SEW EURODRIVE

Assembly and operating instructions

R.., F.., K.., S.., SPIROPLAN® W.. gear unit series

Edition 03/2025

31978088/EN

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1 General information

1.1 About this documentation

The documentation at hand is the original.

This documentation is an integral part of the product. The documentation is intended for all employees who perform work on the product.

Make sure this documentation is accessible and legible. Ensure that persons responsible for the systems and their 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 if you 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 graduation and meaning of the signal words in the safety notes.

Signal word	Meaning	Consequences if not observed
⚠ **DANGER**	Imminent danger	Death or severe injuries
⚠ **WARNING**	Possibly dangerous situation	Death or severe injuries
⚠ **CAUTION**	Possibly dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the product or its environment
INFORMATION	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.

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Meaning of the hazard symbols

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

Hazard symbol	Meaning
	General hazard
	Warning of hot surfaces
	Warning of risk of crushing
	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 step.

This is the formal structure of an embedded safety note:

⚠ **SIGNAL WORD!** Type and source of danger. Possible consequence(s) if disregarded. Measure(s) to prevent danger.

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 Recycling, reprocessing, reuse

When manufacturing products, SEW-EURODRIVE makes sure to keep the use of new natural resources in the interests of the circular economy to a minimum. Key aspects here are the recycling of materials as well as the inspection and/or processing of returned components and their reuse in new products. These processes are only used at SEW-EURODRIVE if the resulting materials and components correspond to the quality of new products.

1.5 Product names and trademarks

The product names mentioned in this documentation are trademarks or registered trademarks of the respective titleholders.

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1.6 Copyright notice

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2 Safety notes

2.1 Preliminary information

The following general safety notes serve the purpose of preventing injury to persons 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:

- The national and regional regulations governing safety and the prevention of accidents
- Product safety label on the product
- All other associated project planning documents, installation and startup instructions, as well as connection and wiring diagrams
- Do not assemble, install, or operate damaged products
- All system-specific specifications and regulations

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

- Qualifications in the field of mechanics in accordance with the national regulations
- Familiarity with this documentation

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Specialist for electrotechnical work

Any electrotechnical work may be performed only by electrically skilled persons with a suitable education. Electrically skilled persons in the context of this documentation are persons who are familiar with electrical installation, startup, troubleshooting, and maintenance of the product, and who possess the following qualifications:

- Qualifications in the field of electrical engineering in accordance with the national regulations
- Familiarity with this documentation

Additional qualifications

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 devices, systems, and circuits in accordance with the standards of safety technology.

Instructed persons

All work in the areas of transport, storage, installation, operation and waste disposal may only be carried out by persons who are trained and instructed appropriately. These instructions must enable the persons to carry out the required activities and work steps safely and in accordance with regulations.

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.

Use in potentially explosive atmospheres is prohibited, unless specifically designated otherwise.

2.5 Creating a safe working environment

Before you work on the product, ensure a safe working environment. Observe the following basic safety notes:

2.5.1 Performing work on the product safely

Defective or damaged product

Never install defective or damaged products. Observe the following information to avoid injuries or damage:

- Before installation, check the product for external damage and replace a damaged product.

Use of hazardous substances, lubricants, adhesives

Observe the following information to avoid poisoning or fire hazards:

- Observe the safety data sheets of the used hazardous substances, lubricants and adhesives.
- Wear safety gloves.

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Hot surfaces

The surfaces of the product can become very hot during operation. Observe the following information to avoid burns:

- Let the product and its accessories cool down before touching it.
- Do not touch any surfaces of the product during operation, except for the control elements.
- Observe the information signs and product safety labels on the product.

Falling load

Observe the following information to avoid death or severe injury due to falling loads:

- Do not stand under the load.
- Secure the area where loads can fall down.
- Use personal protective equipment (such as helmet and safety shoes).
- Use a suitable lifting tool (chain hoist, forklift) and transport protection.

Rotating parts

When working on the product, there may be a risk of exposed rotating parts and uncontrolled movement of the components. Observe the following information to avoid body parts getting crushed or pulled in:

- Switch off the product before you start working on it.
- Observe all technical data of the product.
- Do not reach into the hazard zone.

Sharp edges

Observe the following information to avoid cuts caused by sharp or non-deburred cutting edges:

- Wear safety gloves.

Toxic vapors due to heating of fluorocarbon rubber

Fluorocarbon rubber is very stable and safe under normal operating conditions and temperatures < 200 °C. However, if fluorocarbon rubber is heated to more than 300 °C, e.g. by fire or the flame of a cutting torch, harmful gases, vapors, and residues can form. The following components can contain elastomers made of fluorocarbon rubber: Oil seals, breather valves, screw plugs. Observe the following information:

- Make sure that components made of fluorocarbon rubber are not exposed to thermal loads > 200 °C. Remove the components, if necessary.
- Observe the temperature ranges specified in the operating instructions when heating components with fluorocarbon rubber.
- Avoid inhaling fluorocarbon rubber gases and vapors, as well as contact with cooled fluorocarbon rubber, as hazardous residues form during thermal load.

2.6 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.

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Observe the storage information on climatic conditions as given in chapter "Storage conditions for extended storage" (→ 🗎 216).

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

For storage periods longer than 9 months, SEW-EURODRIVE recommends the "extended storage" design. For more information, go to "Extended storage" (→ 🗎 216).

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.

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 lifting eyebolts. The lifting eyes or lifting eyebolts are designed to carry only the weight of the product. Do not apply any additional loads.

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

Do not store the gearmotor on the fan guard.

Use suitable, sufficiently rated and reusable handling equipment.

2.7 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. Electrical components must not be mechanically damaged or destroyed.

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

- Use in applications with impermissibly high mechanical vibration and shock loads.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.

Before using a stainless steel shrink disk or stainless steel output shaft, check if the ambient conditions are compatible with the stainless steel material. For information on the material, refer to the order confirmation.

2.8 Startup/operation

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.

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2.9 Cleaning

When using a stainless steel shrink disk or stainless steel output shaft, check if the cleaning agents and chemicals are compatible with the stainless steel material. For information on the material, refer to the order confirmation.

2.10 Inspection/maintenance

Observe the information in chapter "Inspection/maintenance" (→ 🗎 150).

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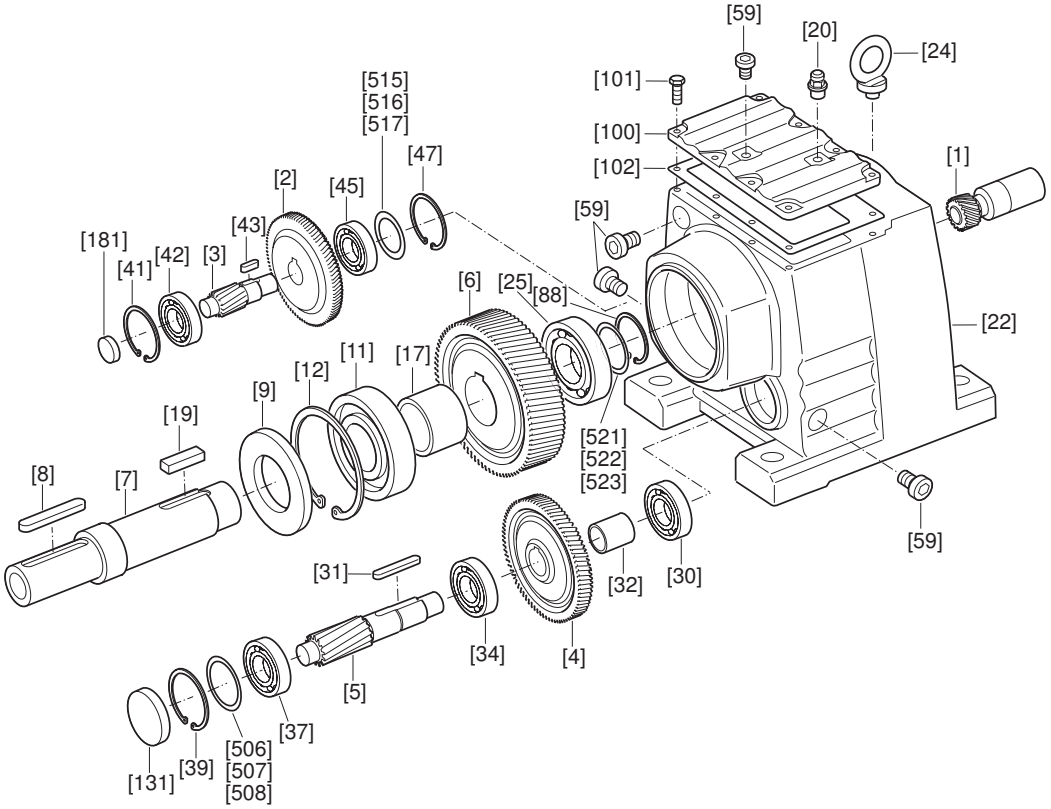
3 Gear unit structure

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

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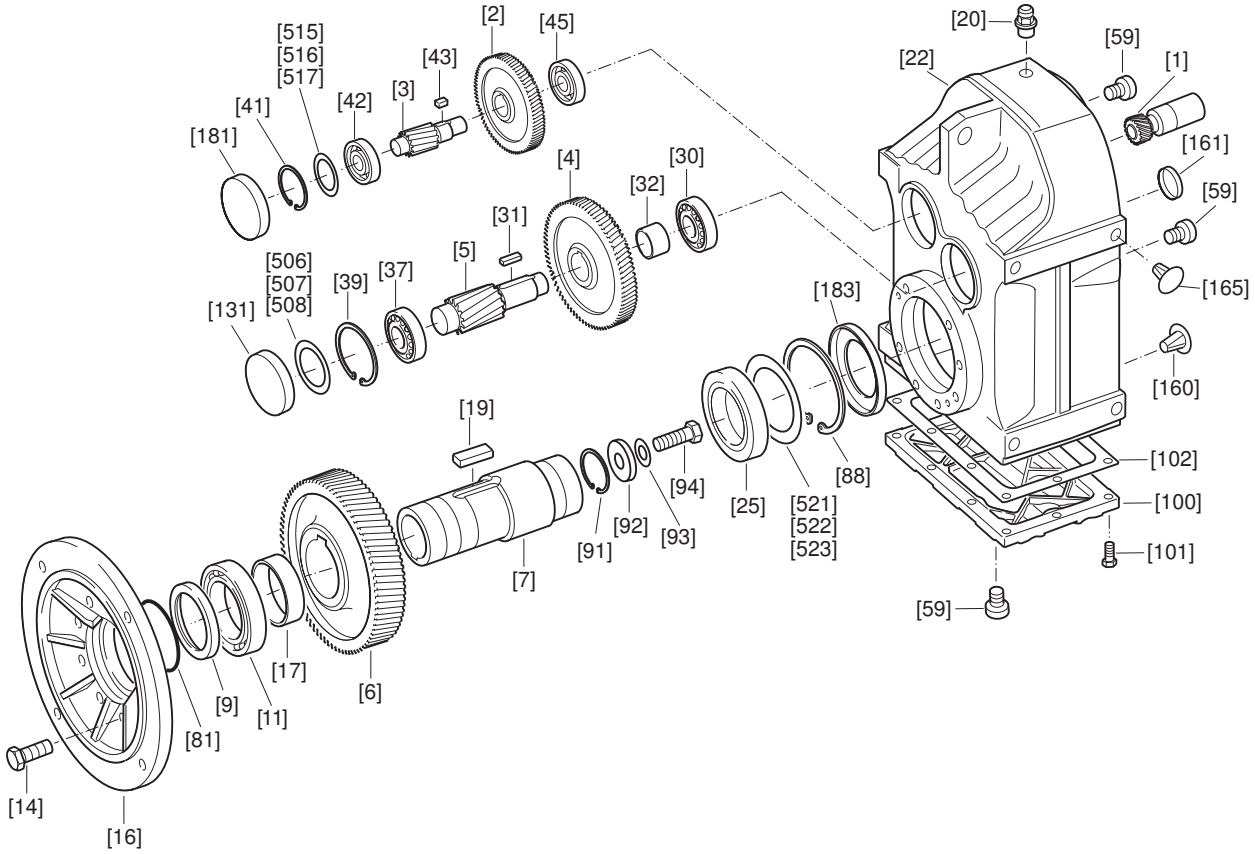
3.2 Basic structure of parallel-shaft helical gear units F..27 – F..157



9007199274039051

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

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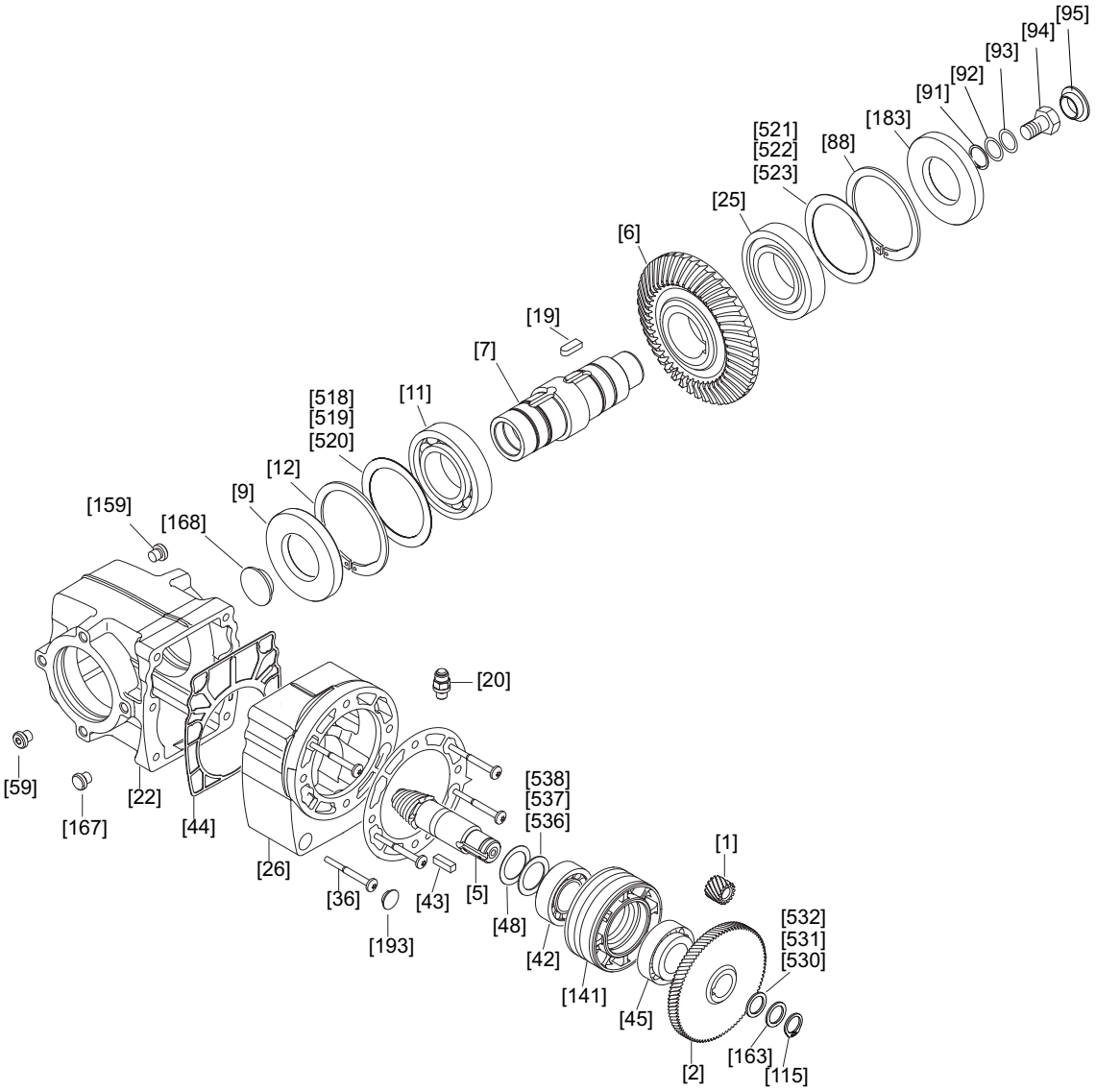
3.3 Basic structure of helical-bevel gear units K..19/K..29



18014405931092491

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

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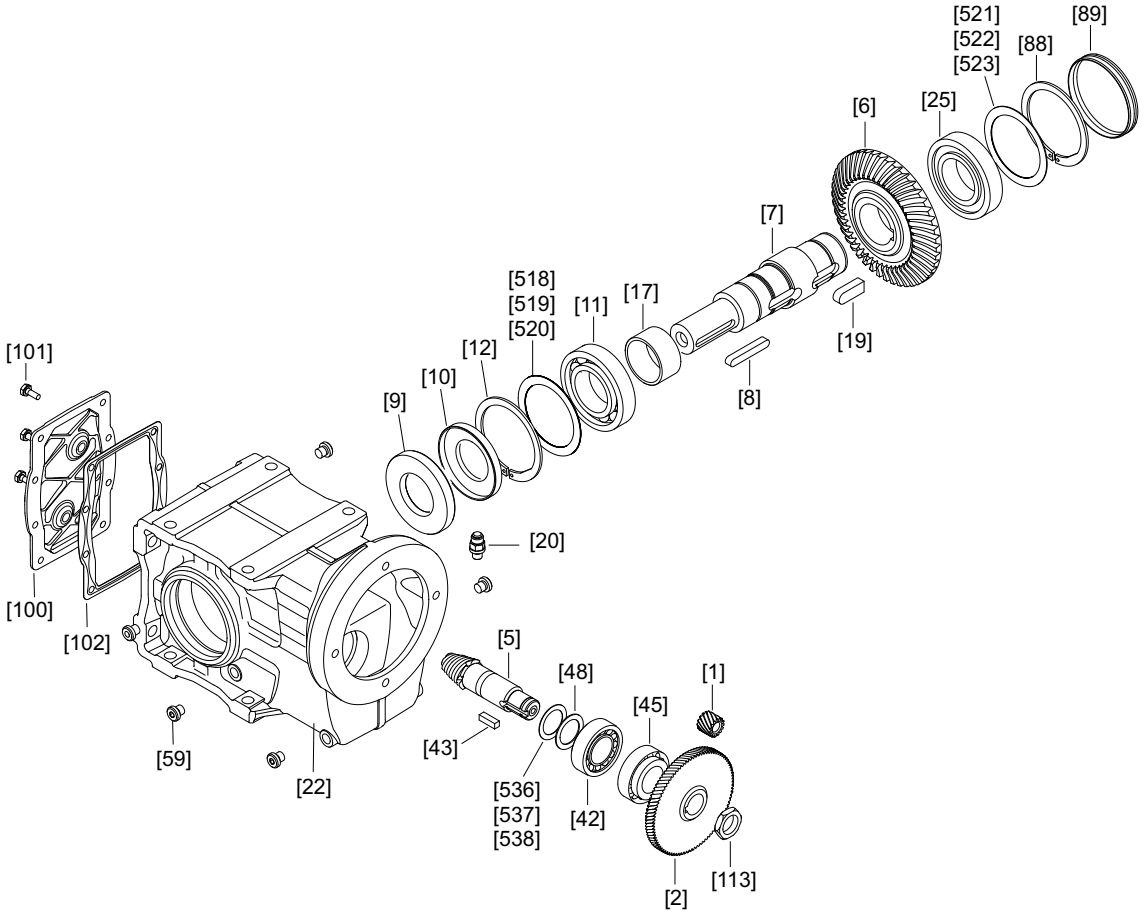
3.4 Basic structure of helical-bevel gear units K..39/K..49



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

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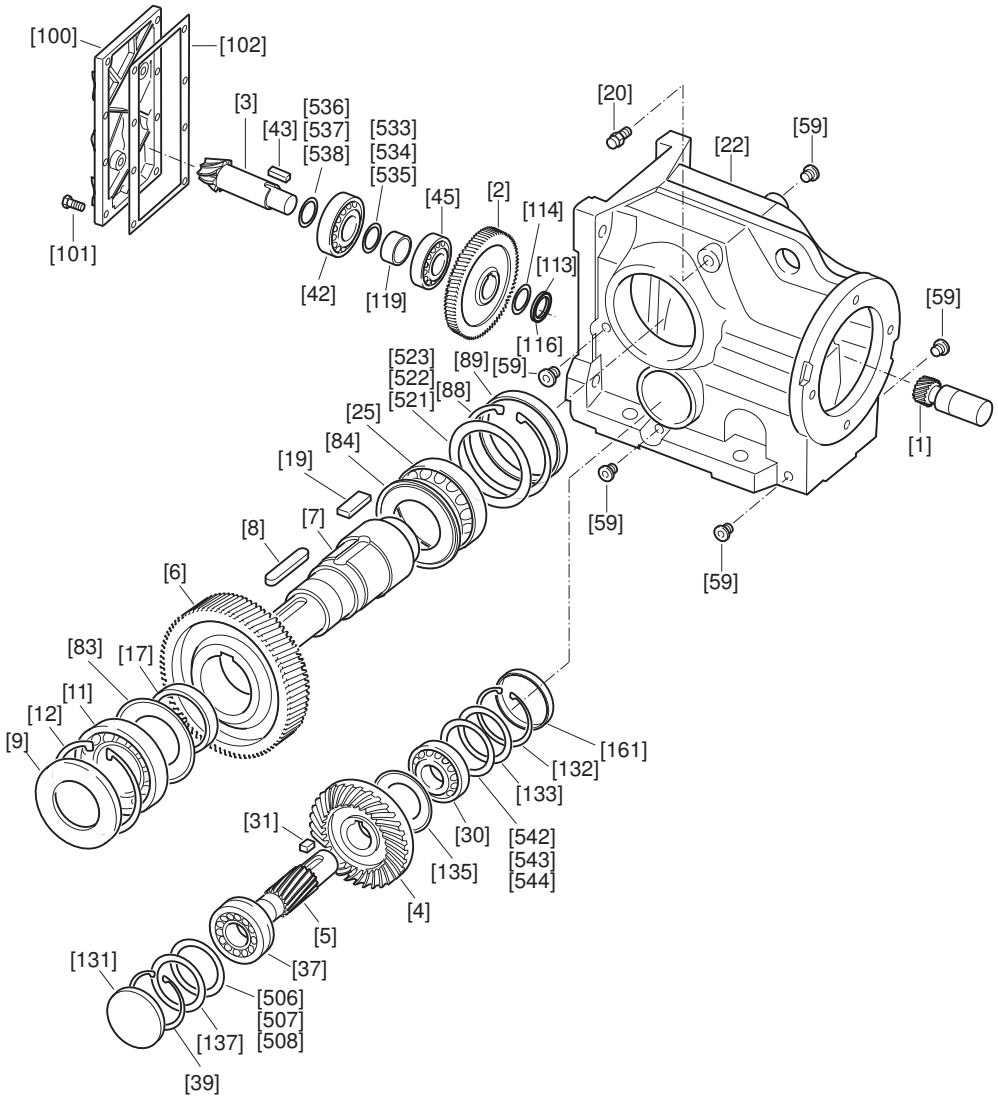
3.5 Basic structure of helical-bevel gear units K..37 – K..187



9007199274042123

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

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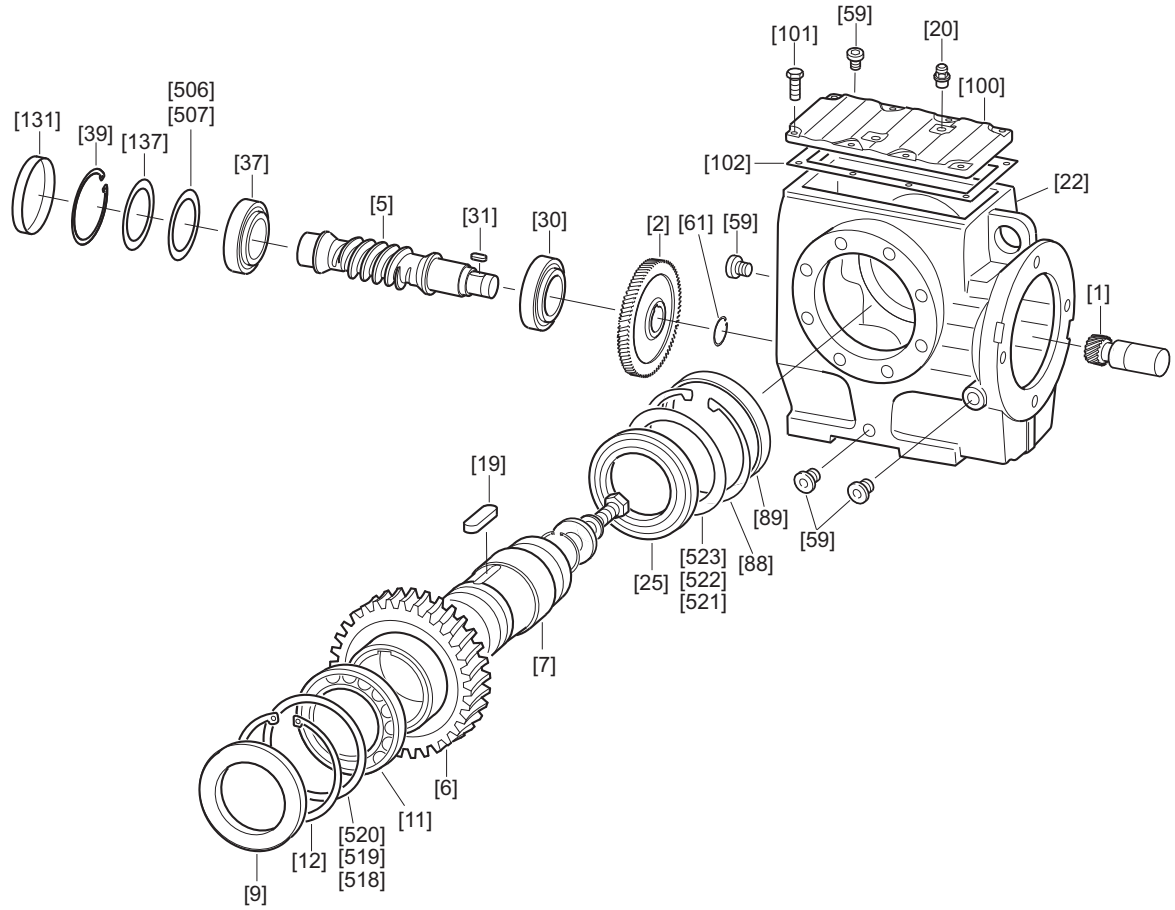
3.6 Basic structure of helical-worm gear units S..37 – S..97, S..37p – S..97p



18014398528786187

[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 bearings	[100]	Gear unit cover	[520]	Shim
[6]	Worm gear	[30]	Rolling bearings	[101]	Hex head screw	[521]	Shim
[7]	Output shaft	[31]	Key	[102]	Seal	[522]	Shim
[9]	Oil seal	[37]	Rolling bearings	[131]	Closing cap	[523]	Shim
[11]	Rolling bearings	[39]	Retaining ring	[137]	Supporting ring		
[12]	Retaining ring	[59]	Screw plug	[506]	Shim		
[19]	Key	[61]	Retaining ring	[507]	Shim		

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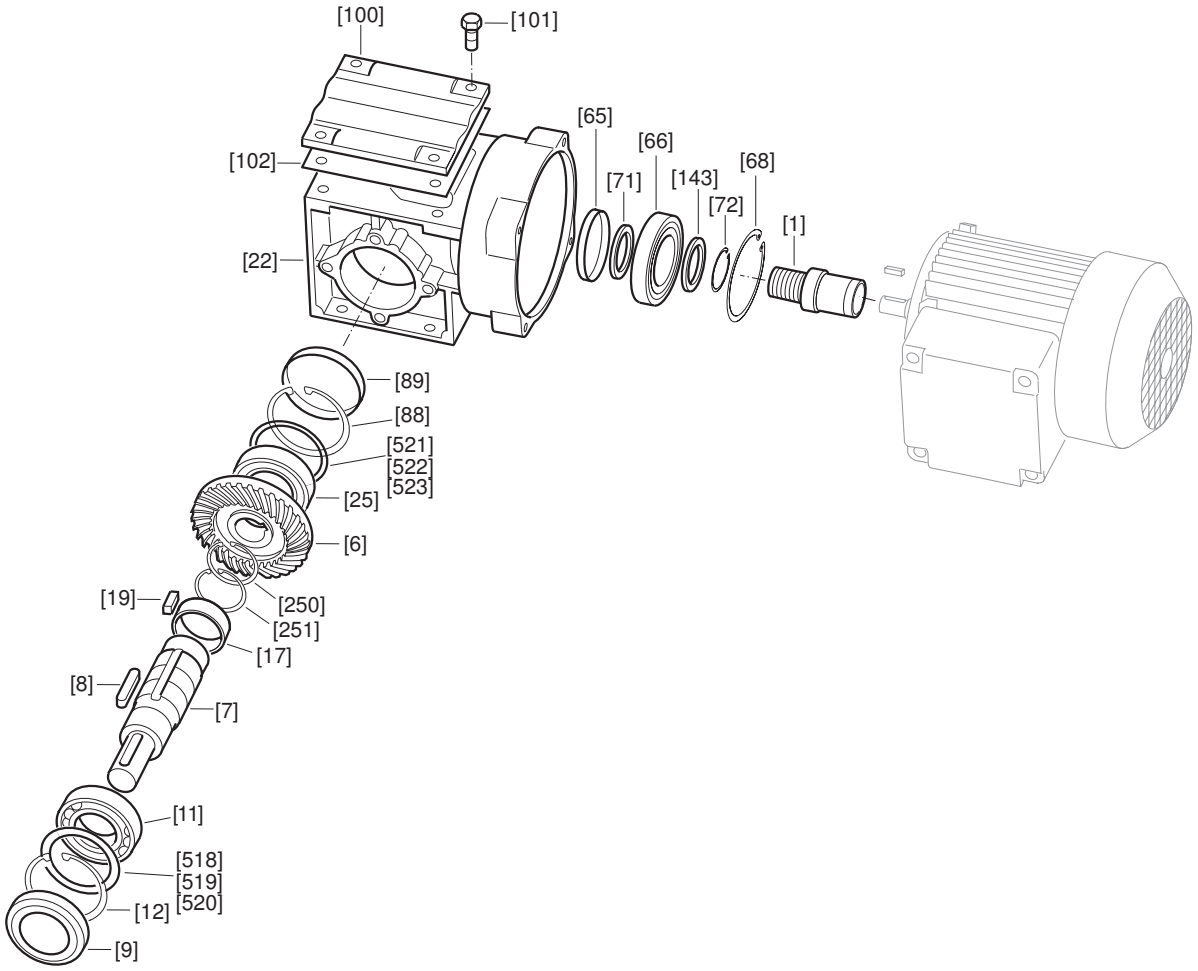
3.7 Basic structure of SPIROPLAN® right-angle gear units W..10 – W..30



9007199274048267

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

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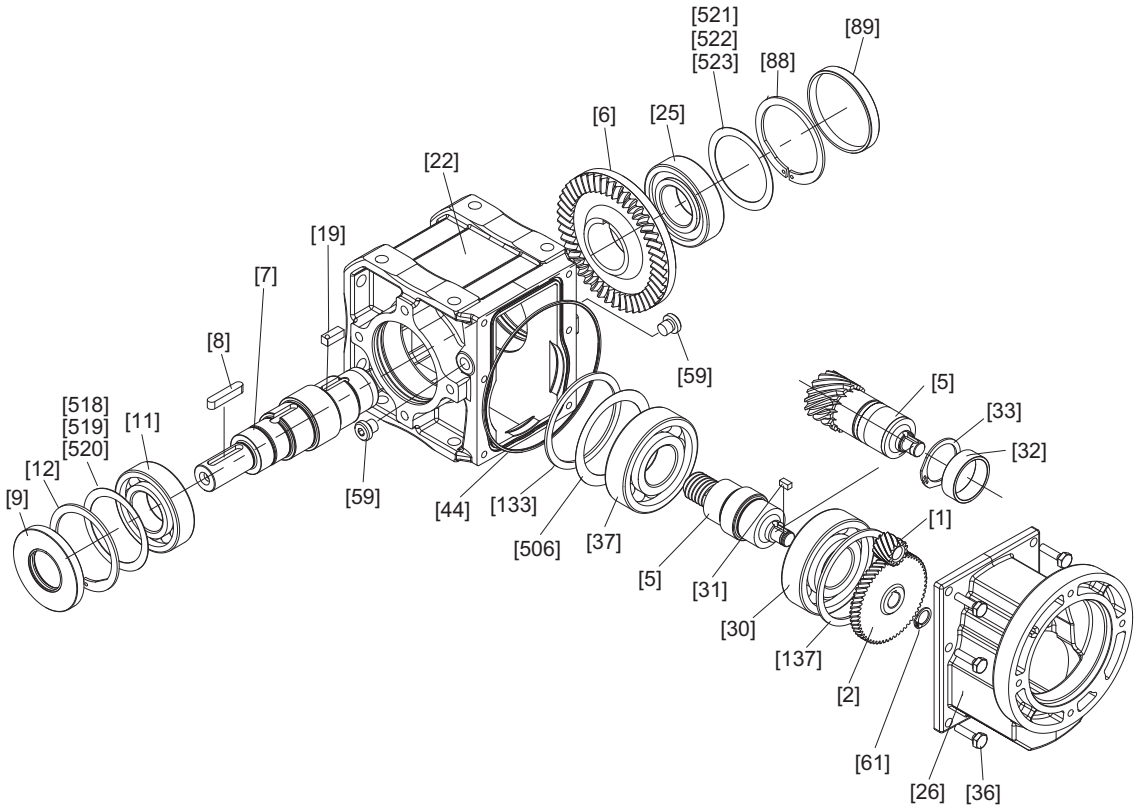
3.8 Basic structure of SPIROPLAN® right-angle gear units W..37/W..47



18014399115354379

[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 of the 1st stage	[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		

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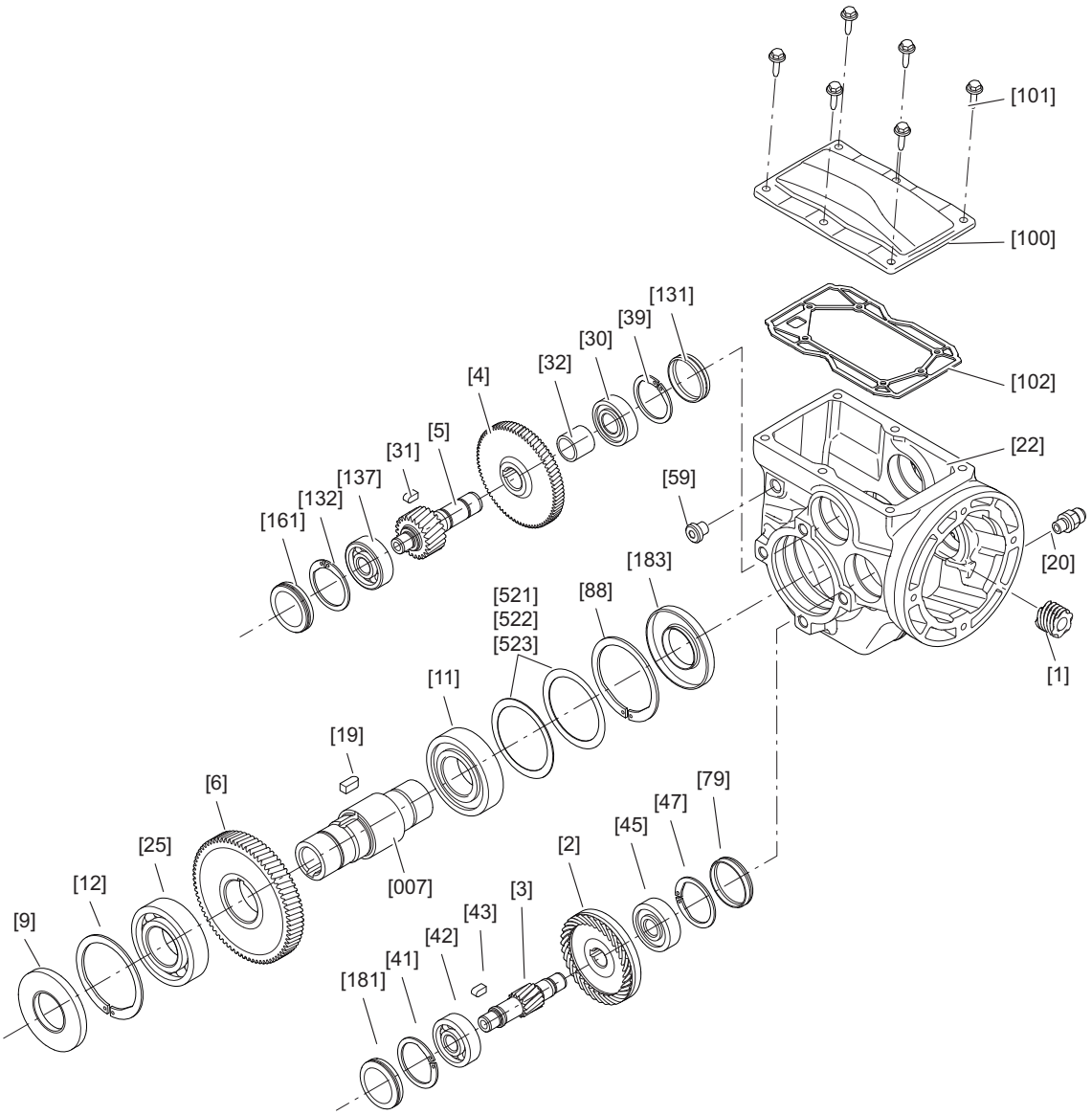
3.9 Basic structure of SPIROPLAN® right-angle gear units W..19 – W..59



[1]	Pinion	[22]	Gear unit housing	[79]	Closing cap	[522]	Shim
[2]	Gear	[25]	Deep groove ball bearing	[88]	Retaining ring	[523]	Shim
[3]	Pinion shaft	[30]	Deep groove ball bearing	[100]	Gear unit cover		
[4]	Gear	[31]	Key	[101]	Hex head screw		
[5]	Pinion shaft	[32]	Spacer tube	[102]	Seal		
[6]	Gear	[39]	Retaining ring	[131]	Closing cap		
[7]	Input shaft	[41]	Retaining ring	[132]	Retaining ring		
[9]	Oil seal	[42]	Deep groove ball bearing	[137]	Deep groove ball bearing		
[11]	Deep groove ball bearing	[43]	Key	[161]	Closing cap		
[12]	Retaining ring	[45]	Deep groove ball bearing	[181]	Closing cap		
[19]	Key	[47]	Retaining ring	[183]	Oil seal		
[20]	Breather valve	[59]	Screw plug	[521]	Shim		

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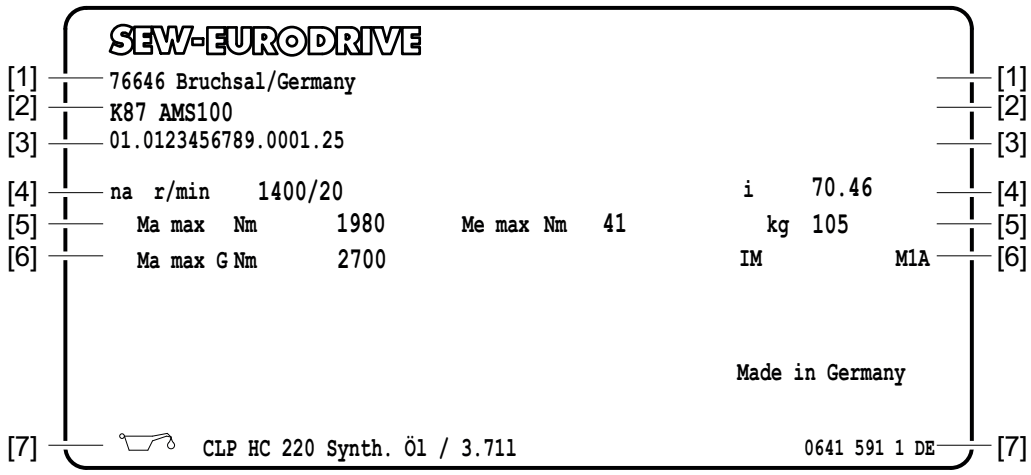
3.10 Nameplate/type designation

3.10.1 Gear unit nameplates

The following figures show examples of nameplates for a helical-bevel gear unit with input adapter:

Nameplate 1



63050415465234059

Line	Information
[1]	• Manufacturer, address
[2]	• Type designation
[3]	• Serial number
[4]	• Input speed / output speed • Gear ratio
[5]	• Maximum permitted output torque of the gear unit / adapter combination • Maximum permitted input torque • Mass
[6]	• Maximum permitted output torque of the open gear unit without additional component • Mounting position
[7]	• Oil type and oil fill volume

Explanation of the production number:

01.	0123456789.	0001.	25
Sales organization	Order number	Item number	Year of manufacture

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Product label

54043229167531275

The QR code on the product gives you quick access to the digital services from SEW-EURODRIVE.

In addition to being able to enter the QR code with the camera of your mobile device or an appropriate app, you can also use the "Product ID Plus" app from SEW-EURODRIVE. After scanning, you will see the technical data to identify the product directly.

In addition, the search for product-specific spare parts and documentation, as well as fault diagnostics and direct service requests are simple and fast.

3.10.2 Type designation of the gear unit

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

Example: K37/R AQSA 80 /1		
Gear unit type	**K**	Helical-bevel gear unit
Gear unit size	**37**	19 – 49; 37 – 187
Option	**/R**	E.g. option /R: reduced rotational clearance
Adapter	**AQSA**	E.g. adapter for mounting servo-motors: AQSA: Adapter with keyway AQSH: Adapter with clamping ring hub
Adapter size	**80**	
Variants	**/1**	

3.10.3 DRN.. gearmotor nameplates

The following figures show examples of the nameplates of a DRN.. gearmotor.

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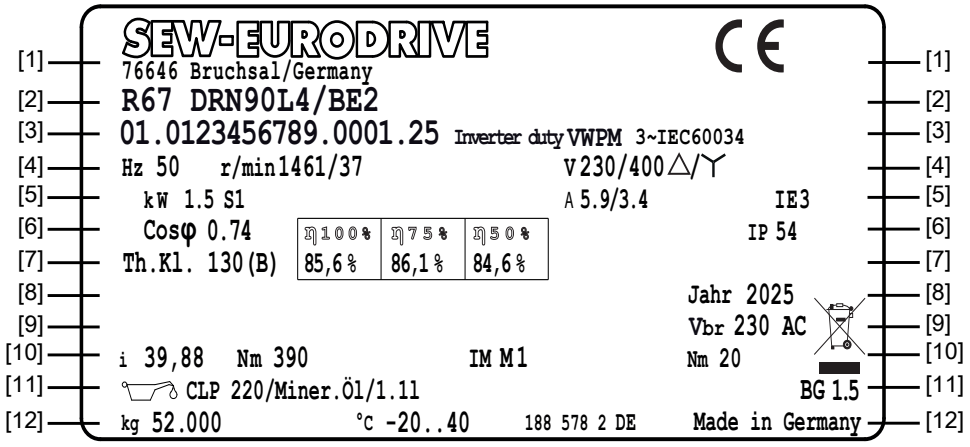
Nameplate 1



27021623189099275

Line	Information
[1]	• Manufacturer, address, CE mark
[2]	• Type designation
[3]	• Serial number • Suitability for inverter operation • Number of phases and underlying rating and performance standard
[4]	• Rated frequency • Rated speed of the motor / speed of the gear unit output shaft • Nominal voltage
[5]	• Rated power and operating mode • Rated current • Energy efficiency class according to IEC 60034-30-1
[6]	• Power factor • Efficiency after capacity utilization of 100%, 75%, and 50% • Degree of protection according to IEC 60034-5
[7]	• Thermal class
[8]	• Year of manufacture
[9]	• Brake voltage • Waste disposal according to WEEE Directive
[10]	• Gear unit ratio • Output torque • Mounting position • Nominal braking torque
[11]	• Oil type and oil fill volume • Brake control
[12]	• Gearmotor weight • Permitted ambient temperature range of the motor • Nameplate number • Country of manufacture

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Product label

54043229167531275

The QR code on the product gives you quick access to the digital services from SEW-EURODRIVE.

In addition to being able to enter the QR code with the camera of your mobile device or an appropriate app, you can also use the "Product ID Plus" app from SEW-EURODRIVE. After scanning, you will see the technical data to identify the product directly.

In addition, the search for product-specific spare parts and documentation, as well as fault diagnostics and direct service requests are simple and fast.

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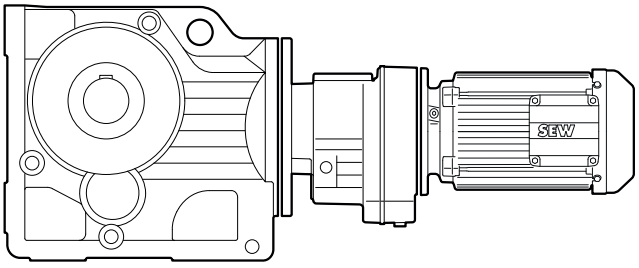
3.10.4 Type designation of a DRN.. gearmotor

The type designation 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: K107R77 DRN100LS4 /TF		
Gear unit type	K	1st Gear unit
Size	107	
Gear unit type	R	2. Gear unit
Size	77	
Motor series	DR	Motor
Product line	N	
Size	100LS	
Number of poles	4	
Motor option temperature sensor	/TF	Option

Example: DRN.. gearmotor



K107 R77 DRN100LS4/TF

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3.11 Designs and options – R.., F.., K.., S.., W.. gear units

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

3.11.1 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

3.11.2 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

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3.11.3 Helical-bevel gear units

Designation	
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 according 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

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3.11.4 Helical-worm gear units

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

3.11.5 SPIROPLAN® right-angle gear unit

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
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

3.11.6 Options

R.., F.., and K..7 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

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3.11.7 Condition monitoring

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

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4 Mechanical installation

4.1 Installation requirements

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 the case of abrasive ambient conditions, the output-end 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 for cleaning. Note that solvent damages the oil seal. Do not let the solvent come into contact with the sealing lips of the oil seal!
- 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" (→ 🗎 219)).
- Make sure the environment contains no hazardous substances (oils, acids, gases, vapors, dusts, etc.) or radiation.

For special designs:

- Check if the gear unit/gearmotor is designed for the ambient temperature. You can find the application limits on the nameplate.

For helical-worm gear units and SPIROPLAN® W..0 right-angle gear units:

- Note that no large external mass moments of inertia which could exert a retrodriving load on the gear unit must be present.
- Note the self-locking at η' (retrodriving) < 0.5.

  Calculation of η':η' = 2 - 1/η

Mounting to servomotors:

- 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.

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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
  - AQS.. and EWH.. motor adapters
  - Input shaft assembly with centering shoulder
- Mounting device
- Compensation elements (washers and spacing rings)
- Fasteners for input and output elements
- Lubricant (e.g. NOCO-Paste)
- Thread locking compound for input shaft assembly 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 • ISO k6 for solid shafts with Ø ≤ 50 mm • ISO m6 for solid shafts with Ø > 50 mm • ISO H7 for hollow shafts • Centering bore according to DIN 332, shape DR	Centering shoulder tolerance to DIN EN 50347 • ISO j6 with N ≤ 250 mm • ISO h6 with N > 250 mm

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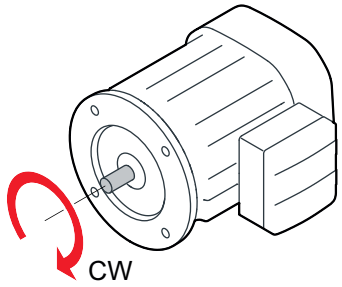
4.2 Directions of rotation

4.2.1 Direction of rotation of the motor shaft

In accordance with the standard IEC 60034-8 defined as standard:

Clockwise (CW) direction of rotation when looking onto the pinion shaft end of the motor.

Prerequisite: Connection U1-V1-W1



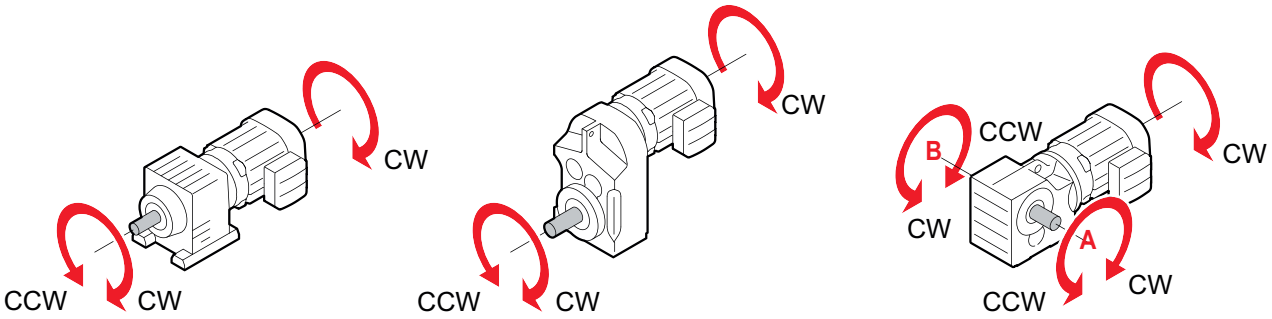
4.2.2 Direction of rotation of the output shaft

Standard direction of rotation when looking onto the output shaft of the gear unit:

- CW (clockwise)

  Clockwise direction of rotation
- CCW (counterclockwise)

  Counterclockwise direction of rotation



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4.2.3 Direction of rotation of the gear unit

Shaft position A, B, or AB (shaft output at both ends) is possible for K.. helical-bevel gear units, S.. helical-worm gear units, and SPIROPLAN® W.. right-angle gear units. The direction of rotation is indicated according to the shaft position when looking onto the output end A or B or onto A and B respectively.

The following table specifies the standard direction of rotation for the CW direction of rotation of the motor.

Series	Size	Gear unit stages	Shaft position	Standard direction of rotation when looking onto the output shaft[1)]
RX	57 – 107	1		CCW
R	07 – 167	2		CW
		3		CCW
F	27 – 157	2		CW
		3		CCW

1) CW = clockwise; CCW = counterclockwise.

Series	Size	Gear unit stages	Shaft position	Standard direction of rotation when looking onto the output shaft[1)]	
				View of output end A	View of output end B
K	19 – 49	2	A	CW	
			AB	CW	CCW
			B		CCW
K	37 – 187	3	A	CCW	
			AB	CCW	CW
			B		CCW
S	37 – 97	2	A	CW	
			AB	CW	CCW
			B		CCW
W	10 – 30	1	A	CCW	
			AB	CCW	CW
			B		CW
W	19 – 59	2	A	CW	
			AB	CW	CCW
			B		CCW
		3	A	CCW	
			AB	CCW	CW
			B		CW

1) CW = clockwise; CCW = counterclockwise.

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4.3 Installing the gear unit

⚠ CAUTION

Risk of injury due to improper installation/disassembly.

Severe injury and damage to property.

- Work on the gear unit only when the machine is in an idle state.
- Secure the drive unit against unintentional power-up.
- Attach an information sign near the ON switch to warn that the gear unit is being worked on.
- Prevent heavy component parts (e.g. shrink disks) against falling during installation/disassembly.

⚠ CAUTION

Risk of injury due to protruding gear unit parts.

Severe injury.

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

⚠ CAUTION

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

Risk of injuries and damage to property.

- The simultaneous use of the foot plates and the torque arm, especially for the KA.9B/T version, is not permitted.
- Attach the KA.9B/T design only via the torque arm.
- Attach the K.9 or KA.9B design only via the foot plate.
- Contact SEW-EURODRIVE if you want to use feet and a torque arm for mounting.

⚠ 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.

- Make sure that the attached foot motor is mounted to the customer's design without distortion.

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⚠ CAUTION

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

Damage to health.

The following gear unit components may contain fluorocarbon rubber: Oil seals, breather valves, screw plugs.

- Make sure that components made of fluorocarbon rubber are not exposed to thermal loads > 200 °C. Remove the components, if necessary.
- Avoid inhaling fluorocarbon rubber gases and vapors as well as skin and eye contact.
- Also avoid contact with cooled fluorocarbon rubber, as dangerous residues form when exposed to a thermal load.

NOTICE

Damage to the gear unit 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 the gearmotor may only be installed in the specified mounting position. Observe the information on the nameplate. SPIROPLAN® right-angle gear units of sizes W10 – W30 are independent of the mounting position.

Oil level

Check the mounting position-dependent oil level. For more information, refer to chapter "Inspection/maintenance of the gear unit" (→ 🗎 157). The gear units are filled with the required oil quantity at the factory. Minor deviations at the oil level plug are possible due to the mounting position and are permitted within the limits of 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" (→ 🗎 235) and chapter "Mounting positions" (→ 🗎 175).

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").
- Changing the mounting position of K gear units to M5 or M6 or within these mounting positions
- Changing the mounting position of size S47 to S97 S gear units to mounting positions M2 and M3
- Changing the mounting positions of R gear units to mounting position M2.

Support structure

The support structure must have the following characteristics:

- Evenness
- Vibration damping
- Torsionally rigid

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The following table shows the maximally permitted flatness defects 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
137/147	Max. 0.7 mm
157 – 187	Max. 0.8 mm

4.3.1 Installing the gear unit

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 an anaerobic surface seal or an anaerobic adhesive.

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.

To connect to the customer application, use all tapped holes available on connection side A or connection side B. This is required for transferring the forces and torques specified in the catalog.

Foot- and flange-mounting

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

Permitted overhung and axial loads

Observe the permitted overhung and axial loads. For the calculation of the permitted overhung and axial loads, refer to chapter "Configuration" in the gear unit or gearmotor catalog.

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. For these gearmotors, use screws of strength class 10.9. Use suitable washers.

Gear unit	Flange Ø mm	Strength class of the screws
RF37/R37F SF37p	120	10.9
RF47/R47F	140	10.9
RF57/R57F	160	10.9
SF67p	200	10.9
FF/FAF77 KF/KAF77 SF77p	250	10.9

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Gear unit	Flange Ø mm	Strength class of the screws
FM/FAM67, FM/FAM77 KM/KAM67, KM/KAM77	300	10.9
FM/FAM87 KM/KAM87 SF87p	350	10.9
FM/FAM97 KM/KAM97	400	10.9
RF147 FM/FAM107 KM/KAM107	450	10.9
RF167 FM/FAM127 KM/KAM127	550	10.9
FM/FAM157 KM/KAM157	660	10.9
RZ37 – RZ87	60ZR – 130ZR	10.9

Corrosion protection for screw connections

Use plastic inserts (2 to 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 Ω. Electrochemical corrosion can occur between various metals, for example, cast iron and stainless steel. Also install the screws with plastic washers. Additionally ground the housing. Use grounding screws on the motor.

Information about the tightening torques

The tightening torques specified in the following chapters are based on the following friction coefficients:

Friction coefficient $\mu_{G,K}$ for the thread and bearing surface	Strength class of the screw
0.14	8.8 / 80[1)]
0.09	10.9, 12.9

1) Stainless steel screws.

If you use screws with a different friction coefficient, you must adapt the tightening torques accordingly.

Use only one of the following tools to tighten the screws:

- Torque wrench
- Torque-controlled torque wrench
- Impulse driver, switched off and controlled mechanically
- Torque wrench with light and sound signal
- Motorized torque wrench with dynamic torque measurement
- Torque-controlled, gradual hydraulic tools

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Tightening torques for retaining screws

Screw on the gearmotors with the following tightening torques and observe the information in chapter "Information about the tightening torques" (→ 🗎 38).

Screw/nut	Tightening torque ±15% Strength class 8.8 Nm
M6	12
M8	28
M10	56
M12	96
M16	235
M20	460
M24	795
M30	1590
M36	2760
M42	4410
M48	6650
M56	10600

Screw on the specified flange-mounted gearmotors with the following increased tightening torques and observe the information in chapter "Information about the tightening torques" (→ 🗎 38):

Flange Ø mm	Gear unit	Screw/nut	Tightening torque ±15% Strength class 10.9 Nm
120	RF37 SF37p	M6	12
140	RF37/RF47	M8	29
160	RF57	M8	29
200	SF67p	M10	57
250	SF77p	M12	98
300	FM/FAM67, FM/FAM77 KM/KAM67, KM/KAM77	M12	98
350	FM/FAM87 KM/KAM87 SF87p	M16	235
400	FM/FAM97 KM/KAM97	M16	235

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Flange Ø mm	Gear unit	Screw/nut	Tightening torque ±15% Strength class 10.9 Nm
450	FM/FAM107 KM/KAM107	M16	235
450	RF147	M16	235
550	FM/FAM127 KM/KAM127	M16	235
550	RF167	M16	235
660	FM/FAM157 KM/KAM157	M20	465
60ZR	RZ37	M8	29
70ZR	RZ47	M8	29
80ZR	RZ57	M10	57
95ZR	RZ67	M10	57
110ZR	RZ77	M10	57
130ZR	RZ87	M12	98
250	FF/FAF77 KF/KAF77	M12	98

Foot-mounted gear units

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	–	–

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Gear units 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[1)]
M8	37/47	27/37/47	37/47	47/57	37
M10	57/67	–	–	–	47
M12	77/87	57/67/77	57/67/77	67/77	–
M16	–	87/97	87/97	87/97	–
M20	–	107/127	107/127	–	–
M24	–	157	157	–	–

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

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Gear units 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:

Flange Ø mm	Screw	Gear unit type						
		RF/R..F/RM	RXF	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	–	29
140	M8	07/17/27/37/47	57	–	–	–	–	–
160	M8	07/17/27/37/47	57/67	27/37	–	19/37	37/47	30/37/47/29
160	M10	–	–	–	–	29/39	–	39/49
200	M10	37/47/57/67	57/67/77	47	–	29/47	57/67	39
200	M12	–	–	–	–	49	–	59
250	M12	57/67/77/87	67/77/87	57/67	–	57/67	77	–
300	M12	67/77/87	87/97	77	67/77	77	–	–
350	M16	77/87/97/107	97/107	87	87	87	87	–
400	M16	–	–	–	97	–	–	–
450	M16	97/107/127/137/ 147	107	97/107	107	97/107	97	–
550	M16	107/127/137/ 147/167	–	127	127	127	–	–
660	M20	147/167	–	157	157	157	–	–

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

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

Thread	Tightening torque Nm
M8 × 1	8
M10 × 1	12
M12 × 1.5	15
M16 × 1.5	40
M22 × 1.5	60
M33 × 2	100
M42 × 2	150

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4.3.3 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 adhesive strips after painting.

Drives are supplied in corrosion-resistant design with appropriate surface protection treatment for use in damp areas or outdoors.

- Repair damage to the paint work e.g. on the breather valve or the lifting eyes.
- When motors are mounted onto ADC.., AMS.., AM.., AQS.., AQ.. adapters or to AR.., AT.. start-up couplings and slip clutches, seal the flange areas with a suitable sealant (e.g. Loctite® 574).
- The drives must not be exposed to direct sunlight when installed outdoors. Install an appropriate protection device, 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.

4.3.4 Gear unit venting

NOTICE

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

Potential damage to property.

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

Gear units with installed breather valve

Depending on gear unit size and mounting position, the gear units are delivered with the activated breather valve installed according to the mounting position. If the breather valve has not been activated yet, remove the transport protection as described in chapter "Activating the breather valve" (→ 🗎 45). This activates the breather valve.

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Gear units with separately included breather valve

The following gear units are delivered with a screw plug on the provided breather hole:

- For gear units in the pivoted mounting position (stationary), see chapter "Gear units in pivoted mounting position (stationary)" (→ 🗎 177).
- For gear units in mounting position MX, see chapter "Mounting position MX" (→ 🗎 178).
- For gear units in the variable mounting position, see chapter "Variable mounting position" (→ 🗎 178).
- Gear head units vented on the input side.

Replace the screw plug with the provided breather valve before startup. The tightening torque can be found in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 42).

Gear units that do not require venting

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
W..19 – W..59	M1/M2/M3/M5/M6
W..29HG – W..59HG	M1 – M6

Gear units that can be operated without venting after verification by SEW-EURODRIVE

Individual testing is required for certain gear units. Contact SEW-EURODRIVE in case of the following gear units:

- Gear units in enclosed design
- Gear units in pivoted mounting position (dynamic), see chapter "Gear units in pivoted mounting position (dynamic)" (→ 🗎 177)

Gear units with gear unit venting on fixed piping

Gear units with gear unit venting on fixed piping (with expansion tank and ventilation filter) are delivered with a breather valve. Replace the breather valve with the supplied venting kit before starting up the gearmotor. Observe the installation notes provided with the respective venting system.

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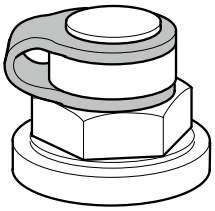
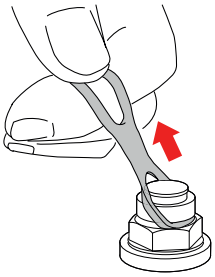
Activating the breather valve

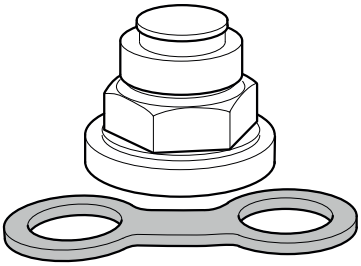
1. Before startup, check whether the transport protection on the breather valve has been removed and the valve is therefore activated. The following figure shows a breather valve with transport protection:



2. Remove the transport protection.



⇨ The following figure shows an activated breather valve.



4.3.5 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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4.4 Gear units with solid shaft

4.4.1 Assembling input and output elements

NOTICE

Damage to bearing, housing or shafts due to incorrect mounting.

Possible damage to property.

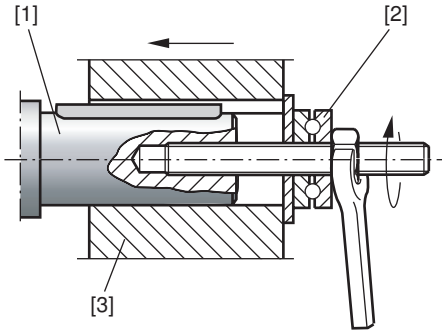
- Only mount the input and output elements with a mounting device (see chapter "Using a mounting device" (→ 🗎 46)). Use the threaded centering bore at the shaft end.
- Never force belt pulleys, couplings, pinions, etc. onto the shaft end by hitting them with a hammer.
- When installing the belt pulleys, 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 permitted values, refer to the "Gearmotors" or "Explosion-Protected Drives" catalog.

INFORMATION

Mounting is easier if you first apply lubricant to the output element or heat it briefly to 80 °C up to a **maximum** of 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.



211368587

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

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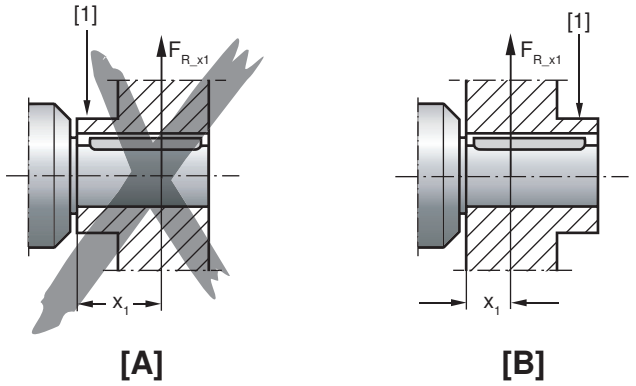
Avoiding high radial loads

To avoid high radial loads, mount gear wheels and sprockets according to figure **B**.



9007199466105227

[1]	Hub	F_{R_X1}	Radial load at position x_1
[A]	Incorrect assembly	[B]	Correct assembly

4.4.2 Mounting of couplings

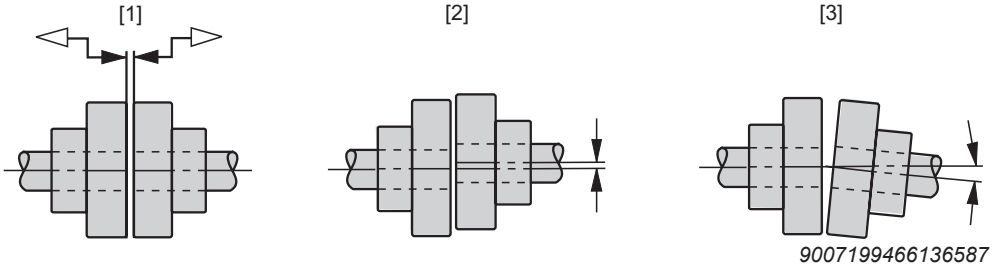
⚠ CAUTION

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

Risk of jamming and crushing.

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

When installing couplings, perform the following alignment according to the specifications of the coupling manufacturer:



9007199466136587

1 Axial misalignment
2 Radial misalignment
3 Angular misalignment

4.5 Torque arms for shaft-mounted gear units

4.5.1 Mounting the torque arm for helical-bevel gear units and helical-worm gear units

NOTICE

Damage to gear unit due to improper installation of the torque arm.

Damage to the gear unit.

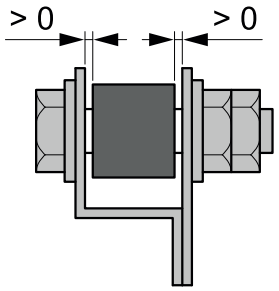
- Do not deform the torque arm during installation.

The following figure shows a secured bushing with a support on both sides.

The reamer bolt or screw must be held in a fork-like design without tensions. On the one hand, the bolt should have little radial clearance to the bushing to keep the impact load low during changeover, but large enough to prevent a distortion of the drive during standstill.

Avoid axial tension on the bushing, especially as this may cause tension on the drive.

Even self-designed torque arms should be fastened this way without tension.



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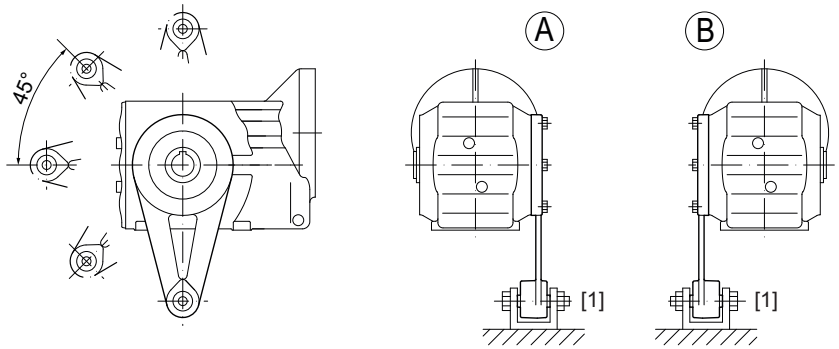
4.5.2 Mounting torque arms for helical-bevel gear units K..19 – K..49

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



[1] Socket contact
A Connection side
B Connection side

Observe the following points during assembly:

- Refer to the following table for the screw sizes and tightening torques:
- For notes on tightening the screws, observe chapter "Information about the tightening torques" (→ 🗎 38).
- Fasten the bushing [1] on both sides and without tension as described in chapter "Mounting the torque arm for helical-bevel gear units and helical-worm gear units" (→ 🗎 48).

Gear unit	Screws	Tightening torque in Nm ± 15% Strength class	
		8.8	80
K..19 /T	4 × M8 × 20	28	28
K..29 /T	4 × M8 × 20	28	28
K..39 /T	4 × M10 × 30	56	56
K..49 /T	4 × M12 × 35	96	96

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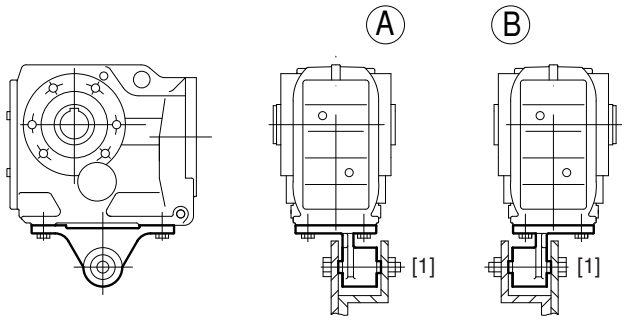
4.5.3 Mounting torque arms for helical-bevel gear units K..37 – K..157

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



36028797230326027

[1] Socket contact
A Connection side
B Connection side

Observe the following points during assembly:

- Refer to the following table for the screw sizes and tightening torques:
- For notes on tightening the screws, observe chapter "Information about the tightening torques" (→ 🗎 38).
- Fasten the bushing [1] on both sides and without tension as described in chapter "Mounting the torque arm for helical-bevel gear units and helical-worm gear units" (→ 🗎 48).

Gear unit	Screws	Tightening torque in Nm ± 15% Strength class	
		8.8	80
K..37 /T	4 × M10 × 25	56	56
K..47 /T	4 × M10 × 30	56	56
K..57 /T	4 × M12 × 35	96	96
K..67 /T	4 × M12 × 35	96	96
K..77 /T	4 × M16 × 40	235	235
K..87 /T	4 × M16 × 40	235	235
K..97 /T	4 × M20 × 50	460	460
K..107 /T	4 × M24 × 60	795	795
K..127 /T	4 × M36 × 130	2760	2760
K..157 /T	4 × M36 × 130	2760	2760

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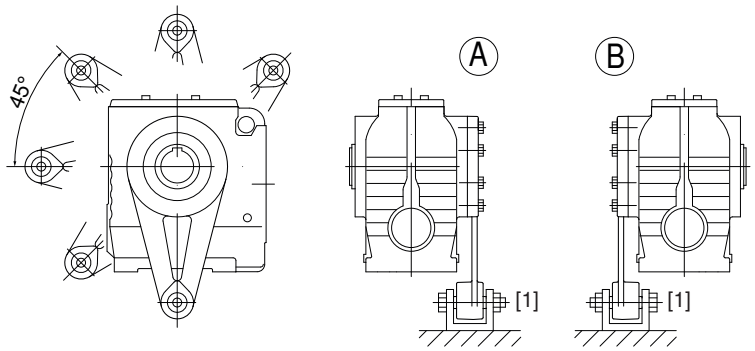
4.5.4 Mounting torque arms for helical-worm gear units

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



36028797230455691

[1] Socket contact
A Connection side
B Connection side

Observe the following points during assembly:

- Refer to the following table for the screw sizes and tightening torques:
- For notes on tightening the screws, observe chapter "Information about the tightening torques" (→ 🗎 38).
- Fasten the bushing [1] on both sides and without tension as described in chapter "Mounting the torque arm for helical-bevel gear units and helical-worm gear units" (→ 🗎 48).

Gear unit	Screws	Tightening torque in Nm ± 15% Strength class	
		8.8	80
S..37 /T	4 × M6 × 16	12	12
S..47 /T	4 × M8 × 25	28	28
S..57 /T	6 × M8 × 25	28	28
S..67 /T	4 × M12 × 35	96	96
S..77 /T	8 × M12 × 35	96	96
S..87 /T	8 × M16 × 45	235	235
S..97 /T	8 × M16 × 50	235	235

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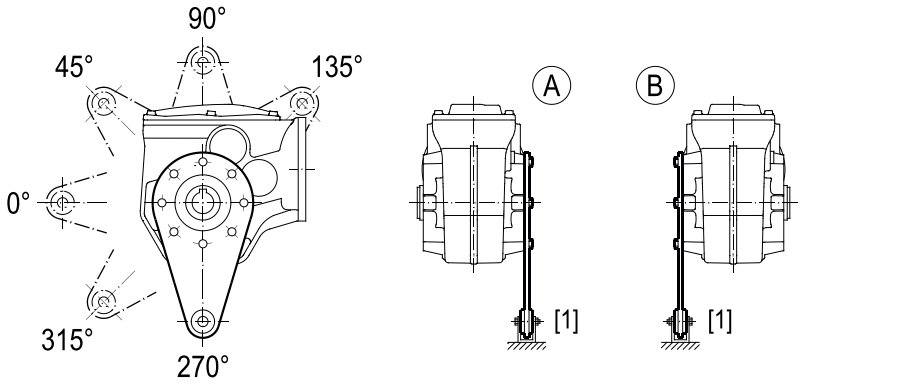
4.5.5 Mounting torque arms for SPIROPLAN® W.. right-angle gear units

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



45035996485194507

[1] Socket contact
A Connection side
B Connection side

The gear units in the following table have exceptions for the position of the torque arm:

Gear unit	Impossible position
W..29, W..39	90 °
W..10 – W..30 W..37, W..47 W..19 – W..49	135 °

Observe the following points during assembly:

- Refer to the following table for the screw sizes and tightening torques:
- For notes on tightening the screws, observe chapter "Information about the tightening torques" (→ 🗎 38).
- Fasten the bushing [1] on both sides and without tension as described in chapter "Mounting the torque arm for helical-bevel gear units and helical-worm gear units" (→ 🗎 48).

Gear unit	Screws	Tightening torque in Nm ± 15% Strength class	
		8.8	80
W..10 /T	4 × M6 × 16	12	12
W..19 /T	4 × M6 × 16	12	12
W..20 /T	4 × M6 × 16	12	12
W..29 /T	4 × M8 × 20	28	28
W..30 /T	4 × M6 × 16	12	12
W..30 /T CMP..	4 × M8 × 20	28	28
W..37 /T	4 × M8 × 20	28	28
W..39 /T	4 × M8 × 20	28	28
W..47 /T	4 × M10 × 25	56	56

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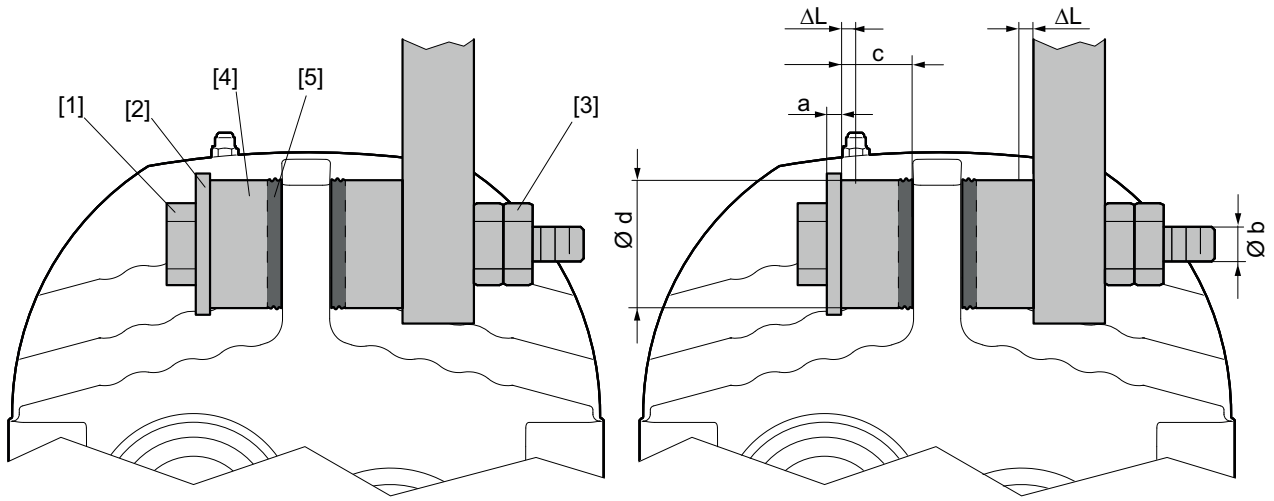
Gear unit	Screws	Tightening torque in Nm ± 15% Strength class	
		8.8	80
W..49 /T	4 × M10 × 30	56	56
W..59 /T	4 × M12 × 30	96	96

4.5.6 Mounting torque arms for parallel-shaft helical gear units

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



[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 in accordance with the following table:

Gear unit	Washer	Rubber buffer			
	a mm	d mm	b mm	c mm	Δ L mm
F..27 /G	5	40	12.5	20	1

Gear unit	Washer	Rubber buffer			
	a	d	b	c	Δ L
	mm	mm	mm	mm	mm
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

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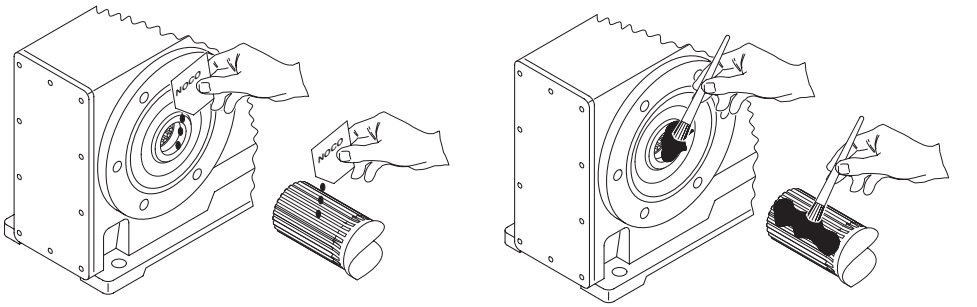
4.6 Mounting shaft-mounted gear units with splined hollow shaft

INFORMATION

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

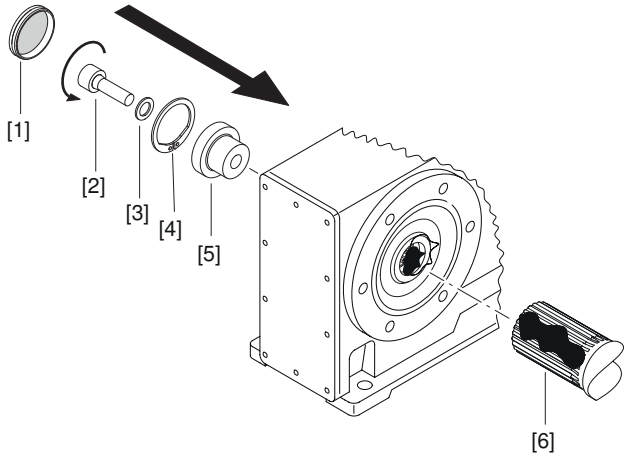
Proceed as follows:

1. Apply NOCO-Paste. Spread carefully.



9007219940210059

2. Install the shaft and secure it axially. Use a mounting device for easier mounting.



20685473931

[1] Closing plug
[2] Cap screw
[3] Supporting ring
[4] Retaining ring
[5] Washer

4.7 Shaft-mounted gear units with keyway

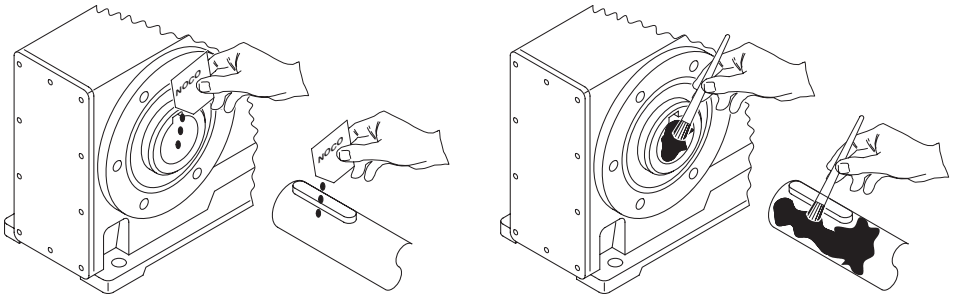
INFORMATION

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

4.7.1 Mounting shaft-mounted gear units with keyway

Proceed as follows:

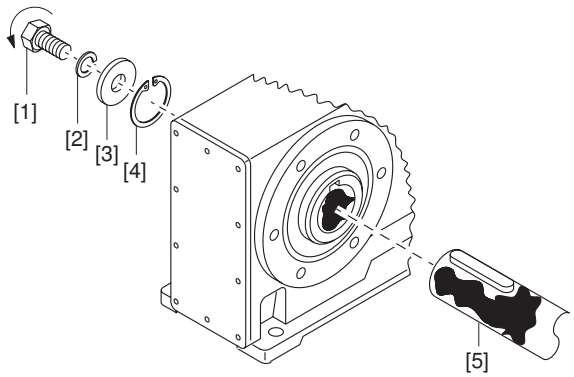
1. Apply NOCO-Paste. Spread carefully.



18014398720998155

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

A) Mounting customer shaft (standard scope of delivery, except with shaft position AB):



18014398721000331

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

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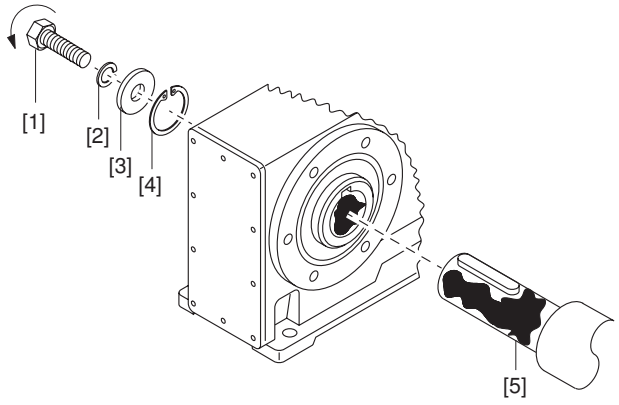
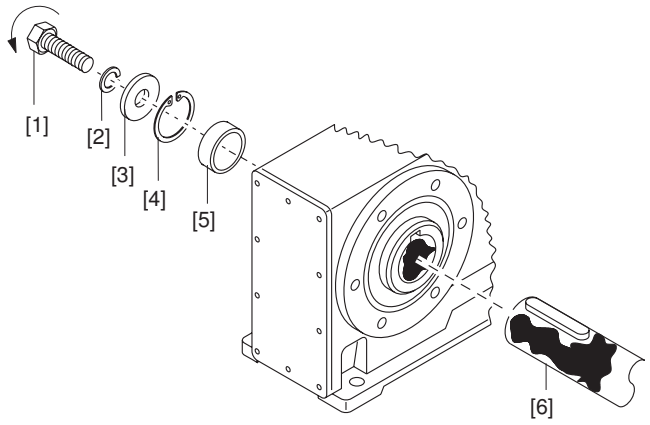
B) Mounting customer shaft with contact shoulder using the SEW-EURODRIVE assembly/disassembly kit:



18014398721002507

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

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



18014398721004683

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

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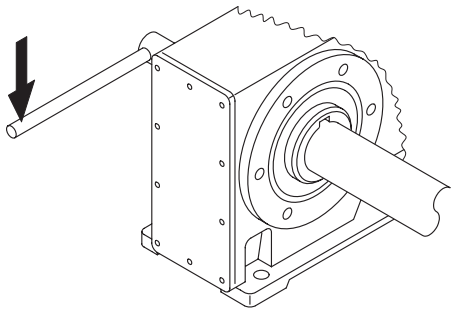
3. Tighten the retaining screw using the appropriate torque. Observe the tightening torques specified in the following table.



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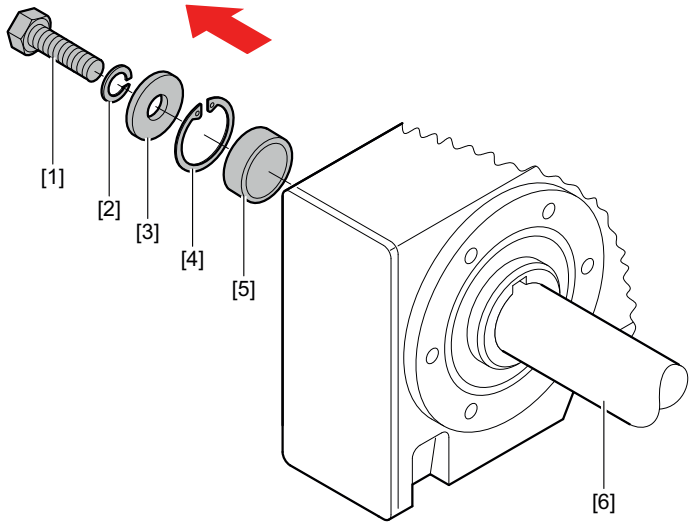
Screw	Tightening torque Nm
M5	5
M6	8
M10/12	20
M16	40
M20	80
M24	200

4.7.2 Removing the shaft-mounted gear unit

This description only applies if the gear unit was mounted with the SEW-EURODRIVE assembly/disassembly kit (see "Assembly/disassembly kit from SEW-EURODRIVE" (→ 🗎 60)).



51614898955

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

Proceed as follows:

1. Loosen the retaining screw [1].

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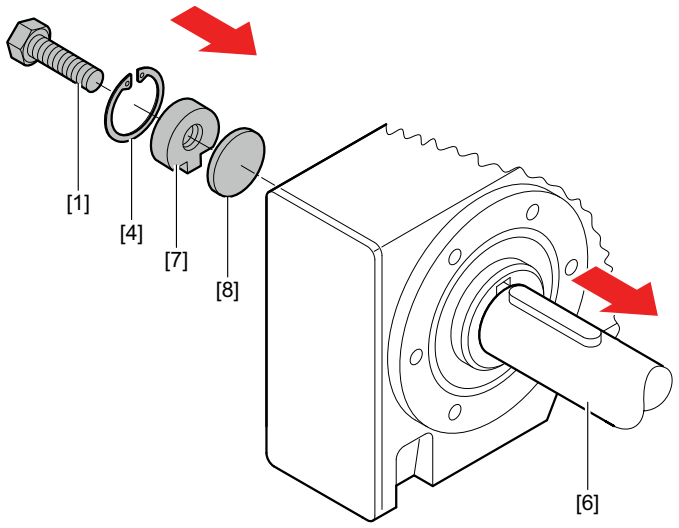
2. Remove parts [2] to [4] and, if present, the spacer tube [5].
3. Insert the forcing washer [8] and the fixed nut [7] from the assembly/disassembly kit between the customer shaft [6] and the retaining ring [4] (see "Assembly/disassembly kit from SEW-EURODRIVE" (→ 🖹 60)).
4. Re-insert the retaining ring [4].
5. Re-insert the retaining screw [1]. Force the gear unit off the shaft by tightening the screw.



51614896523

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

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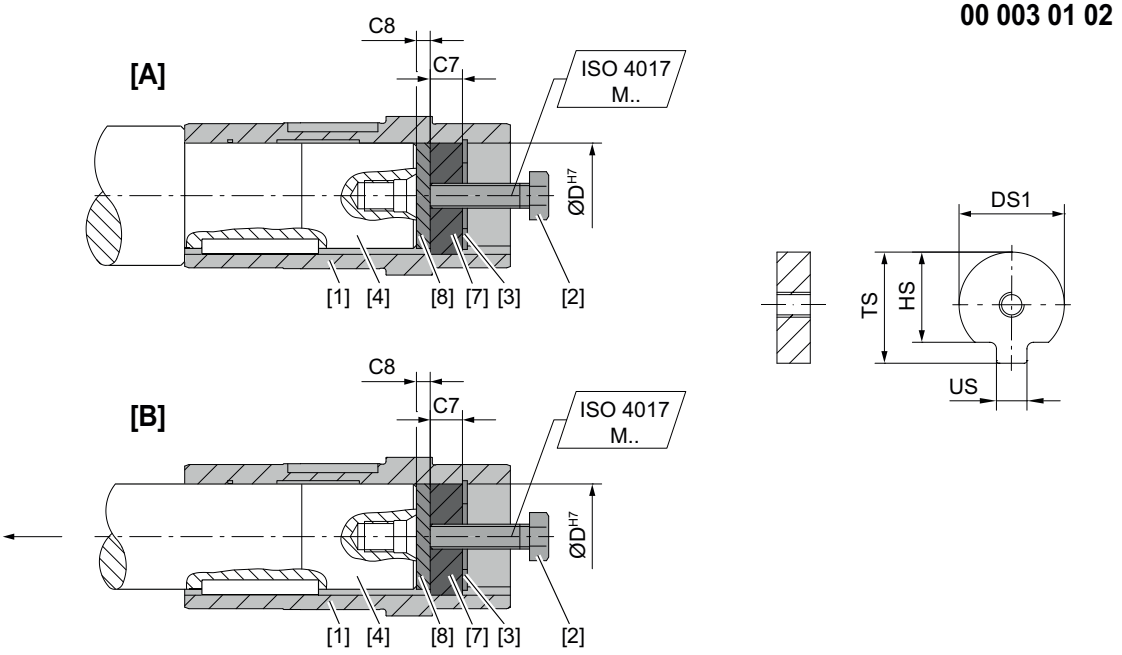
4.7.3 Assembly/disassembly kit from SEW-EURODRIVE

Only applies to prior assembly with the assembly/disassembly kit.

1. Loosen the retaining screw [2].
2. Remove the retaining ring [3] and, if present, the spacer tube.
3. Insert the forcing washer [8] and the fixed nut [7] between the customer shaft [4] and the retaining ring [3] as shown in the following figure.
4. Re-insert the retaining ring [3].
5. Re-insert the retaining screw [2]. You can now push the gear unit off the shaft.

00 003 01 02



54684456715

C7 Width of fixed nut
C8 Width of forcing washer
D Hollow shaft diameter
DS1 Diameter of fixed nut
HS Height 1 fixed nut
TS Height 2 fixed nut
US Base width of fixed nut
[1] Hollow shaft
[2] Retaining screw
[3] Retaining ring
[4] Customer shaft
[7] Fixed nut for disassembly
[8] Forcing washer

Dimensions and part numbers of the assembly/disassembly kit:

Gear unit	D^{H7} mm	C8 mm	C7 mm	HS mm	US mm	TS mm	DS1 mm	ISO 4017 M..	Part number of assembly/disassembly kit
WA..10	16	5	5	12	4.5	18	15.7	M5 × 50	06437125
WA..19, WA..20	18	5	6	13.5	5.5	20.5	17.7	M6 × 25	0643682X

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Gear unit	D^{H7} mm	C8 mm	C7 mm	HS mm	US mm	TS mm	DS1 mm	ISO 4017 M..	Part number of assembly/disassembly kit
KA..19, SA..37, WA..19, WA..20, WA..29, WA..30	20	5	6	15.5	5.5	22.5	19.7	M6 × 25	06436838
FA..27, KA..29, SA..47,WA..29, WA..39	25	5	10	20	7.5	28	24.7	M10 × 35	06436846
FA..37, KA..29, KA..37, KA..39, SA..47, SA..57, WA..29, WA..39, WA..49	30	5	10	25	7.5	33	29.7	M10 × 35	06436854
FA..47, KA..39, KA..47, KA..49, SA..57, WA..49, WA..59	35	5	12	29	9.5	38	34.7	M12 × 45	06436862
FA..57, KA..57, FA..67, KA..49, KA..67, SA..67, WA..59	40	5	12	34	11.5	41.9	39.7	M16 × 50	06436870
SA..67	45	5	12	38.5	13.5	48.5	44.7	M16 × 50	06436889
FA..77, KA..77, SA..77	50	5	12	43.5	13.5	53.5	49.7	M16 × 50	06436897
FA..87, KA..87, SA..77, SA..87	60	5	16	56	17.5	64	59.7	M20 × 60	06436900
FA..97, KA..97, SA..87, SA..97	70	5	16	65.5	19.5	74.5	69.7	M20 × 60	06436919
FA..107, KA..107, SA..97	90	5	20	80	24.5	95	89.7	M24 × 70	06436927
FA..127, KA..127	100	5	20	89	27.5	106	99.7	M24 × 70	06436935
FA..157, KA..157	120	5	20	107	31	127	119.7	M24 × 70	06436943

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4.8 Shaft-mounted gear units with shrink disk

4.8.1 Mounting shaft mounted gear units with shrink disk

NOTICE

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

Gear unit damage.

- Never tighten the locking screws without the shaft installed.

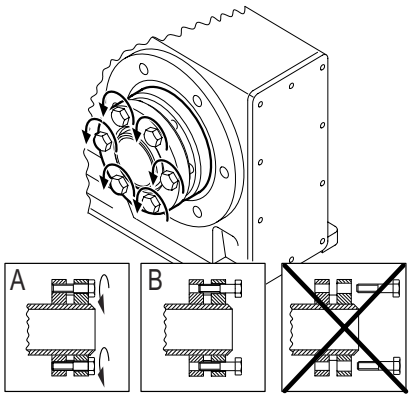
INFORMATION

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.

1. Slightly loosen the locking screws. Do not screw them completely out.



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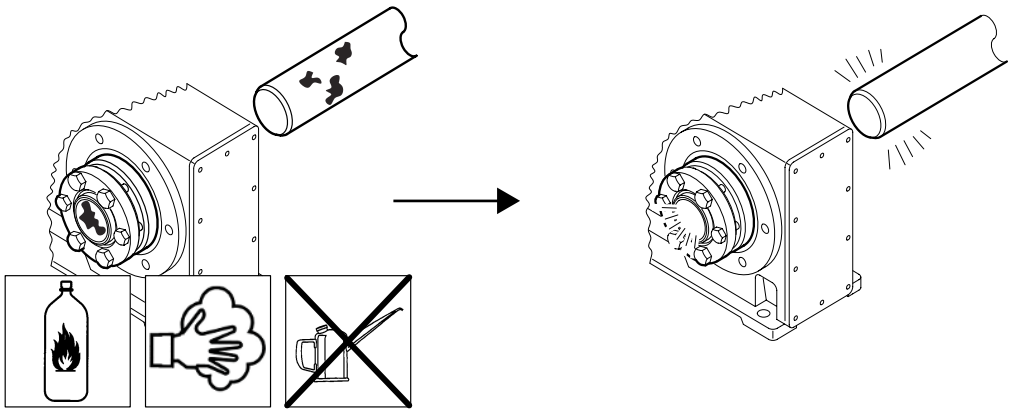
2. Carefully **degrease** the hollow shaft bore and the input shaft with commercially available solvent.



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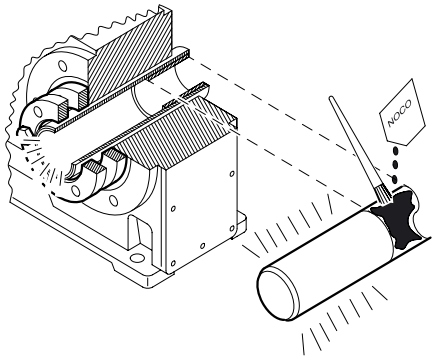
3. ⚠ **CAUTION!** Never apply NOCO-Paste directly onto the bushing, since the compound can get into the clamping area of the shrink disk when the machine shaft is fitted.
   Apply NOCO-Paste to the machine shaft in the vicinity of the bushing. The clamping area of the shrink disk must remain free of grease!



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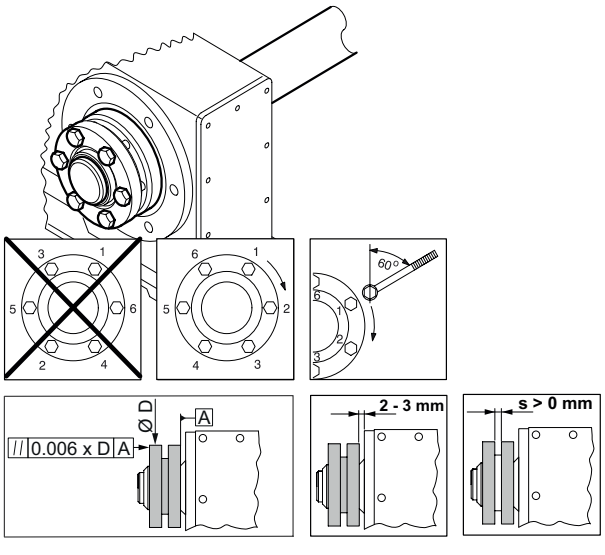
4. ⚠ **CAUTION!** Risk of injury due to falling shrink disk. Secure the shrink disk immediately after fitting the shaft.

5. Install the input shaft. Make sure that the outer rings of the shrink disk are plane-parallel.
6. For a gear unit with a shaft shoulder, fit the shrink disk to the shaft shoulder as far as it will go, whereby the minimum distance between the outer ring of the shrink disk facing the gear unit and the gear unit housing must be no less than 2 mm.
7. For a gear unit without shaft shoulder, mount the shrink disk at a distance of 2 to 3 mm from the gear unit housing.
8. Tighten the locking screws by working round several times from one screw to the next (not in diametrically opposite sequence). The tightening torques can be found in the following table.



9007199466283275

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

10. To prevent corrosion, grease the outer surface of the hollow shaft around the shrink disk.
11. ⚠ **CAUTION!** Install the provided rotating safety cover or another, suitable protective cover at the shrink disk to prevent injuries. Never start up the drive if the protective covers are not installed.

Gear unit type				Locking screw ISO 4014/ISO 4017/ ISO 4762	Tightening torque ±4% Nm
KH..	FH..	SH...	WH..		
19/29	27	37	37/29/39	M5	5
37/39/47/49/57/67/77	37/47/57/67/77	47/57/67/77	47/49/59	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

4.8.2 Removing shaft-mounted gear units with shrink disk

INFORMATION

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

1. ⚠ **CAUTION!** Risk of injury due to falling shrink disk. Secure the shrink disk before disassembly.
2. To prevent the outer rings from jamming, loosen the locking screws a quarter turn, one after the other.
3. Steadily loosen the locking screws one after the other, but do not remove the locking screws completely.
4. If rust has formed on the shaft in front of the hub, remove the rust.
5. Remove the shaft or pull the hub off the shaft.
6. Remove the shrink disk from the hub.

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4.8.3 Cleaning and lubricating the shrink disk

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)	Trade form
Molykote® 321 (lube coat)	Spray
Molykote® spray (powder spray)	Spray
Molykote® G Rapid	Spray or paste
Aemasol® MO 19P	Spray or paste
Aemasol® DIO-setral-57 N (lube coat)	Spray

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

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4.9 Shaft-mounted gear units with TorqLOC®

NOTICE

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

Damage to property.

- Only if it is ensured that no static overdetermination can occur may a flange or foot mounting be used for TorqLOC® installation. It must be possible to adjust the tolerance of the shaft.

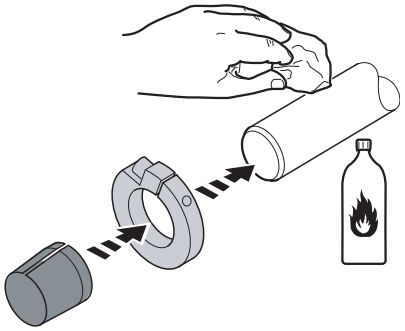
INFORMATION

In the case of flange mounting, it may no longer be possible to install the clamping ring depending on the size.

4.9.1 Mounting a customer shaft without contact shoulder

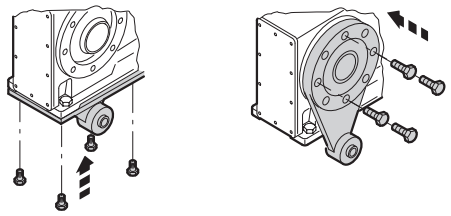
Proceed as follows:

1. Clean the customer shaft and the inside of the hollow shaft. Make sure that all grease and oil residues are removed.
2. Mount the stop ring and the bushing on the customer shaft.



211941003

3. Attach the torque arm to the drive unit. Observe the information in chapter "Torque arms for shaft-mounted gear units" (→ 🗎 48).



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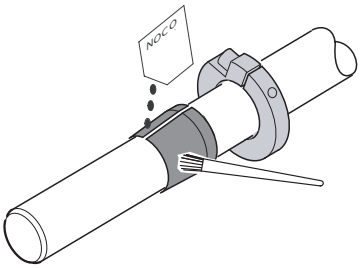
4. Apply NOCO-Paste to the bushing. Spread carefully.



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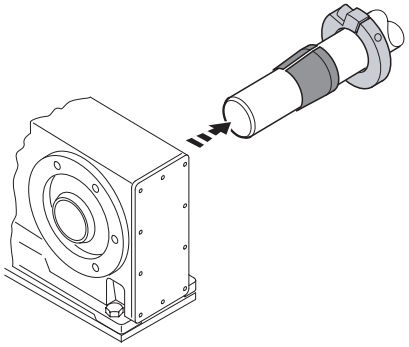
5. Slide the gear unit onto the customer shaft.



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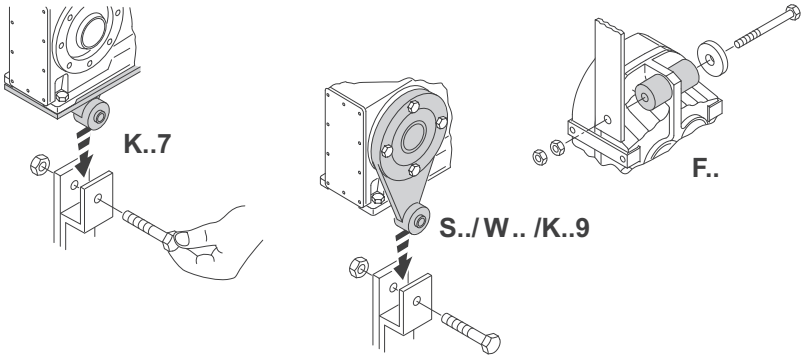
6. Premount the torque arm. Do not tighten the screws.



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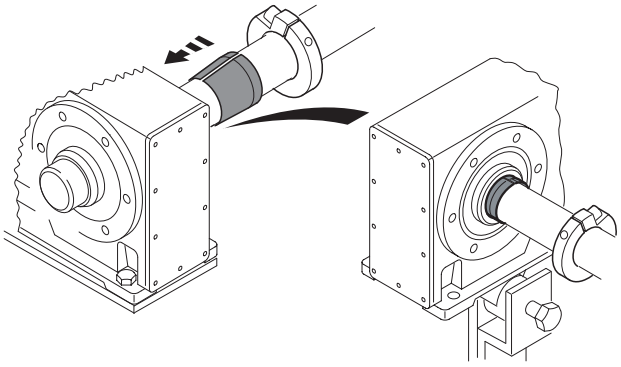
7. Slide the bushing into the gear unit as far as its stop.



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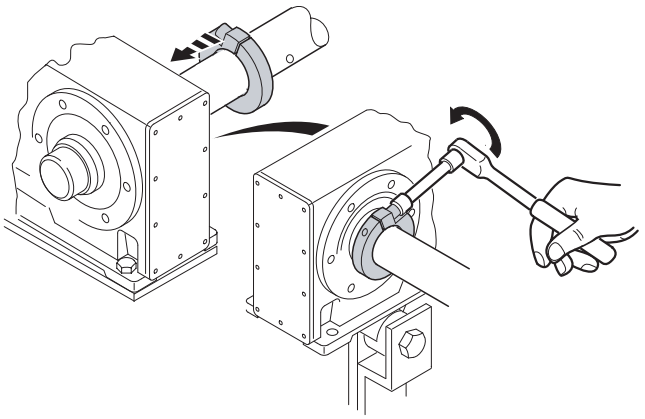
8. Secure the bushing with the stop ring Attach the stop ring to the bushing with the respective tightening torque. Refer to the following table for the suitable tightening torque.



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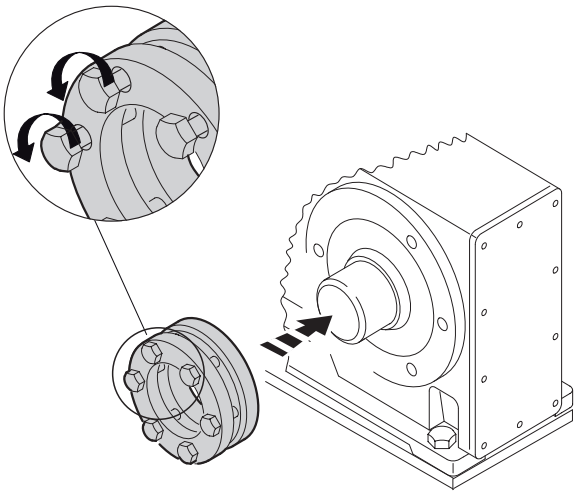
Gear unit type				Tightening torque Nm	
FT..	KT..	ST..	WT..	Standard	Stainless steel
–	19	37	37/29	10	10
37	29/37	47	47/39	10	10
47	39/47	57	49	10	10
57/67	49/57/67	67	59	25	25
77	77	77	–	25	25
87	87	87	–	25	25
97	97	97	–	25	25
107	107	–	–	38	38
127	127	–	–	65	65
157	157	–	–	150	150

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



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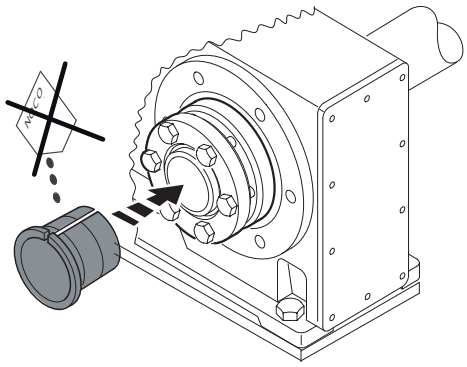
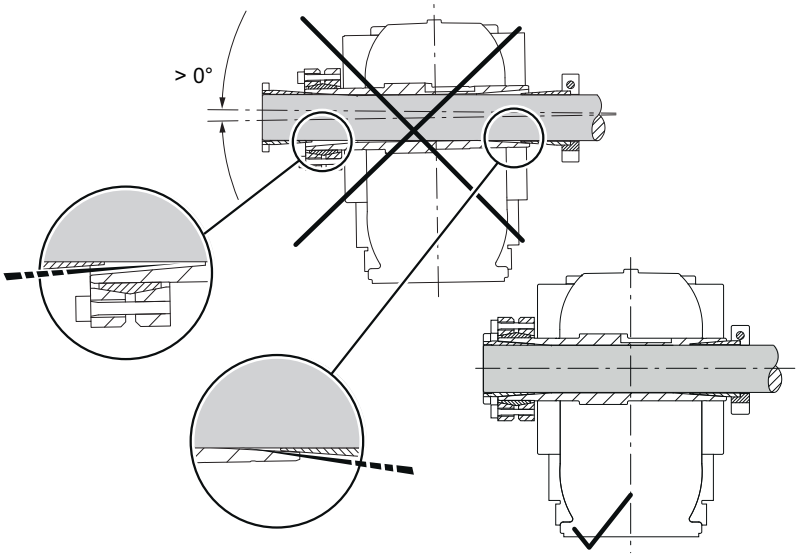
10. Slide the counter bushing onto the customer shaft and into the hollow shaft. Make sure that the gear unit is mounted flush with the customer shaft.



18014398721487243



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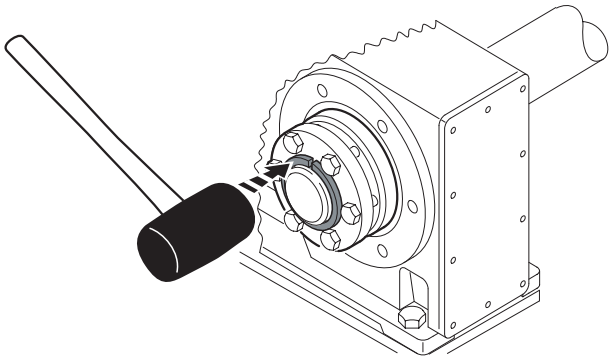
11. If you have a gear unit **with a shaft shoulder**, then fit the shrink disk to the shaft shoulder as far as it will go, whereby the minimum distance between the outer ring of the shrink disk facing the gear unit and the gear unit housing must be no less than 2 mm. In the case of a gear unit **without a shaft shoulder**, mount the shrink disk at a distance of 2 – 3 mm from the gear unit housing.
12. Lightly hammer on the flange of the counter bushing to ensure that the bushing is firmly seated in the hollow shaft.



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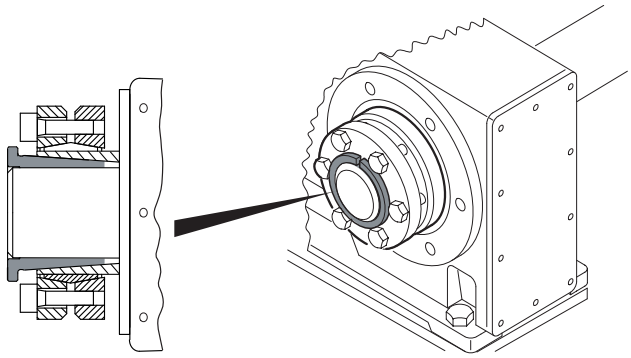
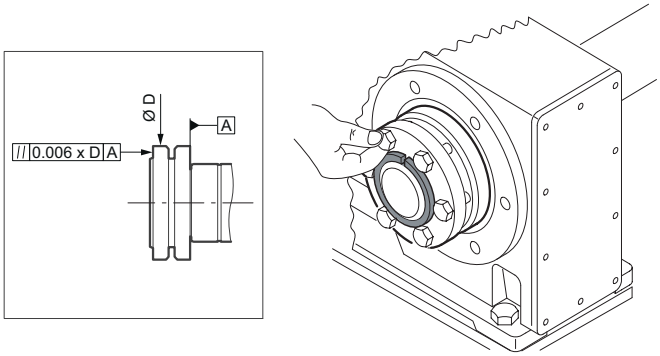
13. Make sure that the customer shaft is seated in the counter bushing.



9007199466750603

14. Tighten the screws of the shrink disk only hand-tight. Make sure that the outer rings of the shrink disk are plane-parallel.



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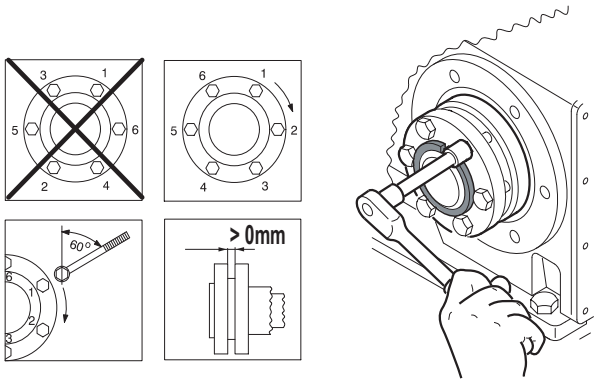
15. Tighten the locking screws with the specified tightening torque in accordance with the following table. Tighten the screws by working round several times from one screw to the next (not in diametrically opposite sequence).



18014398721495947

INFORMATION

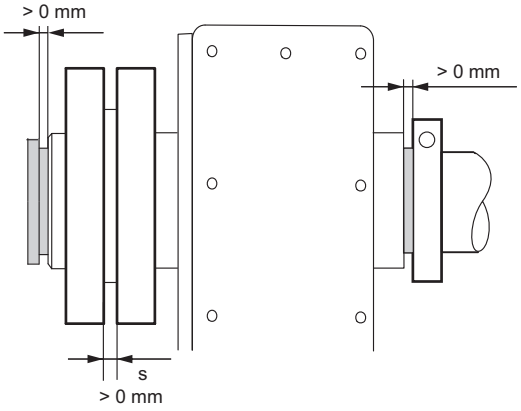
The exact values for the tightening torques are shown on the shrink disk.

INFORMATION

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

Gear unit type				Locking screw	Tightening torque ±4%
FT..	KT..	ST..	WT..	ISO 4762	Nm
–	19	37	37/29	M5	4
–	29		39	M5	5
37	37	47	47	M6	12
47/57/67	39/47/49/57/67	57/67	49/59	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.
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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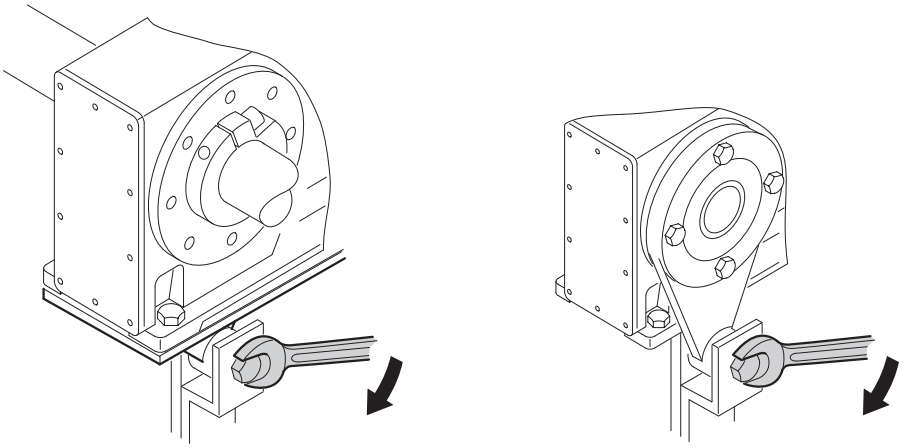
18. Tighten the torque arm sufficiently. Observe the information in chapter "Torque arms for shaft-mounted gear units" (→ 🖹 48).



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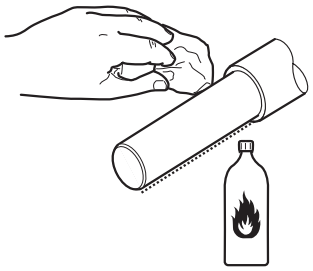
4.9.2 Mounting a customer shaft with contact shoulder

1. Clean the customer shaft and the inside of the hollow shaft. Make sure that all grease and oil residues are removed.



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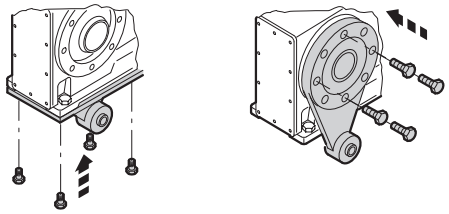
2. Attach the torque arm to the drive unit. Observe the information in chapter "Torque arms for shaft-mounted gear units" (→ 🗎 48).



K..7 **S../W../K..9**

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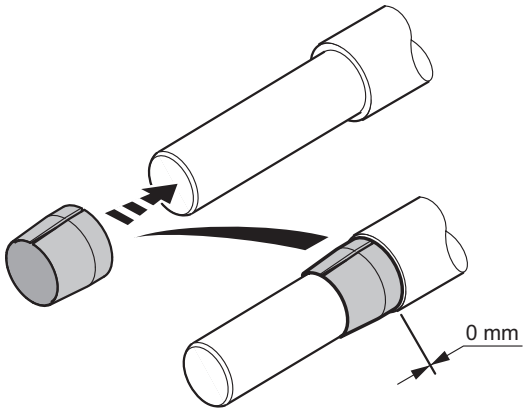
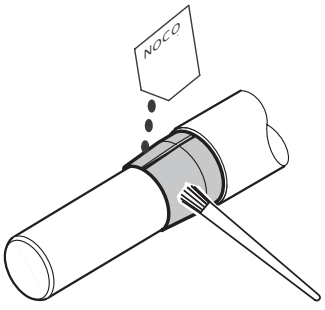
3. Mount the bushing on the customer shaft.



2349377035

4. Apply NOCO-Paste to the bushing. Spread carefully.



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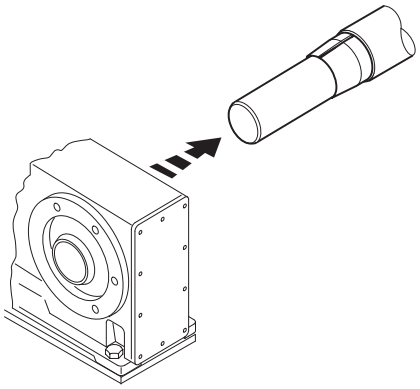
5. Slide the gear unit onto the customer shaft.



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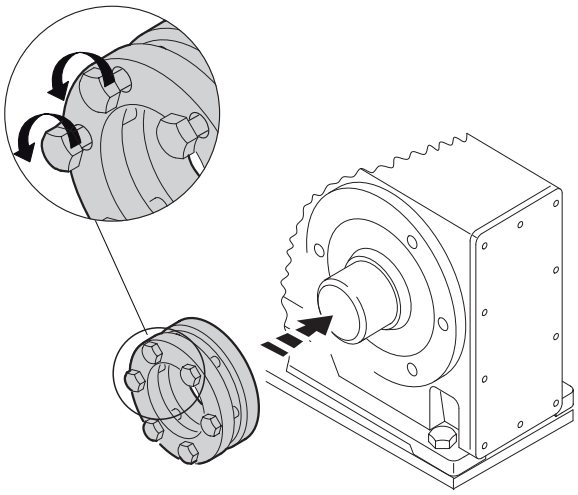
6. Ensure that all screws are loosened. Slide the shrink disk onto the hollow shaft.



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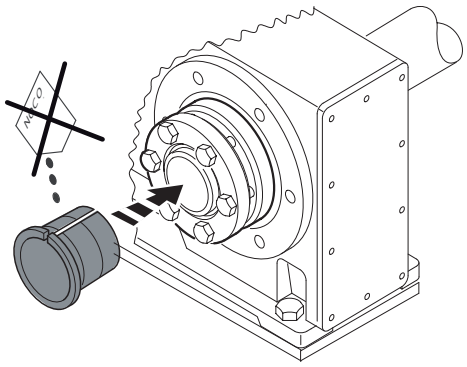
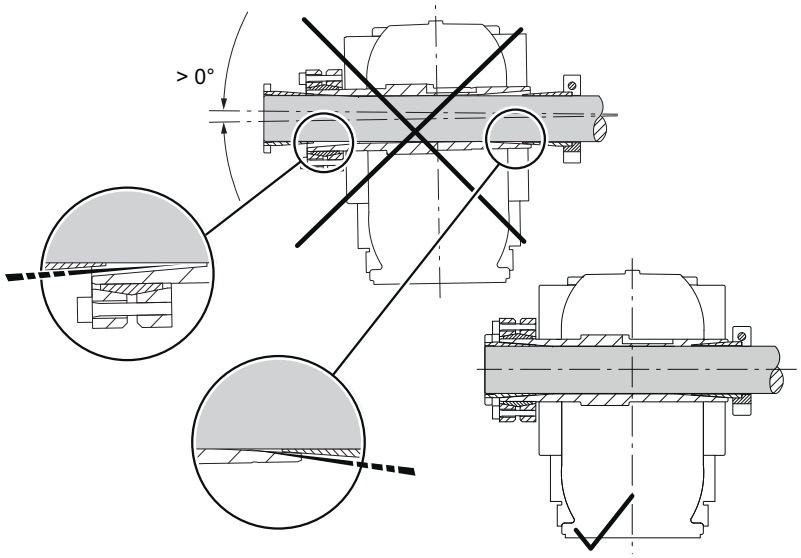
7. Slide the counter bushing onto the customer shaft and into the hollow shaft. Make sure that the gear unit is mounted flush with the customer shaft.



18014398721487243



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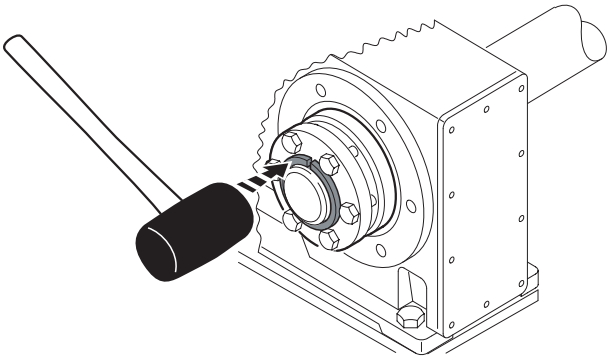
8. In the case of a gear unit **with a shaft shoulder**, fit the shrink disk to the shaft shoulder as far as it will go. If the case of a gear unit **without a shaft shoulder**, then fit the shrink disk at a distance of 2 – 3 mm from the gear unit housing, whereby the minimum distance between the outer ring of the shrink disk facing the gear unit and the gear unit housing must be no less than 2 mm.
9. Lightly hammer on the flange of the counter bushing to ensure that the bushing is firmly seated in the hollow shaft.



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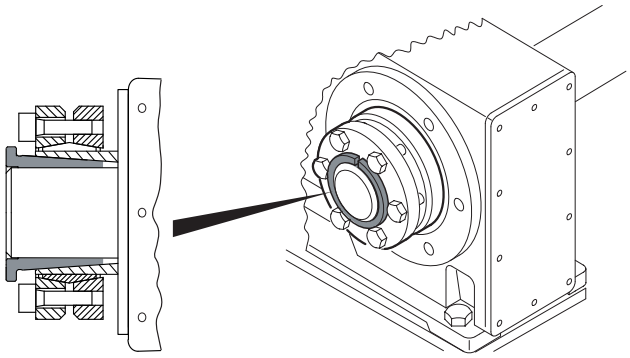
10. Make sure that the customer shaft is seated in the counter bushing.



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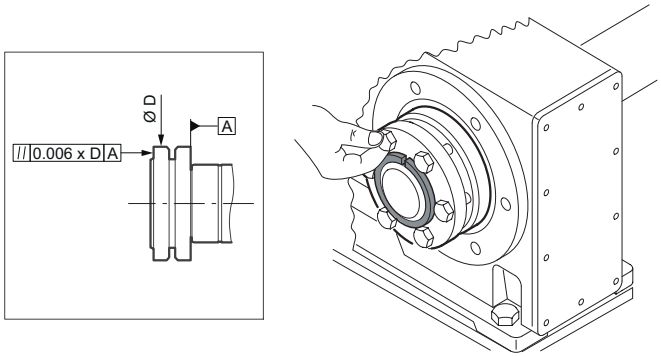
11. Tighten the screws of the shrink disk only hand-tight. Make sure that the outer rings of the shrink disk are plane-parallel.



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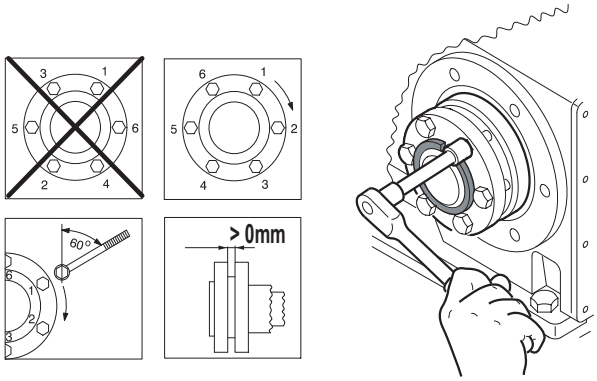
12. Tighten the locking screws with the specified tightening torque in accordance with the following table. Tighten the screws by working round several times from one screw to the next (not in diametrically opposite sequence).



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INFORMATION

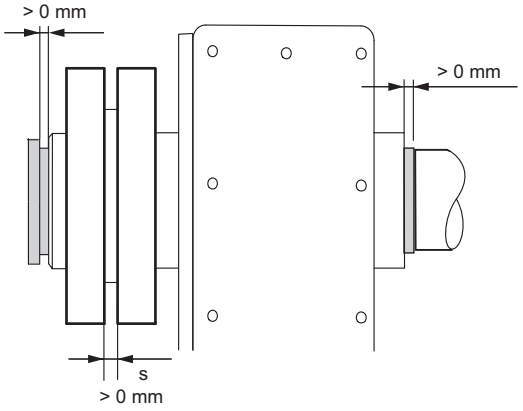
The exact values for the tightening torques are shown on the shrink disk.

INFORMATION

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

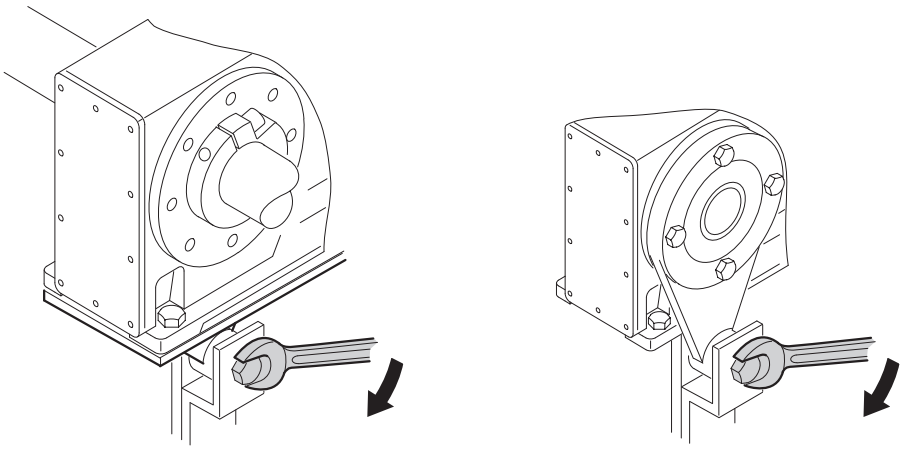
Gear unit type				Locking screw	Tightening torque ±4%
FT..	KT..	ST..	WT..	ISO 4762	Nm
–	19	37	37/29	M5	4
–	29		39	M5	5
37	37	47	47	M6	12
47/57/67	39/47/49/57/67	57/67	49/59	M6	12
77/87/97	77/87/97	77/87/97	–	M8	30
107	107	–	–	M10	59
127/157	127/157	–	–	M12	100

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.



22017650059

15. Mount the torque arm and tighten it firmly. Observe the information in chapter "Torque arms for shaft-mounted gear units" (→ 🗎 48).



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4.9.3 Removing the shaft-mounted gear unit

⚠ CAUTION

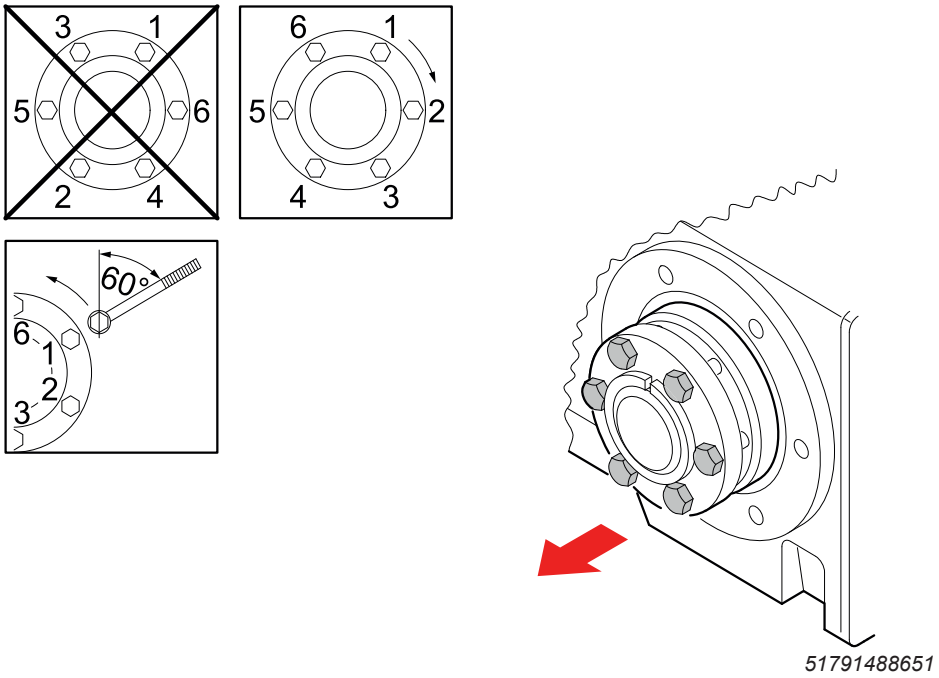
Risk of burns due to hot surfaces.

Severe injury.

- Let the devices cool down sufficiently before working on them.

Proceed as follows:

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



2. Loosen the locking screws evenly and in sequence. Do not unscrew the locking screws completely.
3. Remove the conical steel bushing. If necessary, use the outer rings as pullers: Proceed as follows:

- Remove all locking screws.
- Screw the corresponding number of screws into the tapped holes of the shrink disk.
- Support the inner ring against the gear unit housing.
- Remove the conical steel bushing by tightening the screws.

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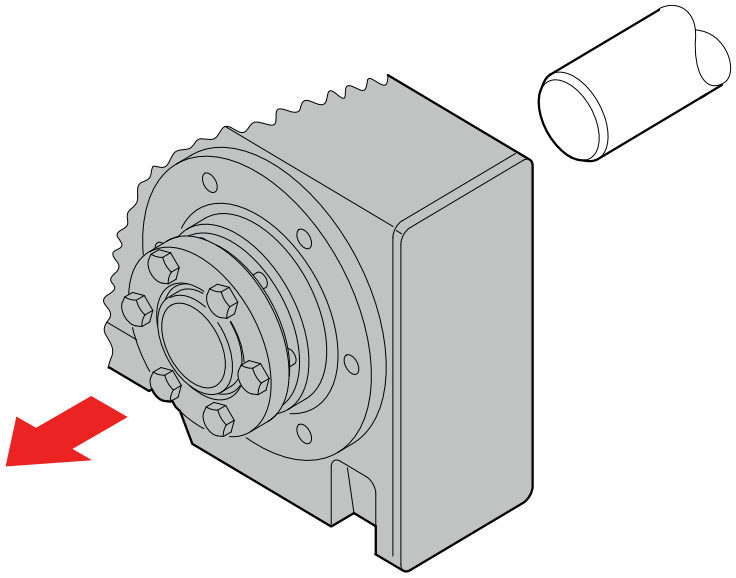
4. Remove the gear unit from the shaft.



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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 re-installed.

4.9.4 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)	Trade form
Molykote® 321 (lube coat)	Spray
Molykote® spray (powder spray)	Spray
Molykote® G Rapid	Spray or paste
Aemasol® MO 19P	Spray or paste
Aemasol® DIO-setral-57 N (lube coat)	Spray

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

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4.10 Mounting the cover

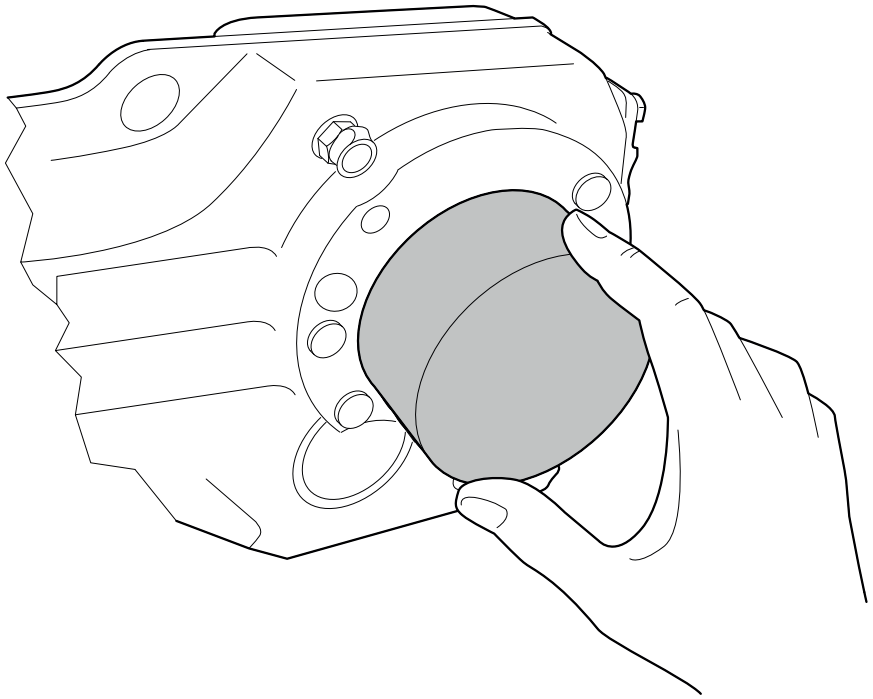
⚠ CAUTION

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.

4.10.1 Installing the rotating safety cover



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1. Insert the rotating safety cover onto the shrink disk until it engages.

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4.10.2 Mounting the fixed cover

Threaded bushings

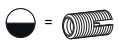
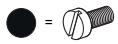
If required, use the supplied threaded bushings only for the following combinations of safety cover and gear unit:

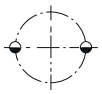
	Flat safety cover	High safety cover	
Gear unit	**KA 49**	**WA/WH/WT 59**	**KA/KH/KT 87**
Threaded bushing	M12 – M8	M12 – M8	M10 – M6
Screw	M8 × 12	M8 × 12	M6 × 16

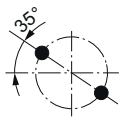
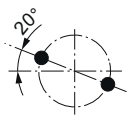
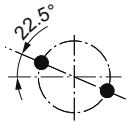
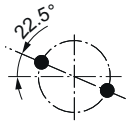
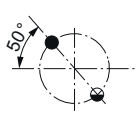
	Flat or high safety cover			
Gear unit	**KA/KH/KT 77**	**SA/SH/ST 77**	**SA/SH/ST 87**	**SA/SH/ST 97**
Threaded bushing	M12 – M8	M12 – M8	M16 – M6	M16 – M10
Screw	M8 × 12	M8 × 12	M6 × 10	M10 × 16

Positions of the mounting bores

The positions of the mounting bores is specified in the following tables:

Key: ◒ =  ● = 

Gear unit type	Size						
	10	**20**	**30**	**19**	**29**	**39**	**49**
KA/KH/KT	–	–	–	 Ø80	 Ø95	 Ø115	 Ø130
SA/SH/ST	–	–	–	–	–	–	
FA/FH/FT	–	–	–	–	–	–	–
WA/WH/WT	 Ø60	 Ø70	 Ø88	 Ø70	 Ø80	 Ø95	 Ø110

Gear unit type	Size						
	59	**27**	**37**	**47**	**57**	**67**	**77**
KA/KH/KT	–	–	 Ø94	 Ø102	 Ø125	 Ø125	 Ø142

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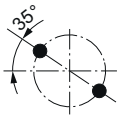
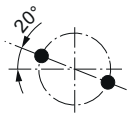
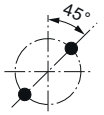
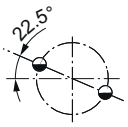
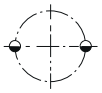
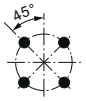
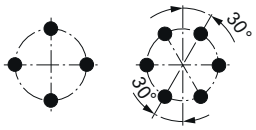
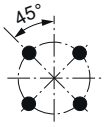
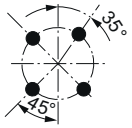
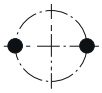
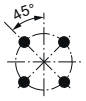
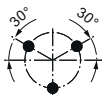
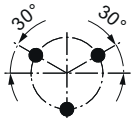
Gear unit type	Size						
	59	27	37	47	57	67	77
SA/SH/ST	–	–	 Ø75	 Ø94	 Ø102	 Ø130	 Ø155
FA/FH/FT	–	 Ø78	 Ø94	 Ø102	 Ø125	 Ø125	 Ø142
WA/WH/WT	 Ø120	–	 Ø88	 Ø100	–	–	–

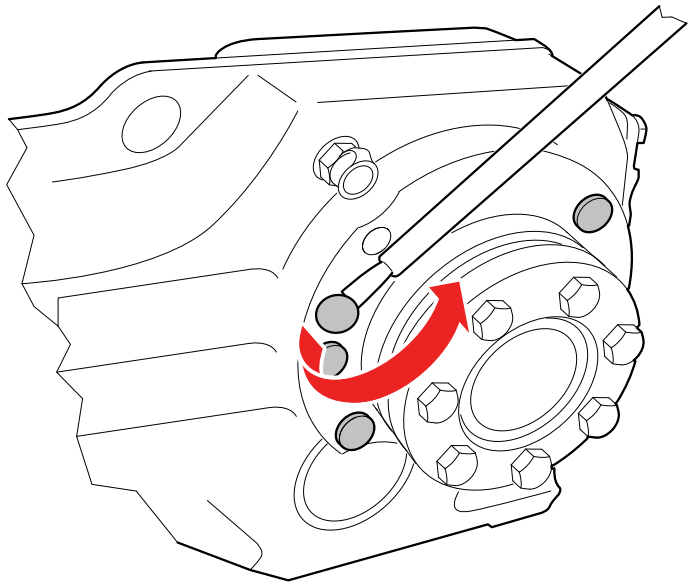
Gear unit type	Size						
	87	97	107	127	157	167	187
KA/KH/KT	 Ø178	 Ø220	 Ø215	 Ø270	 Ø345	 Ø366	 Ø412
SA/SH/ST	 Ø180	 Ø178	–	–	–	–	–
FA/FH/FT	 Ø180	 Ø220	 Ø215	 Ø270	 Ø300	–	–
WA/WH/WT	–	–	–	–	–	–	–

Assembly

Proceed as follows:

✓ The two previous chapters determine the positions at which the safety cover is to be mounted with screws and, if necessary with threaded bushings.

1. Remove the plastic plugs from the gear unit housing.



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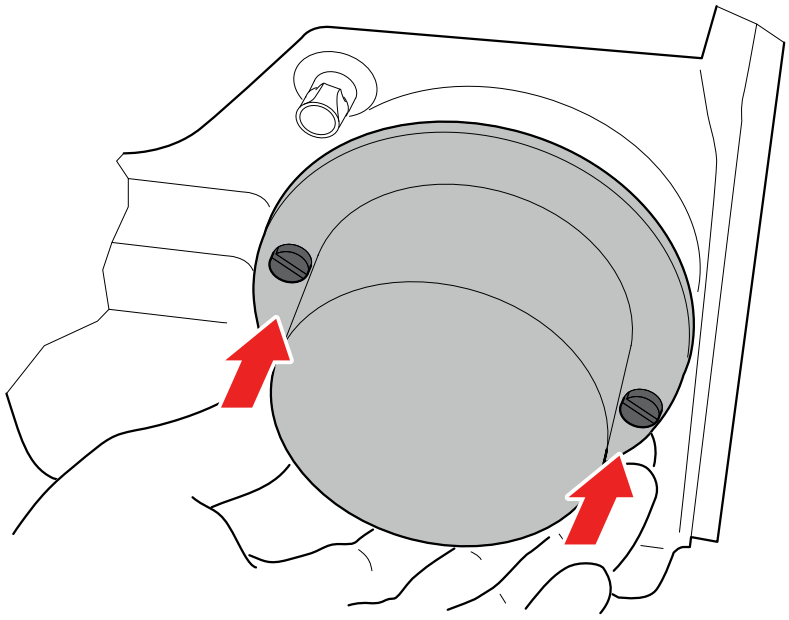
2. Mount the safety cover onto the gear unit housing using the supplied screws and, if necessary, the threaded bushings.



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4.10.3 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 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.

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4.11 AMS.. adapters

4.11.1 Figure and note concerning the installation of the AMS.. adapter

NOTICE

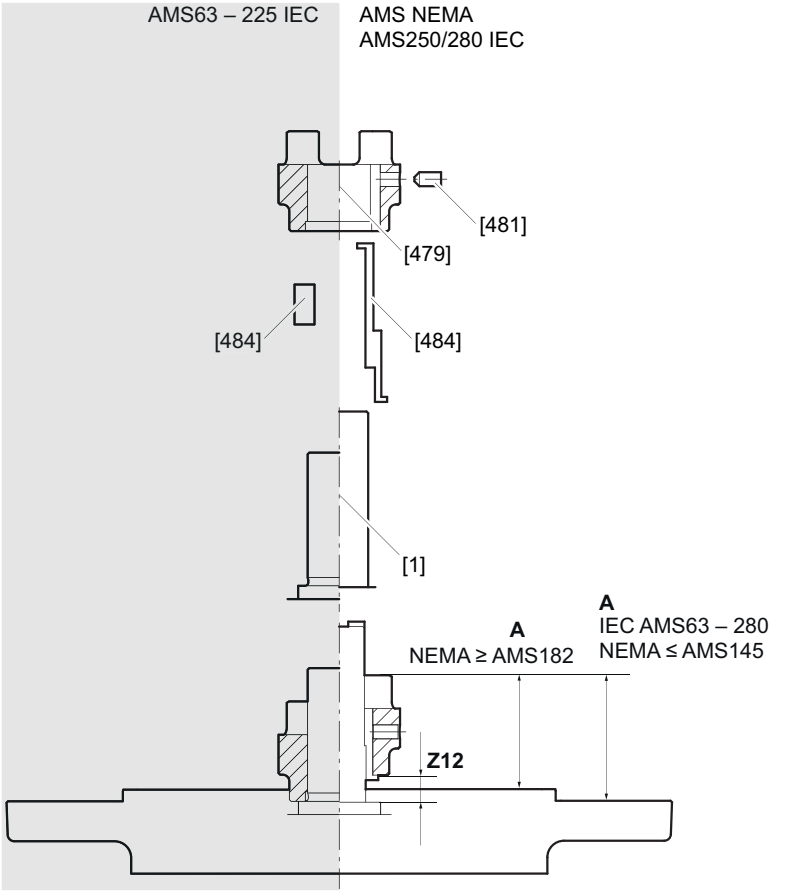
Damage to the adapter due to ingress of moisture or dirt (e.g. dust) when a motor/drive is attached to the adapter.

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 applying NOCO-Paste to the motor shaft before mounting the coupling half.



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[1] Motor shaft
[479] Coupling half
[481] Set screw
[484] Key
A Distance A
Z12 Distance between shaft shoulder and coupling

4.11.2 Fitting the motor to IEC adapters AMS63 – 225

1. Clean the motor shaft [1] and the flange surfaces of the motor and the adapter.
2. Remove the key of the motor shaft. Install the supplied key [484] so that it is as flush as possible with the base of the claw of the coupling. **Notice!** The key must not protrude beyond the base of the coupling claw in the installed condition!
3. Heat the coupling half [479] to approx. 80 °C to a **maximum** of 100 °C. Slide the coupling half onto the shoulder of the motor shaft as far as it will go.
4. Check the position of the coupling half. The values for distance "A" are listed in the following table.
5. Secure the key and the coupling half to the motor shaft using the set screw [481]. Refer to the following table for the required tightening torque "T_A".
6. Seal the contact surfaces between adapter and motor with a suitable surface sealant.
7. Mount the motor to the adapter in such a way that the coupling claws of the adapter shaft engage in the plastic coupling ring. Adhere to the tightening torques specified in chapter "Tightening torques for motor to adapter" (→ 🗎 112).

IEC adapter AMS63 – 225: Distance A and tightening torque T_A

	63/71	80	90	100/112	132	160/180	200	225
A /mm	27.3	30	39	48.5	56.5	80.5	78	93
T_A /Nm	1.5	2	2	4.8	10	17	17	17
Thread	M4	M5	M5	M6	M8	M10	M10	M10

4.11.3 Fitting the motor to IEC adapter AMS250/280 and NEMA adapter AMS56 – 365 with the provided key

1. Clean the motor shaft [1] and the flange surfaces of the motor and the adapter.
2. Remove the key of the motor shaft.
3. Install the supplied key [484]. The position of the key is dependent upon the adapter:
4. ⇨ **AMS250/280**: The key must lie against the shoulder of the motor shaft.
5. ⇨ **NEMA**: The shoulder of the key must lie against the front of the motor shaft.
6. Heat the coupling half [479] to approx. 80 °C (**maximum** 100 °C) and slide the coupling half onto the motor shaft. Slide the coupling half onto the shoulder of the key as far as it will go.
7. Check the position of the coupling half. The values for distance "A" are listed in the following table.
8. Secure the key and the coupling half to the motor shaft using the set screw [481]. Refer to the following table for the required tightening torque "T_A".
9. Seal the contact surfaces between adapter and motor with a suitable surface sealant.
10. Mount the motor to the adapter in such a way that the coupling claws of the adapter shaft engage in the plastic coupling ring. Adhere to the tightening torques specified in chapter "Tightening torques for motor to adapter" (→ 🗎 112).

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IEC adapter AMS250/280: Distance A and tightening torque T_A

	250/280
A /mm	139
T_A /Nm	17
Thread	M10

NEMA adapter AMS56 – 365: Distance A and tightening torque T_A

	56	143/145	182/184	213/215	254/256 284/286	324/326 364/365
A /mm	37.7	46.3	54.2	61.2	81.6	90.4
T_A /Nm	2	2	4.8	10	17	17
Thread	M5	M5	M6	M8	M10	M10

4.11.4 Mounting the motor to IEC adapters AMS250/280 and NEMA adapters AMS56 – 365 with standard key

1. Clean the motor shaft [1] and the flange surfaces of the motor and the adapter.
2. Remove the key of the motor shaft. Replace the key with a standard key. The required size of the standard key can be found in the following table. **Notice!** The key must not protrude beyond the base of the coupling claw in the installed condition!
3. Heat the coupling half [479] to approx. 80 °C to a **maximum** of 100 °C and slide the coupling half onto the motor shaft. Slide the coupling half onto the motor shaft up to distance Z12. The values for distance "Z12" are listed in the following table.
4. Check the position of the coupling half. The values for distance "A" are listed in the table in chapter "Fitting the motor to IEC adapter AMS250/280 and NEMA adapter AMS56 – 365 with the provided key" (→ 🗎 84).
5. Secure the key and the coupling half to the motor shaft using the set screw [481]. The required tightening torque "T_A" can be found in the table in chapter "Fitting the motor to IEC adapter AMS250/280 and NEMA adapter AMS56 – 365 with the provided key" (→ 🗎 84).
6. Seal the contact surfaces between adapter and motor with a suitable surface sealant.
7. Mount the motor to the adapter in such a way that the coupling claws of the adapter shaft engage in the plastic coupling ring. Adhere to the tightening torques specified in chapter "Tightening torques for motor to adapter" (→ 🗎 112).

Adapter	Z12 mm	Standard key[1)] inch	Standard key[2)] mm
AMS56	3.1	B3/16 × 3/16 × 7/16	–
AMS143/145	10.6	B3/16 × 3/16 × 9/16	–
AMS182/184	9	B1/4 × 1/4 × 1/2	–
AMS213/215	11.3	B5/16 × 5/16 × 13/16	–
AMS254/256	7.4	B3/8 × 3/8 × 1 1/4	–
AMS284/286	13.8	B1/2 × 1/2 × 1 1/4	–

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Adapter	Z12 mm	Standard key[1] inch	Standard key[2] mm
AMS324/326	18.7	B1/2 × 1/2 × 1 1/2	–
AMS364/365	19	B5/8 × 5/8 × 1 1/4	–
AMS250	19	–	B18 × 11 × 70
AMS280	19	–	B20 × 12 × 70

1) The key size relates to material type 1045 or type 1018 in accordance with ASTM A 29/A29M.
2) The key size relates to material C45+C in accordance with DIN EN 10277-2.

4.11.5 Permitted loads

NOTICE

The gear unit can become overloaded due to excessive weight or the excessive power rating of an attached motor.

Gear unit damage.

- Note that the load data specified in the following table is not to be exceeded.
- Ensure that the permitted power rating (torque and speed) on the adapter is adhered to according to the nameplate.

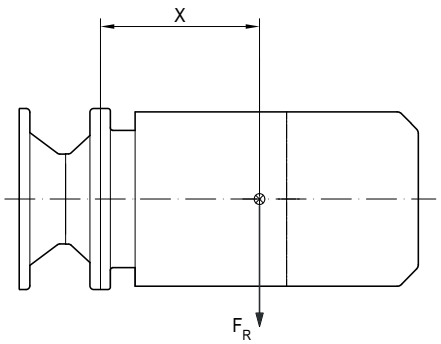
NOTICE

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

Damage to property.

- A motor attached at the foot relieves the interface at the adapter; however, make sure that the installed foot-mounted motor is attached to the customer's construction in a stress-free manner.

The following figure shows the load caused by the mass of the motor:



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⊗ Motor center of gravity
x Distance between adapter flange and motor center of gravity
F_R Overhung load

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Permitted loads for gear unit type series R.., F..[2], K.., S.., and W..9:

IEC adapter	x[1]	Gear unit input end flange diameter	Default	/DH option	/RS option
	mm	mm	F_R[1] in N	F_R[1] in N	F_R[1] in N
AMS63/71 [2]	77	105	260	220	–
		≥ 120	530	455	–
AMS80 [2]	113	105	300	265	–
		120	420	370	350
		≥ 160	1000	880	820
AMS90 [2]	113	120	420	375	350
		≥ 160	1000	895	840
AMS100/112 [2]	144	≥ 160	2000	1685	1685
AMS132 [2]	186	160	1600	1375	1370
		≥ 200	4700	4060	4055
AMS160/180	251	≥ 250	4600	4200	4600
AMS200/225	297	≥ 300	5600	5600	5600
AMS250/280	390	≥ 450	11 200	11 200	11 200

NEMA adapter	x[1]	Gear unit input end flange diameter	Default	/DH option	/RS option
	mm	mm	F_R[1] in N	F_R[1] in N	F_R[1] in N
AMS56	77	105	215	185	–
		≥ 120	445	385	–
AMS143/145	113	120	410	370	345
		≥ 160	965	865	820
AMS182/184	144	≥ 160	1960	1660	1660
AMS213/215	186	160	1585	1360	1360
AMS213/215		≥ 200	4640	4010	4010
AMS254 to 286	251	≥ 250	4525	4135	4525
AMS324 to 365	297	≥ 300	5600	5600	5600

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 of the attached motor must be reduced linearly. If the center of gravity distance x decreases, the maximum permitted weight F_R must not be increased.

2) An extended adapter is used for certain adapter combinations with parallel-shaft helical gear units (see following table) to avoid collisions with the safety cover. This changes the maximum permitted weight F_R.

Deviating permitted loads for certain adapter combinations with parallel-shaft helical gear units

IEC adapter	x[1]	Gear unit size	Gear unit safety cover		Default
	mm		High fixed plastic safety cover	Fixed tin sheet metal safety cover (standard for TorqLOC® and ATEX)	F_R[1] in N
AMS71	77	F..37	X	X	455
AMS80	113	F..37, F..47	X	X	370
		F..57	X	X	880
AMS90	113	F..37, F..47	X	X	375
		F..57	X	X	895
AMS100/112	144	F..57		X	1685
AMS132	186	F..77		X	4060

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 of the attached motor must be reduced linearly. If the center of gravity distance x decreases, the maximum permitted weight F_R must not be increased.

Permitted loads for gear unit type series SPIROPLAN® W..37/W..47

IEC adapter	x[1]	Standard	/DH option	/RS option
	mm	F_R[1] in N	F_R[1] in N	F_R[1] in N
AMS63/71	115	140	125	–
AMS80/90	151	270	245	230

NEMA adapters	x[1]	Standard	/DH option	/RS option
	mm	F_R[1] in N	F_R[1] in N	F_R[1] in N
AMS56	115	120	105	–
AMS143/145	151	265	240	230

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 of the attached motor must be reduced linearly. If the center of gravity distance x decreases, the maximum permitted weight F_R must not be increased.

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Permitted mass moments of inertia

The specified mass moments of inertia apply to the standard adapter and the adapter with reinforced bearings (VL). An exception is the AMS80 adapter with reinforced bearing (VL), which has the same inertia as the AMS90 adapter. The mass moments of inertia for the adapters with backstop AMS../RS and drain hole AMS../DH can be found in the tables in chapters "Adapter with backstop AMS../RS" (→ 🗎 91) and "Adapter with drain hole AMS../DH" (→ 🗎 92).

Calculation formula: $J_{AMS80\ (VL)} = J_{AMS90} = 2.5 \times 10^{-4}\ kg \times m^2$

The following table shows the permitted mass moments of inertia:

Adapter		$J_{Adapter}$
IEC	**NEMA**	**kg × m²**
AMS63	–	0.44×10^{-4}
AMS71[1)]	AMS56	0.44×10^{-4}
AMS80[1)]	AMS143	1.3×10^{-4}
AMS90[1)]	AMS145	2.5×10^{-4}
AMS100[1)]	AMS182	7.8×10^{-4}
AMS112[1)]	AMS184	7.8×10^{-4}
AMS132S/M[1)]	AMS213/215	22×10^{-4}
AMS132ML[1)]	–	22×10^{-4}
AMS160	AMS254/256	72×10^{-4}
AMS180	AMS284/286	72×10^{-4}
AMS200	AMS324/326	201×10^{-4}
AMS225	AMS364/365	204×10^{-4}
AMS250	–	442×10^{-4}
AMS280	–	547×10^{-4}

1) An extended adapter is used for certain adapter combinations with parallel-shaft helical gear units (see following table) to avoid collisions with the safety cover. This changes the mass moment of inertia.

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Deviating mass moments of inertia for certain adapter combinations with parallel-shaft helical gear units

The specified mass moments of inertia apply to the standard adapter and the adapter with reinforced bearings (VL). An exception is the AMS80 adapter with reinforced bearing (VL), which has the same inertia as the AMS90 adapter. The mass moments of inertia for the adapters with backstop AMS../RS and drain hole AMS../DH can be found in the tables in chapters "Adapter with backstop AMS../RS" (→ 🗎 91) and "Adapter with drain hole AMS../DH" (→ 🗎 92).

Calculation formula: $J_{AMS80\ (VL)} = J_{AMS90} = 3.1 \times 10^{-4}$ kg × m²

IEC adapter	Gear unit size	Gear unit safety cover			$J_{Adapter}$
		High fixed plastic safety cover	Fixed sheet metal safety cover (standard for TorqLOC® and ATEX)	Rotating safety cover	kg × m²
AMS71	F..37	X	X	FH37	0.6×10^{-4}
AMS80	F..37, F..47	X	X	FH37, FH47	1.8×10^{-4}
	F..57	X	X		
AMS90	F..37, F..47	X	X		3.1×10^{-4}
	F..57	X	X		
AMS100 **AMS112**	F..57		X		11×10^{-4}
AMS132	F..77		X		31×10^{-4}

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4.11.6 Adapter with backstop AMS../RS

Check the direction of rotation of the drive prior to assembly 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.

Adapter		Max. locking torque of the backstop	Minimum lift-off speed	$J_{Adapter}$
IEC	NEMA	Nm	min^{-1}	$kg \times m^2$
AMS80/RS	–	130	720	4.5×10^{-4}
AMS90/RS	AMS143/145/RS			
AMS100/RS	AMS182/RS	190	625	15×10^{-4}
AMS112/RS	AMS184/RS			
AMS132/RS	AMS213/215/RS	500	550	44×10^{-4}
AMS160/RS	AMS254/256/RS	900	515	108×10^{-4}
AMS180/RS	AMS284/286/RS			
AMS200/RS	AMS324/326/RS	1900	490	257×10^{-4}
AMS225/RS	AMS364/365/RS			
AMS250/RS	–			496×10^{-4}
AMS280/RS	–			601×10^{-4}

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4.11.7 Adapter with drain hole AMS../DH

The following table shows the maximum permissible rotational speeds and mass moments of inertia for the adapters with the drain hole option (condensation drain hole):

Adapter		Max. permitted speed	$J_{Adapter}$
IEC	NEMA	min^{-1}	$kg \times m^2$
AMS63/71/DH	–	3600	0.6×10^{-4}
AMS80/DH	AMS56/DH	3600	1.8×10^{-4}
AMS90/DH	AMS143/145/DH	3600	3.1×10^{-4}
AMS100/DH	AMS182/DH	3600	11×10^{-4}
AMS112/DH	AMS184/DH	3600	11×10^{-4}
AMS132/DH	AMS213/215/DH	3200	31×10^{-4}
AMS160/DH	AMS254/256/DH	2600	87×10^{-4}
AMS180/DH	AMS284/286/DH	2600	86×10^{-4}
AMS200/DH	AMS324/326/DH	1900	201×10^{-4}
AMS225/DH	AMS364/365/DH	1900	204×10^{-4}
AMS250/DH	–	1900	442×10^{-4}
AMS280/DH	–	1900	547×10^{-4}

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4.11.8 Mounting third-party motors to AMS.. or AR../AL.. adapters

When mounting a third-party motor, the customer must ensure that the permitted weight and the power at the adapter are adhered to according to the operating instructions. For the permitted loads, refer to chapter "Permitted loads" (→ 🗎 86).

Adapter	x[1)] mm	F_R[1)] N
AR/AL71	77	375
AR/AL80/90	113	320
AR/AL100/112	144	1560
AR/AL132[2)]	186	1230
AR/AL132	186	3630
AR/AL160/180	251	3540

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 of the attached motor must be reduced linearly. If the center of gravity distance x decreases, the maximum permitted weight F_R must not be increased.

2) Gear unit input end flange diameter: 160 mm.

4.11.9 Tightening torques for motor to AM.. adapters

Screw the motors to the adapters with the following tightening torques: Observe the information in chapter "Information about the tightening torques" (→ 🗎 38).

Screw size	Strength class	Tightening torque ±15% Nm
M5	8.8	7
M6	8.8	12
M8	8.8	28
M10	8.8	56
M12	8.8	96
M16	8.8	235

4.11.10 AMS.. adapters with attached 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 tension at the customer construction.

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4.12 AM.. adapters

4.12.1 Mounting IEC adapters AM63 – 280/NEMA adapters AM56 – 365

NOTICE

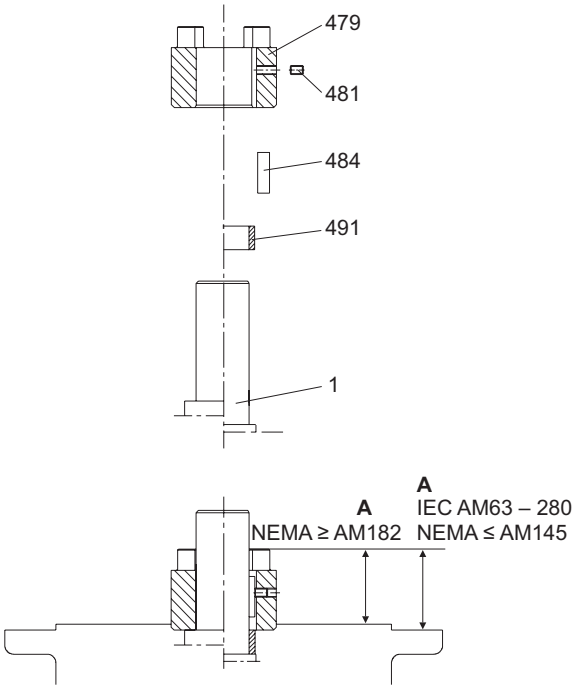
Damage to the adapter due to ingress of moisture or dirt (e.g. dust) when a motor/drive is attached to the adapter.

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 applying NOCO-Paste to the motor shaft before mounting the coupling half.



20577139211

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

Proceed as follows:

1. Clean the motor shaft and the flange surfaces of the motor and the adapter.
2. Remove the key of 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 to a **maximum** of 100 °C and slide the coupling half onto the motor shaft. Position the coupling half as follows:

- IEC adapters AM63 – 225: up to the stop on the collar of the motor shaft.

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- IEC adapters AM250 – 280: to distance "A". The values for distance "A" are listed in the following table.
- NEMA adapters with spacer tube [491] to distance "A". The values for distance "A" are listed in the following table.

4. Secure the key and the coupling half to the motor shaft using the set screw [481]. Refer to the following table for the required tightening torque "T_A".
5. Check the position of the coupling half. The values for distance "A" are listed in the following table.
6. Seal the contact surfaces between adapter and motor with a suitable surface sealant.
7. Mount the motor to the adapter in such a way that the coupling claws of the adapter shaft engage in the plastic coupling ring.

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

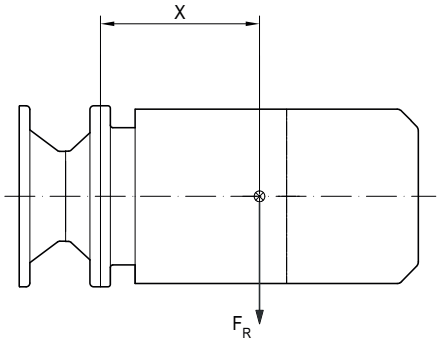
Permitted loads

NOTICE

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

Damage to property.

- A motor attached at the foot relieves the interface at the adapter; however, make sure that the installed foot-mounted motor is attached to the customer's construction in a stress-free manner.



⊗ Motor center of gravity
X Distance from adapter flange to motor center
F_R Overhung load

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

Adapter type		x[1]	F_R[1] N	
IEC	NEMA	mm	IEC adapter	NEMA adapter
AM63/71	AM56	77	530	410
AM80/90	AM143/145	113	420	380
AM100/112	AM182/184	144	2000	1760
AM132[2]	AM213/2152[2]	186	1600	1250
AM132..	AM213/215		4700	3690
AM160/180	AM254/286	251	4600	4340
AM200/225	AM324-AM365	297	5600	5250
AM250/280	–	390	11200	–

1) 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]	F_R[1] N	
IEC	NEMA	mm	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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Permitted mass moments of inertia

The following table shows the permitted mass moments of inertia:

Adapter type		$J_{adapter}$
IEC	**NEMA**	**kg × m²**
AM63	–	0.44×10^{-4}
AM71	AM56	0.44×10^{-4}
AM80	AM143	1.9×10^{-4}
AM90	AM145	1.9×10^{-4}
AM100	AM182	5.2×10^{-4}
AM112	AM184	5.2×10^{-4}
AM132S/M	AM213/215	19×10^{-4}
AM132ML	–	19×10^{-4}
AM160	AM254/256	91×10^{-4}
AM180	AM284/286	90×10^{-4}
AM200	AM324/326	174×10^{-4}
AM225	AM364/365	174×10^{-4}
AM250	–	173×10^{-4}
AM280	–	685×10^{-4}

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4.12.2 AM.. adapters with AM../RS backstop

Check the direction of rotation of the drive before assembly or startup. In case of a wrong direction of rotation, contact SEW-EURODRIVE.

The backstop is maintenance-free in operation. Depending on the size, the backstops have so-called minimum lift-off speeds (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^{-1}
AM80/90/RS AM143/145/RS	65	820
AM100/112/RS AM182/184/RS	425	620
AM132/RS AM213/215/RS	850	530
AM160/180/RS AM254/286/RS	1450	480
AM200/225/RS AM324-365/RS	1950	450
AM250/280/RS	1950	450

4.12.3 Mounting third-party motors at AM.. or AR../AL.. adapters

When mounting a third-party motor, the customer must ensure that the permitted weight and the power at the adapter are adhered to according to the operating instructions. For the permitted loads, refer to chapter "Permitted loads" (→ 🖹 86).

Type	X[1)] mm	F_R[1)] N
AR/AL71	77	375
AR/AL80/90	113	320
AR/AL100/112	144	1560
AR/AL132[2)]	186	1230
AR/AL132	186	3630
AR/AL160/180	251	3540

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Type	X[1] mm	F_R[1] N

[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 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

4.12.4 Tightening torques for motor to AM.. adapters

Screw the motors to the adapters with the following tightening torques: Observe the information in chapter "Information about the tightening torques" (→ 🗎 38).

Screw size	Strength class	Tightening torque ±15% Nm
M5	8.8	7
M6	8.8	12
M8	8.8	28
M10	8.8	56
M12	8.8	96
M16	8.8	235

4.12.5 AM.. adapters with attached 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.

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4.13 AQS.. adapters

4.13.1 Figure and note concerning the installation of the AQS.. adapter

NOTICE

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

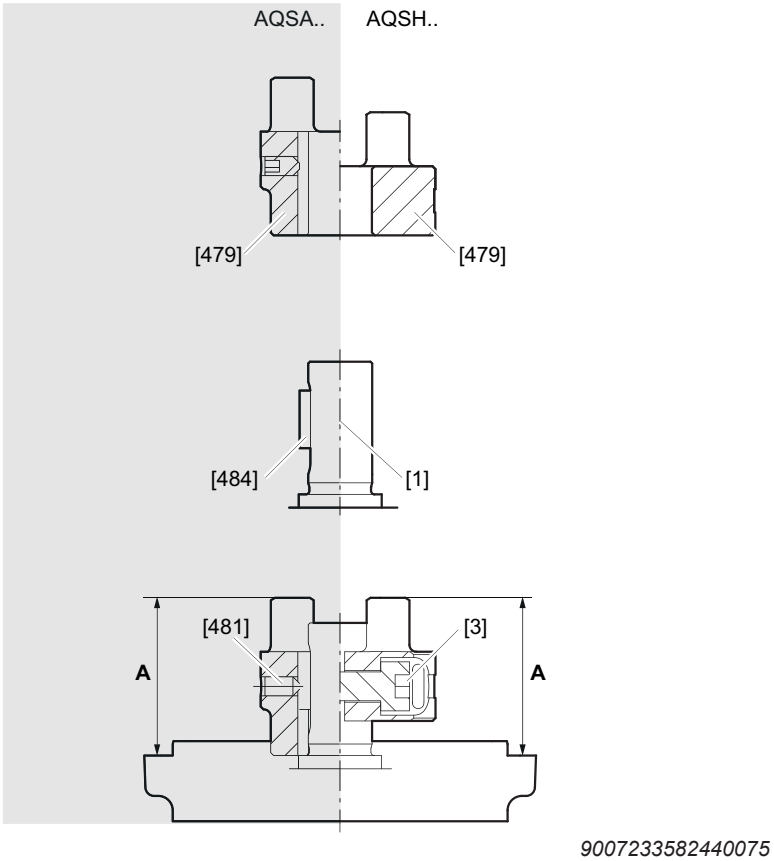
Damage to the adapter.

- 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

With AQSA..: To avoid contact corrosion, SEW-EURODRIVE recommends to apply NOCO-Paste to the motor shaft before mounting the coupling half.

With AQSH..: Use of NOCO-Paste is not permitted.



9007233582440075

[1] Motor shaft
[3] Clamping screw
[479] Coupling half
[481] Set screw
[484] Key
A Distance A

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4.13.2 Mounting of motor to adapter AQSH.. with coupling half pre-mounted in adapter

1. Clean the motor shaft [1] and the flange surfaces of the motor and the adapter.
2. Ensure that the clamping screw [3] of the coupling is accessible through the lateral hole in the housing. **Information!** The coupling half [479] is spread apart in the delivery state.
3. Seal the contact surfaces between adapter and motor with a suitable surface sealant.
4. Fit the motor to the adapter. Adhere to the tightening torques specified in chapter "Tightening torques for motor to adapter" (→ 🗎 112).
5. Tighten the clamping screw of the coupling half. The values for tightening torque "T_A" are listed in the table in chapter "Distances and tightening torques" (→ 🗎 103).
6. Close the lateral holes using the closing plugs.

4.13.3 Mounting of motor to adapter AQSH.. with coupling half pre-mounted to motor shaft

1. Clean the motor shaft [1] and the flange surfaces of the motor and the adapter.
2. Unscrew the clamping screw [3] of the coupling until the screw head is lying against the lateral pin. Then continue turning for half a revolution so that the coupling half [479] is spread apart.
3. Slide the coupling half onto the motor shaft up to distance "A". The values for distance "A" are listed in the table in chapter "Distances and tightening torques" (→ 🗎 103).
4. Check the position of the coupling half. The values for distance "A" are listed in the table in chapter "Distances and tightening torques" (→ 🗎 103).
5. Secure the coupling half to the motor shaft. Tighten the clamping screw of the coupling half. The values for tightening torque "T_A" are listed in the table in chapter "Distances and tightening torques" (→ 🗎 103).
6. Seal the contact surfaces between adapter and motor with a suitable surface sealant.
7. Mount the motor to the adapter so that the claws of the two coupling halves mesh. Adhere to the tightening torques specified in chapter "Tightening torques for motor to adapter" (→ 🗎 112). **Information!** The mounting force can be reduced by lightly greasing or oiling the coupling ring or the coupling half. To do this, only use mineral oil-based oil or grease without additives.
8. Close the lateral holes using the closing plugs.

⇨ The required insertion force for joining the two coupling halves is compensated for after final assembly and therefore does not pose a risk of axial load on adjacent bearings.

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4.13.4 Mounting of motor to adapter AQSA..

1. Clean the motor shaft [1] and the flange surfaces of the motor and the adapter.
2. Remove the key [484] of the motor shaft.
3. Install the supplied key so that it is as flush as possible with the base of the claw of the coupling.
   ⇨ With AQSA100 – AQSA190, the key may protrude a maximum of 1 mm beyond the base of the coupling claw when installed!
4. Heat the coupling half [479] to approx. 80 °C to a **maximum** of 100 °C.
5. Slide the coupling half onto the motor shaft up to distance "A". The values for distance "A" are listed in the table in chapter "Distances and tightening torques" (→ 🗎 103).
6. Check the position of the coupling half. The values for distance "A" are listed in the table in chapter "Distances and tightening torques" (→ 🗎 103).
7. Secure the coupling half and the key to the motor shaft using the set screw [481]. The values for tightening torque "T_A" are listed in the table in chapter "Distances and tightening torques" (→ 🗎 103).
8. Seal the contact surfaces between adapter and motor with a suitable surface sealant.
9. Mount the motor to the adapter so that the claws of the two coupling halves mesh. Adhere to the tightening torques specified in chapter "Tightening torques for motor to adapter" (→ 🗎 112). **Information!** The mounting force can be reduced by lightly greasing or oiling the coupling ring or the coupling half. To do this, only use mineral oil-based oil or grease without additives.
10. Close the lateral holes using the closing plugs.

⇨ The required insertion force for joining the two coupling halves is compensated for after final assembly and therefore does not pose a risk of axial load on adjacent bearings.

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4.13.5 Distances and tightening torques

Adapter	Coupling bore Ø	Distance A	Screws		Tightening torque T_A Nm	
	mm	mm	AQSA..	AQSH..	AQSA..	AQSH..
AQSA/AQSH50	8	23.3	–	M4	–	4.1
	9		M3		0.6	
AQSA/AQSH80	11	27.3	M4	M5	1	8.1
	14					
AQSA/AQSH100 /1 – 5	14	30	M5	M6	2	14
	16					
	19					
AQSA100/6	14	35.5	M5	–	2	–
	16					
	19					
AQSA100/7	14	40	M5	–	2	–
	16					
	19					
AQSA/AQSH115/1/3/5	19	39	M5	M6	2	14
	22					
	24					
AQSA/AQSH115/4	19	45	M5	M6	2	14
	22					
	24					
AQSA115/6	19	44	M5	–	2	–
	22					
	24					
AQSA/AQSH140	24	48.5	M6	M8	4.8	34
	28					
	32					
AQSA/AQSH160	28	56.5	M8	M10	10	67
	32					
AQSA/AQSH190/1 to 5	35		–		–	
	38		M8		10	
AQSA/AQSH190/6	35	68.5	M8	M10	10	67

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4.13.6 Permitted loads

NOTICE

The gear unit can become overloaded due to excessive weight or the excessive power rating of an attached motor.

Gear unit damage.

- Note that the load data specified in the following table is not to be exceeded.
- Ensure that the permitted power rating (torque and speed) on the adapter is adhered to according to the nameplate.

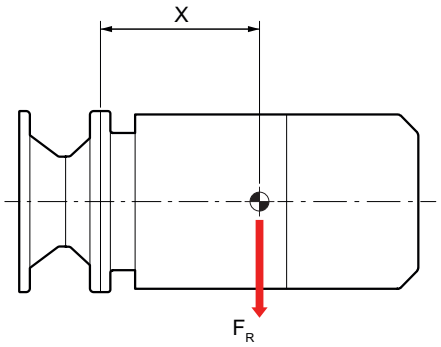
NOTICE

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

Damage to property.

- A motor attached at the foot relieves the interface at the adapter; however, make sure that the installed foot-mounted motor is attached to the customer's construction in a stress-free manner.

The following figure shows the load caused by the mass of the motor:



⊗ Motor center of gravity
x Distance between adapter flange and motor center of gravity
F_R Overhung load

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

Adapter	x[1)] mm	Gear unit input end flange diameter mm	F_R[1)] N
AQS50	45	≥ 105	200
AQS80	77	105	200
		≥ 120	370
AQS100	113	105	200
		≥ 120	350
AQS115	113	≥ 120	300

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Adapter	x[1] mm	Gear unit input end flange diameter mm	F_R[1] N
AQS140	144	120	300
		≥ 160	1550
AQS160	144	≥ 160	1450
AQS190	186	160	1250
		≥ 200	3750

Permitted loads for gear unit type series SPIROPLAN® W..37/47:

Adapter	x[1] mm	F_R[1] N
AQS50/80	115	140
AQS100/115	151	265
AQS140	151	265

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 of the attached motor must be reduced linearly. If the center of gravity distance x decreases, the maximum permitted weight F_R must not be increased.

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4.14 AQ.. adapters

4.14.1 Mounting adapters AQA80 – 190 (with keyway)/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.

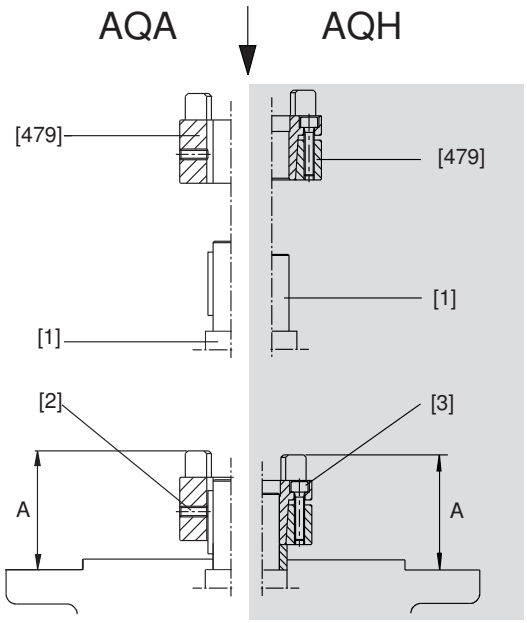
Damage to the adapter.

- 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

With AQA..: To avoid contact corrosion, SEW-EURODRIVE recommends to apply NOCO-Paste to the motor shaft before mounting the coupling half.

With AQH..: Use of NOCO-Paste is not permitted.



9007199466855947

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

Proceed as follows:

1. Clean the motor shaft and the flange surfaces of the motor and the adapter.
2. **Type AQH:** Loosen the screws of the coupling half [479] and loosen the cone connection.
3. **Type AQA/AQH:** Heat the coupling half to approx. 80 °C to a **maximum** of 100 °C and slide the coupling half onto the motor shaft up to distance "A". The values for distance "A" are listed in the table in chapter "Distances and tightening torques" (→ 🗎 103).
4. **Type AQH:** Tighten the screws on the coupling half evenly in diametrically opposite sequence, working round several times. The values for tightening torque "T_A" are listed in the table in chapter "Distances and tightening torques" (→ 🗎 103).

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5. **Type AQA:** Secure the coupling half with a set screw (see figure).
6. Check the position of the coupling half. The values for distance "A" are listed in the table in chapter "Distances and tightening torques" (→ 🗎 103).
7. Mount the motor to the adapter so that the claws of the two coupling halves mesh.
   ⇨ The required insertion force for joining the two coupling halves is compensated for after final assembly and therefore does not pose a risk of axial load on adjacent bearings.

4.14.2 Setting standards and tightening torques

Type	Coupling Ø	Distance A	Screws		Tightening torque T_A Nm	
	mm	mm	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

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4.14.3 Permitted loads

NOTICE

The gear unit can become overloaded due to excessive weight or the excessive power rating of an attached motor.

Gear unit damage.

- Note that the load data specified in the following table is not to be exceeded.
- Ensure that the permitted power rating (torque and speed) on the adapter is adhered to according to the nameplate.

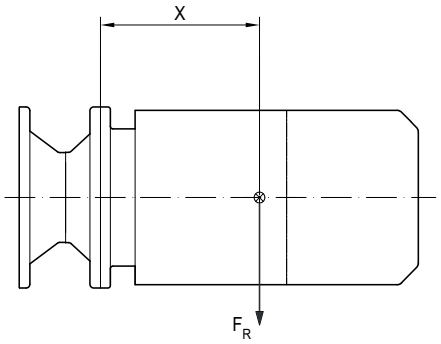
NOTICE

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

Damage to property.

- A motor attached at the foot relieves the interface at the adapter; however, make sure that the installed foot-mounted motor is attached to the customer's construction in a stress-free manner.

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



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⊗ Motor 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[2)]	186	1250
AQ190/3[2)]	186	1150

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Type	x[1)] mm	F_R[1)] N
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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4.15 EWH.. adapters

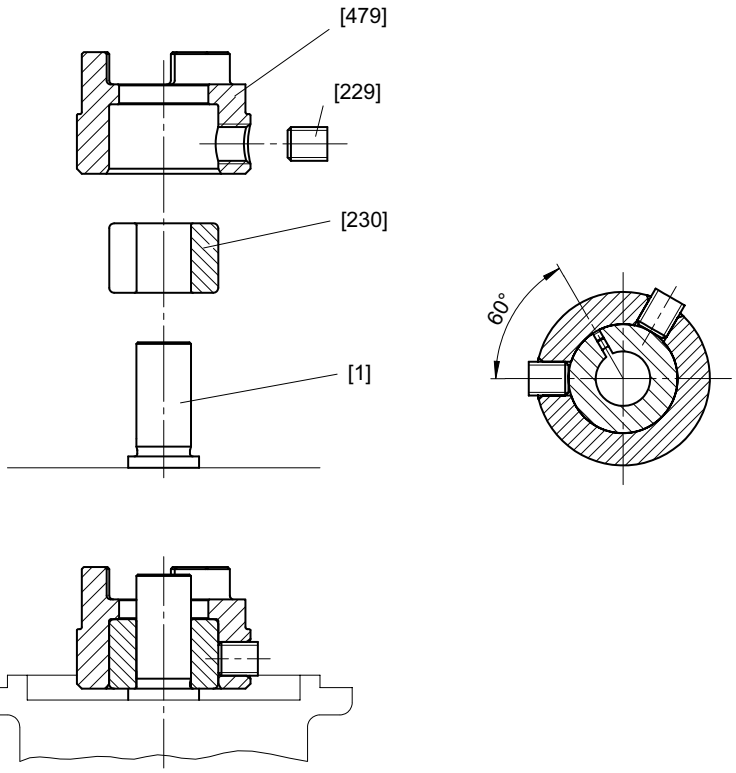
4.15.1 Adapters EWH01 – 03

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.



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[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, initially to 25% of the tightening torque prescribed in the following table.
5. Tighten the two clamping screws [229] to the full prescribed tightening torque.

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Adapter	Motor shaft diameter mm	Number of clamping screws	Clamping screw tightening torque 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

4.15.2 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 must not to be exceeded.
- Make sure that the approved power rating (torque and speed) on the adapter is observed according to the nameplate.

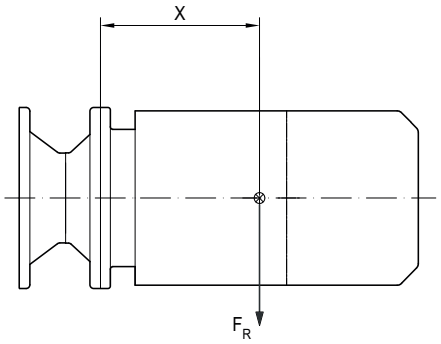
NOTICE

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 load caused by the mass of the motor:



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⊗ Motor center of gravity
x Distance between adapter flange and motor center of gravity
F_R Overhung load

Adapter	x[1)] mm	F_R[1)] N
EWH01	113	40
EWH02	120	56

Adapter	x[1)] mm	F_R[1)] N
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 of the attached motor must be reduced linearly. If the center of gravity distance x decreases, the maximum permitted weight F_R must not be increased.

4.15.3 Tightening torques for motor to adapter

Screw the motors to the adapters with the following tightening torques. When doing this, observe the tightening torques in chapter "Information about the tightening torques" (→ 🗎 38).

Screw size	Strength class	Tightening torque ±15% Nm
M5	8.8	7
M6	8.8	12
M8	8.8	28
M10	8.8	56
M12	8.8	96
M16	8.8	235

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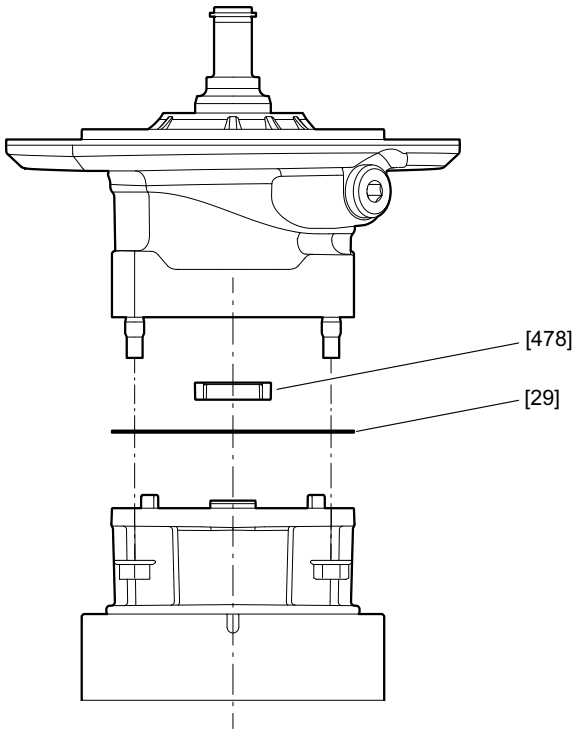
4.16 ADC adapters

4.16.1 Mounting the motor to the ADC adapter

The following figure shows how to mount the ADC adapter to a motor.



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[29] Flat gasket
[478] Coupling piece

✓ Position the coupling on the adapter side and the coupling on the motor side in the same radial position so that the two coupling halves align when they are plugged together.

1. ⚠ **CAUTION!** Damage to the adapter due to ingress of moisture or dirt (e.g. dust) when a motor or drive is attached to the adapter. Damage to the adapter. When mounting the motor to the adapter, make sure that no moisture or dust enters the adapter.

2. Place the enclosed flat gasket [29] on the flange.
3. Insert the plastic coupling part [478] into the coupling half on the adapter side.
4. Mount the motor to the adapter in such a way that the coupling of the motor engages in the plastic coupling part of the adapter. Observe the tightening torques specified in the table below when tightening the screws. Observe the information in chapter "Information about the tightening torques" (→ 🗎 38).

Screw size	Strength class	Tightening torque ±15% in Nm
M5	8.8	7

4.16.2 Mass moment of inertia of ADC adapter

The following table shows the mass moment of inertia of the ADC adapter:

Adapter	$J_{adapter}$ in kg × m^2
ADC	0.22×10^{-4}

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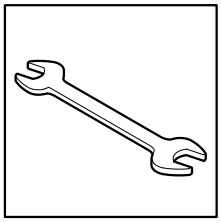
4.17 AD.. input shaft assembly

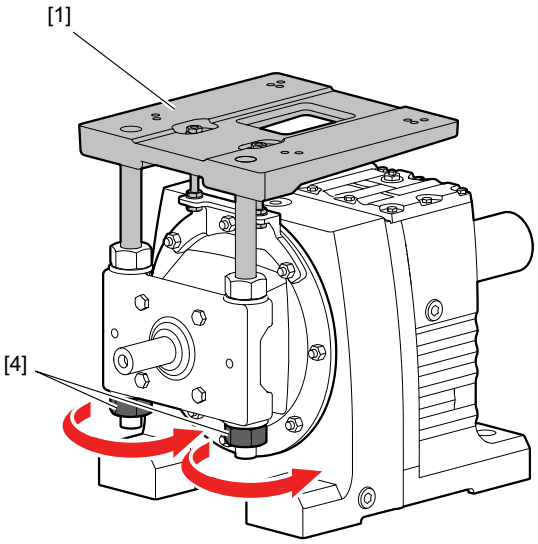
Observe chapter "Mounting the drive components and output elements" (→ 🗎 46) when installing drive components.

4.17.1 Mounting the cover with motor platform AD../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 adjustment nuts [4].





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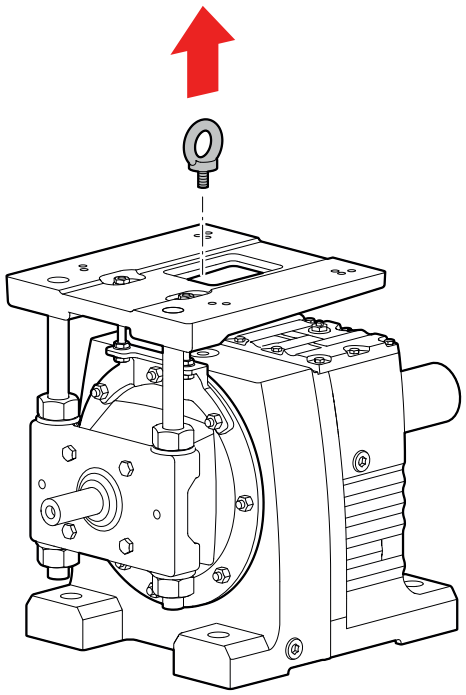
2. If necessary, remove the lifting eyebolt/lifting eye of the helical gear unit to reach the lowest adjustment position. Touch up any damage to the paint work.



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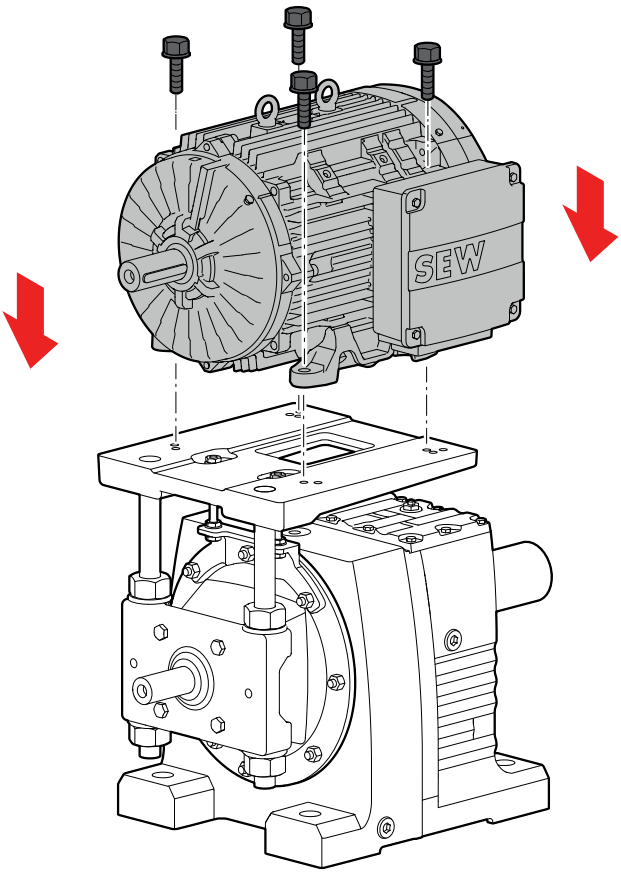
3. Place the motor onto the base plate. Align the motor on the motor platform [1] so that the shaft ends are in line. Fasten the motor.



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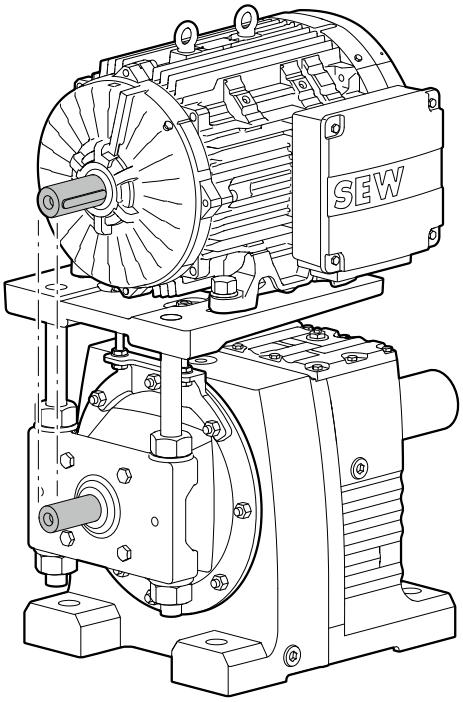

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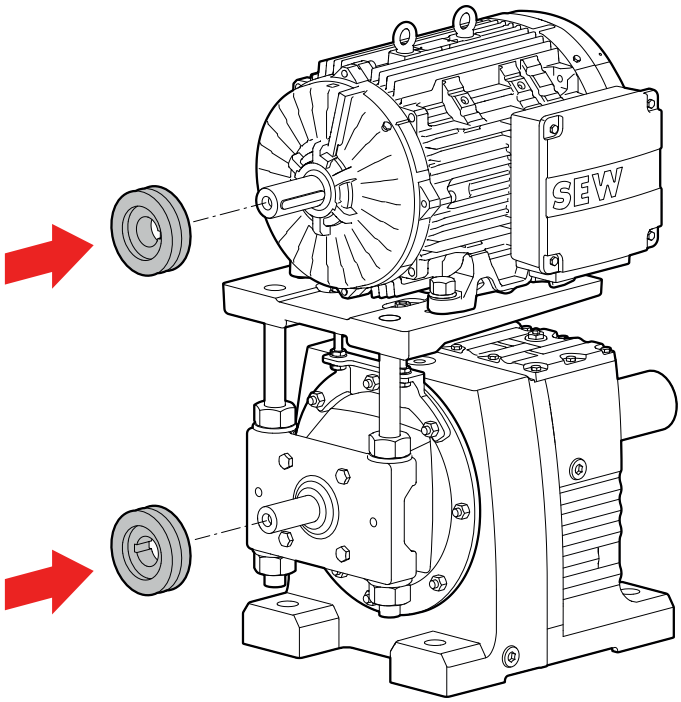
4. Mount the drive components onto the input side shaft end and the motor shaft.



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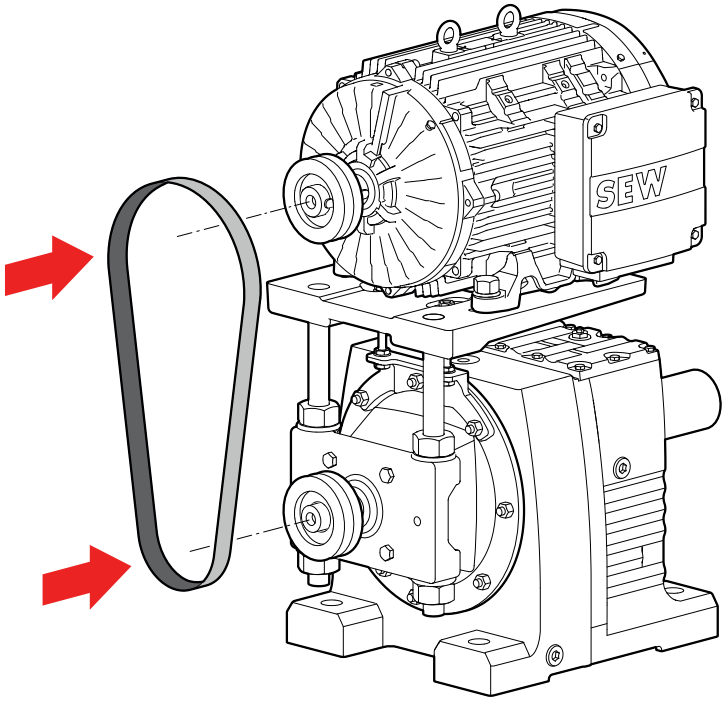
5. Align the drive components, shaft end and motor shaft. If necessary, correct the motor position.
6. Put on the traction elements (V-belt, chain, etc.) and apply a preload by evenly adjusting the motor platform [1]. Do not stress the motor platform and the columns against each other when doing this.



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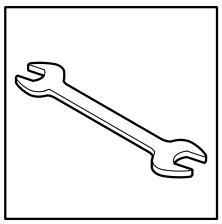
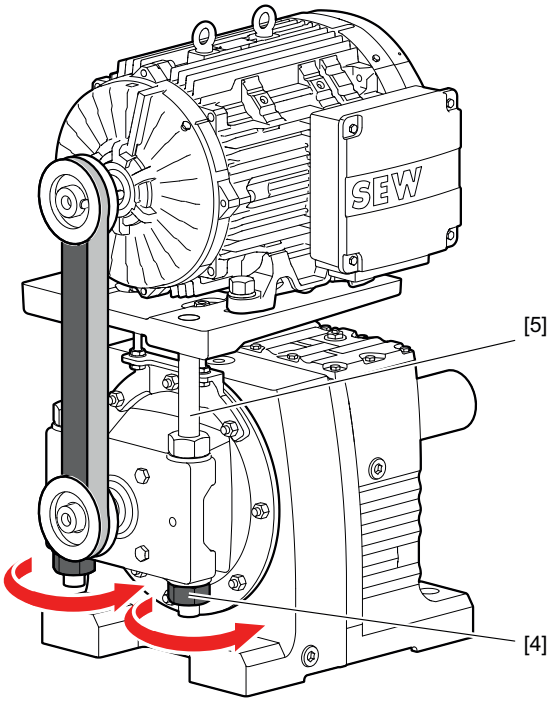
7. To fasten the threaded columns [5], tighten the nuts [4] that are not used for adjustment.





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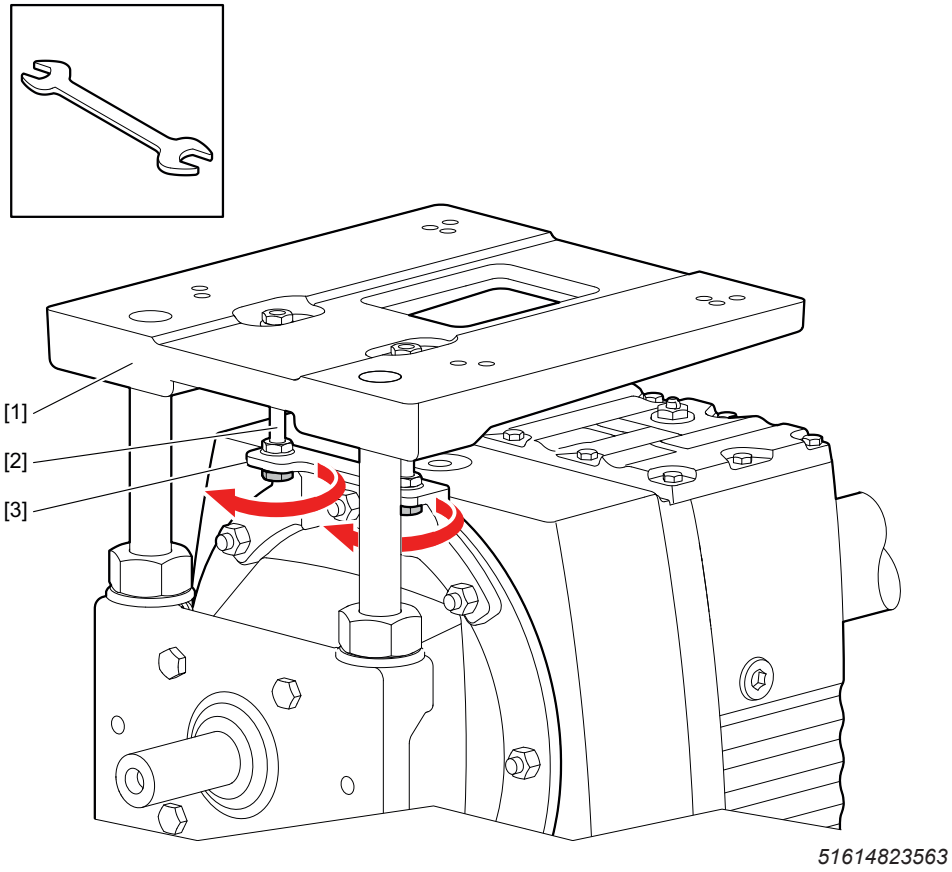
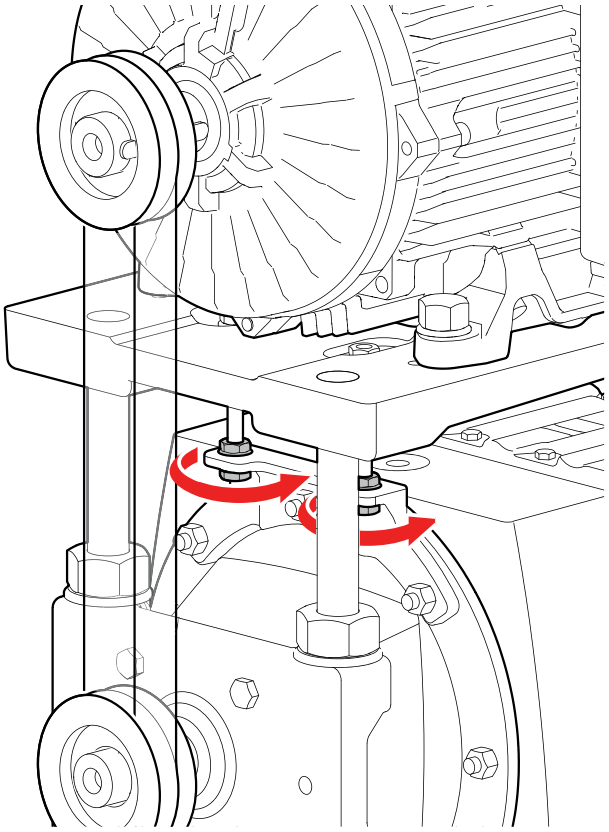
4.17.2 Special aspects of AD6/P and AD7/P

Proceed as follows:

1. Loosen the nuts of the stud bolts [2] before adjustment so that the stud bolts [2] in the support [3] can move freely in axial direction.



2. Tighten the nuts only after the final adjustment position is reached.



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INFORMATION

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

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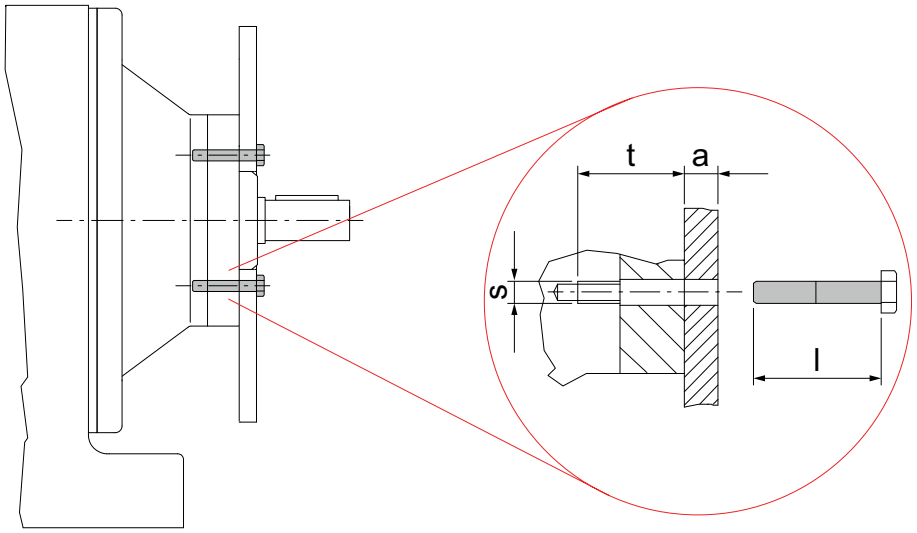
4.17.3 AD../ZR input shaft assembly with centering shoulder

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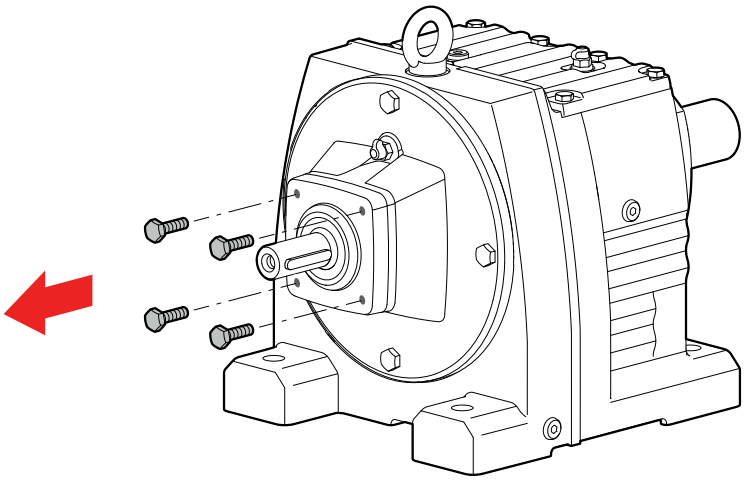
a Strength of the additional element
s Fastening winch (see table)
t Screw-in depth (see table)

2. Remove the retaining screw from the centering shoulder.



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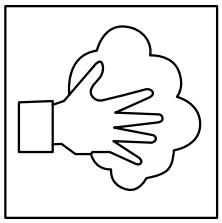
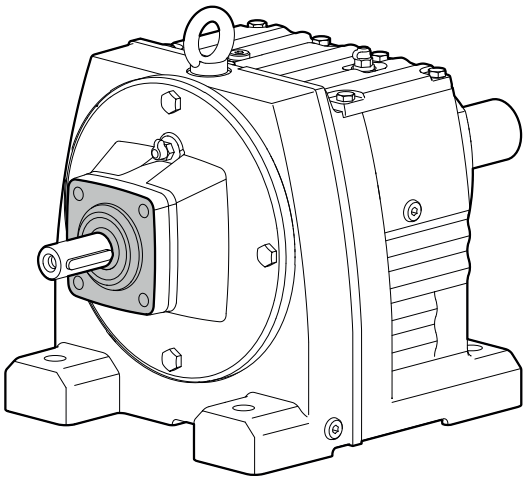
3. Clean the contact surface and the centering shoulder.





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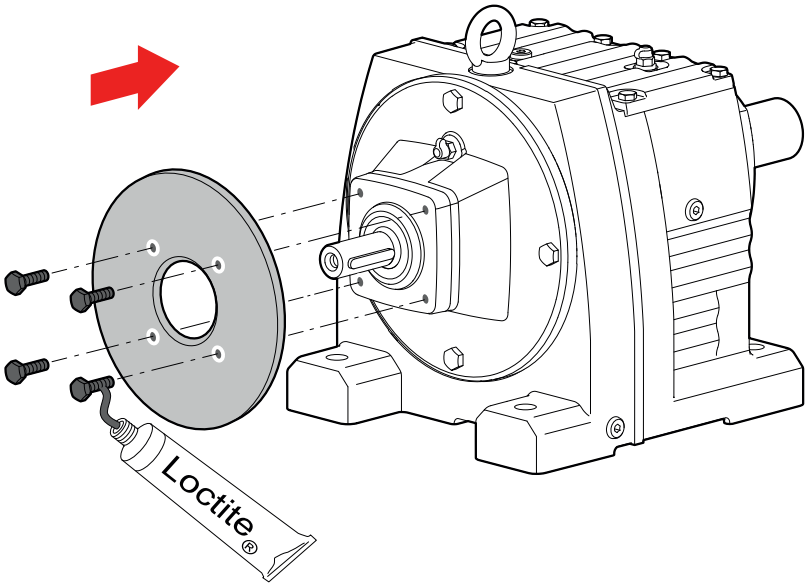
4. Clean the threads of the new screws and apply a thread locking compound (e.g. Loctite® 243) to the first few threads.



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5. Place the application on the centering shoulder. Tighten the retaining screws with the specified tightening torque "T_A" (see following table).

Cover	Screw-in depth t mm	Retaining thread	Tightening torque T_A for connection screws in strength class 8.8 Nm
AD2/ZR	25.5	M8	28
AD3/ZR	31.5	M10	56
AD4/ZR	36	M12	96
AD5/ZR	44	M12	96

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Cover	Screw-in depth t mm	Retaining thread	Tightening torque T_A for connection screws in strength class 8.8 Nm
AD6/ZR	48.5	M16	235
AD7/ZR	49	M20	460
AD8/ZR	42	M12	96

Permitted loads

NOTICE

The gear unit can become overloaded due to excessive weight or the excessive power rating of an attached motor.

Gear unit damage.

- Note that the load data specified in the following table is not to be exceeded.
- Ensure that the permitted power rating (torque and speed) on the adapter is adhered to according to the nameplate.

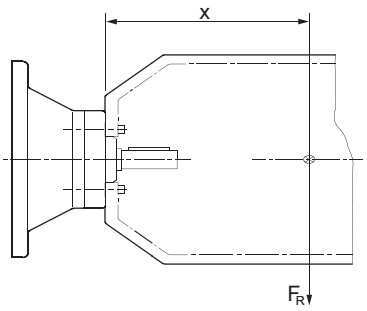
NOTICE

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

Damage to property.

- A motor attached at the foot relieves the interface at the adapter; however, make sure that the installed foot-mounted motor is attached to the customer's construction in a stress-free manner.

The following figure shows the load caused by the motor mass:



⊗ Motor's center of gravity
x Distance from adapter flange to motor's center of gravity
F_R Overhung load

Cover	x[1)] mm	F_R[1)] N
AD2/ZR	193	330
AD3/ZR	274	1400

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Cover	x[1)] mm	F_R[1)] N
AD4/ZR[2)]	361	1120
AD4/ZR		3300
AD5/ZR	487	3200
AD6/ZR	567	3900
AD7/ZR	663	10 000
AD8/ZR	516	4300

1) Maximum load values for connection screws of strength class 8.8. As the center of gravity distance x increases, the maximum permitted weight of the attached motor F_R must be reduced linearly. As the center of gravity distance x decreases, the maximum permitted weight F_R must not be increased.

2) Diameter of the adapter output flange: 160 mm

4.17.4 Cover with backstop AD../RS

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.

Check the direction of rotation of the drive prior to mounting or startup. If the direction of rotation is wrong, consult SEW-EURODRIVE.

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

Cover	Maximum locking torque of the backstop Nm	Minimum lift-off speed min^{-1}
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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4.18 Direct mounting of a motor on a gear unit

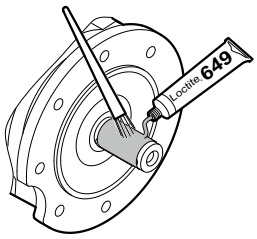
INFORMATION

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 behind the groove over the entire area of the circumference. For information on Loctite®, refer to "Selecting and using Loctite®" (→ 🗎 127).



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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.

Cleaning the sealing surfaces

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 the thread through bores that lead into the housing interior and their studs.
8. Apply Loctite® 574 or Loctite® 5188 in a continuous ring on the upper threads of the flange thread and the stud. For information on Loctite®, refer to chapter "Selecting and using Loctite®" (→ 🗎 127).

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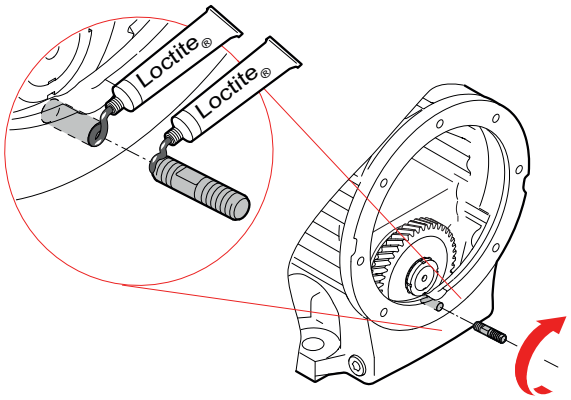

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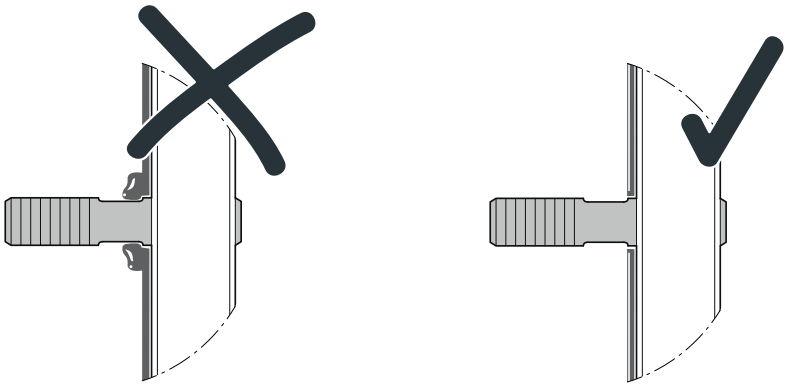
Screwing in the studs

9. Screw the studs into the thread up to the shoulder.
10. Remove any excess Loctite® from the sealing surface 60 minutes after screwing in at the latest.



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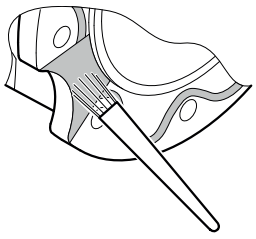
Sealing the flange surface

INFORMATION

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

11. Spread Loctite® 574 or Loctite® 5188 only over one of the sealing surfaces. Apply the sealant in beads or over a large area without gaps. **Always apply the sealant over a large area in case of narrow places or with R97, R107, R127, F97 and F107 gear units.** 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. For information on Loctite®, refer to chapter "Selecting and using Loctite®" (→ 🗎 127).



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Joining flange surfaces

12. Join the flange surfaces together. Next, **immediately** tighten the nuts with the specified torque. If you tighten the nuts too late, the sealing film can tear. For information on the tightening torques, refer to chapter "Tightening torques for direct mounting of a motor to a gear unit" (→ 🗎 127).
13. The sealant must harden for 30 minutes and must not come into contact with the gear oil during this time.

4.18.1 Tightening torques for direct mounting of a motor to a gear unit

For notes on tightening, observe the notes in chapter "Information about the tightening torques" (→ 🗎 38).

Screw/nut	Tightening torque ±15% Nm
M6	12
M8	28
M10	56
M12	96
M16	235

4.18.2 Selecting and using Loctite®

Selecting and using Loctite®

Sealant	Use	Suitability	Batch size	Part number
Loctite® 649	Locking agent for pinions	All gear units	50 ml	09120998
Loctite® 574	Surface sealant	All gear units except R97 – R127, R87 with CM3C – R127 with CM3C, F97, F107, F87 with CM3C – F107 with CM3C	7 ml	09102558
Loctite® 5188		R97 – R127, R87 with CM3C – R127 with CM3C, F97, F107, F87 with CM3C – F107 with CM3C	50 ml	03207013

When mounting CM3C.. motors to gear unit sizes R87 – R127 and F87 – F107 with mandatory activator use. Activator Loctite® 7649 must be applied to the entire surface of the gear unit sealing surface and Loctite® 5188 must be applied to the entire surface of the aluminum flange. Additionally apply Loctite® in beads at the critical points of the bearing eyes. The motor and gear unit must be attached and screwed together without any interruption in work, as the activator used greatly accelerates the bonding of the sealant and starts immediately.

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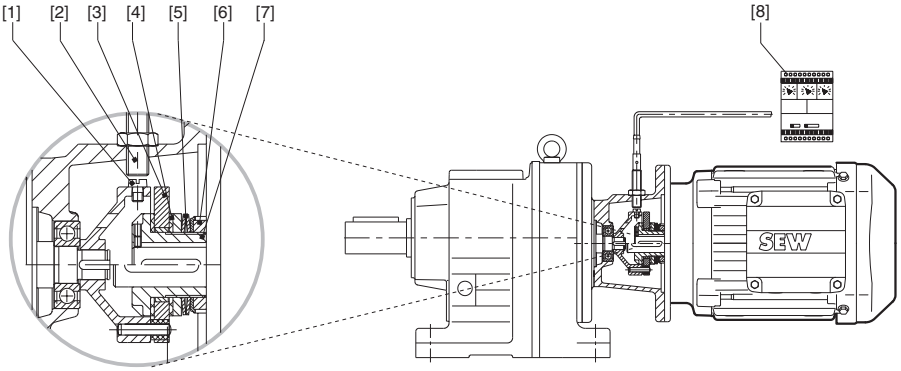
4.19 Accessory equipment

4.19.1 AR.. and AT.. centrifugal and friction couplings

AR.. slip clutch

Drives with a slip clutch consist of a standard toothed gear drive and motor/variable speed gearmotor with an adapter installed between them. This adapter accommodates the slip clutch. In gearmotors with a compound 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 particular drive design.

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



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

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 unit

INFORMATION

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

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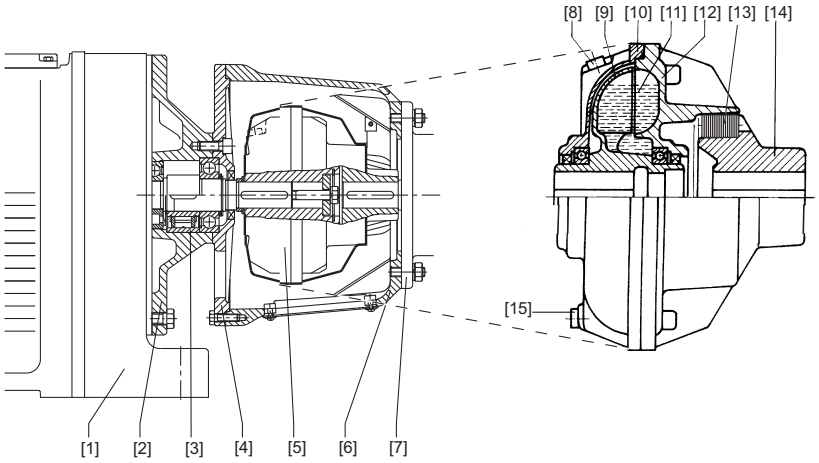
AT.. hydraulic centrifugal coupling

Hydraulic start-up couplings are flow couplings that operate according to the Föttinger principle. They consist of 2 pivoted semicircular chambers equipped with blades, facing each other with a narrow gap.

The applied torque is transmitted by the mass forces of the flowing liquid. This liquid runs in a closed circuit between the pump wheel (primary side) [12] on the driving shaft (motor shaft) and the turbine wheel (secondary side) [9] of the driven shaft (gear unit input shaft).

The following figure shows the structure of a drive with hydraulic start-up coupling:



18014400410625675

[1] Gear unit
[2] Basic flange complete
[3] Backstop (optional)
[4] Intermediate flange
[5] Hydraulic start-up coupling
[6] Extended housing
[7] Motor
[8] Filling plugs
[9] Turbine wheel
[10] Coupling shell
[11] Operating fluid (hydraulic oil)
[12] Pump wheel
[13] Elastic component
[14] Elastic connection coupling

INFORMATION

Further information on AT.. couplings, refer to the "AR.. and AT.. Start-Up Couplings and Slip Clutches" operating instructions.

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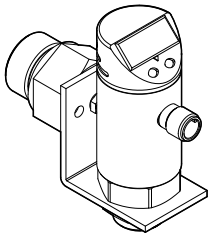
4.19.2 Diagnostic units /DUV and /DUO

/DUO diagnostic unit

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:



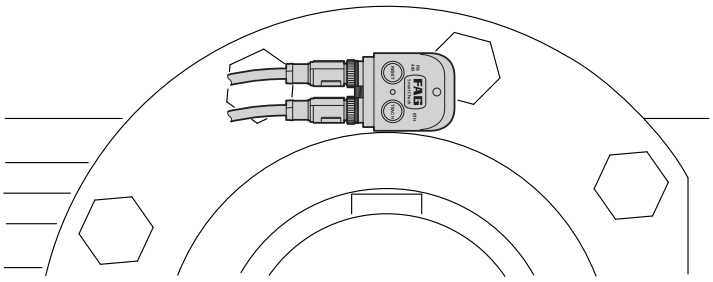
INFORMATION

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

DUV40A (Diagnostic Unit Vibration)

The DUV40A vibration monitoring system is used for early detection of damage to gear units and gearmotors (e.g. bearing damage or imbalance). Permanent frequency-selective monitoring of the gearmotor is used for this purpose. 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-controlled measuring tasks. After the analysis and depending on user-defined alarm limits, the system can switch outputs and display the state using LEDs.

DUV40A is configured using the SmartWeb software. If you use several Vibration SmartCheck systems, you can control them centrally from one PC using the SmartUtility Light software.



INFORMATION

For more information about DUV40A, refer to the "Diagnostic Unit Vibration" manual, part number: 31969828/EN

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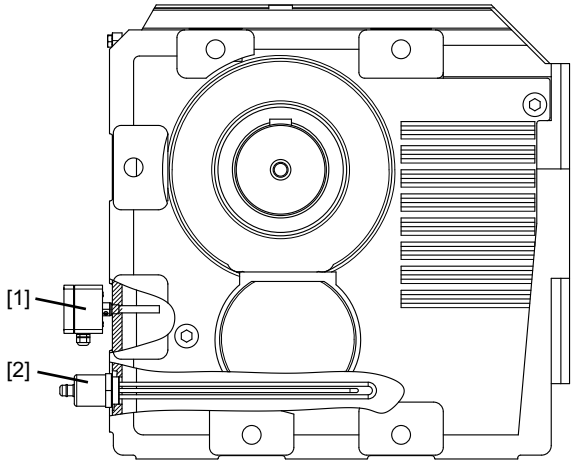
4.19.3 Gear unit heater for gear unit series R..7, F..7, and K..7

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:



2060553483

[1] Thermostat [2] Heater

INFORMATION

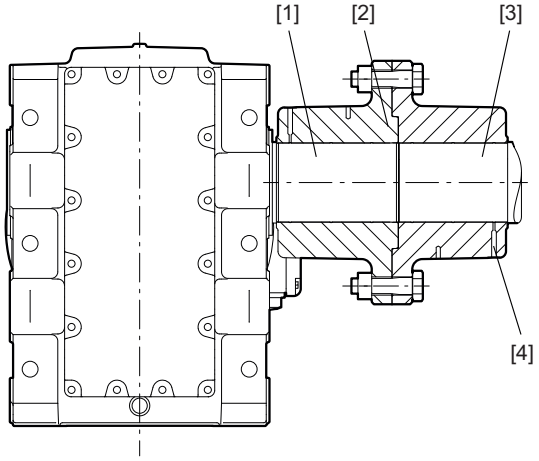
For further information regarding gear unit heaters, refer to the addendum "Gear unit heaters for gear unit series R..7, F..7 and K..7" to the operating instructions "Gear unit series R..7, F..7, K..7, K..9, S..7, SPIROPLAN® W".

4.19.4 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.

The torque between shaft and coupling is transferred via a cylindrical shrink fit. The two coupling halves are screwed together on the flanges. The couplings are equipped with several disassembly bores [3] for disassembling the interference fit hydraulically.



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[1] Flange coupling
[2] Customer and gear unit shaft
[3] Disassembly bores

INFORMATION

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

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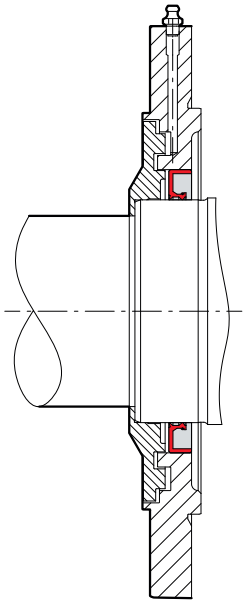
4.19.5 Regreasing the labyrinth seal

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
- Operation in **very** dusty environments with abrasive particles



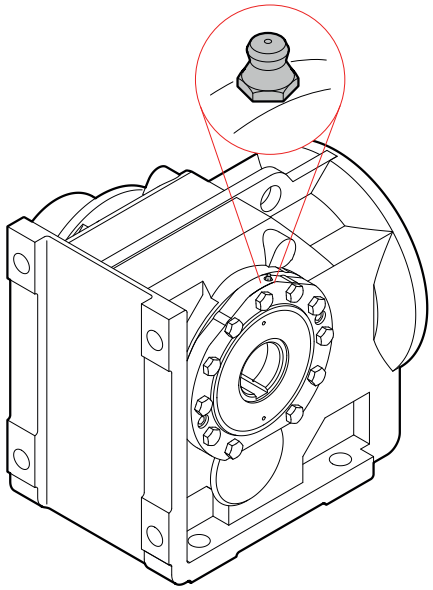
51614920843

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 is to be performed at regular intervals. The lubrication points are near the output shaft, see the following figure:



51614945163

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.

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Technical data

Sealing and rolling bearing grease

The table shows the lubricants recommended by SEW-EURODRIVE:

Area of application	Ambient temperature	Manufacturer	Type
Standard	-40°C to +80°C	SEW-EURODRIVE	Grease HL 2 E1[1)]
		Fuchs	Renolit CX-TOM 15[1)]
		Klüber	Petamo GHY 133 N
 2)	-40°C to +40°C	SEW-EURODRIVE	Grease HL 2 H1 E1
		Bremer & Leguil	Cassida Grease GTS 2
 3)	-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:

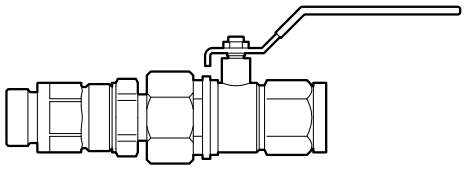
- **For fast-running bearings (gear unit input side):** Fill the cavities between the rolling elements one-third full with grease.
- **For slow-running bearings (gear unit output side):** Fill the cavities between the rolling elements two-thirds full with grease.

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.

4.19.6 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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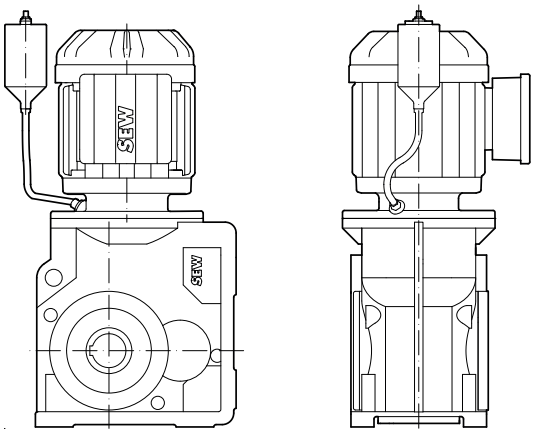
4.19.7 Oil expansion tank

The oil fill level for gear units in mounting position M4 is set due to technical reasons. In case of unfavorable circumstances, oil may leak from the breather valve of these gear units. Use an oil expansion tank to reliably prevent oil from leaking. The oil expansion tank provides additional space for the lubricant to expand.

SEW-EURODRIVE recommends using an oil expansion tank for gear units and gearmotors in mounting position M4 in the following cases:

- For input speeds > 2000 min^{-1}
- For sizes 77 – 97 and input speeds > 1800 min^{-1}
- For gear units and gearmotors in size 107 and larger

The following figure shows the oil expansion tank mounted to a gear unit.



The oil expansion tank is delivered as an 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.

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

If you require further information, contact SEW-EURODRIVE.

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4.19.8 Oil-air cooler for splash lubrication

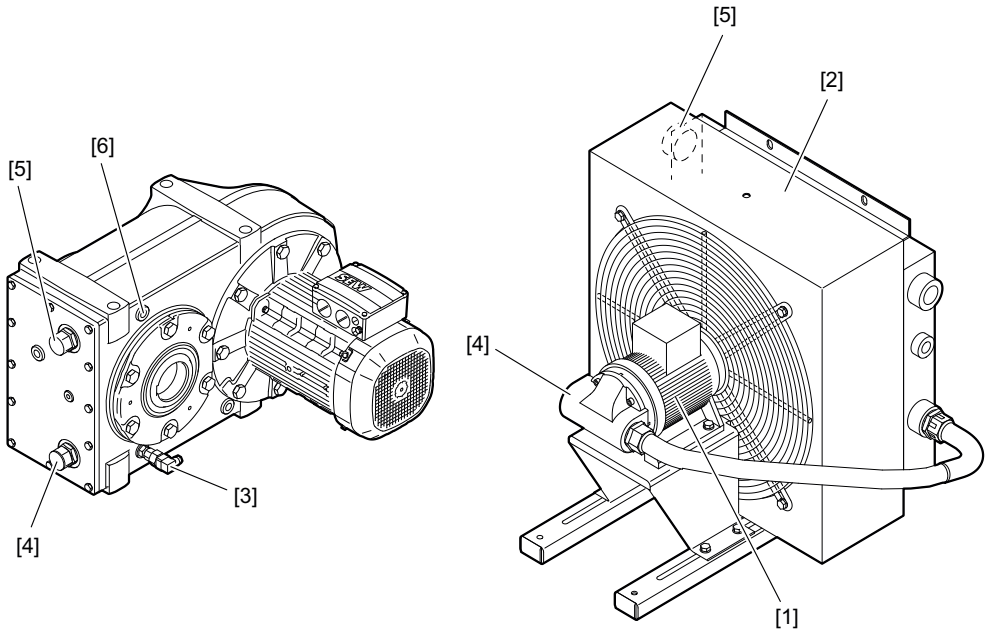
If the thermal rating of the naturally cooled gear unit is not sufficient, an oil-air cooling system can be used.

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

The standard scope of delivery of the basic cooling system includes:

- 1 pump with directly mounted asynchronous motor
- 1 oil-air heat exchanger
- 1 temperature switch with 2 switching points

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



51614840587

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

INFORMATION

You can find detailed documents describing the cooling systems in the Online Support section of the SEW-EURODRIVE website.

4.19.9 Agitator design

Relubrication of the agitator design

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

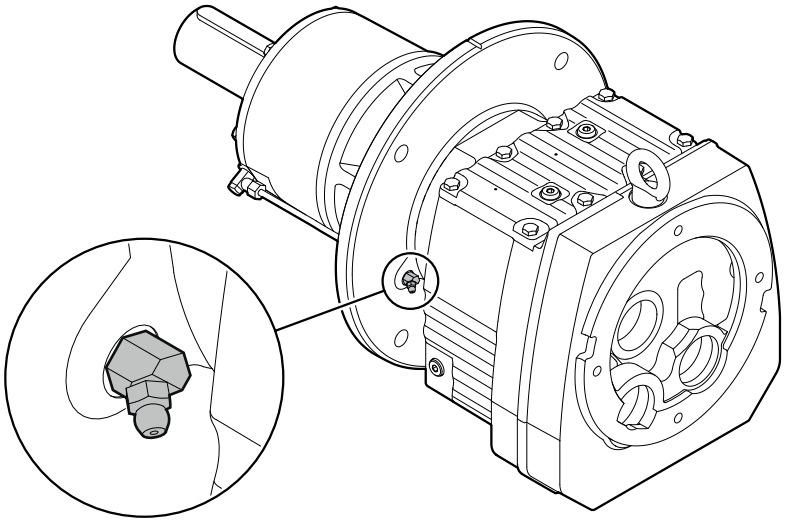
Position of greasing points

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 figures show the position of the greasing points:

RM.. agitator gear unit:



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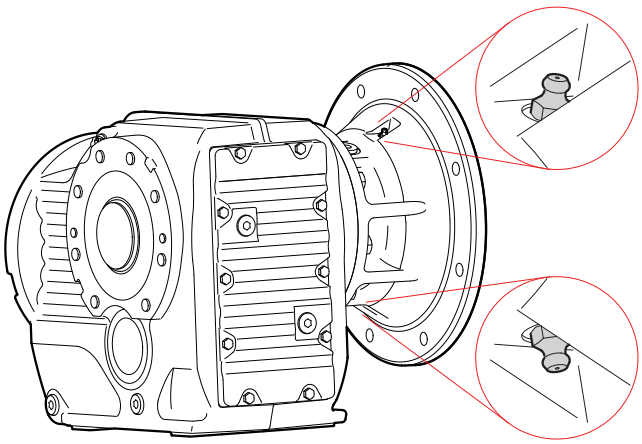
FM.., FAM.., KM.., KAM.. agitator gear unit:



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Maintenance interval and grease quantities

Regrease the agitator after 10 000 operating hours. The number of regreasing procedures is limited to 5 times. Observe the information on the required grease quantities in the following table:

Size	Grease quantity for regreasing in g	
	KM/FM	RM
67	5	7
77	11	13
87	11	20
97	16	32
107	35	43
127	34	70
137	–	70
147	–	79
157	46	–
167	–	93

The table shows the lubricants recommended by SEW-EURODRIVE:

Area of application	Ambient temperature	Manufacturer	Type
Standard	-40°C to +80°C	SEW-EURODRIVE	Grease HL 2 E1[1)]
		Fuchs	Renolit CX-TOM 15[1)]
		Klüber	Petamo GHY 133 N
2)	-40°C to +40°C	SEW-EURODRIVE	Grease HL 2 H1 E1
		Bremer & Leguil	Cassida Grease GTS 2
3)	-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.

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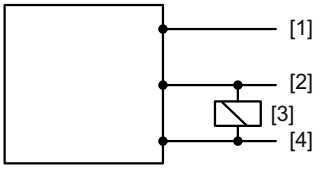
Leak sensor (Drywell design) with the agitator design

A Drywell design with level sensor is optionally available for FM.., FAM.., KM.., and KAM.. agitator drives.

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

Level sensor for sizes 67 – 97

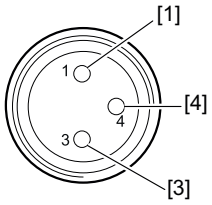
Electrical connection



51614937867

[1] DC 12 V – 32 V
[2] Output
[3] Load
[4] 0 V

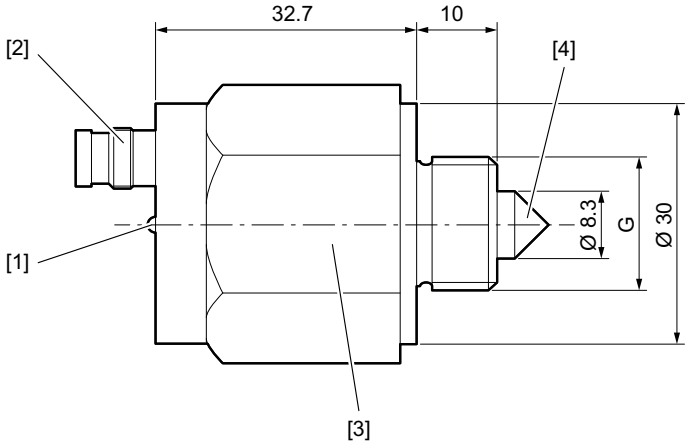
Pin assignment



51614942731

[1] DC 12 V – 32 V
[4] Output
[3] Load

Dimensions



51614962187

[1] LED function indicator
[2] M8 ×1 circular connector; 3-pin (alternatively cable connection)
[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

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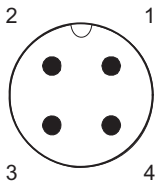
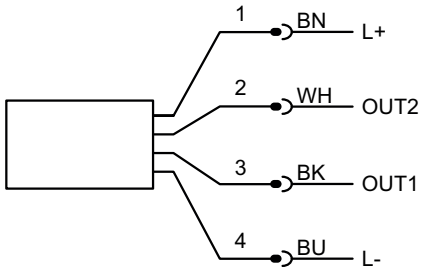
Mounting position	Any
Optical display of the switching status	1 LED
Process connection	Male thread G 3/8", G 1/2", or M12 × 1

For more information, contact SEW-EURODRIVE.

Level sensor for sizes 107 – 157

Electrical connection



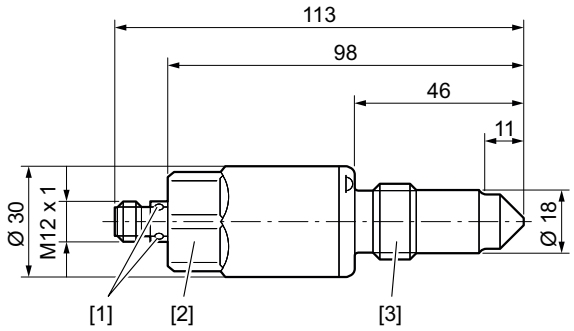


M12 connector

54657733515

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

Dimensions



51614959755

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

Technical data

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

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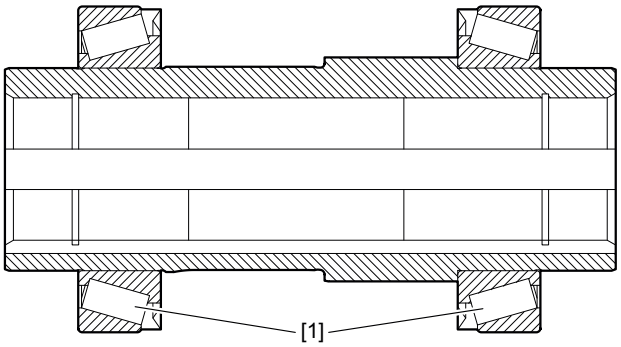
4.19.10 Reinforced hollow shaft bearing

With the reinforced hollow shaft bearing, the standard deep groove ball bearings are replaced with tapered roller bearings. This measure enables considerably higher overhung and axial loads and at the same time an increased service life of the bearings.

For FA./FH.87 and FA./FH.97 gear units, the reinforced bearing changes the gear unit dimensions (see chapter "Gear unit dimensions with reinforced bearings"). With all gear units, the dimensions of the gear units with reinforced bearings are identical to those of the gear units with standard bearings.

Contact SEW-EURODRIVE for additional information.



[1] Tapered roller bearing

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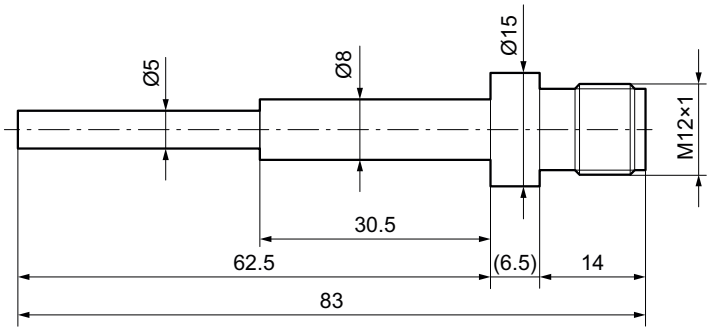
4.19.11 Pt1000 temperature sensor

Dimension drawing Pt1000



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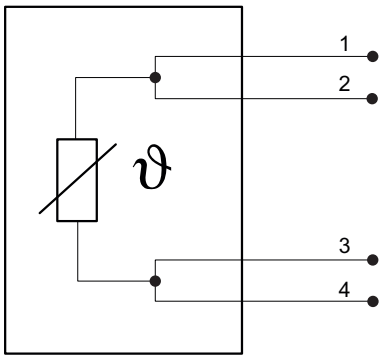
Technical data Pt1000

Technical data	Value
Bar length	62.5 mm
Measuring range	-40 to 130 °C
Permitted oil temperature	-40 to 130 °C
Accuracy	± (Pt1000 + 0.2 K)
Measuring element	1 × Pt1000 to DIN EN 60751, class B, 4-wire connection
Dynamic response T05/T09 (s)	3/8 to DIN EN 60751
Ambient temperature	-25 to 80 °C
Degree of protection, protection class	IP67, III
Housing materials	V4A (1.4404)
Materials in contact with the medium	V4A (1.4404)
Connection	M12 plug-in connection; gold-plated contacts

Pt1000 connection diagram



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5 Startup

NOTICE

Improper startup can damage the gear unit.

Possible damage to property.

- Observe the following information.

- Before startup, check the correct oil level corresponding to chapter "Inspection/ maintenance of the gear unit" (→ 🗎 157)! For the lubricant fill quantities, refer to the respective nameplate. If the gear unit is equipped with an oil sight glass, you can also determine the oil level at the oil sight glass.
- Remove any available transport protection prior to startup.
- Check that the direction of rotation is correct in the **decoupled** state. Listen out for unusual grinding noises as the shaft rotates.
- The oil level plugs and drain plugs as well as the breather plugs and breather valves must be freely accessible.
- Secure the key for the test run without output elements.
- Do not deactivate monitoring and protection devices even for a test run.
- Observe the maximum and effective values of project planning during startup of gear units with servomotor. The buyer is obliged to make the data available to the end user.
- Observe the information on the nameplate. Additional data relevant for operation is available in drawings and on the order confirmation.
- After installing the gear unit, check to verify 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 and couplings are equipped with suitable protection covers.
- If an oil sight glass is used for oil level monitoring, protect it against damage.
- Protect the gear unit from falling objects.

5.1 Inverter-operated gearmotors

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

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5.2 Checking the oil level

Before startup, always check that the oil level matches the mounting position. Observe the information in chapter "Checking the oil level and changing the oil".

As an alternative, you can determine the oil level using the oil sight glass if the gear unit is equipotential with an oil sight glass,.

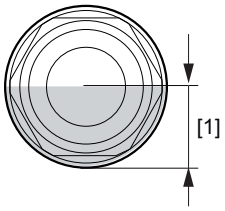
NOTICE

Gear unit damage due to leaking gear oil at the damaged oil sight glass.

Possible device damage

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

1. Check the oil level at the oil sight glass according to the following figure:



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

2. If the oil level is too low, proceed as follows:
   - Open the corresponding oil filling plug, see chapter "Inspection/maintenance of the gear unit" (→ 🗎 157).
   - Fill in fresh oil of the same type via the filling plug up to the marking.
   - Screw in the oil filling plug.

5.3 Pseudo-leakage at shaft seals

Due to the operating principle, seals of moving sealing surfaces on shaft feedthroughs cannot be completely tight because a lubricating film forms during operation. The lubricating film between the shaft and the sealing lip minimizes heat development and wear on the sealing system and provides the prerequisites for the intended service life. The optimum sealing properties are achieved after the run-in phase.

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5.4 Helical-worm gear units and SPIROPLAN® right-angle gear units W..

5.4.1 Run-in period

SPIROPLAN® W..0-, SPIROPLAN® W..7 and helical-worm gear units require a run-in period of at least 48 hours before reaching their maximum efficiency. A separate run-in period applies for each direction of rotation if the gear unit is operated in both directions of rotation. The table shows the average power reduction during the run-in period.

Helical-worm gear units

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

SPIROPLAN® right-angle gear units

Gear units of the series SPIROPLAN® W..9 are not subject to the run-in behavior because the gear ratios in the SPIROPLAN® stage are smaller and therefore have a very small amount of sliding.

W..10/W..20/W..30		W..37/W..47	
i range	**η reduction**	**i range**	**η 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%

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5.4.2 Helical-worm gear unit with projecting worm shaft

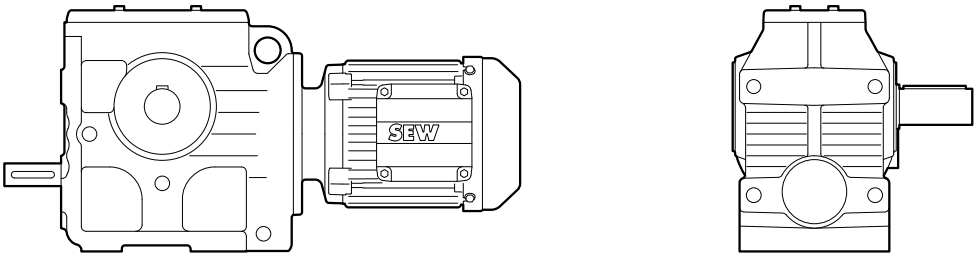
⚠ CAUTION

Risk of injury due to rotating parts

Injuries

- 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:



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

If the gear units were installed according to chapter "Mechanical installation" (→ 🗎 31), no special startup notes must be observed for helical, parallel-shaft helical and helical-bevel gear units.

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5.6 Gear units with backstop

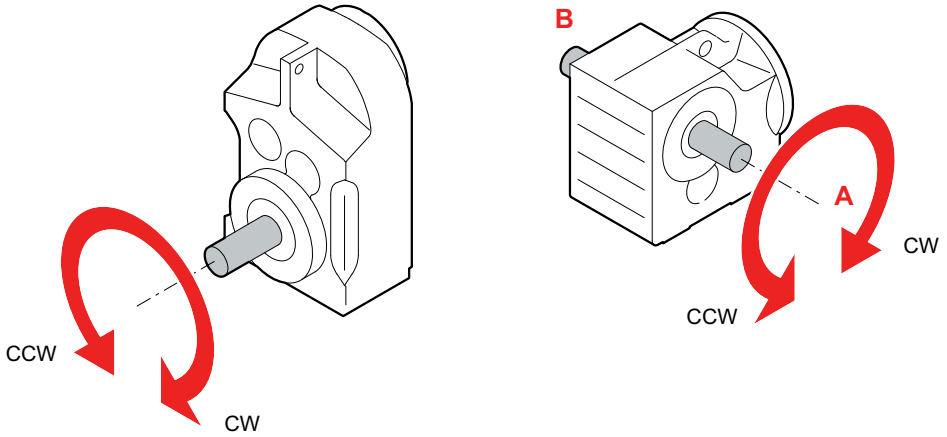
NOTICE

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.
- The backstop can be operated in blocking direction with half the output torque once for control purposes.

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



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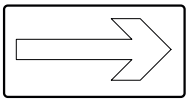
The permitted direction of rotation is indicated by a direction arrow on the housing:



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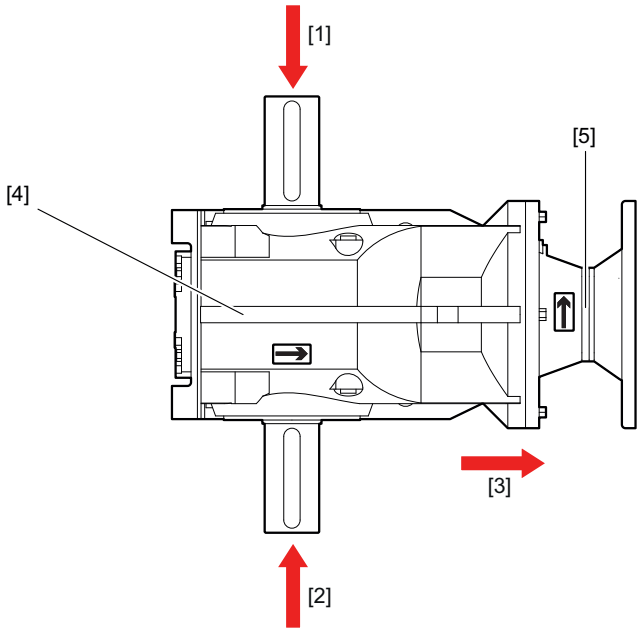
A replacement label is enclosed for the customer.

For right-angle gear units, you must also specify whether the direction of rotation is specified with a view to the A-side or B-side.



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[1] Viewing direction Direction of rotation Output B
[2] Viewing direction Direction of rotation Output A and A+B
[4] Gear unit
[3] Viewing direction in direction of rotation at the drive side
[5] Adapter/cover with RS option

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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 starting work.
- Prevent the drive from starting up unintentionally, for example by locking the key switch or removing the fuses from the current supply, and set up a prohibition sign to prevent a restart.

⚠ 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.

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.

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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:

- 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 bearings

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:

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

The rolling bearings must therefore be inspected regularly. Observe the corresponding inspection and maintenance intervals in chapter "Inspection intervals/maintenance intervals" (→ 🗎 154), "Lubricant change intervals" (→ 🗎 155), "Maintaining ADC/AL../AMS../AM../AQS../AQ../EWH.. adapters" (→ 🗎 156) and "AD.. input shaft assembly maintenance" (→ 🗎 156).

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.

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The service life depends significantly on the oil operating temperature. For information on the lubricant change intervals depending on the operating temperature, refer to the figure in chapter "Lubricant change intervals" (→ 🗎 155).

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 speed 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 chapter "Inspection intervals/maintenance intervals" (→ 🗎 154), "Lubricant change intervals" (→ 🗎 155), "Maintaining ADC/AL../AMS../AM../AQS../AQ../EWH.. adapters" (→ 🗎 156) and "AD.. input shaft assembly maintenance" (→ 🗎 156).

Cam ring/ Coupling ring

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

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

Observe the corresponding inspection and maintenance intervals in chapter "Maintaining ADC/AL../AMS../AM../AQS../AQ../EWH.. adapters" (→ 🗎 156).

Rubber buffer

The rubber buffer is required for shaft-mounted gear units of the F.., K..9, 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 flexible bushing is required for the torque arm of the S.. and K..7 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

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- Switching frequency
- Impact characteristics

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6.2 Inspection intervals/maintenance intervals

The following table shows the time intervals to be observed and the corresponding measures:

Time interval	Required steps
• Every 3000 operating hours, at least every 6 months	• Check the oil and oil level. • Check running noise for possible bearing damage. • Visual inspection of the seals for leakage. • Check that all screw plugs, any oil sight glass, the breather valve, and the gear unit cover screws are tight. • For gear units with a torque arm: Check the rubber buffer and replace if necessary.
With mineral oil: • Depending on the operating conditions (see figure in chapter "Lubricant change intervals" (→ 🗎 155)), at least every 3 years • According to oil temperature	• Change the oil. • Replace the oil seal (do not install it in the same track as the previous oil seal).
With synthetic oil: • Depending on the operating conditions (see figure in chapter "Lubricant change intervals" (→ 🗎 155)), at least every 5 years • According to oil temperature	• Change the oil. • Replace the oil seal (do not install it in the same track as the previous oil seal).
• Varies (depending on external factors)	• Touch up or renew the surface/corrosion protection paint. • Check the function of breather valve (if present).
• From 5th year of operation	• Check the blocking effect of the backstop annually. Ensure that the maximum blocking torque is not exceeded.

Exceptions

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

- R..07, R..17, R..27 helical gear units
- Parallel-shaft helical gear unit F..27
- SPIROPLAN® right-angle gear units

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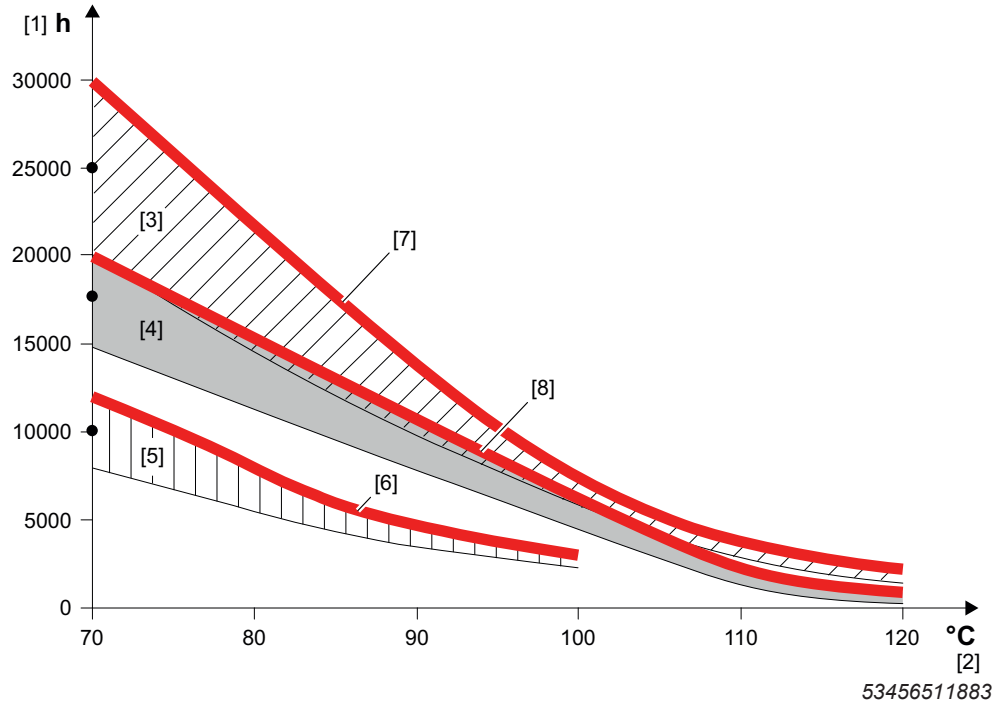
6.3 Lubricant change intervals

Use the following figure to determine the number of operating hours between 2 oil changes based on the sustained oil bath temperature at normal ambient conditions. In case of special designs under severe/aggressive ambient conditions, change the lubricant more frequently.



[1] Operating hours
[2] Continuous oil bath temperature
[3] CLP PG / CLP PG NSF H1
[4] CLP HC / CLP HC NSF H1
[5] CLP / E
[6] GearOil Base by SEW-EURODRIVE
[7] GearOil Poly (H1) / GearFluid Poly (H1) by SEW-EURODRIVE
[8] GearOil Synth (H1) by SEW-EURODRIVE

- Average value for each oil type at 70 °C

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6.4 Maintaining ADC/AL../AMS../AM../AQS../AQ../EWH.. adapters

The following table shows the time intervals to be observed and the corresponding measures:

Time interval	Required steps
• Every 3000 operating hours, at least every 6 months	• Check the running noises to detect possible bearing damage. • Visually check the test adapter for leakage. • With the drain hole design, check whether the condensation drain holes are clear.
• After 10 000 operating hours	• Perform a visual inspection of the coupling ring and check the coupling ring and the coupling parts for damage. • For backlash-free designs (AQ../AQS..) no abrasion/wear is permitted, otherwise the functional principle of the coupling (backlash-free) is no longer guaranteed.
• After 10 000 operating hours with NBR/FKM oil seals • After 20 000 operating hours with Premium Sine Seal adapter oil seals	• 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 adapter oil seals. • Change the bearing grease of the AM.. adapter • Change the bearing grease of the AM.. adapter with reinforced bearings.

6.5 AD.. input shaft assembly maintenance

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

Time interval	What to do?
• Every 3000 operating hours, at least every 6 months	• Check the running noises to detect possible bearing damage. • Visually check the adapter for leakage.
• After 10 000 operating hours	• Change the oil seal. Do not mount it in the same track.

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6.6 Inspection/maintenance of the gear unit

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

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

Thread	Tightening torque Nm
M8 × 1	8
M10 × 1	12
M12 × 1.5	15
M16 × 1.5	40
M22 × 1.5	60
M33 × 2	100
M42 × 2	150

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6.6.2 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 to 27	B					
	R..37/R..67	A					
	R..47/R..57	A				B	A
	R..77 to 167	A					
	RX..57 to 107	A					
F	F..27	B					
	F..37 to 157	A					
K	K..19/K..29	C					
	K..39/K..49	A					
	K..37 to 187	A					
S	S..37	C					
	S..47 to 97	A					
W	W..10 to 30	B					
	W..19 to 59	B					
	W..37 to 47	D			E	D	

Code letter	Chapter "Checking the oil level and changing the oil"	Reference
A:	• Helical gear units • Parallel-shaft helical gear units • Helical-bevel gear units K..39/K..49, K..37 to 187 • Helical-worm gear units S..47 to 97 **With oil level plug**	(→ 🗎 159)
B:	• Helical gear units • Parallel-shaft helical gear units • SPIROPLAN® W..0/W..9 **Without oil level plug, with cover plate**	(→ 🗎 162)
C:	• S..37 helical-worm gear units • K..19/K..29 helical-bevel gear units **Without oil level plug, without cover plate**	(→ 🗎 166)
D:	• SPIROPLAN® W..37/W..47 **In mounting positions M1, M2, M3, M5, M6 with oil level plug**	(→ 🗎 169)

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Code letter	Chapter "Checking the oil level and changing the oil"	Reference
E:	• SPIROPLAN® W..37/W..47... **In mounting position M4 without oil level plug and cover plate**	(→ 🗎 171)

Refer to chapter "Mounting positions" (→ 🗎 175) for notes on the mounting positions.

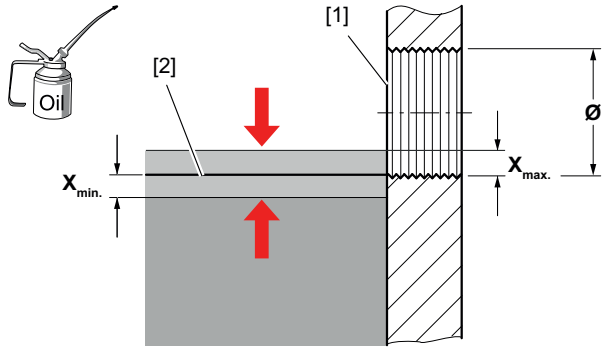
You cannot check the oil level of gear units in pivoted mounting position. The gear units are delivered with the correct oil level. Observe the specifications and fill quantities on the nameplate if you have to change the oil.

6.6.3 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 information in "Inspection/maintenance" (→ 🗎 150).
2. Determine the positions of the oil level plug and the breather valve using the mounting position sheets. Refer to chapter "Mounting positions" (→ 🗎 175).
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 might be higher than the lower edge of the oil level bore.
5. Check the oil level according to the following figure and the corresponding table.



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[1] Ø oil level bore
[2] Oil level setpoint
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. If the oil level is too low, proceed as follows:
   - Remove the breather valve from the breather bore.
   - 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.

- Screw the breather valve back in. Observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 157).

7. Screw the oil level plug back in. Observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 157).

Checking the oil via the oil drain plug

Proceed as follows to check the gear unit oil:

1. Observe the information in "Inspection/maintenance" (→ 🗎 150).
2. Determine the position of the oil drain plug using the mounting position sheets, see chapter "Mounting positions" (→ 🗎 175).
3. Extract some oil from the oil drain plug.
4. Check the oil consistency:
   - Viscosity (have this carried out by a suitable laboratory if necessary)
   - If you can see that the oil is heavily contaminated, it is advisable to change the oil, even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 🗎 154).
5. Check the oil level according to the previous chapter.

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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.

Severe 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 information at the beginning of chapter "Inspection/maintenance" (→ 🗎 150).
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" (→ 🗎 175).
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. When doing this, observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 157).
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 quantities according to the specifications on the nameplate or according to the mounting position. See chapter "Lubricant fill quantities" (→ 🗎 235).
   - Check the oil level at the oil level plug.
8. Re-insert the oil level plug and the breather valve. When doing this, observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 157).

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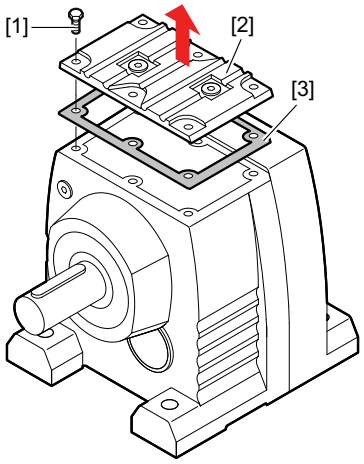
6.6.4 B: Helical, parallel-shaft, SPIROPLAN® right-angle gear units without oil level plug with mounting cover

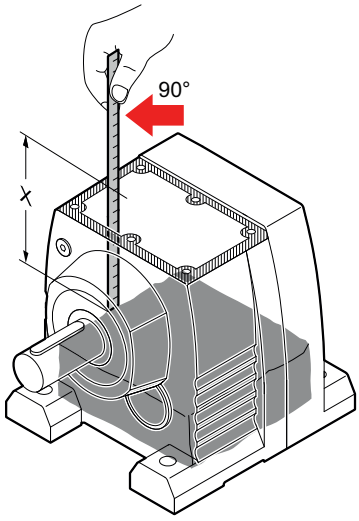
Checking the oil level via the cover plate

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

1. Observe the information in "Inspection/maintenance" (→ 🗎 150).
2. To position the cover plate on the top, place the gear unit in the following mounting position:
   - R..07 – R..27 in mounting position M1
   - R..47 and R..57 in mounting position M5
   - F..27 in mounting position M3
   - W..10 to W..30 and W..19 to W..59 in mounting position M1
3. Loosen the screws [1] of the cover plate [2]. Remove the cover plate [2] with its gasket [3] (see figure below).



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



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. Correct the fill level if necessary.

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Gear unit type		Maximum distance x between oil level and sealing surface of gear unit housing for mounting position					
		M1	M2	M3	M4	M5	M6
R..07	2-stage	52 ± 1	27 ± 1	27 ± 1	27 ± 1	27 ± 1	27 ± 1
	3-stage	49 ± 1	21 ± 1	21 ± 1	21 ± 1	21 ± 1	21 ± 1
R..17	2-stage	63 ± 1	18 ± 1	46 ± 1	18 ± 1	46 ± 1	46 ± 1
	3-stage	58 ± 1	11 ± 2	40 ± 2	11 ± 2	40 ± 2	40 ± 2
R..27	2-stage	74 ± 1	22 ± 1	45 ± 1	22 ± 1	45 ± 1	45 ± 1
	3-stage	76 ± 1	19 ± 1	42 ± 1	19 ± 1	42 ± 1	42 ± 1
R..47	2-stage	–	–	–	–	39 ± 1	–
	3-stage	–	–	–	–	32 ± 1	–
R..57	2-stage	–	–	–	–	32 ± 1	–
	3-stage	–	–	–	–	28 ± 1	–
F..27	2-stage	78 ± 1	31 ± 1	72 ± 1	56 ± 1	78 ± 1	78 ± 1
	3-stage	71 ± 1	24 ± 1	70 ± 1	45 ± 1	71 ± 1	71 ± 1
W..19		42 ± 1			6 ± 1	14 ± 1	
W..29		45 ± 1			5 ± 1	15 ± 1	
W..39		56 ± 1			4 ± 1	25 ± 1	
W..49		65 ± 1			9 ± 1	24 ± 1	
W..59		63 ± 1			4 ± 1	9 ± 1	
independent of the mounting position							
W..10		12 ± 1					
W..20		19 ± 1					
W..30		31 ± 1					

6. Close the gear unit after the oil level check:
   - Reattach the gasket of the cover plate. Make sure that the sealing surfaces are clean and undamaged.
   - Mount 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 tightened securely. To avoid damaging the cover plate, use only impulse wrenches or torque wrenches. Do not use impact screwdrivers.

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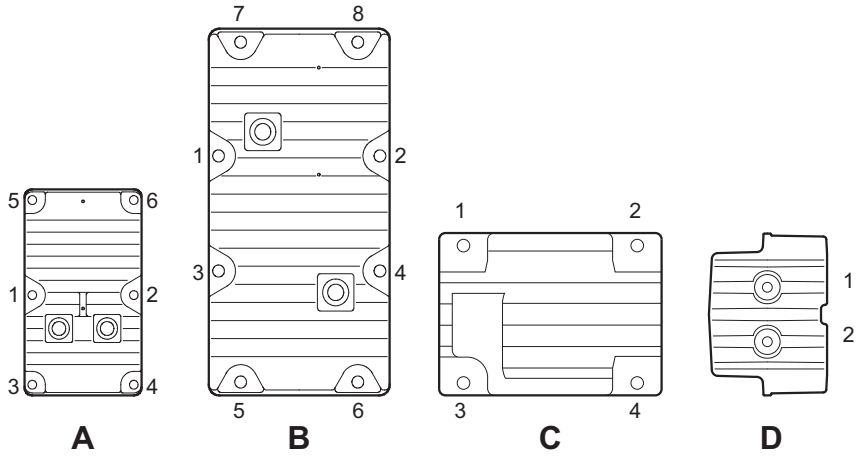

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Gear unit type	Image	Retaining thread	Tightening torque T_N Nm
R/RF07/17/27	D	M6	12
R/RF47/57	A	M6	12
F..27	B	M5	7
W..10	C	M5	7
W..19	C	M5	7
W..20	C	M6	12
W..29	A	M5	7
W..30	A	M6	12
W..39	A	M5	7
W..49	A	M5	7
W..59	A	M5	7

Reassembly

Note that the thread is already in the gear unit housing during reassembly with the self-tapping screw. Therefore, screw the screw into the thread by hand with approx. two turns and retighten it with a torque wrench according to the table.

Impulse wrenches and impact wrenches are not permitted.

The tightening torques correspond to a metric ISO screw with strength class 8.8.

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Checking the oil via the cover plate

Proceed as follows to check the gear unit oil:

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 150).
2. Open the cover plate of the gear unit according to chapter "Checking the oil level via the cover plate" (→ 🗎 162).
3. Take an oil sample via the cover plate opening.
4. Check the oil consistency.
   - Viscosity (have this carried out by a suitable laboratory if necessary)
   - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends changing the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 🗎 157).
5. Check the oil level. See chapter "Checking the oil level via the cover plate" (→ 🗎 162).
6. Screw on the cover plate. Observe the order and the tightening torques in accordance with chapter "Checking the oil level via the cover plate" (→ 🗎 162).

Changing the oil via the cover plate

⚠ WARNING

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

Severe injuries.

- Let the gear unit cool down before you start working on it. 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 information at the beginning of chapter "Inspection/maintenance" (→ 🗎 150).
2. Open the cover plate of the gear unit according to chapter "Checking the oil level via the cover plate" (→ 🗎 162).
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. You must not mix different synthetic lubricants.
   - Fill in the oil quantity 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 in accordance with chapter "Checking the oil level via the cover plate" (→ 🗎 162).

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Reassembly

Note that the thread is already in the gear unit housing during reassembly with the self-tapping screw. Therefore, screw the screw into the thread by hand with approx. two turns and retighten it with a torque wrench according to the table.

Impulse wrenches and impact wrenches are not permitted.

The tightening torques correspond to a metric ISO screw with strength class 8.8.

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

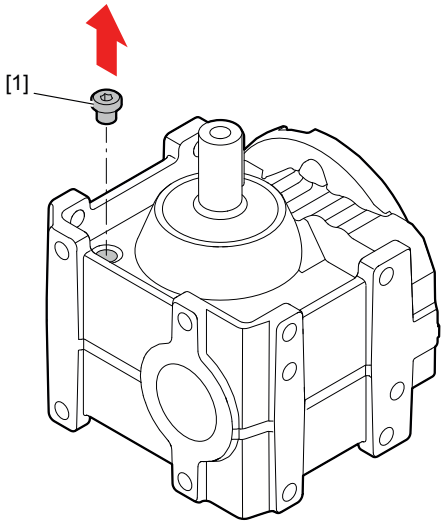
Checking the oil level via the screw plug

The gear units S..37, K..19 and K..29 are not equipped with an oil level plug or a mounting cover. This is why the oil level is checked via the control bore.

1. Observe the information in "Inspection/maintenance" (→ 🗎 150).
2. Place the gear unit in the mounting position stated in the following table. This is why the control bore always points upwards.

Gear unit	Mounting position
S..37	M5/M6
K..19/K..29	M6

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



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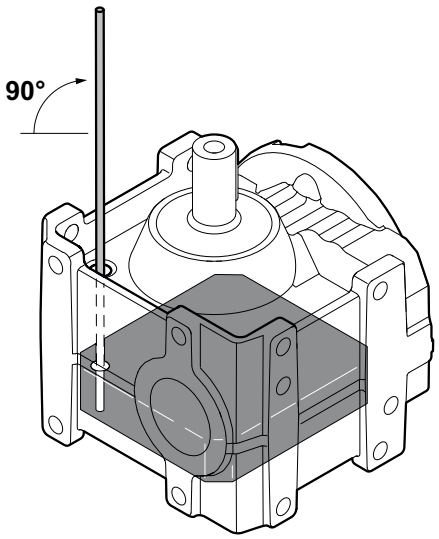
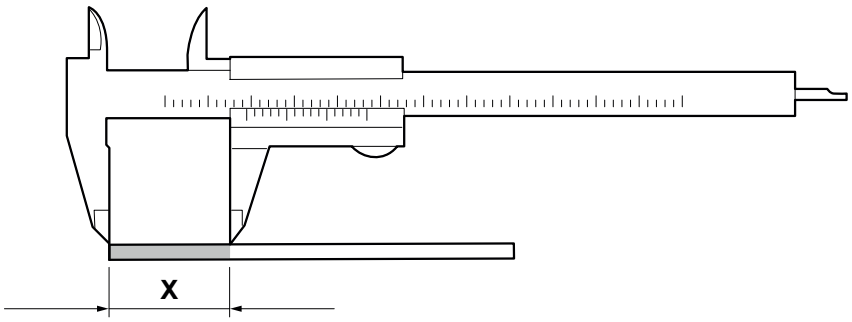
4. Insert the dipstick vertically via the control bore all the way to the bottom of the gear unit housing. Pull the dipstick vertically out of the control bore again, as shown in the following figure:



53456502155

5. Determine the size of the section "x" of the dipstick covered with lubricant using a caliper, as depicted in the following figure.



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

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

7. Tighten the screw plug again. Observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 157).

Checking the oil via the screw plug

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 150).
2. Open the screw plug of the gear unit according to chapter "Checking the oil level via the screw plug" (→ 🗎 166).
3. Take an oil sample via the screw plug bore.
4. Check the oil consistency.
   - Viscosity (have this carried out by a suitable laboratory if necessary)
   - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends changing the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 🗎 154).
5. Check the oil level. See chapter "Checking the oil level via the screw plug" (→ 🗎 166).
6. Screw the screw plug back into place. When doing this, observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 157).

Changing the oil via the screw plug

⚠ WARNING

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

Severe injuries.

- Let the gear unit cool down before you start working on it. 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 information at the beginning of chapter "Inspection/maintenance" (→ 🗎 150).
2. Open the screw plug of the gear unit according to chapter "Checking the oil level via the screw plug" (→ 🗎 166).
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" (→ 🗎 235).
5. Check the oil level.
6. Screw the screw plug back into place. When doing this, observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 157).

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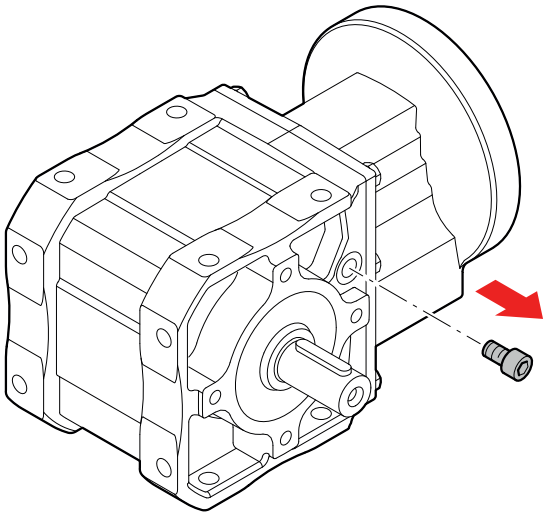
6.6.6 D: SPIROPLAN® W..37/W..47 in mounting position M1, M2, M3, M5, M6 with oil level plug

Checking the oil level at the oil level plug

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

1. Observe the information in "Inspection/maintenance" (→ 🗎 150).
2. Set up the gear unit in mounting position M1.
3. Slowly remove the oil level plug (see following figure). In this case, oil can leak in small quantities.



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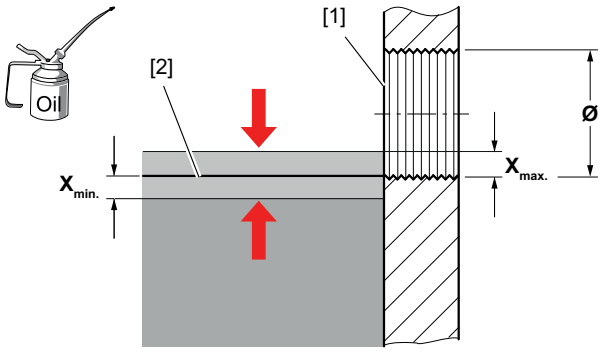
4. Check the oil level according to the following figure.



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[1] Ø oil level bore [2] Target oil level

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

5. If the oil level is too low, add fresh oil of the same type (consult SEW-EURODRIVE if necessary) via the oil level bore, up to the lower edge of the bore.
6. Screw the oil level plug back in. Observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 157).

Checking the oil level at the oil level plug

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

1. Observe the information in "Inspection/maintenance" (→ 🗎 150).
2. Remove some oil at the oil level plug.
3. Check the oil consistency.
   - Viscosity (have this carried out by a suitable laboratory if necessary)
   - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends changing the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 🗎 154).
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.

Severe 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 information at the beginning of chapter "Inspection/maintenance" (→ 🗎 150).
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 🗎 175).
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. When doing this, observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 157).
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 quantity specified on the nameplate or according to the mounting position. See chapter "Lubricant fill quantities" (→ 🗎 235).
   - Check the oil level in accordance with in chapter "Checking the oil level at the oil level plug" (→ 🗎 169).
8. Re-insert the upper oil level plug. When doing this, observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 157).

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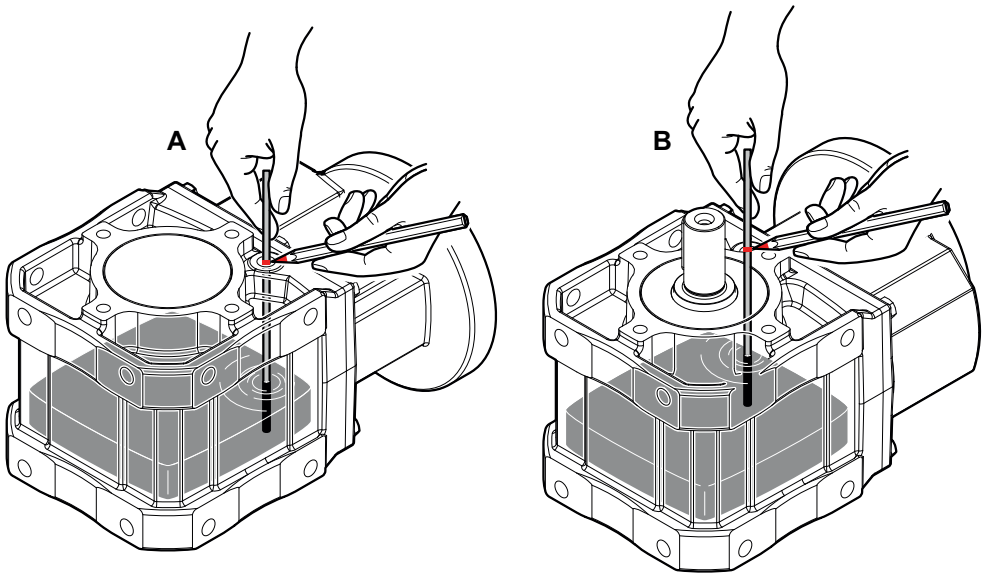
6.6.7 E: SPIROPLAN® W..37 / W..47 in mounting position M4 without oil level plug and cover plate

Checking the oil level using the screw plug

The gear units W..37/W..47 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 information in "Inspection/maintenance" (→ 🗎 150).
2. Set up the gear unit in mounting position M5 or M6. See chapter "Mounting positions" (→ 🗎 175).
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. Vertically pull the dipstick out of the control bore again (as shown in the following figure).



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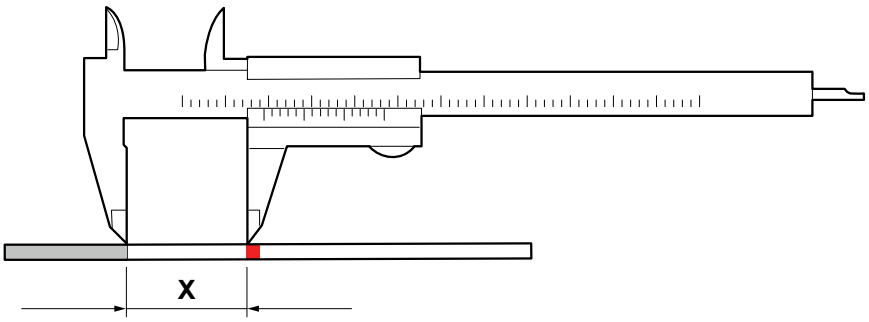
5. Determine the distance "x" between the wetted part and the marking of the dipstick using a caliper. (see following figure).



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

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Gear unit type	Oil level = section "x" in mm of the dipstick Mounting position during the test	
	M5 Lying on the A-side	M6 Lying on the B-side
W..37 in mounting position M4	37 ± 1	29 ± 1
W..47 in mounting position M4	41 ± 1	30 ± 1

7. Tighten the screw plug again. Observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 157).

Checking the oil via the screw plug

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

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 150).
2. Remove a little oil at the oil screw plug.
3. Check the oil consistency:
   - Viscosity (have this carried out by a suitable laboratory if necessary)
   - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends changing the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 🗎 154).
4. Check the oil level. See previous chapter.

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Changing the oil via the screw plug

⚠ WARNING

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

Severe injury.

- 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 information at the beginning of chapter "Inspection/maintenance" (→ 🗎 150).
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 🗎 175).
3. Place a container underneath the screw plug.
4. Remove the screw plugs at the A and B-side of the gear unit.
5. Drain all the oil.
6. Re-insert the lower screw plug. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 157).
7. Add fresh oil of the same type (consult SEW-EURODRIVE if necessary) via the upper screw plug. You must not mix different synthetic lubricants.
   - Add the oil quantity specified on the nameplate or in accordance with the information in chapter "Lubricant fill quantities" (→ 🗎 235).
   - Check the oil level in accordance with in chapter "Checking the oil level using the screw plug" (→ 🗎 171).
8. Re-insert the upper screw plug. When doing this, please observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 157).

6.6.8 Replacing the oil seal

NOTICE

Damage to oil seal due to mounting below 0 °C.

Damage to oil seal.

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

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6.6.9 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 adhesive strips after painting.

6.6.10 Reassembly

Note that the thread is already in the gear unit housing during reassembly with the self-tapping screw. Therefore, screw the screw into the thread by hand with approx. two turns and retighten it with a torque wrench according to the table.

Impulse wrenches and impact wrenches are not permitted.

The tightening torques correspond to a metric ISO screw with strength class 8.8.

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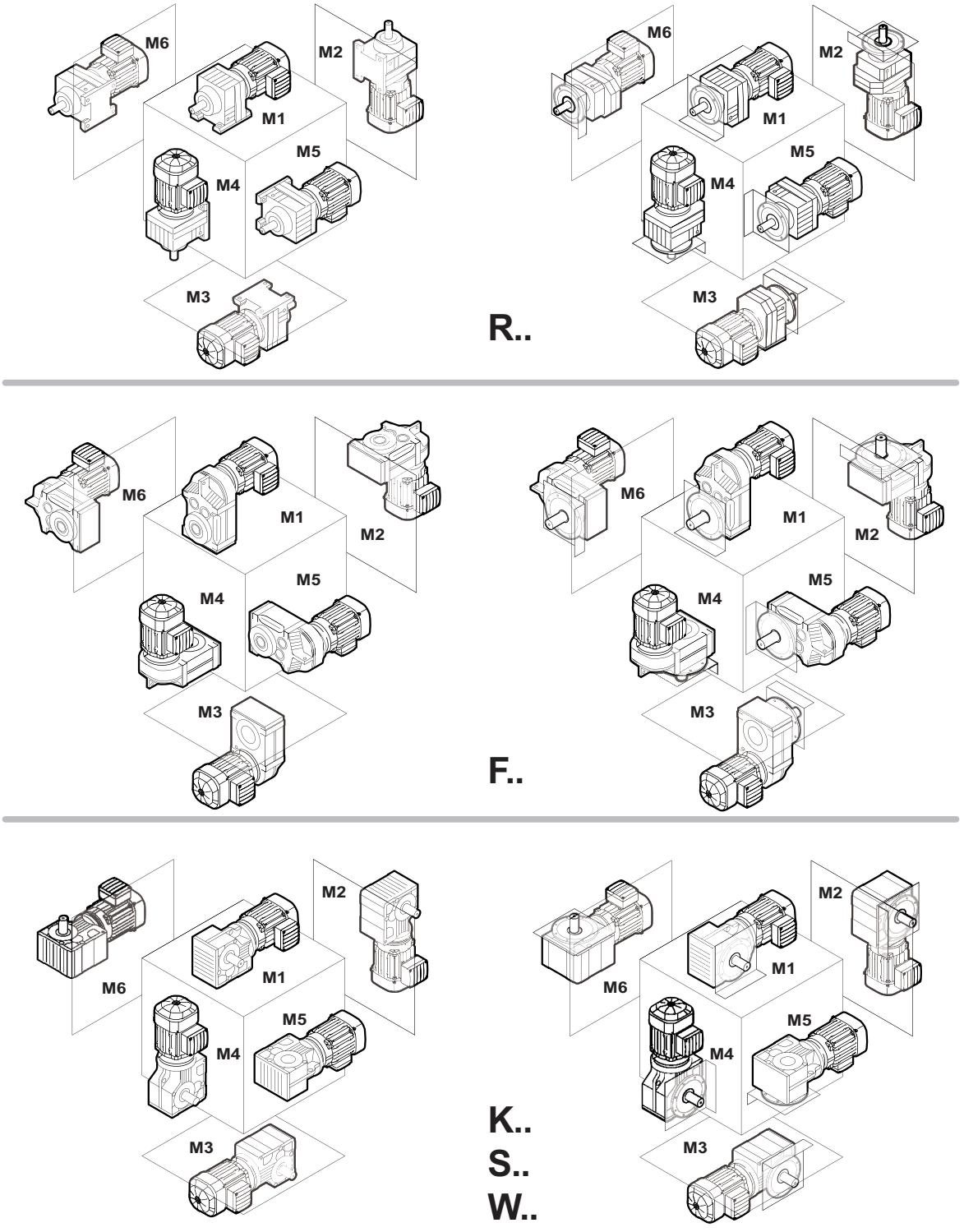
7 Mounting positions

7.1 Designation of the mounting positions

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



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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 the thermal check:

- A mounting position where the first gear unit stage is completely immersed in the lubricant. The corresponding mounting positions of the gear units are marked with an * in chapter "Mounting position sheets" (→ 🗎 179).
- A high mean input speed and consequently a high circumferential speed of the gear wheels of the input gear stage.

If one or both conditions apply, determine the requirements from the application and the corresponding operating conditions (see chapter "Data for calculating the thermal rating" (→ 🗎 176)) 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 measures, such as by using a synthetic lubricant with higher thermal endurance properties.

To keep churning losses to a minimum, use the gear unit preferably in mounting position M1.

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 n_{em} or mean output speed n_{am} each in min^{-1}
- Effective motor torque M_{eff} in Nm
- Input motor power P_{Mot} in kW
- Mounting position M1 – M6 or pivoting angle

Installation site:

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

Installation situation:

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

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7.3 Change of mounting position

Observe the following information when operating 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").
- For helical-bevel gearmotors: Contact SEW-EURODRIVE if you want to change to mounting position M5 or M6.
- 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 performing a thermal check/doing the project planning again.

7.4 Gear units in pivoted mounting position (dynamic)

The dynamic pivoted mounting position is available on request for gear units of the types R..7, F..7, K..7, K..9, S..7, and SPIROPLAN® W..9.

In the pivoted mounting position, the gear units are delivered with the maximum required oil fill quantity and sealed with oil screw plugs. The gear unit can be pivoted during operation to the mounting positions required by the customer.

7.5 Gear units in pivoted mounting position (stationary)

The stationary pivoted mounting position is available for all gear units of the type R..7, F..7, K..7, K..9, S..7 and SPIROPLAN® W..7.

In the stationary pivoted mounting position, the gear units are delivered with the oil fill quantity required for this pivoted mounting position and sealed with oil screw plugs. For gear units with stationary pivoted mounting position, replace the highest screw plug with the supplied breather valve before startup.

When doing this, observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 157).

7.6 Universal mounting position M0

SPIROPLAN® right-angle gear units W..10 – W..30 are available in universal mounting position M0. Due to their small size they are completely enclosed and do not have a breather valve. You can use them in any mounting position from M1 to M6 without needing to make any adjustments to the gear unit.

All W..10 to W..30 gear units of a particular size have the same oil fill quantity.

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7.7 Mounting position MX

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

Before startup, make adjustments dependent on the mounting position for gear units in mounting position MX.

In the mounting position MX, the gear units are delivered with the maximum required oil fill quantity 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" (→ 🗎 235)). Customers will also have to mount the enclosed breather valve at the proper location depending on the mounting position, see chapter "Mounting position sheets" (→ 🗎 179). When 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" (→ 🗎 157).

Check for the correct oil level before startup, as described in chapter "Checking the oil level and changing the oil" (→ 🗎 158).

7.7.1 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.

7.8 Variable mounting position

The variable mounting position is available upon request for gear units of the types R.., F.., K.., S.., and SPIROPLAN® W..7/W..9.

For gear units with variable mounting position, you must perform mounting position-dependent adjustments before startup. Adjustment of the oil fill quantity is not required.

With the variable mounting position, the gear units are delivered with the maximum required oil fill quantity of the mentioned mounting positions and sealed with oil screw plugs. A breather valve is included if necessary.

The enclosed breather valve must be mounted in the proper location depending on the mounting position, see chapter "Mounting position sheets" (→ 🗎 179).

When 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" (→ 🗎 157).

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7.9 Mounting position sheets

7.9.1 Dimension sheet information

Position of the valves and screws

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.

Representation of the shaft

For gear units with solid shaft, the shaft shown is always on the A-side. For shaft-mounted gear units, the customer shaft is shown as a dashed line. The output end (position of the output shaft) is always shown on the A-side.

W..0 gear units

SPIROPLAN® right-angle gearmotors W..10, W..20, and W..30 are independent of the mounting position. No breather valves, oil level plugs or oil drain plugs can be installed. Mounting positions M1 to M6 are also displayed for these SPIROPLAN® right-angle gearmotors for better orientation.

Mounting position M0

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.

Gear units W..9 in mounting position M4 or M2

SPIROPLAN® right-angle gearmotors W..9 are equipped with breather valves in mounting position M4 and with an oil drain plug in mounting position M2.

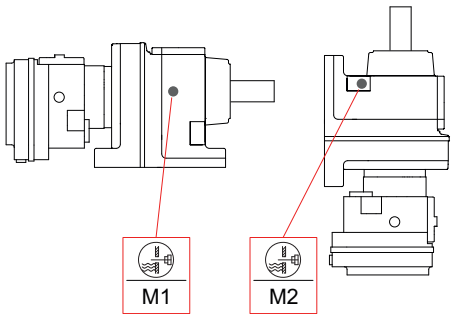
7.9.2 Position of the oil level plug of compound gear units

To ensure sufficient lubrication of the 1st gear unit (large gear unit) of compound gear units, the following gear units have an increased oil level in the specified mounting position:

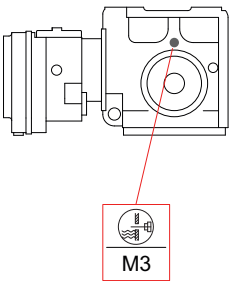
- Helical gear unit type R..R in mounting position M1 and M2
- Helical-worm gear unit type S..R in mounting position M3

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

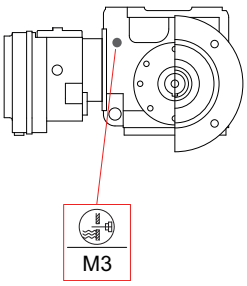
R..R..



S..R..



SF..R.., S.F..R.., SA..R..



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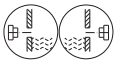
Symbol	Meaning
	Oil level plug

7.9.3 Symbols used

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

Symbol	Meaning
	Breather valve
	Oil level plug
	Oil drain plug

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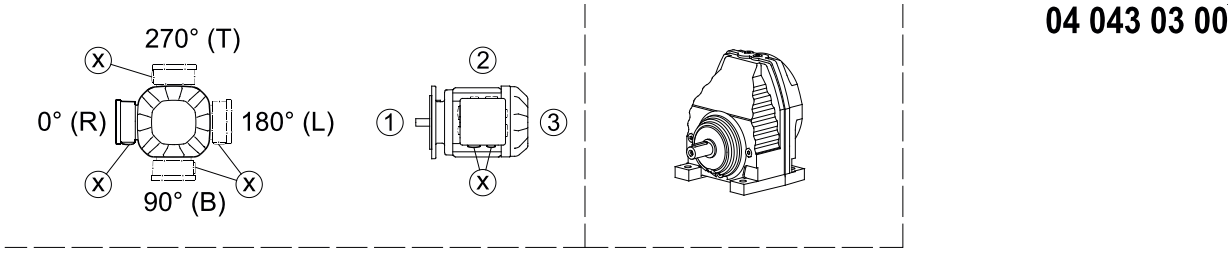
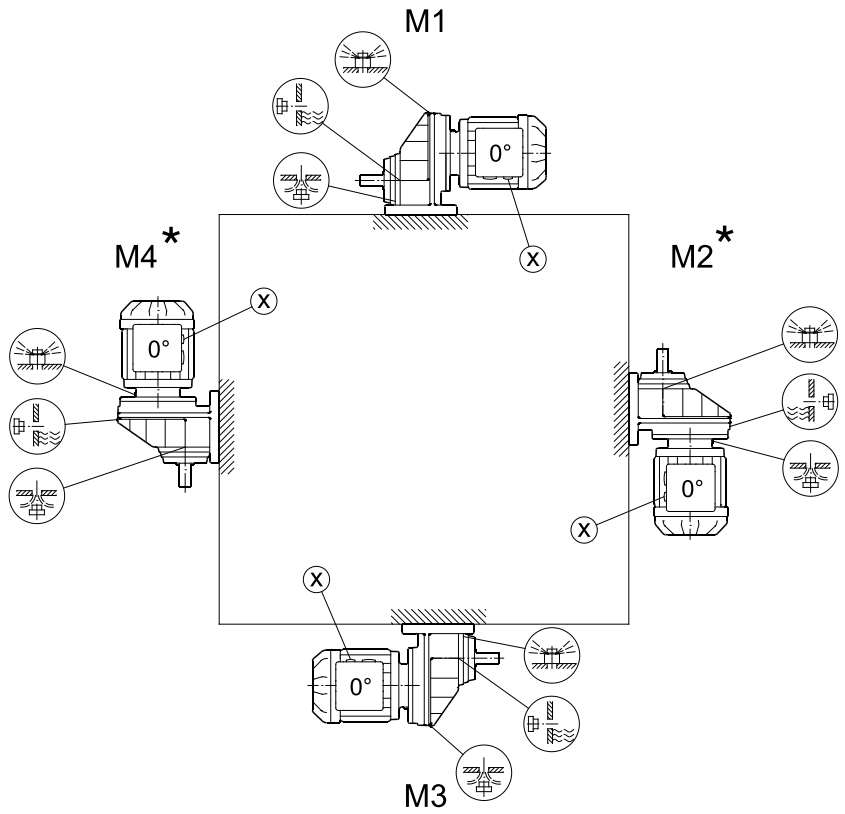
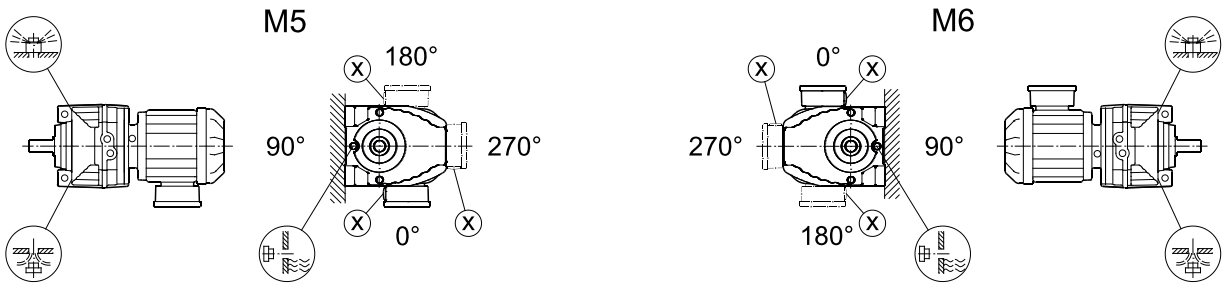
7.9.4 Mounting positions of helical gear units

RX57 – RX107



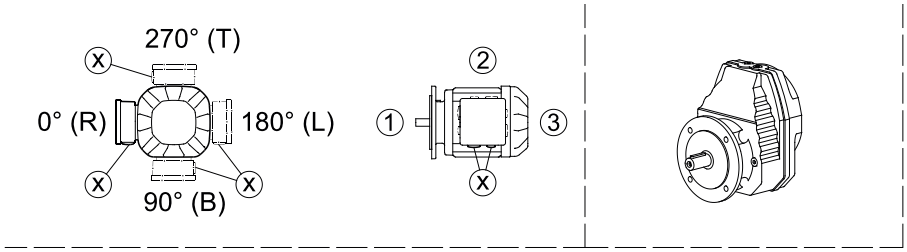


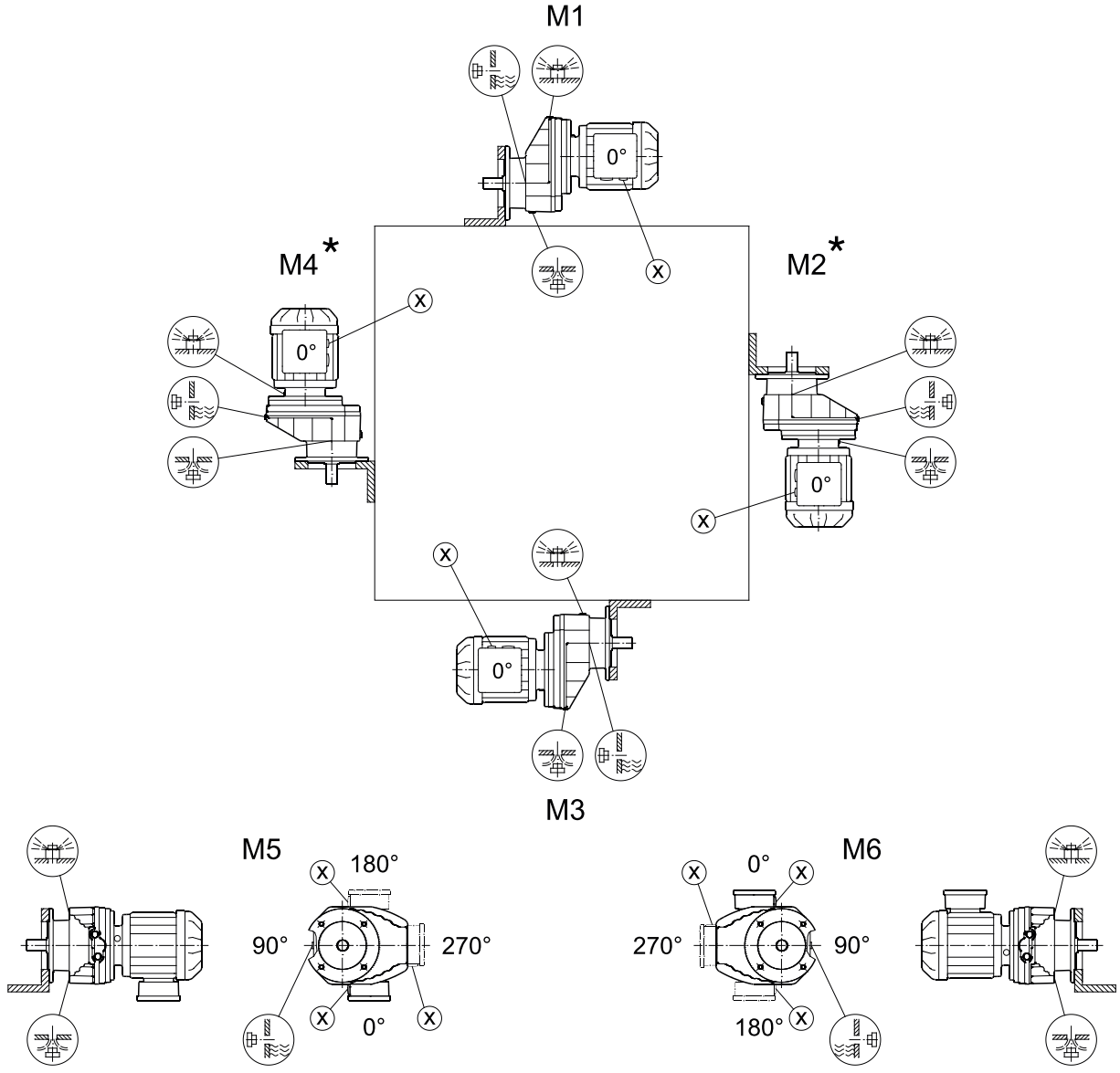


* (→ 🗎 176)

RXF57 – RXF107

04 044 03 00





* (→ 🗎 176)

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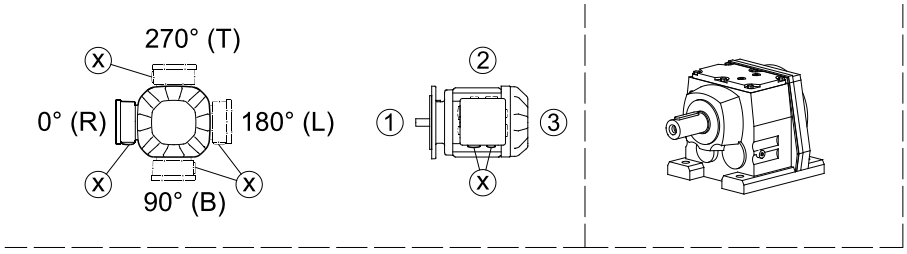
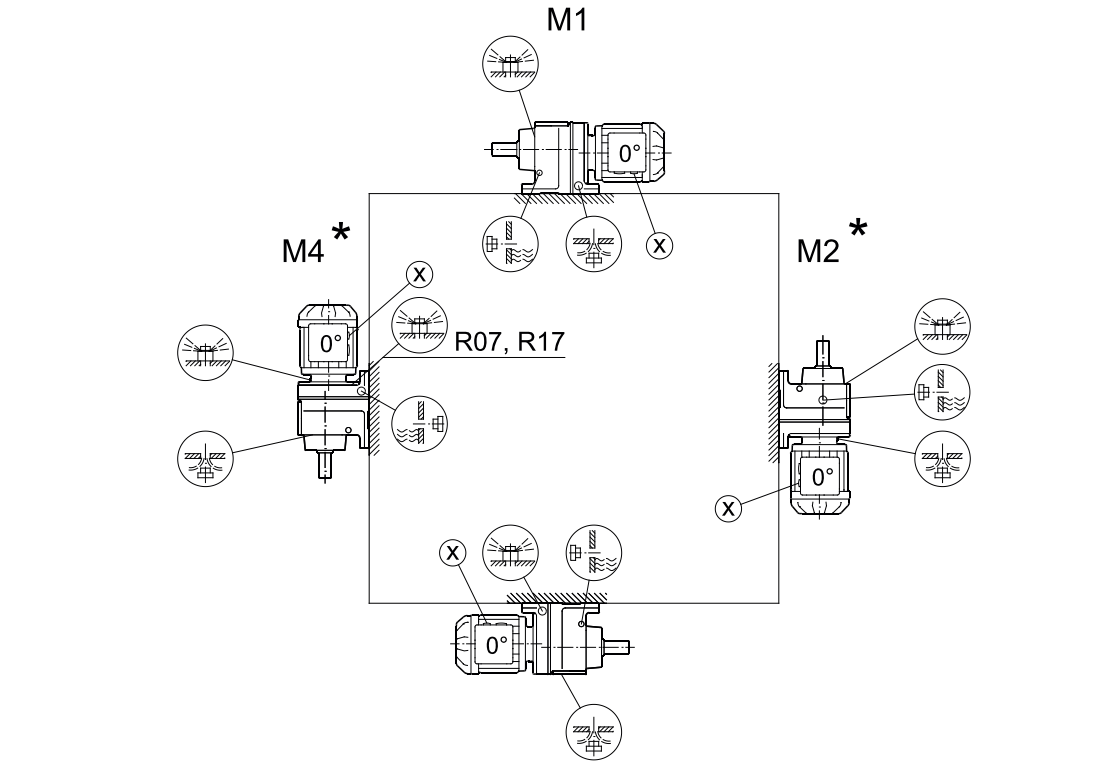
R07 – R167



04 040 04 00



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

* (→ 🗎 176)

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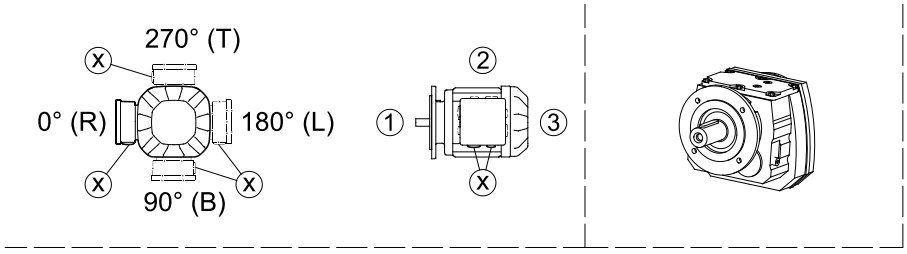
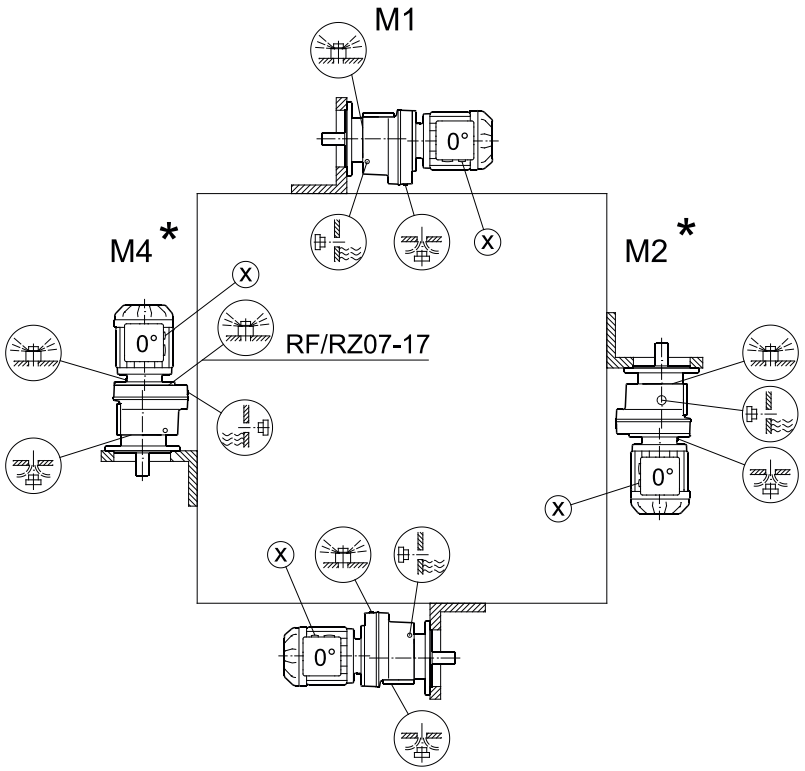
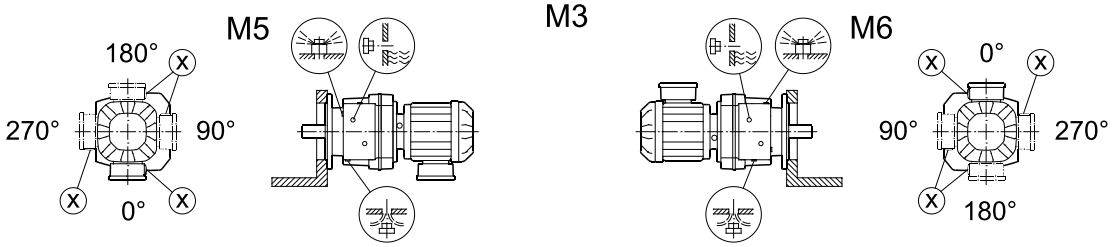
RF07 – RF167, RZ07 – RZ87, RM57 – RM167

04 041 04 00







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

* (→ 🗎 176)

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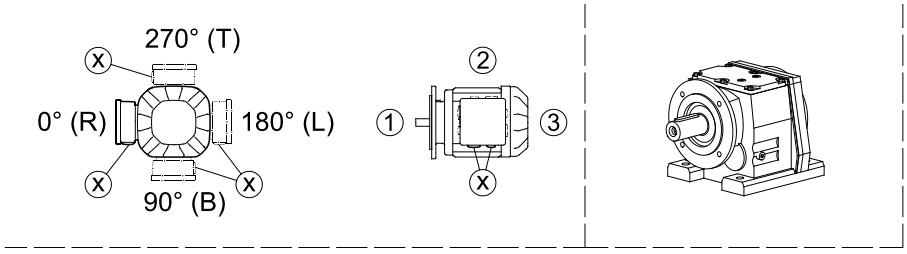
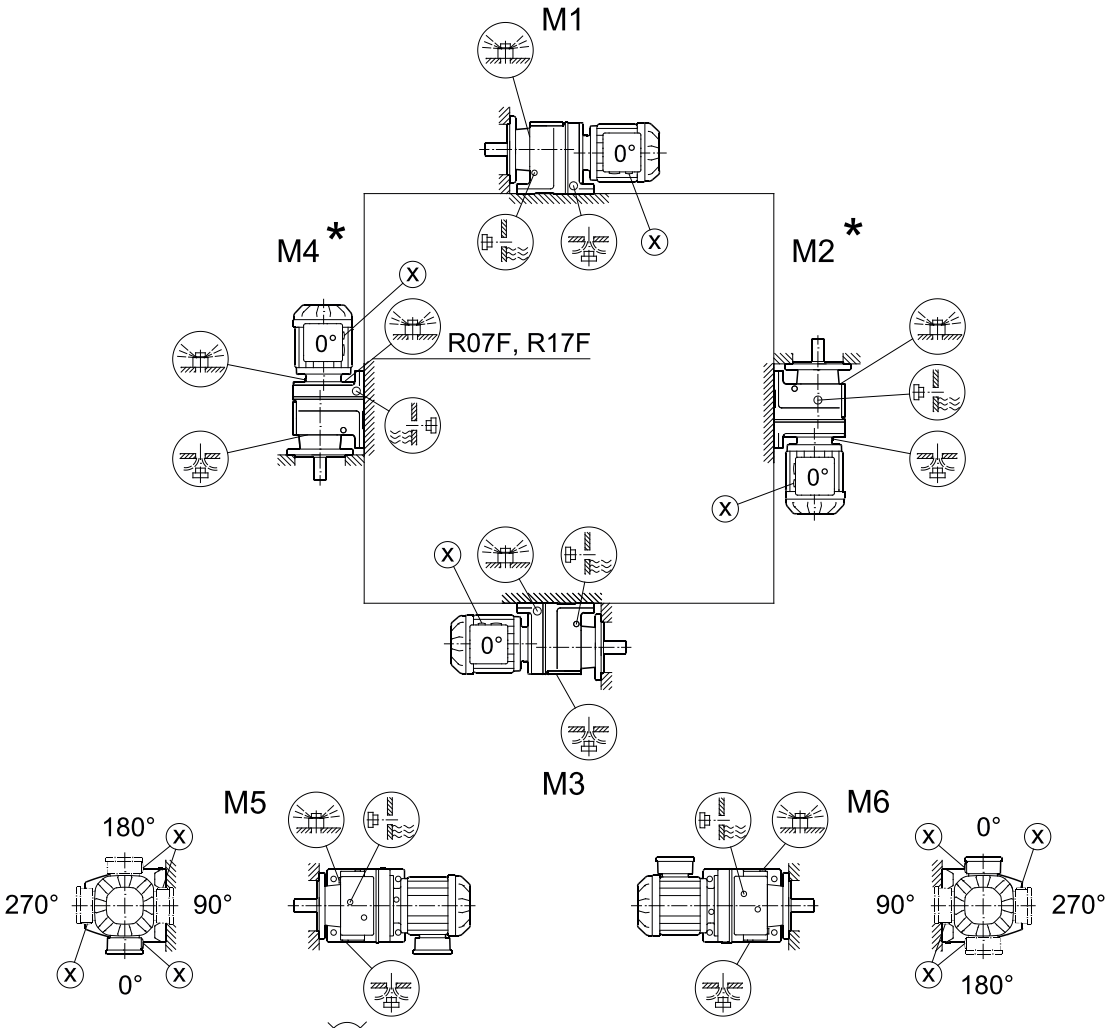
R07F – R87F

04 042 04 00





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

* (→ 🗎 176)

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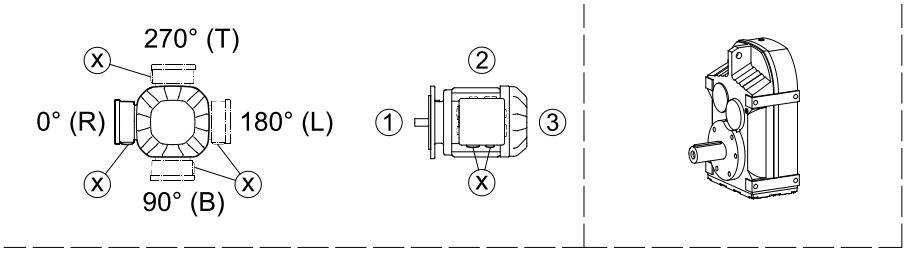
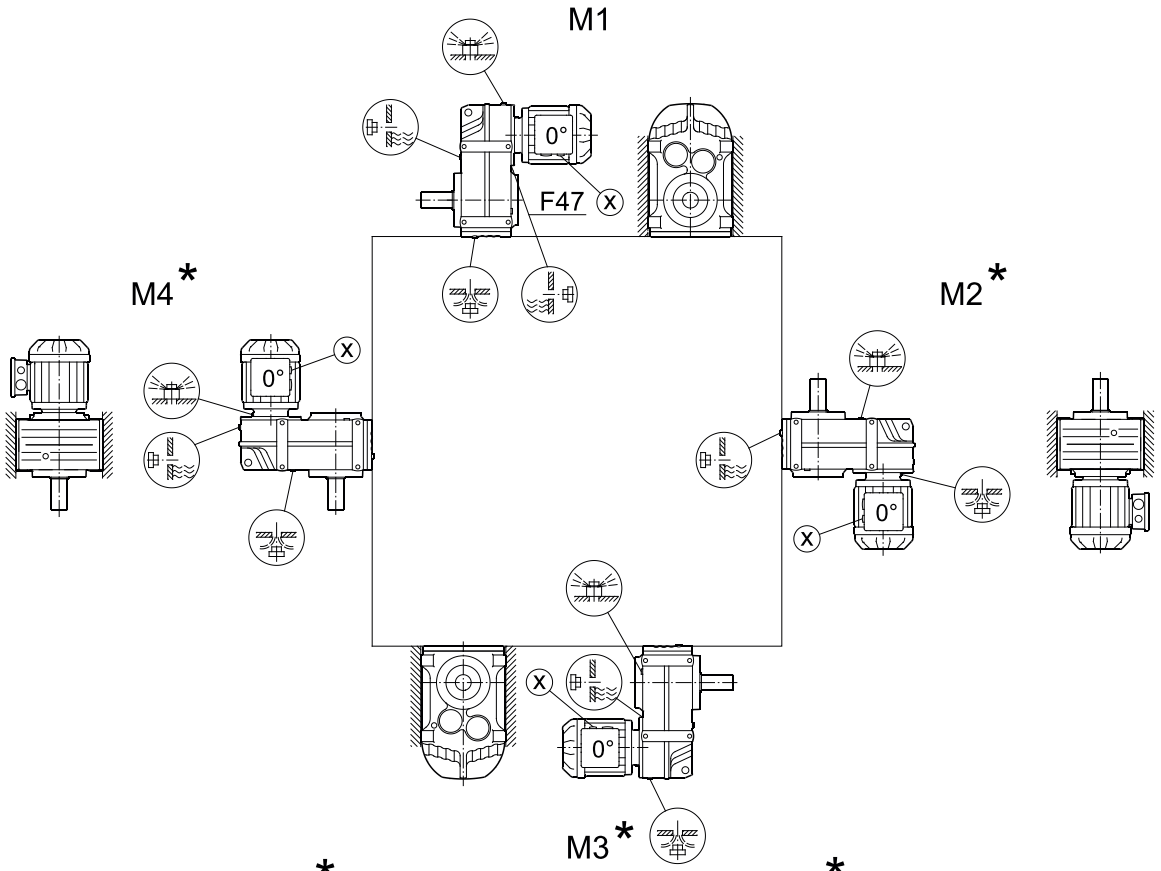
7.9.5 Mounting positions of parallel-shaft helical gear units

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

* (→ 🗎 176)

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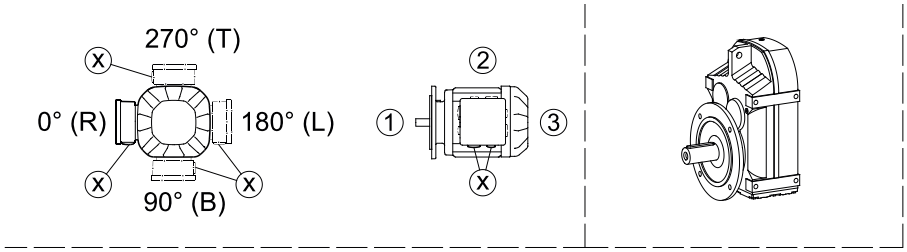
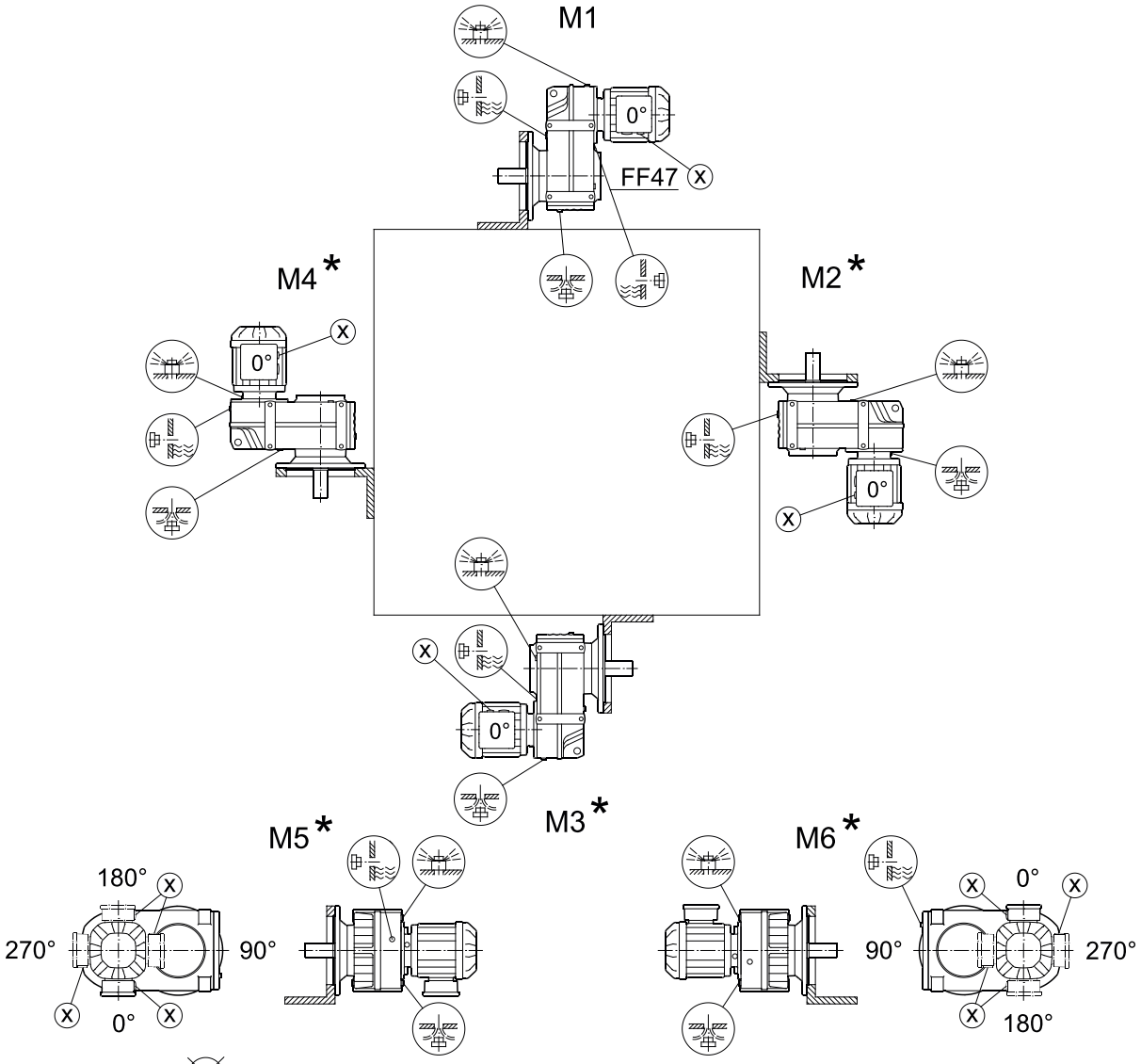
FF/FAF/FHF/FZ/FAZ/FHZ27 – 157, FVF/FVZ27 – 107, FM/FAM67 – 157

42 043 04 00





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

* (→ 🗎 176)

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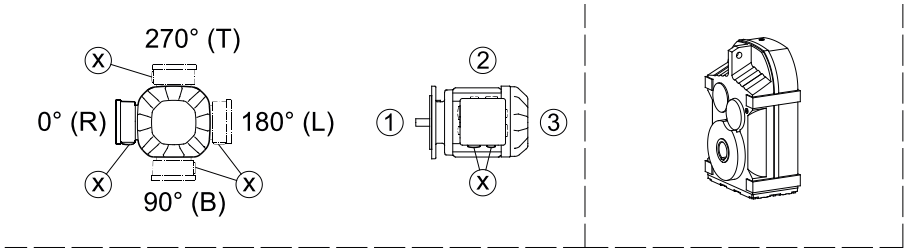
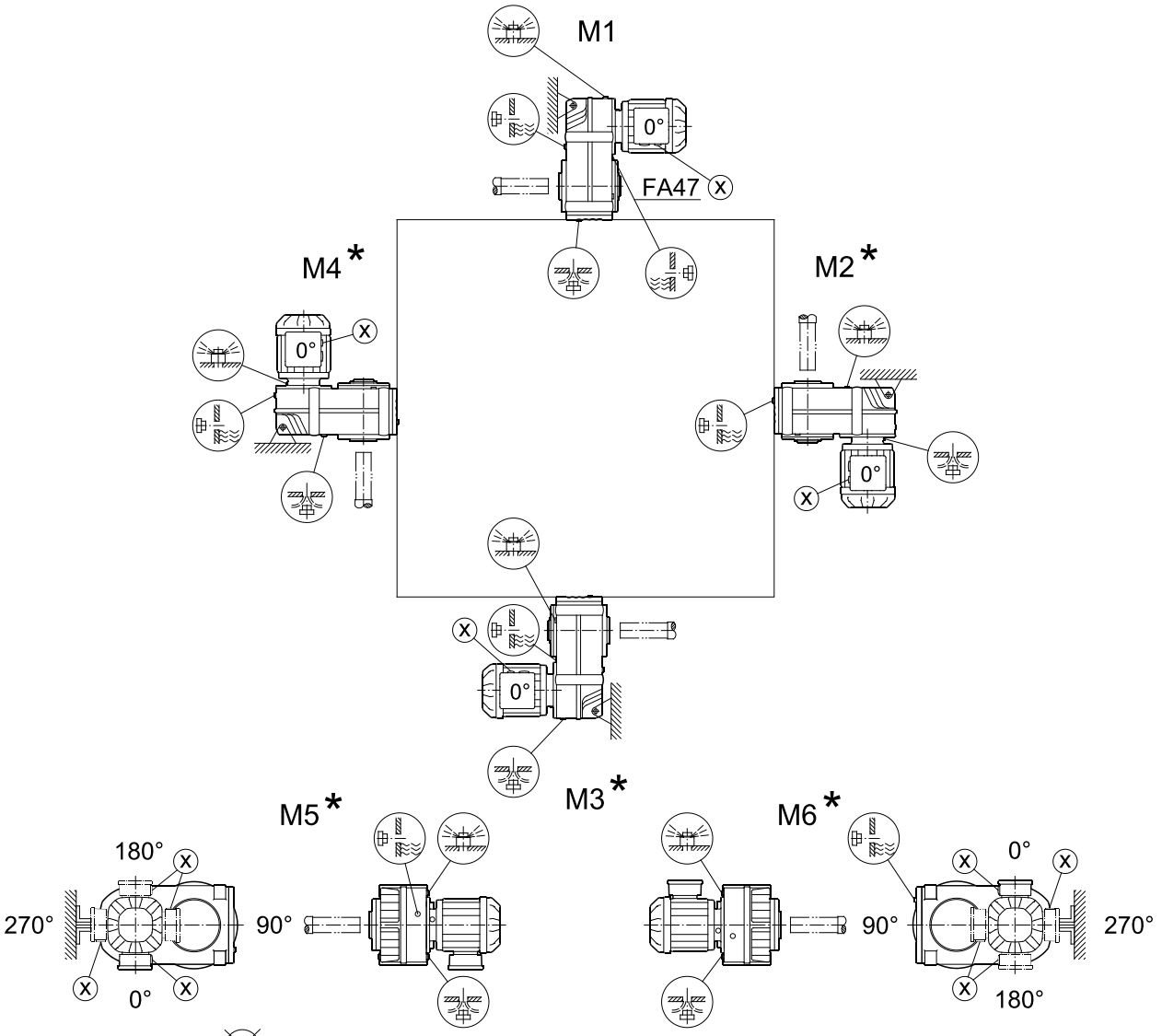
FA/FH27 – 157, FV27 – 107, FT37 – 157

42 044 04 00





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

* (→ 🗎 176)

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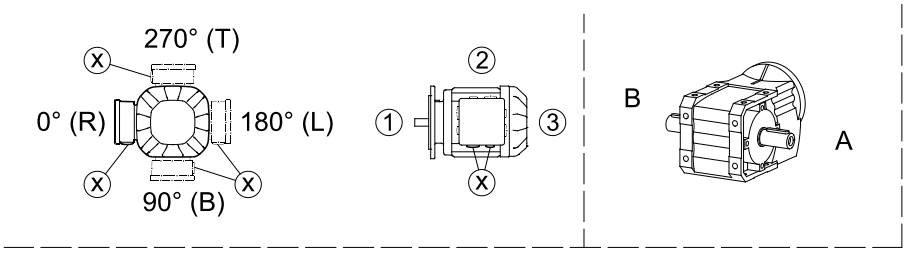
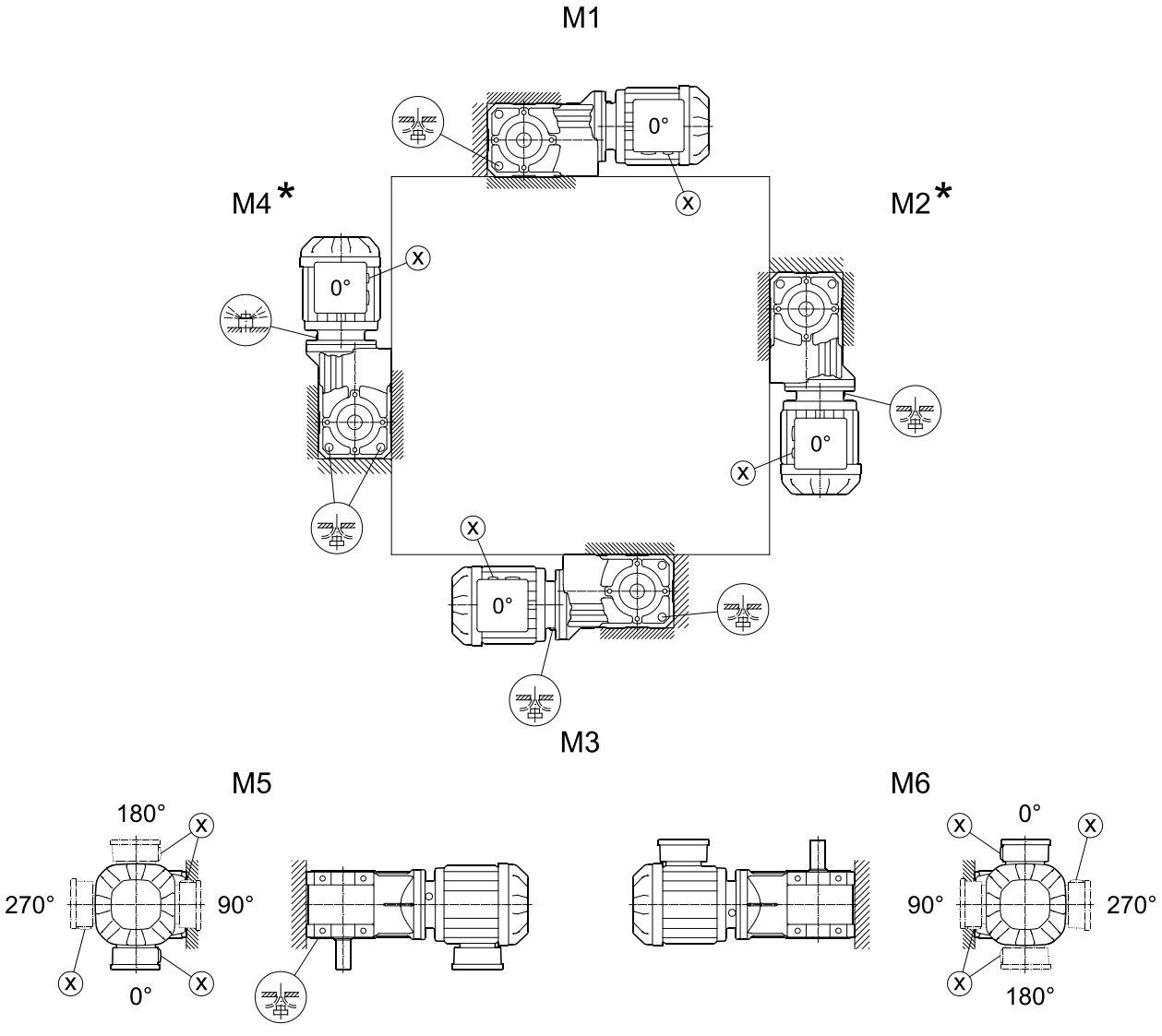
7.9.6 Mounting positions of helical-bevel gear units

K/KA..B/KH19B – 29B

33 023 00 15



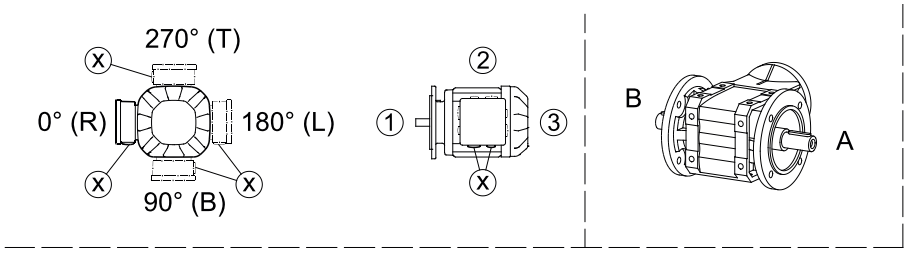


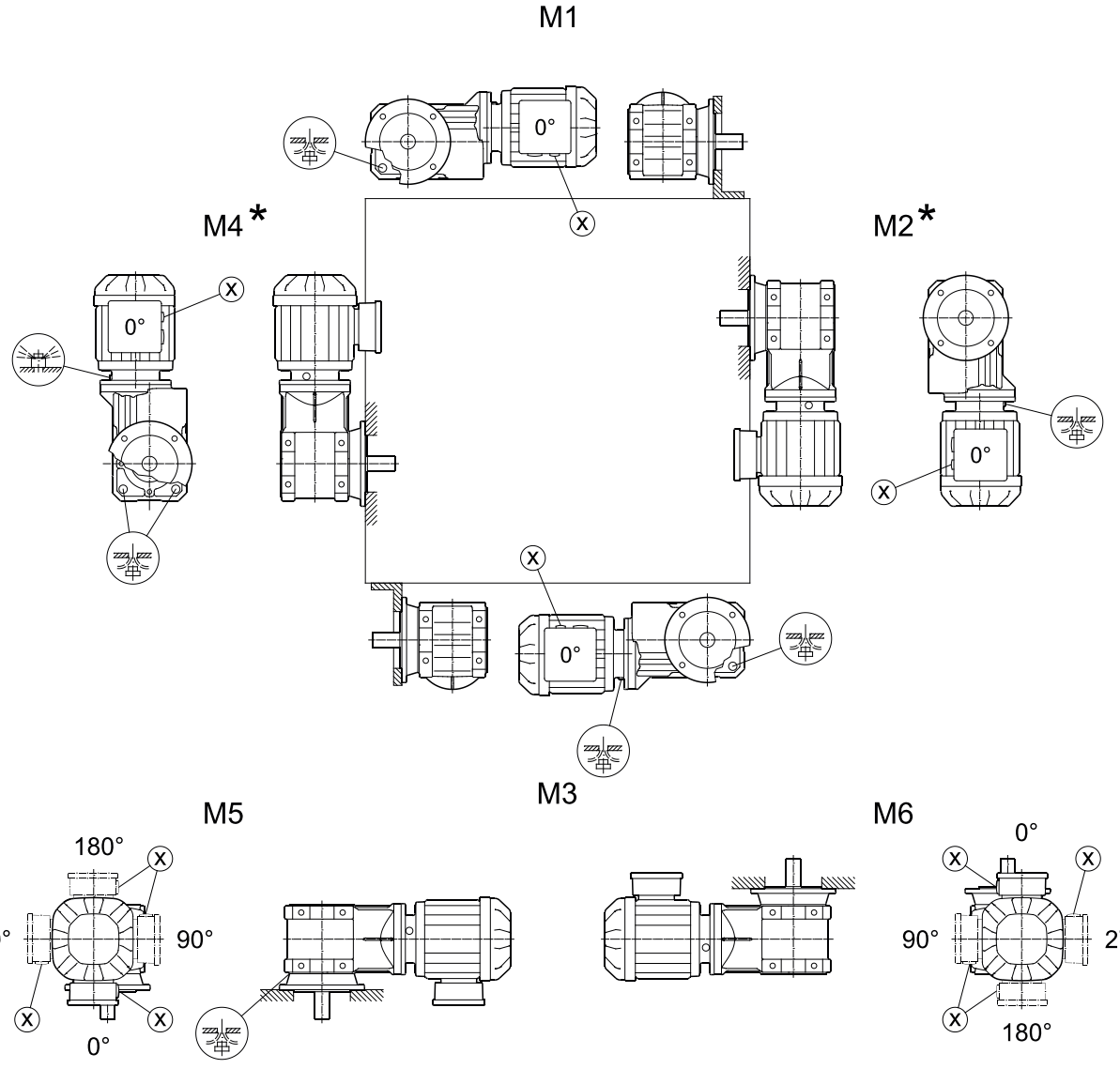
* (→ 🗎 176)

31978088/EN – 03/2025

KF..B/KAF..B/KHF19B – 29B

33 024 00 15





* (→ 🗎 176)

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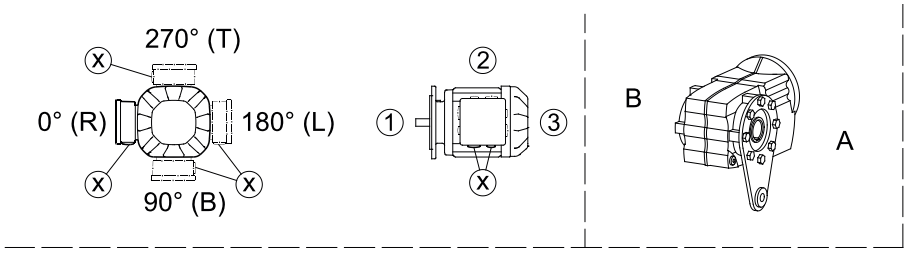
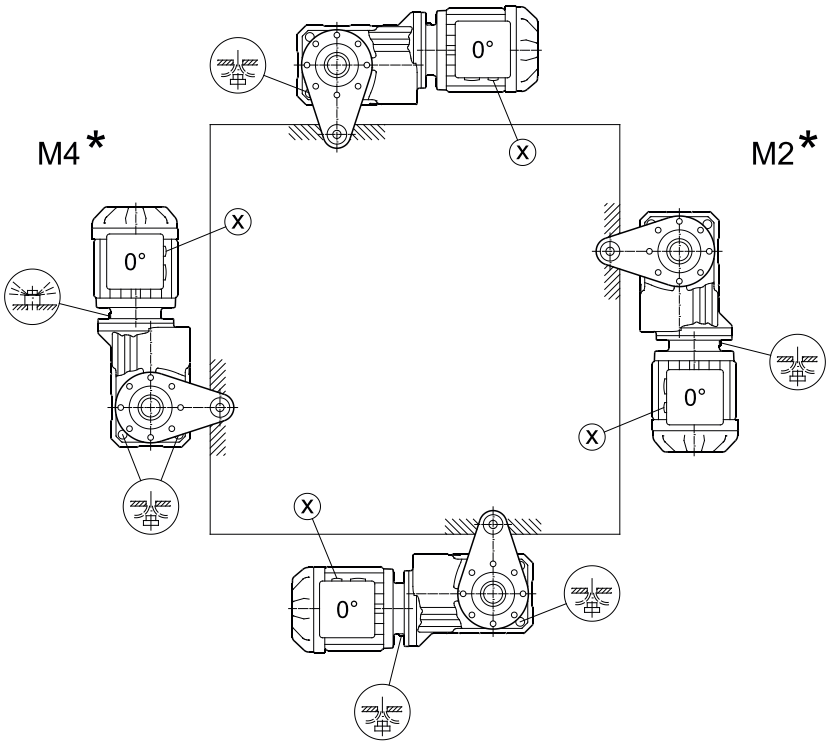
KA..B/KH19B – 29B

33 025 00 15



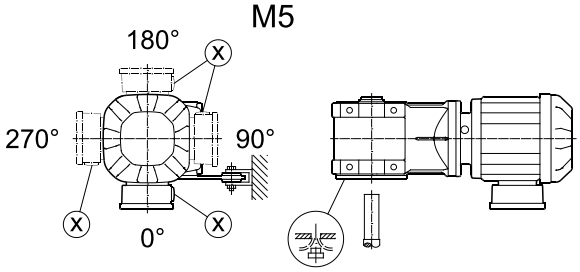
M1



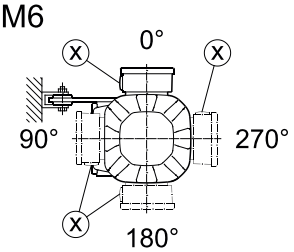
M4 * M2 *

M3

M5



M6



* (→ 🗎 176)

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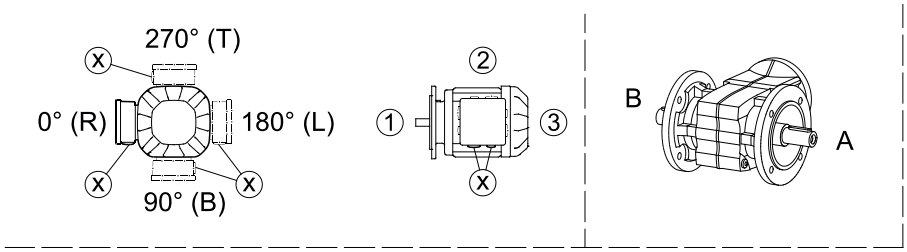
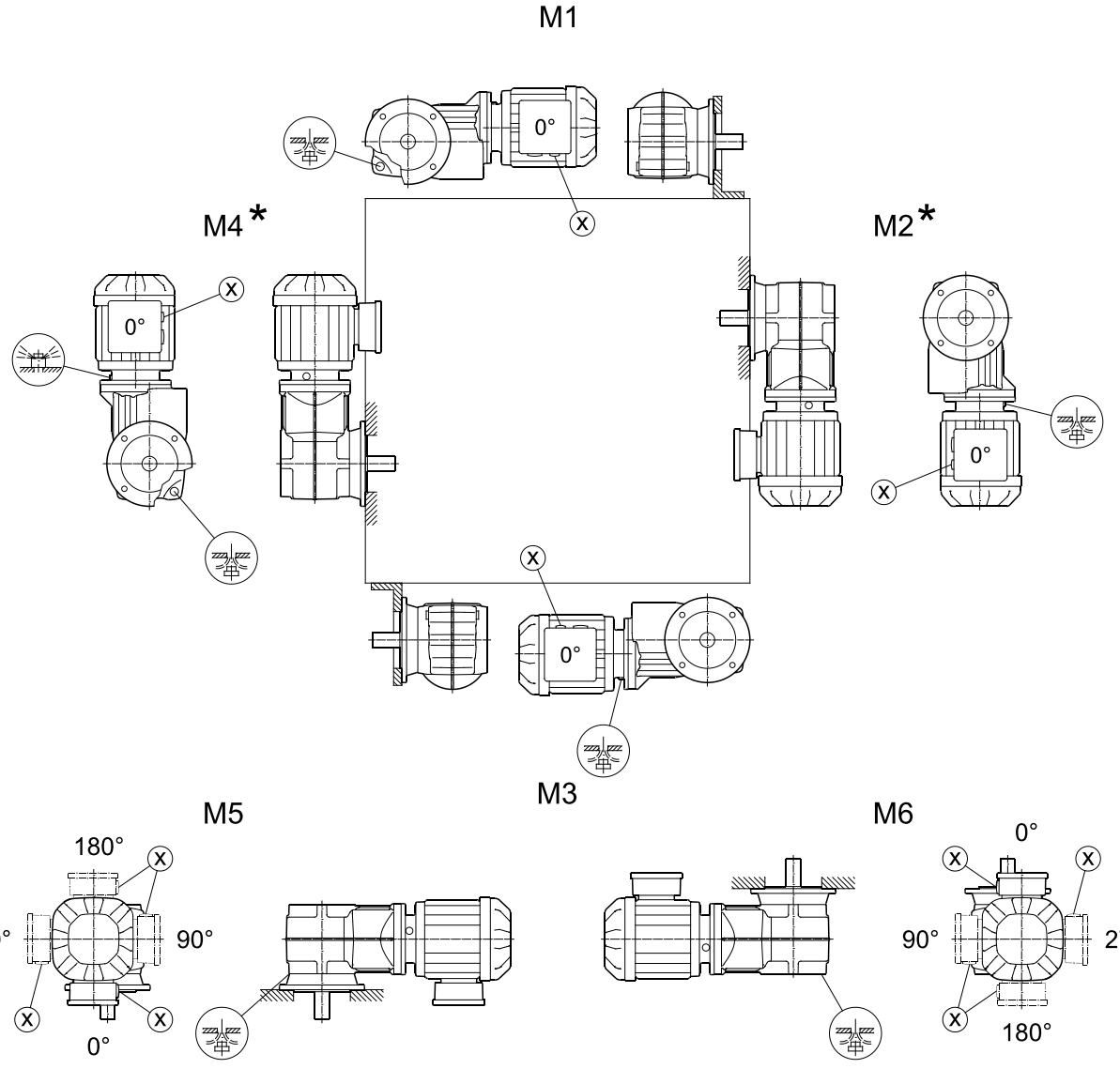
KF/KAF/KHF19 – 29

33 026 00 15

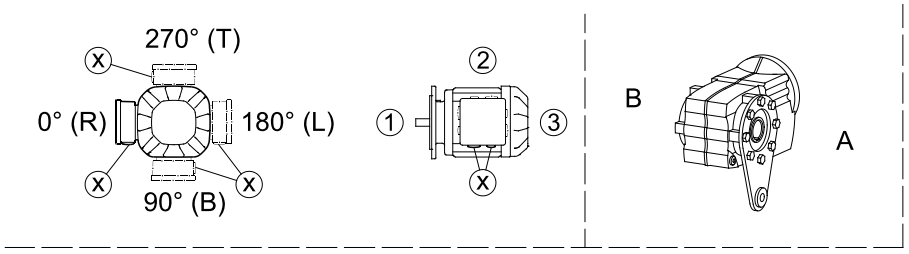


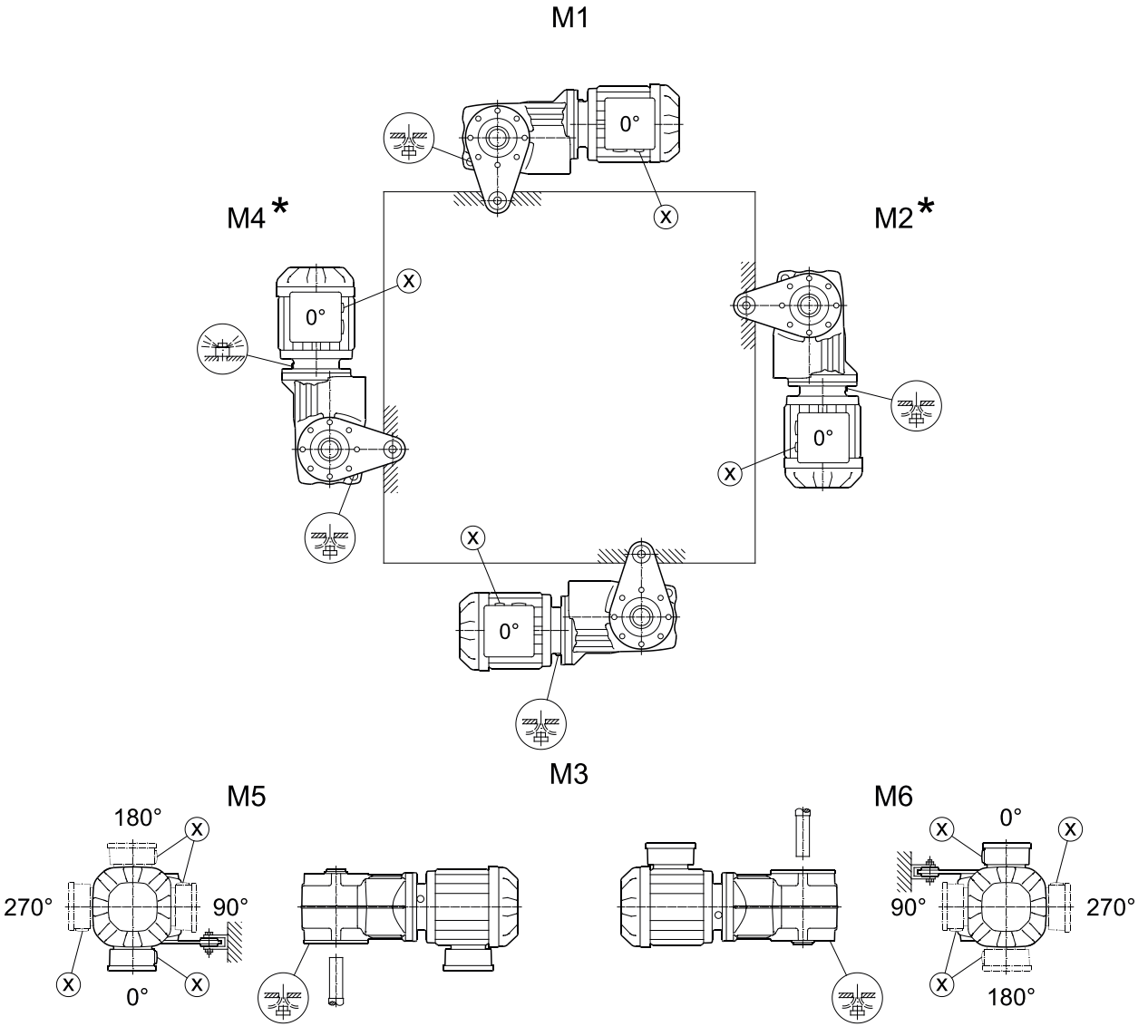


* (→ 176)

KA/KH/KT19 – 29

33 027 00 15





* (→ 🗎 176)

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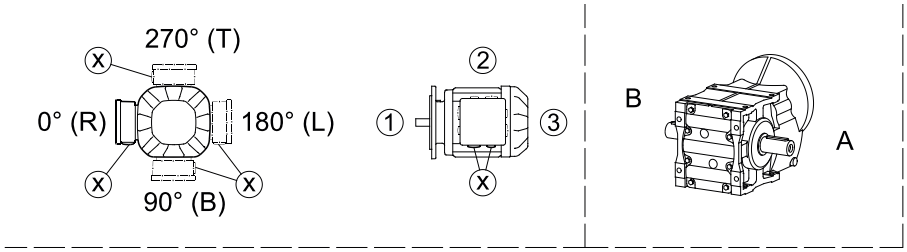
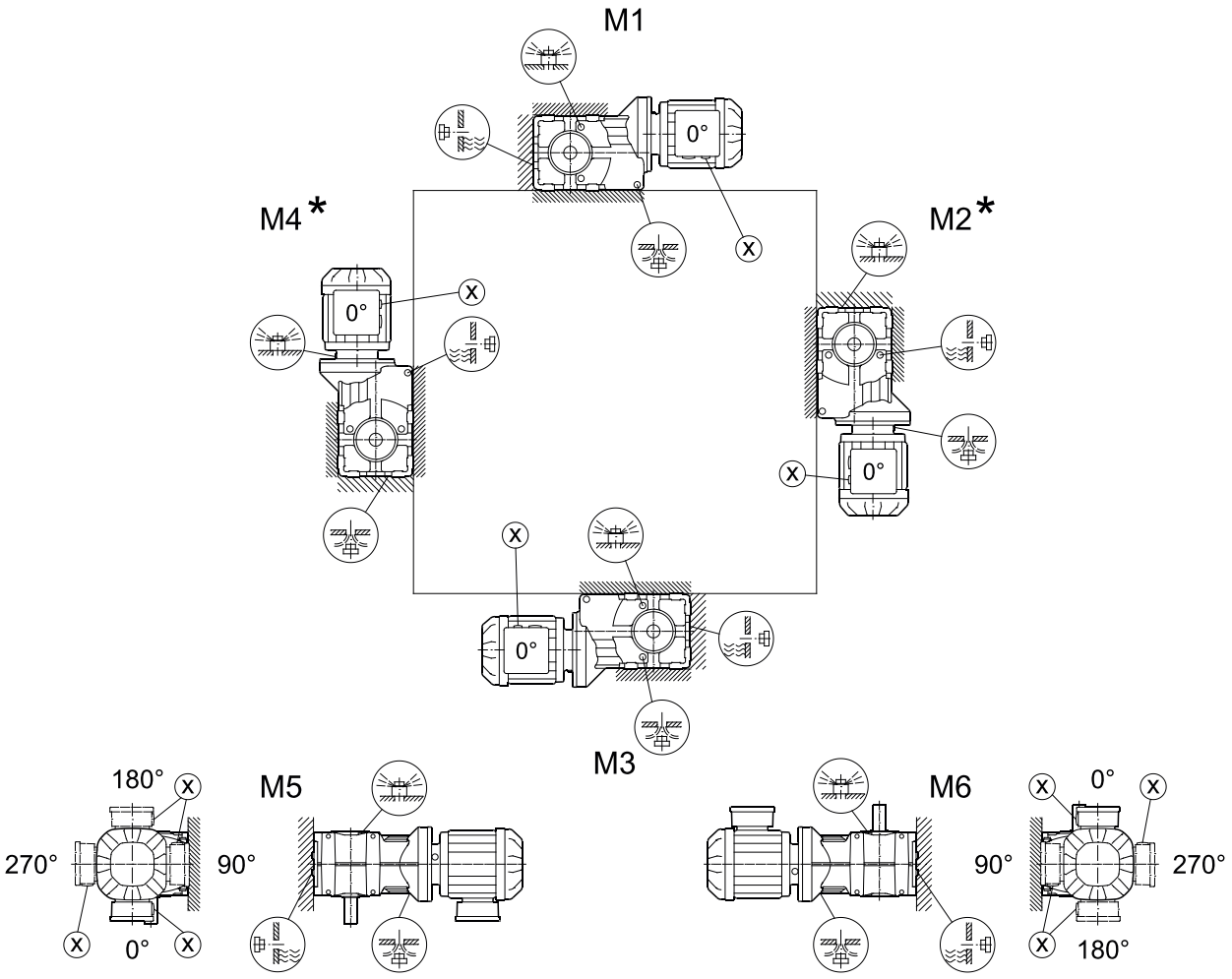
K/KA..B39 – 49

33 092 03 14





* (→ 🗎 176)

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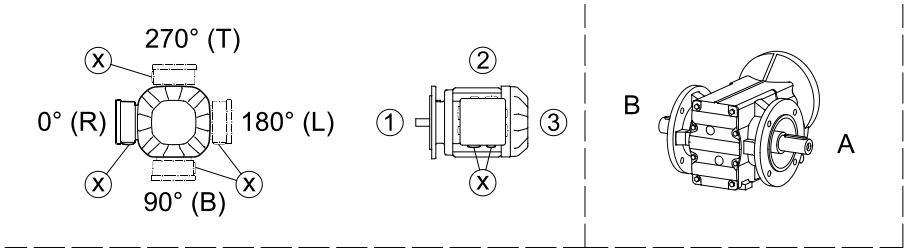
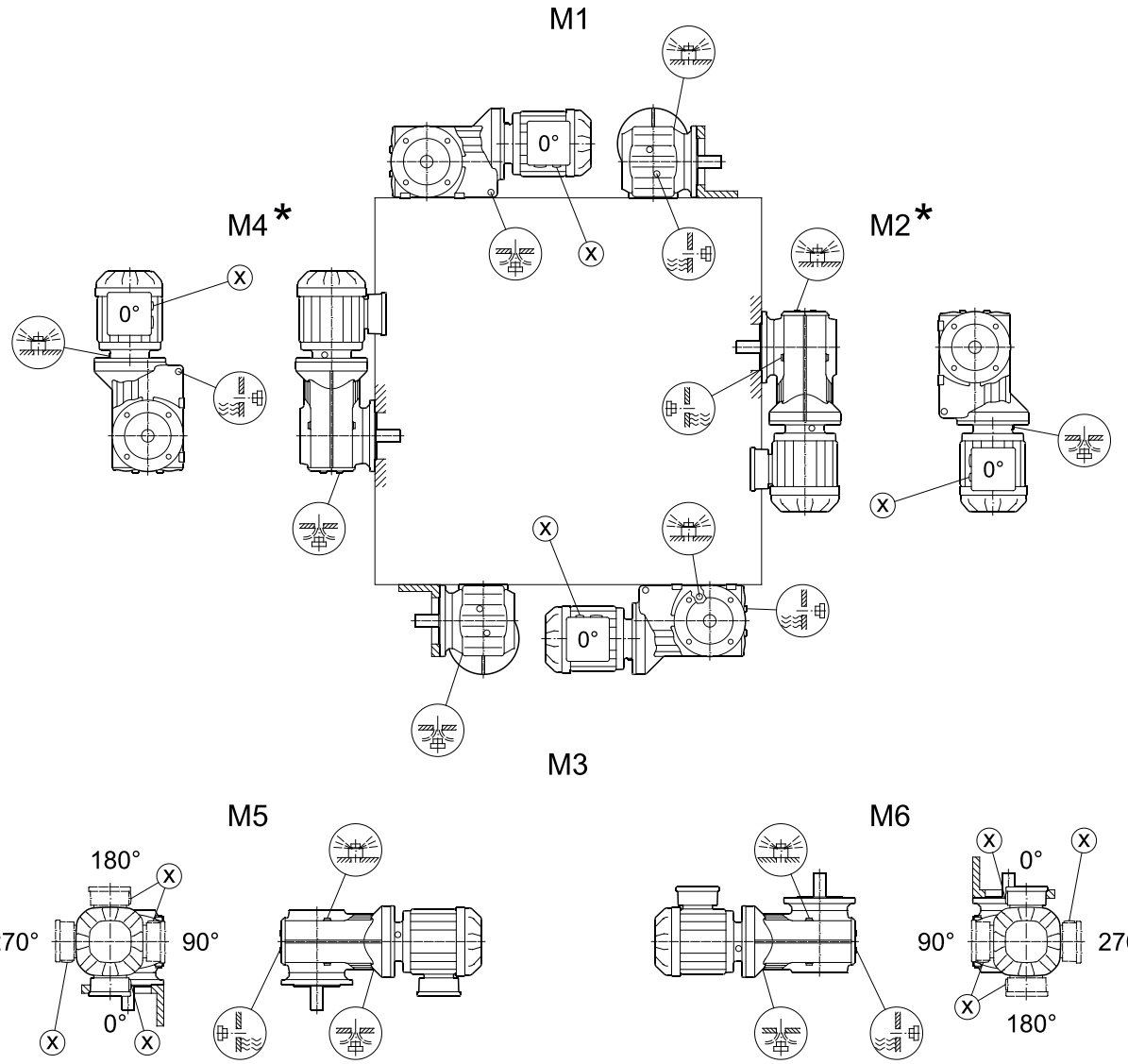
KF/KAF/KHF39 – 49

33 093 01 14





* (→ 🗎 176)

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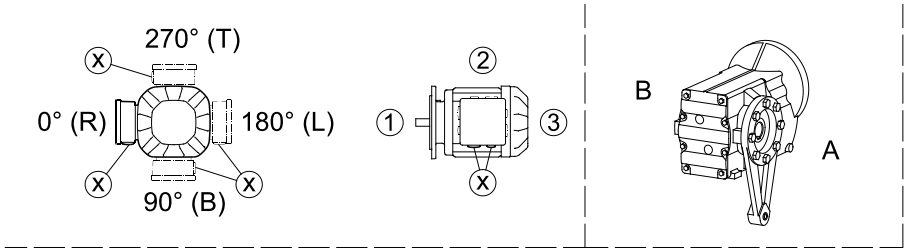
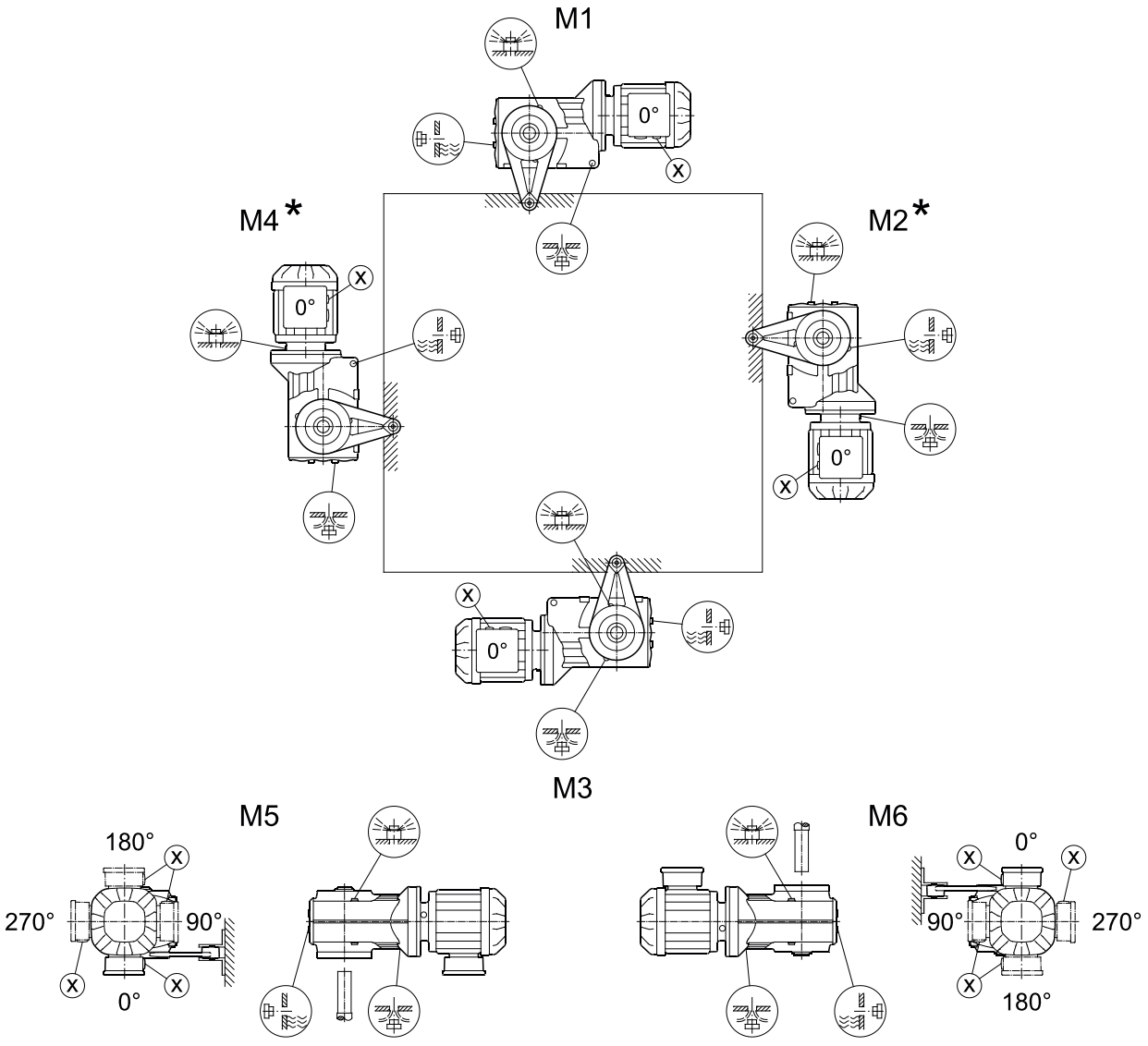
KA/KH/KT39 – 49

33 094 01 14

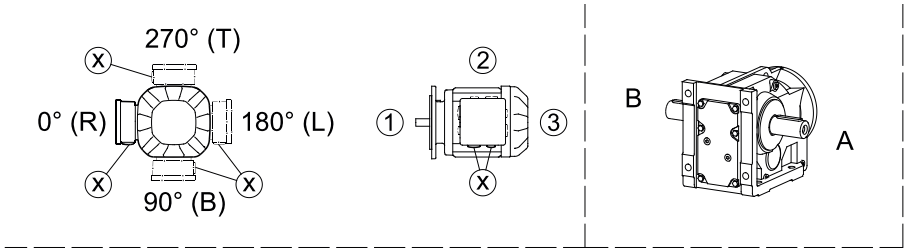


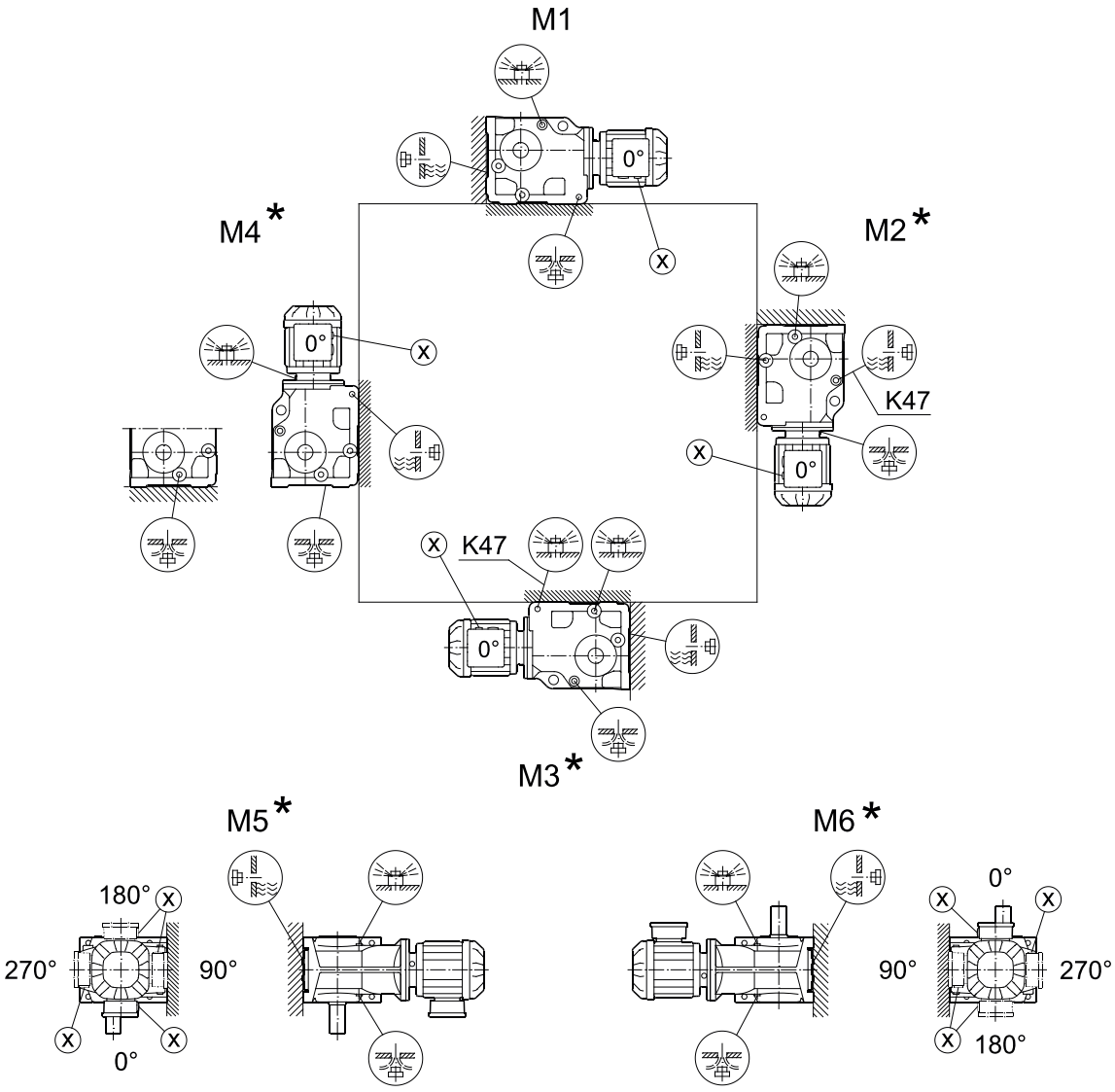


* (→ 🗎 176)

K37 – 157, KA..B/KH47B – 157B, KV47B – 107B

34 025 05 00

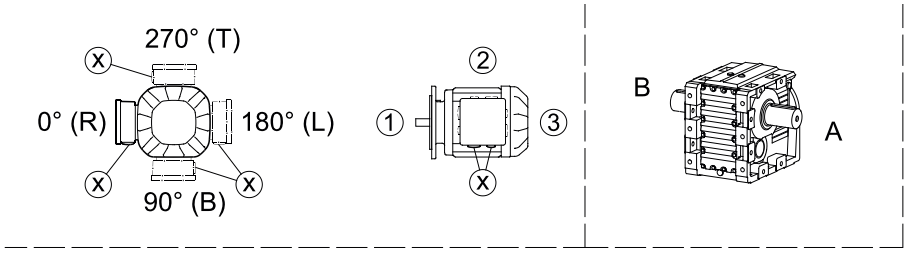


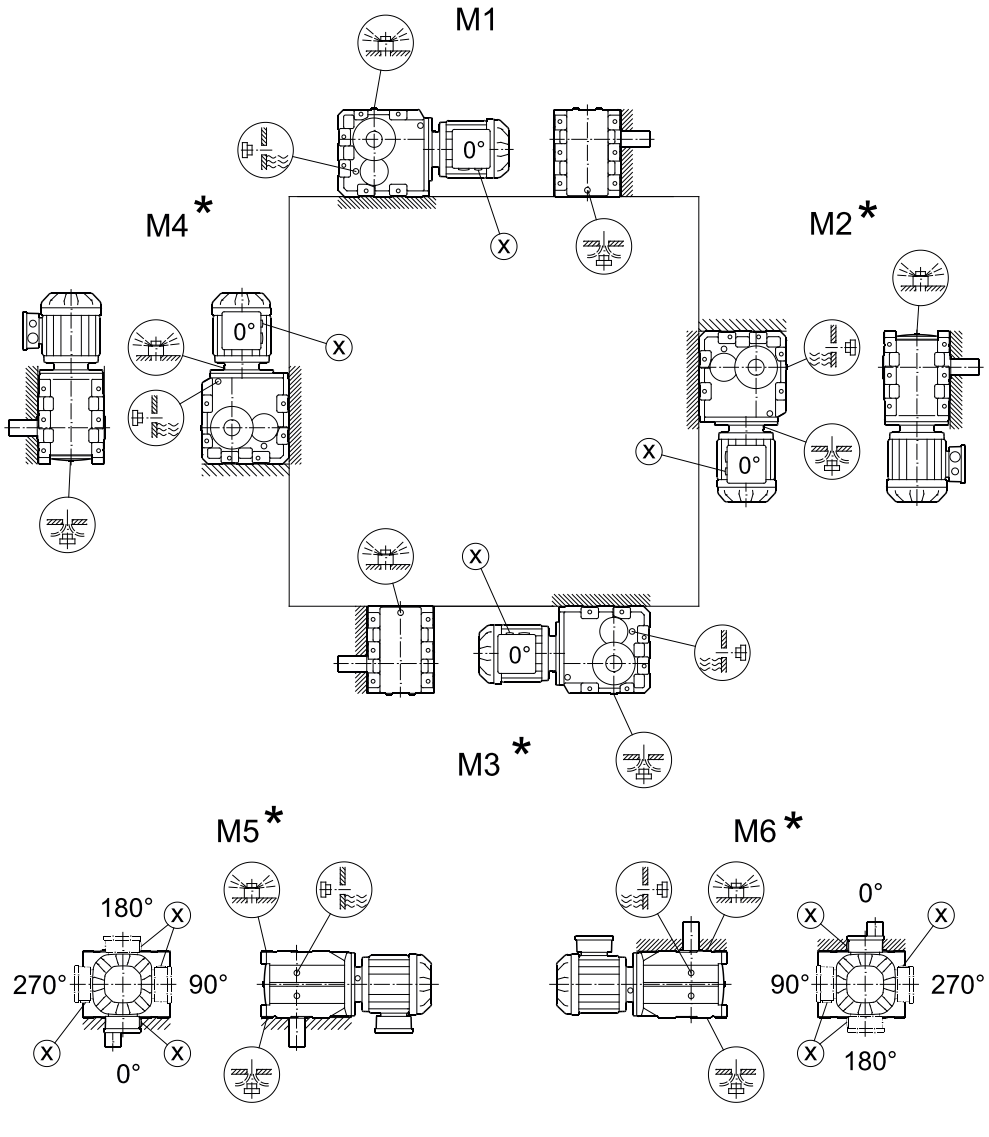


* (→ 🗎 176)

K167 – 187, KH167B – 187B

34 026 05 00





* (→ 🗎 176)

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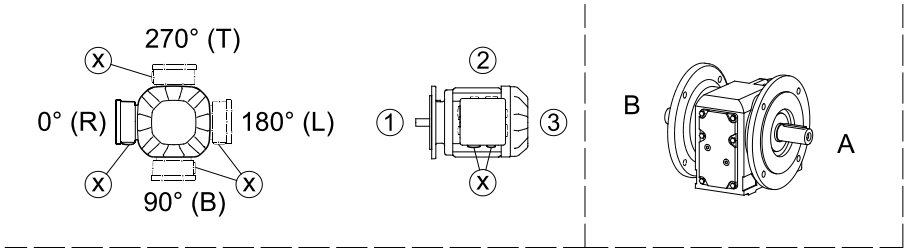
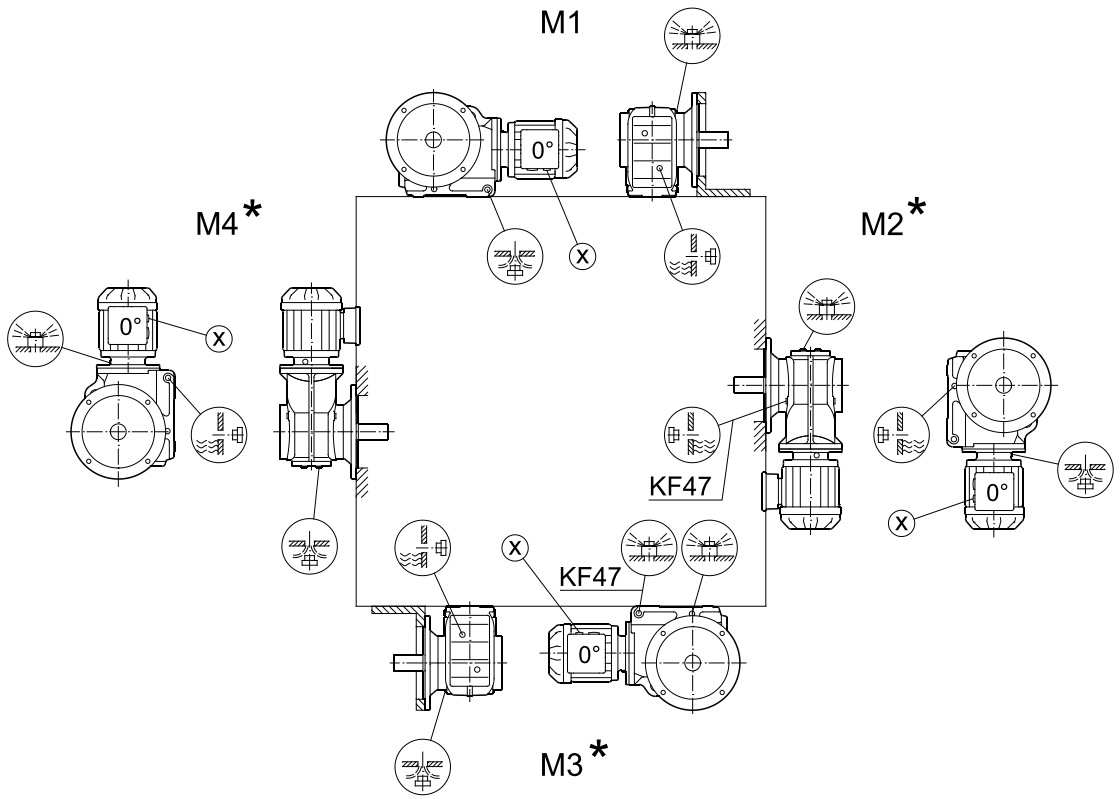
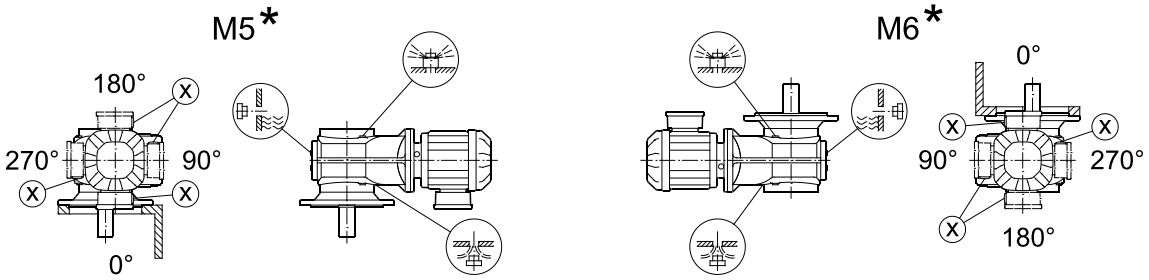
KF/KAF/KHF/KZ/KAZ/KHZ37 – 157, KVF/KVZ37 – 107, KM/KAM67 – 157

34 027 04 00







* (→ 🗎 176)

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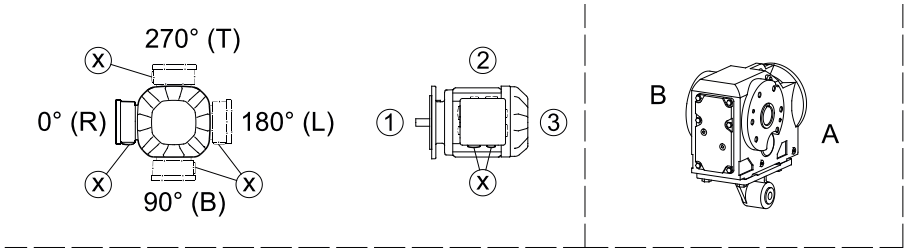
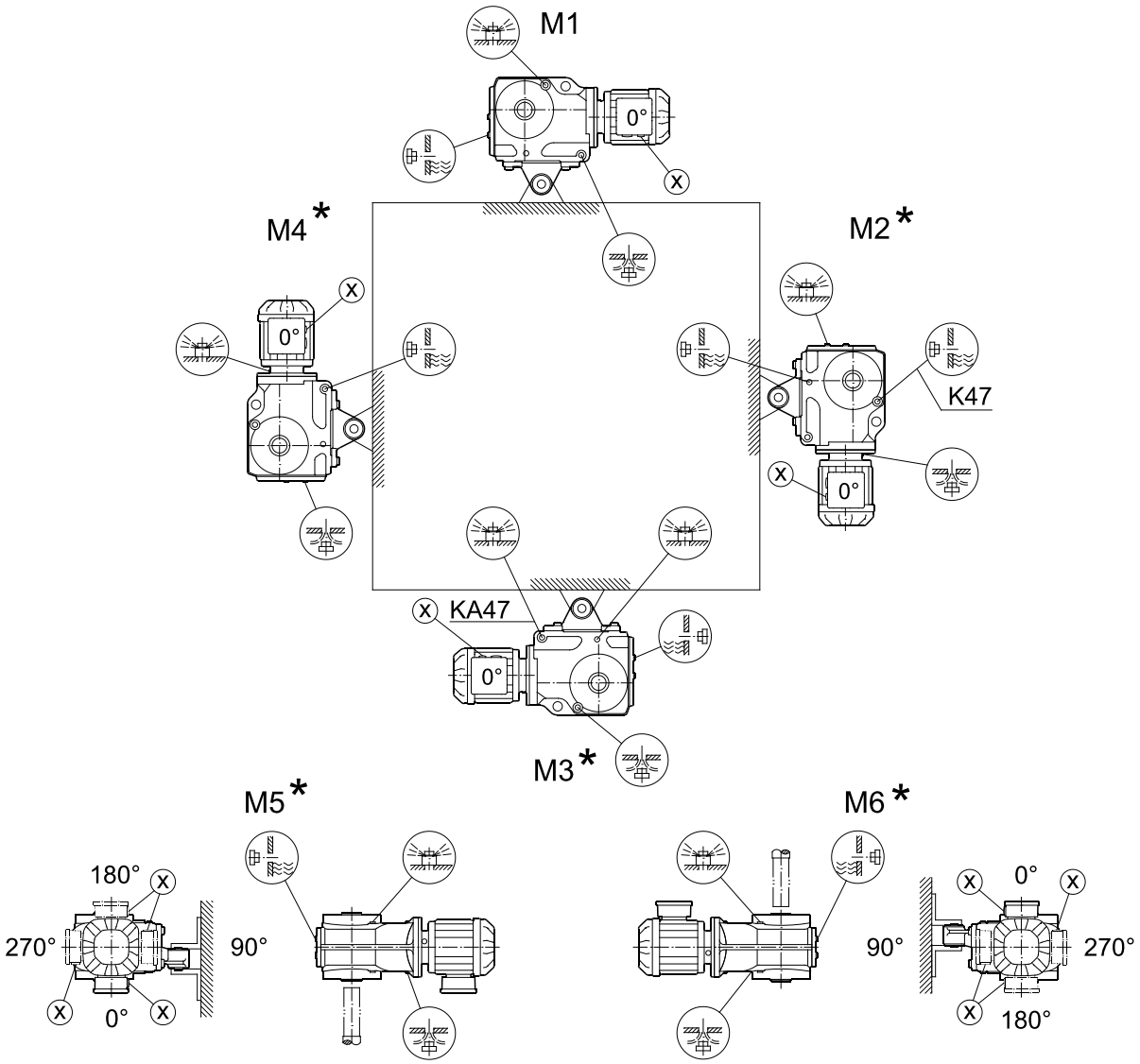
KA/KH37 – 157, KV37 – 107, KT37 – 157

39 025 05 00





* (→ 🗎 176)

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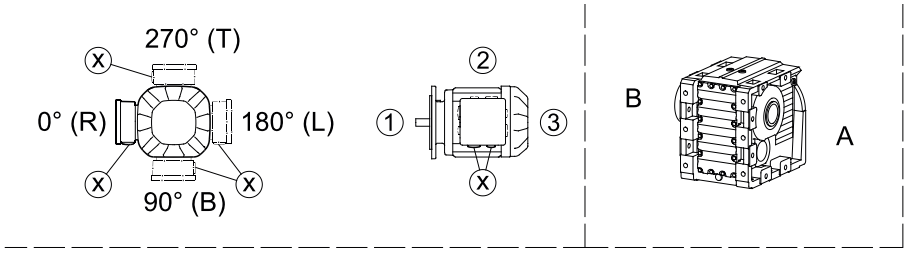
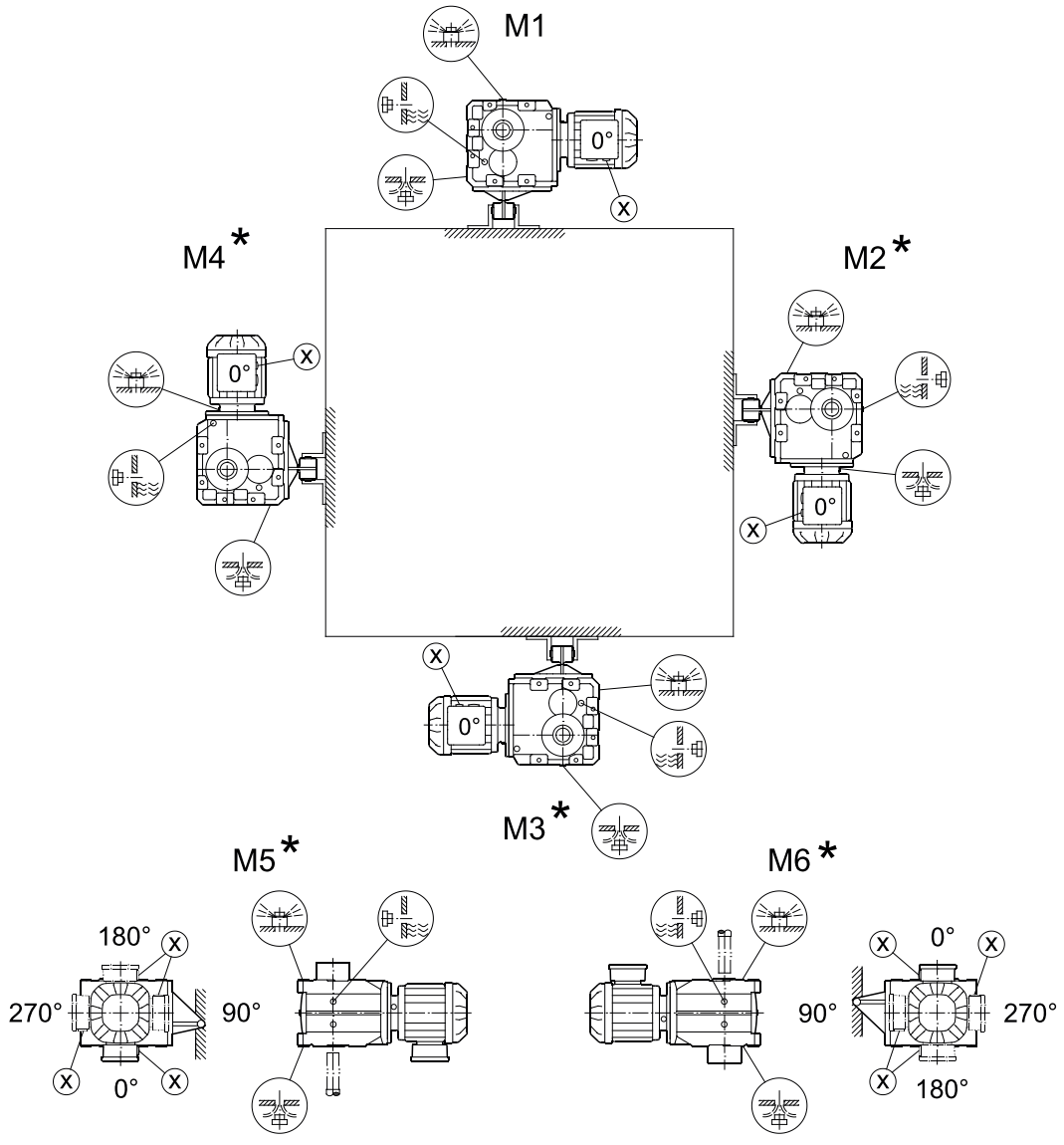
KH167 – 187

39 026 05 00





* (→ 🗎 176)

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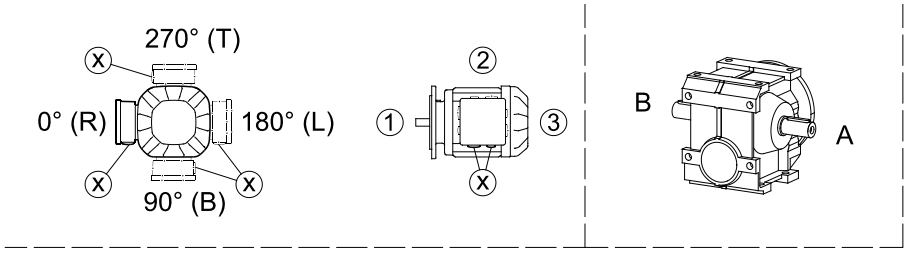
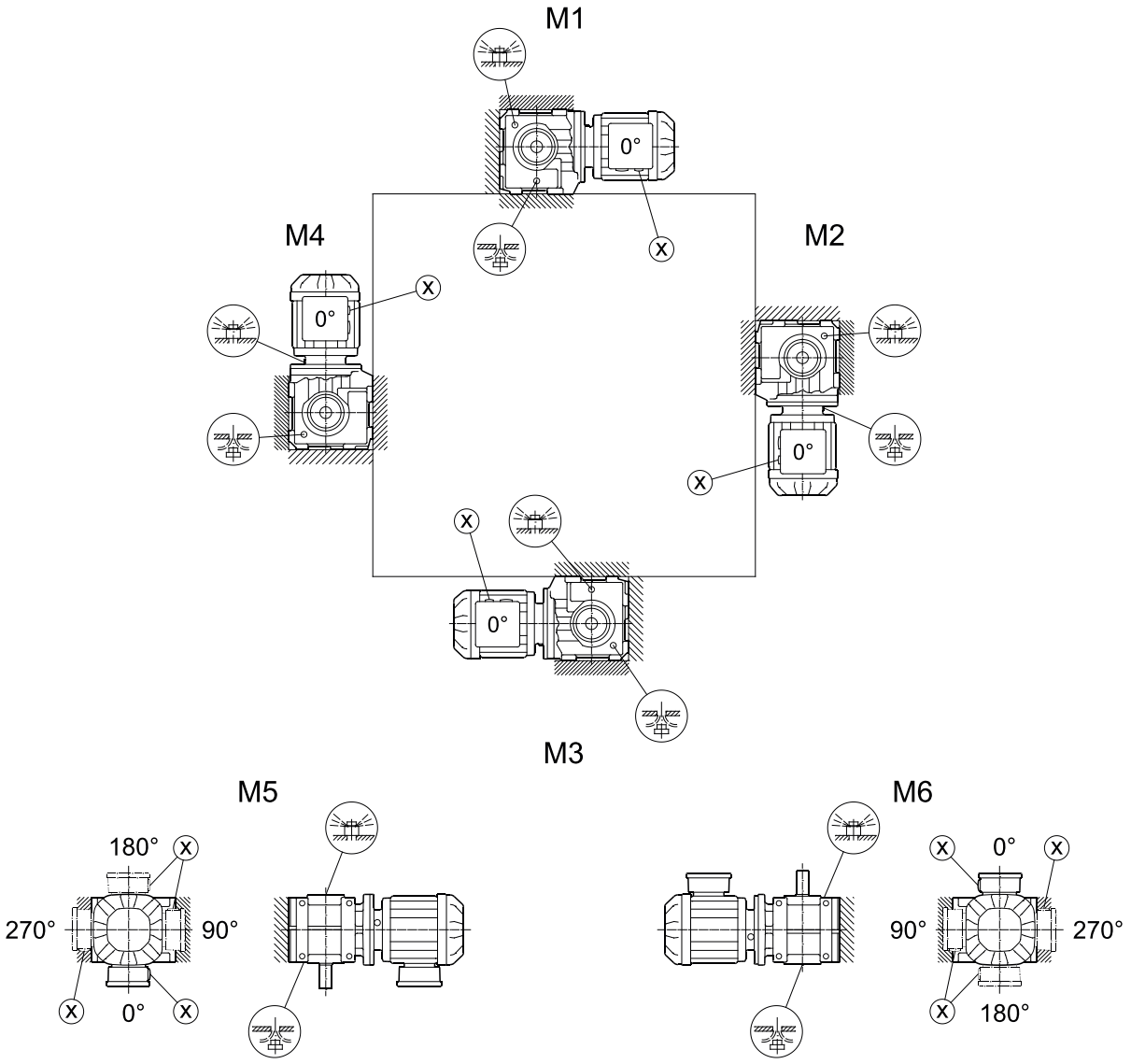
7.9.7 Mounting positions of helical-worm gear units

S37



05 025 05 00



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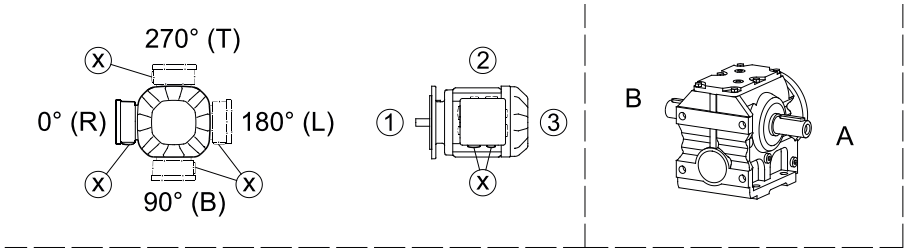
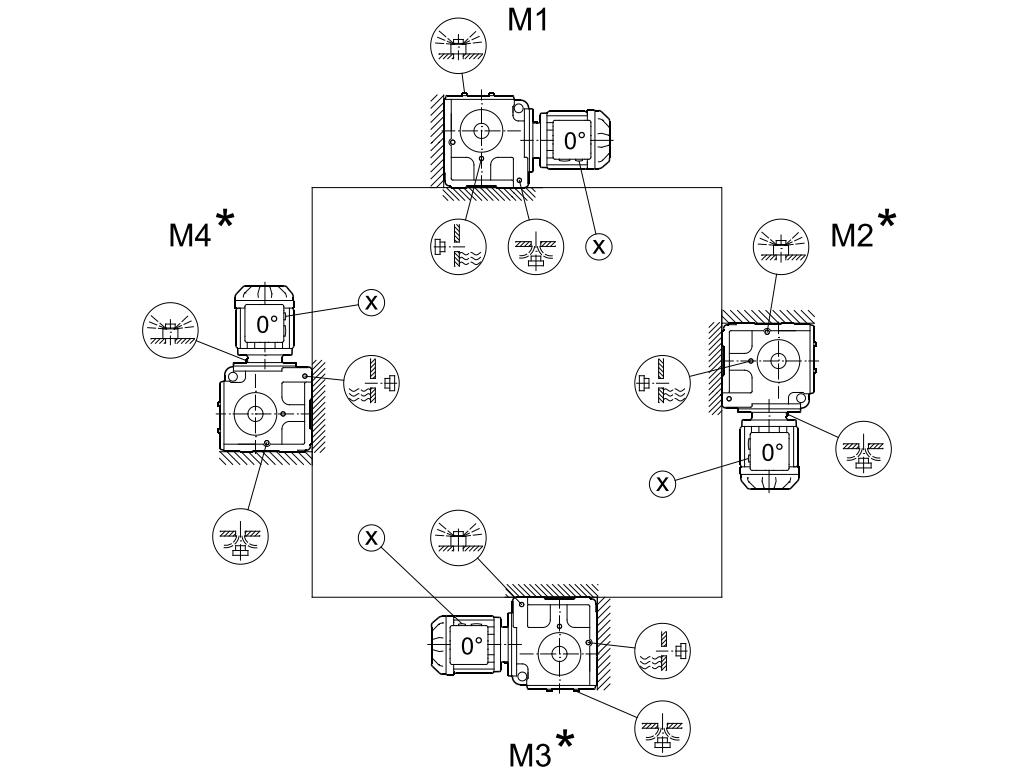
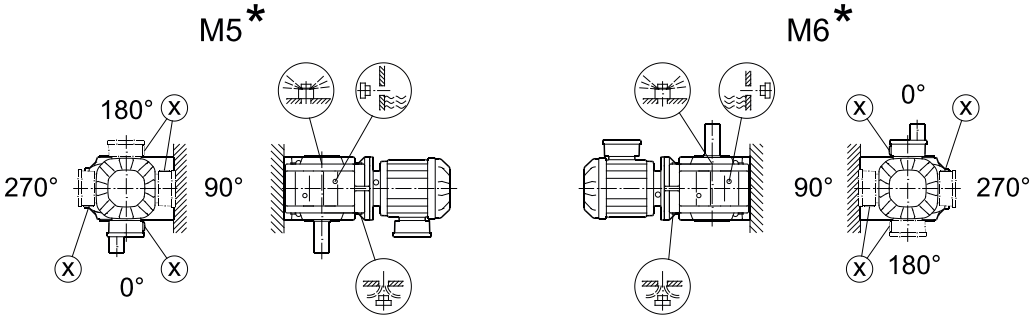
S47 – S97

05 026 04 00







* (→ 🗎 176)

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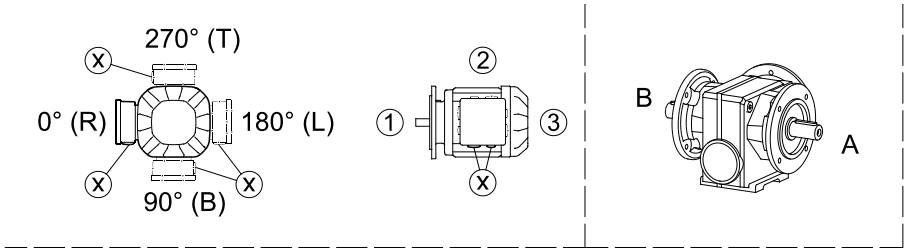
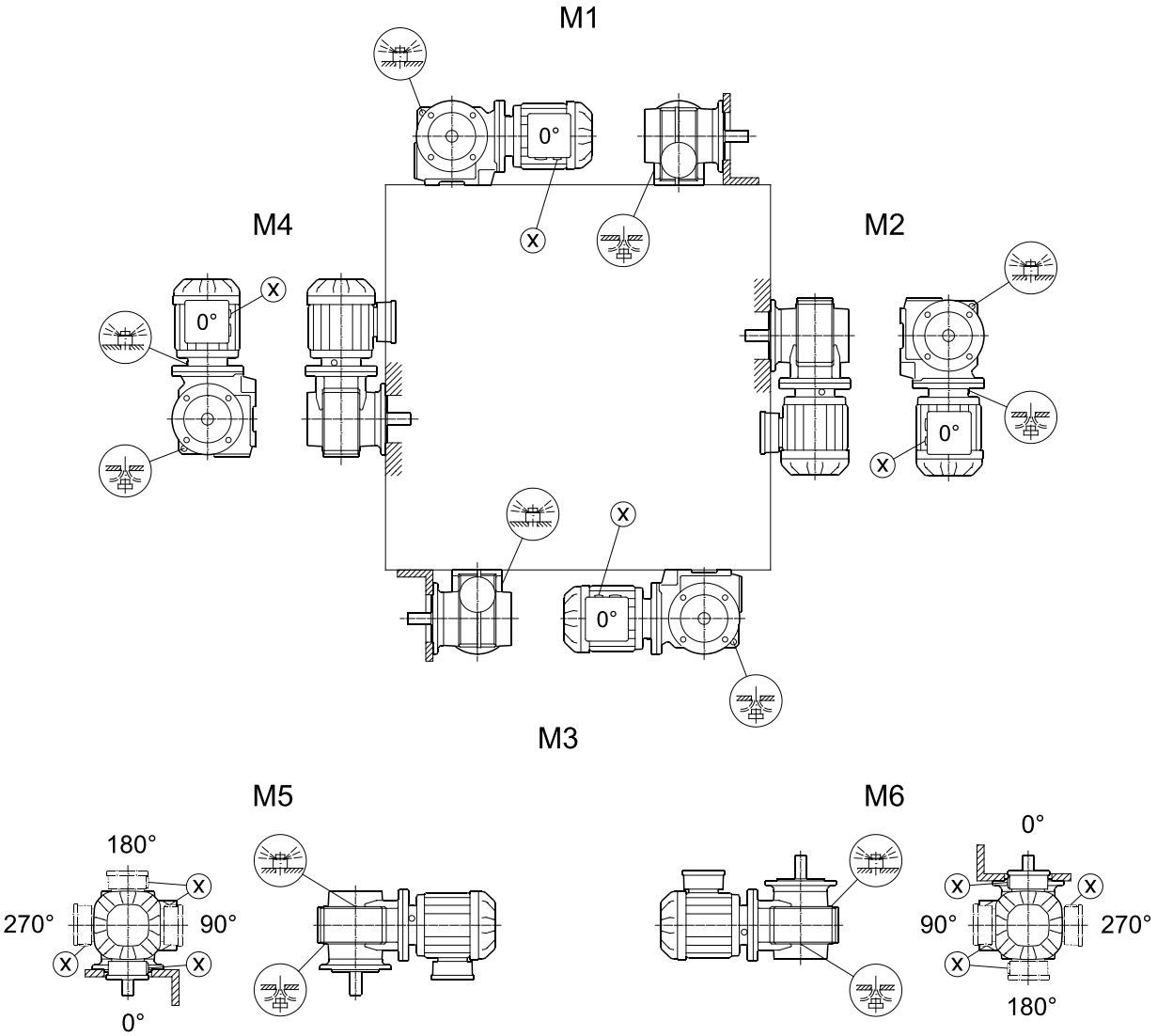
SF/SAF/SHF37

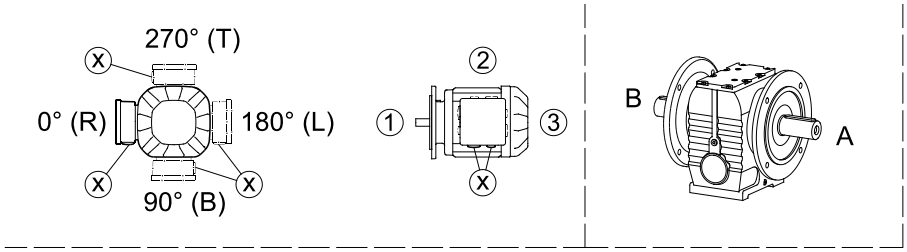
05 027 05 00

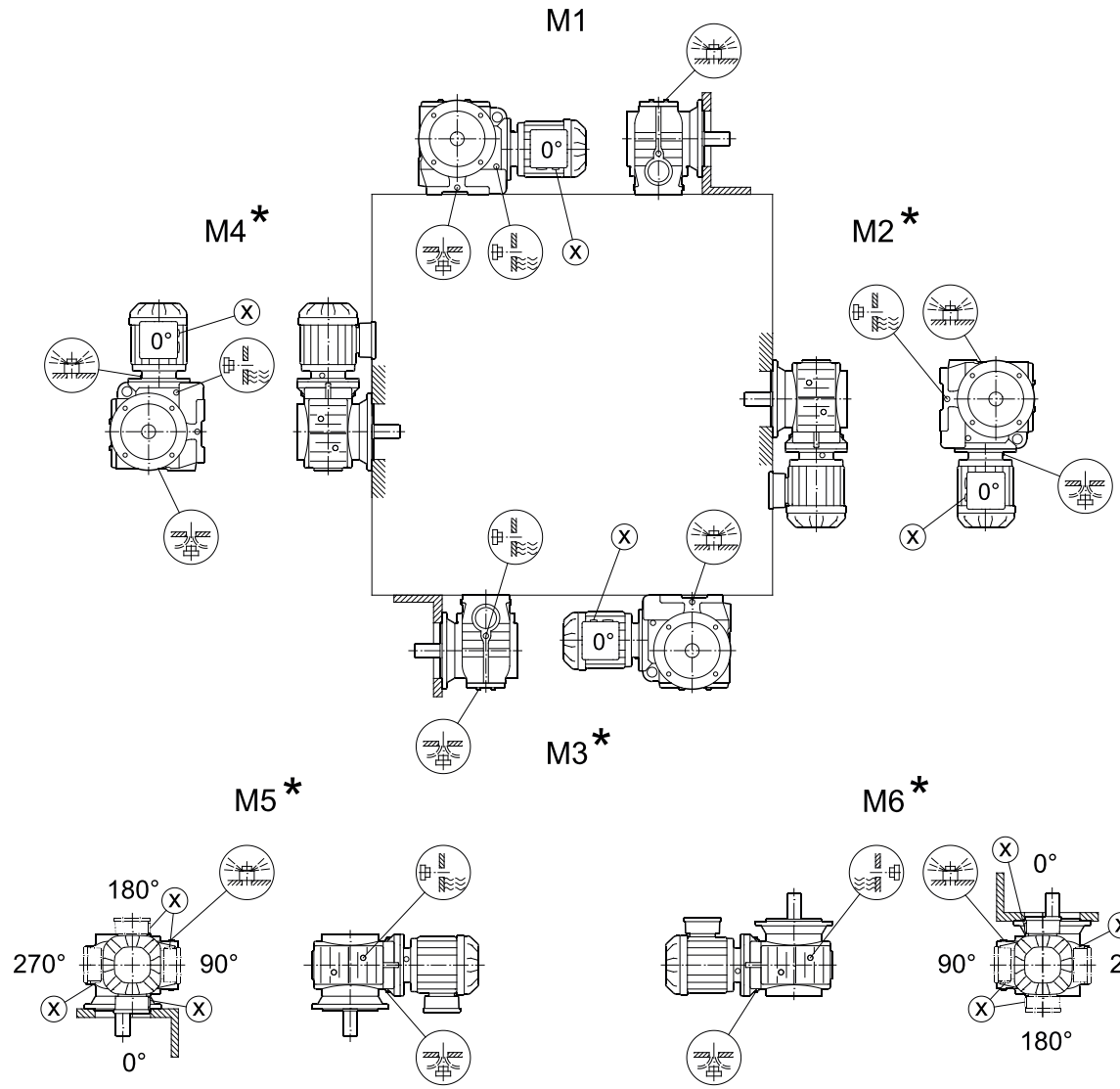




SF/SAF/SHF/SAZ/SHZ47 – 97

05 028 04 00





* (→ 🗎 176)

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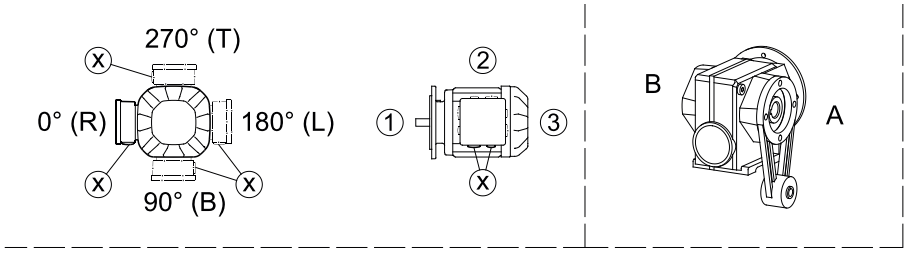
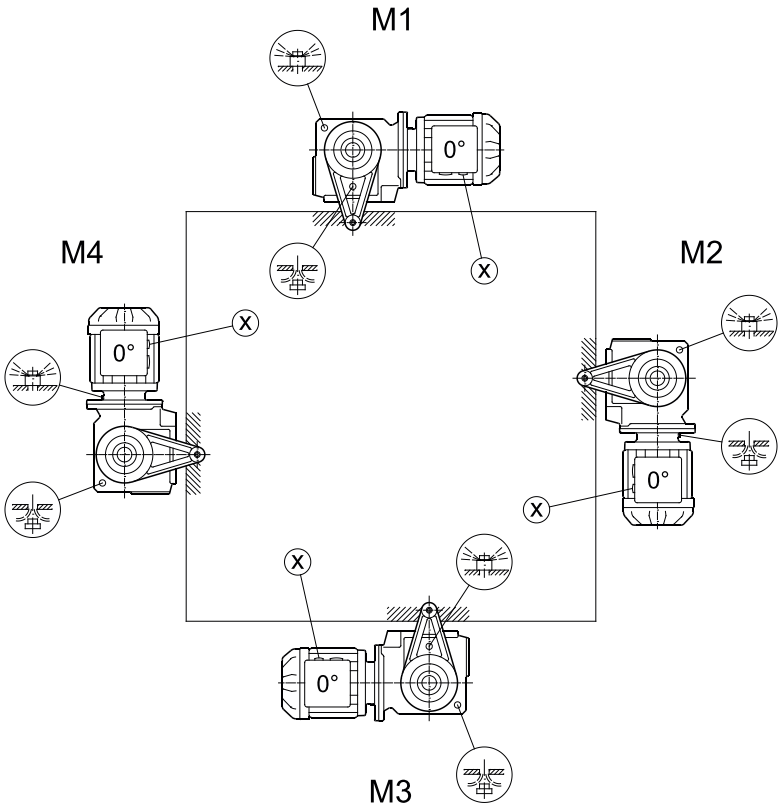
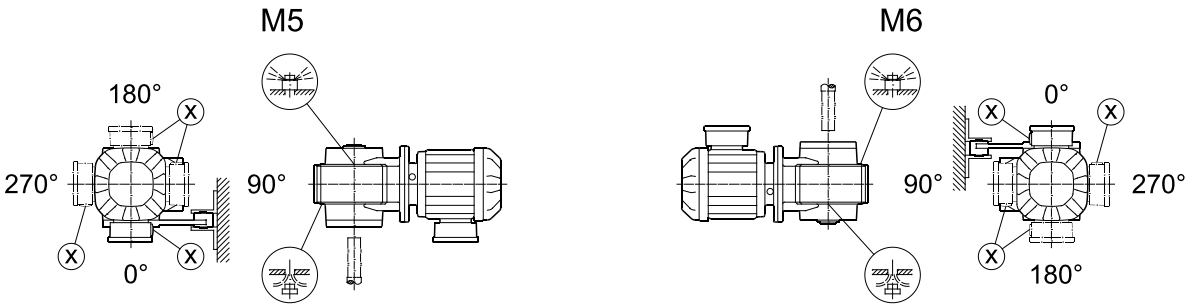
SA/SH/ST37

28 020 06 00



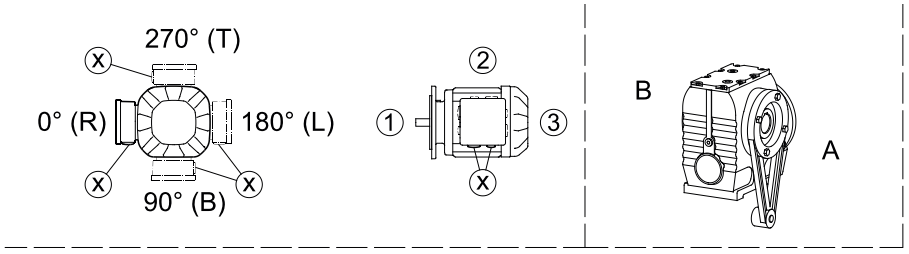


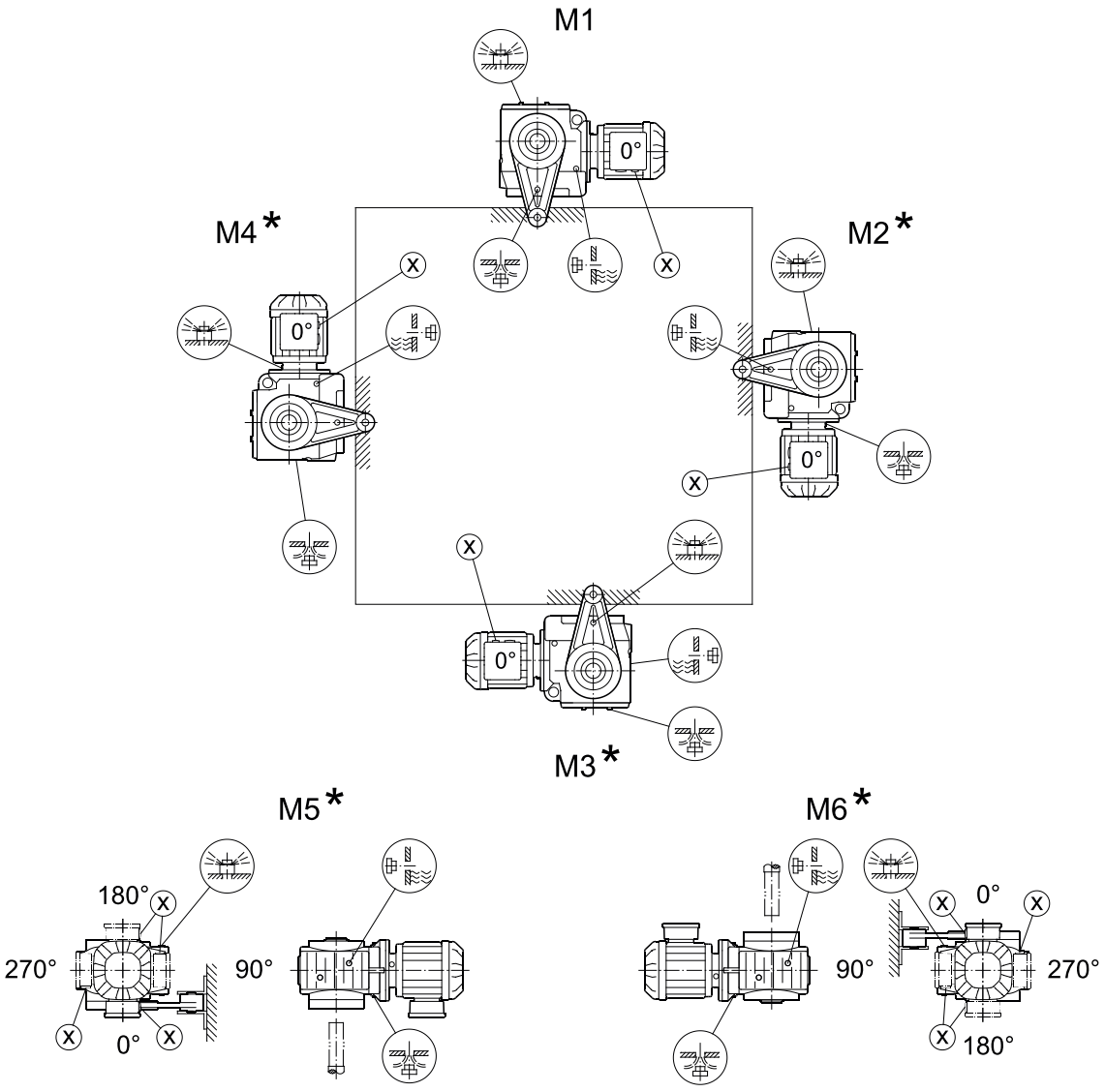


31978088/EN – 03/2025

SA/SH/ST47 – 97

28 021 04 00



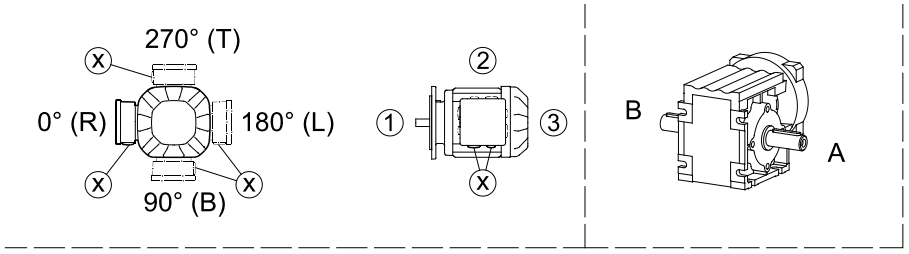


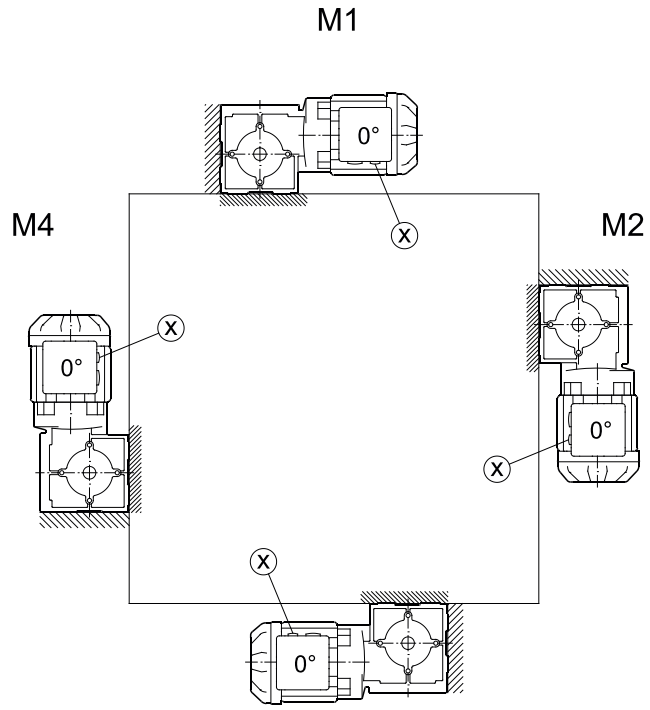
* (→ 🗎 176)

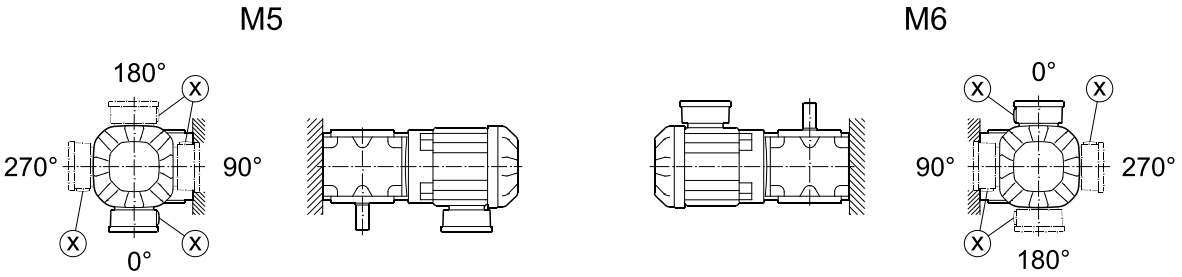
7.9.8 Mounting positions SPIROPLAN® right-angle gear units

W10 – 30

20 001 02 02







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WF10 – 30

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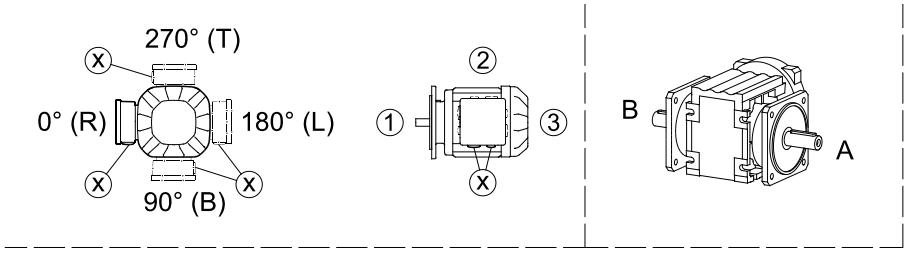

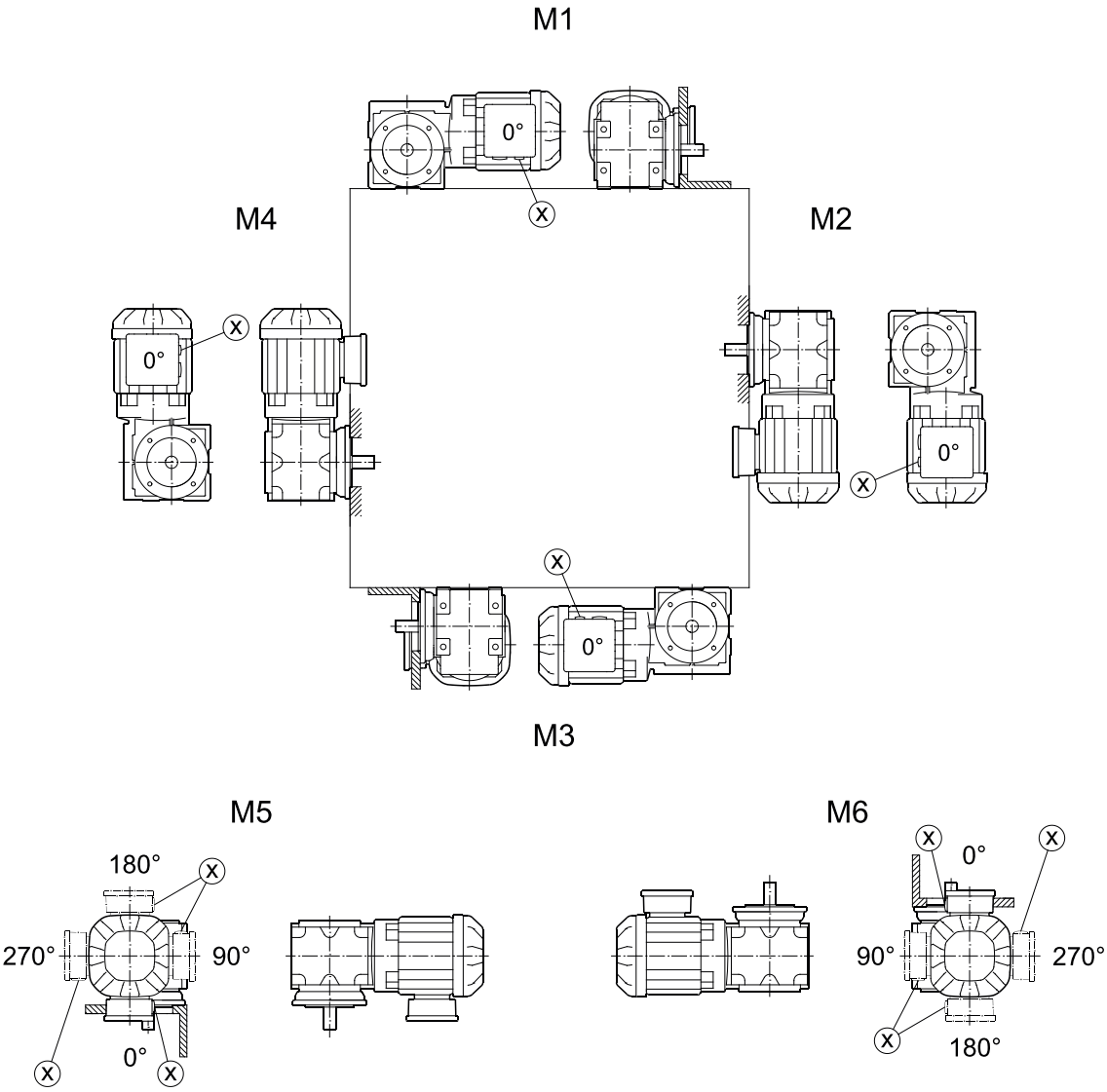

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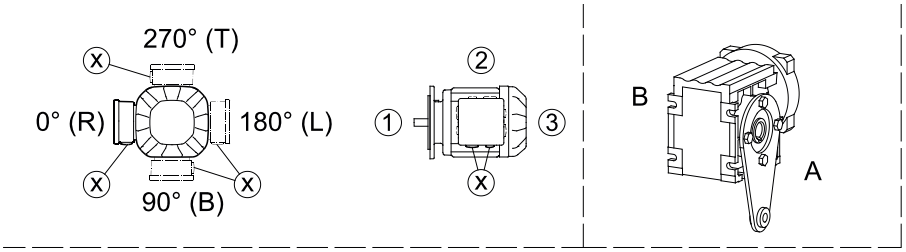

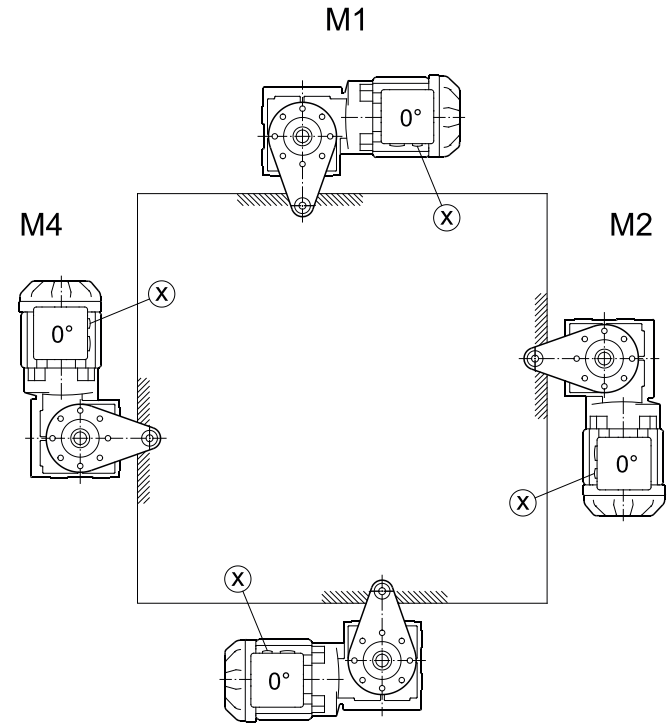

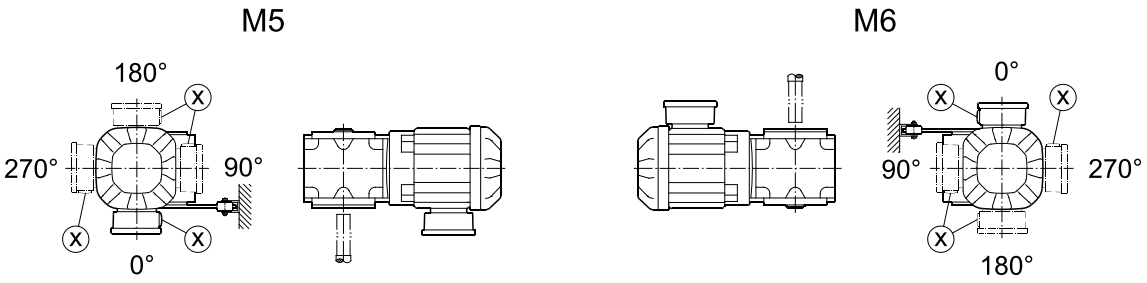

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W/WA..B/WH37B to 47B

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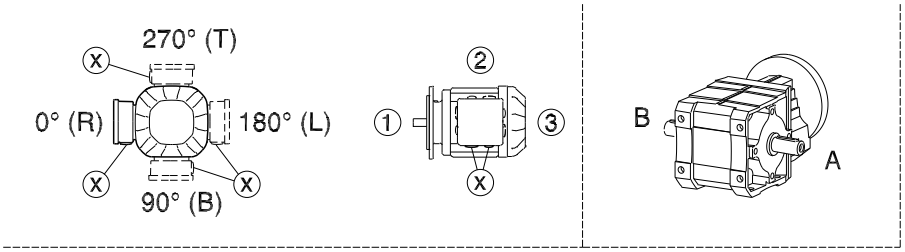

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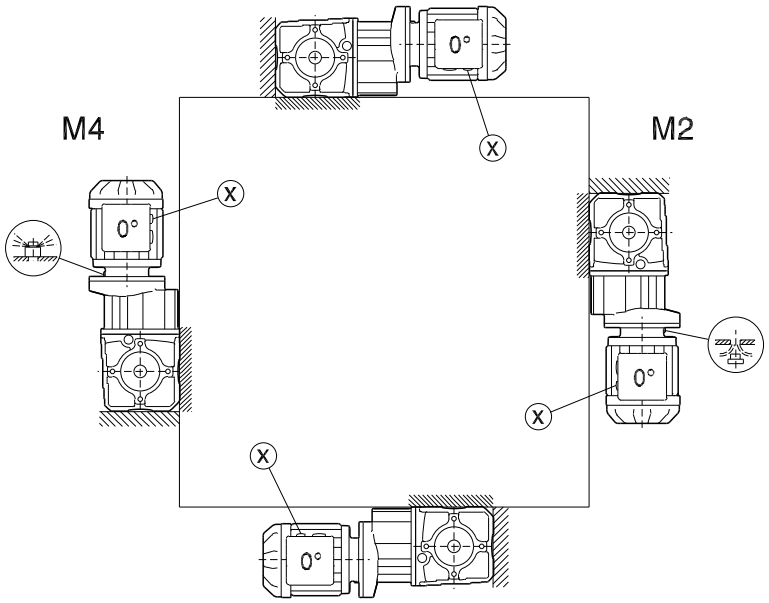
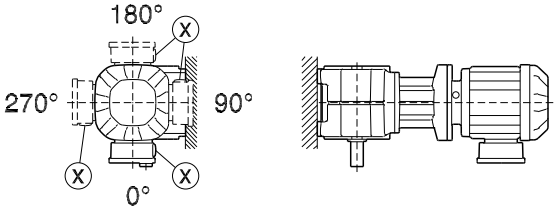


M4

M2

M3

M5



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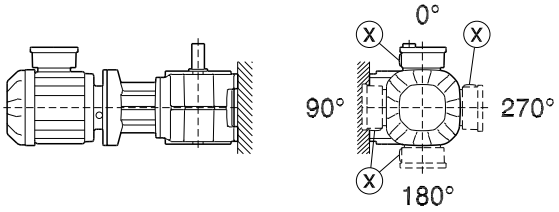

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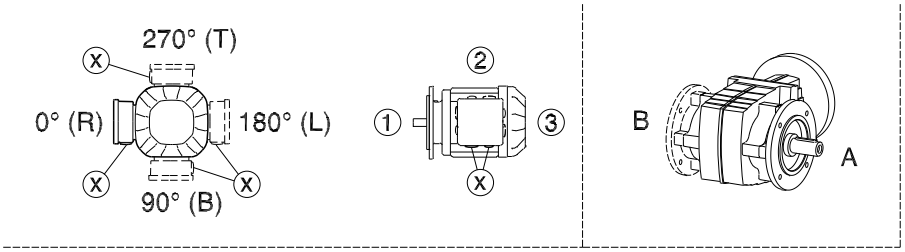
WF/WAF/WHF37 to 47



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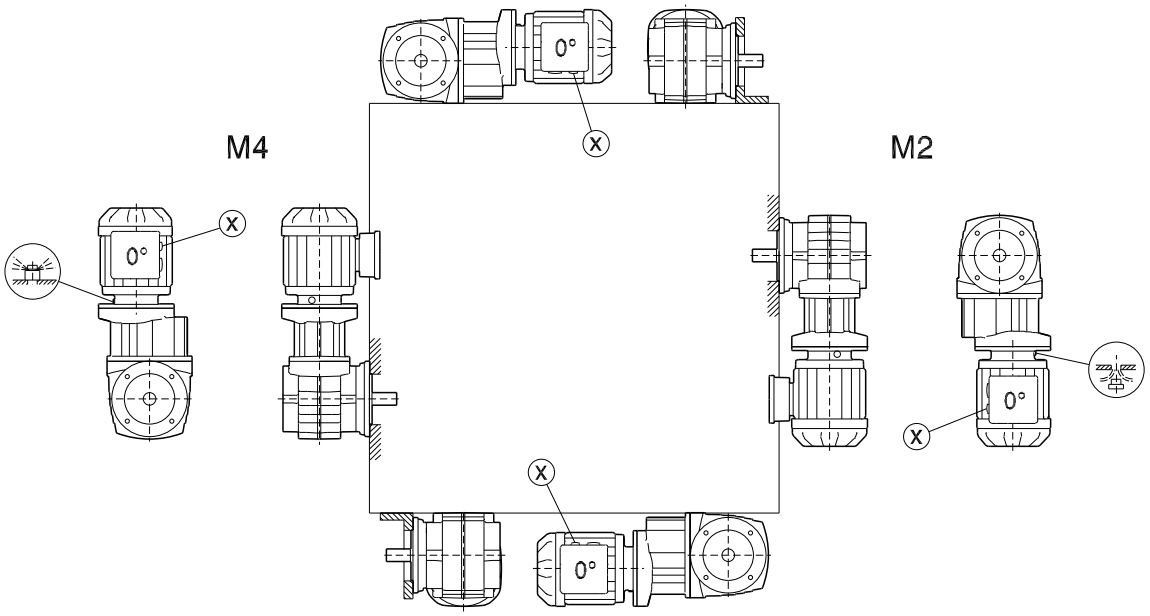

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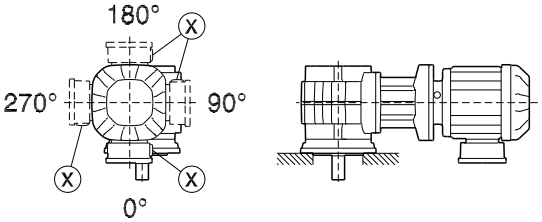
M5



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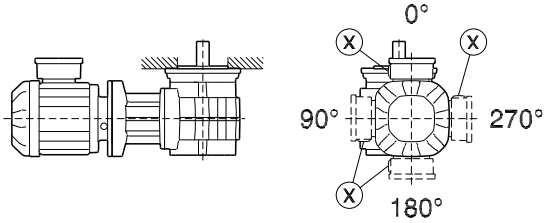

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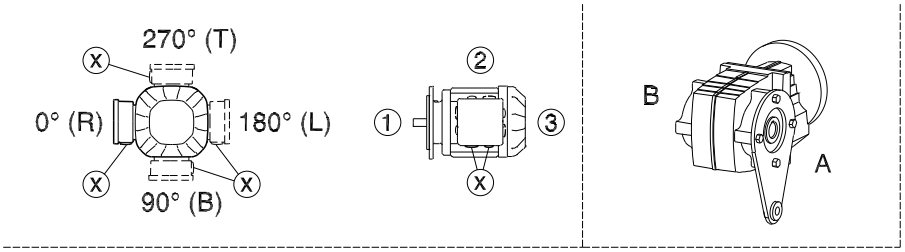
WA/WH/WT37 to 47



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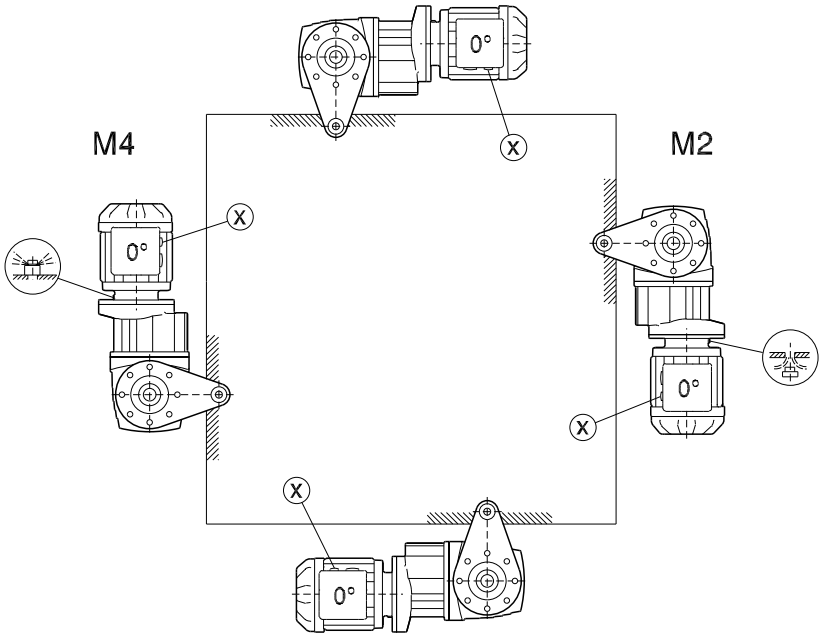
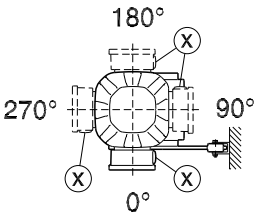


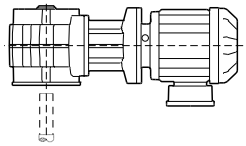
M4

M2

M3

M5





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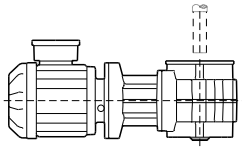

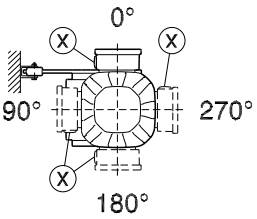

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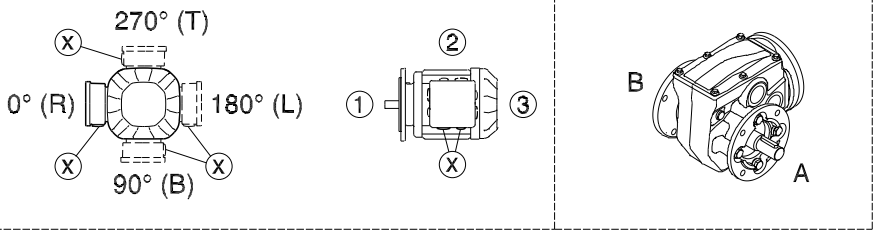

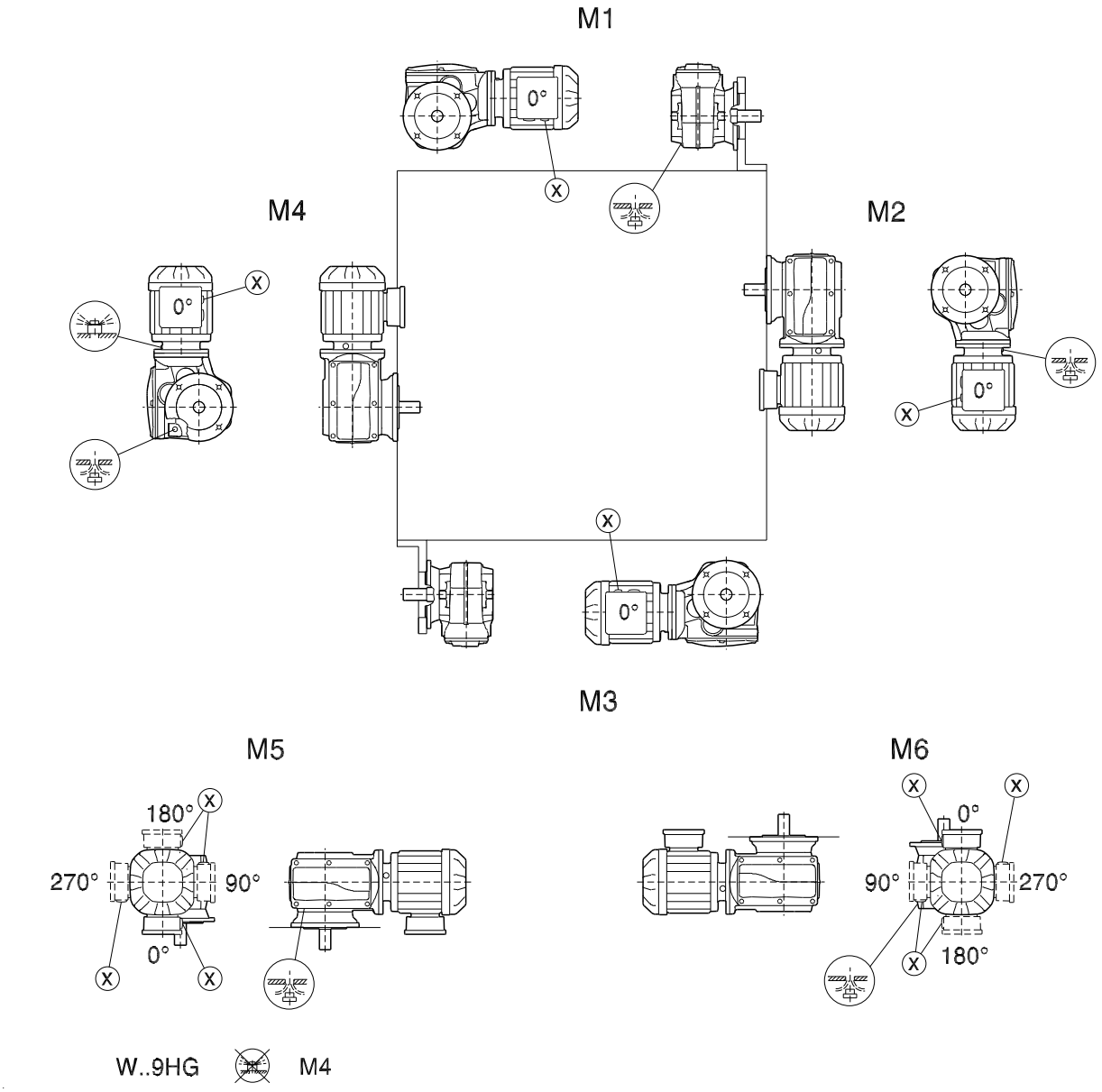

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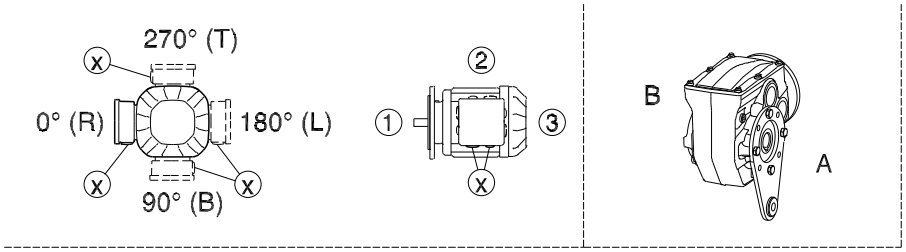
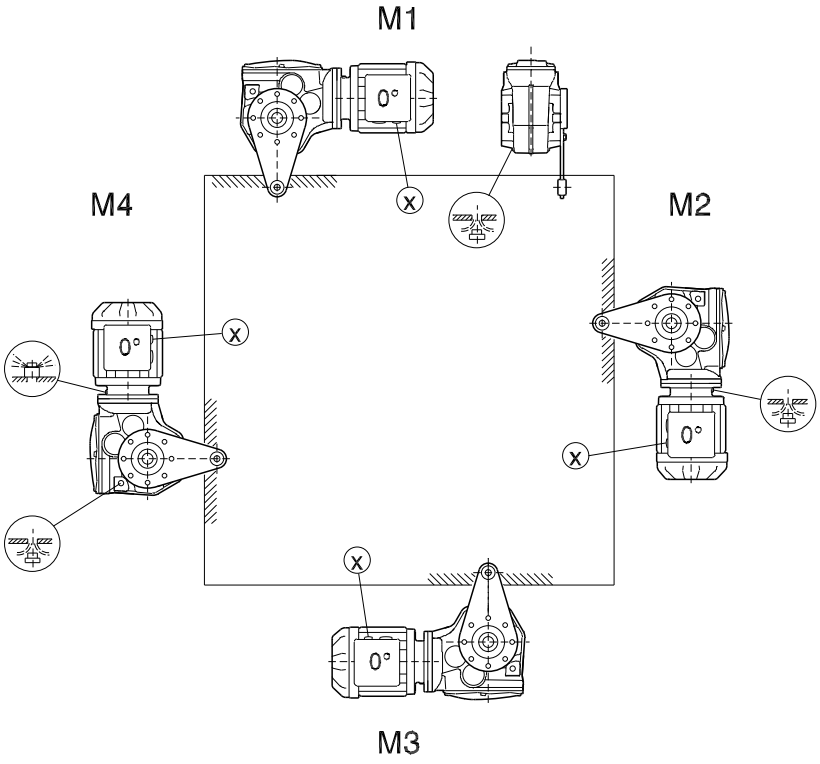
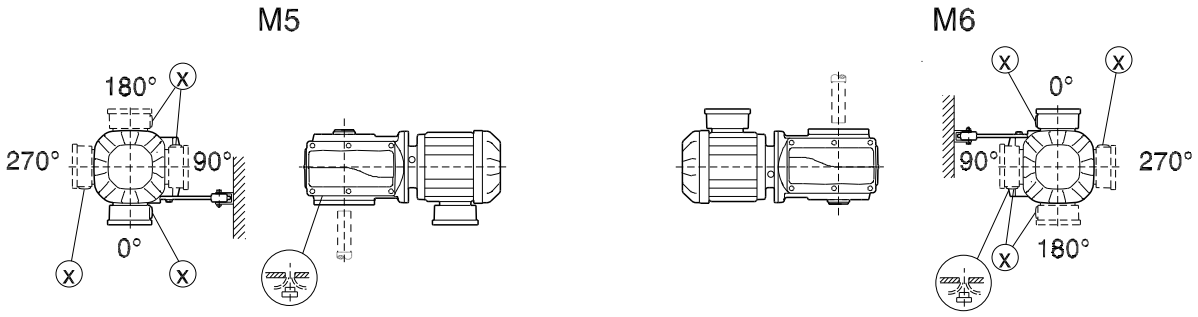
WA19 – 59, WH/WT29 – 59, WA/WH/WT29-59HG

20 176 01 20







W..9HG M4

8 Technical data

8.1 Extended storage

INFORMATION

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

Consequences

INFORMATION

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

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

- The lubricant is mixed with a VCI anti-corrosion agent (**v**olatile **c**orrosion **i**nhibitors). This VCI anti-corrosion agent works in the temperature range -25 °C – +50 °C.
- The flange contact surfaces and the shaft ends are coated with an anti-corrosion agent.

8.1.1 Storage conditions for extended storage

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

Climate zone	Packaging[1)]	Storage[2)]	Storage period
Temperate	• Packed in containers • With desiccant and moisture indicator sealed in the plastic wrap	• Roofed • Protected against rain and snow • Vibration-free	Up to 4 years with regular inspection of the packaging and humidity indicator (rel. humidity < 50%)
(Europe, USA, Canada, China and Russia except for tropical areas)	open	• Roofed and enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 50 °C, relative humidity < 50%) • No sudden temperature variations • Controlled ventilation with filter (free from dust and dirt) • No aggressive vapors • No shocks	2 years or more with regular inspections • Check for cleanliness and mechanical damage during the inspection. • Check that the corrosion protection is intact.

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Climate zone	Packaging[1)]	Storage[2)]	Storage period
Tropical (Asia, Africa, Central and South America, Australia, New Zealand except for temperate regions)	• Packed in containers • With desiccant and moisture indicator sealed in the plastic wrap • Protected against insect damage and mildew by chemical treatment	• Roofed • Protected against rain and snow • Vibration-free	Up to 3 years with regular inspection of the packaging and humidity indicator (rel. humidity < 50%)
	open	• Roofed and enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 50 °C, relative humidity < 50%) • No sudden temperature variations • 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 cleanliness and mechanical damage during the inspection. • Check that the corrosion protection is intact.

1) Packaging must be carried out by an experienced company using packaging material specifically suited for the application.
2) SEW-EURODRIVE recommends storing the gear units according to the mounting position.

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8.2 Lubricants

Unless a special arrangement has been made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific gear unit and mounting position. The decisive factor is the specification of the mounting position when ordering the drive. You must adapt the lubricant fill to any subsequent changes made to the mounting position. For quantity information, refer to chapter "Lubricant fill quantities" (→ 🗎 235).

8.2.1 Bearing greases

The gear unit rolling bearings are filled with the greases listed below at the factory.

The table shows the lubricants recommended by SEW-EURODRIVE:

Area of application	Ambient temperature	Manufacturer	Type
Standard	-40°C to +80°C	SEW-EURODRIVE	Grease HL 2 E1[1)]
		Fuchs	Renolit CX-TOM 15[1)]
		Klüber	Petamo GHY 133 N
 2)	-40°C to +40°C	SEW-EURODRIVE	Grease HL 2 H1 E1
		Bremer & Leguil	Cassida Grease GTS 2
 3)	-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.

The rolling bearings do not need to be re-greased. If the rolling bearings have been washed or new ungreased rolling bearings are installed, the rolling bearings must be filled with the following grease quantities:

- **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.

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8.2.2 Lubricant table

NOTICE

Damage to the gear unit due to improper lubricants.

Possible damage to property.

- Do not mix synthetic lubricants.
- Do not mix synthetic lubricants and mineral lubricants.

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

Oils of the same viscosity class from different manufacturers do not have the same characteristics. In particular, the minimum and maximum permitted oil bath temperatures are manufacturer-specific. These temperatures are specified in the lubricant tables.

The oil viscosity and type (mineral/synthetic) 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 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 the latest information about the lubricants, visit: **www.sew-eurodrive.de/lubricants**.

To avoid gear unit damage, use only one lubricant type.

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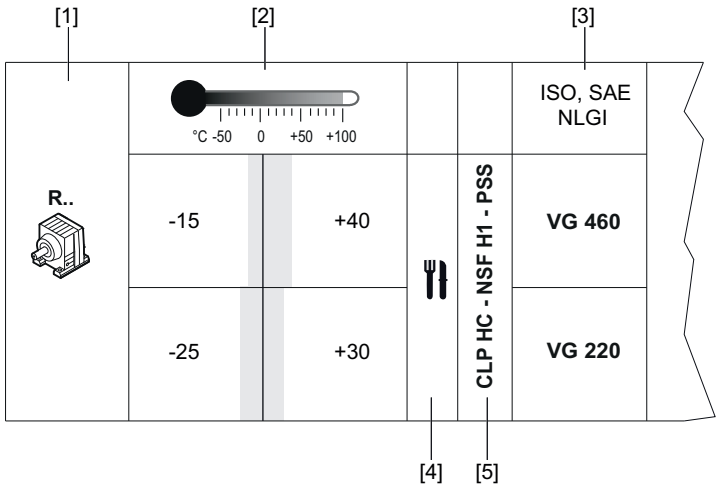
Information on the table structure



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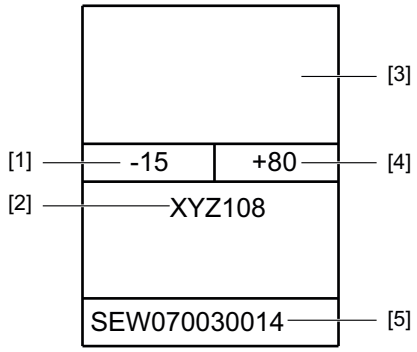
[1] Gear unit type
[2] Ambient temperature range
[3] Viscosity class
[4] Information about special approvals
[5] Lubricant type

The specified ambient temperatures are guide values for selecting a suitable lubricant. The exact upper and lower temperature limits for project planning are specified in the table with the respective trade name. Bear in mind during project planning that the viscosity increases at low temperatures and that this might influence the starting behavior.

Information on the various lubricants



[1] Lowest oil sump temperature in °C, going below this value during operation is not permitted.
[2] Trade name
[3] Manufacturer
[4] Highest oil sump temperature in °C. The service life will be considerably reduced when this temperature is exceeded. Observe the lubricant change intervals. For more information, refer to chapter "Lubricant change intervals" (→ 🗎 155).
[5] Approvals regarding compatibility of the lubricant with approved oil seals

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Lubricant compatibility with oil seals

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.

In the low temperature range, oil seals can withstand shaft deflections (e.g. through overhung load) only to a limited extent. Take special care to avoid or limit pulsating and changing radial displacements of the shaft. Contact SEW-EURODRIVE if necessary.

Oil seals Material class	Permitted Oil sump temperature
NBR	-40°C to +80°C
FKM	-25°C to +115°C
FKM-PSS	-25°C to +115°C

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	1	75 FKM 585
					2	75 FKM 170055
			2	Trelleborg	1	VCBVR
			3	SKF	1	FKM 00934

Examples:

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

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

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Key

The following table shows the symbols and abbreviations used in the lubricant table and their meaning.

Abbreviation/symbol	Meaning
	Synthetic lubricant (marked gray)
	Mineral lubricant
CLP	Mineral oil
CLP PG	Polyglycol (PG)
rPCF	Reduced Product Carbon Footprint
CLP HC	Synthetic hydrocarbons to polyalphaolefins (PAO)
E	Ester-based oil
	Lubricant for the food processing industry and feed industry. Oils are NSF-H1 registered and compliant in accordance with FDA 21 CFR § 178.3570
	Lubricants with particularly reduced CO_2 footprint (cradle-to-gate) with sustainable raw materials.
	Lubricants with slight bio-degradability for environmentally sensitive areas (> 60% according to OECD 301 or according to appendix A of EPA 2013 VGP)
	Lubricant suitable for explosion-protected gear units and gearmotors
1)	Helical-worm gear units with CLP-PG: Contact SEW-EURODRIVE.
2)	Low-viscosity grease
3)	With appropriate measures, the gear units can be operated at ambient temperatures as low as -40 °C. Contact SEW-EURODRIVE.
4)	Oils for the food processing industry cannot be combined with the gear unit option “Extended storage” (a VCI anti-corrosion agent is added).
Oil seal	Oil seal
Premium Sine Seal	Oil seal of the Premium Sine Seal type. The addendum "PSS" for the lubricant type indicates compatibility with the sealing system.

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

The lubricant table is valid on the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

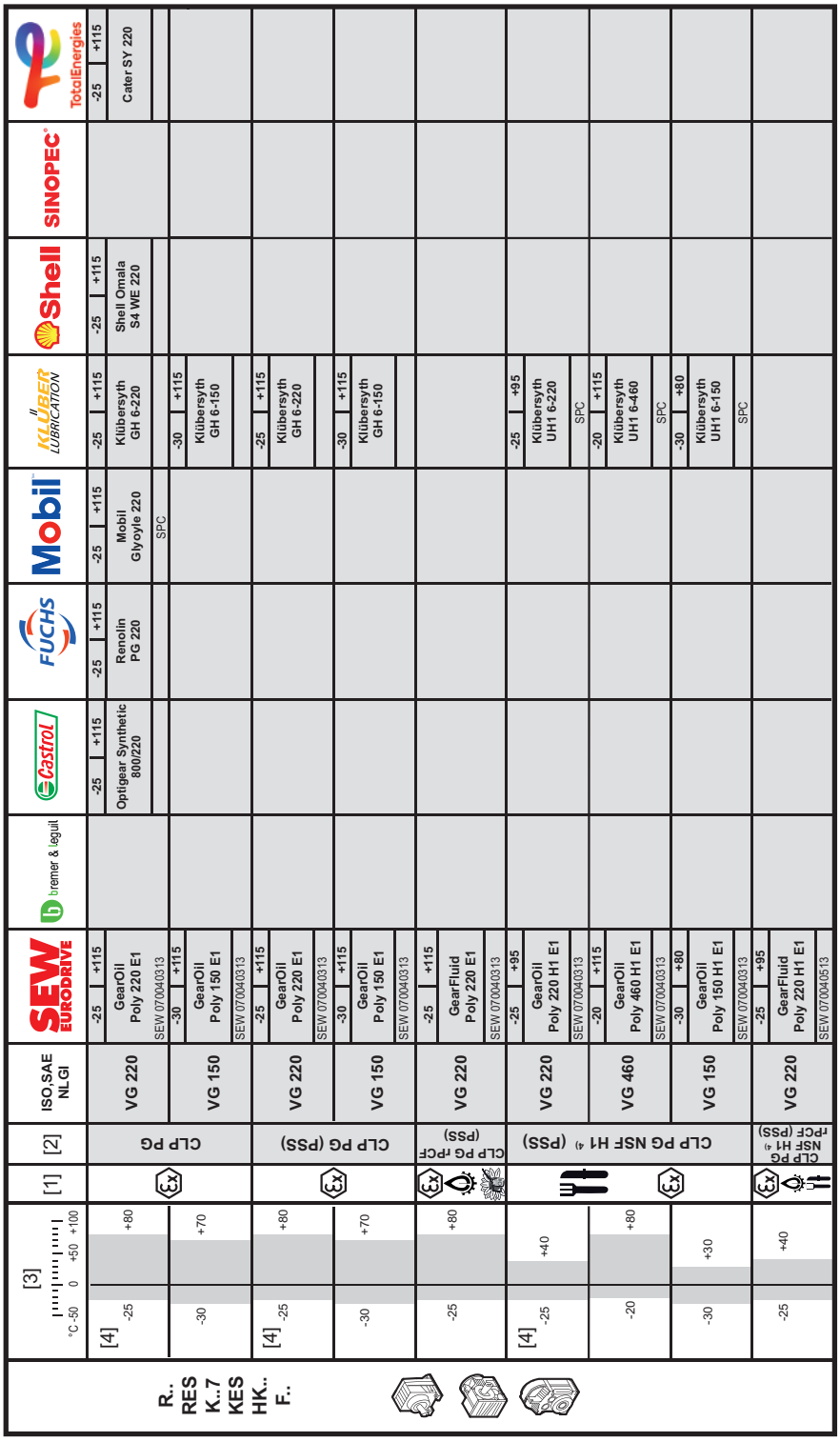
Observe the thermal application limit of the oil seal materials under "Lubricant compatibility with oil seals" (→ 🗎 221).

R.. RES K..7 KES HK.. F..	[3] °C -50 0 +50 +100	[1]	[2]	ISO,SAE NLGI	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	Mobil	KLÜBER LUBRICATION	Shell	SINOPEC	TotalEnergies
[4]	-15 +40		CLP	VG 220	-15 +80 GearOil Base 220 E1/US1/CN1/BR1 SEW 070040313		-15 +80 Optigear BM 220	-15 +80 Renolin CLP 220 Plus SEW 070040313	-15 +80 Mobilgear 600 XP 220 SEW 070040013	-15 +80 Klüberoil GEM 1-220 N		-15 +80 AP-SGO 220 SEW 070040313	-15 +80 Cater EP 220
[4]	-20 +30			VG 150	-20 +80 GearOil Base 150 E1/US1/CN1/BR1 SEW 070040313		-20 +80 Optigear BM 150	-20 +80 Renolin CLP 150 Plus SEW 070040313	-20 +80 Mobilgear 600 XP 150 SEW 070040013	-20 +80 Klüberoil GEM 1-150 N		-20 +80 AP-SGO 150 SEW 070040313	-20 +80 Cater EP 150
[4]	-15 +40		CLP PSS	VG 220	-15 +80 GearOil Base 220 E1/US1/CN1/BR1 SEW 070040313			-15 +80 Renolin CLP 220 Plus SEW 070040313	-15 +80 Mobilgear 600 XP 220 SEW 070040013			-15 +80 AP-SGO 220 SEW 070040313	
[4]	-20 +30			VG 150	-20 +80 GearOil Base 150 E1/US1/CN1/BR1 SEW 070040313			-20 +80 Renolin CLP 150 Plus SEW 070040313	-20 +80 Mobilgear 600 XP 150 SEW 070040013			-20 +80 AP-SGO 150 SEW 070040313	

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

The lubricant table is valid on the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

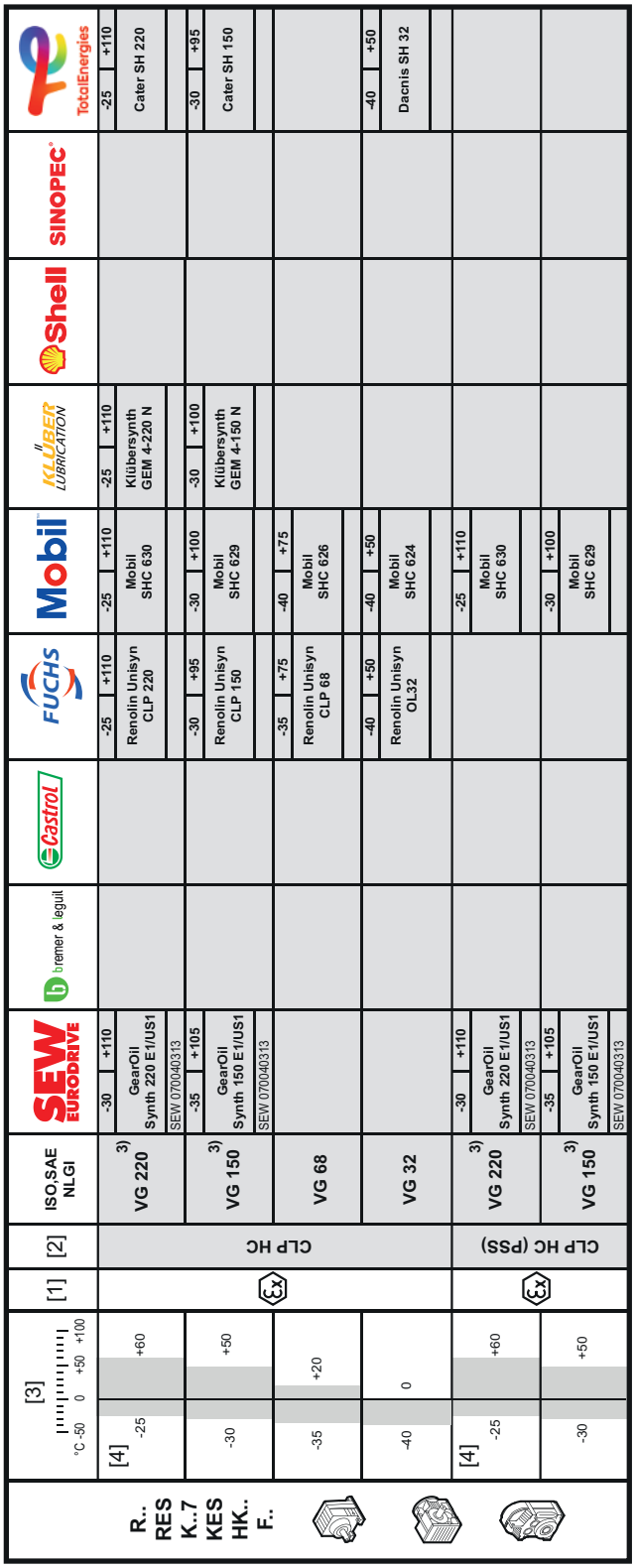
Observe the thermal application limit of the oil seal materials under "Lubricant compatibility with oil seals" (→ 🗎 221).



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

The lubricant table is valid on the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

Observe the thermal application limit of the oil seal materials under "Lubricant compatibility with oil seals" (→ 🖹 221).



R.. RES K..7 KES HK.. F..	[4]	[3] °C	[1]	[2]	ISO,SAE NLGI	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	Mobil	KLÜBER LUBRICATION	Shell	SINOPEC	TotalEnergies
	-25	+60	Ex	CLP HC	3) VG 220	-30 | +110 GearOil Synth 220 E1/US1 SEW 070040313			-25 | +110 Renolin Unisyn CLP 220	-25 | +110 Mobil SHC 630	-25 | +110 Klübersynth GEM 4-220 N			-25 | +110 Cater SH 220
	-30	+50	Ex	CLP HC	3) VG 150	-35 | +105 GearOil Synth 150 E1/US1 SEW 070040313			-30 | +95 Renolin Unisyn CLP 150	-30 | +100 Mobil SHC 629	-30 | +100 Klübersynth GEM 4-150 N			-30 | +95 Cater SH 150
	-35	+20		CLP HC	VG 68				-35 | +75 Renolin Unisyn CLP 68	-40 | +75 Mobil SHC 626				
	-40	0		CLP HC	VG 32				-40 | +50 Renolin Unisyn OL32	-40 | +50 Mobil SHC 624				-40 | +50 Dacnis SH 32
	-25	+60	Ex	CLP HC (PSS)	3) VG 220	-30 | +110 GearOil Synth 220 E1/US1 SEW 070040313				-25 | +110 Mobil SHC 630				
	-30	+50	Ex	CLP HC (PSS)	3) VG 150	-35 | +105 GearOil Synth 150 E1/US1 SEW 070040313				-30 | +100 Mobil SHC 629				

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

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The lubricant table is valid on the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

Observe the thermal application limit of the oil seal materials under "Lubricant compatibility with oil seals" (→ 🖹 221).

R.. RES K..7 KES HK.. F..	[3] °C -50 0 +50 +100	[1]	[2]	ISO,SAE NLGI	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	Mobil	KLÜBER LUBRICATION	Shell	SINOPEC	TotalEnergies
	[4] -15 … +40		CLP HC NSF H1 4)	VG 460	-20 … +110 GearOil Synth 460 H1 E1/US1 SEW 070040313	-15 … +100 Cassida Fluid GL 460	-15 … +100 Optileb GT 460 SEW 070040313	-15 … +100 Cassida Fluid GL 460		-15 … +105 Klüberoil 4 UH1-460 N SPC			
	[4] -25 … +30			VG 220	-30 … +90 GearOil Synth 220 H1 E1/US1 SEW 070040313	-25 … +80 Cassida Fluid GL 220	-25 … +80 Optileb GT 220 SEW 070040313	-25 … +80 Cassida Fluid GL 220		-25 … +80 Klüberoil 4 UH1-220 N SPC			
	-35 … 0			VG 68	SEW 070040313	-35 … +50 Cassida Fluid HF 68	-40 … +50 Optileb HY 68	-35 … +50 Cassida Fluid HF 68		-35 … +50 Klüberoil 4 UH1-68 N SPC			
	-40 … -10			VG 32		-40 … +30 Cassida Fluid HF 32	-40 … +30 Optileb HY 32	-40 … +30 Cassida Fluid HF 32		-40 … +30 KlüberSummit HySyn FG 32 SPC			
	[4] -15 … +40		CLP HC NSF H1 4) (PSS)	VG 460	-20 … +110 GearOil Synth 460 H1 E1/US1 SEW 070040313	-15 … +100 Cassida Fluid GL 460	-15 … +100 Optileb GT 460 SEW 070040313	-15 … +100 Cassida Fluid GL 460					
	-25 … +30			VG 220	-30 … +90 GearOil Synth 220 H1 E1/US1 SEW 070040313	-25 … +80 Cassida Fluid GL 220	-25 … +80 Optileb GT 220 SEW 070040313	-25 … +80 Cassida Fluid GL 220					
	-15 … +50		E	VG 460				-15 … +95 Plantogear 460 S S2					
	-20 … +40			VG 320				-20 … +85 Plantogear 320 S S2		-20 … +85 Klüberbio EG 2-320 S2			

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

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Lubricant table for K..9 gear units

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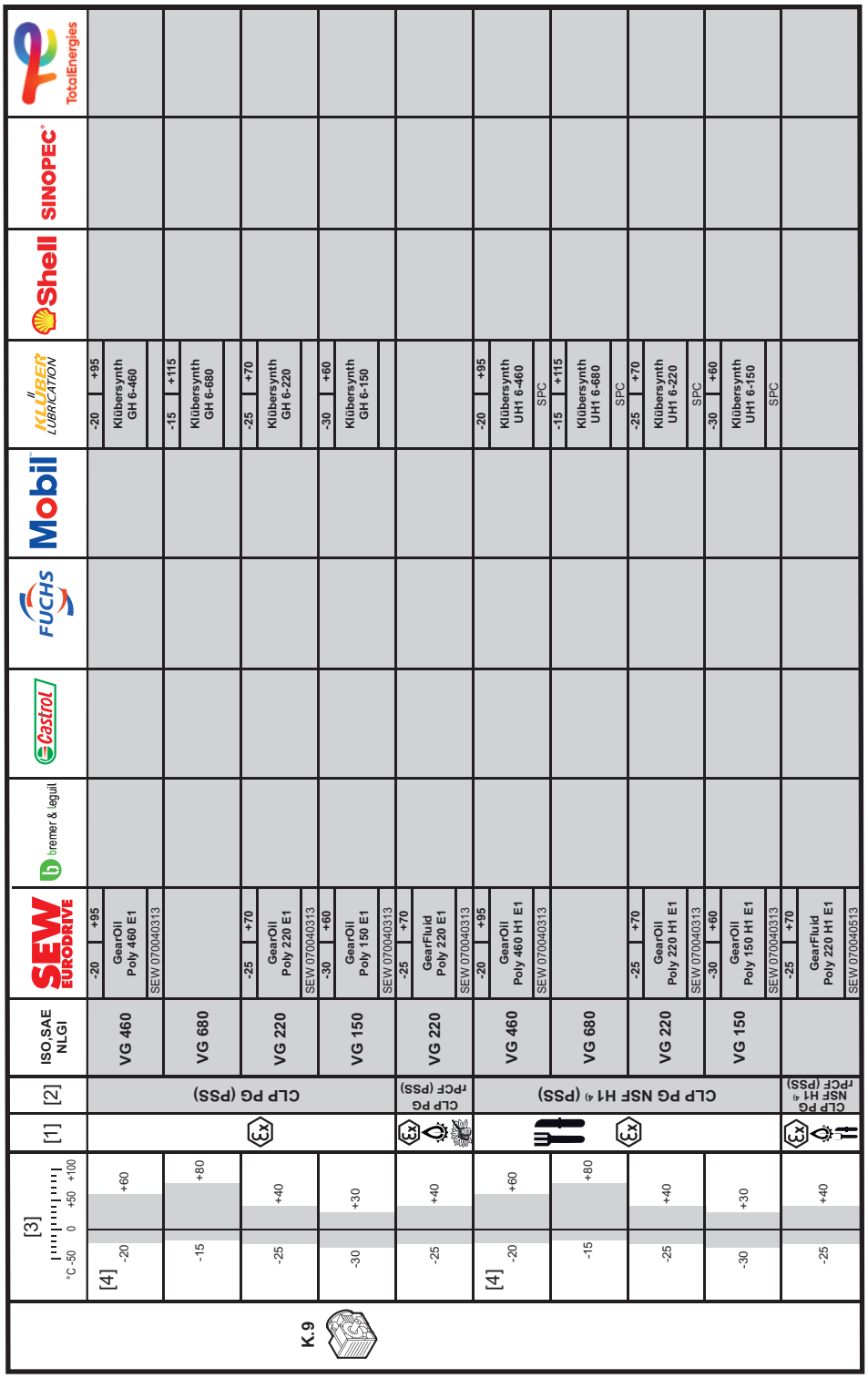
Observe the thermal application limit of the oil seal materials under "Lubricant compatibility with oil seals" (→ 🗎 221).



[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 on the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

Observe the thermal application limit of the oil seal materials under "Lubricant compatibility with oil seals" (→ 🗎 221).

S.. HS..	[3] °C -50 0 +50 +100	[1]	[2]	ISO,SAE NLGI	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	Mobil	KLÜBER LUBRICATION	Shell	SINOPEC	TotalEnergies
	[4] 0 +40		CLP	VG 680	0 +80 SEW GearOil Base 680 S E1 SEW 070040313		0 +80 Optigear BM 680	0 +80 Renolin CLP 680 Plus SEW 070040313	0 +80 Mobilgear 600 XP 680 SEW 070040313	0 +80 Kluberoil GEM 1-680 N		0 +80 AP-SGO 680 SEW 070040313	0 +80 Carter EP 680
	-20 +25			VG 150	-20 +65 SEW GearOil Base 150 E1/US1CN1/BR1 SEW 070040313		-20 +65 Optigear BM 150	-20 +65 Renolin CLP 150 Plus SEW 070040313	-20 +65 Mobilgear 600 XP 150 SEW 070040313	-20 +65 Kluberoil GEM 1-150 N		-20 +65 AP-SGO 150 SEW 070040313	-20 +65 Carter EP 150
	[4] 0 +40		CLP (PSS)	VG 680	0 +80 SEW GearOil Base 680 S E1 SEW 070040313			0 +80 Renolin CLP 680 Plus SEW 070040313	0 +80 Mobilgear 600 XP 680 SEW 070040313			0 +80 AP-SGO 680 SEW 070040313	
	-20 +25			VG 150	-20 +65 SEW GearOil Base 150 E1/US1CN1/BR1 SEW 070040313			-20 +65 Renolin CLP 150 Plus SEW 070040313	-20 +65 Mobilgear 600 XP 150 SEW 070040313			-20 +65 AP-SGO 150 SEW 070040313	

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

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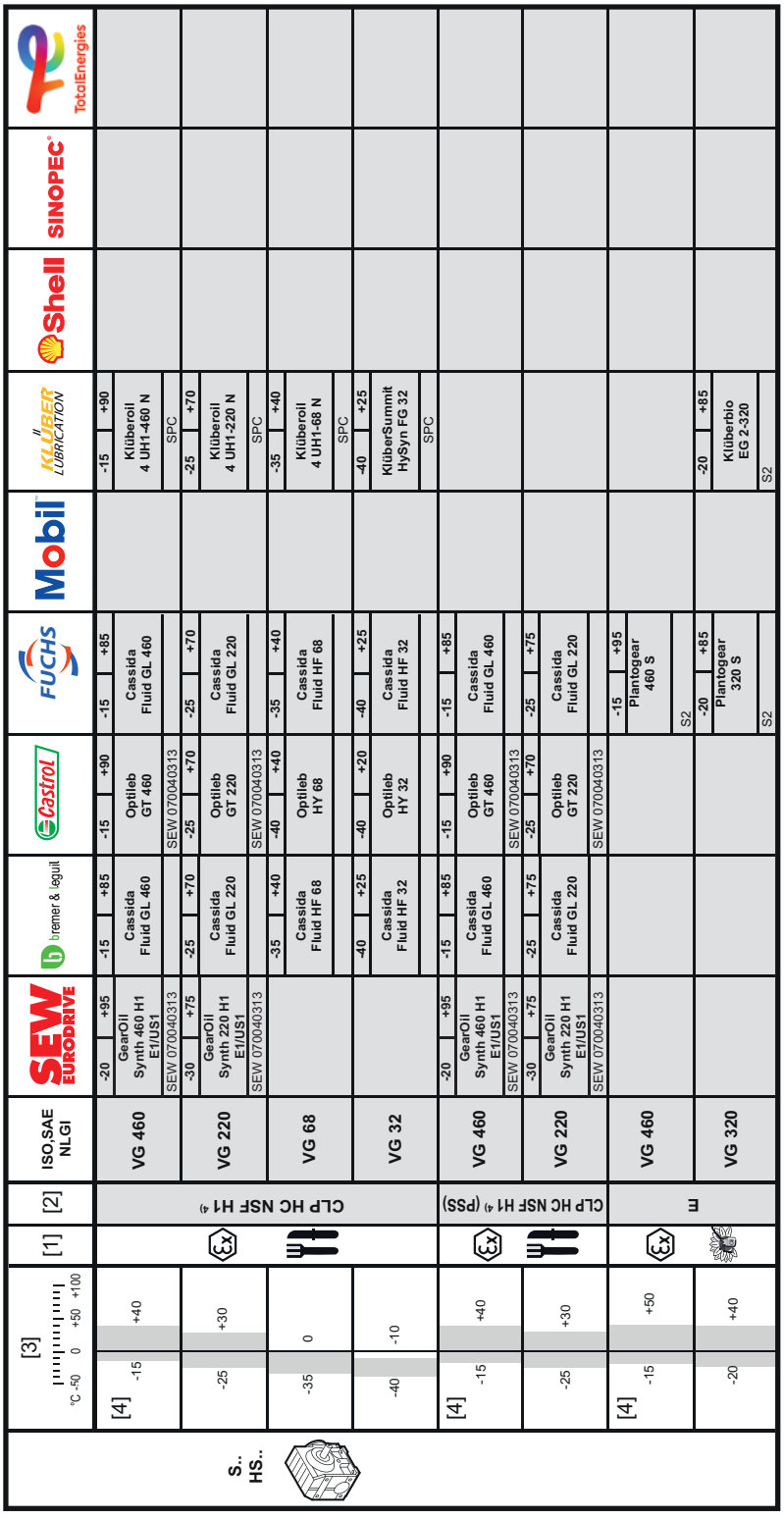
The lubricant table is valid on the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

Observe the thermal application limit of the oil seal materials under "Lubricant compatibility with oil seals" (→ 🗎 221).



S.. HS..	[3] °C	[1]	[2]	ISO,SAE NLGI	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	Mobil	KLÜBER LUBRICATION	Shell	SINOPEC	TotalEnergies
	[4] -15 … +40		CLP HC NSF H1 ⁴⁾	VG 460	-20 … +95 GearOil Synth 460 H1 E1/US1 SEW 070040313	-15 … +85 Cassida Fluid GL 460	-15 … +90 Optileb GT 460 SEW 070040313	-15 … +85 Cassida Fluid GL 460		-15 … +90 Klüberoil 4 UH1-460 N SPC			
	-25 … +30			VG 220	-30 … +75 GearOil Synth 220 H1 E1/US1 SEW 070040313	-25 … +70 Cassida Fluid GL 220	-25 … +70 Optileb GT 220 SEW 070040313	-25 … +70 Cassida Fluid GL 220		-25 … +70 Klüberoil 4 UH1-220 N SPC			
	-35 … 0			VG 68		-35 … +40 Cassida Fluid HF 68	-40 … +40 Optileb HY 68	-35 … +40 Cassida Fluid HF 68		-35 … +40 Klüberoil 4 UH1-68 N SPC			
	-40 … -10			VG 32		-40 … +25 Cassida Fluid HF 32	-40 … +20 Optileb HY 32	-40 … +25 Cassida Fluid HF 32		-40 … +25 KlüberSummit HySyn FG 32 SPC			
	[4] -15 … +40		CLP HC NSF H1 ⁴⁾ (PSS)	VG 460	-20 … +95 GearOil Synth 460 H1 E1/US1 SEW 070040313	-15 … +85 Cassida Fluid GL 460	-15 … +90 Optileb GT 460 SEW 070040313	-15 … +85 Cassida Fluid GL 460					
	-25 … +30			VG 220	-30 … +75 GearOil Synth 220 H1 E1/US1 SEW 070040313	-25 … +75 Cassida Fluid GL 220	-25 … +70 Optileb GT 220 SEW 070040313	-25 … +75 Cassida Fluid GL 220					
	[4] -15 … +50		E	VG 460				-15 … +95 Plantogear 460 S S2					
	-20 … +40			VG 320				-20 … +85 Plantogear 320 S S2		-20 … +85 Klüberbio EG 2-320 S2			

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

The lubricant table is valid on the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

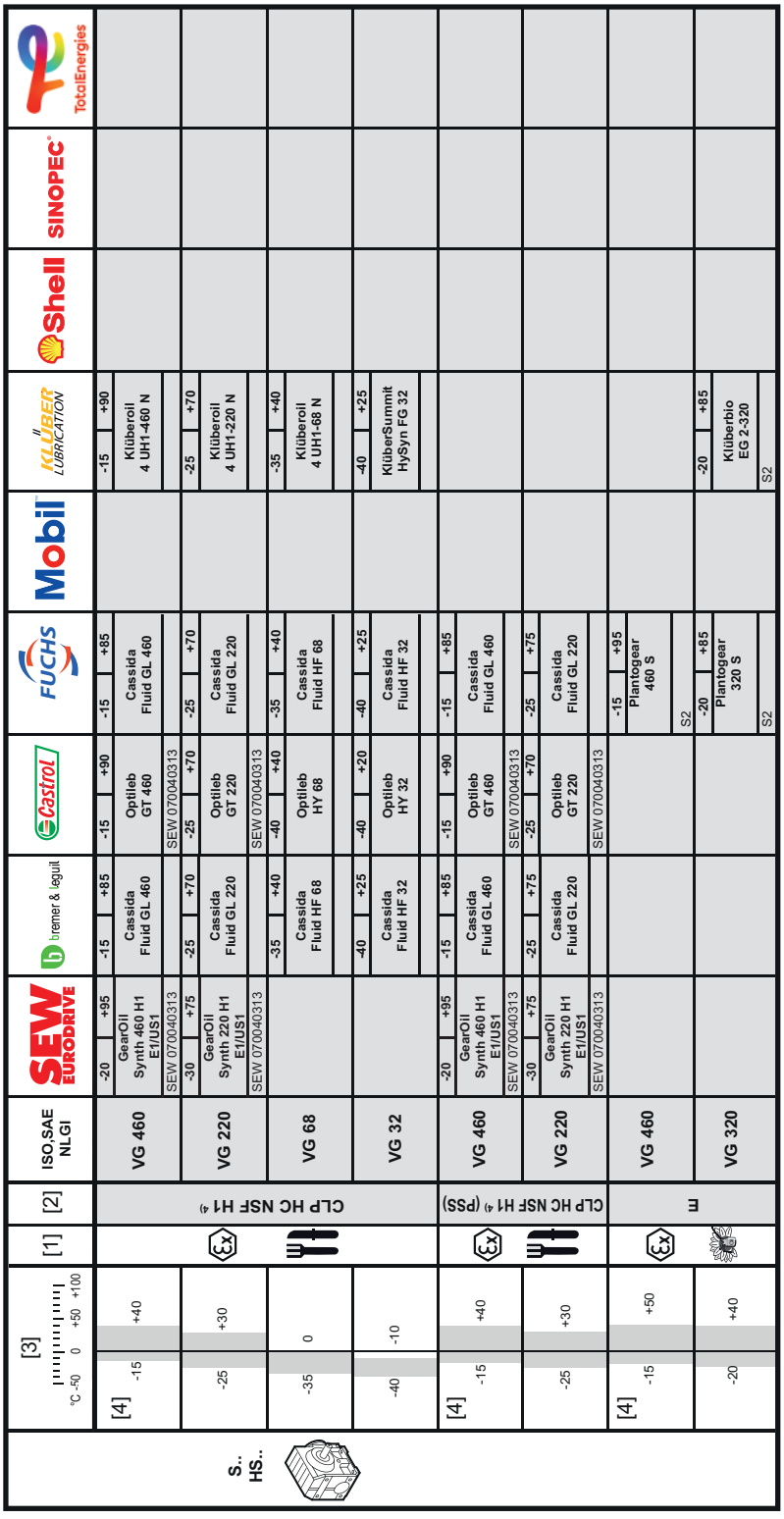
Observe the thermal application limit of the oil seal materials under "Lubricant compatibility with oil seals" (→ 🖹 221).

S.. HS..	[3] °C -50 0 +50 +100	[1]	[2]	ISO,SAE NLGI	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	Mobil	KLÜBER LUBRICATION	Shell	SINOPEC	TotalEnergies
	[4] -15 +60	Ex	CLP HC	VG 460	-20 +110 GearOil Synth 460 E1/US1 SEW 070040313			-15 +100 Renolin Unisyn CLP 460	-20 +105 Mobil SHC 634	-15 +105 Klübersynth GEM 4-460 N			-15 +105 Carter SH 460
	-30 +30			3) VG 150	-35 +75 GearOil Synth 150 E1/US1 SEW 070040313			-30 +70 Renolin Unisyn CLP 150	-30 +75 Mobil SHC 629	-30 +70 Klübersynth GEM 4-150 N			-30 +70 Carter SH 150
	-35 +20			VG 68				-35 +50 Renolin Unisyn CLP 68	-40 +55 Mobil SHC 626				
	-40 0			VG 32				-40 +30 Renolin Unisyn OL 32	-40 +30 Mobil SHC 624				-40 +30 Dacnis SH 32
	[4] -15 +60	Ex	CLP HC (PSS)	VG 460	-20 +110 GearOil Synth 460 E1/US1 SEW 070040313				-20 +105 Mobil SHC 634				
	-30 +30			3) VG 150	-35 +75 GearOil Synth 150 E1/US1 SEW 070040313				-30 +75 Mobil SHC 629				

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

The lubricant table is valid on the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

Observe the thermal application limit of the oil seal materials under "Lubricant compatibility with oil seals" (→ 🗎 221).



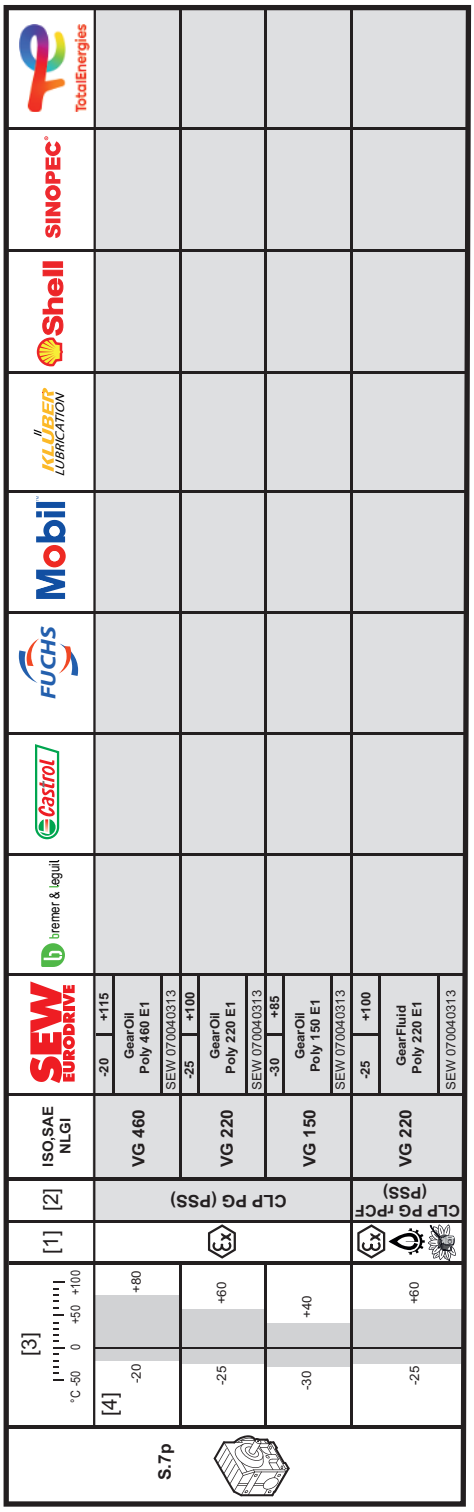
S.. HS..	[3] °C	[1]	[2]	ISO,SAE NLGI	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	Mobil	KLÜBER LUBRICATION	Shell	SINOPEC	TotalEnergies
	[4] -15 … +40		CLP HC NSF H1 ⁴⁾	VG 460	-20 … +95 GearOil Synth 460 H1 E1/US1 SEW 070040313	-15 … +85 Cassida Fluid GL 460	-15 … +90 Optileb GT 460 SEW 070040313	-15 … +85 Cassida Fluid GL 460		-15 … +90 Klüberoil 4 UH1-460 N			
	-25 … +30			VG 220	-30 … +75 GearOil Synth 220 H1 E1/US1 SEW 070040313	-25 … +70 Cassida Fluid GL 220	-25 … +70 Optileb GT 220 SEW 070040313	-25 … +70 Cassida Fluid GL 220		-25 … +70 Klüberoil 4 UH1-220 N			
	-35 … 0			VG 68		-35 … +40 Cassida Fluid HF 68	-40 … +40 Optileb HY 68	-35 … +40 Cassida Fluid HF 68		-35 … +40 Klüberoil 4 UH1-68 N			
	-40 … -10			VG 32		-40 … +25 Cassida Fluid HF 32	-40 … +20 Optileb HY 32	-40 … +25 Cassida Fluid HF 32		-40 … +25 KlüberSummit HySyn FG 32			
	[4] -15 … +40		CLP HC NSF H1 ⁴⁾ (PSS)	VG 460	-20 … +95 GearOil Synth 460 H1 E1/US1 SEW 070040313	-15 … +85 Cassida Fluid GL 460	-15 … +90 Optileb GT 460 SEW 070040313	-15 … +85 Cassida Fluid GL 460					
	-25 … +30			VG 220	-30 … +75 GearOil Synth 220 H1 E1/US1 SEW 070040313	-25 … +75 Cassida Fluid GL 220	-25 … +70 Optileb GT 220 SEW 070040313	-25 … +75 Cassida Fluid GL 220					
	[4] -15 … +50		E	VG 460				-15 … +95 Plantogear 460 S S2					
	-20 … +40			VG 320				-20 … +85 Plantogear 320 S S2		-20 … +85 Klüberbio EG 2-320 S2			

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

Lubricant table for S..p gear units

The lubricant table is valid on the day this document is published. See **www.sew-eurodrive.de/lubricants** for the latest tables.

Observe the thermal limits of the oil seal materials; see chapter "Lubricant compatibility with oil seals".



[1] Information about special approvals
[2] Oil type
[3] Ambient temperature range
[4] Standard

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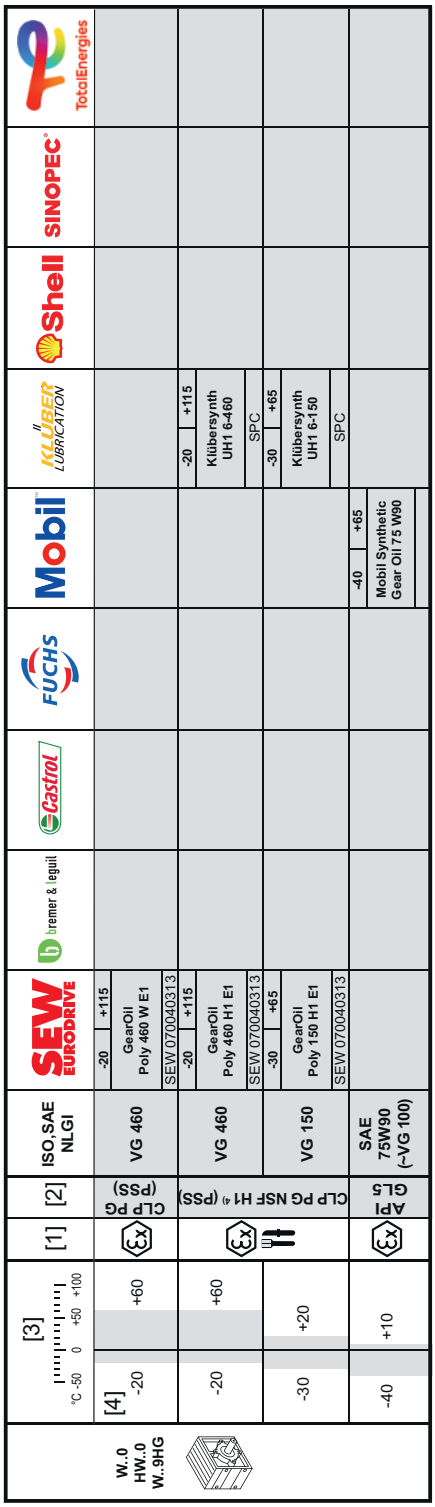
Lubricant table for W.. gear units

The lubricant table is valid on the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

Observe the thermal application limit of the oil seal materials under "Lubricant compatibility with oil seals" (→ 🗎 221).



[1] Information about special approvals
[2] Oil type
[3] Ambient temperature range
[4] Standard

		[3] °C -50 0 +50 +100	[1]	[2]	ISO,SAE NLGI	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	Mobil	KLÜBER LUBRICATION	Shell	SINOPEC	TotalEnergies
W.9	[4]	–25		CLP PG (PSS)	VG 220	-25 | +100 GearOil Poly 220 E1 SEW 070040313					-25 | +100 Klübersynth GH 6-220			
		+60												
	[4]	–20			VG 460	-20 | +115 GearOil Poly 460 E1 SEW 070040313					-20 | +115 Klübersynth GH 6-460			
		+80												
	[4]	–30			VG 150	-30 | +85 GearOil Poly 150 H1 E1 SEW 070040313					-30 | +85 Klübersynth GH 6-150			
		+40												
	[4]	–25		CLP PG rPCF (PSS)	VG 220	-25 | +100 GearFluid Poly 220 E1 SEW 070040313								
		+60												
	[4]	–25		CLP PG NSF H1 a) (PSS)	VG 220	-25 | +80 GearOil Poly 220 H1 E1 SEW 070040313					-25 | +80 Klübersynth UH1 6-220 SPC			
		+40												
	[4]	–20			VG 460	-20 | +110 GearOil Poly 460 H1 E1 SEW 070040313					-20 | +110 Klübersynth UH1 6-460 SPC			
		+70												
	[4]	–30			VG 150	-30 | +65 GearOil Poly 150 H1 E1 SEW 070040313					-30 | +65 Klübersynth UH1 6-150 SPC			
		+20												
	[4]	–25		CLP PG NSF H1 a) rPCF (PSS)	VG 220	-25 | +80 GearFluid Poly 220 H1 E1 SEW 070040513								
		+40												

[1] Information about special approvals
[2] Oil type
[3] Ambient temperature range
[4] Standard

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8.2.3 Lubricant fill quantities

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

The exact values vary depending on the number of gear stages and the gear ratio. Always check the oil level plug during filling for the exact oil quantity.

Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific mounting position. The decisive factor is the specification of the mounting position when ordering the drive.

When the mounting position is changed, the lubricant fill quantity must be adapted accordingly. Do not change the mounting position without prior consultation with SEW-EURODRIVE, otherwise the rights to claim under limited warranty become void.

Helical (R) gear units

R.., R..F

Gear unit	Fill quantity in liters					
	M1[1)]	M2[1)]	M3[1)]	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	6.5/8.1	7.4/7.2	7.4	6.4	6.6
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) With compound gear units, the large gear unit must be filled with the larger oil quantity.

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RF.., RM.., RZ..

Gear unit	Fill quantity in liters					
	M1[1)]	M2[1)]	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	2.50/3.2	2.70	2.80	1.90	2.10
RF77	1.20/2.60	3.10/4.0	3.30	3.60	2.40	3.00
RF87	2.40/6.0	6.5/8.2	7.3	7.4	6.4	6.5
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	
RF167	26.0/70.0	82.0	78.0	88.0	65.0	71.0

1) With compound gear units, the large gear unit must be filled with the larger oil quantity.

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	1.40	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	
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	

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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	
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	2.25	3.15	1.65	3.15	2.40	2.50
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	11.0	13.1	7.70	14.0	10.9	11.1
F..97	18.8	22.7	12.6	25.5	18.6	20.2
F..107	24.5	32.0	19.5	37.5	27.0	
F..127	40.5	54.5	34.0	61.0	46.3	47.0
F..157	74.0	106.5	63.0	110.0	88.5	80.5

FF..

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
FF27	0.60	0.80	0.65	0.70	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	3.05	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	11.0	13.3	7.80	14.3	11.1	11.3
FF97	19.3	22.7	12.6	25.9	19.0	20.7
FF107	25.5	32.0	19.5	38.5	18.6	28.0
FF127	41.5	55.5	34.0	63.0	45.0	49.0
FF157	77.0	107.5	64.0	111.0	89.5	81.5

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	
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.30	1.70	1.00	1.90	1.40	1.70
F..57	2.40	3.10	1.70	3.15	2.40	2.50
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	11.0	13.1	7.70	14.0	10.9	11.1
F..97	18.8	22.7	12.6	25.5	18.6	20.2
F..107	24.5	32.0	19.5	37.5	27.0	
F..127	39.0	54.5	34.0	61.0	45.0	46.5
F..157	73.0	105.5	62.0	109.0	87.5	79.5

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Helical-bevel (K) gear units

K..19 and K..29 gear units have a universal design and are filled with the same quantity of oil regardless of the mounting position, with the exception of M4.

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..37	0.50	1.00		1.25	0.95	
K..39	0.86	1.65	1.55	2.10	1.55	1.30
K..47	0.80	1.30	1.50	2.00	1.60	
K..49	1.65	3.35	2.80	4.20	3.15	2.75
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	8.20	8.90	10.90	8.20	
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	19.0	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	
KF37	0.50	1.10		1.40	1.00	
KF39	0.86	1.65	1.55	2.10	1.55	1.30
KF47	0.80	1.30	1.70	2.20	1.60	
KF49	1.65	3.35	2.80	4.20	3.15	2.75
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	8.30	9.2	11.90	8.60	8.50
KF97	7.0	14.70	17.30	21.50	15.70	16.50
KF107	10.0	21.90	26.0	35.10	25.40	25.30
KF127	19.0	41.50	46.0	55.0	41.0	
KF157	31.0	66.0	69.0	92.0	63.0	

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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..37	0.50	1.00		1.30	1.00	
K..39	0.86	1.65	1.55	2.10	1.55	1.30
K..47	0.80	1.30	1.60	2.0	1.60	
K..49	1.65	3.35	2.80	4.20	3.15	2.75
K..57	1.20	2.20	2.40	3.15	2.70	2.40
K..67	1.10	2.40	2.70	3.70	2.60	
K..77	2.10	4.10	4.60	5.90	4.40	
K..87	3.70	8.40	9.0	11.10	8.2	
K..97	7.0	14.70	15.70	20.0	15.70	
K..107	10.0	20.80	24.5	32.4	24.5	24.3
K..127	19.0	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[1)]	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	1.35	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) With compound gear units, the large gear unit must be filled with the larger oil quantity.

SF..

Gear unit	Fill quantity in liters											
	M1	M2	M3[1)]	M4 Output		M5 Output			M6 Output			
				A/B	A + B	A	B	A + B	A	B	A + B	
SF37	0.25	0.40	0.50	0.55	0.6	0.4	0.4	0.4	0.4	0.4	0.4	
SF47	0.40	0.90	0.90/1.05	1.10	1.15	1.0	0.9	1.0	0.9	1.0	1.0	
SF57	0.50	1.20	1.00/1.50	1.50	1.55	1.4	1.4	1.4	1.4	1.4	1.4	
SF67	1.00	2.20	2.30/3.00	3.20	3.5	2.7	2.6	2.7	2.6	2.7	2.7	
SF77	1.90	4.10	3.90/5.8	6.5	7.2	4.9	4.6	4.9	4.6	4.9	4.9	
SF87	3.80	8.0	7.1/10.1	12.0	13.2	9.1	8.2	9.1	8.2	9.1	9.1	
SF97	7.4	15.0	13.8/18.8	23.1	25.2	18.0	17.0	18.0	17.0	18.0	18.0	

1) With compound gear units, the large gear unit must be filled with the larger oil quantity.

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

Gear unit	Fill quantity in liters					
	M1	M2	M3[1)]	M4	M5	M6
S..37	0.25	0.40	0.50		0.40	
S..47	0.40	0.80	0.70/0.90	1.05	0.80	
S..57	0.50	1.10	1.00/1.50	1.45	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	21.0	15.7	

1) With compound gear units, the large gear unit must be filled with the larger oil quantity.

SPIROPLAN® right-angle gear units (W..)

SPIROPLAN® right-angle gear units W..10 to W..30 have a universal design and are filled with the same quantity of oil regardless of the mounting position.

The oil fill quantity of SPIROPLAN® right-angle 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
				2	3		
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
				2	3		
W..10	0.16						
W..19	0.34			0.57	0.51	0.515	
W..20	0.24						
W..29	0.54			0.93	0.78	0.72	
W..30	0.40						
W..37	0.50			0.70		0.50	
W..39	0.85			1.40	1.25	1.15	
W..47	0.90			1.55		0.90	
W..49	1.39			2.41	2.19	2.15	
W..59	2.0			3.29	3.0	2.8	

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

Gear unit	Fill quantity in liters						
	M1	M2	M3	M4		M5	M6
				2	3		
W..10	0.16						
W..19	0.34			0.57	0.51	0.515	
W..20	0.24						
W..29	0.54			0.93	0.78	0.72	
W..30	0.40						
W..37	0.50			0.70		0.50	
W..39	0.85			1.40	1.25	1.15	
W..47	0.80			1.40		0.80	
W..49	1.39			2.41	2.19	2.15	
W..59	2.0			3.29	3.0	2.8	

WF..9HG, WA..9HG, WAF..9HG,WH..9HG, WHF..9HG, WT..9HG

Gear unit	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
W..29HG	0.54			0.78	0.72	
W..39HG	0.85			1.25	1.15	
W..49HG	1.39			2.19	2.15	
W..59HG	2.0			3.0	2.8	

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9 Malfunctions and remedies

⚠ WARNING

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

Severe or fatal injuries.

- Before starting work, disconnect the motor from the power supply.
- Secure the motor against unintended power-up.

⚠ CAUTION

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

Severe injury.

- Allow the gear unit to cool down before starting work.
- Carefully remove the oil level plug and the oil drain plug.

NOTICE

Damage to the gear unit/gearmotor due to improper installation.

Damage to the gear unit/gearmotor.

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

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9.1 Gear units

Fault	Possible cause	Measure
Unusual, regular running noise	• Meshing/grinding noise: Bearing damage	• Check the oil consistency; change bearings
	• Knocking noise: Irregularity in the gearing	• Contact SEW-EURODRIVE. For a better assessment of the failure, send an audio recording of the noise
	• Deformation of the housing upon tightening	• Check the gear unit mounting for possible deformation and correct if necessary
	• Noise generation caused by insufficient rigidity of the gear unit foundation	• Reinforce the gear unit foundation
Unusual, irregular running noises	• Foreign objects in the oil	• Check the oil consistency • Stop the drive, contact SEW-EURODRIVE
Oil leaking from gear unit cover	• Seal of the gear unit cover leaking	• Tighten the screws of the gear unit cover and observe the gear unit. Contact SEW-EURODRIVE if oil is still leaking
	• Seal defective	• Contact SEW-EURODRIVE
Small amounts of oil leak from the oil seal during run-in phase	• Function-related pseudo-leakage	• There is no failure. Remove with a soft, lint-free cloth and keep monitoring it.
Film of moisture around the dust lip of the oil seal	• Function-related pseudo-leakage	• There is no failure. Remove with a soft, lint-free cloth and keep monitoring it.
Oil leaking from oil seal	• Oil seal leaking/defective	• Check sealing system. It may be necessary to consult SEW-EURODRIVE
Oil leaking from motor (e.g. terminal box or fan)	• Too much oil	• Check oil level, correct if necessary
	• Gear unit not ventilated	• Vent gear unit
	• Oil seal leaking/defective	• Check sealing system. It may be necessary to consult SEW-EURODRIVE
Oil leaking from flange	• Flange gasket leaking/defective	• Check sealing system. It may be necessary to consult SEW-EURODRIVE
	• Too much oil	• Check oil level, correct if necessary
	• Gear unit not ventilated	• Vent gear unit
Oil emerging from breather valve	• Too much oil	• Check oil quantity, correct if necessary
	• Function-related oil mist	• There is no failure.
	• Drive not installed in proper mounting position	• Install breather valve correctly and adjust the oil level.
	• Frequent cold starts (oil foams) and/or high oil level	• Install oil expansion tank

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Fault	Possible cause	Measure
Output shaft does not turn although the motor is running or the input shaft is rotated	• Shaft-hub connection in the gear unit interrupted	• Send in the gear unit/gearmotor for repair

9.2 ADC/AMS../AM../AQS../AQ../AL../EWH.. adapters

Fault	Possible cause	Measure
Unusual, regular running noise	• Meshing/grinding noise: Bearing damage	• Contact SEW-EURODRIVE
Oil leaking	• Seal defective	• Contact SEW-EURODRIVE
Output shaft does not turn although the motor is running or the input shaft is rotated	• Shaft-hub connection in the gear unit interrupted	• Send in the gear unit/gearmotor for repair
Change in running noise and/or vibrations	• Coupling ring wear, short-term torque transmission due to metal contact	• Replace the coupling ring
	• Screws to secure hub axially are loose	• Tighten the screws
Premature coupling ring wear	• Contact with aggressive fluids/ oils; ozone influence; excessive ambient temperatures, etc. that can change the physical properties of the coupling ring.	• Contact SEW-EURODRIVE
	• Impermissibly high coupling ring ambient/contact temperatures; max. permissible: -20 °C to +80 °C.	• Contact SEW-EURODRIVE
	• Overload	• Contact SEW-EURODRIVE

9.3 AD.. input shaft assembly

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

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9.4 Service

If you require customer service, include the following information:

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

9.5 Waste disposal

Dispose of the product and all parts separately in accordance with their material structure and the national regulations. Put the product through a recycling process or contact a specialist waste disposal company. If possible, divide the product into the following categories:

- Iron, steel or cast iron
- Stainless steel
- Aluminum
- Copper
- Plastics

The following materials are hazardous to health and the environment. These materials must be collected and disposed of separately:

- Oil and grease

  Collect used oil and grease separately according to type. Ensure that the used oil is not mixed with solvent. Dispose of used oil and grease correctly.

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10 Contacting SEW-EURODRIVE

You can find the worldwide contact data and locations on the **SEW-EURODRIVE website** via the following link or the QR code shown below.

https://www.sew-eurodrive.de/contacts-worldwide

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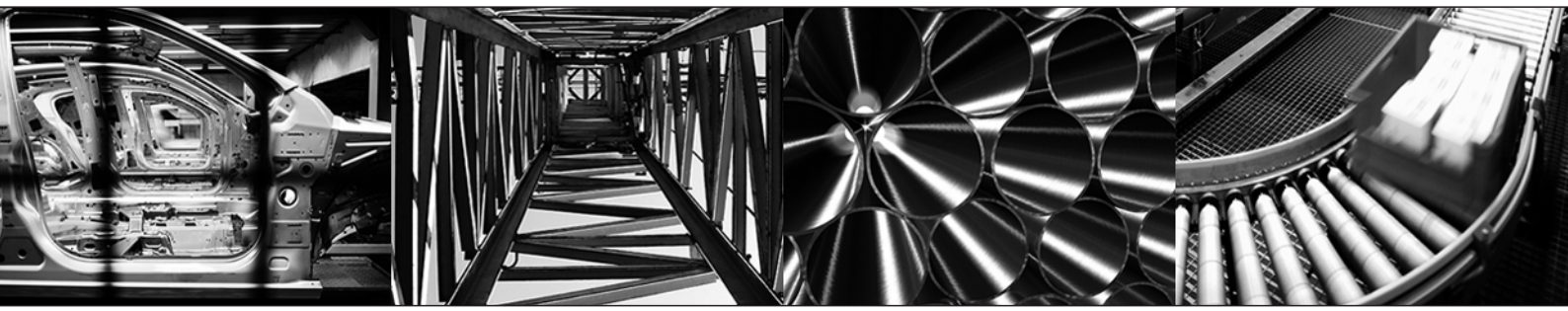

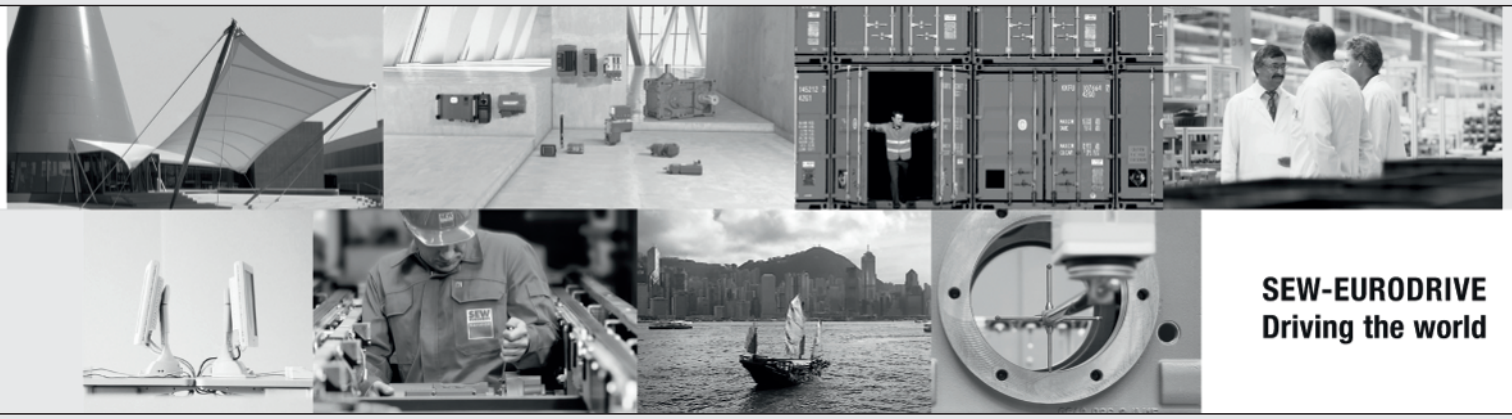

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