1 General Information .......................................................................................... 5
  1.1 Structure of the safety notes ................................................................. 5
  1.2 Rights to claim under warranty ......................................................... 5
  1.3 Exclusion of liability ........................................................................ 5

2 Safety Notes ...................................................................................................... 6
  2.1 Preliminary information ....................................................................... 6
  2.2 General ............................................................................................... 6
  2.3 Designated use .................................................................................. 7
  2.4 Transportation .................................................................................. 7
  2.5 Installation ......................................................................................... 7
  2.6 Electrical connection ....................................................................... 8
  2.7 Operation .......................................................................................... 8

3 Motor Design ..................................................................................................... 9
  3.1 Basic structure of DR71 – DR100 ..................................................... 9
  3.2 Basic structure DR315 ...................................................................... 10
  3.3 Nameplate, unit designation ............................................................. 11

4 Mechanical Installation .................................................................................. 12
  4.1 Before you begin ............................................................................... 12
  4.2 Mechanical Installation .................................................................. 12

5 Electrical Installation ...................................................................................... 15
  5.1 Use wiring diagrams ................................................................. 15
  5.2 Wiring notes .................................................................................... 15
  5.3 Special features when operating with a frequency inverter .............. 16
  5.4 Improving the grounding (EMC) ...................................................... 17
  5.5 Special features for switching operation ..................................... 18
  5.6 Ambient conditions during operation .............................................. 18
  5.7 Connecting the motor ..................................................................... 19
  5.8 Connecting the brake ..................................................................... 24
  5.9 Accessory equipment ................................................................... 25

6 Startup .............................................................................................................. 28
  6.1 Prerequisites for startup ................................................................. 28

7 Inspection and Maintenance ........................................................................... 29
  7.1 Inspection and maintenance intervals .......................................... 29
  7.2 Bearing lubrication ......................................................................... 30
  7.3 Reinforced bearing ......................................................................... 31
  7.4 Preliminary work for motor and brake maintenance ....................... 32
  7.5 Inspection and maintenance work on the motor DR71-DR100 ......... 34
  7.6 Inspection and maintenance for brake motor DR71-DR100 .......... 36
  7.7 Inspection and maintenance work on the motor DR315 ................. 49
  7.8 Inspection and maintenance for brake motor DR315 .................. 52
1 General Information

1.1 Structure of the safety notes

The safety notes in these operating instructions are structured as follows:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>SIGNAL WORD</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚠️</td>
<td>Nature and source of hazard</td>
</tr>
<tr>
<td></td>
<td>Possible consequence(s) if disregarded.</td>
</tr>
<tr>
<td></td>
<td>• Measure(s) to avoid the hazard.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Signal word</th>
<th>Meaning</th>
<th>Consequences if disregarded</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="example" alt=" General hazard " /></td>
<td>DANGER</td>
<td>Imminent danger</td>
<td>Severe or fatal injuries</td>
</tr>
<tr>
<td><img src="example" alt=" Specific danger, e.g. electric shock " /></td>
<td>WARNING</td>
<td>Possible dangerous situation</td>
<td>Severe or fatal injuries</td>
</tr>
<tr>
<td><img src="example" alt=" STOP " /></td>
<td>CAUTION</td>
<td>Possible dangerous situation</td>
<td>Minor injuries</td>
</tr>
<tr>
<td><img src="example" alt=" NOTE " /></td>
<td>STOP</td>
<td>Possible damage to property</td>
<td>Damage to the drive system or its environment</td>
</tr>
<tr>
<td><img src="example" alt=" NOTE " /></td>
<td>NOTE</td>
<td>Useful information or tip. Simplifies the handling of the drive system.</td>
<td></td>
</tr>
</tbody>
</table>

1.2 Rights to claim under warranty

Adhering to the operating instructions is a prerequisite for fault-free operation and the fulfillment of any right to claim under warranty. Read the operating instructions before you start working with the unit.

Make sure that the operating instructions are available to persons responsible for the system and its operation, as well as to persons who work independently on the unit. You must also ensure that the documentation is legible.

1.3 Exclusion of liability

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

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

2.1 Preliminary information

The following safety notes relate primarily to the use of motors. If using gearmotors, please also refer to the safety notes for gear units in the corresponding operating instructions.

Also consider the supplementary safety notes in the individual sections of these operating instructions.

2.2 General

Never install or operate damaged products. In the event of damage, submit a complaint to the shipping company immediately.

Low-voltage machines have dangerous, live and rotating parts as well as hot surfaces. All work related to transportation, storage, setup/mounting, connection, startup, maintenance and repair may only be carried out by qualified personnel, in strict observation of:

- The relevant detailed operating instruction(s) and wiring diagrams
- The warning and safety signs on the motor/gearmotor
- The specific regulations and requirements for the system
- The national/regional regulations governing safety and the prevention of accidents

Removing covers without authorization, improper use as well as incorrect installation or operation may result in severe injuries to persons or damage to machinery.

Consult the documentation for additional information.
2.3 **Designated use**

The electric motors are intended for industrial systems. Use in potentially explosive areas is prohibited, unless measures are expressly taken to make it possible.

Air-cooled versions are designed for ambient temperatures of $-20 \degree C (-4 \degree F)$ to $+40 \degree C (104 \degree F)$ and installation altitudes $\leq 1000 \text{ m (3281 ft)}$ above sea level. Note that information on the nameplate may differ. It is essential that the operating conditions for the unit comply with the nameplate information.

2.4 **Transportation**

Immediately upon receipt, inspect the shipment for any damage that may have occurred during transportation. If necessary, inform the shipping company immediately. You may need to preclude startup.

Tighten the eyebolts securely. They are only intended for 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 of these 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 when necessary. Remove any transportation fixings prior to startup. Reattach these in the case of further transportation. If low-voltage machines are put into storage, make sure they are kept in a dry, dust-free and low-vibration ($v_{\text{eff}} \leq 0.2 \text{ mm/s}$) environment (bearing standstill damage). Measure the insulation resistance prior to startup. Dry the winding if values $\leq 1 \Omega$ per volt of the rated voltage.

2.5 **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.
2.6 **Electrical connection**

All work may only be carried out by qualified personnel. During work, the low-voltage machine must be on standstill, enabled, and safeguarded against an accidental restart. This also applies to auxiliary circuits (e.g. anti-condensation heating).

Check that the motor is de-energized.

Exceeding the tolerances in EN 60034-1 (VDE 0530, part 1) – voltage +5%, frequency +2%, curve shape, symmetry – increases the heating and influences electromagnetic compatibility. Observe nameplate data and the wiring diagram in the terminal box.

Pay attention to the wiring information and different data on the nameplate, as well as observing the wiring diagram.

The connection should be a continuous 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 to non-insulated and live parts must not be shorter than the minimum values according to IEC 60664 and national regulations. With low voltage, the distances should be no shorter than the following values, in compliance with IEC 60664:

<table>
<thead>
<tr>
<th>Rated voltage $V_N$</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 500 V</td>
<td>3 mm</td>
</tr>
<tr>
<td>≤ 690 V</td>
<td>5.5 mm</td>
</tr>
</tbody>
</table>

The terminal box must be free of 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 keys for test mode without output elements. When operating low-voltage machines with brakes, check that the break is functioning correctly before startup.

Observe the notes in the "Electrical Installation" section.

2.7 **Operation**

Whenever changes to normal operation occur, such as increased temperatures, noise, vibrations, etc., you should determine the cause and contact the manufacturer, if required. Never deactivate protection devices, even in test mode. If you are in doubt, switch off the motor.

Regularly clean air ducts in dusty or dirty environments.
3 Motor Design

NOTE
The following illustration shows the general structure. Its only purpose is to facilitate the assignment of components to the spare parts lists. Deviations are possible depending on the motor size and version.

3.1 Basic structure of DR71 – DR100

1 Rotor
2 Circlip
3 Key
7 Flanged endshield
9 Screw plug
10 Circlip
11 Deep groove ball bearing
12 Circlip
13 Machine screw
16 Stator
22 Hex head bolt
24 Eyebolt
30 Oil seal
32 Circlip
35 Fan guard
36 Fan
41 Shim washer
42 B-side endshield
44 Deep groove ball bearing
90 Base plate
93 Pan head screw
100 Hex nut
103 Stud
106 Oil seal
107 Oil fflinger
108 Nameplate
109 Grooved pin
111 Gasket for lower part
112 Terminal box lower part
113 Pan head screw
115 Terminal board
116 Terminal clip
117 Hex head bolt
118 Lock washer
119 Pan head screw
123 Hex head bolt
129 Screw plug with O-ring
131 Gasket for cover
132 Terminal box cover
134 Screw plug with O-ring
136 Information sign
262 Terminal clip, complete
392 Gasket
705 Protective cowl
706 Spacer
707 Pan head screw
3.2 Basic structure DR315

[1] Rotor
[2] Circlip
[3] Key
[4] Screw plug
[7] Flange
[9] Roller bearing
[10] Foot mounting
[16] Stator
[17] Hex nut
[21] Oil seal flange
[22] Hex head bolt
[24] Eyebolt
[26] Sealing washer
[30] Oil seal
[31] Key
[32] Circlip
[35] Fan guard
[36] Fan
[40] Circlip
[42] B-side endshield
[43] Supporting ring
[44] Roller bearing
[90] Oil flinger
[94] Machine 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
[113] Machine screw
[115] Terminal board
[116] Serrated lock washer
[117] Stud
[118] Washer
[119] Hex head bolt
[123] Hex head bolt
[128] Serrated lock washer
[129] Screw plug
[131] Gasket for cover
[132] Terminal box cover
[134] Screw plug
[138] Hex head bolt
[140] Washer
[151] Machine screw
[219] Hex nut
[250] Oil seal
[452] Terminal strip
[454] Top hat rail
[604] Lubrication ring
[606] Greasing nipple
[607] Greasing nipple
[608] Oil seal flange
[609] Hex head bolt
[633] End bracket
[634] End plate
[705] Protective cowl
[706] Spacer bolt
[707] Hex head bolt
[708] Hex nut
[715] Hex nut
[716] Washer
### 3.3 Nameplate, unit designation

#### 3.3.1 Nameplate

Example:

**DRE gearmotor with brake**

![Nameplate](image)

#### 3.3.2 Unit designation

Example:

**Foot-mounted AC motor with brake**

![Unit designation](image)
4 Mechanical Installation

4.1 Before you begin

The drive may only be installed if:

- the specifications on the drive's nameplate and the output voltage of the frequency inverter match the voltage supply system
- the drive is undamaged (no damage caused by transportation or storage)
- it is certain that the following requirements have been fulfilled:
  - ambient temperature between –20 °C (–4.0 °F) and 40 °C (104 °F) \(^1\)
  - no oil, acid, gas, vapors, radiation, etc.
  - installation altitude max. 1000 m (3281 ft) above sea level
  - note the limitations for encoders
  - special versions: drive configured in accordance with the ambient conditions.

4.2 Mechanical Installation

4.2.1 Preliminary work

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 cause material damage.

**Motors with reinforced bearings**

**STOP**

Motors with a reinforced bearing must not be operated without an overhung load. Otherwise you risk damaging the bearings.

---

\(^1\) Note that you can also limit the temperature range of the gear unit (see gear unit operating instructions).
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.
- You should re-lubricate the lubrication devices on motors that have been in storage for longer than 5 years before startup. 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. To do so, measure the insulation resistance (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.

Drying the motor

Heat the motor:
- with hot air or
- using an isolation transformer
  - connect the windings in series (see following figure)
  - auxiliary AC voltage supply max. 10 % of the rated voltage with max. 20 % of the rated current

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 sealed; if they are not, clean or replace them
4.2.2 Installing the motor

The motor or gearmotor may only be mounted or installed in the specified mounting position on a level, vibration-proof and torsionally rigid support structure.

Carefully align the motor and the driven machine to avoid placing any intolerable strain on the output shafts (observe permitted overhung load and axial load).

Do not butt or hammer the shaft end.

**Use an appropriate cover to prevent objects or fluids entering motors in vertical mounting positions (protective cowl C).**

Ensure the cooling air supply is unobstructed and that air heated by other apparatus cannot be drawn in again.

Balance components for subsequent mounting on the shaft with a half key (motor shafts are balanced with a half key).

Condensation drainage holes are plugged with closing plugs. These can be opened if you want to drain the condensation but must be closed again, as open drain holes render higher enclosures void.

If using brake motors with manual brake release, screw in either the hand lever (with self-reengaging manual brake release) or the setscrew (with lockable manual brake release).

If possible, arrange the terminal box so that the cable entries are pointing downwards.

Coat the threads of cable glands and filler plugs with sealing compound and tighten them well; then coat them again.

Seal the cable entry well.

Thoroughly clean the sealing surfaces of terminal boxes and terminal box covers prior to reassembly; gaskets must be glued in on one side. Replace brittle gaskets.

Restore the anticorrosive coating if necessary.

Check the enclosure.

4.2.3 Installation tolerances

<table>
<thead>
<tr>
<th>Shaft end</th>
<th>Flanges</th>
</tr>
</thead>
</table>
| Diameter tolerance according to EN 50347  
- ISO j6 at Ø ≤ 28 mm (1.1 in)  
- ISO k6 at Ø ≥ 38 mm (1.5 in) to ≤ 48 mm (1.9 in)  
- ISO m6 at Ø ≥ 55 mm (2.2 in)  
- Center hole in accordance with DIN 332, shape DR. | Centering shoulder tolerance in accordance with EN 50347  
- ISO j6 at Ø ≤ 250 mm (9.84 in)  
- ISO h6 at Ø ≥ 300 mm (11.8 in) |
5 Electrical Installation

### 5.1 Use wiring 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.

### 5.2 Wiring notes

Comply with the safety notes during installation.

#### 5.2.1 Protection against interference from brake controls

Unless they are shielded, brake cables must always be routed separately from other power cables with phased currents to protect brake controls against interference. In particular, power cables with phased currents include:

- output cables from frequency inverters and servo controllers, soft startup units and brake units
- supply cables for braking resistors and similar options

#### 5.2.2 Protecting against interference by motor protection devices

To protect against interference by SEW motor protection devices (temperature sensors TF, winding thermostats TH):

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

---

**NOTE**

- It is imperative that you observe the safety notes in section 2 during installation.
- Use switch contacts in utilization category AC-3 according to EN 60947-4-1 for switching the motor and the brake.
5.3 **Special features when operating with a frequency inverter**

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

### 5.3.1 Motor on SEW inverter

SEW-EURODRIVE has tested operation of the motor on SEW frequency inverters. The required dielectric strength values of the motors were confirmed and the startup routines adjusted to the motor data. You can operate the DR motor with any frequency inverter from SEW-EURODRIVE. To do this, start up the motor as described in the operating instructions for the frequency inverter.

### 5.3.2 Motor on a non-SEW inverter

You may operate SEW motors on non-SEW frequency inverters if the pulse voltages indicated in the figure below are not exceeded at the given rise times.

![Diagram showing permitted pulse voltages](image)

**NOTE**

The diagram applies to motor operation of the motor. If the permitted pulse voltage is exceeded, you must install limiting measures, such as filters, chokes or special motor cables. You should also consult the manufacturer of the frequency inverter.

[1] Permitted pulse voltage for DR standard
[2] Permitted pulse voltage according to IEC 60 034-17
5.4  Improving the grounding (EMC)

For improved, low-impedance grounding at high frequencies, we recommend using the following connections:

5.4.1 Size DR71...DR100:

DIN 7500 M5 x 12 self-tapping screw and 2 serrated lock washers in accordance with DIN 6798.

[1] Use the pre-cast bore at the terminal box (brake motor)

[2] Bore in stator housing (Ø = 4.6, t\text{max} = 11.5)

5.4.2 Size DR315:

- 1 x hex head bolt ISO 4017 M12 x 30
- 1 x washer ISO 7090
- 1 x serrated lock washer DIN 6798

[1] Use the grounding screw at the terminal box
5.5 Special features for switching operation

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

5.6 Ambient conditions during operation

5.6.1 Ambient temperature

Adherence to the temperature range of −20 °C (−4 °F) to +40 °C (104 °F) is imperative unless specified otherwise on the nameplate. Motors intended for use in higher or lower ambient temperatures will have the respective designation on the nameplate.

5.6.2 Installation altitude

The maximum installation altitude of 1000 m (3281 ft) above sea level must not be exceeded. Otherwise this causes a power reduction at a factor $f_H$ as specified in the following diagram.

![Diagram showing the reduction in rated power as a function of installation altitude.](image)

The reduction in rated power is calculated according to the following formula:

$$P_{\text{Rated1}} = P_{\text{Rated}} \times f_H$$

- $P_{\text{Rated1}}$ = reduced rated power [kW]
- $P_{\text{Rated}}$ = rated power [kW]
- $f_H$ = factor for reduction due to installation altitude

5.6.3 Hazardous radiation

Motors must not be subjected to hazardous radiation (such as ionizing radiation). Contact SEW-EURODRIVE if necessary.
5.7 Connecting the motor

5.7.1 Connecting the motor via terminal boxes

- in accordance with the wiring diagram provided
- check cable cross section
- arrange terminal links correctly
- firmly screw on connections and protective earth conductors
- In the terminal box: check winding connections and tighten them if necessary

NOTE
The terminal box must be free of foreign objects, dirt and humidity. Unused cable entry openings and the terminal box itself must be closed so they are dust and water proof.
5.7.2 Motor connection terminal board

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

### Motor size DR71-100

<table>
<thead>
<tr>
<th>Terminal stud diameter</th>
<th>Tightening torque of hex nut</th>
<th>Connection at customer end cross section</th>
<th>Version</th>
<th>Connection type</th>
<th>Scope of delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4</td>
<td>1.6 Nm (14 in-lb)</td>
<td>≤ 1.5 mm²</td>
<td>Version 1a</td>
<td>Solid wire conductor end sleeve</td>
<td>Pre-assembled terminal links</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤ 6 mm²</td>
<td>Version 1b</td>
<td>Ring cable lug</td>
<td>Pre-assembled terminal links</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤ 6 mm²</td>
<td>Version 2</td>
<td>Ring cable lug</td>
<td>Small connection accessories enclosed in bag</td>
</tr>
<tr>
<td>M5</td>
<td>2.0 Nm (18 in-lb)</td>
<td>≤ 10 mm²</td>
<td>Version 2</td>
<td>Ring cable lug</td>
<td>Small connection accessories enclosed in bag</td>
</tr>
<tr>
<td>M6</td>
<td>3.0 Nm (27 in-lb)</td>
<td>≤ 16 mm²</td>
<td>Version 3</td>
<td>Ring cable lug</td>
<td>Small connection accessories enclosed in bag</td>
</tr>
</tbody>
</table>

### Motor size DR315

<table>
<thead>
<tr>
<th>Terminal stud diameter</th>
<th>Tightening torque of hex nut</th>
<th>Connection at customer end cross section</th>
<th>Version</th>
<th>Connection type</th>
<th>Scope of delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>15.5 Nm (137 in-lb)</td>
<td>≤ 50 mm²</td>
<td>Version 3</td>
<td>Ring cable lug</td>
<td>Connection parts pre-assembled</td>
</tr>
<tr>
<td>M16</td>
<td>30 Nm (270 in-lb)</td>
<td>≤ 95 mm²</td>
<td>Version 3</td>
<td>Ring cable lug</td>
<td>Connection parts pre-assembled</td>
</tr>
</tbody>
</table>

The versions in bold print apply to S1 operation for the standard voltages and standard frequencies according to the data in the catalog. Other versions may have different connections, for example different terminal stud diameters and/or a different scope of delivery.
Version 1

a) If the cross section of the external connection is $\leq 1.5 \text{ mm}^2$, it can be installed directly below the terminal washer.

b) If the cross section of the external connection is $> 1.5 \text{ mm}^2$, it must be installed as a cable lug below the terminal washer.

Version 1a: cross section $\leq 1.5 \text{ mm}^2$

[1] External connection with cross section $\leq 1.5 \text{ mm}^2$
[2] Terminal stud
[3] Flange nut
[4] Terminal link
[5] Terminal washer
Version 1b: Cross section > 1.5 mm²

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

Version 2

1. Terminal stud
2. Lock washer
3. Terminal washer
4. Winding connection
5. Top nut
6. Washer
7. External connection with ring cable lug, according to DIN 46237 or DIN 46234, for example
8. Bottom nut
Version 3

[1] External connection with ring cable lug, according to DIN 46237 or DIN 46234, for example
[2] Terminal stud
[3] Top nut
[5] Terminal link
[6] Bottom nut
[8] Serrated lock washer
5.8 Connecting the brake

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

### STOP

- Comply with the applicable regulations issued by the relevant employer's liability insurance association for phase failure protection and the associated cycle times/cycle time modifications.
- Connect the brake according to the wiring diagram provided.
- In view of the DC voltage to be switched and the high level of current load, it is essential to use either special brake contactors or AC contactors with contacts in utilization category AC-3 according to EN 60947-4-1.

5.8.1 Connecting the brake control

The DC disc brake is powered by a brake control with protection circuit. This is accommodated in the terminal box / IS lower part or must be installed in the control cabinet.

- Check the cable cross sections – braking currents (see Section "Technical Data")
- Connect the brake control according to the wiring diagram provided
- For motors in thermal class 180 (H), install the brake rectifier in the control cabinet.
5.9 Accessory equipment

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

5.9.1 Temperature sensor TF

<table>
<thead>
<tr>
<th>STOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>The temperature sensor TF may not be subjected to voltages &gt; 30 V.</td>
</tr>
</tbody>
</table>

The positive temperature coefficient (PTC) temperature sensors comply with DIN 44082.

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

- Standard measured values: 20...500 \( \Omega \), thermal resistance > 4000 \( \Omega \)

When using the temperature sensor for thermal monitoring, the evaluation function must be activated to maintain reliable insulation of the temperature sensor circuit. If the temperature reaches an excessive level, the thermal protection function must be brought into effect immediately.

5.9.2 Winding thermostats TH

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

<table>
<thead>
<tr>
<th>Voltage U [V]</th>
<th>AC V</th>
<th>DC V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (( \cos \varphi = 1.0 )) [A]</td>
<td>2.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Current (( \cos \varphi = 0.6 )) [A]</td>
<td>1.6</td>
<td></td>
</tr>
</tbody>
</table>

Contact resistance max. 1 Ohm at DC 5 V / 1 mA
5.9.3 Forced cooling fan V

- Connection in separate terminal box
- Max. connection cross section 3 x 1.5 mm²
- Cable gland M16 × 1.5

<table>
<thead>
<tr>
<th>Operating mode / connection</th>
<th>Frequency in Hz</th>
<th>Voltage V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ~ AC ( △ )</td>
<td>50</td>
<td>230 – 277</td>
</tr>
<tr>
<td>1 ~ AC ( △ )</td>
<td>60</td>
<td>230 – 277</td>
</tr>
<tr>
<td>3 ~ AC ▽</td>
<td>50</td>
<td>346 – 500</td>
</tr>
<tr>
<td>3 ~ AC ▽</td>
<td>60</td>
<td>346 – 575</td>
</tr>
<tr>
<td>3 ~ AC △</td>
<td>50</td>
<td>200 – 290</td>
</tr>
<tr>
<td>3 ~ AC △</td>
<td>60</td>
<td>200 – 330</td>
</tr>
</tbody>
</table>

NOTE

For information on how to connect the forced cooling fan V, refer to the wiring diagram.
5.9.4 Overview of encoders

Refer to the wiring connection diagrams on information on how to connect incremental encoders:

<table>
<thead>
<tr>
<th>Encoder</th>
<th>SEW motor</th>
<th>Encoder type</th>
<th>Mounting type</th>
<th>Power supply</th>
<th>Signal</th>
<th>Wiring diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES7S</td>
<td>DR71-100</td>
<td>Encoder</td>
<td>Shaft-centered</td>
<td>DC 7..30 V</td>
<td>1 Vss sin/cos</td>
<td>68 169 xx 061)</td>
</tr>
<tr>
<td>ES7H</td>
<td>DR71-100</td>
<td>Encoder</td>
<td>Shaft-centered</td>
<td>DC 7..12 V</td>
<td>Hiperface single-turn</td>
<td>68 170 xx 061)</td>
</tr>
<tr>
<td>AS7H</td>
<td>DR71-100</td>
<td>Encoder</td>
<td>Shaft-centered</td>
<td>DC 7..12 V</td>
<td>Hiperface multi-turn</td>
<td>68 170 xx 061)</td>
</tr>
<tr>
<td>EH7S</td>
<td>DR315</td>
<td>Encoder</td>
<td>Shaft-centered</td>
<td>DC 10..30 V</td>
<td>1 Vss sin/cos</td>
<td>08 259 xx 071)</td>
</tr>
<tr>
<td>AH7Y</td>
<td>DR315</td>
<td>Encoder</td>
<td>Shaft-centered</td>
<td>DC 9..30 V</td>
<td>TTL + SSI (RS 422)</td>
<td>08 259 xx 071)</td>
</tr>
</tbody>
</table>

1) xx = placeholder for the wiring diagram version

**NOTE**

- Maximum oscillation load for encoder ≤ 10 g ≈ 100 m/s² (3937.008 in/s²) (10 Hz ... 2 kHz)
- Shock resistance ≤ 100 g ≈ 1000 m/s² for the DR71-100
- Shock resistance ≤ 200 g ≈ 2000 m/s² (78740.157 in/s²) for the DR315

5.9.5 Encoder connection

When connecting encoders to inverters, always follow the operating instructions for the relevant inverter.

- Maximum cable length (inverter – encoder):
  - 100 m (328 ft) with a capacitance per unit length ≤ 120 nF/km (193 nF/mile)
- Core cross section: 0.20 ... 0.5 mm²
- Use a shielded cable with twisted pair cores and apply shield over a large surface area at both ends:
  - to the connection cover of the encoder, in the cable gland, or in the encoder plug
  - to the inverter on the electronics shield clamp or to the housing of the sub D plug
- Install the encoder cables separately from the power cables, maintaining a distance of at least 200 mm (7.87 in).
6 Startup

6.1 Prerequisites for startup

NOTE

- It is essential to comply with Safety notes in section 2 (page 6) during installation.
- In case of problems, refer to the "Malfunctions" section (page 81).

6.1.1 Before startup, make sure that

- the drive is undamaged and not blocked,
- the measures stipulated in section "Preliminary work" (page 12) are performed after extended storage period,
- all connections have been made properly,
- the direction of rotation of the motor/gearmotor is correct,
  - (motor rotating clockwise: U, V, W to L1, L2, L3)
- all protective covers have been installed correctly,
- all motor protection equipment is active and set for the rated motor current,
- and that there are no other sources of danger present.

6.1.2 During startup, make sure that:

- the motor is running correctly (no overload, no speed fluctuation, no loud noises, etc.),
- and the correct braking torque is set according to the specific application; see "Technical Data" (page 63) section.

STOP

On brake motors with a self-reengaging manual brake release, the hand lever must be removed after startup. A bracket is provided for storing the lever on the outside of the motor.
7 Inspection and Maintenance

7.1 Inspection and maintenance intervals

<table>
<thead>
<tr>
<th>Unit / unit part</th>
<th>Time interval</th>
<th>Procedure?</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE brake</td>
<td>• If used as a working brake: at least every 3000 hours of operation(^1)</td>
<td>Inspect the brake: • measure the brake disc thickness • brake disc, lining • measure and set working air gap • pressure plate • carrier / gearing • pressure rings • vacuum up any abraded residue • inspect the switch contacts and change if necessary (e.g. in case of burn-out)</td>
</tr>
<tr>
<td></td>
<td>• If used as a holding brake: every 2 to 4 years, depending on operating conditions(^1)</td>
<td></td>
</tr>
<tr>
<td>Motor</td>
<td>• Every 10,000 hours of operation(^2)</td>
<td>Inspect the motor: • check roller bearings and change if necessary • change the oil seal • clean the cooling air passages</td>
</tr>
<tr>
<td>Drive</td>
<td>• Varies (depends on external influences)</td>
<td>• Touch up or renew the surfaces / anticorrosion coating</td>
</tr>
</tbody>
</table>

\(^1\) The periods of wear are affected by many factors and may be short. The machine designer must calculate the required inspection/maintenance intervals individually in accordance with the project planning documents (e.g. "Project Planning for Drives").

\(^2\) For the DR315 with lubrication device, observe the short re-lubrication intervals in the "Bearing lubrication DR315" section.
7.2 Bearing lubrication

7.2.1 Bearing lubrication DR71-100

The motor bearings generally come with lubrication for life.

7.2.2 Bearing lubrication DR315

Series 315 motors may be equipped with a lubrication device. The following figure shows the positions of the lubrication devices.

![Lubrication device in type A in accordance with DIN 71412](image)

[1] Lubrication device in type A in accordance with DIN 71412

In normal operating conditions and at an ambient temperature between –20 °C (–4 °F) to 40 °C (104 °F), SEW-EURODRIVE uses a mineral high-performance, high temperature grease for lubrication; a polyurea-based lubricant produced by ESSO Polyrex EM (K2P-20 DIN51825).

For motors in the low temperature range up to –40 °C (–40 °F), the SKF GXN grease is used instead, which is also a mineral polyurea-based grease.

Relubrication

You can purchase the lubricants in 400 g cartridges from SEW-EURODRIVE. For order information, refer to the section, "Lubricant tables for roller bearings of SEW motors" (page 73).

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only mix lubricants of the same thickness type, the same base oil and the same consistency (NLGI class).</td>
</tr>
</tbody>
</table>

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

After relubricating the motors, you should startup slowly, if possible, so that the grease is distributed evenly.
Relubrication interval for bearings

- if the ambient temperature is –20 °C (–4 °F) to 40 °C (104 °F),
- at a 4-pole speed,
- and with a normal load,

are assigned using the table below. At greater speeds, higher loads or higher ambient temperatures, the relubrication intervals are shorter.

<table>
<thead>
<tr>
<th>Motor type</th>
<th>Horizontal mounting position</th>
<th>Vertical mounting position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Duration</td>
<td>Quantity</td>
</tr>
<tr>
<td>DR315 /NS</td>
<td>5000 h</td>
<td>50 g</td>
</tr>
<tr>
<td>DR315 /ERF /NS</td>
<td>3000 h</td>
<td>50 g</td>
</tr>
</tbody>
</table>

7.3 Reinforced bearing

STOP

In the /ERF (reinforced bearing) option, cylindrical roller bearings are installed on the A side. These must not be operated without an overhung load, otherwise you risk damaging the bearings.

The reinforced bearing is only offered with the /NS (relubrication) option so as to facilitate optimal lubrication of the bearing. For bearing lubrication, refer to the notes in the "Bearing lubrication DR315" section (page 30).
### 7.4 Preliminary work for motor and brake maintenance

**DANGER**
Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries can occur.
- Before starting work, isolate the motor and brake from the power supply.
- Safeguard against accidental startup.

#### 7.4.1 Removing the incremental encoder from the DR71-100.

The following figure shows how to remove an encoder using the ES7. incremental encoder as example.

![Encoder Removal Diagram]

**Removing ES7.**
- Remove the protection cover [361].
- Unfasten the expansion anchor by unscrewing the screws [733] from the cover grid.
- Unscrew the central retaining screw [367] by about two to three turns and unfasten the spread shaft cone by tapping lightly on the head of the screw.
- Remove the incremental encoder from the bore of the rotor [1].

**Removing AS7.**
- Remove the protection cover [361].
- Unscrew the connection cover [220] and remove it. Do not disconnect the encoder connection cable.
- Unfasten the expansion anchor by unscrewing the screws [733] from the cover grid.
- Unscrew the central retaining screw [367] by about two to three turns and unfasten the spread shaft cone by tapping lightly on the head of the screw.
- Remove the incremental encoder from the bore of the rotor [1].

**Re-assembly**

*For re-assembly, please note:*
- Apply NOCO® fluid to the encoder spigot.
- Tighten the central retaining screw [367] with a tightening torque of 2.9 Nm (26 in-lb).
- Tighten the screw [733] in the expansion anchor with a tightening torque of max. 1.0 Nm (8.9 in-lb).
7.4.2 Removing the incremental encoder from the DR315

The following figure shows how to remove the incremental encoder on the DR315.

Removing EH7.
- Remove the protection cover [657] by unfastening the screws [659].
- Separate the encoder from the fan guard by loosening the nut [734].
- Unfasten the retaining screw [367] on the encoder and remove the encoder [220] from the shaft.

Removing AH7.
- Remove the protection cover [657] by loosening the screws [659].
- Separate the encoder from the fan guard by loosening the screws [748].
- Unfasten the retaining screw [367] on the encoder [220] and remove the encoder [220] from the shaft.

Re-assembly
For re-assembly, please note:
- Apply NOCO® fluid to the encoder spigot.
- Tighten the retaining screw with the following tightening torques:

<table>
<thead>
<tr>
<th>Encoder</th>
<th>Tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>EH7.</td>
<td>0.7 Nm (6 in-lb)</td>
</tr>
<tr>
<td>AH7.</td>
<td>3.0 Nm (27 in-lb)</td>
</tr>
</tbody>
</table>
7.5  Inspection and maintenance work on the motor DR71-DR100

7.5.1  Basic structure of DR71-DR100

[1] Rotor
[2] Circlip
[3] Key
[7] Flanged endshield
[9] Screw plug
[10] Circlip
[12] Circlip
[16] Stator
[22] Hex head bolt
[24] Eyebolt
[30] Oil seal
[32] Circlip
[35] Fan guard
[36] Fan

[41] Shim washer
[42] B-side endshield
[44] Deep groove ball bearing
[90] Base plate
[93] Pan head screw
[100] Hex nut
[103] Stud
[106] Oil seal
[107] Oil flinger
[108] Nameplate
[109] Grooved pin
[111] Gasket for lower part
[112] Terminal box lower part
[113] Pan head screw
[115] Terminal board
[116] Terminal clip

[117] Hex head bolt
[118] Lock washer
[119] Pan head screw
[123] Hex head bolt
[129] Screw plug with O-ring
[131] Gasket for cover
[132] Terminal box cover
[134] Screw plug with O-ring
[156] Information sign
[262] Terminal clip, complete
[327] Gasket
[392] Protective cowl
[705] Spacer
[706] Protective cowl
[707] Pan head screw
7.5.2 Procedure for inspecting motor DR71-DR100

**DANGER**

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries can occur.
- Disconnect the motor from the power supply before starting work and safeguard against accidental startup.
- Carefully observe the following operation steps.

1. Remove forced cooling fan and incremental encoder (if installed).
   See section "Preliminary work for motor and brake maintenance" (page 32).
2. Remove fan guard [35] and fan [36].
4. Visual inspection: are there traces of gear oil or condensation inside the stator?
   - If there are not, proceed to step 7
   - If there is condensation, proceed to step 5
   - If there is gear oil, have the motor repaired by a specialist workshop
5. If there is condensation 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 "Preliminary work" section (page 12).
   See section "Permitted roller bearing types" (page 72).
8. Reseal the shaft:
   - A-side: Replace oil seal [106]
   - B-side: Replace oil seal [30]
     Coat the sealing lip with grease (Klüber Petamo GHY 133).
9. Reseal the stator seat:
   - Seal the sealing surface with a duroplastic sealing compound (operating temperature –40 °C [–40 °F]...180 °C [356 °F]), such as "Hylomar L Spezial".
   - Replace gasket [392]
10. Install the motor and accessory equipment.
7.6  
**Inspection and maintenance for brake motor DR71-DR100**

7.6.1  
**Basic structure of brake motor DR71, DR80**

[1] Motor with brake endshield  
[22] Hex head bolt  
[36] Fan guard  
[36] Fan  
[49] Pressure plate  
[50] Brake spring  
[51] Hand lever  
[53] Releasing lever  
[54] Magnet, complete  
[56] Stud  
[57] Conical coil spring  
[58] Setting nut  
[59] Parallel pin  
[60] Stud 3x  
[61] Hex nut  
[62] Circlip  
[65] Pressure ring  
[66] Rubber sealing collar  
[67] Counter spring  
[68] Brake disc  
[70] Carrier  
[71] Key  
[73] Stainless steel shim plate  
[95] Sealing ring  
[718] Damping plate
7.6.2 Basic structure of brake motor DR90, DR100

- Motor with brake endshield
- Hex head bolt
- Fan guard
- Fan
- Hand lever
- Releasing lever
- Stud
- Conical coil spring
- Setting nut
- Parallel pin
- Circlip
- Carrier
- Sealing ring
- Pre-assembled brake
- Screw
- Gasket
7.6.3 Basic structure of brake BE05-BE5

- [49] Pressure plate
- [50] Brake spring (standard)
- [54] Magnet, complete
- [60] Stud 3x
- [61] Hex nut
- [65] Pressure ring
- [66] Rubber sealing collar
- [67] Counter spring
- [68] Brake disc
- [69] Annular spring
- [276] Brake spring (blue)
- [702] Friction disc
- [718] Damping plate

174202635
7.6.4 Procedure for inspecting brake motor DR71-DR100

<table>
<thead>
<tr>
<th>DANGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of crushing if the drive starts up unintentionally.</td>
</tr>
<tr>
<td>Severe or fatal injuries can occur.</td>
</tr>
<tr>
<td>• Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup.</td>
</tr>
<tr>
<td>• Carefully observe the following operation steps.</td>
</tr>
</tbody>
</table>

1. Remove forced cooling fan and incremental encoder (if installed).
   See section "Preliminary work for motor and brake maintenance" (page 32).
2. Remove fan guard [35] and fan [36].
4. Remove the terminal box cover and unfasten the brake cable from the rectifier.
5. Push the brake off the stator and carefully lift it off.
6. Pull the stator back by approx. 3 – 4 cm (1 – 2 in).
7. Visual inspection: are there traces of gear oil or condensation inside the stator?
   - If there are not, proceed to step 10
   - If there is condensation, proceed to step 8
   - If there is gear oil, have the motor repaired by a specialist workshop
8. If there is condensation inside the stator:
   - With gearmotors: remove the motor from the gear unit
   - With motors without a gear unit: remove the A-flange
   - Remove the rotor [1]
9. Clean the winding, dry it and check it electrically see "Preliminary work" section (page 12).
    See section "Permitted roller bearing types" (page 72).
11. Reseal the shaft:
    - A-side: Replace oil seal [106]
    - B-side: Replace oil seal [30]
    Coat the sealing lip with grease (Klüber Petamo GHY 133).
12. Reseal the stator seat:
    - Seal the sealing surface with a duroplastic sealing compound (operating temperature –40 °C [–40 °F]...180 °C [356 °F]), such as "Hylomar L Spezial".
    - Replace gasket [392]
13. Install the motor, brake and accessory equipment.
### Setting the working air gap for brake BE05-BE5

#### DANGER

Risk of crushing if the drive starts up unintentionally. Severe or fatal injuries can occur.

- Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup.
- Carefully observe the following operation steps.

1. Remove the following:
   - Forced cooling fan and incremental encoder (if installed) see section "Preliminary work for motor and brake maintenance" (page 32).
   - Flange cover or fan guard [21]
2. Push the rubber sealing collar [5] aside,
   - release the clip to do this, if necessary
   - vacuum up any abraded residue
3. Measure the brake disc [68]:
   - if the brake disc ≤ 9 mm, (on motors up to DR100), replace the brake disc.
   See section "Replacing the brake disc for brake BE05-BE5" (page 41).
4. Measure the working air gap A (see following figure) (use a feeler gauge and measure at three points offset by 120°):
   - between the pressure plate [49] and damping plate [718]
5. Tighten the hex nuts [61]:
6. Tighten the setting sleeves
   - until the working air gap is set correctly; see "Technical Data" section (page 63).
7. Put the rubber sealing collar back in place and re-install the dismantled parts.
7.6.6 Replacing the brake disc for brake BE05-BE5

When fitting a new brake disc (thickness ≤ 9 mm), also inspect the other removed parts and, if necessary, install new ones.

---

**DANGER**

- Risk of crushing if the drive starts up unintentionally.
- Severe or fatal injuries can occur.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup.
- Carefully observe the following operation steps.

---

**NOTE**

- The brake for motor sizes DR 71-80 cannot be removed from the motor because the BE brake is directly installed on the brake endshield of the motor.
- With motor sizes DR 90-100, you can remove the brakes when changing the brake disc, as the BE brake is pre-assembled on the motor's brake endshield on top of a friction disc.

---

1. Remove the following:
   - forced cooling fan and incremental encoder (if installed)
     
   - flange cover or fan guard [35], circlip [62] and fan [36]

2. Remove the rubber sealing collar [66] and the manual brake release:
   - setting nuts [58], conical coil springs [57], studs [56], releasing lever [53], spiral dowel pin [59]

3. Unfasten hex nuts [61], carefully pull off the brake coil body [54] (brake cable) and remove the brake springs [50].

4. Remove the damping plate [718], pressure plate [49] and brake disc [68], and clean the brake components.

5. Install a new brake disc.

6. Re-install the brake components,
   - except for the fan and the fan guard, because the working air gap has to be set first see section "Setting the working air gap for brake BE05-BE5" (page 40).
7. With manual brake release: use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see following figure). The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

<table>
<thead>
<tr>
<th>Brake</th>
<th>Floating clearance &quot;s&quot; [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE05; BE1</td>
<td>1.5</td>
</tr>
<tr>
<td>BE2; BE5</td>
<td>2</td>
</tr>
</tbody>
</table>

8. Put the rubber sealing collar back in place and re-install the dismantled parts.

**NOTE**
- The lockable manual brake release (type HF) is already released if a resistance is encountered when operating the setscrew.
- The self-reengaging manual brake release (type HR) can be operated with normal hand pressure.
- In brake motors with self-reengaging manual brake release, the manual brake release lever must be removed after startup/maintenance. A bracket is provided for storing the lever on the outside of the motor.

**NOTE**
Important: after replacing the brake disc, the maximum braking torque is reached only after several cycles.
7.6.7 Changing the braking torque of brake BE05-BE5

The braking torque can be altered in stages,
• by changing the type and number of brake springs
• by changing the complete magnet (only possible for BE05 and BE1)
• by changing the brake (from motor size DR90)

To find the possible braking torque graduations for each motor, refer to the "Technical Data" section (page 63).

Changing the brake spring

<table>
<thead>
<tr>
<th>DANGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of crushing if the drive starts up unintentionally. Severe or fatal injuries can occur.</td>
</tr>
<tr>
<td>Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup.</td>
</tr>
<tr>
<td>Carefully observe the following operation steps.</td>
</tr>
</tbody>
</table>

1. Remove the following:
   - forced cooling fan and incremental encoder (if installed)
     See section "Preliminary work for motor and brake maintenance" (page 32).
   - flange cover or fan guard [35], circlip [62] and fan [36]
2. Remove the rubber sealing collar [66] and the manual brake release:
   - setting nuts [58], conical coil springs [57], studs [56], releasing lever [53], spiral dowel pin [59]
3. Unfasten hex nuts [61] and pull off the brake coil body [54]
   - By approx. 50 mm (2.0 in) (watch the brake cable)
4. Change or add brake springs [50/276]
   - Position the brake springs symmetrically
5. Re-install the brake components,
   - except for the fan and the fan guard, because the working air gap has to be set first see section "Setting the working air gap for brake BE05-BE5" (page 40).
6. With manual brake release: use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see the following figure). The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

![Diagram showing setting nuts and floating clearance](177241867)

<table>
<thead>
<tr>
<th>Brake</th>
<th>Floating clearance &quot;s&quot; [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE05; BE1</td>
<td>1.5</td>
</tr>
<tr>
<td>BE2; BE5</td>
<td>2</td>
</tr>
</tbody>
</table>

7. Put the rubber sealing collar back in place and re-install the dismantled parts.

**NOTE**

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

**DANGER**

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries can occur.

- **Isolate the motor and brake from the power supply before starting work,** safeguarding them against accidental startup.
- **Carefully observe the following operation steps.**

1. Remove the following:
   - forced cooling fan and incremental encoder (if installed)
     See section "Preliminary work for motor and brake maintenance" (page 32).
   - flange cover or fan guard [35], circlip [62] and fan [36]

2. Remove the rubber sealing collar [66] and the manual brake release:
   - setting nuts [58], conical coil springs [57], studs [56], releasing lever [53], spiral dowel pin [59]

3. Remove the terminal box cover and loosen the brake cable from the rectifier. If necessary, attach trailing wire to brake cables.

4. Unfasten hex nuts [61], remove complete magnet [54], replace brake springs [50/276].

5. Re-install the brake components,
   - except for the fan and the fan guard, because the working air gap has to be set first see section "Setting the working air gap for brake BE05-BE5" (page 40).

6. With manual brake release: use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see the following figure).

   **The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.**

   ![Image](177241867)

7. Put the rubber sealing collar back in place and re-install the dismantled parts.

<table>
<thead>
<tr>
<th>Brake</th>
<th>Floating clearance &quot;s&quot; [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE05; BE1</td>
<td>1.5</td>
</tr>
<tr>
<td>BE2; BE5</td>
<td>2</td>
</tr>
</tbody>
</table>

---

**Operating Instructions – AC Motors DRS/DRE/DRP**
Replacing the brake on DR71 and DR80

**DANGER**

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries can occur.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup.
- Carefully observe the following operation steps.

1. Remove the following:
   - forced cooling fan and incremental encoder (if installed)
     See section "Preliminary work for motor and brake maintenance" (page 32).
   - flange cover or fan guard [35], circlip [62] and fan [36]
2. Remove the terminal box cover and loosen the brake cable from the rectifier. If necessary, attach trailing wire to brake cables.
3. Loosen machine screws [13] and remove brake endshield with brake from stator.
4. Guide the brake cable into the terminal box.
5. Align the cam of the brake endshield.

**Notes for BE05 and BE1 installed on the DR80:** You can only turn the brake against the shaft as long as the brake is not making contact with the carrier. Turning the brake on the shaft can destroy the brake disc of the brake. Turning the whole brake, including the shaft, is permitted.

6. Mount oil seal [95].
7. With manual brake release: use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see the following figure).

The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

<table>
<thead>
<tr>
<th>Brake</th>
<th>Floating clearance &quot;s&quot; [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE05; BE1</td>
<td>1.5</td>
</tr>
<tr>
<td>BE2</td>
<td>2</td>
</tr>
</tbody>
</table>
Replacing the brake on DR90 and DR100

1. Remove the following:
   - forced cooling fan and incremental encoder (if installed)
     See section “Preliminary work for motor and brake maintenance” (page 32).
   - flange cover or fan guard [35], circlip [62] and fan [36]
2. Remove the terminal box cover and loosen the brake cable from the rectifier. If necessary, attach trailing wire to brake cables.
3. Unfasten screws [900] and remove brake from brake endshield.
4. Pay attention to the alignment of the gasket [901].
5. Guide the brake cable into the terminal box.
6. Align the cam of the friction disc.
   **Note for BE1:** You can only turn the brake against the shaft as long as the brake is not making contact with the carrier. Turning the brake on the shaft can destroy the brake disc of the brake. Turning the whole brake, including the shaft, is permitted.
7. Mount oil seal [95].
8. With manual brake release: use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see the following figure).
   The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

<table>
<thead>
<tr>
<th>Brake</th>
<th>Floating clearance &quot;s&quot; [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE1</td>
<td>1.5</td>
</tr>
<tr>
<td>BE2; BE5</td>
<td>2</td>
</tr>
</tbody>
</table>

**DANGER**
Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries can occur.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup.
- Carefully observe the following operation steps.

---

Operating Instructions – AC Motors DRS/DRE/DRP
7.6.8 Retrofitting the manual brake release HR/HF

**DANGER**
Risk of crushing if the drive starts up unintentionally. Severe or fatal injuries can occur.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup.
- Carefully observe the following operation steps.

1. Remove the following:
   - forced cooling fan and incremental encoder (if installed)
   - flange cover or fan guard [35], circlip [62] and fan [36]
2. Sealing ring [95].
3. Screw in studs [56], insert sealing ring [95], and hammer in the parallel pin [59].
4. Use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see the following figure).

The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

<table>
<thead>
<tr>
<th>Brake</th>
<th>Floating clearance &quot;s&quot; [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE05; BE1</td>
<td>1.5</td>
</tr>
<tr>
<td>BE2; BE5</td>
<td>2</td>
</tr>
</tbody>
</table>

5. Reassemble the removed parts.
7.7 Inspection and maintenance work on the motor DR315

7.7.1 Basic structure of the motor DR315

- Rotor
- Circlip
- Key
- Flange
- Screw plug
- Roller bearing
- Machine screw
- Stator
- Hex nut
- Machine screw
- Oil seal flange
- Stud
- Cup spring
- Oil seal
- Oil flinger
- Nameplate
- Grooved pin
- Gasket for lower part
- Terminal box lower part
- Terminal box cover
- Screw plug
- Hex head bolt
- Washer
- Machine screw
- Hex nut
- Hex head bolt
- Oil seal
- Oil seal flange
-top hat rail
- Lubrication ring
- Greasing nipple
- Greasing nipple
- End bracket
- End plate
- Protective cowl
- Spacer bolt
- Hex head bolt
- Hex nut
- Washer
- Supporting ring
- Foot mounting
- Machine screw
- Hex nut
- Machine screw
- Oil seal
- Top hat rail
- Terminal strip
- Nameplate
- Grooved pin
- Gasket for lower part
- Terminal box lower part
- Screw plug
- Hex head bolt
- Washer
- Machine screw
- Hex nut
- Hex head bolt
- Oil seal
- Oil seal flange
- top hat rail
- Lubrication ring
- Greasing nipple
- Greasing nipple
- End bracket
- End plate
- Protective cowl
- Spacer bolt
- Hex head bolt
- Hex nut
- Washer
- Supporting ring
- Foot mounting
- Machine screw
- Hex nut
- Machine screw
- Oil seal
- Top hat rail
- Terminal strip
- Nameplate
- Grooved pin
- Gasket for lower part
- Terminal box lower part
- Screw plug
- Hex head bolt
- Washer
- Machine screw
- Hex nut
- Hex head bolt
- Oil seal
- Oil seal flange
- top hat rail
- Lubrication ring
- Greasing nipple
- Greasing nipple
- End bracket
- End plate
- Protective cowl
- Spacer bolt
- Hex head bolt
- Hex nut
- Washer
7.7.2 Procedure for inspecting motor DR315

*DANGER*
Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries can occur.
- Disconnect the motor from the power supply before starting work and safeguard against accidental startup.
- Carefully observe the following operation steps.

1. Remove forced cooling fan and incremental encoder (if installed).
   See section "Preliminary work for motor and brake maintenance" (page 32).
   With gearmotors: Remove the motor from the gear unit.
2. Remove fan guard [35] and fan [36].
3. Unfasten machine screws [25] and [19] and remove B-side endshield [42].
5. Loosen screws [609] and separate the rotor from the flange [7]. Before disassembly, protect the oil seal seat against damage using adhesive tape or a protective sleeve.
6. Visual inspection: are there traces of gear oil or condensation inside the stator?
   - If there are not, proceed to step 8
   - If there is condensation, continue with 7
   - If there is gear oil, have the motor repaired by a specialist workshop
7. If there is condensation inside the stator:
   Clean the winding, dry it and check it electrically see "Preliminary work" section (page 12).
   See section "Permitted roller bearing types" (page 72).
   Fill the bearing with grease until it is two-thirds full.
   See section "Bearing lubrication DR315" (page 30).
   Important: place the oil seal flange, [608] and [21], onto the rotor shaft before installing the bearings.
10. Place the cup springs [105] and lubrication ring [604] into the bearing bore of the flange [7].
    Hang the rotor [1] onto the B-side thread, and guide into the flange [7].
    Fasten the oil seal flange [608] to the flange [7] using the hex head bolts [609].
11. Mount the stator [16].
   - Reseal the stator seat: seal the sealing surface with a duroplastic sealing compound (operating temperature -40 °C [-40 °F]...180 °C [356 °F]), such as "Hylomar L Spezial".
     Important: Protect the winding overhead from damage.
   - Screw in the stator [16] and flange [7] with screws [15].

12. Before mounting the B-side endshield [42], screw in the M8 setscrew approximately 200 mm (7.87 in) into the oil seal flange [21].


14. Renew oil seals
   - A-side: insert the oil seal [106] and the oil seal [250] for gearmotors. With gearmotors, fill the space between the two oil seals approx. two-thirds full with grease (Klüber Petamo GHY133).
   - B-side: insert the oil seal [30], and coat the sealing lip with the same grease.

15. Install the fan [36] and fan guard [35].
7.8 Inspection and maintenance for brake motor DR315

7.8.1 Basic structure of brake motor DR315

- [1] Motor with brake endshield
- [22] Hex head bolt
- [31] Key
- [32] Circlip
- [35] Fan guard
- [36] Fan
- [37] V-ring
- [47] O-ring
- [53] Releasing lever
- [55] Closing piece
- [56] Stud
- [57] Conical coil spring
- [58] Setting nut
- [62] Circlip
- [64] Setscrew
- [70] Carrier
- [71] Key
- [255] Conical seat
- [256] Spherical washer
- [550] Pre-assembled brake
- [900] Screw
- [901] Gasket
7.8.2 Basic structure of brake BE120-BE122

- Closing cap
- Pressure plate
- Brake spring
- Brake stationary disc (BE122 only)
- Magnet, complete
- Stud 3x
- Hex nut
- Rubber sealing collar
- Setting sleeve
- Brake disc
- Brake disc (BE122 only)
- Annular spring
- Annular spring (BE122 only)
- Friction disc
- Cover disc
- Screw
7.8.3 Procedure for inspecting brake motor DR315

1. Remove forced cooling fan and incremental encoder (if installed)
   See section "Preliminary work for motor and brake maintenance" (page 32).
2. Remove fan guard [35] and fan [36]
3. Unfasten brake connector
4. Loosen screws [900] and remove pre-assembled brake [550] from brake endshield.
5. Unfasten machine screws [25] and [19] and remove B-side endshield [42].
7. Loosen screws [609] and separate the rotor from the flange [7]. Before disassembly, protect the oil seal seat from damage using adhesive tape or a protective sleeve.
8. Visual inspection: are there traces of gear oil or condensation inside the stator?
   – If there are not, proceed to step 8
   – If there is condensation, continue with 7
   – If there is gear oil, have the motor repaired by a specialist workshop
9. If there is condensation inside the stator:
   Clean the winding, dry it and check it electrically; see "Preliminary work" section (page 32).
    See section "Permitted roller bearing types" (page 72).
    Fill the bearing with grease until it is two-thirds full.
    See section "Bearing lubrication DR315" (page 30)
    Important: place the oil seal flange, [608] and [21], onto the rotor shaft before installing the bearings.
11. Starting on the A-side, mount the motor vertically.
12. Place the cup springs [105] and lubrication ring [604] into the bearing bore of the flange [7].
    Hang the rotor [1] onto the B-side thread, and guide into the flange [7].
    Fasten the oil seal flange [608] to the flange [7] using the hex head bolts [609].
13. Mount the stator [16].
   - Reseal the stator seat: seal the sealing surface with a duroplastic sealing compound (operating temperature –40 °C [–40 °F]...180 °C [356 °F]), such as "Hylomar L Spezial".
     Important: Protect the winding overhead from damage.
   - Screw in the stator [16] and flange [7] with screws [15].

14. Before mounting the brake endshield, screw in the M8 setscrew approximately 200 mm (7.87 in) into the oil seal flange [21].

15. Before mounting the brake endshield [42], feed the setscrew in through a bore for the screw [25]. Screw in the brake endshield and stator [16] using machine screws [19] and hex nuts [17]. Lift the oil seal flange [21] with the setscrew, and fasten using 2 screws [25]. Remove the setscrew and screw in the remaining screws [25].

16. Renew oil seals
   - A-side: insert the oil seals [106] and the oil seal [250] for gearmotors.
     Fill the space between the two oil seals approx. two-thirds full with grease (Klüber Petamo GHY133).
   - B-side: insert the oil seal [30], and coat the sealing lip with the same grease. This condition applies only to gearmotors

17. Align the cam of the friction disc, and mount the brake onto the brake endshield using a screw [900].

18. With manual brake release: use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see the following figure).

   The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

19. Install the fan [36] and fan guard [35].

20. Install the motor and accessory equipment.
7.8.4 Setting the working air gap for brake BE120-BE122

**DANGER**

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries can occur.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup.
- Carefully observe the following operation steps.

1. Remove forced cooling fan and incremental encoder (if installed)
   See section "Preliminary work for motor and brake maintenance" (page 32)
2. Remove fan guard [35] and fan [36]
3. Push the rubber sealing collar [66] aside,
   - release the clip to do this, if necessary
   - vacuum up any abraded residue
4. Measure the brake disc [68, 68b]:
   Replace the brake disc if the brake disc ≤ 12 mm (0.47 in).
   See section "Replacing the brake disc for brake BE120-BE122" (page 58)
5. Unfasten the setting sleeve [67] by turning it towards the endshield
6. Measure the working air gap A (see following figure)
   (use a feeler gauge and measure at three points offset by 120°):
7. Tighten the hex nuts [61]

8. If you are mounting the BE122 in a vertical position, set the 3 springs on the brake stationary disc to the following measurement:

<table>
<thead>
<tr>
<th>Mounting position</th>
<th>X in [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4</td>
<td>10.0</td>
</tr>
<tr>
<td>M2</td>
<td>10.5</td>
</tr>
</tbody>
</table>

9. Tighten the setting sleeves
   - towards the magnet
   - until the working air gap is set correctly; see "Technical Data" section (page 63)

10. Put the rubber sealing collar back in place and re-install the dismantled parts.
7.8.5 Replacing the brake disc for brake BE120-BE122

When fitting a new brake disc (thickness ≤ 12 mm (0.47 in)), also inspect the other removed parts and, if necessary, install new ones.

DANGER
Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries can occur.

- Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup.
- Carefully observe the following operation steps.

1. Remove forced cooling fan and incremental encoder (if installed)
   See section "Preliminary work for motor and brake maintenance" (page 32)
2. Remove the fan guard [35], circlip [32] and fan [36]
3. Loosen the plug connector on the magnet
4. Remove the rubber sealing collar [66] and the manual brake release:
   - setting nuts [58], conical seat [255], spherical washer [256], conical coil springs [57], studs [56], releasing lever [53]
5. Unfasten hex nuts [61], carefully remove complete magnet [54] and remove brake springs [50/265].
6. Remove the pressure plate [49] and brake disc [68b], and clean the brake components.
7. Install a new brake disc.
8. Re-install the brake components,
   - except for the fan and the fan guard, because the working air gap has to be set first see section "Setting the working air gap for brake BE120-BE122" (page 56).
9. With manual brake release: use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see the following figure). The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

10. Put the rubber sealing collar back in place and re-install the dismantled parts.

<table>
<thead>
<tr>
<th>Brake</th>
<th>Floating clearance &quot;s&quot; [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE120, BE122</td>
<td>2</td>
</tr>
</tbody>
</table>

NOTE

- The lockable manual brake release (type HF) is already released if a resistance is encountered when operating the setscrew.
- After replacing the brake disc, the maximum braking torque is reached only after several cycles.
7.8.6 Changing the braking torque of brake BE120-BE122

The braking torque can be altered in stages,
• by changing the type and number of brake springs
• by changing the brake

To find the possible braking torque graduations for each motor, refer to the "Technical Data" section (page 63).

**Changing the brake spring**

<table>
<thead>
<tr>
<th>DANGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of crushing if the drive starts up unintentionally.</td>
</tr>
<tr>
<td>Severe or fatal injuries can occur.</td>
</tr>
<tr>
<td>• Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup.</td>
</tr>
<tr>
<td>• Carefully observe the following operation steps.</td>
</tr>
</tbody>
</table>

1. Remove forced cooling fan and incremental encoder (if installed)
   See section "Preliminary work for motor and brake maintenance" (page 32)
2. Remove the flange cover or fan guard [35], circlip [32] and fan [36].
3. Unfasten the plug connector on the magnet [54] and protect it from getting dirty
4. Remove the rubber sealing collar [66] and the manual brake release:
   – setting nuts [58], conical seat [255], spherical washer [256], conical coil springs [57], setscrews [56], releasing lever [53]
5. Unfasten hex nuts [61] and pull off the magnet [54]
   – by approx. 50 mm (2.0 in)
6. Change or add brake springs [50/265]
   – Position the brake springs symmetrically
7. Re-install the brake components,
   – except for the fan and the fan guard, because the working air gap has to be set first see section "Setting the working air gap for brake BE120-BE122" (page 56).
8. With manual brake release: use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see the following figure). The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

![Image of brake diagram]

<table>
<thead>
<tr>
<th>Brake</th>
<th>Floating clearance &quot;s&quot; [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE120; BE122</td>
<td>2</td>
</tr>
</tbody>
</table>

9. Put the rubber sealing collar back in place and re-install the dismantled parts.

**NOTE**
Replace setting nuts [58] and hex nuts [61] if the removal procedure is repeated.
Re replacing the brake on DR315

**STOP**

The mounting position for installation should correspond to the specifications on the nameplate; make sure that the intended mounting position is permitted.

**DANGER**

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries can occur.

- Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup.
- Carefully observe the following operation steps.

1. Remove forced cooling fan and incremental encoder (if installed)
   See section "Preliminary work for motor and brake maintenance" (page 32)
2. Remove the flange cover or fan guard [35], circlip [32] and fan [36]
3. Unfasten brake connector
4. Unfasten screws [900] and remove brake from brake endshield.
5. Align the cam of the friction disc, and mount the brake onto the brake endshield using a screw [900].
6. With manual brake release: use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see the following figure).

   The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

   

<table>
<thead>
<tr>
<th>Brake</th>
<th>Floating clearance &quot;s&quot; [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE120; BE122</td>
<td>2</td>
</tr>
</tbody>
</table>

STOP

The mounting position for installation should correspond to the specifications on the nameplate; make sure that the intended mounting position is permitted.

**DANGER**

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries can occur.

- Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup.
- Carefully observe the following operation steps.

1. Remove forced cooling fan and incremental encoder (if installed)
   See section "Preliminary work for motor and brake maintenance" (page 32)
2. Remove the flange cover or fan guard [35], circlip [32] and fan [36]
3. Unfasten brake connector
4. Unfasten screws [900] and remove brake from brake endshield.
5. Align the cam of the friction disc, and mount the brake onto the brake endshield using a screw [900].
6. With manual brake release: use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see the following figure).

   The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

   

<table>
<thead>
<tr>
<th>Brake</th>
<th>Floating clearance &quot;s&quot; [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE120; BE122</td>
<td>2</td>
</tr>
</tbody>
</table>
## 8 Technical Data

### 8.1 Work done, working air gap, braking torques

<table>
<thead>
<tr>
<th>Brake type</th>
<th>Work done until maintenance [10^6 J] ([in-lb])</th>
<th>Working air gap [mm]</th>
<th>Braking torque [Nm] ([in-lb])</th>
<th>Braking torque settings</th>
<th>Type and number of brake springs</th>
<th>Order numbers for brake springs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>min. 1)</td>
<td>max.</td>
<td>Braking torque</td>
<td>Normal</td>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>BE05</td>
<td>120 (1060)</td>
<td>0.25</td>
<td>5.0 (44)</td>
<td>2</td>
<td>4</td>
<td>0135 017 X 1374 137 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.5 (31)</td>
<td>2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2.5 (22)</td>
<td>–</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.8 (16)</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>BE1</td>
<td>120 (1060)</td>
<td>0.25</td>
<td>10 (89)</td>
<td>6</td>
<td>–</td>
<td>0135 017 X 1374 137 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7.0 (62)</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5.0 (44)</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>BE2</td>
<td>165 (1460)</td>
<td>0.25</td>
<td>20 (180)</td>
<td>6</td>
<td>–</td>
<td>1374 024 5 1374 052 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14 (120)</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 (89)</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7.0 (62)</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>BE5</td>
<td>260 (2300)</td>
<td>0.25</td>
<td>55 (490)</td>
<td>4</td>
<td>2</td>
<td>1374 070 9 1374 071 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40 (350)</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>28 (250)</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20 (180)</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>BE120</td>
<td>520 (4600)</td>
<td>0.4</td>
<td>1000 (8851)</td>
<td>8</td>
<td>–</td>
<td>1360 877 0 1360 831 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>800 (7080)</td>
<td>6</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>600 (5310)</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>400 (3540)</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>BE122</td>
<td>520 (4600)</td>
<td>0.5</td>
<td>2000 (17700)</td>
<td>8</td>
<td>–</td>
<td>1360 877 0 1360 831 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1600 (14160)</td>
<td>6</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1200 (10620)</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>800 (7080)</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

1) Please note when checking the working air gap: Parallelism tolerances on the brake disc may cause deviations of ±0.15 mm after a test run.
8.2 Braking torque breakdown

8.2.1 Motor size DR71-100

<table>
<thead>
<tr>
<th>Motor type</th>
<th>Brake type</th>
<th>Braking torque gradation in Nm ([in-lb])</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR71</td>
<td>BE05</td>
<td>1.8 (16) 2.5 (22) 3.5 (31) 5.0 (44)</td>
</tr>
<tr>
<td></td>
<td>BE1</td>
<td>5.0 (44) 7.0 (62) 10.0 (88.5)</td>
</tr>
<tr>
<td></td>
<td>BE3</td>
<td>5.0 (44) 7.0 (62) 10.0 (89)</td>
</tr>
<tr>
<td></td>
<td>BE2</td>
<td>7.0 (62) 10 (89) 14 (120) 20 (180)</td>
</tr>
</tbody>
</table>

8.2.2 Motor size DR315

<table>
<thead>
<tr>
<th>Motor type</th>
<th>Brake type</th>
<th>Braking torque gradation in Nm ([in-lb])</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR315</td>
<td>BE120</td>
<td>400 (3540) 600 (5310) 800 (7080) 1000 (8851)</td>
</tr>
<tr>
<td></td>
<td>BE122</td>
<td>800 (7080) 1200 (10620) 1600 (14160) 2000 (17700)</td>
</tr>
</tbody>
</table>
8.3 Operating currents

8.3.1 Brake BE05/1, BE2, BE5

The current values $I_H$ (holding current) specified in the tables are r.m.s. values. Measure the r.m.s. values using only the appropriate measuring instruments. The inrush current (acceleration current) $I_{Acc}$ only flows for a short time (max. 160 ms) when the brake is released. There is no increased inrush current if a BG or BMS brake rectifier is used or if there is a direct DC voltage supply – only possible with brakes up to size BE2.

<table>
<thead>
<tr>
<th>Max. braking torque [Nm] ([in lb])</th>
<th>BE05/1</th>
<th>BE2</th>
<th>BE5</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 (40)/10 (89)</td>
<td>20</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Braking power [W] ([hp])</td>
<td>32 (0.043)</td>
<td>43 (0.058)</td>
<td>49 (0.066)</td>
</tr>
<tr>
<td>Inrush current ratio $I_{Acc}/I_H$</td>
<td>4</td>
<td>4</td>
<td>5.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated voltage $V_{Rated}$</th>
<th>$V_{AC}$</th>
<th>$V_{DC}$</th>
<th>BE05/1</th>
<th>BE2</th>
<th>BE5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>$I_H$</td>
<td>$I_{DC}$</td>
<td>$I_H$</td>
</tr>
<tr>
<td>24 (23-26)</td>
<td>10</td>
<td>2.10</td>
<td>2.80</td>
<td>2.75</td>
<td>3.75</td>
</tr>
<tr>
<td>60 (57-63)</td>
<td>24</td>
<td>0.88</td>
<td>1.17</td>
<td>1.57</td>
<td>1.46</td>
</tr>
<tr>
<td>120 (111-123)</td>
<td>48</td>
<td>0.45</td>
<td>0.58</td>
<td>0.59</td>
<td>0.78</td>
</tr>
<tr>
<td>184 (174-193)</td>
<td>80</td>
<td>0.29</td>
<td>0.35</td>
<td>0.38</td>
<td>0.47</td>
</tr>
<tr>
<td>208 (194-217)</td>
<td>90</td>
<td>0.26</td>
<td>0.31</td>
<td>0.34</td>
<td>0.42</td>
</tr>
<tr>
<td>230 (218-243)</td>
<td>96</td>
<td>0.23</td>
<td>0.29</td>
<td>0.30</td>
<td>0.39</td>
</tr>
<tr>
<td>254 (244-273)</td>
<td>110</td>
<td>0.20</td>
<td>0.26</td>
<td>0.27</td>
<td>0.34</td>
</tr>
<tr>
<td>290 (274-306)</td>
<td>125</td>
<td>0.18</td>
<td>0.26</td>
<td>0.24</td>
<td>0.30</td>
</tr>
<tr>
<td>330 (307-343)</td>
<td>140</td>
<td>0.16</td>
<td>0.20</td>
<td>0.21</td>
<td>0.27</td>
</tr>
<tr>
<td>360 (344-379)</td>
<td>160</td>
<td>0.14</td>
<td>0.18</td>
<td>0.19</td>
<td>0.24</td>
</tr>
<tr>
<td>400 (380-431)</td>
<td>180</td>
<td>0.13</td>
<td>0.16</td>
<td>0.17</td>
<td>0.21</td>
</tr>
<tr>
<td>460 (432-484)</td>
<td>200</td>
<td>0.11</td>
<td>0.14</td>
<td>0.15</td>
<td>0.19</td>
</tr>
<tr>
<td>500 (485-542)</td>
<td>220</td>
<td>0.10</td>
<td>0.13</td>
<td>0.13</td>
<td>0.17</td>
</tr>
<tr>
<td>575 (543-600)</td>
<td>250</td>
<td>0.09</td>
<td>0.11</td>
<td>0.12</td>
<td>0.15</td>
</tr>
</tbody>
</table>

**Key**

$I_{Acc}$ Acceleration current – brief inrush current

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

$I_{DC}$ Direct current with direct DC voltage supply

$V_{Rated}$ Rated voltage (rated voltage range)
8.3.2 Brake BE120, BE122

The current values $I_H$ (holding current) specified in the tables are r.m.s. values. Measure the r.m.s. values using only the appropriate measuring instruments. The inrush current (acceleration current) $I_{Acc}$ only flows for a short time (max. 400 ms) when the brake is released. You may not use a direct voltage supply if it is not required.

<table>
<thead>
<tr>
<th>Max. braking torque [Nm] ([in lb])</th>
<th>BE120</th>
<th>BE122</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 (8851)</td>
<td></td>
<td>2000 (17700)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Braking power [W] ([hp])</th>
<th>BE120</th>
<th>BE122</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 (0.335)</td>
<td></td>
<td>250 (0.335)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inrush current ratio $I_{Acc}/I_H$</th>
<th>BE120</th>
<th>BE122</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.9</td>
<td></td>
<td>4.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated voltage $V_{Rated}$</th>
<th>$V_{AC}$</th>
<th>$V_{DC}$</th>
<th>BE120</th>
<th>$I_H$ [A$_{AC}$]</th>
<th>BE122</th>
<th>$I_H$ [A$_{AC}$]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>230 (218-243)</td>
<td>–</td>
<td>1.80</td>
<td>1.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>254 (244-273)</td>
<td>–</td>
<td>1.60</td>
<td>1.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>290 (274-306)</td>
<td>–</td>
<td>1.43</td>
<td>1.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>360 (344-379)</td>
<td>–</td>
<td>1.14</td>
<td>1.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>400 (380-431)</td>
<td>–</td>
<td>1.02</td>
<td>1.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>460 (432-484)</td>
<td>–</td>
<td>0.91</td>
<td>0.91</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>500 (485-542)</td>
<td>–</td>
<td>0.81</td>
<td>0.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>575 (543-600)</td>
<td>–</td>
<td>0.72</td>
<td>0.72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key**

$I_{Acc}$ Acceleration current – brief inrush current  
$I_H$ Holding current r.m.s. value in the supply cable to the SEW brake rectifier  
$I_{DC}$ Direct current with direct DC voltage supply  
$V_{Rated}$ Rated voltage (rated voltage range)
## 8.4 Resistances

### 8.4.1 Brake BE05/1, BE2, BE5

<table>
<thead>
<tr>
<th></th>
<th>BE05/1</th>
<th>BE2</th>
<th>BE5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. braking torque [Nm] ([in lb])</td>
<td>5 (40) /10 (89)</td>
<td>20 (180)</td>
<td>55 (490)</td>
</tr>
<tr>
<td>Braking power [W] ([hp])</td>
<td>32 (0.043)</td>
<td>43 (0.058)</td>
<td>49 (0.066)</td>
</tr>
<tr>
<td>Inrush current ratio $I_{AC}/I_{H}$</td>
<td>4</td>
<td>4</td>
<td>5.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated voltage $V_{Rated}$</th>
<th>BE05/1</th>
<th>BE2</th>
<th>BE5</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{AC}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 (23-26)</td>
<td>10</td>
<td>0.77</td>
<td>0.57</td>
</tr>
<tr>
<td>60 (57-63)</td>
<td>24</td>
<td>4.85</td>
<td>3.60</td>
</tr>
<tr>
<td>120 (111-123)</td>
<td>48</td>
<td>19.4</td>
<td>14.4</td>
</tr>
<tr>
<td>184 (174-193)</td>
<td>80</td>
<td>48.5</td>
<td>36.0</td>
</tr>
<tr>
<td>208 (194-217)</td>
<td>90</td>
<td>61.0</td>
<td>45.5</td>
</tr>
<tr>
<td>230 (218-243)</td>
<td>96</td>
<td>77.0</td>
<td>58.0</td>
</tr>
<tr>
<td>254 (244-273)</td>
<td>110</td>
<td>97.0</td>
<td>72.0</td>
</tr>
<tr>
<td>290 (274-306)</td>
<td>125</td>
<td>122</td>
<td>91</td>
</tr>
<tr>
<td>330 (307-343)</td>
<td>140</td>
<td>154</td>
<td>115</td>
</tr>
<tr>
<td>360 (344-379)</td>
<td>160</td>
<td>194</td>
<td>144</td>
</tr>
<tr>
<td>400 (380-431)</td>
<td>180</td>
<td>245</td>
<td>182</td>
</tr>
<tr>
<td>460 (432-484)</td>
<td>200</td>
<td>310</td>
<td>230</td>
</tr>
<tr>
<td>500 (485-542)</td>
<td>220</td>
<td>385</td>
<td>290</td>
</tr>
<tr>
<td>575 (543-600)</td>
<td>250</td>
<td>490</td>
<td>365</td>
</tr>
</tbody>
</table>

The following illustration shows how to measure resistance with cutoff in the AC circuit.

The following illustration shows how to measure resistance with cutoff in the DC and AC circuits.

<table>
<thead>
<tr>
<th>$R_{Acc}$</th>
<th>Acceleration coil resistance at 20 °C (68 °F) [Ω]</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R_{Sec}$</td>
<td>Coil section resistance at 20 °C (68 °F) [Ω]</td>
</tr>
<tr>
<td>$V_{Rated}$</td>
<td>Rated voltage (rated voltage range)</td>
</tr>
</tbody>
</table>

**NOTE**

When measuring the resistance of the coil section ($R_{Sec}$) or the acceleration coil ($R_{Acc}$), remove the white conductor from the brake rectifier; if it remains connected, the internal resistance of the brake rectifier will cause erroneous results.
**8.4.2 Brake BE120, BE122**

<table>
<thead>
<tr>
<th></th>
<th>BE120</th>
<th>BE122</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. braking torque</td>
<td>1000 (8851)</td>
<td>2000 (17700)</td>
</tr>
<tr>
<td>[Nm] ([in lb])</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braking power [W] ([hp])</td>
<td>250 (0.335)</td>
<td>250 (0.335)</td>
</tr>
<tr>
<td>Inrush current ratio</td>
<td>4.9</td>
<td>4.9</td>
</tr>
<tr>
<td>$I_{Acc}/I_H$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage $V_{Rated}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>$V_{AC}$ (V)</th>
<th>$V_{DC}$ (V)</th>
<th>$R_{Acc}$ (Ω)</th>
<th>$R_{Sec}$ (Ω)</th>
<th>$R_{Acc}$ (Ω)</th>
<th>$R_{Sec}$ (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>230 (218-243)</td>
<td>7.6</td>
<td>29.5</td>
<td>7.6</td>
<td>29.5</td>
<td></td>
</tr>
<tr>
<td>254 (244-273)</td>
<td>9.5</td>
<td>37.0</td>
<td>9.5</td>
<td>37.0</td>
<td></td>
</tr>
<tr>
<td>290 (274-306)</td>
<td>12.0</td>
<td>46.5</td>
<td>12.0</td>
<td>46.5</td>
<td></td>
</tr>
<tr>
<td>360 (344-379)</td>
<td>19.1</td>
<td>74.0</td>
<td>19.1</td>
<td>74.0</td>
<td></td>
</tr>
<tr>
<td>400 (380-431)</td>
<td>24.0</td>
<td>93.0</td>
<td>24.0</td>
<td>93.0</td>
<td></td>
</tr>
<tr>
<td>460 (432-484)</td>
<td>30.0</td>
<td>117.0</td>
<td>30.0</td>
<td>117.0</td>
<td></td>
</tr>
<tr>
<td>500 (485-542)</td>
<td>38.0</td>
<td>147.0</td>
<td>38.0</td>
<td>147.0</td>
<td></td>
</tr>
<tr>
<td>575 (543-600)</td>
<td>48.0</td>
<td>185.0</td>
<td>48.0</td>
<td>185.0</td>
<td></td>
</tr>
</tbody>
</table>

The following illustration shows how to measure resistance with BMP 3.1.

![Resistance Measurement Illustration](image)

BS Acceleration coil
TS Coil section
$R_{Acc}$ Acceleration coil resistance at 20 °C (68 °F) [Ω]
$R_{Sec}$ Coil section resistance at 20 °C (68 °F) [Ω]
$V_{Rated}$ Rated voltage (rated voltage range)

**NOTE**

When measuring the resistance of the coil section ($R_{Sec}$) or the acceleration coil ($R_{Acc}$), remove the white conductor from the brake rectifier; if it remains connected, the internal resistance of the brake rectifier will cause erroneous results.
8.5 Brake rectifier combinations

8.5.1 Brake BE05/1, BE2, BE5

The table below shows the standard and optional combinations of brakes and brake rectifiers.

<table>
<thead>
<tr>
<th></th>
<th>BE05</th>
<th>BE1</th>
<th>BE2</th>
<th>BE5</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG</td>
<td>BG 1.5</td>
<td>X(^1)</td>
<td>X(^1)</td>
<td>X(^1)</td>
</tr>
<tr>
<td></td>
<td>BG 3</td>
<td>X(^2)</td>
<td>X(^2)</td>
<td>X(^2)</td>
</tr>
<tr>
<td>BGE</td>
<td>BGE 1.5</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>BGE 3</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>BS</td>
<td>BS 24</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>BMS</td>
<td>BMS 1.5</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>BMS 3</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>BME</td>
<td>BME 1.5</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>BME 3</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>BMH</td>
<td>BMH 1.5</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>BMH 3</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>BMK</td>
<td>BMK 1.5</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>BMK 3</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>BMP</td>
<td>BMP 1.5</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>BMP 3</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>BME</td>
<td>BME 1.5</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>BME 3</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>BSR</td>
<td>BSR 11</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>BSR 15</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>BUR</td>
<td>BUR 11</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>BUR 15</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

X  Standard design
X\(^1\)  Standard design with brake rated voltage of AC 150 – 500 V
X\(^2\)  Standard design with brake rated voltage of AC 24/42 – 150 V
•  Optional
–  Not permitted

8.5.2 Brake BE120, BE122

The table below shows the standard and optional combinations of brakes and brake rectifiers.

<table>
<thead>
<tr>
<th></th>
<th>BE120</th>
<th>BE122</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMP 3.1</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
8.6 Brake control

8.6.1 Motor wiring compartment

The following table lists the technical data of brake control systems for installation in the motor wiring compartment and the breakdown in regard to motor size and connection technology. The different housings have different colors (= color code) to make them easier to distinguish.

### Motor size DR71-100

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
<th>Voltage</th>
<th>Holding current $I_{\text{hmax}}$ [A]</th>
<th>Type</th>
<th>Part number</th>
<th>Color code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG</td>
<td>One-way rectifier</td>
<td>AC 150...500 V</td>
<td>1.5</td>
<td>BG 1.5</td>
<td>825 384 6</td>
<td>Black</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 24...500 V</td>
<td>3.0</td>
<td>BG 3</td>
<td>825 386 2</td>
<td>Brown</td>
</tr>
<tr>
<td>BGE</td>
<td>One-way rectifier with electronic switching</td>
<td>AC 150...500 V</td>
<td>1.5</td>
<td>BGE 1.5</td>
<td>825 385 4</td>
<td>Red</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 42...150 V</td>
<td>3.0</td>
<td>BGE 3</td>
<td>825 387 0</td>
<td>Blue</td>
</tr>
<tr>
<td>BSR</td>
<td>One-way rectifier + current relay for cut-off in the DC circuit</td>
<td>AC 150...500 V</td>
<td>1.0</td>
<td>BGE 1.5 + SR 11</td>
<td>825 385 4</td>
<td>Red</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 150...500 V</td>
<td>1.0</td>
<td>BGE 1.5 + SR 15</td>
<td>825 385 4</td>
<td>Red</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 42...150 V</td>
<td>1.0</td>
<td>BGE 3 + SR11</td>
<td>825 387 0</td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 42...150 V</td>
<td>1.0</td>
<td>BGE 3 + SR15</td>
<td>825 387 0</td>
<td>Blue</td>
</tr>
<tr>
<td>BUR</td>
<td>One-way rectifier + voltage relay for cut-off in the DC circuit</td>
<td>AC 150...500 V</td>
<td>1.0</td>
<td>BGE 1.5 + UR 15</td>
<td>825 385 4</td>
<td>Red</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 150...500 V</td>
<td>1.0</td>
<td>BGE 1.5 + UR 15</td>
<td>825 385 4</td>
<td>Red</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 42...150 V</td>
<td>1.0</td>
<td>BGE 3 + UR 11</td>
<td>825 387 0</td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 42...150 V</td>
<td>1.0</td>
<td>BGE 3 + UR 11</td>
<td>825 387 0</td>
<td>Blue</td>
</tr>
<tr>
<td>BS</td>
<td>Varistor protection circuit</td>
<td>DC 24 V</td>
<td>5.0</td>
<td>BS24</td>
<td>826 763 4</td>
<td>Aqua</td>
</tr>
<tr>
<td>BSG</td>
<td>Electronic switching</td>
<td>DC 24 V</td>
<td>5.0</td>
<td>BSG</td>
<td>825 459 1</td>
<td>White</td>
</tr>
</tbody>
</table>

### Motor size DR315

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
<th>Voltage</th>
<th>Holding current $I_{\text{hmax}}$ [A]</th>
<th>Type</th>
<th>Part number</th>
<th>Color code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMP</td>
<td>One-way rectifier with electronic switching, integrated voltage relay for cut-off in the DC circuit</td>
<td>AC 230...575 V</td>
<td>2.8</td>
<td>BMP 3.1</td>
<td>829 507 7</td>
<td>White</td>
</tr>
</tbody>
</table>
8.6.2 Control cabinet

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

### Motor size DR71-100

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
<th>Voltage</th>
<th>Holding current $I_{\text{Hmax}}$ [A]</th>
<th>Type</th>
<th>Part number</th>
<th>Color code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS</td>
<td>One-way rectifier as with BG</td>
<td>AC 150...500 V</td>
<td>1.5</td>
<td>BMS 1.5</td>
<td>825 802 3</td>
<td>Black</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 42...150 V</td>
<td>3.0</td>
<td>BMS 3</td>
<td>825 803 1</td>
<td>Brown</td>
</tr>
<tr>
<td>BME</td>
<td>One-way rectifier with electronic switching as with BGE</td>
<td>AC 150...500 V</td>
<td>1.5</td>
<td>BME 1.5</td>
<td>825 722 1</td>
<td>Red</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 42...150 V</td>
<td>3.0</td>
<td>BME 3</td>
<td>825 723 X</td>
<td>Blue</td>
</tr>
<tr>
<td>BMH</td>
<td>One-way rectifier with electronic switching and heating function</td>
<td>AC 150...500 V</td>
<td>1.5</td>
<td>BMH 1.5</td>
<td>825 818 X</td>
<td>Green</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 42...150 V</td>
<td>3</td>
<td>BMH 3</td>
<td>825 819 8</td>
<td>Yellow</td>
</tr>
<tr>
<td>BMP</td>
<td>One-way rectifier with electronic switching, integrated voltage relay for cut-off in the DC circuit</td>
<td>AC 150...500 V</td>
<td>1.5</td>
<td>BMP 1.5</td>
<td>825 685 3</td>
<td>White</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 42...150 V</td>
<td>3.0</td>
<td>BMP 3</td>
<td>826 566 6</td>
<td>Light blue</td>
</tr>
<tr>
<td>BMK</td>
<td>One-way rectifier with electronic switching, 24 V DC control input and separation in the DC circuit</td>
<td>AC 150...500 V</td>
<td>1.5</td>
<td>BMK 1.5</td>
<td>826 463 5</td>
<td>Aqua</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC 42...150 V</td>
<td>3.0</td>
<td>BMK 3</td>
<td>826 567 4</td>
<td>Bright red</td>
</tr>
<tr>
<td>BMV</td>
<td>Brake control unit with electronic switching, 24 V DC control input and fast cut-off</td>
<td>DC 24 V</td>
<td>5.0</td>
<td>BMV 5</td>
<td>1 300 006 3</td>
<td>White</td>
</tr>
</tbody>
</table>

### Motor size DR315

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
<th>Voltage</th>
<th>Holding current $I_{\text{Hmax}}$ [A]</th>
<th>Type</th>
<th>Part number</th>
<th>Color code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMP</td>
<td>One-way rectifier with electronic switching, integrated voltage relay for cut-off in the DC circuit</td>
<td>AC 230...575 V</td>
<td>2.8</td>
<td>BMP 3.1</td>
<td>829 507 7</td>
<td></td>
</tr>
</tbody>
</table>

---

Operating Instructions – AC Motors DRS/DRE/DRP
### 8.7 Permitted roller bearing types

#### 8.7.1 Roller bearing types for motor size DR71-100

<table>
<thead>
<tr>
<th>Motor type</th>
<th>A-side (drive) bearing</th>
<th>B-side (non drive) bearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC motor</td>
<td>Gearmotor</td>
<td></td>
</tr>
<tr>
<td>DR71</td>
<td>6204-2Z-J-C3</td>
<td>6203-2Z-J-C3</td>
</tr>
<tr>
<td>DR80</td>
<td>6205-2Z-J-C3</td>
<td>6304-2Z-J-C3</td>
</tr>
<tr>
<td>DR90 – DR100</td>
<td>6306-2Z-J-C3</td>
<td>6205-2Z-J-C3</td>
</tr>
</tbody>
</table>

#### 8.7.2 Roller bearing types for motor size DR315

<table>
<thead>
<tr>
<th>Motor type</th>
<th>A-side (drive) bearing</th>
<th>B-side (non drive) bearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC motor</td>
<td>Gearmotor</td>
<td></td>
</tr>
<tr>
<td>DR315K</td>
<td>6319-J-C3</td>
<td>6319-J-C3</td>
</tr>
<tr>
<td>DR315S</td>
<td>6322-J-C3</td>
<td>6322-J-C3</td>
</tr>
<tr>
<td>DR315M</td>
<td>6319-J-C3</td>
<td></td>
</tr>
</tbody>
</table>

Motor with reinforced bearings

<table>
<thead>
<tr>
<th>Motor type</th>
<th>A-side (drive) bearing</th>
<th>B-side (non drive) bearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR315K</td>
<td>NU319E</td>
<td>6319-J-C3</td>
</tr>
<tr>
<td>DR315S</td>
<td></td>
<td>6319-J-C3</td>
</tr>
<tr>
<td>DR315M</td>
<td></td>
<td>6322-J-C3</td>
</tr>
<tr>
<td>DR315L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8.8 **Lubricant tables**

8.8.1 **Lubricant table for roller bearings**

*Motor size*  
DR71-100

The bearings are 2Z or 2RS closed bearings and cannot be relubricated.

<table>
<thead>
<tr>
<th>Ambient temperature</th>
<th>Manufacturer</th>
<th>Type</th>
<th>DIN designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>–20 °C (~4 °F) ... 80 °C (176 °F)</td>
<td>Esso</td>
<td>Polyrex EM&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>K2P-20</td>
</tr>
<tr>
<td>+20 °C (68 °F) ... 100 °C (212 °F)</td>
<td>Klüber</td>
<td>Barrierta L55/2&lt;sup&gt;2)&lt;/sup&gt;</td>
<td>KX2U</td>
</tr>
<tr>
<td>–40 °C (~40 °F) ... 60 °C (140 °F)</td>
<td>Kyodo Yushi</td>
<td>Multemp SRL&lt;sup&gt;2)&lt;/sup&gt;</td>
<td>K2N-40</td>
</tr>
</tbody>
</table>

1) Mineral lubricant (= mineral-based roller bearing grease)  
2) Synthetic lubricant (= synthetic-based roller bearing grease)

*Motor size*  
DR315

Series DR315 motors may be equipped with a lubrication device.

<table>
<thead>
<tr>
<th>Ambient temperature</th>
<th>Manufacturer</th>
<th>Type</th>
<th>DIN designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>–20 °C (~4 °F) ... 80 °C (176 °F)</td>
<td>Esso</td>
<td>Polyrex EM&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>K2P-20</td>
</tr>
<tr>
<td>–40 °C (~40 °F) ... 60 °C (140 °F)</td>
<td>SKF</td>
<td>GXN&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>K2N-40</td>
</tr>
</tbody>
</table>

1) Mineral lubricant (= mineral-based roller bearing grease)

8.9 **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.

<table>
<thead>
<tr>
<th>Use</th>
<th>Manufacturer</th>
<th>Type</th>
<th>Quantity</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lubricant for roller bearings</td>
<td>Esso</td>
<td>Polyrex EM</td>
<td>400 g (14.1 oz)</td>
<td>09101470</td>
</tr>
<tr>
<td>SKF</td>
<td>GXN</td>
<td>400 g (14.1 oz)</td>
<td>09101276</td>
<td></td>
</tr>
<tr>
<td>Type of lubricant Sealing rings</td>
<td>Klüber</td>
<td>Petamo GHY 133</td>
<td>10 g (0.35 oz)</td>
<td>04963458</td>
</tr>
<tr>
<td>Anti-corrosive and lubricant</td>
<td>SEW-EURODRIVE</td>
<td>Noco Fluid&lt;sup&gt;®&lt;/sup&gt;</td>
<td>5.5 g (0.19 oz)</td>
<td>09107819</td>
</tr>
</tbody>
</table>
9 Appendix

9.1 Wiring diagrams

**NOTE**
The motor should be connected as shown in the connection wiring diagram or the assignment diagram, which are included with the motor. Only a selection of the common types of connections are shown in the following section. You can obtain the relevant wiring diagrams free of charge from SEW-EURODRIVE.

### 9.1.1 Delta and star connection

Three-phase current motor

For all motors with a rotation speed, direct-on-line or Δ - Δ startup.

**Δ connection**
The following illustration shows the Δ connection for lower voltage.

![Δ connection diagram](image1)

- [1] Motor winding
- [3] Supply cables

**△ connection**
The following illustration shows the △ connection for high voltage.

![△ connection diagram](image2)

- [1] Motor winding
- [3] Supply cables

Change in direction of rotation: Swap connection of 2 supply cables (L1 – L2).
9.1.2 Motor protection using TF or TH with DR71-100

**TF/TH**

The following illustrations show the connection of the motor protection with TF PTC thermistor sensors or TH bimetallic thermostats.

Either a two-pole terminal clip or a five-pole terminal strip is available for connecting to the trip switch.

**Example: TF/TH to a two-pole terminal strip.**

![Two-pole terminal clip diagram]

**Example: 2xTF/TH to a five-pole terminal strip.**

![Five-pole terminal strip diagram]

**2xTF/TH / with standstill heater**

The following illustration shows the connection of the motor protection with 2 TF PTC thermistor sensors or TH bimetallic thermostats and Hx standstill heater.
9.1.3 Motor protection using TF or TH with DR315

TF/TH

The following illustrations show the connection of the motor protection with TF PTC thermistor sensors or TH bimetallic thermostats.

Depending on the version, an "x-pole" terminal strip is available for connecting to the trip switch.

Example: TF/TH to terminal strip

Example: 2xTF/TH to terminal strip
9.1.4 BGE, BG, BSG, BUR brake control

Brake BE

BGE, BG, BSG, BUR brake control;

Apply voltage to release the brake (see nameplate).

Contact rating of the brake control: AC3 in accordance with EN 60947-4-1.

The voltage can be distributed as follows:

- Through a separate supply cable
- From the motor terminal board

This does not apply to multi-speed and frequency-controlled motors.

BG / BGE

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

![Wiring Diagram](image)

[1] Brake coil
BSG control unit
The following illustration shows the DC 24 V connection of the BSG control unit

[BNS]

BUR brake control
Connection to motor terminal board not permitted.

The following illustration shows the wiring for the BUR brake control

[1] Brake coil
UR 11 (42 – 150 V) = BN
UR 15 (150 – 500 V) = BK
9.1.5 BSR brake control

BE brake
BSR brake control
Brake voltage = Phase voltage
The white connecting leads are the ends of a converter loop and, depending on the motor connection, must be connected to the motor terminal block instead of the Δ or ⊗ bridge.

Factory: ⊗

The following illustration shows the factory wiring for the BSR brake control
Example: Motor: AC 230/400 V
Brake: AC 230 V

[1] Brake coil
9.1.6 BMP3.1 brake control in the terminal box

BE120, BE122 brake
BMP3.1 brake control
Apply voltage to release the brake (see nameplate).
Contact rating of the brake control: AC3 in accordance with EN 60947-4-1.
Separate supply cables are required for the voltage supply.

The following illustration shows the wiring for the BMP3.1 brake rectifier for the AC-side shutoff as well as the DC and AC-side shutoff.

[1] Brake coil
## Malfunctions

### 10.1 Motor malfunctions

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Possible cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor does not start up</td>
<td>Break in supply cable</td>
<td>Check the connections and (intermediate) terminal points, correct if necessary</td>
</tr>
<tr>
<td></td>
<td>Brake does not release</td>
<td>See sec. &quot;Brake malfunctions&quot; (page 83)</td>
</tr>
<tr>
<td></td>
<td>Supply cable fuse has blown</td>
<td>Replace fuse</td>
</tr>
<tr>
<td></td>
<td>Motor protection (switch) has triggered</td>
<td>Check that the motor protection (switch) is set correctly; current specification is on the nameplate</td>
</tr>
<tr>
<td></td>
<td>Motor protection does not trip</td>
<td>Check motor protection control</td>
</tr>
<tr>
<td></td>
<td>Malfunction in control or in the control process</td>
<td>Observe the switching sequence; correct if necessary</td>
</tr>
<tr>
<td>Motor does not start or starts only with difficulty</td>
<td>Motor power designed for delta connection but connected in star</td>
<td>Correct the connection from star to delta; follow the wiring diagram</td>
</tr>
<tr>
<td></td>
<td>Motor power designed for star-star connection but only connected in star</td>
<td>Correct the connection from star to star-star; follow the wiring diagram</td>
</tr>
<tr>
<td></td>
<td>Voltage or frequency deviate considerably from setpoint, at least while being switched on</td>
<td>Provide better power supply system; reduce the power supply load; Check cross section of supply cable, replace with cable of larger cross section if needed</td>
</tr>
<tr>
<td>Motor does not start in star connection, only in delta connection</td>
<td>Torque not sufficient in star connection</td>
<td>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 with SEW-EURODRIVE)</td>
</tr>
<tr>
<td>Incorrect direction of rotation</td>
<td>Motor connected incorrectly</td>
<td>Swap two phases of the motor supply cable</td>
</tr>
<tr>
<td>Motor hums and has high current consumption</td>
<td>Brake does not release</td>
<td>See sec. &quot;Brake malfunctions&quot; (page 83)</td>
</tr>
<tr>
<td></td>
<td>Winding defective</td>
<td>Send motor to specialist workshop for repair</td>
</tr>
<tr>
<td></td>
<td>Rotor rubbing</td>
<td></td>
</tr>
<tr>
<td>Fuses blow or motor protection trips immediately</td>
<td>Short circuit in the motor supply cable</td>
<td>Repair short circuit</td>
</tr>
<tr>
<td></td>
<td>Supply cables connected incorrectly</td>
<td>Correct the wiring, observe the wiring diagram</td>
</tr>
<tr>
<td></td>
<td>Short circuit in motor</td>
<td>Send motor to specialist workshop for repair</td>
</tr>
<tr>
<td></td>
<td>Ground fault on motor</td>
<td></td>
</tr>
<tr>
<td>Severe speed loss under load</td>
<td>Motor overload</td>
<td>Measure power, check project planning and use larger motor or reduce load if necessary</td>
</tr>
<tr>
<td></td>
<td>Voltage drops</td>
<td>Check cross section of supply cable, replace with cable of larger cross section if needed</td>
</tr>
<tr>
<td>Malfunction</td>
<td>Possible cause</td>
<td>Remedy</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Motor heats up excessively (measure temperature)</td>
<td>Overload</td>
<td>Measure power, check project planning and use larger motor or reduce load if necessary</td>
</tr>
<tr>
<td>Insufficient cooling</td>
<td></td>
<td>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</td>
</tr>
<tr>
<td>Ambient temperature is too high</td>
<td></td>
<td>Observe the permitted temperature range, reduce the load if necessary</td>
</tr>
<tr>
<td>Motor in delta connection instead of star connection as provided for</td>
<td></td>
<td>Correct the wiring, observe the wiring diagram</td>
</tr>
<tr>
<td>Loose contact in supply cable (one phase missing)</td>
<td></td>
<td>Tighten loose contact, check connections, observe wiring diagram</td>
</tr>
<tr>
<td>Fuse has blown</td>
<td></td>
<td>Look for and rectify cause (see above); replace fuse</td>
</tr>
<tr>
<td>Supply voltage deviates from the rated motor voltage by more than 5% (range A)/10% (range B)</td>
<td></td>
<td>Adjust motor to supply voltage.</td>
</tr>
<tr>
<td>Rated operation type (S1 to S10, DIN 57530) exceeded, e.g. through excessive startup frequency</td>
<td></td>
<td>Adjust rated operation type of motor to required operating conditions; if necessary, call in a specialist to determine correct drive</td>
</tr>
<tr>
<td>Excessively loud</td>
<td>Ball bearing compressed, dirty or damaged</td>
<td>Re-align motor and the driven machine, inspect ball bearing (see sec. “Permitted ball bearing types”) and replace if necessary</td>
</tr>
<tr>
<td>Vibration of rotating parts</td>
<td></td>
<td>Look for the case, possibly an imbalance; correct the cause, observe method for balancing</td>
</tr>
<tr>
<td>Foreign bodies in cooling air passages</td>
<td></td>
<td>Clean the cooling air passages</td>
</tr>
</tbody>
</table>
### 10.2 Brake malfunctions

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Possible cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake does not release</td>
<td>Incorrect voltage on brake control unit</td>
<td>Apply the correct voltage; brake voltage specified on the nameplate</td>
</tr>
<tr>
<td></td>
<td>Brake control unit failed</td>
<td>Install a new brake control, check resistances and insulation of the brake coils (see &quot;Resistances&quot; section for resistance values). Check switchgear, replace if needed</td>
</tr>
<tr>
<td></td>
<td>Max. permitted working air gap exceeded because brake lining worn down</td>
<td>Measure and set working air gap. See the following sections:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Setting the working air gap for brake BE05-BE5&quot; (page 40)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Setting the working air gap for brake BE120-BE122&quot; (page 56)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If the brake disk is too thin, replace the brake disk (BE05-BE5 &lt; 9 mm / BE120-BE122 &lt; 12 mm).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See the following sections:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Replacing the brake disk for brake BE05-BE5&quot; (page 41)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Replacing the brake disk for brake BE120-BE122&quot; (page 58)</td>
</tr>
<tr>
<td></td>
<td>Voltage drop on supply cable &gt; 10%</td>
<td>Provide correct connection voltage: brake voltage specifications on the nameplate. Check the cross section of the brake supply cable, increase cross section if necessary</td>
</tr>
<tr>
<td></td>
<td>Inadequate cooling, brake overheats</td>
<td>Provide for cooling air supply or clear cooling air passages, check air filter, clean or replace if necessary. Replace type BG brake rectifier with type BGE</td>
</tr>
<tr>
<td></td>
<td>Brake coil has interturn fault or short circuit to exposed conductive part</td>
<td>Check resistances and insulation of the brake coils (see &quot;Resistances&quot; section for resistance values); Replace complete brake and brake control (specialist workshop). Check switchgear, replace if needed</td>
</tr>
<tr>
<td></td>
<td>Rectifier defective</td>
<td>Replace rectifier and brake coil; it may be more economical to replace the complete brake</td>
</tr>
<tr>
<td>Brake does not brake</td>
<td>Working air gap not correct</td>
<td>Measure and set working air gap. See the following sections:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Setting the working air gap for brake BE05-BE5&quot; (page 40)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Setting the working air gap for brake BE120-BE122&quot; (page 56)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If the brake disk is too thin, replace the brake disk (BE05-BE5 &lt; 9 mm / BE120-BE122 &lt; 12 mm).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See the following sections:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Replacing the brake disk for brake BE05-BE5&quot; (page 41)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Replacing the brake disk for brake BE120-BE122&quot; (page 58)</td>
</tr>
<tr>
<td></td>
<td>Brake lining worn down.</td>
<td>Replace entire brake disk. See the following sections:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Replacing the brake disk for brake BE05-BE5&quot; (page 41)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Replacing the brake disk for brake BE120-BE122&quot; (page 58)</td>
</tr>
<tr>
<td>Incorrect braking torque</td>
<td>Check the project planning and change the braking torque if needed; see section &quot;Work done, working air gap, braking torques&quot; (63)</td>
<td>by changing the type and number of brake springs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- by selecting a different brake</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See section &quot;Braking torque breakdown&quot; (page 64)</td>
</tr>
<tr>
<td>Working air gap so large that setting nuts for the manual release come into contact</td>
<td>Set the working air gap. See the following sections:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Setting the working air gap for brake BE05-BE5&quot; (page 40)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Setting the working air gap for brake BE120-BE122&quot; (page 56)</td>
</tr>
<tr>
<td>Manual brake release device not set correctly</td>
<td>Set the setting nuts for the manual release correctly</td>
<td>See the following sections:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Changing the braking torque of brake BE05-BE5&quot; (page 43)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;Changing the braking torque of brake BE120-BE122&quot; (page 60)</td>
</tr>
<tr>
<td>Brake locked by manual brake release HF</td>
<td>Loosen the setscrew, remove if needed</td>
<td></td>
</tr>
</tbody>
</table>
Malfunctions
Malfunctions when operating with a frequency inverter

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Possible cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake is applied with time lag</td>
<td>Brake is switched only on AC voltage side</td>
<td>Switch both the DC and AC sides (e.g., through retrofitting the current relay from SR to BSR or the voltage relay from UR to BUR); observe wiring diagram</td>
</tr>
<tr>
<td>Noises in vicinity of brake</td>
<td>Gearing wear on the brake disk or the carrier caused by jolting startup</td>
<td>Check the project planning, replace the brake disk if needed. See the following sections: – &quot;Replacing the brake disk for brake BE05-BE5&quot; (page 41) – &quot;Replacing the brake disk for brake BE120-BE122&quot; (page 58) Have a specialist workshop replace the carrier</td>
</tr>
<tr>
<td>Pulsating torques due to incorrectly set frequency inverter</td>
<td>Check correct setting of frequency inverter according to its operating instructions, correct if needed</td>
<td></td>
</tr>
</tbody>
</table>

10.3 **Malfunctions when operating with a frequency inverter**

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

10.4 **Customer service**

Please have the following information available if you require customer service assistance:
- Nameplate data (complete)
- Type and extent of the problem
- Time the problem occurred and any accompanying circumstances
- Assumed cause
Index

A
Accessory equipment .............................................. 25
AH7Y ............................................................... 27, 33
Ambient conditions
  Ambient temperature ........................................... 18
  Hazardous radiation ........................................ 18
  Installation altitude ........................................ 18
AS7H .................................................................. 27, 32

B
BE05 .................................................................. 38
BE1 .................................................................... 38
BE120 ................................................................. 53
BE122 .................................................................. 53
BE2 ..................................................................... 38
BE5 ..................................................................... 38
Bearing lubrication .............................................. 30
Brake
  BE05 .................................................................. 38
  BE1 .................................................................... 38
  BE120 ................................................................. 53
  BE122 .................................................................. 53
  BE2 ..................................................................... 38
  BE5 ..................................................................... 38
  Braking torque breakdown .................................. 64
  Braking torques .................................................. 63
  Operating currents ............................................. 65
  Resistances ......................................................... 67
  Work done ........................................................ 63
  Working air gap .................................................. 63
Brake connection .................................................. 24
Brake control ......................................................... 15, 24, 70
  BG ..................................................................... 77
  BGE ................................................................... 77
  BMP3.1 ............................................................. 80
  BSG ................................................................... 77
  BSR ................................................................... 79
  BUR ................................................................... 77
  Control cabinet .................................................... 71
  Motor wiring compartment .................................. 70
Brake malfunctions .............................................. 83
Brake rectifier combinations .................................. 69
Braking torque breakdown .................................... 64

C
Changing the braking torque
  BE05 .................................................................. 43
  BE1 .................................................................... 43
  BE120 ............................................................... 43, 60
  BE122 ............................................................... 43, 60
  BE2 ..................................................................... 43
  BE5 ..................................................................... 43
Connecting the motor .......................................... 19
Connection
  Delta ................................................................... 19
  Star .................................................................. 19
Customer service .................................................. 84

D
Delta connection ..................................................... 19, 74
Design
  DR100 ................................................................ 9
  DR315 ............................................................. 10
  DR71 .................................................................. 9
  DR80 .................................................................. 9
  DR90 .................................................................. 9
  Motor .................................................................. 9, 10
Designated use ....................................................... 7

E
EH7S .................................................................. 27, 33
Electrical connection .............................................. 8
Electrical Installation ............................................. 15
EMC .................................................................... 17
Encoder ............................................................... 27
  AH7Y ................................................................ 27
  AS7H .................................................................. 27
  EH7S .................................................................. 27
  ES7H .................................................................. 27
  ES7S .................................................................. 27
Encoder connection .............................................. 27
ES7H .................................................................. 27, 32
ES7S .................................................................. 27, 32
Exclusion of liability ............................................... 5
Extended storage .................................................. 13

F
Forced cooling fan V .............................................. 26
Frequency inverter operation .................................. 16

G
General safety notes ............................................. 6
Grounding ............................................................ 17
Index

Setting the working air gap
  BE05 ................................................................. 40
  BE1 ................................................................. 40
  BE120 ............................................................... 56
  BE122 ............................................................... 56
  BE2 ................................................................. 40
  BE5 ................................................................. 40
Special features for switching operation ............. 18
Star connection ............................................... 19, 74
Startup ................................................................ 28
Switching operation ............................................. 18

T
Technical data ...................................................... 63
Temperature sensor TF ........................................ 25
TF ............................................................... 25, 75, 76
TH ............................................................... 25, 75, 76
Transportation ..................................................... 7

U
Unit designation .................................................. 11

V
V ................................................................. 26

W
Winding thermostats TH ...................................... 25
Wiring diagram
  BMP3.1 ........................................................... 80
Wiring diagrams .................................................. 74
  BG ............................................................... 77
  BGE ............................................................. 77
  BSG ............................................................. 78
  BSR ............................................................. 79
  BUR ............................................................. 78
  Delta connection .............................................. 74
  Star connection ............................................... 74
  TF ............................................................... 75, 76
  TH ............................................................... 75, 76
# Address List

## Germany

<table>
<thead>
<tr>
<th>Headquarters</th>
<th>Production</th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bruchsal</td>
<td>SEW-EURODRIVE GmbH &amp; Co KG</td>
<td>Tel. +49 7251 75-0</td>
</tr>
<tr>
<td></td>
<td>Ernst-Blickle-Straße 42</td>
<td>Fax +49 7251 75-1970</td>
</tr>
<tr>
<td></td>
<td>D-76646 Bruchsal</td>
<td><a href="http://www.sew-eurodrive.de">http://www.sew-eurodrive.de</a></td>
</tr>
<tr>
<td></td>
<td>P.O. Box</td>
<td><a href="mailto:sew@sew-eurodrive.de">sew@sew-eurodrive.de</a></td>
</tr>
<tr>
<td></td>
<td>Postfach 3023 • D-76642 Bruchsal</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service</th>
<th>Competence Center</th>
<th>Gear units / Motors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>SEW-EURODRIVE GmbH &amp; Co KG</td>
<td>Tel. +49 7251 75-1710</td>
</tr>
<tr>
<td></td>
<td>Ernst-Blickle-Straße 1</td>
<td>Fax +49 7251 75-1711</td>
</tr>
<tr>
<td></td>
<td>D-76667 Graben-Neudorf</td>
<td><a href="mailto:sc-mitte-gm@sew-eurodrive.de">sc-mitte-gm@sew-eurodrive.de</a></td>
</tr>
</tbody>
</table>

| Central          | SEW-EURODRIVE GmbH & Co KG | Tel. +49 7251 75-1780 |
|                  | Ernst-Blickle-Straße 42    | Fax +49 7251 75-1769 |
|                  | D-76646 Bruchsal            | sc-mitte-e@sew-eurodrive.de |

| North            | SEW-EURODRIVE GmbH & Co KG | Tel. +49 5137 8798-30 |
|                  | Alte Ricklinger Straße 40-42 | Fax +49 5137 8798-55 |
|                  | D-30823 Garbsen (near Hannover) | sc-nord@sew-eurodrive.de |

| East             | SEW-EURODRIVE GmbH & Co KG | Tel. +49 3764 7606-0 |
|                  | D-08393 Meerane (near Zwickau) | Fax +49 3764 7606-30 |

| South            | SEW-EURODRIVE GmbH & Co KG | Tel. +49 89 909552-10 |
|                  | Domagkstraße 5             | Fax +49 89 909552-50 |
|                  | D-85551 Kirchheim (near München) | sc-sued@sew-eurodrive.de |

| West             | SEW-EURODRIVE GmbH & Co KG | Tel. +49 2173 8507-30 |
|                  | Siemensstraße 1            | Fax +49 2173 8507-55 |
|                  | D-40764 Langenfeld (near Düsseldorf) | sc-west@sew-eurodrive.de |

**Drive Service Hotline / 24 Hour Service**
+49 180 5 SEWHELP
+49 180 5 7394357

Additional addresses for service in Germany provided on request!

## France

<table>
<thead>
<tr>
<th>Production</th>
<th>Sales</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haguenau</td>
<td>SEUSOCOME</td>
<td>Tel. +33 3 88 73 67 00</td>
</tr>
<tr>
<td></td>
<td>48-54, route de Soufflenheim</td>
<td>Fax +33 3 88 73 66 00</td>
</tr>
<tr>
<td></td>
<td>B. P. 20185</td>
<td><a href="http://www.usocom.com">http://www.usocom.com</a></td>
</tr>
<tr>
<td></td>
<td>F-67506 Haguenau Cedex</td>
<td><a href="mailto:sew@usocom.com">sew@usocom.com</a></td>
</tr>
</tbody>
</table>

| Bordeaux   | SEUSOCOME | Tel. +33 5 57 26 39 00 |
|           | Parc d’activités de Magellan | Fax +33 5 57 26 39 09 |
|           | 62, avenue de Magellan - B. P. 182 | |
|           | F-33607 Pessac Cedex | |

| Lyon       | SEUSOCOME | Tel. +33 4 72 15 37 00 |
|           | Parc d’Affaires Roosevelt | Fax +33 4 72 15 37 15 |
|           | Rue Jacques Tati | |
|           | F-69120 Vaulx en Velin | |

| Paris      | SEUSOCOME | Tel. +31 1 64 42 40 80 |
|           | Zone industrielle | Fax +31 1 64 42 40 88 |
|           | 2, rue Denis Papin | |
|           | F-77390 Verneuil l’Etang | |

Additional addresses for service in France provided on request!

## Algeria

<table>
<thead>
<tr>
<th>Sales</th>
<th>Algiers</th>
<th>Tel. +213 21 8222-84</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Réducom</td>
<td>Fax +213 21 8222-84</td>
</tr>
<tr>
<td></td>
<td>16, rue des Frères Zaghnoun</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bellevue El-Harrach</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16200 Alger</td>
<td></td>
</tr>
</tbody>
</table>

## Argentina

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Sales</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buenos Aires</td>
<td>SEURODRIVE ARGENTINA S.A.</td>
<td>Tel. +54 3327 4572-84</td>
</tr>
<tr>
<td></td>
<td>Centro Industrial Garin, Lote 35</td>
<td>Fax +54 3327 4572-21</td>
</tr>
<tr>
<td></td>
<td>Ruta Panamericana Km 37,5</td>
<td><a href="mailto:sewar@sew-eurodrive.com.ar">sewar@sew-eurodrive.com.ar</a></td>
</tr>
<tr>
<td></td>
<td>1619 Garin</td>
<td></td>
</tr>
</tbody>
</table>
### Address List

#### Australia

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Sales</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melbourne</td>
<td>SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043</td>
<td>Tel. +61 3 9933-1000 Fax +61 3 9933-1003 <a href="http://www.sew-eurodrive.com.au">http://www.sew-eurodrive.com.au</a> <a href="mailto:enquiries@sew-eurodrive.com.au">enquiries@sew-eurodrive.com.au</a></td>
</tr>
<tr>
<td>Sydney</td>
<td>SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164</td>
<td>Tel. +61 2 9725-9900 Fax +61 2 9725-9905 <a href="mailto:enquiries@sew-eurodrive.com.au">enquiries@sew-eurodrive.com.au</a></td>
</tr>
<tr>
<td>Townsville</td>
<td>SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814</td>
<td>Tel. +61 7 4779 4333 Fax +61 7 4779 5333 <a href="mailto:enquiries@sew-eurodrive.com.au">enquiries@sew-eurodrive.com.au</a></td>
</tr>
</tbody>
</table>

#### Austria

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Sales</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wien</td>
<td>SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien</td>
<td>Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 <a href="http://sew-eurodrive.at">http://sew-eurodrive.at</a> <a href="mailto:sew@sew-eurodrive.at">sew@sew-eurodrive.at</a></td>
</tr>
</tbody>
</table>

#### Belgium

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Sales</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brüssel</td>
<td>SEW Caron-Vector S.A. Avenue Eiffel 5 B-1300 Wavre</td>
<td>Tel. +32 10 231-311 Fax +32 10 231-336 <a href="http://www.caron-vector.be">http://www.caron-vector.be</a> <a href="mailto:info@caron-vector.be">info@caron-vector.be</a></td>
</tr>
</tbody>
</table>

#### Brazil

<table>
<thead>
<tr>
<th>Production</th>
<th>Sales</th>
<th>Service</th>
</tr>
</thead>
</table>

#### Bulgaria

<table>
<thead>
<tr>
<th>Sales</th>
<th>Sofia</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia</td>
<td>Tel. +359 2 9151160 Fax +359 2 9151166 <a href="mailto:bever@fastbg.net">bever@fastbg.net</a></td>
</tr>
</tbody>
</table>

#### Cameroon

<table>
<thead>
<tr>
<th>Sales</th>
<th>Douala</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electro-Services Rue Drouot Akwa B.P. 2024 Douala</td>
<td>Tel. +237 4322-99 Fax +237 4277-03</td>
</tr>
</tbody>
</table>

#### Canada

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Sales</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toronto</td>
<td>SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1</td>
<td>Tel. +1 905 791-1553 Fax +1 905 791-2999 <a href="http://www.sew-eurodrive.ca">http://www.sew-eurodrive.ca</a> <a href="mailto:l.reynolds@sew-eurodrive.ca">l.reynolds@sew-eurodrive.ca</a></td>
</tr>
<tr>
<td>Vancouver</td>
<td>SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta, B.C. V4G 1 E2</td>
<td>Tel. +1 604 946-5535 Fax +1 604 946-2513 <a href="mailto:b.wake@sew-eurodrive.ca">b.wake@sew-eurodrive.ca</a></td>
</tr>
<tr>
<td>Montreal</td>
<td>SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Street LaSalle, Quebec H8N 2V9</td>
<td>Tel. +1 514 367-1124 Fax +1 514 367-3077 <a href="mailto:a.peluso@sew-eurodrive.ca">a.peluso@sew-eurodrive.ca</a></td>
</tr>
</tbody>
</table>

#### Chile

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Sales</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santiago de Chile</td>
<td>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</td>
<td>Tel. +56 2 75770-00 Fax +56 2 75770-01 <a href="http://www.sew-eurodrive.cl">www.sew-eurodrive.cl</a> <a href="mailto:ventas@sew-eurodrive.cl">ventas@sew-eurodrive.cl</a></td>
</tr>
<tr>
<td>Country</td>
<td>Assembly</td>
<td>Sales</td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
<td>-------</td>
</tr>
</tbody>
</table>
| China     | Tianjin  | SEW-EURODRIVE (Tianjin) Co., Ltd.  
No. 46, 7th Avenue, TEDA  
Tianjin 300457 | Tel. +86 22 25322612  
Fax +86 22 25322611  
gm-tianjin@sew-eurodrive.cn  
http://www.sew-eurodrive.com.cn |
|          | Suzhou   | SEW-EURODRIVE (Suzhou) Co., Ltd.  
333, Suhong Middle Road  
Suzhou Industrial Park  
Jiangsu Province, 215021  
P. R. China | Tel. +86 512 62581781  
Fax +86 512 62581783  
suzhou@sew.com.cn |
| Colombia  | 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  
sewco@sew-eurodrive.com.co |
| Croatia   | Zagreb   | KOMPEKS d. o. o.  
PIT Erdödy 4 II  
HR 10 000 Zagreb | Tel. +385 1 4613-158  
Fax +385 1 4613-158  
kompeks@net.hr |
| Czech Republic | Praha | SEW-EURODRIVE CZ S.R.O.  
Business Centrum Praha  
Lužná 591  
CZ-16000 Praha 6 - Vokovice | Tel. +420 220121234  
Fax +420 220121237  
http://www.sew-eurodrive.cz  
sew@sew-eurodrive.cz |
| Denmark   | Kopenhagen | SEW-EURODRIVEA/S  
Geminivej 28-30, P.O. Box 100  
DK-2670 Greve | Tel. +45 43 9585-00  
Fax +45 43 9585-09  
http://www.sew-eurodrive.dk  
sew@sew-eurodrive.dk |
| Estonia   | Tallin   | ALAS-KUUL AS  
Mustamäe tee 24  
EE-10620 Tallin | Tel. +372 6593230  
Fax +372 6593231  
veiko.soots@alas-kuul.ee |
| Finland   | Lahti    | SEW-EURODRIVE OY  
Vesimäentie 4  
FIN-15860 Hollola 2 | Tel. +358 201 589-300  
Fax +358 3 780-6211  
sew@sew.fi  
http://www.sew-eurodrive.fi |
| Gabon     | Libreville | Electro-Services  
B.P. 1889  
Libreville | Tel. +241 7340-11  
Fax +241 7340-12 |
| Great Britain | Normanton | SEW-EURODRIVE Ltd.  
Beckbridge Industrial Estate  
P.O. Box No.1  
GB-Normanton, West- Yorkshire WF6 1QR | Tel. +44 1924 893-855  
Fax +44 1924 893-702  
http://www.sew-eurodrive.co.uk  
info@sew-eurodrive.co.uk |
| Greece    | Athen    | Christ. Boznos & Son S.A.  
12, Mavromichali Street  
P.O. Box 80136, GR-18545 Piraeus | Tel. +30 2 1042 251-34  
Fax +30 2 1042 251-59  
http://www.boznos.gr  
info@boznos.gr |
<table>
<thead>
<tr>
<th>Country</th>
<th>Region</th>
<th>Address</th>
<th>Phone</th>
<th>Fax</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong</td>
<td>Assembly</td>
<td>SEW-EURODRIVE LTD.</td>
<td>+852 2 7960477</td>
<td>+852 2 79604654</td>
<td><a href="mailto:sew@sewhk.com">sew@sewhk.com</a></td>
</tr>
<tr>
<td>Sales</td>
<td></td>
<td>Unit No. 801-806, 8th Floor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td></td>
<td>Hong Leong Industrial Complex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. 4, Wang Kwong Road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kowloon, Hong Kong</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>Sales</td>
<td>SEW-EURODRIVE Kft.</td>
<td>+36 1 437 06-58</td>
<td>+36 1 437 06-50</td>
<td><a href="mailto:office@sew-eurodrive.hu">office@sew-eurodrive.hu</a></td>
</tr>
<tr>
<td>Service</td>
<td></td>
<td>H-1037 Budapest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kunigunda u. 18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>Assembly</td>
<td>SEW-EURODRIVE India Pvt. Ltd.</td>
<td>+91 265 2831086</td>
<td>+91 265 2831087</td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td></td>
<td>Plot No. 4, Gidc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td></td>
<td>Por Ramangamdi • Baroda - 391 243</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>Technical Offices</td>
<td>SEW-EURODRIVE India Private Limited</td>
<td>+91 80 22266565</td>
<td>+91 80 22266569</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>308, Prestige Centre Point</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7, Edward Road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bangalore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td>Sales</td>
<td>Alperton Engineering Ltd.</td>
<td>+353 1 830-6277</td>
<td>+353 1 830-6458</td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td></td>
<td>48 Moyle Road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dublin Industrial Estate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Glasnevin, Dublin 11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Israel</td>
<td>Sales</td>
<td>Liraz Handasa Ltd.</td>
<td>+972 3 5599511</td>
<td>+972 3 5599512</td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td></td>
<td>Ahofer Str 34B / 228</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>58658 Holon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>Assembly</td>
<td>SEW-EURODRIVE di R. Blickle &amp; Co.s.a.s.</td>
<td>+39 02 96 9801</td>
<td>+39 02 96 799781</td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td></td>
<td>Via Bernini,14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td></td>
<td>I-20020 Solaro (Milano)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Korea</td>
<td>Assembly</td>
<td>SEW-EURODRIVE KOREA CO., LTD.</td>
<td>+82 31 492-8051</td>
<td>+82 31 492-8056</td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td></td>
<td>B 801-4, Banweul Industrial Estate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td></td>
<td>Unit 1048-4, Shingil-Dong</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ansan 425-120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latvia</td>
<td>Sales</td>
<td>SIA Alas-Kuul</td>
<td>+371 7139253</td>
<td>+371 7139386</td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td></td>
<td>Kaštakalna 11C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LV-1073 Riga</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td>Region</td>
<td>Name</td>
<td>Address</td>
<td>Phone</td>
<td>Fax</td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
<td>------</td>
<td>---------</td>
<td>-------</td>
<td>-----</td>
</tr>
<tr>
<td>Lebanon</td>
<td></td>
<td>Gabriel Acar &amp; Fils sarl</td>
<td>B. P. 80484</td>
<td>+961 1 4982-72</td>
<td>+961 1 4949-71</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bouj Hammoud, Beirut</td>
<td>+961 1 4947-86</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithuania</td>
<td></td>
<td>UAB Irseva</td>
<td>Naujoji 19</td>
<td>+370 315 79204</td>
<td>+370 315 56175</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LT-62175 Alytus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luxembourg</td>
<td></td>
<td>CARON-VECTOR S.A.</td>
<td>Avenue Eiffel 5</td>
<td>+32 10 231-311</td>
<td>+32 10 231-336</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>B-1300 Wavre</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td></td>
<td>SEW-EURODRIVE SDN BHD</td>
<td>No. 95, Jalan Seroja 39, Taman Johor Jaya</td>
<td>+60 7 3549409</td>
<td>+60 7 3541404</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>81000 Johor Bahru, Johor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>West Malaysia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td></td>
<td>SEW-EURODRIVE MEXIKO SA DE CV</td>
<td>Tequisquiapan No. 102</td>
<td>+52 442 1030-300</td>
<td>+52 442 1030-301</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Parque Industrial Queretaro</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C.P. 76220 Queretaro, Mexico</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morocco</td>
<td></td>
<td>Afit</td>
<td>5, rue Emir Abdelkader</td>
<td>+212 22618372</td>
<td>+212 22618351</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MA 20300 Casablanca</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Zealand</td>
<td></td>
<td>SEW-EURODRIVE NEW ZEALAND LTD.</td>
<td>P.O. Box 58-428</td>
<td>+64 9 2745627</td>
<td>+64 9 2740165</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>82 Greenmount drive</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>East Tamaki Auckland</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SEW-EURODRIVE NEW ZEALAND LTD.</td>
<td>10 Settlers Crescent, Ferrymead Christchurch</td>
<td>+64 3 384-6251</td>
<td>+64 3 384-6455</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norway</td>
<td></td>
<td>SEW-EURODRIVE A/S</td>
<td>Solgaard skog 71</td>
<td>+47 69 241-020</td>
<td>+47 69 241-040</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N-1599 Moss</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peru</td>
<td></td>
<td>SEW DEL PERU MOTORES REDUCTORES S.A.C.</td>
<td>Los Calderos, 120-124</td>
<td>+51 1 3495280</td>
<td>+51 3 3493002</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Urbanizacion Industrial Vulcano, ATE, Lima</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td>Category</td>
<td>City/Region</td>
<td>Company Name</td>
<td>Address 1</td>
<td>Address 2</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------</td>
<td>---------------------</td>
<td>--------------------------------</td>
<td>-----------------------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Sales</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Service</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portugal</td>
<td>Assembly</td>
<td>Coimbra</td>
<td>SEW-EURODRIVE, LDA.</td>
<td>Apartado 15</td>
<td>P-3050-901 Mealhada</td>
</tr>
<tr>
<td></td>
<td>Sales</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Service</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Romania</td>
<td>Sales</td>
<td>Bucuresti</td>
<td>Sialco Trading SRL</td>
<td>str. Madrid nr.4</td>
<td>011785 Bucuresti</td>
</tr>
<tr>
<td></td>
<td>Service</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russia</td>
<td>Assembly</td>
<td>St. Petersburg</td>
<td>ZAO SEW-EURODRIVE</td>
<td>P.O. Box 36</td>
<td>195220 St. Petersburg Russia</td>
</tr>
<tr>
<td></td>
<td>Sales</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Service</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senegal</td>
<td>Sales</td>
<td>Dakar</td>
<td>SENEMECA</td>
<td>Mécanique Générale</td>
<td>B.P. 3251, Dakar</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Km 8, Route de Rufisque</td>
<td></td>
</tr>
<tr>
<td>Serbia and Montenegro</td>
<td>Sales</td>
<td>Beograd</td>
<td>DIPAR d.o.o.</td>
<td>Ustanicka 128a</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC Košum, IV floor</td>
<td></td>
</tr>
<tr>
<td>Singapore</td>
<td>Assembly</td>
<td>Singapore</td>
<td>SEW-EURODRIVE PTE. LTD.</td>
<td>No 9, Tuas Drive 2</td>
<td>Jurong Industrial Estate Singapore</td>
</tr>
<tr>
<td></td>
<td>Sales</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Service</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovakia</td>
<td>Sales</td>
<td>Bratislava</td>
<td>SEW-Eurodrive SK s.r.o.</td>
<td>Rybnícká 40</td>
<td>SK-83107 Bratislava</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Banská Bystrica</td>
<td>SEW-Eurodrive SK s.r.o.</td>
<td>ul. Vojtecha Spanyola 33</td>
<td>SK-010 01 Zilina</td>
<td>Tel. +421 41 700 2513</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovakia</td>
<td>Sales</td>
<td>Celje</td>
<td>Pakman - Pogonska Tehnika d.o.o.</td>
<td>Ul. XIV, divizije 14</td>
<td>SLO - 5000 Celje</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td>Assembly</td>
<td>Sales</td>
<td>Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
<td>-------</td>
<td>---------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td>Johannesburg</td>
<td>SEW-EURODRIVE (PROPRIETARY) LIMITED</td>
<td>Tel. +27 11 248-7000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eurodrive House</td>
<td>Fax +27 11 494-3104</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cnr. Adcock Ingram and Aerodrome Roads</td>
<td><a href="http://www.sew.co.za">http://www.sew.co.za</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aerotone Ext. 2</td>
<td><a href="mailto:dross@sew.co.za">dross@sew.co.za</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Johannesburg 2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P.O.Box 90004</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bertham 2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Capetown</td>
<td>SEW-EURODRIVE (PROPRIETARY) LIMITED</td>
<td>Tel. +27 21 552-9820</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rainbow Park</td>
<td>Fax +27 21 552-9830</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cnr. Racecourse &amp; Omuramba Road</td>
<td>Telex 576 062</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Montague Gardens</td>
<td><a href="mailto:dswanepoel@sew.co.za">dswanepoel@sew.co.za</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cape Town</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P.O.Box 36556</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chempet 7442</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cape Town</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Durban</td>
<td>SEW-EURODRIVE (PROPRIETARY) LIMITED</td>
<td>Tel. +27 31 700-3451</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Monaco Place</td>
<td>Fax +27 31 700-3847</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pinelawon</td>
<td><a href="mailto:dtlait@sew.co.za">dtlait@sew.co.za</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Durban</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P.O. Box 10433, Ashwood 3605</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td>Assembly</td>
<td>Bilbao</td>
<td>SEW-EURODRIVE ESPAÑA, S.L.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tel. +34 9 4431 84-70</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fax +34 9 4431 84-71</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parque Tecnológico, Edificio, 302</td>
<td><a href="http://www.sew-eurodrive.es">http://www.sew-eurodrive.es</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E-48170 Zamudio (Vizcaya)</td>
<td><a href="mailto:sew.spain@sew-eurodrive.es">sew.spain@sew-eurodrive.es</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>Assembly</td>
<td>Jönköping</td>
<td>SEW-EURODRIVE AB</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tel. +46 36 3442-00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fax +46 36 3442-80</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gnejsvägen 6-8</td>
<td><a href="http://www.sew-eurodrive.se">http://www.sew-eurodrive.se</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>S-55303 Jönköping</td>
<td><a href="mailto:info@sew-eurodrive.se">info@sew-eurodrive.se</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Box 3100 S-55030 Jönköping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switzerland</td>
<td>Assembly</td>
<td>Basel</td>
<td>Alfred Imhof A.G.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tel. +41 61 417 1717</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fax +41 61 417 1700</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Juristrasse 10</td>
<td><a href="http://www.imhof-sew.ch">http://www.imhof-sew.ch</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CH-4142 Münchenstein bei Basel</td>
<td><a href="mailto:info@imhof-sew.ch">info@imhof-sew.ch</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>Assembly</td>
<td>Chon Buri</td>
<td>SEW-EURODRIVE (Thailand) Ltd.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tel. +66 38 454281</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fax +66 38 454288</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bangpakong Industrial Park 2</td>
<td><a href="mailto:sewthailand@sew-eurodrive.com">sewthailand@sew-eurodrive.com</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>700/456, Moo.7, Tambol Donhuaroh</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Muang District</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chon Buri 20000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tunisia</td>
<td>Sales</td>
<td>Tunis</td>
<td>T. M.S. Technic Marketing Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7, rue Ibn El Heithem</td>
<td>Tel. +216 1 4320-40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Z.1. SMMT</td>
<td>Fax +216 1 4329-76</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2014 Mégrine Erniad</td>
<td><a href="mailto:tms@tms.com.tn">tms@tms.com.tn</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>Assembly</td>
<td>Istanbul</td>
<td>SEW-EURODRIVE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tel. +90 216 4419163 / 164 3838014/15</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fax +90 216 3055867</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hareket Sistemleri San. ve Tic. Ltd. Sti.</td>
<td><a href="mailto:sew@sew-eurodrive.com.tr">sew@sew-eurodrive.com.tr</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bagdat Cad. Koruma Cikmazi No. 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TR-34846 Maltepe ISTANBUL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ukraine</td>
<td>Sales</td>
<td>Dnepropetrovsk</td>
<td>SEW-EURODRIVE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tel. +380 56 370 3211</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fax +380 56 372 2078</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Str. Rabochaja 23-B, Office 409</td>
<td><a href="http://www.sew-eurodrive.ua">http://www.sew-eurodrive.ua</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>49008 Dnepropetrovsk</td>
<td><a href="mailto:sew@sew-eurodrive.ua">sew@sew-eurodrive.ua</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Address</td>
<td>Phone Numbers</td>
<td>Emails</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------------------------------</td>
<td>---------------------------------------------</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Greenville | 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 Manuf. +1 864 439-9948  
Fax Ass. +1 864 439-0566  
Telex 805 550  
http://www.seweurodrive.com  
cslyman@seweurodrive.com | |
| San Francisco | SEW-EURODRIVE INC.  
30599 San Antonio St.  
Hayward, California 94544-7101 | Tel. +1 510 487-3560  
Fax +1 510 487-6381 | cshayward@seweurodrive.com |
| Philadelphia/PA | 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 | |
| Dayton | SEW-EURODRIVE INC.  
2001 West Main Street  
Troy, Ohio 45373 | Tel. +1 937 335-0036  
Fax +1 937 440-3799  
cstroy@seweurodrive.com | |
| Dallas | SEW-EURODRIVE INC.  
3950 Platinum Way  
Dallas, Texas 75237 | Tel. +1 214 330-4824  
Fax +1 214 330-4724  
csdallas@seweurodrive.com | |
| 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  
sewventas@cantv.net  
sewfinanzas@cantv.net | |
How we’re driving the world

With people who think fast and develop the future with you.

With a worldwide service network that is always close at hand.

With drives and controls that automatically improve your productivity.

With comprehensive knowledge in virtually every branch of industry today.

With uncompromising quality that reduces the cost and complexity of daily operations.

With a global presence that offers responsive and reliable solutions. Anywhere.

With innovative technology that solves tomorrow’s problems today.

With online information and software updates, via the Internet, available around the clock.

SEW-EURODRIVE
Driving the world