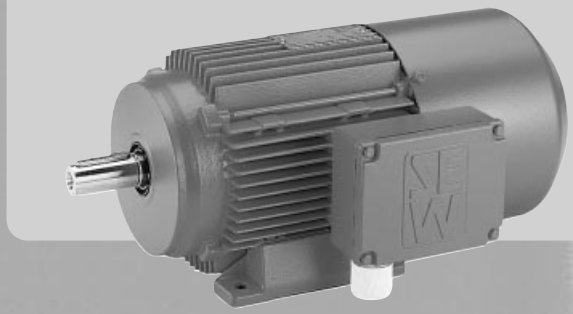
SEW EURODRIVE

DR/DT/DV AC Motors
CT/CV Asynchronous Servomotors

Edition

03/2001



Operating Instructions

0919 8512 / EN

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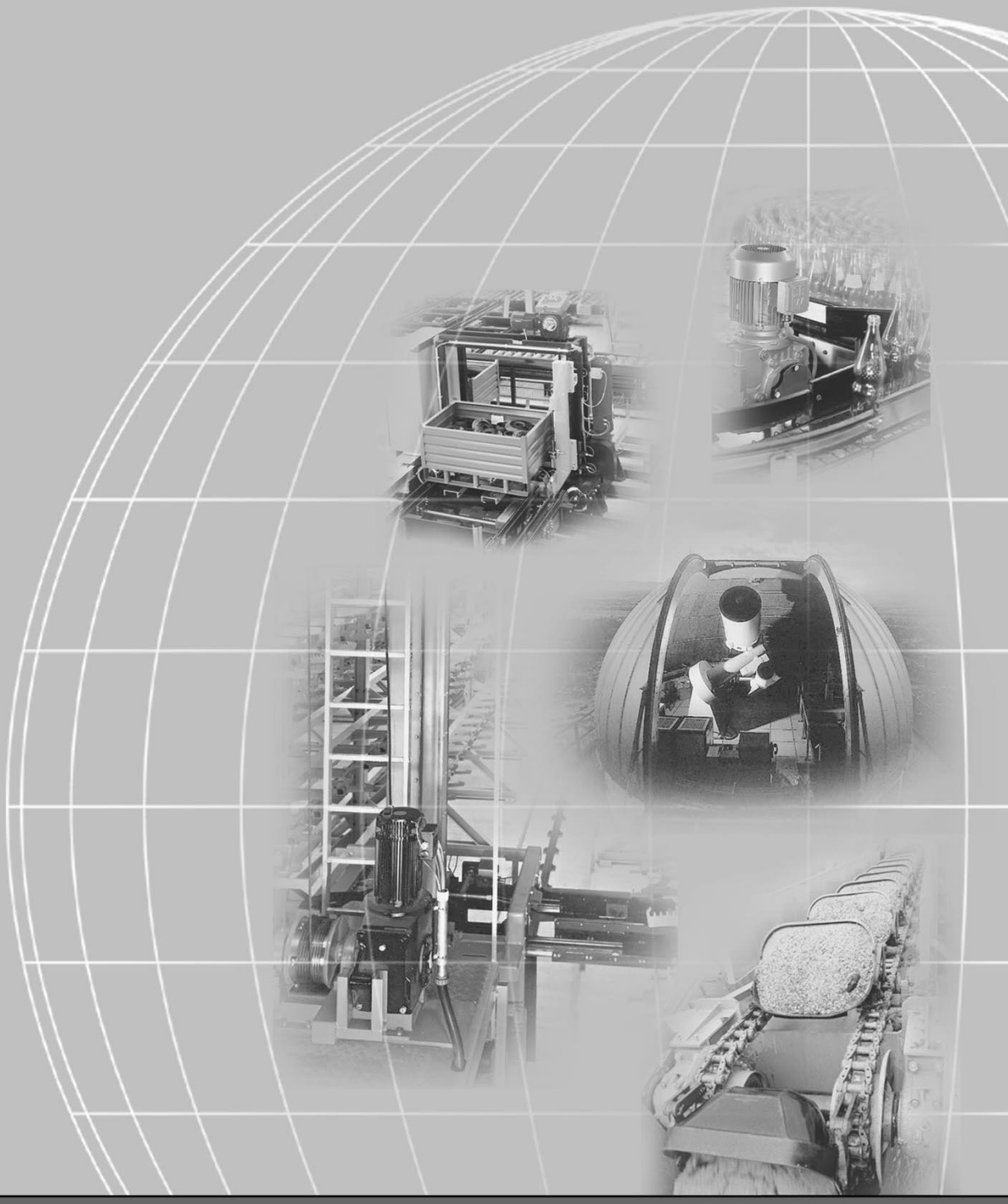


SEW-EURODRIVE

1 Important Notes

Safety and warning instructions

Always follow the safety and warning instructions contained in this publication!

Electrical hazard

Possible consequences: Severe or fatal injuries.

Hazard

Possible consequences: Severe or fatal injuries.

Hazardous situation

Possible consequences: Slight or minor injuries.

Harmful situation

Possible consequences: Damage to the unit and the environment.

A requirement of fault-free operation and fulfillment of any rights to claim under guarantee is that the information in the operating instructions is adhered to. Consequently, read the operating instructions before you start working with the unit!

The operating instructions contain important information about servicing; as a result, they should be kept in the vicinity of the unit.

Waste disposal

This product consists of

- Iron
- Aluminum
- Copper
- Plastic
- Electronics components

Please dispose of the parts in accordance with the applicable regulations.

Modifications to the 04/2000 edition are indicated by a gray bar in the margin.

2 Safety Notes

The following safety notes are concerned with the use of motors.

If using **geared motors**, please also refer to the safety notes for gear units in the corresponding operating instructions.

Please also take account of the supplementary safety notes in the individual sections of these operating instructions.

Mounting, connection, startup, maintenance and repair only by trained personnel observing

- these instructions,
- the warning and information signs on the motor/geared motor,
- all other project planning documents, operating instructions and wiring diagrams appertaining to the drive,
- the specific regulations and requirements for the system and
- currently valid national/regional regulations.

Designated use

These electric motors are intended for industrial systems. They comply with the applicable standards and regulations and meet the requirements of the Low Voltage Directive 73/23/EEC.

Technical data and information about the permitted conditions where the unit is used can be found on the nameplate and in these operating instructions (→ Sec. 9 "Technical Data").

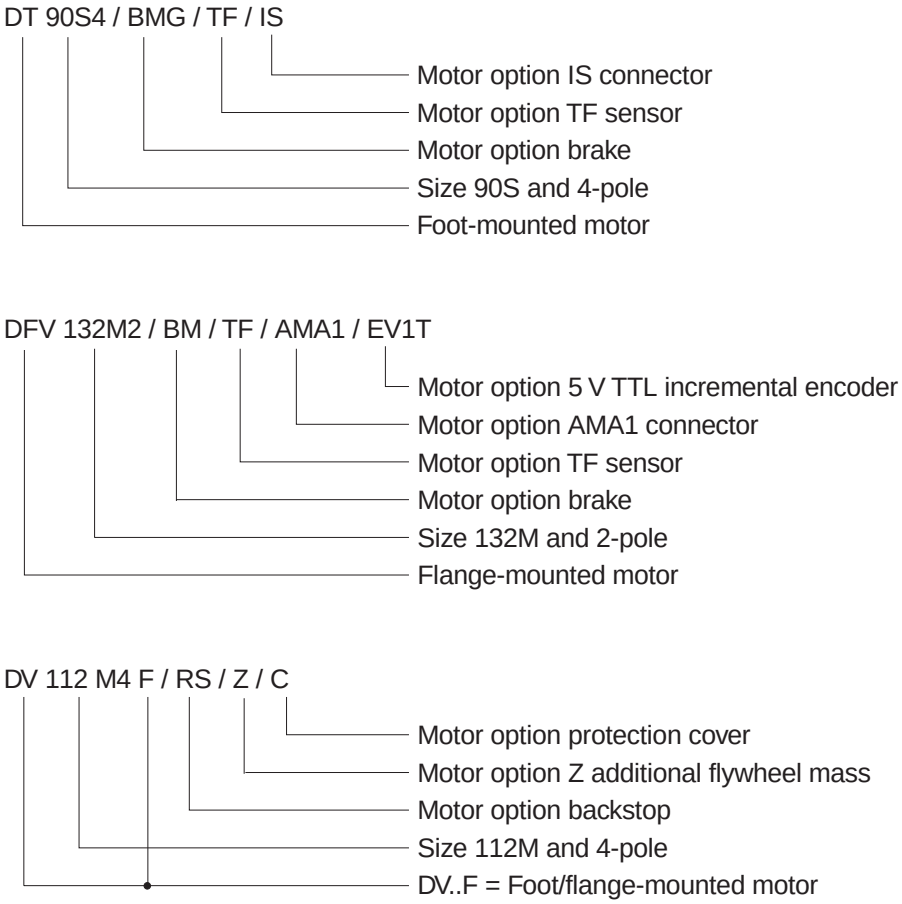
It is essential for this specified information to be observed!

3 Motor Design, DR/DT/DV and CT/CV

3.1 Unit designation, nameplate

Unit designation

Examples:
AC (brake) motors DR/DT/DV



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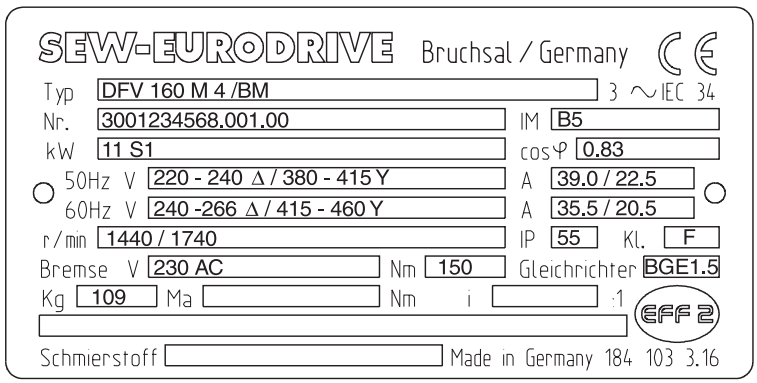
Nameplate

For example:
Brake motor
DFV 160 M 4 /BM



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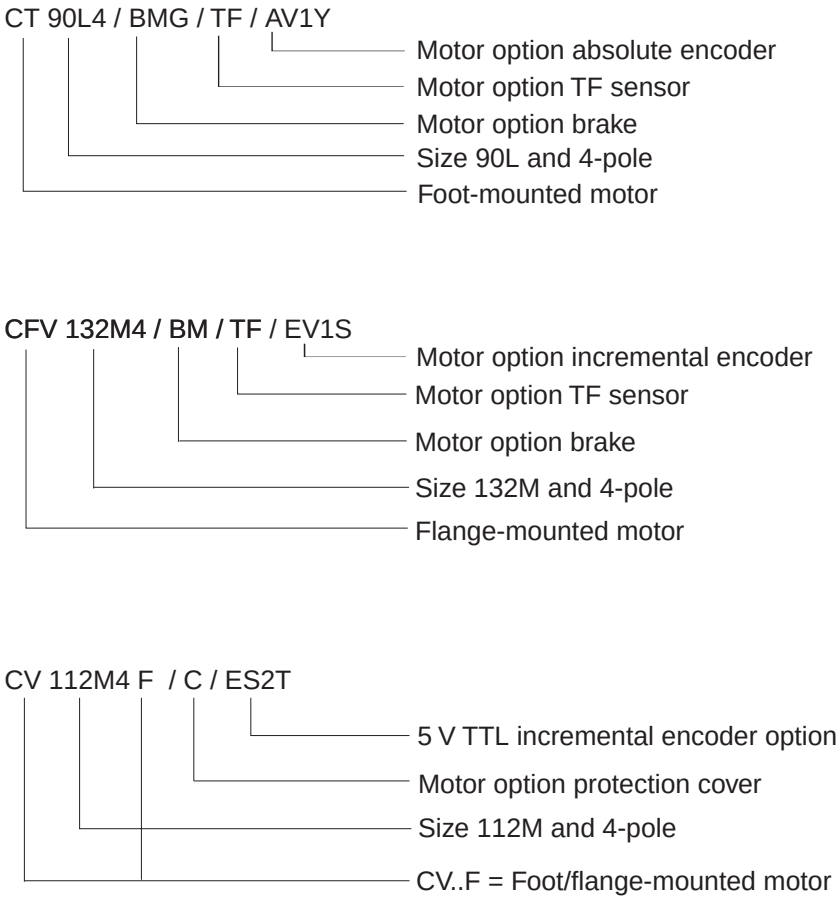
Unit designation

Examples: Servo (brake) motors CT/CV



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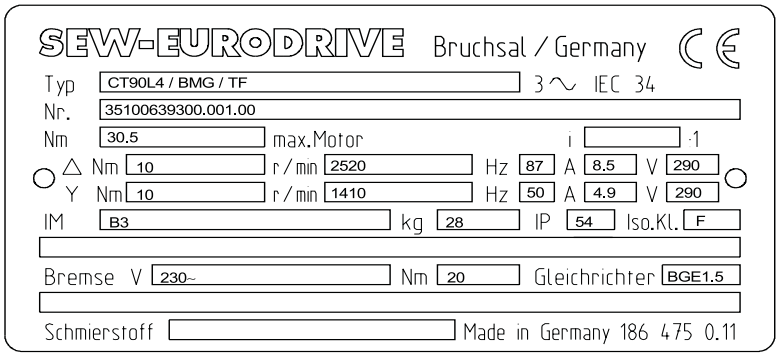
Nameplate

For example: Servo brake motor CT90L4 / BMG / TF



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4 Mechanical Installation

It is essential to comply with the safety notes on page 5 during installation!

4.1 Before you begin

The drive may only be installed if

- the entries on the nameplate of the drive and/or the output voltage of the frequency inverter match the voltage supply system,
- the drive is undamaged (no damage caused by transport or storage) and
- it is certain that the following requirements have been fulfilled:
  - ambient temperature between -25 °C and +40 °C[1]
  - No oil, acid, gas, vapors, radiation, etc.
  - Installation altitude max. 1000 m above sea level
  - Note the restrictions for encoders (SEW Encoder Systems manual)
  - Special versions: drive configured in accordance with the ambient conditions

4.2 Preliminary work following extended storage

Please note the reduced grease utilization period of the ball bearings after storage periods exceeding one year.

Check whether the motor has absorbed moisture as a result of being stored for a long period. Measure the insulation resistance to do this (measuring voltage 500 V).

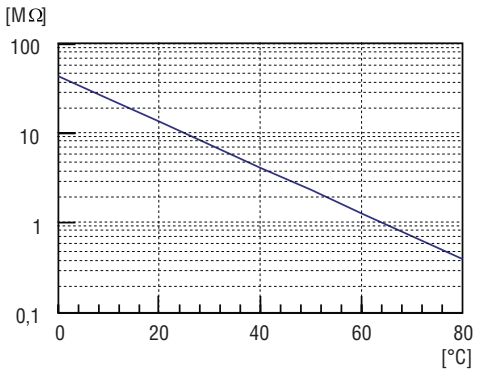

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Fig. 1: Minimum permitted insulation resistance

Note

The insulation resistance varies greatly depending on the temperature! The motor must be dried if the insulation resistance is not adequate (→ "Drying the motor" on page 9).

1. Minimum temperature for motors with backstop: -15 °C,
   note that the temperature range of the gear unit may also be restricted
   → Gear unit operating instructions

Drying the motor

1. Heat up the motor (max. 80 °C)
   - with hot air or
   - using an isolation transformer
     – Connect the windings in series (→ Fig. 2)
     – Auxiliary AC voltage supply max. 10 % of the rated voltage with max. 20 % of the rated current

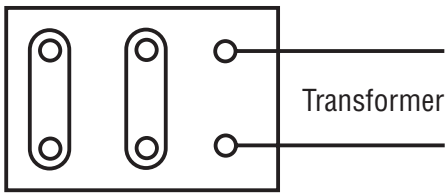

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Fig. 2: Example: Single speed motor

2. The drying process is finished when the minimum insulation resistance has been attained (→ Fig. 1)
3. Check the terminal box to see whether
   – the inside is clean and dry,
   – the connections and fixing parts are free from corrosion,
   – the joint seals are OK,
   – the cable screw fittings are sound, otherwise clean or replace them.

4.3 Installing the motor

- The motor or geared motor may only be mounted or installed in the specified mounting position on a level and torsionally rigid support structure which is not subject to shocks.
- Thoroughly remove anti-corrosion agents from the shaft extensions (use a commercially available solvent). Do not allow the solvent to penetrate the bearings or shaft seals – this could cause material damage!
- Carefully align the motor and the driven machine, to avoid placing any unacceptable strain on the output shafts (observe permissible overhung load and axial thrust data!).
- Do not butt or hammer the shaft extension.

STOP

- **Use an appropriate cover to protect motors in vertical mounting positions from objects or fluids entering! (Protection cowl C)**
- Ensure an unobstructed cooling air supply and that air heated by other apparatus cannot be drawn in or reused.
- Balance components for subsequent mounting on the shaft with a half key (motor shafts are balanced with a half key).

STOP

- **Any condensation drain holes will be sealed by plastic plugs and should only be opened when necessary; open condensation drain holes are not permissible, as this would invalidate higher classes of enclosure.**
- Brake motors with manual brake release:
  Screw in either the hand lever (with self-reengaging manual brake release) or the setscrew (with locked manual brake release).

STOP

- **Note (for encoder mounting):**
  Foot-mounted motors CT/DT71, CT/DT90, CV/DV132M, CV/DV160L must be mounted on supports because the radius of the cover is greater than the shaft height.

Installation in damp areas or in the open

- If possible, arrange the terminal box so the cable entries are pointing downwards.
- Coat the threads of cable screw fittings and blind plugs with sealant 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. Fit new gaskets to replace brittle ones!
- Restore the anticorrosive coating, if necessary.
- Check the enclosure.

4.4 Installation tolerances

Shaft extensions	Flanges
Diametric tolerance in accordance with DIN 748 • ISO k6 at Ø ≤ 50 mm • ISO m6 at Ø > 50 mm (Center bore in accordance with DIN 332, shape DR)	Centering shoulder tolerance in accordance with DIN 42948 • ISO j6 at Ø ≤ 230 mm • ISO h6 at Ø > 230 mm

5 Electrical Installation

- **It is essential to comply with the safety notes on page 5 during installation!**
- **Switch contacts in utilization category AC-3 to EN 60947-4-1 must be used for switching the motor and the brake.**

5.1 Wiring notes

Protection against interference from brake control systems

- Do not route brake cables alongside switched-mode power cables, since otherwise there is a risk of disrupting brake controllers.
  Switched-mode power cables include, in particular:
  - Output cables from frequency and servo controllers, converters, soft start units and brake units
  - Connecting harnesses to braking resistors, etc.

Protection against interference from motor protection devices

- To provide protection against interference from SEW motor protection devices (temperature sensors TF, winding thermostats TH):
  - Route separately shielded feeder cables together with switched-mode power lines in one cable
  - Do not route unshielded feeder cables together with switched-mode power lines in one cable

5.2 Special aspects for operation with a frequency inverter

Observe the wiring instructions issued by the inverter manufacturer when motors are powered by inverters. It is essential to adhere to the frequency inverter operating instructions.

5.3 Special aspects for operation of single-phase motors

SEW single-phase motors are supplied without accessory equipment such as capacitors, starting relays or centrifugal switches. Any parts you need must be obtained from your dealer and connected according to the corresponding instructions and wiring diagrams.

5.4 Special aspects of torque motors and low-speed motors

Due to the design of torque motors and low-speed motors, very high induction voltages may be generated when they are switched off. We therefore recommend connecting a varistor to provide protection (→ Fig. 3). The size of the varistors depends, among other factors, on the starting frequency – note for project planning!

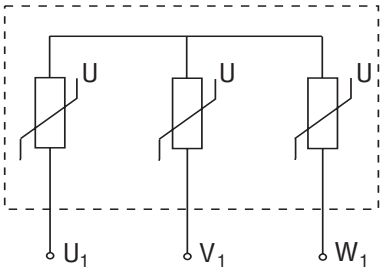

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Fig. 3: Varistor circuit for protection against inductive voltages

5.5 Replacement of cable screw fitting threads in DR/DT/DV motors

On 1/1/2000, the DIN 46320 standard applicable in Germany for Pg glands was replaced by European standard EN 50262 for metric cable screw fittings. Terminal boxes of SEW AC motors and AC brake motors are configured with metric threaded holes according to EN 50262 as standard.

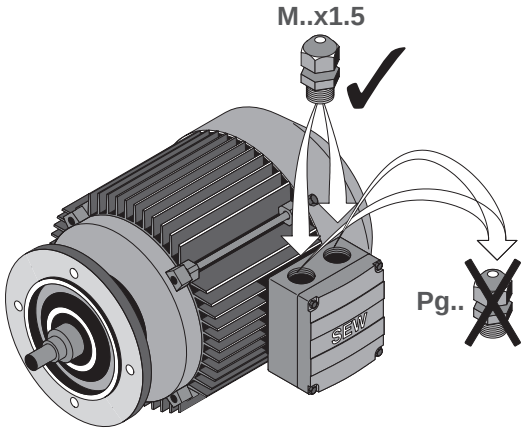

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Fig. 4: Metrical cable screw fitting replaces Pg fitting

Motor size	Cable screw fitting	
	Pg	Metric
DFR63	-	2 × M20×1.5, 2 × M16×1.5
DT71 – DT90	1 × Pg16, 1 × Pg11	1 × M25×1.5, 1 × M16×1.5
DV100 – DV132S	1 × Pg21, 1 × Pg11	1 × M32×1.5, 1 × M16×1.5
DT71/BMG – DT90/BMG	2 × Pg16, 1 × Pg11	2 × M25×1.5, 1 × M16×1.5
DV100/BMG – DV132S/BMG	2 × Pg21, 1 × Pg11	2 × M32×1.5, 1 × M16×1.5
DV132M – DV132ML + /BM	2 × Pg21, 2 × Pg11	2 × M32×1.5, 2 × M16×1.5
DV160M – DV180L + /BM	2 × Pg29, 2 × Pg11	2 × M40×1.5, 2 × M16×1.5
DV200 – DV225 + /BM	2 × Pg36, 2 × Pg11	2 × M50×1.5, 2 × M16×1.5

5.6 Special aspects in switching operation

When the motors are used in switching operation, any possible malfunctions of the switchgear must be excluded by appropriate wiring. According to EN 60204 (electrical equipment of machines), motor windings must have interference suppression in order to protect the numerical or programmable logic controllers. Since it is primarily switching operations which lead to disruptions, we recommend installing protective circuitry on the switching devices.

5.7 Connecting the motor

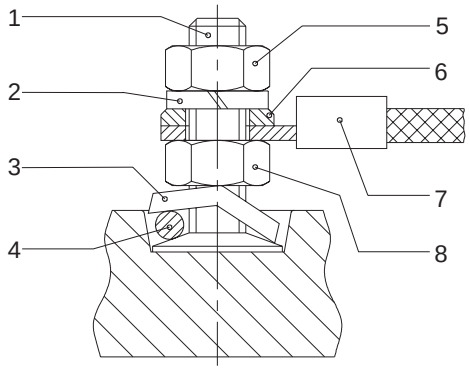
In case of operation with electronic control units, it is essential to adhere to the corresponding operating instructions/wiring diagrams!

Connecting the motor via terminal boxes

- According to circuit diagram (enclosed)
- Check the cross sections of cables
- Arrange terminal links correctly
- Fasten connections and protective earth conductors firmly
- In terminal boxes: Check winding connections and tighten them if necessary

Small connection accessories

Please note: In the case of motor sizes 71 - 132S, the small connection accessories (connection nuts for feeder cables, terminal links, the lock washer and the washers) are supplied in a bag. Install the parts accordingly (→ Fig. 5).



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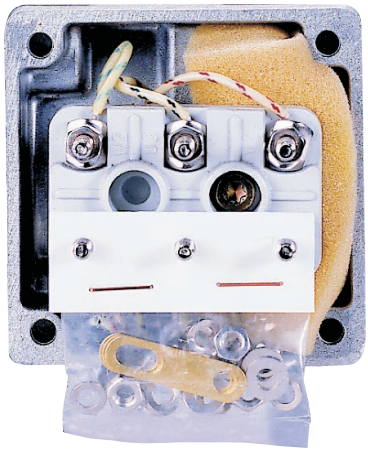

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1 Terminal stud
2 Lock washer
3 Terminal washer
4 Motor terminal lead
5 Top nut
6 Washer
7 External connection
8 Bottom nut

Fig. 5: Small connection accessories

5.8 Preparation for connecting motor size 63 – knockout

Important: Wear safety glasses – danger of injury from fragments!

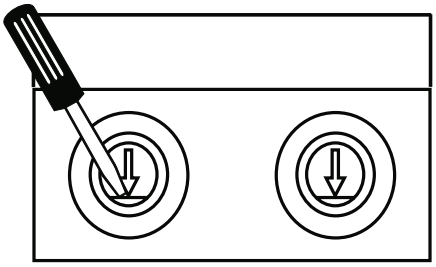

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Fig. 6: Cable entry knockout

- Put on the terminal box cover and fasten with screws.
- Determine which cable entries to open.
- Open the cable entries
  - with a chisel or similar (hold at an angle → Fig. 6)
  - by a light tap with a hammer

Caution: Do not knock through to the inside of the terminal box!

- Open the terminal box, remove the knockout cover if it has broken off.
- Secure the cable screw fittings with the supplied lock nuts.

5.9 Connecting the motor via IS plug connector

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Fig. 7: AC geared motor with integrated IS plug connector

The IS plug connector is supplied from the factory with its base fully wired, including additional features such as a brake rectifier. The upper section of the IS connection is included in the scope of delivery and must be connected as shown in the circuit diagram.

The IS plug connection has CSA approval up to 600 V. (Note for application according to CSA regulations: Tighten the M3 terminal screws to a torque of 0.5 Nm! Note the line cross sections according to American Wire Gauge (AWG) → Table 1).

Line cross section

Make sure the type of line corresponds to the applicable regulations. The rated currents are specified on the motor nameplate. Line cross sections which can be used:

Without variable terminal link	With variable terminal link	Link cable	Double assignment (motor and brake/SR)
0.25 - 4.0 mm^2	0.25 - 2.5 mm^2	max. 1.5 mm^2	max.1 x 2.5 and 1 x 1.5mm^2
23 - 12 # AWG	23 - 14 # AWG	max. 16 # AWG	max. 1 x 14 # and 1 x 16 # AWG

Table 1: Line cross sections which can be used

Wiring the upper section of the plug connector

- Remove screws from housing cover
  - remove the cover
- Loosen screws from upper section of plug connector
  - remove the upper section of the plug connection from the cover
- Strip the insulation off the connection lead
  - strip about 9 mm insulation off the connecting leads
- Pass the cable through the cable screw fitting

Wiring up as shown in circuit diagram DT82, DT83

- Connect the lines as shown in the circuit diagram
  - tighten clamping screws carefully!
- Install the plug connection (→ "Installing the plug connection" on page 17)

Wiring up as shown in circuit diagram DT81

For Y/Δ startup:

- Connection with 6 lines
  - tighten the clamping screws carefully!
  - motor contactors in the switch cabinet
- Install the plug connection (→ "Installing the plug connection" on page 17)

For Y or Δ operation:

- Connection according to circuit diagram
- Install the variable terminal link according to the required motor operation (Y or Δ, Fig. 8 and Fig. 9)
- Install the plug connection (→ "Installing the plug connection" on page 17)

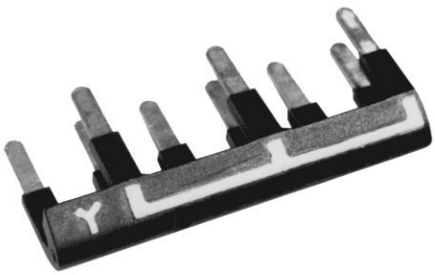

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Fig. 8

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Fig. 9

Brake control system BSR – preparing the variable terminal link

For ⅄ operation:

On the ⅄ side of the variable terminal link: remove only bright metal pin of the marked prong horizontally – touch guard!
(Fig. 10).

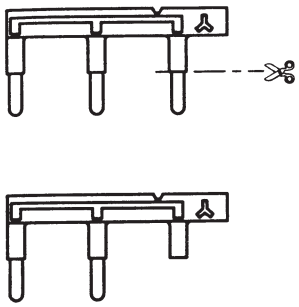

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Fig. 10

For Δ **operation:**

On the Δ side of the variable terminal link: remove the two (2) marked prongs completely horizontally (Fig. 11).

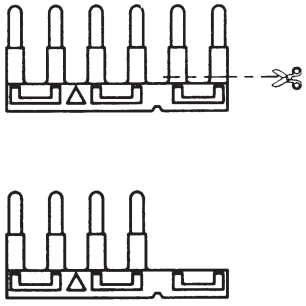

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Fig. 11

Wiring up as shown in circuit diagram DT 81 for ⅄- or Δ operation with double terminal assignment (Fig. 12 and Fig. 13)

- At terminal point for double assignment: Connect the link cable.
- When operation is as required: Insert the link cable in the variable terminal link.
- Install the variable terminal link.
- At terminal point for double assignment: Connect the motor lead above the variable terminal link.
- Connect the other lines as shown in the circuit diagram.
- Install the plug connection (→ "Installing the plug connection" on page 17).

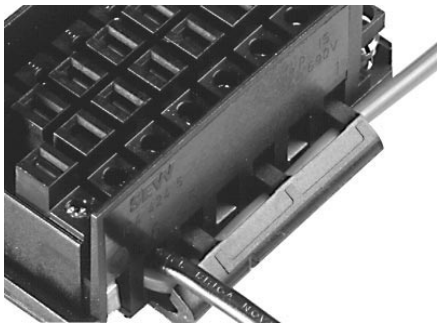

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Fig. 12

Installing the plug connection

The housing cover of the IS plug connector can be screwed onto the lower section of the plug connector depending on the required position of the cable lead. The upper section of the plug connector must first be installed in the housing cover so it will match the position of the lower plug connector section:

- Define the required mounting position.
- Install upper section of the plug connector into the housing cover according to the mounting position (Fig. 14).
- Close the plug connector.
- Screw the housing cover onto the lower section.
- Tighten the cable screw fitting.

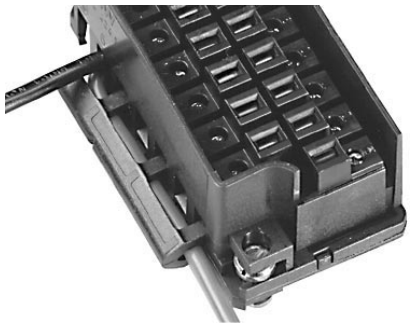

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Fig. 13: Installing the plug connector

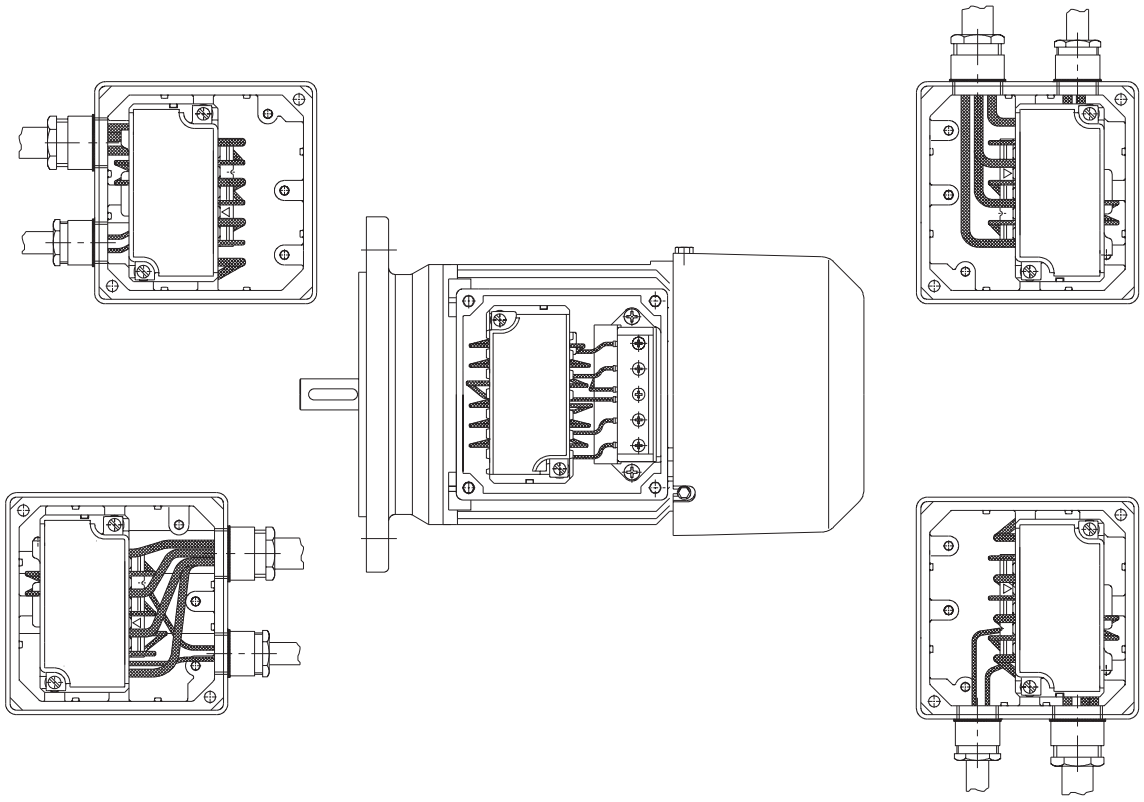

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Fig. 14: Mounting position of the upper plug connector section in the housing cover

5.10 Connecting motor via ASA1/ASD1 and AMA1/AMD1 plug connectors

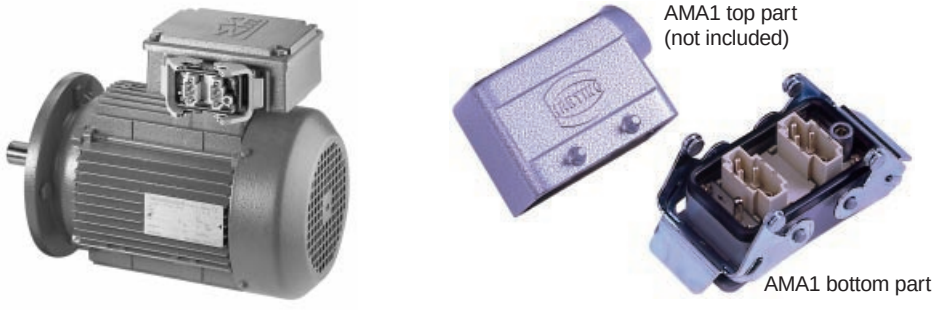

Fig. 15: AC motor with AMA1 plug connector

The ASD1 type with single clip closure corresponds to the DESINA regulation issued by the Association of German Machine Tool Manufacturers (VDW).

The bottom part of the ASA1 / ASD1 or AMA1 / AMD1 is supplied from the factory with its base fully wired, including additional features such as a brake rectifier.
The customer is responsible for obtaining the upper section of the connector from the dealer and connecting it in accordance with the wiring diagrams (supplied with the motor).

5.11 Connecting the brake

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

Important:
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 circuit diagram supplied with the brake
- **Note:** 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 to EN 60947-4-1.
- If necessary, for version with manual brake release, screw in
  - hand lever (for manually disengaging brake)
  - or manual brake release screw (for fixing brake in the disengaged position)

Connecting the brake control system

The DC disk brake is powered from a brake control system with protective circuitry. This is accommodated in the terminal box / IC lower part or must be installed in the switch cabinet. (Pay attention to the wiring notes → Sec. 5.1.)

- **Check the line cross sections – braking currents (→ Sec. 9.3)**
- Connect the brake control system according to the circuit diagram supplied with the brake
- For motors with thermal classification H: Install the brake rectifier in a switch cabinet!

5.12 Additional equipment

Connect supplied additional equipment according to the wiring diagrams included.

Temperature sensor TF

Do not apply any voltage!

The positive temperature coefficient (PTC) thermistors comply with DIN 44082. Resistance measurement (measuring instrument with V ≤ 2.5 V or I < 1 mA).

- Normal measured values: 20 – 500 Ω, thermal resistance > 4000 Ω.
- Measured values pole-changing with separate winding: 40 – 1000 Ω, thermal resistance > 4000 Ω.

Winding thermostats TH

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

	V_{AC}		V_{DC}	
Voltage U [V]	250	400	60	24
Current (cos φ = 1.0) [A]	2.5	0.75	1.0	1.6
Current (cos φ = 0.6) [A]	1.6	0.5		
Contact resistance max. 1 ohm at 5 V = / 1 mA				

Table 2

Forced cooling fan

Motor size 71-132S

VR system

- 24 V_{DC} +/- 20 %
- Plug connector
- Maximum connection cross section 3 x 1 mm^2
- Cable screw fitting Pg7 with inside diameter 7 mm

VS system

- 1 x 230 V_{AC} 50 Hz
- Connection in separate terminal box
- Maximum connection cross section 3 x 1.5 mm^2
- Cable screw fitting M16 x 1.5

Motor size 132M-225

V system

- 3 x 400 V_{AC} 50 Hz
- Connection in separate terminal box
- Maximum connection cross section 4 x 1.5 mm²
- Cable screw fitting M16 x 1.5

A transformer may be present in the VS system in order to adapt to a voltage other than the standard. VS and V systems are also available for 60 Hz.

Please refer to the VS or V circuit diagram for information about connecting the VS and V systems (order no: 0975 8385).

Overview of SEW encoder systems

Name	For SEW motor	Type of encoder	Shaft	Specification	Supply	Signal
ES1T*	CT/DT/CV/ DV71 – 100	Encoder	Spread shaft	-	5 V_{DC} regulated	5 V_{DC} TTL/RS-422
ES1S**					24 V_{DC}	1 V_{SS} sin/cos
ES1R						5 V_{DC} TTL/RS-422
ES1C						24 V_{DC} HTL
ES2T*	CV/DV 112 – 132S				5 V_{DC} regulated	5 V_{DC} TTL/RS-422
ES2S**					24 V_{DC}	1 V_{SS} sin/cos
ES2R						5 V TTL/RS-422
ES2C						24 V_{DC} HTL
EV1T*	CT/CV71 – 200 DT/DV71 – 225		Solid shaft		5 V_{DC} regulated	5 V_{DC} TTL/RS-422
EV1S**					24 V_{DC}	1 V_{SS} sin/cos
EV1R						5 V_{DC} TTL/RS-422
EV1C						24 V_{DC} HTL
NV11	DT/DV 71 – 132S	Proximity sensors	Solid shaft	A track	24 V_{DC}	1 pulse/revolution, normally open contact
NV21				A+B track		
NV12				A track		2 pulses/ revolution, normally open contact
NV22				A+B track		
NV16				A track		6 pulses/ revolution, normally open contact
NV26				A+B track		
AV1Y	CT/CV71 – 200 DT/DV71 – 225	Absolute encoder	Solid shaft	-	15/24 V_{DC}	MSSI interface and 1 V_{SS} sin/cos

* recommended encoder for operation with MOVITRAC® 31C

** recommended encoder for operation with MOVIDRIVE®

- Refer to the SEW Encoder Systems manual for more information about installation and technical data (order no.: 0919 6404).
- Refer to the following wiring diagrams for information about connecting ES1./ES2./ EV1. encoders and AV1Y absolute encoders:
  - Wiring diagram ES1./ES2. or EV1. encoder: Order number 0918 6832
  - Wiring diagram AV1Y absolute encoder: Order number 0918 6808

Encoder connection

Always follow the operating instructions for the relevant inverter when connecting the encoders to the inverters!

- Max. line length (inverter – encoder):
  100 m with a cable capacitance ≤ 120 nF/km
- Core cross section: 0.20 – 0.5 mm^2
- Use a shielded cable with twisted pairs of insulated conductors (exception: cable for HTL sensor) and connect the shield over a large surface area at both ends:
  - to the encoder in the cable screw fitting or in the encoder plug
  - to the inverter on the electronics shield clamp or to the housing of the sub D plug
- Route the encoder cables separately from the power cables, maintaining a gap of at least 200 mm.

6 Startup

It is essential to comply with the safety notes during startup (→ page 5).

Before startup, make sure that

- the drive is undamaged and not blocked,
- the measures stipulated in Sec. 4.2 ”Preliminary work following extended storage” are performed after lengthy storage,
- all connections have been made properly,
- the direction of rotation of the motor/geared motor is correct, (motor rotating clockwise: U, V, W to L1, L2, L3)
- all protective covers have been fitted correctly,
- all motor protection equipment is active and set for the rated current of the motor,
- in the case of hoist drives, the self-reengaging manual brake release is used,
- there are no other sources of danger present,

During startup, make sure that

- the motor is running correctly (no overload, no speed fluctuation, no loud noises, etc.),
- the correct braking torque is set according to the specific application (→ Sec. 9 ”Technical Data”),
- if problems occur (→ Sec. 8 ”Operation and Service”)

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

6.1 Altering the blocking direction on motors with a backstop

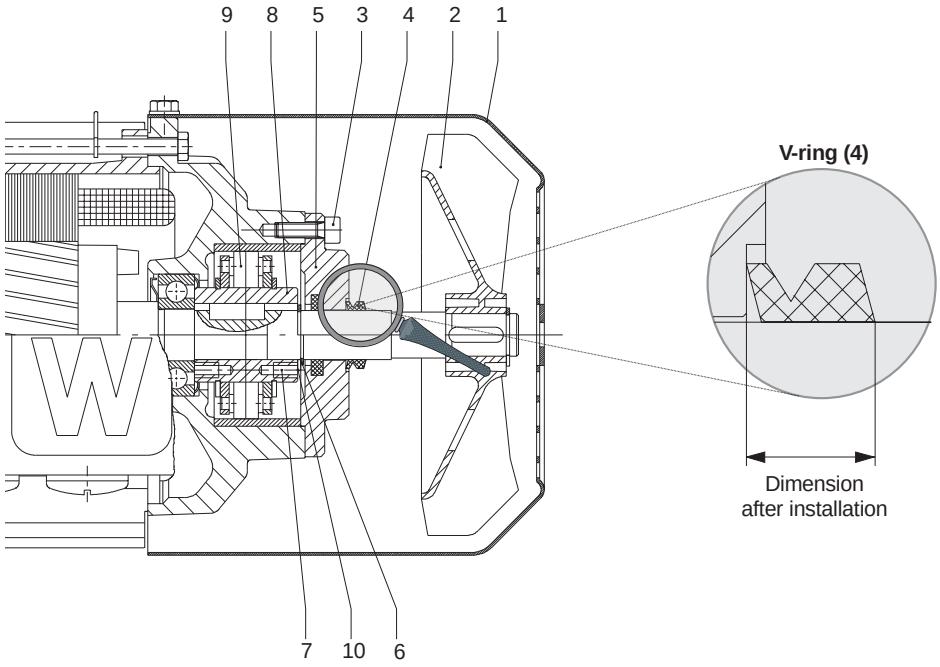

Fig. 16: Backstop

Explanation of Fig. 16

Dimension after installation	
DT71/80	6.7 mm
DT90/DV100	9.0 mm
DV112/132S	9.0 mm
DV132M-160M	11.0 mm
DV160L-225	11.0 mm

STOP

Do not start up the motor in the blocking direction (note the phase angle when connecting). Note the direction of rotation of the output shaft and the number of stages when mounting the motor on a gear unit. For testing purposes, the backstop can be operated once in the blocking direction at half the motor voltage for checking purposes.

Altering blocking direction (→ Fig. 16)

1. **Isolate the motor from the power supply source, preventing an unintentional restart**
2. Remove fan guard (1) and fan (2); remove the machine screws (3)
3. Remove V-ring (4) and sealing flange with felt ring (5) (Collect grease for subsequent use)
4. Remove circlip (6) (not with DT71/80); in additional for DV132M-160M: remove the equalizing rings (10)
5. Pull the driver (8) and wedge element train (9) completely off via threading bores (7), turn them by 180° and press them back on
6. Refill the grease

STOP

Important: **Do not exert pressure on or hit the wedge element train – possible material damages!**

During the press-in operation – shortly before the wedge element enters the locking collar – slowly turn the rotor shaft by hand in the direction of rotation. This allows the wedge elements to slide into the locking collar more easily.

7. Fit the remaining parts of the backstop by following steps 4. to 2. in reverse order. Note the installation dimension for the V-ring (4).

7 Inspection and Maintenance

Important

- **Only use genuine spare parts in accordance with the valid parts list!**
- **Always fit a new brake control system at the same time as replacing the brake coil!**
- **Motors can become very hot during operation – danger of burns!**
- **Secure hoist drives or lower them (danger of falling).**
- **Isolate the motor and brake from the supply before starting work, safeguarding them against unintentional power-up!**

7.1 Inspection and maintenance periods

Equipment/components	Frequency	What to do?	See page
Brake BR03, BMG 05-8, BM 15- 62	• **If used as a working brake:** At least every 3000 hours of operation[1)] • **If used as a holding brake:** Depending on loading conditions: Every 2 to 4 years [1)]	Inspecting the brake: • Measure and set working air gap • Brake disk, lining • Pressure plate • Carrier / gearing • Pressure rings • Extract the abraded matter • Inspect the switch elements and replace if necessary (e.g. in case of burn-out)	**29ff**
Motor	• Every **10 000** hours of operating	Inspect the motor: • Check ball bearings and change if necessary • Change the oil seal • Clean the cooling air passages	**27ff**
Motor with backstop		• Change the low-viscosity grease in the backstop	**28**
Tacho-generator		• Inspection / maintenance as described in the enclosed operating instructions	**-**
Drive	• Varies (depending on external factors)	• Touch up or renew the surface/ anticorrosion coating	**-**

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. Drive Engineering - Practical Implementation, Vol. 4).

7.2 Preliminary work for motor and brake maintenance

Important:

Isolate the motor and brake from the supply before starting work, safeguarding them against unintentional power-up!

Removing the incremental encoder EV1.

1. Remove the hood cover (361). If a forced cooling fan is fitted, remove it first.
2. Unscrew the screw (366) from the intermediate flange and remove the cover plate (369).
3. Unscrew the clamping hub connection of the coupling.
4. Loosen the retaining screws (232) and turn the conical spring washers (251) outwards.
5. Remove the encoder (220) together with the coupling (233).
6. Lever off the intermediate flange (236) after removing the screws (234).

   Note:
   During re-assembly, make sure the runout of the shaft end is ≤ 0.05 mm.

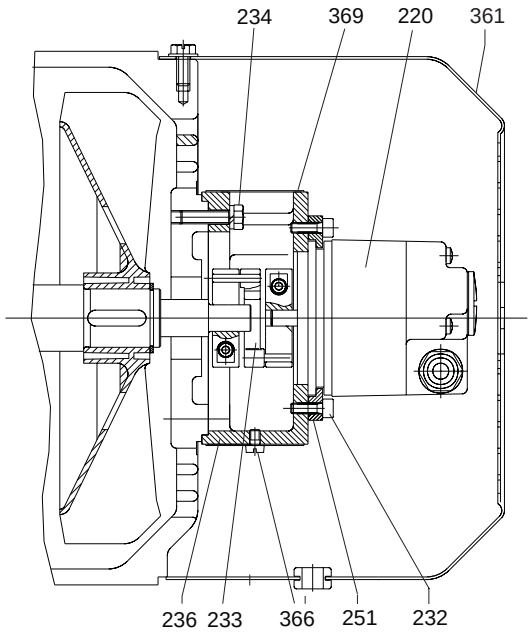

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Fig. 17: Incremental encoder EV1.

Removing the incremental encoder ES1. / ES2.

1. Remove the hood cover (361) and open the screw cover on the back wall of the encoder (220).
2. Unscrew the central retaining screw (367) by about 2 – 3 turns and loosen the cone by tapping lightly on the head of the screw. Then unscrew the retaining screw and pull off the encoder.

   Note:
   During re-assembly:
   – Apply Noco-Fluid® to the encoder spigot.
   – Tighten the central retaining screw (367) to 2.9 Nm.

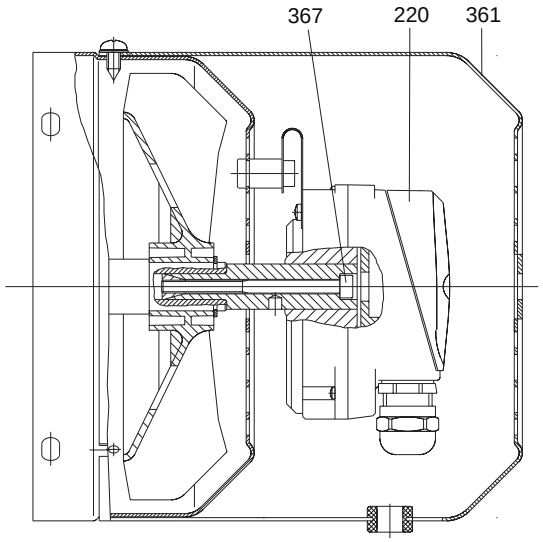

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Fig. 18: Incremental encoder ES1./ES2.

Removing the proximity sensor NV1. / NV2.

Important! It is essential for the fan wheel to be stationary!

1. Disconnect the plug.
2. Pull off the fan guard including NV1. / NV2. Do not tilt it, in order to avoid damaging the proximity switch.

If the mounting block has been removed from the fan guard or has come loose, **it is essential to ensure the following during re-assembly**:

The switching surface of the proximity switch must be calibrated to a distance of 3.5 mm from the edge of the prismatic block (→ Fig. 19).

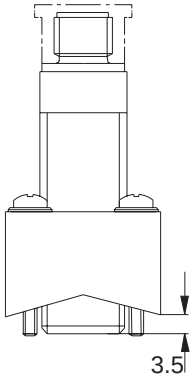

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Fig. 19: Proximity sensor NV1./2.

7.3 Inspection and maintenance work on the motor

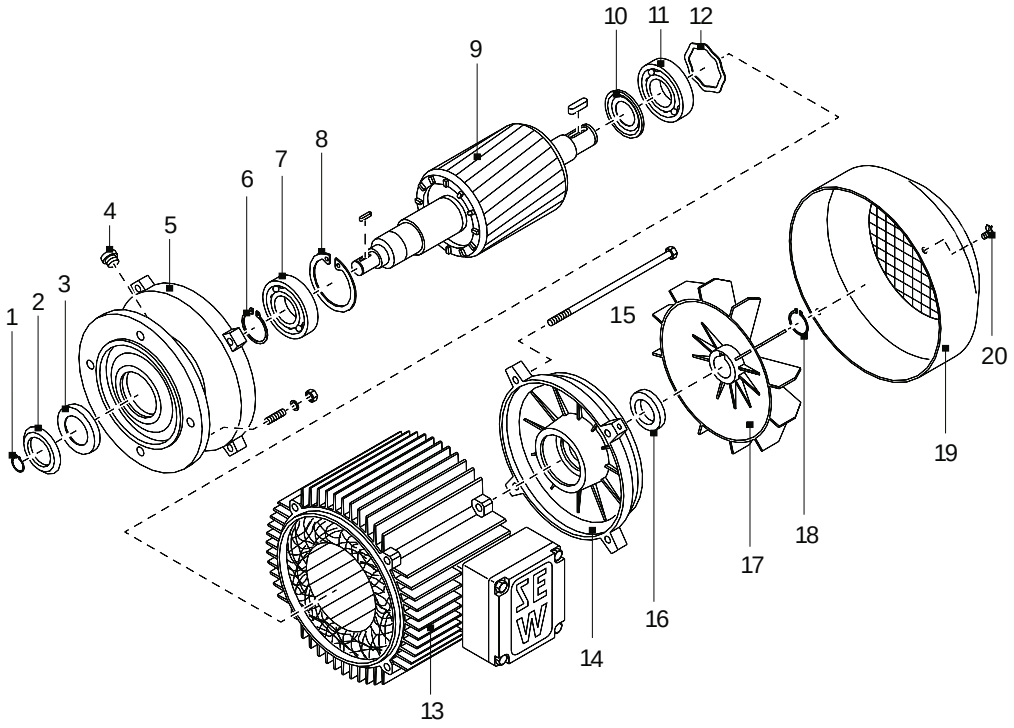

Fig. 20: Example: motor DFT 90

Key

1	Circlip	8	Circlip	15	Hex head screw
2	Oil flinger	9	Rotor	16	V-ring
3	Oil seal	10	Nilos ring	17	Fan
4	Screw plug	11	Ball bearing	18	Circlip
5	Drive end bearing end shield	12	Equalizing ring	19	Fan guard
6	Circlip	13	Stator	20	Housing screw
7	Ball bearing	14	Non-drive end bearing end shield		

Procedure

1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.**
2. Remove the forced cooling fan and encoder, if fitted (→ Sec. 7.2 "Preliminary work for motor and brake maintenance").
3. Remove the flange cover or fan guard (19) and the fan (17).
4. Remove the hexagon head cap screws (15) from the drive end bearing end shield (5) and the non-drive end bearing end shield (14), release the stator (13) from the drive end bearing end shield.
5. **a) Motors with brake BM/BMG:**
   – Open the terminal box cover, loosen the brake cable from the rectifier
   – Push the non-drive end bearing shield and the brake off the stator and carefully lift them off (if necessary, run the brake cable along with trailing wire)
   – Pull the stator off by about 3 – 4 cm

   b) Motors with brake BR03:
   – Remove the complete brake with the releasing lever (on version with manual brake release)
6. Visual check:
   Are there traces of gear oil or condensation inside the stator?
   – If not, continue with 9
   – If there is condensation, continue with 7
   – If there is gear oil, have the motor repaired by a specialist workshop
7. a) Geared motors: Remove the motor from the gear unit.
   b) Motors without a gear unit: Remove the drive end flange.
   c) Remove the rotor (9).
8. Clean the winding, dry it and check it electrically (→ Sec. 4.2 "Preliminary work following extended storage").
9. Fit new ball bearings (7, 11) (only use authorized ball bearings (→ Sec. 9.4 "Permitted ball bearing types").
10. Fit a new oil seal (3) in the drive end bearing end shield.
11. a) Reseal the stator seat
    b) Grease the V-ring or labyrinth seal (DR63)
    c) Fit the motor, brake etc.
12. Then check the gear unit (if applicable) (→ gear unit operating instructions).

Lubrication of the backstop

The backstop is supplied with Mobil LBZ low-viscosity grease as a lubricant and anticorrosion protection. If you want to use a different 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 temperature range extends from -50 °C to +90 °C. See the following table for the amount of grease required.

Motor type	71/80	90/100	112/132	132M/160M	160L/225
Grease [g]	9	15	15	20	45

7.4 Inspection and maintenance of the brake

Brake BR03

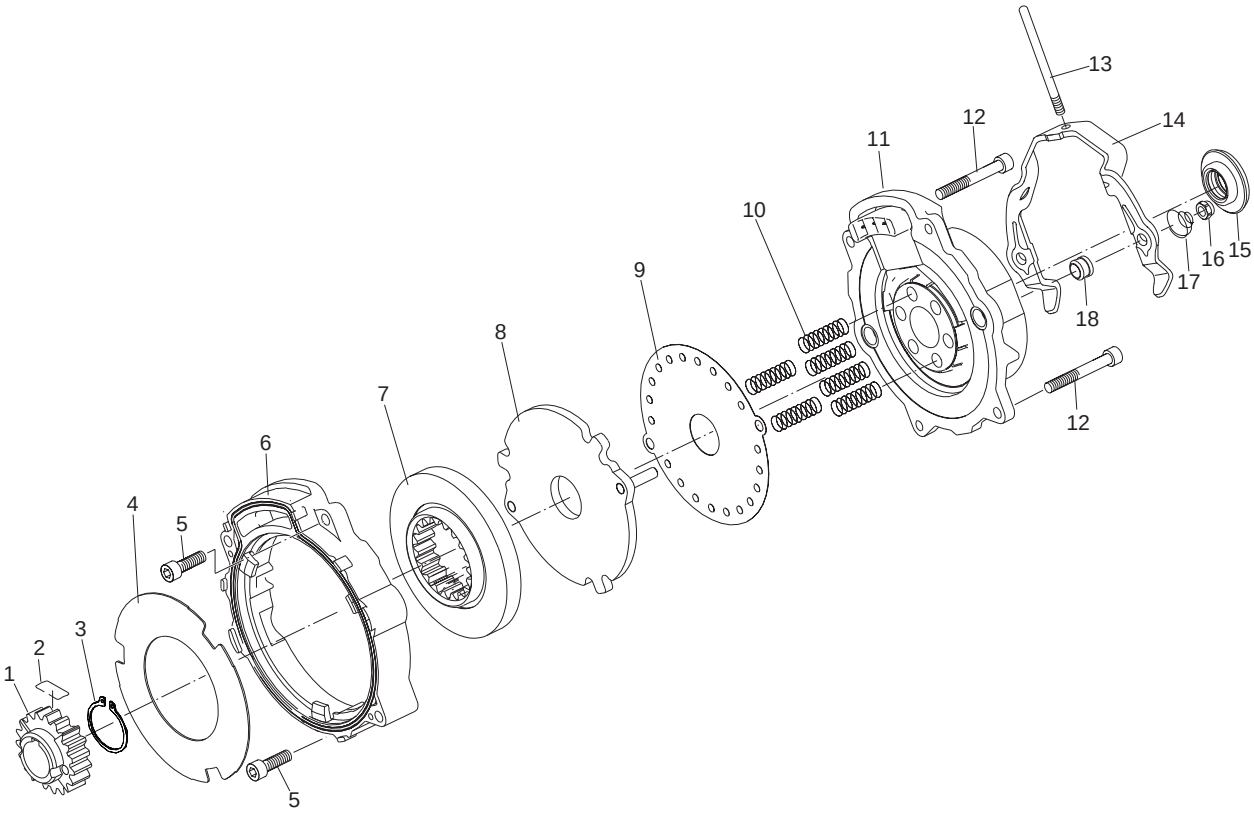

Fig. 21: Brake BR03

Key

1 Carrier
2 Clip
3 Circlip
4 Friction plate
5 Bolt
6 Guide ring
7 Brake disk
8 Pressure plate with stud
9 Damping plate
10 Brake springs
11 Brake coil body
12 Bolt
13 Hand lever
14 Releasing lever
15 Sealing washer
16 Self locking counter nut
17 Conical coil spring
18 Sealing element

Inspecting brake BR03, measuring the working air gap

The working air gap cannot be adjusted and can only be measured by means of the stroke of the pressure plate when the brake is released.

1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.**
2. Unscrew the hand lever (13, on version with manual brake release). Remove the fan guard and the fan.
3. Remove the self locking counter nuts (16) and, if manual brake release is fitted, remove the conical coil springs (17) and the releasing lever (14).
4. Measure clearance x (Fig. 22) with the brake at rest:
   – From the end of the stud on the pressure plate (8) to the brake coil body (11)
5. Release the brake electrically.
6. Measure clearance x (Fig. 22) with the brake released:
   – From the end of the stud on the pressure plate (8) to the brake coil body (11)

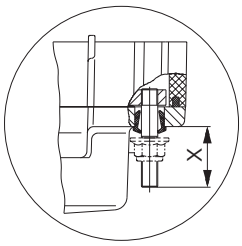

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Fig. 22: Checking the working air gap

7. The differential corresponds to the working air gap, i.e. the stroke of the pressure plate (18):
   – If the working air gap ≤ 0.8 mm, reinstall the conical coil springs (17), releasing lever (14) and self locking counter nuts (16)
   – **If the working air gap ≥ 0.8 mm, replace the entire brake (→ Fig. 24)**
   – Use setting nuts to set the floating clearance between the conical coil springs (pressed flat) and the setting nuts (→ Fig. 23).

Brake	Floating clearance s [mm]
BR03	2

Important: 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.

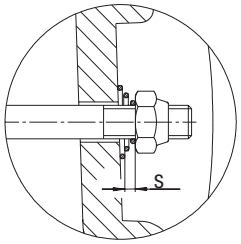

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Fig. 23: Setting the floating clearance

8. Reassemble the removed parts. Install the complete brake (replaced if the working air gap ≥ 0.8 mm) to the motor (→ Fig. 24):
   – Make sure the gearing of the brake disk engages in the gearing of the carrier and that the plug on the motor end fits into the socket on the brake end

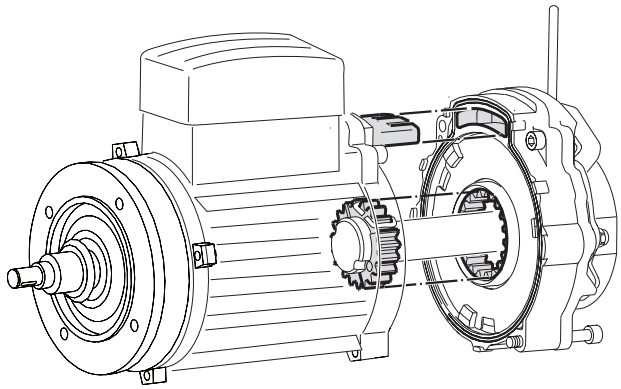

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Fig. 24: Replacing the entire brake BR03

Altering the braking torque BR03

The braking torque can be changed in steps (→ Sec. 9.1 "Work done until maintenance, working air gap, braking torques of brake BR03, BMG 05-8")

- by installing different brake springs,
- by changing the number of brake springs.

1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.**
2. Unscrew the hand lever (13, on version with manual brake release). Remove the fan guard and the fan.
3. Loosen the screws (12) and remove the complete brake with the releasing lever (on version with manual brake release).
4. Loosen the screws (5) and remove the guide ring (6) with friction plate (4), brake disk (7), pressure plate (8) and damping plate (9).
5. Remove the brake springs (10) from the brake coil body (11) and replace them by new ones.
6. Position the new brake springs symmetrically.
7. Slide the damping plate (9) over two studs attached to the pressure plate (8) so the embossing pattern is located with the projecting side facing the pressure plate.
8. Pressure plate (8):
   – Place on the brake springs (10) together with the damping plate (9)
   – Guide the studs attached to the pressure plate (8) through the holes in the brake coil body (6) and make sure the pressure plate is in the correct position

9. Place the flat side of the brake disk (7) on the pressure plate (8).

   Note: Do not bring the disk into contact with grease or oil!
10. Place the guide ring (6) and friction disk (4) onto the brake disk (7), press down and fit the screws (5).

11. Design with manual brake release:

– Put on the conical coil springs (17) and releasing lever (14), fit the self locking counter nuts (16)
– With manual brake release: Use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (→ Fig. 25)

Brake	Floating clearance s [mm]
BR03	2

Important: 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.

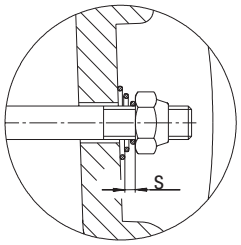

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Fig. 25: Setting the floating clearance

12. Connect the complete brake back onto the motor (→ Fig. 26):
    – Make sure the gearing of the brake disk engages in the gearing of the carrier and that the plug on the motor end fits into the socket on the brake end

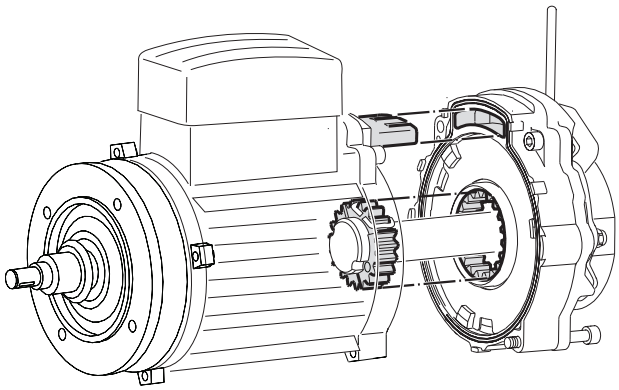

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Fig. 26: Replacing the entire brake BR03

13. Fit the fan and fan guard back on, screw the hand lever (10) back in (on version with manual brake release).

Brake BMG 05-8, BM 15 - 62

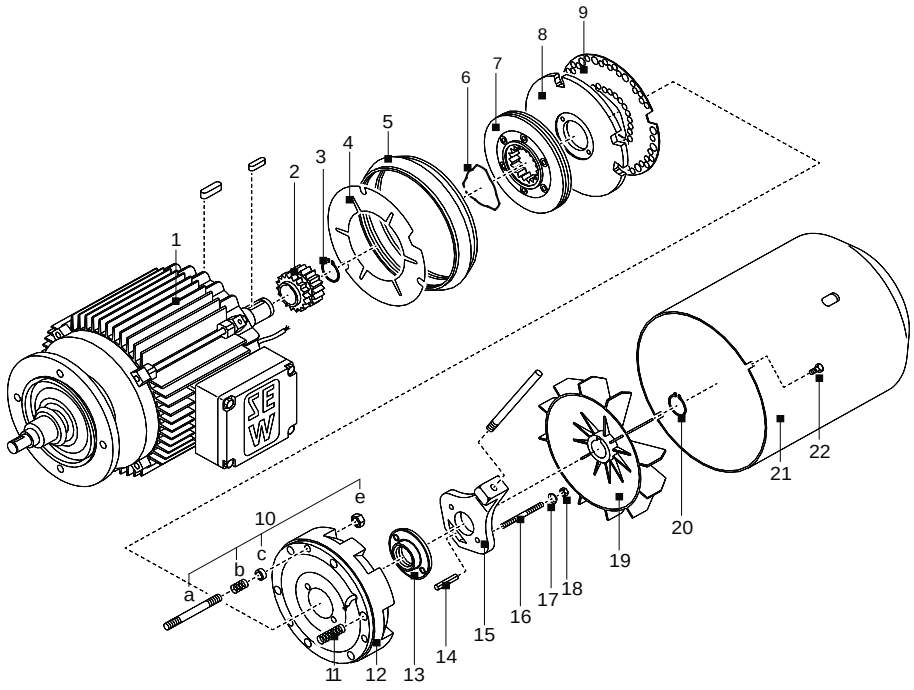

Fig. 27: Brake type BM(G) 05– 15

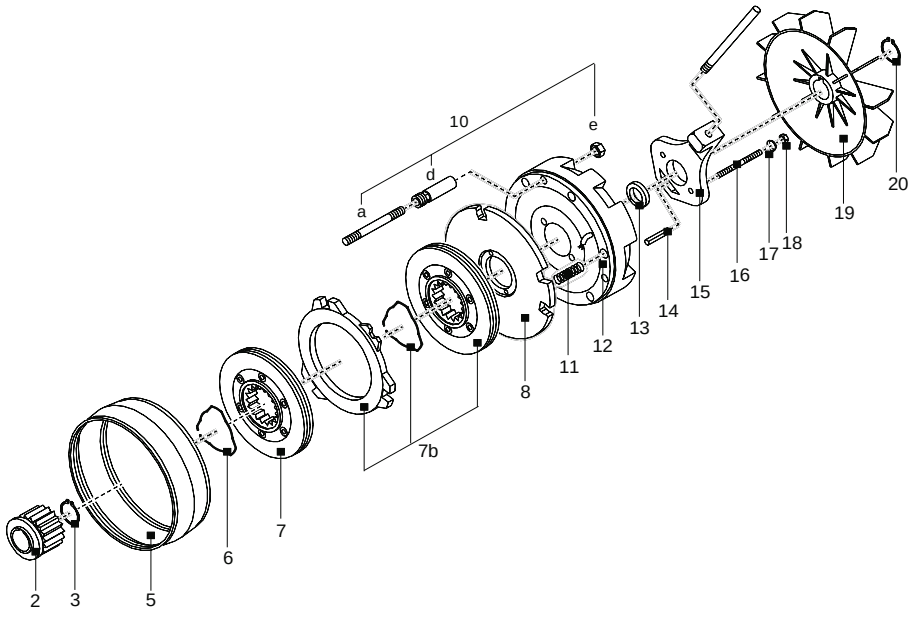

Fig. 28: Brake type BM 30– 62

Key

1 Motor with brake bearing end shield
2 Carrier
3 Circlip
4 Niro disk (only BMG)
5 Rubber sealing collar
6 Annular spring
7 Brake disk
7b Only BM 32, 62: Brake stationary disk, annular spring, brake disk
8 Pressure plate
9 Damping plate (BMG only)
10 a Stud (3x)
b Counter spring
c Pressure ring
e Hex nut
11 Brake spring
12 Brake coil body
13 In BMG: Sealing washer
In BM: V-ring
14 Dowel pin
15 Releasing lever with hand lever
16 Stud (2 pcs.)
17 Conical coil spring
18 Setting nut
19 Fan
20 Circlip
21 Fan guard
22 Housing screw

Inspecting brake BMG 05–8, BM 15–62, setting the working air gap

1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.**
2. Remove the following:
   - If fitted, forced cooling fan, tacho/encoder (→ Sec. 7.2 "Preliminary work for motor and brake maintenance")
   - Flange cover or fan guard (21)
3. Push the rubber sealing collar (5) aside.
   - Release the clip to do this, if necessary.
   - Extract the abraded matter
4. Measure the brake disk (7, 7b):
   If the brake disk is:
   - ≤ 9 mm on brake motors up to size 100
   - ≤ 10 mm on brake motors up to size 112

   Fit a new brake disk (→Sec. "Changing the drake disk BMG 05–8, BM 15–62"). Otherwise
5. **In BM 30–62:**
   Loosen the setting sleeve (10d) by turning towards the bearing end shield.
6. Measure the working air gap A
   (using a feeler gauge at three points offset by approx. 120° → Fig. 29:
   - In BM, between the pressure plate (8) and the brake coil body (12)
   - In BMG, between the pressure plate and the damping plate (9)
7. Tighten the hex nuts (10e).
   - Until the working air gap is set correctly (→ Sec. 9.1, 9.2)
   - In BM 30–62, until the working air gap is initially 0.25 mm
8. **In BM 30–62:**
   Tighten the setting sleeves
   - against the brake coil body
   - until the working air gap is set correctly (→ Sec. 9.1, 9.2)
9. Fit the rubber sealing collar back in place and re-install the dismantled parts.

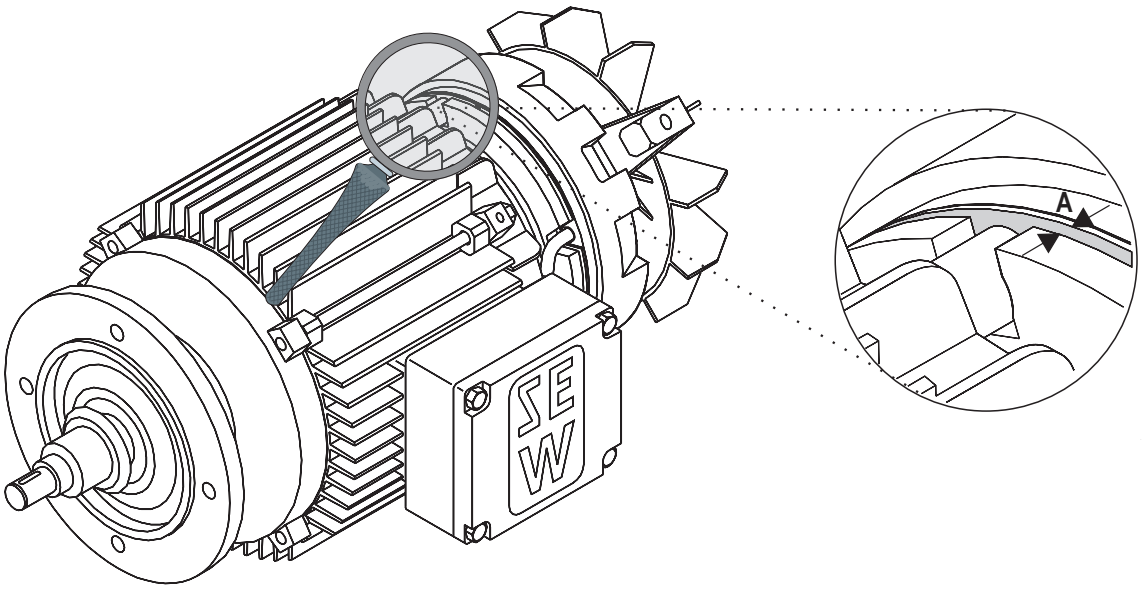

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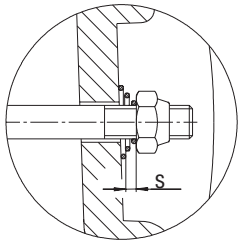
Fig. 29: Measuring the working air gap A

Changing the drake disk BMG 05–8, BM 15–62

When fitting a new brake disk[1)], inspect the other removed parts as well and fit new ones if necessary.

1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.**
2. Remove the following:
   - If fitted, forced cooling fan, tacho/encoder (→ Sec. 7.2 "Preliminary work for motor and brake maintenance")
   - Flange cover or fan guard (21), circlip (20) and fan (19)
3. Remove the rubber sealing collar (5) and the manual brake release:
   - setting nuts (18), conical coil springs (17), studs (16), release lever (15), dowel pin (14)
4. Unscrew hex nuts (10e), carefully pull off the brake coil body (12) (brake cable!) and take out the brake springs (11).
5. Remove the damping plate (9), pressure plate (8) and brake disk (7, 7b) and clean the brake components.
6. Fit a new brake disk.
7. Re-install the brake components.
   - Except for the rubber sealing collar, fan and fan guard, set the working air gap (→ "Inspecting brake BMG 05–8, BM 15–62, setting the working air gap" , points 5 through 8)
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 (→ Fig. 30)

Brake	Floating clearance s [mm]
BMG 05-1	1.5
BMG 2-8	2
BM 15-62	2



Important: 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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Fig. 30: Setting the floating clearance

9. Fit 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 grub screw.
- The self-reengaging manual brake release (type HR) can be operated with normal hand pressure.

Important: 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 it on the outside of the motor.

1) If brake disk on BMG 05-4 ≤ 9 mm
on BMG 8-BM 62 ≤ 10 mm

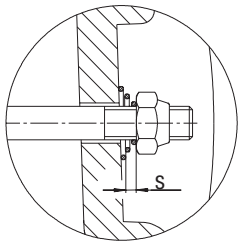
Altering the braking torque BMG 05–8, BM 15 –62 (→ Fig. 27 through Fig. 29)

The braking torque can be changed in steps (→ Sec. 9.1, 9.2)

- by installing different brake springs,
- by changing the number of brake springs.
- by changing the brake coil body:
  - **BMG 05:** if the maximum braking torque is not sufficient for the specific application, install the brake coil body (12) of brake BMG 1 of the same design in order to ensure safe braking
  - **BMG 2:** if the maximum braking torque is not sufficient for the specific application, install the brake coil body (12) of brake BMG 4 of the same design in order to ensure safe braking

1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.**
2. Remove the following:
   - If fitted, forced cooling fan, tacho/encoder (→ Sec. 7.2 "Preliminary work for motor and brake maintenance")
   - Flange cover or fan guard (21), circlip (20) and fan (19)
3. Remove the rubber sealing collar (5**)** and the manual brake release:
   - setting nuts (18), conical coil springs (17), studs (16), release lever (15), dowel pin (14)
4. Unscrew hex nuts (10e), pull off the coil body (12).
   - By approx. 50 mm (watch the brake cable!)
5. Change or add brake springs (11).
   - Position the brake springs symmetrically
6. Re-install the brake components.
   - Except for the rubber sealing collar, fan and fan guard, set the working air gap (→ "Inspecting brake BMG 05–8, BM 15–62, setting the working air gap" , points 5 through 8)
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 (→ Fig. 31)

Brake	Floating clearance s [mm]
BMG 05-1	1.5
BMG 2-8	2
BM 15-62	2



Important: 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.

01111BXX

Fig. 31: Setting the floating clearance

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

Note

Fit new setting nuts (18) and hexagon nuts (10e) if the removal procedure is repeated!

8 Operation and Service

8.1 Motor problems

Problem	Possible cause	Solution
Motor does not start up	Interruption in connecting harness	Check connections, correct
	Brake does not release	→ Sec. 8.2
	Fuse blown	Fit new fuse
	Motor protection has tripped	Check motor protection is set correctly, rectify any fault
	Motor protection does not switch, fault in control	Check motor protection control, rectify any fault
Motor does not start or only with difficulty	Motor designed for delta connection but used in star connection	Correct circuit
	Voltage and frequency deviate markedly from setpoint, at least during switch-on	Provide better supply system; check cross section of connecting harness
Motor does not start in star connection, only in delta connection	Torque not sufficient in star connection	Switch on directly if delta inrush current is not too great; otherwise use a larger motor or a special version (contact SEW)
	Contact fault on star delta switch	Rectify fault
Incorrect direction of rotation	Motor connected incorrectly	Swap over two phases
Motor hums and has high current consumption	Brake does not release	→ Sec. 8.2
	Winding defective	Send motor to specialist workshop for repair
	Rotor rubbing	
Fuses blow or motor protection trips immediately	Short circuit in line	Rectify short circuit
	Short circuit in motor	Send motor to specialist workshop for repair
	Lines connected incorrectly	Correct circuit
	Ground fault on motor	Send motor to specialist workshop for repair
Severe speed loss under load	Overload	Perform power measurement, use larger motor or reduce load if necessary
	Voltage drops	Increase cross section of connecting harness
Motor heats up excessively (measure temperature)	Overload	Perform power measurement, use larger motor or reduce load if necessary
	Inadequate cooling	Correct cooling air supply or clear cooling air passages, retrofit forced cooling fan if necessary
	Ambient temperature too high	Adhere to permitted temperature range
	Use delta connection for motor rather than star connection as provided for	Correct circuit
	Loose contact in connecting harness (one phase missing)	Rectify loose contact
	Fuse blown	Look for and rectify cause (see above), fit new fuse
	Supply voltage deviates from rated motor voltage by more than ± 5 %. A higher voltage has a particularly unfavorable effect in motors with a low-speed winding since in these, the no-load current is already close to the rated current even when the voltage is normal.	Adapt motor to supply voltage
	Rated operating mode (S1 to S10, DIN 57530) exceeded, e.g. due to excessive Starting frequency	Adapt rated operating mode of motor to required operating conditions; if necessary call in a specialist to determine what is the correct drive
Excessively loud	Ball bearing compressed, contaminated or damaged	Re-align motor, inspect ball bearing (→ Sec. 9.4), grease if necessary (→ Sec. 9.5), replace
	Vibration of rotating parts	Rectify cause, possibly imbalance
	Foreign bodies in cooling air passages	Clean the cooling air passages

8.2 Brake problems

Problem	Possible cause	Solution
Brake does not release	Incorrect voltage on brake control unit	Apply correct voltage (→ Sec. 3.1)
	Brake control unit failed	Fit a new brake control system, check internal resistance and insulation of brake coil, check switchgear
	Max. permitted working air gap exceeded because brake lining worn down	Measure and set working air gap
	Voltage drop along connecting harness > 10 %	Provide for correct connection voltage Check cable cross section
	Inadequate cooling, brake overheats	Replace type BG brake rectifier with type BGE
	Brake coil has interturn fault or short circuit to exposed conductive part	Replace complete brake and brake control system (specialist workshop), check switchgear
Motor does not brake	Working air gap not correct	Measure and set working air gap
	Brake lining worn down	Replace entire brake disk
	Incorrect braking torque	Change the braking torque (→ Sec. 9.1): • by the type and number of brake springs • **Brake BMG 05**: by installing the same brake coil body design as in the BMG 1 brake • **Brake BMG 2**: by installing the same brake coil body design as in the BMG 4 brake
	BM(G) only: Working air gap so large that setting nuts come into contact	Check working air gap
	BR03, BM(G) only: Manual brake release device not set correctly	Set the setting nuts correctly
Brake is applied with time lag	Brake is switched on AC voltage side	Switch on DC and AC voltage sides (e.g. BSR); please refer to circuit diagram
Noises in vicinity of brake	Gearing wear caused by jolting startup	Check project planning
	Pulsating torques due to incorrectly set frequency inverter	Check/correct setting of frequency inverter according to operating instructions

8.3 Problems when operating with a frequency inverter

The symptoms described in Sec. 8.1 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.

If you require assistance from our customer service staff, please state the following:

- Data on the nameplate
- Type and extent of the fault
- Time and peripheral circumstances of the fault
- Presumed cause

9 Technical Data

9.1 Work done until maintenance, working air gap, braking torques of brake BR03, BMG 05-8

Brake type	For motor size	Work done until maintenance [10^6 J]	Working air gap [mm]		Braking torque settings				
			min.[1]	max.	Braking torque [Nm]	Type and no. of springs		Order number of springs	
						Normal	Red	Normal	Red
BR 03	63	200	-	0.8	3.2 2.4 1.6 0.8	6 4 3 -	- 2 - 6	185 815 7	185 873 4
BMG 05[2]	71	60	0.25	0.6	5.0 4.0 2.5 1.6 1.2	3 2 - - -	- 2 6 4 3	135 017 X	135 018 X
BMG 1	80	60			10 7.5 6.0	6 4 3	- 2 3		
BMG 2[2]	90 100	130			20 16 10 6.6 5.0	3 2 - - -	- 2 6 4 3	135 150 8	135 151 6
BMG 4	100	130			40 30 24	6 4 3	- 2 3		
BMG 8	112M 132S	300	0.3	1.2	75 55 45 37 30 19 12.6 9.5	6 4 3 3 2 - - -	- 2 3 - 2 6 4 3	184 845 3	135 570 8

1) **Please note when checking the working air gap:**
Parallelism tolerances on the brake disk may give rise to deviations of ±0.1 mm after a test run.

2) **BMG 05:**
If the maximum braking torque (5 Nm) is not sufficient, it is possible to install the brake coil body of the BMG 1 brake.

BMG 2:
If the maximum braking torque (20 Nm) is not sufficient, it is possible to install the brake coil body of the BMG 4 brake.

9.2 Work done until maintenance, working air gap, braking torques of brake BM 15 - 62

Brake type	For motor size	Work done until maintenance [10^6 J]	Working air gap [mm]		Braking torque settings				
			min.[1]	max.	Braking torque [Nm]	Type and no. of springs		Order number of springs	
						Normal	Red	Normal	Red
BM 15	132M, ML 160M	500	0.3	1.2	150 125 100 75 50 35 25	6 4 3 3 - - -	- 2 3 - 6 4 3	184 486 5	184 487 3
BM 30	160L 180	750			300 250 200 150 125 100 75 50	8 6 4 4 2 - - -	- 2 4 - 4 8 6 4	136 998 9	136 999 7
BM 31	200 225	750							
BM32[2]	180	750	0.4	1.2	300 250 200 150 100	4 2 - - -	- 4 8 6 4		
BM62[2]	200 225	750			600 500 400 300 250 200 150 100	8 6 4 4 2 - - -	- 2 4 - 4 8 6 4	136 998 9	136 999 7

1) **Please note when checking the working air gap:**
Parallelism tolerances on the brake disk may give rise to deviations of ±0.1 mm after a test run.
2) Double disk brake

9.3 Operating currents

The current values I_H (holding current) specified in the tables are r.m.s. values. Only use r.m.s. instruments for your measurement.
The inrush current (accelerator current) I_B only flows for a short time (max. 120 ms) when the brake is released or during voltage dips below 70 % of rated voltage. There is no increased inrush current if the BG brake rectifier is used or if there is a direct DC voltage supply – both are only possible with brakes up to motor size 100.

Brake BR03

	BR03
Motor size	63
Max. braking torque (Nm)	3.2
Coil power (W)	24
Control factor I_B/I_H	4

Voltage V_N		BR03	
V_{AC}	V_{DC}	I_H A_{AC}	I_G A_{DC}
	24	-	0.72
24 (23-26)	**10**	1.5	1.80
42 (40-45)	**18**	0.81	1.01
48 (46-50)	**20**	0.72	0.90
53 (51-56)	**22**	0.64	0.80
60 (57-63)	**24**	0.57	0.72
67 (64-70)	**27**	0.50	0.64
73 (71-78)	**30**	0.45	0.57
85 (79-87)	**36**	0.40	0.51
92 (88-98)	**40**	0.35	0.45
110 (99-110)	**44**	0.31	0.40
115 (111-123)	**48**	0.28	0.36
133 (124-138)	**54**	0.25	0.32
147 (139-154)	**60**	0.22	0.29
160 (155-173)	**68**	0.20	0.25
184 (174-193)	**75**	0.17	0.23
208 (194-217)	**85**	0.16	0.20
230 (218-243)	**96**	0.14	0.18
254 (244-273)	**110**	0.12	0.16
290 (274-306)	**125**	0.11	0.14
318 (307-343)	**140**	0.10	0.13
360 (344-379)	**150**	0.09	0.11
400 (380-431)	**170**	0.08	0.10
460 (432-500)	**190**	0.07	0.09

Key

I_H	Holding current r.m.s. value in the connecting harness to the SEW brake rectifier
I_B	Accelerator current - short-term inrush current
I_G	Direct current with direct DC voltage supply
U_N	Rated voltage (rated voltage range)

Brake BMG 05 - BMG 4

	BMG 05	BMG 1	BMG 2	BMG 4
Motor size	71/80	80	90/100	100
Max. braking torque (Nm)	5	10	20	40
Coil power (W)	32	36	40	50
Control factor I_B/I_H	4	4	4	4

Voltage V_N		BMG 05		BMG 1		BMG 2		BMG 4	
V_{AC}	V_{DC}	I_H A_{AC}	I_G A_{DC}	I_H A_{AC}	I_G A_{DC}	I_H A_{AC}	I_G A_{DC}	I_H A_{AC}	I_G A_{DC}
	24		1.38		1.54		1.77		2.20
24 (23-25)	**10**	2.0	3.3	2.4	3.7	-	-	-	-
42 (40-46)	**18**	1.14	1.74	1.37	1.94	1.46	2.25	1.80	2.80
48 (47-52)	**20**	1.02	1.55	1.22	1.73	1.30	2.00	1.60	2.50
56 (53-58)	**24**	0.90	1.38	1.09	1.54	1.16	1.77	1.43	2.20
60 (59-66)	**27**	0.81	1.23	0.97	1.37	1.03	1.58	1.27	2.00
73 (67-73)	**30**	0.72	1.10	0.86	1.23	0.92	1.41	1.14	1.76
77 (74-82)	**33**	0.64	0.98	0.77	1.09	0.82	1.25	1.00	1.57
88 (83-92)	**36**	0.57	0.87	0.69	0.97	0.73	1.12	0.90	1.40
97 (93-104)	**40**	0.51	0.78	0.61	0.87	0.65	1.00	0.80	1.25
110 (105-116)	**48**	0.45	0.69	0.54	0.77	0.58	0.90	0.72	1.11
125 (117-131)	**52**	0.40	0.62	0.48	0.69	0.52	0.80	0.64	1.00
139 (132-147)	**60**	0.36	0.55	0.43	0.61	0.46	0.70	0.57	0.88
153 (148-164)	**66**	0.32	0.49	0.39	0.55	0.41	0.63	0.51	0.79
175 (165-185)	**72**	0.29	0.44	0.34	0.49	0.37	0.56	0.45	0.70
200 (186-207)	**80**	0.26	0.39	0.31	0.43	0.33	0.50	0.40	0.62
230 (208-233)	**96**	0.23	0.35	0.27	0.39	0.29	0.44	0.36	0.56
240 (234-261)	**110**	0.20	0.31	0.24	0.35	0.26	0.40	0.32	0.50
290 (262-293)	**117**	0.18	0.28	0.22	0.31	0.23	0.35	0.29	0.44
318 (294-329)	**125**	0.16	0.25	0.19	0.27	0.21	0.31	0.25	0.39
346 (330-369)	**147**	0.14	0.22	0.17	0.24	0.18	0.28	0.23	0.35
400 (370-414)	**167**	0.13	0.20	0.15	0.22	0.16	0.25	0.20	0.31
440 (415-464)	**185**	0.11	0.17	0.14	0.19	0.15	0.22	0.18	0.28
500 (465-522)	**208**	0.10	0.15	0.12	0.17	0.13	0.20	0.16	0.25

Key

I_H Holding current r.m.s. value in the connecting harness to the SEW brake rectifier

I_B Accelerator current – short-term inrush current

I_G Direct current with direct DC voltage supply

U_N Rated voltage (rated voltage range)

Brake BMG 8 - BM 32/62

	BMG 8	BM 15	BM 30/31 32/62
Motor size	112/132S	132M-160M	160L-225
Max. braking torque (Nm)	75	150	600
Coil power (W)	65	95	95
Control factor I_B/I_H	6.3	7.5	8.5

Voltage V_N		BMG 8	BM 15	BM 30/31 32/62
V_{AC}	V_{DC}	I_H A_{AC}	I_H A_{AC}	I_H A_{AC}
	24	2.77[1)]	4.15[1)]	4.00[1)]
42 (40-46)	**-**	2.31	3.35	3.15
48 (47-52)	**-**	2.10	2.95	2.80
56 (53-58)	**-**	1.84	2.65	2.50
60 (59-66)	**-**	1.64	2.35	2.25
73 (67-73)	**-**	1.46	2.10	2.00
77 (74-82)	**-**	1.30	1.87	1.77
88 (83-92)	**-**	1.16	1.67	1.58
97 (93-104)	**-**	1.04	1.49	1.40
110 (105-116)	**-**	0.93	1.32	1.25
125 (117-131)	**-**	0.82	1.18	1.12
139 (132-147)	**-**	0.73	1.05	1.00
153 (148-164)	**-**	0.66	0.94	0.90
175 (165-185)	**-**	0.59	0.84	0.80
200 (186-207)	**-**	0.52	0.74	0.70
230 (208-233)	**-**	0.46	0.66	0.63
240 (234-261)	**-**	0.41	0.59	0.56
290 (262-293)	**-**	0.36	0.53	0.50
318 (294-329)	**-**	0.33	0.47	0.44
346 (330-369)	**-**	0.29	0.42	0.40
400 (370-414)	**-**	0.26	0.37	0.35
440 (415-464)	**-**	0.24	0.33	0.31
500 (465-522)	**-**	0.20	0.30	0.28

1) Direct current in BSG operation

Key

I_H Holding current r.m.s. value in the connecting harness to the SEW brake rectifier

I_B Accelerator current – short-term inrush current

I_G Direct current with direct DC voltage supply

U_N Rated voltage (rated voltage range)

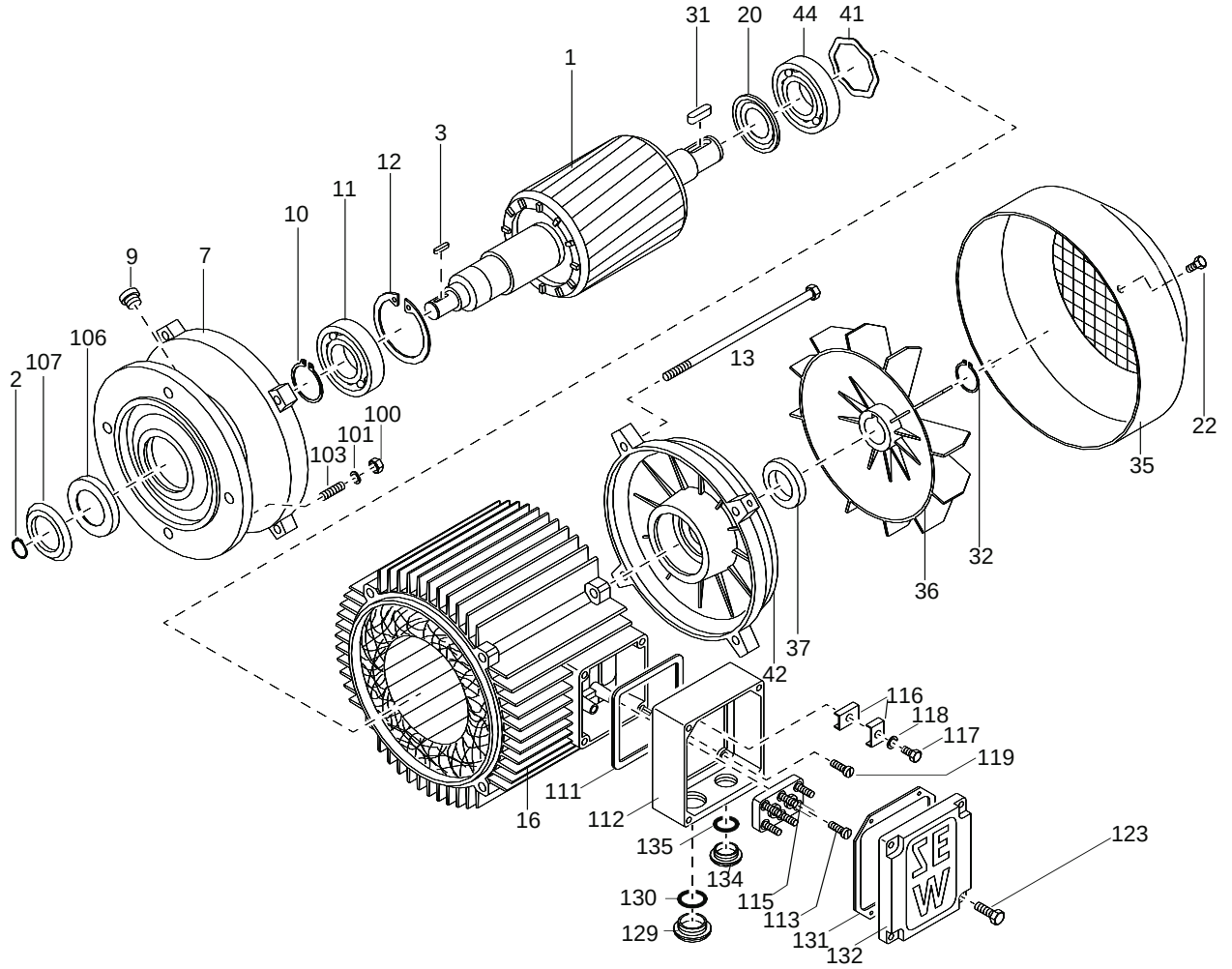
9.4 Permitted ball bearing types

Motor type	Driving end A-bearing (AC motor, brake motor)			Non-driving end B-bearing (foot-mounted, flange-mounted, geared motors)	
	Flange-mounted motor	Geared motor	Foot-mounted motor	AC motor	Brake motor
DFR 63	6203-Z-J	6203-Z-J	-	6202-J	6202-2RS-J-C3
DT 71 - 80	6204-Z-J	6303-Z-J	6204-Z-J	6203-J	6203-RS-J-C3
DT 90 - DV100	6306-Z-J			6205-J	6205-RS-J-C3
DV 112 - 132 S	6208-Z-J	6307-Z-J	6208-Z-J	6207-J	6207-RS-J-C3
DV 132 M - 160 M	6309-Z-J-C3			6209-2Z-J-C3	
DV 160 L - 180 L	6312-Z-J-C3			6213-2Z-J-C3	
DV 200 - 225	6314-Z-J-C3			6314-Z-J-C3	

9.5 Lubricant table for anti-friction bearings of SEW motors

Ambient temperature	Lubricant type DIN	NLGI class	Esso	Shell	Klüber Lubrication
+80 °C – +100 °C	Grease DIN 51818	2			BARRIERTA L55/2
-25 °C – +80 °C		3	Unirex N3		
-25 °C – +60 °C		3		Shell Alvania Grease R 3	
-45 °C – –25 °C		2		Aero Shell Grease 16	

9.6 Components of the motor



Key
(to facilitate assignment, the part numbering corresponds to the relevant spare parts lists)

1 Rotor, cpl.
2 Circlip
3 Key
7 Flanged end shield
9 Screw plug
10 Circlip
11 Grooved ball bearing
12 Circlip
13 Hex head screw (tie rod)
16 Stator, cpl.
20 Nilos ring
22 Hex head screw
31 Key
32 Circlip
35 Fan guard
36 Fan
37 V-ring
41 Equalizing ring
42 Non drive-end bearing shield
44 Grooved ball bearing
100 Hex nut
101 Lock washer
103 Stud
106 Oil seal
107 Oil flinger
111 Gasket
112 Terminal box lower part
113 Slotted cheese head screw
115 Terminal board
116 Terminal yoke
117 Hex head screw
118 Lock washer
119 Slotted cheese head screw
123 Hex head screw
129 Screw plug
130 Sealing washer
131 Gasket
132 Terminal box cover
134 Screw plug
135 Sealing washer

Address List

Germany			
Headquarters **Production** **Sales** **Service**	**Bruchsal**	SEW-EURODRIVE GmbH & Co Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 · D-76642 Bruchsal	Tel. (0 72 51) 75-0 Fax (0 72 51) 75-19 70 Telex 7 822 391 http://www.SEW-EURODRIVE.de sew@sew-eurodrive.de
Production	**Graben**	SEW-EURODRIVE GmbH & Co Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf P.O. Box Postfach 1220 · D-76671 Graben-Neudorf	Tel. (0 72 51) 75-0 Fax (0 72 51) 75-29 70 Telex 7 822 276
Assembly **Service**	**Garbsen** (near Hannover)	SEW-EURODRIVE GmbH & Co Alte Ricklinger Straße 40-42 D-30823 Garbsen P.O. Box Postfach 110453 · D-30804 Garbsen	Tel. (0 51 37) 87 98-30 Fax (0 51 37) 87 98-55
	Kirchheim (near München)	SEW-EURODRIVE GmbH & Co Domagkstraße 5 D-85551 Kirchheim	Tel. (0 89) 90 95 52-10 Fax (0 89) 90 95 52-50
	Langenfeld (near Düsseldorf)	SEW-EURODRIVE GmbH & Co Siemensstraße 1 D-40764 Langenfeld	Tel. (0 21 73) 85 07-30 Fax (0 21 73) 85 07-55
	Meerane (near Zwickau)	SEW-EURODRIVE GmbH & Co Dänkritzer Weg 1 D-08393 Meerane	Tel. (0 37 64) 76 06-0 Fax (0 37 64) 76 06-30
	Additional addresses for service in Germany provided on request!		
France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME SAS 48-54, route de Soufflenheim B. P. 185 F-67506 Haguenau Cedex	Tel. 03 88 73 67 00 Fax 03 88 73 66 00 http://www.usocome.com sew@usocome.com
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME SAS Parc d'activités de Magellan 62, avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. 05 57 26 39 00 Fax 05 57 26 39 09
	Lyon	SEW-USOCOME SAS Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. 04 72 15 37 00 Fax 04 72 15 37 15
	Paris	SEW-USOCOME SAS Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. 01 64 42 40 80 Fax 01 64 42 40 88
	Additional addresses for service in France provided on request!		
Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. (3327) 45 72 84 Fax (3327) 45 72 21 sewar@sew-eurodrive.com.ar
Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. (03) 99 33 10 00 Fax (03) 99 33 10 03
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. (02) 97 25 99 00 Fax (02) 97 25 99 05
Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. (01) 6 17 55 00-0 Fax (01) 6 17 55 00-30 sew@sew-eurodrive.at

Belgium			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. (010) 23 13 11 Fax (010) 2313 36 http://www.caron-vector.be info@caron-vector.be
Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW DO BRASIL Motores-Redutores Ltda. Rodovia Presidente Dutra, km 208 CEP 07210-000 - Guarulhos - SP	Tel. (011) 64 60-64 33 Fax (011) 64 80-46 12 sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		
Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GMBH Bogdanovetz Str.1 BG-1606 Sofia	Tel. (92) 9 53 25 65 Fax (92) 9 54 93 45 bever@mbox.infotel.bg
Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. (905) 7 91-15 53 Fax (905) 7 91-29 99
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. (604) 9 46-55 35 Fax (604) 946-2513
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Street LaSalle, Quebec H8N 2V9	Tel. (514) 3 67-11 24 Fax (514) 3 67-36 77
	Additional addresses for service in Canada provided on request!		
Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE Motores-Reductores LTDA. Panamericana Norte No 9261 Casilla 23 - Correo Quilicura RCH-Santiago de Chile	Tel. (02) 6 23 82 03+6 23 81 63 Fax (02) 6 23 81 79
China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. (022) 25 32 26 12 Fax (022) 25 32 26 11
Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. (0571) 5 47 50 50 Fax (0571) 5 47 50 44 sewcol@andinet.com
Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 14 61 31 58 Fax +385 14 61 31 58
Czech Republic			
Sales	**Praha**	SEW-EURODRIVE S.R.O. Business Centrum Praha Luná 591 16000 Praha 6	Tel. 02/20 12 12 34 + 20 12 12 36 Fax 02/20 12 12 37 sew@sew-eurodrive.cz
Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30, P.O. Box 100 DK-2670 Greve	Tel. 4395 8500 Fax 4395 8509 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Estonia			
Sales	**Tallin**	ALAS-KUUL AS Paldiski mnt.125 EE 0006 Tallin	Tel. 6 59 32 30 Fax 6 59 32 31

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. (3) 589 300 Fax (3) 780 6211
Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. 19 24 89 38 55 Fax 19 24 89 37 02
Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. 14 22 51 34 Fax 14 22 51 59 Boznos@otenet.gr
Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. 2-7 96 04 77 + 79 60 46 54Fax 2-7 95-91 29sew@sewhk.com
Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06 58 Fax +36 1 437 06 50
India			
Assembly **Sales** **Service**	**Baroda**	SEW-EURODRIVE India Pvt. Ltd. Plot No. 4, Gidc Por Ramangamdi · Baroda - 391 243 Gujarat	Tel. 0 265-83 10 86 Fax 0 265-83 10 87 sew.baroda@gecsl.com
Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. (01) 8 30 62 77 Fax (01) 8 30 64 58
Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. (02) 96 98 01 Fax (02) 96 79 97 81
Japan			
Assembly **Sales** **Service**	**Toyoda-cho**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Toyoda-cho, Iwata gun Shizuoka prefecture, P.O. Box 438-0818	Tel. (0 53 83) 7 3811-13 Fax (0 53 83) 7 3814
Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE CO., LTD. R 601-4, Banweol Industrial Estate Unit 1048-4, Shingil-Dong Ansan 425-120	Tel. (031) 4 92-80 51 Fax (031) 4 92-80 56
Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. (010) 23 13 11 Fax (010) 2313 36 http://www.caron-vector.be info@caron-vector.be
Macedonia			
Sales	**Skopje**	SGS-Skopje / Macedonia "Teodosij Sinactaski" 6691000 Skopje / Macedonia	Tel. (0991) 38 43 90 Fax (0991) 38 43 90
Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. (07) 3 54 57 07 + 3 54 94 09 Fax (07) 3 5414 04

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004AB Rotterdam	Tel. (010) 4 46 37 00 Fax (010) 4 15 55 52
New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. 0064-9-2 74 56 27 Fax 0064-9-2 74 01 65 sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. (09) 3 84 62 51 Fax (09) 3 84 64 55 sales@sew-eurodrive.co.nz
Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1539 Moss	Tel. (69) 2410 20 Fax (69) 2410 40
Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos # 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. (511) 349-52 80 Fax (511) 349-30 02 sewperu@terra.com.pe
Poland			
Sales	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Pojezierska 63 91-338 Lodz	Tel. (042) 6 16 22 00 Fax (042) 6 16 22 10 sew@sew-eurodrive.pl
Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. (0231) 20 96 70 Fax (0231) 20 36 85 infosew@sew-eurodrive.pt
Romania			
Sales **Service**	**Bucuresti**	Sialco Trading SRL str. Madrid nr.4 71222 Bucuresti	Tel. (01) 2 30 13 28 Fax (01) 2 30 71 70 sialco@mediasat.ro
Russia			
Sales	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 193 193015 St. Petersburg	Tel. (812) 3 26 09 41 + 5 35 04 30 Fax (812) 5 35 22 87 sewrus@post.spbnit.ru
Singapore			
Assembly **Sales** **Service**		SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. 8 62 17 01-705 Fax 8 61 28 27 Telex 38 659
South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. + 27 11 248 70 00 Fax +27 11 494 23 11
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens, 7441 Cape Town P.O.Box 53 573 Racecourse Park, 7441 Cape Town	Tel. +27 21 552 98 20 Fax +27 21 552 98 30 Telex 576 062
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700 34 51 Fax +27 31 700 38 47

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. 9 44 31 84 70 Fax 9 44 31 84 71 sew.spain@sew-eurodrive.es
Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. (036) 34 42 00 Fax (036) 34 42 80 www.sew-eurodrive.se
Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. (061) 4 17 17 17 Fax (061) 4 17 17 00 http://www.imhof-sew.ch info@imhof-sew.ch
Thailand			
Assembly **Sales** **Service**	**Chon Buri**	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, Moo.7, Tambol Donhuaroh Muang District Chon Buri 20000	Tel. 0066-38 21 40 22 Fax 0066-38 21 45 31
Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti Bagdat Cad. Koruma Cikmazi No. 3 TR-81540 Maltepe ISTANBUL	Tel. (0216) 4 41 91 63 + 4 41 91 64 + 3 83 80 14 + 3 83 80 15 Fax (0216) 3 05 58 67 seweurodrive@superonline.com.tr
USA			
Production **Assembly** **Sales** **Service**	**Greenville**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. (864) 4 39 75 37 Fax Sales (864) 439-78 30 Fax Manuf. (864) 4 39-99 48 Fax Ass. (864) 4 39-05 66 Telex 805 550
Assembly **Sales** **Service**	**San Francisco**	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. (510) 4 87-35 60 Fax (510) 4 87-63 81
	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 200 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. (856) 4 67-22 77 Fax (856) 8 45-31 79
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. (9 37) 3 35-00 36 Fax (9 37) 4 40-37 99
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. (214) 3 30-48 24 Fax (214) 3 30-47 24
	Additional addresses for service in the USA provided on request!		
Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia	Tel. +58 (241) 8 32 98 04 Fax +58 (241) 8 38 62 75 sewventas@cantr.net sewfinanzas@cantr.net

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