



**SEW**  
**EURODRIVE**

# Assembly and Operating Instructions



**Gear Unit Series R..7, F..7, K..7, K..9, S..7, SPIROPLAN® W**



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# 1 General information

## 1.1 About this documentation

**The current version of the documentation is the original.**

This documentation is an integral part of the product. The documentation is written for all employees who assemble, install, start up, and service this product.

Make sure this documentation is accessible and legible. Ensure that persons responsible for the machinery and its operation as well as persons who work on the product independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation or require further information, contact SEW-EURODRIVE.

## 1.2 Structure of the safety notes

### 1.2.1 Meaning of signal words

The following table shows the grading and meaning of the signal words for safety notes.

Signal word	Meaning	Consequences if disregarded
<b>▲ DANGER</b>	Imminent hazard	Severe or fatal injuries
<b>▲ WARNING</b>	Possible dangerous situation	Severe or fatal injuries
<b>▲ CAUTION</b>	Possible dangerous situation	Minor injuries
<b>NOTICE</b>	Possible damage to property	Damage to the product or its environment
<b>INFORMATION</b>	Useful information or tip: Simplifies handling of the product.	

### 1.2.2 Structure of section-related safety notes

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

This is the formal structure of a safety note for a specific section:



#### **SIGNAL WORD**







Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

### Meaning of the hazard symbols

The hazard symbols in the safety notes have the following meaning:

Hazard symbol	Meaning
	General hazard
	Warning of dangerous electrical voltage
	Warning of hot surfaces
	Warning of risk of crushing
	Warning of suspended load
	Warning of automatic restart

#### 1.2.3 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

**▲ SIGNAL WORD** Type and source of hazard. Possible consequence(s) if disregarded. Measure(s) to prevent the hazard.

### 1.3 Rights to claim under limited warranty

Read the information in this documentation. This is essential for fault-free operation and fulfillment of any rights to claim under limited warranty. Read the documentation before you start working with the product.

## **1.4 Exclusion of liability**

Read the information in this documentation, otherwise safe operation is impossible. You must comply with the information contained in this documentation to achieve the specified product characteristics and performance features. 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, SEW-EURODRIVE assumes no liability for defects.

## **1.5 Product names and trademarks**

The brands and product names in this documentation are trademarks or registered trademarks of their respective titleholders.

## **1.6 Copyright notice**

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## 2 Safety notes

### 2.1 Preliminary information

The following general safety notes have the purpose to avoid injury and damage to property. They primarily apply to the use of products described in this documentation. If you use additional components also observe the relevant warning and safety notes.

### 2.2 Duties of the user

As the user, you must ensure that the basic safety notes are observed and complied with. Make sure that persons responsible for the machinery and its operation as well as persons who work on the device independently have read through the documentation carefully and understood it.

As the user, you must ensure that all of the work listed in the following is carried out only by qualified specialists:

- Setup and installation
- Installation and connection
- Startup
- Maintenance and repairs
- Shutdown
- Disassembly

Ensure that the persons who work on the product pay attention to the following regulations, conditions, documentation, and information:

- National and regional safety and accident prevention regulations
- Warning and safety signs on the product
- All other relevant project planning documents, installation and startup instructions, and wiring diagrams
- Do not assemble, install or operate damaged products
- All system-specific specifications and conditions

Ensure that systems in which the product is installed are equipped with additional monitoring and protection devices. Observe the applicable safety regulations and legislation governing technical work equipment and accident prevention regulations.

### 2.3 Target group

Specialist for mechanical work

Any mechanical work may only be performed by adequately qualified specialists. Specialists in the context of this documentation are persons familiar with the design, mechanical installation, troubleshooting, and maintenance of the product who possess the following qualifications:

- Qualification in the mechanical area in accordance with the national regulations
- Familiarity with this documentation

Specialist for electrotechnical work	Any electrotechnical work may only be performed by electrically skilled persons with a suitable education. Electrically skilled persons in the context of this documentation are persons familiar with electrical installation, startup, troubleshooting, and maintenance of the product who possess the following qualifications: <ul style="list-style-type: none"> <li>• Qualification in the electrotechnical area in accordance with the national regulations</li> <li>• Familiarity with this documentation</li> </ul>
Additional qualification	In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives, and laws specified in this documentation. The persons must have the express authorization of the company to operate, program, parameterize, label, and ground units, systems, and circuits in accordance with the standards of safety technology.
Instructed persons	All work in the areas of transportation, storage, operation and waste disposal must be carried out by persons who are trained appropriately. The purpose of the instruction is that the persons are capable of performing the required tasks and work steps in a safe and correct manner.

## 2.4 Designated use

The product is intended for use in industrial and commercial systems.

In case of installation in electrical systems or machines, startup of the product is prohibited until it is determined that the machine meets the requirements stipulated in the local laws and directives. For Europe, Machinery Directive 2006/42/EC as well as the EMC Directive 2014/30/EU apply.

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

## 2.5 Transportation/storage

Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. If the product is damaged, it must not be assembled, installed or started up.

Observe the storage information on climatic conditions as given in chapter "Storage conditions" (→ 167).

The permissible storage temperature is -30 °C to +50 °C.

If the product is not immediately installed, it must be stored in a dry and dust-free location. The product can be stored for up to 9 months without requiring any special measures before startup. Do not store the product outdoors.

The installed lifting eyebolts are in accordance with DIN 580. Observe the loads and regulations specified there. The tension force vector of the slings must not exceed a 45° angle in accordance with DIN 580.

The lifting eyes are designed to carry only the weight of the product. Do not mount any additional loads. If the product has several lifting eyes or lifting eyebolts, then you should use all lifting eyes and lifting eyebolts for attaching transport ropes. Tighten the screwed-in lifting eyes.

The gear units K..167 and K..187 have no lifting eyes and are supplied without lifting eyebolts. Use alternative, suitable slings.

Use suitable, sufficiently rated handling equipment, that can be used for further transport.

## 2.6 Installation/assembly

Ensure that the product is installed and cooled according to the regulations in the documentation.


Protect the product from strong mechanical strain. The product and its mounting parts must never protrude into the path of persons or vehicles. Ensure that components are not deformed, particularly during transportation and handling. Electric components must not be mechanically damaged or destroyed.

The following applications are prohibited unless the device is explicitly designed for such use:

- Operation in applications with impermissibly high mechanical vibration and shock loads in excess of the regulations stipulated in EN 61800-5-1
- Use in environments with harmful oils, acids, gases, vapors, dust, radiation, etc.

Observe the danger due to static overdetermination. Gear units with foot (e.g. KA19/29B, KA127/157B or FA127/157B) must not be fastened via the torque arm and the foot plate at the same time. Gearmotors must also not be fastened to the foot plate of the gear unit (e.g. KA19/29B, KA127/157B or FA127/157B, R gear unit with foot-mounted motor) and the foot plate of the motor at the same time.

## 2.7 Startup/operation

Check the oil level before startup as described in chapter "Inspection/maintenance" (→  106).


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

Secure the keys for the test run without output elements.

Do not deactivate monitoring and protection devices even for a test run.

Switch off the gearmotor if in doubt whenever changes occur in relation to normal operation (e.g. increased temperatures, unusual noises, vibrations). Determine the cause. It may be necessary to contact SEW-EURODRIVE.

## 2.8 Inspection/maintenance

Observe the information in chapter "Inspection/maintenance" (→  106).

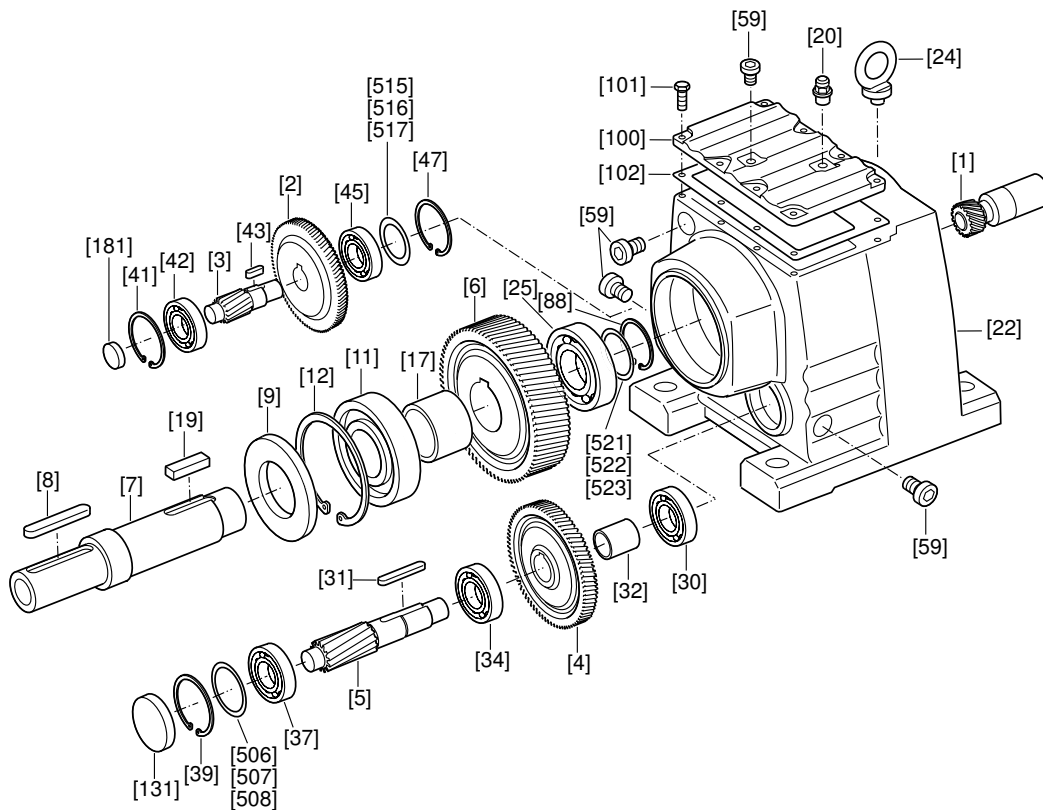
**3 Gear unit structure**

**INFORMATION**



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 structure of helical gear units R..07 – R..167**

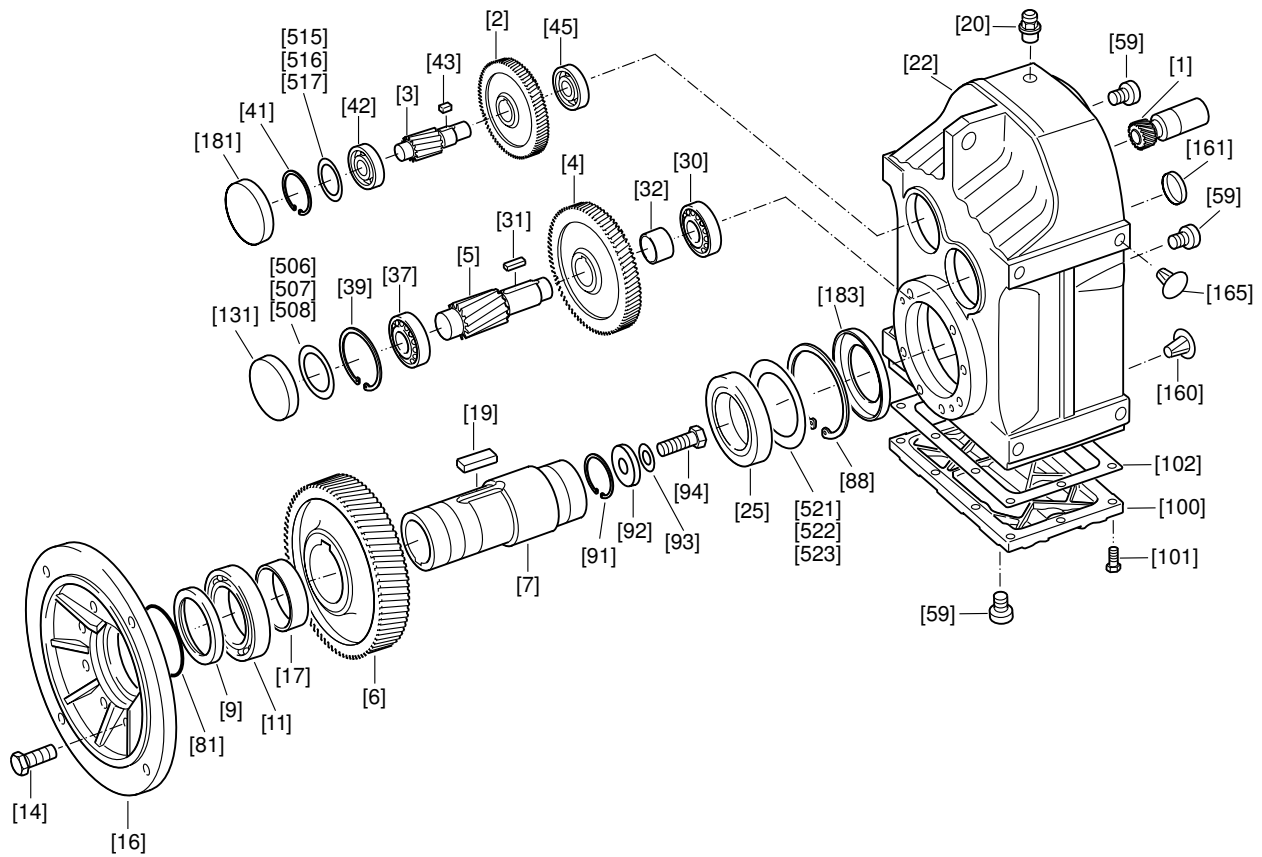


18014398528676235

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

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## 3.2 Basic structure of parallel-shaft helical gear units F..27 – F..157

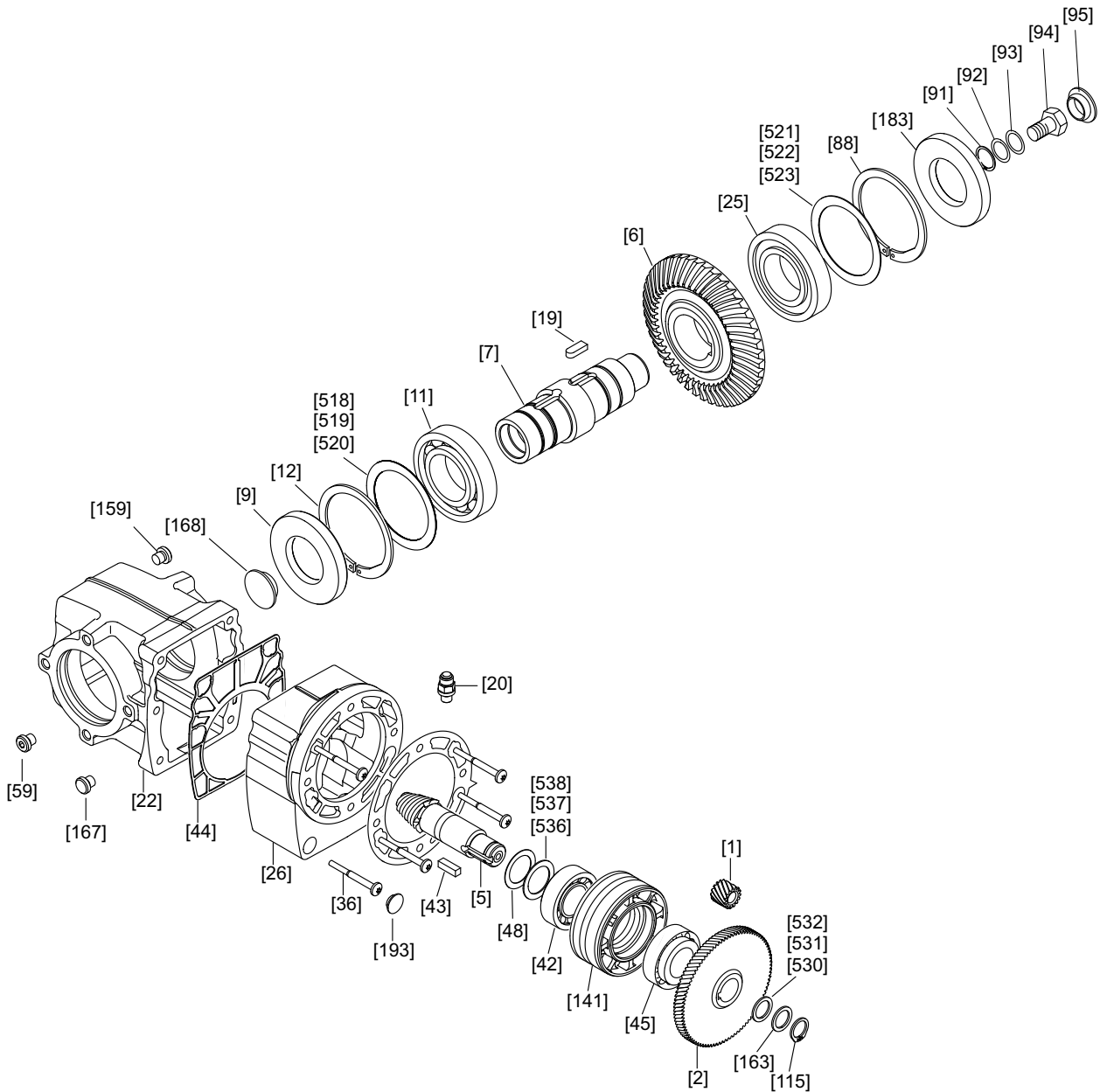


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[1] Pinion	[22] Gear unit housing	[91] Retaining ring	[506] Shim
[2] Gear	[25] Rolling bearing	[92] Washer	[507] Shim
[3] Pinion shaft	[30] Rolling bearing	[93] Lock washer	[508] Shim
[4] Gear	[31] Key	[94] Hex head screw	[515] Shim
[5] Pinion shaft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



**3.3 Basic structure of helical-bevel gear units K..19/K..29**



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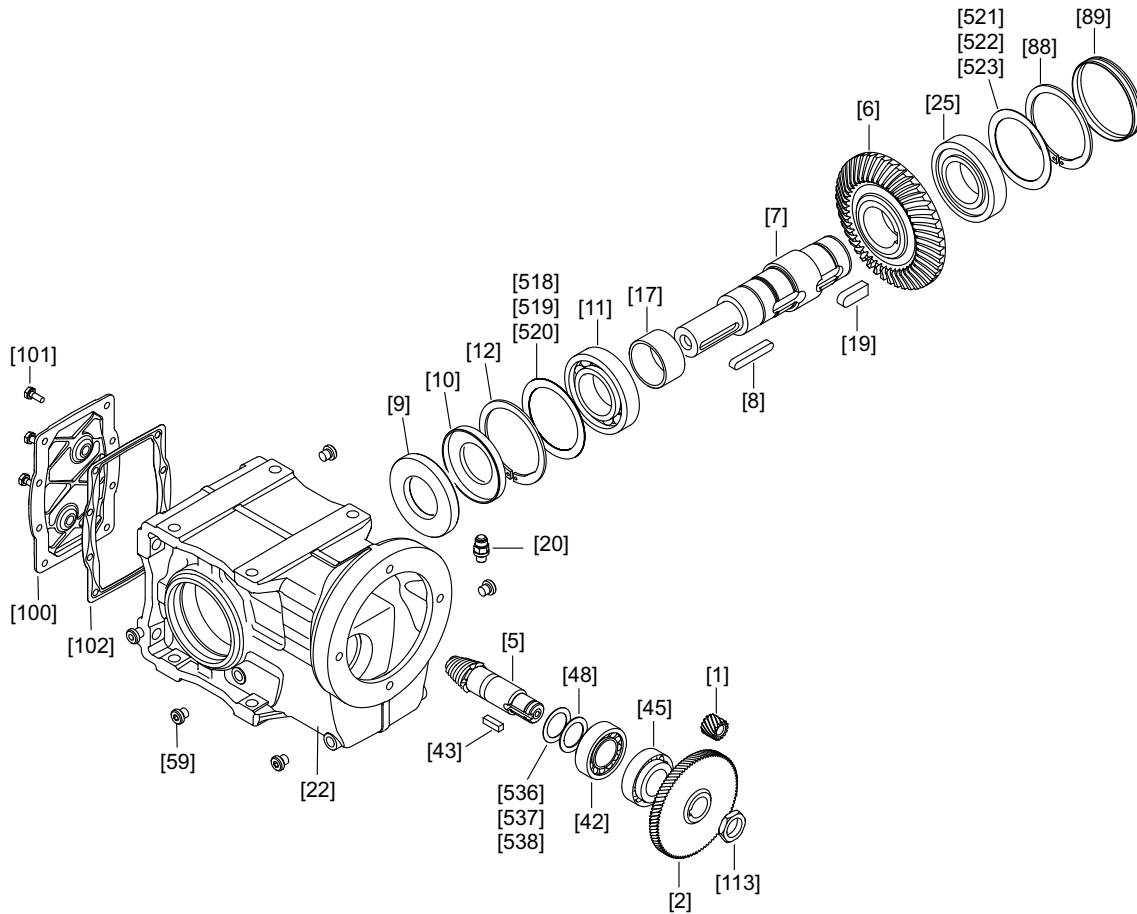
# 3

## Gear unit structure

Basic structure of helical-bevel gear units K..19/K..29

[1] Pinion	[26] Housing of 1st stage	[94] Hex head screw	[520] Shim
[2] Gear	[36] Stud	[95] Protection cap	[521] Shim
[5] Pinion shaft	[42] Tapered roller bearing	[115] Retaining ring	[522] Shim
[6] Gear	[43] Key	[141] Bushing	[523] Shim
[7] Hollow shaft	[44] Seal	[159] Closing plug	[530] Shim
[9] Oil seal	[45] Tapered roller bearing	[163] Supporting ring	[531] Shim
[11] Rolling bearing	[50] Bevel gear set	[167] Closing plug	[532] Shim
[12] Retaining ring	[59] Screw plug	[168] Protection cap	[536] Shim
[19] Key	[88] Retaining ring	[183] Oil seal	[537] Shim
[20] Breather valve	[91] Retaining ring	[193] Closing plug	[538] Shim
[22] Gear unit housing	[92] Washer	[518] Shim	
[25] Deep groove ball bearing	[93] Lock washer	[519] Shim	

**3.4 Basic structure of helical-bevel gear units K..39/K..49**



14457456395

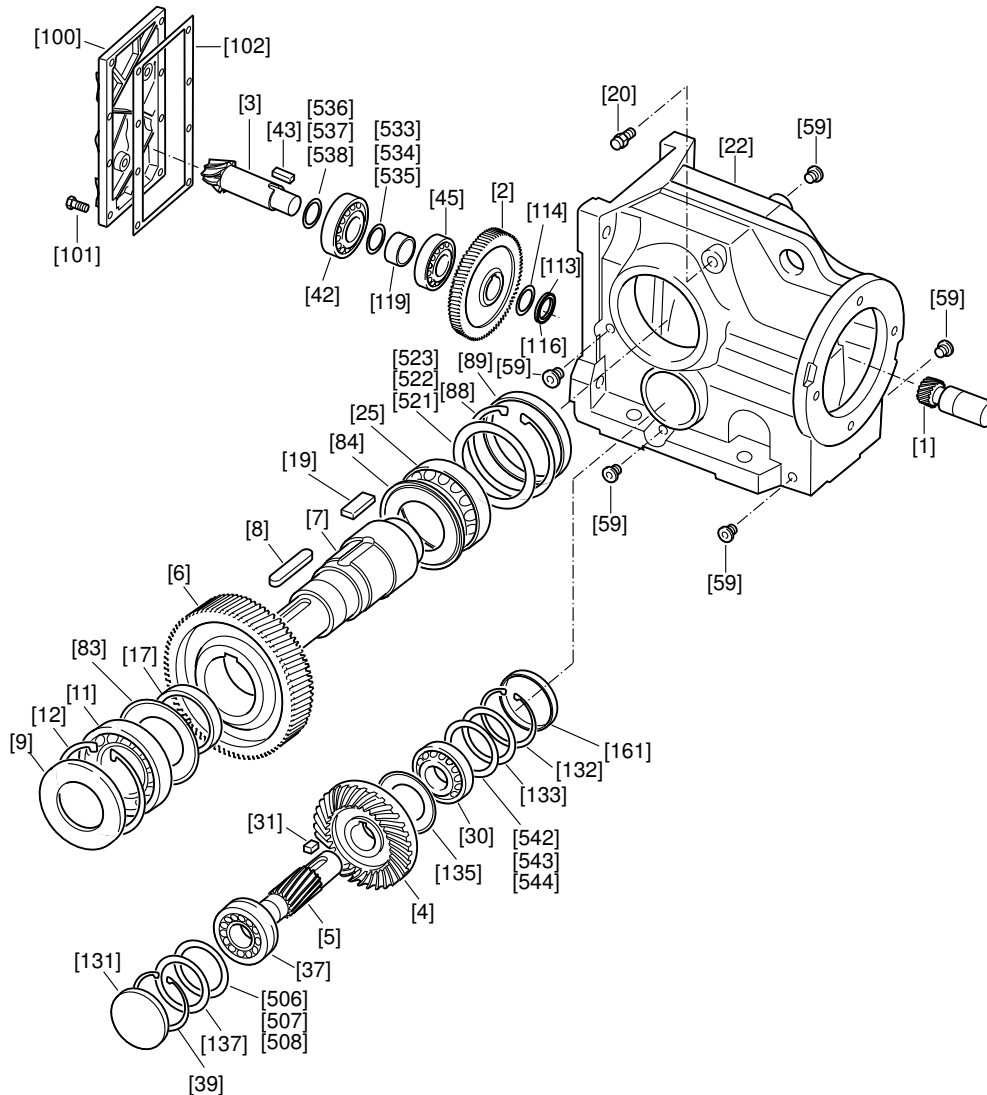
[1] Pinion	[12] Retaining ring	[48] Supporting ring	[518] Shim
[2] Gear	[17] Spacer tube	[50] Bevel gear set	[519] Shim
[5] Pinion shaft	[19] Key	[59] Screw plug	[520] Shim
[6] Gear	[20] Breather valve	[88] Retaining ring	[521] Shim
[7] Hollow shaft	[22] Gear unit housing	[89] Closing cap	[522] Shim
[8] Key	[25] Deep groove ball bearing	[100] Inspection cover	[523] Shim
[9] Oil seal	[42] Tapered roller bearing	[101] Hex head screw	[536] Shim
[10] Oil seal	[43] Key	[102] Gasket	[537] Shim
[11] Deep groove ball bearing	[45] Tapered roller bearing	[113] Slotted nut	[538] Shim

# 3

## Gear unit structure

Basic structure of helical-bevel gear units K..37 – K..187

### 3.5 Basic structure of helical-bevel gear units K..37 – K..187

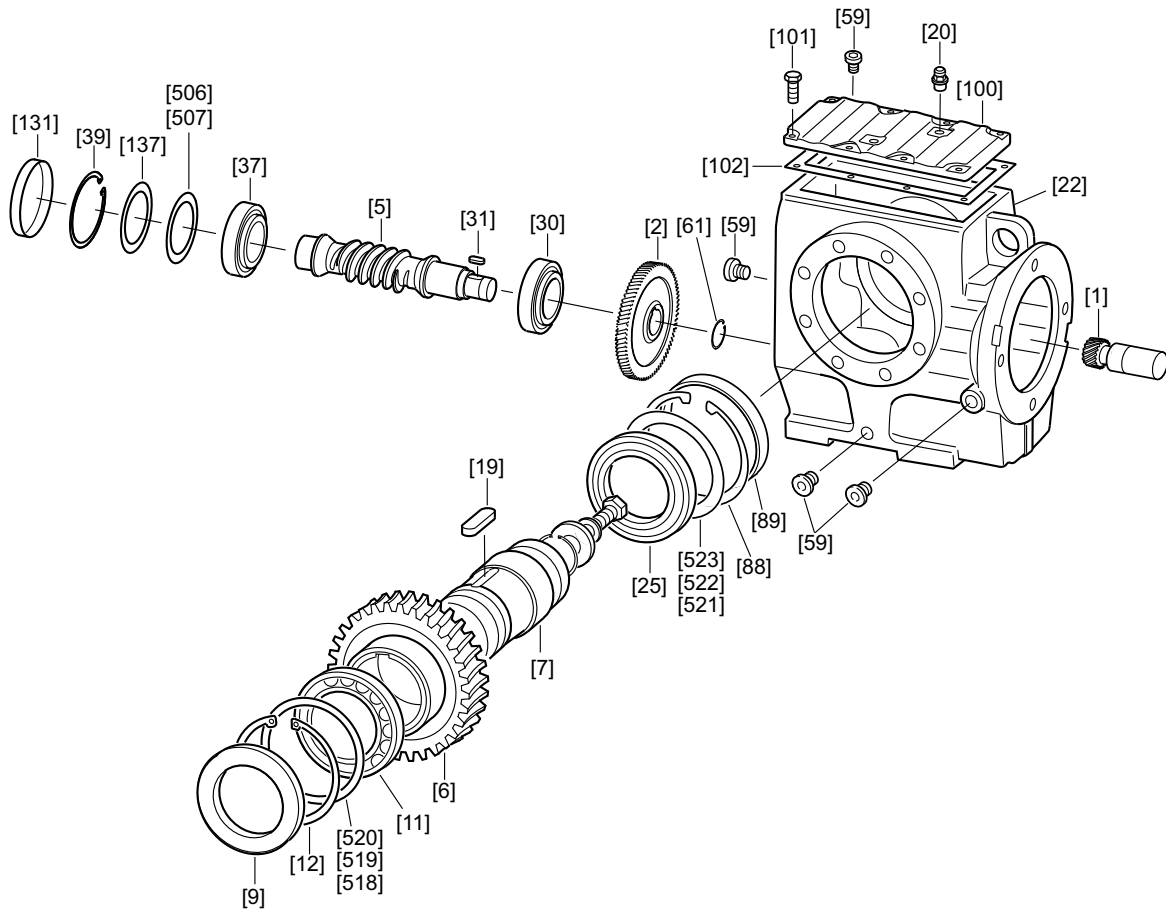


9007199274042123

[1] Pinion	[25] Rolling bearing	[102] Gasket	[522] Shim
[2] Gear	[30] Rolling bearing	[113] Slotted nut	[523] Shim
[3] Pinion shaft	[31] Key	[114] Multi-tang washer	[533] Shim
[4] Gear	[37] Rolling bearing	[116] Thread lock	[534] Shim
[5] Pinion shaft	[39] Retaining ring	[119] Spacer tube	[535] Shim
[6] Gear	[42] Rolling bearing	[131] Closing cap	[536] Shim
[7] Output shaft	[43] Key	[132] Retaining ring	[537] Shim
[8] Key	[45] Rolling bearing	[133] Supporting ring	[538] Shim
[9] Oil seal	[59] Screw plug	[135] Shield ring	[542] Shim
[11] Rolling bearing	[83] Shield ring	[137] Supporting ring	[543] Shim
[12] Retaining ring	[84] Shield ring	[161] Closing cap	[544] Shim
[17] Spacer tube	[88] Retaining ring	[506] Shim	
[19] Key	[89] Closing cap	[507] Shim	
[20] Breather valve	[100] Inspection cover	[508] Shim	
[22] Gear unit housing	[101] Hex head screw	[521] Shim	

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**3.6 Basic structure of helical-worm gear units S..37 – S..97**



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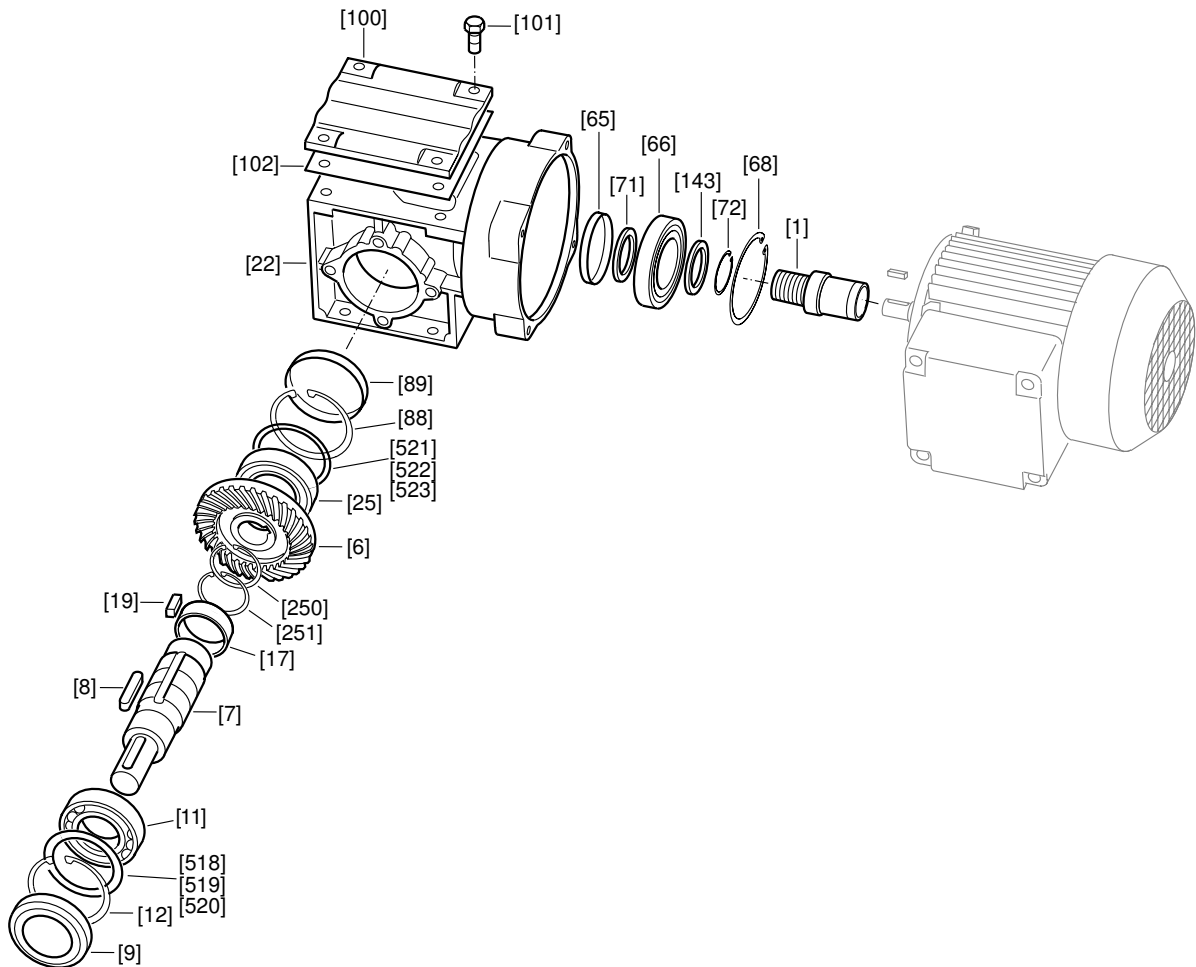
[1] Pinion	[20] Breather valve	[88] Retaining ring	[518] Shim
[2] Gear	[22] Gear unit housing	[89] Closing cap	[519] Shim
[5] Worm	[25] Rolling bearing	[100] Gear unit cover	[520] Shim
[6] Worm gear	[30] Rolling bearing	[101] Hex head screw	[521] Shim
[7] Output shaft	[31] Key	[102] Seal	[522] Shim
[9] Oil seal	[37] Rolling bearing	[131] Closing cap	[523] Shim
[11] Rolling bearing	[39] Retaining ring	[137] Supporting ring	
[12] Retaining ring	[59] Screw plug	[506] Shim	
[19] Key	[61] Retaining ring	[507] Shim	

# 3

## Gear unit structure

Basic structure of SPIROPLAN® gear units W..10 – W..30

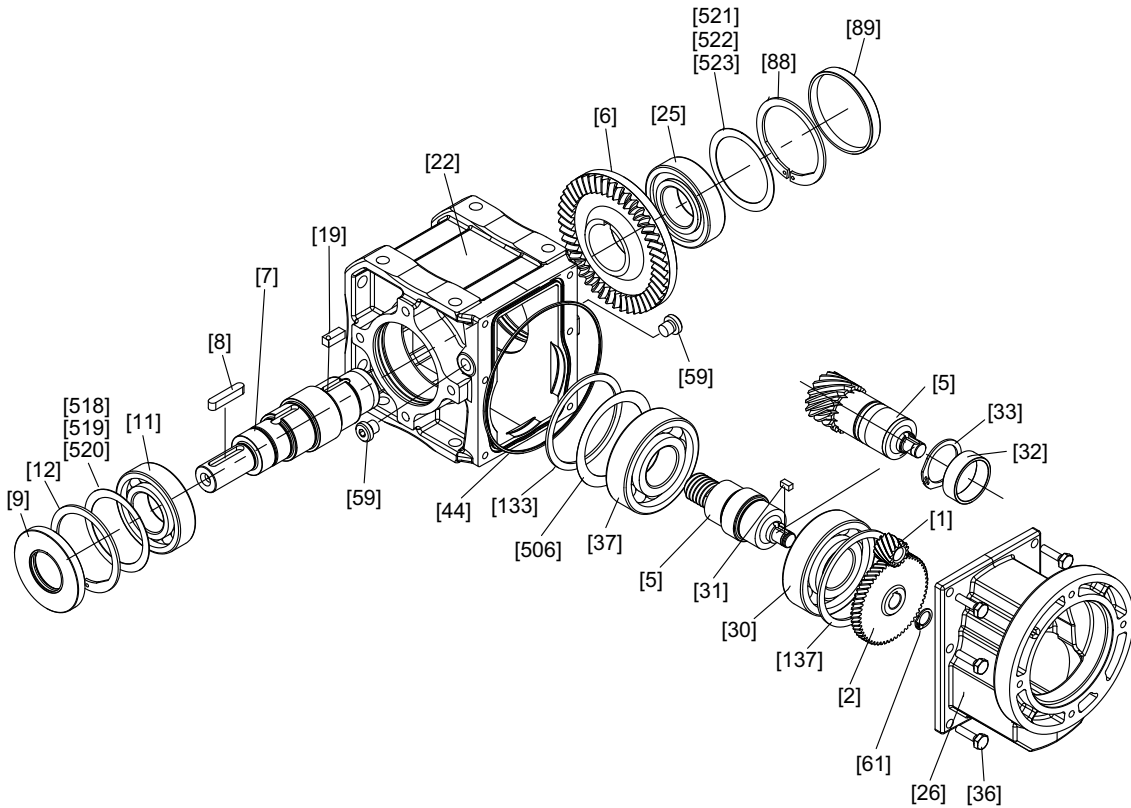
### 3.7 Basic structure of SPIROPLAN® gear units W..10 – W..30



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[1] Pinion	[19] Key	[88] Retaining ring	[518] Shim
[6] Gear	[22] Gear unit housing	[89] Closing cap	[519] Shim
[7] Output shaft	[25] Rolling bearing	[100] Inspection cover	[520] Shim
[8] Key	[65] Oil seal	[101] Hex head screw	[521] Shim
[9] Oil seal	[66] Rolling bearing	[102] Gasket	[522] Shim
[11] Rolling bearing	[68] Retaining ring	[143] Supporting ring	[523] Shim
[12] Retaining ring	[71] Supporting ring	[250] Retaining ring	
[17] Spacer tube	[72] Retaining ring	[251] Retaining ring	

**3.8 Basic structure of SPIROPLAN® gear units W..37 – W..47**



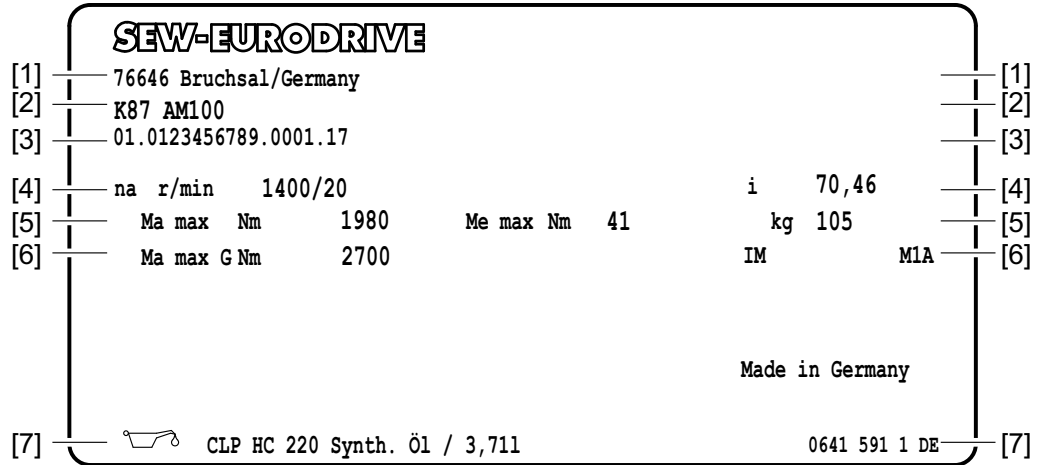
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[1] Pinion	[22] Gear unit housing	[59] Screw plug	[521] Shim
[2] Gear	[25] Deep groove ball bearing	[61] Retaining ring	[522] Shim
[5] Pinion shaft	[26] Housing stage 1	[88] Retaining ring	[523] Shim
[6] Gear	[30] Deep groove ball bearing	[89] Closing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

### 3.9 Nameplate/type designation

#### 3.9.1 Gear unit nameplate

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



- [1] • Address
- [2] • Type designation of the gear unit
- [3] • Production number
- [4] • Input rated speed/rotational speed at the output shaft of the gear unit in  $\text{min}^{-1}$ 
  - Gear unit ratio
- [5] • Minimum permissible output torque of the gear unit/adaptor combination in Nm
  - Maximum permissible driving torque in Nm
  - Mass in kg
- [6] • Maximum permissible output torque of the open gear unit without additional component in Nm
  - Mounting position
- [7] • Oil type and oil fill volume
  - Nameplate number

#### Explanation of the production number:

<b>01.</b>	<b>0123456789.</b>	<b>0001.</b>	<b>17</b>
Sales organization	Order number	Item number	Year of manufacture

#### 3.9.2 Type designation of the gear unit

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

Example: K37/R AQA 80 /1		
Gear unit type	<b>K</b>	Helical-bevel gear units
Gear unit size	<b>37</b>	19 – 49; 37 – 187
Option	<b>/R</b>	e.g. option /R for servo drives: Reduced rotational clearance



<b>Example: K37/R AQA 80 /1</b>		
Adapter	<b>AQA</b>	e.g. adapter for servo drives: AQA: Adapter with keyway AQH: Adapter with clamping ring hub
Adapter size	<b>80</b>	
Variants	<b>/1</b>	

### 3.9.3 DRN.. gearmotor nameplate

The following figure shows an example nameplate of a DRN.. gearmotor.

<b>SEW-EURODRIVE</b>										
[1]	76646 Bruchsal/Germany		[1]							
[2]	R67 DRN90L4/BE2		[2]							
[3]	01.1207730226.0001.17	Inverter duty VWPM	3~IEC60034		[3]					
[4]	Hz 50	r/min 1461/21	V 230/400 Δ/Y		[4]					
[5]	kW 1.5	s1	A 5.9/3.4	eff% 85.6	[5]					
[6]	Cosφ 0.74			IP 65	[6]					
[7]	Th.Kl. 155 (F)				[7]					
[8]				V <sub>br</sub> 230 AC	[8]					
[9]	i 69.75	Nm 685	IM M1	Nm 20	[9]					
[10]	∇ CLP 220 Miner. Öl / 1.11			BG 1.5	[10]					
[11]	kg 54.000		188 578 2	Made in Germany	[11]					

20683265035

- [1] • Address
- [2] • Type designation gearmotor
- [3] • Production number
  - Suitability for inverter operation
  - Number of phases and underlying rated and power standard
- [4] • Rated frequency /Hz
  - Rated speed of the motor/rotational speed of the gear unit output shaft /min<sup>-1</sup>
  - Nominal voltage /V
- [5] • Rated power /kW and operating mode
  - Rated current /A
  - Efficiency /%
  - Energy efficiency class
- [6] • Power factor
  - Degree of protection according to IEC 60034-5
- [7] • Thermal class
- [8] • Brake voltage /V
- [9] • Gear unit ratio
  - Output torque /Nm
  - Mounting position
  - Nominal braking torque /Nm
- [10] • Oil type and oil fill volume /l
  - Brake control
- [11] • Mass /kg
  - Nameplate
  - Country of production

# 3

## Gear unit structure

Nameplate/type designation

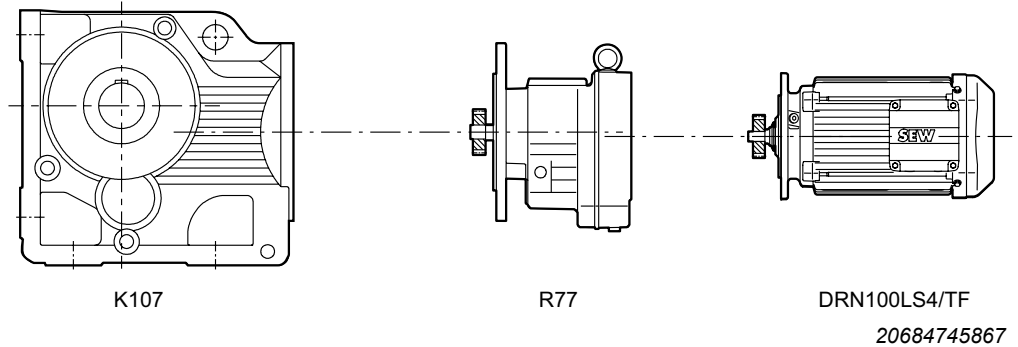
### 3.9.4 Type designation of a DRN.. gearmotor

The type designation of the gearmotor starts from the component on the output end.

For instance, a multi-stage helical-bevel gearmotor with temperature sensor in the motor winding has the following type designation:

Example: K107R77DRN100LS4 /TF		
Gear unit type	K	1. Gear unit
Gear unit size	107	
Gear unit series	R	2. Gear unit
Gear unit size	77	
Motor series	DRN..	Motor
Motor size	100	
Length	LS	
Number of poles	4	
Motor option temperature sensor	/TF	Option

Example: DRN.. gearmotor



### 3.10 Designs and options – R, F, K, S, W gear units

Below an overview of type designations for R, F, K, S, and W gear units and their options.

#### 3.10.1 Helical gear units

Designation	Description
RX..	Single-stage foot-mounted design, output shaft with key
RXF..	Single-stage B5 flange-mounted design, output shaft with key
R..	Foot-mounted design, output shaft with key
R..F	Foot- and B5 flange-mounted design, output shaft with key
RF..	B5 flange-mounted design, output shaft with key
RZ..	B14 flange-mounted design, output shaft with key
RM..	B5 flange-mounted design with extended bearing hub, output shaft with key

#### 3.10.2 Parallel-shaft helical gear units

Designation	Description
F..	Foot-mounted design, output shaft with key
FA..B	Foot-mounted design, hollow shaft with keyway
FH..B	Foot-mounted design, hollow shaft with shrink disk
FV..B	Foot-mounted design, splined hollow shaft to DIN 5480
FF..	B5 flange-mounted design, output shaft with key
FAF..	B5 flange-mounted design, hollow shaft with keyway
FHF..	B5 flange-mounted design, hollow shaft with shrink disk
FVF..	B5 flange-mounted design, splined hollow shaft to DIN 5480
FA..	Hollow shaft with keyway
FH..	Hollow shaft with shrink disk
FT..	Hollow shaft with TorqLOC® hollow shaft mounting system
FV..	Splined hollow shaft to DIN 5480
FZ..	B14 flange-mounted design, output shaft with key
FAZ..	B14 flange-mounted design, hollow shaft with keyway
FHZ..	B14 flange-mounted design, hollow shaft with shrink disk
FVZ..	B14 flange-mounted design, splined hollow shaft to DIN 5480
FM..	B5 flange-mounted design with extended bearing hub, output shaft with key
FAM..	B5 flange-mounted design with extended bearing hub, hollow shaft with keyway

**3.10.3 Helical-bevel gear units**

<b>Designation</b>	
K..	Foot-mounted design, output shaft with key
KA..B	Foot-mounted design, hollow shaft with keyway
KAF..B	B5 flange-mounted design, foot-mounted design, hollow shaft with keyway
KF..B	B5 flange-mounted design, foot-mounted design, output shaft with key
KH..B	Foot-mounted design, hollow shaft with shrink disk
KHF..B	B5 flange-mounted design, foot-mounted design, hollow shaft with shrink disk
KV..B	Foot-mounted design, splined hollow shaft to DIN 5480
KF..	B5 flange-mounted design, output shaft with key
KAF..	B5 flange-mounted design, hollow shaft with keyway
KHF..	B5 flange-mounted design, hollow shaft with shrink disk
KVF..	B5 flange-mounted design, splined hollow shaft to DIN 5480
KA..	Hollow shaft with keyway
KH..	Hollow shaft with shrink disk
KT..	Hollow shaft with TorqLOC® hollow shaft mounting system
KV..	Splined hollow shaft to DIN 5480
KZ..	B14 flange-mounted design, output shaft with key
KAZ..	B14 flange-mounted design, hollow shaft with keyway
KHZ..	B14 flange-mounted design, hollow shaft with shrink disk
KVZ..	B14 flange-mounted design, splined hollow shaft to DIN 5480
KM..	B5 flange-mounted design with extended bearing hub, output shaft with key
KAM..	B5 flange-mounted design with extended bearing hub, hollow shaft with keyway

**3.10.4 Helical-worm gear units**

<b>Designation</b>	<b>Description</b>
S..	Foot-mounted design, output shaft with key
SF..	B5 flange-mounted design, output shaft with key
SAF..	B5 flange-mounted design and hollow shaft with keyway
SHF..	B5 flange-mounted design and hollow shaft with shrink disk
SA..	Hollow shaft with keyway
SH..	Hollow shaft with shrink disk
ST..	Hollow shaft with TorqLOC® hollow shaft mounting system
SAZ..	B14 flange-mounted design and hollow shaft with keyway

Designation	Description
SHZ..	B14 flange-mounted design and hollow shaft with shrink disk

**3.10.5 SPIROPLAN® gear units**

Designation	Description
W..	Foot-mounted design, output shaft with key
WF..	B5 flange-mounted design, output shaft with key
WAF..	B5 flange-mounted design and hollow shaft with keyway
WA..	Hollow shaft with keyway
WA..B	Foot-mounted design and hollow shaft with keyway
WH..B	Foot-mounted design and hollow shaft with shrink disk
WHF..	B5 flange-mounted design and hollow shaft with shrink disk
WH..	Hollow shaft with shrink disk
WT..	Hollow shaft with TorqLOC® hollow shaft mounting system

**3.10.6 Options**

R, F and K gear units:

Designation	Description
/R	Reduced backlash

K, S and W gear units:

Designation	Description
/T	With torque arm

F gear units:

Designation	Description
/G	With rubber buffer

**3.10.7 Condition monitoring**

Designation	Description
/DUO	Diagnostic Unit Oil = Oil aging sensor
/DUV40A	Diagnostic Unit Vibration = Vibration sensor

## 4 Mechanical installation

### 4.1 Prerequisites for installation


#### NOTICE

Damage to the gear unit/gearmotor due to improper installation

Damage to property

- Observe the following notes.

Make sure that the following requirements are met before you start installing the unit:

- The drive has not been damaged during transportation or storage.
- The entries on the nameplate of the gearmotor match the voltage supply system.
- In case of abrasive ambient conditions, the output side oil seals must be protected against wear.
- Output shafts and flange surfaces must be completely free from anti-corrosion agent and any kind of pollution. Use a commercially available solvent to clean the flange surfaces. Note that solvent damages the oil seal. Do not let the solvent come into contact with the sealing lips of the oil seals!
- **For standard drives:**
  - Check if the gear unit/gearmotor is designed for the ambient temperature. For the application limits refer to the technical documentation, the nameplate or the lubricant table (see chapter "Lubricant table" (→  170)).
  - Make sure the environment contains no hazardous substances (oils, acids, gases, vapors, dusts,...) or radiation.
- **For special designs:**
  - Check if the gear unit/gearmotor is designed for the ambient temperature. You find the application limits on the nameplate.
- **For worm/SPIROPLAN® gearmotors:**
  - Note that no large external mass moments of inertia must be present, which could exert a retrodriving load on the gear unit.
  - Note the self-locking at  $\eta' \text{ (retrodriving)} < 0.5$ .  
Calculation of  $\eta'$ :  $\eta' = 2 - 1/\eta$
- **Servomotor mounting:**
  - The drive may only be mounted if it is ensured that after the mounting the drive will be sufficiently ventilated. Ventilation prevents heat build-up.

**4.1.1 Required tools/resources**

The following tools and resources are required for the mechanical installation:

- Wrench
- Torque wrench for:
  - Gear unit mounting
  - Shrink disks
  - Motor adapter AQH or EWH
  - Input shaft assembly with centering shoulder
- Mounting device
- Compensation elements (shims and spacing rings)
- Fasteners for input and output elements
- Lubricant (e.g. NOCO® fluid)
- Threadlocker compound for input cover with centering shoulder (e.g. Loctite® 243)

**INFORMATION**



Standard parts are not included in the delivery.

**4.1.2 Installation tolerances**

Shaft end	Flanges
Diameter tolerance according to DIN 748 <ul style="list-style-type: none"> <li>• ISO k6 for solid shafts with <math>\varnothing \leq 50</math> mm</li> <li>• ISO m6 for solid shafts with <math>\varnothing &gt; 50</math> mm</li> <li>• ISO H7 for hollow shafts</li> <li>• Centering bore in accordance with DIN 332, shape DR</li> </ul>	Centering shoulder tolerance to DIN 42948 <ul style="list-style-type: none"> <li>• ISO j6 with <math>b1 \leq 230</math> mm</li> <li>• ISO h6 with <math>b1 &gt; 230</math> mm</li> </ul>

## 4.2 Installing the gear unit

**▲ CAUTION**

Risk of injury due to improper installation/disassembly

Severe personal injury and damage to property

- Work on the gear unit only when the machine is not in use.
- Secure the drive unit against unintentional power-up.
- Prevent heavy component parts (e.g. shrink disks) against falling during installation/disassembly.

**▲ CAUTION**

Risk of injury due to protruding gear unit parts

Severe injuries

- Keep a sufficient safety distance to the gear unit/gearmotor.

**▲ CAUTION**

Danger due to static overdetermination if gear units with foot (e.g. KA19/29B, KA127/157B or FA127/157B) are mounted both via the torque arm and via the foot plate.

Risk of injuries and damage to property

- Especially with the KA.9B/T variant, it is not permitted to use the foot plates and the torque arm at the same time.
- Attach the KA.9B/T design only via the torque arm.
- Attach the K.9 or KA.9B design only via the foot plate.
- If you want to use foot plates and torque arms for mounting, contact SEW-EURODRIVE.

**▲ CAUTION**

Danger due to static overdetermination in the case of gearmotors when the gear unit is attached to the foot plate (e.g. KA19/29B, KA127/157B or FA127/157B, R gear unit with foot-mounted motor) and the motor is attached to the foot plate as well.

Risk of injuries and damage to property

- Attach only the gear unit or only the motor to the foot plate.

**NOTICE**

Damage to gear unit/gearmotor due to cold air currents. Condensed water in the gear unit can cause damage.

Damage to property

- Protect the gear unit from direct cold air currents.

**INFORMATION**

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



**Mounting position** The gear unit or gearmotor is only allowed to be installed in the specified mounting position. Observe the information on the nameplate. SPIROPLAN® gear units of sizes W10 – W30 are mounting position-independent.

**Oil level** Check the mounting position-dependent oil level; see chapter "Inspection/maintenance work on the gear unit" (→ 113). The gear units are filled with the required oil quantity 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 quantities and the position of the breather valve accordingly in the event of a change of mounting position.** Observe chapter Lubricant fill quantities and chapter "Mounting positions" (→ 129).

Contact SEW-EURODRIVE in case of the following mounting position changes:

- Mounting position change to M4: Depending on the operating mode of the drive, an oil expansion tank can be necessary (see chapter "Oil expansion tank" (→ 93)).
- Changing the mounting position of K gear units to M5 or M6 or within these mounting positions
- Changing the mounting position of size S47 – S97 S gear units to mounting positions M2 and M3
- Changing the mounting positions of R gear units to mounting position M2.

**Submounting** The support structure must have the following characteristics:

- Level
- Vibration damping
- Torsionally rigid

The following table shows the maximally permitted flatness defect for foot- and flange-mounting (guide values based on DIN ISO 1101):

Gear unit size	Flatness defect
≤ 67	max. 0.4 mm
77 – 107	max. 0.5 mm
127 – 147	max. 0.7 mm
157 – 187	max. 0.8 mm

Do not twist housing legs and mounting flanges against each other. Observe 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.

# 4 Mechanical installation

## Installing the gear unit

Strength class of the screws

Always mount gearmotors using screws of strength class 8.8. The gearmotors in flange-mounted design and in foot-/flange-mounted design listed in the following table are an exception. Always use screws of strength class 10.9 for these gearmotors. Use suitable washers.

Gear unit	Flange Ø in mm	Strength class of the screws
RF37/R37F	120	10.9
RF47/R47F	140	
RF57/R57F	160	
FF/FAF77 KF/KAF77	250	
FM/FAM67, FM/FAM77 KM/KAM67, KM/KAM77	300	
FM/FAM87 KM/KAM87	350	
FM/FAM97 KM/KAM97	400	
RF147 FM/FAM107 KM/KAM107	450	
RF167 FM/FAM127 KM/KAM127	550	
FM/FAM157 KM/KAM157	660	
RZ37 – RZ87	60ZR – 130ZR	

Corrosion protection for screw connections

Use plastic inserts (2 – 3 mm thick) if there is a risk of electrochemical corrosion between the gear unit and the driven machine. The material used must have an electrical leakage resistance  $< 10^9 \Omega$ . Electrochemical corrosion can occur between various metals, for example, cast iron and stainless steel. Also install the bolts with plastic washers! Additionally ground the housing. Use grounding screws on the motor.

**4.2.1 Tightening torques for retaining screws**

Mount the gearmotors with the following tightening torques:

<b>Screw/nut</b>	<b>Tightening torque ± 10% Strength class 8.8 Nm</b>
M6	11
M8	27
M10	54
M12	93
M16	230
M20	464
M24	798
M30	1597
M36	2778
M42	3995
M48	6022
M56	9650

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

<b>Flange Ø mm</b>	<b>Gear unit</b>	<b>Screw/nut</b>	<b>Tightening torque ± 10% Strength class 10.9 Nm</b>
120	RF37	M6	17
140	RF37/RF47	M8	40
160	RF57	M8	40
300	FM/FAM67, FM/FAM77 KM/KAM67, KM/KAM77	M12	137
350	FM/FAM87 KM/KAM87	M16	338
400	FM/FAM97 KM/KAM97	M16	338
450	FM/FAM107 KM/KAM107	M16	338
450	RF147	M20	661
550	FM/FAM127 KM/KAM127	M16	338
550	RF167	M20	661

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# 4

## Mechanical installation

### Installing the gear unit

Flange Ø mm	Gear unit	Screw/nut	Tightening torque ± 10% Strength class 10.9 Nm
660	FM/FAM157 KM/KAM157	M20	661
60ZR	RZ37	M8	40
70ZR	RZ47	M8	40
80ZR	RZ57	M10	79
95ZR	RZ67	M10	79
110ZR	RZ77	M10	79
130ZR	RZ87	M12	137
250	FF77/KF77/ FAF77/ KAF77	M12	137

#### 4.2.2 Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses

Observe the tightening torques in the following table when screwing in:

Thread	Tightening torque Nm
M10 × 1	8
M12 × 1.5	14
M22 × 1.5	45
M33 × 2	100
M42 × 2	160

## 4.2.3 Gear unit mounting

## INFORMATION



If you use the gear unit in flange-mounted design or foot/flange-mounted design in connection with VARIBLOC® variable-speed gear units, use screws of 10.9 quality and suitable washers for flange mounting on the customer side.

To improve the friction contact between flange and mounting surface, SEW-EURODRIVE recommends anaerobic gaskets or an anaerobic glue.

## INFORMATION



With the gear units KAZ/KZ/FAZ/FZ 107-157, remove the 4 transport protection screws from the B14 flange. The 2 recessed screws **must** remain in the B14 flange.

## 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	–	–	19	–	10/20
M8	17/27/37	–	27/37	29	37	30/37/47
M10	–	57	47	37/39/47/49	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	127/137	–	127	107/167	–	–
M36	147/167	–	157	127/157/187	–	–

## Gear unit with B14 flange-mounted design 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	FZ/FAZ/FHZ/ FVZ	KZ/KAZ/KHZ/ KVZ	SA/SAZ/SHZ	WA
M6	07/17/27	–	–	37	10/20/30 <sup>1)</sup>
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	–	–

# 4 Mechanical installation

## Installing the gear unit

Screw	Gear unit type				
	RZ	FZ/FAZ/FHZ/ FVZ	KZ/KAZ/KHZ/ KVZ	SA/SAZ/SHZ	WA
M24	–	157	157	–	–

1) For the W30 design mounted directly on a CMP.. motor or mounted via an EWH.. adapter, the thread size is M8.

### Gear unit with B5 flange-mounted design

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

Ø flange mm	Screw	Gear unit type					
		RF/R..F/RM	FF/FAF/ FHF/FVF	FM/FAM KM/KAM	KF/KAF/ KHF/KVF	SF/SAF/ SHF	WF/WAF/ WHF
80	M6	–	–	–	–	–	10
110	M8	–	–	–	–	–	20
120	M6	07/17/27	–	–	–	37	10/20/30/37
120	M8	–	–	–	19	–	–
140	M8	07/17/27/37/47	–	–	–	–	–
160	M8	07/17/27/37/47	27/37	–	19/37	37/47	30/37/47
160	M10	–	–	–	29/39	–	–
200	M10	37/47/57/67	47	–	29/47	57/67	–
200	M12	–	–	–	49	–	–
250	M12	57/67/77/87	57/67	–	57/67	77	–
300	M12	67/77/87	77	67/77	77	–	–
350	M16	77/87/97/107	87	87	87	87	–
400	M16	–	–	97	–	–	–
450	M16	97/107/127/137/ 147	97/107	107	97/107	97	–
550	M16	107/127/137/ 147/167	127	127	127	–	–
660	M20	147/167	157	157	157	–	–

### 4.2.4 Installation in damp locations or outdoors

#### NOTICE

Paint can block the breather valve and damage the sealing lips of the oil seals.

Damage to property.

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

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Drives are supplied in corrosion-resistant designs with an according surface protection coating for use in damp areas or outdoors.

- Repair any damage to the paint work (e.g. on the breather valve or the lifting eyes).
- When mounting the motors onto AM, AQ adapters and to AR, AT start-up couplings and slip clutches, seal the flange areas with a suitable sealant (e.g. Loctite® 574).
- In case of setup outdoors, the drives must not be exposed to direct sunlight. Install appropriate protection devices e.g. a cover or a canopy. The protection device must not cause heat build-up.
- The system operator must ensure that no foreign objects (e.g. falling objects or coverings) affect the operation of the gear unit.

#### 4.2.5 Gear unit venting

### NOTICE

Dirt and dust in the environment affect the function of the breather valve.

Potential damage to property.

- Check the breather valve function regularly and replace it if necessary.
- In case of high dirt and dust load use a breather filter instead of a breather valve.

The following table lists gear units that do not require venting:

Gear unit	Mounting position
R..07	M1/M2/M3/M5/M6
R..17/R..27/F..27	M1/M3/M5/M6
W..10/W..20/W..30	M1 – M6
W..37/W..47	M1/M2/M3/M5/M6
K..19/K..29	M1/M2/M3/M5/M6

All other gear units are delivered with a breather valve suitable to the mounting position and activated.

#### Exceptions:

- The following gear units are delivered with a screw plug on the provided breather hole:
  - Gear unit with pivoted mounting position (dynamic)
  - Gear unit for mounting in an inclined position (stationary)
  - Mounting position MX

A breather valve is supplied in a separate plastic bag attached to the gear unit. Before startup, replace the highest screw plug with the breather valve provided. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).

- For **gear head units** and **gear units with pivoted mounting position** with venting on the input end, a breather valve is supplied in a plastic bag.
- **Enclosed gear units** are delivered without a breather valve.

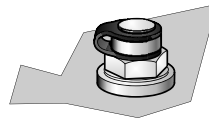
# 4 Mechanical installation

## Installing the gear unit

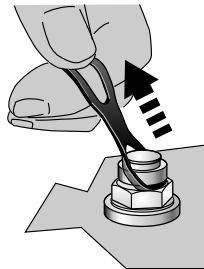
- Gear units with gear unit venting on fixed piping, with expansion tank, and with ventilation filter are delivered without a breather valve.
- In some countries, the breather valve is installed, but not activated due to possible pressure fluctuations during transport. In such cases the transport protection must be removed. This activates the breather valve (see chapter "Activating the breather valve" (→ 36)).

### Activating the breather valve

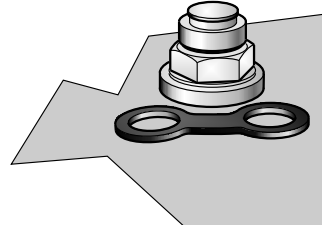
1. Before startup, check whether the transport protection on the breather valve has been removed and the valve is therefore activated. The following figure shows a breather valve with transport protection:



2. Remove the transport protection.



⇒ The following figure shows an activated breather valve:



### 4.2.6 Painting the gear unit

#### NOTICE

Paint can block the breather valve and damage the sealing lips of the oil seals.

Damage to property.

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

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## 4.3 Gear unit with solid shaft

### 4.3.1 Assembling input and output elements

#### NOTICE

Damage to bearing, housing or shafts due to incorrect mounting

Possible damage to property.

- Only use a mounting device for installing input and output elements (see chapter "Using the mounting device" (→ 37)). Use the threaded centering bore at the shaft end.
- Never force belt pulleys, couplings, pinions, etc. onto the shaft end by hitting them with a hammer.
- During the installation of belt pulleys, make sure the belt is tensioned correctly in accordance with the manufacturer's instructions.
- Make sure the transmission elements are balanced after fitting and do not give rise to any impermissible radial or axial forces. For the approved values, refer to the catalog "Gearmotors" or "Explosion-Proof Drives".

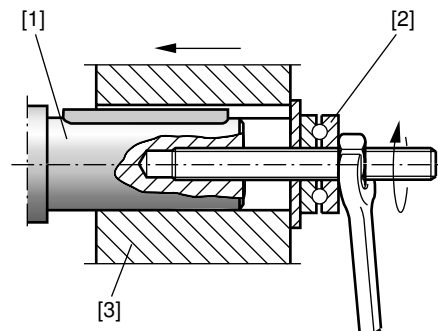
#### INFORMATION



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

#### Using a mounting device

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



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[1] Gear shaft end  
[2] Thrust bearing

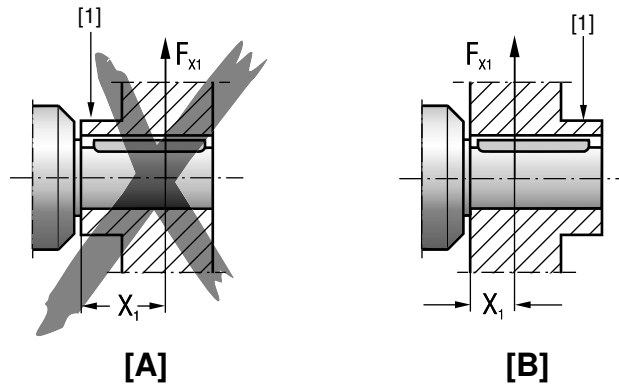
[3] Coupling hub

# 4 Mechanical installation

Gear unit with solid shaft

## Avoiding excessive overhung loads

To avoid high overhung loads, mount gears and sprockets according to figure B.



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[1] Hub  
[A] Incorrect assembly

$F_{x1}$  Overhung load at point X1  
[B] Correct assembly

### 4.3.2 Mounting of couplings

#### ⚠ CAUTION

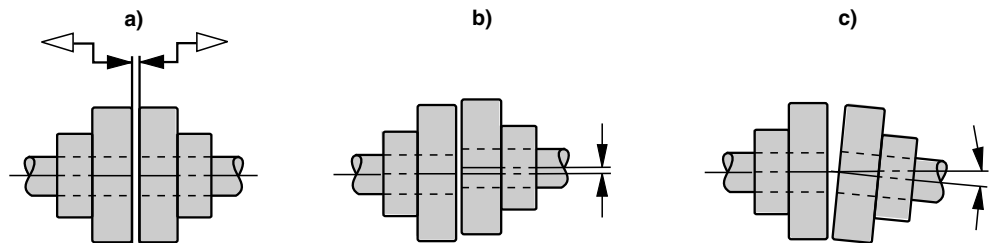
Risk of injury due to moving drive elements, such as belt pulleys or couplings, during operation.

Risk of jamming and crushing.

- Equip the input and output elements with a touch guard.

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

- Maximum and minimum clearance
- Axial misalignment
- Angular misalignment



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### 4.4 Torque arms for shaft-mounted gear units

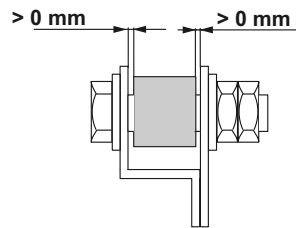
#### NOTICE

Damage to gear unit due to improper installation

Damage to the gear unit

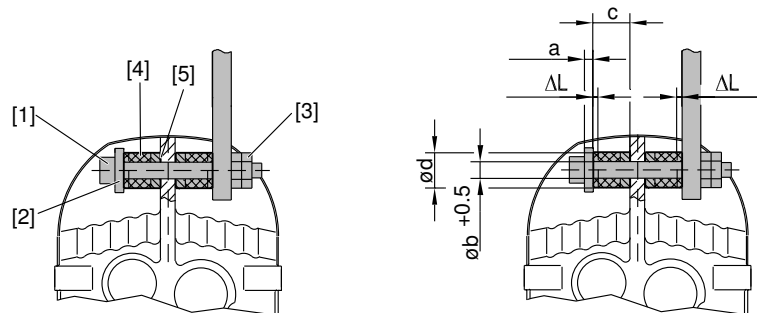
- Do not place torque arms under strain during installation.
- Always use bolts of quality 8.8 to fasten torque arms.

The following figure shows the mounted torque arm without tension:



#### 4.4.1 Mounting torque arms for parallel-shaft helical gear units

The following figure shows the torque support for parallel-shaft helical gear units in loose state.



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- [1] Screw
- [2] Washer
- [3] Nuts
- [4] Rubber buffer
- [5] Metal side of the rubber buffer

- a Washer width
- b Rubber buffer inner diameter
- c Rubber buffer length in loose state
- d Rubber buffer diameter
- ΔL Preload per rubber buffer in tightened state

Proceed as follows:

1. Make sure that the metal sides of the rubber buffers lay against the gear unit.
2. Use screws [1] and washers [2] according to the following table.
3. Secure the screw connection with a nut [3].
4. Tighten the screw [1] until the preload "Δ L" of the rubber buffers is reached according to the table:

# 4

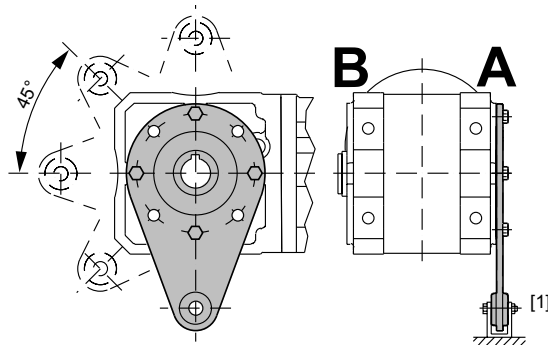
## Mechanical installation

### Torque arms for shaft-mounted gear units

Gear unit	Washer a mm	Rubber buffer			Δ L mm
		d mm	b mm	c mm	
F..27 /G	5	40	12.5	20	1
F..37 /G	5	40	12.5	20	1
F..47 /G	5	40	12.5	20	1.5
F..57 /G	5	40	12.5	20	1.5
F..67 /G	5	40	12.5	20	1.5
F..77 /G	10	60	21.0	30	1.5
F..87 /G	10	60	21.0	30	1.5
F..97 /G	12	80	25.0	40	2
F..107 /G	12	80	25.0	40	2
F..127 /G	15	100	32.0	60	3
F..157 /G	15	120	32.0	60	3

#### 4.4.2 Mounting torque arms for helical-bevel gear unit K..19 – K..49

The following figure shows the torque support for the helical-bevel gear units K..19 – K..49:



[1] Bushing

A Connection side

B Connection side

Observe the following points during assembly:

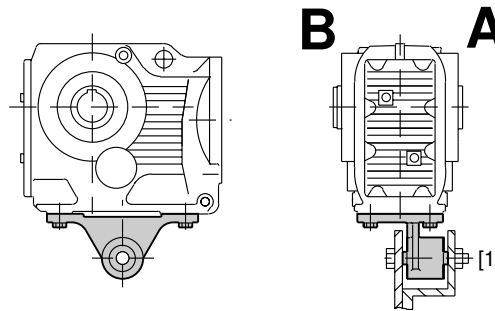
- Apply bearings to both sides of the bushing [1].
- Mount connection side B so that it mirrors side A.
- Use screws and tightening torques according to the following table:

Gear unit	Screws	Tightening torque ± 10%
		Nm
K..19 /T	4 × M8 × 20 – 8.8	27
K..29 /T	4 × M8 × 22 – 8.8	27
K..39 /T	4 × M10 × 30 – 8.8	54
K..49 /T	4 × M12 × 35 – 8.8	93

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4.4.3 Mounting torque arms for helical-bevel gear unit K..37 – K..157

The following figure shows the torque support for the helical-bevel gear units K..37 – K..157.



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[1] Bushing

A Connection side  
B Connection side

Proceed as follows:

1. Apply bearings to both sides of the bushing [1].
2. Mount connection side B so that it mirrors side A.
3. Use screws and tightening torques according to the following table:

Gear unit	Screws	Tightening torque ± 10%
		Nm
K..37 /T	4 × M10 × 25 – 8.8	54
K..47 /T	4 × M10 × 30 – 8.8	54
K..57 /T	4 × M12 × 35 – 8.8	93
K..67 /T	4 × M12 × 35 – 8.8	93
K..77 /T	4 × M16 × 40 – 8.8	230
K..87 /T	4 × M16 × 40 – 8.8	230
K..97 /T	4 × M20 × 50 – 8.8	464
K..107 /T	4 × M24 × 60 – 8.8	796
K..127 /T	4 × M36 × 130 – 8.8	2778
K..157 /T	4 × M36 × 130 – 8.8	2778

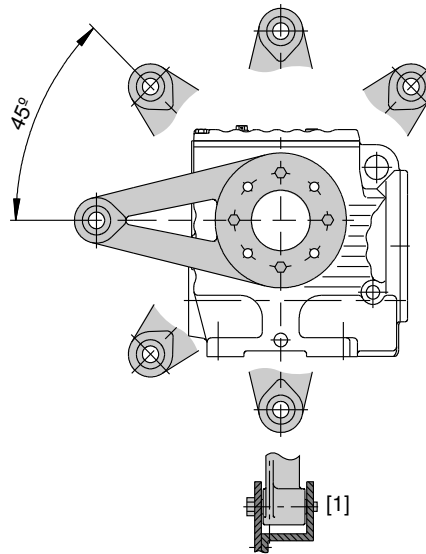
# 4

## Mechanical installation

### Torque arms for shaft-mounted gear units

#### 4.4.4 Mounting torque arms for helical-worm gear units

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



18014398720973707

[1] Bushing

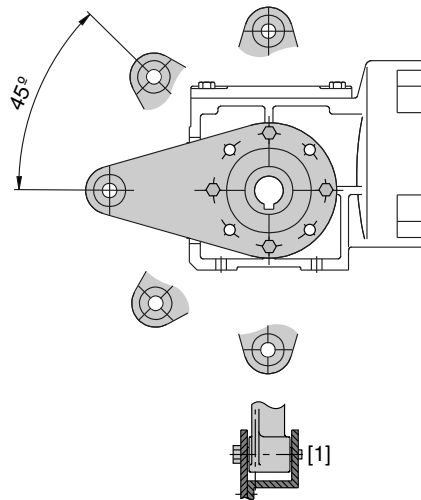
Proceed as follows:

1. Apply bearings to both sides of the bushing [1].
2. Use screws and tightening torques according to the following table:

Gear unit	Screws	Tightening torque $\pm 10\%$
		Nm
S..37 /T	4 × M6 × 16 – 8.8	11
S..47 /T	4 × M8 × 25 – 8.8	27
S..57 /T	6 × M8 × 25 – 8.8	27
S..67 /T	4 × M12 × 35 – 8.8	93
S..77 /T	4 × M12 × 35 – 8.8	93
S..87 /T	4 × M16 × 45 – 8.8	230
S..97 /T	4 × M16 × 50 – 8.8	230

4.4.5 Mounting torque arms for SPIROPLAN® W gear units

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



18014398720971531

[1] Bushing

Proceed as follows:

1. Apply bearings to both sides of the bushing [1].
2. Use screws and tightening torques according to the following table:

Gear unit	Screws	Tightening torque ± 10%
		Nm
W..10 /T	4 × M6 × 16 – 8.8	11
W..20 /T	4 × M6 × 16 – 8.8	11
W..30 /T	4 × M6 × 16 – 8.8	11
W..37 /T	4 × M8 × 20 – 8.8	27
W..47 /T	4 x M10 × 20 – 8.8	54

#### 4.5 Mounting shaft-mounted gear units with splined hollow shaft

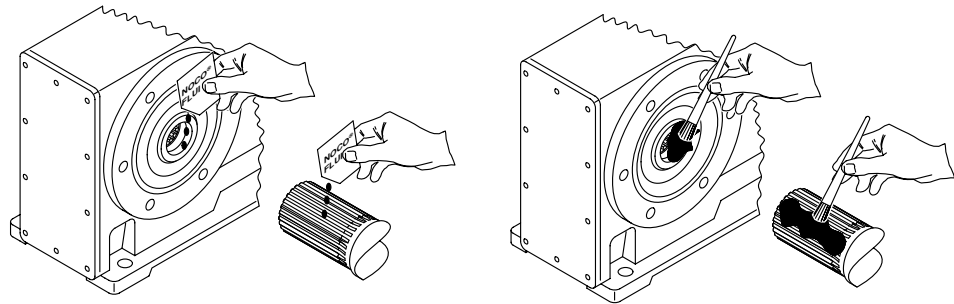
### INFORMATION



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

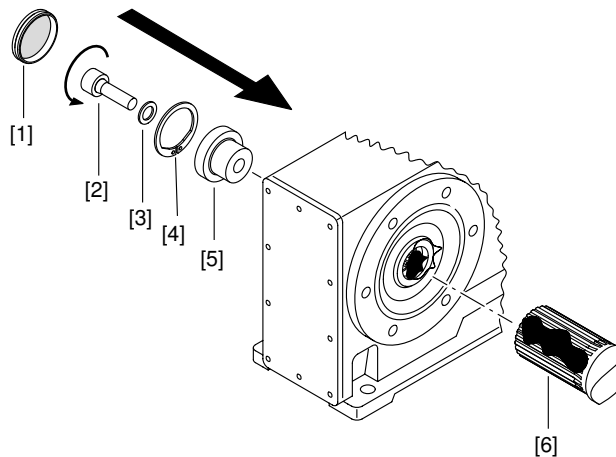
Proceed as follows:

1. Apply NOCO® fluid. Spread carefully.



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2. Install the shaft and secure it axially. For easier mounting, use a mounting device.



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- [1] Closing plug
- [2] Cap screw
- [3] Supporting ring

- [4] Retaining ring
- [5] Washer



## 4.6 Shaft-mounted gear unit with keyway

### INFORMATION

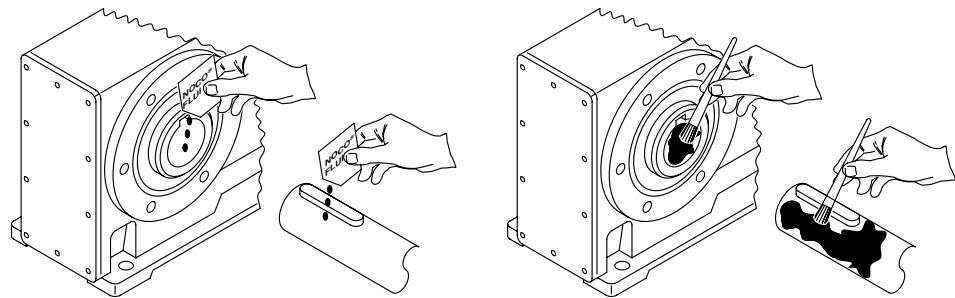


Concerning the design of the customer shaft, please also refer to the design notes in the "Gearmotors" catalog.

#### 4.6.1 Mounting shaft-mounted gear units with keyway

Proceed as follows:

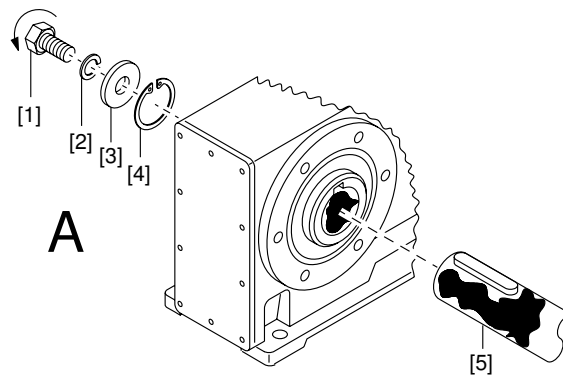
1. Apply NOCO® fluid. Spread carefully.



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2. Install the shaft and secure it axially. For easier mounting, use a mounting device. Proceed according to one of the **3 mounting types**, depending on the scope of delivery.

#### A) Mounting a customer shaft (standard scope of delivery):



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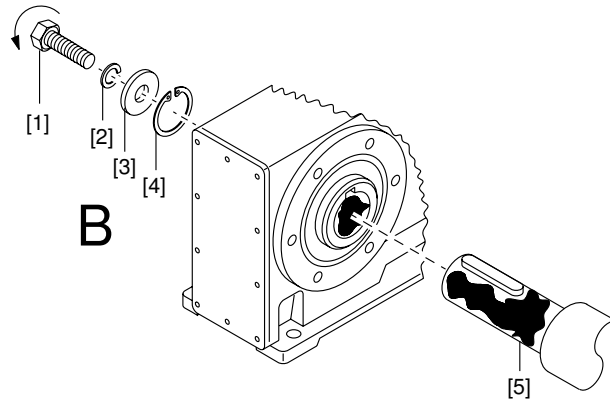
- |   |                    |
|---|--------------------|
| [1] Short retaining screw<br>(standard scope of delivery) | [3] Washer         |
| [2] Lock washer   | [4] Retaining ring |
|   | [5] Customer shaft |

# 4

## Mechanical installation

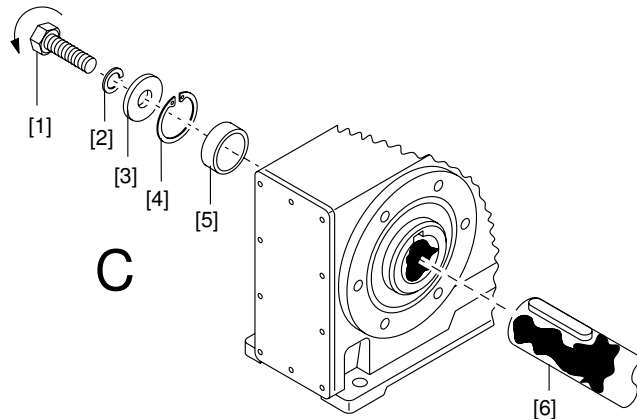
Shaft-mounted gear unit with keyway

### B) Mounting customer shaft with contact shoulder using the SEW-EURODRIVE assembly/disassembly kit:



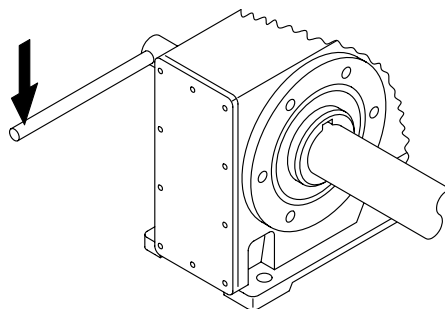
- |     |                 |     |                                      |
|-----|-----------------|-----|--------------------------------------|
| [1] | Retaining screw | [4] | Retaining ring                       |
| [2] | Lock washer     | [5] | Customer shaft with contact shoulder |
| [3] | Washer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

### C) Mounting customer shaft without contact shoulder using the SEW-EURODRIVE assembly/disassembly kit:



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

3. Tighten the retaining screw to the appropriate torque. Observe the tightening torques specified in the following table.



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

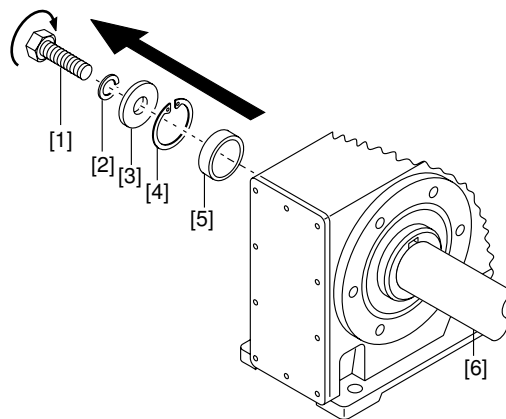
## INFORMATION



To avoid contact corrosion, SEW-EURODRIVE recommends that the customer shaft should be lathed down between the 2 contact surfaces.

### 4.6.2 Removing the shaft-mounted gear unit

This description is only applicable if the gear unit was assembled using the SEW-EURODRIVE assembly/disassembly kit (see step 2 of "Mounting the shaft-mounted gear unit" (→ 45)).



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

Proceed as follows:

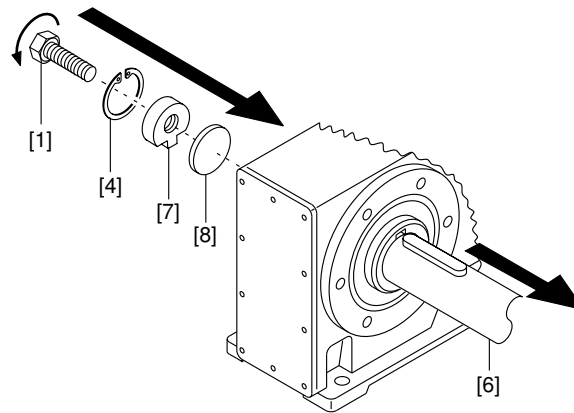
1. Loosen the retaining screw [1].
2. Remove parts [2] to [4] and, if applicable, the spacer tube [5].
3. Insert the forcing washer [8] and the fixed nut [7] from the SEW-EURODRIVE assembly/disassembly kit between the customer shaft [6] and the retaining ring [4] (see "SEW-EURODRIVE assembly/disassembly kit" (→ 49)).

# 4

## Mechanical installation

Shaft-mounted gear unit with keyway

4. Re-install the retaining ring [4].
5. Re-install the retaining screw [1]. Press the gear unit off the shaft by tightening the screw.



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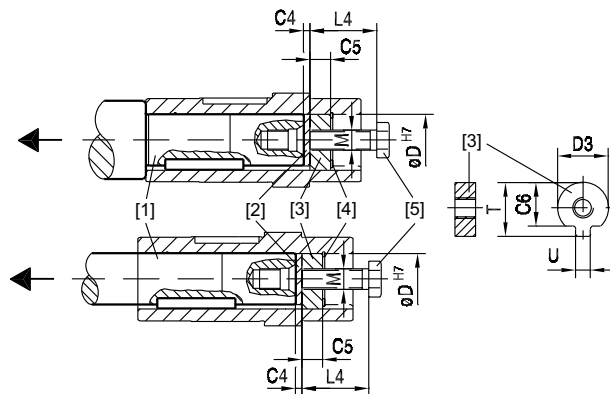
- |     |                 |     |                |
|-----|-----------------|-----|----------------|
| [1] | Retaining screw | [7] | Fixed nut      |
| [4] | Retaining ring  | [8] | Forcing washer |
| [6] | Customer shaft  |     |                |

4.6.3 Assembly/disassembly kit by SEW-EURODRIVE

Applies only if the installation/removal kit was previously used for installation.

1. Loosen the retaining screw [5].
2. Remove the retaining ring [4] and, if used, the spacer tube.
3. Insert the forcing washer [2] and the fixed nut [3] between the customer shaft [1] and retaining ring [4] as shown in the following figure.
4. Re-insert the retaining ring [4].
5. Re-install the retaining screw [5]. Now you can force the gear unit off the shaft.

The following figure shows the SEW-EURODRIVE assembly/disassembly kit.



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- |                               |                     |
|-------------------------------|---------------------|
| [1] Customer shaft            | [4] Retaining ring  |
| [2] Forcing washer            | [5] Retaining screw |
| [3] Fixed nut for disassembly |                     |

Dimensions and part numbers of the assembly/disassembly kit:

Type	D <sup>H7</sup> mm	M <sup>1)</sup>	C4 mm	C5 mm	C6 mm	U <sup>-0.5</sup> mm	T <sup>-0.5</sup> mm	D3 <sup>-0.5</sup> mm	L4 mm	Part number of the assembly/disassembly kit
WA..10	16	M5	5	5	12	4.5	18	15.7	50	6437125
WA..20	18	M6	5	6	13.5	5.5	20.5	17.7	25	643682X
WA..20, WA..30, SA..37, WA..37, KA..19	20	M6	5	6	15.5	5.5	22.5	19.7	25	6436838
FA..27, SA..47, WA..47, KA..29	25	M10	5	10	20	7.5	28	24.7	35	6436846
FA..37, KA..29, KA..37, KA..39, SA..47, SA..57, WA..47,	30	M10	5	10	25	7.5	33	29.7	35	6436854
FA..47, KA..39, KA..47, KA..49, SA..57	35	M12	5	12	29	9.5	38	34.7	45	6436862
FA..57, KA..57, FA..67, KA..49, KA..67, SA..67	40	M16	5	12	34	11.5	41.9	39.7	50	6436870
SA..67	45	M16	5	12	38.5	13.5	48.5	44.7	50	6436889
FA..77, KA..77, SA..77	50	M16	5	12	43.5	13.5	53.5	49.7	50	6436897
FA..87, KA..87, SA..77, SA..87	60	M20	5	16	56	17.5	64	59.7	60	6436900
FA..97, KA..97, SA..87, SA..97	70	M20	5	16	65.5	19.5	74.5	69.7	60	6436919
FA..107, KA..107, SA..97	90	M24	5	20	80	24.5	95	89.7	70	6436927

1) Retaining screw

## 4.7 Shaft-mounted gear unit with shrink disk

### 4.7.1 Mounting the shaft-mounted gear unit

#### NOTICE

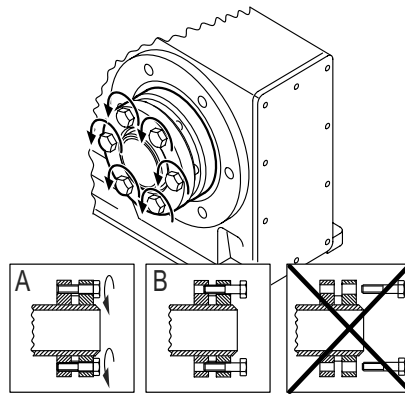
Deformation of the hollow shaft due to tightening the locking screws without first installing the shaft.

Damage to the hollow shaft.

- Never tighten the screws without the shaft installed.

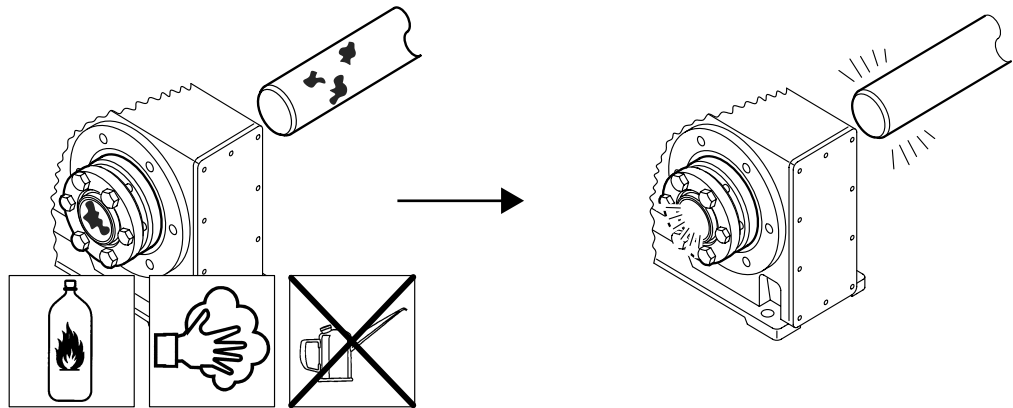
Proceed as follows:

1. Slightly loosen the locking screws. Do not remove the locking screws completely.



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



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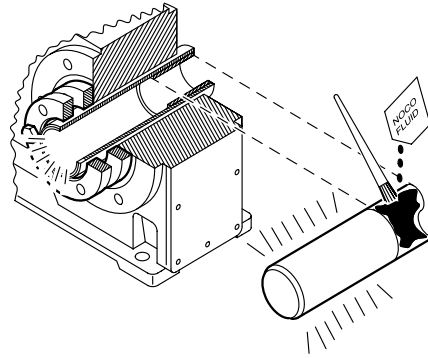
3. Only apply NOCO® fluid to the input shaft around the bushing.

#### NOTICE

The hollow shaft mounting system is without function if NOCO® fluid is applied directly to the bushing. When the input shaft is installed, NOCO® fluid can get into the clamping area of the shrink disk.

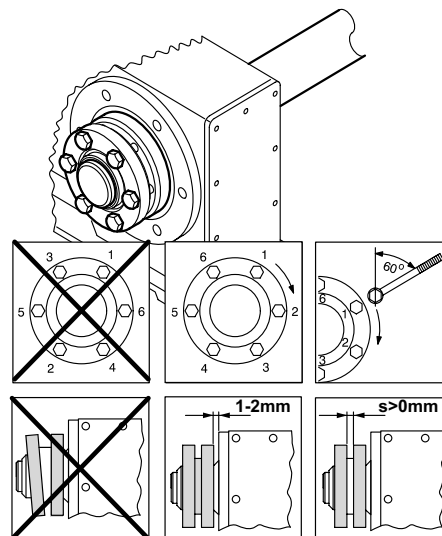
Possible damage to property

- Never apply NOCO® fluid directly to the bushing. The clamping area of the shrink disk must be absolutely free of grease.



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4. Install the input shaft. Proceed as follows to do so:
  - Make sure that the outer rings of the shrink disk are plane-parallel.
  - In the case of a gear unit with shaft shoulder, mount the shrink disk at the shaft shoulder up to the stop.
  - In the case of a gear unit without shaft shoulder, mount the shrink disk at a distance of 1 mm to 2 mm from the gear unit housing.
  - Tighten the locking screws with the specified tightening torque according to the following table. Tighten the screws in several turns. Tighten screws one after the other, not in diametrically opposite sequence.



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## INFORMATION



The exact values for the tightening torques are shown on the shrink disk.

## INFORMATION



Standard shrink disks and stainless steel shrink disks have the same tightening torques.

KH..	Gear unit type			Locking screw ISO 4014/ISO 4017/ ISO 4762	Tightening torque $\pm 4\%$ Nm
	FH..	SH..	WH..		
19/29	27	37	37	M5	5

# 4

## Mechanical installation

Shaft-mounted gear unit with shrink disk

KH..	Gear unit type			Locking screw ISO 4014/ISO 4017/ ISO 4762	Tightening torque ± 4% Nm
	FH..	SH..	WH..		
37/39/47/49/57/67/77	37/47/57/67/77	47/57/67/77	47	M6	12
87/97	87/97	87/97	–	M8	30
107	107	–	–	M10	59
127/157	127/157	–	–	M12	100
167	–	–	–	M16	250
187	–	–	–	M20	470

5. After installation, make sure the remaining gap "s" between the outer rings of the shrink disk is > 0 mm.
6. To prevent corrosion, grease the outside of the hollow shaft around the shrink disk.

### 4.7.2 Removing the shaft-mounted gear unit

Proceed as follows:

1. To prevent the outer rings from jamming, loosen the locking screws for a quarter turn, one after the other.
2. Steadily loosen the locking screws one after the other, but do not remove the locking screws completely.
3. If rust has formed on the shaft in front of the hub, remove the rust.
4. Remove the shaft or pull the hub off the shaft.
5. Remove the shrink disk from the hub.

## INFORMATION



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

### 4.7.3 Cleaning and lubricating shaft-mounted gear units

Proceed as follows:

1. If the shrink disk is dirty, clean and lubricate the shrink disk.
2. Lubricate the tapered surfaces. Use 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

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

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## 4.8 Shaft-mounted gear units with TorqLOC®

### NOTICE

With a fixed flange or foot mounting, stress can build up in the drive train because of the possible tolerance adjustment of the TorqLOC® shaft.

Damage to property

- A flange or foot mounting is only allowed for TorqLOC® mounting if it is ensured that no static overdetermination can occur. Tolerance adjustment of the shaft must be possible.

### INFORMATION

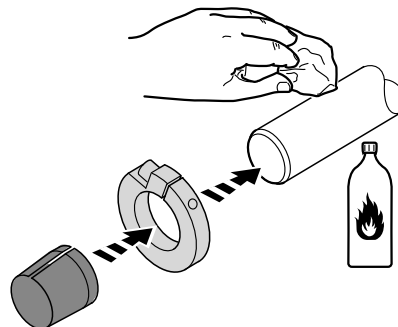


In case of flange mounting, installing the clamping ring may not be possible depending on the size.

#### 4.8.1 Mounting a customer shaft without contact shoulder

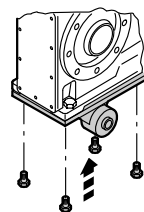
Proceed as follows:

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

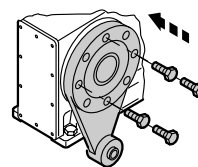


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3. Attach the torque arm to the drive unit. Note the information in chapter "Torque arm for shaft-mounted gear units" (→ 39).



K..7



S../W../K..9

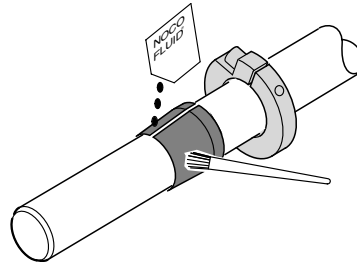
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# 4

## Mechanical installation

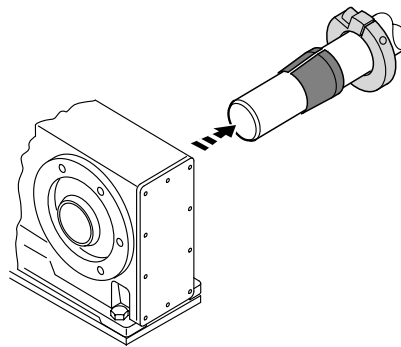
Shaft-mounted gear units with TorqLOC®

4. Apply NOCO® fluid directly to the bushing. Spread carefully.



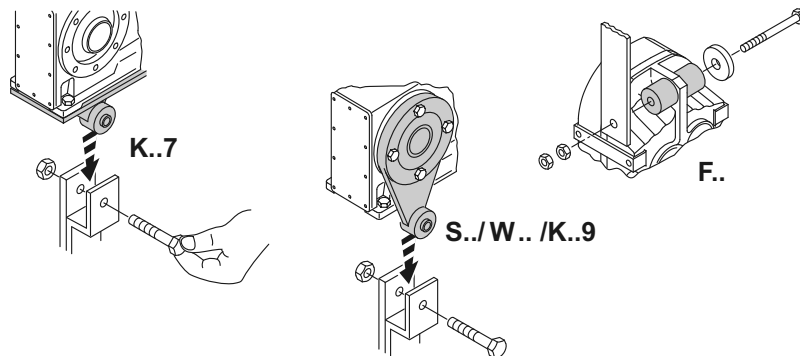
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5. Push the gear unit onto the customer shaft.



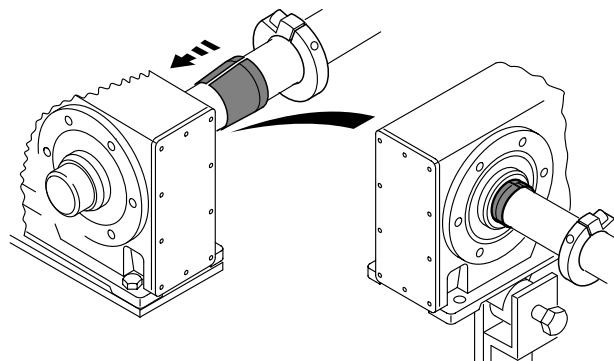
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6. Preassemble the torque arm. Do not firmly tighten the screws.



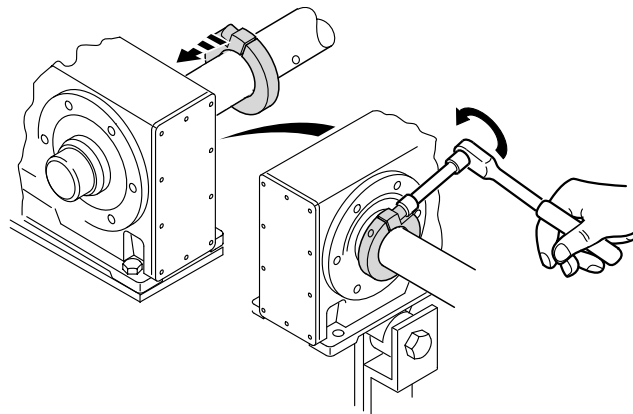
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7. Push the bushing into the gear unit up to the stop.



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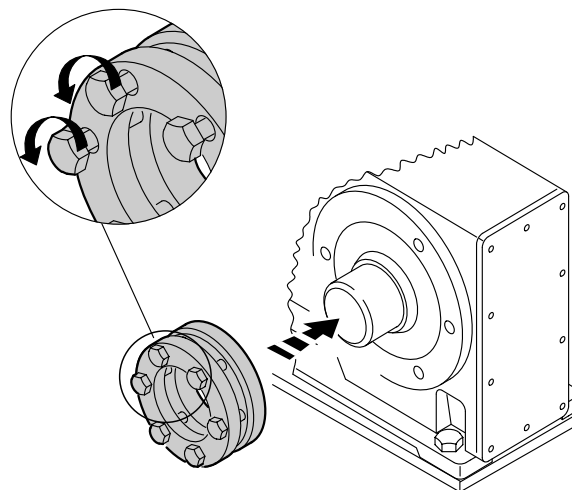
- Secure the bushing with the stop ring. Attach the stop ring to the bushing with the respective tightening torque. Refer to the following table for the suitable tightening torque.



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Gear unit type				Tightening torque	
FT..	KT..	ST..	WT..	Nm	
				Standard	Stainless steel
–	–	37	37	10	10
37	37	47	47	10	10
47	39/47	57	–	10	10
57/67	49/57/67	67	–	25	25
77	77	77	–	25	25
87	87	87	–	25	25
97	97	97	–	25	25
107	107	–	–	38	38
127	127	–	–	65	65
157	157	–	–	150	150

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



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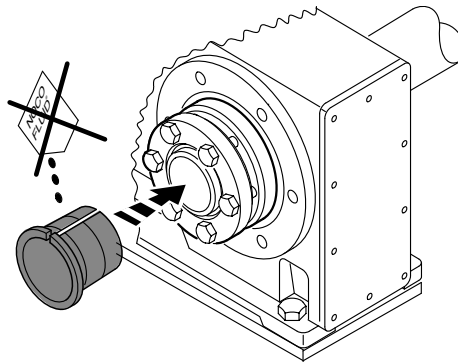
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# 4

## Mechanical installation

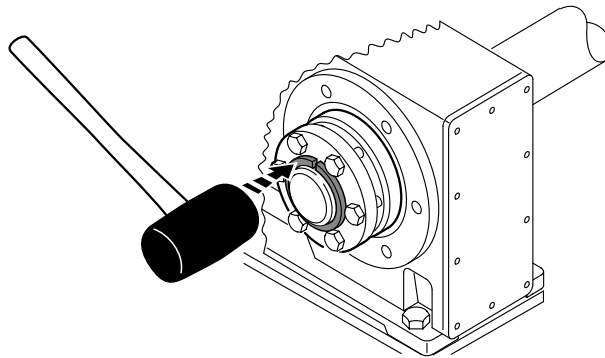
Shaft-mounted gear units with TorqLOC®

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



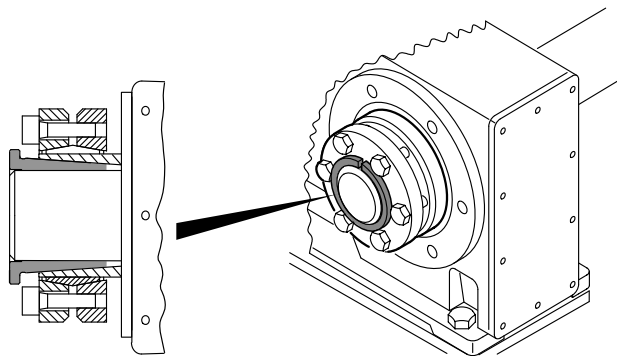
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11. In the case of a gear unit **with shaft shoulder**, mount the shrink disk at the shaft shoulder up to the stop. In the case of a gear unit **without shaft shoulder**, mount the shrink disk at a distance of 1 mm to 2 mm from the gear unit housing.
12. Tap lightly on the flange of the counter bushing to ensure that the bushing is fitted securely in the hollow shaft.



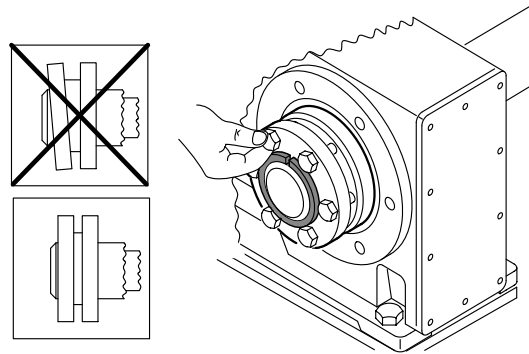
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13. Make sure that the customer shaft is seated in the counter bushing.



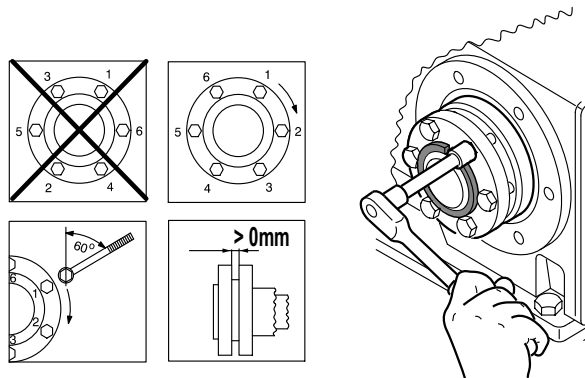
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14. Manually tighten the screws of the shrink disk. Make sure that the outer rings of the shrink disk are plane-parallel.



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



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## INFORMATION



The exact values for the tightening torques are shown on the shrink disk.

## INFORMATION



Standard shrink disks and stainless steel shrink disks have the same tightening torques.

Gear unit type				Locking screw ISO 4762	Tightening torque ± 4% Nm
FT..	KT..	ST..	WT..		
–	–	37	37	M5	4
37	37	47	47	M6	12
47/57/67	39/47/49/57/67	57/67	–	M6	12
77/87/97	77/87/97	77/87/97	–	M8	30
107	107	–	–	M10	59
127/157	127/157	–	–	M12	100

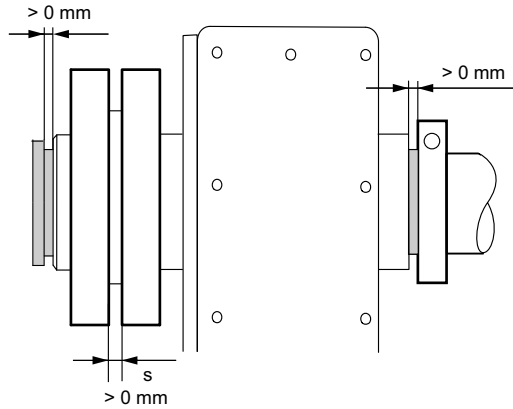
16. After installation, make sure the remaining gap "s" between the outer rings of the shrink disk is > 0 mm.

# 4

## Mechanical installation

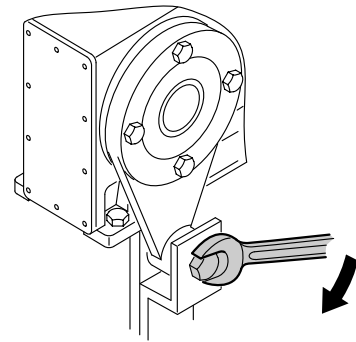
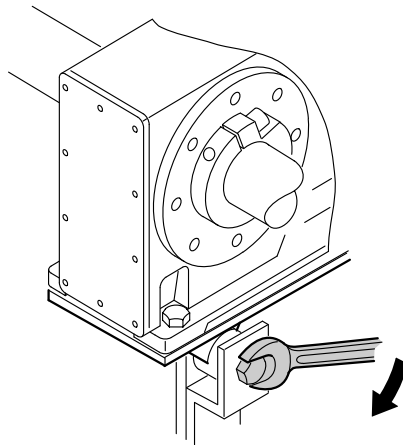
Shaft-mounted gear units with TorqLOC®

17. Make sure that the remaining gap between counter bushing and hollow shaft end, as well as between hollow shaft end and the stop ring is  $> 0$  mm.



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18. Tighten the torque arm. Note the information in chapter "Torque arm for shaft-mounted gear units" ( $\rightarrow$  39).



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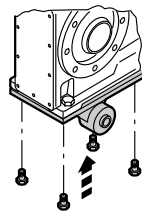
4.8.2 Mounting a customer shaft with contact shoulder

1. Clean the customer shaft and the inside of the hollow shaft. Ensure that all traces of grease or oil are removed.

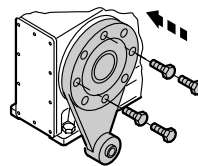


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2. Attach the torque arm to the drive unit. Note the information in chapter "Torque arm for shaft-mounted gear units" (→ 39).



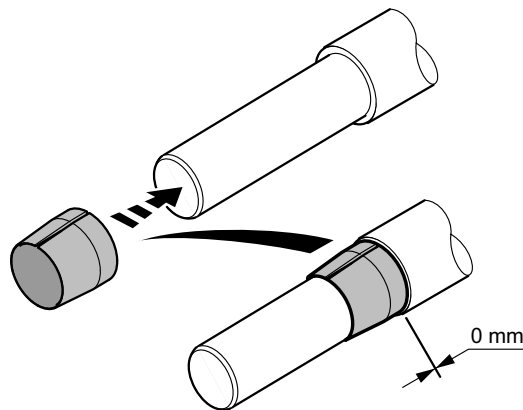
K..7



S../W../K..9

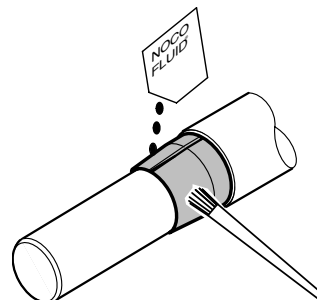
20622111627

3. Slide the bushing onto the customer shaft.



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4. Apply NOCO® fluid directly to the bushing. Spread carefully.



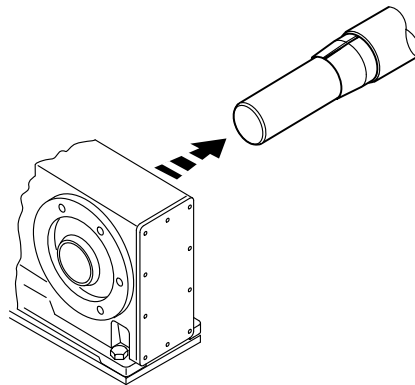
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# 4

## Mechanical installation

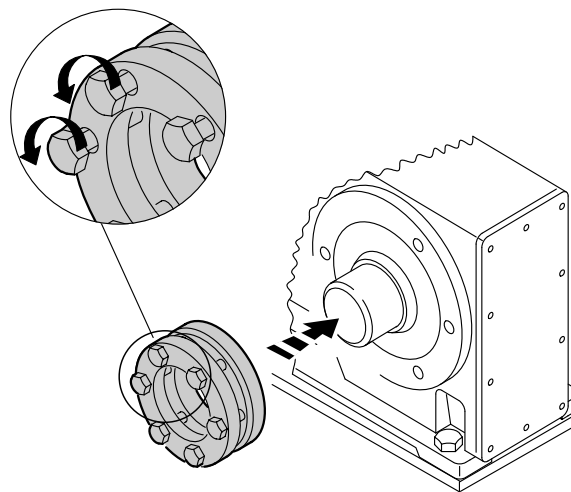
Shaft-mounted gear units with TorqLOC®

5. Push the gear unit onto the customer shaft.



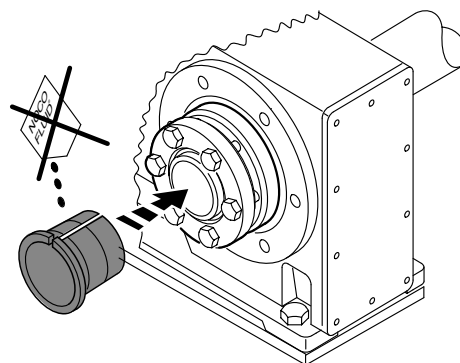
5129650443

6. Ensure that all screws are loosened. Slide the shrink disk onto the hollow shaft.



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



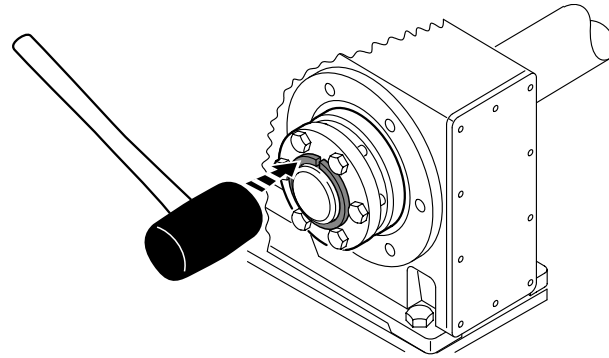
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8. In the case of a gear unit **with shaft shoulder**, mount the shrink disk at the shaft shoulder up to the stop. In the case of a gear unit **without shaft shoulder**, mount the shrink disk at a distance of 1 mm to 2 mm from the gear unit housing.

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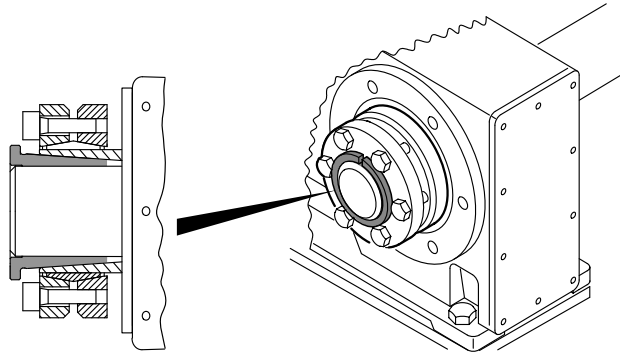


9. Tap lightly on the flange of the counter bushing to ensure that the bushing is fitted securely in the hollow shaft.



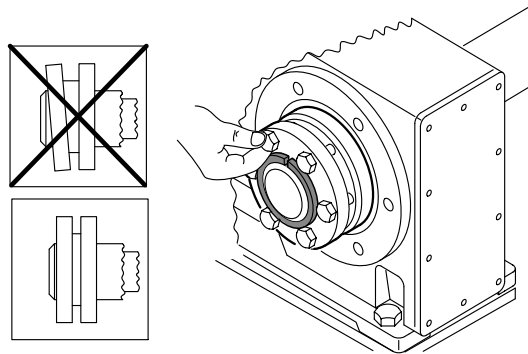
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10. Make sure that the customer shaft is seated in the counter bushing.



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11. Manually tighten the screws of the shrink disk. Make sure that the outer rings of the shrink disk are plane-parallel.



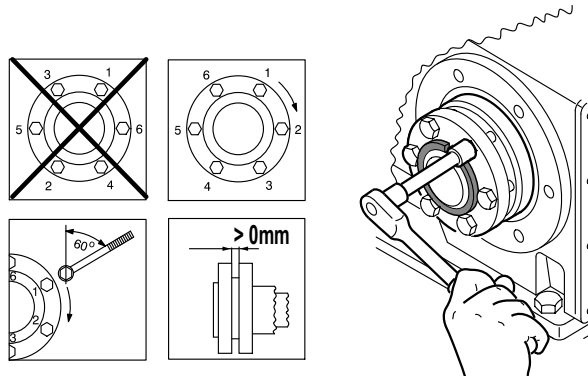
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# 4

## Mechanical installation

Shaft-mounted gear units with TorqLOC®

12. Tighten the locking screws with the specified tightening torque according to the following table. Tighten the screws by working round several times from one bolt to the next (not in diametrically opposite sequence).



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### INFORMATION



The exact values for the tightening torques are shown on the shrink disk.

### INFORMATION

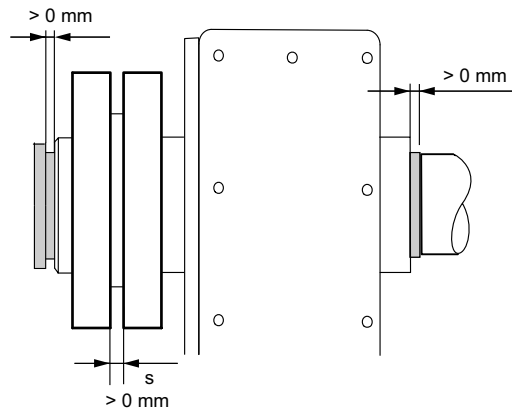


Standard shrink disks and stainless steel shrink disks have the same tightening torques.

Gear unit type				Locking screw ISO 4762	Tightening torque ± 4% Nm
FT..	KT..	ST..	WT..		
–	–	37	37	M5	4
37	37	47	47	M6	12
47/57/67	39/47/49/57/67	57/67	–	M6	12
77/87/97	77/87/97	77/87/97	–	M8	30
107	107	–	–	M10	59
127/157	127/157	–	–	M12	100

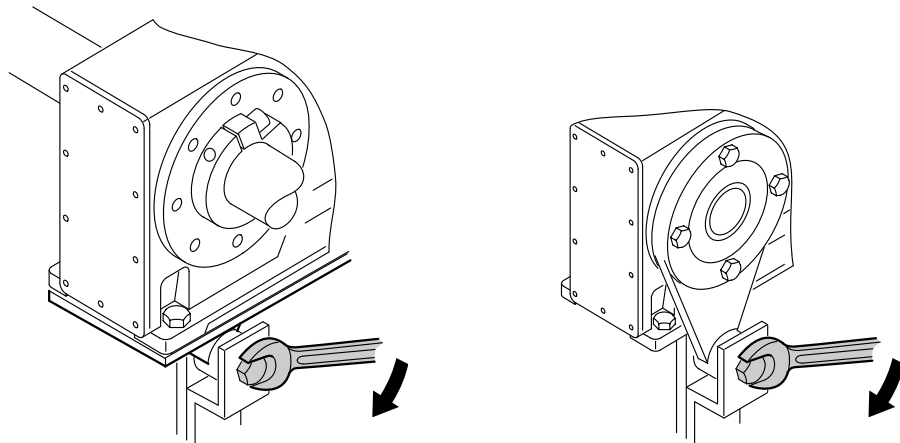
13. After installation, make sure the remaining gap "s" between the outer rings of the shrink disk is > 0 mm.

14. Make sure that the remaining gap between counter bushing and hollow shaft end, as well as between the hollow shaft end and customer shaft shoulder is  $> 0$  mm.



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15. Mount the torque arm and firmly tighten it. Note the information in chapter "Torque arm for shaft-mounted gear units" ( $\rightarrow$  39).



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## 4.8.3 Removing the shaft-mounted gear unit

**▲ CAUTION**

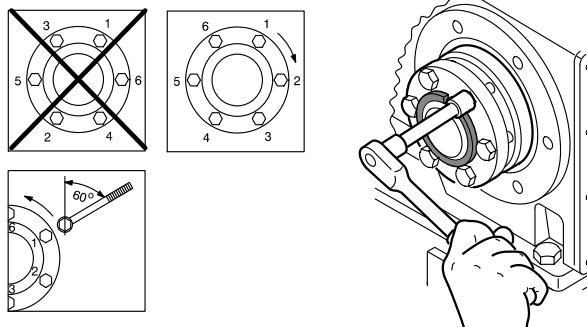
Risk of burns caused by hot surfaces

Severe injuries

- Let the units cool down before working on them.

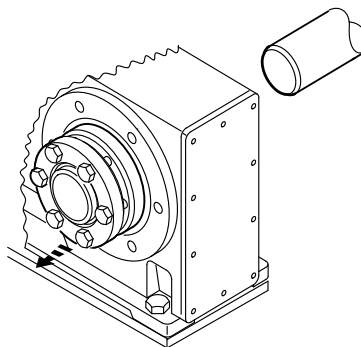
Proceed as follows:

1. To prevent the outer rings from jamming, loosen the locking screws for a quarter turn, one after the other.



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



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5. Remove the shrink disk from the hub.

**INFORMATION**

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

#### 4.8.4 Cleaning and lubricating shaft-mounted gear units

- If the shrink disk is dirty, clean and lubricate the shrink disk.
- 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.

# 4 Mechanical installation

## Mounting the cover

### 4.9 Mounting the cover

#### ⚠ CAUTION

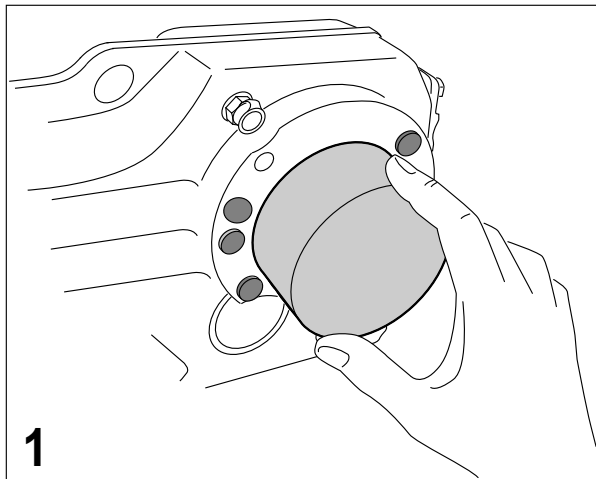


Injury due to assembly work during operation.

Injury

- Before you begin working on the unit, disconnect the motor from the power supply. Safeguard the drive against unintentional restart.

#### 4.9.1 Mounting the rotating cover



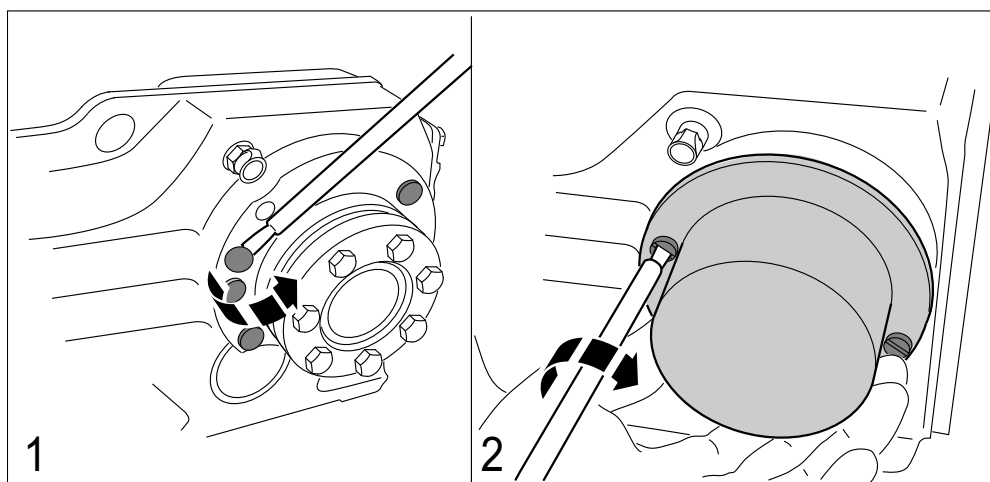
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1. Slide the rotating cover onto the shrink disk until it snaps in.

#### 4.9.2 Mounting the fixed cover

Proceed as follows:

1. Remove the plastic plug on the gear unit housing (see figure 1).



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2. Use the delivered screws to mount the cover to the gear unit housing (see figure 2).

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#### **4.9.3 Operation without cover**

In certain application cases, e.g. with a through-shaft, a cover cannot be installed. The cover is not necessary if the system or unit manufacturer provides corresponding components to guarantee for compliance with the required degree of protection. If this results in additional maintenance, the manufacturer has to describe this in the operating instructions for the system or component.

# 4 Mechanical installation

## Coupling of AM adapters

### 4.10 Coupling of AM adapters

#### 4.10.1 Mounting the IEC adapter AM63 – 280/NEMA adapter AM56 – 365

#### NOTICE

Damage to the adapter due to ingress of moisture or dirt (e.g. dust) when a motor/drive is attached to the adapter.

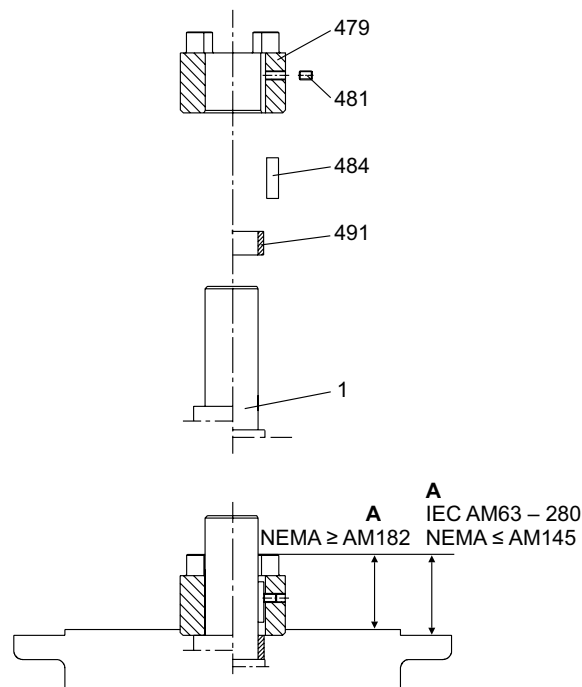
Damage to the adapter

- Seal the adapter with an anaerobic fluid seal.
- When the motor/drive to be attached has openings or bores that provide access to the inside of the adapter, seal these against dust or liquid.

#### INFORMATION



To avoid contact corrosion, SEW-EURODRIVE recommends to apply NOCO® fluid to the motor shaft before mounting the coupling half.



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

Proceed as follows:

1. Clean the motor shaft and flange surfaces of the motor and the adapter.
2. Remove the key from the motor shaft. Replace the key from the motor shaft with the supplied key [484] (not AM63 and AM250).
3. Heat the coupling half [479] to approx. 80 °C – 100 °C and push the coupling half onto the motor shaft. Position as follows:
  - IEC adapter AM63 – 225 until stop at motor shaft shoulder.



- IEC adapter AM250 – 280 to distance "A". The values for the distance "A" are listed in the following table.
- NEMA adapter with spacer tube [491] to distance "A". The values for the distance "A" are listed in the following table.
- 4. Secure the key and coupling half using the set screw [481] on the motor shaft. Refer to the following table for the required tightening torque " $T_A$ ".
- 5. Check the position of the coupling half. The values for the distance "A" are listed in the following table.
- 6. Seal the contact surfaces between the adapter and motor using a suitable sealing compound.
- 7. Mount the motor on the adapter. Ensure that the coupling claws of the adapter shaft are engaged in the plastic cam ring.

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

#### Permitted loads

### NOTICE

Overloading of the gear unit due to excessive weight or excessive power rating of an attached motor.

Gear unit failure

- Note that the load data specified in the following table are not to be exceeded.
- Make sure that the approved power rating (torque and speed) on the adapter is observed according to the nameplate.

### NOTICE

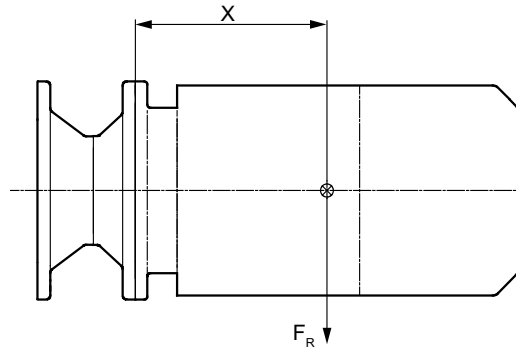
Danger due to static overdetermination when motors are additionally attached via a foot plate.

Damage to property

- A motor attached at the foot relieves the interface on the adapter, but you have to make sure that the attached foot-mounted motor is attached to the customer's construction stress-free.

# 4 Mechanical installation

## Coupling of AM adapters



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- ⊗ Motor's center of gravity
- X Distance from adapter flange – motor center
- $F_R$  Overhung load

Permitted loads for gear unit series R..7, F..7, K..7, K..9, and S..7:

Adapter type		$x^{1)}$ mm	$F_R^{1)}$ 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 <sup>2)</sup>	AM213/215 <sup>2)</sup>	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) If the center of gravity distance  $x$  increases, the maximum permitted weight  $F_{R_{max}}$  of the attached motor must be reduced linearly. If this center of gravity distance  $x$  is reduced, it is not permitted to increase the maximum permitted weight  $F_{R_{max}}$ .
- 2) Diameter of the adapter output flange: 160 mm

Permitted loads for gear unit series SPIROPLAN® W37 – W47

Adapter type		$x^{1)}$ mm	$F_R^{1)}$ N	
IEC	NEMA		IEC adapter	NEMA adapter
AM63/71	AM56	115	140	120
AM80/90	AM143/145	151	270	255

- 1) If the center of gravity distance  $x$  increases, the maximum permitted weight  $F_{R_{max}}$  of the attached motor must be reduced linearly. If this center of gravity distance  $x$  is reduced, it is not permitted to increase the maximum permitted weight  $F_{R_{max}}$ .

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Permissible power ratings and mass moments of inertia

The following table shows the permitted power ratings and mass moments of inertia:

Adapter type		P <sub>m</sub> <sup>1)</sup> kW	J <sub>Adapter</sub> kg × m <sup>2</sup>
IEC	NEMA		
AM63	–	0.25	0.44 × 10 <sup>-4</sup>
AM71	AM56	0.37	0.44 × 10 <sup>-4</sup>
AM80	AM143	0.75	1.9 × 10 <sup>-4</sup>
AM90	AM145	1.5	1.9 × 10 <sup>-4</sup>
AM100	AM182	3	5.2 × 10 <sup>-4</sup>
AM112	AM184	4	5.2 × 10 <sup>-4</sup>
AM132S/M	AM213/215	7.5	19 × 10 <sup>-4</sup>
AM132ML	–	9.2	19 × 10 <sup>-4</sup>
AM160	AM254/256	15	91 × 10 <sup>-4</sup>
AM180	AM284/286	22	90 × 10 <sup>-4</sup>
AM200	AM324/326	30	174 × 10 <sup>-4</sup>
AM225	AM364/365	45	174 × 10 <sup>-4</sup>
AM250	–	55	173 × 10 <sup>-4</sup>
AM280	–	90	685 × 10 <sup>-4</sup>

1) Maximum rated power of the attached standard electric motor at 1400 1/min

4.10.2 AM adapter with AM../RS backstop

Check the direction of rotation of the drive prior to mounting or startup. In case of a wrong direction of rotation, contact SEW-EURODRIVE.

The backstop is maintenance-free in operation. Backstops have a minimum lift-off speed depending on the size (see following table).

**NOTICE**

If the speed is below the minimum lift-off speed of the drive, the backstop is subject to wear and heats up.

Possible damage to property.

- In nominal operation the lift-off speed of the drive must not drop below the specified minimum.
- During startup or braking, the lift-off speed of the drive may drop below the minimum levels.

Type	Maximum locking torque of the backstop Nm	Minimum lift-off speed min <sup>-1</sup>
AM80/90/RS AM143/145/RS	65	820

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Type	Maximum locking torque of the backstop Nm	Minimum lift-off speed min <sup>-1</sup>
AM100/112/RS AM182/184/RS	425	620
AM132/RS AM213/215/RS	850	530
AM160/180/RS AM254/286/RS	1450	480
AM200/225/RS AM324-365/RS	1950	450
AM250/280/RS	1950	450

#### 4.10.3 Mounting of third-party motors at AM and AR/AL adapters

If a third-party motor is mounted, the customer must ensure that the permitted weight and the power at the adapter are adhered to according to the operating instructions. For information on the permitted loads, refer to chapter "Permitted loads" (→ 69).

Type	x <sup>1)</sup> mm	F <sub>R</sub> <sup>1)</sup> N
AR/AL71	77	375
AR/AL80/90	113	320
AR/AL100/112	144	1560
AR/AL132 <sup>2)</sup>	186	1230
AR/AL132	186	3630
AR/AL160/180	251	3540

<sup>1)</sup> If the center of gravity distance x increases, the maximum permitted weight F<sub>R,max</sub> of the attached motor must be reduced linearly. If the center of gravity distance x decreases, the maximum permitted weight F<sub>R,max</sub> must not be increased.

<sup>2)</sup> Diameter of the adapter output flange: 160 mm

#### 4.10.4 AM adapter with foot-mounted motor

A foot-mounted motor reduces the loads at the adapter interface. The foot-mounted motor at the adapter must be installed without tensions at the customer construction.

## 4.11 AQ. adapter coupling

### 4.11.1 Mount adapter AQA80 – 190 (with keyway)/Adapter AQH80 – 190 (without keyway)

#### NOTICE

Damage to the adapter due to ingress of moisture or dirt (e.g. dust) when a motor/drive is attached to the adapter.

Damage to the adapter

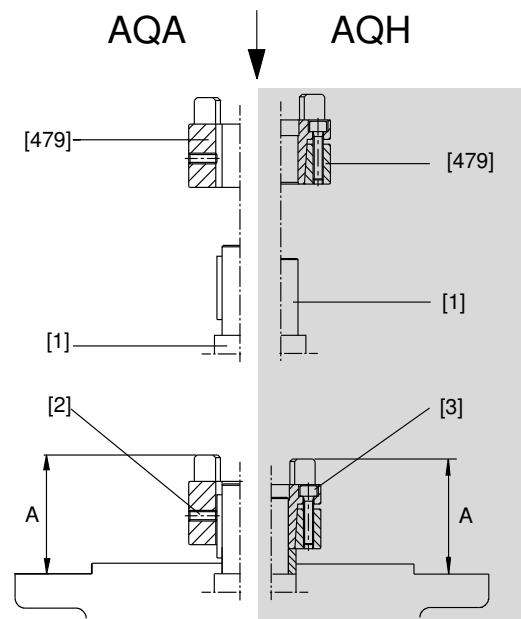
- Seal the adapter with an anaerobic fluid seal.
- When the motor/drive to be attached has openings or bores that provide access to the inside of the adapter, seal these against dust or liquid.

#### INFORMATION



**For AQA:** To avoid contact corrosion, SEW-EURODRIVE recommends applying NOCO® fluid to the motor shaft before mounting the coupling half.

**For AQH:** Using NOCO® fluid is not approved.



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- |                 |                     |
|-----------------|---------------------|
| [1] Motor shaft | [3] Washer          |
| [2] Lock washer | [479] Coupling half |

Proceed as follows:

1. Clean the motor shaft and flange surfaces of the motor and the adapter.
2. **AQH design:** Loosen the screws of the coupling half [479] and loosen the conical connection.
3. **AQA/AQH design:** Heat the coupling half to approx. 80 °C – 100 °C and push the coupling half onto the motor shaft up to distance "A". The values for the distance "A" are listed in the table in chapter "Setting standards and tightening torques" (→ 74).

4. **AQH design:** Tighten the screws evenly in diametrically opposite sequence, working round several times. The values for the tightening torque " $T_A$ " are listed in the table in chapter "Setting standards and tightening torques" (→ 74).
5. **AQA design:** Secure the coupling half using the set screw (see figure).
6. Check the position of the coupling half. The values for the distance "A" are listed in the table in chapter "Setting standards and tightening torques" (→ 74).
7. Mount the motor onto the adapter, making sure that the claws of the two coupling halves engage in each other.
  - ⇒ The force that must be applied when joining the two coupling halves is dissipated after final assembly, so there is no risk of any axial load being applied to adjacent bearings.

#### 4.11.2 Setting standards and tightening torques

Type	Coupling Ø mm	Distance A mm	Screws		Tightening torque $T_A$ Nm	
			AQA	AQH	AQA	AQH
AQA /AQH 80 /1 /2 /3	19	44.5	M5	6 × M4	2	4
AQA /AQH 100 /1 /2		39				
AQA /AQH 100 /3 /4		53				
AQA /AQH 115 /1 /2		62				
AQA /AQH 115 /3	24	62	M5	4 × M5	2	9
AQA /AQH 140 /1 /2		62				
AQA /AQH 140 /3 /4	28	74.5	M8	8 × M5	10	9
AQA /AQH 160 /1		74.5				
AQA /AQH 190 /1 /2		76.5				
AQA /AQH 190 /3	38	100	M8	8 × M6	10	14

#### 4.11.3 Permitted loads

### NOTICE

Overloading of the gear unit due to excessive weight or excessive power rating of an attached motor.

Gear unit failure

- Note that the load data specified in the following table are not to be exceeded.
- Make sure that the approved power rating (torque and speed) on the adapter is observed according to the nameplate.

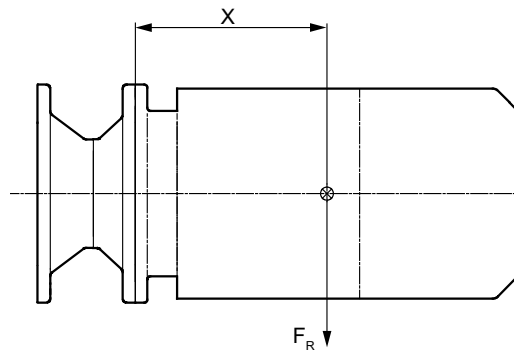
**NOTICE**

Danger due to static overdetermination when motors are additionally attached via a foot plate.

Damage to property

- A motor attached at the foot relieves the interface on the adapter, but you have to make sure that the attached foot-mounted motor is attached to the customer's construction stress-free.

The following figure shows the permitted force application points for the permitted maximum weights:



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- ⊗ Motor's center of gravity
- X Adapter flange – motor center distance
- $F_R$  Overhung load

Type	$x^1$ mm	$F_R^1$ N
AQ80	77	370
AQ100/1/2	113	350
AQ100/3/4	113	315
AQ115	113	300
AQ140/1/2	144	1550
AQ140/3	144	1450
AQ160	144	1450
AQ190/1/2 <sup>2)</sup>	186	1250
AQ190/3 <sup>2)</sup>	186	1150
AQ190/1/2	186	3750
AQ190/3	186	3400

- 1) Maximum load values for connection screws of strength class 8.8. If the center of gravity distance  $x$  increases, the maximum permitted weight  $F_{R\_max}$  of the attached motor must be reduced linearly. If the center of gravity distance  $x$  decreases, the maximum permitted weight  $F_{R\_max}$  must not be increased.
- 2) Diameter of the adapter output flange: 160 mm

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### 4.12 EWH adapters

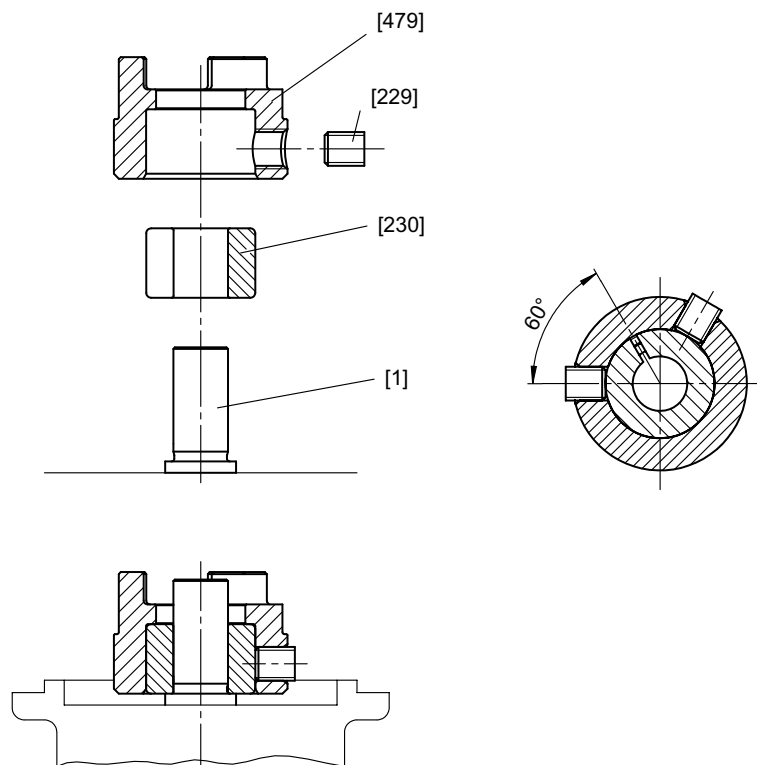
#### 4.12.1 Adapter EWH01 – 03

#### NOTICE

Damage to the adapter due to ingress of moisture or dirt (e.g. dust) when a motor/drive is attached to the adapter.

Damage to the adapter

- Seal the adapter with an anaerobic fluid seal.
- When the motor/drive to be attached has openings or bores that provide access to the inside of the adapter, seal these against dust or liquid.



4557485195

[1]	Motor shaft	[230]	Motor shaft sleeve
[229]	Clamping screws	[479]	Coupling half

1. Clean and de-grease the hollow shaft hole of the coupling half [479], the motor shaft sleeve [230], and the motor shaft [1].
2. Insert the motor shaft sleeve [230] into the coupling half [479] so that the slot of the motor shaft sleeve [230] is at a 60° angle to the two clamping screws [229].
3. Push the coupling half [479] until it reaches the shoulder of the motor shaft.
4. Tighten the clamping screws [229] one after the other with a suitable torque wrench, first to 25% of the tightening torque specified in the following table.
5. Tighten the two clamping screws [229] to the full specified tightening torque.



Adapter type	Motor shaft diameter mm	Number of clamping screws	Tightening torque of the clamping screw Nm	Wrench size mm
EWH01	9	2	6	3
EWH01	11	2	10	4
EWH02	11; 14; 16	2	10	4
EWH03	11; 14; 16	2	10	4

4.12.2 Permitted loads

**NOTICE**

Overloading of the gear unit due to excessive weight or excessive power rating of an attached motor.

Gear unit failure

- Note that the load data specified in the following table are not to be exceeded.
- Make sure that the approved power rating (torque and speed) on the adapter is observed according to the nameplate.

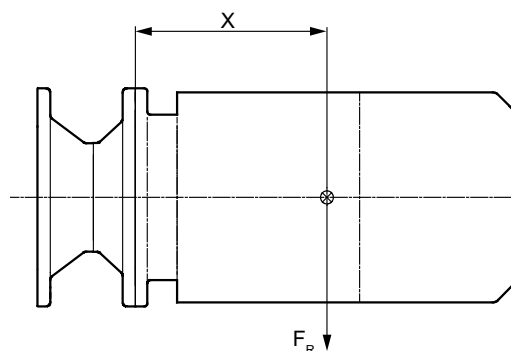
**NOTICE**

Danger due to static overdetermination when motors are additionally attached via a foot plate.

Damage to property

- A motor attached at the foot relieves the interface on the adapter, but you have to make sure that the attached foot-mounted motor is attached to the customer's construction stress-free.

The following figure shows the permitted force application points for the permitted maximum weights:



9007199273254411

- ⊗ Motor's center of gravity
- X Distance from adapter flange to the middle of the motor
- $F_R$  Overhung load

Type	$x^{1)}$ mm	$F_R^{1)}$ N
EWH01	113	40

# 4 Mechanical installation

## EWH adapters

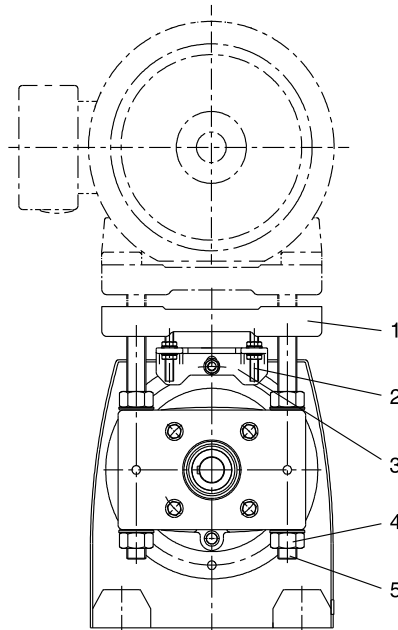
Type	$x^{1)}$ mm	$F_R^{1)}$ N
EWH02	120	56
EWH03	120	56

- 1) Maximum load values for connection screws of strength class 8.8. If the center of gravity distance  $x$  increases, the maximum permitted weight  $F_{R\_max}$  of the attached motor must be reduced linearly. If the center of gravity distance  $x$  decreases, the maximum permitted weight  $F_{R\_max}$  must not be increased.

## 4.13 AD Input shaft assembly

Observe chapter "Mounting the drive components and output elements" (→ 37) when installing drive components.

### 4.13.1 Mounting the cover with motor platform AD../P



212119307

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

To mount the motor and to adjust the motor platform proceed as follows:

1. Set the motor platform [1] to the required mounting position by evenly tightening the adjusting nuts [4].
2. If necessary, remove the lifting eyebolt/lifting eye of the helical gear unit to reach the lowest adjustment position. Touch up any damage to the paint work.
3. Align the motor on the motor platform [1] so that the shaft ends are in line. Attach the motor.
4. Mount the drive component onto the input side shaft end and the motor shaft.
5. Align drive component, shaft end and motor shaft. If necessary correct the motor position again.
6. Put on the traction elements (V-belt, chain, etc.) and apply a preload by evenly adjusting the motor platform [1]. Do not stress the motor platform and the columns against each other when doing this.
7. To fasten the threaded columns [5] tighten the nuts [4] that are not used for adjustment.

# 4 Mechanical installation

## AD Input shaft assembly

### 4.13.2 Special aspects of AD6/P and AD7/P

Proceed as follows:

1. Unscrew the nuts on the threaded bolts [2] before adjustment to allow the threaded bolts [2] to move axially in the support [3] without restriction.
2. Only tighten the nuts when the final adjustment position is reached.

### INFORMATION

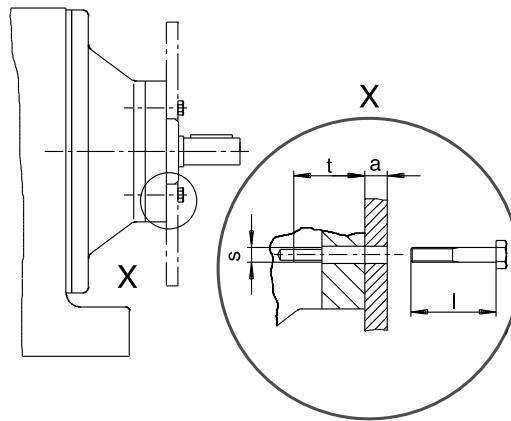


Do not adjust the motor platform [1] via the support [3].

### 4.13.3 AD../ZR input shaft assembly with centering shoulder

Mounting applications on the input shaft assembly with centering shoulder

1. Prepare screws of a suitable length for attaching the application. The following figure shows the screw length  $l = t + a$ . **Round off the result to the next smaller standard length.**



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- a    Strength of the additional element    s    Retaining thread (see table)  
t    Screw-in depth (see table)

2. Remove the retaining screw from the centering shoulder
3. Clean the contact surface and the centering shoulder.
4. Clean the threads of the new bolts and apply a thread locking compound (e.g. Loctite® 243) to the first few threads.
5. Place the application on the centering shoulder. Tighten the retaining screws with the specified tightening torque "T<sub>A</sub>" (see following table).

Type	Screw-in depth t mm	Retaining thread	Tightening torque T <sub>A</sub> for connection screws of strength class 8.8 Nm
AD2/ZR	25.5	M8	27
AD3/ZR	31.5	M10	54
AD4/ZR	36	M12	93
AD5/ZR	44	M12	93
AD6/ZR	48.5	M16	230

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Type	Screw-in depth t mm	Retaining thread	Tightening torque $T_A$ for connection screws of strength class 8.8 Nm
AD7/ZR	49	M20	464
AD8/ZR	42	M12	93

**Permitted loads**

The following figure shows the permitted force application points for the permitted maximum weights:

**NOTICE**

Overloading of the gear unit due to excessive weight or excessive power rating of an attached motor.

Gear unit failure

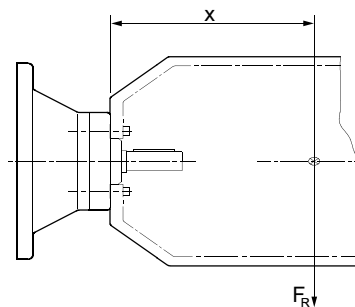
- Note that the load data specified in the following table are not to be exceeded.
- Make sure that the approved power rating (torque and speed) on the adapter is observed according to the nameplate.

**NOTICE**

Danger due to static overdetermination when motors are additionally attached via a foot plate.

Damage to property

- A motor attached at the foot relieves the interface on the adapter, but you have to make sure that the attached foot-mounted motor is attached to the customer's construction stress-free.



- ⊗ Motor's center of gravity
- X Distance from adapter flange – motor center
- $F_R$  Overhung load

Type	$x^{1)}$ mm	$F_R^{1)}$ N
AD2/ZR	193	330
AD3/ZR	274	1400
AD4/ZR <sup>2)</sup>	361	1120
AD4/ZR		3300

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# 4 Mechanical installation

## AD Input shaft assembly

Type	x <sup>1)</sup> mm	F <sub>R</sub> <sup>1)</sup> N
AD5/ZR	487	3200
AD6/ZR	567	3900
AD7/ZR	663	10000
AD8/ZR	516	4300

- 1) Maximum load values for connection screws of strength class 8.8. If the center of gravity distance x increases, the maximum permitted weight F<sub>R\_max</sub> of the attached motor must be reduced linearly. If the center of gravity distance x decreases, the maximum permitted weight F<sub>R\_max</sub> must not be increased.
- 2) Diameter of the adapter output flange: 160 mm

### 4.13.4 Cover with backstop AD../RS

Check the direction of rotation of the drive prior to mounting or startup. In case of a wrong direction of rotation, contact SEW-EURODRIVE.

The backstop is maintenance-free in operation. Backstops have a minimum lift-off speed depending on the size (see following table).

#### NOTICE

If the speed is below the minimum lift-off speed of the drive, the backstop is subject to wear and heats up.

Possible damage to property.

- In nominal operation the lift-off speed of the drive must not drop below the specified minimum.
- During startup or braking, the lift-off speed of the drive may drop below the minimum levels.

Type	Maximum locking torque of the backstop Nm	Minimum lift-off speed min <sup>-1</sup>
AD2/RS	65	820
AD3/RS	425	620
AD4/RS	850	530
AD5/RS	1450	480
AD6/RS	1950	450
AD7/RS	1950	450
AD8/RS	1950	450

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4.14 Direct mounting of a motor on a gear unit

**INFORMATION**

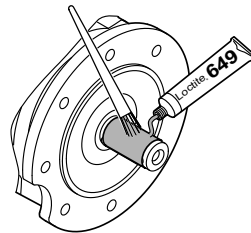


Secure all pinions on the motor or input shaft with Loctite® 649 even if a retaining ring is additionally present.

If the pinion is already fastened to the shaft, start cleaning the sealing surface (step 6).

Joining the pinion to the motor or input shaft

1. Clean and degrease the shaft and the bore of the pinion.
2. Apply Loctite® 649 to the shaft after the securing hole over the entire area of the circumference.



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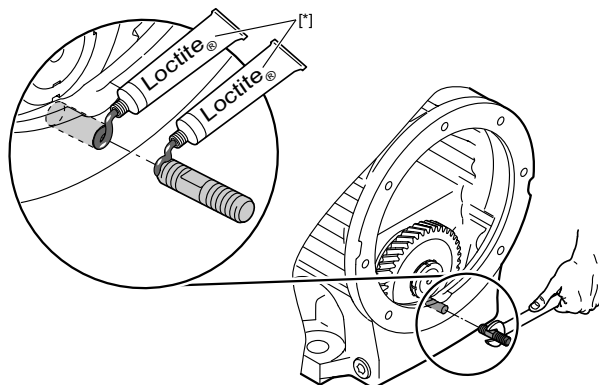
Cleaning the sealing surfaces

3. Warm the pinion up to **at least** 100 °C to a **maximum of** 130 °C.
4. Push the pinion onto the shaft.
5. Secure the pinion on the shaft with the retaining ring.
6. Remove oils, grease, irregularities of the surface, rust and old Loctite® residue from the flange surfaces.

Sealing threads that lead into the housing interior

To prevent oil from escaping after installation, flange threads that lead into the housing interior must be sealed!

7. Clean and degrease thread through bores that lead into the housing interior and their studs.
8. Apply Loctite® 574 or Loctite® 5188 (selection according to the table at the end of the chapter) in a continuous ring on the upper threads of the flange thread and the stud.



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[\*] Loctite® according to the table at the end of the chapter

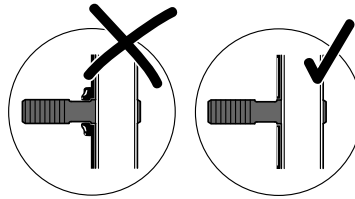
Screwing in the studs

9. Screw the studs into the thread up to the shoulder.

# 4 Mechanical installation

Direct mounting of a motor on a gear unit

10. Remove any excess Loctite® (see following diagram) from the sealing surface 60 minutes after screwing in at the latest.



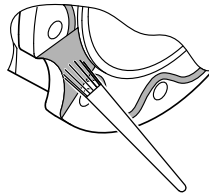
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Sealing the flange surface

## INFORMATION



Always apply the sealant over a large area in narrow places and on the gear units R97, R107, R127, F97 or F107.



11. Only distribute Loctite® 574 or Loctite® 5188 (selection according to the table at the end of the chapter) to one of the sealing surfaces. Apply the sealant in beads or over a large area without gaps. Use a suitable application tool that does not contaminate the sealing surface, for example, a non-shedding brush or a short-hair lamb's wool roller.

Joining flange surfaces

12. Join the flange surfaces together. Next, **immediately** tighten the nuts with the specified torque (see the table at the end). If you tighten the nuts too late, the sealing film can tear.
13. The sealant must harden for 30 minutes and must not come into contact with the gear oil.

### Tightening torques

Screw/nut	Tightening torque
	Nm
M6	11.3
M8	27.3
M10	54
M12	93
M16	230

### Selection and use of Loctite®

Sealant	Use	Suitability	Batch size	Part number
Loctite® 649	Locking agent for pinions	All gear units	50 ml	09120998

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Sealant	Use	Suitability	Batch size	Part number
Loctite® 574	Surface sealing agent	All gear units except for R97 – R127, F97, F107	7 ml	09102558
Loctite® 5188		R97 – R127, F97, F107	50 ml	03207013

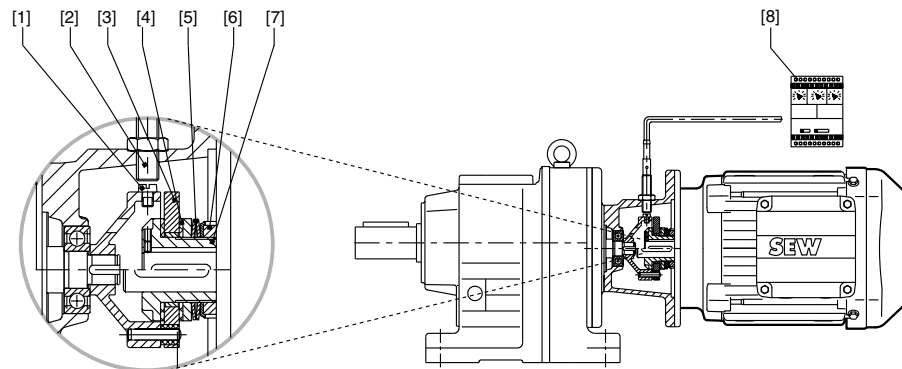
## 4.15 Accessory equipment

### 4.15.1 AR.. and AT.. centrifugal and friction couplings

#### AR.. friction coupling

Drives with a slip clutch consist of a standard gear unit and motor/variable speed gearmotor with an adapter installed between them. This adapter accommodates the slip clutch. In gearmotors with a double gear unit, the slip clutch may be located between the first and second gear units. On delivery, the slip torque is set individually according to the drive selection.

The following figure shows a drive with slip clutch and W speed monitor:



1901048587

[1] Trip cam	[4] Friction lining	[7] Friction hub
[2] Incremental encoder	[5] Cup spring	[8] Speed monitor
[3] Driving disk	[6] Slotted nut	

#### W speed monitor:

The speed monitor is used with constant-speed gearmotors and is connected to the incremental encoder in the adapter.

#### WS slip monitor:

The slip monitor is used with the following components:

- Speed-controlled motors with speed sensor
- VARIBLOC® variable-speed gear units

## INFORMATION



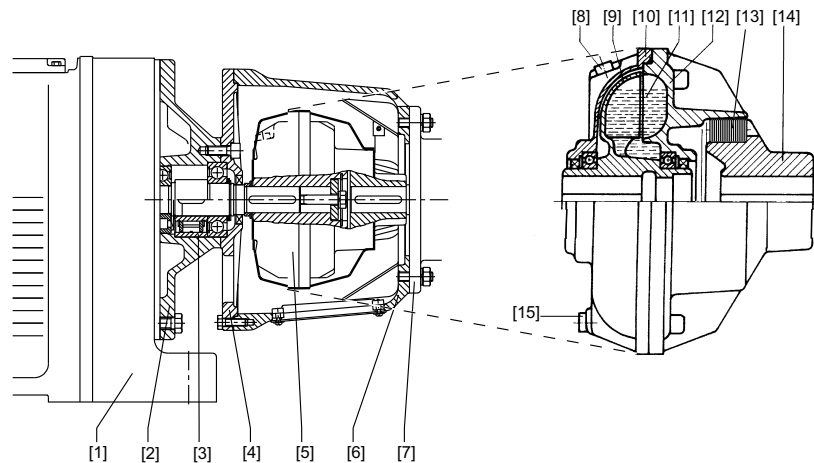
For further information about the AR.. coupling, refer to the "Start-up coupling and slip clutch AR.. and AT.." operating instructions.

#### AT.. hydraulic centrifugal coupling

Hydraulic centrifugal couplings are fluid couplings based on the Föttinger principle. They consist of 2 hinged hemispheres with blades separated by a tight gap.

The applied torque is transmitted by the inertial force of the streaming fluid. This fluid circulates within a closed circuit, between the pump wheel (primary side) [12] on the driving shaft (motor shaft) and the turbine wheel (secondary side) [9] on the driven shaft (gear unit input shaft).

The following figure shows the structure of a drive with hydraulic centrifugal coupling:



9007201155884683

- |                           |                               |                                      |
|---------------------------|-------------------------------|--------------------------------------|
| [1] Gear unit             | [6] Extended housing complete | [11] Operating fluid (hydraulic oil) |
| [2] Basic flange complete | [7] Motor                     | [12] Pump wheel                      |
| [3] Backstop (optional)   | [8] Filler plug               | [13] Elastic components              |
| [4] Intermediate flange   | [9] Turbine wheel             | [14] Flexible connection coupling    |

## INFORMATION



For detailed information about the AT.. coupling, refer to the "Start-up coupling and slip clutch AR.. and AT.." operating instructions.

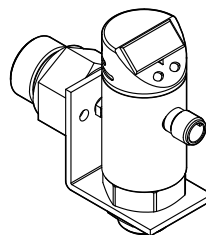
### 4.15.2 Diagnostic units /DUV and /DUO

#### Diagnostic unit DUO

DUO10A comprises a diagnostic unit and a temperature sensor. The temperature sensor (PT100 or PT1000 resistance sensor) is positioned in the gear unit oil to record the oil's temperature. The diagnostic units uses the oil temperature values to calculate the remaining service life of the oil.

The diagnostic unit continuously records the gear unit temperature and calculates the remaining service life for the selected oil type immediately. For this purpose, the diagnostic unit must be supplied with a 24 V voltage supply. Times when the diagnostic unit is switched off are not included in the forecast.

The following figure shows the DUO10A diagnostic unit:



### INFORMATION



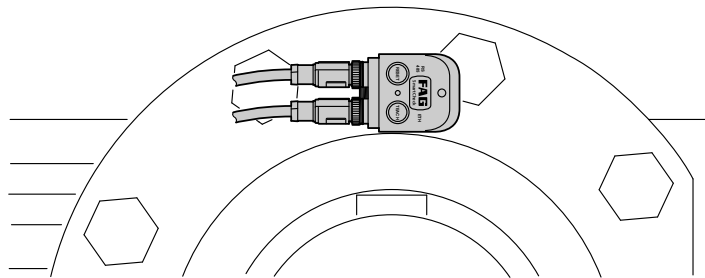
For further information on the evaluation unit, refer to the manual "DUV30A Diagnostic Unit".

#### Vibration SmartCheck /DUV40A

Vibration SmartCheck vibration monitoring is used to detect damage of gear units and gearmotors early (e.g. bearing damage or imbalances). For this purpose, permanent frequency-selective monitoring of the gearmotor is used. Apart from the vibration analysis, additional measured values of up to 3 signal encoders can be detected, recorded and analyzed. The additional signals can be used as reference values for signal analysis e.g. to trigger time or event-based measuring tasks. After the analysis and depending on user-defined alarm limits, the system can switch outputs and display the state using LEDs.

Vibration SmartCheck is configured using the FAG SmartWeb software. If you use several Vibration SmartCheck systems, you can control them via the FAG software SmartUtility Light centrally from one PC.

The full version of the SmartUtility software allows you to open sensors directly via the FAG SmartWeb software, to analyze measurement data in the SmartUtility Viewer and to download configurations or uploading configurations on other devices.



### INFORMATION



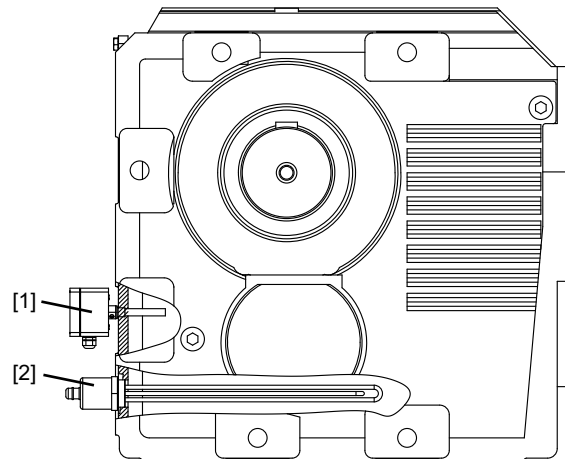
Further information about the evaluation unit and accessories can be found in the "Vibration SmartCheck" supplement (installation instructions).

#### 4.15.3 Gear unit heater for gear unit series R..7, F..7, and K..7

An oil heating can be required in order to allow for a smooth startup in the event of a cold start at low ambient temperatures. An oil heating is available with an external or an integrated thermostat depending on the gear unit design.

The heater is screwed into the gear unit housing and is controlled via a thermostat. The limit temperature of the thermostat below which the oil must be heated, is set depending on the respective lubricant.

The following figure shows a gear unit with heater and external thermostat:



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[1] Thermostat

[2] Heater

### INFORMATION



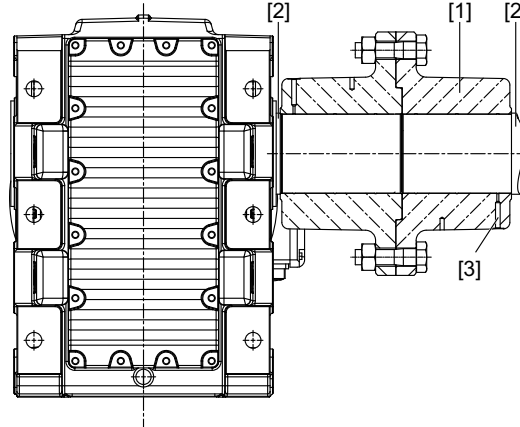
For further information regarding gear unit heaters, refer to the addendum "Gear unit heaters for gear unit series R..7, F..7 and K..7" to the operating instructions "Gear unit series R..7, F..7, K..7, K..9, S..7, SPIROPLAN® W".

### 4.15.4 Flange coupling

Flange couplings [1] are rigid couplings for connecting 2 shafts [2].

Flange couplings are suitable for operation in both directions of rotation, but cannot compensate any shaft misalignments.

Torque between shaft and coupling is transmitted via a cylindrical interference fit. The two coupling halves are mounted together at the flanges. The couplings are equipped with several disassembly bores [3] for removing the interference fit hydraulically.



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- [1] Rigid flange coupling
- [2] Customer and gear shaft
- [3] Disassembly bores

### INFORMATION



For detailed information about the rigid flange coupling, refer to the "Gear Unit Series R..7, F..7, K..7, S..7, and SPIROPLAN® W – Rigid flange coupling" addendum to the operating instructions.

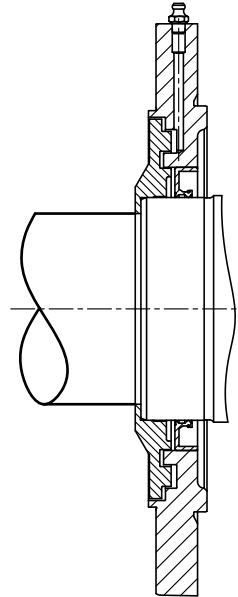
#### 4.15.5 Regreasing the labyrinth seal

Labyrinth seals are used to protect the oil seal in case of very high dust load or other abrasive substances.

#### Output shaft

The following figure shows an example of a regreasable radial labyrinth seal (taconite).

- Single oil seal with radial labyrinth seal
- Used in **very dusty** environments with abrasive particles



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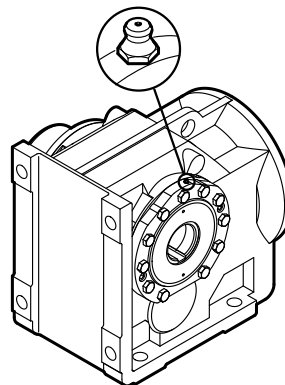
### INFORMATION



The gear shaft must rotate during relubrication.

#### Position of greasing points

Regreasable sealing systems are usually equipped with taper greasing nipples according to DIN 71412 A. Relubrication must be carried out at regular intervals. The greasing points are located near the output shaft, see following figure:



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# 4 Mechanical installation

Accessory equipment

## Refilling grease

Regreasable sealing systems can be refilled with lubricating grease. Use moderate pressure to force grease into each lubrication point until new grease leaks out of the sealing gap.

Used grease, including contaminants and sand, is in this way pressed out of the sealing gap.

## INFORMATION



Immediately remove the old grease that leaked out.

## Inspection and maintenance intervals



Observe the following inspection and maintenance intervals for the regreasing of labyrinth seals:

Time interval	What to do?
Every 3000 operating hours, at least every 6 months	Fill regreasable sealing systems with grease.

## Technical data

### Sealing and rolling bearing grease

The table shows the lubricants recommended by SEW-EURODRIVE:

Area of operation	Ambient temperature	Manufacturer	Type
Standard	-40 °C to +80 °C	Fuchs	Renolit CX-TOM 15 <sup>1)</sup>
	-40 °C to +80 °C	Klüber	Petamo GHY 133 N
 <sup>2)</sup>	-40 °C to +40 °C	Bremer & Leguil	Cassida Grease GTS 2
 <sup>3)</sup>	-20 °C to +40 °C	Fuchs	Plantogel 2S

1) Bearing grease based on semi-synthetic base oil

2) Lubricant for the food processing industry

3) Easily biodegradable lubricant for environmentally sensitive areas

## INFORMATION



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.

## INFORMATION

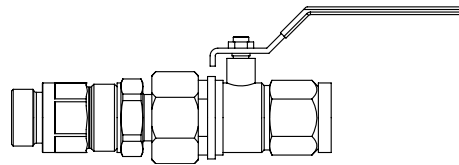


If a customer wants to use a grease that is not listed in the above table, the customer has to make sure that it is suitable for the intended application.



#### 4.15.6 Oil drain valve

The gear unit is equipped with an oil drain plug as standard. An oil drain valve can optionally be installed, that enables attaching a drain pipe for changing the gear unit oil.



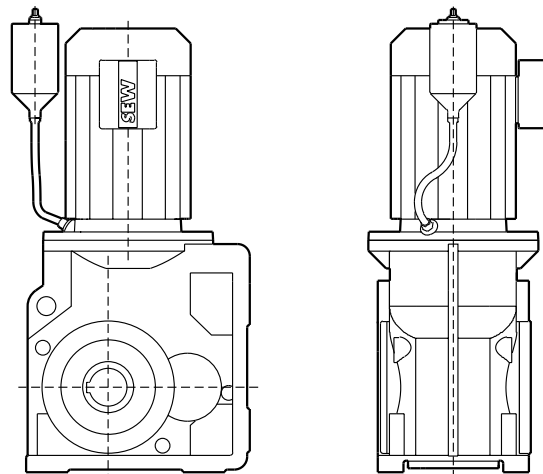
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#### 4.15.7 Oil expansion tank

The oil expansion tank allows the lubricant or air space of the gear unit to expand. This means no lubricant can escape the breather valve at high operating temperatures.

SEW-EURODRIVE recommends to use oil expansion tanks for gear units and gear-motors in M4 mounting position and for input speeds  $> 2000 \text{ min}^{-1}$ .

The following figure shows the oil expansion tank of a gearmotor.



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The oil expansion tank is delivered as assembly kit for mounting onto the gearmotor. In case of limited space or of gear units without motor, the oil expansion tank can also be mounted to nearby machine parts.

### INFORMATION



Transverse acceleration is not permitted for gear units with expansion tank with fixed piping for third party motors and servomotors.

For further information, contact your SEW-EURODRIVE sales representative.

# 4 Mechanical installation

## Accessory equipment

### 4.15.8 Oil-air cooler for splash lubrication /OAC

If the thermal rating of the naturally cooled gear unit is not sufficient, an oil-air cooling system can be used.

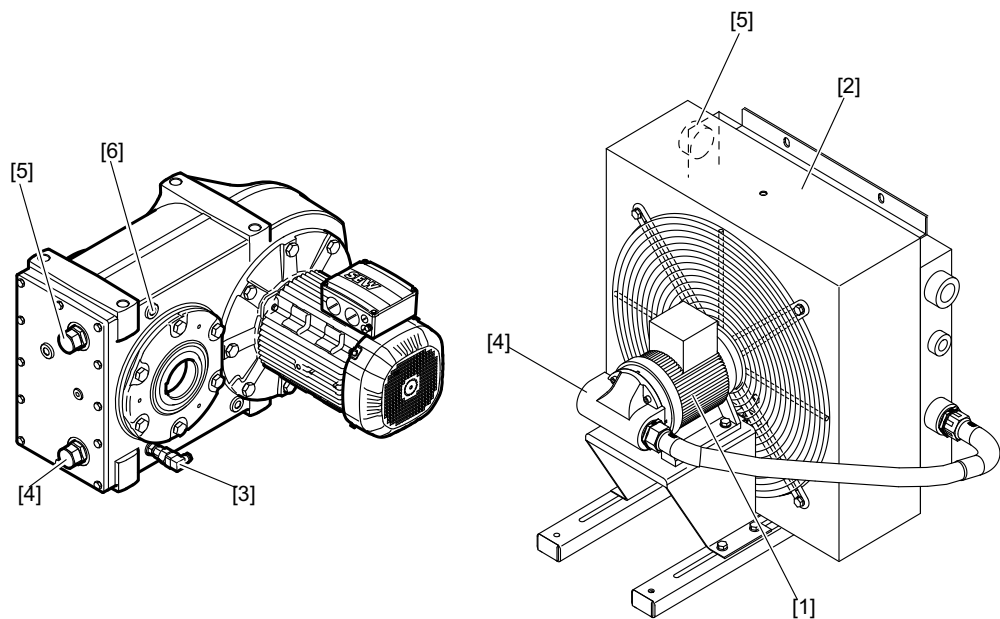
The cooling system is delivered without electrical wiring and piping as a complete unit on a base frame for separate installation.

The standard scope of delivery of the cooling system includes:

- Pump with directly mounted asynchronous motor
- Oil-air heat exchanger
- Temperature switch with 2 switching points

SEW-EURODRIVE uses oil-air cooling systems for standard gear units in sizes OAC 005 and OAC 010.

The following figure shows an example of a standard parallel-shaft helical gear unit next to an oil-air cooler.



9007208235792395

- |     |  |     |                                       |
|-----|--|-----|---------------------------------------|
| [1] | Motor for pump and fan                     | [4] | Suction pipe connections              |
| [2] | Oil-air heat exchanger                     | [5] | Pressure pipe connections             |
| [3] | Temperature switch with 2 switching points | [6] | Option: Oil expansion tank connection |

### INFORMATION



For more information on the cooling system, refer to the addendum to the operating instructions "Gear unit series R..7, F..7, K..7, K..9, S..7 and SPIROPLAN® W: Oil-air cooler for splash lubrication /OAC".

#### 4.15.9 Agitator design

##### Relubrication of the agitator design

A relubrication of the output shaft bearing is offered as an option for the agitator drives FM..., FAM..., KM... and KAM...

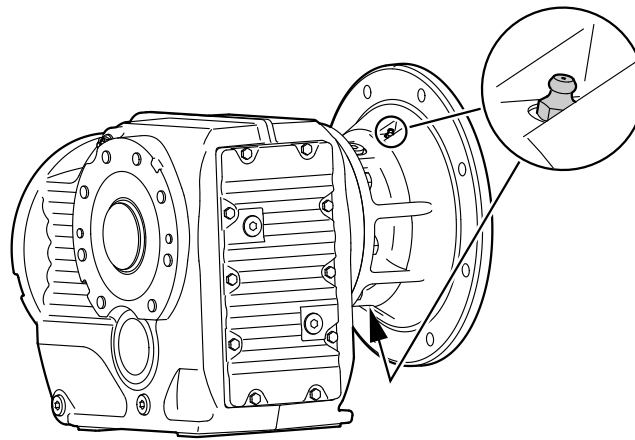
##### Position of greasing points

### INFORMATION



The gear shaft must turn during the relubrication procedure.

Regreasable sealing systems are usually equipped with taper greasing nipples according to DIN 71412 A. The following figure shows the position of the greasing points:



23563258507

##### Maintenance interval and grease quantities



Relubricate the agitator design after 5000 operating hours. The number of relubrication procedures is limited to 5x. Observe the information on the required grease quantities in the following table:

Size	Grease quantity for relubrication g
67	7
77	15
87	15
97	23
107	50
127	48
157	66

# 4 Mechanical installation

## Accessory equipment

The table shows the lubricants recommended by SEW-EURODRIVE:

Area of operation	Ambient temperature	Manufacturer	Type
Standard	-40 °C to +80 °C	Fuchs	Renolit CX-TOM 15 <sup>1)</sup>
	-40 °C to +80 °C	Klüber	Petamo GHY 133 N
 <sup>2)</sup>	-40 °C to +40 °C	Bremer & Leguil	Cassida Grease GTS 2
 <sup>3)</sup>	-20 °C to +40 °C	Fuchs	Plantogel 2S

1) Bearing grease based on semi-synthetic base oil

2) Lubricant for the food processing industry

3) Easily biodegradable lubricant for environmentally sensitive areas

## INFORMATION



If a customer wants to use a grease that is not listed in the above table, the customer has to make sure that it is suitable for the intended application.

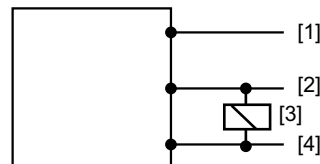
### Leak sensor (Drywell design) with the agitator design

A Drywell design with level sensor is offered as an option for the agitator drives FM..., FAM..., KM... and KAM...

One of the two following sensors is used, depending on the gear unit size:

*Level sensor for sizes 67 – 97*

#### Electrical connection



23527583115

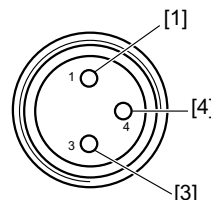
[1] DC 12 V – 32 V

[2] Output

[3] Load

[4] 0 V

#### Pin assignment



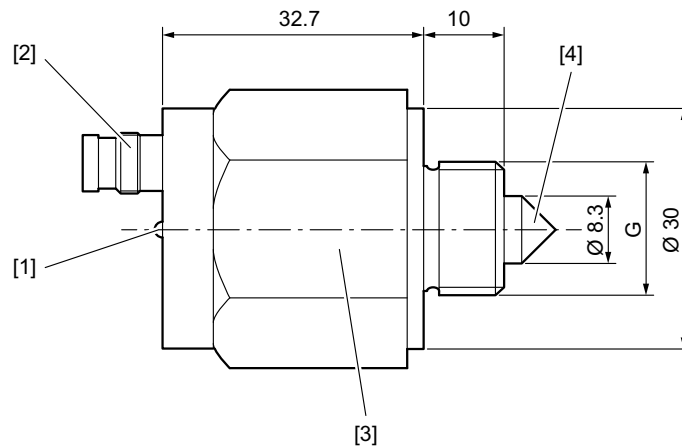
23527590411

[1] DC 12 V – 32 V

[4] Output

[3] Load

**Dimensions**



23563256075

- [1] LED function indicator
- [2] M8×1 circular connector; 3-pin (alternatively cable termination)
- [3] Wrench size: 30
- [4] Glass prism

**Technical data**

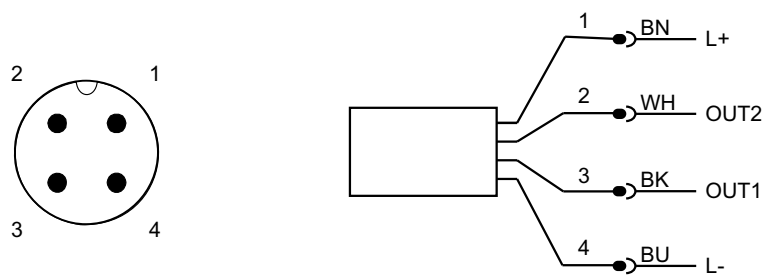
Measuring accuracy	± 0.5 mm
Minimum distance of the glass tip to an opposite surface	≥ 10 mm
Mounting position	Any
Optical display of the switching status	1 LED
Process connection	Male thread G3/8", G 1/2" or M12x1

For more information, please contact SEW-EURODRIVE.

*Level sensor for sizes 107 – 157*

**Electrical connection**

M12 plug-in connection:



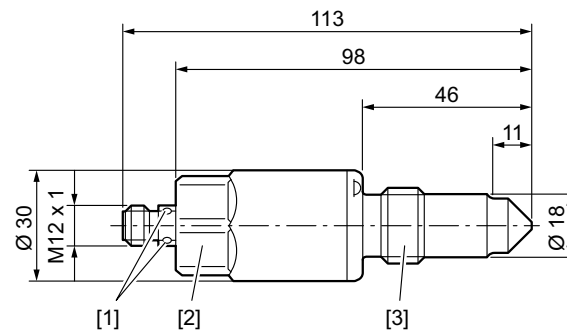
23527585547

OUT1: Switching output/IO link/teach  
OUT2: Switching output

# 4 Mechanical installation

Accessory equipment

## Dimensions



23563253643

- [1] LED
- [2] Tightening torque 20 – 25 Nm
- [3] G 1/2

Tightening torque 20 – 25 Nm

### Technical data

- Plug-in connection
- Process connection G 1/2 A
- Gold-plated contacts
- 2 switching outputs

## 5 Startup



### ⚠ CAUTION

Damage to the gear unit due to improper startup.

Possible damage to property.

- Observe the following information.
- 
- Check the correct oil level before startup; see chapter "Inspection/maintenance work on the gear unit" (→ 113).
  - The oil level plugs and oil drain plugs, as well as the breather plugs and breather valves must be freely accessible.
  - Observe the maximum and rms values of project planning during startup of gear units with servomotor. The buyer is obliged to make the data available to the end user.
  - The most important technical data is provided on the nameplate. Additional data relevant for operation is available in drawings and the order confirmation.
  - After gear unit setup, ensure that all retaining screws are tight.
  - Make sure that the alignment has not changed after tightening the mounting elements.
  - Prior to startup, ensure that rotating shafts as well as couplings are equipped with suitable protective covers.
  - If the gear unit has an oil sight glass to monitor the oil level, the oil sight glass must be protected against damage.
  - It is essential that there is no open fire or risk of sparks when working on the gear unit.
  - Protect the gear unit from falling objects.
  - Remove transport protection prior to startup.
  - Strictly observe the safety notes in the individual chapters.

### 5.1 Inverter-operated gearmotors

For gear units with servomotor, the maximum and r.m.s. values of project planning must be observed during startup. The buyer is obliged to make the data available to the user.

### 5.2 Checking the oil level

Before startup, make sure that the oil level corresponds to the mounting position. Observe the chapter "Checking the oil level and changing the oil" (→ 113).

If the gear unit is equipped with an oil sight glass, you can also determine the oil level at the oil sight glass.

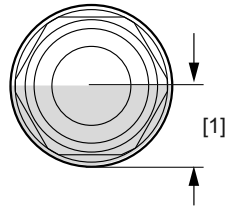
**NOTICE**

Damage to the gear unit due to oil leaking from the damaged oil sight glass.

Possible damage to the unit

- Attach a protective device to prevent the oil sight glass from being damaged by mechanical impacts.

1. Observe the information in chapter General information.
2. Check the oil level at the oil sight glass according to the following figure:



4158756363

[1] The oil level must be within this range.

3. Proceed as follows if the oil level is too low:
  - Open the respective oil fill plug, see chapter "Inspection/maintenance for the gear unit" (→ 113).
  - Fill in new oil of the same type via the oil fill plug up to the mark.
  - Screw in the oil fill plug.

Before startup, make sure that the oil level corresponds to the mounting position. Observe the chapter "Checking the oil level and changing the oil" (→ 113).

### 5.3 Pseudo-leakage at shaft seals

Due to their operating principle, seals between moving surfaces at shaft passages cannot be completely tight, as a lubricant film must form during operation. The lubricant film between shaft and sealing lip keeps the built-up of heat and wear on the sealing system to a minimum and ensures the intended service life. The optimum sealing properties are only achieved after the run-in phase.



## 5.4 Helical-worm gear units and SPIROPLAN® W gear units

### 5.4.1 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	$\eta$ reduction
<b>1-start</b>	Approx. 50 – 280	Approx. 12%
<b>2-start</b>	Approx. 20 – 75	Approx. 6%
<b>3-start</b>	Approx. 20 – 90	Approx. 3%
<b>4-start</b>	–	–
<b>5-start</b>	Approx. 6 – 25	Approx. 3%
<b>6-start</b>	Approx. 7 – 25	Approx. 2%

#### SPIROPLAN® gear units

W10/W20/W30		W37/W47	
i range	$\eta$ reduction	i range	$\eta$ reduction
Approx. 35 – 75	Approx. 15%		
Approx. 20 – 35	Approx. 10%		
Approx. 10 – 20	Approx. 8%	Approx. 30 – 70	Approx. 8%
Approx. 8	Approx. 5%	Approx. 10 – 30	Approx. 5%
Approx. 6	Approx. 3%	Approx. 3 – 10	Approx. 3%

### 5.4.2 Helical-worm gear unit with projecting worm shaft



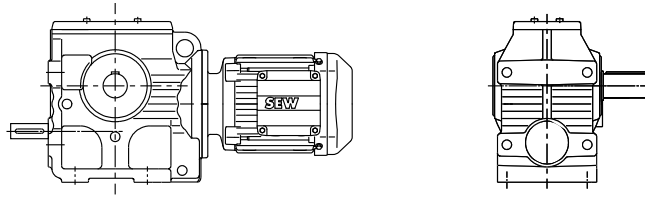
#### ⚠ CAUTION

Risk of injury due to rotating parts

Injury

- Before you operate the helical-worm gear unit using the inserted handwheel or the hand crank, de-energize the drive.
- If the handwheel or the hand crank remains attached to the shaft during operation, take appropriate measures to prevent injuries.

The following figure shows a helical-worm gearmotor with projecting worm shaft:



15050784011

## 5.5 Helical/parallel-shaft helical/helical-bevel gear units

If the gear units were installed according to chapter "Mechanical installation" (→ 26), no special startup notes must be observed for helical, parallel-shaft helical and helical-bevel gear units.

## 5.6 Gear units with backstop

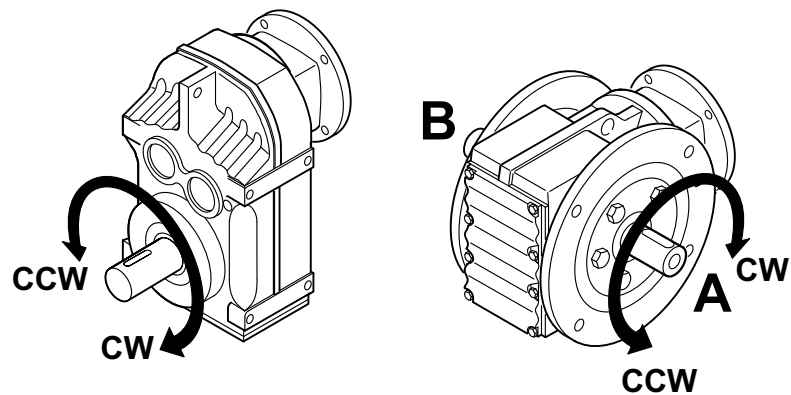
### NOTICE

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

Possible damage to property

- Do not start up the motor in the blocking direction. Before motor startup, make sure the current supply of the motor for the direction of rotation is connected accordingly.
- For control purposes, operation in blocking direction with half the output torque is permitted once.

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



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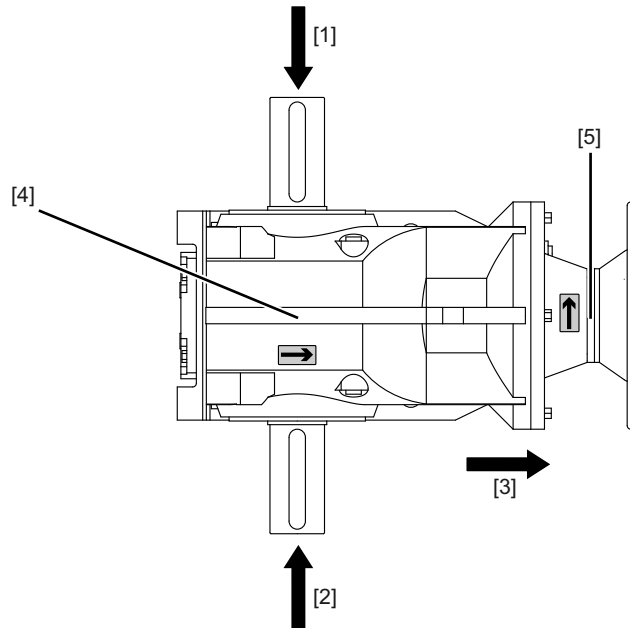
The permitted direction of rotation is indicated by a direction arrow on the housing:



15985405835

A replacement label is enclosed for the customer.

In right-angle gear units, you also have to indicate whether the direction of rotation is given looking onto the A or B-side.



16117549579

- |                                  |                       |                       |                       |
|----------------------------------|-----------------------|-----------------------|-----------------------|
| [1] Viewing direction            | Direction of rotation | [2] Viewing direction | Direction of rotation |
|                                  | Output B              |                       | Output A and A+B      |
| [3] Viewing direction            | Direction of rotation | [4] Gear unit         |                       |
|                                  | Input end             |                       |                       |
| [5] Adapter/cover with RS option |                       |                       |                       |

### 5.7 Components made of elastomers with fluorocarbon rubber



#### ⚠ CAUTION

Health risk due to dangerous gases, vapors, and residue created by heating fluorocarbon rubber to > 200 °C.

Damage to health.

- Make sure that components made of fluorocarbon rubber are not exposed to temperatures > 200 °C. Remove the components, if necessary.
- Avoid inhaling fluorocarbon rubber gases and vapors as well as skin and eye contact.
- Avoid contact with the cooled-down fluorocarbon rubber, as dangerous residue has formed while it was heated.

Under normal operating conditions and at temperatures up to 200 °C, fluorocarbon rubber is very stable and safe. However, when heated to more than 300 °C, e.g. by fire or the flame of a cutting torch, fluorocarbon rubber forms harmful gases and vapors as well as residue.

The following components of R..7, F..7, K..7, K..9, S..7, and SPIROPLAN® W gear units can contain elastomers made of fluorocarbon rubber:

- Oil seals

- Breather valve
- Screw plugs

The user is responsible for safe handling during the service life including eco-friendly disposal.

SEW-EURODRIVE is not responsible for damage caused by improper handling.

## 6 Inspection/maintenance



### ⚠ WARNING

Risk of injury if the drive starts up unintentionally.

Severe or fatal injuries

- Disconnect the drive from the power supply before you start working on the unit.
- Prevent the drive from starting up unintentionally for example, by locking the key switch or removing the fuses from the current supply.



### ⚠ WARNING

Risk of injury if preloaded shaft connections are loosened.

Severe or fatal injuries

- Before releasing any shaft connections, make sure there is no active torsional torque present that could lead to tension within the system.



### ⚠ WARNING

Risk of burns due to hot gear unit and hot gear unit lubricant

Severe injuries

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

### NOTICE

Loss of lubricant qualities due to filling of wrong lubricant

Damage to the gear unit

- Do not mix synthetic lubricants and mineral lubricants.
- Do not mix different synthetic lubricants.
- As standard lubricant use mineral oil.

### NOTICE

Damage to oil seal caused by cleaning the gear unit with a high pressure device.

Gear unit damage.

- Do not clean the gear unit with a high-pressure cleaning device.

### NOTICE

Damage to gear unit due to ingress of foreign objects during maintenance and inspection work

Gear unit failure

- Prevent foreign particles from entering into the gear unit during maintenance and inspection work.

**INFORMATION**

Maintain the inspection and maintenance intervals. This is necessary to ensure operational safety.

---

**INFORMATION**

Perform a safety check and functional check following maintenance and repair work.

---

## 6.1 Wearing parts

### Gearing

If you observe the SEW-EURODRIVE design criteria and the inspection and maintenance intervals, then the gearing components of the gear units will be wear-free after the run-in period. The worm gearing is an exception for design reasons. Depending on the operating conditions, material on the tooth flanks of the worm gear is removed to different extents. The main influencing factors are:

- Rotational speed
- Load
- Operating temperature
- Lubricant (type, viscosity, additives, pollution)
- Switching frequency

For information on the worm gearing service life under certain operating conditions, contact SEW-EURODRIVE.

### Rolling bearing

Rolling bearings in the gear unit, adapter and input shaft assembly have a limited service life, even under ideal operating conditions. This nominal bearing service life is a solely statistical value. The actual service life of an individual bearing may deviate greatly from this value. The main influencing factors are:

- Rotational speed
- Equivalent bearing load
- Operating temperature
- Lubricant (type, viscosity, additives, pollution)
- Lubricant supply of the bearing
- Misalignment under operating load

Therefore the rolling bearings must be inspected regularly. Observe the corresponding inspection and maintenance intervals in the chapters "Inspection/maintenance intervals" (→ 110), "Lubricant change intervals" (→ 111), "Maintenance of AL/AM/AQ./EWH adapter" (→ 111) and "AD input shaft assembly maintenance" (→ 112).

For information on the nominal bearing service life under certain operating conditions, contact SEW-EURODRIVE.

### Lubricants

Lubricants are subject to aging. Their service life is limited depending on the load conditions.

The service life significantly depends on the oil operating temperature. The dependency of lubricant change intervals and operating temperature is depicted in the figure in chapter "Lubricant change intervals" (→ 111).

### Oil seals

Oil seals are contact seals that seal unit housings at emerging elements, such as shafts, from the environment. Oil seals are wear parts with a service life that is influenced by the following factors, among others:

- Shaft speed and circumferential velocity at the sealing lip
- Ambient conditions (temperature, dust, humidity, pressure, chemicals, radiation)
- Lubricant (type, viscosity, additives, pollution)
- Surface quality of the sealing
- Lubricant supply of the sealing
- Oil seal material



Due to the various influencing factors it is not possible to predict the service life. Therefore the oil seals must be inspected regularly. Observe the corresponding inspection and maintenance intervals in the chapters "Inspection/maintenance intervals" (→ 110), "Lubricant change intervals" (→ 111), "Maintenance of AL/AM/AQ./EWH adapter" (→ 111) and "AD input shaft assembly maintenance" (→ 112).

#### Cam ring/ coupling ring

The couplings used in the AM, AL, AQ. and EWH adapters are designed to be positive, puncture-proof and low-maintenance claw couplings. They have an impact and vibration-absorbing cam ring (AM, EWH) or coupling ring (AQ., AL). The service life is determined by the following factors, among others:

- Ambient conditions (temperature, chemicals, radiation)
- Operational conditions (switching frequency, impact characteristics)

Adhere to the corresponding inspection and maintenance intervals in chapter "Maintenance of AL/AM/AQ./EWH adapter" (→ 111).

#### Rubber buffer

The rubber buffer is required for shaft-mounted gear units of the F and W gear unit types for torque support. Rubber buffers are wear parts with a service life that is influenced by the following factors:

- Load
- Ambient conditions
  - Temperature
  - Humidity
  - Aggressive chemicals, e.g. ozone
- Switching frequency
- Impact characteristics

#### Flexible bushing

A so-called flexible bushing is required for the torque arm of the S and K gear unit types. Flexible bushings are wear parts with a service life that is influenced by the following factors:

- Load
- Ambient conditions
  - Temperature
  - Humidity
  - Aggressive chemicals, e.g. ozone
- Switching frequency
- Impact characteristics

## 6.2 Inspection/maintenance intervals

The following table lists the obligatory intervals and the corresponding measures:

Time interval	What to do?
<ul style="list-style-type: none"> <li>Every 3000 hours of operation, at least every 6 months</li> </ul>	<ul style="list-style-type: none"> <li>Check oil and oil level</li> <li>Check running noise for possible bearing damage</li> <li>Visual inspection of the seals for leakage</li> <li>Check that all screw plugs, any oil sight glass, the breather valve and the gear unit cover screws are tight.</li> <li>For gear units with a torque arm: Check and replace the rubber buffers, if necessary</li> </ul>
<ul style="list-style-type: none"> <li>Depending on the operating conditions (see illustration in chapter "Lubricant change intervals" (→ 111)), every 3 years at the latest</li> <li>according to oil temperature</li> </ul>	<ul style="list-style-type: none"> <li>Change mineral oil</li> <li>Replace bearing grease (recommendation)</li> <li>Replace oil seal (do not install it in the same track)</li> </ul>
<ul style="list-style-type: none"> <li>Depending on the operating conditions (see illustration in chapter "Lubricant change intervals" (→ 111)), every 5 years at the latest</li> <li>according to oil temperature</li> </ul>	<ul style="list-style-type: none"> <li>Change synthetic oil</li> <li>Replace bearing grease (recommendation)</li> <li>Replace oil seal (do not install it in the same track)</li> </ul>
<ul style="list-style-type: none"> <li>Varying (depending on external factors)</li> </ul>	<ul style="list-style-type: none"> <li>Touch up or renew the surfaces / anti-corrosion coating</li> </ul>

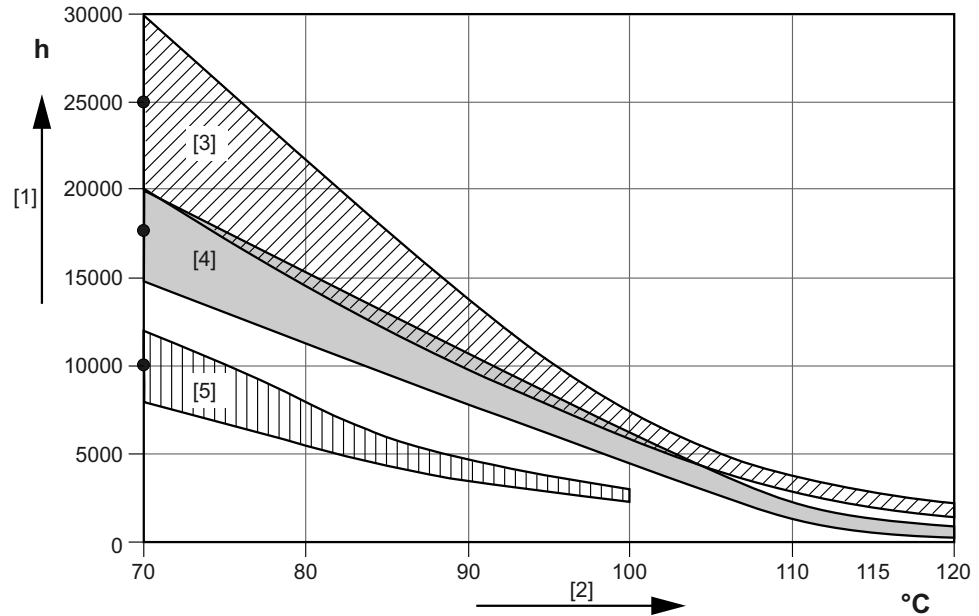
### Exceptions

The following gear units are lubricated for life. A scheduled oil change is not necessary:

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

### 6.3 Lubricant change intervals

The following image depicts the change intervals for standard gear units under normal ambient conditions. In case of special designs under severe/aggressive ambient conditions, change the lubricant more frequently.



18014398528211595

- [1] Operating hours
- [2] Sustained oil bath temperature
  - Average value per oil type at 70 °C
- [3] CLP PG/CLP PG NSF H1
- [4] CLP HC/ CLP HC NSF H1
- [5] CLP (CC)/E

### 6.4 Maintenance of AL/AM/AQ./EWH adapter

The following table lists the obligatory intervals and the corresponding measures:

Time interval	What to do?
<ul style="list-style-type: none"> <li>• Every 3000 hours of operation, at least every 6 months</li> </ul>	<ul style="list-style-type: none"> <li>• Check the running noises to detect possible bearing damage.</li> <li>• Visually check the adapter for leakage.</li> </ul>
<ul style="list-style-type: none"> <li>• After 10 000 operating hours</li> </ul>	<ul style="list-style-type: none"> <li>• Check the rotational clearance.</li> <li>• Visually check the cam ring (AM, EWH) or coupling ring (AQ., AL).</li> </ul>
<ul style="list-style-type: none"> <li>• After 10 000 operating hours with NBR/FKM oil seals</li> <li>• After 20 000 operating hours with Premium Sine Seal (PSS) adapter oil seals:</li> </ul>	<ul style="list-style-type: none"> <li>• Change the bearing grease.</li> <li>• Change the oil seal. With standard NBR or FKM oil seals, the new oil seal must not be fitted on the previous track. This is allowed with Premium Sine Seal (PSS) adapter oil seals.</li> </ul>

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### 6.5 AD input shaft assembly maintenance

The following table lists the obligatory intervals and the corresponding measures:

Time interval	What to do?
<ul style="list-style-type: none"><li>• Every 3000 hours of operation, at least every 6 months</li></ul>	<ul style="list-style-type: none"><li>• Check the running noises to detect possible bearing damage.</li><li>• Visually check the adapter for leakage.</li></ul>
<ul style="list-style-type: none"><li>• After 10000 operating hours</li></ul>	<ul style="list-style-type: none"><li>• Change the bearing grease.</li><li>• Change the oil seal. Do not mount it in the same track.</li></ul>

## 6.6 Inspection/maintenance for the gear unit

### 6.6.1 Checking the oil level and changing the oil

The procedure when checking the oil level and changing the oil depends on gear unit type, size and mounting position. Determine the code letter (A, B, C, D or E) in the following table in regard of gear unit type and size. Use the code letter to find the reference for the procedure for the corresponding gear unit in the 2nd table.

Gear unit type	Size	Code letter for chapter "Checking the oil level and changing the oil"					
		M1	M2	M3	M4	M5	M6
R	R..07 – 27	B					
	R..37 / R..67	A					
	R..47 / R..57	A			B		A
	R..77 – 167	A					
	RX..57 – 107	A					
F	F..27	B					
	F..37 – 157	A					
K	K..19 / K..29	C					
	K..39 / K49	A					
	K..37 – 187	A					
S	S..37	C					
	S..47 – 97	A					
W	W..10 – 30	B					
	W..37 – 47	D			E	D	

Code letter	Chapter "Checking the oil level and changing the oil"	Reference
<b>A:</b>	<ul style="list-style-type: none"> <li>• Helical gear units...</li> <li>• Parallel-shaft helical gear units...</li> <li>• Helical-bevel gear units...K..39 / K..49, K..37 – 187</li> <li>• Helical-worm gear units... S..47 – 97</li> </ul> <p><b>With oil level plug</b></p>	(→ 114)
<b>B:</b>	<ul style="list-style-type: none"> <li>• Helical gear units...</li> <li>• Parallel-shaft helical gear units...</li> <li>• SPIROPLAN® gear units...</li> </ul> <p><b>Without oil level plug, with cover plate</b></p>	(→ 117)
<b>C:</b>	<ul style="list-style-type: none"> <li>• S..37 helical-worm gear unit</li> <li>• Helical-bevel gear units K..19 / K..29</li> </ul> <p><b>Without oil level plug, without cover plate</b></p>	(→ 121)
<b>D:</b>	<ul style="list-style-type: none"> <li>• SPIROPLAN® W..37 / W..47</li> </ul> <p><b>In mounting positions M1, M2, M3, M5, M6 with oil level plug</b></p>	(→ 124)

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Code letter	Chapter "Checking the oil level and changing the oil"	Reference
E:	<ul style="list-style-type: none"> <li>SPIROPLAN® W..37 / W..47...</li> </ul> <b>In mounting position M4 without oil level plug and cover plate</b>	(→ 126)

Refer to chapter "Mounting positions" (→ 129) for notes on the mounting positions.

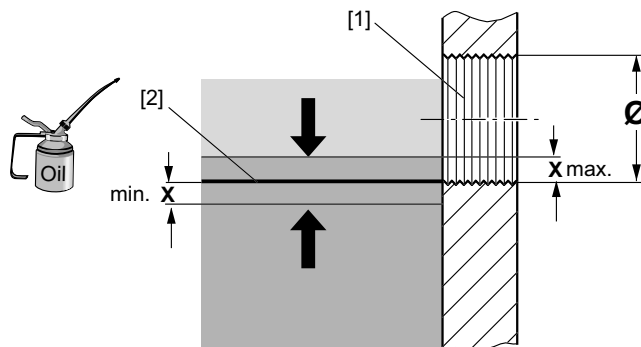
You cannot check the oil level of gear units in pivoted mounting position. The gear units are delivered with the correct oil level. Observe the designations and fill quantities on the nameplate if you have to change the oil.

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

#### Checking the oil level at the oil level plug

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

1. Observe the notes in chapter Information on gear unit inspection/maintenance.
2. Determine the position of the oil level plug and the breather valve using the mounting position sheets. See chapter "Mounting positions" (→ 129).
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 maximum 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.



634361867

- [1] Oil level bore  
 [2] Ideal oil level  
 X min/max oil level

Ø oil level bore	Approved fluctuation "x" of the oil level mm
M10 × 1	1.5
M12 × 1.5	2
M22 × 1.5	3
M33 × 2	4
M42 × 2	5

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

- Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the breather bore, up to the lower edge of the oil level bore.

- Re-insert the breather valve. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).
7. Screw in the oil level plug again. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).

### Checking the oil via the oil drain plug

Proceed as follows to check the gear unit oil:

1. Observe the notes in chapter Information on gear unit inspection/maintenance.
2. Determine the position of the oil drain plug using the mounting position sheets. See chapter "Mounting positions" (→ 129).
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, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 110).
5. Check the oil level. See chapter "Checking the oil level via the oil level plug" (→ 114).

### 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 the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.
- 
1. Observe the notes in chapter Information on gear unit inspection/maintenance.
  2. Determine the position of the oil drain plug, the oil level plug and the breather valve using the mounting position sheets. See chapter "Mounting positions" (→ 129).
  3. Place a container underneath the oil drain plug.
  4. Remove the oil level plug, the breather valve and the oil drain plug.
  5. Drain all the oil.
  6. Re-insert the oil drain plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).
  7. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the breather bore. Do not mix different synthetic lubricants!
    - Observe the oil fill quantities according to the specifications on the nameplate or according to the mounting position. See chapter Lubricant fill quantities.
    - Check the oil level at the oil level plug.

8. Re-insert the oil level plug and the breather valve. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→  32).

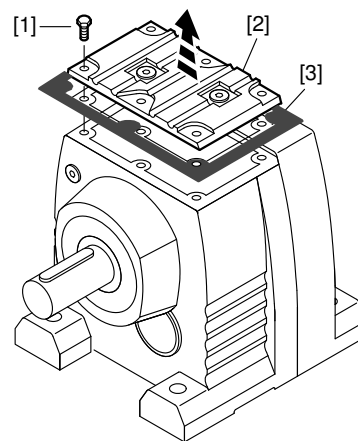


**6.6.3 B: Helical, parallel shaft helical, SPIROPLAN® gear units without oil level plug with cover plate**

**Checking the oil level via the cover plate**

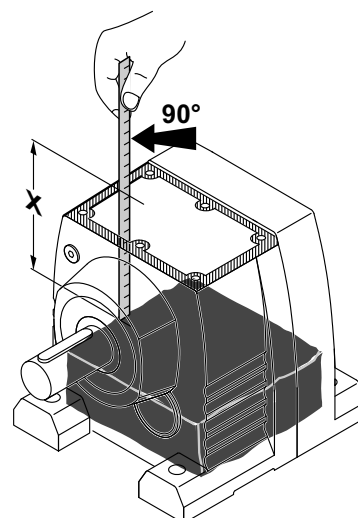
For gear units without oil level bore, the oil level is checked via the cover plate opening. Proceed as follows:

1. Observe the notes in chapter Information on gear unit inspection/maintenance.
2. To position the cover plate on the top, place 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).

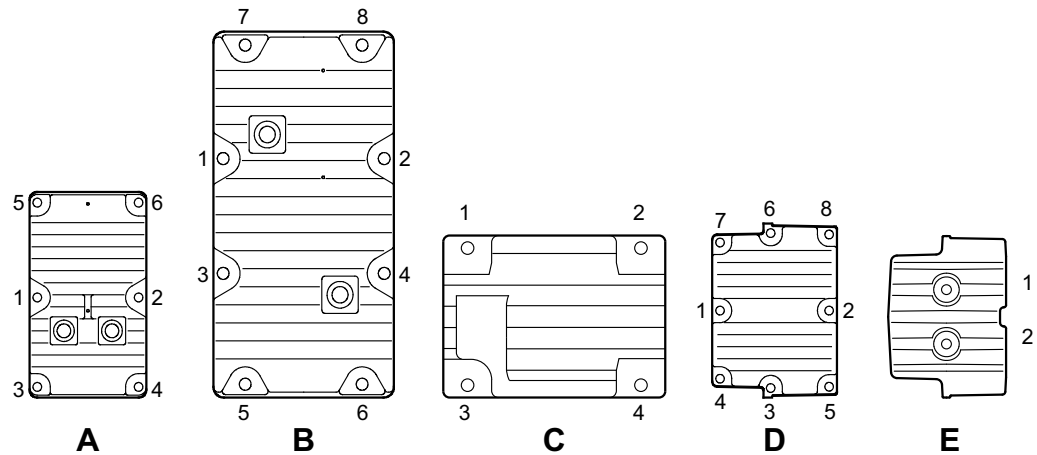


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5. Compare the determined value "x" to the max. distance between oil level and sealing surface of the gear unit housing specified in the following table. Adjust the fill level if required.

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

6. Close the gear unit after the oil level check:
- Re-attach the seal of the cover plate. Make sure that the sealing surfaces are clean and dry.
  - Screw on the cover plate. Tighten the cover plate screw connections working from the inside to the outside. Tighten the cover plate screw connections in the sequence depicted in the following figure. Tighten the cover plate screw connections with the specified tightening torque according to the following table. Repeat the tightening procedure until the screws are properly tightened. To avoid damaging the cover plate, use only impulse wrenches or torque wrenches. Do not use impact screwdrivers.



27021597782872715

Gear unit type	Image	Retaining thread	Tightening torque $T_N$ Nm	Minimum tightening torque $T_{min}$ Nm
R/RF07/17	E	M6	11	7
R/RF27	D			
R/RF47/57	A			
F27	B			
W10	C	M5	6	4
W20	C	M6	11	7
W30	A			

### Checking the oil via cover plate

Proceed as follows to check the gear unit oil:

1. Observe the notes in chapter Information on gear unit inspection/maintenance.
2. Open the cover plate of the gear unit according to chapter "Checking the oil level via the cover plate" (→ 117).
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, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 113).
5. Check the oil level. See chapter "Checking the oil level via the cover plate" (→ 117).
6. Screw on the cover plate. Observe the order and the tightening torques according to chapter "Checking the oil level via the cover plate" (→ 117).

## Changing the oil via the cover plate

**▲ WARNING**

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

Serious injuries.

- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.
- 
1. Observe the notes in chapter Information on gear unit inspection/maintenance.
  2. Open the cover plate of the gear unit according to chapter "Checking the oil level via the cover plate".
  3. Completely drain the oil into a container via the cover plate opening.
  4. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the cover plate. Do not mix different synthetic lubricants.
    - Fill in the oil as specified on the nameplate or the order confirmation.
  5. Check the oil level.
  6. Screw on the cover plate. Observe the order and the tightening torques according to chapter "Checking the oil level via the cover plate" (→ 117).

**6.6.4 C: Helical-worm gear units S..37 and helical-bevel gear units K..19/K..29 without oil level plug and cover plate**

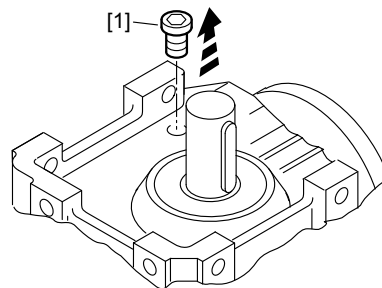
**Checking the oil level via screw plug**

The gear units S..37, K..19, and K..29 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 chapter Information on gear unit inspection/maintenance.
2. Place the gear unit in the mounting position stated in the following table. Thus the control bore always points upwards.

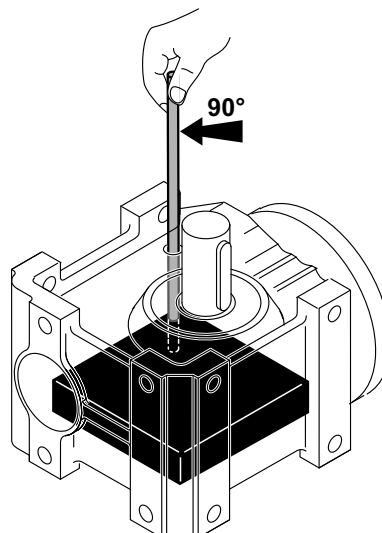
Gear unit	Mounting position
S..37	M5/M6
K19/29	M6

3. Remove the screw plug [1] as shown in the following figure.



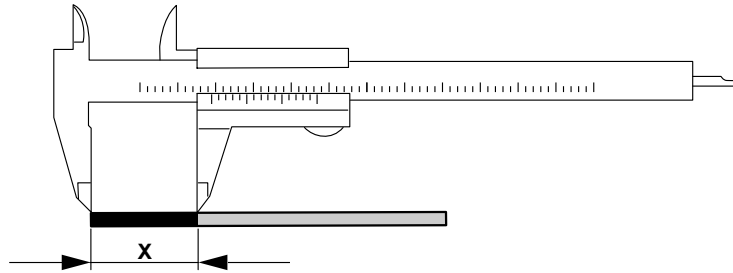
18655371

4. Insert the dipstick vertically via the control bore all the way to the bottom of the gear unit housing. Vertically pull the dipstick out of the control bore, as shown in the following figure.



18658699

- Determine the size of the section "x" of the dipstick covered with lubricant using a slide-gauge as depicted in the following figure.



18661771

- 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" in mm of the dipstick					
	Mounting position					
	M1	M2	M3	M4	M5	M6
K..19	33 ± 1	33 ± 1	33 ± 1	35 ± 1	33 ± 1	33 ± 1
K..29	50 ± 1	50 ± 1	50 ± 1	63 ± 1	50 ± 1	50 ± 1
S..37	10 ± 1	24 ± 1	34 ± 1	37 ± 1	24 ± 1	24 ± 1

- Re-insert and tighten the screw plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).

### Checking the oil via the screw plug

- Observe the notes in chapter Information on gear unit inspection/maintenance.
- Open the screw plug of the gear unit according to chapter "Checking the oil level via screw plug" (→ 121).
- Take an oil sample via the screw plug bore.
- Check the oil consistency.
  - Viscosity
  - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 110).
- Check the oil level. See chapter "Checking the oil level via screw plug" (→ 121).
- Re-insert and tighten the screw plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).

## Changing the oil via the screw plug



### ▲ WARNING

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

Serious injuries.

- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.

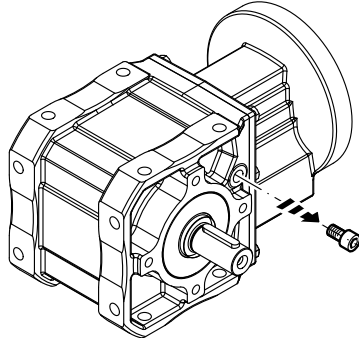
1. Observe the notes in chapter Information on gear unit inspection/maintenance.
2. Open the cover plate of the gear unit according to chapter "Checking the oil level via the screw plug".
3. Completely drain the oil via the screw plug bore.
4. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the control bore. You must not mix different synthetic lubricants.
  - Observe the oil quantity specified on the nameplate or according to the mounting position. Observe chapter Lubricant fill quantities.
5. Check the oil level.
6. Re-insert and tighten the screw plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).

#### 6.6.5 D: SPIROPLAN® W..37/W..47 in mounting position M1, M2, M3, M5, M6 with oil level plug

##### Checking the oil level at the oil level plug

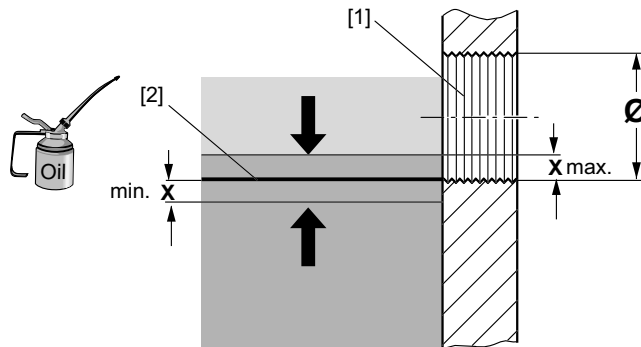
Proceed as follows to check the oil level of the gear unit:

1. Observe the notes in chapter Information on gear unit inspection/maintenance.
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] Ideal oil level

Ø oil level bore	Fluctuation "x" for minimum and maximum fill level in mm
M10 × 1	1.5

5. In case the oil level is too low, fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the oil level bore, up to the lower edge of the oil level bore.
6. Screw in the oil level plug again. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).

##### Checking the oil level at the oil level plug

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

1. Observe the notes in chapter Information on gear unit inspection/maintenance.



2. Remove some oil at the oil level plug.
3. Check the oil consistency.
  - Viscosity
  - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 110).
4. Check the oil level. See previous chapter.

### Changing the oil at the oil level plug



#### **▲ WARNING**

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

Serious injuries.

- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.

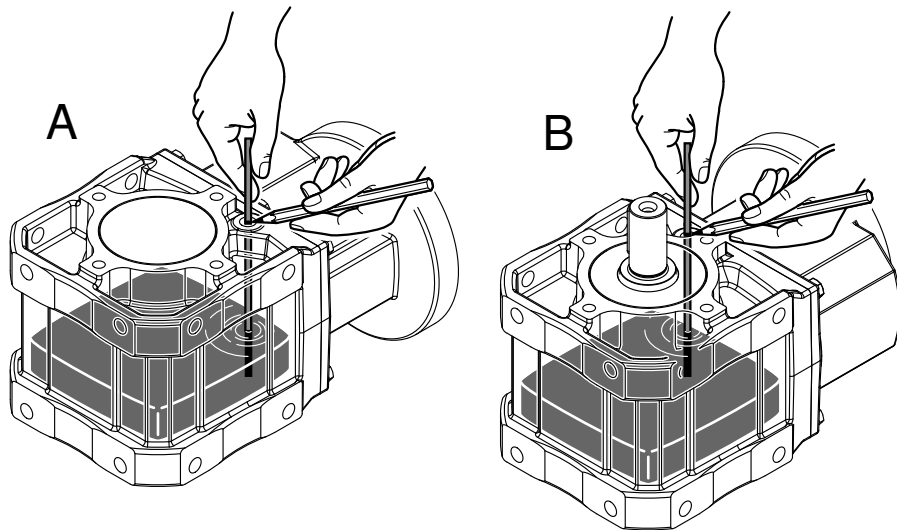
1. Observe the notes in chapter Information on gear unit inspection/maintenance.
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 129).
3. Place a container underneath the oil level plug.
4. Remove the oil level plugs on the A- and B-side of the gear unit.
5. Drain all the oil.
6. Re-insert the lower oil level plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).
7. Fill in new oil of the same type (contact SEW-EURODRIVE if necessary) via the upper oil level plug. You must not mix different synthetic lubricants.
  - Observe the oil fill quantities according to the specifications on the nameplate or according to the mounting position. See chapter Lubricant fill quantities.
  - Check the oil level according to chapter "Checking the oil level via oil level plug"
8. Re-insert the upper oil level plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).

#### 6.6.6 E: SPIROPLAN® W..37 / W..47 in mounting position M4 without oil level plug and cover plate

##### Checking the oil level via screw plug

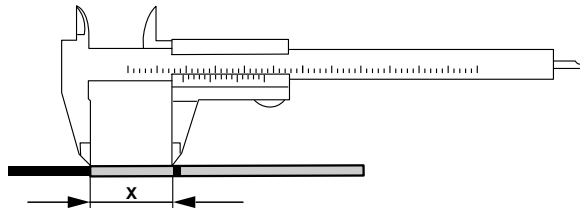
The W37 / W47 gear units are not equipped with an oil level plug or a cover plate. This is why the oil level is checked via the control bore.

1. Observe the notes in chapter Information on gear unit inspection/maintenance.
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 129).
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 = section "x" in mm of the dipstick	
	Mounting position during 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. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).

### Checking the oil via the screw plug

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

1. Observe the notes in chapter Information on gear unit inspection/maintenance.
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, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 110).
4. Check the oil level. See previous chapter.

### Changing the oil via the screw plug



#### **▲ WARNING**

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

Serious injuries.

- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.

1. Observe the notes in chapter Information on gear unit inspection/maintenance.
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 129).
3. Place a container underneath the screw plug.
4. Remove the screw plugs on the A- and B-side of the gear unit.
5. Drain all the oil.
6. Re-insert the lower screw plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).
7. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the upper screw plug. You must not mix different synthetic lubricants.
  - For the required oil quantity, refer to the nameplate or chapter Lubricant fill quantities.
  - Check the oil level according to chapter "Checking the oil level via oil level plug".
8. Re-insert the upper screw plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).

**6.6.7 Replacing the oil seal****NOTICE**

Damage to oil seal when mounted below 0 °C.

Damage to oil seal.

- Store oil seals at ambient temperatures over 0 °C.
  - If necessary, heat the oil seal before mounting it.
- 

Proceed as follows:

1. Ensure that there is a sufficient grease reservoir between the dust lip and sealing lip, depending on the gear unit design.
2. If you use double oil seals, the space has to be filled with grease for one third.

**6.6.8 Painting the gear unit****NOTICE**

Paint can block the breather valve and damage the sealing lips of the oil seals.

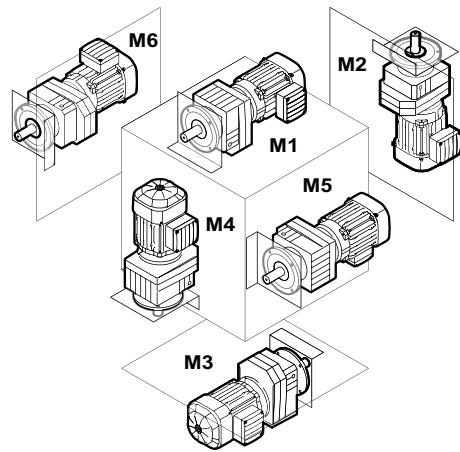
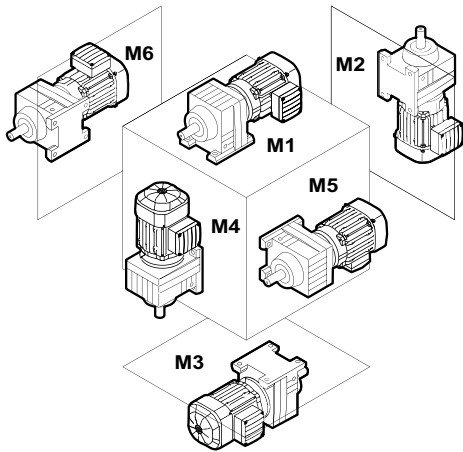
Damage to property

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

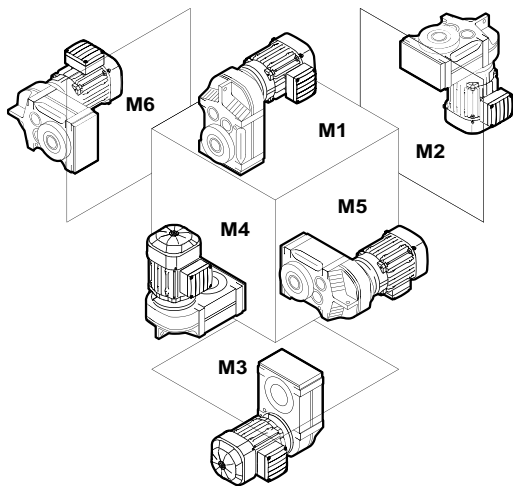
## 7 Mounting positions

### 7.1 Designation of the mounting positions

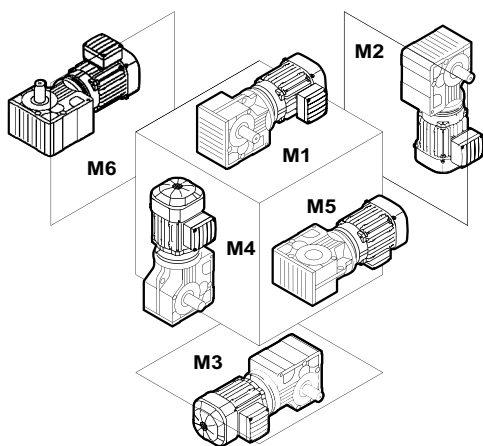
The following illustration shows the SEW-EURODRIVE mounting positions M1 – M6:



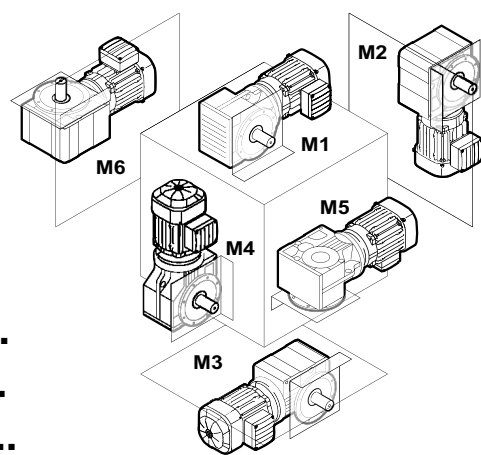
R..



F..




K..  
S..  
W..





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## 7.2 Churning losses and thermal rating

\* (→  X)

Churning losses may occur with the following conditions. They must be considered during thermal check:

- A mounting position where the first gear unit stage is fully immersed in the lubricant. The respective mounting positions of the gear units are indicated with a \* in chapter "Mounting position sheets" (→  132).
- A high mean input speed and thus a high circumferential velocity of the gear wheels of the input gear stage.

If one or both requirements are met, determine the requirements of the application and the corresponding operating conditions (see chapter "Data for calculating the thermal rating" (→  130)) and contact SEW-EURODRIVE. SEW-EURODRIVE can calculate the thermal rating based on the actual operating conditions. The thermal rating of the gear unit can be increased by appropriate measure e.g. by using a synthetic lubricant with higher thermal endurance properties.

### INFORMATION



To reduce churning losses to a minimum, use gear units preferably in M1 mounting position.

### 7.2.1 Data for calculating the thermal rating

The following information is required for calculating the thermal rating:

#### Gear unit type and design:

- Gear unit ratio  $i$
- Mean input speed  $\bar{n}_e$  or mean output speed  $\bar{n}_a$  in  $\text{min}^{-1}$
- Effective motor torque  $M_{\text{eff}}$  in Nm
- Input motor power  $P_e$  in kW
- Mounting position M1 – M6 or pivoting angle

#### Installation site:


- Ambient temperature  $T_{\text{amb}}$  in °C
- In small, closed rooms or in large rooms (halls) or outdoors

#### Installation on site:

- Space-critical or well ventilated
- Steel or concrete base

## 7.3 Change of mounting position

Make sure to read the following information when you operate the gearmotor in a mounting position other than the one indicated in the order:

- Adjust the lubricant fill quantity to the changed mounting position.
- Adjust the position of the breather valve.
- When changing the mounting position to M4: Contact SEW-EURODRIVE. Depending on the drive's operating mode, an oil expansion tank might be necessary (see chapter "Oil expansion tank" (→  93)).
- For helical-bevel gearmotors: Contact SEW-EURODRIVE if you want to change to mounting position M5 or M6, independent of the initial mounting position.

- For helical-worm gearmotors: Contact SEW-EURODRIVE when changing to mounting position M2 or M3.
- For helical gearmotors: Contact SEW-EURODRIVE when changing to mounting position M2.
- If you change the mounting position to a mounting position that requires more oil, SEW-EURODRIVE recommends to perform a thermal check/project planning again.

## 7.4 Universal mounting position M0

SPIROPLAN® W10 – W30 gear units can be ordered with M0 universal mounting position. These small SPIROPLAN® gear units are entirely enclosed due to their small size and have no breather valve. You can use them in any mounting position M1 – M6 without having to adjust the gear unit.

All W10 – W30 gear units of one size have the same oil fill quantity.

## 7.5 Mounting position MX

Mounting position MX is available for all gear units of the sizes R..7, F..7, K..7, K..9, S..7 and SPIROPLAN® W..7.

In contrast to the M0 mounting position, gear units in MX mounting position must be adjusted according to the mounting position prior to startup.

For mounting position MX, the gear units are delivered with the maximally possible amount of oil and sealed with oil screw plugs. A breather valve is included with each drive. The oil fill volume must be adapted according to the mounting position of the gear unit (see chapter Lubricant fill quantities). Customers will also have to mount the enclosed breather valve at the proper location depending on the mounting position, see chapter Mounting position sheets. For screwing in the breather valve, observe the corresponding tightening torque in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 32).

Check for the correct oil level before startup, as described in chapter Checking the oil level and changing the oil.

### 7.5.1 Compound gear units in MX mounting position

In MX mounting position, both gear units (primary and subsequent gear unit) are in the same mounting position.

## 7.6 Mounting position sheets

### 7.6.1 Key to the mounting position sheets

#### INFORMATION



The positions of the breather valve, oil level plug, and oil drain plug specified in the mounting position sheets are binding and comply with the assembly specifications.

The motors are only depicted symbolically on the mounting position sheets.

#### INFORMATION



**For gear units with solid shaft:** The displayed shaft is always on the A-side.

**For shaft-mounted gear units:** The shaft with dashed lines represents the customer shaft. The output side (= shaft position) is always shown on the A-side.

#### INFORMATION



SPIROPLAN® gearmotors are not dependent on the mounting position, except for W..37 and W..47 gearmotors in mounting position M4. However, mounting positions M1 to M6 are also shown for SPIROPLAN® gearmotors to assist you in working with this documentation.

#### INFORMATION



SPIROPLAN® gearmotors W..10 to W..30 cannot be equipped with breather valves, oil level plugs or oil drain plugs.

SPIROPLAN® gearmotors W..37 and W..47 are equipped with breather valves in mounting position M4 and with oil drain plugs in mounting position M2.

#### INFORMATION



Some gear units can be supplied in mounting position M0. In this case, the gear unit is delivered in a universal mounting position and can be adjusted to various mounting positions by the customer. It may be necessary to contact SEW-EURODRIVE.

### Symbols used

The following table shows the icons used in the mounting position sheets.

Icon	Meaning
	Breather valve
	Oil level plug <sup>1)</sup>
	Oil drain plug

1) Does not apply to the 1st gear unit (large gear unit) of compound gear units. See chapter "Position of the oil level plug of compound gear units".

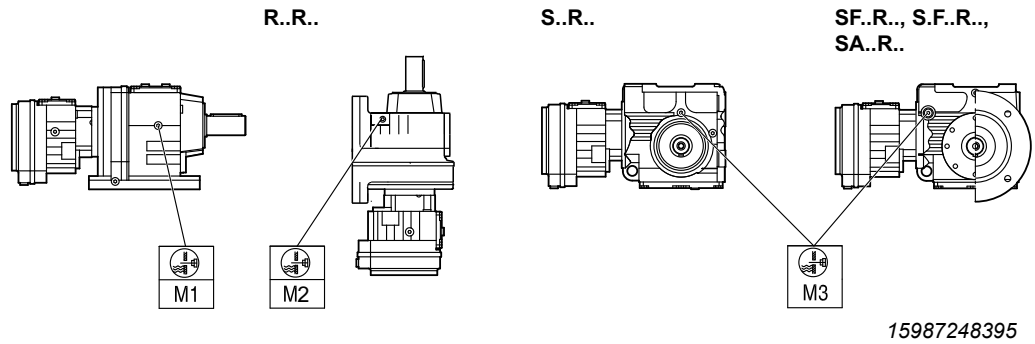


**7.6.2 Position of the oil level plug of compound gear units**

To ensure sufficient lubrication of the first gear unit (larger gear unit) in case of compound gear units, the following gear units have a higher oil level in the specified mounting positions:

- Helical gear unit type R..R in mounting position M1 and M2
- Helical-worm gear unit type S..R in mounting position M3

The oil level plugs are located at the following positions, deviating from the specifications on the mounting position sheets:



Icon	Meaning
	Oil level plug

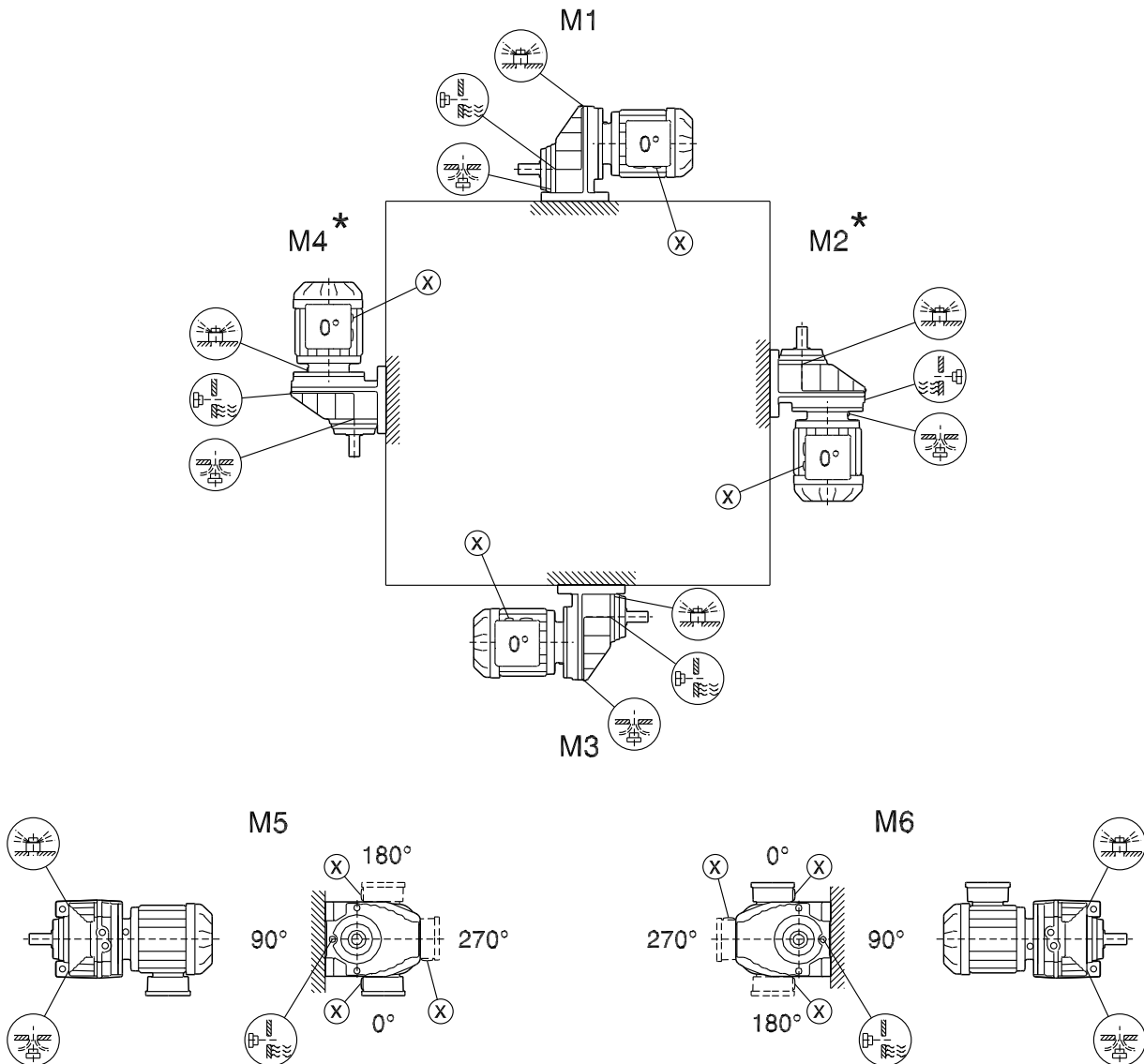
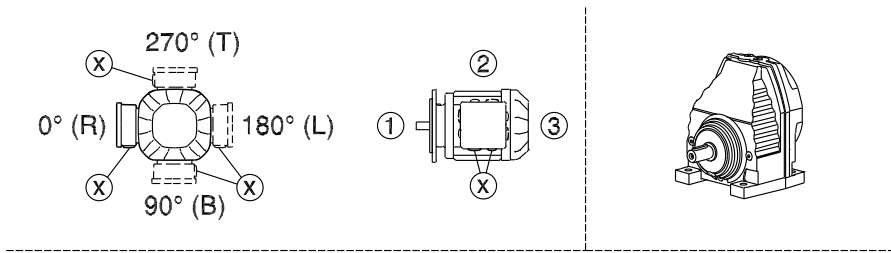
# 7 Mounting positions

Mounting position sheets

## 7.6.3 Mounting positions of helical gearmotors

RX57-RX107

04 043 03 00

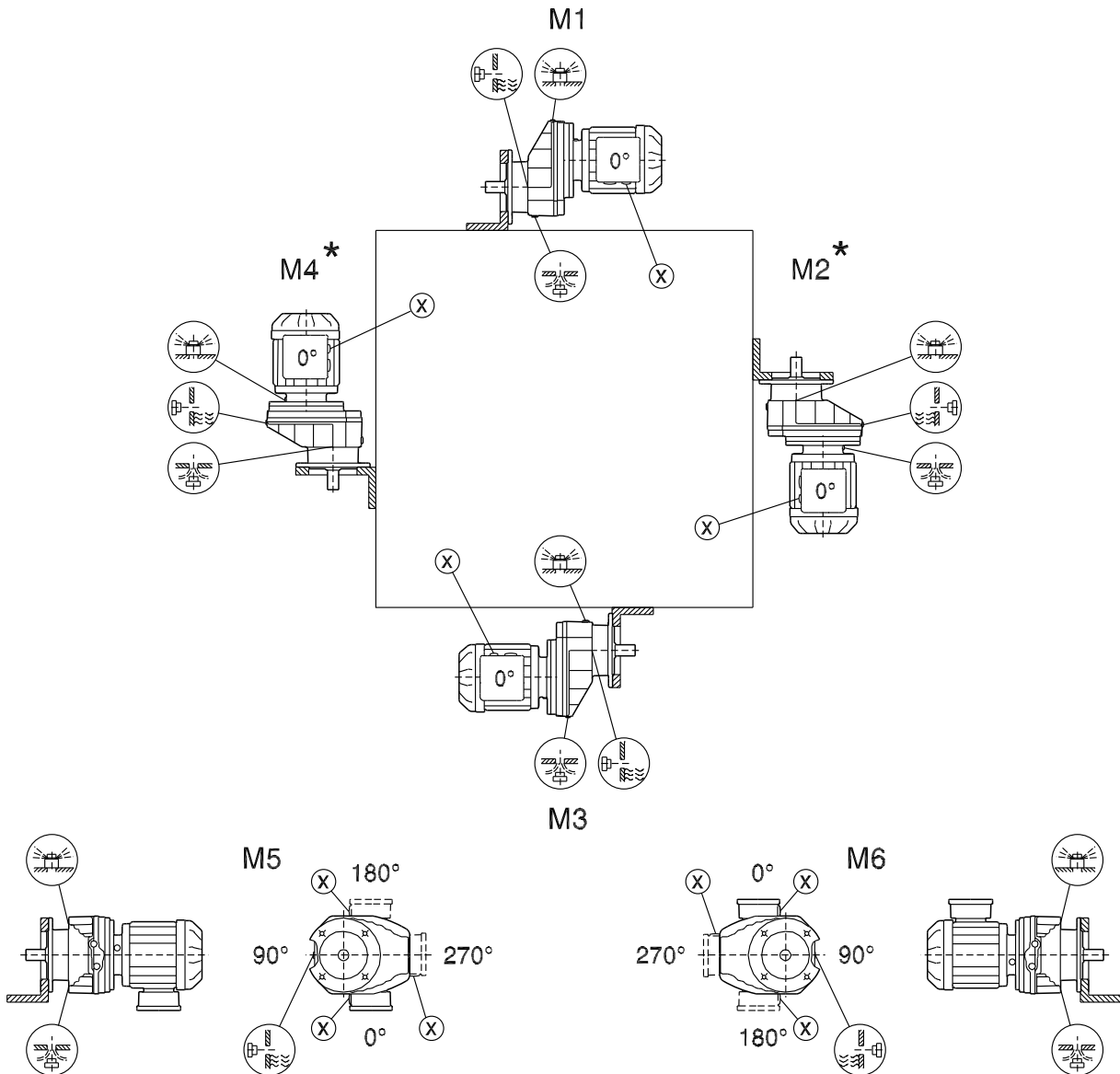
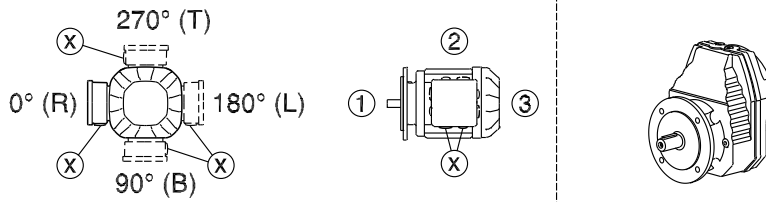


\* (→ 130)

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RXF57-RXF107

04 044 03 00



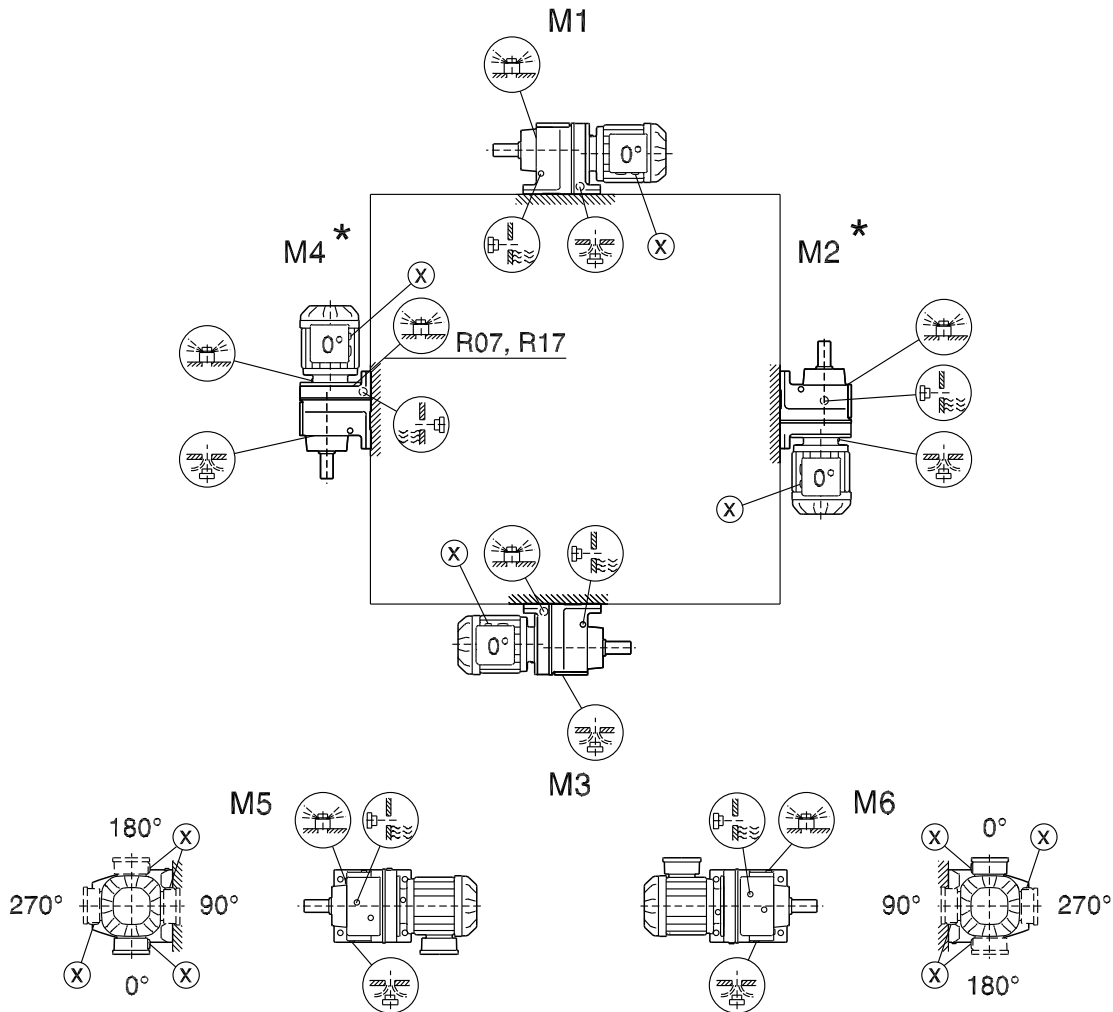
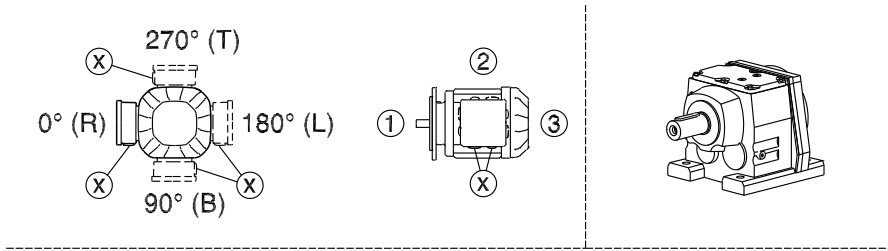
\* (→ 130)

# 7 Mounting positions

Mounting position sheets

R07-R167

04 040 04 00



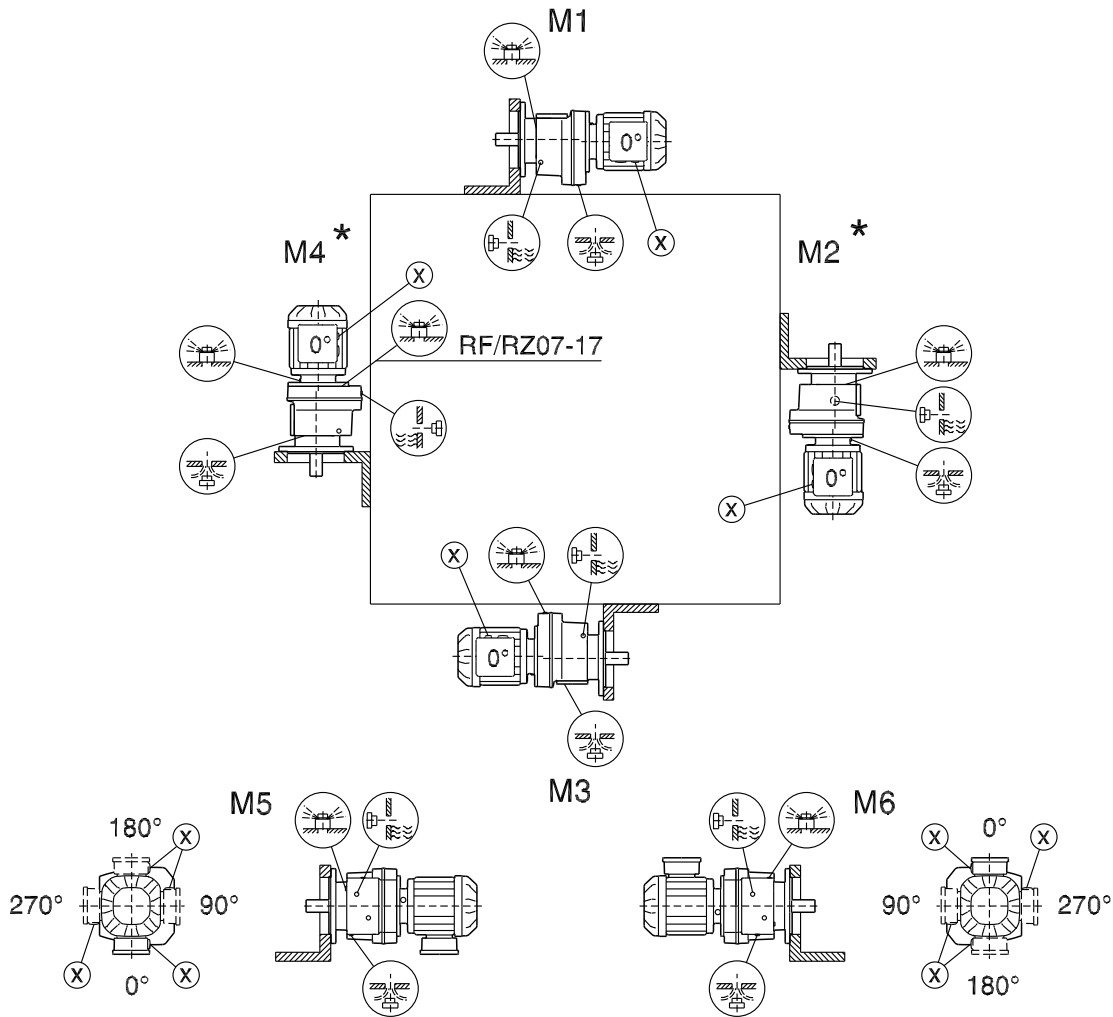
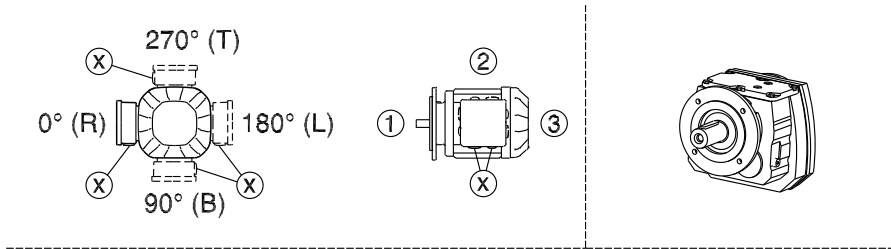
- |               |  |                    |
|---------------|--|--------------------|
| R07           |  | M1, M2, M3, M5, M6 |
| R17, R27      |  | M1, M3, M5, M6     |
| R07, R17, R27 |  |                    |
| R47, R57      |  | M5                 |

\* (→ 130)

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RF07-RF167, RZ07-RZ87

04 041 04 00



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

\* (→ 130)

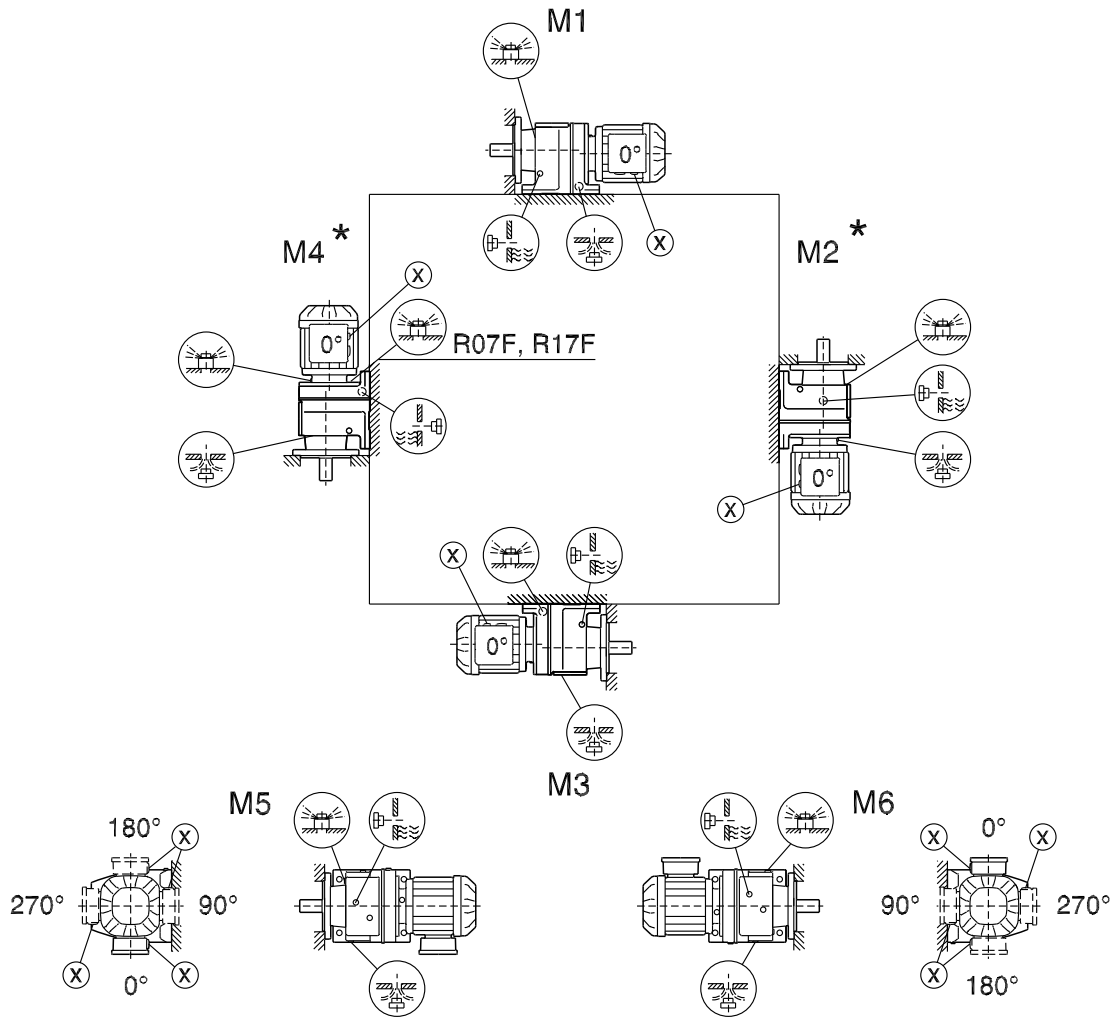
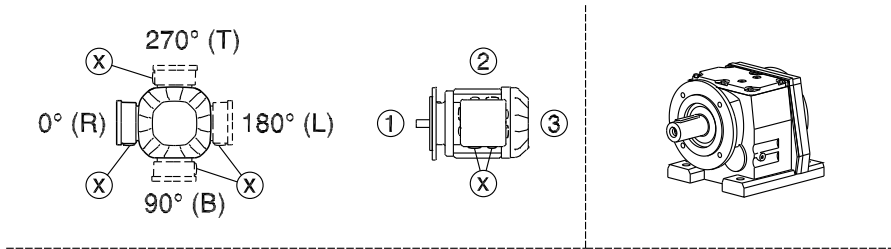
25803530/EN – 04/2018

# 7 Mounting positions

Mounting position sheets

## R07F-R87F

04 042 04 00



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

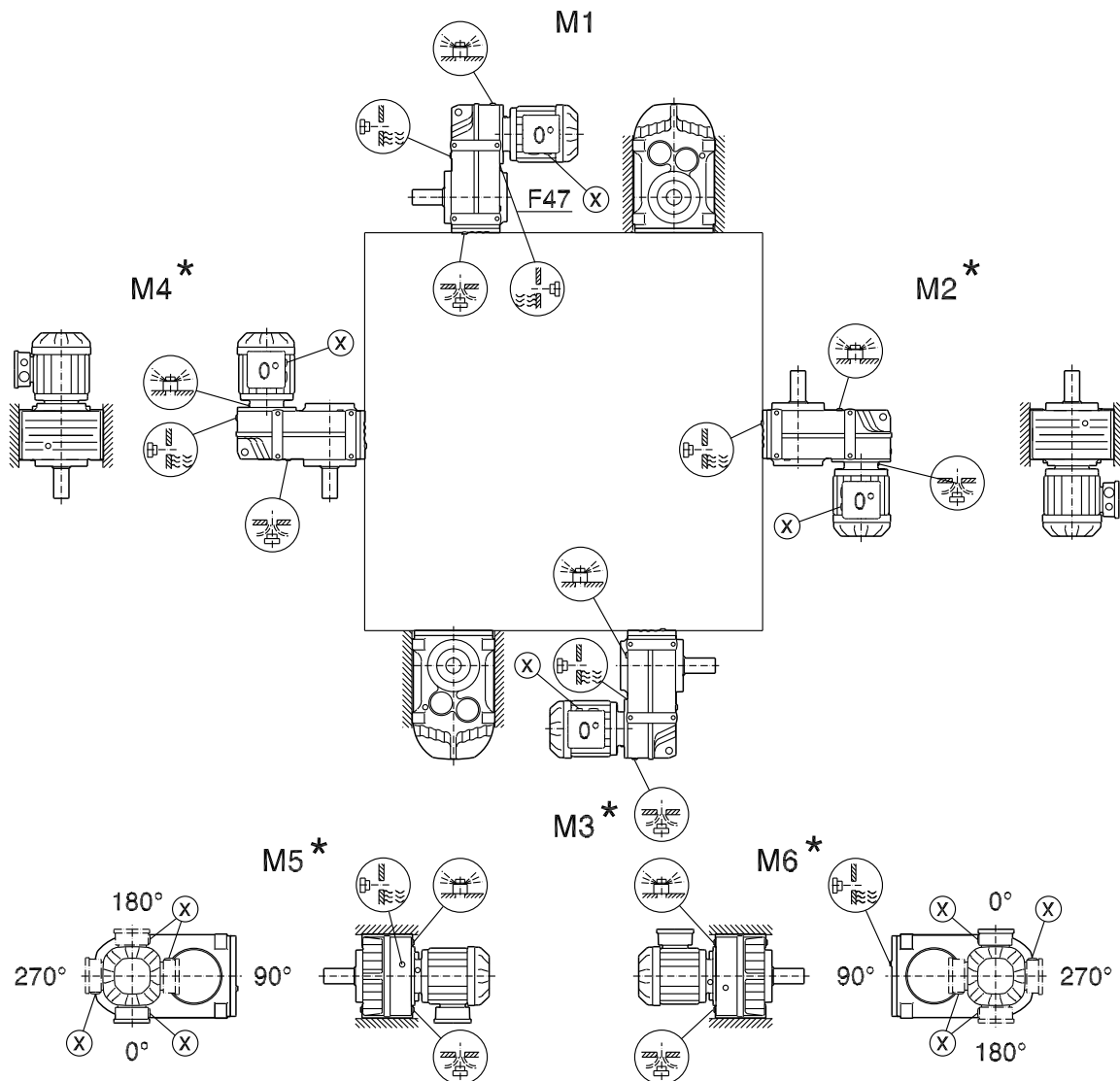
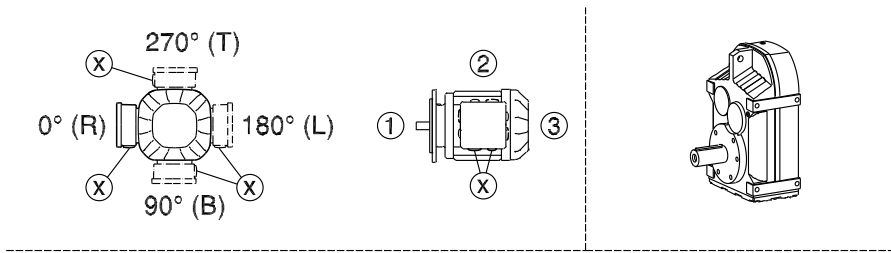
\* (→ 130)

25803530/EN – 04/2018

7.6.4 Mounting positions of parallel-shaft helical gearmotors

F/FA..B/FH27B-157B, FV27B-107B

42 042 04 00



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

\* (→ 130)

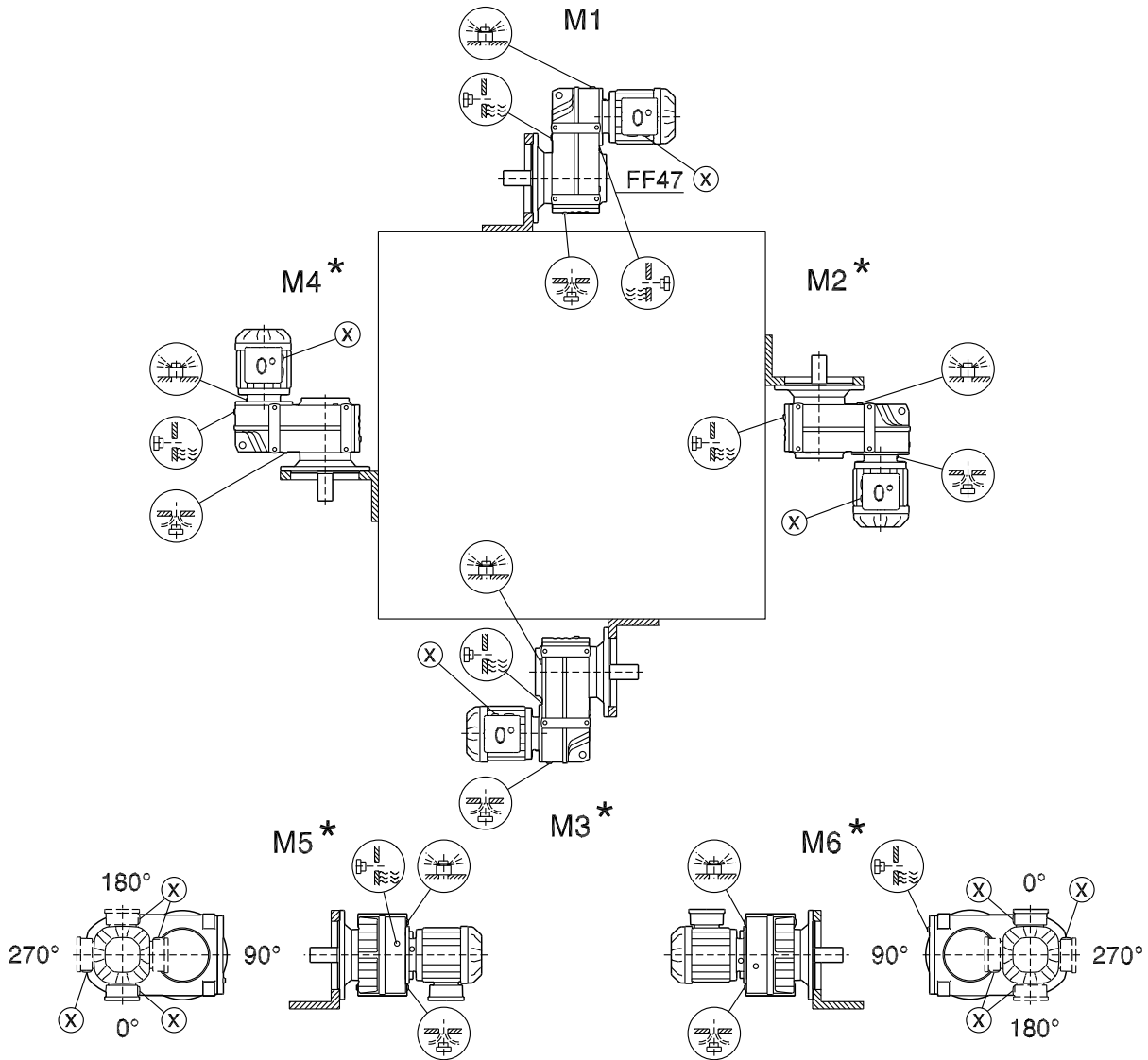
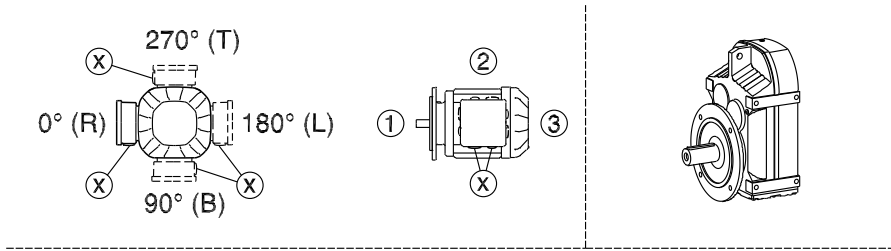
25803530/EN – 04/2018

# 7 Mounting positions

Mounting position sheets

FF/FAF/FHF/FZ/FAZ/FHZ27-157, FVF/FVZ27-107, FM/FAM67-157

42 043 04 00



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

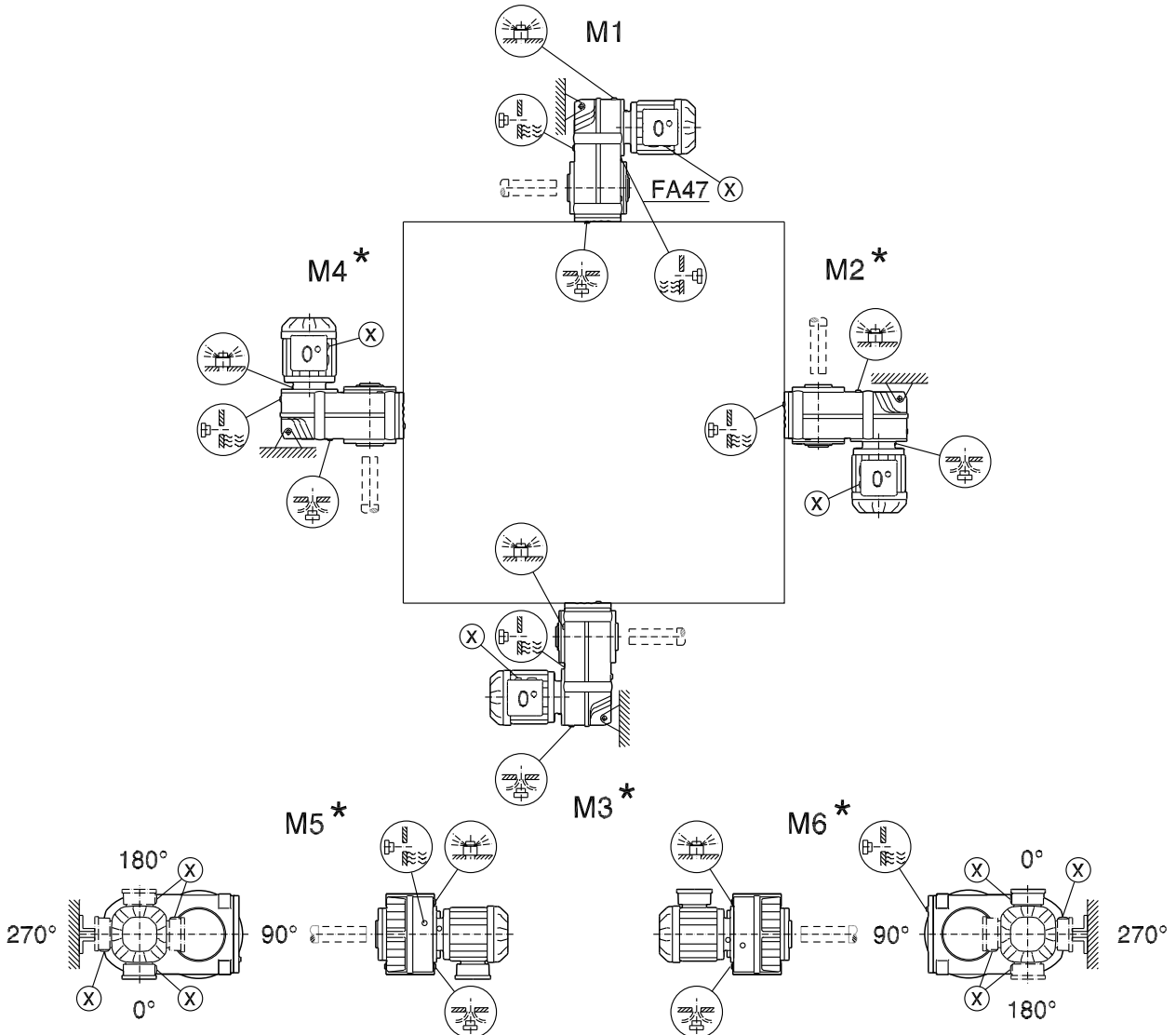
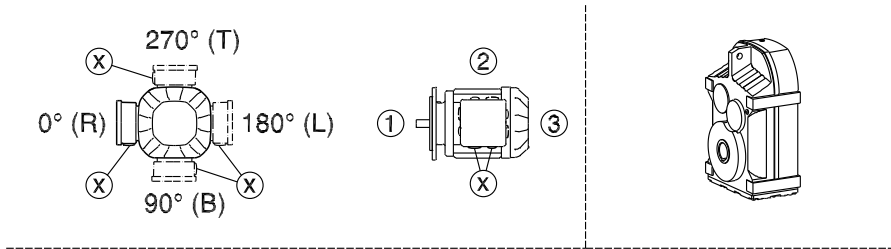
\* (→ 130)

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FA/FH27-157, FV27-107, FT37-97

42 044 04 00



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

\* (→ 130)

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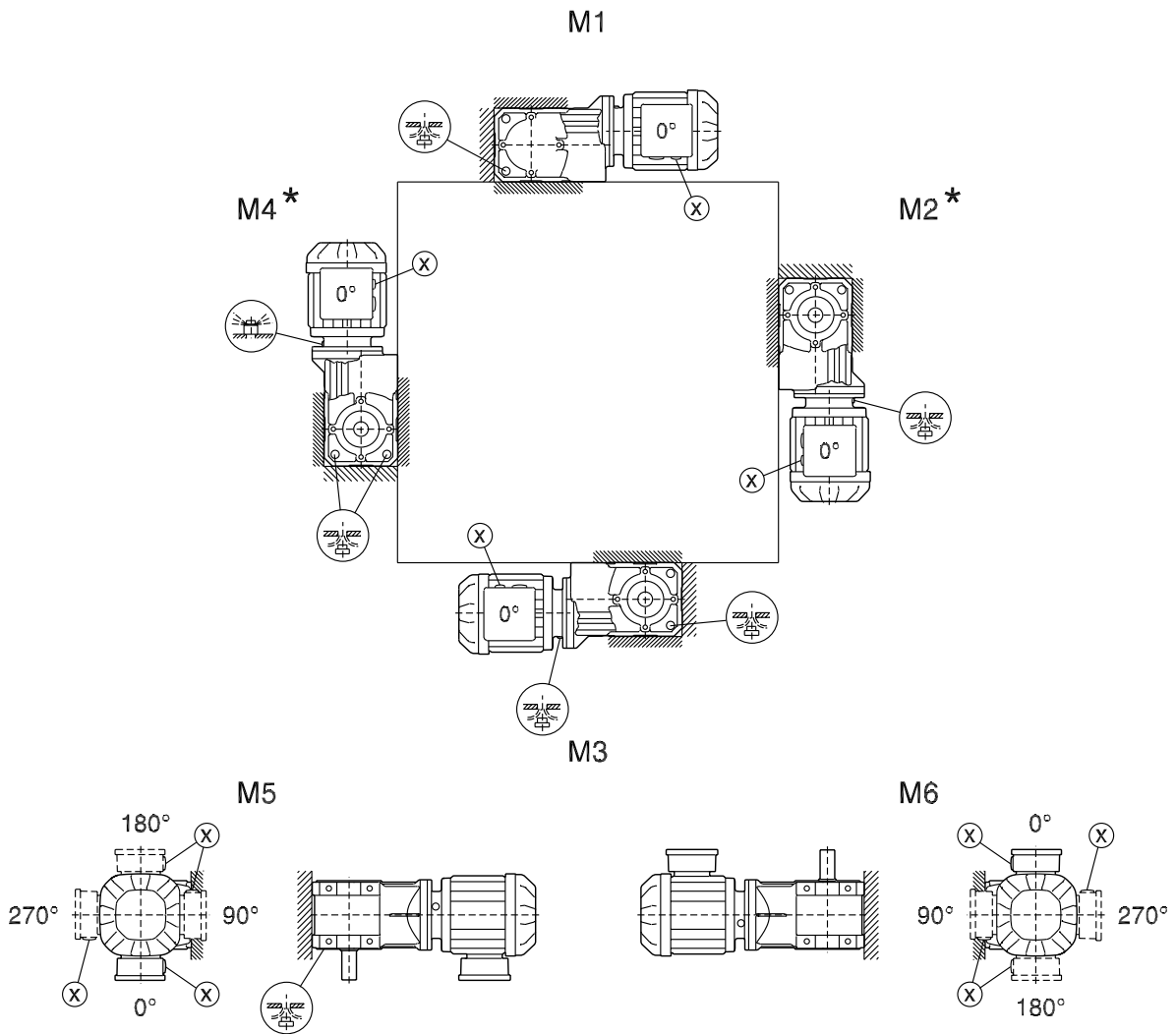
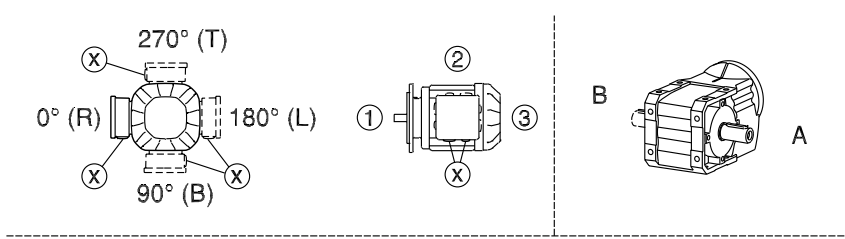
# 7 Mounting positions

Mounting position sheets

## 7.6.5 Mounting positions of helical-bevel gearmotors

K/KA..B/KH19B-29B

33 023 00 15

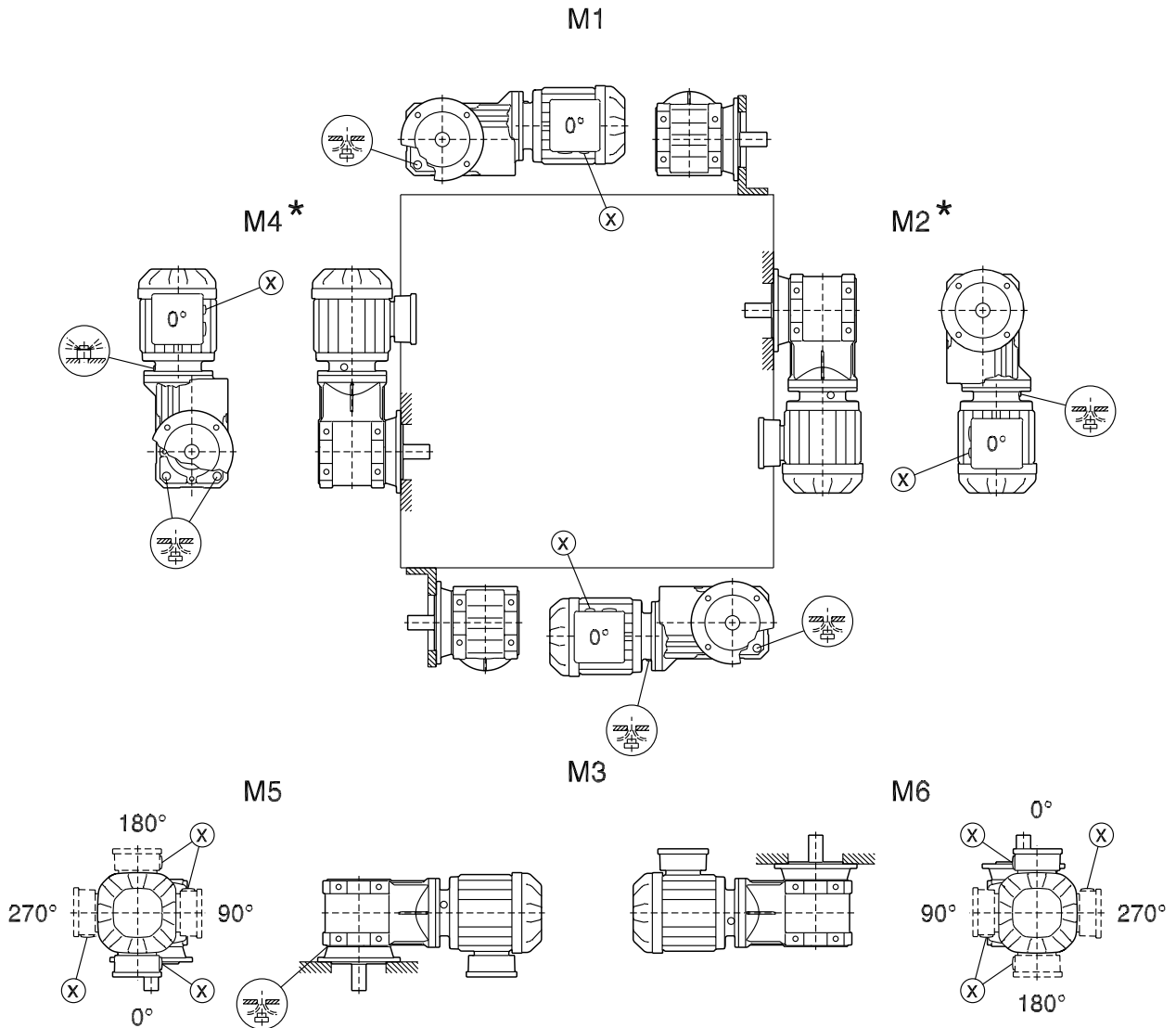
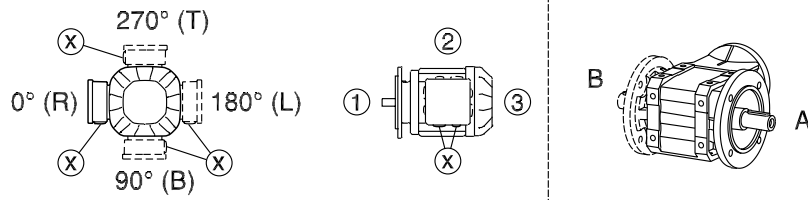


\* (→ 130)

25803530/EN – 04/2018

KF..B/KAF..B/KHF19B-29B

33 024 00 15



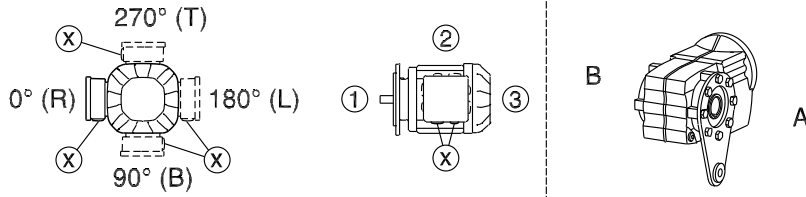
\* (→ 130)

# 7 Mounting positions

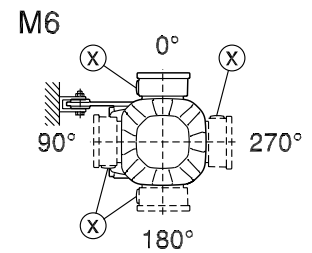
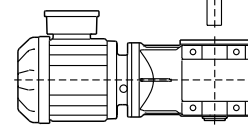
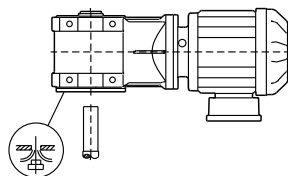
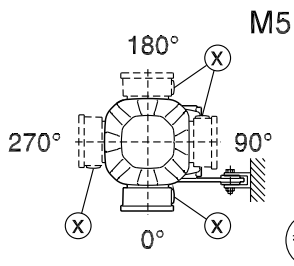
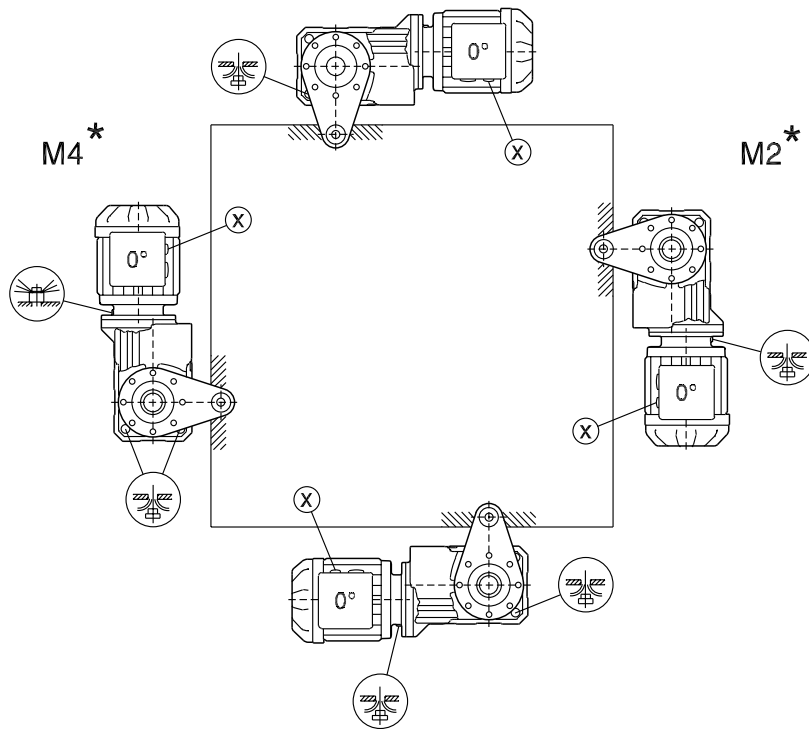
Mounting position sheets

KA..B/KH19B-29B

33 025 00 15



M1

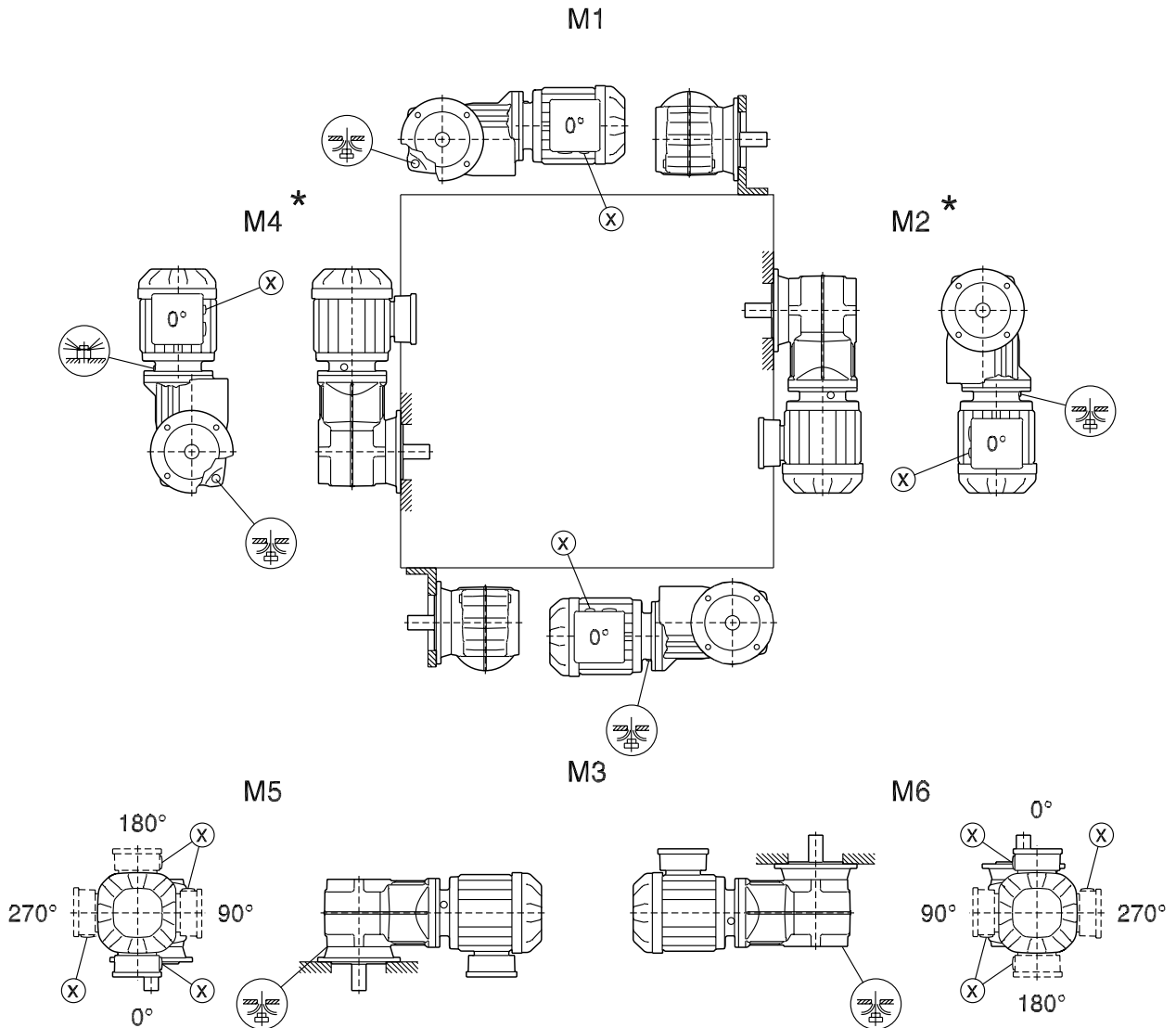
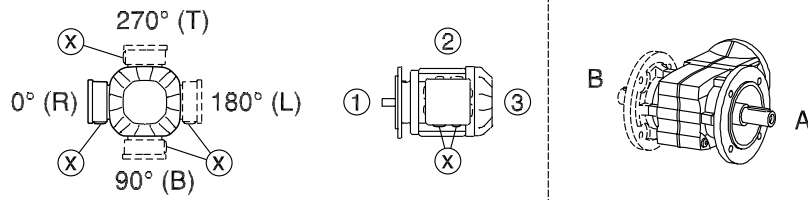


\* (→ 130)

25803530/EN – 04/2018

KF/KAF/KHF19-29

33 026 00 15



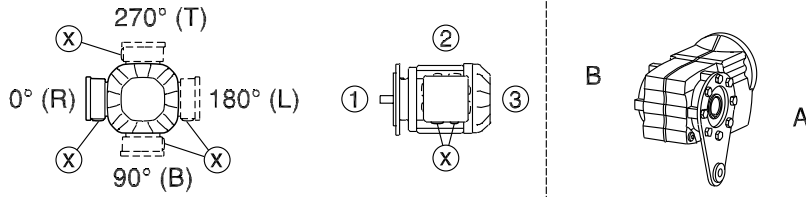
\* (→ 130)

# 7 Mounting positions

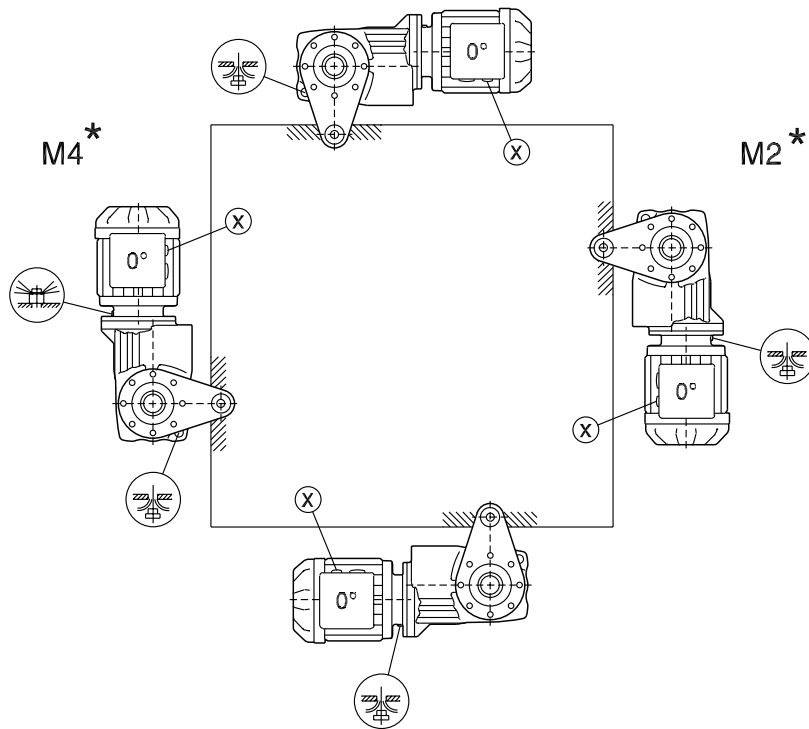
Mounting position sheets

KA/KH19-29

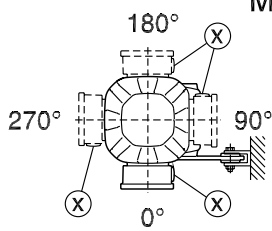
33 027 00 15



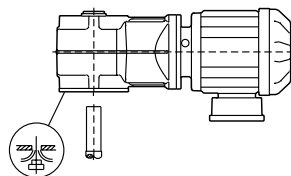
M1



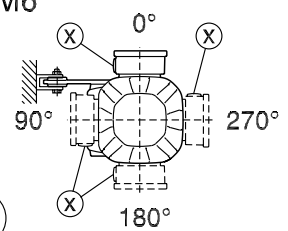
M5



M3



M6

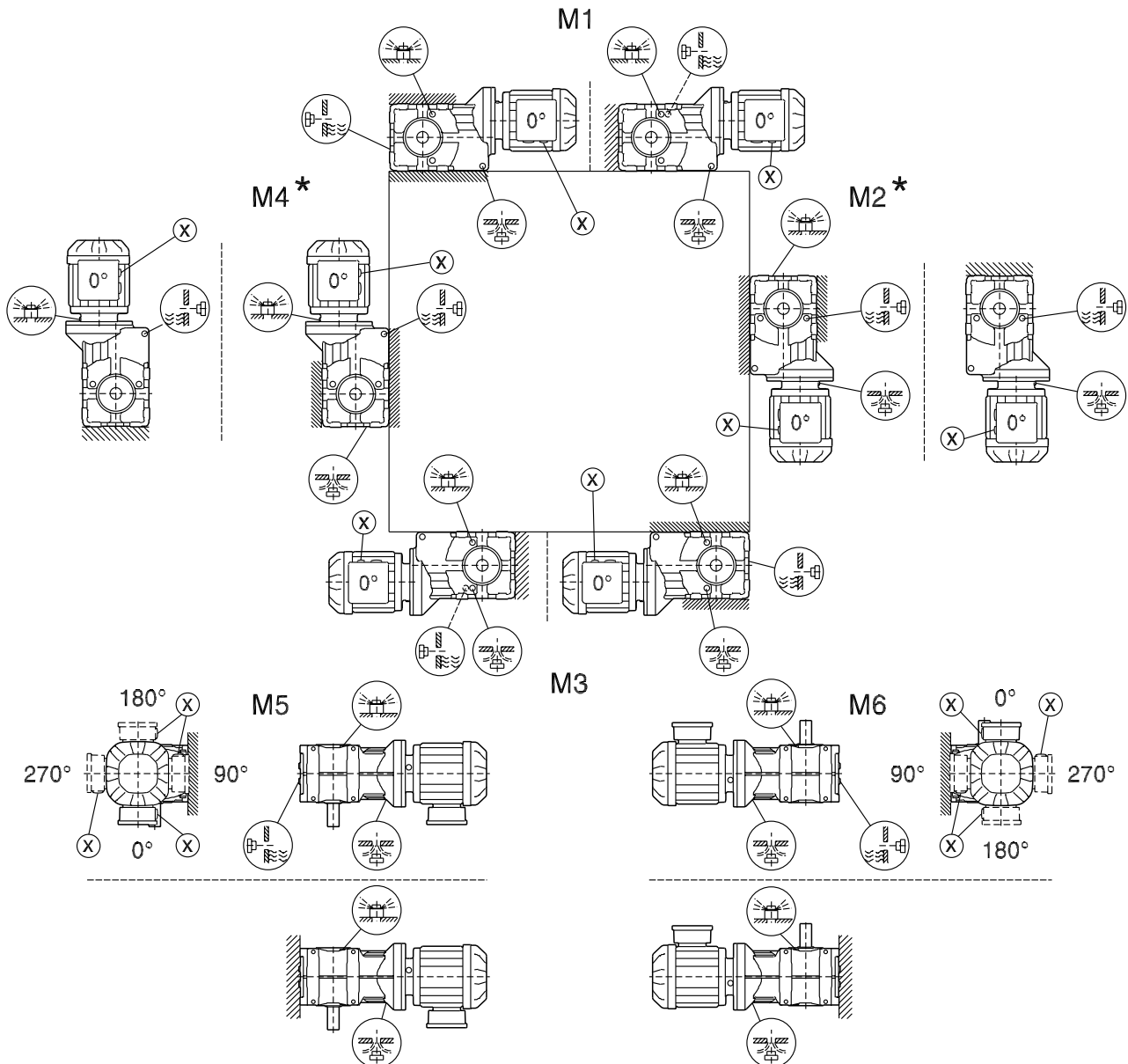
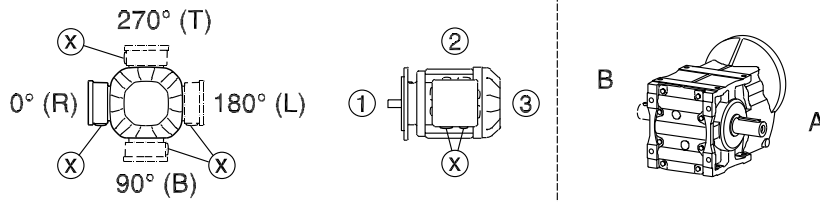


\* (→ 130)

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K/KA..B39-49

33 092 02 14



\* (→ 130)

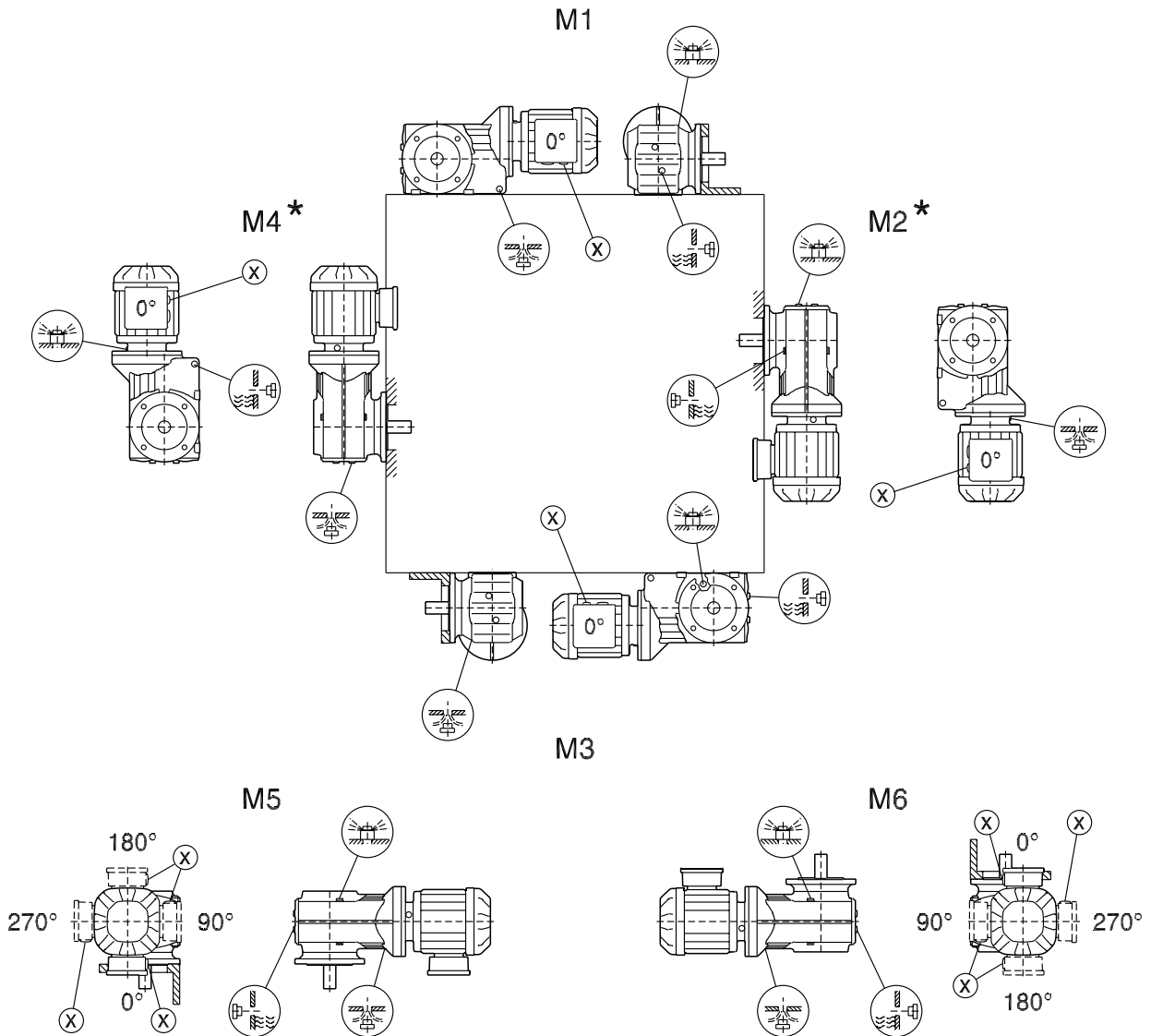
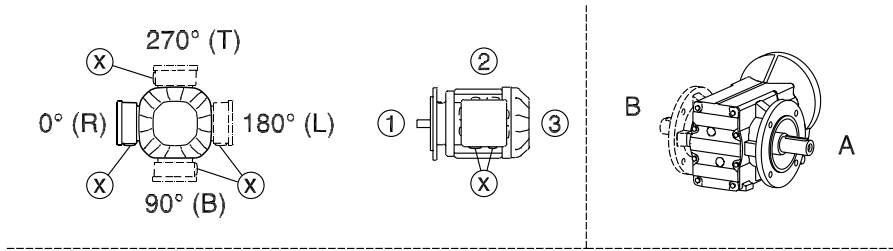
25803530/EN – 04/2018

# 7 Mounting positions

Mounting position sheets

KF/KAF/KHF39-49

33 093 01 14



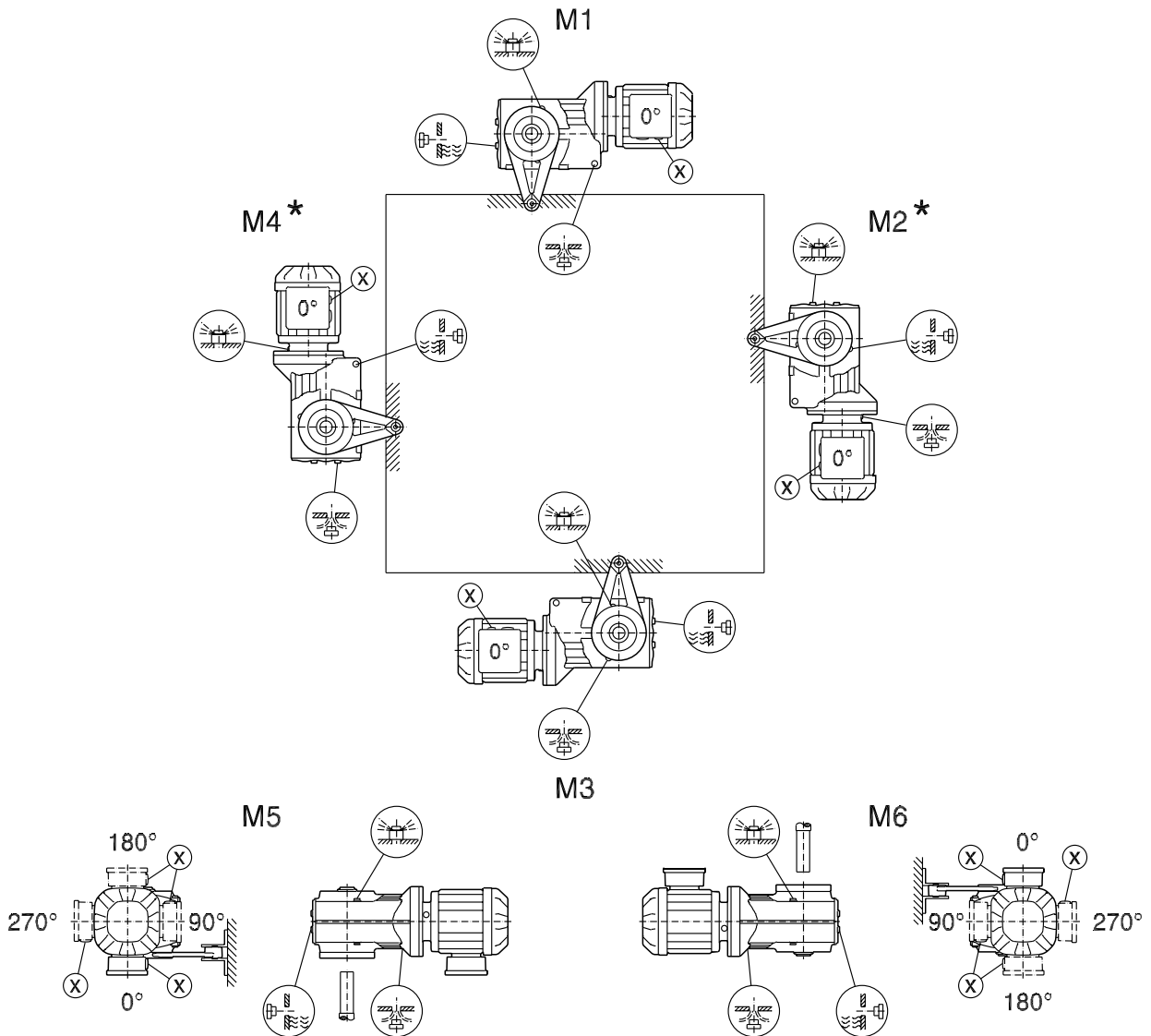
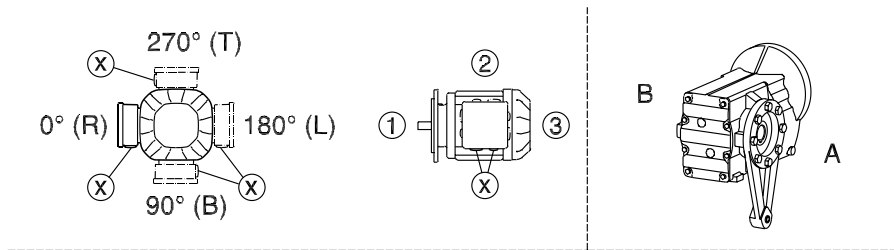
\* (→ 130)

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KA/KH/KT39-49

33 094 01 14



\* (→ 130)

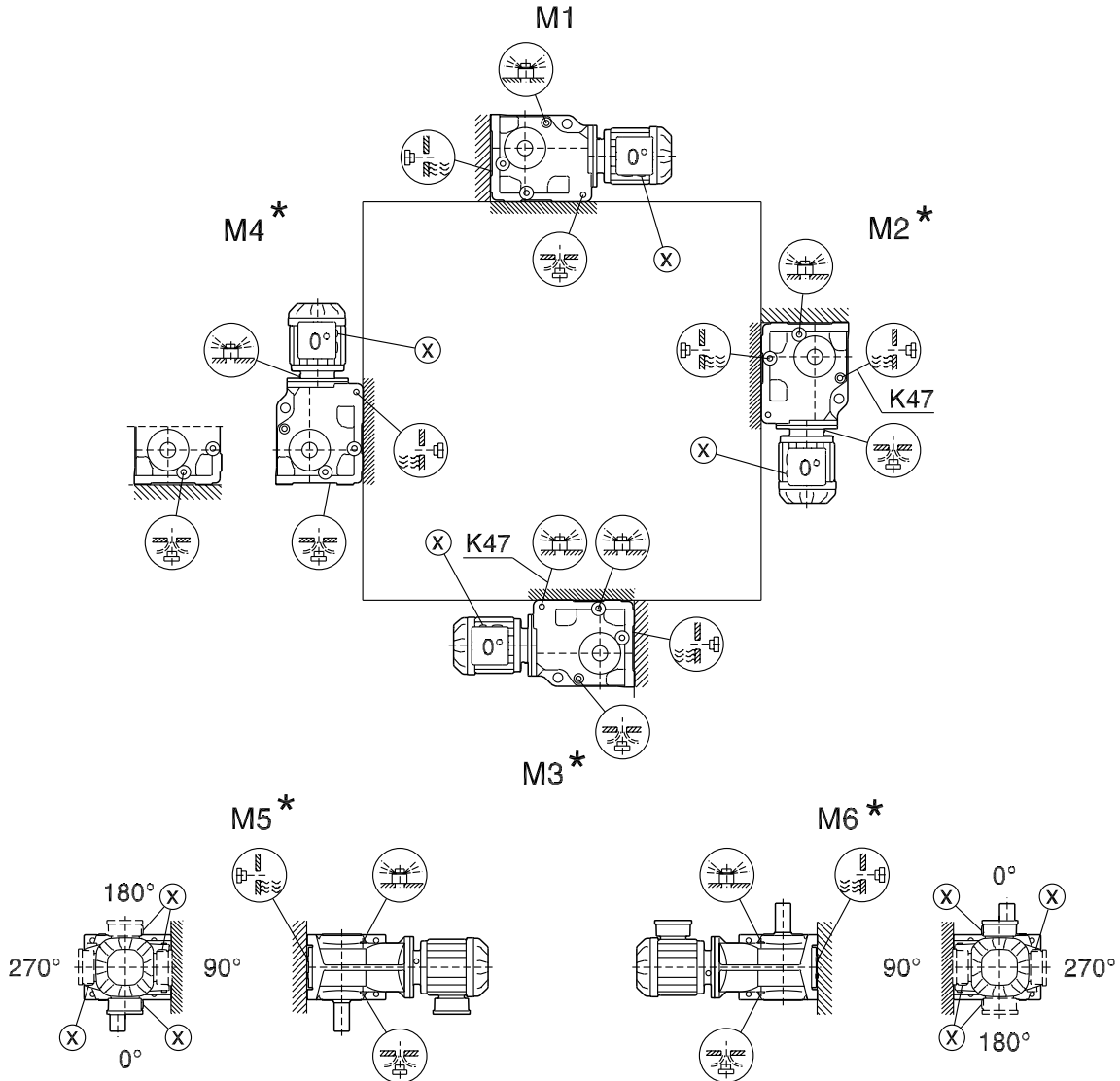
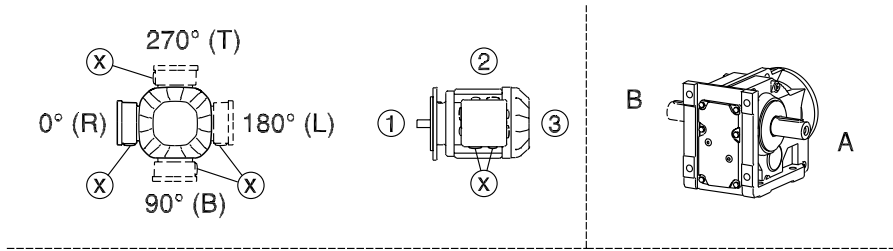
25803530/EN – 04/2018

# 7 Mounting positions

Mounting position sheets

K/KA..B/KH47B-157B, KV47B-107B

34 025 05 00

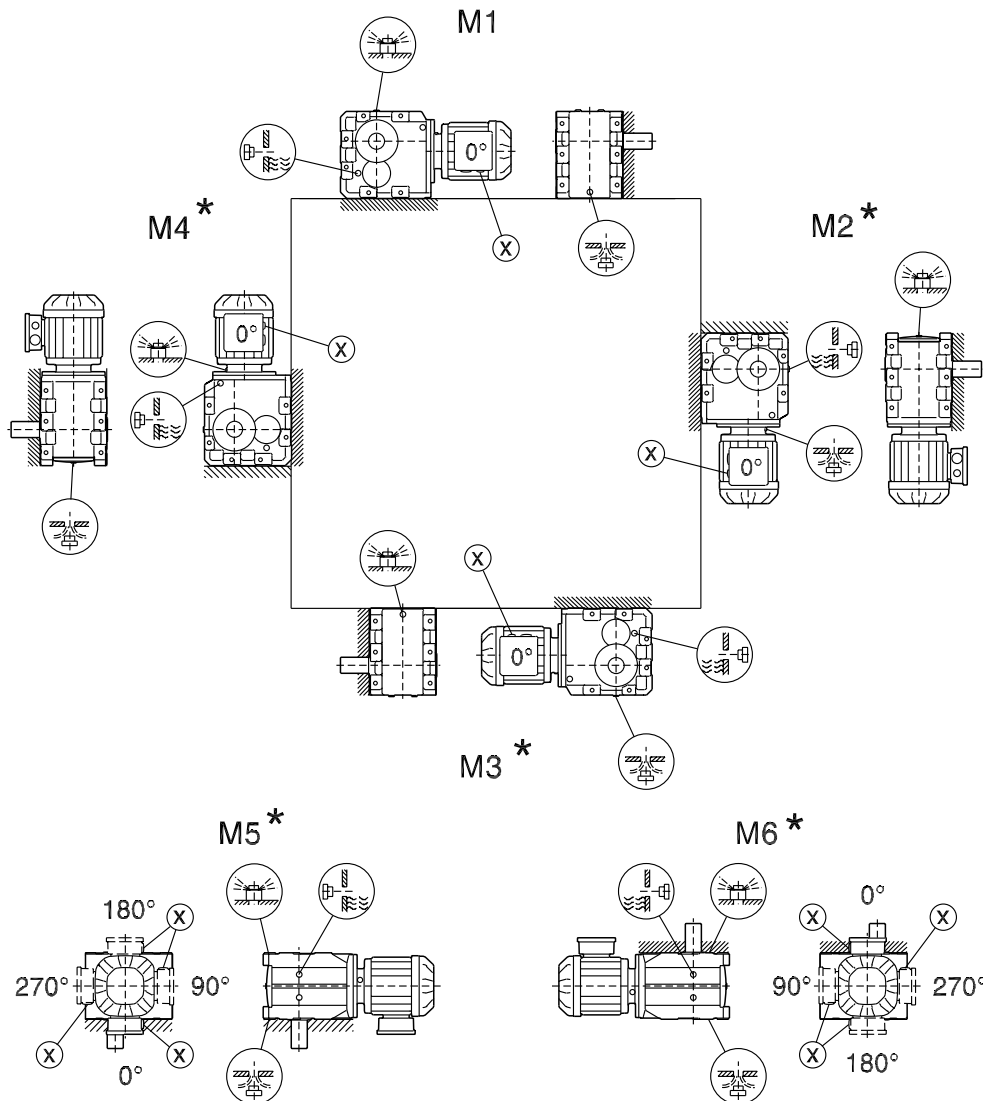
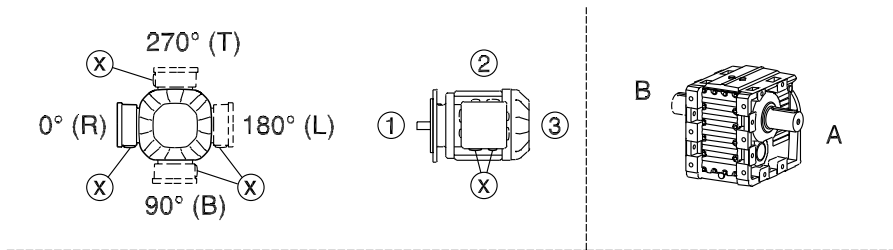


\* (→ 130)

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K167-187, KH167B-187B

34 026 05 00



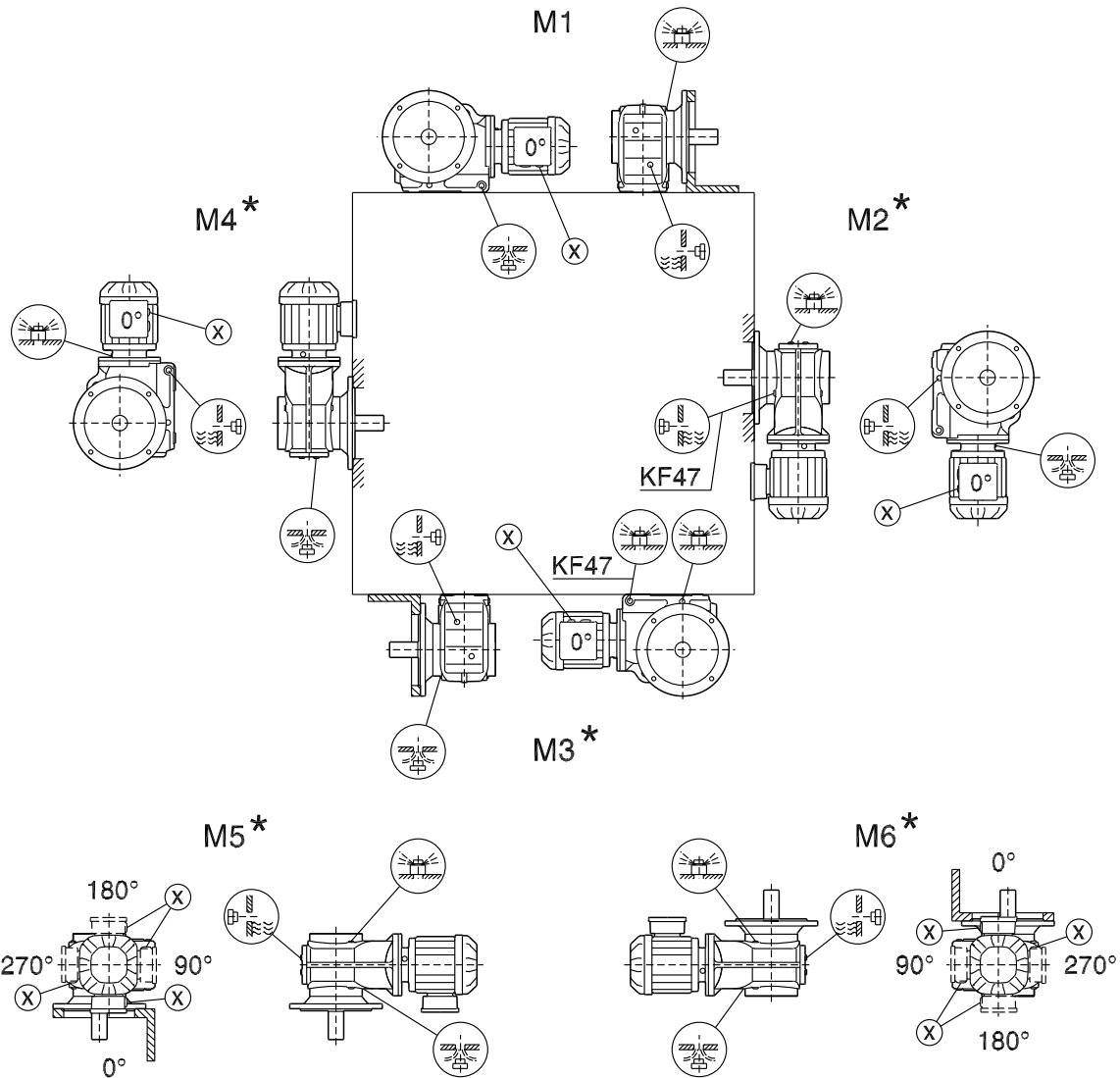
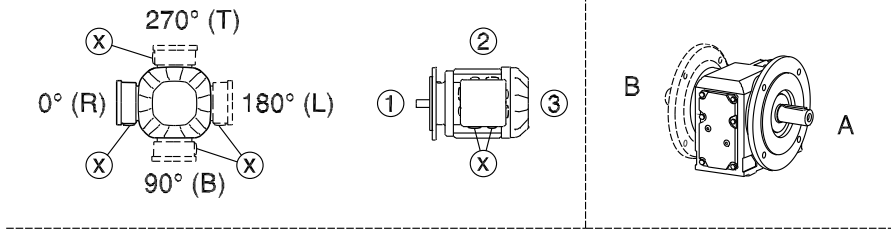
\* (→ 130)

# 7 Mounting positions

Mounting position sheets

KF/KAF/KHF/KZ/KAZ/KHZ37-157, KVF/KVZ37-107, KM/KAM67-157

34 027 04 00

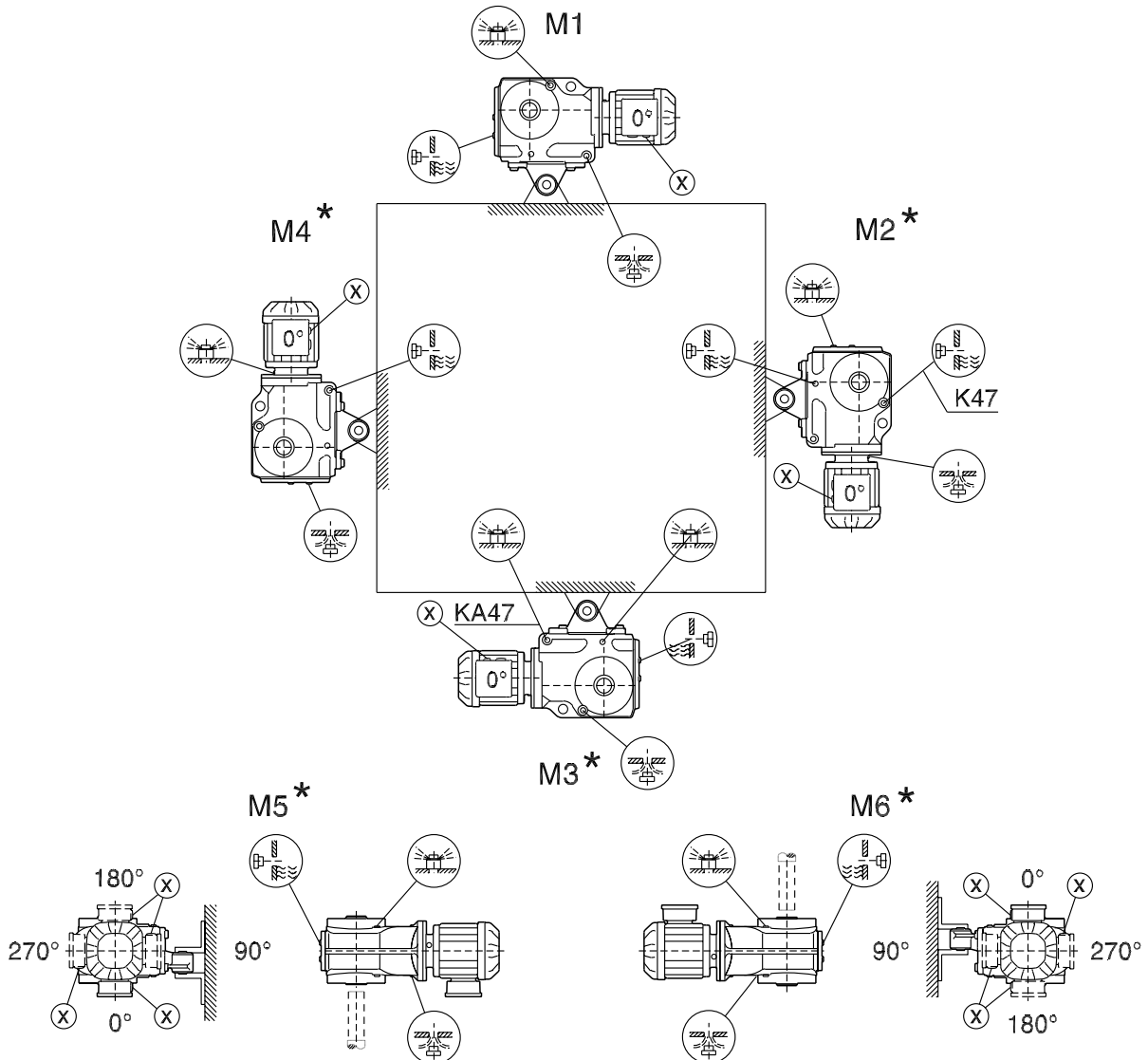
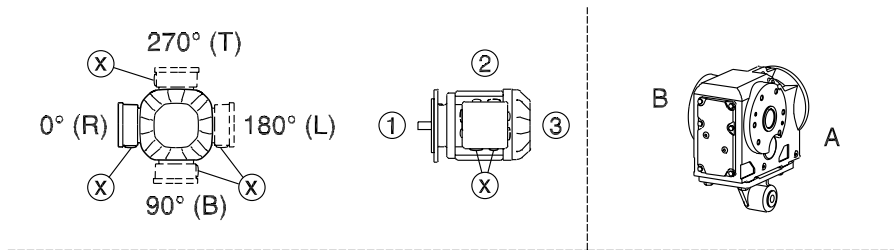


\* (→ 130)

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KA/KH37-157, KV37-107, KT37-97

39 025 05 00



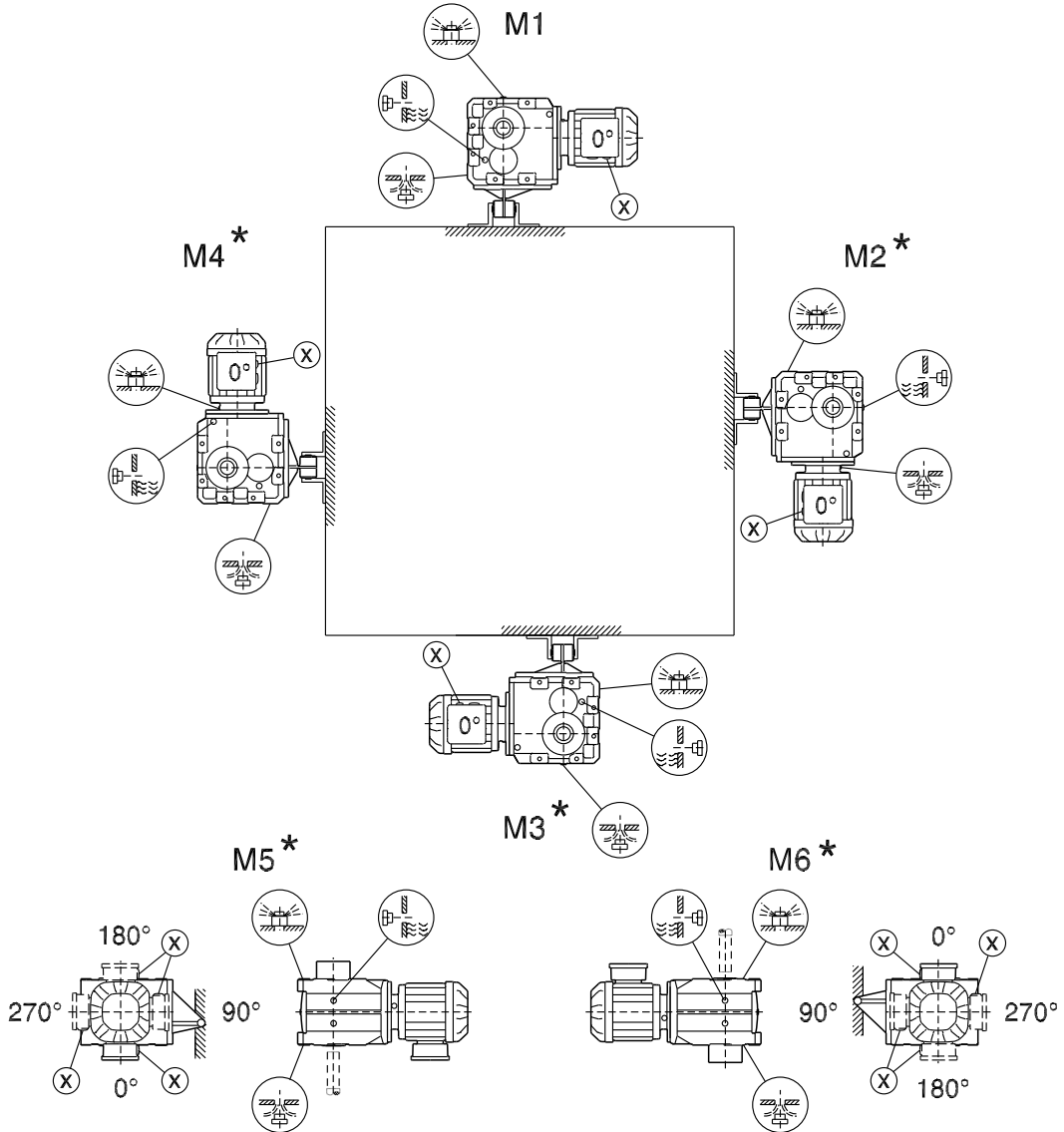
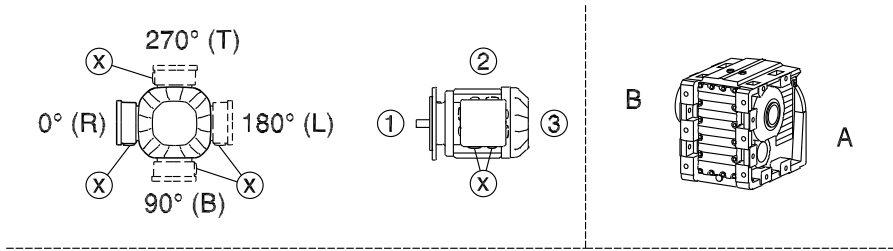
\* (→ 130)

# 7 Mounting positions

Mounting position sheets

KH167-187

39 026 05 00



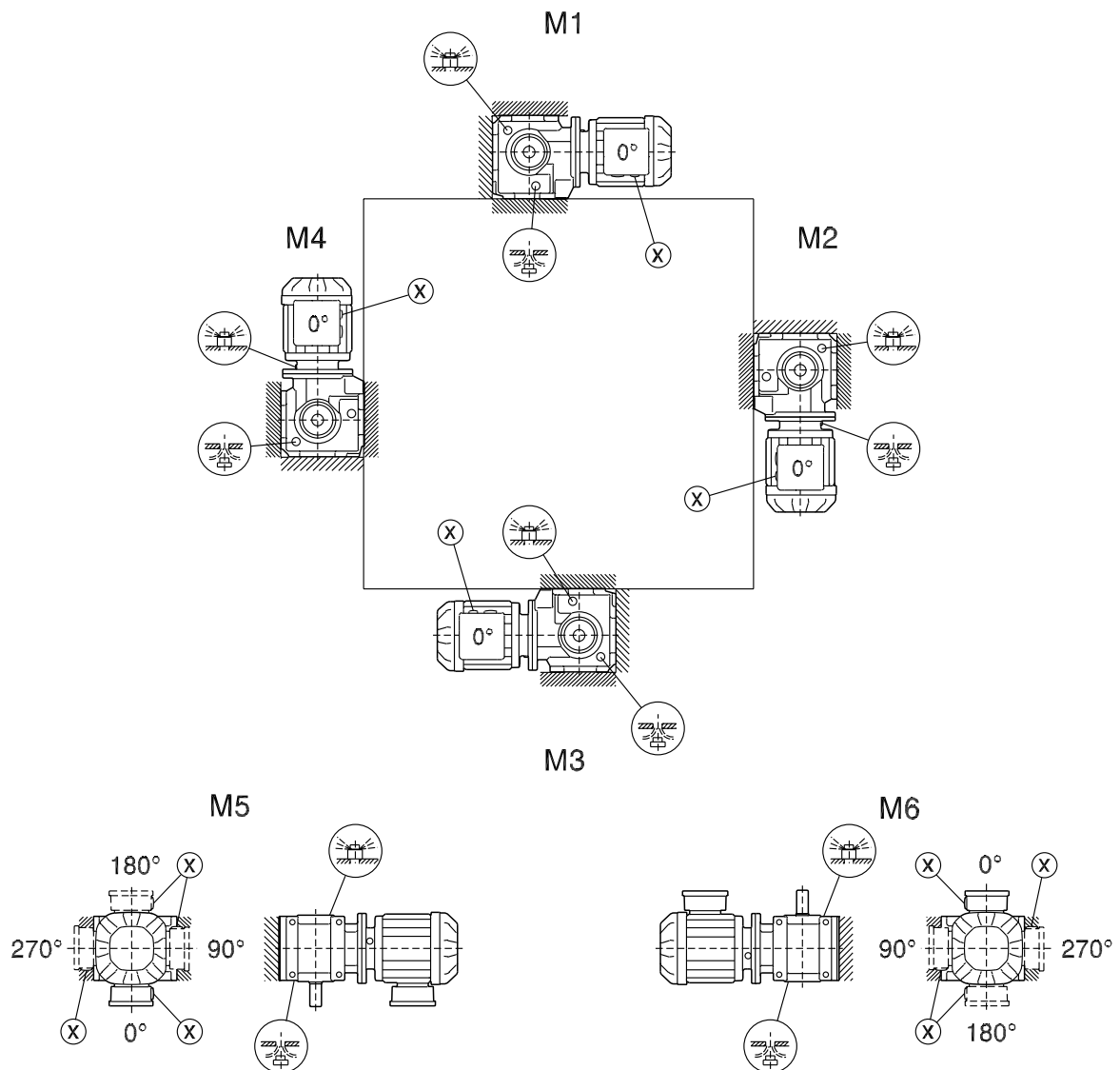
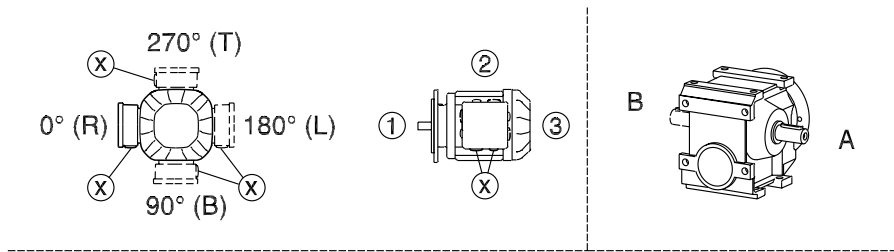
\* (→ 130)

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7.6.6 Mounting positions of helical-worm gearmotors

S37

05 025 04 00



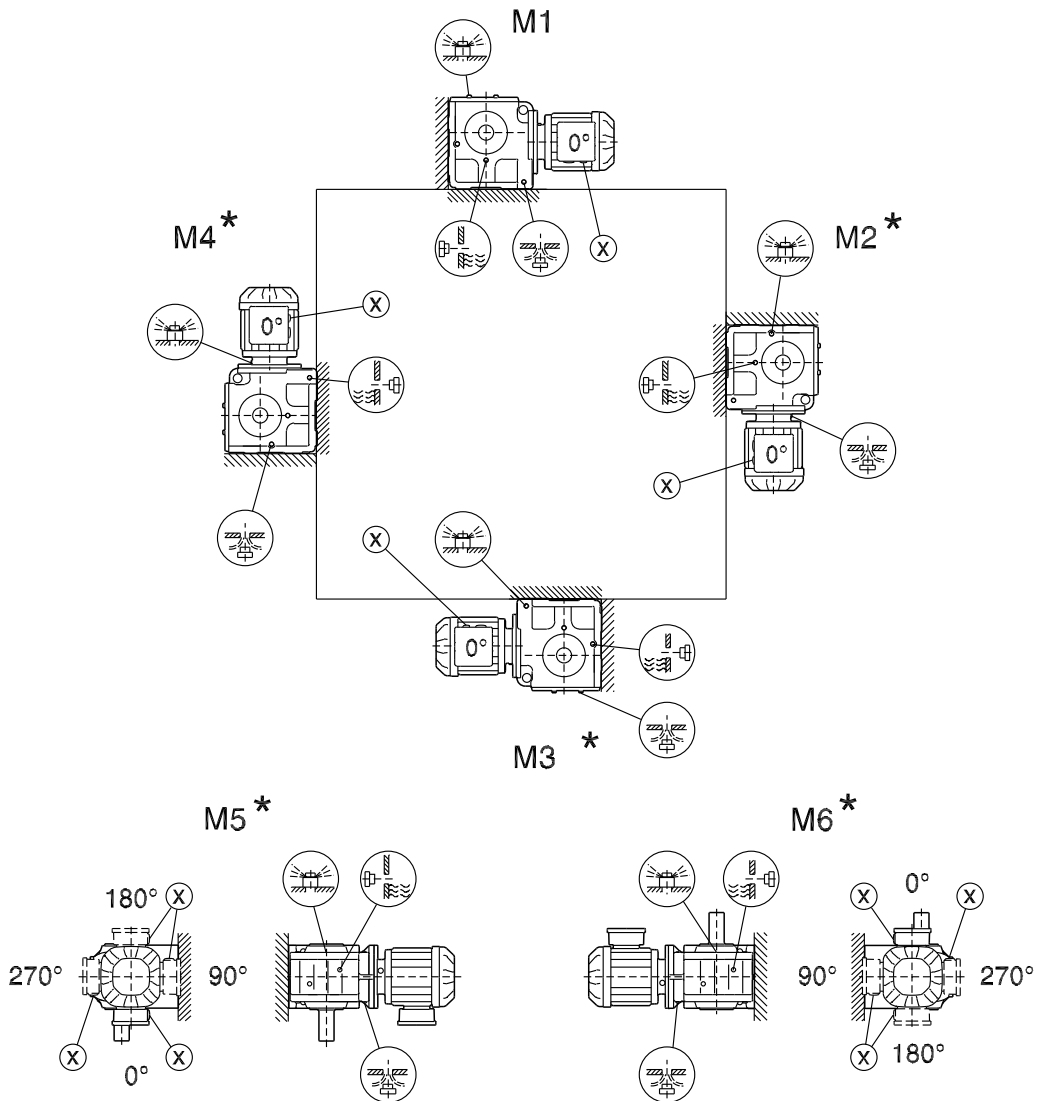
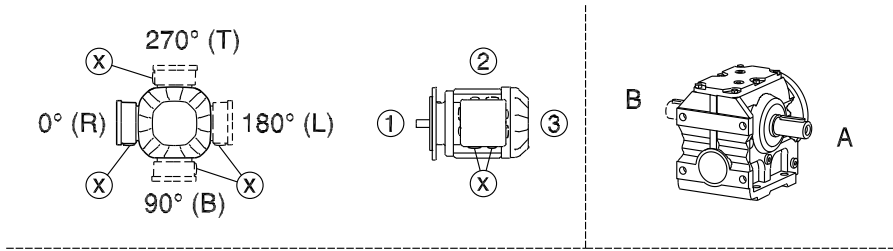
25803530/EN – 04/2018

# 7 Mounting positions

Mounting position sheets

S47-S97

05 026 04 00



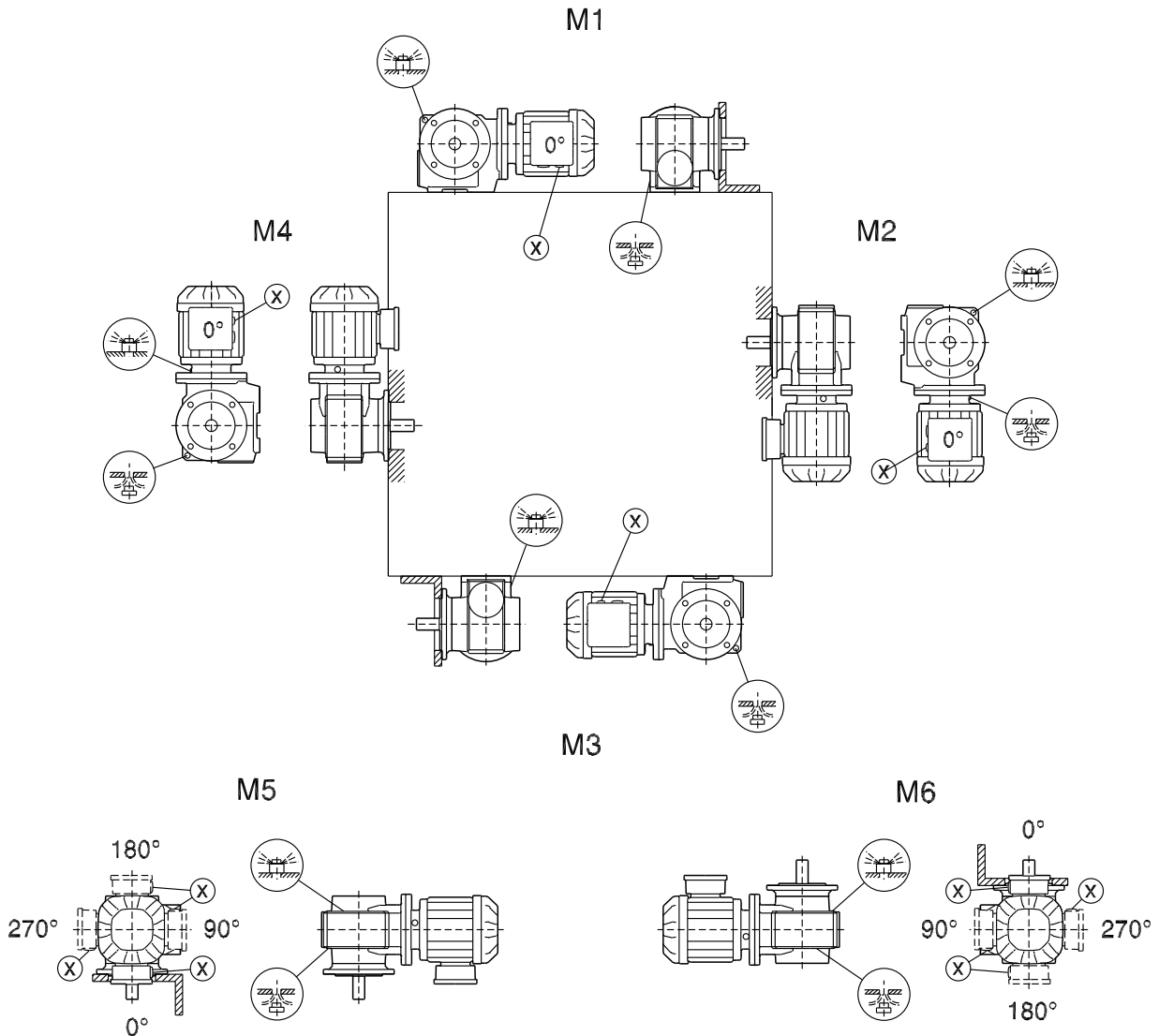
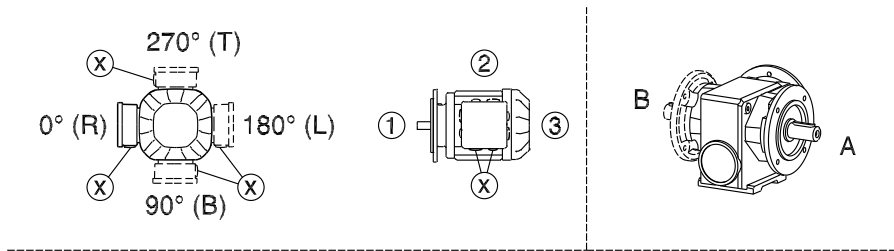
\* (→ 130)

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SF/SAF/SHF37

05 027 04 00



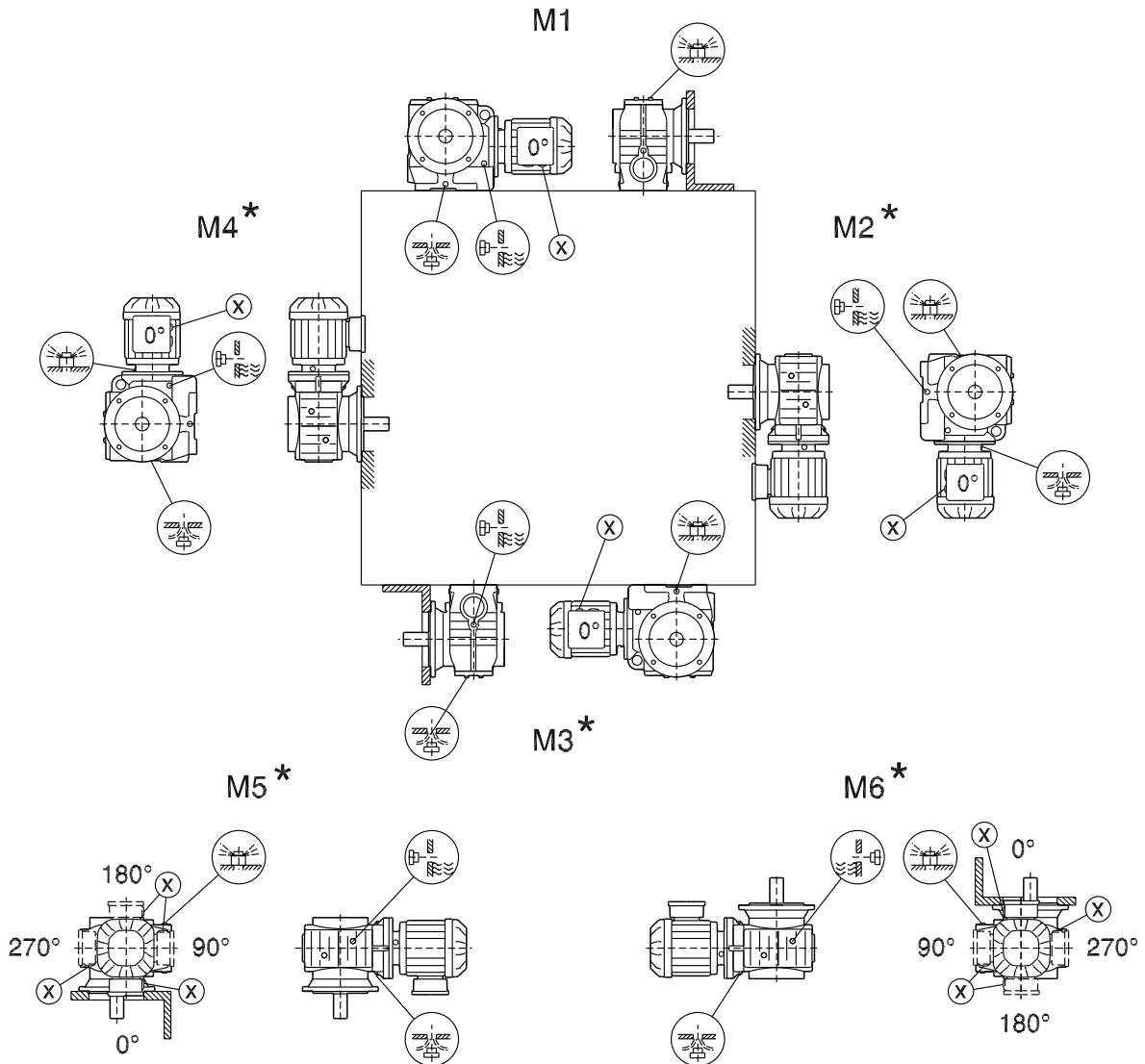
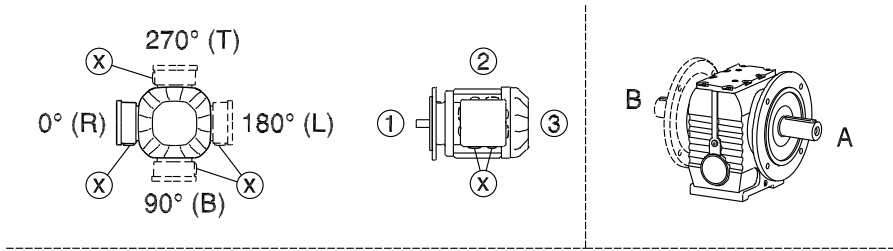
25803530/EN – 04/2018

# 7 Mounting positions

Mounting position sheets

SF/SAF/SHF/SAZ/SHZ47-97

05 028 04 00

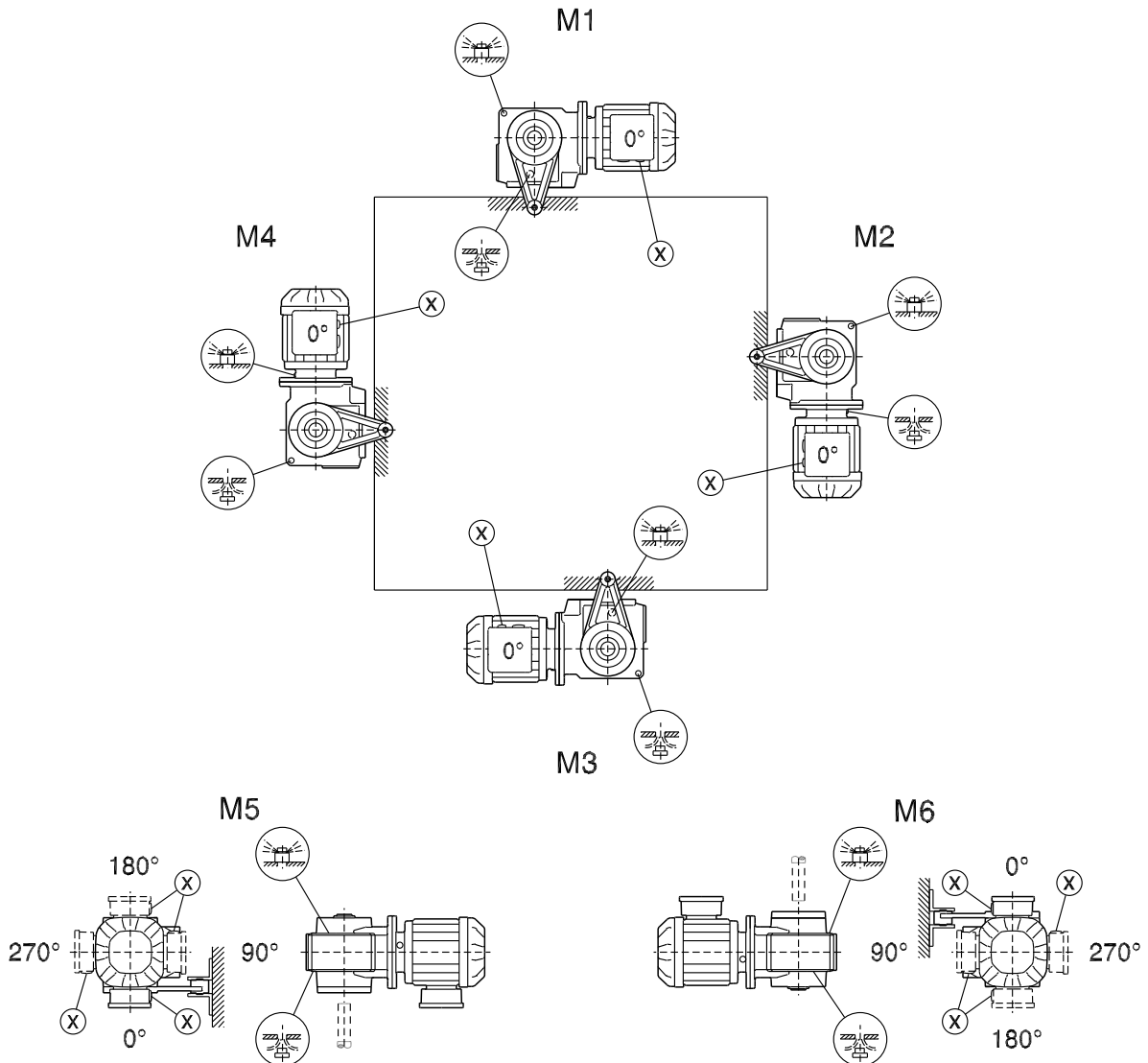
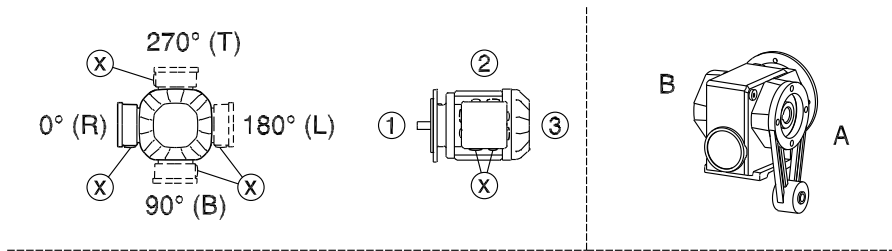


\* (→ 130)

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SA/SH/ST37

28 020 05 00



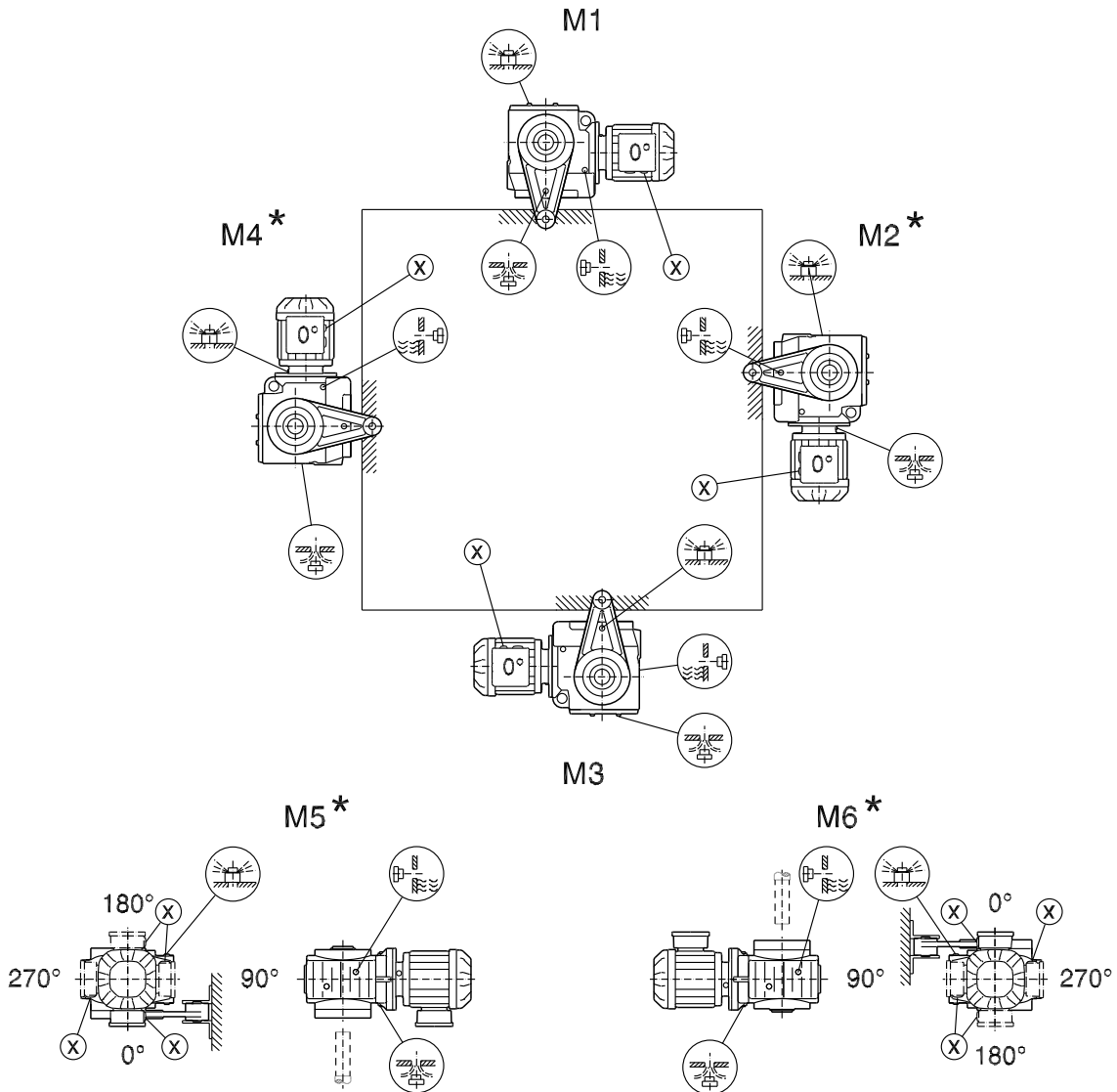
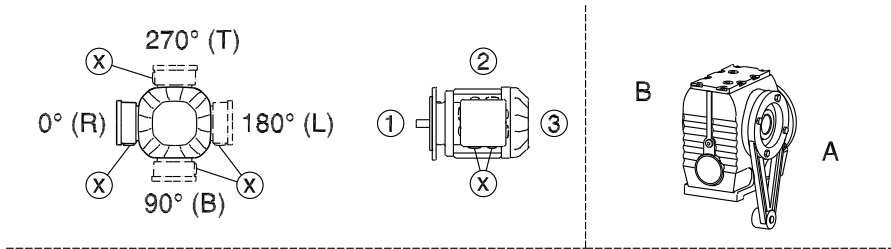
25803530/EN – 04/2018

# 7 Mounting positions

Mounting position sheets

SA/SH/ST47-97

28 021 04 00



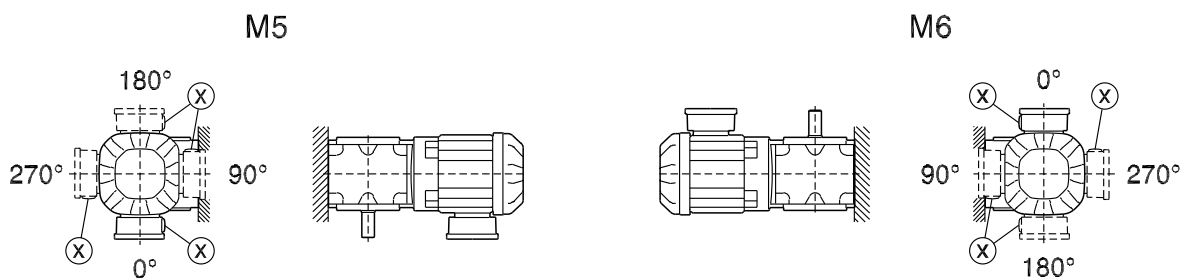
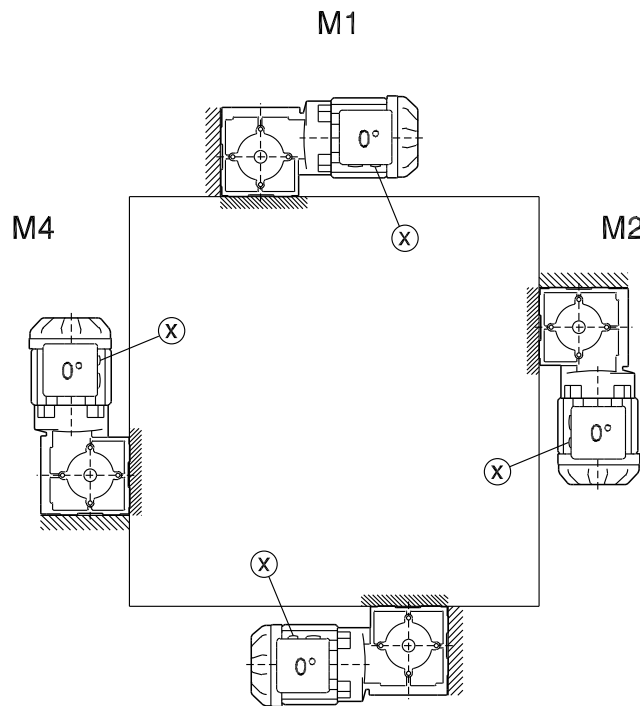
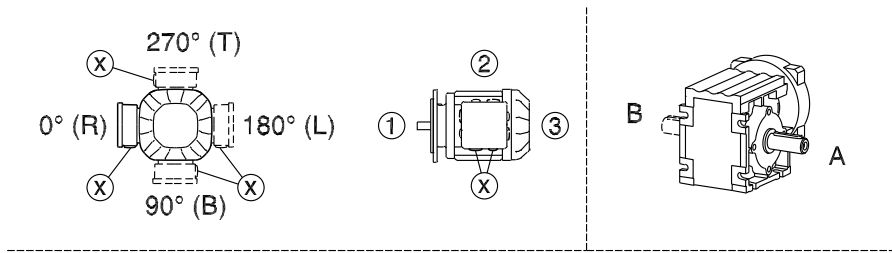
\* (→ 130)

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7.6.7 Mounting positions of SPIROPLAN® gearmotors

W10-30

20 001 02 02



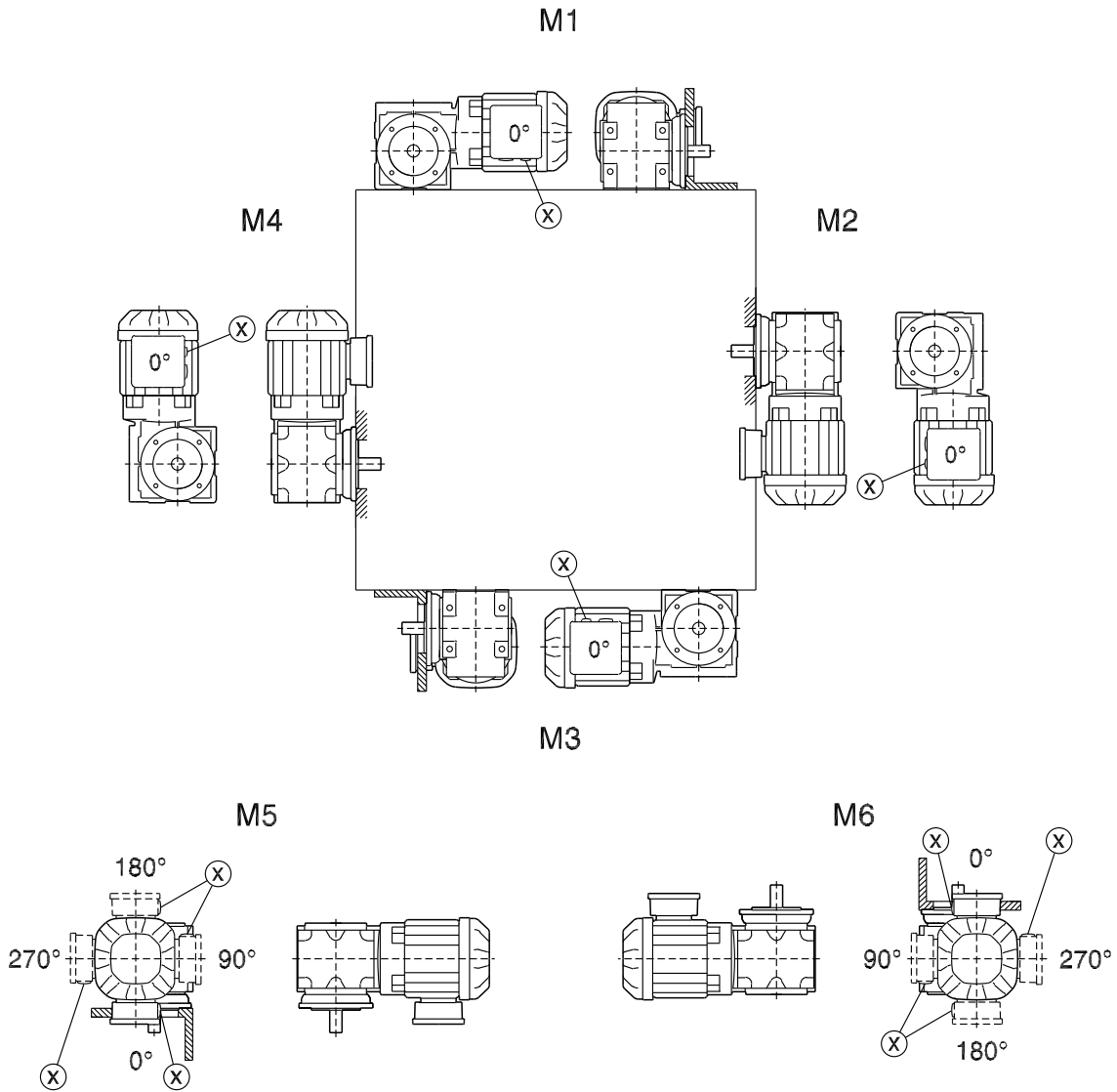
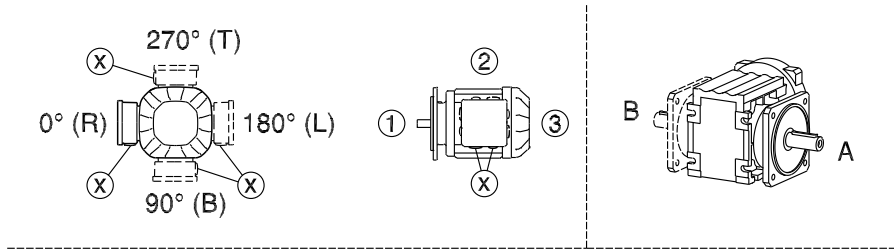
25803530/EN – 04/2018

# 7 Mounting positions

Mounting position sheets

WF10-30

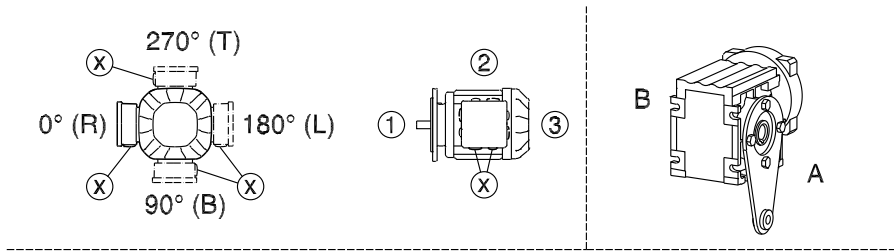
20 002 02 02



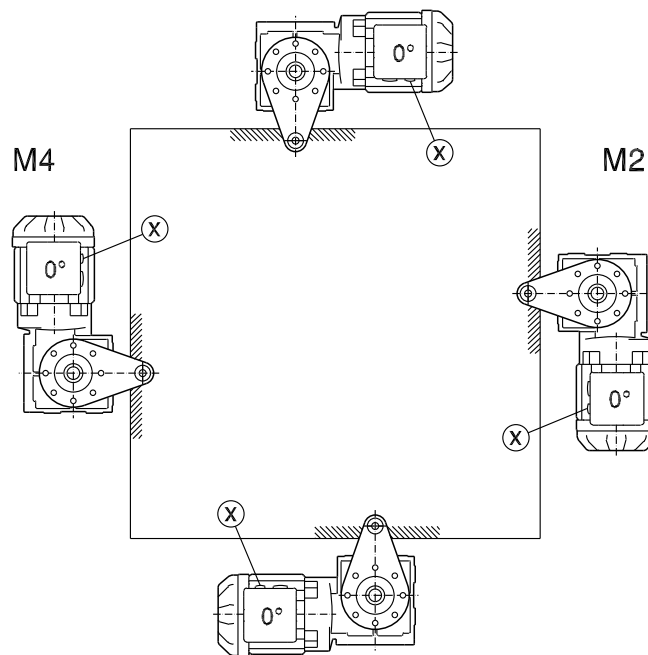
25803530/EN – 04/2018

WA10-30

20 003 03 02

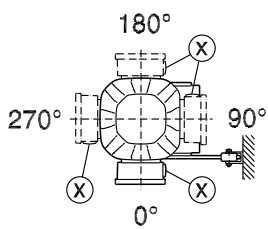


M1

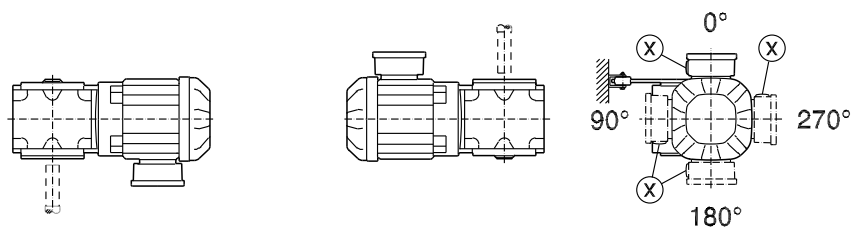


M3

M5



M6



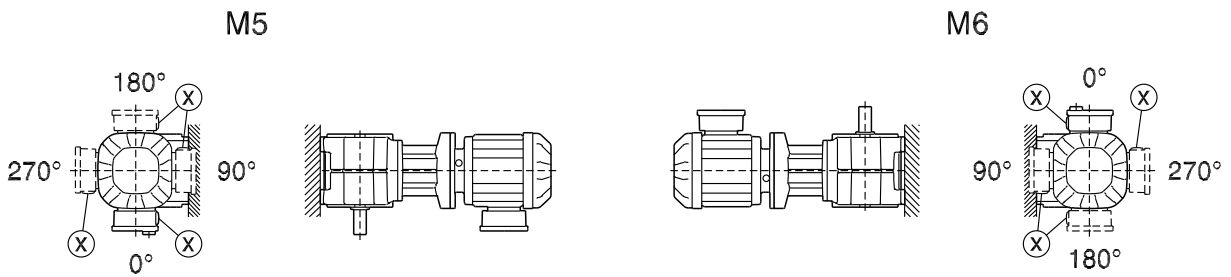
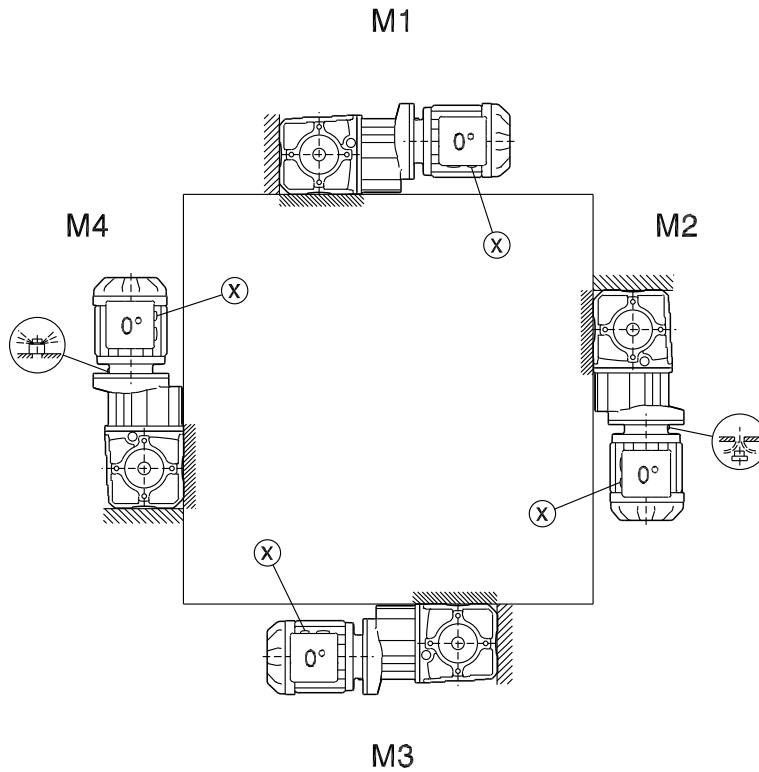
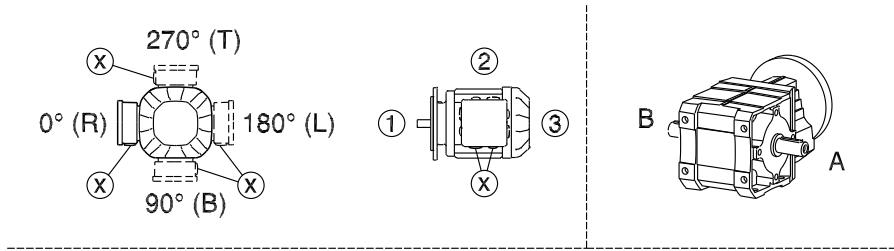
25803530/EN – 04/2018

# 7 Mounting positions

Mounting position sheets

W/WA..B/WH37B-47B

20 012 02 07

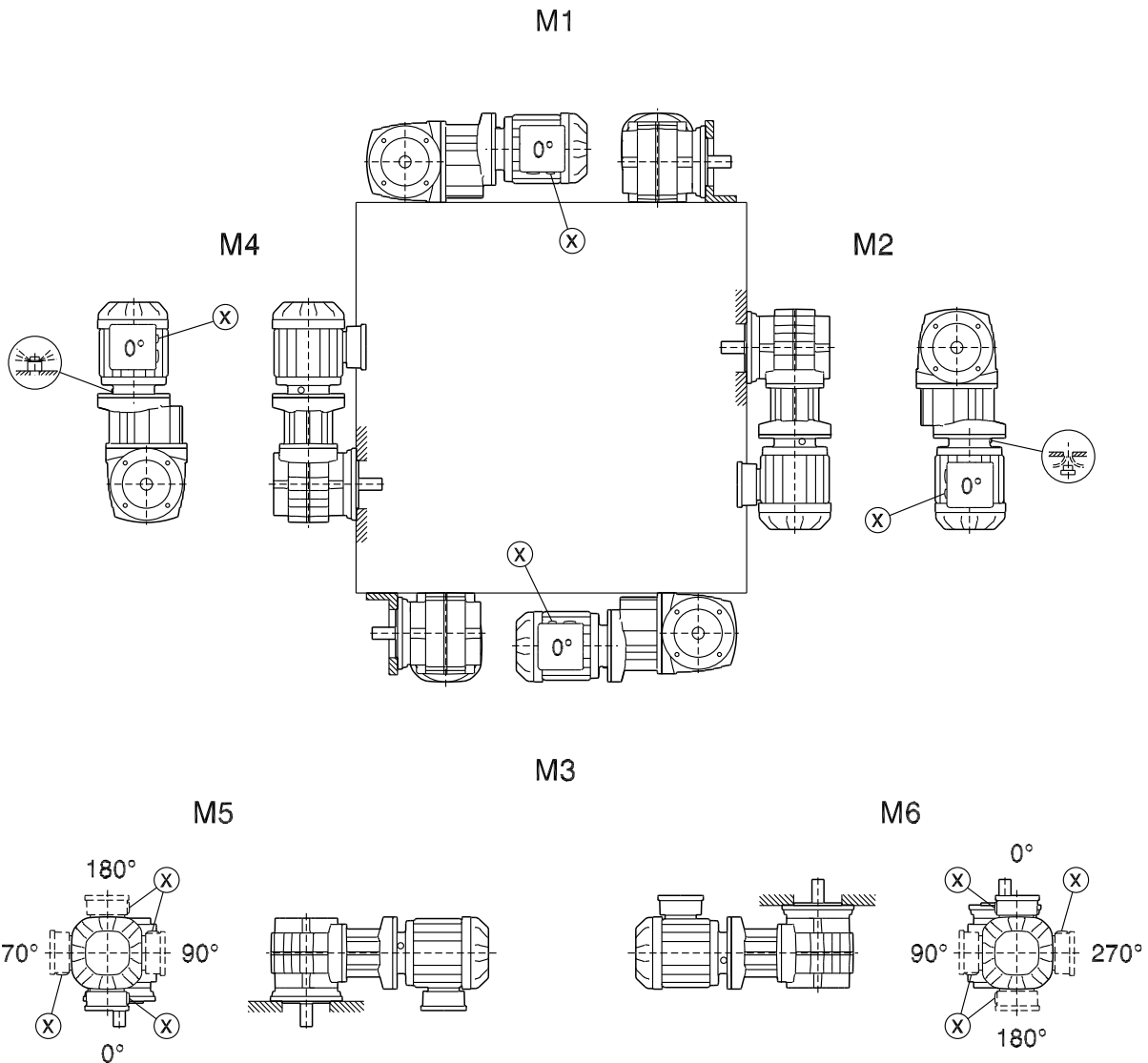
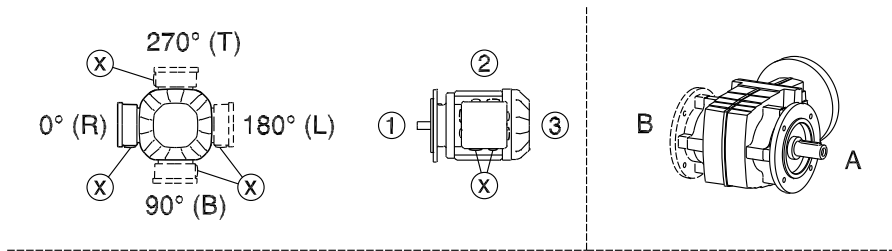


25803530/EN – 04/2018



WF/WAF/WHF37-47

20 013 02 07



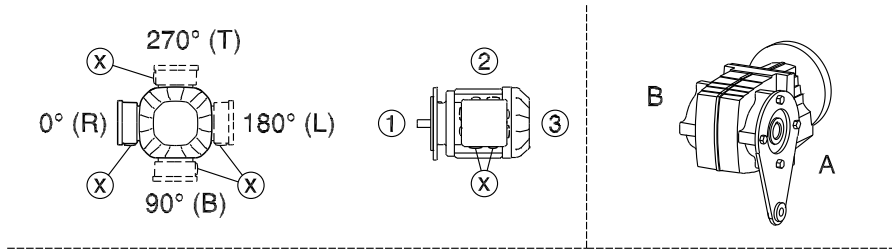
25803530/EN – 04/2018

# 7 Mounting positions

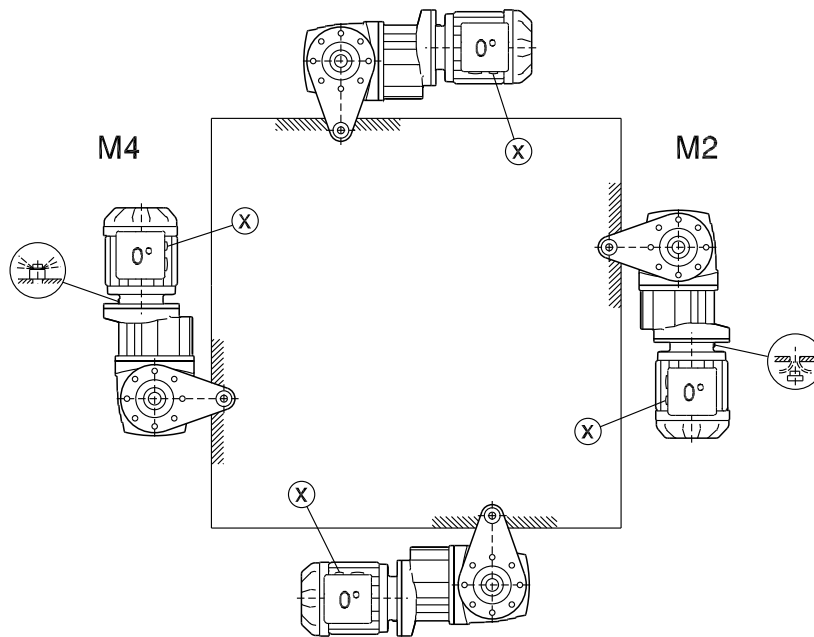
Mounting position sheets

WA/WH/WT37-47

20 014 02 07

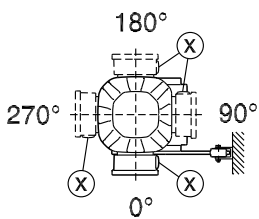


M1

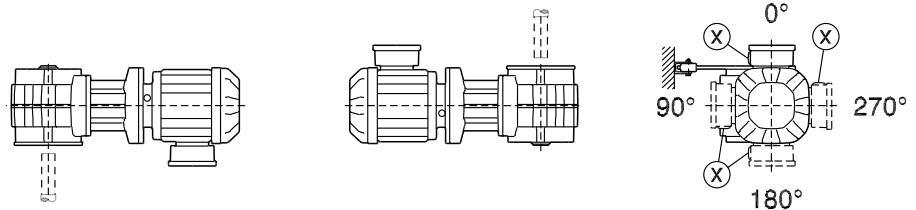


M3

M5



M6



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## 8 Technical data

### 8.1 Extended storage

#### INFORMATION



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

#### INFORMATION



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

For gear units of the "extended storage" design, the following measures are taken:

- A VCI anti-corrosion agent (volatile corrosion inhibitors) is added to the lubricant.  
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

Climate zone	Packaging <sup>1)</sup>	Storage <sup>2)</sup>	Storage duration
Temperate (Europe, USA, Canada, China and Russia, ex- cluding tropical zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap.	Under roof, protected against rain and snow, no shock loads.	Up to 3 years with regular checks on the packaging and moisture in- dicator (relative atmospheric hu- midity < 50%).
	Open	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < $\vartheta$ < 50 °C, < 50% relative humidity).  No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). No ag- gressive vapors, no shocks.	2 years or more with regular in- spections. Check for cleanness and mechanical damage during the inspection. Check corrosion protection.

Climate zone	Packaging <sup>1)</sup>	Storage <sup>2)</sup>	Storage duration
Tropical (Asia, Africa, Central and South America, Australia, New Zealand and 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.	Under roof, protected against rain and shocks.	Up to 3 years with regular checks on the packaging and moisture indicator (relative atmospheric humidity < 50%).
	Open	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < $\vartheta$ < 50 °C, relative humidity < 50%).  No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). No aggressive vapors, no shocks. Protected against insect damage.	2 years or more with regular inspections. Check for cleanness and mechanical damage during the inspection. Check corrosion protection.

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

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



## 8.2 Lubricants

Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific gear unit and mounting position. The mounting position (M1 – M6, see chapter "Mounting positions" (→ 129)) must be specified in the order. You must adapt the lubricant fill in case of any subsequent changes made to the mounting position (see chapter Lubricant fill quantities).

### 8.2.1 Bearing greases

The gear unit rolling bearings are given a factory-fill with the greases listed below. SEW-EURODRIVE recommends re-greasing the rolling bearings with a grease filling at the same time as changing the oil.

The table shows the lubricants recommended by SEW-EURODRIVE:

Area of operation	Ambient temperature	Manufacturer	Type
Standard	-40 °C to +80 °C	Fuchs	Renolit CX-TOM 15 <sup>1)</sup>
	-40 °C to +80 °C	Klüber	Petamo GHY 133 N
 <sup>2)</sup>	-40 °C to +40 °C	Bremer & Leguil	Cassida Grease GTS 2
 <sup>3)</sup>	-20 °C to +40 °C	Fuchs	Plantogel 2S

1) Bearing grease based on semi-synthetic base oil

2) Lubricant for the food processing industry

3) Easily biodegradable lubricant for environmentally sensitive areas

## INFORMATION



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 table

**NOTICE**

Selecting improper lubricants may damage the gear unit.

Possible damage to property.

- Observe the following information.

- The oil viscosity and type (mineral/synthetic) that are to be used are determined by SEW-EURODRIVE specifically for each order. This information is noted in the order confirmation and on the gear unit's nameplate.


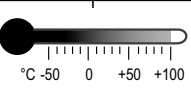

If you use other lubricants for the gear units and/or use the lubricants at temperatures outside the recommended temperature range, SEW-EURODRIVE does not assume liability.

The lubricant recommendation in the lubricant table in no way represents a guarantee regarding the quality of the lubricant delivered by each respective supplier. Each lubricant manufacturer is responsible for the quality of their product.

- Do not mix synthetic lubricants.
- Do not mix synthetic and mineral lubricants.
- Oils of the same viscosity class from different manufacturers do not have the same characteristics. In particular, the minimally and maximally permitted oil bath temperatures are manufacturer-specific. These temperatures are specified in the lubricant tables.
- The values specified in the lubricant tables apply as of the time of printing of this document. The data of the lubricants are subject to dynamic change on the part of the lubricant manufacturers. For up-to-date information about the lubricants, visit:

[www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants)

## Information on table structure

[1]	[2]			[3]
R.. 				ISO, SAE NLGI
	-15	+40		VG 460
	-25	+30	CLP HC - NSF H1 - PSS	VG 220
			[4]	[5]

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- [1] Gear unit type
- [2] Ambient temperature range
- [3] Viscosity class
- [4] Note on special approvals
- [5] Lubricant type

The specified ambient temperatures are guide values for the preselection of a suitable lubricant. The exact upper and lower temperature limits for project planning are specified in the table with the respective trade name.

**Information on the various lubricants**

			[4]
[1]	-15	+80	[5]
[2]	XYZ108		
[3]	DE, FR		
	SEW070030014		[6]

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- [1] Lowest oil sump temperature in °C, **going below this value during operation is not permitted**
- [2] Trade name
- [3] Factory filling for the listed countries  
BR: Brazil  
CN: China  
DE: Germany  
FR: France  
US: United States of America
- [4] Manufacturer
- [5] Highest oil sump temperature in °C. The service life will be considerably reduced when exceeded. Observe the lubricant change intervals according to chapter "Lubricant change intervals" (→ 111).
- [6] Approvals regarding compatibility of the lubricant with approved oil seals

**Lubricant compatibility with oil seal**

Approval	Explanation
SEW07004__13:	A lubricant especially recommended with regard to compatibility with the approved oil seals. The lubricant exceeds the state-of-the-art requirements regarding elastomer compatibility.

**Approved application temperature range of the oil seals**

Oil seal Material class	Permitted Oil sump temperature
NBR	-45 °C to +80 °C
FKM	-25 °C to +115 °C
FKM-PSS	-25 °C to +115 °C

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**Limitations of use** of oil seals with the specific lubricant are described in the following table:

Material class		Manufacturer		Material	
S	1	NBR	1	Freudenberg	72 NBR 902
			2	Trelleborg	4NV11
	2	FKM	1	Freudenberg	75 FKM 585
			2	Trelleborg	75 FKM 170055
			1	VCBVR	






**Examples:**

**S11:** Only the elastomer 72NBR902 of the Freudenberg company meets the requirements of the approval in conjunction with the specific lubricant.

**S2:** Only the elastomer FKM meets the requirements of the approval in conjunction with the specific lubricant.

**Key**

The following table shows the abbreviations and icons used in the lubricant table and explains what they mean:

Abbreviation/ icon	Meaning
	Synthetic lubricant (marked gray)
	Mineral lubricants
CLP	Mineral oil
CLP PG	Polyglycol (PG)
CLP HC	Synthetic hydrocarbons – polyalphaolefin (PAO)
E	Ester-based oil
	Lubricant for the food processing industry – NSF-H1-compliant
	Easily biodegradable oil for environmentally sensitive areas
	Lubricant suitable for ATEX environment.
1)	Helical-worm gear units with CLP-PG: Contact SEW-EURODRIVE
2)	Special lubricant for SPIROPLAN® gear units only
3)	SEW $f_B \geq 1.2$ required
4)	Observe the critical starting behavior at low temperatures
Oil seal	Oil seal
PSS	Oil seal type PSS (Premium Sine Sealing). The addendum "PSS" at the lubricant type signals compatibility with the sealing system.



Lubricant table for R., F., and K..7 gear units

The lubricant table is valid at the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 171).

	[3]	[1]	[2]	ISO,SAE NLGI	bremner & leguit	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TOTAL
R: RES		[1]	[2]	VG 220		Optigear BM 220	Renolin CLP220	Mobilgear 600 XP 220 DE,FR SEW070040013	Kluberoil GEM 1-220 N	Shell Omala S2 G 220 CN,US	Cater EP 220
K..7 KES											
HK.. F..				VG 220		Optigear BM 150	Renolin CLP150	Mobilgear 600 XP 150 DE,FR SEW070040013	Kluberoil GEM 1-150 N	Shell Omala S2 G 150 CN,US	Cater EP 150
			CLP PG	VG 220		Optigear Synthetic 800/220	Renolin PG220	Mobil Glycyole 220 DE,FR	Klubersynth GH 6-220 DE,FR,US,BR,CN		Cater SY 220
			CLP PG PSS	VG 220							

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- [1] Note on special approvals
- [2] Oil type
- [3] Ambient temperature range
- [4] Standard

The lubricant table is valid at the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 171).

[3]	[4]	[1]	[2]	ISO,SAE NLGI	b bremner & leguit	Castrol	FUCHS	Mobil®	MAGNAT	Shell	TOTAL
				VG 220		Optigear Synthetic PD220	Renolin Unisyn CLP220	Mobil SHC 630 DE, FR	Klubersynth GEM 4-220 N BR	Shell Omala S4 GX 220 CN, US	Cater SH 220
				VG 150 <sup>4)</sup>		Optigear Synthetic PD150	Renolin Unisyn CLP150	Mobil SHC 629 DE, FR	Klubersynth GEM 4-150 N	Shell Omala S4 GX 150	Cater SH 150
				VG 68 <sup>4)</sup>			Renolin Unisyn CLP68	Mobil SHC 626 DE, FR		Shell Omala S4 GX 68	
				VG 32 <sup>4)</sup>			Renolin Unisyn OL32	Mobil SHC 624 DE, FR			Dacris SH 321
				VG 220				Mobil SHC 630 DE, FR, US, BR, CN			
				VG 150 <sup>4)</sup>				Mobil SHC 629 DE, FR, US, BR, CN			

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- [1] Note on special approvals
- [2] Oil type
- [3] Ambient temperature range
- [4] Standard

The lubricant table is valid at the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 171).

[3]	[4]	[1]	[2]	ISO,SAE NLGI	bremner & leguit	Castrol	FUCHS	Mobil®	KLÜBER LUBRICANTEN	Shell	TOTAL				
			CLP HC - NSF H1	VG 460	-15    +100 Cassida Fluid GL 460 DE,FR SEW070040013	-15    +100 Optileb GT 460 DE,FR			-15    +105 Klüberoil 4UH1-460 N						
					-25    +80 Cassida Fluid GL 220 DE,FR SEW070040013	-25    +80 Optileb GT 220 DE,FR			-25    +80 Klüberoil 4UH1-220 N						
					-40    +50 Cassida Fluid HF 68 DE,FR	-35    +50 Optileb HY 68 DE,FR			-35    +50 Klüberoil 4UH1-68 N						
							CLP HC - NSF H1 - PSS	VG 460							
				-40    +30 Cassida Fluid HF 32 DE,FR	-40    +30 Optileb HY 32 DE,FR					-40    +30 KlüberSummit HySynFG32					
							F	VG 220							
				-15    +40 Optileb C DE,FR,US,BR,CN SEW070040013	-25    +80 Optileb GT 220 DE,FR,US,BR,CN SEW070040013										
				VG 460											

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- [1] Note on special approvals
- [2] Oil type
- [3] Ambient temperature range
- [4] Standard

#### Lubricant table for K..9 gear units

The lubricant table is valid at the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 171).

 [3] °C -50 0 +50 +100		+60		+80		+40		+30		+60		+80		+40		+30	
		-20		-15		-25		-30		-20		-15		-25		-30	
[1]																	
[2]		CLP PG (-PSS)								CLP PG - H1 (-PSS)							
ISO,SAE NLGI		VG 460		VG 680		VG 220		VG 150 <sup>4)</sup>		VG 460		VG 680		VG 220		VG 150 <sup>4)</sup>	
brenner & reguil																	
Castrol																	
FUCHS																	
Mobil®																	
		-20 +95 Kübbersynth GH 6-460 DE, FR, US, BR, CN		-15 +115 Kübbersynth GH 6-680 DE, FR, US, BR, CN		-25 +70 Kübbersynth GH 6-220 DE, FR, US, BR, CN		-30 +60 Kübbersynth GH 6-150 DE, FR, US, BR, CN		-20 +95 Kübbersynth UHT 6-460 DE, FR, US, BR, CN		-15 +115 Kübbersynth UHT 6-680 DE, FR, US, BR, CN		-25 +70 Kübbersynth UHT 6-220 DE, FR, US, BR, CN		-30 +60 Kübbersynth UHT 6-150 DE, FR, US, BR, CN	
K..9																	

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- [1] Note on special approvals
- [2] Oil type
- [3] Ambient temperature range
- [4] Standard

Lubricant table for S.. gear units

The lubricant table is valid at the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 171).

[3]	[4]	[1]	[2]	ISO, SAE NLGI	brenner & regit	Castrol	FUCHS	Mobil®	KLOBER LUBRICATION	Shell	TOTAL	Temperature range	
												Min	Max
[3]	[4]	[1]	[2]	VG 680		Optigear EM 680	Renolin SEW 680 DE, FR	Mobilegear 600 XP 680 SEW070040013	Klüberoil GEM 1-680 N	Shell Omala S2 G 680 US	Carter EP 680	0	+80
												-20	+65
[3]	[4]	[1]	[2]	VG 150		Optigear BM150	Renolin CLP 150 SEW070040013	Mobilegear 600 XP 150 DE, FR	Klüberoil GEM 1-150 N	Shell Omala S2 G 150 US	Carter EP 150	0	+80
												-20	+65
[3]	[4]	[1]	[2]	VG 680	1)	Optigear Synthetic 800/680	Renolin PG 680	Mobil Glygoyle 680	Klübersynth GH 6-680 DE, FR	Shell Omala S4 WE 680	Carter SY 220	-15	+115
												-25	+90
[3]	[4]	[1]	[2]	VG 220	1)	Optigear Synthetic 800/220	Renolin PG 220	Mobil Glygoyle 220 DE, FR	Klübersynth GH 6-220	Shell Omala S4 WE 220	Carter SY 220	-15	+115
												-25	+90
[3]	[4]	[1]	[2]	VG 680	1)				Klübersynth GH 6-680 DE, FR, US, BR, CN			-15	+115
												-25	+100
[3]	[4]	[1]	[2]	VG 220	1)				Klübersynth GH 6-220 DE, FR, US, BR, CN			-15	+115
												-25	+100



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- [1] Note on special approvals
- [2] Oil type
- [3] Ambient temperature range
- [4] Standard

The lubricant table is valid at the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 171).

[3] °C -50 0 +50 +100	[1]	[2]	ISO,SAE NLGI	b brenner & eguit	Castrol	FUCHS	Mobil®	KUBBER LUBRICATION	Shell	TOTAL	Ambient temperature range	
											Min	Max
[4] -15	⊕	CLP HC	VG 460		Optigear Synthetic PD 460	Renolin Unisyn CLP 460	Mobil SHC 634 DE, FR	Klubbersynth GEM 4-460 N	Shell Omala S4 GX 460	Carter SH 460	-15	+105
											-30	+75
-30	⊕	CLP HC	VG 150		Optigear Synthetic PD 150	Renolin Unisyn CLP 150	Mobil SHC 629 DE, FR	Klubbersynth GEM 4-150 N	Shell Omala S4 GX 150	Carter SH 150	-30	+75
											-40	+55
-40	⊕	CLP HC	VG 68			Renolin Unisyn CLP 68	Mobil SHC 626 DE, FR		Shell Omala S4 GX 68		-40	+50
											-40	+30
-40	⊕	CLP HC - PSS	VG 32			Renolin Unisyn OL 32	Mobil SHC 624 DE, FR			Dachnis SH 32	-40	+30
											[4] -15	+105
[4] -15	⊕	CLP HC - PSS	VG 460				Mobil SHC 634 DE, FR, US, BR, CN				-15	+105
											-30	+75
-30	⊕	CLP HC - PSS	VG 150				Mobil SHC 629 DE, FR, US, BR, CN				-30	+75
											-30	+75

S.:  
HS.: 

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- [1] Note on special approvals
- [2] Oil type
- [3] Ambient temperature range
- [4] Standard

The lubricant table is valid at the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 171).

[3]		[1]	[2]	ISO, SAE NLGI	bremner & leguit	Castrol	FUCHS	Mobil®	KLÜBER Lubrication	Shell	TOTAL
[4]	-15	+40	CLP HC - NSF H1	VG 460	Cassida Fluid GL 460	Optileb GT 460 DE, FR			Klüberoil 4UH1-460 N		
	-25			VG 220	Cassida Fluid GL 220	Optileb GT 220 DE, FR			Klüberoil 4UH1-220 N		
[4]	-35	+10	CLP HC - NSF H1 - PSS	VG 68	Cassida Fluid HF 68	Optileb HY 68 DE, FR			KlüberSummit HySyn FG 32		
	-40			VG 32	Cassida Fluid HF 32	Optileb HY 32 DE, FR			Klüberoil 4UH1-68 N		
[4]	-15	+40	CLP HC - NSF H1 - PSS	VG 460		Optileb GT 460 DE, FR, US, BR, CN					
	-25			VG 220		Optileb GT 220 DE, FR, US, BR, CN					
[4]	-20	+40	E	VG 460							

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- [1] Note on special approvals
- [2] Oil type
- [3] Ambient temperature range
- [4] Standard

#### Lubricant table for W.. gear units

The lubricant table is valid at the day this document is published. Refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 171).

ISO/SAE NLGI		<sup>2)</sup> VG 460	<sup>3)</sup> VG 460	<sup>4)</sup> SAE 75W90 (~VG 100)						
[2]		CLP Pg	NSF H1 (PSS) CLP Pg	GLS API						
[1]										
[3]		+40	+60	+30						
	°C	-50 0 +50 +100	-20	-40						
	[4]	-20	-20	-40						
	W. HW..									

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- [1] Note on special approvals
- [2] Oil type
- [3] Ambient temperature range
- [4] Standard



### 8.2.3 Lubricant fill quantities

#### INFORMATION



The specified fill quantities are **guide values**. The exact values vary depending on the number of gear stages and gear ratio. Check the oil level plug for the exact oil quantity.

---

#### INFORMATION



Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific mounting position. The mounting position (see chapter "Designation of the mounting positions" (→ 129)) must therefore be specified in the drive order.

When the mounting position is changed, the lubricant fill quantity must be adapted accordingly (see the following chapters). Consequently, a mounting position may only be **changed** after consultation with SEW-EURODRIVE, **otherwise your rights to claim under limited warranty no longer apply**.

---

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 units	Fill quantity in liters					
	M1 <sup>1)</sup>	M2	M3	M4	M5	M6
R07	0.12	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	
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	
R57	0.80/1.70	1.90	1.70	2.10	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		6.3	6.5
R97	4.60/9.8	11.7		13.4	11.3	11.7
R107	6.0/13.7	16.3	16.9	19.2	13.2	15.9
R127	6.4/17	18.3	18.2	22.0	16.8	17.9
R137	10.0/25.0	28.0	29.5	31.5	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 compound gear units must be filled with the larger oil volume.

## RF..., RZ..

Gear units	Fill quantity in liters					
	M1 <sup>1)</sup>	M2	M3	M4	M5	M6
RF07	0.12	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	
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	
RF57	0.80/1.70	1.80	1.70	2.00	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
RF127	6.6/16.0	18.3	18.2	21.4	15.9	17.0
RF137	9.5/25.0	27.0	29.0	32.5	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 compound gear units must be filled with the larger oil volume.

## RX..

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

## RXF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RXF57	0.50	0.80	1.10		0.70	

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RXF67	0.70	0.80	1.50	1.40	1.00	
RXF77	0.90	1.30	2.40	2.00	1.60	
RXF87	1.60	1.95	4.90	3.95	2.90	
RXF97	2.10	3.70	7.1	6.3	4.80	
RXF107	3.10	5.7	11.2	9.3	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	5.90	7.30	4.30	8.00	6.00	6.30
F..87	10.8	13.0	7.70	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	39.5	51.7	31.5	60.1	45.6	44.2
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	2.30	3.10	1.70	3.10	2.30	2.40
FF67	2.70	3.80	1.90	3.80	2.90	3.20
FF77	5.90	7.30	4.30	8.10	6.00	6.30
FF87	10.8	13.2	7.80	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	40.6	51.6	31.5	61.2	46.3	44.9
FF157	72.0	105.0	64.0	106.0	87.0	79.0

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

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	5.90	7.30	4.30	8.00	6.00	6.30
F..87	10.8	13.0	7.70	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	38.3	50.9	31.5	59.7	44.7	43.3
F..157	68.0	103.0	62.0	104.0	85.0	77.0

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## Helical-bevel (K) gear units

## INFORMATION



All K..19 and K..29 gear units have a universal mounting position, which means that K..19 and K..29 gear units of the same design are filled with the same oil quantity independent of the mounting position. An exception to this is the M4 mounting position.

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

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..19		0.40		0.45	0.40	
K..29		0.70		0.85	0.70	
K..39	0.90	1.70	1.55	1.9	1.55	1.30
K..49	1.70	3.40	2.80	4.20	3.15	2.80
K..37	0.50	1.00		1.25	0.95	
K..47	0.80	1.30	1.50	2.00	1.60	
K..57	1.10	2.20		2.80	2.30	2.10
K..67	1.10	2.40	2.60	3.45	2.60	
K..77	2.20	4.10	4.40	5.80	4.20	4.40
K..87	3.70	8.0	8.70	10.90	8.0	
K..97	7.0	14.0	15.70	20.0	15.70	15.50
K..107	10.0	21.0	25.50	33.50	24.0	
K..127	21.0	41.50	44.0	54.0	40.0	41.0
K..157	31.0	65.0	68.0	90.0	62.0	63.0
K..167	33.0	97.0	109.0	127.0	89.0	86.0
K..187	53.0	156.0	174.0	207.0	150.0	147.0

KF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
KF19		0.40		0.45	0.40	
KF29		0.70		0.85	0.70	
KF39	0.90	1.70	1.55	1.9	1.55	1.30
KF49	1.70	3.40	2.80	4.20	3.15	2.80
KF37	0.50	1.10		1.50	1.00	
KF47	0.80	1.30	1.70	2.20	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	
KF77	2.10	4.10	4.40	5.90	4.50	
KF87	3.70	8.20	9.0	11.90	8.40	
KF97	7.0	14.70	17.30	21.50	15.70	16.50
KF107	10.0	21.80	25.80	35.10	25.20	
KF127	21.0	41.50	46.0	55.0	41.0	
KF157	31.0	66.0	69.0	92.0	62.0	63.0

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

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..19		0.40		0.45	0.40	
K..29		0.70		0.85	0.70	
K..39	0.90	1.70	1.55	1.9	1.55	1.30
K..49	1.70	3.40	2.80	4.20	3.15	2.80
K..37	0.50	1.00		1.40	1.00	
K..47	0.80	1.30	1.60	2.15	1.60	
K..57	1.20	2.20	2.40	3.15	2.70	2.40

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..67	1.10	2.40	2.70	3.70	2.60	
K..77	2.10	4.10	4.60	5.90	4.40	
K..87	3.70	8.20	8.80	11.10	8.0	
K..97	7.0	14.70	15.70	20.0	15.70	
K..107	10.0	20.50	24.0	32.40	24.0	
K..127	21.0	41.50	43.0	52.0	40.0	
K..157	31.0	65.0	68.0	90.0	62.0	63.0
K..167	33.0	97.0	109.0	127.0	89.0	86.0
K..187	53.0	156.0	174.0	207.0	150.0	147.0

### Helical-worm (S) gear units

S..

Gear unit	Fill quantity in liters					
	M1	M2	M3 <sup>1)</sup>	M4	M5	M6
S37	0.25	0.40	0.50	0.55	0.40	
S47	0.35	0.80	0.70/0.90	1.00	0.80	
S57	0.50	1.20	1.00/1.20	1.45	1.30	
S67	1.00	2.00	2.20/3.10	3.10	2.60	2.60
S77	1.90	4.20	3.70/5.4	5.9	4.40	
S87	3.30	8.1	6.9/10.4	11.3	8.4	
S97	6.8	15.0	13.4/18.0	21.8	17.0	

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

## SF..

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

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

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

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

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

## SPIROPLAN® (W) gear units



## INFORMATION

SPIROPLAN® gear units W..10 to W..30 have a universal mounting position, which means that gear units of the same design are filled with the same oil quantity independent of the mounting position.

The oil fill quantity of SPIROPLAN® gear units W..37 and W..47 in mounting position M4 is different from that of the other mounting positions.

## W.., WA..B, WH..B

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	

## WF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
WF10	0.16					
WF20	0.24					
WF30	0.40					
WF37	0.50		0.70		0.50	
WF47	0.90		1.55		0.90	

WA.., WAF..,WH.., WT.., WHF..

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	0.80			1.40	0.80	

## 9 Malfunctions and remedies



### ⚠ WARNING

Risk of death or injury if the drive starts up unintentionally.

Severe or fatal injuries.

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



### ⚠ CAUTION

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

Serious injuries.

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

### NOTICE

Damage to gear unit/gearmotor due to improper operation.

Damage to the gear unit/gearmotor.

- Repair works at SEW-EURODRIVE gear units may only be performed by qualified personnel. In the context of this documentation, qualified personnel are persons who are familiar with the "Technical regulations on operating safety" (TRBS).
- Drive and motor may only be disconnected by qualified personnel.
- Contact SEW-EURODRIVE.



## 9.1 Gear units

Fault	Possible cause	Measure
Unusual, regular running noise	<ul style="list-style-type: none"> <li>Meshing/grinding noise: Bearing damage</li> <li>Knocking noise: Irregularity in the gearing</li> <li>Deformation of the housing upon tightening</li> <li>Noise generated by insufficient stiffness of the gear unit foundation</li> </ul>	<ul style="list-style-type: none"> <li>Check oil consistency, change bearings</li> <li>Consult SEW-EURODRIVE</li> <li>Check the gear unit mounting for possible deformation and correct if necessary</li> <li>Reinforce the gear unit foundation</li> </ul>
Unusual, irregular running noises	<ul style="list-style-type: none"> <li>Foreign objects in the oil</li> </ul>	<ul style="list-style-type: none"> <li>Check the oil consistency</li> <li>Stop the drive, contact SEW-EURODRIVE</li> </ul>
Oil leaking from inspection cover	<ul style="list-style-type: none"> <li>Seal of the inspection cover leaking</li> </ul>	<ul style="list-style-type: none"> <li>Tighten the screws of the inspection cover and observe the gear unit. Contact SEW-EURODRIVE if oil is still leaking.</li> </ul>
	<ul style="list-style-type: none"> <li>Seal defective</li> </ul>	<ul style="list-style-type: none"> <li>Contact SEW-EURODRIVE.</li> </ul>
Small amounts of oil leak from the oil seal during run-in phase.	<ul style="list-style-type: none"> <li>Function-related pseudo-leakage</li> </ul>	<ul style="list-style-type: none"> <li>There is no fault. Remove with soft, lint-free cloth and keep monitoring it.</li> </ul>
Film of moisture around the dust lip of the oil seal	<ul style="list-style-type: none"> <li>Function-related pseudo-leakage</li> </ul>	<ul style="list-style-type: none"> <li>There is no fault. Remove with soft, lint-free cloth and keep monitoring it.</li> </ul>
Oil leaking from the oil seal.	<ul style="list-style-type: none"> <li>Oil seal leaking/defective</li> </ul>	<ul style="list-style-type: none"> <li>Check sealing system. It may be necessary to contact SEW-EURODRIVE.</li> </ul>
Oil leaking from motor (e.g. terminal box or fan)	<ul style="list-style-type: none"> <li>Too much oil</li> </ul>	<ul style="list-style-type: none"> <li>Check oil level, correct if necessary</li> </ul>
	<ul style="list-style-type: none"> <li>Gear unit not ventilated</li> </ul>	<ul style="list-style-type: none"> <li>Vent gear unit</li> </ul>
	<ul style="list-style-type: none"> <li>Oil seal leaking/defective</li> </ul>	<ul style="list-style-type: none"> <li>Check sealing system. It may be necessary to contact SEW-EURODRIVE.</li> </ul>
Oil leaking from flange	<ul style="list-style-type: none"> <li>Flange gasket leaking/defective</li> </ul>	<ul style="list-style-type: none"> <li>Check sealing system. It may be necessary to contact SEW-EURODRIVE.</li> </ul>
	<ul style="list-style-type: none"> <li>Too much oil</li> </ul>	<ul style="list-style-type: none"> <li>Check oil level, correct if necessary</li> </ul>
	<ul style="list-style-type: none"> <li>Gear unit not ventilated</li> </ul>	<ul style="list-style-type: none"> <li>Vent gear unit</li> </ul>
Oil leaking from breather valve.	<ul style="list-style-type: none"> <li>Too much oil.</li> </ul>	<ul style="list-style-type: none"> <li>Check oil quantity, correct if necessary</li> </ul>
	<ul style="list-style-type: none"> <li>Function-related oil mist</li> </ul>	<ul style="list-style-type: none"> <li>There is no fault.</li> </ul>
	<ul style="list-style-type: none"> <li>Drive not installed in proper mounting position.</li> </ul>	<ul style="list-style-type: none"> <li>Install breather valve correctly and adjust the oil level.</li> </ul>
	<ul style="list-style-type: none"> <li>Frequent cold starts (oil foaming) and/or high oil level.</li> </ul>	<ul style="list-style-type: none"> <li>Install oil expansion tank.</li> </ul>
Output shaft does not turn although the motor is running or the input shaft is rotated.	<ul style="list-style-type: none"> <li>Shaft-hub connection in the gear unit interrupted.</li> </ul>	<ul style="list-style-type: none"> <li>Send in the gear unit/gearmotor for repair</li> </ul>

## 9.2 Adapters AM/AQ./AL/EWH

Fault	Possible cause	Measure
Unusual, regular running noise	<ul style="list-style-type: none"> <li>Meshing/grinding noise: Bearing damage</li> </ul>	<ul style="list-style-type: none"> <li>Contact SEW-EURODRIVE.</li> </ul>
Oil leaking.	<ul style="list-style-type: none"> <li>Seal defective</li> </ul>	<ul style="list-style-type: none"> <li>Contact SEW-EURODRIVE.</li> </ul>
Output shaft does not turn although the motor is running or the input shaft is rotated.	<ul style="list-style-type: none"> <li>Shaft-hub connection in the gear unit interrupted.</li> </ul>	<ul style="list-style-type: none"> <li>Send in the gear unit/gearmotor for repair.</li> </ul>
Change in running noise and/or vibrations	<ul style="list-style-type: none"> <li>Spider wear, short-term torque transmission through metal contact</li> </ul>	<ul style="list-style-type: none"> <li>Change the spider.</li> </ul>
	<ul style="list-style-type: none"> <li>Screws to secure hub axially are loose</li> </ul>	<ul style="list-style-type: none"> <li>Tighten the screws</li> </ul>
Premature wear of spider	<ul style="list-style-type: none"> <li>Contact with aggressive fluids/oils; ozone influence; excessive ambient temperatures, etc. that can change the physical properties of the spider.</li> </ul>	<ul style="list-style-type: none"> <li>Contact SEW-EURODRIVE.</li> </ul>
	<ul style="list-style-type: none"> <li>Impermissibly high ambient/contact temperature for the spider; maximum permitted temperature: -20 °C to +80 °C.</li> </ul>	<ul style="list-style-type: none"> <li>Contact SEW-EURODRIVE.</li> </ul>
	<ul style="list-style-type: none"> <li>Overload</li> </ul>	<ul style="list-style-type: none"> <li>Contact SEW-EURODRIVE.</li> </ul>

## 9.3 AD input shaft assembly

Fault	Possible cause	Measure
Unusual, regular running noise.	<ul style="list-style-type: none"> <li>Meshing/grinding noise: Bearing damage.</li> </ul>	<ul style="list-style-type: none"> <li>Contact SEW-EURODRIVE.</li> </ul>
Oil is leaking.	<ul style="list-style-type: none"> <li>Seal defective.</li> </ul>	<ul style="list-style-type: none"> <li>Contact SEW-EURODRIVE.</li> </ul>
Output shaft does not turn although the input shaft is rotated.	<ul style="list-style-type: none"> <li>Shaft-hub connection in gear unit or cover interrupted.</li> </ul>	<ul style="list-style-type: none"> <li>Send the gear unit to SEW-EURODRIVE for repair.</li> </ul>

## 9.4 Service

If you require customer service, include the following information:

- Nameplate data (complete)
- Nature and extent of the problem
- Time the failure occurred and any accompanying circumstances
- Presumed cause
- A digital picture of the failure, if possible

## 9.5 Waste disposal

Dispose gear units in accordance with the material structure and the regulations in force:

- As steel scrap
  - Housing parts
  - Gears
  - Shafts
  - Rolling bearing
- Parts of the worm gears are made of non-ferrous metals. Dispose of the worm gears appropriately.
- Collect used oil and dispose of it according to the regulations in force.

## 10 Address list

<b>Algeria</b>			
Sales	Algiers	REDUCOM Sarl 16, rue des Frères Zaghroune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 <a href="http://www.reducom-dz.com">http://www.reducom-dz.com</a> <a href="mailto:info@reducom-dz.com">info@reducom-dz.com</a>
<b>Argentina</b>			
Assembly Sales	Buenos Aires	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 <a href="http://www.sew-eurodrive.com.ar">http://www.sew-eurodrive.com.ar</a> <a href="mailto:sewar@sew-eurodrive.com.ar">sewar@sew-eurodrive.com.ar</a>
<b>Australia</b>			
Assembly Sales Service	Melbourne	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 <a href="http://www.sew-eurodrive.com.au">http://www.sew-eurodrive.com.au</a> <a href="mailto:enquires@sew-eurodrive.com.au">enquires@sew-eurodrive.com.au</a>
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 <a href="mailto:enquires@sew-eurodrive.com.au">enquires@sew-eurodrive.com.au</a>
<b>Austria</b>			
Assembly Sales Service	Vienna	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Straße 24 1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 <a href="http://www.sew-eurodrive.at">http://www.sew-eurodrive.at</a> <a href="mailto:sew@sew-eurodrive.at">sew@sew-eurodrive.at</a>
<b>Bangladesh</b>			
Sales	Bangladesh	SEW-EURODRIVE INDIA PRIVATE LIMITED 345 DIT Road East Rampura Dhaka-1219, Bangladesh	Tel. +88 01729 097309 <a href="mailto:salesdhaka@seweurodrivebangladesh.com">salesdhaka@seweurodrivebangladesh.com</a>
<b>Belarus</b>			
Sales	Minsk	Foreign unitary production enterprise SEW- EURODRIVE RybalkoStr. 26 220033 Minsk	Tel. +375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 <a href="http://www.sew.by">http://www.sew.by</a> <a href="mailto:sales@sew.by">sales@sew.by</a>
<b>Belgium</b>			
Assembly Sales Service	Brussels	SEW-EURODRIVE n.v./s.a. Researchpark Haasrode 1060 Evenementenlaan 7 3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 <a href="http://www.sew-eurodrive.be">http://www.sew-eurodrive.be</a> <a href="mailto:info@sew-eurodrive.be">info@sew-eurodrive.be</a>
Service Competence Center	Industrial Gears	SEW-EURODRIVE n.v./s.a. Rue de Parc Industriel, 31 6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 <a href="http://www.sew-eurodrive.be">http://www.sew-eurodrive.be</a> <a href="mailto:service-IG@sew-eurodrive.be">service-IG@sew-eurodrive.be</a>
<b>Brazil</b>			
Production Sales Service	São Paulo	SEW-EURODRIVE Brasil Ltda. Estrada Municipal José Rubim, 205 – Rodovia Santos Dumont Km 49 Indaiatuba – 13347-510 – SP	Tel. +55 19 3835-8000 <a href="mailto:sew@sew.com.br">sew@sew.com.br</a>
Assembly Sales Service	Rio Claro	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 <a href="mailto:montadora.rc@sew.com.br">montadora.rc@sew.com.br</a>
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 <a href="mailto:fial.sc@sew.com.br">fial.sc@sew.com.br</a>
<b>Bulgaria</b>			
Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 <a href="mailto:bever@bever.bg">bever@bever.bg</a>

<b>Cameroon</b>			
Sales	Douala	SEW-EURODRIVE S.A.R.L. Ancienne Route Bonabéri P.O. Box B.P 8674 Douala-Cameroun	Tel. +237 233 39 02 10 Fax +237 233 39 02 10 sew@sew-eurodrive-cm
<b>Canada</b>			
Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 <a href="http://www.sew-eurodrive.ca">http://www.sew-eurodrive.ca</a> l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
<b>Chile</b>			
Assembly Sales Service	Santiago de Chile	SEW-EURODRIVE CHILE LTDA Las Encinas 1295 Parque Industrial Valle Grande LAMP Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 2757 7000 Fax +56 2 2757 7001 <a href="http://www.sew-eurodrive.cl">http://www.sew-eurodrive.cl</a> ventas@sew-eurodrive.cl
<b>China</b>			
Production Assembly Sales Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 78, 13th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 <a href="http://www.sew-eurodrive.cn">http://www.sew-eurodrive.cn</a> info@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 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Taiyuan	SEW-EURODRIVE (Taiyuan) Co., Ltd. No.3, HuaZhang Street, TaiYuan Economic & Technical Development Zone ShanXi, 030032	Tel. +86-351-7117520 Fax +86-351-7117522 taiyuan@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
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

<b>Colombia</b>			
Assembly Sales Service	Bogota	SEW-EURODRIVE COLOMBIA LTDA. Calle 17 No. 132-18 Interior 2 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 <a href="http://www.sew-eurodrive.com.co">http://www.sew-eurodrive.com.co</a> <a href="mailto:sew@sew-eurodrive.com.co">sew@sew-eurodrive.com.co</a>
<b>Croatia</b>			
Sales Service	Zagreb	KOMPEKS d. o. o. Zeleni dol 10 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 <a href="mailto:kompeks@inet.hr">kompeks@inet.hr</a>
<b>Czech Republic</b>			
Assembly Sales Service	Hostivice	SEW-EURODRIVE CZ s.r.o. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 <a href="http://www.sew-eurodrive.cz">http://www.sew-eurodrive.cz</a> <a href="mailto:sew@sew-eurodrive.cz">sew@sew-eurodrive.cz</a>
	Drive Service Hotline / 24 Hour Service	+420 800 739 739 (800 SEW SEW)	Service Tel. +420 255 709 632 Fax +420 235 358 218 <a href="mailto:servis@sew-eurodrive.cz">servis@sew-eurodrive.cz</a>
<b>Denmark</b>			
Assembly Sales Service	Copenhagen	SEW-EURODRIVEA/S Geminivej 28-30 2670 Greve	Tel. +45 43 95 8500 Fax +45 43 9585-09 <a href="http://www.sew-eurodrive.dk">http://www.sew-eurodrive.dk</a> <a href="mailto:sew@sew-eurodrive.dk">sew@sew-eurodrive.dk</a>
<b>Egypt</b>			
Sales Service	Cairo	Copam Egypt for Engineering & Agencies Building 10, Block 13005, First Industrial Zone, Obour City Cairo	Tel. +202 44812673 / 79 (7 lines) Fax +202 44812685 <a href="http://www.copam-egypt.com">http://www.copam-egypt.com</a> <a href="mailto:copam@copam-egypt.com">copam@copam-egypt.com</a>
<b>Estonia</b>			
Sales	Tallin	ALAS-KUUL AS Reti tee 4 75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 <a href="http://www.alas-kuul.ee">http://www.alas-kuul.ee</a> <a href="mailto:veiko.soots@alas-kuul.ee">veiko.soots@alas-kuul.ee</a>
<b>Finland</b>			
Assembly Sales Service	Hollola	SEW-EURODRIVE OY Vesimäentie 4 15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 <a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a> <a href="mailto:sew@sew.fi">sew@sew.fi</a>
Service	Hollola	SEW-EURODRIVE OY Keskikankaantie 21 15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 <a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a> <a href="mailto:sew@sew.fi">sew@sew.fi</a>
Production Assembly	Karkkila	SEW Industrial Gears Oy Santasalonkatu 6, PL 8 03620 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 <a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a> <a href="mailto:sew@sew.fi">sew@sew.fi</a>
<b>France</b>			
Production Sales Service	Hagenau	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 <a href="http://www.usocom.com">http://www.usocom.com</a> <a href="mailto:sew@usocom.com">sew@usocom.com</a>
Production	Forbach	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 57604 Forbach Cedex	Tel. +33 3 87 29 38 00
	Brumath	SEW-USOCOME 1 Rue de Bruxelles 67670 Mommenheim Cedex	Tel. +33 3 88 37 48 00
Assembly Sales Service	Bordeaux	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan – B. P. 182 33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09

France			
	Lyon	SEW-USOCOME 75 rue Antoine Condorcet 38090 Vaulx-Milieu	Tel. +33 4 74 99 60 00 Fax +33 4 74 99 60 15
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin 77390 Verneuil l'Étang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
Gabon			
Sales	Libreville	SEW-EURODRIVE SARL 183, Rue 5.033.C, Lalala à droite P.O. Box 15682 Libreville	Tel. +241 03 28 81 55 +241 06 54 81 33 <a href="http://www.sew-eurodrive.cm">http://www.sew-eurodrive.cm</a> <a href="mailto:sew@sew-eurodrive.cm">sew@sew-eurodrive.cm</a>
Germany			
Headquarters Production Sales	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 <a href="http://www.sew-eurodrive.de">http://www.sew-eurodrive.de</a> <a href="mailto:sew@sew-eurodrive.de">sew@sew-eurodrive.de</a>
Production / Industrial Gears	Bruchsal	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str. 10 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Production	Graben	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-0 Fax +49 7251-2970
	Östringen	SEW-EURODRIVE GmbH & Co KG, Werk Östringen Franz-Gurk-Straße 2 76684 Östringen	Tel. +49 7253 9254-0 Fax +49 7253 9254-90 <a href="mailto:oesstringen@sew-eurodrive.de">oesstringen@sew-eurodrive.de</a>
Service Competence Center	Mechanics / Mechatronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 <a href="mailto:scc-mechanik@sew-eurodrive.de">scc-mechanik@sew-eurodrive.de</a>
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 <a href="mailto:scc-elektronik@sew-eurodrive.de">scc-elektronik@sew-eurodrive.de</a>
Drive Technology Center	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 30823 Garbsen (Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 <a href="mailto:dtc-nord@sew-eurodrive.de">dtc-nord@sew-eurodrive.de</a>
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 08393 Meerane (Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 <a href="mailto:dtc-ost@sew-eurodrive.de">dtc-ost@sew-eurodrive.de</a>
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 85551 Kirchheim (München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 <a href="mailto:dtc-sued@sew-eurodrive.de">dtc-sued@sew-eurodrive.de</a>
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 40764 Langenfeld (Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 <a href="mailto:dtc-west@sew-eurodrive.de">dtc-west@sew-eurodrive.de</a>
Drive Center	Berlin	SEW-EURODRIVE GmbH & Co KG Alexander-Meißner-Straße 44 12526 Berlin	Tel. +49 306331131-30 Fax +49 306331131-36 <a href="mailto:dc-berlin@sew-eurodrive.de">dc-berlin@sew-eurodrive.de</a>
	Ludwigshafen	SEW-EURODRIVE GmbH & Co KG c/o BASF SE Gebäude W130 Raum 101 67056 Ludwigshafen	Tel. +49 7251 75 3759 Fax +49 7251 75 503759 <a href="mailto:dc-ludwigshafen@sew-eurodrive.de">dc-ludwigshafen@sew-eurodrive.de</a>
	Saarland	SEW-EURODRIVE GmbH & Co KG Gottlieb-Daimler-Straße 4 66773 Schwalbach Saar – Hülzweiler	Tel. +49 6831 48946 10 Fax +49 6831 48946 13 <a href="mailto:dc-saarland@sew-eurodrive.de">dc-saarland@sew-eurodrive.de</a>
	Ulm	SEW-EURODRIVE GmbH & Co KG Dieselstraße 18 89160 Dornstadt	Tel. +49 7348 9885-0 Fax +49 7348 9885-90 <a href="mailto:dc-ulm@sew-eurodrive.de">dc-ulm@sew-eurodrive.de</a>

<b>Germany</b>			
	Würzburg	SEW-EURODRIVE GmbH & Co KG Nürnbergerstraße 118 97076 Würzburg-Lengfeld	Tel. +49 931 27886-60 Fax +49 931 27886-66 dc-wuerzburg@sew-eurodrive.de
Drive Service Hotline / 24 Hour Service			0 800 SEWHELP 0 800 7394357
<b>Great Britain</b>			
Assembly Sales Service	Normanton	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 <a href="http://www.sew-eurodrive.co.uk">http://www.sew-eurodrive.co.uk</a> info@sew-eurodrive.co.uk
Drive Service Hotline / 24 Hour Service			Tel. 01924 896911
<b>Greece</b>			
Sales	Athens	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 <a href="http://www.boznos.gr">http://www.boznos.gr</a> info@boznos.gr
<b>Hungary</b>			
Sales Service	Budapest	SEW-EURODRIVE Kft. Csillaghegyi út 13. 1037 Budapest	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 <a href="http://www.sew-eurodrive.hu">http://www.sew-eurodrive.hu</a> office@sew-eurodrive.hu
<b>Iceland</b>			
Sales	Reykjavik	Varma & Vélaverk ehf. Knarrarvogi 4 104 Reykjavik	Tel. +354 585 1070 Fax +354 585)1071 <a href="http://www.varmaverk.is">http://www.varmaverk.is</a> vov@vov.is
<b>India</b>			
Registered Office Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200 Fax +91 265 3045300 <a href="http://www.seweurodriveindia.com">http://www.seweurodriveindia.com</a> salesvadodara@seweurodriveindia.com
Assembly Sales Service	Chennai	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com
	Pune	SEW-EURODRIVE India Private Limited Plant: Plot No. D236/1, Chakan Industrial Area Phase- II, Warale, Tal- Khed, Pune-410501, Maharashtra	Tel. +91 21 35 628700 Fax +91 21 35 628715 salespune@seweurodriveindia.com
<b>Indonesia</b>			
Sales	Medan	PT. Serumpun Indah Lestari Jl.Pulau Solor no. 8, Kawasan Industri Medan II Medan 20252	Tel. +62 61 687 1221 Fax +62 61 6871429 / +62 61 6871458 / +62 61 30008041 sil@serumpunindah.com serumpunindah@yahoo.com <a href="http://www.serumpunindah.com">http://www.serumpunindah.com</a>
	Jakarta	PT. Cahaya Sukses Abadi Komplek Rukan Puri Mutiara Blok A no 99, Sunter Jakarta 14350	Tel. +62 21 65310599 Fax +62 21 65310600 csajkt@cbn.net.id
	Jakarta	PT. Agrindo Putra Lestari JL.Pantai Indah Selatan, Komplek Sentra In- dustri Terpadu, Pantai indah Kapuk Tahap III, Blok E No. 27 Jakarta 14470	Tel. +62 21 2921-8899 Fax +62 21 2921-8988 aplindo@indosat.net.id <a href="http://www.aplindo.com">http://www.aplindo.com</a>



**Indonesia**

Surabaya	PT. TRIAGRI JAYA ABADI Jl. Sukosemolo No. 63, Galaxi Bumi Permai G6 No. 11 Surabaya 60111	Tel. +62 31 5990128 Fax +62 31 5962666 sales@triagri.co.id <a href="http://www.triagri.co.id">http://www.triagri.co.id</a>
Surabaya	CV. Multi Mas Jl. Raden Saleh 43A Kav. 18 Surabaya 60174	Tel. +62 31 5458589 Fax +62 31 5317220 sianhwa@sby.centrin.net.id <a href="http://www.cvmultimas.com">http://www.cvmultimas.com</a>

**Ireland**

Sales Service	Dublin	Alperon Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 <a href="http://www.alperon.ie">http://www.alperon.ie</a> info@alperon.ie
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**Israel**

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

Assembly Sales Service	Milan	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 20020 Solaro (Milano)	Tel. +39 02 96 980229 Fax +39 02 96 980 999 <a href="http://www.sew-eurodrive.it">http://www.sew-eurodrive.it</a> milano@sew-eurodrive.it
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**Ivory Coast**

Sales	Abidjan	SEW-EURODRIVE SARL Ivory Coast Rue des Pêcheurs, Zone 3 26 BP 916 Abidjan 26	Tel. +225 21 21 81 05 Fax +225 21 25 30 47 info@sew-eurodrive.ci <a href="http://www.sew-eurodrive.ci">http://www.sew-eurodrive.ci</a>
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**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 <a href="http://www.sew-eurodrive.co.jp">http://www.sew-eurodrive.co.jp</a> sewjapan@sew-eurodrive.co.jp hamamatsu@sew-eurodrive.co.jp
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**Kazakhstan**

Sales	Almaty	SEW-EURODRIVE LLP 291-291A, Tole bi street 050031, Almaty	Tel. +7 (727) 350 5156 Fax +7 (727) 350 5156 <a href="http://www.sew-eurodrive.kz">http://www.sew-eurodrive.kz</a> sew@sew-eurodrive.kz
	Tashkent	SEW-EURODRIVE LLP Representative office in Uzbekistan 96A, Sharaf Rashidov street, Tashkent, 100084	Tel. +998 71 2359411 Fax +998 71 2359412 <a href="http://www.sew-eurodrive.uz">http://www.sew-eurodrive.uz</a> sew@sew-eurodrive.uz
	Ulaanbaatar	IM Trading LLC Narny zam street 62 Sukhbaatar district, Ulaanbaatar 14230	Tel. +976-77109997 Fax +976-77109997 imt@imt.mn

**Kenya**

Sales	Nairobi	SEW-EURODRIVE Pty Ltd Transnational Plaza, 5th Floor Mama Ngina Street P.O. Box 8998-00100 Nairobi	Tel. +254 791 398840 <a href="http://www.sew-eurodrive.co.tz">http://www.sew-eurodrive.co.tz</a> info@sew.co.tz
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**Latvia**

Sales	Riga	SIA Alas-Kuul Katlakalna 11C 1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 <a href="http://www.alas-kuul.lv">http://www.alas-kuul.lv</a> info@alas-kuul.com
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<b>Lebanon</b>			
Sales (Lebanon)	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
Sales (Jordan, Kuwait , Beirut Saudi Arabia, Syria)		Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 <a href="http://www.medrives.com">http://www.medrives.com</a> info@medrives.com
<b>Lithuania</b>			
Sales	Alytus	UAB Irseva Statybininku 106C 63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 <a href="http://www.irseva.lt">http://www.irseva.lt</a> irmantas@irseva.lt
<b>Luxembourg</b>			
representation: Belgium			
<b>Macedonia</b>			
Sales	Skopje	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 <a href="http://www.boznos.mk">http://www.boznos.mk</a>
<b>Malaysia</b>			
Assembly Sales Service	Johor	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
<b>Mexiko</b>			
Assembly Sales Service	Quéretaro	SEW-EURODRIVE MEXICO S.A. de C.V. SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Querétaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 <a href="http://www.sew-eurodrive.com.mx">http://www.sew-eurodrive.com.mx</a> scmexico@seweurodrive.com.mx
Sales Service	Puebla	SEW-EURODRIVE MEXICO S.A. de C.V. Calzada Zavaleta No. 3922 Piso 2 Local 6 Col. Santa Cruz Buenavista C.P. 72154 Puebla, México	Tel. +52 (222) 221 248 <a href="http://www.sew-eurodrive.com.mx">http://www.sew-eurodrive.com.mx</a> scmexico@seweurodrive.com.mx
<b>Mongolia</b>			
Technical Office	Ulaanbaatar	IM Trading LLC Naryn zam street 62 Union building, Suite A-403-1 Sukhbaatar district, Ulaanbaatar 14230	Tel. +976-77109997 Tel. +976-99070395 Fax +976-77109997 <a href="http://imt.mn/">http://imt.mn/</a> imt@imt.mn
<b>Morocco</b>			
Sales Service	Bouskoura	SEW-EURODRIVE Morocco Parc Industriel CFCIM, Lot 55 and 59 Bouskoura	Tel. +212 522 88 85 00 Fax +212 522 88 84 50 <a href="http://www.sew-eurodrive.ma">http://www.sew-eurodrive.ma</a> sew@sew-eurodrive.ma
<b>Namibia</b>			
Sales	Swakopmund	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 anton@dbminingnam.com
<b>Netherlands</b>			
Assembly Sales Service	Rotterdam	SEW-EURODRIVE B.V. Industrieweg 175 3044 AS Rotterdam Postbus 10085 3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP <a href="http://www.sew-eurodrive.nl">http://www.sew-eurodrive.nl</a> info@sew-eurodrive.nl

**New Zealand**

Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 <a href="http://www.sew-eurodrive.co.nz">http://www.sew-eurodrive.co.nz</a> sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 30 Lodestar Avenue, Wigram Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

**Nigeria**

Sales	Lagos	Greenpeg Nig. Ltd Plot 296A, Adeyemo Akapo Str. Omole GRA Ikeja Lagos-Nigeria	Tel. +234-701-821-9200-1 <a href="http://www.greenpeg ltd.com">http://www.greenpeg ltd.com</a> bolaji.adekunle@greenpeg ltd.com
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**Norway**

Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 <a href="http://www.sew-eurodrive.no">http://www.sew-eurodrive.no</a> sew@sew-eurodrive.no
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**Pakistan**

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

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	Hanoi	MICO LTD Quảng Trị - North Vietnam / All sectors except Construction Materials 8th Floor, Ocean Park Building, 01 Dao Duy Anh St, Ha Noi, Viet Nam	Tel. +84 4 39386666 Fax +84 4 3938 6888 <a href="mailto:nam_ph@micogroup.com.vn">nam_ph@micogroup.com.vn</a> <a href="http://www.micogroup.com.vn">http://www.micogroup.com.vn</a>

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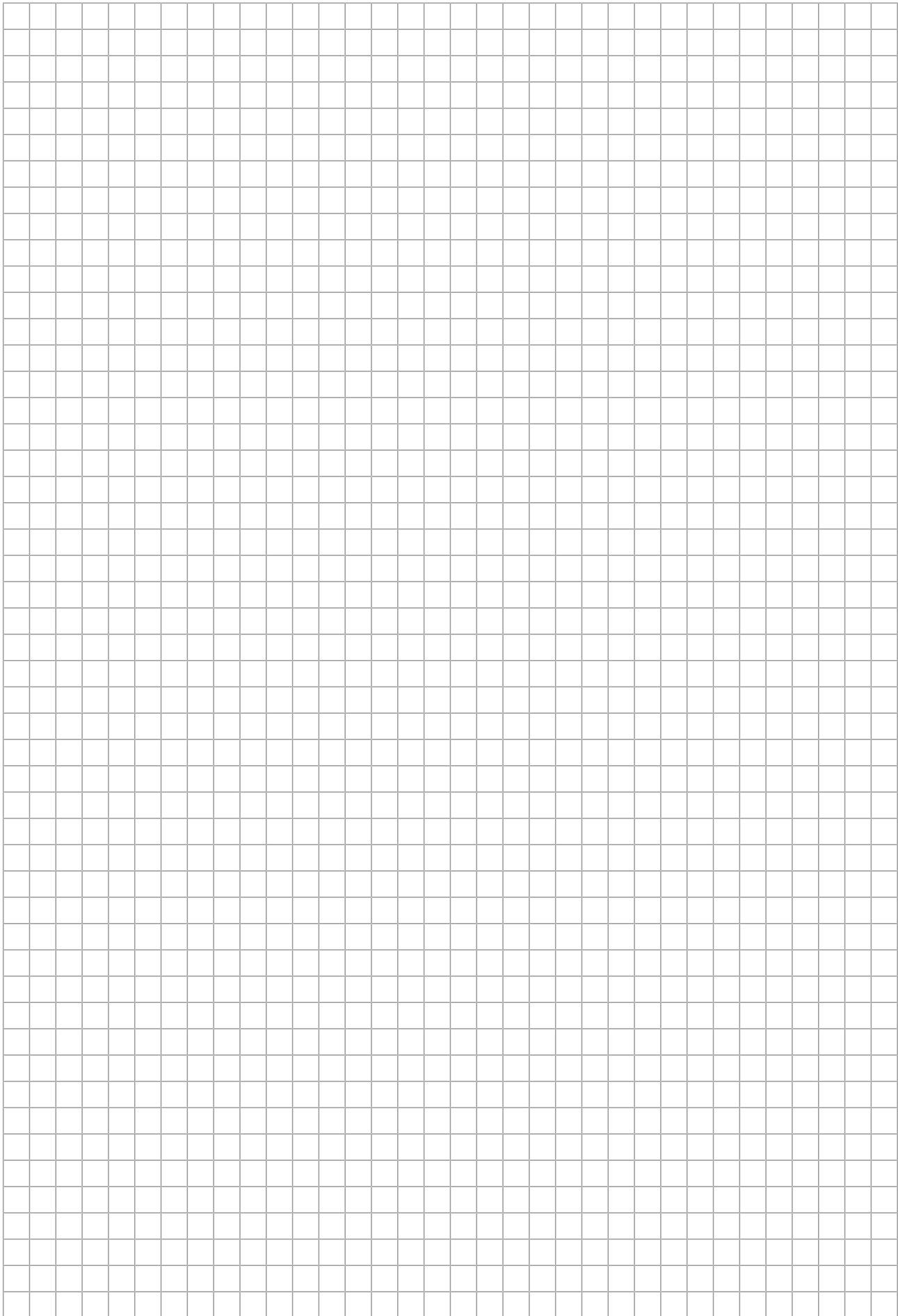
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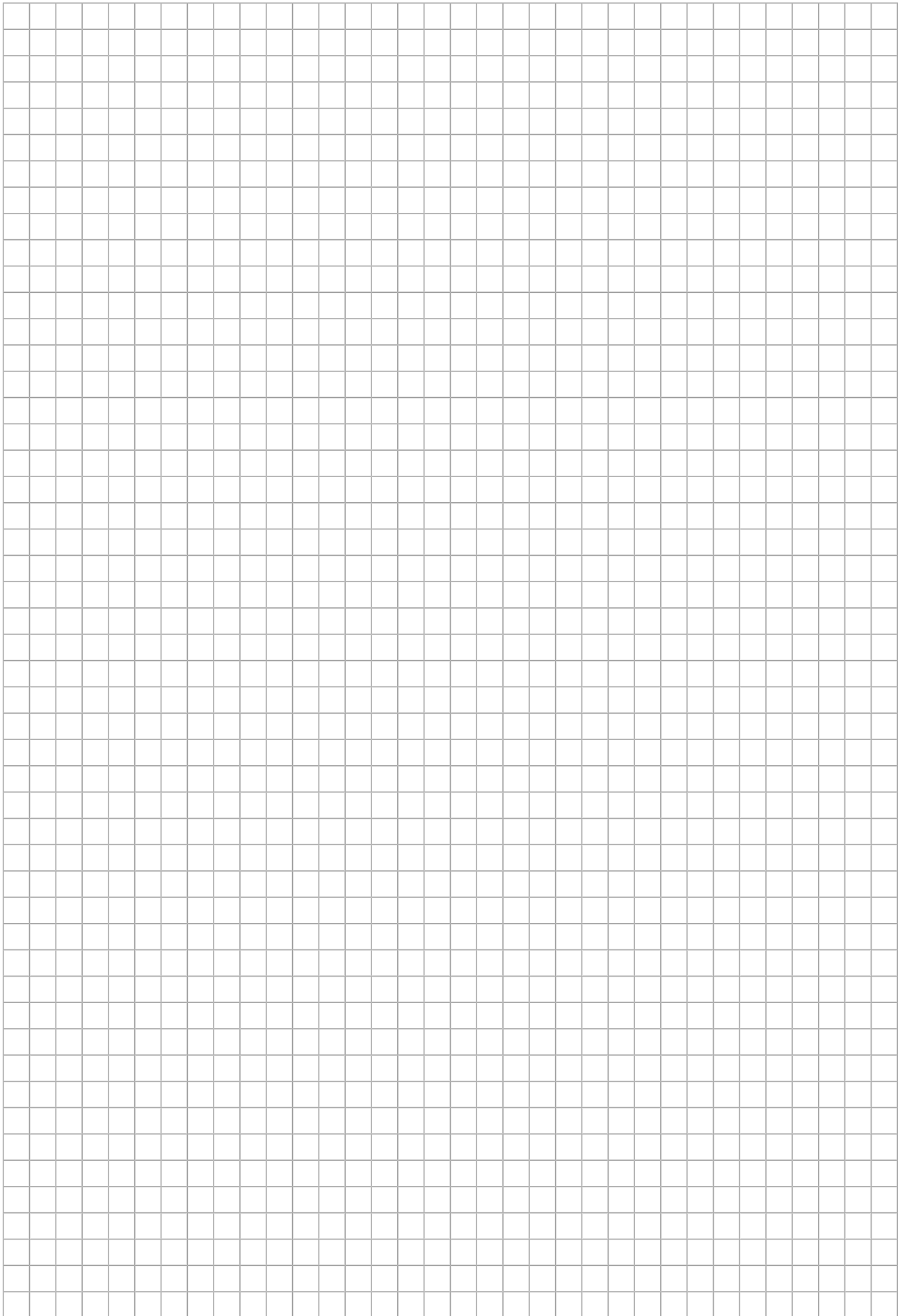
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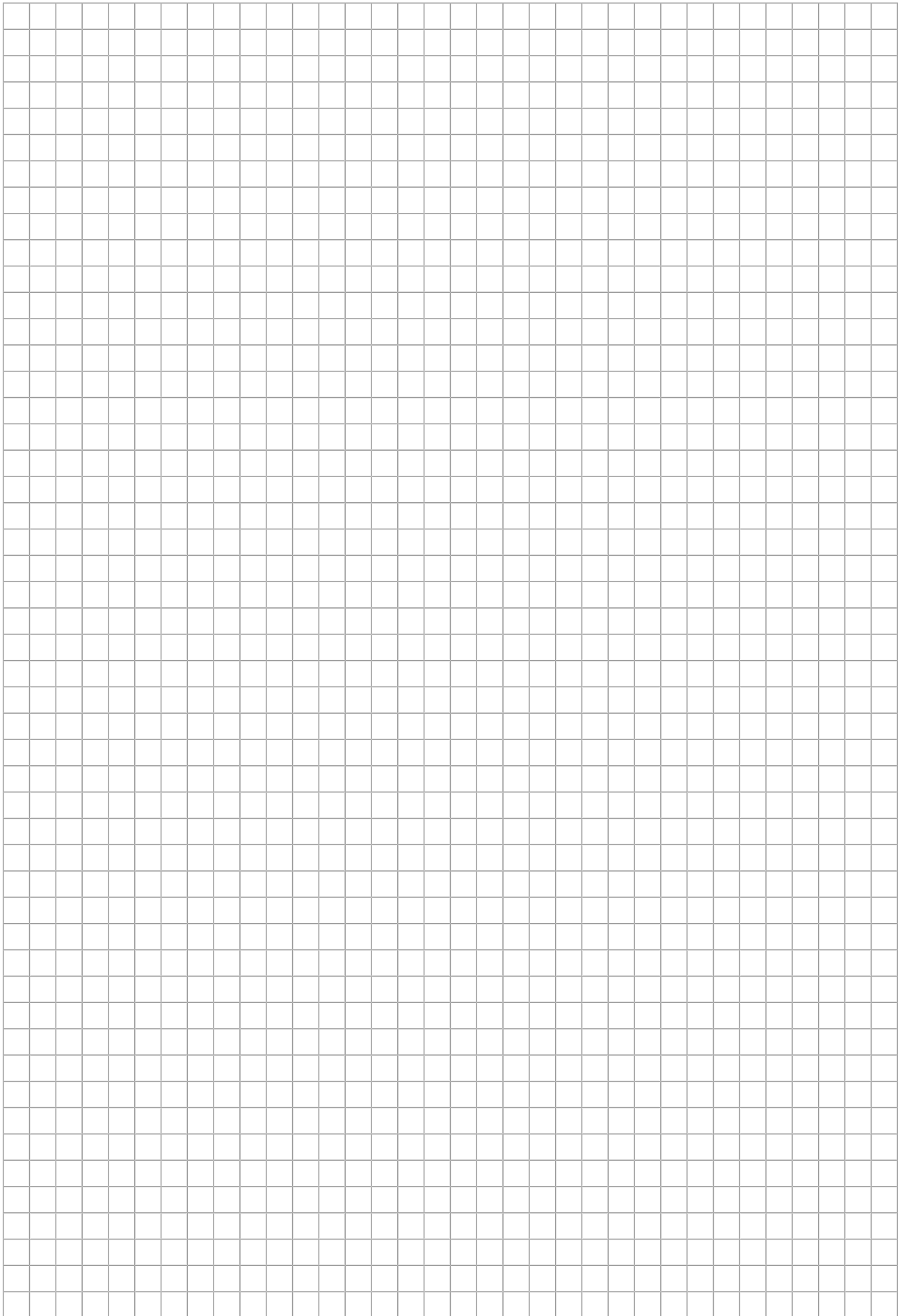


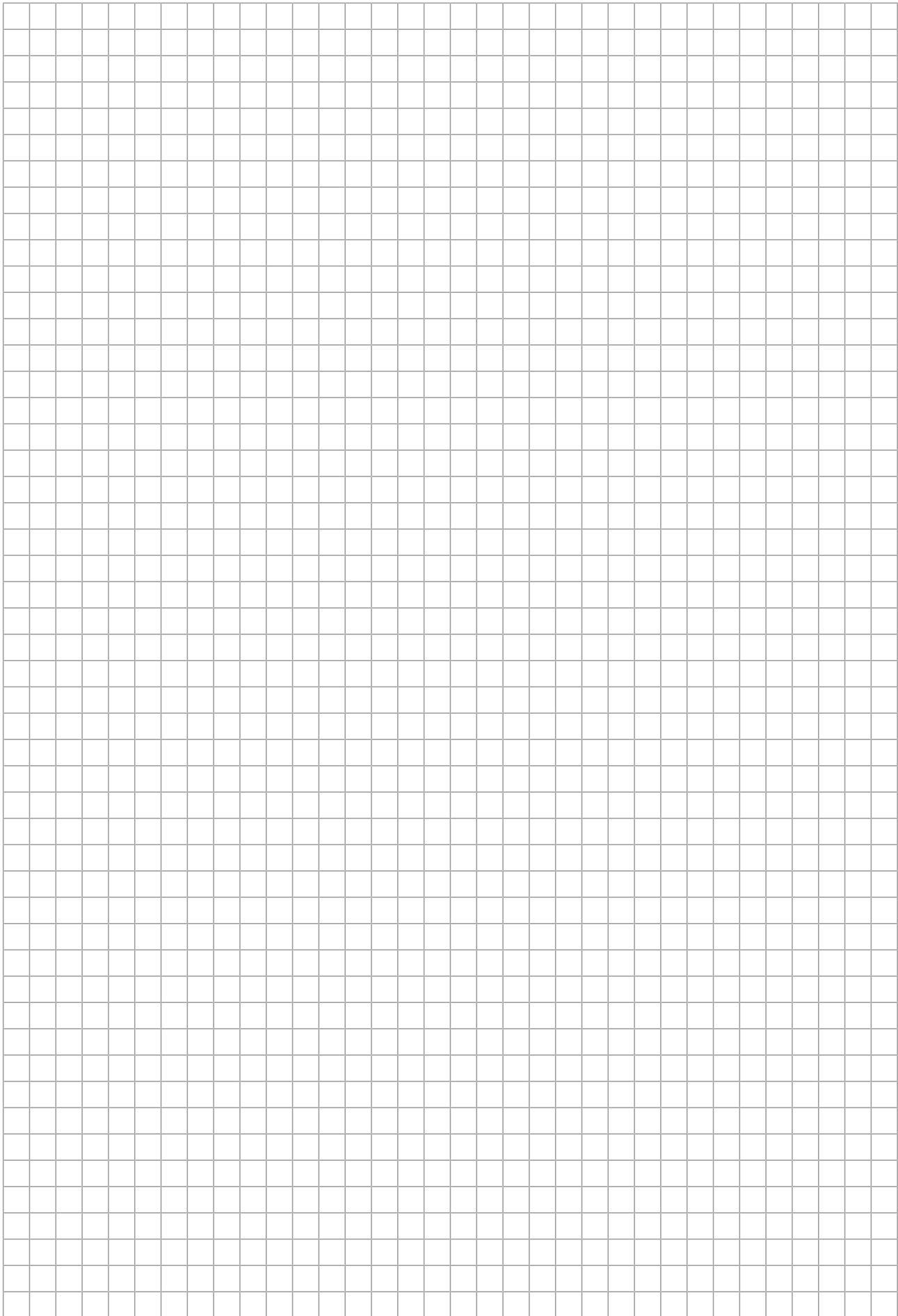
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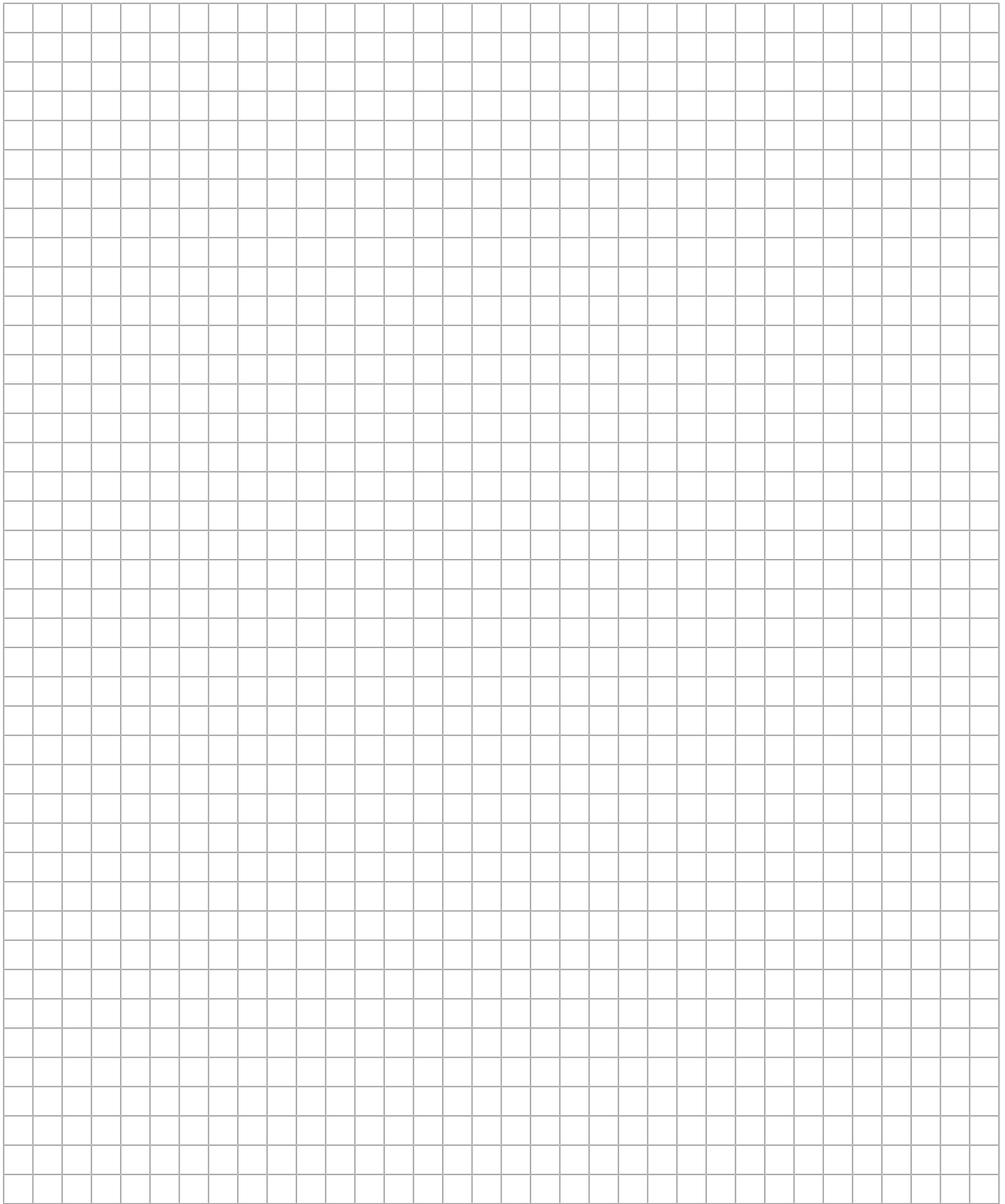
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