

SEW
EURODRIVE

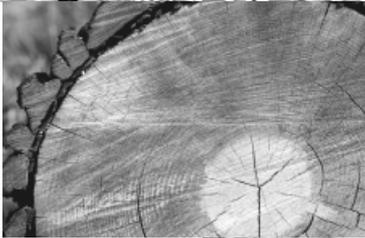


Gear unit series R..7, F..7, K..7, S..7, SPIROPLAN[®] W

Edition 02/2009

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Operating Instructions





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1 General Information

1.1 Use of operating instructions

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

The operating instructions must be kept available in a legible condition. Ensure 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 completely and understood them. If you are unclear about any of the information in this documentation or require further information, please contact SEW-EURODRIVE.

1.2 Structure of the safety notes

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

Symbol	SIGNAL WORD
	Nature and source of danger. Possible consequence(s) if disregarded. <ul style="list-style-type: none"> • Measure(s) to avoid the danger.

Symbol	Signal word	Meaning	Consequences if disregarded
Example: General danger	DANGER	Imminent danger	Severe or fatal injuries
	WARNING	Possible dangerous situation	Severe or fatal injuries
 Specific danger, e.g. electric shock	CAUTION	Possible dangerous situation	Minor injuries
	NOTICE	Possible damage to property	Damage to the drive system or its environment
	TIP	Useful information or tip Simplifies handling of the drive system	



1.3 Rights to claim under warranty

Adhering to the operating instructions is a prerequisite for fault-free operation and the fulfillment of any right to claim under warranty. You should therefore 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 and performance characteristics. SEW-EURODRIVE assumes no 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

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Any reproduction, modification, distribution or unintended use, in whole or in part, is prohibited.



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 observed and complied with. Ensure 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 or if you require further information, please contact SEW-EURODRIVE.

2.1 Preliminary information

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

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

2.2 General information

	DANGER
	<p>During operation, motors and gearmotors may have live, bare and movable or rotating parts as well as hot surfaces, depending on their protection type.</p> <p>Severe or fatal injuries</p> <ul style="list-style-type: none"> • All work related to transportation, storage, installation/assembly, connection, startup, maintenance and servicing may be carried out only by qualified specialists under strict observance of: <ul style="list-style-type: none"> – The pertinent 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 system-specific regulations and requirements – The national and 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 machinery.

Consult the documentation for further information.



2.3 Target group

All mechanical work must be carried out by trained specialists only. Specialists in this context are persons who are familiar with the setup, mechanical installation, troubleshooting and maintenance for this product. Further, they are qualified as follows:

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

All electrical engineering work may be carried out by qualified electricians only. Qualified electricians in this context are persons who are familiar with the electronic installation, startup, troubleshooting and maintenance for this product. Further, they are qualified as follows:

- They are trained 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 may be carried out only by persons who are trained appropriately.

2.4 Designated use

The gear units and gearmotors are intended for industrial systems and may only be used in accordance with the information provided in the technical documentation of SEW-EURODRIVE and the information given on the nameplate. They correspond to the applicable standards and regulations. Using these products in potentially explosive atmospheres is prohibited, unless explicitly specified otherwise.

2.5 Other applicable documentation

The following publications and documents should also be observed:

- Operating Instructions "AC Motors, Asynchronous Servomotors" for gearmotors
- Operating instructions of any attached options
- "Gear Units" catalog or
- "Gearmotors" catalog



2.6 *Transportation*

Immediately upon receipt of the shipment, inspect it for any damage that may have occurred during shipping. Where applicable, inform the shipping company of any damage immediately. It may be necessary to preclude startup.

Tighten installed eyebolts. They are rated only 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 eyebolts or lifting eyebolts, use both of the eyebolts 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 restraints prior to startup.

2.7 *Extended storage*

Observe the notes in section "Extended storage" (see page 106).

2.8 *Installation and assembly*

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

2.9 *Startup and operation*

Check the oil level before startup as described in section "Inspection and Maintenance" (see page 61).

Check that the direction of rotation is correct in **decoupled** condition. Pay attention to unusual grinding noises as the shaft rotates.

Secure key for test run 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 normal operation (e.g. increased temperature, noise, oscillation). Determine the cause and contact SEW-EURODRIVE, if required.

2.10 *Inspection and maintenance*

Observe the notes in section "Inspection and Maintenance" (see page 61).



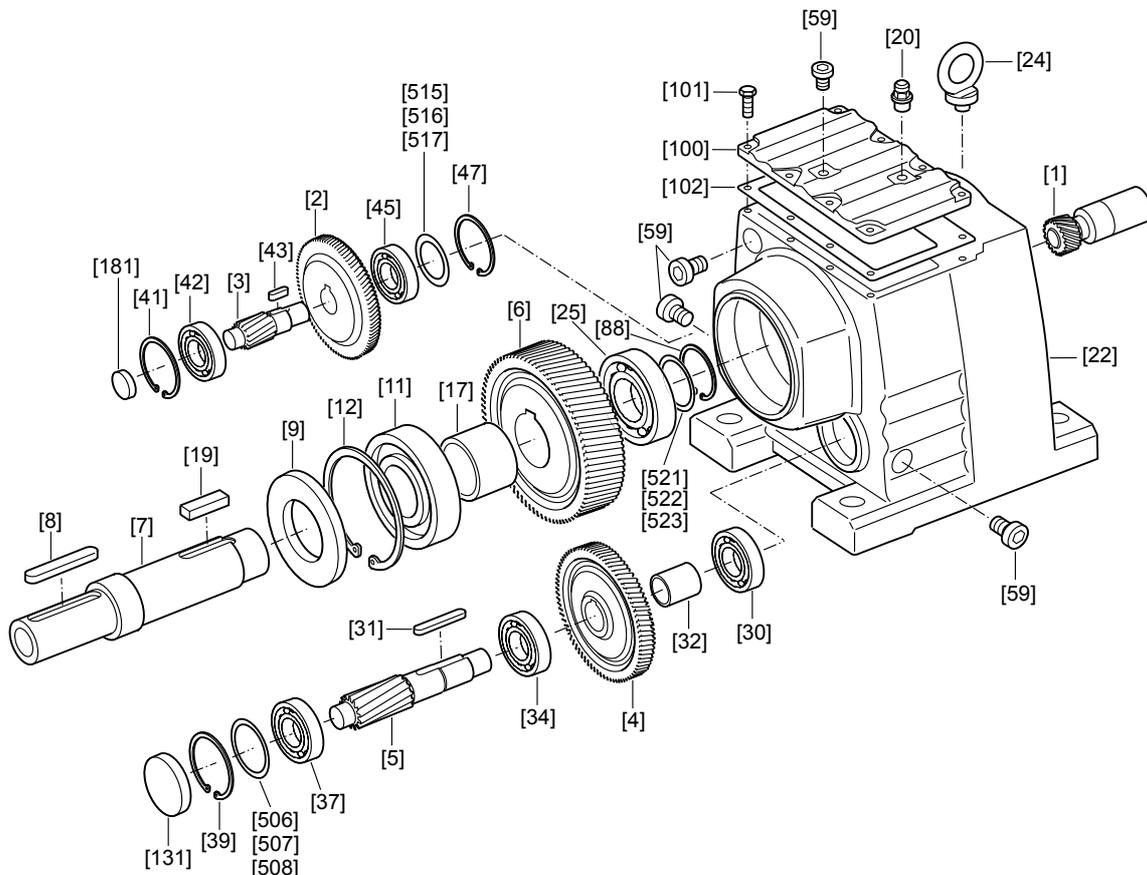
3 Gear Unit Design



TIP

The following figures are block diagrams. Their purpose is only to make it easier to assign components to the spare parts lists. Discrepancies may occur depending on the gear unit size and version.

3.1 Basic design of helical gear units

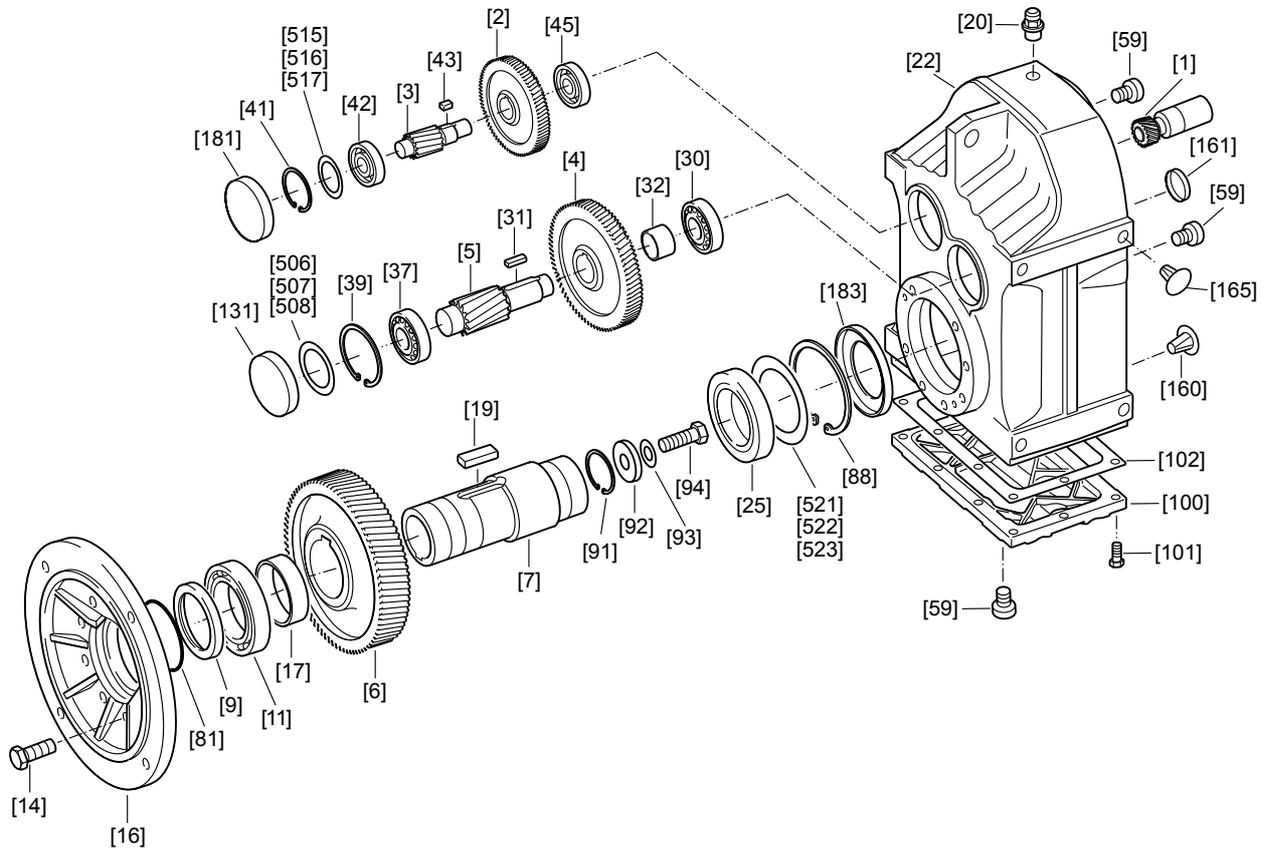


19194251

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



3.2 Basic design of parallel shaft helical gear units

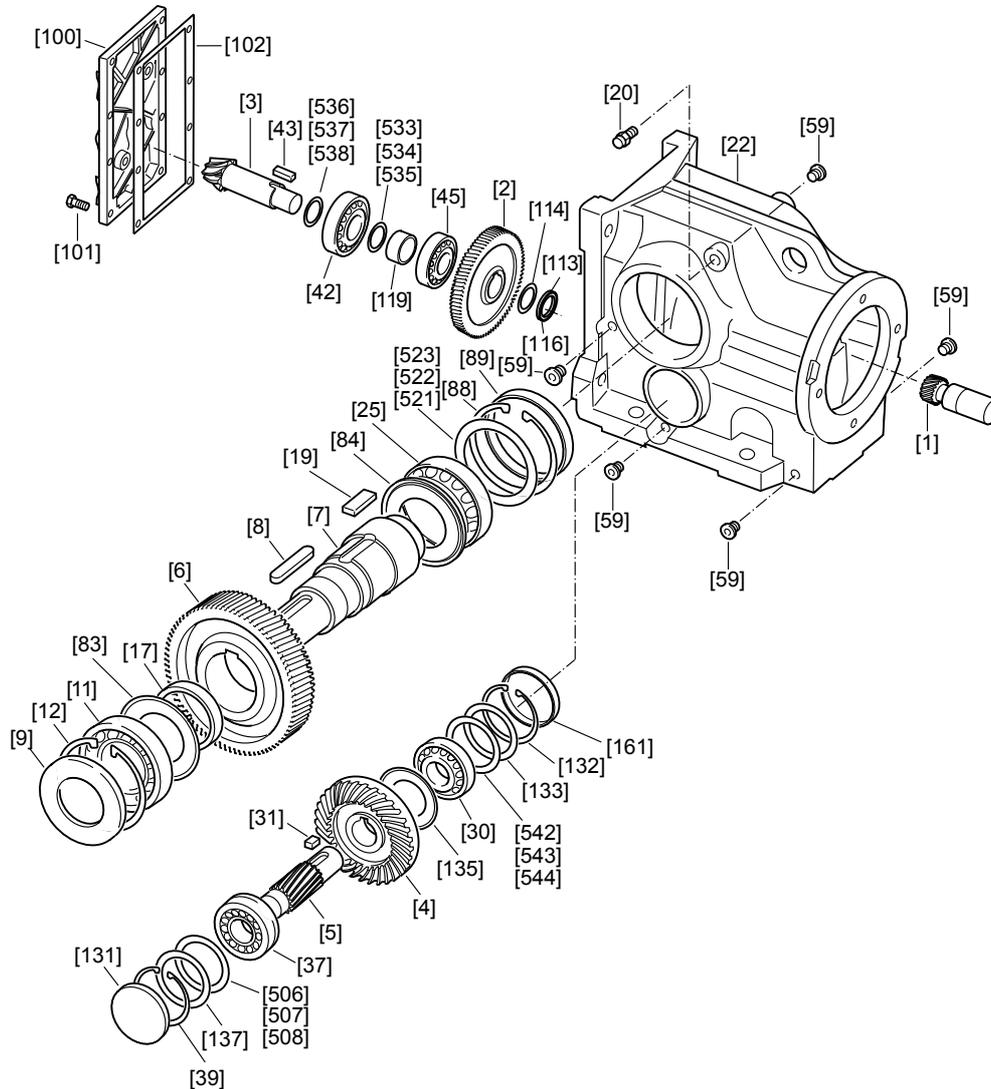


19298059

[1] Pinion	[22] Gear unit housing	[91] Circlip	[506] Shim
[2] Gearwheel	[25] Roller bearing	[92] Disc	[507] Shim
[3] Pinion shaft	[30] Roller bearing	[93] Lock washer	[508] Shim
[4] Gearwheel	[31] Key	[94] Hex head bolt	[515] Shim
[5] Pinion shaft	[32] Spacer tube	[100] Gear unit cover	[516] Shim
[6] Gearwheel	[37] Roller bearing	[101] Hex head bolt	[517] Shim
[7] Hollow shaft	[39] Circlip	[102] Gasket	[521] Shim
[9] Oil seal	[41] Circlip	[110] Closing cap	[522] Shim
[11] Roller bearing	[42] Roller bearing	[111] Closing cap	[523] Shim
[14] Hex head bolt	[43] Key	[112] Closing cap	
[16] Output flange	[45] Roller bearing	[113] Oil seal	
[17] Spacer tube	[59] Screw plug		
[19] Key	[81] Nilos ring		
[20] Breather valve	[88] Circlip		



3.3 Basic design of helical-bevel gear units

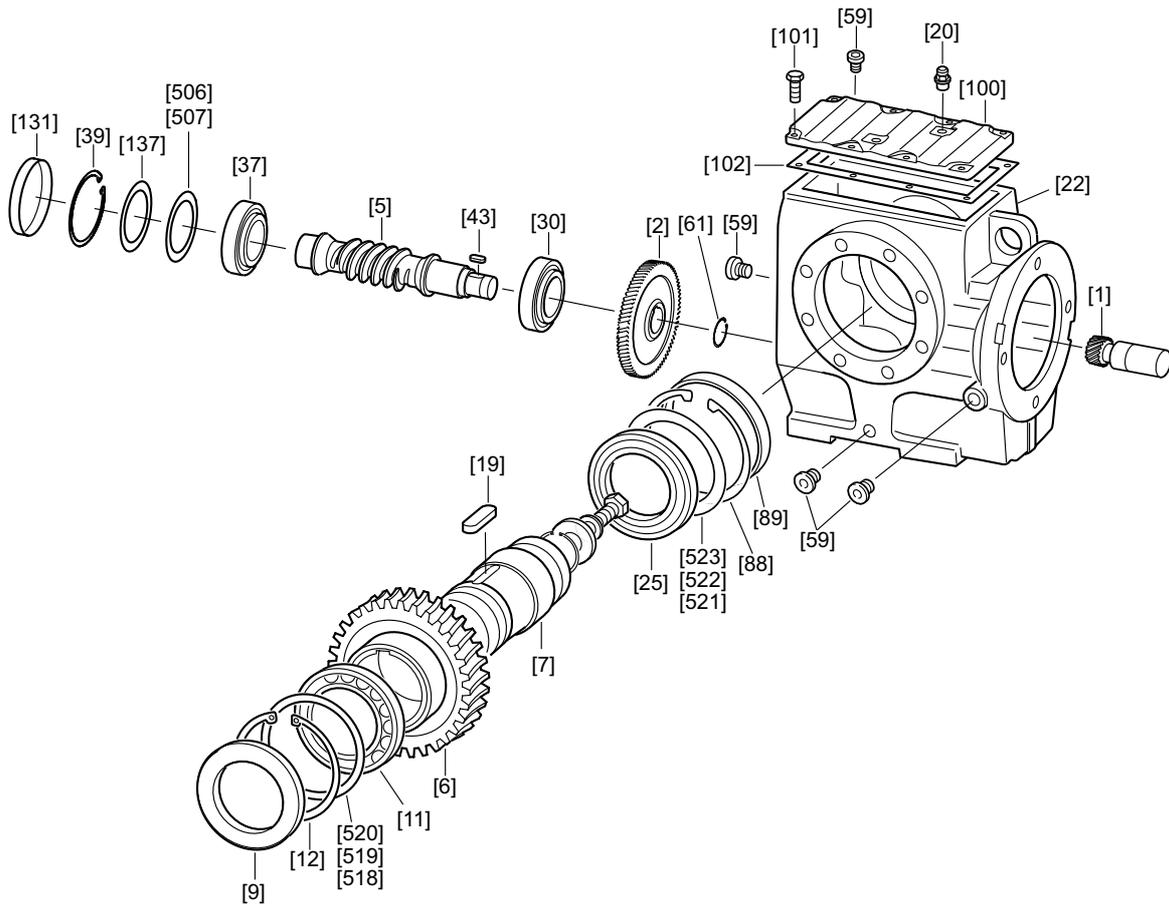


19301131

[1] Pinion	[25] Roller bearing	[102] Gasket	[522] Shim
[2] Gearwheel	[30] Roller bearing	[113] Slotted nut	[523] Shim
[3] Pinion shaft	[31] Key	[114] Lock washer	[533] Shim
[4] Gearwheel	[37] Roller bearing	[116] Thread lock	[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 unit cover	[521] Shim	
[22] Gear unit housing	[101] Hex head bolt	[521] Shim	



3.4 Basic design of helical-worm gear units



19304203

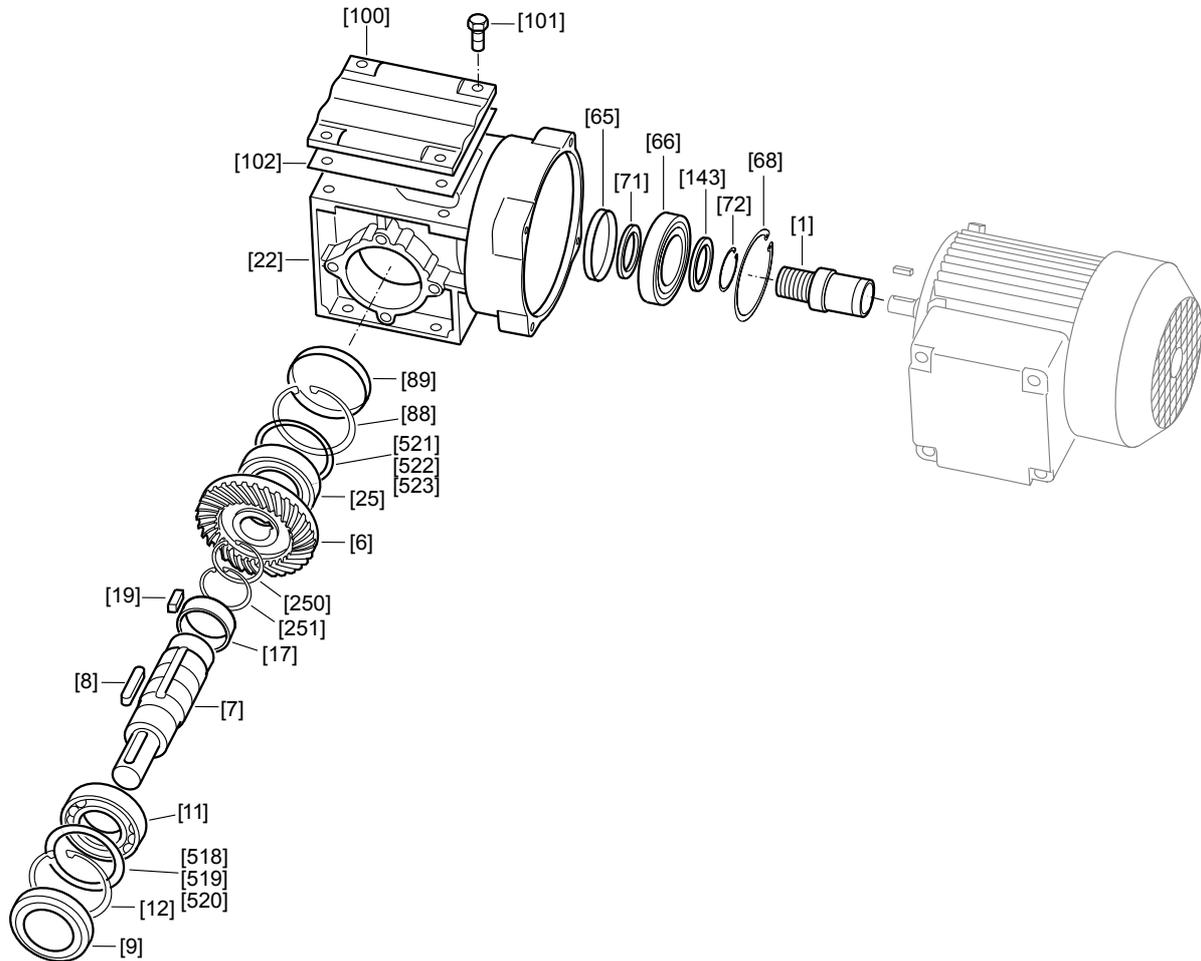
[1] Pinion	[20] Breather valve	[88] Circlip	[518] Shim
[2] Gearwheel	[22] Gear unit housing	[89] Closing cap	[519] Shim
[5] Worm	[25] Roller bearing	[100] Gear unit cover	[520] Shim
[6] Worm gear	[30] Roller bearing	[101] Hex head bolt	[521] Shim
[7] Output shaft	[37] Roller bearing	[102] Gasket	[522] 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	



Gear Unit Design

Basic design of SPIROPLAN® W10-W30 gear units

3.5 Basic design of SPIROPLAN® W10-W30 gear units

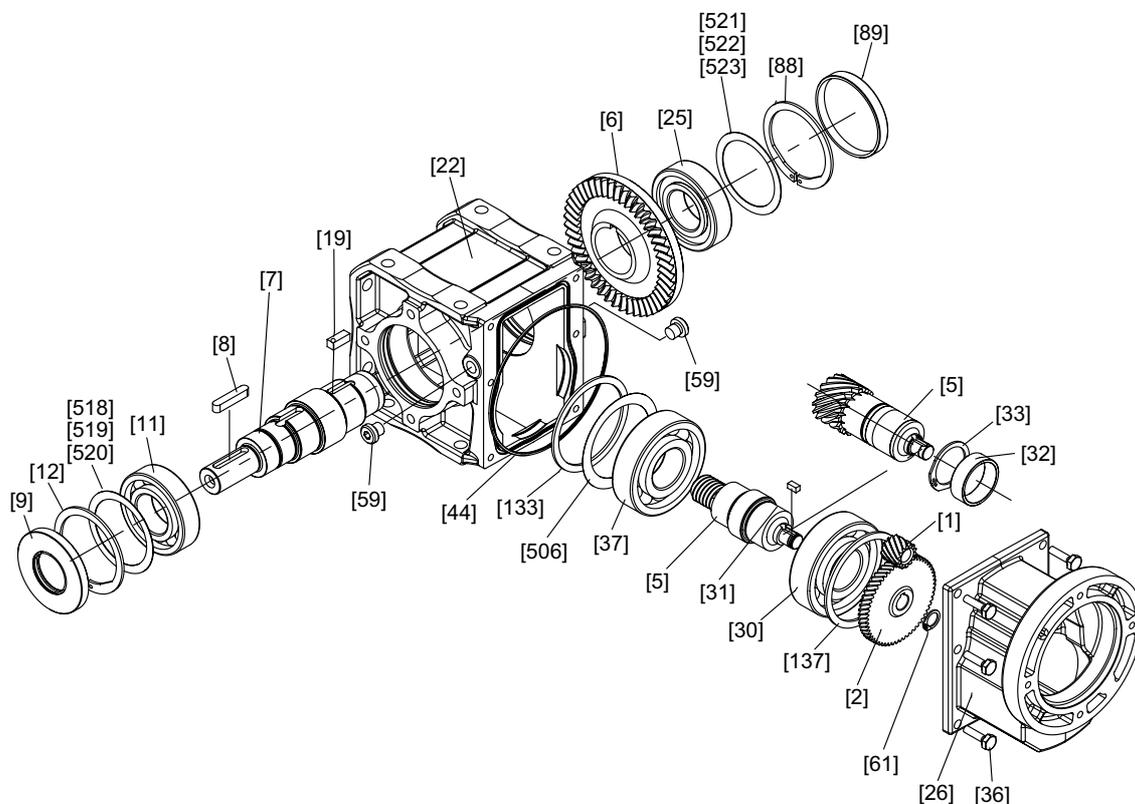


19307275

[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 unit cover	[519]	Shim
[8]	Key	[65]	Oil seal	[101]	Hex head bolt	[520]	Shim
[9]	Oil seal	[66]	Roller bearing	[102]	Gasket	[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 design of SPIROPLAN® W37-W47 gear units



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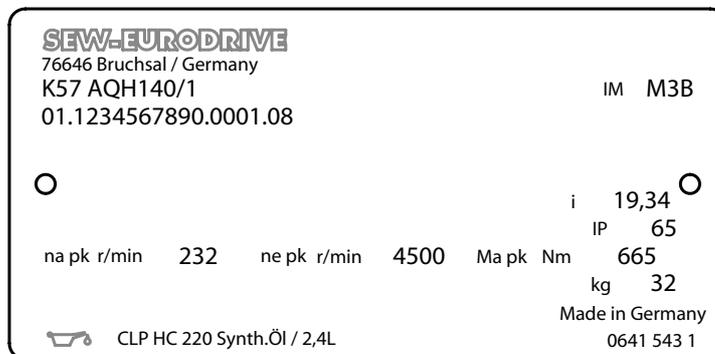
[1] Pinion	[22] Gear unit housing	[44] O-ring	[137] Shim
[2] Gearwheel	[24] Eyebolt	[59] Screw plug	[150] Hex nut
[5] Pinion shaft	[25] Deep groove ball bearing	[61] Circlip	[183] Oil seal
[6] Gearwheel	[26] Housing stage 1	[68] Circlip	[506] Shim
[7] Output shaft	[30] Deep groove ball bearing	[72] Circlip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



3.7 Nameplate and unit designation

3.7.1 Nameplate

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



624901899

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

3.7.2 Unit designation



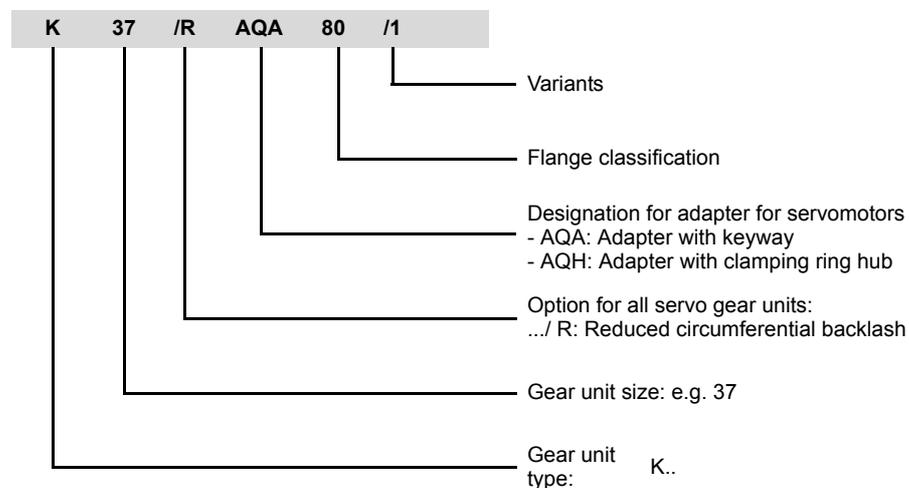
TIP

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 and resources

- Set of wrenches
- Torque wrench for:
 - Shrink discs
 - Motor adapter
 - Input shaft assembly with centering shoulder
- Mounting device
- Compensation elements (discs, spacer rings), if necessary
- Fasteners for input and output elements
- Lubricant (e.g. NOCO® Fluid)
- Threadlocker compound (for input shaft assembly with centering shoulder), e.g. Loctite® 243
- Standard parts are not part of the delivery

4.1.1 Installation tolerances

Shaft end	Flanges
Diameter tolerance in accordance with DIN 748 <ul style="list-style-type: none"> • ISO k6 for solid shafts with $\varnothing \leq 50$ mm • ISO m6 for solid shafts with $\varnothing > 50$ mm • ISO H7 for hollow shafts • Center bore in accordance with DIN 332, shape DR 	Centering shoulder tolerance to DIN 42948 <ul style="list-style-type: none"> • ISO j6 at $b_1 \leq 230$ mm • ISO h6 at $b_1 > 230$ mm



4.2 Prerequisites for installation

	NOTICE
	<p>Improper installation may result in damages to the gear unit/gearmotor.</p> <p>Potential damage to property</p> <ul style="list-style-type: none"> • Closely observe the information in this section.

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" (see page 107).
- No harmful oils, acids, gases, vapors, radiation etc. in the vicinity

For special versions:

- The drive is designed in accordance with the ambient conditions. Observe 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) = $2 - 1/\eta < 0.5$ self-locking]

- You must clean the output shafts and flange surfaces thoroughly to ensure they are free of anti-corrosion agents, contamination or similar substances. Use a standard solvent. Do not let the solvent come into contact with the sealing lips of the oil seals – danger of damage to the material.
- When the drive is installed in abrasive ambient conditions, protect the output side oil seals against wear.



4.3 Installation of the gear unit

The gear unit or gearmotor may only be installed in the specified mounting position. Observe 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 features:

- Level
- Vibration damping
- Torsionally rigid

Maximum permitted flatness defect 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 to 107: max. 0.5 mm
- Gear unit size 137 to 147: max. 0.7 mm
- Gear unit size 157 to 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 the "Project Planning" section 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



TIP

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, check that the oil fill corresponds to the specifications for the intended mounting position (see section "Lubricant fill quantities" (see page 110) or refer to the information on the nameplate). The gear units are filled with the required amount of oil 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.



Adjust the lubricant fill volumes and the position of the breather valve accordingly in the event of a change of mounting position. Observe section "Lubricant fill quantities" (see page 110) and section "Mounting Positions" (see page 79).

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

Consult SEW customer service if you intend to change the mounting position of S gear units sizes S47 to 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 in thickness. The material used must have an electrical bleeder resistor $< 10^9 \Omega$. Electrochemical corrosion can occur between various metals, for example, cast iron and stainless steel. In addition, fit the screws with plastic washers. Use grounding screws on the motor to ground the housing.

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	1,450
M36	2,500
M42	4,600
M48	6,950
M56	11,100

Mount the flange-mounted helical gearmotors 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 Securing the gear unit

Foot-mounted gear unit

The following table shows the thread sizes of the foot-mounted gear units 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 [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 a 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, seal the flange surfaces with a suitable sealing compound, e.g. Loctite® 574.

4.3.4 Gear unit venting

The following gear units do not require venting:

- 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 and 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 breather valve provided.

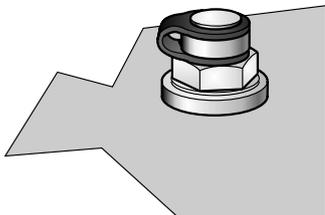
2. SEW supplies a breather valve in a plastic bag for **gear head units** requiring venting on the input side.
3. **Enclosed gear units** are supplied without a breather valve.



Activating the breather valve

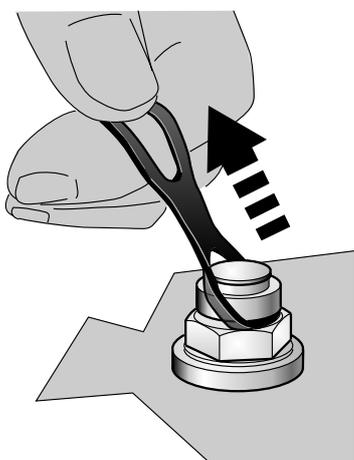
Check whether the breather valve is activated. If the breather valve has not been activated, you must remove the transport fixture from the breather valve before starting up the gear unit.

1. Breather valve with transport fixture



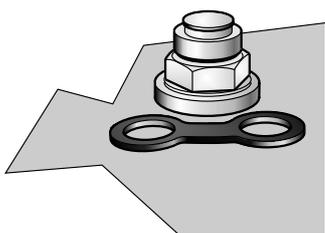
211319051

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 the painting or re-painting process.

Potential damage to property.

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



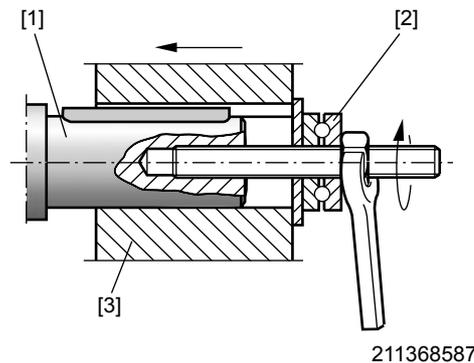
4.4 Gear units with solid shafts

4.4.1 Mounting the input and output elements

	NOTICE
	<p>Bearing, housing or shafts may be damaged due to improper mounting.</p> <p>Potential damage to property</p> <ul style="list-style-type: none"> • Only mount the input and output elements 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. • 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).

Mounting with mounting device

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

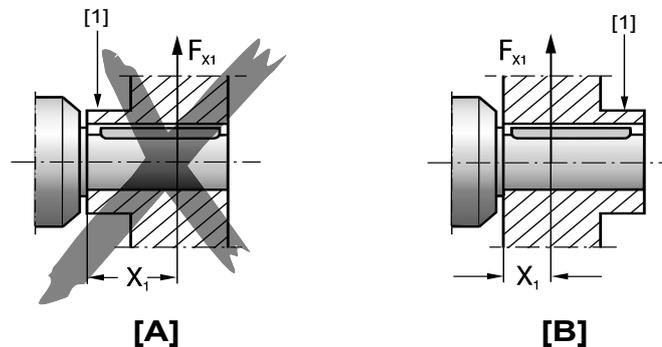


- [1] Gear shaft end
- [2] Thrust bearing
- [3] Coupling hub



Avoid excessive overhung loads

To avoid high overhung loads: Mount the gear or chain sprockets according to figure B if possible.



211364235

- [1] Hub
- [A] Unfavorable
- [B] Correct

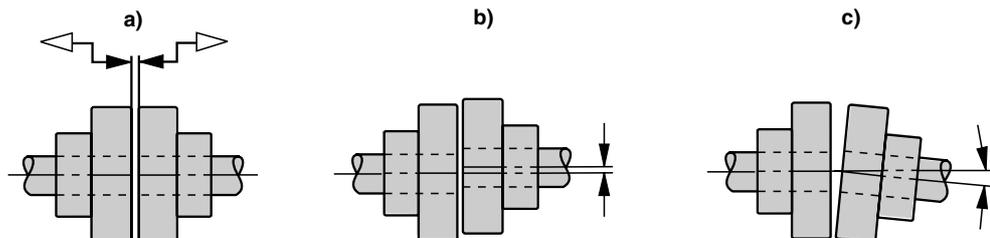
	<p>TIP</p> <p>Mounting is easier if you first apply lubricant to the output element or heat it up briefly (to 80 - 100 °C).</p>
--	--

4.4.2 Mounting of couplings

	<p>NOTICE</p> <p>Input and output elements such as belt pulleys, couplings etc. move quickly during operation.</p> <p>Risk of trapping and crushing.</p> <ul style="list-style-type: none"> • Input and output elements must have protection against contact.
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Make the following adjustments according to the coupling manufacturer's specifications when mounting couplings.

- a) Maximum and minimum clearance
- b) Axial misalignment
- c) Angular offset



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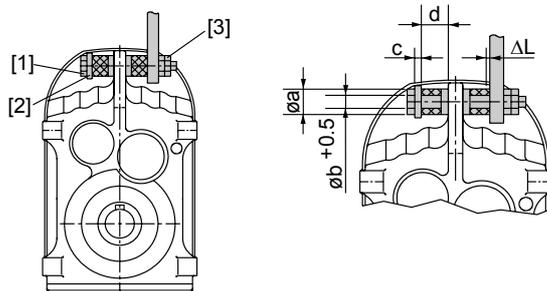


4.5 Torque arms for shaft-mounted gear units

	NOTICE
	<p>Improper mounting may result in damage to the gear unit.</p> <p>Potential damage to property</p> <ul style="list-style-type: none"> • Do not place torque arms under strain when mounting. • Use screws of quality 8.8 to fasten torque arms.

4.5.1 Parallel shaft helical gear units

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



211366411

- [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 pretension " ΔL " of the rubber buffers is reached according to the table.

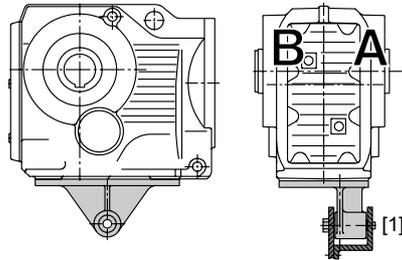
Gear unit	Diameter	Rubber buffer		Washer width	ΔL (taut)
	a [mm]	Internal diameter b [mm]	Length (loose) c [mm]	d [mm]	[mm]
FA27	40	12.5	20	5	1
FA37	40	12.5	20	5	1
FA47	40	12.5	20	5	1.5
FA57	40	12.5	20	5	1.5
FA67	40	12.5	20	5	1.5
FA77	60	21.0	30	10	1.5
FA87	60	21.0	30	10	1.5
FA97	80	25.0	40	12	2
FA107	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 torque arm for helical-bevel gear units.

- Apply bearings to both sides of the bushing [1].
- Mount connection side B so that it mirrors A.



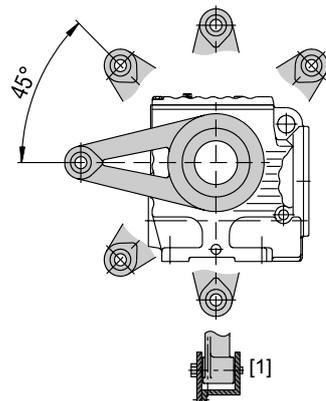
211362059

Gear unit	Screws	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	2,500 Nm
KA157	4 × M36 × 130 – 8.8	2,500 Nm

4.5.3 Helical-worm gear units

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

- Apply bearings to both sides of the bushing [1].



211491723

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



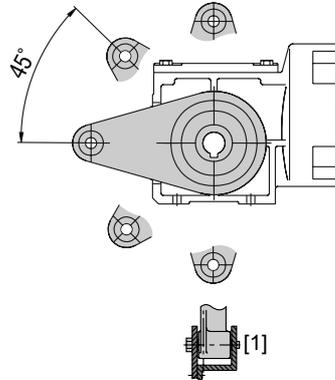
Mechanical Installation

Torque arms for shaft-mounted gear units

4.5.4 SPIROPLAN® W gear units

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

- Apply bearings to both sides of the bushing [1].



211489547

Gear unit	Screws	Tightening torque
WA10	4 x M6 x 16	11 Nm
WA20	4 x M6 x 16	11 Nm
WA30	4 x M6 x 16	11 Nm
WA37	4 x M8 x 20	25 Nm
WA47	4 x M10 x 25	48 Nm

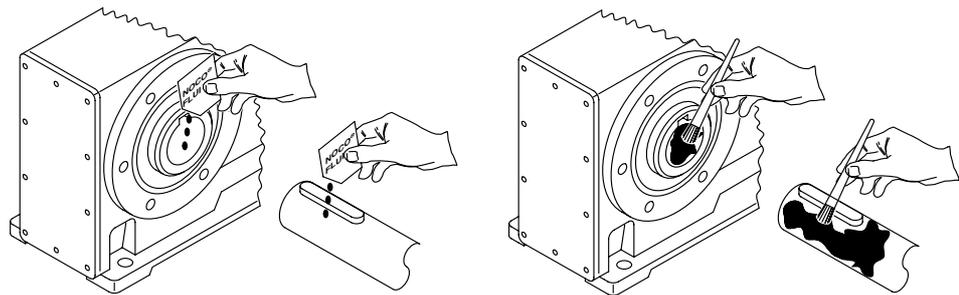


4.6 Shaft-mounted gear units with keyway or splined hollow shaft

i	<p>TIP</p> <p>Concerning the configuration of the customer shaft, please also refer to the design notes in the “Gearmotors” catalog.</p>
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4.6.1 Installation instructions

1. Apply and thoroughly spread NOCO® Fluid.

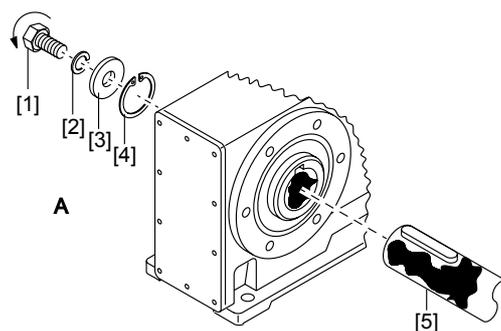


211516171

2. Install the shaft and secure it axially (installation is facilitated by a mounting device).
The three installation types are described below:

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

2A: Installation with standard scope of delivery



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- [1] Short retaining screw (standard scope of delivery)
- [2] Lock washer
- [3] Washer
- [4] Circlip
- [5] Customer shaft

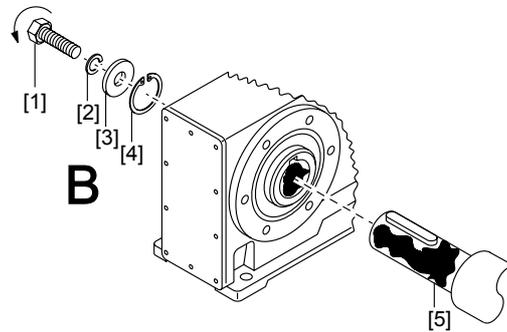


Mechanical Installation

Shaft-mounted gear units with keyway or splined hollow shaft

2B: Installation with SEW-EURODRIVE installation/removal kit (see page 34)

– Customer shaft **with** contact shoulder

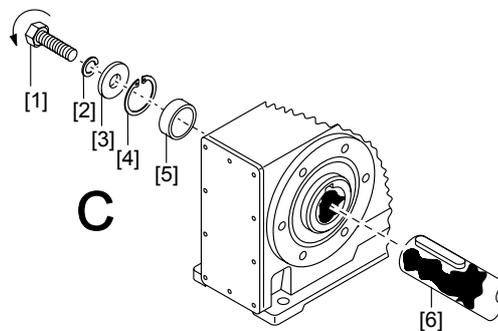


211520523

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

2C: Installation with SEW-EURODRIVE installation/removal kit (see page 34)

– Customer shaft **without** contact shoulder

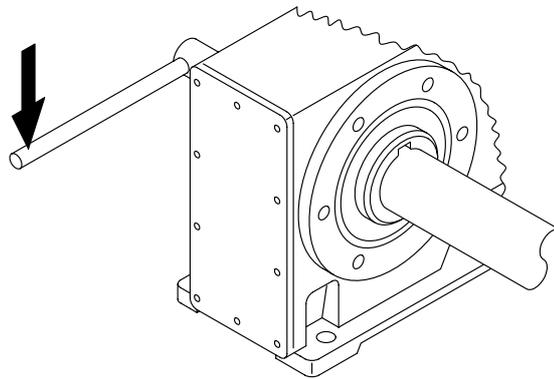


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- [1] Retaining screw
- [2] Lock washer
- [3] Washer
- [4] Circlip
- [5] Spacer tube
- [6] Customer shaft without contact shoulder



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



TIP

To avoid contact corrosion, we recommend that the customer shaft should turn freely between the two contact surfaces.



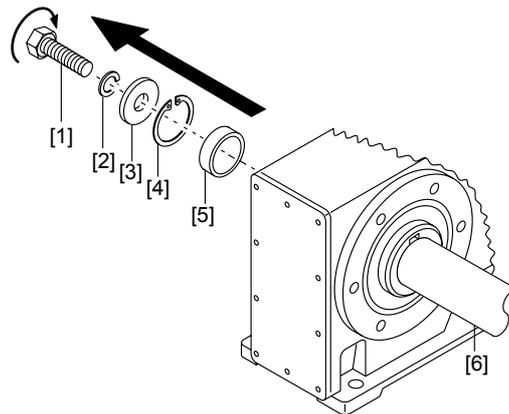
Mechanical Installation

Shaft-mounted gear units with keyway or splined hollow shaft

4.6.2 Removal instructions

This description is only applicable when the gear unit was installed using the installation/removal kit (see page 34) from SEW-EURODRIVE. Observe section "Installation instructions" (see page 29), points 2B or 2C.

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



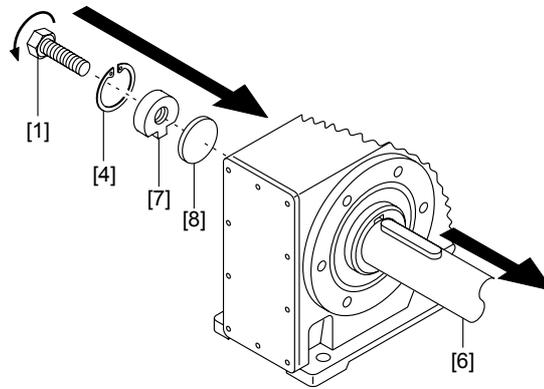
211527051

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

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



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



211529227

- [1] Retaining screw
- [4] Circlip
- [6] Customer shaft
- [7] Fixed nut
- [8] Forcing disc

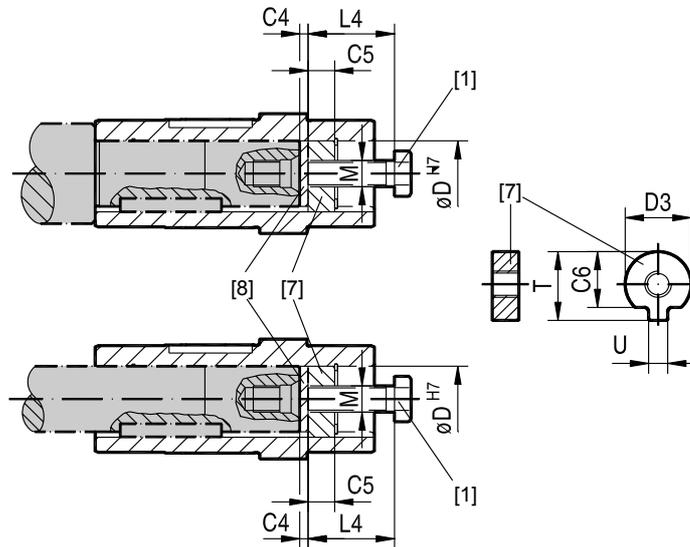


Mechanical Installation

Shaft-mounted gear units with keyway or splined hollow shaft

4.6.3 SEW installation/removal kit

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



211531403

- [1] Retaining screw
- [7] Fixed nut for removal
- [8] Forcing disc

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 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



TIP

SEW-EURODRIVE recommends using the SEW installation kit for installing the customer shaft. You must always check whether this design can compensate for existing axial loads. In particular applications (e.g. mounting agitator 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 do not cause potential sources of combustion according to DIN EN 13463 (e.g. impact sparks).



4.7 Shaft-mounted gear units with shrink disc

4.7.1 Installation instructions



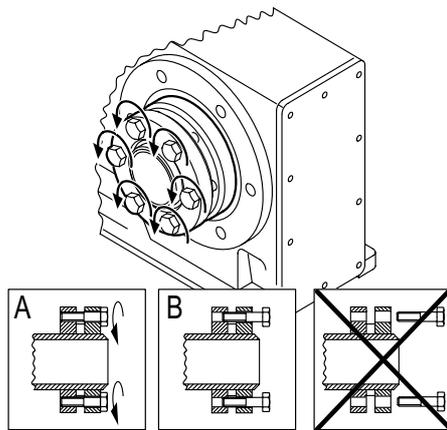
NOTICE

Tightening the locking screws without first installing a shaft may result in the hollow shaft being deformed.

Potential damage to property

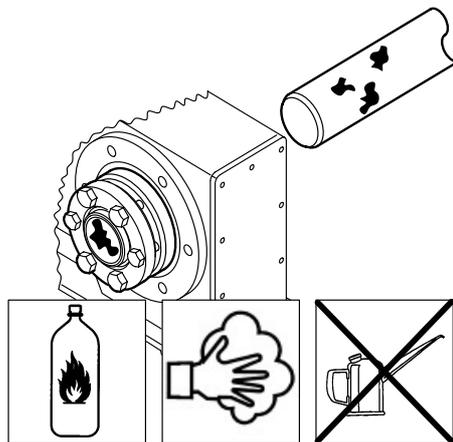
- Only tighten the locking screws with the shaft installed.

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



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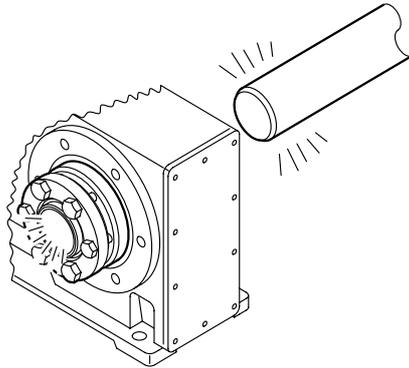
2. Carefully degrease the hollow shaft hole and the input shaft using a commercial solvent.



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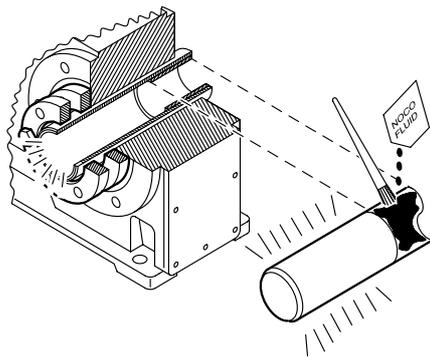
3. Hollow shaft/input shaft after degreasing



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 disc is free from grease. Never apply NOCO® Fluid directly to the bushing, since the paste may get into the clamping area of the shrink disc when the input shaft is put on.



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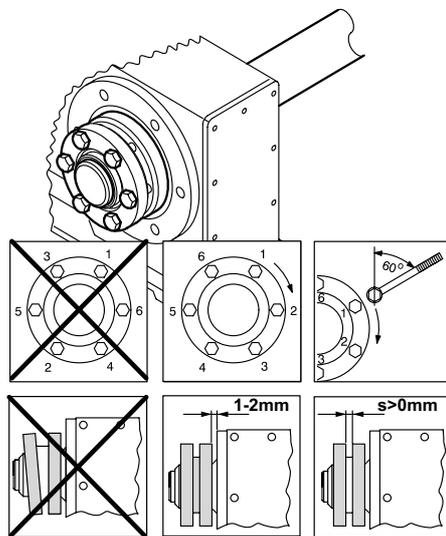


Mechanical Installation

Shaft-mounted gear units with shrink disc

5. Install the input shaft.

- Make sure that the outer rings of the shrink disc are installed parallel to each other.
- For gear unit housings with shaft shoulder:
Mount the shrink disc onto the stop on the shaft shoulder.
- For gear unit housings without shaft shoulder:
Mount the shrink disc, maintaining a 1 to 2 mm distance from the gear unit housing.
- Tighten the locking screws by working around 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 of the shrink disc is > 0 mm.
7. Grease the outer surface of the hollow shaft around the shrink disc 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 instructions

	<p>⚠ NOTICE</p>
	<p>Risk of trapping and crushing due to improper removal of heavy components. Risk of injury.</p> <ul style="list-style-type: none"> • Observe the following removal instructions. • Removing the shrink disc properly. <ol style="list-style-type: none"> 1. Loosen the locking screws one after the other by a quarter of a rotation to avoid tilting the outer rings. 2. Unscrew the locking screws evenly one after the other. Do not remove the locking screws completely. 3. Remove the shaft or pull the hub off the shaft. (It is first necessary to remove any rust which may have formed between the hub and the end of the shaft). 4. Remove the shrink disc from the hub.

4.7.3 Cleaning and lubrication

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

Clean and lubricate the shrink disc if it is dirty.

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

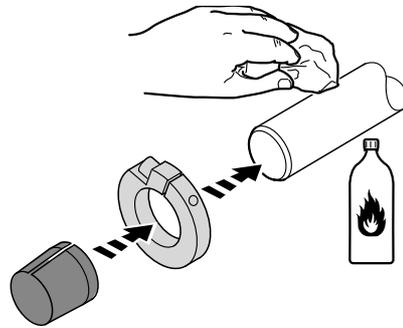
Lubricant (Mo S2)	Sold as
Molykote 321 (lube coat)	Spray
Molykote spray (powder spray)	Spray
Molykote G Rapid	Spray or paste
Aemasol MO 19P	Spray or paste
Aemasol DIO-sétral 57 N (lube coat)	Spray

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



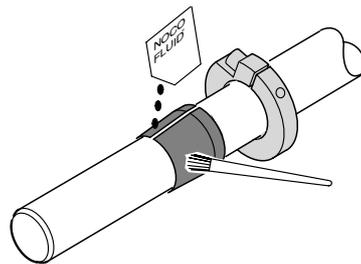
4.8 Shaft-mounted gear units with TorqLOC®

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



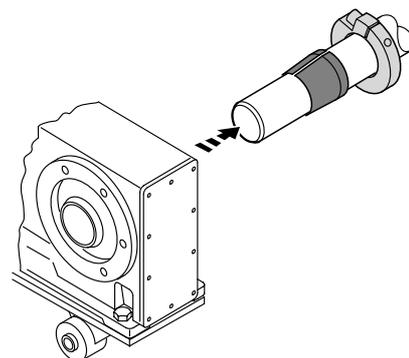
211941003

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



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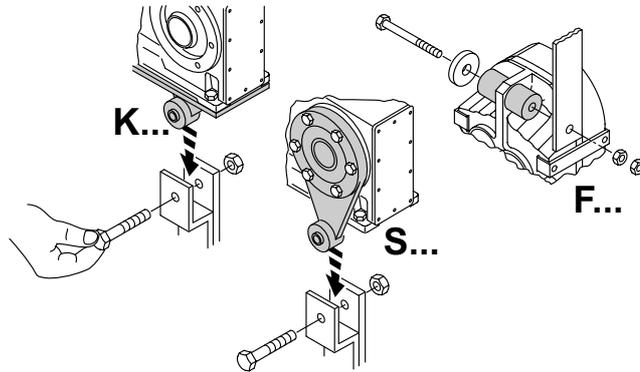
4. Push the gear unit onto the customer shaft.



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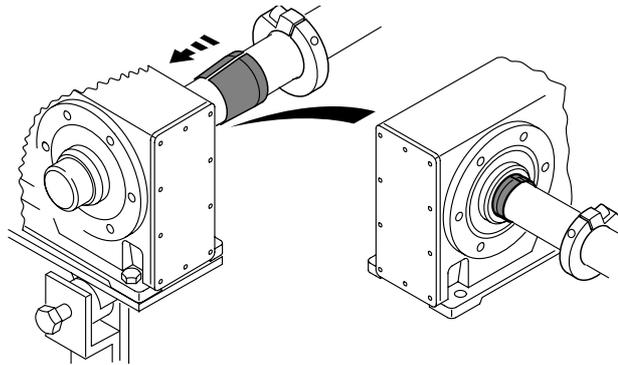


5. Pre-mount the torque arm (do not tighten the screws).



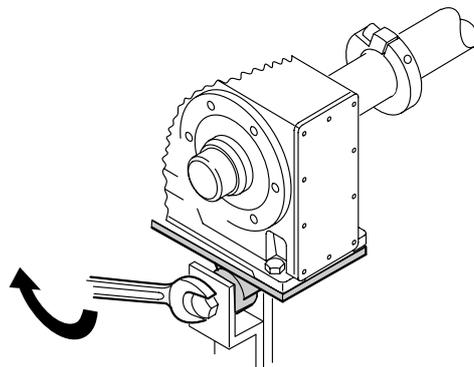
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6. Push the bushing onto the gear unit up to the stop.



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



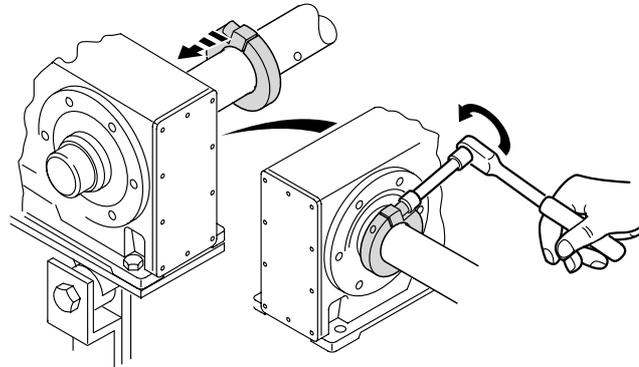
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Mechanical Installation

Shaft-mounted gear units with TorqLOC®

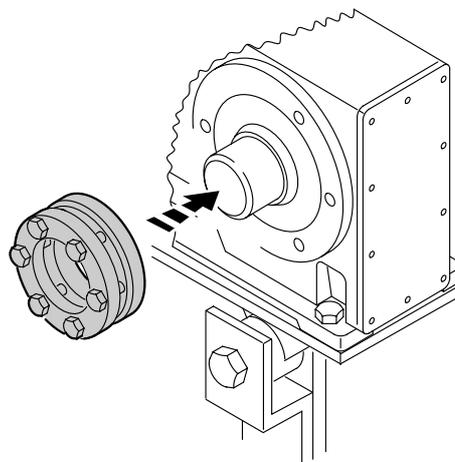
8. Secure the bushing with the stop ring. Tighten the stop ring on the bushing using the appropriate torque as specified in the following table:



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

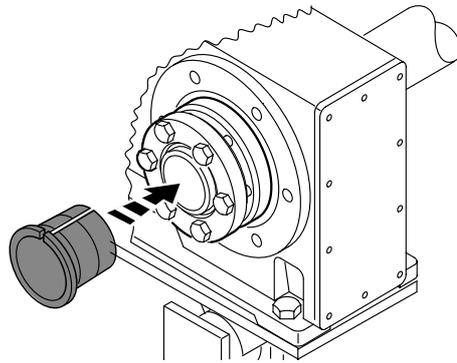
9. Make sure that all screws are loosened and slide the shrink disc onto the hollow shaft.



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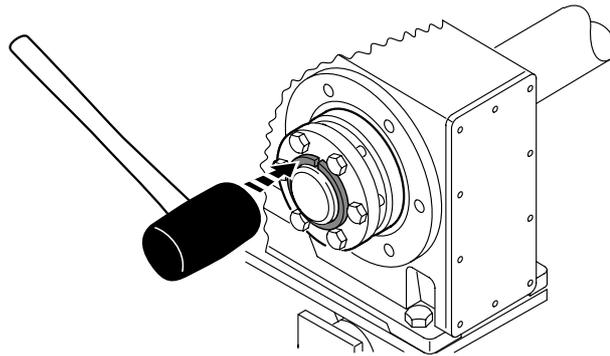
10. Slide the counter bushing onto the customer shaft and into the hollow shaft.



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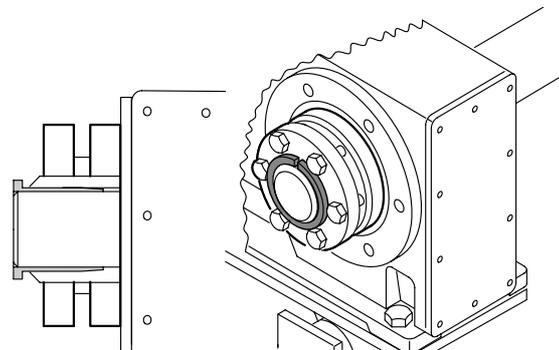
11. Seat the shrink disc properly.

12. Tap lightly on the flange of the counter bushing to ensure that the bushing is fitted securely in the hollow shaft.



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13. Check whether the customer shaft is seated in the counter bushing.



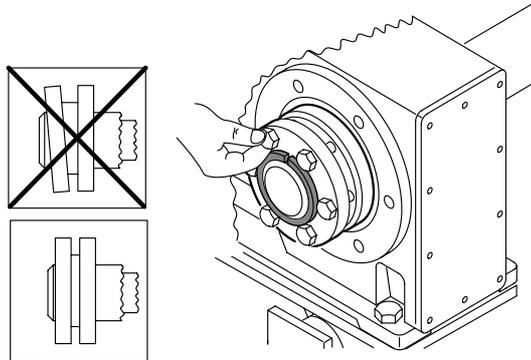
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Mechanical Installation

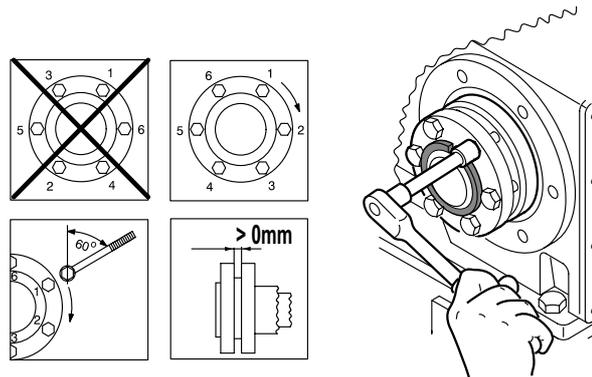
Shaft-mounted gear units with TorqLOC®

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



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

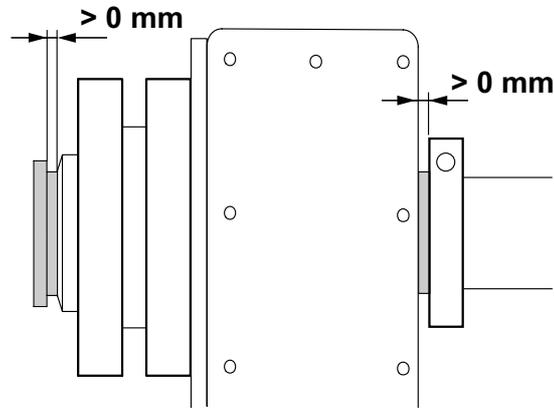


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Type		Nickel plated [Standard]	Stainless steel
KT/FT	ST/WT	Torque [Nm]	
-	37	4.1	6.8
37	47	10	6.8
47	57	12	6.8
57, 67	67	12	15
77	77	30	30
87	87	30	50
97	97	30	50
107	-	59	65
127	-	100	120
157	-	100	120



16. After mounting, 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 locking collar must be > 0 mm.



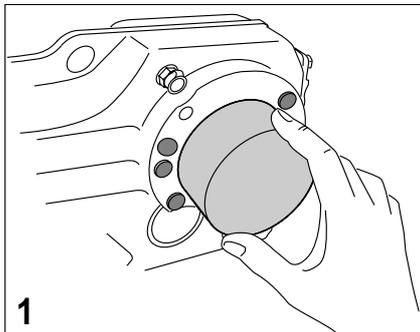
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4.9 Mounting the protective cover

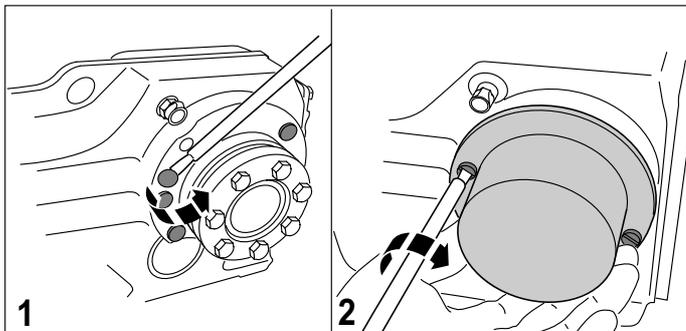
	⚠ NOTICE
	<p>During operation, output elements move quickly. Risk of trapping and crushing.</p> <ul style="list-style-type: none"> • Disconnect the motor from the power supply before starting work and safeguard against accidental startup. • Input and output elements must have protection against contact.

4.9.1 Mounting the rotating protection cover



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

4.9.2 Mounting the fixed protection cover



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



4.9.3 Installation without protection cover

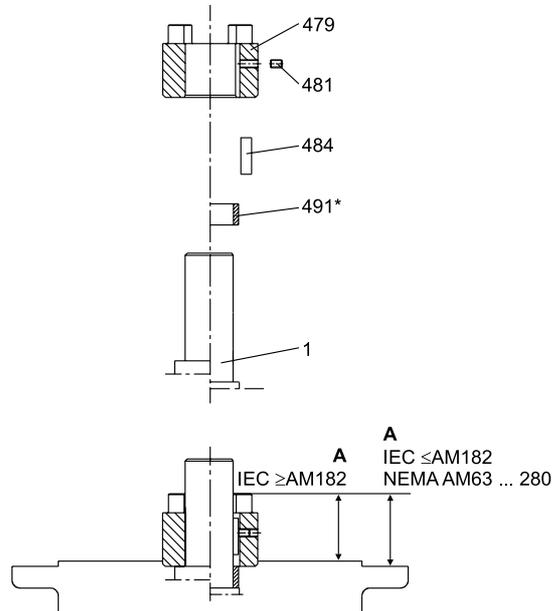
In certain individual cases (e.g. through-shaft), you cannot mount the protection cover. In such cases, the protection cover is not necessary if the system or unit manufacturer provides corresponding components to guarantee for the compliance with the required degree of protection.

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



4.10 Coupling of AM adapter

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 coupling half [479] to approx. 80 °C – 100 °C and slide 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 onto the adapter, making sure that the coupling claws of the adapter shaft are 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



TIP

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 gasket.



Permitted loads

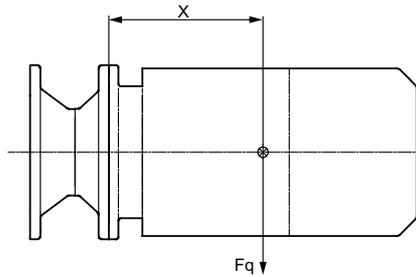


NOTICE

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		x ¹⁾ [mm]	F _q ¹⁾ [N]	
IEC	NEMA		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 $F_{q_{max}}$ must be reduced linearly as the center of gravity distance x increases. If this distance is reduced, the maximum permitted weight $F_{q_{max}}$ cannot be increased.
- 2) Diameter of the adapter output flange: 160 mm



*AM adapter with
AM../RS backstop*

Check the direction of rotation of the drive prior to mounting or startup. Please inform SEW-EURODRIVE customer 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 falls below the minimum lift-off speed level, the backstops are subject to wear and the resulting friction causes the temperature to increase.

Potential damage to property

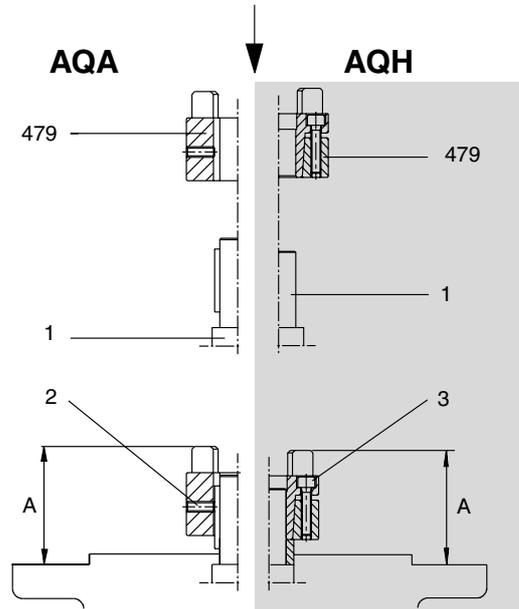
- In rated operation, the lift-off speeds must not drop below the minimum values.
- During startup or braking, the lift-off speeds may drop below the minimum values.

Type	Maximum locking torque of 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	1,450	480
AM200/225/RS, AM324-365/RS	1,950	450
AM250/280/RS,	1,950	450



4.11 Coupling of AQ adapter

4.11.1 AQA80 - 190 adapter / AQH80 - 190 adapter



212114955

- 1 Motor shaft
- 2 Setscrew
- 3 Screw

AQA = With keyway
AQH = Without keyway

1. Clean the motor shaft and the flange surfaces of the motor and the adapter.
2. **AQH version:** 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 version: 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).

Install 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.

	NOTE
	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. <ul style="list-style-type: none"> Seal adapter with anaerobic fluid seal

4.11.2 Setting dimensions/tightening torques

Type	Coupling size	Clearance "A" [mm]	Screws 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

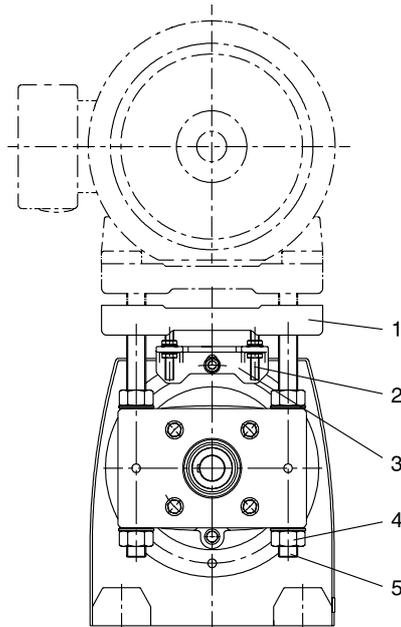


4.12 Input cover AD

Observe section "Mounting the input and output elements" (see page 24) when mounting input elements.

4.12.1 Cover with motor mounting platform AD../P

Mounting the motor and adjusting the motor mounting platform.



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- [1] Motor mounting platform
- [2] Threaded 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/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 line up) 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 pretension 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 secure the threaded columns.



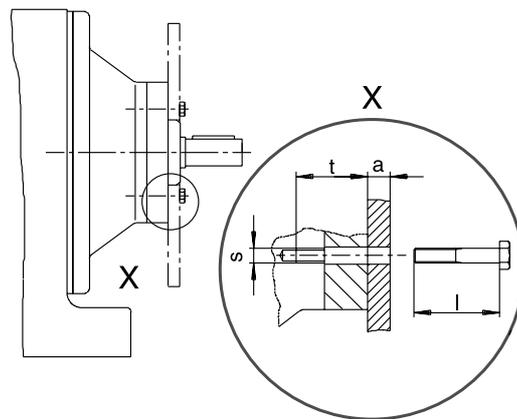
4.12.2 Only AD6/P and AD7/P

Unscrew the nuts on the threaded bolts before adjusting to allow the threaded 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 Cover with centering shoulder AD../ZR

Mounting applications on the input cover with centering shoulder.

1. Screws of a suitable length must be used to secure the application. The length l of the new screws 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 smallest standard length.

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



Mechanical Installation

Input cover AD

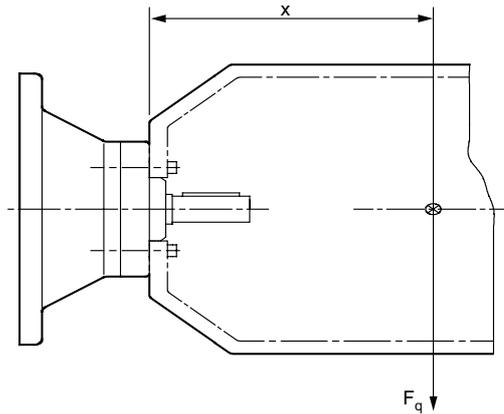
4. Clean the threads of the new screws and apply a threadlocker compound (e.g. Loctite® 243) to the first few threads.
5. Attach the application to the centering shoulder and tighten the retaining screws with the specified tightening torque T_A (see table).

Type	Screw-in depth t [mm]	Retaining threads	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
	<p>Impermissibly high loads may occur when mounting a motor. Potential damage to property</p> <ul style="list-style-type: none"> Do not exceed the load data specified in the following table.



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Type	x^1 [mm]	F_q^1 [N]
AD2/ZR	193	330
AD3/ZR	274	1,400
AD4/ZR²⁾	361	1,120
AD4/ZR		3,300
AD5/ZR	487	3,200
AD6/ZR	567	3,900
AD7/ZR	663	10,000
AD8/ZR	516	4,300

- 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 Cover with backstop AD../RS

Check the direction of rotation of the drive prior to mounting or startup. Please inform SEW-EURODRIVE customer 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 falls below the minimum lift-off speed level, the backstops are subject to wear and the resulting friction causes the temperature to increase.

Potential 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 values.

Type	Maximum locking torque of backstop [Nm]	Minimum lift-off speed [rpm]
AD2/RS	65	820
AD3/RS	425	620
AD4/RS	850	530
AD5/RS	1,450	480
AD6/RS	1,950	450
AD7/RS	1,950	450
AD8/RS	1,950	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" (see page 64).

5.2 Helical-worm and SPIROPLAN® W gear units

	TIPS
	Note: The direction of rotation of the output shaft in series S..7 helical-worm gear units has been changed from CW to CCW; this is different from the S..2 series. Reverse direction of rotation: Swap two motor cables.

5.2.1 Run-in period

SPIROPLAN® and helical-worm gear units require a run-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 units

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

SPIROPLAN® gear units

W10 / W20 / W30		W37 / W47	
i range	η reduction	i range	η reduction
Approx. 35 to 75	Approx. 15 %		
Approx. 20 to 35	Approx. 10 %		
Approx. 10 to 20	Approx. 8 %	Approx. 30 to 70	Approx. 8 %
Approx. 8	Approx. 5 %	Approx. 10 to 30	Approx. 5 %
Approx. 6	Approx. 3 %	Approx. 3 to 10	Approx. 3 %



Startup

Helical/parallel shaft helical/helical-bevel gear units

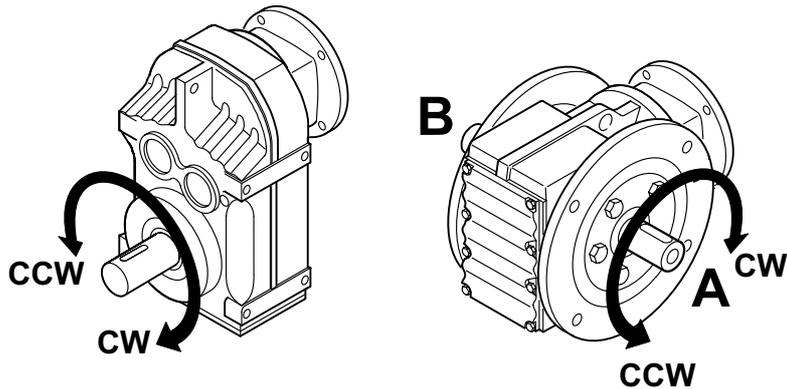
5.3 Helical/parallel shaft helical/helical-bevel gear units

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

5.4 Gear units with backstop

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

	NOTICE
	<p>Operating the motor in the direction that is blocked could destroy the backstop. Potential damage to property</p> <ul style="list-style-type: none"> • Do not start up the motor in the direction that is blocked. 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 blocked direction with half the output torque once for control purposes.



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The direction of rotation is determined as one views the output shaft (LSS).

- Clockwise (CW)
- Counterclockwise (CCW)

The permitted direction of rotation is indicated on the housing.



6 Inspection and Maintenance

The following gear units are lubricated for life and are thus maintenance-free:

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

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

The following inspection and maintenance intervals apply for all the other gear units.

6.1 Preliminary work regarding gear unit inspection and maintenance

Observe the following information before you start with the inspection or maintenance work.

	<p>⚠ DANGER</p> <p>Risk of crushing if the drive starts up unintentionally. Severe or fatal injuries</p> <ul style="list-style-type: none"> • Disconnect the gearmotor from the power supply before starting work and protect it against unintentional re-start.
	<p>⚠ WARNING</p> <p>Risk of burns due to hot gear unit and hot gear unit oil. Serious injuries</p> <ul style="list-style-type: none"> • Let gear unit cool down before beginning work. • Only remove the oil level and oil drain plug very carefully.
	<p>NOTICE</p> <p>Filling the unit with wrong oil may negatively affect the lubricant properties. Potential damage to property</p> <ul style="list-style-type: none"> • Do not mix different synthetic lubricants and do not mix synthetic with mineral lubricants. • Mineral oil is used as standard lubricant.
	<p>NOTE</p> <p>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 section "Mounting Positions" (see page 79).</p>

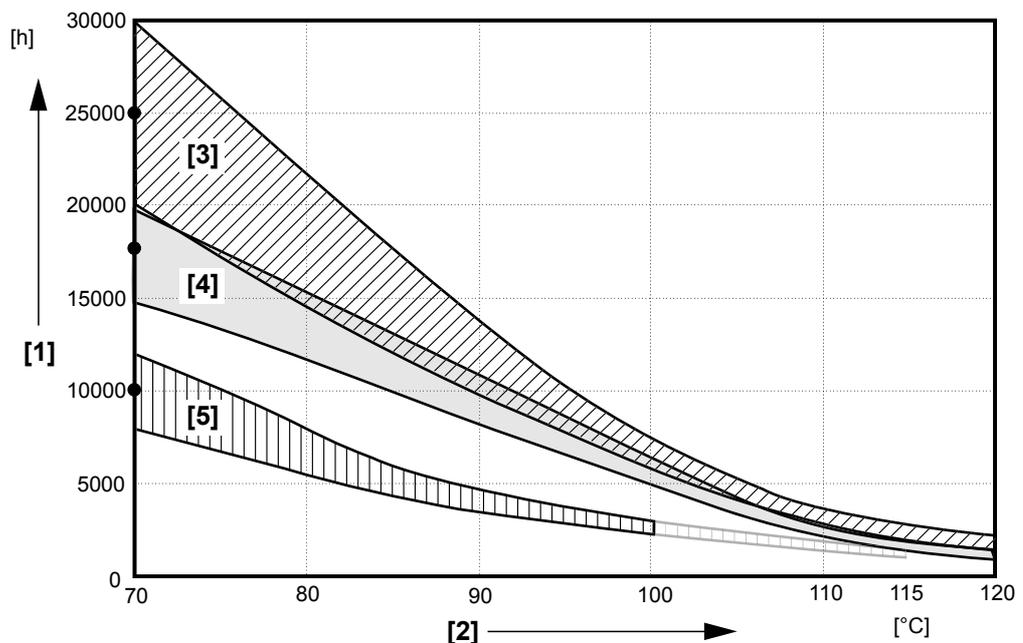


6.2 Inspection and maintenance intervals

Time interval	What to do?
<ul style="list-style-type: none"> Every 3,000 operating hours, at least every 6 months 	<ul style="list-style-type: none"> Check oil and oil level Check running noise for possible bearing damage Visually check the gaskets for leakage For gear units with a torque arm: Check the rubber buffer and change it if necessary
<ul style="list-style-type: none"> Depending on the operating conditions (see illustration below), at least every 3 years Depending on oil temperature 	<ul style="list-style-type: none"> Change mineral oil Replace roller bearing grease (recommended) Replace oil seal (do not install it in the same track)
<ul style="list-style-type: none"> Depending on the operating conditions (see illustration below), at least every 5 years Depending on oil temperature 	<ul style="list-style-type: none"> Change synthetic oil Replace roller bearing grease (recommended) Replace oil seal (do not install it in the same track)
<ul style="list-style-type: none"> Varies (depending on external factors) 	<ul style="list-style-type: none"> Touch up or renew the surface/anticorrosive 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 and maintenance for adapter AL / AM / AQ.

Time interval	What to do?
<ul style="list-style-type: none"> • Every 3,000 operating hours, at least every 6 months 	<ul style="list-style-type: none"> • Check running noise for possible bearing damage • Visually check the adapter for leakage
<ul style="list-style-type: none"> • After 10,000 operating hours 	<ul style="list-style-type: none"> • Check circumferential backlash • Visually inspect the elastic ring gear
<ul style="list-style-type: none"> • After 25,000 – 30,000 hours of operation 	<ul style="list-style-type: none"> • Replace the roller bearing grease • Replace oil seal (do not install it in the same track) • Change the elastic ring gear

6.5 Inspection and maintenance for input cover AD

Time interval	What to do?
<ul style="list-style-type: none"> • Every 3,000 operating hours, at least every 6 months 	<ul style="list-style-type: none"> • Check running noise for possible bearing damage • Visually inspect the adapter for leakage
<ul style="list-style-type: none"> • After 25,000 – 30,000 hours of operation 	<ul style="list-style-type: none"> • Replace the roller bearing grease • Change the oil seal



6.6 Inspection and 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 section "Mounting Positions" (see page 79) 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:	<ul style="list-style-type: none"> • Helical gear units... • Parallel shaft helical gear units... • Helical-bevel gear units... • Helical-worm gear units... With oil level plug	(see page 65)
B:	<ul style="list-style-type: none"> • Helical gear units... • Parallel shaft helical gear units... • SPIROPLAN® gear units... Without oil level plug, with cover plate	(see page 67)
C:	<ul style="list-style-type: none"> • Helical-worm gear units S37... Without oil level plug and cover plate	(see page 71)
D:	<ul style="list-style-type: none"> • SPIROPLAN® W37 / W47... In mounting positions: M1, M2, M3, M5, M6 with oil level plug	(see page 74)
E:	<ul style="list-style-type: none"> • SPIROPLAN® W37 / W47... In M4 mounting position without oil level plug and cover plate	(see page 76)

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

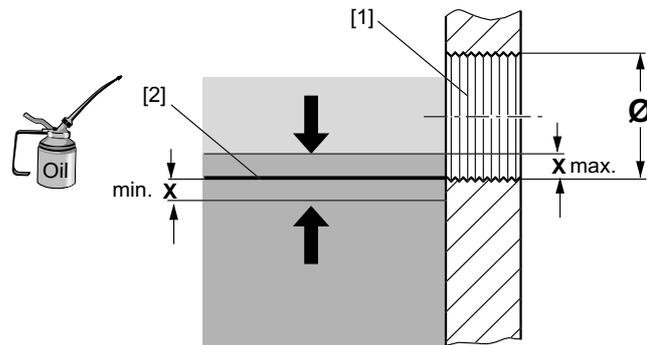


6.6.2 Helical, parallel shaft helical, helical-bevel and helical-worm gear units with oil level plug

Checking the oil level via 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 and maintenance" (see page 61).
2. Determine the position of the oil level plug and the breather valve using the mounting position sheets. See section "Mounting Positions" (see page 79).
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.



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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
M12 x 1.5	2
M22 x 1.5	3
M33 x 2	4
M42 x 2	5

6. Proceed as follows if the oil level is too low:
 - 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.



Inspection and Maintenance

Inspection and maintenance for the gear unit

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 and maintenance" (see page 61).
2. Determine the position of the oil drain plug using the mounting position sheets. See section "Mounting Positions" (see page 79).
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" (see page 62).
5. Check the oil level. See previous section.

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



⚠ WARNING

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

Serious injuries

- Let gear unit cool down before beginning work.
- The gear unit must still be warm, otherwise the high viscosity of excessively cold oil will make it harder to drain the oil correctly.

1. Observe the notes in section "Preliminary work regarding gear unit inspection and maintenance" (see page 61).
2. Determine the position of the oil drain plug, the oil level plug and the breather valve using the mounting position sheets. See section "Mounting Positions" (see page 79).
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 of the oil.
6. Re-insert the oil drain plug.
7. Fill in new oil of the same type via the vent hole (otherwise consult customer service). Do not mix synthetic lubricants.
 - Observe the oil fill quantities according to the specifications on the nameplate or according to the mounting position. See section "Lubricant fill quantities" (see page 108).
 - Check the oil level at the oil level plug.
8. Re-insert the oil level plug and the breather valve.

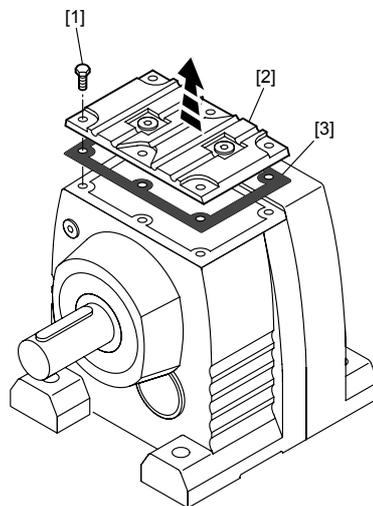


6.6.3 Helical, parallel shaft helical, SPIROPLAN® gear units without oil level plug with cover plate

Checking the oil level via the cover plate

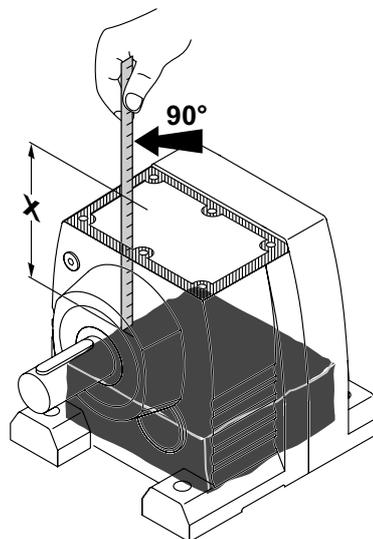
For gear units without oil level bore, the oil level is checked via the cover plate opening. Proceed as follows:

1. Observe the notes in section "Preliminary work regarding gear unit inspection and maintenance" (see page 61).
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 gasket [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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Inspection and Maintenance

Inspection and maintenance for the gear unit

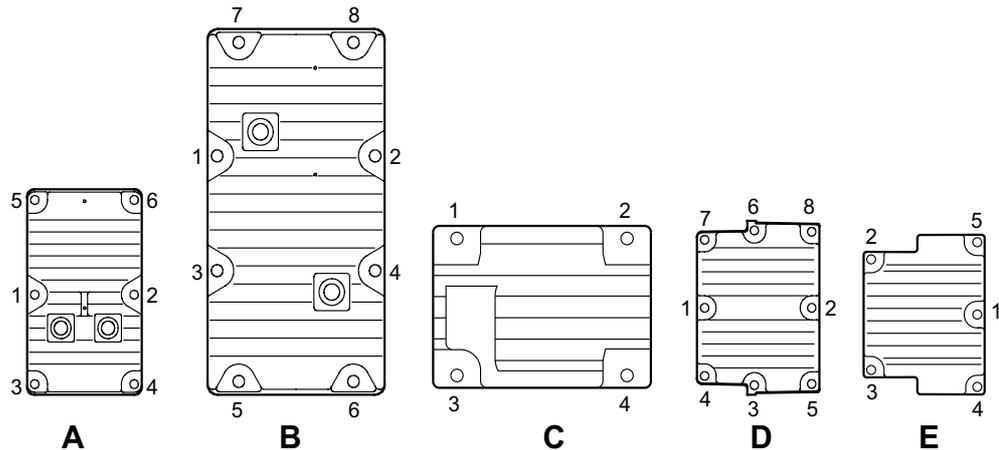
5. Compare the determined value "x" to the max. distance (depending on the mounting position) between the oil level and the sealing surface of the gear unit housing as specified in the following table. Adjust the fill level if required.

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-stage	52 ± 1	27 ± 1	27 ± 1	27 ± 1	27 ± 1	27 ± 1
	3-stage	49 ± 1	21 ± 1	21 ± 1	21 ± 1	21 ± 1	21 ± 1
R17	2-stage	63 ± 1	18 ± 1	46 ± 1	18 ± 1	46 ± 1	46 ± 1
	3-stage	58 ± 1	11 ± 2	40 ± 2	11 ± 2	40 ± 2	40 ± 2
R27	2-stage	74 ± 1	22 ± 1	45 ± 1	22 ± 1	45 ± 1	45 ± 1
	3-stage	76 ± 1	19 ± 1	42 ± 1	19 ± 1	42 ± 1	42 ± 1
R47	2-stage	–	–	–	–	39 ± 1	–
	3-stage	–	–	–	–	32 ± 1	–
R57	2-stage	–	–	–	–	32 ± 1	–
	3-stage	–	–	–	–	28 ± 1	–
F27	2-stage	78 ± 1	31 ± 1	72 ± 1	56 ± 1	78 ± 1	78 ± 1
	3-stage	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 gasket 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. In order to prevent the cover plate from being damaged, use only impulse drivers or torque wrenches (no impact screwdrivers).



18649739

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



Inspection and Maintenance

Inspection and maintenance for the gear unit

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 and maintenance" (see page 61).
2. Open the cover plate of the gear unit according to section "Checking the oil level via the cover plate" (see page 67).
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" (see page 62).
5. Check the oil level. See section "Checking the oil level via the cover plate" (see page 67).
6. Screw on the cover plate. Observe the order and the tightening torques according to section "Checking the oil level via the cover plate" (see page 67).

Changing the oil via the cover plate



WARNING

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

Serious injuries

- Let gear unit cool down before beginning work.
- The gear unit must still be warm, otherwise the high viscosity of excessively cold oil will make it harder to drain the oil correctly.

1. Observe the notes in section "Preliminary work regarding gear unit inspection and maintenance" (see page 61).
2. Open the cover plate of the gear unit according to section "Checking the oil level 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 customer service). Do not mix synthetic lubricants.
 - Pour in the oil in accordance with the mounting position or as specified on the nameplate. See section "Lubricant fill quantities" (see page 108).
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" (see page 67).

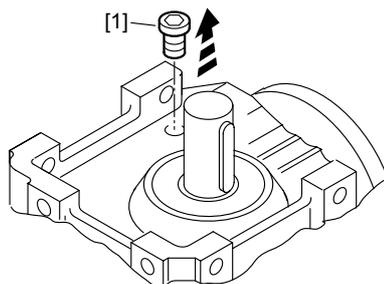


6.6.4 S37 helical-worm gear units without oil level plug and cover plate

Checking the oil level via the screw plug

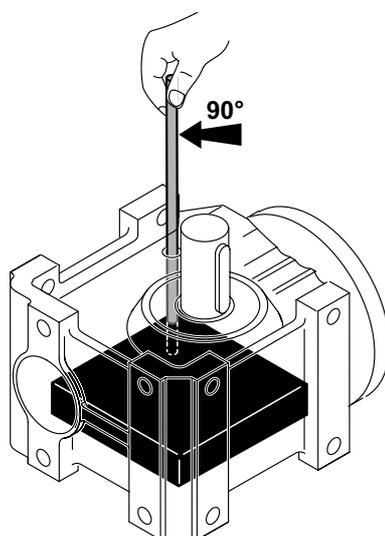
The S37 gear unit is not equipped with an oil level plug or a cover plate. This is why the oil level is checked via the control bore.

1. Observe the notes in section "Preliminary work regarding gear unit inspection and maintenance" (see page 61).
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).



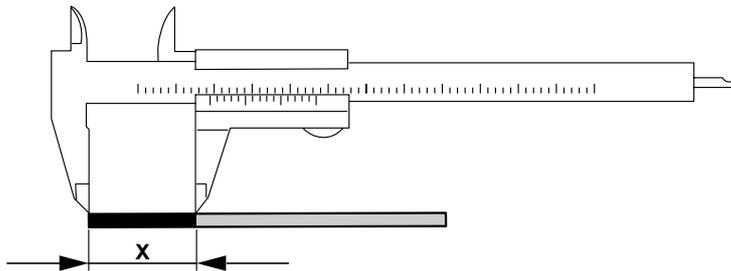
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Inspection and Maintenance

Inspection and maintenance for the gear unit

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



18661771

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 and maintenance" (see page 61).
2. Open the cover plate of the gear unit according to section "Checking the oil level 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" (see page 62).
5. Check the oil level. See previous section.
6. Re-insert and tighten the screw plug.

*Changing the oil
via the screw plug*



! WARNING

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

Serious injuries

- Let gear unit cool down before beginning work.
- The gear unit must still be warm, otherwise the high viscosity of excessively cold oil will make it harder to drain the oil correctly.

1. Observe the notes in section "Preliminary work regarding gear unit inspection and maintenance" (see page 61).
2. Open the cover plate of the gear unit according to section "Checking the oil level 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 customer service). Do not mix 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" (see page 107).
5. Check the oil level.
6. Re-insert and tighten the screw plug.

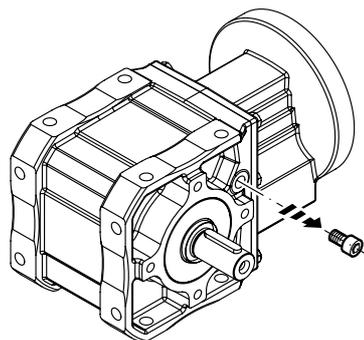


6.6.5 SPIROPLAN® W37/W47 in mounting positions M1, M2, M3, M5, M6 with oil level plug

Checking the oil level via the oil level plug

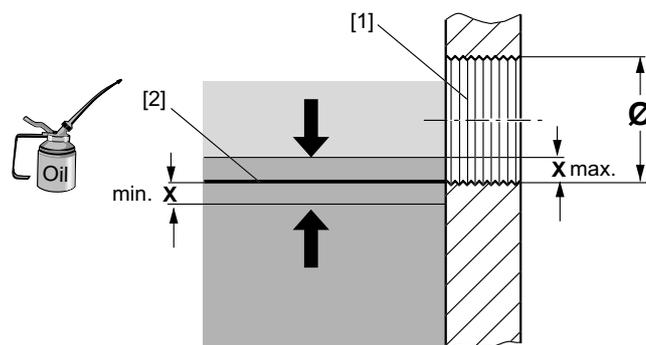
Proceed as follows to check the oil level of the gear unit:

1. Observe the notes in section "Preliminary work regarding gear unit inspection and maintenance" (see page 61).
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 and maintenance" (see page 61).
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" (see page 62).
4. Check the oil level. See previous section.

*Changing the oil
via the oil level
plug*

	⚠ WARNING
	<p>Risk of burns due to hot gear unit and hot gear unit oil. Serious injuries</p> <ul style="list-style-type: none">• Let gear unit cool down before beginning work.• The gear unit must still be warm, otherwise the high viscosity of excessively cold oil will make it harder to drain the oil correctly.

1. Observe the notes in section "Preliminary work regarding gear unit inspection and maintenance" (see page 61).
2. Set up the gear unit in M5 or M6 mounting position. See section "Mounting Positions" (see page 79).
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 of 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 customer service). Do not mix synthetic lubricants.
 - Observe the oil fill quantities according to the specifications on the nameplate or according to the mounting position. See section "Lubricant fill quantities" (see page 108).
 - Check the oil level according to section "Checking the oil level via the oil level plug".
8. Re-insert the upper oil level plug.

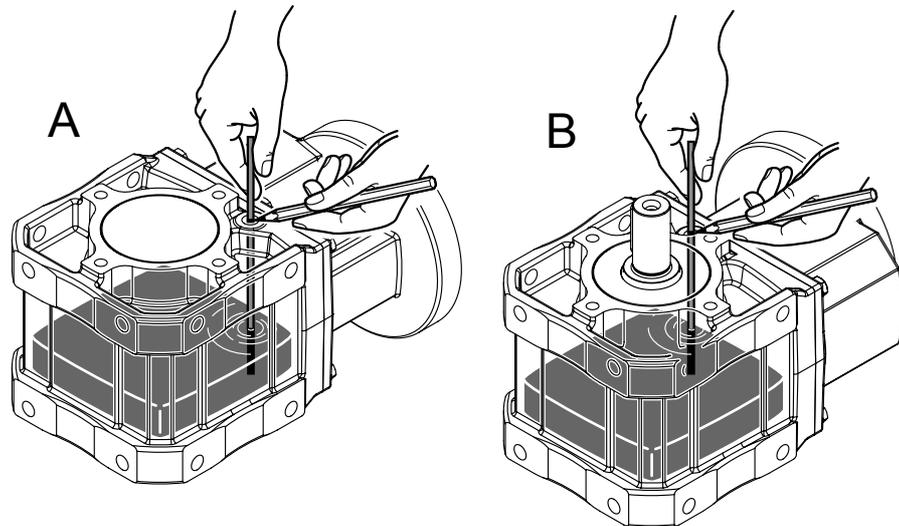


6.6.6 SPIROPLAN® W37/W47 in M4 mounting position without oil level plug and cover plate

Checking the oil level via the screw plug

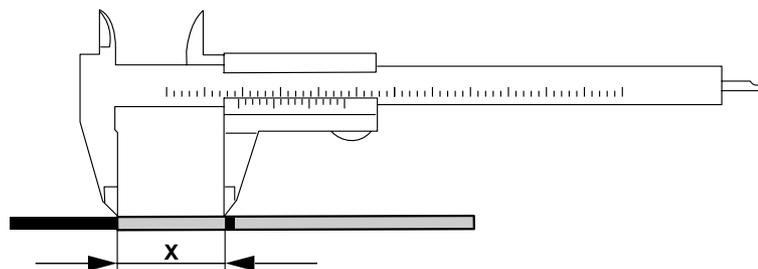
The W37/W47 gear units are not equipped with an oil level plug or a cover plate. This is why the oil level is checked via the control bore.

1. Observe the notes in section "Preliminary work regarding gear unit inspection and maintenance" (see page 61).
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 on 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 and maintenance" (see page 61).
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" (see page 62).
4. Check the oil level. See previous section.

Changing the oil via the screw plug

	<p>! WARNING</p>
	<p>Risk of burns due to hot gear unit and hot gear unit oil. Serious injuries</p> <ul style="list-style-type: none"> Let gear unit cool down before beginning work. The gear unit must still be warm, otherwise the high viscosity of excessively cold oil will make it harder to drain the oil correctly.

1. Observe the notes in section "Preliminary work regarding gear unit inspection and maintenance" (see page 61).
2. Set up the gear unit in M5 or M6 mounting position. See section "Mounting Positions" (see page 79).
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 of the oil.



Inspection and Maintenance

Inspection and maintenance for the gear unit

6. Re-insert the lower screw plug.
7. Fill in new oil of the same type via the upper screw plug bore (otherwise consult customer service). Do not mix synthetic lubricants.
 - Observe the oil fill quantities according to the specifications on the nameplate or according to the mounting position. See section "Lubricant fill quantities" (see page 108).
 - 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 Changing the oil seal

	NOTICE
	<p>Oil seals with a temperature below 0 °C may get damaged during installation. Potential damage to property.</p> <ul style="list-style-type: none"> • Store oil seals at ambient temperatures over 0 °C. • Warm up the oil seals prior to installation if required. <ol style="list-style-type: none"> 1. When changing the oil seal, ensure that there is a sufficient grease reservoir between the dust lip and sealing 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 Painting the gear unit

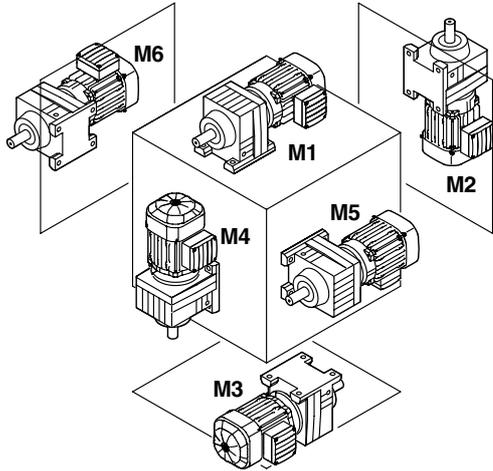
	NOTICE
	<p>Breather valves and oil seals may be damaged during the painting or re-painting process. Potential damage to property.</p> <ul style="list-style-type: none"> • Thoroughly cover the breather valves and the sealing lip of the oil seals with strips of tape prior to the painting process. • Remove the strips after the painting process.

kVA	n
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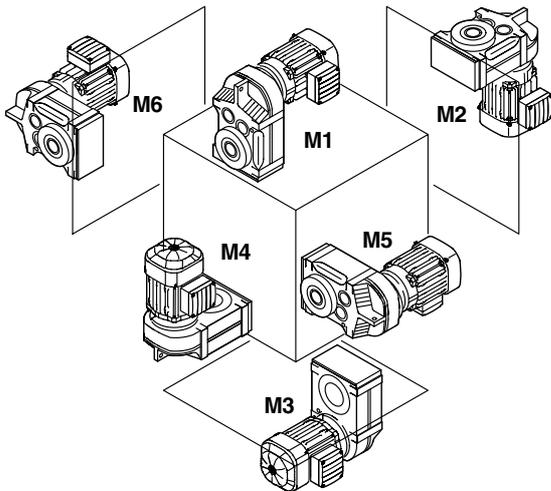
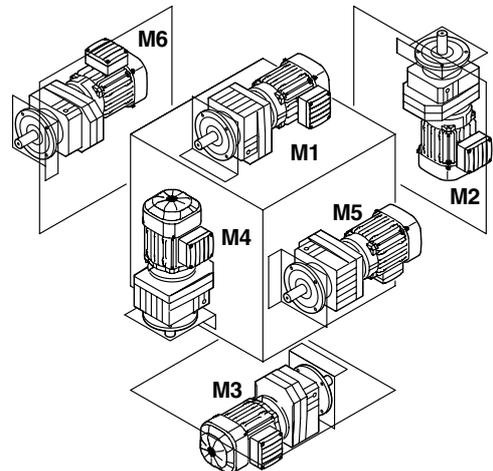
7 Mounting Positions

7.1 Designation of the mounting positions

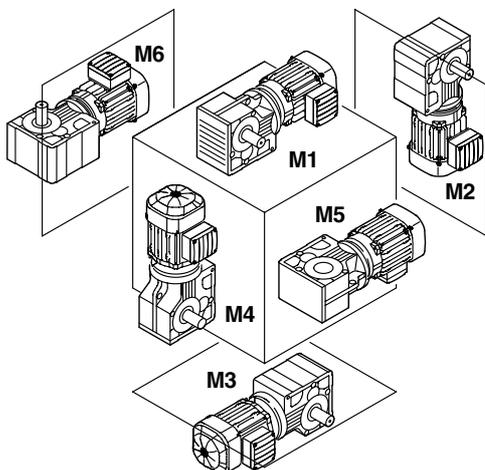
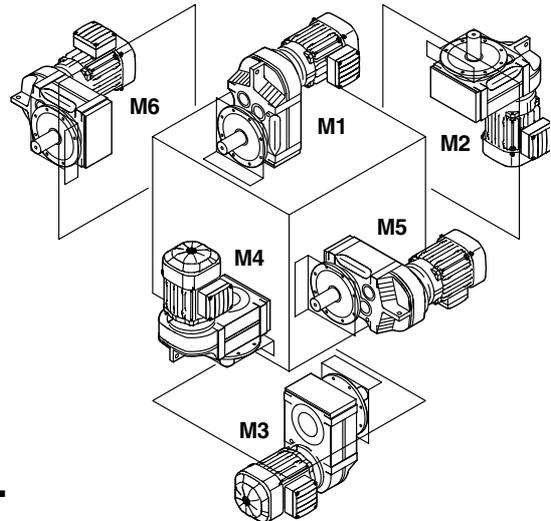
SEW differentiates between the six mounting positions M1 ... M6. The following figure shows the spatial orientation of the gearmotor in mounting positions M1 ... M6.



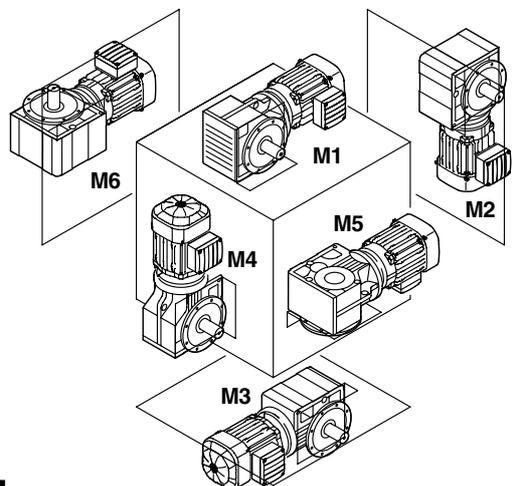
R..

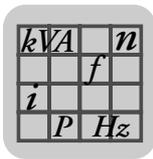


F..



W..





7.2 Key

	<p>TIP</p> <p>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 shown for all SPIROPLAN® gearmotors to assist you in working with this documentation.</p>
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Notice: SPIROPLAN® gearmotors of sizes W10-W30 cannot be equipped with breather valves, oil level plugs or drain plugs.

7.2.1 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

7.2.2 Churning losses

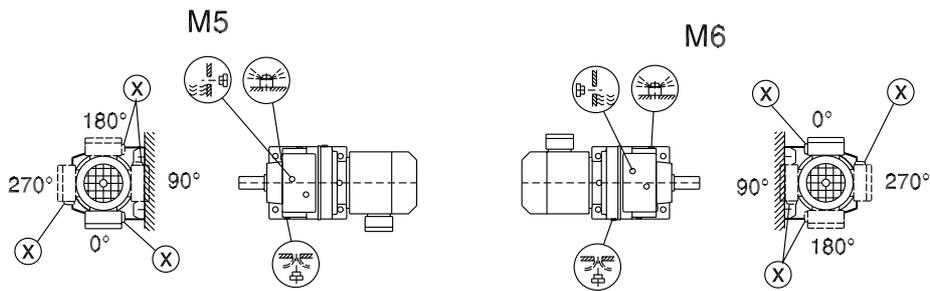
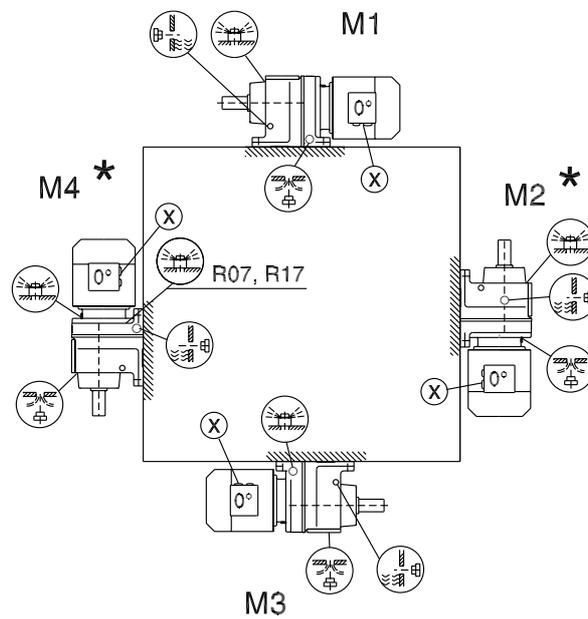
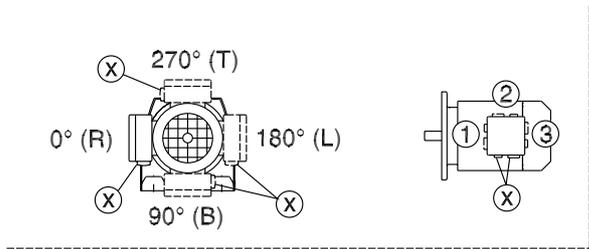
Some mounting positions may result in more churning losses. Contact SEW-EURODRIVE in case of the following combinations:

Mounting position	Gear unit type	Gear unit size	Input speed [rpm]
M2, M4	R	97 to 107	> 2,500
		> 107	> 1,500
M2, M3, M4, M5, M6	F	97 to 107	> 2,500
		> 107	> 1,500
	K	77 to 107	> 2,500
		> 107	> 1,500
M1, M2, M3, M4, M5, M6	S	77 to 97	> 2,500
	W	37 to 47	> 1,500

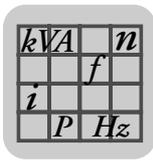
7.3 Helical gearmotors R

7.3.1 R07 ... R167

04 040 03 00



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

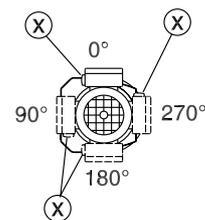
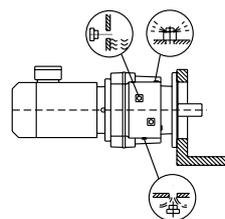
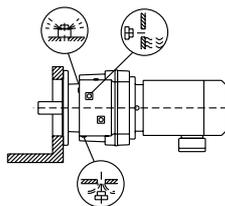
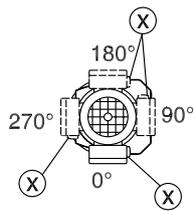
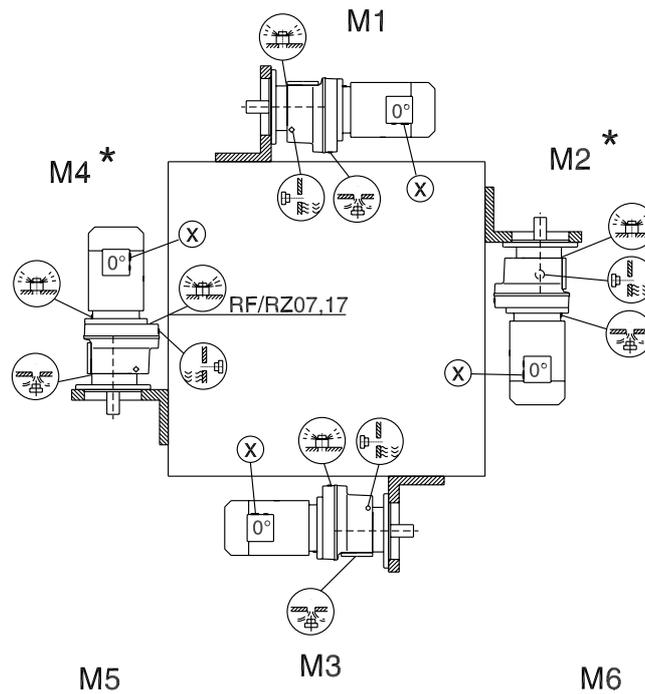
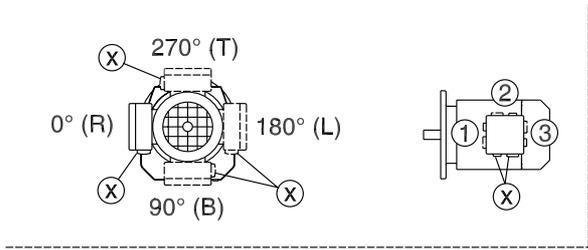


Mounting Positions

Helical gearmotors R

7.3.2 RF07 ... RF167, RZ07 ... RZ87

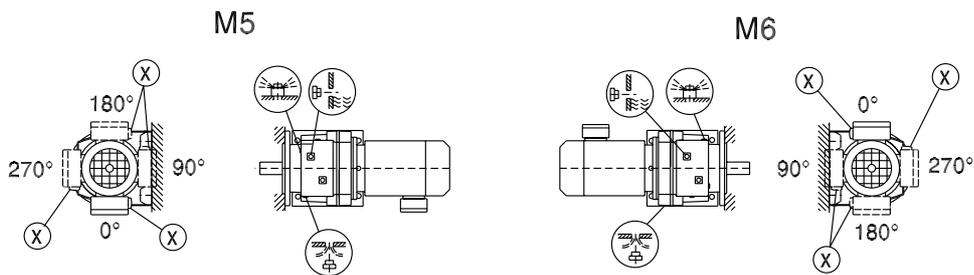
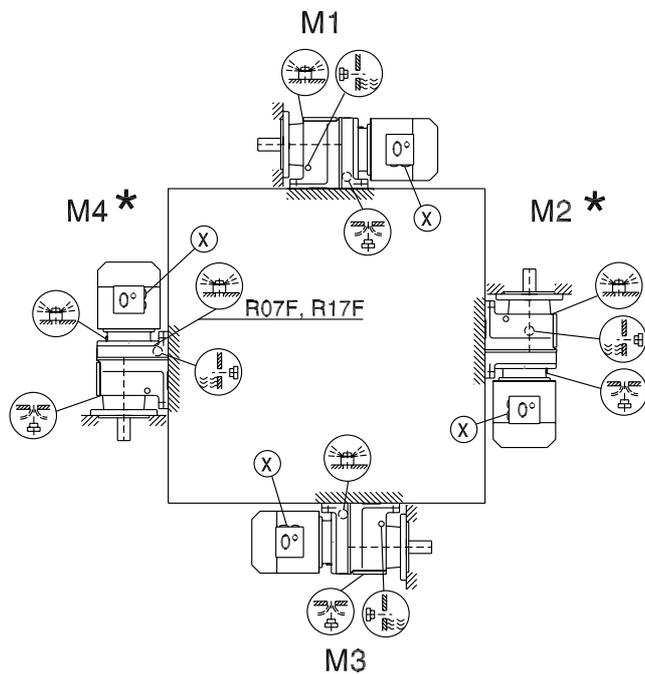
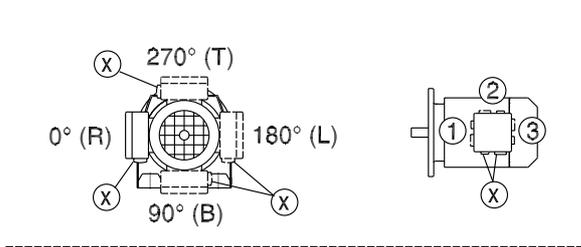
04 041 03 00



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

7.3.3 R07F ... R87F

04 042 03 00



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

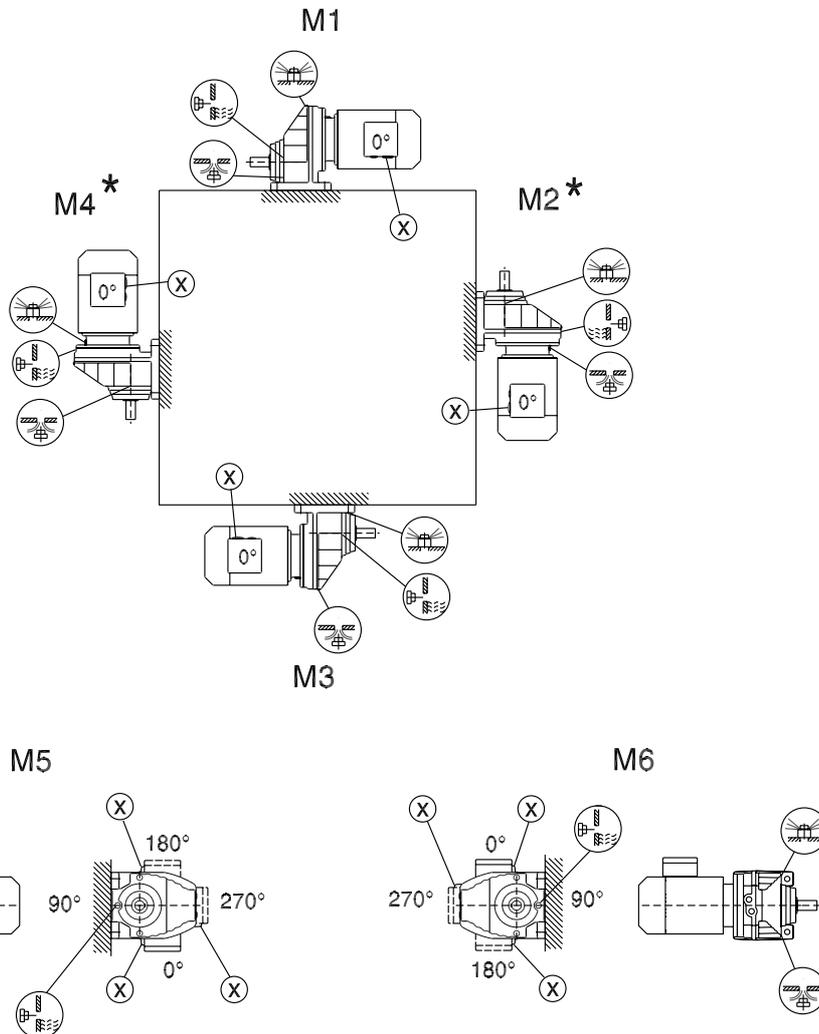
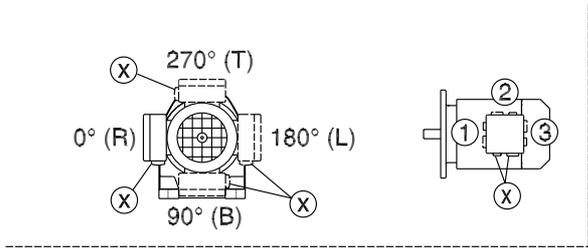
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	f
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P	H_z

Mounting Positions
Helical gearmotors RX

7.4 Helical gearmotors RX

7.4.1 RX57 ... RX107

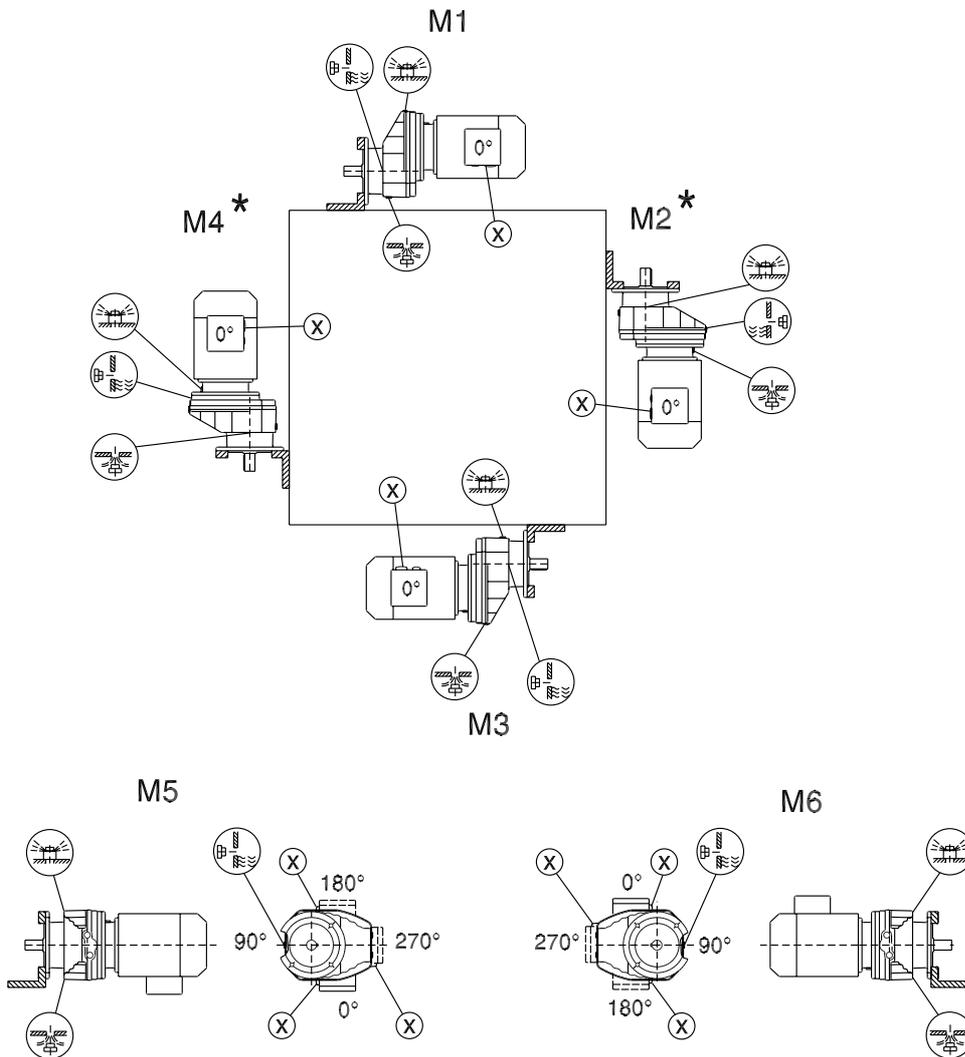
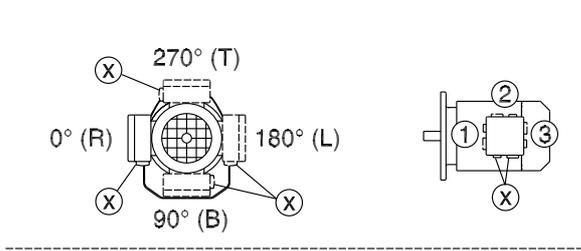
04 043 02 00

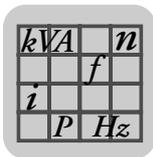


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f	
i	
P	H_z

7.4.2 RXF57 ... RXF107

04 044 02 00





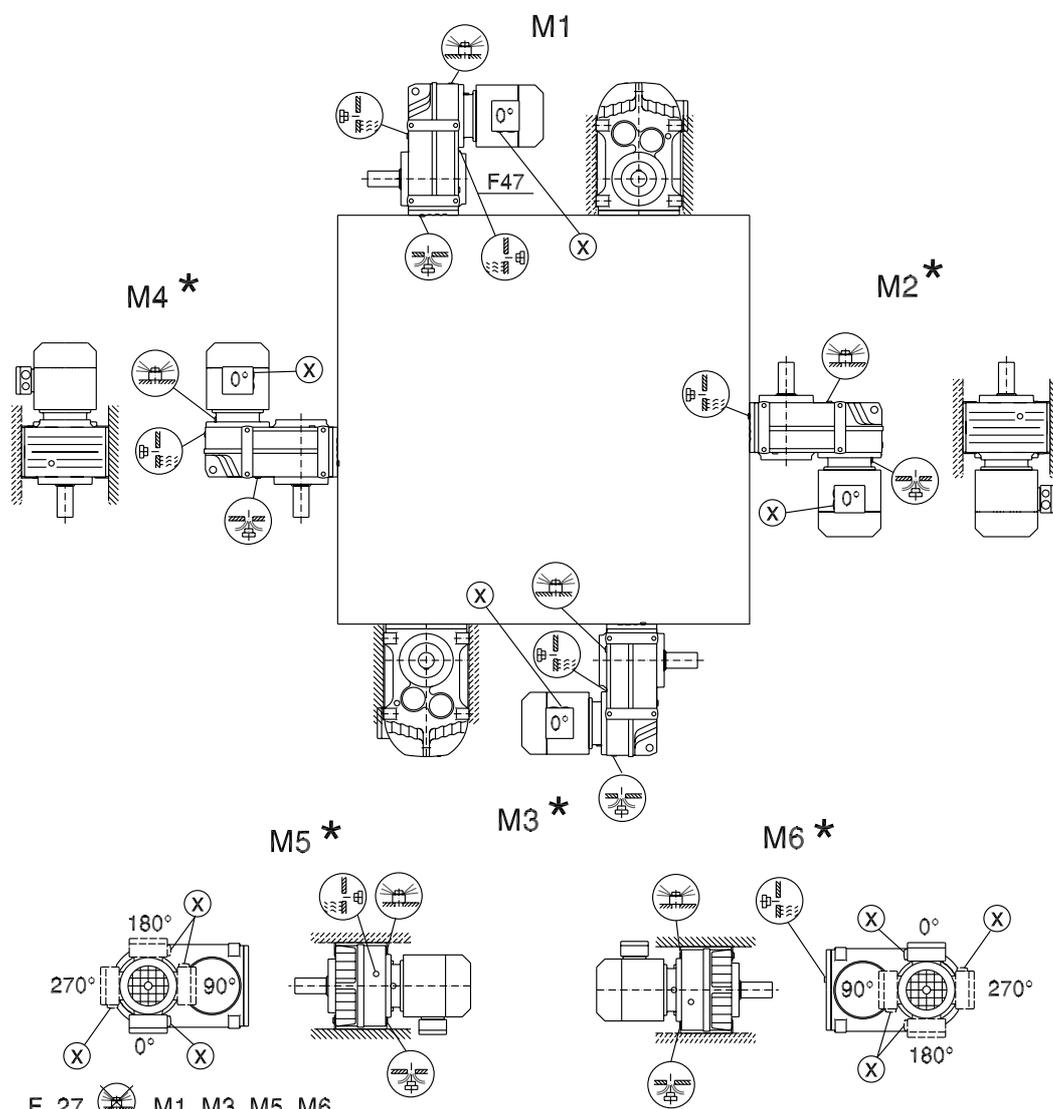
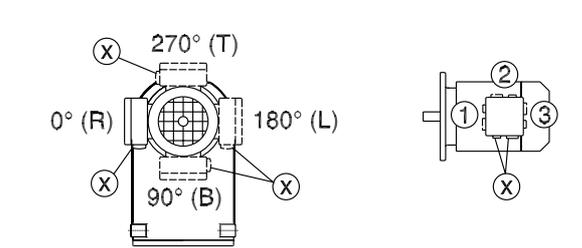
Mounting Positions

Parallel shaft helical gearmotors F

7.5 Parallel shaft helical gearmotors F

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

42 042 03 00

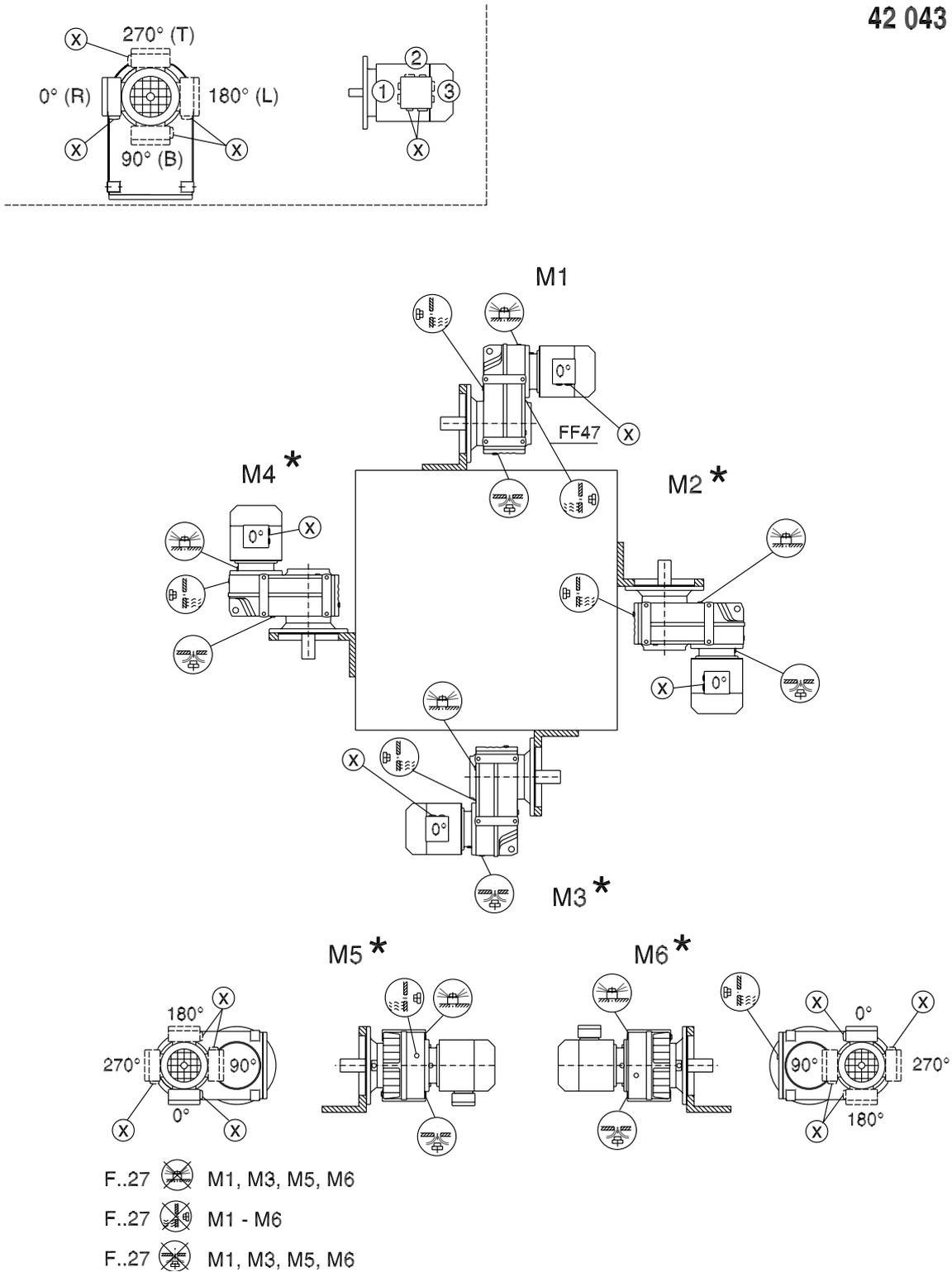


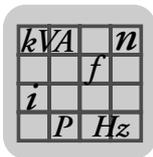
- F..27 M1, M3, M5, M6
- F..27 M1 - M6
- F..27 M1, M3, M5, M6

kVA	n
f	
i	
P	H_z

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

42 043 03 00



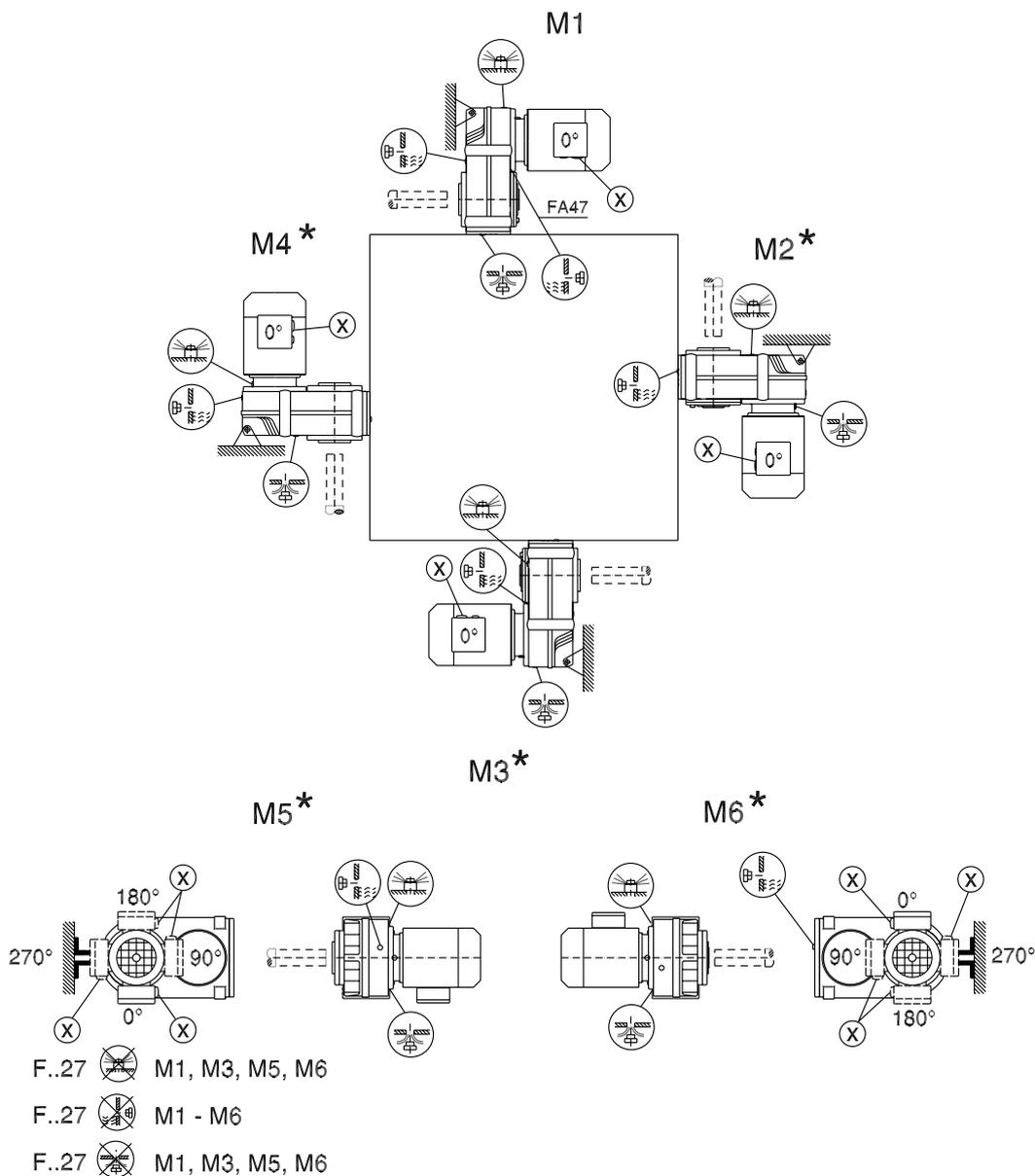
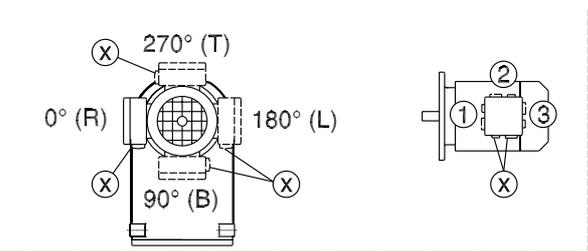


Mounting Positions

Parallel shaft helical gearmotors F

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

42 044 03 00

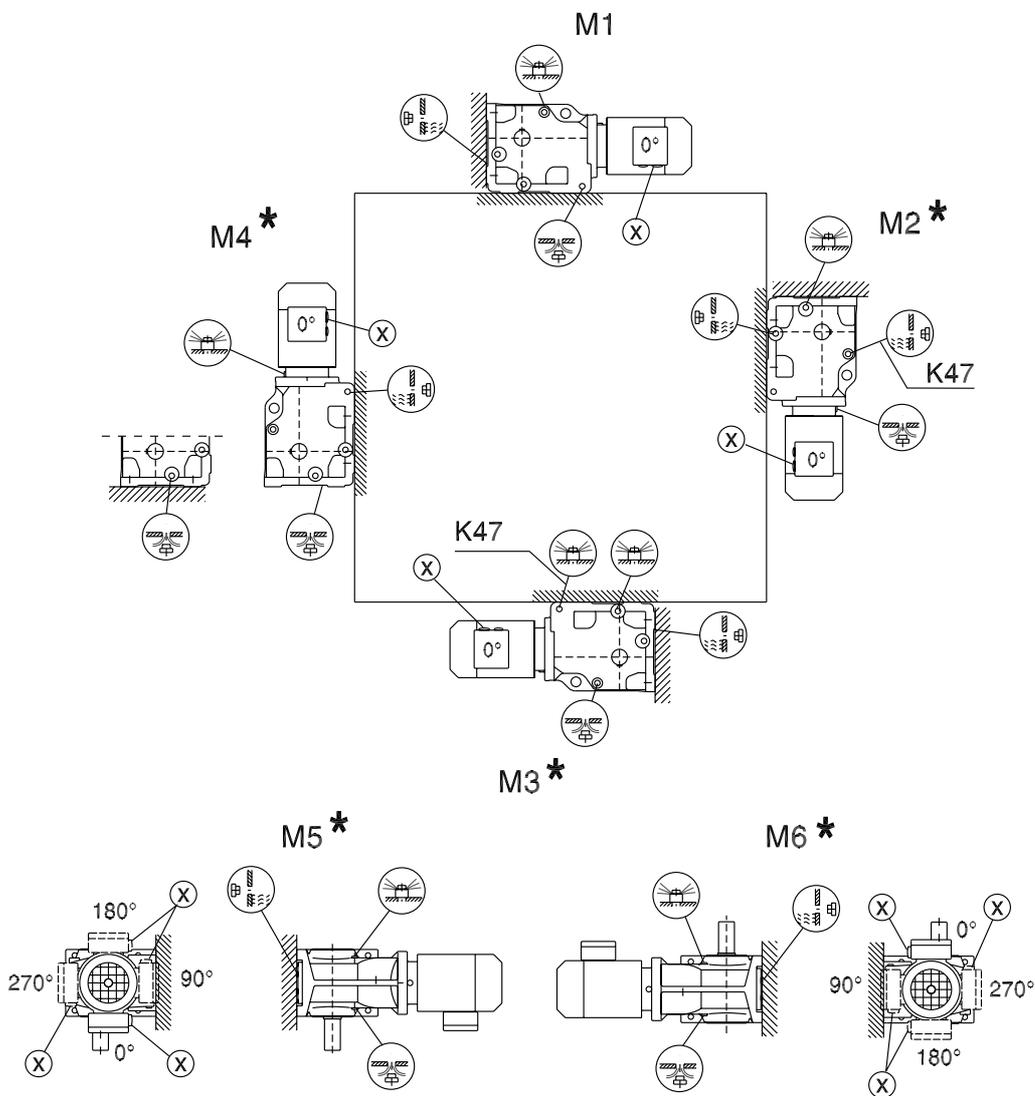
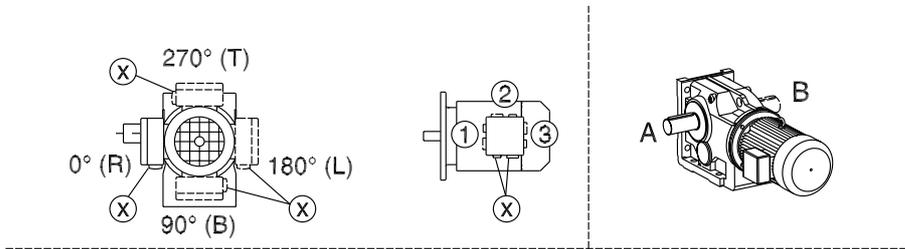


kVA	n
f	
i	
P	H_z

7.6 Helical-bevel gearmotors K

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

34 025 03 00



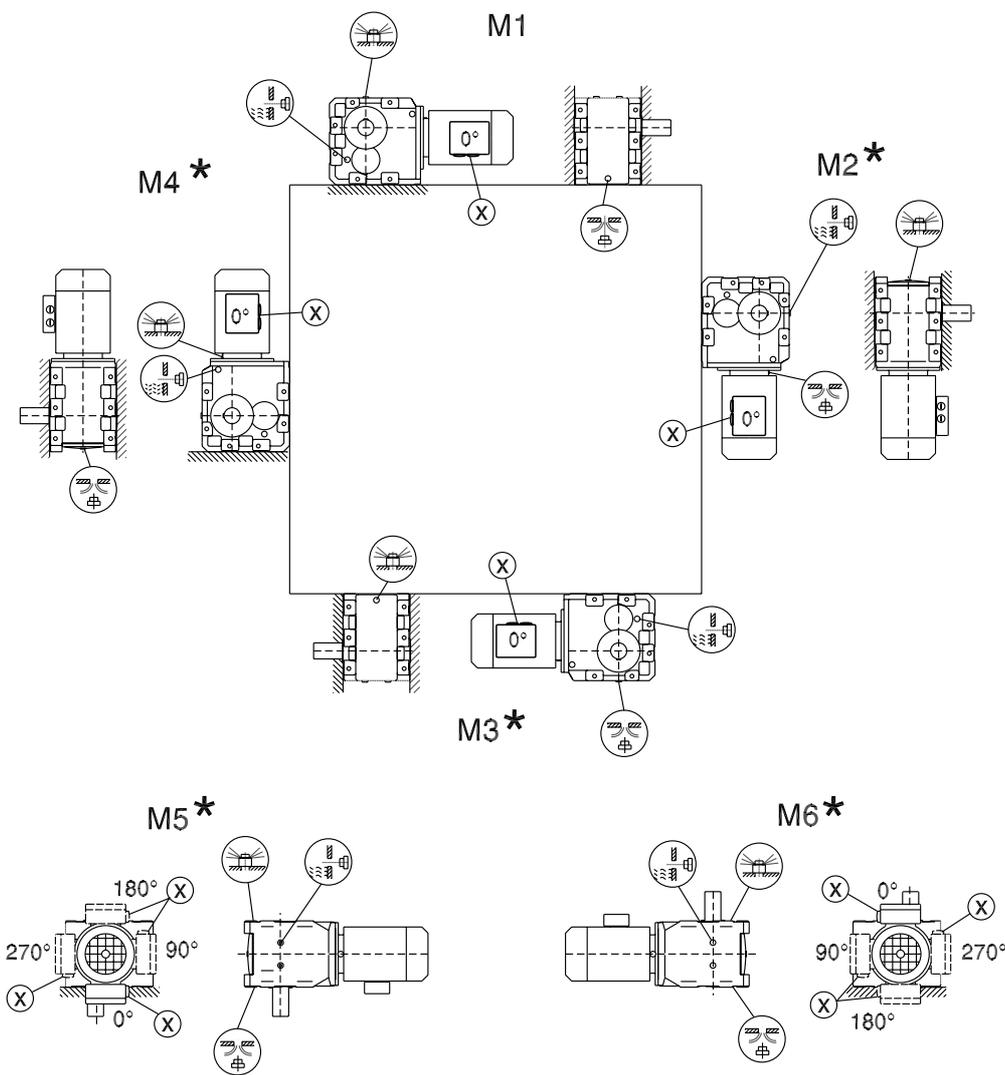
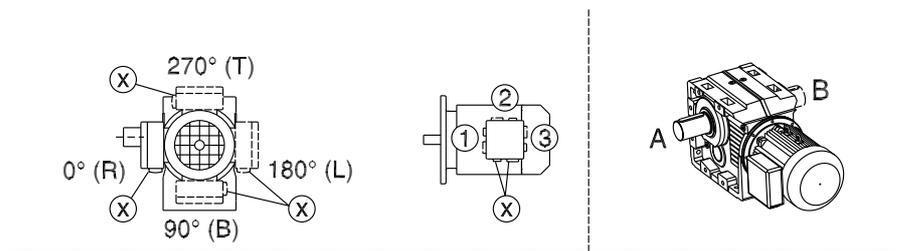
kVA	n
	f
i	
P	H_z

Mounting Positions

Helical-bevel gearmotors K

7.6.2 K167 ... K187 / KH167B ... KH187B

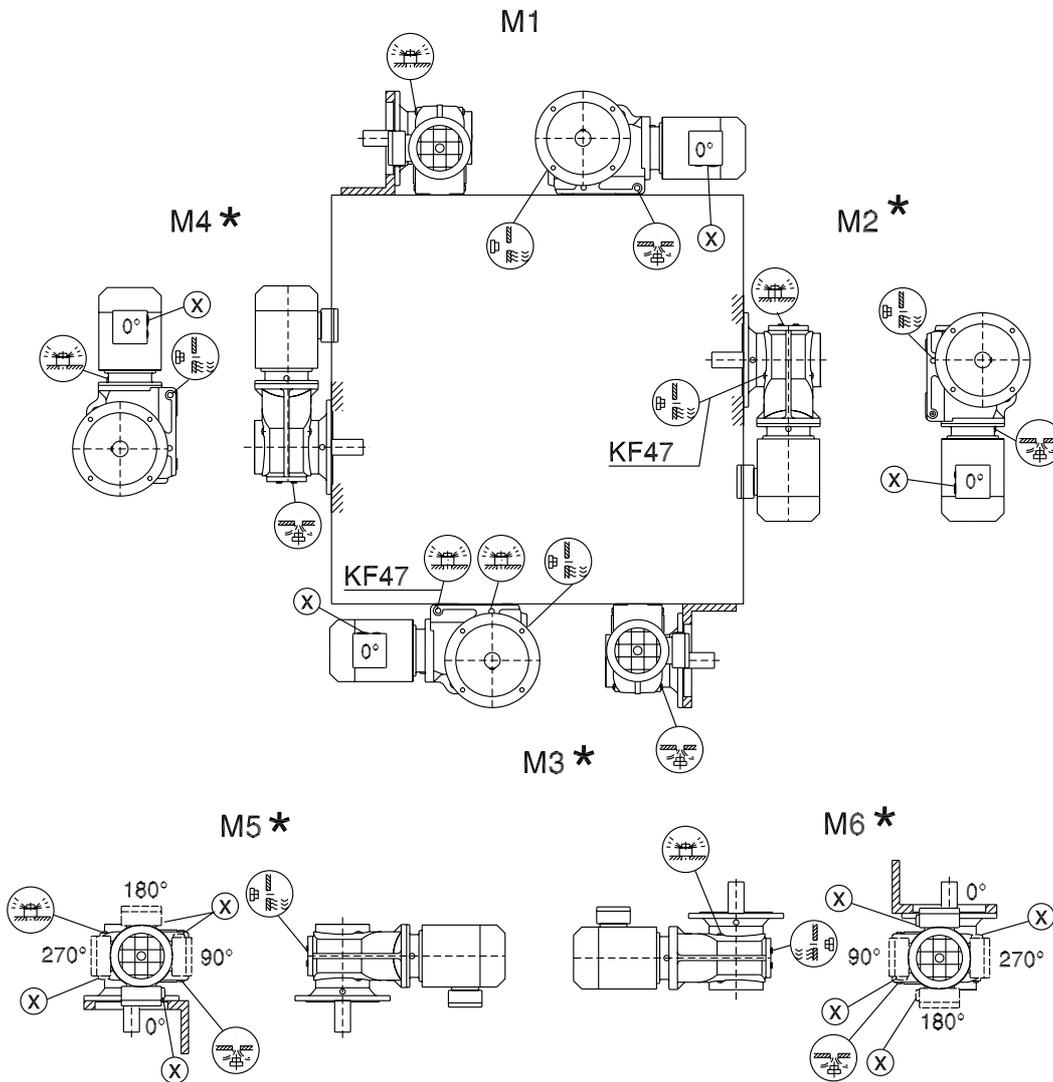
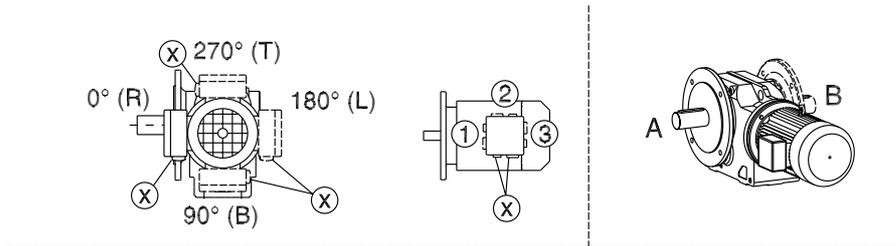
34 026 03 00



kVA	n
f	
i	
P	H_z

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

34 027 03 00

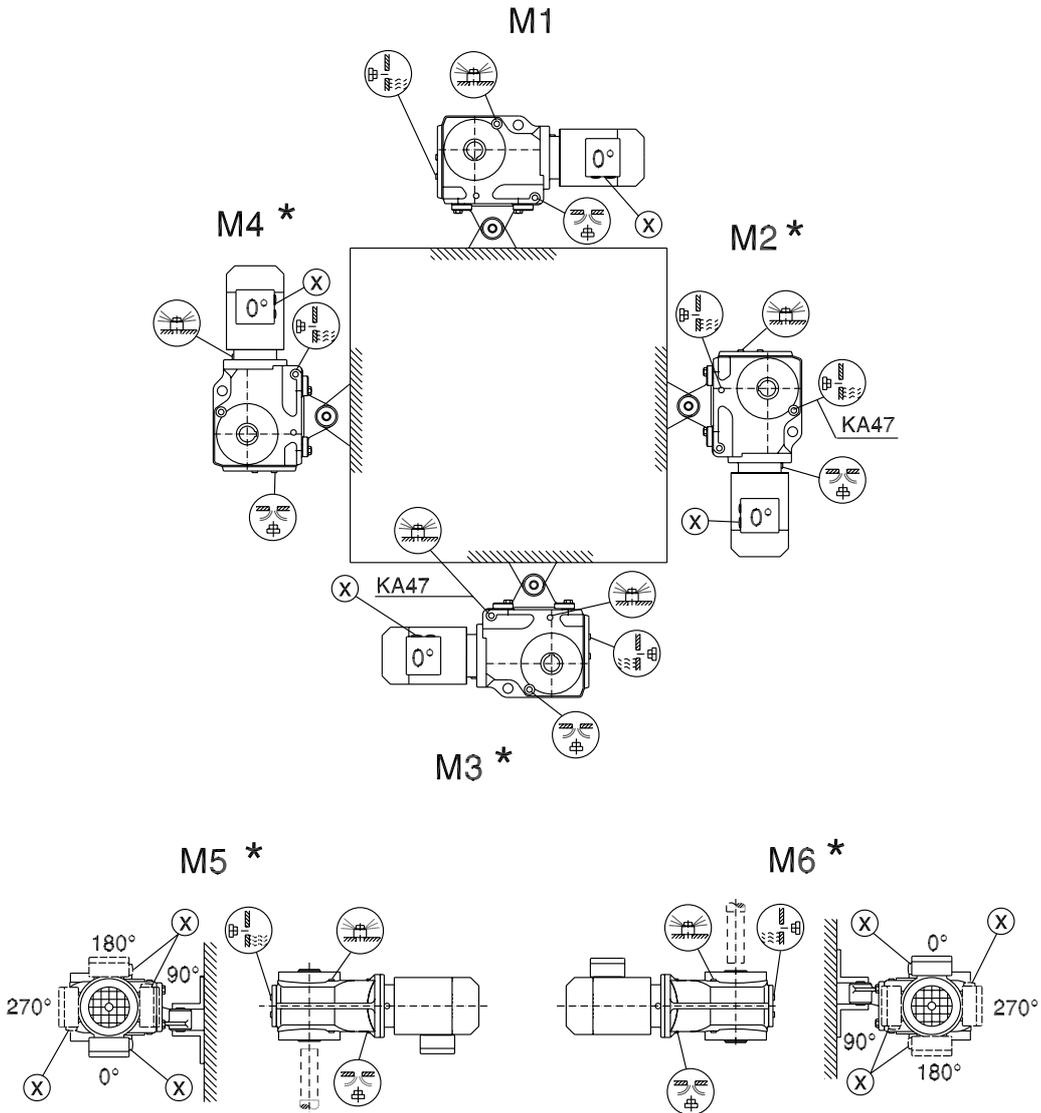
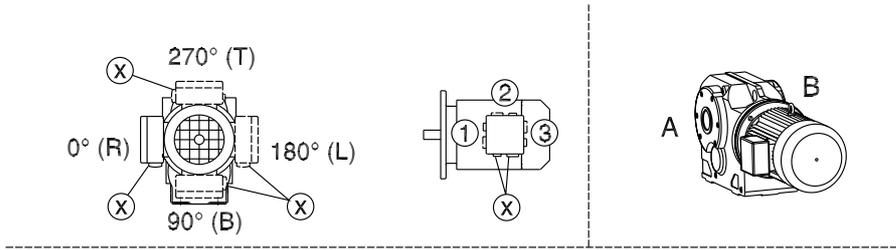


kVA	n
f	
i	
P	H _Z

Mounting Positions
Helical-bevel gearmotors K

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

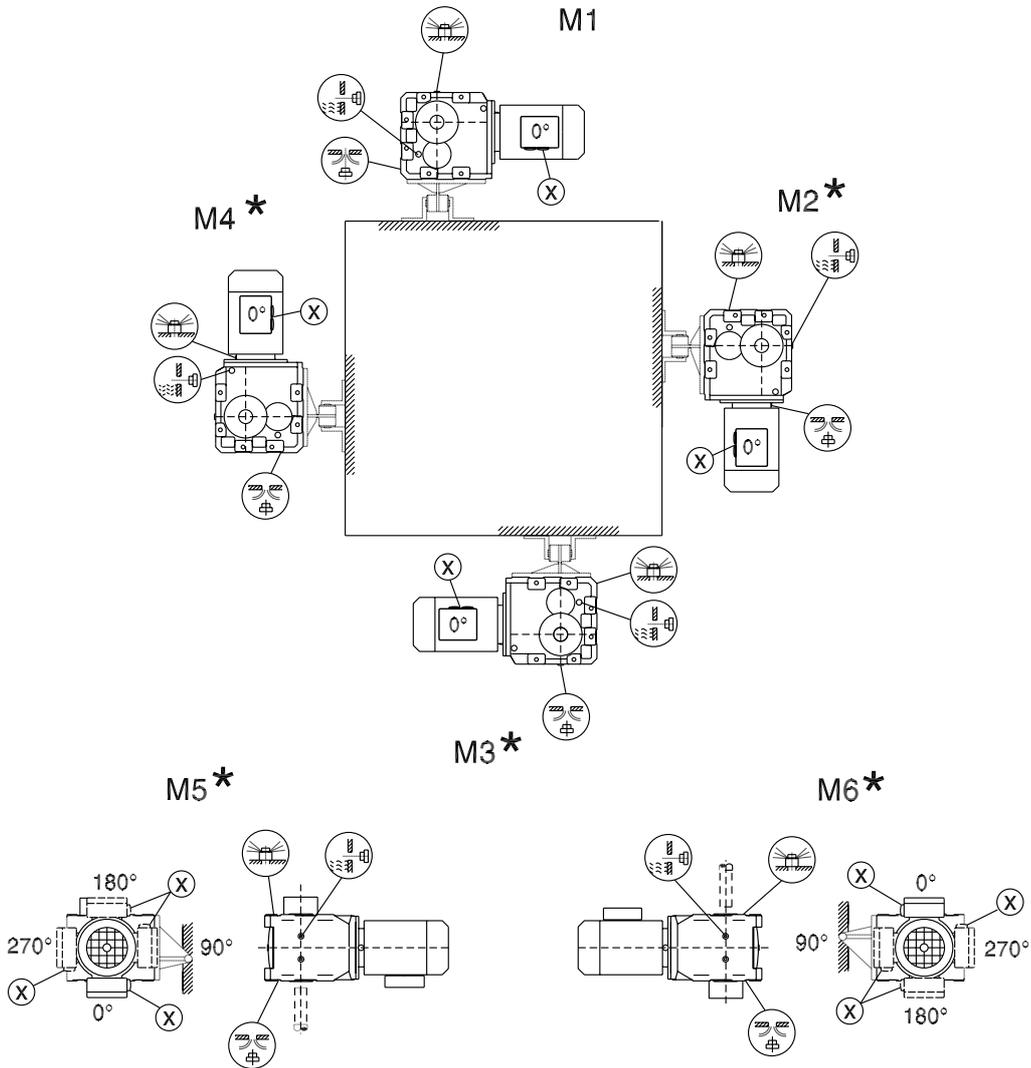
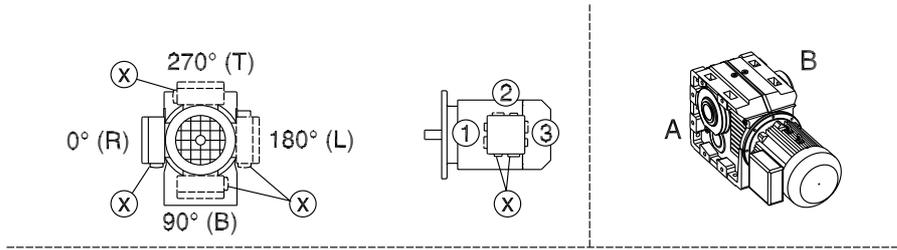
39 025 04 00

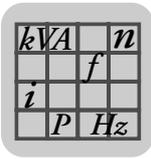


kVA	n
f	
i	
P	H_z

7.6.5 KH167 ... KH187

39 026 04 00



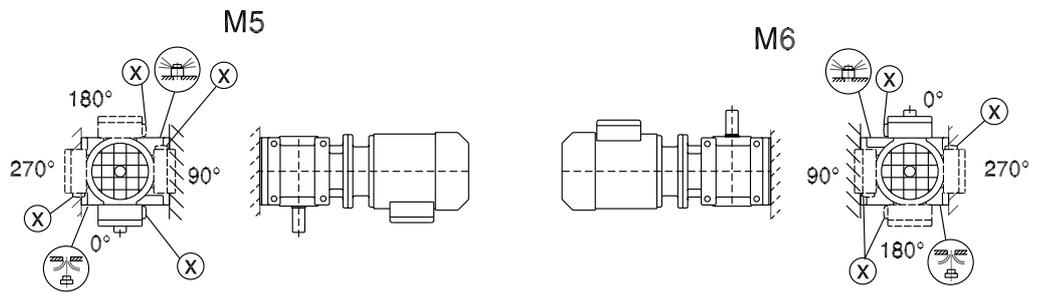
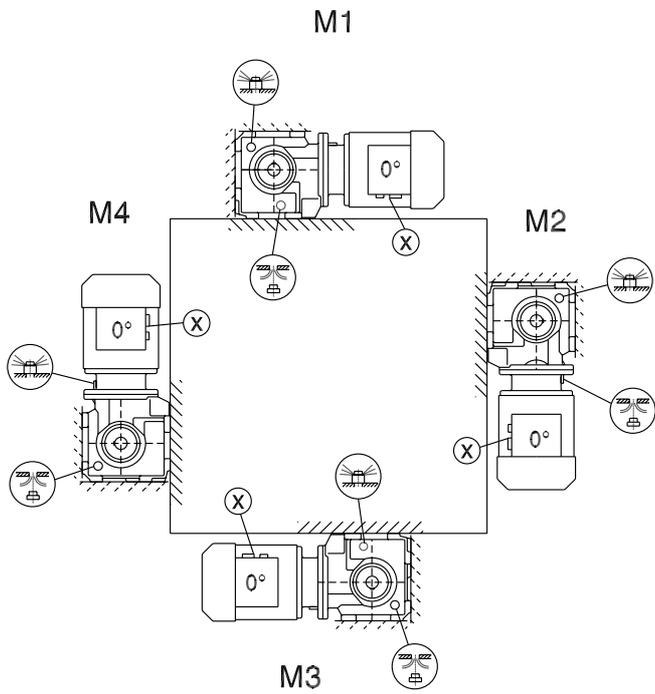
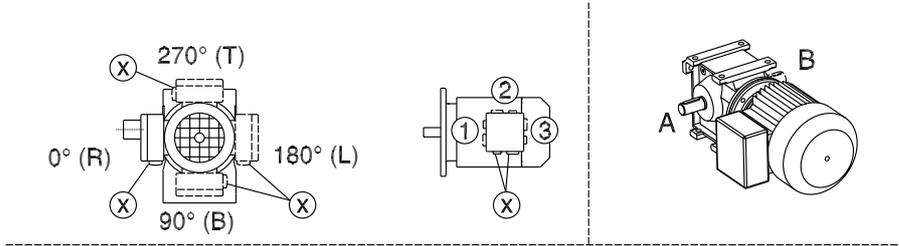


Mounting Positions
Helical-worm gearmotors S

7.7 Helical-worm gearmotors S

7.7.1 S37

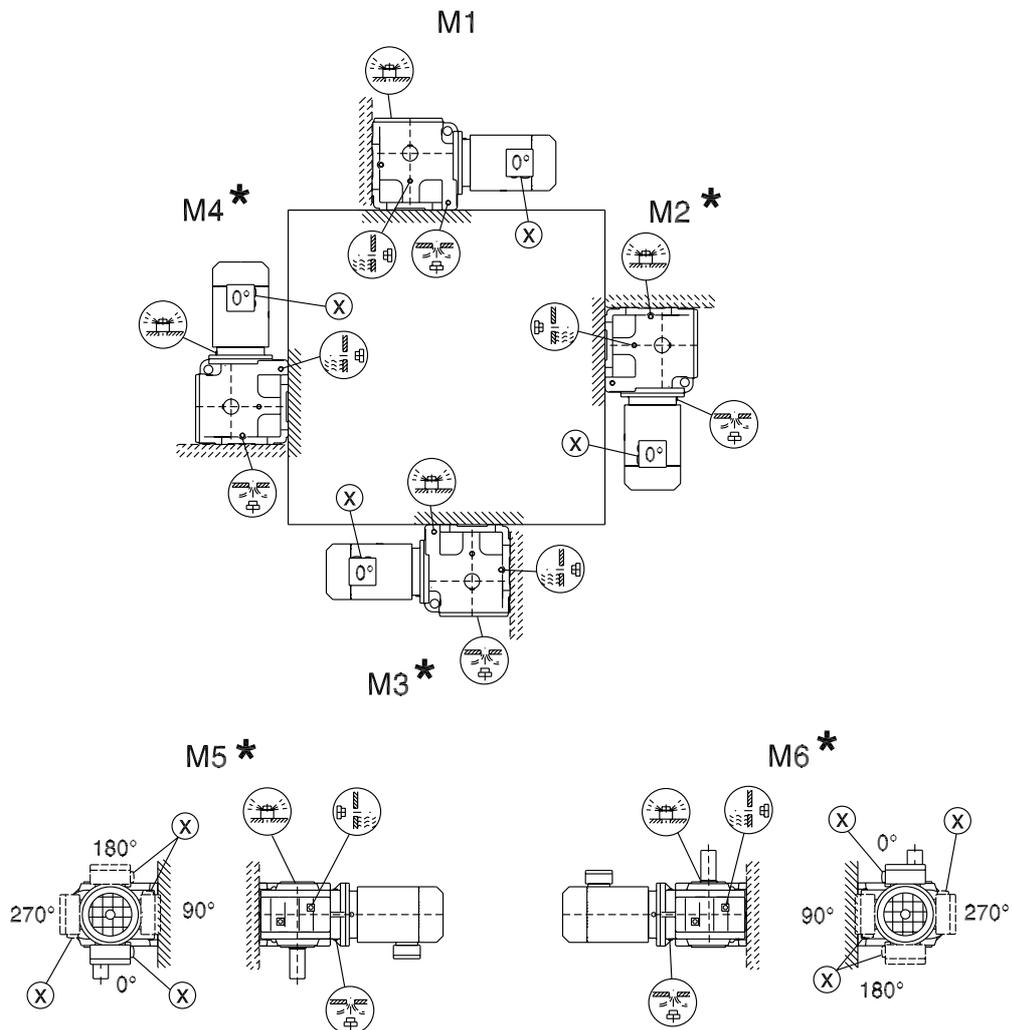
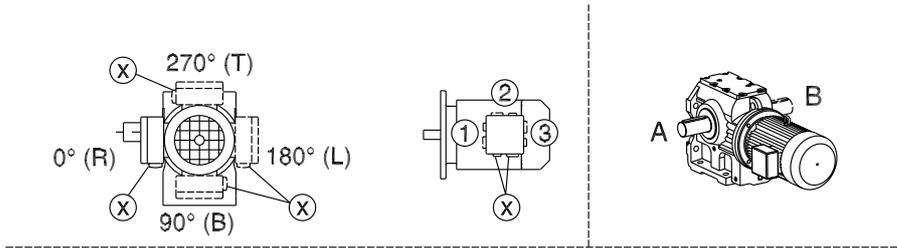
05 025 03 00



kVA	n
f	
i	
P	H_z

7.7.2 S47 ... S97

05 026 03 00



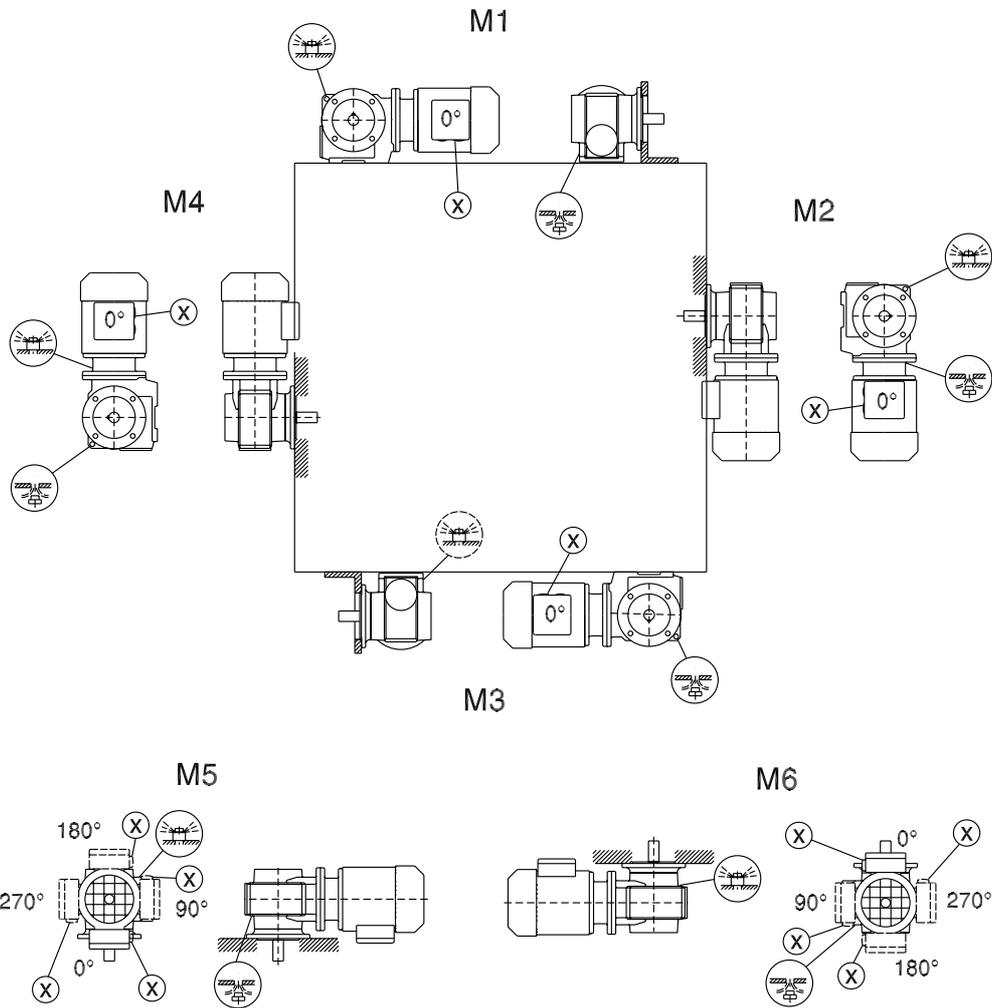
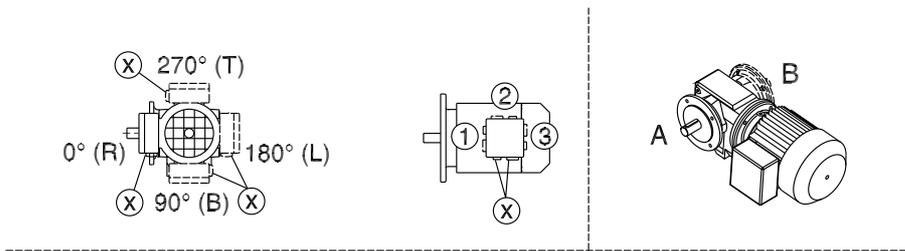
kVA	n
i	f
P	H _Z

Mounting Positions

Helical-worm gearmotors S

7.7.3 SF37 / SAF37 / SHF37

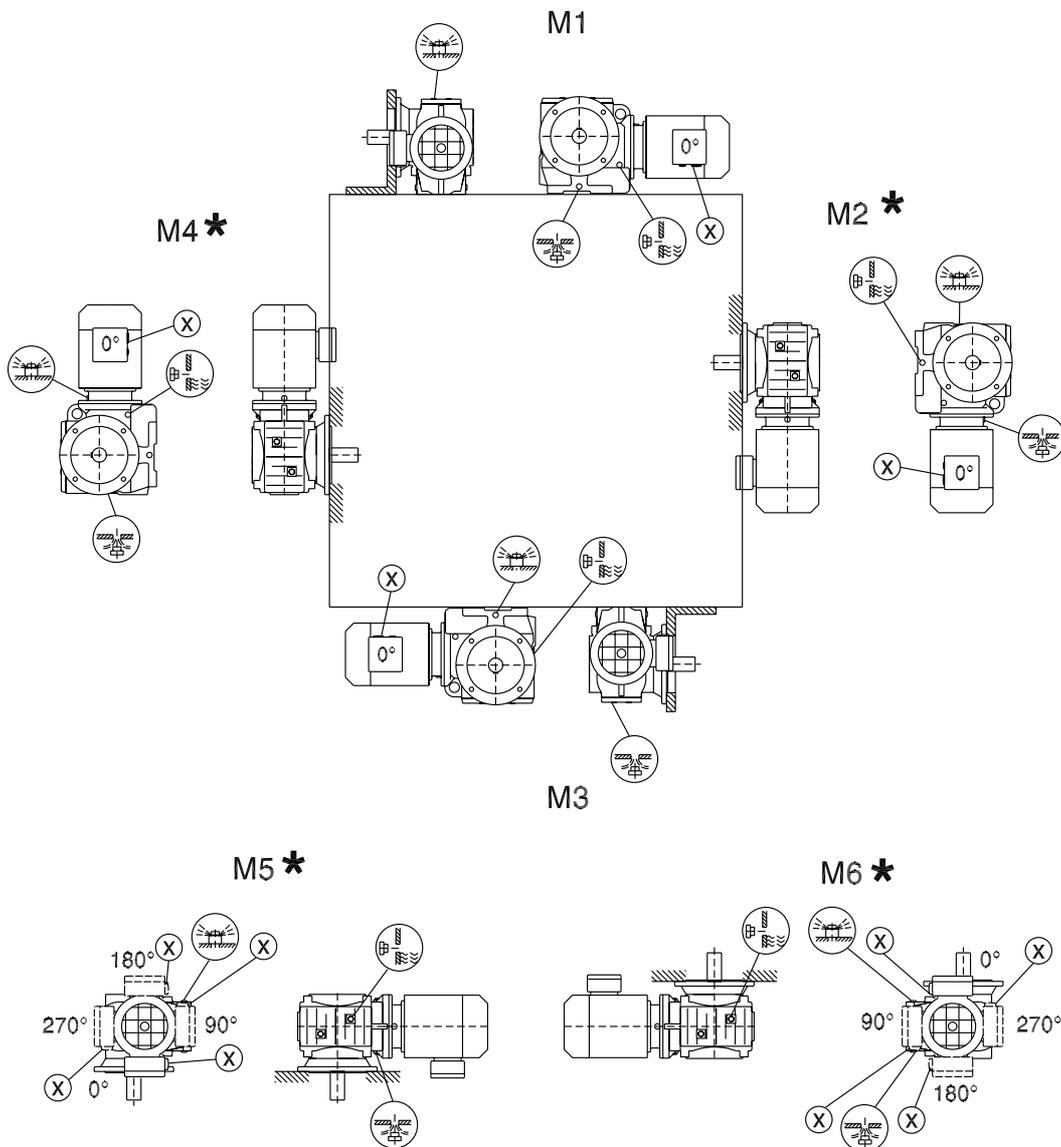
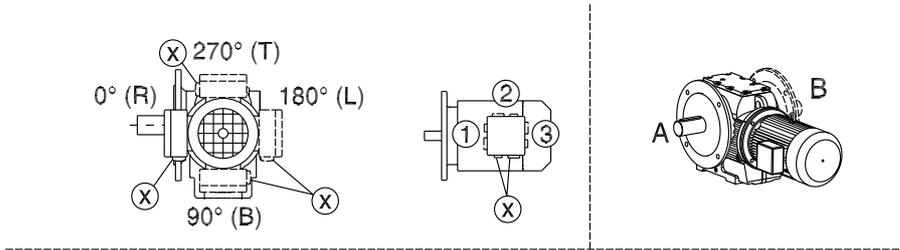
05 027 03 00



kVA	n
f	
i	
P	H_z

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

05 028 03 00



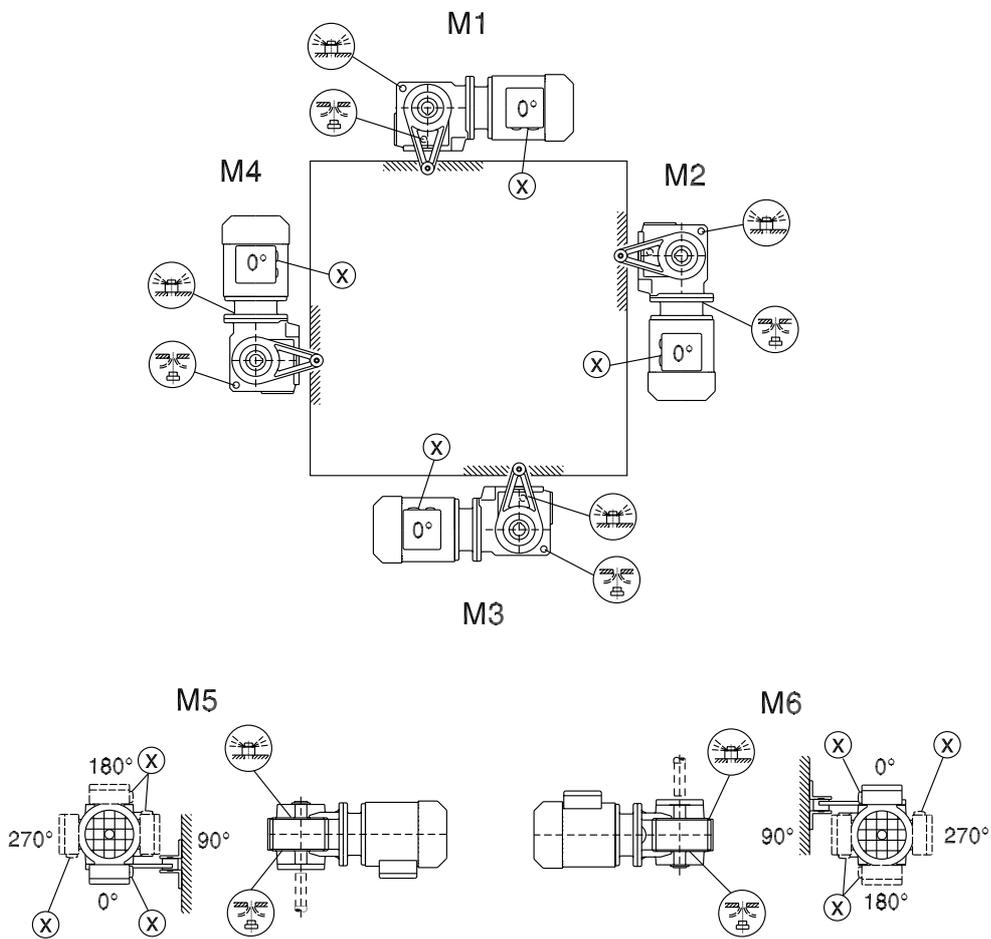
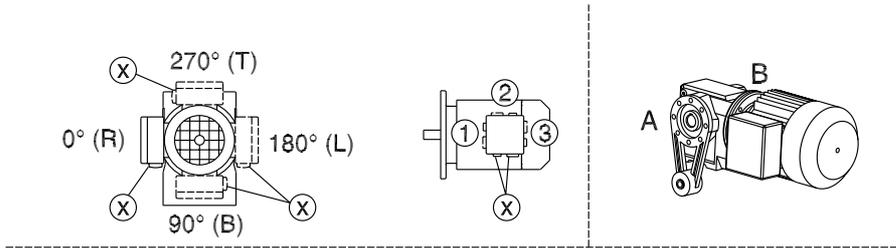
kVA	n
f	
i	
P	Hz

Mounting Positions

Helical-worm gearmotors S

7.7.5 SA37 / SH37 / ST37

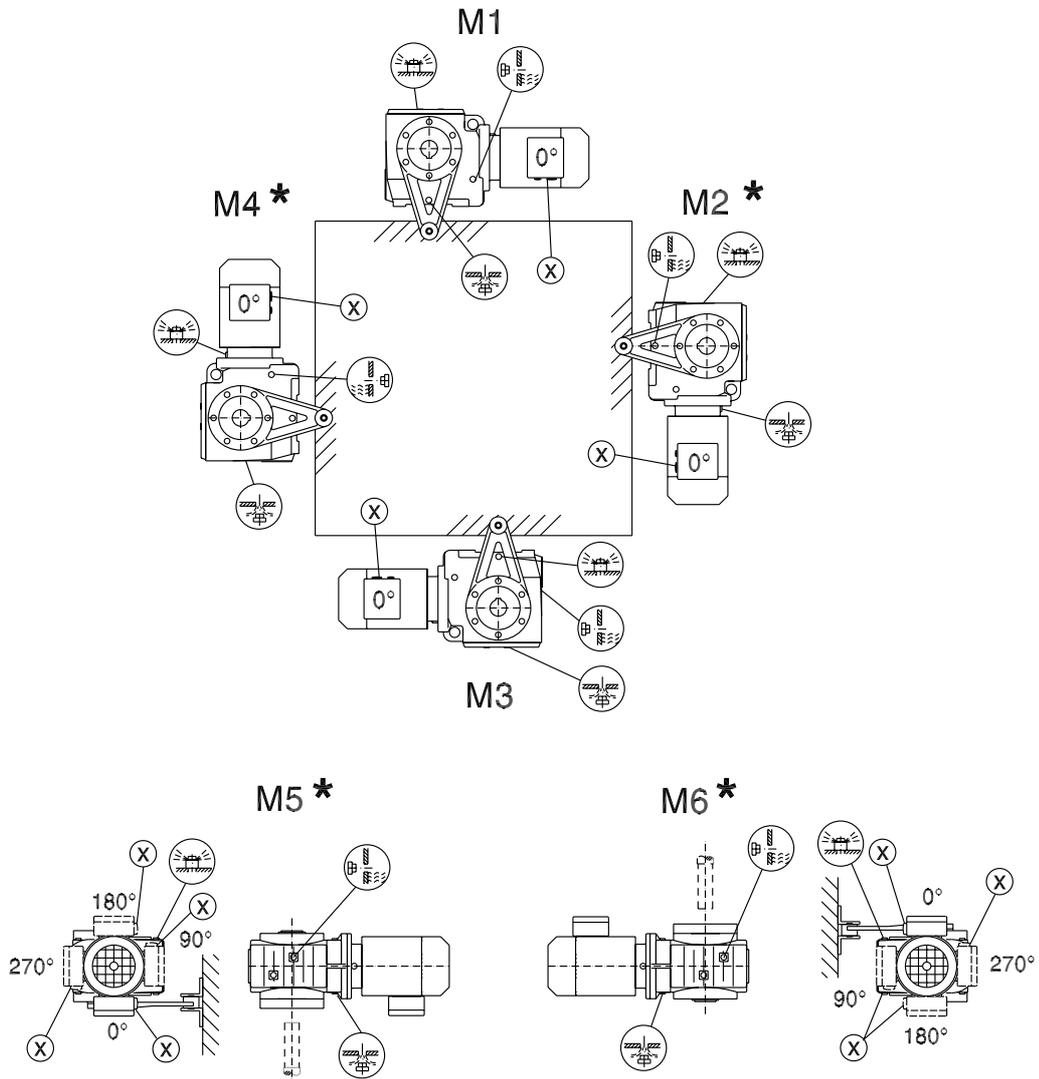
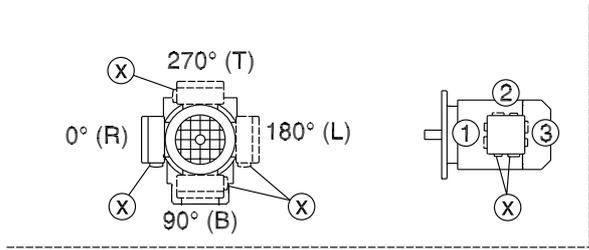
28 020 04 00



kVA	n
f	
i	
P	H_z

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

28 021 03 00



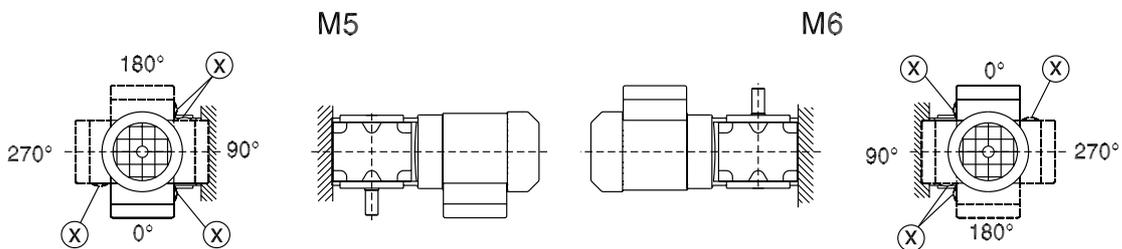
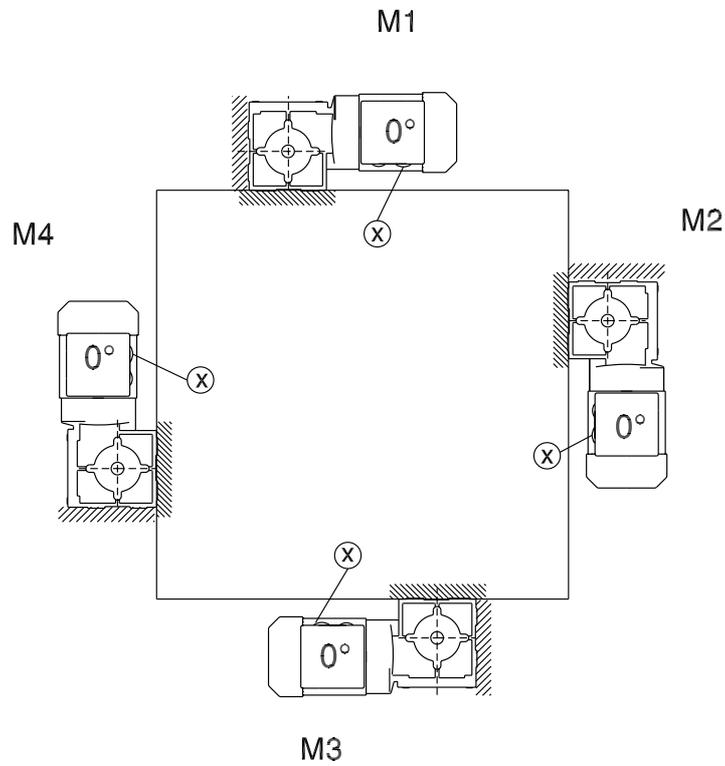
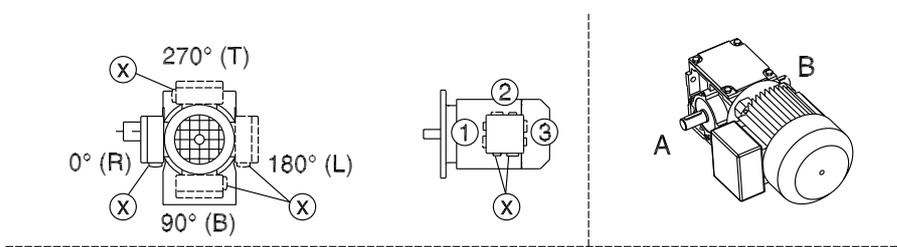
kVA	n
	f
i	
P	Hz

Mounting Positions
SPIROPLAN® W gearmotors

7.8 SPIROPLAN® W gearmotors

7.8.1 W10 ... W30

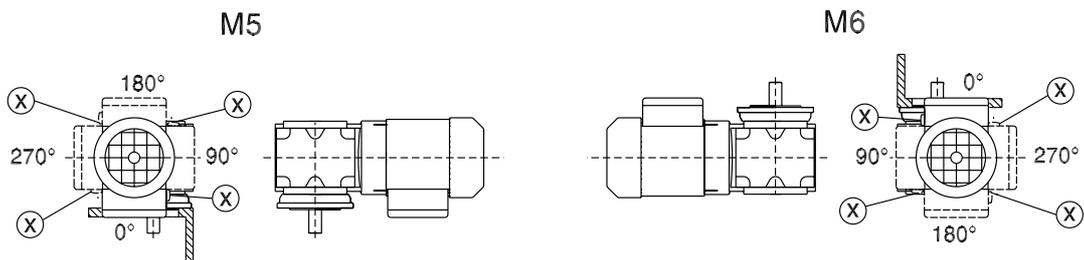
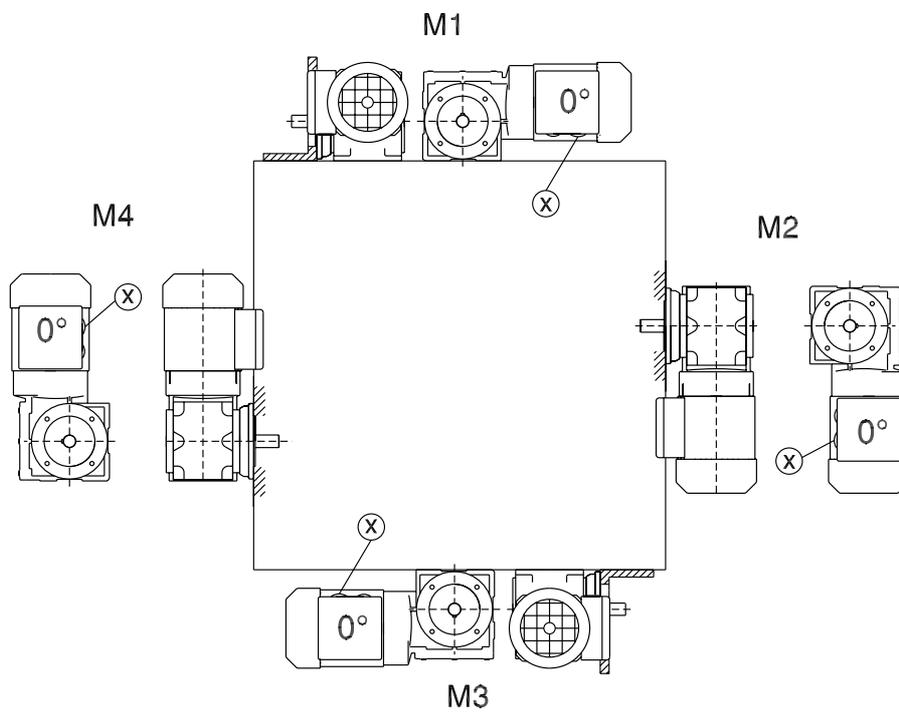
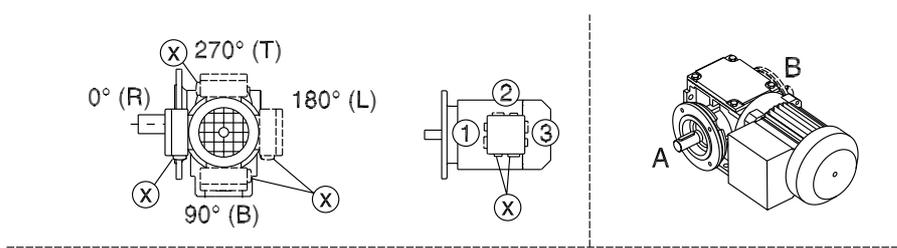
20 001 01 02



kVA	n
f	
i	
P	H_z

7.8.2 WF10 ... WF30 / WAF10 ... WAF30

20 002 01 02

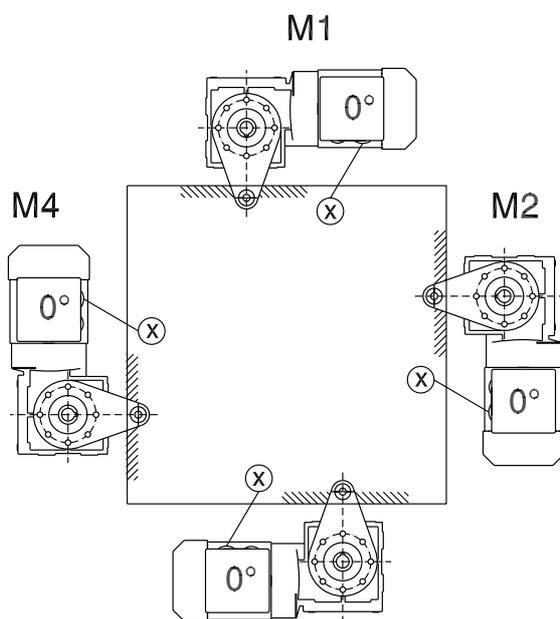
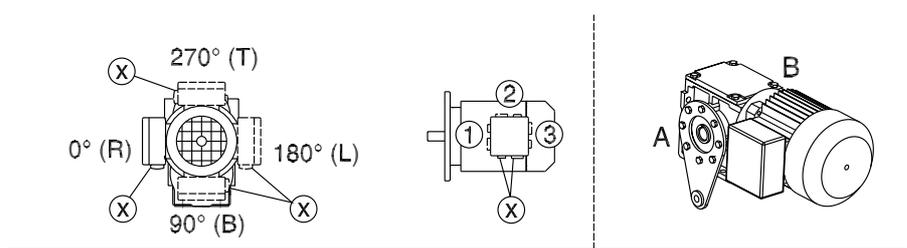


kVA	n
	f
i	
P	Hz

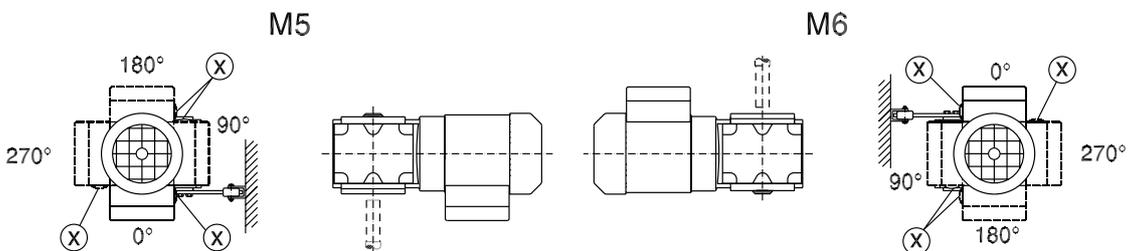
Mounting Positions
SPIROPLAN® W gearmotors

7.8.3 WA10 ... WA30

20 003 02 02



M3



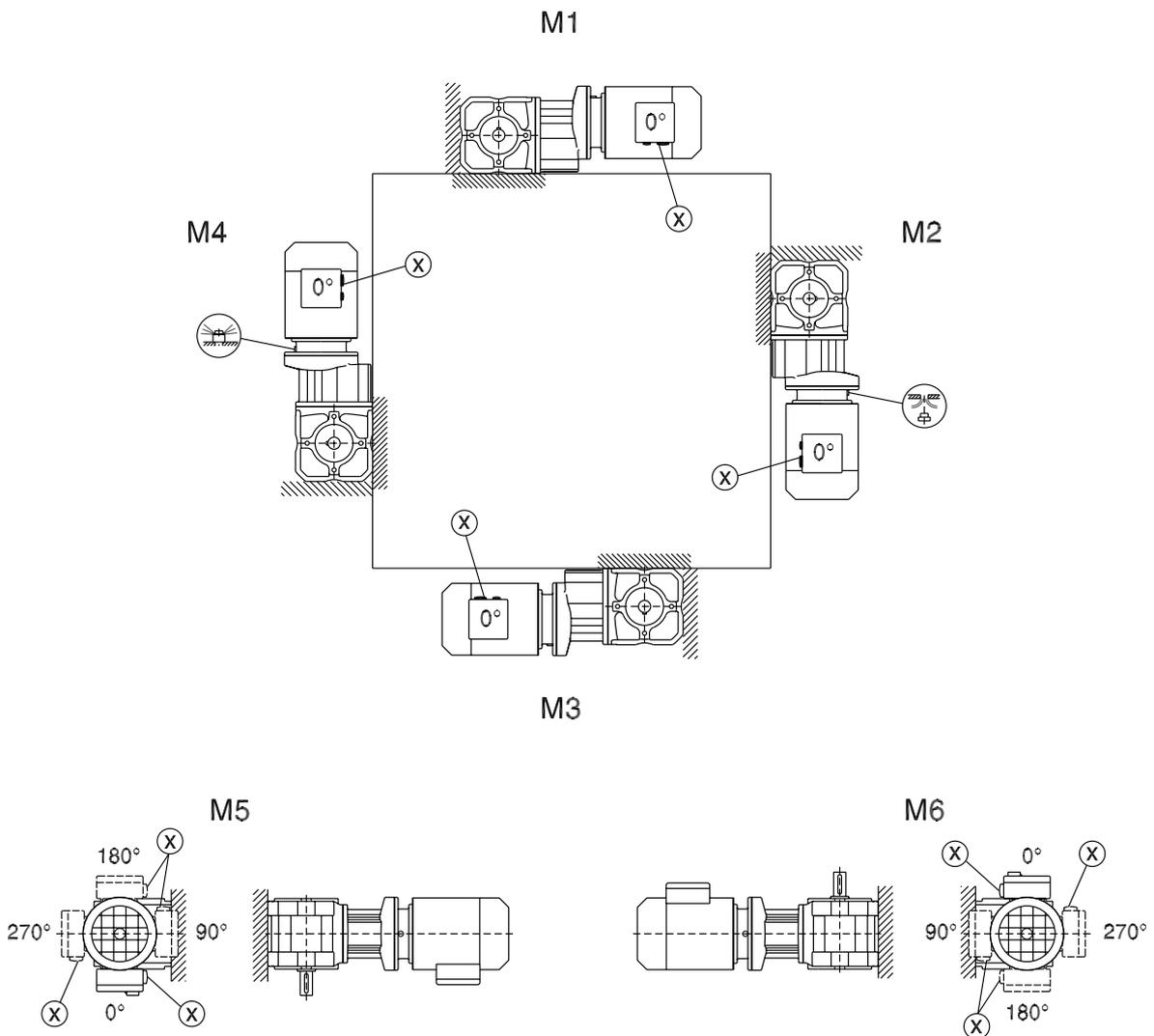
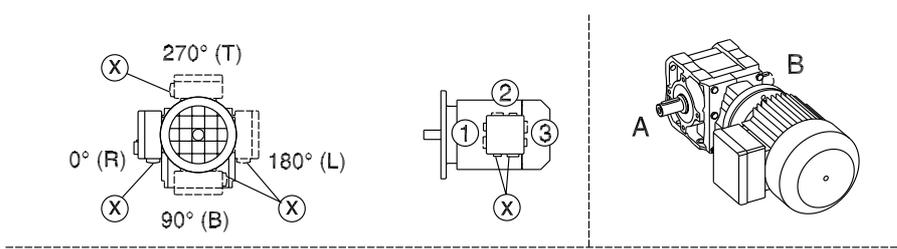
M5

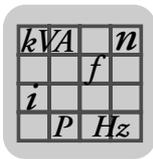
M6

kVA	n
f	
i	
P	H_z

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

20 012 01 07

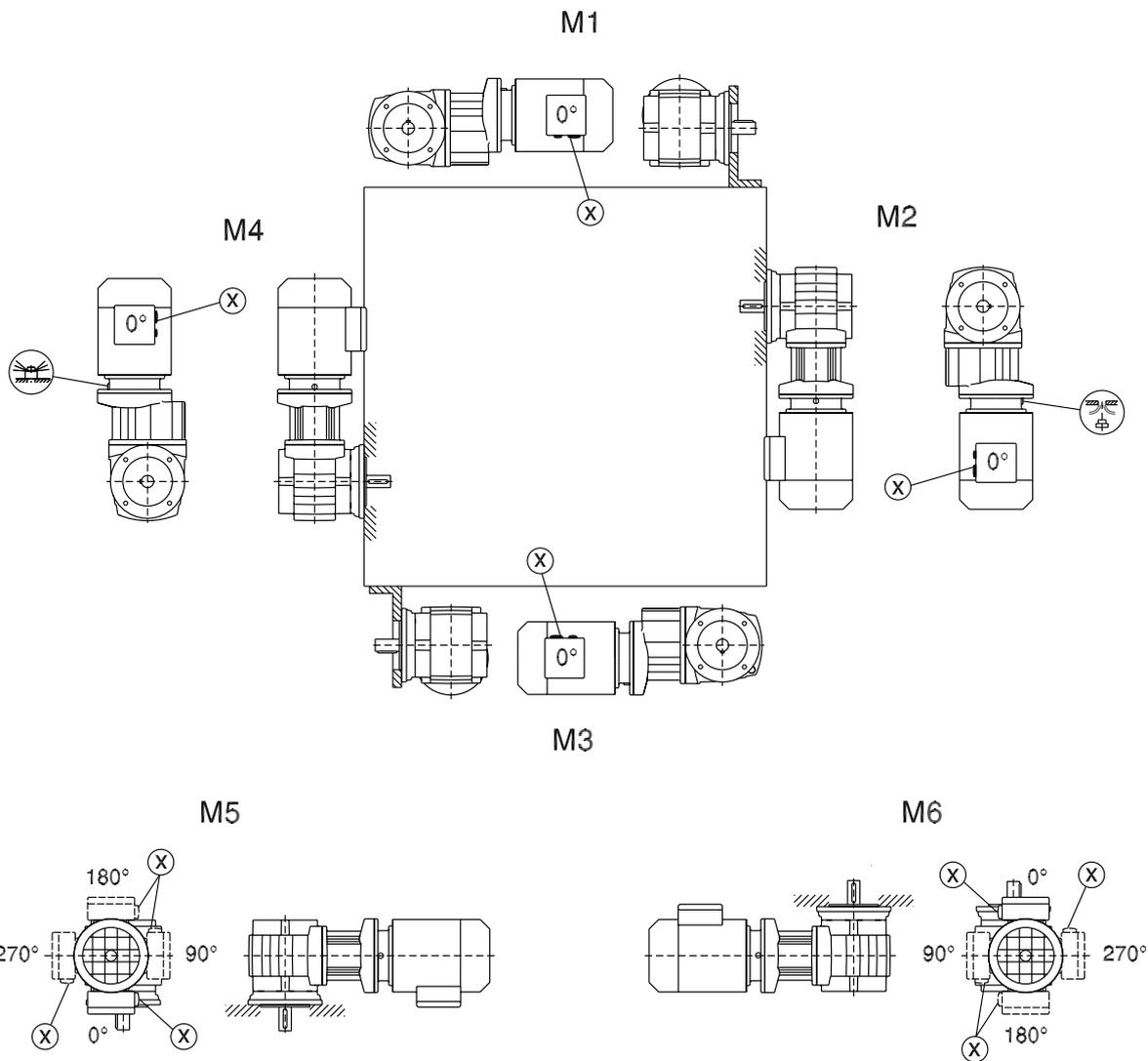
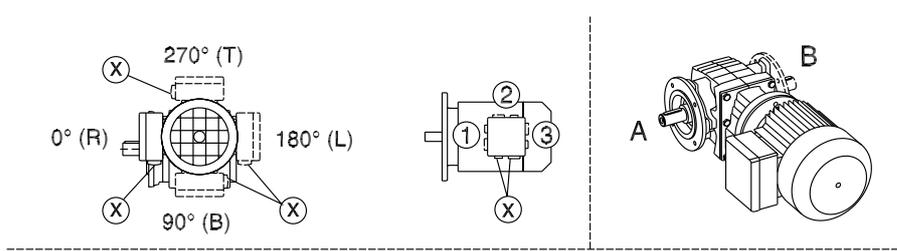




Mounting Positions
SPIROPLAN® W gearmotors

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

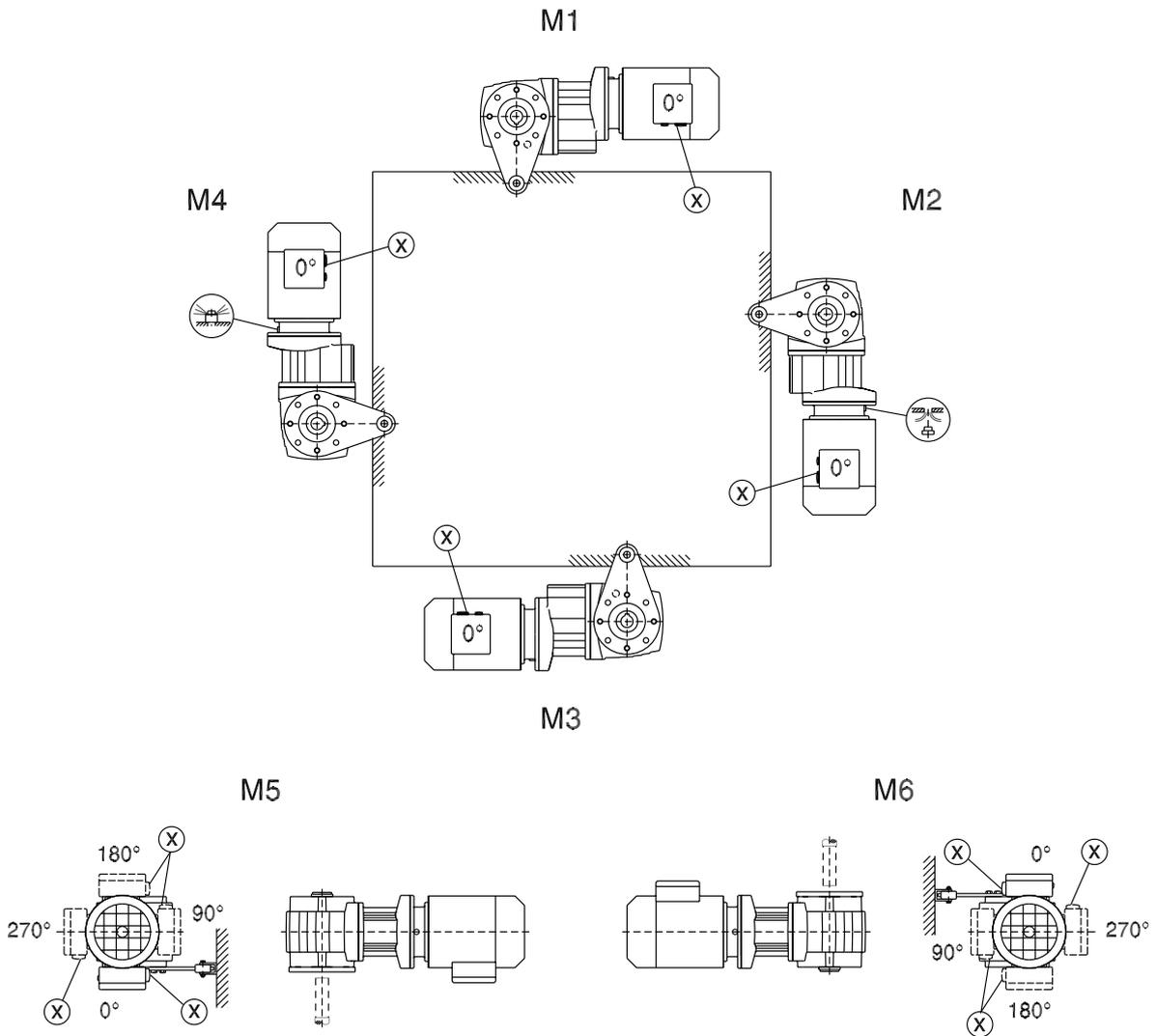
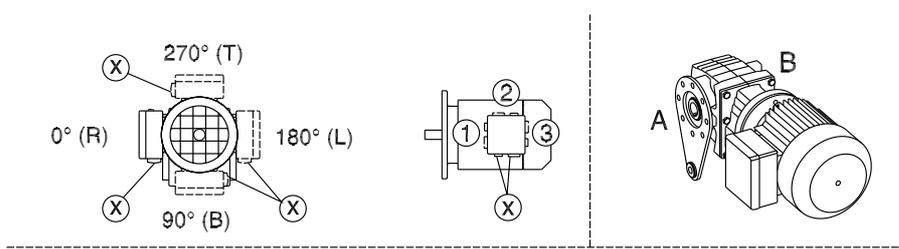
20 013 01 07

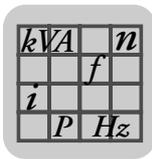


kVA	n
f	
i	
P	H_z

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

20 014 01 07





8 Technical Data

8.1 Extended storage

	TIP
	For storage periods longer than 9 months, SEW-EURODRIVE recommends the "Extended storage" version. Gear units of this version are appropriately designated with a label.

In this case, a VCI anti-corrosion agent (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

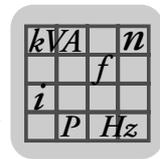
The gear units must remain tightly sealed until startup to prevent the VCI anti-corrosion agent from evaporating.

At the factory, gear units are supplied with an oil fill according to the mounting position (M1 ... M6) and are ready for operation. Check the oil level before you start operating the gear unit for the first time.

Climate zone	Packaging ¹⁾	Storage location 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.	Roofed, protected against rain and snow, shock-free.	Up to three years with regular inspection of the packaging and humidity indicator (rel. humidity < 50 %).
	Open	Roofed, enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 60 °C, < 50 % relative humidity). Protected against sudden temperature fluctuations and with controlled ventilation with filter (free from dust and dirt). Protected against aggressive vapors and shocks.	Two years or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Check that the corrosion protection is still intact.
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.	Roofed, protected against rain and shocks.	Up to three years with regular inspection of the packaging and humidity indicator (rel. humidity < 50 %).
	Open	Roofed, enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 50 °C, < 50 % relative humidity). Protected against sudden temperature fluctuations and with controlled ventilation with filter (free from dust and dirt). Protected against aggressive vapors and shocks. Protected against insect damage.	Two years or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Check that the corrosion protection is still intact.

1) Packaging must be performed by an experienced company using the packaging materials that have been expressly specified for the particular application.

2) SEW-EURODRIVE recommends that you 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. You have to specify the mounting position (M1...M6, see the section regarding mounting positions and important order information) when you order the drive. You must adapt the lubricant fill in case of any subsequent changes made to the mounting position (see section "Lubricant fill quantities").

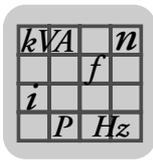
8.2.1 Lubricant table

The lubricant table on the following page shows the permitted lubricants for SEW-EURODRIVE gear units. Please refer to the following key for the lubricant table.

Key to the lubricant table

Abbreviations used, 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 class 1 (German regulation – "WKG"))
- HCE = Synthetic hydrocarbons + ester oil (USDA - H1 approval)
- HLP = Hydraulic oil
-  = Synthetic lubricant (= synthetic roller bearing grease)
-  = Mineral lubricant (= mineral-based roller bearing grease)
- 1) Helical-worm gear units with PG oil: Please contact SEW-EURODRIVE
- 2) Special lubricant for SPIROPLAN® gear units only
- 3) Recommendation: Use SEW $f_B \geq 1.2$
- 4) Pay attention to critical starting behavior at low temperatures.
- 5) Low-viscosity grease
- 6) Ambient temperature
-  Lubricant for the food industry (food grade oil)
-  Biodegradable oil (lubricant for agriculture, forestry, and fisheries)



Roller bearing greases

The roller bearings in gear units and motors are filled at the factory with the greases listed below. SEW-EURODRIVE recommends regreasing roller bearings with a grease filling at the same time as changing the oil.

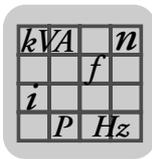
	Ambient temperature	Manufacturer	Type
Gear unit roller bearings	-40 °C to +80 °C	Fuchs	Renolit CX-TOM 15
	-40 °C to +40 °C	Castrol	Obeen FS 2
	-20 °C to +40 °C	Aral	Aralube BAB EP2



TIP

The following grease quantities are required:

- For fast-running bearings (gear unit input side): Fill the cavities between the rolling elements one-third full with grease.
- For slow-running bearings (gear unit output side): Fill the cavities between the rolling elements two-thirds full with grease.



8.2.2 Lubricant fill quantities

The specified fill quantities are **guide values**. The precise values vary depending on the number of stages and gear ratio. When filling, it is essential to pay attention to the **oil level plug since this indicates the precise oil capacity**.

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

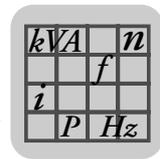
Gear unit	Fill quantity in liters					
	M1 ¹⁾	M2	M3	M4	M5	M6
R07	0.12	0.20	0.20	0.20	0.20	0.20
R17	0.25	0.55	0.35	0.55	0.35	0.40
R27	0.25/0.40	0.70	0.50	0.70	0.50	0.50
R37	0.30/0.95	0.85	0.95	1.05	0.75	0.95
R47	0.70/1.50	1.60	1.50	1.65	1.50	1.50
R57	0.80/1.70	1.90	1.70	2.10	1.70	1.70
R67	1.10/2.30	2.40	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 volume of oil.

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 volume of oil.

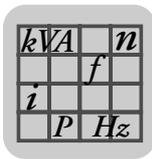


RX..

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

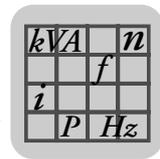
Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.60	3.50	2.10	3.50	2.80	2.90
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.9	7.3	4.30	8.0	6.0	6.3
F..87	10.8	13.0	7.7	13.8	10.8	11.0
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	77.0



Helical-bevel (K)
gear units

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

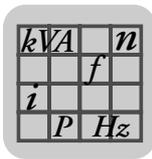
Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..37	0.50	1.00	1.00	1.25	0.95	0.95
K..47	0.80	1.30	1.50	2.00	1.60	1.60
K..57	1.10	2.20	2.20	2.80	2.30	2.10
K..67	1.10	2.40	2.60	3.45	2.60	2.60
K..77	2.20	4.10	4.40	5.8	4.20	4.40
K..87	3.70	8.0	8.7	10.9	8.0	8.0
K..97	7.0	14.0	15.7	20.0	15.7	15.5
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 volume of oil.

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 volume of oil.

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 volume of oil.

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 and Service

	NOTICE
	<p>Improper handling of the gear unit and the motor may result in damage. Potential damage to property</p> <ul style="list-style-type: none"> • Any repair work on SEW drives must be performed by qualified specialists only. • Only qualified specialists are permitted to separate the drive from the motor. • Consult SEW-EURODRIVE customer service.

9.1 Gear unit

Failure	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage	Check the oil, see "Inspection and maintenance for the gear unit" (see page 64), change bearings
	Knocking noise: Irregularity in the gearing	Contact customer service
Unusual, irregular running noise	Foreign bodies in the oil	<ul style="list-style-type: none"> • Check the oil, see "Inspection and maintenance for the gear unit" (see page 64) • Stop the drive, contact customer service
Oil leaking ¹⁾ <ul style="list-style-type: none"> • From the gear unit cover • From the motor flange • From the motor oil seal • From the gear unit flange • From the output side oil seal 	Rubber gasket on the gear unit cover leaking	Tighten the screws on the gear unit cover and observe the gear unit. If oil still leaks: Contact customer service
	Gasket defective	Contact customer service
	Gear unit not ventilated	Vent the gear unit (see section "Mounting Positions" (see page 79))
Oil leaking from breather valve	Too much oil	Correct the oil quantity, see "Inspection and maintenance for the gear unit" (see page 64)
	Drive operated in incorrect mounting position	<ul style="list-style-type: none"> • Properly adjust the breather valve, see "Mounting Positions" (see page 79) • Correct the oil level, see "Inspection and maintenance for the gear unit" (see page 64)
	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 or grease leakage at the oil seal is possible in the run-in phase (48 hours running time).



9.2 Adapters AM / AQ. / AL

Failure	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage	Contact SEW-EURODRIVE customer service
Oil leaking	Gasket 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 or adapter interrupted	Send the gear unit to SEW-EURODRIVE for repair
Change in running noise and/or vibrations	Ring gear wear, short-term torque transmission through metal contact	Change the ring gear
	Screws to secure hub axially are loose	Tighten the screws
Premature wear in ring gear	<ul style="list-style-type: none"> • Contact with aggressive fluids/oils; ozone influence; excessively high ambient temperatures etc, which can cause a change in the physical properties of the ring gear • Impermissibly high ambient/contact temperature for the ring gear; maximum permitted temperature: -20 °C to +80 °C • Overload 	Contact SEW-EURODRIVE customer service

9.3 Input cover AD

Failure	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage	Contact SEW-EURODRIVE customer service
Oil leaking	Gasket 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)
- Nature and extent of the failure
- Time the failure occurred and any accompanying circumstances
- Presumed cause

9.5 Waste disposal

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

- Steel scrap
 - Housing parts
 - Gears
 - Shafts
 - Roller bearings
- Parts of the worm gears are made of non-ferrous metals. Dispose of the worm gears appropriately.
- 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		
Additional addresses for service in Germany provided on request!			
France			
Production Sales Service	Hagenau	SEW-USOCOME 48-54, route de Soufflenheim B. P. 20185 F-67506 Hagenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocom.com sew@usocom.com
Production	Forbach	SEW-EUROCOME 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
	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	Réducom 16, rue des Frères Zagnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84 reducom_sew@yahoo.fr
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://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	Brüssel	SEW Caron-Vector Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.be info@caron-vector.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
Additional addresses for service in Brazil provided on request!			
Bulgaria			
Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str. 1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net
Cameroon			
Sales	Douala	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137
Canada			
Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca marketing@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 marketing@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 marketing@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 LAMP 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 25322611 info@sew-eurodrive.cn http://www.sew-eurodrive.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 82267891 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 84478398 Fax +86 27 84478388
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. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr
Czech Republic			
Sales	Praha	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	Kopenhagen	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 Service	Karkkila	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Kakkila, 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 7340-11 Fax +241 7340-12
Great Britain			
Assembly Sales Service	Normanton	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-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	Athen	Christ. Boznos & Son S.A. 12, 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
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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 PORRamangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 2831086 Fax +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 PhaseII 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	Milano	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
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Sales	Abidjan	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36
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 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
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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@sew-korea.co.kr
	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
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Sales	Riga	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com
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Lithuania			
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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
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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
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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 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 22618372 Fax +212 22618351 ali.alami@premium.net.ma
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
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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
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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
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Assembly Sales Service	Lima	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe
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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 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
		24 Hour Service	Tel. +48 602 739 739 (+48 602 SEW SEW) sewis@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
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Sales Service	București	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro
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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
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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.co.yu
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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
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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. Rudlovska 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. Ul. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
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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
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	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
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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			
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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
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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
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Sales	Tunis	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn
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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 4419164, 3838014, 3738015 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
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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
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	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
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	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!			
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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



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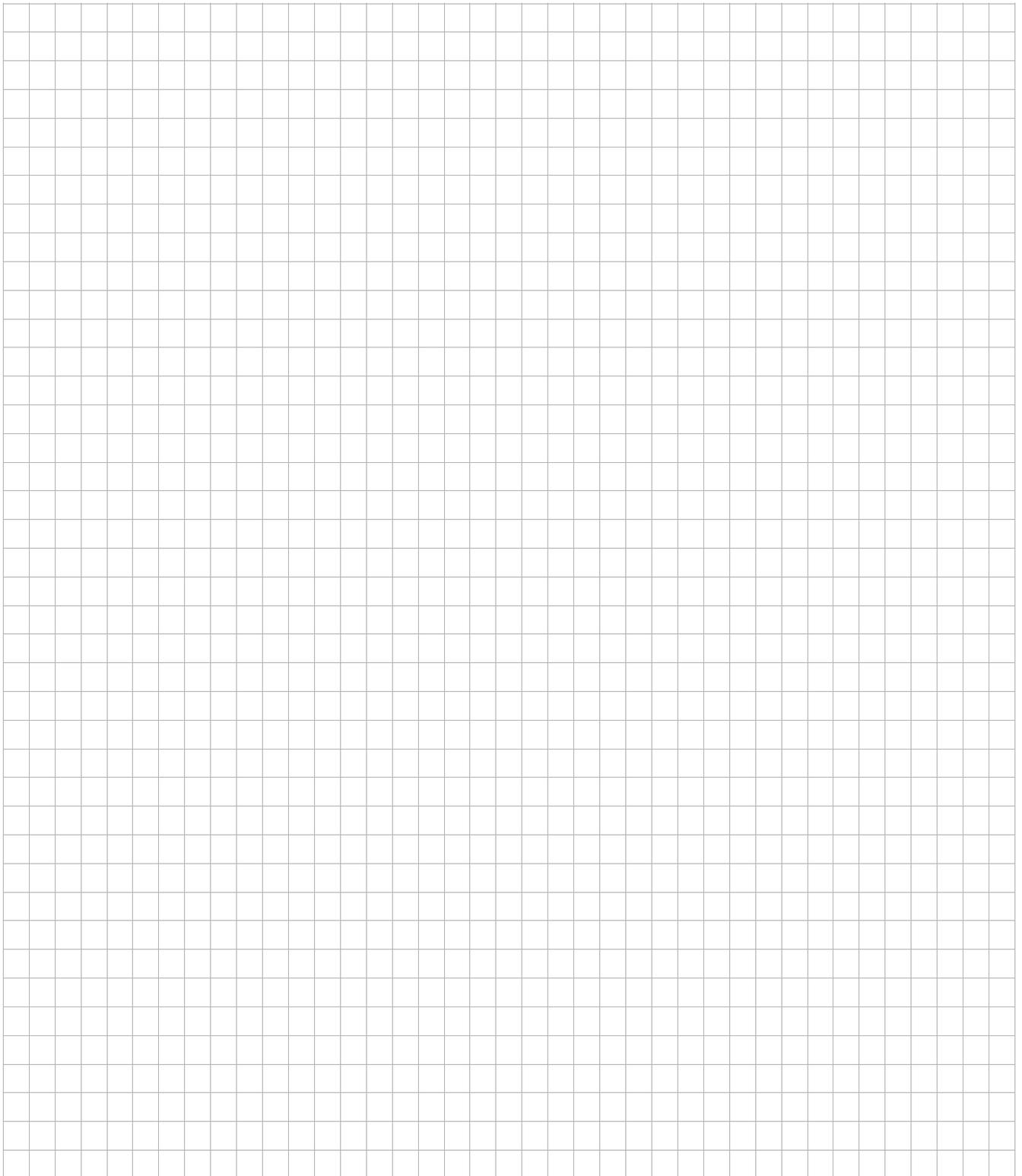
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SEW-EURODRIVE GmbH & Co KG
P.O. Box 3023 · D-76642 Bruchsal / Germany
Phone +49 7251 75-0 · Fax +49 7251 75-1970
sew@sew-eurodrive.com

→ www.sew-eurodrive.com