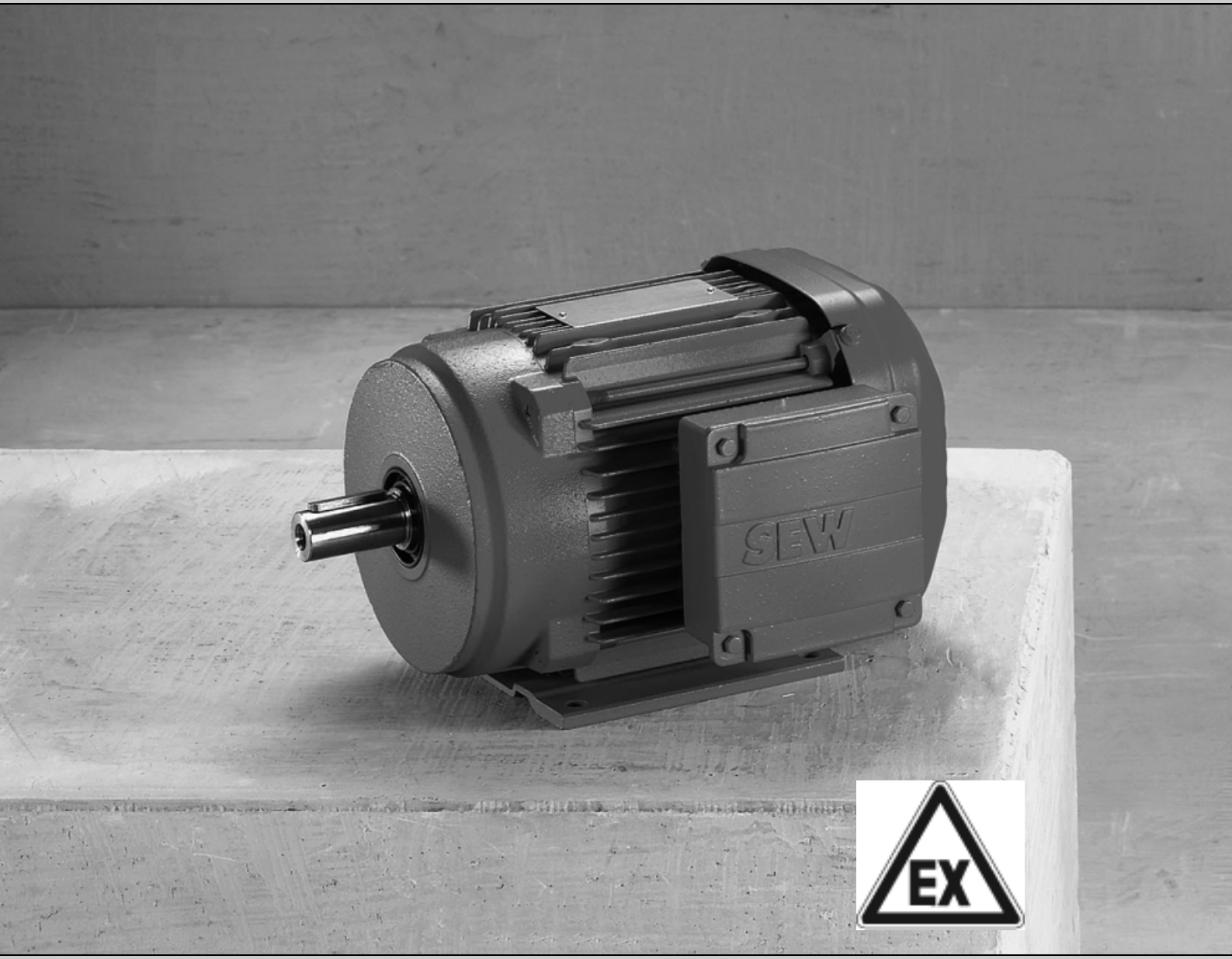
SEW EURODRIVE

Operating instructions

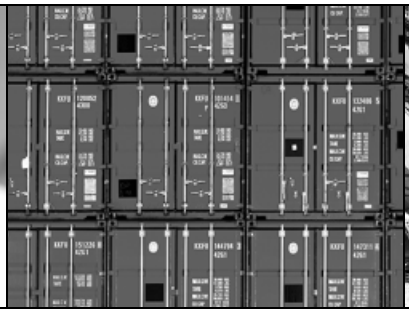


EDR.71 – 225 AC motors
according to the Class Definition System (HazLoc-NA®)

Edition 08/2013

20147341 / EN






Contents

1 General Information

1.1 How to use this documentation

The documentation is an integral part of the product and contains important information on operation and service. The documentation is written for all employees who assemble, install, start up, and service this product.

The documentation must be accessible and legible. Make sure that persons responsible for the system and its operation, as well as persons who work independently on the unit, 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 grading and meaning of the signal words for safety notes, notes on potential risks of damage to property, and other notes.

Signal word	Meaning	Consequences if disregarded
⚠ **DANGER**	Imminent danger	Severe or fatal injuries
⚠ **WARNING**	Possible dangerous situation	Severe or fatal injuries
⚠ **CAUTION**	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the drive system or its environment
NOTE ON EXPLOSION PROTECTION	Important note on explosion protection	Suspension of explosion protection and resulting hazards
INFORMATION	Useful information or tip: Simplifies the handling of the drive system.	

1.2.2 Design of the section-related safety notes

Section-related safety notes do not apply to a specific action, but to several actions pertaining to one subject. The 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 danger.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the danger.

1.2.3 Design of the embedded safety notes

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

This is the formal structure of an embedded safety note:

- ⚠ **SIGNAL WORD!** Type and source of hazard.

  Possible consequence(s) if disregarded.

  – Measure(s) to prevent the hazard.

1.3 Rights to claim under warranty

A requirement of fault-free operation and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the documentation. Therefore read the documentation before you start working with the unit.

1.4 Exclusion of liability

You must comply with the information contained in this documentation to ensure safe operation and to achieve the specified product characteristics and performance features. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.

1.5 Product names and trademarks

All product names in this documentation are trademarks or registered trademarks of their respective titleholders.

1.6 Copyright

2 Safety notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and adhered to. Make sure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation or if you require further information, please contact SEW-EURODRIVE.

2.1 Preliminary information

The following safety notes are primarily concerned with the use of the following components: EDR.. explosion-proof AC motors. If using gearmotors, also refer to the safety notes in the corresponding operating instructions for:

- Gear unit

Also observe the supplementary safety notes in the individual sections of this documentation.

2.2 General information

⚠ WARNING

Danger of fatal injury or risk of injury during the operation of motors or gearmotors caused by live, bare (in the event of open connectors/terminal boxes) and movable or rotating parts.

Risk of burns caused by hot surfaces

Severe or fatal injuries

- All work related to transport, storage, installation, assembly, connection, startup, maintenance and repair may only be carried out by qualified personnel.
- For transport, storage, installation, assembly, connection, startup, maintenance and repair it is important that you adhere to the information in the following documents:
  - Warning and safety signs on the motor/gearmotor
  - All the project planning documents, startup instructions and wiring diagrams related to the drive
  - System-specific regulations and requirements
  - National/regional safety and accident prevention regulations.
- Never install damaged products.
- Never operate or energize the unit without the necessary protection covers or housing.
- Use the unit only for its intended purpose.
- Make sure the unit is installed and operated properly.

INFORMATION

Report any transport damage to the shipping company immediately.

This documentation provides additional information.

2.3 Target group

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

- They have completed an apprenticeship in the field of mechanical engineering (e.g. mechanic or mechatronic technician).
- They are authorized under applicable law to carry out the necessary mechanical work.
- They are familiar with these operating instructions.

Any electrical work may only be performed by adequately qualified electricians. Qualified electricians in the context of this documentation are persons familiar with electrical installation, startup, troubleshooting and servicing of the product who possess the following qualifications:

- They have completed an apprenticeship in the field of electrical engineering (e.g. electrician or mechatronic technician).
- They are authorized under applicable law to carry out the necessary electrical work.
- They are familiar with these operating instructions.

Any work in further areas of transportation, storage, operation and waste disposal may only be carried out by persons who are trained appropriately.

All qualified personnel must wear appropriate protective clothing.

2.4 Designated use

The explosion-proof electric motors are intended for industrial systems.

In the case of installation in machines, startup of the motors (i.e., the start of the designated operation) is prohibited until it is determined whether the machine complies with the Canadian Electrical Code C22.1 (latest edition) in Canada or the National Electrical Code NFPA 70 (latest edition) in the USA as well as all applicable regional standards and regulations.

NOTES ON EXPLOSION PROTECTION

- The motor may only be operated under the conditions described in the "Startup" chapter.
- A motor may only be operated on a frequency inverter if the requirements of the CSA certification and/or this documentation and the information on the nameplate of the motor, if available, are fulfilled.
- Make sure that there are no aggressive substances in the vicinity that could damage the paint and seals.

Air-cooled versions are designed for ambient temperatures of -20°C to +40°C and installation altitudes ≤ 1000 m above sea level. Any differing specifications on the nameplate must be observed. The ambient conditions must comply with all the specifications on the nameplate.

2.5 Other applicable documentation

The following publications and documents have to be observed as well:

- Wiring diagrams provided with the motor
- "Gear Unit Series R..7, F..7, K..7, S..7, SPIROPLAN® W" operating instructions for gearmotors
- Operating instructions of any mounted frequency inverter for motors powered by inverters.
- Operating instructions of installed options, if applicable
- "Gear Units" catalog
- "AC Motors" catalog and/or "DR Gearmotors" catalog
- "Explosion-Proof AC Motors" catalog
- "AC Motors EDR.71 – 225" catalog according to Class Definition System (in preparation)

2.6 Safety notes on the motor

⚠ CAUTION

Safety notes and signs can get dirty over time.

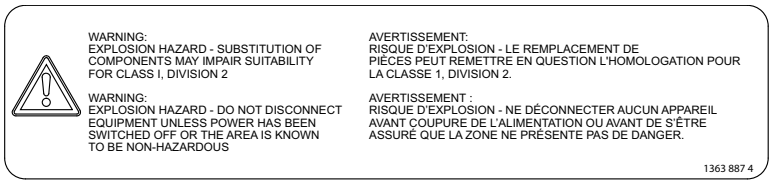
Risk of injury due to illegible symbols.

- Always make sure that safety, warning, and operating notes are legible.
- Replace damaged safety notes and signs.

The safety notes attached to the motor, usually to the terminal box cover, must be observed!

2.6.1 Safety note 1

The following safety note is attached to motors for supply system operation:



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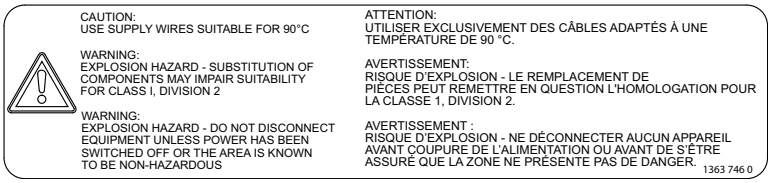
- "Warning: Explosion hazard – Substitution of components may impair suitability for Class I, Division 2."
- "Warning: Explosion hazard – Do not disconnect equipment from the supply system unless power has been switched off or the area is known to be non-hazardous."

The following safety note is attached to motors for frequency inverter operation:



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- "Important: Use supply wires suitable for 90°C."
- "Warning: Explosion hazard – Substitution of components may impair suitability for Class I, Division 2."
- "Warning: Explosion hazard – Do not disconnect equipment from the supply system unless power has been switched off or the area is known to be non-hazardous."

2.6.2 Safety note 2

The following safety note is attached to all of the motors:

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- "Warning: Re-install plastic caps or insulation sleeves onto terminal studs after terminating field wiring."

2.7 Transport/storage

Inspect the shipment for any damage that may have occurred in transit as soon as you receive the delivery. Inform the shipping company immediately in the event of damage. It may be necessary to preclude startup.

Tighten the eyebolts securely. They are designed to carry only the weight of the motor/gearmotor; do not attach any additional loads.

The built-in lifting eyebolts comply with DIN 580. Always observe the loads and regulations listed in this standard. If the gearmotor is equipped with two eyebolts, then both should be used for transportation. In this case, the tension force vector of the slings must not exceed a 45° angle according to DIN 580.

Use suitable, sufficiently rated handling equipment if required. Reattach these in the case of further transportation.

Store the motor/gearmotor in a dry, dust-free environment if it is not to be installed straight away. You must not store the motor/gearmotor outdoors or on the fan guard. The motor/gearmotor can be stored for up to 9 months without requiring any special measures before startup.

2.8 Installation

Make sure that the supports are even, the foot and flange mounting is correct and if there is direct coupling, align with precision. Resonances between the rotational frequency and the double network frequency caused by the structure are to be avoided. Release the brake (if installed), turn rotor manually, check for unusual grinding noise. Check the direction of rotation in decoupled state.

Install or remove belt pulleys and couplings using only suitable devices (heat up) and cover with a touch guard. Avoid improper belt tension.

Make the pipe connections that may eventually be required. Mounting positions with shaft ends pointing upwards should be equipped with a cover to prevent foreign objects from falling into the fan. Ensure that ventilation openings are not obstructed and that waste air, or air from adjacent units, cannot be drawn in again straight away.

Observe the notes in the "Mechanical installation" section.

2.9 Electrical connection

All work may only be carried out by qualified personnel. During work, the low-voltage machine must be at standstill, de-energized, and safeguarded against accidental restart. This also applies to auxiliary circuits.

Check whether the motor is de-energized!

Exceeding the tolerances stipulated in IEC 60034-1 (voltage +5%, frequency +2%, curve shape, symmetry) increases heating and influences electromagnetic compatibility. Observe IEC 60364 (and any national regulations, if applicable).

In addition to the generally applicable installation regulations for low-voltage electrical equipment, you must observe the special regulations for the installation of electrical systems in hazardous locations. NFPA 70 (for USA) and C22.1 (for Canada) and plant-specific conditions.

Observe the wiring information and differing data on the nameplate as well as the wiring diagram in the terminal box.

The connection must be a permanently secure electrical connection (no protruding wire ends); use the cable end equipment intended for this purpose. Establish a secure protective earth connection. When the motor is connected, the distances between live parts and between live and conductive parts must not be shorter than the minimum values according to CSA-C 22.2 No.100 and national regulations.

The terminal box must be free from foreign objects, dirt and humidity. Unused cable entry openings and the box itself must be closed so that they are dust- and water-proof. Secure the key for test mode without output elements. Make sure that the low-voltage machine is functioning properly before you start it up.

Observe the notes in the "Electrical installation" chapter.

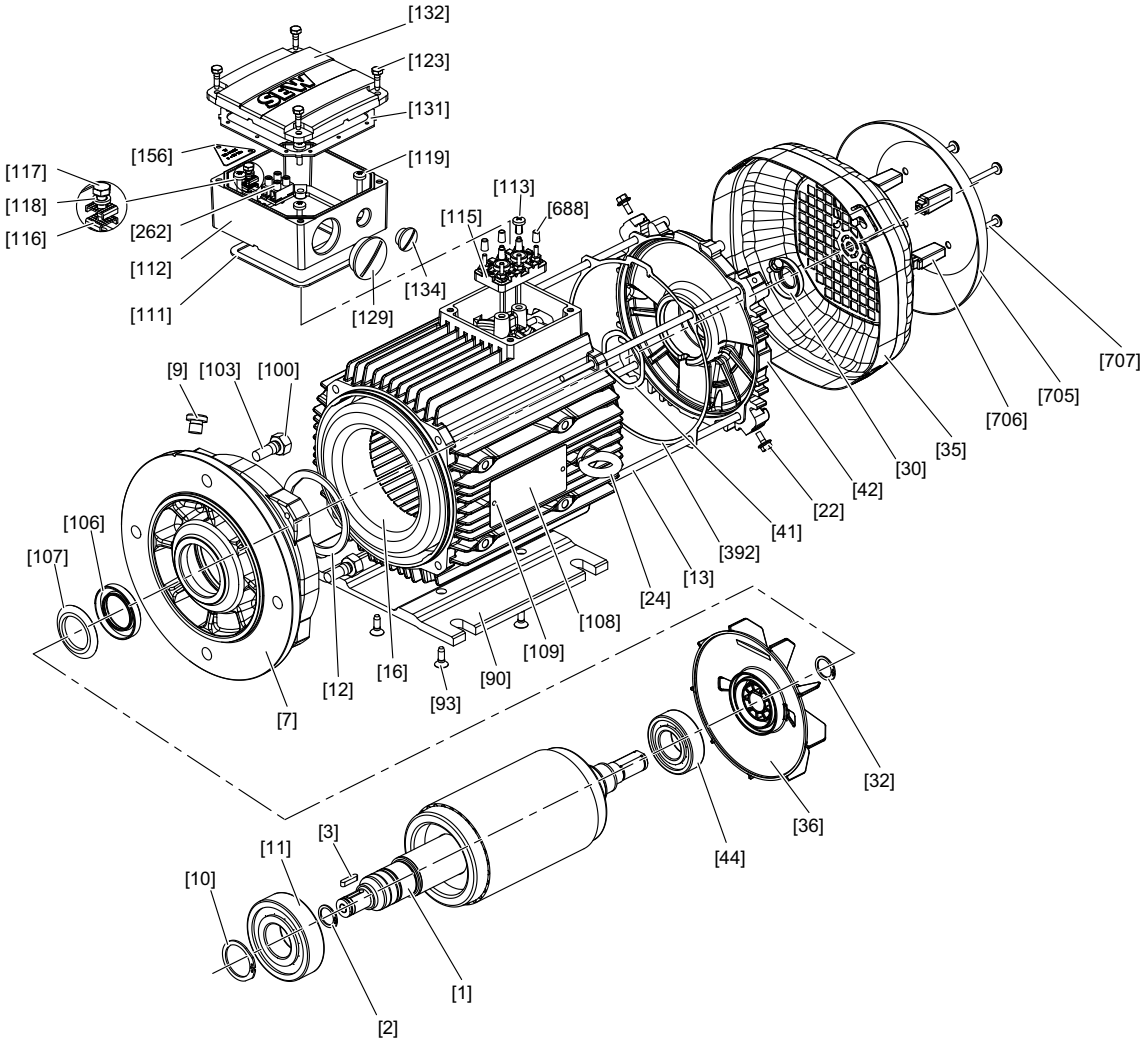
2.10 Startup/operation

Whenever changes to normal operation occur, such as increased temperatures, noise, vibrations, etc., try to determine the cause. Consult the manufacturer if required. Never deactivate protection devices, even in test mode. Switch off the motor in case of doubt.

Regularly clean air ducts in dusty or dirty environments.

3 Motor structure

3.1 Basic structure of EDR.71 – EDR.132



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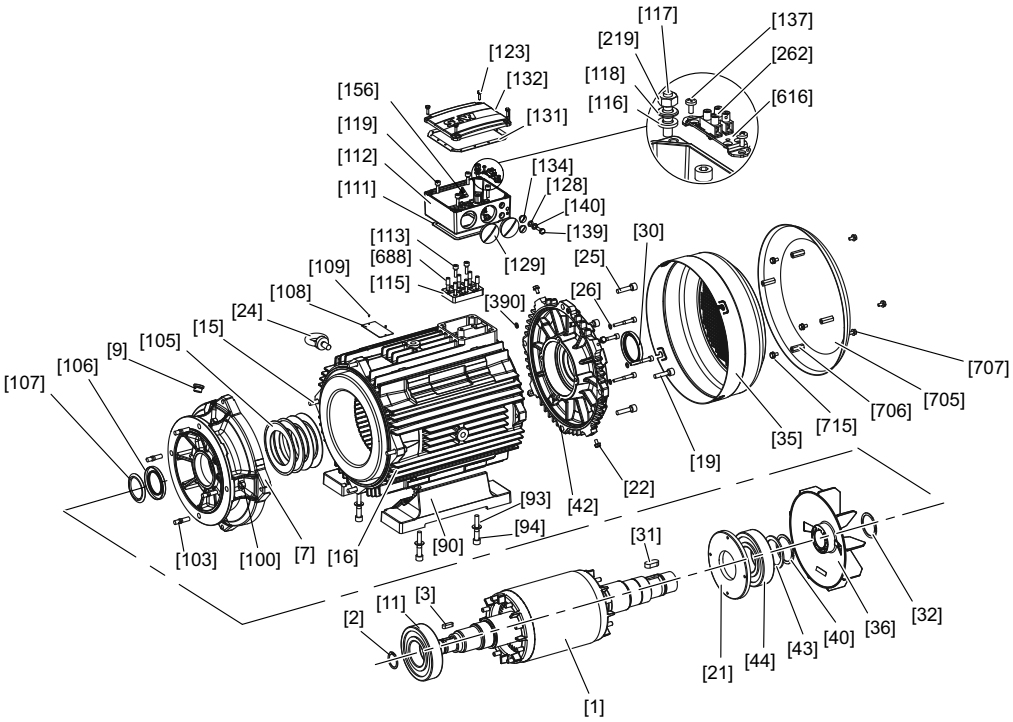
[1]	Rotor	[30]	Oil seal	[107]	Oil flinger	[129]	Screw plug with O-ring
[2]	Retaining ring	[32]	Retaining ring	[108]	Nameplate	[131]	Gasket for cover
[3]	Key	[35]	Fan guard	[109]	Grooved pin	[132]	Terminal box cover
[7]	Flanged endshield	[36]	Fan	[111]	Gasket for lower part	[134]	Screw plug with O-ring
[9]	Screw plug	[41]	Shim	[112]	Terminal box lower part	[156]	Information label
[10]	Retaining ring	[42]	B-side endshield	[113]	Pan head screw	[262]	Terminal clip, complete
[11]	Grooved ball bearing	[44]	Grooved ball bearing	[115]	Terminal board	[392]	Seal
[12]	Retaining ring	[90]	Base plate	[116]	Terminal clip	[688]	Protection caps
[13]	Cap screw	[93]	Pan head screws	[117]	Hexagon screw	[705]	Canopy
[16]	Stator	[100]	Hex nut	[118]	Lock washer	[706]	Spacers
[22]	Hexagon screw	[103]	Stud	[119]	Pan head screw	[707]	Pan head screw
[24]	Eyebolt	[106]	Oil seal	[123]	Hexagon screw		

3.2 General structure EDR.160 – EDR.180



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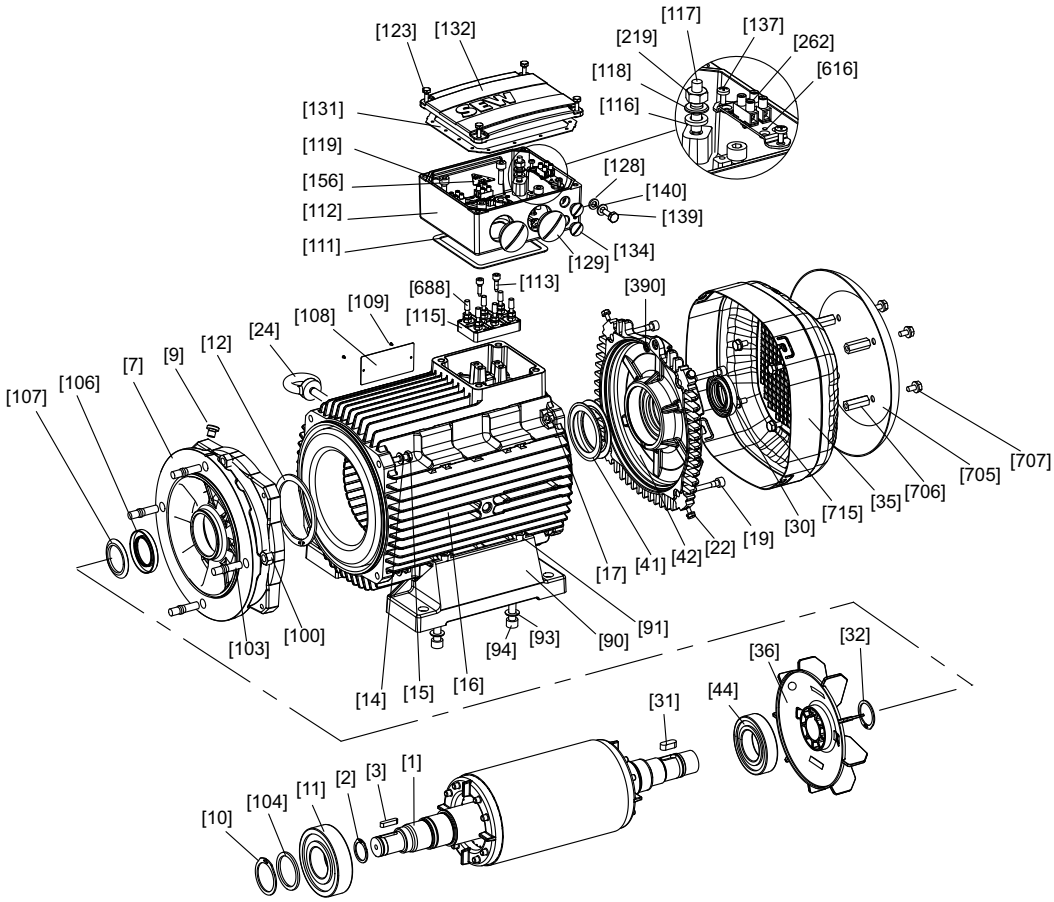
[1]	Rotor	[31]	Key	[108]	Nameplate	[132]	Terminal box cover
[2]	Retaining ring	[32]	Retaining ring	[109]	Grooved pin	[134]	Screw plug with O-ring
[3]	Key	[35]	Fan guard	[111]	Gasket for lower part	[137]	Screw
[7]	Flange	[36]	Fan	[112]	Terminal box lower part	[139]	Hex head screw
[9]	Screw plug	[41]	Spring washer	[113]	Screw	[140]	Washer
[10]	Retaining ring	[42]	B-side endshield	[115]	Terminal board	[153]	Terminal strip, complete
[11]	Grooved ball bearing	[44]	Grooved ball bearing	[116]	Serrated lock washer	[156]	Information sign
[12]	Retaining ring	[90]	Foot	[117]	Stud	[219]	Hex nut
[14]	Washer	[91]	Hex nut	[118]	Washer	[262]	Connection terminal
[15]	Hex head screw	[93]	Washer	[119]	Cap screw	[390]	O-ring
[16]	Stator	[94]	Cap screw	[121]	Grooved pin	[616]	Retaining plate
[17]	Hex nut	[100]	Hex nut	[123]	Hex head screw	[688]	Protection caps
[19]	Cap screw	[103]	Stud	[128]	Serrated lock washer	[705]	Canopy
[22]	Hex head screw	[104]	Supporting ring	[129]	Screw plug with O-ring	[706]	Spacers
[24]	Eyebolt	[106]	Oil seal	[131]	Gasket for cover	[707]	Hex head screw
[30]	Sealing ring	[107]	Oil flinger			[715]	Hex head screw

3.3 Basic structure of EDR.200 – EDR.225



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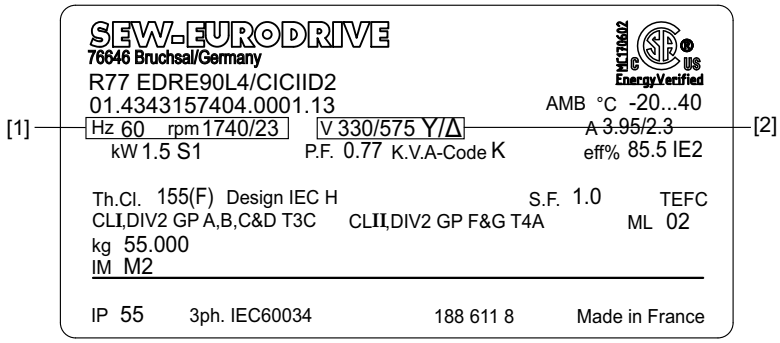
[1]	Rotor	[31]	Key	[107]	Oil flinger	[132]	Terminal box cover
[2]	Retaining ring	[32]	Retaining ring	[108]	Nameplate	[134]	Screw plug
[3]	Key	[35]	Fan guard	[109]	Grooved pin	[137]	Screw
[7]	Flange	[36]	Fan	[111]	Gasket for lower part	[139]	Hexagon screw
[9]	Screw plug	[40]	Retaining ring	[112]	Terminal box lower part	[140]	Washer
[11]	Grooved ball bearing	[42]	B-side endshield	[113]	Cap screw	[156]	Information label
[15]	Hexagon screw	[43]	Supporting ring	[115]	Terminal board	[219]	Hex nut
[16]	Stator	[44]	Grooved ball bearing	[116]	Serrated lock washer	[262]	Terminal clip
[19]	Cap screw	[90]	Foot	[117]	Stud	[390]	O-ring
[21]	Oil seal flange	[93]	Washer	[118]	Washer	[616]	Retaining plate
[22]	Hexagon screw	[94]	Cap screw	[119]	Cap screw	[688]	Protection caps
[24]	Eyebolt	[100]	Hex nut	[123]	Hexagon screw	[705]	Canopy
[25]	Cap screw	[103]	Stud	[128]	Serrated lock washer	[706]	Spacer bolt
[26]	Sealing washer	[105]	Spring washer	[129]	Screw plug	[707]	Hexagon screw
[30]	Oil seal	[106]	Oil seal	[131]	Gasket for cover	[715]	Hexagon screw

3.4 Nameplate, type designation

3.4.1 EDR. motor nameplate

EDR motor

The following figure shows a nameplate for the supply system operation:



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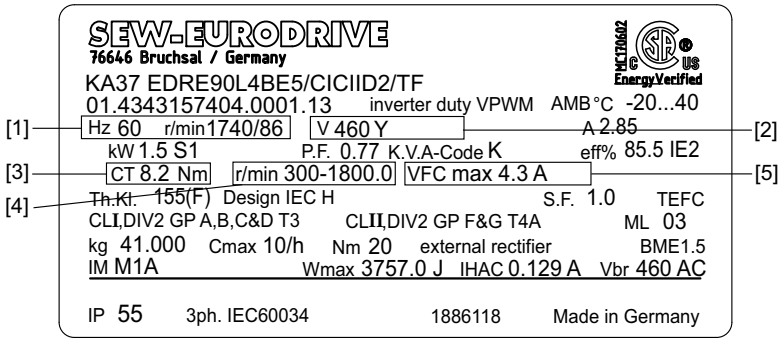
The following figure shows a nameplate for the frequency inverter operation:



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[1] Speed specifications (motor/gear unit output) at 60 Hz
[2] Voltage and connection type
[3] Continuous torque M_{CT} within the scope of the specified speed range [4]
[4] Speed range with constant torque
300 = Minimum sustained speed n_{min}
1800 = Maximum sustained speed n_{max}
[5] Maximum dynamic current with VFC mode $I_{max\ VFC}$
VFC = Voltage-controlled control mode for the inverter

Motors for frequency inverter operation are available only in an individual voltage

Markings on the nameplate

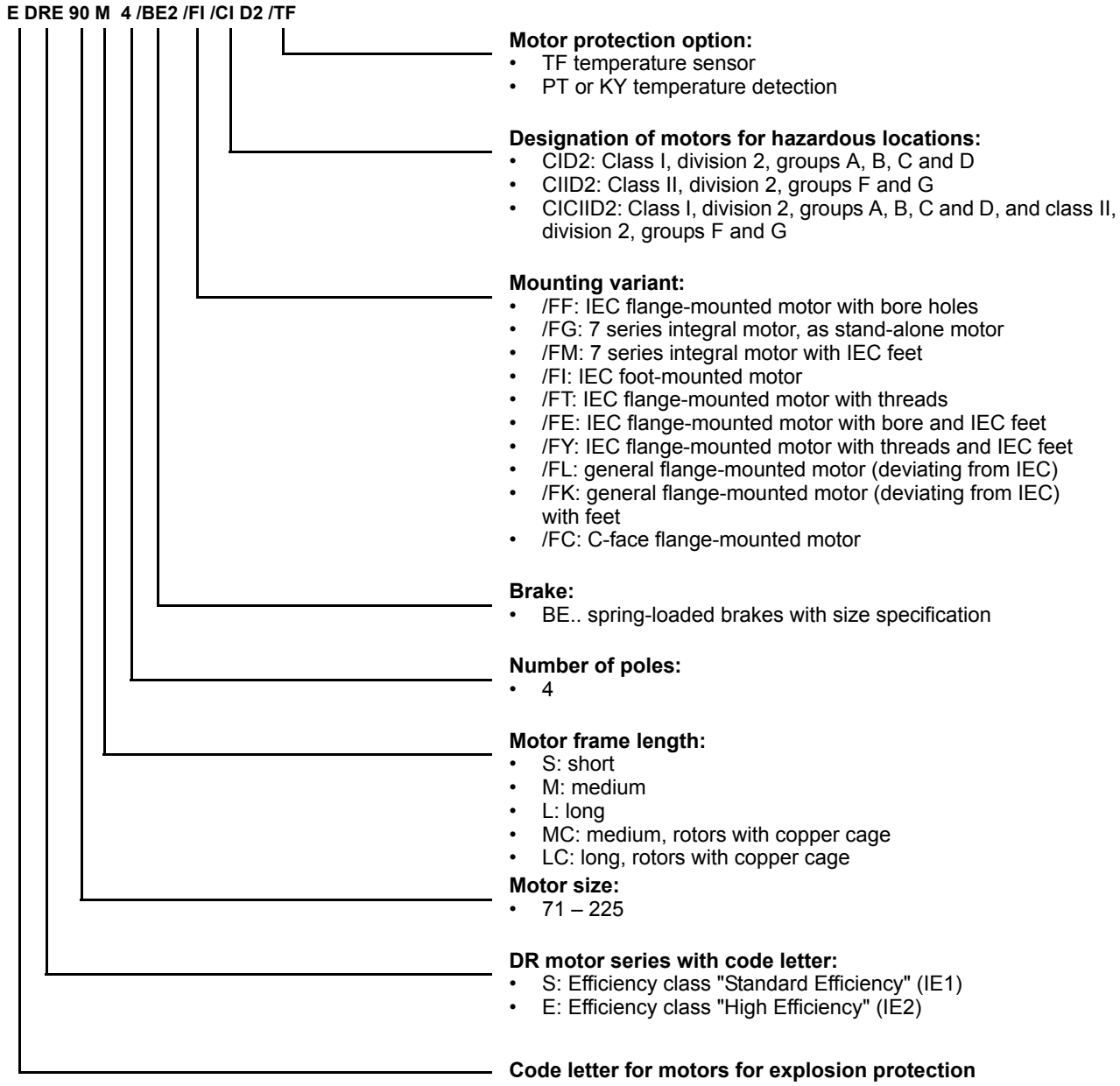
The marks on the upper edge of the nameplate are only present when the motor has been certified accordingly or when it includes the relevant components. The following table contains an explanation of all of the marks:

Mark	Meaning
	The CSA mark indicates that the product complies with the applicable Canadian standards.
 C US	The CSA/US mark indicates that the product complies with the applicable US and Canadian standards.
 Energy Verified	The CSA/Energy Verification mark indicates that the product complies with the applicable Canadian standards and complies with Canadian Federal and Provincial Energy Efficiency Regulations
 C US Energy Verified	The CSA C/US combined Energy Verification mark indicates that the product meets applicable US and Canadian standards and complies with Canadian Federal and Provincial Energy Efficiency Regulations along with US Federal Energy Efficiency Regulations.
 CC056A	The DoE mark indicates that the product complies with US efficiency limit values for AC motors.

Type designations of EDR. motors

EDR.. series AC motor

The following diagram shows a type designation:



3.5 Optional equipment

3.5.1 AC motor series

The following table shows the types of AC motors:

Designation	Available class and division	
EDRS..	/CID2, /CIID2, /CICIID2	Motor for hazardous locations, 60 Hz
EDRE..		Motor for hazardous locations, energy-efficient, 60 Hz
71 – 225		Sizes:71 / 80 / 90 / 100 / 112 / 132 / 160 / 180 / 200 / 225
S – L		Lengths: S = short / M = medium / L = long MC = medium, rotor with copper cage / LC = long, rotor with copper cage
4		Number of poles

3.5.2 Mounting variants

The following table shows possible output variants:

Designation	Available class and division	Option
/FI	/CID2, /CIID2, /CICIID2	IEC foot-mounted motor with specification of shaft height
/FG		7 series integral motor, as stand-alone motor
/FF		IEC flange-mounted motor with bore holes
/FT		IEC flange-mounted motor with threads
/FL		General flange-mounted motor (other than IEC)
/FM		7-series integral gearmotor with IEC feet, with specification of shaft height if required
/FE		IEC flange-mounted motor with bore holes and IEC feet, with specification of shaft height if applicable
/FY		IEC flange-mounted motor with thread and IEC feet, with specification of shaft height if required
/FK		General flange-mounted motor (other than IEC) with feet, with specification of shaft height if required
/FC		C-face flange-mounted motor, dimensions in inches

3.5.3 Mechanical attachments

The following table shows possible mechanical additions:

Designation	Available class and division	Option
BE	/CID2, /CIID2, /CICIID2	Spring-loaded brake with specification of size
HF		Manual brake release, lockable
HR		Manual brake release of the brake, automatic disengaging function
/RS		Backstop

3.5.4 Encoder

The following table shows possible encoder variants:

Designation	Available class and division	Option
/XV.A	/CID2, /CIID2, /CICIID2	Mounting adapter for non-SEW encoders

3.5.5 Temperature sensor / temperature detection

The following table shows the thermal protection options:

Designation	Available class and division	Option
/TF	/CID2, /CIID2, /CICIID2	Temperature sensor (positive coefficient thermistor or PTC resistor)
/KY		One KTY84 – 130 sensor
/PT		One/three PT100 sensor(s)

3.5.6 Ventilation

The following table shows possible ventilation variants:

Designation	Available class and division	Option
/AL	/CID2, /CIID2, /CICIID2	Metal fan
/C		Protection canopy for the fan guard
/LN		Low-noise fan guard (for EDR.71 – 132)

3.5.7 Motors for hazardous locations

The following table shows the option variants for hazardous locations:

Available class and division	Option
/CID2	Motors suitable for use in class I, division 2 Gas atmosphere
/CIID2	Motors suitable for use in class II, division 2 Dust atmosphere
/CICIID2	Motors suitable for use in class I or II, division 2 Gas or dust atmospheres

3.5.8 Other additional features

The following table shows an additional feature:

Designation	Available class and division	Option
/2W	/CID2, /CIID2, /CICIID2	Second shaft end on the motor/brakemotor
/RI		Reinforced winding insulation
/RI2		Reinforced winding insulation with increased resistance against partial discharge (in preparation)

3.5.9 Designation of motors for hazardous locations

The following table shows the areas of application according to the nameplate designation.

Identifier for hazardous locations	Section	Motor for hazardous locations
CID2	With potentially explosive gas-air / vapor-air mixtures	• Class I, division 2, groups A, B, C and D
CIID2	With potentially explosive dust-air mixtures	• Class II, division 2, groups F and G
CICIID2	With potentially explosive gas-air / vapor-air mixtures and with potentially explosive dust-air mixtures	• Class I, division 2, groups A, B, C and D • Class II, division 2, groups F and G

The class defines a general limit of the physical properties of the hazardous substances.

Class I:

Gases, vapors, and liquids that can be present in sufficient quantities to be explosive or ignitable.

Class II:

Dust or combustible dust that can be present in sufficient quantities to create potentially explosive mixtures or electrically conductive dust.

In addition, hazardous substances are assigned to different groups according to the nature of the hazardous substance.

The following table shows the assignment of the existing classes and groups:

Assignment of groups A – D in class I Gas and vapor		Assignment of groups E – G in class II Dust	
Group A	Acetylene	**Group E**[1)]	Flammable metal dust, including aluminum, magnesia, or similar substances
Group B	Flammable gas, flammable vapor, or flammable vapor-air mixtures, including hydrogen, butadiene, ethylene oxide, propylene oxide	**Group F**	Flammable dust containing carbon, e.g. black coal, carbon dust, charcoal, and coke dust
Group C	Flammable gas, flammable vapor, or flammable vapor-air mixtures, including ethylene, acetaldehyde, cyclopropane, ether, hydrogen sulfide	**Group G**	Flammable dust not covered by group E or F, including flour, grain, wood, plastic, and chemicals
Group D	Flammable gas, flammable vapor, or flammable vapor-air mixtures, including propane, acetone, alcohol, ammonia, gasoline, solvents, natural gas, propylene		

1) Group E is not available for EDR. motors.

Note that the table is not exhaustive. For a full description of the groups, refer to the standards CSA C22.1 and NFPA 70.

Temperature class:

EDR. motors in class I for hazardous locations are additionally labeled with the respective temperature class. It is listed on the nameplate and specifies the maximum surface temperature.

The following table shows all possible temperature classes:

Temperature class	Maximum surface temperature
T1	450°C
T2	300°C
T2A	280°C
T2B	260°C
T2C	230°C
T2D	215°C
T3 [1)]	**200°C**
T3A	180°C
T3B	165°C
T3C[1)]	**160°C**
T4	135°C
T4A	**120°C**
T5	100°C
T6	85°C

1) These two temperature classes are provided by SEW-EURODRIVE.

EDR. motors for hazardous locations from SEW-EURODRIVE are labeled with one of the following temperature classes depending on the operating mode.

Operating mode	Temperature class
Line operation	T3C, T3 (optional)
Inverter operation	T3

Before startup, make sure that the temperature class specified on the motor is not higher than the ignition temperature of the hazardous substances (dust, fiber, gas, or vapor), even if the ambient conditions correspond with the class and group listed on the nameplate.

INFORMATION

EDR. motors in temperature class T3 (max. 200°C) and T3C (max. 160°C) can be safely used with gases that have a higher ignition temperature.

EDR. motors in class II Hazardous Locations from SEW-EURODRIVE are indicated with temperature class T4A.

4 Mechanical installation

4.1 Before you start

NOTICE

The mounting position for installation must correspond to the specifications on the nameplate.

Only install the drive if the following conditions are met:

- The specifications on the nameplate of the drive correspond to the supply system or the output voltage of the frequency inverter
- The drive is undamaged (no damage caused by transportation or storage)
- All transport locks have been removed.
- You are certain that the following requirements have been met:
  - Ambient temperature between -20°C and +40°C.

    Note that the temperature range of the gear unit may also be restricted (see gear unit operating instructions)

    Note that information on the nameplate may differ. The ambient conditions must comply with all the specifications on the nameplate.
  - No oil, acid, gas, vapors, radiation, etc.
  - Installation altitude max. 1000 m above sea level

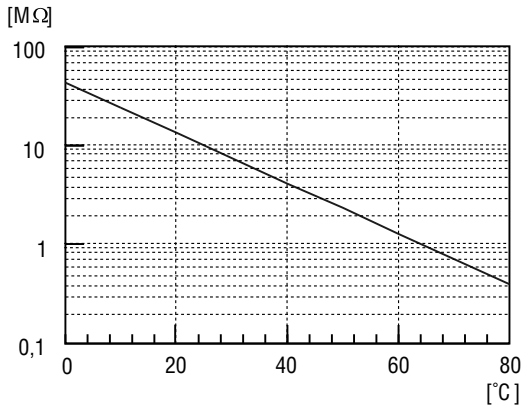
    Observe chapter "Electrical Installation" > "Ambient conditions during operation" > "Installation altitude".
  - Note the restrictions for encoders
  - Special design: Drive configured in accordance with the ambient conditions

The above mentioned information refers to standard orders. The conditions might be different when you order drives other than the standard. Observe any differing conditions in the order confirmation.

4.2 Extended storage of motors

- Note that the service life of the lubricant in the ball bearings is reduced by 10% per year after the first year of storage.
- Before startup, you should re-lubricate the lubrication devices on motors that have been in storage for longer than 5 years. Take note of the information on the motor lubricant plate.
- Check whether the motor has absorbed moisture as a result of being stored for a long time. Measure the insulation resistance for this purpose (measuring voltage 500 V).

The insulation resistance (see following figure) varies greatly depending on the temperature. The motor must be dried if the insulation resistance is not adequate.



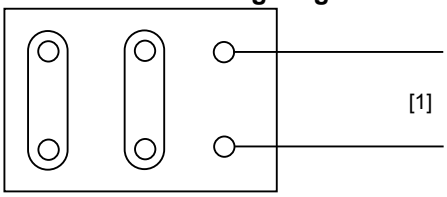
173323019

4.2.1 Drying the motor

Heating the motor either with warm air or via isolation transformer:

- With warm air
- Using an isolation transformer
  - Connect the windings in series (see following figures)
  - Auxiliary AC voltage supply max. 10% of the rated voltage with max. 20% of the rated current

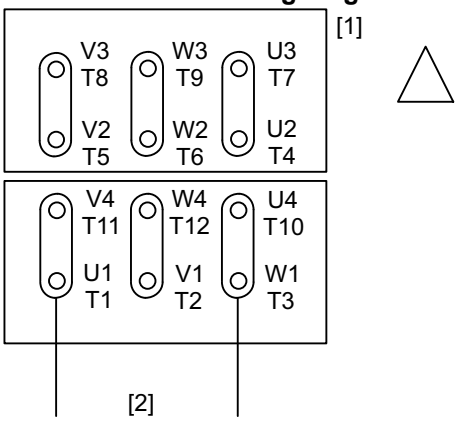
Connection in wiring diagram R13:



2336250251

[1] Transformer

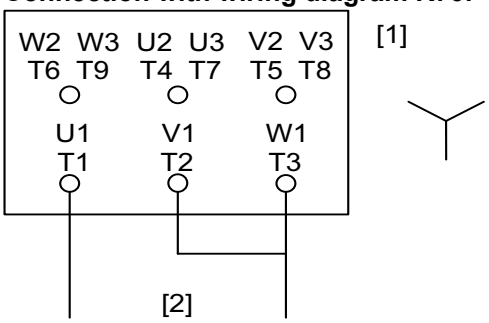
Connection with wiring diagram R72:



2343045259

[1] Motor terminal boards
[2] Transformer

Connection with wiring diagram R76:



2343047179

[1] Motor terminal board
[2] Transformer

The drying process is finished when the minimum insulation resistance has been exceeded.

In the terminal box, make sure that:

- The inside is clean and dry
- The connections and fixing parts are free from corrosion
- The gasket and sealing surfaces are in good condition
- The cable glands are tight, otherwise clean or replace them

4.3 Motor installation notes

⚠ CAUTION

Sharp edges due to open keyway.

Minor injuries.

- Insert key in keyway.
- Pull protective sleeve over shaft.

⚠ CAUTION

Improper mounting may result in damages to the motor.

Possible damage to property

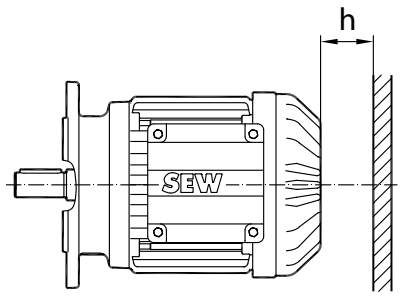
- Note the following:

NOTICE

The mounting position for installation must correspond with the specifications on the nameplate.

- Motor shaft ends must be thoroughly cleaned of anti-corrosion agents, contamination or similar (use a commercially available solvent). Do not allow the solvent to penetrate the bearings or shaft seals – this could damage the material.
- Mount the gearmotor only on a level, vibration-free and torsionally rigid support structure.
- Make sure the customer's counter-bearing is unobstructed and can move freely.
- Align the motor and the driven machine carefully in order to prevent the output shaft from being exposed to unacceptable strain. Observe the permitted overhung and axial forces.
- Do not jolt or hammer the shaft end.

- Make sure that there is sufficient clearance around the motor to provide for adequate cooling, and that the motor does not suck in warm air from other units. Observe the following minimum clearance:



Motor type	h in mm for motors	
	Without brake	With brake
EDR.71, EDR.80	15	140
EDR.90, EDR.100	20	200
EDR.112, EDR.132	25	220
EDR.160	30	270
EDR.180	35	320
EDR.200, EDR.225	45	395

- Balance components for subsequent mounting on the shaft with a half key (motor shafts are balanced with a half key).
- For brakemotors with manual brake release, screw in the manual lever (for HR self-reengaging manual brake release).

INFORMATION

- If using belt pulleys:
  - Only use belts that do not build up an electrostatic charge.
  - Do not exceed the maximum permitted overhung load; for motors without gear units, see chapter "Overhung loads (→ page 103)".
- Motors in vertical mounting position (e.g. M4/V1) are equipped with a canopy /C as standard.

  On request, the motor can be delivered without canopy. In this case, you have to install a cover when you install the drive in the plant/machine in order to prevent objects from falling into the ventilation openings. This cover must not obstruct the cooling air supply.
- In mounting positions with the motor output shaft pointing upwards (e.g. M2 / V3), a suitable cover must prevent small objects from falling through the fan guard. This cover must not obstruct the cooling air supply.

4.3.1 Installation in damp locations or in the open

- Use suitable cable glands for the incoming cable (use reducing adapters if necessary) according to the installation instructions.
- If possible, arrange the terminal box so 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 with a suitable anti-corrosion agent.

4.4 Installation tolerances

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

4.5 Installing drive components

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.

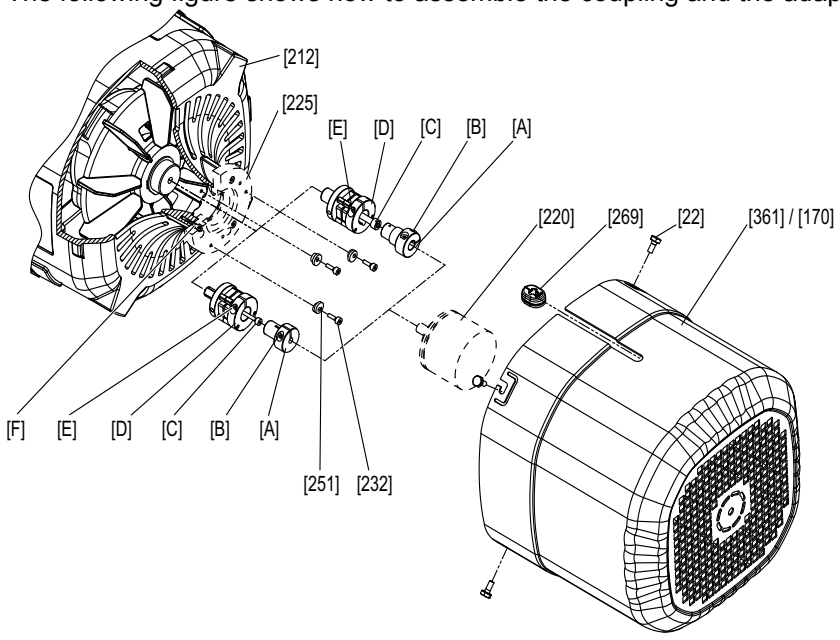
4.6 Non-SEW encoder mounting

If a drive was ordered with non-SEW encoder, SEW-EURODRIVE will deliver the drive with enclosed coupling. You must not connect the coupling for operation without non-SEW encoder.

4.7 Connecting XV.A encoder mounting adapter to EDR.71 – 225 motors

If you have ordered the XV.A encoder mounting adapter, the adapter and the coupling are enclosed with the motor and are to be assembled by the customer.

The following figure shows how to assemble the coupling and the adapter:



3633163787

[22]	Screw	[361]	Extended fan guard
[170]	Forced cooling fan guard	[269]	Grommet
[212]	Fan guard with encoder mount	[A]	Adapter
[220]	Encoder	[B]	Retaining screw
[225]	Intermediate flange (not with XV1A)	[C]	Central retaining screw
[232]	Screws (only with XV1A and XV2A)	[D]	Coupling (spread- or solid shaft coupling)
[251]	Conical spring washers (only with XV1A and XV2A)	[E]	Retaining screw
		[F]	Screw

1. If available, remove cover [361] or forced cooling fan guard [170].
2. **For XV2A and XV4A:** Remove intermediate flange [225].
3. Screw in the coupling [D] into the encoder bore of the motor shaft with the screw [C].

   EDR.71 – 132: Tighten the screw [C] with a tightening torque of 3 Nm [26.6 lb-in].

   EDR.160 – 225: Tighten the screw [C] with a tightening torque of 8 Nm [70.8 lb-in].
4. Push the adapter [A] on the encoder [220] and tighten it with the retaining screw [B] with a tightening torque of 3 Nm [26.6 lb-in].

5. **For XV2A and XV4A:** Mount the intermediate flange [225] with the screw [F] with a tightening torque of 3 Nm [26.6 lb-in].
6. Push the encoder and the adapter on the coupling [D] and tighten the retaining screw [E] with a tightening torque of 3 Nm [26.6 lb-in].
7. **With XV1A and XV2A:** Arrange conical spring washers [251] with retaining screws [232] and place in annular groove of the encoder [220] and tighten with a tightening torque of 3 Nm (26.6 lb-in).
8. **For XV3A and XV4A:** Installation by the customer via the bores in the encoder plate.

4.7.1 XH.A encoder mounting adapter

The XH1A, XH7A and XH8A encoder mounting adapters for hollow shaft encoders are premounted on delivery.

Proceed according to chapter "Motor and brake maintenance – preliminary work" (→ page 77) to mount the encoder.

4.8 Tightening torques

The following table shows the necessary tightening torques:

Screw	Area of application	Tightening torque	
		in Nm	in lb-in
Terminal stud nut	M4 stud	1.2	10.6
	M6 stud	3	26.6
	M8 stud	6	53.1
	M10 stud	10	88.5
	M12 stud	15.5	137.2
Pan head screw	EDR.71 – 132	5	44.3
Hex head screw grounding inside	EDR.71 – 132	4	35.4
	EDR.160	25.5	225.7
	EDR.180 – 225 (aluminum design)	25.5	225.7
	EDR.180 – 225 (gray-cast iron design)	50	442.5
Pan head screw of terminal box	EDR.71 – 132	5	44.3
	EDR.160 – 225	25.5	225.7
Hex head screw terminal box cover	EDR.71 – 132	4	35.4
	EDR.160	10.3	91.2
	EDR.180 – 225 (aluminum design)	10.3	91.2
	EDR.180 – 225 (gray-cast iron design)	25.5	225.7
Screw option terminal	EDR.71 – 225	1.8	16.0
Hex head screw grounding outside	EDR.71 – 225	4	35.4
Flat head screw option terminal	EDR.71 – 225	1	8.9
Pan head screw option terminal	EDR.71 – 225	1.8	16.0

4.9 Additional features

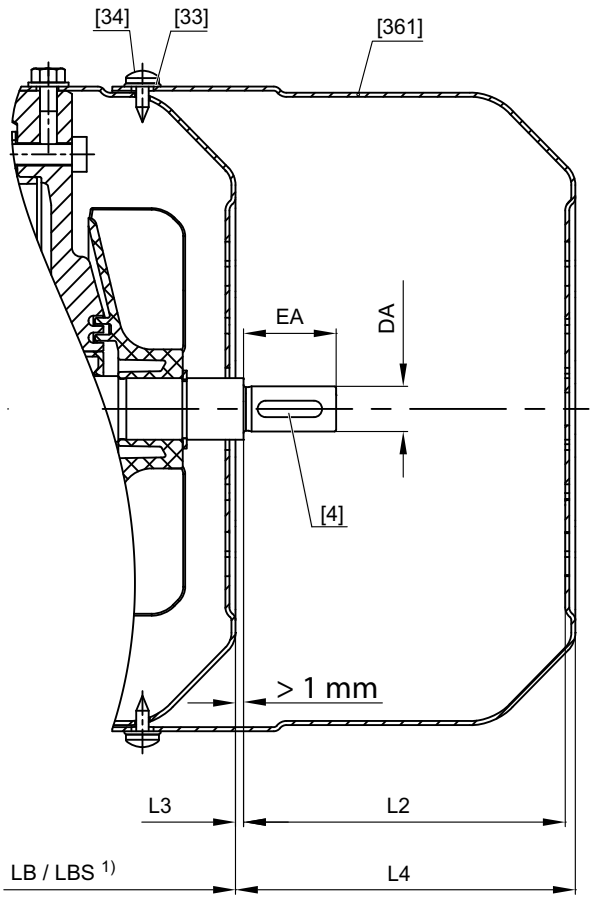
4.9.1 Second shaft end

As standard, SEW-EURODRIVE supplies the accessory equipment "second shaft end" with inserted key and additional protection by means of a tape. No cover is supplied as standard. The cover can be ordered separately.

With optional cover

Sizes EDR.71 – EDR.225 come equipped with an extended fan guard.

The following figure shows the dimensions of the covers:



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[4]	Keyway	LB/LBS	Length of the motor/brakemotor
[33]	Washer	1)	Refer to the catalog for dimensions
[34]	Tapping screw	[361]	Extended fan guard

Motor size	DA	EA	L2	L3	L4
EDR.71	11	23	87	2	91.5
EDR.71BE			83.5		88
EDR.80	14	30	91	2	95.5
EDR.80BE			90		94.5
EDR.90	14	30	84	2	88.5
EDR.90BE			76.5		81
EDR.100	14	30	83	2	87.5
EDR.100BE			76.5		81
EDR.112/132	19	40	120	3.5	125
EDR.112/132BE			115.5		120.5
EDR.160	28	60	187	4	193
EDR.160BE			180		187
EDR.180	38	80	226	4	233
EDR.180BE			229		236
EDR.200/225	48	110	221.5	5	230
EDR.200/225BE			237.5		246

Observe the distances between the shaft shoulder and the fan housing as well as the overhung loads when you connect accessories.

The following table shows the distances between the shaft shoulder and the fan housing:

Motor size	Length of the second shaft end in mm	Distance between shaft shoulder and fan housing in mm
71	23	2
80	30	2
90	30	2
100	30	2
112	40	3.5
132	40	3.5

Without optional cover

Variants without cover must be provided with a cover by the customer.

⚠ CAUTION

protective cover missing or incorrect.

Severe or fatal injuries.

- Only qualified personnel may mount the protective cover.
- Only start up the motor with the correct protective cover.

5 Electrical installation

⚠ WARNING

Danger of electric shock.

Severe or fatal injuries!

- Note the following:

- It is essential to comply with the safety notes in chapter 2 during installation!
- Switch contacts in utilization category AC-3 to IEC 60947-4-1 must be used for switching the motor and the brake.
- When motors are powered by inverters, you must adhere to the wiring instructions issued by the inverter manufacturer.
- Observe the operating instructions of the inverter.

5.1 Additional regulations

The generally applicable installation regulations CSA C22.0 and NFPA 70 for electrical low-voltage equipment must be observed when installing electrical systems.

5.2 Wiring diagrams and terminal assignment diagrams

Connect the motor only as shown in the wiring diagram(s) included with the motor. Do not connect or start up the motor if the wiring diagram is missing. You can obtain the valid wiring diagrams free of charge from SEW-EURODRIVE.

5.3 Cable entries

The terminal boxes have NPT tapped holes according to ANSI B1.20.1-1983. All bores are equipped with explosion-proof closing plugs upon delivery.

For a correct cable entry, replace the closing plugs with cable glands with strain relief that are certified for use in the respective hazardous location. Select the cable screw fitting according to the outer diameter of the cable used. For the tightening torque of the cable entry, refer to the operating/installation instructions. The IP degree of protection of the cable entry must be at least as high as the IP degree of protection of the motor.

Only use connection glands with screw heads that fit into the existing counterbore.

To meet the IP requirements, all unused cable entries must be sealed with a closing plug after the installation has been completed. A closing plug may only be replaced with another explosion-proof closing plug.

5.4 Equipotential bonding

IEC 60364-5 might require a connection to an equipotential bonding system. Observe the chapter "Electrical Installation" / "Improving the grounding (EMC)".

5.5 Wiring notes

Observe the accompanying wiring diagram during installation.

5.5.1 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. Power cables with phased currents are in particular

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

5.5.2 Protecting the motor protection devices against interference

Adhere to the following points to protect SEW motor protection devices (TF temperature sensors) against interference:

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

5.6 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 IEC 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 protective circuitry in the switching devices.

5.7 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. Observe section "Operating modes and limit values" and the operating instructions of the frequency inverter.

If a drive operated on the supply system has an earth-leakage current of more than AC/DC 10 mA, one or more of the following conditions for the PE system must be fulfilled:

- The PE conductor has a minimum cross section of 10 mm^2 for copper or 16 mm^2 for aluminum over its entire length.
- If the PE conductor has a cross section smaller than 10 mm^2 (for copper) or 16 mm^2 (for aluminum), a second PE conductor with at least the same cross section must be installed up to the point where the PE conductor has a cross section of minimum 10 mm^2 (for copper) or 16 mm^2 (for aluminum).

  It might be necessary to equip the drive with a separate connection for a second PE conductor.

5.8 Exterior grounding at the terminal box, LF grounding

In addition to the interior PE connection, a LF (low frequency) grounding cable is attached to the outside of the terminal box. It is installed as standard.

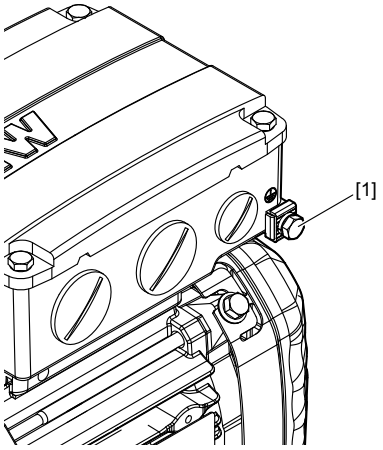
For EDR.71 – 132 motors, a brake or gray cast iron terminal box is required. For DR.160 – 225 motors, this option can be combined with all terminal box types.

The LF grounding can be combined with HF grounding.

INFORMATION

All parts of the LF grounding kit are made from stainless steel.

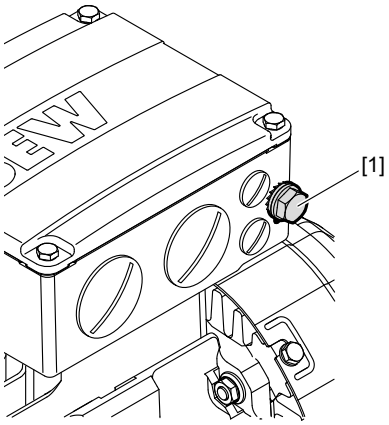
EDR.71 – 132



8024328587

[1] LF grounding at the terminal box

EDR.160 – 225



8026938379

[1] LF grounding at the terminal box

5.9 Improving the grounding (EMC), HF grounding

For improved, low-impedance grounding at high frequencies, we recommend using the following connections: SEW-EURODRIVE recommends to use corrosion-resistant connection elements.

If you require an LF equipotential bonding in addition to the HF equipotential bonding, you can apply the conductor at the same point.

The "Improved grounding" option can be ordered as follows:

- Completely pre-installed at the factory, or as
- "Connecting element" kit for customer installation; part numbers listed in the following table.

Motor size	Part number of "connecting element" kit
EDR.71S/M EDR.80S/M	1363 3953
EDR.90M/L	
EDR.100M	
EDR.100L – EDR.132	1363 3945
EDR.160 – EDR.225	

INFORMATION

All parts of the kit are made from stainless steel.

INFORMATION

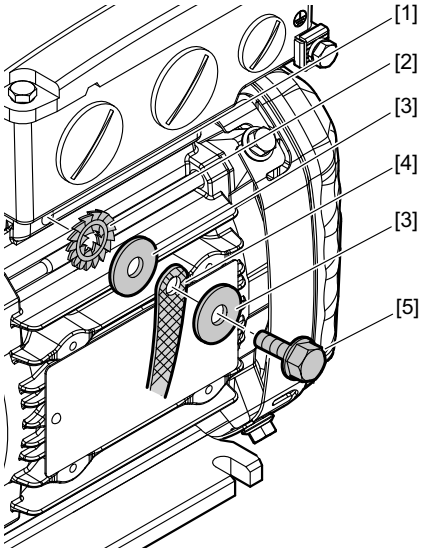
For further information regarding the grounding, refer to the SEW publication "Drive Engineering – Practical Implementation, EMC in Drive Engineering".

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.

5.9.1 Size EDR.71S / M and EDR.80S / M

The following figure shows how to install the grounding:

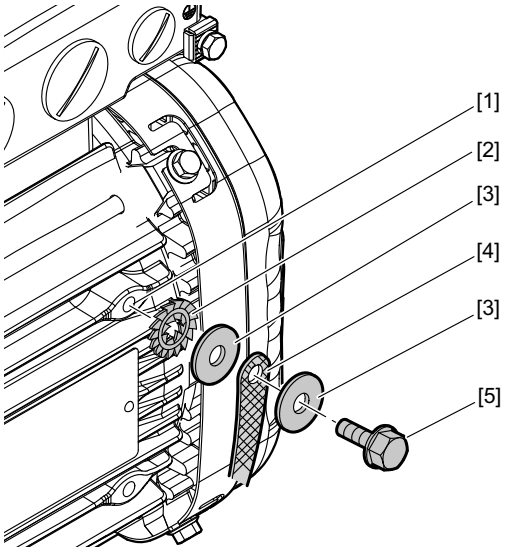


9007202821673739

[1]	Use of the pre-cast bore at the terminal box connection point	[4]	Ground strap (not included in the scope of delivery)
[2]	Serrated lock washer	[5]	Self-tapping screw DIN 7500 M6 x 16, tightening torque 10 Nm (88.5 lb-in)
[3]	Washer 7093		

5.9.2 Size EDR.90M / L

The following figure shows how to install the grounding:

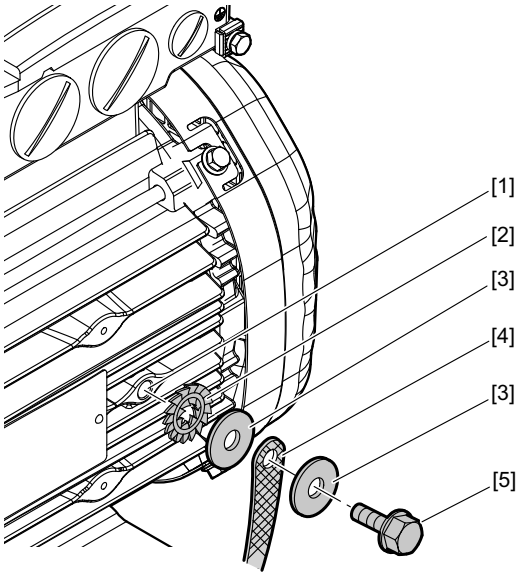


9007202806842891

[1]	Use of the pre-cast bore at the terminal box connection point	[4]	Ground strap (not included in the scope of delivery)
[2]	Serrated lock washer	[5]	Self-tapping screw DIN 7500 M6 x 16, tightening torque 10 Nm (88.5 lb-in)
[3]	Washer 7093		

5.9.3 Size EDR.100M

The following figure shows how to install the grounding:

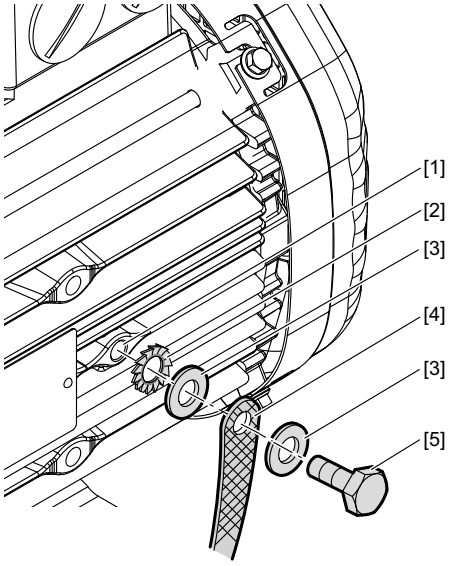


9007202809812875

[1] Use of the pre-cast bore at the terminal box connection point
[2] Serrated lock washer
[3] Washer 7093
[4] Ground strap (not included in the scope of delivery)
[5] Self-tapping screw DIN 7500 M6 x 16, tightening torque 10 Nm (88.5 lb-in)

5.9.4 Size EDR.100L – EDR.132

The following figure shows how to install the grounding:

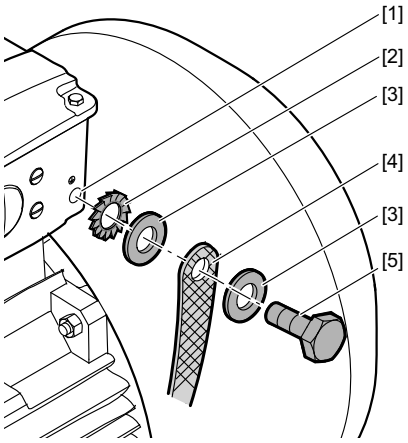


18014402064551947

[1] Use of tapped hole for lifting eyes
[2] Serrated lock washer DIN 6798
[3] Washer 7089 / 7090
[4] Ground strap (not included in the scope of delivery)
[5] Hexagon screw ISO 4017 M8 x 18, tightening torque10 Nm (88.5 lb-in)

5.9.5 Sizes EDR.160 – EDR.225

The following figure shows how to install the grounding:



9007202821668107

[1] Use of the tapped holes at the terminal box
[2] Serrated lock washer DIN 6798
[3] Washer 7089 / 7090
[4] Ground strap (not included in the scope of delivery)
[5]
- Hex head screw ISO 4017 M8 x 18 (with aluminum terminal boxes of size DR.160 – 225), tightening torque 10 Nm (88.5 lb-in)
- Hex head screw ISO 4017 M10 x 25 (with gray cast iron terminal boxes of the size DR.160 – 225), tightening torque 10 Nm (88.5 lb-in)

For sizes DR.160 – 225 with gray cast iron terminal boxes, the grounding is always pre-installed upon delivery of the drive.

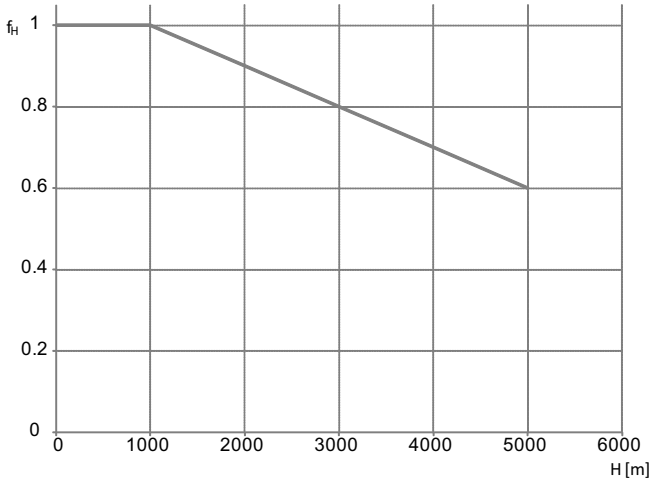
5.10 Ambient conditions during operation

5.10.1 Ambient temperature

The temperature range of -20°C to +40°C must be ensured unless specified otherwise on the nameplate.

5.10.2 Motor power depending on the installation altitude

The following diagram shows the factor f_H by which the motor power is reduced as a function of the installation altitude.



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The reduction is calculated as follows: $P_H = f_H \times P_N$

The current is calculated as follows: $I_H = f_H \times I_N$

5.10.3 Hazardous radiation

Motors must not be subjected to hazardous radiation (such as ionizing radiation). Consult SEW-EURODRIVE, if necessary.

5.10.4 Harmful gas, vapor and dust

If used according to their designated use, explosion-proof motors are incapable of igniting explosive gases, vapors or dusts. However, explosion-proof motors may not be subjected to gases, vapors or dusts that endanger operational safety, for example through

- Corrosion
- Damage to the protective coating
- Damage to the sealing material, etc.

Seal selection

If the motor is operated in environments with high environmental impact, such as increased ozone values, EDR motors can be equipped with high-quality gaskets. If you have doubts regarding the stability of the gaskets in connection with the respective environmental impacts, consult SEW-EURODRIVE.

5.11 Motors for hazardous locations

5.11.1 General information

The SEW-EURODRIVE motors for hazardous locations of the EDR.. series are designed for the following areas of application:

Identifier for hazardous locations	Operating range
CID2	Motor for hazardous locations according to CSA C22.1 or NFPA 70 • Class I, division 2, groups A, B, C and D
CIID2	Motor for hazardous locations according to CSA C22.1 or NFPA 70 • Class II, division 2, groups F and G
CICIID2	Motor for hazardous locations according to CSA C22.1 or NFPA 70 • Class I, division 2, groups A, B, C and D • Class II, division 2, groups F and G

5.11.2 Temperature classes

The motors are authorized for temperature classes T3 and T3C. The temperature class of the motor can be found on the nameplate or on the order confirmation.

5.11.3 Surface temperature

The surface temperature of the motor can be found on the nameplate or on the order confirmation.

5.11.4 Protection against impermissibly high surface temperatures

Motors for hazardous locations ensure safe operation under normal operating conditions. The motor must be switched off securely in the case of overload to avoid the risk of impermissibly high surface temperatures.

5.11.5 Protection exclusively with motor protection switch

Note the following when installing the motor protection switch according to IEC 60947:

- The motor protection switch must disconnect all poles in the event of a phase failure.
- The motor protection switch must be set to the rated motor current indicated on the nameplate.

5.11.6 Protection exclusively with PTC thermistor (TF)

The PTC thermistor must be evaluated using a suitable device. The applicable installation regulations must be adhered to.

⚠ CAUTION

Damage to the temperature sensor due to excessive voltage.

Possible destruction of the temperature sensor.

- Do not apply any voltages > 30 V.

The PTC thermistors comply with DIN 44082.

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

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

The PTC thermistor (TF) is required in order to maintain a safe isolation and for thermal monitoring.

The evaluation function of the temperature monitoring must be activated in connection with the temperature sensor measuring circuit and must become effective in the event of an overtemperature.

5.11.7 Protection with motor protection switch and additional PTC thermistor

The stated conditions for exclusive protection with motor protection switches also apply here. Protection with positive temperature coefficient thermistors (TF) only represents a supplementary protection measure which is irrelevant to certification for potentially explosive atmospheres.

INFORMATION

Proof of the efficacy of the installed protective equipment is required prior to startup.

5.12 Notes regarding motor connection

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. The applicable wiring diagrams are available from SEW-EURODRIVE free of charge.

INFORMATION

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

INFORMATION

The protection caps must be mounted properly on the terminal studs for startup; otherwise, the approval is void.

Observe the following points when connecting the motor:

- Inspect cable cross-section
- Arrange terminal links correctly
- Screw on the connections and the PE conductor correctly
- Make sure that the connection cables are not cramped to avoid damage to the cable insulation.
- Be aware of air gaps, see chapter "Electrical connection"
- In the terminal box: Check winding connections and tighten them if necessary
- Perform the connection in accordance with the enclosed wiring diagram
- Avoid protruding wire ends
- Observe the specified direction of rotation

5.13 Connection variants via terminal board

The motors are supplied and connected in different ways depending on the electrical design. Arrange the terminal links as shown in the wiring diagram and screw them on firmly. Observe the tightening torques specified in the following tables.

Motor size EDR.71-DR.100							
Terminal stud Ø	**Tightening torque of hex nut**	**Customer connection Cross sec.**	**Design**	**Connection type**	**Scope of delivery**	**PE terminal stud Ø**	**PE design**
M4	**1.6 Nm** (14.2 lb-in)	**≤ 1.5 mm² (AWG 16)**	**1a**	**Solid wire conductor end sleeve**	**Pre-assembled terminal links**	M5	4
		≤ 6 mm² (AWG 10)	**1b**	**Ring cable lug**	**Pre-assembled terminal links**		
		≤ 6 mm² (AWG 10)	2	Ring cable lug	Small connection accessories enclosed in bag		
M5	2.0 Nm (17.7 lb-in)	≤ 2.5 mm² (AWG 14)	1a	Solid wire conductor end sleeve	Pre-assembled terminal links		
		≤ 16 mm² (AWG 6)	1b	Ring cable lug	Pre-assembled terminal links		
		≤ 16 mm² (AWG 6)	2	Ring cable lug	Small connection accessories enclosed in bag		
M6	3.0 Nm (26.5 lb-in)	≤ 35 mm² (AWG 2)	3	Ring cable lug	Small connection accessories enclosed in bag		

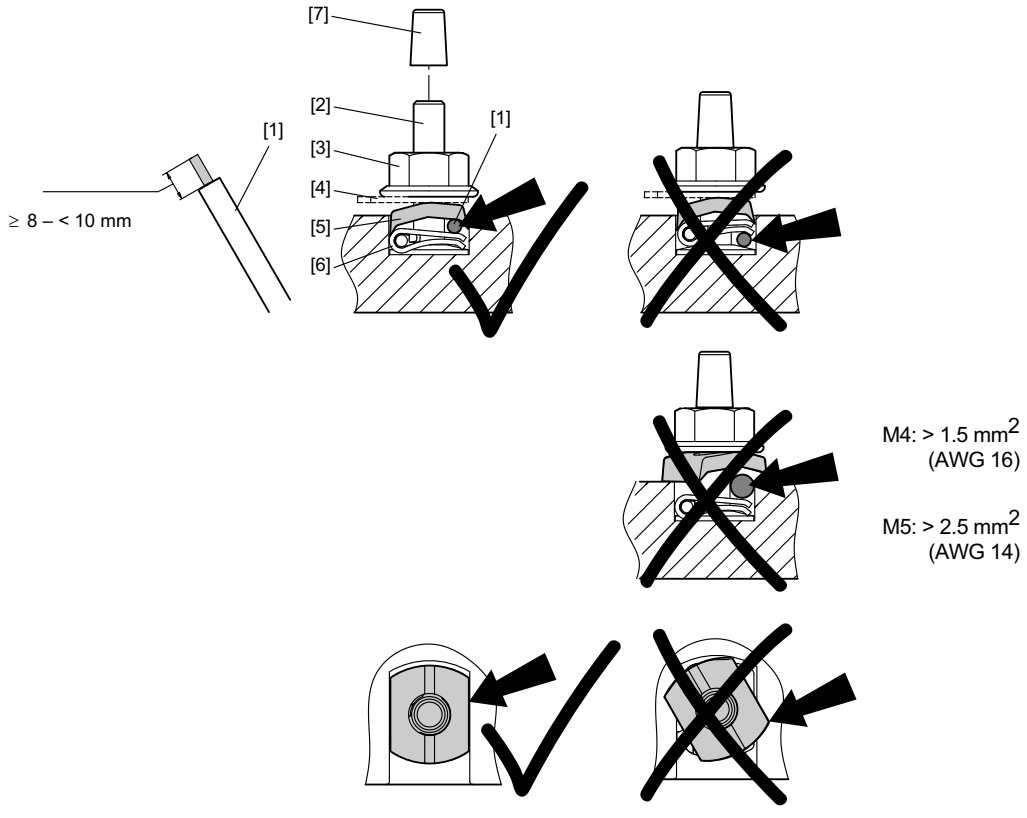
Motor size EDR.112-DR.132							
Terminal stud Ø	**Tightening torque of hex nut**	**Customer connection Cross sec.**	**Design**	**Connection type**	**Scope of delivery**	**PE terminal stud Ø**	**PE design**
M5	**2.0 Nm** (17.7 lb-in)	**≤ 2.5 mm² (AWG 14)**	**1a**	**Solid wire conductor end sleeve**	**Pre-assembled terminal links**	M5	4
		≤ 16 mm² (AWG 6)	**1b**	**Ring cable lug**	**Pre-assembled terminal links**		
		≤ 16 mm² (AWG 6)	2	Ring cable lug	Small connection accessories enclosed in bag		
M6	3.0 Nm (26.5 lb-in)	≤ 35 mm² (AWG 2)	3	Ring cable lug	Small connection accessories enclosed in bag		

Motor size EDR.160							
Terminal stud Ø	**Tightening torque of hex nut**	**Customer connection Cross sec.**	**Design**	**Connection type**	**Scope of delivery**	**PE terminal stud Ø**	**PE design**
M6	**3.0 Nm** (26.5 lb-in)	**≤ 35 mm² (AWG 2)**	**3**	**Ring cable lug**	**Small connection accessories enclosed in bag**	M8	5
M8	6.0 Nm (53.1 lb-in)	≤ 70 mm² (AWG 2/0)	3	Ring cable lug	Small connection accessories enclosed in bag	M10	5

Motor size EDR.180-DR.225							
Terminal stud **Ø**	**Tightening torque of hex nut**	**Customer connection** **Cross sec.**	**Variant**	**Connection type**	**Scope of delivery**	**PE terminal stud** **Ø**	**PE design**
M8	**6.0 Nm** (53.1 lb-in)	**≤ 70 mm²** (AWG 2/0)	**3**	**Ring cable lug**	**Small connection accessories enclosed in bag**	M8	5
M10	10 Nm (88.5 lb-in)	≤ 95 mm² (AWG 3/0)	3	Ring cable lug	Small connection accessories enclosed in bag	M10	5
M12	15.5 Nm (137.2 lb-in)	≤ 95 mm² (AWG 3/0)	3	Ring cable lug	Small connection accessories enclosed in bag	M10	5

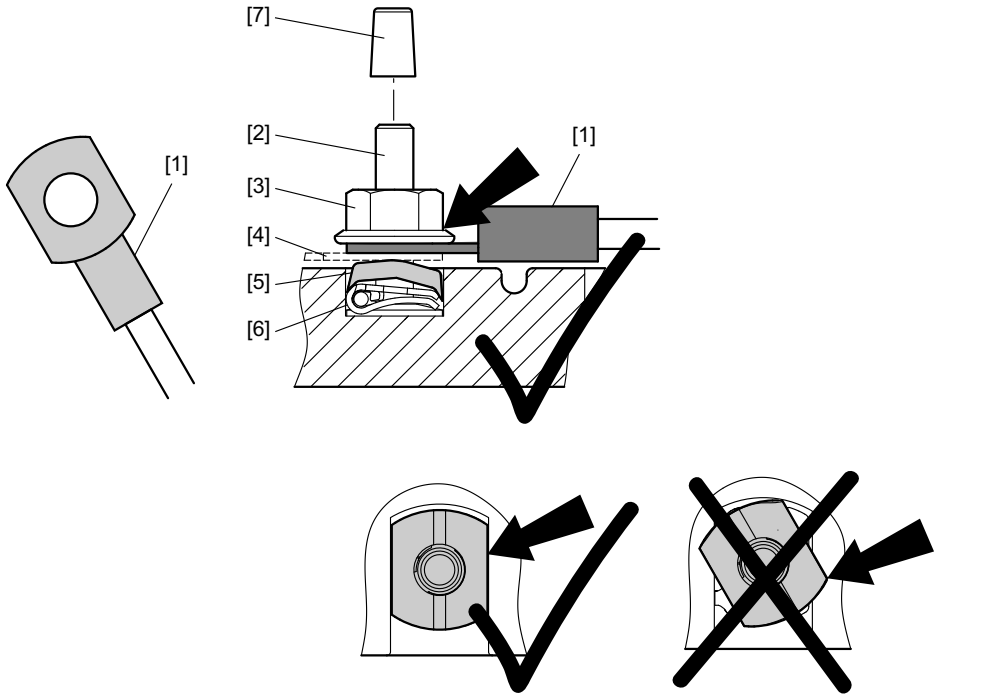
The designs in bold print apply to S1 operation for the standard voltages and standard frequencies according to the data in the catalog. Other variants may have different connections, for example, different terminal stud diameters and/or a different scope of delivery.

5.13.1 Variant 1a



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

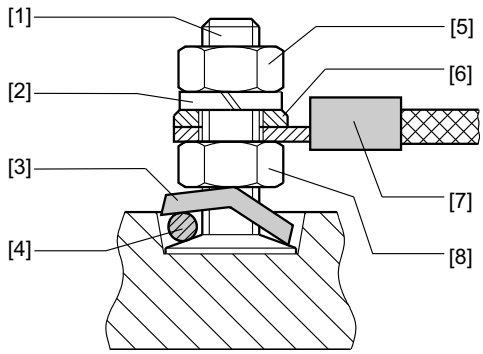
5.13.2 Variant 1b



4343866763

[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 connection terminal
[7] Protection caps

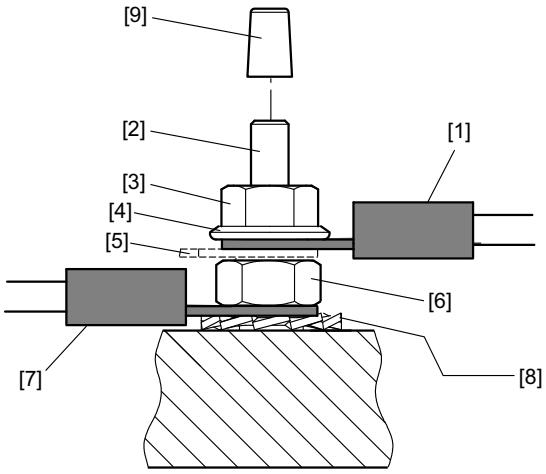
5.13.3 Variant 2



185439371

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

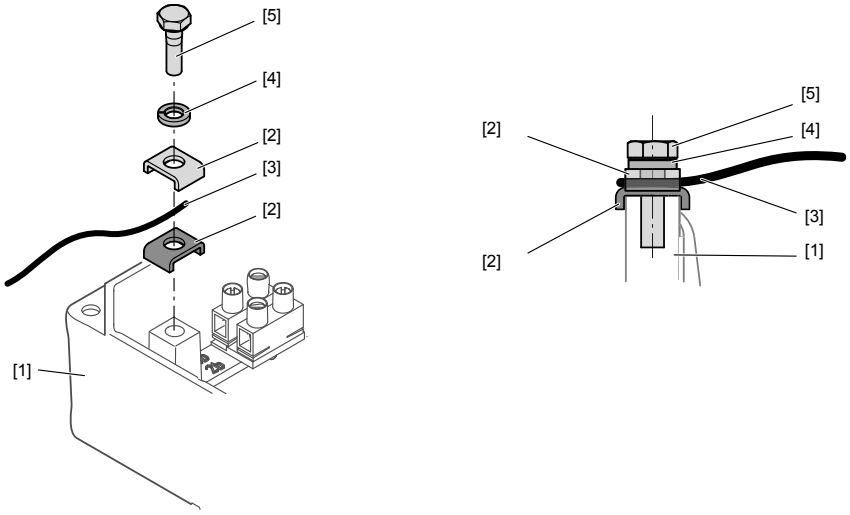
5.13.4 Variant 3



4343868683

[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] Lower nut
[7] Winding connection with ring cable lug
[8] Serrated lock washer
[9] Protection caps

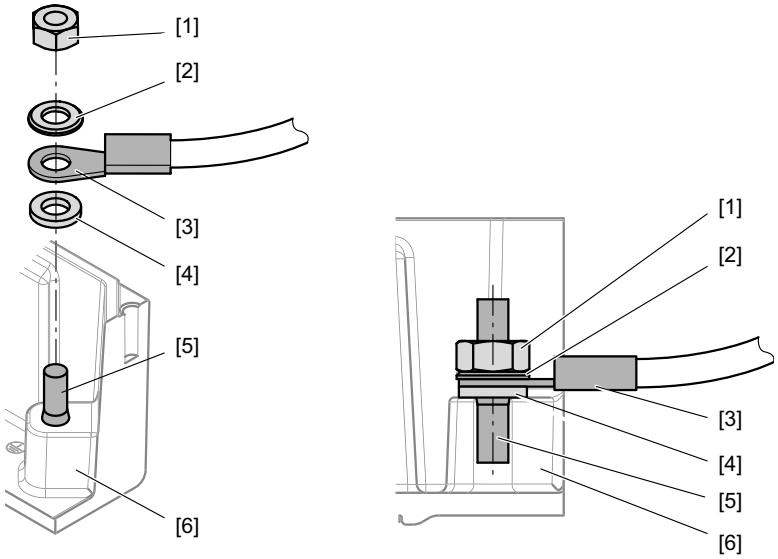
5.13.5 Variant 4



1139606667

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

5.13.6 Variant 5



1139608587

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

5.14 Connecting the brake

The brake is released electrically. The brake is applied mechanically when the voltage is switched off.

⚠ WARNING

Risk of crushing if the hoist falls.

Severe or fatal injuries.

- Comply with the applicable national or plant-specific regulations regarding phase failure protection and the associated circuit/circuit modification.
- Connect the brake according to the provided wiring diagram.
- In view of the DC voltage to be switched and the high level of current load, it is essential to use either special brake contactors or AC contactors with contacts in utilization category AC-3 according to EN 60947-4-1.

5.14.1 Connecting the brake controller

The DC disk brake is powered by a brake control system with protection circuit. It is located in the terminal box or must be installed in the control cabinet.

- **Check the cable cross sections – brake currents (see chapter "Technical data")**
- Connect the brake controller according to the provided wiring diagram
- Brakes must not be released electrically all the time while the motor is at standstill.

5.15 Accessory equipment

Connect accessory equipment as shown in the wiring diagram(s) provided with the motor. **Do not connect or startup any accessory equipment if the wiring diagram is missing.** You can obtain the relevant wiring diagrams from SEW-EURODRIVE free of charge.

5.15.1 Temperature sensor /TF

NOTICE

Damage of the temperature sensor due to excessive heat.

The drive system might be damaged.

- Do not apply voltages > 30 V to the TF temperature sensor.

The PTC thermistors comply with DIN 44082.

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

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

When using the temperature sensor for thermal monitoring, the evaluation function must be activated to maintain reliable isolation of the temperature sensor circuit. If the temperature reaches an excessive level, a thermal protection function must be triggered immediately.

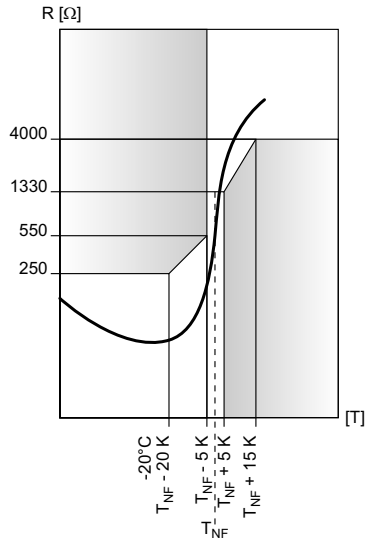
If there is a second terminal box for the TF temperature sensor, this is where you must connect the temperature sensor.

Observe the provided wiring diagram for the connection of the TF temperature sensor. If the wiring diagram is missing, you can obtain it from SEW-EURODRIVE free of charge.

INFORMATION

The temperature sensor TF may not be subjected to voltages > 30 V.

Characteristic curve of the TF with reference to the nominal response temperature (referred to here as T_{NF}):



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5.15.2 Temperature sensor /KY (KTY84-130)

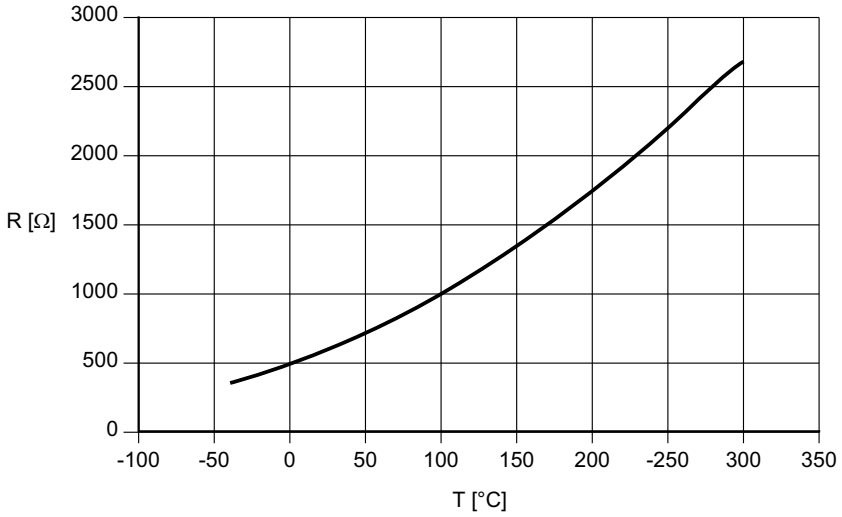
NOTICE

Excessive self-heating of the temperature sensor can damage the insulation of the temperature sensor.

The drive system might be damaged.

- Avoid currents > 4 mA in the circuit of the KTY.
- Observe the correct connection of KTY to ensure correct evaluation of the temperature sensor. Ensure correct polarity.

The characteristic curve in the following figure shows the resistance curve subject to the motor temperature with a measuring current of 2 mA and correct pole connection.



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

5.15.3 Temperature sensor /PT (PT100)

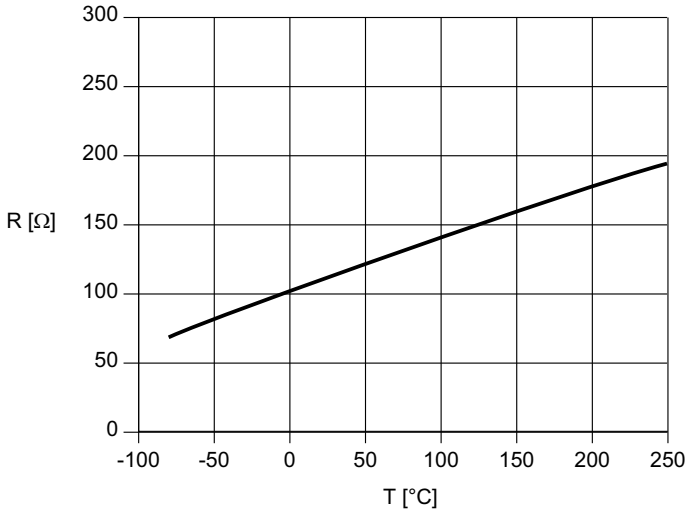
NOTICE

Excessive self-heating of the temperature sensor can damage the insulation of the temperature sensor.

The drive system might be damaged.

- Avoid currents > 4 mA in the circuit of the PT100.
- Observe the correct connection of PT100 to ensure correct evaluation of the temperature sensor. Ensure correct polarity.

The characteristic curve in the following figure shows the resistance curve subject to the motor temperature.



Technical data	PT100
Connection	Red/white
Resistance at 20 – 25°C per PT100	107 Ω < R < 110 Ω
Test current	< 3 mA

6 Operating modes and limit values

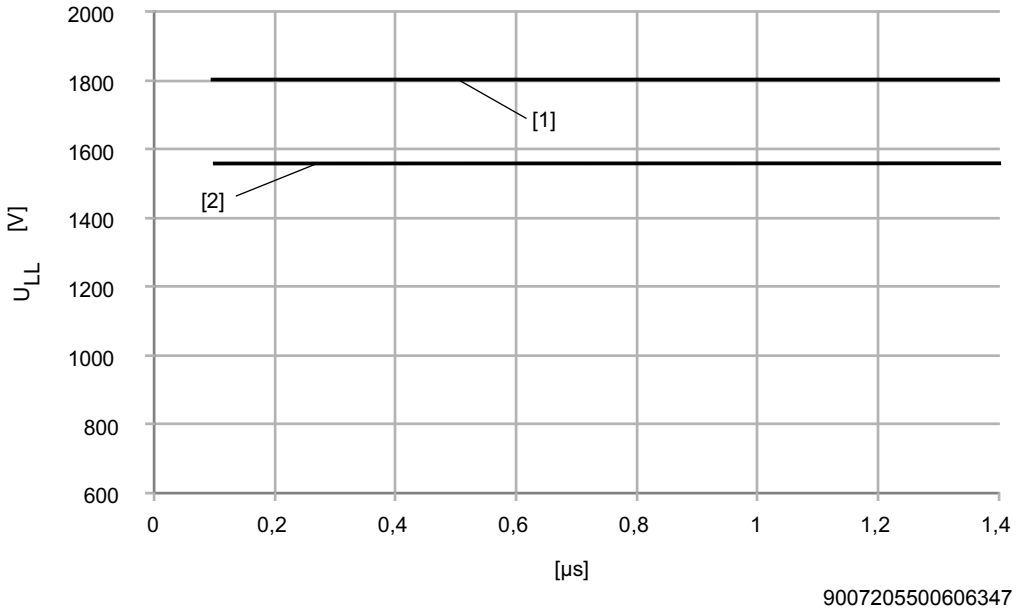
6.1 Permitted duty types

The permitted duty type is "continuous duty".

Class	Division	Protection against impermissibly high temperatures exclusively through	Permitted operating mode
CICII	2	Motor protection switch	• S1
		PTC thermistor (TF)	• S1 • Heavy start • Frequency inverter operation • Soft start unit

6.1.1 Permitted voltage load

The following diagram shows the permitted pulse voltage U_{LL} for EDR.71 – 225.



[1] Permitted pulse voltage for EDR motors with reinforced insulation (/RI), $V_N \leq 575$ V, according to NEMA MG1 part 31

[2] Permitted pulse voltage for EDR motors with standard insulation in double-star and star connection, $V_N \leq 500$ V, according to NEMA MG1 part 31

U_{LL} Permitted pulse voltage

µs Voltage rise time

Frequency inverter from SEW-EURODRIVE

When using frequency inverters from SEW-EURODRIVE on supply systems of up to 500 V, the maximally permitted limit values of the EDR.. motors are met.

The maximum permitted motor cable length is 100 m.

A braking resistor and a 4Q startup are mandatory. This prevents that in case of a fault in 1Q operation, the DC link voltage increases to an unacceptable level. External components, e.g. output choke, must not be used.

Frequency inverters from third party manufacturers

If the maximum permitted limit values cannot be met with frequency inverters from other manufacturers, you must take limiting measures. Consult the manufacturer of the frequency inverter.

IT network

In an IT system, an insulation fault between a phase and ground is tolerated. The ground connection of the motor could mean that the maximum permitted limit value for phase-to-ground of 1200 V is exceeded in regenerative operation. To prevent this effectively, you have to install suitable protection elements between the frequency inverter and the motor. Usually, sine filters are installed between frequency inverter and motor for this purpose. For detailed information about component selection and wiring, please contact the manufacturer of the frequency inverter.

Regeneration

The regenerative power supply module of MOVIDRIVE® or MOVIAXIS® can be used with the necessary options without restrictions. The regenerative power supply unit prevents high DC link voltages and ensures that the limit values are not exceeded.

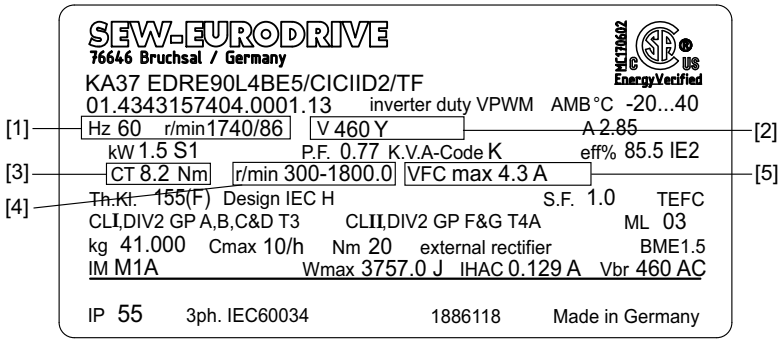
6.2 Use

NOTES ON EXPLOSION PROTECTION

- It is not permitted to connect more than one motor to one frequency inverter.
- If the motor voltage is too low (undercompensation), slip increases, which causes higher temperatures in the rotor of the motor.
- If the mechanical load is the same, operation on a frequency inverter causes a more significant motor temperature rise due to the harmonic content in current and voltage.

6.2.1 Explanation of the information on the nameplate

The following figures represent a motor nameplate for the frequency inverter operation and a gear unit nameplate:



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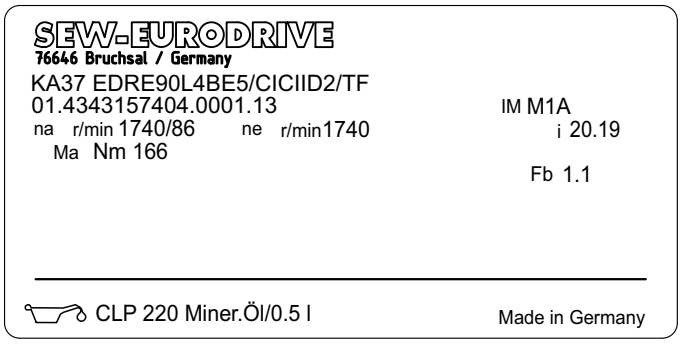

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[1] Speed specifications (motor/gear unit output) at 60 Hz
[2] Voltage and connection type
[3] Continuous torque M_{CT} within the scope of the specified speed range [4]
[4] Speed range with constant torque
300 = Minimum sustained speed n_{min}
1800 = Maximum sustained speed n_{max}
[5] Maximum dynamic current with VFC mode $I_{max\ VFC}$
VFC = Voltage-controlled control mode for the inverter

6.3 Safe operation of explosion-proof motors in division 2

Project planning is the basic prerequisite for the safe operation of explosion-proof motors in division 2 for CI (gas) and CII (dust). The following points have to be considered:

- Adhere to the thermal torque characteristic curve (M_{CT})
- Observe the dynamic limit torque
- Take the minimum and maximum motor speeds n_{min} and n_{max} into account
- Select the suitable frequency inverter
- Use the braking resistor irrespective of the duty type
- Observe the maximum permitted braking work per switching operation or per emergency stop, see chapter "Permitted work done by the BE brake for AC motors" (→ page 112).
- Check the overhung and axial loads on the motor shaft of stand-alone motors

In the case of combinations with explosion-proof gear units (in compliance with Directive 94/9/EC), the following points must be observed:

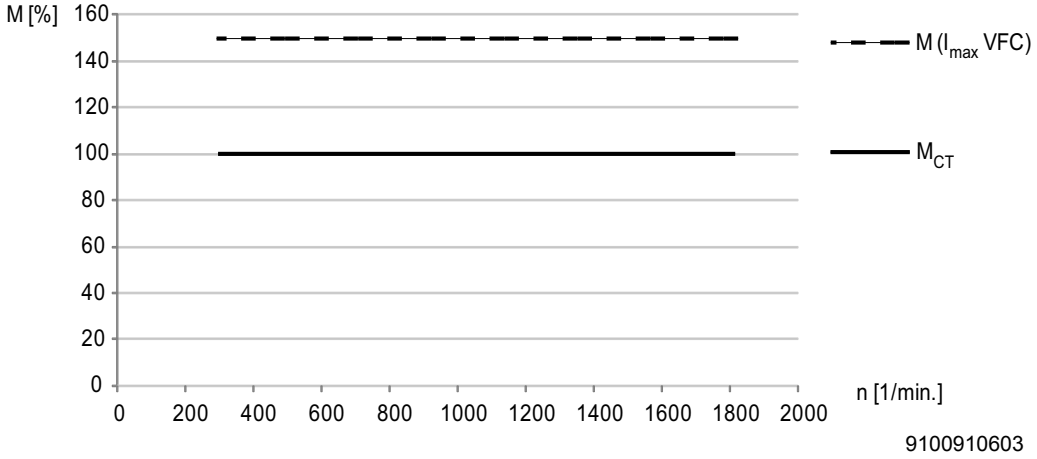
- Maximum gear unit input speed, see n_{emax} on the nameplate
- Maximum gear unit output torque, see M_{amax} on the nameplate

6.3.1 Maximum permitted torques

The thermal torque limit characteristic curve shows the permitted maximum torque for continuous operation.

The values may be exceeded for brief periods if the effective operating point lies below the thermal limit characteristic curve (M_{CT}).

The maximum dynamic limit torque must not be exceeded. To ensure this, the frequency inverter limits the output current to 150% of the nominal motor current.



Permitted maximum and minimum motor speeds

It is essential to observe the maximum and minimum motor speeds listed in the assignment tables for the motor-frequency inverter combinations. The actual values may not exceed or fall below these specifications.

Frequency inverter selection

Base your selection of the right frequency inverter on the table in chapter "Motor/inverter assignment for motors of division 2" (→ page 61).

If the rated motor voltage is different, the frequency inverter must be selected manually. In this case, you must bear in mind that the maximum permitted output current is 150% of the nominal motor current.

The frequency inverter power is limited by the condition $I_{N\ FI} \leq 2x\ I_{N\ Mot}$.

Key:
$I_{N\ FI}$ = Nominal inverter output current $I_{N\ Mot}$ = Nominal motor current

6.3.2 Notes for safe operation

General

Install the frequency inverter outside of any potentially explosive atmosphere.

Thermal motor protection

Only motors that are equipped with a PTC thermistor (TF) are permitted for operation on an inverter to ensure that the permitted limit temperature is not exceeded. The positive temperature coefficient thermistor has to be evaluated using an appropriate device.

Motors that are suitable for operation with a frequency inverter are indicated with the duty type "Inverter duty" on the nameplate.

Overvoltage at the motor terminals

When operating the motors on frequency inverters, observe chapter "Permitted voltage requirement" (→ page 56).

EMC measures

The following components are permitted for the MOVIDRIVE® and MOVITRAC® frequency inverters:

- Line filters of the NF...-... series
- Output chokes of the HD... series
- Output filter (sine filter) HF..

  If an output filter is used, the voltage drop at the filter must be taken into account.

Voltage drop

Take the voltage drop into account in general to prevent undervoltage.

Gear units in compliance with Directive 94/9/EC (ATEX)

When parameterizing FI-controlled gearmotors, you have to observe the n_{emax} and M_{amax} values of the gear unit.

6.3.3 Motor/inverter assignment for motors in division 2

Frequency inverters that have similar values with respect to output current and output voltage can also be used.

Inverter output voltage [V]				Canada/USA: 460 to 480								Canada: 575			
Rated motor voltage [V]				460				230				575		330	
Connection type				⅄				⅄⅄				⅄		△	
Motor type	P_n [kW] 60 Hz	P_n [HP] 60 Hz	M_n [Nm] 60 Hz	n_{min} - n_{max} rpm]	$I_{N\ mot}$ [A]	FI [kW]	FI [HP]	n_{min} - n_{max} [rpm]	$I_{N\ mot}$ [A]	FI [kW]	FI [HP]	n_{min} - n_{max} [rpm]	$I_{N\ mot}$ [A]	n_{min} - n_{max} [rpm]	$I_{N\ mot}$ [A]
EDRS71S4	0.18	0.25	1.01	300 - 1800	0.44	0.25	0.34	300 - 3000	0.87	0.37	0.5	300 - 1800	0.35	300 - 3000	0.61
EDRS71S4	0.25	0.34	1.4	300 - 1800	0.57	0.25	0.34	300 - 3000	1.14	0.37	0.5	300 - 1800	0.46	300 - 3000	0.79
EDRS71S4	0.37	0.5	2.1	450 - 1800	0.92	0.37	0.5	450 - 3000	1.84	0.75	1	450 - 1800	0.74	450 - 3000	1.3
EDRS71M4	0.55	0.75	3.1	450 - 1800	1.25	0.55	0.75	450 - 3000	2.5	1.1	1.5	450 - 1800	1	450 - 3000	1.7
EDRE80M4	0.75	1	4.1	300 - 1800	1.44	0.75	1	300 - 3000	2.88	1.5	2	300 - 1800	1.2	300 - 3000	2.0
EDRE90M4	1.1	1.5	6	300 - 1800	2.3	1.1	1.5	300 - 3000	4.5	2.2	3	300 - 1800	1.8	300 - 3000	3.1
EDRE90L4	1.5	2	8.2	300 - 1800	2.9	1.5	2	300 - 3000	5.7	3	4	300 - 1800	2.3	300 - 3000	4.0
EDRE100L4	2.2	3	12.1	300 - 1800	4	2.2	3	300 - 3000	8	4	5.4	300 - 1800	3.2	300 - 3000	5.6
EDRE112M4	3.7	5	20	300 - 1800	6.3	4	5.4	300 - 3000	12.6	7.5	10	300 - 1800	5.0	300 - 3000	8.8
EDRE132S4	4	5.4	21.5	300 - 1800	6.9	4	5.4	300 - 3000	13.8	7.5	10	300 - 1800	5.5	300 - 3000	9.6
EDRE132M4	5.5	7.5	30	300 - 1800	9	5.5	7.5	300 - 3000	18	11	15	300 - 1800	7.2	300 - 3000	12.5
EDRE160S4	7.5	10	40.5	300 - 1800	12.7	7.5	10	300 - 3000	25.4	15	20	300 - 1800	10.2	300 - 3000	17.7
EDRE160M4	9.2	12.5	49.5	300 - 1800	15.4	11	15	300 - 3000	30.8	22	30	300 - 1800	12.3	300 - 3000	21.5
EDRE180S4	11	15	59	300 - 1800	17.9	11	15	300 - 3000	35.8	22	30	300 - 1800	14.3	300 - 3000	25.0
EDRE180M4	15	20	81	300 - 1800	24	15	20	300 - 2700	48	30	40	300 - 1800	19.2	300 - 2700	33.5
EDRE180L4	18.5	25	100	300 - 1800	30	22	30	300 - 2700	60	37	50	300 - 1800	24.0	300 - 2700	41.8
EDRE200L4	22	30	118	300 - 1800	36.5	22	30	Setting range is not possible				300 - 1800	29.2	Setting range is not possible	
EDRE200L4	30	40	161	450 - 1800	49.5	30	40					450 - 1800	39.6		
EDRE225S4	37	50	200	300 - 1800	59	37	50					300 - 1800	47.2		
EDRE225M4	45	60	240	900 - 1800	71	45	60					900 - 1800	56.8		

INFORMATION

When selecting the frequency inverter, the condition $I_{N\ FI} \leq 2x\ I_{N\ Mot}$ must be taken into account.

INFORMATION

The brake/backstop or gear unit options may have different minimum or maximum speeds (see nameplate).

6.4 Soft-start units

The use of soft start units is permitted for motors of division 2 when the motors are equipped with a TF temperature sensor and meet the conditions of EN 60079-14. During startup, you must verify and document whether temperature monitoring is effective and whether the motor starts up correctly. The motor must be disconnected from the supply system when the protection device trips.

7 Startup

INFORMATION

- Observe the safety notes in chapter 2 during installation.
- In case of problems, refer to the section "Malfunctions".

⚠ WARNING

Risk of explosion due to the use of components that are not protected against explosions.

Severe or fatal injuries.

- Only use components that are designed for the relevant hazardous location class.

⚠ WARNING

Risk of explosion due to sparks.

Severe or fatal injuries.

- Do not open the wiring space of the motor in hazardous locations.

⚠ WARNING

Danger of electric shock.

Severe or fatal injuries.

Observe the following notes.

- Use switch contacts in utilization category AC-3 according to IEC 60947-4-1 for switching the motor.

⚠ CAUTION

The surface temperatures on the drive can be very high during operation.

Danger of burns.

- Let the motor cool down before you start your work.

7.1 Before startup

Before startup, make sure that:

- The drive is undamaged and not blocked,
- Any transport locks have been removed
- The measures stipulated in section "Extended storage of motors" (→ page 12) are performed after extended storage periods
- All connections have been made properly
- The direction of rotation of the motor/gearmotor is correct
  - Motor rotating clockwise: U, V, W (T1, T2, T3) to L1, L2, L3
- All protective covers have been properly installed
- All motor protection equipment is active and set for the rated motor current
- There are no other sources of danger
- The reliability of the lockable manual brake release has been ensured

7.2 During startup

During startup, make sure that:

- The motor is running properly, which means
  - No overload,
  - No speed fluctuation,
  - No loud noises,
  - No unusual vibrations, etc.
- The braking torque corresponds to the respective application. Observe the "Technical data" (→ page 103) chapter and the nameplate.

INFORMATION

On brakemotors with self-reengaging manual brake release, the lever must be removed after startup. A bracket is provided for storing the lever on the outside of the motor housing.

7.3 Parameter setting: Frequency inverters for division 2 motors

INFORMATION

When you start up the frequency inverter, observe the operating instructions of the respective frequency inverter as well as the operating instructions of the gear unit if you use a gearmotor.

7.3.1 Startup procedure for MOVITRAC® 07B

Observe the following points during startup:

- Use the MOVITOOLS® MotionStudio software, version 5.90 or higher, for a guided startup procedure.
- The startup and operation of motors in division 2 is only possible in parameter set 1.
- Always select direct input as the startup mode.
- The system configuration only allows for individual drives.
- You can set either "V/f" or "vector-controlled" for the control mode.
- For the application, you can only select speed control and hoist application. Do not use the options "DC braking" or "Flying start function".
- Always set the operating mode to "4-quadrant operation".
- Select the appropriate motor series in the "Motor type" window.
- In the "Motor selection" window, choose the appropriate class/division type, the line voltage, the motor voltage and the connection type in addition to the motor.

Example for selecting the motor voltage:	
Voltage specification on the nameplate: 460 V 人	Voltage specification on the nameplate: 230 V 人 人
Input in the MotionStudio: • Motor voltage selection 230/460 V • Connection type 人	Input in the MotionStudio: • Motor voltage selection 230/460 V • Connection type 人 人

Current limit parameter

In guided startup, the *Current limit* parameter is set to 150% $I_{N\ Mot}$ in the application window. Do not increase this value. In the case of a combination with an explosion-proof gear unit (in compliance with Directive 94/9/EC), the value must be adjusted according to the maximum permitted output torque of the gear unit M_{amax}.

Maximum speed parameter

The minimum and maximum motor speeds are limited in the window *System integration*. You must observe the following when setting the parameter *maximum speed*:

- *Maximum speed* ≤ maximum motor speed n_{max} and
- In the case of an explosion-proof gear unit (in compliance with Directive 94/9/EC): *Maximum speed* ≤ maximum gear unit input speed n_{emax} (see gear unit nameplate)

Automatic adjustment parameter

The parameter *automatic adjustment* is activated via guided startup. Thus, the frequency inverter sets parameter *IxR value* with each enable signal. A manual change is not permitted.

7.3.2 Startup procedure for MOVIDRIVE® B

Observe the following points during startup:

- Use the MOVITOOLS® MotionStudio software, version 5.90 or higher, for a guided startup procedure.
- Startup and operation of the motors in division 2 is possible in parameter set 1 and 2.
- The first startup must always be a complete startup.
- The motor configuration only allows for individual drives. You can set either "V/f" or "vector-controlled" (VFC) for the control mode.
- Select the appropriate motor series in the "Motor type" window (EDR HazLoc-NA®).
- For the application options, you can only select "speed control" and "hoist" function. Do not use the functions "DC braking" or "Flying start function".
- The operating mode must always be set to "4-quadrant operation" (parameters P820/P821).
- In the "SEW motor type 1" window, you must choose the appropriate class/division type, the nominal motor voltage, the connection type, and the line voltage in addition to the motor.

Example for selecting the motor voltage:	
Voltage specification on the nameplate: 460 V 人	Voltage specification on the nameplate: 230 V 人 人
Input in the MotionStudio: • Motor voltage selection 230/460 V • Connection type 人	Input in the MotionStudio: • Motor voltage selection 230/460 V • Connection type 人 人

Current limit parameter

Parameter *Current limit* is set to 150% $I_{N\ Mot}$ via guided startup. Do not increase this value. In the case of a combination with an explosion-proof gear unit (in compliance with Directive 94/9/EC), the value must be adjusted according to the maximum permitted output torque of the gear unit M_{amax}.

Maximum speed parameter

The minimum and maximum motor speed is limited in the *System limits* window. You must observe the following when setting the parameter *maximum speed*:

- *Maximum speed* ≤ maximum motor speed n_{max} and
- In the case of an explosion-proof gear unit (in compliance with Directive 94/9/EC): *Maximum speed* ≤ maximum gear unit input speed n_{emax} (see gear unit nameplate)

Automatic adjustment parameter

The parameter *automatic adjustment* is activated via guided startup. Thus, the frequency inverter sets parameter *IxR value* with each enable signal. A manual change is not permitted.

7.3.3 General information for frequency inverter operation

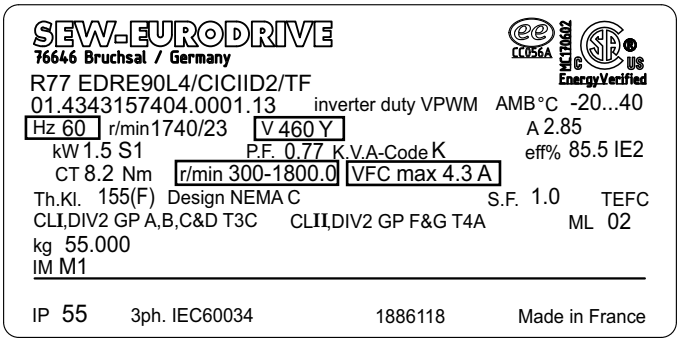
The following example illustrates the settings required on the frequency inverter.

Basic procedure:

1. Transfer the nominal motor data from the nameplate
2. Set the motor characteristics using the base frequency
3. Set the limit values (minimum speed, maximum speed and current limit)

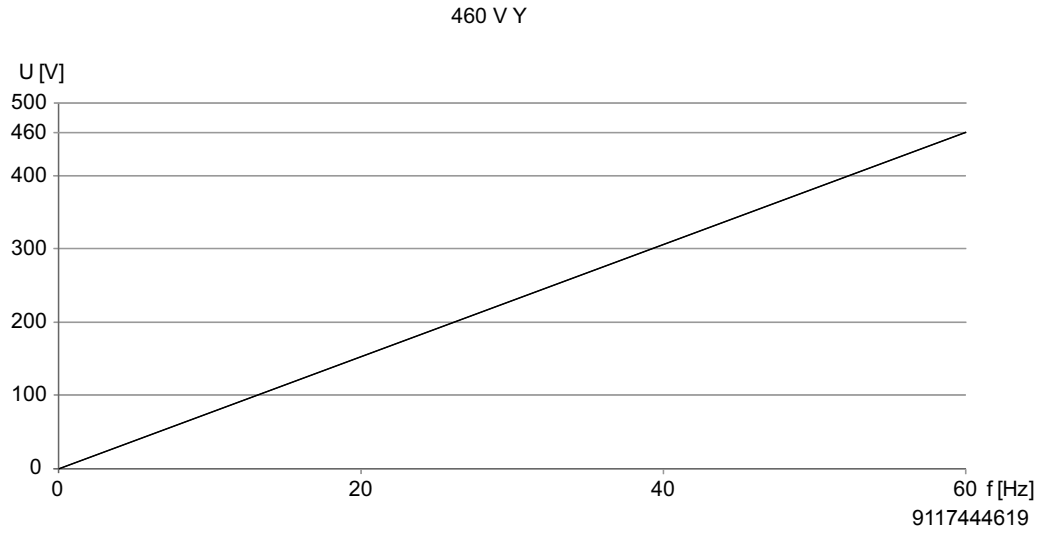
60 Hz characteristic curve - 460 V

For output voltage 3 x 460 V-480 V



9117451147

Set the 60 Hz characteristic curve (460 V ⅄, 60 Hz, 1800 1/min)



9117444619

Transfer the limit values from the nameplate:

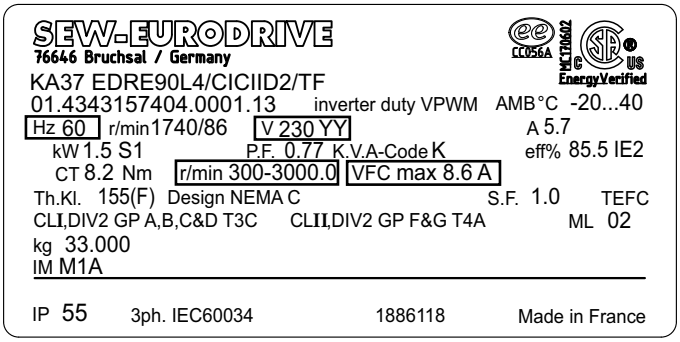
Minimum speed = 300 1/min

Maximum speed = 1800 1/min

I_{max} = 4.3 A

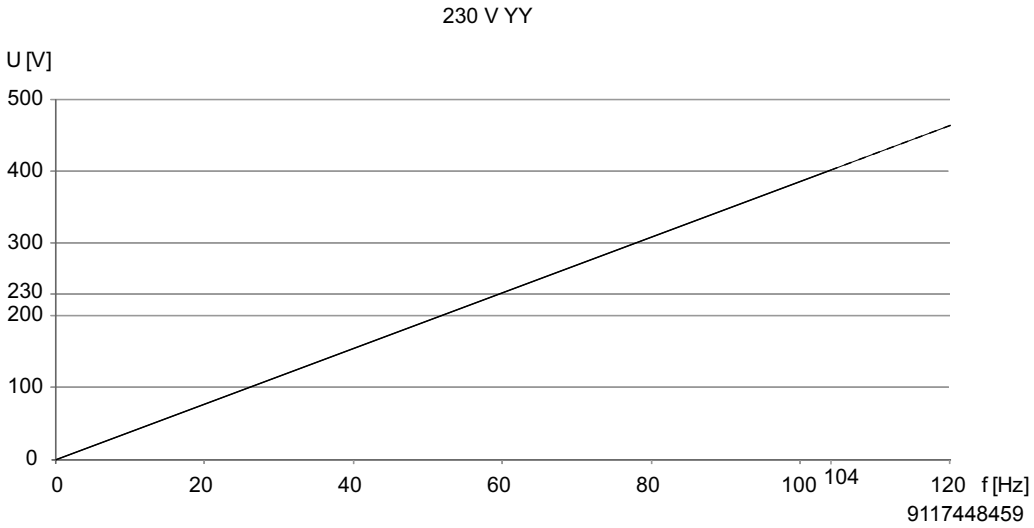
120 Hz characteristic curve - 460 V

For output voltage 3 x 460 V-480 V



9117785867

Set the 120 Hz characteristic curve (230 V ⅄⅄, 60 Hz, 3000 1/min)



9117448459

Transfer the limit values from the nameplate:

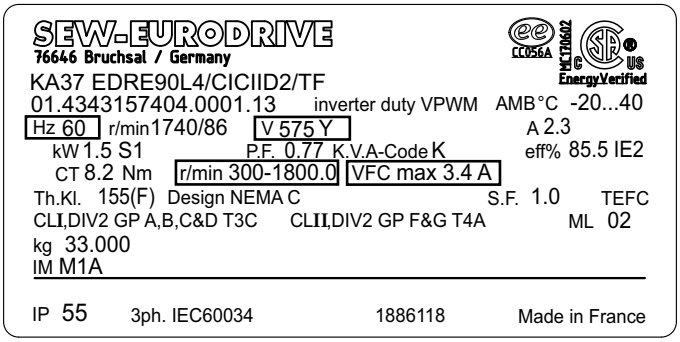
Minimum speed = 300 1/min

Maximum speed = 3000 1/min

I_{max} = 8.6 A

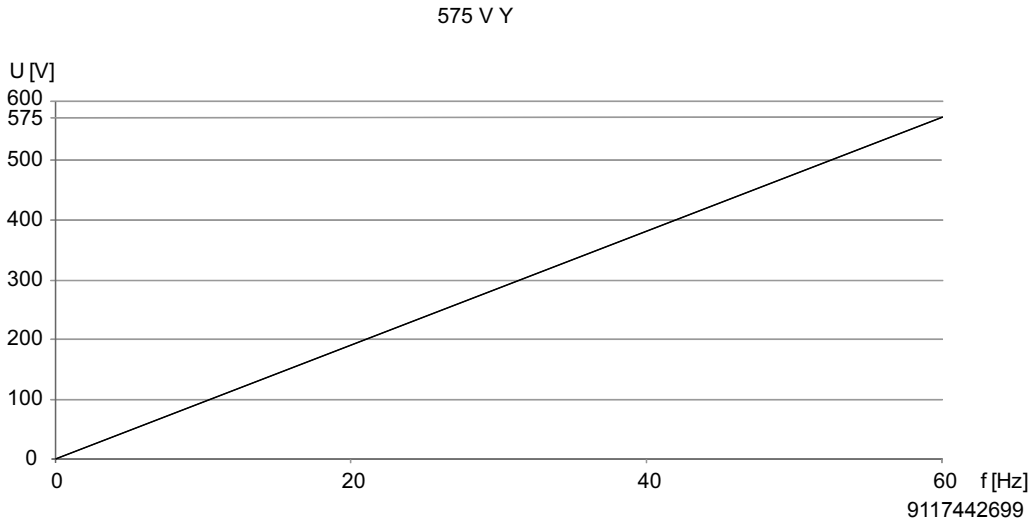
60 Hz characteristic curve - 575 V

For output voltage 3 x 575 V



9117787787

Set the 60 Hz characteristic curve (575 V ⅄, 60 Hz, 1800 1/min)



9117442699

Transfer the limit values from the nameplate:

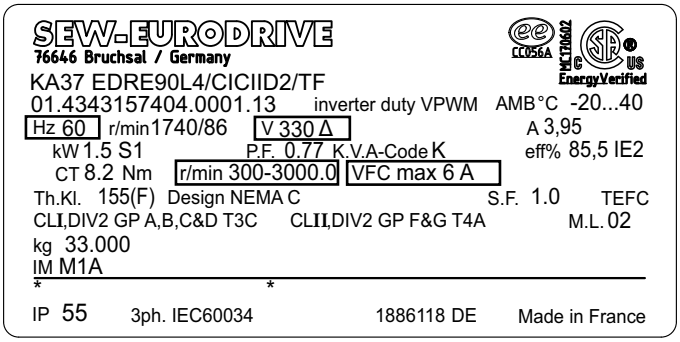
Minimum speed = 300 1/min

Maximum speed = 1800 1/min

I_{max} = 3.4 A

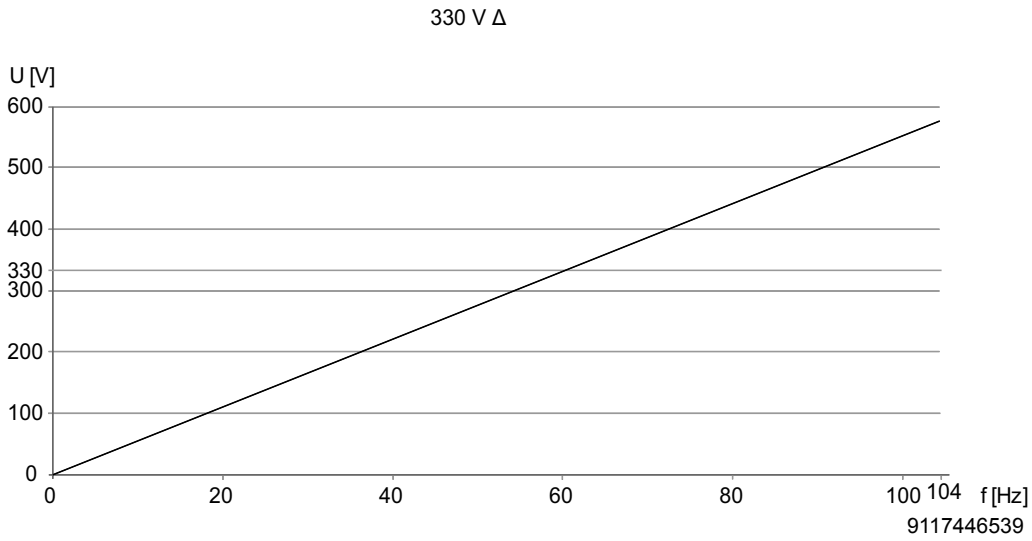
104 Hz characteristic curve - 575 V

For output voltage 3 x 575 V



9117789707

Set the 104 Hz characteristic curve (330 V △, 60 Hz, 3000 1/min)



9117446539

Transfer the limit values from the nameplate:

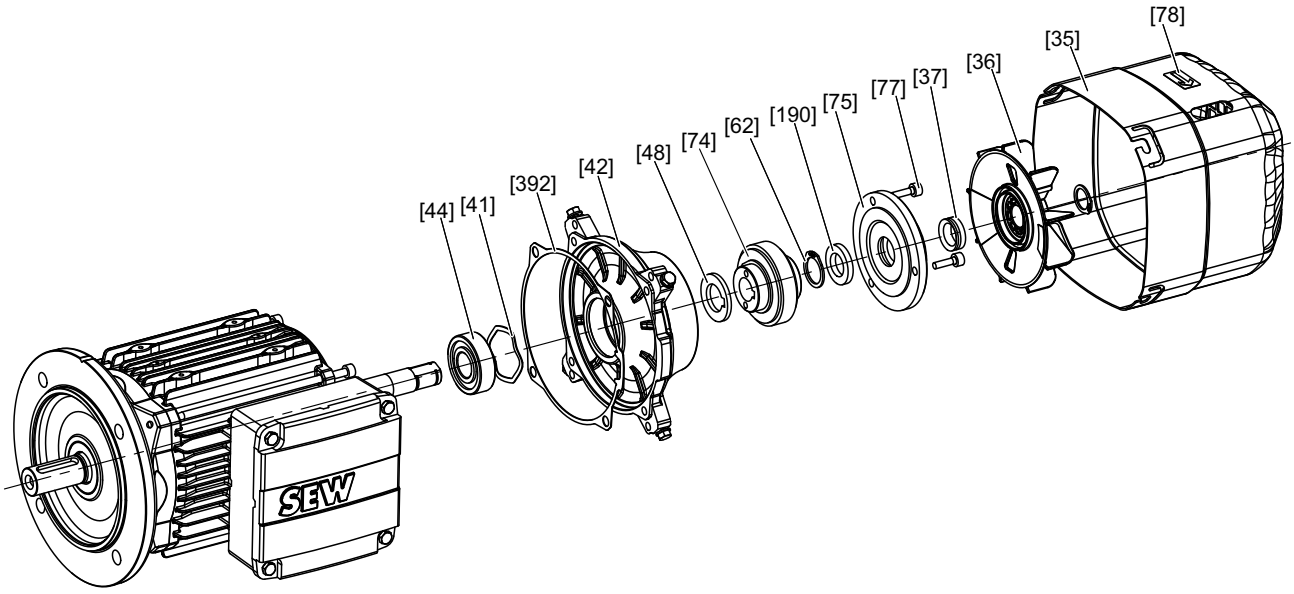
Minimum speed = 300 1/min

Maximum speed = 3000 1/min

I_{max} = 6 A

7.4 Changing the blocking direction of motors with backstop

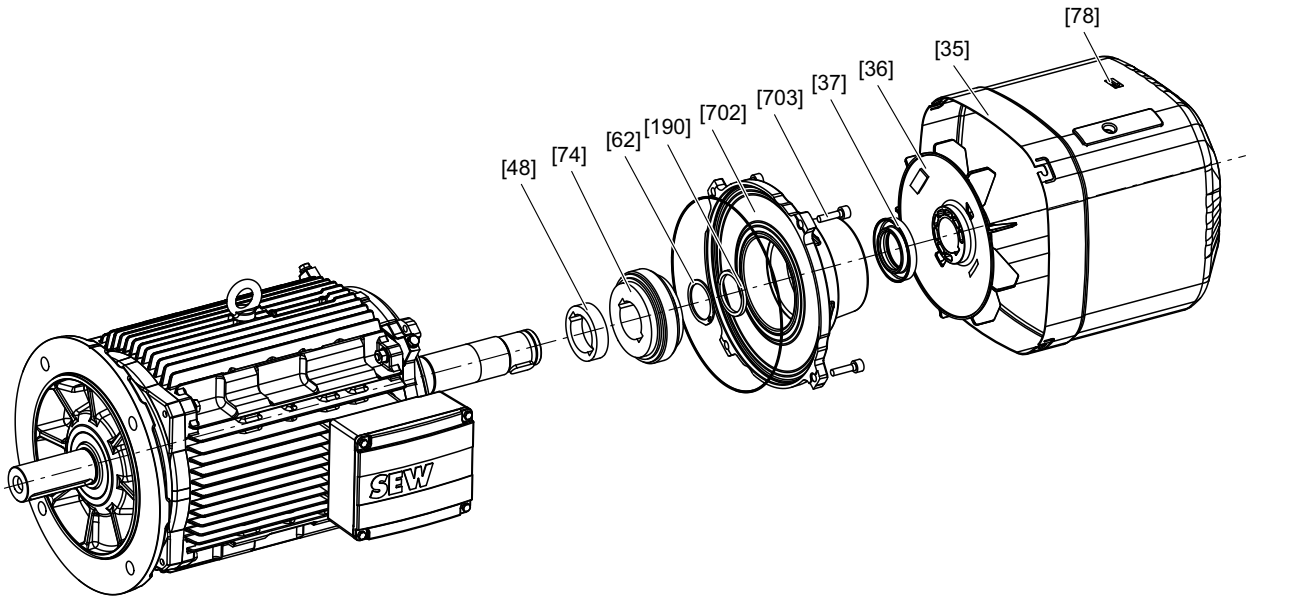
7.4.1 Structure of an EDR.71 – EDR.80 with backstop



1142858251

[35] Fan guard
[36] Fans
[37] Sealing ring
[41] Shim
[42] Backstop endshield
[44] Grooved ball bearing
[48] Spacing ring
[62] Retaining ring
[74] Complete sprag ring
[75] Sealing flange
[77] Screw
[78] Direction of rotation information tag
[190] Felt ring
[392] Sealing

7.4.2 Structure of EDR.90 – EDR.225 with backstop (example)



1142856331

[35] Fan guard
[36] Fan
[37] Sealing ring
[48] Spacing ring
[62] Retaining ring
[74] Complete sprag ring
[78] Direction of rotation information tag
[190] Felt ring
[702] Backstop housing, complete
[703] Machine screw

7.4.3 Changing the blocking direction

A backstop is used to block/preclude 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 gearmotor 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 (ensure correct connection of power supply with motor).** For inspection purposes, you can operate the backstop once with half the motor voltage in the blocking direction.

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- De-energize the motor before you start working.
- Safeguard against accidental startup.
- Carefully observe the steps described below.

Proceed as follows to change the blocking direction:

1. Remove forced cooling fan and incremental encoder (if installed).

   See chapter "Inspection/Maintenance" > "Motor and brake maintenance – preliminary work".
2. Remove flange cover or fan guard [35]
3. EDR.71 – 80: Remove the sealing flange [75].

   EDR.90 – 225: Completely remove the backstop housing [702]
4. Loosen the retaining ring [62]
5. Remove the wedge element ring [74] via screws in the forcing threads or using a puller
6. Spacing ring [48], if provided, remains installed
7. Turn around wedge element ring [74], check the old grease and replace according to the specifications below and reinstall the wedge element ring.
8. Install the retaining ring [62]

   ⚠ **NOTICE** Damage due to incorrect assembly

   Damage to the material

   - Do not exert pressure on or hit the wedge element train
9. EDR.71 – 80: Apply SEW L Spezial to the sealing flange [75] and install it. Replace felt ring [190] and sealing ring [37], if required.

   EDR.90 – 225: Replace seal [901], felt ring [190] and sealing ring [37], if required, and install the backstop housing [702].
10. Reinstall the removed parts.
11. Replace the label [78] indicating the direction of rotation

Greasing the backstop

The backstop is supplied with the corrosion protection low-viscosity grease Mobil LBZ. If you want to use another grease, make sure it complies with NLGI class 00/000 with a base oil viscosity of 42 mm^2/s at 40°C on a lithium saponified and mineral oil base. The application temperature range is -50°C to +90°C. See the following table for the amount of grease required.

Motor type	71	80	90/100	112/132	160	180	200/225
Amount of grease [g]	9	11	15	20	30	45	80

The tolerance margin for the grease amount is ± 30%.

8 Inspection/Maintenance

⚠ WARNING

Risk of crushing if the hoist falls or in the event of uncontrolled unit behavior.

Severe or fatal injuries.

- Secure or lower hoist drives (danger of falling)
- Safeguard and/or protect the driven machine against touching
- Isolate the motor, brake, and forced cooling fan, if installed, from the power supply before starting work, safeguarding them against unintentional re-start.
- Only use genuine spare parts in accordance with the valid spare parts list.
- Always install a new brake control system at the same time as replacing the brake coil.

⚠ CAUTION

The surface temperatures on the drive can be very high during operation.

Danger of burns.

- Let the motor cool down before you start your work.

CAUTION

For assembly, the ambient temperature and the oil seals themselves may not be colder than 0°C, otherwise the oil seals might be damaged.

Only SEW service staff, repair workshops or plants that have the necessary expertise may repair or modify the motor.

Before re-startup of the motor, make sure that all regulations are complied with and document this with a label on the motor or a written test report.

Always perform safety and functional tests following all maintenance and repair work (thermal protection).

INFORMATION

Apply a grease reservoir around the lip of the oil seals before assembly, see chapter "Oder information for lubricants and anti-corrosion agents" (→ page 128).

NOTES ON EXPLOSION PROTECTION

- Use only original spare parts from the relevant and valid spare parts lists; otherwise, the approval for hazardous locations of the motor will become void.
- The routine test must be repeated whenever motor parts relating to explosion protection are replaced.
- Make sure that the motor is assembled correctly and all openings have been plugged after service and maintenance work.
- Clean motors for hazardous locations regularly.
- Explosion protection is largely dependent on the IP enclosure. Therefore, always check that the seals are fitted correctly and in perfect condition when performing any work on the machine.
- Explosion protection can only be ensured if motors are serviced and maintained correctly.

8.1 Inspection and maintenance intervals

The following table lists the inspection and maintenance intervals:

Unit / unit part	Time interval	What to do?
BE brake	• **If used as a working brake:** At least every 3000 hours of operation[1)] • **If used as a holding brake:** Every 0.5 to 2 years, depending on operating conditions[1)]	Brake inspection • Measuring the brake disk thickness • Brake disk, lining • Measuring and adjusting working air gap • Pressure plate • Driver/gearing • Pressure rings • Sucking off any abrasion • Inspect the switch contacts and replace them, if necessary (e.g. in case of burn-out)
Motor	• **Every 10,000 operating hours** [2)]	Motor inspection: • Check rolling bearing and change if necessary • Replacing the oil seal • Clean cooling air ducts
Drive	• Varies [2)]	• Touch up or renew the surface/ anticorrosion coating • if applicable, clean condensation drain hole at the bottom of the fan guard • Clean clogged bores

1) The amount of wear depends on many factors and may be high. The machine manufacturer must calculate the required inspection/maintenance intervals individually in accordance with the project planning documents (e.g. "Project Planning for Drives").

2) The interval depends on outer influences and can be very short, e.g. in the event of high dust concentration in the environment.

If you open the motor compartment during inspection/maintenance, you have to clean it before you close it.

8.1.1 Connection cables

Check the connection cable for damage at regular intervals and replace if necessary.

8.2 Bearing lubrication

8.2.1 Bearing lubrication EDR.71- EDR.225

The motor bearings generally come with lubrication for life.

8.3 Corrosion protection

In all brakemotors for hazardous locations and in motors with the /KS corrosion protection option in IP56 or IP66, you have to replace the old sealing compound at the studs with new sealing compound, e.g. "SEW L Spezial", during maintenance.

8.4 Preliminary work for motor and brake maintenance

⚠ WARNING

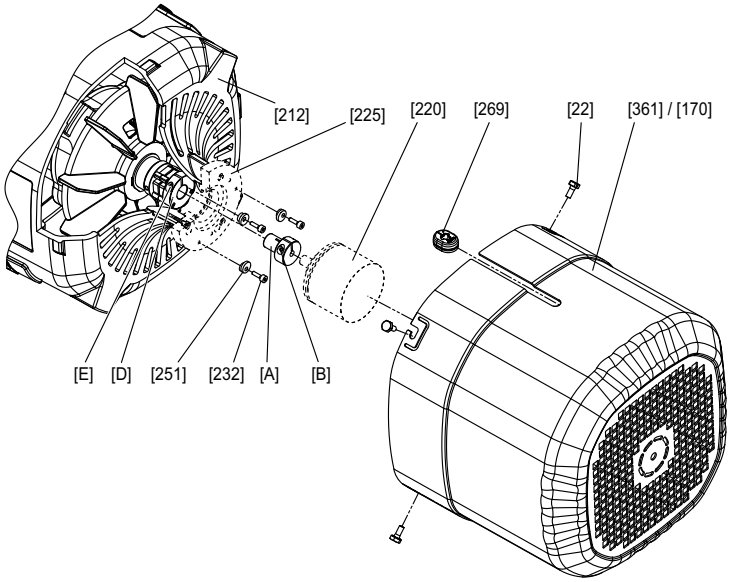
Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Before starting work, isolate the motor, brake, and if installed, the forced cooling fan from the power supply.
- Safeguard against accidental startup.

8.4.1 Removing/installing incremental encoders, absolute encoders and special encoders with XV.A mounting adapter from/on DR.71 – 225

The following figure illustrates the disassembly procedure using a non-SEW encoder as an example:



9007202887906699

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

Removing the XV.. encoder

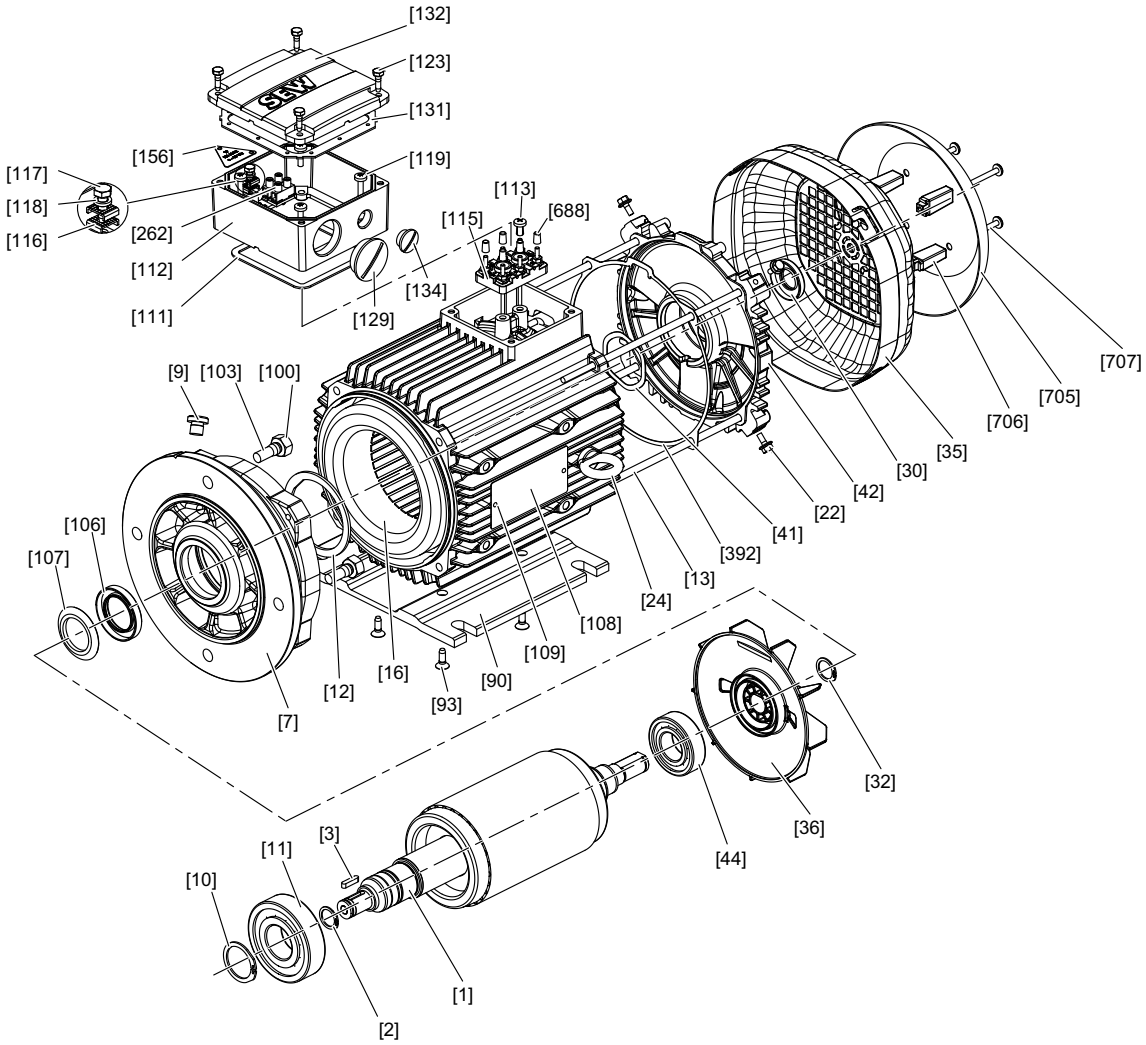
1. Remove the extended fan guard [361] by loosening the screws [22] or remove forced-cooling fan guard [170].
2. Loosen the retaining screws [232] and turn the conical spring washers [251] outwards.
3. Loosen the clamping screw [E] of the coupling.
4. Remove the adapter [A] and the encoder [220].

Re-assembly

1. Proceed according to chapter "Installing XV.A encoder mounting adapter on EDR.71 – 225 motors" (→ page 31) to mount the encoder.

8.5 Inspection/maintenance for EDR.71 – EDR.225 motors

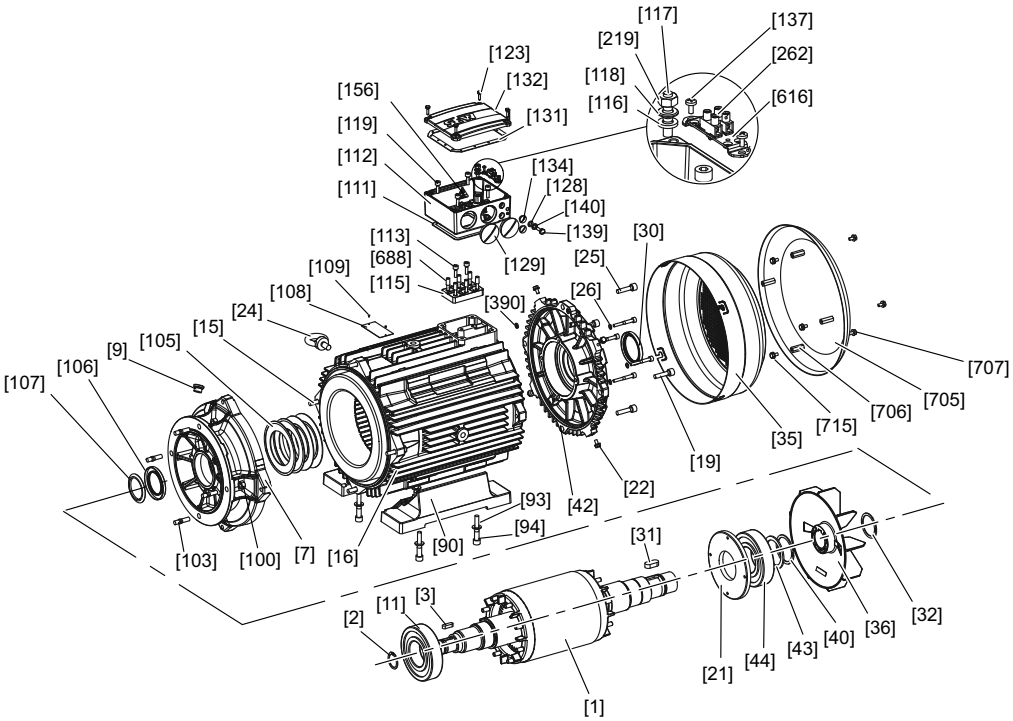
8.5.1 Basic structure of EDR.71 – EDR.132



4285467275

[1]	Rotor	[30]	Oil seal	[107]	Oil flinger	[129]	Screw plug with O-ring
[2]	Retaining ring	[32]	Retaining ring	[108]	Nameplate	[131]	Gasket for cover
[3]	Key	[35]	Fan guard	[109]	Grooved pin	[132]	Terminal box cover
[7]	Flanged endshield	[36]	Fan	[111]	Gasket for lower part	[134]	Screw plug with O-ring
[9]	Screw plug	[41]	Shim	[112]	Terminal box lower part	[156]	Information label
[10]	Retaining ring	[42]	B-side endshield	[113]	Pan head screw	[262]	Terminal clip, complete
[11]	Grooved ball bearing	[44]	Grooved ball bearing	[115]	Terminal board	[392]	Seal
[12]	Retaining ring	[90]	Base plate	[116]	Terminal clip	[688]	Protection caps
[13]	Cap screw	[93]	Pan head screws	[117]	Hexagon screw	[705]	Canopy
[16]	Stator	[100]	Hex nut	[118]	Lock washer	[706]	Spacers
[22]	Hexagon screw	[103]	Stud	[119]	Pan head screw	[707]	Pan head screw
[24]	Eyebolt	[106]	Oil seal	[123]	Hexagon screw		

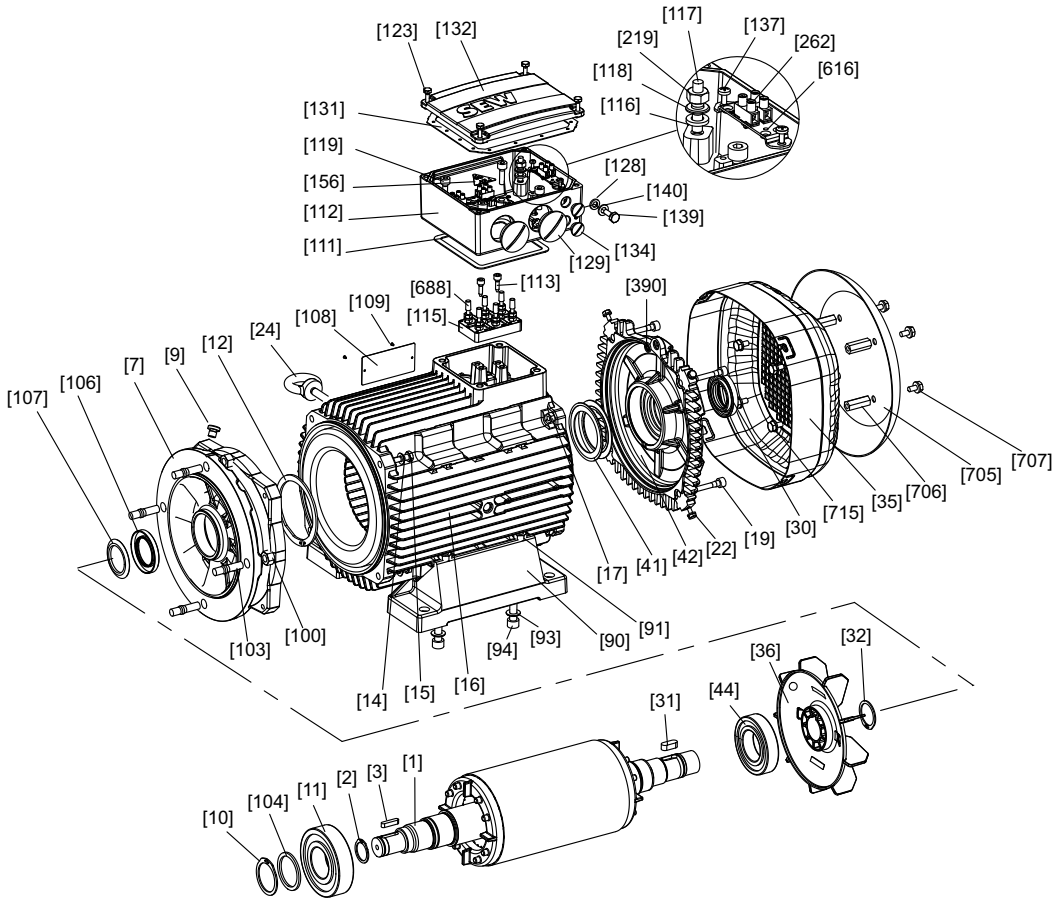
8.5.2 Basic structure of EDR.160 – EDR.180



4285469195

[1] Rotor
[2] Retaining ring
[3] Key
[7] Flange
[9] Screw plug
[10] Retaining ring
[11] Grooved ball bearing
[12] Retaining ring
[14] Washer
[15] Hexagon screw
[16] Stator
[17] Hex nut
[19] Cap screw
[22] Hexagon screw
[24] Eyebolt
[30] Sealing ring
[31] Key
[32] Retaining ring
[35] Fan guard
[36] Fan
[41] Spring washer
[42] B-side endshield
[44] Grooved ball bearing
[90] Foot
[91] Hex nut
[93] Washer
[94] Cap screw
[100] Hex nut
[103] Stud
[104] Supporting ring
[106] Oil seal
[107] Oil flinger
[108] Nameplate
[109] Grooved pin
[111] Gasket for lower part
[112] Terminal box lower part
[113] Screw
[115] Terminal board
[116] Serrated lock washer
[117] Stud
[118] Washer
[119] Cap screw
[121] Grooved pin
[123] Hexagon screw
[128] Serrated lock washer
[129] Screw plug with O-ring
[131] Gasket for cover
[132] Terminal box cover
[134] Screw plug with O-ring
[137] Screw
[139] Hexagon screw
[140] Washer
[153] Terminal strip, complete
[156] Information label
[219] Hex nut
[262] Terminal clip
[390] O-ring
[616] Retaining plate
[688] Protection caps
[705] Canopy
[706] Spacers
[707] Hexagon screw
[715] Hexagon screw

8.5.3 Basic structure of EDR.200 – EDR.225



4285535115

[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]	Hexagon screw
[9]	Screw plug	[40]	Retaining ring	[112]	Terminal box lower part	[140]	Washer
[11]	Grooved ball bearing	[42]	B-side endshield	[113]	Cap screw	[156]	Information label
[15]	Hexagon screw	[43]	Supporting ring	[115]	Terminal board	[219]	Hex nut
[16]	Stator	[44]	Grooved ball bearing	[116]	Serrated lock washer	[262]	Terminal clip
[19]	Cap screw	[90]	Foot	[117]	Stud	[390]	O-ring
[21]	Oil seal flange	[93]	Washer	[118]	Washer	[616]	Retaining plate
[22]	Hexagon screw	[94]	Cap screw	[119]	Cap screw	[688]	Protection caps
[24]	Eyebolt	[100]	Hex nut	[123]	Hexagon screw	[705]	Canopy
[25]	Cap screw	[103]	Stud	[128]	Serrated lock washer	[706]	Spacer bolt
[26]	Sealing washer	[105]	Spring washer	[129]	Screw plug	[707]	Hexagon screw
[30]	Oil seal	[106]	Oil seal	[131]	Gasket for cover	[715]	Hexagon screw

8.5.4 Inspection procedure for EDR.71 – EDR.225 motors

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Isolate the motor and forced cooling fan, if installed, from the power supply before starting work, safeguarding them against unintentional re-start.
- Carefully observe the steps described below.

1. Remove forced cooling fan and incremental encoder (if installed).

   See chapter "Inspection/Maintenance" > "Motor maintenance – preliminary work".
2. Remove fan guard [35] and fan [36].
3. Remove stator:
   - **Sizes EDR.71 – EDR.132:** Remove cap screws [13] from flanged endshield [7] and B-side endshield [42]. Remove stator [16] from flanged endshield [7].
   - **Sizes EDR.160 – EDR.180:** Loosen cap screws [19] and remove B-side endshield [42]. Loosen hexagon screw [15] and remove stator from flanged endshield.
   - **Sizes EDR.200 – EDR.225:**
     - Loosen hexagon screw [15] and remove the flanged endshield [7] from the stator.
     - With gearmotors: Remove oil flinger [107]
     - Loosen cap screws [19] and remove the complete rotor [1] together with the B-side endshield [42].
     - Loosen cap screws [25] and remove the complete rotor [1] from the B-side endshield [42].
4. Visual inspection: Is there any moisture or gear unit oil inside the stator?
   - If not, proceed with step 7
   - If there is moisture, proceed with step 5
   - If there is gear oil, have the motor repaired by a specialist workshop
5. If there is moisture inside the stator:
   - With gearmotors: Remove the motor from the gear unit
   - With motors without a gear unit: Remove the A-flange
   - Remove the rotor [1]
6. Clean the winding, dry it and check it electrically, see chapter "Mechanical installation" > "Long-term storage of motors" > "Drying the motor".

7. Replace the grooved ball bearings [11], [44] with permitted ball bearings.

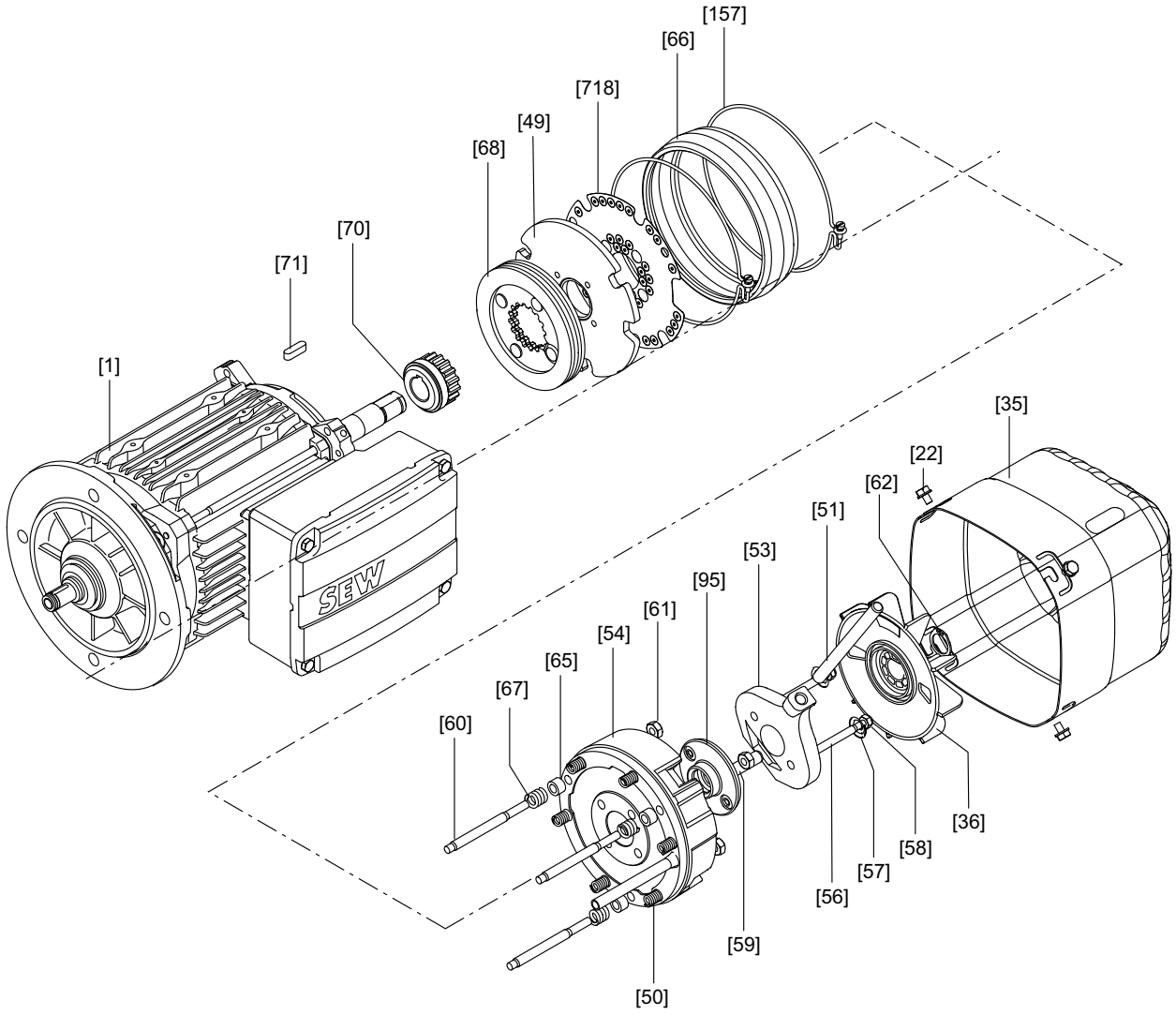
   See chapter "Technical data" > "Permitted rolling bearing types".
8. Reseal the shaft:
   - A-side: Replace the oil seal [106]
   - B-side: Replace the oil seal [95]

     Apply grease to the sealing lip (see chapter "Technical data" > "Order information for lubricants and anti-corrosion agents").
9. Reseal the stator seat:
   - Seal the sealing surface with duroplastic sealing compound

     (operating temperature -40°C to +180°C) e.g. "SEW L Spezial".
   - Sizes EDR.71 – EDR.132: Replace sealing [392].
10. Install the motor and accessory equipment.

8.6 Inspection/maintenance for EDR.71 – EDR.225 brakemotors

8.6.1 Basic structure of EDR.71 – EDR.80 brakemotors



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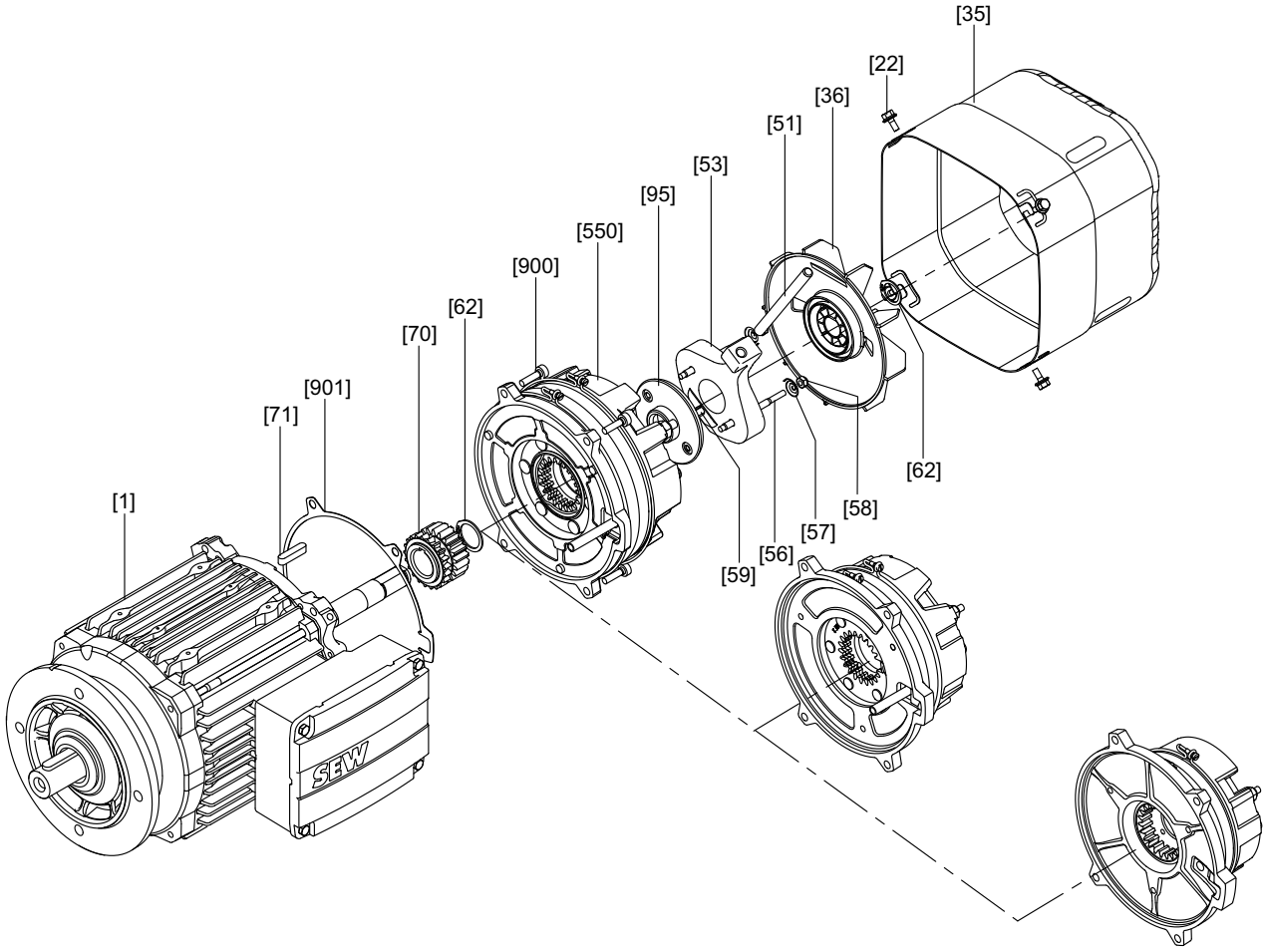
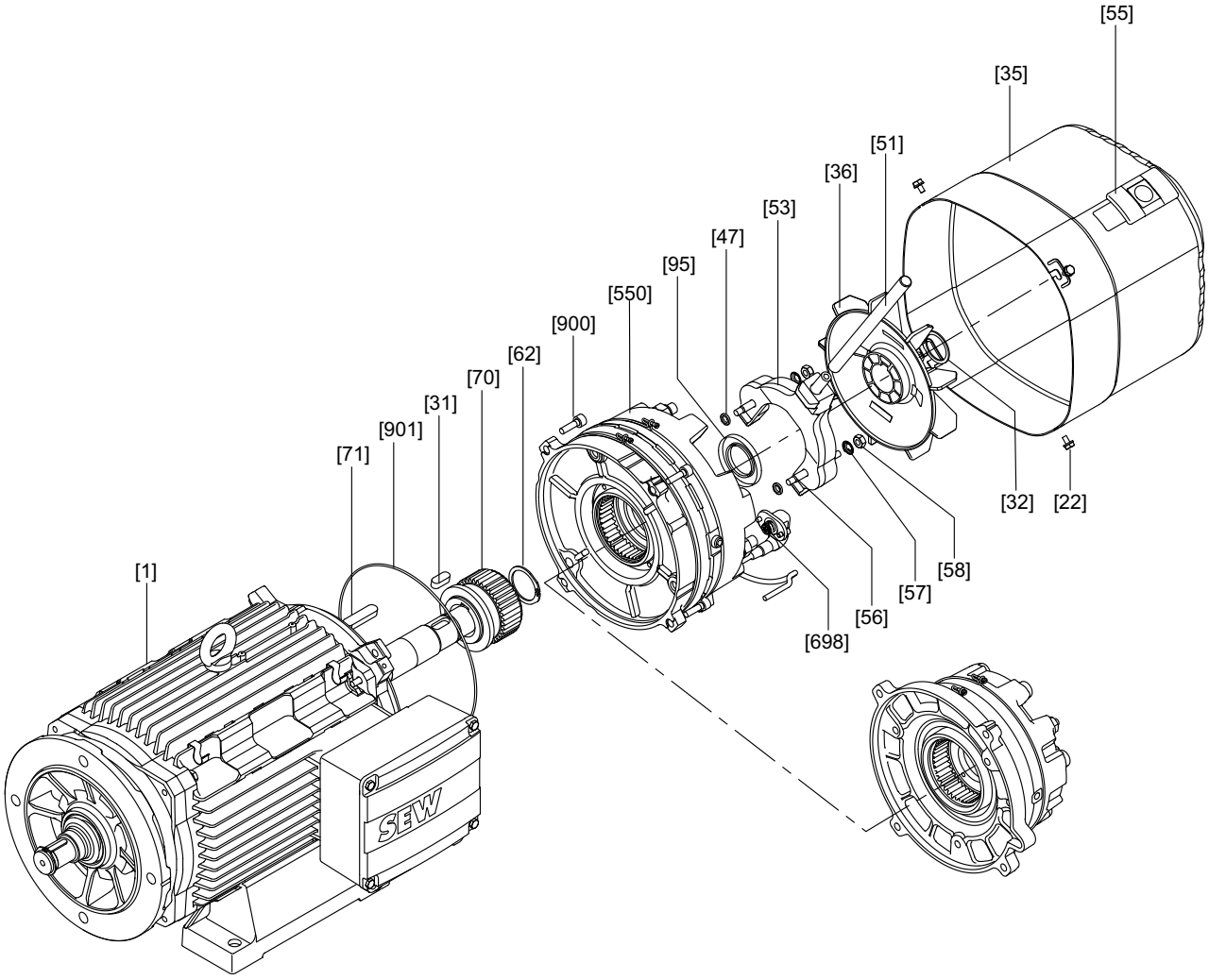
[1] Motor with brake endshield
[22] Hex head screw
[35] Fan guard
[36] Fan
[49] Pressure plate
[50] Brake spring
[51] Hand lever
[53] Release lever
[54] Magnet, complete
[56] Stud
[57] Conical spring
[58] Setting nut
[59] Parallel pin
[60] Stud 3x
[61] Hex nut
[62] Retaining ring
[65] Pressure ring
[66] Rubber sealing collar
[67] Counter spring
[68] Brake disk
[70] Driver
[71] Key
[95] Sealing ring
[157] Clamping straps 2x
[718] Damping plate

8.6.2 Basic structure of EDR.90 – EDR.132 brakemotors



[1] Motor with brake endshield
[22] Hex head screw
[32] Retaining ring
[35] Fan guard
[36] Fan
[51] Hand lever
[53] Release lever
[56] Stud
[57] Conical coil spring
[58] Setting nut
[59] Parallel pin
[62] Retaining ring
[70] Carrier
[71] Key
[95] Sealing ring
[550] Pre-assembled brake
[900] Screw
[901] Sealing

8.6.3 Basic structure of EDR.160 – EDR.225 brakemotors



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[1] Motor with brake endshield
[22] Hex head screw
[31] Key
[32] Retaining ring
[35] Fan guard
[36] Fan
[47] O-ring
[51] Hand lever
[53] Release lever
[55] Closing piece
[56] Stud
[57] Conical coil spring
[58] Setting nut
[62] Retaining ring
[70] Carrier
[71] Key
[95] Sealing ring
[550] Pre-assembled brake
[698] Plug connector complete (only for BE20 – BE32)
[900] Screw
[901] O-ring

8.6.4 Inspection procedure for EDR.71 – EDR.225 brakemotors

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Isolate the motor, brake, and forced cooling fan, if installed, from the power supply before starting work, safeguarding them against unintentional re-start.
- Carefully observe the steps described below.

1. Remove forced cooling fan and incremental encoder (if installed).

   See chapter "Motor and brake maintenance – preliminary work" (→ page 77).
2. Remove fan guard [35] and fan [36].
3. Remove stator:
   - **Sizes EDR.71 – EDR.132:** Remove cap screws [13] from flanged endshield [7] and brake endshield [42]. Remove stator [16] from flanged endshield [7].
   - **Sizes EDR.160 – EDR.180:** Loosen cap screws [19] and remove brake endshield [42]. Loosen hexagon screw [15] and remove stator from flanged endshield.
   - **Sizes EDR.200 – EDR.225:**
     - Loosen hexagon screw [15] and remove the flanged endshield [7] from the stator.
     - With gearmotors: Remove oil flinger [107]
     - Loosen cap screws [19] and remove the complete rotor [1] together with the brake endshield [42].
     - Loosen cap screws [25] and remove the complete rotor [1] from the brake endshield [42].
4. Remove the brake cable:
   - **BE05 – BE11:** Remove the terminal box cover and unfasten the brake cable from the rectifier.
   - **BE20 – BE32:** Loosen safety screws of the brake plug connector [698] and remove plug connector.
5. Push the brake off the stator and carefully lift it off.
6. Pull the stator back by about 3 to 4 cm.
7. Visual inspection: Is there any moisture or gear unit oil inside the stator?
   - If not, proceed with step 10
   - If there is moisture, proceed with step 8
   - If there is gear oil, have the motor repaired by a specialist workshop
8. If there is moisture inside the stator:
   - With gearmotors: Remove the motor from the gear unit
   - With motors without a gear unit: Remove the A-flange
   - Remove the rotor [1]
9. Clean the winding, dry it and check it electrically, see chapter "Mechanical Installation" > "Long-term storage of motors" > "Drying the motor".

10. Replace the grooved ball bearings [11], [44] with permitted ball bearings.

    See section"Permitted rolling bearing types" (→ page 127).

11. Reseal the shaft:
    - A-side: Replace the oil seal [106]
    - B-side: Replace the oil seal [95]

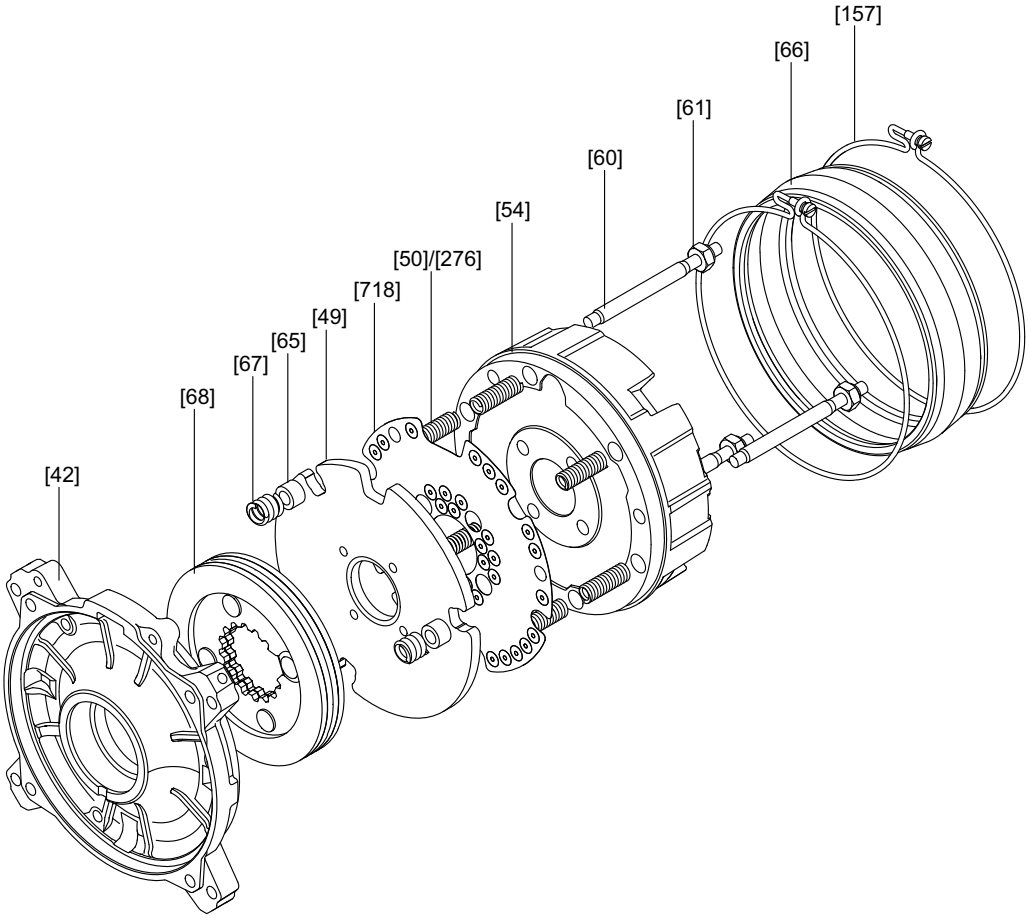
      Apply grease to the sealing lip (see chapter "Order information for lubricants and anti-corrosion agents" (→ page 128)).

12. Reseal the stator seat:
    - Seal the sealing surface with duroplastic sealing compound

      (operating temperature –40°C to +180°C), e.g. "SEW L Spezial".
    - Sizes EDR.71 – EDR.132: Replace sealing [392].

13. **Motor sizes EDR.160 – EDR.225:** Replace the O-ring [901] between the brake end-shield [42] and the pre-assembled brake [550]. Install the pre-assembled brake [550]
14. Install the motor, the brake and accessory equipment.

8.6.5 Basic structure of BE05 – BE2 brakes (EDR.71 – EDR.80)



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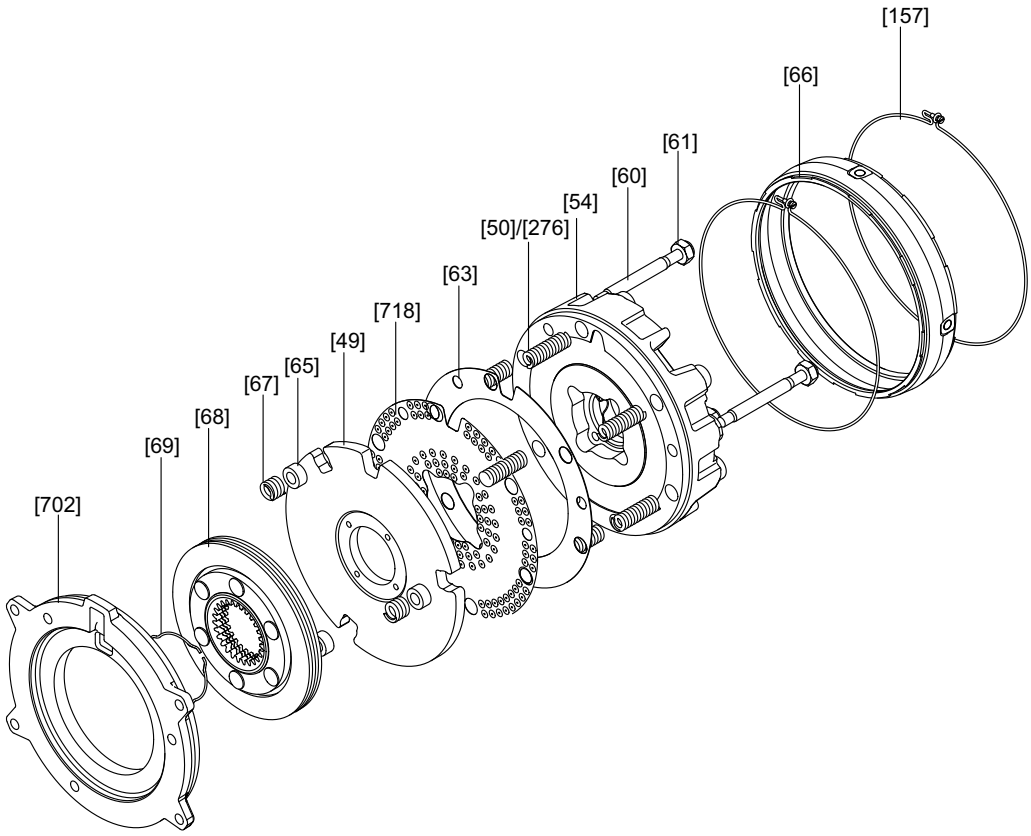
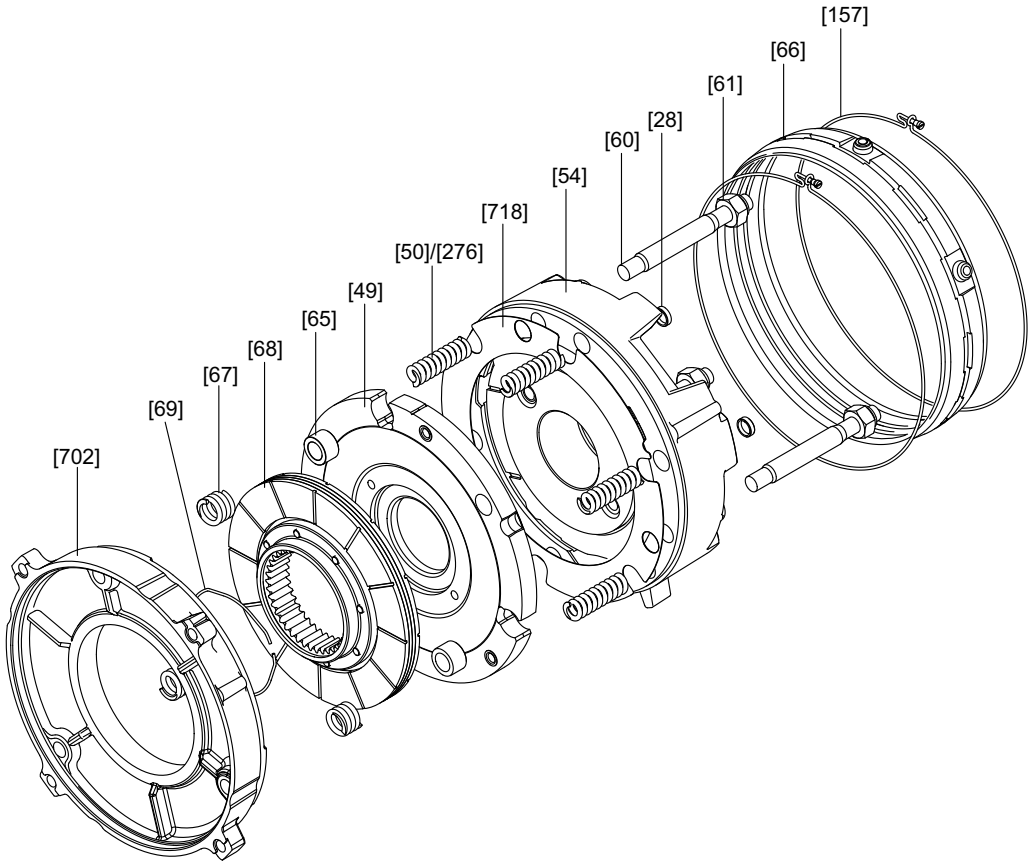
[42]	Brake endshield	[61]	Hex nut	[68]	Brake disk
[49]	Pressure plate	[65]	Pressure ring	[157]	Clamping straps 2x
[50]	Brake spring (normal)	[66]	Rubber sealing collar	[276]	Brake spring (blue)
[54]	Magnets, complete	[67]	Counter spring	[718]	Damping plate
[60]	Stud 3x				

8.6.6 Basic structure of BE1 – BE11 brakes (EDR.90 – EDR.160)



[49]	Pressure plate	[63]	Pole sheet	[69]	Circular spring
[50]	Brake spring (normal)	[65]	Pressure ring	[157]	Clamping straps 2x
[54]	Magnets, complete	[66]	Rubber sealing collar	[276]	Brake spring (blue)
[60]	Stud 3x	[67]	Counter spring	[702]	Friction disk
[61]	Hex nut	[68]	Brake disk	[718]	Damping plate

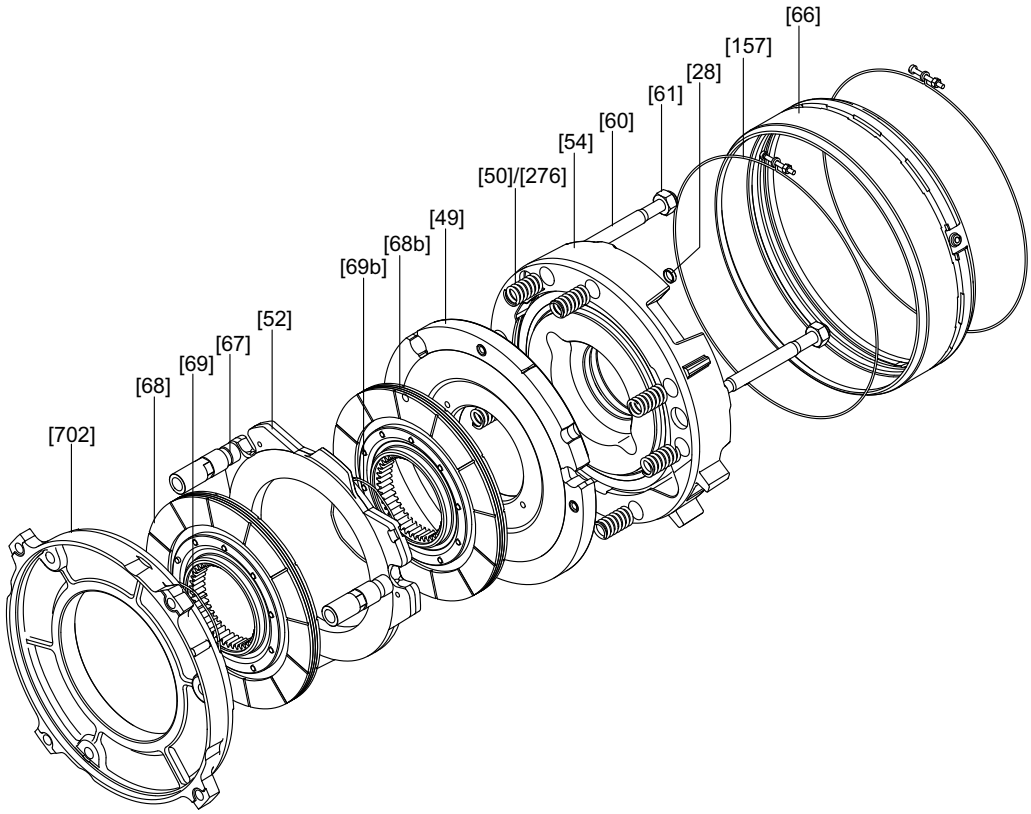
8.6.7 Basic structure of BE20 brakes (EDR.160 – EDR.180)



3850427403

[28]	Closing cap	[61]	Hex nut	[69]	Circular spring
[49]	Pressure plate, complete	[65]	Pressure ring	[157]	Clamping straps 2x
[50]	Brake spring (normal)	[66]	Rubber sealing collar	[276]	Brake spring (blue)
[54]	Magnets, complete	[67]	Counter spring	[702]	Friction disk
[60]	Stud 3x	[68]	Brake disk	[718]	Damping plate

8.6.8 Basic structure of BE30 – BE32 brakes (EDR.180 – EDR.225)



3850429323

[28]	Closing cap	[60]	Stud 3x	[69]	Circular spring
[49]	Pressure plate, complete	[61]	Hex nut	[157]	Clamping straps 2x
[50]	Brake spring (normal)	[66]	Rubber sealing collar	[276]	Brake spring (blue)
[52]	Brake stationary disk	[67]	Adjusting sleeve	[702]	Friction disk
[54]	Magnets, complete	[68]	Brake disk		

8.6.9 Setting the working air gap of BE05 – BE32 brakes

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

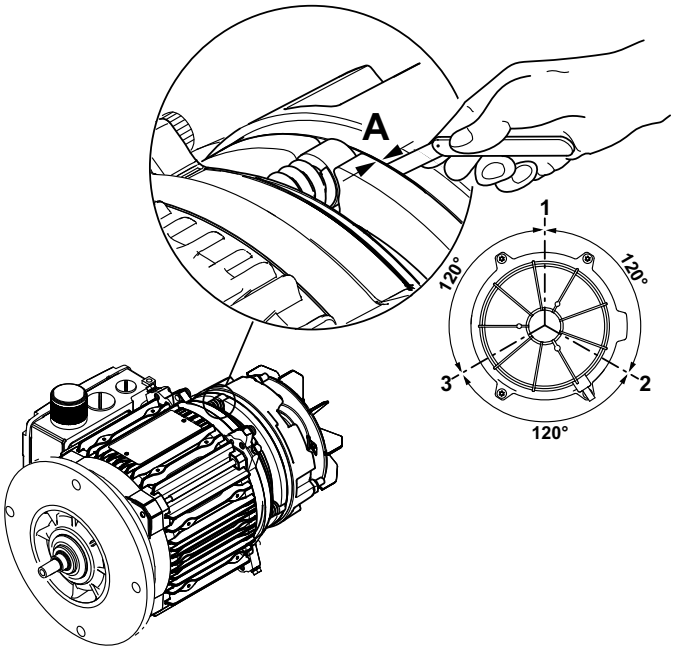
Severe or fatal injuries.

- Isolate the motor, brake, and forced cooling fan, if installed, from the power supply before starting work, safeguarding them against unintentional re-start.
- Carefully observe the steps described below.

1. Remove the following:
   - Forced cooling fan and incremental encoder (if installed)

     See chapter "Motor and brake maintenance – preliminary work" (→ page 77).
   - Flange cover or fan guard [35]
2. Push the rubber sealing collar [66] aside,
   - Loosen the clamping straps [157]
   - Sucking off any abrasion
3. Measure the brake disk [68]:
   - Minimum brake disk thickness see chapter "Technical data" (→ page 103).
   - Replace brake disk if necessary, see chapter "Replacing the brake disk of BE05 – BE32 brakes".
4. **BE30 – BE32:** Unfasten the setting sleeves [67] by turning them towards the brake endshield.
5. Measure the working air gap A (see the following figure)

   (use a feeler gauge and measure at three points offset by 120°):
   - **For BE05 – 11:** between pressure plate [49] and damping plate [718]
   - **For BE20 – 32:** between pressure plate [49] and coil body [54]



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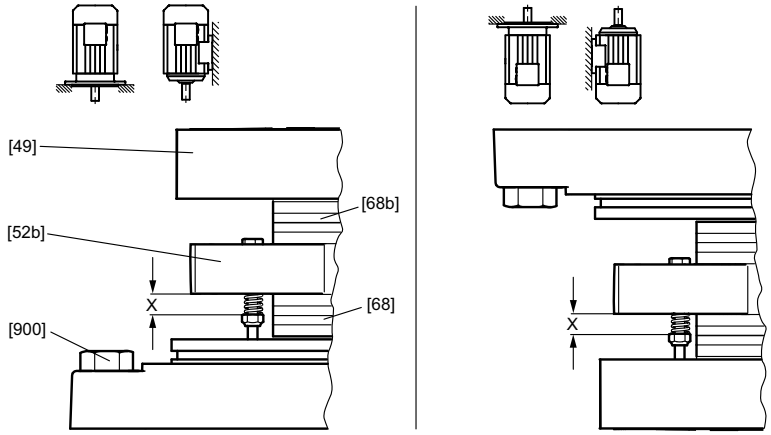
6. **BE05 – BE20:** Tighten the hex nuts [61] until the working air gap is set correctly, see chapter "Technical data" (→ page 103).

   BE30 – BE32: Tighten the hex nuts [61] until the working air gap is 0.25 mm.

7. If you are mounting the BE32 in a vertical position, set the 3 springs on the brake stationary disk to the following measurement:

Mounting position	X in [mm]
Brake at the top	7.3
Brake at the bottom	6.5



[49] Pressure plate
[52b] Brake lining (BE32 only)
[68] Brake disk
[68b] Brake disk (BE32 only)
[900] Hex nut

8. **BE30 – BE32:** Tighten the setting sleeves [67]
   - towards the magnet
   - until the working air gap is set correctly, see chapter "Technical data" (→ page 103).
9. Seal hex nuts [61] with duroplastic sealing compound, e.g. "SEW L Spezial".
10. Mount sealing strip [66], clamping straps [157]. Re-install the removed parts.

8.6.10 Replacing the brake disk of BE05 – BE32 brakes

In addition to the brake elements listed in column "BE brake", see chapter "Inspection and maintenance intervals", check the hex nuts [61] for wear when you replace the brake disk. You must always replace the hex nuts [61] when you replace the brake disk.

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Isolate the motor, brake, and forced cooling fan, if installed, from the power supply before starting work, safeguarding them against unintentional re-start.
- Carefully observe the steps described below.

INFORMATION

- The brake of EDR.71 – EDR.80 motor sizes cannot be removed from the motor because the BE brake is directly installed on the brake endshield of the motor.
- The brake of EDR.90 – EDR.225 motor sizes can be removed from the motor for replacing the brake disk because the BE brake is pre-installed on the brake endshield of the motor via a friction disk .

1. Remove the following:
   - Forced cooling fan and incremental encoder (if installed)

     See chapter "Motor and brake maintenance – preliminary work" (→ page 77).
   - Flange cover or fan guard [35], retaining ring [32/62] and fan [36]
2. Loosen the brake cable
   - **BE05 – BE11:** Remove the terminal box cover and loosen the brake cable from the rectifier.
   - **BE11 – BE32:** Loosen safety screws of the brake plug connector [698] and remove plug connector.
3. Remove the sealing strip [66] and clamping strap [157]
4. Loosen hex nuts [61], carefully pull off the magnet [54] (brake cable!) and take out the brake springs [50].
5. **BE05 – BE11:** Remove the damping plate [718], pressure plate [49] and brake disk [68]

   BE20 – BE30: Remove pressure plate [49] and brake disk [68]

   BE32: Remove pressure plate [49], brake disks [68] and [68b]
6. Clean the brake parts, check for damage, and replace them if necessary.
7. Install new brake disk(s).
8. Re-install the brake components,
   - Leave out the fan and the fan guard, because the working air gap has to be set first, see chapter "Setting the working air gap of the BE05 – BE32 brakes".

9. Reseal the shaft:
   – Replace the sealing ring [95]

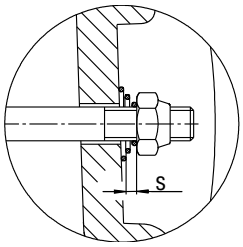
     Apply grease to the sealing lip (see chapter "Order information for lubricants and anti-corrosion agents" (→ page 128)).
10. In case of manual brake release: Use the setting nuts to adjust the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see following figure).

⚠ WARNING

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

Severe or fatal injuries.

- Set the floating clearance "s" correctly according to the following figure and table so that the pressure plate can move up as the brake lining wears.



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Brake	Floating clearance s [mm]
BE05, BE1, BE2, BE5	1.5
BE11, BE20, BE30, BE32	2

11. Seal hex nuts [61] with duroplastic sealing compound, e.g. "SEW L Spezial".
12. Mount sealing strip [66] and clamping straps [157]. Re-install the removed parts.

INFORMATION

- The lockable manual brake release (type HF) is already released when resistance is encountered as the set screw is turned.
- The self-reengaging manual brake release (type HR) can be operated with normal hand pressure.
- In brakemotors with self-reengaging manual brake release, the manual brake release lever must be removed after startup/maintenance! A holding fixture is provided for storing the lever on the outside of the motor.

INFORMATION

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

8.6.11 Changing the braking torque of BE05 – BE122 brakes

The braking torque can be altered in stages.

- By changing the type and number of brake springs
- By changing the complete magnet (only possible for BE05 and BE1)
- By changing the brake (from motor size DR.90).
- By changing to a two-disk brake (BE30 only)

For the possible braking torque steps, please refer to chapter "Technical data" (→ page 103).

8.6.12 Changing the brake spring of BE05 – BE32 brakes

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Isolate the motor, brake, and forced cooling fan, if installed, from the power supply before starting work, safeguarding them against unintentional re-start.
- Carefully observe the steps described below.

1. Remove the following:
   - Forced cooling fan and incremental encoder (if installed)

     See chapter "Motor and brake maintenance – preliminary work" (→ page 77).
   - Flange cover or fan guard [35], retaining ring [32/62] and fan [36]
2. Loosen the brake cable
   - **BE05 – BE11:** Remove the terminal box cover and loosen the brake cable from the rectifier.
   - **BE20 – BE32:** Loosen safety screws of the brake plug connector [698] and remove plug connector.
3. Remove the sealing strip [66] and clamping straps [157]; remove manual brake release if necessary:
   - setting nuts [58], conical coil springs [57], studs [56], releasing lever [53], spiral dowel pin [59]
4. Loosen hex nuts [61] and pull off the magnet [54]
   - By approx. 50 mm (watch the brake cable)
5. Change or add brake springs [50/276]
   - Position the brake springs symmetrically, see chapter "Technical data" > "Work done, working air gap, braking torques".
6. Re-install the brake components
   - Leave out the fan and the fan guard, because the working air gap has to be set first, see chapter "Setting the working air gap of the BE05 – BE32 brakes" (→ page 115).

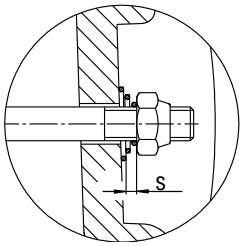
7. In case of manual brake release: Use the setting nuts to adjust the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see following figure).

⚠ WARNING

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

Severe or fatal injuries.

- Set the floating clearance "s" correctly according to the following figure and table so that the pressure plate can move up as the brake lining wears.



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Brake	Floating clearance s [mm]
BE05, BE1, BE2, BE5	1.5
BE11, BE20, BE30, BE32	2

8. Seal hex nuts [61] with duroplastic sealing compound, e.g. "SEW L Spezial".
9. Mount sealing strip [66] and clamping straps [157]. Re-install the removed parts.

INFORMATION

Replace setting nuts [58] and hex nuts [61] if the removal procedure is repeated.

8.6.13 Changing the magnet of BE05 – BE32 brakes

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Isolate the motor, brake, and forced cooling fan, if installed, from the power supply before starting work, safeguarding them against unintentional re-start.
- Carefully observe the steps described below.

1. Remove the following:
   - Forced cooling fan and incremental encoder (if installed)

     See chapter "Motor and brake maintenance – preliminary work" (→ page 77).
   - Flange cover or fan guard [35], retaining ring [32/62] and fan [36]
2. Remove the brake cable
   - **BE05 – BE11:** Remove the terminal box cover and loosen the brake cable from the rectifier.
   - **BE20 – BE32:** Loosen safety screws of the brake plug connector [698] and remove plug connector.
3. Remove the sealing strip [66] and clamping straps [157]; remove manual brake release if necessary:
   - Ssetting nuts [58], conical coil springs [57], studs [56], releasing lever [53], spiral dowel pin [59]
4. Loosen hex nuts [61], remove magnet [54], remove brake springs [50/276].
5. Install new magnet body with brake springs. For the possible braking torque steps, please refer to chapter "Technical data" (→ page 103).
6. Clean the brake parts, check for damage, and replace them if necessary.
7. Re-install the brake components
   - Leave out the fan and the fan guard, because the working air gap has to be set first, see chapter "Setting the working air gap of the BE05 – BE20 brakes".
8. Reseal the shaft:
   - Replace the sealing ring [95]

     Apply grease to the sealing lip (see chapter "Technical data" > "Order information for lubricants and anti-corrosion agents").

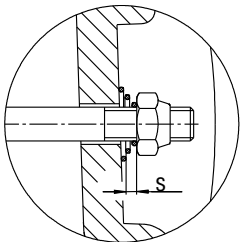
9. In case of manual brake release: Use the setting nuts to adjust the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see following figure).

⚠ WARNING

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

Severe or fatal injuries.

- Set the floating clearance "s" correctly according to the following figure and table so that the pressure plate can move up as the brake lining wears.



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Brake	Floating clearance s [mm]
BE05, BE1, BE2, BE5	1.5
BE11, BE20, BE30, BE32	2

10. Seal hex nuts [61] with duroplastic sealing compound, e.g. "SEW L Spezial".
11. Mount sealing strip [66] and clamping straps [157]. Re-install the removed parts.
12. Replace brake controller in the event of a brake failure due to an interturn short circuit or a short circuit to frame.

INFORMATION

Replace setting nuts [58] and hex nuts [61] if the removal procedure is repeated.

8.6.14 Changing the brake of EDR.71 – EDR.80

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Isolate the motor, brake, and forced cooling fan, if installed, from the power supply before starting work, safeguarding them against unintentional re-start.
- Carefully observe the steps described below.

1. Remove the following:
   - Forced cooling fan and incremental encoder (if installed)
     See chapter "Motor and brake maintenance – preliminary work" (→ page 77).
   - Flange cover or fan guard [35], retaining ring [32/62] and fan [36]
2. Remove the terminal box cover and loosen the brake cable from the rectifier. If necessary, attach trailing wire to brake cables.
3. Loosen cap screws [13] and remove brake endshield with brake from stator.
4. Loosen the clamping straps [157] and store them.
5. Insert the brake cable of the new brake into the terminal box.
6. Install the new brake, observing the alignment of the cams of the brake endshield.
7. Mount the stored clamping straps [157] to the new brake.
8. Reseal the shaft:
   - Replace the sealing ring [95]

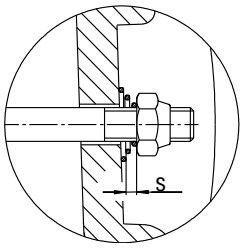
     Apply grease to the sealing lip (see chapter "Technical data" > "Order information for lubricants and anti-corrosion agents").
9. In case of manual brake release: Use the setting nuts to adjust the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see following figure).

⚠ WARNING

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

Severe or fatal injuries.

- Set the floating clearance "s" correctly according to the following figure and table so that the pressure plate can move up as the brake lining wears.



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Brake	Floating clearance s [mm]
BE05, BE1, BE2, BE5	1.5

10. Seal hex nuts [61] with duroplastic sealing compound, e.g. "SEW L Spezial".

8.6.15 Replacing the brake of EDR.90 – EDR.225

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Isolate the motor, brake, and forced cooling fan, if installed, from the power supply before starting work, safeguarding them against unintentional re-start.
- Carefully observe the steps described below.

1. Remove the following:
   - Forced cooling fan and incremental encoder (if installed)

     See chapter "Motor and brake maintenance – preliminary work" (→ page 77).
   - Flange cover or fan guard [35], retaining ring [32/62] and fan [36]
2. Loosen the brake cable
   - **BE05 – BE11:** Remove the terminal box cover and loosen the brake cable from the rectifier.
   - **BE20 – BE32:** Loosen safety screws of the brake plug connector [698] and remove plug connector.
3. Loosen screws [900] and remove brake from brake endshield.
4. Loosen the clamping straps [157] and store them.
5. **EDR.90 – EDR.132:** Pay attention to the alignment of the gasket [901].
6. Connect the brake cables of the new brake.
7. Install the new brake, observing the alignment of the cams of the friction disk.
8. Mount the stored clamping straps [157] to the new brake.
9. Reseal the shaft:
   - Replace the sealing ring [95]

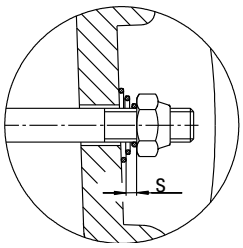
     Apply grease to the sealing lip (see chapter "Technical data" > "Order information for lubricants and anti-corrosion agents").
10. In case of manual brake release: Use the setting nuts to adjust the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see following figure).

⚠ WARNING

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

Severe or fatal injuries.

- Set the floating clearance "s" correctly according to the following figure and table so that the pressure plate can move up as the brake lining wears.



177241867

Brake	Floating clearance s [mm]
BE05, BE1, BE2, BE5	1.5
BE11, BE20, BE30, BE32	2

11.Seal hex nuts [61] with duroplastic sealing compound, e.g. "SEW L Spezial".

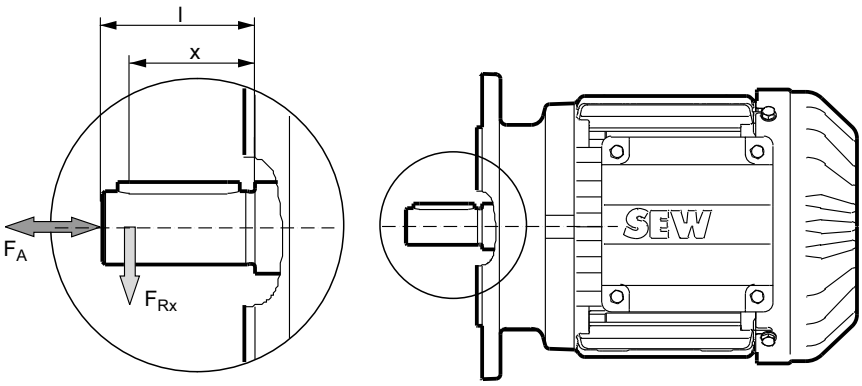
9 Technical data

9.1 Overhung loads

9.1.1 Permitted overhung load

Refer to the following diagrams for the permitted overhung load F_{Rx} for EDR AC brake-motors. In order to read the permitted overhung load from the diagram, you must know what the distance x is between the force application point of the overhung load F_R and the shaft shoulder.

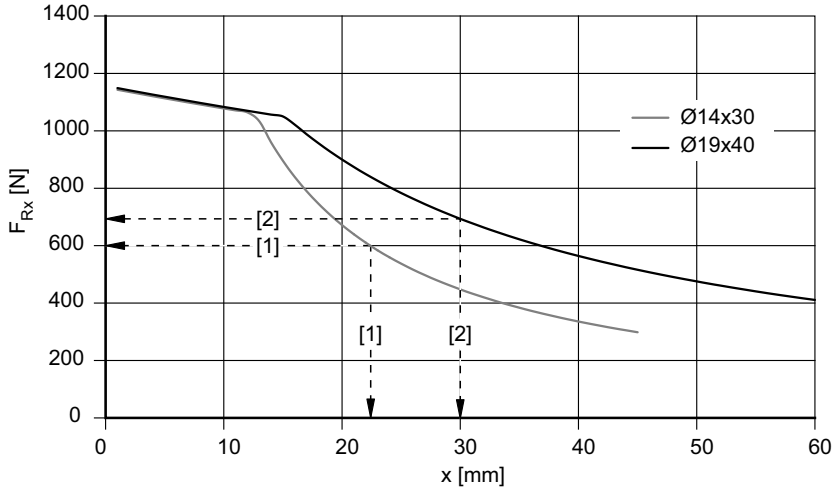
The following figure shows the application point of the overhung load.



2636511499

l = Length of the shaft end
x = Distance between overhung load application point and shaft shoulder
F_{Rx} = Overhung load at force application point
F_A = Axial force

The following diagram shows an example of how you can read the overhung load from the diagram (all Ø specified in mm):



2636513163

[1] Motor with shaft diameter 14 mm, force application x at 22 mm, permitted overhung load F_{Rx} = 600 N
[2] Motor with shaft diameter 19 mm, force application x at 30 mm, permitted overhung load F_{Rx} = 700 N

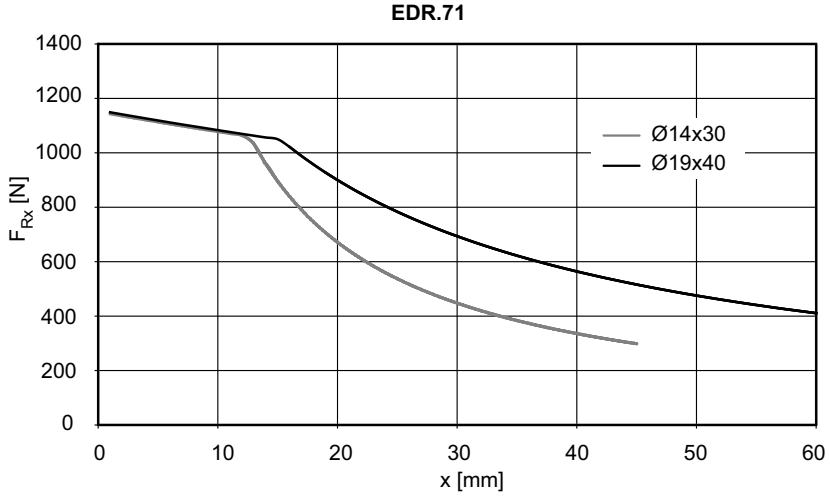
Permitted axial load for EDR motors

You can then determine the permitted axial load F_A by means of the previously determined overhung load F_{Rx}:

$F_A = 0.2 \times F_{Rx}$

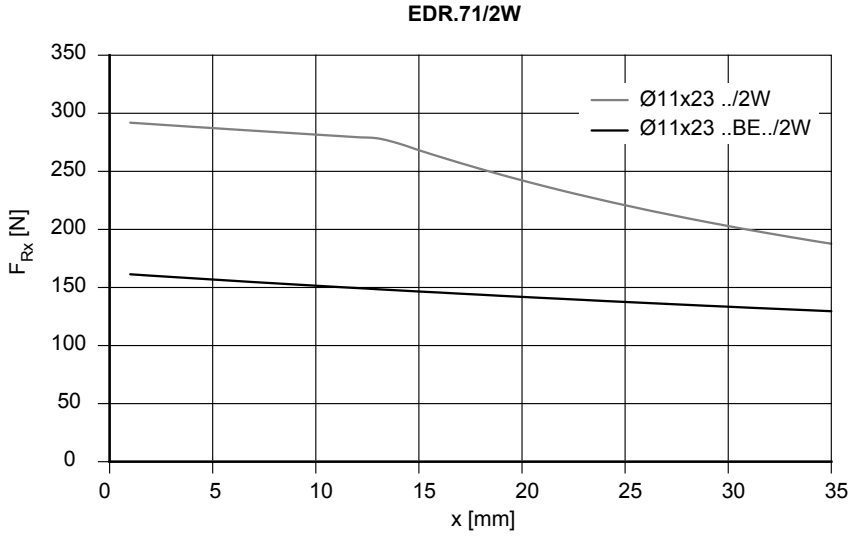
9.1.2 Overhung load diagrams of the 4-pole EDR motors

Overhung load diagram EDR.71



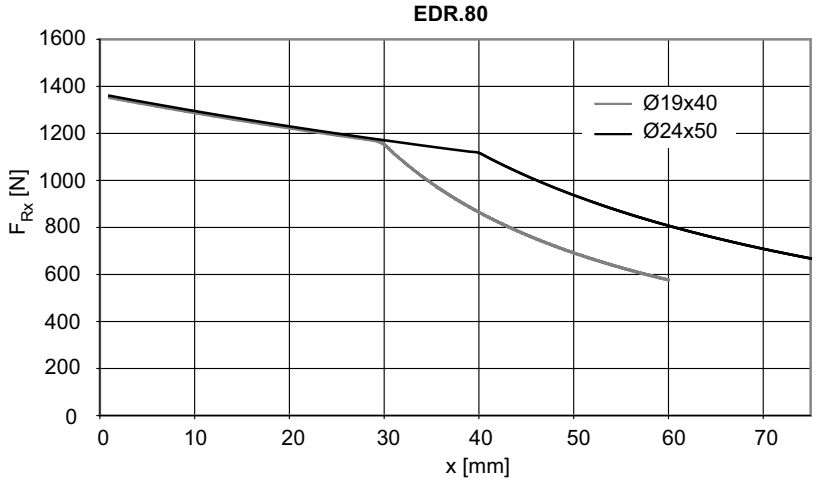
2637430411

Overhung load diagram EDR.71 at second shaft end



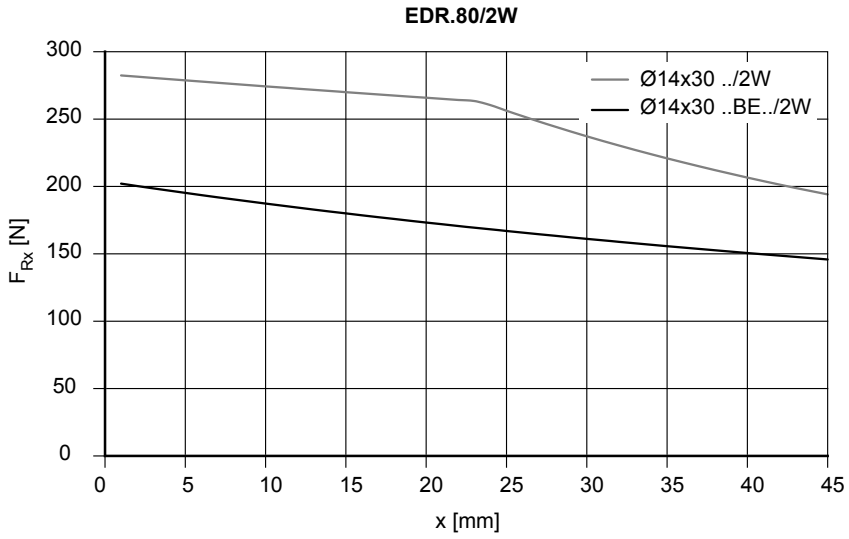
2636893835

Overhung load diagram EDR.80



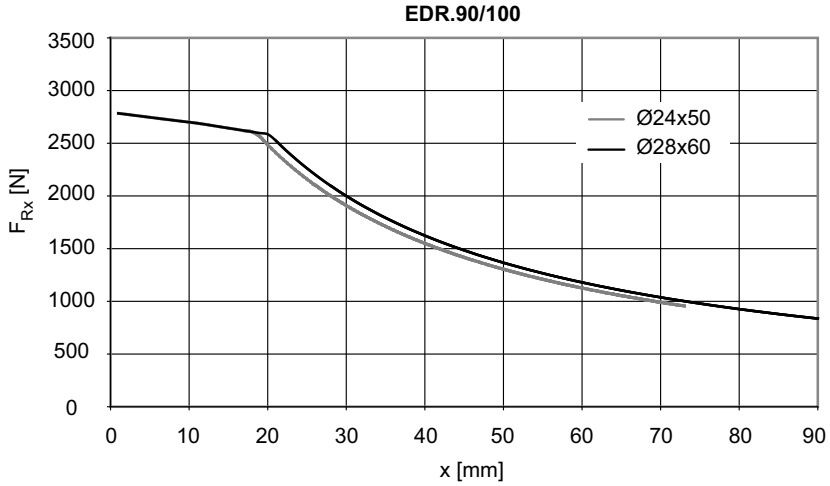
2636896523

Overhung load diagram EDR.80 at second shaft end



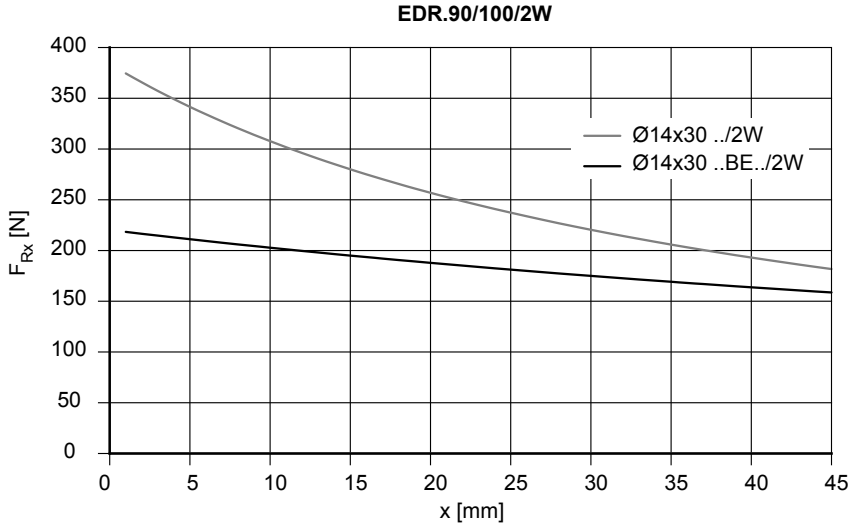
2636899211

Overhung load diagram EDR.90 and EDR.100



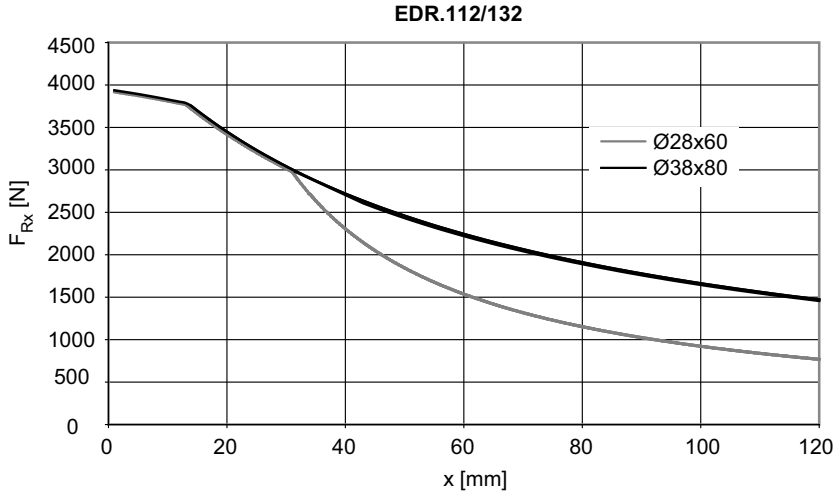
2636901899

Overhung load diagram EDR.90 and EDR.100 at second shaft end



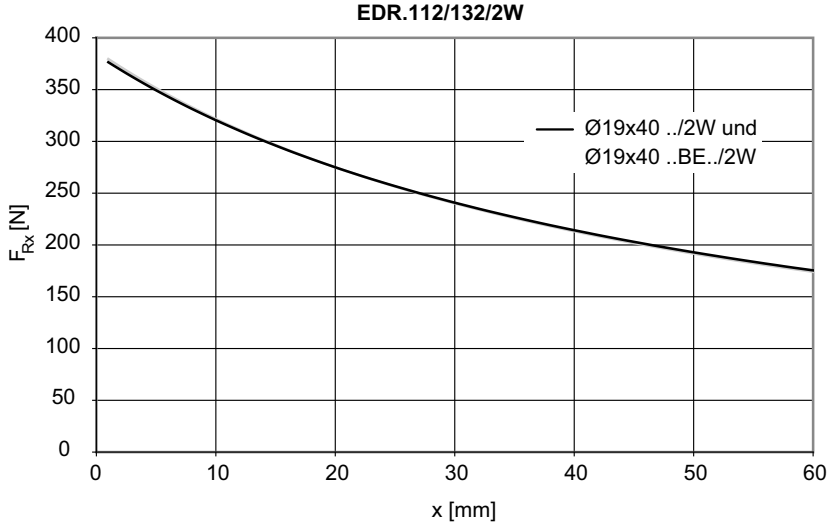
2636904587

Overhung load diagram EDR.112 and EDR.132



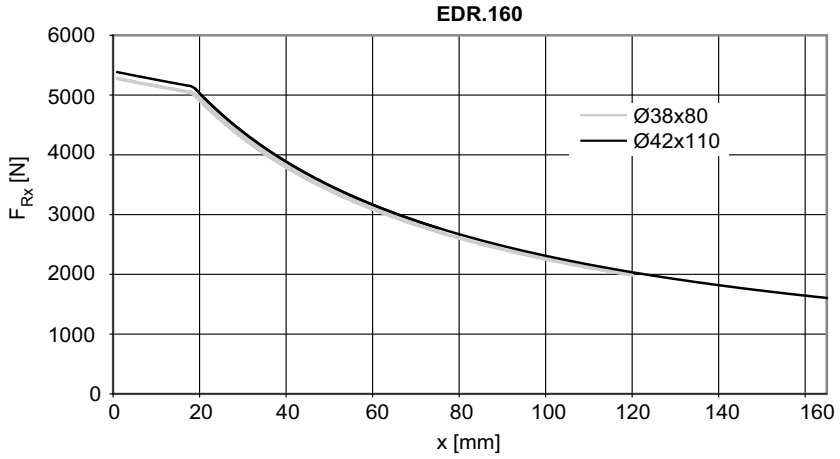
2636907275

Overhung load diagram EDR.112 and EDR.132 at second shaft end



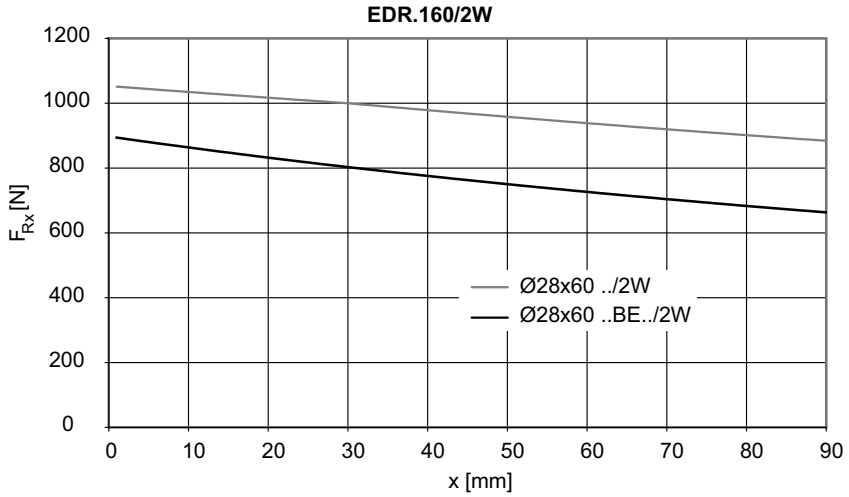
2636909963

Overhung load diagram EDR.160



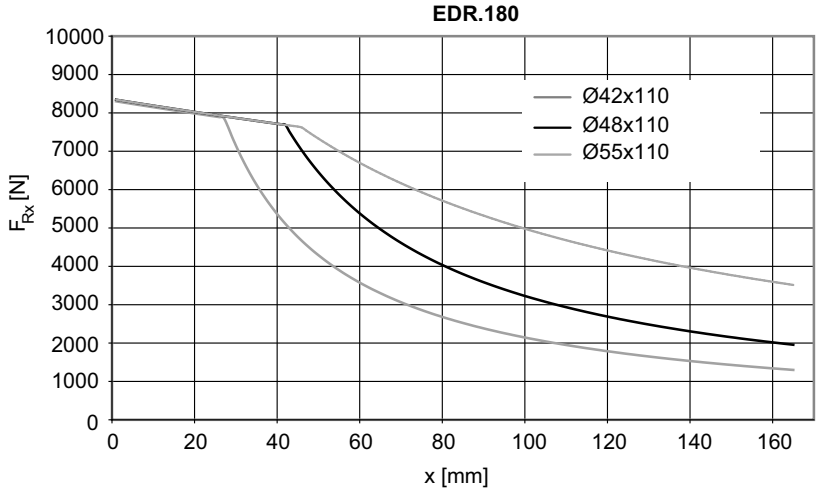
2636912651

Overhung load diagram EDR.160 at second shaft end



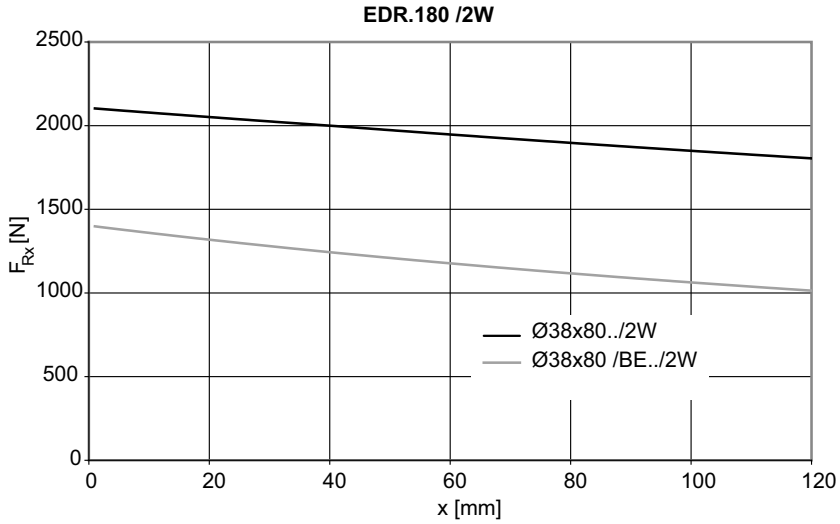
2636915339

Overhung load diagram EDR.180



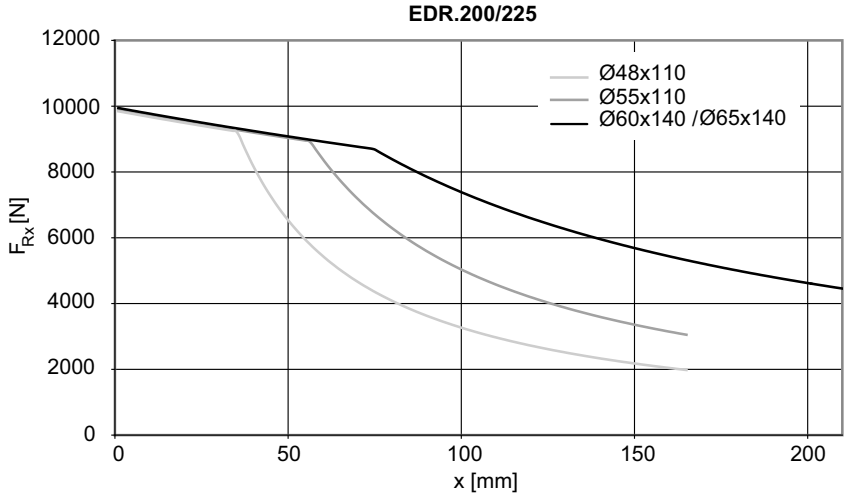
2636918027

Overhung load diagram EDR.180 at second shaft end



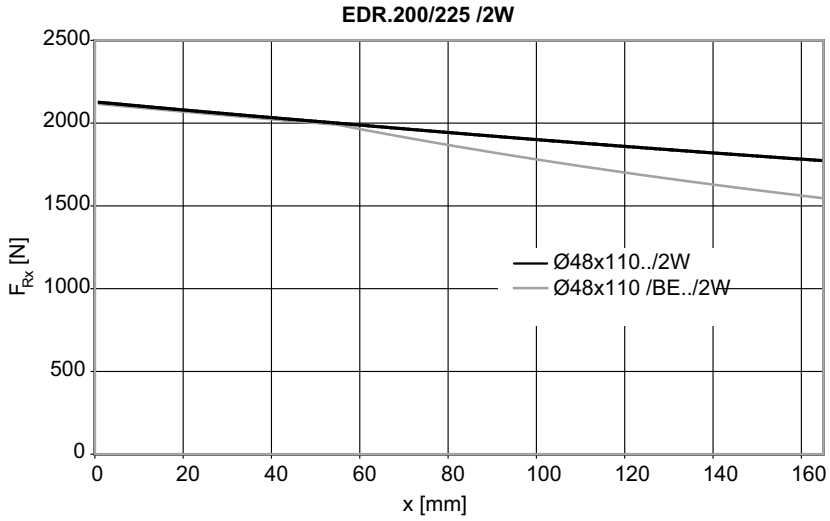
2636920715

Overhung load diagram EDR.200 and EDR.225



2636923403

Overhung load diagram EDR.200 and EDR.225 at second shaft end



2636926091

9.2 Important notes on the brake

The type of application determines what the brake is used for. The decisive factor is the operating frequency of the brake.

INFORMATION

In line operation, the emergency stop braking work is the same for both continuous and switching operations.

INFORMATION

In frequency inverter operation, the emergency stop braking work is speed-dependent, see the graphic "Permitted work done by the BE brake in case of emergency off" (→ page 112).

9.2.1 Continuous operation

In S1 continuous operation, the brake is applied when the drive is switched off or in an emergency. The braking work may not exceed the specified maximum braking work per braking operation. You can find this information as C_{max} on the nameplate and in the illustration "Permitted work done by the BE brake in case of emergency off" (→ page 112).

A maximum of 10 emergency braking operations are permitted per hour. Between two braking operations, a waiting time of minimum 6 minutes must be adhered to.

9.2.2 Switching operation

If the brakemotor is used in applications that require a high operating frequency, both the motor and the brake are dimensioned accordingly. In this case, the motor must be equipped with a /TF temperature sensor.

The braking work in an emergency may not exceed the specified maximum braking work per emergency braking operation. It is listed on the nameplate.

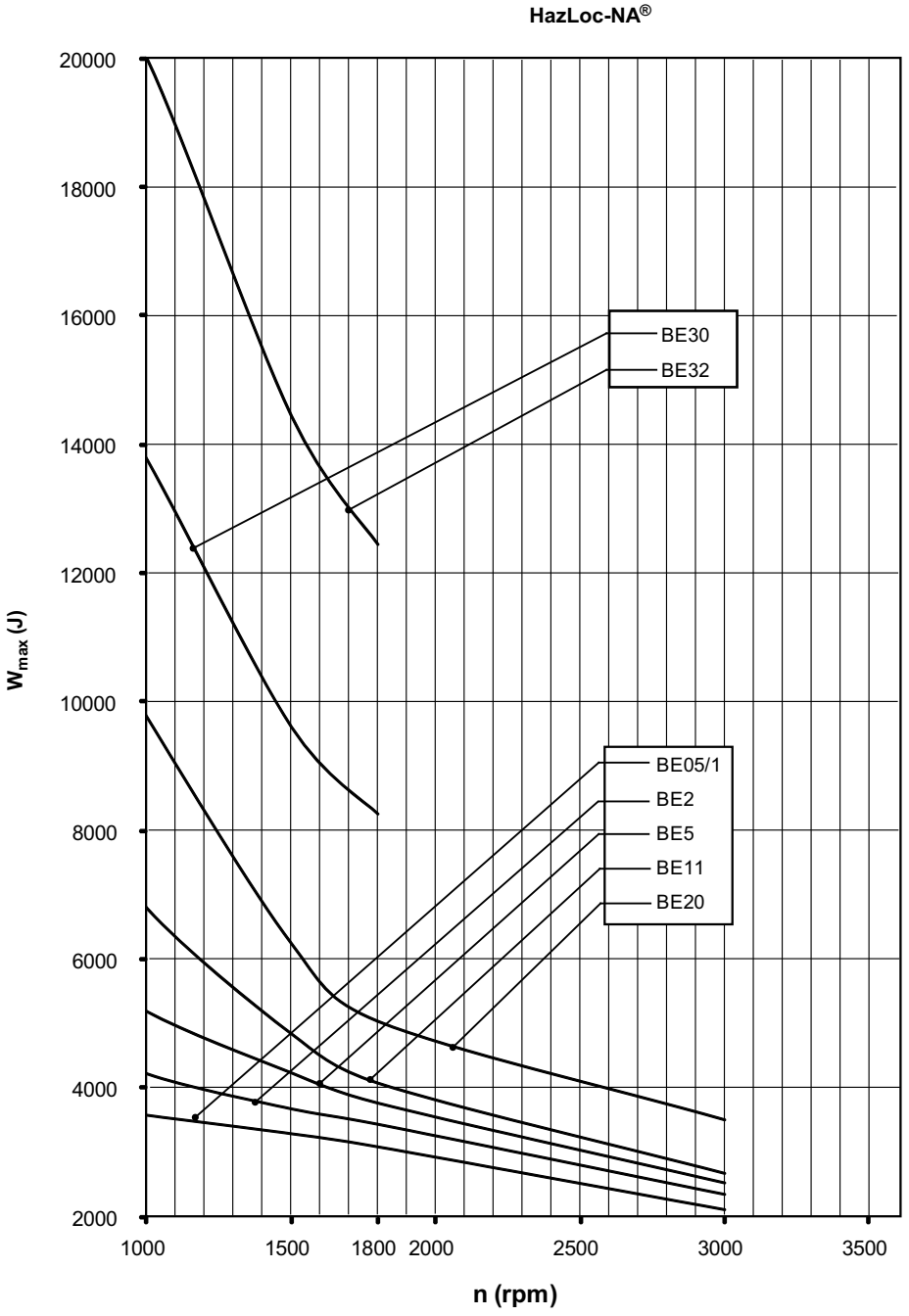
9.2.3 Frequency inverter operation

Due to the thermal load at low speeds, high braking torques cannot be achieved within one size. Please take note of the permitted combinations in the chapter "Braking torque assignment" (→ page 114).

You must also observe the maximum permitted speed for the brake in use during project planning and startup.

9.3 Permitted work done by the BE brake in case of emergency off

The following diagram shows the permitted braking work of the BE brake in the case of emergency switch-off:



4919378571

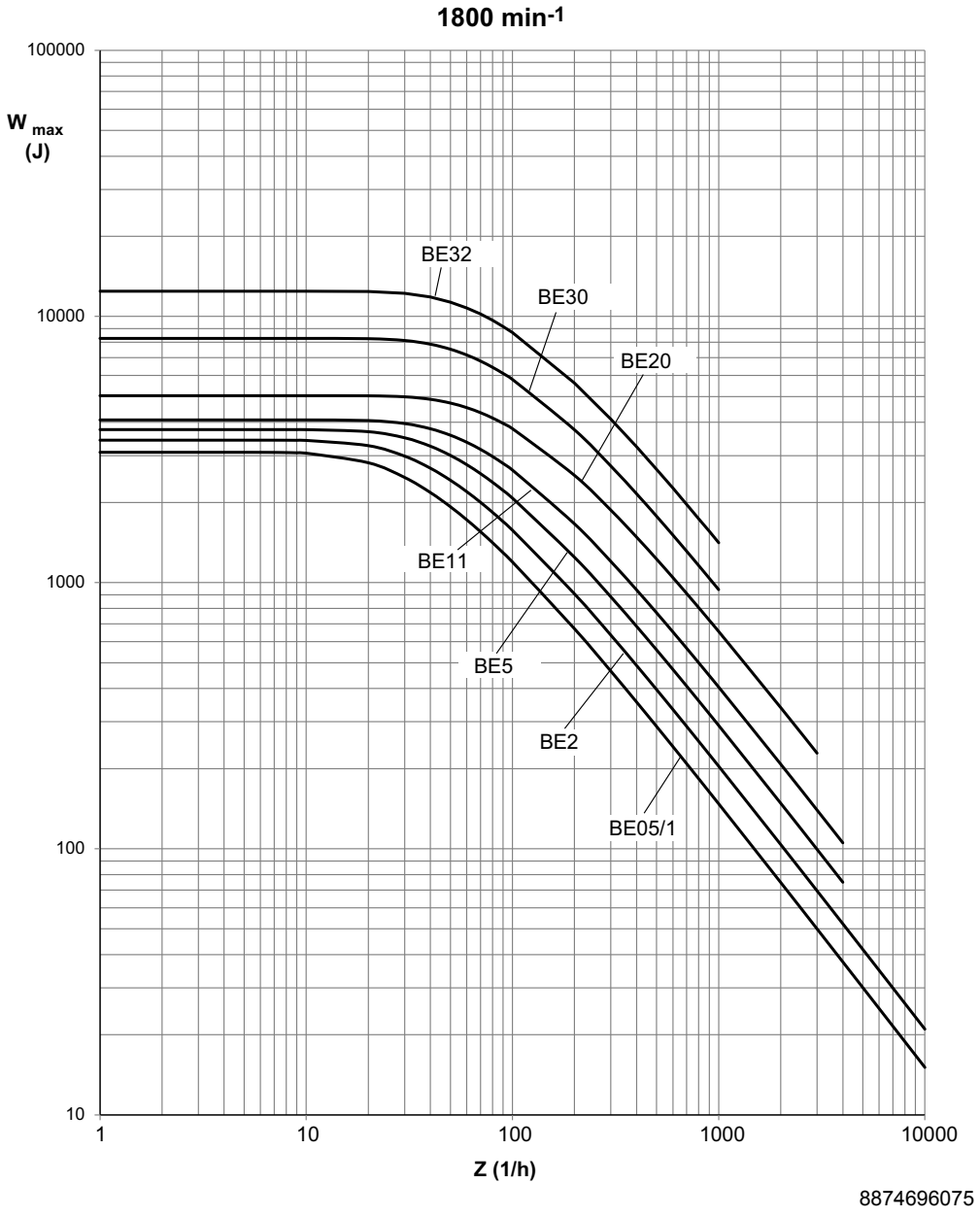
[1] Speed n in rpm
[2] Work done W_{max} in J

INFORMATION

Max. 10 emergency switch-off braking operations are permitted per hour, with at minimum of 6 minutes between two braking operations.

9.4 Maximum braking work per braking operation

Maximum braking work per braking operation Wmax depending on the starting frequency Z when braking at speed.



9.5 Braking torque assignment

9.5.1 Motor sizes EDR.71 – EDR.100

Motor type	Brake type	Braking torque steps [Nm (lb-in)]										
EDR.71	BE05	1.8 (16)	2.5 (22)	3.5 (31)	5.0 (44)							
	BE1				5.0 (44)	7.0 (62)	10 (88)					
EDR.80	BE05	1.8 (16)	2.5 (22)	3.5 (31)	5.0 (44)							
	BE1				5.0 (44)	7.0 (62)	10 (88)					
	BE2				5.0 (44)	7.0 (62)	10 (88)	14 (124)	20 (177)			
EDR.90	BE1				5.0 (44)	7.0 (62)	10 (88)					
	BE2				5.0 (44)	7.0 (62)	10 (88)	14 (124)	20 (177)			
	BE5							14 (124)	20 (177)	28 (248)	40 (354)	55 (487)
EDR.100	BE2				5.0 (44)	7.0 (62)	10 (88)	14 (124)	20 (177)			
	BE5							14 (124)	20 (177)	28 (248)	40 (354)	55 (487)

Not for frequency inverter operation

9.5.2 Motor sizes EDR.112 – EDR.225

Motor type	Brake type	Braking torque steps [Nm (lb-in)]												
EDR.112	BE5	14 (124)	20 (180)	28 (248)	40 (354)	55 (487)								
	BE11		20 (180)	28 (248)	40 (354)	55 (487)	80 (708)	110 (974)						
EDR.132	BE5	14 (124)	20 (180)	28 (248)	40 (354)	55 (487)								
	BE11		20 (180)	28 (248)	40 (354)	55 (487)	80 (708)	110 (974)						
EDR.160	BE11		20 (180)	28 (248)	40 (354)	55 (487)	80 (708)	110 (974)						
	BE20				40 (354)	55 (487)	80 (708)	110 (974)	150 (1328)	200 (1770)				
EDR.180	BE20				40 (354)	55 (487)	80 (708)	110 (974)	150 (1328)	200 (1770)				
	BE30						75 (667)	100 (885)	150 (1328)	200 (1770)	300 (2655)			
	BE32							100 (885)	150 (974)	200 (1770)	300 (2655)	400 (3540)		
EDR.200/ 225	BE30						75 (667)	100 (885)	150 (974)	200 (1770)	300 (2655)			
	BE32							100 (885)	150 (1328)	200 (1770)	300 (2655)	400 (3540)	500 (4425)	600 (5310)

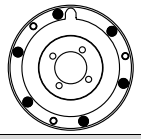
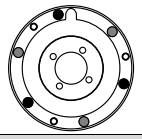
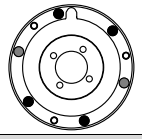
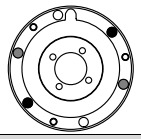
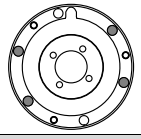
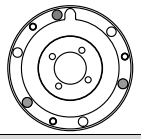
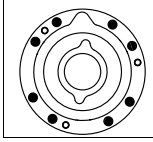
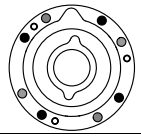
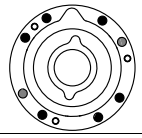
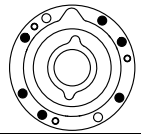
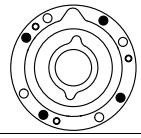
Not for frequency inverter operation

9.6 Working air gap, braking torques

Brake type	Braking work until maintenance [10^6 J]	Working air gap [mm] min. [1]	Working air gap [mm] max.	Brake disk [mm] min.	Part number damping plate/pole sheet	Braking torque settings: Braking torque [Nm (lb-in)]	Type and number of brake springs: Normal	Blue	White	Order number of brake springs: Normal	Blue	White
BE05	60	0.25	0.6	9.0	1374 056 3	5.0 (44) 3.5 (31) 2.5 (22) 1.8 (16)	3 – – –	– 6 4 3	– – – –	0135 017 X	1374 137 3	–
BE1	60	0.25	0.6	9.0	1374 056 3	10 (88.5) 7.0 (62) 5.0 (44)	6 43	– 2 –	– – –	0135 017 X	1374 137 3	–
BE2	90	0.25	0.6	9.0	1374 019 9	20 (177) 14 (124) 10 (88.5) 7.0 (62) 5.0 (44)	6 2 2 – –	– 4 2 4 3	– – – – –	1374 024 5	1374 052 0	–
BE5	190	0.25	0.6	9.0	1374 069 5	55 (487) 40 (354) 28 (248)	6 2 2	– 4 2	– – –	1374 070 9	1374 071 7	–
					1374 069 5	20 (177)	–	–	6			1374 773 8
						14 (124)	–	–	4			
BE11	320	0.3	0.9	10.0	1374 171 3	110 (974) 80 (708) 55 (487) 40 (354)	6 2 2 –	– 4 2 4	– – – –	1374 183 7	1374 184 5	–
					1374 171 3 + 1374 699 5	28 (248) 20 (177)	– –	3 –	– 4			1374 778 9
BE20	500	0.3	0.9	10.0	–	200 (1770) 150 (1328) 110 (974) 80 (708) 55 (487)	6 4 3 3 –	– 2 3 – 4	– – – – –	1374 322 8	1374 248 5	–
					1374 675 8	40 (354)	–	3	–			
BE30	750	0.3	0.9	10.0	–	300 (2655) 200 (1770) 150 (1328) 100 (885) 75 (667)	8 4 4 – –	– 4 – 8 6	– – – – –	0187 455 1	1374 435 6	–
BE32	750	0.4	0.9	10.0	–	600 (5310) 500 (4425) 400 (3540) 300 (2655) 200 (1770) 150 (1328)	8 6 4 4 – –	– 2 4 – 8 6	– – – – – –	0187 455 1	1374 435 6	–
					1374 673 1	100 (885)	–	4	–			–

1) When checking the working air gap, note: Parallelism tolerances on the brake disk may cause deviations of ± 0.15 mm after a test run.

The following table shows the brake spring requirements:

BE05 – BE20:					
6 springs	3 + 3 springs	4 + 2 springs	2 + 2 springs	4 springs	3 springs
					
BE30 – BE32:					
8 springs	4 + 4 springs	6 + 2 springs	6 springs	4 springs	
					

9.7 Operating currents for line operation

9.7.1 BE05, BE1, BE2 brake

The current values I_H (holding current) listed in the tables are r.m.s. values. Use only appropriate instruments for measuring r.m.s. values. The inrush current (accelerator current) I_B only flows for a short time (ca. 160 ms) when the brake is released.

	BE05, BE1	BE2
Max. braking torque [Nm (lb-in)]	5/10 (44/88)	20 (177)
Braking power [W (hp)]	32 (0.043)	43 (0.058)
Inrush current ratio I_B/I_H	4	4

Nominal voltage V_N		BE05, BE1		BE2	
AC V	DC V[1)]	I_H [AC A]	I_{DC} [DC A]	I_H [AC A]	I_{DC} [DC A]
60 (57-63)	**24**	0.90	1.17	1.18	1.53
120 (111-123)	**48**	0.45	0.59	0.59	0.77
147 (139-154)	**60**	0.36	0.47	0.48	0.61
184 (174-193)	**80**	0.29	0.37	0.38	0.49
208 (194-217)	**90**	0.26	0.33	0.34	0.43
230 (218-243)	**96**	0.23	0.30	0.30	0.39
254 (244-273)	**110**	0.20	0.27	0.27	0.35
290 (274-306)	**125**	0.18	0.24	0.24	0.31
330 (307-343)	**140**	0.16	0.21	0.21	0.28
360 (344-379)	**160**	0.14	0.19	0.19	0.25
400 (380-431)	**180**	0.13	0.17	0.17	0.22
460 (432-484)	**200**	0.11	0.15	0.15	0.19
500 (485-542)	**220**	0.10	0.13	0.14	0.18
575 (543-600)	**250**	0.09	0.12	0.12	0.16

1) In preparation

Key

I_B Acceleration current – brief inrush current
I_H Holding current r.m.s. value in the supply cable to the SEW brake rectifier
I_{DC} Direct current with direct DC voltage supply
V_N Nominal voltage (nominal voltage range)

9.7.2 Brakes BE5, BE11, BE20, BE30, BE32

The current values I_H (holding current) listed in the tables are r.m.s. values. Use only appropriate instruments for measuring r.m.s. values. The inrush current (accelerator current) I_B only flows for a short time (ca. 160 ms) when the brake is released. A separate voltage supply is not possible.

	BE5	BE11	BE20	BE30, BE32
Max. braking torque [Nm (lb-in)]	55 (487)	110 (974)	200 (1770)	300/600 (2655/5310)
Braking power [W (hp)]	49 (0.066)	77 (0.10)	100 (0.13)	130 (0.13)
Inrush current ratio I_B/I_H	5.7	6.6	7	10

Nominal voltage V_N		BE5	BE11	BE20	BE30, BE32
AC V	**DC V**	**I_H [AC A]**	**I_H [AC A]**	**I_H [AC A]**	**I_H [AC A]**
60 (57-63)	**24**	1.28	2.05	2.55	-
120 (111-123)	**48**	0.64	1.04	1.28	1.66
147 (139-154)	**60**	0.51	0.83	1.02	1.33
184 (174-193)	**80**	0.41	0.66	0.81	1.05
208 (194-217)	**90**	0.37	0.59	0.72	0.94
230 (218-243)	**96**	0.33	0.52	0.65	0.84
254 (244-273)	**110**	0.29	0.47	0.58	0.75
290 (274-306)	**125**	0.26	0.42	0.51	0.67
330 (307-343)	**140**	0.23	0.37	0.46	0.59
360 (344-379)	**160**	0.21	0.33	0.41	0.53
400 (380-431)	**180**	0.18	0.30	0.37	0.47
460 (432-484)	**200**	0.16	0.27	0.33	0.42
500 (485-542)	**220**	0.15	0.24	0.29	0.38
575 (543-600)	**250**	0.13	0.22	0.26	0.34

Legend

I_B Acceleration current – brief inrush current
I_H Holding current r.m.s. value in the supply cable to the SEW brake rectifier
I_{DC} Direct current with direct DC voltage supply
V_N Nominal voltage (nominal voltage range)

9.8 Operating currents for frequency inverter operation

9.8.1 BE05, BE1, BE2 brake

	BE05, BE1	BE2
Max. braking torque in Nm (lb-in)	3.5/7 (31/62)	14 (1566)
Braking power in W (hp)	25 (0.034)	34 (0.046)
Inrush current ratio ESV	4	4

Nominal voltage V_N		BE05, BE1		BE2	
AC V	**DC V**	**I_H AC A**	**I_{DC} DC A**	**I_H AC A**	**I_{DC} DC A**
–	**24**[1)]	–	0.93	–	1.220
60 (57-63)	**24**	0.720	0.93	0.940	1.220
120 (111-123)	**48**	0.355	0.465	0.470	0.610
147 (139-154)	**60**	0.285	0.370	0.375	0.475
184 (174-193)	**80**	0.225	0.295	0.295	0.385
208 (194-217)	**90**	0.200	0.265	0.265	0.340
230 (218-243)	**96**	0.181	0.235	0.235	0.305
254 (244-273)	**110**	0.160	0.210	0.210	0.275
290 (274-306)	**125**	0.143	0.186	0.187	0.240
330 (307-343)	**140**	0.128	0.166	0.167	0.215
360 (344-379)	**160**	0.113	0.147	0.149	0.193
400 (380-431)	**180**	0.101	0.131	0.133	0.172
460 (432-484)	**200**	0.090	0.118	0.121	0.156
500 (485-542)	**220**	0.080	0.105	0.108	0.139

1) Operation with control unit BSG, BS24, BMV

9.8.2 Brakes BE5, BE11, BE20, BE30, BE32

	BE5	BE11	BE20	BE30, BE32
Max. braking torque in Nm (lb-in)	40 (354)	80 (708)	150 (1328)	200/400 (1770/3540)
Braking power in W (hp)	39 (0.052)	61 (0.081)	79 (0.106)	103 (0.138)
Inrush current ratio ESV	5.7	6.6	7	10

Nominal voltage V_N		BE5		BE11		BE20		BE30, BE32	
AC V	**DC V**	**I_H AC A**	**I_{DC} DC A**	**I_H AC A**	**I_{DC} DC A**	**I_H AC A**	**I_{DC} DC A**	**I_H AC A**	**I_{DC} DC A**
–	**24**[1)]	–	1.303	–	2.105	–	2.650	–	–
60 (57-63)	–	1.02	–	1.66	–	2.05	–	–	–
120 (111-123)	–	0.51	–	0.83	–	1.03	–	1.38	–
147 (139-154)	–	0.41	–	0.66	–	0.82	–	1.09	–
184 (174-193)	–	0.325	–	0.52	–	0.65	–	0.88	–
208 (194-217)	–	0.29	–	0.465	–	0.58	–	0.78	–
230 (218-243)	–	0.255	–	0.415	–	0.52	–	0.69	–
254 (244-273)	–	0.23	–	0.37	–	0.46	–	0.61	–
290 (274-306)	–	0.205	–	0.33	–	0.41	–	0.55	–
330 (307-343)	–	0.181	–	0.295	–	0.36	–	0.49	–
360 (344-379)	–	0.161	–	0.265	–	0.325	–	0.44	–
400 (380-431)	–	0.145	–	0.235	–	0.29	–	0.385	–
460 (432-484)	–	0.129	–	0.21	–	0.26	–	0.345	–
500 (485-542)	–	0.115	–	0.192	–	0.23	–	0.31	–

1) Operation with control unit BSG, BMV

9.9 Resistors for line operation

9.9.1 Brake BE05, BE1, BE2, BE5

	BE05, BE1	BE2	BE5
Max. braking torque [Nm (lb-in)]	5/10 (44/88)	20 (177)	55 (487)
Braking power [W (hp)]	3 2 (0.043)	43 (0.058)	49 (0.066)
Inrush current ratio I_B/I_H	4	4	5.7

Nominal voltage V_N		BE05, BE1		BE2		BE5	
V_{AC}	V_{DC}	R_B	R_T	R_B	R_T	R_B	R_T
60 (57-63)	**24**	4.85	14.8	3.60	11.0	2.20	10.5
120 (111-123)	**48**	19.4	59.0	14.4	44.0	8.70	42.0
147 (139-159)	**60**	31.0	94.0	23.0	69.0	13.8	66
184 (174-193)	**80**	48.5	148	36.0	111	22.0	105
208 (194-217)	**90**	61.0	187	45.5	139	27.5	132
230 (218-243)	**96**	78.0	235	58.0	174	34.5	166
254 (244-273)	**110**	97.0	295	72.0	220	43.5	210
290 (274-306)	**125**	122	370	91	275	55.0	265
330 (307-343)	**140**	154	470	115	350	69.0	330
360 (344-379)	**160**	194	590	144	440	87.0	420
400 (380-431)	**180**	245	740	182	550	110	530
460 (432-484)	**200**	310	940	230	690	138	660
500 (485-542)	**220**	385	1180	290	870	174	830
575 (543-600)	**250**	490	1480	365	1100	220	1050

9.9.2 Brakes BE11, BE20, BE30, BE32

	BE11	BE20	BE30, BE32
Max. braking torque [Nm (lb-in)]	110 (974)	200 (1770)	300/600 (2655/5310)
Braking power [W (hp)]	77 (0.10)	100 (0.13)	130 (0.17)
Inrush current ratio I_B/I_H	6.6	7.5	8.5

Nominal voltage V_N		BE11		BE20		BE30, BE32	
V_{AC}	V_{DC}	R_B	R_T	R_B	R_T	R_B	R_T
60 (57-63)	**24**	1.20	7.6	1.1	7.1	–	–
120 (111-123)	**48**	4.75	30.5	3.3	28.6	2.1	15.8
147 (139-159)	**60**	7.7	43.5	5.4	36.0	3.7	27.5
184 (174-193)	**80**	12.0	76.0	8.4	57	5.3	39.8
208 (194-217)	**90**	15.1	96	10.6	71.7	6.7	50
230 (218-243)	**96**	19.0	121	13.3	90.3	8.4	63
254 (244-273)	**110**	24.0	152	16.7	134	10.6	79.3
290 (274-306)	**125**	30.0	191	21.1	143	13.3	100
330 (307-343)	**140**	38.0	240	26.5	180	16.8	126
360 (344-379)	**160**	47.5	305	33.4	227	21.1	158
400 (380-431)	**180**	60	380	42.1	286	26.6	199
460 (432-484)	**200**	76	480	52.9	360	33.4	251
500 (485-542)	**220**	95	600	66.7	453	42.1	316
575 (543-600)	**250**	120	760	83.9	570	53.0	398

9.10 Resistors for frequency inverter operation

9.10.1 BE05, BE1, BE2 brake

	BE05, BE1	BE2
Max. braking torque [Nm (lb-in)]	3.5/7 (31/62)	14 (1566)
Braking power [W (hp)]	25 (0.034)	34 (0.046)
Inrush current ratio ESV	4	4

Nominal voltage V_N		BE05, BE1		BE2	
AC V	**DC V**	R_B	R_T	R_B	R_T
	24[1)]	6.2	18.7	4.55	13.8
60 (57-63)	**24**	6.2	18.7	4.55	13.8
120 (111-123)	**48**	24.5	75	18.2	55
147 (139-159)	**60**	39	118	29	87
184 (174-193)	**80**	62	187	45.5	139
208 (194-217)	**90**	78	235	58	174
230 (218-243)	**96**	98	295	72	220
254 (244-273)	**110**	124	375	91	275
290 (274-306)	**125**	156	470	115	350
330 (307-343)	**140**	196	590	144	440
360 (344-379)	**160**	245	750	182	550
400 (380-431)	**180**	310	940	230	690
460 (432-484)	**200**	390	1180	280	860
500 (485-542)	**220**	490	1490	355	1080

1) Operation with control unit BSG, BS24, BMV

9.10.2 Brakes BE5, BE11, BE20, BE30, BE32

	BE5	BE11	BE20	BE30, BE32
Max. braking torque [Nm (lb-in)]	40 (354)	80 (708)	150 (1328)	200/400 (1770/3540)
Braking power [W (hp)]	39 (0.052)	61 (0.081)	79 (0.106)	103 (0.138)
Inrush current ratio ESV	5.7	6.6	7	10

Nominal voltage V_N		BE5		BE11		BE20		BE30, BE32	
AC V	**DC V**	R_B	R_T	R_B	R_T	R_B	R_T	R_B	R_T
	24[1)]	2.75	13.2	1.5	8.7	1.1	7.2	–	–
60 (57-63)	**–**	2.75	13.2	1.5	8.7	1.1	7.2	–	–
120 (111-123)	**–**	11	53	6.2	34.5	4.25	28.5	2.9	21.5
147 (139-159)	**–**	17.4	83	9.8	55.0	6.8	45.5	4.6	34.5
184 (174-193)	**–**	27.5	132	15.5	87	10.7	72	7.3	54
208 (194-217)	**–**	34.5	166	19.5	110	13.5	91	9.2	69
230 (218-243)	**–**	43.5	210	24.5	138	17.0	114	11.6	86
254 (244-273)	**–**	55	265	31.0	174	21.5	144	14.6	109
290 (274-306)	**–**	69	330	39.0	220	27	181	18.3	137
330 (307-343)	**–**	87	420	49	275	34	230	23	172
360 (344-379)	**–**	110	530	62	345	42.5	285	29	215
400 (380-431)	**–**	138	660	78	435	54	360	36.5	275
460 (432-484)	**–**	174	830	98	550	68	455	46	345
500 (485-542)	**–**	220	1050	119	670	85	570	58	430

1) Operation with control unit BSG, BMV

9.11 Resistance measurement BE05, BE1, BE2, BE5, BE11, BE20, BE30, BE32

INFORMATION

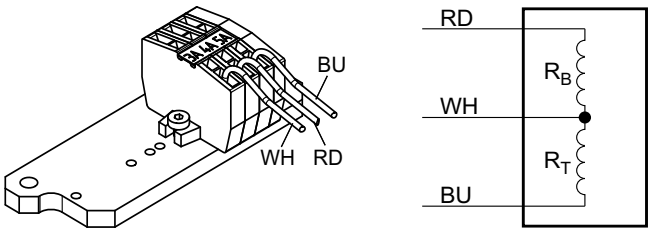
The colored cores of the brake coil must be removed from their terminals for the resistance measurement; otherwise, this could lead to incorrect measurement results.

For drives of category 3GD, the brake controller must always be installed in the control cabinet.

For drives of category 3D, the brake controller can be installed in the control cabinet or in the terminal box.

9.11.1 Brake control system in the control cabinet

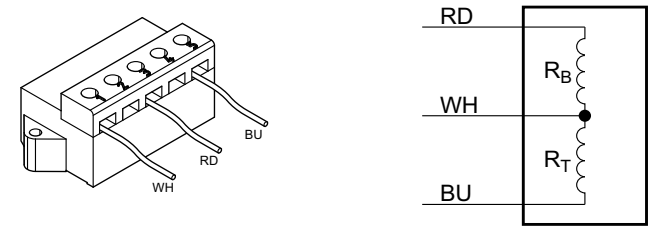
The following figure shows the brake coil resistance measurement at the auxiliary terminal strip in the terminal box when the brake controller is installed in the control cabinet:



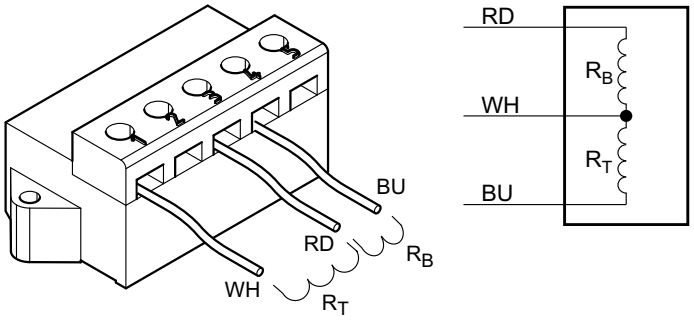
R_B	Acceleration coil resistance at 20°C (68°F) [Ω]	RD	Red
R_T	Coil section resistance at 20°C [Ω]	WH	White
		BU	Blue

9.11.2 Brake controller in the terminal box

The following figure shows the resistance measurement when the brake controller is installed in the terminal box (cut-off in the AC circuit):



The following figure shows the resistance measurement when the brake controller is installed in the terminal box (cut-off in the DC and AC circuit):



9.12 Brake control system

9.12.1 Wiring space of the motor

The following tables list the technical data of brake control systems for installation in the motor wiring space and the assignments with regard to motor size and connection technology. The different housings have different colors (= color code) to make them easier to distinguish.

Motor sizes EDR.71 – EDR.225

The following table shows the technical data of the rectifiers:

Type	Function	Voltage	Holding current I_{Hmax} [A]	Type	Part number	Color code
BGE	One-way rectifier with electronic switching	AC 150 – 500 V	1.5	BGE 1.5	825 385 4	Red
		AC 42 – 150 V	3.0	BGE 3	825 387 0	Blue
BSR..E[1)]	One-way rectifier + current relay for cut-off in the DC circuit	AC 150 – 500 V	1.0	BGE 1.5 + SR 11 /II3D	825 385 4 826 761 8	Red –
			1.0	BGE 1.5 + SR 15 /II3D	825 385 4 826 762 6	Red –
			1.0	BGE 1.5 + SR 19 /II3D	825 385 4 826 246 2	Red –
		AC 42 – 150 V	1.0	BGE 3 + SR 11 /II3D	825 387 0 826 761 8	Blue –
			1.0	BGE 3 + SR 15 /II3D	825 387 0 826 762 6	Blue –
			1.0	BGE 3 + SR 19 /II3D	825 387 0 826 246 2	Blue –
BUR..E[1)]	One-way rectifier + voltage relay for cut-off in the DC circuit	AC 150 – 500 V	1.0	BGE 1.5 + UR 15 /II3D	825 385 4 826 759 6	Red –
		AC 42 – 150 V	1.0	BGE 3 + UR 11 /II3D	825 387 0 826 758 8	Blue –

1) In preparation

INFORMATION

If the voltage is higher than 500 V or in the case of a frequency inverter operation, no rectifiers may be used in the terminal box.

9.12.2 Control cabinet

The following tables list the technical data of brake control systems for installation in the control cabinet, and the assignment regarding the motor size and connection technology. The different housings have different colors (= color code) to make them easier to distinguish.

Motor sizes EDR.71 – EDR.225

Type	Function	Voltage	Holding current I_{Hmax} [A]	Type	Part number	Color code
BME	One-way rectifier with electronic switching such as BGE	AC 230 – 575 V	1.4	BME 1.4	829 831 9	Red
		AC 150...500 V	1.5	BME 1.5	825 722 1	Red
		AC 42-150 V	3.0	BME 3	825 723 X	Blue
BMP	One-way rectifier with electronic switching, integrated voltage relay for cut-off in the DC circuit	AC 230 – 575 V	1.4	BMP 1.4	829 832 7	White
		AC 150...500 V	1.5	BMP 1.5	825 685 3	White
		AC 42-150 V	3.0	BMP 3	826 566 6	Light blue
BMK	One-way rectifier with electronic switch mode, $_{DC}$ 24 V control input and separation in the DC circuit	AC 230 – 575 V	1.4	BMK 1.4	829 833 5	Water blue
		AC 150...500 V	1.5	BMK 1.5	826 463 5	Water blue
		AC 42-150 V	3.0	BMK 3	826 567 4	Bright red

9.13 Permitted rolling bearing types

9.13.1 Rolling bearing types for EDR.71 – EDR.225 motors

Motor type	A-side bearing		B-side bearing	
	IEC motor	Gearmotor	AC motor	Brakemotor
EDR.71	6204-2Z-J-C3	6303-2Z-J-C3	6203-2Z-J-C3	6203-2RS-J-C3
EDR.80	6205-2Z-J-C3	6304-2Z-J-C3	6304-2Z-J-C3	6304-2RS-J-C3
EDR.90 – EDR.100	6306-2Z-J-C3		6205-2Z-J-C3	6205-2RS-J-C3
EDR.112 – EDR.132	6308-2Z-J-C3		6207-2Z-J-C3	6207-2RS-J-C3
EDR.160	6309-2Z-J-C3		6209-2Z-J-C3	6209-2RS-J-C3
EDR.180	6312-2Z-J-C3		6213-2Z-J-C3	6213-2RS-J-C3
EDR.200 – EDR.225	6314-2Z-J-C3		6314-2Z-J-C3	6314-2RS-J-C3

9.13.2 Current insulated rolling bearings for motor sizes EDR.200 – EDR.225

Motor type	AC motor	Brakemotor
EDR.200 – EDR.225	6314-C3-EI	6314-C3-EI

9.14 Lubricant tables

9.14.1 Lubricant table for rolling bearings

INFORMATION

Inadequate bearing greases may result in bearing damage.

Motor sizes EDR.71 – EDR.225

The bearings are 2Z or 2RS closed bearings and cannot be re-lubricated.

	Ambient temperature	Manufacturer	Type	DIN designation
Motor rolling bearings	-20°C to +40°C	Esso	Polyrex EM[1)]	K2P-20
	-20°C to +40°C	Kyodo Yushi	Multemp SRL[2)]	K2N-40

1) mineral lubricant (= mineral-based rolling bearing grease)

9.15 Order information for lubricants and anti-corrosion agents

Lubricants and anti-corrosion agents can be obtained directly from SEW-EURODRIVE using the following purchase order numbers.

Use	Manufacturer	Type	Packaging unit	Order number
Lubricant for rolling bearings	Esso	Polyrex EM	400 g	09101470
	SKF	GXN	400 g	09101276
Duroplastic sealing compound	Marston Domsel	SEW L Spezial	80 g	09112286
Lubricant for Sealing rings	Klüber	Petamo GHY 133 for [30], [37], [106], [95]	10 g	04963458
	Fuchs	Renolit CX-Tom 15 for [30], [37], [106], [95]	On request	On request
Anti-corrosion agent and lubricant	SEW-EURODRIVE	NOCO® FLUID	5.5 g	09107819

9.16 Mounting device

Mounting device		XV0A	XV1A	XV2A	XV3A	XV4A
For motors		EDR.71 – 225				
Mounting type of encoder		Flange centered with coupling				
Variant	Encoder shaft	Any	6 mm	10 mm	12 mm	11 mm
	Centering	Any	50 mm	50 mm	80 mm	85 mm
Suitable for encoder		Provided by the customer or by SEW-EURODRIVE on behalf of the customer.				

10 Malfunctions

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- De-energize the motor before you start working on the unit.
- Secure the motor against unintended power-up.

⚠ CAUTION

The surface temperatures on the drive can be very high during operation.

Danger of burns.

- Let the motor cool down before you start your work.

NOTICE

Improper troubleshooting measures may damage the drive.

Possible damage to property.

- Note the following information.

- Use only genuine spare parts in accordance with the valid parts list.
- Strictly observe the safety notes in the individual chapters.

10.1 Motor malfunctions

Malfunction	Possible cause	Remedy
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
	Malfunction 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; follow the wiring diagram
	Motor power designed for star-star connection but only connected in star	Correct the connection from star to star-star; follow the wiring diagram
	Voltage or frequency deviate considerably from setpoint, at least while being switched on	Provide better power supply system; reduce the power supply load; Check cross section of supply cable, replace with cable of larger cross section if need be
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 version if necessary (consult 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 two 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	
Fuses blow or motor protection trips immediately	Short circuit in the motor supply cable	Repair short circuit
	Supply cables connected incorrectly	Correct the wiring, observe the wiring diagram
	Short circuit in motor	Send motor to specialist workshop for repair
	Ground fault on motor	
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 need be

Malfunction	Possible cause	Remedy
Motor heats up excessively (measure temperature)	Overload	Measure power, check project planning and use larger motor or reduce load if necessary
	Insufficient cooling	Provide for 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 provided for	Correct the wiring, observe the wiring diagram
	Loose contact in supply cable (one phase missing)	Tighten loose contact, check connections, observe wiring diagram
	Fuse has blown	Look for and rectify cause (see above); replace fuse
	Line voltage deviates from the rated motor voltage by more than 5% (range A)/10% (range B).	Adjust motor to line voltage.
	Rated operation type (S1 to S10, DIN 57530) exceeded, e.g. through excessive starting frequency	Adjust the rated operating mode of the motor to the required operating conditions; consult a professional to determine the correct drive if necessary
Excessively loud	Ball bearing compressed, dirty or damaged	Re-align motor and the driven machine, inspect rolling bearing and replace if necessary. See section "Permitted rolling bearing types" (→ page 127).
	Vibration of rotating parts	Look for the case, possibly an imbalance; correct the cause, observe method for balancing
	Foreign bodies in cooling air passages	Clean the cooling air passages

10.2 Brake malfunctions

Malfunction	Possible cause	Remedy
Brake does not release	Incorrect voltage on brake control unit	Apply the correct voltage; brake voltage specified on the nameplate
	Brake control unit failed	Install a new brake control, check resistors and insulation of the brake coils (see "Resistors" section for resistance values). Check switchgear, replace if necessary
	Max. permitted working air gap exceeded because brake lining worn down.	Measure and set working air gap. See the following sections: • "Setting the working air gap of brakes BE05-BE32" If the brake disk is too thin, replace the brake disk. See the following sections: • "Replacing the brake disk of BE05-BE32 brakes"
	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 overheats	Provide for cooling air supply or clear cooling air passages, check air filter, clean or replace if necessary. Replace brake rectifier type BG or BMS by type BGE or BME
	Brake coil has interturn short circuit or a short circuit to frame	Check resistors and insulation of the brake coils (see "Resistors" section for resistance values). 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. See the following sections: • "Setting the working air gap of brakes BE05-BE32" If the brake disk is too thin, replace the brake disk. See the following sections: • "Replacing the brake disk of BE05-BE32 brakes"
	Brake lining worn	Replace entire brake disk. See the following sections: • "Replacing the brake disk of BE05-BE32 brakes"
	Incorrect braking torque.	Check the project planning and change the braking torque if needed; see chapter "Technical data" > "Work done, working air gap, braking torques" • by changing the type and number of brake springs. See the following sections: – "Changing the braking torque of brakes BE05-BE32" (→ page 96) • by selecting a different brake See section "Braking torque assignment"
Brake does not brake	Working air gap so large that setting nuts for the manual release come into contact.	Set the working air gap. See the following sections: • "Setting the working air gap of brakes BE05-BE32"
	Manual brake release device not set correctly	Set the setting nuts for the manual release correctly See the following sections: • "Changing the braking torque of brakes BE05-BE32" (→ page 96)
	Brake locked by manual brake release HF	Loosen the setscrew, remove if necessary
Brake is applied with time lag	Brake is switched only on AC voltage side	Switch on DC and AC voltage sides; observe wiring diagram
Noises in vicinity of brake	Gearing wear on the brake disk or the carrier caused by jolting startup	Check the project planning, replace the brake disk if necessary See the following sections: • "Replacing the brake disk of BE05-BE32 brakes"Have a specialist workshop replace the carrier
	Alternating torques due to incorrectly set frequency inverter	Check correct setting of frequency inverter according to its operating instructions, correct if necessary.

10.3 Malfunctions when operated with a frequency inverter

The symptoms described in chapter "Motor malfunctions" can also occur when the motor is operated with a frequency inverter. Please refer to the frequency inverter operating instructions for the meaning of the problems that occur and to find information about rectifying the problems.

10.4 Disposal

Dispose of the motors in accordance with the material structure and the regulations in force:

- Iron
- Aluminum
- Copper
- Plastic
- Electronic components
- Oil and grease (not mixed with solvents)

10.5 Customer service

Please have the following information to hand if you require the assistance of our customer service:

- Nameplate data (complete)
- Type and extent of the problem
- Time the problem occurred and any accompanying circumstances
- Assumed cause
- Environmental conditions e.g.:
  - Ambient temperature
  - Humidity
  - Installation altitude
  - Dirt
  - etc.

11 Appendix

11.1 Wiring diagrams

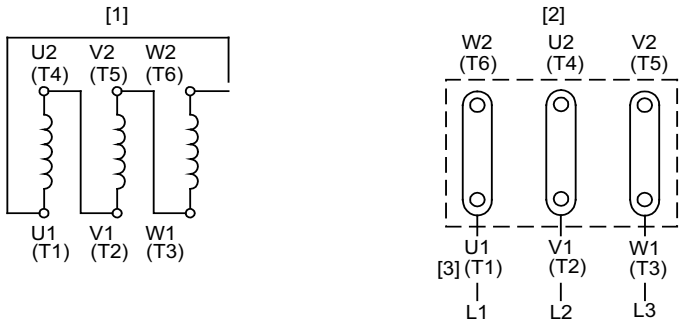
INFORMATION

The motor should be connected as shown in the connection wiring diagram or the 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.

11.1.1 Wiring diagram R13 (68001 xx 06)

△ *connection*

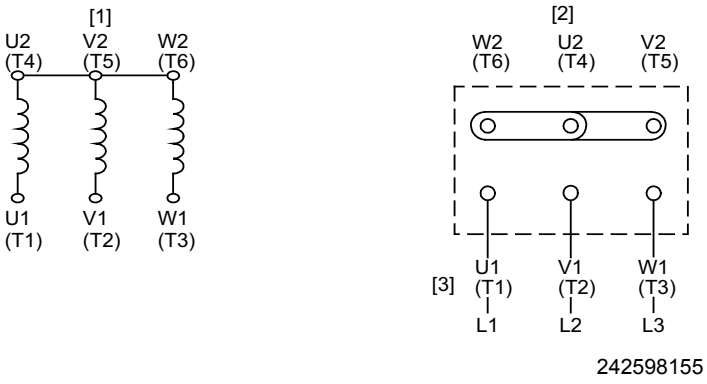
The following figure shows △ connection for low voltage.



[1] Motor winding
[2] Motor terminal board
[3] Supply cables

人 *connection*

The following figure shows 人 connection for high voltage.



[1] Motor winding
[2] Motor terminal board
[3] Supply cables

Change in direction of rotation: Swap connection of 2 supply cables, L1 - L2

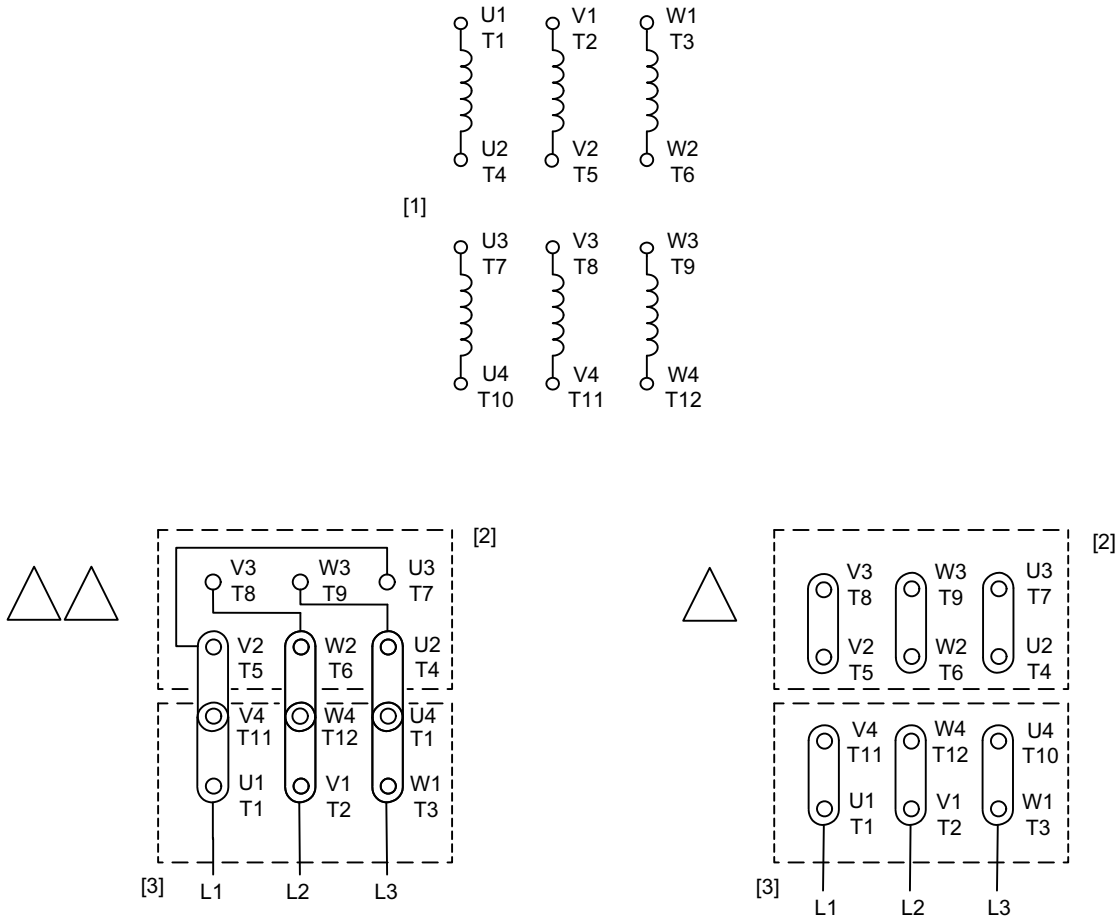
11.1.2 Delta connection with wiring diagram R72 (68192 xx 09)

AC motor

For all motors with one speed and direct power-on.

△ *connection,*
△△ *connection*

The following figure shows △ connection for high voltages and △△ connection for low voltages.



[1] Motor winding
[2] Motor terminal board
[3] Supply cables

Change in direction of rotation: Swap connection of 2 supply cables, L1 - L2

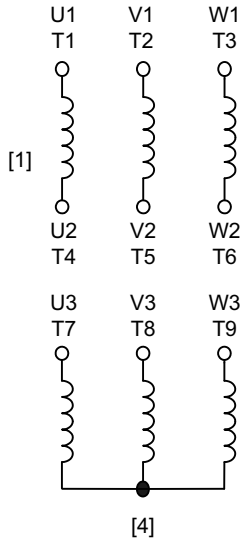
11.1.3 Star connection with wiring diagram R76 (68043 xx 06)

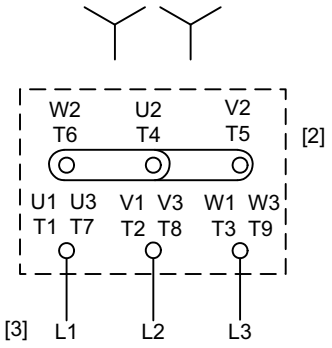
AC motor

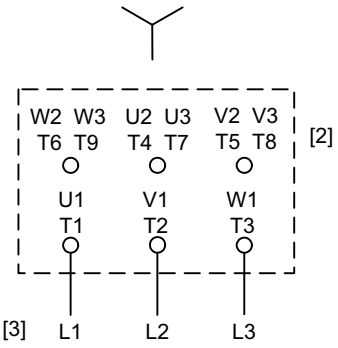
For all motors with one speed and direct power-on.

⅄ connection,
⅄ ⅄ connection

The following figure shows ⅄ connection for high voltages and ⅄ ⅄ connection for low voltages.







[1] Motor winding
[2] Motor terminal board
[3] Supply cables
[4] Star point connected in motor

Change in direction of rotation: Swap connection of 2 supply cables, L1 - L2

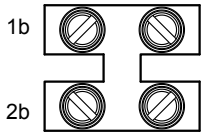
11.1.4 Motor protection with TF for EDR.71 – EDR.225

TF

The following figures show the connection of motor protection with TF PTC thermistor sensor.

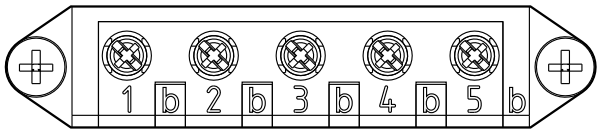
A number of terminals are available for connection to the trip device.

Example: TF to 2-pole terminal strip



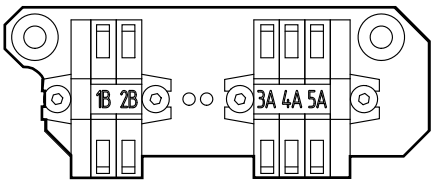
1b	2b
TF	TF

Example: 2 × TF to 5-pole terminal strip (in preparation)



1b	2b	3b	4b	5b
1.TF	1.TF	2.TF	2.TF	-

Example: 3+2-pole terminal strip



1b	2b	3a	4a	5a
1.TF	1. TF	BE	BE	BE

11.1.5 BGE; BSG brake control (in preparation)

BE brake

BGE; BSG brake control

Apply voltage to release the brake (see nameplate).

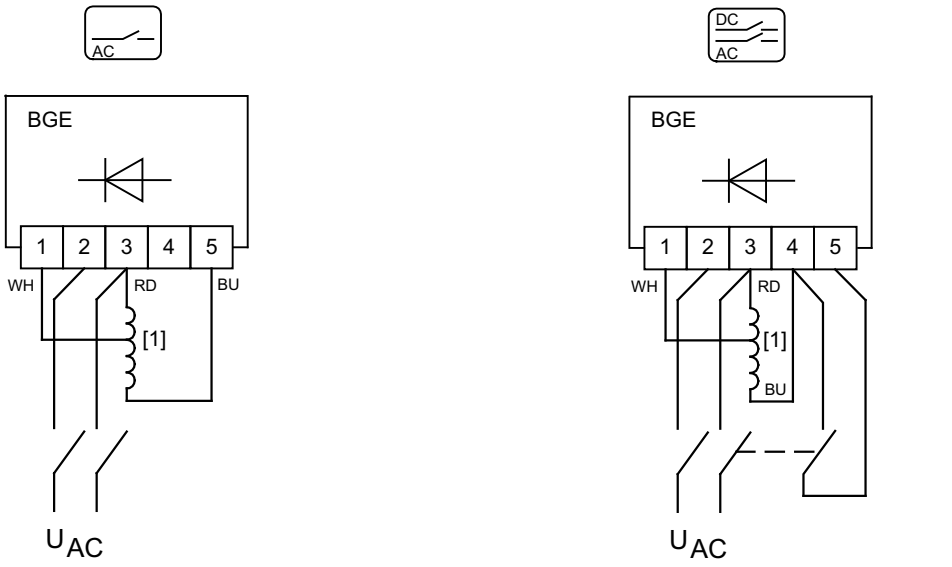
Contact rating of the braking contactors: AC3 in accordance with EN 60947-4-1.

The voltage can be taken from both the terminal board of the motor and through a separate incoming cable at the same voltage.

For motors that are operated with a frequency inverter, the voltage cannot be received through a separate incoming cable.

BGE

The following illustration shows the wiring for the BGE brake rectifier for the AC-side shut-off as well as the DC and AC-side shutoff.

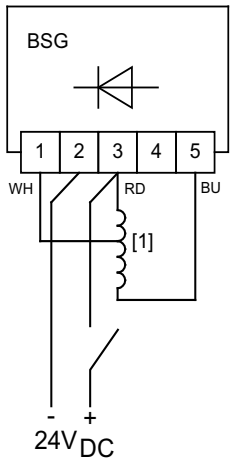


8281626379

[1] Brake coil

BSG

The following illustration shows the DC 24 V connection of the BSG control unit



242606475

[1] Brake coil

12 Address List

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Production / Industrial Gears	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str.10 D-76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Service Competence Center	**Mechanics / Mechatronics**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
Drive Technology Center	**North**	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 800 SEWHELP +49 800 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	**Forbach**	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles F-44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20

France			
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Algiers**	REDUCOM Sarl 16, rue des Frères Zaghnoune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 info@reducom-dz.com http://www.reducom-dz.com

Argentina			
Assembly **Sales**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

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Belarus			
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Belgium			
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Service Competence Center	**Industrial Gears**	**SEW-EURODRIVE n.v./s.a.** Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be

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Brazil			
Assembly **Sales** **Service**	**Rio Claro**	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
	Indaiatuba	SEW-EURODRIVE Brasil Ltda. Estrada Municipal Jose Rubim, 205 Rodovia Santos Dumont Km 49 13347-510 - Indaiatuba / SP	Tel. +55 19 3835-8000 sew@sew.com.br

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137 electrojemba@yahoo.fr

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
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China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn

China			
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	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
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	Drive Service Hotline / 24 Hour Service	HOT-LINE +420 800 739 739 (800 SEW SEW)	**Servis:** Tel. +420 255 709 632 Fax +420 235 358 218 servis@sew-eurodrive.cz

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Assembly **Sales** **Service**	**Copenhagen**	SEW-EURODRIVE A/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

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Finland			
Assembly **Sales** **Service**	**Hollola**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Service	**Hollola**	SEW-EURODRIVE OY Keskikankaantie 21 FIN-15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Production **Assembly**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
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Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
	Drive Service Hotline / 24 Hour Service		Tel. 01924 896911

Greece			
Sales	**Athens**	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu

India			
Registered Office **Assembly** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com salesvadodara@seweurodriveindia.com
Assembly **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**Solaro**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 980 999 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Société Industrielle & Commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1173 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373855 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

Kazakhstan			
Sales	**Almaty**	ТОО "СЕВ-ЕВРОДРАЙВ" пр.Райымбека, 348 050061 г. Алматы Республика Казахстан	Тел. +7 (727) 334 1880 Факс +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz

Kenya			
Sales	**Nairobi**	Barico Maintenances Ltd Kamutaga Place Commercial Street Industrial Area P.O.BOX 52217 - 00200 Nairobi	Tel. +254 20 6537094/5 Fax +254 20 6537096 info@barico.co.ke

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales Lebanon	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
		After Sales Service	service@medrives.com

Lebanon			
Sales Jordan / Kuwait / Saudi Arabia / Syria	**Beirut**	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 info@medrives.com http://www.medrives.com
		After Sales Service	service@medrives.com

Lithuania			
Sales	**Alytus**	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 irmantas@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.lu info@sew-eurodrive.be

Madagascar			
Sales	**Antananarivo**	Ocean Trade BP21bis. Andraharo Antananarivo. 101 Madagascar	Tel. +261 20 2330303 Fax +261 20 2330330 oceantrabp@moov.mg

Malaysia			
Assembly **Sales** **Service**	**Johor**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my

Mexico			
Assembly **Sales** **Service**	**Quéretaro**	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Mongolia			
Sales	**Ulan Bator**	SEW-EURODRIVE Representative Office Mongolia Olympic street 8, 2nd floor Juulchin corp bldg., Sukhbaatar district, Ulaanbaatar 14253	Tel. +976-70009997 Fax +976-70009997 http://www.sew-eurodrive.mn sew@sew-eurodrive.mn

Morocco			
Sales **Service**	**Mohammedia**	SEW-EURODRIVE SARL 2 bis, Rue Al Jahid 28810 Mohammedia	Tel. +212 523 32 27 80/81 Fax +212 523 32 27 89 sew@sew-eurodrive.ma http://www.sew-eurodrive.ma

Namibia			
Sales	**Swakopmund**	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 sales@dbmining.in.na

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	SEW-EURODRIVE B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Nigeria			
Sales	**Lagos**	EISNL Engineering Solutions and Drives Ltd Plot 9, Block A, Ikeja Industrial Estate (Ogba Scheme) Adeniyi Jones St. End Off ACME Road, Ogba, Ikeja, Lagos Nigeria	Tel. +234 (0)1 217 4332 team.sew@eisnl.com http://www.eisnl.com

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Pakistan			
Sales	**Karachi**	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk

Paraguay			
Sales	**Fernando de la Mora**	SEW-EURODRIVE PARAGUAY S.R.L De la Victoria 112, Esquina nueva Asunción Departamento Central Fernando de la Mora, Barrio Bernardino	Tel. +595 991 519695 Fax +595 21 3285539 sew-py@sew-eurodrive.com.py

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 676 53 00 Fax +48 42 676 53 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	Service	Tel. +48 42 6765332 / 42 6765343 Fax +48 42 6765346	Linia serwisowa Hotline 24H Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucharest**	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 RUS-195220 St. Petersburg	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn http://www.senemeca.com

Serbia			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV sprat SRB-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 bgriffiths@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospecton Road Isipingo Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 902 3815 Fax +27 31 902 3826 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za

South Korea			
Assembly **Sales** **Service**	**Ansan**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate #1048-4, Shingil-Dong, Danwon-Gu, Ansan-City, Kyunggi-Do Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master.korea@sew-eurodrive.com
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Swaziland			
Sales	**Manzini**	C G Trading Co. (Pty) Ltd PO Box 2960 Manzini M200	Tel. +268 2 518 6343 Fax +268 2 518 5033 engineering@cgtrading.co.sz

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch

Tanzania			
Sales	**Dar es Salaam**	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam	Tel. +255 0 22 277 5780 Fax +255 0 22 277 5788 uroos@sew.co.tz

Thailand			
Assembly **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 http://www.tms.com.tn tms@tms.com.tn

Turkey			
Assembly **Sales** **Service**	**Kocaeli-Gebze**	SEW-EURODRİVE Sistemleri San. Ve TIC. Ltd. Sti Gebze Organize Sanayi Böl. 400 Sok No. 401 41480 Gebze Kocaeli	Tel. +90-262-9991000-04 Fax +90-262-9991009 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

Ukraine			
Assembly **Sales** **Service**	**Dnipropetrovsk**	ООО «СЕВ-Евродрайв» ул.Рабочая, 23-В, офис 409 49008 Днепропетровск	Тел. +380 56 370 3211 Факс. +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

United Arab Emirates			
Sales **Service**	**Sharjah**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae

USA			
Production **Assembly** **Sales** **Service**	**Southeast Region**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**Northeast Region**	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net

Vietnam			
Sales	**Ho Chi Minh City**	**All sectors except harbor and offshore:** Nam Trung Co., Ltd 250 Binh Duong Avenue, Thu Dau Mot Town, Binh Duong Province HCM office: 91 Tran Minh Quyen Street District 10, Ho Chi Minh City	Tel. +84 8 8301026 Fax +84 8 8392223 namtrungco@hcm.vnn.vn truongtantam@namtrung.com.vn khanh-nguyen@namtrung.com.vn
		Harbor and offshore: DUC VIET INT LTD Industrial Trading and Engineering Services A75/6B/12 Bach Dang Street, Ward 02, Tan Binh District, 70000 Ho Chi Minh City	Tel. +84 8 62969 609 Fax +84 8 62938 842 totien@ducvietint.com
	Hanoi	Nam Trung Co., Ltd R.205B Tung Duc Building 22 Lang ha Street Dong Da District, Hanoi City	Tel. +84 4 37730342 Fax +84 4 37762445 namtrunghn@hn.vnn.vn

Zambia			
Sales	**Kitwe**	EC Mining Limited Plots No. 5293 & 5294,Tangaanyika Road, Off Mutentemuko Road, Heavy Industrial Park, P.O.BOX 2337 Kitwe	Tel. +260 212 210 642 Fax +260 212 210 645 sales@ecmining.com http://www.ecmining.com

Index

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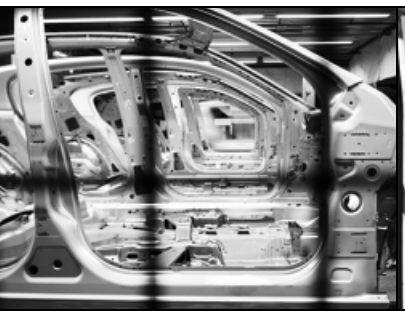
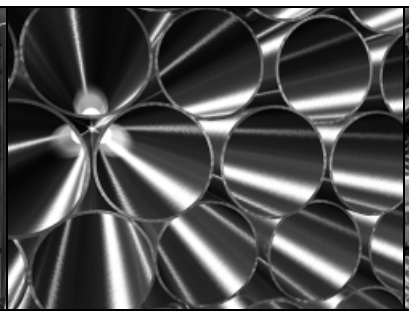
X






SEW-EURODRIVE
Driving the world

SEW-EURODRIVE GmbH & Co KG
P.O. Box 3023
D-76642 Bruchsal/Germany
Phone +49 7251 75-0
Fax +49 7251 75-1970
sew@sew-eurodrive.com

➞ **www.sew-eurodrive.com**