminal box.
14. For size 71 – 315: Place the safety cover [361] onto the fan guard [35].
    - ⇨ The arrow that is cast in the lower part [C] of the connection adapter [U] indicates the direction of the subsequent cable outlet for the connection cover [619].
    - ⇨ If you wish to change the direction of the cable outlet: Unscrew the screws [D]. Twist the lower part [C] against the T-slot nut [B]. Screw in the screws [D]. When doing so, only tighten the screws [D] lightly.
15. Secure the safety cover [361] in place by using the screws [22].
    - ⇨ DR..71 – 132S: Tightening torque 3.3 Nm
    - ⇨ DR..132M – L: Tightening torque 11.3 Nm
    - ⇨ DR..160 – 225: Tightening torque 27.3 Nm
16. Slide the connection adapter [U] into the recess of the safety cover [361] or the forced cooling fan [170] up to the stop. The standard alignment of the recess points towards the terminal box.
17. Turn the connection adapter [U] clockwise up to the stop.
18. Secure the connection adapter [U] in place by tightening the screws [D].
    - ⇨ Tightening torque 2 Nm
19. Place the connection cover [619] onto the connection adapter [U].
20. Screw the screws [E] through the bores in the connection cover [619] and into the bores in the connection adapter [U].
    - ⇨ Tightening torque 2.25 Nm ± 15%

Removing encoder EV8./AV8. with coupling and optional forced cooling fan

1. Unscrew the screws [E].
2. Remove the connection cover [619] from the connection adapter [U].
3. Loosen the screws [D] in the lower part [C].
    - ⇨ Only unscrew the screws [D] to such an extent that the connection adapter [U] can be moved in the recess of the safety cover [657]/forced cooling fan [170].
4. Loosen the screws [22].
5. For size 71–315: Unscrew the screws [34].
6. Remove the forced cooling fan [170] from the motor. When doing this, slide the connection adapter [1164] out of the recess.
7. With forced cooling fan: Remove the signal cable from the slot/3 wings of the cable retainer [1900].
8. Unscrew the screws [232].
9. Remove the eccentric disks [251] from the circumferential groove of the encoder [220].

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10. Unscrew the screw plug [A] of the encoder [220].
11. Loosen the central retaining screw of the encoder [220]. Use a tool that is at least 45 mm long for this.
    ⇨ If the central retaining screw of the encoder [220] cannot be loosened, exert counter-pressure at the Ø 4.1 mm bore of the rear coupling half.
12. Remove the encoder [220] from the coupling [233].

Mounting encoder EV8./AV8. with coupling and optional forced cooling fan

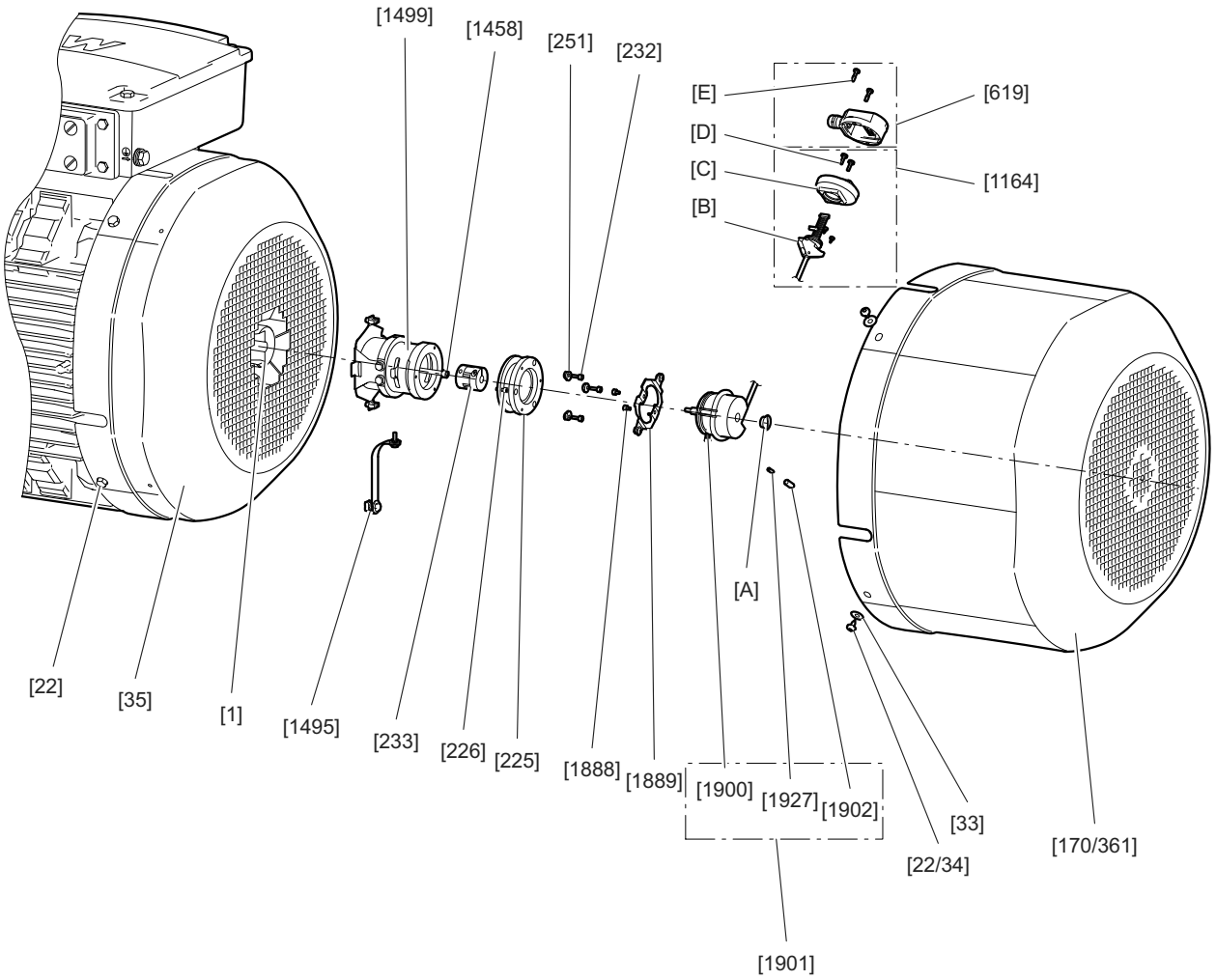
1. Remove the screw plug [A] of the encoder.
2. If the closing plate [646] is present: Unscrew the screws [232] and remove the closing plate [646].
3. Clean the cone of the rotor [1], the encoder [220] and the coupling [233].
4. Insert the coupling [233] into the conical bore of the rotor.
5. To secure the coupling [233] in place, screw in the central retaining screw [F].
   ⇨ Tightening torque 3.3 Nm
   ⇨ Exert counter-pressure at the Ø 4.1 mm bore of the rear coupling half.
6. To remove the torque arm [1889] from the encoder, unscrew the screws [1888].
7. Remove the screw plug [A] of the encoder.
   ⇨ For size DR..132M/L: Place the spacer ring [225] between the encoder [220] and the fan guard with encoder mount [212].
8. For size 355: Insert the encoder [220] into the coupling half with conical bore [233].
9. To secure the encoder [220] in place, tighten the central retaining screw. Use a tool that is at least 45 mm long for this.
   ⇨ Tightening torque 3.3 Nm
   ⇨ Exert counter-pressure at the Ø 4.1 mm bore of the rear coupling half.
10. To seal the encoder [220], screw in the screw plug [A].
    ⇨ Tightening torque 1.8 Nm
11. Insert the screws [232] to fasten the conical spring washers [251].
12. Tighten the screws [232] while turning the eccentric disks [251] in clockwise direction into the groove of the encoder [220].
    ⇨ Tightening torque 2.25 Nm
    ⇨ Make sure the signal cable is of a sufficient length so that the connection adapter [1164] can be inserted into the recess of the forced cooling fan [170].
13. ⚠ **CAUTION!**
    Improper mounting can cause damage to the equipment. Damage to the signal cable. Insert the signal cable of the encoder [220] into the curve of the cable support [1900] so that the signal cable does not touch the rotating forced cooling fan.
14. For size 71–315 and insulation coupling: To turn the cable retainer [1900], loosen the set screw [1927].
15. For size 71–315 and insulation coupling: To secure the cable retainer [1900] in place, tighten the set screw [1927].
    ⇨ Tightening torque 1.8 Nm
16. Place the forced cooling fan [170] onto the fan guard with encoder mount [212].

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17. Insert the connection adapter [1164] into the recess of the forced cooling fan [170]. The standard alignment of the recess points towards the terminal box.
    - ⇨ The arrow that is cast in the lower part [C] of the connection adapter [U] indicates the direction of the subsequent cable outlet for the connection cover [619].
    - ⇨ If you wish to change the direction of the cable outlet: Unscrew the screws [D]. Twist the lower part [C] against the T-slot nut [B]. Screw in the screws [D]. When doing so, only tighten the screws [D] lightly.
18. Use the screws [22] to secure the forced cooling fan [170] to the fan guard with encoder mount [212] of the motor.
    - ⇨ DR..71 – 132S: Tightening torque 3.3 Nm
    - ⇨ DR..132M – L: Tightening torque 11.3 Nm
    - ⇨ DR..160 – 225: Tightening torque 27.3 Nm
19. Slide the connection adapter [U] into the recess of the safety cover [361] or the forced cooling fan [170] up to the stop. The standard alignment of the recess points towards the terminal box.
20. Turn the connection adapter [U] clockwise up to the stop.
21. Secure the connection adapter [U] in place by tightening the screws [D].
    - ⇨ Tightening torque 2 Nm
22. Place the connection cover [619] onto the connection adapter [U].
23. Screw the screws [E] through the bores in the connection cover [619] and into the bores in the connection adapter [U].
    - ⇨ Tightening torque 2.25 Nm ± 15%

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7.5.15 Removing and mounting encoder EV8./AV8. with coupling from DR..250 – 280 motors



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[1]	Rotor	[1499]	Encoder mounting adapter
[22]	Screw (hexagonal)	[1495]	Ground strap SET
[33]	Washer	[1898]	Clamp
[34]	Screw (cross recess)	[1899]	Cage nut
[35]	Fan guard	[1900]	Cable retainer
[170]	Forced cooling fan	[1901]	Accessory bag
[225]	Intermediate flange	[1902]	Threaded sleeve
[226]	Cap screw	[1927]	Set screw
[232]	Screw (hexalobular)	[A]	Screw plug
[233]	Coupling	[B]	T-slot nut
[251]	Conical spring washer	[C]	Lower part
[361]	Safety cover	[D]	Screw
[619]	Connection cover	[E]	Screw
[1164]	Connection adapter		
[1458]	Cap screw		

Removing encoder EV8./AV8. with coupling

1. Unscrew the screws [E].
2. Remove the connection cover [619] from the connection adapter [U].

3. Loosen the screws [D] in the lower part [C].
   ⇨ Only unscrew the screws [D] to such an extent that the connection adapter [U] can be moved in the recess of the safety cover [657]/forced cooling fan [170].
4. For size 71–315: Unscrew the screws [34].
5. Remove the safety cover [361]/[657] or the forced cooling fan [170] from the motor. When doing this, slide the connection adapter [U] out of the recess.
6. Unscrew the screws [232].
7. Remove the eccentric disks [251] from the circumferential groove of the encoder [220].
8. Remove the encoder [220] from the intermediate flange [225].
9. Unscrew the screw plug [A] of the encoder [220].
10. Loosen the central retaining screw of the encoder [220]. Use a tool that is at least 45 mm long for this.
11. Remove the encoder with the mounted rear coupling half [233] from the mounting adapter [1499].
    ⇨ If the central retaining screw of the encoder [220] cannot be loosened, counter-tighten the spanner flat SW10 of the encoder shaft.
12. Remove the encoder [220] from the coupling [233].

Mounting encoder EV8./AV8. with coupling

1. Clean the cone of the rotor [1], the encoder mounting adapter [1499] and the coupling [233].
2. Insert the encoder mounting adapter [1499] into the conical bore of the rotor [1].
3. To secure the encoder mounting adapter [1499] in place, screw in the central retaining screw [1458].
   ⇨ Tightening torque 3.3 Nm
4. With a forced cooling fan: Use the screws [22] to secure the fan guard [35] to the rear endshield or brake endshield [42] of the motor.
   ⇨ While doing so, the plastic dampers [1486] of the torque arm for the encoder mounting adapter [1499] must engage into the grille of the fan guard [35].
   ⇨ The tightening torque is 27.3 Nm.
5. To secure the ground strap [1495] to the encoder mounting adapter [1499], screw in the screw [1498].
   ⇨ Tightening torque 6.5 Nm
6. To secure the ground strap [1495] to the fan guard [35], screw the screw [1462] into the cage nut [1459].
   ⇨ The tightening torque is 11.3 Nm.
7. Place the coupling half with cylindrical internal bore [233] onto the inner pin of the encoder mounting adapter [1499].
8. To secure the coupling half with cylindrical internal bore [233] in place, screw the screw into the conical spring washer of the coupling [233].
   ⇨ Tightening torque 3.3 Nm
9. To secure the intermediate flange [225] to the encoder mounting adapter [1499], screw in the screw [226].
   ⇨ Tightening torque 3.3 Nm

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10. To remove the torque arm [1889] from the encoder, unscrew the screws [1888].
11. Remove the screw plug [A] of the encoder.
12. For size 355: Insert the encoder [220] into the coupling half with conical bore [233].
13. To secure the encoder [220] in place, tighten the central retaining screw. Use a tool that is at least 45 mm long for this.
    - ⇨ Tightening torque 3.3 Nm
    - ⇨ Counter-tighten the spanner flat SW10 of the encoder shaft.
14. To seal the encoder [220], screw in the screw plug [A].
    - ⇨ Tightening torque 1.8 Nm
15. Insert the encoder [220] with mounted coupling half into the centering of the intermediate flange [225]. The two coupling halves must interlock via the plastic coupling star.
16. Insert the screws [232] to fasten the conical spring washers [251].
17. Tighten the screws [232] while turning the eccentric disks [251] in clockwise direction into the groove of the encoder [220].
    - ⇨ Tightening torque 3 Nm
    - ⇨ Make sure the signal cable is of a sufficient length so that the connection adapter [U] can be inserted into the recess of the safety cover [361]/[657] of the forced cooling fan [170].
18. Insert the connection adapter [1164] into the recess of the safety cover [361]. The standard alignment of the recess points towards the terminal box.
19. For size 71 – 315: Place the safety cover [361] onto the fan guard [35].
    - ⇨ The arrow that is cast in the lower part [C] of the connection adapter [U] indicates the direction of the subsequent cable outlet for the connection cover [619].
    - ⇨ If you wish to change the direction of the cable outlet: Unscrew the screws [D]. Twist the lower part [C] against the T-slot nut [B]. Screw in the screws [D]. When doing so, only tighten the screws [D] lightly.
20. Without forced cooling fan: Secure the safety cover [361] in place by using the screws [34] and washers [33].
    - ⇨ Tightening torque 4.5 Nm
21. Slide the connection adapter [U] into the recess of the safety cover [361] or the forced cooling fan [170] up to the stop. The standard alignment of the recess points towards the terminal box.
22. Turn the connection adapter [U] clockwise up to the stop.
23. Secure the connection adapter [U] in place by tightening the screws [D].
    - ⇨ Tightening torque 2 Nm
24. Place the connection cover [619] onto the connection adapter [U].
25. Screw the screws [E] through the bores in the connection cover [619] and into the bores in the connection adapter [U].
    - ⇨ Tightening torque 2.25 Nm ± 15%

Removing encoder EV8./AV8. with coupling and optional forced cooling fan

1. Unscrew the screws [E].
2. Remove the connection cover [619] from the connection adapter [U].

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3. Loosen the screws [D] in the lower part [C].
   ⇨ Only unscrew the screws [D] to such an extent that the connection adapter [1164] can be moved in the recess of the forced cooling fan [170].
4. With a forced cooling fan: Unscrew the screws [22].
5. Remove the forced cooling fan [170] from the motor. When doing this, slide the connection adapter [1164] out of the recess.
6. If necessary, loosen the set screw [1927].
7. With forced cooling fan: Remove the signal cable from the slot/3 wings of the cable retainer [1900].
8. Unscrew the screws [232].
9. Remove the eccentric disks [251] from the circumferential groove of the encoder [220].
10. Remove the encoder [220] from the intermediate flange [225].
11. Unscrew the screw plug [A] of the encoder [220].
12. Loosen the central retaining screw of the encoder [220]. Use a tool that is at least 45 mm long for this.
13. Remove the encoder with the mounted rear coupling half [233] from the mounting adapter [1499].
    ⇨ If the central retaining screw of the encoder [220] cannot be loosened, counter-tighten the spanner flat SW10 of the encoder shaft.
14. Remove the encoder [220] from the coupling [233].

Mounting encoder EV8./AV8. with coupling and optional forced cooling fan

1. Clean the cone of the rotor [1], the encoder mounting adapter [1499] and the coupling [233].
2. Insert the encoder mounting adapter [1499] into the conical bore of the rotor [1].
3. To secure the encoder mounting adapter [1499] in place, screw in the central retaining screw [1458].
   ⇨ Tightening torque 3.3 Nm
4. Use the screws [1485] to secure the torque arm [935] to the mounting adapter [1499].
   ⇨ Tightening torque 6 Nm
5. Use the sleeves [934], screws [936] and washers [1666] to secure the torque arm [935] to the rear endshield or brake endshield [42].
   ⇨ The tightening torque is 11.3 Nm.
6. With a forced cooling fan: Use the screws [22] to secure the fan guard [35] to the rear endshield or brake endshield [42] of the motor.
   ⇨ While doing so, the plastic dampers [1486] of the torque arm for the encoder mounting adapter [1499] must engage into the grille of the fan guard [35].
   ⇨ The tightening torque is 27.3 Nm.
7. Place the coupling half with cylindrical internal bore [233] onto the inner pin of the encoder mounting adapter [1499].
8. To secure the coupling half with cylindrical internal bore [233] in place, screw the screw into the conical spring washer of the coupling [233].
   ⇨ Tightening torque 3.3 Nm

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9. To secure the intermediate flange [225] to the encoder mounting adapter [1499], screw in the screw [226].
   ⇨ Tightening torque 3.3 Nm
10. To remove the torque arm [1889] from the encoder, unscrew the screws [1888].
11. Remove the screw plug [A] of the encoder.
12. For size 355: Insert the encoder [220] into the coupling half with conical bore [233].
13. To secure the encoder [220] in place, tighten the central retaining screw. Use a tool that is at least 45 mm long for this.
    ⇨ Tightening torque 3.3 Nm
    ⇨ Counter-tighten the spanner flat SW10 of the encoder shaft.
14. To seal the encoder [220], screw in the screw plug [A].
    ⇨ Tightening torque 1.8 Nm
15. Insert the encoder [220] with mounted coupling half into the centering of the intermediate flange [225]. The two coupling halves must interlock via the plastic coupling star.
16. Insert the screws [232] to fasten the conical spring washers [251].
17. Tighten the screws [232] while turning the eccentric disks [251] in clockwise direction into the groove of the encoder [220].
    ⇨ Tightening torque 3 Nm
    ⇨ Make sure the signal cable is of a sufficient length so that the connection adapter [U] can be inserted into the recess of the safety cover [361]/[657] of the forced cooling fan [170].
18. ⚠ **CAUTION!**
    Improper mounting can cause damage to the equipment. Damage to the signal cable. Insert the signal cable of the encoder [220] into the curve of the cable support [1900] so that the signal cable does not touch the rotating forced cooling fan.
19. For size 71–315 and insulation coupling: To turn the cable retainer [1900], loosen the set screw [1927].
20. For size 71–315 and insulation coupling: To secure the cable retainer [1900] in place, tighten the set screw [1927].
    ⇨ Tightening torque 1.8 Nm
21. Insert the connection adapter [1164] into the recess of the forced cooling fan [170]. The standard alignment of the recess points towards the terminal box.
    ⇨ The arrow that is cast in the lower part [C] of the connection adapter [U] indicates the direction of the subsequent cable outlet for the connection cover [619].
    ⇨ If you wish to change the direction of the cable outlet: Unscrew the screws [D]. Twist the lower part [C] against the T-slot nut [B]. Screw in the screws [D]. When doing so, only tighten the screws [D] lightly.
22. Fasten the forced cooling fan [170] with the screws [22] on the rear or brake endshield [42] of the motor.
    ⇨ The tightening torque is 27.3 Nm.
23. Slide the connection adapter [U] into the recess of the safety cover [361] or the forced cooling fan [170] up to the stop. The standard alignment of the recess points towards the terminal box.
24. In motors of sizes 250 – 315: To fasten the supporting plate [1892], screw in the screws [1893]. Push the sealing profile [1310]/[1965] into the cutout.

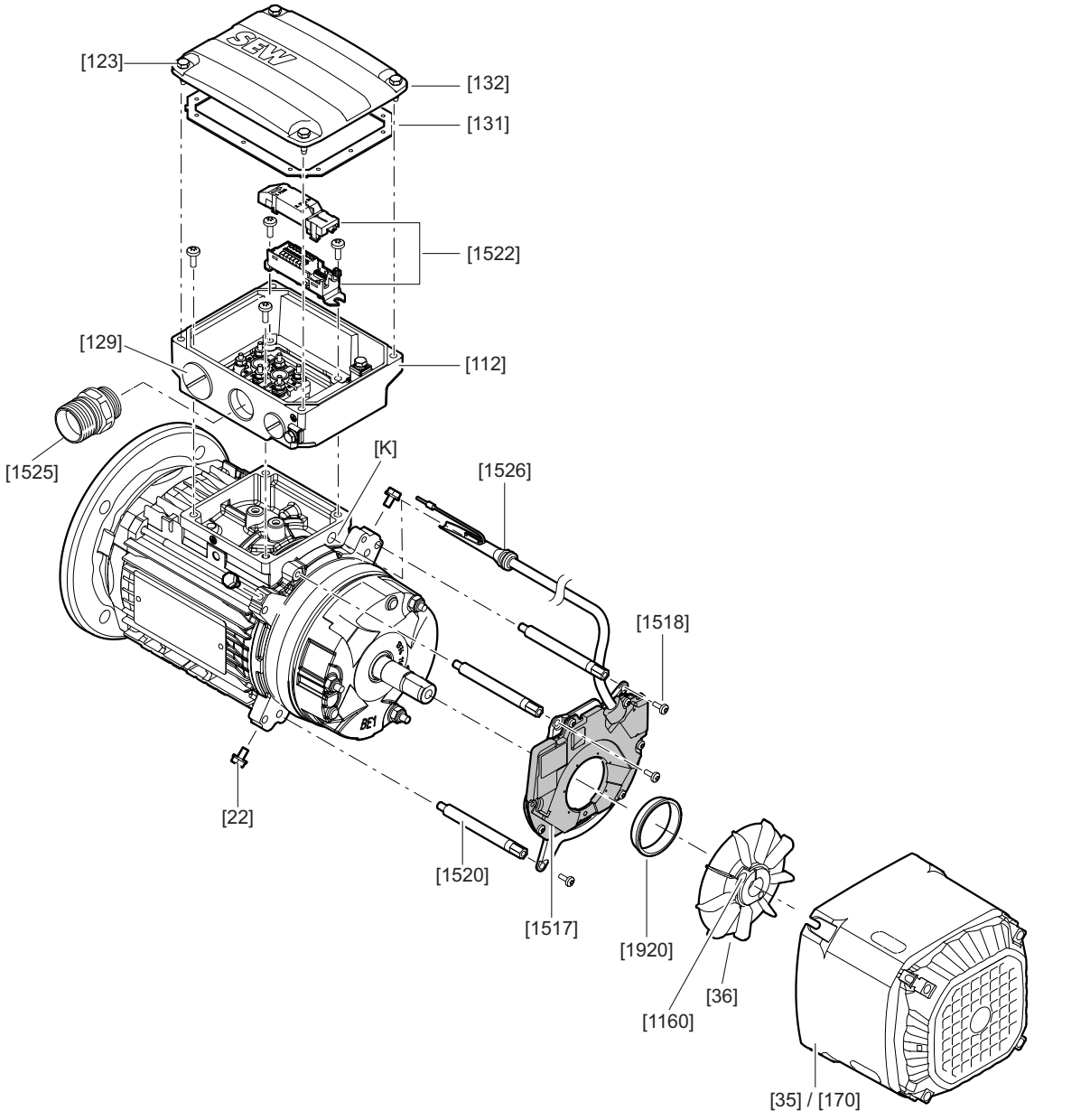
25. Secure the connection adapter [U] in place by tightening the screws [D].
    ⇨ Tightening torque 2 Nm
26. Place the connection cover [619] onto the connection adapter [U].
27. Screw the screws [E] through the bores in the connection cover [619] and into the bores in the connection adapter [U].
    ⇨ Tightening torque 2.25 Nm ± 15%

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7.5.16 Removing and mounting built-in encoder EI8.

A centering ring is required when mounting the built-in encoder EI8. You can order the centering ring via the following part number:

Motor	Built-in encoder	Part number
DR..71 – 132S	Centering ring EI8.	22659129



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[22]	Screw	[131]	Gasket for cover	[1522]	Connection unit
[35]	Fan guard	[132]	Terminal box cover	[1525]	M23 connector
[36]	Fan, complete	[170]	Forced cooling fan	[1526]	Grommet
[112]	Terminal box lower part	[1160]	Cap screw	[1920]	Centering ring (aid)
[119]	Screw	[1517]	Encoder module	[K]	Knock-out
[123]	Screw	[1518]	Screw		
[129]	Screw plug	[1520]	Hexagonal spacer		

Removing EI8. with connection unit

✓ Required resources: Screwdrivers (SW7, SW8, TX20, TX25)

1. Disassemble the forced cooling fan [170] if applicable.
2. Remove the screws [22] to disassemble the fan guard [35].
3. Loosen the radial clamping screw [1160]:
   ⇨ DR..71 – 100: M3 with cylinder head
   ⇨ DR..112/132S: M4 with cylinder head
4. Remove the fan [36] with bushing and pole ring from the shaft end.
5. Remove the 3 x M4 screws [1518] of the encoder module [1517].
6. If present, remove the hexagonal spacers [1520] (SW7).
7. Unscrew the screws [123] to remove the terminal box cover [132].
8. Remove the cover of the connection unit [1522] by pressing the cover on both sides behind the cable bushing.
9. Disconnect the 10-pin board connector.
10. Pull the female contact of the encoder cable from the connector.
11. Unscrew the grounding element of the encoder cable.
12. **NOTICE!** Possible defect of the encoder module. Damage to property. Do not pull directly on the encoder module.
    To remove the encoder module [1517] from the motor, pull the encoder cable out of the grommet [1526] and the opening of the knock-out [K].

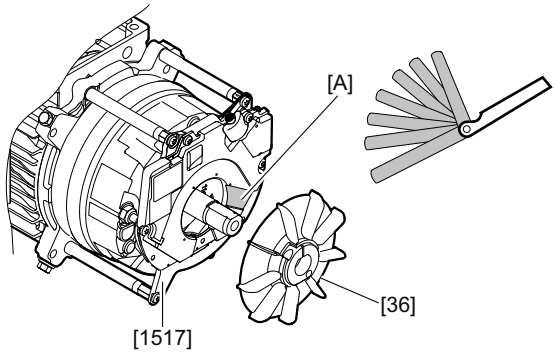
Mounting EI8. with connection unit

✓ Required resources: Feeler gauge (0.9 mm), screwdriver, centering ring [1920]

1. Unscrew the screws [123] to remove the terminal box cover [132].
2. **NOTICE!** Damage to the terminal box or fragments inside the motor. Possible damage to property. Carefully break the knockout open.
   Break open the knock-out [K] by using a chisel or screwdriver.
3. **NOTICE!** Damage to the connector. Possible damage to property. Do not subject the connector to excessive tension.
   Pull the grommet [1526] with encoder cable through the knockout [K].
   ⇨ The grommet must engage into the opening of the knockout [K].
4. If necessary, screw the hexagonal spacers [1520] into the brake endshield.
   ⇨ Tightening torque 5 Nm
5. Place the centering ring [1920] onto the pole ring.
6. Push the encoder module [1517] onto the shaft end.
7. Push the fan [36] with bushing and pole ring onto the shaft end.
8. Center the encoder module [1517] with the centering ring [1920] radially to the shaft.
9. Fasten the encoder module [1517] with 3 screws [1518] on the rear endshield or, if applicable, using 3 screws [1518] on the hexagonal spacers [1520] that are fastened to the brake endshield.
   ⇨ Tightening torque 2.5 Nm
10. Remove the fan [36] with bushing and pole ring from the shaft end and remove the centering ring [1920].

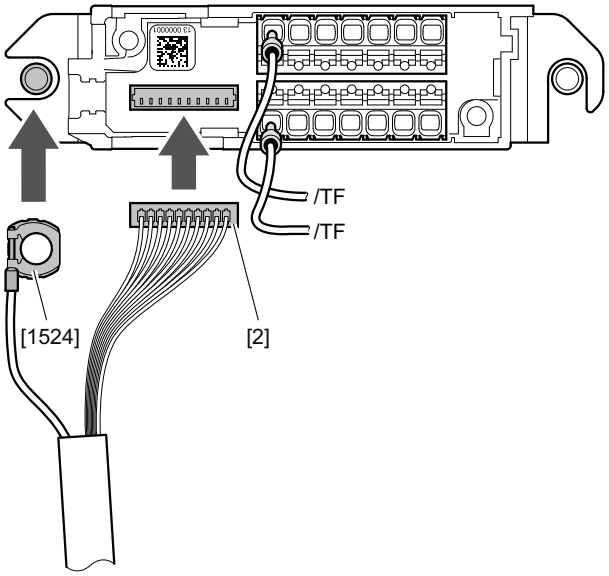
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11. Push the fan [36] with bushing and pole ring onto the shaft end.
12. To set a clear span of 0.9 mm between the pole ring surface and the base of the notch, insert a 0.9 mm feeler gauge into the notch [A].



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13. Tighten the clamping screw [1160].
    - ⇨ DR..71 – 100: Tightening torque 1.2 Nm
    - ⇨ DR..112 – 132S: Tightening torque 3.3 Nm
14. Route the encoder cable in the terminal box in such a way that it is not crushed or improperly subjected to stress.
15. Remove the cover of the connection unit [1522] by pressing the cover on both sides behind the cable bushing.
16. Apply the shielding of the encoder cable onto the terminal washer.
17. Place the connection unit [1522] in the terminal box.
18. To secure the connection unit [1522] in place, screw the terminal washer [1524] and the shield plate tightly in the terminal box.
    - ⇨ For gray cast iron terminal boxes: Tightening torque 1.8 Nm
    - ⇨ For aluminum terminal boxes: Tightening torque 5 Nm



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19. Insert the socket contact of the encoder cable [2] onto the connector on the board and insert the encoder cable into the hollow of the connection unit [1522], which serves as strain relief. If applicable, connect the temperature probe /TF.

20. Connect the customer's evaluation unit for the encoder to the connection unit [1522] with a shield plate.
21. Connect the supply voltage and the signal cables of the encoder module [1517] to the connection unit [1522].
22. Attach the cover of the connection unit [1522].
23. Check the visual feedback of the status LED for the encoder module [1517].
    - ⇨ LED lights up green: The encoder module [1517] has been installed correctly and you can continue with the assembly process.
    - ⇨ LED lights up red: Switch off the supply voltage. Set the distance of 0.9 mm between the encoder module [1517] and the pole ring again. Switch the supply voltage back on. If the status LED still lights up red, contact the SEW-EURODRIVE Service department.
24. Mount the terminal box cover [132] using the screws [123] (4 × M5 SW8).
    - ⇨ Tightening torque 4 Nm
25. Mount the fan guard [35] with the screws [22].
    - ⇨ For plastic guard: Tightening torque 2 Nm
    - ⇨ For metal guard: Tightening torque 3.3 Nm
26. Mount the forced cooling fan [170] if applicable.

Removing EI8. with M23 plug connector

- ✓ Required resources: Screwdriver

1. Disassemble the forced cooling fan [170] if applicable.
2. Remove the screws [22] to disassemble the fan guard [35].
3. Loosen the radial clamping screw [1160]:
   - ⇨ DR..71 – 100: M3 with cylinder head
   - ⇨ DR..112/132S: M4 with cylinder head
4. Remove the fan [36] with bushing and pole ring from the shaft end.
5. Remove the 3 x M4 screws [1518] of the encoder module [1517].
6. If present, remove the hexagonal spacers [1520] (SW7).
7. Unscrew the screws [123] to remove the terminal box cover [132].
8. Remove the protective cover of the M23 connector [1525] on the inside of the terminal box.
9. Pull the female contact of the encoder cable from the connector.
10. Remove the grounding element of the encoder.
11. **NOTICE!** Possible defect of the encoder module. Damage to property. Do not pull directly on the encoder module.
    To remove the encoder module [1517] from the motor, pull the encoder cable out of the grommet [1526] and the opening of the knock-out [K].

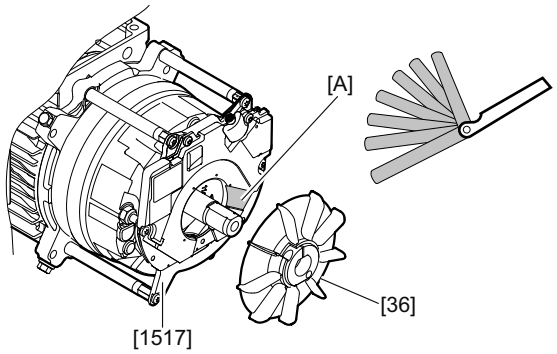
Mounting EI8. with M23 plug connector

- ✓ Required resources: Feeler gauge (0.9 mm), screwdriver, centering ring [1920]

1. Unscrew the screws [123] to remove the terminal box cover [132].

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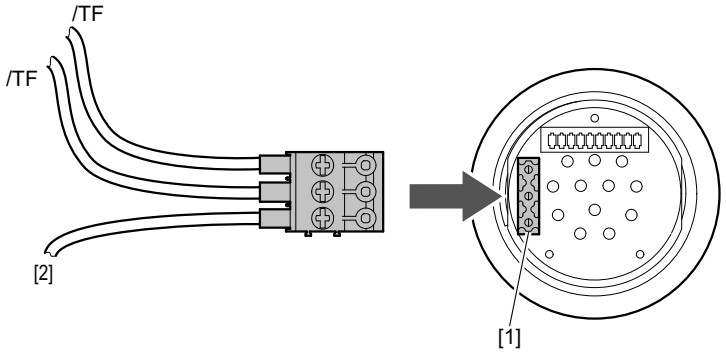
2. **NOTICE!** Damage to the terminal box or fragments inside the motor. Possible damage to property. Carefully break the knockout open.
   Break open the knock-out [K] by using a chisel or screwdriver.
3. **NOTICE!** Damage to the connector. Possible damage to property. Do not subject the connector to excessive tension.
   Pull the grommet [1526] with encoder cable through the knockout [K].
   ⇨ The grommet must engage into the opening of the knockout [K].
4. If necessary, screw the hexagonal spacers [1520] into the brake endshield.
   ⇨ Tightening torque 5 Nm
5. Place the centering ring [1920] onto the pole ring.
6. Push the encoder module [1517] onto the shaft end.
7. Push the fan [36] with bushing and pole ring onto the shaft end.
8. Center the encoder module [1517] with the centering ring [1920] radially to the shaft.
9. Fasten the encoder module [1517] with 3 screws [1518] on the rear endshield or, if applicable, using 3 screws [1518] on the hexagonal spacers [1520] that are fastened to the brake endshield.
   ⇨ Tightening torque 2.5 Nm
10. Remove the fan [36] with bushing and pole ring from the shaft end and remove the centering ring [1920].
11. Push the fan [36] with bushing and pole ring onto the shaft end.
12. To set a clear span of 0.9 mm between the pole ring surface and the base of the notch, insert a 0.9 mm feeler gauge into the notch [A].



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13. Tighten the clamping screw [1160].
    ⇨ DR..71 – 100: Tightening torque 1.2 Nm
    ⇨ DR..112 – 132S: Tightening torque 3.3 Nm
14. Route the encoder cable in the terminal box in such a way that it is not crushed or improperly subjected to stress.
15. Remove the protective cover of the M23 connector [1525] on the inside of the terminal box.
16. Plug the socket contact of the encoder cable onto the connector on the board.

17. Connect the shielding of the encoder cable [2] and, if applicable, the temperature probe /TF to the screw terminal.



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18. Insert the screw terminal with the connection side facing outwards into the connector [1] on the printed circuit board.
19. Install the protective cover of the M23 connector [1525] on the inside of the terminal box.
20. Connect the supply voltage and the signal cables of the encoder module [1517] to the connection unit [1522].
21. Check the visual feedback of the status LED for the encoder module [1517].
    - ⇨ LED lights up green: The encoder module [1517] has been installed correctly and you can continue with the assembly process.
    - ⇨ LED lights up red: Switch off the supply voltage. Set the distance of 0.9 mm between the encoder module [1517] and the pole ring again. Switch the supply voltage back on. If the status LED still lights up red, contact the SEW-EURODRIVE Service department.
22. Mount the terminal box cover [132] using the screws [123] (4 × M5 SW8).
    - ⇨ Tightening torque 4 Nm
23. Mount the fan guard [35] with the screws [22].
    - ⇨ For plastic guard: Tightening torque 2 Nm
    - ⇨ For metal guard: Tightening torque 3.3 Nm
24. Mount the forced cooling fan [170] if applicable.

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7.6 Inspection/maintenance for DR..56 – 315 motors

For the position numbers used in the following descriptions, refer to chapter "Motor structure" (→ 🗎 15).

7.6.1 Inspection steps for DR..71 – 315 motors

1. Before starting to perform any work on the motor, disconnect the motor and all mounted options from the power supply before and secure the motor against unintentional power-up.
2. With gearmotors: Remove the motor from the gear unit.

   Remove pinion and oil flinger [107].
3. Remove the forced cooling fan and rotary encoder, if installed, see chapter "Preliminary work for motor and brake maintenance" (→ 🗎 134).
4. Remove fan guard [35] and fan [36].
5. Remove stator:
   - **DR..63 motors:** Removing the cap screw [19].
   - **DR..56 – 132S motors:** Remove cap screws [13] from flanged endshield [7] and rear endshield [42]. Remove stator [16] from flanged endshield [7].
   - **DR..132M – 180 motors:** Loosen cap screw [19] and remove rear endshield [42]. Loosen hex head screw [15] and remove stator from flanged endshield.
   - **DR..200 – 225 motors**
     - Loosen hex head screw [15] and remove flanged endshield [7] from stator.
     - Loosen cap screws [19] and remove the complete rotor [1] together with the rear endshield [42].
     - Loosen cap screws [25] and remove the complete rotor [1] from the rear endshield [42].
   - **DR..250 – 280 motors** without /ERF or /NS option
     - Loosen cap screws [15] and remove the flange [7].
     - Loosen cap screws [19] and remove the rear endshield [42] together with the rotor [1].
     - Loosen cap screws [25] and remove the rear endshield [42] from the rotor [1].
   - **DR..250 – 280 motors with** /ERF or /NS option, or **DR.. motors**
     - Loosen cap screws [19] and [25], and remove the rear endshield [42].
     - Loosen cap screws [15] and remove the flange [7] together with the rotor [1].

       Apply tension or pressure mainly via the rotor [1], carry the flange [7] evenly.
     - Loosen hex head screws [609] and remove the flange [7] from the rotor [1].
     - Before disassembly, preferably protect the oil seal seat from damage using adhesive tape or a protective sleeve.
6. Visual inspection: Is there any moisture or gear unit oil inside the stator?
   - If not, proceed with step 9.
   - If there is moisture, proceed with step 7.
   - If there is gear oil, have the motor repaired by a specialist workshop
7. If there is moisture inside the stator:
   - With gearmotors: Remove the motor from the gear unit.

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- With motors without a gear unit: Remove the A-flange.
- Remove the rotor [1].

8. Clean the winding, dry it and check it electrically, see chapter "Drying the motor" (→ 🗎 41).
9. Replace the rolling bearing [11], [44] with permitted rolling bearing types, see chapter "Permitted rolling bearings" (→ 🗎 247).

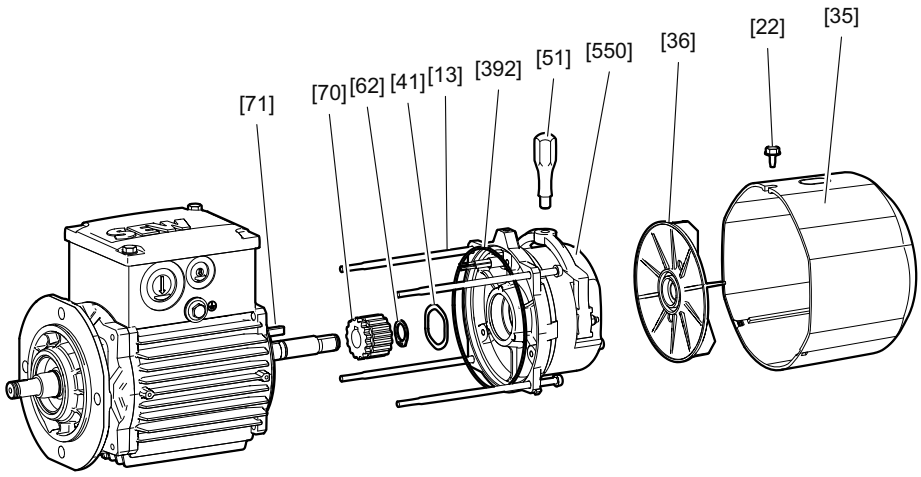
   Apply tension or pressure to the inner ring of the bearings.
10. **DR..250 – 280 motors** with /ERF or /NS option, or **DR.. motors**
    - Fill the rolling bearing with grease until it is two-thirds full, see chapter "Bearing lubrication" (→ 🗎 131)
    - Notice: Place the oil seal flange [608] and [21] onto the rotor shaft before installing the bearings.
    - Mount the motor vertically starting on the A-side.
    - Place the springs [105] and lubrication ring [604] into the bearing bore of the flange [7].
    - Hang the rotor [1] onto the B-side thread, and guide it into the flange [7].
    - Fasten the oil seal flange [608] to the flange [7] using the hex head screws [609].
11. Reseal the shaft:
    - A-side: Replace the oil seal [106].
    - B-side: Replace the oil seal [30].

      Coat the sealing lip with grease (Klüber Petamo GHY 133).
12. Reseal the stator seat:
    - Seal the sealing surface with duroplastic sealing compound (operating temperature -40 °C to +180 °C), such as "SEW L Spezial".
    - **DR..71 – 132S motors**: Replace the seal [392].
    - **DR..56 – 132S motors**: Replace the O-ring [1480] if it is deformed or damaged. As an alternative, use e.g. "SEW L Spezial" instead of the O-ring.
    - **DR..56 – 63 motors**: Replace the O-ring [392] if it is deformed or damaged. As an alternative, use a duroplastic sealing compound, e.g. "SEW L Spezial" instead of the O-ring.
13. Install the motor and options.

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7.7 Inspection/maintenance for DR..56 – 315 brakemotors

7.7.1 Basic structure of DR2..56 brakemotors

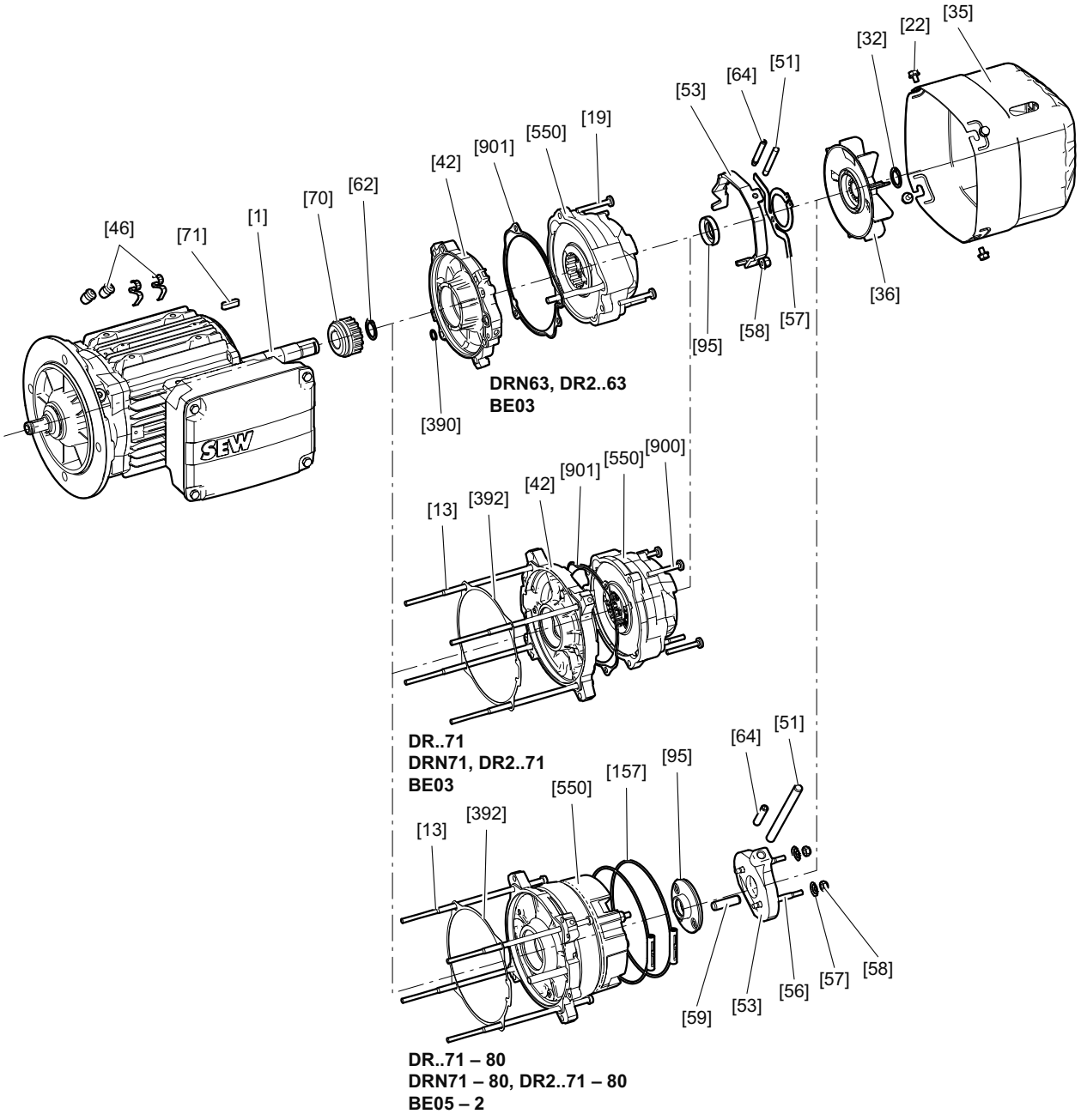


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[13]	Cap screw	[41]	Equalizing ring	[71]	Key
[22]	Hex head screw	[51]	Hand lever (/HR)	[392]	Gasket
[35]	Fan guard	[62]	Retaining ring	[550]	Pre-assembled brake
[36]	Fan wheel	[70]	Driver		

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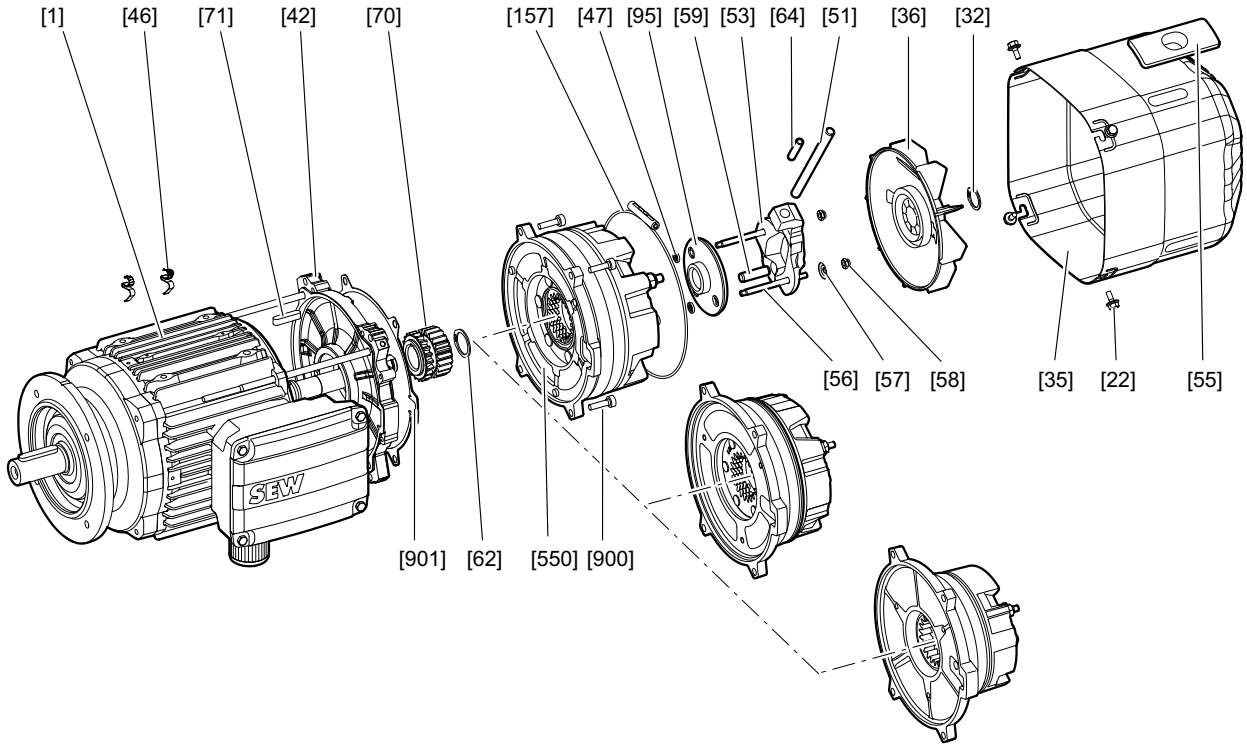
7.7.2 Basic structure of DR..63 – 80 brakemotors



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[1]	Motor	[51]	Hand lever (/HR)	[70]	Driver
[13]	Cap screw	[53]	Releasing lever	[71]	Key
[19]	Screw	[56]	Stud	[95]	Sealing ring
[22]	Hex head screw	[57]	Conical spring	[157]	Clamping strap (optional)
[32]	Retaining ring	[58]	Hex nut	[392]	Gasket
[35]	Fan guard	[59]	Parallel pin	[550]	Pre-assembled brake
[36]	Fan wheel	[62]	Retaining ring	[900]	Screw
[42]	Brake endshield	[64]	Set screw (/HF)	[901]	Flat gasket
[46]	Clip				

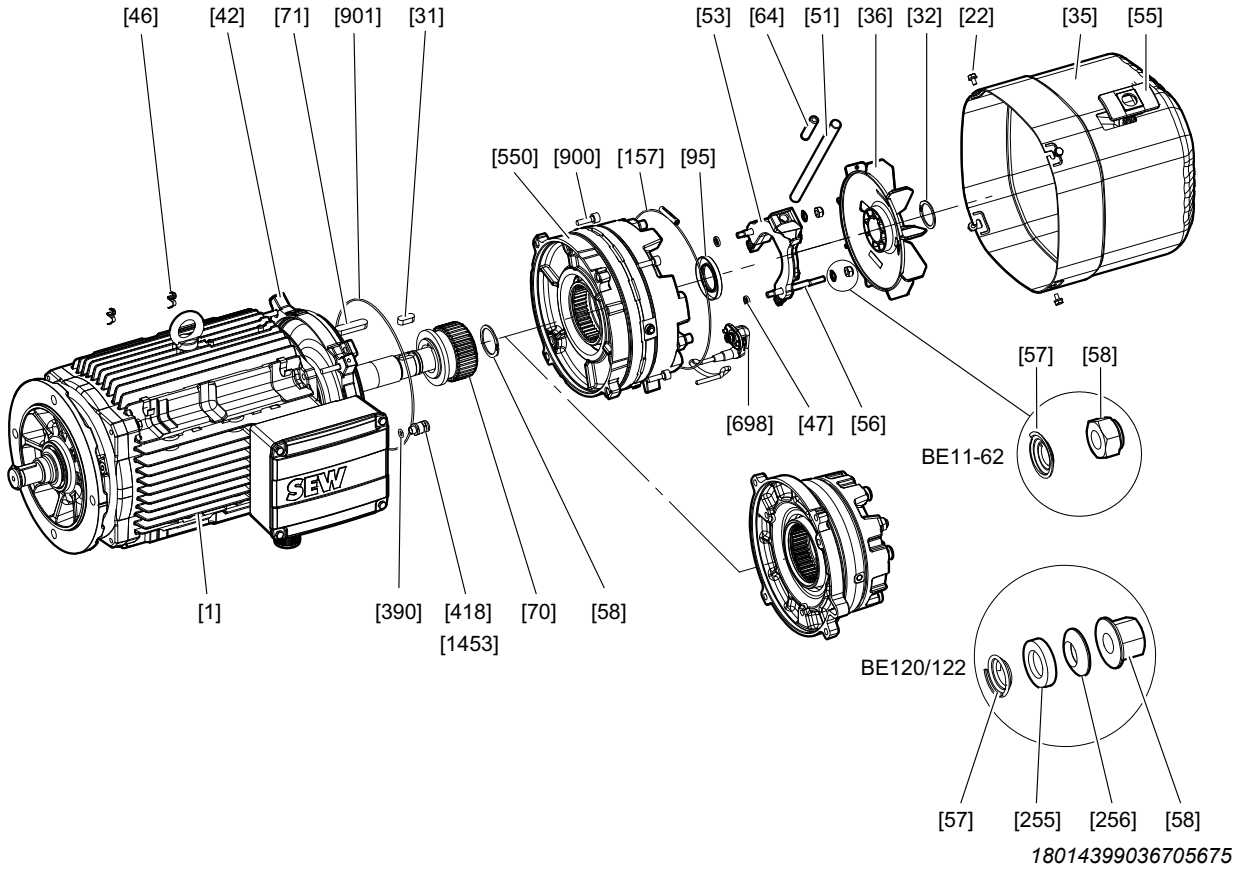
7.7.3 Basic structure of DR..90 – 132S brakemotors



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[1] Motor
[22] Hex head screw
[32] Retaining ring
[35] Fan guard
[36] Fan wheel
[42] Brake endshield
[46] Clip
[47] O-ring
[51] Hand lever (/HR)
[53] Releasing lever
[55] Closing piece fan guard (DR..112 – 132, DRN112 – 132S)
[56] Stud
[57] Conical spring
[58] Hex nut
[59] Parallel pin
[62] Retaining ring
[64] Set screw (/HF)
[70] Driver
[71] Key
[95] Sealing ring
[157] Clamping strap (optional)
[550] Pre-assembled brake
[900] Screw
[901] Gasket

7.7.4 Basic structure of DR..132M – 315 brakemotors



[1]	Motor with brake endshield	[53]	Releasing lever	[95]	Sealing ring
[22]	Hex head screw	[55]	Closing piece	[157]	Clamping strap (optional)
[31]	Key	[56]	Stud	[255]	Conical seat
[32]	Retaining ring	[57]	Conical spring	[256]	Spherical washer
[35]	Fan guard	[58]	Hex nut	[390]	O-ring (DR..160 – 225, DRN132M – 225)
[36]	Fan	[58]	Adjusting nut	[418]	Cable gland
[42]	Brake endshield	[62]	Retaining ring	[550]	Pre-assembled brake
[46]	Clip	[64]	Set screw (/HF)	[698]	Connector complete (BE20 – BE122)
[47]	O-ring	[70]	Driver	[900]	Screw
[51]	Hand lever	[71]	Key	[901]	O-ring/seal (DR..160 – 225, DRN132M – 225)
				[1453]	Grommet (for DRN180 instead of [418])
				[1607]	O-ring (DR..250 – 280/DRN250 – 280)

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7.7.5 Inspection steps for DR..63 – 315 brakemotors

1. Before starting any work, disconnect the voltage supply to the motor and all connected options and safeguard the motor from unintentional power-up.
2. For gearmotors: Remove the motor from the gear unit. Remove pinion and oil flinger [107].
3. Remove forced cooling fan and rotary encoder, if installed. Refer to chapter "Motor and brake maintenance – preliminary work" (→ 🗎 134).
4. Remove the fan guard with encoder mount or fan guard [35] and the fan wheel [36].
5. If available, remove the sensors of the /DUE option, see chapter "Removing the /DUE diagnostic unit" (→ 🗎 214).
6. **DR..56 – 315 motors**: Remove the brake cpl. [550] with mounted /HR, /HF manual brake release option (if applicable).
   - **BE02 – 11 and BE1H – BE2H**: Remove the terminal box cover, loosen the brake cable.
   - **BE20 – 122**: Loosen the locking screws of the brake connector [698] and remove the connector.
   - Loosen screws [13]/[19]/[900], press brake [550] off the endshield [42], and carefully lift off the brake.
7. Remove the stator:
   - **DR..63 – 132S:** Remove cap screws [13] from flanged endshield [7] and rear endshield [42]. Remove stator [16] from flanged endshield [7].
   - **DR..132M – 180 motors:** Loosen cap screws [19] and remove the rear endshield [42]. Loosen the hex head screw [15] and remove the stator from the flanged endshield.
   - **DR..200 – 225 motors**
     – Loosen hex head screw [15] and remove the flanged endshield [7] from the stator.
     – Loosen cap screws [19] and remove the complete rotor [1] together with the rear endshield [42].
     – Loosen cap screws [25] and remove the complete rotor [1] from the rear endshield [42].
   - **DR..250 – 280 motors** without /ERF or /NS option
     – Loosen cap screws [15] and remove the flange [7].
       Apply tension or pressure to the rotor [1], carry the flange [7] evenly.
     – Loosen cap screws [19] and remove the rear endshield [42] together with the rotor [1].
     – Loosen cap screws [25] and remove the rear endshield [42] from the rotor [1].
   - **DR..250 – 280 motors with** /ERF or /NS option, or **DR..315 motors**
     – Loosen cap screws [19] and [25] and remove the rear endshield [42].
     – Loosen cap screws [15] and remove the flange [7] together with the rotor [1].
     – Loosen hex head screws [609] and remove the flange [7] from the rotor [1].
     – Before disassembly, preferably protect the oil seal seat from damage using adhesive tape or a protective sleeve.
8. Remove the stator approx. 3 – 4 cm.

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9. Visual inspection: Is there any moisture or gear oil inside the stator?
   - If not, proceed with step 11.
   - If there is moisture, proceed with step 10.
   - If there is gear oil, have the motor repaired by a specialist workshop.
10. If there is moisture inside the stator:
    - For gearmotors: Remove the motor from the gear unit
    - For motors without a gear unit: Remove the A-flange
    - Remove the rotor [1]
    - Clean, dry, and electrically test the winding, see chapter "Drying the motor" (→ 🗎 41).
11. Remove the driver from the shaft.
12. Replace the rolling bearing [11], [44] with permitted rolling bearing types, see chapter "Permitted rolling bearings" (→ 🗎 247).

    Apply tension or pressure to the inner ring of the bearings.
13. Install key [71] and driver [70]:
    - Preheat the driver to allow for easier installation (joining temperature +85 °C to +115 °C).
    - **DR..63 – 71 motors**: Clean the driver seat at the rotor [1] before installation. Glue in the driver using Loctite 649. Join the retaining ring [62] flush to the driver. Protect the sealing surface for the oil seal against scratches.
    - **DR..80 – 315 motors**: Clean the driver seat at the rotor [1] and coat it with an anti-corrosion agent (e.g. NOCO-Paste) before fitting. Then mount the retaining ring [62].
14. Seal the stator again and install it:
    - **DR..63 – 132S motors**: Replace the gasket [392].
    - **DR..63, DR..132M – 225 motors**: Replace O-ring [390].
    - **DR..160 – 315 motors**: Seal the sealing surfaces with duroplastic sealing compound (operating temperature -40 °C to +180 °C), such as "SEW-L-Spezial".
15. **DR..250 – 280 motors with** /ERF or /NS option, or **DR..315 motors**
    - Fill the rolling bearing with grease until it is two thirds full, see chapter "Bearing lubrication" (→ 🗎 131).
    - Notice: Place the oil seal flange [608], [21] onto the rotor shaft before installing the bearings.
    - Mount the motor vertically starting on the A-side.
    - Place the springs [105] and lubrication ring [604] into the bearing bore of the flange [7].
    - Hang the rotor [1] onto the B-side thread, and guide it into the flange [7].
    - Fasten the oil seal flange [608] to the flange [7] using the hex head screws [609].
    - Screw together the stator [16] and flange [7] with screws [15].

      Notice: Protect the winding overhang from damage!
    - Before mounting the rear endshield, screw in the M8 set screw (approximately 200 mm) into the oil seal flange [21].

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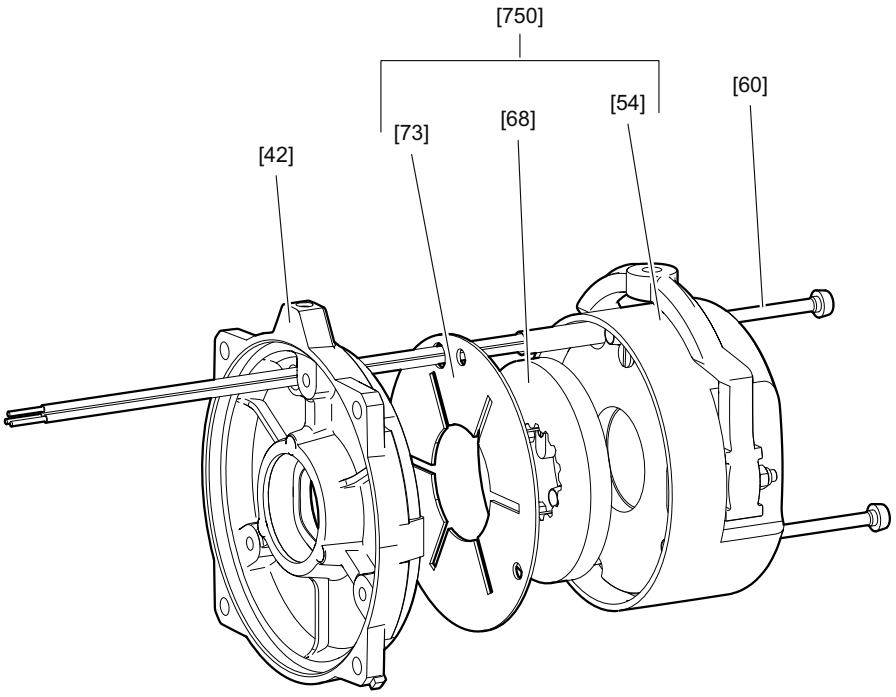
- Before mounting the rear endshield [42], insert the set screw in through a bore for the screw [25]. Screw rear endshield to stator [16] using cap screws [19] and hex nuts [17]. Lift the oil seal flange [21] with the set screw, and fasten using 2 screws [25]. Remove the set screw and screw in the remaining screws [25].

16. Reseal the shaft:
    - Replace the oil seal [106] on the A-side.
    - **DR..315 motors with /FG option:** Replace the oil seal [250] on the A-side.
    - **DR..225 – 315 motors with /NS option**: Replace the oil seal [30] on B-side
    - Apply suitable grease to the sealing lip, see chapter "Order information for lubricants, anti-corrosion agents and sealants" (→ 🗎 250).
17. Seal the friction disk of the brake [550] again at the brake endshield [42]:
    - **DR..63 – 71 motors with BE03:** Replace flat gasket [901].
    - **DR..90 – 132S motors**: Replace gasket [901]
    - **DR..132M – 280 motors**: Replace O-ring [901] or [1607].
    - **DR..315 motors**: Seal the sealing surface with duroplastic sealing compound (operating temperature -40°C to +180°C), such as "SEW L Spezial".
18. Reinstall the brake [550]: Insert the brake cable into the terminal box when installing the brake. Install the brake. Observe the alignment of the brake. (Cams at the endshield, manual brake release position).
    - **BE03 brake**: The self-tapping screws must be distributed and tightened around the brake evenly to prevent the mounted brake from being tilted.
    - **DR..63/BE03 motors**: Tighten the screw [19] M5x35 (self-tapping) with a tightening torque of 5 Nm. The screws can be reused.
    - **DR..71/BE03 motors**: Tighten screw [900] M5x20 (self-tapping) with a tightening torque of 5 Nm. New screws must be used each time the brake is mounted again.
    - **DR..56 – 80 motors**: Install cap screws [13]. Tightening torque: 5 Nm
    - **DR..90 – 315 motors** Install cap screws [900]

Motors	DR..90 – 100	DR..112 – 132	DR..160 – 180	DR..200 – 225	DR..250 – 315
Tightening torque	10.3 Nm	25.5 Nm	50 Nm	87.3 Nm	230 Nm

19. Connect the brake connection cable.
    - **BE02 – 11 and BE1H – BE2H**: Reconnect the brake cable according to the wiring diagram.
    - **BE20 – 122**: Plug in the brake connector [698] again. Tighten the retaining screws again (tightening torque: 3 Nm)
20. **DR..63 – 315 motors:** Apply suitable grease to the sealing ring [95], see chapter "Order information for lubricants, anti-corrosion agents and sealants" (→ 🗎 250).
21. If present: Install sensors of the /DUE option and recalibrate the zero value. Refer to chapter "Retrofitting diagnostic unit /DUE for function and wear monitoring".
22. Install the fan wheel [36] and the fan guard [35]. Install available optional equipment.
23. For gearmotors: Replace oil flinger [107] and install the pinion.

7.7.6 Basic structure of BE02 brakes

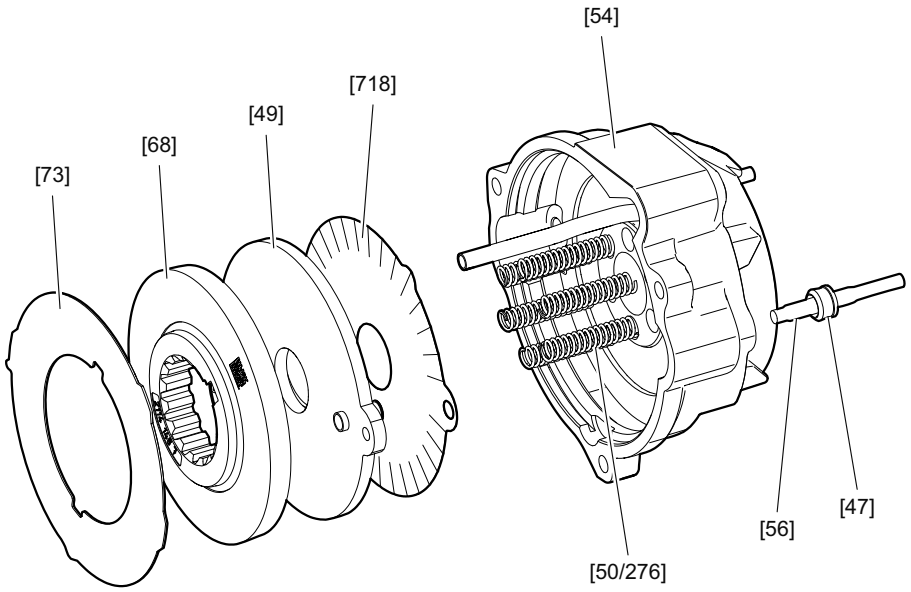


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[42]	Brake endshield	[68]	Brake lining
[54]	Magnet body, complete	[73]	Friction plate
[60]	Cap screw	[750]	Pre-assembled brake

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7.7.7 Basic structure of BE03 brakes

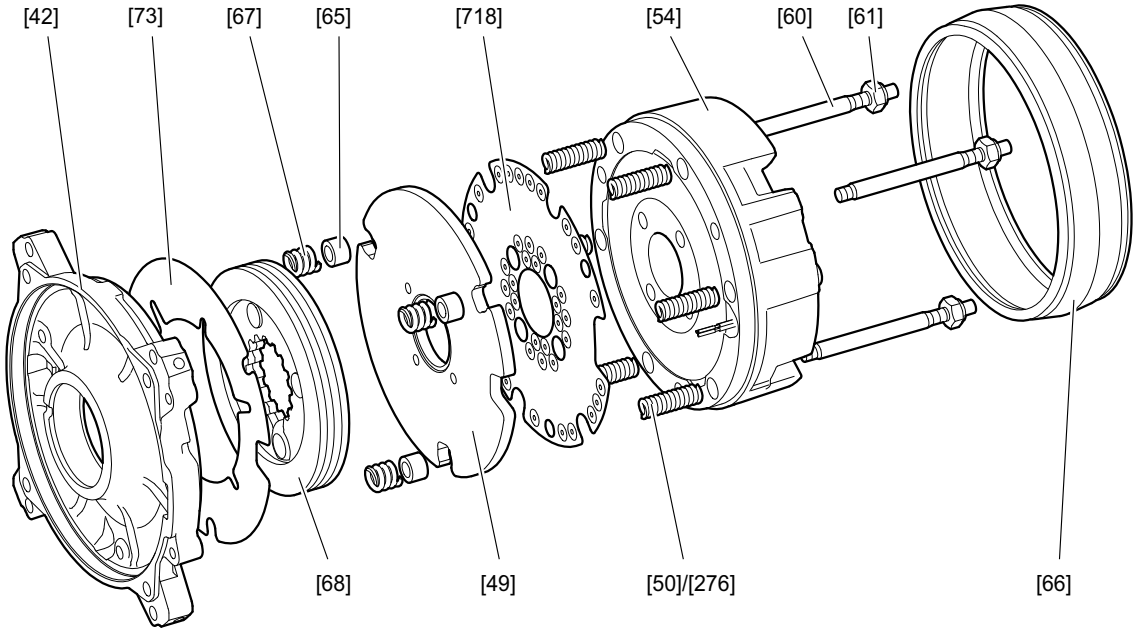


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[47]	Sealing element	[54]	Magnet body, complete	[73]	Friction plate
[49]	Pressure plate	[56]	Stud	[276]	Brake spring
[50]	Brake spring	[68]	Brake disk (complete)	[718]	Damping plate

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7.7.8 Basic structure of BE05 – 2 and BE1H – BE2H brakes

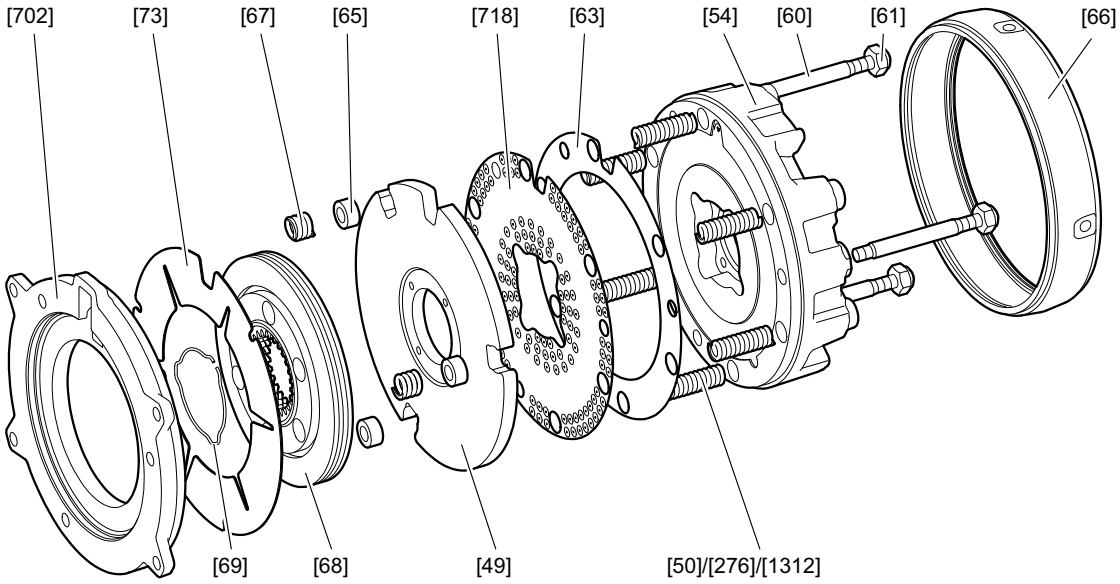


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[42]	Brake endshield	[61]	Hex nut	[73]	Niro sheet metal
[49]	Pressure plate	[65]	Pressure ring	[276]	Brake spring (blue)
[50]	Brake spring (normal)	[66]	Sealing strip	[718]	Damping plate
[54]	Magnet body, complete	[67]	Counter spring		
[60]	Stud	[68]	Brake lining carrier		

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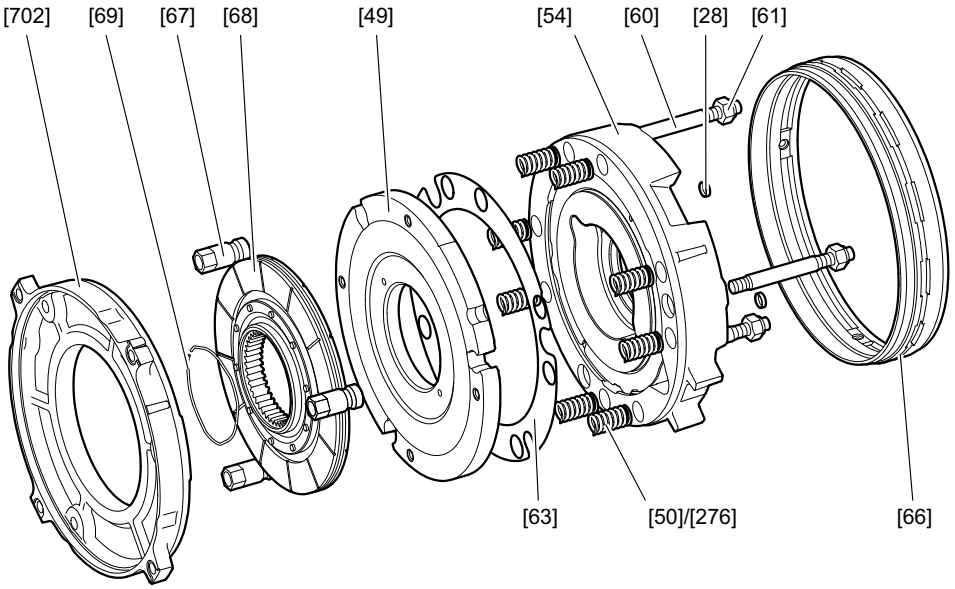
7.7.9 Basic structure of BE05 – 20 brakes



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[49]	Pressure plate	[65]	Pressure ring	[276]	Brake spring (blue)
[50]	Brake spring (normal)	[66]	Sealing strip	[702]	Friction disk
[54]	Magnet body, complete	[67]	Counter spring	[718]	Damping plate (BE05 – 11)
[60]	Stud	[68]	Brake lining carrier	[1312]	Brake spring (white)
[61]	Hex nut	[69]	Circular spring/clasp (BE5 – 20)		
[63]	Pole sheet	[73]	Niro sheet metal		

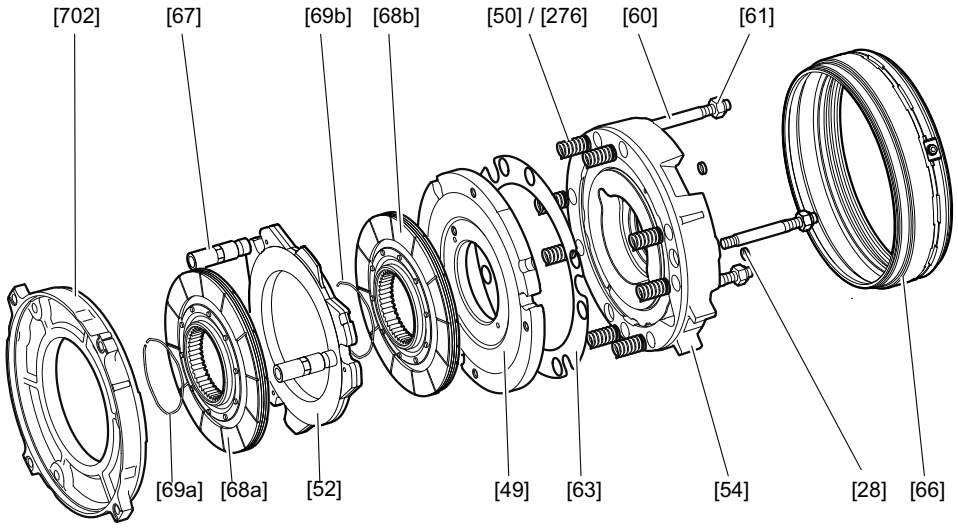
7.7.10 Basic structure of BE30, 60, 120 brakes



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[28]	Closing cap	[61]	Hex nut	[69]	Circular spring
[49]	Pressure plate	[63]	Pole sheet	[276]	Brake spring (blue)
[50]	Brake spring (normal)	[66]	Sealing strip	[702]	Friction disk
[54]	Magnet body, complete	[67]	Setting sleeve		
[60]	Stud	[68]	Complete brake disk		

7.7.11 Basic structure of BE32, 62, 122 brakes



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[28]	Closing cap	[61]	Hex nut	[69a]	Circular spring
[49]	Pressure plate	[63]	Pole sheet	[69b]	Circular spring
[50]	Brake spring (normal)	[66]	Sealing strip	[276]	Brake spring (blue)
[52]	Brake plate complete	[67]	Setting sleeve	[702]	Friction disk
[54]	Magnet body, complete	[68a]	Complete brake disk		
[60]	Stud	[68b]	Complete brake disk		

7.7.12 Measuring the wear of the BE02 brakes

The working air gap of BE02 brakes cannot be adjusted. Check the brake lining carrier thickness during maintenance.

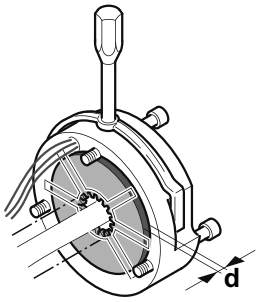
Replacing individual parts of the brake is not permitted.

✓ The motor and all connected options are disconnected from the power supply.

✓ The motor is protected against unintended restart.

1. Loosen the screws [60].
2. Remove the complete magnet body [54] with pressure plate and, if applicable, installed manual brake release from the brake endshield [42].
3. Make sure the brake springs [50]/[276] and friction plates [73] do not fall out.
4. Remove the brake lining carrier [68] and measure its thickness "d".

⇨ Replace the brake if the lining thickness is below the minimum permitted value. For the values, refer to chapter "Working air gap, thickness of brake lining carrier" (→ 🗎 231).



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7.7.13 Measuring the wear of BE03 brakes

The working air gap of BE03 brakes cannot be adjusted. Check the stroke of the pressure plate during maintenance.

Replacing individual parts of the brake is not permitted.

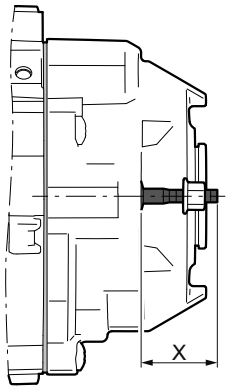
✓ The motor and all connected options are disconnected from the power supply.

✓ The motor is protected against unintended restart.

1. Measure the dimension "X" at the stroke of the studs when the brake is released or applied using a depth gauge or slide gauge.

   ⇨ The difference between both values is the working air gap.

⇨ The maximum permitted working air gap is 0.65 mm. Replace the brake in case this value is exceeded.

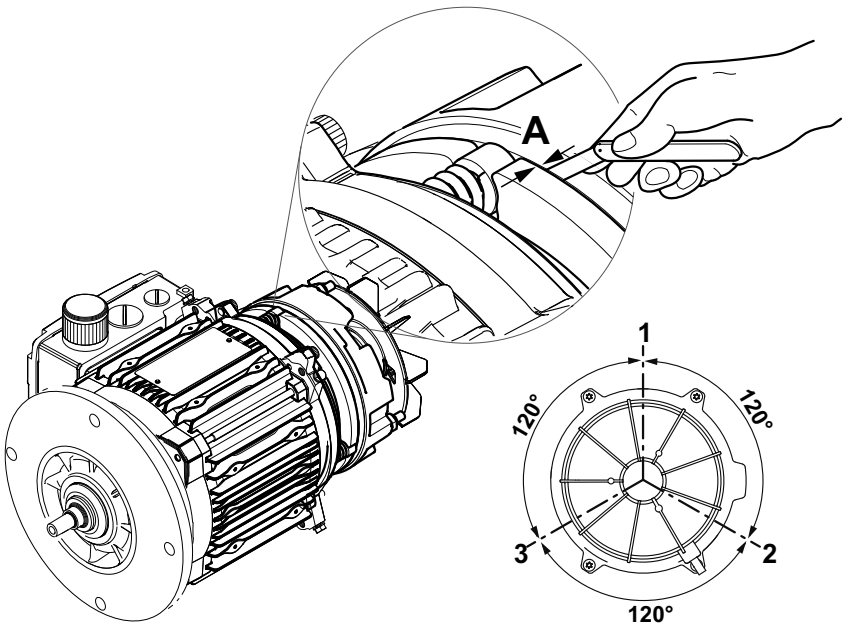


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7.7.14 Set the working air gap of the BE05 – 122 and BE1H – BE2H brakes

1. Before starting any work, disconnect the voltage supply to the motor and all connected options and safeguard the motor from unintentional power-up.
2. Dismantle:
   - Forced cooling fan and rotary encoder, if present. See chapter "Motor and brake maintenance – preliminary work" (→ 🗎 134).
   - Fan guard with encoder mount or fan guard [35]
3. Shift the sealing strip [66],
   - Loosen the clamping strap [157] to do this, if necessary
   - Vacuum any abrasion
4. Measure the brake lining carrier [68]:
   - Minimum thickness of the brake lining carrier, see chapter "Technical data" (→ 🗎 227).
   - If necessary, replace the brake lining carrier. See chapter "Replacing the brake disk of BE05 – BE122 brakes".
5. **BE30 – 122:** Loosen the setting sleeve [67] by turning it towards the rear endshield.
6. Measure working air gap A (see figure below)

   (with feeler gauge, at three positions offset by 120°):
   - **BE05 – 11 and BE1H – BE2H:** between pressure plate [49] and damping plate [718]
   - **BE20 – 122:** between pressure plate [49] and magnet body [54]



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   - **BE05 – 20 and BE1H – BE2H:** Tighten the hex nuts [61] until the working air gap is set correctly, see chapter "Working air gap, thickness of brake lining carrier" (→ 🗎 231).

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- **BE30 – 122:** Tighten the hex nuts [61] until the working air gap is 0.05 – 0.1 mm larger than the desired setting value (for default values, see chapter "Working air gap, thickness of brake lining carrier" (→ 🗎 231)). For example, with a desired air gap of 0.4 mm, the preset value must be 0.45 – 0.5 mm.

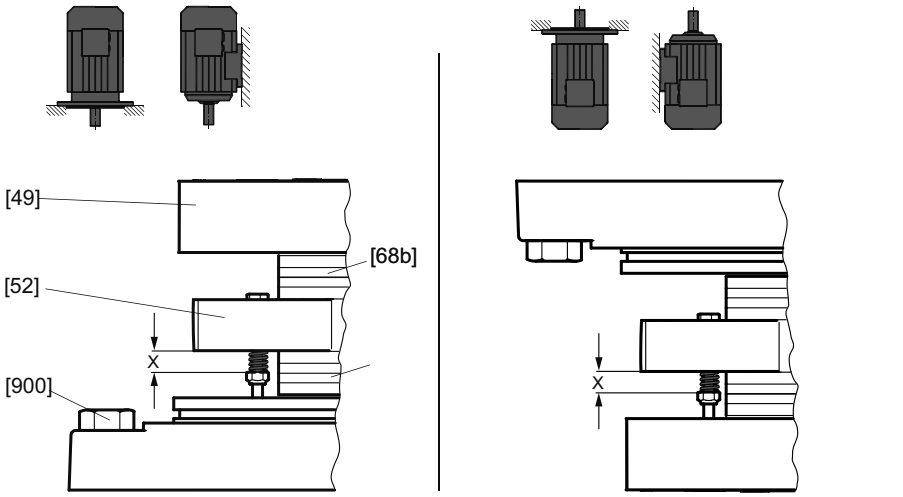
7. **BE30 – 122:** Evenly apply the setting sleeves [67] to the friction disk [900] by screwing them out of the magnet body.

   Then tighten the hex nuts [61] with the following tightening torque. Lastly, check the settings of the working air gap and adjust it if necessary.

Brake	Tightening torque
BE30 – BE32	93 Nm
BE60 – BE62	140 Nm
BE120 – BE122	230 Nm

8. If you are mounting the **BE32, BE62, BE122** to a motor with vertical motor axis, set the 3 springs of the brake plate [52] to the following dimension:

Brake	Dimension X in mm
BE32	7.3
BE62	10.0
BE122	10.0



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9. Refit the sealing strip [66] and reinstall the dismantled parts.

7.7.15 Replace the brake lining carrier of the BE05 – 122 and BE1H – BE2H brakes

When replacing the brake lining carrier, besides checking the brake elements listed in the "BE brake" column, see chapter "Inspection and maintenance intervals" (→ 🗎 129), also check the hex nuts [61] for wear. The hex nuts [61] must always be replaced when replacing the brake lining carrier.

INFORMATION

- With DR..71 – 80 motors with BE05 – 2 brake, the brake cannot be removed from the motor because the BE brake is directly installed on the brake endshield of the motor.

INFORMATION

- Note that brake lining carriers with special friction material are used for the BE1H and BE2H brakes. Make sure that only brake lining carriers suitable for BE.H are used when replacing the brake lining carriers.

1. Before starting any work, disconnect the voltage supply to the motor and all connected options and safeguard the motor from unintentional power-up.
2. Dismantle:
   - Forced cooling fan and rotary encoder, if installed. See chapter "Motor and brake maintenance – preliminary work" (→ 🗎 134).
   - Fan guard with encoder mount or fan guard [35], retaining ring [32/62], and fan [36]
3. Disconnect the brake cable
   - **BE05 – 11 and BE1H – BE2H:** Remove the terminal box cover and disconnect the brake cable from the rectifier.
   - **BE20 – 122:** Loosen the locking screws of the brake connector [698] and remove the connector.
4. Remove the sealing strip [66].
5. If necessary, remove the manual brake release.
   - Adjusting nuts [58], conical springs [57], studs [56], releasing lever [53], conical seat [255], spherical washer [256]
6. Loosen the hex nuts [61], carefully remove the magnet body [54] (brake cable!), and take out the brake springs [50]/[276]/[1312].
7. **BE05 – 11 and BE1H – BE2H:** Remove the damping plate [718], the pressure plate [49], and the brake lining carrier [68]

   BE20, BE30, BE60, BE120: Remove the pressure plate [49], pole sheet [63], and brake lining carrier [68]

   BE32, BE62, BE122: Remove the pressure plate [49], brake lining carriers [68a] and [68b], and the brake plate [52].
8. Clean the brake components.
9. Install new brake lining carrier(s).
10. Reinstall the brake components as described in chapter "Inspection steps for DR..63 – 315 brakemotors" (→ 🗎 189).
    - Except for the fan and the fan guard, because the working air gap has to be set first, see chapter "Set the working air gap of the BE05 – 122 and BE1H – BE2H brakes" (→ 🗎 200).

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11. In case of manual brake release, use the adjusting nuts to adjust the floating clearance "s" between the conical springs (pressed flat) and the adjusting nuts (see chapter "Retrofitting the /HR, /HF manual brake release" (→ 🗎 212)).

⚠ WARNING



No braking due to incorrectly set floating clearance "s".

Severe or fatal injuries.

- Make sure the floating clearance "s" is correctly set, so that the pressure plate can move up as the brake lining wears.

12. Put the sealing strip [66] in place and re-install the dismantled parts.

INFORMATION



After replacing the brake disk, the maximum braking torque is reached only after several cycles.

7.7.16 Changing the braking torque of the BE05 – 122 and BE1H – BE2H brakes

You can alter the braking torque in stages. This can be done in various ways:

- Via the type and number of brake springs (not possible/permitted for BE1H and BE2H)
- By changing the complete magnet body (only possible for BE05 and BE1)
- By changing the brake (for motor size 90 and larger)
- By changing to a double disk brake (only possible for BE30, BE60, BE120)

For the possible braking torque graduations in each case, refer to chapter "Technical data" (→ 🗎 227).

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7.7.17 Changing the brake spring of BE05 – BE122 brakes

INFORMATION

- For BE1H and BE2H, the brake spring combination must not be changed.

1. Before starting any work, disconnect the voltage supply to the motor and all connected options and safeguard the motor from unintentional power-up.
2. Dismantle:
   - Forced cooling fan and rotary encoder, if installed. See chapter "Motor and brake maintenance – preliminary work" (→ 🗎 134).
   - Fan guard with encoder mount or fan guard [35], retaining ring [32/62], and fan [36]
3. Disconnect the brake cable.
   - **BE05 – 11:** Remove the terminal box cover. Remove the brake cable from the rectifier.
   - **BE20 – 122:** Loosen the locking screws of the brake connector [698]. Remove the connector.
4. Remove the sealing strip [66] and (if necessary) the manual brake release:
   - Adjusting nuts [58], conical springs [57], studs [56], releasing lever [53], conical seat [255], spherical washer [256]
5. Unscrew the hex nuts [61], remove the magnet body [54]
   - By approx. 50 mm (caution, brake cable!)
6. Replace or add brake springs [50/276/1312]
   - Arrange brake springs symmetrically
7. Reinstall the brake components as described in chapter "Inspection steps for DR..71 – 315, DRN80 – 315 brakemotors".
   - Except for the fan and the fan guard, because the working air gap has to be set first, see chapter "Set the working air gap of the BE05 – 122 and BE1H – BE2H brakes" (→ 🗎 200).
8. In case of manual brake release: Use the adjusting nuts to adjust the floating clearance "s" between the conical springs (pressed flat) and the adjusting nuts (see chapter "Retrofitting the /HR, /HF manual brake release" (→ 🗎 212)).

⚠ WARNING

No braking due to incorrectly set floating clearance "s".

Severe or fatal injuries.

- Make sure the floating clearance "s" is correctly set, so that the pressure plate can move up as the brake lining wears.

9. Put the sealing strip [66] in place and re-install the dismantled parts.

INFORMATION

Replace the setting sleeves [58] if the removal procedure is repeated.

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7.7.18 Replacing the magnet body for BE05 – 122 and BE1H – BE2H brakes

1. Before starting any work, disconnect the voltage supply to the motor and all connected options and safeguard the motor from unintentional power-up.
2. Dismantle:
   - Forced cooling fan and rotary encoder, if installed. See chapter "Motor and brake maintenance – preliminary work" (→ 🗎 134).
   - Fan guard with encoder mount or fan guard [35], retaining ring [32/62], and fan [36]
3. Remove the sealing strip [66] and (if necessary) the manual brake release:
   - Setting nuts [58], conical coil springs [57], studs [56], releasing lever [53], parallel pin [59]
4. Disconnect the brake cable
   - **BE05 – 11 and BE1H – BE2H:** Remove the terminal box cover and disconnect the brake cable from the rectifier.
   - **BE20 – 122:** Loosen the locking screws of the brake connector [698] and remove the connector.
5. Loosen the hex nuts [61], remove the magnet body cpl. [54], and take out the brake springs [50]/[276]/[1312].
6. Mount the new magnet body with brake springs. For the possible braking torque steps, refer to chapter "Technical data" (→ 🗎 227).
7. Reinstall the brake components as described in chapter "Inspection steps for DR..63 – 315 brakemotors" (→ 🗎 189).
   - Except for the fan and the fan guard, because the working air gap has to be set first, see chapter "Set the working air gap of the BE05 – 122 and BE1H – BE2H brakes" (→ 🗎 200).
8. In case of manual brake release: Use the adjusting nuts to adjust the floating clearance "s" between the conical springs (pressed flat) and the adjusting nuts (see chapter "Retrofitting the /HR, /HF manual brake release" (→ 🗎 212)).

⚠ WARNING



No braking due to incorrectly set floating clearance "s".

Severe or fatal injuries.

- Make sure the floating clearance "s" is correctly set, so that the pressure plate can move up as the brake lining wears.

9. Put the sealing strip [66] in place and re-install the dismantled parts.
10. Replace the brake control in the event of an interturn fault or a short circuit to frame.

INFORMATION



Replace the setting sleeves [58] if the removal procedure is repeated.

7.7.19 Replacing BE02 brakes of DR..56 motors

✓ The motor and all connected options are disconnected from the power supply.

✓ The motor is protected against unintended restart.

1. Disassemble the following parts:
   - ⇨ Forced cooling fan and rotary encoder, if installed, see chapter "Motor and brake maintenance – preliminary work" (→ 🗎 134).
   - ⇨ Fan guard with encoder mount [212] or fan guard [35], retaining ring [32]/[62] and fan [36]
2. Remove the terminal box cover and loosen the brake cable from the brake control/ terminals. Attach trailing wire to brake cables, if necessary.
3. Remove the screws and brake (with brake endshield if necessary) from the stator.
   - ⇨ DR2..56: Screws [13]
4. Replace gasket [392]. Observe the alignment of the gasket.
5. If necessary, replace driver [70], key [71], and retaining ring [62], see chapter "Inspection steps for DR..63 – 315 brakemotors" (→ 🗎 189).
6. Insert the brake cable of the new brake into the terminal box.
7. Position the new brake. Make sure the cable outlet and brake lining carrier gearing are correctly aligned.
8. Refasten the brake using the screws.
   - ⇨ Cap screws [13]
   - ⇨ Tightening torque 3.3 Nm
   - ⇨ Tolerance ±10%.
9. Install the disassembled parts of the motor.

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7.7.20 Replacing BE03 brakes of DR..63 – 71 motors

- ✓ The motor and all connected options are disconnected from the power supply.
- ✓ The motor is protected against unintended restart.

1. Disassemble the following parts:
   - ⇨ Forced cooling fan and rotary encoder, if installed, see chapter "Motor and brake maintenance – preliminary work" (→ 🗎 134).
   - ⇨ Fan guard with encoder mount [212] or fan guard [35], retaining ring [32]/[62] and fan [36]
2. Remove the terminal box cover and loosen the brake cable from the brake control/ terminals. Attach trailing wire to brake cables, if necessary.
3. Remove the screws and brake (with brake endshield if necessary) from the stator.
   - ⇨ DR..63 motors: Screws [19]
   - ⇨ DR..71 motors: Screws [900]
4. Replace the gasket [901]. Observe the alignment of the gasket, if necessary.
5. If necessary, replace driver [70], key [71], and retaining ring [62], see chapter "Inspection steps for DR..63 – 315 brakemotors" (→ 🗎 189).
6. Insert the brake cable of the new brake into the terminal box.
7. Position the new brake. Make sure the cable outlet and brake lining carrier gearing are correctly aligned.
8. Fasten the brake using screws [19] or [900]. Distribute the screws around the brake and tighten them one after the other.
   - ⇨ DR..63 motors: The screws [19] can be reused. Tightening torque 5 Nm, tolerance ±10%.
   - ⇨ DR..71 motors: Use new screws [900]. Tightening torque 5 Nm, tolerance ±10%.
9. Seal the shaft.
10. Replace the sealing ring [95].
11. Apply grease to the sealing lip, see chapter "Order information for lubricants, anticorrosion agents and sealants" (→ 🗎 250).
12. ⚠ **DANGER!** No braking due to incorrectly set floating clearance "s". Severe or fatal injuries. Make sure the floating clearance "s" is set correctly so that the pressure plate can move up as the brake lining wears.
    Manual brake release option: Set the floating clearance "s" using the adjusting nuts, see chapter "Retrofitting the /HR, /HF manual brake release" (→ 🗎 212).
13. Install the disassembled parts of the motor.

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7.7.21 Replacing brakes BE05 – 2 and BE1H – BE2H in DR..71 – 80 motors

✓ The motor and all connected options are disconnected from the power supply.

✓ The motor is protected against unintended restart.

1. Disassemble the following parts:
   - ⇨ Forced cooling fan and rotary encoder, if installed, see chapter "Motor and brake maintenance – preliminary work" (→ 🗎 134).
   - ⇨ Fan guard with encoder mount [212] or fan guard [35], retaining ring [32]/[62] and fan [36]
2. Remove the terminal box cover and loosen the brake cable from the brake control/ terminals. Attach trailing wire to brake cables, if necessary.
3. Remove the screws and brake (with brake endshield if necessary) from the stator.
   - ⇨ DR..80: Screws [13]
4. Replace gasket [392]. Observe the alignment of the gasket.
5. If necessary, replace driver [70], key [71], and retaining ring [62], see chapter "Inspection steps for DR..63 – 315 brakemotors" (→ 🗎 189).
6. Insert the brake cable of the new brake into the terminal box.
7. Position the new brake. Make sure the cable outlet and brake lining carrier gearing are correctly aligned.
8. Refasten the brake using the screws.
   - ⇨ Cap screws [13]
   - ⇨ Tightening torque 5 Nm
   - ⇨ Tolerance ±10%.
9. Seal the shaft.
10. Replace the sealing ring [95].
11. Apply grease to the sealing lip, see chapter "Order information for lubricants, anti-corrosion agents and sealants" (→ 🗎 250).
12. For designs with corrosion protection /KS and/or IP56/66, the clamping straps of the disassembled brake have to be mounted to the new brake [550]. Seal studs with SEW-L-Spezial, see chapter "Order information for lubricants, anti-corrosion agents and sealants" (→ 🗎 250).
13. ⚠ **DANGER!** No braking due to incorrectly set floating clearance "s". Severe or fatal injuries. Make sure the floating clearance "s" is set correctly so that the pressure plate can move up as the brake lining wears.
    Manual brake release option: Set the floating clearance "s" using the adjusting nuts, see chapter "Retrofitting the /HR, /HF manual brake release" (→ 🗎 212).
14. Diagnostic unit option /DUE: Insert the sensor [1151] into the magnet body [54] of the new brake using the screw fitting. Fasten the cable with the terminal [1152/1153] at the magnet body in a way that the sensor cable cannot touch the fan wheel [36]. Then calibrate the zero value, see chapter "Zero value calibration" (→ 🗎 222).
15. Install the disassembled parts of the motor.

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7.7.22 Replacing brakes BE05 – 62 and BE1H – BE2H in DR..90 – 225 motors

✓ The motor and all connected options are disconnected from the power supply.

✓ The motor is protected against unintended restart.

1. Disassemble the following parts:
   - ⇨ Forced cooling fan and rotary encoder, if installed, see chapter "Motor and brake maintenance – preliminary work" (→ 🗎 134).
   - ⇨ Fan guard with encoder mount [212] or fan guard [35], retaining ring [32]/[62] and fan [36]
2. Loosen the brake cable.
   - ⇨ BE05 – 11: Remove the terminal box cover and loosen the brake cable from the brake control/terminals.
   - ⇨ BE20 – 62: Loosen locking screws of the brake plug connector [698] and remove plug connector.
3. Remove the screws and brake (with brake endshield if necessary) from the stator.
4. Replace the gasket [901]. Observe the alignment of the gasket, if necessary.
5. If necessary, replace driver [70], key [71], and retaining ring [62], see chapter "Working steps for inspecting DR..71 – 315, DRN63 – 315, DR2..63 – 80 brakemotors".
6. BE05 – 11: Insert the brake cable of the new brake into the terminal box.
7. Position the new brake. Make sure the cable outlet and brake lining carrier gearing are correctly aligned.
   - ⇨ BE20 – 62 with manual brake release option: It is important that the manual brake release is positioned properly.
8. Refasten the brake using the screws.
   - ⇨ Cap screws [900]
   - ⇨ Tightening torque DR..90 – 100: 10.3 Nm
   - ⇨ Tightening torque DR..112 – 132: 25.5 Nm
   - ⇨ Tightening torque DR..160 – 180: 50 Nm
   - ⇨ Tightening torque DR..200 – 225: 87.3 Nm
   - ⇨ Tolerance ±10%.
9. Seal the shaft.
10. Replace the sealing ring [95].
11. Apply grease to the sealing lip, see chapter "Order information for lubricants, anti-corrosion agents and sealants" (→ 🗎 250).
12. BE20 – 62: Insert the plug connector [698] into the brake and fasten using screws.
    - ⇨ Tightening torque 3 Nm
13. For designs with corrosion protection /KS and/or IP56/66, the clamping straps of the disassembled brake have to be mounted to the new brake [550]. Seal studs with SEW-L-Spezial, see chapter "Order information for lubricants, anti-corrosion agents and sealants" (→ 🗎 250).
14. ⚠ **DANGER!** No braking due to incorrectly set floating clearance "s". Severe or fatal injuries. Make sure the floating clearance "s" is set correctly so that the pressure plate can move up as the brake lining wears.
    Manual brake release option: Set the floating clearance "s" using the adjusting nuts, see chapter "Retrofitting the /HR, /HF manual brake release" (→ 🗎 212).

15. Diagnostic unit option /DUE: Insert the sensor [1151] into the magnet body [54] of the new brake using the screw fitting. Fasten the cable with the terminal [1152/1153] at the magnet body in a way that the sensor cable cannot touch the fan wheel [36]. Then calibrate the zero value, see chapter "Zero value calibration" (→ 🗎 222).
16. Install the disassembled parts of the motor.

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7.7.23 Replacing BE60 – 122 brakes of DR..250 – 315 motors

✓ The motor and all connected options are disconnected from the power supply.

✓ The motor is protected against unintended restart.

1. Disassemble the following parts:
   - ⇨ Forced cooling fan and rotary encoder, if installed, see chapter "Motor and brake maintenance – preliminary work" (→ 🗎 134).
   - ⇨ Fan guard with encoder mount [212] or fan guard [35], retaining ring [32]/[62] and fan [36]
2. Unscrew the locking screws of the brake plug connector [698] and remove the plug connector.
3. Remove the screws and brake (with brake endshield if necessary) from the stator.
   - ⇨ DR..250 – 280 motors: Replace the O-ring [1607].
4. If necessary, replace driver [70], key [71], and retaining ring [62], see chapter "Inspection steps for DR..63 – 315 brakemotors" (→ 🗎 189).
5. Seal the shaft.
6. Replace the sealing ring [95].
7. Apply grease to the sealing lip, see chapter "Order information for lubricants, anti-corrosion agents and sealants" (→ 🗎 250).
8. Position the new brake. Make sure the cable outlet and brake lining carrier gearing are correctly aligned.
   - ⇨ Manual brake release option: It is important that the manual brake release is positioned properly.
9. Refasten the brake using the screws.
   - ⇨ Cap screws [900]
   - ⇨ Tolerance ±10%.
10. For designs with corrosion protection /KS and/or IP56/66, the clamping straps of the disassembled brake have to be mounted to the new brake [550]. Seal studs with SEW-L-Spezial, see chapter "Order information for lubricants, anti-corrosion agents and sealants" (→ 🗎 250).
11. Insert plug connector [698] in the brake and fasten using screws.
    - ⇨ Tightening torque 3 Nm
12. ⚠ **DANGER!** No braking due to incorrectly set floating clearance "s". Severe or fatal injuries. Make sure the floating clearance "s" is set correctly so that the pressure plate can move up as the brake lining wears.
    Manual brake release option: Set the floating clearance "s" using the adjusting nuts, see chapter "Retrofitting the /HR, /HF manual brake release" (→ 🗎 212).
13. Diagnostic unit option /DUE: Insert the sensor [1151] into the magnet body [54] of the new brake using the screw fitting. Fasten the cable with the terminal [1152/1153] at the magnet body in a way that the sensor cable cannot touch the fan wheel [36]. Then calibrate the zero value, see chapter "Zero value calibration" (→ 🗎 222).
14. Install the disassembled parts of the motor.

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7.7.24 Retrofitting the /HR, /HF manual brake release

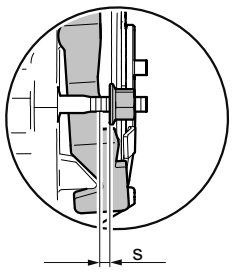
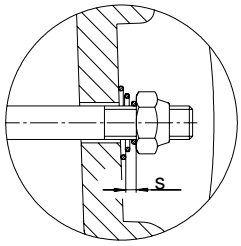
INFORMATION

With BE02 brakes, the manual brake release can only be retrofitted if the brake is completely replaced.

✓ The motor and all connected options are disconnected from the power supply.

✓ The motor is protected against unintended restart.

1. Disassemble the following parts:
   - ⇨ Forced cooling fan and rotary encoder, if installed, see chapter "Motor and brake maintenance – preliminary work" (→ 🗎 134).
   - ⇨ Fan guard with encoder mount [212] or fan guard [35], retaining ring [32]/[62] and fan [36]
2. Mount the manual brake release.
   - ⇨ BE03: Position the releasing lever [53] and the spring plate [53] correctly. Mount the flange nut [58]. Attach the hand lever [51]/set screw [64] to the stator using the grommets.
   - ⇨ BE05 – BE11 and BE1H – BE2H: Remove the old sealing ring [95]. Screw in the studs [56] and glue them. Insert the sealing rings for the manual brake release [95]. Hammer in the parallel pin [59]. Install the releasing lever [53], the conical springs [57] and the adjusting nuts [58].
   - ⇨ BE20 – BE62: Insert O-rings [47] into the magnet body. Screw in the studs [56] and glue them. Install the releasing lever [53], the conical springs [57] and the adjusting nuts [58].
   - ⇨ BE120 – BE122: Insert O-rings [47] in the magnet body. Screw in the studs [56] and glue them.
3. ⚠ **DANGER!** Diminished braking effect due to incorrectly set floating clearance "s". Severe or fatal injuries. Make sure the floating clearance "s" is set correctly so that the pressure plate can move up as the brake lining wears.
   Set the floating clearance "s" using the adjusting nuts or flange nuts.
   - ⇨ BE03: Between releasing lever and flange nut (see following illustration)
   - ⇨ BE05 – 122 and BE1H – BE2H: Between conical springs (pressed flat) and adjusting nuts (see following illustration)

BE03	BE05 – 122 BE1H – BE2H
	

Brake	Floating clearance s mm
BE03	2.2

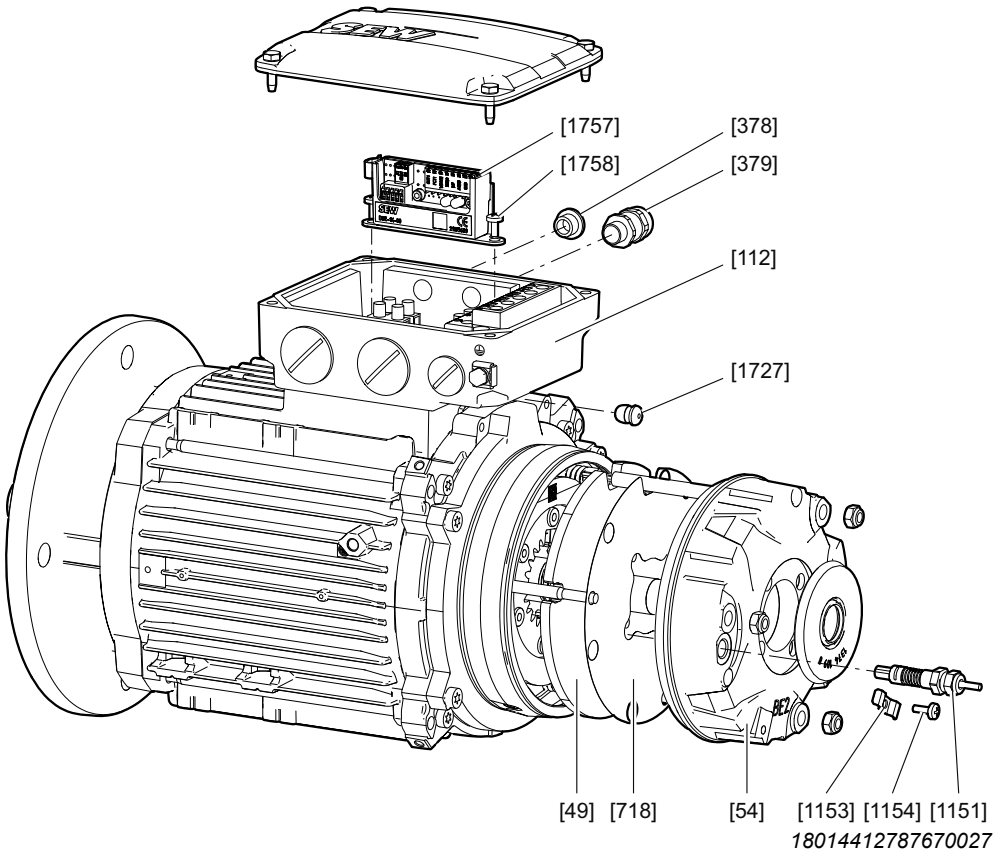
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Brake	Floating clearance s mm
BE05, BE1, BE1H, BE2, BE2H	1.5
BE5	1.7
BE11, BE20, BE30, BE32, BE60, BE62, BE120, BE122	2

4. Install the disassembled parts of the motor.

7.8 Inspection/maintenance work diagnostic unit /DUE

7.8.1 Basic structure of diagnostic unit /DUE



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[49]	Pressure plate for /DUE (BE20 and higher)	[1151]	Distance sensor
[54]	Magnet body complete for /DUE	[1153]	Spring (BE20 – 122)
[112]	Terminal box lower part	[1154]	Mushroom head screw (BE20 – 122)
[378]	Screw plug (DRN200 – 315)	[1757]	Evaluation unit
[379]	Screw fitting (DRN200 – 315)	[1758]	Screw
[718]	Dampening plate (BE1 – 11)	[1727]	Grommet (DRN80 – 180)

7.8.2 Removing the /DUE diagnostic unit

1. Remove forced cooling fan and rotary encoder, if installed, see chapter "Motor and brake maintenance – preliminary work" (→ 🗎 134).
2. Remove the fan guard [35] / fan guard with encoder mount [212], or the forced cooling fan [170] by loosening the retaining screws [22].
3. If applicable: Remove the retaining ring [32] and the fan wheel [36] using a suitable tool.
4. Loosen the screw [1154] for the cable fixture clamp [1153].
5. Loosen the union nut of the sensor screw fitting. The sensor cable is free.
6. Loosen the sensor [1151] on the mounting flange. Remove the sensor.

7.8.3 Retrofitting the /DUE diagnostic unit for function and wear monitoring

Designation

For the component designation of the evaluation unit, refer to chapter "Designation of the components" (→ 🗎 111).

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Conditions

The /DUE diagnostic unit can be retrofitted for motor sizes 80 – 315 with brakes BE1 – 122 and BE2H only under the following conditions:

- Exchange of the existing brake without /DUE preparation for a new brake with /DUE preparation.
- Conversion of the terminal box to create room for the evaluation unit of the /DUE diagnostic unit.
- Retrofitting the evaluation and sensor unit, see chapter "Evaluation unit" (→ 🗎 215).

Whether and to what extent the first two measures in the list are to be carried out depends greatly on the respective motor design. To identify the components that need to be replaced, please contact SEW-EURODRIVE.

Evaluation unit

The evaluation unit has a 5-pin DIP switch that is labeled with the numbers 1 to 5. Use it to set the measuring range and the maximum permitted wear limit (maximum working air gap).

If the brake is used in combination with a safety encoder, or if the brake is designed as safety brake, the setting values for the wear limit are reduced. For the new values, refer to the addendum to the operating instructions for safety brakes and safety encoders.

To activate the DIP switch ≙1, push the switch upwards. To deactivate the DIP switch ≙0, push the switch downwards.

The following table shows the DIP switch settings of the evaluation unit for the maximum working air gap.

S1	S2	S3	S4	S5	Wear limit	BE1 – 2 brake BE2H	Brake BE5
Sensor Ø 6 mm							
0	**0**	**0**	**0**	**0**	1.2 mm		
0	**0**	**0**	**0**	**1**	1.1 mm		
0	**0**	**0**	**1**	**0**	1.0 mm		
0	**0**	**0**	**1**	**1**	0.9 mm		X
0	**0**	**1**	**0**	**0**	0.8 mm		
0	**0**	**1**	**0**	**1**	0.7 mm		
0	**0**	**1**	**1**	**0**	0.6 mm	X	
0	**0**	**1**	**1**	**1**	0.5 mm		
S1	**S2**	**S3**	**S4**	**S5**	**Wear limit**	**Brake BE11 – 122**	
Sensor Ø 8 mm							
1	**0**	**0**	**0**	**0**	1.2 mm	X	
1	**0**	**0**	**0**	**1**	1.1 mm		
1	**0**	**0**	**1**	**0**	1.0 mm		
1	**0**	**0**	**1**	**1**	0.9 mm		
1	**0**	**1**	**0**	**0**	0.8 mm		
1	**0**	**1**	**0**	**1**	0.7 mm		
1	**0**	**1**	**1**	**0**	0.6 mm		
1	**0**	**1**	**1**	**1**	0.5 mm		

X Factory setting
Setting possible in addition

Setting and mounting the evaluation unit

✓ The motor and all connected options are disconnected from the power supply.

✓ The motor is protected against unintended restart.

1. Set the wear limit using the DIP switches.
2. Screw the evaluation unit into the terminal box after consultation with SEW-EURODRIVE.
3. Connect the sensor, see chapter "Connecting the sensor" (→ 🗎 218).
4. Calibrate the infinite value, see chapter "Calibrating the infinite value" (→ 🗎 220).
5. Install the sensor in the brake, see chapter "Installing the sensor" (→ 🗎 221).
6. Route the cable, see chapter "Cable routing" (→ 🗎 222).
7. Calibrate the zero value, see chapter "Zero value calibration" (→ 🗎 222).
8. To check the function, measure the voltage via terminal 5k to 10k. Switch the brake and check if 24 V are applied.
9. To check if the working air gap is within the permitted range, measure the current between terminals 4k and 10k. Compare the value to the range in the diagram in chapter "Output signals for function and wear monitoring" (→ 🗎 219).

Connecting electronics

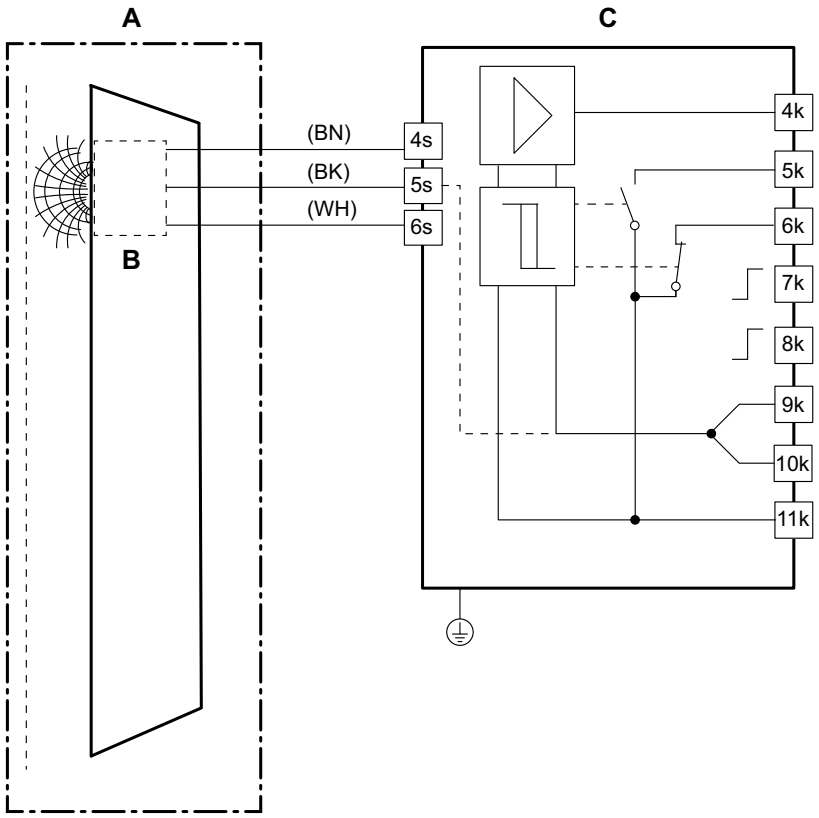
The function and wear monitoring is connected according to the following wiring diagram. The maximum permitted cable cross section at terminals "k" is 1.5 mm² with conductor end sleeve without plastic collar, 0.75 mm² with plastic collar. The recommended cable cross section at terminal "k" is 0.5 mm² with conductor end sleeve with plastic collar.

INFORMATION

Use shielded cables to wire the evaluation unit. Connect the shield to the GND potential, or use the shield plate at the user's signal evaluation.

- Unless they are shielded, sensor cables must always be routed separately from other power cables with phased currents.
- Provide for a suitable equipotential bonding between drive and control cabinet.

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[A]	Brake	[4k]	Analog output wear 1 (air gap)
[B]	Eddy current sensor	[5k]	Digital output function 1 (NO contact)
[C]	Evaluation unit	[6k]	Digital output wear 1 (NC contact)
		[7k]	Input calibration zero value
[4s]	Connection sensor A1 (brown cable)	[8k]	Input calibration infinite value
[5s]	Connection sensor GND 1 (black cable)	[9k]	Signal ground AGND
[6s]	Connection sensor B1 (white cable)	[10k]	Ground potential GND
		[11k]	DC 24 V supply

The evaluation unit is supplied with DC 24 V via the terminals GND [10k] and DC 24 V [11k].

Brake monitoring provides digital signals for:

- Function FCT1 [5k] and wear WEAR1 [6k] of the brake.

The working air gap can be monitored continuously via the analog signal (4 – 20 mA) regarding the signal ground [9k]:

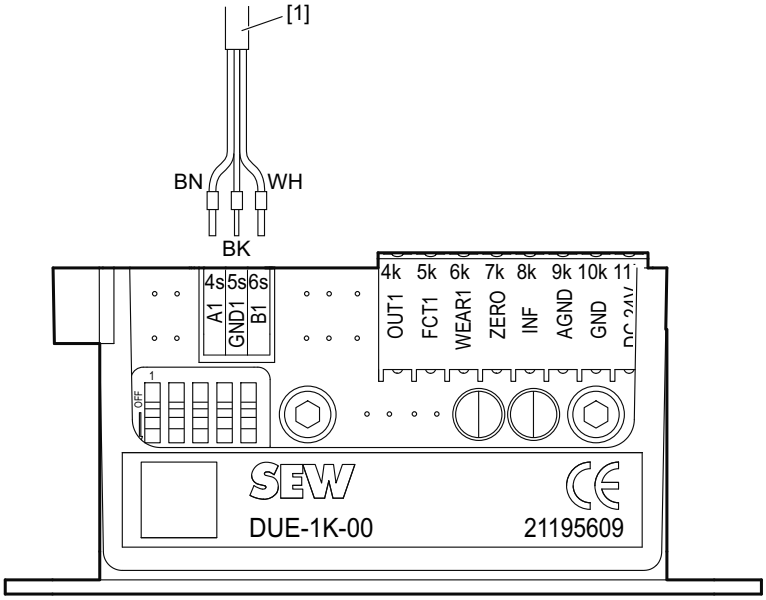
- Terminal OUT1 [4k]

Use terminals ZERO [7k] and INF [8k] for calibration.

INFORMATION

If values deviate from the factory setting, the wear point setting must be adjusted. See chapter "Evaluation unit" (→ 🗎 215).

Connecting the sensor



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[1] Brake sensor

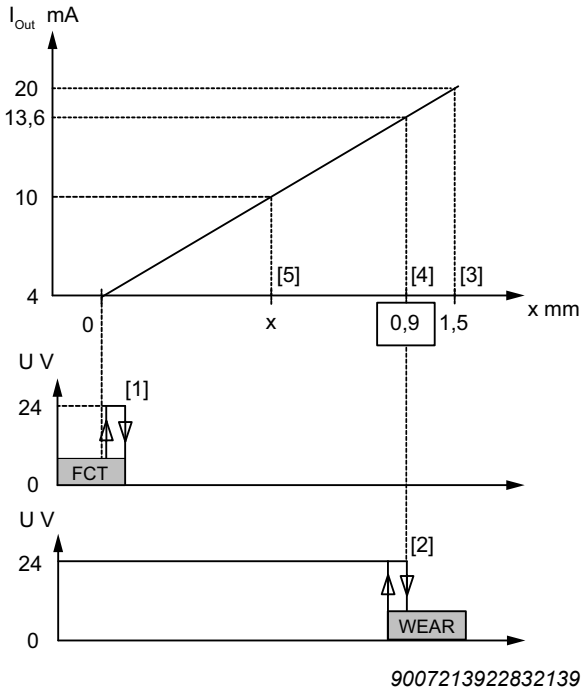
The connection cross section of the sensor is 0.14 mm^2. The litz wires of the sensor cables must be equipped with conductor end sleeves. The cable shield must be isolated against other potentials using a heat shrink tubing. The litz wires can be pushed into the terminals without using tools. Put the sensor cables in the provided line clip, see figure in chapter "Calibrating the infinite value" (→ 🗎 220). To remove the sensor cables, use an electronic screwdriver to disengage the clips.

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Output signals for function and wear monitoring

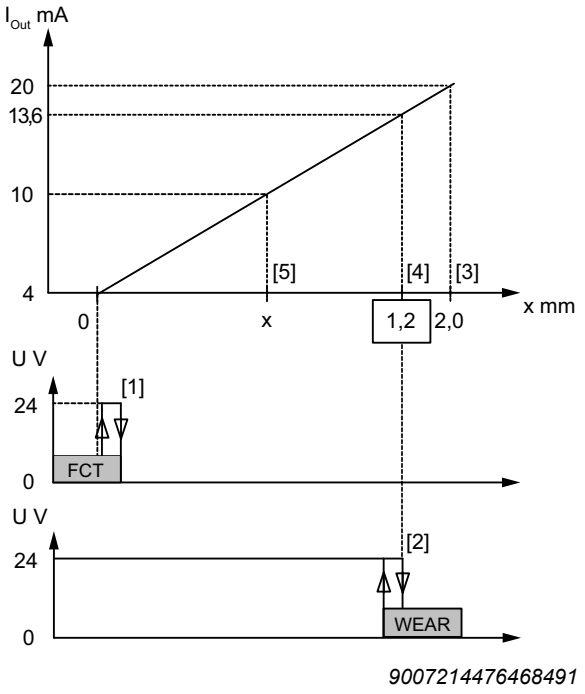
The diagnostic unit /DUE provides an analog signal (4 – 20 mA, DIN IEC 60381-1) for the current working air gap of the brake.

D6



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D8



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[1] FCT: Digital output function (DC 24 V, DIN EN 61131-2)
[2] WEAR: Digital output wear (DC 24 V, DIN EN 61131-2)
[3] Measuring range of the sensor
[4] Max. working air gap of the brake (exemplary)
[5] Currently measured working air gap (exemplary)

Calibrating the infinite value

Before you can install the sensor in the brake, the electronics must be calibrated to the actual cable length. During calibration of the infinite value, electronics is adjusted to the sensor cable length. Electronics is reset and previous settings are overwritten.

The sensor must be removed from the brake for the following steps.

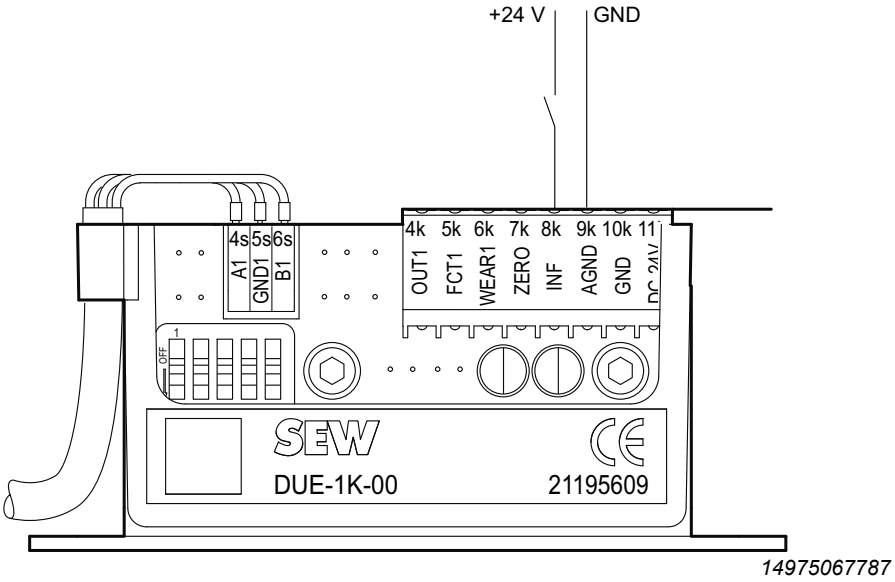
Procedure to calibrate the infinite value for the sensor:

1. Make sure that no metallic objects are within a 10 cm radius from the sensor head. The mounting springs may be in contact with the back of the sensor head during calibration.
2. Connect the supply voltage to INF (8k) and AGND (9k) for approx. 5 s. You can use GND (10k) as reference potential instead of AGND (9k). The evaluation unit is supplied via the calibration input during calibration.

The analog output OUT1 signals 0 mA during the calibration procedure.

The infinite value was successfully calibrated when OUT1 (4k) displays 20 mA. The red LED briefly flashes once per second as visual signal.

The corresponding wiring diagram for the calibration process.



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During calibration, the digital outputs WEAR1 (6k), FCT1 (5k) send a 0 signal which may lead to error messages (wear limit reached).

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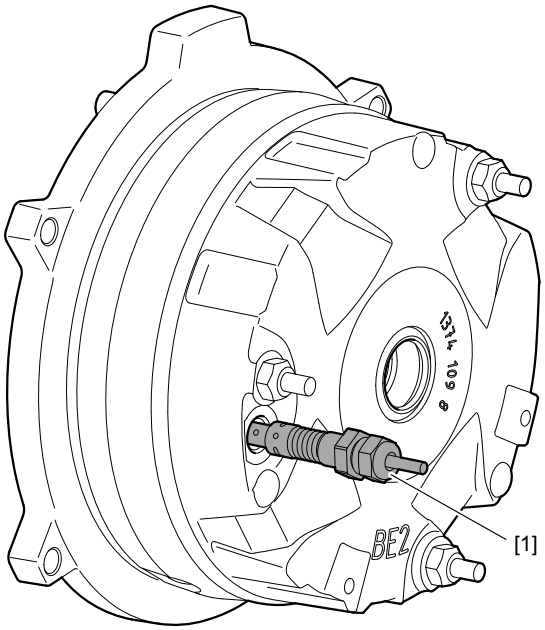
Installing the sensor

After calibration, the eddy current sensor can be installed in the magnet body of the brake. When installing the sensor, make sure that the sensor head can be inserted in the stepped bore without pressure being applied.

First install the lower part of the cable gland. Then mount the upper part of the cable gland.

INFORMATION

To ensure that the sensor is correctly inserted in the stepped bore, twist the sensor carefully with the cable before screwing in the cable gland. Protect the sensor cable against damage.



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[1] Brake sensor

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Cable routing

Prevent the cable from colliding with the fan cable. If necessary, attach the cable to the included clamping strap [157] on the brake using cable ties.

Zero value calibration

During calibration of the zero value, the current working air gap with released (open) brake is written to the evaluation unit. The electronics are reset and previous settings are overwritten. You can save the zero value again at any time without changing the infinite value.

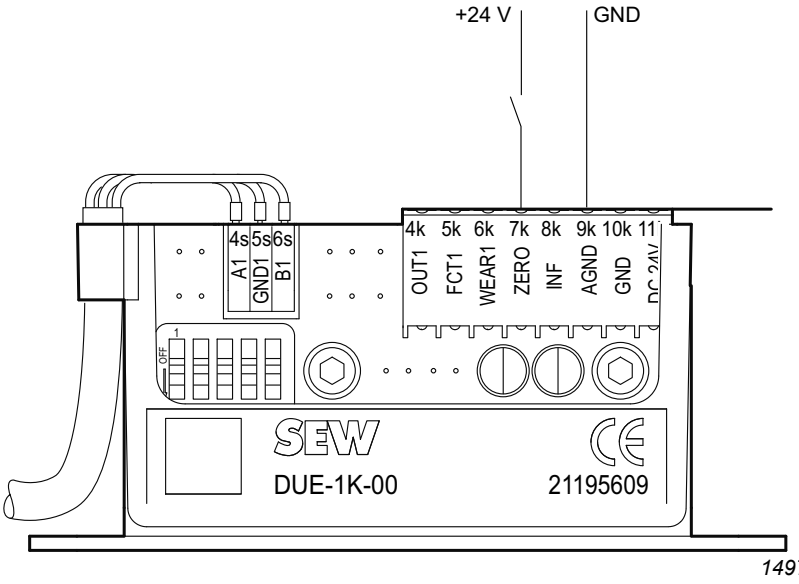
Procedure for calibrating the zero value:

1. Open the brake.
2. Apply the supply voltage to ZERO (7k) and AGND (9k) for approx. 3 seconds. Electronics is in calibration mode. You can use GND (10k) as reference potential instead of AGND (9k). The evaluation unit is supplied via the calibration input during calibration.

The evaluation unit saves the smallest working air gap of the brake. Each write process is indicated by a brief flashing of the red LED.

The activated calibration mode is indicated by the following LED state:

LED	State
Green [6]	Off
Red [6]	Flashing (2 Hz)



14977696651

During calibration, the digital outputs WEAR1 (6k), FCT1 (5k) send a 0 signal which may lead to error messages (wear limit reached).

The analog output OUT1 (4k) signals 0 mA during the calibration procedure. After successful calibration, the value is saved. The output has 4 mA with released brake. If a smaller value is available within 3 seconds, the last value is deleted and the new value is saved. The 4 mA at the output remain unchanged.

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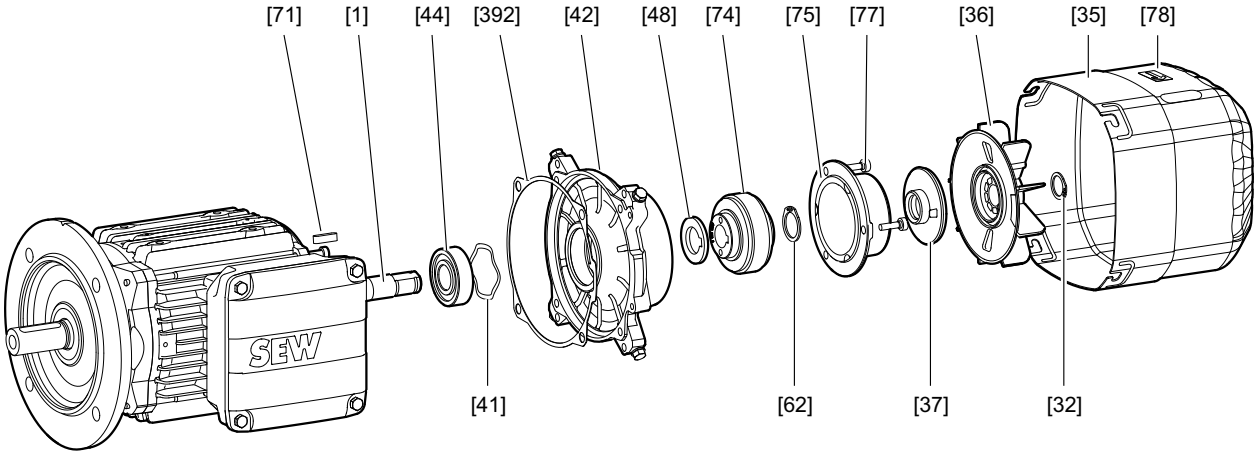
Status messages of the evaluation unit

Brake	Sensor	Calibration		LEDs and outputs					State
		ZERO	INF	Green	Red	FCT	WEAR	OUT	
Up	Installed	–	–	On	Off	HI	HI	3.6 – 5.6 mA	Brake released, no wear
Id	Installed	–	–	Off	Off	LO	HI	6 – 20 mA	Brake engaged, no wear
Id	Installed	–	–	Off	On	LO	LO	6 – 20 mA	Brake engaged, set wear limit of brake reached
–	–	–	–	Off	On	LO	LO	>20 mA	Measuring range exceeded or sensor not connected correctly
–	Not installed	–	HI	Off	Flashing, 1 Hz	LO	LO	0 mA	Infinite value calibration active
–	Not installed	–	HI	Off	Flashing 1 Hz	LO	LO	20 mA	Infinite calibration successful
–	–	–	–	Flashing, 1 Hz	Flashing, 1 Hz	Clock 1 Hz	Clock 1 Hz	0 mA	Not fully calibrated: • ZERO calibration missing • Delivery state (both calibrations missing)
Up	Installed	HI	–	Off	Flashing, 2 Hz	LO	LO	0 mA	Zero value calibration active
Up	Installed	HI	–	Off	Flashing, 2 Hz	LO	LO	4 mA	First zero value calibration successful
Up	Installed	HI	–	Off	Flickering	LO	LO	4 mA	Smaller zero value detected and saved

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7.9 Altering the blocking direction on motors with a backstop

7.9.1 Basic structure of DR..71 – 80 motors with backstop

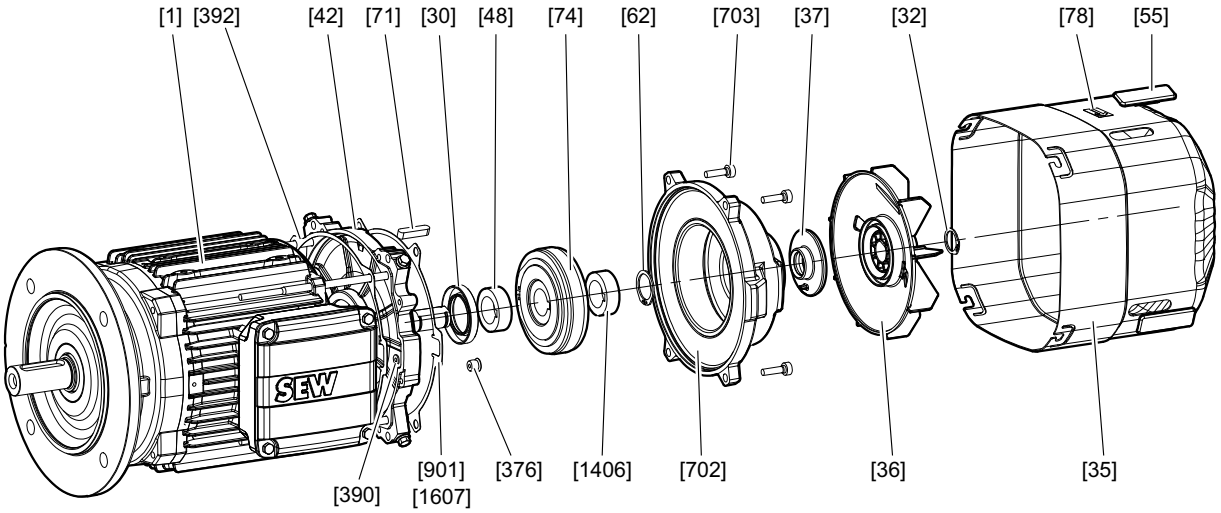


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[1]	Motor with brakemotor	[48]	Spacing ring (only DR../DRN/DR2..80)
[32]	Retaining ring	[62]	Retaining ring (only DR../DRN/ DR2..80)
[35]	Fan guard	[71]	Key
[36]	Fan wheel	[74]	Backstop
[37]	Sealing ring	[75]	Sealing flange
[41]	Equalizing ring	[77]	Cap screw
[42]	Backstop endshield, complete	[78]	Direction of rotation information sign
[44]	Deep groove ball bearing	[392]	Gasket

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7.9.2 Basic structure of DR..63, DR..90 – 315 motors with backstop



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[1]	Motor	[74]	Backstop
[30]	Sealing ring (DR../DRN250-315)	[78]	Information sign for direction of rotation
[32]	Retaining ring		
[35]	Fan guard	[702]	Backstop housing
[36]	Fan wheel	[703]	Cap screw
[37]	Sealing ring	[376]	Screw plugs (DR..132M – 315)
[42]	Brake endshield	[392]	O-ring (with DR..63) Gasket (DR..90 – 132S)
[48]	Spacing ring	[901]	Gasket (DR..90 – 225)
[55]	Closing piece (from DR../ DRN112)	[1406]	Spacing ring (DR..250 – 315)
[62]	Retaining ring (from DR../DRN90)	[1607]	O-ring (DR..250 – 280)
[71]	Key		

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7.9.3 Changing the blocking direction

Proceed as follows to change the blocking direction:

✓ The motor and all connected options are disconnected from the power supply.

✓ The motor is protected against unintended restart.

1. Disassemble the following parts:
   - ⇨ Forced cooling fan and rotary encoder, if installed, see chapter "Motor and brake maintenance – preliminary work" (→ 🗎 134).
   - ⇨ Fan guard with encoder mount [212] or fan guard [35], retaining ring [32]/[62] and fan [36]
   - ⇨ **DR..71 – 80 motors:** Sealing flange [75].
   - ⇨ **DR..90 – 315, DR..63 motors:** Backstop housing, complete [702].
2. Remove the retaining ring [62] and, if necessary, the spacing ring [1406].
3. Dismount the backstop [74] using a puller.
4. To alter the blocking direction, turn around the backstop [74].
5. Check the old grease. If necessary, replace the grease as specified below.
   - ⇨ **DR..63 – 71 motors**: Glue in the backstop [74] with Loctite 648/649.
   - ⇨ **DR..80 – 315 motors:** Press on the backstop [74].
6. Mount the retaining ring [62].
7. Mount the following parts:
   - ⇨ **DR..71 – 80 motors:** Apply SEW-L-Spezial sealant to the sealing flange [75]. Mount the sealing flange [75].
   - ⇨ **DR..90 – 315, DR..63 motors:** Replace the seals [901], [1607], and if necessary [37]. Mount the complete backstop housing [702].
8. Install the disassembled parts of the motor.
9. Replace the label [78] indicating the direction of rotation.

Lubricating the backstop

The backstop is greased at the factory with the corrosion protection low-viscosity grease LBZ 1. If you want to use a different grease, make sure it complies with NLGI grade 00, has a base oil viscosity of 42 mm^2/s at 40 °C, and is based on lithium soap and mineral oil. The application temperature range is from -50 °C to +90 °C. See the following table for the amount of grease required:

DR.. motors	63/71	80	90/100	112/132S	132M/L	160/180	200/225	250/280	315
Amount of grease in g	9	11	15	20	30	45	80	80	120

The tolerance regarding the grease level is ± 30%.

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8 Technical data

8.1 Braking torques

The following table shows the possible braking torque combinations for the various sizes of the BE05 – 122 brakes. For BE02 and BE03 brakes, the braking torques of each brake are preset at the factory and cannot be adjusted.

BE.H brakes are only approved as holding brakes for inverter duty motors and are equipped with a special friction material to achieve increased braking torques.

In case of a conversion, make sure the selected spring set generates nominal braking torques that are permitted for your drive combination and suitable for the application.

For the BE1H and BE2H brakes, make sure that the correct spare parts are installed with the friction material intended for the BE.H brakes. If in doubt, contact SEW-EURODRIVE.

Observe the project planning specification in the "Project planning for BE.. brakes – DR.., DRN.., DR2.., EDR.., EDRN.. AC motors – standard brake/safety brake" manual or contact SEW-EURODRIVE.

Brake	Braking torque	Assigned components				
		Type and number of brake springs			Number of shim plates	
	Nm	Standard [50]	Blue [276]	White [1312]	Pole sheet [63]	Damping plate [718]
BE05	5.0	3	–	–	–	1
	3.5	–	6	–	–	1
	2.5	–	4	–	–	1
	1.8	–	3	–	–	1
BE1H	14	6	–	–	–	1
BE1	10	6	–	–	–	1
	7.0	4	2	–	–	1
	5.0	3	–	–	–	1
BE2H	28	6	–	–	–	1
BE2	20	6	–	–	–	1
	14	2	4	–	–	1
	10	2	2	–	–	1
	7.0	–	4	–	–	1
	5.0	–	3	–	–	1
BE5	55	6	–	–	–	1
	40	2	4	–	–	1
	28	2	2	–	–	1
	20	–	–	6	–	1
	14	–	–	4	–	1
BE11	110	6	–	–	–	1
	80	2	4	–	–	1
	55	2	2	–	–	1
	40	–	4	–	–	1
	28	–	3	–	1	1
	20	–	–	4	1	1
BE20	200	6	–	–	–	–
	150	4	2	–	–	–
	110	3	3	–	–	–
	80	3	–	–	–	–
	55	–	6	–	1	–
	40	–	4	–	1	–

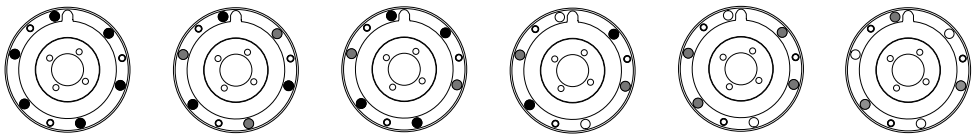
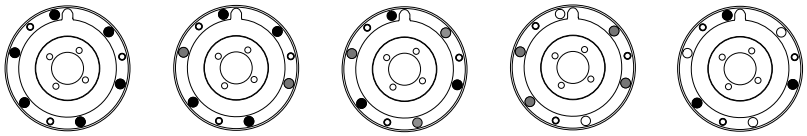
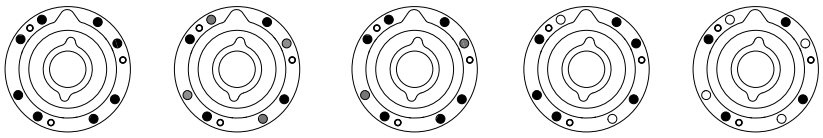
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Brake	Braking torque	Assigned components				
		Type and number of brake springs			Number of shim plates	
	Nm	Standard [50]	Blue [276]	White [1312]	Pole sheet [63]	Damping plate [718]
BE30	300	8	–	–	–	–
	200	4	4	–	–	–
	150	4	–	–	–	–
	100	–	8	–	–	–
	75	–	6	–	1	–
BE32	600	8	–	–	–	–
	500	6	2	–	–	–
	400	4	4	–	–	–
	300	4	–	–	–	–
	200	–	8	–	–	–
	150	–	6	–	1	–
	100	–	4	–	1	–
BE60	600	8	–	–	–	–
	500	6	2	–	–	–
	400	4	4	–	–	–
	300	4	–	–	–	–
	200	–	8	–	–	–
BE62	1200	8	–	–	–	–
	1000	6	2	–	–	–
	800	4	4	–	–	–
	600	4	–	–	–	–
	400	–	8	–	–	–
BE120	1000	8	–	–	–	–
	800	6	2	–	–	–
	600	4	4	–	–	–
	400	4	–	–	–	–
BE122	2000	8	–	–	–	–
	1600	6	2	–	–	–
	1200	4	4	–	–	–
	800	4	–	–	–	–

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8.2 Brake spring layout

The following table shows the arrangement of the brake springs:

BE05 – 11 and BE1H – BE2H:					
6 springs	3 + 3 springs	4 + 2 springs	2 + 2 springs	4 springs	3 springs
					
BE20:					
6 springs	4 + 2 springs	3 + 3 springs	4 springs	3 springs	
					
BE30 – 122:					
8 springs	4 + 4 springs	6 + 2 springs	6 springs	4 springs	
					

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8.3 List of order numbers for springs and inserts

The order numbers for brake lining carriers depend on the design of the motor and brake. To determine the correct part number, contact SEW-EURODRIVE.

Brake type	Component	Pos. no.	Design	Part number
BE03	Brake spring	[50]	Standard/SR	01858157
	Brake spring	[276]	Blue/BU	13750798
	Damping plate	[718]	Normal	21141525
BE05/1 BE1H	Brake spring	[50]	Standard/SR	0135017X
	Brake spring	[276]	Blue/BU	13741373
	Brake spring	[1312]	White/WH	13637789
	Damping plate	[718]	Normal	13740563
	Damping plate	[718]	DUE	13749862
BE2 BE2H	Brake spring	[50]	Standard/SR	13740245
	Brake spring	[276]	Blue/BU	13740520
	Damping plate	[718]	Normal	13740199
	Damping plate	[718]	DUE	13749870
BE5	Brake spring	[50]	Standard/SR	13740709
	Brake spring	[276]	Blue/BU	13740717
	Brake spring	[1312]	White/WH	13747738
	Damping plate	[718]	Normal	13740695
	Damping plate	[718]	DUE	13749889
BE11	Brake spring	[50]	Standard/SR	13741837
	Brake spring	[276]	Blue/BU	13741845
	Brake spring	[1312]	White/WH	13747789
	Pole sheet	[63]	Standard	13746995
	Damping plate	[718]	Normal	13741713
	Damping plate	[718]	DUE	13749854
BE20	Brake spring	[50]	Standard/SR	13743228
	Brake spring	[276]	Blue/BU	13742485
	Pole sheet	[63]	Normal	13749307
BE30	Brake spring	[50]	Standard/SR	01874551
	Brake spring	[276]	Blue/BU	13744356
	Pole sheet	[63]	Standard	13749455
BE32	Brake spring	[50]	Standard/SR	01874551
	Brake spring	[276]	Blue/BU	13744356
	Pole sheet	[63]	Standard	13749455
BE60	Brake spring	[50]	Standard/SR	01868381
	Brake spring	[276]	Blue/BU	13745204
BE62	Brake spring	[50]	Standard/SR	01868381
	Brake spring	[276]	Blue/BU	13745204
BE120/122	Brake spring	[50]	Standard/SR	13608770
	Brake spring	[276]	Blue/BU	13608312

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8.4 Working air gap, thickness of brake lining carrier

If the brake is used in combination with a safety encoder, or if the brake is designed as a safety brake, the maximum values for the working air gap and for the minimum permissible thickness of the brake lining carrier are lower. For the new values, refer to the addendum to the operating instructions for safety brakes and safety encoders.

Brake	Working air gap		Brake disk thickness
	min.[1]	Maximum	Minimum
	mm	mm	mm
BE02	–[2]	–[2]	Min. 5.4 for 0.8 Nm Min. 5.6 for 1.2 Nm
BE03	0.25	0.65	–[2]
BE05	0.25	0.6	11.0
BE1, BE1H	0.25	0.6	11.0
BE2, BE2H	0.25	0.6	11.0
BE5	0.25	0.9	11.0
BE11	0.3	1.2	12.5
BE20	0.3	1.2	12.5
BE30	0.3	1.2	12.5
BE32	0.4	1.2	12.5
BE60	0.3	1.2	14.0
BE62	0.4	1.2	14.0
BE120	0.6	1.2	14.0
BE122	0.8	1.2	14.0

1) When checking the working air gap, note: After a test run, parallelism tolerances on the brake lining carrier may give rise to deviations of ±0.15 mm.

2) The brake lining carrier cannot be replaced. Once the minimum thickness of the brake lining carrier/the maximum working air gap has been reached, the brake must be replaced.

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8.5 Operating currents

8.5.1 General information on determining operating currents

The tables in this chapter list the operating currents of the BE.. and BE.H brakes at different voltages.

The acceleration current I_B (= inrush current) flows only for a short time (approx. 160 ms for BE02 – BE62 and BE1H – BE2H, 400 ms for BE60 – BE122 in combination with BMP3.1 brake control) when the brake is released. No increased inrush current occurs when using the BG.., BS24, or BMS.. brake control and direct DC voltage supply without a control unit (only possible with brake size BE02 – BE2 and BE1H – BE2H).

The values for the holding currents I_H are rms values. Only use current measurement units that are designed to measure rms values.

INFORMATION



The following operating currents and power consumption values are nominal values. They refer to a coil temperature of +20 °C.

Operating currents and power consumption usually decrease during normal operation due to heating of the brake coil.

Note that the actual operating currents can be higher by up to 25% depending on the ambient temperature and with coil temperatures below +20 °C.

8.5.2 Legend

The following tables list the operating currents of the brakes at different voltages.

The following values are specified:

P_B	Nominal value of the electric power consumption in the brake coil in watt
V_N	Nominal voltage (rated voltage range) of the brake in V (AC or DC)
I_H	Nominal holding current in A (AC). Effective value of the braking current in the supply cable to the SEW-EURODRIVE brake control
I_G	Nominal holding current in A (DC) in the brake cable with direct DC voltage supply or Nominal holding current in A (DC) in the brake cable with DC 24 V supply via BS24, BSG, or BMV
I_B	Acceleration current in A (AC or DC) when operated with SEW-EURODRIVE brake control for high-speed excitation
I_B/I_H	Inrush current ratio ESV
I_B/I_G	Inrush current ratio ESV for DC 24 V supply with BSG or BMV

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8.5.3 Brakes BE02, BE03, BE05, BE1, BE1H, BE2, BE2H

	BE02	BE03	BE05, BE1 BE1H	BE2 BE2H
Nominal power brake coil in W	25	25	30	41
Inrush current ratio ESV	4	4	4	4

Nominal voltage (rated voltage range) V_N		BE02		BE03		BE05, BE1 BE1H		BE2 BE2H	
		I_H	I_G	I_H	I_G	I_H	I_G	I_H	I_G
AC V	DC V	AC A	DC A	AC A	DC A	AC A	DC A	AC A	DC A
24 (23 – 26)	10	–	–	2.18	2.83	2.25	2.90	2.95	3.80
60 (57 – 63)	24	–	0.72	0.8	1.08	0.90	1.17	1.18	1.53
120 (111 – 123)	48	–	–	0.41	0.54	0.45	0.59	0.59	0.77
184 (174 – 193)	80	–	–	0.27	0.35	0.29	0.37	0.38	0.49
208 (194 – 217)	90	–	–	0.24	0.31	0.26	0.33	0.34	0.43
230 (218 – 243)	96	0.14	0.18	0.22	0.28	0.23	0.30	0.30	0.39
254 (244 – 273)	110	–	–	0.20	0.26	0.20	0.27	0.27	0.35
290 (274 – 306)	125	–	–	0.18	0.23	0.18	0.24	0.24	0.31
330 (307 – 343)	140	–	–	0.16	0.20	0.16	0.21	0.21	0.28
360 (344 – 379)	160	–	–	0.13	0.18	0.14	0.19	0.19	0.25
400 (380 – 431)	180	0.08	0.10	0.11	0.15	0.13	0.17	0.17	0.22
460 (432 – 484)	200	0.07	0.09	0.10	0.13	0.11	0.15	0.15	0.19
500 (485 – 542)	220	–	–	0.09	0.12	0.10	0.13	0.14	0.18
575 (543 – 600)	250	–	–	0.08	0.11	0.09	0.12	0.12	0.16

8.5.4 Brakes BE5, BE11, BE20

	BE5	BE11	BE20
Nominal power brake coil in W	50	70	95
Inrush current ratio ESV	5.9	6.6	7.5

Nominal voltage (rated voltage range) V_N		BE5		BE11		BE20	
		I_H		I_H		I_H	
AC V	DC V	AC A	DC A	AC A	DC A	AC A	DC A
60 (57 – 63)	24	1.28	1.57	2.05	2.55	2.55	3.15
120 (111 – 123)	–	0.64	–	1.04	–	1.28	–
184 (174 – 193)	–	0.41	–	0.66	–	0.81	–
208 (194 – 217)	–	0.37	–	0.59	–	0.72	–
230 (218 – 243)	–	0.33	–	0.52	–	0.65	–
254 (244 – 273)	–	0.29	–	0.47	–	0.58	–
290 (274 – 306)	–	0.26	–	0.42	–	0.51	–
330 (307 – 343)	–	0.23	–	0.37	–	0.46	–
360 (344 – 379)	–	0.21	–	0.33	–	0.41	–
400 (380 – 431)	–	0.18	–	0.30	–	0.37	–
460 (432 – 484)	–	0.16	–	0.27	–	0.33	–
500 (485 – 542)	–	0.15	–	0.24	–	0.29	–
575 (543 – 600)	–	0.13	–	0.22	–	0.26	–

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8.5.5 Brakes BE30, BE32, BE60, BE62, BE120, BE122

	BE30, BE32	BE60, BE62	BE120, BE122
Nominal power brake coil in W	120	195	220
Inrush current ratio ESV	8.5	9.2	6

Nominal voltage (rated voltage range) V_N	BE30, BE32	BE60, BE62	BE120, BE122
	I_H	I_H	I_H
AC V	AC A	AC A	AC A
230 (218 – 243)	–	–	1.45
254 (244 – 273)	1.66	–	1.30
290 (274 – 306)	1.05	–	1.16
360 (344 – 379)	0.94	1.50	0.92
400 (380 – 431)	0.84	1.35	0.82
460 (432 – 484)	0.75	1.20	0.73
500 (485 – 542)	0.67	1.12	0.65
575 (543 – 600)	0.59	0.97	0.58

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8.6 Resistances

The depicted values apply to the standard temperature range of -20 to +40 °C. Deviating resistances may occur in other temperature ranges, especially in case of drives with permitted temperature above +60 °C, or in case of non-ventilated drives, due to modified winding configurations. The values are available from SEW-EURODRIVE on request.

8.6.1 Brake coil resistance measurement

INFORMATION

For motors with brake controls in the terminal box, the white core must be detached from the terminal for resistance measurement, because otherwise the internal resistances of the brake control can falsify the measurement result.

8.6.2 Brakes BE02, BE03, BE05, BE1, BE1H, BE2, BE2H

	BE02	BE03	BE05, BE1 BE1H	BE2 BE1H
Nominal power brake coil in W	25	25	32	43
Inrush current ratio ESV	4	4	4	4

Nominal voltage (rated voltage range) V_N		BE02		BE03		BE05, BE1 BE1H		BE2 BE2H	
AC V	DC V	R_B	R_T	R_B	R_T	R_B	R_T	R_B	R_T
60 (57 – 63)	24	8.5	24	6	20	4.85	14.8	3.60	11.0
120 (111 – 123)	48	–	–	25	78	19.4	59.0	14.4	44.0
184 (174 – 193)	80	–	–	62	191	48.5	148	36.0	110
208 (194 – 217)	90	–	–	78	241	61.0	187	45.5	139
230 (218 – 243)	96	121	345	96	296	77.0	235	58.0	174
254 (244 – 273)	110	–	–	119	367	97.0	296	72.0	220
290 (274 – 306)	125	–	–	150	462	122	372	91	275
330 (307 – 343)	140	–	–	191	589	154	469	115	350
360 (344 – 379)	160	–	–	247	762	194	590	144	440
400 (380 – 431)	180	375	1070	326	1004	244	743	182	550
460 (432 – 484)	200	580	1650	412	1270	308	935	230	690
500 (485 – 542)	220	–	–	512	1580	387	1178	290	870
575 (543 – 600)	250	–	–	645	1989	488	1483	365	1100

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8.6.3 Brakes BE5, BE11, BE20

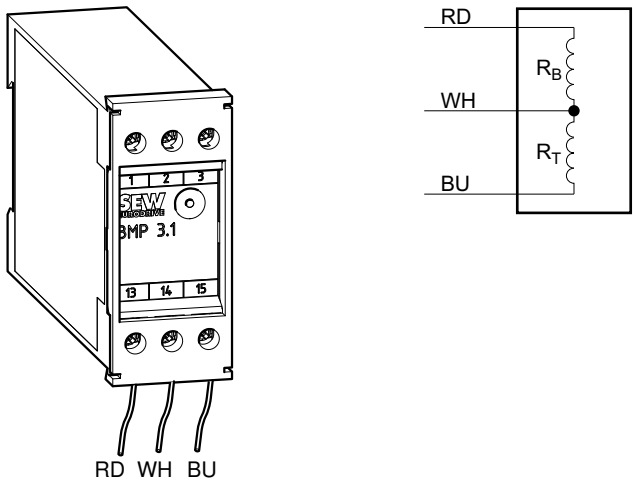
	BE5	BE11	BE20
Nominal power brake coil in W	49	77	95
Inrush current ratio ESV	5.9	6.6	7.5

Nominal voltage (rated voltage range) V_N	BE5			BE11			BE20		
AC V	**R_B**	**R_T**	**DC V**	**R_B**	**R_T**	**DC V**	**R_B**	**R_T**	**DC V**
60 (57 – 63)	2.20	10.5	24	1.22	7.0	24	0.9	5.7	24
120 (111 – 123)	8.70	42.0	–	4.90	28.0	–	3.4	22.8	–
184 (174 – 193)	22.0	105	–	12.3	70	–	8.5	57.2	–
208 (194 – 217)	27.5	132	–	15.5	88	–	10.7	72.0	–
230 (218 – 243)	34.5	166	–	19.5	111	–	13.5	90.6	–
254 (244 – 273)	43.5	210	–	24.5	139	–	17.0	114.1	–
290 (274 – 306)	55.0	265	–	31.0	175	–	21.4	143.6	–
330 (307 – 343)	69.0	330	–	39.0	220	–	26.9	180.8	–
360 (344 – 379)	87.0	420	–	49	280	–	33.2	223	–
400 (380 – 431)	110	530	–	62	350	–	42.7	287	–
460 (432 – 484)	138	660	–	78	440	–	53.2	357	–
500 (485 – 542)	174	830	–	98	550	–	67.7	454	–
575 (543 – 600)	220	1050	–	123	700	–	83.5	559	–

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8.6.4 Resistance measurement BE120, BE122

The following illustration shows how to measure resistance with BMP 3.1.



BS	Accelerator coil	RD	Red
TS	Coil section	WH	White
R_B	Accelerator coil resistance at 20 °C in Ω	BU	Blue
R_T	Coil section resistance at 20 °C in Ω		
V_N	Nominal voltage (rated voltage range)		

INFORMATION

For motors with brake controls in the terminal box, the white core must be detached from the terminal for resistance measurement, because otherwise the internal resistances of the brake control can falsify the measurement result.

8.6.5 Brakes BE30, BE32, BE60, BE62, BE120, BE122

	BE30, BE32	BE60, BE62	BE120, BE122
Nominal power brake coil in W	120	195	220
Inrush current ratio ESV	8.5	9.2	6

Nominal voltage (rated voltage range) V_N	**BE30, BE32**		**BE60, BE62**		**BE120, BE122**	
AC V	**R_B**	**R_T**	**R_B**	**R_T**	**R_B**	**R_T**
230 (218 – 243)	–	–	–	–	7.6	37.9
254 (244 – 273)	2.3	17.2	–	–	9.6	47.7
290 (274 – 306)	5.8	43.2	–	–	12.1	60.1
360 (344 – 379)	7.3	54.4	4.0	32.6	19.2	95.2
400 (380 – 431)	9.2	68.5	5.0	41.0	24.2	119.9
460 (432 – 484)	11.6	86.2	6.3	51.6	30.4	150.9
500 (485 – 542)	14.6	108.6	7.9	65.0	38.3	189.9
575 (543 – 600)	18.4	136.7	10.0	81.8	48.2	239.1

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8.7 Brake control

The depicted combinations apply to drives in insulation class B or F, and to the standard temperature range of -20 °C to +40 °C.

For the brake control assigned to your drive, refer to the specifications on the motor nameplate.

INFORMATION

The depicted combinations may be limited depending on the present drive configuration (e.g. insulation class H, deviating temperature ranges, etc.). In case of a conversion, check if brake control is permitted for your drive combination. Contact SEW-EURODRIVE if necessary.

8.7.1 Permitted combinations

The following table shows the standard and optional combinations of brake and brake rectifier.

		BE02	BE03 with DRN63	BE03	BE05	BE1 BE1H	BE2 BE2H
BG..	BG 1.2	X	X	–	–	–	–
	BG 1.4	–	–	X[3]	X[3]	X[3]	X[3]
	BG 1.5	–	–	X[1]	X[1]	X[1]	X[1]
	BG 2.4	X	X	–	–	–	–
	BG 3	–	–	X[2]	X[2]	X[2]	X[2]
BGE..	BGE 1.4	–	–	o	o	o	o
	BGE 1.5	–	–	•	•	•	•
	BGE 3	–	–	•	•	•	•
BS..	BS 24	–	–	X	X	X	X
BMS..	BMS 1.4	o	o	o	o	o	o
	BMS 1.5	•	•	•	•	•	•
	BMS 3	•	•	•	•	•	•
BME..	BME 1.4	o	o	o	o	o	o
	BME 1.5	•	•	•	•	•	•
	BME 3	•	•	•	•	•	•
BMH..	BMH 1.4	o	o	o	o	o	o
	BMH 1.5	•	•	•	•	•	•
	BMH 3	•	•	•	•	•	•
BMK..	BMK 1.4	o	o	o	o	o	o
	BMK 1.5	•	•	•	•	•	•
	BMK 3	•	•	•	•	•	•
BMKB..	BMKB 1.5	•	•	•	•	•	•
BMP..	BMP 1.4	o	o	o	o	o	o
	BMP 1.5	•	•	•	•	•	•
	BMP 3	•	•	•	•	•	•
	BMP 3.1	–	–	–	–	–	–
BMV..	BMV 5	•	•	•	•	•	•
BSG..	BSG	–	–	•	•	•	•
BUR..	BG 1.2 + UR10	•	•	–	–	–	–
	BG 2.4 + UR10	•	•	–	–	–	–
	BGE 3 + UR 11	–	–	•	•	•	•
	BGE 1.5 + UR 15	–	–	•	•	•	•

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		BE02	BE03 with DRN63	BE03	BE05	BE1 BE1H	BE2 BE2H
BST..	BST 0.6S	•	•	•	•	•	•
	BST 0.7S	•	•	•	•	•	•
	BST 1.2S	•	•	•	•	•	•
		BE02	**BE03 with DRN63**	**BE03**	**BE05**	**BE1**	**BE2**
BSR..	BG 1.2 + SR10	•	•	–	–	–	–
	BG 2.4 + SR10	•	•	–	–	–	–
	BGE1.5 + SR10	–	–	•	•	•	–
	BGE 1.4 + SR 15	–	–	o	o	o	o
	BGE 3 + SR 11	–	–	•	•	•	•
	BGE 3 + SR 15	–	–	•	•	•	•
	BGE3 + SR10	–	–	•	•	•	–
	BGE 1.5 + SR 11	–	–	•	•	•	•
	BGE 1.5 + SR 15	–	–	•	•	•	•
		BE5	**BE11**	**BE20**	**BE30, BE32**	**BE60, BE62**	**BE120, BE122**
BG..	BG 1.2	–	–	–	–	–	–
	BG 1.4	–	–	–	–	–	–
	BG 1.5	–	–	–	–	–	–
	BG 2.4	–	–	–	–	–	–
	BG 3	–	–	–	–	–	–
BGE..	BGE 1.4	X[3]	X[3]	X[3]	X[3]	X[3]	–
	BGE 1.5	X[1]	X[1]	X[1]	X[1]	X	–
	BGE 3	X[2]	X[2]	X[2]	X[2]	X	–
BS..	BS 24	–	–	–	–	–	–
BMS..	BMS 1.4	–	–	–	–	–	–
	BMS 1.5	–	–	–	–	–	–
	BMS 3	–	–	–	–	–	–
BME..	BME 1.4	o	o	o	o	o	–
	BME 1.5	•	•	•	•	X	–
	BME 3	•	•	•	•	X	–
BMH..	BMH 1.4	o	o	o	o	–	–
	BMH 1.5	•	•	•	•	–	–
	BMH 3	•	•	•	•	–	–
BMK..	BMK 1.4	o	o	o	o	–	–
	BMK 1.5	•	•	•	•	–	–
	BMK 3	•	•	•	•	–	–
BMKB..	BMKB 1.5	•	•	•	•	–	–
BMP..	BMP 1.4	o	o	o	o	–	–
	BMP 1.5	•	•	•	•	–	–
	BMP 3	•	•	•	•	–	–
	BMP 3.1	–	–	–	–	•	X
BMV..	BMV 5	•	•	•	–	–	–
BSG..	BSG	X	X	X	–	–	–

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		BE5	BE11	BE20	BE30, BE32	BE60, BE62	BE120, BE122
BSR..	BG 1.2 + SR10	–	–	–	–	–	–
	BG 2.4 + SR10	–	–	–	–	–	–
	BGE1.5 + SR10	–	–	–	–	–	–
	BGE 1.4 + SR 15	o	o	o	o	–	–
	BGE 3 + SR 11	•	•	–	–	–	–
	BGE 3 + SR 15	•	•	•	•	–	–
	BGE3 + SR10	–	–	–	–	–	–
	BGE 1.5 + SR 11	•	•	–	–	–	–
	BGE 1.5 + SR 15	•	•	•	•	–	–
BUR..	BG 1.2 + UR10	–	–	–	–	–	–
	BG 2.4 + UR10	–	–	–	–	–	–
	BGE 3 + UR 11	•	–	–	–	–	–
	BGE 1.5 + UR 15	•	•	•	•	–	–
BST..	BST 0.6S	•	•	•	•	–	–
	BST 0.7S	•	•	•	•	–	–
	BST 1.2S	•	•	•	•	–	–

X Standard design

X^1 Standard design with nominal brake voltage of 150 – 500 V_{AC}

X^2 Standard design with nominal brake voltage of 24/42 – 150 V_{AC}

X^3 Standard design with nominal brake voltage of 575 V_{AC}

• Optional

o Optional with 575 V_{AC} nominal brake voltage

– Not permitted

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8.7.2 Motor terminal box

The following table shows the technical data of the brake controls for installation in the terminal box. The different housings have different colors (= color code) to make them easier to distinguish.

BG..

Half-wave rectifier without electronic switching.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BG1.4	AC 230 – 575 V	DC 1.0 A	08278814	Jet black
BG1.2	AC 90 – 500 V	DC 1.2 A	08269920	Jet black
BG1.5	AC 150 – 500 V	DC 1.5 A	08253846	Jet black
BG2.4	AC 24 – 90 V	DC 2.4 A	08270198	Mahogany brown
BG3	AC 24 – 500 V	DC 2.8 A	08253862	Mahogany brown

BGE..

Half-wave rectifier with electronic switching.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BGE1.4	AC 230 – 575 V	DC 1.0 A	08278822	Vermilion
BGE1.5	AC 150 – 500 V	DC 1.5 A	08253854	Vermilion
BGE3	AC 42 – 150 V	DC 2.8 A	08253870	Light blue

BGE..

Half-wave rectifier with electronic switching.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BGE1.5	AC 150 – 500 V	DC 1.5 A	08253854	Vermilion
BGE3	AC 42 – 150 V	DC 2.8 A	08253870	Light blue

BSR..

Half-wave rectifier + current relay for switch-off in the DC circuit.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BGE1.5 + SR10	AC 150 – 500 V	DC 1.0 A	08253854 0826760X	Jet black Gray

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Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BGE1.5 + SR11	AC 150 – 500 V	DC 1.0 A	08253854 08267618	Jet black Gray
BGE1.5 + SR15	AC 150 – 500 V	DC 1.0 A	08253854 08267626	Jet black Gray
BG1.2 + SR10	AC 90 – 500 V	DC 1.0 A	08269920 0826760X	Jet black Gray
BG1.2 + SR11	AC 90 – 500 V	DC 1.0 A	08269920 08267618	Jet black Gray
BG2.4 + SR10	AC 42 – 90 V	DC 1.0 A	08270198 0826760X	Mahogany brown Gray
BGE3 + SR11	AC 42 – 150 V	DC 1.0 A	20253870 08267618	Mahogany brown Gray
BGE3 + SR15	AC 42 – 150 V	DC 1.0 A	08253870 08267626	Mahogany brown Gray

BUR..

Half-wave rectifier with voltage relay for switch-off in the DC circuit.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BG1.2 + UR15	AC 150 – 500 V	DC 1.0 A	08269920 0826760X	Jet black Gray
BGE1.5 + UR15	AC 150 – 500 V	DC 1.0 A	08253854 08267596	Vermilion Gray
BG2.4 + UR11	AC 42 – 150 V	DC 1.0 A	08270198 08267588	Mahogany brown Gray
BGE3 + UR11	AC 42 – 150 V	DC 1.0 A	08253870 08267588	Light blue Gray

BS24

Varistor overvoltage protection.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BS24	DC 24 V	DC 5.0 A	08267634	Water blue

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BSG..

Electronic switching.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BSG	DC 24 V	DC 5.0 A	08254591	Pure white

BMP..

Half-wave rectifier with electronic switching and integrated voltage relay for cut-off in the DC circuit.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BMP3.1[1)]	AC 230 – 575 V	DC 2.8 A	08295077	–

1) Only sizes 250 – 315

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8.7.3 Control cabinet

The following tables list the technical data of brake control systems for installation in the control cabinet. The different housings have different colors (= color code) to make them easier to distinguish.

BMS..

Half-wave rectifier without electronic switching.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BMS1.4	AC 230 – 575 V	DC 1.0 A	08298300	Tar black
BMS1.5	AC 150 – 500 V	DC 1.5 A	08258023	Tar black
BMS3	AC 42 – 150 V	DC 3.0 A	08258031	Mahogany brown

BME..

Half-wave rectifier with electronic switching.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BME1.4	AC 230 – 575 V	DC 1.0 A	08298319	Vermilion
BME1.5	AC 150 – 500 V	DC 1.5 A	08257221	Vermilion
BME3	AC 42 – 150 V	DC 3.0 A	0825723X	Light blue

BMH..

Half-wave rectifier with electronic switching and heating function

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BMH1.4	AC 230 – 575 V	DC 1.0 A	08298343	Signal green
BMH1.5	AC 150 – 500 V	DC 1.5 A	0825818X	Signal green
BMH3	AC 42 – 150 V	DC 3.0 A	08258198	Zinc yellow

BMP..

Half-wave rectifier with electronic switching and integrated voltage relay for cut-off in the DC circuit.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BMP1.4	AC 230 – 575 V	DC 1.0 A	08298327	Light gray
BMP1.5	AC 150 – 500 V	DC 1.5 A	08256853	Light gray
BMP3	AC 42 – 150 V	DC 3.0 A	08265666	Light green

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Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BMP3.1	AC 230 – 575 V	DC 2.8 A	08295077	–

BMK..

Half-wave rectifier with electronic switching, DC 24 V control input, and cut-off in the DC circuit.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BMK1.4	AC 230 – 575 V	DC 1.0 A	08298335	Water blue
BMK1.5	AC 150 – 500 V	DC 1.5 A	08264635	Water blue
BMK3	AC 42 – 150 V	DC 3.0 A	08265674	Light pink

BMKB..

Half-wave rectifier with electronic switching, DC 24 V control input, rapid cut-off and LED status display.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BMKB1.5	AC 150 – 500 V	DC 1.5 A	08281602	Water blue

BMV..

Brake control unit with electronic switching, DC 24 V control input and fast cut-off.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BMV5	DC 24 V	DC 5.0 A	13000063	Pure white

BST..

Safe brake control with electronic switching, DC 24 V control input and safe DC 24 V control input. Supply via the DC link of the inverter.

Type	Nominal voltage	Nominal output current I_L	Part number	Color code
BST0.6S	AC 460 V	DC 0.6 A	08299714	–
BST0.7S	AC 400 V	DC 0.7 A	13000772	–
BST1.2S	AC 230 V	DC 1.2 A	13001337	–

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8.8 Permitted rolling bearings

8.8.1 Rolling bearing for DR..56 – 280 motors

Motors	A-side bearing		B-side bearing	
	AC motor	Gearmotor	AC motor	Brakemotor
DR..56	–	6302-2Z-C3	6002-2Z-C3	6002-2RS-C3
DR..63	6202-2Z-C3	6303-2Z-C3	6203-2Z-C3	6203-2Z-C3
DR..71	6204-2Z-C3		6203-2Z-C3	
DR..80	6205-2Z-C3	6304-2Z-C3	6304-2Z-C3	6304-2RS-C3
DR..90	6305-2Z-C3 IEC28X60: 6306		6205-2Z-C3	6205-2RS-C3
DR..100	6306-2Z-C3		6205-2Z-C3	6205-2RS-C3
DR..112	6308-2Z-C3		6207-2Z-C3	6207-2RS-C3
DR..132S	6308-2Z-C3	6308-2Z-C3	6207-2Z-C3	6207-2RS-C3
DR..132M/L	6308-2Z-C3 IEC42X110: 6309	6309-2Z-C3	6209-2Z-C3	6209-2RS-C3
DR..160	6310-2Z-C3	6312-2Z-C3	6212-2Z-C3	6212-2RS-C3
DR..180	6311-2Z-C3 IEC55x110: 6312	6312-2Z-C3	6212-2Z-C3	6212-2RS-C3
DR..200	6312-2Z-C3 IEC60x140: 6314	6314-2Z-C3	6314-2Z-C3	6314-2RS-C3
DR..225	6314-2Z-C3		6314-2Z-C3	6314-2RS-C3
DR..250 – 280	6317-2Z-C4		6315-2Z-C3	

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8.8.2 Rolling bearing for DR..315, DRN315 motors

Motors	A-side bearing		B-side bearing	
	AC motor	Gearmotor	AC motor	Gearmotor
DR..315S	6319-C3	6319-C3	6319-C3	6319-C3
DR..315M				
DR..315L	6319-C3	6322-C3	6319-C3	6322-C3
DR..315H				

8.8.3 Rolling bearing for DR..250 – 315 with reinforced bearings /ERF

Motors	A-side bearing	B-side bearing	
		AC motor	Gearmotor
DR..250 – 280	NU317E-C3	6315-C3	
DR..315S	NU319E	6319-C3	6319-C3
DR..315M			
DR..315L			6322-C3
DR..315H			

8.8.4 Rolling bearing for DR..200 – 315 with current-insulated rolling bearings /NIB

Motors	B-side bearing	
	AC motor	Gearmotor
DR..200 – 225	6314-C3-EI	6314-C3-EI
DR..250 – 280	6315-Z-C3-EI	6315-Z-C3-EI
DR..315S	6319-C3-EI	6319-C3-EI
DR..315M		
DR..315L		6322-C3-EI
DR..315H		

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8.9 Lubricant tables

8.9.1 Lubricant table for rolling bearings

INFORMATION

Use of wrong bearing grease can damage the bearings.

Motors with sealed bearings

The bearings are 2Z or 2RS closed bearings and cannot be relubricated. They are used for DR..56 – 280 motors.

	Ambient temperature	Manufacturer	Type	DIN designation
Motor rolling bearings	-20 °C to +80 °C	Mobil	Polyrex EM[1)]	K2P-20
	+20 °C to +100 °C	Klüber	Klüberquiet BQ72-72[2)]	KX2U
	-40 °C to +60 °C	Kyodo Yushi	Multemp SRL[2)]	KE2N-40
	-20 °C to +60 °C	SKF	LHT23[2)]	KE2N-40

1) Mineral lubricant (= mineral-based bearing grease)
2) Synthetic lubricant (= synthetic-based bearing grease)

Motors with open bearings

Motors of size DR..315 always have open bearings. If the DR..225 – 280 motors have the relubrication option /NS, they also have open bearings.

	Ambient temperature	Manufacturer	Type	DIN designation
Rolling bearings	-20 °C to +80 °C	Mobile	Polyrex EM[1)]	K2P-20
	-40 °C to +60 °C	SKF	LGHP 2[1)]	K2N-40

1) Mineral lubricant (= mineral-based bearing grease)

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8.9.2 Order information for lubricants, anti-corrosion agents and sealants

Lubricants, anti-corrosion agents, and sealants can be obtained directly from SEW-EURODRIVE using the following purchase order numbers.

Use	Manufacturer	Type	Quantity	Purchase order number
Lubricant for rolling bearing	Mobile	Polyrex EM	400 g	09101470
	SKF	LGHP2	400 g	09101276
Lubricant for sealing rings				
Material: NBR/FKM	Klüber	Petamo GHY 133N	10 g	04963458
Material: EPDM/EPP	Klüber	Klübersynth BLR 46-122	10 g	03252663
Corrosion protection and lubricant	SEW-EURODRIVE	NOCO-Paste	5.5 g	09107819
Sealant	Marston Domsel	SEW-L-Spezial	80 g	09112286
Backstop lubricant	Mobile	Grease LBZ 1	400 g	03287211

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8.10 Encoders

For information on the available encoders, refer to the manual and the operating instructions "Built-in encoders, add-on encoders and safety encoders – DR.., DRN.., DRU.., DR2.., EDR.., EDRN.. AC Motors".

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8.11 Diagnostic unit /DUE

Sensors		Ø 6 mm	Ø 8 mm
		DUE-d6-01	DUE-d8-01
Measuring range (MB)	mm	1.5	2.0
Protection class		IP66	IP66
Operating temperature (sensor and cable)		-50 to +150 °C	-50 to +150 °C

Evaluation unit			DUE-1K-00
Part number			21195609
Signal outputs (1 channel)			OUT1: 4 – 20 mA FCT1: DC 24 V (150 mA) WEAR1: DC 24 V (150 mA)
Current consumption	Max.	mA	320
	Min.	mA	40
Supply voltage			DC 24 V (±15%)
Electromagnetic compatibility			DIN EN 61800-3
Operating temperature (evaluation unit)			-40 bis +105 °C
Air humidity			≤ 90% rF
Protection class			IP20 (in the closed terminal box up to IP66)

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8.12 Characteristic safety values

8.12.1 Characteristic safety values for brakes BE.. and BE.H

The values specified in the following table apply to BE.. brakes in standard applications.

	Characteristic safety values according to EN ISO 13849-1	
Classification	Category B	
System structure	1-channel (Cat. B)	
$MTTF_d$ value	Calculation via B_{10D} value	
B_{10D} value	BE02	1.5×10^6
	BE03	20×10^6
	BE05	16×10^6
	BE1 BE1H	12×10^6
	BE2 BE2H	8×10^6
	BE5	6×10^6
	BE11	3×10^6
	BE20	2×10^6
	BE30	1.5×10^6
	BE32	1.5×10^6
	BE60	1×10^6
	BE62	1×10^6
	BE120	0.25×10^6
	BE122	0.25×10^6

SEW-EURODRIVE offers BE03 to BE32 brakes also as safety brakes. For more information, refer to the addendum to the operating instructions Safety Brakes – AC Motors DR.., DRN.., DRU.., DR2.., EDR.., EDRN.. – Functional Safety".

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9 Malfunctions

9.1 General information



⚠ WARNING

Risk of injury if the drive starts up unintentionally.

Severe or fatal injuries.

- Before you start working on the unit, disconnect the motor and all connected options from the power supply.
- Secure the motor against unintended power-up.



⚠ CAUTION

The surfaces on the drive can be very hot during operation.

Risk of burns.

- Let the motor cool down sufficiently before you start working on it.



INFORMATION

- Monitor encoders using electronic temperature detection in order to prevent malfunctions.
- In the event of an emergency stop or heavy braking, electronic encoders will report a fault that must be acknowledged in the encoder evaluation or control unit. A new reference travel may be required.

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9.2 Motor malfunctions

Fault	Possible cause	Measure
Motor does not start up	Supply cable interrupted	Check the connections and (intermediate) terminal points, correct if necessary
	Brake does not release	See chapter "Brake malfunctions"
	Supply cable fuse has blown	Replace fuse
	Motor protection (switch) has triggered	Check that the motor protection (switch) is set correctly; current specification is on the nameplate
	Motor protection does not trip	Check motor protection control
	Error in control or in the control process	Observe the switching sequence; correct if necessary
Motor only starts with difficulty or does not start at all	Motor power designed for delta connection but connected in star	Correct the connection from star to delta; Observe wiring diagram
	Motor power designed for star-star connection but only connected in star	Correct the connection from star to star-star; Observe wiring diagram
	Voltage or frequency differs considerably from the setpoint, at least when switching on the motor	Provide better power supply system; reduce the power supply load; Check cross section of supply cable, replace with cable of larger cross section if necessary
Motor does not start in star connection, only in delta connection	Star connection does not provide sufficient torque	If the delta inrush current is not too high (observe the regulations of the power supplier), start up directly in delta; Check the project planning and use a larger motor or special design if necessary. Contact SEW-EURODRIVE.
	Contact fault on star/delta switch	Check the switch, replace if necessary; Check the connections
Incorrect direction of rotation	Motor connected incorrectly	Swap 2 phases of the motor supply cable
Motor hums and has high current consumption	Brake does not release	See chapter "Brake malfunctions"
	Winding defective	Send motor to specialist workshop for repair
	Rotor rubbing	Send motor to specialist workshop for repair
Fuses blow or motor protection trips immediately	Short circuit in the motor supply cable	Eliminate short circuit
	Supply cables connected incorrectly	Correct the connection; Observe wiring diagram
	Short circuit in the motor	Send motor to specialist workshop for repair
	Ground fault on motor	Send motor to specialist workshop for repair

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Fault	Possible cause	Measure
Severe speed loss under load	Motor overload	Measure power, check project planning and use larger motor or reduce load if necessary
	Voltage drops	Check cross section of supply cable, replace with cable of larger cross section if necessary
Motor heats up excessively (measure temperature)	Overload	Measure power, check project planning and use larger motor or reduce load if necessary
	Insufficient cooling	Provide a cooling air supply or clear cooling air passages, retrofit forced cooling fan if necessary. Check the air filter, clean or replace if necessary
	Ambient temperature too high	Observe the permitted temperature range, reduce the load if necessary
	Motor in delta connection instead of star connection as intended	Correct the wiring, observe the wiring diagram
	Loose contact in supply cable (one phase missing)	Tighten loose contact, check connections, observe wiring diagram
	Fuse defective	Look for and rectify cause; replace fuse
	Line voltage deviates from the rated motor voltage by more than 5% (range A) / 10% (range B)	Adjust motor to line voltage
	Operating mode (S1 to S10, DIN 57530) exceeded, e.g. caused by excessive switching frequency	Adjust the operating mode of the motor to the required operating conditions; consult a professional to determine the proper drive, if necessary
Loud noises	Ball bearing compressed, dirty or damaged	Realign motor and the driven machine, inspect rolling bearing and replace if necessary.
	Vibration of rotating parts	Look for the cause, possibly an imbalance; correct the cause, observe method for balancing
	Foreign bodies in cooling air ducts	Clean cooling air ducts
	For DR.. motors with rotor designation "J": Load too high	Reduce the load

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9.3 Brake malfunctions

Fault	Possible cause	Measure
Brake does not release	Incorrect voltage on brake control unit	Apply the correct voltage; brake voltage specified on the nameplate.
	Brake control unit failed	Renew brake control, check resistors and isolation of the brake coils. Check switchgear, replace if necessary.
	Maximum permitted working air gap exceeded because brake lining worn down.	Measure and set working air gap. If the brake disk is too thin, replace the brake disk.
	Voltage drop along supply cable > 10%	Provide correct connection voltage: brake voltage specifications on the nameplate. Check the cross section of the brake supply cable, increase cross section if necessary.
	Inadequate cooling, brake overheating	Provide for cooling air supply or clear cooling air passages, check air filter, clean or replace if necessary. Replace type BG brake rectifier with type BGE.
	Brake coil has interturn short circuit or a short circuit to frame	Check resistors and isolation of the brake coils; Replace complete brake and brake control (specialist workshop); Check switchgear, replace if necessary.
	Rectifier defective	Replace rectifier and brake coil; it may be more economical to replace the complete brake.
Brake does not brake	Working air gap not correct	Measure and set working air gap. If the brake disk is too thin, replace the brake disk.
	Brake lining worn	Replace entire brake lining carrier.
	Incorrect braking torque	Check the dimensioning and, if necessary, change braking torque by type and number of brake springs, or by selecting a different brake.
Brake does not brake	Working air gap so large that setting nuts for the manual release come into contact	Set the working air gap.
	Manual brake release device not set correctly	Set the setting nuts for the manual release correctly.
	Brake locked by manual brake release HF	Loosen the set screw, remove if needed.
Brake is applied with time lag	Brake is switched only on AC voltage side	Switch both the DC and AC circuits (e.g. by retrofitting a SR current relay to BSR or a UR voltage relay to BUR); Observe wiring diagram.

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Fault	Possible cause	Measure
Noises in vicinity of brake	Gearing wear on the brake disk or the driver caused by jerky start-up	Check the project planning, replace the brake disk if necessary. Have a specialist workshop replace the carrier.
	Alternating torques due to incorrectly set inverter	Check correct setting of inverter according to its operating instructions, correct if necessary.

9.4 Malfunctions when operated with a frequency inverter

The symptoms described in chapter "Motor malfunctions" (→ 🗎 255) can also occur when the motor is operated with a frequency inverter. Refer to the frequency inverter operating instructions for the meaning of the problems that occur and to find information about rectifying the problems.

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9.5 Waste disposal

Dispose of the product and all parts separately in accordance with their material structure and the national regulations. Put the product through a recycling process or contact a specialist waste disposal company. If possible, divide the product into the following categories:

- Iron, steel or cast iron
- Stainless steel
- Magnets
- Aluminum
- Copper
- Electronic parts
- Plastics

The following materials are hazardous to health and the environment. These materials must be collected and disposed of separately:

- Oil and grease

  Collect used oil and grease separately according to type. Ensure that the used oil is not mixed with solvent. Dispose of used oil and grease correctly.
- Screens
- Capacitors



Waste disposal according to WEEE Directive 2012/19/EU

This product and its accessories may fall within the scope of the country-specific application of the WEEE Directive. Dispose of the product and its accessories according to the national regulations of your country.

For further information, contact the responsible SEW-EURODRIVE branch or an authorized partner of SEW-EURODRIVE.

9.6 Service

Please have the following information available if you require customer service assistance:

- Nameplate data (complete)
- Type and extent of the failure
- Time the failure occurred and any accompanying circumstances
- Assumed cause
- Ambient conditions such as
  - Ambient temperature
  - Air humidity
  - Installation altitude
  - Dirt
  - etc.

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10 Appendix

10.1 Wiring diagrams

INFORMATION

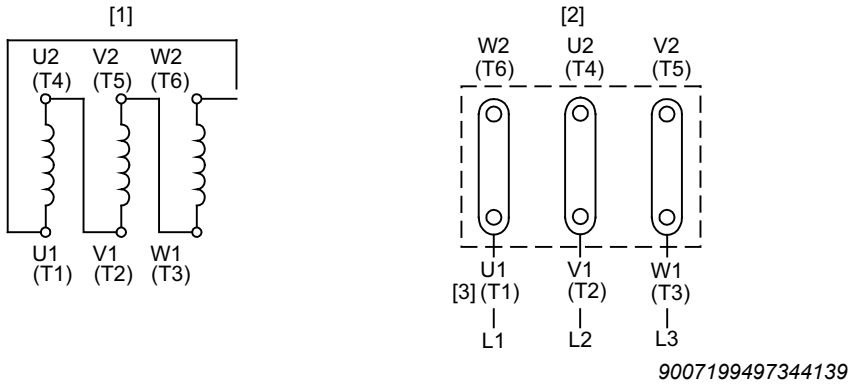
The motor should be connected as shown in the connection wiring diagram or the terminal assignment diagram, which are supplied with the motor. The following section only shows a selection of the common types of connections. You can obtain the relevant wiring diagrams free of charge from SEW-EURODRIVE.

10.1.1 Delta and star connection in wiring diagram R13 (68001 xx 06)

For all motors with one speed, direct on-line, or ⅄/△ start-up.

Delta connection

The following illustration shows the △ connection for lower voltage.

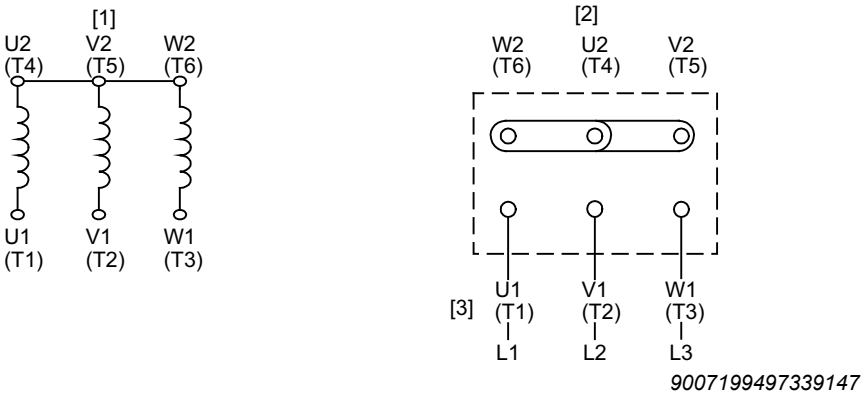


9007199497344139

[1] Motor winding
[2] Motor terminal board
[3] Supply cables

Star connection

The following illustration shows the ⅄ connection for high voltage.



9007199497339147

[1] Motor winding
[2] Motor terminal board
[3] Supply cables

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Proceed as follows to reverse the direction of rotation:

1. Swap the supply cables L1 – L2.

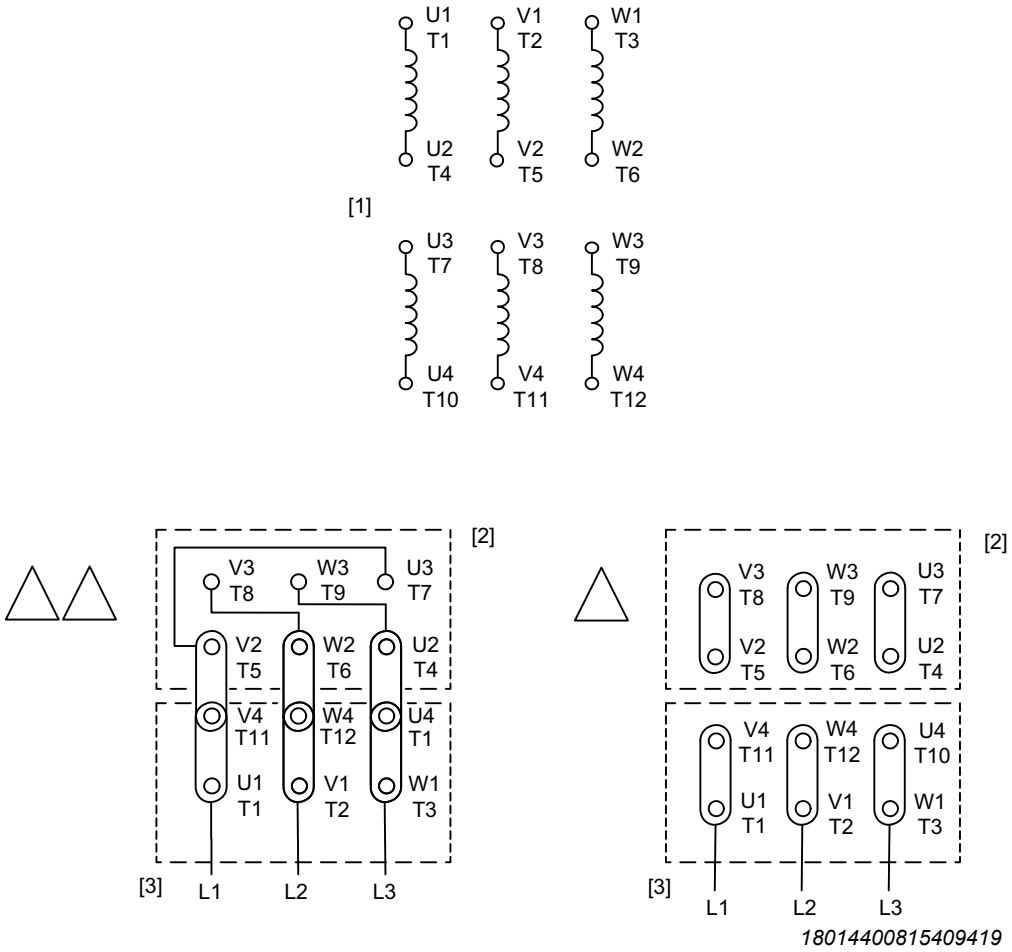
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10.1.2 Delta connection with wiring diagram R72 (68192 xx 09)

For all motors with one speed and direct power-on.

Delta connection, Double-delta connection

The following figure shows the △ connection for high voltages and the △△ connection for lower voltages.



[1] Motor winding
[2] Motor terminal board
[3] Supply cables

Proceed as follows to reverse the direction of rotation:

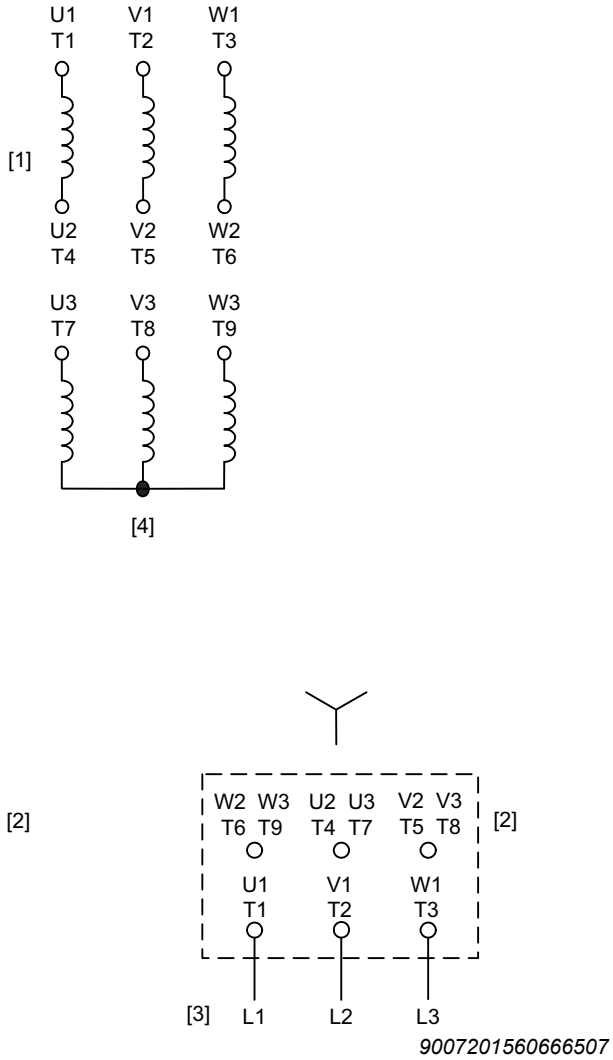
1. Swap the supply cables L1 – L2.

10.1.3 Star connection with wiring diagram R76 (68043 xx 06)

For all motors with one speed and direct power-on.

Star connection, double-star connection

The following figure shows the ⅄ connection for high voltages and the ⅄ ⅄ connection for lower voltages.



9007201560666507

[1] Motor winding
[2] Motor terminal board
[3] Supply cables
[4] Star point connected in motor

Proceed as follows to reverse the direction of rotation:

1. Swap the supply cables L1 – L2.

10.1.4 Motor protection with /TF or /TH for DR..63 – 80 motors

INFORMATION

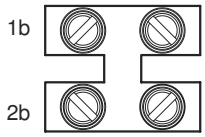
The following shows an example terminal assignment. The actual terminal assignment is included in the motor delivery as a wiring diagram.

/TF, /TH

The following figures show examples for connection of motor protection with /TF PTC thermistor sensors or /TH bimetallic thermostats.

Either a two-pole connection terminal or a five-pole terminal strip is available for connecting to the trip switch.

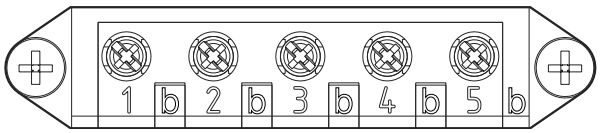
Example: /TF, /TH to 2-pin terminal strip



9007199728684427

1b	2b
TF/TH	TF/TH

Example: 2 × /TF, /TH to 5-pin terminal strip

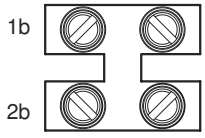


18014398983427083

1b	2b	3b	4b	5b
1.TF/TH	1.TF/TH	2.TF/TH	2.TF/TH	–

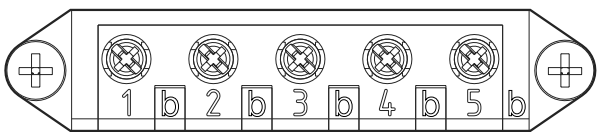
2 × /TF, /TH with anti-condensation heating

The following illustration shows the connection of the motor protection with 2 /TF PTC thermistor sensors or /TH bimetallic thermostats and Hx anti-condensation heating.



9007199728684427

1b	2b
Hx	Hx



18014398983427083

1b	2b	3b	4b	5b
1.TF/TH	1.TF/TH	2.TF/TH	2.TF/TH	–

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10.1.5 Motor protection with /TF or /TH for DR..315 motors

INFORMATION

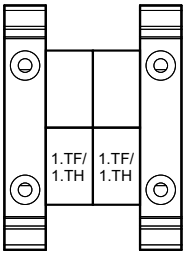
The following shows an example terminal assignment. The actual terminal assignment is included in the motor delivery as a wiring diagram.

/TF, /TH

The following figures show examples for connection of motor protection with /TF PTC thermistor sensors or /TH bimetallic thermostats.

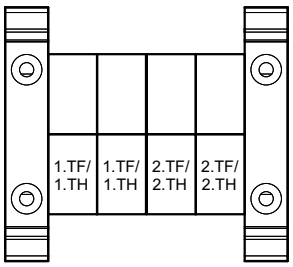
Depending on the version, an "x-pin" terminal strip is available for connection to the trip switch.

Example: /TF, /TH to terminal strip



473405707

Example: 2x /TF, /TH to terminal strip



473410187

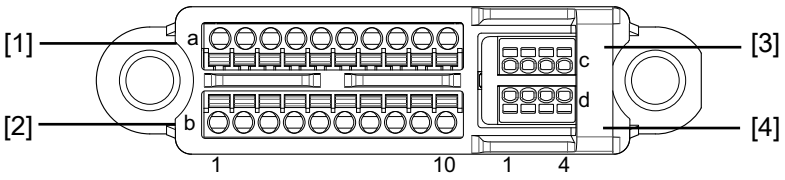
10.1.6 Connecting EI7. built-in encoders

INFORMATION

Observe the wiring diagrams in chapter "Overview of wiring diagrams"

Connection via terminal strip in the terminal box

The encoder is equipped with a 10-pin terminal strip for connection:



29160248331

[1]	The range 1a – 10a has been pre-configured by SEW-EURODRIVE. It must not be changed.
[2]	The range 1b – 10b is intended for connection by the customer.
[3]	The range 1c – 4c has been pre-configured by SEW-EURODRIVE. It must not be changed.
[4]	The range 1d – 4d has been pre-configured by SEW-EURODRIVE. It must not be changed by the customer.

Basic connection:

The connections 1a – 10a, 1c – 4c and 1d – 4d lead to the encoder and/or the motor.

The connections 1b – 10b lead to the cable gland.

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
a	TF1[1)]	TF1[1)]	TF2[1)] opt.	TF2[1)] opt.	+UB (GY)	GND (PK)	A (BN)	$\overline{A}$ (WH)	$\overline{B}$ (YE)	B (GN)
b	TF1[1)]	TF1[1)]	TF2[1)] opt.	TF2[1)] opt.	+UB	GND	A	$\overline{A}$	B	$\overline{B}$

1) TF, PI, PK motor temperature sensor (operation only in protective extra-low voltage)

Pin assignment EI7**C**				
	1	2	3	4
c	GND_ Config (BU)	n. c.	n. c.	n. c.
d	EI7C (RD)	n. c.	n. c.	n. c.

Pin assignment EI7**6**				
	1	2	3	4
c	GND_ Config (BU)	n. c.	n. c.	n. c.
d	n. c.	EI76 (RD)	n. c.	n. c.

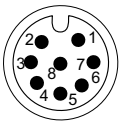
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Pin assignment EI7**2**				
	1	2	3	4
c	GND_ Config (BU)	n. c.	n. c.	n. c.
d	n. c.	n. c.	EI72 (RD)	n. c.

Pin assignment EI7**1**				
	1	2	3	4
c	GND_ Config (BU)	n. c.	n. c.	n. c.
d	n. c.	n. c.	n. c.	EI71 (RD)

Connection via M12 connector on the terminal box

An 8-pin or a 4-pin M12 connector is available for the connection.

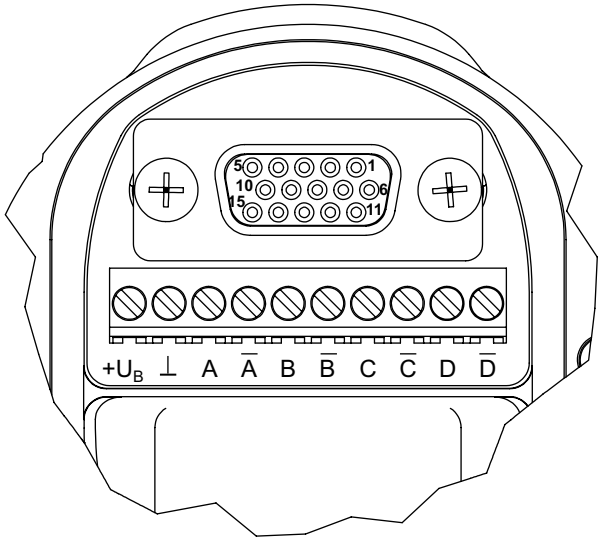
4-pin M12 connector AVSE		**8-pin M12 connector AVRE**	
• A-coded • male 	Pin 1: $+U_B$ Pin 2: B Pin 3: GND Pin 4: A	• A-coded • male 	Pin 1: $+U_B$ Pin 2: GND Pin 3: A Pin 4: $\overline{A}$ Pin 5: B Pin 6: $\overline{B}$ Pin 7: TF1 Pin 8: TF1

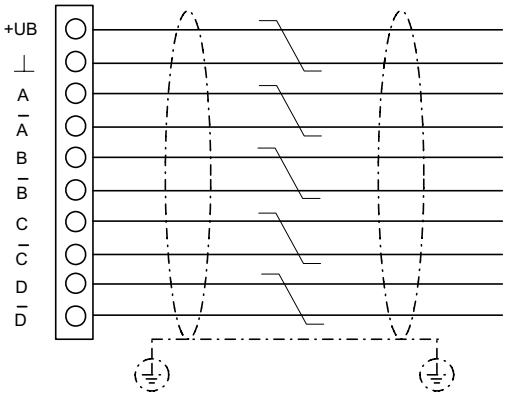
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10.1.7 Structure of wiring diagram of EK8., AK8., ES7., AS7., EG7., AG7., RK8M add-on encoders

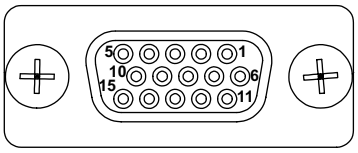
Connection via integrated encoder connector

Observe the notes in the respective chapters about connecting your encoder when connecting the encoder.



		EK8W AK8W AS7W AG7W AV8W	AK8Y AS7Y AG7Y AV8Y	AK8H AV8H	EK8C EK8R ES7C EG7C ES7R EG7R EV8C EV8R	EK8S ES7S EG7S EV8S	RK8M
	$+U_B$	$+U_B$	$+U_B$	$+U_B$	$+U_B$	$+U_B$	R1 ref+
	⊥	DGND	DGND	DGND	DGND	DGND	R2 ref-
	A	Cos+	Cos+	Cos	A	Cos+	S1 cos+
	Ā	Cos-	Cos-	Cos ref	Ā	Cos-	S3 cos-
	B	Sin+	Sin+	Sin	B	Sin+	S2 sin+
	B̄	Sin-	Sin-	Sin ref	B̄	Sin-	S4 sin-
	C	–	Clock+	–	C	C	n.c.
	C̄	–	Clock-	–	C̄	C̄	n.c.
	D	Data+	Data+	Data+	–	Data+	n.c.
	D̄	Data-	Data-	Data-	–	Data-	n.c.

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15-pin D-sub socket	
	Pin 1: D+, data+
	Pin 2: D-, data-
	Pin 3: n.c.
	Pin 4: n.c.
	Pin 5: U_B
	Pin 6: C-, clock-
	Pin 7: n.c.
	Pin 8: n.c.
	Pin 9: GND
	Pin 10: GND
	Pin 11: C+, clock+
	Pin 12: B-, sin-
	Pin 13: B+, sin+
	Pin 14: A-, cos-
	Pin 15: A+, cos+

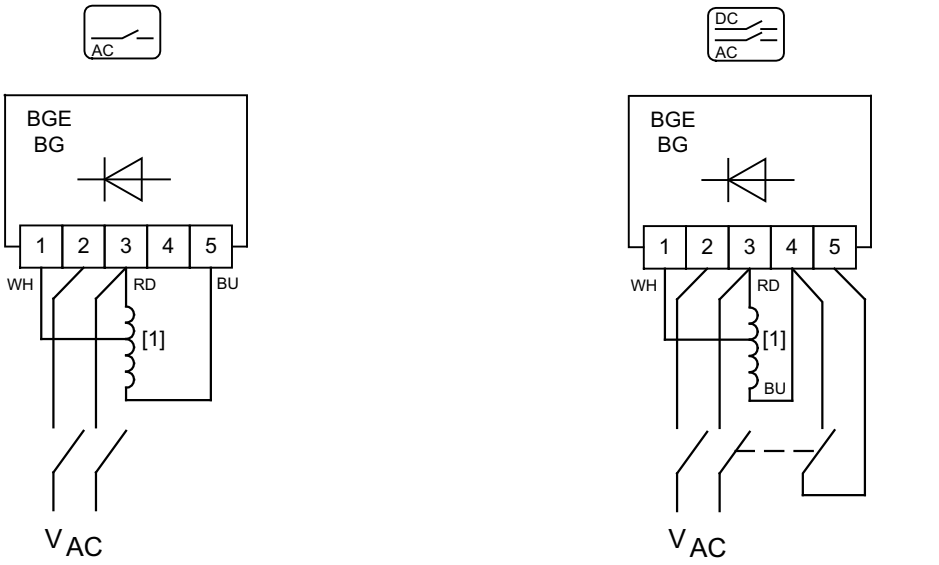
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10.1.8 BGE..; BS..; BSG..; BUR.. brake control

BG../BGE..

Wiring diagram B100

The following illustration shows the wiring for BG.. and BGE.. brake rectifiers for the AC-side shut-off as well as the DC and AC-side shutoff.



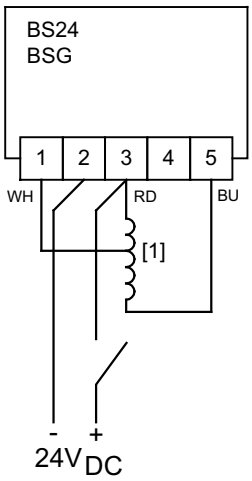
9007199497345803

[1] Brake coil

BS24/BSG..

Wiring diagram B105

The following illustration shows the DC 24 V connection of the BS24 brake protection or BSG.. control unit.



18014398752088459

[1] Brake coil

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BUR

NOTICE

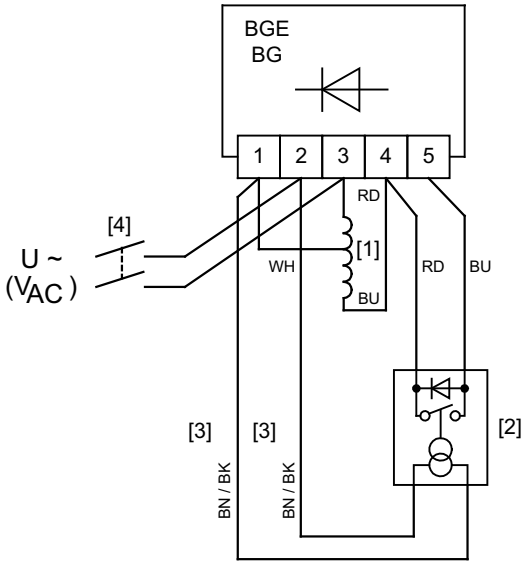
Malfunction caused by incorrect brake connection for frequency inverter operation.

The drive system might be damaged.

- Do not connect the brake to the terminal board of the motor.

Wiring diagram B100

The following figure shows the wiring for BUR.. brake control



9007199497349131

[1] Brake coil
[2] UR11/UR15 voltage relay

BN = UR 11 (42 – 150 V)
BK = UR 15 (150 – 500 V)

10.1.9 BSR.. brake control

Brake voltage = phase-to-neutral voltage

BSR.. brake control for single speed drives in line operation (basic wiring diagram R13)

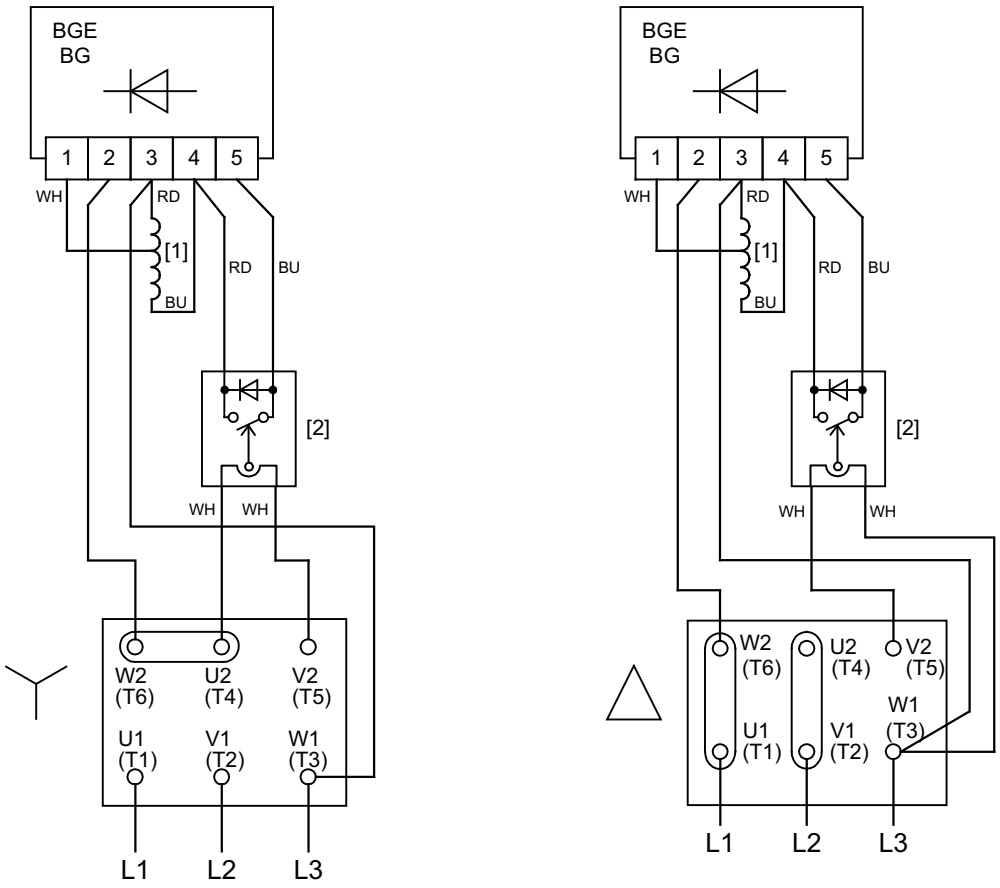
Wiring diagram R13A/R13B

The white interconnecting wires are the ends of a converter loop and, depending on the motor connection, must be connected to the motor terminal block instead of the △ or ⅄ bridge.

The following figure shows the factory wiring for BSR.. brake control.

For example

Motor:	AC 230 V/AC 400 V
Brake:	AC 230 V



18014398752081803

[1] Brake coil
[2] SR10/11/15/19 current relay

Brake voltage = Line voltage

Wiring diagram R13C

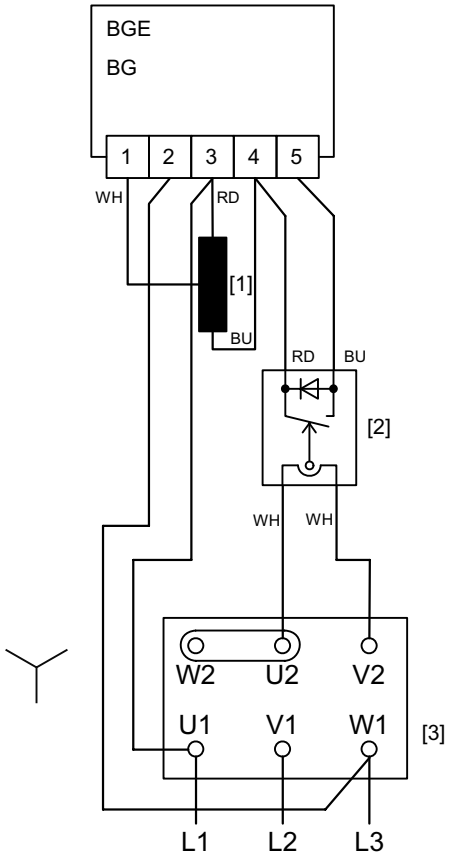
The white interconnecting wires are the ends of a converter loop and, depending on the motor connection, must be connected to the motor terminal block instead of one of the ⅄ bridges before startup.

The following figure shows the factory wiring for BSR.. brake control:

Example

Motor: AC 400 V

Brake: AC 400 V



17564599179

[1] Brake coil
[2] SR10/11/15/19 current relay
[3] Terminal board

Further wiring diagrams for BSR.. brake control

Wiring diagrams for BSR.. brake control in combination with the following drives are available from SEW-EURODRIVE upon request.

- Multi-voltage motors according to basic wiring diagram R76 or R72
- Single speed drive with cage clamp terminal /KCC (basic wiring diagram A13 or C13)

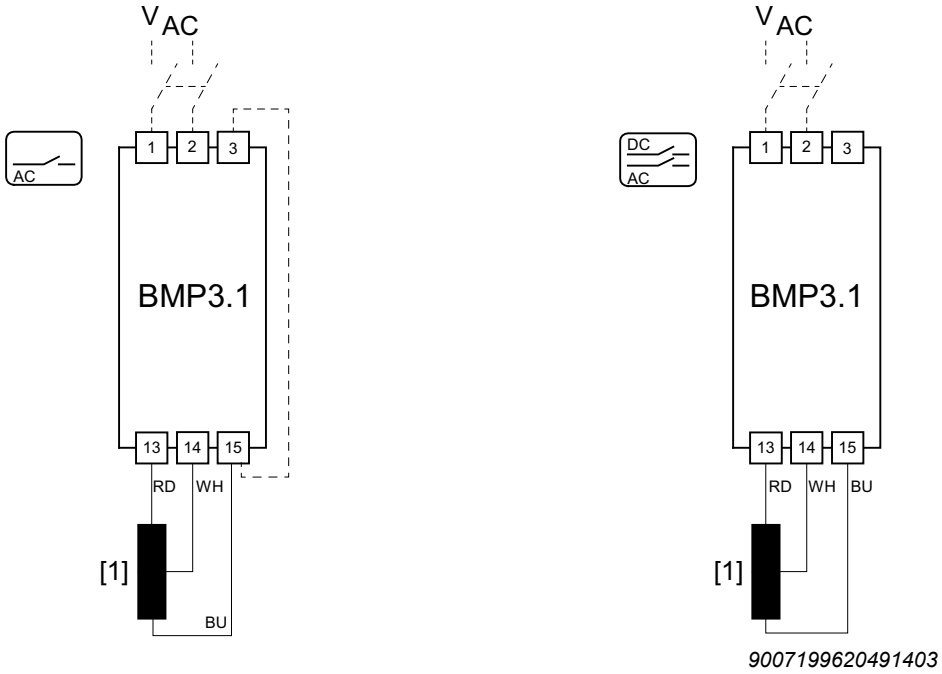
10.1.10 BMP3.1 brake control in the terminal box

INFORMATION

Separate supply cables are required for the voltage supply.

BMP3.1

The following illustration shows the wiring for the BMP3.1 brake rectifier for cut-off in the AC circuit and cut-off in the DC and AC circuit.

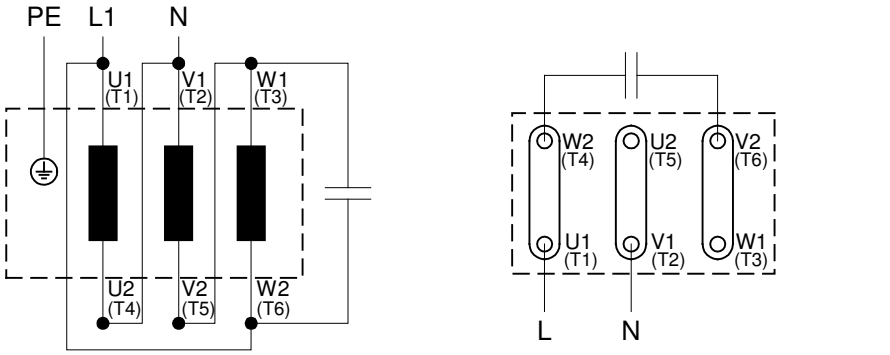


[1] Brake coil

10.1.11 Forced cooling fan /V

Delta Steinmetz

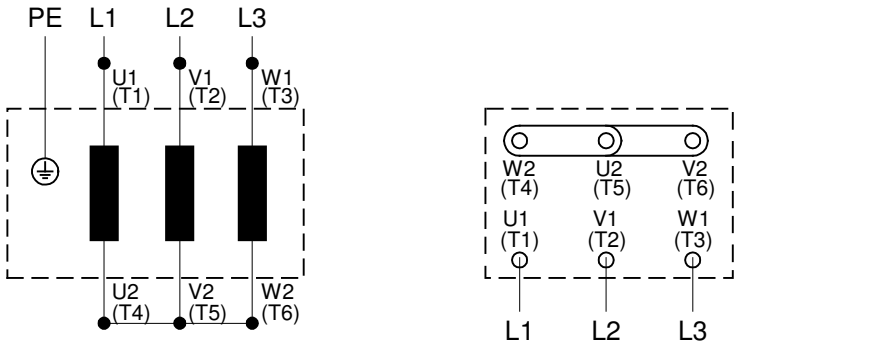
The following figure shows the wiring of the V forced cooling fan for delta-Steinmetz connection for 1-phase operation.



9007199778089483

Star connection

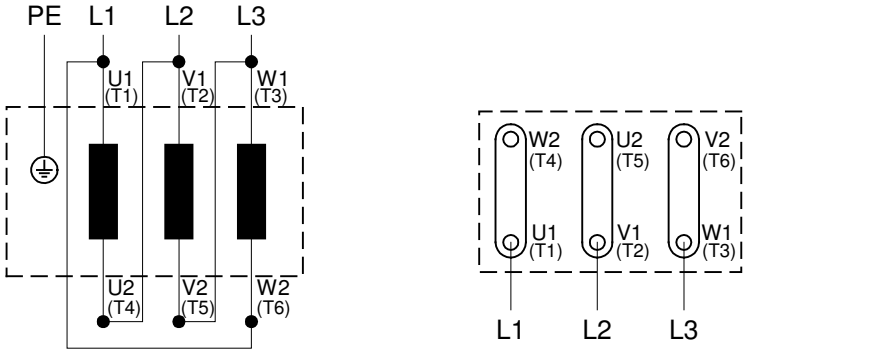
The following figure shows the wiring of the /V forced cooling fan for star connection.



9007199778091147

Delta connection

The following figure shows the wiring of the /V forced cooling fan for delta connection.

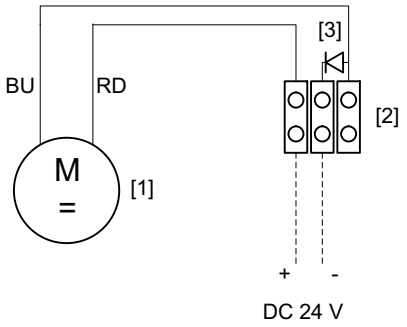


18014399032833803

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DC 24 V connection

The following figure shows the wiring of the /V forced cooling fan for DC 24 V.



9007201648125067

[1] Forced cooling fan
[2] Terminal strip
[3] Polarity reversal protection diode

NOTICE

Damage to the forced cooling fan due to incorrect connection.

The drive system might be damaged.

- Observe the polarity when connecting the forced cooling fan.

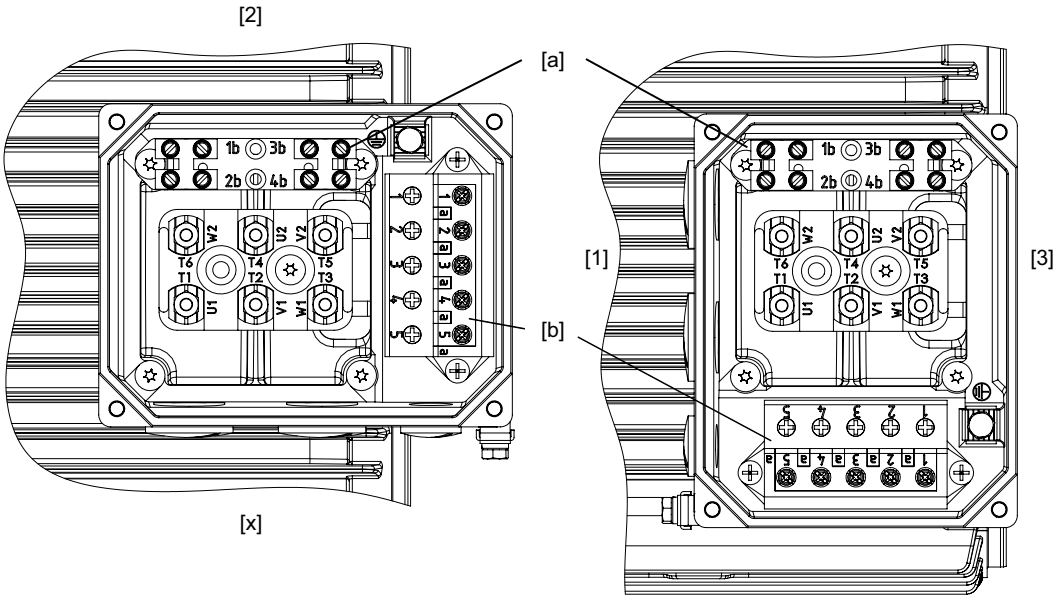
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10.2 Auxiliary terminals

The following figure shows the arrangement of the auxiliary terminals for the different terminal box positions.

Terminal box position 2 and X, here X[1)]

Terminal box position 1 and 3, here 3



1) If auxiliary terminal 2 is not provided, you can install auxiliary terminal 1 in the same position.

[1]	Terminal box position 1	[X]	Terminal box position X
[2]	Terminal box position 2	[a]	Auxiliary terminal 1
[3]	Terminal box position 3	[b]	Auxiliary terminal 2

Regardless of the terminal box position, auxiliary terminal 1 must always be mounted parallel to the terminal board.

The terminal structure can vary depending on the terminal box design.

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11 Contacting SEW-EURODRIVE

You can find the worldwide contact data and locations on the **SEW-EURODRIVE website** via the following link or the QR code shown below.

https://www.sew-eurodrive.de/contacts-worldwide



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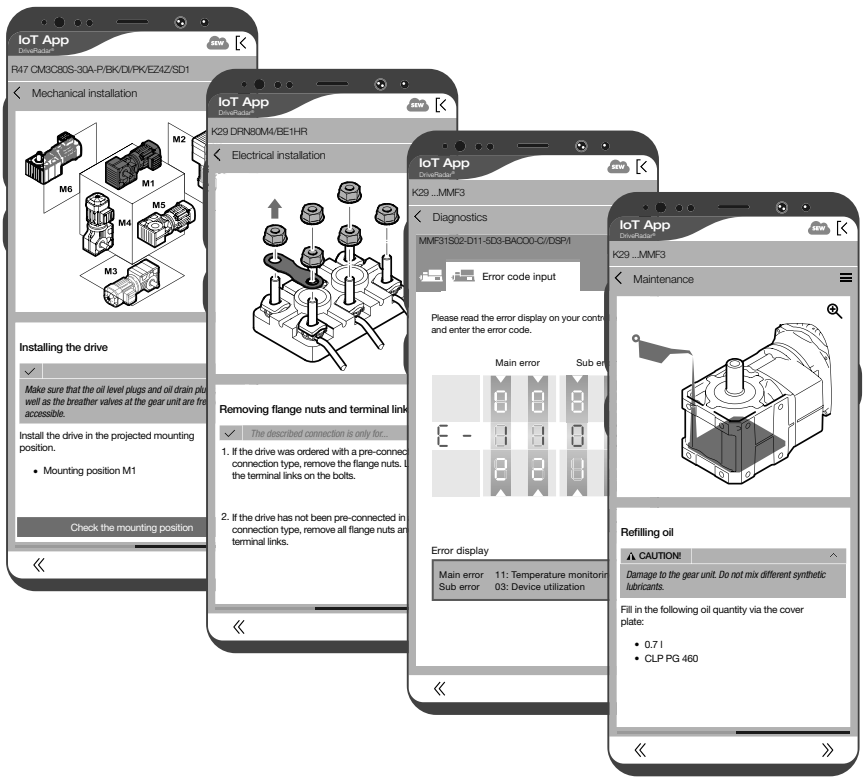
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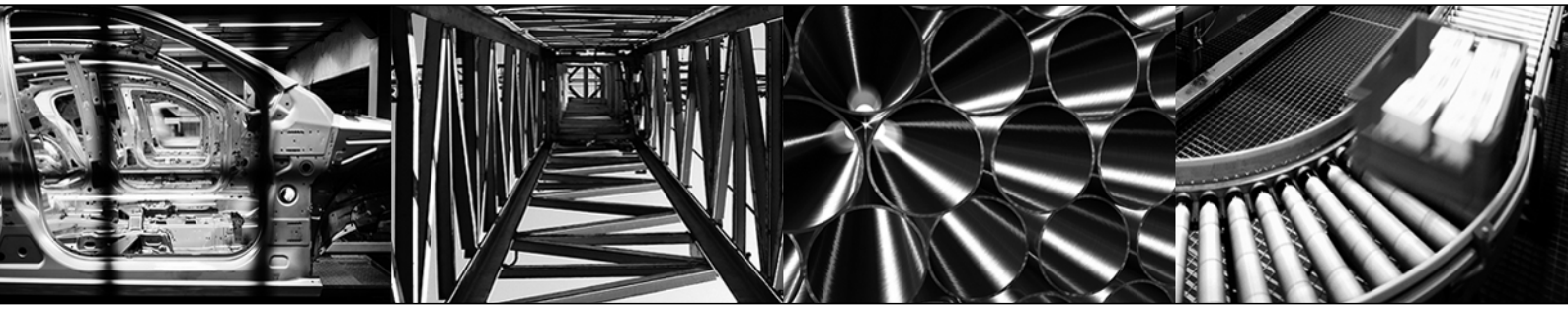
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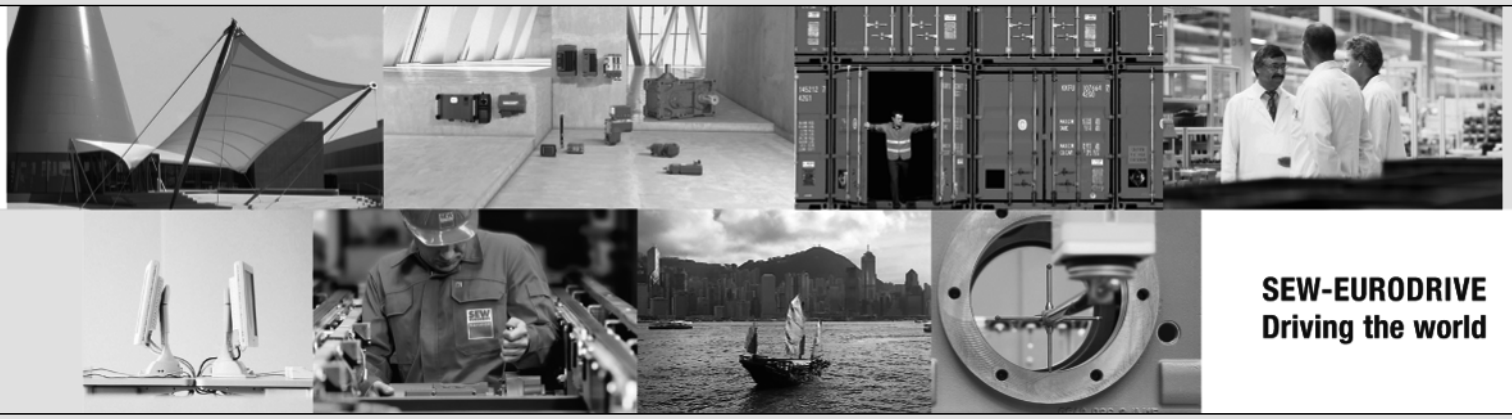
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