5 Electrical Installation

It is essential to comply with the safety notes in Section 2 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 of operation of single-phase motors

Please note that SEW single-phase motors (with the exception of ET56L4 → Section "ET56 Single-phase motor design") 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.

5.6 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

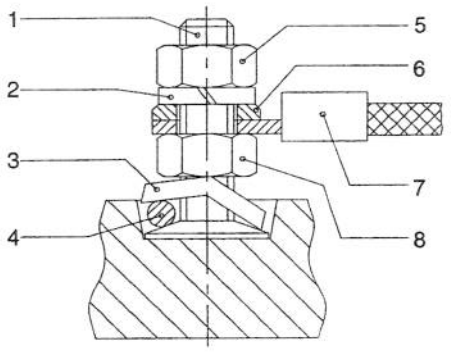
In case of operation with electronic control units, it is essential to adhere to the corresponding operating instructions/wiring diagrams!

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 as demonstrated by the following illustration.



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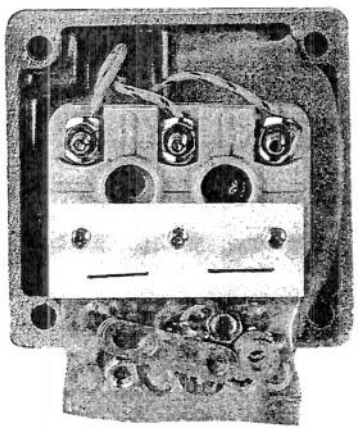

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1 Terminal stud
2 Lock washer
3 Terminal washer
4 Motor terminal lead
5 Top nut
6 Washer
7 External connection
8 Bottom nut

5.10 The ET56 single-phase design

The ET56 single-phase motor is deliverd with the running capacitor installed and connected:

1~230 V, 50 Hz $C_B = 4\ \mu F$

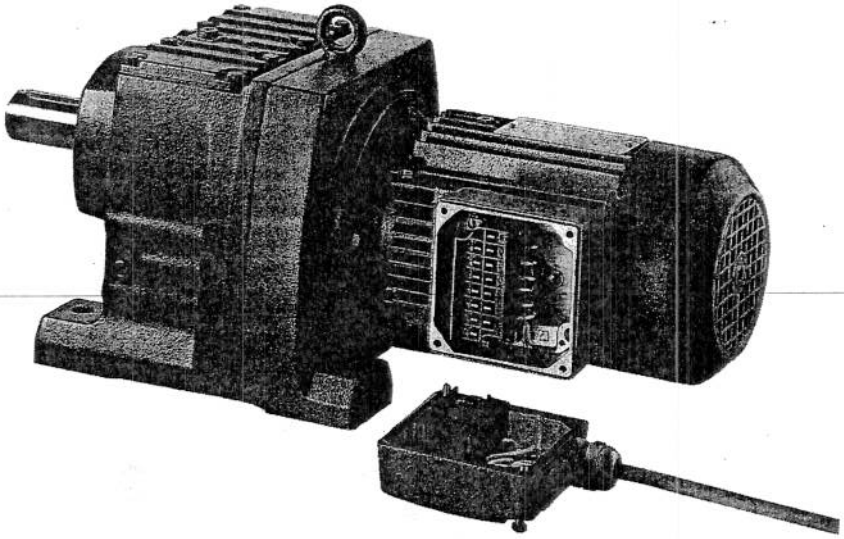
1~230 V, 60 Hz $C_B = 4\ \mu F$

1~110 V, 60 Hz $C_B = 20\ \mu F$

STOP

A full-load startup can only be prevented by employment of the running capacitor! The single-phase motor cannot be combined with the TF.

5.11 Connecting the motor via IS plug connector



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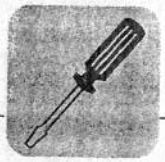
The IS plug connector is supplied from the factory with its base fully wired, including additional features such as a brake rectifier. The upper section of the IS connection is included in the scope of delivery and must be connected as shown in the circuit diagram.

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) as shown in the following table.

Cable cross sections

Make sure the type of line corresponds to the applicable regulations. The rated currents are specified on the motor nameplate.

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

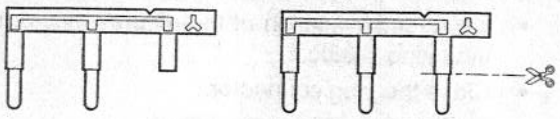


Connecting the motor via IS plug connector

Brake control system BSR – preparing the variable terminal link

For Y operation:

On the Y side of the variable terminal link:
remove only bright metal pin of the marked prong horizontally – touch guard!



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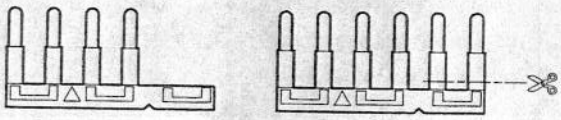
For Δ **operation:**

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



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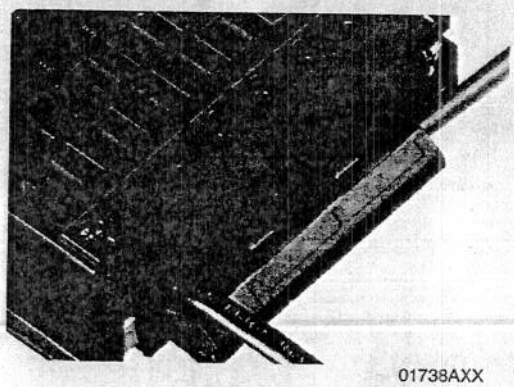
Wiring up as shown in circuit diagram DT 81 for Y- or Δ operation with double terminal assignment

- 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 (→ Section "Installing the plug connector).



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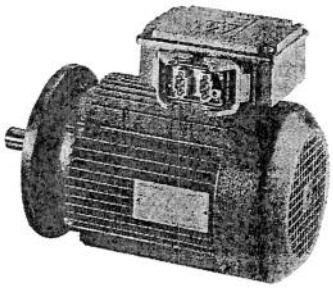
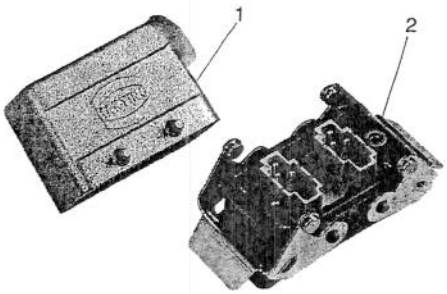
5.12 Connecting motor via ASA1/ASD1 and AMA1/AMD1 plug connectors





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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).

5.13 Connecting the brake

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

STOP

Comply with the applicable regulations issued by the relevant employer's liability insurance association 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.
- 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.)

STOP

- **Check the line cross sections – braking currents (→ Section "Technical Data")**
- 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!

Overview of SEW encoder systems

Encoder	For SEW motor	Type of encoder	Shaft	Specification	Supply	Signal
ES1T[1)]	CT/DT/CV/ DV71 – 100	Encoder	Spread shaft	-	5 V_{DC} regulated	5 V_{DC} TTL/RS-422
ES1S[2)]					24 V_{DC}	1 V_{SS} sin/cos
ES1R						5 V_{DC} TTL/RS-422
ES1C						24 V_{DC} HTL
ES2T[1)]	CV/DV 112 – 132S				5 V_{DC} regulated	5 V_{DC} TTL/RS-422
ES2S[2)]					24 V_{DC}	1 V_{SS} sin/cos
ES2R						5 V_{DC} TTL/RS-422
ES2C						24 V_{DC} HTL
EV1T[1)]	CT/CV71 – 200 DT/DV71 – 225		Solid shaft		5 V_{DC} regulated	5 V_{DC} TTL/RS-422
EV1S[2)]					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
AV1H					7/12 V_{DC}	HIPERFACE interface and 1 V_{SS} sin/cos

1. recommended encoder for operation with MOVITRAC® 31C
2. recommended encoder for operation with MOVIDRIVE®

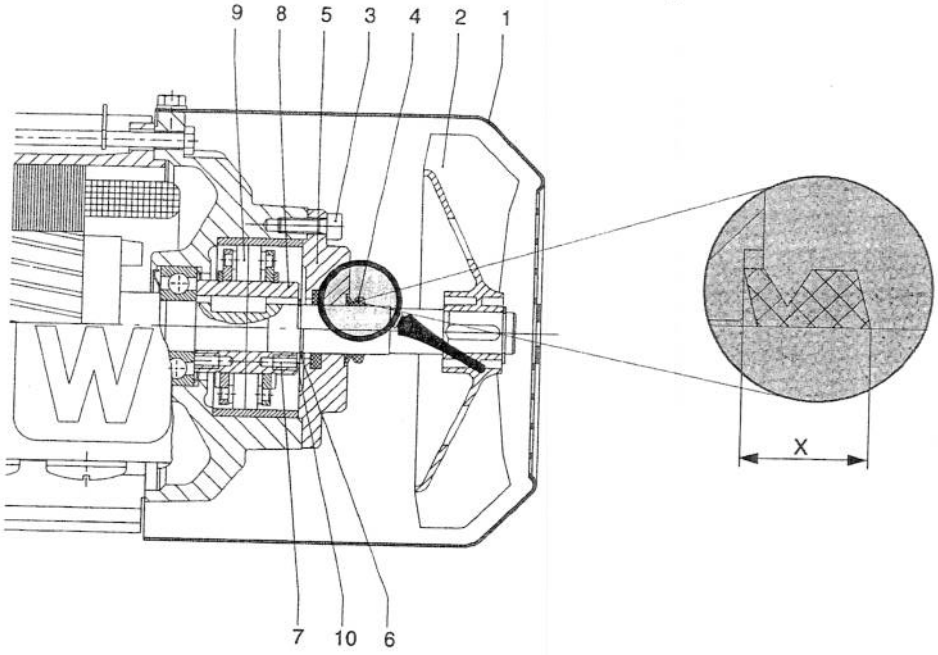
- Refer to the following wiring diagrams for information about connecting ES1./ES2./ EV1. encoders and AV1Y and AV1H absolute encoders:
  - Wiring diagram ES1./ES2. or EV1. encoder: Order number 0918 6832
  - Wiring diagram AV1Y absolute encoder: Order number 0918 6808
  - Wiring diagram AV1H absolute encoder: Order number 1052 9705

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.

6.2 Altering the blocking direction on motors with a backstop



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Dimension X after installation

Motor	Dimension X 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.

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.
7. **Important: Do not exert pressure on or hit the wedge element train – possible material damages!**
8. 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.
9. Fit the remaining parts of the backstop by following,in reverse order, steps 4. to 2. Note the installation dimension for the V-ring (4).

STOP

7.2 Brake problems

Problem	Possible cause	Solution
Brake does not release	Incorrect voltage on brake control unit	Apply correct voltage
	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 (→ Section " Technical data"): • 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

7.3 Problems when operating with a frequency inverter

The symptoms described in the section on "Motor problems" 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.

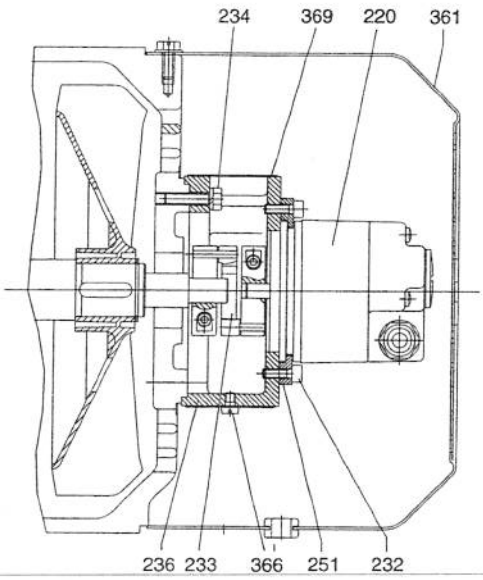
If you require assistance from our customer service staff, please state the following:

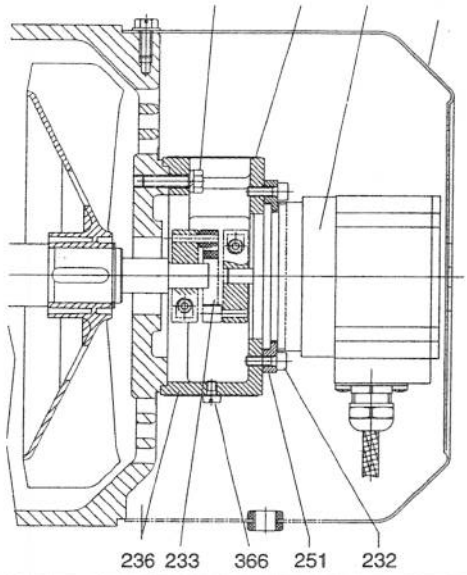
- Type and extent of the fault
- Time and peripheral circumstances of the fault
- Presumed cause
- Data on the nameplate

8.2 Preliminary work for motor and brake maintenance

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

Removing the incremental encoder EV1. / absolute encoder AV1H



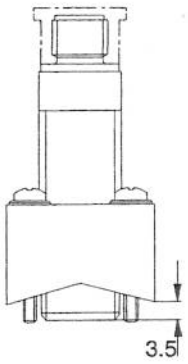


Incremental encoder EV1 — Absolute encoder AV1H

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

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

Removing proximity sensors NV1. / NV2.



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

- Disconnect the plug!
- Pull off the fan guard including NV1. / NV2. Do not tilt as this could cause damage to 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 (→ above illustration).

Procedure

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

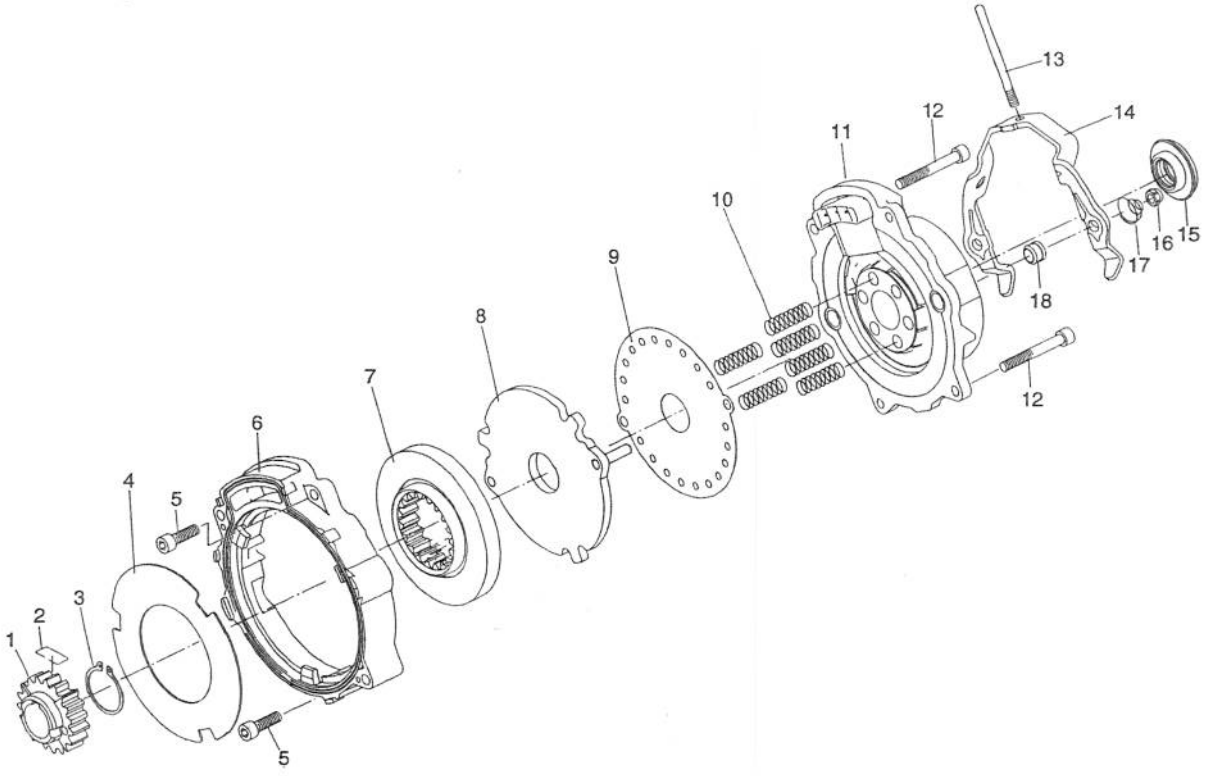
1. Remove the forced cooling fan and encoder, if fitted (→ Section "Preliminary work for motor and brake maintenance).
2. Remove the flange cover or fan guard (19) and the fan (17).
3. Remove the hexagon head cap screws (15) from the drive end bearing end shield (5) and the non-drive end bearing end shield (14), release the stator (13) from the drive end bearing end shield.
4. **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.
5. **Motors with brake BMG02, 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. If there is condensation inside the stator
   - Geared motors: Remove the motor from the gear unit.
   - Motors without a gear unit: Remove the drive end flange.
   - Remove the rotor (9).
8. Clean the winding, dry it and check it electrically (→ Section "Preliminary work").
9. Fit new ball bearings (7, 11) (only use authorized ball bearings (→ Section "Permitted ball bearing types").
10. Fit a new oil seal (3) in the drive end bearing end shield.
11. Reseal the stator seat and grease the V-ring or labyrinth seal (DR63).
12. Fit the motor, brake etc.
13. 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

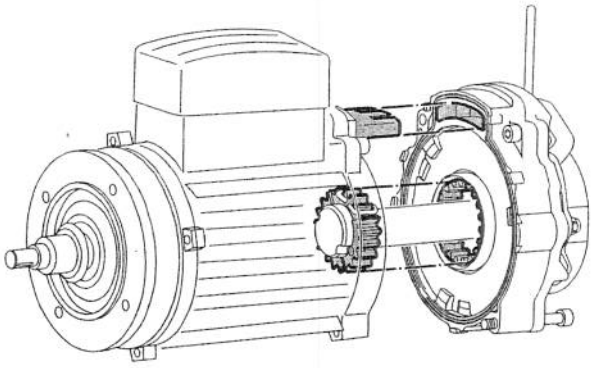
8.5 Inspection and maintenance of brake BR03



Key

1 Carrier
2 Clip
3 Circlip
4 Friction plate
5 Bolt
6 Guide ring
7 brake disc
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

8. Reassemble the removed parts. Install the complete brake (replaced if the working air gap ≥ 0.8 mm) to the motor (→ following illustration):
   - Make sure the gearing of the brake disc 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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Altering the braking torque BR03

The braking torque can be changed in steps (→ Section "Work done, working air gap, braking torque of brake BR03, MG 05-8").

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

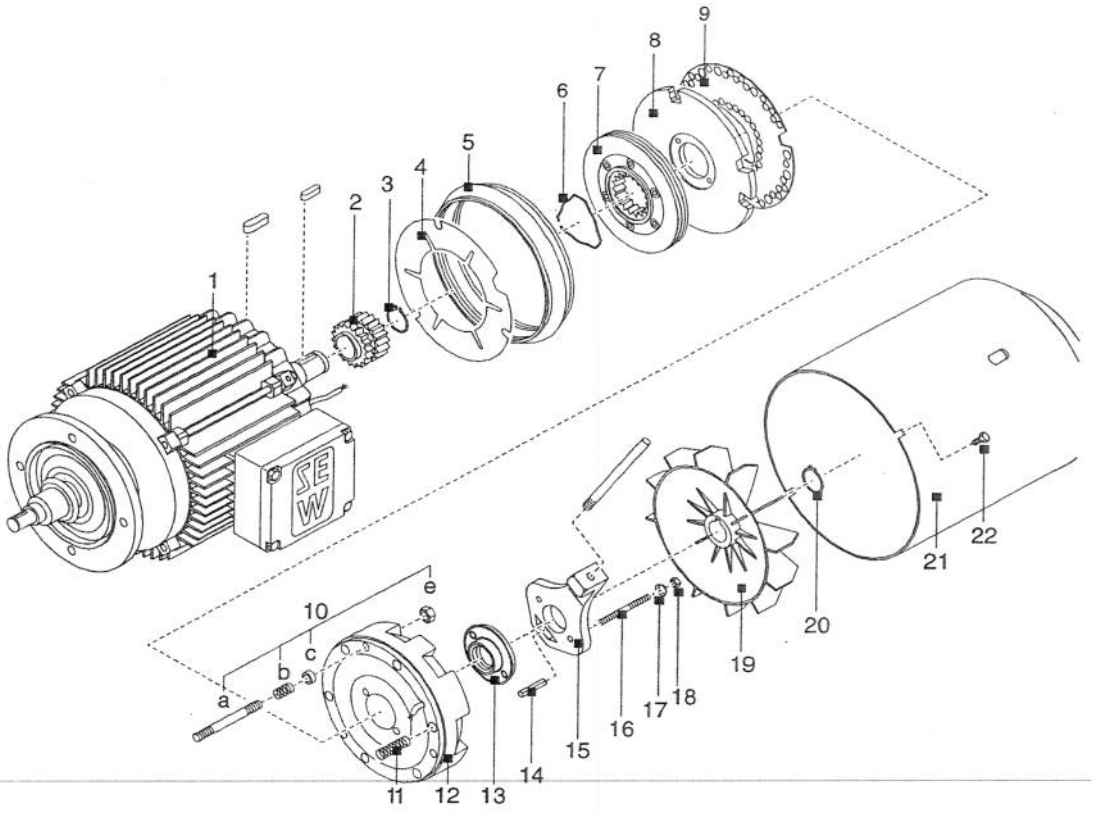
1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.**
2. Unscrew the hand lever (13, on version with manual brake release). Remove the fan guard and the fan.
3. Loosen the screws (12) and remove the complete brake with the releasing lever (on version with manual brake release).
4. Loosen the screws (5) and remove the guide ring (6) with friction plate (4), brake disc (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 disc (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 disc (7), press down and fit the screws (5).

8.6 Inspection and maintenance of brake BMG 05-8, BM 15 - 62

Brake BM(G)05-15



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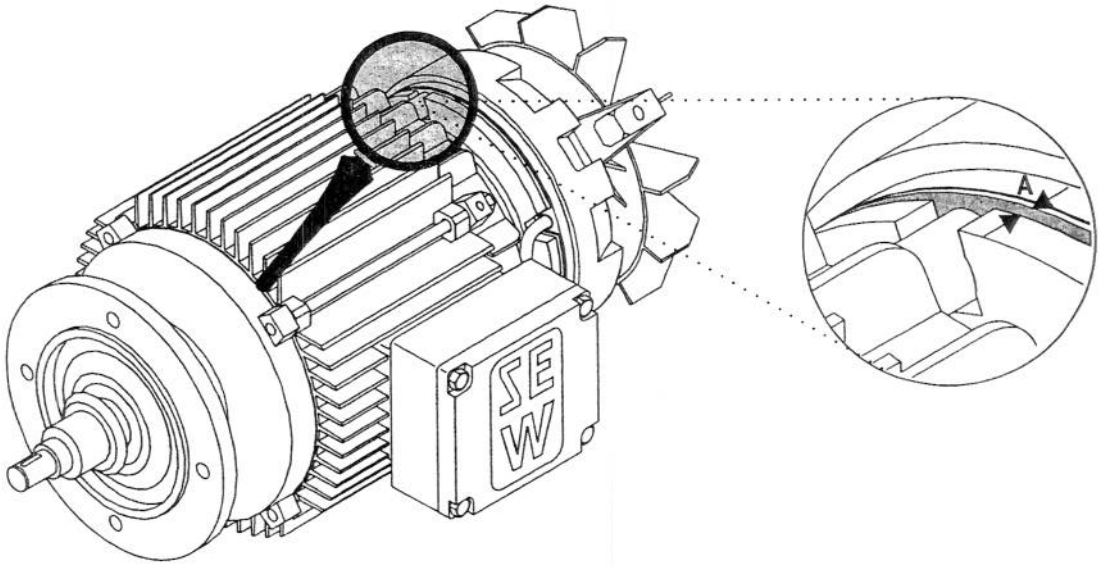
Inspecting brake BMG 05–8, BM 15–62, setting the working air gap

1. **Isolate the motor and brake from the supply, safeguarding them agains unintentional power-up.**
2. Remove the following:
   - If fitted, forced-cooling fan, tacho/encoder (→ Section "Preliminary work fc 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 disc (7, 7b):
   If the brake disc is:
   - ≤ 9 mm on brake motors up to size 100.
   - ≤ 10 mm on brake motors up to size 112.

   Fit a new brake disc (→ Section "Changing brake disc on BMG 05-8, BM 15-62"
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° → following illustration
   - 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 (→ Section "Technical Data").
   - 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 (→ Section "Technical Data").
9. Fit the rubber sealing collar back in place and re-install the dismantled parts.



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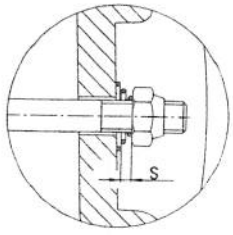
Altering the braking torque BMG 05–8, BM 15–62

The braking torque can be changed in steps (→ Section "Technical Data")

- 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 spec application, install the brake coil body (12) of brake BMG 1 of the same desigr order to ensure safe braking.
  - **BMG 2:** if the maximum braking torque is not sufficient for the spec application, install the brake coil body (12) of brake BMG 4 of the same desigr order to ensure safe braking.

1. **Isolate the motor and brake from the supply, safeguarding them agair unintentional power-up.**
2. Remove the following:
   - If fitted, forced-cooling fan, tacho/encoder (→ Section "Preliminary work 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), dov 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 t working air gap" , points 5 through 8)
7. With manual brake release: Use setting nuts to set floating clearance "s" betwe the conical coil springs (pressed flat) and the setting nuts (→ following illustratior



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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 pla can move up as the brake lining wears. Otherwise, reliable braking is n guaranteed.

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 repeate

9.3 Work done, 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	120	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	120			10 7.5 6.0	6 4 3	- 2 3		
BMG 2[3]	90 100	260			20 16 10 6.6 5.0	3 2 - - -	- 2 6 4 3	135 150 8	135 151 6
BMG 4	100	260			40 30 24	6 4 3	- 2 3		
BMG 8	112M 132S	600	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.

3) 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.

9.5 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 BMG02-BR03

	BMG02	BR03
Motor size	56	63
Max. braking torque (Nm)	1.2	3.2
Coil power (W)	25	24
Control factor I_B/I_H	-	4

Voltage V_N		BMG02		BR03	
V_{AC}	V_{DC}	I_H [A_{AC}]	I_G [A_{DC}]	I_H [A_{AC}]	I_G [A_{DC}]
	24	-	0.72	-	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	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	0.08	0.10
460 (432-500)	**190**	0.07	0.09	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
- V_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
- V_N Rated voltage (rated voltage range)

Addresses

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 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 scm-garbsen@sew-eurodrive.de
	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 scm-kirchheim@sew-eurodrive.de
	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 scm-langenfeld@sew-eurodrive.de
	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 scm-meerane@sew-eurodrive.de
	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

Address list

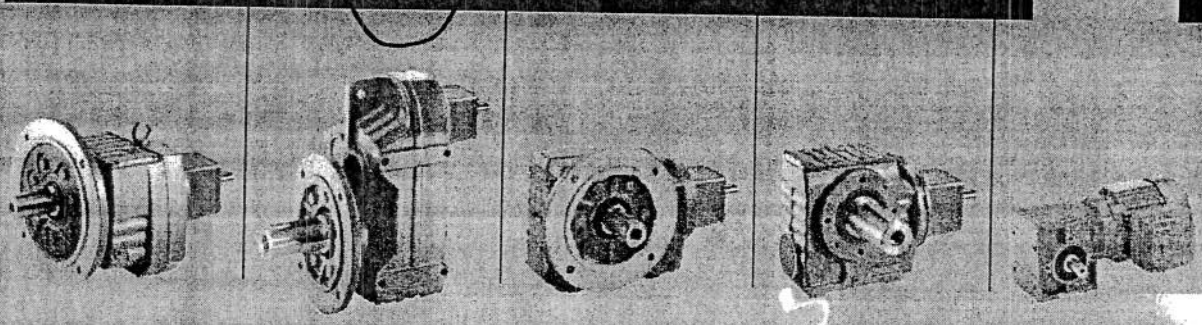
Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. (3) 589 300 Fax (3) 780 6211
Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. 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 54 Fax 2-7 95-91 29 sew@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 KOREA CO., LTD. B 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 master@sew-korea.co.kr
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

USA			
	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

SEW EURODRIVE

Gear Units
R..7, F..7, K..7, S..7 Series, Spiroplan® W

Edition
05/2001



Operating Instructions

10503013 / EN

Contents

2 Safety Notes

Preliminary remarks

The following safety notes are principally concerned with the use of gear units.

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

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

General

During and after operation, geared motors and gear units have live and moving parts and their surfaces may be hot.

All work related to transport, putting into storage, setting up/mounting, connection, startup, maintenance and repair may only be carried out by qualified specialists in accordance with

- the corresponding detailed operating instructions booklet(s) and wiring diagrams
- the warning and safety signs on the gear unit/geared motor
- the specific regulations and requirements for the system and
- national/regional regulations governing safety and the prevention of accidents

Severe injuries and damage to property may result from

- incorrect use
- incorrect installation or operation
- removal of required protective covers or the housing when this is not permitted

Designated use

These geared motors/gear units are intended for industrial systems. They correspond to the applicable standards and regulations.

The technical data and the information about permitted conditions are to be found on the nameplate and in the documentation.

It is essential for all specified information to be observed!

Transportation / Storage

Inspect the delivered goods for any shipping damage as soon as you receive the delivery. Inform the shipping company immediately. It may be necessary to preclude startup.

Tighten installed transportation lugs firmly. They are only designed for the weight of the geared motor/gear unit; do not attach any additional loads.

The installed lifting eyebolts meet DIN 580. The loads and guidelines listed in the standard have to be observed. If there are two transportation or lifting eyebolts installed on the geared motor, you have to use both of them for transportation. The direction of the tensile force is not to exceed an angle of 45°to meet the guidelines set forth in DIN 580.

Use suitable, sufficiently rated handling equipment if necessary. Remove any transport fixtures prior to startup.

3 Gear Unit Design

The following illustrations represent design principles. They are merely reference tools for the spare parts lists. Deviations according to gear unit size and design are possible!

3.1 Basic design of a helical gear unit

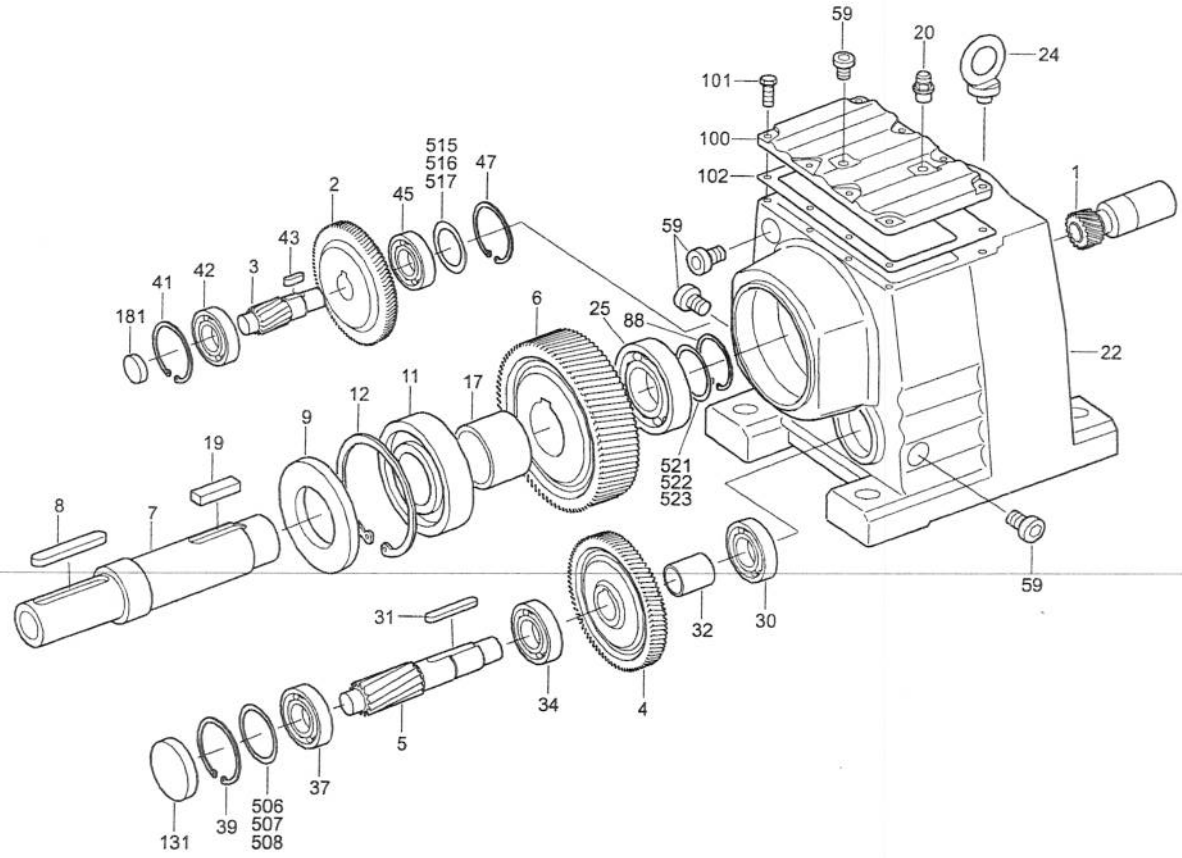


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Fig. 1: Basic structure of helical gear units

Legend

1	Pinion	19	Key	42	Deep groove ball bearing	507	Shim
2	Gear	20	Breather valve	43	Key	508	Shim
3	Pinion shaft	22	Gear unit housing	45	Deep groove ball bearing	515	Shim
4	Gear	24	Lifting eyebolt	47	Circlip	516	Shim
5	Pinion shaft	25	Cylinder ball bearing	59	Screw plug	517	Shim
6	Gear	30	Deep groove ball bearing	88	Circlip	521	Shim
7	Output shaft	31	Key	100	Cover	522	Shim
8	Key	32	Spacer tube	101	Hex head screw	523	Shim
9	Oil seal	34	Cylinder ball bearing	102	Gasket		
11	Deep groove ball bearing	37	Deep groove ball bearing	131	Cap		
12	Circlip	39	Circlip	181	Cap		
17	Spacer tube	41	Circlip	506	Shim		

3.3 Basic design of a helical-bevel gear unit

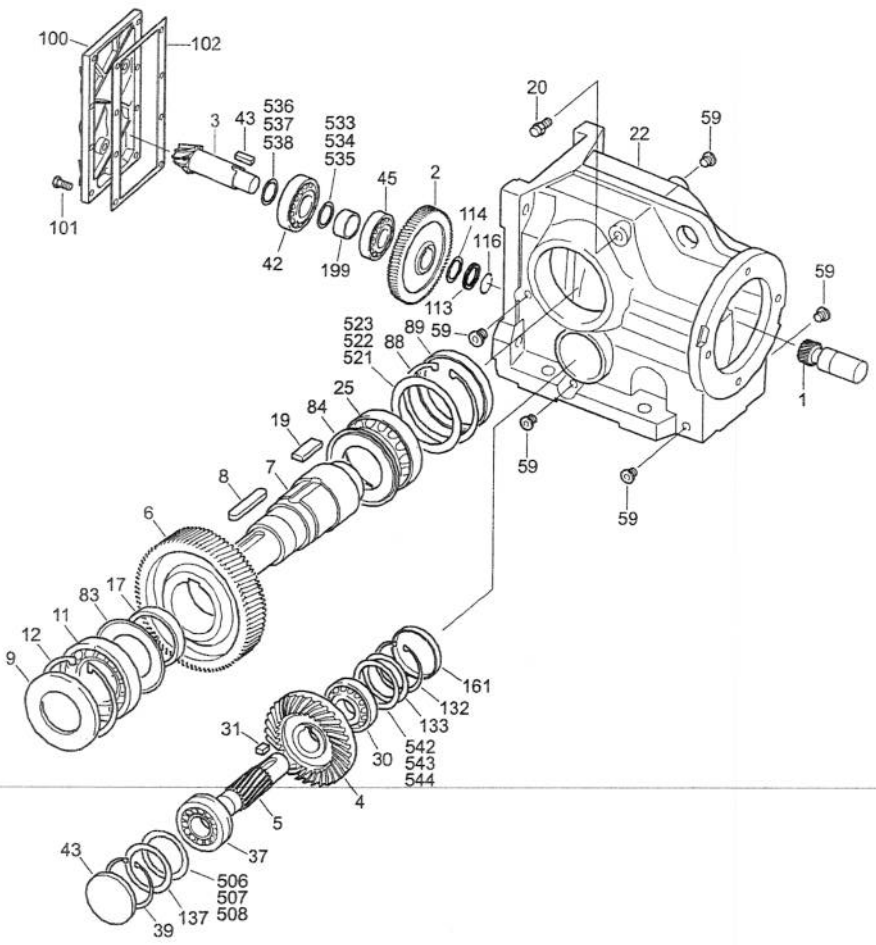

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Fig.3: Basic design of a helical-bevel gear unit

Legend

1 Pinion	25 Tapered roller bearing	102 Adhesive and sealant	523 Shim
2 Gear	30 Tapered roller bearing	113 Wing nut	533 Shim
3 Pinion shaft	31 Key	114 Locking plate	534 Shim
4 Gear	37 Tapered roller bearing	116 Thread retention	535 Shim
5 Pinion shaft	39 Circlip	119 Spacer tube	536 Shim
6 Gear	42 Tapered roller bearing	131 Cap	537 Shim
7 Output shaft	43 Key	132 Circlip	538 Shim
8 Key	45 Tapered roller bearing	133 Spacer	542 Shim
9 Oil seal	59 Screw plug	137 Spacer	543 Shim
11 Tapered roller bearing	83 Nilos ring	161 Cap	544 Shim
12 Circlip	84 Nilos ring	506 Shim	
17 Spacer tube	88 Circlip	507 Shim	
19 Key	89 Cap	508 Shim	
20 Breather valve	100 Gear unit cover	521 Shim	
22 Gear unit housing	101 Hex head screw	522 Shim	

3.5 Basic design of a SPIROPLAN® gear unit

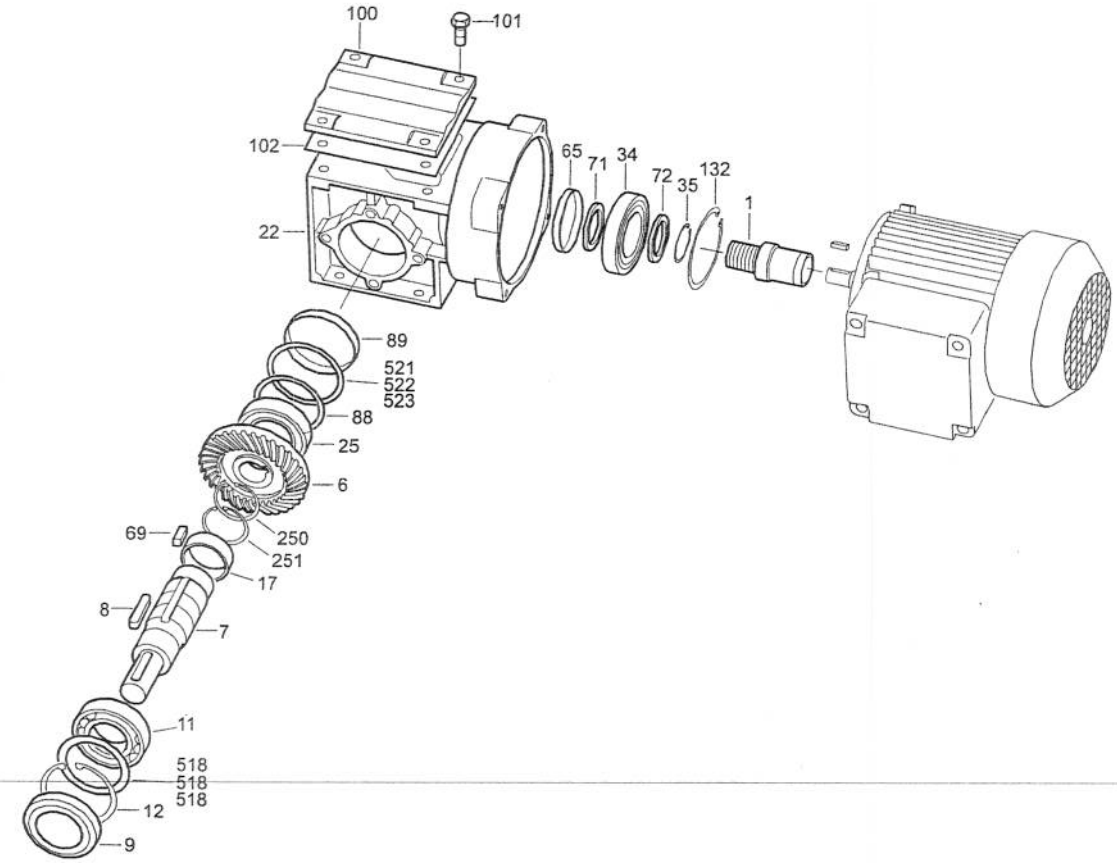

Fig. 5: Basic design of a SPIROPLAN® gear unit

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Legend

1	Pinion	19	Key	88	Circlip	251	Circlip
6	Gear	22	Gear unit housing	89	Cap	518	Shim
7	Output shaft	25	Deep groove ball bearing	100	Gear unit cover	519	Shim
8	Key	34	Deep groove ball bearing	101	Hex head screw	520	Shim
9	Oil seals	35	Circlip	102	Gasket	521	Shim
11	Deep groove ball bearing	65	Oil seal	132	Circlip	522	Shim
12	Circlip	71	Spacer	183	Oil ring	523	Shim
17	Spacer tube	72	Spacer	250	Circlip		

4.4 Installing the gear unit

The gear unit or geared motor must be mounted/installed in the specified mounting position on a level[1], vibration-absorbing and torsionally rigid support structure (Spiroplan® gear units are not dependent on mounting position). Do not tighten housing legs and mounting flanges against each other and pay attention to the approved overhung and axial loads

Use only bolts of 8.8 quality for installation of the geared motors

Use bolts of **10.9 quality** for fastening of flanges to transmit the rated torques listed in the catalog for the following helical geared motors in flange design (RF..) and in foot/ flange version (R..F):

- RF37, R37F with flange-Ø 120 mm
- RF47, R47F with flange-Ø 140 mm
- RF57, R57F with flange-Ø 160 mm

Oil check screws, drain screws and breather valves have to be freely accessible!

At this point of assembly, please check that the oil filling is as prescribed for the mounting position (see "Lubricants" / "Lubricant fill levels" or data on nameplate). **In case of mounting position change, adjust lubricant filling quantities accordingly.**

Please consult our service department, if the mounting position for K gear units is changed to M5 or M6 or within these mounting positions.

Please consult our service department, if the mounting position of S units in sizes S47 ... S97 is to be changed to mounting position M2.

Use plastic inserts (2 – 3 mm thick) if there is a risk of electrochemical corrosion between the gear unit and the driven machine (connection between different metals such as cast iron and high-grade steel)! Also fit the bolts with plastic washers! Ground the housing additionally – use the grounding bolts on the motor.

Installation in damp areas or in the open

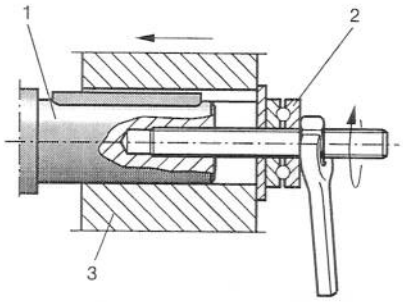
Gear units are supplied in corrosion-resistant versions for use in damp areas or in the open air. Any damage to the paintwork (e.g. on the breather valve) must be repaired.

1. Maximum permitted flatness error for flange mounting (approximate values with reference to DIN ISO 1101): with → flange 120...600 mm max. error 0.2...0.5 mm

4.5 Gear units with solid shaft

Installation of input and output elements

The following illustration is an example of a moutning device for mounting couplings or hubs onto gear unit or motor shaft ends. It may be possible to dispense with the thrust bearing on the mounting device.



1) Gear unit shaft end
2) Thrust bearing
3) Coupling hub

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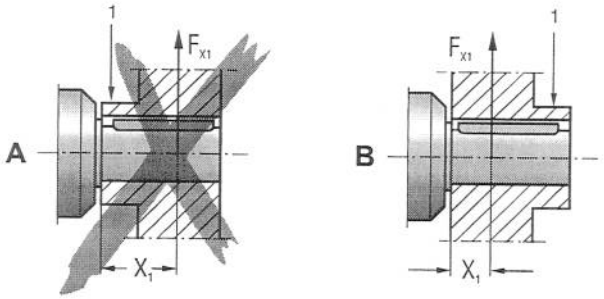
The following illustration displays the correct mounting arrangment **B** of a gear wheel or sprocket to prevent excessively high overhung loads.



1 = Hub

A = incorrect
B = correct

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- Only use a mounting device (see Fig. 1) for installing input and output elements. Use the center bore and the thread on the shaft end for positioning purposes.
- **Never drive belt pulleys, couplings, pinions, etc. onto the shaft end by hitting them with a hammer (damage to bearings, housing and the shaft!).**
- **In the case of belt pulleys, make sure the belt is tensioned correctly (in accordance with the manufacturer's instructions).**
- Power transmission elements should be balanced after fitting and must not give rise to any impermissible radial or axial forces (see Fig. 2 / permitted values see the "Geared Motors" catalog).

Note:

Assembly is easier if you first apply lubricant to the output element or heat it up briefly (to 80-100 °C).