

Explosion-Proof AC Motors/AC Brake Motors

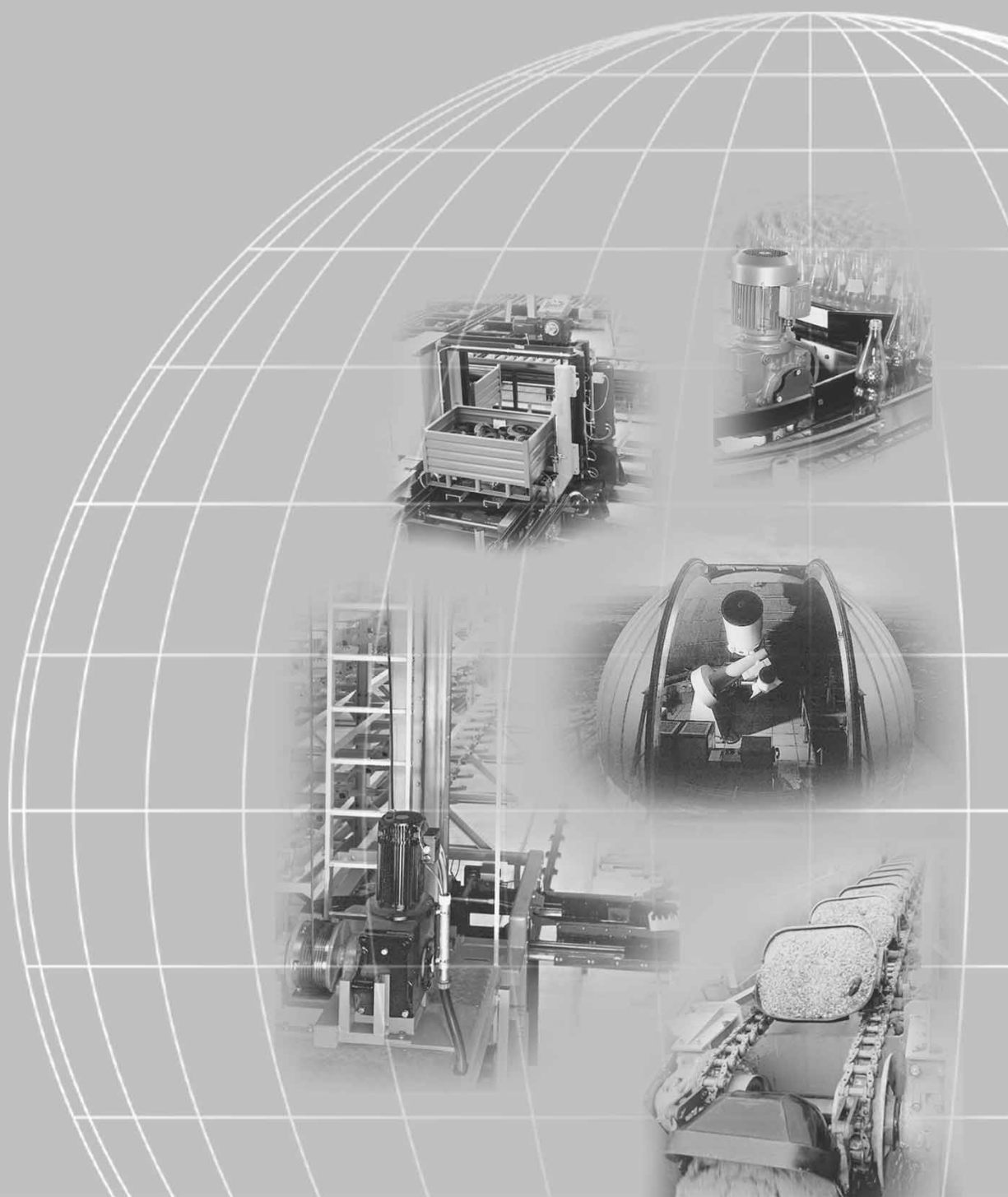
Edition

10/2000

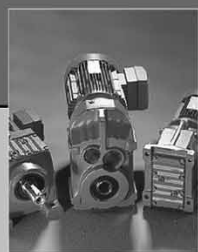


Operating Instructions

0919 861x / EN



SEW-EURODRIVE





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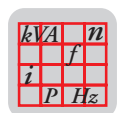
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1 Important Notes

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.



Important information about explosion protection



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 03/2000 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.



Explosive gas mixtures or concentrations of dust can lead to severe or fatal injuries in conjunction with hot, live and moving parts of electrical machinery.

Mounting, connection, startup, maintenance and repair may only be carried out by qualified specialists in accordance with



- 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.
(Explosion protection/safety/accident prevention)

Designated use

These electric motors are intended for industrial systems. They correspond to the applicable standards and regulations.

- EN50014
- EN50018 for protection type "d"
- EN50019 for protection type "e"
- EN50021 for protection type "n"
- EN50281-1-1 for "dust explosion protection"

They also comply with the requirements of the 94/9/EC Directive (ATEX 100a).

Technical data and information about the permitted conditions where the unit is used can be found on the nameplate and in these operating instructions.

It is essential for this specified information to be observed!

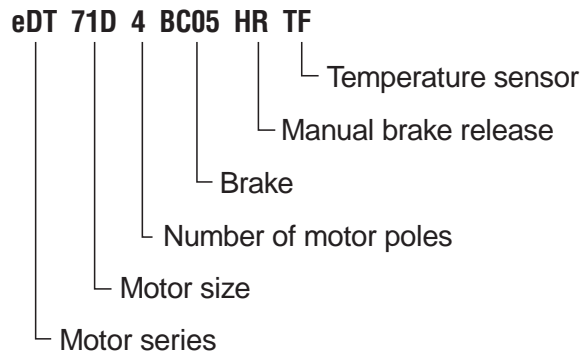


3 Structure of the Unit

3.1 Type code, nameplate

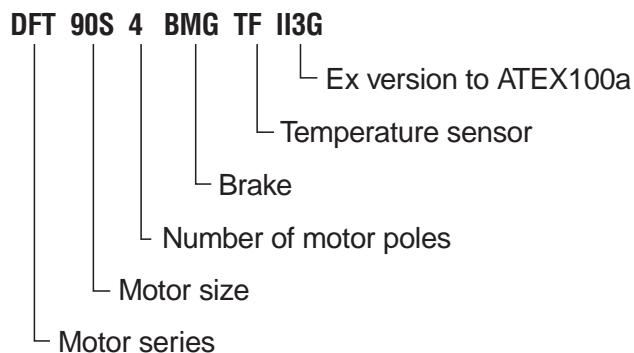
Type code

For example:
Category 2G



02971AEN

For example:
Category 3G



03143AEN

Nameplate

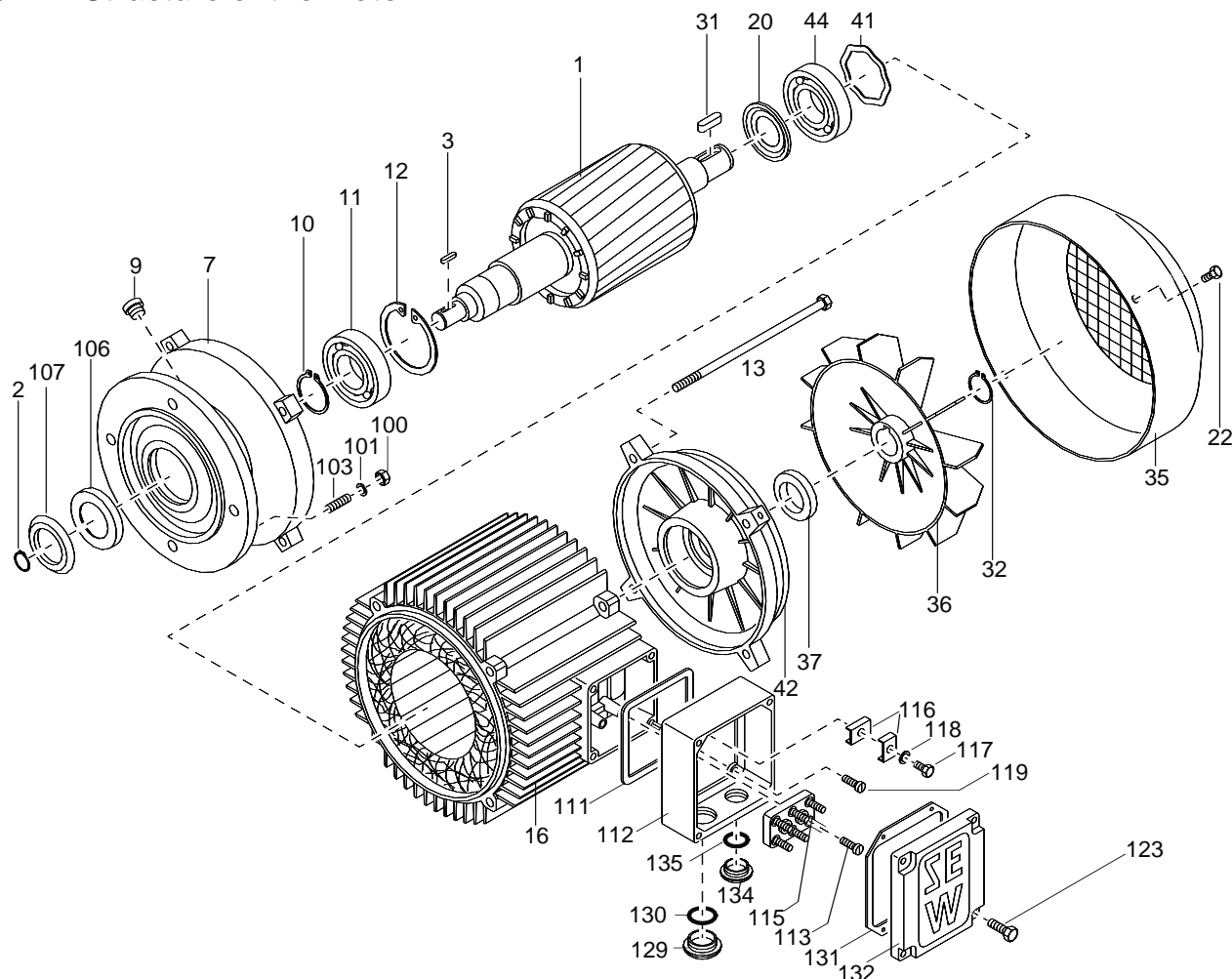
For example:
Category 3G

SEW-EURODRIVE		Bruchsal / Germany			
Typ	DFT 90 S4/BMG/TF/II3G	3 ~	IEC 34		
Nr.	3009818304.0001.99	i		:1	
r/min	1400	Nm			
kW	1,1 S1	cos φ	0,77		
V	230 D/ 400 Y	A	4,85/2,80	Hz	50
IM	B 5	kg		IP	54
Bremse	V 230AC	Nm		Gleichrichter	
VDE			EExnAT3	II 3 G	
Schmierstoff		Made in Germany	186	353	3.10

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3.2 Structure of the motor



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Key

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

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



4 Mechanical Installation



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

4.1 Before you begin

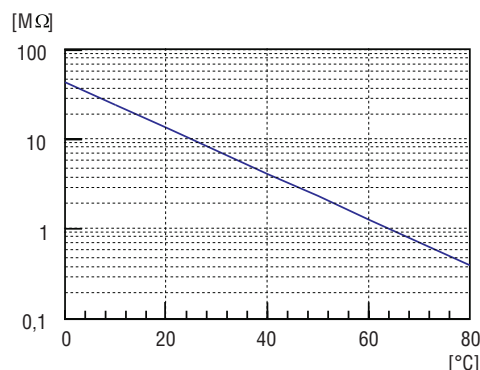
The drive may only be installed if

- the entries on the nameplate of the drive match the permitted potentially explosive atmosphere operating range on-site (unit group, category, zone, temperature class),
- the entries on the nameplate of the drive 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 -20 °C and +40 °C
 - No oil, acid, gas, vapors, radiation, etc.
 - Installation altitude max. 1000 m above sea level
 - Special versions: drive configured in accordance with the ambient conditions

4.2 Preliminary work following lengthy 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).

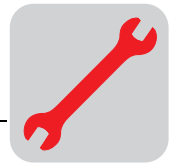


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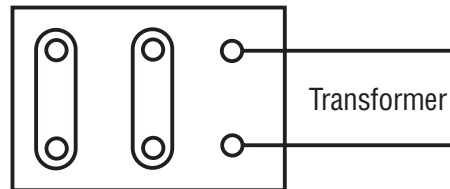
Fig. 1: Minimum permitted insulation resistance

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).

**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 subjected 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 and 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.
- **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).
- 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.
- If belt pulleys are used, then only belts which do not become electrostatically charged may be used.
- Brake motors with manual brake release:
 - Screw in either the hand lever (with self-reengaging manual brake release) or the grub screw (with lockable manual brake release).





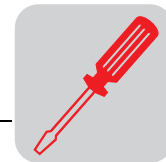
**Installation in
damp areas or in
the open air**

- If possible, arrange the terminal box so the cable entries are pointing downwards.
- Coat the threads of cable screw fittings and pocket caps 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 embrittled ones!
- Restore the anticorrosive coating if necessary.
- Check the enclosure.

4.4 Installation tolerances

Shaft extensions	Flanges
Diametric tolerance in accordance with DIN 748 <ul style="list-style-type: none"> • ISO k6 at $\varnothing \leq 50$ mm • ISO m6 at $\varnothing > 50$ mm (Center bore in accordance with DIN 332, shape DR)	Centering shoulder tolerance in accordance with DIN 42948 <ul style="list-style-type: none"> • ISO j6 at $\varnothing \leq 230$ mm • ISO h6 at $\varnothing > 230$ mm

→ "Geared Motors" catalog, "Notes Appertaining to the Dimension Sheets" section



5 Electrical Installation



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

Important



It is essential to comply with the EC prototype test certificate or also the declaration of conformity prior to connection and startup. Amongst other information, these specify how the motor should be protected and give data about special conditions which must be observed when connecting and operating the motor.

Preliminary remarks

- In addition to the generally applicable installation regulations for low-voltage electrical equipment (e.g. in Germany: DIN VDE 0100, DIN VDE 0105), it is also necessary to comply with the special provisions on setting up electrical machinery in potentially explosive atmospheres (ExV; EN 60 079-14; EN 50 281-1- 2 and specific provisions for the machine).

Wiring diagrams



- The motor must only ever be connected as shown in the wiring diagram included with the motor. **Do not connect or start up the motor if this wiring diagram is missing.** You can obtain the valid connection diagram from SEW.

Switching the motor and brake

- **Switch contacts in utilization category AC-3 to EN 60947-4-1 must be used for switching the motor and the brake.**

Cable entries

- All **metric cable entries** are supplied with ATEX certified closing plugs.
- The closing plugs are replaced by **ATEX certified metric cable screw fittings with strain relief** for making the **correct cable entry**. Select the cable screw fitting according to the outside diameter of the cable used.
- All **cable entries which are not required must be sealed off** with an ATEX certified closing plug after completion of the installation (→ Maintaining the enclosure).

5.1 EMC compliant cabling

Switching operation

- When the motors are used in switching operation, any possible malfunctions of the switchgear must be excluded by appropriate wiring.

Protection against malfunction

- 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.



5.2 Motors and brake motors in category 2G (EExe, EExed)

General information

- Explosion-proof SEW motors in series eDT and eDV are intended for use in zone 1 and fulfill the design requirements for unit group II, category 2G. The determinant protection type is "e" to EN 50 019.

Brakes in the flameproof enclosure "d" protection type

- In addition, SEW offers brakes in the determinant protection type "d" to EN 50 018 for use in potentially explosive atmospheres. With brake motors, the flameproof enclosure only extends to the brake cavity. The motor itself and the wiring space for the brake have protection type "e".

Code "X"

- If the code "X" appears after the certification number on the declaration of conformity or the EC prototype test certificate, this indicates the certificate contains special conditions for safe application of the motors.

Connection boxes

- Connection boxes are in protection type "e".

Temperature classes

- The motors are authorized for temperature classes T3 and/or T4. The temperature class of the motor can be found on the nameplate, the declaration of conformity or the EC prototype test certificate supplied with the motor.

Motor connection

- Motors with a terminal block to DIN 46 295 are only allowed to be connected using lugs to DIN 46 295 (→ Fig. 3). Alternatively, a solid round wire can be used for the connection. The diameter of the wire must correspond to the width of the slot in the terminal stud (→ Table 1).

Motor	Terminal	Slot width [mm]
eDT 71 C	KB0	2.5
eDT 71 D	KB0	2.5
eDT 80 K	KB0	2.5
eDT 80 N	KB0	2.5
eDT 90 S	KB0	2.5
eDT 90 L	KB0	2.5
eDT 100 LS	KB0	2.5
eDT 100 L	KB0	2.5

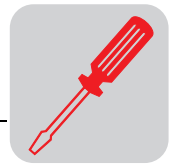
Motor	Terminal	Slot width [mm]
eDV 112 M	KB02	3.1
eDV 132 S	KB02	3.1
eDV 132 M	KB3	4.3
eDV 132 ML	KB3	4.3
eDV 160 M	KB3	4.3
eDV 160 L	KB4	6.3
eDV 180 M	KB4	6.3
eDV 180 L	KB4	6.3

Table 1: Slot width of the terminal stud



Fig. 3: Motor connection with terminal block to DIN 46 295

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5.2.1 Thermal motor protection

Exclusively with motor protection switch

The installation of the motor protection switch to EN 60 947 must satisfy the following minimum requirements:

- Approved by a named body and assigned a corresponding inspection number
- Set to the motor rated current I_N listed on the nameplate or in the prototype test certificate
- Response time with starting current ratio I_A/I_N less than the safe-locked rotor time t_E of the motor (see the nameplate or the prototype test certificate for data)
- Separate mutually interlocked protective equipment for every number of poles of a pole-changing motor

Exclusively with positive temperature coefficient thermistors (TF)

- The PTC thermistor trip switches to EN 60 947 for motors and if appropriate the brake must satisfy the following minimum criteria if they are exclusively thermally monitored and protected using positive temperature coefficient thermistors (TF) in the winding.

- Approved by a named body and assigned a corresponding inspection number (e.g. from PTB: 3.53-PTC A)

With motor protection switch and additional positive temperature coefficient thermistors (TF)

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



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



5.2.2 Connecting the motor

Wiring diagram



It is essential to comply with the valid wiring diagram!

Do not connect or start up the motor if this wiring diagram is missing.

You can ask for a copy of the valid wiring diagram from SEW at any time by quoting the order number of the motor (→ Sec. 3.1 "Type code, nameplate") (→ Table 2).

Series	Pole numbers	Corresponding circuit diagram (designation / number)
eDT and eDV	4, 6 and 8	DT13 / 08 798 _6
eDT and eDV	8/4	DT33 / 08 799 _6
eDT with brake BC	4	AT101 / 09 861 _4
eDT with brake Bd	4	A95 / 08 840 _9

Table 2: Wiring diagrams

Checking cross sections

- Check the cross sections of the cables – based on the rated motor current, the valid installation regulations and the requirements where the unit is installed.

Check the winding connections

- Check the winding connections in the terminal box and tighten them if necessary.

Temperature sensor

- Connect the temperature sensor TF (DIN 44082), if provided as sole or supplementary protection,
 - Connect according to the instructions given by the manufacturer of the trip switch and the enclosed circuit diagram, using a cable routed separately from the supply system lead
 - **Apply a voltage < 2.5 V_{DC}**



Demonstrate the effectiveness of monitoring prior to startup.

5.2.3 Connecting the brake

Preliminary remark

- The flameproof brake BC (Bd) (EExd) is electrically released. The brake is applied mechanically when the voltage is switched off.

Inspecting the ignition gaps

- Inspect the ignition gaps of the flameproof brake prior to connection, since they represent a significant aspect of the explosion protection. The gaps must not be painted over nor sealed over in any other way.

Cross sections

- The cross sections of the connection cables between the rectifier and the brake must be sufficiently large to guarantee the function of the brake (→ "Operating currents" on page 43).

Connection

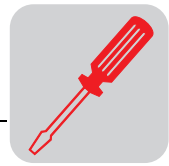
- The SEW brake rectifier is installed and connected in the switch cabinet according to the enclosed circuit diagram, outside the potentially explosive atmosphere.
- Connect the connection cables between the rectifier and the separate brake terminal box on the motor.

Temperature sensor

- Temperature sensor TF (DIN 44082)
 - Connect according to the instructions given by the manufacturer of the trip switch and the enclosed circuit diagram, using a cable routed separately from the supply system lead
 - **Apply a voltage < 2.5 V_{DC}!**



Demonstrate the effectiveness of monitoring prior to startup.



5.3 Motors in category 2D (dust explosion protection)

General information

- Dust explosion-proof SEW motors in series eDT and eDV for use in zone 21 comply with the design requirements for unit group II, category 2D to EN 50 014 and EN 50 281-1-1.

Surface temperature

- The surface temperature is max. 120 °C.

Operating mode

- The motors must only be used in the EN 60 034-1 operating mode for which they have been approved (→ Sec. 3.1 "Type code, nameplate").

Enclosure IP 65

- SEW motors and brake motors in category 2D are supplied with enclosure IP65 to EN 60 034.

Cable screw fittings

- Use only ATEX-approved cable screw fittings with enclosure of at least IP65 for the cable entries.

Code "X"

- If the code "X" appears after the certification number on the declaration of conformity or the EC prototype test certificate, this indicates the certificate contains special conditions for safe application of the motors.

Motor connection

- Motors with a terminal block to DIN 46 295 are only allowed to be connected using lugs to DIN 46 295 (→ Fig. 4). Alternatively, a solid round wire can be used for the connection. The diameter of the wire must correspond to the width of the slot in the terminal stud (→ Table 3).

Motor	Terminal	Slot width [mm]
eDT 71 C	KB0	2.5
eDT 71 D	KB0	2.5
eDT 80 K	KB0	2.5
eDT 80 N	KB0	2.5
eDT 90 S	KB0	2.5
eDT 90 L	KB0	2.5
eDT 100 LS	KB0	2.5
eDT 100 L	KB0	2.5

Motor	Terminal	Slot width [mm]
eDV 112 M	KB02	3.1
eDV 132 S	KB02	3.1
eDV 132 M	KB3	4.3
eDV 132 ML	KB3	4.3
eDV 160 M	KB3	4.3
eDV 160 L	KB4	6.3
eDV 180 M	KB4	6.3
eDV 180 L	KB4	6.3

Table 3: Slot width of the terminal stud



Fig. 4: Motor connection with terminal block to DIN 46 295

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5.3.1 Thermal motor protection

Exclusively with motor protection switch

The installation of the motor protection switch to EN 60 947 must satisfy the following minimum requirements:

- Approved by a named body and assigned a corresponding inspection number
- Set to the motor rated current I_N listed on the nameplate or in the prototype test certificate
- Response time with starting current ratio I_A/I_N less than the safe-locked rotor time t_E of the motor (see the nameplate or the prototype test certificate for data)
- Separate mutually interlocked protective equipment for every number of poles of a pole-changing motor

Exclusively with positive temperature coefficient thermistors (TF)

- The PTC thermistor trip switches to EN 60 947 for motors and if appropriate the brake must satisfy the following minimum criteria if they are exclusively thermally monitored and protected using positive temperature coefficient thermistors (TF) in the winding.

- Approved by a named body and assigned a corresponding inspection number (e.g. from PTB: 3.53-PTC A)

With motor protection switch and additional positive temperature coefficient thermistors (TF)

- Protection using positive temperature coefficient (PTC) thermistors (TF) represents a supplementary preventive measure. Comply with the information in the EC prototype test certificate.



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

5.3.2 Connecting the motor

Wiring diagram



It is essential to comply with the valid wiring diagram!

Do not connect or start up the motor if this wiring diagram is missing.

You can ask for a copy of the valid wiring diagram from SEW at any time by quoting the order number of the motor (→ Sec. 3.1 "Type code, nameplate") (→ Table 4).

Series	Pole numbers	Corresponding circuit diagram (designation / number)
eDT and eDV	4, 6 and 8	DT13 / 08 798 _6
eDT and eDV	8/4	DT33 / 08 799 _6

Table 4: Wiring diagrams

Checking cross sections

- Check the cross sections of the cables – based on the rated motor current, the valid installation regulations and the requirements where the unit is installed.

Check the winding connections

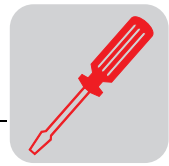
- Check the winding connections in the terminal box and tighten them if necessary.

Temperature sensor

- Temperature sensor TF (DIN 44082)
 - Connect according to the instructions given by the manufacturer of the trip switch and the enclosed circuit diagram, using a cable routed separately from the supply system lead
 - **Apply a voltage < 2.5 V_{DC}**



Demonstrate the effectiveness of monitoring prior to startup.



5.4 Motors and brake motors in category 3G (EExnA)

General information

- Explosion-proof SEW motors in series DT and DV with protection type EExnA for use in zone 2 comply with the design requirements for unit group II, category 3G to EN 50 014 and EN 50 021.
- SEW motors in category 3G are supplied with at least enclosure IP54 to EN 60 034.
- The motors are designed for temperature class T3.
- The motors must only be used in the EN 60 034-1 operating mode for which they have been approved (→ Sec. 3.1 "Type code, nameplate").

5.4.1 Thermal motor protection

With motor protection switch

Motor protection switches set for the motor rated current must be capable of protecting the motor even in the event of a phase failure.
Pole-changing motors are protected with mutually interlocked motor protection switches for each pole number.

With positive temperature coefficient thermistors (TF)

SEW fits positive temperature coefficient thermistors (TF) to all pole-changing motors and motors with a high starting frequency in category 3G for use in zone 2.
All poles of the motor must be disconnected from the supply system by a commercial trip switch in the event of a malfunction.



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

5.4.2 Connecting the motor

Wiring diagram



It is essential to comply with the valid wiring diagram!

Do not connect or start up the motor if this wiring diagram is missing.

You can ask for a copy of the valid wiring diagram from SEW at any time by quoting the order number of the motor (→ Sec. 3.1 "Type code, nameplate") (→ Table 5).

Series	Pole numbers	Connection	Corresponding circuit diagram (designation / number)
DT, DV	2,4,6,8	Δ / Y	DT13 / 08 798 _6
DT, DV	4/2, 8/4	$\Delta / Y Y$	DT33 / 08 799 _6
DT, DV	All PC with separate winding	Y / Y	DT43 / 08 828 _7
DT, DV	All PC with separate winding	Δ / Y	DT45 / 08 829 _7
DT, DV	All PC with separate winding	Y / Δ	DT48 / 08 767 _3
DT, DV	4/2, 8/4	$\Delta / Y Y$	DT53 / 08 739 _1

Table 5: Wiring diagrams

Check the cross sections of cables

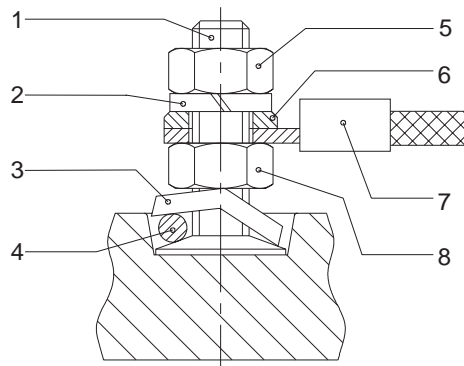
- Check the cross sections of the cables – based on the rated motor current, the valid installation regulations and the requirements where the unit is installed.

Winding connections

- Check the winding connections in the terminal box and tighten them if necessary.

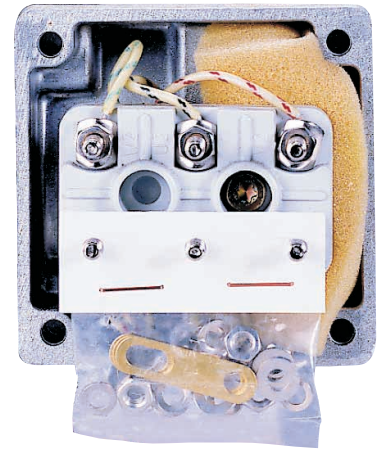
Small connection accessories

- With motor sizes 71 to 132S, remove the small connection accessories from the enclosed bag and install them (→ Fig. 5).
 - **Arrange the cables and terminal links as shown in the circuit diagram and screw them on firmly**



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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



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Fig. 5: Small connection accessories

Temperature
sensor

- Temperature sensor TF (DIN 44082)
 - Connect according to the instructions given by the manufacturer of the trip switch and the enclosed circuit diagram, using a cable routed separately from the supply system lead
 - **Apply a voltage < 2.5 V_{DC}!**



Demonstrate the effectiveness of monitoring prior to startup.

5.4.3 Connecting the brake

Preliminary remark

- The brake BMG/BM is released electrically. The brake is applied mechanically when the voltage is switched off.

*Limit values for
permitted work
done*



- It is essential to adhere to the limit values for permitted work done (→ Sec. 9.2 "Work done until adjustment, working air gap, braking torques of brake BM 15 - 62"). The machine designer is responsible for ensuring that the machine dimensions are selected correctly on the basis of the SEW project planning regulations and the brake data in "Drive Engineering - Practical Implementation, Vol. 4". Otherwise, the explosion protection of the brake is not guaranteed.

*Check the function
of the brake*

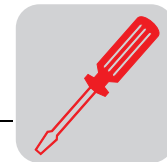
- Check that the brake is functioning correctly prior to startup, in order to make sure the brake linings are not rubbing which would lead to overheating.

*Cross sections of
connection cables*

- The cross sections of the connection cables between the supply system, the rectifier and the brake must be sufficiently large to guarantee the function of the brake (→ "Operating currents" on page 43).

Connection

- Depending on its design and function, the SEW brake rectifier or brake control system is connected in the terminal box or installed and connected in the switch cabinet outside the potentially explosive atmosphere. In either case, it must be connected according to the enclosed circuit diagram.
- Connect the connection cables between the switch cabinet and the rectifier in the terminal box or between the rectifier in the switch cabinet and the brake on the motor.



5.5 Motors and brake motors in category 3D (dust explosion protection)

General information

- Dust explosion-proof SEW motors in series DT and DV for use in zone 22 comply with the design requirements for unit group II, category 3D to EN 50 014 and EN 50 281-1-1.

Surface temperature

- The surface temperature is max. 120 °C (thermal classification B) or 140 °C (thermal classification F).

Operating mode

- The motors must only be used in the EN 60 034-1 operating mode for which they have been approved (→ Sec. 3.1 "Type code, nameplate").

5.5.1 Thermal motor protection for motors with dust explosion protection

With motor protection switch

Motor protection switches set for the motor rated current must be capable of protecting the motor even in the event of a phase failure.
Pole-changing motors are protected with mutually interlocked motor protection switches for each pole number.

With positive temperature coefficient thermistors (TF)

SEW fits positive temperature coefficient thermistors (TF) to all pole-changing motors and motors with a high starting frequency in category 3D for use in zone 22.
All poles of the motor must be disconnected from the supply system by a commercial trip switch in the event of a malfunction.



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

5.5.2 Connecting the motor

Wiring diagram

It is essential to comply with the valid wiring diagram!

Do not connect or start up the motor if this wiring diagram is missing.



You can ask for a copy of the valid wiring diagram from SEW at any time by quoting the order number of the motor (→ Sec. 3.1 "Type code, nameplate") (→ Table 6).

Series	Pole numbers	Connection	Corresponding circuit diagram (designation / number)
DT, DV	2,4,6,8	Δ / Y	DT13 / 08 798 _6
DT, DV	4/2, 8/4	$\Delta / Y Y$	DT33 / 08 799 _6
DT, DV	All PC with separate winding	Y / Y	DT43 / 08 828 _7
DT, DV	All PC with separate winding	Δ / Y	DT45 / 08 829 _7
DT, DV	All PC with separate winding	Y / Δ	DT48 / 08 767 _3
DT, DV	4/2, 8/4	$\Delta / Y Y$	DT53 / 08 739 _1

Table 6: Wiring diagrams

Cable cross sections

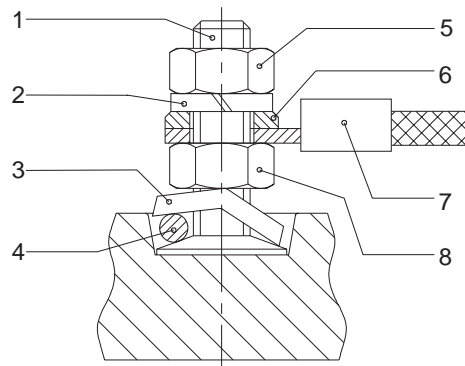
- Check the cross sections of the cables – based on the rated motor current, the valid installation regulations and the requirements where the unit is installed.

Winding connections

- Check the winding connections in the terminal box and tighten them if necessary.

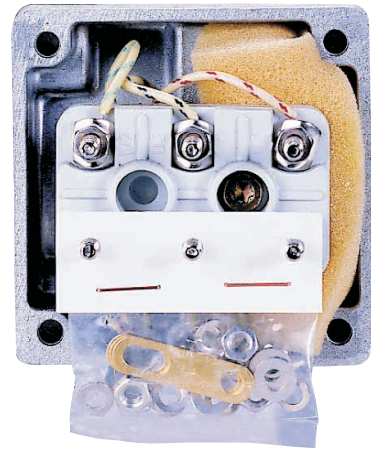
Small connection accessories

- With motor sizes 71 to 132S, remove the small connection accessories from the enclosed bag and install them (→ Fig. 6).
 - Arrange the cables and terminal links as shown in the circuit diagram and screw them on firmly**



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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



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Fig. 6: Small connection accessories

Temperature
sensor

- Temperature sensor TF (DIN 44082)
 - Connect according to the instructions given by the manufacturer of the trip switch and the enclosed circuit diagram, using a cable routed separately from the supply system lead
 - **Apply a voltage < 2.5 V_{DC}!**



Demonstrate the effectiveness of monitoring prior to startup.

5.5.3 Connecting the brake

Limit values for
permitted work
done

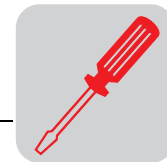


Check the function
of the brake

Cross sections of
connection cables

Connection

- The brake BMG/BM is released electrically. The brake is applied mechanically when the voltage is switched off.
- It is essential to adhere to the limit values for permitted work done (→ Sec. 9.2 "Work done until adjustment, working air gap, braking torques of brake BM 15 - 62"). The machine designer is responsible for ensuring that the machine dimensions are selected correctly on the basis of the SEW project planning regulations and the brake data in "Drive Engineering - Practical Implementation, Vol. 4". Otherwise, the explosion protection of the brake is not guaranteed.
- Check that the brake is functioning correctly prior to startup, in order to make sure the brake linings are not rubbing which would lead to overheating.
- The cross sections of the connection cables between the supply system, the rectifier and the brake must be sufficiently large to guarantee the function of the brake (→ "Operating currents" on page 43).
- Depending on its design and function, the SEW brake rectifier or brake control system is connected in the terminal box or installed and connected in the switch cabinet outside the potentially explosive atmosphere. In either case, it must be connected according to the enclosed circuit diagram.
- Connect the connection cables between the switch cabinet and the rectifier in the terminal box or between the rectifier in the switch cabinet and the brake on the motor.



5.6 Additional conditions for cat. II3G / II3D motors with MOVITRAC® 31C

Only agreed combinations are permitted

- For operation with MOVITRAC® 31C frequency inverters, motors are available which meet the requirements of categories II3G and II3D. **All permitted inverter/motor combinations are listed in the summary (see Table "7" on page 22).** The permitted setting values for the current limitation (Table 7) must not be exceeded.
- MOVITRAC® 31C is installed in the switch cabinet outside the potentially explosive atmosphere.
- The motor winding has thermal classification F as a result of the increased thermal load in inverter operation.
- A characteristic feature of motors in category 3D is their the maximum surface temperature of 140 °C.

Additional restrictions in hoist operation

- There are restrictions in hoist operation with the "hoist function" (parameters 710/712). The following combinations are not permitted:
 - DT 71D4 ↘ connection + MC 31C008
 - DT 80K4 ↘ connection + MC 31C008
 - DT 71D4 △ connection + MC 31C008

Operation with regard to the thermal limiting characteristic

- During project planning for motors to be operated on an inverter, it is essential to ensure that the motor will be operated below the thermal limiting characteristic (torque limit characteristic) throughout its entire control range (see "Torque limit characteristics" on page 23). Having the current limitation set correctly is an important prerequisite for maintaining the limiting characteristic (Table 7).
- In order to provide a reliable means of avoiding exceeding the permitted limit temperature, motors operated on inverters are always monitored using a temperature sensor and an evaluation unit (e.g. PTB test number 3.53-PTCA) which the manufacturer has certified for use with explosion-proof motors. Evaluation in the inverter with the FIT 31C option is not permitted.
- EF.. EMC modules or HD.. series output chokes are permitted as EMC measures. HF.. output filters are not allowed.
- The permitted maximum frequency (parameter 202) is 70 Hz with a ↘ connection and 120 Hz with a △ connection.

5.7 Explosion-proof tachometers

Please adhere to the installation and operating instructions supplied by the manufacturer.

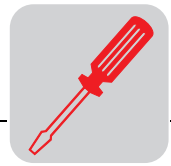


Assignment of motor → frequency inverter, setting values for current limitation

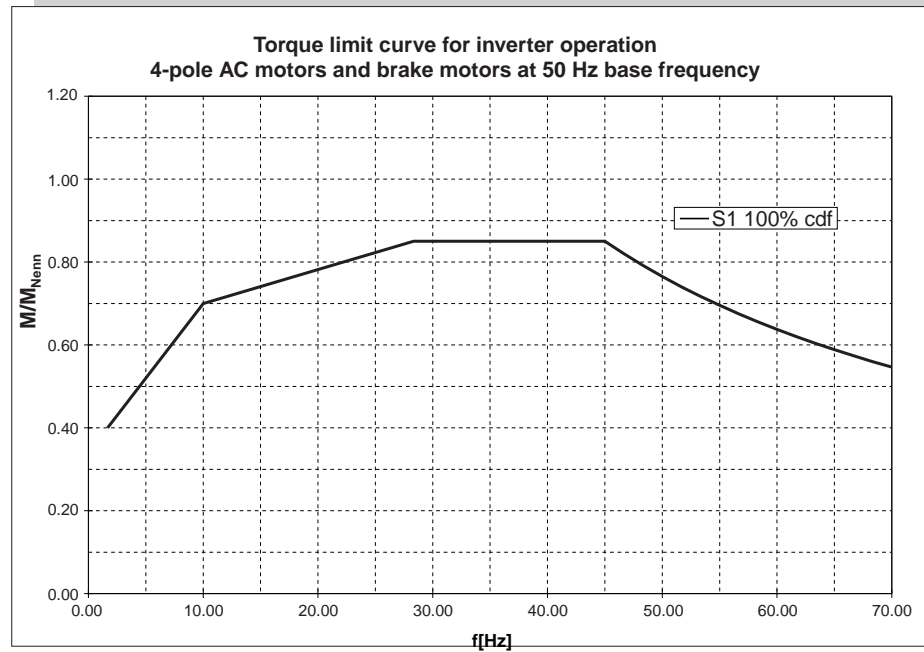
In category 3G (zone 2) and category 3D (zone 22)

Motor type	Motor connection			
	MOVITRAC 31C type	Settings P320/P340 Current limitation [%]	MOVITRAC 31C type	Settings P320/P340 Current limitation [%]
DT 71 D 4.../II3G DT 71 D 4.../II3D	008-503-4-00 or 005-503-4-00	55 85	008-503-4-00 or 005-503-4-00	80 116
DT 80 K 4.../II3G DT 80 K 4.../II3D	008-503-4-00 or 005-503-4-00	65 98	008-503-4-00	108
DT 80 N 4.../II3G DT 80 N 4.../II3D	008-503-4-00	80	015-503-4-00	86
DT 90 S 4.../II3G DT 90 S 4.../II3D	008-503-4-00	115	015-503-4-00	125
DT 90 L 4.../II3G DT 90 L 4.../II3D	015-503-4-00	105	022-503-4-00	125
DV 100 M 4.../II3G DV 100 M 4.../II3D	022-503-4-00	92	030-503-4-00	122
DV 100 L 4.../II3G DV 100 L 4.../II3D	022-503-4-00	122	055-503-4-00	108
DV 112 M 4.../II3G DV 112 M 4.../II3D	030-503-4-00	122	075-503-4-00	96
DV 132 S 4.../II3G DV 132 S 4.../II3D	040-503-4-00	118	110-503-4-00	87
DV 132 M 4.../II3G DV 132 M 4.../II3D	075-503-4-00	98	110-503-4-00	114
DV 160 M 4.../II3G DV 160 M 4.../II3D	110-503-4-00	96	220-503-4-00	87
DV 160 L 4.../II3G DV 160 L 4.../II3D	150-503-4-00	122	220-503-4-00	122

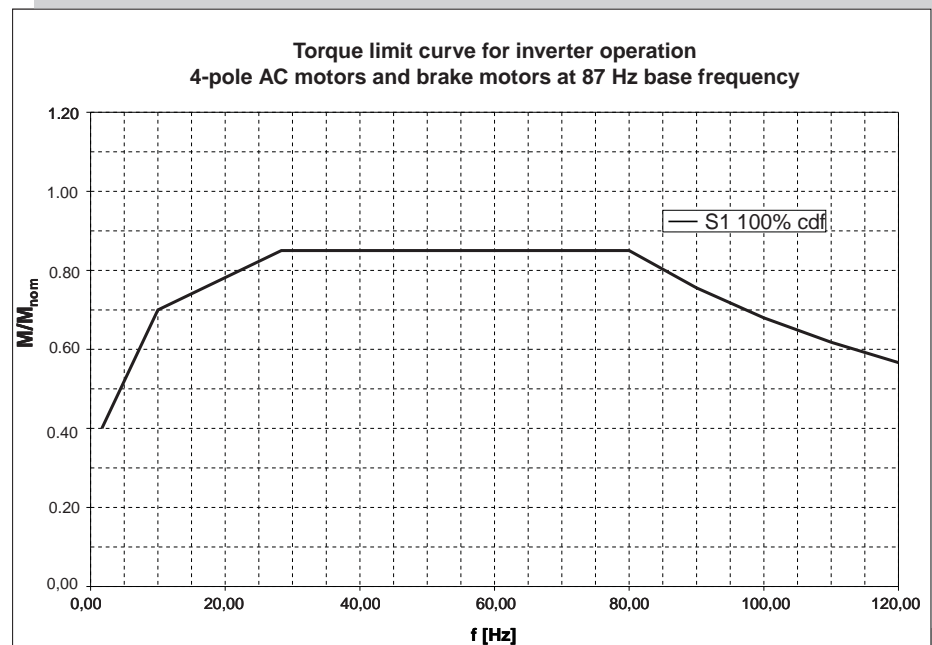
Table 7: Assignment of motor → frequency inverter / current limitation values



Torque limit characteristics



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6 Startup



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

**Before startup,
make sure that**

- the drive is undamaged and not blocked,
- the measures stipulated in section 4.2 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 speed fluctuation, no loud noises, etc.).
- If problems occur (→ "Operation and Servicing" on page 39)

Important



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 Compulsory settings for MOVITRAC® 31C

Use the appropriate operating instructions for MOVITRAC® 31C startup. In addition, the following compulsory settings for the MOVITRAC® 31C frequency inverter must be adhered to for operation of category II3G/II3D AC motors:

**Setting the
current limitation**

- Set parameter P320/P340 according to Table 7.

**Setting the
maximum
frequency**

- Parameter P202 may only be set to maximum 70 Hz in a Δ connection and only to maximum 120 Hz in a \triangle connection.

**Setting the IxR
and boost
parameters**

- Set parameters P328/P348 "Measure motor" to "Yes".
- The measurement process must take place with the motor "cold".
- Following the first test run, set parameter P328/P348 to "No" so that the "IxR" and "Boost" parameters are saved.

Exceptions:

– DT 71D4 Δ connection + MC 31C008

The "IxR" parameter is permanently saved. Set the "Boost" parameter so that no current greater than 45 % flows.





– DT 80K4 connection + MC 31C008

The "IxR" parameter is permanently saved. Set the "Boost" parameter so that no current greater than 55 % flows.

- If altering the "IxR" and "Boost" parameters manually, technical application reasons dictate that the maximum current limit value in Table 7 must not be exceeded.

Setting the other parameters

- Refer to the operating instructions for the frequency inverter

6.2 Altering the blocking direction on motors with a backstop

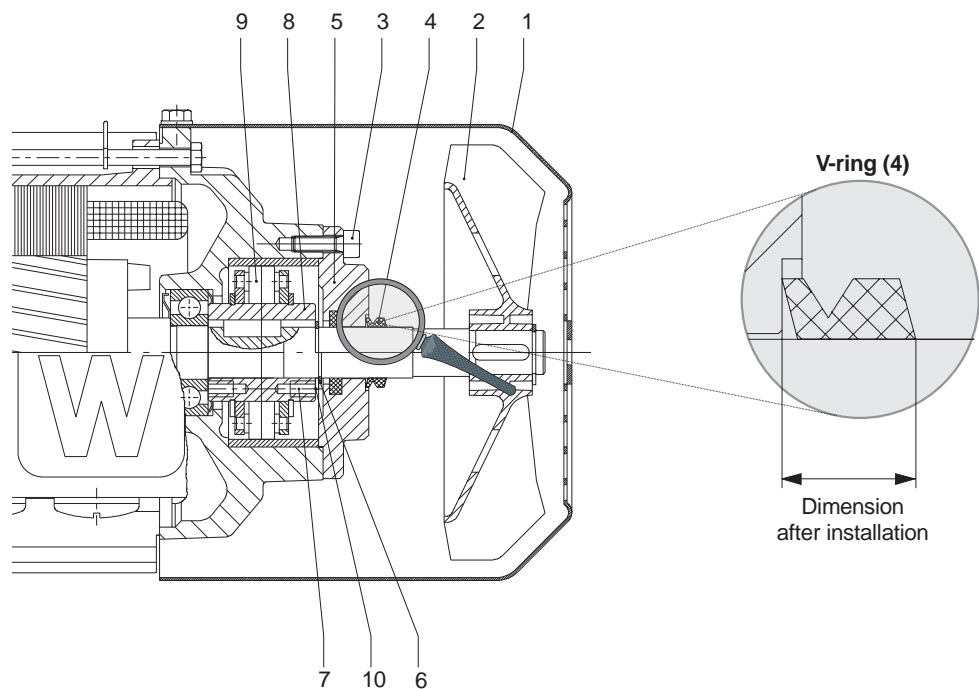


Fig. 7: Backstop

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Explanation of Fig. 7

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

Altering the blocking direction

You must alter the direction of rotation of the backstop if you determine during startup that the motor is turning against the backstop. Do this as follows (→ Fig. 7):

1. Isolate the motor from the supply, safeguarding it against unintentional power-up.
2. Remove the fan guard (1) and the fan (2); remove the slotted cheese head screws (3).
3. Remove the V-ring (4) and sealing flange with felt ring (5). (Collect the grease for subsequent use.)
4. Remove the circlip (6) (not on DT 71/80),



additionally for DV 112-160M: remove the equalizing rings (10).

5. The carrier (8) and wedge element train (9) must be
 - a) pulled off completely using the threaded holes (7)
 - b) turned through 180° and pressed back on
6. Refill the grease



Important: Do not exert pressure on or hit the wedge element train – danger of damaging the material!

During the press-in operation – shortly before the wedge element penetrates 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.

Assemble the remaining parts of the backstop from 4. to 2. in reverse order.

– Note the assembly dimension for the V-ring (4)



7 Inspection and Maintenance

Important



- SEW motors in category 2G (EExe, EExed) are only allowed to be serviced and repaired by authorized specialists!
- Only use genuine spare parts in accordance with the relevant valid spare parts list; failure to do so will invalidate the motor's certification for use in potentially explosive atmospheres!
- The routine test must be repeated whenever parts of the motor relating to explosion protection are replaced.
- 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!
- Following maintenance and repair work, make sure the motor has been reassembled correctly and that all apertures have been carefully sealed. This is particularly important for SEW motors in category 3D. In this case, explosion protection is particularly dependent on the IP enclosure.
- Perform safety and functional tests following all maintenance and repair work (thermal protection, brake).

7.1 Inspection and maintenance periods

Equipment/components	Frequency	What to do	See page
Brake BMG 05-8, BM 15 - 62	<ul style="list-style-type: none"> • If used as a working brake: At least every 3000 hours of operation¹⁾ • If used as a holding brake: Depending on loading conditions: Every 2 to 4 years ¹⁾ 	<ul style="list-style-type: none"> • Inspect the brake <ul style="list-style-type: none"> – Working air gap – Brake disk – Pressure plate – Carrier / gearing – Pressure rings • Extract the abraded matter • Inspect the switch elements and change if necessary (e.g. in case of burn-out) 	33ff
BC, Bd		<ul style="list-style-type: none"> • Adjust the brake 	30 ff
Motors eDT/eDV, DT/DV		<ul style="list-style-type: none"> • Inspecting the motor <ul style="list-style-type: none"> – Check ball bearings and change if necessary – Change the oil seal • Clean the cooling air passages 	27 ff
Motor with backstop	<ul style="list-style-type: none"> • Every 10,000 hours of operation 	<ul style="list-style-type: none"> • Change the low-viscosity grease in the backstop 	38
Brake motors eDT..BC, Bd		<ul style="list-style-type: none"> • Send motor and brake to a specialist workshop for a general overhaul 	-
Drive	<ul style="list-style-type: none"> • Varies (depending on external factors) 	<ul style="list-style-type: none"> • Touch up or renew the 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 Inspection and maintenance work on the motor

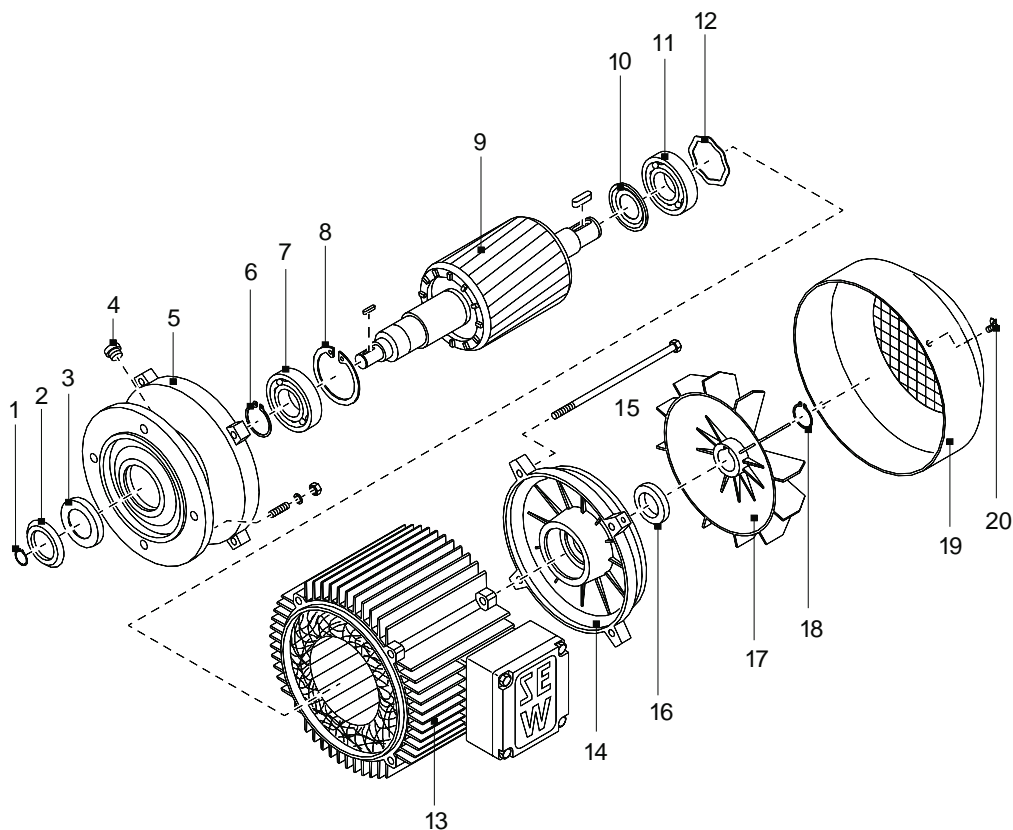


Fig. 8: Example: motor DFT 90

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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	



Sequence



1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.**
2. Remove the flange cover or fan guard (19).
3. 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.
4. a) Motors with a brake:
 - Open the terminal box cover, unfasten the brake cable from the rectifier
 - Push the non-drive end bearing end shield and the brake off the stator and carefully lift them off
(if necessary, run the brake cable along with trailing wire)b) Pull the stator back by approx. 3 to 4 cm.
5. Visual check:
Are there traces of gear oil or condensation inside the stator?
 - If not, continue with 8
 - If there is condensation, continue with 6
 - If there is gear oil, have the motor repaired by a specialist workshop
6. 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).
7. Clean the winding, dry it and check it electrically (→ from Sec. 4.2, page 8).
8. Fit new ball bearings (7, 11) (only use authorized ball bearings → from Sec. 9.4, page 47).
9. Fit a new oil seal (3) in the drive end bearing end shield.
10. Reseal the stator seat, reassemble the motor, brake, etc.
11. Then check the gear unit (if applicable) (→ gear unit operating instructions).



7.3 Inspection and maintenance of the brake

7.3.1 Brake BC for category 2G motors (EExed), brake Bd for zone 1

Important



Maintenance and repair work must be performed by SEW or repair workshops for electrical drives. Parts relating to the flameproof enclosure are only allowed to be replaced with genuine SEW spare parts. In other respects, please refer to the provisions in EN 50018 and national regulations (e.g. in Germany: Ex V (§ 6) and Elex V (§ 9)).

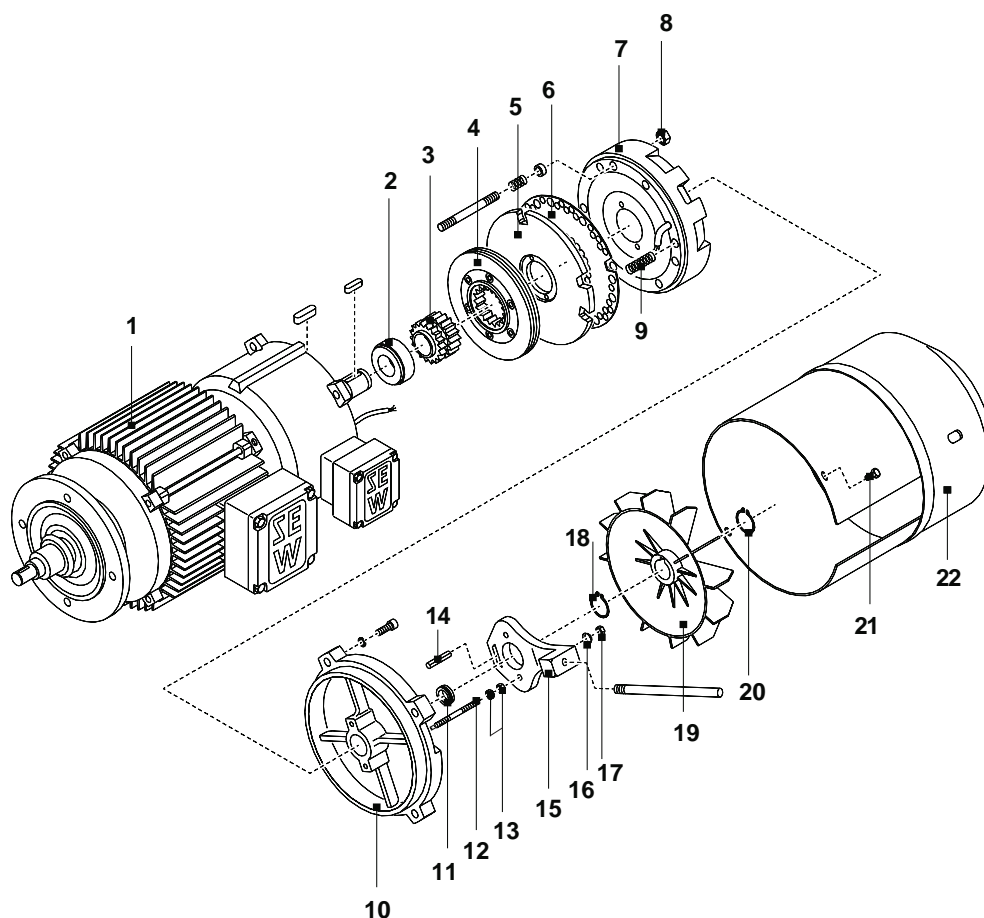


Fig. 9

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Key

- | | | |
|-------------------|------------------------|------------------|
| 1 Motor | 9 Brake spring | 17 Setting nut |
| 2 Spacer bush | 10 Housing cover | 18 Circlip |
| 3 Carrier | 11 V-ring | 19 Fan |
| 4 Brake disk | 12 Stud | 20 Circlip |
| 5 Pressure plate | 13 Nuts | 21 Housing screw |
| 6 Damping plate | 14 Dowel pin | 22 Fan guard |
| 7 Brake coil body | 15 Release lever | |
| 8 Hex nut | 16 Conical coil spring | |



Adjusting brake BC, Bd

(Fig. 9 + Fig. 10)



1. Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.
2. Remove the following parts (replace if worn):
Fan guard (22), circlip (20), fan (19), circlip (18), setting nuts (17), conical coil springs (16), release lever (15), dowel pin (14), nuts (13), studs (12), V-ring (11), housing cover (10)
3. Extract the abraded matter
4. Carefully tighten the hex nuts (8).
– Evenly, until you encounter a slight resistance (signifies: working air gap = 0)
5. Turn back the hex nuts.
– By approx. 120° (signifies: working air gap set)
6. Install: Housing cover¹⁾, V-ring, studs, nuts, dowel pin, release lever, conical coil springs



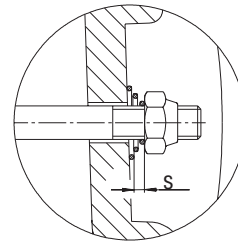
1) Important:

**Please make sure of the following when mounting the housing cover:
The ignition gaps must be clean and free from rust.**

7. Use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (→ Fig. 10).

Brake	Floating clearance s [mm]
BC 05	1.5
BC 2	2

Important: This floating clearance "s" is necessary so that the pressure plate (5) can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.



8. Install the fan and fan guard.

01111BXX

Fig. 10: Setting the floating clearance



Changing the braking torque BC, Bd (Fig. 9)

The braking torque can be changed in steps (→ from Sec. 9.1, page 41)

- by installing different brake springs,
 - by changing the number of brake springs.
1. From points 1 to 3 of the "Adjusting brake BC, Bd (Fig. 9 + Fig. 10)" section.
 2. Unscrew hex nuts (8), pull off the coil body (7).
 - By approx. 70 mm (watch the brake cable!)
 3. Change or add brake springs (9).
 - Position the brake springs symmetrically
 4. Fit the brake coil body and hex nuts.
 - Arrange the brake cable in the pressure chamber in the process
 5. From points 4 to 8 of the "Adjusting brake BC, Bd (Fig. 9 + Fig. 10)" section on page 27.

Note

- The lockable manual brake release is already released if a resistance is encountered when operating the grub screw.
- The self-reengaging manual brake release 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.



7.3.2 Brakes BMG, BM for category 3G, 3D motors

Brake
BMG 05–8,
BM 15

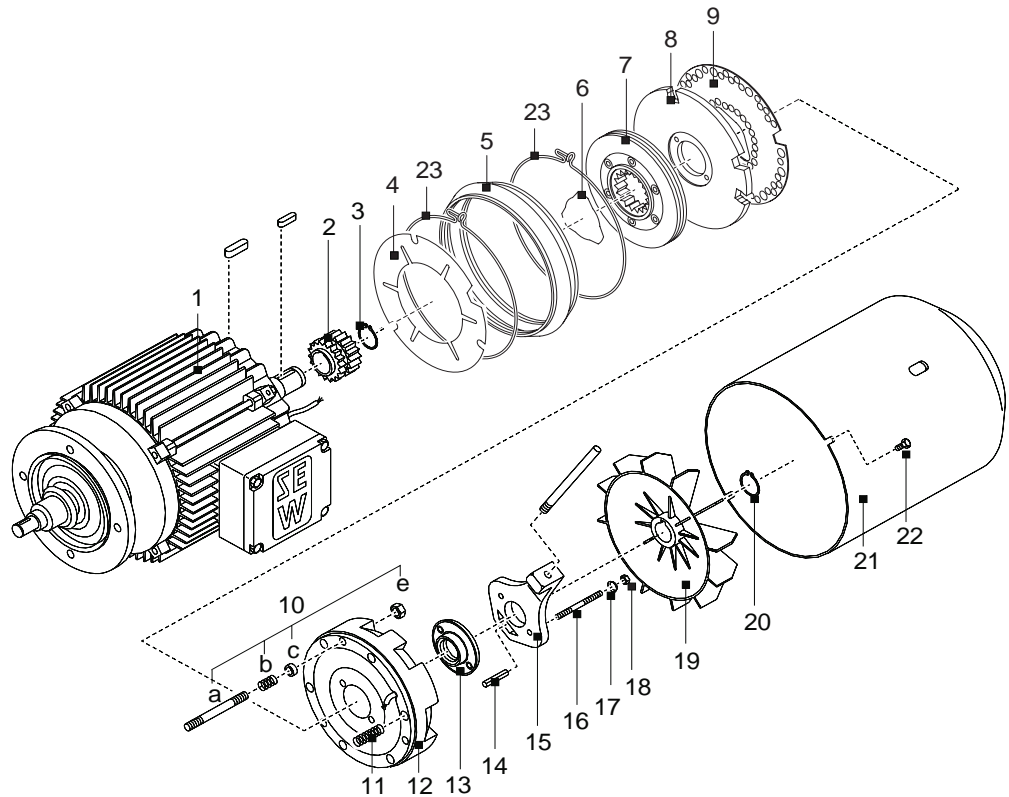


Fig. 11

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Key

- | | | |
|--|---|-------------------------------------|
| 1 Motor with
brake bearing end shield | 8 Pressure plate | 14 Dowel pin |
| 2 Carrier | 9 Damping plate
(BMG only) | 15 Release lever with hand
lever |
| 3 Circlip | 10 a Stud (3x) | 16 Stud (2 pcs.) |
| 4 Niro disk
(only BMG 05-4) | b Counter spring | 17 Conical coil spring |
| 5 Rubber sealing collar | c Pressure ring | 18 Hex nut |
| 6 Annular spring | e Hex nut | 19 Fan |
| 7 Brake disk | 11 Brake spring | 20 Circlip |
| | 12 Brake coil body | 21 Fan guard |
| | 13 In BMG: Sealing
washer
In BM: V-ring | 22 Hex head screw |
| | | 23 Clamping strap |



Brake
BM 30 - 62

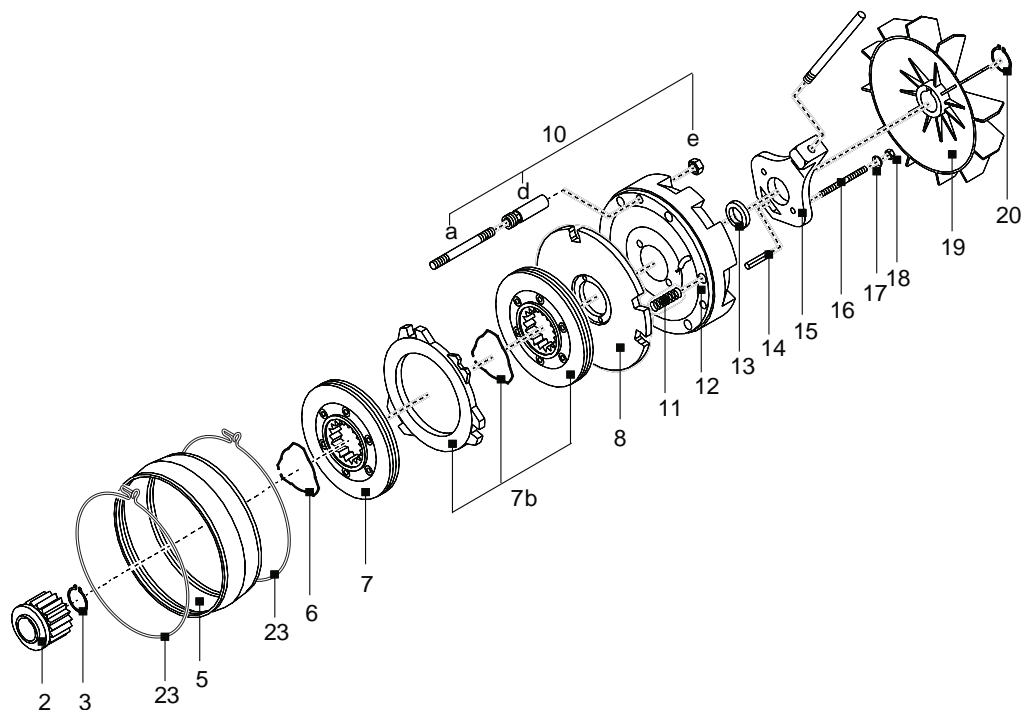


Fig. 12

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Key

- | | | |
|---|--------------------|----------------------------------|
| 2 Carrier | 8 Pressure plate | 14 Dowel pin |
| 3 Circlip | 10 a Stud (3x) | 15 Release lever with hand lever |
| 5 Rubber sealing collar | d setting sleeve | 16 Stud (2 pcs.) |
| 6 Annular spring | e Hex nut | 17 Conical coil spring |
| 7 Brake disk | 11 Brake spring | 18 Hex nut |
| 7b Brake stationary disc, annular spring, brake disc (only BM32/62) | 12 Brake coil body | 19 Fan |
| | 13 V-ring | 20 Circlip |
| | | 23 Clamping strap |



Inspecting the brake, setting the working air gap (Fig. 11 to Fig. 13)



Request appropriate manuals from SEW if a tachometer has to be removed prior to work on the brake and then reinstalled. **Don't work without instructions!**

1. Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.
2. Remove the 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 from size 112
 then change the brake disk (\rightarrow page 30).
 - Otherwise**
5. In BM 30–62:
 - Release setting sleeve (10d).
 - By turning towards the bearing end shield
6. Measure the working air gap A (\rightarrow from Sec. 9.1, page 41)
 - (using a feeler gauge at three points offset by approx. $120^\circ \rightarrow$ Fig. 13).
 - 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 (\rightarrow from Sec. 9.1, page 41)
 - 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 (\rightarrow from Sec. 9.1, page 41)
9. Fit the rubber sealing collar back in place and re-install the dismantled parts.

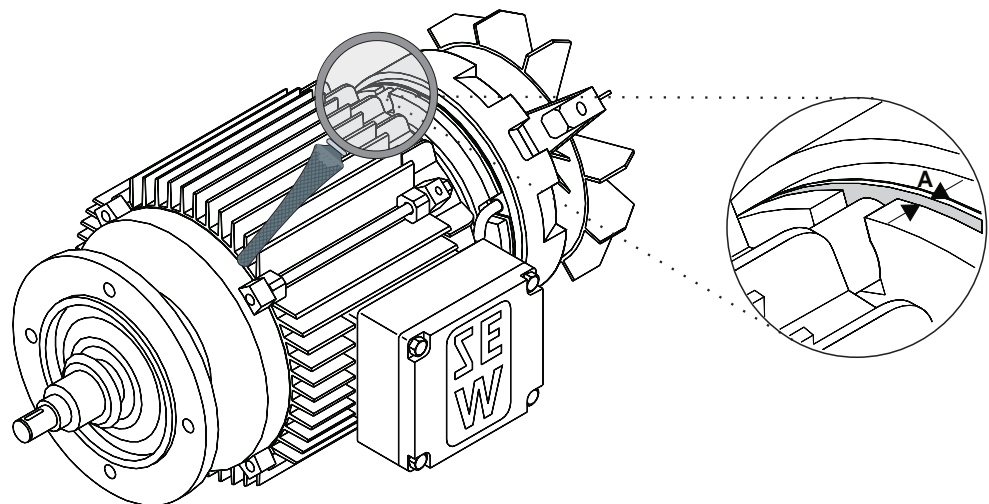


Fig. 13: Setting the working air gap

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Replacing the BMG brake disk (Fig. 9 + Fig. 11)



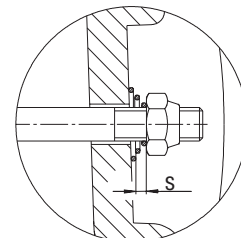
Replace the brake disk when:

- brake disk in BMG 05–4 ≤ 9 mm
- brake disk in BMG 8–BM 62 ≤ 10 mm:

When fitting a new brake disk, 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 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
8. Set the working air gap.
("Inspecting the brake, setting the working air gap (Fig. 11 to Fig. 13)" on page 29, steps 5 to 8)
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 (→ Fig.

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



14).

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. 14: Setting the floating clearance

10. 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.



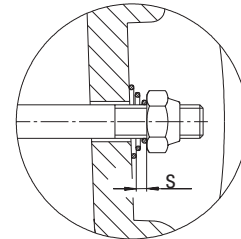
Changing the braking torque (Fig. 9 + Fig. 11)



The braking torque can be changed in steps (→ from Sec. 9.1, page 41).

- 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. Remove the 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
 7. Set the working air gap.
("Inspecting the brake, setting the working air gap (Fig. 11 to Fig. 13)" on page 29, steps 5 to 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. 15).

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. 15: Setting the floating clearance

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

Note:

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





7.4 Inspection and maintenance of the backstop

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 000. See the following table for the amount of grease required.

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



8 Operation and Servicing

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
Motor heats up excessively (measure temperature)	Supply voltage deviates from rated motor voltage by more than $\pm 5\%$. 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 and replace if necessary
	Vibration of rotating parts	Rectify cause, possibly imbalance
	Foreign bodies in cooling air passages	Clean the cooling air passages

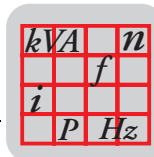


8.2 Brake problems

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	Check 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	Check working air gap
	Brake lining worn down	Replace entire brake disc
	Incorrect braking torque	Changing the braking torque
	BM(G) only: Working air gap so large that setting nuts come into contact	Check working air gap
	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

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



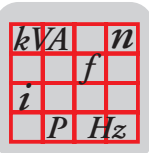
9 Technical Data

9.1 Work done until adjustment, working air gap, braking torques of brake BMG 05-8, BC, Bd

Brake type	For motor size	Work done until adjustment [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
BMG 05 Bd 05	71 80	60	0.25	0.6	5.0	3	-	135 017 X	135 018 X
					4.0	2	2		
					2.5	-	6		
					1.6	-	4		
					1.2	-	3		
BC 05	71 80	60			7.5	4	2		
					6.0	3	3		
					5.0	3	-		
					4.0	2	2		
					2.5	-	6		
					1.6	-	4		
BMG 1	80	60			10	6	-		
					7.5	4	2		
					6.0	3	3		
BMG 2 Bd2	90 100	130			20	3	-	135 150 8	135 151 6
					16	2	2		
					10	-	6		
					6.6	-	4		
					5.0	-	3		
BC 2	90 100	130			30	4	2		
			24	3	3				
			20	3	-				
			16	2	2				
			10	-	6				
			6.6	-	4				
			5.0	-	3				
BMG 4	100	130	10	6	-				
			30	4	2				
			24	3	3				
BMG 8	112M 132S	300	0.3	0.9	75	6	-	184 845 3	135 570 8
					55	4	2		
					45	3	3		
					37	3	-		
					30	2	2		
					19	-	6		
					12.6	-	4		
					9.5	-	3		

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.



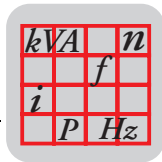
9.2 Work done until adjustment, working air gap, braking torques of brake BM 15 - 62

Brake type	For motor size	Work done until adjustment [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	0.9	150	6	-	184 486 5	184 487 3
					125	4	2		
					100	3	3		
					75	3	-		
					50	-	6		
					35	-	4		
					25	-	3		
BM 30	160L 180	750			300	8	-	136 998 9	136 999 7
					250	6	2		
BM 31	200 225	750			200	4	4		
					150	4	-		
					125	2	4		
					100	-	8		
					75	-	6		
			50	-	4				
BM32 ²⁾	180	750	300	4	-				
			250	2	4				
			200	-	8				
			150	-	6				
			100	-	4				
BM62 ²⁾	200 225	750	0.4	0.9	600	8	-		
					500	6	2		
					400	4	4		
					300	4	-		
					250	2	4		
					200	-	8		
					150	-	6		
					100	-	4		

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 disc 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 to measure their values.

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.

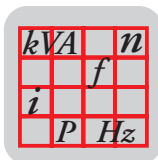
Brake BMG 05 - BMG 4

	BMG 05	BMG1	BMG2	BMG4
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		BMG1		BMG2		BMG4	
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 – brief inrush current
I_G	Direct current with direct DC voltage supply
U_N	Rated voltage (rated voltage range)
I_L	Rated direct current of the rectifier



Brake BMG 8 - BM 32/62

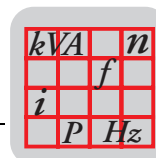
	BMG 8	BM 15	BM 30/31 32/62
Motor size	112/132S	132M-160M	160L-225
Max. braking torque (Nm)	75	150	600
Coil power (W)	65	95	95
Control factor I_B/I_H	6.3	7.5	8.5

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 – brief inrush current
I_G	Direct current with direct DC voltage supply
U_N	Rated voltage (rated voltage range)
I_L	Rated direct current of the rectifier

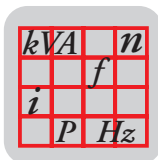
**Brake BC**

	BC05	BC2
Motor size	71/80	90/100
Max. braking torque (Nm)	7.5	30
Coil power (W)	29	41
Control factor I_B/I_H	4	4

Voltage V_N		BC05		BC2	
V_{AC}	V_{DC}	I_H A_{AC}	I_G A_{DC}	I_H A_{AC}	I_G A_{DC}
	24	-	1.22	-	1.74
42 (40-46)	18	1.10	1.39	1.42	2.00
48 (47-52)	20	0.96	1.23	1.27	1.78
56 (53-58)	24	0.86	1.10	1.13	1.57
60 (59-66)	27	0.77	0.99	1.00	1.42
73 (67-73)	30	0.68	0.87	0.90	1.25
77 (74-82)	33	0.60	0.77	0.79	1.12
88 (83-92)	36	0.54	0.69	0.71	1.00
97 (93-104)	40	0.48	0.62	0.63	0.87
110 (105-116)	48	0.42	0.55	0.57	0.79
125 (117-131)	52	0.38	0.49	0.50	0.71
139 (132-147)	60	0.34	0.43	0.45	0.62
153 (148-164)	66	0.31	0.39	0.40	0.56
157 (165-185)	72	0.27	0.34	0.35	0.50
200 (186-207)	80	0.24	0.31	0.31	0.44
230 (208-233)	96	0.21	0.27	0.28	0.40
240 (234-261)	110	0.19	0.24	0.25	0.35
290 (262-293)	117	0.17	0.22	0.23	0.32
318 (294-329)	125	0.15	0.20	0.19	0.28
346 (330-369)	147	0.13	0.18	0.18	0.24
400 (370-414)	167	0.12	0.15	0.15	0.22
440 (415-464)	185	0.11	0.14	0.14	0.20
500 (465-522)	208	0.10	0.12	0.12	0.17

Key

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

**Brake Bd**

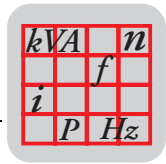
	Bd 05	Bd 2
Motor size	71/80	90/100
Max. braking torque (Nm)	7.5	30
Coil power (W)	29	45

Voltage V_N		Bd 05	Bd 2
V_{AC}	V_{DC}	$I_G^{1)}$ A_{DC}	$I_G^{1)}$ A_{DC}
	24	1.17	1.76
42 (40-44)	18	1.36	2.20
46 (45-48)	20	1.43	2.30
51 (49-53)	22	1.28	2.00
56 (54-58)	24	1.17	1.76
61 (59-63)	27	1.00	1.65
67 (64-69)	29	0.90	1.66
73 (70-76)	32	0.80	1.44
80 (77-84)	35	0.83	1.27
88 (85-92)	39	0.72	1.13
97 (93-100)	43	0.66	1.00
106 (101-109)	47	0.58	0.93
115 (110-120)	51	0.49	0.82
125 (121-133)	55	0.50	0.81
139 (134-146)	62	0.47	0.73
153 (147-159)	68	0.40	0.65
167 (160-175)	74	0.36	0.66
184 (176-191)	82	0.38	0.48
200 (192-210)	89	0.33	0.52
220 (211-231)	98	0.29	0.46
240 (232-254)	107	0.26	0.41
266 (255-278)	119	0.23	0.35
290 (279-304)	130	0.21	0.37
318 (305-331)	142	0.19	0.33
346 (332-360)	155	0.17	0.29
380 (361-400)	170	0.17	0.25
415 (401-440)	186	0.15	0.26
460 (441-480)	206	0.15	0.24
500 (481-525)	224	0.14	0.21

1) The r.m.s. current on the alternating current side is approx. 77 % of the direct current

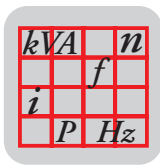
Key

I_G Direct current with direct DC voltage supply
 U_N Rated voltage (rated voltage range)



9.4 Approved 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
(e) DT 71 - 80	6204-Z-J	6303-Z-J	6204-Z-J	6203-J	6203-RS-J-C3
(e) DT 90-100		6306-Z-J		6205-J	6205-RS-J-C3
(e) DV 112 - 132 S	6208-Z-J	6307-Z-J	6208-Z-J	6207-J	6207-RS-J-C3
(e) DV 132 M, 160 M		6309-Z-J-C3		6209-2Z-J-C3	
(e) DV 160 L, 180 L		6312-Z-J-C3		6213-2Z-J-C3	
(e) DV 200 - 225		6314-Z-J-C3		6314-Z-J-C3	



9.5 Declaration of conformity

9.5.1 Motors and brakes in category 2G, series eDT, eDV and BC



**SEW
EURODRIVE**

SEW-EURODRIVE GmbH & Co
Ernst-Blickle-Str. 42
D-76646 Bruchsal

Konformitätserklärung Declaration of Conformity

(im Sinne der EG-Richtlinie 94/9/EG, Anhang IV)
(according to EC Directive 94/9/EC, Appendix IV)

SEW-EURODRIVE

erklärt in alleiniger Verantwortung, dass die Motoren sowie die Bremsen in Kategorie 2G der Baureihen eDT, eDV sowie BC, auf die sich diese Erklärung bezieht, mit der

declares in sole responsibility that the motors and brakes in category 2G of the eDT, eDV and BC series that are subject to this declaration are meeting the requirements set forth in

**EG Richtlinie 94/9/EG
EC Directive 94/9/EC.**

übereinstimmen.

Angewandte harmonisierte Normen: **EN 50 014; EN 50 018; EN 50 019**
Applicable harmonised standards: **EN 50 014; EN 50 018; EN 50 019**

SEW-EURODRIVE hält folgende technische Dokumentationen zur Einsicht bereit:
SEW-EURODRIVE have the following documentation available for inspection:

- vorschriftsmäßige Bedienungsanleitung
- *Installation and operating instructions in conformance with applicable regulations*
- techn. Bauunterlagen
- *Technical design documentation*
- Mitteilung über die Anerkennung der Qualitätssicherung Produktion
- *notification about the recognition of the quality assurance production*

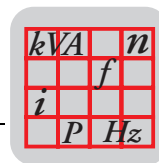
SEW-EURODRIVE GmbH & Co

Bruchsal, den 09.08.2000

Ort und Datum der Ausstellung
Place and date of issue

ppa

Funktion: Vertriebsleitung / Deutschland
Function: Head of Sales / Germany



9.5.2 Motors and brakes in categories 2D, series eDT and eDV



SEW-EURODRIVE GmbH & Co
Ernst-Blickle-Str. 42
D-76646 Bruchsal

Konformitätserklärung Declaration of Conformity

(im Sinne der EG-Richtlinie 94/9/EG, Anhang IV)
(according to EC Directive 94/9/EC, Appendix IV)

SEW-EURODRIVE

erklärt in alleiniger Verantwortung, dass die Motoren
in Kategorie 2D der Baureihen eDT, eDV, auf die sich diese
Erklärung bezieht, mit der

*declares in sole responsibility that the motors in category
2D of the eDT and eDV series that are subject to this declaration
are meeting the requirements set forth in*

**EG Richtlinie 94/9/EG
EC Directive 94/9/EC.**

übereinstimmen.

Angewandte harmonisierte Normen: **EN 50 014; EN 50 281**
Applicable harmonised standards: **EN 50 014; EN 50 281**

SEW-EURODRIVE hält folgende technische Dokumentationen zur Einsicht bereit:
SEW-EURODRIVE have the following documentation available for inspection:

- vorschriftsmäßige Bedienungsanleitung
- *Installation and operating instructions in conformance with applicable regulations*
- techn. Bauunterlagen
- *Technical design documentation*
- Mitteilung über die Anerkennung der Qualitätssicherung Produktion
- *notification about the recognition of the quality assurance production*

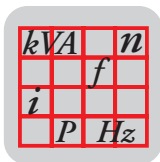
SEW-EURODRIVE GmbH & Co

Bruchsal, den 09.10.2000

Ort und Datum der Ausstellung
Place and date of issue

ppa

Funktion: Vertriebsleitung / Deutschland
Function: Head of Sales / Germany



9.5.3 Motors and brake motors in categories 3G and 3D, series DT and DV



SEW-EURODRIVE GmbH & Co
Ernst-Blickle-Str. 42
D-76646 Bruchsal

Konformitätserklärung Declaration of Conformity

(im Sinne der EG-Richtlinie 94/9/EG, Anhang VIII)
(according to EC Directive 94/9/EC, Appendix VIII)

SEW-EURODRIVE

erklärt in alleiniger Verantwortung, dass die Motoren und Bremsmotoren in der Kategorie 3G und 3D der Baureihe DT und DV, auf die sich diese Erklärung bezieht, mit der

declares in sole responsibility that the motors and brake motors in categories 3G and 3D of the DT and DV series that are subject to this declaration are meeting the requirements set forth in

**EG Richtlinie 94/9/EG
EC Directive 94/9/EC.**

übereinstimmen.

Angewandte harmonisierte Normen:
Applicable harmonised standards:

**EN 50 014; EN 50 021; EN 50 281-1-1
EN 50 014; EN 50 021; EN 50 281-1-1**

SEW-EURODRIVE hält folgende technische Dokumentationen zur Einsicht bereit:
SEW-EURODRIVE has the following documentation available for inspection:

- vorschriftsmäßige Bedienungsanleitung
- *Installation and operating instructions in conformance with applicable regulations*
- techn. Bauunterlagen
- *Technical design documentation*

SEW-EURODRIVE GmbH & Co

Bruchsal, den 09.08.2000

Ort und Datum der Ausstellung
Place and date of issue

ppa

Funktion: Vertriebsleitung / Deutschland
Function: Head of Sales / Germany



10 Address list

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	Kirchheim (near München)	SEW-EURODRIVE GmbH & Co Domagkstraße 5 D-85551 Kirchheim	Phone: (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	Phone: (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	Phone: (0 37 64) 76 06-0 Fax: (0 37 64) 76 06-30
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	Lyon	SEW-USOCOME SAS Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Phone: 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	Phone: 01 64 42 40 80 Fax: 01 64 42 40 88
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Belgium			
Assembly Sales Service	Brüssel	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Phone: (010) 23 13 11 Fax: (010) 2313 36 http://www.caron-vector.be info@caron-vector.be
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Production Sales Service	Sao Paulo	SEW DO BRASIL Motores-Redutores Ltda. Caixa Postal 201-0711-970 Rodovia Presidente Dutra km 213 CEP 07210-000 Guarulhos-SP	Phone: (011) 64 60-64 33 Fax: (011) 64 80-43 43 sew.brasil@originet.com.br
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Assembly Sales Service	Bogotá	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Phone: (0571) 5 47 50 50 Fax: (0571) 5 47 50 44
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Sales Service	Dublin	Alpert Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Phone: (01) 8 30 62 77 Fax: (01) 8 30 64 58
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Sales	Skopje	SGS-Skopje / Macedonia Teodosij Sinactaski" 6691000 Skopje / Macedonia	Phone: (0991) 38 43 90 Fax: (0991) 38 43 90
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New Zealand			
Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Phone: (09) 2 74 56 272 74 00 77 Fax: (09) 274 0165 sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Phone: (09) 3 84 62 51 Fax: (09) 3 84 64 55 sales@sew-eurodrive.co.nz
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Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 N-1539 Moss	Phone: (69) 2410 20 Fax: (69) 2410 40
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Assembly Sales Service	Lima	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos # 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Phone: (511) 349-52 80 Fax: (511) 349-30 02
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Sales	Lodz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Pojezierska 63 91-338 Lodz	Phone: (042) 6 16 22 00 Fax: (042) 6 16 22 10 sew@sew-eurodrive.pl
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Sales Service	Bucuresti	Sialco Trading SRL str. Madrid nr.4 71222 Bucuresti	Phone: (01) 2 30 13 28 Fax: (01) 2 30 71 70 sialco@mediasat.ro

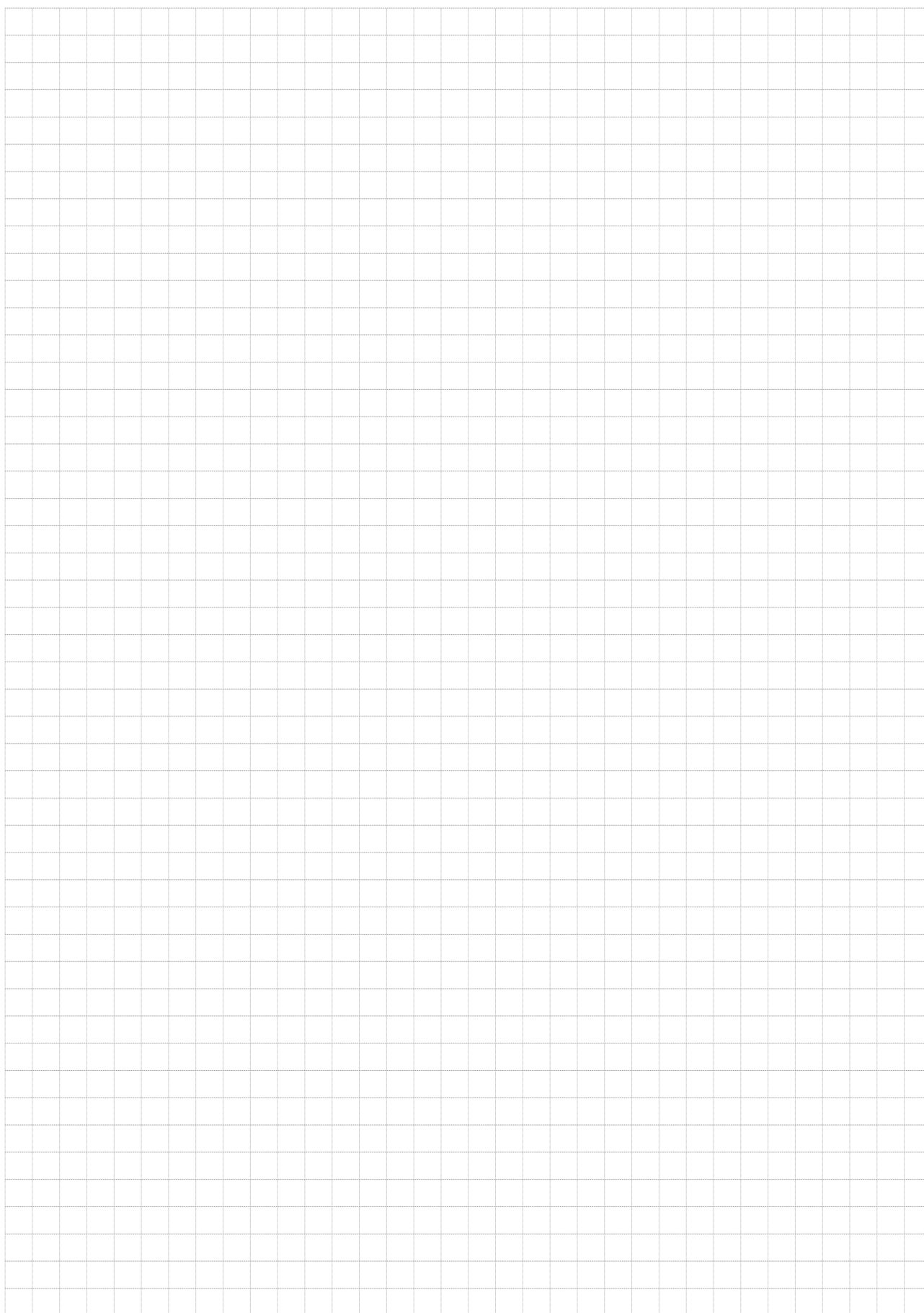


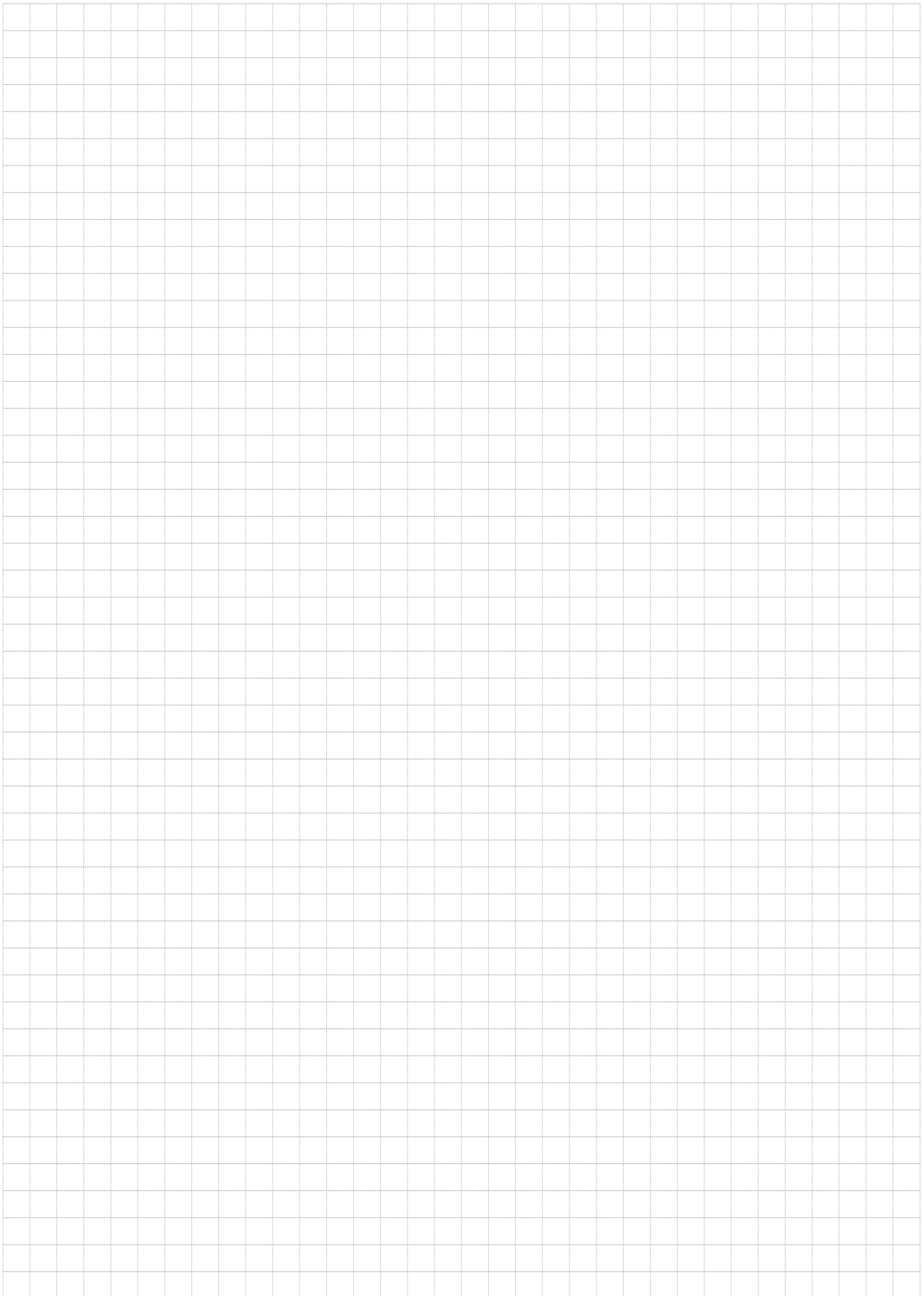
Russia			
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South Africa			
Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O. Box 27032 2011 Benrose, Johannesburg	Phone: (11) 49 44 380 Fax: (11) 49 42 300
	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	Phone: (021) 5 11 09 87 Fax: (021) 5 11 44 58 Telex: 576 062
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 39 Circuit Road Westmead, Pinetown P.O. Box 10433, Ashwood 3605	Phone: (031) 700 34 51 Telex: 622 407
Spain			
Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Phone: 9 44 31 84 70 Fax: 9 44 31 84 71 sew.spain@sew-eurodrive.es
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Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Phone: (036) 34 42 00 Fax: (036) 34 42 80 www.sew-eurodrive.se
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Assembly Sales Service	Basel	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein near Basel	Phone: (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, M007, Tambol Bonhwaroh Muang District Chon Buri 20000	Phone: 0066-38 21 45 29/30 Fax: 0066-38 21 45 31
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Assembly Sales Service	Istanbul	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti Bagdat Cad. Koruma Cikmazi No. 3 TR-81540 Maltepe ISTANBUL	Phone: (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
Uruguay			
	Please contact our office in Argentina.		

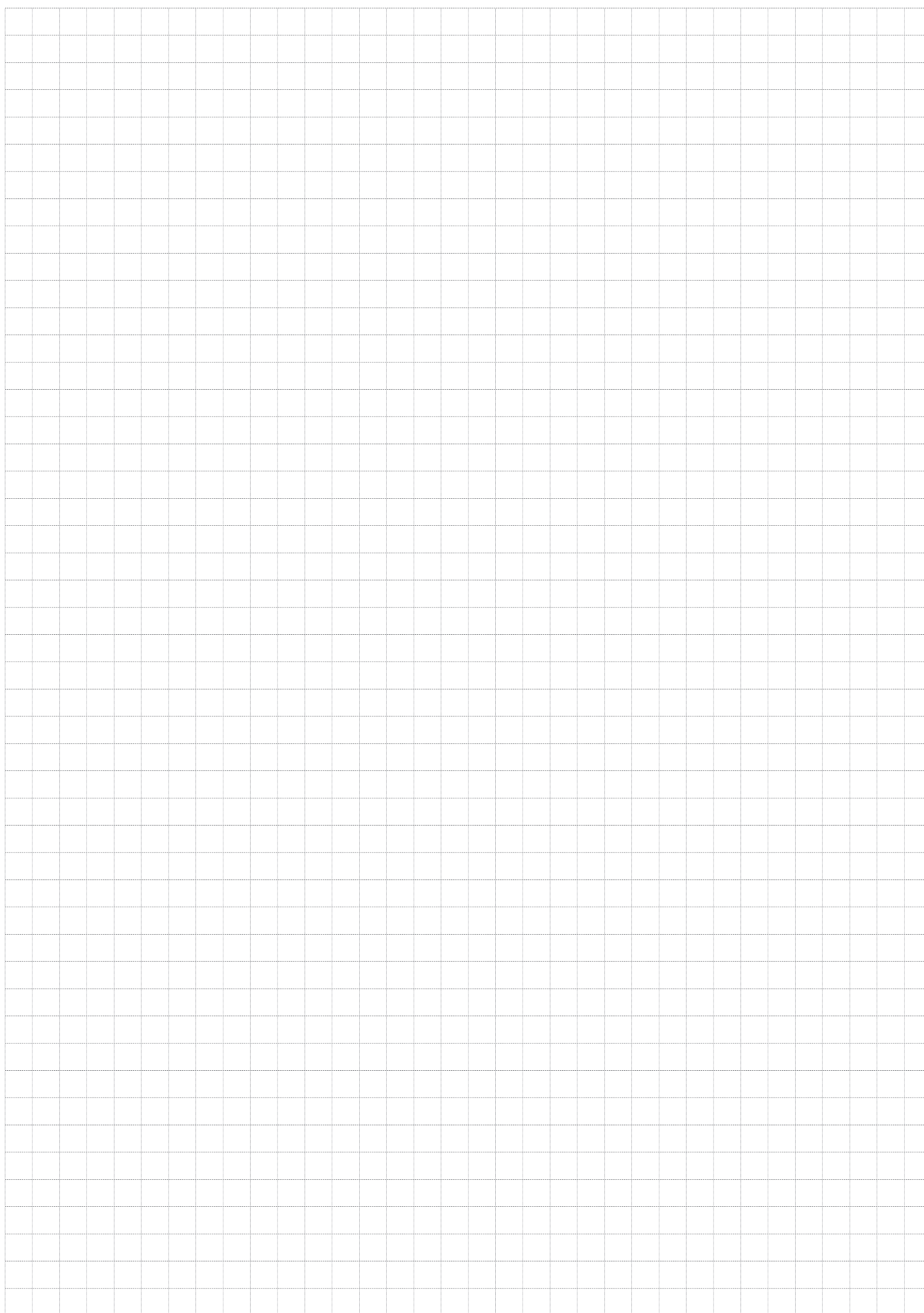


Address list

USA			
Production Assembly Sales Service	Greenville	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Phone: (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
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	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Phone: (214) 3 30-48 24 Fax: (214) 3 30-47 24
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