SEW EURODRIVE

Operating Instructions

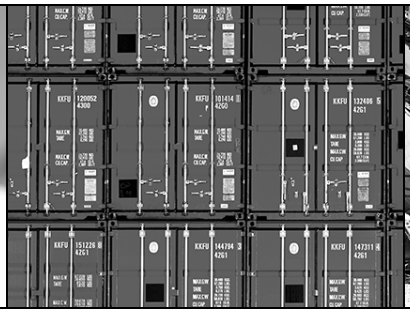
IECEx

Explosion-Proof AC Motors EDR.71 – 225

Edition 8/2013

19496419 / 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. 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 of the EDR.. explosion-proof AC motors and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of the documentation. In such cases, any liability for defects is excluded.

1.5 Copyright

1.6 Product names and trademarks

The brands and product names contained within this publication are trademarks or registered trademarks of the titleholders.

2 Safety notes

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 personnel 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:

- Training in mechanical engineering, e.g. as a mechanic or mechatronics technician (final examinations must have been passed).
- They are familiar with these operating instructions.

Any electronic 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:

- Training in electrical engineering, e.g. as an electrician, electronics or mechatronics technician (final examinations must have been passed).
- They are familiar with these operating instructions.

All work in further areas of transportation, storage, operation and waste disposal must 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.

When installed in machines, startup (i.e. start of designated operation) is prohibited until it is determined that the machine complies with the local laws and directives applicable in the country of use.

INFORMATION ON EXPLOSION PROTECTION

- The motor may only be operated under the conditions described in the chapter "Startup".
- A motor may only be operated on a frequency inverter if the requirements of the IECEx Certificate of Conformity (IECEx CoC) 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 painting and seals.
- The motors must not be operated in areas / applications that cause strong electrical charge on the motor housing, e.g. a fan motor in a dust-transporting tube as this may cause electrostatic charge of the coated surfaces.

Air-cooled types are dimensioned for ambient temperatures from -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 should also be observed:

- Wiring diagrams provided with the motor
- Operating instructions "Explosion-Proof Gear Units R..7, F..7, K..7, S..7 Series, SPIROPLAN® W" for gearmotors
- Operating instructions "Explosion-Proof VARIBLOC® Variable-Speed Gear Units and Accessories" / "Explosion-Proof VARIMOT® Variable-Speed Gear Units and Accessories"
- Operating instructions of any mounted frequency inverter for motors powered by inverters.
- Operating instructions of any other installed options, if applicable
- "Explosion-Proof AC Motors" catalog
- "Explosion-Proof Drives" catalog

The complete range of technical documentation is available from our website:

www.sew-eurodrive.com

2.6 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.

2.7 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. Turn the rotor manually and listen for unusual noises. Check the direction of rotation in decoupled status.

Only install or remove belt pulleys and couplings using 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 used air, including air from adjacent units, cannot be drawn in again straight away.

Observe the notes in the "Mechanical Installation" section.

2.8 Safety notes on the motor

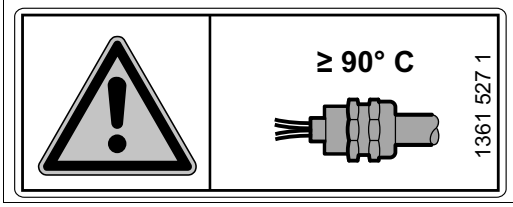
⚠ CAUTION

Safety notes or signs can become dirty or illegible 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 following safety note applies to motors operated in an ambient temperature of > 40°C or motors operated with a frequency inverter. Safety notes on the motor are usually attached to the terminal box cover and have to be observed. They have the following meaning:

Safety note	Meaning
	Only use cables and cable glands that are rated for temperatures ≥ 90 °C.

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 (e.g. anti-condensation heating or forced cooling fan).

Check whether the unit is de-energized!

Exceeding the tolerances stipulated in IEC 60034-1 (voltage +5%, frequency +2%, curve shape, symmetry) increases heating and influences electromagnetic compatibility. Also adhere to IEC 60364.

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 potentially explosive areas applicable in the country of use, such as:

- Australia, New Zealand: relevant regulations for hazardous locations LV standards are AS/NZS60079 and AS/NZS3000
- IEC 60079 -14

Observe the wiring information and any 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 IEC 60079-7, --15 and national regulations. The minimum values according to the respective standards must be observed, see the following table:

Nominal voltage V_N	Distance for motors of equipment protection level c (IEC 60079-15)	Distance for motors of equipment protection level b (IEC 60079-7)
≤ 500 V	5 mm	8 mm
> 500 V to ≤ 690 V	5.5 mm	10 mm

The connection 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” section.

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.

2.10.1 Surface temperature during operation

⚠ CAUTION

The surfaces of the drive can be very hot during operation.

Danger of burns.

- Make sure that hot surfaces cannot be touched unintentionally or during normal operation. Install covers or warning signs according to regulations.
- Let the unit cool down before you start working on it.

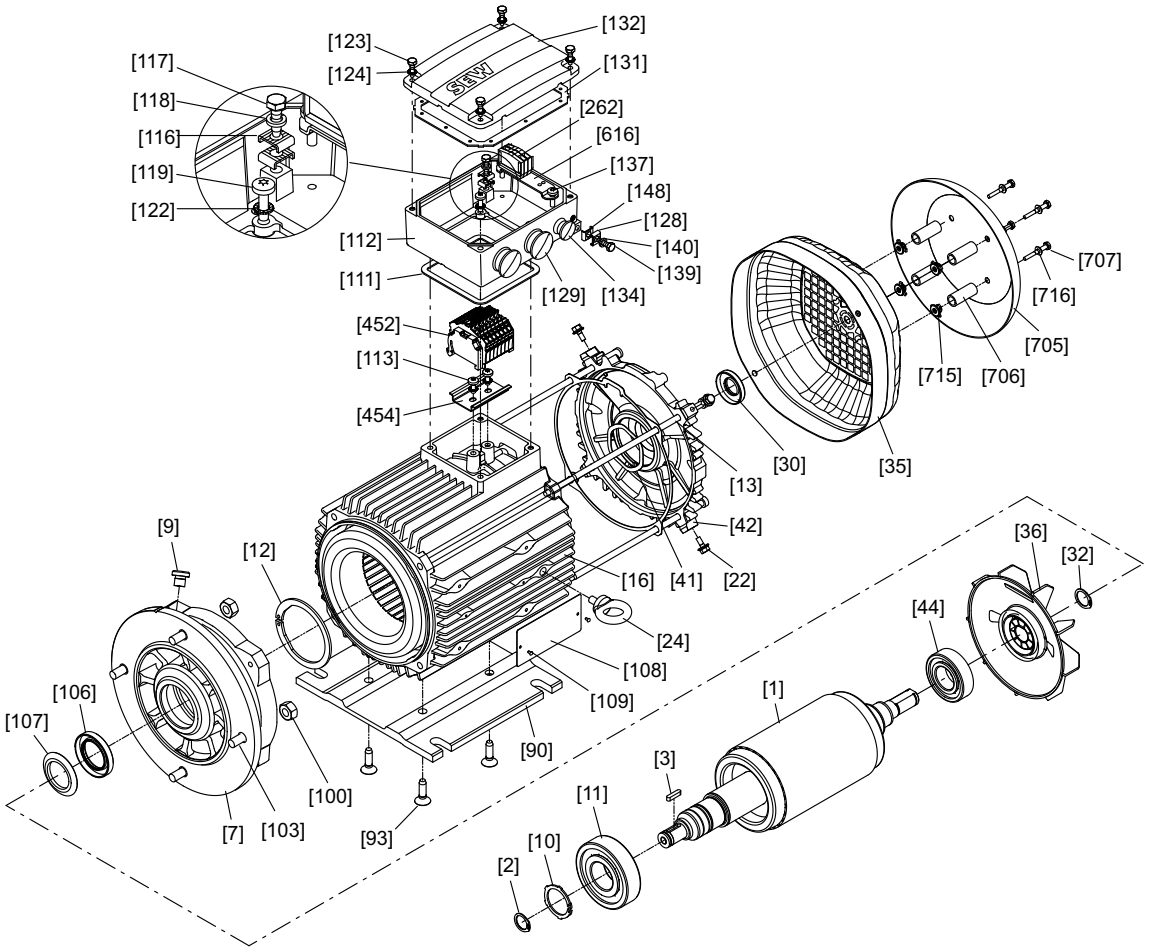
3 Motor structure

INFORMATION

The following figures are block diagrams. Their purpose is only to make it easier to assign components to the spare parts lists. Deviations are possible depending on the motor size and version.

3.1 General structure of EDR.71 – EDR.132

The following figure shows an example of the basic structure of EDR.71 – EDR.132 with cage clamp:

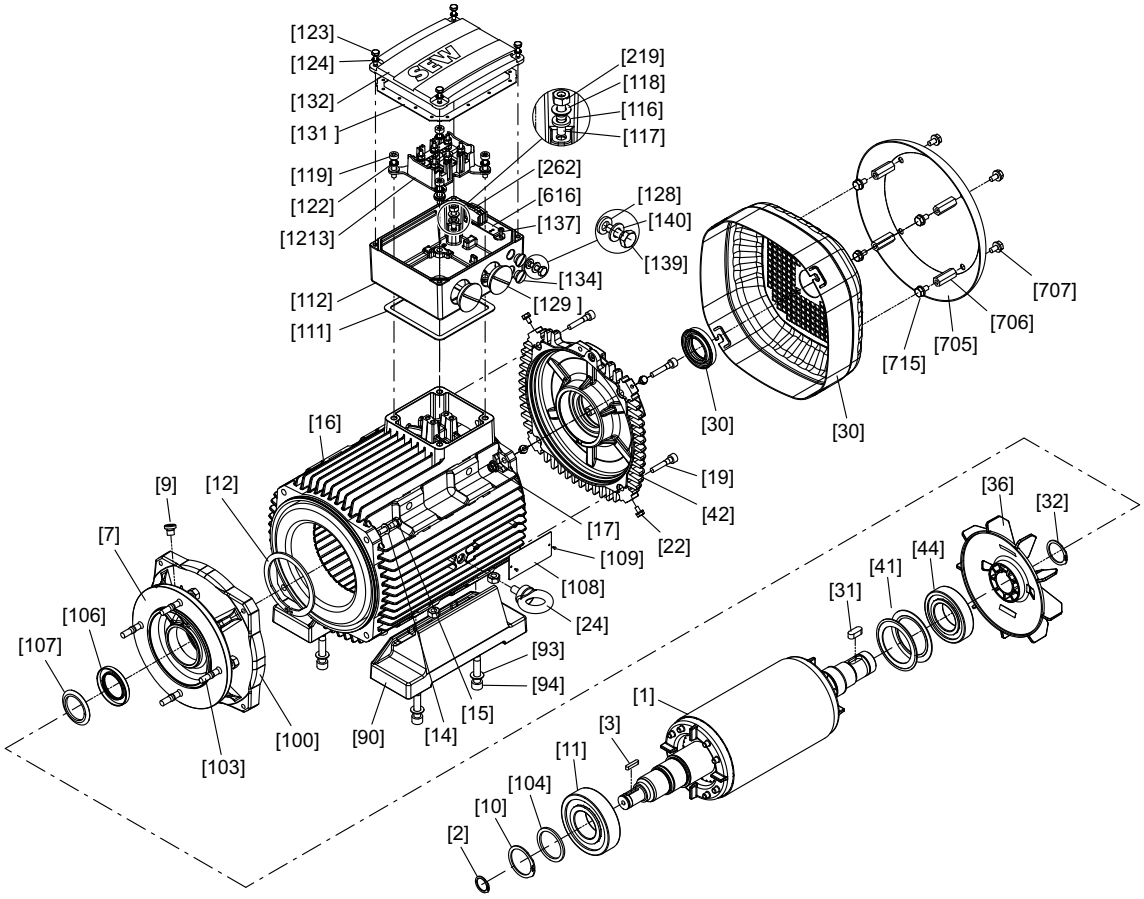


2931885963

[1]	Rotor	[35]	Fan guard	[112]	Terminal box lower part	[137]	Screw
[2]	Retaining ring	[36]	Fan	[113]	Pan head screw	[139]	Hex head screw
[3]	Key	[41]	Shim	[116]	Terminal clip	[140]	Lock washer
[7]	Flanged endshield	[42]	B-side endshield	[117]	Hex head screw	[148]	Terminal clip
[9]	Screw plug	[44]	Deep groove ball bearing	[118]	Lock washer	[262]	Terminal
[10]	Retaining ring	[90]	Bed plate	[119]	Pan head screw	[392]	Seal
[11]	Deep groove ball bearing	[93]	Countersunk screw	[122]	Tooth lock washer	[452]	Terminal strip
[12]	Retaining ring	[100]	Hex nut	[123]	Hex head screw	[454]	Support rail
[13]	Cap screw	[103]	Stud	[124]	Tooth lock washer	[616]	Retaining plate
[16]	Stator	[106]	Oil seal	[128]	Terminal clip	[705]	Canopy
[22]	Hex head screw	[107]	Oil flinger	[129]	Screw plug	[706]	Spacers
[24]	Eyebolt	[108]	Nameplate	[131]	Gasket for cover	[707]	Pan head screw
[30]	Oil seal	[109]	Grooved pin	[132]	Terminal box cover	[715]	Blind rivet
[32]	Retaining ring	[111]	Gasket for lower part	[134]	Screw plug	[716]	Washer

3.2 General structure of EDR.160 – EDR.180

The following figure shows an example of the basic structure of EDR.160 – EDR.180 with anti-twist frame:

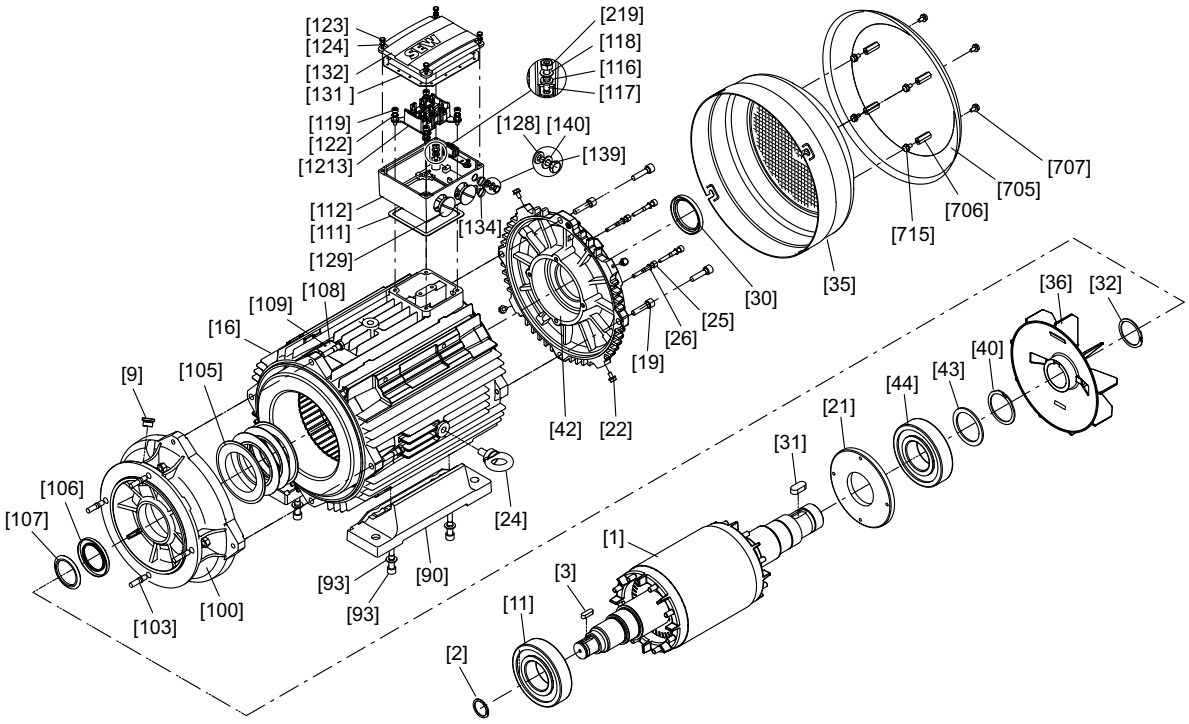


2967197579

[1] Rotor
[2] Retaining ring
[3] Key
[7] Flange
[9] Screw plug
[10] Retaining ring
[11] Deep groove ball bearing
[12] Retaining ring
[14] Washer
[15] Hex head screw
[16] Stator
[17] Hex nut
[19] Cap screw
[22] Hex head screw
[24] Eyebolt
[30] Sealing ring
[31] Key
[32] Retaining ring
[35] Fan guard
[36] Fan
[41] Cup spring
[42] B-side endshield
[44] Deep groove 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
[116] Serrated lock washer
[117] Stud
[118] Washer
[119] Cap screw
[122] Tooth lock washer
[123] Hex head screw
[124] Tooth lock washer
[128] Serrated lock washer
[129] Screw plug
[131] Gasket for cover
[132] Terminal box cover
[134] Screw plug
[139] Hex head screw
[140] Washer
[219] Hex nut
[705] Canopy
[706] Spacers
[707] Hex head screw
[715] Hex head screw
[1213] Kit (1 anti-twist frame, 1 terminal board, 4 sleeves, 2 screws, 2 nuts)

3.3 General structure of EDR.200 – EDR.225

The following figure shows an example of the basic structure of EDR.200 – EDR.225 with anti-twist frame:



3055268107

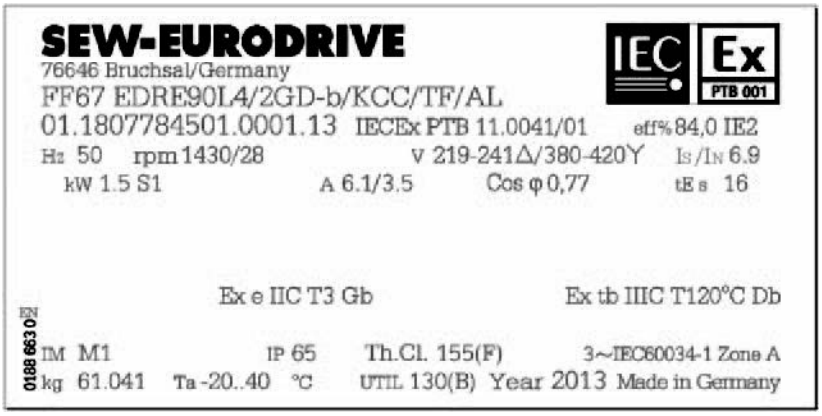
[1] Rotor
[2] Retaining ring
[3] Key
[7] Flange
[9] Screw plug
[11] Deep groove ball bearing
[16] Stator
[19] Cap screw
[21] Oil seal flange
[22] Hex head screw
[24] Eyebolt
[25] Cap screw
[26] Shield ring
[31] Key
[32] Retaining ring
[35] Fan guard
[36] Fan
[40] Retaining ring
[42] B-side endshield
[43] Supporting ring
[44] Deep groove ball bearing
[90] Foot
[93] Washer
[94] Cap screw
[100] Hex nut
[103] Stud
[105] Cup spring
[106] Oil seal
[107] Oil flinger
[108] Nameplate
[109] Grooved pin
[111] Gasket for lower part
[112] Terminal box lower part
[107] Oil flinger
[116] Serrated lock washer
[117] Stud
[118] Washer
[119] Cap screw
[123] Hex head screw
[124] Tooth lock washer
[128] Serrated lock washer
[129] Screw plug
[131] Gasket for cover
[132] Terminal box cover
[134] Screw plug
[139] Hex head screw
[140] Washer
[219] Hex nut
[705] Canopy
[706] Spacer bolt
[707] Hex head screw
[715] Hex head screw
[1213] Kit (1 anti-twist frame, 1 terminal board, 4 sleeves, 2 screws, 2 nuts)

3.4 Nameplate, type designation

3.4.1 Nameplates EDR. motor - IECEx

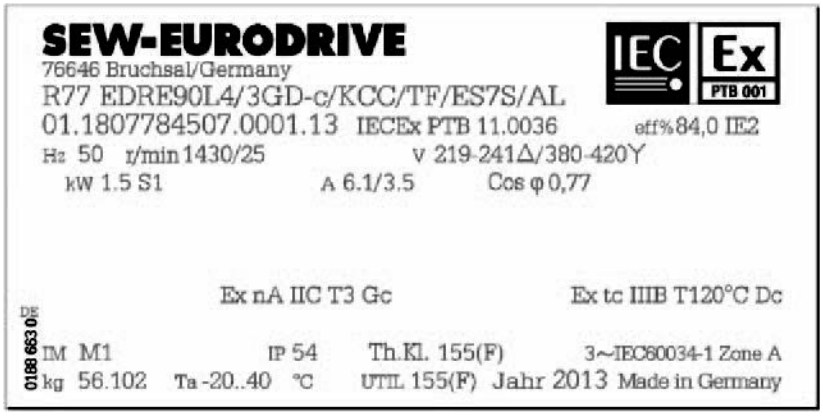
EDR. motor for line operation

The following figure shows an example of a nameplate of a EDRE gearmotor in equipment protection level b for line operation.



7997436043

The following figure shows an example of a nameplate of a EDRE gearmotor in equipment protection level c for line operation.

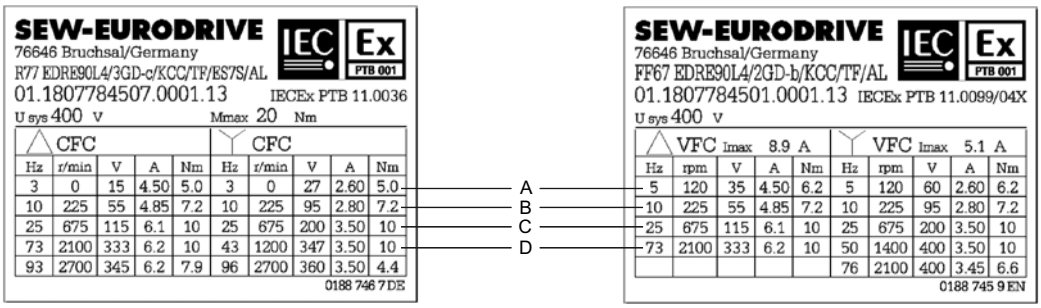


8011073803

EDR. motor for frequency inverter operation

If a motor is operated on a frequency inverter, an additional FI nameplate is attached to the motor. The following figure shows two examples of additional FI nameplates on EDRE motors.

The FI nameplates apply to equipment protection level c (with control mode CFC) and b (with control mode VFC):



8260982795

The additional FI nameplate lists the thermal limit characteristic curves (page 69) of the motor (item A - D) considering voltage and frequency.

Further data specified on the nameplate:

U_{sys}	System voltage - line voltage of frequency inverter
M_{max}	maximum permitted torque, e.g. when accelerating with CFC control mode
I_{max}	maximum permitted peak current, e.g. when accelerating with VFC control mode
Hz	Specification of the permitted minimum frequency. A different minimum frequency is possible depending on the option.
VFC	(Voltage Mode Flux Control) Voltage-controlled control mode of the frequency inverter
CFC	(Current Mode Flux Control) Current-controlled control mode of the frequency inverter

INFORMATION

The maximum frequency for operation in delta or star connection must not be exceeded.

3.4.2 Nameplate marks – IECEx

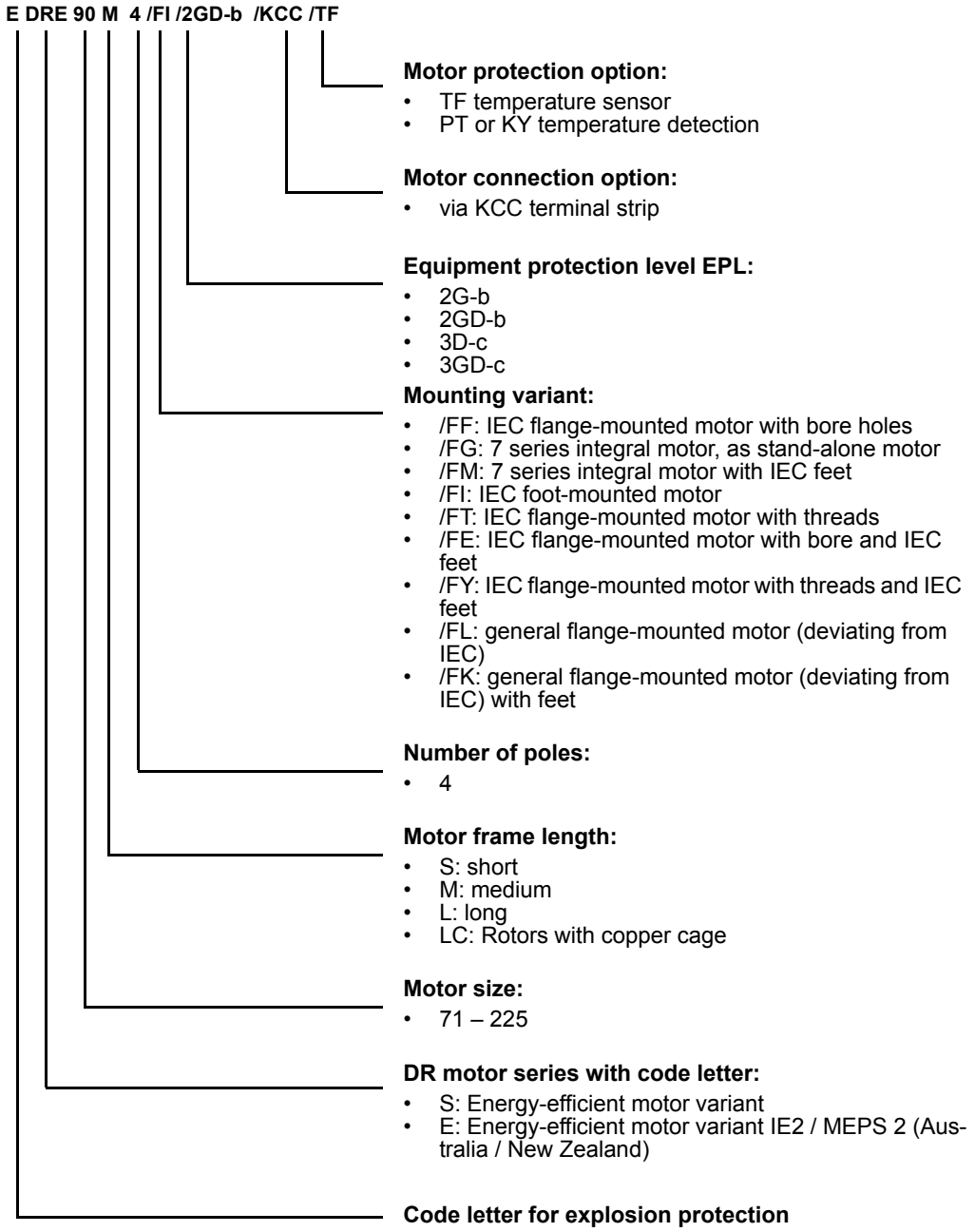
The following table lists all marks that can occur on a nameplate and an explanation of what they mean:

Mark	Meaning
IEC Ex PTB 001	IECEx Conformity mark

3.4.3 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	Equipment protection level (EPL)	Meaning
EDRS..	Gb, Db Gc, Dc	IECEx motor
EDRE..		IECEx energy efficient motor, High Efficiency IE2
71 – 225		Sizes: 71 / 80 / 90 / 100 / 112 / 132 / 160 / 180 / 200 / 225
S – L, LC		Lengths: S = short / M = medium / L = long LC = Rotors with copper cage
4		Number of poles

3.5.2 Explosion-proof motors

The following table shows the possible explosion protection categories:

SEW designation	Equipment protection level (EPL)	Option
2G-b	Gb	Motors in accordance with IEC 60079 (Gas)
2GD-b	Gb, Db	Motors in accordance with IEC 60079 (Gas / Dust)
3D-c	Dc	Motors in accordance with IEC 60079 (Gas)
3GD-c	Gc, Dc	Motors in accordance with IEC 60079 (Gas / Dust)

3.5.3 Mounting variants

The following table shows possible output variants:

Designation	Equipment protection level (EPL)	Option
/FI	b c	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 required
/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

3.5.4 Mechanical attachments

The following table shows possible mechanical attachments:

Designation	Equipment protection level (EPL)	Option
/RS	c	Backstop (in preparation)

3.5.5 Temperature sensor / temperature detection

The following table shows the temperature detection variants:

Designation	Equipment protection level (EPL)	Option
/TF	b c	Temperature sensor (PTC thermistor or PTC resistor)
/KY		One KTY84 – 130 sensor
/PT		One / three PT100 sensor(s)

3.5.6 Encoder

The following table shows possible encoder variants:

Designation	Equipment protection level (EPL)	Option
/XV.A	c	Mounting adapter for non-SEW speed sensor (in preparation)
/XV..		Mounted non-SEW speed sensors

3.5.7 Connection options

The following table shows the connection options:

Designation	Equipment protection level (EPL)	Included in the scope of delivery
/KCC	b c	Terminal strip with cage clamps (for EDR.71 – EDR.132)

3.5.8 Ventilation

The following table shows possible ventilation variants:

Designation	Equipment protection level (EPL)	Option
/AL	b	Metal fan
/C	c	Canopy for the fan guard (in preparation)

3.5.9 Other additional features

The following table shows an additional feature:

Designation	Equipment protection level (EPL)	Option
/2W	b c	Second shaft end on the motor

3.6 Explosion protection designation of electrical equipment in accordance with IEC 60079-0

In part 0 of the IEC 60079 series of standards, three groups of electrical equipment are defined.

Group	Equipment for the use
I	In mine openings with a risk of firedamp (underground mining)
II	In areas with potentially explosive gas/air mixtures
III	In areas with potentially explosive dust/air mixtures

Electrical equipment of group II and III is additionally divided into 3 subgroups according to the characteristics of the potentially explosive atmosphere that they will be used in.

Subgroups of group II

Group	Typical gas
IIA	Propane
IIB	Ethylene
IIC	Hydrogen

Subgroups of group III

Group	Approved for atmospheres with
IIIA	Inflammable lint
IIIB	Non-conducting dust
IIIC	Conducting dust

The subdivision of the groups allows for a classification of the substances and thus the potentially explosive areas in which the substances occur.

The demands on the used equipment increase from group IIA to IIC and from IIIA to IIIC respectively. The equipment must meet the requirements of the respective group.

Equipment which meets the requirements of group IIC can also be used in areas classified as IIB and IIA. Equipment of group IIB can be used in areas classified as IIB and IIA, while IIA equipment can only be used in areas classified as IIA.

The same applies to equipment of group III.

The standard IEC 60079-0 (2007) introduced the equipment protection level (EPL) for risk evaluation for explosion-proof equipment.

Equipment for potentially explosive areas are classified in 3 equipment protection levels.

Gas			Dust		
EPL	Degree of protection	Use in zone	EPL	Protection level	Use in zone
Ga	Very high	0	Da	Very high	20
Gb	High	1	Db	High	21
Gc	Increased	2	Dc	Increased	22

The letters G and D indicate whether the equipment is approved for areas with potential risk of gas explosions (G → gas) or for areas with risk of inflammable dust (D → dust).

EDR. explosion-proof AC motors can have the following marks

Area	IECEx mark
with potentially explosive gas/air mixtures	Ex e IIC T3 Gb Ex nA IIC T3 Gc
with potentially explosive dust/air mixtures	Ex tb IIIC T120°C Db Ex tc IIIB T120°C Dc Ex tc IIIC T120°C Dc

The symbol "ex" shows that the unit meets the requirements of a protection type. The listed protection types are used with EDR. explosion-proof AC motors depending on the requirements.

Symbol	Protection type
e	Increased safety
nA	Non-sparking
t	Protection through housing

The labeling of units with protection type "Protection through housing" is supplemented with the equipment protection level. At the same time, the minimum requirements for the IP degree of protection in accordance with IEC 60529 are defined.

Protection level	Use in zone	Equipment in the group		
		IIIC	IIIB	IIIA
ta	20	IP6x	IP6x	IP6x
tb[1)]	21	IP6x	IP6x	IP5x
tc[1)]	22	IP6x	IP5x	IP5x

1) available designs

4 Mechanical Installation

INFORMATION

Observe the safety notes in section 2 of these operating instructions for the 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

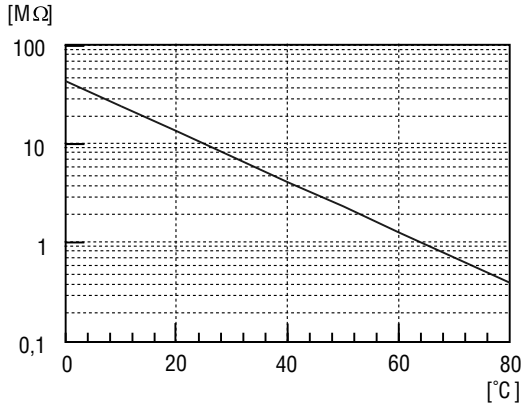
    Observe chapter "Electrical Installation" > "Ambient conditions during operation" > "Installation altitude".
  - Note the restrictions for encoders
  - Special design: Drive configured in accordance with the ambient conditions

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. Observe 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.



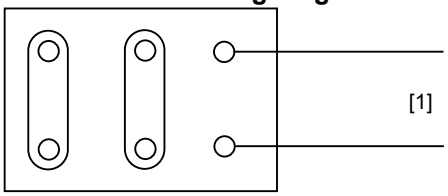
173323019

4.2.1 Drying the motor

Heat the motor:

- With hot air or
- Using 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

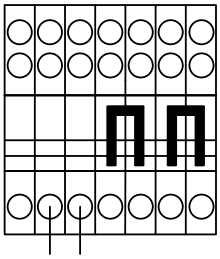
Connection in wiring diagram R13:



2336250251

[1] Transformer

Connection in wiring diagram C13:



3955447819

[1] Transformer

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

In the terminal box check that:

- The inside is clean and dry
- The connections and fixing parts are free from corrosion
- The gasket and sealing surfaces are functioning
- 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 damage to the motor.

Possible damage to property.

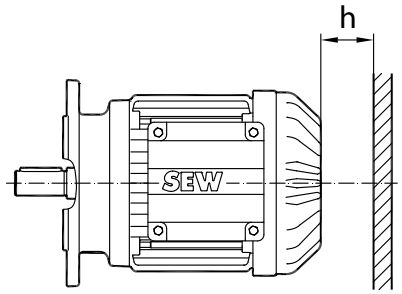
- Note the following:

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 sealing rings – 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 draw in warm air from other units. Observe the following minimum clearance:



	Motor
Motor type	**h in mm**
EDR.71, EDR.80	15
EDR.90, EDR.100	20
EDR.112, EDR.132	25
EDR.160	30
EDR.180	35
EDR.200, EDR.225	45

- Balance components for subsequent mounting on the shaft with a half key (motor shafts are balanced with a half key).
- If you have used the hand lever of the self-reengaging manual brake release during startup, you must remove the lever again for regular operation. A bracket is provided for storing the lever on the outside of the motor housing.

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 101)".
- 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. Observe the requirements according to IEC 60079-0 and IEC 60079-7. 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, see also IEC 60079-0. This cover must not obstruct the cooling air supply.

4.4 Installation tolerances

Shaft end	Flanges
Diameter tolerance according to IEC 60072-1 • 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 IEC 60072-1 • 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

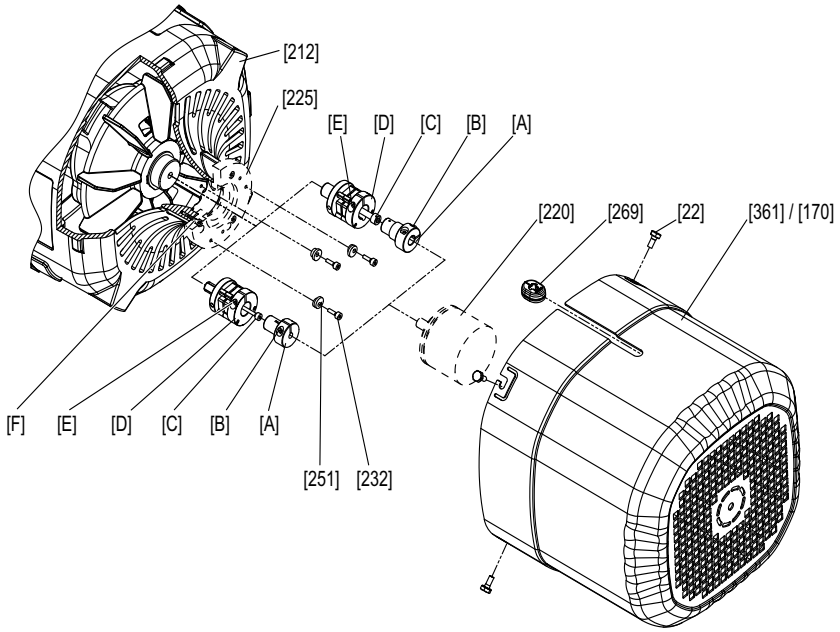
If a drive was ordered with non-SEW encoder, SEW-EURODRIVE will deliver the drive with enclosed coupling. You must not connect the coupling for operation without non-SEW encoder.

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

The XV.A encoder mounting adapter is in preparation

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 extended fan guard [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

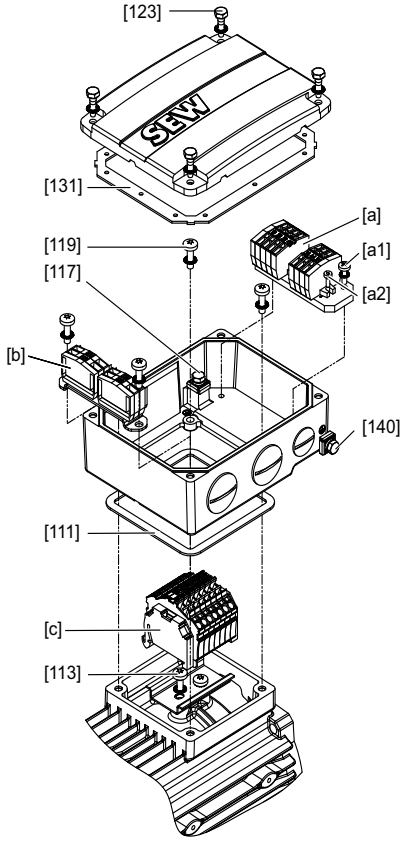
The XH1A, XH7A and XH8A encoder mounting adapters for hollow shaft encoders are premounted on delivery.

Proceed according to chapter "Motor maintenance – preliminary work" (page 95) to mount the encoder.

4.8 Turning the terminal box

4.8.1 Terminal box with cage clamp power connections /KCC

The following figure shows the terminal box variant with cage clamps /KCC:



18014401261724939

[111] Gasket
[113] Pan head screw mounting rail
[117] Hexagon screw grounding inside
[119] Terminal box retaining screws + lock washers (4 x each)
[123] Terminal box cover retaining screws + lock washers (4 x each)
[131] Gasket
[140] Hexagon screw grounding outside
[a] Terminal strip 1
[a1] Screw of option terminal / rectifier
[a2] Flat head screw option terminal
[b] Terminal strip 2 + retaining plate
[c] Power terminal

The type and number of terminal strips varies with the terminal box design and the options.

Proceed as follows to turn the terminal box:

1. Loosen the screws [123] from the terminal box cover and remove the cover.
2. Loosen the retaining screws [119] and the terminal box.
3. Clean the sealing surfaces at the stator shoulder, the bottom and the cover of terminal box.
4. Check the gaskets [111 and 131] for damage and replace them if necessary.
5. Position the terminal box as desired.
6. If the terminal strip 2 [b] has been installed with the retaining screws of the terminal box [119], it must be mounted again to the face of the power terminal after the terminal box has been turned.

INFORMATION

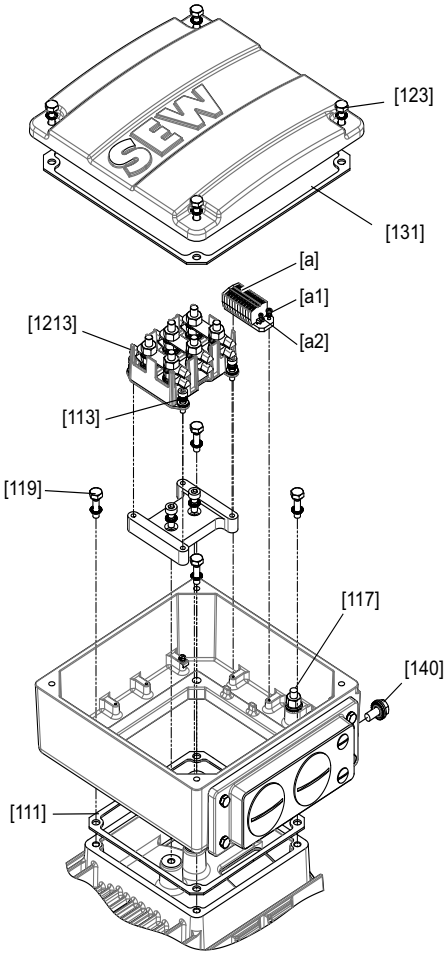
Connection alternatives for 2 terminal strips [a] and [b] are listed in the appendix.

7. Fasten the bottom part of the terminal box with the screws [119] and the lock washers with one of the following tightening torques:
   - **EDR.71 – 132:** 5 Nm [44.3 lb-in]
8. Fasten the terminal box cover with the screws [123] and lock washers using the appropriate tightening torque. Make sure the gasket is seated properly.

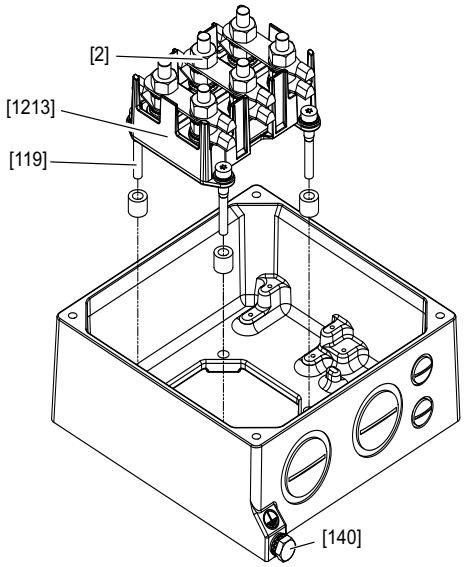
4.8.2 Terminal box with terminal board and anti-twist frame

The following figure shows a terminal box with anti-twist frame:

K1M6 / K1M8 in with aluminum or gray cast design



K1M12S made of gray cast



18014401328547595

[2] Terminal stud nut
[111] Gasket
[117] Hexagon screw grounding inside
[119] Terminal box retaining screws + lock washers (4 x each)
[123] Terminal box cover retaining screws + lock washers (4 x each)
[131] Gasket
[140] Hexagon screw grounding outside
[a] Terminal strip 1
[a1] Screw of option terminal / rectifier
[a2] Flat head screw option terminal
[b] Terminal strip 2
[1213] Kit (1 anti-twist frame, 1 terminal board, 4 sleeves, 2 screws, 2 nuts)

The type and number of terminal strips varies with the terminal box design and the options.

Proceed as follows to turn the terminal box:

1. Loosen the screws [123] from the terminal box cover and remove the cover.
2. Remove the retaining screws [119] of the terminal box.
3. Clean the sealing surfaces at the stator shoulder as well as the bottom and the cover of the terminal box.
4. Check the gaskets [111 and 131] for damage and replace them if necessary.
5. Take the unit consisting of terminal board and anti-twist frame from the terminal box.

   Remove any cables that are already connected before taking out the unit.
6. Position the terminal box as desired.
7. Turn the unit consisting of terminal board and anti-twist frame in the same way as the terminal box and put it back in.

   The terminal board designations U1, V1 and W1 must be pointing towards the cable outputs afterwards.
8. Fasten the bottom part of the terminal box with the screws [119] and the lock washers with one of the following tightening torques:
   - **EDR.71 – 132:** 5 Nm [44.3 lb-in]
   - **EDR.160 – 225:** 25.5 Nm [225.7 lb-in]
9. Re-connect any removed cables according to the following table:

yellow	white	brown
W2/T4	U2/T5	V2/T6
black	red	blue
U1/T1	V1/T2	W1/T3

   Tighten the nuts on the terminal studs with the appropriate tightening torque (page 37).

INFORMATION

The connected cables must be free from bends and twists, etc.

Observe the correct order of the small connection accessories, see chapter "Motor connection via terminal board".

10. Fasten the terminal box cover with the screws [123] and lock washers using the appropriate tightening torque. Make sure the gasket is seated properly.

⚠ WARNING

Possible damage to the motor outputs when turning the terminal board.

Possible damage to property.

- To make sure that the cables have not been damaged, carry out an insulation test after re-assembly, see chapter "Extended storage of motors" (page 27).

4.8.3 Tightening torques

The following table shows all the tightening torques required for this procedure:

Key number	Screw	Applies to	Tightening torque	
			in Nm	in lb-in
[2]	Terminal stud nut	M6 stud	3	26.6
		M8 stud	6	53.1
		M12 stud	15.5	137.2
[61]	Pan head screw option terminal	EDR.71 – 225	1.8	16.0
[113]	Pan head screw DIN rail connection	EDR.71 – 132	5	44.3
[117]	Hexagon 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
[119]	Pan head screw of terminal box	EDR.71 – 132	5	44.3
		EDR.160 – 225	25.5	225.7
[123]	Hexagon 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
[140]	Hexagon screw grounding outside	EDR.71 – 225	4	35.4
[a1]	Screw of option terminal / rectifier	EDR.71 – 225	1.8	16.0
[a2]	Flat head screw option terminal	EDR.71 – 225	1	8.9

4.9 Painting

INFORMATION ON EXPLOSION PROTECTION

SEW-EURODRIVE delivers the drives with a painting that complies with the requirements for preventing electrostatic charging according to IEC 60079-0. If you repaint the motors or gearmotors, observe the requirements for preventing electrostatic charging according to IEC 60079-0.

4.10 Extended fan guard second Shaft end

As standard, the optional equipment "Second shaft end" is supplied with inserted key and additional protection by means of tape. No cover is supplied as standard. The cover can be ordered separately.

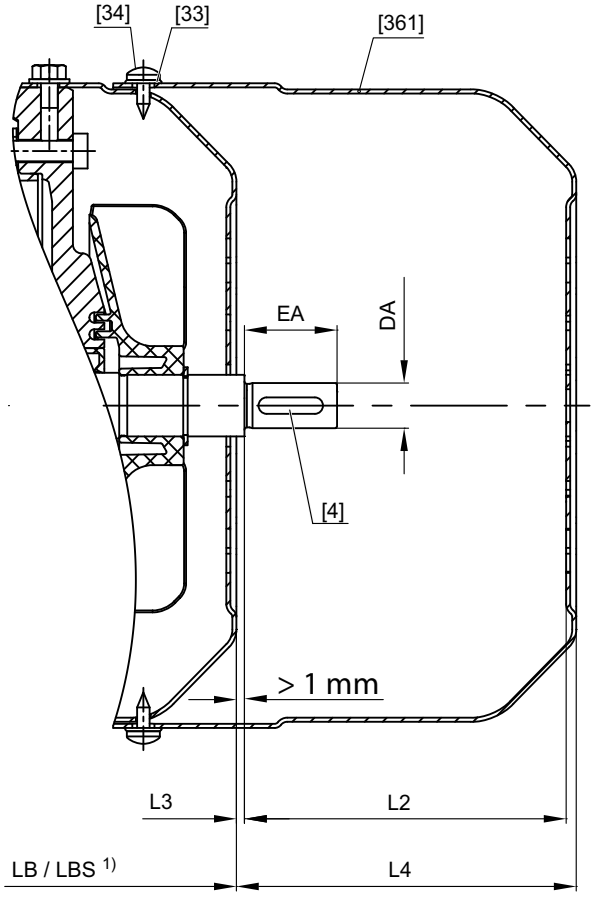
4.10.1 With optional cover

The option with second shaft end /2W is in preparation.

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

The following figure shows the dimensions of the extended fan guard:

Sizes EDR.71 – EDR.132



2634738827

[4]	Keyway	LB/LBS	Length of motor
[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	80	2	91.5
EDR.80	14	30	93	2	95.5
EDR.90	14	30	86.5	2	89
EDR.100	14	30	86.5	2	89
EDR.112/132	19	40	122.5	3.5	125

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

4.10.2 Without optional extended fan guard

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

Observe the impact resistance requirements according to IEC 60079-0 when you select and mount the cover.

⚠ CAUTION

Extended fan guard missing or installed incorrectly.

Severe or fatal injuries.

- Only qualified personnel may mount the extended fan guard.
- Only start up the motor with the correct extended fan guard.

5 Electrical installation

⚠ WARNING

Risk of injury due to electric shock.

Severe or fatal injuries.

- Observe the following notes.

- It is essential to comply with the safety notes in chapter 2 during installation!
- Use switch contacts in utilization category AC-3 IEC 60947-4-1 for switching the motor.
- 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 for low-voltage electric equipment (such as IEC 60364) must be complied with when setting up electrical machinery.

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 metric threaded holes according to EN 50262 or NPT threaded 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 by cable glands with strain relief that are certified for use in the respective hazardous location. Select the cable gland corresponding to the outside diameter of the cable used. For the tightening torque of the cable entry, refer to the operating/installation instructions or the IECEx Certificate of Conformity (IECEx CoC) of the cable glands. 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 countersink.

The following table shows the sizes of the flat bottom counter sinking with the corresponding screw sizes:

Counter sinking in mm	Screw fitting
19	M12
24	M16
30	M20
35	M25
45	M32
56	M40
64	M50
75	M63

All cable entries that are not in use must be sealed off with a screw plug after completion of the installation in order to maintain the degree of protection. If you need to replace a screw plug, replace it with one that is approved for potentially explosive atmospheres.

5.4 Equipotential bonding

In accordance with IEC 61241-14, a connection to an equipotential bonding system might be required. Observe the chapter "Electrical Installation" / "Improving the grounding (EMC)".

5.5 Wiring notes

Adhere to the safety notes during installation.

5.5.1 Protecting the motor protection devices against interference

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

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

5.6 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.

5.7 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.

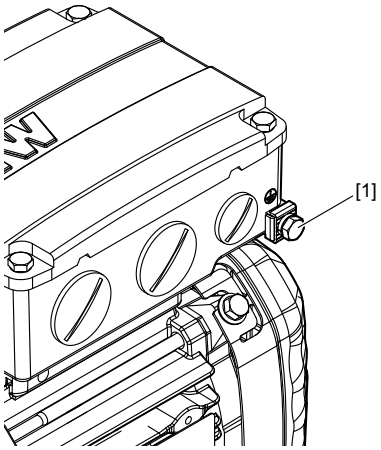
For EDR.71 – 132 motors, a brake or gray cast iron terminal box is required. For DR.160 – 225 motors, this option can be combined with all terminal box types.

The LF grounding can be combined with HF grounding.

INFORMATION

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

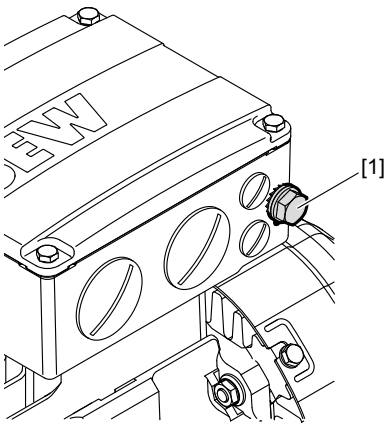
EDR.71 – 132



8024328587

[1] LF grounding at the terminal box

EDR.160 – 225



8026938379

[1] LF grounding at the terminal box

5.8 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.100 L – EDR.132	1363 3945
EDR.160 – EDR.225	

INFORMATION

All parts of the kit are made from stainless steel.

INFORMATION

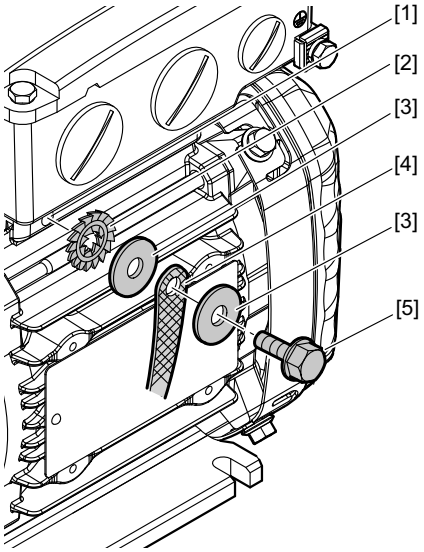
For further information regarding the grounding, refer to the SEW publication “Drive Engineering – Practical Implementation, EMC in Drive Engineering”.

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.

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

The following figure shows how to install the grounding:

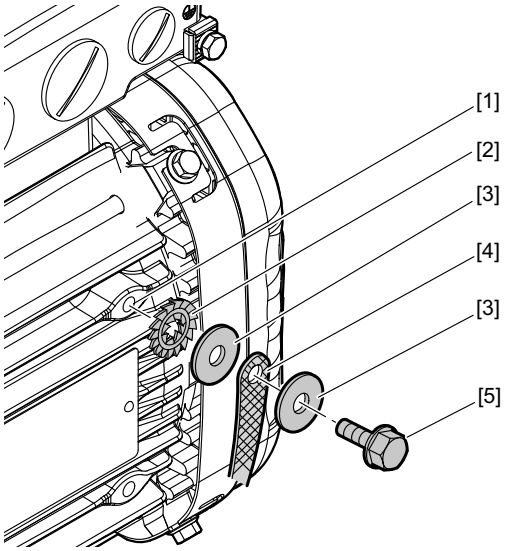


9007202821673739

[1] Use of the pre-cast bore at the terminal box connection point
[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)

5.8.2 Size EDR.90M / L

The following figure shows how to install the grounding:

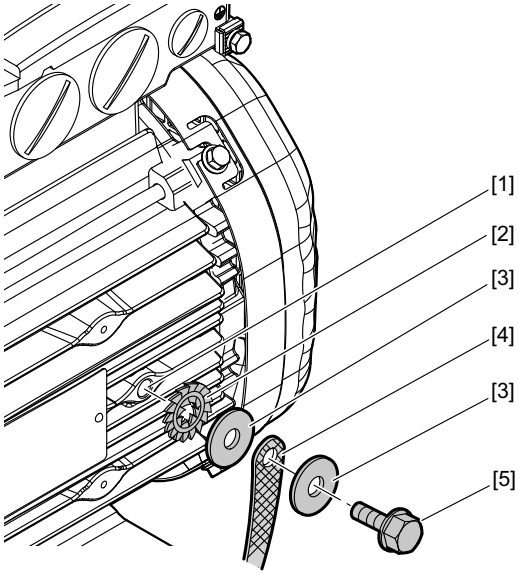


9007202806842891

[1] Use of the pre-cast bore at the terminal box connection point
[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)

5.8.3 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

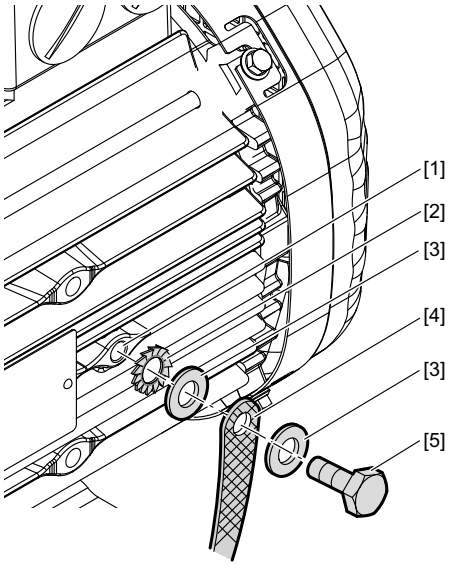
[3] Washer 7093

[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)

5.8.4 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

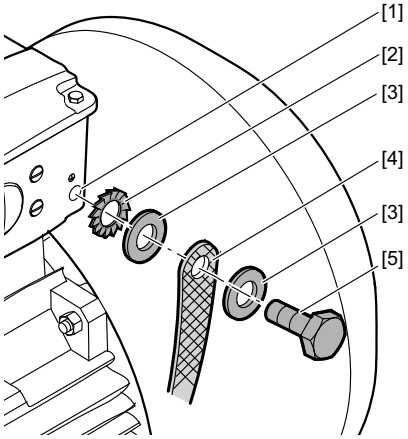
[3] Washer 7089 / 7090

[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)

5.8.5 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.

5.9 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 circuit in the switching devices.

5.10 Ambient conditions during operation

5.10.1 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.

5.10.2 Ambient temperature

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

Motors approved for use in higher or lower ambient temperatures have specific designations on the nameplate.

If the motors are used at ambient temperatures above +40 °C (max. +60 °C) or operated with a frequency inverter, the cables and cable glands must be suited for temperatures ≥ 90 °C. Motors like this are labeled with a respective safety note (page 11).

Temperatures below -20 °C (max. -40 °C) require an anti-condensation heating. In addition, the cables and cable glands must be selected according to the respective temperature.

5.11 Characteristics of motors with IECEx approval

5.11.1 General information

The explosion-proof SEW-EURODRIVE motors of the EDR.. series are designed for the following application zones.

Equipment protection level of the motor	Area of application
Gb	Use in zone 1
Gb, Db	Use in Zone 1 or Zone 21
Dc	Use in zone 22
Gc, Dc	Use in Zone 2 or Zone 22

5.11.2 Special indication "X"

If the special indication "X" appears after the certification number on the IECEx declaration of conformity (IECEx CoC), this indicates the certificate contains special conditions for the safe application of the motors.

5.11.3 Temperature classes

The motors are approved for temperature classes T3 (standard) or T4 (optional).

IECEx

For the temperature classes of the motor types 2G-b, 2 GD-b, 3D-c, 3Gd-c, please refer to the nameplates or the IECEx Certificate of Conformity (IECEx CoC), which is available on the internet.

5.11.4 Surface temperature

For the surface temperature of the motor, refer to the nameplate, or the IECEx Certificate of Conformity (CoC).

5.11.5 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.

Motor protection must be in accordance with the respective approvals. There are 2 basic motor protection types. The respective options can be added if available:

Motor protection types	Options
A: Motor current circuit breaker	TF, KY or PT
B: PTC thermistor (PTC resistor: SEW designation: TF)	KY or PT

The following table shows the type of motor protection required according to the respective approval:

Equipment protection level	b		c		
Operation:	Supply system	Frequency inverter	Supply system	• Frequency inverter • Soft start	Pulsed
Designation (see nameplate):	T_e time	–	–	–	–
Motor protection via	**A**	**B**	**A**	**B**	**B**

For permitted operating modes depending on the motor protection, see chapter "Permitted operating modes" (page 58).

5.11.6 Protection exclusively with motor protection switch

IECEx

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

- **For equipment protection level b:** With starting current ratio I_A/I_N listed on the nameplate, the response time of the motor protection switch must be less than the heating time t_E of the motor.
- The motor protection switch must disconnect all poles in the event of a phase failure.
- The motor protection switch must be approved by a notified body and assigned a corresponding inspection number.
- The motor protection switch must be set to the rated motor current indicated on the nameplate. With equipment protection level b, the permitted nominal motor current is specified on the test certificate.

5.11.7 Protection exclusively with PTC thermistor (TF)

The PTC thermistor must be evaluated using a suitable device. Observe the applicable installation regulations.

⚠ 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, hot 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.

5.11.8 Protection with motor protection switch and additional PTC thermistor

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

INFORMATION

Check during startup whether a trip of the protection device shuts down the drive properly.

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.

Observe the following points when you connect the motor:

- Check 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 in oder to avoid damage to the insulation.
- Observe clearances
- 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

The following wiring diagrams can be obtained from SEW-EURODRIVE by specifying the motor order number (see chapter "Nameplate, type designation"):

Series	Number of poles	Connection	Pertinent wiring diagram (designation / number) xx = placeholder for the version
EDR.71-225	4	△ / 人	C13: 68 184 xx 08 R13: 68 001 xx 06

The motors are supplied and connected differently depending on the size and electrical design. Comply with the connection type specified in the following table:

Series	Connection
EDR.71 – EDR.132	• With V < 500 V and I < 17 A: Motor connection via cage clamp terminal • With V > 500 V and I > 17 A: Motor connection via terminal board
EDR.160 – EDR.225	• Motor connection via terminal board

Observe the permitted air and creepage distances when connecting the supply system cable.

5.13 Motor connection 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 sizes EDR.71 – EDR.132							
Terminal stud Ø	**Tightening torque of hex nut**	**Connection Customer Cross section**	**Design**	**Connection type**	**Scope of delivery**	**PE connection stud Ø**	**Design**
M6	**3.0 Nm** (26.5 lb-in)	**≤ 6 mm²** (AWG 10)	**1**	**Ring cable lug or solid wire**	**Small connection accessories enclosed in bag**	M5	2
M6	3.0 Nm (26.5 lb-in)	≤ 35 mm² (AWG 2)	1	Ring cable lug	Small connection accessories enclosed in bag	M5	2

Motor size EDR.160							
Terminal stud Ø	**Tightening torque of hex nut**	**Customer connection Cross section**	**Design**	**Connection type**	**Scope of delivery**	**PE connection stud Ø**	**Design**
M6	3.0 Nm (26.5 lb-in)	≤ 6 mm² (AWG 10)	1	Ring cable lug or solid wire	Small connection accessories enclosed in bag	M8	2
M6	**3.0 Nm** (26.5 lb-in)	**≤ 35 mm²** (AWG 2)	**1**	**Ring cable lug**	**Small connection accessories enclosed in bag**	M8	2
M8	6.0 Nm (53.1 lb-in)	≤ 70 mm² (AWG 2/0)	1	Ring cable lug	Small connection accessories enclosed in bag	M10	2

Motor sizes EDR.180 – EDR.225							
Terminal stud Ø	**Tightening torque of hex nut**	**Customer connection Cross section**	**Design**	**Connection type**	**Scope of delivery**	**PE connection stud Ø**	**Design**
M6	3.0 Nm (26.5 lb-in)	≤ 6 mm² (AWG 10)	1	Ring cable lug or solid wire	Small connection accessories enclosed in bag	M8	2
M8	**6.0 Nm** (53.1 lb-in)	**≤ 70 mm²** (AWG 2/0)	**1**	**Ring cable lug**	**Small connection accessories enclosed in bag**	M8	2
M12	15.5 Nm (137.2 lb-in)	35 mm² (AWG 2) – 95 mm² (AWG 3/0)	1	Ring cable lug	Premounted connection pieces	M12	2

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.

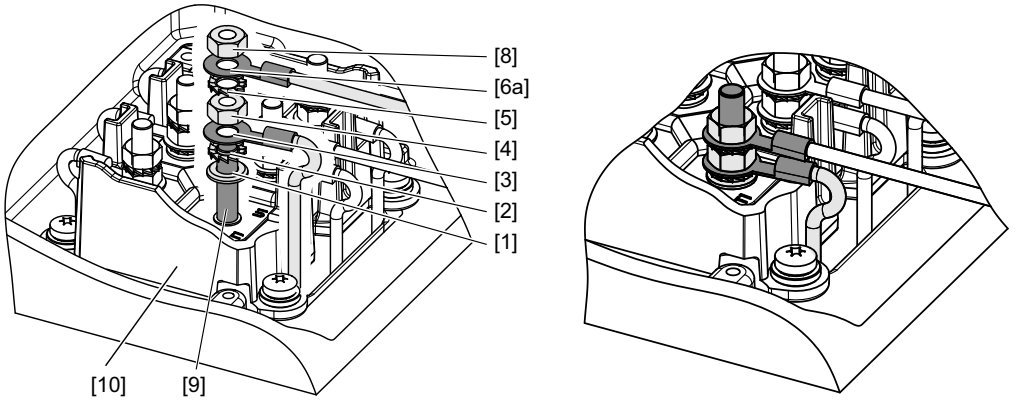
NOTE ON EXPLOSION PROTECTION

Tubular cable lugs of DIN 46235 must not be used because the minimum permitted air gaps could be undercut.

5.13.1 Design 1

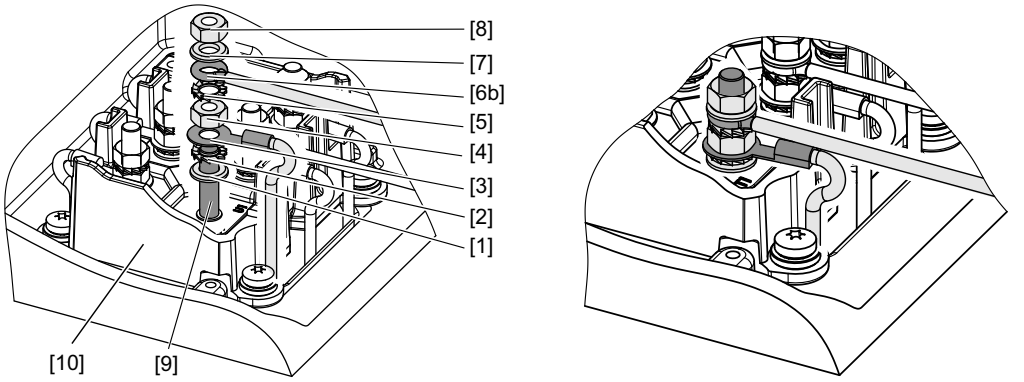
The following figure shows the 2 possible customer connections:

Customer connection with ring cable lug:



3989525643

Customer connection with solid wire:

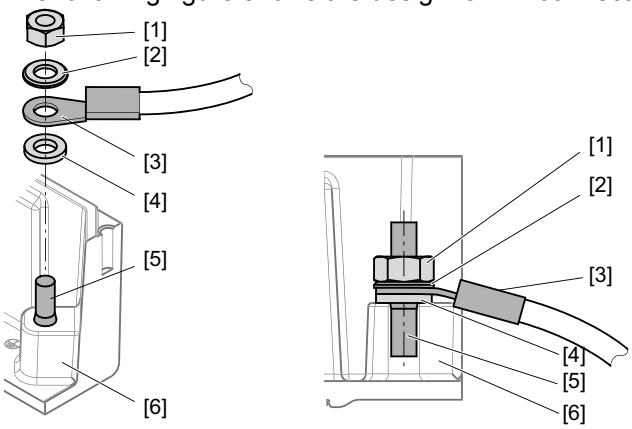


9007201889135499

[1] Washer
[2] Serrated lock washer
[3] Winding connection with ring cable lug
[4] Bottom nut
[5] Serrated lock washer
[6a] Winding connection with ring cable lug, e.g. according to DIN 46237 or DIN 46234.
[6b] Winding connection with solid wire, U-shaped
[7] Serrated lock washer
[8] Top nut
[9] Terminal stud
[10] Anti-twist frame for ensuring the clearances

5.13.2 Design 2

The following figure shows the design for PE connection:



9007202075543051

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

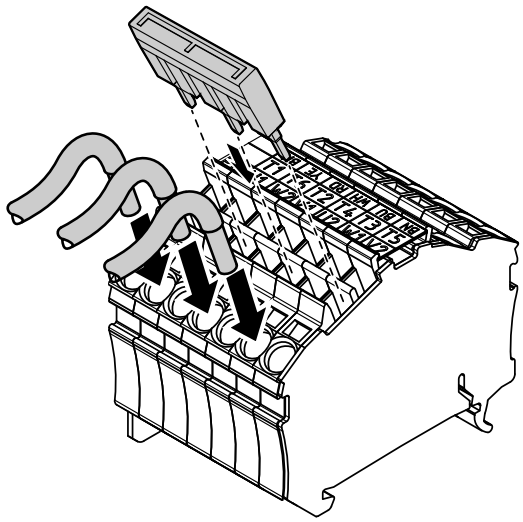
5.14 Connecting the motor via KCC terminal strip

- Perform the connection in accordance with the enclosed wiring diagram
- Check the maximum and minimum cable cross section according to the following table:

Terminal	Min. cross section	Max. cross section	Connection type
2.5 (color: gray)	0.25 (AWG 34)	4 (AWG 12)	Single-wire or finely stranded
	0.75 (AWG 28)	4 (AWG 12)	Single-wire, no tools
	0.75 (AWG 28)	2.5 (AWG 14)	Conductor end sleeve, 12 mm

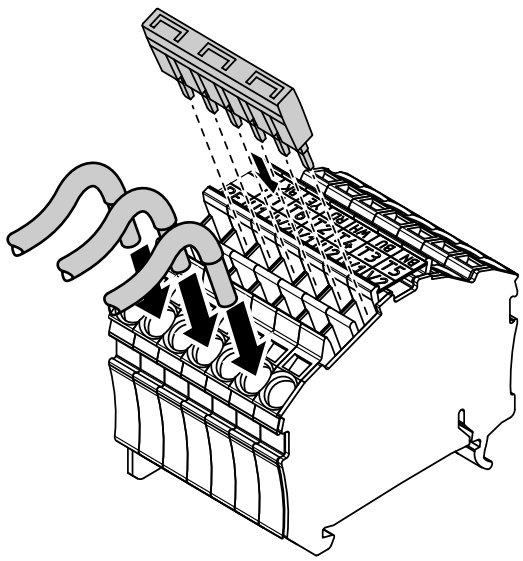
- In the terminal box: Check winding connections and re-wire them if necessary
- Strip-off length 10-12 mm

Arrangement of terminal links for ⅄ connection



18014399506064139

Arrangement of terminal links for △ connection



18014399506066059

5.15 Optional equipment

Connect accessory equipment as shown in the wiring diagram(s) provided with the motor. **If the wiring diagram is missing, do not connect or start up any accessory equipment.** The applicable wiring diagrams are available from SEW-EURODRIVE free of charge.

The following optional equipment is used depending on the category, see the following table:

Optional equipment	IECEx	Equipment protection level b	Equipment protection level c
Temperature sensor /TF	IECEx	x	x
Temperature sensor /KY	IECEx	x	x
Temperature sensor /PT	IECEx	x	x
Anti-condensation heater	IECEx	x	x

5.15.1 Anti-condensation heater

An anti-condensation heating is required when the explosion-proof motors are operated at temperatures below -20 °C.

Anti-condensation heating is optional for applications above -20 °C where moisture condensation is expected.

When connecting the anti-condensation heating, observe the permitted supply voltage for the strip heater according to the motor nameplate as well as the wiring diagram of the motor.

INFORMATION

Do not energize the strip heater as long as the motor is switched on.

6 Operating modes and limit values

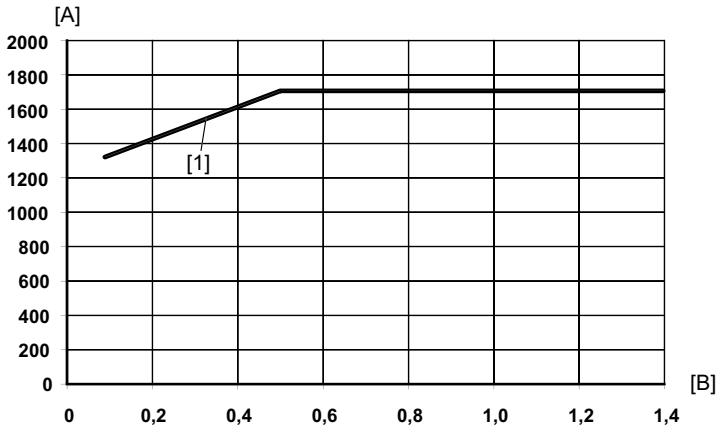
6.1 Permitted duty types

The following table shows the permitted duty types:

Equipment protection level (EPL)	Protection against impermissibly high temperatures exclusively through	Permitted operating mode
c	Motor protection switch	• S1
	PTC thermistor (TF)	• S1 • Heavy start • Frequency inverter operation • Soft start unit
b	Motor protection switch	• S1
	PTC thermistor (TF)	• S1 • Frequency inverter operation

6.1.1 Permitted voltage load for frequency inverter operation

Operating SEW motors on frequency inverters is permitted if the pulse voltages at the motor terminals indicated in the following figure are not exceeded.



[A] Permitted pulse voltage U_{LL} in V
[B] Rise time in µs
[1] Permitted pulse voltage for EDR standard

INFORMATION ON EXPLOSION PROTECTION

The permitted maximum PE voltage of 1200 V must not be exceeded in IT system operation even in the event of an error.

INFORMATION ON EXPLOSION PROTECTION

If the permitted pulse voltage is exceeded, you have to provide for according measures to limit the pulse voltage. Consult the manufacturer of the frequency inverter.

INFORMATION

The maximum permitted rated motor voltage for frequency inverter operation is 500 V.

Frequency inverters 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 4Q startup are mandatory. This prevents that the DC link voltage increases to an unacceptable level in case of faulty 1Q operation. External components, e.g. output choke, must not be used.

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.

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 system

In an IT system, an insulation fault between a phase and ground is tolerated. The ground connection of the motor could lead to the maximum permitted limit value for phase-to-ground of 1200 V being 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.

6.2 Use

INFORMATION ON EXPLOSION PROTECTION

- It is not permitted to connect more than one motor to one frequency inverter.
- The voltage at the motor terminal board must be projected to prevent overheating.
- 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 Motors with equipment protection level b

INFORMATION ON EXPLOSION PROTECTION

- The frequency inverter is only permitted with motors that are permitted for this operating mode according to the IECEx Certificate of Conformity (IECEx CoC).
- Verification that the motor voltage matches the specifications of the IECEx Certificate of Conformity (IECEx CoC) must be provided during startup.

The necessary information for this is listed on the additional FI nameplate.

6.3 Safe operation of motors with equipment protection level b

Project planning is the basic requirement for safe operation of explosion-proof motors. The following points have to be considered:

- Checking the conditions of the typical application
- With deviations from the typical application: Calculate points D* and E*
- Adhere to the thermal torque limit characteristic curve
- Observe the dynamic limit torque
- Observe motor limit frequency
- Select the suitable frequency inverter
- Braking resistor must be used irrespective of the duty type
- Check the overhung and axial loads on the motor shaft of stand-alone motors
- Observe the maximum gear unit input speed, see n_{emax} on the nameplate
- Observe the maximum gear unit output torque, see M_{amax} / M_{emax} on the nameplate

6.3.1 Motor terminal voltage

The calculation of the motor terminal voltage is an important component of project planning.

If the conditions differ from the typical application, you have to calculate the start of the field weakening f_{D*}, the torque M_{E*} and the current limit I_{E*}, see also chapter "Special application" (page 71).

6.3.2 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.

The permitted maximum dynamic limit torque is determined by the short time current limitation (150 % $I_{N\ Motor}$) and must be limited to 60 s. The value $I_{N\ motor}$ is listed on the IECEx Certificate of Conformity (IECEx CoC) and/or the nameplate.

6.3.3 Permitted maximum and minimum frequencies

The permitted maximum and minimum frequencies are listed on the IECEx Certificate of Conformity (IECEx CoC) and/or the nameplate. The actual values may not exceed or fall below these specifications.

6.3.4 Motor/inverter assignment for motors with equipment protection level b

MOVITRAC® B can be used for the basic control range. With version 18225632.11 and later[1] MOVITRAC® B can be used for the field weakening range.

MOVIDRIVE® B is only suitable for the basic setting range. This means the *maximum speed* parameter must be limited to the beginning of the field weakening range.

Only use frequency inverters which meet the requirements listed in the IECEx Certificate of Conformity (IECEx CoC).

$I_{N\,FrequencyInverter} \leq 2 \times I_{N\,Motor}$

Combinations for motor voltages other than 230/400 V can be requested from SEW-EURODRIVE.

Motor in ⅄ connection with motor voltage 230/400 V:

Motor type 2G / 2GD	P_N kW	n_{max} rpm	Inverter power kW																				
			0.25	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	22	30	37	45	55	75	90	110
EDRS71S4	0.25	2385	x	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRS71M4	0.37	2110	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRS80S4	0.55	2410	o	o	x	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE80M4	0.55	2500	o	o	x	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE80M4	0.75	2465	–	o	o	x	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE90M4	1.1	2455	–	–	o	o	x	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE90L4	1.5	2395	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE100M4	2.2	2455	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–
EDRE100L4	2.2	2470	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–
EDRE100LC4	3	2480	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–
EDRE112M4	3	1695	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–
EDRE132S4	4	1730	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–
EDRE132M4	5.5	1685	–	–	–	–	–	–	–	–	o	x	o	–	–	–	–	–	–	–	–	–	–
EDRE160S4	7.5	1730	–	–	–	–	–	–	–	–	–	o	x	o	–	–	–	–	–	–	–	–	–
EDRE160M4	9.2	1755	–	–	–	–	–	–	–	–	–	–	o	x	o	–	–	–	–	–	–	–	–
EDRE180S4	11	2325	–	–	–	–	–	–	–	–	–	–	o	x	o	–	–	–	–	–	–	–	–
EDRE180M4	15	2325	–	–	–	–	–	–	–	–	–	–	–	o	x	o	–	–	–	–	–	–	–
EDRE180L4	18.5	2325	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	–	–	–	–	–	–
EDRE200L4	22	2365	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	o	–	–	–	–
EDRE225S4	30	2365	–	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	o	–	–	–
EDRE 225M4	37	2065	–	–	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	o	–	–

x = recommended o = permitted – = not permitted

1) Parameter P076 contains information about the firmware version.

Motor in △ connection with motor voltage 230/400 V:

Motor type 2G / 2GD	P_N kW	n_{max} rpm	Inverter power kW																			
			0.25	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	22	30	37	45	55	75	90	110
EDRS71S 4	0.25	2510	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRS71M 4	0.37	2465	–	o	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRS80S 4	0.55	2525	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE80M4	0.55	2540	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE80M 4	0.75	2535	–	–	–	o	o	x	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE90M 4	1.1	2530	–	–	–	–	o	o	x	o	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE90L 4	1.5	2535	–	–	–	–	–	–	o	x	o	–	–	–	–	–	–	–	–	–	–	–	–
EDRE100M 4	2.2	2530	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–
EDRE100L4	2.2	2540	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–
EDRE100LC 4	3	2555	–	–	–	–	–	–	–	–	o	x	o	–	–	–	–	–	–	–	–	–	–
EDRE112M 4	3	1740	–	–	–	–	–	–	–	–	o	x	o	–	–	–	–	–	–	–	–	–	–
EDRE132S 4	4	1760	–	–	–	–	–	–	–	–	–	o	x	o	–	–	–	–	–	–	–	–	–
EDRE132M 4	5.5	1730	–	–	–	–	–	–	–	–	–	–	o	x	o	–	–	–	–	–	–	–	–
EDRE160S 4	7.5	1750	–	–	–	–	–	–	–	–	–	–	–	o	x	o	–	–	–	–	–	–	–
EDRE160M 4	9.2	1760	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	–	–	–	–	–	–
EDRE180S 4	11	2340	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–
EDRE180M 4	15	2330	–	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–
EDRE180L 4	18.5	2340	–	–	–	–	–	–	–	–	–	–	–	–	–	o	o	x	o	o	–	–	–
EDRE200L 4	22	2375	–	–	–	–	–	–	–	–	–	–	–	–	–	–	o	o	x	o	o	–	–
EDRE225S 4	30	2375	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	o	o	x	o	o	o
EDRE225M 4	37	2075	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	o	o	x	o	o

x = recommended o = permitted – = not permitted

INFORMATION

The speed can be reduced in case of gearmotors. If in doubt, refer to the nameplate for the permitted values.

6.3.5 Notes for safe operation

General information

Install the frequency inverter outside the potentially explosive atmosphere.

Thermal motor protection

Thermal motor protection is ensured by the following measures:

IECEx

- Winding temperature monitoring through PTC thermistors (TF) built into the winding. The monitoring of the TF must be carried out with an evaluation unit that is labeled with the Ex marking II2GD / II2G.
- Monitoring of the motor current must comply with the IECEx Certificate of Conformity (IECEx CoC).
- Limitation of the motor torque must comply with the IECEx Certificate of Conformity (IECEx CoC).

Overvoltage at the motor terminals

For FI-operated motors, observe section "Permitted voltage requirement in FI operation" (page 58)

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. Observe the "Special application" (page 71) chapter.

Gear unit

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

6.4 Safe operation of motors with equipment protection level c

Project planning is the basic requirement for safe operation of explosion-proof motors. The following points have to be considered:

- Checking the conditions of the typical application
- With deviations from the typical application: Calculate points D* and E*
- Adhere to the thermal torque limit characteristic curve
- Observe the dynamic limit torque
- Observe motor limit frequency
- Select the suitable frequency inverter
- Braking resistor must be used irrespective of the duty type
- Check the overhung and axial loads on the motor shaft of stand-alone motors
- Observe the maximum gear unit input speed, see n_{emax} on the nameplate
- Observe the maximum gear unit output torque, see M_{amax} / M_{emax} on the nameplate

6.4.1 Motor terminal voltage

The calculation of the motor terminal voltage is an important component of project planning.

If the conditions differ from the typical application, you have to calculate the start of the field weakening f_{D*} and the torque M_{E*}, see also chapter "Special application" (page 71).

6.4.2 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, see chapter "Typical application" (page 68).

The maximum dynamic limit torque of motors with equipment protection level c must not exceed 200% of M_N.

Permitted frequencies

Observe the maximum frequencies listed in the assignment tables for the motor/frequency inverter combinations. These values must not be exceeded.

Frequency inverter selection

Base your selection of the right frequency inverter on the table in chapter "Motor/inverter assignment for motors with equipment protection level c" (page 65).

6.4.3 Motor/inverter assignment for motors with equipment protection level c

Frequency inverters that have similar values with respect to output current and output voltage can also be used. For more information, refer to the standard IEC 60079-15.

Combinations for motor voltages other than 230/400 V can be requested from SEW-EURODRIVE.

Motor in ⅄ connection with motor voltage 230/400 V:

			Inverter power kW																			
Motor type 3G / 3GD	**P_N kW**	**n_{max} rpm**	**0.25**	**0.37**	**0.55**	**0.75**	**1.1**	**1.5**	**2.2**	**3**	**4**	**5.5**	**7.5**	**11**	**15**	**22**	**30**	**37**	**45**	**55**	**75**	**90**	**110**
EDRS71S4	0.25	2385	x	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRS71M4	0.37	2110	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRS80S4	0.55	2750	o	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE80M4	0.55	2870	o	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE80M4	0.75	2820	–	o	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE90M4	1.1	2790	–	–	o	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE90L4	1.5	2780	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE100M4	2.2	2805	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–
EDRE100L4	2.2	2840	–	–	–	–	–	o	x	o	o	o	–	–	–	–	–	–	–	–	–	–	–
EDRE100LC4	3	2850	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–
EDRE112M4	3	2460	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–
EDRE132S4	4	2510	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–
EDRE132M4	5.5	2445	–	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–
EDRE160S4	7.5	2500	–	–	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–
EDRE160M4	9.2	2540	–	–	–	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–
EDRE180S4	11	2545	–	–	–	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–
EDRE180M4	15	2530	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	o	–	–	–	–	–
EDRE180L4	18.5	2535	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	o	–	–	–	–
EDRE200L4	22	2560	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	o	o	–	–	–
EDRE225S4	30	2565	–	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	o	o	–	–
EDRE 225M4	37	2560	–	–	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	o	o	–

x = recommended o = permitted – = not permitted

Motor in △ connection with motor voltage 230/400 V:

Motor type 3G / 3GD	P_N kW	n_{max} rpm	Inverter power kW																			
			0.25	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	22	30	37	45	55	75	90	110
EDRS71S 4	0.25	2900	o	x	o	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRS71M 4	0.37	2850	–	o	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRS80S 4	0.55	2900	–	–	o	x	o	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE80M4	0.55	2930	–	–	o	x	o	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE80M 4	0.75	2910	–	–	–	o	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–	–
EDRE90M 4	1.1	2860	–	–	–	–	o	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–	–
EDRE90L 4	1.5	2920	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–	–
EDRE100M 4	2.2	2905	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–
EDRE100L4	2.2	2930	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–	–
EDRE100LC 4	3	2935	–	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–
EDRE112M 4	3	2545	–	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–	–
EDRE132S 4	4	2565	–	–	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–	–
EDRE132M 4	5.5	2535	–	–	–	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–	–
EDRE160S 4	7.5	2560	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–	–
EDRE160M 4	9.2	2570	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	–	–	–	–	–
EDRE180S 4	11	2580	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	o	–	–	–	–
EDRE180M 4	15	2565	–	–	–	–	–	–	–	–	–	–	–	–	–	o	x	o	o	o	–	–	–
EDRE180L 4	18.5	2575	–	–	–	–	–	–	–	–	–	–	–	–	–	o	o	x	o	o	o	–	–
EDRE200L 4	22	2585	–	–	–	–	–	–	–	–	–	–	–	–	–	–	o	o	x	o	o	o	–
EDRE225S 4	30	2580	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	o	o	x	o	o	o
EDRE225M 4	37	2585	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	o	o	x	o	o

x = recommended o = permitted – = not permitted

INFORMATION

The speed can be reduced in case of gearmotors. If in doubt, refer to the nameplate for the permitted values.

6.4.4 Notes for safe operation

General information

Install the frequency inverter outside the potentially explosive atmosphere.

Thermal motor protection

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

Motors that are suitable for frequency inverter operation have an additional frequency inverter nameplate.

Overvoltage at the motor terminals

For FI-operated motors, observe section "Permitted voltage requirement in FI operation" (page 58)

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..

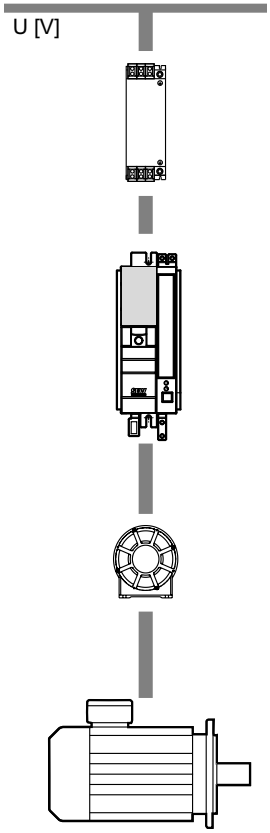
  If an output filter is used, the voltage drop at the filter must be taken into account. Observe the "Special application" (page 71) chapter.

Gear unit

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

6.5 Typical application

The following conditions must be met:



- Supply system tolerance: ±5 %
- Installation with and without external NF line filter, without line choke
- Frequency inverter:
  – MOVITRAC® 07B
  – MOVIDRIVE® B
- Installation without sine filter
- Max. motor cable length 100 m
  Maximum permitted voltage drop: 10 V
- Rated motor voltage[1]:: 219 – 241 V
  380 – 420 V or 230 / 400 V (here for V_{line} = 400 V)

1) The rated motor voltage must be selected depending on the line voltage.

5457884171

6.5.1 Motor terminal voltage

The thermal torque limit curves are based on the assumption that all conditions of a typical application are fulfilled.

The motor terminal voltage must only be dimensioned if the conditions of a typical application are not met. Consult SEW-EURODRIVE in this case.

6.5.2 Limit characteristic curves of EDRS and EDRE motors in inverter operation

The thermal torque characteristic curves show the permitted maximum torque ratings for continuous operation.

The values may be exceeded for brief periods if the effective operating point lies below the thermal limit characteristic curve.

Points A, B and C

These 3 points limit the torque in the lower speed range in order to protect the from overheating due to the reduced cooling. They do not have to be projected. The variables are included in the startup software and are automatically assigned the permitted values during startup.

Points D, E

The two points illustrate the progress of the torque characteristic in the field weakening if the motor terminal voltage corresponds to the rated motor voltage (ideal case). Field weakening begins at point D. Point E is the permitted torque at limit speed.

Points D*, E* (typical application)

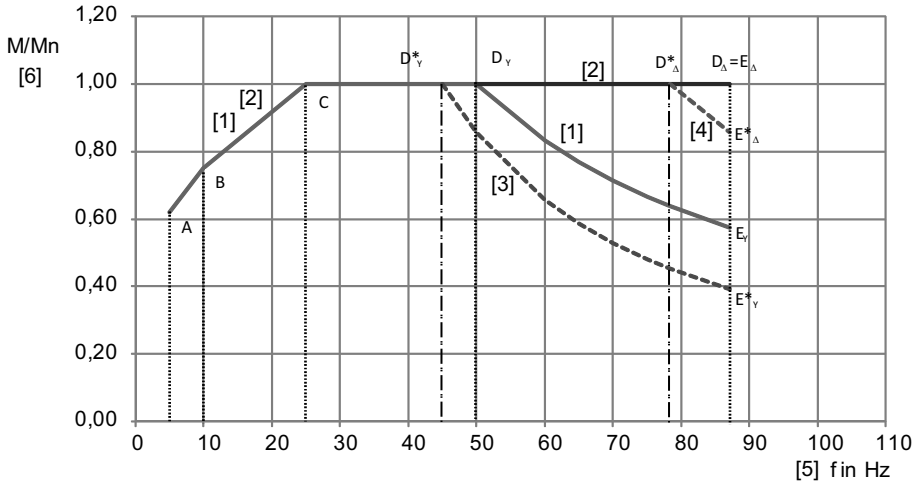
The typical application is characterized by the fact that due to the voltage drop the motor terminal board is not provided with the entire supply voltage. This causes a shift of the field weakening progress. The field weakening starts in point D*.

For the limit speed, the shift of the characteristic results in a reduced torque E*.

The startup software calculates both points D* and E* for the typical application and sets the respective parameters.

Equipment protection level b

The following diagram shows the typical limit curve for equipment protection level b. For the exact values, refer to the additional FI nameplate.

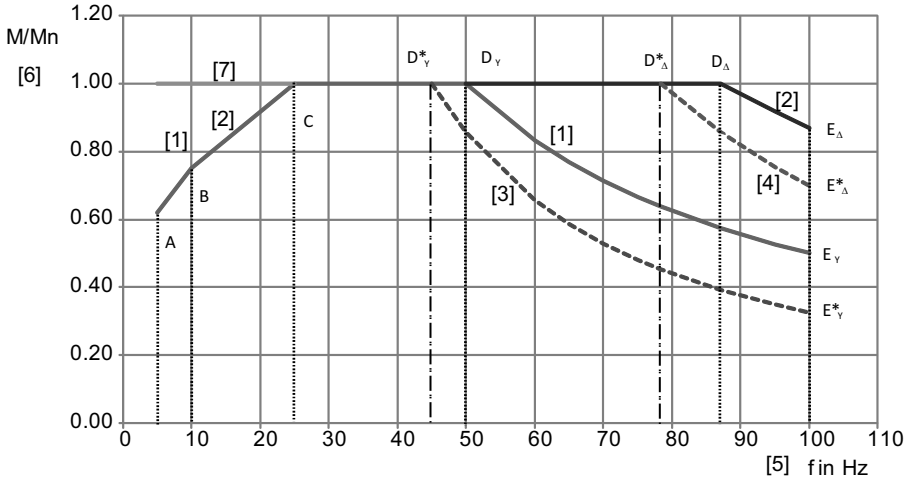


18014402161438091

[1] Star connection
[2] Delta connection
[3] Typical application – star connection
[4] Typical application – delta connection
[5] Supply frequency of the motor
[6] Torque ratio M/M_N

Equipment protection level c

The following diagram shows the typical limit curve for equipment protection level c. For the exact values, refer to the additional FI nameplate.



7057796235

[1] Star connection
[2] Delta connection
[3] Typical application – star connection
[4] Typical application – delta connection
[5] Supply frequency of the motor
[6] Torque ratio M/M_N
[7] VE fan

6.6 Special application

If the conditions of the typical application are not met, the motor terminal voltage can deviate and, as a result, the motor can heat up excessively.

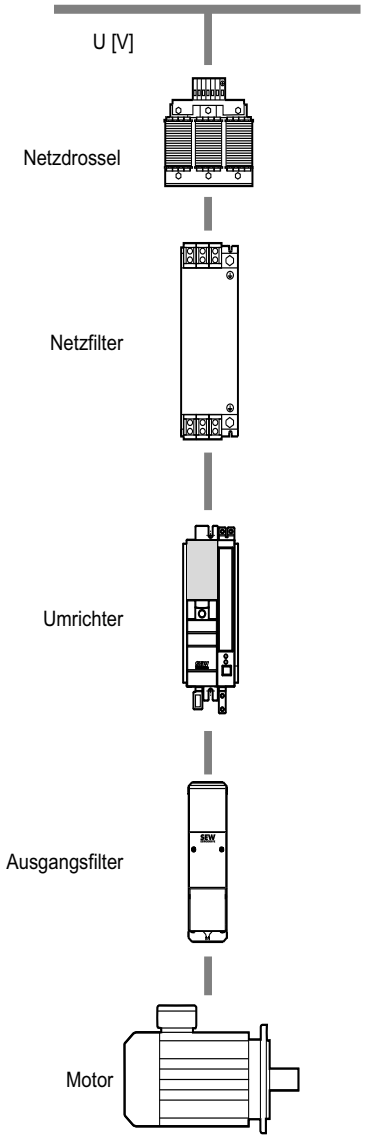
The deviating motor terminal voltage changes the shape of the thermal characteristic curve. The calculation and observation of points D (field weakening f_{D*}) and E (current limit I_{E*} and torque M_{E*}) during startup prevents the motor from overheating. The current limit I_{E*} must only be calculated for drives in category 2.

The project planning procedure is as follows:

- Determining the maximum terminal voltage:
- Calculating the field weakening f_{D*}
- Calculating the torque characteristics M_{E*}

6.6.1 Calculating the motor terminal voltage

The calculation of the motor terminal voltage is an important component of project planning. The results must be considered during startup and corrected, if necessary, to prevent excessive heating of the motor.



V_{line}, observe tolerances

ΔV_{ND}

ΔV_{NF}

$V_{E\_FI} = V_{Line} - \Delta V_{LC} - \Delta V_{LF}$

$V_{A\_FI} = 0.925 \times V_{E\_FI}$

ΔV_{HF}

ΔV_{Perm}

$V_{MotorTerm} = V_{A\_FI} - \Delta V_{HF} - \Delta V_{Perm}$

1458069131

V_{I_FI} = Inverter input voltage in V

V_{O_FI} = Inverter output voltage in V

$\triangle V_{HF}$ = Voltage drop across sine filter in V

$\triangle V_{permitted}$ = Voltage drop across incoming motor cable in V

$\triangle V_{ND}$ = Voltage drop across line choke in V

$\triangle V_{NF}$ = Voltage drop across line filter, in V

For inverter operation, the motor voltage is calculated as follows:

$$V_{Motor} = V_{Line} - (\Delta V_{LineFilter/Choke} + \Delta V_{FI} + \Delta V_{Outp.Filter} + \Delta V_{Cable})$$

Line voltage V_{line}

The line voltage is determined via direct measurement with multimeter or, alternatively, by reading off the DC link voltage ($V_{DC\ link}$) in the inverter ($V_{line} = V_{DC\ link} / \sqrt{2}$).

Voltage drop at the line choke Δ $V_{line\ choke}$

The calculation of the voltage drop can be carried out in two ways:

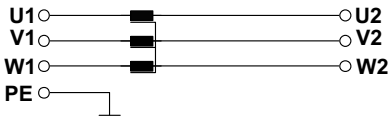
1. Calculation based on an equation
2. based on tabular values

Both options are illustrated below.

1. Voltage drop at the line choke

The extent of the voltage drop is determined by the main inductance and the ohmic share of the inductance.

Typical connection pattern:



Equation for calculating the voltage drop:

$$\Delta V_{LC} = I_{E\_FI} \times \sqrt{3} \times \sqrt{(2 \times \pi \times f \times L_{LC})^2 + R_{LC}{}^2}$$

L_{ND} = Inductance of line choke in H
R_{ND} = Ohmic resistance of line choke in Ω
$\triangle U_{ND}$ = Voltage drop across line choke in V
I_{I_FI} = Nominal input current of the inverter

For the inductance L and the ohmic resistance R of the inductance, refer to the documents for the line choke.

2. Table "percentage voltage drop when using a line choke"

The following table show the extent of the voltage drop as a percentage of the line voltage for the use of a line choke.

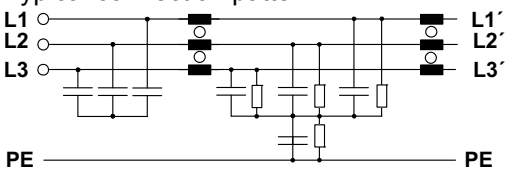
Power of the inverter in kW	Nominal input current of the inverter in A	Line choke	Voltage drop in $\%V_N$
0.25	0.9	ND020-013	0
0.37	1.4		
0.55	1.8		
0.75	2.2		
1.1	2.8		
1.5	3.6		
2.2	5		
3	6.3		
4	8.6		
5.5	11.3		
7.5	14.4		
11	21.6	ND030-023	1
15	28.8		
22	41.4	ND045-013	1
30	54	ND085-013	1.5
37	65.7		
45	80.1		
55	94.5	ND150-013	2
75	117		
90	153	ND200-0033	1
110	180		

Voltage drop at the line filter

The line filter consists of current compensated radio interference suppression chokes. The current flows through the winding of the chokes and the resulting magnetic fields compensate each other.

This is why the inverter current that flows through the line filter is only dampened by the ohmic share of the inductance and the leakage inductance. The leakage inductance is very low compared to the main inductance. Hence the voltage drop via the line filter can be neglected.

Typical connection pattern:



Equation for calculating the voltage drop:

$$\Delta V_{LF} = I_{E\_FI} \times \sqrt{3} \times \sqrt{(2 \times \pi \times f \times L_{Leak})^2 + R_{LF}{}^2}$$

$\triangle U_{NF}$ = Voltage drop across line filter, in V
I_{I_FI} = Nominal input current of the inverter in A
L_{leak} = Leakage inductance in H
R_{NF} = Ohmic resistance in Ω

Determining the inverter voltage

The inverter input voltage is determined by:

- measuring the mains voltage, or
- calculating the voltage according to the formula $V_{E\_FI} = V_{Line} - \Delta V_{LC} - \Delta V_{LF}$, or
- Reading-off the DC link voltage in the frequency inverter

Voltage drop at the inverter V_{FI}

The voltage drop at the inverter is determined by:

- the voltages across the rectifier path
- the voltages at the output stage transistors
- the principle of converting supply voltage into DC link voltage and into the rotating field voltage
- the anti-overlap times resulting from the clocking of the output stage and the missing voltage-time areas
- the modulation process
- the load state and the energy dissipation of the DC link capacitors

INFORMATION

To simplify the calculation, use the value of **7.5 % of the line input voltage**. This value is to be taken as the maximum possible voltage drop at the inverter. This allows for a reliable project planning.

Voltage drop at the output filter Δ $V_{Outp.filter}$

The voltage drop at the output filter is proportional to the modulated fundamental output frequency and the motor current. It must be requested from the manufacturer of the output filter in individual cases. The voltage drop of SEW output filters can be read from the table.

$$\Delta V_{Outp.Filter} = I \times \sqrt{3} \times \sqrt{(2 \times \pi \times f \times L)^2 + R^2}$$

Since the resistance R is small enough to be neglected compared to the inductance L, the equation can be simplified to:

$$\Delta V_{Outp.Filter} = I \times \sqrt{3} \times 2 \times \pi \times f \times L$$

Filter				Choke	Voltage drop [V]					
					V = 400 V			V = 500 V		
		I_{N400}	I_{N500}	L	50 Hz	60 Hz	87 Hz	50 Hz	60 Hz	87 Hz
Type	Size	(A)	(A)	(mH)	(V)	(V)	(V)	(V)	(V)	(V)
HF 008-503	1	2.5	2	11	15	18	26	12	14	21
HF 015-503	1	4	3	9	20	24	34	15	18	26
HF 022-503	1	6	5	7	23	27	40	19	23	33
HF 030-503	1	8	6	5.5	24	29	42	18	22	31
HF 040-503	2	10	8	4.5	24	29	43	20	24	34
HF 055-503	2	12	10	3.2	21	25	36	17	21	30
HF 075-503	2	16	13	2.4	21	25	36	17	20	30
HF 023-403	3	23	19	1.6	20	24	35	17	20	29
HF 033-403	3	33	26	1.2	22	26	37	17	20	30
HF 047-403	4	47	38	0.8	20	25	36	17	20	29

HD.. output chokes

The voltage drop is negligible (current-compensated) for SEW-EURODRIVE output chokes (HD...).

Voltage drop at the motor cable
$\Delta V_{Mot.cable}$

The voltage drop of the motor cable depends on the motor current and the cross section, length and material of the cable. The voltage drop can be read from the following table.

cable cross section	Load with I [A]																		
	4	6	8	10	13	16	20	25	30	40	50	63	80	100	125	150	200	250	300
Copper	Voltage drop Δ V [V] with length = 100 m and ϑ = 70 °C																		
1.5 mm²	5.3	8	10.6[1]	13.3[1]	17.3[1]	21.3[1]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
2.5 mm²	3.2	4.8	6.4	8.1	10.4	12.8[1]	16[1]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
4 mm²	1.9	2.8	3.8	4.7	6.5	8.0	10	12.5 [1]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
6 mm²					4.4	5.3	6.4	8.3	9.9	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
10 mm²						3.2	4.0	5.0	6.0	8.2	10.2	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
16 mm²								3.3	3.9	5.2	6.5	7.9	10.0	[2]	[2]	[2]	[2]	[2]	[2]
25 mm²									2.5	3.3	4.1	5.1	6.4	8.0	[2]	[2]	[2]	[2]	[2]
35 mm²											2.9	3.6	4.6	5.7	7.2	8.6	[2]	[2]	[2]
50 mm²														4.0	5.0	6.0	[2]	[2]	[2]
70 mm²																	4.6	[2]	[2]
95 mm²																	3.4	4.2	[2]
150 mm²																		2.7	3.3
185 mm²																			2.7

1) This value is not recommended by SEW-EURODRIVE.

2) Load not permitted according to IEC 60364-5-52.

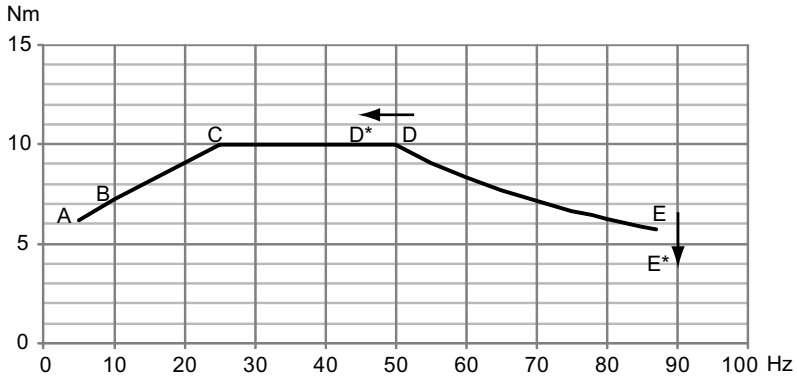
INFORMATION

The voltage drop at the cable is compensated by the IxR compensation. SEW-EURODRIVE frequency inverters adjust this value in the "Automatic calibration ON" mode every time the frequency inverter is started. In order to provide for a voltage reserve in the frequency inverter for this compensation, you have to take into account the voltage loss via the motor cable.

6.6.2 Calculation of the field weakening and the torque characteristic

The calculations described below require values from the EC prototype test certificate.

The following diagram illustrates the S1 limit characteristics of the EDRE90L4 of category 2.



Field weakening

The field weakening is calculated as follows:

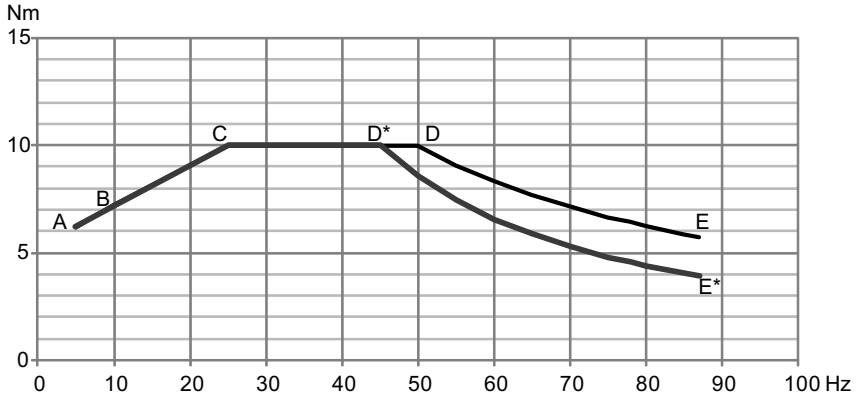
$$f_{D^*} = \frac{V_{MotorTermVoltage}}{V_{RatedMotorVoltage}} \times f_{base}$$

f_D = Start of the field weakening (ideal)
f_{IN} = Maximum speed
f_{D^*} = Start of the field weakening (depending on the actual motor terminal voltage)

torque profile

The torque characteristic is calculated as follows:

$$M_{E^*} = M_{Nom} \times \frac{\left(\frac{f_{D^*}}{f_E} + \left(\frac{f_{D^*}}{f_E} \right)^2 \right)}{2}$$



f_D = Start of the field weakening (ideal)
f_{IN} = Maximum speed
M_{E^*} = reduced torque at maximum speed (depending on the actual motor terminal voltage)

INFORMATION

You have to calculate several auxiliary points to determine an exact curve progression.

6.7 Soft-start units

The use of soft start units is permitted for motors with equipment protection level c if the motor is equipped with a TF temperature sensor and all requirements of IEC 60079-14 are met. The effectiveness of the temperature monitoring and the correct run-up of the motor must be verified and documented during startup. 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 injury due to 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.
- 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.

⚠ 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

Limit the maximum speed and current at the inverter. For information on the procedure, refer to the documentation of the inverter.

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 chapter "Extended storage of motors" (page 26) 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 lockable manual brake release is permitted

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.

7.3 Parameter setting: Frequency inverters for motors with equipment protection level b

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 Before startup

Prior to startup, check that all the conditions for the typical application (page 68) are met. In the event of deviations from these conditions, you have to calculate the maximum terminal voltage, the field weakening range, and the torque characteristics prior to startup. The effective operating point must be below the new thermal characteristic curve.

7.3.2 Startup procedure for MOVITRAC® 07B

Observe the following points during startup:

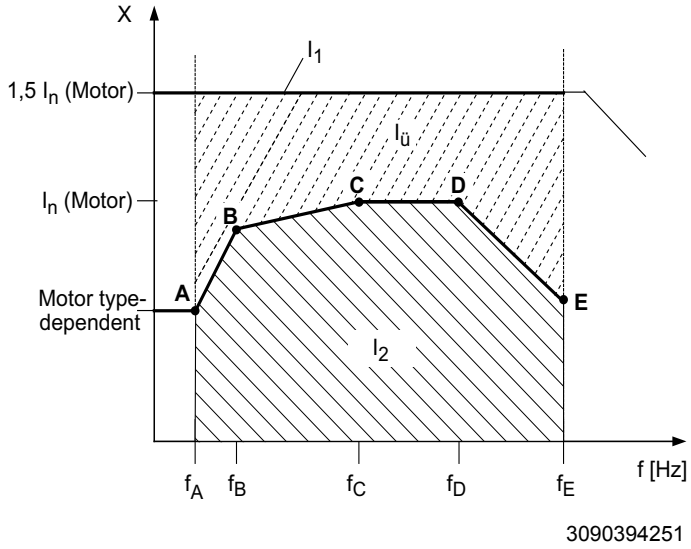
- Use the MOVITOOLS® MotionStudio software, version 5.80 or higher, for a guided startup procedure.
- The startup can only be activated in parameter set 1 due to current limitation function for motors of equipment protection level b.
- The system configuration only allows for individual drives.
- You can set either "V/f" or "vector-controlled" for the control mode.
- For the application, you can only select speed control. The options "Hoist", "DC braking" or "Flying start function" must not be used.
- The operating mode must always be set to "4-quadrant operation".
- Select the proper motor series in the "Motor type" window.
- In the "Motor selection" window, you must choose the unit category, the line voltage, the motor voltage, the connection type and the type of plant configuration in addition to the motor.

Current limit

In guided startup, the *Current limit* parameter is set to 150% $I_{N\ Mot}$ in the application window. This value must be reduced according to the permitted maximum output torque at the gear unit (M_{amax}).

Current monitoring

The parameters that need to be set for monitoring the current depend on the motor.



I_n	Nominal current in A	X	Current limitation
I_1	Permitted max. current in A	f	Frequency in Hz
I_2	Permitted continuous current range in A	A, B, C, D, E	Limiting points
I_O	Overload current in A		

After motor startup, current limitation I_1 is active. Current limitation I_2 determines the current that is permanently permitted. The Ex-e motor current limitation function is activated automatically during startup for SEW-EURODRIVE motors of equipment protection level b.

The speed-dependent current limit is activated via the according motor selection and all the parameters of group P560 are set for points A to E, see the following parameter table. Additionally, the values are listed in IECEx Certificate of Conformity (IECEx CoC).

Parameters	Point A	Point B	Point C	Point D	Point E
Frequency [Hz]	P561	P563	P565	P567	P570
Calculation	via startup software				
Current limit in % of $I_{N\ FI}$	P562	P564	P566	P568	P571
Calculation	via startup software				

In the event of deviations from the typical application, you have to recalculate and manually adapt the parameters for points D (field weakening f_D) and E (current limit I_E), see the following table:

Parameters	Point A	Point B	Point C	Point D	Point E
Frequency [Hz]	P561	P563	P565	P567	P570
Calculation	via startup software			Is required + manual input of f_{D*}	via startup software
Current limit in % of $I_{N\ FI}$	P562	P564	P566	P568	P571
Calculation	via startup software				Is required + manual input of f_{E*} $I_{E*} = I_E \times (N_{E*} / M_{E*})$

Maximum speed

The maximum motor speed must be limited in the "System limits" window. Observe the following when you set the parameter *maximum speed*:

- Maximum speed ≤ motor limit speed (see frequency inverter nameplate) and
- Maximum speed ≤ maximum gear unit input speed n_{emax} (see gear unit nameplate)

Automatic adjustment

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 Startup procedure for MOVIDRIVE® B

INFORMATION

The MOVIDRIVE® B units are only suitable for the basic control range, i.e. the connected motor must not be operated in the field weakening range.

Observe the following points during startup:

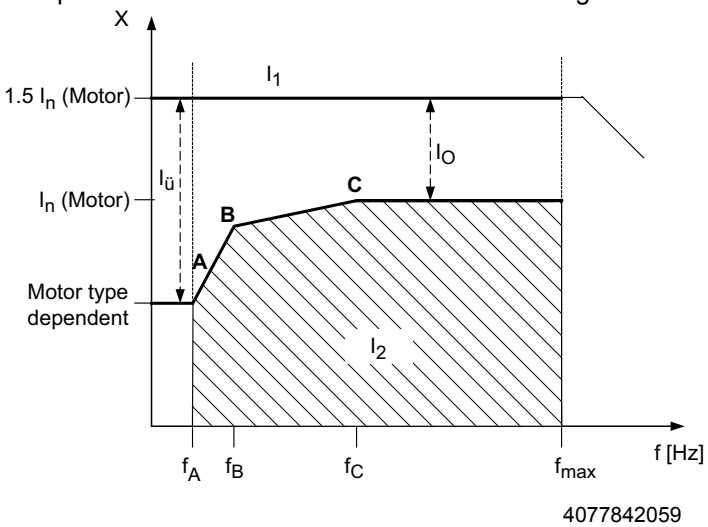
- The startup can only be activated in parameter set 1 due to current limitation function for motors of equipment protection level b.
- The first startup must always be a complete startup.
- The motor configuration only allows for individual drives. You can set either "V/f" or "vector-controlled" (VFC) for the control mode.
- Select the proper motor series in the "Motor type" window.
- In the "SEW motor type 1" window, you must choose the unit category, the nominal motor voltage, the connection type, and the line voltage in addition to the motor.
- In the application selection window, you can only select speed control. The options "Hoist", "DC braking" or "Flying start function" must not be used.
- The operating mode must always be set to "4-quadrant operation".

Current limit

In guided startup, the *current limit* parameter is set to 150 % $I_{N\ Mot}$ in the parameter window 1. This value must be reduced according to the permitted maximum output torque at the gear unit (M_{amax}).

Current monitoring

The parameters that need to be set for monitoring the current depend on the motor.



I_n	Nominal current in A	X	Current limitation
I_1	Permitted max. current in A	f	Frequency in Hz
I_2	Permitted continuous current range in A	A, B, C	Limiting points
I_O	Overload current in A		

After motor startup, current limitation I_1 is active. Current limitation I_2 determines the current that is permanently permitted. The Ex-e motor current limitation function is activated automatically during startup for SEW-EURODRIVE motors of equipment protection level b.

The characteristic curve for MOVIDRIVE® B is defined by operating points A, B and C. The parameters of group P560 are preset during startup, see following table. Additionally, the values are listed in IECEx Certificate of Conformity (IECEx CoC).

Parameters	Point A	Point B	Point C
Frequency [Hz]	P561	P563	P565
Current limit in % of $I_{N\ FI}$	P562	P564	P566

Maximum speed

The maximum motor speed must be limited in the "System limits" window. Observe the following when you set the parameter *maximum speed*:

- Maximum speed ≤ start of field weakening
- Maximum speed ≤ motor limit speed (see frequency inverter nameplate) and
- Maximum speed ≤ maximum gear unit input speed n_{emax} (see gear unit nameplate)

Automatic adjustment

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.

7.3.4 Overload protection

Operation above the permitted current range is permitted for 60 seconds. To prevent a sudden reduction of the current limitation and thus torque shocks, after about 50 seconds, the current is reduced to the permitted value along a ramp within 10 seconds. The current can again exceed the permitted range after a recovery time of 10 minutes. Operation below 5 Hz is permitted for 60 seconds. After this time has elapsed, the unit switches off with error F110 "Ex e protection" and performs an emergency stop as a fault response.

The binary inputs P62_ can be parameterized to "Ex e current limitation active".

Preconditions for the output being set ("1" signal):

- Current limit 1 exceeded
- Recovery time not yet elapsed
- Operation < 5 Hz longer than 60 seconds

The current-time monitoring is not reset by an error reset.

The current-time monitoring is active both for mains operation and 24 V backup mode.

INFORMATION

If the mains is switched off without 24 V backup mode, the monitoring function is reset completely.

7.4 Parameter setting: Frequency inverters for motors with equipment protection level c

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.

7.4.1 Before startup

Prior to startup, check that all the conditions for the typical application (page 68) are met. In the event of deviations from these conditions, you have to calculate the maximum terminal voltage, the field weakening range, and the torque characteristics prior to startup. The effective operating point must be below the new thermal characteristic curve.

7.4.2 Startup procedure for MOVITRAC® 07B

Observe the following points during startup:

- Use the MOVITOOLS® MotionStudio software, version 5.80 or higher, for a guided startup procedure.
- Startup and operation of motors with equipment protection level c is possible in parameter set 1 and 2.
- 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".
- The operating mode must always be set to "4-quadrant operation".
- Select the proper motor series in the "Motor type" window.
- In the "Motor selection" window, you must choose the unit category, the line voltage, the motor voltage and the connection type in addition to the motor.

Current limit

In guided startup, the *Current limit* parameter is set to 150% $I_{N\ Mot}$ in the application window. This value must be reduced according to the permitted maximum output torque at the gear unit (M_{amax}).

Maximum speed

The maximum motor speed must be limited in the "System limits" window. Observe the following when you set the parameter *maximum speed*:

- Maximum speed ≤ motor limit speed (see frequency inverter nameplate) and
- Maximum speed ≤ maximum gear unit input speed n_{emax} (see gear unit nameplate)

Automatic adjustment

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.

7.4.3 Startup procedure for MOVIDRIVE® B

Observe the following points during startup:

- Use the MOVITOOLS® MotionStudio software, version 5.80 or higher, for a guided startup procedure.
- Startup and operation of motors with equipment protection level c 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 proper motor series in the "Motor type" window.
- In the "SEW motor type 1" window, you must choose the unit category, the nominal motor voltage, the connection type, and the line voltage in addition to the motor.
- For the application options, you can only select "speed control" and "hoist" function. Do not use the options "DC braking" or "Flying start function".
- The operating mode must always be set to "4-quadrant operation" (parameters P820/P821).

Current limit

In guided startup, the *Current limit* parameter is set to 150% $I_{N\ Mot}$ in the parameter window 1. This value must be reduced according to the permitted maximum output torque at the gear unit (M_{amax}).

Maximum speed

The maximum motor speed must be limited in parameter window 2. Observe the following when you set the parameter *maximum speed*:

- Maximum speed ≤ motor limit speed (see frequency inverter nameplate)
- Maximum speed ≤ maximum gear unit input speed n_{emax} (see gear unit nameplate)

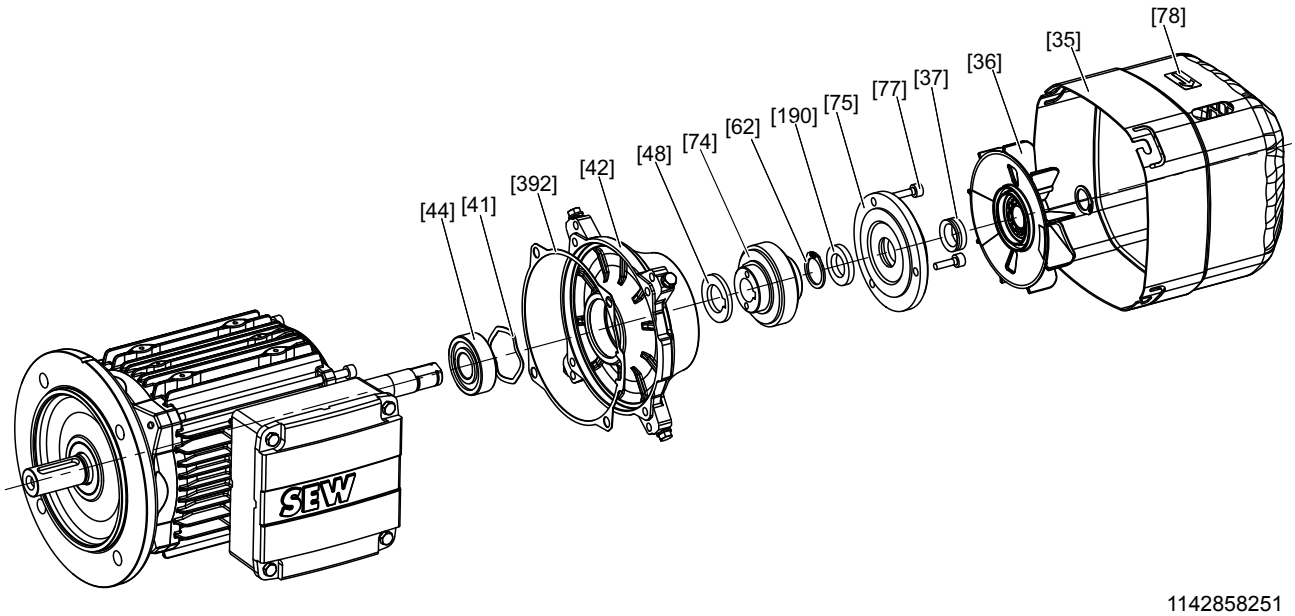
Automatic adjustment

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.

7.5 Altering the blocking direction on motors with a backstop

The backstop option is in preparation.

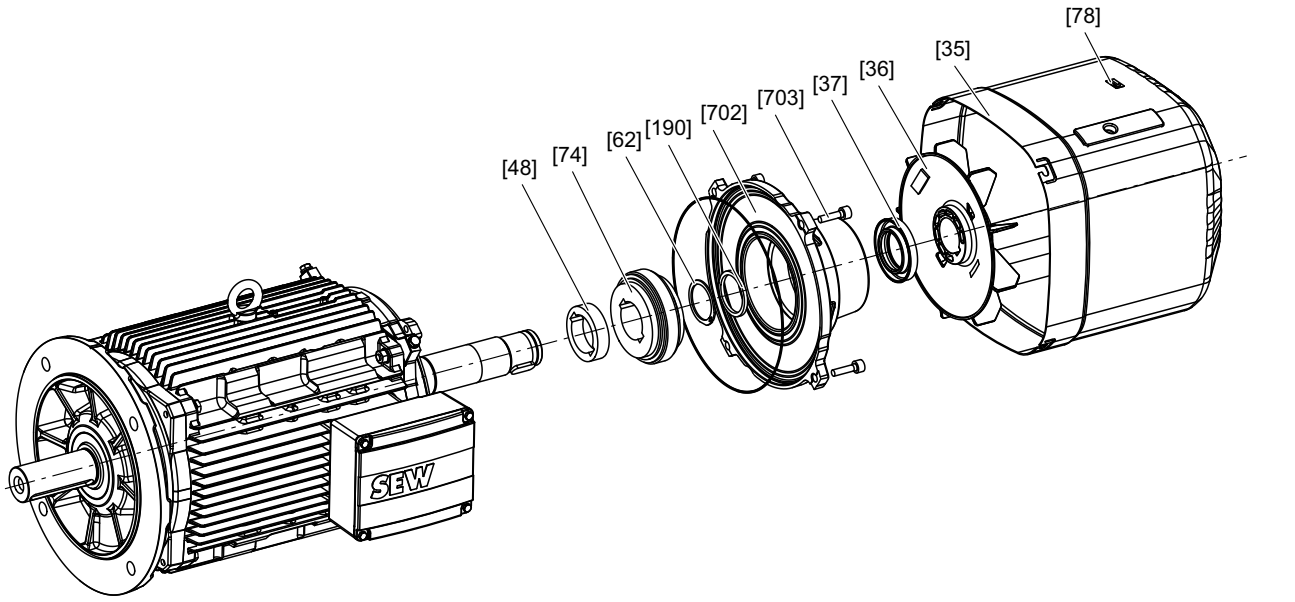
7.5.1 Structure of an EDR.71 – EDR.80 with backstop (example)



1142858251

[35] Fan guard
[36] Fan
[37] Sealing ring
[41] Shim
[42] Backstop endshield
[44] Deep groove 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] Seal

7.5.2 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] Cap screw

7.5.3 Minimum speed

INFORMATION

Please not that with motors operated with a frequency inverter, the set speed is always higher than the lift-off speed.

7.5.4 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.

- Before starting work, isolate the motor and, if installed, the forced cooling fan from the power supply.
- 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 maintenance – preliminary work" (page 95).

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 sprag ring [74] via screws in the forcing threads or using a puller
6. Spacing ring [48], if provided, remains installed
7. Turn around the sprag ring [74], check the old grease and replace according to the specifications below and reinstall the sprag ring.
8. Install retaining ring [62]

   ⚠ **NOTICE** Damage due to incorrect assembly

   Material damage

   - 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

Lubricating 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 from -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 regarding the grease level 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
- Before starting work, disconnect the motor and, if installed, the forced cooling fan from the power supply safeguarding them against unintentional re-start.
- Only use genuine spare parts in accordance with the valid spare parts list.

⚠ CAUTION

The surfaces of the drive can be very hot 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.

Repairs such as bearing change or adjustments to the motor may only be performed by SEW service staff, in SEW repair workshops or plants, according to country specific regulations and laws as well as the IEC 60079-17 and -19

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 grease with a grease depot to the lip of the oil seal before assembly.

INFORMATION 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 sealed after service and maintenance work.
- Clean motors for hazardous locations regularly. Prevent dust from building up higher than 5 mm.
- 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.
- If you repaint the motors or gearmotors, you have to observe the requirements regarding the prevention of electrostatic charge according to EN / IEC 60079-0, see chapter "Painting" (page 37).
- You have to use tie rods with a strength of 8.8 for motors of sizes EDR.71 to EDR.100 that are used for temperatures below -20 °C down to -40 °C according to the nameplate.
- You have to use screws of strength class 8.8 for applications in the low temperature range from -20 °C to -40 °C.

8.1 Inspection and maintenance intervals

The following table lists the inspection and maintenance intervals:

Unit / unit part	Time interval	What to do?
Motor	• **Every 10,000 operating hours** [1)]	Motor inspection: • Check rolling bearing and change if necessary. • Replace oil seal • Clean cooling air ducts
Drive	• Varies [1)]	• 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 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 during inspection/maintenance, you have to clean it before you close it.

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

With all explosion-proof motors with /KS corrosion protection option in IP56 or IP66, you must replace the old Hylomar at the studs with new Hylomar during maintenance.

8.4 Motor maintenance – preliminary work

⚠ WARNING

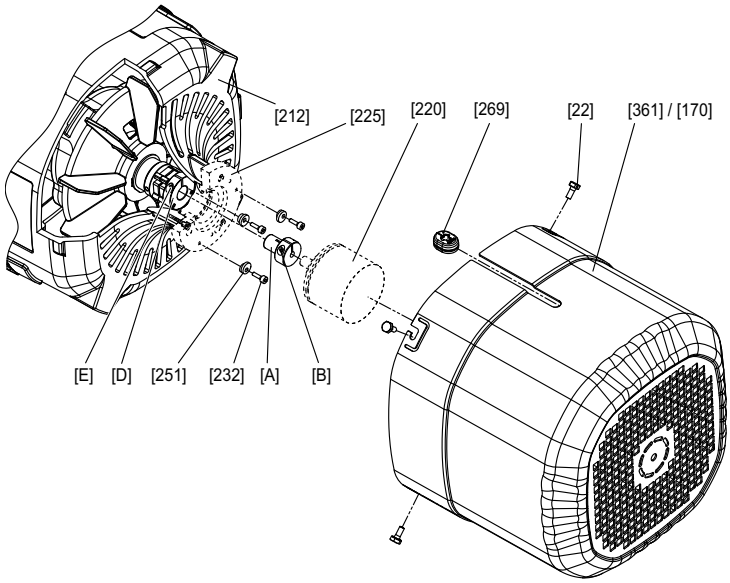
Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Before starting work, isolate the motor 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 (in preparation) from/on EDR.71 – 225

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



9007202887906699

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

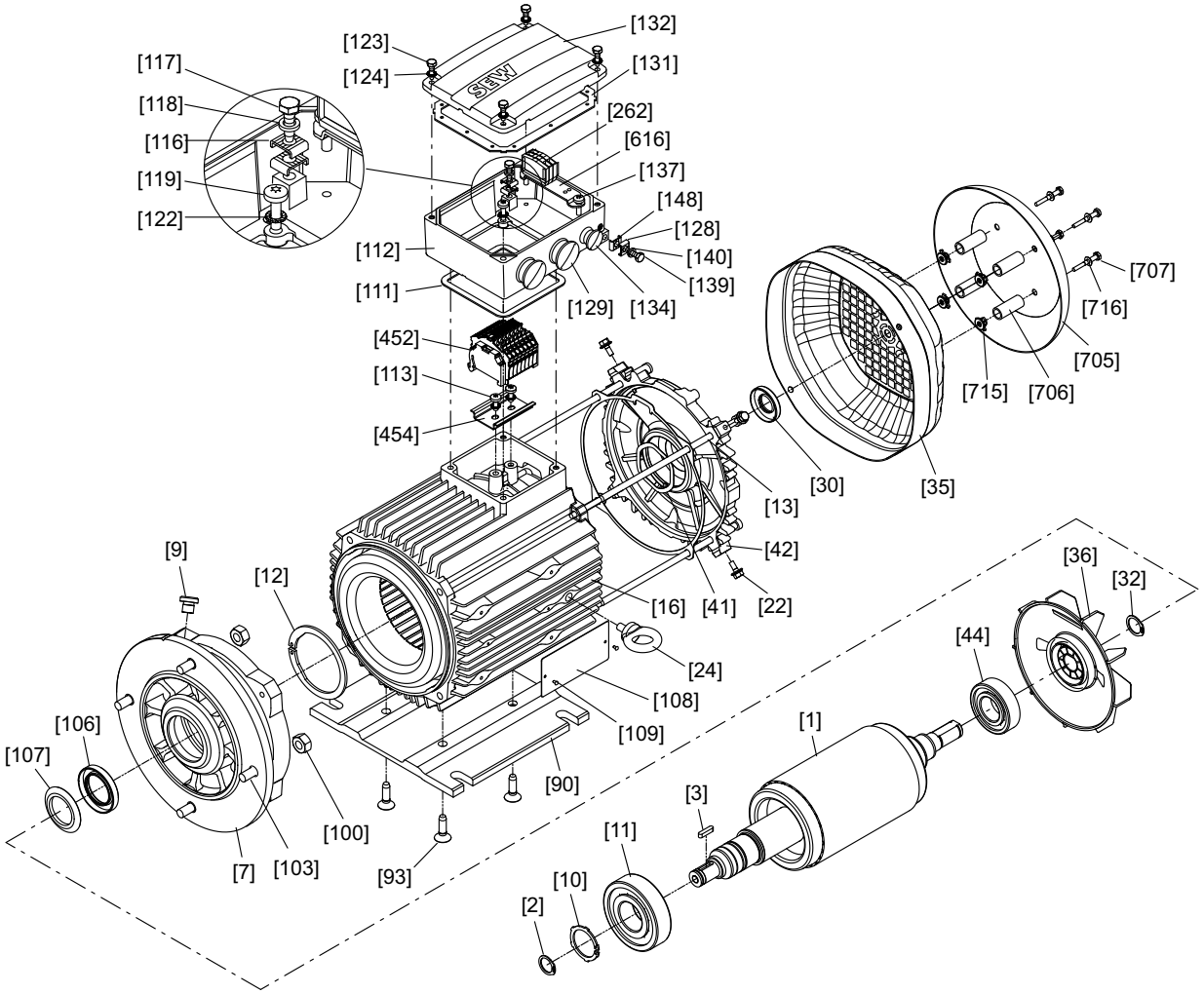
Re-assembly

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

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

8.5.1 General structure of EDR.71 – EDR.132

The following figure shows an example of the basic structure of EDR.71 – EDR.132 with cage clamp:

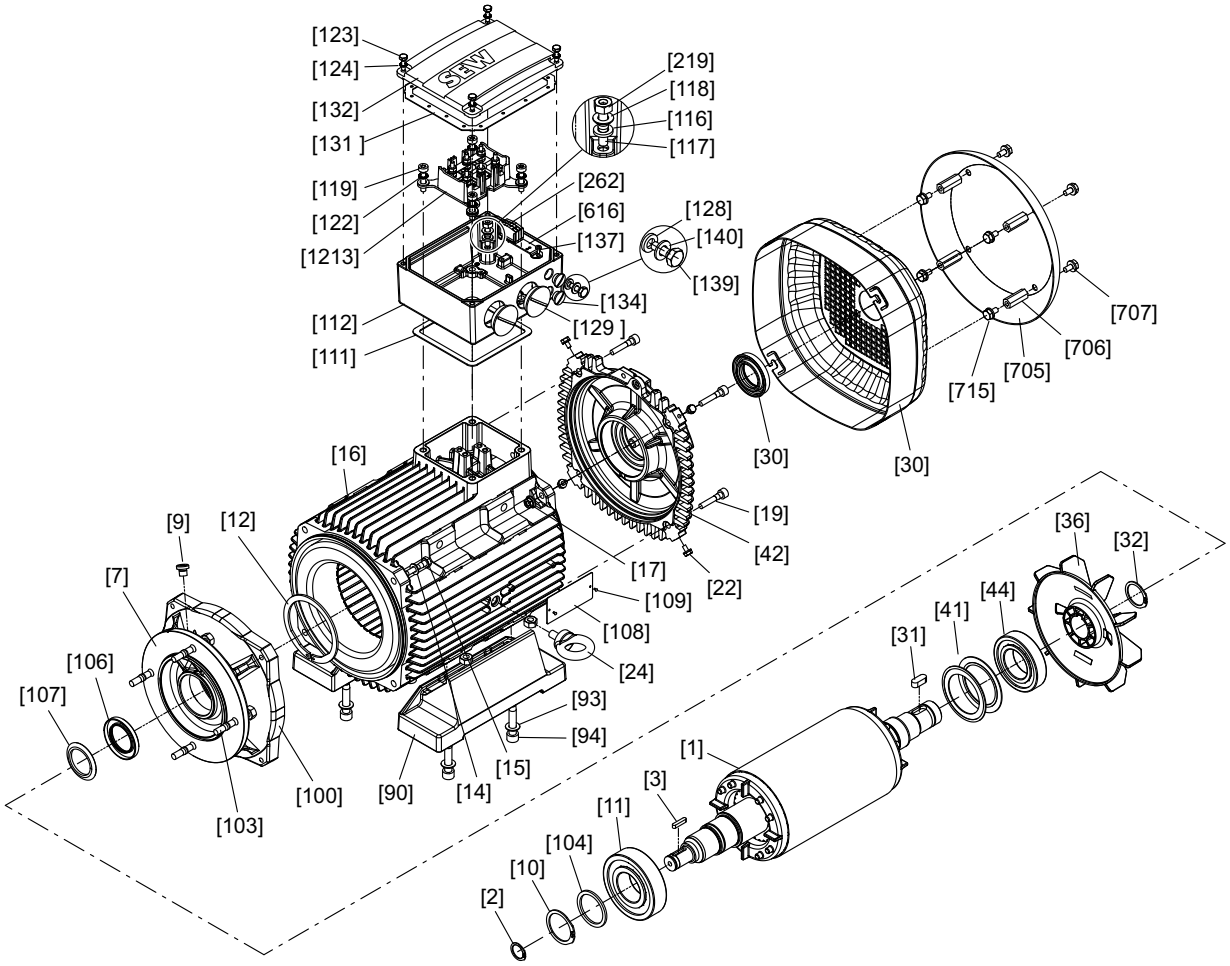


2931885963

[1]	Rotor	[35]	Fan guard	[112]	Terminal box lower part	[137]	Screw
[2]	Retaining ring	[36]	Fan	[113]	Pan head screw	[139]	Hex head screw
[3]	Key	[41]	Shim	[116]	Terminal clip	[140]	Lock washer
[7]	Flanged endshield	[42]	B-side endshield	[117]	Hex head screw	[148]	Terminal clip
[9]	Screw plug	[44]	Deep groove ball bearing	[118]	Lock washer	[262]	Terminal
[10]	Retaining ring	[90]	Bed plate	[119]	Pan head screw	[392]	Seal
[11]	Deep groove ball bearing	[93]	Countersunk screw	[122]	Tooth lock washer	[452]	Terminal strip
[12]	Retaining ring	[100]	Hex nut	[123]	Hex head screw	[454]	Support rail
[13]	Cap screw	[103]	Stud	[124]	Tooth lock washer	[616]	Retaining plate
[16]	Stator	[106]	Oil seal	[128]	Terminal clip	[705]	Canopy
[22]	Hex head screw	[107]	Oil flinger	[129]	Screw plug	[706]	Spacers
[24]	Eyebolt	[108]	Nameplate	[131]	Gasket for cover	[707]	Pan head screw
[30]	Oil seal	[109]	Grooved pin	[132]	Terminal box cover	[715]	Blind rivet
[32]	Retaining ring	[111]	Gasket for lower part	[134]	Screw plug	[716]	Washer

8.5.2 General structure of EDR.160 – EDR.180

The following figure shows an example of the basic structure of EDR.160 – EDR.180 with anti-twist frame:

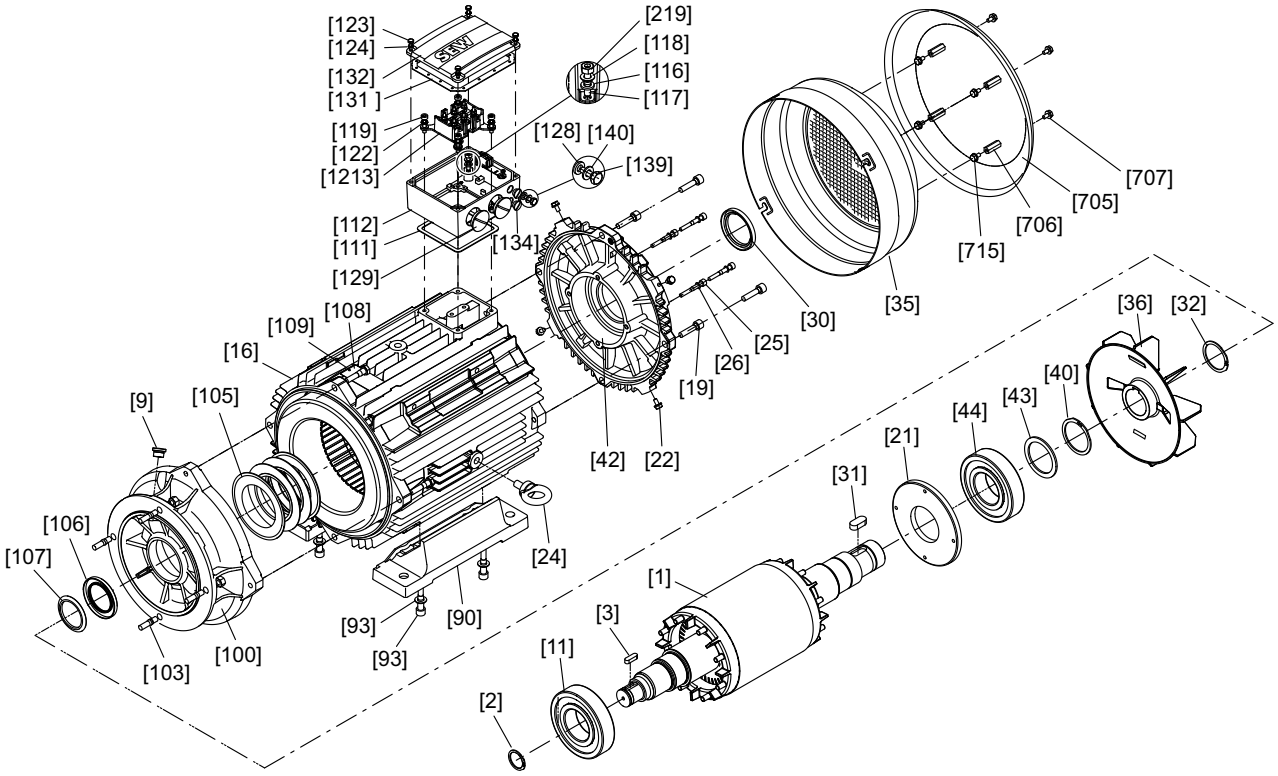


2967197579

[1]	Rotor	[30]	Sealing ring	[106]	Oil seal	[131]	Gasket for cover
[2]	Retaining ring	[31]	Key	[107]	Oil flinger	[132]	Terminal box cover
[3]	Key	[32]	Retaining ring	[108]	Nameplate	[134]	Screw plug
[7]	Flange	[35]	Fan guard	[109]	Grooved pin	[139]	Hex head screw
[9]	Screw plug	[36]	Fan	[111]	Gasket for lower part	[140]	Washer
[10]	Retaining ring	[41]	Spring washer	[112]	Terminal box lower part	[219]	Hex nut
[11]	Deep groove ball bearing	[42]	B-side endshield	[116]	Serrated lock washer	[705]	Canopy
[12]	Retaining ring	[44]	Deep groove ball bearing	[117]	Stud	[706]	Spacers
[14]	Washer	[90]	Foot	[118]	Washer	[707]	Hex head screw
[15]	Hex head screw	[91]	Hex nut	[119]	Cap screw	[715]	Hex head screw
[16]	Stator	[93]	Washer	[122]	Tooth lock washer	[1213]	Kit (1 anti-twist frame, 1 terminal board, 4 sleeves, 2 screws, 2 nuts)
[17]	Hex nut	[94]	Cap screw	[123]	Hex head screw		
[19]	Cap screw	[100]	Hex nut	[124]	Tooth lock washer		
[22]	Hex head screw	[103]	Stud	[128]	Serrated lock washer		
[24]	Eyebolt	[104]	Supporting ring	[129]	Screw plug		

8.5.3 General structure of EDR.200 – EDR.225

The following figure shows an example of the basic structure of EDR.200 – EDR.225 with anti-twist frame:



3055268107

[1]	Rotor	[32]	Retaining ring	[107]	Oil flinger	[131]	Gasket for cover
[2]	Retaining ring	[35]	Fan guard	[108]	Nameplate	[132]	Terminal box cover
[3]	Key	[36]	Fan	[109]	Grooved pin	[134]	Screw plug
[7]	Flange	[40]	Retaining ring	[111]	Gasket for lower part	[139]	Hex head screw
[9]	Screw plug	[42]	B-side endshield	[112]	Terminal box lower part	[140]	Washer
[11]	Deep groove ball bearing	[43]	Supporting ring	[107]	Oil flinger	[219]	Hex nut
[16]	Stator	[44]	Deep groove ball bearing	[116]	Serrated lock washer	[705]	Canopy
[19]	Cap screw	[90]	Foot	[117]	Stud	[706]	Spacer bolt
[21]	Oil seal flange	[93]	Washer	[118]	Washer	[707]	Hex head screw
[22]	Hex head screw	[94]	Cap screw	[119]	Cap screw	[715]	Hex head screw
[24]	Eyebolt	[100]	Hex nut	[123]	Hex head screw	[1213]	Kit (1 anti-twist frame, 1 terminal board, 4 sleeves, 2 screws, 2 nuts)
[25]	Cap screw	[103]	Stud	[124]	Tooth lock washer		
[26]	Shield ring	[105]	Spring washer	[128]	Serrated lock washer		
[31]	Key	[106]	Oil seal	[129]	Screw plug		

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: Are there traces of gear oil or moisture 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].

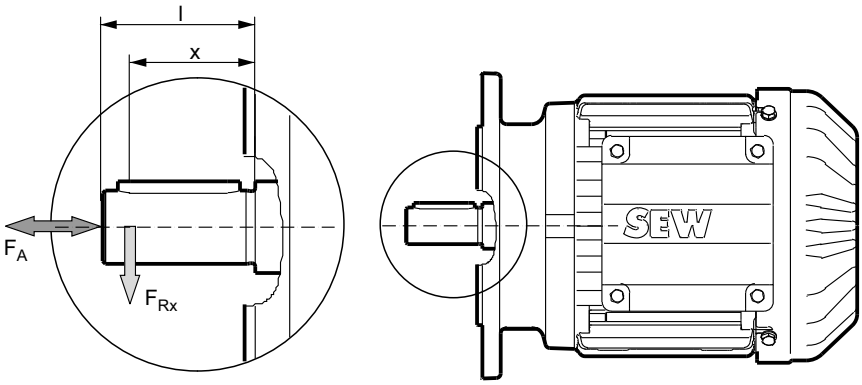
10. Install the motor and accessory equipment.

9 Technical data

9.1 Overhung loads

9.1.1 Permitted overhung load

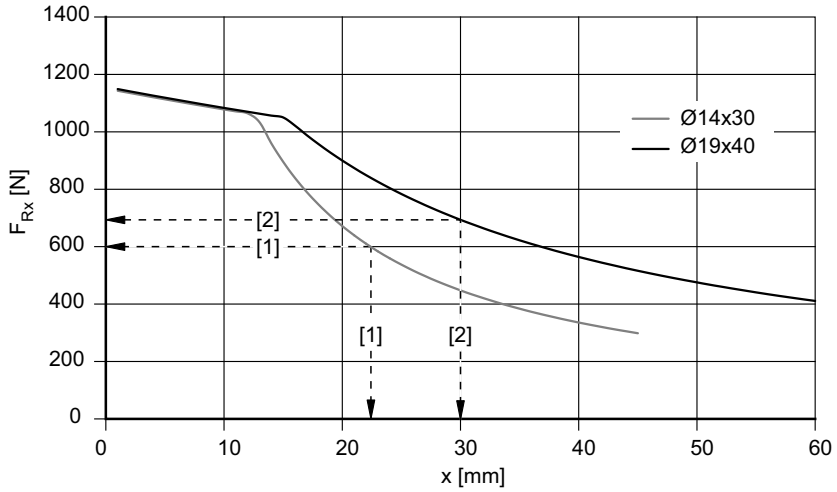
Refer to the following diagrams for the permitted overhung load F_{Rx} for EDR AC motors. In order to read the permitted overhung load from the diagram, you must know what the distance x is between the force application point of the overhung load F_R and the shaft shoulder. The following figure shows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



2636511499

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

The following diagram shows an example of how you can read the overhung load from the diagram:



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}:

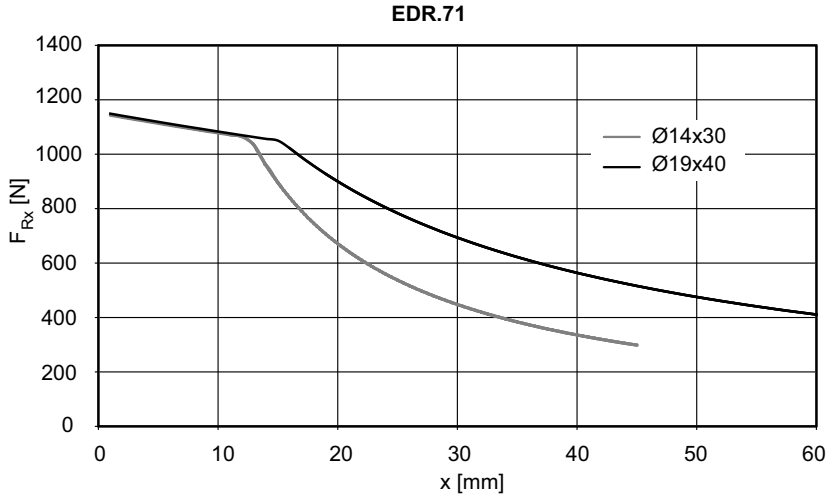
$F_A = 0.2 \times F_{Rx}$

9.1.2 Permitted overhung loads of the pole-changing motors

The permitted overhung loads for pole-changing motors are the same as those for 4-pole motor.

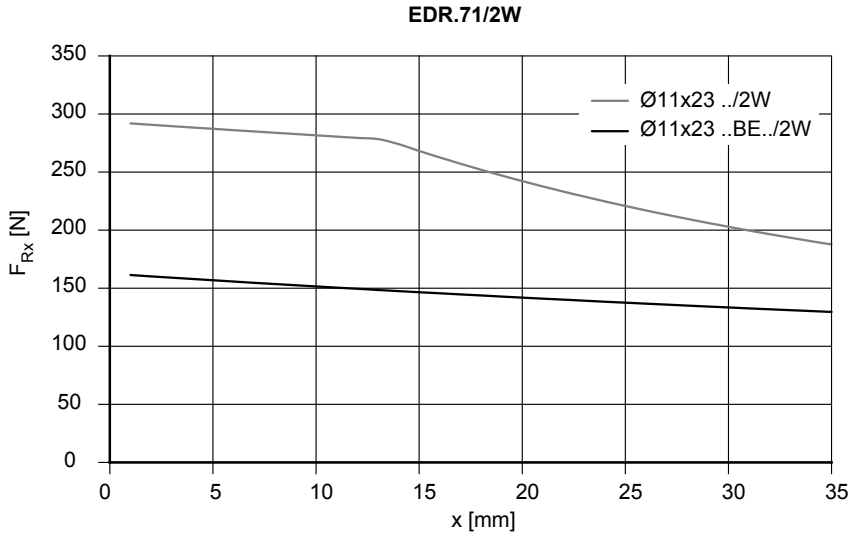
9.1.3 Overhung load diagrams of the 4-pole EDR motors

Overhung load diagram EDR.71



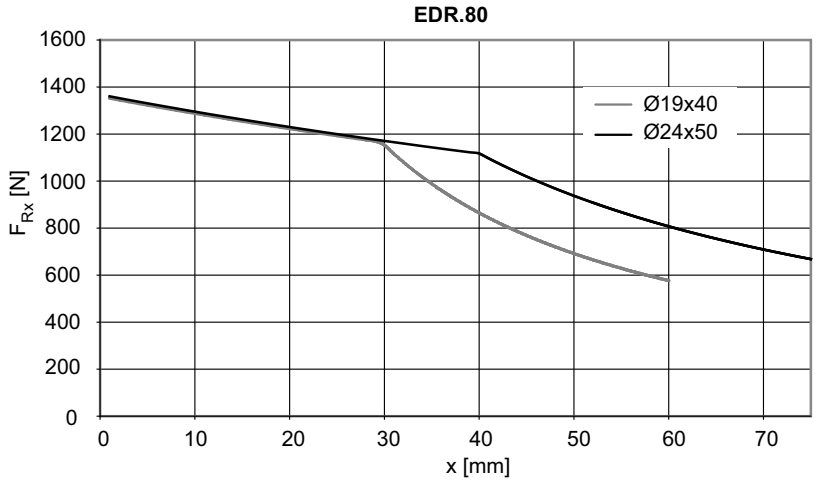
2637430411

Overhung load diagram EDR.71 at second shaft end



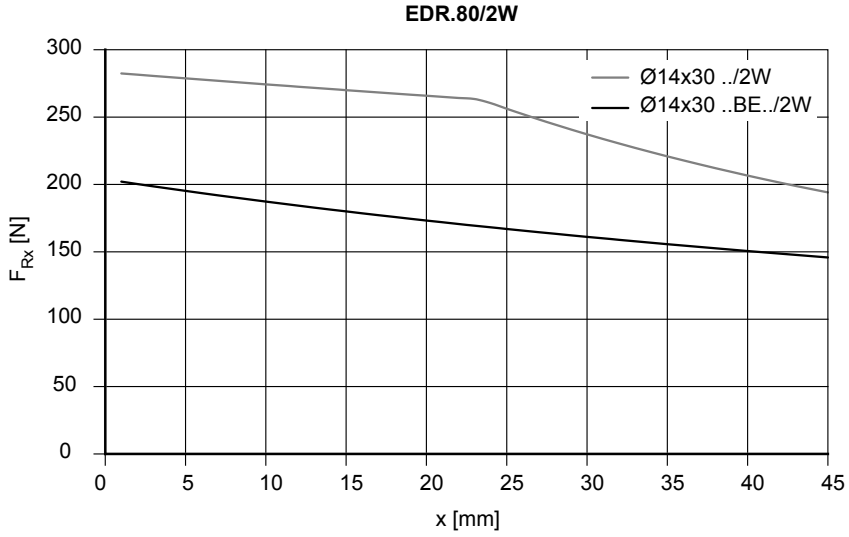
2636893835

Overhung load diagram EDR.80



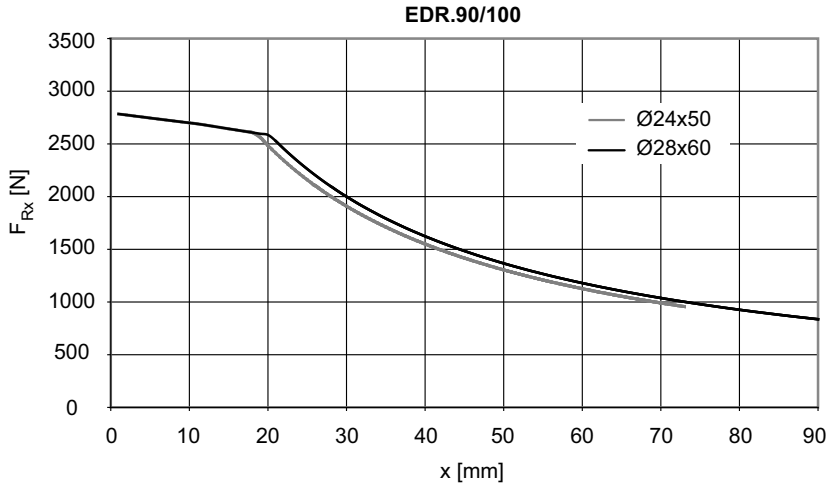
2636896523

Overhung load diagram EDR.80 at second shaft end



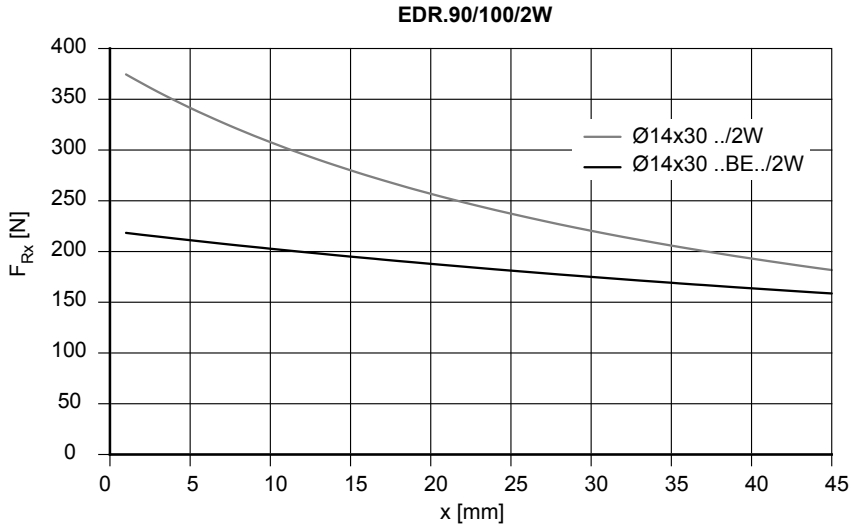
2636899211

Overhung load diagram EDR.90 and EDR.100



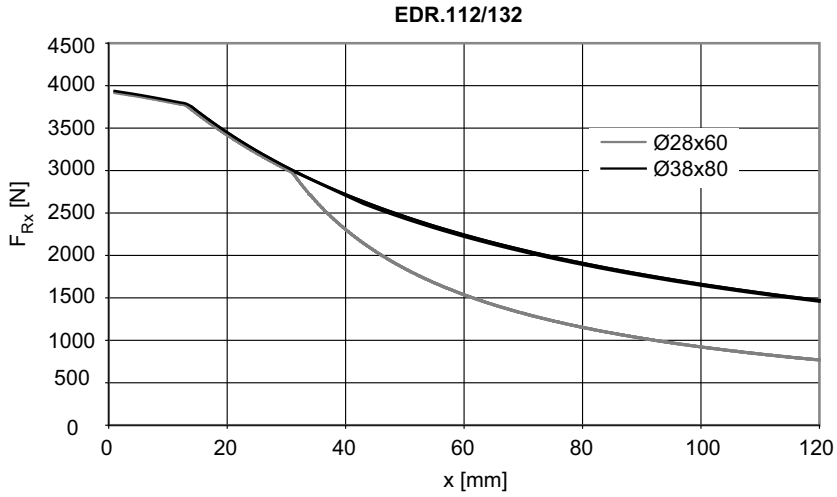
2636901899

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



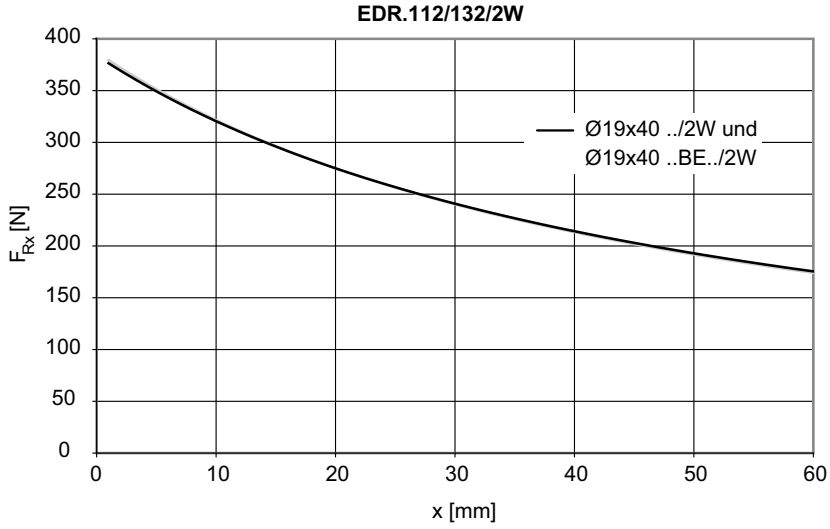
2636904587

Overhung load diagram EDR.112 and EDR.132



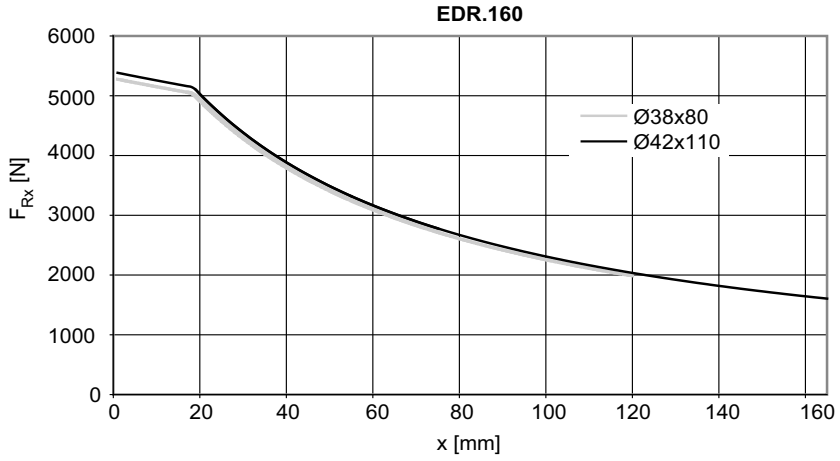
2636907275

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



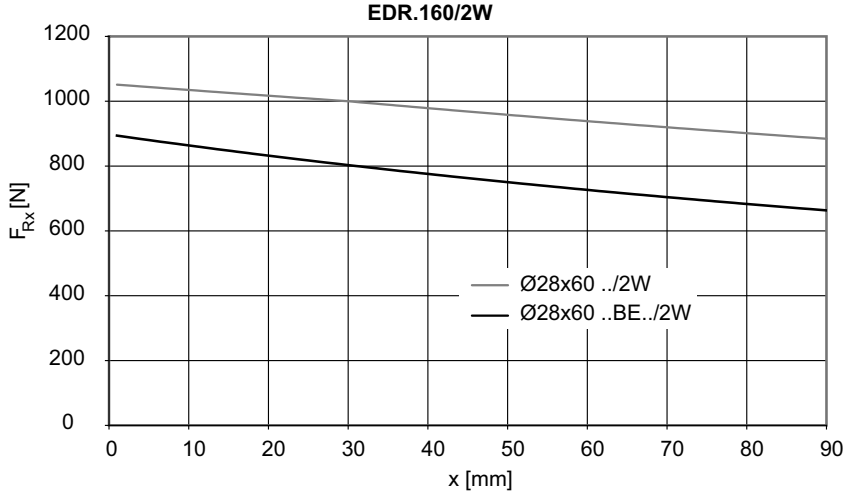
2636909963

Overhung load diagram EDR.160



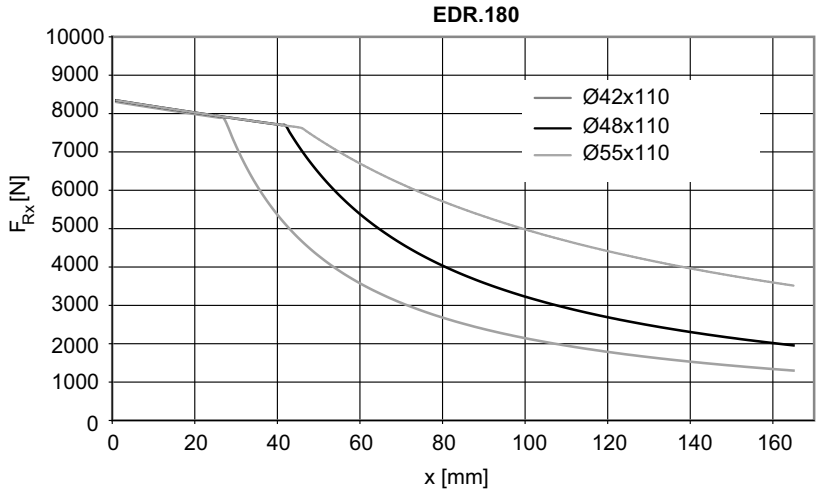
2636912651

Overhung load diagram EDR.160 at second shaft end



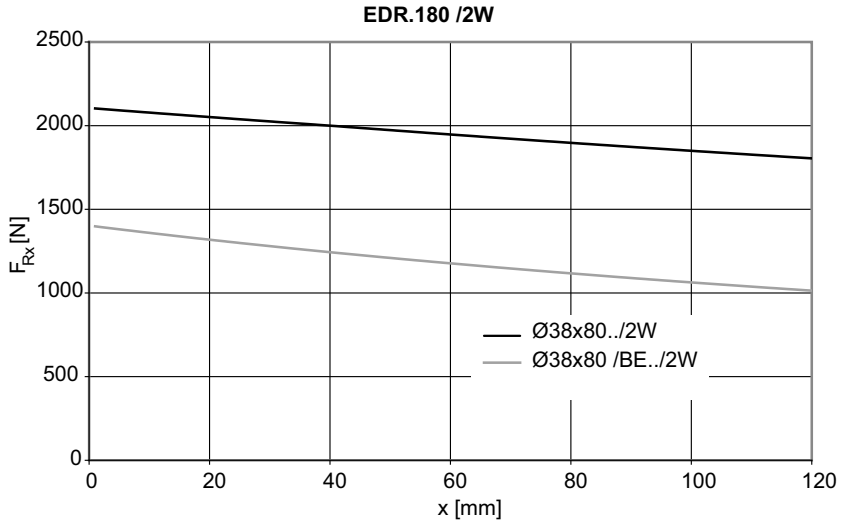
2636915339

Overhung load diagram EDR.180



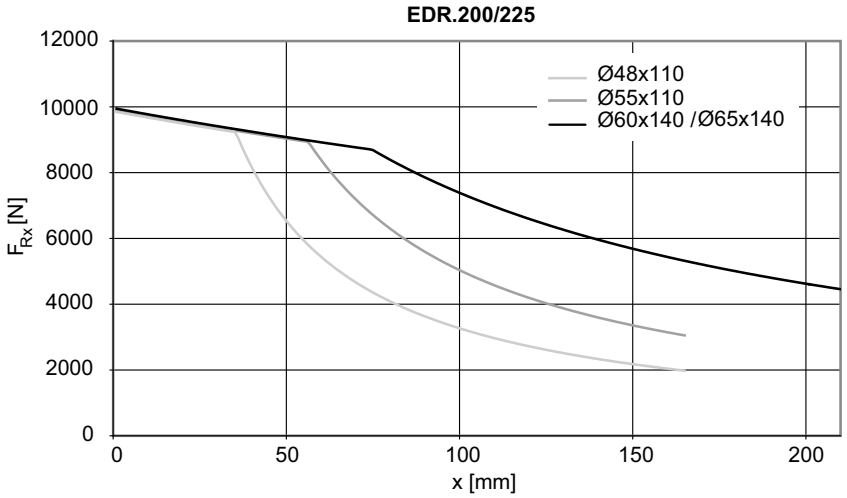
2636918027

Overhung load diagram EDR.180 at second shaft end



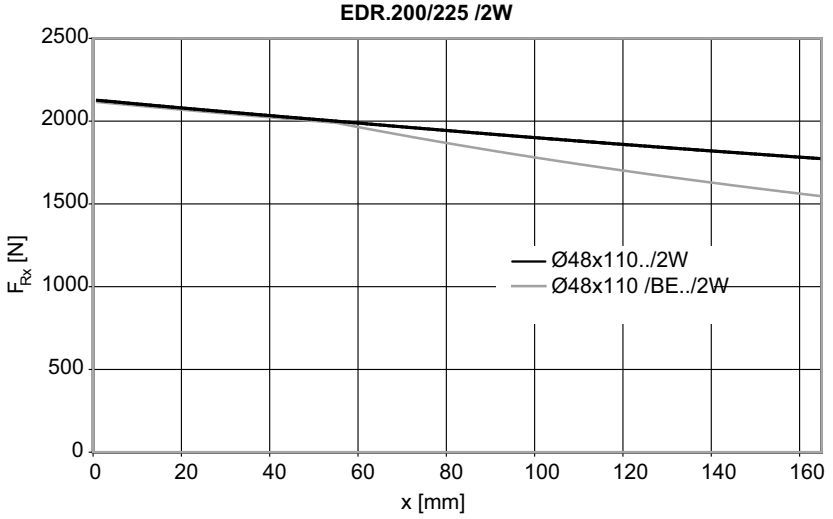
2636920715

Overhung load diagram EDR.200 and EDR.225



2636923403

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



2636926091

9.2 Lubricant tables

9.2.1 Lubricant table for rolling bearings

INFORMATION

Inadequate bearing greases may result in increased motor noise.

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 +80 °C	Esso	Polyrex EM[1)]	K2P-20
	+20 °C to +100 °C	Klüber	Barrierta L55/2[2)]	KX2U
	-40 °C to +60 °C	Kyodo Yushi	Multemp SRL[2)]	K2N-40

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

2) synthetic lubricant (= synthetic-based roller bearing grease)

9.3 Order information for lubricants and anti-corrosion agents

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

Use	Manufacturer	type	Packaging unit	Purchase 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	Klübersynth HLR 46-371 for [95]	6 ml	03258017
	Klüber	Petamo GHY 133 for [30], [37], [106]	10 g	04963458
	Fuchs	Renolit CX-Tom 15 for [30], [37], [106]	On request	On request
Anti-corrosion agent and lubricant	SEW-EURODRIVE	NOCO® FLUID	5.5 g	09107819

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

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

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

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

9.6 Encoder

9.6.1 Mounting adapter (in preparation)

Mounting adapter		XV0A	XV1A	XV2A	XV3A	XV4A
For motors		EDR71 – 225				
Mounting type of encoder		Flange centered with coupling				
Design	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 surfaces of the drive can be very hot 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

Malfunctions	Possible cause	Remedy
Motor does not start up	Supply cable interrupted	Check the connections and (intermediate) terminal points, correct if necessary)
	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 differs considerably from the setpoint, at least when switching on the motor	Provide better power supply system; reduce the power supply load; Check cross section of supply cable, replace with cable of larger cross section if necessary.
Motor does not start in star connection, only in delta connection	Star connection does not provide sufficient torque	If the delta inrush current is not too high (observe the regulations of the power supplier), start up directly in delta; Check the project planning and use a larger motor or special 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	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	Eliminate short circuit
	Supply cables connected incorrectly	Correct the wiring, observe the wiring diagram
	Short circuit in the 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 necessary.
Motor heats up excessively (measure temperature)	Overload	Measure power, check project planning and use larger motor or reduce load if necessary
	Insufficient cooling	Provide 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 intended	Correct the wiring, observe the wiring diagram
	Loose contact in supply cable (one phase missing)	Tighten loose contact, check connections, observe wiring diagram
	Fuse 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
	Nominal duty cycle (S1 to S10, DIN 57530) exceeded, e.g. caused by excessive starting frequency	Adjust the nominal duty cycle of the motor to the required operating conditions; consult a professional to determine the proper drive, if necessary

Malfunctions	Possible cause	Remedy
Excessively loud	Ball bearing compressed, dirty or damaged	Re-align motor and the driven machine, inspect rolling bearing and replace if necessary. See chapter "Permitted rolling bearing types".
	Vibration of rotating parts	Look for the case, possibly an imbalance; correct the cause, observe method for balancing
	Foreign objects in cooling air ducts	Clean cooling air ducts

10.2 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.

10.3 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.

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)

11 Appendix

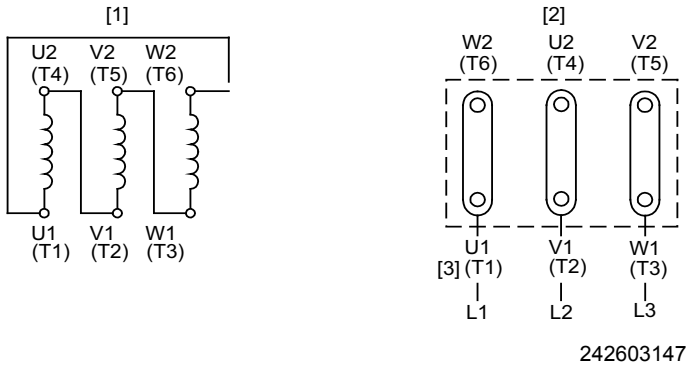
11.1 Wiring diagrams

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.

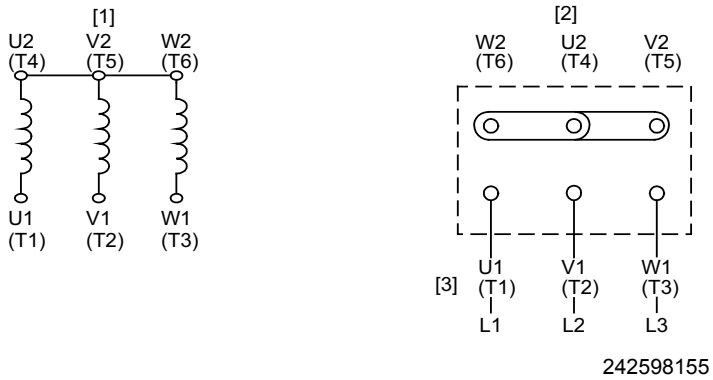
11.1.1 Wiring diagram R13 (68001 xx 06)

△ *connection* The following figure shows △ connection for low voltage.



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

⅄ *connection* The following figure shows ⅄ connection for high voltage.

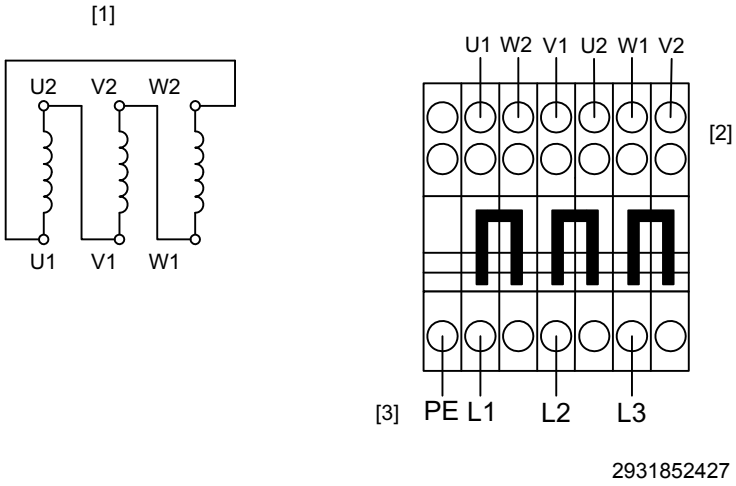


[1] Motor winding
[2] Motor terminal board
[3] Supply cables

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

11.1.2 Wiring diagram C13 (68184 xx 08)

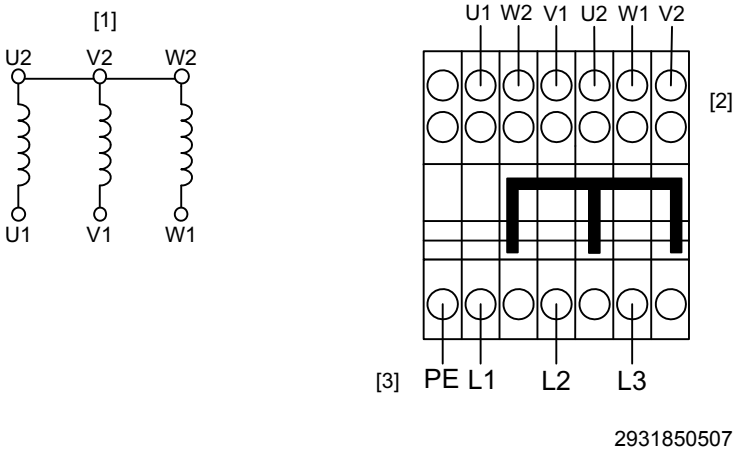
△ *connection* The following figure shows △ connection for low voltage.



2931852427

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

⅄ *connection* The following figure shows ⅄ connection for high voltage.



2931850507

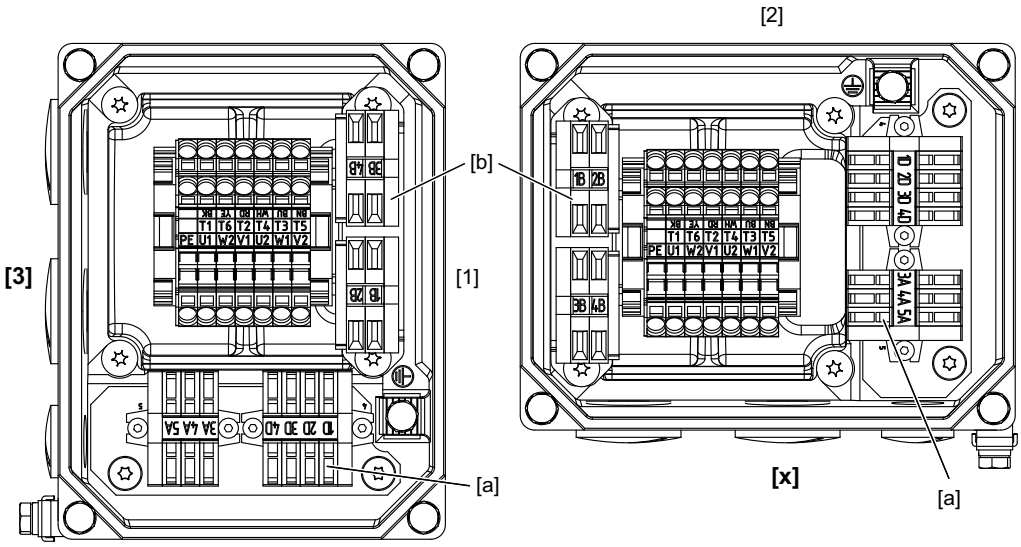
[1] Motor winding
[2] Motor terminal board
[3] Supply cables

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

11.2 Terminal strips 1 and 2

The following figure shows the arrangement of the terminal strips for the different terminal box positions.

Terminal box position 1 and 3, here 3[1)] **Terminal box position X and 2, here X[1)]**



9007202526572427

1) If terminal strip 1 does not exist, you can install terminal strip 2 in the position for terminal strip 1 or for the rectifier.

[1]	Terminal box position 1	[X]	Terminal box position X
[2]	Terminal box position 2	[a]	Terminal strip 1 (or rectifier with equipment protection level c)
[3]	Terminal box position 3	[b]	Terminal strip 2

The terminals can vary in appearance and design depending on the terminal box variant and the connected options.

INFORMATION

- Remove any cables that are already connected before taking out terminal strip 2.
- The connected cables must be free from bends and twists, etc. when they are connected again.

12 Certificates

INFORMATION

The IECEx Certificate of Conformity (IECEx CoC) is available for download on the IECEx website http://iecex.iec.ch/.

13 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

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at

Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 http://www.sew.by sales@sew.by

Belgium			
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.be info@sew-eurodrive.be
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

Brazil			
Production **Sales** **Service**	**São Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br

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
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 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			
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 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
	Additional addresses for service in China provided on request!		

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sew@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. Zeleni dol 10 HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr

Czech Republic			
Sales **Assembly** **Service**	**Hostivice**	SEW-EURODRIVE CZ s.r.o. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
	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

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

Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 EI Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 +1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**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			
Sales	**Libreville**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059 esg_services@yahoo.fr

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@seweurodrivein-dia.com

India			
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
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

Poland			
	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

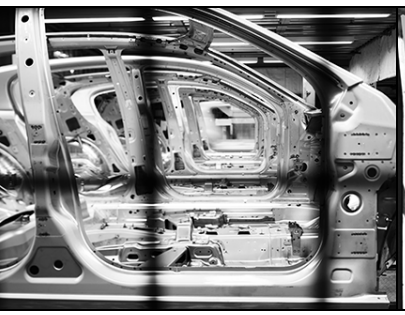
USA			
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

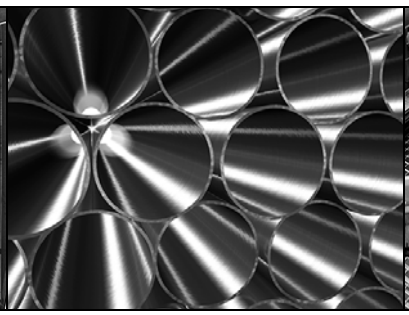
Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net

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






SEW-EURODRIVE
Driving the world

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

➞ www.sew-eurodrive.com