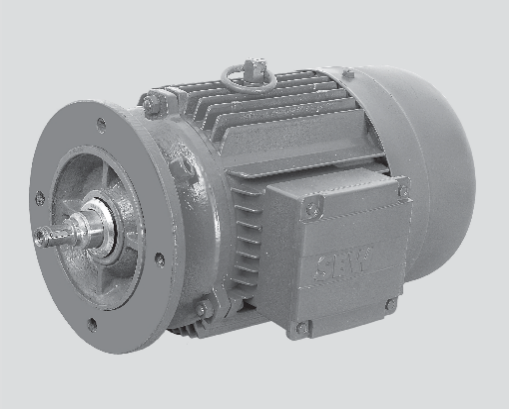
SEW EURODRIVE



DIB. AC Motors

Edition 06/2020
90791479 / EN

Operating Instruction

SEW
EURODRIVE

Table of Contents

1 General Information

1.1 How to use the operating instructions

The operating instructions are an integral part of the product and contain important information on operation and service. The operating instructions are written for all employees who assemble, install, startup, and service this product.

The operating instructions must be accessible and legible. Make sure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the operating instructions carefully and understood them. Consult SEW-EURODRIVE if you have any questions or if you require further information.

1.2 Structure of the safety notes

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

Symbol	SIGNAL WORD!
	Nature and source of hazard. Possible consequence(s) if disregarded. • Measure(s) to avoid the hazard.

Symbol	Signal word	Meaning	Consequences if disregarded
Example:  General hazard  Specific hazard, e.g. electric shock	HAZARD!	Imminent hazard	Severe or fatal injuries
	WARNING!	Possible hazardous situation	Severe or fatal injuries
	CAUTION!	Possible hazardous situation	Minor injuries
	STOP!	Possible damage to property	Damage to the drive system or its environment
	NOTE	Useful information or tip. Simplifies handling of the drive system.	

1.3 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.

1.4 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 does not assume liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.

1.5 Copyright notice

2 Safety Notes

2.1 Preliminary information

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

2.2 Duties of the user

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

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

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

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

- National and regional safety and accident prevention regulations
- Warning and safety signs on the product
- All other relevant project planning documents, installation and startup instructions, and wiring diagrams
- Do not assemble, install or operate damaged products
- All system-specific specifications and conditions

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

2.3 Designated use

The product is intended for use in industrial and commercial systems.
In the case of installation in electrical systems or machines, it is prohibited to start the proper operation of the product until it is determined that the machine meets the requirements stipulated in the local laws and directives.
The standards given in the declaration of conformity apply to the product.

2.4 Transportation/Storage

Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. If the product is damaged, it must not be assembled, installed or started up.

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

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

If necessary, use suitable, sufficiently dimensioned handling equipment.

Observe the following notes when transporting the device:

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

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

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

2.5 Installation / Assembly

Note the following points during installation:

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

See also the information in chapter "Mechanical installation" Section.

2.5.1 *Restrictions of use*

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

- Use in potentially explosive atmospheres
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, and radiation

2.6 *Electric work*

2.6.1 *Carrying out electric work safely*

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

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

2.6.2 *Electrical connection*

Exceeding the stated tolerances in IS/IEC 60034-1 – voltage ± 10 %, frequency ± 5%, curve shape, symmetry – increases the heating and influences ele c tromagnetic compatibility.

Observe the wiring information and differing data on the nameplate as well as the provided wiring diagram.

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

Nominal voltage V_N	Distance
≤ 500 V	3 mm

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

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

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

Observe the notes in chapter "Electrical installation".

2.7. *Startup/operation*

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

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

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

Make sure that any existing transport protection is removed.

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

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

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

Mechanical blocking or internal protective functions of the product can cause a motor standstill. Removing the cause of this problem can result in the drive re-starting. Disconnect the product from the power supply before you start with troubleshooting.

Overheating of motors with backstop /RS

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

- Do not permanently operate motors with backstop /RS below lift-o ffspeed.

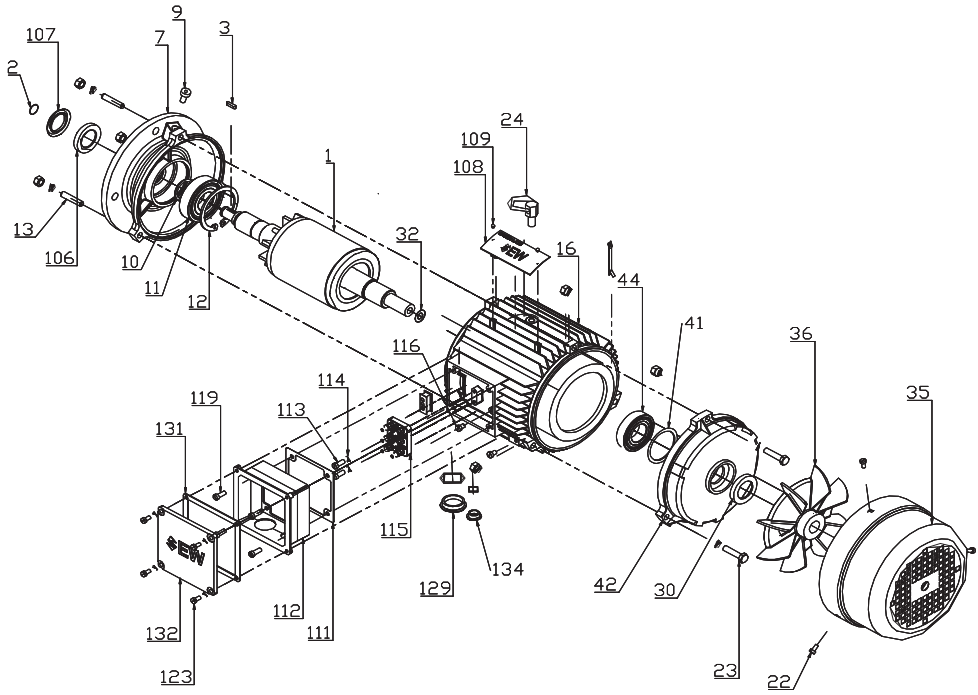
3 Motor Structure

3.1 DIB. Motor - Basic structure

3.1.1 Basic structure of DIB.63-180

NOTE

The following figure illustrates 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!

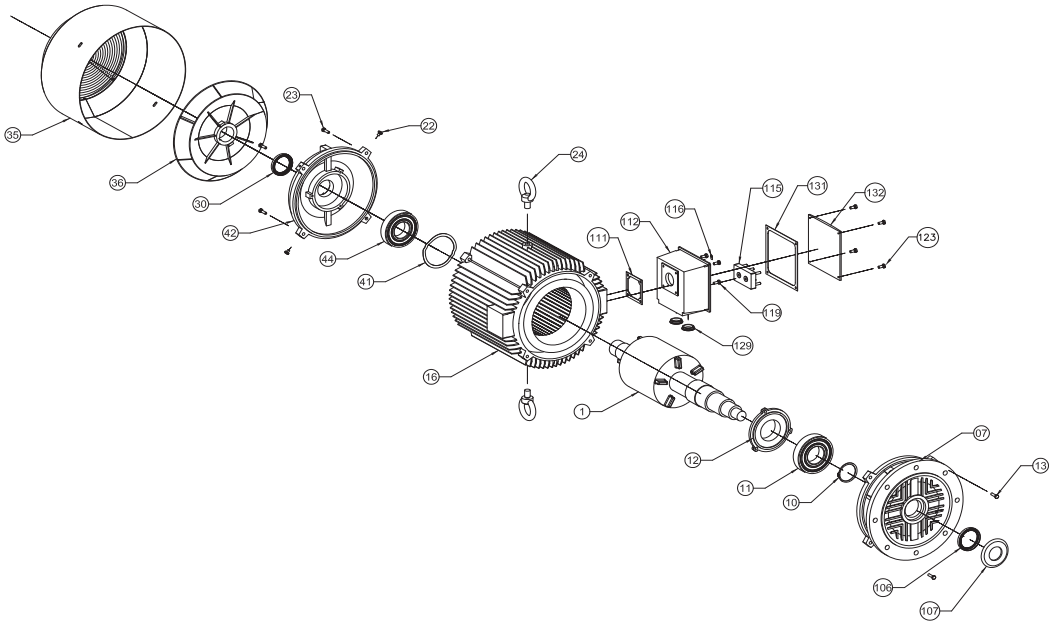


[1]	Rotor	[42]	B-side endshield
[2]	Circlip	[44]	Grooved ball bearing
[3]	Key	[106]	Oil seal
[7]	Flanged end shield	[107]	Oil finger
[9]	Screw plug	[108]	Nameplate
[10]	Circlip	[109]	Grooved pin
[11]	Grooved ball bearing	[111]	Gasket for lower part
[12]	Circlip	[112]	Terminal box lower part
[13]	Stud with Nut+Spring Washer	[113]	CH head screw
[16]	Stator	[114]	Lock washer
[22]	CH head screw	[115]	Terminal board
[23]	Fit Bolt with nut+Spring washer	[116]	Earthing screw
[24]	Lifting eyebolt	[119]	CH head screw
[30]	Oil seal	[123]	CH head screw
[32]	Circlip	[129]	Screw plug with O-ring
[35]	Fan guard	[131]	Gasket for cover
[36]	Fan	[132]	Terminal box cover
[41]	Shim washer	[134]	Screw plug with O-ring

3.1.2 Basic structure of DIB.200-225

NOTE

The following figure illustrates 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!

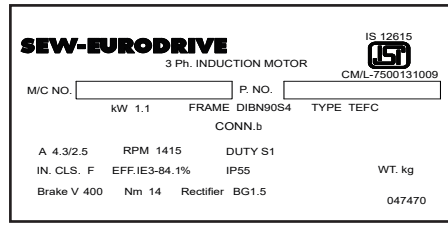


[1]	Rotor	[42]	B-side endshield
[2]	Circlip	[44]	Grooved ball bearing
[3]	Key	[106]	Oil seal
[7]	Flanged end shield	[107]	Oil finger
[9]	Screw plug	[108]	Nameplate
[10]	Circlip	[109]	Grooved pin
[11]	Grooved ball bearing	[111]	Gasket for lower part
[12]	Circlip	[112]	Terminal box lower part
[13]	Stud with Nut+Spring Washer	[113]	CH head screw
[16]	Stator	[114]	Lock washer
[22]	CH head screw	[115]	Terminal board
[23]	Fit Bolt with nut+Spring washer	[116]	Earthing screw
[24]	Lifting eyebolt	[119]	CH head screw
[30]	Oil seal	[123]	CH head screw
[32]	Circlip	[129]	Screw plug with O-ring
[35]	Fan guard	[131]	Gasket for cover
[36]	Fan	[132]	Terminal box cover
[41]	Shim washer	[134]	Screw plug with O-ring

3.2 *Nameplate, unit designation*

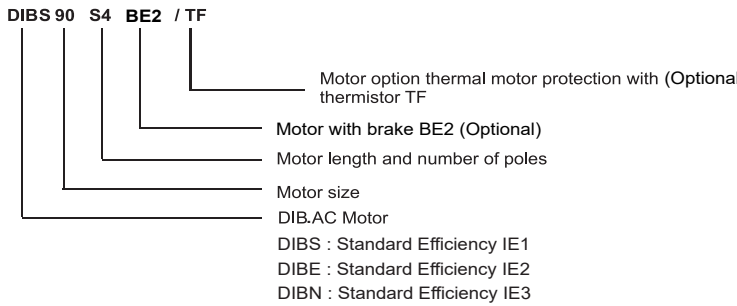
3.2.1 Nameplate

Example: DIB gearmotor



3.2.2 Unit designation

Example:



4 Mechanical Installation

	**NOTE**
	Observe the safety notes in section 2 during installation!

4.1 Before you start

Do only install the drive if the following conditions are met:

- The specifications on the nameplate of the drive correspond to the supply system or the output voltage of the frequency inverter
- The drive is undamaged (no damage caused by transportation or storage)
- You are certain that the following requirements have been met:
  - Ambient temperature according to the name plate

    Note that the temperature range of the gear unit may also be restricted (see gear unit operating instructions)
  - No oil, acid, gas, vapors, radiation, etc.
  - Installation altitude max. 1000 m above sea level

    Observe section "Designated use"
  - Special design: Drive configured in accordance with the ambient conditions

The aforementioned information refers to standard orders. The conditions might be different when you order drives other than the standard. Refer to the order confirmatio n for deviating conditions.

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

4.2 Motor installation notes

⚠ CAUTION

Sharp edges due to open keyway.

Minor injuries.

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

NOTICE

Improper assembly may damage the drive and corresponding components.

Possible damage to property

• Observe the following notes :

- Motor shaft ends must be thoroughly cleaned of anti-corrosion agents, contamination or similar (use a commercially available solvent). Do not allow the solvent to penetrate the bearings or shaft seals – this could damage the material.
- Only install the gearmotor in the specified mounting position on a level, vibration-free and torsionally rigid support structure.
- Align the motor and the driven machine carefully in order to prevent the output shaft from being exposed to unacceptable strain. Observe the permitted overhung and axial forces.
- Do not jolt or hammer the shaft end.
- Use an appropriate cover, e.g. motor option /C "Canopy", to prevent objects or fluids entering motors in vertical mounting positions (M4/V1).
- Make sure that there is sufficient clearance around the motor to provide for adequate cooling, and that the motor does not draw in warm air from other units.
- Balance components for subsequent mounting on the shaft with a half key (motor shafts are balanced with a half key).
- If using brakemotors with manual brake release, screw in either the hand lever (with self-reengaging manual brake release) or the setscrew (with lockable manual brake release).
- Protect shaft again against corrosion, if necessary.

4.2.1 Installation in damp locations or in the open

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

4.3 HR/HF manual brake release

4.3.1 Manual brake release HF

You can use the optional lockable HF manual brake release to continuously mechanically release the BE.. brake with a setscrew and a release lever.

On delivery, the setscrew is inserted far enough to not fall out and to not affect the brake performance. The setscrew is self-locking with a nylon coat in order to prevent it from unintended further penetration or from falling out.

Proceed as follows to activate the lockable HF manual brake release:

- Screw in the setscrew until there is no more play at the release lever. Additionally, screw in the setscrew by another 1/4 or 1/2 revolution in order to manually release the brake.

Proceed as follows to loosen the lockable HF manual brake release:

- Loosen the setscrew at least until the floating clearance (see chapter "Retrofitting HR/HF manual brake release") of the manual brake release has completely returned.

⚠ WARNING

Lacking functionality of the manual brake release due to improper brake installation, e.g. setscrew inserted too far.

Severe or fatal injuries.

- Only qualified staff may perform work on the brake.
- Check the brake for proper function prior to startup.

4.3.2 Retrofitting HR/HF manual brake release

⚠ WARNING

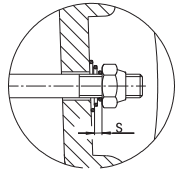
Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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

1. Remove the following:
   - Forced cooling fan
   - Flange cover or fan guard [35], circlip [32/62] and fan [36]
2. Installing manual brake release:
   - **for BE05 – BE11**
     - Remove the sealing ring [95]
     - Screw in and glue studs [56], insert sealing ring for manual brake release [95] and hammer in parallel pin [59].
     - Mount release lever [53], conical coil springs [57] and setting nuts [58].
   - **For BE20-BE30**
     - Screw in studs [56].
     - Mount release lever [53], conical coil springs [57] and setting nuts [58].
3. Use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see the following figure).

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



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Brake	Floating clearance s [mm]
BE05; BE1; BE2	1.5
BE5	1.7
BE11; BE20-BE30	2

4. Reinstall the removed parts.

4.4 Direct mounting of a motor on a gear unit

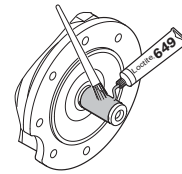
INFORMATION

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

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

Joining the pinion to the motor or input shaft

1. Clean and degrease the shaft and the bore of the pinion.
2. Apply Loctite® 649 to the shaft after the securing hole over the entire area of the circumference.



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

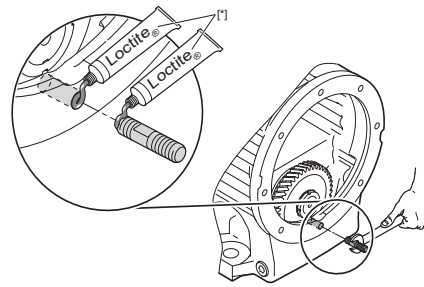
Cleaning the sealing surfaces

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

Sealing threads that lead into the housing interior

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

7. Clean and degrease thread through bores that lead into the housing interior and their studs.
8. Apply Loctite® 574 or Loctite® 5188 (selection according to the table at the end of the chapter) in a continuous ring on the upper threads of the flange thread and the stud.



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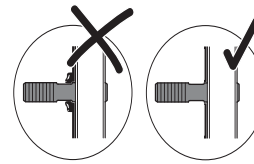
[*] Loctite® according to the table at the end of the chapter

Screwing in the studs

9. Screw the studs into the thread up to the shoulder.

10. Remove any excess Loctite ® (see following diagram) from the sealing surface 60 minutes after screwing in at the latest.



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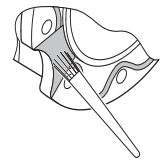
Sealing the flange surface

INFORMATION

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



11. Only distribute Loctite® 574 or Loctite® 5188 (selection according to the table at the end of the chapter) to one of the sealing surfaces. Apply the sealant in beads or over a large area without gaps. Use a suitable application tool that does not contaminate the sealing surface, for example, a non-shedding brush or a short-hair lamb's wool roller.

Joining flange surfaces

12. Join the flange surfaces together. Next, **immediately** tighten the nuts with the specified torque (see the table at the end). If you tighten the nuts too late, the sealing film can tear.
13. The sealant must harden for 30 minutes and must not come into contact with the gear oil.

4.4.1 Tightening torques

Screw/nut	Tightening torque Nm
M6	11.3
M8	27.3
M10	54
M12	93
M16	230

4.4.2 Selection and use of Loctite®

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

5 Electrical Installation

	NOTES
	• Observe the safety notes in section 2 during installation! • Use switch contacts in utilization category AC-3 for switching the motor.

5.1 Compulsory use of the wiring diagrams

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

5.1.1 Protecting the brake control system against interference

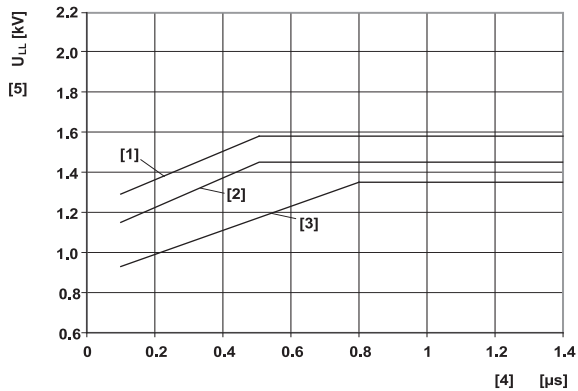
Unless they are shielded, brake cables must always be routed separately from other power cables with phased currents to protect brake controls against interference. Power cables with phased currents are in particular

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

5.2 Special aspects for operation with a frequency inverter

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

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



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[1] Permitted pulse voltage according IEC 60034-25, limit value curve A for nominal voltage $V_N \leq 500$ V, star connection

[2] Permitted pulse voltage according IEC 60034-25, limit value curve A for nominal voltage $V_N \leq 500$ V, delta connection

[3] Permitted pulse voltage according to IEC 60034-17

[4] Voltage rise time

[5] Permitted pulse voltage

INFORMATION

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. Consult the manufacturer of the frequency inverter.

5.2.1 Inverter, IviCdata

VVVF Installation Requirements :-

Earthing :- Special high frequency earthing (at customer's end).

Type of power cable :- Shielded cables recommended (at customer's end).

Cable length between drive motor, along with peak voltage limit for motor insulation:-

Safe up to 10 meters. (Equivalent length of shielded cable) , 5 meters for XLP or PVC cable.

For higher length, customer or his system integrator has to ensure by using sine filters/ dv/dt filters / chokes / lower switching frequencies such that;

dv/dt filters or sine wave filter Mandatory for high switching frequency (5kHz or more).

DIB motors are stress categories as per IEC 60034-18-41:2014 - type I insulation systems based on a 2-level converter

Motor maximum peak to peak operating voltage will be,

For 415V :- stress category B (Moderate)

Phase/phase maximum operating voltage = 1.85 kV

Phase/ground maximum operating voltage = 0.7 x 1.85 = 1.30 kV

5.3 Earthing

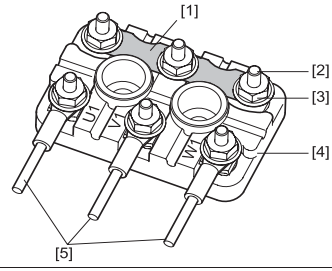
Earthing provision is there inside motor terminal box and motor mody, it is mendatory to establish proper earthing connection before starting motor.

5.4 Connecting the motor

5.4 .1 Connecting the motor via the terminal box

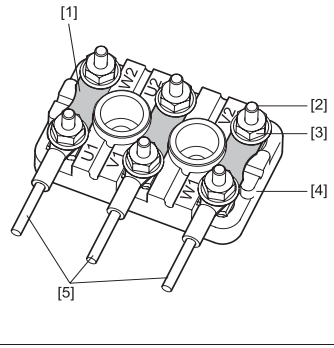
- In accordance with the wiring diagram provided
- Check cable cross section
- Arrange terminal links correctly
- Tighten connections and protective earth
- In the terminal box: Check winding connections and tighten them if necessary

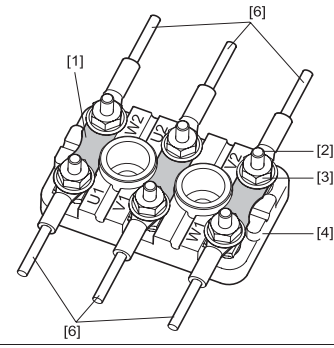
Arrangement of the terminal links for Y connection **240 △ /415 Y upto DIB 132S**



Arrangement of the terminal links for △ connection

415 △ for motor > DIB 132S





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

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.

5.4.2 Motor connection terminal box

Arrange the cables and terminal links as shown in the wiring diagram and screw them on firmly.

5.4.3 Cable size, Earthing size

Frame Size	Terminal stud size	Tightening torque hex nut	Connection Cross section	Connection type	Grounding Screw size
63	M5	2.0 Nm	≤ 2.5 mm2	Solid wire Conductor end sleeve	M5
			≤ 16 mm2	Ring cable lug	
71	M5	2.0 Nm	≤ 2.5 mm2	Solid wire Conductor end sleeve	M5
			≤ 16 mm2	Ring cable lug	
80	M5	2.0 Nm	≤ 2.5 mm2	Solid wire Conductor end sleeve	M5
			≤ 16 mm2	Ring cable lug	
90	M5	2.0 Nm	≤ 2.5 mm2	Solid wire Conductor end sleeve	M5
			≤ 16 mm2	Ring cable lug	
100	M5	2.0 Nm	≤ 2.5 mm2	Solid wire Conductor end sleeve	M6
			≤ 16 mm2	Ring cable lug	
112	M6	3.0 Nm	≤ 35 mm2	Ring cable lug	M6
132	M6	3.0 Nm	≤ 35 mm2	Ring cable lug	M6
160	M6	3.0 Nm	≤ 35 mm2	Ring cable lug	M6
180	M6	3.0 Nm	≤ 35 mm2	Ring cable lug	M6
200	M8	6.0 Nm	≤ 70 mm2	Ring cable lug	M8
225	M8	6.0 Nm	≤ 70 mm2	Ring cable lug	M8

5.5 Framewise bearing sizes

Frame Size	Bearing No.		
	DE	**NDE AC Motor**	**NDE AC Brake Motor**
DIB. 63	6303 -2Z-J	6201 -2Z-J	-
DIB. 71	6303 -2Z-J	6203 -2Z-J	**6203-2Z-J-C3**
DIB. 80	6303 -2Z-J	6203 -2Z-J	**6203-2Z-J-C3**
DIB. 90	6306 -2Z-J-C3	6205 -2Z-J-C3	**6205-2Z-J-C3**
DIB. 100	6306 -2Z-J-C3	6206 -2Z-J-C3	**6206-2Z-J-C3**
DIB. 112	6307 -2Z-J-C3	6206 -2Z-J-C3	**6206-2Z-J-C3**
DIB. 132 **K/S**	6307 -2Z-J-C3	6208 -2Z-J-C3	**6208-2Z-J-C3**
DIB. 132 M	6309 -2Z-J-C3	6208 -2Z-J-C3	**6208-2Z-J-C3**
DIB. 160	6309 -2Z-J-C3	6209 -2Z-J-C3	**6209-2Z-J-C3**
DIB. 180	6312 -2Z-J-C3	6210 -2Z-J-C3	**6211-2Z-J-C3**
DIB. 200/225	**6314-** ZZ	**6313** -ZZ	**-**

5.6 *Connecting the brake*

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

⚠ WARNING

Risk of crushing if the hoist falls.

Severe or fatal injuries.

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

5.6.1 Connecting the brake control

The DC disk brake is powered from a brake control system with protection circuit. It is located in the terminal box.

- **Check the cable cross sections – braking currents (see section "Technical Data")**
- Connect the brake control system according to the wiring diagram supplied with the brake

5.7 Options

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

5.7.1 Temperature sensor /TF

NOTICE

Destruction of the temperature sensor due to overheating if the voltage is too high.

The drive system might be damaged.

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

The PTC thermistors comply with DIN 44082.

Resistance measurement (measuring instrument with V ≤ 2.5 V or I < 2 mA):

- Standard measured values: 20 – 250 Ω, hot resistance > 4000 Ω

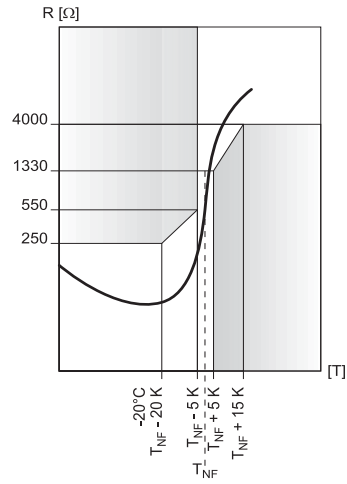
When using the temperature sensor for thermal monitoring, the evaluation function must be activated to maintain reliable isolation of the temperature sensor circuit. If the temperature reaches an excessive level, a thermal protection function must be triggered immediately.

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

INFORMATION

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

Below figure shows the characteristic curve of the TF with reference to the nominal response temperature (referred to as T_{NF}).



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5.7.2 /TH winding thermostats

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

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

5.7.3 V forced cooling fan

- Connection in separate Connector

Motor size	Operating mode/connection	Frequency Hz	Voltage V
DIB.63 - 180	1 ~ AC	50	220

5.8 De-rated Rating for 4 Pole constant torque w/o force cooled

Torque Ratio	2:1	5:1	10:1
Speed variation	50% to 100%	20% to 100%	10% to 100%

Frame	STD O/P KW	4 POLE							
		CLASS F RISE				CLASS B RISE			
		LOAD TYPES				LOAD TYPES			
		V.T	C.T			V.T	C.T		
		TαN^2	,2:1	,5:1	,10:1	TαN^2	,2:1	,5:1	,10:1
71	0.37	0.37	0.37	0.296	0.259	0.35	0.31	0.26	0.22
80	0.75	0.75	0.75	0.6	0.525	0.71	0.64	0.53	0.45
90S	1.1	1.1	1.1	0.88	0.77	1.05	0.94	0.77	0.66
90L	1.5	1.5	1.5	1.2	1.05	1.43	1.28	1.1	0.9
100L	2.2	2.2	2.2	1.76	1.54	2.09	1.87	1.5	1.3
112M	3.7	3.7	3.7	2.96	2.59	3.52	3.1	2.6	2.2
132S	5.5	5.5	5.5	4.4	3.85	5.23	4.7	3.9	3.3
160M	9.3	9.3	9.3	7.44	6.51	8.84	7.9	6.5	5.6
160L	15	15	15	12	10.5	14.3	12.8	10.5	9
180M	18.5	18.5	15	14.8	12.95	17.6	15.7	13	11
180L	22	22	22	17.6	15.4	20.9	18.7	15.4	13
200	30	30	30	24	21	28.5	25.5	21	18
225S	37	37	37	29.6	25.9	35.2	31.5	25.9	22
225M	45	45	45	36	31.5	42.8	38.3	31.5	27

V.T - Variable torque
C.T - Constant torque
T -Torque
N –RPM (Speed)

6 Startup

6.1 Prerequisites for startup

	NOTE
	• It is essential to observe the safety notes in section 2 during installation. • In case of problems, refer to section "Malfunctions".

6.1.1 Before startup

Prior to startup make sure that:

- The drive is undamaged and not blocked.
- Any transport locks have been removed.
- All connections have been made correctly.
- The direction of rotation of the motor/gearmotor is correct.
  - Motor rotating clockwise: U, V, W (T1, T2, T3) to L1, L2, L3
- All protective covers are installed correctly.
- All motor protection equipment is active and set for the rated motor current.
- There are no other sources of danger.
- Loose elements like keys are appropriately secured.
- The brake is not manually released.
  - The set screw of /HF option is loosened correctly.
  - The hand lever of the /HR option has been removed and correctly attached to the stator using the designated clamps.

6.1.2 During startup, make sure that

- the motor is running correctly (no overload, no speed fluctuation, no loud noises, etc.)

6.2 Motors with backstop /RS

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

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

If a conversion is required to change the blocking direction, follow the instructions in chapter "Altering the blocking direction on motors with a backstop"

7 Inspection/Maintenance

⚠ WARNING

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

Severe or fatal injuries.

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

⚠ CAUTION

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

Risk of burns.

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

NOTICE

Damage to the oil seals if the temperatures is too low during installation.

Possible damage to the oil seals.

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

INFORMATION

Apply grease with a grease depot (Klüber Petamo GHY133N) to the lip of the oil seal before assembly.

INFORMATION

Friction disks in the brakemotor may only be replaced by SEW-EURODRIVE service staff.

Only SEW-EURODRIVE repair workshops, or SEW plants that provide the necessary expertise may repair or modify the motor/brakemotor.

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

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

7.1 Inspection and maintenance intervals

The following table lists the inspection and maintenance intervals:

Unit / unit part	Time interval	Required steps
BE brake	• **If used as a working brake:** At least every 3000 hours of operation [1)] • **If used as a holding brake:** Every 0.5 to 4 years, depending on operating conditions [1)]	Inspecting the brake • Measuring the brake disk thickness • Brake disk, lining • Measuring and adjusting working air gap • Pressure plate • Carrier/gearing • Pressure rings • Sucking off any abrasion • Inspect the switch contacts and replace them if necessary (e.g. in case of burn-out)
Motor	• **Every 10000 operating hours** [2) 3)]	Motor inspection: • Check rolling bearing and change if necessary • Replacing the oil seal • Clean the cooling air passages
Drive	• Varies [3)]	• Touch up or renew the surfaces/anti-corrosion coating • Check and clean the air filter. • if applicable, clean condensation drain hole at the bottom of the fan guard • Clean clogged bores

1) The amount of wear depends on many factors and may be high. The machine 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 DIB.200 - 225 with relubrication device, note the shortened relubrication periods in the chapter "Bearing lubrication DIB.200 - 225

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

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

7.1.1 Connection cables

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

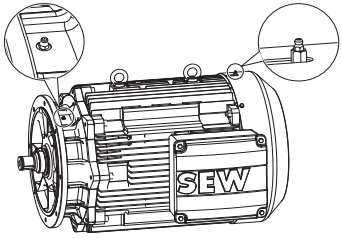
7.2 Bearing lubrication

7.2.1 Bearing lubrication DIB.63 - 225

In standard design, the bearings are lubricated for life.

7.2.2 Bearing lubrication DIB.200 - 225 with relubrication device (optional)

Motors of sizes 200, 225 can be equipped with a relubrication device. The following figure shows the positions of the lubrication devices



Relubrication

INFORMATION

Each time you relubricate, 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

7.3 Maintenance for DIB motors

inspection steps

⚠ HAZARD!

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Disconnect the motor from the power supply and safeguard it against accidental startup before starting work!
- Carefully observe the following steps!

7.3.1 Dismantaling the motor

1. Before dismantling the motor disconnect it from the supply.
2. Remove the pulley/pinion fitted on shaft extension using suitable puller.
3. Refer to cross sectional drawing, given in the manual.
4. Remove the shaft key. (Part No. 07)
5. Remove the fan cover by taking out its mgf. screw.
6. Remove the fan with help of screw driver after taking out split pin (15)/washer and nut. Remove the fan locking key.
7. Remove the bolts(18) and take out NDE endcover using screw driver and tapping it slowly.
8. Remove the bolts (18) and take out DE endcover (2)/Flange (2) alongwith rotor assembly shaft, Rotor (10) and bearing.
9. Remove circlip from flange
10. Remove the bearing cover screw & washer (24) and loosen the bearing cover.
11. Remover the end cover / flange using mallet for tapping slowly. Now the rotor assembly is free from both end shields.
12. Remove Bearing (DE) & (NDE) using suitable bearing puller.
13. Remove the bearing cover.
14. Remove the terminal box cover (20) by taking out mtg. screws (21)
15. Disconnect winding leads from terminal studs & disconnect the capacitor.
16. Remove terminal block by taking out its mtg. screw using screw driver.

7.3.2 Reassemly

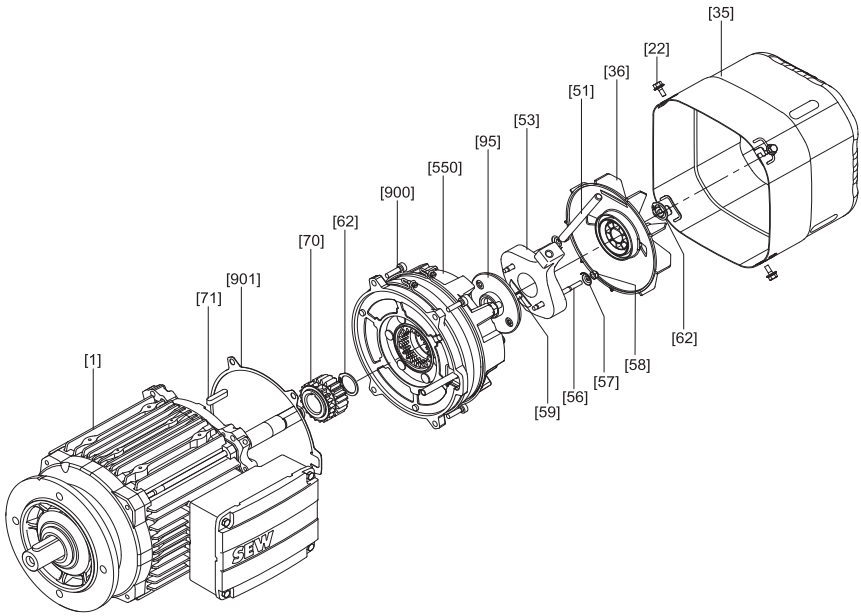
1. Clean the parts throughly before taking them for re-assembly.
2. All sharp edges, dent marks, burrs shall be removed.
3. the worn out/damaged parts shall be removed.
4. Fix circlip to flange
1. Mount the bearing on NDE side using mounting sleeve/hydraulic press.
2 Insert bearing cover then mount bearing on DE side.
3. Mount oil seal (If replaced) in the DE end cover/flange.
4. Mount DE end cover/flange on DE bearing.
5. Tighten the bearing cover using bearing cover screw & washer.
6. Insert rotor assembly from DE side in the stator bore.
7. Mount NDE end cover on motor frame by fixing bolts.
8. Check the freeness of the rotorshaft by rotating it manually.
9. Mount the fan using split pin / key and washer.
10. Mount fan cover on NDE cover using screws and washer.
11. Carryout connection of the motors as per connection diagram & run the motor.

Note :

1. Ensure that terminal connections are made as per the connection diagram provided.
2. Couple the motor with driven equipment and start the motor. It will give you the desired performance.

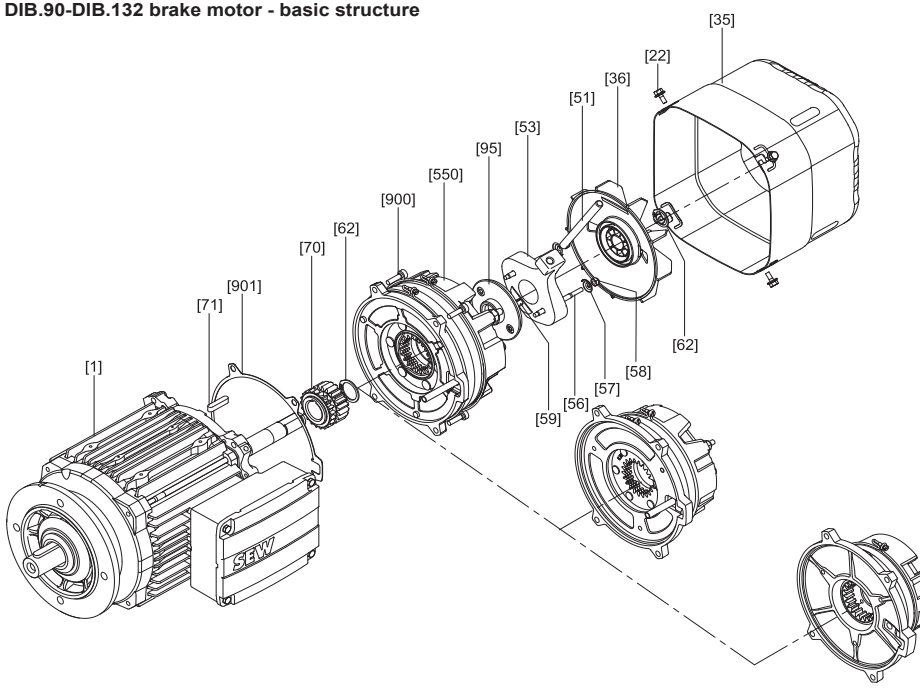
7.4 Inspection/maintenance for DIB.71-DIB.180 brakemotors

7.4.1-I DIB.71-DIB. 80 brakemotor - Basic structure



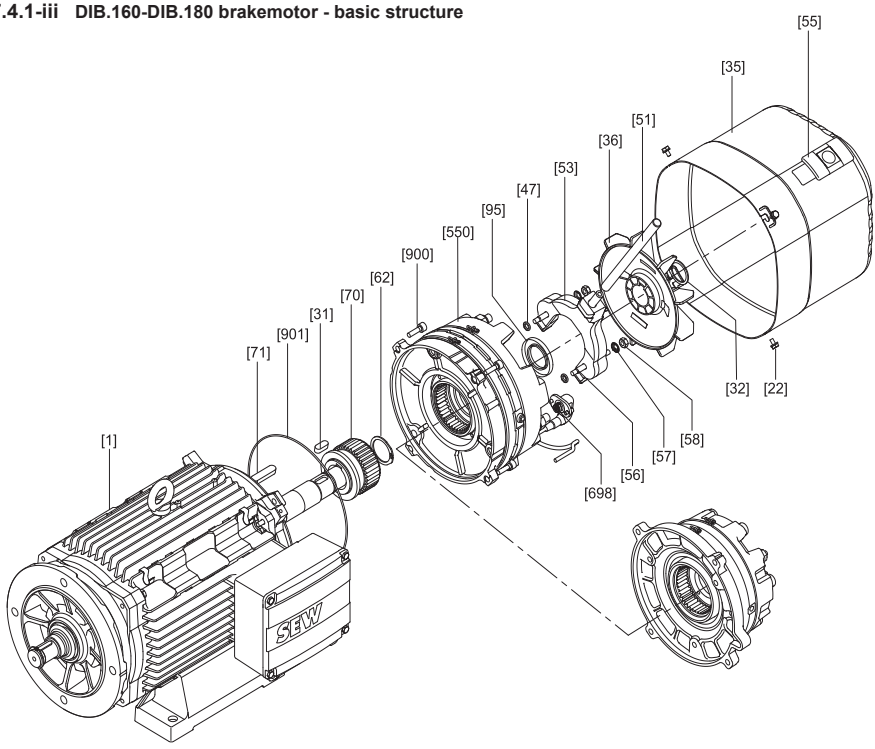
[1]	Motor with brake endshield	[53]	Releasing lever	[70]	Driver
[22]	Hex head screw	[56]	Stud	[71]	Key
[32]	Retaining ring	[57]	Conical spring	[95]	Sealing ring
[35]	Fan guard	[58]	Adjusting nut	[550]	Pre-assembled brake
[36]	Fan	[59]	Parallel pin	[900]	Screw
[51]	Hand lever	[62]	Retaining ring	[901]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

7.4.1-ii DIB.90-DIB.132 brake motor - basic structure



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

7.4.1-iii DIB.160-DIB.180 brakemotor - basic structure



[1]	Motor with brake end-shield	[51]	Hand lever	[70]	Driver
[22]	Hex head screw	[53]	Releasing lever	[71]	Key
[31]	Key	[55]	Closing piece	[95]	Sealing ring
[32]	Retaining ring	[56]	Stud	[550]	Pre-assembled brake
[35]	Fan guard	[57]	Conical spring	[698]	Connector complete (only for BE20 – BE122)
[36]	Fan	[58]	Adjusting nut	[900]	Screw
[47]	O-ring	[62]	Retaining ring	[901]	Gasket

7.4.2 DIB.71-DIB.180 brakemotor - inspection steps

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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

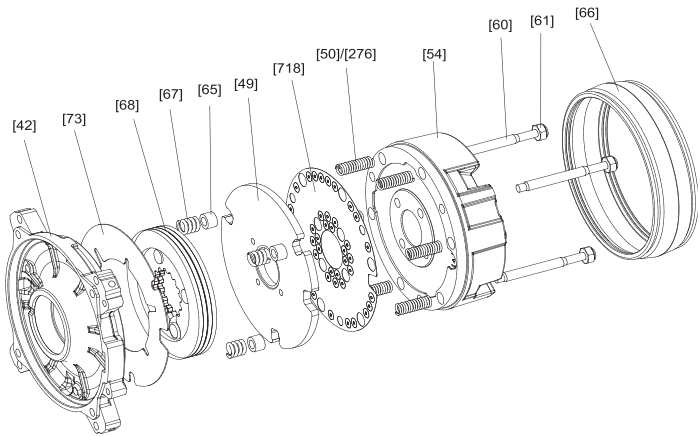
1. Remove fan guard [35] and fan [36].
2. Remove the brake cable:
   - BE05 – 11: Remove the terminal box cover and unfasten the brake cable from the rectifier.
   - BE20 : Loosen locking screws of the brake plug connector [698] and remove plug connector.
   - Remove the terminal box cover and unfasten the brake cable from the rectifier.
3. Push the brake off the stator and carefully lift it off **and remove the endshield.**
4. Remove stator:
   - Remove machine screws [13] from flanged endshield [7] and brake endshield [42]. Remove stator [16] from flanged endshield [7].
5. Pull the stator back by about. 3 to 4 cm.
6. Visual inspection: Is there any moisture or gear unit oil inside the stator?
   - If not, proceed with step 10.
   - If there is moisture, proceed with step 8
   - If there is gear oil, have the motor repaired by a specialist workshop
7. If there is moisture inside the stator:
   - With gearmotors: Remove the motor from the gear unit
   - With motors without a gear unit: Remove the A-flange
   - Remove the rotor [1]
8. Clean the winding, dry it and check it electrically (see chapter "Drying the motor".
9. Replace the grooved ball bearings [11], [44] with permitted ball bearings.

   See section"Permitted rolling bearing types".
10. Reseal the shaft:
    - A-side: Replace the oil seal [106]
    - B-side: Replace the oil seal [30]

      Coat the sealing lip with grease (Klüber Petamo GHY 133).
11. Reseal the stator seat:
    - Seal the sealing surface with duroplastic sealing compound

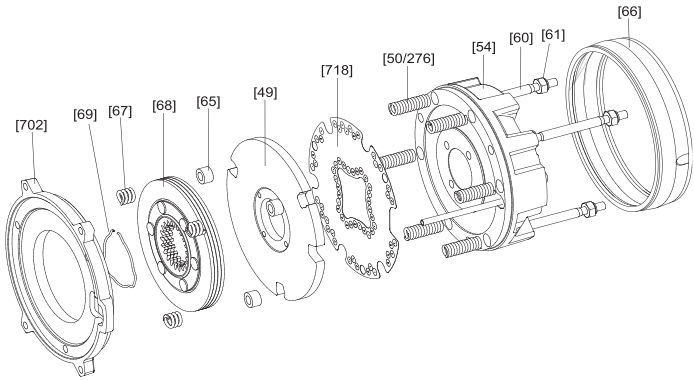
      (Operating temperature - 40 °C...+180 °C) e.g. "Hylomar L Spezial".
12. Replace the Gasket [901] between the brake endshield [42] and the pre-assembled brake [550]. Install the pre-assembled brake [550]
13. Install the motor, the brake and accessory equipment.

7.4.3 BE05-2 brakes - Basic structure



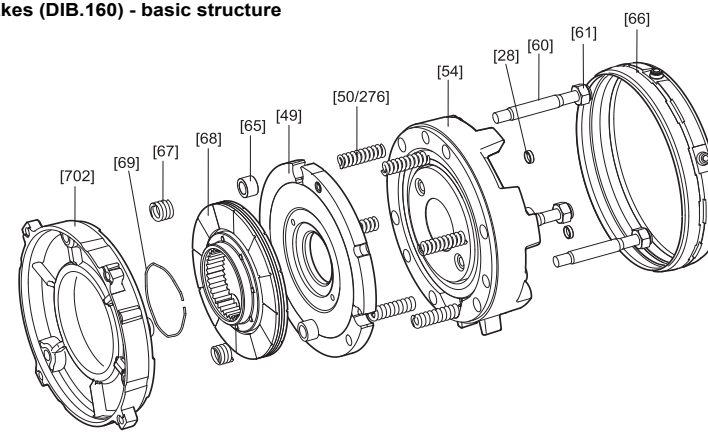
[42] Brake bearing end shield
[49] Pressure plate
[50] Brake spring (normal)
[54] Magnet, complete
[60] Stud 3x
[61] Hex nut
[65] Pressure ring
[66] Rubber sealing collar
[67] Counter spring
[68] Brake disk
[73] Terminal disk
[276] Brake spring (blue)
[718] Dampening plate

7.4.4 BE1-BE11 brakes (DIB.90-DIB.132) - Basic structure



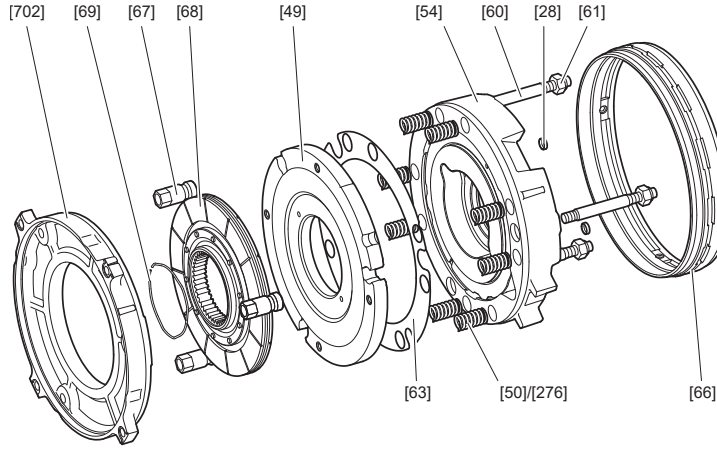
[49] Pressure plate
[50] Brake spring (normal)
[54] Magnet, complete
[60] Stud 3x
[61] Hex nut
[65] Pressure ring
[66] Rubber sealing collar
[67] Counter spring
[68] Brake disk
[69] Circular spring
[276] Brake spring (blue)
[702] Friction disk
[718] Dampening plate

7.4.5 BE20 brakes (DIB.160) - basic structure



[28]	Closing cap	[61]	Hex nut	[69]	Circular spring
[49]	Pressure plate, complete	[65]	Pressure ring	[276]	Brake spring (blue)
[50]	Brake spring (normal)	[66]	Sealing strip	[702]	Friction disk
[54]	Magnet body, complete	[67]	Counter spring		
[60]	Stud 3x	[68]	Brake disk		

7.4.6 BE30 brakes (DIB.180) - basic structure



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

7.4.7 Setting the working air gap of BE05-BE30 brakes

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

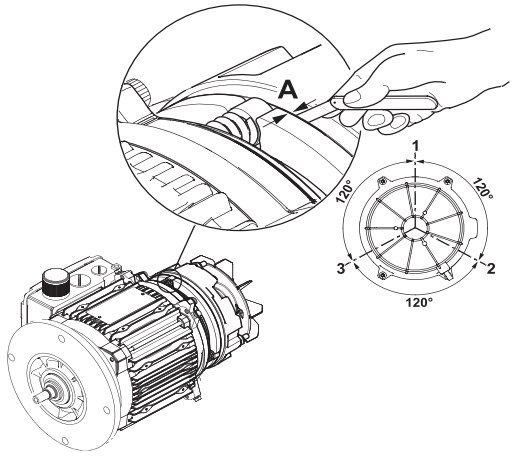
Severe or fatal injuries.

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

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

     See section "Motor and brake maintenance – preliminary work".
   - Flange cover or fan guard [35]
2. Push the rubber sealing collar [66] aside,
   - release the clamping strap, if necessary
   - Sucking off any abrasion
3. Measure the brake disk [68]:
   - Minimum brake disk thickness see chapter "Technical Data".
   - Replace brake disk if necessary, see chapter "Replacing the brake disk of BE05-BE30 brakes".
4. BE30 : Loosen the setting sleeve [67] by turning it towards the rear end-shield.
5. Measure the working air gap A (see the following figure)

   (use a feeler gauge and measure at three points offset by 120°):
   - **for BE05:** between the pressure plate [49] and damping plate [718]
   - For BE05 – 11: between pressure plate [49] and damping plate [718]
   - For BE20 – 30: between pressure plate [49] and magnet body [54]



BE05-BE20 : Tighten the hex nuts [61] until the working air gap is set correctly, see chapter "Technical Data"

BE30 : Tighten the hex nuts [61] until the working air gap is initially 0.05 – 0.1mm larger than the desired setting value (for default values, see chapter "Braking work, working air gap, and brake lining carrier thickness"F or example, with a desired air gap of 0.4 mm, the preset value must be 0.45 – 0.5 mm.

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

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

Brake	Tightening torque
BE30 – BE32	93 Nm
BE60 – BE62	40 Nm
BE120 – BE122	230 Nm

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

7.4.8 Replacing the brake disk of BE05-BE30 brakes

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

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

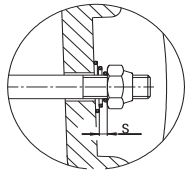
Severe or fatal injuries.

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

1. Remove the following:
   - Forced cooling fan and fan guard [35], circlip [32/62] and fan [36]
2. Remove the brake cable
   - **BE05-BE11 :** Remove the terminal box cover and unfasten the brake cable from the rectifier.
   - **BE20-BE30 :** Loosen locking screws of the brake plug connector [698] and remove plug connector.
3. Remove the rubber sealing collar [66]
4. Loosen hex nuts [61], carefully pull off the magnet [54] (brake cable!) and take out the brake springs [50].
5. **BE05-BE11 :** Remove the damping plate [718], pressure plate [49] and brake disk [68]

   BE20-BE30 : Remove pressure plate [49] and pole sheet [63] brake disk [68]
6. Clean the brake components
7. Install a new brake disk(s).
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 chapter "Setting the working air gap of the BE05-BE 30 brakes".
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 following figure).

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



Brake	Floating clearance s [mm]
BE05; BE1; BE2;	1.5
BE5	1.7
BE11; BE20; BE30	2

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

INFORMATION

- The lockable manual brake release (type HF) is already released when resistance is encountered when operating the grub screw.
- 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.

INFORMATION

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

7.4.9 Changing the braking torque of BE05-BE30 brakes

The braking torque can be altered in stages.

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

7.4.10 Changing the brake spring of BE05-BE30 brakes

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

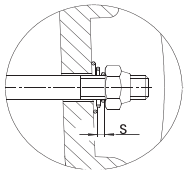
Severe or fatal injuries.

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

1. Remove the following:
   - Forced cooling fan and fan guard [35], circlip [32/62] and fan [36]
2. Remove the brake cable
   - **BE05 – 11:** Remove the terminal box cover and unfasten the brake cable from the rectifier.
     BE20-BE30 : Loosen locking screws of the brake plug connector [698] and remove plug connector.
   -
3. 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]
4. Unfasten hex nuts [61] and pull off the magnet [54]
   - by approx. 50 mm (watch the brake cable)
5. Change or add brake springs [50/276]
   - Arrange brake springs symmetrically
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 chapter "Setting the working air gap of the BE05-BE30 brakes".

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).

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



Brake	Floating clearance s [mm]
BE05; BE1; BE2;	1.5
BE5	1.7
BE11; BE20; BE30	2

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

INFORMATION

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

7.4.11 Changing the magnet of BE05-BE30 brakes

WARNING

Risk of crushing if the drive starts up unintentionally.

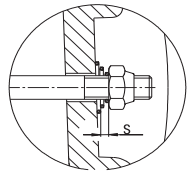
Severe or fatal injuries.

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

1. Remove the following:
   - Forced cooling fan and fan guard [35], circlip [32/62] 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 brake cable
   - **BE05 – 11:** Remove the terminal box cover and unfasten the brake cable from the rectifier.
     BE20-BE30 : Loosen locking screws of the brake plug connector [698] and remove plug connector.

4. Unfasten hex nuts [61], remove complete magnet [54], remove brake springs [50/276].
5. Install new magnet with brake springs. For the possible braking torque steps.
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 chapter"Setting the working air gap of the BE05-BE20 brakes".
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).

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



Brake	Floating clearance s [mm]
BE05; BE1; BE2;	1.5
BE5	1.7
BE11; BE20; BE30	2

8. Put the rubber sealing collar back in place and re-install the dismantled parts.
9. Replace brake controller in the event of an interturn short circuit or a short circuit to frame.

INFORMATION

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

7.4.12 Replacing the brake of DIB.71-DIB.180

⚠ WARNING

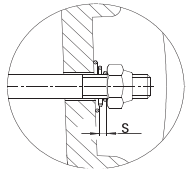
Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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

1. Remove the following:
   - Flange cover or fan guard [35], circlip [32/62] and fan [36]
2. Remove the terminal box cover and loosen the brake cable from the rectifier. If necessary, attach trailing wire to brake cables.
3. Loosen 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.
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 following figure).

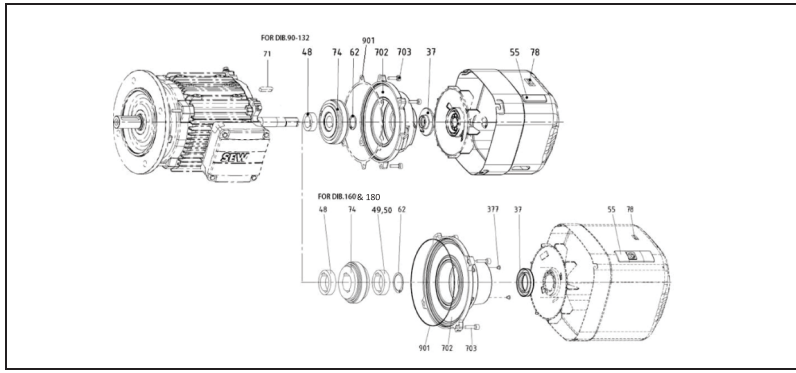
   This floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.



Brake	Floating clearance s [mm]
BE05; BE1; BE2;	1.5
BE5	**1.7**
BE11; BE20; BE30	2

7.5 Altering the blocking direction on motors with a backstop

7.5.1 Basic structure of DIB.90–180 motors with backstop



[37]	Sealing ring	[74]	Backstop
[48]	Spacing ring	[78]	Information sign for direction of rotation
[49]	Spacing ring	[702]	Backstop housing
[50]	Spacing ring	[703]	Cap screw
[55]	Closing piece	[377]	Screw plug
[62]	Retaining ring	[901]	Seal
[71]	Key		

7.5.2 Changing the blocking direction

Proceed as follows to change the blocking direction:

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

✓ The motor is protected against unintended restart.

1. Disassemble the following parts:
   - ⇨ Forced cooling fan and fan guard [35], retaining ring [32]/[62] and fan [36]
   - ⇨ **DIB.90-180 Motors:** Backstop housing, complete [702].
2. Remove the retaining ring [62] and, if necessary, the spacing ring [49,50].
3. Dismount the backstop [74] using a puller.
4. To alter the blocking direction, turn around the backstop [74].
5. Check the old grease. If necessary, replace the grease as specified below.
   - ⇨ **DIB.90-180 Motors:** Press on the backstop [74].
6. Mount the retaining ring [62].
7. Mount the following parts:
   - ⇨ **DIB.90-180 Motors:** Replace the gasket [901],and if necessary sealing ring [37]. Mount the complete backstop housing [702].
8. Install the disassembled parts of the motor.
9. Replace the label [78] indicating the direction of rotation.

Lubricating the backstop

The backstop is greased at the factory with the corrosion protection low-viscosity grease LBZ 1. If you want to use another grease, make sure it complies with NLGI class 00/000 with a base oil viscosity of 42 mm^2/s at 40 °C on a lithium saponified and mineral oil base. The application temperature range is from -50 °C to +90 °C. See the following table for the amount of grease required:

DIB.. motors	90/100	112/132	160	180
Amount of grease in g	15	20	30	45

The tolerance regarding the grease level is ± 30%.

8 Technical Data

8.1 Braking torques

The following table shows the possible braking torque combinations for various sizes of the BE05 – 30 brake.

⚠ WARNING

Insufficient or excessive braking torque due to impermissible spring pack.

Severe or fatal injuries.

- Maintenance work may only be performed by a trained specialist.
- In case of a conversion, make sure the selected spring set generates nominal braking torques that are permitted for your drive combination and are suitable for the application.

.

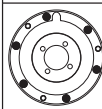
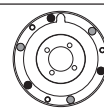
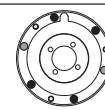
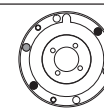
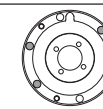
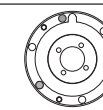
Brake	Part number Damping plate [718] Pole sheet [63]	Braking torque settings					
		Braking torque	Type and number of brake springs			Purchase order numbers for brake springs	
		Nm	Normal [50]	Blue [276]	White [1312]	Normal	Blue/white
BE05	13740563	5.0	3	–	–	0135017X	13741373
		3.5	–	6	–		
		2.5	–	4	–		
		1.8	–	3	–		
BE1	13740563	10	6	–	–	0135017X	13741373
		7.0	4	2	–		
		5.0	3	–	–		
BE2	13740199	20	6	–	–	13740245	13740520
		14	2	4	–		
		10	2	2	–		
		7.0	–	4	–		
		5.0	–	3	–		
BE5	13740695	55	6	–	–	13740709	13740717
		40	2	4	–		
		28	2	2	–		
		20	–	–	6		13747738
		14	–	–	4		
BE11	13741713	110	6	–	–	13741837	13741845
		80	2	4	–		
		55	2	2	–		
		40	–	4	–		
	13741713 + 13746995 13746995	28	–	3	–		
	13741713 + 13746995 13746995	20	–	–	4		13747789

Brake	Part number Damping plate [718] Pole sheet [63]	Braking torque settings					
		Braking torque	Type and number of brake springs			Purchase order numbers for brake springs	
		Nm	Normal [50]	Blue [276]	White [1312]	Normal	Blue/white
BE20	–	200	6	–	–	13743228	13742485
	–	150	4	2	–		
	–	110	3	3	–		
	–	80	3	–	–		
	13749307	55	–	4	–		
	13746758	40	–	3	–		
BE30	–	300	8	–	–	01874551	13744356
	–	200	4	4	–		
	–	150	4	–	–		
	–	100	–	8	–		
	13749455	75	–	6	–		

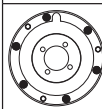
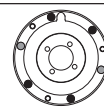
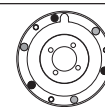
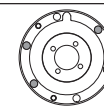
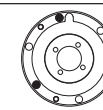
8.1.1 Brake spring layout

The following table shows the brake spring layout:

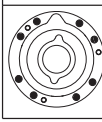
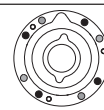
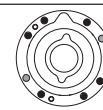
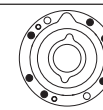
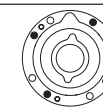
BE05 – 11:

6 springs	3 + 3 springs	4 + 2 springs	2 + 2 springs	4 springs	3 springs
					

BE20:

6 springs	4 + 2 springs	3 + 3 springs	4 springs	3 springs
				

BE30 :

8 springs	4 + 4 springs	6 + 2 springs	6 springs	4 springs
				

8.2 Braking work, working air gap, and brake lining carrier thickness

Brake	Braking work until maintenance[1]	Working air gap		Brake lining carrier
		min.[2]	maximum	minimum
	10^6 J	mm	mm	mm
BE05	120	0.25	0.6	11.0
BE1	120	0.25	0.6	11.0
BE2	180	0.25	0.6	11.0
BE5	390	0.25	0.9	11.0
BE11	640	0.3	1.2	12.5
BE20	1000	0.3	1.2	12.5
BE30	1500	0.3	1.2	12.5

1) The specified values are nominal values that were determined during rating operation. The actual braking work that can be reached before maintenance may vary depending on the actual load during operation.
2) When checking the working air gap, note: After a test run, parallelism tolerances on the brake lining carrier may give rise to deviations of ±0.15 mm.

8.3 Operating currents

8.3.1 General information on determining operating currents

The tables in this chapter list the operating currents of BE.. brakes at different voltages.

The acceleration current I_B (= inrush current) flows only for a short t im e when the brake is released.

The values for the holding currents I_H are rms values. Only use current measurement units that are designed to measure rms values.

INFORMATION

The following operating currents and power consumption values are nominal values. They refer to a coil temperature of +20 °C.

Operating currents and power consumption usually decrease during normal operation due to heating of the brake coil.

Note that the actual operating currents can be higher by up to 25% depending on the ambient temperature and with coil temperatures below +20 °C.

8.3.2 Legend

The following tables list the operating currents of the brakes at different voltages.

The following values are specified:

P_B Nominal value of the electric power consumption in the brake coil in watt.

U_N Nominal voltage (rated voltage range) of the brake in V (AC or DC).

I_H Nominal holding current in A (AC). rms value of the braking current in the supply cable to the SEW-EURODRIVE brake control.

I_{DC} Nominal holding current in A (DC) in the brake cable with direct DC voltage supply

or

Nominal holding current in A (DC) in the brake cable with DC 24 V supply via BSG.

I_B Acceleration current in ampere (AC or DC) when operated with SEW brake control for high-speed excitation.

I_B/I_H Inrush current ratio ESV.

I_B/I_{DC} Inrush current ratio ESV for DC 24 V supply with BSG.

8.3.3 BE05, BE1, BE2 brakes

	BE05, BE1	BE2
Nominal power brake coil in W	30	41
Inrush current ratio ESV	4	4

Nominal voltage (rated voltage range) V_N		BE05, BE1		BE2	
		I_H	I_{DC}	I_H	I_{DC}
AC V	DC V	AC A	DC A	AC A	DC A
24 (23 – 26)	10	2.25	2.90	2.95	3.80
60 (57 – 63)	24	0.90	1.17	1.18	1.53
120 (111 – 123)	48	0.45	0.59	0.59	0.77
184 (174 – 193)	80	0.29	0.37	0.38	0.49
208 (194 – 217)	90	0.26	0.33	0.34	0.43
230 (218 – 243)	96	0.23	0.30	0.30	0.39
254 (244 – 273)	110	0.20	0.27	0.27	0.35
290 (274 – 306)	125	0.18	0.24	0.24	0.31
330 (307 – 343)	140	0.16	0.21	0.21	0.28
360 (344 – 379)	160	0.14	0.19	0.19	0.25
400 (380 – 431)	180	0.13	0.17	0.17	0.22
460 (432 – 484)	200	0.11	0.15	0.15	0.19
500 (485 – 542)	220	0.10	0.13	0.14	0.18
575 (543 – 600)	250	0.09	0.12	0.12	0.16

8.3.4 Brakes BE5, BE11, BE20, BE30

	BE5	BE11	BE20	BE30
Nominal power brake coil in W	50	70	95	120
Inrush current ratio ESV	5.9	6.6	7.5	8.5

Nominal voltage (rated voltage range) V_N		BE5	BE11	BE20	BE30
		I_H	I_H	I_H	I_H
AC V	DC V	AC A	AC A	AC A	AC A
60 (57 – 63)	24	1.28	2.05	2.55	–
120 (111 – 123)	–	0.64	1.04	1.28	1.66
184 (174 – 193)	–	0.41	0.66	0.81	1.05
208 (194 – 217)	–	0.37	0.59	0.72	0.94
230 (218 – 243)	–	0.33	0.52	0.65	0.84
254 (244 – 273)	–	0.29	0.47	0.58	0.75
290 (274 – 306)	–	0.26	0.42	0.51	0.67
330 (307 – 343)	–	0.23	0.37	0.46	0.59
360 (344 – 379)	–	0.21	0.33	0.41	0.53
400 (380 – 431)	–	0.18	0.30	0.37	0.47
460 (432 – 484)	–	0.16	0.27	0.33	0.42
500 (485 – 542)	–	0.15	0.24	0.29	0.38
575 (543 – 600)	–	0.13	0.22	0.26	0.34

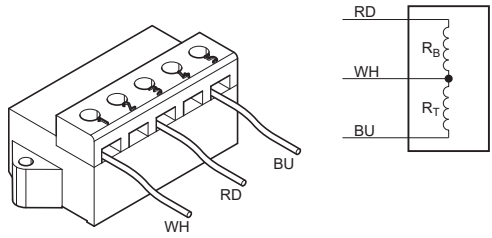
8.4 Resistors

The depicted values apply to the standard temperature range of -20 to +40 °C. Deviating resistances may occur in other temperature ranges, especially in case of drives with permitted temperature above +60 °C, or in case of non-ventilated drives, due to modified winding configurations. The values are available from SEW-EURODRIVE on request.

8.4.1 Resistance measurement of Brakes

Cut-o ffin the AC circuit

The following illustration shows how to measure resistance with cut-o ffin the AC circuit.



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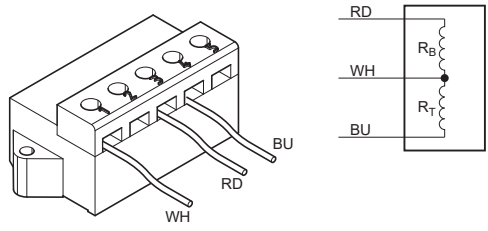
Cut-o ffin the DC and AC circuits

The following illustration shows how to measure resistance with cut-o ffin the DC and AC circuits.



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BS	Accelerator coil	RD	Red
TS	Coil section	WH	White
R_B	Accelerator coil resistance at 20 °C in Ω	BU	Blue
R_T	Coil section resistance at 20 °C in Ω		
U_N	Nominal voltage (rated voltage range)		

INFORMATION

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 Brakes BE05, BE1, BE2

	BE05, BE1	BE2
Nominal power brake coil in W	32	43
Inrush current ratio ESV	4	4

Nominal voltage (rated voltage range) V_N		BE05, BE1		BE2	
AC V	DC V	R_B	R_T	R_B	R_T
60 (57 – 63)	24	4.85	14.8	3.60	11.0
120 (111 – 123)	48	19.4	59.0	14.4	44.0
184 (174 – 193)	80	48.5	148	36.0	110
208 (194 – 217)	90	61.0	187	45.5	139
230 (218 – 243)	96	77.0	235	58.0	174
254 (244 – 273)	110	97.0	296	72.0	220
290 (274 – 306)	125	122	372	91	275
330 (307 – 343)	140	154	469	115	350
360 (344 – 379)	160	194	590	144	440
400 (380 – 431)	180	244	743	182	550
460 (432 – 484)	200	308	935	230	690
500 (485 – 542)	220	387	1178	290	870
575 (543 – 600)	250	488	1483	365	1100

8.4.3 Brakes BE5, BE11, BE20, BE30

	BE5	BE11	BE20	BE30
Nominal power brake coil in W	49	77	95	120
Inrush current ratio ESV	5.9	6.6	7.5	8.5

Nominal voltage (rated voltage range) V_N	BE5		BE11		BE20		BE30	
AC V	R_B	R_T	R_B	R_T	R_B	R_T	R_B	R_T
60 (57 – 63)	2.20	10.5	1.22	7.0	0.9	5.7	–	–
120 (111 – 123)	8.70	42.0	4.90	28.0	3.4	22.8	2.3	17.2
184 (174 – 193)	22.0	105	12.3	70	8.5	57.2	5.8	43.2
208 (194 – 217)	27.5	132	15.5	88	10.7	72.0	7.3	54.4
230 (218 – 243)	34.5	166	19.5	111	13.5	90.6	9.2	68.5
254 (244 – 273)	43.5	210	24.5	139	17.0	114.1	11.6	86.2
290 (274 – 306)	55.0	265	31.0	175	21.4	143.6	14.6	108.6
330 (307 – 343)	69.0	330	39.0	220	26.9	180.8	18.4	136.7
360 (344 – 379)	87.0	420	49	280	33.2	223	23.1	172.1
400 (380 – 431)	110	530	62	350	42.7	287	29.1	216.6
460 (432 – 484)	138	660	78	440	53.2	357	35.1	261.8
500 (485 – 542)	174	830	98	550	67.7	454	45.2	336.4
575 (543 – 600)	220	1050	123	700	83.5	559	56.3	419.2

8.5 Brake control system

8.5.1 Wiring space of the motor

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

Motor size DIB.71-DIB.180

Type	Function	Voltage	Holding current I_{hmax}[A]	Type	Part number	Color code
BG	One-way rectifier	AC 150...500V	1.5	BG 1.5	825 384 6	Black
BGE	One-way rectifier with electronic switching	AC 150...500V	1.5	BGE 1.5	825 384 4	Red

9 Malfunctions

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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

⚠ CAUTION

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

Risk of burns.

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

NOTICE

Improper troubleshooting measures may damage the drive.

Possible damage to property.

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

9.1 Motor malfunctions

Fault	Possible cause	Measure
Motor does not start up	Supply cable interrupted	Check the connections and (intermediate) terminal points, correct if necessary
	Brake does not release	See chapter "Brake malfunctions"
	Supply cable fuse has blown	Replace fuse
	Motor protection (switch) has triggered	Check that the motor protection (switch) is set correctly; current specification is on the nameplate
	Motor protection does not trip	Check motor protection control
	Malfunction in control or in the control process	Observe the switching sequence; correct if necessary
Motor only starts with difficulty or does not start at all	Motor power designed for delta connection but connected in star	Correct the connection from star to delta; follow the wiring diagram
	Motor power designed for star-star connection but only connected in star	Correct the connection from star to star-star; follow the wiring diagram
	Voltage or frequency differs considerably from the setpoint, at least when switching on the motor	Provide better power supply system; reduce the power supply load; Check cross section of supply cable, replace with cable of larger cross section if necessary
Motor does not start in star connection, only in delta connection	Star connection does not provide sufficient torque	If the delta inrush current is not too high (observe the regulations of the power supplier), start up directly in delta; Check the project planning and use a larger motor or special design if necessary. Contact SEW-EURODRIVE.
	Contact fault on star/delta switch	Check the switch, replace if necessary; Check the connections
Incorrect direction of rotation	Motor connected incorrectly	Swap two phases of the motor supply cable
Motor hums and has high current consumption	Brake does not release	See chapter "Brake malfunctions"
	Winding defective	Send motor to specialist workshop for repair
	Rotor rubbing	
Fuses blow or motor protection trips immediately	Short circuit in the motor supply cable	Eliminate short circuit
	Supply cables connected incorrectly	Correct the wiring, observe the wiring diagram
	Short circuit in the motor	Send motor to specialist workshop for repair
	Ground fault on motor	
Severe speed loss under load	Motor overload	Measure power, check project planning and use larger motor or reduce load if necessary
	Voltage drops	Check cross section of supply cable, replace with cable of larger cross section if necessary

Fault	Possible cause	Measure
Motor heats up excessively (measure temperature)	Overload	Measure power, check project planning and use larger motor or reduce load if necessary
	Insufficient cooling	Provide for cooling air supply or clear cooling air passages, retrofit forced cooling fan if necessary. Check the air filter, clean or replace if necessary
	Ambient temperature too high	Observe the permitted temperature range, reduce the load if necessary
	Motor in delta connection instead of star connection as intended	Correct the wiring, observe the wiring diagram
	Loose contact in supply cable (one phase missing)	Tighten loose contact, check connections, observe wiring diagram
	Fuse blown	Look for and rectify cause (see above); replace fuse
Excessively loud	Ball bearing compressed, dirty or damaged	Re-align motor and the driven machine, inspect rolling bearing and replace if necessary. See chapter "Permitted rolling bearing types"
	Vibration of rotating parts	Look for the case, possibly an imbalance; correct the cause, observe method for balancing
	Foreign objects in cooling air ducts	Clean cooling air ducts

9.2 Brake malfunctions

Malfunction	Possible cause	Remedy
Brake does not release	Incorrect voltage on brake control unit	Apply the correct voltage; brake voltage specified on the nameplate
	Brake control unit failed	Install a new brake control, check resistors and insulation of the brake coils (see "Resistors" section for resistance values). Check switchgear, replace if necessary
	Max. permitted working air gap exceeded because brake lining worn down.	Measure and set working air gap. See the following sections: • "Setting the working air gap of brakes BE05-BE20" If the brake disk is too thin, replace the brake disk. See the following sections: • "Replacing the brake disk of BE05-BE20 brakes"
	Voltage drop on supply cable > 10%	Provide correct connection voltage: brake voltage specifications on the nameplate. Check the cross section of the brake supply cable, increase cross section if necessary.
	Inadequate cooling, brake overheats	Provide for cooling air supply or clear cooling air passages, check air filter, clean or replace if necessary. Replace type BG brake rectifier with type BGE.
	Brake coil has interturn short circuit or a short circuit to frame	Check resistors and insulation of the brake coils (see "Resistors" section for resistance values). Replace complete brake and brake control (specialist workshop), Check switchgear, replace if necessary
	Rectifier defective	Replace rectifier and brake coil; it may be more economical to replace the complete brake.
Brake does not brake	Working air gap not correct	Measure and set working air gap. See the following sections: • "Setting the working air gap of brakes BE05-BE20" If the brake disk is too thin, replace the brake disk. See the following sections: • "Replacing the brake disk of BE05-BE20 brakes"
	Brake lining worn	Replace entire brake disk. See the following sections: • "Replacing the brake disk of BE05-BE20 brakes"
	Incorrect braking torque.	Check the project planning and change the braking torque if necessary; see chapter "Work done, working air gap, braking torques" • by changing the type and number of brake springs. See the following sections: – "Changing the braking torque of brakes BE05-BE20" • by selecting a different brake See section "Braking torque assignment"

Malfunction	Possible cause	Remedy
Brake does not brake	Working air gap so large that setting nuts for the manual release come into contact.	Set the working air gap. See the following sections: • "Setting the working air gap of brakes BE05-BE20
	Manual brake release device not set correctly	Set the setting nuts for the manual release correctly See the following sections: • "Changing the braking torque of brakes BE05-BE20
	Brake locked by manual brake release HF	Loosen the setscrew, remove if necessary
Noises in vicinity of brake	Gearing wear on the brake disk or the carrier caused by jolting startup	Check the project planning, replace the brake disk if necessary See the following sections: • "Replacing the brake disk of BE05-BE20 brakes" Have a specialist workshop replace the carrier
	Alternating torques due to incorrectly set frequency inverter	Check correct setting of frequency inverter according to its operating instructions, correct if necessary.

9.3 Malfunctions when operated 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 meaning of the problems that occur and to find information about rectifying the problems. Brake supply voltage should be given seperately and not through inverter.

9.4 Preventive Maintenance

1. Clean the space between the cooling fins and fan cover at regular intervals.
2. Check/clean earthing terminals at regular intervals.
3. Bearings for the motor used are double shielded (ZZ) upto 225M frame. They are prelubricatred with high temperature grease and maintenance free. Replacing of bearings after 40,000 operating hours is essential.
   Use ZZ bearings only.
4. When the motor is opened, protect bearings from foreign particles and dirt.
5. In case of IP54/55 protection motors, oil seals/"V" ring seals are provided.
   Make sure that these seals are not distorted during disassembly & reassembly. apply small amount of grease to the lip during re-assembly.
   There should not be any clearance between cable OD and cable gland ID to ensure water tight joint. Also ensure that gaskets are fixed in the T.Box joint to ensure water tightness.

Note : If the motor is used for gearbox or other similar application then it is recommended to use oil seals instead of "V" ring seals.

9.5 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
- Ambient conditions such as:
  - Ambient temperature
  - Humidity
  - Installation altitude
  - Dirt
  - etc.

9.6 Disposal

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

- Iron
- Aluminum
- Copper
- Plastics
- Electronic parts
- Oil and grease (not mixed with solvents)

10 Appendix

10.1 Wiring diagrams

	NOTE
	Connect the motor as shown in the wiring diagram or the assignment diagram included with the motor. The following section only gives an overview of the most common connection options. You can obtain the valid wiring diagrams free of charge from SEW-EURODRIVE.

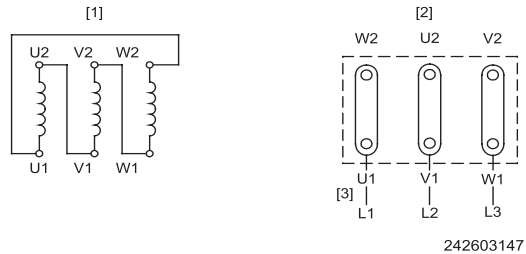
10.1.1 Delta and star connection

AC motor

For all motors with one speed, direct on-line or ⅄- △ startup.

△ *connection*

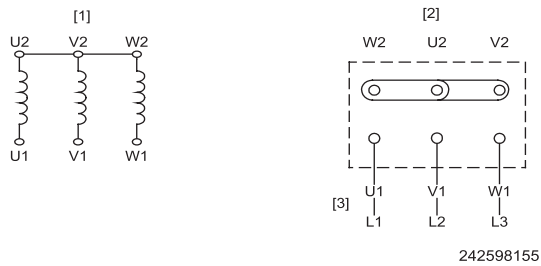
The following figure depicts the △ connection for low voltage.



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

⅄ *connection*

The following figure depicts the ⅄ connection for high voltage.



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

Change in direction of rotation: Replacing two incoming cables (L1 - L2).

10.1.2 Brake control BGE; BG

BE brake

BGE, BG brake control;

Apply voltage to release the brake (see nameplate).

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

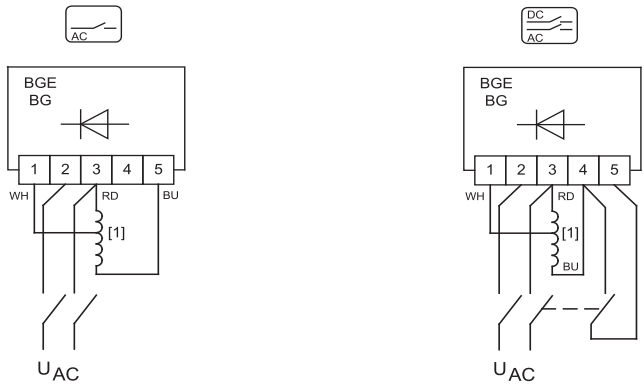
The voltage can be distributed as follows:

- 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 figure shows the wiring for BG and BGE brake rectifiers for the AC-side Cut-off, as well as the DC and AC side cut-off.



[1] Brake coil

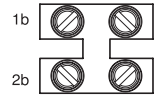
10.1.3 Motor protection with /TF or /TH for DIB.63-225

/TF, /TH

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

Two-pin connection terminal strip is available for connecting to the trip switch.

Example: TF to a two-pin terminal strip



1b	2b
TF/TH	TF/TH

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