SEW EURODRIVE

Assembly and Operating Instructions

User-friendly documentation
TÜV SÜD DocCert

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

Edition 06/2010

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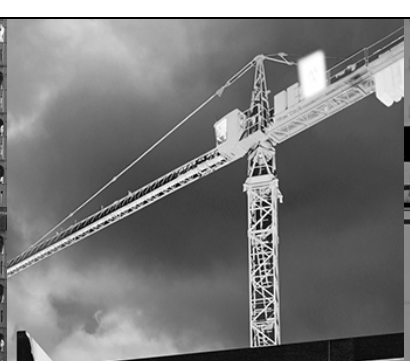


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1 General Information

1.1 How to use the operating instructions

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

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

1.2 Structure of the safety notes

1.2.1 Meaning of the signal words

The following table shows the grading and meaning of the signal words for safety notes, notes on potential risks of damage to property, and other notes.

Signal word	Meaning	Consequences if disregarded
⚠ **DANGER**	Imminent danger	Severe or fatal injuries
⚠ **WARNING**	Possible dangerous situation	Severe or fatal injuries
⚠ **CAUTION**	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the drive system or its environment
INFORMATION	Useful information or tip: Simplifies the handling of the drive system.	

1.2.2 Structure of the section-specific safety notes

Section safety notes do not apply to a specific action, but to several actions pertaining to one subject. The used symbols indicate either a general or a specific hazard.

This is the formal structure of a section safety note:

⚠ SIGNAL WORD

Type and source of danger.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the danger.

1.2.3 Structure of the embedded safety notes

Embedded safety notes are directly integrated in the instructions just before the description of the dangerous action.

This is the formal structure of an embedded safety note:

- ⚠ **SIGNAL WORD** Nature and source of hazard.

  Possible consequence(s) if disregarded.

  – Measure(s) to prevent the danger.

1.3 Rights to claim under limited warranty

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

1.4 Exclusion of liability

You must comply with the information contained in these operating instructions to ensure safe operation of the R..7, F..7, K..7, S..7, SPIROPLAN® W series gear units and to achieve the specified product characteristics and performance requirements.
SEW-EURODRIVE does not assume liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.

1.5 Copyright

2 Safety Notes

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

2.1 Preface

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

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

2.2 General information

⚠ DANGER

During operation, the motors, gearmotors and brakes can have live, bare and movable or rotating parts as well as hot surfaces, depending on their enclosure.

Severe or fatal injuries.

- All work related to transportation, storage, setup/mounting, connection, startup, maintenance and repair may only be carried out by qualified personnel, in strict observation of:
  - The relevant detailed operating instructions
  - The warning and safety signs on the motor/gearmotor
  - All other project planning documents, operating instructions and wiring diagrams related to the drive
  - The specific regulations and requirements for the system
  - The national/regional regulations governing safety and the prevention of accidents
- Never install damaged products
- Immediately report any damage to the shipping company

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

Refer to the documentation for additional information.

2.3 Target group

Any mechanical work may only be performed by adequately qualified personnel. Qualified personnel in this context are persons who are familiar with the setup, mechanical installation, trouble shooting and maintenance for this product. Further, they are qualified as follows:

- Training in mechanical engineering, e.g. as a mechanic or mechatronics technician (final examinations must have been passed).
- They are familiar with these operating instructions.

Any electronic work may only be performed by adequately qualified electricians. Qualified electricians in this context are persons who are familiar with the electronic installation, startup, trouble shooting and maintenance for this product. Further, they are qualified as follows:

- Training in electrical engineering, e.g. as an electrician or mechatronics technician (final examinations must have been passed).
- They are familiar with these operating instructions.

All work in further areas of transportation, storage, operation and waste disposal must only be carried out by persons who are trained appropriately.

All qualified personnel must wear appropriate protective clothing.

2.4 Designated use

The gear units are intended for industrial systems and may only be used in accordance with the information provided in SEW-EURODRIVE's technical documentation and the information given on the nameplate. They fulfill the applicable standards and regulations.

According to the 2006/42/EC Machinery Directive, the gear units are components for the installation in machines and plants. In the scope of the Directive, you must not take the machinery into operation in the proper fashion until you have established that the end product complies with Machinery Directive 2006/42/EC.

Using these products in potentially explosive atmospheres is prohibited, unless specifically designated otherwise.

2.5 Other applicable documentation

The following publications and documents have to be observed as well:

- "DR.71-225, 315 AC Motors" operating instructions for gearmotors
- Operating instructions of any attached options
- "Gear Units" catalog or
- "Gearmotors" catalog

2.6 Transport

Inspect the shipment immediately upon receipt for any damage that may have occurred during transportation. Inform the shipping company immediately. It may be necessary to preclude startup.

Tighten installed eyebolts. They are only intended for the weight of the motor/gearmotor; do not attach any additional loads.

The built-in lifting eyebolts comply with DIN 580. Always observe the loads and regulations listed in this standard. If the gearmotor is equipped with two suspension eye lugs or lifting eyebolts, then both of the suspension eye lugs should be used for transportation. In this case, the tension force vector of the slings must not exceed a 45° angle according to DIN 580.

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

2.7 Extended storage

Observe the notes in section "Extended storage" (page 109).

2.8 Installation/assembly

Observe the notes in section "Mechanical Installation" (page 17)!

2.9 Startup/operation

Check the oil level before startup as described in chapter Inspection/Maintenance (page 63).

Check that the direction of rotation is correct in **decoupled** status. Listen out for unusual grinding noises as the shaft rotates.

Secure keys for test mode without output elements. Do not deactivate monitoring and protection equipment even in test mode.

Switch off the gearmotor if in doubt whenever changes occur in relation to normal operation (e.g. increased temperature, noise, vibration). Determine the cause and contact SEW-EURODRIVE, if required.

2.10 Inspection/maintenance

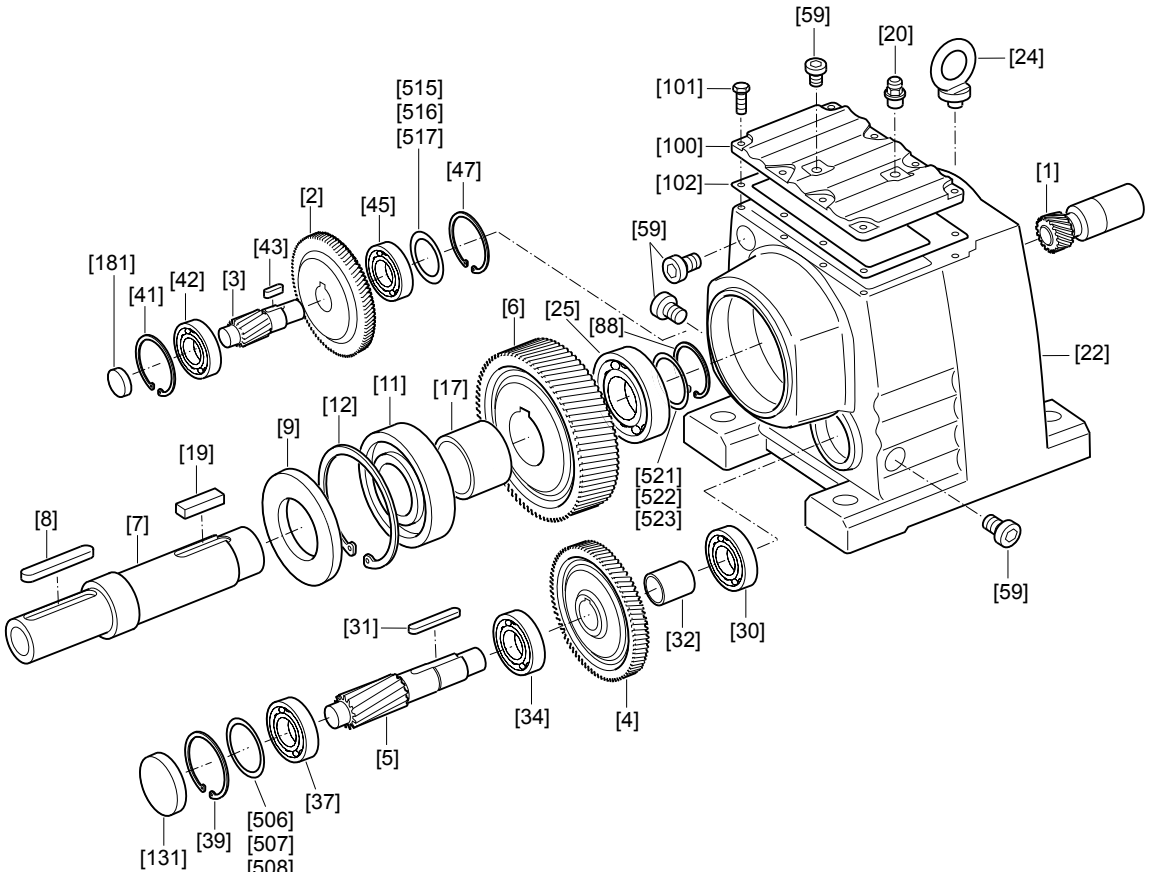
Observe the notes in chapter "Inspection/Maintenance" (page 63)!

3 Gear Unit Structure

INFORMATION

The following figures are block diagrams. They help you to assign components to the spare parts list. Discrepancies may occur depending on the gear unit size and version.

3.1 Basic structure of helical gear units



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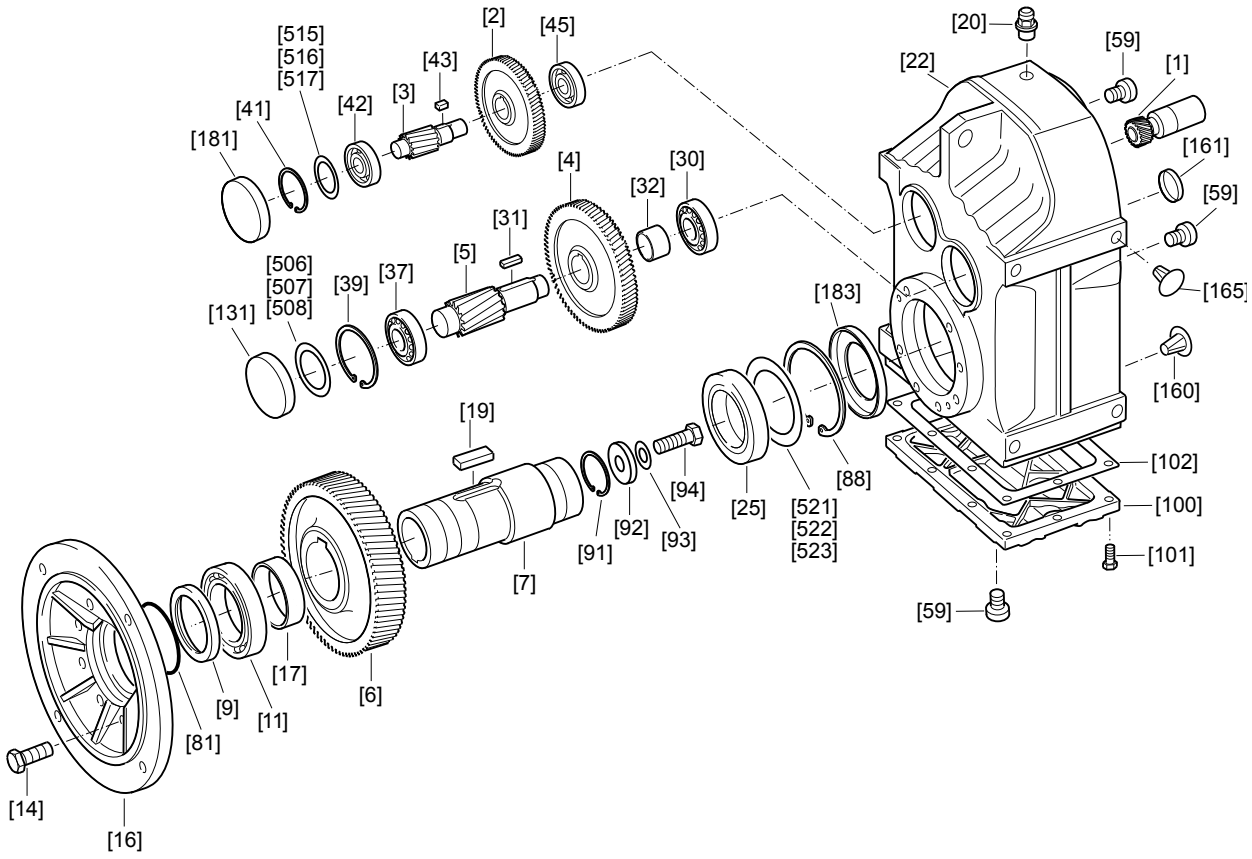
[1] Pinion
[2] Gearwheel
[3] Pinion shaft
[4] Gearwheel
[5] Pinion shaft
[6] Gearwheel
[7] Output shaft
[8] Key
[9] Oil seal
[11] Roller bearing
[12] Circlip
[17] Spacer tube
[19] Key
[20] Breather valve
[22] Gear unit housing
[24] Lifting eyebolt
[25] Roller bearing
[30] Roller bearing
[31] Key
[32]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

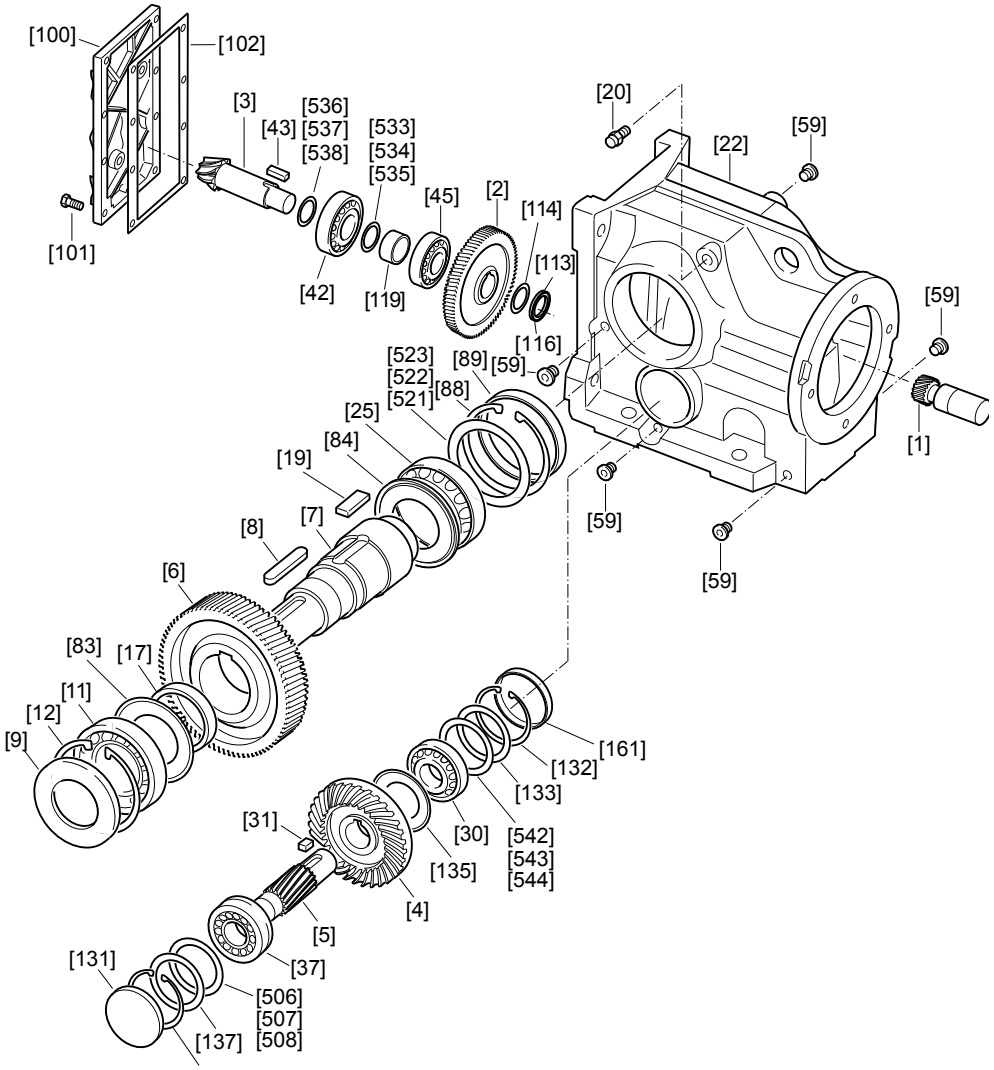
3.2 Basic structure of parallel shaft helical gear units



19298059

[1] Pinion
[2] Gearwheel
[3] Pinion shaft
[4] Gearwheel
[5] Pinion shaft
[6] Gearwheel
[7] Hollow shaft
[9] Oil seal
[11] Roller bearing
[14] Hex head screw
[16] output flange
[17] Spacer tube
[19] Key
[20] Breather valve
[22] Gear unit housing
[25] Roller bearing
[30] Roller bearing
[31] Key
[32] Spacer tube
[37] Roller bearing
[39] Circlip
[41] Circlip
[42] Roller bearing
[43] Key
[45] Roller bearing
[59] Screw plug
[81] Nilos ring
[88] Circlip
[91] Circlip
[92] Disc
[93] Lock washer
[94] Hex head screw
[100] Gear cover plate
[101] Hex head screw
[102] Seal
[131] Closing cap
[160] Closing plug
[161] Closing cap
[165] Closing plug
[181] Closing cap
[183] Oil seal
[506] Shim
[507] Shim
[508] Shim
[515] Shim
[516] Shim
[517] Shim
[521] Shim
[522] Shim
[523] Shim

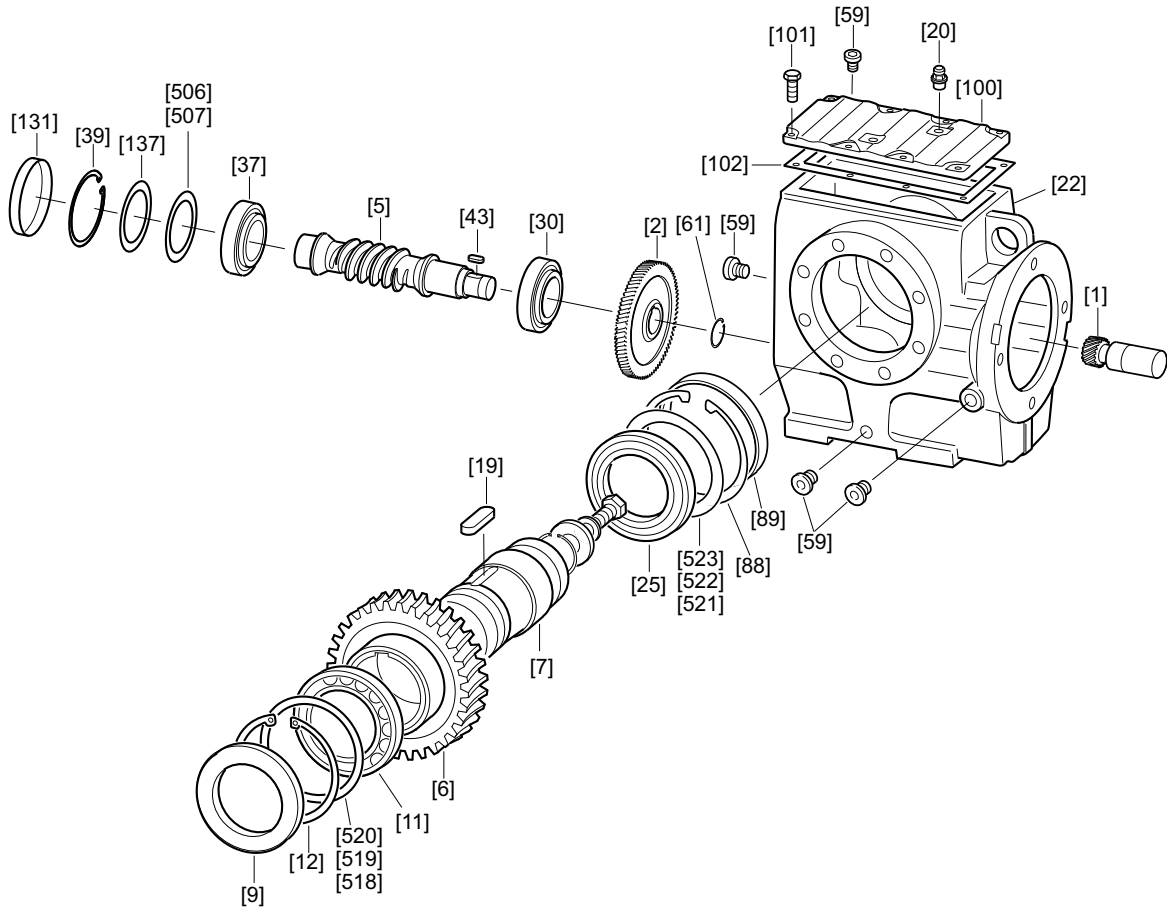
3.3 Basic structure of helical-bevel gear units



19301131

[1]	Pinion	[25]	Roller bearing	[102]	Seal	[522]	Shim
[2]	Gearwheel	[30]	Roller bearing	[113]	Slotted nut	[523]	Shim
[3]	Pinion shaft	[31]	Key	[114]	Multi-tang washer	[533]	Shim
[4]	Gearwheel	[37]	Roller bearing	[116]	Thread locker	[534]	Shim
[5]	Pinion shaft	[39]	Circlip	[119]	Spacer tube	[535]	Shim
[6]	Gearwheel	[42]	Roller bearing	[131]	Closing cap	[536]	Shim
[7]	Output shaft	[43]	Key	[132]	Circlip	[537]	Shim
[8]	Key	[45]	Roller bearing	[133]	Supporting ring	[538]	Shim
[9]	Oil seal	[59]	Screw plug	[135]	Nilos ring	[542]	Shim
[11]	Roller bearing	[83]	Nilos ring	[161]	Closing cap	[543]	Shim
[12]	Circlip	[84]	Nilos ring	[506]	Shim	[544]	Shim
[17]	Spacer tube	[88]	Circlip	[507]	Shim		
[19]	Key	[89]	Closing cap	[508]	Shim		
[20]	Breather valve	[100]	Gear cover plate	[521]	Shim		
[22]	Gear unit housing	[101]	Hex head screw	[521]	Shim		

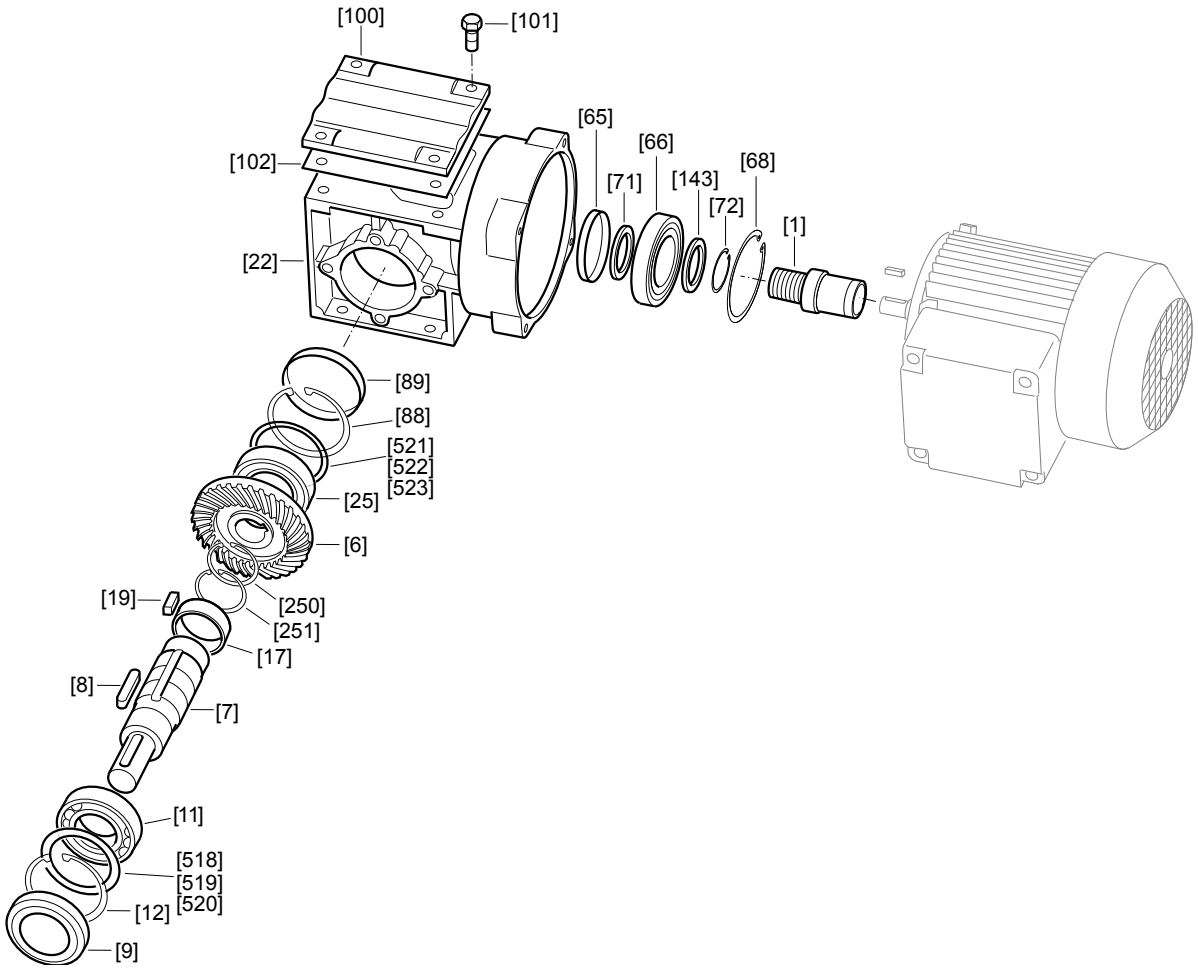
3.4 Basic structure of helical-worm gear units



19304203

[1]	Pinion	[20]	Breather valve	[88]	Circlip	[518]	Shim
[2]	Gearwheel	[22]	Gear unit housing	[89]	Closing cap	[519]	Shim
[5]	Worm	[25]	Roller bearing	[100]	Gear cover plate	[520]	Shim
[6]	Worm gear	[30]	Roller bearing	[101]	Hex head screw	[521]	Shim
[7]	Output shaft	[37]	Roller bearing	[102]	Seal	[522]	Shim
[9]	Oil seal	[39]	Circlip	[131]	Closing cap	[523]	Shim
[11]	Roller bearing	[43]	Key	[137]	Supporting ring		
[12]	Circlip	[59]	Screw plug	[506]	Shim		
[19]	Key	[61]	Circlip	[507]	Shim		

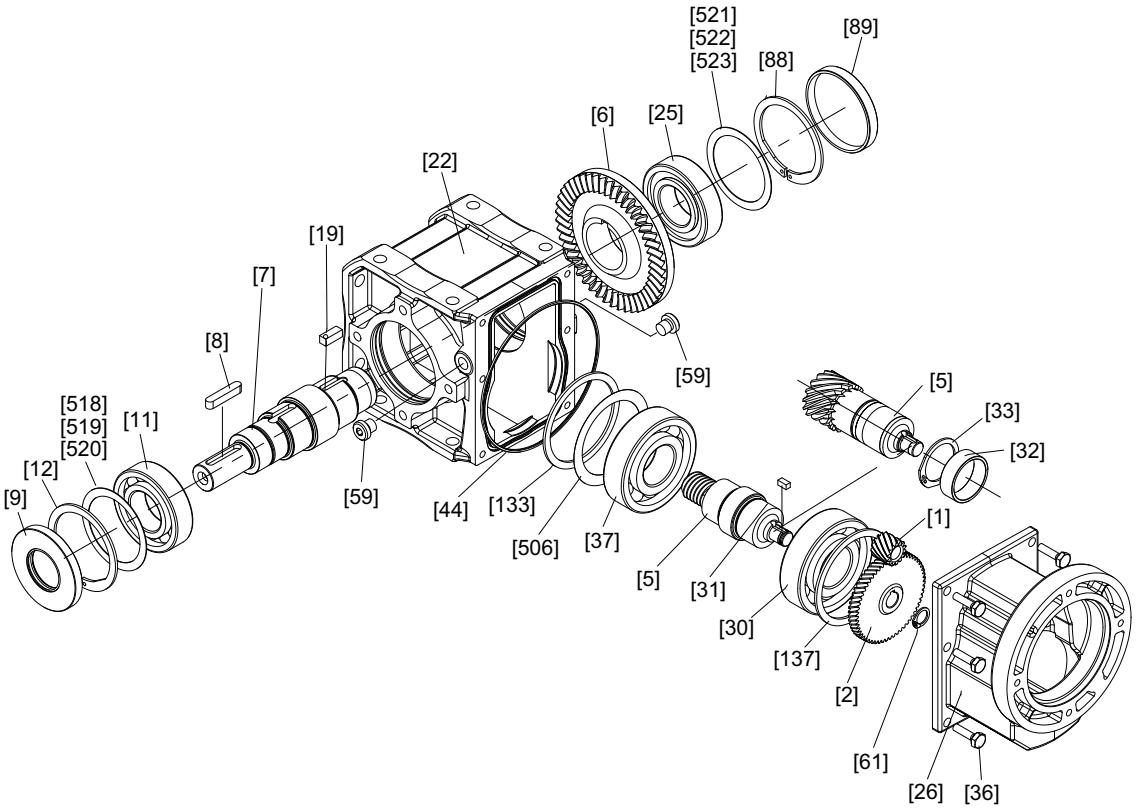
3.5 Basic structure of SPIROPLAN® W10-W30 gear units



19307275

[1]	Pinion	[19]	Key	[88]	Circlip	[251]	Circlip
[6]	Gearwheel	[22]	Gear unit housing	[89]	Closing cap	[518]	Shim
[7]	Output shaft	[25]	Roller bearing	[100]	Gear cover plate	[519]	Shim
[8]	Key	[65]	Oil seal	[101]	Hex head screw	[520]	Shim
[9]	Oil seal	[66]	Roller bearing	[102]	Seal	[521]	Shim
[11]	Roller bearing	[71]	Supporting ring	[132]	Circlip	[522]	Shim
[12]	Circlip	[72]	Circlip	[183]	Oil seal	[523]	Shim
[17]	Spacer tube	[143]	Supporting ring	[250]	Circlip		

3.6 Basic structure of SPIROPLAN® W37 gear units



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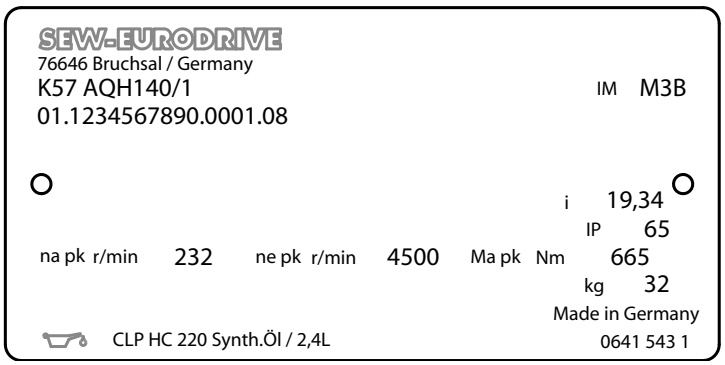
[1]	Pinion	[22]	Gear unit housing	[44]	O-ring	[137]	Shim
[2]	Wheel	[24]	Eyebolt	[59]	Screw plug	[150]	Hex nut
[5]	Pinion shaft	[25]	Grooved ball bearing	[61]	Retaining ring	[183]	Oil seal
[6]	Wheel	[26]	Housing stage 1	[68]	Retaining ring	[506]	Shim
[7]	Output shaft	[30]	Grooved ball bearing	[72]	Retaining ring	[518]	Shim
[8]	Key	[31]	Key	[80]	Key	[519]	Shim
[9]	Oil seal	[32]	Spacer tube	[88]	Retaining ring	[520]	Shim
[11]	Grooved ball bearing	[33]	Retaining ring	[89]	Closing cap	[521]	Shim
[12]	Retaining ring	[36]	Hex head screw	[106]	Stud	[522]	Shim
[19]	Key	[37]	Grooved ball bearing	[133]	Shim	[523]	Shim

3.7 Nameplate/unit designation

3.7.1 Nameplate

The following figure shows an example of a nameplate for a helical-bevel gear unit with AQ adapter:



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i		Gear unit reduction ratio
IM		Mounting position
IP		Degree of protection
n_{epk}	[rpm]	Maximum permitted input speed
n_{apk}	[rpm]	Maximum permitted output speed
M_{apk}	[Nm]	Maximum permitted output torque

3.7.2 Type designation

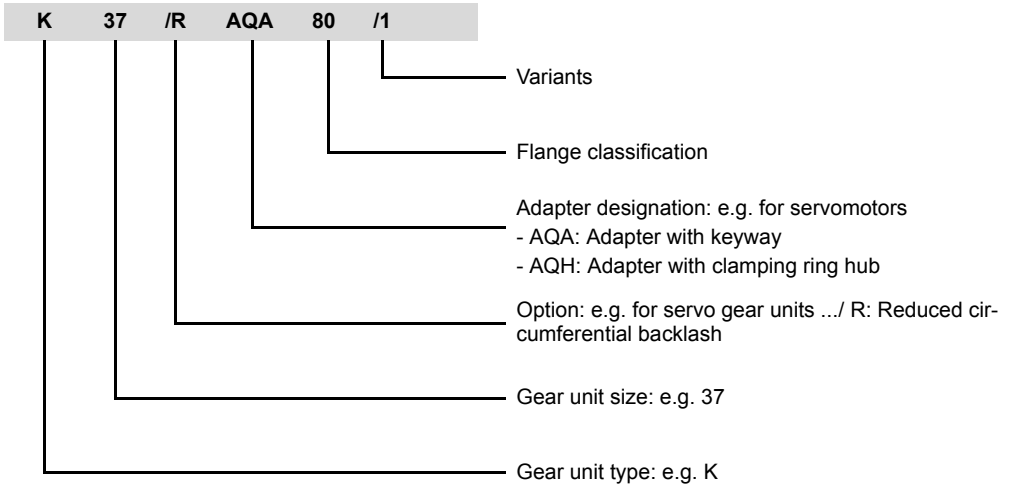
INFORMATION

For a detailed overview of unit designations and additional information, refer to the following publications:

- "Gear Units" catalog or
- "Gearmotors" catalog

Example: Helical-bevel gear unit

A helical-bevel gear unit with adapter has, for example, the following unit designation:



4 Mechanical Installation

4.1 Required tools/resources

- Set of wrenches
- Torque wrench for:
  - Shrink disks
  - AQH motor adapter
  - Input shaft assembly with centering shoulder
- Mounting device
- Compensation elements (shims, spacing rings)
- Fasteners for input and output elements
- Lubricant (e.g. NOCO® Fluid)
- Bolt locking compound (for input shaft assembly with centering shoulder), e.g. Loctite® 243
- Standard parts are not included in the delivery

4.1.1 Installation tolerances

Shaft end	Flanges
Diameter tolerance in accordance with DIN 748 • ISO k6 for solid shafts with Ø ≤ 50 mm • ISO m6 for solid shafts with Ø > 50 mm • ISO H7 for hollow shafts • Center bore in accordance with DIN 332, shape DR	Centering shoulder tolerance to DIN 42948 • ISO j6 for b1 ≤ 230 mm • ISO h6 with b1 > 230 mm

4.2 Prerequisites for assembly

Check that the following conditions have been met:

- The entries on the nameplate of the gearmotor match the voltage supply system.
- The drive has not been damaged during transportation or storage.
- Ensure that the following requirements have been met:

  For standard gear units:

  – Ambient temperature according to the technical documentation, nameplate and lubricant table in section "Lubricants" (page 111).

  – No harmful oils, acids, gases, vapors, radiation etc. in the vicinity

  For special versions:

  – The drive is designed in accordance with the ambient conditions. Refer to the information on the nameplate.

  For helical-worm/SPIROPLAN® W gear units:

  – No large external mass moments of inertia which could exert a retrodriving load on the gear unit.

    [for η' (retrodriving) = 2 – 1/η < 0.5 self-locking]

- You must clean the output shafts and flange surfaces thoroughly to ensure they are free of anti-corrosion agents, contamination or similar. Use a commercially available solvent. Do not expose the sealing lips of the oil seals to the solvent – damage to the material.
- When the drive is installed in abrasive ambient conditions, protect the output end oil seals against wear.

4.3 Installing the gear unit

⚠ NOTICE

Improper assembly may result in damages to the gear unit/gearmotor.

Possible damage to property.

- Do closely observe the notes in this chapter.

- Work on the gear unit only when the machine is not in use. Secure the drive unit against unintentional power-up.
- Protect the gear unit from direct cold air currents. Condensation may cause water to accumulate in the oil.

The gear unit or gearmotor is only allowed to be installed in the specified mounting position. Refer to the information on the nameplate. SPIROPLAN® gear units of sizes W10-W30 do not depend on a particular mounting position.

The support structure must have the following characteristics:

- Level
- Vibration damping
- Torsionally rigid

The maximum permitted flatness error for foot and flange mounting (guide values with reference to DIN ISO 1101):

- Gear unit size ≤ 67: Max. 0.4 mm
- Gear unit size 77 – 107: Max. 0.5 mm
- Gear unit size 137 – 147: Max. 0.7 mm
- Gear unit size 157 – 187: Max. 0.8 mm

Do not tighten the housing legs and mounting flanges against one another and ensure that you comply with the permitted overhung and axial loads! Observe chapter "Project Planning" in the Gear unit/gearmotor catalog for calculating the permitted overhung and axial loads.

Secure gearmotors using quality 8.8 screws.

Secure the following gearmotors using quality 10.9 screws:

- RF37, R37F with flange Ø = 120 mm
- RF47, R47F with flange Ø = 140 mm
- RF57, R57F with flange Ø = 160 mm
- and RZ37, RZ47, RZ57, RZ67, RZ77, RZ87

INFORMATION

When installing the gear unit, make sure that the oil level and drain plugs as well as the breather plugs are easily accessible!

At the same time, also check that the oil fill corresponds to the specifications for the intended mounting position (see section "Lubricant fill quantities" (page 113) or refer to the information on the nameplate). The gear units are filled with the required oil volume at the factory. There may be slight deviations at the oil level plug as a result of the mounting position, which are permitted within the manufacturing tolerances.

If you change the mounting position, make sure that you change the lubricant fill quantities and the position of the breather valve accordingly. Observe section"Lubricant fill quantities" (page 113) and chapter "Mounting Positions" (page 82).

Consult the SEW customer service if you intend to change the mounting position of K gear units to or between M5 and M6.

Consult the SEW customer service if you intend to change the mounting position of S gear units sizes S47 ... S97, to M2 and M3.

In case there is a risk of electrochemical corrosion between the gear unit and the driven machine, use plastic inserts that are 2 to 3 mm thick. The material used must have an electrical leakage resistance < 10^9 Ω. Electrochemical corrosion can occur between various metals, for example, cast iron and high-grade steel. Also fit the bolts with plastic washers. Ground the housing additionally – use the grounding bolts on the motor.

4.3.1 Tightening torques for retaining screws

Mount the gearmotors with the following tightening torques:

Screw/nut	Tightening torque screw / nut Strength class 8.8 [Nm]
M6	11
M8	25
M10	48
M12	86
M16	210
M20	410
M24	710
M30	1450
M36	2500
M42	4600
M48	6950
M56	11100

Mount the helical gearmotors in flange-mounted design with the following increased tightening torques:

Flange	Gear unit	Screw/nut	Tightening torque screw / nut Strength class 10.9 [Nm]
120	RF37	M6	14
140	RF47	M8	35
160	RF57	M8	35
60ZR	RZ37	M8	35
70ZR	RZ47	M8	35
80ZR	RZ57	M10	69
95ZR	RZ67	M10	69
110ZR	RZ77	M12	120
130ZR	RZ87	M12	120

4.3.2 Mounting the gear units

Foot-mounted gear unit

The following table shows the thread sizes of the gear units in foot-mounted design depending on the gear unit type and size:

Screw	Gear unit type					
	R / R..F	RX	F / FH..B / FA..B	K / KH..B / KV..B / KA..B	S	W
M6	07					10/20
M8	17/27/37		27/37		37	30/37/47
M10		57	47	37/47	47/57	
M12	47/57/67	67	57/67	57/67	67	
M16	77/87	77/87	77/87	77	77	
M20	97	97/107	97	87	87	
M24	107		107	97	97	
M30	137		127	107/167		
M36	147/167		157	127/157/187		

Gear unit with B14 flange and/or hollow shaft

The following table shows the thread sizes of the gear units with B14 flange and/or hollow shaft depending on the gear unit type and size:

Screw	Gear unit type				
	RZ	FAZ / FHZ	KAZ / KHZ / KVZ	SA / SAZ / SHZ	WA
M6	07/17/27			37	10/20/30
M8	37/47	27/37/47	37/47	47/57	37
M10	57/67				47
M12	77/87	57/67/77	57/67/77	67/77	
M16		87/97	87/97	87/97	
M20		107/127	107/127		
M24		157	157		

Gear unit with B5 flange

The following table shows the thread sizes of the gear units with B5 flange depending on the gear unit type,size and flange diameter:

Flange Ø [mm]	Screw	Gear unit type				
		RF / R..F / RM	FF / FAF / FHF	KF / KAF / KHF / KVF	SF / SAF /SHF	WF / WAF
80	M6					10
110	M8					20
120	M6	07/17/27			37	10/20/30/37
140	M8	07/17/27				
160	M8	07/17/27/37/47	27/37	37	37/47	30/37/47
200	M10	37/47/57/67	47	47	57/67	
250	M12	57/67/77/87	57/67	57/67	77	
300	M12	67/77/87	77	77		
350	M16	77/87/97/107	87	87	87	
450	M16	97/107/137/147	97/107	97/107	97	
550	M16	107/137/147/167	127	127		
660	M20	147/167	157	157		

4.3.3 Installation in damp locations or in the open

Drives are supplied in corrosion-resistant versions with an according surface protection coating for use in damp areas or outdoors. Repair any damage to the paint work (e.g. on the breather valve or the eyebolts).

When mounting the motors onto AM, AQ, AR, AT adapters and to start-up and friction couplings, seal the flange areas with a suitable sealing compound, e.g. Loctite® 574.

Units installed outdoors must be protected from the sun. Suitable protective devices are required, such as covers or roofs. Avoid any heat accumulation. The operator must ensure that foreign objects do not impair the function of the gear unit (e.g., by falling objects or coverings).

4.3.4 Breather

The following gear units do not require a breather:

- R07 in mounting positions M1, M2, M3, M5 and M6
- R17, R27 and F27 in mounting positions M1, M3, M5 and M6
- SPIROPLAN® W10, W20, W30 gear units
- SPIROPLAN® W37 and W47 gear units in mounting positions M1, M2, M3, M5, M6

SEW-EURODRIVE supplies all other gear units with the breather valve installed and activated according to the particular mounting position.

Exceptions:

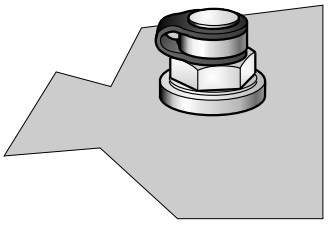
1. SEW supplies the following gear units with a screw plug on the vent hole provided:
   - Pivoted mounting positions, if possible
   - Gear units for mounting on a slant

   The breather valve is located in the motor terminal box. Before startup, you must replace the highest screw plug with the provided breather valve.
2. SEW supplies a breather valve in a plastic bag for **gear head units** requiring venting on the input end.
3. **Enclosed gear units** are supplied without a breather valve.

Activating the breather valve

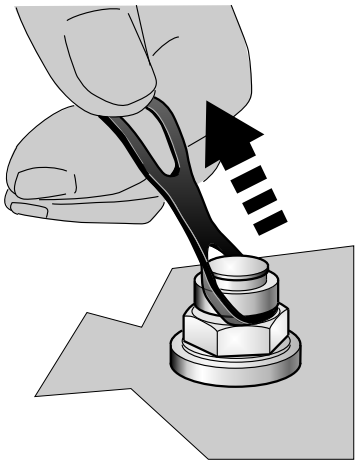
Check whether the breather valve is activated. If the breather valve has not been activated, you must remove the transport fixture from the breather valve before starting up the gear unit!

1. Breather valve with transport fixture



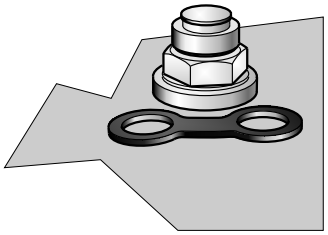
211319051

2. Removing the transport fixture



211316875

3. Activated breather valve



211314699

4.3.5 Painting the gear unit

NOTICE

Breather valves and oil seals may be damaged during painting or re-painting.

Potential damage to property.

- Thoroughly cover the breather valves and the sealing lip of the oil seals with strips prior to painting.
- Remove the strips after painting.

4.4 Gear units with solid shaft

4.4.1 Assembling input and output elements

NOTICE

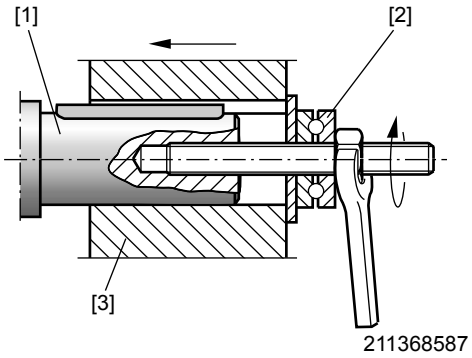
Bearing, hosing or shaft may be damaged due to improper assembly.

Possible damage to property

- Only assemble the input and output components with a mounting device. Use the center bore and the thread on the shaft end for positioning.
- Never force belt pulleys, couplings, pinions, etc. onto the shaft end by hitting them with a hammer.
- 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 the "Gearmotors" or "Explosion-Proof Drives" catalog for permitted values).

Using a mounting device

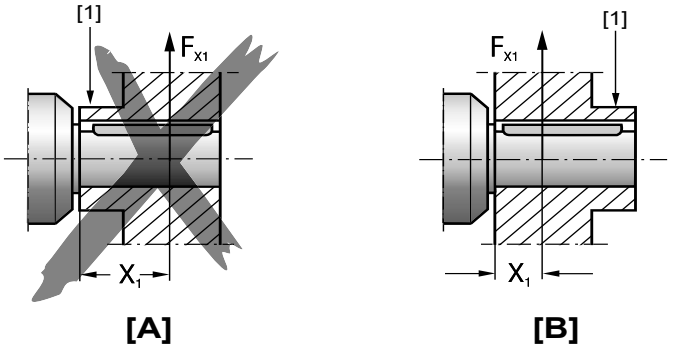
The following figure shows a mounting device for installing couplings or hubs on gear unit or motor shaft ends. Should you be able to tighten the screw without any problems, you may not need the thrust bearing on the mounting device.



[1] Gear shaft end
[2] Thrust bearing
[3] Coupling hub

Avoiding excessive overhung loads

Avoid high overhung loads by: Installing the gear or chain sprocket according to figure **B** if possible.



[1] Hub
[A] unfavorable
[B] correct

INFORMATION

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

4.4.2 Mounting of couplings

⚠ CAUTION

Input and output components such as belt pulleys, couplings etc. are in fast motion during operation.

Risk of jamming and crushing.

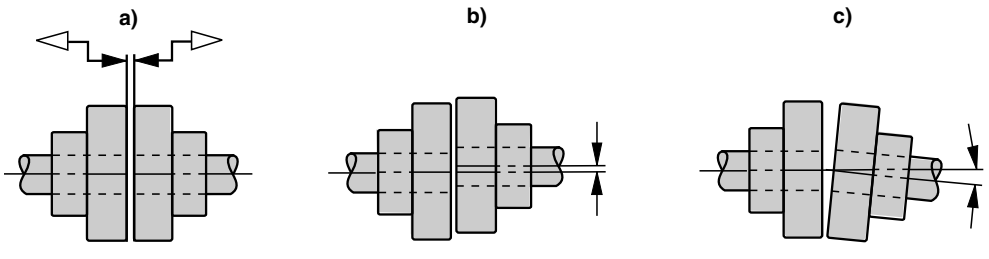
- Cover input and output components with a touch guard.

Adjust the following misalignments according to the coupling manufacturer's specifications when mounting couplings.

a) Maximum and minimum clearance

b) Axial offset

c) Angular offset



4.5 Torque arms for shaft-mounted gear units

NOTICE

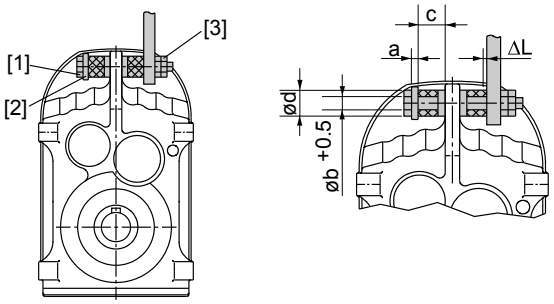
Improper assembling may result in damages to the gear unit.

Possible damage to property

- Do not place torque arms under strain during installation.
- Use bolts of quality 8.8 to fasten torque arms.

4.5.1 Parallel shaft helical gear units

The following figure shows the toque arm for parallel shaft helical gear units.



9007199466107403

[1] Screw
[2] Washer
[3] Nut

Proceed as follows to mount the rubber buffers:

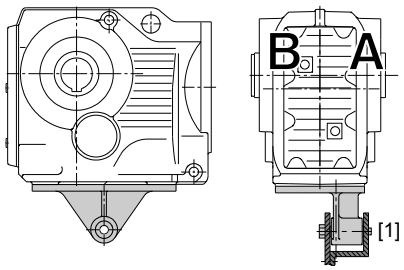
1. Use screws [1] and washers according to the following table.
2. Use two nuts to secure the screw connection [3].
3. Tighten the screw until the initial stress "Δ L" of the buffers is reached according to the table.

Gear unit	rubber buffer			Washer width	Δ L (taut)
	Diameter	Internal diameter	Length (loose)		
	d [mm]	b [mm]	c [mm]	a [mm]	[mm]
FA27	40	12.5	20	5	1
FA37	40	12.5	20	5	1
FA47	40	12.5	20	5	1.5
FA57	40	12.5	20	5	1.5
FA67	40	12.5	20	5	1.5
FA77	60	21.0	30	10	1.5
FA87	60	21.0	30	10	1.5
FA97	80	25.0	40	12	2
FA107	80	25.0	40	12	2
FA127	100	32.0	60	15	3
FA157	120	32.0	60	15	3

4.5.2 Helical-bevel gear units

The following figure shows the toque arm for helical-bevel gear units.

- Bushing [1] with bearings on both ends.
- Install connection end B as a mirror image of A.



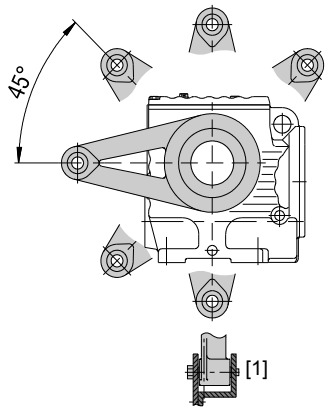
211362059

Gear unit	bolts	Tightening torque
KA37	4 × M10 × 25 – 8.8	48 Nm
KA47	4 × M10 × 30 – 8.8	48 Nm
KA67	4 × M12 × 35 – 8.8	86 Nm
KA77	4 × M16 × 40 – 8.8	210 Nm
KA87	4 × M16 × 45 – 8.8	210 Nm
KA97	4 × M20 × 50 – 8.8	410 Nm
KA107	4 × M24 × 60 – 8.8	710 Nm
KA127	4 × M36 × 130 – 8.8	2500 Nm
KA157	4 × M36 × 130 – 8.8	2500 Nm

4.5.3 Helical worm gear units

The following figure shows the toque arm for helical-worm gear units.

- Bushing [1] with bearings on both ends.



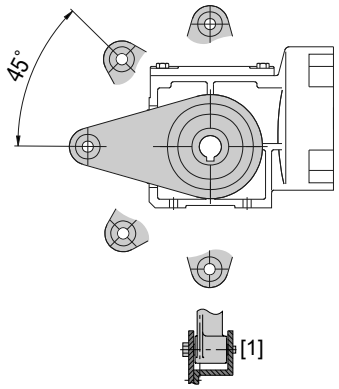
211491723

Gear unit	bolts	Tightening torque
SA37	4 x M6 × 16 – 8.8	11 Nm
SA47	4 x M8 × 20 – 8.8	25 Nm
SA57	6 x M8 × 20 – 8.8	25 Nm
SA67	8 x M12 × 25 – 8.8	86 Nm
SA77	8 x M12 × 35 – 8.8	86 Nm
SA87	8 x M16 × 35 – 8.8	210 Nm
SA97	8 x M16 × 35 – 8.8	210 Nm

4.5.4 SPIROPLAN®W gear units

The following figure shows the toque arm for SPIROPLAN® W gear units.

- Bushing [1] with bearings on both ends.



211489547

Gear unit	bolts	Tightening torque Nm
WA10	4 x M6 × 16 - 8.8	11
WA20	4 x M6 × 16 - 8.8	11
WA30	4 x M6 × 16 - 10.9	15
WA37	4 x M8 × 20 - 10.9	35
WA47	4 x M10 × 25 - 10.9	70

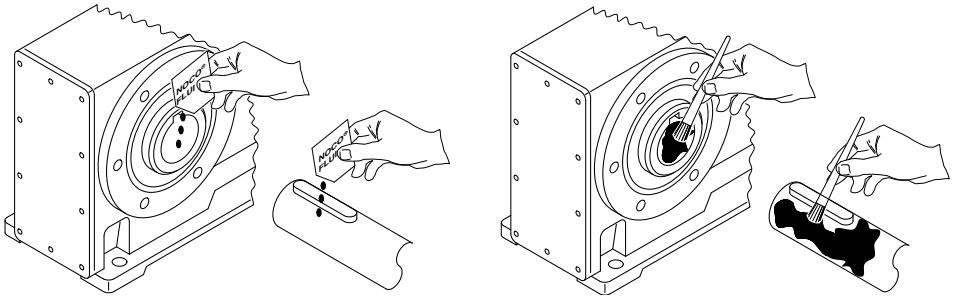
4.6 Shaft-mounted gear units with keyway or splined hollow shaft

INFORMATION

Concerning the configuration of the customer shaft, please also refer to the design notes in the Gearmotors catalog.

4.6.1 Assembly notes

1. Apply and thoroughly spread NOCO® Fluid



211516171

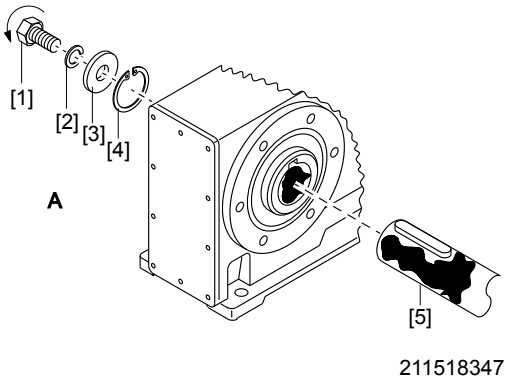
2. Install the shaft and secure it axially

   (mounting is facilitated by using a mounting device)

   The three mounting types are described below:

   - 2A: Standard scope of delivery
   - 2B: installation and removal kit for customer shaft with contact shoulder
   - 2C: installation and removal kit for customer shaft without contact shoulder

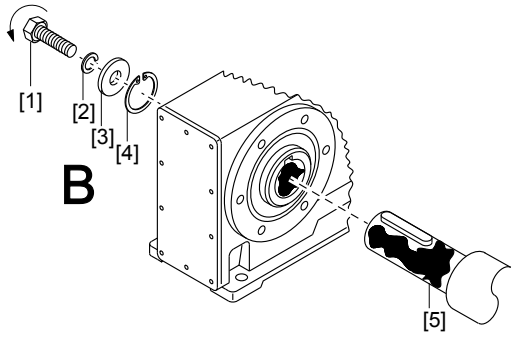
2A: Installation with standard scope of delivery



211518347

[1] Short retaining bolt (standard delivery scope)
[2] Lock washer
[3] Washer
[4] Retaining ring
[5] Customer shaft

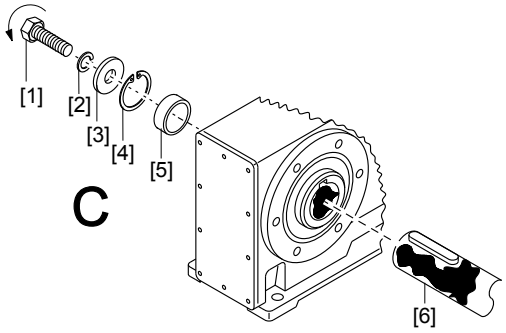
2B: Installation with SEW-EURODRIVE installation and removal kit (page 35)
– customer shaft **with** contact shoulder



211520523

[1] Retaining screw
[2] Lock washer
[3] Washer
[4] Retaining ring
[5] Customer shaft with contact shoulder

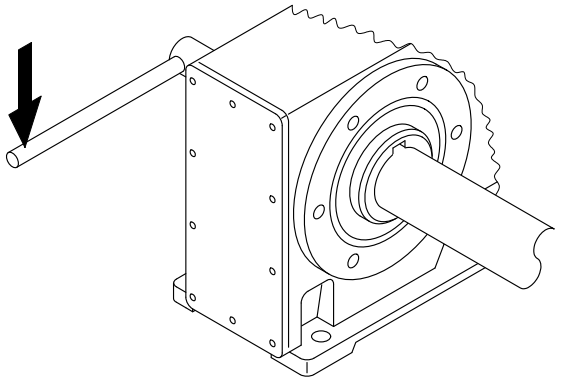
2C: Installation with SEW-EURODRIVE installation and removal kit (page 35)
– customer shaft **without** contact shoulder



211522699

[1] Retaining screw
[2] Lock washer
[3] Washer
[4] Retaining ring
[5] Spacer tube
[6] Customer shaft without contact shoulder

3. Tighten the retaining screw to the appropriate torque (see table).



211524875

Screw	Tightening torque [Nm]
M5	5
M6	8
M10/12	20
M16	40
M20	80
M24	200

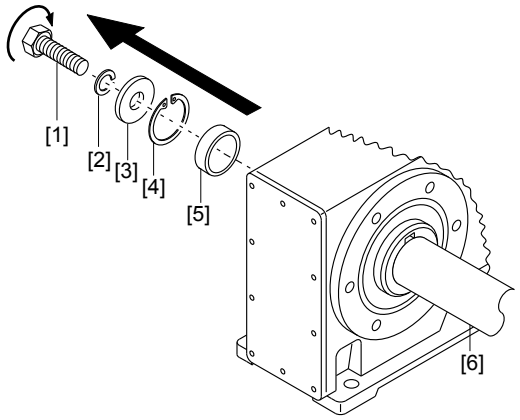
INFORMATION

To avoid contact corrosion, we recommend that the customer shaft should additionally be lathed down between the 2 contact surfaces.

4.6.2 Removal notes

This description is only applicable when the gear unit was assembled using the installation and removal kit (page 35) from SEW-EURODRIVE. Observe section "Installation notes (page 30)", 2B or 2C.

1. Loosen the retaining screw [1].
2. Remove parts [2] to [4] and, if applicable, the distance piece [5].

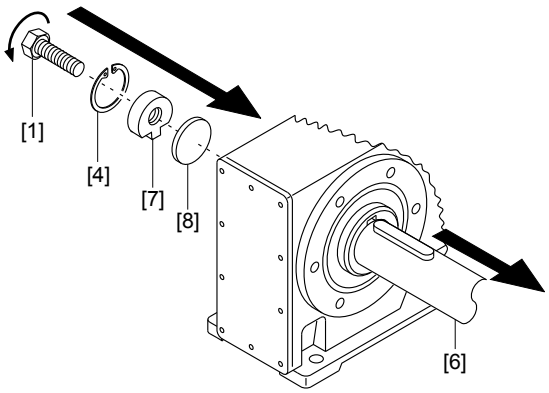


211527051

[1] Retaining screw
[2] Lock washer
[3] Washer
[4] Retaining ring
[5] Spacer tube
[6] Customer shaft

3. Insert the forcing disk [8] and the fixed nut [7] from the SEW-EURODRIVE installation/removal kit between the customer shaft [6] and the retaining ring [4].
4. Re-install the retaining ring [4].

5. Screw the retaining screw [1] back in. Now you can force the gear unit off the shaft by tightening the bolt.

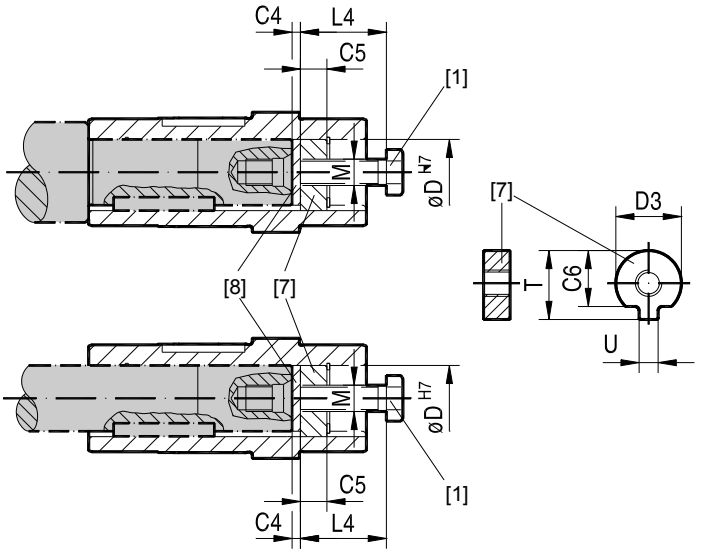


211529227

[1] Retaining screw
[4] Retaining ring
[6] Customer shaft
[7] Fixed nut
[8] Forcing disk

4.6.3 SEW installation and removal kit

The SEW-EURODRIVE installation/removal kit can be ordered by quoting the specified part number.



211531403

[1] Retaining screw
Fixed nut for disassembly [7]
[8] Forcing disk

Type	D^{H7} [mm]	M[1)]	C4 [mm]	C5 [mm]	C6 [mm]	$U^{-0.5}$ [mm]	$T^{-0.5}$ [mm]	$D3^{-0.5}$ [mm]	L4 [mm]	Part number of the installation/ removal kit
WA..10	16	M5	5	5	12	4.5	18	15.7	50	643 712 5
WA..20	18	M6	5	6	13.5	5.5	20.5	17.7	25	643 682 X
WA..20, WA..30, SA..37, WA..37	20	M6	5	6	15.5	5.5	22.5	19.7	25	643 683 8
FA..27, SA..47, WA..47	25	M10	5	10	20	7.5	28	24.7	35	643 684 6
FA..37, KA..37, SA..47, SA..57, WA..47	30	M10	5	10	25	7.5	33	29.7	35	643 685 4
FA..47, KA..47, SA..57	35	M12	5	12	29	9.5	38	34.7	45	643 686 2
FA..57, KA..57, FA..67, KA..67, SA..67	40	M16	5	12	34	11.5	41.9	39.7	50	643 687 0
SA..67	45	M16	5	12	38.5	13.5	48.5	44.7	50	643 688 9
FA..77, KA..77, SA..77	50	M16	5	12	43.5	13.5	53.5	49.7	50	643 689 7
FA..87, KA..87, SA..77, SA..87	60	M20	5	16	56	17.5	64	59.7	60	643 690 0
FA..97, KA..97, SA..87, SA..97	70	M20	5	16	65.5	19.5	74.5	69.7	60	643 691 9
FA..107, KA..107, SA..97	90	M24	5	20	80	24.5	95	89.7	70	643 692 7
FA..127, KA..127	100	M24	5	20	89	27.5	106	99.7	70	643 693 5
FA..157, KA..157	120	M24	5	20	107	31	127	119.7	70	643 694 3

1) Retaining screw

INFORMATION

The SEW installation kit for attaching the customer shaft is a recommendation by SEW-EURODRIVE. You must always check whether this design can compensate the axial loads. In particular applications (e.g. mounting mixer shafts), a different design may have to be used to secure the shaft axially. In these cases, customers can use their own devices. However, you must ensure that these designs do not cause potential sources of combustion according to DIN EN 13463 (for example, impact sparks).

4.7 Shaft-mounted gear units with shrink disk

4.7.1 Assembly notes

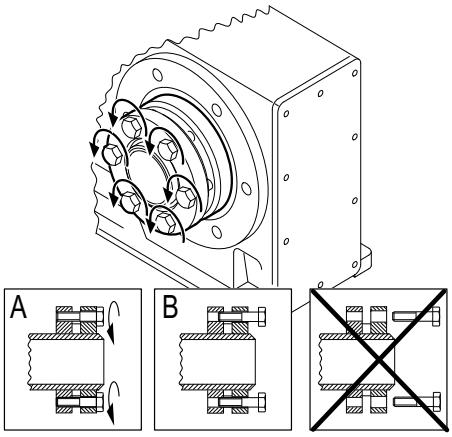
⚠ NOTICE

Tightening the screws without installed shaft may result in the hollow shaft being deformed.

Possible damage to property

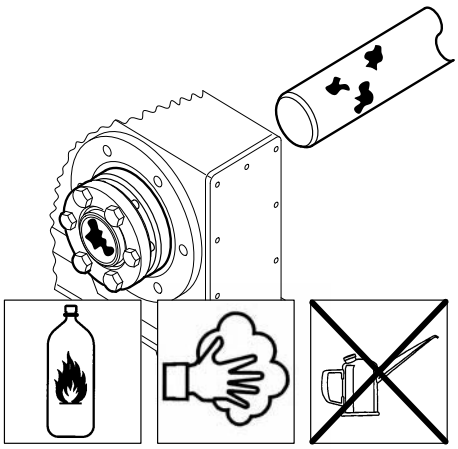
- Only tighten the locking screws with the shaft installed.

1. Loosen the locking screws by a few turns (do not unscrew them completely).



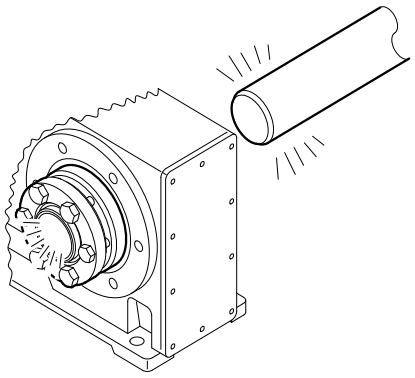
211533579

2. Carefully degrease the hollow shaft hole and the input shaft using a commercial solvent.



211535755

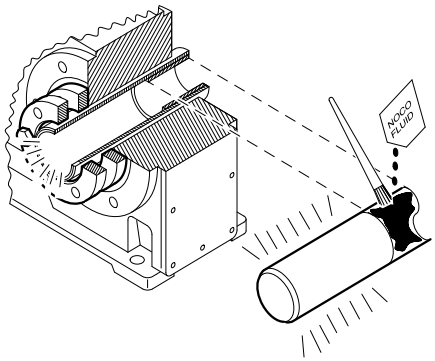
3. Hollow shaft/input shaft after degreasing.



211537931

4. Apply NOCO® fluid to the input shaft in the area of the bushing.

   It is essential to make sure that the clamping area of the shrink disk is free from grease. As a result, never apply NOCO® Fluid directly to the bush. This is because the paste may be able to get into the clamping area of the shrink disk when the input shaft is put on.

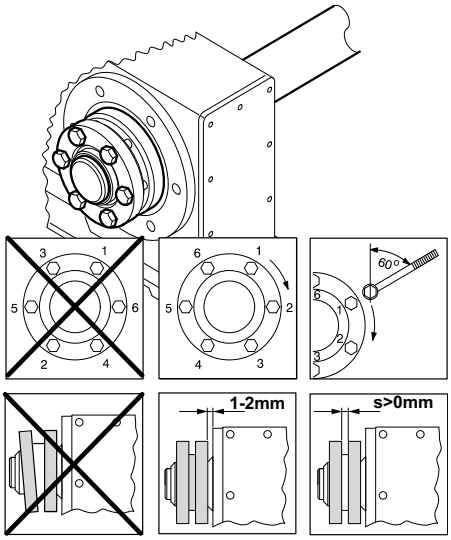


211540107

5. Install the input shaft.
   - Make sure that the locking collars of the shrink disk are installed in parallel to each other.
   - For gear unit housings with shaft shoulder:

     Mount the shrink disk onto the stop on the shaft shoulder.
   - For gear unit housings without shaft shoulder:

     Install the shrink disk with a 1 to 2 mm distance from the gear unit housing.
   - Tighten the locking screws by working round with the torque wrench several times from one screw to the next (not in diametrically opposite sequence). For tightening torques, refer to the following table.



211542283

6. After the installation, make sure the remaining gap between the outer rings is > 0 mm.
7. Grease the the area around the shrink disk outside of the hollow shaft to prevent corrosion.

Gear unit type				Screw	Nm	max.[1)]
		SH37	WH37	M5	5	60°
KH37...77	FH37...77	SH47...77	WH47	M6	12	
KH87/97	FH87/97	SH87/97		M8	30	
KH107	FH107			M10	59	
KH127/157	FH127/157			M12	100	
KH167				M16	250	
KH187				M20	470	

1) Maximum tightening angle per rotation

4.7.2 Removal notes

⚠ CAUTION

Risk of jamming and crushing due to improper removal of heavy components.

Risk of injury.

- Observe the following removal notes.
- Removing the shrink disk properly.

1. Loosen the locking screws one after the other by a quarter rotation to avoid tilting the outer rings.
2. Unscrew the locking bolts evenly one after the other. Do not remove the locking screws completely.
3. Remove the shaft or pull the hub off the shaft. (remove any rust that may have formed between the hub and the end of the shaft beforehand).
4. Remove the shrink disk from the hub.

4.7.3 Cleaning and lubrication

There is no need to dismantle removed shrink disks before they are reinstalled.

Clean and lubricate the shrink disk if it is dirty.

Lubricate the tapered surfaces with one of the following solid lubricants:

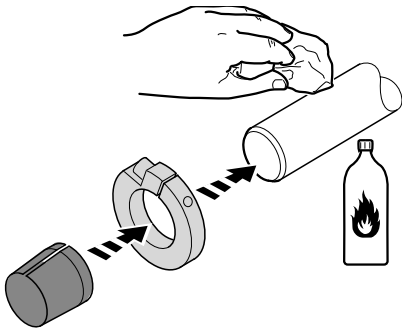
Lubricant (Mo S2)	Sold as
Molykote 321 (lube coat)	Spray
Molykote spray (powder spray)	Spray
Molykote G Rapid	Spray or paste
Aemasol MO 19P	Spray or paste
Aemasol DIO-sétral 57 N (lube coat)	Spray

Grease the locking screws with a multipurpose grease such as Molykote BR 2 or similar.

4.8 Shaft-mounted gear units with TorqLOC®

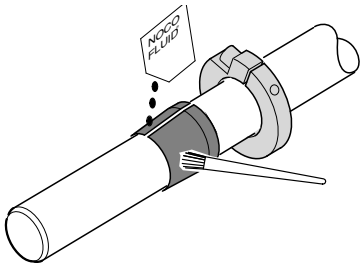
4.8.1 Assembly notes

1. Clean the customer shaft and the inside of the hollow shaft. Ensure that all traces of grease or oil are removed.
2. Install the stop ring and the bushing on the customer shaft.



211941003

3. Apply and thoroughly spread NOCO® Fluid on the bushing.



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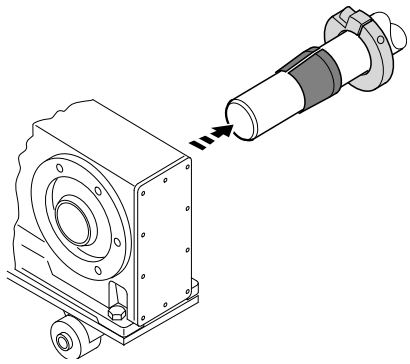
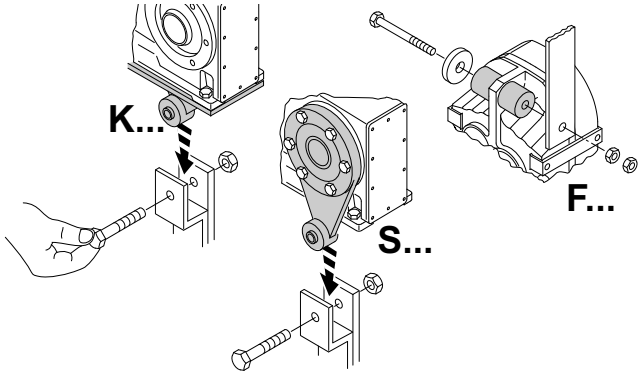
4. Push the gear unit onto the customer shaft.



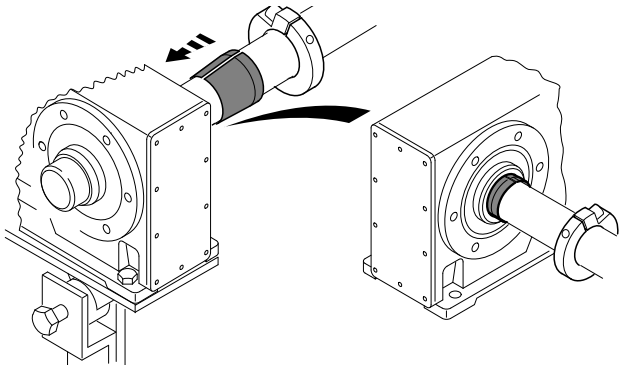
211936651

5. Preassemble the torque arm (do not tighten the screws).



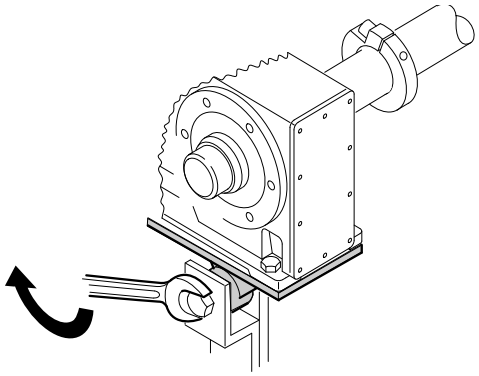
211943179

6. Push the busing onto the gear unit up to the stop.



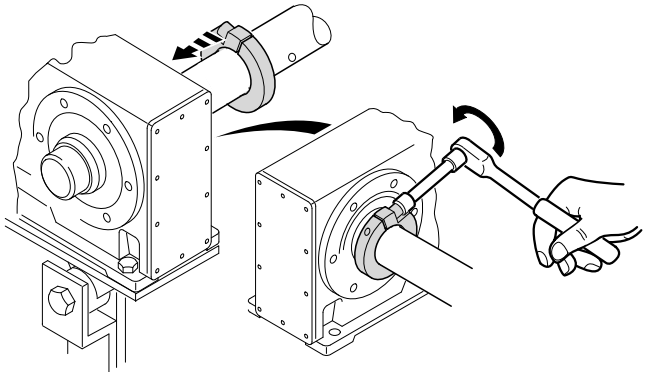
211945355

7. Tighten all the retaining screws of the torque arm.



211947531

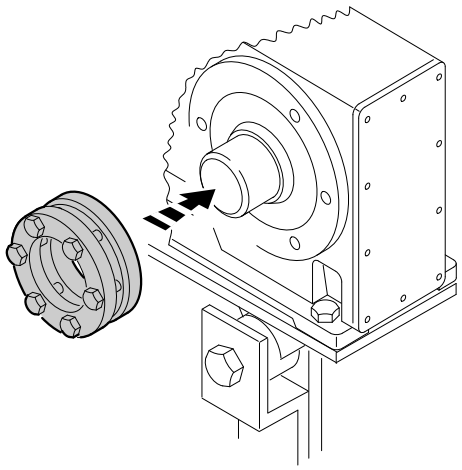
8. Secure the bushing with the split ring. Tighten the split ring on the bushing using the appropriate torque as specified in the following table:



212000907

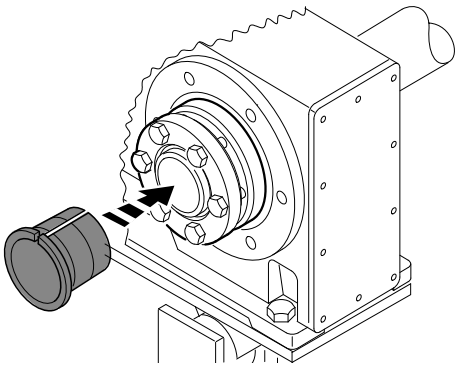
Type		nickel-plated [Standard]	Stainless steel
KT/FT	ST/WT	Torque [Nm]	
-	37	18	7.5
37	47	18	7.5
47	57	18	7.5
57, 67	67	35	18
77	77	35	18
87	87	35	18
97	97	35	18
107	–	38	38
127	–	65	65
157	–	150	150

9. Make sure that all screws are loosened and slide the shrink disk onto the hollow shaft.



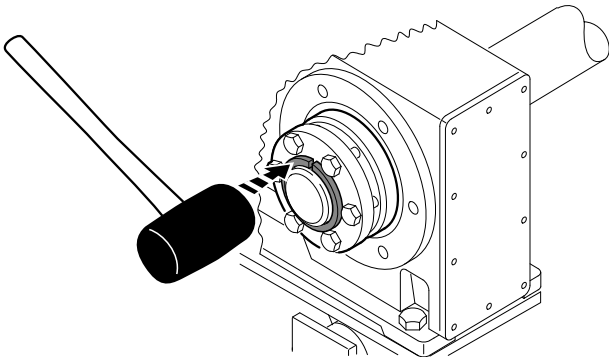
212003083

10. Slide the counter bushing onto the customer shaft and into the hollow shaft



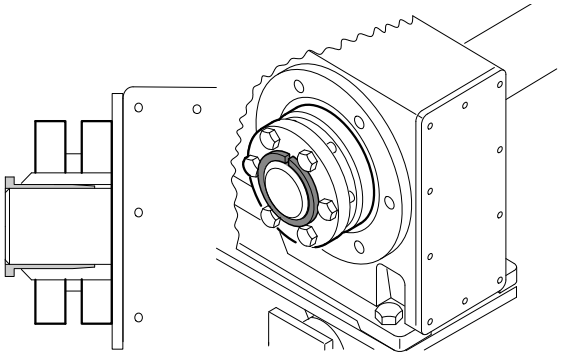
212005259

11. until the shrink disk is properly seated.
12. Tap lightly on the flange of the counter bushing to ensure that the socket is fitted securely in the hollow shaft.



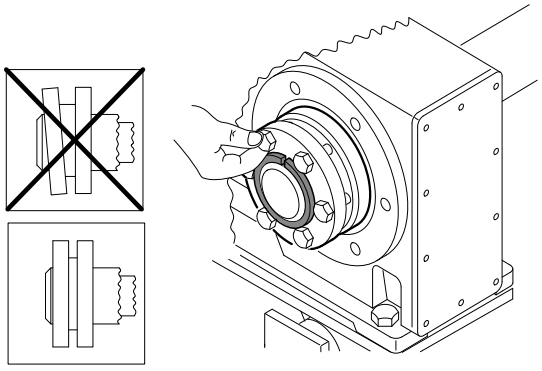
212007435

13. Make sure that the customer shaft is seated in the counter bushing.



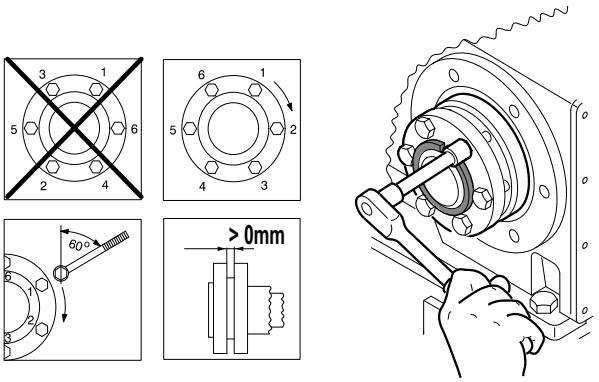
212009611

14. Manually tighten the screws of the shrink disk and ensure that the end rings of the shrink disk are parallel.



212011787

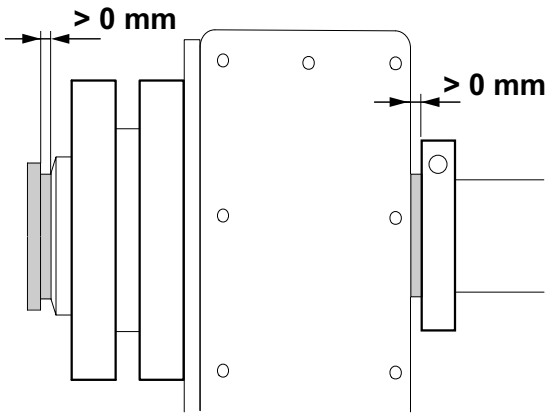
15. Tighten the locking screws with a torque wrench by working round several times from one bolt to the next (not in diametrically opposite sequence) according to the following table:



212013963

Type		nickel-plated [Standard]	Stainless steel
KT/FT	ST/WT	Torque [Nm]	
-	37	4.0	7
37	47	10	7
47	57	12	7
57, 67	67	12	15
77	77	30	30
87	87	30	50
97	97	30	50
107	–	59	65
127	–	100	120
157	–	100	120

16. After the installation, make sure the remaining gap between the outer rings is > 0 mm.
17. The remaining gap between counter bushing and hollow shaft end as well as stop ring bushing and split ring must be > 0 mm.



212016139

4.8.2 Removal notes

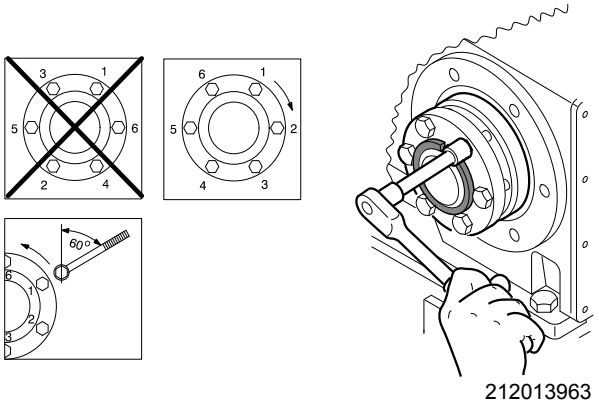
⚠ CAUTION

Risk of jamming and crushing due to improper removal of heavy components.

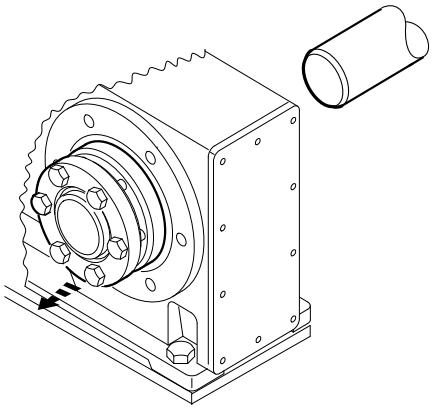
Risk of injury.

- Removing the shrink disk properly.
- Observe the following removal notes.

1. Loosen the locking screws one after the other by a quarter rotation to avoid tilting the outer rings.



2. Unscrew the locking bolts evenly one after the other.
   Do not remove the locking screws completely.
3. Dismantle the conical steel bushing.
   If required, use the outer rings as pullers as follows:
   – Remove all the locking screws.
   – Screw the respective number of screws in the tapped holes of the shrink disk.
   – Support the inner ring against the gear unit housing.
   – Pull off the conical steel bushing by tightening the screws.
4. Remove the gear unit from the shaft.



5. Remove the shrink disk from the hub.

4.8.3 Cleaning and lubrication

There is no need to dismantle removed shrink disks before they are reinstalled.

Clean and lubricate the shrink disk if it is dirty.

Lubricate the tapered surfaces with one of the following solid lubricants:

Lubricant (Mo S2)	Sold as
Molykote 321 (lube coat)	Spray
Molykote spray (powder spray)	Spray
Molykote G Rapid	Spray or paste
Aemasol MO 19P	Spray or paste
Aemasol DIO-sétral 57 N (lube coat)	Spray

Grease the locking screws with a multipurpose grease such as Molykote BR 2 or similar.

4.9 Installing the protective cover

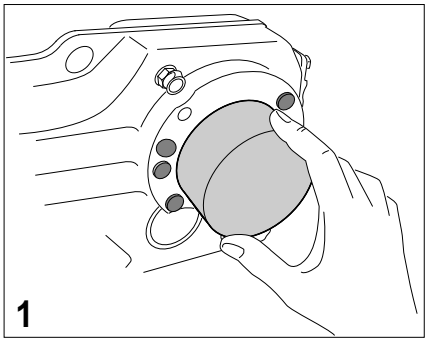
⚠ CAUTION

During operation, output components are in fast motion.

Risk of jamming and crushing.

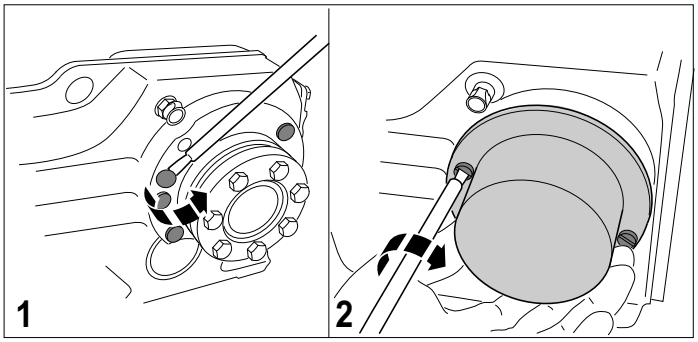
- Disconnect the motor from the power supply before starting work and safeguard against accidental startup.
- Cover input and output components with a touch guard.

4.9.1 Installing the rotating cover



1. Slide the rotating cover onto the shrink disk until it snaps in.

4.9.2 Installing the fixed cover



1. To fasten the cover, remove the plastic plug on the gear unit housing (see figure 1)
2. Use the delivered screws to mount the cover to the gear unit housing (see figure 2).

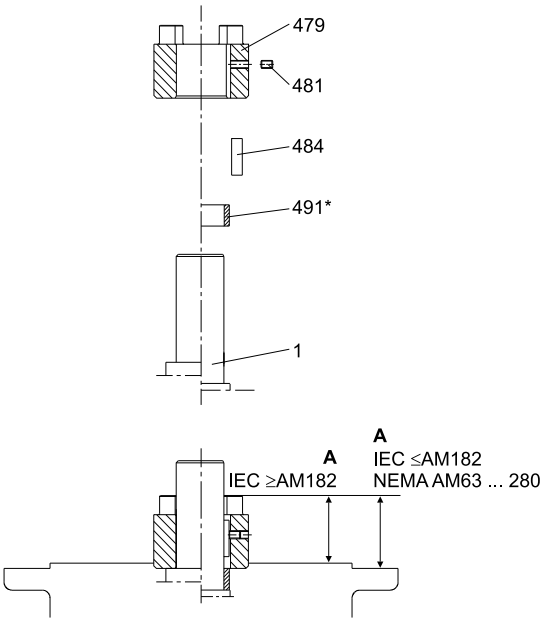
4.9.3 Installation without cover

In certain individual cases (e.g. through-shaft), you cannot install the cover. In such cases, the cover is not necessary if the system or unit manufacturer provides corresponding components to guarantee for the compliance with the required degree of protection.

If this results in additional maintenance, you have to describe this in the operating instructions for system/component.

4.10 AM adapter coupling

4.10.1 IEC adapter AM63 - 280 / NEMA adapter AM56 - 365



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[1] Motor shaft
[479] Coupling half
[481] Setscrew
[484] Key
[491] Spacer tube

1. Clean the motor shaft and the flange surfaces of the motor and the adapter.
2. Remove the key from the motor shaft and replace it with the supplied key [484] (not AM63 and AM250).
3. Heat the coupling half [479] to approx. 80 - 100 °C and push the coupling half onto the motor shaft. Position as follows:
   - IEC adapter AM63 - 225 Until stop at motor shaft shoulder.
   - IEC adapter AM250 - 280 to dimension**A**.
   - NEMA adapter with spacer tube [491] to dimension **A**.
4. Secure the key and coupling half using the setscrew [481] and tightening torque T_A according to the table on the motor shaft.

5. Check the dimension **A**.
6. Seal the contact surfaces between the adapter and motor using a suitable sealing compound.
7. Mount the motor on the adapter. Ensure that the coupling claw of the adapter shaft is engaged in the plastic cam ring.

IEC AM	63 / 71	80 / 90	100 / 112	132	160 / 180	200	225	250 / 280
A	24.5	31.5	41.5	54	76	78.5	93.5	139
T_A	1.5	1.5	4.8	4.8	10	17	17	17
Thread	M4	M4	M6	M6	M8	M10	M10	M10
NEMA AM	56	143 / 145	182 / 184	213 / 215	254 / 256	284 / 286	324 / 326	364 / 365
A	46	43	55	63.5	78.5	85.5	107	107
T_A	1.5	1.5	4.8	4.8	10	17	17	17
Thread	M4	M4	M6	M6	M8	M10	M10	M10

INFORMATION

To avoid contact corrosion, we recommend applying NOCO® Fluid to the motor shaft before mounting the coupling half.

⚠ NOTICE

Dampness might enter the adapter when mounting a motor to the adapter.

Potential damage to property

- Seal adapter with anaerobic fluid seal.

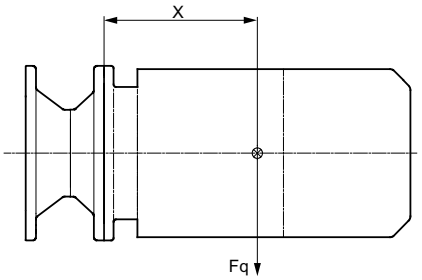
Permitted loads

⚠ NOTICE

Impermissibly high loads may occur when mounting a motor.

Potential damage to property

- The load data specified in the following table are not to be exceeded.



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Adapter type			F_q [1] [N]	
IEC	NEMA	x [1] [mm]	IEC adapter	NEMA adapter
AM63/71	**AM56**	77	530	410
AM80/90	**AM143/145**	113	420	380
AM100/112	**AM182/184**	144	2000	1760
AM132 [2]	**AM213/215** [2]	186	1600	1250
AM132..	**AM213/215**		4700	3690
AM160/180	**AM254/286**	251	4600	4340
AM200/225	**AM324-AM365**	297	5600	5250
AM250/280	**-**	390	11200	-

1) **The maximum permitted weight of the attached motor F_{qmax} must be reduced linearly as the center of gravity distance x increases. If this distance is reduced, the maximum permitted weight F_{qmax} cannot be increased.**
2) Diameter of the adapter output flange: 160 mm

AM../RS adapter AM with backstop

Check the direction of rotation of the drive prior to assembly or startup. Inform the SEW-EURODRIVE service in the case of incorrect direction of rotation.

The backstop is maintenance-free in operation, and does not require any further maintenance work. Backstops have a minimum lift-off speed depending on the size (see following table).

.

⚠ NOTICE

If the actual speed level is below the minimum lift-off speed level, the backstops are subject to wear, and the resulting friction causes the temperature to increase.

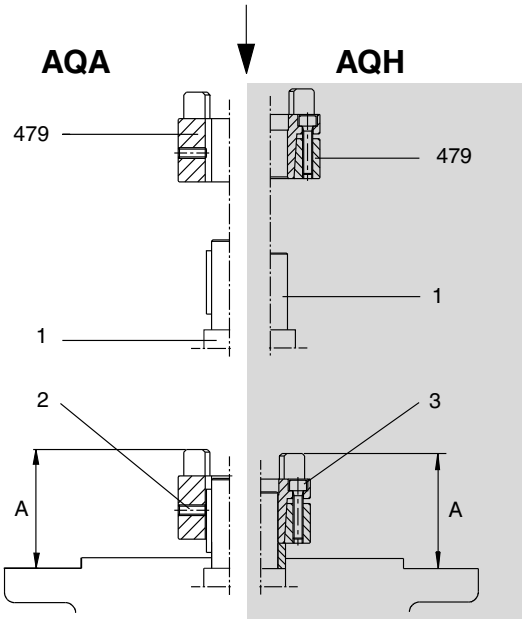
Possible damage to property

- In rated operation, the lift-off speeds must not drop below the minimum values.
- During startup or braking, the lift-off speeds may drop below the minimum levels.

Type	Maximum locking torque of the backstop [Nm]	Minimum lift-off speed [rpm]
AM80/90/RS, AM143/145/RS	65	820
AM100/112/RS, AM182/184/RS	425	620
AM132/RS, AM213/215/RS	850	530
AM160/180/RS, AM254/286/RS	1450	480
AM200/225/RS, AM324-365/RS	1950	450
AM250/280/RS,	1950	450

4.11 AQ adapter coupling

4.11.1 AQA80 - 190 adapter / AQH80 - 190 adapter



212114955

1 Motor shaft
2 Grub screw
3 screws

AQA = With keyway
AQH = Without keyway

1. Clean the motor shaft and the flange surfaces of the motor and the adapter.
2. **Type AQH:**Loosen the screws of the coupling half (479) and loosen the conical connection.
3. Heat up the coupling half (80 °C - 100 °C) and slide it onto the motor shaft.

   AQA / AQH design: up to clearance "A" (see table)

4. **Type AQH:**Tighten the screws evenly in diametrically opposite sequence, working round several times. Make sure that all the screws are tightened with the tightening torque T_A according to the following table.

   Type AQA: Secure the coupling halves using the setscrew (see table).

5. Check the position of the coupling half (clearance "A", see table).

   Mount the motor onto the adapter, making sure that the claws of the two coupling halves engage in each other. The force that must be applied when joining the two coupling halves is dissipated after final assembly, so there is no risk of any axial load being applied to adjacent bearings.

INFORMATION

Only for AQA, not permitted for AQH: To avoid contact corrosion, we recommend applying NOCO®® Fluid to the motor shaft before mounting the coupling half.

⚠ NOTICE

Dampness might enter the adapter when mounting a motor to the adapter.

Potential damage to property

- Seal adapter with anaerobic fluid seal

4.11.2 Setting dimensions/tightening torques

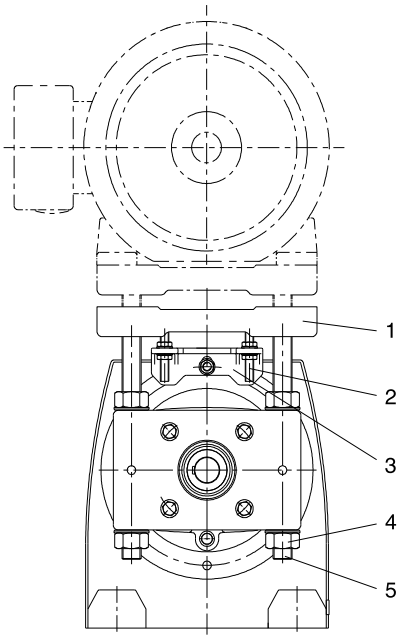
Type	Coupling size	Clearance "A" [mm]	Bolts DIN 912		Tightening torque T_A [Nm]	
			AQA	AQH	AQA	AQH
AQA /AQH 80 /1/2/3	19/24	44,5	M5	M4	2	3
AQA /AQH 100 /1/2		39				
AQA /AQH 100 /3/4		53				
AQA /AQH 115 /1/2		62				
AQA /AQH 115 /3	24/28	62	M5	M5	2	6
AQA /AQH 140 /1/2		62				
AQA /AQH 140 /3	28/38	74,5	M8	M5	10	6
AQA /AQH 190 /1/2		76,5				
AQA /AQH 190 /3	38/45	100	M8	M6	10	10

4.12 AD input shaft assembly

Observe section "Assembling the input and output components" (page 25) when installing input components.

4.12.1 AD../P – cover with motor mounting platform

Mounting the motor and adjusting the motor mounting platform.



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[1] Motor mounting platform
[2] Stud bolt (only AD6/P / AD7/P)
[3] Support (only AD6/P / AD7/P)
[4] Nut
[5] Threaded column

1. Set the motor mounting platform to the required mounting position by evenly tightening the adjusting nuts. Remove the lifting eyebolt from helical gear units in order to achieve the lowest adjustment position. Touch up any damage to the paint work.
2. Align the motor on the motor mounting platform (shaft ends must be in alignment) and secure it.
3. Mount the input elements on the input shaft end and the motor shaft, line them up with one another and correct the motor position again, if necessary.
4. Put on the traction elements (V-belt, chain, etc.) and apply a preload by evenly adjusting the motor mounting platform. Do not stress the motor mounting platform and the columns against each other when doing this.
5. Tighten all the nuts not used for adjustment in order to fix the threaded columns.

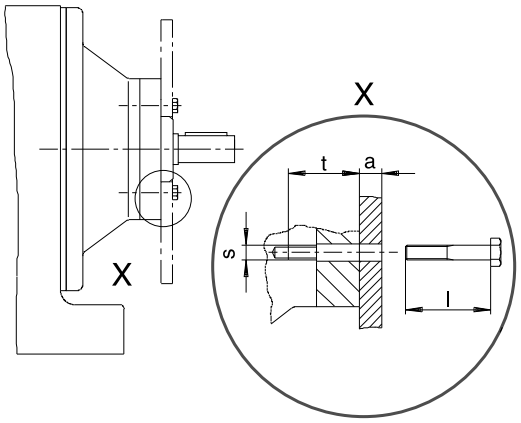
4.12.2 Only AD6/P and AD7/P

Unscrew the nuts on the stud bolts before adjustment to allow the stud bolts to move axially in the support without restriction. Do not tighten the nuts until the final adjustment position has been reached. Do not adjust the motor mounting platform using the support.

4.12.3 AD../ZR – input cover with centering shoulder

Mounting applications on the input shaft assembly with centering shoulder.

1. Retaining bolts of a suitable length must be used to secure the application. The length l of the new bolts is calculated as follows:



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[l] t+a
[t] Screw-in depth (see table)
[a] Thickness of the application
[s] Retaining thread (see table)

Round down the calculated screw length to the next smaller standard length.

2. Remove the retaining screws from the centering shoulder.
3. Clean the contact surface and the centering shoulder.

4. Clean the threads of the new bolts and apply a bolt locking compound (e.g. Loctite® 243) to the first few threads.
5. Attach the application to the centering shoulder and tighten the retaining screws with the specified tightening torque T_A (see table).

Type	Screw-in depth t [mm]	Retaining thread s	Tightening torque T_A for connection screws of strength class 8.8 [Nm]
AD2/ZR	25,5	M8	25
AD3/ZR	31,5	M10	48
AD4/ZR	36	M12	86
AD5/ZR	44	M12	86
AD6/ZR	48,5	M16	210
AD7/ZR	49	M20	410
AD8/ZR	42	M12	86

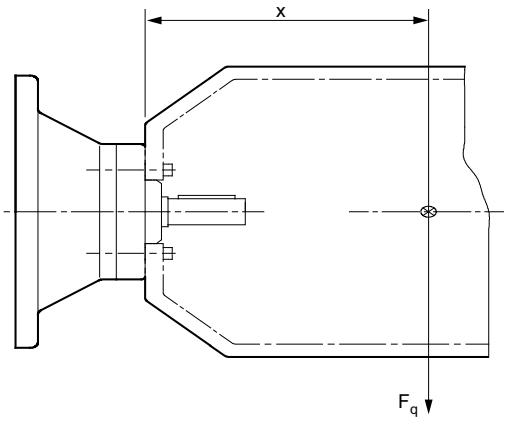
Permitted loads

⚠ NOTICE

Impermissibly high loads may occur when mounting a motor.

Potential damage to property

- The load data specified in the following table are not to be exceeded.



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Type	x[1)] [mm]	F_q[1)] [N]
AD2/ZR	193	330
AD3/ZR	274	1400
AD4/ZR[2)]	361	1120
AD4/ZR		3300
AD5/ZR	487	3200
AD6/ZR	567	3900
AD7/ZR	663	10000
AD8/ZR	516	4300

1) Maximum load values for connection screws of strength class 8.8. The maximum permitted weight of the attached motor F_{qmax} must be reduced linearly as the center of gravity distance x increases. When this distance is reduced, F_{qmax} cannot be increased.

2) Diameter of the adapter output flange: 160 mm

4.12.4 AD../RS – cover with backstop

Check the direction of rotation of the drive prior to assembly or startup. Inform the SEW-EURODRIVE service in the case of incorrect direction of rotation.

The backstop is maintenance-free in operation, and does not require any further maintenance work. Backstops have a minimum lift-off speed depending on the size (see following table).

⚠ NOTICE

If the actual speed level is below the minimum lift-off speed level, the backstops are subject to wear, and the resulting friction causes the temperature to increase.

Possible damage to property

- In rated operation, the lift-off speeds must not drop below the minimum values.
- During startup or braking, the lift-off speeds may drop below the minimum levels.

Type	Maximum locking torque of the backstop [Nm]	Minimum lift-off speed [rpm]
AD2/RS	65	820
AD3/RS	425	620
AD4/RS	850	530
AD5/RS	1450	480
AD6/RS	1950	450
AD7/RS	1950	450
AD8/RS	1950	450

5 Startup

5.1 Checking the oil level

Before startup, make sure that the oil level corresponds to the mounting position. Observe section "Checking the oil level and changing the oil" (page 67).

5.2 Helical-worm and SPIROPLAN® W gear units

5.2.1 Run-in period

SPIROPLAN® and helical-worm gear units require a running-in period of at least 48 h before reaching their maximum efficiency. A separate run-in period applies for each direction of rotation if the gear unit is operated in both directions of rotation. The table shows the average power reduction during the run-in period.

Helical-worm gear unit

	Worm	
	i range	**η reduction**
1-start	approx. 50 ... 280	approx. 12 %
2-start	approx. 20 ... 75	approx. 6 %
3-start	approx. 20 ... 90	approx. 3 %
4-start	-	-
5-start	approx. 6 ... 25	approx. 3 %
6-start	approx. 7 ... 25	approx. 2 %

SPIROPLAN® gear units

W10 / W20 / W30		W37 / W47	
i range	**η reduction**	**i range**	**η reduction**
approx. 35 ... 75	approx. 15 %		
approx. 20 ... 35	approx. 10 %		
approx. 10 ... 20	approx. 8 %	about 30...70	approx. 8 %
About 8	approx. 5 %	approx. 10 ... 30	approx. 5%
About 6	approx. 3 %	about 3...10	approx. 3%

5.3 Helical/parallel shaft helical/helical-bevel gear units

No special startup instructions are required for helical, parallel shaft helical and helical-bevel gear units providing the gear units have been installed in accordance with section "Mechanical Installation" (page 17).

5.4 Gear units with backstop

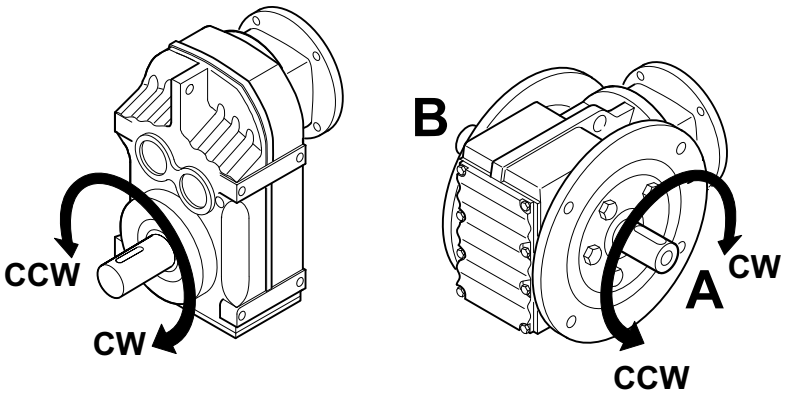
The purpose of a backstop is to prevent undesirable reverse rotation. During operation, the backstop permits rotation in one specified direction of rotation only.

⚠ NOTICE

Operating the motor in the blocking direction could destroy the backstop.

Possible damage to property

- Do not start up the motor in the blocking direction. Be sure that the motor power supply is correctly connected so that the motor rotates in the required direction.
- The backstop can be operated in blocking direction with half the output torque once for control purposes.



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The direction of rotation is determined with a view to the output shaft (LSS).

- Clockwise (CW)
- Counterclockwise (CCW)

The permitted direction of rotation is indicated on the housing.

6 Inspection/Maintenance

The following gear units are lubricated for life:

- Helical gear units R07, R17, R27
- Parallel shaft helical gear unit F27
- SPIROPLAN® gear units

Depending on external factors, the surface/corrosion protection might have to be repaired or renewed.

6.1 Preliminary work regarding gear unit inspection/maintenance

Observe the following notes before you start with the inspection/maintenance work.

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Disconnect the gearmotor from the power supply before starting work and protect it against unintentional re-start.

⚠ WARNING

Danger of burns due to hot gear unit and hot gear unit oil.

Severe injuries.

- Let the gear unit cool down before you begin with your work.
- Only remove the oil level and oil drain plug very carefully.

⚠ NOTICE

Filling in the wrong oil may result in significantly different lubricant characteristics.

Potential damage to property

- Do not mix different synthetic lubricants and do not mix synthetic with mineral lubricants.
- Mineral oil is used as standard lubricant.

NOTICE

Improper maintenance may result in damages to the gear unit.

Possible damage to property.

- Heed the information in this chapter.

INFORMATION

The position of the oil level plug, oil drain plug and the breather valve depends on the mounting position. Refer to the diagrams of the mounting positions. See chapter "Mounting Positions" (page 82).

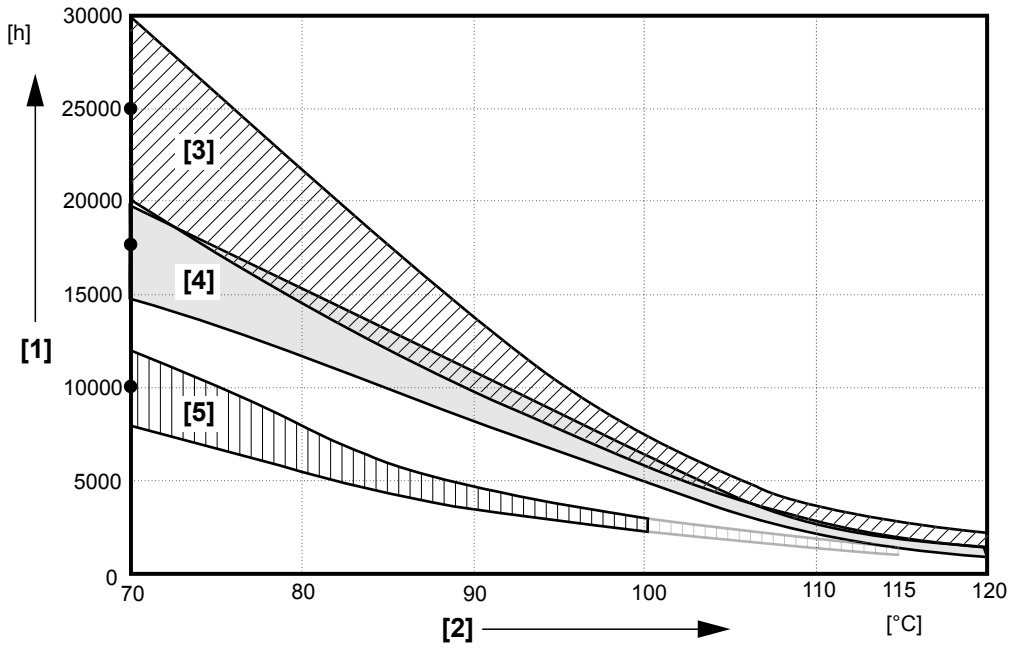
- Strict adherence to the inspection and maintenance intervals is absolutely necessary to ensure safe working conditions.
- Before releasing shaft connections, be sure that there are no active torsional moments present (tensions within the system).
- Prevent foreign bodies from entering into the gear unit during maintenance and inspection work.
- Do not clean the gear unit with a high-pressure cleaning system as water might enter the gear unit and the seals might be damaged.
- Perform safety and function tests following all maintenance and repair work.

6.2 Inspection/maintenance intervals

Time interval	What do I do?
• Every 3000 operating hours, at least every 6 months	• Check oil and oil level • Check running noise for possible bearing damage • Visually check the seals for leakage • For gear units with a torque arm: Check the rubber buffer and change it, if necessary
• Depending on the operating conditions (see illustration below), at the latest every 3 years • according to oil temperature	• Change mineral oil
	• Replace anti-friction bearing grease (recommendation) • Replace oil seal (do not install it in the same track)
• Depending on the operating conditions (see illustration below), at the latest every 5 years • according to oil temperature	• Change synthetic oil
	• Replace anti-friction bearing grease (recommendation) • Replace oil seal (do not install it in the same track)
• Varying (depending on external factors)	• Touch up or renew the surfaces/anticorrosion coating

6.3 Lubricant change intervals

The following figure shows the change intervals for standard gear units under normal environmental conditions. Change the oil more frequently when using special versions subject to more severe/aggressive environmental conditions!



[1] Operating hours
[2] Sustained oil bath temperature
• Average value per oil type at 70 °C
[3] CLP PG
[4] CLP HC / HCE
[5] CLP / HLP / E

6.4 Inspection/maintenance for the AL/AM/AQ adapter

Time interval	What do I do?
• Every 3000 operating hours, at least every 6 months	• Check running noise for possible bearing damage • Visually check the adapter for leakage
• After 10000 operating hours	• Check torsional play • Visually check the elastic annular gear
• after 25 000 - 30 000 hours of operation	• Renew the anti-friction bearing grease • Replace oil seal (do not install it in the same track) • Change the elastic annular gear

6.5 Inspection/maintenance for the AD input cover

Time interval	What do I do?
• Every 3000 operating hours, at least every 6 months	• Check running noise for possible bearing damage • Visually check the adapter for leakage
• after 25 000 - 30 000 hours of operation	• Renew the anti-friction bearing grease
	• Replace the oil seal

6.6 Inspection/maintenance for the gear unit

6.6.1 Checking the oil level and changing the oil

The procedure when checking the oil level and changing the oil depends on the following factors:

- Gear unit type
- Size
- Mounting position

Observe the references to the respective sections as well as the following table. Refer to chapter "Mounting Positions" (page 82) for notes on the mounting positions. You cannot check the oil level of gear units in pivoted mounting position. The gear units are delivered with the correct oil level. Observe the designations and fill quantities on the nameplate if you have to change the oil.

Code letter	Section "Checking the oil level and changing the oil"	Reference
A:	• Helical gear units... • Parallel shaft helical gear units... • Helical-bevel gear units... • Helical-worm gear units... **With oil level plug**	(page 68)
B:	• Helical gear units... • Parallel shaft helical gear units... • SPIROPLAN® gear units... **without oil level plug, with cover plate**	(page 70)
C:	• S37... helical-worm gear units **without oil level plug and cover plate**	(page 74)
D:	• SPIROPLAN® W37 / W47... **in mounting positions: M1, M2, M3, M5, M6 with oil level plug**	(page 77)
E:	• SPIROPLAN® W37 / W47... **in M4 mounting position without oil level plug and cover plate**	(page 79)

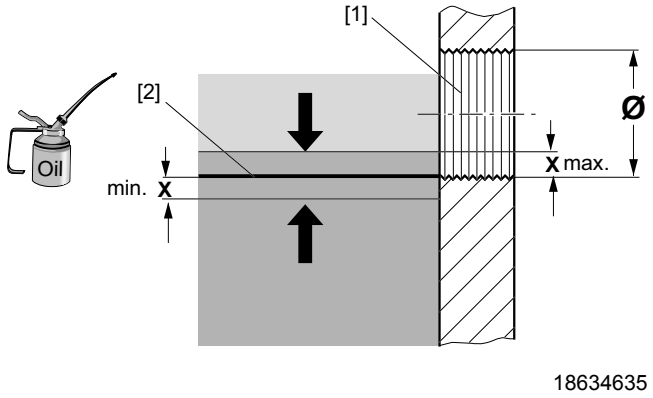
Series	Gear unit	Code letter for section "Checking the oil level and changing the oil"					
		M1	M2	M3	M4	M5	M6
R	R07...R27	B					
	R37 / R67	A					
	R47 / R57	A				B	A
	R77...R167	A					
	RX57...R107	A					
F	F27	B					
	F37..F157	A					
K	K37...K187	A					
S	S37	C					
	S47...S97	A					
W	W10...W30	B					
	W37...W47	D			E	D	

6.6.2 A: Helical, parallel shaft helical, helical-bevel and helical-worm gear units with oil level plug

Checking the oil levelvia the oil level plug

Proceed as follows to check the oil level of the gear unit:

1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Determine the position of the oil level plug and the breather valve using the mounting position sheets. See chapter "Mounting Positions" (page 82).
3. Place a container underneath the oil level plug.
4. Slowly remove the oil level plug. Small amounts of oil may leak out as the permitted max. oil level is higher than the lower edge of the oil level bore.
5. Check the oil level according to the following figure and the corresponding table.



[1] Oil level bore
[2] Reference oil level

? Oil level bore	Min and max fill level = x [mm]
M10 x 1	1.5
M12 x 1.5	2
M22 x 1.5	3
M33 x 2	4
M42 x 2	5

6. If the oil level is too low, do the following:
   - Remove the breather valve.
   - Fill in additional oil of the same type via the vent hole until the oil level is at the lower edge of the oil level bore.
   - Re-insert the breather valve.
7. Re-insert the oil level plug.

Checking the oil via the oil drain plug

Proceed as follows to check the oil of the gear unit:

1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Determine the position of the oil drain plug using the mounting position sheets. See chapter "Mounting Positions" (page 82).
3. Remove a little oil from the oil drain plug.
4. Check the oil consistency.
   - Viscosity
   - If you can see that the oil is heavily contaminated, we recommend that you change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (page 64).
5. Check the oil level. See previous section.

Changing the oil via the oil drain plug and the breather valve

⚠ WARNING

Danger of burns due to hot gear unit and hot gear unit oil.

Severe injuries.

- Let the gear unit cool down before you begin with your work.
- However, the gear unit must still be warm otherwise the high viscosity of excessively cold oil will make it harder to drain the oil properly.

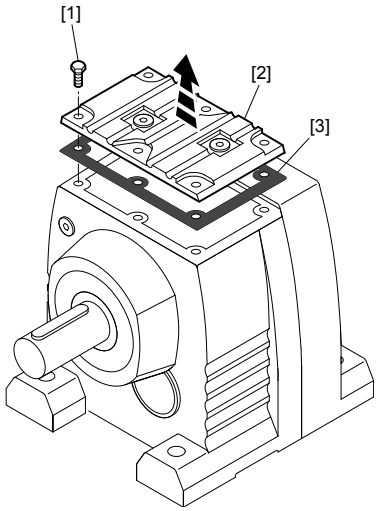
1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Determine the position of the oil drain plug, the oil level plug and the breather valve using the mounting position sheets. See chapter "Mounting Positions" (page 82).
3. Place a container underneath the oil drain plug.
4. Remove the oil level plug, the breather valve and the oil drain plug.
5. Drain all the oil.
6. Re-insert the oil drain plug.
7. Fill in new oil of the same type via the vent hole (otherwise consult the customer service). Do not mix different synthetic lubricants.
   - Observe the oil fill quantities according to the specifications on the nameplate or according to the mounting position. See sect "Lubricant fill quantities" (page 110).
   - Check the oil level at the oil level plug.
8. Re-insert the oil level plug and the breather valve.

6.6.3 B: Helical, parallel shaft helical, SPIROPLAN® gear units without oil level plug with cover plate

Checking the oil level via the cover plate

For gear units without oil level bore, the oil level is checked via the cover plate opening. Proceed as follows:

1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. For the cover plate to be on top, you have to set up the gear unit in the following mounting position.
   - R07 - R57 in M1 mounting position
   - F27 in M3 mounting position
   - W10 - W30 in M1 mounting position
3. Loosen the screws [1] of the cover plate [2] and remove the cover plate [2] and the corresponding seal [3] (see following figure).



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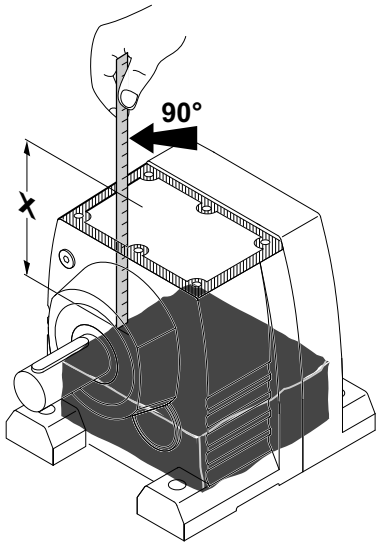
4. Determine the vertical distance "x" between oil level and sealing surface of the gear unit housing (see following figure).



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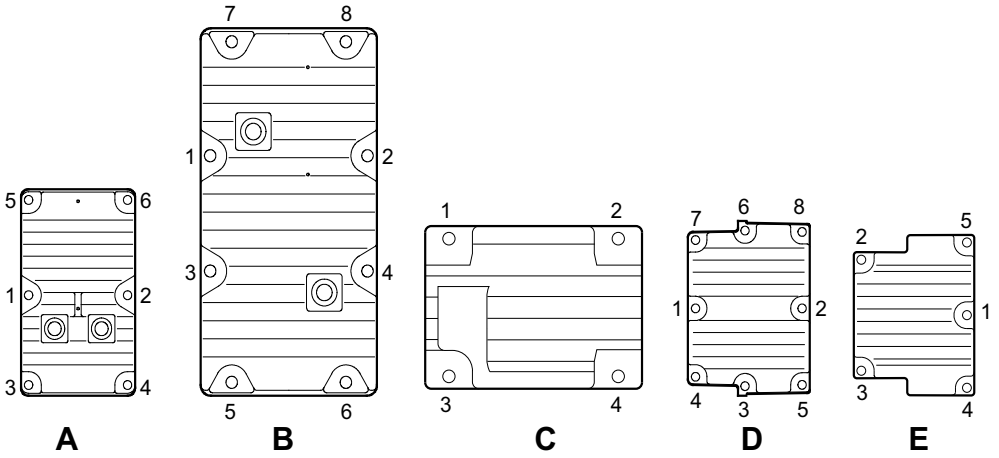
5. Compare the determined value "x" to the max. distance between oil level and sealing surface of the gear unit housing specified in the following table. Adjust the fill level if required.

Gear unit type		Max. distance x [mm] between oil level and sealing surface of the gear unit housing for mounting position					
		M1	**M2**	**M3**	**M4**	**M5**	**M6**
R07	2 stages	52 ± 1	27 ± 1	27 ± 1	27 ± 1	27 ± 1	27 ± 1
	3 stages	49 ± 1	21 ± 1	21 ± 1	21 ± 1	21 ± 1	21 ± 1
R17	2 stages	63 ± 1	18 ± 1	46 ± 1	18 ± 1	46 ± 1	46 ± 1
	3 stages	58 ± 1	11 ± 2	40 ± 2	11 ± 2	40 ± 2	40 ± 2
R27	2 stages	74 ± 1	22 ± 1	45 ± 1	22 ± 1	45 ± 1	45 ± 1
	3 stages	76 ± 1	19 ± 1	42 ± 1	19 ± 1	42 ± 1	42 ± 1
R47	2 stages	–	–	–	–	39 ± 1	–
	3 stages	–	–	–	–	32 ± 1	–
R57	2 stages	–	–	–	–	32 ± 1	–
	3 stages	–	–	–	–	28 ± 1	–
F27	2 stages	78 ± 1	31 ± 1	72 ± 1	56 ± 1	78 ± 1	78 ± 1
	3 stages	71 ± 1	24 ± 1	70 ± 1	45 ± 1	71 ± 1	71 ± 1
		irrespective of the mounting position					
W10		12 ± 1					
W20		19 ± 1					
W30		31 ± 1					

6. Close the gear unit after the oil level check:
   - Re-attach the seal of the cover plate. Make sure that the sealing surfaces are clean and dry.
   - Screw on the cover plate. Tighten the cover screws with the rated tightening torque according to the following table from the inside to the outside in the order illustrated in the figure. Repeat the tightening procedure until the screws are properly tightened. Only use impulse drivers or torque wrenches in order to prevent the cover plate from being damaged (no impact drivers).



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Gear unit type	Figure	Retaining thread	Rated tightening torque T_N [Nm]	Minimum tightening torque T_N [Nm]
R/RF07	E	M5	6	4
R/RF17/27	D	M6	11	7
R/RF47/57	A			
F27	B			
W10	C	M5	6	4
W20	C	M6	11	7
W30	A			

Checking the oil via the cover plate

Proceed as follows to check the oil of the gear unit:

1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Open the cover plate of the gear unit according to section "Checking the oil via the cover plate" (page 70).
3. Take an oil sample via the cover plate opening.
4. Check the oil consistency.
   - Viscosity
   - If you can see that the oil is heavily contaminated, we recommend that you change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (page 64).
5. Check the oil level. See section "Checking the oil level via the cover plate" (page 70).
6. Screw on the cover plate. Observe the order and the tightening torques according to section "Checking the oil level via the cover plate" (page 70)

Checking the oil via the cover plate

⚠ WARNING

Danger of burns due to hot gear unit and hot gear unit oil.

Severe injuries.

- Let the gear unit cool down before you begin with your work.
- However, the gear unit must still be warm otherwise the high viscosity of excessively cold oil will make it harder to drain the oil properly.

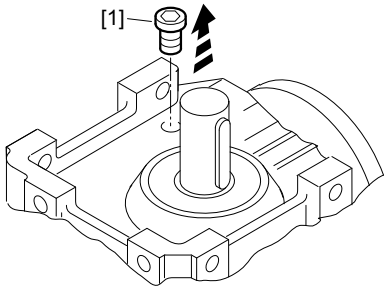
1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Open the cover plate of the gear unit according to section "Checking the oil via the cover plate".
3. Completely drain the oil in to a vessel via the cover plate opening.
4. Fill in new oil of the same type via the cover plate opening (otherwise consult the customer service). Do not mix different synthetic lubricants.
   - Pour in the oil in accordance with the mounting position or as specified on the nameplate. See section "Lubricant fill quantities" (page 110).
5. Check the oil level.
6. Screw on the cover plate. Observe the order and the tightening torques according to section "Checking the oil level via the cover plate" (page 70)

6.6.4 C: S37 helical-worm gear units without oil level plug and cover plate

Checking the oil level via the screw plug

The S37 gear unit is not equipped with an oil level plug or a cover plate. This is why the oil level is checked via the control bore.

1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Set up the gear unit in M5 or M6 mounting position, i.e. control bore always on top.
3. Remove the screw plug [1] (see following figure).



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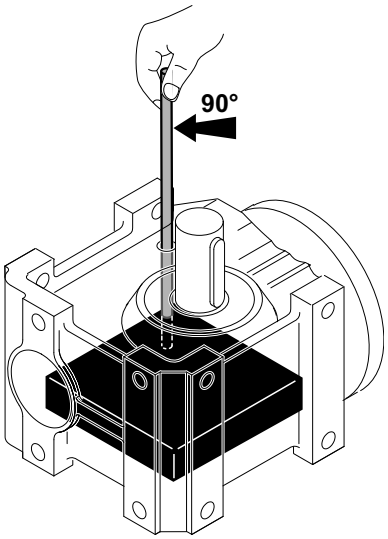
4. Insert the dipstick vertically via the control bore all the way to the bottom of the gear unit housing. Pull out the dipstick vertically (see following figure).



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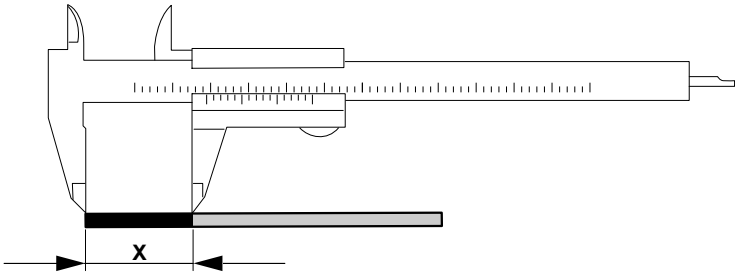
5. Determine the size of the section "x" of the dipstick covered with lubricant using a caliper (see following figure).



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6. Compare the determined value "x" to the min. value depending on the mounting position specified in the following table. Correct the fill level if required.

Gear unit type	Oil level = wetted section x [mm] of the dipstick Mounting position					
	M1	**M2**	**M3**	**M4**	**M5**	**M6**
S37	10 ± 1	24 ± 1	34 ± 1	37 ± 1	24 ± 1	24 ± 1

7. Re-insert and tighten the screw plug.

Checking the oil via the screw plug

1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Open the cover plate of the gear unit according to section "Checking the oil via the screw plug".
3. Take an oil sample via the screw plug bore.
4. Check the oil consistency.
   - Viscosity
   - If you can see that the oil is heavily contaminated, we recommend that you change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (page 64).
5. Check the oil level. See previous section.
6. Re-insert and tighten the screw plug.

Changing the oil via the screw plug

⚠ WARNING

Danger of burns due to hot gear unit and hot gear unit oil.

Severe injuries.

- Let the gear unit cool down before you begin with your work.
- However, the gear unit must still be warm otherwise the high viscosity of excessively cold oil will make it harder to drain the oil properly.

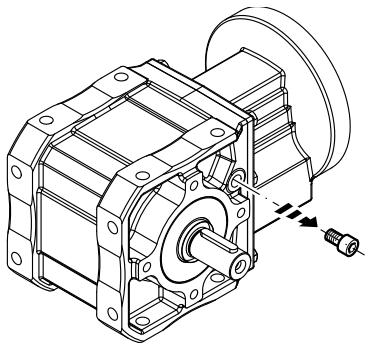
1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Open the cover plate of the gear unit according to section "Checking the oil via the screw plug".
3. Completely drain the oil via the screw plug bore.
4. Fill in new oil of the same type via the control bore (otherwise consult the customer service). Do not mix different synthetic lubricants.
   - Observe the oil fill quantities according to the specifications on the nameplate or according to the mounting position. Observe section "Lubricant fill quantities" (page 111).
5. Check the oil level.
6. Re-insert and tighten the screw plug.

6.6.5 D: SPIROPLAN® W37/W47 in mounting positions M1, M2, M3, M5, M6 with oil level plug

Checking the oil levelvia the oil level plug

Proceed as follows to check the oil level of the gear unit:

1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Set up the gear unit in M1 mounting position.
3. Slowly remove the oil level plug (see following figure). Small amounts of oil may leak out.



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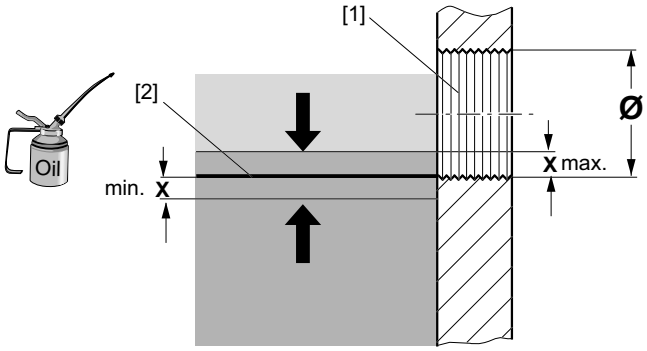
4. Check the oil level according to the following figure.



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[1] Oil level bore
[2] Reference oil level

Ø oil level bore	Min and max fill level = x [mm]
M10 x 1	1.5

5. If the oil level is too low, fill in new oil of the same type via the oil level bore until the oil level reaches the lower edge of the bore.
6. Re-insert the oil level plug.

Checking the oil via the oil level plug

Proceed as follows to check the oil of the gear unit:

1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Remove a little oil at the oil level plug.
3. Check the oil consistency.
   - Viscosity
   - If you can see that the oil is heavily contaminated, we recommend that you change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (page 64).
4. Check the oil level. See previous section.

Changing the oil via the oil level plug

⚠ WARNING

Danger of burns due to hot gear unit and hot gear unit oil.

Severe injuries.

- Let the gear unit cool down before you begin with your work.
- However, the gear unit must still be warm otherwise the high viscosity of excessively cold oil will make it harder to drain the oil properly.

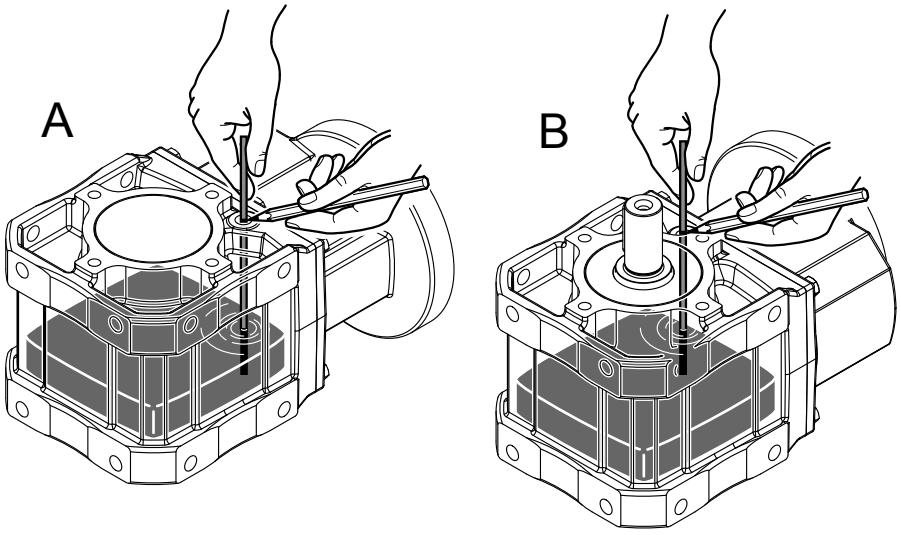
1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting Positions" (page 82).
3. Place a container underneath the oil level plug.
4. Remove the oil level plugs on the A and B side of the gear unit.
5. Drain all the oil.
6. Re-insert the lower oil level plug.
7. Fill in new oil of the same type via the upper oil level plug bore (otherwise consult the customer service). Do not mix different synthetic lubricants.
   - Observe the oil fill quantities according to the specifications on the nameplate or according to the mounting position. See sect "Lubricant fill quantities" (page 110).
   - Check the oil level according to section "Checking the oil level via the oil level plug"
8. Re-insert the upper oil level plug.

6.6.6 E: SPIROPLAN® W37/W47 in M4 mounting position without oil level plug and cover plate

Checking the oil level via the screw plug

The W37/W47 gear units are not equipped with an oil level plug or a cover plate. This is why the oil level is checked via the control bore.

1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Set up the gear unit in M5 or M6 mounting position.
3. Remove the screw plug.
4. Insert the dipstick vertically via the control bore all the way to the bottom of the gear unit housing. Mark the point of the dipstick where it exits the gear unit. Pull out the dipstick vertically (see following figure).



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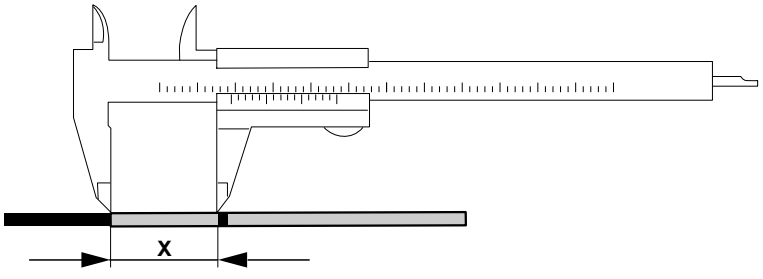
5. Determine the section "x" between the wetted part and the marking using a caliper (see following figure).



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6. Compare the determined value "x" to the min. value depending on the mounting position specified in the following table. Correct the fill level if required.

Gear unit type	Oil level = wetted section x [mm] of the dipstick Mounting position during the check	
	M5 Lying on the A side	M6 Lying on the B side
W37 in M4 mounting position	37 ± 1	29 ± 1
W47 in M4 mounting position	41 ± 1	30 ± 1

7. Re-insert and tighten the screw plug.

Checking the oil via the screw plug

Proceed as follows to check the oil of the gear unit:

1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Remove a little oil at the oil screw plug.
3. Check the oil consistency.
   - Viscosity
   - If you can see that the oil is heavily contaminated, we recommend that you change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (page 64).
4. Check the oil level. See previous section.

Changing the oil via the screw plug

⚠ WARNING

Danger of burns due to hot gear unit and hot gear unit oil.

Severe injuries.

- Let the gear unit cool down before you begin with your work.
- However, the gear unit must still be warm otherwise the high viscosity of excessively cold oil will make it harder to drain the oil properly.

1. Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (page 63).
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting Positions" (page 82).
3. Place a container underneath the screw plug.
4. Remove the screw plugs on the A and B side of the gear unit.
5. Drain all the oil.

6. Re-insert the lower screw plug.
7. Fill in new oil of the same type via the upper screw plug bore (otherwise consult the customer service). Do not mix different synthetic lubricants.
   – Observe the oil fill quantities according to the specifications on the nameplate or according to the mounting position. See sect "Lubricant fill quantities" (page 110).
   – Check the oil level according to section "Checking the oil level via the oil level plug"
8. Re-insert the upper screw plug.

6.6.7 Replacing the oil seal

⚠ NOTICE

Oil seals with a temperature below 0° C may get damaged during installation.

Potential damage to property.

- Store oil seals at ambient temperatures over 0° C.
- Warm up the oil seals prior to installation if required.

1. When changing the oil seal, ensure that there is a sufficient grease reservoir between the dust lip and protective lip, depending on the type of gear unit.
2. If you use double oil seals, fill one-third of the gap with grease.

6.6.8 Gear unit coating

⚠ NOTICE

Breather valves and oil seals may be damaged during painting or re-painting.

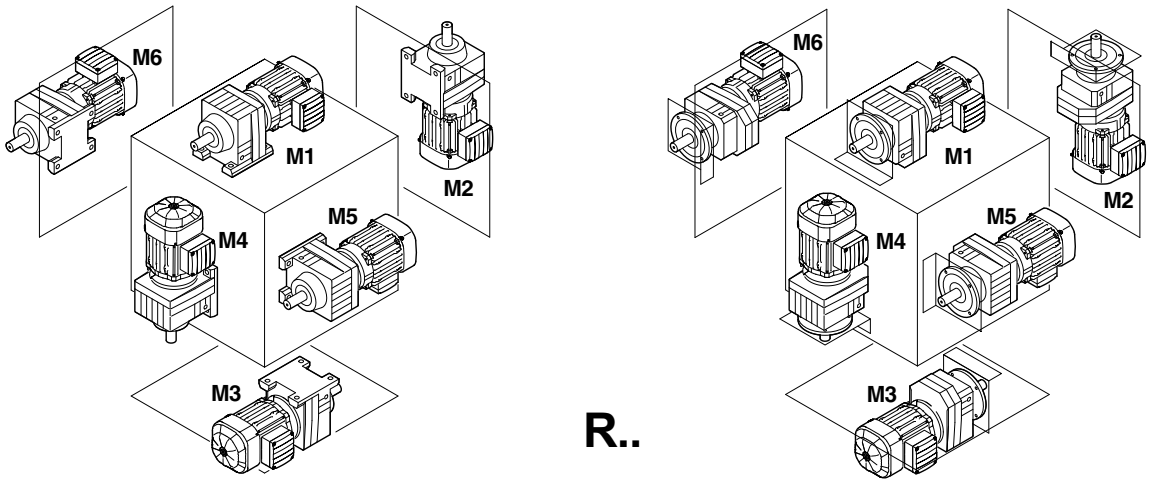
Potential damage to property.

- Thoroughly cover the breather valves and the sealing lip of the oil seals with strips prior to painting.
- Remove the strips after painting.

7 Mounting Positions

7.1 Designation of the mounting positions

SEW differentiates between six mounting positions, M1 – M6. The following figure shows the spatial orientation of the gearmotor in mounting positions M1 – M6.



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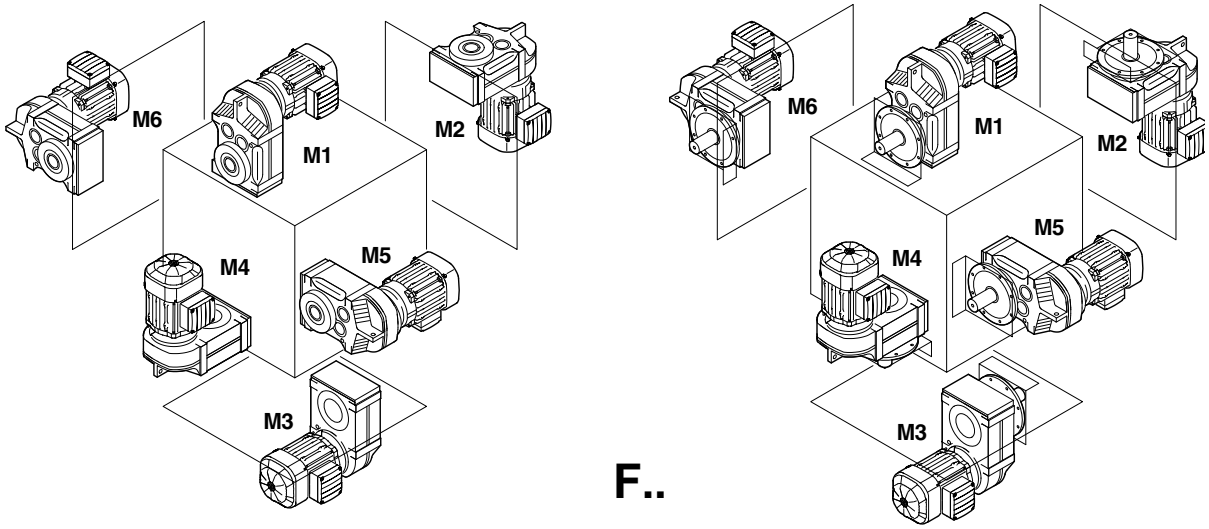

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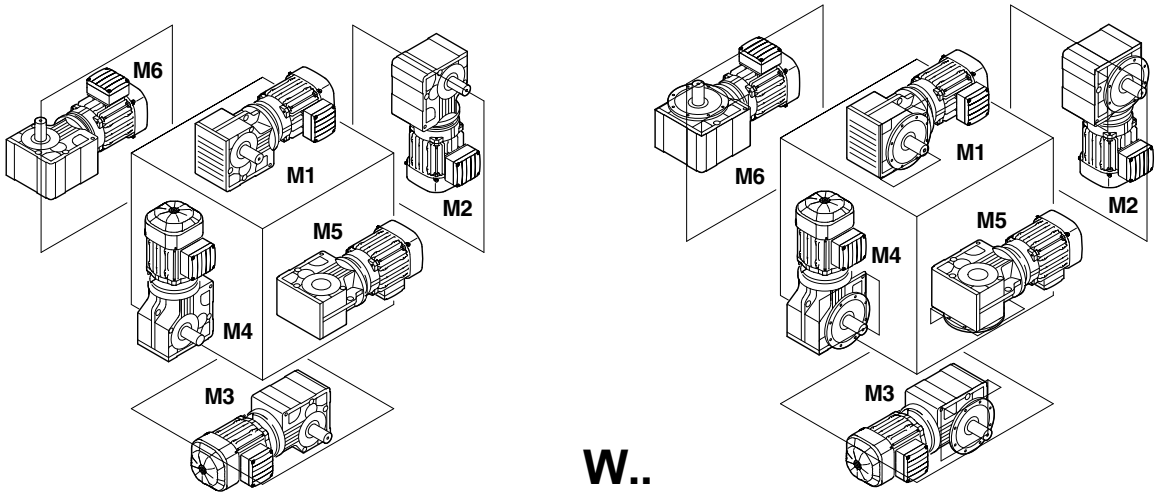

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7.2 Churning losses

Churning losses may occur in some mounting positions. Contact SEW-EURODRIVE in case of the following combinations:

Mounting position	Gear unit type	Gear unit size	Input speed [rpm]
M2, M4	R	97 – 107	> 2500
		> 107	>1500
M2, M3, M4, M5, M6	F	97 – 107	> 2500
		> 107	> 1500
	K	77 – 107	> 2500
		> 107	> 1500
	S	77 – 97	> 2500
M1, M2, M3, M4, M5, M6	W	37 – 47	> 1500

7.3 Key

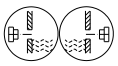
INFORMATION

The SPIROPLAN® gearmotors are not dependent on the mounting position, except for W37 and W47 in the M4 mounting position. However, mounting positions M1 to M6 are also shown for SPIROPLAN® gearmotors to assist you in working with this documentation.

Note: SPIROPLAN® gearmotors of sizes W10 – W30 cannot be equipped with breather valves, oil level plugs or drain plugs.

7.3.1 Symbols used

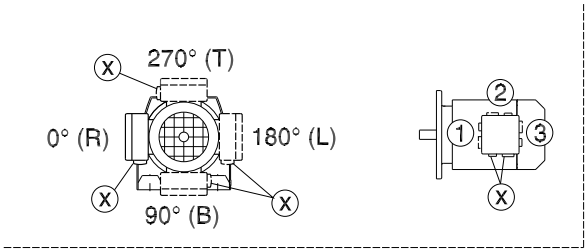
The following table shows the symbols used in the mounting position sheets and what they mean:

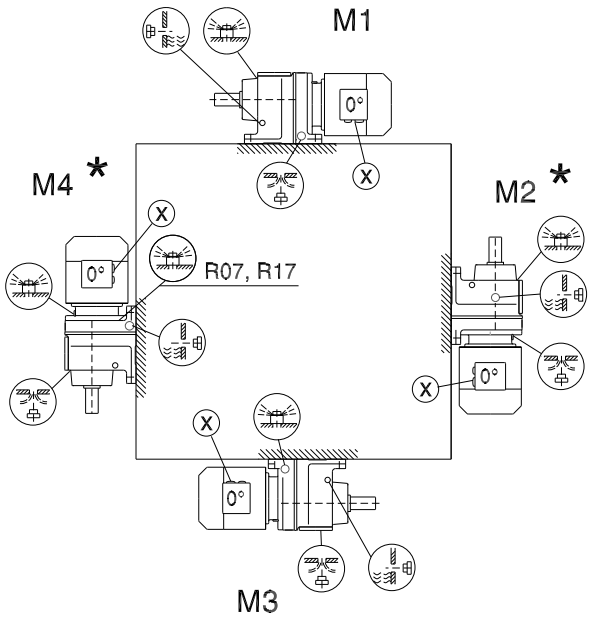
Symbol	Meaning
	Breather valve
	Oil level plug
	Oil drain plug

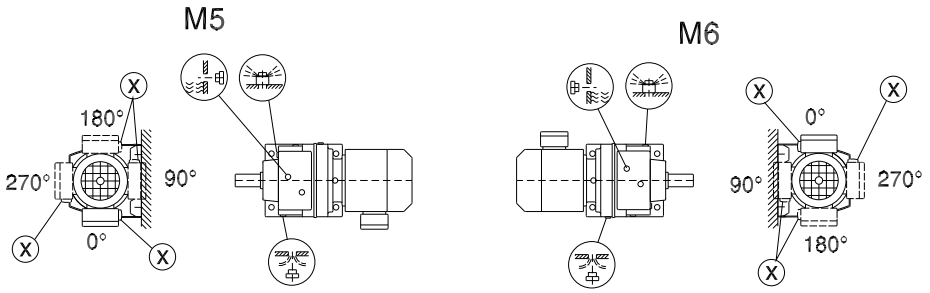
7.4 Helical gearmotors R

7.4.1 R07 ... R167

04 040 03 00



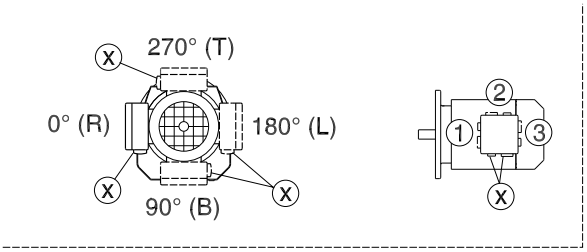


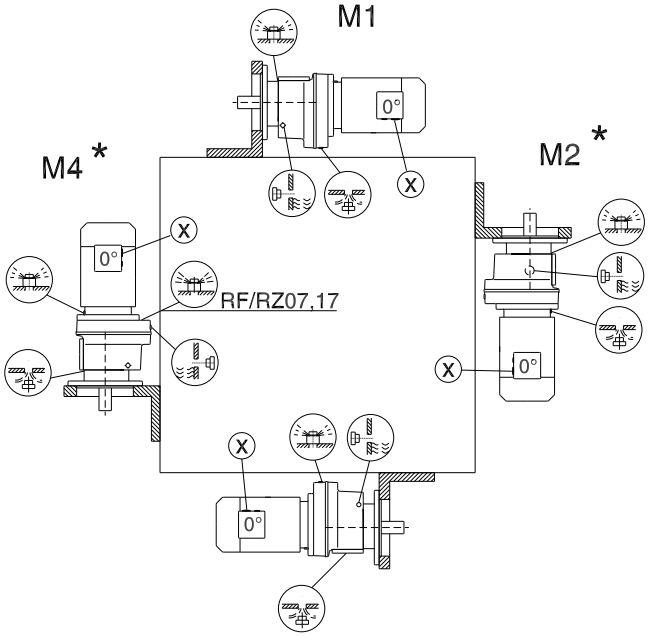


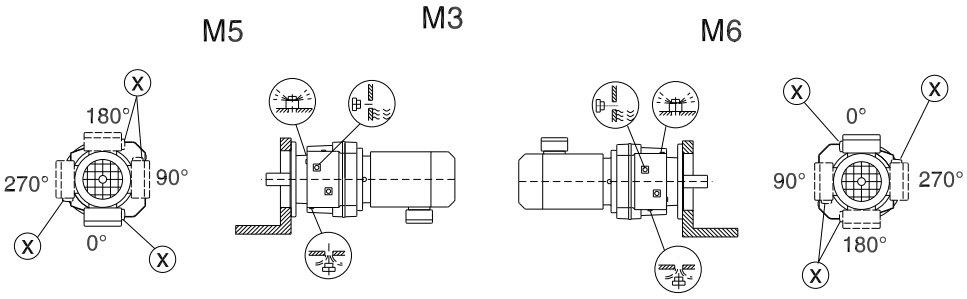
R07		M1, M2 , M3 , M5 , M6
R17, R27		M1, M3 , M5 , M6
R07, R17, R27		
R47, R57		M5

7.4.2 RF07 ... RF167, RZ07 ... RZ87

04 041 03 00



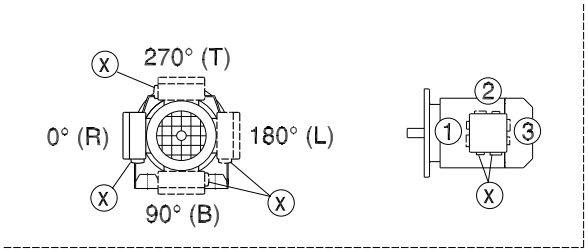


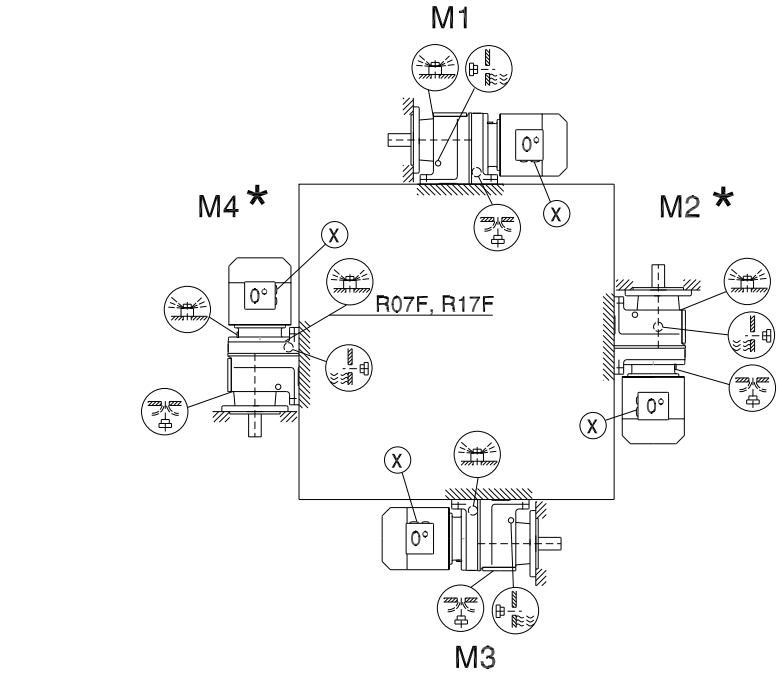


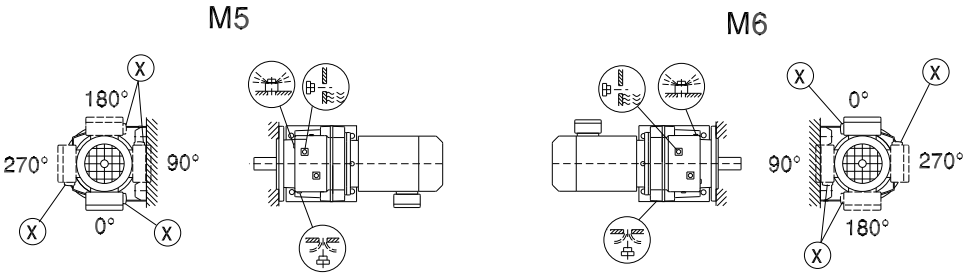
RF/RZ07		M1, M2 , M3 , M5 , M6
RF/RZ17,27		M1, M3 , M5 , M6
RF/RZ07, 17, 27		
RF/RZ47, 57		M5

7.4.3 R07F ... R87F

04 042 03 00





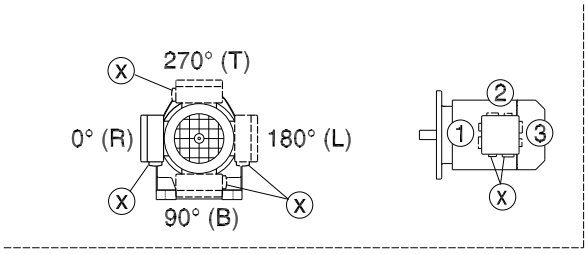


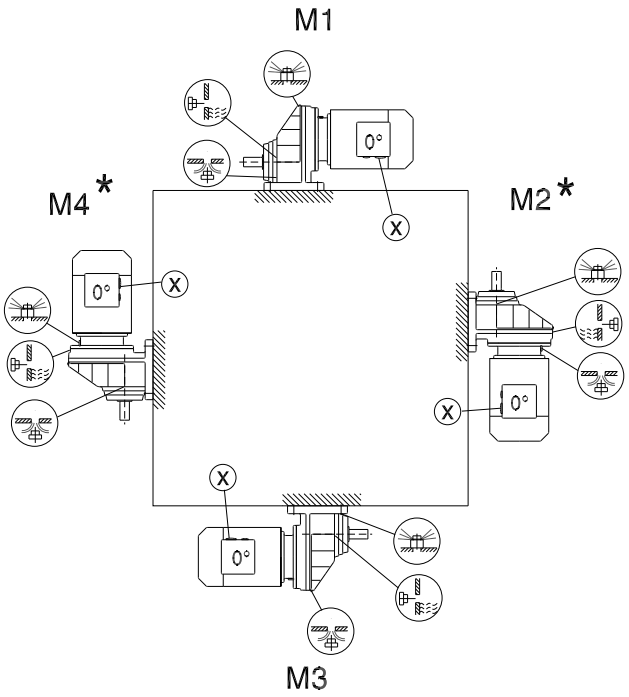
R07F		M1, M2 , M3 , M5 , M6
R17F, R27F		M1, M3 , M5 , M6
R07F, R17F, R27F		
R47F, R57F		M5

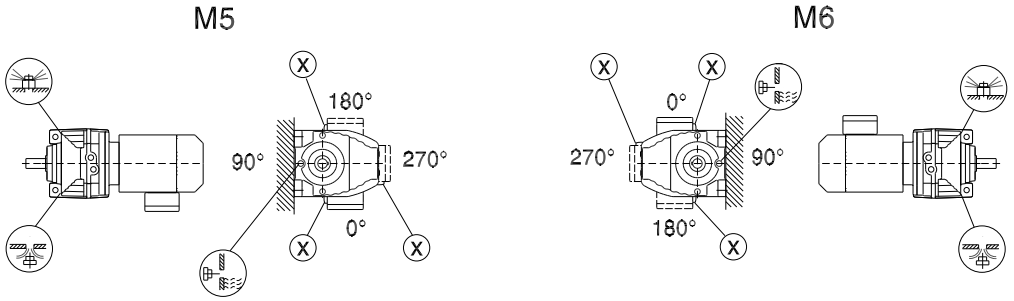
7.5 Helical gearmotors RX

7.5.1 RX57 ... RX107

04 043 02 00

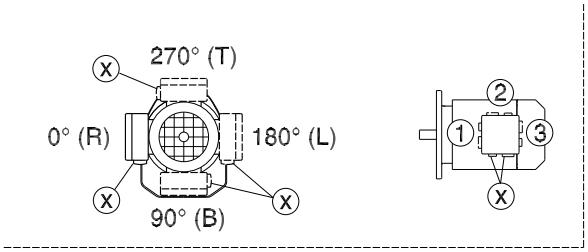


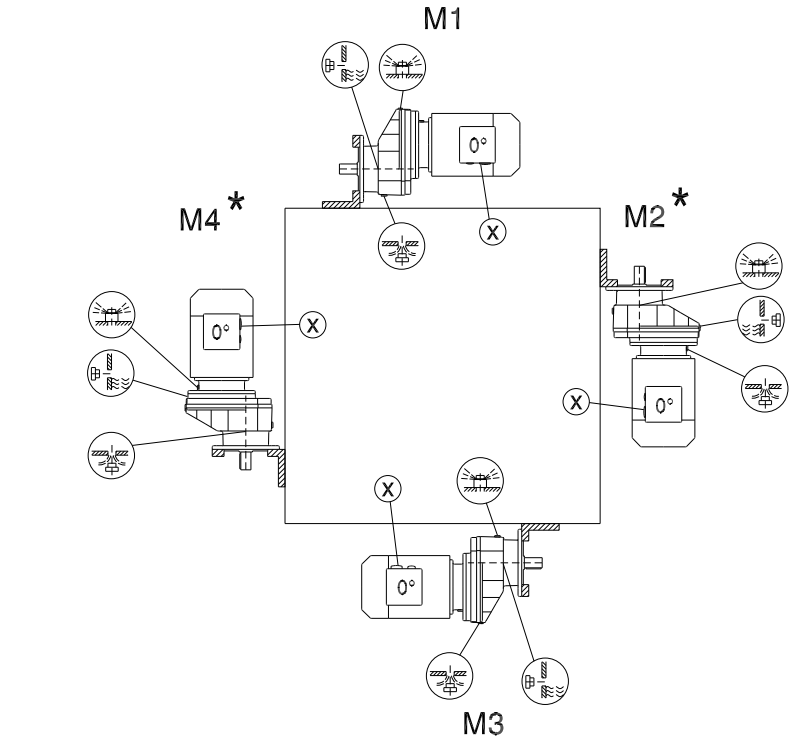


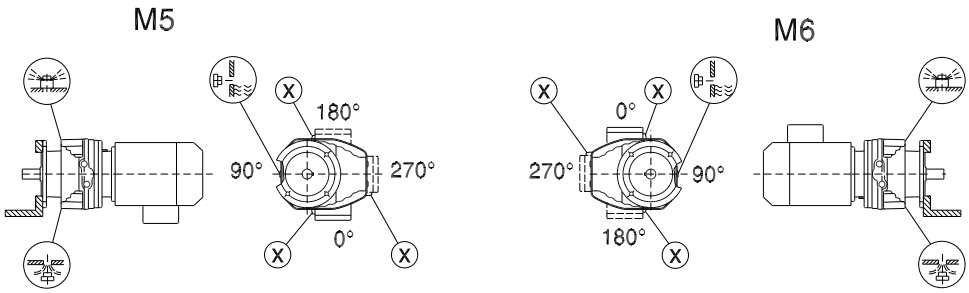


7.5.2 RXF57 ... RXF107

04 044 02 00



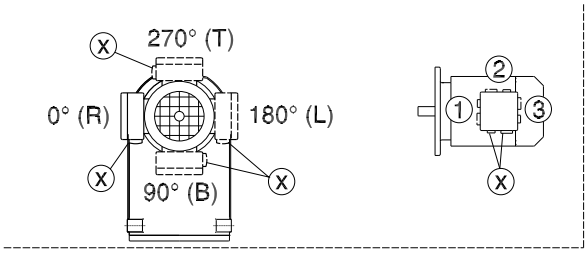


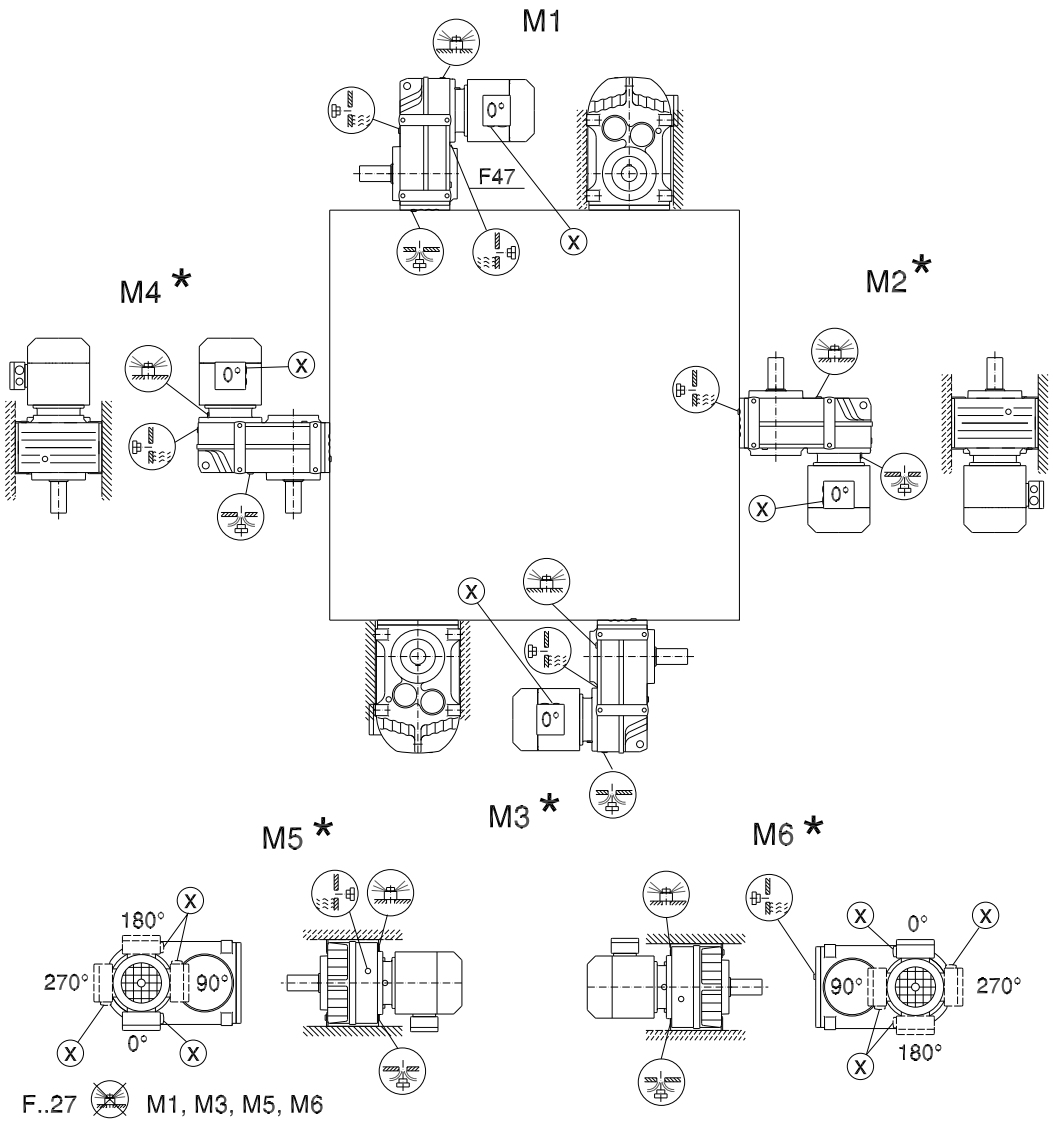


7.6 Parallel-shaft helical gearmotors F

7.6.1 F27 ... F157 / FA27B ... F157B / FH27B .. FH157B / FV27B ... FV107B

42 042 03 00





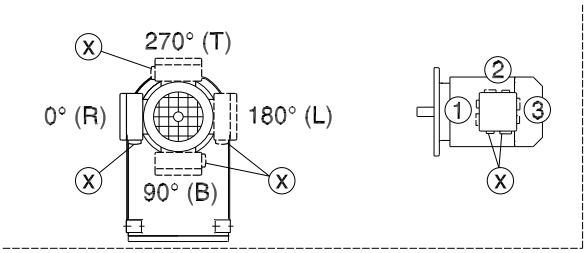
F..27 M1, M3, M5, M6

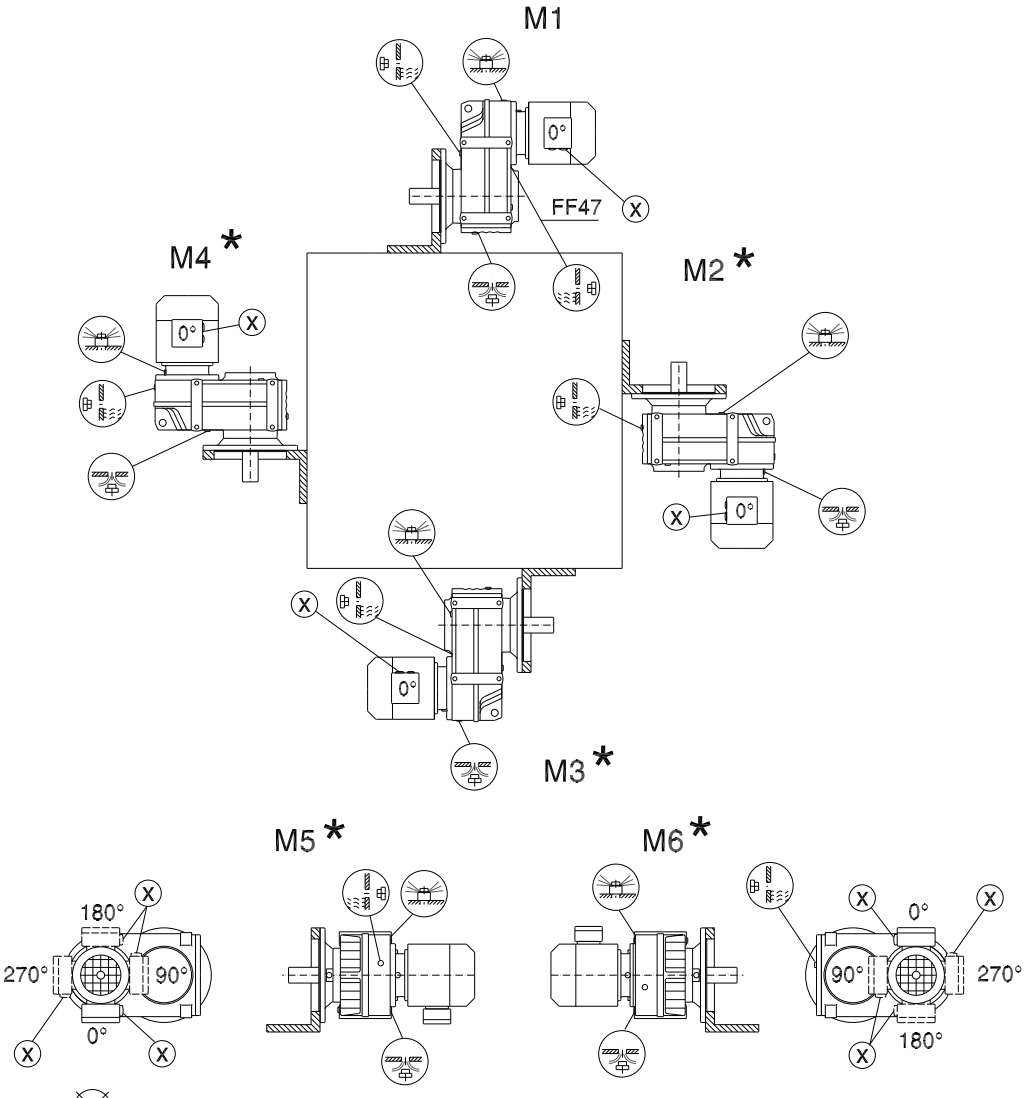
F..27 M1 - M6

F..27 M1, M3, M5, M6

7.6.2 FF27 ... FF157 / FAF27 ... FAF157 / FHF27 ... FHF157 / FAZ27 ... FAZ157 / FHZ27 ... FHZ157 / FVF27 ... FVF107 / FVZ27 ... FVZ107

42 043 03 00





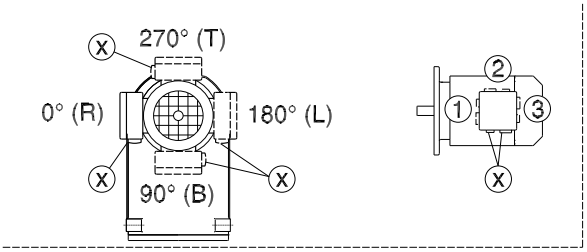
F..27 ⊗ M1, M3, M5, M6

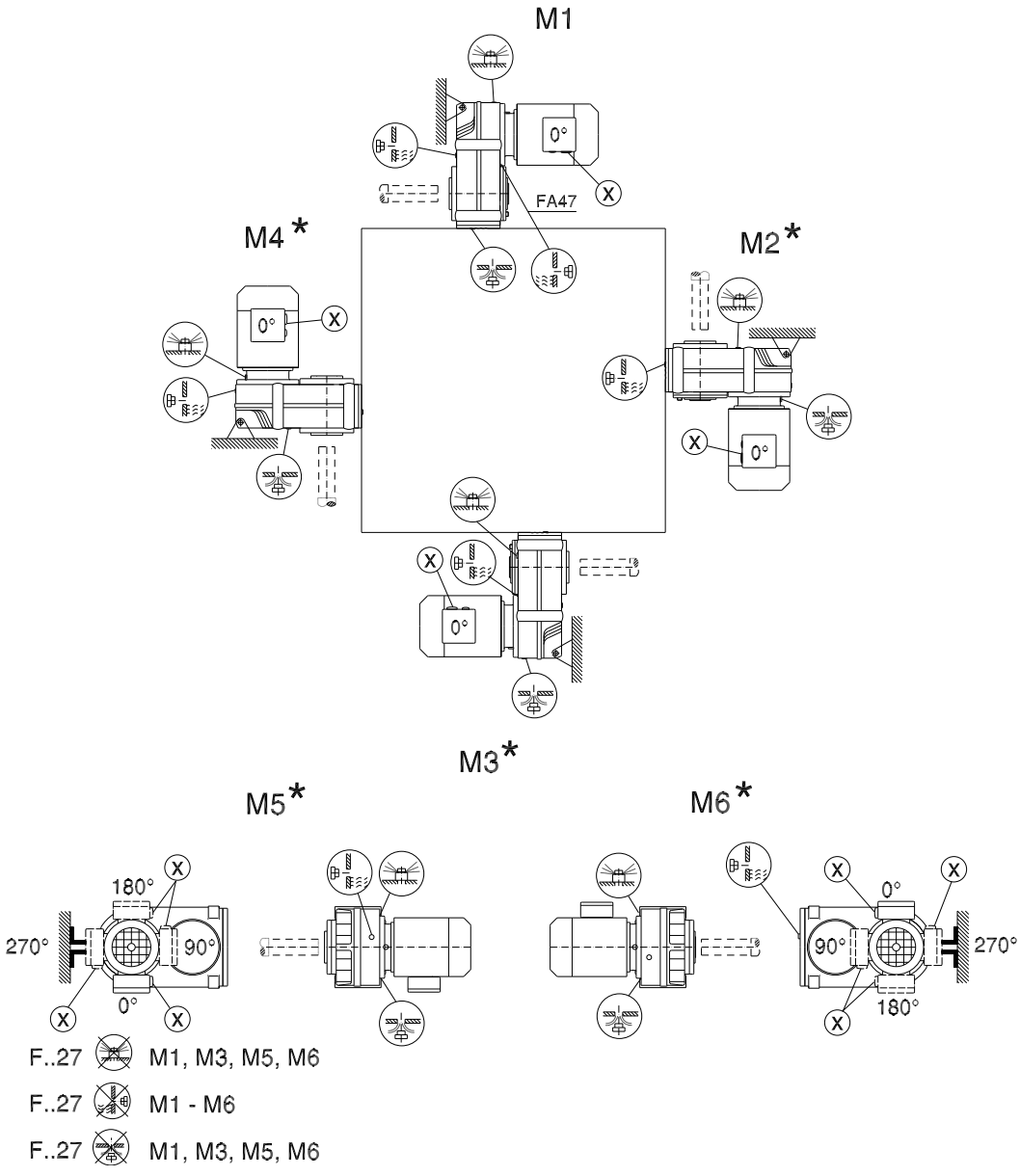
F..27 ⊗ M1 - M6

F..27 ⊗ M1, M3, M5, M6

7.6.3 FA27 ... FA157 / FH27 ... FH157 / FV27 ... FV107 / FT37 ... FT157

42 044 03 00

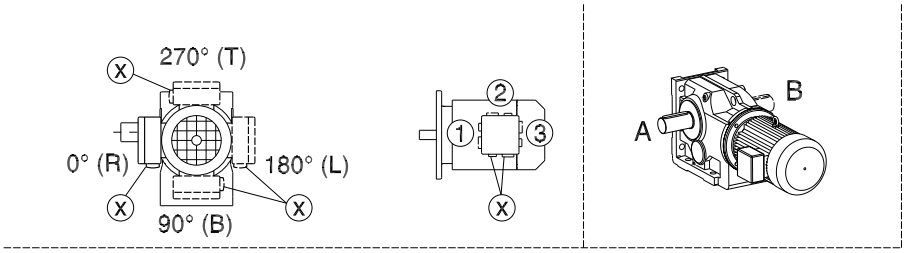


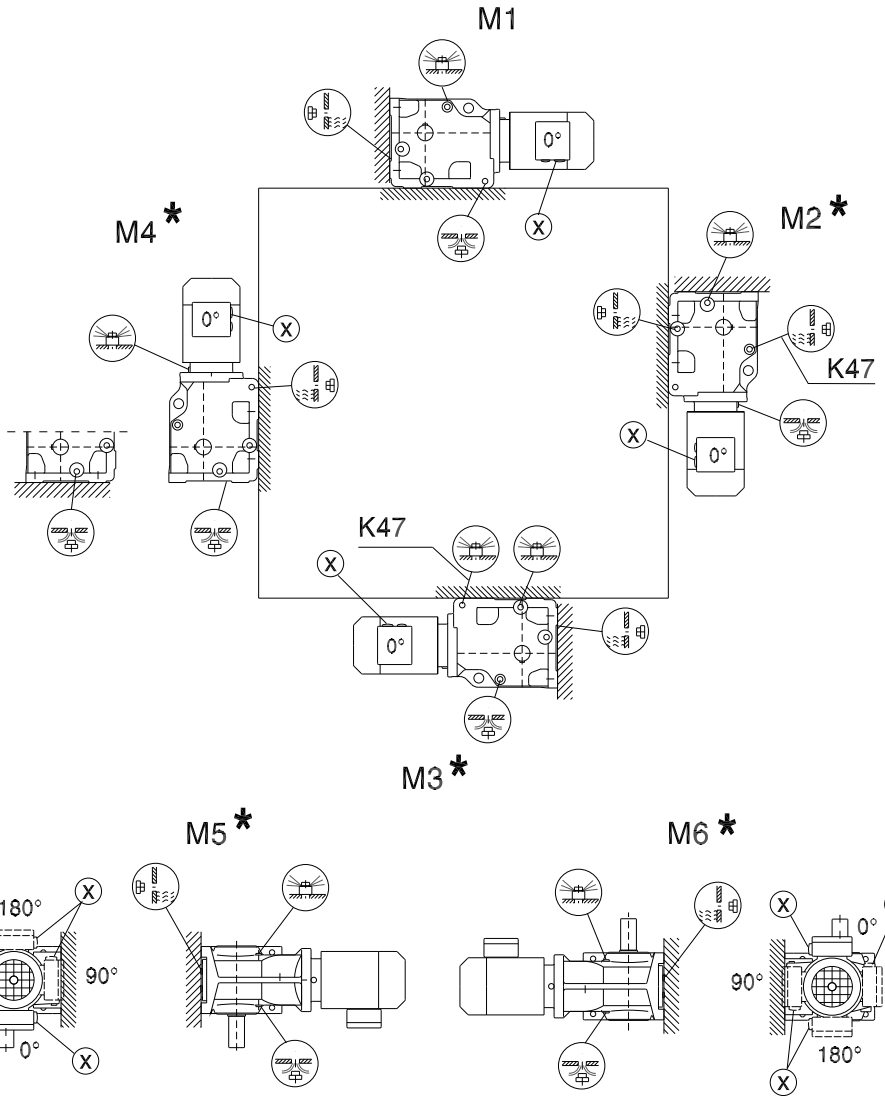


7.7 Helical-bevel gearmotors K

7.7.1 K37 ... K157 / KA37B ... KA157B / KH37B ... KH157B / KV37B ... KV107B

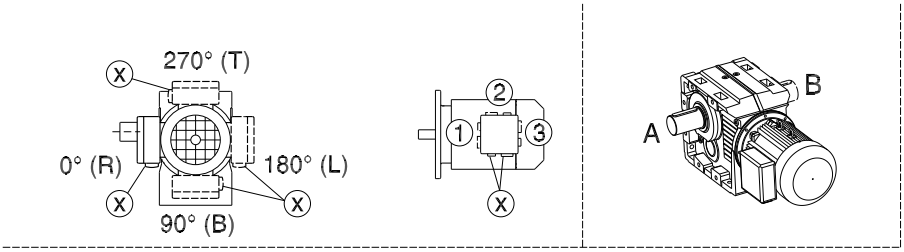
34 025 03 00

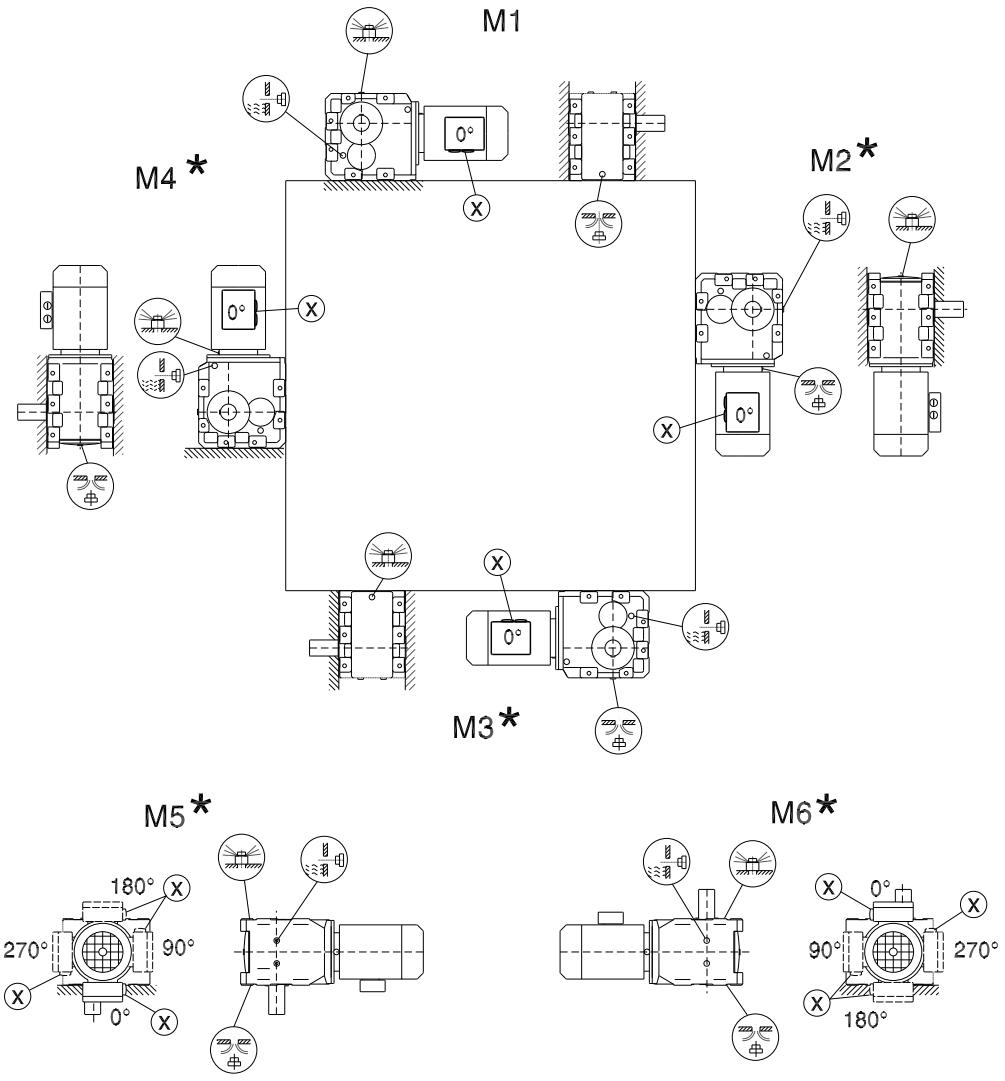




7.7.2 K167 ... K187 / KH167B ... KH187B

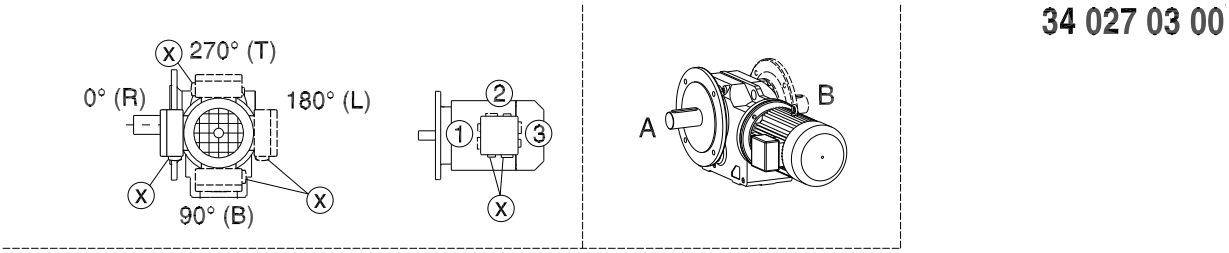
34 026 03 00

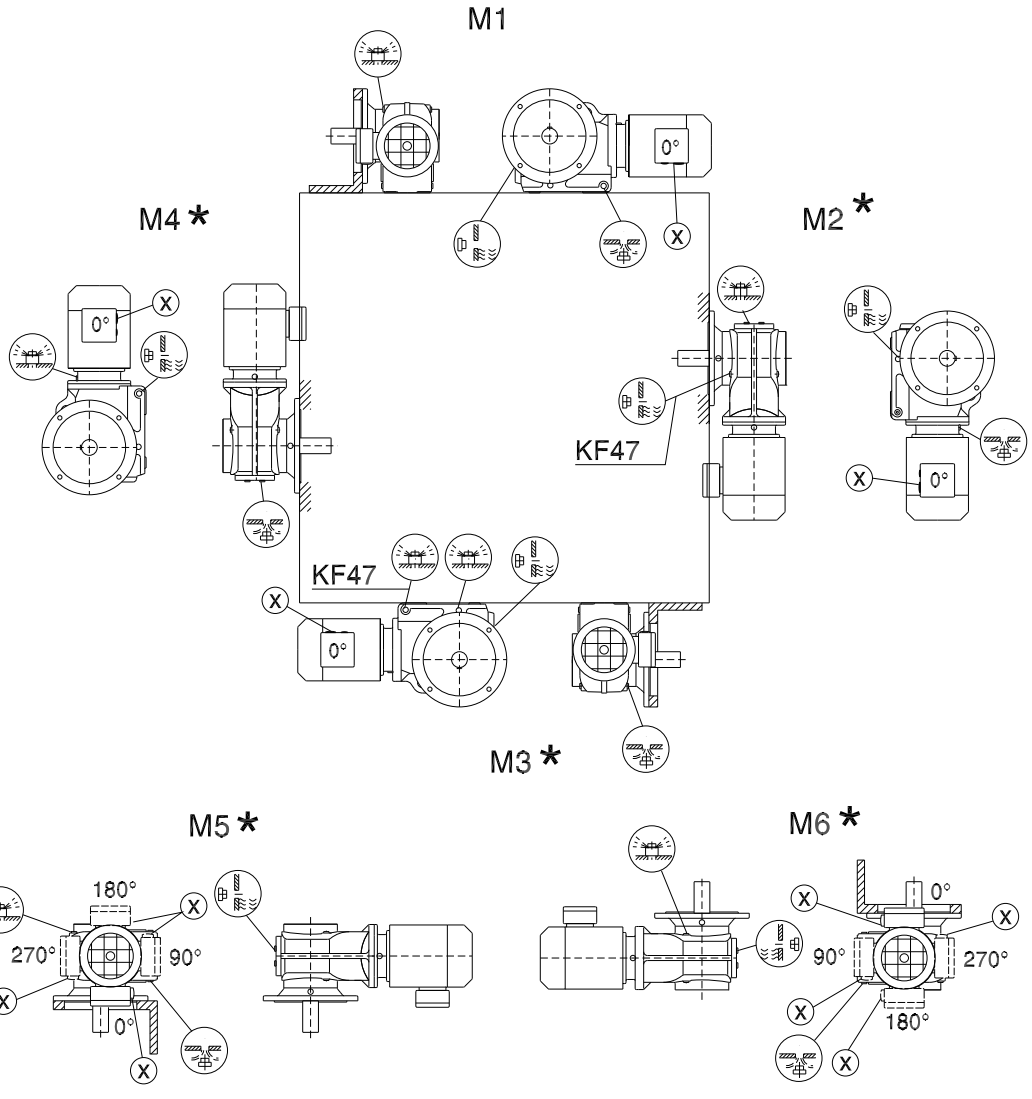




7.7.3 KF37 ... KF157 / KAF37 ... KAF157 / KHF37 ... KHF157 / KAZ37 ... KAZ157 / KHZ37 ... KHZ157 / KVF37 ... KVF107 / KVZ37 ... KVZ107

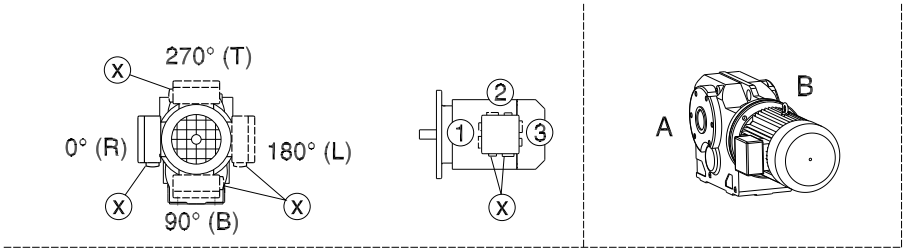
34 027 03 00

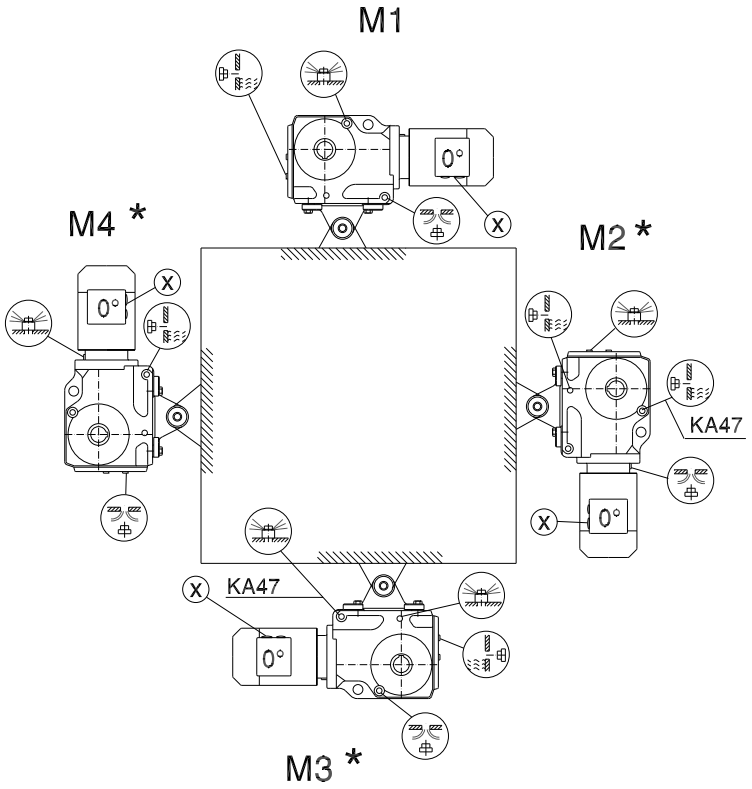


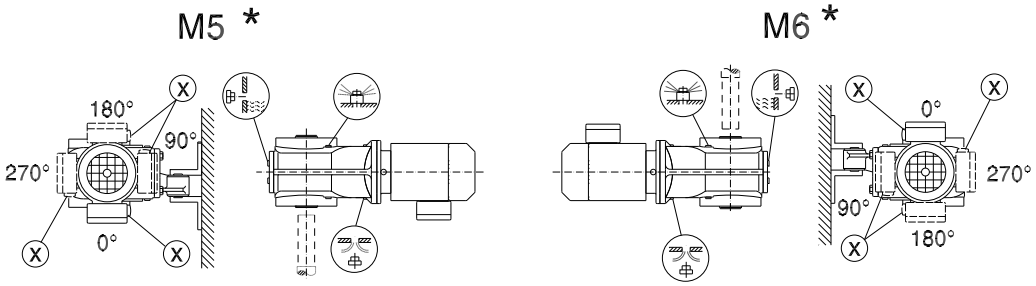


7.7.4 KA37 ... KA157 / KH37 ... KH157 / KV37 ... KV107 / KT37 ... KT157

39 025 04 00

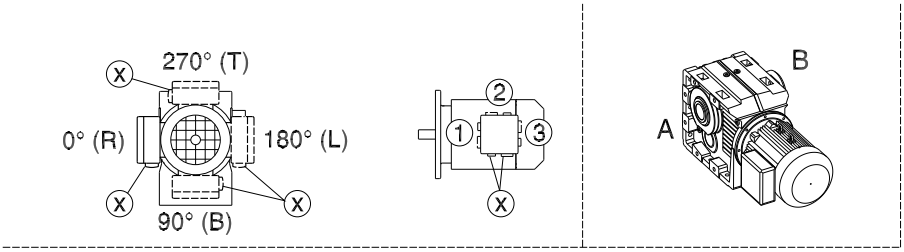


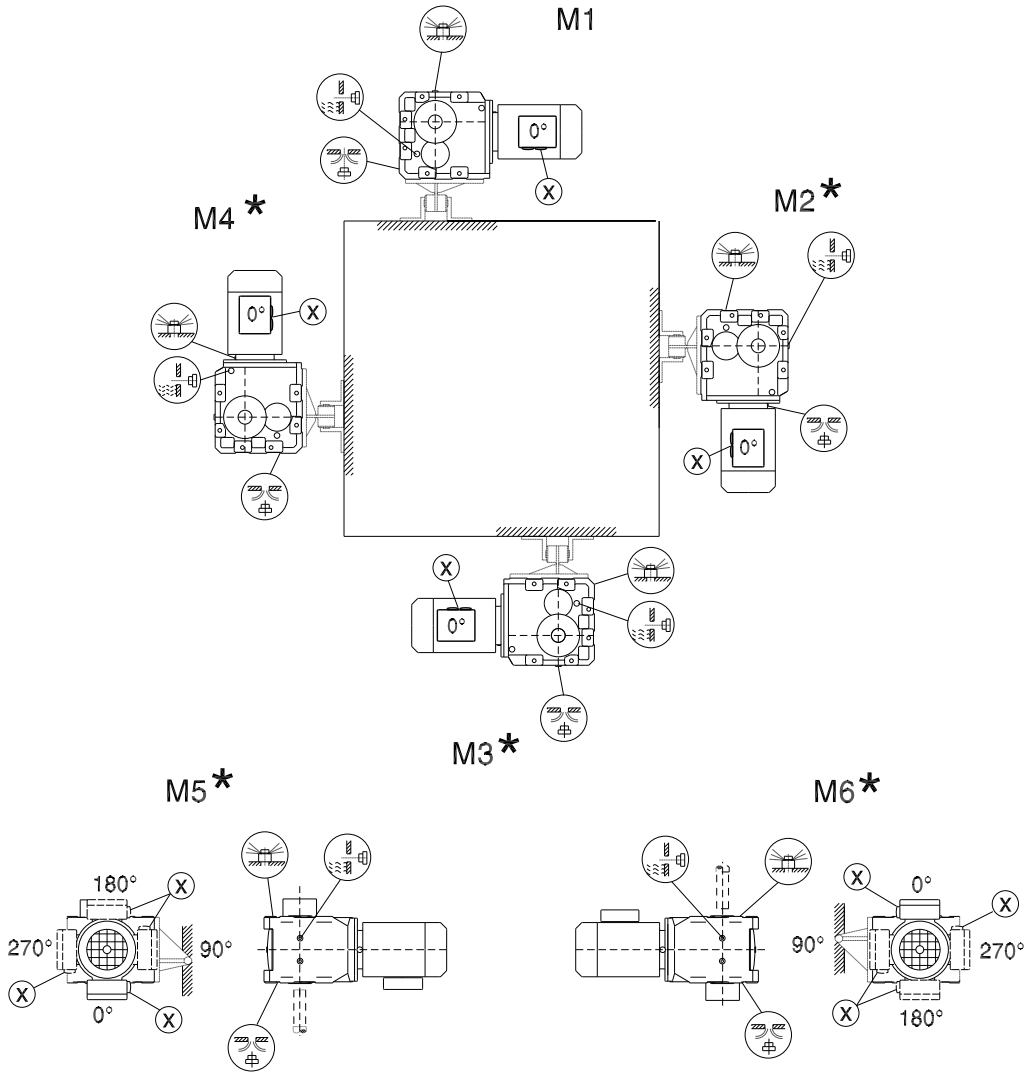




7.7.5 KH167 ... KH187

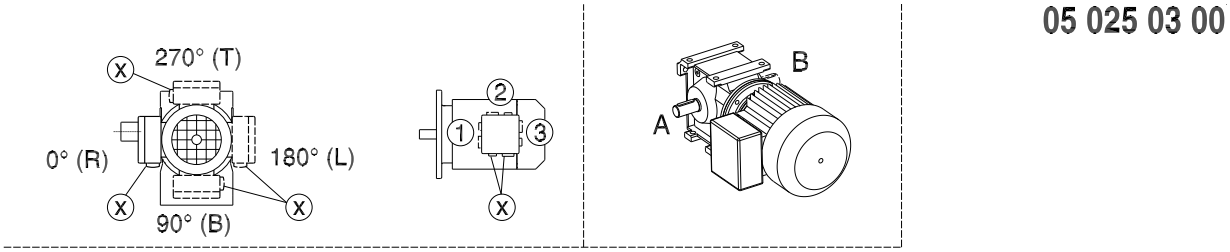
39 026 04 00

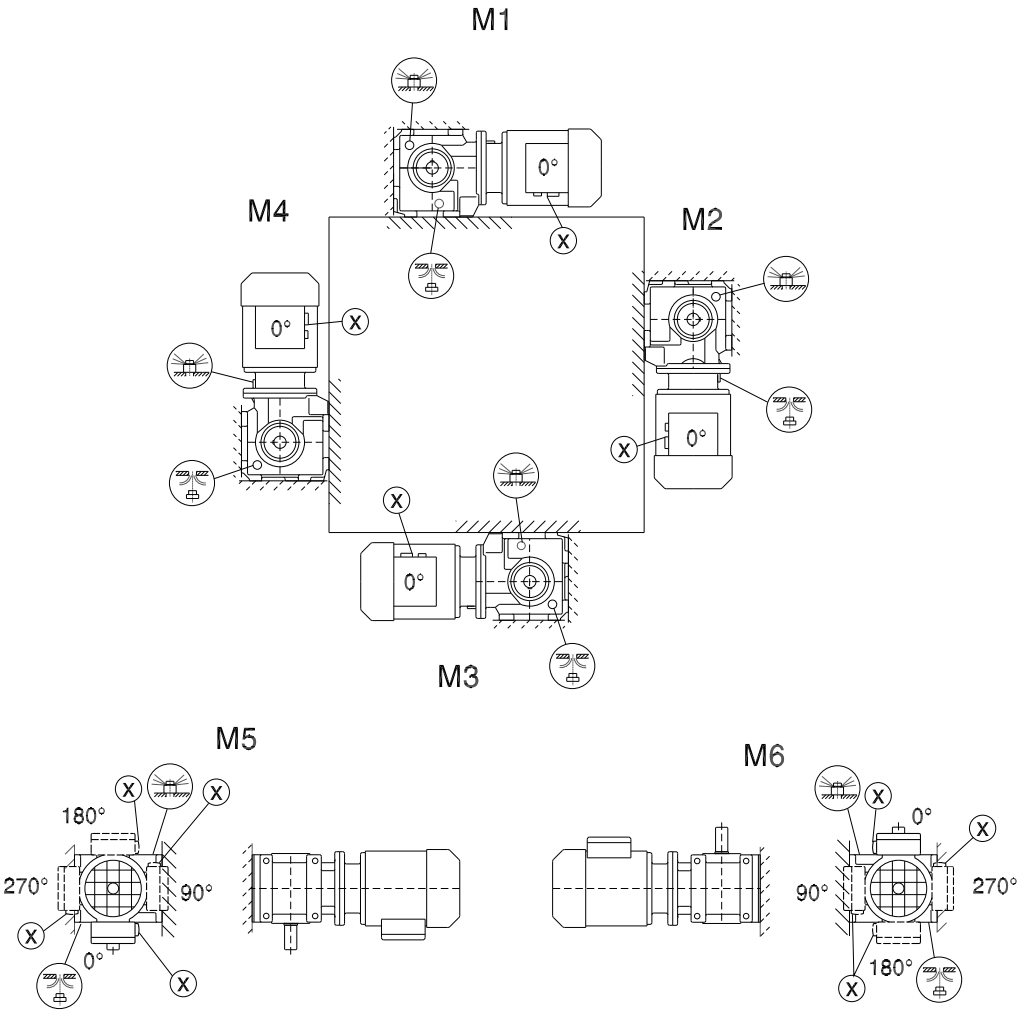




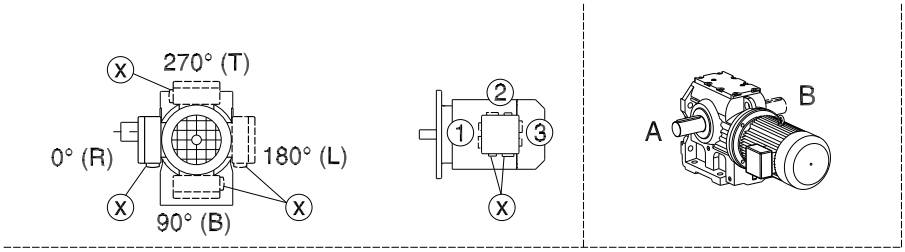
7.8 Helical-worm gearmotors S

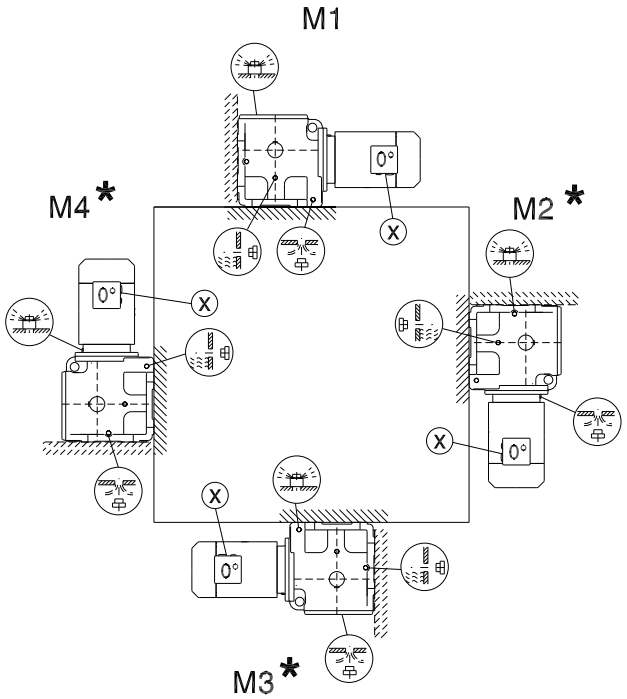
7.8.1 S37

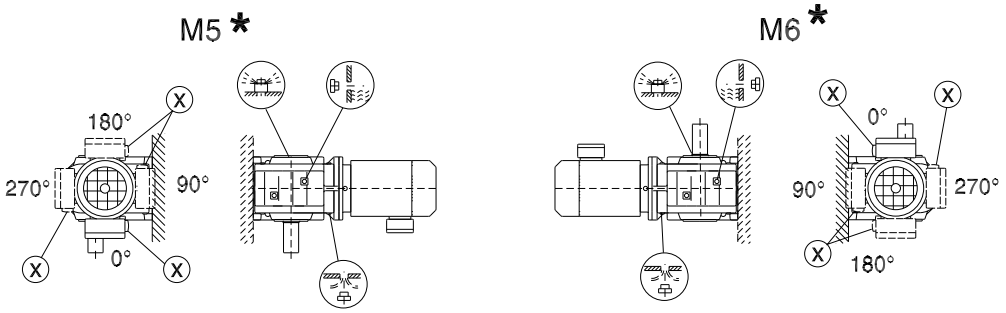




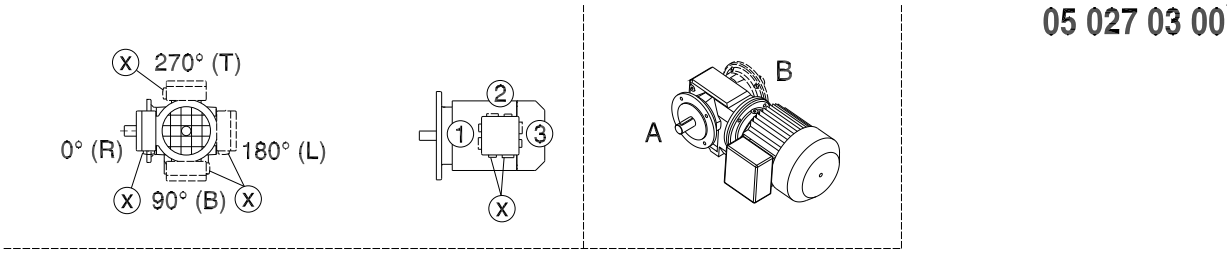
7.8.2 S47 ... S97

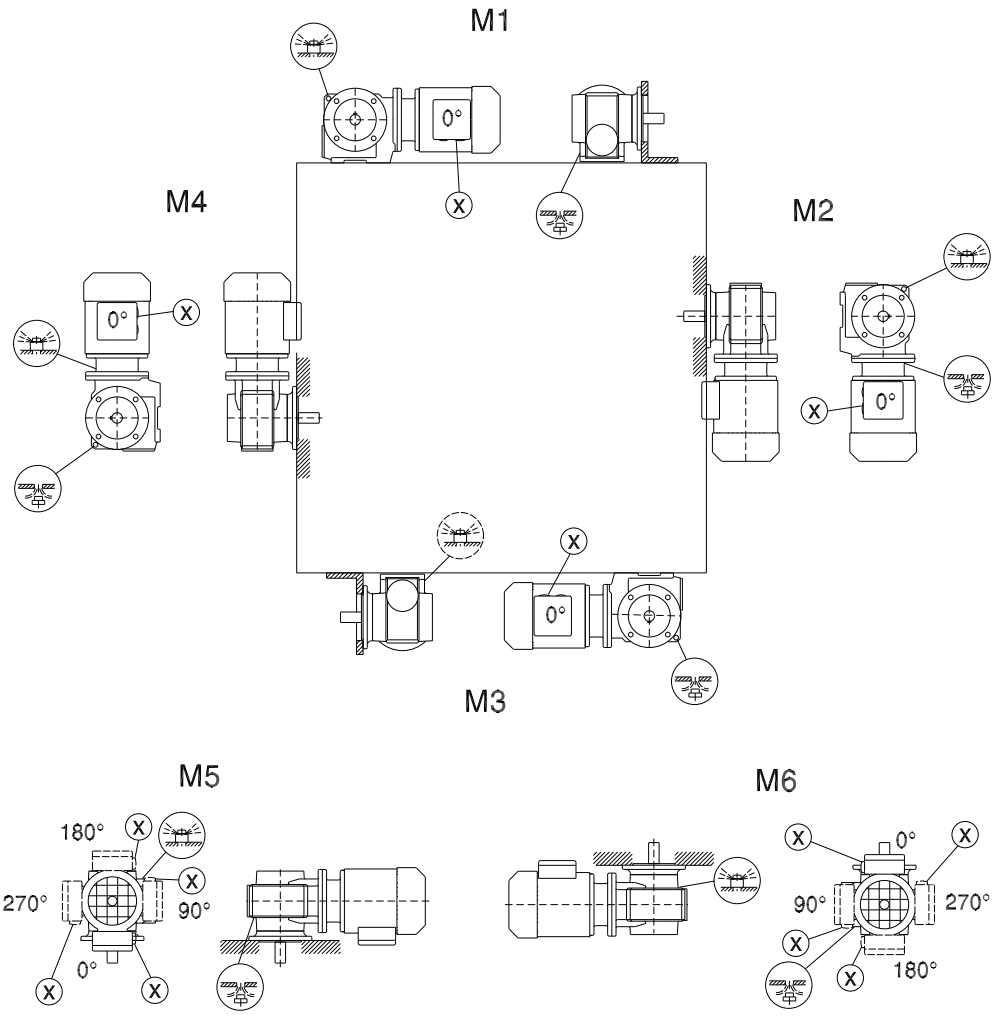

05 026 03 00
270° (T)
0° (R)
180° (L)
90° (B)
X
1
2
3
A
B


M1
M4 *
M2 *
M3 *
0°
X

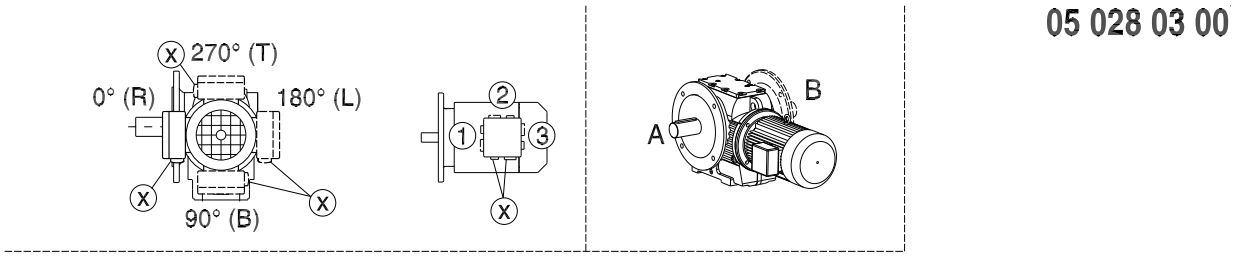

M5 *
M6 *
180°
270°
90°
0°
X

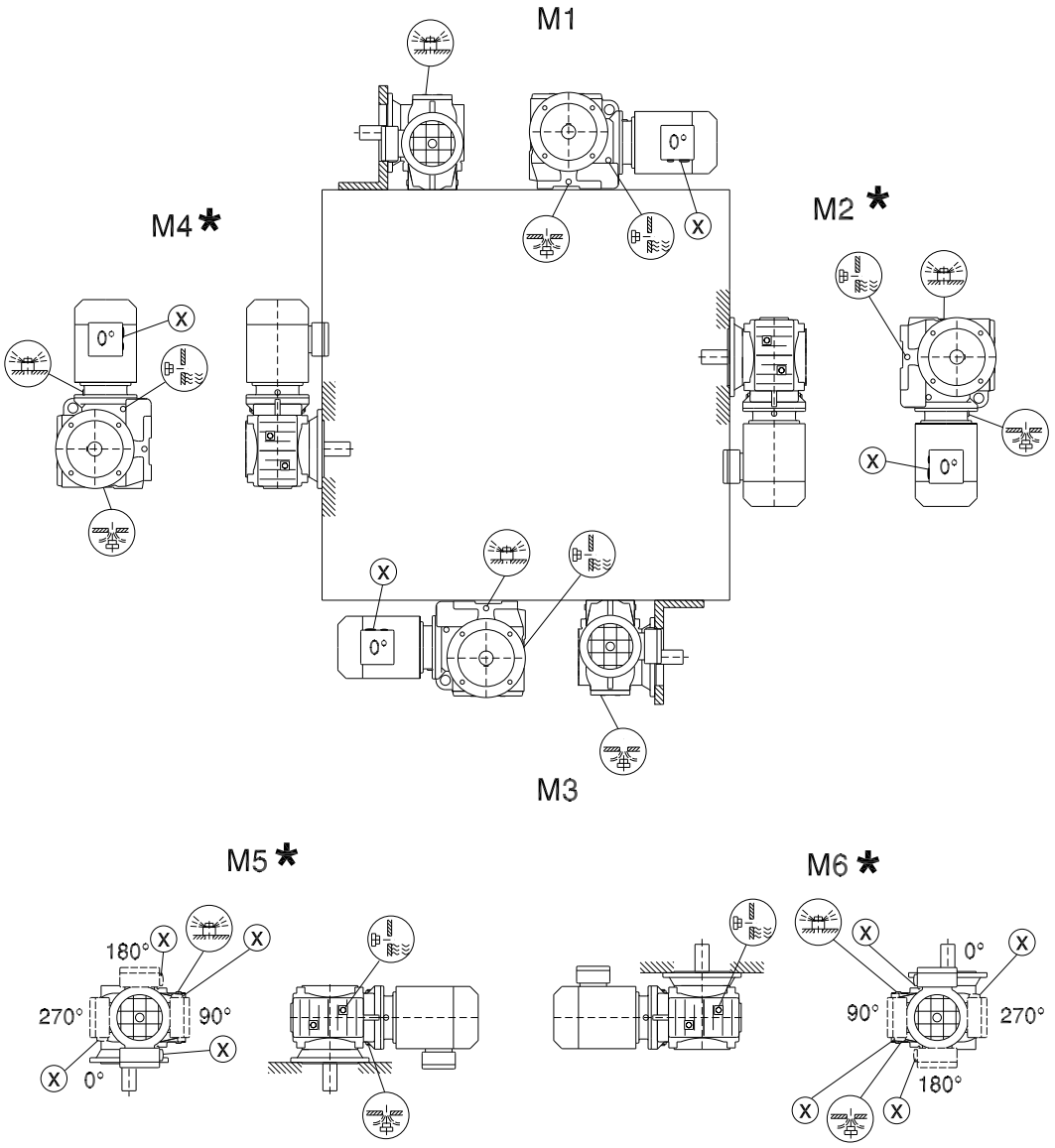
7.8.3 SF37 / SAF37 / SHF37





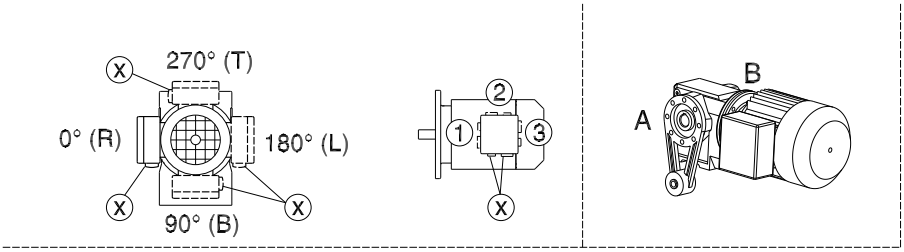
7.8.4 SF47 ... SF97 / SAF47 ... SAF97 / SHF47 ... SHF97 / SAZ47 ... SAZ97 / SHZ47 ... SHZ97

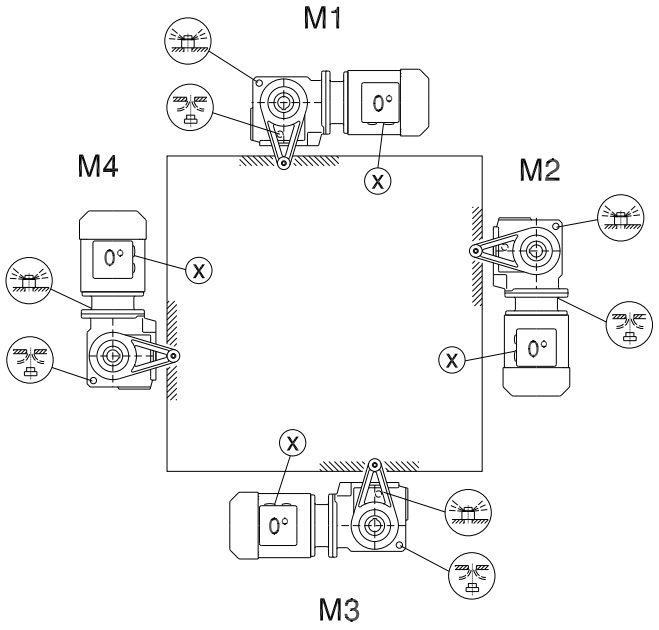


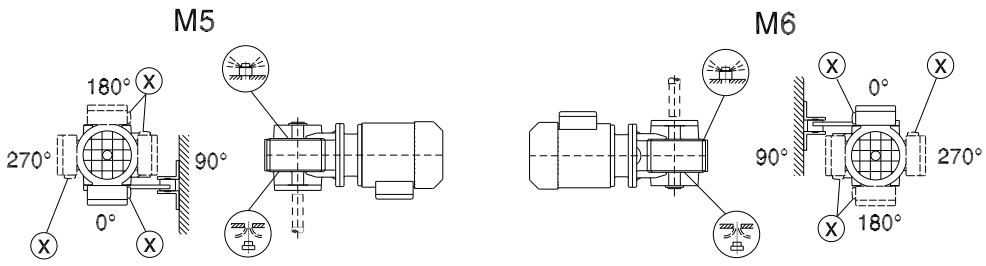


7.8.5 SA37 / SH37 / ST37

28 020 04 00

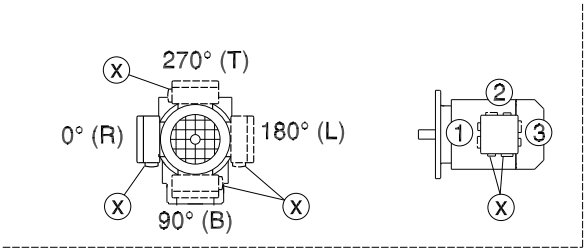


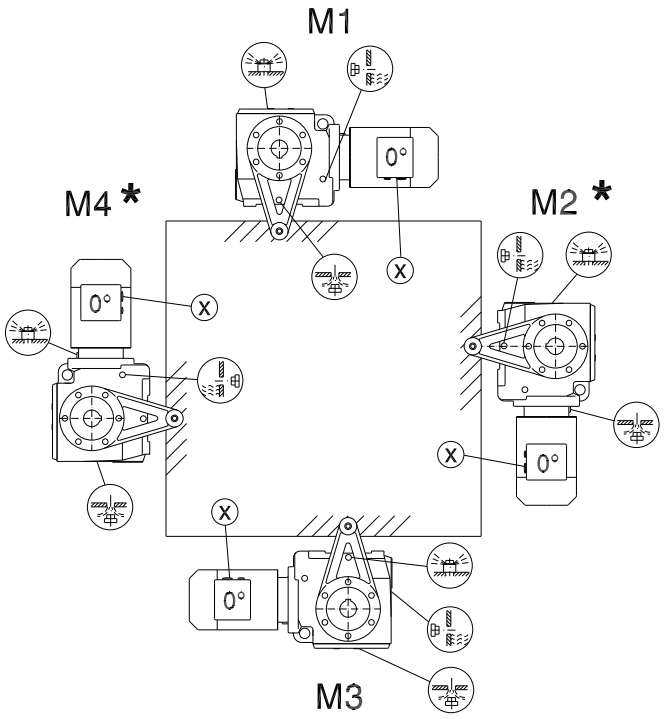


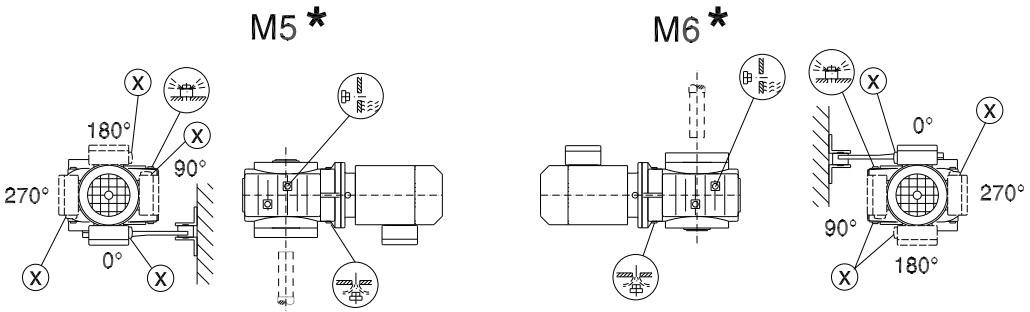


7.8.6 SA47 ... SA97 / SH47 ... SH97 / ST47 ... ST97

28 021 03 00



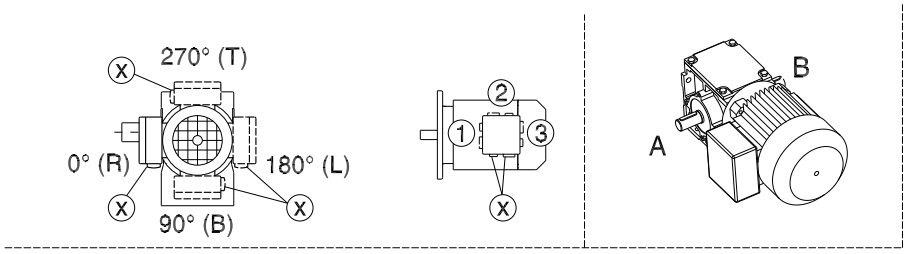


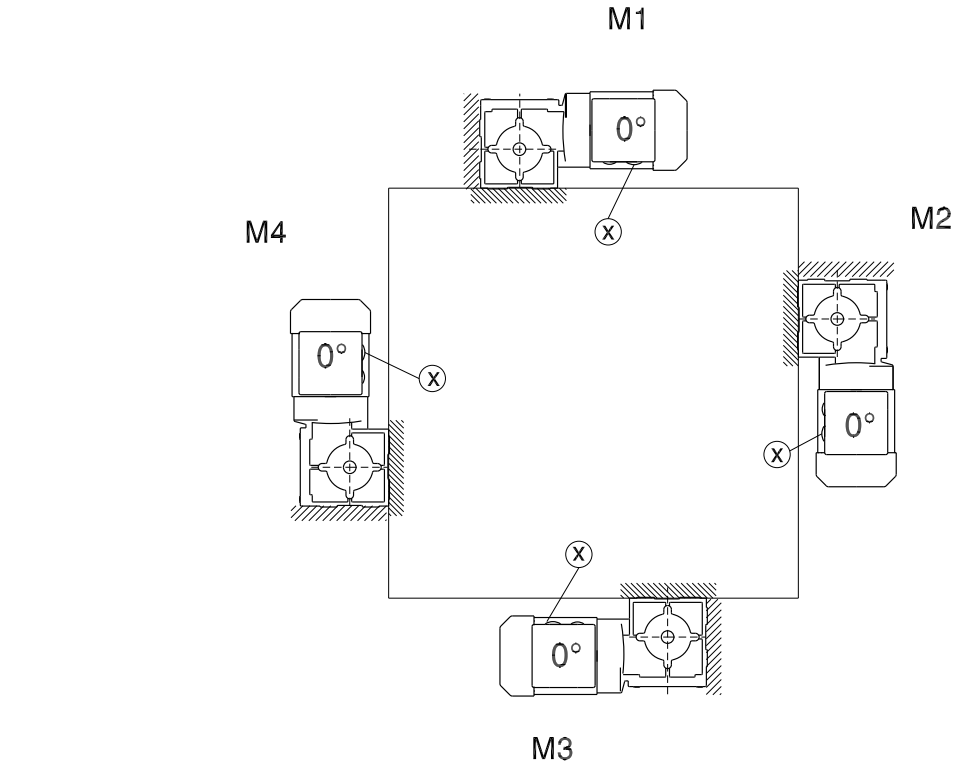


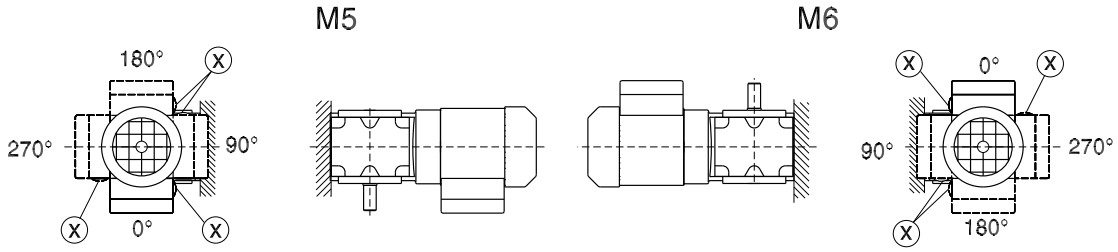
7.9 SPIROPLAN® W gearmotors

7.9.1 W10 ... W30

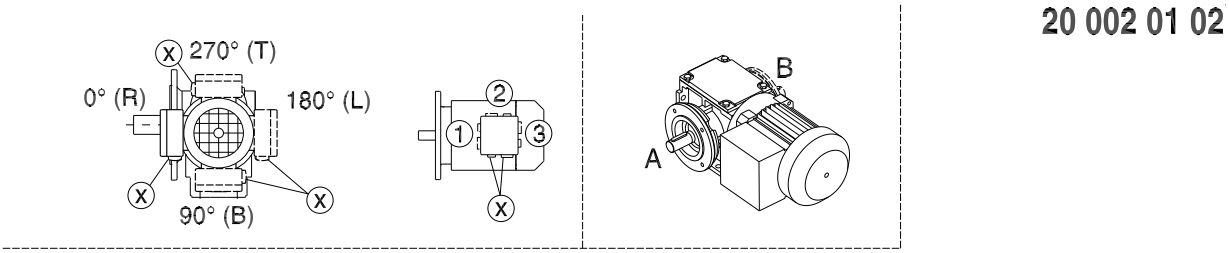
20 001 01 02

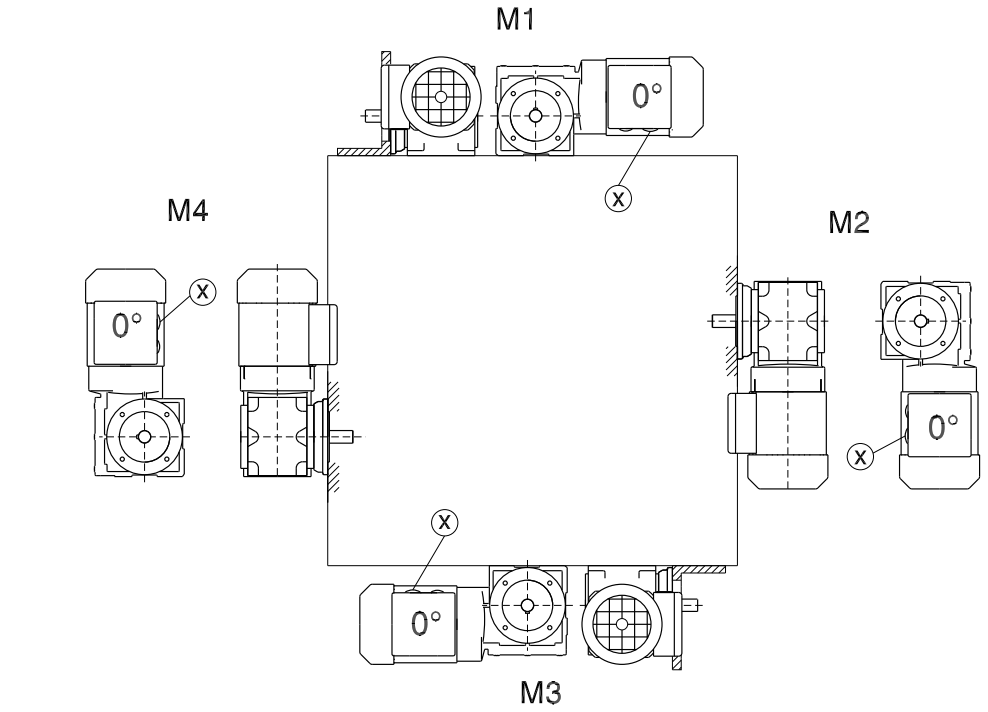


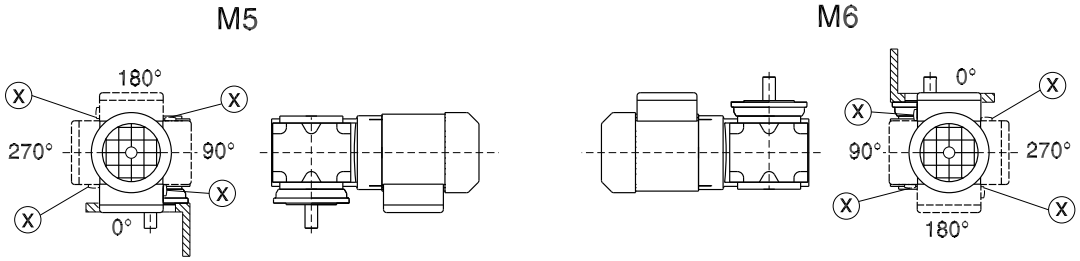




7.9.2 WF10 ... WF30 / WAF10 ... WAF30

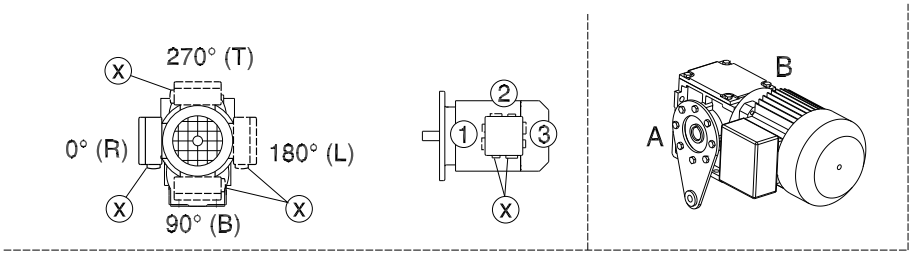


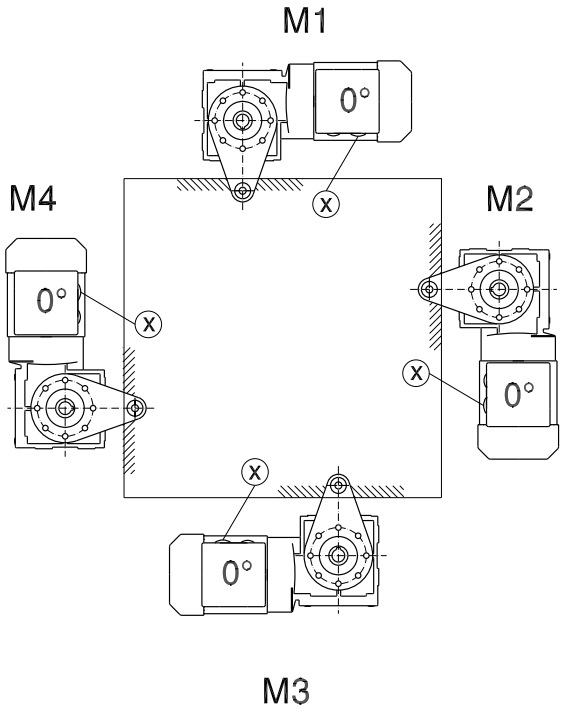


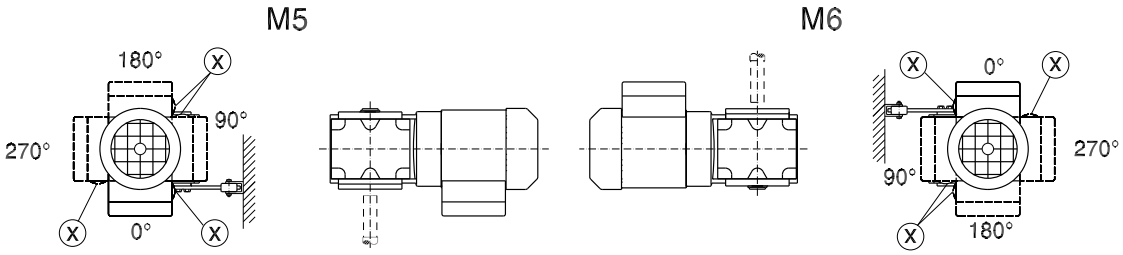


7.9.3 WA10 ... WA30

20 003 02 02

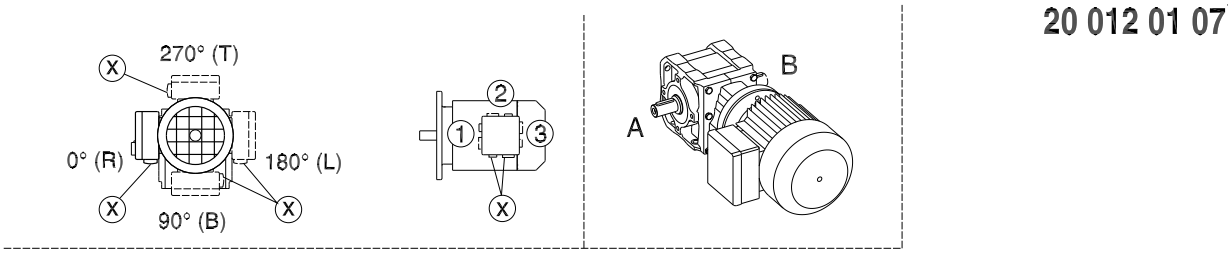


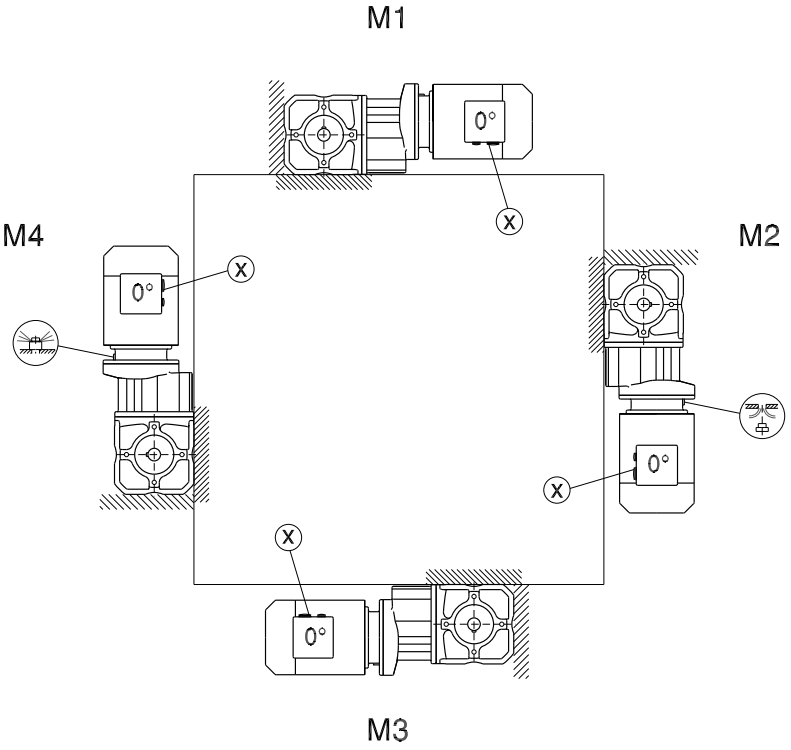


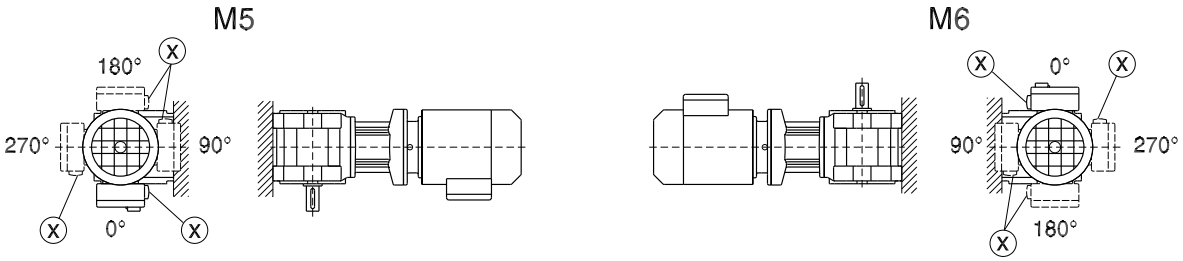


7.9.4 W37 ... W47 / WA37B ... WA47B / WH37B ... WH47B

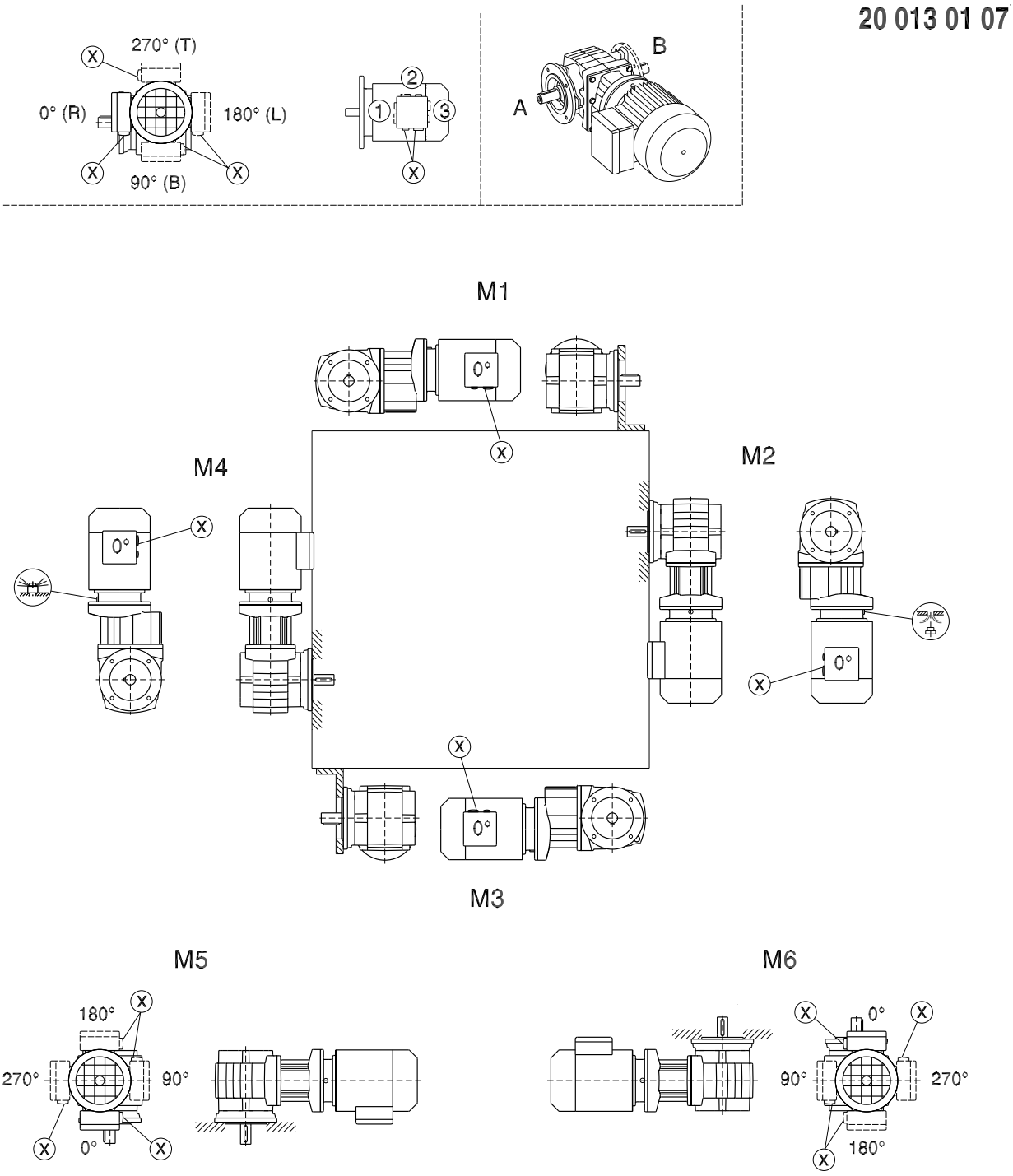
20 012 01 07



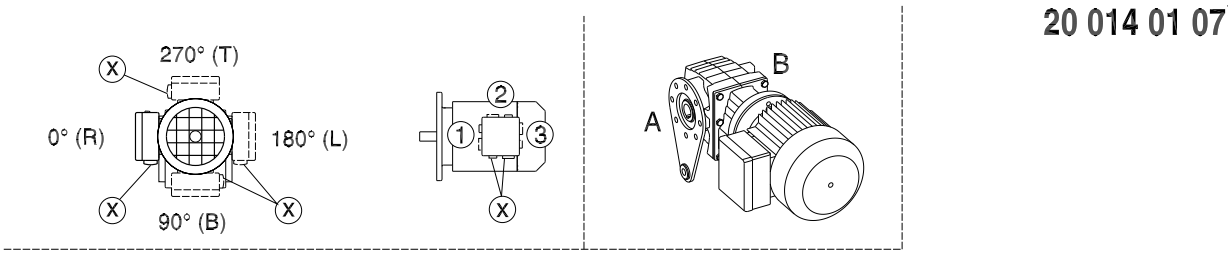


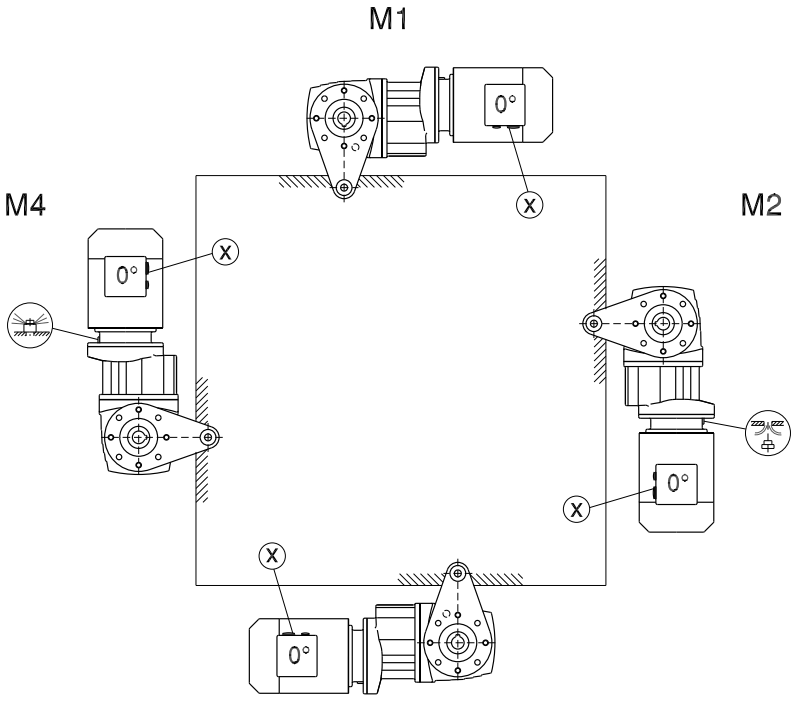


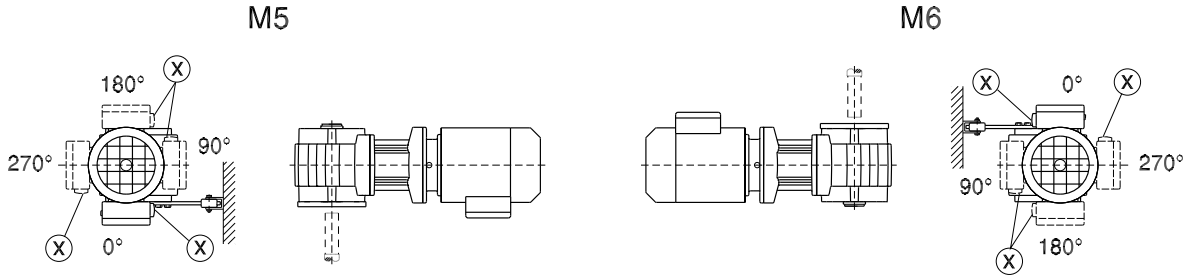
7.9.5 WF37 ... WF47 / WAF37 ... WAF47 / WHF37 ... WHF47



7.9.6 WA37 ... WA47 / WH37 ... WH47 / WT37 ... WT47







8 Technical Data

8.1 Extended storage

INFORMATION

For storage periods longer than 9 months, SEW-EURODRIVE recommends the "Extended storage" design. Gear units in this design are designated with a corresponding label.

In this case, a VCI corrosion inhibitor (volatile corrosion inhibitor) is added to the lubricant in these gear units. Please note that this VCI anti-corrosion agent is only effective in a temperature range of -25 °C to +50 °C. The flange contact surfaces and shaft ends are also treated with an anti-corrosion agent.

Observe the storage conditions specified in the following table for extended storage:

8.1.1 Storage conditions

The gear units must remain tightly sealed until taken into operation to prevent the VCI corrosion protection agent from evaporating.

The gear units come with the oil fill according to the specified mounting position (M1 – M6). Check the oil level before you start operating the gear unit for the first time.

Climate zone	Packaging[1)]	Storage[2)]	Storage duration
Temperate (Europe, USA, Canada, China and Russia, excluding tropical zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap.	Under roof, protected against rain and snow, no shock loads.	Up to 3 years with regular checks of the packaging and moisture indicator (rel. humidity < 50%).
	Open	Under roof and enclosed at constant temperature and atmospheric humidity (5°C < ϑ < 60°C, < 50% relative humidity). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). Protected against aggressive vapors and shocks.	2 years or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Check corrosion protection.
Tropical (Asia, Africa, Central and South America, Australia, New Zealand excluding temperate zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap. Protected against insect damage and mildew by chemical treatment.	With roof, protected against rain and shocks.	Up to 3 years with regular checks of the packaging and moisture indicator (rel. humidity < 50%).
	Open	Under roof and enclosed at constant temperature and atmospheric humidity (5°C < ϑ < 50°C, < 50% relative humidity). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). Protected against aggressive vapors and shocks. Protected against insect damage.	2 years or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Check corrosion protection.

1) The packaging must be carried out by an experienced company using the packaging materials that have been explicitly specified for the particular application.

2) SEW-EURODRIVE recommends to store the gear units according to the mounting position.

8.2 Lubricants

Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific gear unit and mounting position. The mounting position (M1 – M6 section "Mounting positions") must be specified with the order. You must adapt the lubricant fill in case of any subsequent changes made to the mounting position, see section "Lubricant fill quantities (page 113)"

8.2.1 Anti-friction bearing greases

The rolling bearings in gear units and motors are given a factory-fill with the greases listed below. SEW-EURODRIVE recommends regreasing anti-friction bearings with a grease fill at the same time as changing the oil.

	Ambient temperature	Manufacturer	Type
Gear unit rolling bearings	-40 °C to +80 °C	Fuchs	Renolit CX-TOM 15
	-40 °C to +80 °C	Klüber	Petamo GHY 133 N
	-40 °C to +40 °C	Castrol	Obeen FS 2
	-20 °C to +40 °C	Fuchs	Plantogel 2S

INFORMATION

The following grease quantities are required:

- **For fast-running bearings (gear unit input end):**

  Fill the cavities between the rolling elements one-third full with grease.
- **For slow-running bearings (gear unit output end):**

  Fill the cavities between the rolling elements two-thirds full with grease.

8.2.2 Lubricant table

The lubricant table on the following page shows the permitted lubricants for SEW-EURODRIVE gear units. Observe the following legend with regards to the lubricant table.

Key to the lubricant table

Abbreviations, meaning of shading and notes:

CLP	= Mineral oil
CLP PG	= Polyglycol (W gear units, conforms to USDA-H1)
CLP HC	= Synthetic hydrocarbons
E	= Ester oil (water hazard classification 1)
HCE	= Synthetic hydrocarbons + ester oil (USDA - H1 certification)
HLP	= Hydraulic oil
	= Synthetic lubricant (= synthetic-based roller bearing grease)
	= Mineral lubricant (= mineral-based rolling bearing grease)

1)	Helical-worm gear units with PG oil: consult SEW-EURODRIVE.
2)	Special lubricant for Spiroplan® gear units only
3)	Recommendation: Select SEW $f_B \geq 1.2$
4)	Observe the critical starting behavior at low temperatures.
5)	Low-viscosity grease
6)	Ambient temperature
7)	Grease
	Lubricant for the food industry (food grade oil)
	Biodegradable oil (lubricant for agriculture, forestry, and water management)

Lubricant table

01 751 05 04

	6) °C -50 0 +50 +100	DIN (ISO)	ISO.NLGI	Mobil®	Shell	Klüber	ARAL	bp	TEXACO	Castrol Tribol	Optimol	FUCHS	TOTAL
R...	Standard -15 +40	CLP(CC)	VG 220	Mobilgear 600 XP 220	Shell Omala 220	Klüberoil GEM 1-220 N	Aral Degol BG 220	BP Energol GR-XP 220	Meropa 220	Tribol 1100/220	Optigear BM 220	Renolin CLP 220	Carter EP 220
	-20 +80	CLP PG	VG 220	Mobil Glygoyle 220	Shell Tivela S 220	Klübersynth GH 6-220	Aral Degol GS 220	BP Enersyn SG-XP 220	Synlube CLP 220	Tribol 800/220	Optiflex A 220	Renolin PG 220	Carter SY 220
K...(HK...)	4) -20 +60	CLP HC	VG 220	Mobil SHC 630	Shell Omala HD 220	Klübersynth GEM 4-220 N	Aral Degol PAS 220		Pinnacle EP 220	Tribol 1510/220	Optigear Synthetic X 220	Renolin Unisyn CLP 220	
	4) -40 +40	CLP HC	VG 150	Mobil SHC 629	Shell Omala HD 150	Klübersynth GEM 4-150 N			Pinnacle EP 150		Optigear Synthetic X 150	Renolin Unisyn CLP 150	Carter SH 150
	-20 +25	CLP (CC)	VG 150 VG 100	Mobilgear 600 XP 100	Shell Omala 100	Klüberoil GEM 1-150 N	Aral Degol BG 100	BP Energol GR-XP 100	Meropa 150	Tribol 1100/100	Optigear BM 100	Renolin CLP 150	Carter EP 100
F...	-30 +10	HLP (HM)	VG 68-46 VG 32	Mobil DTE 10 Excel 32	Shell Tellus T 32	Klüberoil GEM 1-68 N	Aral Degol BG 46		Rando EP Ashless 46	Tribol 1100/68	Optigear 32	Renolin B 46 HVI	Equivis ZS 46
	4) -40 +20	CLP HC	VG 68	Mobil SHC 626	Shell Omala HD 68							Renolin Unisyn CLP 68	
	4) -40 + 0	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32			Cetus PAO 46		Optilieb HY 32	Renolin Unisyn OL 32	Dacnis SH 32
	4) -40 -20	HLP (HM)	VG 22 VG 15	Mobil DTE 10 Excel 15	Shell Tellus T 15	Isoflex MT 30 ROT		BP Energol HLP-HM 15	Rando HDZ 15		Hyspin AWS 22	Renolin MR 310	Equivis ZS 15
S...(HS...)	Standard 0 +40	CLP (CC)	VG 680	Mobilgear 600 XP 680	Shell Omala 680	Klüberoil GEM 1-680 N	Aral Degol BG 680	BP Energol GR-XP 680	Meropa 680	Tribol 1100/680	Optigear BM 680	Renolin SEW 680	Carter EP 680
	-20 +80	CLP PG	VG 680 1)	Mobil Glygoyle 680	Shell Tivela S 680	Klübersynth GH 6-680		BP Enersyn SG-XP 680	Synlube CLP 680	Tribol 800/680	Optiflex A 680	Renolin PG 680	
	4) -20 +60	CLP HC	VG 460	Mobil SHC 634	Shell Omala HD 460	Klübersynth GEM 4-460 N			Pinnacle EP 460		Optigear Synthetic X 460	Renolin Unisyn CLP 460	
	4) -40 +30	CLP HC	VG 150	Mobil SHC 629	Shell Omala HD 150	Klübersynth GEM 4-150 N			Pinnacle EP 150		Optigear Synthetic X 150	Renolin Unisyn CLP 150	Carter SH 150
	-20 +10	CLP (CC)	VG 150 VG 100	Mobilgear 600 XP 100	Shell Omala 100	Klüberoil GEM 1-150 N	Aral Degol BG 100	BP Energol GR-XP 100	Meropa 150	Tribol 1100/100	Optigear BM 100	Renolin CLP 150	Carter EP 100
	-20 +40	CLP PG	VG 220 1)	Mobil Glygoyle 220	Shell Tivela S 220	Klübersynth GH 6-220	Aral Degol GS 220	BP Enersyn SG-XP 220	Synlube CLP 220	Tribol 800/220	Optiflex A 220	Renolin PG 220	Carter SY 220
	4) -40 -20	CLP HC	VG 68	Mobil SHC 626	Shell Omala HD 68							Renolin Unisyn CLP 68	
	4) -40 0	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32			Cetus PAO 46		Alphasyn T32	Renolin Unisyn OL 32	Dacnis SH 32
R...,K...(HK...), F...,S...(HS...)	4) -10 +40	CLP HC NSF H1	VG 460		Shell Cassida Fluid GL 460	Klüberoil 4UH1-460 N					Optileb GT 460	Geralyn SF 460	
	-20 +30		VG 220		Shell Cassida Fluid GL 220	Klüberoil 4UH1-220 N					Optileb GT 220		
	-40 0		VG 68		Shell Cassida Fluid HF 68	Klüberoil 4UH1-68 N					Optileb HY 68		
		E	VG 460			Klüberbio CA2-460				Tribol Bio Top 1418/460		Plantogear 460 S	
W...(HW...)	Standard -20 +40	CLP PG 460 -SEW	VG 460 2)			Klüber SEW HT-460-5							
	4) -40 +10	API GL5	SAE 75W90 (–VG 100)	Mobil Synthetic Gear Oil 75 W90									
		H1 PG	VG 460 2) 3)			Klübersynth UH1 6-460							
PS.F..	Standard -20 +40	CLP PG	VG 220			Klübersynth GH 6-220							
	-20 +60	H1 PG	VG 460 2) 3)			Klübersynth UH1 6-460							
	-40 0	CLP HC	VG 32	Mobil SHC 624									
PS.C..	Standard	CLP (CC)	VG 220	Mobilgear 600 XP 220									
	-20 +40	DIN 51 818	00 5)	Mobilux EP 004									
	-20 +40		1 7)			Klübersynth UH1 14-151							
	-40 0	CLP HC	VG 32	Mobil SHC 624									
BS.F..	Standard -40 +40	API GL5	SAE 75W90 (–VG 100)	Mobil Synth Gear Oil 75 W90									
	-20 +60	H1 PG	VG 460 2) 3)			Klübersynth UH1 6-460							

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8.2.3 Lubricant fill quantities

The specified fill quantities are **recommended values**. The precise values vary depending on the number of stages and gear ratio. When filling, it is essential to check the **oil level plug since it indicates the precise oil volume**.

The following tables show guide values for lubricant fill quantities in relation to the mounting position M1 ... M6.

Helical (R) gear units

R.., R..F

Gear unit	Fill quantity in liters					
	M1[1)]	M2	M3	M4	M5	M6
R07	0.12	0.20	0.20	0.20	0.20	0.20
R17	0.25	0.55	0.35	0.55	0.35	0.40
R27	0.25/0.40	0.70	0.50	0.70	0.50	0.50
R37	0.30/0.95	0.85	0.95	1.05	0.75	0.95
R47	0.70/1.50	1.60	1.50	1.65	1.50	1.50
R57	0.80/1.70	1.90	1.70	2.10	1.70	1.70
R67	1.10/2.30	2.40	2.80	2.90	1.80	2.00
R77	1.20/3.00	3.30	3.60	3.80	2.50	3.40
R87	2.30/6.0	6.4	7.2	7.2	6.3	6.5
R97	4.60/9.8	11.7	11.7	13.4	11.3	11.7
R107	6.0/13.7	16.3	16.9	19.2	13.2	15.9
R137	10.0/25.0	28.0	29.5	31.5	25.0	25.0
R147	15.4/40.0	46.5	48.0	52.0	39.5	41.0
R167	27.0/70.0	82.0	78.0	88.0	66.0	69.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

RF..

Gear unit	Fill quantity in liters					
	M1[1)]	M2	M3	M4	M5	M6
RF07	0.12	0.20	0.20	0.20	0.20	0.20
RF17	0.25	0.55	0.35	0.55	0.35	0.40
RF27	0.25/0.40	0.70	0.50	0.70	0.50	0.50
RF37	0.35/0.95	0.90	0.95	1.05	0.75	0.95
RF47	0.65/1.50	1.60	1.50	1.65	1.50	1.50
RF57	0.80/1.70	1.80	1.70	2.00	1.70	1.70
RF67	1.20/2.50	2.50	2.70	2.80	1.90	2.10
RF77	1.20/2.60	3.10	3.30	3.60	2.40	3.00
RF87	2.40/6.0	6.4	7.1	7.2	6.3	6.4
RF97	5.1/10.2	11.9	11.2	14.0	11.2	11.8
RF107	6.3/14.9	15.9	17.0	19.2	13.1	15.9
RF137	9.5/25.0	27.0	29.0	32.5	25.0	25.0
RF147	16.4/42.0	47.0	48.0	52.0	42.0	42.0
RF167	26.0/70.0	82.0	78.0	88.0	65.0	71.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

RX..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RX57	0.60	0.80	1.30	1.30	0.90	0.90
RX67	0.80	0.80	1.70	1.90	1.10	1.10
RX77	1.10	1.50	2.60	2.70	1.60	1.60
RX87	1.70	2.50	4.80	4.80	2.90	2.90
RX97	2.10	3.40	7.4	7.0	4.80	4.80
RX107	3.90	5.6	11.6	11.9	7.7	7.7

RXF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RXF57	0.50	0.80	1.10	1.10	0.70	0.70
RXF67	0.70	0.80	1.50	1.40	1.00	1.00
RXF77	0.90	1.30	2.40	2.00	1.60	1.60
RXF87	1.60	1.95	4.90	3.95	2.90	2.90
RXF97	2.10	3.70	7.1	6.3	4.80	4.80
RXF107	3.10	5.7	11.2	9.3	7.2	7.2

Parallel shaft helical (F) gear units

F.., FA..B, FH..B, FV..B

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.60	3.50	2.10	3.50	2.80	2.90
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.9	7.3	4.30	8.0	6.0	6.3
F..87	10.8	13.0	7.7	13.8	10.8	11.0
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.5	27.0	27.0
F..127	40.5	54.5	34.0	61.0	46.3	47.0
F..157	69.0	104.0	63.0	105.0	86.0	78.0

FF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
FF27	0.60	0.80	0.65	0.70	0.60	0.60
FF37	1.00	1.25	0.70	1.30	1.00	1.10
FF47	1.60	1.85	1.10	1.90	1.50	1.70
FF57	2.80	3.50	2.10	3.70	2.90	3.00
FF67	2.70	3.80	1.90	3.80	2.90	3.20
FF77	5.9	7.3	4.30	8.1	6.0	6.3
FF87	10.8	13.2	7.8	14.1	11.0	11.2
FF97	19.0	22.5	12.6	25.6	18.9	20.5
FF107	25.5	32.0	19.5	38.5	27.5	28.0
FF127	41.5	55.5	34.0	63.0	46.3	49.0
FF157	72.0	105.0	64.0	106.0	87.0	79.0

FA.., FH.., FV.., FAF.., FAZ.., FHF.., FHZ.., FVF.., FVZ.., FT..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.70	3.50	2.10	3.40	2.90	3.00
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.9	7.3	4.30	8.0	6.0	6.3
F..87	10.8	13.0	7.7	13.8	10.8	11.0
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.5	27.0	27.0
F..127	39.0	54.5	34.0	61.0	45.0	46.5
F..157	68.0	103.0	62.0	104.0	85.0	79.5

Helical-bevel (K) gear units

K.., KA..B, KH..B, KV..B

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..37	0.50	1.00	1.00	1.25	0.95	0.95
K..47	0.80	1.30	1.50	2.00	1.60	1.60
K..57	1.10	2.20	2.20	2.80	2.30	2.10
K..67	1.10	2.40	2.60	3.45	2.60	2.60
K..77	2.20	4.10	4.40	5.8	4.20	4.40
K..87	3.70	8.0	8.7	10.9	8.0	8.0
K..97	7.0	14.0	15.7	20.0	15.7	15.5
K..107	10.0	21.0	25.5	33.5	24.0	24.0
K..127	21.0	41.5	44.0	54.0	40.0	41.0
K..157	31.0	62.0	65.0	90.0	58.0	62.0
K..167	33.0	95.0	105.0	123.0	85.0	84.0
K..187	53.0	152.0	167.0	200	143.0	143.0

KF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
KF37	0.50	1.10	1.10	1.50	1.00	1.00
KF47	0.80	1.30	1.70	2.20	1.60	1.60
KF57	1.20	2.20	2.40	3.15	2.50	2.30
KF67	1.10	2.40	2.80	3.70	2.70	2.70
KF77	2.10	4.10	4.40	5.9	4.50	4.50
KF87	3.70	8.2	9.0	11.9	8.4	8.4
KF97	7.0	14.7	17.3	21.5	15.7	16.5
KF107	10.0	21.8	25.8	35.1	25.2	25.2
KF127	21.0	41.5	46.0	55.0	41.0	41.0
KF157	31.0	66.0	69.0	92.0	62.0	62.0

KA.., KH.., KV.., KAF.., KHF.., KVF.., KAZ.., KHZ.., KVZ.., KT..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..37	0.50	1.00	1.00	1.40	1.00	1.00
K..47	0.80	1.30	1.60	2.15	1.60	1.60
K..57	1.20	2.20	2.40	3.15	2.70	2.40
K..67	1.10	2.40	2.70	3.70	2.60	2.60
K..77	2.10	4.10	4.60	5.9	4.40	4.40
K..87	3.70	8.2	8.8	11.1	8.0	8.0
K..97	7.0	14.7	15.7	20.0	15.7	15.7
K..107	10.0	20.5	24.0	32.4	24.0	24.0
K..127	21.0	41.5	43.0	52.0	40.0	40.0
K..157	31.0	66.0	67.0	87.0	62.0	62.0
K..167	33.0	95.0	105.0	123.0	85.0	84.0
K..187	53.0	152.0	167.0	200	143.0	143.0

Helical-worm (S) gear units

S

Gear unit	Fill quantity in liters					
	M1	M2	M3[1)]	M4	M5	M6
S..37	0.25	0.40	0.50	0.55	0.40	0.40
S..47	0.35	0.80	0.70/0.90	1.00	0.80	0.80
S..57	0.50	1.20	1.00/1.20	1.45	1.30	1.30
S..67	1.00	2.00	2.20/3.10	3.10	2.60	2.60
S..77	1.90	4.20	3.70/5.4	5.9	4.40	4.40
S..87	3.30	8.1	6.9/10.4	11.3	8.4	8.4
S..97	6.8	15.0	13.4/18.0	21.8	17.0	17.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

SF..

Gear unit	Fill quantity in liters					
	M1	M2	M3[1)]	M4	M5	M6
SF37	0.25	0.40	0.50	0.55	0.40	0.40
SF47	0.40	0.90	0.90/1.05	1.05	1.00	1.00
SF57	0.50	1.20	1.00/1.50	1.55	1.40	1.40
SF67	1.00	2.20	2.30/3.00	3.20	2.70	2.70
SF77	1.90	4.10	3.90/5.8	6.5	4.90	4.90
SF87	3.80	8.0	7.1/10.1	12.0	9.1	9.1
SF97	7.4	15.0	13.8/18.8	22.6	18.0	18.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

SA.., SH.., SAF.., SHZ.., SAZ.., SHF.., ST..

Gear unit	Fill quantity in liters					
	M1	M2	M3[1)]	M4	M5	M6
S..37	0.25	0.40	0.50	0.50	0.40	0.40
S..47	0.40	0.80	0.70/0.90	1.00	0.80	0.80
S..57	0.50	1.10	1.00/1.50	1.50	1.20	1.20
S..67	1.00	2.00	1.80/2.60	2.90	2.50	2.50
S..77	1.80	3.90	3.60/5.0	5.8	4.50	4.50
S..87	3.80	7.4	6.0/8.7	10.8	8.0	8.0
S..97	7.0	14.0	11.4/16.0	20.5	15.7	15.7

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

SPIROPLAN® (W) gear units

The fill quantity of SPIROPLAN® gear units W..10 to W..30 does not vary, irrespective of their mounting position. Only the fill quantity of SPIROPLAN® gear units W..37 and W..47 in mounting position M4 are different from that of other mounting positions.

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
W..10	0.16					
W..20	0.24					
W..30	0.40					
W..37	0.50			0.70	0.50	
W..47	0.90			1.40	0.90	
WF47	0.90			1.40	0.90	
WA47	0.90			1.25	0.90	

9 Malfunctions/Service

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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

⚠ CAUTION

Danger of burns due to hot gear unit and hot gear unit oil.

Severe injuries.

- Let the gear unit cool down before you start working on it.
- Only remove the oil level and oil drain plug very carefully.

⚠ NOTICE

Improper handling of the gear unit and the motor may lead to damages.

Possible damage to property

- Any repair work on SEW drives may be performed by qualified personnel only.
- Only qualified personnel is permitted to separate drive and motor.
- Consult SEW-EURODRIVE customer service.

9.1 Gear unit

Fault	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage	Check the oil →see "Inspection/maintenance for the gear unit" (page 67), change bearings.
	Knocking noise: Irregularity in the gearing	Contact customer service.
Unusual, irregular running noise	Foreign bodies in the oil	• Check the oil →see "Inspection/maintenance for the gear unit" (page 67), • Stop the drive, contact customer service
Oil leakage[1)] • From inspection cover • From the motor flange • From the motor oil seal • From the gear unit flange • From the output end oil seal.	Rubber seal on the gear cover plate leaking	Tighten the screws on the gear cover plate and observe the gear unit. If oil still leaks: Contact customer service.
	Seal defective.	Contact customer service.
	Gear unit not ventilated	Vent the gear unit → see "Mounting Positions (page 82)".
Oil leaking from breather valve	Too much oil	Correct the oil fill quantity →see "Inspection/maintenance for the gear unit" (page 67),
	Drive installed in incorrect mounting position	• Properly adjust the breather valve, see "Mounting Positions (page 82)" • Correct the oil level →see "Inspection/maintenance for the gear unit" (page 67),
	Frequent cold starts (oil foams) and/or high oil level.	Use an oil expansion tank
Output shaft does not turn although the motor is running or the input shaft is rotated	Connection between shaft and hub in gear unit interrupted	Send in the gear unit/gearmotor for repair.

1) Short-term oil / grease leakage at the oil seal is possible in the run-in phase (48 hours running time).

9.2 AM/AQ/AL adapter

Malfunction	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage.	Contact SEW-EURODRIVE customer service
Oil leaking	Seal defective	Contact SEW-EURODRIVE customer service
Output shaft does not turn although the motor is running or the input shaft is rotated	Connection between shaft and hub in gear unit interrupted	Send the gear unit to SEW-EURODRIVE for repair.
Change in running noise and / or vibrations.	Annular gear wear, short-term torque transfer through metal contact	Change the annular gear
	Bolts to secure hub axially are loose.	Tighten the screws
Premature wear in annular gear	• Contact with aggressive fluids / oils; ozone influence; too high ambient temperatures etc, which can cause a change in the physical properties of the annular gear. • Impermissibly high ambient/contact temperature for the annular gear; maximum permitted temperature: -20 °C to +80 °C • Overload	Contact SEW-EURODRIVE customer service

9.3 AD input shaft assembly

Malfunction	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage.	Contact SEW-EURODRIVE customer service
Oil leaking	Seal defective	Contact SEW-EURODRIVE customer service
Output shaft does not turn although the input shaft is rotated.	Connection between shaft and hub in gear unit or cover interrupted	Send the gear unit to SEW-EURODRIVE for repair.

9.4 Customer service

Please have the following information available if you require customer service assistance:

- Nameplate data (complete)
- Type and extent of the problem
- Time the problem occurred and any accompanying circumstances
- Assumed cause

A digital photograph if possible

9.5 Disposal

Dispose gear units in accordance with the regulations in force regarding respective materials:

- Steel scrap
  - Housing parts
  - Gears
  - Shafts
  - Roller bearing
- Parts of the worm gears are made of non-ferrous metals. Dispose of the worm gears as appropriate.
- Collect waste oil and dispose of it according to the regulations in force.

10 Address List

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Service Competence Center	**Central**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	**Forbach**	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles F-44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Alger**	REDUCOM Sarl 16, rue des Frères Zaghnoune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 sew-algeria@reducom-dz.com http://www.reducom-dz.com

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at

Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 (17) 298 38 50 Fax +375 (17) 29838 50 sales@sew.by

Belgium			
Assembly **Sales** **Service**	**Brussels**	**SEW Caron-Vector** Research park Haasrode Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Center	**Industrial Gears**	**SEW Caron-Vector** Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be
	Antwerp	**SEW Caron-Vector** Glasstraat, 19 BE-2170 Merksem	Tel. +32 3 64 19 333 Fax +32 3 64 19 336 http://www.sew-eurodrive.be service-antwerpen@sew-eurodrive.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@mail.bg

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137 electrojemba@yahoo.fr

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 info@sew-eurodrive.cn http://www.sew-eurodrive.com.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
	Additional addresses for service in China provided on request!		

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sewcol@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. Zeleni dol 10 HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr

Czech Republic			
Sales	**Prague**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 255 709 601 Fax +420 220 121 237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Copenhagen**	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 + 1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi
Production **Assembly**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059 esg_services@yahoo.fr

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 Normanton, West-Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athens**	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

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. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

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 office@sew-eurodrive.hu

India			
Registered Office **Assembly** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@seweurodriveindia.com
Assembly **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 c.v.shivkumar@seweurodriveindia.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**Solaro**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Société industrielle & commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1115 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373855 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

Kazakhstan			
Sales	**Almaty**	ТОО "СЕВ-ЕВРОДРАЙВ" 050061, Республика Казахстан г.Алматы, пр.Райымбека, 348	Тел. +7 (727) 334 1880 Факс +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@info.com.lb
Jordan Kuwait Saudi Arabia Syria	**Beirut**	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 info@medrives.com http://www.medrives.com

Lithuania			
Sales	**Alytus**	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my

Mexico			
Assembly **Sales** **Service**	**Quéretaro**	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Morocco			
Sales	**Casablanca**	Afit Route D'El Jadida KM 14 RP8 Province de Nouaceur Commune Rurale de Bouskoura MA 20300 Casablanca	Tel. +212 522633700 Fax +212 522621588 fatima.haquiq@premium.net http://www.groupe-premium.com

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Pakistan			
Sales	**Karachi**	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 676 53 00 Fax +48 42 676 53 45 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	24 Hour Service		Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucharest**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn http://www.senemeca.com

Serbia			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 cfoster@sew.co.za

South Africa			
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaco Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za

South Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master.korea@sew-eurodrive.com
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 tms@tms.com.tn

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 4419164 Fax +90 216 3055867 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

Ukraine			
Sales **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

United Arab Emirates			
Sales **Service**	**Sharjah**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae

USA			
Production **Assembly** **Sales** **Service** **Corporate Offices**	**Southeast Region**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**Northeast Region**	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	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, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net

Vietnam			
Sales	**Ho Chi Minh City**	Nam Trung Co., Ltd 91 - 93 Tran Minh Quyen Street, District 10, HCMC	Tel. +84 8 8301026 Fax +84 8 8392223 namtrungco@hcm.vnn.vn

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