SEW EURODRIVE

Assembly and Operating Instructions

Explosion-Proof Gear Units

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

Edition 05/2018

24804134/EN

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1 General information

1.1 About this documentation

The current version of the documentation is the original.

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

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

1.2 Structure of the safety notes

1.2.1 Meaning of signal words

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

Signal word	Meaning	Consequences if disregarded
⚠ **DANGER**	Imminent hazard	Severe or fatal injuries
⚠ **WARNING**	Possible dangerous situation	Severe or fatal injuries
⚠ **CAUTION**	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the product or its environment
INFORMATION ON EXPLOSION PROTECTION	Important information about explosion protection	
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 dangerous electrical voltage
	Warning of hot surfaces
	Warning of risk of crushing
	Note on explosion protection
	Warning of automatic restart

1.2.3 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

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

1.3 Rights to claim under limited warranty

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

1.4 Product names and trademarks

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

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1.5 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:

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

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

2.3 Target group

Specialist for mechanical work

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

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

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Specialist for electrotechnical work

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

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

Additional qualification

In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives, and laws specified in this documentation. The persons must have the express authorization of the company to operate, program, parameterize, label, and ground units, systems, and circuits in accordance with the standards of safety technology.

Instructed persons

All work in the areas of transportation, storage, operation and waste disposal must be carried out by persons who are trained appropriately. The purpose of the instruction is that the persons are capable of performing the required tasks and work steps in a safe and correct manner.

2.4 Designated use

The gear units are intended for industrial systems and may only be used in accordance with the information provided in the technical documentation by SEW-EURODRIVE and the information given on the nameplate. They meet the requirements set forth in Directive 2014/34/EU and comply with the applicable standards and regulations.

The gear units are components for the installation in machines and plants according to the 2006/42/EC Machinery Directive. Within the scope of the Directive, you must not operate the machine in the designated fashion until you have established that the end product complies with Machinery Directive 2006/42/EC.

Optional equipment

In addition to the general installation guidelines, the following regulations in accordance with German operating safety regulations (BetrSichV) or other national regulations must be observed for connecting additional devices:

- EN ISO 80079-36 Potentially explosive atmosphere - part 36: Non-electrical equipment for use in potentially explosive atmospheres – Basics and requirements
- EN ISO 80079-37 Potentially explosive atmosphere - part 37: Non-electrical equipment for explosive atmospheres - Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k"
- EN 50281-2-1 Electrical apparatus for use in the presence of combustible dust - Part 2-1: Test methods; methods for determining the minimum ignition temperatures of dust
- EN 60079-0 Potentially explosive areas – part 0: General requirements
- EN 60079-1 Potentially explosive areas – part 1: Device protection by flameproof enclosure "d"
- EN 60079-7 Potentially explosive areas – part 7: Equipment protection by increased safety "e"
- EN 60079-11 Potentially explosive areas – part 11: Device protection by intrinsic safety "i"
- EN 60079-14 Potentially explosive areas – part 14: Project planning, selection and setup of electrical machinery.

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- EN 60079-15 Potentially explosive areas – part 15: Equipment protection by protection type "n"
- EN 60079-17 Potentially explosive areas – part 17: Testing and maintenance of electrical machinery
- EN 60079-31 Potentially explosive areas – part 31: Equipment dust ignition protection by housing "t"
- DIN VDE 105-9 "Operating electrical equipment" or other national regulations
- DIN VDE 0100 "Erection of power installations with rated voltages below 1000 V" or other national regulations

Technical data and information on the permitted conditions are given on the nameplate and in the documentation; they have to be observed under all circumstances.

2.5 Other applicable documentation

Observe the corresponding documentation for all further components.

2.6 Safety note for working in potentially explosive areas

Note that explosive gas mixtures or concentrations of dust can lead to explosions in conjunction with hot, live, or moving parts of electrical machinery.

2.7 Transportation/storage

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

Observe the storage information on climatic conditions as given in chapter "Storage conditions" (→ 🗎 174).

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 further information, refer to chapter "Extended storage" (→ 🗎 174).

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.

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2.8 Installation/assembly

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

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

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

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

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

2.9 Startup/operation

Check the oil level before startup as described in chapter "Inspection/maintenance" (→ 🗎 107).

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

Secure the keys for the test run without output elements.

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

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

2.10 Inspection/maintenance

Observe the information in chapter "Inspection/maintenance" (→ 🗎 107).

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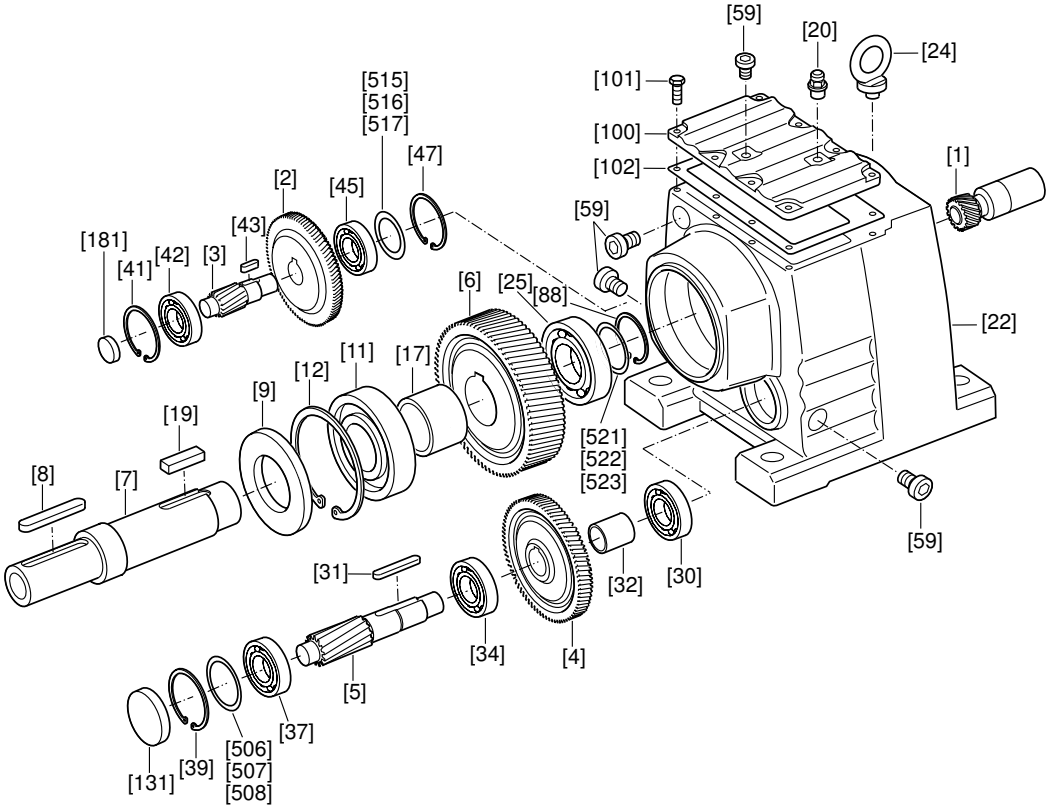
3 Gear unit structure

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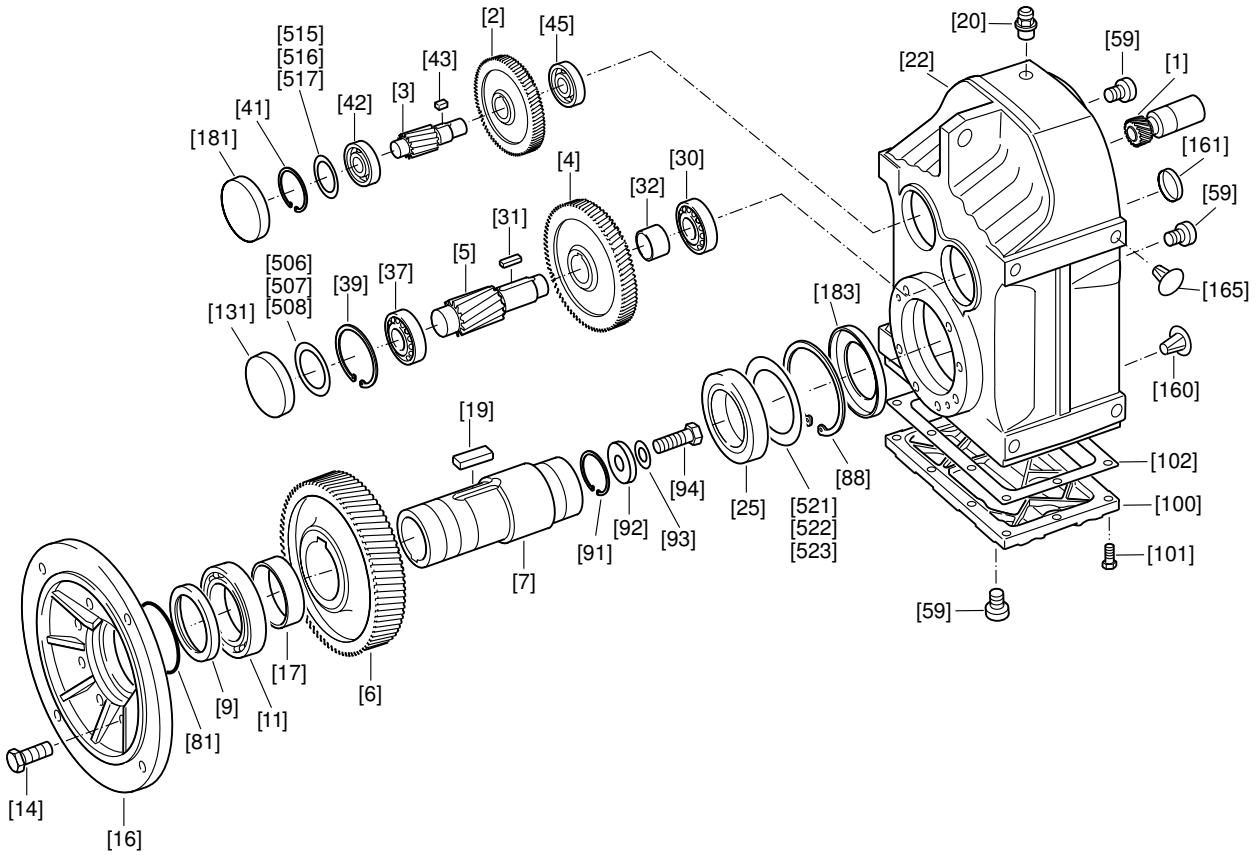
3.2 Basic structure of parallel-shaft helical gear units F..27 – F..157



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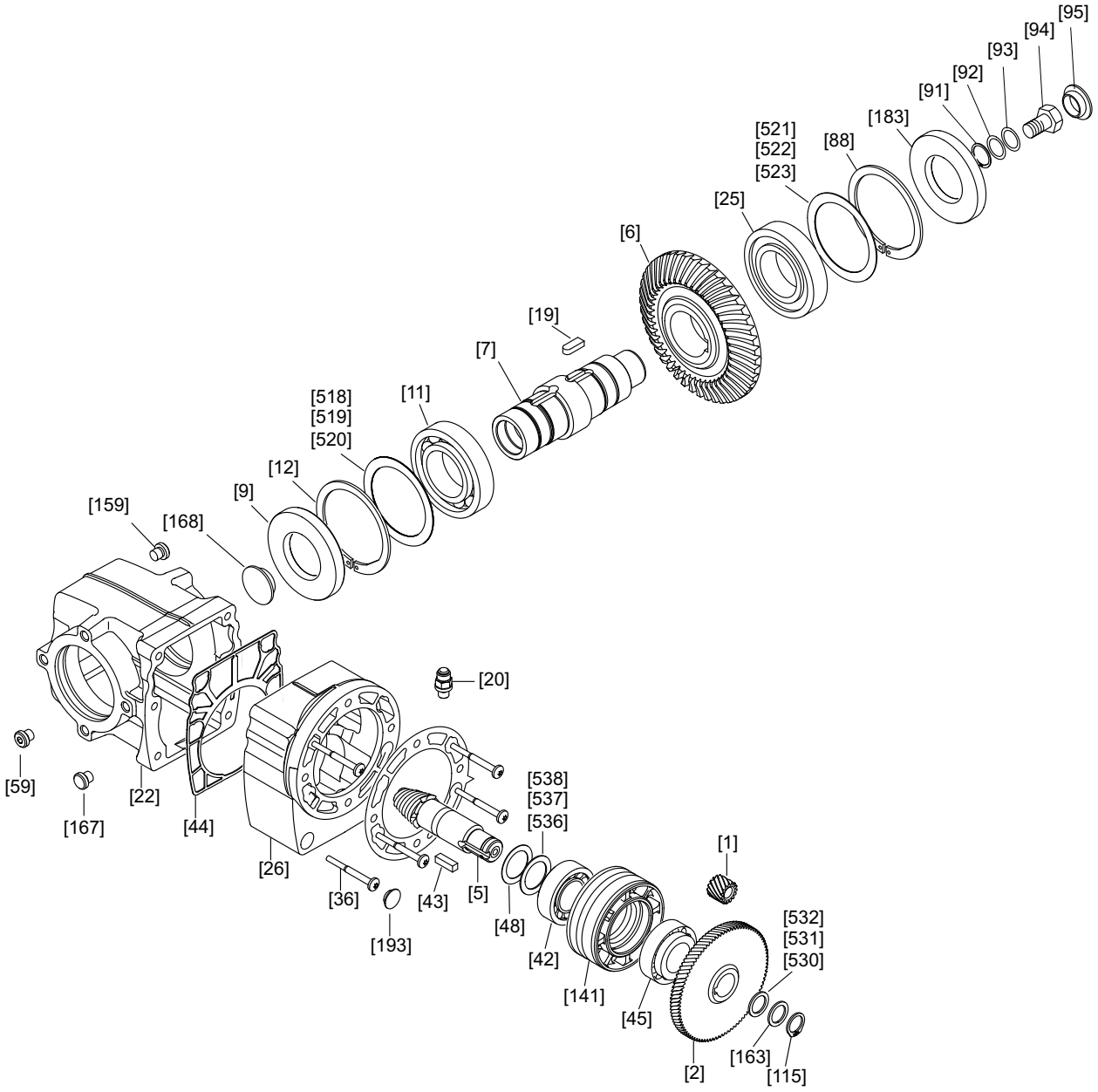
3.3 Basic structure of helical-bevel gear units K..19/K..29



9007206676351499

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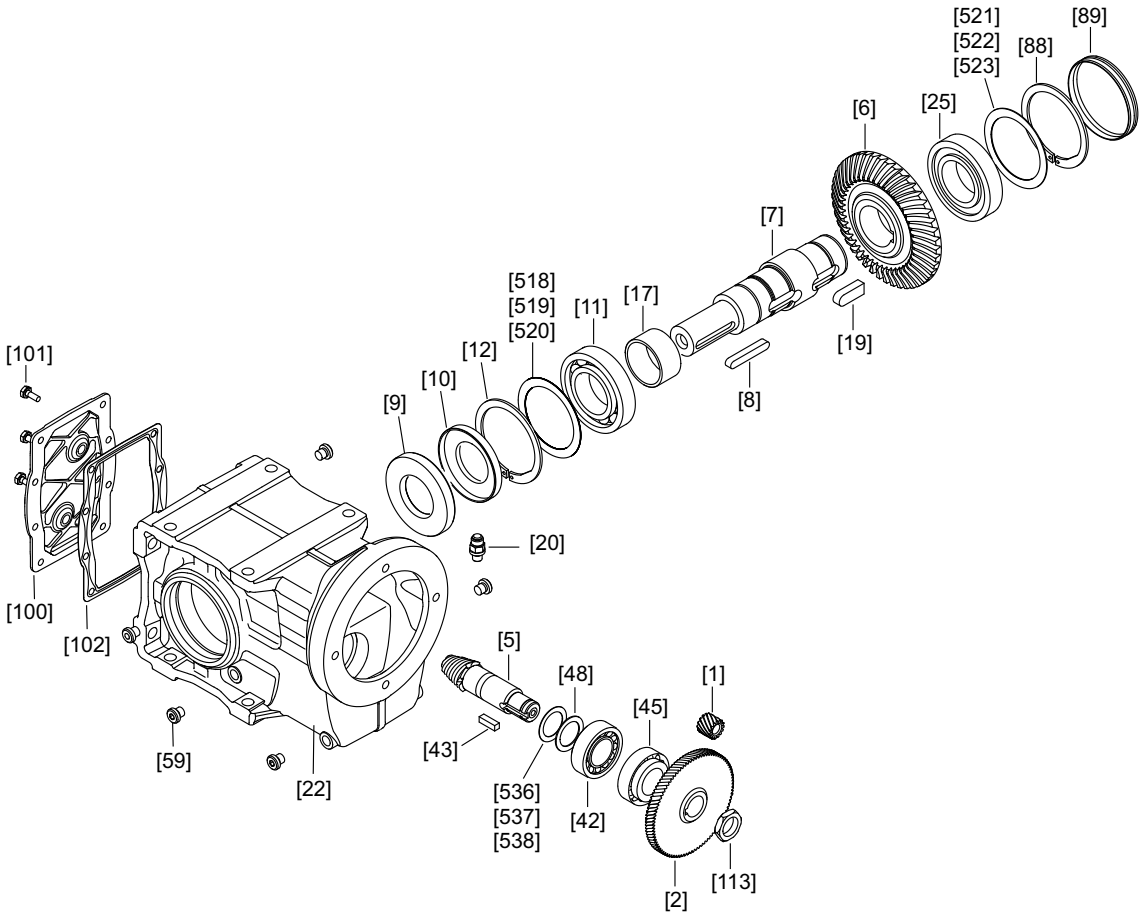
3.4 Basic structure of helical-bevel gear units K..39/K..49



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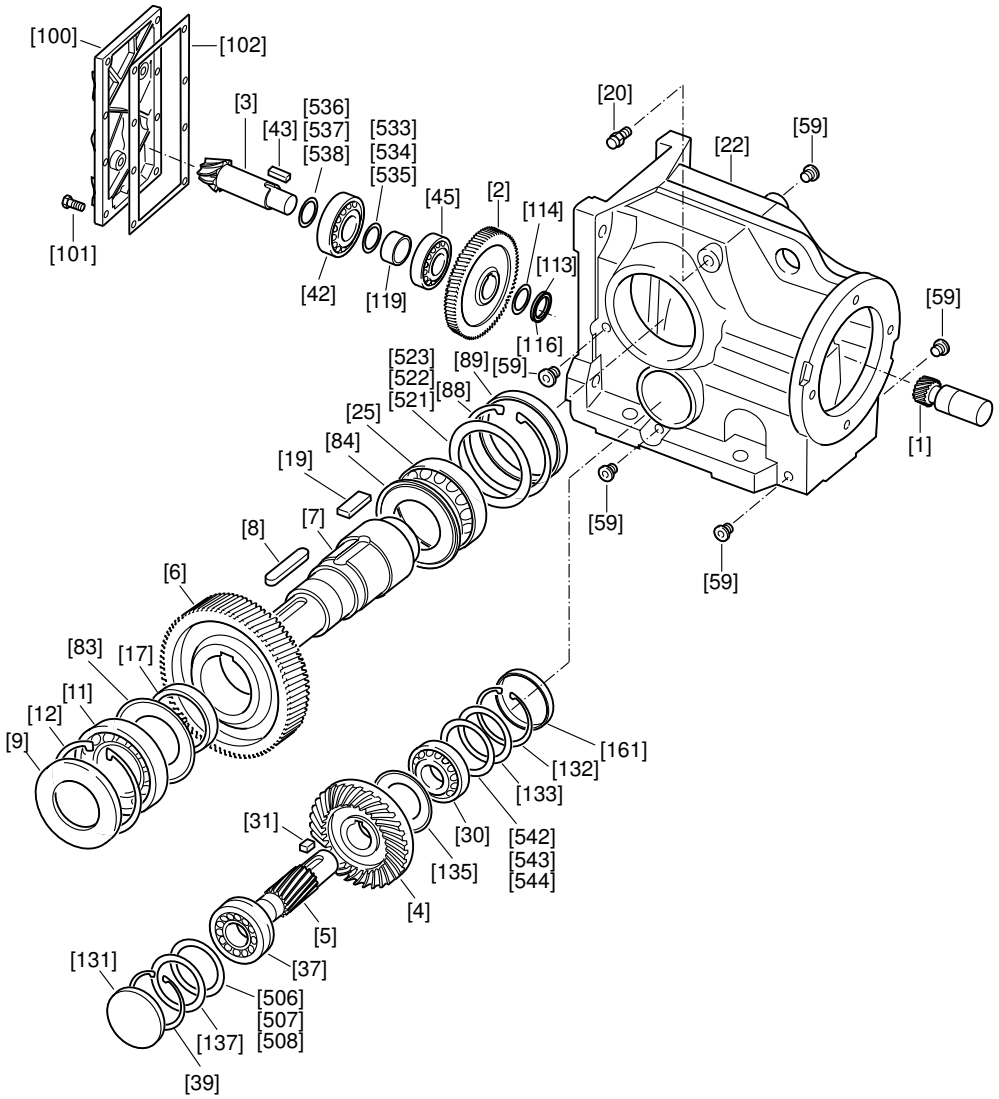
3.5 Basic structure of helical-bevel gear units K..37 – K..187



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 bearing
[12] Retaining ring
[17] Spacer tube
[19] Key
[20] Breather valve
[22] Gear unit housing
[25] Rolling bearing
[30] Rolling bearing
[31] Key
[37] Rolling bearing
[39] Retaining ring
[42] Rolling bearing
[43] Key
[45] Rolling bearing
[59] Screw plug
[83] Shield ring
[84] Shield ring
[88] Retaining ring
[89] Closing cap
[100] Inspection cover
[101] Hex head screw
[102] Gasket
[113] Slotted nut
[114] Multi-tang washer
[116] Thread lock
[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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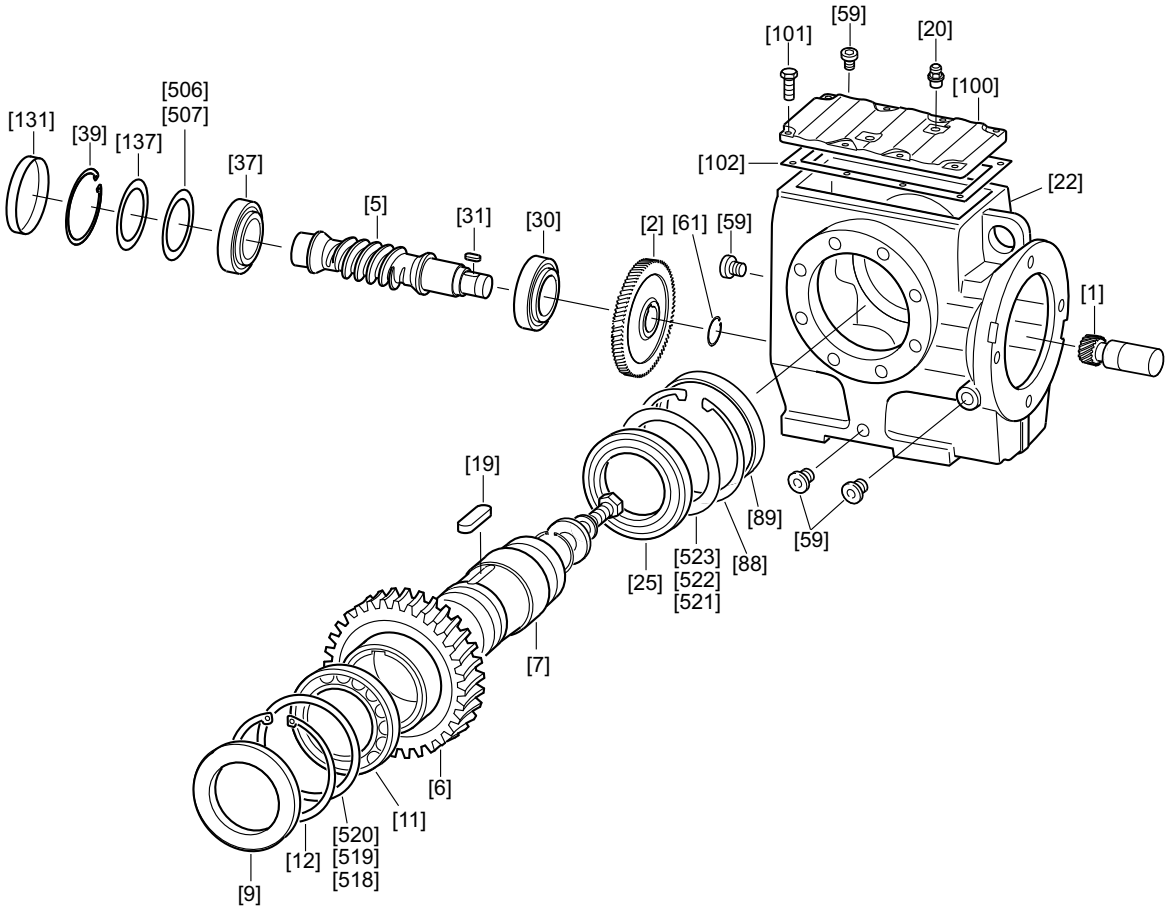
3.6 Basic structure of helical-worm gear units S..37 – S..97



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

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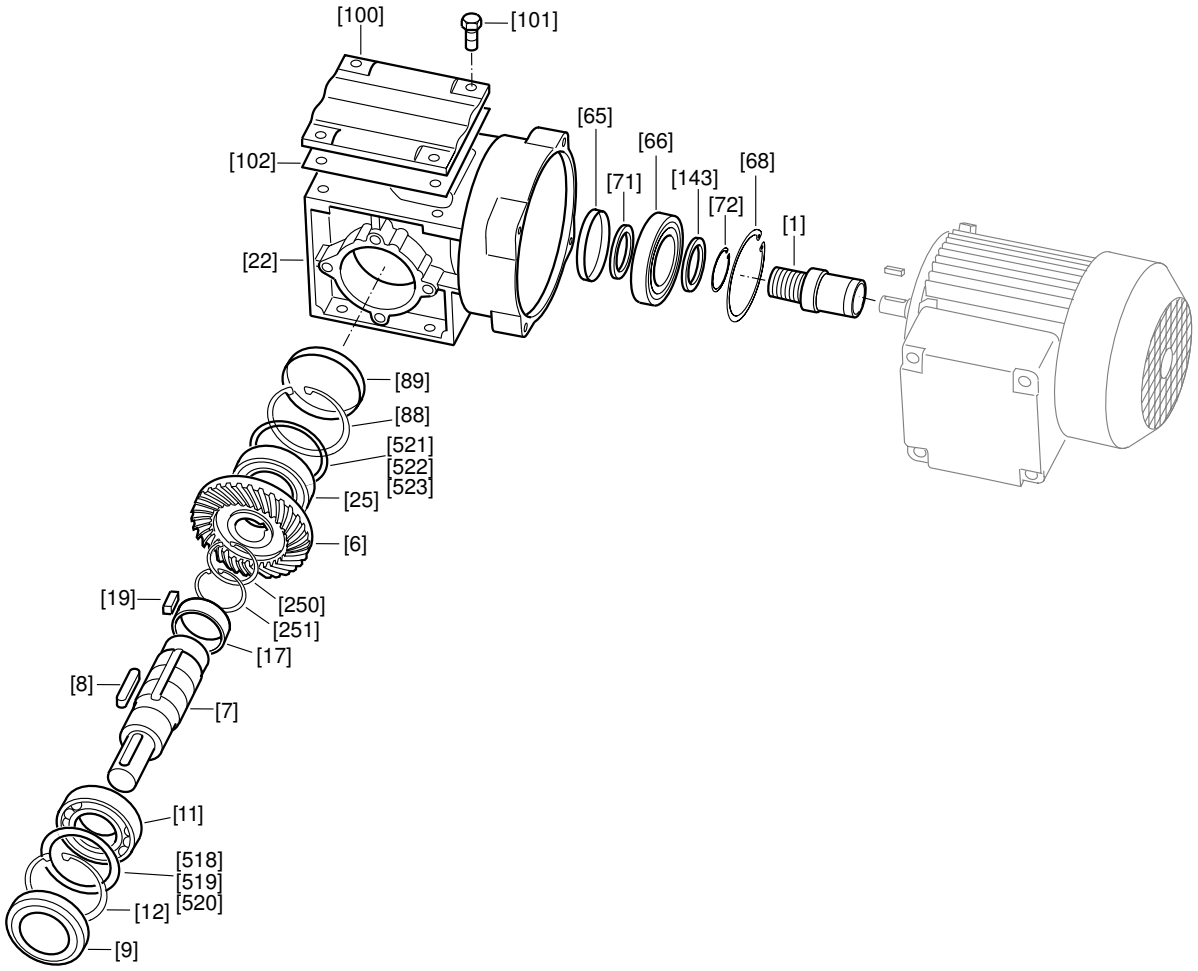
3.7 Basic structure of SPIROPLAN® gear units W..10 – W..30



9007199274048267

[1] Pinion
[6] Gear
[7] Output shaft
[8] Key
[9] Oil seal
[11] Rolling bearing
[12] Retaining ring
[17] Spacer tube
[19] Key
[22] Gear unit housing
[25] Rolling bearing
[65] Oil seal
[66] Rolling bearing
[68] Retaining ring
[71] Supporting ring
[72] Retaining ring
[88] Retaining ring
[89] Closing cap
[100] Inspection cover
[101] Hex head screw
[102] Gasket
[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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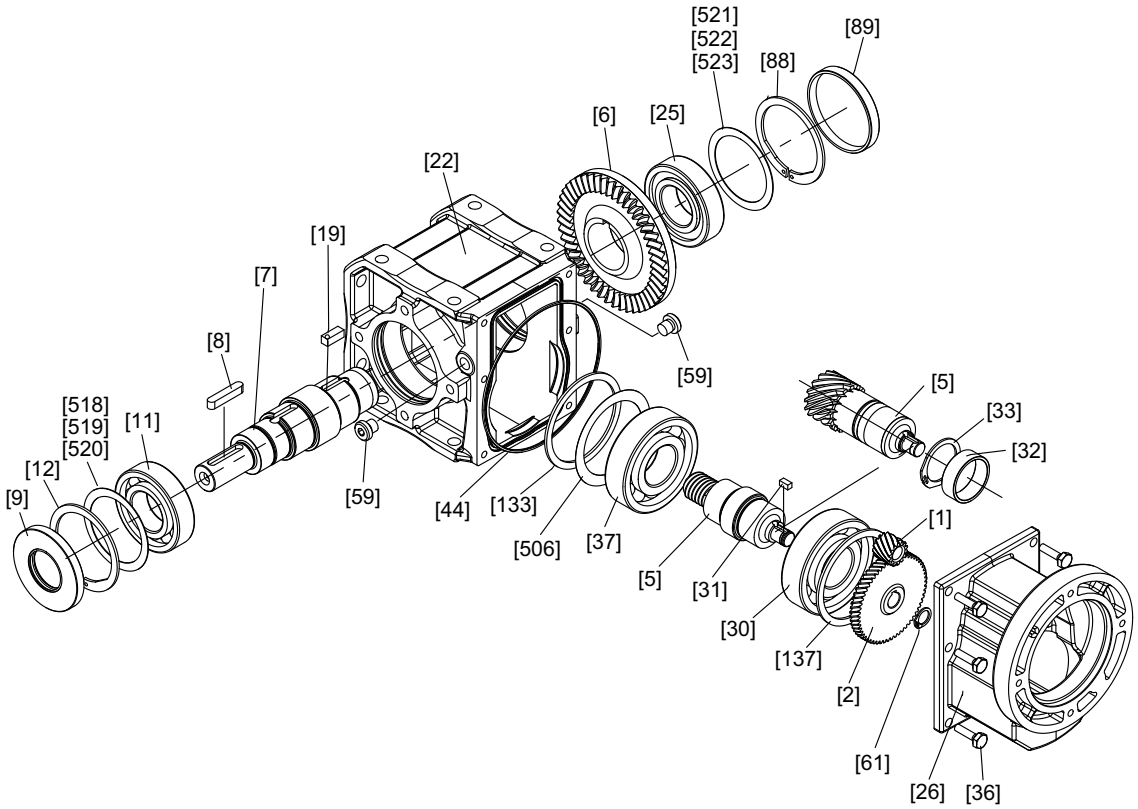
3.8 Basic structure of SPIROPLAN® gear units W..37 – W..47



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 stage 1	[88]	Retaining ring	[523]	Shim
[6]	Gear	[30]	Deep groove ball bearing	[89]	Closing cap		
[7]	Output shaft	[31]	Key	[133]	Shim		
[8]	Key	[32]	Spacer tube	[137]	Shim		
[9]	Oil seal	[33]	Retaining ring	[506]	Shim		
[11]	Deep groove ball bearing	[36]	Hex head screw	[518]	Shim		
[12]	Retaining ring	[37]	Deep groove ball bearing	[519]	Shim		
[19]	Key	[44]	O-ring	[520]	Shim		

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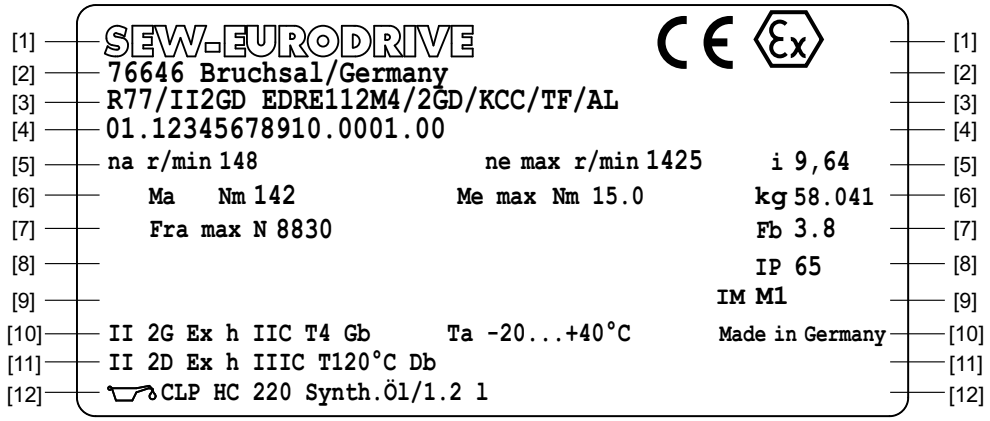
3.9 Nameplate/type designation

3.9.1 Nameplate

The following figure gives an example of a nameplate of an explosion-proof gearmotor:



[1] Company name, CE marking, ATEX marking
[2] Address
[3] Type designation of the gear unit, type designation of the motor
[4] Serial number
[5] Output speed, maximum input speed, gear ratio
[6] Output torque, maximum input torque, weight
[7] Maximum overhung load acting on the output shaft, service factor
[8] Degree of protection
[9] Mounting position
[10] Indicates gas explosion protection, ambient temperature, country of manufacture
[11] Indicates dust explosion protection
[12] Oil type, oil quantity

INFORMATION

For ATEX gearmotors, the nameplates of the motor and gear unit must be compared. When you compare the values (e.g. dust or ambient temperature) on the nameplates, the least common multiples determines the overall unit of motor and gear unit.

INFORMATION

In some applications, SEW-EURODRIVE gear units/gearmotors must only be operated in compliance with special measures. For these cases, there is a special indication on the nameplate **"II..X"**. For further information, refer to chapter "Information on special indication X identification" (→ 🗎 23).

The gear unit designs and options are described in chapter "Type designation" (→ 🗎 25).

3.9.2 EAC marking

On request, the explosion-proof gear units from SEW-EURODRIVE meet the requirements of the technical regulations of the Eurasian Economic customs union (Russia, Kazakhstan, Belarus, and Armenia). The EAC marking on the product certifies the conformity with the safety requirement of the Customs Union.

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3.9.3 Information on special indication X identification

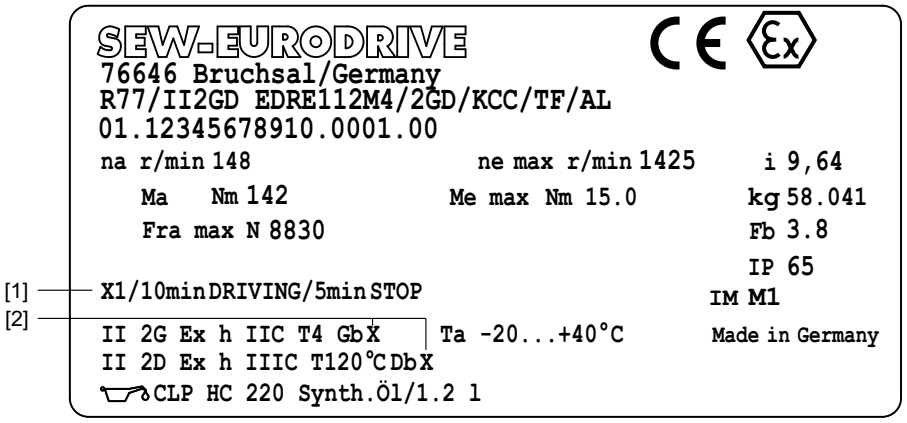
INFORMATION

For the special operation data, refer to the order confirmation and the nameplate.

In some applications, SEW-EURODRIVE gear units, motors, or gearmotors must only be operated if special measures are adhered to (e.g. intermittent duty exclusively, reduced output torque etc.). These special measures may be necessary due to various reasons. The customer has been informed about the required special measures on the initial distribution of the gear unit/motor/gearmotor. The customer is obliged to ensure the compliance with these special measures.

Gear units, motors, or gearmotors with special measures are indicated with the special identification "X" on the nameplate (see following figure). The relevant special measure is indicated separately by an "X" combined with a number on the nameplate. The following describes the special measures in detail.

X1: Intermittent duty



23913221003

[1] Special measure X1 [2] Special indication "X"

In this case, an arrangement has been made with the buyer that the drive may be used only in intermittent duty. The maximum time for operation and pauses in minutes are indicated on the nameplate [1] and the order confirmation. Reducing the idling time is not permitted. The operating time may be reduced but not extended. The buyer is obliged to take measures to ensure that the specifications are adhered to.

X2: Drive in combination with an ATEX-compliant oil cooling system provided by the customer

In this case, it was agreed with the buyer that this drive may only be operated in connection with an ATEX compliant oil cooling system on the customer side. On the basis of the required oil bath temperature, the cooling system must provide a certain minimum cooling power at a certain ambient temperature. The oil quantity must be extended by the volume of the cooling circuit to ensure sufficient and permanent lubrication of the gear unit. The buyer is responsible for the assessment of the reliability of the oil cooling system. The buyer of this product is obligated to meet these requirements through appropriate dimensioning and installation of a suitable cooling system.

X3: Concession for multiple mounting positions

In this case, it was agreed with the buyer that this drive can also be operated in mounting positions other than the one specified in the following quotation text. Prerequisite is that the breather valve is mounted according to the mounting position.

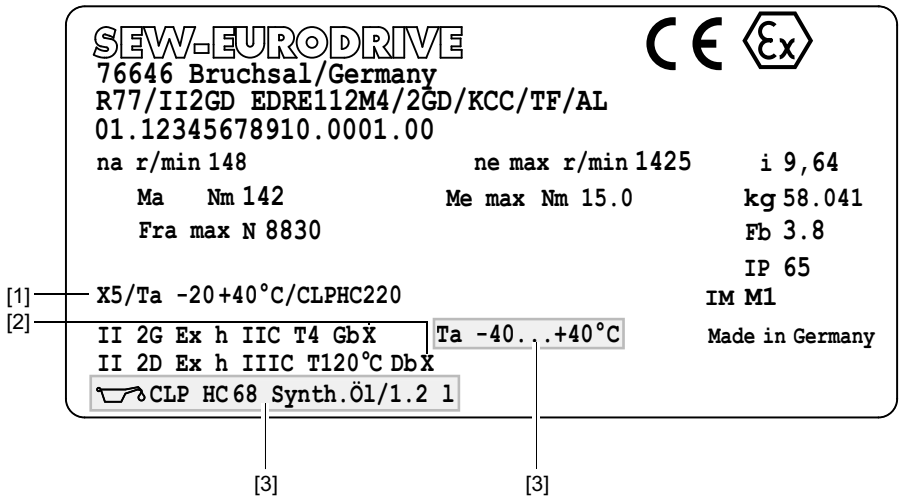
X4: Customer-supplied output shaft

In this case, customer-specific load data regarding overhung load, force application point, axial load and output torque are confirmed as the output shaft is supplied by the customer.

X5: Oil change (summer and winter operation)

In this case, it was agreed with the buyer that the oil must be changed for summer and winter operation.

The fields marked on the following nameplate refer to the initial filling. These fields are only highlighted as an example.



23913752331

[1] Special measure X5
[2] Special indication "X"
[3] The values specified refer to the initial filling

X6: Reduced overhung load for mounting position M..AB/A, M..AB/B, M..A/AB, M..B/AB

In this case, the following agreement was met with the buyer: If the force is applied on a different side than where the customer's flange connection is mounted, then the maximum permitted overhung load is reduced to the value specified in line X.

The buyer of this product shall take appropriate measures to ensure that these requirements are met.

For the special operation data, refer to the order confirmation and the nameplate.

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3.10 Type designation

INFORMATION

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

- "Explosion-Proof Gearmotors" catalog
- "Explosion-Proof AC Motors" catalog

Example: Helical-bevel gear units in explosion-proof design II2GD

Example: KF87/II2GD		
Series	**KF**	• K = Helical-bevel gear unit • F = B5 flange-mounted design
Size	**87**	Size 87
Explosion-proof design	**/II2G**	Explosion-proof design according to equipment group II: • 2G = category 2, explosive gas atmosphere • 2D = category 2, explosive dust atmosphere

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

3.10.1 Helical gear units

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

3.10.2 Parallel-shaft helical gear units

Designation	Description
F..	Foot-mounted design, output shaft with key
FA..B	Foot-mounted design, hollow shaft with keyway
FH..B	Foot-mounted design, hollow shaft with shrink disk
FV..B	Foot-mounted design, splined hollow shaft to DIN 5480
FF..	B5 flange-mounted design, output shaft with key
FAF..	B5 flange-mounted design, hollow shaft with keyway
FHF..	B5 flange-mounted design, hollow shaft with shrink disk

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

3.10.3 Helical-bevel gear units

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 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

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Designation	
KM..	B5 flange-mounted design with extended bearing hub, output shaft with key
KAM..	B5 flange-mounted design with extended bearing hub, hollow shaft with keyway

3.10.4 Helical-worm gear units

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

3.10.5 SPIROPLAN® gear units

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

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3.10.6 Options

Designation	Description
/WEX	Speed monitoring

R, F and K gear units:

Designation	Description
/R	Reduced backlash

K, S and W gear units:

Designation	Description
/T	With torque arm

F gear units:

Designation	Description
/G	With rubber buffer

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4 Mechanical installation

4.1 General information

⚠ WARNING

Risk of explosion due to hot gear unit surfaces caused by loss of oil.

Fatal or serious injuries.

- Check the transportation packaging for oil residues. Oil residues could indicate an oil leak. In this case, the lubrication of the gear unit is not guaranteed. This could cause excessive temperature on the surface.
- Contact SEW-EURODRIVE if there are oil residues on the gear unit.

⚠ CAUTION

Risk of injury due to protruding gear unit parts.

Minor injuries.

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

⚠ CAUTION

Health risk 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 temperatures > 200 °C. Remove the components, if necessary.
- Avoid inhaling fluorocarbon rubber gases and vapors as well as skin and eye contact.
- Avoid contact with the cooled-down fluorocarbon rubber, as dangerous residue were formed while it was heated.

NOTICE

The bearing and the sealing rings can be damaged if exposed to solvents.

Damage to property.

- When cleaning the shafts and flange surfaces with solvents, protect bearings and oil seals.
- Use a commercially available solvent.

INFORMATION

The assembly of gear head units with motors or adapters may be performed by authorized personnel only. Contact SEW-EURODRIVE.

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4.2 Gear units/gearmotors in explosion-proof design II2GD and II3GD

INFORMATION

- Explosion-proof gear units and gearmotors of the R..7, F..7, K..7, K..9, S..7, and SPIROPLAN® W series comply with the design requirements for equipment group II, categories 2G (potentially explosive gas atmosphere) and 2D (potentially explosive dust atmosphere). These units are intended for use in zones 1 and 21.
- The explosion-proof gear units of the R..7, F..7, K..7, K9, and S..7 series with AR adapter (adapter with slip clutch) comply with equipment group II, categories 3G (potentially explosive gas atmosphere) and 3D (potentially explosive dust atmosphere). These units are intended for use in zones 2 and 22.

4.2.1 Ambient temperature

If no deviating data is given on the nameplate, gear units in explosion-proof design may only be used at ambient temperatures in the range from -20 °C – +40 °C.

If an attached component limits this temperature range, the data on the components nameplate applies.

INFORMATION

Any ambient temperatures deviating from this range are listed on the nameplate.

4.2.2 Temperature class

Mains-operated gear units/gearmotors in category II2G (potentially explosive gas atmosphere) are approved for temperature classes T3 to T6 depending on their speed, reduction ratio and mounting position.

The temperature class of the gear unit is specified on the nameplate.

To define which stand-alone gear units and which 4-pole gearmotors operated with inverters can be used in an application, contact SEW-EURODRIVE.

4.2.3 Surface temperature

The surface temperature of gear units of category II2D is 120 °C or 140 °C depending on speed, ratio and mounting position. Refer to the nameplate for the maximum surface temperature of the gear unit.

The system operator must guarantee that a possible accumulation of dust will not exceed a maximum thickness of 5 mm, in accordance with EN 50281-1-2.

4.2.4 Degree of protection

The degree of protection for the gear unit design is IP65 according to EN 60529. Deviating information is specified on the nameplate.

4.2.5 Ambient conditions

The gear unit must be sufficiently ventilated. No external heat generation (e.g. via couplings, flanges or shafts) must be present.

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4.2.6 Output power and output torque

Observe the nominal output torque and the permitted overhung loads.

4.3 Prerequisites for installation

Check that the following conditions have been met:

- The drive has not been damaged during transportation or storage.
- The entries on the nameplate of the gearmotor match the voltage supply system.
- The ambient temperature corresponds to the specifications in the technical documentation, the nameplate and the lubricant table in chapter Lubricants.
- No harmful oils, acids, gases, vapors, radiation etc. are present in the environment.
- The oil seals on the output end are protected against wear in abrasive ambient conditions.
- In case of helical-worm gear units and SPIROPLAN® W gear units: Make sure that no large external mass moments of inertia are present, which could exert a retrodriving load on the gear unit. In this respect, observe the following formula:

  η' (retrodriving) = $2 - 1/\eta$

  Self-locking if $\eta' < 0.5$!
- In case of **special designs**, make sure that the drive is designed according to the ambient conditions. Observe the information on the nameplate.

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4.4 Required tools/resources

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

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

INFORMATION

Standard parts are not included in the delivery.

4.5 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 in accordance with DIN 332, shape DR	Centering shoulder tolerance to DIN 42948 • ISO j6 with b1 ≤ 230 mm • ISO h6 with b1 > 230 mm

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4.6 Installing the gear unit

⚠ WARNING

Risk of explosion due to electric sparks if housing is not additionally grounded.

Fatal and serious injuries.

- Additionally ground the housing. Use the grounding screw at the motor.

⚠ WARNING

Risk of explosion due to friction that causes electrical charge on the coating.

Fatal and serious injuries.

- Prevent moving parts on the coating from creating electric sparks.

⚠ CAUTION

Risk of injury due to improper installation/removal

Severe personal injury and damage to property

- Work on the gear unit only when the machine is not in use.
- Secure the drive unit against unintentional power-up.
- 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.
- It is important that you observe the notes in this chapter.

⚠ CAUTION

Risk of injury due to protruding gear unit parts

Severe injuries

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

⚠ CAUTION

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

Risk of injuries and damage to property

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

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⚠ CAUTION

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

Risk of injuries and damage to property

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

NOTICE

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

Damage to property

- Protect the gear unit from direct cold air currents.

INFORMATION

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

Mounting position

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

Oil fill quantity

Check the oil fill depending on the mounting position (for information on the fill quantity refer to the nameplate). Control the oil fill level at this opportunity. See chapter "Inspection/maintenance for the gear unit" (→ 🗎 118). The gear units are filled with the required oil quantity at the factory. There may be slight deviations at the oil level plug as a result of the mounting position, which are permitted within the manufacturing tolerances.

Changing the mounting position

Adjust the lubricant fill quantities and the position of the breather valve accordingly in the event of a change of mounting position. Also observe chapter "Mounting positions" (→ 🗎 136).

INFORMATION

Do not change the mounting position without prior consultation with SEW-EURODRIVE.

The information on the nameplate is binding. The ATEX EU declaration of conformity and the guarantee no longer apply if the mounting position is changed without prior consultation with SEW-EURODRIVE. Changes to the mounting position must be projected and indicated on the nameplate.

Submounting

The support structure must have the following characteristics:

- Level
- Vibration damping
- Torsionally rigid

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

Gear unit size	Flatness defect
≤ 67	max. 0.4 mm

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77 – 107	max. 0.5 mm
137/147	max. 0.7 mm
157 – 187	max. 0.8 mm

Do not twist housing legs and mounting flanges against each other. Observe the permitted overhung and axial loads! Observe the chapter "Project Planning" in the gear unit/gearmotor catalog for calculating the permitted overhung and axial loads.

Strength class of the screws

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

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

Corrosion protection for screw connections

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

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4.6.1 Installation in damp locations or outdoors

NOTICE

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

Damage to property.

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

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

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

4.6.2 Tightening torques for retaining screws

Mount the gearmotors with the following tightening torques:

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

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

Flange Ø mm	Gear unit	Screw/nut	Tightening torque ± 10% Strength class 10.9 Nm
120	RF37	M6	17
140	RF37/RF47	M8	40
160	RF57	M8	40
300	FM/FAM67, FM/FAM77 KM/KAM67, KM/KAM77	M12	137
350	FM/FAM87 KM/KAM87	M16	338
400	FM/FAM97 KM/KAM97	M16	338
450	FM/FAM107 KM/KAM107	M16	338
450	RF147	M20	661
550	FM/FAM127 KM/KAM127	M16	338
550	RF167	M20	661
660	FM/FAM157 KM/KAM157	M20	661
60ZR	RZ37	M8	40
70ZR	RZ47	M8	40
80ZR	RZ57	M10	79
95ZR	RZ67	M10	79
110ZR	RZ77	M10	79
130ZR	RZ87	M12	137
250	FF77/KF77/ FAF77/ KAF77	M12	137

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

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

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

4.6.4 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 anaerobic gaskets or an anaerobic glue.

INFORMATION

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

Foot-mounted gear unit

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

Screw	Gear unit type					
	R/R..F	RX	F/FH..B/ FA..B	K/KH..B/KV..B/ KA..B	S	W
M6	07	–	–	19	–	10/20
M8	17/27/37	–	27/37	29	37	30/37/47
M10	–	57	47	37/39/47/49	47/57	–
M12	47/57/67	67	57/67	57/67	67	–
M16	77/87	77/87	77/87	77	77	–
M20	97	97/107	97	87	87	–
M24	107	–	107	97	97	–
M30	127/137	–	127	107/167	–	–
M36	147/167	–	157	127/157/187	–	–

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Gear unit with B14 flange-mounted design and/or hollow shaft

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

Screw	Gear unit type				
	RZ	FZ/FAZ/FHZ/ FVZ	KZ/KAZ/KHZ/ KVZ	SA/SAZ/SHZ	WA
M6	07/17/27	–	–	37	10/20/30[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 to a CMP.. motor, the thread size is M8.

Gear unit with B5 flange-mounted design

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

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

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4.6.5 Components made of elastomers with fluorocarbon rubber

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

⚠ CAUTION

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

Damage to health.

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

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

- Oil seals
- Breather valve
- Screw plugs

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

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

4.6.6 Venting the gear unit

⚠ WARNING

Risk of explosion due to overheated gear unit due to a dirty or dusty breather valve.

Severe or fatal injuries

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

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

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

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

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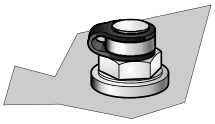
Exceptions:

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

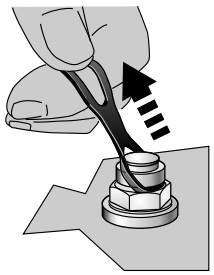
   A breather valve is supplied in a separate plastic bag attached to the gear unit. Before startup, replace the highest screw plug with the breather valve provided. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).
2. For **gear head units** and **gear units with pivoted mounting position** with venting on the input end, a breather valve is supplied in a plastic bag.
3. **Enclosed gear units** are delivered without a breather valve.
4. In some countries, the breather valve is installed, but not activated due to possible pressure fluctuations during transport. In such cases the transport protection must be removed. This activates the breather valve (see chapter "Activating the breather valve" (→ 🗎 41)).
5. Gear units with gear unit venting on fixed piping, with expansion tank, and with ventilation filter are delivered without a breather filter.

Activating the breather valve

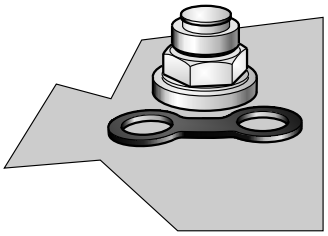
1. Before startup, check whether the transport protection on the breather valve has been removed and the valve is therefore activated. The following figure shows a breather valve with transport protection:



2. Remove the transport protection.



⇨ The following figure shows an activated breather valve:



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4.6.7 Painting gear units

SEW-EURODRIVE delivers the drives with a coating that complies with the requirements regarding the prevention of electrostatic charge according to EN/IEC 13463-1.

⚠ WARNING

Risk of explosion due to electrostatic charge and sparks caused by improper painting.

Severe or fatal injuries from explosion.

- If the motor is painted, observe the requirements for painting to avoid electrostatic charge according to EN 13463-1.

⚠ WARNING

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

Severe or fatal injuries.

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

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4.7 Gear unit with solid shaft

INFORMATION

If input and output elements are subject to the Directive 2014/34/EU, the input and output elements require ATEX approval.

INFORMATION

Only use belts with sufficient electrical leakage resistance < 10^9 Ω.

4.7.1 Assembling input and output elements

NOTICE

Damage to bearing, housing or shafts due to incorrect mounting

Possible damage to property.

- Only use a mounting device for installing input and output elements (see chapter "Using the mounting device" (→ 🗎 44)). Use the threaded centering bore at the shaft end.
- Never force belt pulleys, couplings, pinions, etc. onto the shaft end by hitting them with a hammer.
- During the installation of belt pulleys, make sure the belt is tensioned correctly in accordance with the manufacturer's instructions.
- Make sure the transmission elements are balanced after fitting and do not give rise to any impermissible radial or axial forces. For the approved values, refer to the catalog "Gearmotors" or "Explosion-Proof Drives".

INFORMATION

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

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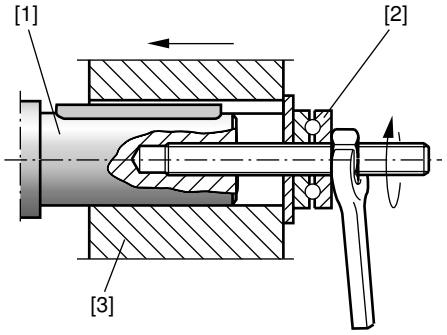
Using a mounting device

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.

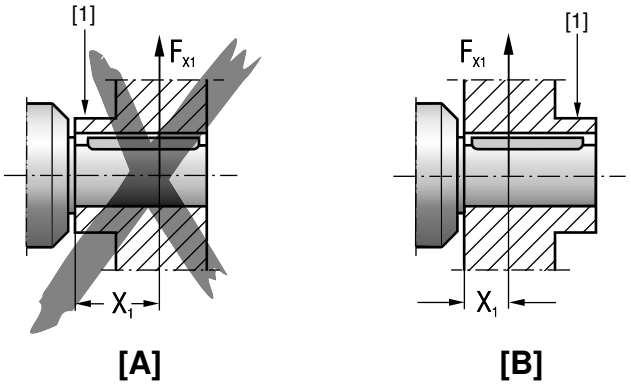


211368587

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

Avoiding excessive overhung loads

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



211364235

[1] Hub
[A] Incorrect assembly
F_{X1} Overhung load at point X1
[B] Correct assembly

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4.7.2 Mounting of couplings

⚠ CAUTION

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

Risk of jamming and crushing.

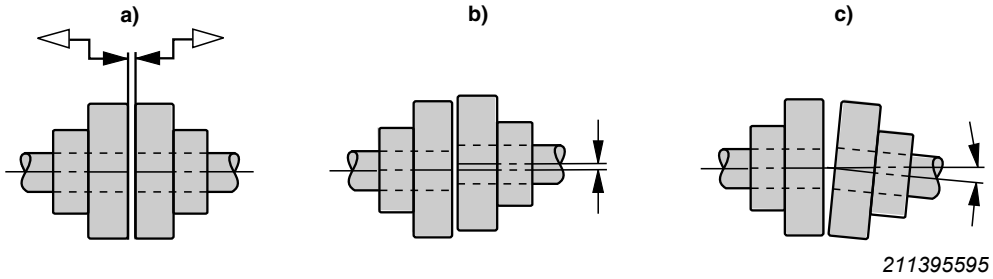
- Equip the input and output elements with a touch guard.

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

a) Maximum and minimum clearance

b) Axial misalignment

c) Angular misalignment



4.8 Torque arms for shaft-mounted gear units

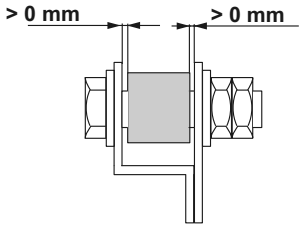
NOTICE

Damage to gear unit due to improper installation

Damage to the gear unit

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

The following figure shows the mounted torque arm without tension:



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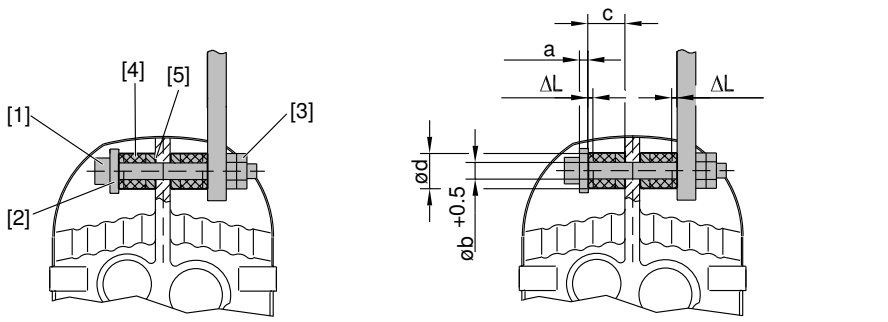
4.8.1 Mounting torque arms for parallel-shaft helical gear units

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



36028797230330379

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

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

Proceed as follows:

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

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

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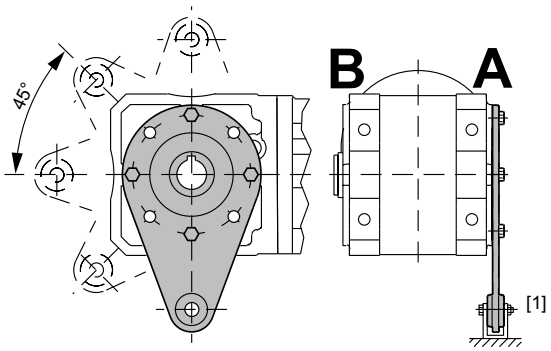
4.8.2 Mounting torque arms for helical-bevel gear unit K..19 – K..49

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



[1] Bushing

A Connection side
B Connection side

Observe the following points during assembly:

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

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

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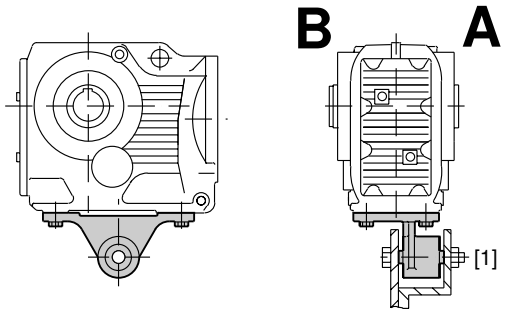
4.8.3 Mounting torque arms for helical-bevel gear unit K..37 – K..157

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



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[1] Bushing

A Connection side
B Connection side

Proceed as follows:

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

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

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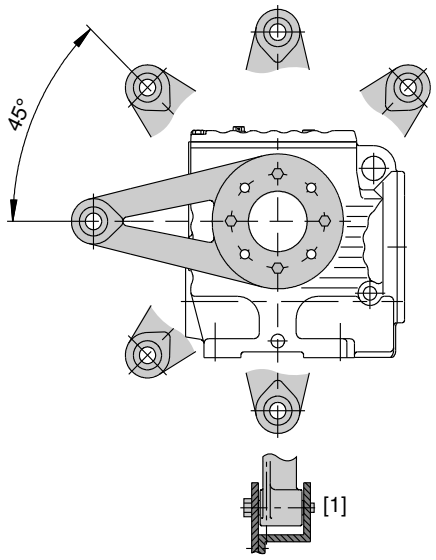
4.8.4 Mounting torque arms for helical-worm gear units

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



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[1] Connector

Proceed as follows:

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

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

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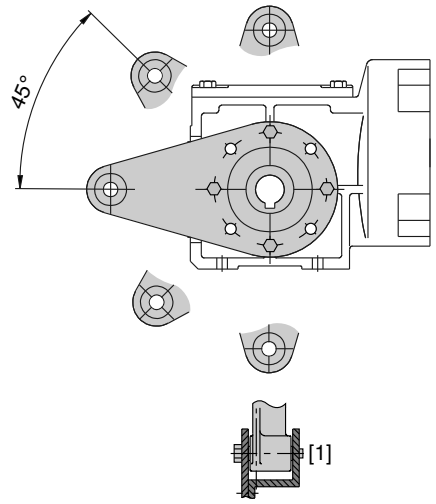
4.8.5 Mounting torque arms for SPIROPLAN® W gear units

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



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[1] Bushing

Proceed as follows:

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

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

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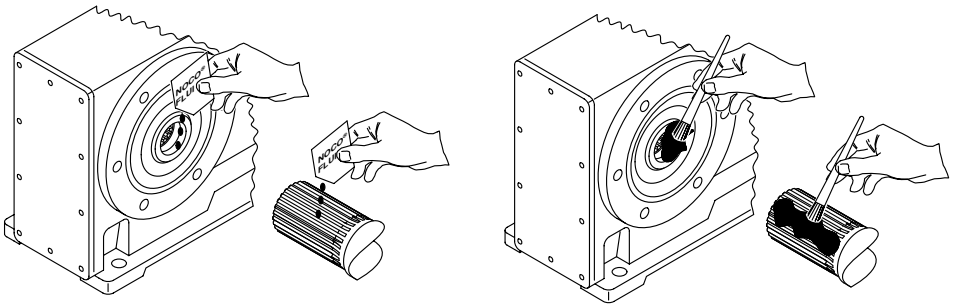
4.9 Mounting shaft-mounted gear units with splined hollow shaft

INFORMATION

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

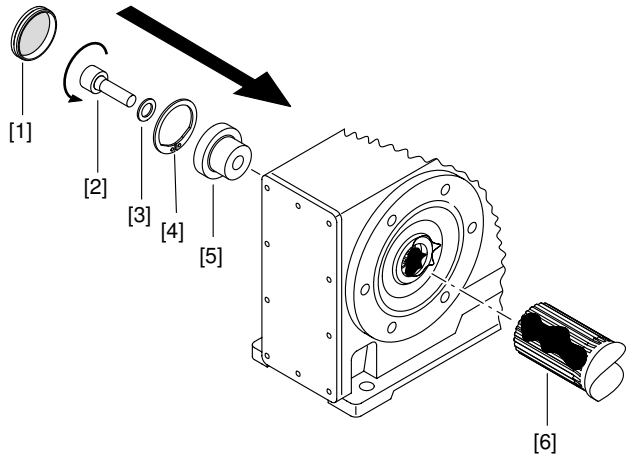
Proceed as follows:

1. Apply NOCO® fluid. Spread carefully.



20685469067

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



20685473931

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

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4.10 Shaft-mounted gear unit with keyway

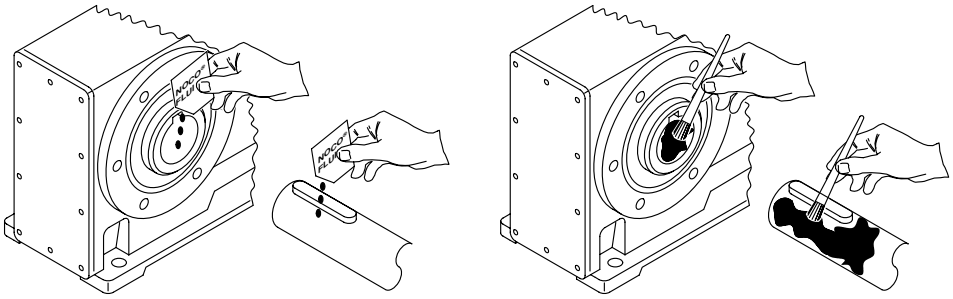
INFORMATION

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

4.10.1 Mounting shaft-mounted gear units with keyway

Proceed as follows:

1. Apply NOCO® fluid. Spread carefully.



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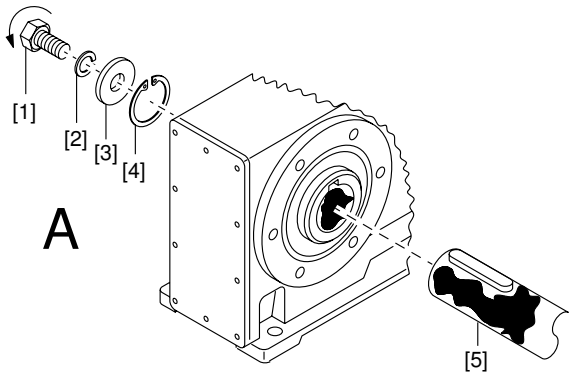
2. Install the shaft and secure it axially. For easier mounting, use a mounting device. Proceed according to one of the **3 mounting types**, depending on the scope of delivery.

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



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

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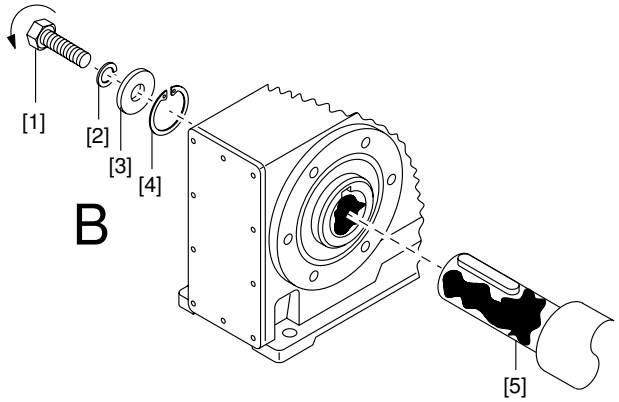
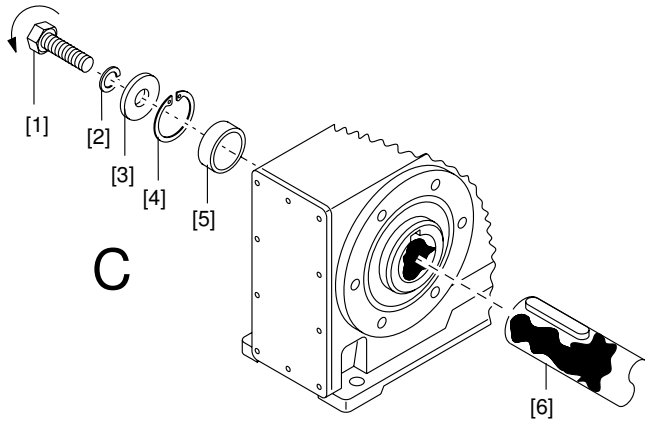
B) Mounting customer shaft with contact shoulder using the SEW-EURODRIVE assembly/disassembly kit:



9007199466261515

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

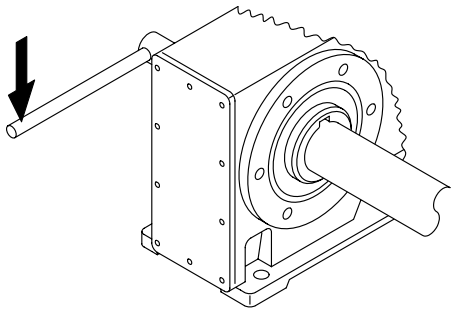
C) Mounting customer shaft without contact shoulder using the SEW-EURODRIVE assembly/disassembly kit:



9007199466263691

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

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



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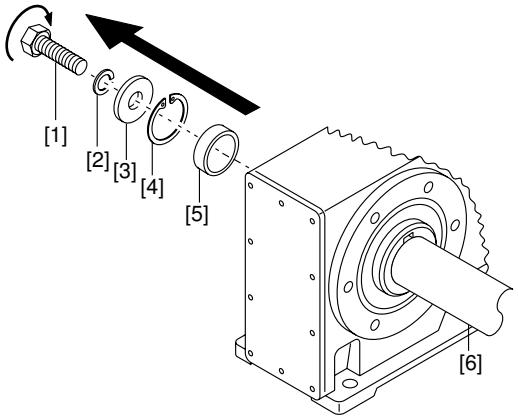
Screw	Tightening torque Nm
M5	5
M6	8
M10/12	20
M16	40
M20	80
M24	200

INFORMATION

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

4.10.2 Removing the shaft-mounted gear unit

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



9007199466268043

[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].
2. Remove parts [2] to [4] and, if applicable, the spacer tube [5].
3. Insert the forcing washer [8] and the fixed nut [7] from the SEW-EURODRIVE assembly/disassembly kit between the customer shaft [6] and the retaining ring [4] (see "SEW-EURODRIVE assembly/disassembly kit" (→ 🗎 56)).

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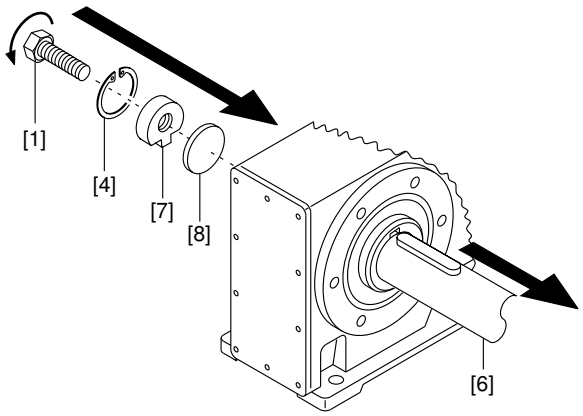
4. Re-install the retaining ring [4].
5. Re-install the retaining screw [1]. Press the gear unit off the shaft by tightening the screw.



9007199466270219

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

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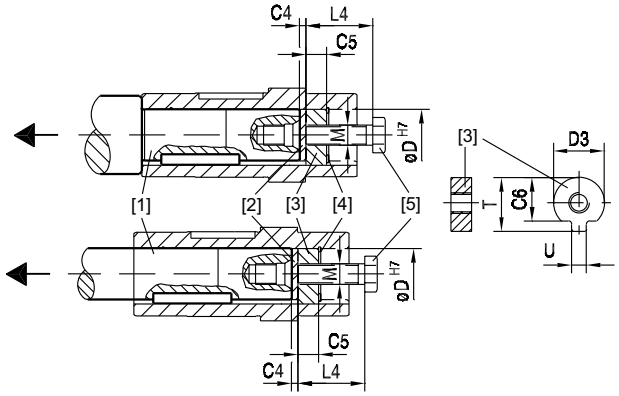
4.10.3 Assembly/disassembly kit by SEW-EURODRIVE

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

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

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



27021606946895115

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

Dimensions and part numbers of the assembly/disassembly kit:

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

1) Retaining screw

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4.11 Shaft-mounted gear unit with shrink disk

4.11.1 Mounting the shaft-mounted gear unit

NOTICE

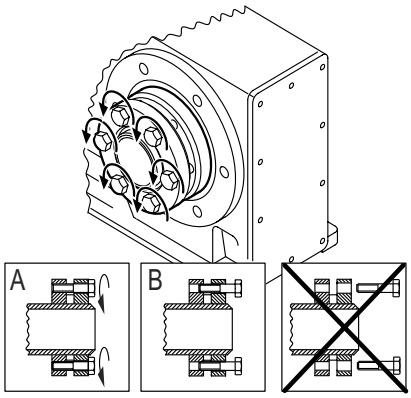
Deformation of the hollow shaft due to tightening the locking screws without first installing the shaft.

Damage to the hollow shaft.

- Never tighten the locking screws without the shaft installed.

Proceed as follows:

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



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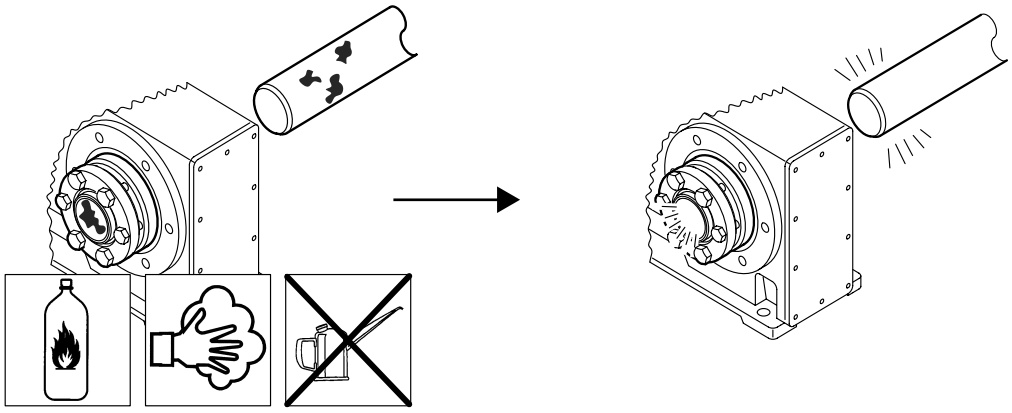
2. Carefully **degrease** the hollow shaft bore and the input shaft using a commercial solvent.



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

NOTICE

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

Possible damage to property

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

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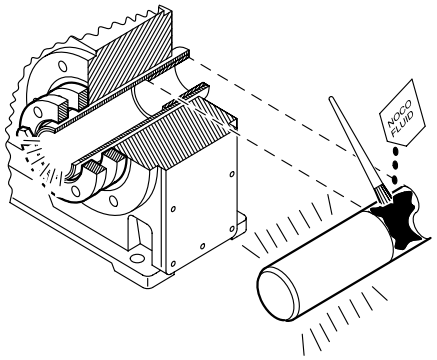

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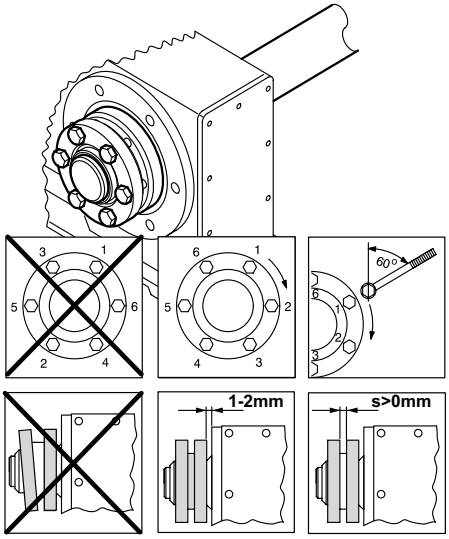
4. Install the input shaft. Proceed as follows to do so:

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



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INFORMATION

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

INFORMATION

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

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

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

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

4.11.2 Removing the shaft-mounted gear unit

Proceed as follows:

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

INFORMATION

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

4.11.3 Cleaning and lubricating shaft-mounted gear units

Proceed as follows:

1. If the shrink disk is dirty, clean and lubricate the shrink disk.
2. Lubricate the tapered surfaces. Use one of the following solid lubricants:

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

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

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4.12 Shaft-mounted gear units with TorqLOC®

NOTICE

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

Damage to property

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

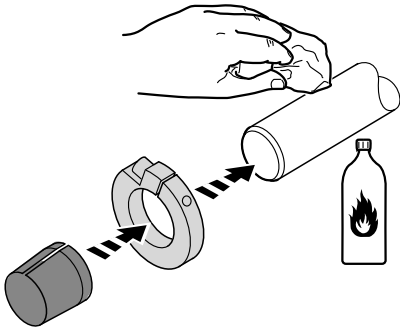
INFORMATION

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

4.12.1 Mounting a customer shaft without contact shoulder

Proceed as follows:

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



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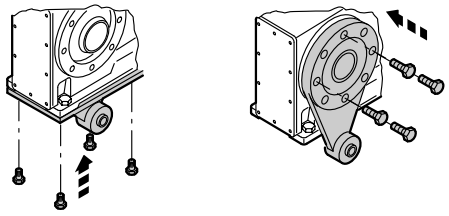
3. Attach the torque arm to the drive unit. Observe the information in chapter "Torque arms for shaft-mounted gear units" (→ 🗎 45).



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

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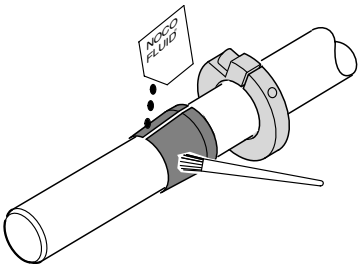
4. Apply NOCO® fluid directly to the bushing. Spread carefully.



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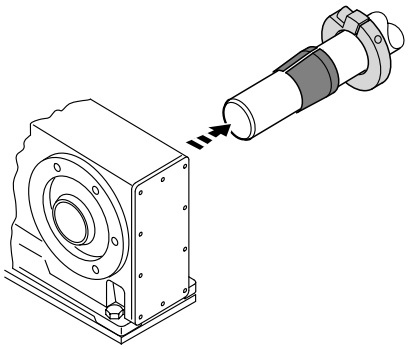
5. Push the gear unit onto the customer shaft.



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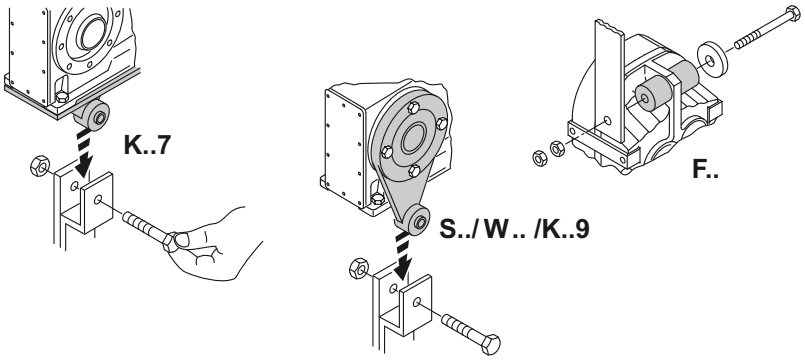
6. Preassemble the torque arm. Do not firmly tighten the screws.



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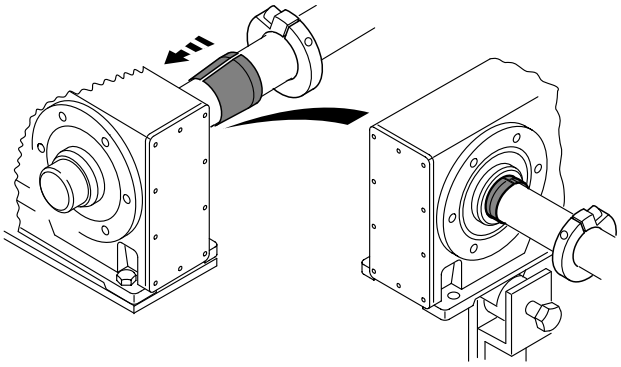
7. Push the bushing into the gear unit up to the stop.



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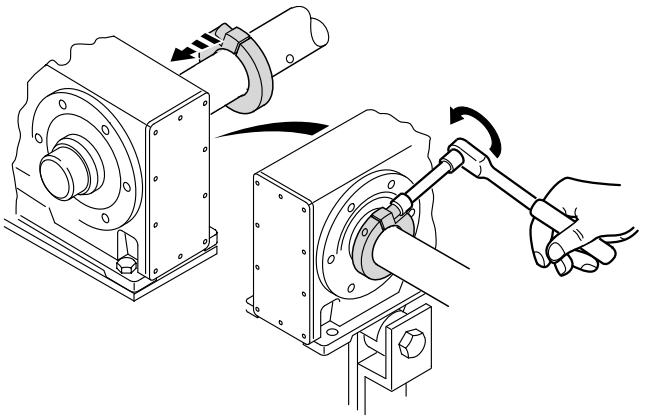
8. Secure the bushing with the stop ring. Attach the stop ring to the bushing with the respective tightening torque. Refer to the following table for the suitable tightening torque.



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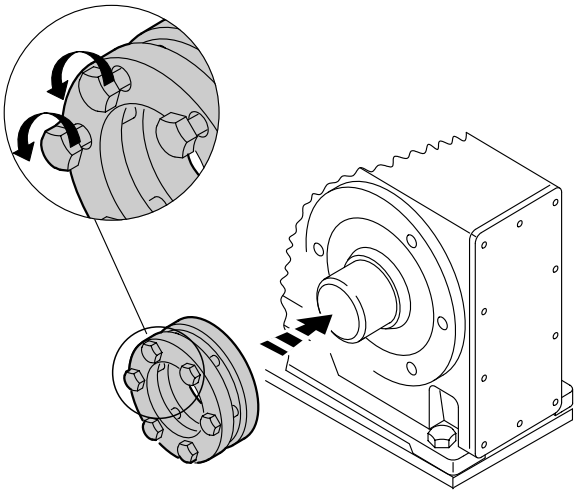
Gear unit type				Tightening torque Nm	
FT..	KT..	ST..	WT..	Standard	Stainless steel
–	–	37	37	10	10
37	37	47	47	10	10
47	39/47	57	–	10	10
57/67	49/57/67	67	–	25	25
77	77	77	–	25	25
87	87	87	–	25	25
97	97	97	–	25	25
107	107	–	–	38	38
127	127	–	–	65	65
157	157	–	–	150	150

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



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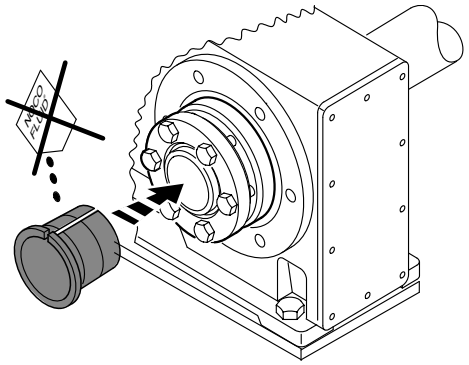
10. Slide the counter bushing onto the customer shaft and into the hollow shaft.



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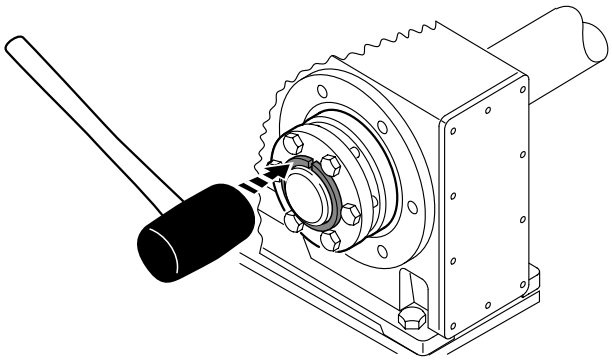
11. In the case of a gear unit **with shaft shoulder**, mount the shrink disk at the shaft shoulder up to the stop. In the case of a gear unit **without shaft shoulder**, mount the shrink disk at a distance of 1 mm to 2 mm from the gear unit housing.
12. Tap lightly on the flange of the counter bushing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



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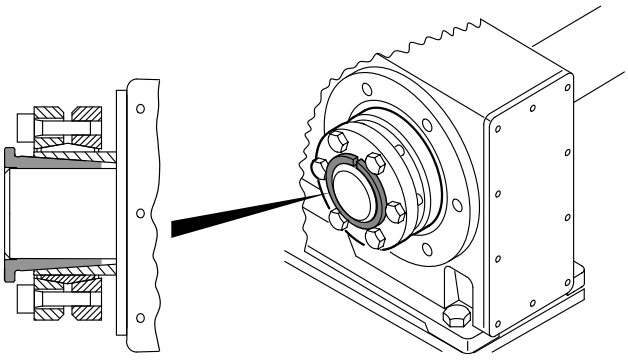
13. Make sure that the customer shaft is seated in the counter bushing.



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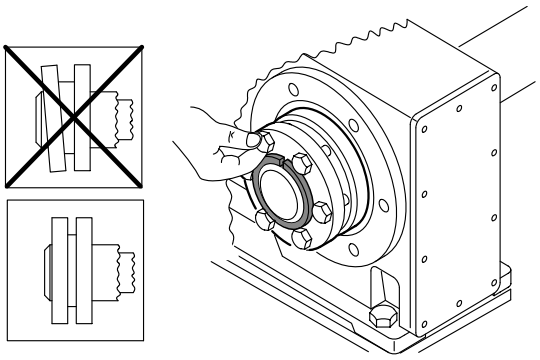
14. Manually tighten the screws of the shrink disk. Make sure that the outer rings of the shrink disk are plane-parallel.



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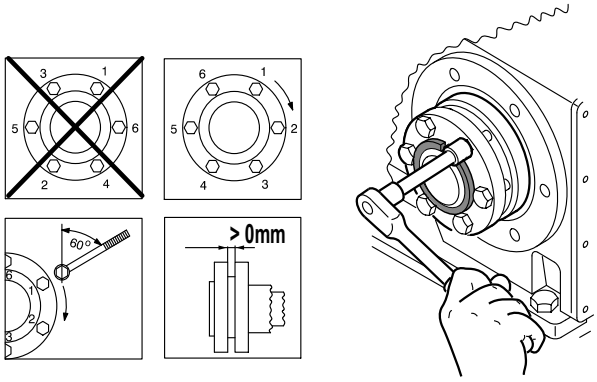
15. Tighten the locking screws with the specified tightening torque according to the following table. Tighten the screws by working round several times from one bolt to the next (not in diametrically opposite sequence).



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INFORMATION

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

INFORMATION

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

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

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

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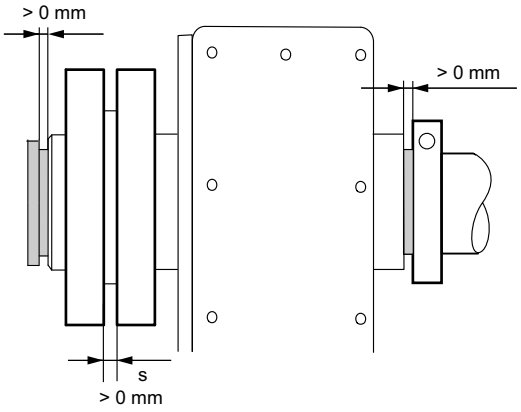
17. Make sure that the remaining gap between counter bushing and hollow shaft end, as well as between hollow shaft end and the stop ring is > 0 mm.



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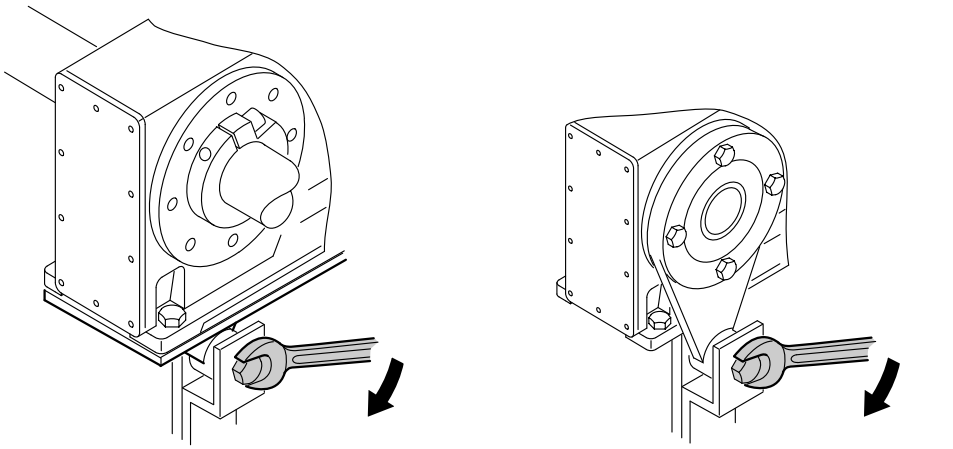
18. Tighten the torque arm. Observe the information in chapter "Torque arms for shaft-mounted gear units" (→ 🗎 45).



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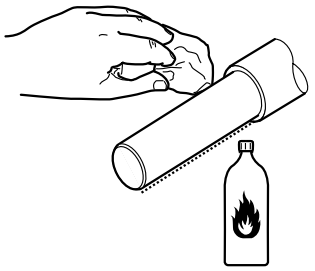
4.12.2 Mounting a customer shaft with contact shoulder

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



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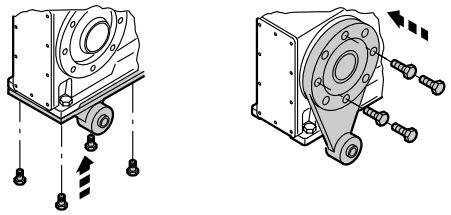
2. Attach the torque arm to the drive unit. Observe the information in chapter "Torque arms for shaft-mounted gear units" (→ 🗎 45).



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

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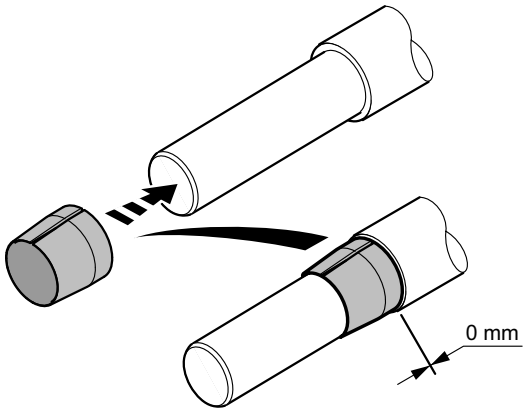
3. Slide the bushing onto the customer shaft.



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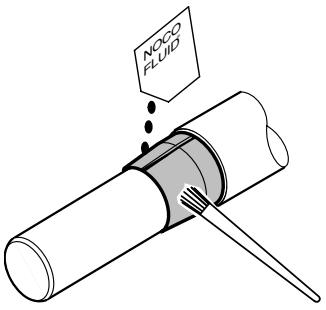
4. Apply NOCO® fluid directly to the bushing. Spread carefully.



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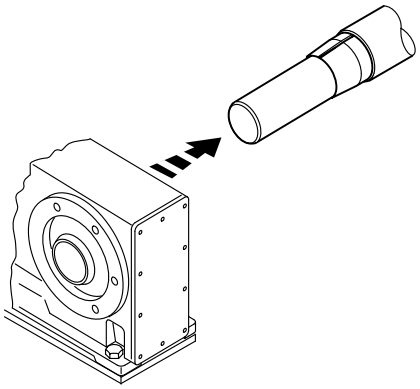
5. Push the gear unit onto the customer shaft.



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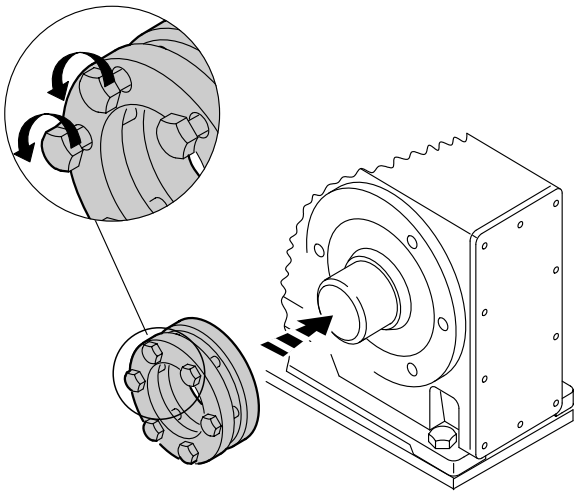
6. Ensure that all screws are loosened. Slide the shrink disk onto the hollow shaft.



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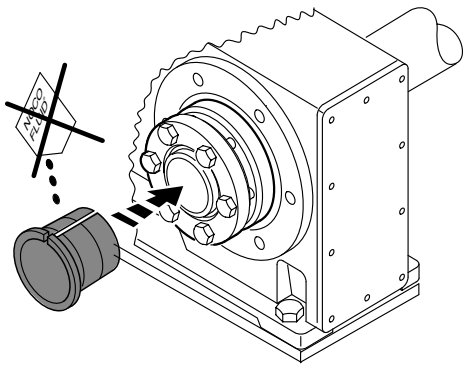
7. Slide the counter bushing onto the customer shaft and into the hollow shaft.



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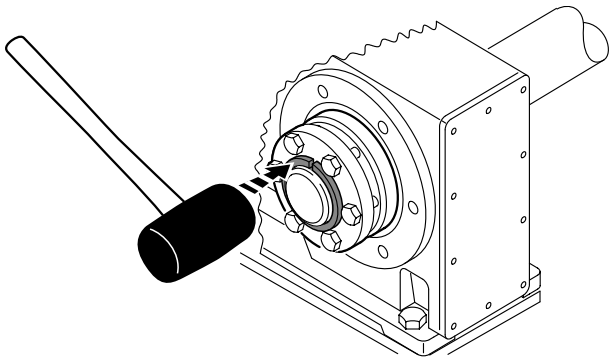
8. In the case of a gear unit **with shaft shoulder**, mount the shrink disk at the shaft shoulder up to the stop. In the case of a gear unit **without shaft shoulder**, mount the shrink disk at a distance of 1 mm to 2 mm from the gear unit housing.

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



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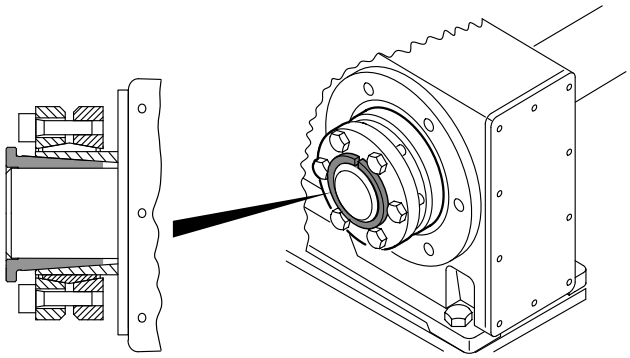
10. Make sure that the customer shaft is seated in the counter bushing.



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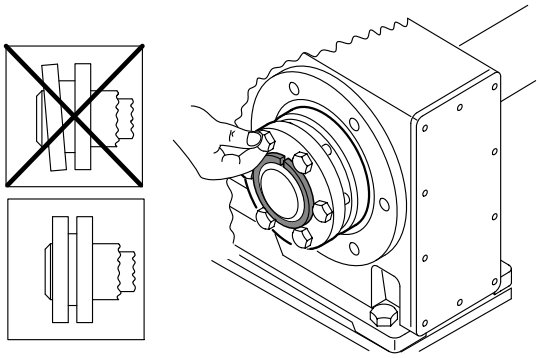
11. Manually tighten the screws of the shrink disk. Make sure that the outer rings of the shrink disk are plane-parallel.



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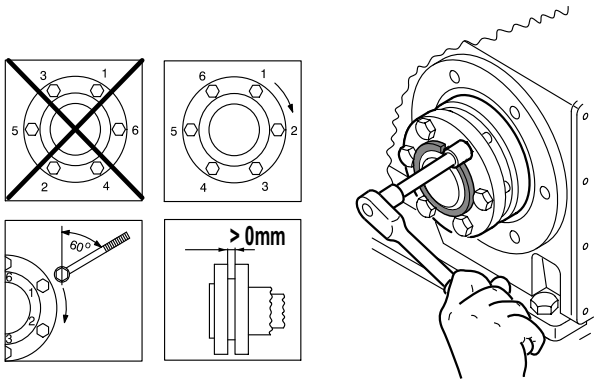
12. Tighten the locking screws with the specified tightening torque according to the following table. Tighten the screws by working round several times from one bolt to the next (not in diametrically opposite sequence).



18014398721495947

INFORMATION

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

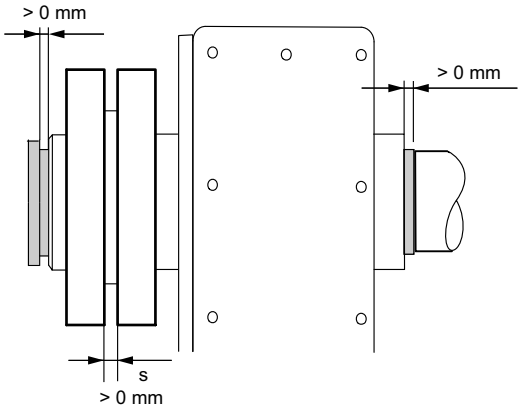
INFORMATION

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
–	–	37	37	M5	4
37	37	47	47	M6	12
47/57/67	39/47/49/57/67	57/67	-	M6	12
77/87/97	77/87/97	77/87/97	–	M8	30
107	107	–	–	M10	59
127/157	127/157	–	–	M12	100

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

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



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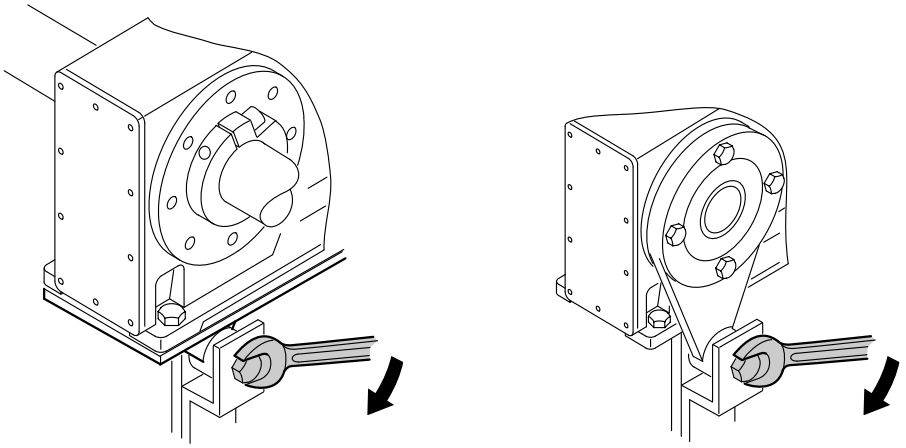
15. Mount the torque arm and firmly tighten it. Observe the information in chapter "Torque arms for shaft-mounted gear units" (→ 🗎 45).



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4.12.3 Removing the shaft-mounted gear unit

⚠ CAUTION

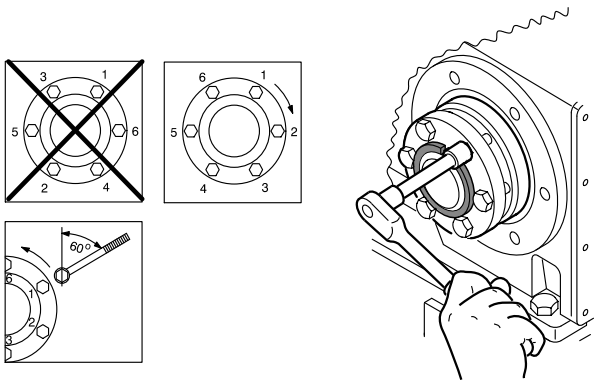
Risk of burns caused by hot surfaces

Severe injuries

- Let the units cool down before working on them.

Proceed as follows:

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

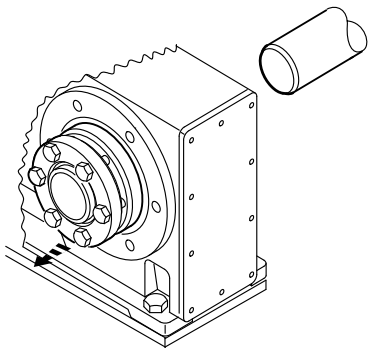


2903644171

2. Unscrew the locking screws evenly one after the other. Do not remove the locking screws completely.
3. Remove the conical steel bushing. If required, use the outer rings as pullers. Proceed as follows to do so:

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

4. Remove the gear unit from the shaft.



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5. Remove the shrink disk from the hub.

INFORMATION

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

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

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

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4.13 Cover

⚠ CAUTION

Risk of injury due to rotating input and output elements during operation.

Risk of jamming and crushing.

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

INFORMATION

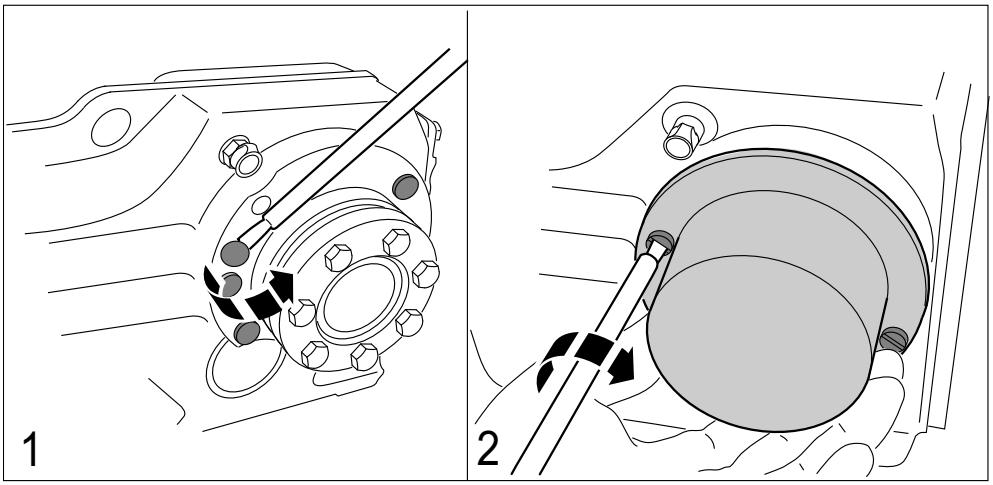
Observe the following points during installation:

- The seal must not be damaged.
- The glued connection between gasket and cover must be flawless.
- The bores of the gasket and the cover must match.

4.13.1 Mounting the fixed cover

Proceed as follows:

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



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

4.13.2 Operation without cover

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

4.14 Coupling of AM adapter

⚠ WARNING

Risk of explosion due to electric sparks when using the spacer tube as assembly aid.

Fatal and serious injuries.

- Do not use the spacer tube as assembly aid but measure the distance.

4.14.1 Mounting the IEC adapter AM63 – 280/NEMA adapter AM56 – 365

NOTICE

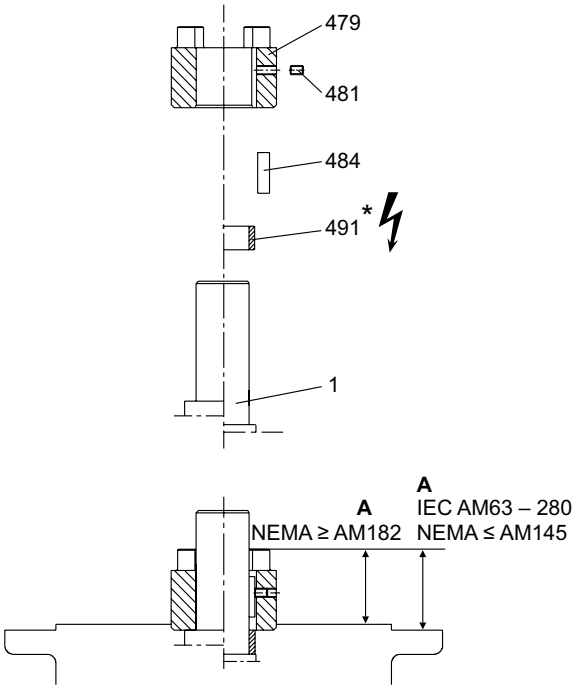
Damage to adapter due to ingression of moisture when mounting a motor to the adapter.

Damage to the adapter

- Seal the adapter with an anaerobic fluid seal.

INFORMATION

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



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[1]	Motor shaft	[484]	Key
[479]	Coupling half	[491*]	This spacer tube must not be used due to the risk of electric sparks
[481]	Set screw		

Proceed as follows:

1. Clean the motor shaft and flange surfaces of the motor and the adapter.

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2. Remove the key from the motor shaft. Replace the key from the motor shaft with the supplied key [484] (not AM63 and AM250).
3. Heat the coupling half [479] to approx. 80 – 100 °C and push the coupling half onto the motor shaft. Position as follows:

- IEC adapter AM63 – 225 until stop at motor shaft shoulder.
- IEC adapter AM250 – 280 to distance "A". The values for the distance "A" are listed in the following table.
- NEMA adapter to distance "A". The values for the distance "A" are listed in the following table.

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

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

Permitted loads

NOTICE

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

Gear unit failure

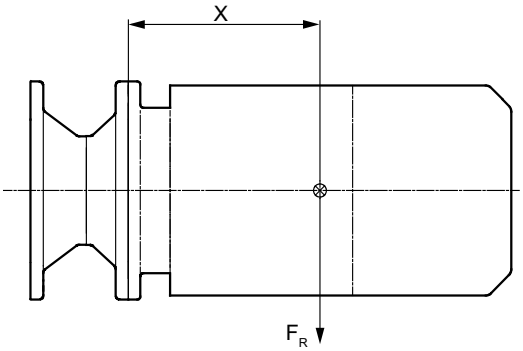
- Note that the load data specified in the following table are not to be exceeded.
- Make sure that the approved power rating (torque and speed) on the adapter is observed according to the nameplate.

NOTICE

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

Damage to property

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



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

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

Adapter type		x[1]	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

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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}.

4.14.2 AM adapter with AM../RS backstop

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

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

NOTICE

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

Possible damage to property.

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

Type	Maximum locking torque of the backstop Nm	Minimum lift-off speed min^{-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

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

If a third-party motor is mounted, the customer must ensure that the permitted weight and the power at the adapter are adhered to according to the operating instructions. For information on the permitted loads, refer to chapter "Permitted loads" (→ 🗎 75).

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

[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

4.14.4 AM adapter with foot-mounted motor

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

4.15 AQ. adapter coupling

⚠ WARNING

Risk of explosion due to electric sparks when using the spacer tube as assembly aid.

Fatal and serious injuries.

- Do not use the spacer tube as assembly aid but measure the distance.

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

NOTICE

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

Damage to the adapter

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

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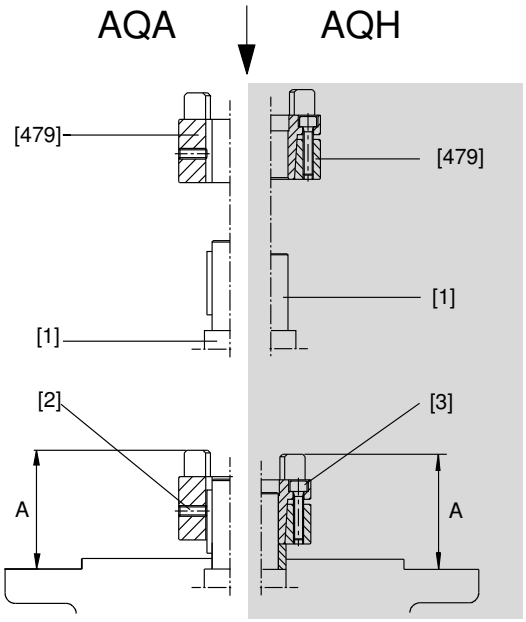
INFORMATION

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

For AQH: Using NOCO® fluid is not approved.



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

Proceed as follows:

1. Clean the motor shaft and flange surfaces of the motor and the adapter.
2. **AQH design:** Loosen the screws of the coupling half [479] and loosen the conical connection.
3. **AQA/AQH design:** Heat the coupling half to approx. 80 – 100 °C and push the coupling half onto the motor shaft up to distance "A". The values for the distance "A" are listed in the table in chapter "Setting standards and tightening torques" (→ 🗎 80).
4. **AQH design:** Tighten the screws at the coupling half evenly in diametrically opposite sequence, working round several times. The values for the tightening torque "T_A" are listed in the table in chapter "Setting standards and tightening torques" (→ 🗎 80).
5. **AQA design:** Secure the coupling half using the set screw (see figure).
6. Check the position of the coupling half. The values for the distance "A" are listed in the table in chapter "Setting standards and tightening torques" (→ 🗎 80).
7. Mount the motor onto the adapter, making sure that the claws of the two coupling halves engage in each other.
   ⇨ The force that must be applied when joining the two coupling halves is dissipated after final assembly, so there is no risk of any axial load being applied to adjacent bearings.

4.15.2 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 x 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 x M5	2	9
AQA/AQH 140 /1 /2		62				
AQA/AQH 140 /3 /4	28	74.5	M8	8 x M5	10	9
AQA/AQH 160 /1		74.5				
AQA/AQH 190 /1 /2		76.5				
AQA/AQH 190 /3	38	100	M8	8 x M6	10	14

4.15.3 Permitted loads

NOTICE

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

Gear unit failure

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

NOTICE

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

Damage to property

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

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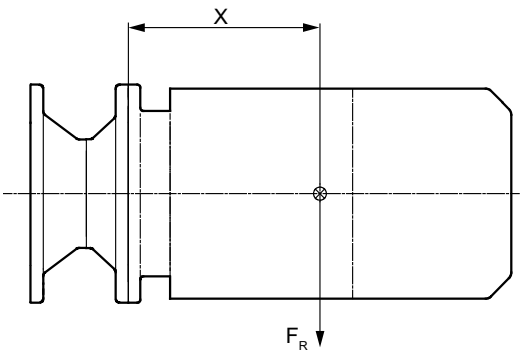
The following figure shows the permitted force application points for the permitted maximum weights:



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

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

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

2) Diameter of the adapter output flange: 160 mm

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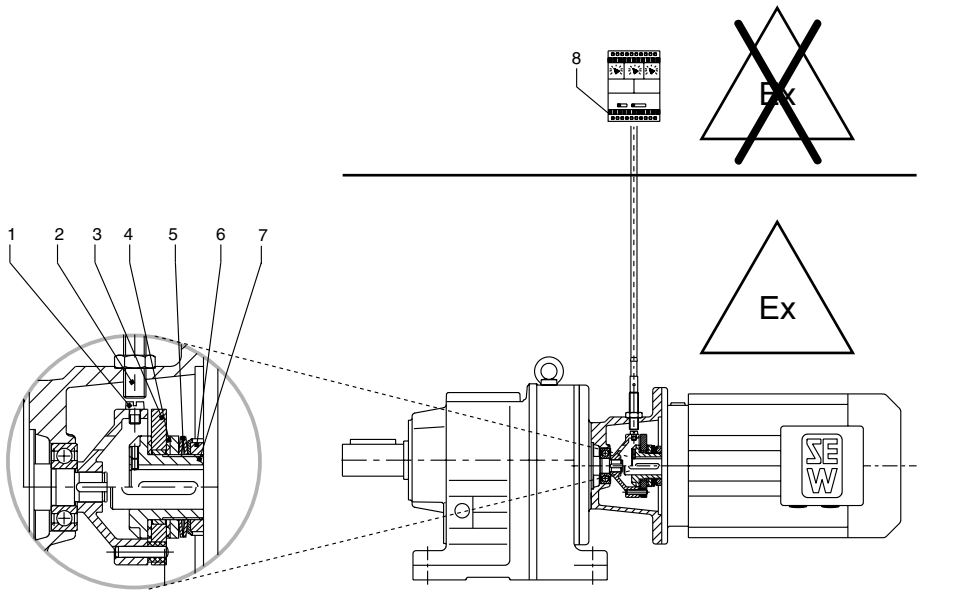
4.16 Adapter with AR slip clutch



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

Drives with a slip clutch consist of a standard gear unit and a 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 unit.

Via the friction lining [4] of the driving disk [3], the input friction hub [7] with cup springs [5] and slotted nut [6] drives the output coupling plate with connecting pin. The slip torque is set individually according to the drive selection.

The speed of the coupling plate at the output end is picked up by a voltage encoder [2] and passed on to a monitoring unit [8]. Speed monitors and slip monitors are used as monitoring units. You can install them together with contactors, safety devices, etc. on a 35 mm standard rail (according to DIN EN 50 022) in a control cabinet or mounted via 2 bores.

4.16.1 WEX speed monitor

INFORMATION

The speed monitor and remote speed indication must be located outside the potentially explosive area.

The speed monitor [8] is used for gearmotors with constant speed. The speed monitor is connected to the voltage encoder [2] in the adapter.

4.16.2 Mount voltage encoder

Proceed as follows:

1. Remove the fan guard from the driving motor.

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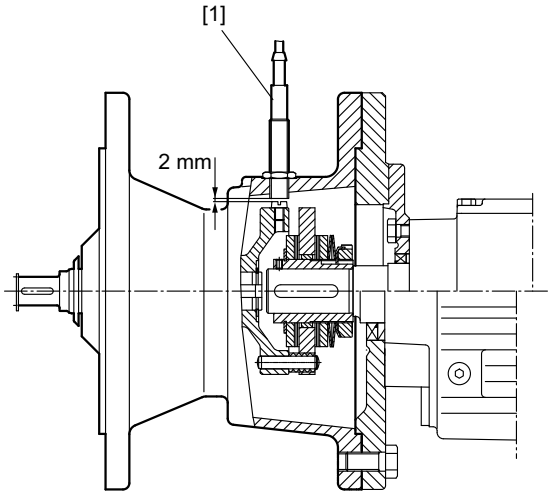
2. Slowly turn the motor and adapter shaft end until you can see a trip cam meaning the head of the cap screw in the tapped hole.
3. Screw in the voltage encoder [1] so deep that is touches the trip cam.



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4. Turn back the voltage encoder [1] by 2 revolutions. It corresponds to a distance of approx. 2 mm.
5. Secure the voltage encoder at the adapter outside using a lock nut.
6. Check to see if the trip cam does not touch the voltage encoder while slowly turning the motor and adapter shaft end.
7. Reinstall the fan guard at the driving motor.

4.16.3 Connecting monitoring devices

INFORMATION

- To prevent interference voltages, do not route the supply lines in multicore cables.
- Use cables with a maximum length of 500 m and a core cross section of 1.5 mm^2.
- If there is a risk of interference from power current or control cables and if the lines are longer than 10 m, use shielded cables.
- Observe the applicable standards especially in the explosion-proof area.

Proceed as follows:

1. For designs with WEX speed monitor, connect the incremental encoder of the adapter to the speed monitor via a 2-core cable.
   ⇨ The incremental encoder supplies 1 pulse/revolution.
2. Connect the speed monitor according to the enclosed wiring diagram.

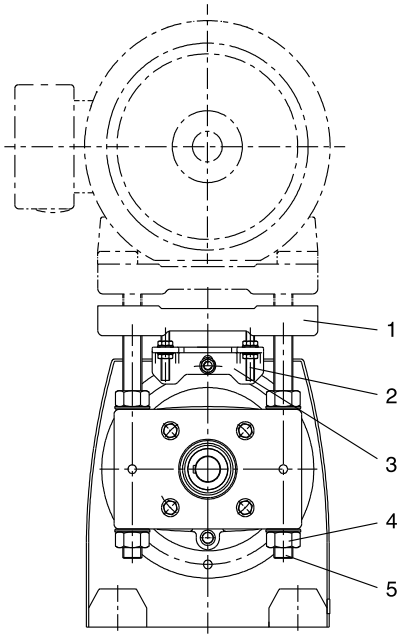
4.17 AD input shaft assembly

For mounting drive components, observer chapter "Assembling input and output elements" (→ 🗎 43).

INFORMATION

- Only use belts with sufficient electrical leakage resistance (< 10^9 Ω) between the output shaft end and the motor shaft.
- Prior to installation of the protection cover, a risk analysis performed by the manufacturer of the protection cover must demonstrate that no sources of ignition can occur (such as impact sparks from grinding).

4.17.1 Mounting the cover with motor platform AD../P



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

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

1. Set the motor platform [1] to the required mounting position by evenly tightening the adjusting nuts [4].
2. If necessary, remove the lifting eyebolt/lifting eye of the helical gear unit to reach the lowest adjustment position. Touch up any damage to the paint work.
3. Align the motor on the motor platform [1] so that the shaft ends are in line. Attach the motor.
4. Mount the drive component onto the input side shaft end and the motor shaft.
5. Align drive component, shaft end and motor shaft. If necessary correct the motor position again.

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6. Put on the traction elements (V-belt, chain, etc.) and apply a preload by evenly adjusting the motor platform [1]. Do not stress the motor platform and the columns against each other when doing this.
7. To fasten the threaded columns [5] tighten the nuts [4] that are not used for adjustment.

4.17.2 Special aspects of AD6/P and AD7/P

Proceed as follows:

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

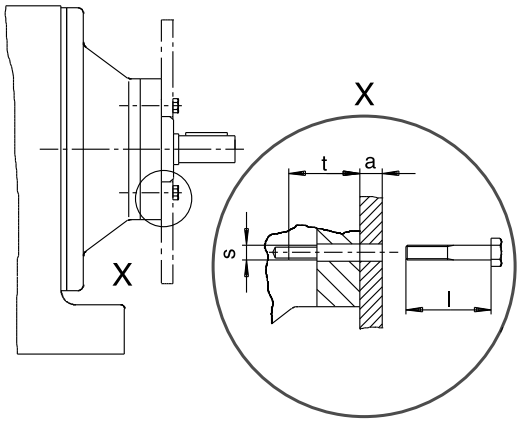
INFORMATION

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

4.17.3 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
t Screw-in depth (see table)
s Retaining thread (see table)

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

Type	Screw-in depth t mm	Retaining thread	Tightening torque T_A for connection screws of strength class 8.8 Nm
AD2/ZR	25.5	M8	27
AD3/ZR	31.5	M10	54
AD4/ZR	36	M12	93
AD5/ZR	44	M12	93
AD6/ZR	48.5	M16	230
AD7/ZR	49	M20	464
AD8/ZR	42	M12	93

Permitted loads

NOTICE

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

Gear unit failure

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

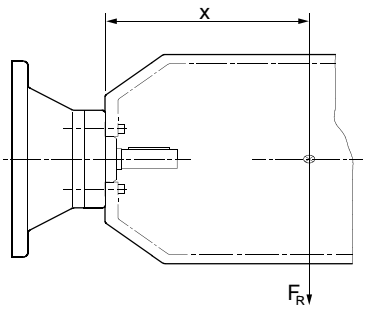
NOTICE

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

Damage to property

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

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



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

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

1) Maximum load values for connection screws of strength class 8.8. 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

4.17.4 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. 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).

Type	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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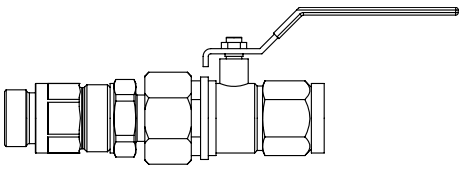
4.18 Accessory equipment

4.18.1 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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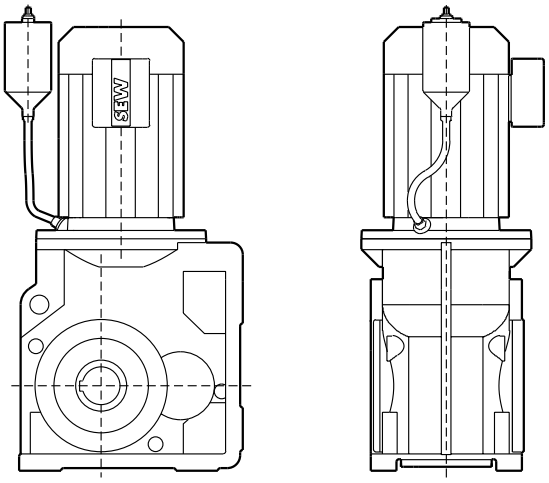
4.18.2 Oil expansion tank

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

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

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



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

INFORMATION

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

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

4.18.3 Agitator design

Relubrication of the agitator design

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

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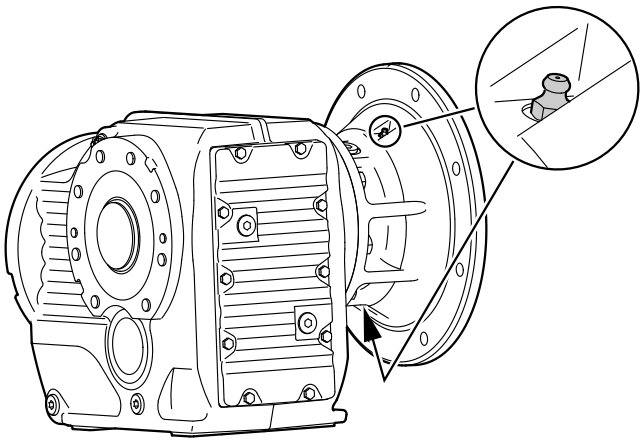
Position of greasing points

INFORMATION

The gear shaft must turn during the relubrication procedure.

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



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Maintenance interval and grease quantities

Relubricate the agitator design after 10000 operating hours. The number of relubrication procedures is limited to 5×. Observe the information on the required grease quantities in the following table:

Size	Grease quantity for relubrication g
67	5
77	11
87	11
97	16
107	35
127	34
157	46

The table shows the lubricants recommended by SEW-EURODRIVE:

Area of operation	Ambient temperature	Manufacturer	Type
Standard	-40 °C to +80 °C	Fuchs	Renolit CX-TOM 15[1)]
	-40 °C to +80 °C	Klüber	Petamo GHY 133 N
[2)]	-40 °C to +40 °C	Bremer & Leguil	Cassida Grease GTS 2

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Area of operation	Ambient temperature	Manufac-turer	Type
	-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.

4.18.4 Temperature sensor

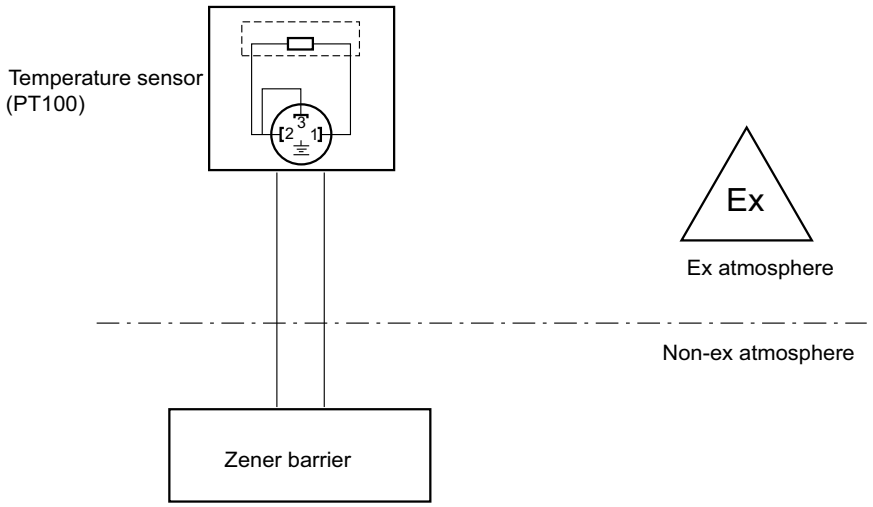
INFORMATION

If the oil temperature is >115 °C, the drive must be switched off.

INFORMATION

To ensure intrinsically safe wiring, the temperature sensor must be used with a Zener barrier. The current consumption of the Zener barrier enables correct measuring operation. The Zener barrier must be located outside the potentially explosive atmosphere.

PT100 screw-in temperature sensor, connection element shape J



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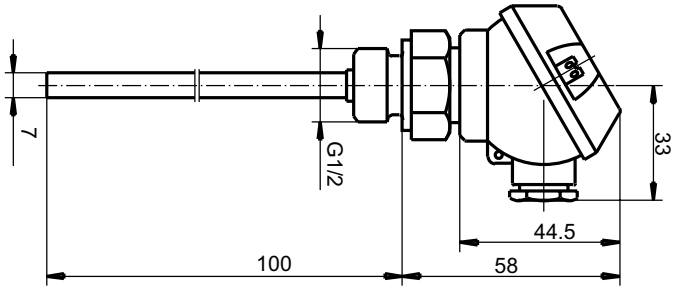
PT100 dimension drawing



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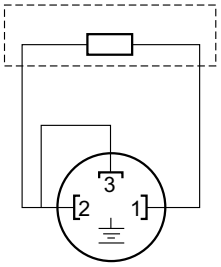
PT100 technical data

Technical data	Value
Area of application	For monitoring the oil temperature
Operating temperature	-50 °C to 400 °C
Ambient temperature	-40 °C to 100 °C
Thermowell	Stainless steel (1.4571)
Connection element	Shape J, aluminum die-casting, M16x1.5, IP54
Outer thread	G1/2 A-cylindrical according to DIN EN ISO 228
Measuring insert	According to DIN EN 60751 class B in two-wire circuit, without measuring transducer
Manufacturer	JUMO (JUM according to W93DE)
SEW part number	13274171

PT100 connection diagram



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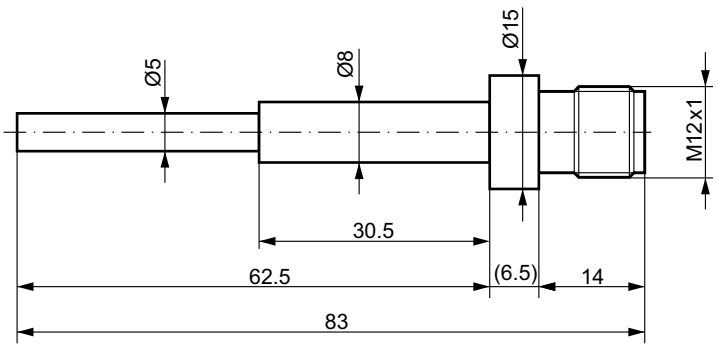
Contact 1 and 2: Connection of the resistance element

PT1000 temperature sensor

PT1000 dimension drawing



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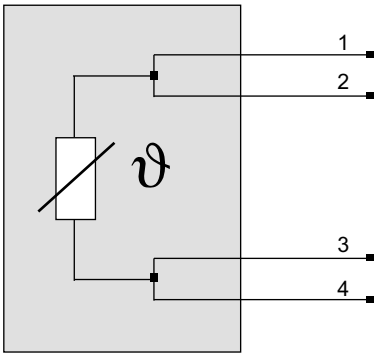
PT1000 technical data

Technical Data	Value
Rod length	62.5 mm
Measuring range	-40 – 130 °C
Permitted oil temperature	-40 – 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 – 80 °C
Degree of protection, protection class	IP67, III
Housing materials	V4A (1.4404)
Materials in contact with the medium	V4A (1.4404)
Port	M12 plug-in connection; gold-plated contacts

PT1000 connection diagram



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5 Startup

NOTICE

Improper startup may result in damage to the gear unit.

Possible damage to property.

- Observe the following notes.

- Before startup, always check to see that the oil level is correct. Refer to the unit's nameplate for lubricant fill quantities.
- The oil checking and drain screws and the breather valves must be freely accessible.
- Observe the maximum and r.m.s values of project planning during startup of gear units with servomotor. The buyer is obliged to make the data available to the end user.
- The most important technical data is provided on the nameplate. Additional data relevant for operation is available in drawings and the order confirmation.
- After gear unit setup, ensure that all retaining screws are tight.
- Make sure that the alignment has not changed after tightening the mounting elements.
- Prior to startup, ensure that rotating shafts as well as couplings are equipped with suitable protective covers.
- If an oil sight glass is used for oil level monitoring, protect it against damage.
- It is essential that there is no open fire or risk of sparks when working on the gear unit.
- Protect the gear unit from falling objects.
- Remove transport protection prior to startup.
- Observe the safety notes.

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5.1 Checklists

5.1.1 Before startup

This checklist includes all activities that will have to be executed **prior to startup** of a gear unit according to Directive 2014/34/EU for operation in potentially explosive atmospheres.

Check prior to startup in potentially explosive atmospheres	Verified	See chapter
Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. It may be necessary to suspend startup. Remove any transport protection prior to startup.		2.6
Does the data on the nameplate of the drive match the situation on site for operation in a potentially explosive area? • Equipment group • Explosion protection category • Temperature class • Maximum surface temperature		3.9 4.2
Have arrangements been made to prevent potentially explosive atmospheres (oils, acids, gases, vapors or radiation) during installation of the gear unit?		
Does the ambient temperature comply with the specifications (nameplate and order confirmation)?		3.9
Have measures been taken to ensure that the gear units are sufficiently ventilated and that they are not heated by an external heat source (e.g. the coupling)? The cooling air must not exceed the maximum ambient temperature designated on the nameplate.		
Does the mounting position correspond to the specifications on the gear unit nameplate? Do not change the mounting position without prior consultation with SEW-EURODRIVE. ATEX approval will become void without prior consultation.		7.0
Does the oil level for the mounting position on the gear unit nameplate correspond to the indicated oil fill quantity?		3.9
Are all oil level plugs, oil drain plugs as well as breather plugs and breather valves freely accessible?		7.6
Do all input and output elements to be installed have ATEX certification?		
Ensure that the data specified on the nameplate are not exceeded for stand-alone gear units with adapters or input shaft assembly.		3.9
Is the cover mounted properly for gear units with hollow shaft and shrink disk?		4.11
Ensure that no spacer bushing is used as assembly aid during the installation of the AM, AQA adapter.		4.14 4.15
When mounting a motor on the AD input shaft assembly: • Does the belt have sufficient electrical leakage resistance < 10^9 Ω between input shaft end and motor shaft? • Before mounting a protection cover: Does a risk analysis performed by the manufacturer of the protection cover demonstrate that no sources of ignition can occur (such as impact sparks from grinding)?		4.17

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Check prior to startup in potentially explosive atmospheres	Verified	See chapter
For mains-operated motors: • Does the data specified on the nameplate of the gear unit and the motor correspond to the ambient conditions at the location where the drive is to be installed?		3.9
When operating gearmotors with inverter: • Is the gearmotor approved for inverter operation? • Does the parameterization of the inverter prevent the gear unit from being overloaded (see gear unit nameplate)?		3.9

5.1.2 During startup

This checklist includes all activities that will have to be executed **during startup** of a gear unit according to Directive 2014/34/EU for operation in potentially explosive atmospheres.

Check during startup in potentially explosive atmospheres	Verified	See chapter
Check surface temperature: • Measure the surface temperature after 3 hours of operation. Do not exceed a temperature difference of 70 K compared to the ambient temperature. At a value > 70 K immediately set the drive to standstill. Contact SEW-EURODRIVE.		5.5
Lubricant change intervals: 1. Measure the oil temperature. 2. Add 10 K to the measured value. 3. Determine the lubricant change interval based on the calculated value.		5.5 6.4
For gear units with AM adapter or AD input shaft assembly with RS backstop: • Check if in nominal operation, the lift-off speeds of the backstops does not drop below the minimum values.		4.14 4.17

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5.2 Inverter-operated gearmotors

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

5.3 Checking the oil level

Before startup, make sure that the oil level corresponds to the mounting position. Observe chapter "Checking the oil level and changing the oil" (→ 🗎 118).

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

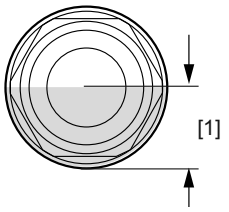
NOTICE

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

Possible damage to the unit

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

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 107).
2. 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.

3. Proceed as follows if the oil level is too low:
   - Open the respective oil fill plug, see chapter "Inspection/maintenance for the gear unit" (→ 🗎 118).
   - Fill in new oil of the same type via the oil fill plug up to the mark.
   - Screw in the oil fill plug.

Before startup, make sure that the oil level corresponds to the mounting position. Observe chapter "Checking the oil level and changing the oil" (→ 🗎 118).

5.4 Pseudo-leakage at shaft seals

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

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5.5 Measuring surface and oil temperature

INFORMATION

The nameplate data on maximum surface temperature is based on measurements at standard ambient conditions and installation altitudes. Even slight changes of these conditions (such as limited installation space) can have a tremendous impact on the temperature.

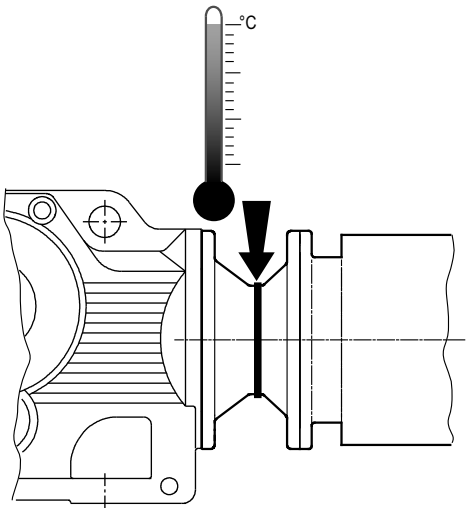
5.5.1 Measuring the surface temperature

It is absolutely necessary to measure the surface temperature at maximum load during startup of the gear unit. A commercially available thermometer is sufficient for this measurement. Measure the surface temperature at the transition space between gear unit and motor where the position of the terminal box prevents venting by the motor fan. The maximum surface temperature will be reached after approximately 3 hours and **must not exceed a difference value of 70 K** compared to the ambient temperature.

INFORMATION

Stop the drive immediately if the difference exceeds the given value. Contact SEW-EURODRIVE in this case.

For gear units with AM, AQ, AR adapter, or AD input shaft assembly, the surface temperature is measured at the joint between input gear unit flange and customer motor flange (see following picture).



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5.5.2 Measuring the oil temperature

It is necessary to measure the oil temperature to determine the lubricant change intervals set forth in the chapter "Inspection and maintenance" (→ 🗎 107). Measure the temperature at the bottom of the gear unit. In case of gear units with oil drain plug, measure the temperature at the oil drain plug. Add 10 K to the measured value. Determine the lubricant change interval based on this temperature values, see chapter "Lubricant change intervals" (→ 🗎 112).

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5.6 Helical-worm gear units and SPIROPLAN® W gear units

5.6.1 Run-in period

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

Helical-worm gear units

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

SPIROPLAN® gear units

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

5.6.2 Helical-worm gear unit with projecting worm shaft

⚠ WARNING

Risk of explosion due to electric sparks of rotating unit parts.

Fatal and serious injuries.

- Take appropriate measures to prevent rotating unit parts to come into contact with foreign objects (e.g. install cover).

⚠ 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.

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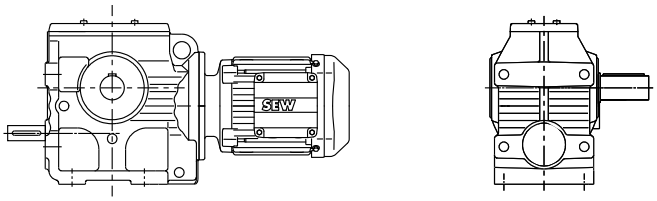
The following figure shows a helical-worm gearmotor with projecting worm shaft:



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

If the gear units were installed according to chapter "Mechanical installation" (→ 🗎 29), no special startup notes must be observed for helical, parallel-shaft helical and helical-bevel gear units.

5.8 Gear units with backstop

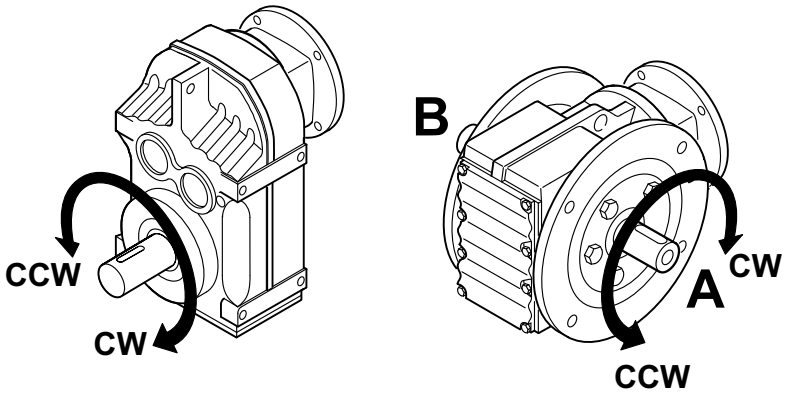
NOTICE

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

Possible damage to property

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

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



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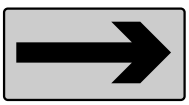
The permitted direction of rotation is indicated by a direction arrow on the housing:



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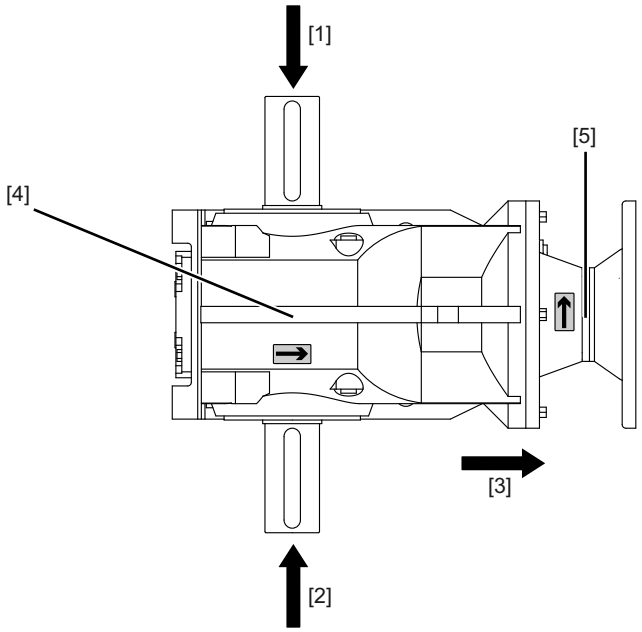
A replacement label is enclosed for the customer.

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



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

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5.9 Speed monitoring

5.9.1 WEX option standard design

The standard version of the explosion-proof AR adapter features an M12×1 thread for mounting a voltage encoder in the motor flange of the adapter. Speed monitor and voltage encoder are included in the delivery.

5.9.2 Manufacturer's data

Speed monitor in WEX design:

Manufacturer:	Pepperl + Fuchs, Mannheim
Type:	KFU8-UFC-Ex1.D
Auxiliary voltage:	DC 20 – 90 V/AC 48 – 253 V
ATEX certification number:	TÜV 99 ATEX 1471

Voltage encoder data in WEXA/WEX/IGEX design:

Manufacturer:	Pepperl + Fuchs, Mannheim
Type:	NCB2-12GM35-N0 to DIN 19234 (NAMUR)
Housing:	M12×1
ATEX certification number:	TÜV 99 ATEX 1471

5.10 Installation and adjustment of the WEX speed monitor

1. Read the operating instructions of the speed monitor manufacturer before you begin with the installation.
2. Perform the basic adjustment of the speed monitor in accordance with the operating instructions of the speed monitor manufacturer.

When the nominal speed of the motor in use is undercut by 5%, the settings must cause the drive to be switched off. Refer to the nameplate for the nominal speed of the driving motor.

The sensor integrated in the adapter generates 1 pulse per revolution of the adapter shaft. If the switching speed of the adapter is too low, i.e. the coupling slips, the driving motor must be disconnected from the supply voltage immediately.

The cause of the problem must be eliminated and the operation of the adapter must be stopped for at least 15 minutes before re-startup. If incorrect operation by the operating personnel cannot be ruled out, this interval should be guaranteed using an automatic restart lockout.

All following installation and setting notes given refer to the speed monitor or voltage encoder in WEX design.

If the installation and setting instructions do not correspond to the speed monitor included in the delivery, perform the installation and startup according to the documentation of the manufacturer.

The speed monitor must be located outside the potentially explosive atmosphere.

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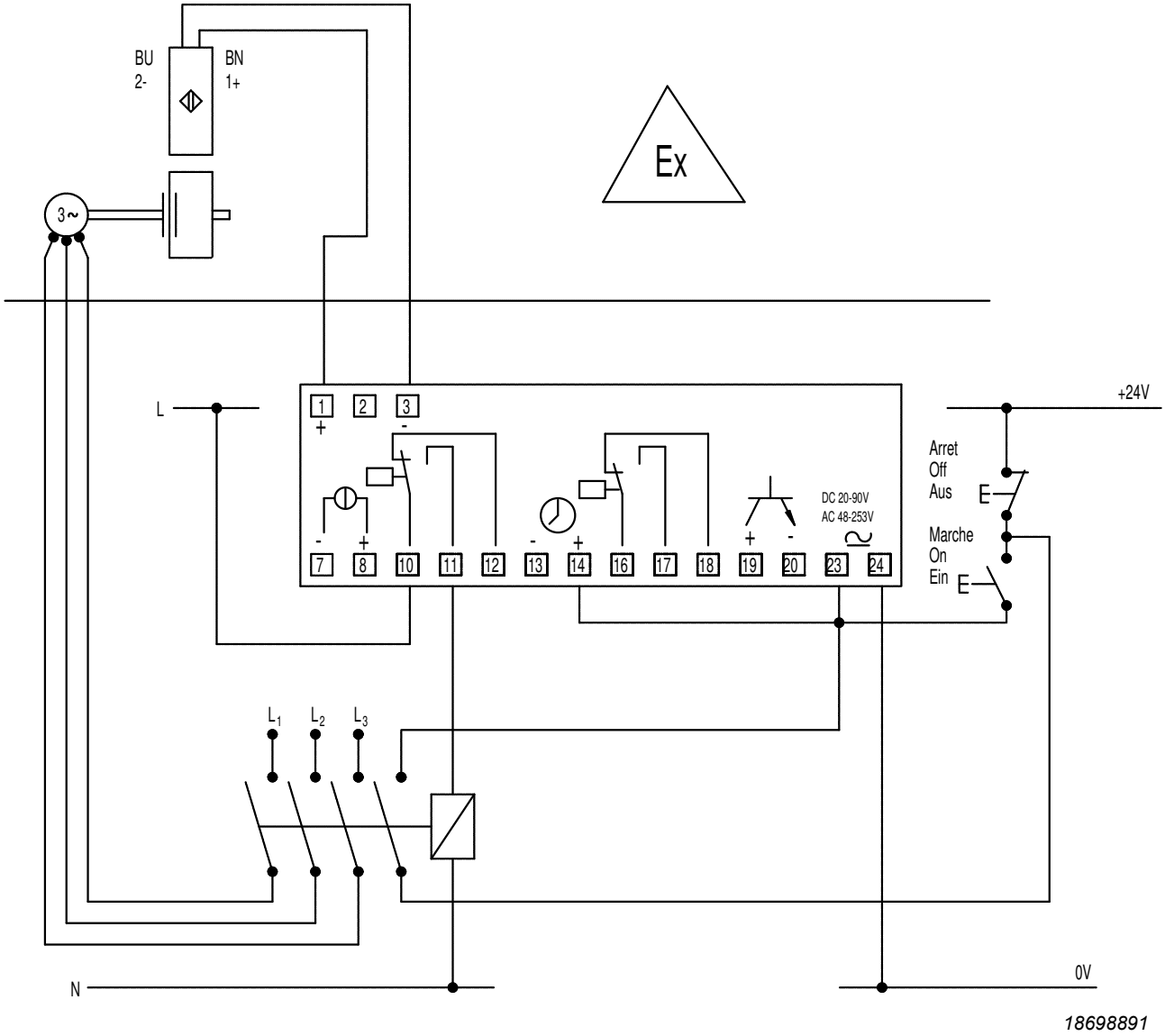
5.10.1 Installation and adjustment of the WEXA/WEX speed monitor

Relay 2 can be used for creating a warning signal or for machine control (terminal assignment 16 – 18).

The wiring diagram below shows possible connection of the speed monitor.



[1] Sensor +
[3] Sensor -
[10] Relay 1 (common connection)
[11] Relay 1 (NO contact)
[12] Relay 1 (NC contact)
[14] Start bypass
[23] DC 24 V voltage supply, +
[24] DC 24 V voltage supply, –
[19] Auxiliary output for customer application +
[20] Auxiliary output for customer application -

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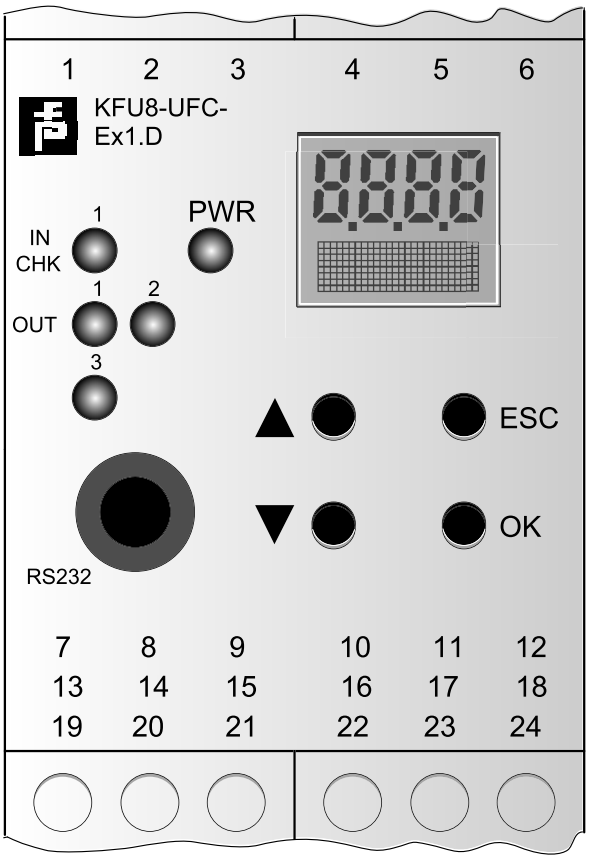
The following figure shows the front of the speed monitor:



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LED in CHK 1 (yellow/red):	Input pulses (flashing yellow in sync), input malfunction (flashing red), and unit malfunction (continuously red)
LED PWR (green):	Voltage
LED OUT 1 (yellow):	Relay 1 active
LED OUT 2 (yellow):	Relay 2 active
LED OUT 3 (yellow):	Transistor active
RS232:	The RS232 interface for connecting a PC for parameterization and diagnosing of the UFC with PACTware
Display:	For showing measured values and faults and visualization in parameterization mode

INFORMATION

The start bypass time may not exceed 3 seconds. The settings above must be performed with care and measured in a subsequent test.

5.10.2 Installing and setting other speed monitors

If other speed monitors are used, they must feature an intrinsically safe sensor input (identification color: blue) for evaluation of sensors according to DIN 19234 (NAMUR) and be approved for use of this sensor in potentially explosive atmospheres.

INFORMATION

The voltage encoder (sensor) generally features a blue connection cable and must conform to DIN 19234 (NAMUR). The corresponding inspection number may be attached to the voltage encoder or the connection cable.

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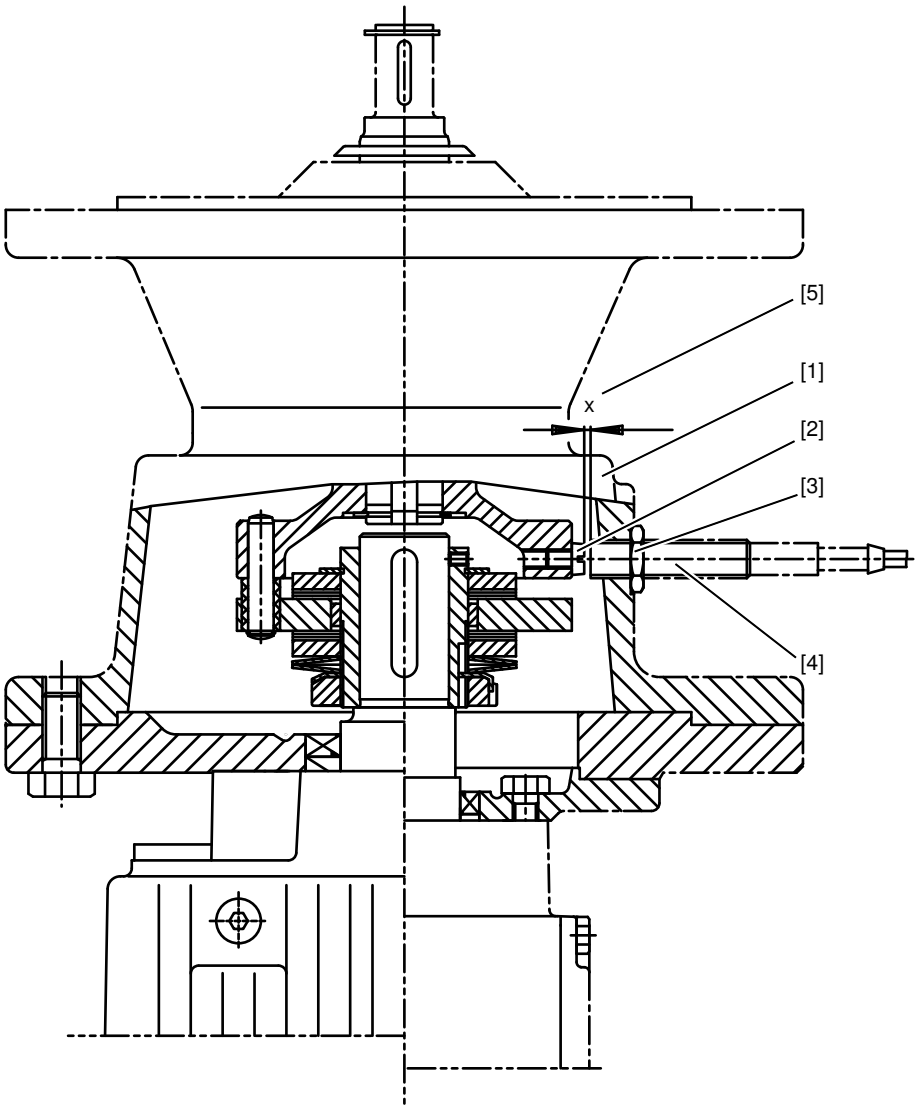
5.11 Installation of the voltage encoder

The following figure illustrates the installation of the voltage encoder and the setting of the sensing distance x.



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[1] Adapter flange bearing cover
[2] Screw head
[3] Lock nut
[4] Voltage encoder
[5] Sensing distance x

1. Rotate the output shaft of the adapter until the slotted screw head can be seen through the tapped hole in the bearing cover.
2. Voltage encoder:
   - Carefully screw it into the thread in the adapter flange [1] of the variable-speed gear unit until the voltage encoder [5] rests on the screw head [2].
   - Turn the encoder back by 2 turns and secure with the lock nut [3].

The sensing distance is now set to 2 mm. During operation, the voltage encoder supplies 1 pulse per revolution at this sensing distance.

5.11.1 Changing sensing distance "x"

If no circuit state change occurs at the voltage encoder (LED display) with rotating shaft of the adapter shaft operating with sensing distance x = 1 mm, the sensing distance can be changed as follows:

1. With **constantly lit LED** [4] of the voltage encoder, turn the voltage encoder a half turn **counterclockwise** at a time and check its function.
2. It the **LED is not lit** [4], turn the voltage encoder **clockwise** by 90 degrees but no more than one time.

⚠ CAUTION

A collision with the slotted screw heads may destroy the voltage encoder.

Possible damage to property.

- Do not turn in the voltage encoder by more than half a turn

3. If a circuit change still does not occur, check the voltage supply of the voltage encoder using the evaluation electronics (with WEXA/WEX design).

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

⚠ WARNING

Risk of injury if preloaded shaft connections are loosened.

Severe or fatal injuries

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

⚠ WARNING

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

Severe injuries

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

NOTICE

Loss of lubricant qualities due to filling of wrong lubricant

Damage to the gear unit

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

NOTICE

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

Gear unit damage.

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

NOTICE

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

Gear unit failure

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

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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.

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6.1 Wearing parts

Gearing

If the SEW-EURODRIVE design criteria and the intervals for inspection and maintenance are observed, the gearing components are wear-free after the run-in period. For constructional reasons, the worm gearing is an exception. The amount of material abrasion on the worm gear tooth flanks varies depending on the operating conditions. The main influencing factors are:

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

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

Rolling bearing

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

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

Therefore the rolling bearings must be inspected regularly. Observe the corresponding inspection and maintenance intervals in the chapters "Inspection/maintenance intervals" (→ 🗎 111), "Lubricant change intervals" (→ 🗎 112), "Maintenance of AL/AM/AQ. adapter" (→ 🗎 112), and "AD input shaft assembly maintenance" (→ 🗎 117).

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

Lubricants

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

The service life significantly depends on the oil operating temperature. The dependency of lubricant change intervals and operating temperature is depicted in the figure in chapter "Lubricant change intervals" (→ 🗎 112).

Oil seals

Oil seals are contact seals that are used to seal unit housings at emerging elements, such as shafts, from the environment. Oils seals are wear parts with a service life that is influenced by various factors. For example:

- 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

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Due to the various influencing factors it is not possible to predict the service life. Therefore the oil seals must be inspected regularly. Observe the corresponding inspection and maintenance intervals in the chapters "Inspection/maintenance intervals" (→ 🗎 111), "Lubricant change intervals" (→ 🗎 112), "Maintenance of AL/AM/AQ. adapter" (→ 🗎 112), and "AD input shaft assembly maintenance" (→ 🗎 117).

Cam ring/ coupling ring

The couplings used in the AM, AL, and AQ. adapters are designed to be positive, puncture-proof and low-maintenance claw couplings. They have a an impact and vibration-absorbing cam ring (AM) or coupling ring (AQ., AL). The service life of cam ring/coupling ring is influenced by various factors. These are, among other things:

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

Adhere to the corresponding inspection and maintenance intervals in chapter "Maintenance of AL/AM/AQ. adapter" (→ 🗎 112).

Rubber buffer

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

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

Flexible bushing

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

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

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6.2 Inspection/maintenance intervals

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

Time interval	What to do?
• Every 3000 hours of operation, at least every 6 months	• Check 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 and replace the rubber buffers, if necessary
• Depending on the operating conditions (see illustration in chapter "Lubricant change intervals" (→ 🗎 112)), every 3 years at the latest • according to oil temperature	• Change mineral oil • Replace bearing grease (recommendation) • Replace oil seal (do not install it in the same track)
• Depending on the operating conditions (see illustration in chapter "Lubricant change intervals" (→ 🗎 112)), every 5 years at the latest • according to oil temperature	• Change synthetic oil • Replace bearing grease (recommendation) • Replace oil seal (do not install it in the same track)
• Varying (depending on external factors)	• Touch up or renew the surfaces / anti-corrosion coating

Exceptions

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

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

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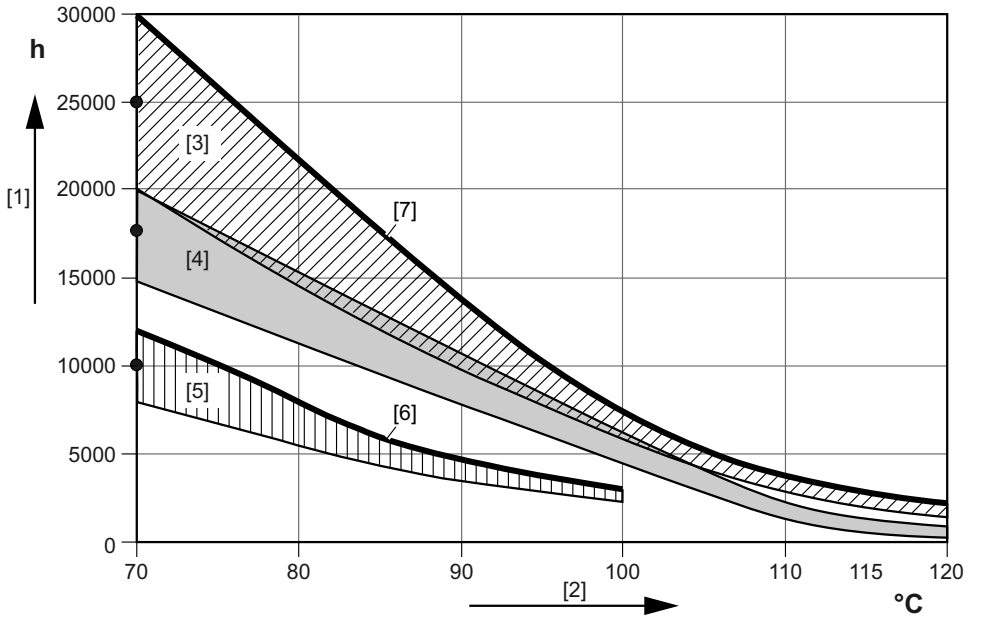
6.3 Lubricant change intervals

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



27021597782952587

[1] Operating hours
[2] Sustained oil bath temperature
• Average value per oil type at 70 °C
[3] CLP PG/CLP PG NSF H1
[4] CLP HC/ CLP HC NSF H1
[5] CLP (CC)/E
[6] SEW GearOil Base
[7] SEW GearOil Poly (H1)

6.4 Maintenance of AL/AM/AQ. adapter

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 10000 operating hours	• Check the rotational clearance. • Visual check the cam ring (AM) or coupling ring (AQ., AL).
• After 10 000 operating hours with NBR/FKM oil seals • After 20 000 operating hours with Premium Sine Seal (PSS) adapter oil seals:	• Change the bearing grease. • Change the oil seal. With standard NBR or FKM oil seals, the new oil seal must not be fitted on the previous track. This is allowed with Premium Sine Seal (PSS) adapter oil seals.

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6.5 AR adapter maintenance

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

Time interval	What to do?
• Every 3000 hours of operation, at least every 6 months	• Check the running noises to detect possible bearing damage. • Visually check the adapter for leakage.
• After 25000 – 30000 hours of operation	• Change the bearing grease. • Change the oil seal. Do not mount it in the same track.

6.6 Maintenance of AR adapter with slip clutch

If you use an adapter with slip clutch, the wear parts are affected by many factors. This is why the inspection intervals are short.

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

Time interval	What to do?	Chapter
At least every 3000 operating hours	• Inspect the friction lining and the cup springs. If necessary, replace them. • If the slip torque is too low, adjust it accordingly.	Chapter "Inspecting/replacing the friction lining, adjusting the slip torque" (→ 🗎 114)

6.6.1 Inspecting the friction lining

If the friction lining thickness is reduced by more than 50% compared to the original state, replace the friction lining (see chapter "Replacing the friction lining and adjusting the slip torque" (→ 🗎 114)).

The following table lists the friction lining thickness in original state:

Adapter type	Friction lining thickness mm
AR71/AR80/AR85/AR90/AR95	2
AR100/AR105/AR112	3
AR132/AR135/AR145/AR160/AR165/AR180/AR185/AR195	4

The following table shows the dimensions of the setting tool:

Adapter type	d mm	l mm	u mm	t_{max} mm
AR71	14	30	5	16.3
AR80/AR85	19	40	6	21.8
AR90/AR95	24	50	8	27.3
AR100/AR105/AR112	28	60	8	31.3
AR132/AR135/AR145	38	80	10	41.3

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Adapter type	d mm	l mm	u mm	t_{max} mm
AR160/AR165	42	110	12	45.3
AR180/AR185/AR195	48		14	51.8

6.6.2 Inspecting/replacing the friction lining, adjusting the slip torque

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Before starting the work, de-energize the gearmotor and prevent it from starting up unintentionally for example by locking the key switch or removing the fuses from the current supply.

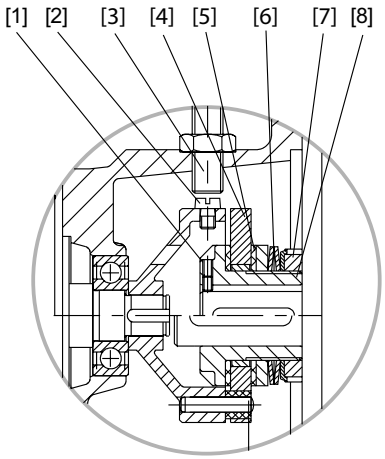
INFORMATION

It is only possible to check and adjust the slip torque accurately by using a torque wrench with an appropriate connection piece.

The following tools and resources are required:

- Standard tools
- Spanner wrench
- Hydraulic press
- Mounting/dismantling tool
- Torque wrench

The following figure shows the gear unit with mounted AR adapter with slip clutch:



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[1] Locking screw
[2] Cylinder head screw
[3] Proximity switch
[4] Friction disk
[5] Friction lining
[6] Cup spring
[7] Slotted nut
[8] Friction hub

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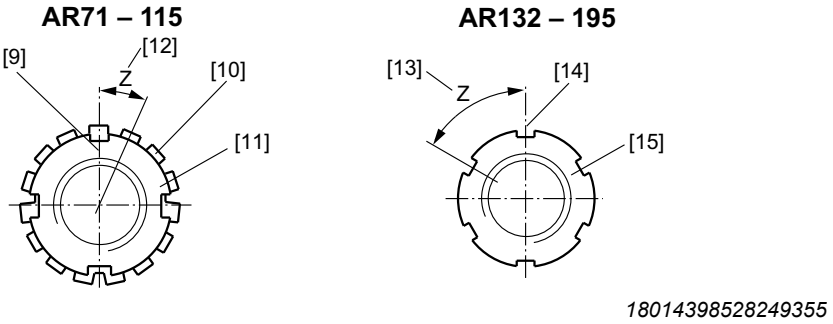
The following figure shows the rough slip torque adjustment:



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[9] Marking
[10] Multi-tang washer (cams)
[11] Slotted nut
[12] Z Number of cams of the lock washer
[13] Z number of slots in the slotted nut
[14] Mark on the driving disk
[15] Slotted nut

Proceed as follows:

✓ The motor/variable-speed gearmotor is disconnected from the adapter.

1. Loosen the locking screw [1] and pull the friction hub [8] from the shaft end.
2. Clamp the friction hub [8] in a vise.
3. For AR 71 – 115 adapters, proceed as follows:

- Loosen the lock washer [10].
- Loosen the slotted nut until you can easily adjust the slip clutch manually.
- Mark this position of the slotted nut [11].

4. For AR 132 – 195 adapters, proceed as follows:

- Loosen the clamping screw at the slotted nut [15].
- Loosen the slotted nut until you can easily adjust the slip clutch manually.
- Mark this position of the driving disk [14].

5. Loosen the slotted nut and remove the cup springs [6]. Not the sequence of the cup spring (see "Sequence of the cup springs" (→ 🗎 116)).

NOTICE

Destruction of the friction lining surface by lubricants.

- Prevent lubricants from getting on the friction surface.

6. Inspect the friction linings [5] (see "Inspecting the friction lining" (→ 🗎 113)). Replace them, if they are worn.
7. Inspect the cup springs [6]. Replace them, if cup springs are burned out.
8. Reassemble the cup springs [6] in the same sequence as you disassembled them.
9. Install the slotted nut up to the mark.
10. Measure the slip torque and adjust it. Proceed as follows to do so:

- How to adjust the slip torque using a torque wrench:
  - Connect the torque wrench with the hub bore.

– Measure the slip torque in both directions of rotation and, if necessary, adjust it via the slotted nut.

• If you adjust the slip torque using a spanner wrench, you can only roughly set the slip torque. In this case, determine the value "Z" that must be set to achieve the required slip torque based on the following table (see "AR slip torques" (→ 🗎 116)). The value "Z" is:

  – For AR 71 – 115 drives, the number of cams of the lock washer starting from the mark.

  – For AR 132 – 195 drives, the number of slots of the slotted nut starting from the mark.

11. Secure the slotted nut either with a lock washer or a clamping screw, depending on the adapter type.

12. Reassemble the drive in opposite order.

AR slip torques

Adapter type	Cup springs			Setting range Nm	No. of cams or slots "Z"																				
	Quantity	Thickness mm	Fig.[1]		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
					Slip torque M_R Nm																				
AR71	4	0.6	1	1.0-2.0						1.0	1.4	1.6	1.8	2.0											
			2	2.1-4.0						2.1	–	2.4	2.6	3.2	3.4	3.8	4.0								
	3		3	4.1-6.0			4.1	5.0	5.8	6.0															
AR80	4	0.6	1	1.0-2.0						1.0	1.4	1.6	2.8	2.0											
			2	2.1-4.0						2.1	–	2.4	2.6	3.2	3.4	3.8	4.0								
	3		3	4.1-6.0			4.1	5.0	5.8	6.0															
	4	0.9	2	6.1-16				6.0	8.0	9.0	10	11	12	13	14	15	16								
AR85 AR90 AR95	4	0.6	2	2.0-4.0				2.0	2.4	3.0	3.6	3.8	4.0												
	3		3	4.1-6.0			4.1	5.0	5.8	6.0															
	4	0.9	2	6.1-16				6.0	8.0	9.0	10	11	12	13	14	15	16								
	2	1.1	3	17-24			16	20	24																
AR100 AR105 AR112 AR115	6	0.7	2	5.0-13							5.0	6.0	8.0	9.0	10	11	12	13							
	2	1.45	2	14-35						14	16	17	18	20	22	23	24	26	27	28	–	30	31	32	35
			3	36-80						36	41	45	48	54	58	60									
AR132S/M AR132M/L AR135 AR145	4	1.5	1	15-32				15	18	22	24	26	–	28	30	32									
			2	33-65			33	40	50	58	67														
			3	66 – 130		68	100	120	135																
AR160	4	1.5	1	30-45										32	36	38	40	41	42	40	44	45			
			2	46-85			46	48	60	65	70	75	80	85											
	2	2.7	2	86-200					86	90	110	125	135	150	160	180	190	200							
AR165 AR180 AR185 AR195	4	1.5	1	30-45										32	36	38	40	41	42	44	45				
			2	46-85			40	48	60	65	70	75	80	85											
	2	2.7	2	86-200					86	90	110	125	135	150	160	170	180	190	200						
			3	201-300			200	280	300																

1) For "sequence of cup springs", refer to the table below

Sequence of the cup springs

No.	Meaning	Installation position
1	Double, alternating sequence	()()
2	Alternating sequence	()
3	Aligned sequence	))

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6.6.3 Replacing the incremental encoder of the adapter

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Before starting the work, de-energize the gearmotor and prevent it from starting up unintentionally for example by locking the key switch or removing the fuses from the current supply.

INFORMATION

Use only genuine spare parts in accordance with the valid spare parts list.

Proceed as follows:

1. Remove the fan guard from the driving motor.
2. Remove the incremental encoder connection.
3. Loosen the lock nut at the incremental encoder and remove the old incremental encoder.
4. Install the new incremental encoder, see "Installing the voltage encoder" (→ 🗎 105).
5. Connect the incremental encoder to the speed/slip monitor.
6. Reinstall the fan guard.

6.7 AD input shaft assembly maintenance

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

Time interval	What to do?
• Every 3000 hours of operation, at least every 6 months	• Check the running noises to detect possible bearing damage. • Visually check the adapter for leakage.
• After 10000 operating hours	• Change the bearing grease. • Change the oil seal. Do not mount it in the same track.

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6.8 Inspection/maintenance for the gear unit

6.8.1 Checking the oil level and changing the oil

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

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

Code letter	Chapter "Checking the oil level and changing the oil"	Reference
A	• Helical gear units... • Parallel-shaft helical gear units... • K..39/K..49, K..37 – 187 helical-bevel gear units • Helical-worm gear units... S..47 – 97 **With oil level plug**	(→ 🗎 120)
B	• Helical gear units... • Parallel-shaft helical gear units... • SPIROPLAN® gear units... **Without oil level plug, with cover plate**	(→ 🗎 123)
C	• S..37 helical-worm gear unit • K..19/K..29 helical-bevel gear unit **Without oil level plug, without cover plate**	(→ 🗎 127)
D	• SPIROPLAN® W..37/W..47 **In mounting positions M1, M2, M3, M5, M6 with oil level plug**	(→ 🗎 130)

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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**	(→ 🗎 133)

Refer to chapter "Mounting positions" (→ 🗎 136) for notes on the mounting positions.

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

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

Checking the oil level at the oil level plug

⚠ CAUTION

The R../R.. compound gear units in mounting position M1 and S../R.. compound gear units in mounting position M3 require sufficient lubrication. This is why the oil level is increased.

- The installed oil level plugs must not be used.

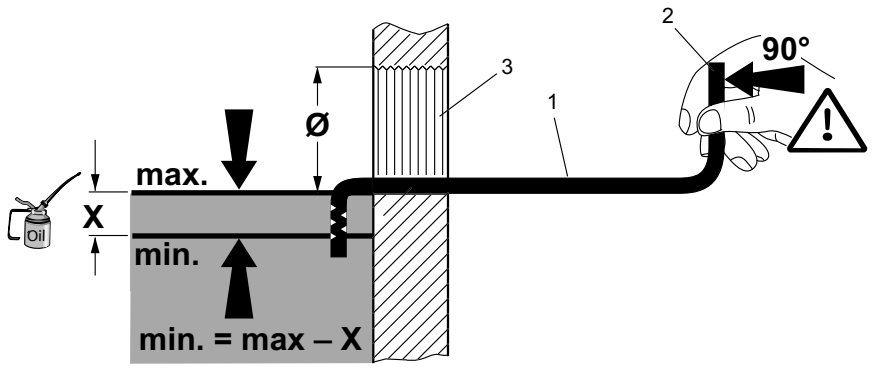
Proceed as follows:

✓ The prerequisites for inspection and maintenance work are fulfilled, see beginning of chapter "Inspection/maintenance" (→ 🗎 107).

1. Determine the position of the oil level plug and the breather valve using the mounting position sheets, see chapter "Mounting positions" (→ 🗎 136).
2. Place a container underneath the oil level plug.
3. Slowly remove the oil level plug. Small amounts of oil may leak out.
4. Check the fill level at the oil level bore (3) using the oil dipstick (1). The oil dipstick is enclosed with the operating instructions.

NOTICE

For the measurement, make sure that the end (2) of the oil dipstick (1) always points up vertically.



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Max. fill level (max.): Lower edge of the oil level bore

Minimum fill level (min.): The minimum fill level depends on the diameter of the oil level bore and is determined using the oil dipstick.

The minimum fill level corresponds to the mark on the oil dipstick.

Ø oil level bore	Minimum fill level: Mark X at the oil dipstick (see following figure) mm
M10 × 1	1.5
M12 × 1.5	2
M22 × 1.5	3

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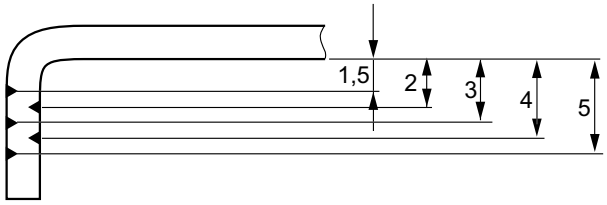
Ø oil level bore	Minimum fill level: Mark X at the oil dipstick (see following figure) mm
M33 × 2	4
M42 × 2	5



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5. If the oil level is too low, remove the breather valve and refill oil of the same type (if necessary, contact SEW-EURODRIVE) through the vent hole.
6. Re-insert the breather valve and the oil level plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).

Checking the oil via the oil drain plug

Proceed as follows to check the gear unit oil:

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 107).
2. Determine the position of the oil drain plug using the mounting position sheets. See chapter "Mounting positions" (→ 🗎 136).
3. Remove a little oil from the oil drain plug.
4. Check the oil consistency:
   - Viscosity
   - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 🗎 111).
5. Check the oil level. See chapter "Checking the oil level at the oil level plug" (→ 🗎 120).

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

⚠ WARNING

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

Serious injuries.

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

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 107).

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" (→ 🗎 136).
3. Place a container underneath the oil drain plug.
4. Remove the oil level plug, the breather valve and the oil drain plug.
5. Drain all the oil.
6. Re-insert the oil drain plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).
7. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the breather bore. Do not mix different synthetic lubricants!
   - Fill the oil according to the quantity specified on the nameplate. See chapter "Lubricant fill quantities" (→ 🗎 188).
   - Check the oil level at the oil level plug.
8. Re-insert the oil level plug and the breather valve. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).

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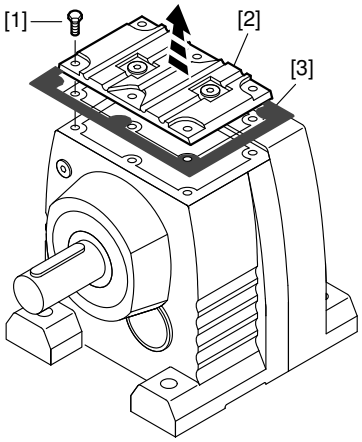
6.8.3 B: Helical, parallel shaft helical, SPIROPLAN® gear units without oil level plug with cover plate

Checking the oil level via the cover plate

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

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 107).
2. To position the cover plate on the top, place the gear unit in the following mounting position:
   - R07 – R57 in mounting position M1
   - F27 in M3 mounting position
   - W10 – W30 in mounting position M1
3. Loosen the screws [1] of the cover plate [2] and remove the cover plate [2] and the corresponding gasket [3] (see following figure).



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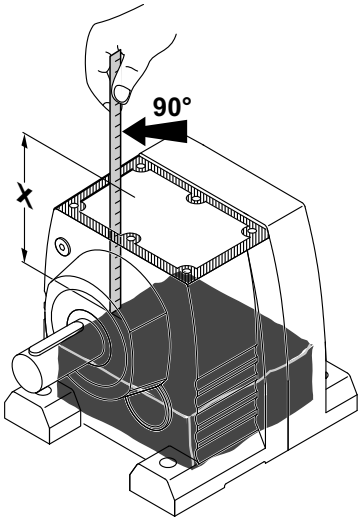
4. Determine the vertical distance "x" between oil level and sealing surface of the gear unit housing (see following figure).



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

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

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

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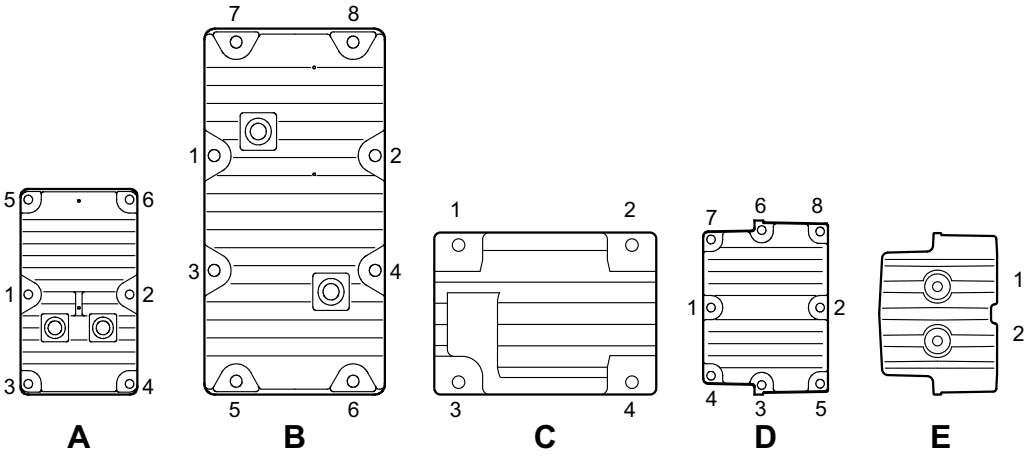

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Gear unit type	Image	Retaining thread	Tightening torque T_N Nm	Minimum tightening torque T_{min} Nm
R/RF07/17	E	M6	11	7
R/RF27	D			
R/RF47/57	A			
F27	B			
W10	C	M5	6	4
W20	C	M6	11	7
W30	A			

Checking the oil via cover plate

Proceed as follows to check the gear unit oil:

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 107).
2. Open the cover plate of the gear unit according to chapter "Checking the oil level via the cover plate" (→ 🗎 123).
3. Take an oil sample via the cover plate opening.
4. Check the oil consistency.
   - Viscosity
   - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 🗎 118).
5. Check the oil level. See chapter "Checking the oil level via the cover plate" (→ 🗎 123).
6. Screw on the cover plate. Observe the sequence and tightening torques in chapter "Checking the oil level via the cover plate" (→ 🗎 123).

Changing the oil via the cover plate

⚠ WARNING

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

Serious injuries.

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

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 107).
2. Open the cover plate of the gear unit according to chapter "Checking the oil level via the cover plate" (→ 🗎 123).
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 as specified on the nameplate or the order confirmation. See chapter "Lubricant fill quantities" (→ 🗎 188).
5. Check the oil level.
6. Screw on the cover plate. Observe the sequence and tightening torques in chapter "Checking the oil level via the cover plate" (→ 🗎 123).

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

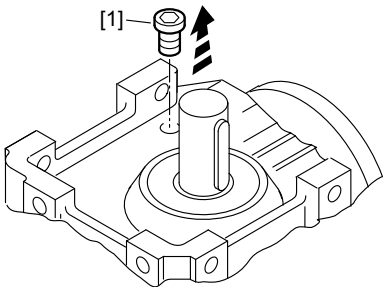
Checking the oil level via screw plug

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

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 107).
2. Place the gear unit in the mounting position stated in the following table. Thus the control bore always points upwards.

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

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



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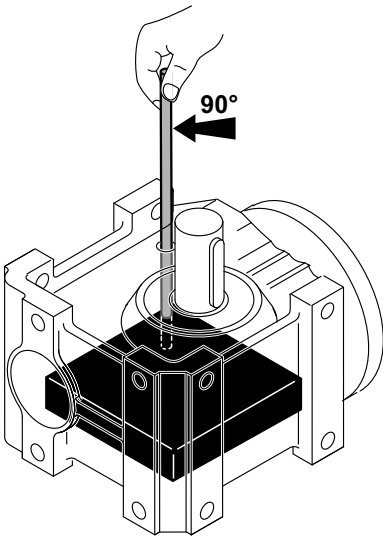
4. Insert the dipstick vertically via the control bore all the way to the bottom of the gear unit housing. Vertically pull the dipstick out of the control bore, as shown in the following figure.



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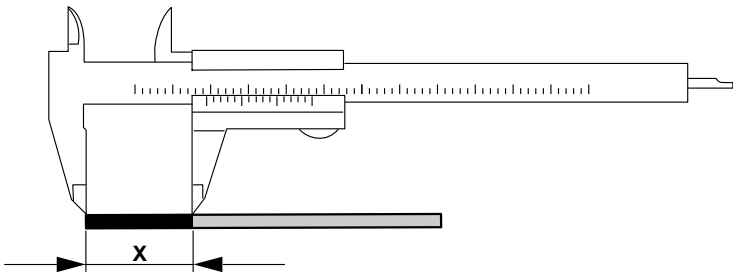
5. Determine the size of the section "x" of the dipstick covered with lubricant using a slide-gauge as depicted in the following figure.



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

Gear unit type	Oil level = wetted section "x" 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. Re-insert and tighten the screw plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).

Checking the oil via the screw plug

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 107).
2. Open the screw plug of the gear unit according to chapter "Checking the oil level via screw plug" (→ 🗎 127).
3. Take an oil sample via the screw plug bore.
4. Check the oil consistency.
   - Viscosity
   - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 🗎 111).
5. Check the oil level. See chapter "Checking the oil level via screw plug" (→ 🗎 127).
6. Re-insert and tighten the screw plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).

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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.

Serious injuries.

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

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 107).
2. Open the cover plate of the gear unit according to chapter "Checking the oil level via the screw plug".
3. Completely drain the oil via the screw plug bore.
4. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the control bore. You must not mix different synthetic lubricants.
   - Observe the oil quantity specified on the nameplate or according to the mounting position. Observe chapter "Lubricant fill quantities" (→ 🗎 188).
5. Check the oil level.
6. Re-insert and tighten the screw plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).

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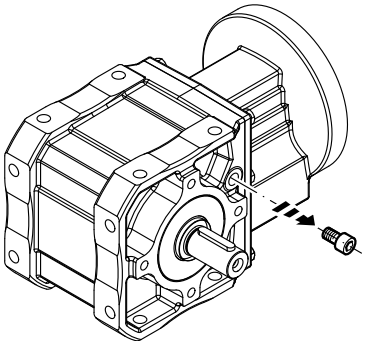
6.8.5 D: SPIROPLAN® W37/W47 in mounting positions M1, M2, M3, M5, M6 with oil level plug

Checking the oil level at the oil level plug

Proceed as follows:

✓ The prerequisites for inspection and maintenance work are fulfilled, see beginning of chapter "Inspection/maintenance" (→ 🗎 107).

1. Set up the gear unit in mounting position M1, see chapter "Mounting positions" (→ 🗎 136).
2. Place a container underneath the oil level plug.
3. Slowly remove the oil level plug. Small amounts of oil may leak out.



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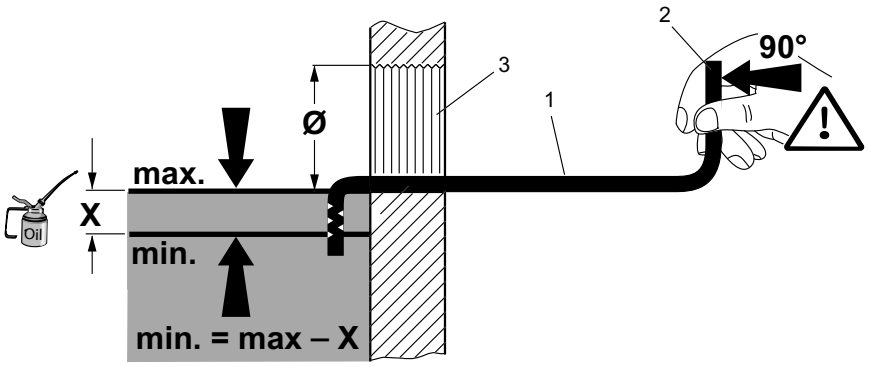
4. Check the fill level at the oil level bore (3) using the oil dipstick (1). The oil dipstick is enclosed with the operating instructions.

NOTICE

For the measurement, make sure that the end (2) of the oil dipstick (1) always points up vertically.



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Max. fill level (max.): Lower edge of the oil level bore

Minimum fill level (min.): The minimum fill level depends on the diameter of the oil level bore and is determined using the oil dipstick.

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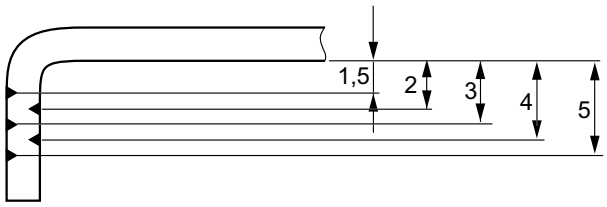
The minimum fill level corresponds to the mark on the oil dipstick.

Ø oil level bore	Minimum fill level: Mark X at the oil dipstick (see following figure) mm
M10 x 1	1.5



9007199273378699

5. If the oil level is too low, fill in new oil via the oil level bore until the oil level reaches the lower edge of the bore.
6. Screw in the oil level plug again. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).

Checking the oil level at the oil level plug

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

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 107).
2. Remove some oil at the oil level plug.
3. Check the oil consistency.
   - Viscosity
   - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 🗎 111).
4. Check the oil level. See previous chapter.

Changing the oil at the oil level plug

⚠ WARNING

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

Serious injuries.

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

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 107).
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 🗎 136).
3. Place a container underneath the oil level plug.
4. Remove the oil level plugs on the A- and B-side of the gear unit.
5. Drain all the oil.

6. Re-insert the lower oil level plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).
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" (→ 🗎 188).
   - Check the oil level according to chapter "Checking the oil level via oil level plug"
8. Re-insert the upper oil level plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).

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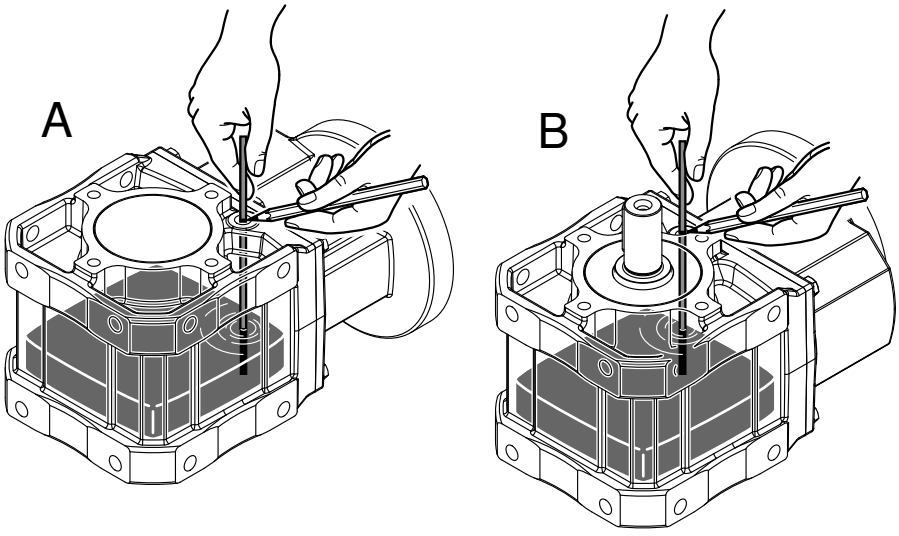
6.8.6 E: SPIROPLAN® W..37 / W..47 in mounting position M4 without oil level plug and cover plate

Checking the oil level via screw plug

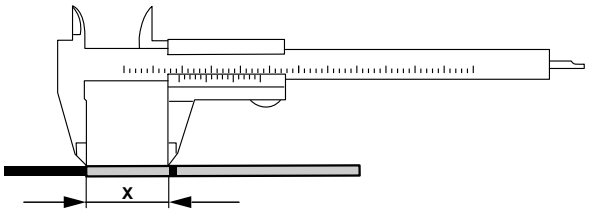
The W37 / W47 gear units are not equipped with an oil level plug or a cover plate. This is why the oil level is checked via the control bore.

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 107).
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 🗎 136).
3. Remove the screw plug.
4. Insert the dipstick vertically via the control bore all the way to the bottom of the gear unit housing. Mark the point on the dipstick where it exits the gear unit. Pull out the dipstick vertically (see following figure).



784447371

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



9007200039761803

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

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

7. Re-insert and tighten the screw plug. Observe for this the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).

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" (→ 🗎 107).
2. Remove a little oil at the oil screw plug.
3. Check the oil consistency:
   - Viscosity
   - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 🗎 111).
4. Check the oil level. See previous chapter.

Changing the oil via the screw plug

⚠ WARNING

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

Serious injuries.

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

1. Observe the information at the beginning of chapter "Inspection/maintenance" (→ 🗎 107).
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 🗎 136).
3. Place a container underneath the screw plug.
4. Remove the screw plugs on the A- and B-side of the gear unit.
5. Drain all the oil.
6. Re-insert the lower screw plug. Observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).
7. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the upper screw plug. You must not mix different synthetic lubricants.
   - Fill the oil according to the quantity specified on the nameplate. See chapter "Lubricant fill quantities" (→ 🗎 188).
   - Check the oil level according to chapter "Checking the oil level via oil level plug".
8. Re-insert the upper screw plug. Observe the tightening torques in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).

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6.8.7 Replacing the oil seal

NOTICE

Damage to oil seal when mounted below 0 °C.

Damage to oil seal.

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

Proceed as follows:

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

6.8.8 Painting gear units

SEW-EURODRIVE delivers the drives with a coating that complies with the requirements regarding the prevention of electrostatic charge according to EN/IEC 13463-1.

⚠ WARNING

Risk of explosion due to electrostatic charge and sparks caused by improper painting.

Severe or fatal injuries from explosion.

- If the motor is painted, observe the requirements for painting to avoid electrostatic charge according to EN 13463-1.

⚠ WARNING

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

Severe or fatal injuries.

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

6.8.9 Clean the gear unit

INFORMATION

When cleaning the gear unit, do not use materials or procedures (e.g. compressed air) that result in processes causing electrical charge on the coating.

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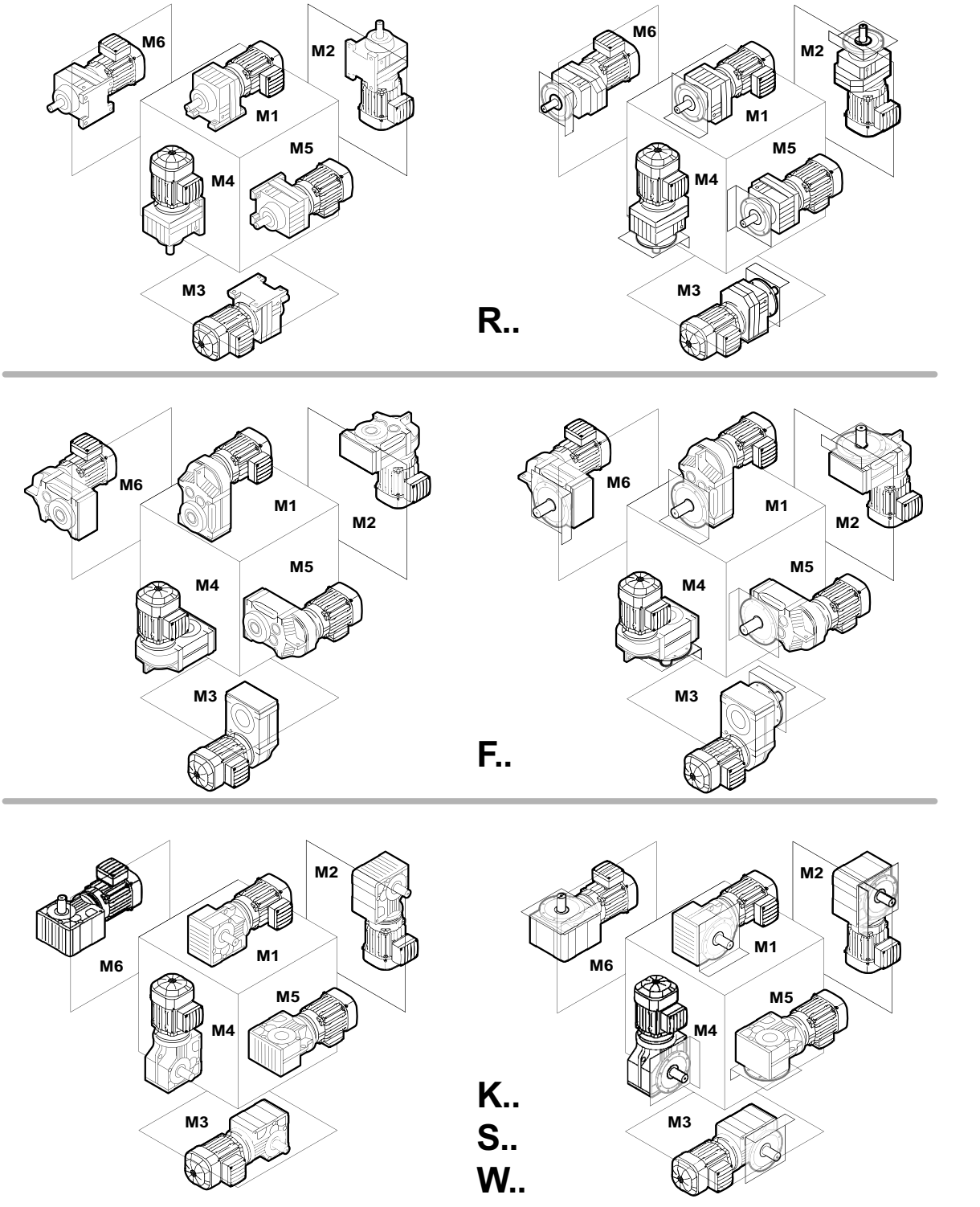
7 Mounting positions

7.1 Designation of the mounting positions

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

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

If one or both requirements are met, determine the requirements of the application and the corresponding operating conditions (see chapter "Data for calculating the thermal rating" (→ 🗎 137)) and contact SEW-EURODRIVE. SEW-EURODRIVE can calculate the thermal rating based on the actual operating conditions. The thermal rating of the gear unit can be increased by appropriate measure e.g. by using a synthetic lubricant with higher thermal endurance properties.

INFORMATION

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

7.2.1 Data for calculating the thermal rating

The following information is required for calculating the thermal rating:

Gear unit type and design:

- Gear unit ratio i
- Mean input speed $\overline{n}_{Mot}$ or mean output speed $\overline{n}_{G}$ in min^{-1}
- Effective motor torque M_{Mot_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
- In small, closed rooms or in large rooms (halls) or outdoors

Installation on site:

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

7.3 Change of mounting position

INFORMATION

Do not change the mounting position without prior consultation with SEW-EURODRIVE.

The information on the nameplate is binding. The ATEX EU declaration of conformity and the guarantee no longer apply if the mounting position is changed without prior consultation with SEW-EURODRIVE. Changes to the mounting position must be projected and indicated on the nameplate.

Adjust the lubricant fill quantities and the position of the breather valve accordingly in the event of a change of mounting position.

7.4 Universal mounting position M0

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

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

7.5 Mounting position MX

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

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

For mounting position MX, the gear units are delivered with the maximally possible amount of oil and sealed with oil screw plugs. A breather valve is included with each drive. The oil fill volume must be adapted according to the mounting position of the gear unit (see chapter "Lubricant fill quantities" (→ 🗎 188)). Customers will also have to mount the enclosed breather valve at the proper location depending on the mounting position, see chapter "Mounting position sheets" (→ 🗎 139). For screwing in the breather valve, observe the corresponding tightening torque in chapter "Tightening torques for oil level plugs, oil drain plugs, screw plugs, breather valves and oil sight glasses" (→ 🗎 38).

Check for the correct oil level before startup, as described in chapter "Checking the oil level and changing the oil" (→ 🗎 118).

7.5.1 Compound gear units in MX mounting position

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

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7.6 Mounting position sheets

7.6.1 Key to the mounting position sheets

INFORMATION

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

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

INFORMATION

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

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

INFORMATION

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

INFORMATION

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

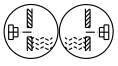
SPIROPLAN® gearmotors W..37 and W..47 are equipped with breather valves in mounting position M4 and with oil drain plugs in mounting position M2.

INFORMATION

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

Symbols used

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

Icon	Meaning
	Breather valve
	Oil level plug [1]
	Oil drain plug

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

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Displayed shaft

Observe the following information regarding the illustrations on the mounting position sheets:

INFORMATION

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

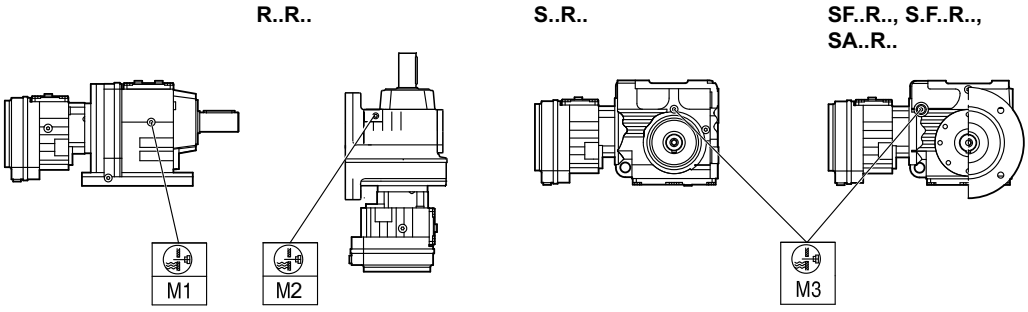
For shaft-mounted gear units: The shaft with dashed lines represents the customer shaft. The output end (= shaft position) is always shown on the A-side.

7.6.2 Position of the oil level plug of compound gear units

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

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

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



Icon	Meaning
	Oil level plug

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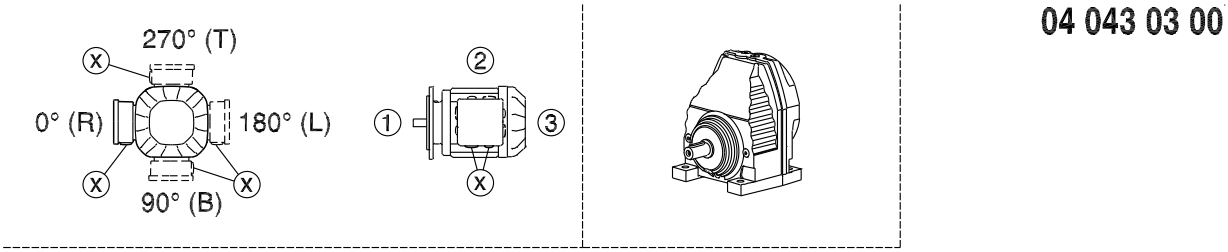
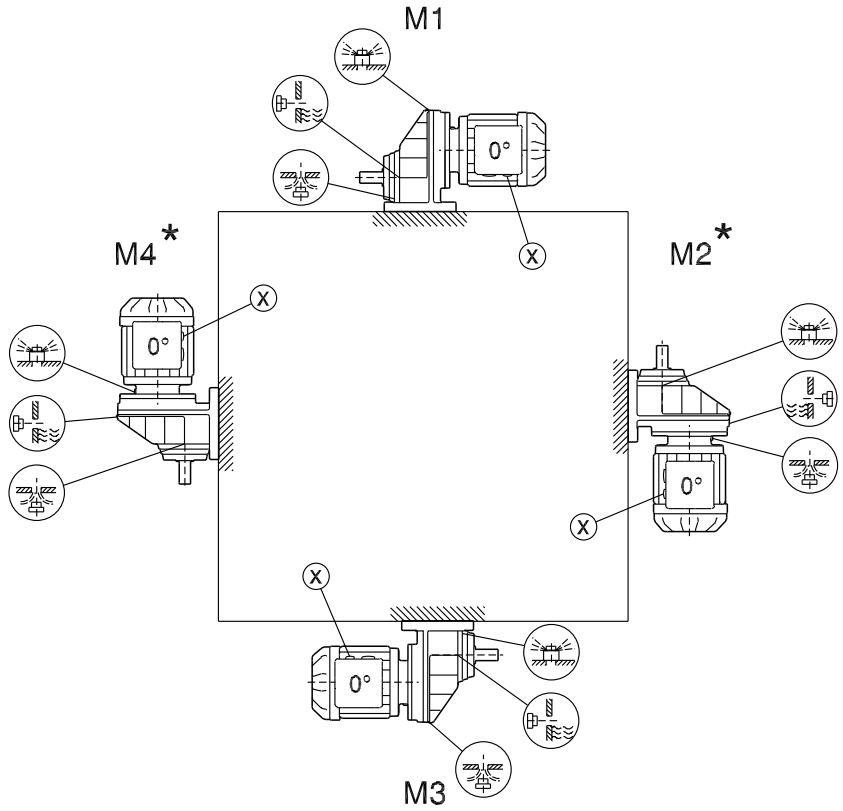
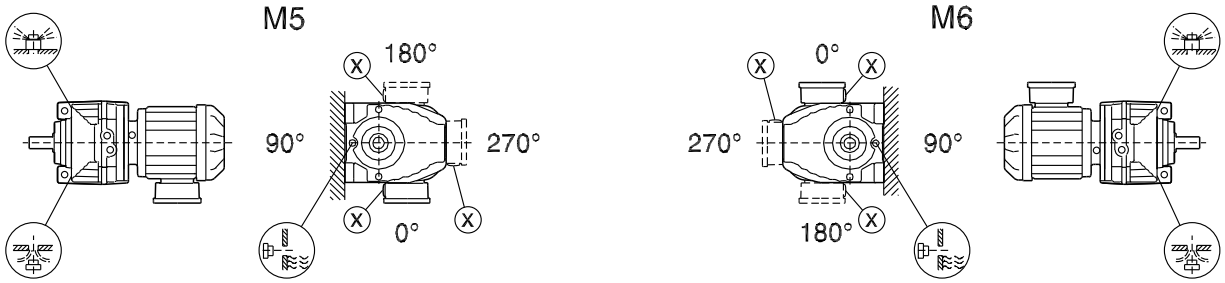
7.6.3 Mounting positions of helical gearmotors

RX57-RX107







* (→ 🗎 137)

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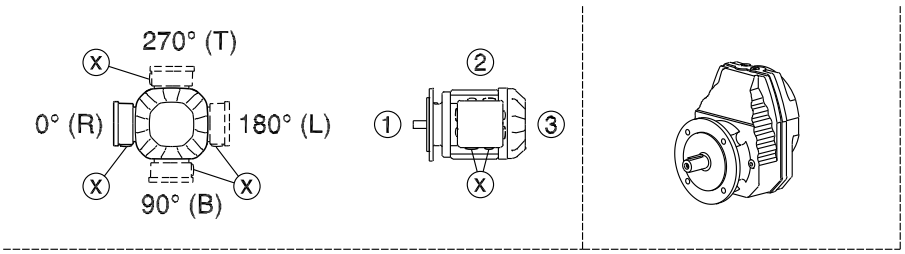
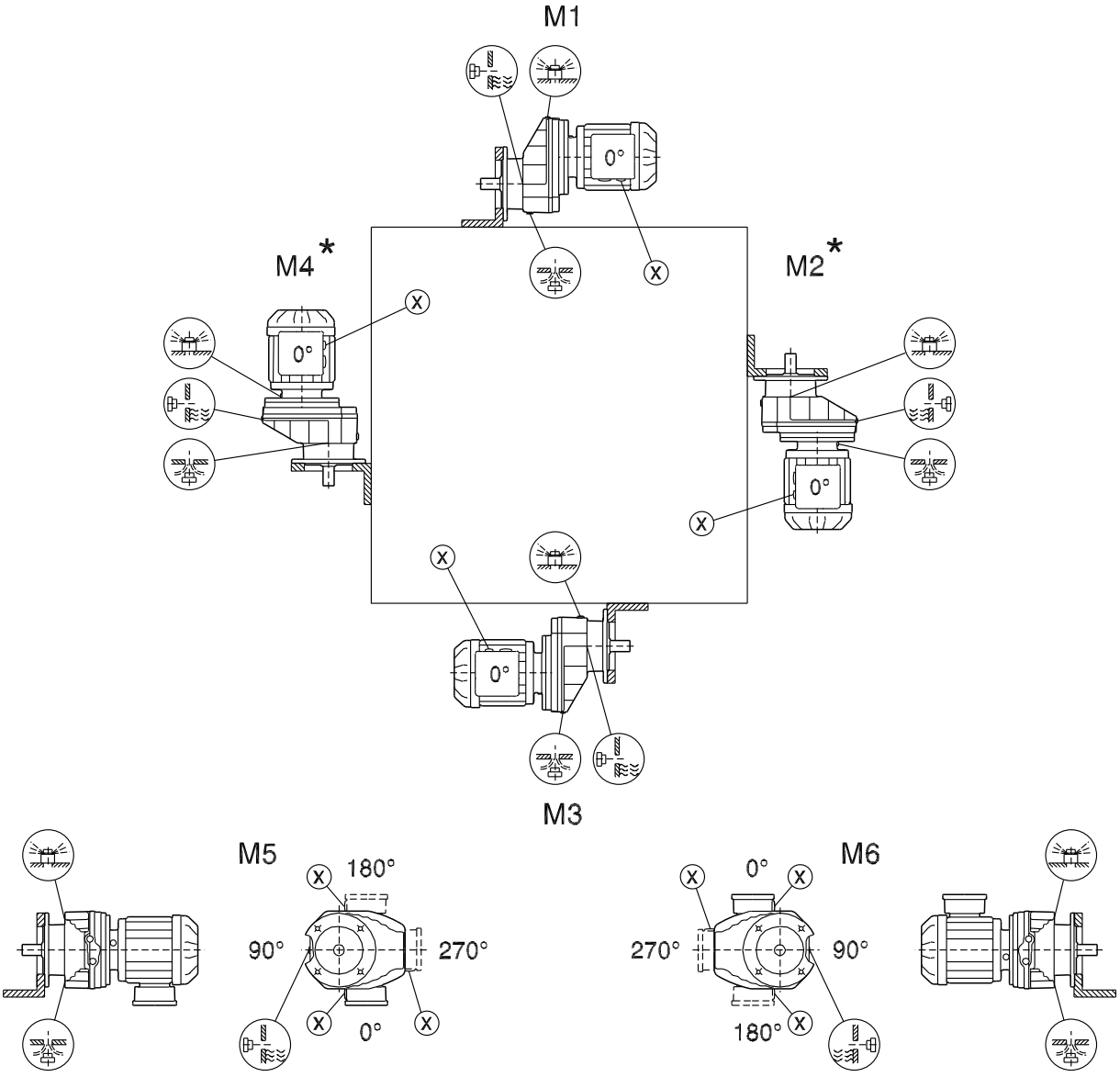
RXF57-RXF107

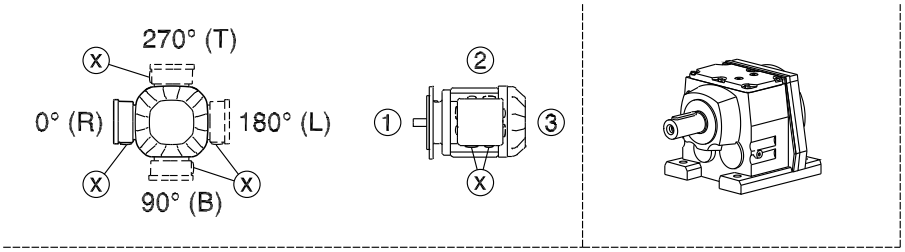


04 044 03 00

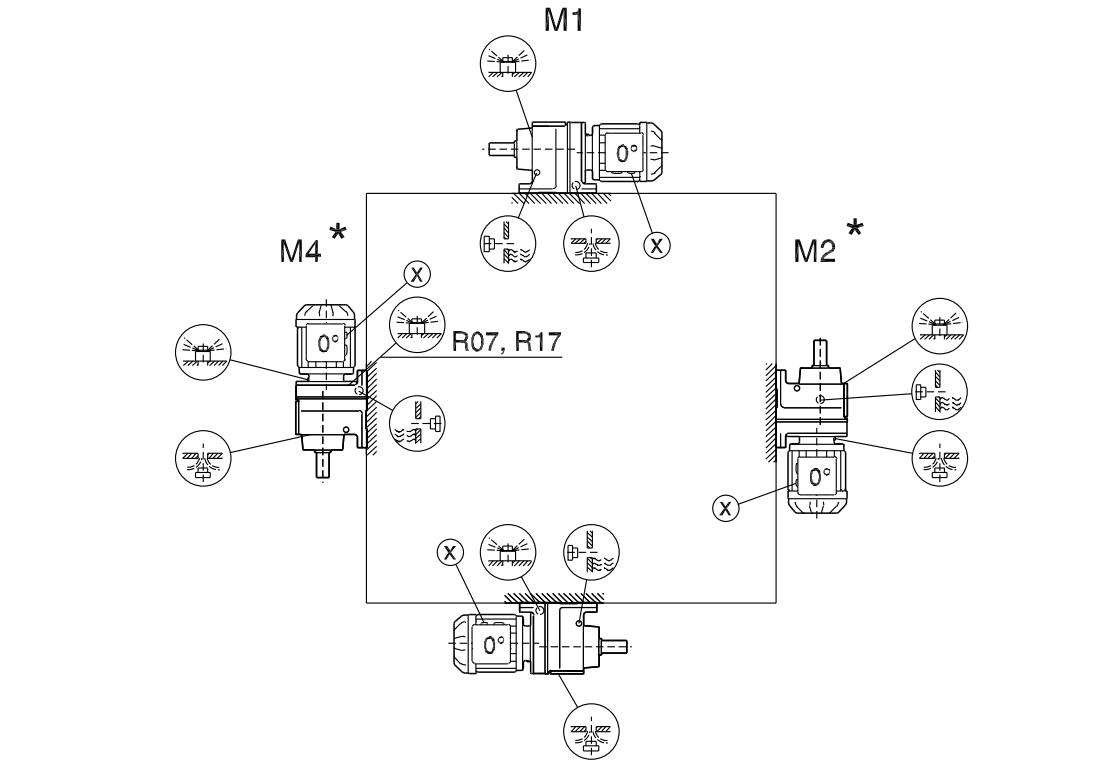


* (→ 🗎 137)

R07-R167



04 040 04 00



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

* (→ 🗎 137)

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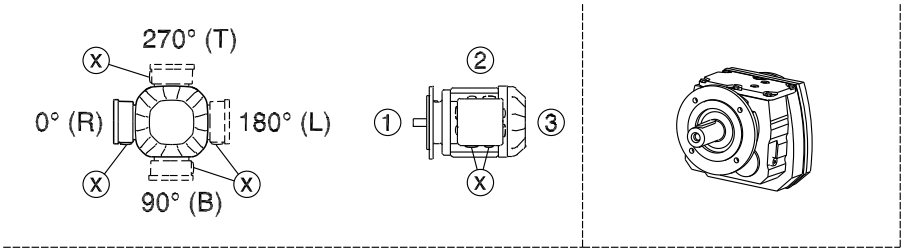
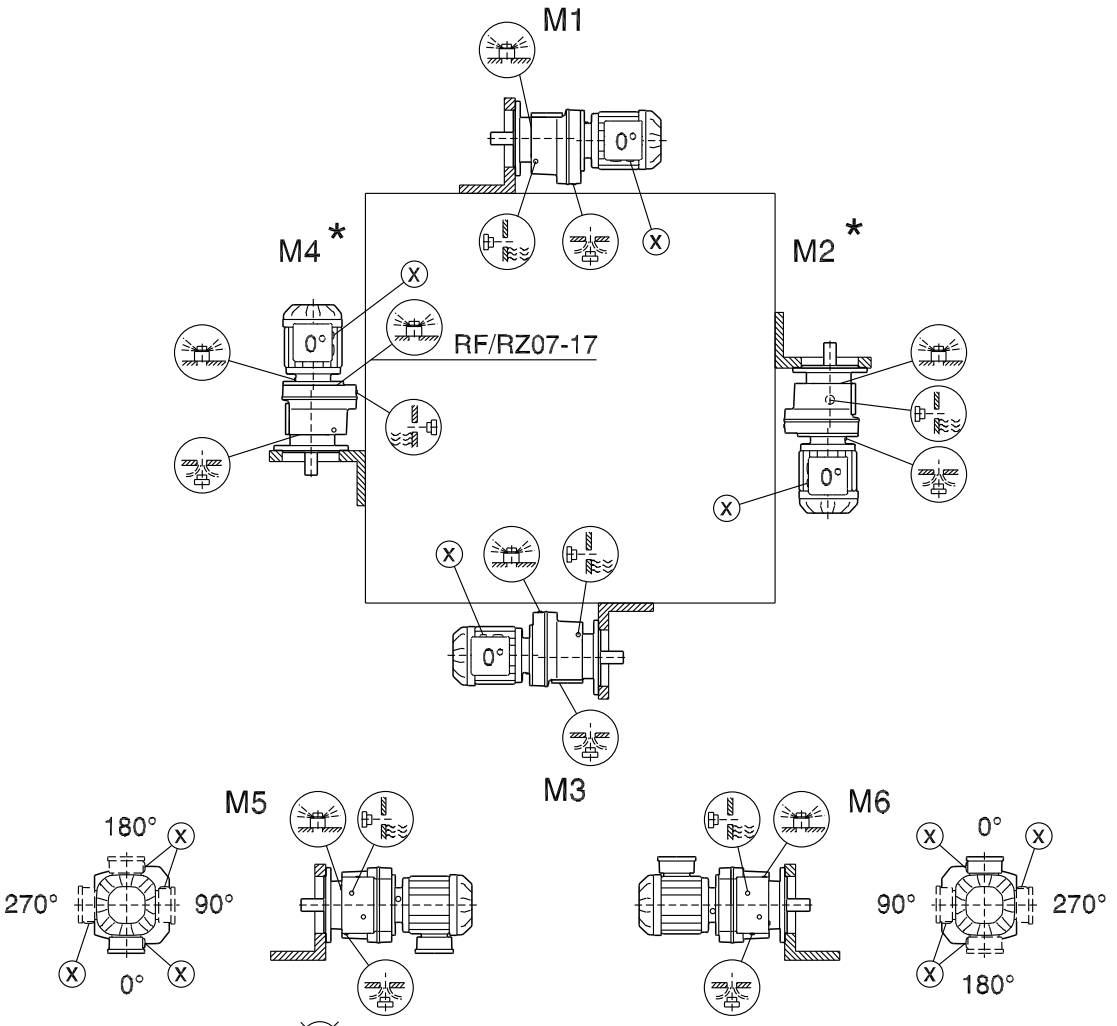
RF07-RF167, RZ07-RZ87

04 041 04 00





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

* (→ 137)

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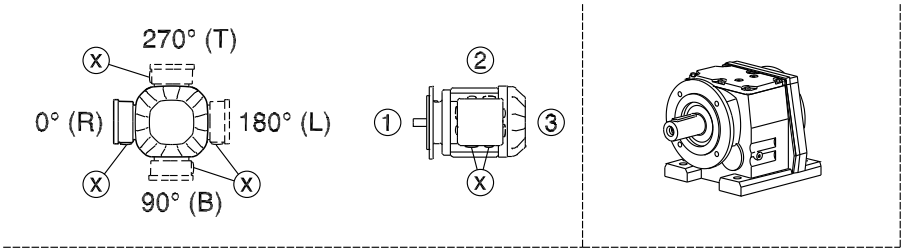
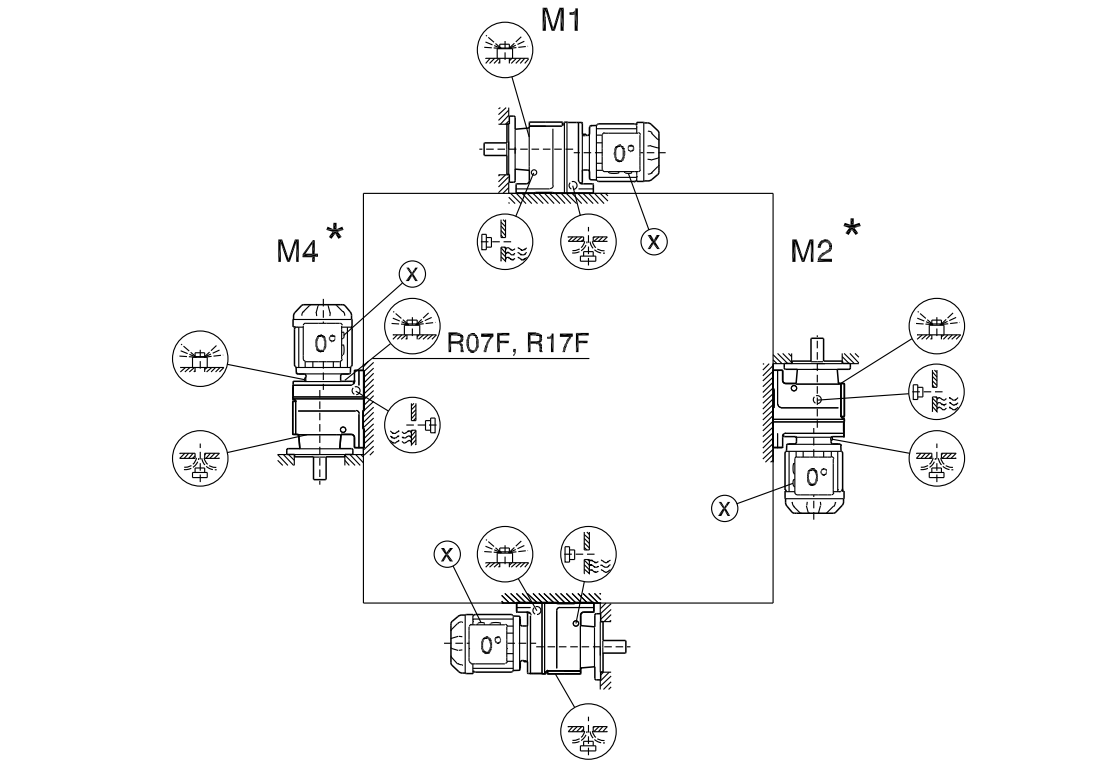
R07F-R87F



04 042 04 00



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

* (→ 🗎 137)

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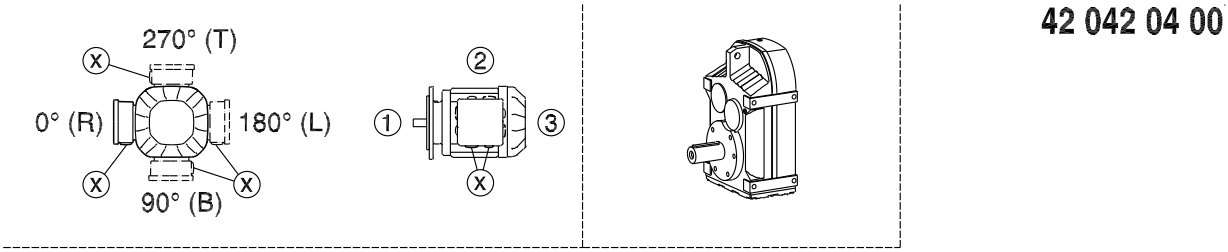
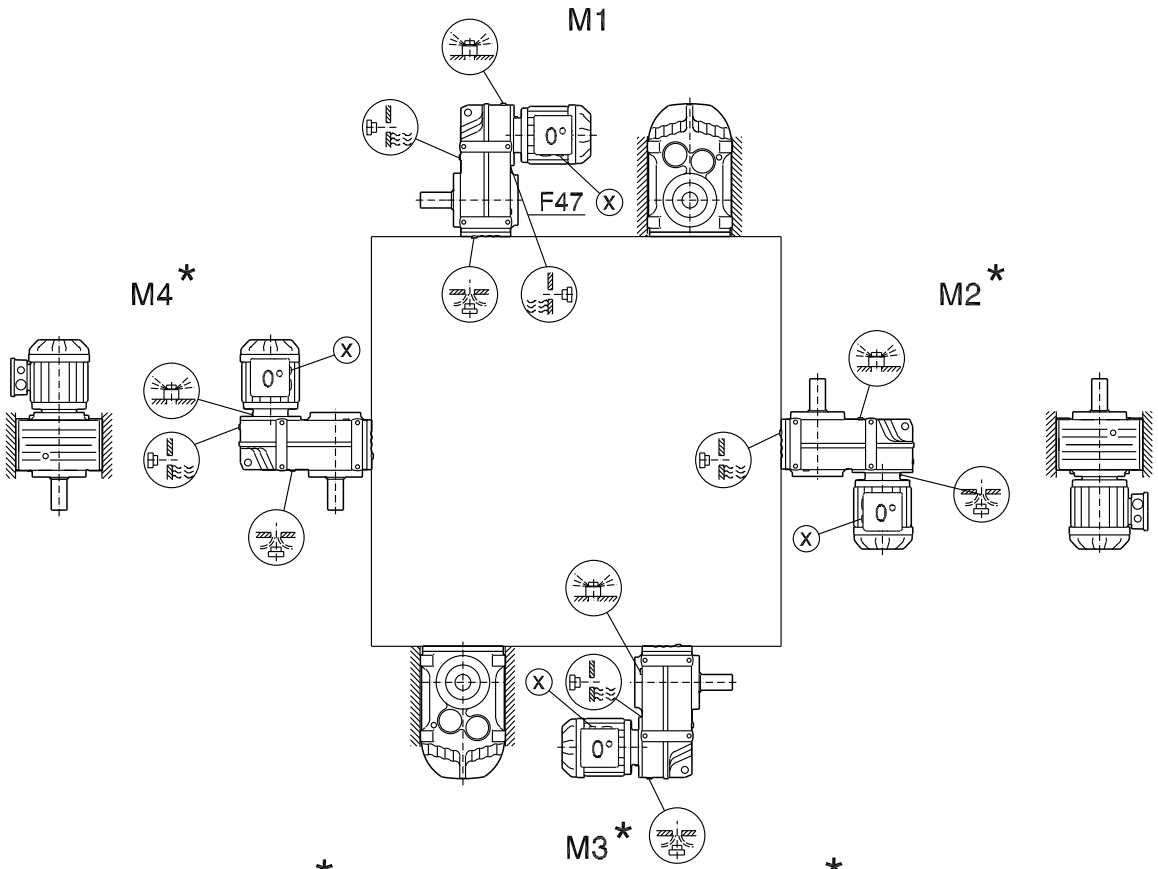
7.6.4 Mounting positions of parallel-shaft helical gearmotors

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





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

* (→ 🗎 137)

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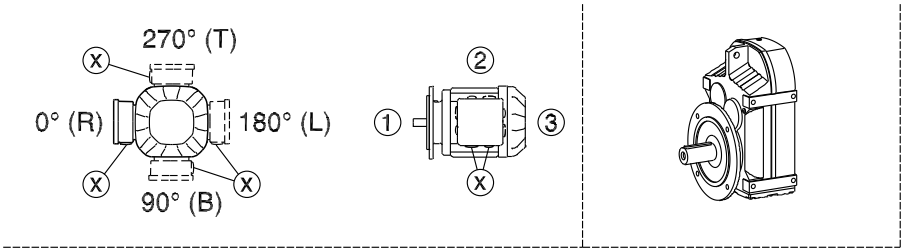
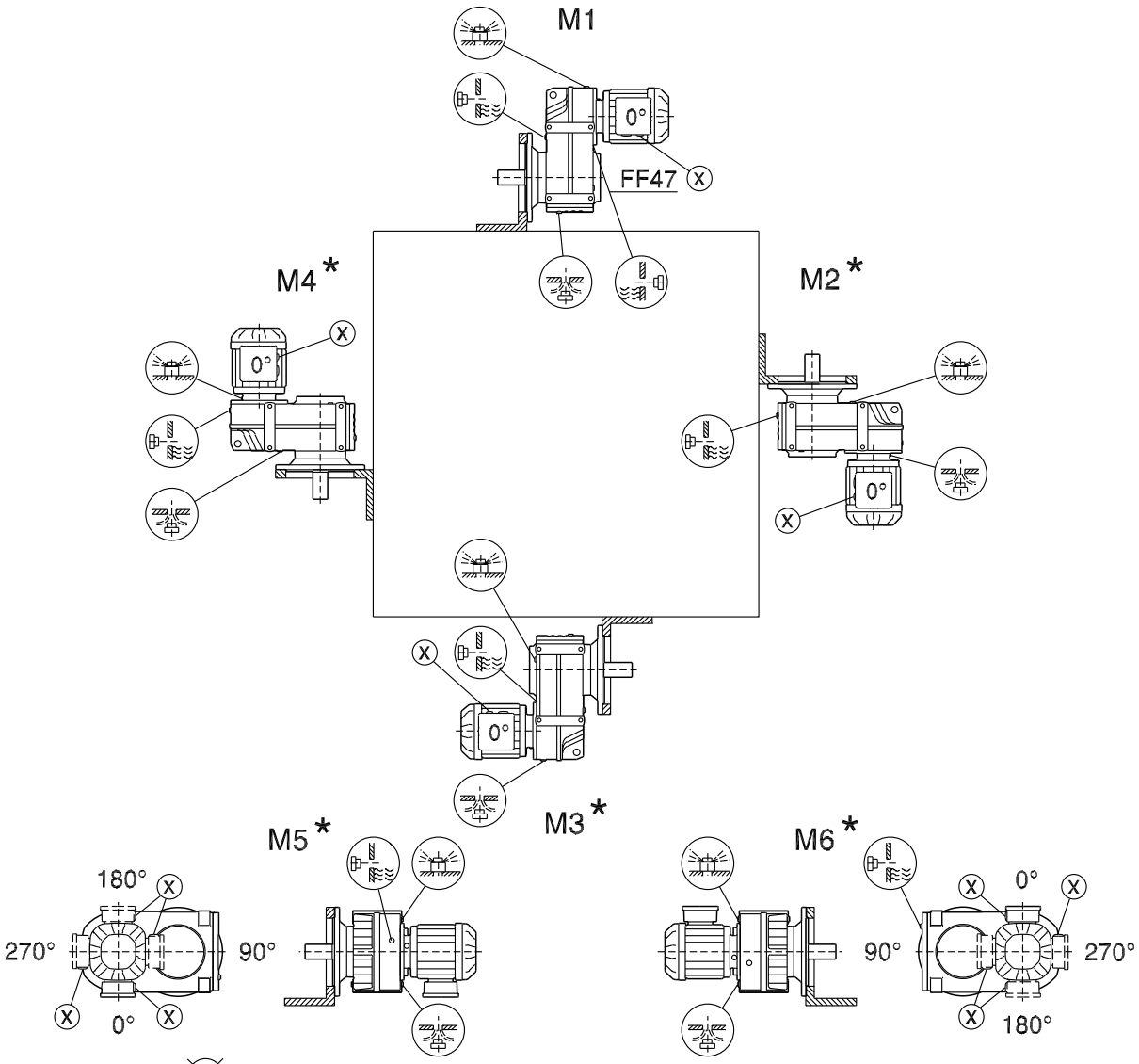
FF/FAF/FHF/FZ/FAZ/FHZ27-157, FVF/FVZ27-107, FM/FAM67-157

42 043 04 00





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

* (→ 137)

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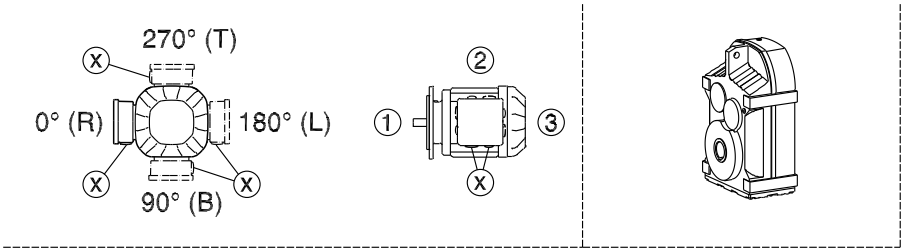
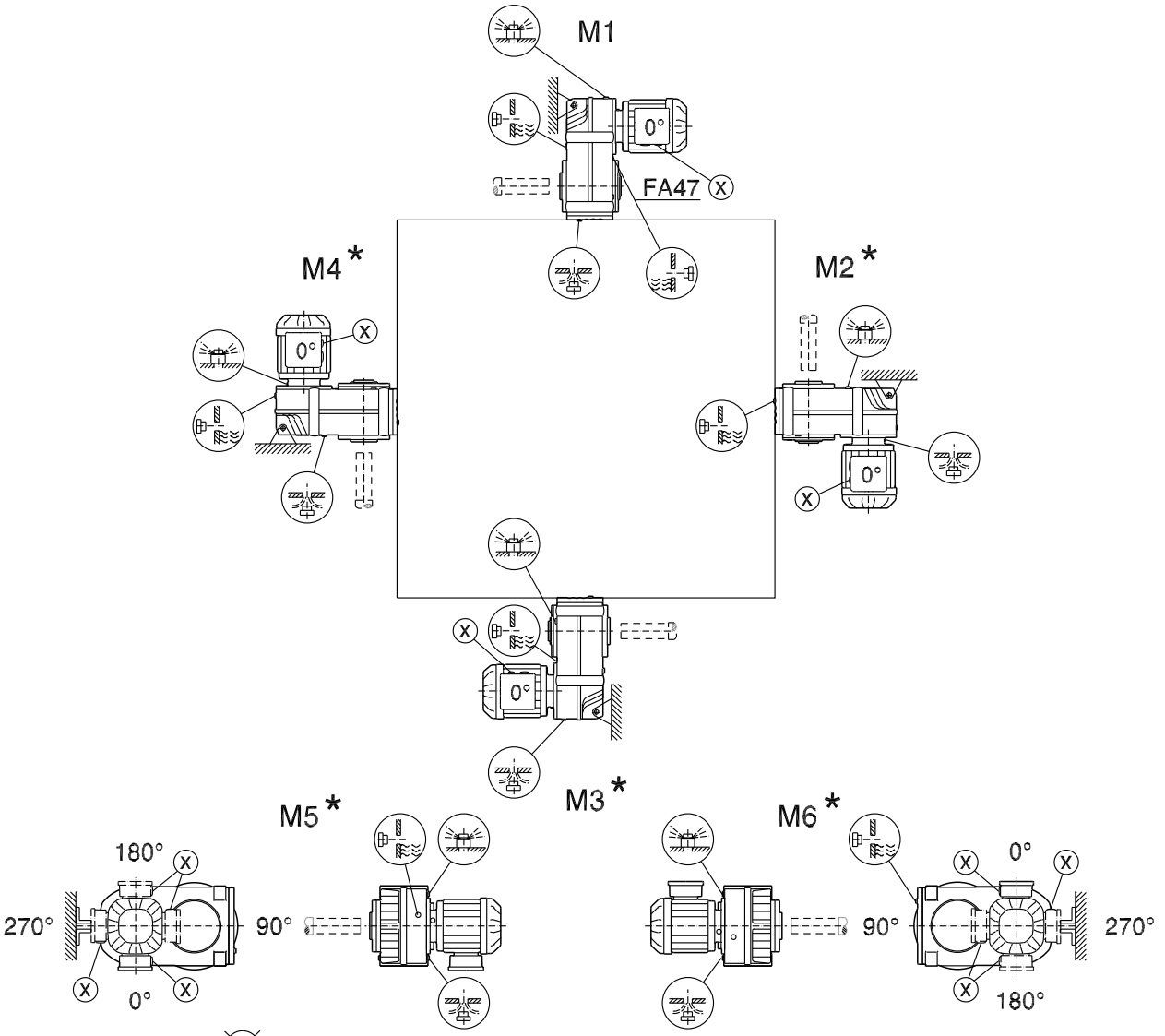
FA/FH27-157, FV27-107, FT37-97

42 044 04 00





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

* (→ 🗎 137)

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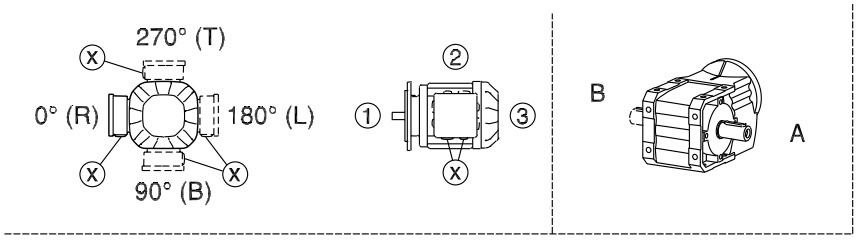
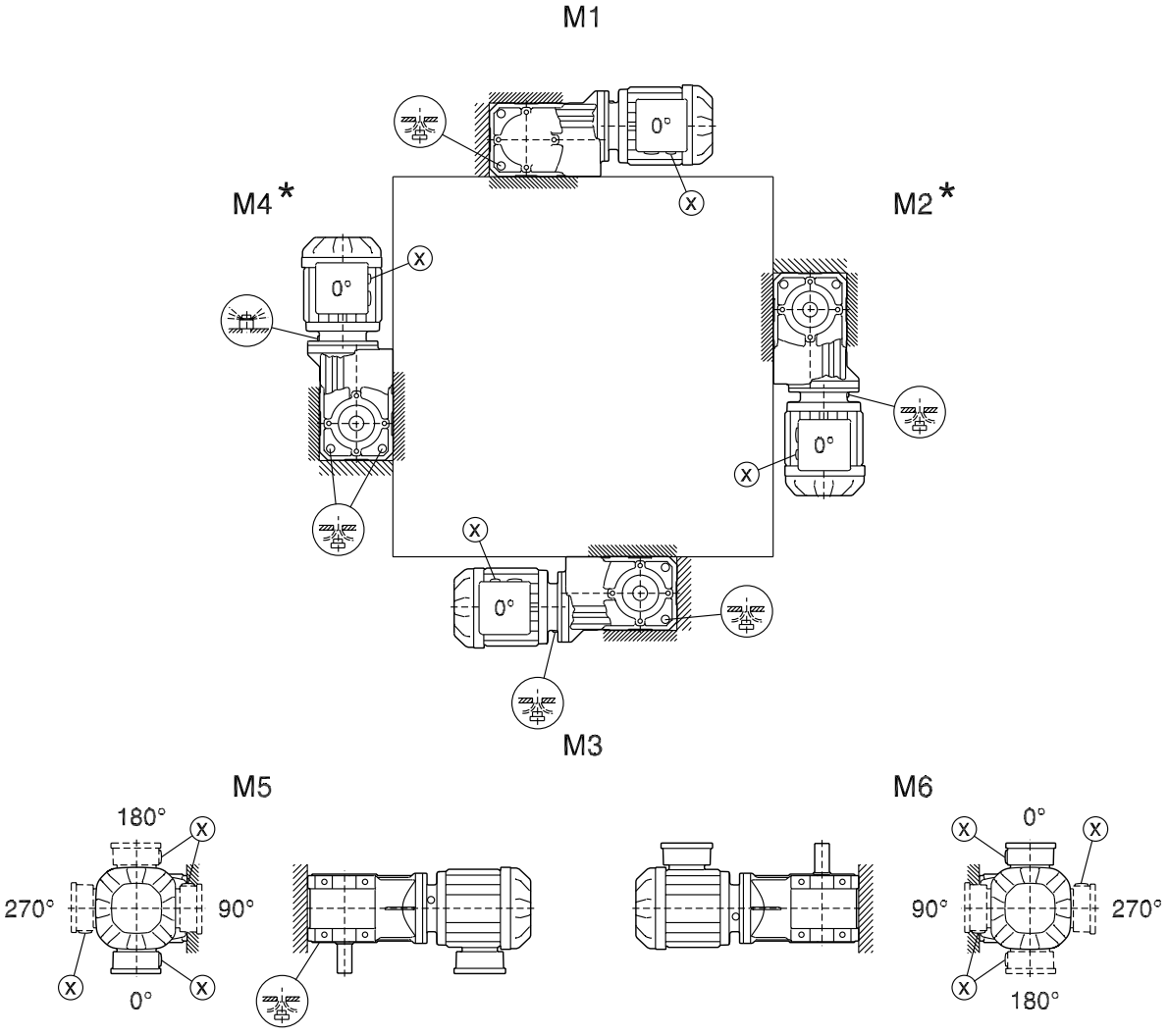
7.6.5 Mounting positions of helical-bevel gearmotors

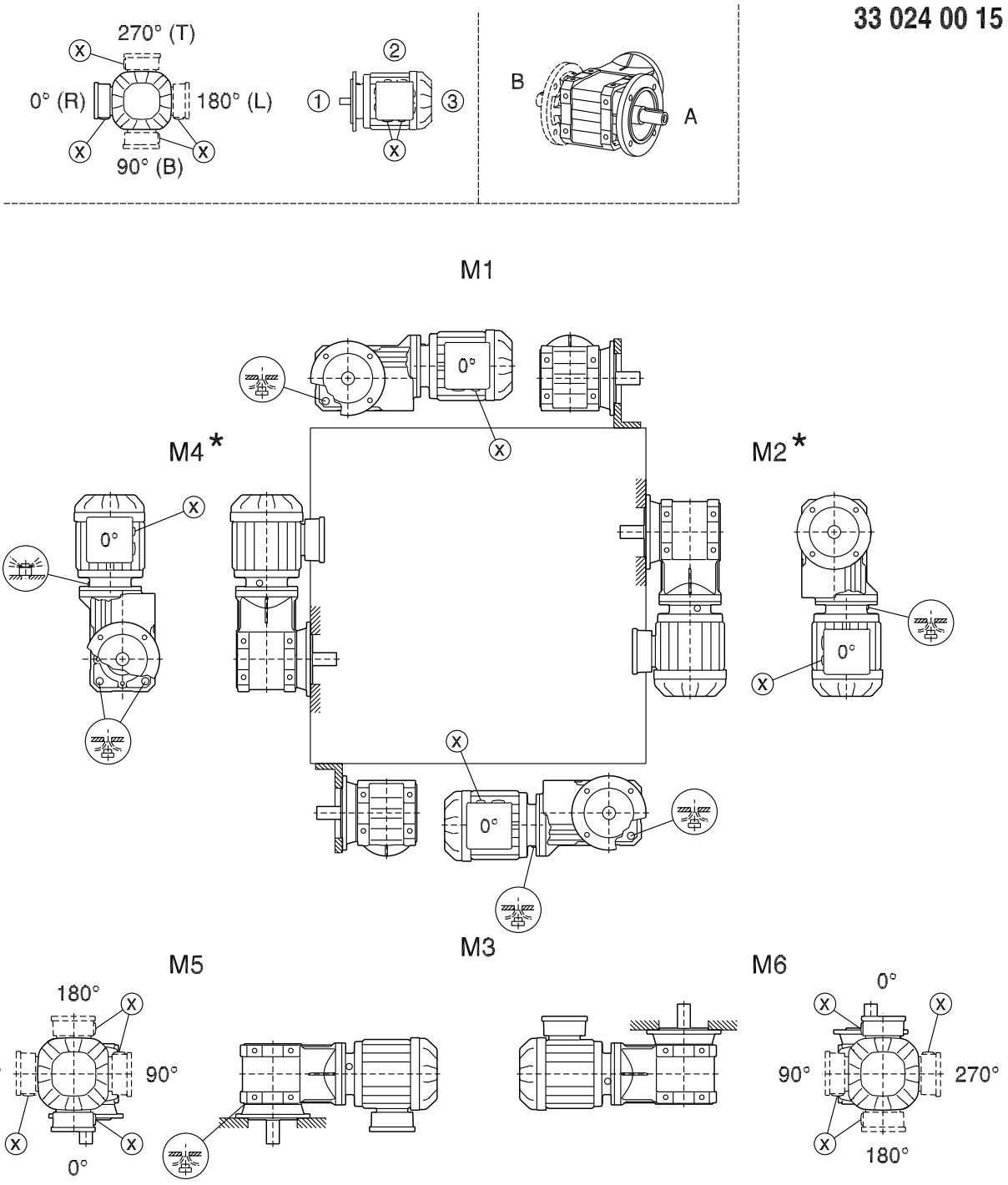
K/KA..B/KH19B-29B





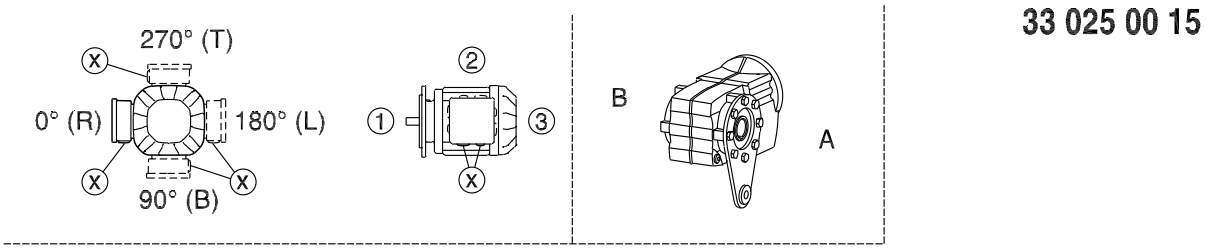
* (→ 🗎 137)

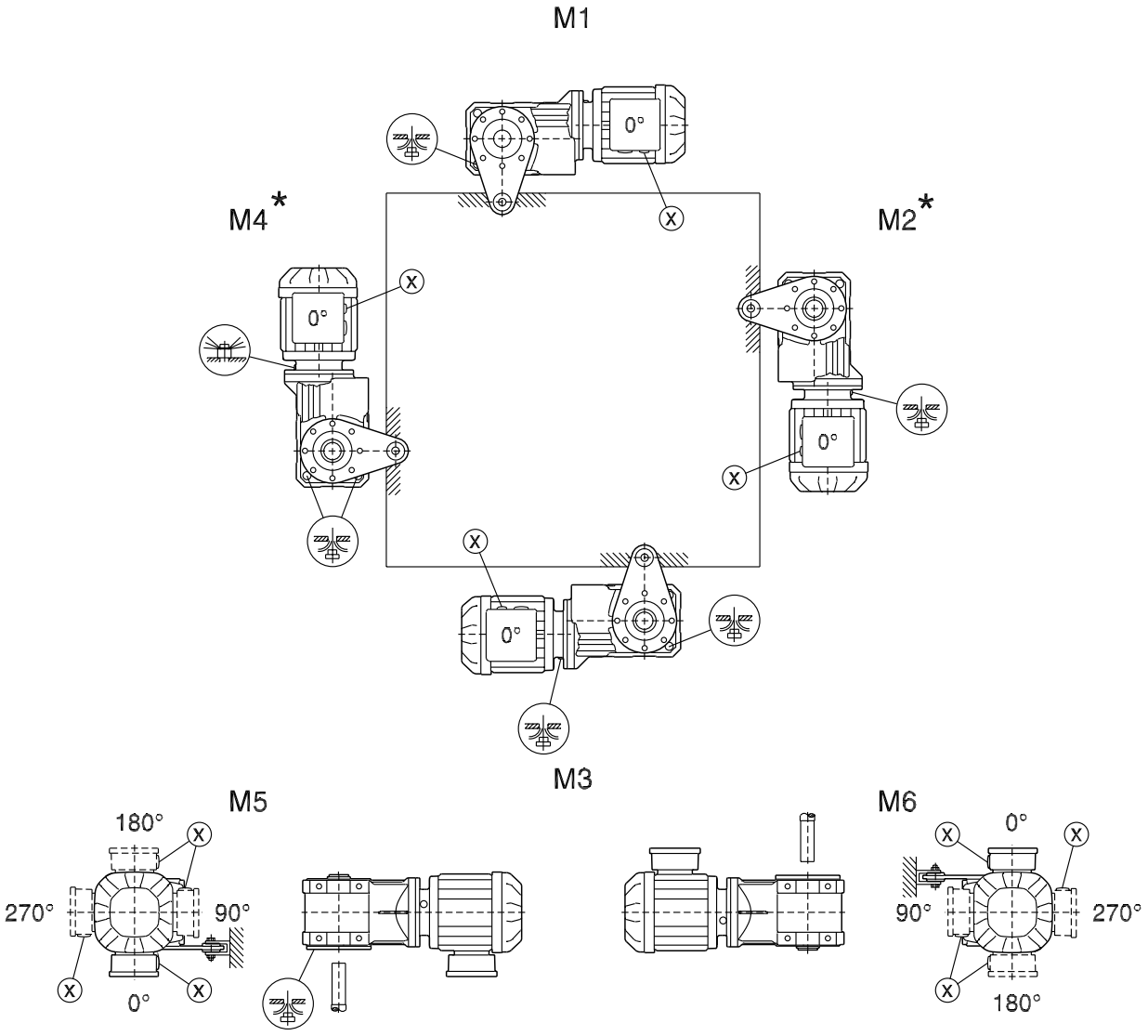
KF..B/KAF..B/KHF19B-29B



* (→ 137)

KA..B/KH19B-29B





* (→ 137)

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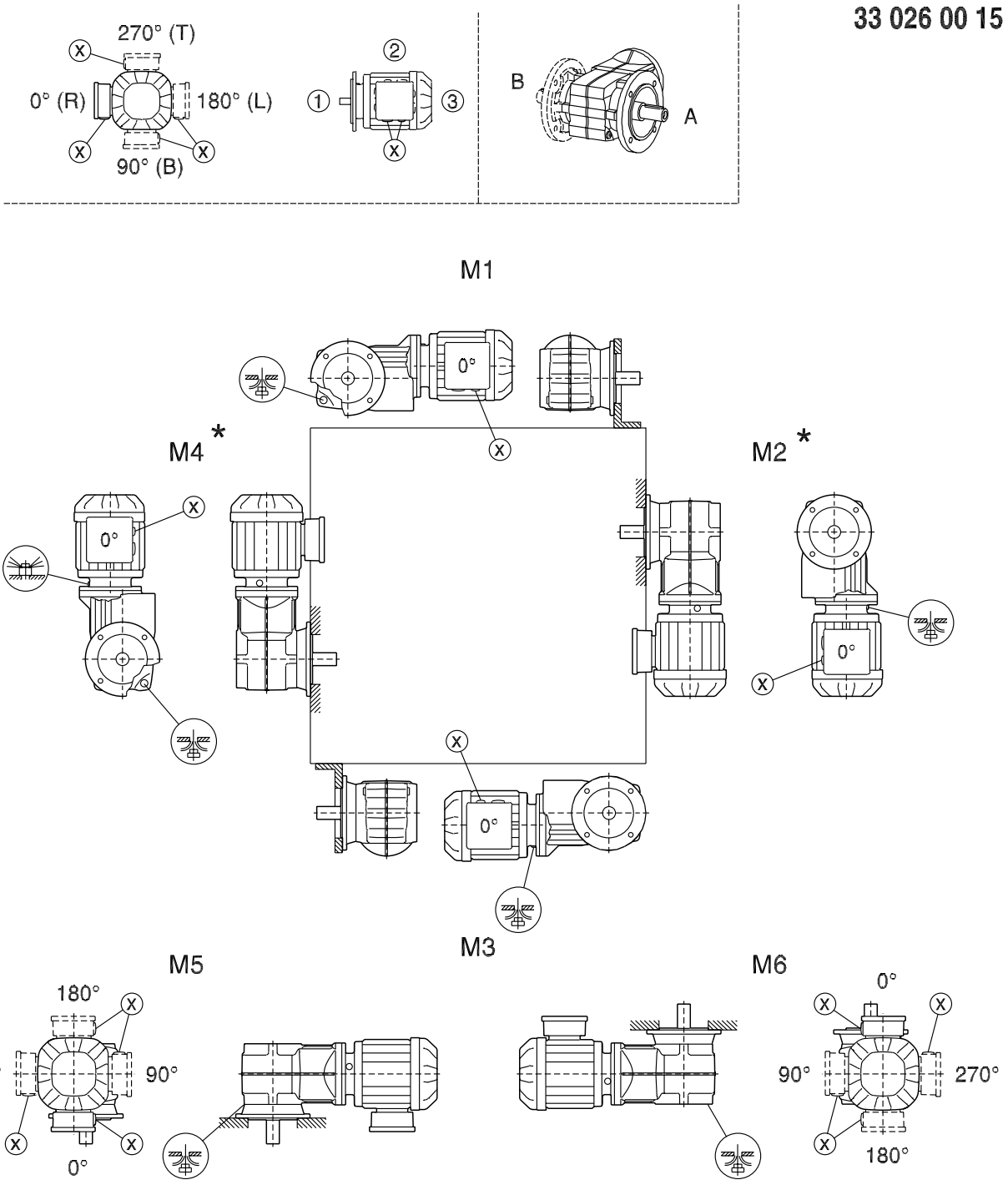
KF/KAF/KHF19-29



* (→ 🖹 137)

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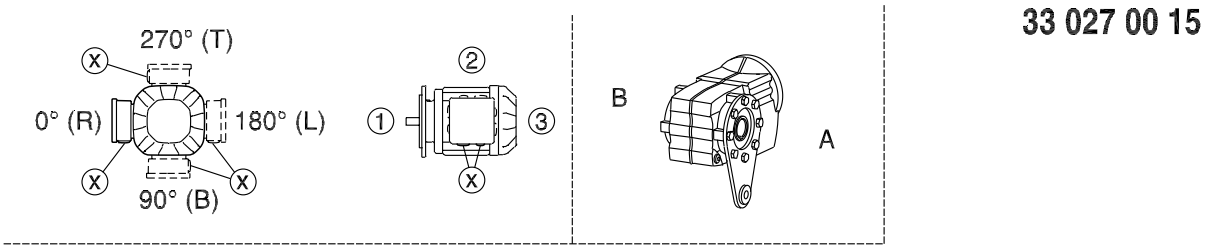
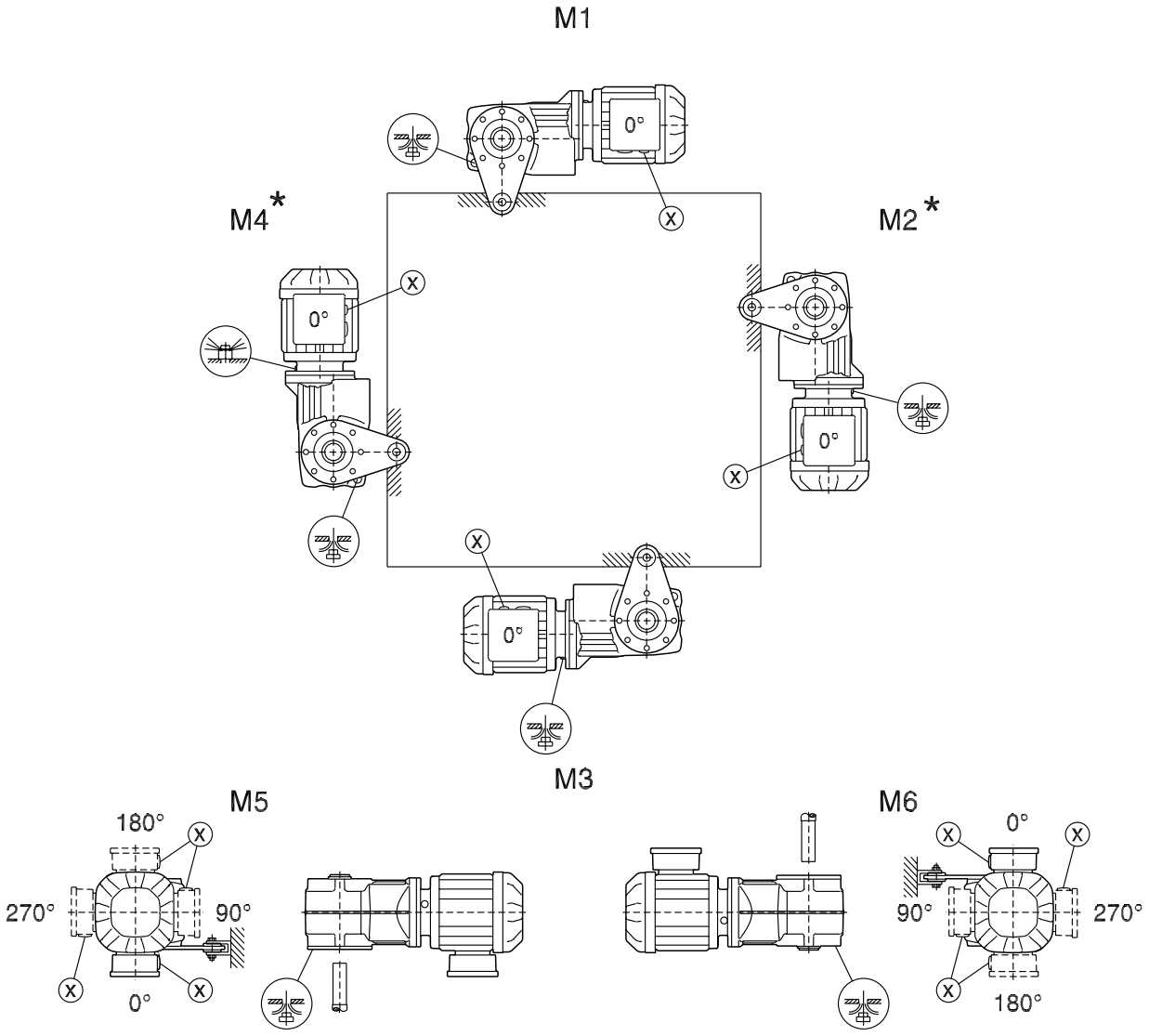
KA/KH19-29





* (→ 137)

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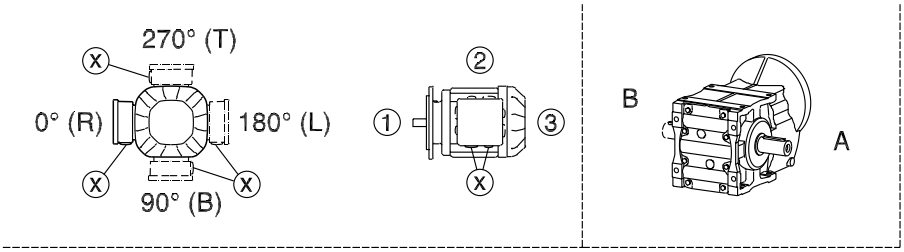
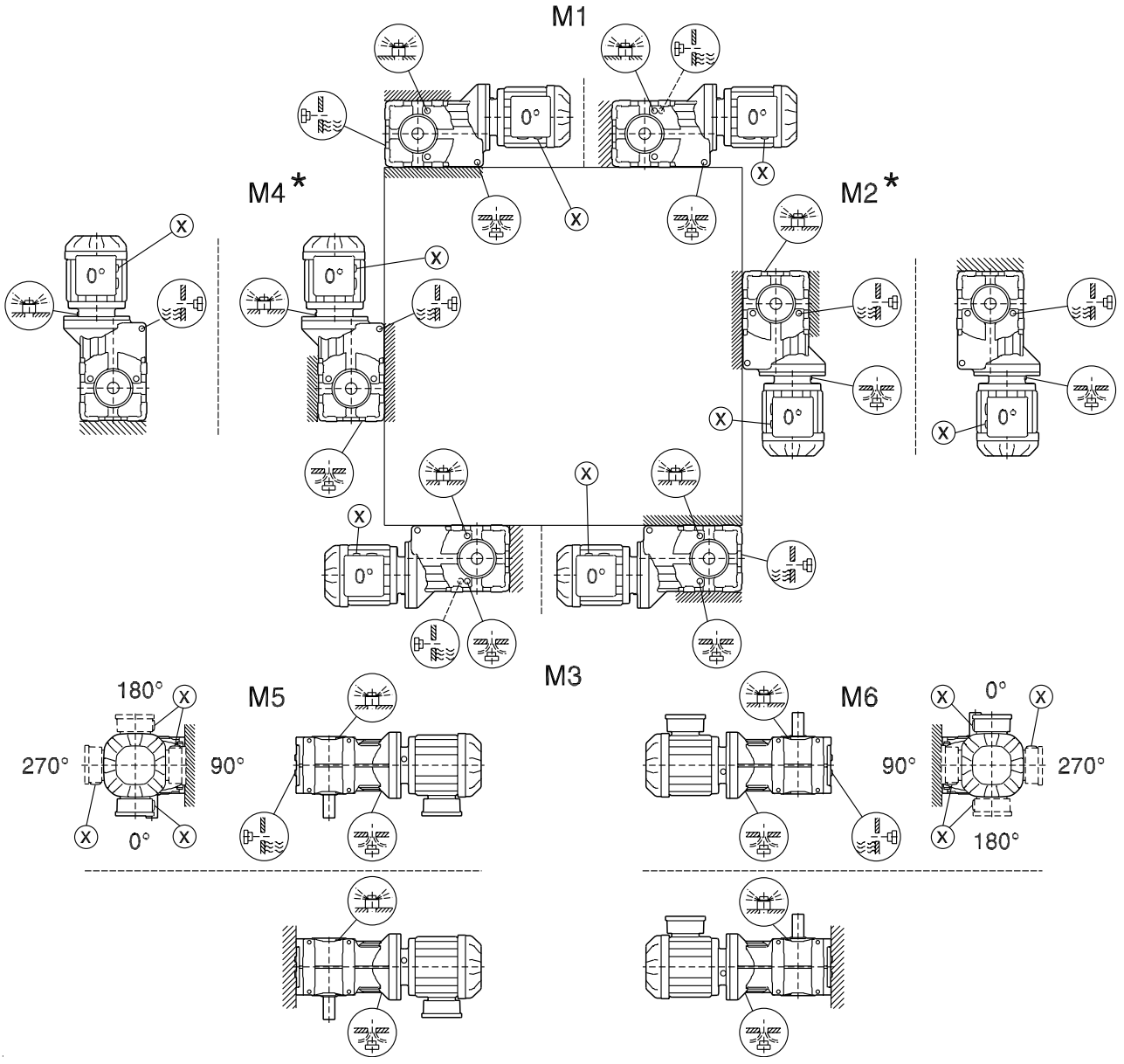
K/KA..B39-49

33 092 02 14

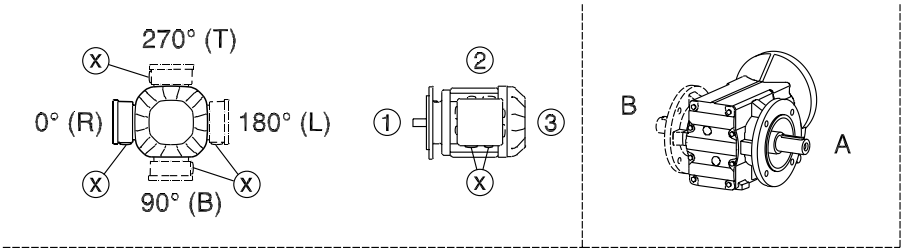


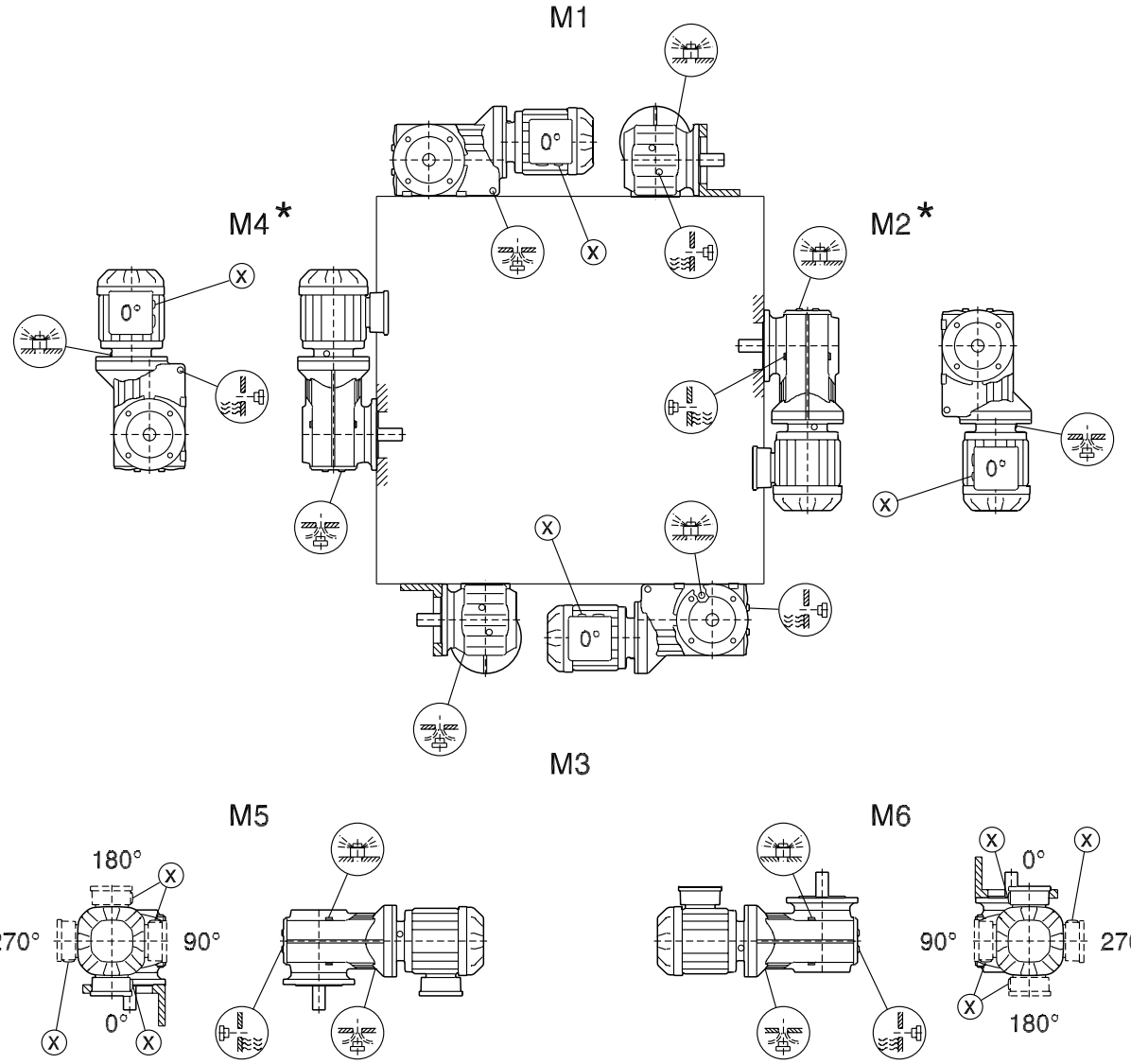


* (→ 137)

KF/KAF/KHF39-49

33 093 01 14





* (→ 137)

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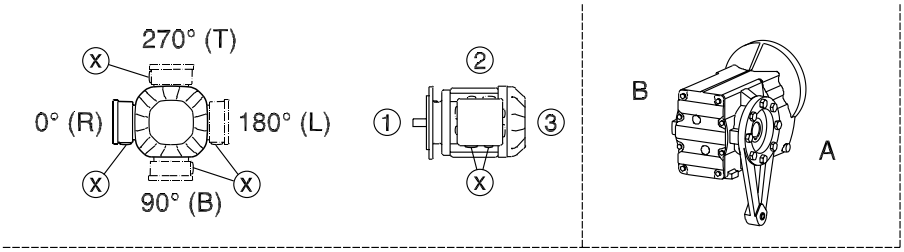
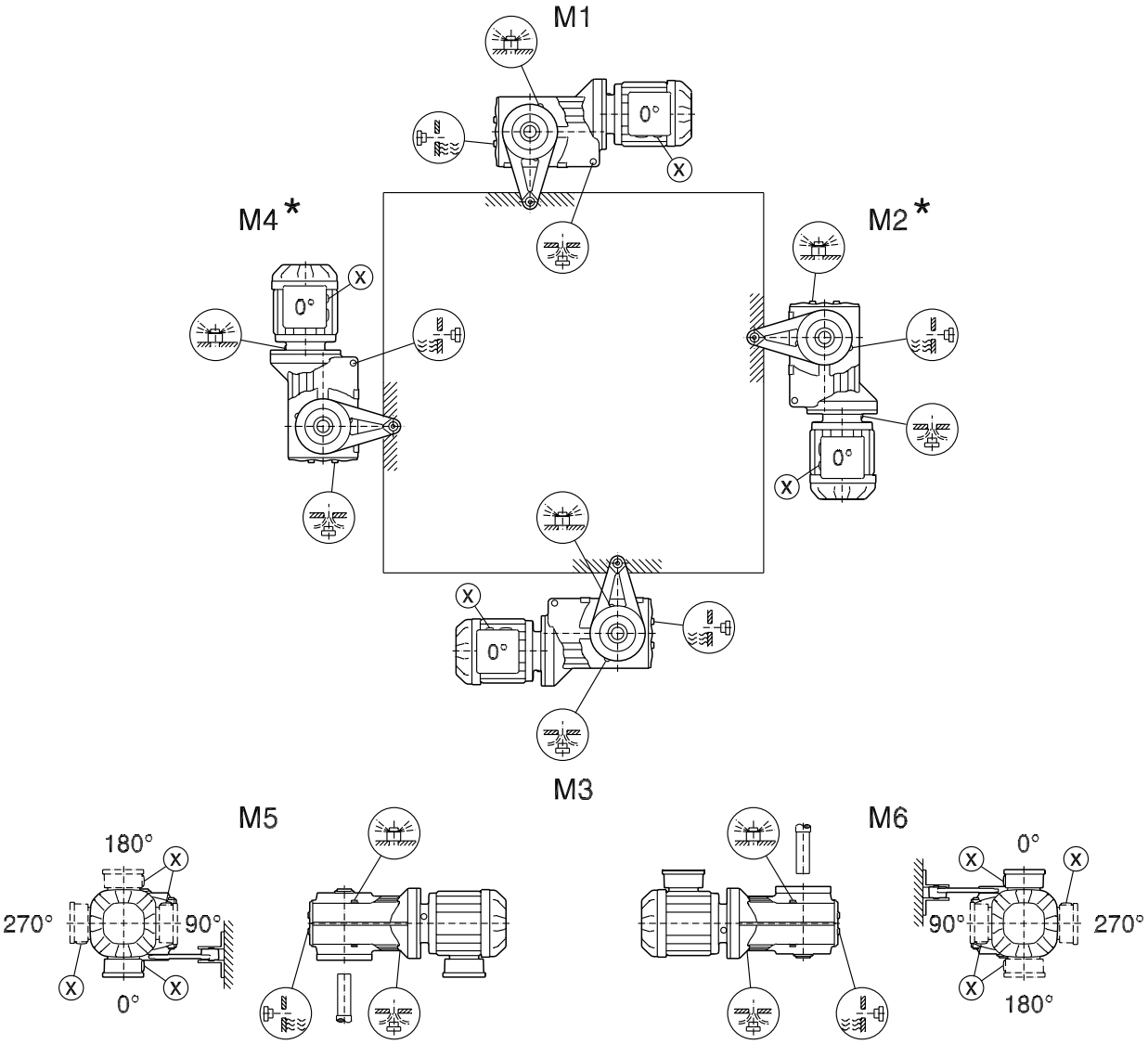
KA/KH/KT39-49

33 094 01 14





* (→ 🗎 137)

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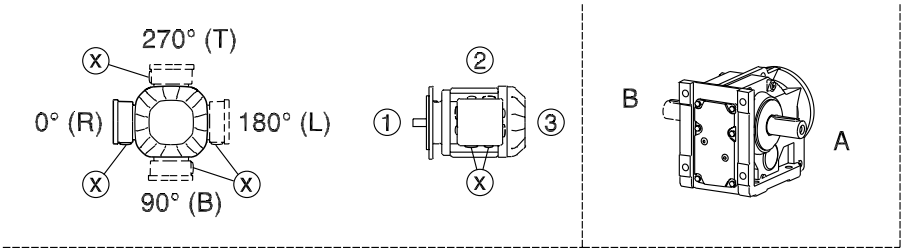
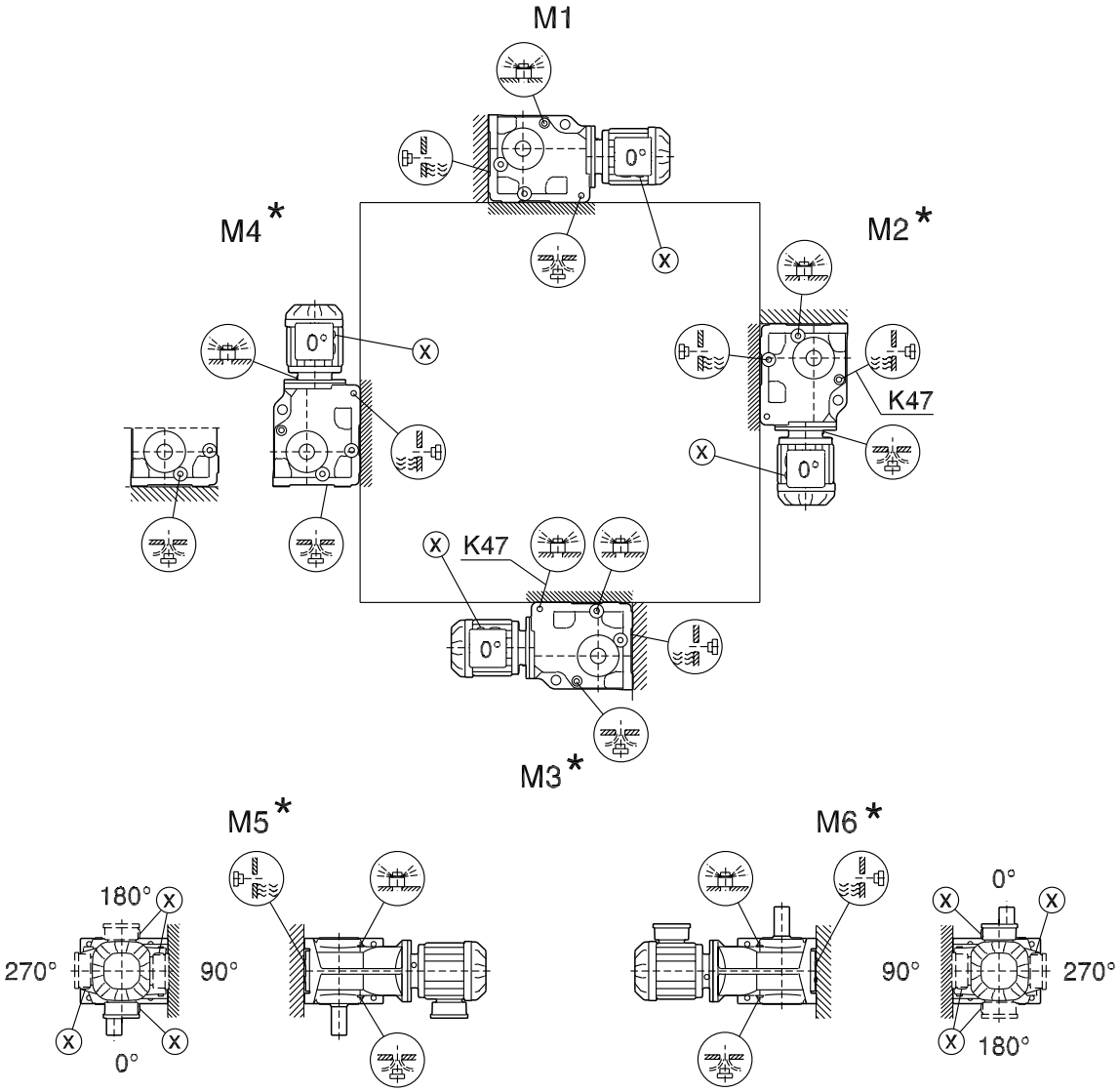
K/KA..B/KH47B-157B, KV47B-107B

34 025 05 00



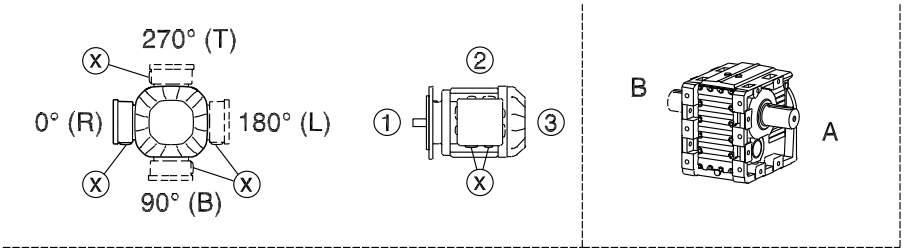


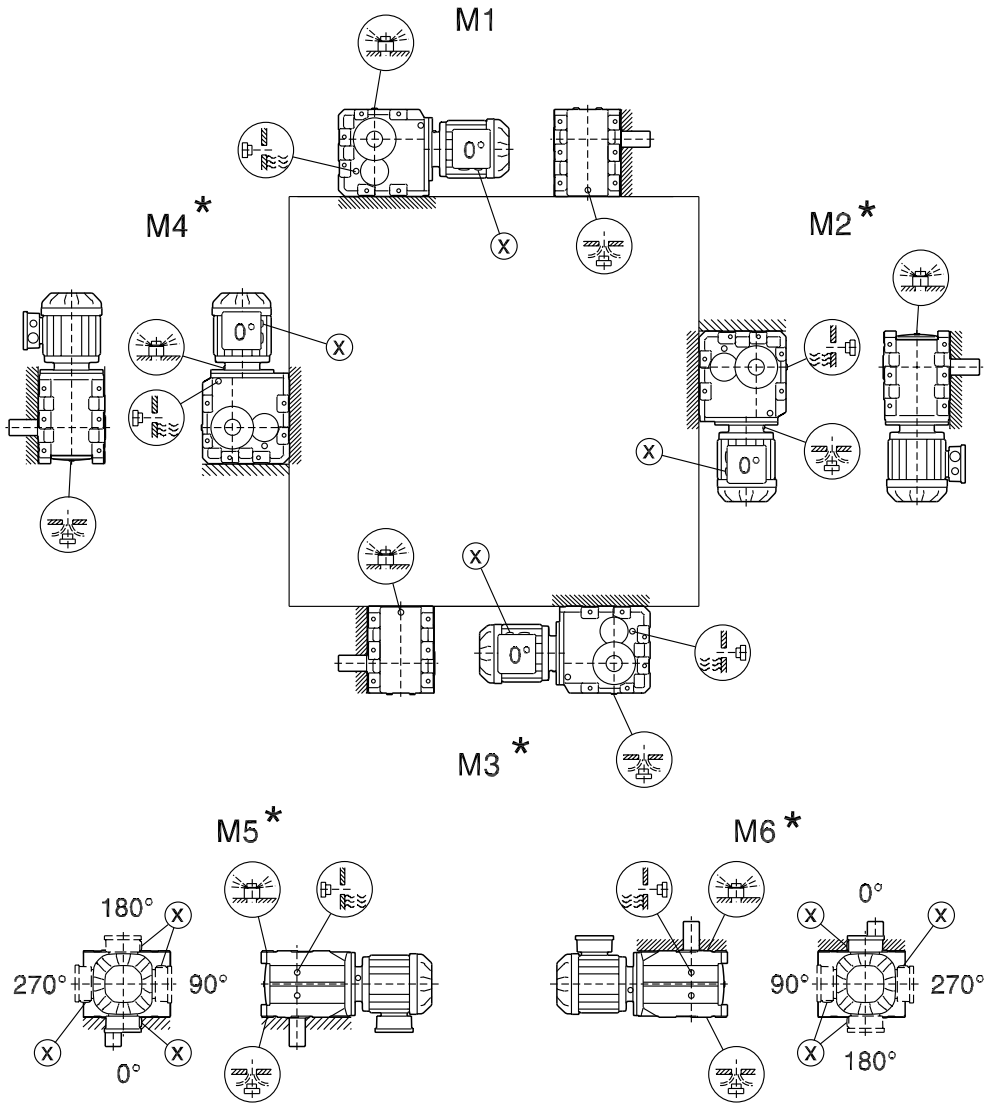
* (→ 137)

24804134/EN – 05/2018

K167-187, KH167B-187B

34 026 05 00

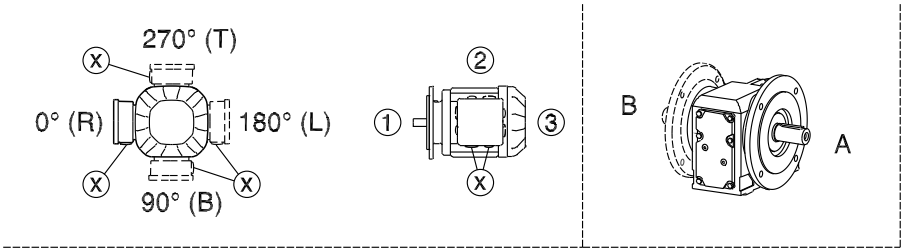


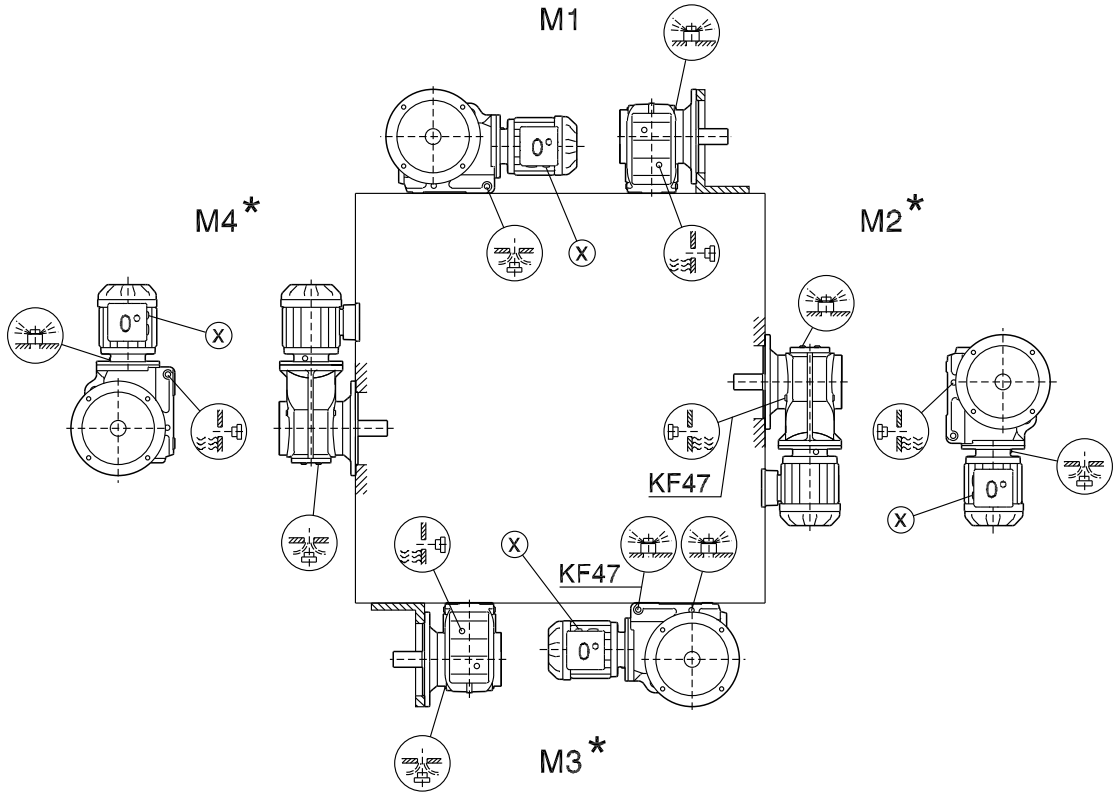


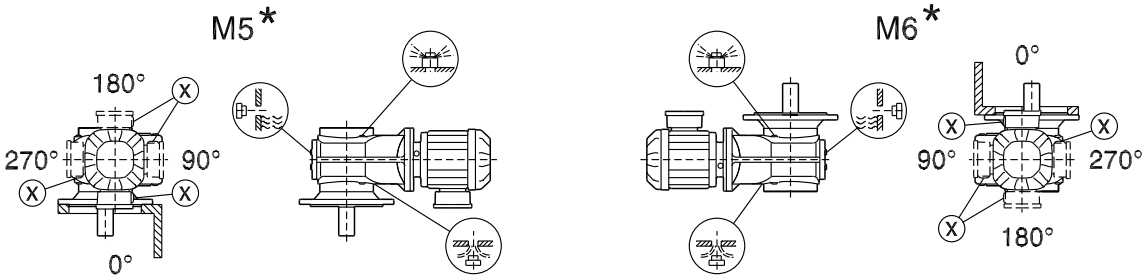
* (→ 🗎 137)

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

34 027 04 00





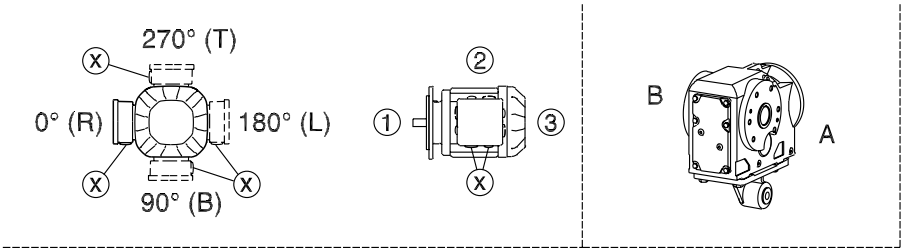


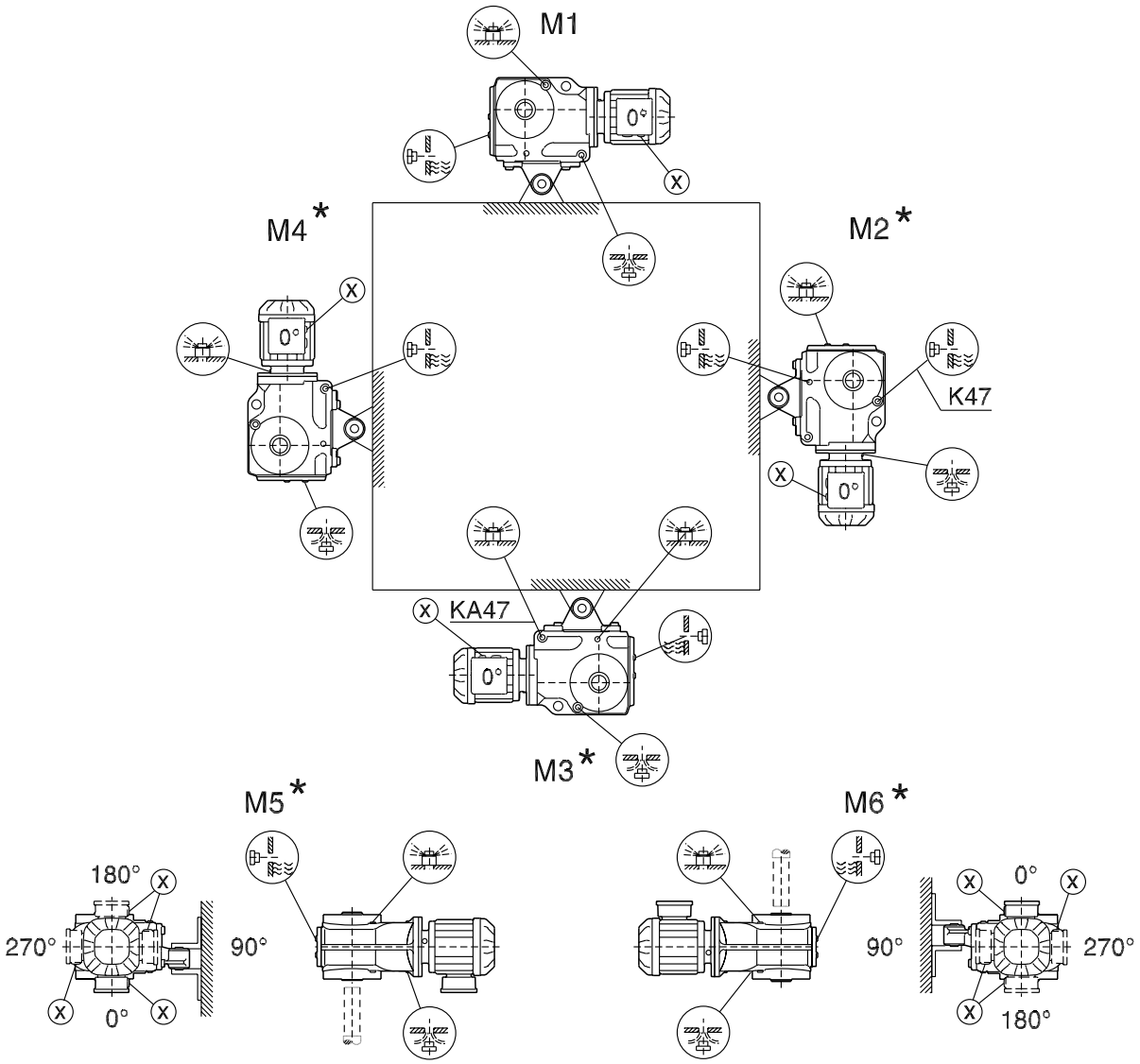
* (→ 🗎 137)

24804134/EN – 05/2018

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

39 025 05 00





* (→ 137)

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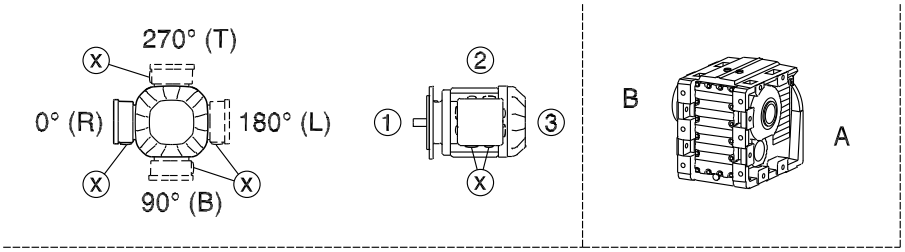
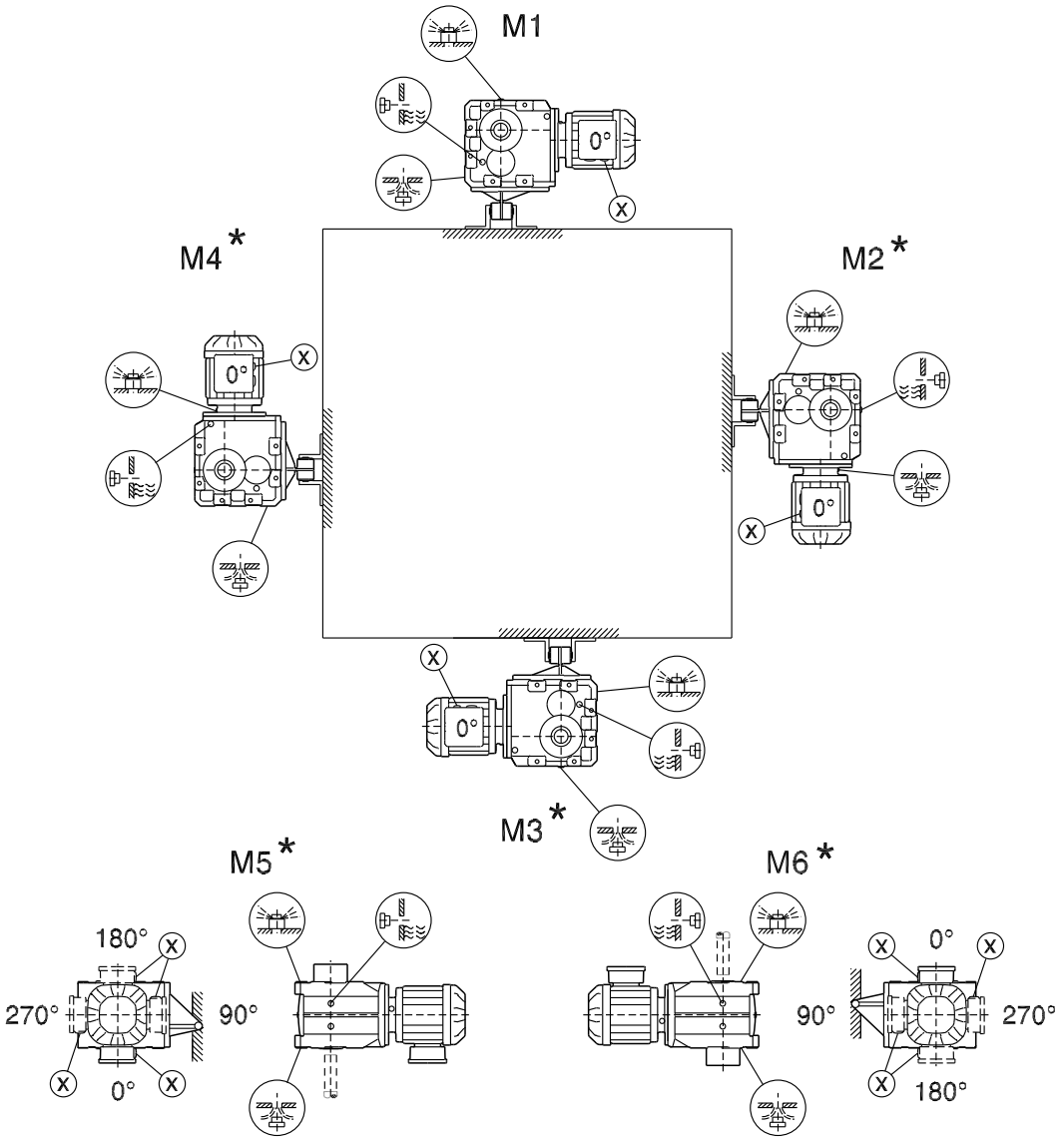
KH167-187

39 026 05 00

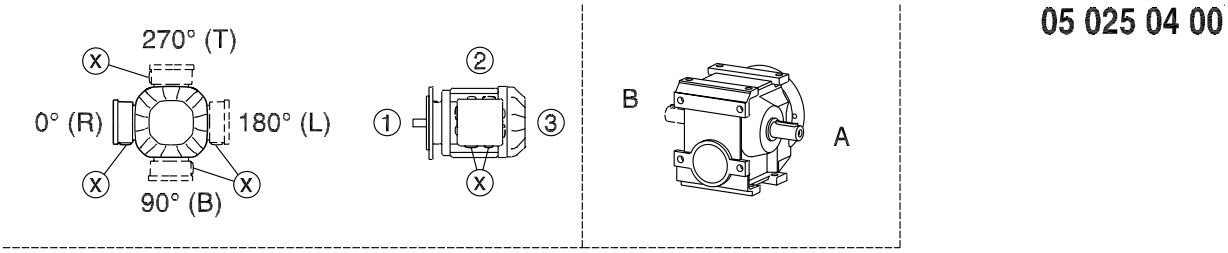


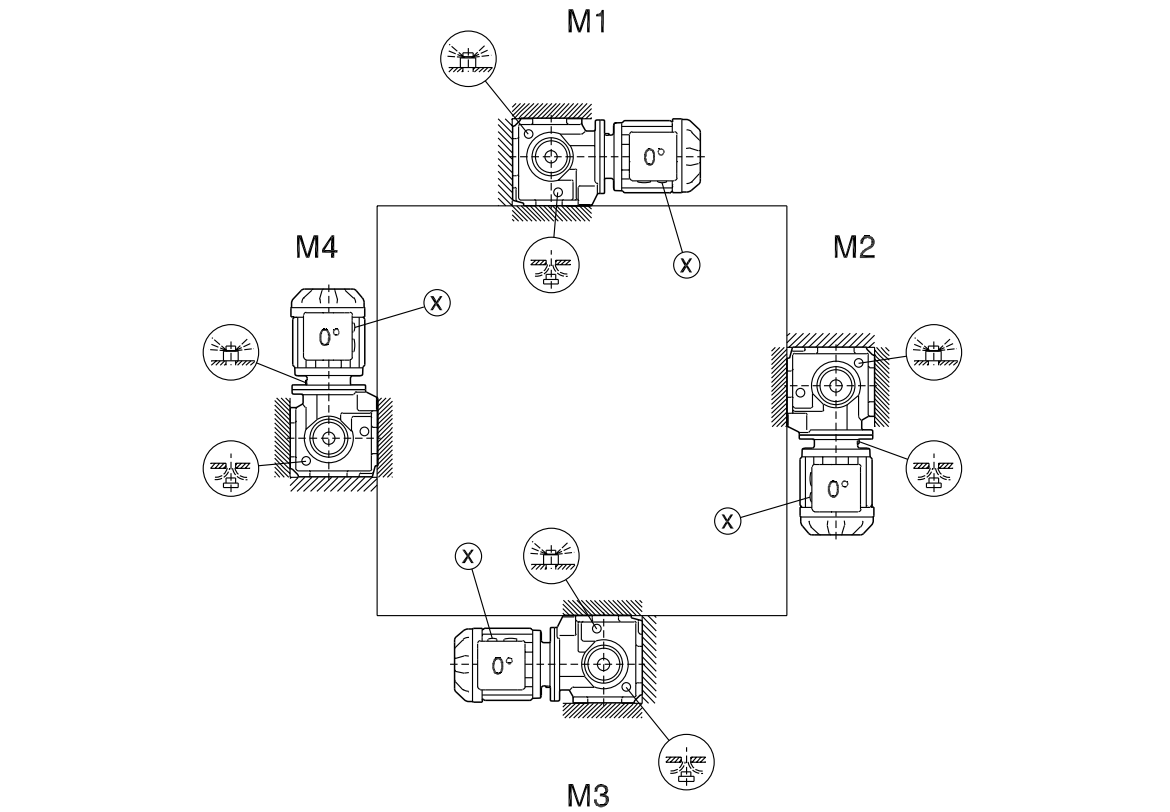


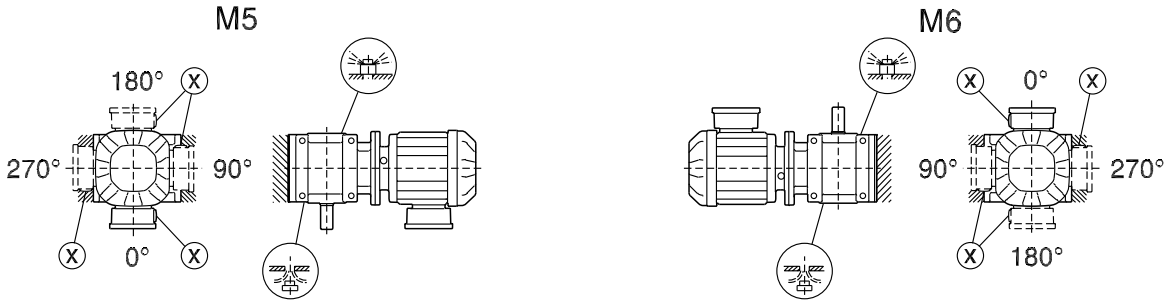
* (→ 🗎 137)

7.6.6 Mounting positions of helical-worm gearmotors

S37







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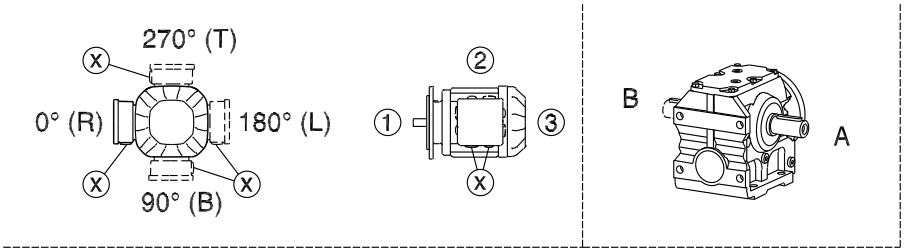
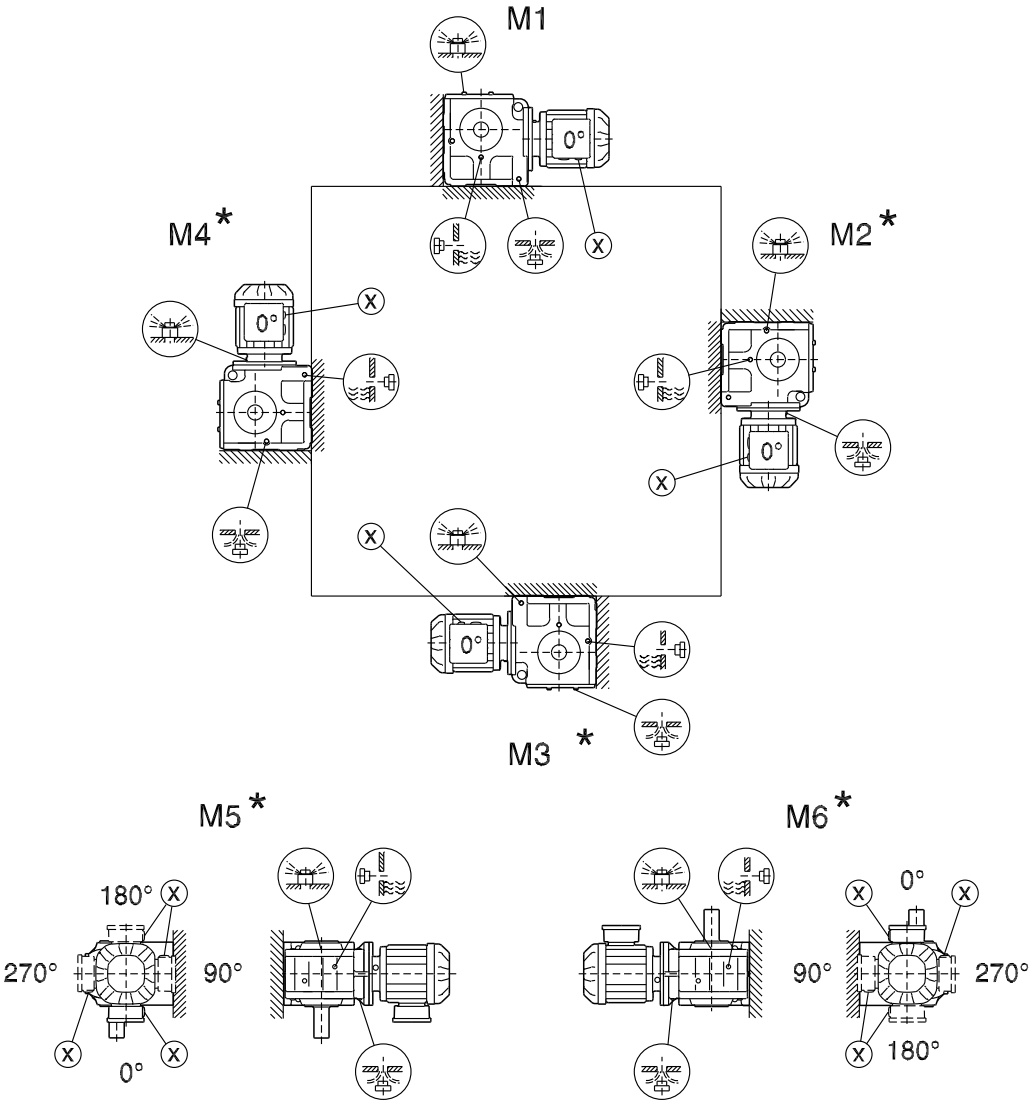
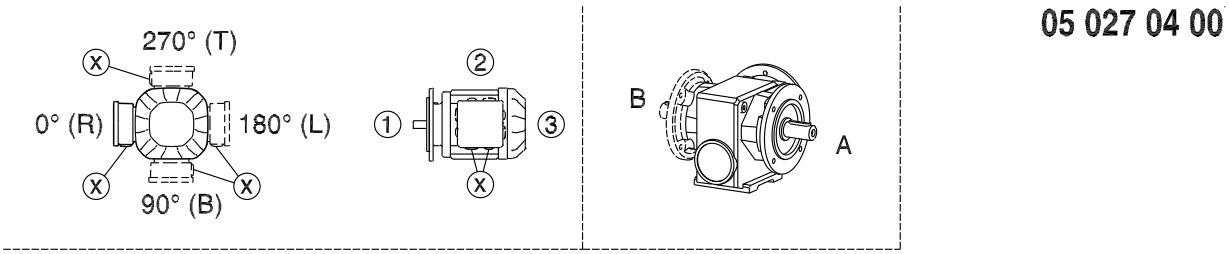
S47-S97

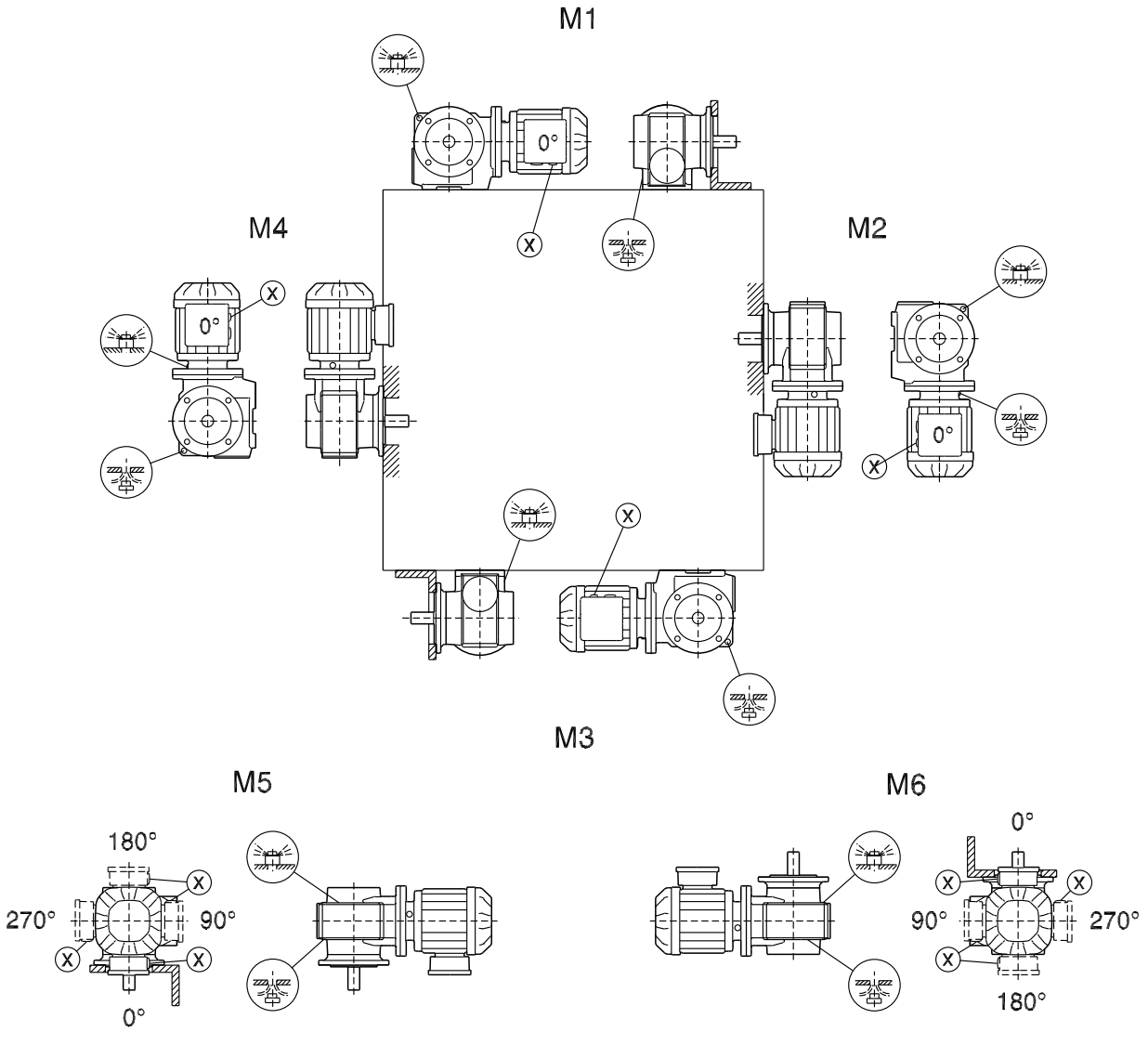

05 026 04 00
270° (T)
0° (R)
180° (L)
90° (B)
X
2
1
3
B
A


M1
0°
M4 *
M2 *
M3 *
M5 *
M6 *
180°
270°
90°
0°

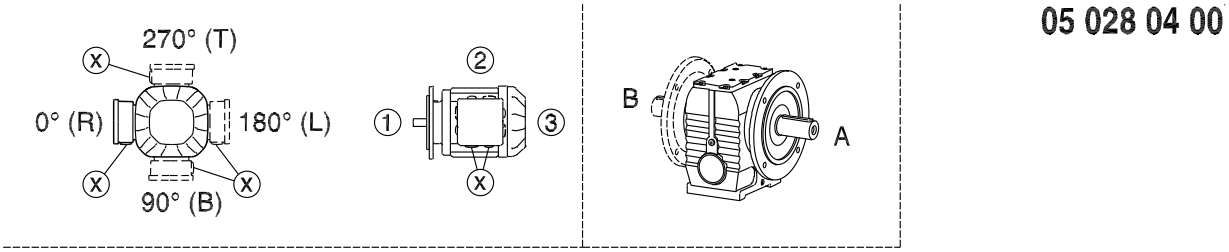
* (→ 🗎 137)

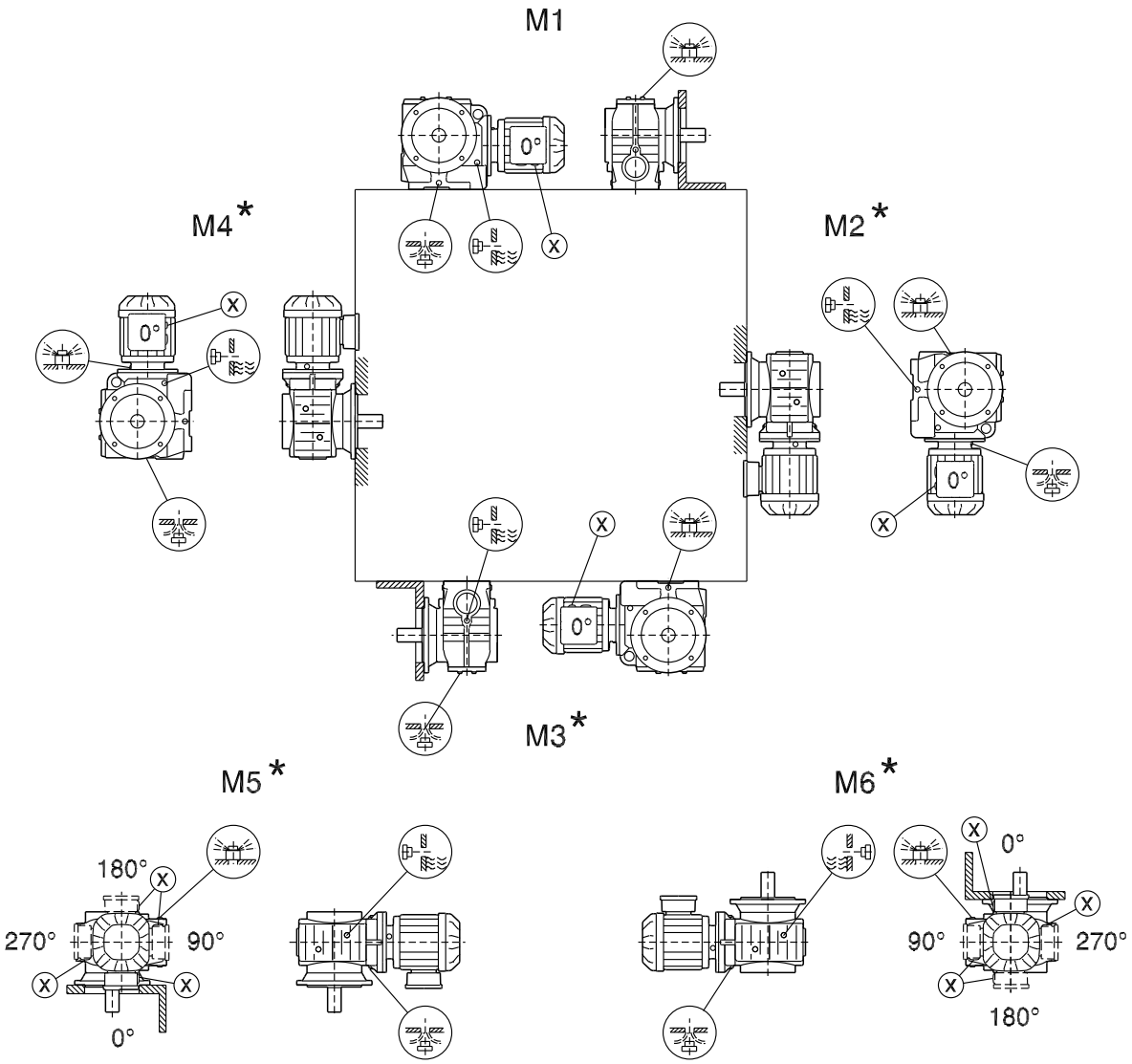
SF/SAF/SHF37


05 027 04 00
270° (T)
0° (R)
180° (L)
90° (B)
X
1
2
3
B
A


M1
M4
M2
M3
M5
M6
0°
X
180°
270°
90°

SF/SAF/SHF/SAZ/SHZ47-97





* (→ 🗎 137)

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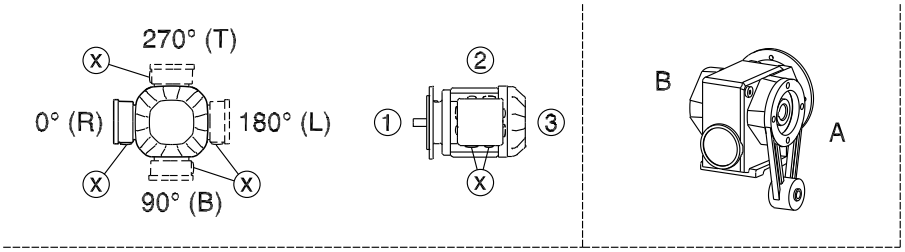
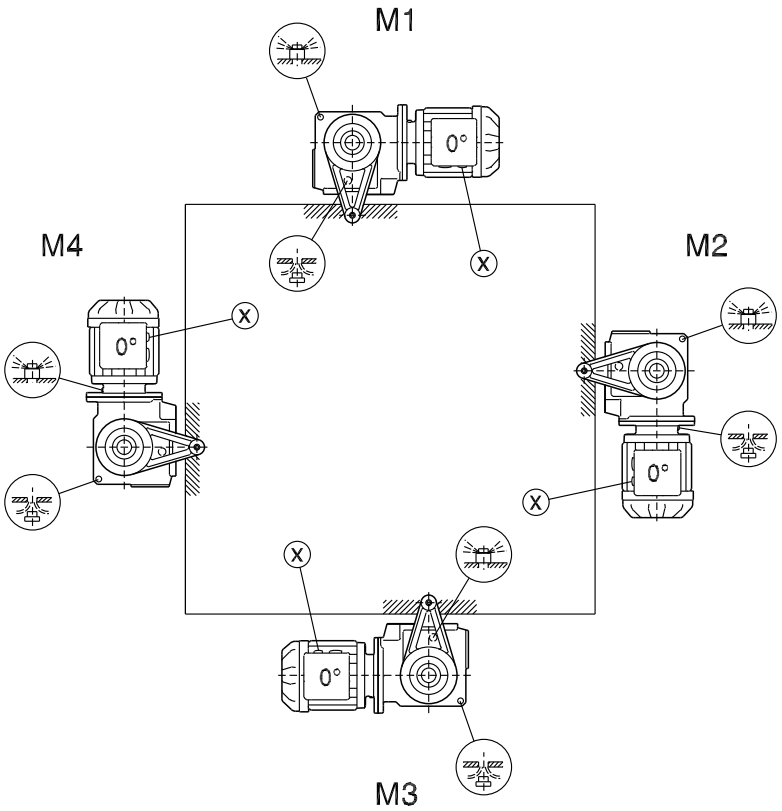
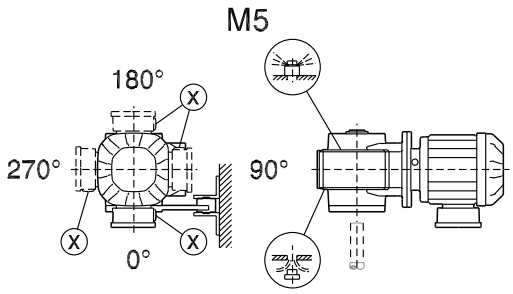
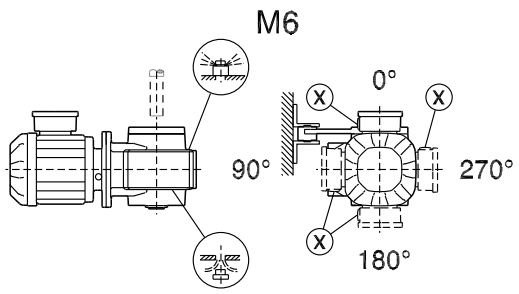
SA/SH/ST37

28 020 05 00





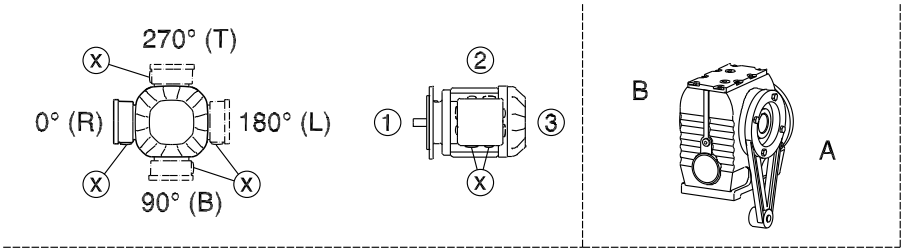


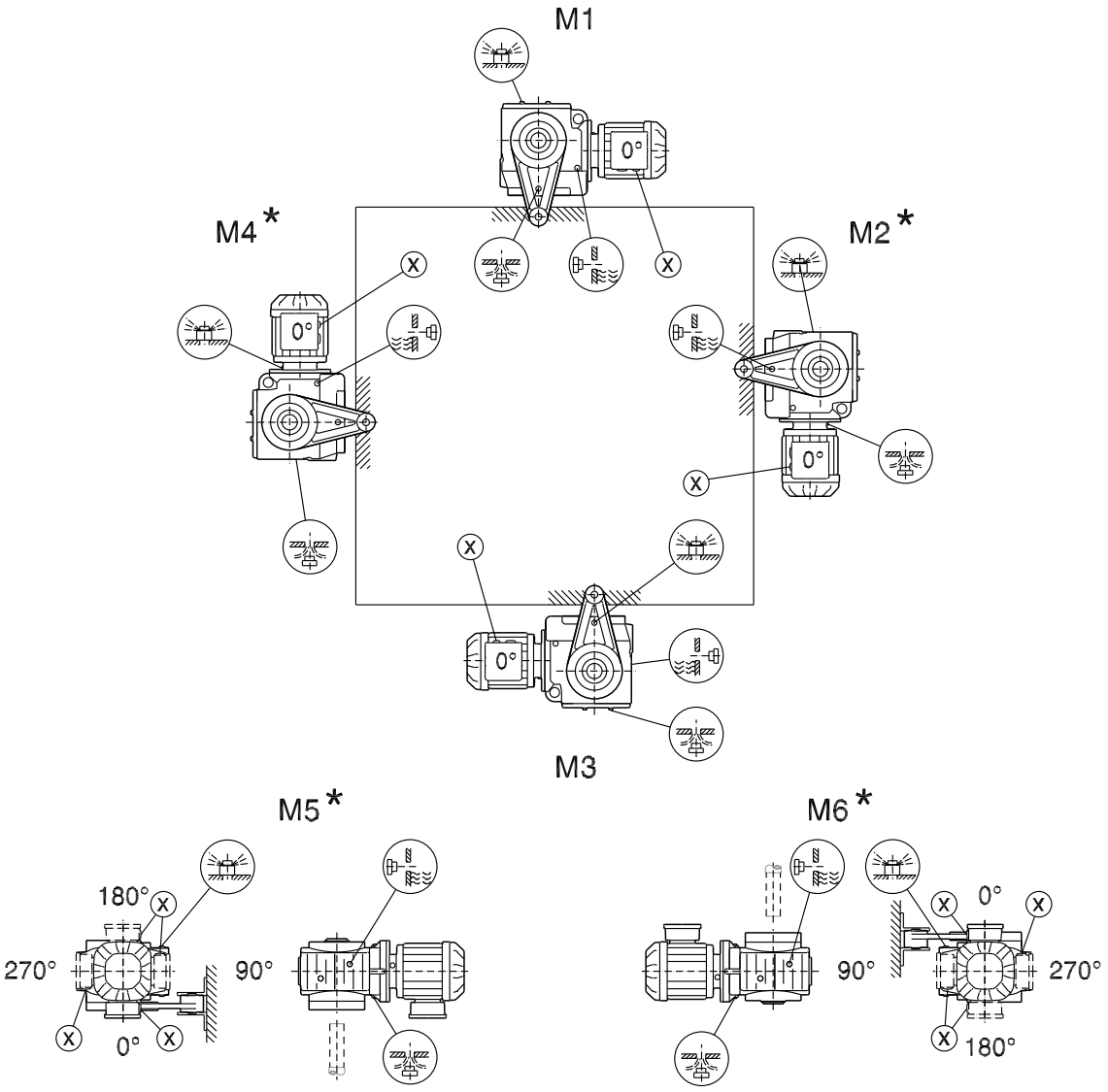


24804134/EN – 05/2018

SA/SH/ST47-97

28 021 04 00

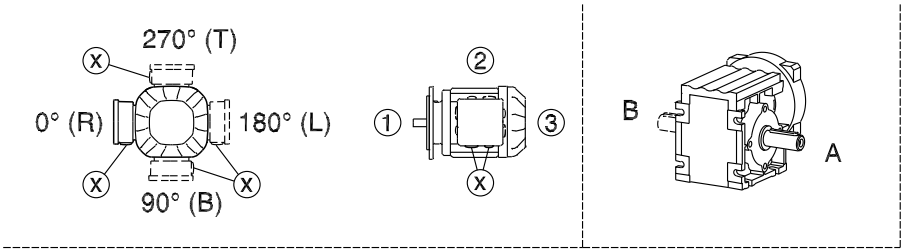




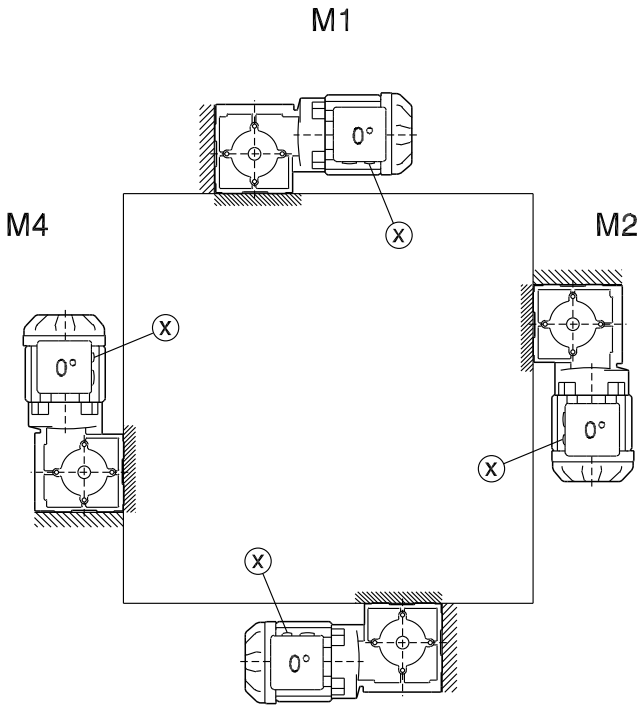
* (→ 🗎 137)

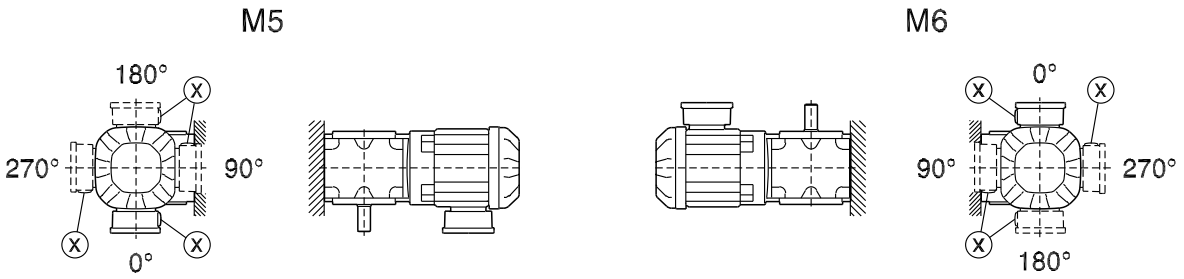
7.6.7 Mounting positions of SPIROPLAN® gearmotors

W10-30



20 001 02 02





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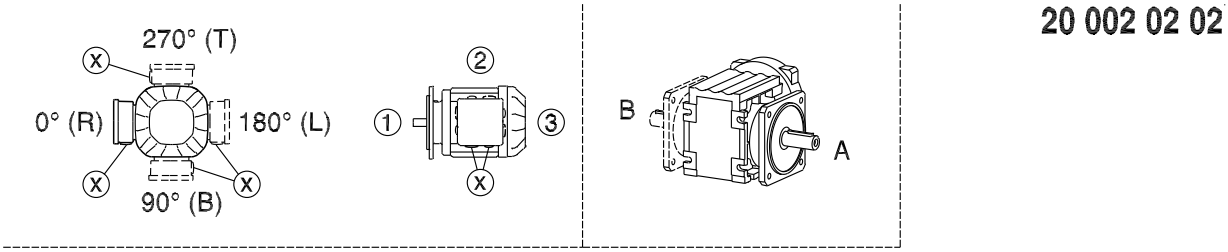
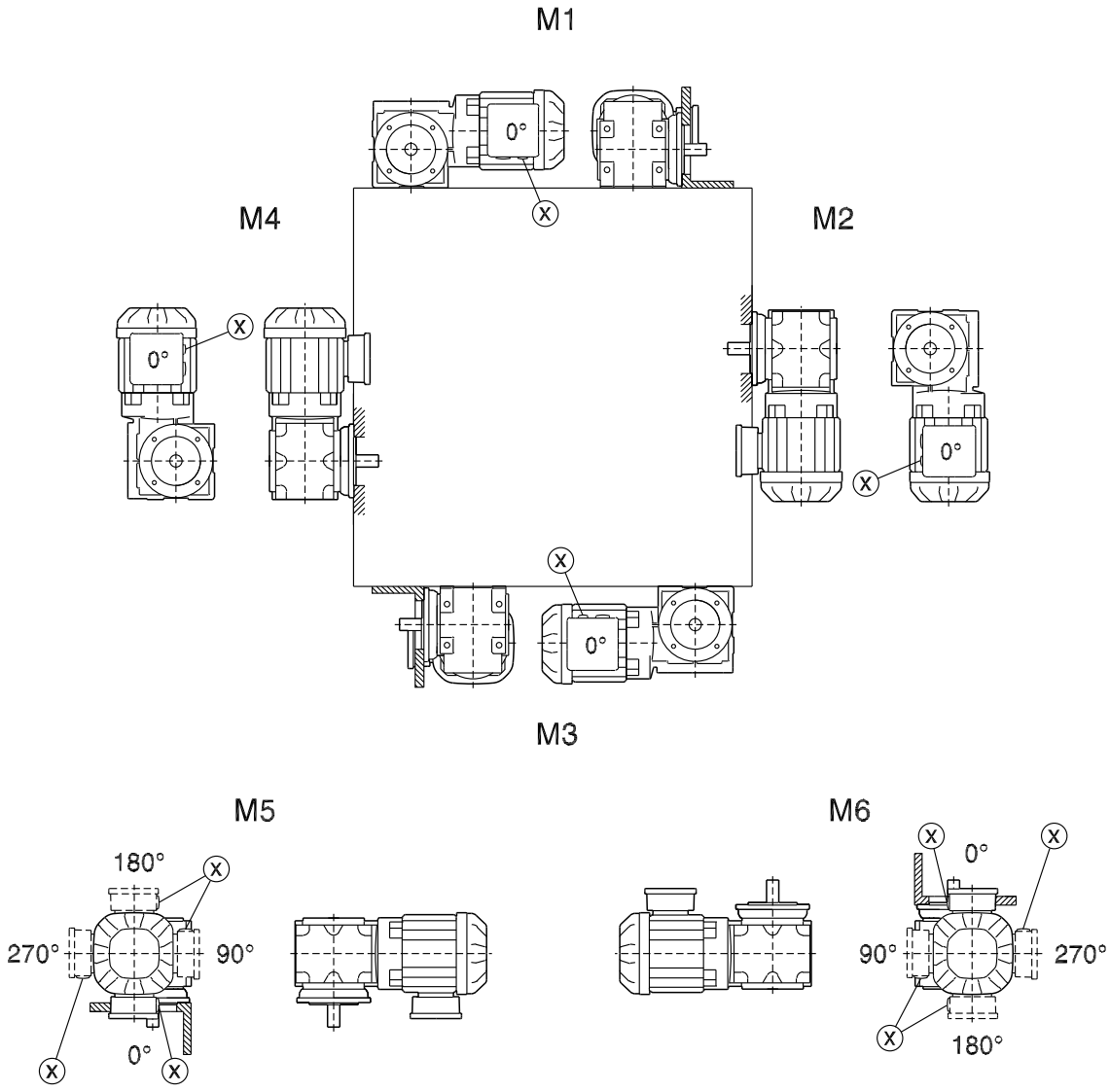
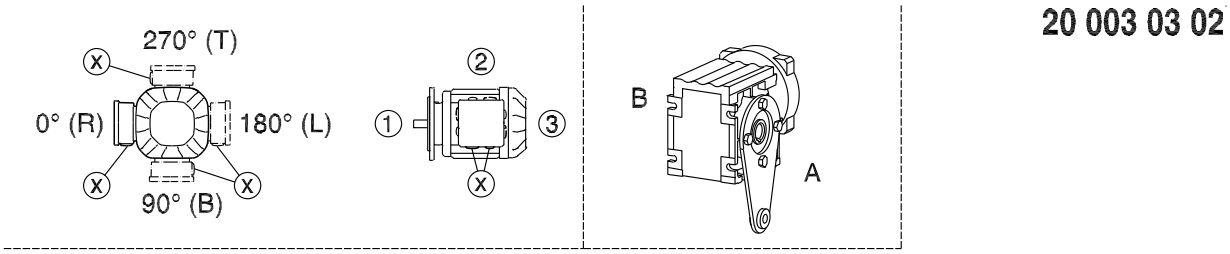
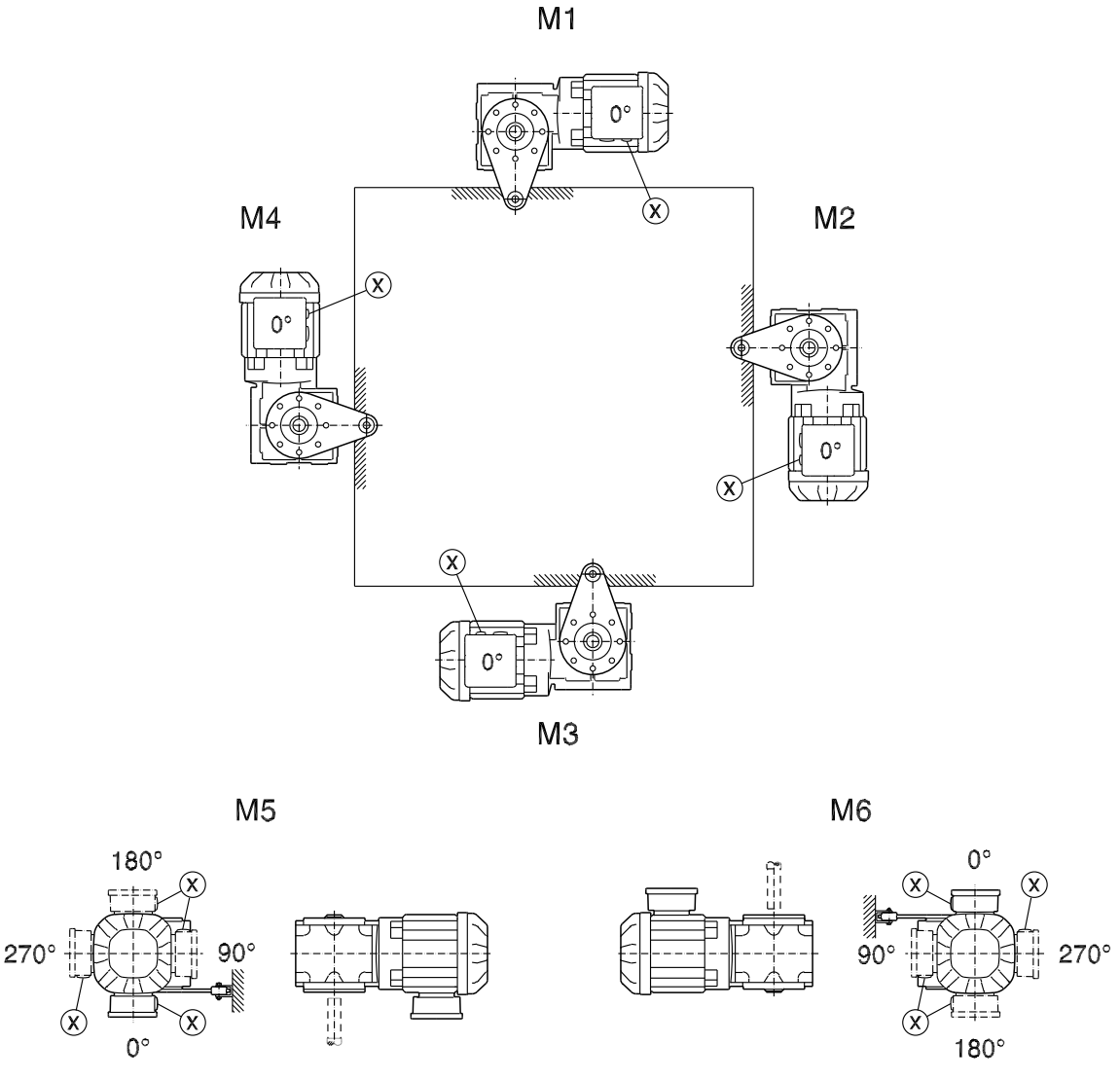
WF10-30


20 002 02 02
270° (T)
0° (R)
180° (L)
90° (B)
X
1
2
3
B
A


M1
M4
M2
M3
M5
M6
0°
X
180°
270°
90°

WA10-30





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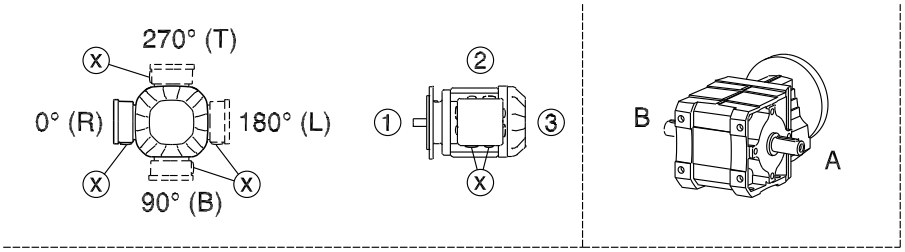
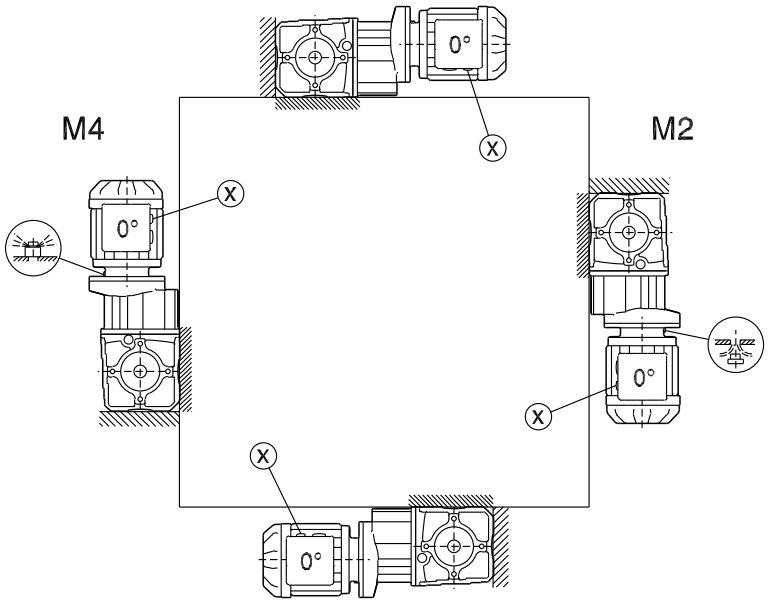
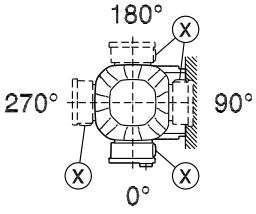
W/WA..B/WH37B-47B

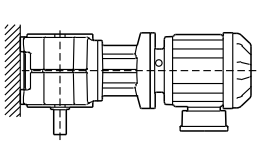


M1

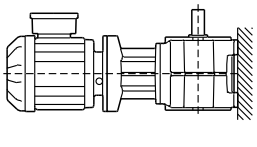


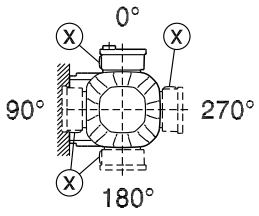
M5





M6





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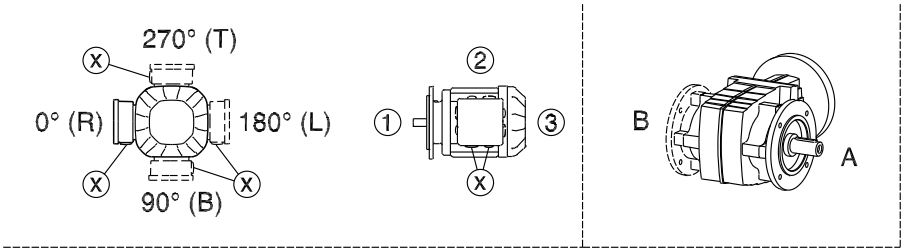
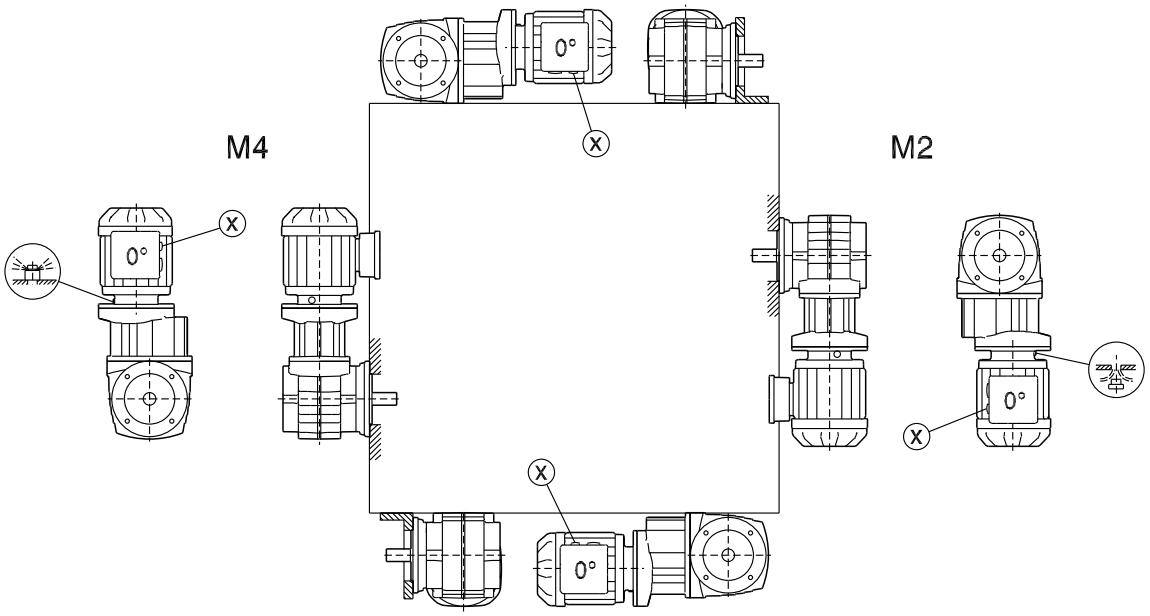
WF/WAF/WHF37-47



M1

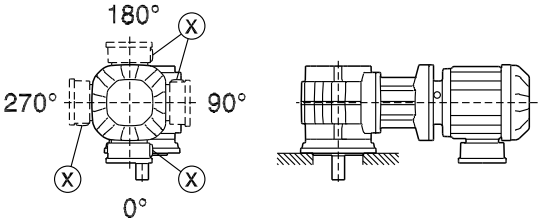


M4

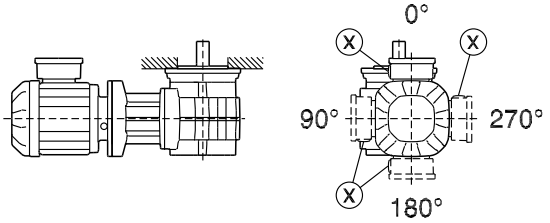
M2

M3

M5



M6



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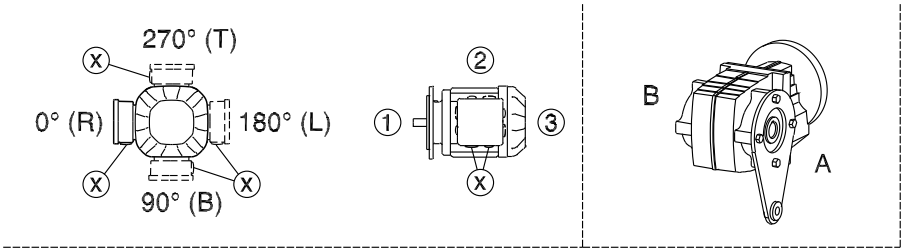
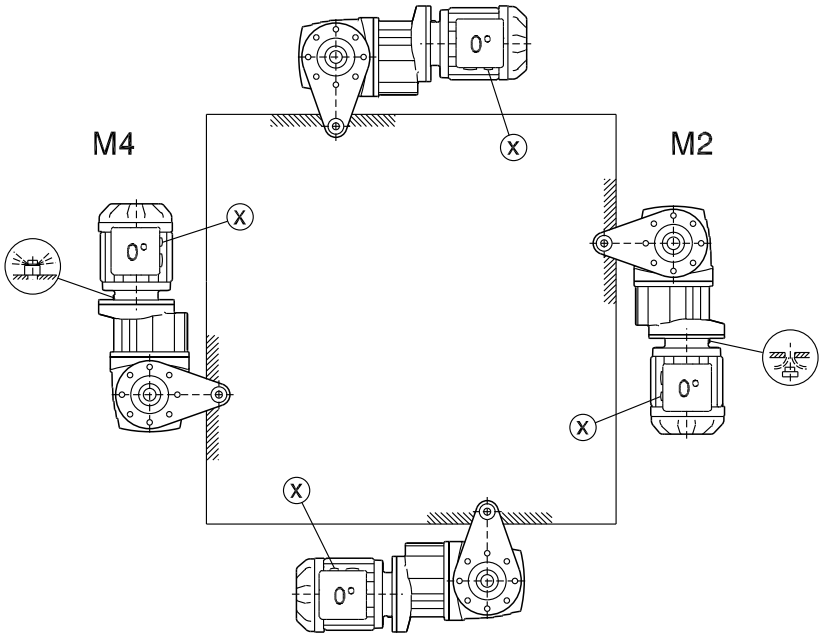
WA/WH/WT37-47

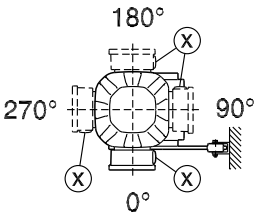


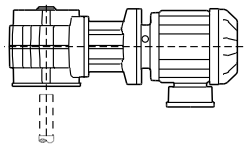
M1



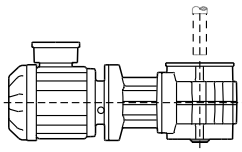
M3

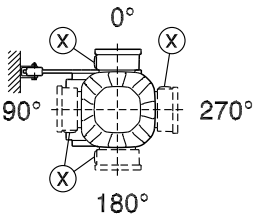
M5





M6





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8 Technical data

8.1 Extended storage

8.1.1 Design

SEW-EURODRIVE recommends the "extended storage" gear unit design for storage periods longer than 9 months. The lubricant of those gear units is then mixed with a VCI anti-corrosion agent (**v**olatile **c**orrosion **i**nhibitors). Please note that this VCI anti-corrosion agent is only effective in a temperature range of -25 °C to +50 °C. The flange contact surfaces and shaft ends are also treated with an anti-corrosion agent. As standard, the gear unit with "extended storage" option will be supplied with OS1 surface protection. Instead of OS1, you can order OS2, OS3 or OS4.

INFORMATION

For SPIROPLAN® gear units, the extended storage option is not available yet.

INFORMATION

To prevent the VCI anti-corrosion agent from evaporating, the gear units in "extended storage" design must remain tightly sealed until startup.

The gear units come with the oil fill according to the specified mounting position (M1 – M6). Always check the oil level before you take the gear unit into operation.

8.1.2 Storage conditions

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

Climate zone	Packaging[1)]	Storage[2)]	Storage duration
Temperate (Europe, USA, Canada, China and Russia, excluding tropical zones)	• Packed in containers • With desiccant and moisture indicator sealed in the plastic wrap	• roofed • Protected against rain and snow • and shocks	Up to 3 years with regular inspection of the packaging and humidity indicator (rel. humidity < 50%)
	open	• Under roof 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 cleanness and mechanical damage during the inspection • Check corrosion protection

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Climate zone	Packaging[1)]	Storage[2)]	Storage duration
Tropical (Asia, Africa, Central and South America, Australia, New Zealand excluding temperate zones)	• Packed in containers • With desiccant and moisture indicator sealed in the plastic wrap • Protected against insect damage and mildew by chemical treatment	• roofed • Protected against rain and snow • and shocks	Up to 3 years with regular inspection of the packaging and humidity indicator (rel. humidity < 50%)
	open	• Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 50 °C, < 50% relative humidity) • No sudden temperature 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 cleanness and mechanical damage during the inspection • Check corrosion protection

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

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

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8.2 Lubricants

Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific gear unit and mounting position. The mounting position (see chapter "Mounting positions" (→ 🗎 136)) must therefore be specified in the drive order. You must adapt the lubricant fill in case of any subsequent changes made to the mounting position (see chapter "Lubricant fill quantities" (→ 🗎 188)).

8.2.1 Bearing greases

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

The table shows the lubricants recommended by SEW-EURODRIVE:

Area of operation	Ambient temperature	Manufacturer	Type
Standard	-40 °C to +80 °C	Fuchs	Renolit CX-TOM 15[1)]
	-40 °C to +80 °C	Klüber	Petamo GHY 133 N
 2)	-40 °C to +40 °C	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.

8.2.2 Lubricant table

NOTICE

Selecting improper lubricants may damage the gear unit.

Possible damage to property.

- Observe the following information.

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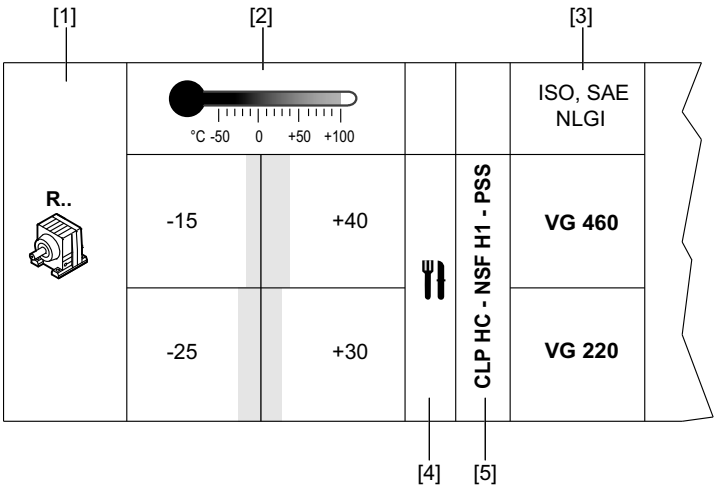
- The oil viscosity and type (mineral/synthetic) that are to be used are determined by SEW-EURODRIVE specifically for each order. This information is noted in the order confirmation and on the gear unit's nameplate.

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

  The lubricant recommendation in the lubricant table in no way represents a guarantee regarding the quality of the lubricant delivered by each respective supplier. Each lubricant manufacturer is responsible for the quality of their product.
- Do not mix synthetic lubricants.
- Do not mix synthetic and mineral lubricants.
- Oils of the same viscosity class from different manufacturers do not have the same characteristics. In particular, the minimally and maximally permitted oil bath temperatures are manufacturer-specific. These temperatures are specified in the lubricant tables.
- The values specified in the lubricant tables apply as of the time of printing of this document. The data of the lubricants are subject to dynamic change on the part of the lubricant manufacturers. For up-to-date information about the lubricants, visit:

  www.sew-eurodrive.de/lubricants

Information on table structure

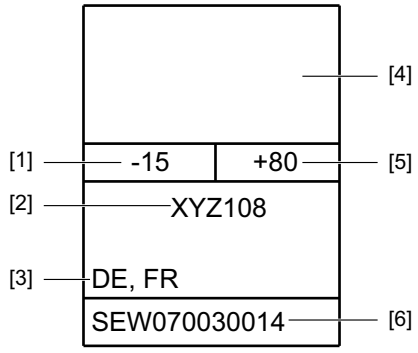


18014416412986635

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

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

Information on the various lubricants



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

Lubricant compatibility with oil seal

Approval	Explanation
SEW07004_ _13:	A lubricant especially recommended with regard to compatibility with the approved oil seals. The lubricant exceeds the state-of-the-art requirements regarding elastomer compatibility.

Approved application temperature range of the oil seals

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

Oil seal 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

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

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

Examples:

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

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

Key

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

Abbreviation/icon	Meaning
	Synthetic lubricant (marked gray)
	Mineral lubricants
CLP	Mineral oil
CLP PG	Polyglycol (PG)
CLP HC	Synthetic hydrocarbons – polyalphaolefin (PAO)
E	Ester-based oil
	Lubricant for the food processing industry – NSF-H1-compliant
	Easily biodegradable oil for environmentally sensitive areas
	Lubricant suitable for ATEX environment.
1)	Helical-worm gear units with CLP-PG: Contact SEW-EURODRIVE
2)	Special lubricant for SPIROPLAN® gear units only
3)	SEW $f_B \geq 1.2$ required
4)	Observe the critical starting behavior at low temperatures
7)	With appropriate measures, the gear units can be operated at ambient temperatures as low as -40 °C. Contact SEW-EURODRIVE.
Oil seal	Oil seal
PSS	Oil seal type Premium Sine Seal (PSS). The addendum "PSS" at the lubricant type signals compatibility with the sealing system.

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

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

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 🗎 178).

R.. RES K..7 KES HK.. F..	[3] °C -50 0 +50 +100	[1]	[2]	ISO,SAE NLGI	SEW EURODRIVE	tribremer & leguil	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TOTAL
							-25 | +115	-25 | +115	-25 | +115	-25 | +115	-25 | +115
	-25	Ex	CLP PG	VG 220			Optigear Synthetic 800/220	Renolin PG220	Mobil GLyoyle 220 DE, FR	Klübersyth GH 6-220	Shell Omala S4 WE 220 CN, US	Cater SY 220
	-25	Ex	CLP PG PSS	VG 220						-25 | +115 Klübersyth GH 6-220 DE, FR, US, BR		

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

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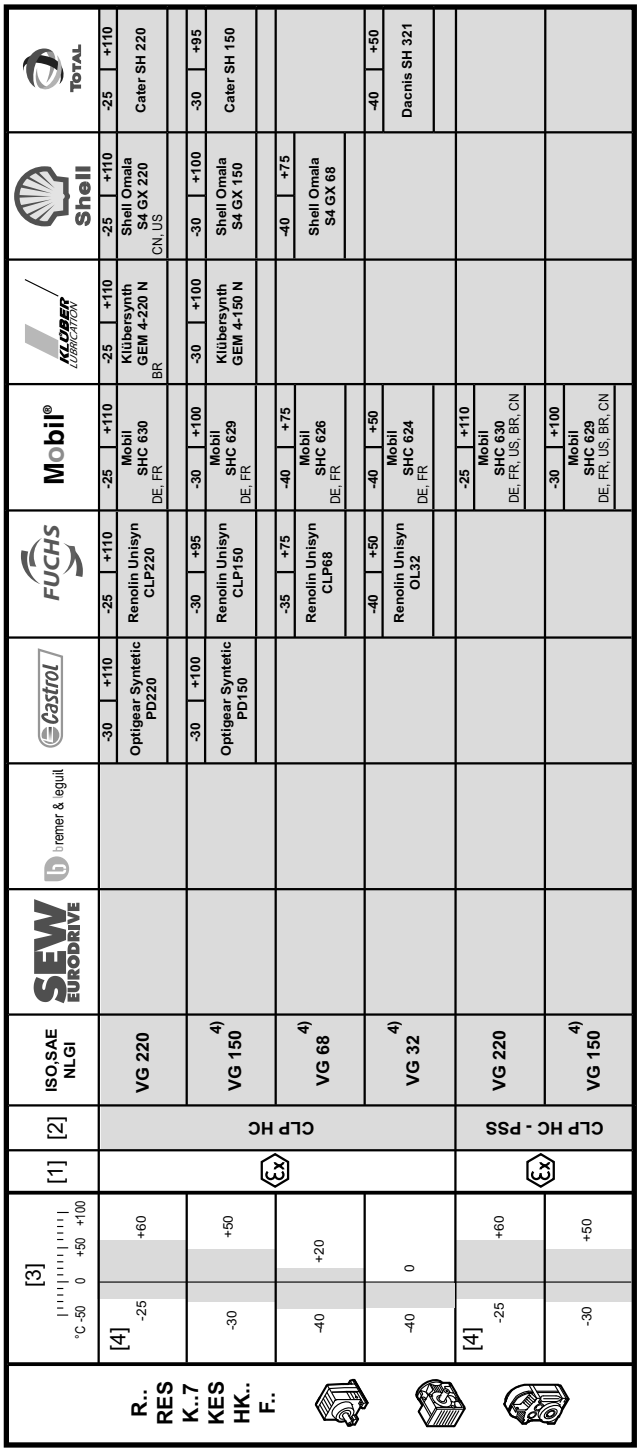
The lubricant table is valid at the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

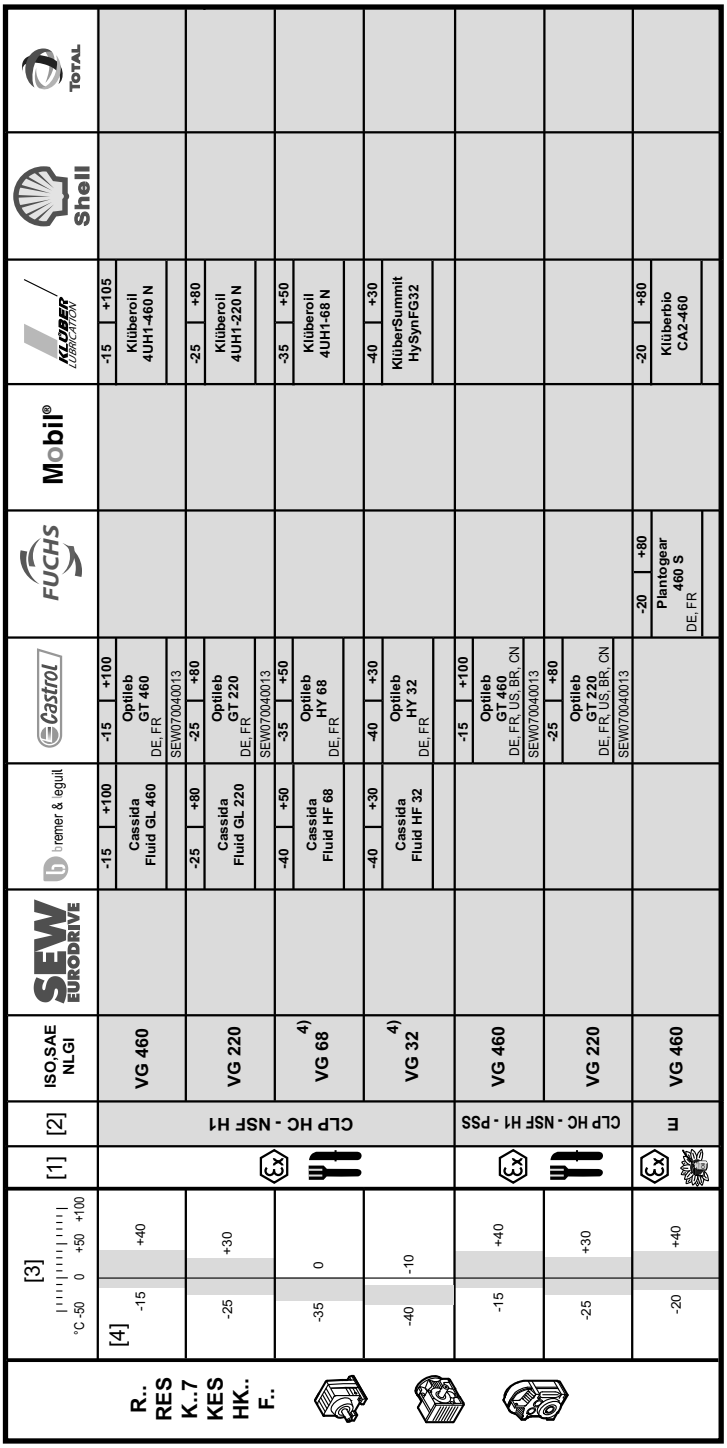
Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 🗎 178).



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

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

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 🖹 178).



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

Lubricant table for K..9 gear units

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

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 178).

K.9

[3] °C (-50 … +100)	[1]	[2]	ISO,SAE NLGI	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	Mobil	KLÜBER LUBRICATION	Shell	TOTAL
[4] -20 … +60	Ex	CLP PG (-PSS)	VG 460						-20 … +95 Klübersynth GH 6-460 DE, FR, US, BR, CN		
-15 … +80			VG 680						-15 … +115 Klübersynth GH 6-680 DE, FR, US, BR, CN		
-25 … +40			VG 220						-25 … +70 Klübersynth GH 6-220 DE, FR, US, BR, CN		
-30 … +30			VG 150 4)						-30 … +60 Klübersynth GH 6-150 DE, FR, US, BR, CN		
[4] -20 … +60	Ex	CLP PG - H1 (-PSS)	VG 460						-20 … +95 Klübersynth UH1 6-460 DE, FR, US, BR, CN		
-15 … +80			VG 680						-15 … +115 Klübersynth UH1 6-680 DE, FR, US, BR, CN		
-25 … +40			VG 220						-25 … +70 Klübersynth UH1 6-220 DE, FR, US, BR, CN		
-30 … +30			VG 150 4)						-30 … +60 Klübersynth UH1 6-150 DE, FR, US, BR, CN		

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

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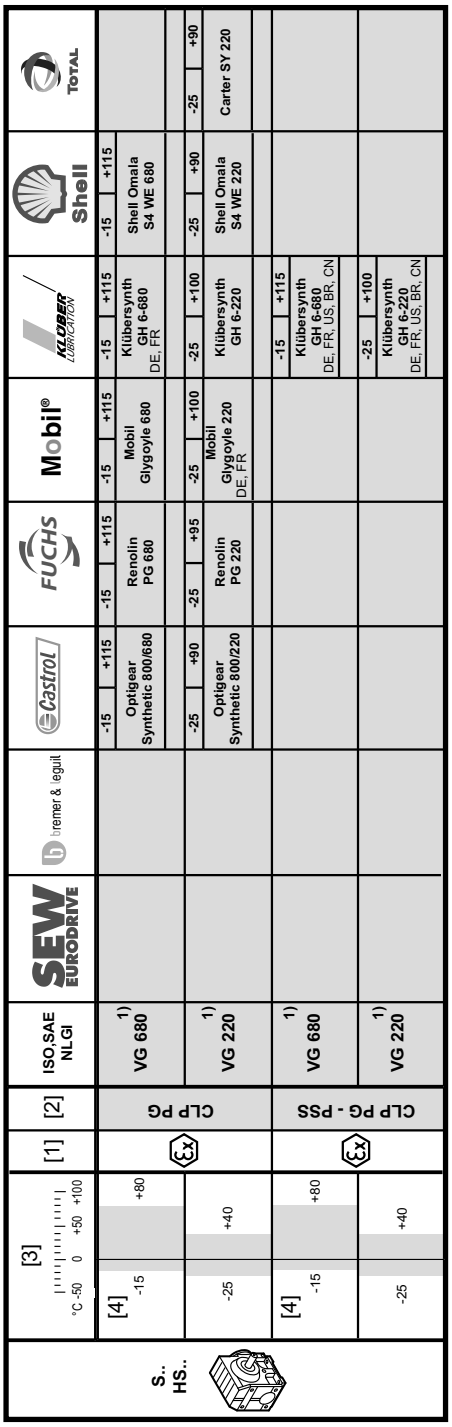
Lubricant table for S.. gear units

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

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 🗎 178).



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

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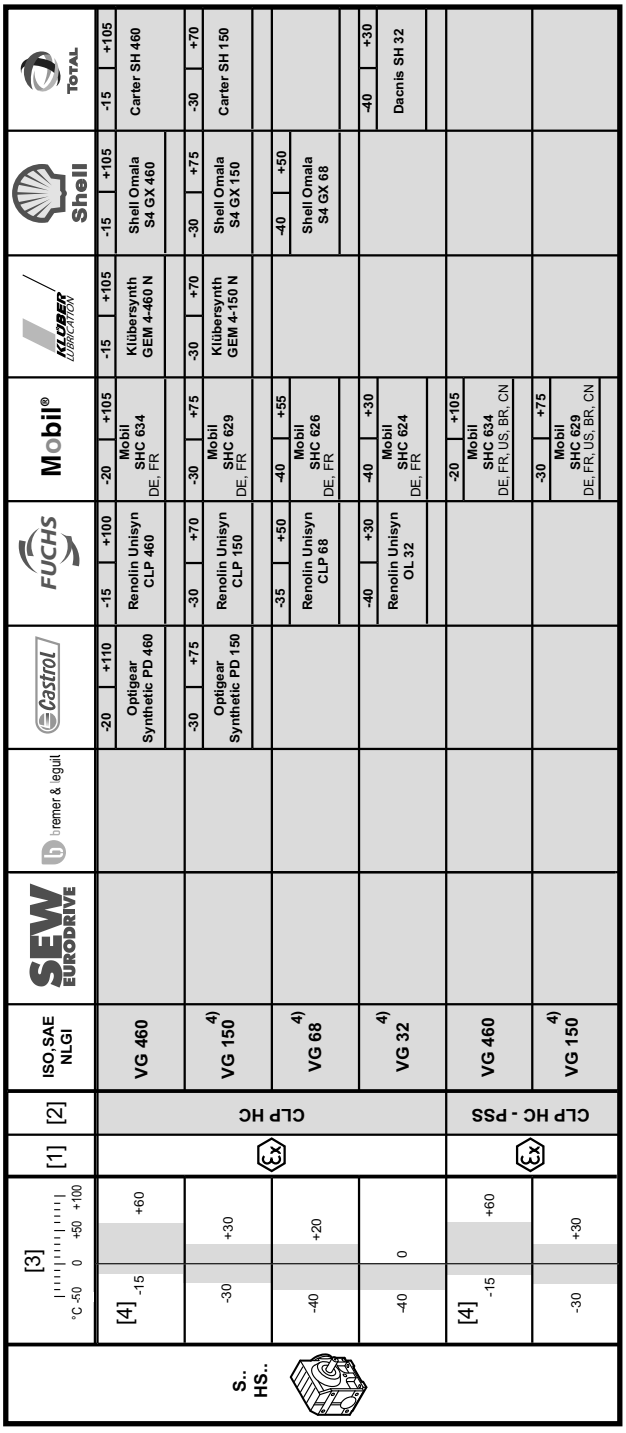
The lubricant table is valid at the day this document is published. Refer to **www.sew-eurodrive.de/lubricants** for the latest tables.

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 🗎 178).



S.. HS..	[3] °C -50 0 +50 +100	[1]	[2]	ISO, SAE NLGI	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TOTAL
	[4] -15 / +60	Ex	CLP HC	VG 460			-20 / +110 Optigear Synthetic PD 460	-15 / +100 Renolin Unisyn CLP 460	-20 / +105 Mobil SHC 634 DE, FR	-15 / +105 Klübersynth GEM 4-460 N	-15 / +105 Shell Omala S4 GX 460	-15 / +105 Carter SH 460
	-30 / +30	Ex	CLP HC	4) VG 150			-30 / +75 Optigear Synthetic PD 150	-30 / +70 Renolin Unisyn CLP 150	-30 / +75 Mobil SHC 629 DE, FR	-30 / +70 Klübersynth GEM 4-150 N	-30 / +75 Shell Omala S4 GX 150	-30 / +70 Carter SH 150
	-40 / +20	Ex	CLP HC	4) VG 68				-35 / +50 Renolin Unisyn CLP 68	-40 / +55 Mobil SHC 626 DE, FR		-40 / +50 Shell Omala S4 GX 68	
	-40 / 0	Ex	CLP HC	4) VG 32				-40 / +30 Renolin Unisyn OL 32	-40 / +30 Mobil SHC 624 DE, FR			-40 / +30 Dacnis SH 32
	[4] -15 / +60	Ex	CLP HC - PSS	VG 460					-20 / +105 Mobil SHC 634 DE, FR, US, BR, CN			
	-30 / +30	Ex	CLP HC - PSS	4) VG 150					-30 / +75 Mobil SHC 629 DE, FR, US, BR, CN			

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

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

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 178).

S.. HS..	[3] °C -40 0 +50 +100		[1]	[2]	ISO,SAE NLGI	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TOTAL
	[4] -15	+40		CLP HC - NSF H1	VG 460		-15 | +85 Cassida Fluid GL 460	-15 | +90 Optileb GT 460 DE, FR SEW070040013			-15 | +90 Klüberoil 4UH1-460 N		
	-25	+30			VG 220		-25 | +75 Cassida Fluid GL 220	-25 | +70 Optileb GT 220 DE, FR SEW070040013			-25 | +70 Klüberoil 4UH1-220 N		
	[4] -35	+10			4) VG 68		-35 | +40 Cassida Fluid HF 68	-35 | +40 Optileb HY 68 DE, FR			-35 | +25 Klüberoil 4UH1-68 N		
	-40	-10			4) VG 32		-40 | +25 Cassida Fluid HF 32	-40 | +20 Optileb HY 32 DE, FR			-40 | +25 KlüberSummit HySyn FG 32		
	[4] -15	+40		CLP HC - NSF H1 - PSS	VG 460			-15 | +90 Optileb GT 460 DE, FR, US, BR, CN SEW070040013					
	-25	+30			VG 220			-15 | +90 Optileb GT 220 DE, FR, US, BR, CN SEW070040013					
	-20	+40		E	VG 460				-20 | +80 Plantogear 460 S DE, FR		-20 | +80 Klüberbio CA2-460		

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

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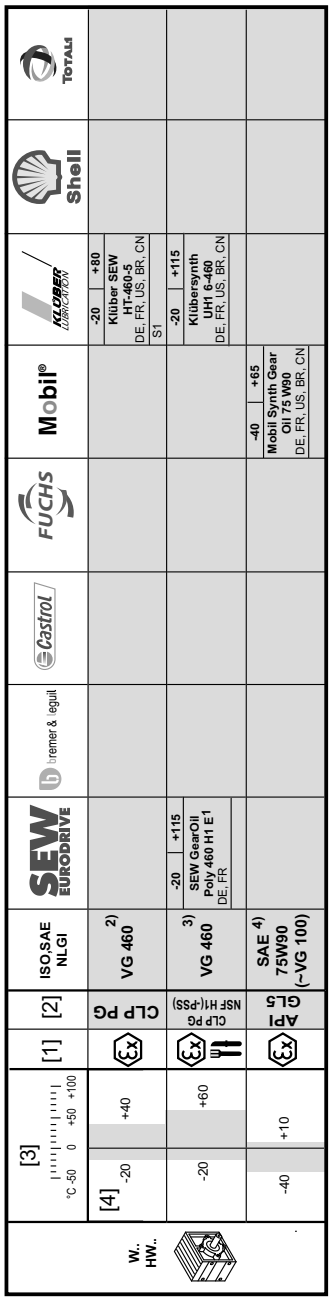
Lubricant table for W.. gear units

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

Observe the thermal limit of the oil seal material, see chapter "Lubricant compatibility with oil seal" (→ 🗎 178).



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

8.2.3 Lubricant fill quantities

Refer to the gear unit nameplate for prescribed lubricant fill quantities in explosion-proof gear units.

Check the oil level after the filling process, see chapter "Inspection/maintenance for the gear unit" (→ 🗎 118).

INFORMATION

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 mounting position (see chapter "Mounting positions" (→ 🗎 136)) which must be specified with the order.

When the mounting position is changed, the amount of lubricant must be adapted accordingly. Do not **change the mounting position** without prior consultation with SEW-EURODRIVE. If you do not consult SEW-EURODRIVE, the **ATEX certification** and **rights to claim under limited warranty** become void.

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9 Malfunctions and remedies

⚠ WARNING

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

Severe or fatal injuries.

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

⚠ CAUTION

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

Serious injuries.

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

NOTICE

Damage to gear unit/gearmotor due to improper operation.

Damage to the gear unit/gearmotor.

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

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9.1 Gear units

Fault	Possible cause	Measure
Unusual, regular running noise	• Meshing/grinding noise: Bearing damage	• Check oil consistency, change bearings
	• Knocking noise: Irregularity in the gearing	• Consult SEW-EURODRIVE
	• Deformation of the housing upon tightening	• Check the gear unit mounting for possible deformation and correct if necessary
	• Noise generated by insufficient stiffness 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 inspection cover	• Seal of the inspection cover leaking	• Tighten the screws of the inspection 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 fault. Remove with 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 fault. Remove with soft, lint-free cloth and keep monitoring it.
Oil leaking from the oil seal.	• Oil seal leaking/defective	• Check sealing system. It may be necessary to contact 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 contact SEW-EURODRIVE.
Oil leaking from flange	• Flange gasket leaking/defective	• Check sealing system. It may be necessary to contact SEW-EURODRIVE.
	• Too much oil	• Check oil level, correct if necessary
	• Gear unit not ventilated	• Vent gear unit
Oil leaking from breather valve.	• Too much oil.	• Check oil quantity, correct if necessary
	• Function-related oil mist	• There is no fault.
	• Drive not installed in proper mounting position.	• Install breather valve correctly and adjust the oil level.
	• Frequent cold starts (oil foaming) and/or high oil level.	• Install oil expansion tank.
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

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9.2 AM/AQ./AL 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	• Spider wear, short-term torque transmission through metal contact	• Change the spider.
	• Screws to secure hub axially are loose	• Tighten the screws
Premature wear of spider	• Contact with aggressive fluids/ oils; ozone influence; excessive ambient temperatures, etc. that can change the physical properties of the spider.	• Contact SEW-EURODRIVE.
	• Impermissibly high ambient/contact temperature for the spider; maximum permitted temperature: -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 is leaking.	• Seal defective.	• Contact SEW-EURODRIVE.
Output shaft does not turn although the input shaft is rotated.	• Shaft-hub connection in gear unit or cover interrupted.	• Send the gear unit to SEW-EURODRIVE for repair.

9.4 Adapter with AR slip clutch

Fault	Possible cause	Measure
Unusual, regular running noise	• Meshing/grinding noise: Bearing damage	• Contact SEW-EURODRIVE.
Oil leaking.	• Seal defective	• Contact SEW-EURODRIVE.

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Fault	Possible cause	Measure
Evaluation unit display empty.	• Incremental encoder of adapter is defective.	• Measure input pulses and replace incremental encoder of adapter if necessary
	• Friction lining worn.	• Inspect friction lining / cup springs and replace if necessary
Slip torque is not reached.	• Friction lining worn. • Cup springs burned out or installed incorrectly after maintenance.	• Inspect friction lining / cup springs and replace if necessary

9.5 Service

If you require customer service, include the following information:

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

9.6 Waste disposal

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

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

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10 Declarations of conformity

10.1 Gear units in category 2G and 2D with AM.., AQ.., AL.., AD.., AR.. adapter

EU Declaration of Conformity

SEW EURODRIVE

Translation of the original text **900610510/EN**

SEW-EURODRIVE GmbH & Co. KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal
declares under sole responsibility that the following products

Gear units of the series	**R..** **F..** **K..** **S..** **W..**	
optionally with mount-on components of the series	**AM..** **AQ..** **AL..** **AD..** **AR..**	
variant	**/II2GD** **/II2G or** **/II2D**	
Category	**2G** **2D**	
Designation	**Ex h IIC T4 Gb or** **Ex h IIC T4 Gb X or** **Ex h IIIC T120 °C Db or** **Ex h IIIC T120 °C Db X**	**15)**
in accordance with		
ATEX Directive	**2014/34/EU** **(L 96, 29.03.2014, 309-356)**	**2)**
Applied harmonized standards:	**EN ISO 80079-36:2016** **EN ISO 80079-37:2016** **EN 60529:1991/A1:2000/A2:2013**	

2) SEW-EURODRIVE lodges the documents required by 2014/34/EU, appendix VIII, with the notified body: FSA GmbH, EU ID no.: 0588

15) This classification of the temperature class / surface temperature is an example. The order-specific Ex identification can be found on the nameplate.

Bruchsal	**01.02.2018**	Johann Soder	
Place	Date	Managing Director Technology	a) b)

a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents

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10.2 Gear units in category 2G and 2D with AR.., AM.., AQ.., AL.., AD.. adapter

EU Declaration of Conformity

SEW EURODRIVE

Translation of the original text **900580510/EN**

SEW-EURODRIVE GmbH & Co. KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal
declares under sole responsibility that the following products

Gear units of the series	**R..** **F..** **K..** **S..** **W..**	
Optionally with mount-on components of the series	**AR..** **AM..** **AQ..** **AL..** **AD..**	
variant	**/II3GD** **/II3G or** **/II3D**	
Category	**3G** **3D**	
Designation	**Ex h IIC T4 Gc or** **Ex h IIC T4 Gc X or** **Ex h IIIC T120 °C Dc or** **Ex h IIIC T120 °C Dc X**	**15)**
in accordance with		
ATEX Directive	**2014/34/EU** **(L 96, 29.03.2014, 309-356)**	
Applied harmonized standards:	**EN ISO 80079-36:2016** **EN ISO 80079-37:2016** **EN 60529:1991/A1:2000/A2:2013**	

15) This classification of the temperature class / surface temperature is an example. The order-specific Ex identification can be found on the nameplate.

Bruchsal	**01.02.2018**		
Place	Date	Johann Soder Managing Director Technology	a) b)

a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents

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Australia			
Assembly Sales Service	Melbourne	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
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Belarus			
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Belgium			
Assembly Sales Service	Brussels	SEW-EURODRIVE n.v./s.a. Researchpark Haasrode 1060 Evenementenlaan 7 3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Center	Industrial Gears	SEW-EURODRIVE n.v./s.a. Rue de Parc Industriel, 31 6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-IG@sew-eurodrive.be
Brazil			
Production Sales Service	São Paulo	SEW-EURODRIVE Brasil Ltda. Estrada Municipal José Rubim, 205 – Rodovia Santos Dumont Km 49 Indaiatuba – 13347-510 – SP	Tel. +55 19 3835-8000 sew@sew.com.br
Assembly Sales Service	Rio Claro	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
Bulgaria			
Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg

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Cameroon			
Sales	Douala	SEW-EURODRIVE S.A.R.L. Ancienne Route Bonabéri P.O. Box B.P 8674 Douala-Cameroun	Tel. +237 233 39 02 10 Fax +237 233 39 02 10 sew@sew-eurodrive-cm
Canada			
Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
Chile			
Assembly Sales Service	Santiago de Chile	SEW-EURODRIVE CHILE LTDA Las Encinas 1295 Parque Industrial Valle Grande LAMPA Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 2757 7000 Fax +56 2 2757 7001 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl
China			
Production Assembly Sales Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 78, 13th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 http://www.sew-eurodrive.cn info@sew-eurodrive.cn
Assembly Sales Service	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
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	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
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Colombia			
Assembly Sales Service	Bogota	SEW-EURODRIVE COLOMBIA LTDA. Calle 17 No. 132-18 Interior 2 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sew@sew-eurodrive.com.co
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Sales Service	Zagreb	KOMPEKS d. o. o. Zeleni dol 10 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr
Czech Republic			
Assembly Sales Service	Hostivice	SEW-EURODRIVE CZ s.r.o. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
	Drive Service Hotline / 24 Hour Service	+420 800 739 739 (800 SEW SEW)	Service Tel. +420 255 709 632 Fax +420 235 358 218 servis@sew-eurodrive.cz
Denmark			
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Egypt			
Sales Service	Cairo	Copam Egypt for Engineering & Agencies Building 10, Block 13005, First Industrial Zone, Obour City Cairo	Tel. +202 44812673 / 79 (7 lines) Fax +202 44812685 http://www.copam-egypt.com copam@copam-egypt.com
Estonia			
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Service	Hollola	SEW-EURODRIVE OY Keskikankaantie 21 15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Production Assembly	Karkkila	SEW Industrial Gears Oy Santasalonkatu 6, PL 8 03620 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 http://www.sew-eurodrive.fi sew@sew.fi
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	Brumath	SEW-USOCOME 1 Rue de Bruxelles 67670 Mommenheim Cedex	Tel. +33 3 88 37 48 00
Assembly Sales Service	Bordeaux	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan – B. P. 182 33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09

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	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin 77390 Verneuil l'Étang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
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Production	Graben	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-0 Fax +49 7251-2970
	Östringen	SEW-EURODRIVE GmbH & Co KG, Werk Östringen Franz-Gurk-Straße 2 76684 Östringen	Tel. +49 7253 9254-0 Fax +49 7253 9254-90 oestringen@sew-eurodrive.de
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	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 scc-elektronik@sew-eurodrive.de
Drive Technology Center	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 30823 Garbsen (Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 dtc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 08393 Meerane (Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 dtc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 85551 Kirchheim (München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 dtc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 40764 Langenfeld (Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 dtc-west@sew-eurodrive.de
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	Ludwigshafen	SEW-EURODRIVE GmbH & Co KG c/o BASF SE Gebäude W130 Raum 101 67056 Ludwigshafen	Tel. +49 7251 75 3759 Fax +49 7251 75 503759 dc-ludwigshafen@sew-eurodrive.de
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	Drive Service Hotline / 24 Hour Service		Tel. 01924 896911
Greece			
Sales	Athens	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr
Hungary			
Sales Service	Budapest	SEW-EURODRIVE Kft. Csillaghegyí út 13. 1037 Budapest	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu
Iceland			
Sales	Reykjavik	Varma & Vélaverk ehf. Knarrarvogi 4 104 Reykjavík	Tel. +354 585 1070 Fax +354 585)1071 http://www.varmaverk.is vov@vov.is
India			
Registered Office Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200 Fax +91 265 3045300 http://www.seweurodriveindia.com salesvadodara@seweurodriveindia.com
Assembly Sales Service	Chennai	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com
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	Jakarta	PT. Cahaya Sukses Abadi Komplek Rukan Puri Mutiara Blok A no 99, Sunter Jakarta 14350	Tel. +62 21 65310599 Fax +62 21 65310600 csajkt@cbn.net.id
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	Surabaya	CV. Multi Mas Jl. Raden Saleh 43A Kav. 18 Surabaya 60174	Tel. +62 31 5458589 Fax +62 31 5317220 sianhwa@sby.centrin.net.id http://www.cvmultimas.com
Ireland			
Sales Service	Dublin	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 http://www.alperton.ie info@alperton.ie
Israel			
Sales	Tel Aviv	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il
Italy			
Assembly Sales Service	Milan	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 20020 Solaro (Milano)	Tel. +39 02 96 980229 Fax +39 02 96 980 999 http://www.sew-eurodrive.it milano@sew-eurodrive.it
Ivory Coast			
Sales	Abidjan	SEW-EURODRIVE SARL Ivory Coast Rue des Pêcheurs, Zone 3 26 BP 916 Abidjan 26	Tel. +225 21 21 81 05 Fax +225 21 25 30 47 info@sew-eurodrive.ci http://www.sew-eurodrive.ci
Japan			
Assembly Sales Service	Iwata	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp hamamatsu@sew-eurodrive.co.jp
Kazakhstan			
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	Tashkent	SEW-EURODRIVE LLP Representative office in Uzbekistan 96A, Sharaf Rashidov street, Tashkent, 100084	Tel. +998 71 2359411 Fax +998 71 2359412 http://www.sew-eurodrive.uz sew@sew-eurodrive.uz
	Ulaanbaatar	IM Trading LLC Olympic street 28B/3 Sukhbaatar district, Ulaanbaatar 14230	Tel. +976-77109997 Fax +976-77109997 imt@imt.mn
Kenya			
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Latvia			
Sales	Riga	SIA Alas-Kuul Katlakalna 11C 1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.lv info@alas-kuul.com

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Lebanon			
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Sales (Jordan, Kuwait , Saudi Arabia, Syria)	Beirut	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 http://www.medrives.com info@medrives.com
Lithuania			
Sales	Alytus	UAB Irseva Statybininku 106C 63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 http://www.irseva.lt irmantas@irseva.lt
Luxembourg			
representation: Belgium			
Macedonia			
Sales	Skopje	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 http://www.boznos.mk
Malaysia			
Assembly Sales Service	Johor	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Mexiko			
Assembly Sales Service	Quéretaro	SEW-EURODRIVE MEXICO S.A. de C.V. SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Querétaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Sales Service	Puebla	SEW-EURODRIVE MEXICO S.A. de C.V. Calzada Zavaleta No. 3922 Piso 2 Local 6 Col. Santa Cruz Buenavista C.P. 72154 Puebla, México	Tel. +52 (222) 221 248 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Mongolia			
Technical Office	Ulaanbaatar	IM Trading LLC Olympic street 28B/3 Sukhbaatar district, Ulaanbaatar 14230	Tel. +976-77109997 Tel. +976-99070395 Fax +976-77109997 http://imt.mn/ imt@imt.mn
Morocco			
Sales Service	Bouskoura	SEW-EURODRIVE Morocco Parc Industriel CFCIM, Lot 55 and 59 Bouskoura	Tel. +212 522 88 85 00 Fax +212 522 88 84 50 http://www.sew-eurodrive.ma sew@sew-eurodrive.ma
Namibia			
Sales	Swakopmund	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 anton@dbminingnam.com
Netherlands			
Assembly Sales Service	Rotterdam	SEW-EURODRIVE B.V. Industrieweg 175 3044 AS Rotterdam Postbus 10085 3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl

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New Zealand			
Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 30 Lodestar Avenue, Wigram Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Nigeria			
Sales	Lagos	Greenpeg Nig. Ltd Plot 296A, Adeyemo Akapo Str. Omole GRA Ikeja Lagos-Nigeria	Tel. +234-701-821-9200-1 http://www.greenpegltd.com bolaji.adekunle@greenpegltd.com
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no
Pakistan			
Sales	Karachi	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk
Paraguay			
Sales	Fernando de la Mora	SEW-EURODRIVE PARAGUAY S.R.L De la Victoria 112, Esquina nueva Asunción Departamento Central Fernando de la Mora, Barrio Bernardino	Tel. +595 991 519695 Fax +595 21 3285539 sewpy@sew-eurodrive.com.py
Peru			
Assembly Sales Service	Lima	SEW EURODRIVE DEL PERU S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe
Philippines			
Sales	Makati	P.T. Cerna Corporation 4137 Ponte St., Brgy. Sta. Cruz Makati City 1205	Tel. +63 2 519 6214 Fax +63 2 890 2802 mech_drive_sys@ptcerna.com http://www.ptcerna.com
Poland			
Assembly Sales Service	Łódź	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 92-518 Łódź	Tel. +48 42 293 00 00 Fax +48 42 293 00 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	Service	Tel. +48 42 293 0030 Fax +48 42 293 0043	24 Hour Service Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl
Portugal			
Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Av. da Fonte Nova, n.º 86 3050-379 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
Romania			
Sales Service	Bucharest	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro
Russia			
Assembly Sales Service	St. Petersburg	ЗАО «СЕВ-ЕВРОДРАЙФ» а. я. 36 195220 Санкт-Петербург	Tel. +7 812 3332522 / +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

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Sambia			
representation: South Africa			
Senegal			
Sales	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 http://www.senemeca.com senemeca@senemeca.sn
Serbia			
Sales	Belgrade	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor 11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs
Singapore			
Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Slovakia			
Sales	Bratislava	SEW-Eurodrive SK s.r.o. Rybničná 40 831 06 Bratislava	Tel.+421 2 33595 202, 217, 201 Fax +421 2 33595 200 http://www.sew-eurodrive.sk sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 Mobile +421 907 671 976 sew@sew-eurodrive.sk
Slovenia			
Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
South Africa			
Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 248-7289 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 bgriffiths@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospecton Road Isipingo Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 902 3815 Fax +27 31 902 3826 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PROPRIETARY) LIMITED 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za
South Korea			
Assembly Sales Service	Ansan	SEW-EURODRIVE KOREA CO., LTD. 7, Dangjaengi-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-eurodrive.kr master.korea@sew-eurodrive.com

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South Korea			
	Busan	SEW-EURODRIVE KOREA CO., LTD. 28, Noksansandan 262-ro 50beon-gil, Gangseo-gu, Busan, Zip 618-820	Tel. +82 51 832-0204 Fax +82 51 832-0230
Spain			
Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es
Sri Lanka			
Sales	Colombo	SM International (Pte) Ltd 254, Galle Raod Colombo 4, Sri Lanka	Tel. +94 1 2584887 Fax +94 1 2582981
Swaziland			
Sales	Manzini	C G Trading Co. (Pty) Ltd PO Box 2960 Manzini M200	Tel. +268 2 518 6343 Fax +268 2 518 5033 engineering@cgtrading.co.sz
Sweden			
Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 553 03 Jönköping Box 3100 S-550 03 Jönköping	Tel. +46 36 34 42 00 Fax +46 36 34 42 80 http://www.sew-eurodrive.se jonkoping@sew.se
Switzerland			
Assembly Sales Service	Basel	Alfred Imhof A.G. Jurastrasse 10 4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch
Taiwan			
Sales	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Huw S. Road Taipei	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 sewtwn@ms63.hinet.net http://www.tingshou.com.tw
	Nan Tou	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878 sewtwn@ms63.hinet.net http://www.tingshou.com.tw
Tanzania			
Sales	Daressalam	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam	Tel. +255 0 22 277 5780 Fax +255 0 22 277 5788 http://www.sew-eurodrive.co.tz info@sew.co.tz
Thailand			
Assembly Sales Service	Chonburi	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Tunisia			
Sales	Tunis	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 http://www.tms.com.tn tms@tms.com.tn
Turkey			
Assembly Sales Service	Kocaeli-Gebze	SEW-EURODRİVE Hareket Sistemleri San. Ve TIC. Ltd. Sti Gebze Organize Sanayi Böl. 400 Sok No. 401 41480 Gebze Kocaeli	Tel. +90 262 9991000 04 Fax +90 262 9991009 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

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United Arab Emirates			
Sales Service	Dubai	SEW-EURODRIVE FZE PO Box 263835 Office No. S3A1SR03 Jebel Ali Free Zone – South, Dubai, United Arab Emirates	Tel. +971 (0)4 8806461 Fax +971 (0)4 8806464 http://www.sew-eurodrive.ae info@sew-eurodrive.ae
Ukraine			
Assembly Sales Service	Dnipropetrovsk	ООО «СЕВ-Евродрайв» ул. Рабочая, 23-В, офис 409 49008 Днепр	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
Uruguay			
Assembly Sales	Montevideo	SEW-EURODRIVE Uruguay, S. A. Jose Serrato 3569 Esqina Corumbe CP 12000 Montevideo	Tel. +598 2 21181-89 Fax +598 2 21181-90 sewuy@sew-eurodrive.com.uy
USA			
Production Assembly Sales Service	Southeast Region	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Production +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly Sales Service	Northeast Region	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Wellford	SEW-EURODRIVE INC. 148/150 Finch Rd. Wellford, S.C. 29385	Tel. +1 864 439-7537 Fax +1 864 661 1167 IGOrders@seweurodrive.com
	Additional addresses for service provided on request!		
Vietnam			
Sales	Ho Chi Minh City	Nam Trung Co., Ltd Huế - South Vietnam / Construction Materials 250 Binh Duong Avenue, Thu Dau Mot Town, Binh Duong Province HCM office: 91 Tran Minh Quyen Street District 10, Ho Chi Minh City	Tel. +84 8 8301026 Fax +84 8 8392223 khanh-nguyen@namtrung.com.vn http://www.namtrung.com.vn
	Hanoi	MICO LTD Quảng Trị - North Vietnam / All sectors except Construction Materials 8th Floor, Ocean Park Building, 01 Dao Duy Anh St, Ha Noi, Viet Nam	Tel. +84 4 39386666 Fax +84 4 3938 6888 nam_ph@micogroup.com.vn http://www.micogroup.com.vn

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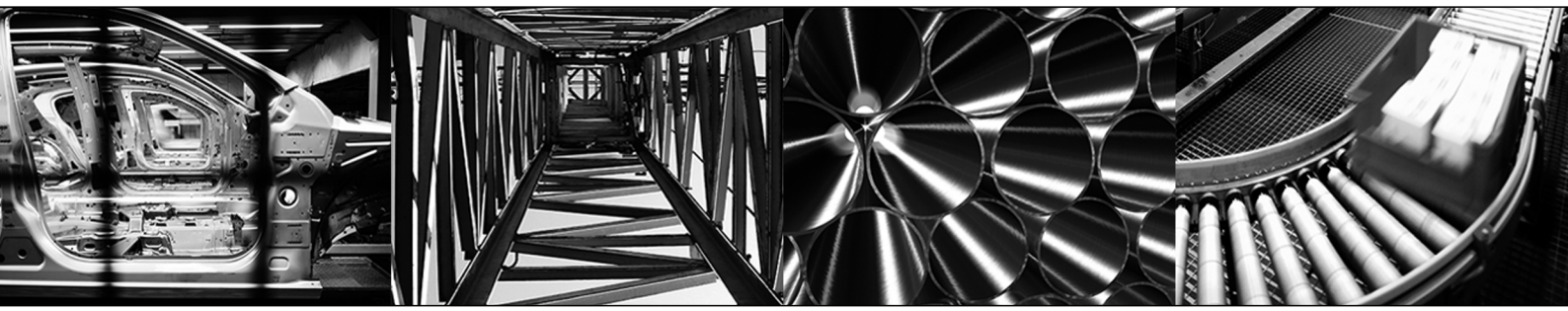

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Driving the world

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