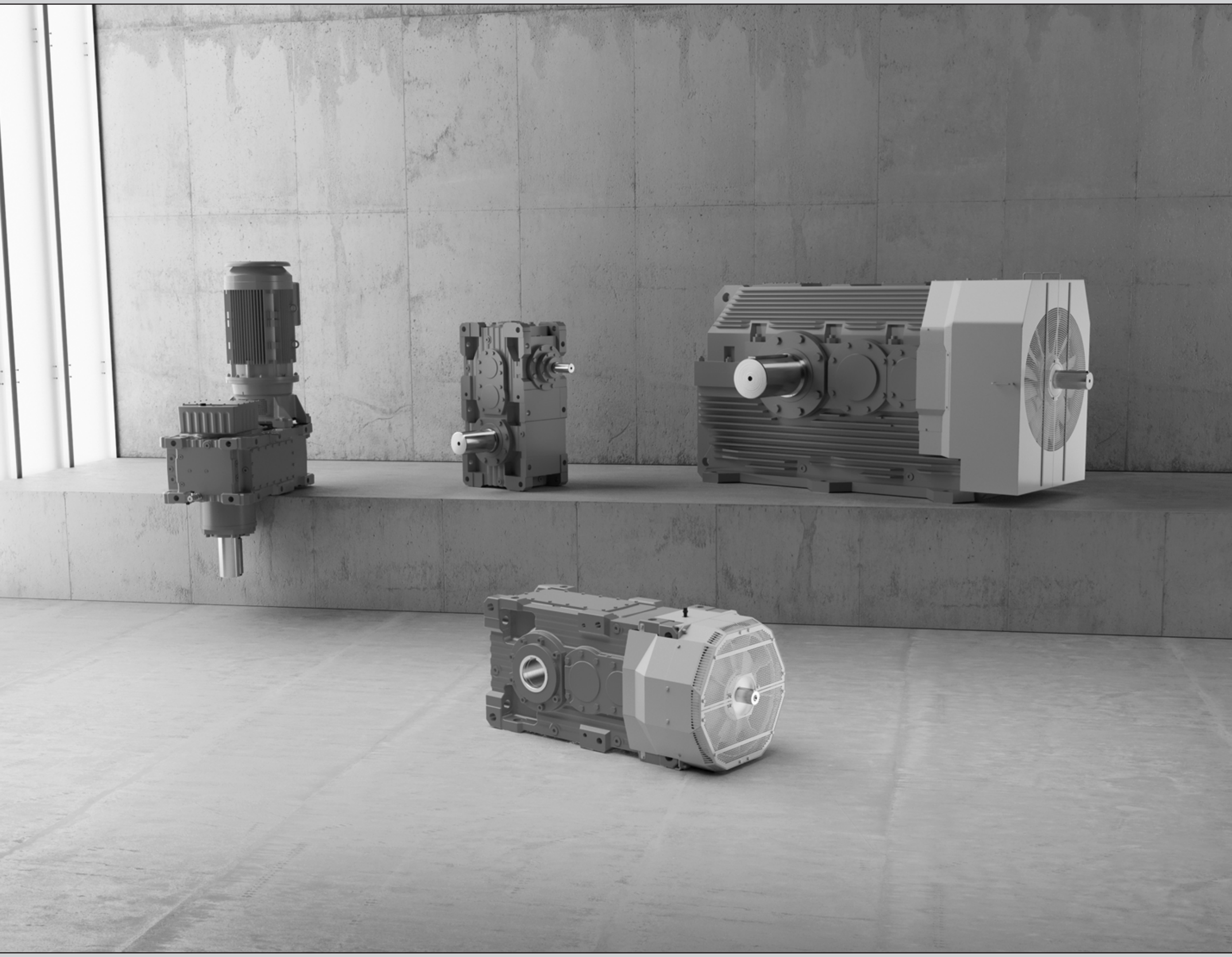
Assembly and Operating Instructions



Industrial Gear Units

X..e Series Helical and Bevel-Helical Gear Units

Torque Classes from 7.2 kNm – 500 kNm

Edition 02/2024

31551947/EN

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1 General information

1.1 About this documentation

The documentation at hand is the original.

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

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

1.2 Structure of the safety notes

1.2.1 Meaning of signal words

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

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

1.2.2 Structure of section-related safety notes

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

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

SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

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 automatic restart

1.2.3 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

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

1.3 Decimal separator in numerical values

In this document, a period is used to indicate the decimal separator.

Example: 30.5 kg

1.4 Recycling, reprocessing, reuse

SEW-EURODRIVE GmbH & Co KG strives to use as few new natural resources as possible in the production of its products. An important aspect of this is the circular economy with the recycling of materials as well as the inspection and/or reprocessing of returned components and their reuse in new products. SEW-EURODRIVE GmbH & Co KG only uses these processes if the resulting materials and components are of the same quality as new parts.

1.5 Product names and trademarks

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

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1.6 Copyright notice

1.7 Other applicable documentation

The following documentation should also be observed:

- Order documents, such as technical specification, spare and wear parts list, dimension sheet, order confirmation, etc.
- If required, the operating instructions of the options installed such as:
  - Oil cooling system
  - Oil supply system
  - Flange coupling
  - Swing base and base frame
  - AC motors
  - DriveRadar®
  - Brake
  - Coupling
- Separate assembly and operating instructions are available for the following gear units:
  - Bucket elevator gear unit
  - Hoist gear units /HC
  - Agitator gear unit /HM

For up-to-date information about industrial gear units, visit:

www.sew-eurodrive.com

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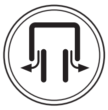
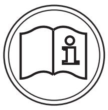
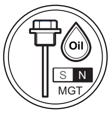
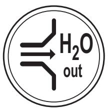
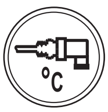
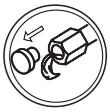
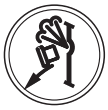
1.8 Symbols on the gear unit

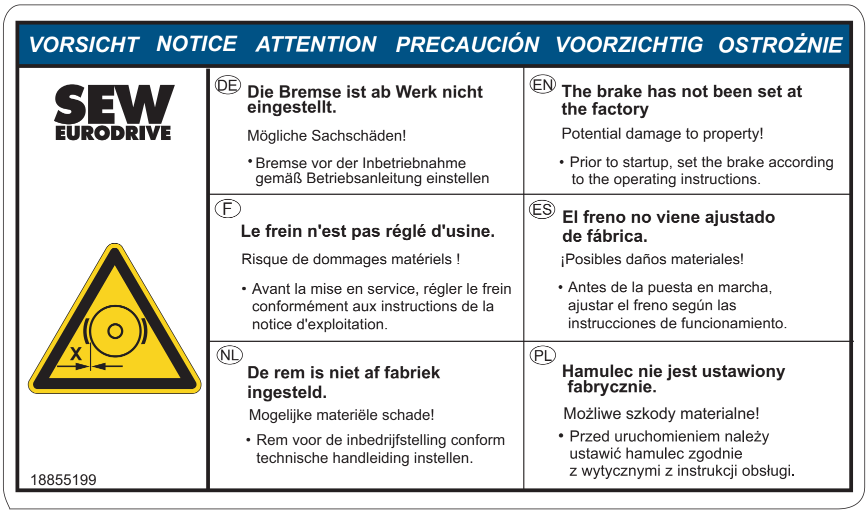
The symbols attached on the gear unit must be observed. They have the following meaning:

Icons	Meaning
	Indicates the **oil filling point**. At the same time, it serves as the correct breather when changing the oil.
	Indicates the **oil drain**.
	Indicates the position of the **breather**. Serves to avoid mistaking the oil measuring position for the venting position.
	Used to avoid faults due to lack of understanding. Observe the information in the operating instructions.
	Indicates the **magnetic oil dipstick**.
	Indicates the **magnetic oil drain plug**.
	Indicates the position of the **relubrication points** and makes it easier to find the points to be lubricated. Helps prevent bearing damage.
	Indicates the **water supply** and is used to find the connection option.
	Indicates the **water return** and is used to find the connection option.
	Indicates the **oil supply** and is used to find the connection option.
	Indicates the **oil return** and is used to find the connection option.
	Indicates the mounting position of the gear unit for the **oil control** on the information sign for pivoted mounting positions.
	Indicates the position of the **temperature sensor/temperature switch**.

Icons	Meaning
	Identifies the **grease drain screw** and is used to find the grease drain option.
	Indicates the **air outlet screw**.

The following gear unit labels can be removed from the gear unit after startup.

Meaning
Brake not set at the factory.



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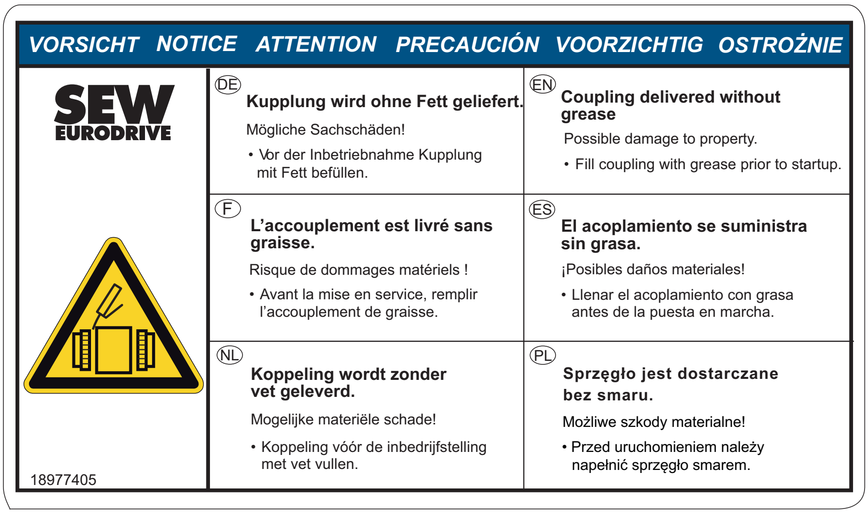
Coupling is delivered without grease.



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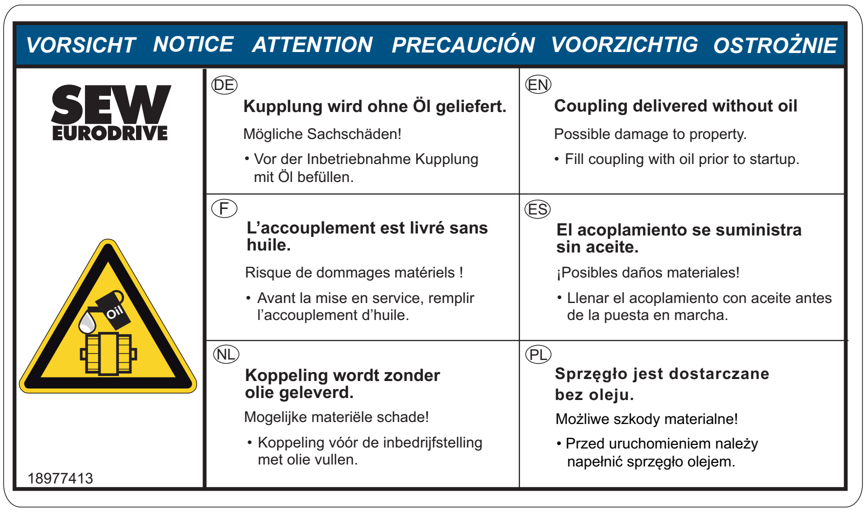
Meaning
Coupling is delivered without oil.



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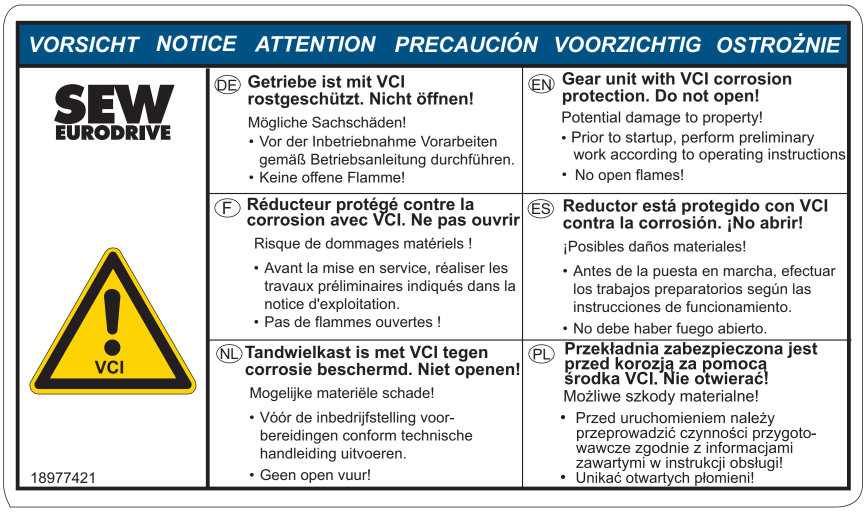
The gear unit is protected against corrosion with VCI.



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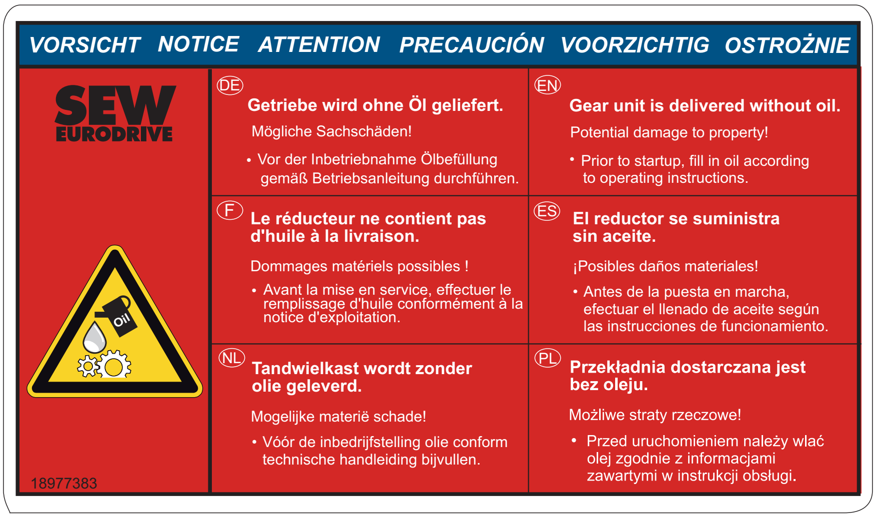
Meaning
Gear unit is delivered without oil.



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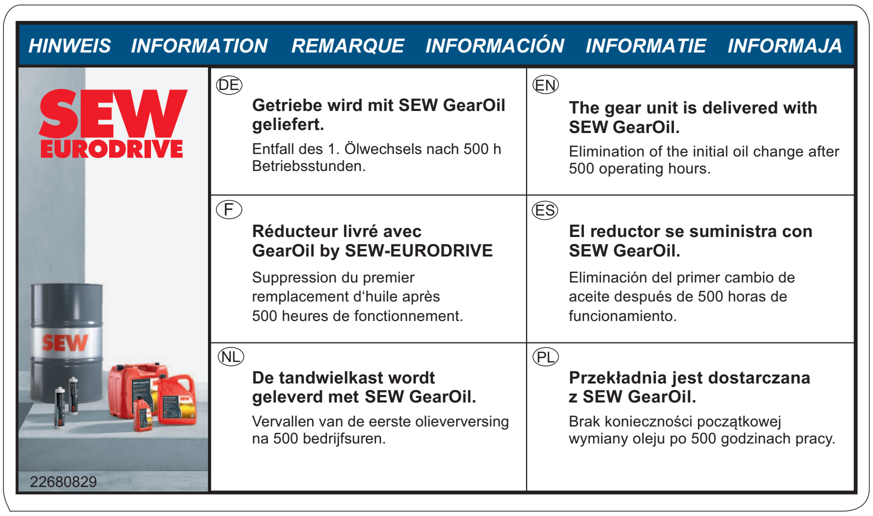
The gear unit is delivered with SEW GearOil.



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1.9 Symbols on the dimension sheet

The symbols on the dimension sheet must be observed. They have the following meaning:

Icons	Meaning
	Indicates the **oil filling point**.
	Indicates the **oil drain**.

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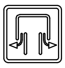
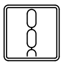
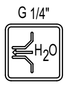
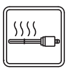
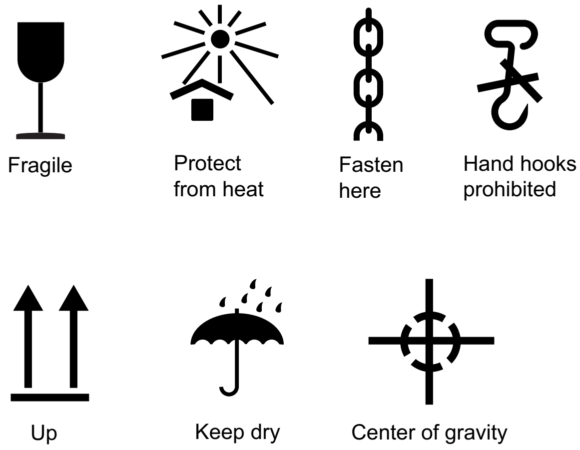
Icons	Meaning
	Indicates the position of the **breather**.
	Indicates the position of the **inspection cover**.
	Indicates the position of the attachment points for **transport**.
	Indicates the position of the **oil dipstick**.
	Indicates the position of the **oil level glass**.
	Indicates the position of the **oil sight glass**.
	Indicates the position of the **relubrication points**.
	Indicates the position of the **relubrication points**.
	Indicates the position of the **grease outlet**.
	Indicates the **water inflow** with connection dimensions.
	Indicates the **water return** with connection dimensions.
	Indicates the **oil inflow**.
	Indicates the **oil return**.
	Indicates the position of the **magnetic screw plug**.
	Indicates the position of the **torque arm**.
	Indicates the position of the operator's **vibration sensor** with connection dimensions.
	Indicates the position of the **oil heater**.

1.10 Symbols on the packaging

The symbols on the packaging must be observed. They have the following meaning:



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2 Safety notes

2.1 Designated use

Industrial gear units are gear units driven by motors and are designed for operation in industrial and commercial systems.

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

For the technical data and the specifications for the installation conditions, refer to the nameplate and the technical specification in this documentation. You must adhere to the data and conditions.

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

Unintended use of the product may result in severe injury to persons and damage to property.

2.1.1 Restrictions of use

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

- Use in potentially explosive areas.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, and radiation.
- Operation in applications with impermissibly high mechanical vibration and shock loads in excess of the regulations stipulated in EN 60068-2-6 and/or EN 60068-2-27.

2.2 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.

2.3 Duties of the user

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

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

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

- Shutdown
- Disassembly

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

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

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

2.4 Target group

Specialist for mechanical work

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

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

Specialist for electrotechnical work

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

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

Additional qualifications

In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives, and laws specified in this documentation.

The persons must have the express authorization of the company to operate, program, parameterize, label, and ground devices, systems, and circuits in accordance with the standards of safety technology.

Instructed persons

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

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2.5 Creating a safe working environment

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

2.5.1 Performing work on the product safely

Defective or damaged product

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

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

Rotating parts

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

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

Falling load

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

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

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Hot surfaces

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

- Let the product and its accessories cool down before touching it.
- Do not touch any surfaces of the product during operation, except for the control elements.
- Also observe the labels and hazard symbols on the product.

Use of hazardous substances, lubricants, adhesives

Observe the following information to avoid poisoning or fire hazards:

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

Missing protective equipment

To avoid injuries, wear the appropriate protective equipment during all work on the product:

- Wear safety gloves.
- Wear safety shoes.
- Wear protective goggles.

2.5.2 Performing electrical work safely

Observe the following information to perform electrical work safely:

Electrical work may only be performed by a qualified electrician or an electronically instructed person under the supervision of an electrician.

The fact that the operation or display elements are no longer illuminated does not indicate that the product has been disconnected from the supply system and no longer carries any voltage.

Live parts

Always adhere to the 5 safety rules for all work on electrical components:

1. Disconnect.
2. Secure the device against a restart.
3. Check that no voltage is applied.
4. Ground and short-circuit.
5. Cover or isolate neighboring live parts.

Depending on the situation, it is possible to deviate from rules 4 and 5. Observe standard EN 50110-1.

2.6 Transportation

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 following information to avoid danger.

- Secure the gear unit against falling over during the lifting process.
- Use suitable, adequately dimensioned and undamaged means of transport.
- Secure the attachment parts, such as keys.
- When selecting the lifting equipment or crane, take the gear unit dimensions, center of gravity and mass to be moved into consideration. The mass of the gear unit (without oil) is indicated on the nameplate. The mass to be moved is the total weight of the drive package including mount-on components (not only the weight of the gear unit).
- Transport the gear unit in such a way that damage to the gear unit and attached parts (e.g. breather) is avoided.
- Make sure that there is not too much oil in the gear unit. If the oil level is too high and the temperature rises, lubricant may escape from the breather.

2.7 Installation/assembly and inspection/maintenance

There is a risk of personal injury or damage to property during installation/assembly and inspection/maintenance. Observe the following information to avoid danger.

- Install/mount the gear unit only in the specified mounting position on a level, vibration-damping, and torsionally rigid support structure. Do not twist housing feet and mounting flanges against each other.
- Do not mount any impermissible components to the gear unit. Mounting impermissible components may lead to material failure at the gear unit. This may cause the gear unit to fall over or down.
- Protect the operator’s machine against unintentional movement when installing or removing the gear unit.
- The seals must not come in contact with aggressive cleaning agents as this may damage the seals.
- Refer to the nameplate for information regarding the gear oil.
- Do not mix oils of different types and from different manufacturers.
- Check whether lubricant leaks from the gear unit or mount-on parts.
- Immediately remove any lubricant that has escaped with a binding agent.

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2.8 Startup

There is a risk of personal injury and damage to property during startup. Observe the following information to avoid danger.

- The gear unit may be damaged during gear unit startup below the permitted ambient temperature.
- After installing the gear unit, check to verify that all retaining screws are tight and aligned correctly.
- Make sure that the gear unit is grounded properly. Electrical mount-on components, such as motor, frequency inverter etc., must be grounded separately.
- Make sure that the monitoring devices (pressure switch, temperature switch, etc.) are working.

2.9 Product safety label on the product

Product safety labels can become dirty or otherwise illegible over time. Always maintain them in a legible state. Replace damaged product safety labels. Failure to do so may result in injury due to illegible product safety labels.

Always observe the product safety labels attached to the gear unit. They have the following meaning:

Product safety label	Meaning
	Caution: Risk of burns due to hot surface. The safety symbol is located on the top side of the gear unit.
	Caution: Gear unit damage when unscrewing the oil dipstick during operation. The safety symbol is located directly next to the oil dipstick.
	Caution: Risk of burns due to hot gear unit oil. The safety symbol is located directly next to the oil drain.

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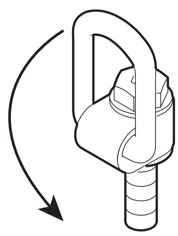
3 Transportation/storage

Before transporting the gear unit, observe the safety notes in chapter "Transportation" (→ 🗎 20) and the following notes.

- The weight of the gear unit (without oil) is indicated on the nameplate or in the dimension sheet. Comply with the loads and regulations specified there.
- If possible, transport the gear unit without oil fill. If this is not possible, note that the weight indicated on the nameplate refers only to the gear unit without oil fill.
- For gear units with non-contact gasket and oil filling on delivery, ensure transport in horizontal mounting position.
- For gear units with a fan, the specified attachment points [1] might be inaccessible because of the fan guard. In this case, remove the fan guard before transporting the gear unit. Before starting up the fan, make sure that the fan guard is mounted properly.
- Only use the specified attachment points [1] to transport the gear unit, see the following illustrations and order documents. The load suspensions of the motor or mount-on components are provided for stabilization purposes only.
- Make sure that the lifting eyebolts are screwed in completely and are flush to the contact surface. Tighten the lifting eyebolts at least hand-tight. Observe the following information.



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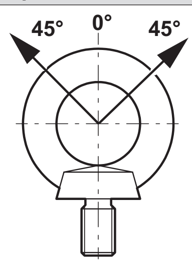
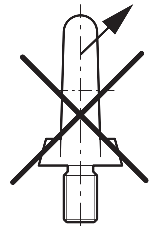
Eyebolts DIN 580/DIN 582	
Correct: **Angle of tension force vector towards the ring plane, max. 45°**	**Incorrect:** **Tension away from the ring plane**
	

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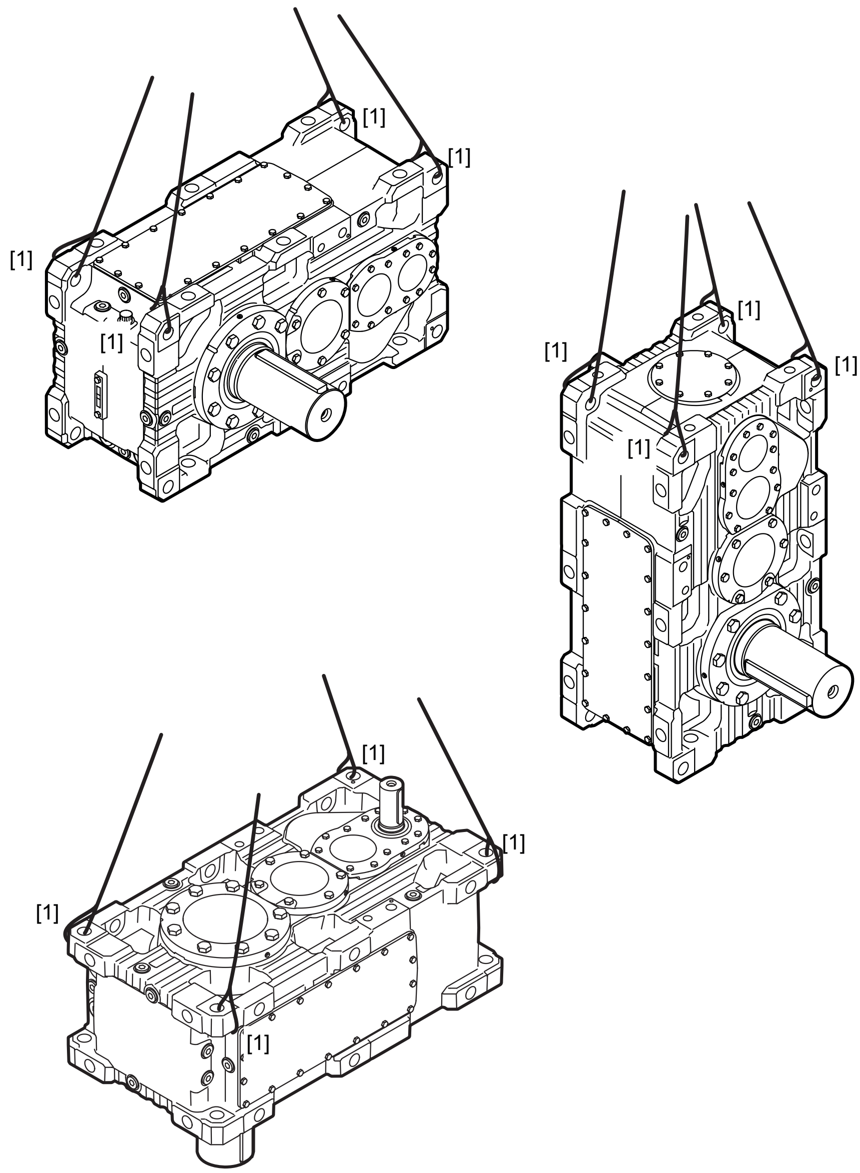
3.1 Gear unit with universal housing /HU

The following figure illustrates examples on how to transport the gear unit.



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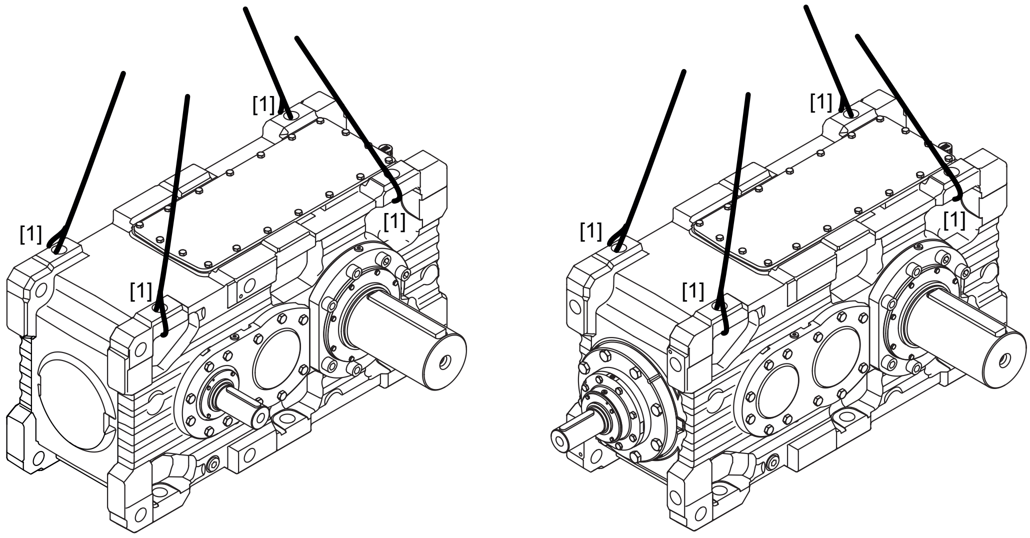
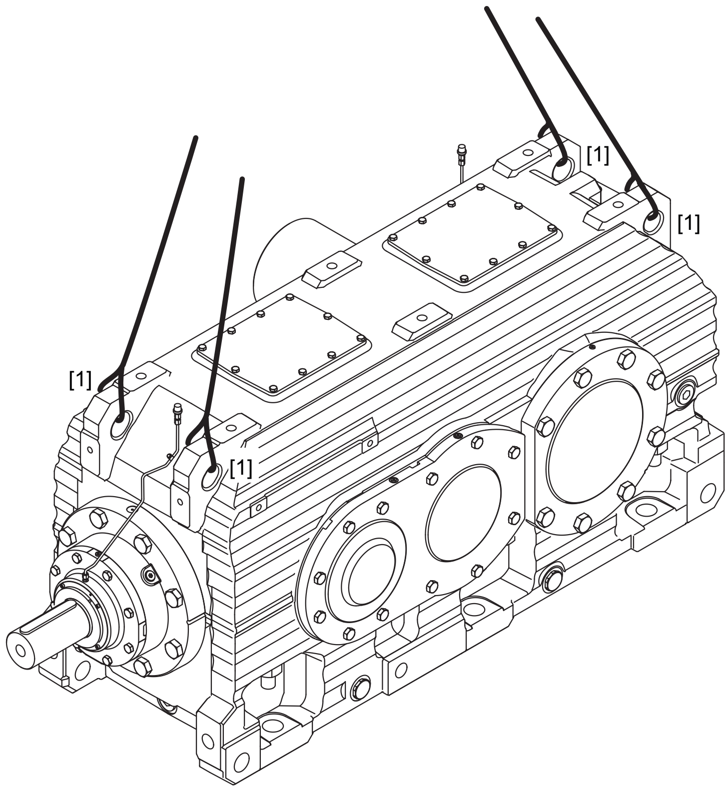
3.2 Gear unit with horizontal housing /HH

The following figures illustrate examples of how to transport the gear unit.

3.2.1 Sizes X100 – 210



3.2.2 Sizes X220 – 320



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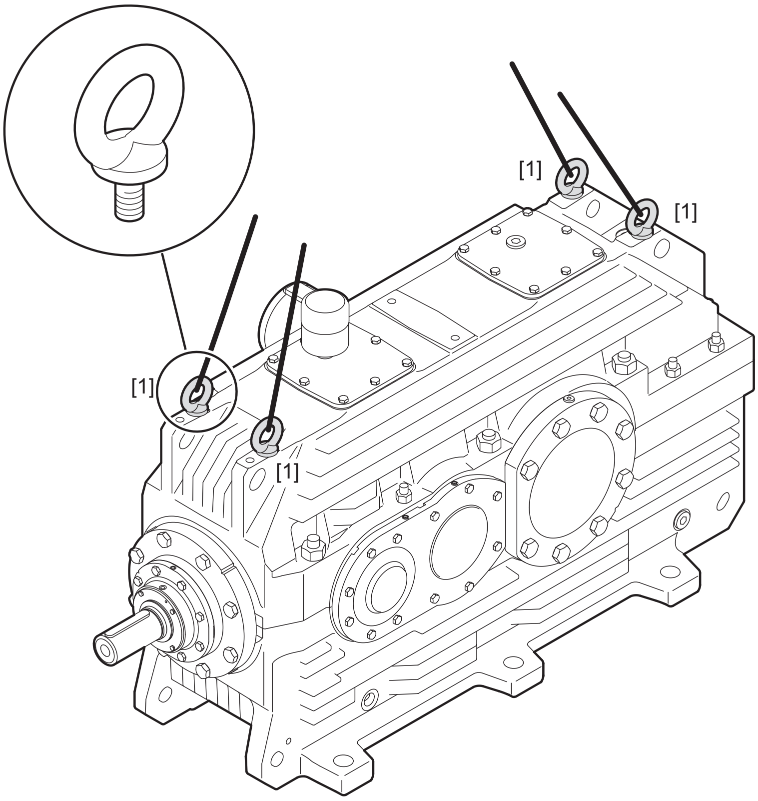
3.3 Gear unit with thermal housing /HT

The values in the table are only valid for transport with **4** attachment points [1] and without mount-on components, such as swing base, base frame or external cooling systems.

Transport with **2** attachment points with eyebolts (DIN 580/DIN 582) is not permitted.

Size	Thread
X220 – 230	4 × M24
X240 – 250	4 × M30
X260 – 280	4 × M30
X290 – 300	4 × M36
X310 – 320	4 × M36

The following figure illustrates how to transport the gear unit.



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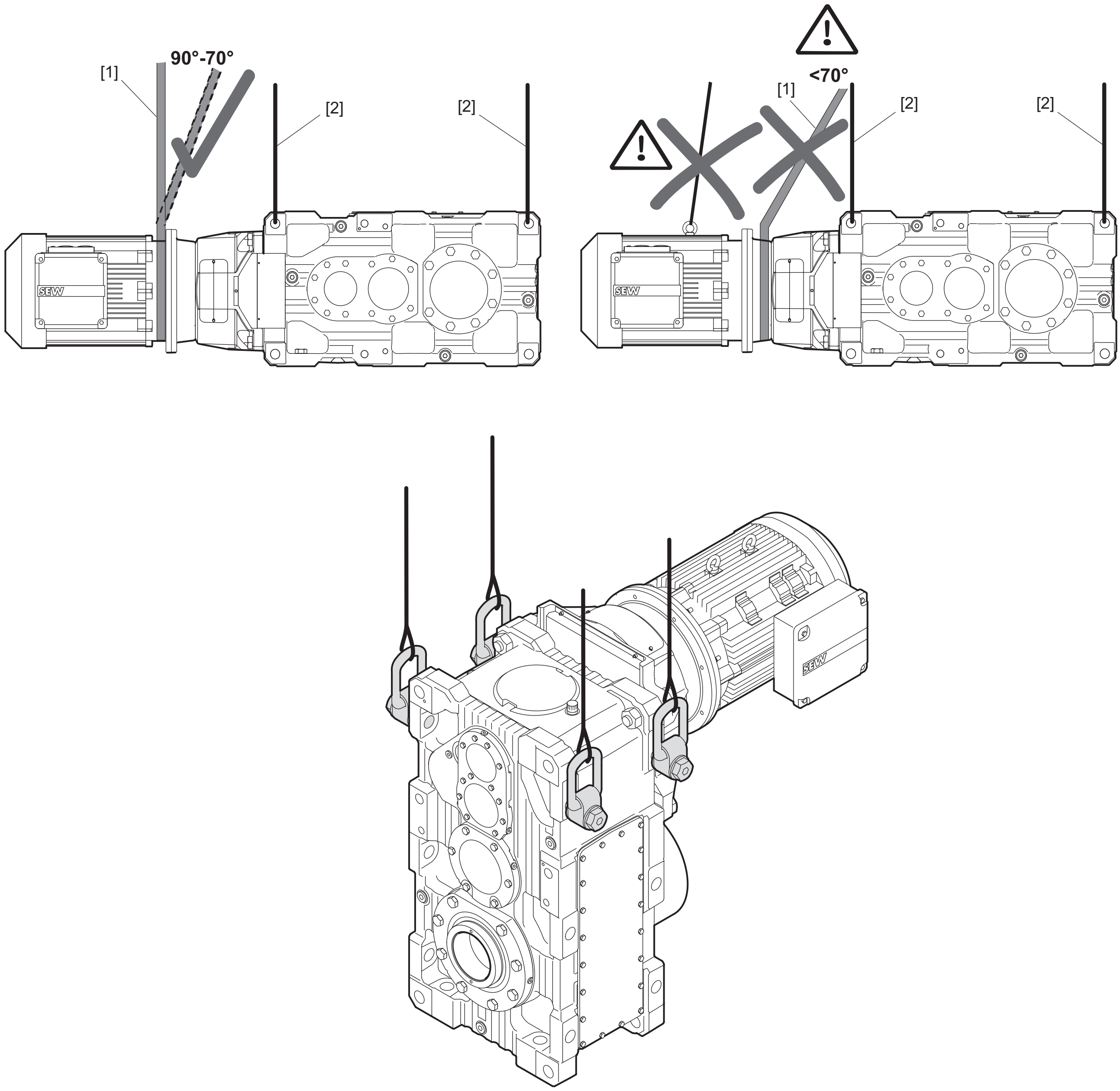
3.4 Gear unit with motor adapter

3.4.1 Universal and horizontal housing /HU/HH

The gear unit with motor adapter may only be transported using lifting cables/chains [2] or lifting straps [1] at an angle of 90° (vertical) up to 70° from the horizontal. The lifting eyes on the motor must not be used for transport. The following figures illustrate how to transport the gear unit.



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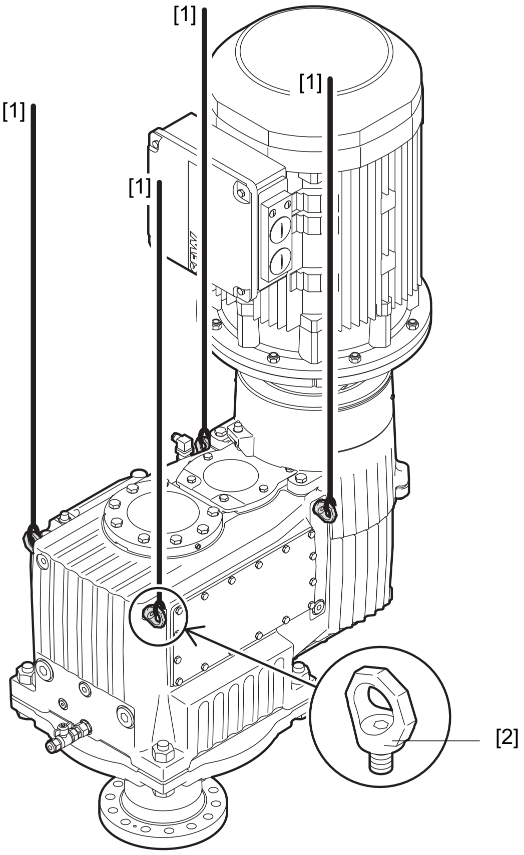
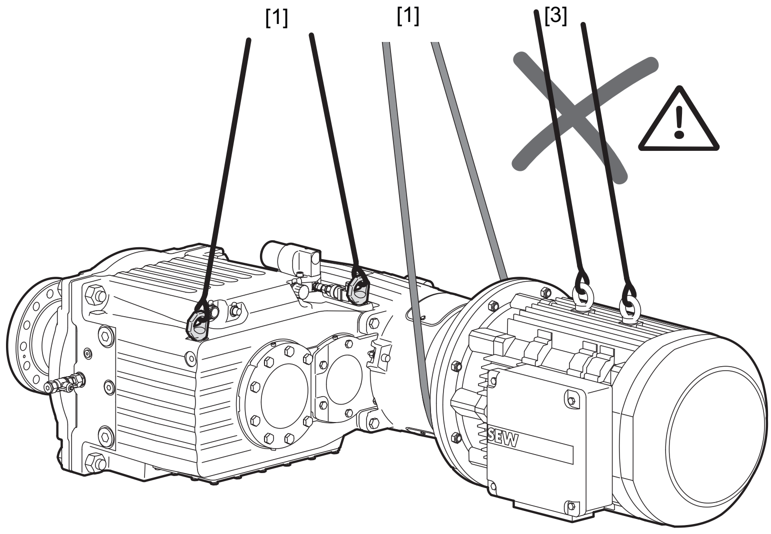
3.4.2 Agitator housing /HA

Use only the provided attachment points [1] and 5 star-shaped lifting eyebolts [2] to transport the gear unit. Transport with eyebolts according to DIN 580 and DIN 582 is not permitted.

The lifting eyes [3] on the motor must not be used for transport. The following figures illustrate how to transport the gear unit.





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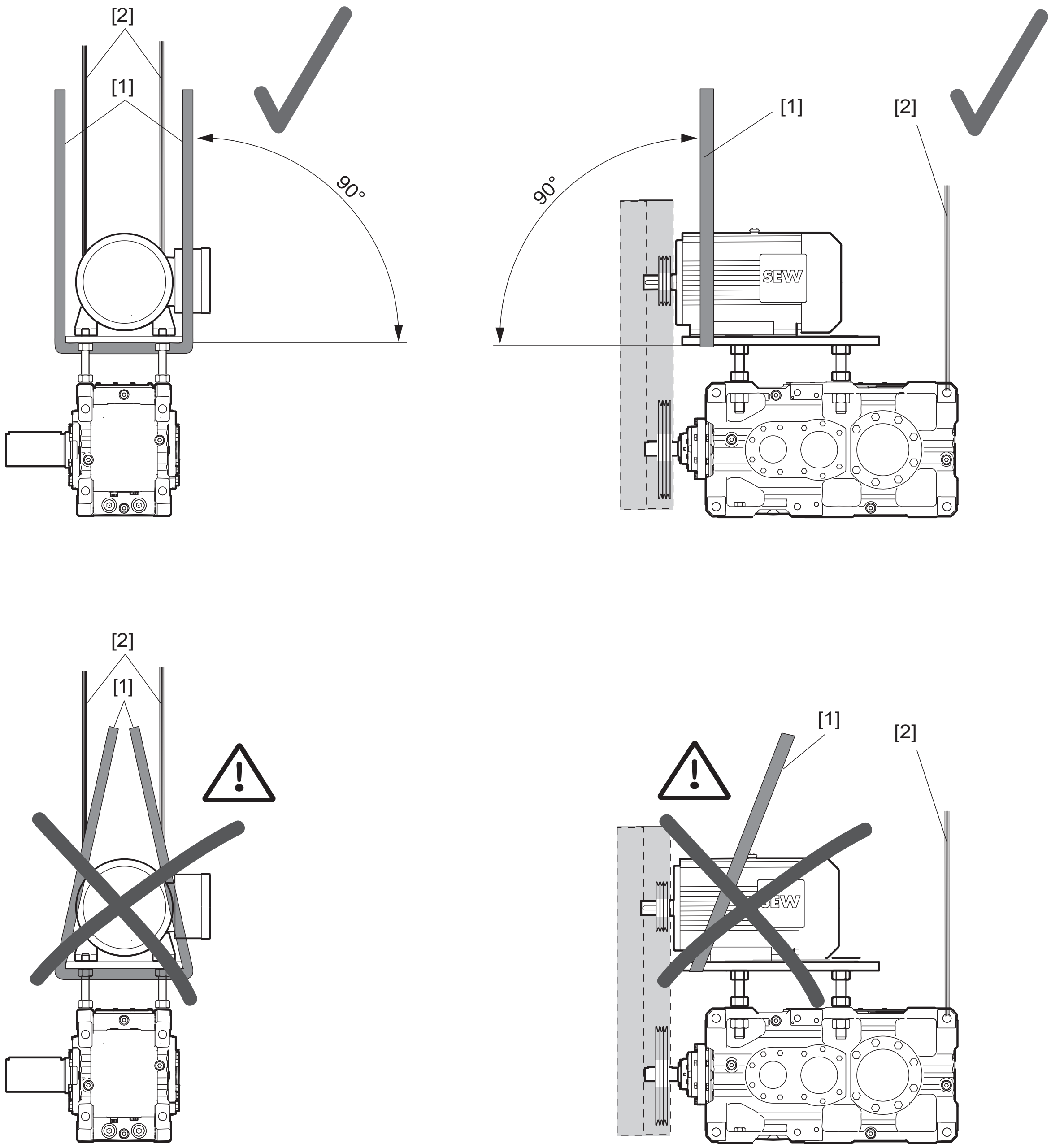
3.5 Gear units with V-belt drive

The gear units must only be transported at an angle of 90° (vertical) using lifting straps [1] and lifting ropes [2]. The eyebolts on the motor must not be used for transport.

The following figures illustrate how to transport the gear unit.



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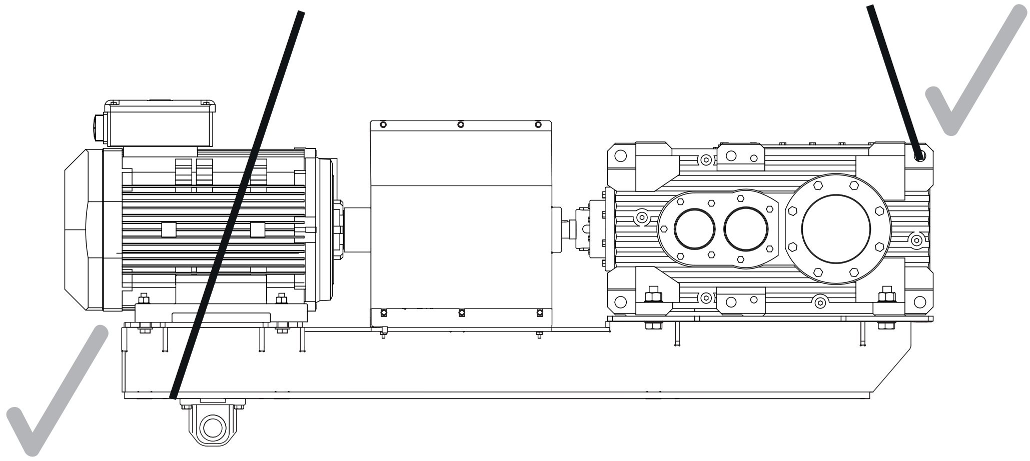
3.6 On swing base/base frame

3.6.1 Swing base

Standard transport

Attach the load handling device to the gear unit housing and underneath the motor swing arm to allow the drive package to be suspended above the center of gravity.



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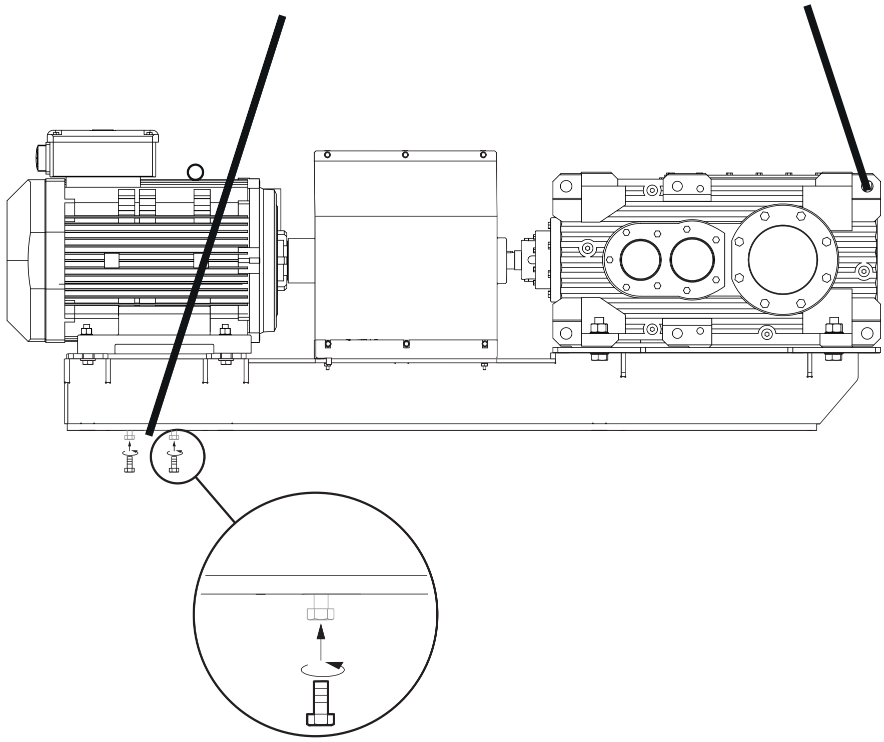
If the support frame is not part of the delivery, you must secure the load handling device with a screw on the steel support construction to prevent it from slipping. Securing with 2 screws prevents the load sling from slipping away. The load handling device must be positioned between the screws.



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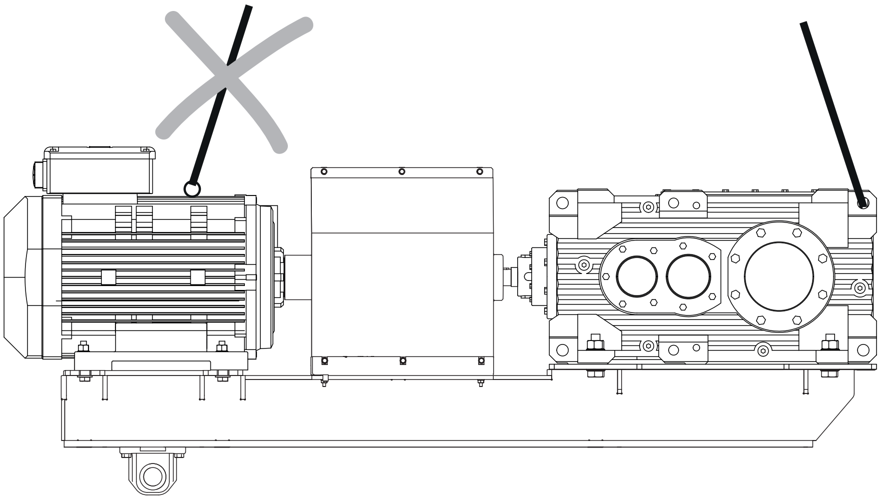
Do not use the lifting eyebolts on the motor as a transport attachment.



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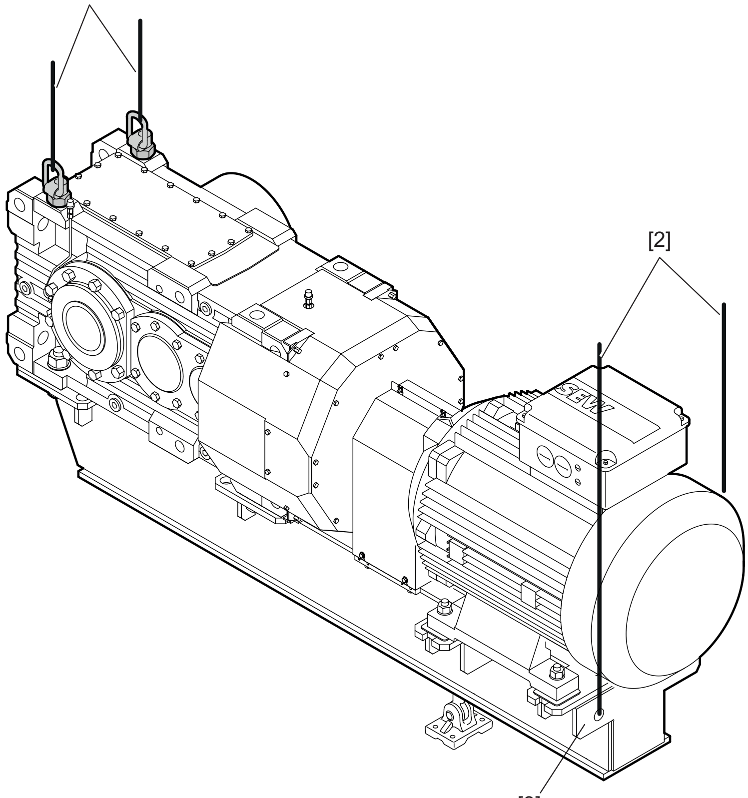
As an option, you can also attach the load handling device to the gear unit housing [1] and to the swing base [2].



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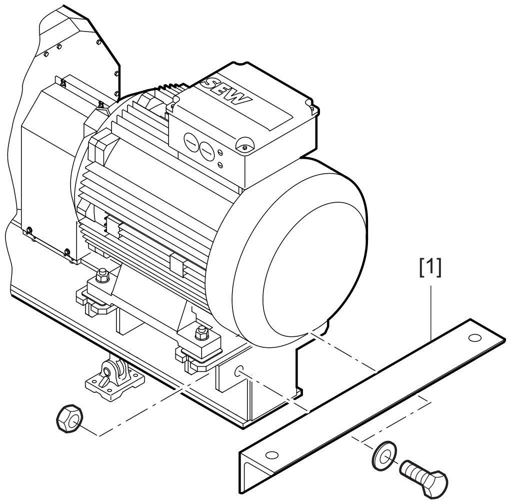
Optional, transport with lateral slinging aid

The slinging aid [1] is an option and can be ordered from SEW-EURODRIVE. This is mounted to the swing base. The fasteners are included in the scope of delivery.



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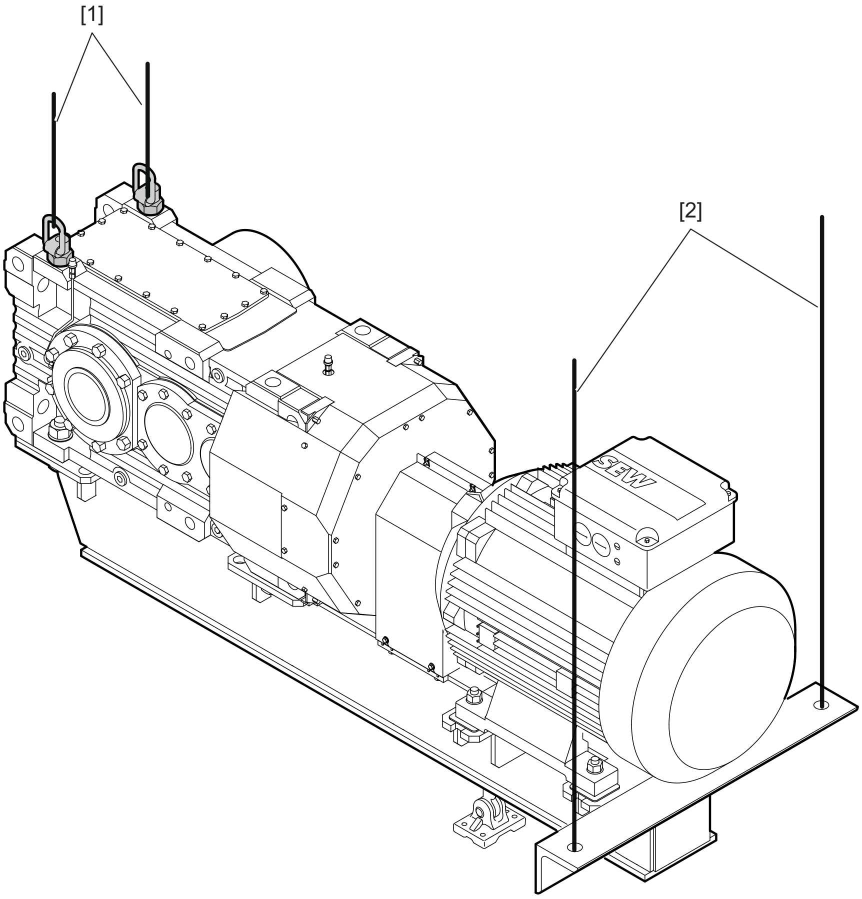
Attach the load handling device to the gear unit housing [1] and to the slinging aid [2].



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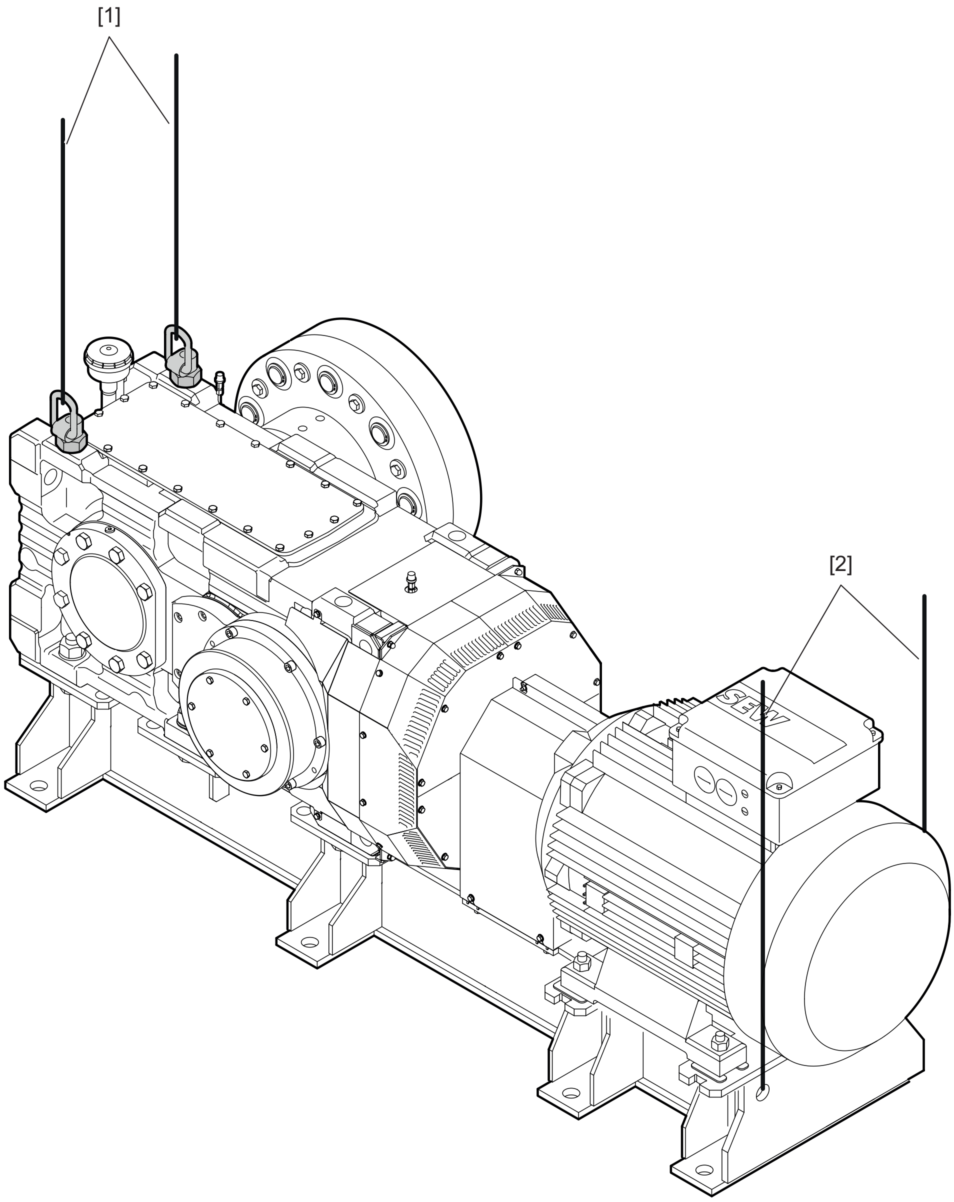
3.6.2 Base frame

Attach the load handling device to the gear unit housing [1] and to the base frame [2].

The slinging aid, as described in chapter "Swing base" (→ 🗎 29), can also be ordered for the base frame.



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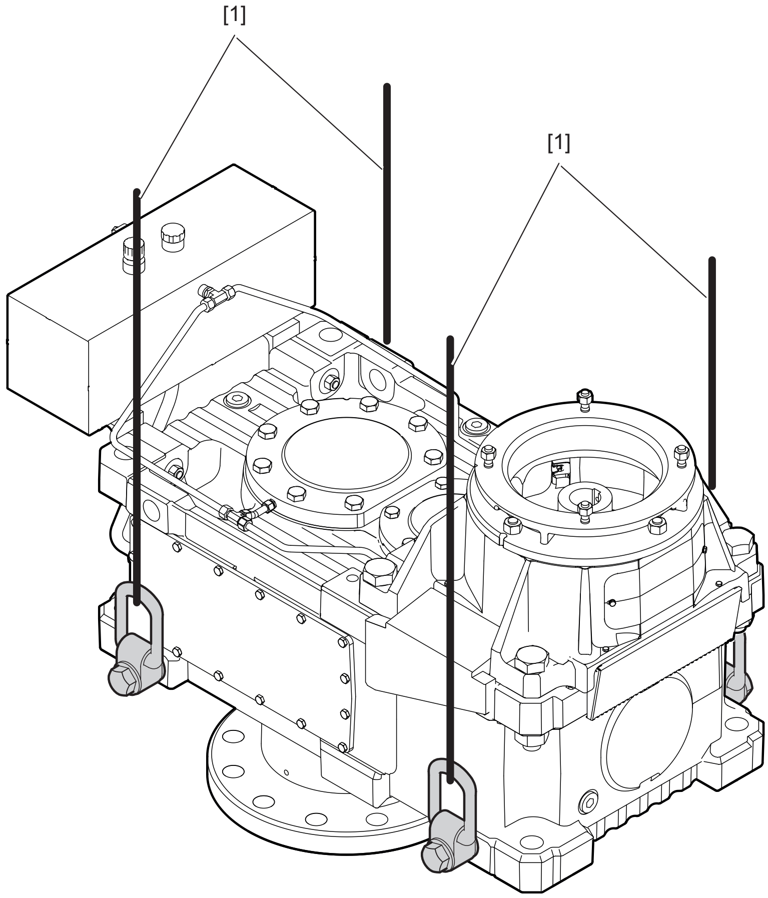
3.7 Gear unit with oil expansion tank in mounting position M5

Use only the provided attachment points [1] to transport the gear unit.



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3.8 Storage and transport conditions

The gear units can be shipped with the following protection and packaging types depending on the storage and transport conditions.

3.8.1 Internal conservation

Standard corrosion protection

After the test run, the test oil fill is drained out of the gear unit. The remaining oil film protects the gear unit against corrosion for a limited period of time. If specified in the order, the gear unit can be delivered with oil. Refer to the order documents for more information.

Long-term corrosion protection

After the test run, the test oil fill is drained out of the gear unit and the interior space is filled with a vapor phase inhibitor. The breather is replaced by a screw plug and included in the gear unit delivery.

Corrosion protection with VCI anti-corrosion agent is not permitted for gear units that are operated with food grade lubricants. Contact SEW-EURODRIVE in such cases.

3.8.2 Exterior corrosion protection

In general, the following measures are used for external preservation:

- Anti-corrosion agent is applied to bare, non-painted functional surfaces of shafts, flanges, mounting and foot surfaces of the housing. The anti-corrosion agent must be removed with a suitable solvent that does not damage the oil seal.
- Small spare parts and loose pieces, such as bolts, nuts, etc., are packed in corrosion protection plastic bags (VCI corrosion protection bags).
- Tapped holes and blind holes are sealed with plastic plugs.
- If the gear unit is stored longer than 6 months, regularly check the protective coating of unpainted areas as well as the paint coating. Areas with protective coating and/or paint that has been damaged may have to be repainted.

3.8.3 Packaging

Standard packaging

The gear unit is delivered on a pallet without cover.

Use: transport by truck or rail

Long-term packaging

The gear unit is delivered in a wooden box that is also appropriate for sea transport.

Use: transport by ship and/or extended storage

3.8.4 Storage conditions

Improper storage may result in damage to the gear unit. Observe the following information to prevent damage to the gear unit:

- While in storage until startup, the gear unit must be stored in a shock-free manner to prevent damage to the rolling bearing races.

- Only fill gear units with oil up to the uppermost rolling element. This ensures a remaining air volume for the oil to expand in case of higher temperatures. Add Anticorit VCI and tightly seal the gear unit (replace the breather with a screw plug)
- The permitted storage temperature is -30 °C to +50 °C.
- When storing in tropical areas, ensure adequate protection against insect damage. In case of deviating requirements, contact SEW-EURODRIVE.

The gear unit is delivered without any oil filling as standard; different protection systems are required depending on the storage period and storage conditions as shown in the following table.

Preservation + packaging	Storage location	Storage period
Standard preservation + standard packaging	Under roof and enclosed at constant temperature and humidity (5 °C < ϑ < 60 °C, < 50% relative humidity). No sudden temperature fluctuations and controlled ventilation with filter (free of dirt and dust). No aggressive vapors or shocks.	Maximum 6 months with intact surface protection
Long-term preservation + standard packaging	Under roof and enclosed at constant temperature and humidity (5 °C < ϑ < 60 °C, < 50% relative humidity). No sudden temperature fluctuations and controlled ventilation of the storage room with filter (free of dirt and dust). No aggressive vapors or shocks.	Maximum 3 years with regular inspection and checking for intactness
Long-term preservation + standard packaging	Under roof, protection against rain, vibration-free.	Maximum 3 years with regular inspection and checking for intactness

3.9 Gear unit preservation/gear unit shutdown

If the gear unit is shut down for a longer period of time, additional preservation measures are required. Observe the installation location, ambient conditions and lubricant condition of the gear unit. Depending on this, preservation may be required within just a few weeks of downtime.

For gear units with water cooling, interrupt the cooling water supply and drain the water from the cooling circuit. For oil supply systems, contact SEW-EURODRIVE.

3.9.1 Internal conservation

- **With new or hardly used gear units:**
  - SEW-EURODRIVE recommends the VCI preservation method for internal preservation of the gear unit.
  - Apply the required amount of VCI anti-corrosion agent to the inside of the gear unit (e.g. FUCHS Anticorit VCI UNI O-40, www.fuchs.com). The quantity depends on the available internal volume of the gear unit. Filled oil can usually remain in the drive.

    Corrosion protection with VCI anti-corrosion agent is not permitted for gear units that are operated with food grade lubricants. Contact SEW-EURODRIVE in such cases.
  - Replace the breather with a screw plug and close the gear unit so that it is air tight. Mount a new breather prior to startup.
- **After longer gear unit operation:**
  - The oil might be contaminated (e.g. oil sludge, water, ...) after long periods of operation. Therefore, drain the oil and thoroughly rinse the inside of the gear unit with new oil prior to preservation. Observe the information in chapter "Changing the oil" (→ 🗎 249) in the corresponding operating instructions. The inside of the gear unit can then be protected again corrosion as described above.

For gear units, internal corrosion protection can also be performed by using the oil type indicated on the nameplate. In this case, the gear unit must be completely filled with clean oil. Replace the breather with a screw plug and fill in the oil from the highest point of the gear unit. To ensure sufficient corrosion protection, all the gearing components and bearing points must be completely covered in oil.

For X2F160 – 320 gear units with contactless sealing system, press grease into the seal of the input shaft.

Then seal the input shaft airtight with adhesive tape. Make sure that the gear unit is stored in mounting position M1. To ensure permanent corrosion protection, fill the inside of the gear unit with the required amount of VCI anti-corrosion agent. Corrosion protection with VCI anti-corrosion agent is not permitted for gear units that are operated with food grade lubricants. Contact SEW-EURODRIVE in such cases.

Before startup, mount a new breather. Observe the oil type and oil quantity according to the nameplate.

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3.9.2 External corrosion protection

- Clean the surfaces to be preserved.
- Grease the shaft near the dust lip to separate the sealing lip of the oil seal and the anti-corrosion agent.
- Preservation the exterior of shaft ends and unpainted surfaces with a wax-based protective coating (e.g. Hölterol MF 1424 from Herm. Hölterhoff, www.hoelterhoff.de).

INFORMATION

Consult the respective supplier regarding the compatibility with the oil that is used and the duration of corrosion protection for your particular gear unit design.

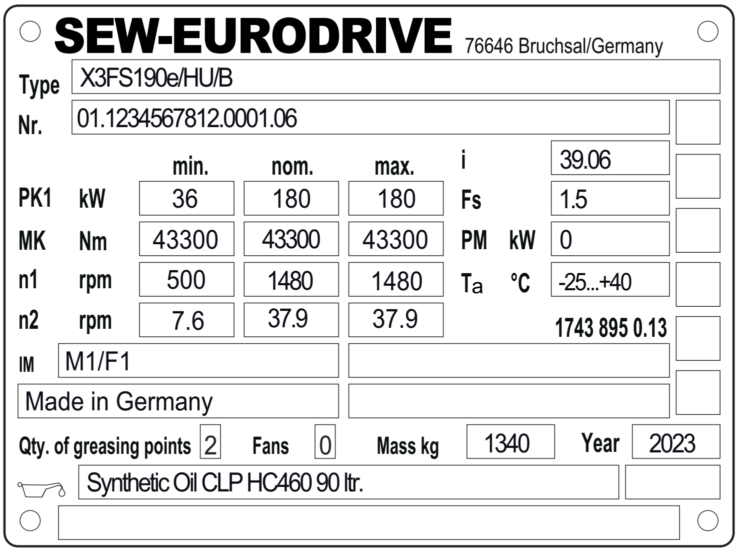
Observe the information in chapter "Storage and transport conditions" (→ 🗎 34) in the corresponding operating instructions. This chapter provides information on the possible storage periods in conjunction with adequate packaging – depending on the storage location.

4 Gear unit structure

4.1 Nameplate

4.1.1 Gear unit

The following example shows the structure of the nameplate.



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Type		Type designation
No.		Serial number
P_{K1}	kW	Operating power on the input shaft (HSS)
M_{K2}	Nm	Gear unit output torque
n_1	rpm	Input speed (HSS)
n_2	rpm	Output speed (LSS)
min.		Minimum operating point
norm.		Normal operating point
max.		Maximum operating point
i		Exact gear unit ratio
F_S		Service factor
P_M	kW	Nominal motor power
T_a	°C	Deviation from the standard temperature range (−20 °C to +40 °C)
Mass	kg	Gear unit weight
Greasing points		Number of greasing points
Fan		Number of mounted fans
		Oil grade and viscosity class/oil quantity
Year		Year of manufacture
IM		Mounting position and mounting surface

4.1.2 QR code

Product label with QR code. The QR code can be scanned. You will be redirected to the digital services of SEW-EURODRIVE. There, you have access to product-specific data, documents, and further services.

The following figure shows an example of a product label:

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4.2 Type designations

4.2.1 Gear units

The following example shows the structure of the type designation:

X3KS250e /HU /B	
X	Industrial gear unit series
3	Number of gear unit stages • 2 = 2 stages • 3 = 3 stages • 4 = 4 stages
K	Gear unit design • F = Helical gear unit • K = Bevel-helical gear unit • T = Bevel-helical gear unit
S	Type of output shaft • S = Solid shaft with key • R = Smooth solid shaft • L = Splined solid shaft • A = Hollow shaft with keyway • H = Hollow shaft with shrink disk • V = Splined hollow shaft • T = Hollow shaft with TorqLOC® hollow shaft mounting system • C = Reinforced solid shaft with key
	Application • B = Bucket elevator gear unit • C = Hoist gear unit
250	Gear unit sizes • 100 – 320
e	Generation X.e
HU	Housing design • HU = Universal housing • HH = Horizontal housing • HA = Agitator housing • HT = Thermal housing • HC = Hoist housing • HW = Welded housing
B	Gear unit mounting • /B = Foot • /T = Torque arm • /F = Flange

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4.2.2 Abbreviations for optional accessories

The table shows the abbreviations used and what they mean.

Abbreviation	Meaning
BF	Base frame
BS	Backstop
BPG	Breather
CCV	Water cooling cover
CCT	Water cooling cartridge
F	Mounting flange
FC	Flange coupling
FAN	Fan
ET	Oil expansion tank
HH	Horizontal housing
HU	Universal housing
HA	Agitator housing
HT	Thermal housing
MA	Motor adapter
SB	Swing base
SEP	Shaft end pump
T	Torque arm
OAC1	Circulation cooling oil-air cooler with motor pump
OAP1	Circulation cooling oil-air cooler with pressure lubrication and motor pump
OWC1	Circulation cooling oil-water cooler with motor pump
OW1	Circulation cooling oil-water cooler with pressure lubrication and motor pump
ONP1/ONP1L	Pressure lubrication and motor pump
OD	Oil dipstick
ODV	Oil drain valve
OLG	Oil level glass
OH	Oil heater
VBD	V-belt drives

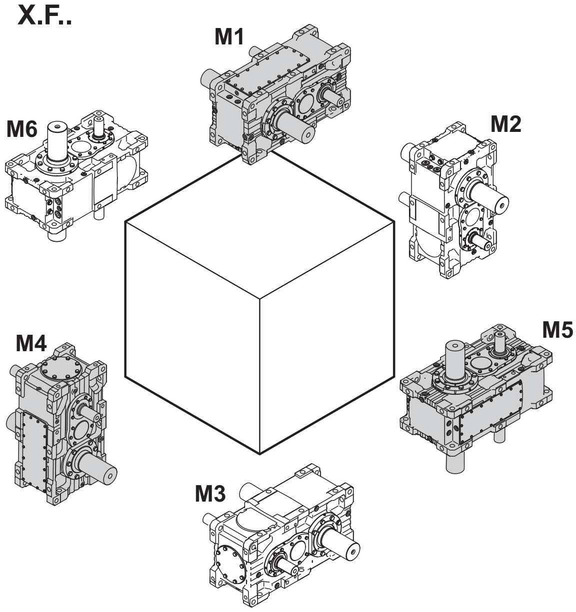
All options are not part of the type designation except for mounting flange, torque arm, horizontal housing, and universal housing.

4.3 Mounting position

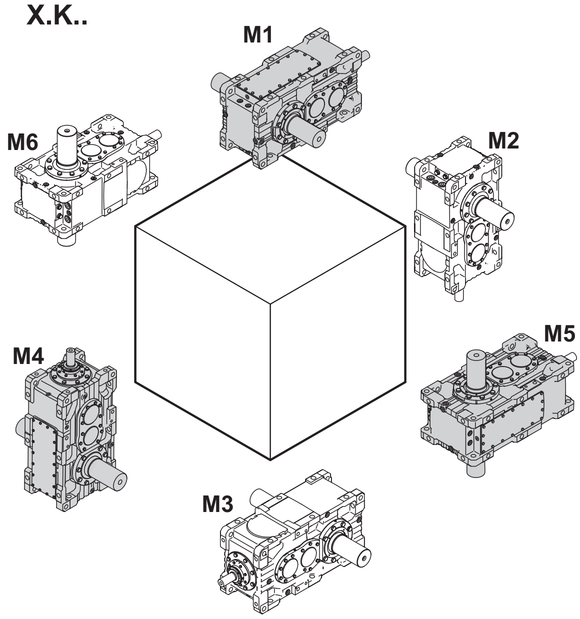
4.3.1 Definition

The mounting position defines the spatial position of the gear unit housing and is designated with **M1 – M6**.

X.F..



X.K..



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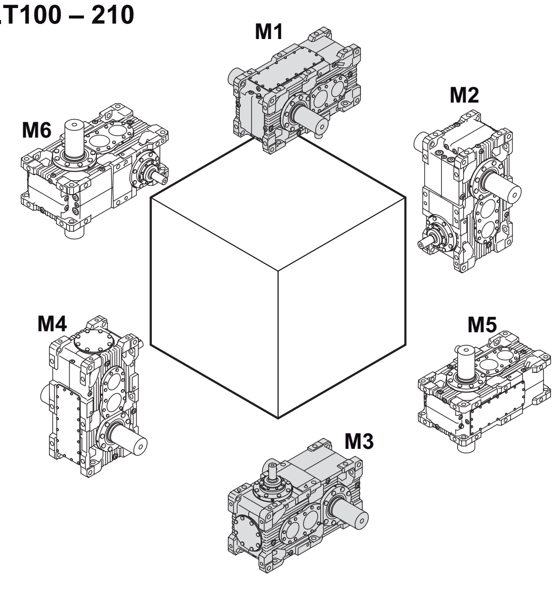
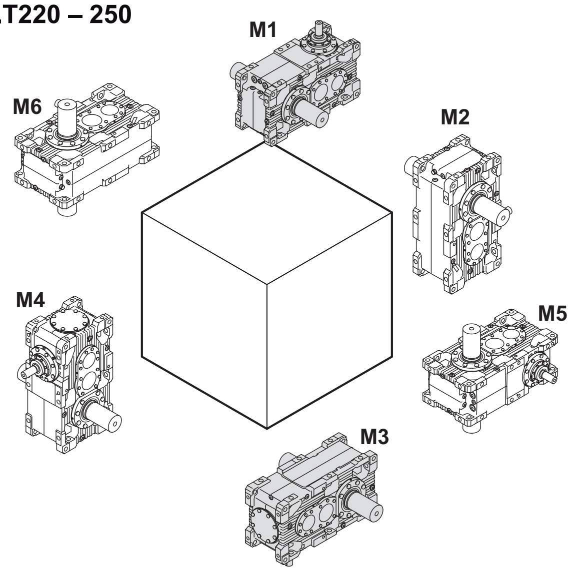
X.T100 – 210



X.T220 – 250

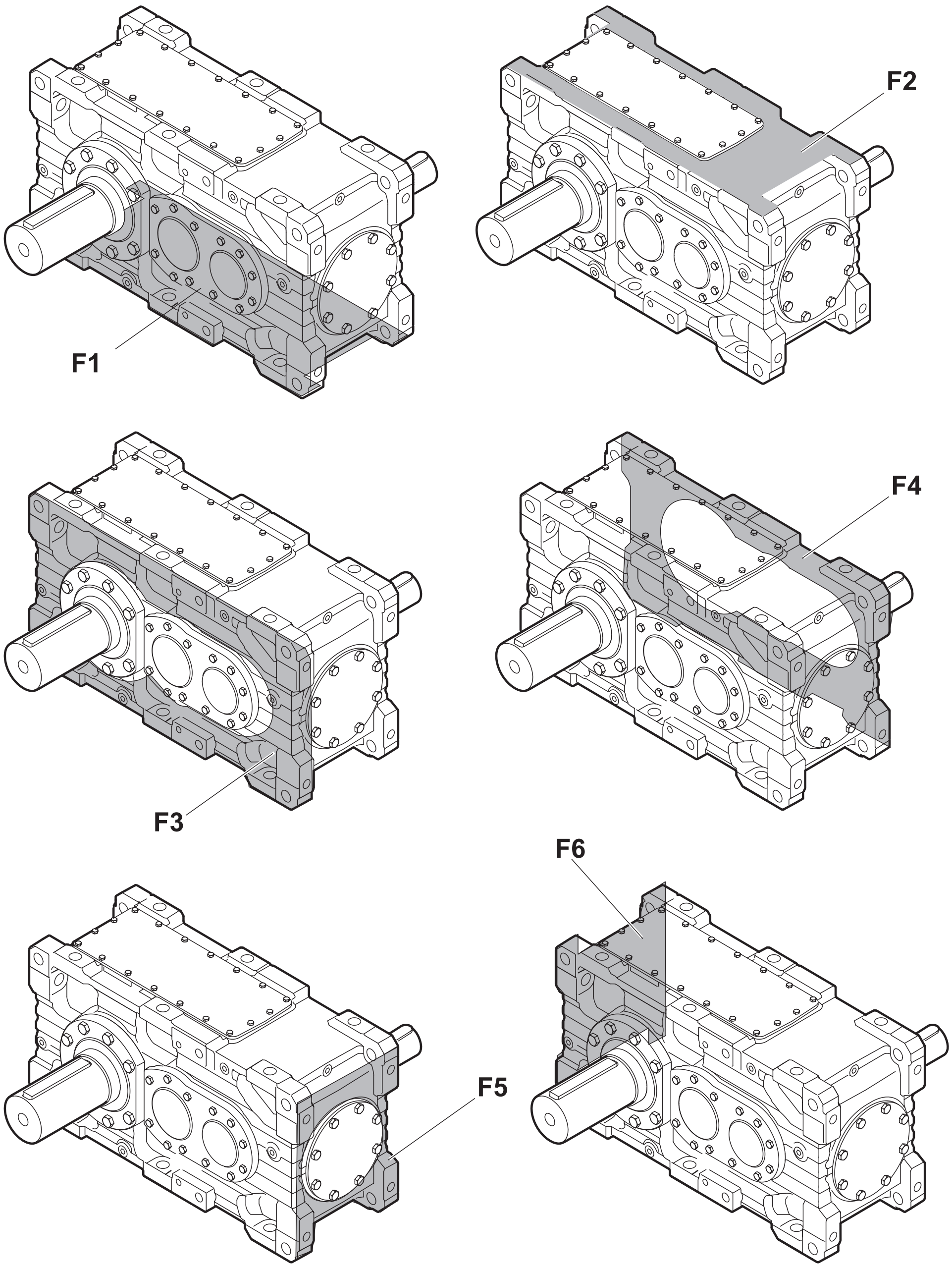


4.4 Mounting surface

The mounting surface is defined as the surface of a gear unit with foot mounting (X... / B) or flange mounting (X.. /F) to which the gear unit is attached.

an der das Getriebe befestigt wird.

Six different mounting surfaces are defined (designation F1 – F6).



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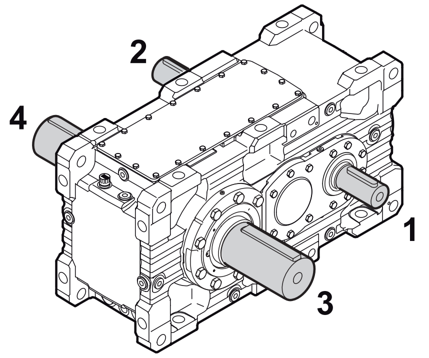
4.5 Shaft position

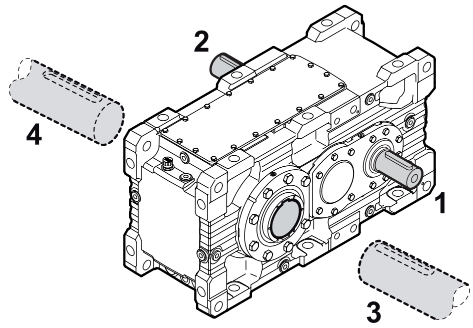
The shaft positions (**0 - 6**) shown in the following figures apply to solid and hollow output shafts. For other shaft positions or for gear units with backstop, contact SEW-EURODRIVE.

4.5.1 X.F..

Shaft position X.FS..

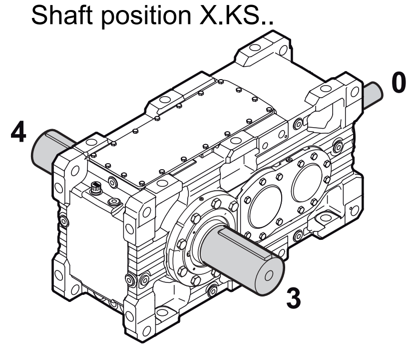


Shaft position X.FA..

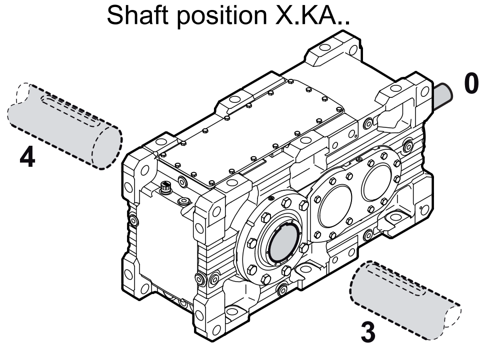


4.5.2 X.K..

Shaft position X.KS..



Shaft position X.KA..



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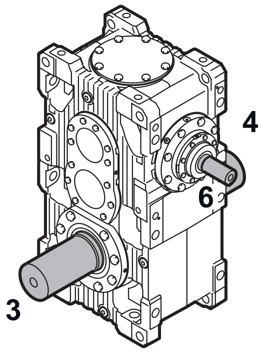
4.5.3 X.T..

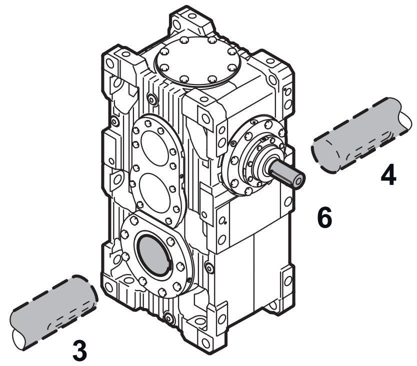
The following shaft positions are possible for gear unit type X.T..

Sizes X100 – 210

Shaft position X.TS..

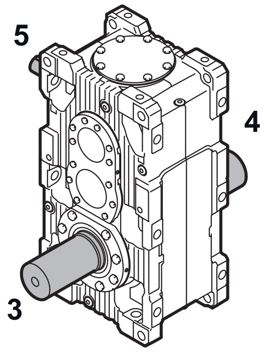


Shaft position X.TA..

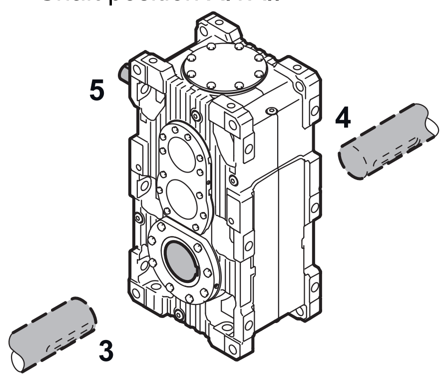


Sizes X220 – 250

Shaft positions X.TS..



Shaft position X.TA..

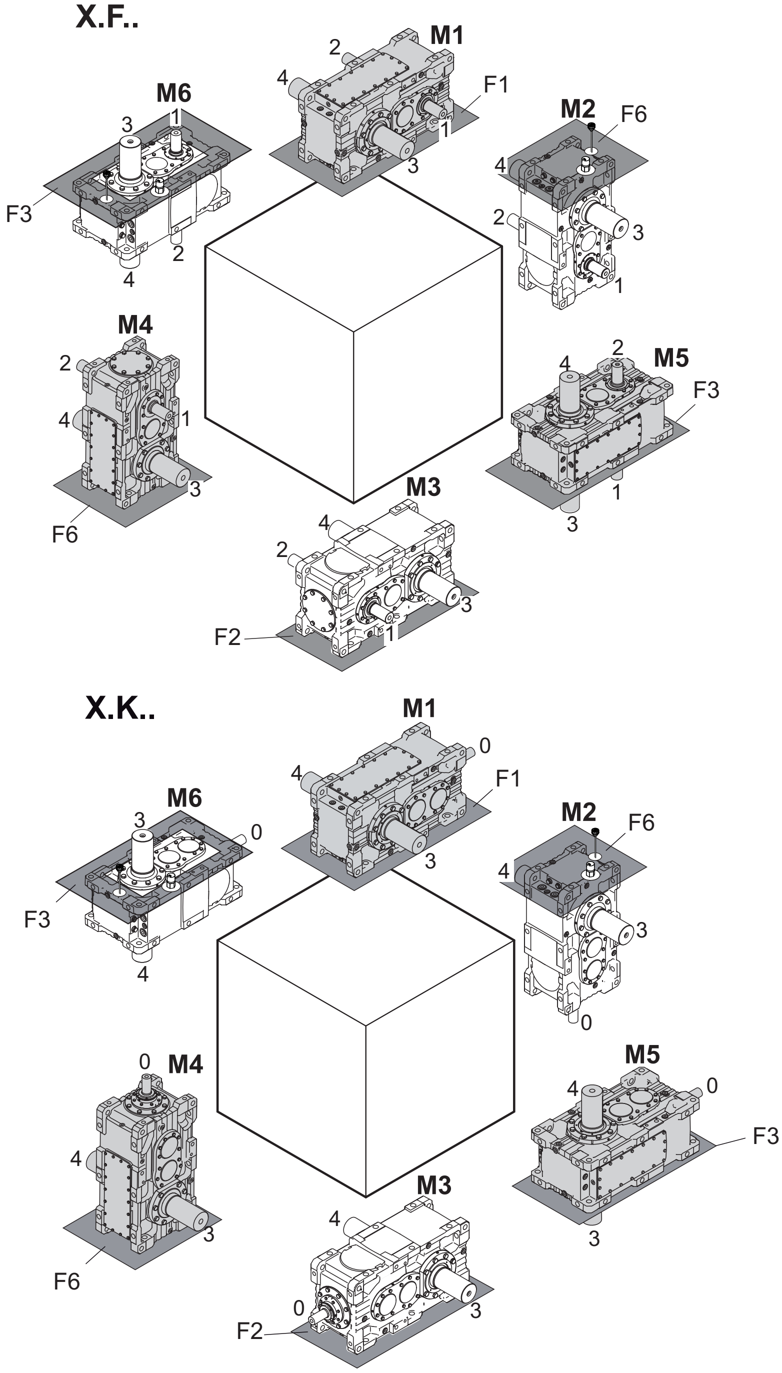


4.6 Mounting positions and standard mounting surfaces

A certain standard mounting surface is assigned to each mounting position.

The mounting position and/or mounting surface must not differ from the order. Observe the order-specific dimension sheet, which can be found in the overall documentation for the gear unit.

The following figure shows an overview of the mounting position and standard mounting surface.



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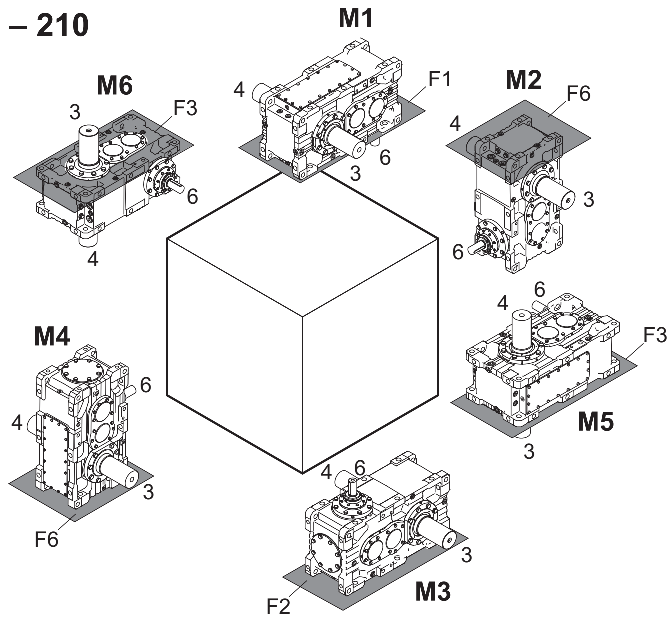
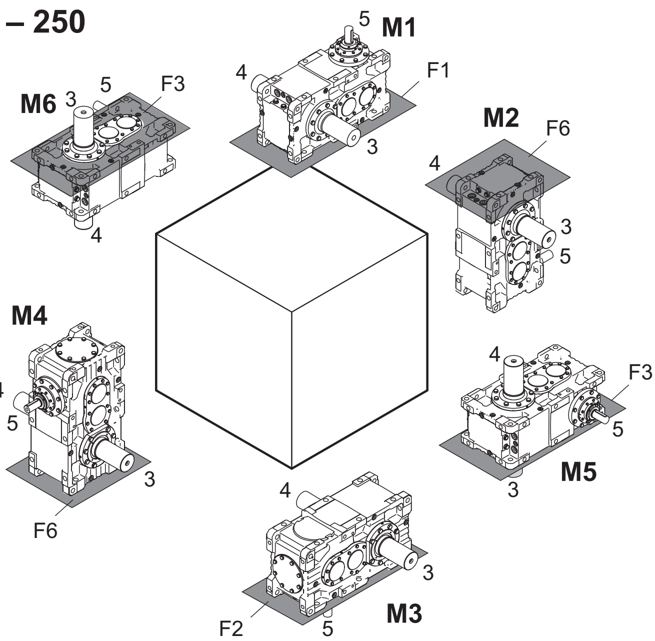
X.T100 – 210



X.T210 – 250



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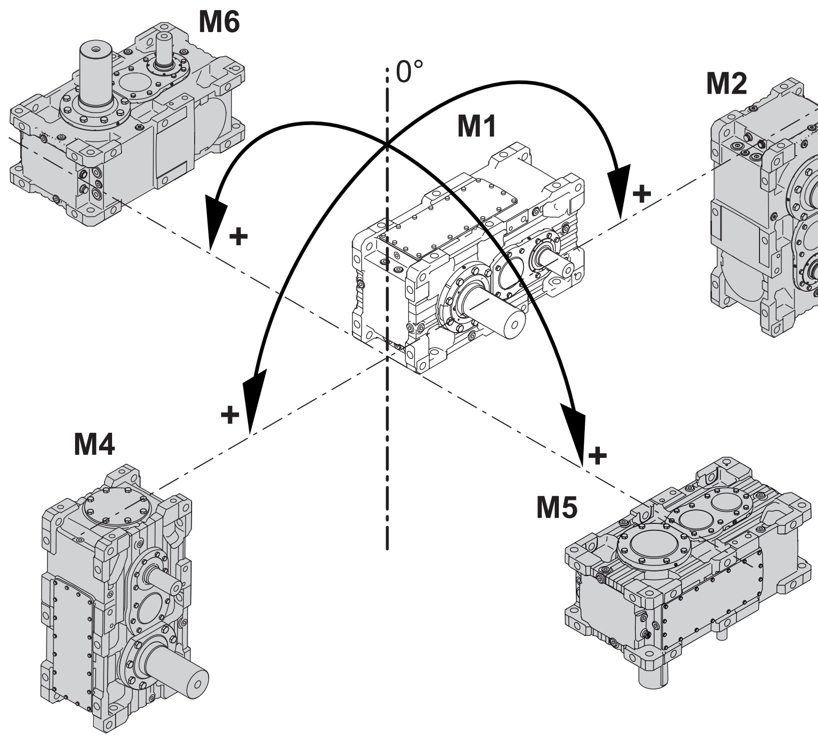
4.7 Fixed and variable pivoted mounting positions

Mounting positions deviating from the standard are differentiated between **fixed** and **variable** pivoted mounting positions.



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4.7.1 Fixed pivoted mounting position

Definition

Gear units with fixed pivoted mounting position have a fixed mounting position that differs from the standard. This means the gear unit does not change its mounting position during operation.

Example

The type designation is set up as follows:

M1-M4/9°

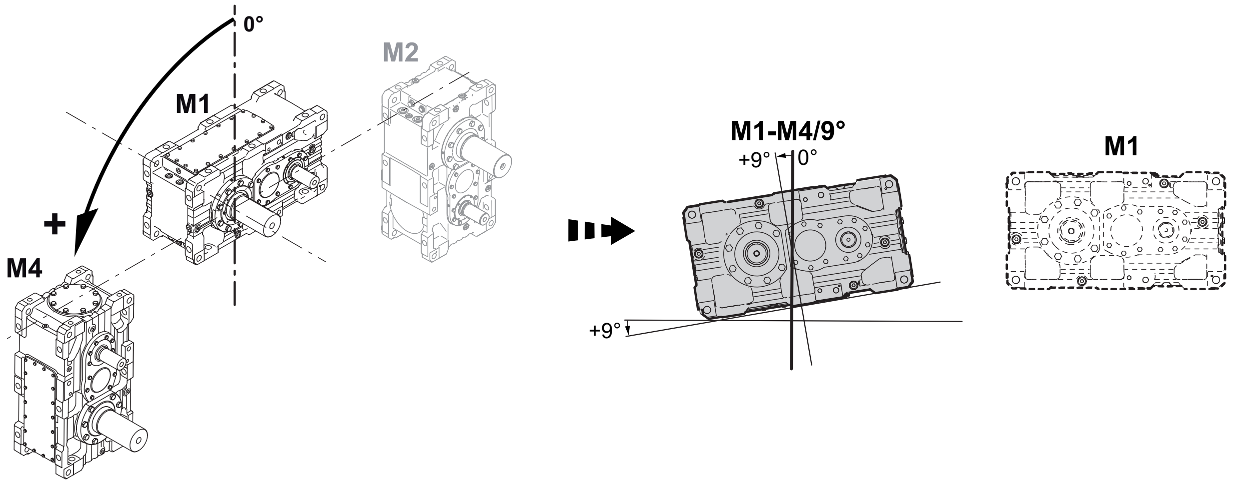
M1 = Initial mounting position

M4 = Pivoting direction

9° = Fixed pivoting angle

Pivoted from mounting position M1 to M4 by 9°

This results in the following fixed pivoted mounting position:



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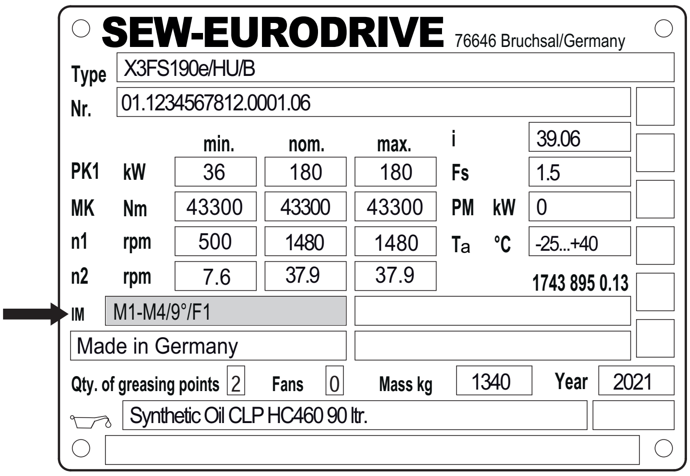
The oil level is checked in the selected fixed pivoted mounting position.

The fixed pivoted mounting position is shown on the nameplate as follows:



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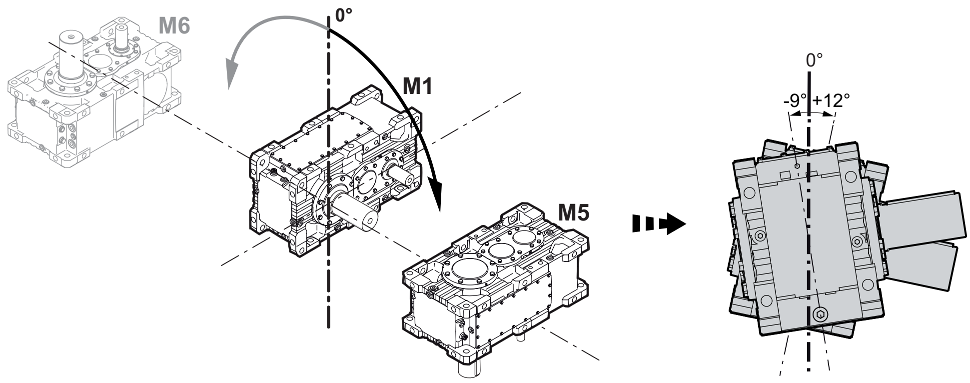
4.7.2 Variable pivoted mounting position

Definition

Gear units with variable pivoted mounting position can change the mounting position **variably** during operation within the specified max./min. range.

Example

The gear unit is operated in variable pivoted mounting position M1 to M6 = 9° and M1 to M5 = 12°.



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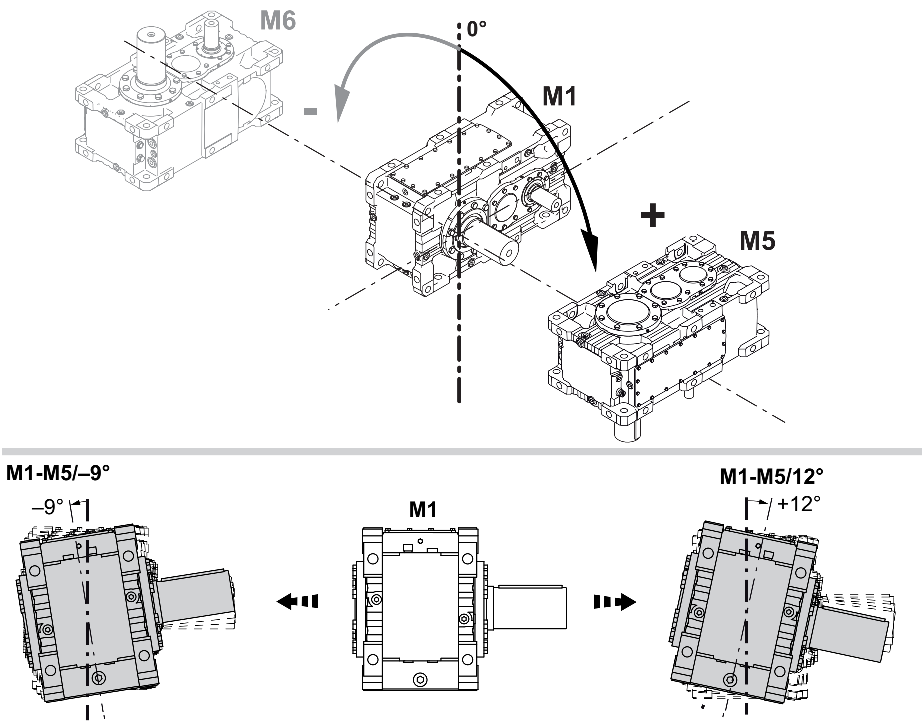
Step 1:

The largest pivoting angle determines the positive pivoting direction (12° > 9°). In this example, this is 12° towards M5.

12° → from M1 to M5, pivoted by +12°

9° → from M1 to M5, pivoted by -9°



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This example results in the following type designation:

M1-M5/–9°...12°

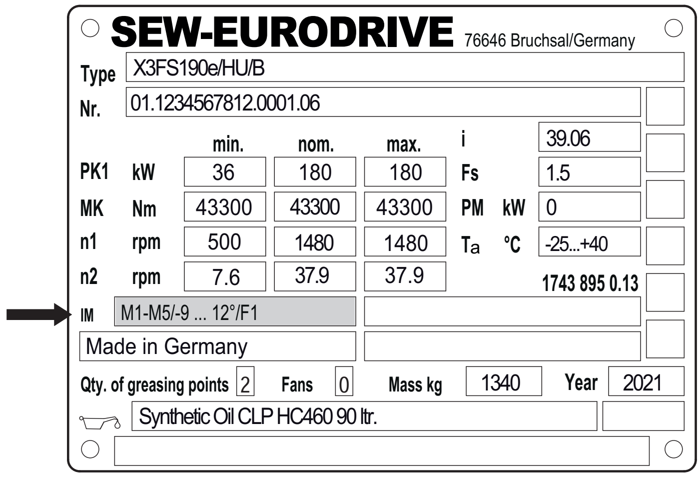
M1 = Initial mounting position

M5 = Pivoting direction

12° = from M1 to M5, pivoted by 12°

-9° = Pivoted from M1 to M5 by -9° (= from M1 to M6, pivoted by 9°)

The variable pivoted mounting position is shown on the nameplate.



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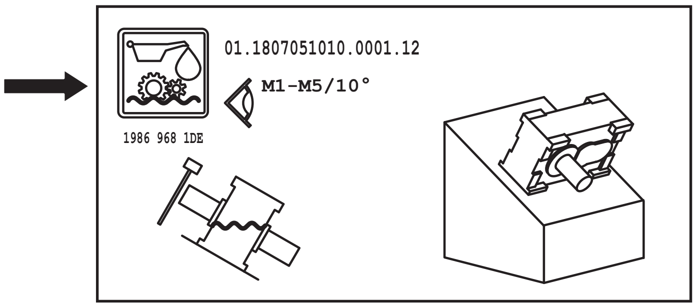
Step 2:

With variable pivoted mounting positions, the customer must specify the pivoting angle in which the oil level is checked.

An additional nameplate is used to clearly indicate the oil check angle. This nameplate indicates the mounting position for checking the oil level.



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4.7.3 Combination of variable and fixed pivoted mounting positions

Fixed and variable pivoted mounting positions can be combined.

Example:

The following example shows a combination of fixed and variable pivoted mounting position. The type designation is set up as follows:

M1-M4/9° (fixed pivoted mounting position)

M1 = Initial mounting position

M4 = Pivoting direction

9° = Fixed pivoting angle

M1-M5/–9°...12° (variable pivoted mounting position)

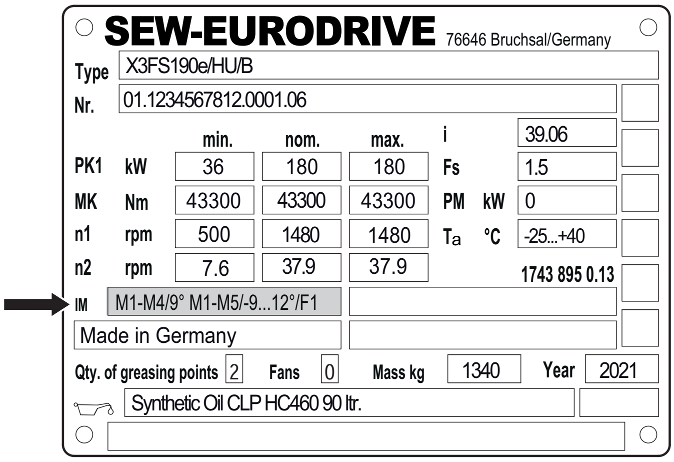
M1 = Initial mounting position

M5 = Pivoting direction

12° = 12° from M1 to M5

-9° = -9° from M1 to M5 (= 9° from M1 to M6)

The variable and the fixed pivoted mounting position are shown on the nameplate.



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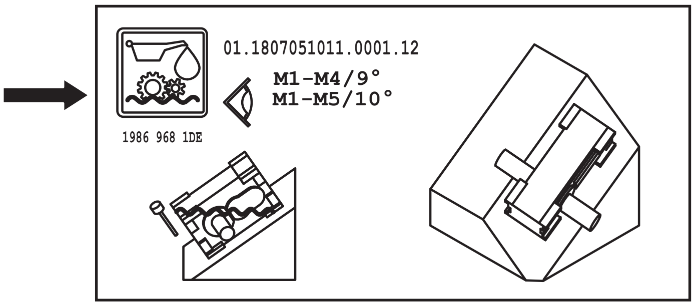
When combining fixed and variable pivoted mounting positions, the customer must specify the variable pivoting in which the oil level is checked. The fixed angle for the oil level check is already defined.

The gear unit has an additional nameplate for correct oil level checks. This nameplate indicates the mounting position for checking the oil level.

In this example, the operator checks the oil level at M1-M4/9° M1-M5/10°.



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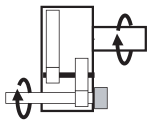
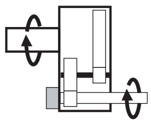
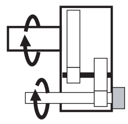
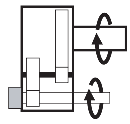
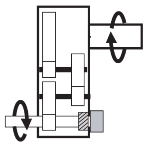
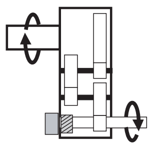
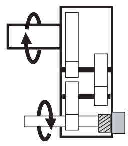
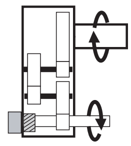
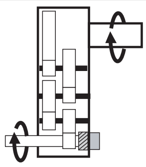
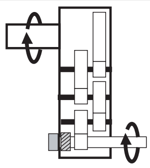
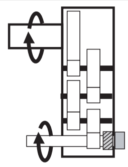
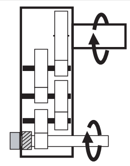
4.8 Corresponding directions of rotation

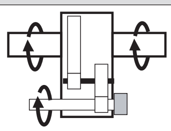
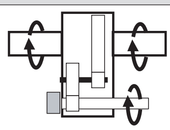
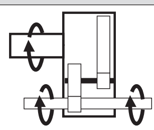
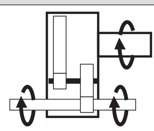
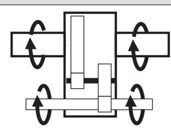
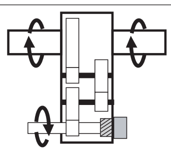
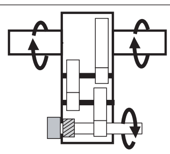
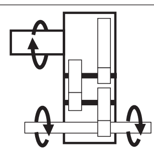
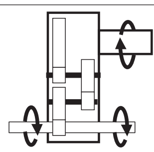
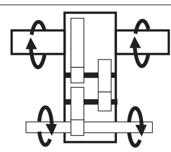
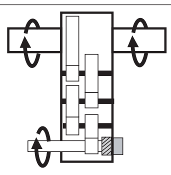
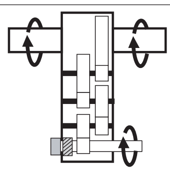
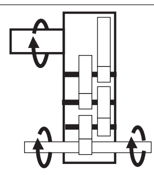
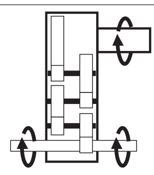
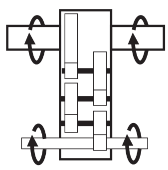
The gear unit can be operated in both directions of rotation. An exception are gear units with backstop.

The following tables show the direction of rotation dependencies between input and output shafts. The gear units as well as the position of the backstop are schematically shown as the solid shaft version.

For the position and blocking direction of the backstop, refer to the order-specific documentation.

4.8.1 X.F..

Shaft position	14	23	13 [1)]	24 [1)]
Position of final gear	3	4	3	4
X2F..				
X3F..				
X4F..				

Shaft position	134 [1)]	243 [1)]	213	124	1234 [1)*]
Position of final gear	3	4	4	3	3
X2F..					
X3F..					
X4F..					

▯ = Position of the backstop

▨ = Alternative backstop position (depending on size and gear ratio)

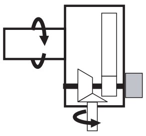
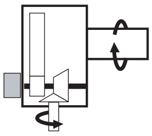
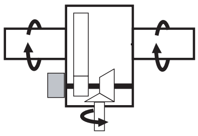
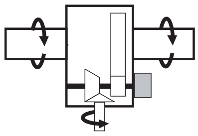
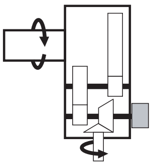
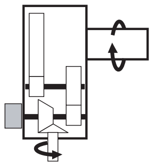
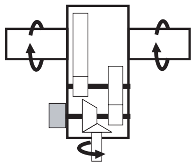
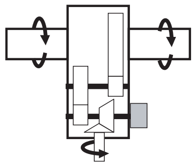
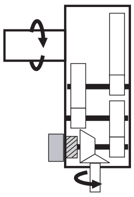
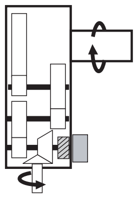
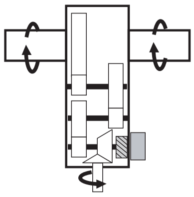
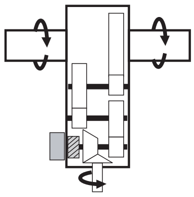
* = Contact SEW-EURODRIVE when using a backstop

1) Note the restrictions regarding external forces on the LSS

INFORMATION: For more information and an isometric view of the gear unit, refer to chapter "Shaft positions" (→ 🗎 45).

4.8.2 X.K..

Standard

Shaft position	03	04	034[1)]	043[1)]
Position of final gear	4	3	3	4
X2K..				
X3K..				
X4K..				

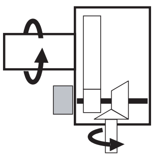
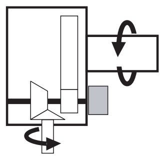
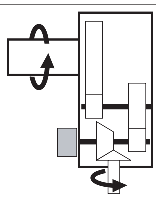
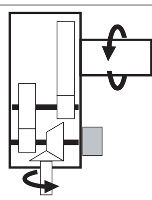
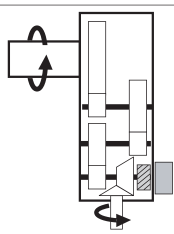
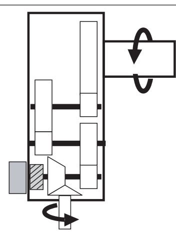
= Position of the backstop

= Alternative backstop position (depending on size and gear ratio)

1) Note the restrictions regarding external forces on the LSS

INFORMATION: For more information and a 3D view of the gear unit, refer to chapter "Shaft positions" (→ 🗎 45).

Direction of rotation reversal

Shaft position	03[1)]	04[1)]
Position of final gear	3	4
X2K..		
X3K..		
X4K..		

= Position of the backstop

= Alternative backstop position (depending on size and gear ratio)

1) Note the restrictions regarding external forces on the LSS

INFORMATION: For more information and an isometric view of the gear unit, refer to chapter "Shaft positions" (→ 🗎 45).

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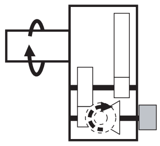
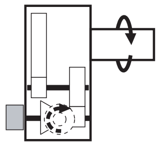
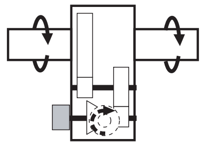
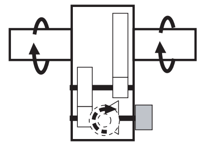
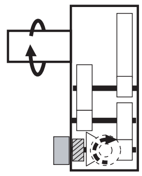
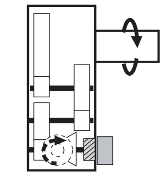
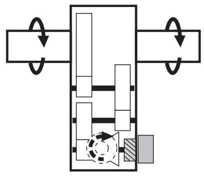
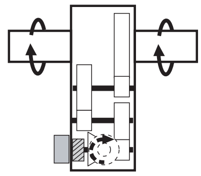
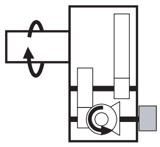
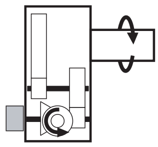
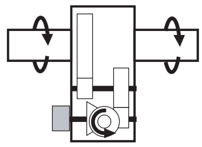
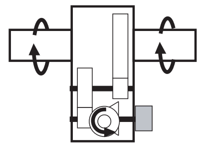
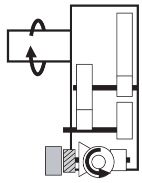
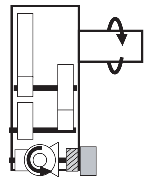
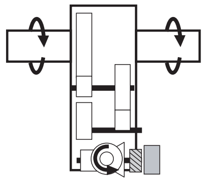
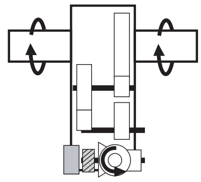
4.8.3 X.T..

Standard

Shaft position	63	64	634 [1)]	643 [1)]
Position of final gear	4	3	3	4
X3T100 – 210				
X4T100 – 210				
Shaft position	53	54	534 [1)]	543 [1)]
Position of final gear	4	3	3	4
X3T220 – 250				
X4T220 – 250				

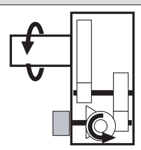
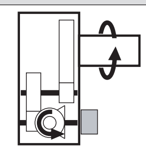
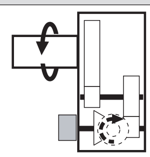
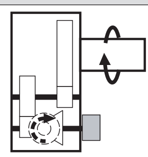
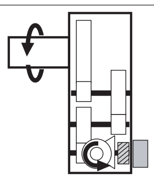
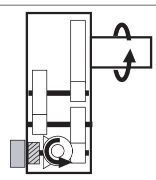
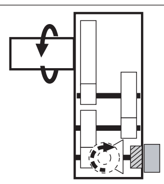
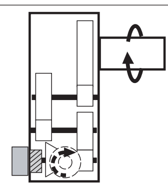
▯ = Position of the backstop

▨ = Alternative backstop position (depending on size and gear ratio)

1) Note the restrictions regarding external forces on the LSS

INFORMATION: For more information and a 3D view of the gear unit, refer to chapter "Shaft positions" (→ 🗎 45).

Direction of rotation reversal

Shaft position	53 [1)]	54 [1)]	63 [1)]	64 [1)]
End wheel pos.	3	4	3	4
X3T..				
X4T..				

▯ = Backstop position

▨ = Alternative position of the backstop (depending on size and gear ratio)

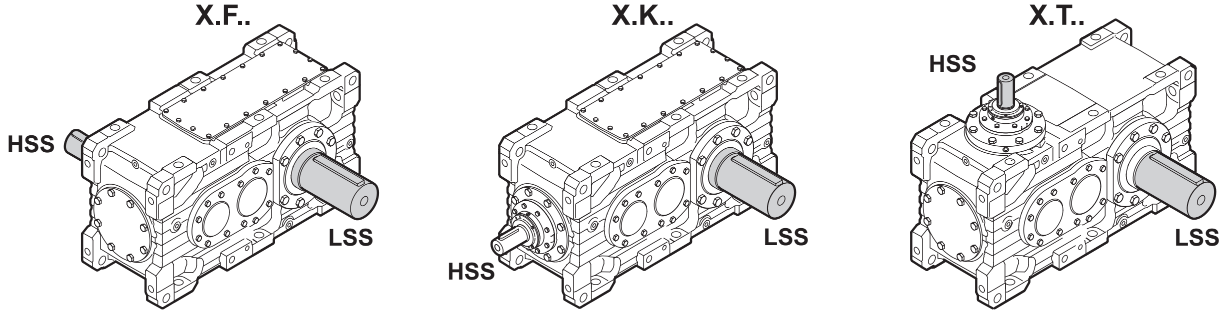
1) Note the restrictions regarding external forces on the LSS

INFORMATION: For more information and an isometric view of the gear unit, refer to chapter "Shaft positions" (→ 🗎 45).

4.9 Input and output shafts

There are two types of shafts:

- High-speed shaft (**HSS**), usually the input shaft
- Low-speed shaft (**LSS**), usually the output shaft



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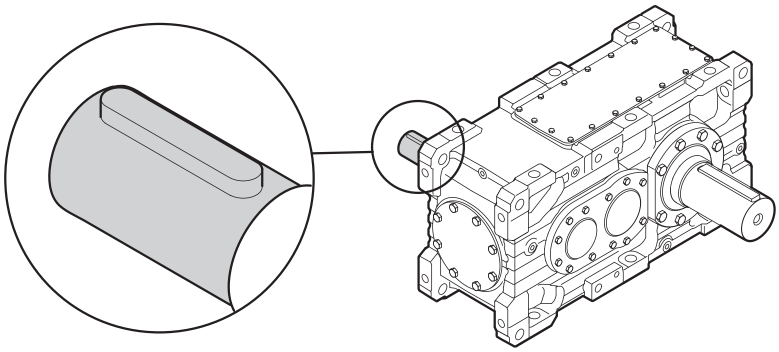
4.9.1 Input shaft

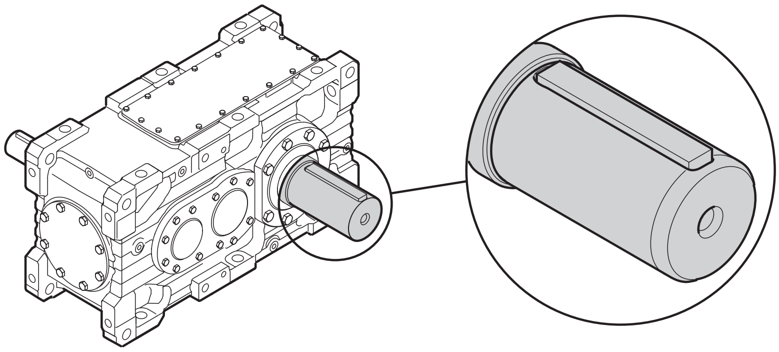
The input shaft is provided with a closed keyway according to DIN 6885/T1 and a center bore (according to DIN 332). The matching key according to DIN 6885/T1 - form A is included in the delivery.



27021598088261643

4.9.2 Output shaft as a solid shaft with key /..S

The output shaft is provided with a closed keyway according to DIN 6885/T1 and a centering bore (according to DIN 332). The delivery includes a key according to DIN 6885/T1 – form B. The shaft has an insertion area with a reduced diameter to simplify the mounting of output elements, such as a coupling hub.



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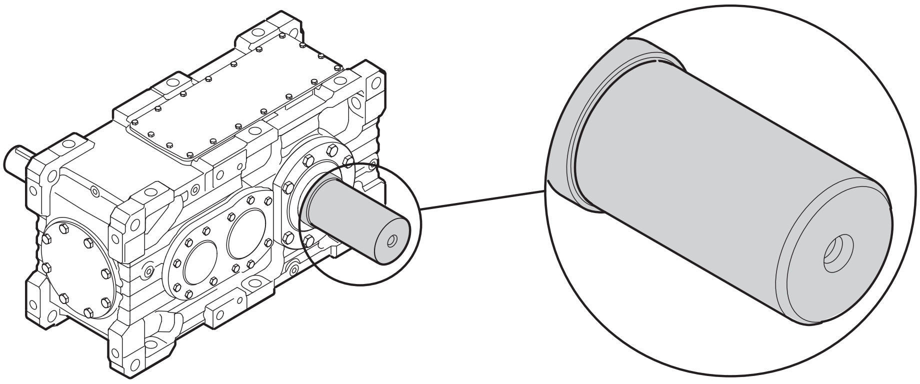
4.9.3 Smooth output shaft /..R

The gear units are available with a smooth output shaft to install non-positive output elements, such as flange couplings with a cylindrical interference fit. The shaft's face has a centering bore according to DIN 332. The insertion area with reduced diameter facilitates the mounting of output elements.



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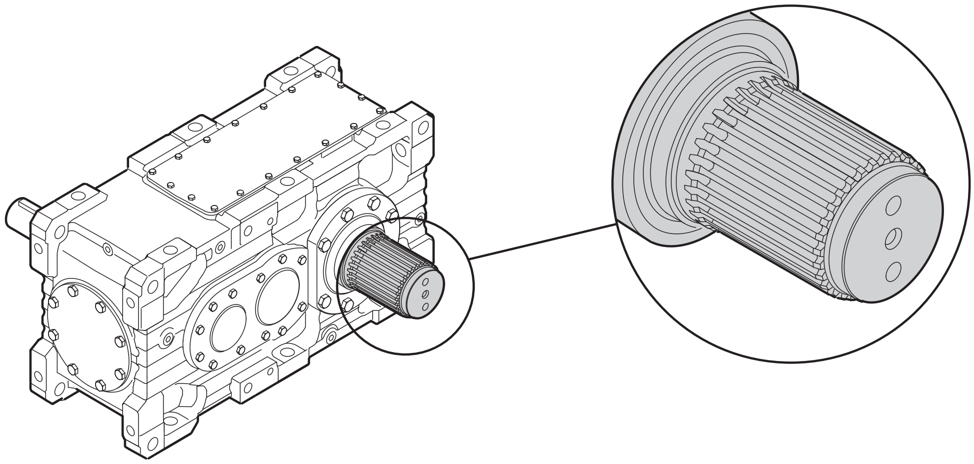
4.9.4 Output shaft as a splined solid shaft /..L

The output shaft is a splined shaft according to DIN 5480. There is a centering in front of and behind the splined shaft to improve the guide of the output element. Two threads are available on the front end of the shaft for mounting an end plate.

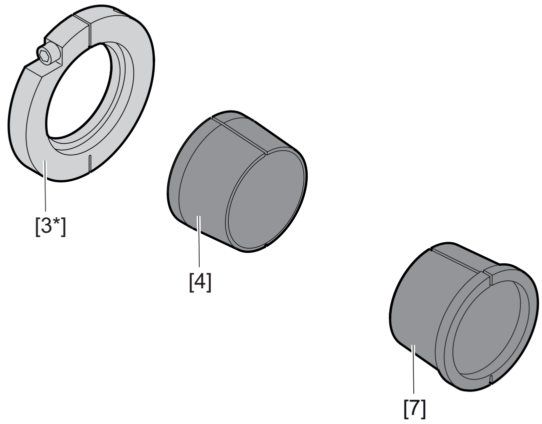


9007199999008011

4.9.5 Output shaft with TorqLOC® /..T

A TorqLOC® hollow shaft is installed in the gear unit with TorqLOC® hollow shaft mounting system upon delivery. The TorqLOC® assembly kit and shrink disk are included in the delivery. The protection cover is mounted on the gear unit.

The TorqLOC® assembly kit consists of the following components:



9007213490555787

[3*] Stop ring (* optionally available for size X100 – 170)
[4] Bushing on output end
[7] Counter bushing

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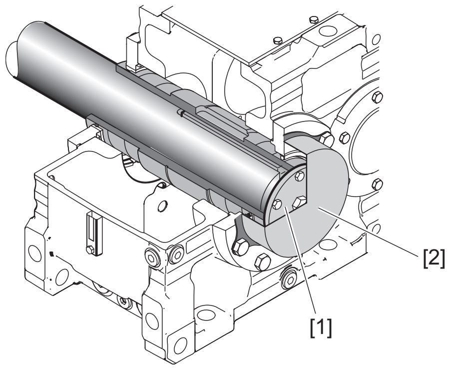
4.9.6 Output shaft as a hollow shaft with keyway /..A

The hollow shaft is equipped with a keyway according to DIN 6885/T1.

Included in the delivery:

- Protection cover [2]
- Retaining screws [1] or
- 2 retaining rings



9007199579038987

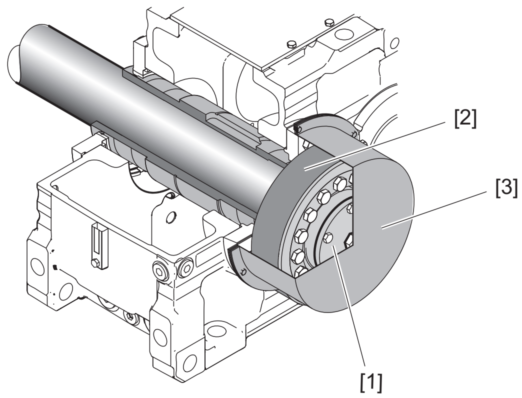
The protection cover is dust-tight. The standard sealing system is therefore normally used on the side of the safety cover.

4.9.7 Output shaft as a hollow shaft with shrink disk /..H

The shrink disk is positioned on the side opposite to the machine shaft.

Included in the delivery:

- Shrink disk [2] and protection cover [3]
- Endplate with retaining screws [1] or
- 2 retaining rings



324304523

The protection cover is dust-tight. The standard sealing system is therefore normally used on the side of the safety cover.

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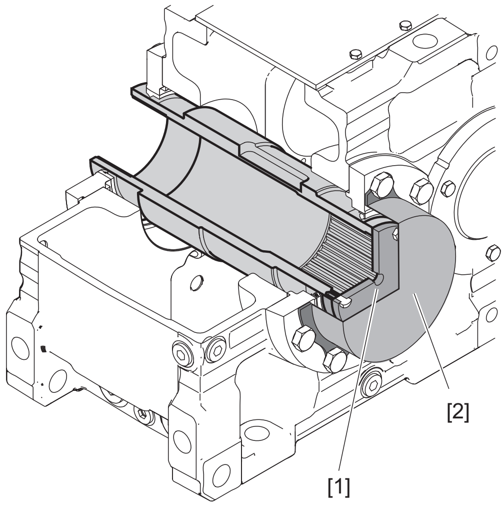
4.9.8 Output shaft as a splined hollow shaft /..V

The output shaft is splined according to DIN 5480.

Included in the delivery:

- Protection cover [2]
- Endplate with screws [1] or
- 2 retaining rings



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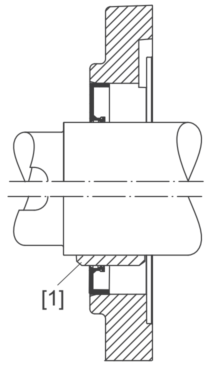
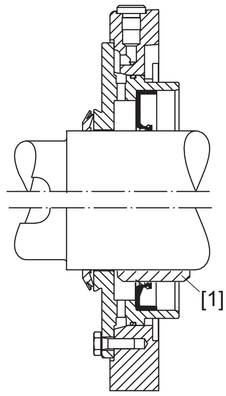
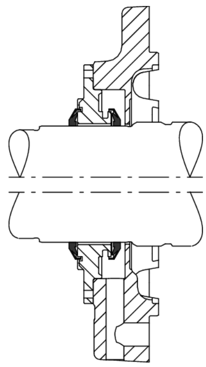
4.10 Sealing system

4.10.1 Input shaft

Non-regreasable seal

Designation	Property	Environment	Figure
Standard	Single oil seal with dust protection lip	Normal environment	
Dust-protected	Single oil seal with dust protection cover	**Medium** dust load with abrasive particles	
Contactless with dust protection	Contactless seal with dust protection and standstill sealing	**Low** dust load with abrasive particles	

[1] Optional with oil seal sleeve

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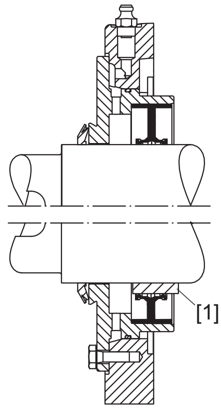
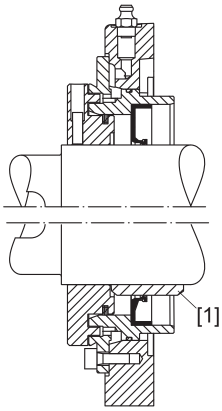
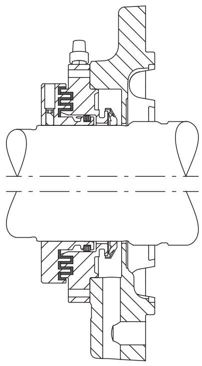
Regreasable seal

Designation	Property	Environment	Figure
Dust-protected regreasable	Double oil seal with dust protection cover	**High** dust load with abrasive particles	
Radial labyrinth seal (Taconite), regreasable	Single oil seal with radial labyrinth seal	**Very high** dust load with abrasive particles	
Non-contact with regreasable radial labyrinth seal	Contactless seal with radial labyrinth and standstill sealing	**Medium to very high** dust load with abrasive particles	

[1] Optional with oil seal sleeve

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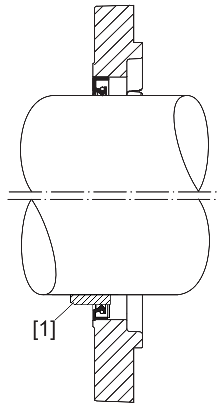
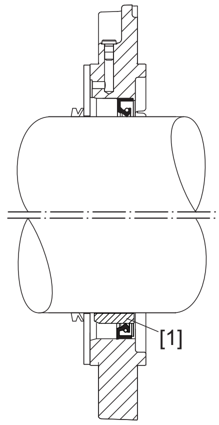
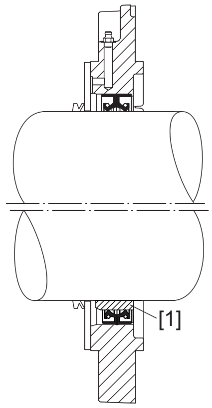
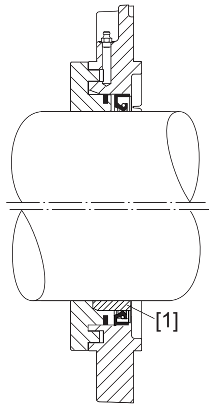
4.10.2 Output shaft

Non-regreasable seal

Designation	Property	Environment	Figure
Standard	Single oil seal with dust protection lip	Normal environment	
Dust-protected	Single oil seal with dust protection cover	**Medium** dust load with abrasive particles	

[1] Optional with oil seal sleeve

Regreasable seal

Designation	Property	Environment	Figure
Dust-protected regreasable	Double oil seal with dust protection cover	**High** dust load with abrasive particles	
Radial labyrinth seal (Taconite), regreasable	Single oil seal with radial labyrinth seal	**Very high** dust load with abrasive particles	

[1] Optional with oil seal sleeve

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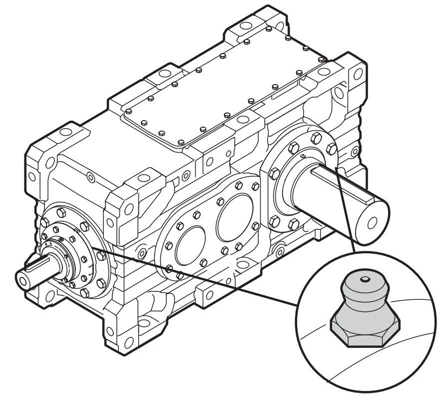
4.10.3 Position of lubrication points

Universal housing /HU, horizontal housing /HH, thermal housing /HT

Grease nipple on gear unit cover

Regreasable sealing systems are usually equipped with taper greasing nipples according to DIN 71412 A R1/8. Relubrication must be carried out at regular intervals. The lubrication points are near the input and/or output shaft.

Example



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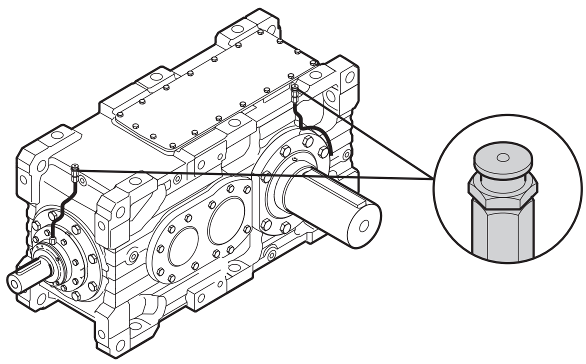
Grease nipple on the top side of the gear unit

When installed in a restricted space, the lubrication points can be relocated to the top side of the gear unit. Flat greasing nipples according to DIN 3404 A G1/8 are used. Relubrication must be carried out at regular intervals.

Note the following points:

- This option is normally used on drives with fans, motor adapters, or V-belt drives.
- The option applies to both input and/or output shaft(s).

Example



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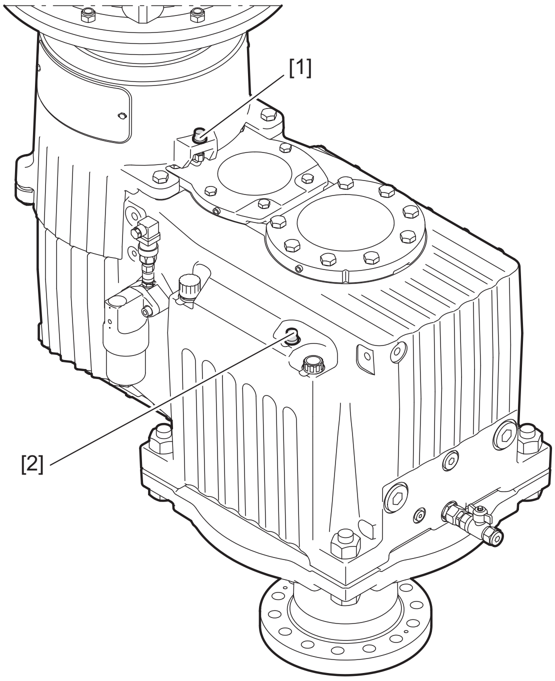
Agitator housing /HA

Regreasable sealing systems are usually equipped with taper greasing nipples. Relubrication is to be performed at regular intervals. The lubrication point [1] serves to lubricate the seal at the input end. The lubrication point [2] serves to lubricate the seal at the output end.



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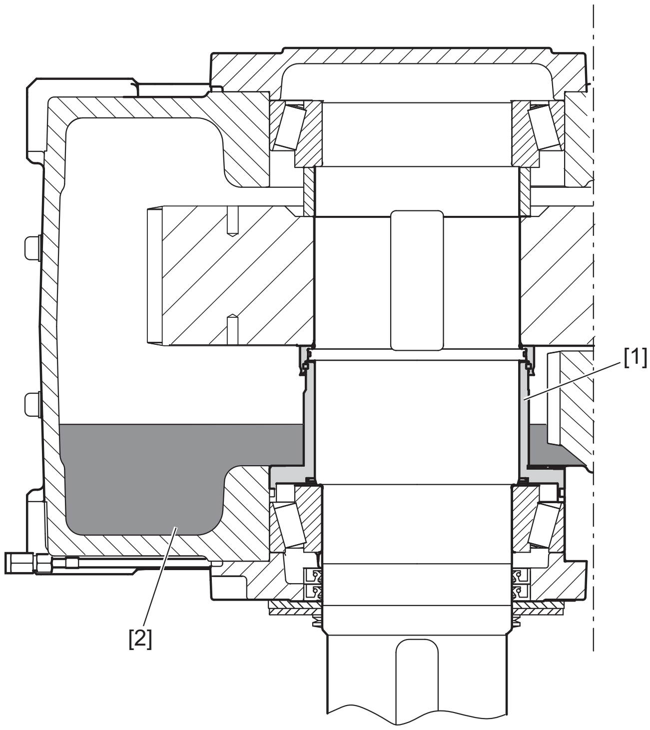
4.10.4 Drywell sealing system

Vertical gear units with the output shaft pointing downwards can be equipped with a drywell sealing system in addition to the normal seal. The lower bearing of the output shaft is separated from the oil chamber by an installed pipe [1]. The bearing is lubricated with grease and must therefore be relubricated at regular intervals (flat grease nipple DIN 3404 a G1/8). The oil level is lowered below the upper end of the pipe, which means that no oil [2] can escape at this point. To ensure sufficient lubrication of the upper bearings as well as the gearing, all gear units are equipped with a drywell sealing system with pressure lubrication (shaft end pump or motor pump).

For the lubrication points of the Drywell sealing system, refer to chapter "Relubricating the bearing for Drywell sealing systems" (→ 🗎 256).



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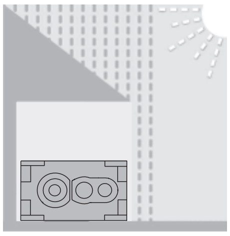
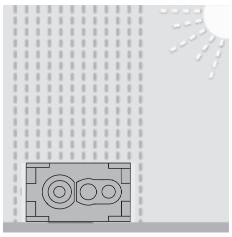
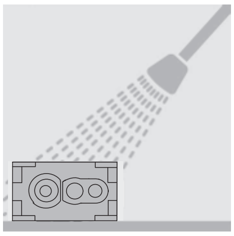
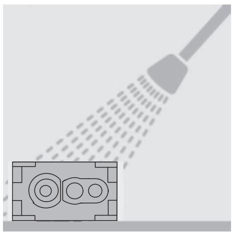
4.11 Coating and surface protection systems

Used as surface protection under typical ambient conditions, corrosivity category DIN EN ISO 12944-2. The following tables give an overview of coating and surface protection systems.

OS 1 low environmental pollution	
	For environments prone to condensation and atmospheres with low humidity or contamination, such as outdoor applications under roof or with protection, unheated buildings where condensation can build up. According to corrosivity category: C2 (low)
Sample applications	• Systems in saw mills • Agitators and mixers
Condensation test ISO 6270	120 h
Salt spray test ISO 7253	–

OS 2 medium environmental pollution	
	For environments with high humidity or moderate atmospheric contamination, such as applications outdoors subject to direct weathering. According to corrosivity category: C3 (moderate)
Sample applications	• Applications in gravel plants • Cableways
Condensation test ISO 6270	120 h
Salt spray test ISO 7253	240 h

OS 3 high environmental pollution	
	Suitable for environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasionally acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt exposure. Based on corrosivity category: C4 (high)
Application examples	• Port cranes • Sewage treatment plants • Mining applications
Condensation test ISO 6270	240 h
Salt spray test ISO 7253	480 h

OS 4 very high environmental pollution	
	Suitable for environments with permanent humidity or severe atmospheric or chemical contamination. Regular acidic and caustic wet cleaning also with chemical cleaning agents. Based on corrosivity category: C5 (very high)
Sample applications	• Drives in malting plants • Wet areas in the beverage industry • Conveyor belts in the food industry
Condensation test ISO 6270	360 h
Salt spray test ISO 7253	600 h

INFORMATION

- Standard top coat color RAL 7031, can deviate depending on the order, see order documents.
- Color according to RAL
- Water and hand perspiration repelling rust preventive for external preservation applied to uncoated parts, shaft ends/flanges.
- Sheet metal parts (such as protection covers) are painted in RAL 1003 as standard.
- If you need surface protection systems of a higher quality, contact SEW-EURODRIVE.

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4.12 Type of lubrication

4.12.1 Splash lubrication

Standard lubrication type for horizontal mounting positions (M1 or M3). Gearing and bearing parts that are not immersed in the oil bath are lubricated by splashing oil.

Reduced oil level

The reduced oil level allows for operating the gear unit with a smaller oil quantity. The machine elements that are not submerged in the oil are sufficiently supplied with oil by an internal oil distribution system. This significantly reduces the power loss depending on the gear ratio.

4.12.2 Bath lubrication

The gear unit is (almost) completely filled with oil; all gearing and bearing positions are submerged in the oil bath either completely or partly.

- Standard lubrication type with oil compensator for:
  - Pivoted mounting positions with horizontal gear units beyond a certain angle of inclination (depending on type of gear unit, design and size)
  - Vertical gear units (mounting position M5)
  - Upright mounting position (M4) with X.K.. gear units
- Standard lubrication type without oil expansion tank for:
  - Upright mounting position (M4) with X.F../X.T.. gear units

4.12.3 Pressure lubrication

The gear unit is equipped with a pump (shaft end pump or motor pump). The oil level is low and possibly even reduced in comparison with the splash lubrication. The gearings and bearing positions that are not submerged in the oil bath are supplied with oil via lubrication lines.

Pressure lubrication is used when

- Splash lubrication is not possible (see corresponding mounting positions and variants under "Bath lubrication"),
- Bath lubrication is not desired and/or is not advantageous for thermal reasons,
- A Drywell sealing system is required (only for vertical output shaft with LSS facing downwards), or
- High input speeds are present and the limit speed for the other types of lubrication is exceeded (depending on the gear unit size, design, and number of stages).

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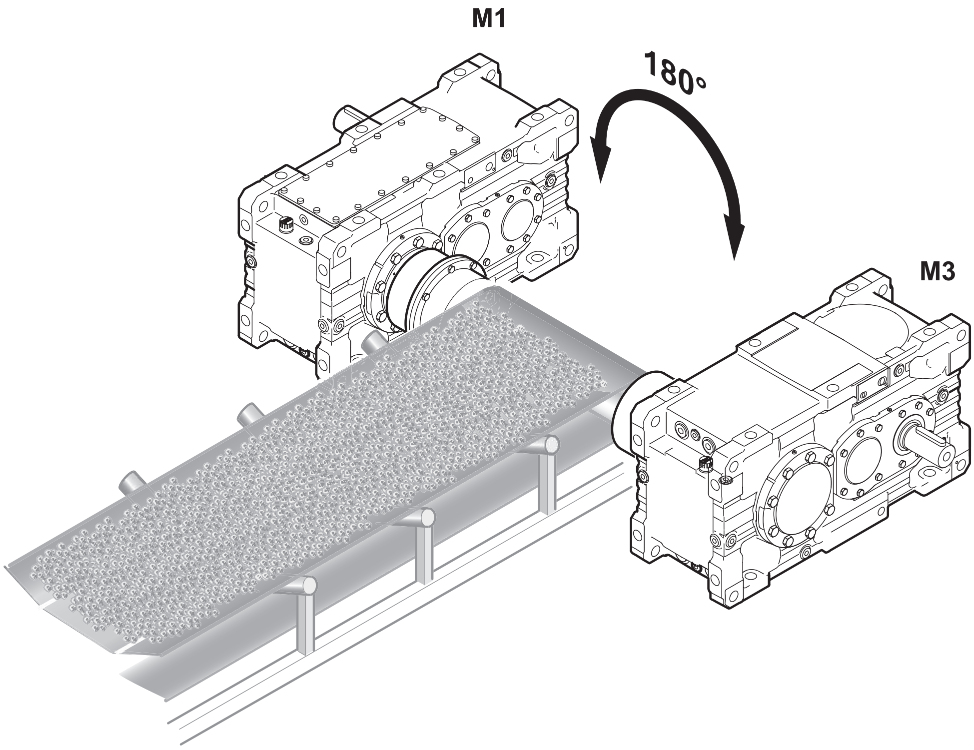
4.13 Reversible gear units

The gear units are symmetrical to the central axis and each mounting surface is designed so that "overhead mounting" is possible for mounting positions M1/M3.

For information about the conversion refer to the separate operating instructions.

You can find these together with the dimension sheet and further documents in the overall documentation for the gear unit.



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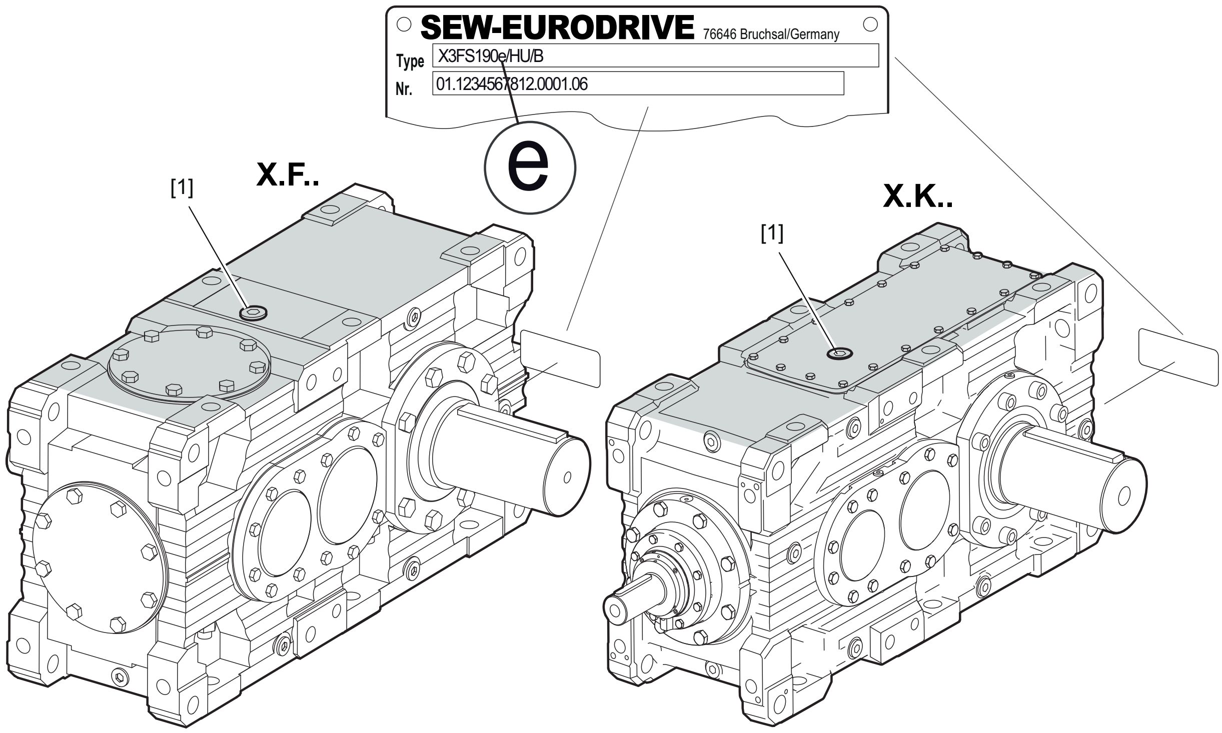
4.14 Identifying features of a reduced oil level

The sizes X180e – X320e are available with a reduced oil level and the lubrication type splash lubrication.

All of the following features must be met to identify a Generation X.e helical and bevel-helical gear unit with reduced oil level:

- Type designation X.e, see nameplate.
- The oil fill opening is located at the upper side of the gear unit (area marked in gray). The following figure shows an example of the oil fill opening on the gear unit cover.



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For further information, refer to the following chapters:

- Structure and description, see chapter "Reduced oil level" (→ 🗎 71).
- Fill the gear unit with oil, see chapter "Filling the gear unit with oil" (→ 🗎 102).
- Gear unit filled with oil upon delivery, see chapter "Upon delivery the gear unit is filled with oil at the factory." (→ 🗎 112).
- Operation, see chapter "Speed limits with reduced oil level" (→ 🗎 227).
- Lubricant fill quantities in chapter "Gear units with reduced oil level" (→ 🗎 294).

5 Design of options and accessories

5.1 Oil expansion tank /ET

Purpose of the oil expansion tank

The oil expansion tank is designed to compensate for oil volume variations in the system caused by temperature fluctuations. When the gear unit temperature increases, the oil expansion tank absorbs some of the increasing oil volume and feeds it back to the gear unit as the temperature goes down, which means the gear unit is always completely filled with oil. Based on the oil level specified by SEW-EURODRIVE, the oil expansion tank is designed to compensate the oil volume changes within the permitted operating temperature range.

Exceeding the permitted temperature ranges

A temperature decrease below the permitted temperature range causes the oil expansion tank to be completely emptied and air being sucked into the gear unit. This can lead to insufficient lubrication and thus to the gear unit failure. An increase above the permitted range causes an overfilling of the oil expansion tank and oil might leak from the gear unit.

Permitted fill quantity

Any oil level below or above the level specified by SEW-EURODRIVE is permitted during operation as long as there is oil in the oil expansion tank and the oil expansion tank does not overflow.

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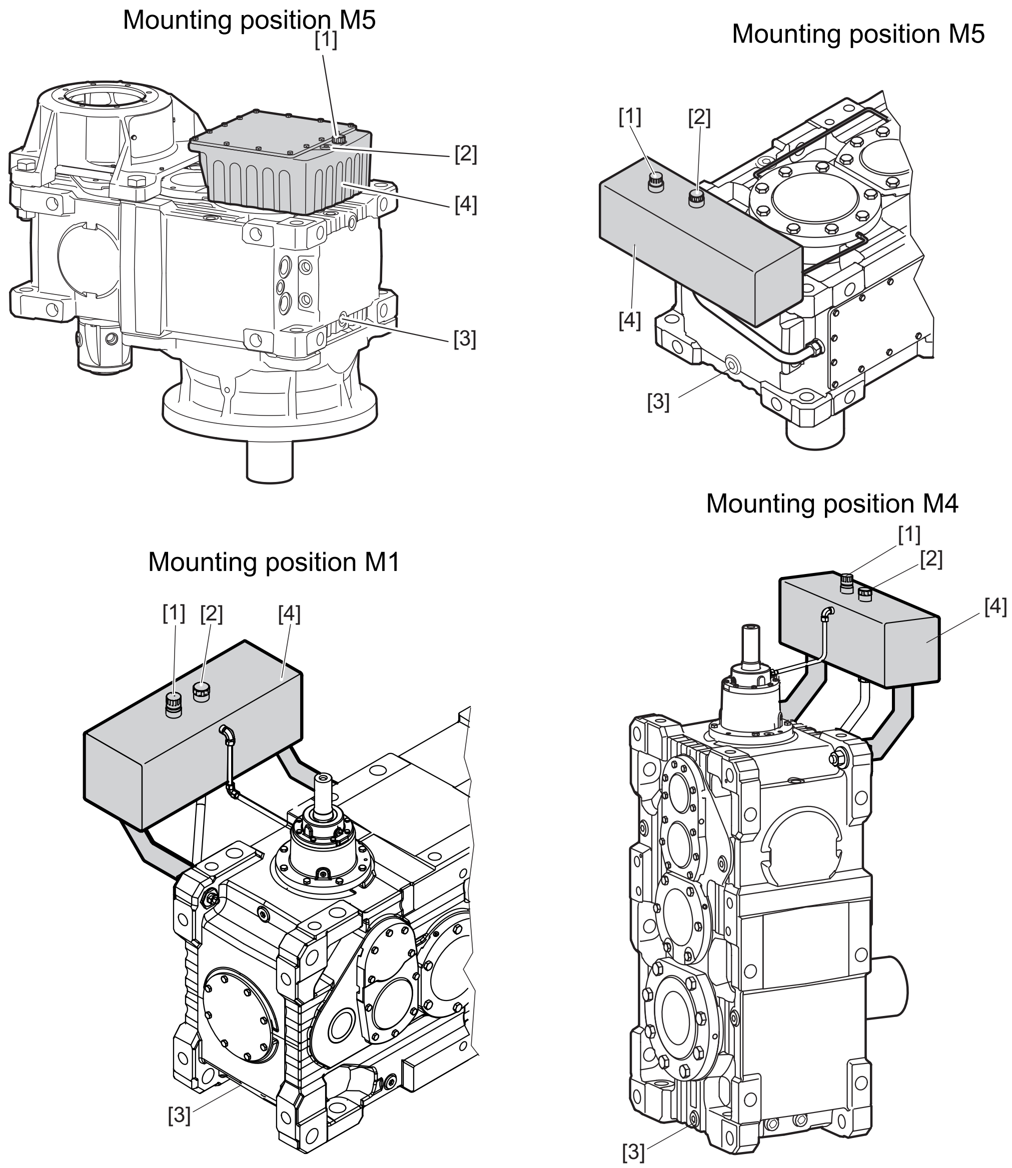
5.1.1 Universal housing /HU

The following figure shows an example of the accessories.



[1] Breather
[2] Oil dipstick
[3] Oil drain
[4] Oil expansion tank

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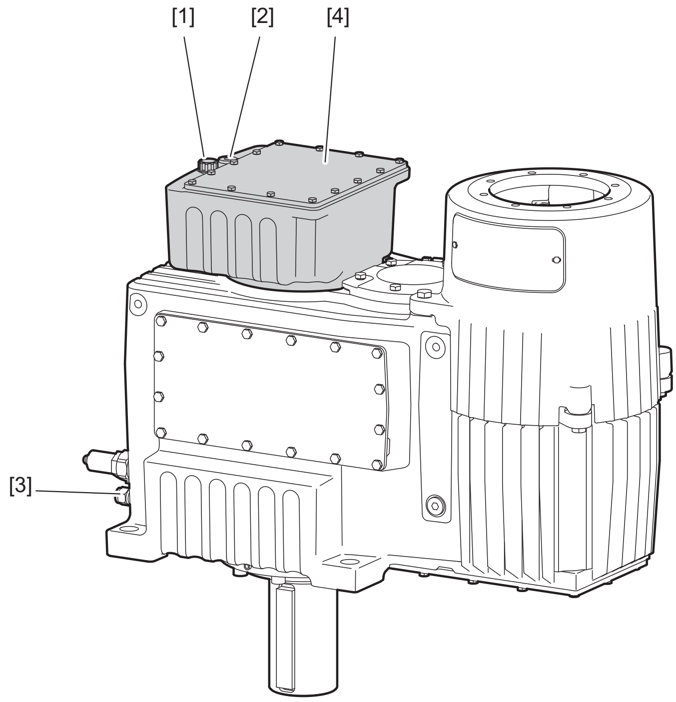
5.1.2 Agitator housing /HA

The following figure shows an example of accessories for an agitator drive /HA size X140 – 210.

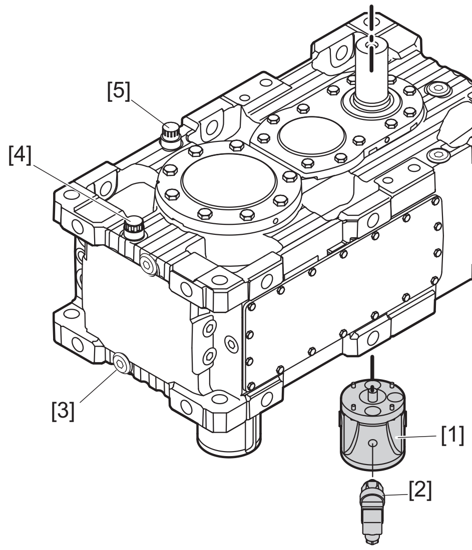


15485987211

[1] Breather
[2] Oil dipstick
[3] Oil drain
[4] Oil expansion tank

5.2 Shaft end pump /SEP

The figure shows the shaft end pump in M5 mounting position as an example.



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[1] Shaft end pump
[2] Pressure switch
[3] Oil drain
[4] Breather
[5] Oil dipstick

With pressure lubrication a shaft end pump (direction-independent) supplies all bearing points and gearing outside the oil sump with oil via a tube system.

The shaft end pump is mounted externally to the gear unit and is driven by the input shaft or intermediate shaft of the gear unit. This ensures high reliability of the pump function.

The shaft end pump is monitored via the connected pressure switch. A minimum input speed is required for the correct function of the shaft end pump. If you use variable input speeds (e.g. inverter-controlled drives) or if you intend to change the input speed of a gear unit equipped with a shaft end pump, it is essential that you contact SEW-EURODRIVE.

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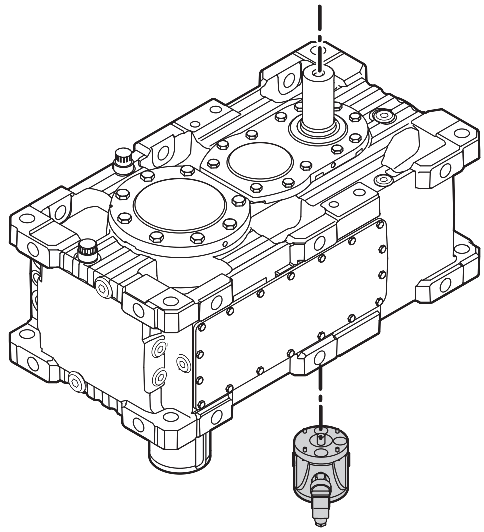
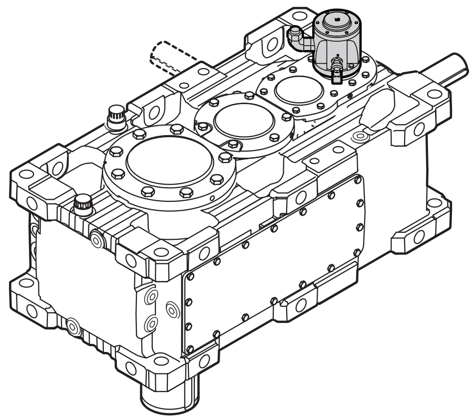
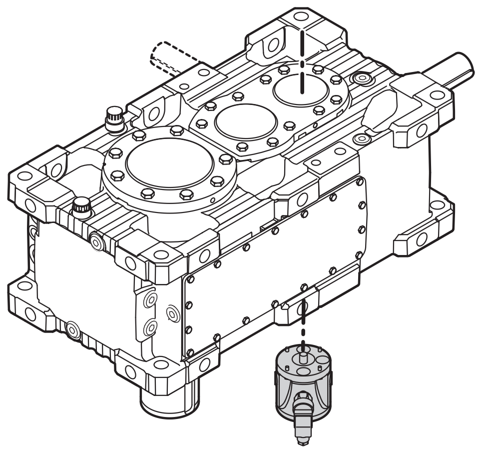
5.2.1 Overview: Position of shaft end pump

Design	Shaft end pump position	Figure
X.F..	With X.F.. helical gear units, the shaft end pump is positioned opposite the input shaft.	
X2K.. **X4K..** **X4T..**	The shaft end pump of X2K/X4K/X4T bevel-helical gear units is located opposite the output shaft.	
X3K.. **X3T..**	The shaft end pump of X3K/X3T gear units is located on the output shaft side.	

5.3 Pressure switch /PS

The pressure switch signals the correct oil pressure in the pressure pipe and in this way indicates that the pressure lubrication is ready for operation. The pressure switch must be monitored by the operator.

Pressure might build up with a delay during the startup phase of the gear unit with a shaft end pump. The slow pressure build-up in this phase can lead to an error signal by the pressure switch that can be bridged. The pressure switch signal must then be bridged for **5 to a maximum of 10 seconds**.

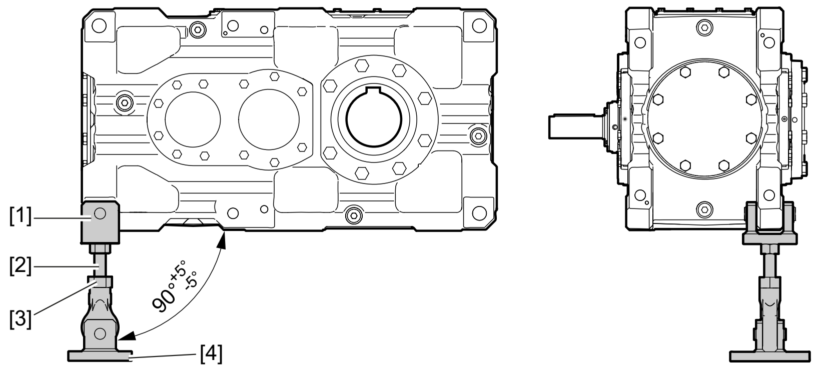
Longer shutdown delays may result in damage to the gear unit and are not permitted.

5.4 Torque arm /T

A torque arm is available as option for shaft-mounted gear units to support the reaction torque. The torque arm can bear tensile stress as well as thrust loads.

The length of the torque arm can be adjusted within a certain range.

The torque arm consists of a yoke with bolt [1], a threaded bolt [2], a maintenance-free joint head [3], and a yoke plate with bolt [4]. The design with the joint head allows for compensating assembly tolerances and operational displacements. Constraining forces on the output shaft are avoided in this way.



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[1] Yoke head with bolt
[2] Stud bolt with nuts
[3] Joint head
[4] Yoke plate with bolt

5.5 Mounting flange /F

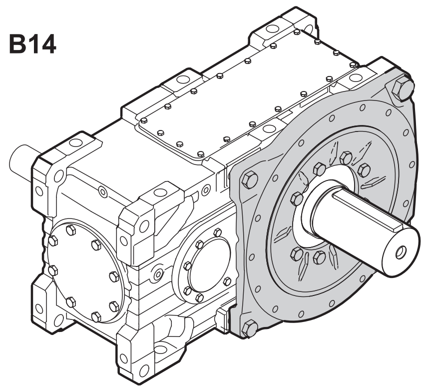
As an alternative to foot mounting, a mounting flange is available for the gear units.

INFORMATION

- The mounting flange can be combined with all output shaft types, but this is not possible in conjunction with the standard sealing system. Observe the limitations for hollow-shaft gear units in chapter "Gear unit mounting for hollow-shaft gear units" (→ 🗎 115).
- For mounting flanges with external overhung loads, contact SEW-EURODRIVE.

5.5.1 B14

The mounting flange in B14 design has an outer centering and retaining threads. It is available for gear unit sizes X100 – 210.



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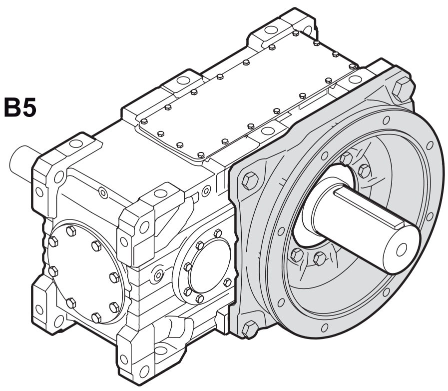
5.5.2 B5

In addition, a B5 design is available for gear unit sizes X130 – 190. The mounting flange is designed with through bores.



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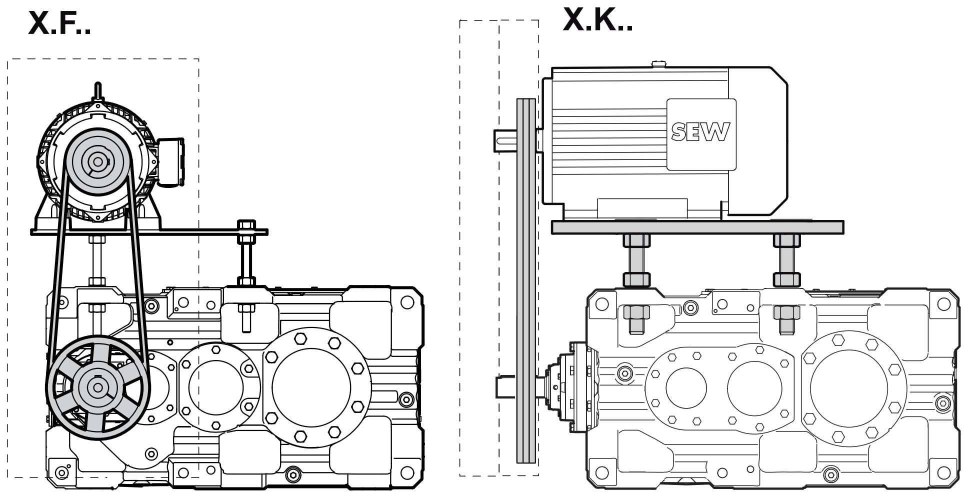
5.6 V-belt drives /VBD

V-belt drives are usually employed where an equalization of the overall gear ratios is necessary or where physical peripheral conditions require a specific motor arrangement.

The standard delivery comprises motor scoop, belt pulleys, V-belt, and V-belt guard. The drive is supplied as a completely mounted unit with motor.

V-belt drives in the standard design cannot be combined with mounting flange or fan because these options collide with each other.

The following figures show the basic structure of a gear unit with V-belt drive.



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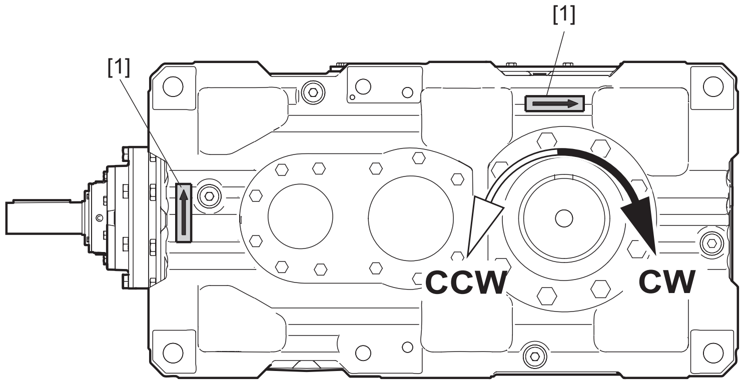
5.7 Backstop /BS

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

The backstop functions by using centrifugal lift-off sprags. Once the lift-off speed is reached, the sprags completely lift off from the contact surface of the outer ring. The backstop is lubricated with gear oil.



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The direction of rotation is specified as viewed onto the output shaft (LSS).

- CW = clockwise rotation
- CCW = counterclockwise rotation

The permitted direction of rotation [1] is indicated on the housing.

Note that the wear may occur in the backstop when operated below lift-off speed.

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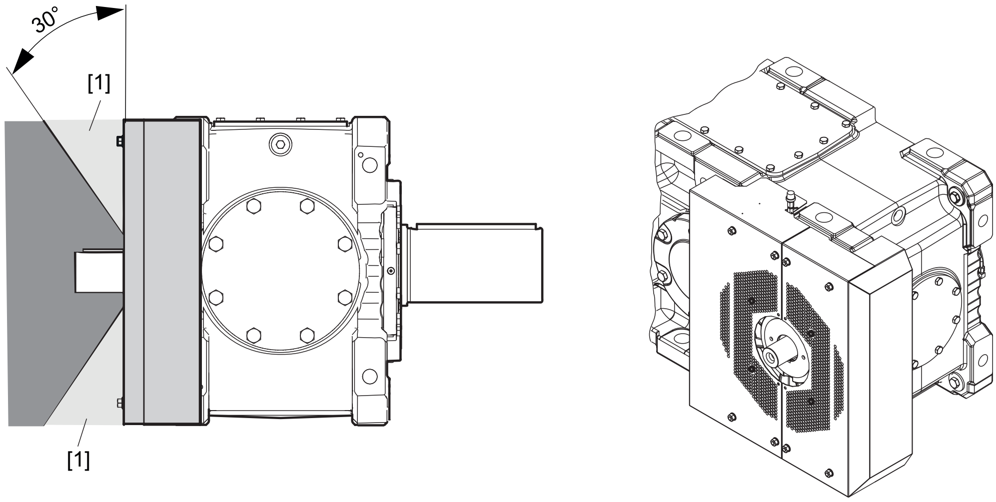
5.8 Fan /FAN

A fan can be retrofitted to increase the thermal rating or when the ambient conditions change after gear unit startup. The direction of rotation of the gear unit does not influence the operation of the fan.

5.8.1 X.F..



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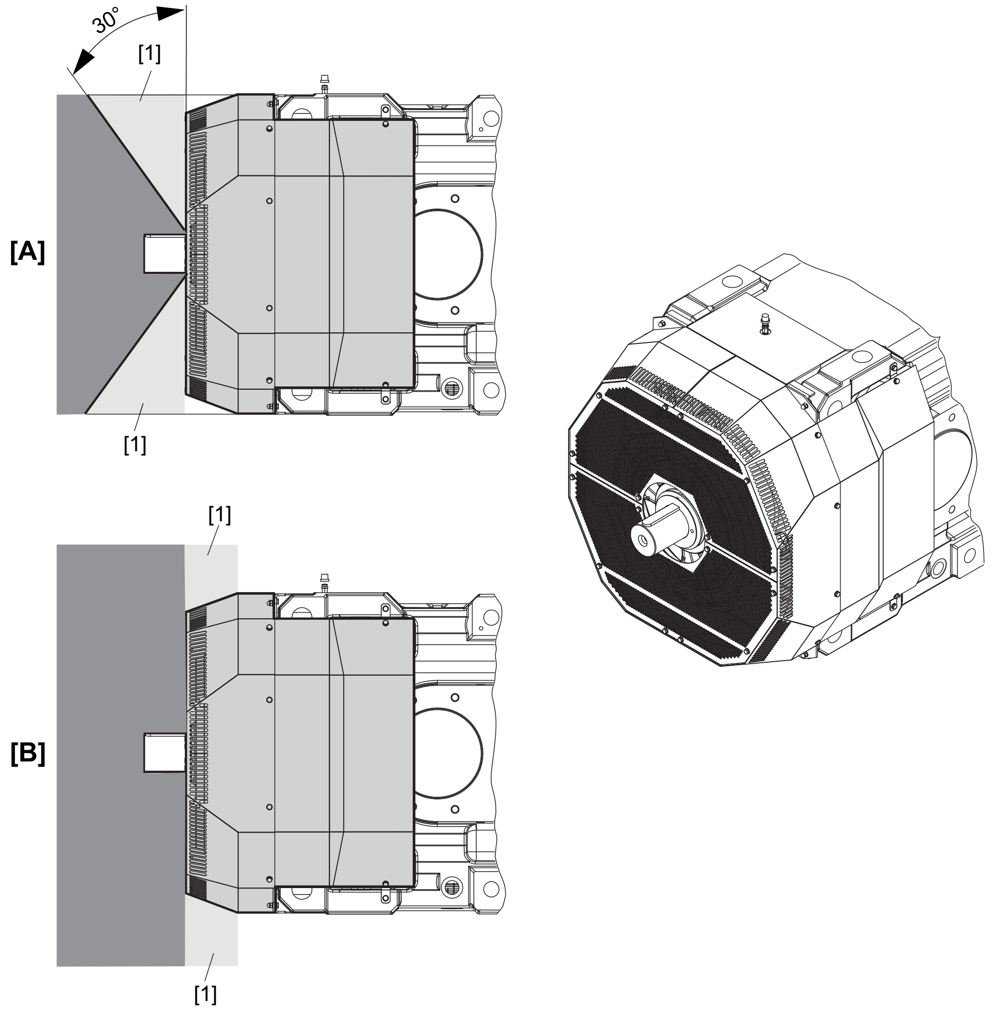
[1] Air intake clearance

5.8.2 X.K.. Fan with universal fan guard



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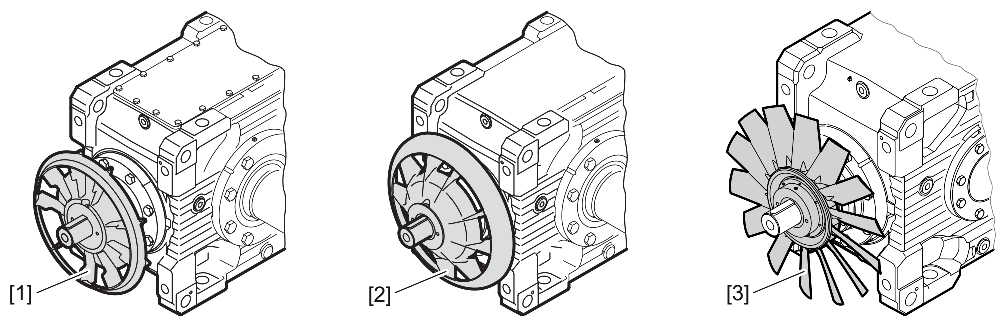
[A] Radial fan and axial fan
[B] Diagonal fan
[1] Air intake clearance

X.K.. fan designs



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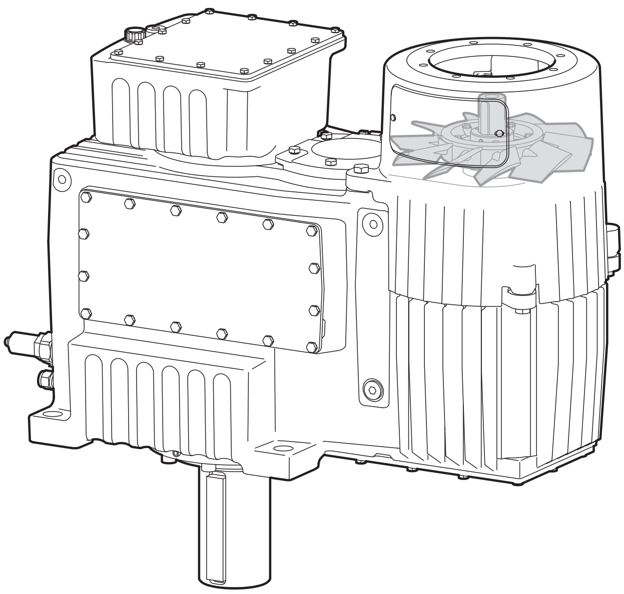
[1] Radial fan [2] Diagonal fan [3] Axial fan

5.8.3 Axial fan base

Agitator housing /HA



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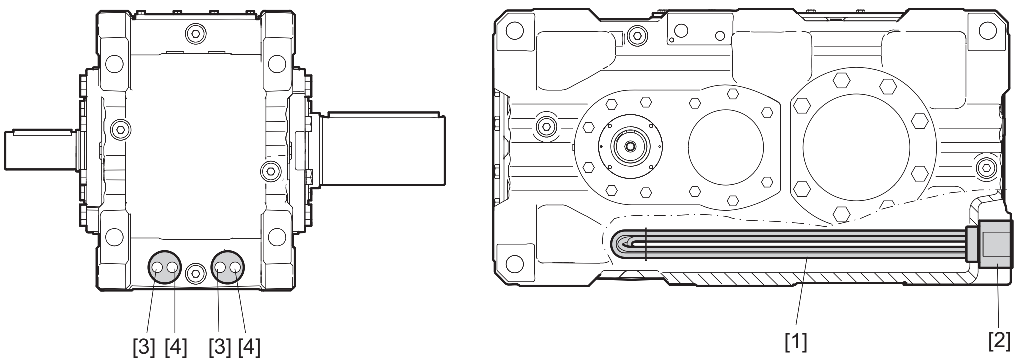
5.9 Water cooling cartridge /CCT

The water cooling cartridge is mounted in the gear unit's oil sump and is supplied via a water connection. The water connection is provided by the customer. The heat quantity that can be dissipated depends on the inlet temperature and the volume flow of the cooling medium.

5.9.1 Structure



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[1]	Cooling pipes	[3]	Return
[2]	Tube plate with connection piece	[4]	Supply

The water cooling cartridge consists of 3 main parts:

- Cooling pipes (copper and nickel alloy), optionally available in stainless steel
- Tube plate (brass)
- Connection piece (brass; gray cast iron; steel)

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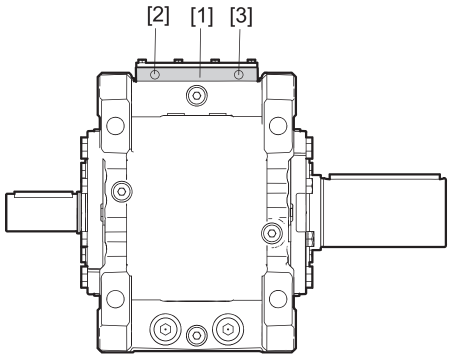
The water cooling cartridges can be retrofitted to a certain extent. Contact SEW-EURODRIVE.

5.10 Water cooling cover /CCV

The water cooling cover is located at the mounting opening of the gear unit and is supplied via a water connection. The water connection is provided by the customer. The heat quantity that can be dissipated depends on the inlet temperature and the volume flow of the cooling medium.

5.10.1 Structure



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[1] Water cooling cover
[2] Supply
[3] Return

The water cooling cover [1] is made of a corrosion-resistant aluminum alloy. A water cooling cover can be retrofitted. Contact SEW-EURODRIVE.

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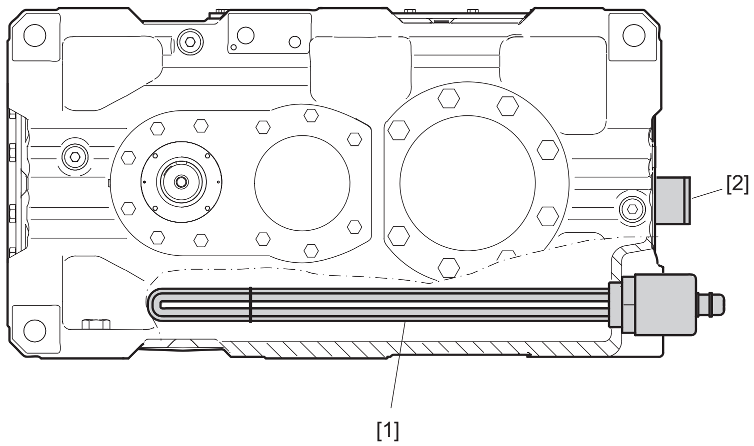
5.11 Oil heater /OH

An oil heater may be required to ensure lubrication during a cold gear unit startup when the ambient temperature is low.

5.11.1 Structure

The oil heater consists of 2 main parts:

1. Heating element in the oil sump ("oil heater") with connection unit
2. Thermostat with integrated temperature sensor



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[1] Oil heater
[2] Thermostat with integrated temperature sensor

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5.12 Oil supply system

For information about the structure, function, startup, maintenance, etc. of the oil supply system, refer to the separate operating instructions.

You can find these together with the dimension sheet and further documents in the overall documentation for the gear unit.

The following oil supply systems can be used:

- Motor pump for pressure lubrication /ONP1
- Motor pump for pressure lubrication /ONP1L

5.13 Oil cooling system

For information about the structure, function, startup, maintenance, etc. of the oil cooling system, refer to the separate operating instructions.

You can find these together with the dimension sheet and further documents in the overall documentation for the gear unit.

The following oil cooling systems can be used:

- Oil-air cooler for splash or bath lubrication /OAC1
- Oil-air cooler for pressure lubrication /OAP1
- Oil-water cooler for splash or bath lubrication /OWC1
- Oil-water cooler for pressure lubrication /OWP1

5.14 Flange coupling

For information about the structure, function, installation, etc. of the flange coupling, refer to the separate operating instructions.

You can find these together with the dimension sheet and further documents in the overall documentation for the gear unit.

5.15 Gear units on swing base/base frame

For information on the structure, function, and installation of the swing base/base frame, refer to the separate operating instructions.

You can find these together with the dimension sheet and further documents in the overall documentation for the gear unit.

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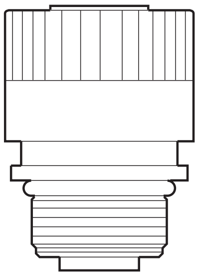
5.16 Breather /BPG

The breather serves to prevent non-permitted pressure generated by heating or cooling during operation.

The following breathers can be used.

5.16.1 Standard



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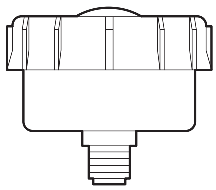
Structure

Features	
Housing material	Polyamide
Filter inserts	Polyester filter, not exchangeable
Filter size	2 µm
Threads	3/4" or 1"

5.16.2 Breather with filter insert /PI



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The breather has the following characteristics:

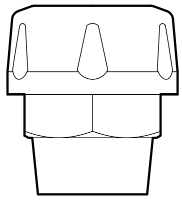
- Corrosion-resistant
- Robust filter housing
- High dirt-absorbing capacity

Structure

The breather has a corrosion-proof housing with an air intake opening at the top. The cover with protection lip keeps splashing water off.

Features	
Housing material	Polyamide
Filter inserts	Wire mesh, galvanized
Filter size	10 µm
Threads	3/4" or 1"

5.16.3 Breather made of steel



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Structure

Characteristics	
Housing material	Steel
Filter inserts	Wire mesh
Threads	3/4" or 1"

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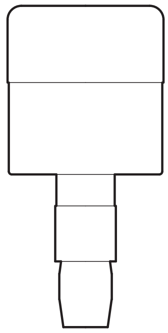
5.16.4 Desiccant breather filter /DC



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The breather has the following characteristics:

- Absorbs water moisture and humidity
- Reduces oil mist

Structure

Features	
Housing material	Polycarbonate
Filter inserts	• Polyester filter: Removes air particles > 3 µm • Silica gel: Absorbs water and humidity. Saturation is indicated by the color changing from blue to pink. • Foam pad: Absorbs oil mist
Thread	3/8" or 1"

5.17 Temperature sensor /Pt100

The Pt100 temperature sensor can be used to measure the temperature of the oil in the gear unit. The temperature signal is evaluated by the operator's control.

Observe the gear unit oil temperature in chapter "Permitted lubricants" (→ 🗎 274) and the information in the order-specific documents.

The temperature sensor is located in the oil sump of the gear unit. The exact position depends on the gear unit version and the location of the shaft.

5.18 Temperature switch /NTB

A temperature switch with preset switching temperatures of 70, 80, 90 or 100 °C is used for monitoring the gear unit oil temperature.

For various functions, the temperature switch is also used as a limit value switch, for example

- as an "early warning"

  or

- as a "main alarm" for switching off the main motor.

To guarantee a long service life and functioning under all conditions, it is recommended to use a relay in the power circuit instead of a direct connection through the temperature switch.

The temperature switch is located in the gear unit's oil sump. The exact position depends on the gear unit version and position of the shaft.

5.19 Temperature switch /TSK2

A temperature switch with preset switching temperatures is available for monitoring the gear unit's oil temperature.

The temperature switch is designed with 2 fixed switching points for controlling and monitoring the system function.

The temperature switch is integrated into the circuit of the oil supply system as follows:

- The cooling system is activated when the oil temperature reaches 60 °C.
- Warning signal or stopping the gear unit if the maximum oil bath temperature is exceeded.

To guarantee a long service life and functioning under all conditions, it is recommended to use a relay in the power circuit instead of a direct connection through the temperature switch.

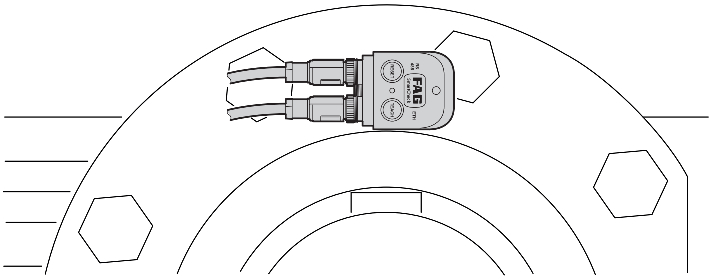
The temperature switch is located in the gear unit's oil sump. The exact position depends on the gear unit version and the location of the shaft.

The temperature switch must be integrated in the operator's controller in such a way that the order-specific switching points are achieved.

5.20 DUV40A (Diagnostic Unit Vibration)

The DUV40A vibration monitoring system is used for early detection of damage to gear units and gearmotors (e.g. bearing damage or imbalance). Permanent frequency-selective monitoring of the gearmotor is used for this purpose. Apart from the vibration analysis, additional measured values of up to 3 signal encoders can be detected, recorded and analyzed. The additional signals can be used as reference values for signal analysis e.g. to trigger time or event-controlled measuring tasks. After the analysis and depending on user-defined alarm limits, the system can switch outputs and display the state using LEDs.

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



INFORMATION

For more information about DUV40A, refer to the "Diagnostic Unit Vibration" manual, part number: 31559018/EN.

5.21 DUO10A diagnostic unit (oil aging)

If specified in the order, the gear unit can be equipped with a DUO10A diagnostic unit. The DUO10A diagnostic unit is used for planning oil change intervals.

The diagnostic unit consists of a Pt100 temperature sensor and an evaluation unit. The temperature sensor installed in the gear unit measures the present gear unit oil temperature. The diagnostic unit uses the oil temperature values to calculate the predicted remaining service life of the oil. This calculation value is continuously shown on the display of the evaluation unit. If necessary, the display can be changed to the current gear unit oil temperature.

INFORMATION

For more information on the evaluation unit, refer to the "Diagnostic Unit DUO10A" manual, part number 11473428/EN.

5.22 DriveRadar®

DriveRadar® Industrial Gear Units enables users to plan maintenance and service work on a predictive basis and to avoid undesirable downtime.

Selected condition monitoring processes are used to record all the operationally relevant mechanical parameters of our industrial gear units on a cyclical basis. The recorded data is evaluated and interpreted using state-of-the-art analytical processes.

Continuously monitoring measurement data in this way provides complete transparency regarding the condition of industrial gear units at all times. Furthermore, the analytical processes match irregularities directly to the affected components, reveal trends and make it possible to predict when critical conditions are likely to arise. If the condition of a component changes, users are notified immediately. They are given initial recommendations and can then use our service offerings to take action in plenty of time.

For information about the structure, function, and startup, refer to the separate operating instructions.

You can find these together with the dimension sheet and further documents in the overall documentation for the gear unit.

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6 Installation/assembly

6.1 Required tools/resources

The following tools/resources are needed for installation/assembly:

- Suitable, sufficiently rated, and undamaged handling equipment
- Set of wrenches and torque wrenches
- Mounting device
- Compensation elements (washers, spacing rings), if necessary
- Fasteners for input/output elements
- Assembly paste, e.g. NOCO-Paste from SEW-EURODRIVE → except for hollow-shaft gear units
- For hollow-shaft gear units:
  - 1 × end plate with 4 retaining screws
  - Aids for assembly/disassembly onto the machine shaft
- Fastening parts for the gear unit base

The tools/resources are not included in the scope of delivery.

6.2 Tolerances

6.2.1 Gear units

Refer to the dimension sheet for the tolerances of the interfaces for gear unit connection.

You can find it together with further documents in the overall documentation for the gear unit.

6.3 Preliminary work for installation/assembly

6.3.1 Information

Read chapter "Creating a safe working environment" (→ 🗎 18) before starting any work.

Check that the following conditions have been met:

NOTICE

Improper installation and mounting may result in damage to the gear unit.

Possible damage to property.

- Make sure that the ambient temperature complies with the specifications in the order documents.
- Do not modify the gear unit or the mount-on components without prior consultation with SEW-EURODRIVE.
- Make sure that the oil level plugs and oil drain plugs, as well as the breather are freely accessible.
- If you install the gear unit in mounting position M2, make sure that the customer's mounting structure leaves enough room for the breather and the oil dipstick.
- When using an oil level glass to monitor the oil level, protect it against damage.
- The unit must not be exposed to direct sunlight when installed outdoors. Suitable protection devices are required, such as covers or roofs. Avoid heat build-up.
- Ensure that foreign objects do not impair the function of the gear unit (e.g. falling objects or coverings).
- Protect the gear unit from direct cold air currents. Condensation can cause water to accumulate in the oil.
- Protect the gear unit from falling objects or coverings.
- Do not perform welding work on the entire drive. Do not use the drives as a ground point for welding work. Welding may destroy gearing components and bearings.
- Use plastic inserts (2 to 3 mm thick) if there is a danger of electrochemical corrosion between the gear unit and the driven machine (connection between different metals such as cast iron and stainless steel). Also fit the screws with plastic washers! Always ground the gear unit housing.
- Repair any damage to the paint work (e.g. on the breather).
- Make sure that the gear unit and mounting parts do not protrude into the walkway.

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6.3.2 Gear unit with long-term preservation

For gear units with long-term preservation, observe the following before installation/assembly.

Remove anti-corrosion agent

You must thoroughly remove anti-corrosion agents, dirt or similar from shafts, flange surfaces, mounting and foot surfaces on the housing. Use a commercially available solvent.

NOTICE

If the dust lips of the oil seal come in contact with solvents, the dust lips can be damaged.

Possible damage to property.

- Do not let the solvent, for example, Rivolta, come into contact with the dust lips.

Insert breather

Replace the screw plug on the gear unit with a breather (position → see order documents).

6.4 Installing the gear unit

⚠ WARNING

Danger due to insufficient attachment options on the part of the operator.

Severe or fatal injuries.

- Make sure that there are sufficient and suitable attachment options for the gear unit at the operator's machine before mounting the gear unit to the operator's machine.

NOTICE

An improper foundation may result in damage to the gear unit.

Possible damage to property.

- The foundation must be level and flat.
- The gear unit must not be deformed when tightening the retaining screws.
- Correctly compensate for unevenness.
- Observe the weight information on the nameplate.

Tighten the retaining screws or nuts with the prescribed tightening torque. Use the screws and tightening torques specified in chapter "Tightening torques: Recommendations for gear unit mounting with foot-mounted design" (→ 🗎 99).

Do not change the mounting position of the gear unit without prior consultation with SEW-EURODRIVE. The warranty will become void without prior consultation.

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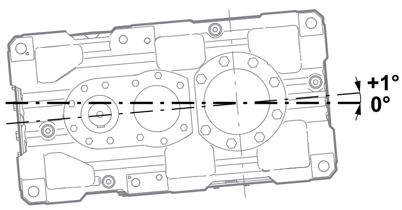
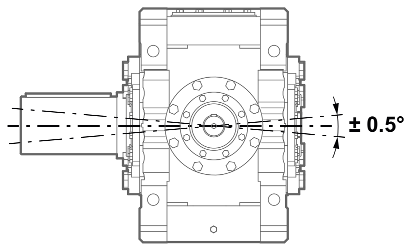
6.4.1 Permitted deviation of the mounting position during installation

The following tolerances must be observed during gear unit installation.

The information relates to gear units without pivoted mounting position.

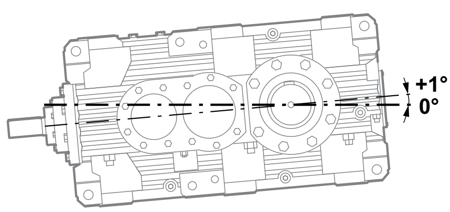
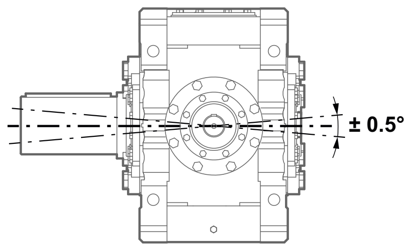
X.F..

Mounting position: M1 and M3	Mounting position: M1 and M3
	

INFORMATION

Deviations in the mounting position of **±1°** are permitted for gear units in mounting positions M2, M4, M5, M6.

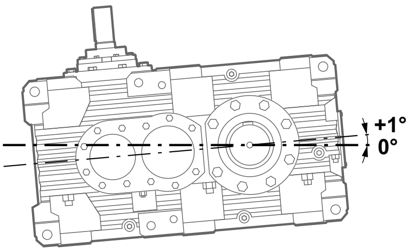
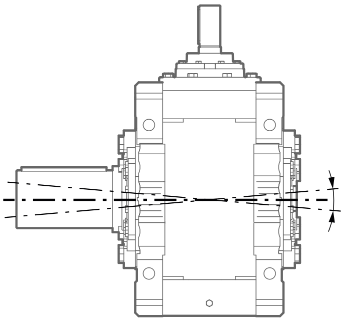
X.K..

Mounting position: M1 and M3	Mounting position: M1 and M3
	

INFORMATION

Deviations in the mounting position of **±1°** are permitted for gear units in mounting positions M2, M4, M5, M6.

X.T..

Mounting position: M1 and M3	Mounting position: M1 and M3
	

INFORMATION

Deviations in the mounting position of **±1°** are permitted for gear units in mounting positions M2, M4, M5, M6.

6.4.2 Tightening torques: Recommendations for gear unit mounting with foot-mounted design

The following table shows the thread sizes and tightening torques for mounting the individual gear unit sizes.

Mount the gear unit according to the order-specific mounting position and mounting surface using all the bores provided for the foot screw fittings.

The values given in the table for the recommended tightening torques for foot screw fittings are based on the following friction coefficients.

Friction coefficient μ_{GK} for thread and head contact surface	Strength class of the screws
0.14 – 0.24	8.8
0.09 – 0.14	10.9

Do not lubricate the screw connections during installation.

If you use screw connections with another friction coefficient, adapt the tightening torques accordingly.

Size	Screw/nut	Tightening torque Nm Strength class 8.8 Strength class 10.9
X100 – 110	M20	460
X120 – 130	M24	795
X140 – 150	M30	1590
X160 – 170	M36	2760
X180 – 190	M36	2770
X200 – 230	M42	4410
X240 – 280	M48	6650
X290 – 320	M56	10600

Use one of the following recommended tools to tighten the screw connections:

- Torque wrench
- Motorized torque wrench with dynamic torque measurement
- Torque-controlled, gradual hydraulic tools

6.4.3 Tightening torques: Recommendations for retaining screws of gear unit mount-on parts

Tighten the screws of gear unit mount-on components, safety covers and other covers with the following tightening torque. Do not lubricate the screw connections during installation.

The tightening torques do not apply to mounting types such as flange coupling, torque arm, mounting flange, hollow shaft with shrink disk, etc. These can be found in the respective chapters.

Screw/nut	Tightening torque Nm Strength class 8.8
M6	12
M8	28
M10	56
M12	96
M14	153
M16	235

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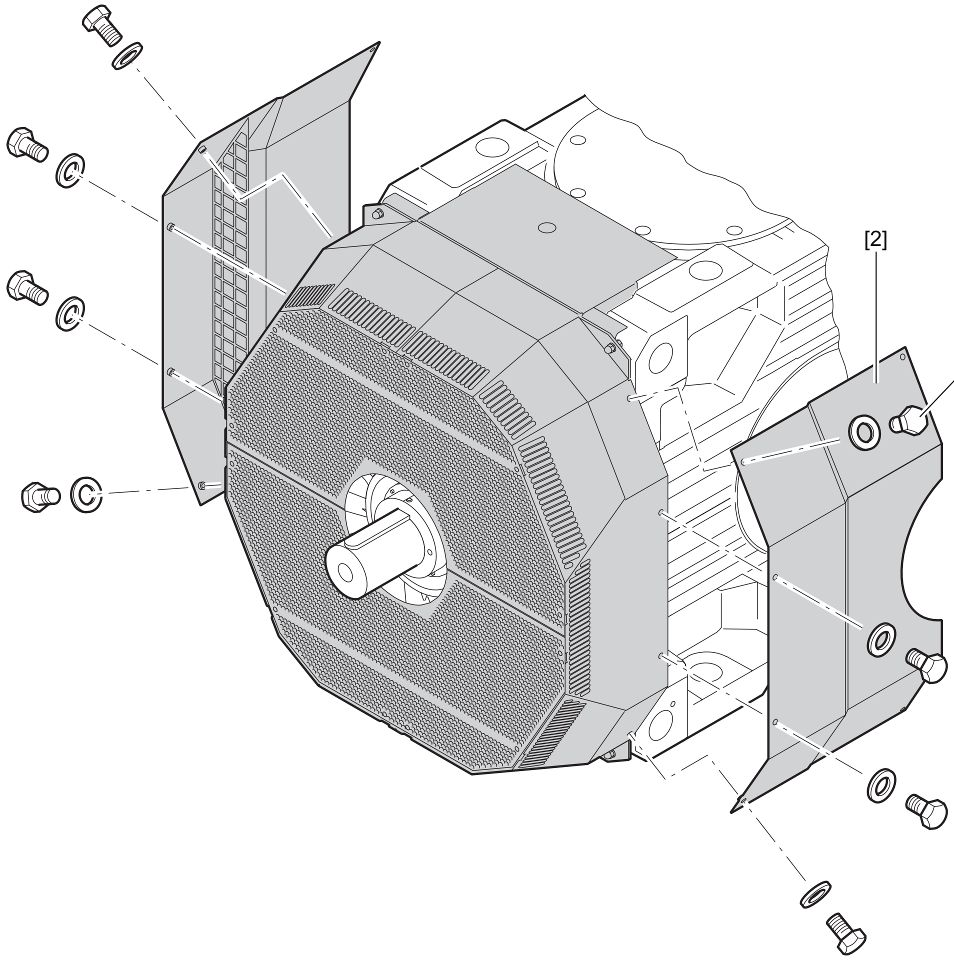
6.4.4 Gear unit mounting with foot-mounted design and fan with universal fan guard

When using gear units with foot mounting, parts of the protective cover of the universal fan guard must be removed so that the gear unit can be fastened.



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1. Loosen the screws [1].
2. Remove the sheet metal covers [2].
3. Fasten the gear unit using all the bores provided for the foot screw fitting.
4. Assemble the fan guard in reverse order.

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6.4.5 Aligning the shaft axis

⚠ WARNING

Shaft breakage and vibration if the correct alignment of the shaft axis is not observed.

Severe or fatal injuries.

- Refer to the manufacturer documentation regarding the requirements of the coupling.

The service life of the shafts, bearings and couplings depends mainly on the alignment accuracy of the shaft axes to each other.

Therefore, the aim must always be zero deviation. For example, the requirements of the couplings can also be found in the operating instructions.

6.5 Filling the gear unit with oil

The gear unit is delivered without being filled with oil at the factory as standard. Observe the following notes while filling in oil.

6.5.1 Information

- Use an oil from the current lubricant table:

  https://www.sew-eurodrive.de/products/gear_units/standard_gear_units/accessories_and_options/lubricants/lubricants.html
- Fill the oil only when the gear unit is in the intended mounting position.
- Fill the gear unit with the oil grade specified on the nameplate. The oil quantity specified on the nameplate is an approximate quantity. The markings [1] and [2] on the oil dipstick or oil level glass are the decisive indicators of the correct oil quantity to be filled in.
- Make sure the oil is fluid when filling it into the gear unit. The flowability can be improved through prior heating, e.g. by using an oil heater. SEW-EURODRIVE recommends an oil temperature of 20 °C to 40 °C for filling in oil.
- Check the oil level only when the gear unit has cooled down in idle state. SEW-EURODRIVE recommends checking the oil level at an oil temperature of 20 °C to 40 °C. The oil level must be between the markings [1] and [2] and should ideally be in the middle. Observe the information in chapter "Checking the oil level" (→ 🗎 241).
- When additional attachments, e.g. an oil supply system, are mounted to the gear unit, the oil fill quantity is higher. In this case, observe the respective "Oil Cooling System" operating instructions from SEW-EURODRIVE. Refer to the overall documentation for the gear unit.
- For gear units with external supply pipes, e.g. oil cooling systems, establish the connections before filling the oil.
- Use a clean filling aid without zinc coating (plastic funnel or similar).

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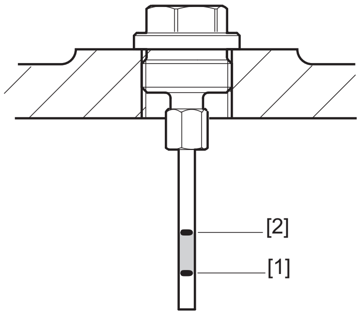
Procedure



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1. Open the oil fill plug.
2. Fill in oil until the oil level is in the middle between marking [1] and marking [2].
3. Screw in the oil fill plug.

Video instructions

German	English

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6.5.2 Gear units with reduced oil level

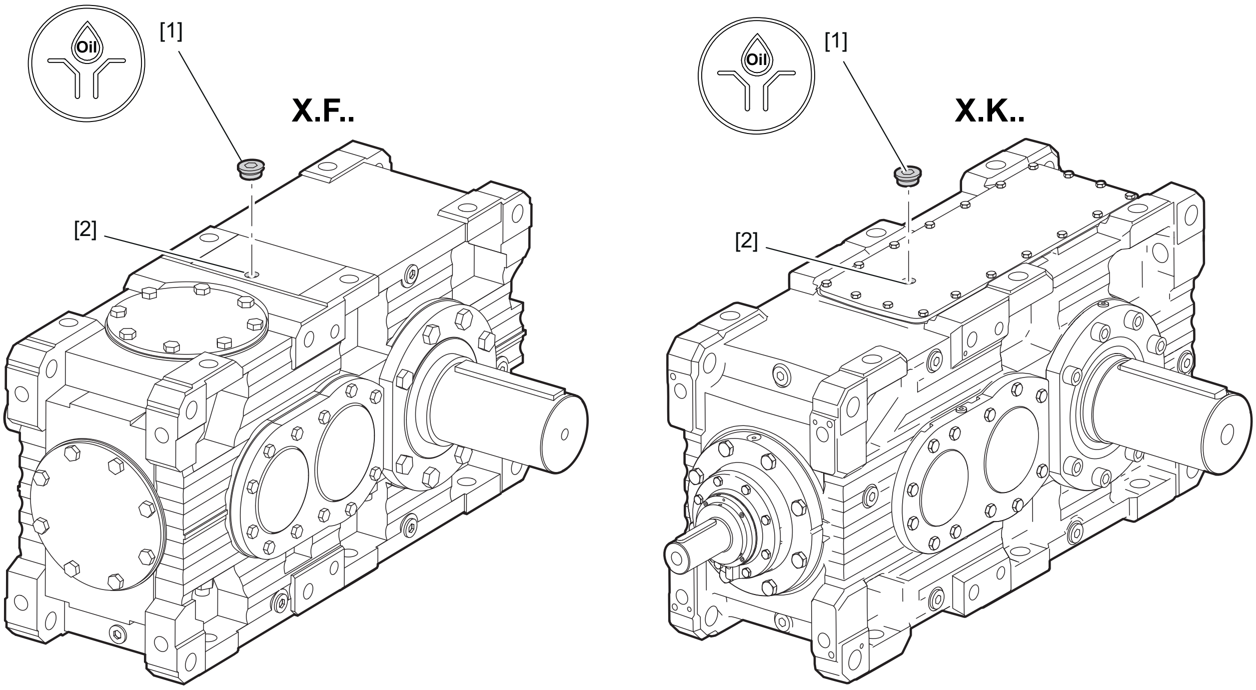
NOTICE

Faulty oil filling may result in damage to the gear unit.

Possible damage to the gear unit.

- The oil may only be filled into the gear unit at the marked screw plug [1]. This ensures that the bearings are lubricated during the initial startup and after an oil change.

Observe the following procedure for reduced oil level. For further Information, refer to chapter "Identifying features of a reduced oil level" (→ 🗎 73).



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1. Remove the oil fill plug [1].
2. Fill the oil via the oil fill opening [2].
- The oil quantity specified on the nameplate is an approximate quantity. The mark on the oil dipstick is the decisive indicator of the correct oil quantity, see chapter "Checking the oil level" (→ 🗎 241).
- Use a clean filling aid without zinc coating (plastic funnel or similar).
3. ⚠ **CAUTION!** Danger due to leakage of lubricant. Possible risk of slipping. Immediately remove any oil that has escaped with oil binder.
4. Re-insert the oil fill plug [1] and the oil dipstick.

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6.5.3 Gear units with oil expansion tank /ET

NOTICE

An oil viscosity above the permitted level of 3500 mm^2/s may result in inadequate venting and an insufficient oil filling which could damage the gear unit.

Possible damage to property.

- Observe the oil viscosity during the filling process.

NOTICE

An oil temperature outside the permitted range during the filling process may cause oil deficiency or oil leakage during operation.

Possible damage to property.

- The temperature of the oil to be filled must generally be within a temperature range of 10 °C and 40 °C.

Also observe the notes in chapter "Procedure for gear units with oil expansion tank /ET" (→ 🗎 244).

Thus, a higher minimum filling temperature might be required depending on the selected oil type. Guide values can be found in the following table.

Minimum oil filling temperature in °C		
Viscosity class	**Mineral**	**Synthetic**
ISO VG 220	10	10
ISO VG 320	10	10
ISO VG 460	15	10
ISO VG 680	20	15

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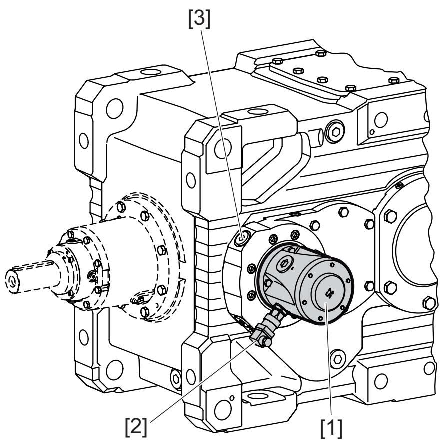
6.5.4 Gear units with shaft end pump /SEP

Procedure

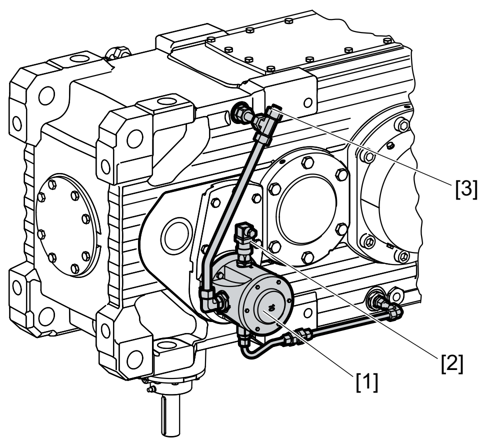
1. Connect the pressure switch [2] to the operator's control. Observe chapter "Pressure switch" (→ 🗎 218).
2. Fill the gear unit with the oil type and oil quantity corresponding to the nameplate data; see chapter "Changing the oil" (→ 🗎 249).
   Before initial startup or after having changed the oil, fill any additional mount-on components (such as piping, cooler matrix, etc.) with oil on the pressure side. Doing so ensures that there is a sufficient oil supply when the entire system is started up. The oil filling holes are marked in the order dimension sheet.
3. Check the oil level using the oil dipstick or the oil level glass. For additional information, refer to chapter "Checking the oil level" (→ 🗎 241).
4. Before initial startup or after having changed the oil, open the screw plug [3] and fill the shaft end pump [1] completely with oil. After having filled in the oil, close the screw plug [3]. This procedure must be repeated after a downtime of more than 6 months or after an oil change.

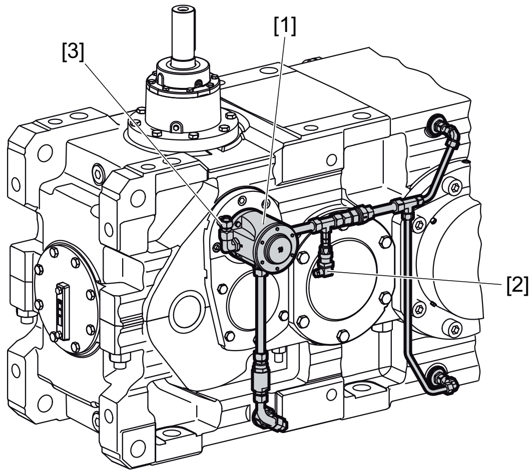
Gear units in mounting position M1

Size XF/XK160 – 320



Size X4T160 – 210



Size X4T220 – 250


[1] Shaft end pump
[2] Pressure switch
[3] Screw plug

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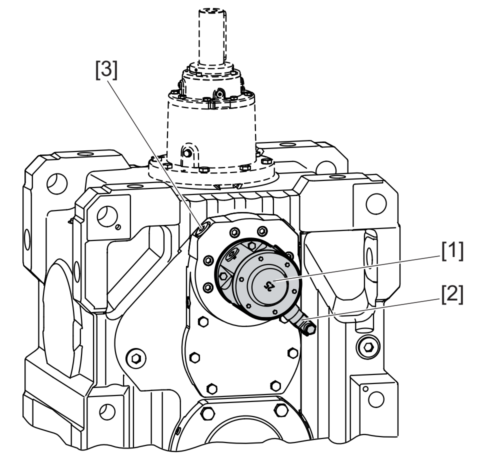
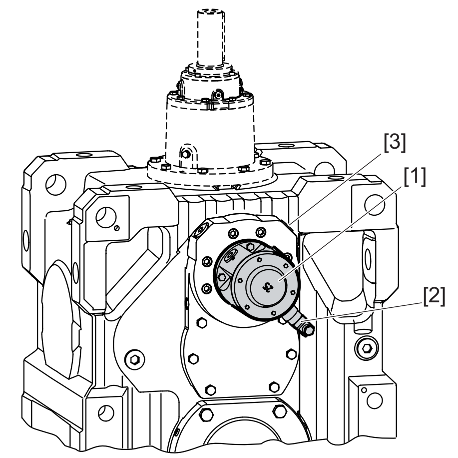
Gear units in mounting position M4

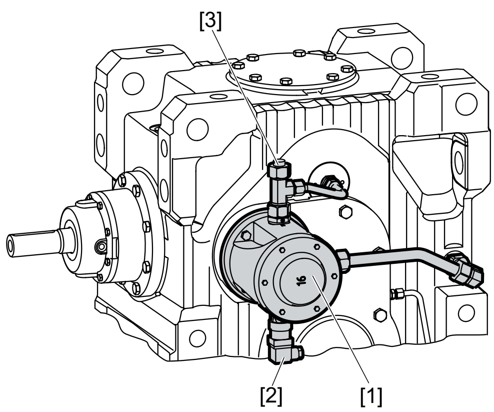
Size XF/XK 120 – 150



Size XF/XK 160 – 320



Size X4T120 – 150



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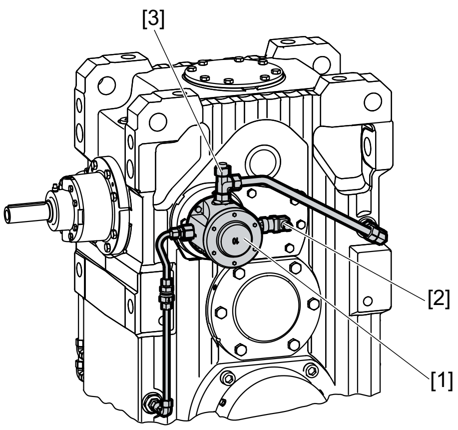
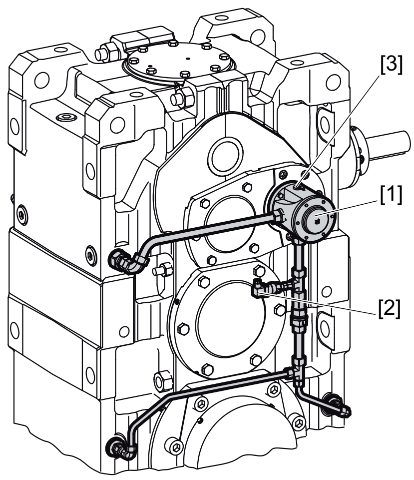
Size X4T160 – 210


Size X4T220 – 250


[1] Shaft end pump
[2] Pressure switch
[3] Screw plug

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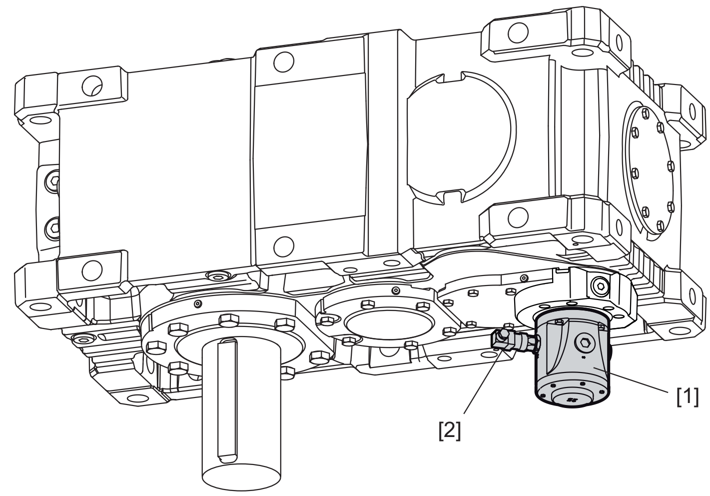
Gear units in mounting position M5

Universal housing /HU

If the shaft end pump [1] is mounted below the oil level, the pump does not need to be filled with oil.

Size XF/XK120 – X320

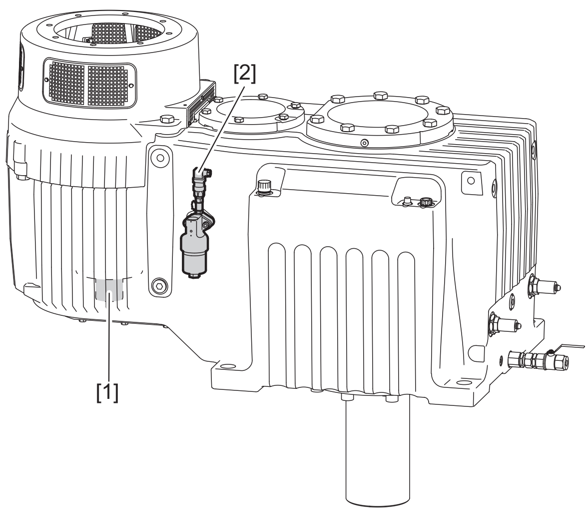


[1] Shaft end pump
[2] Pressure switch

Agitator housing /HA

For gear units with agitator housing, the shaft end pump must not be filled manually at initial startup.

Sizes X3F140 – 210



[1] Shaft end pump
[2] Pressure switch

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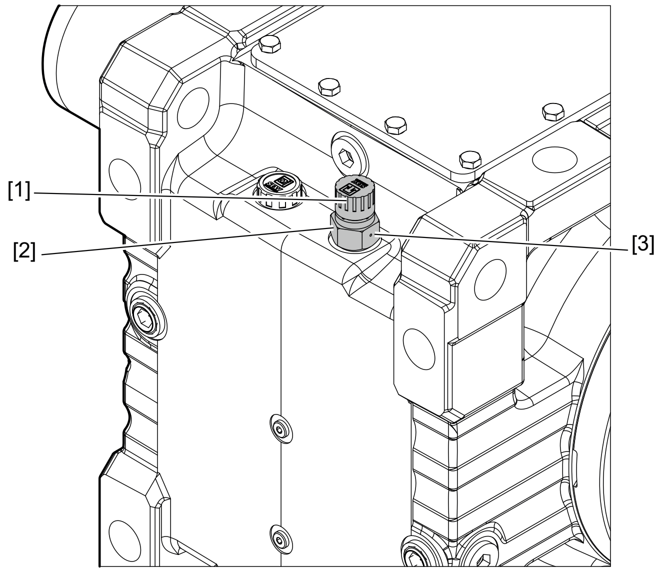
6.6 Installing the splash guard adapter

The splash guard adapter prevents the gear unit oil from escaping the breather during operation.

A splash guard adapter is used at certain gear unit speeds. If this is required, it is included in the delivery.

The splash guard adapter [2] and the breather [1] must be installed prior to startup if the gear unit is delivered with oil fill or after an oil change.



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Procedure

1. **NOTICE!** Improper mounting of the splash guard adapter may result in damage to the gear unit. Possible damage to property.
   Prevent foreign particles from entering into the gear unit when performing the following work.
2. Clean the tapped hole and the thread of the splash guard adapter with solvent.
3. Apply liquid threadlocker, e.g. Loctite® 577, to the thread of the splash guard adapter.
4. Screw the splash guard adapter into the gear unit.
5. Align the splash guard adapter [2] in such a way that the positioning mark [3] points to the opposite side of the end wheel.
6. Screw the breather [1] onto the splash guard adapter [2].

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6.7 Upon delivery the gear unit is filled with oil at the factory.

The gear unit can optionally be delivered with oil filled at the factory.

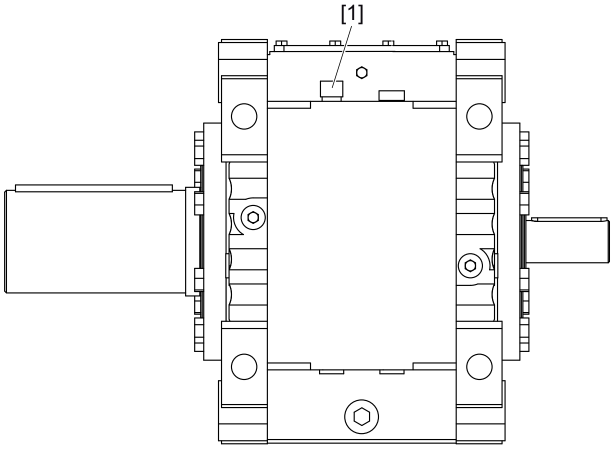
NOTICE

Faulty startup may result in damage to the gear unit.

Possible damage to property.

- It is important that gear units with shaft end pump, motor pump or customer-installed cooling system are vented before taking them into operation.
- Fill the shaft end pump completely with oil shortly before taking it into operation. Observe the notes in chapter "Gear units with shaft end pump /SEP" (→ 🗎 106).

The following figure is an example. Proceed as follows.



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1. Remove the closing plug.
2. Insert the breather [1] included in the delivery. For the position of the breather, refer to the order documents.
3. The oil level may deviate during transport, or due to other ambient conditions at the destination. For this reason, the oil fill must be checked and corrected if necessary. Check the oil level according to chapter "Checking the oil level" (→ 🗎 241).

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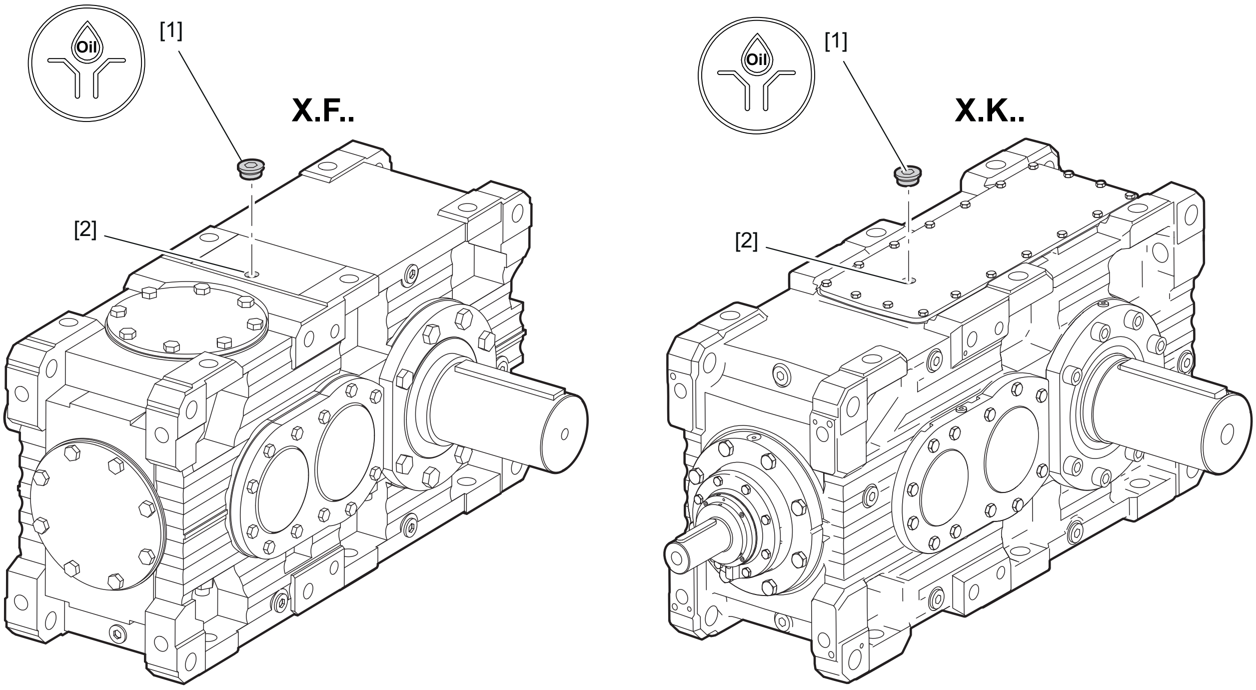
6.7.1 Gear units with reduced oil level

Observe the following procedure for reduced oil level. For further Information, refer to chapter "Identifying features of a reduced oil level" (→ 🗎 73).



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1. Remove the oil fill plug [1].
2. Slowly open the oil drain valve and drain 5 liters of oil.
3. Fill the oil back in via the oil fill opening [2] before you start the gear unit.
4. Re-insert the oil fill plug [1].

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6.8 Gear units with solid shaft

6.8.1 Mounting input and output components

NOTICE

Improper assembly can damage the bearings, housings, or shafts.

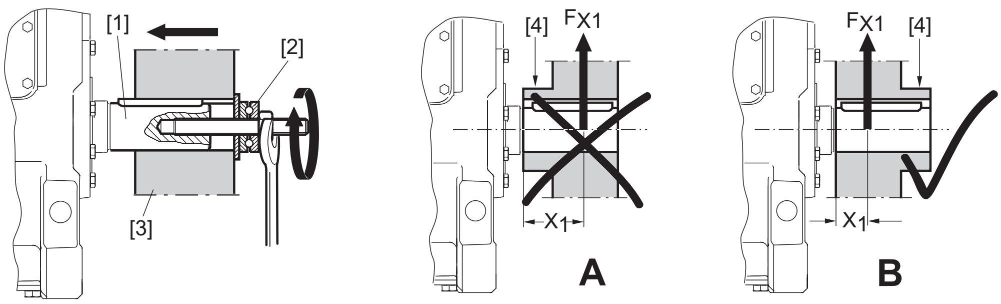
Possible damage to property.

- Mount the input and output elements only using the mounting device. Use the centering bore and the thread on the shaft end for positioning.
- Never force belt pulleys, couplings, pinions, etc. onto the shaft end by hitting them with a hammer.
- Make sure the belt of belt pulleys is tensioned correctly in accordance with the manufacturer's specifications.

The following figure shows a mounting device for installing couplings or hubs on gear unit or motor shaft ends. You can dispense with the axial bearing on the mounting device if necessary.

Mounting is easier if you first apply assembly paste to the input and output element and/or heat it up briefly (to 80 – 100 °C).

To avoid impermissibly high overhung load: Install gear wheels or sprockets according to figure **B**.



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[1]	Shaft end	A	unfavorable
[2]	Thrust bearing	B	correct
[3]	Coupling hub		
[4]	Hub		

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6.9 Dimensioning the customer hub of solid shaft gear units

The material of the customer hub should be dimensioned according to the loads that will occur.

6.10 Gear unit mounting for hollow shaft gear units

NOTICE

Due to the rigid connection between the machine shaft and the hollow shaft of the gear unit, constraining forces can be imposed on the output shaft bearing. This damages the output shaft bearing and promotes the formation of friction corrosion in the connection between the machine shaft and the hollow shaft of the gear unit.

Possible damage to property.

- For machine shafts without their own bearing or with only one bearing point, the gear unit is designed with foot or flange mounting and used as a bearing point. Make sure that the bearing is very well aligned coaxially to the existing bearing point.
- If the machine shaft has at least two bearing points, the gear unit should be connected merely to the machine shaft and supported with a torque arm. To prevent overdetermination of the bearing, gear units with foot or flange mounting must be avoided.

6.11 Output shaft as a hollow shaft with keyed connection /..A

6.11.1 General information

The material and the keyed connection of the machine shaft (for design X..A) should be dimensioned by the customer according to the loads (e.g. impacts) that will occur.

Depending on the gear unit size, the material of the shaft must have the following minimum yield point for transferring the nominal torque:

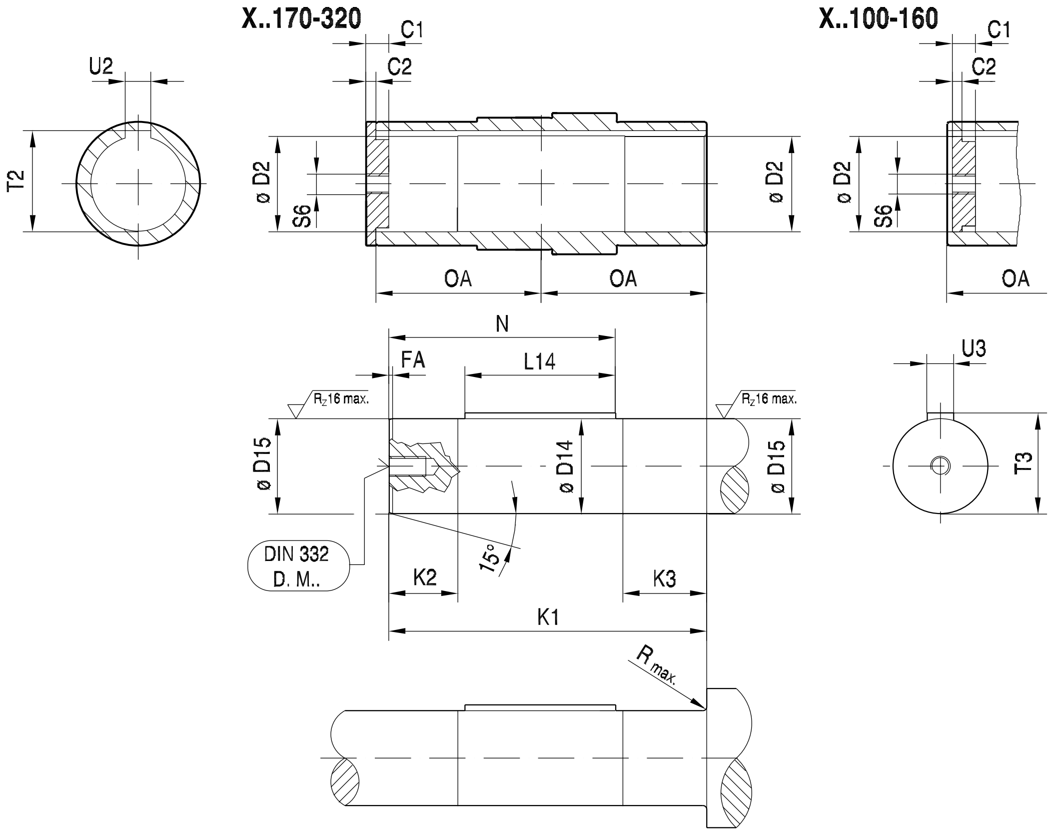
- R_e = 320 N/mm^2 for the sizes X..A100 – X..A290
- R_e = 360 N/mm^2 for the sizes X..A300 – X..A320

The material of the key must be selected according to the loads that will occur.

The minimum key length specified in the dimension sheet (see following page or in the overall documentation of the gear unit) must be adhered to. If a longer key is inserted, it must be arranged symmetrically to the hollow shaft.

With a through-going machine shaft or axial forces, SEW-EURODRIVE recommends that the machine shaft be designed with a contact shoulder. To prevent loosening of the retaining screw of the machine shaft with reversing load direction, secure it with a suitable thread locking device. If necessary, two eccentric retaining screws can be used.

6.11.2 Dimensions of the machine shaft



	C1	C2	ø D2	ø D14	ø D15	FA	K1	K2	K3	L14	N	OA	Rmax.	S6	T2	T3	U2	U3	DIN 332 DR.M..
X..A100	25	12	75^{H8}	75_{h11}	75_{js7}	2	312	47.5	81	90	205	173	1.6	M24	80.4	80	20^{JS9}	20_{h9}	M20
X..A110	30	14	85^{H8}	85_{h11}	85_{js7}	2	312.5	45	84	100	210	176	1.6	M30	90.4	90	22^{JS9}	22_{h9}	M24
X..A120	30	14	95^{H8}	95_{h11}	95_{js7}	2	342	53	92	140	244.5	190.5	1.6	M30	100.4	100	25^{JS9}	25_{h9}	M24
X..A130	30	14	105^{H8}	105_{h11}	105_{js7}	2	347	68	109	160	258	194	1.6	M30	111.4	111	28^{JS9}	28_{h9}	M24
X..A140	30	14	115^{H8}	115_{h11}	115_{js7}	2	403	61	102	200	306	222	1.6	M30	122.4	122	32^{JS9}	32_{h9}	M24
X..A150	30	14	125^{H8}	125_{h11}	125_{js7}	3	408	76	117	200	308.5	224.5	1.6	M30	132.4	132	32^{JS9}	32_{h9}	M24
X..A160	36	16	135^{H8}	135_{h11}	135_{js7}	3	465	80	127	250	361	256	1.6	M36	143.4	143	36^{JS9}	36_{h9}	M30
X..A170	36	17	150^{H8}	150_{h11}	150_{js7}	3	493	96	115	280	377	256	1.6	M36	158.4	158	36^{JS9}	36_{h9}	M30
X..A180	36	17	165^{H8}	165_{h11}	165_{js7}	3	565	109	128	300	423	292	2	M36	174.4	174	40^{JS9}	40_{h9}	M30
X..A190	36	17	165^{H8}	165_{h11}	165_{js7}	3	565	109	128	300	423	292	2	M36	174.4	174	40^{JS9}	40_{h9}	M30
X..A200	36	17	180^{H8}	180_{h11}	180_{js7}	3	620	130	149	320	460.5	319.5	2	M36	190.4	190	45^{JS9}	45_{h9}	M30
X..A210	36	17	190^{H8}	190_{h11}	190_{js7}	3	620	130	149	320	460.5	319.5	2	M36	200.4	200	45^{JS9}	45_{h9}	M30
X..A220	36	17	210^{H8}	210_{h11}	210_{js7}	3	686	133	152	370	518.5	352.5	2.5	M36	221.4	221	50^{JS9}	50_{h9}	M30
X2KA220	36	17	210^{H8}	210_{h11}	210_{js7}	3	756	133	152	370	554	388	2.5	M36	221.4	221	50^{JS9}	50_{h9}	M30
X..A230	36	17	210^{H8}	210_{h11}	210_{js7}	3	686	133	152	370	518.5	352.5	2.5	M36	221.4	221	50^{JS9}	50_{h9}	M30
X2KA230	36	17	210^{H8}	210_{h11}	210_{js7}	3	756	133	152	370	554	388	2.5	M36	221.4	221	50^{JS9}	50_{h9}	M30
X..A240	45	22	230^{H8}	230_{h11}	230_{js7}	3	778	147	170	370	562.5	400.5	2.5	M42	241.4	241	50^{JS9}	50_{h9}	M36
X2KA240	45	22	230^{H8}	230_{h11}	230_{js7}	3	853	147	170	370	600	438	2.5	M42	241.4	241	50^{JS9}	50_{h9}	M36
X..A250	45	22	240^{H8}	240_{h11}	240_{js7}	3	778	147	170	370	562.5	400.5	2.5	M42	252.4	252	56^{JS9}	56_{h9}	M36
X2KA250	45	22	240^{H8}	240_{h11}	240_{js7}	3	853	147	170	370	600	438	2.5	M42	252.4	252	56^{JS9}	56_{h9}	M36
X..A260	45	22	240^{H8}	240_{h11}	240_{js7}	3	851	143	166	450	639	437	2.5	M42	252.4	252	56^{JS9}	56_{h9}	M36
X..A270	45	22	275^{H8}	275_{h11}	275_{js7}	4	877	158	181	450	652	450	5	M42	287.4	287	63^{JS9}	63_{h9}	M36
X..A280	45	22	275^{H8}	275_{h11}	275_{js7}	4	877	158	181	500	677	450	5	M42	287.4	287	63^{JS9}	63_{h9}	M36
X..A290	45	22	290^{H8}	290_{h11}	290_{js7}	4	961	160	183	500	719	492	5	M42	302.4	302	63^{JS9}	63_{h9}	M36
X..A300	45	22	290^{H8}	290_{h11}	290_{js7}	4	961	160	183	500	719	492	5	M42	302.4	302	63^{JS9}	63_{h9}	M36
X..A310	55	28	320^{H8}	320_{h11}	320_{js7}	4	1030	170	197	560	781.5	528.5	5	M42	334.4	334	70^{JS9}	70_{h9}	M36
X..A320	55	28	320^{H8}	320_{h11}	320_{js7}	4	1030	170	197	560	781.5	528.5	5	M42	334.4	334	70^{JS9}	70_{h9}	M36

6.11.3 Mounting the gear unit onto the machine shaft

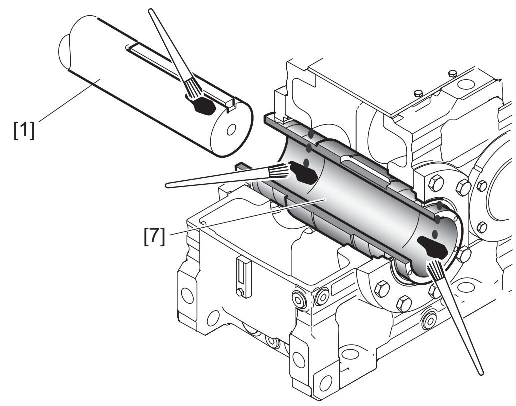
1. Make sure the dimensions of the machine shaft correspond to SEW specifications. Observe the dimensions of the machine shaft.
2. Loosen the retaining screws of the protection cover.
3. Remove the protection cover.

Size X100 – 160

INFORMATION

- Included in the scope of delivery:
  - 2 × retaining ring [8]/[9] and end plate [4]
- **Not** included in the scope of delivery:
  - Threaded rod [2], nut [5], retaining screw [6], ejector screw [8]

1. Apply some assembly paste, such as NOCO-Paste onto the hollow shaft [7] and onto the shaft end of the machine shaft [1].



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[1] Machine shaft
[7] Hollow shaft

2. Attach the inner retaining ring [8] to the hollow shaft [7].
3. Secure the end plate [4] with the outer retaining ring [9].
4. Thread the threaded rod [2] into the machine shaft [1].

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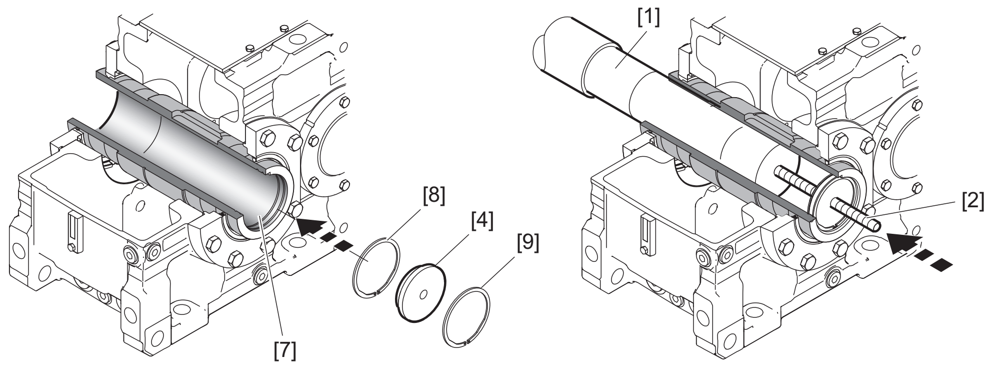

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[1]	Machine shaft	[7]	Hollow shaft
[2]	Threaded rod	[8]	Retaining ring, inner
[4]	End plate	[9]	Retaining ring, outer

Observe the following thread sizes of the threaded rods [2].

Size	Strength class 8.8
X..A100	M20
X..A110 – 150	M24
X..A160	M30

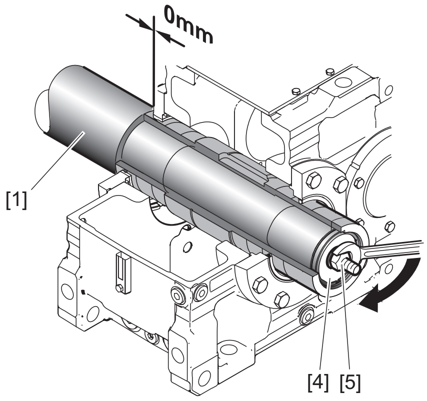
Observe the following information on the retaining rings [8][9].

Size	2 × retaining ring (bore) DIN 472
X..A100	75 × 2.5
X..A110	85×2.5
X..A120	95 × 3
X..A130	105 × 4
X..A140	115 × 4
X..A150	125 × 4
X..A160	135 × 4

INFORMATION

Mounting is easier if you first apply assembly paste to the threaded rod and the nut.

5. Screw the nut [5] onto the threaded rod up to the end plate [4]. Tighten the nut [5] until the shaft shoulders of the machine shaft [1] and the hollow shaft meet.



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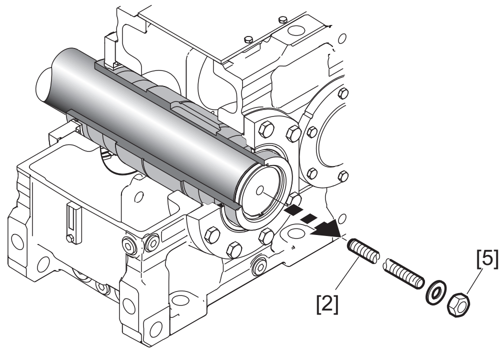
[1] Machine shaft
[4] End plate
[5] Nut

6. Loosen the nut [5]. Remove the threaded rod [2].



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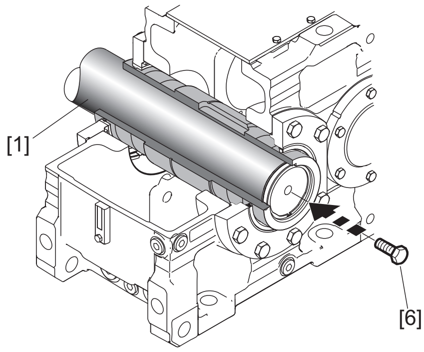
[2] Threaded rod
[5] Nut

7. Secure the machine shaft [1] with the retaining screw [6]. The retaining screw is also to be locked with a suitable threadlocker. Observe the following information on the retaining screw [6].

Size	Retaining screw	Tightening torque in Nm Strength class 8.8
X..A120 – 150	M24	795
X..A160	M30	1590



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[1] Machine shaft
[6] Retaining screw

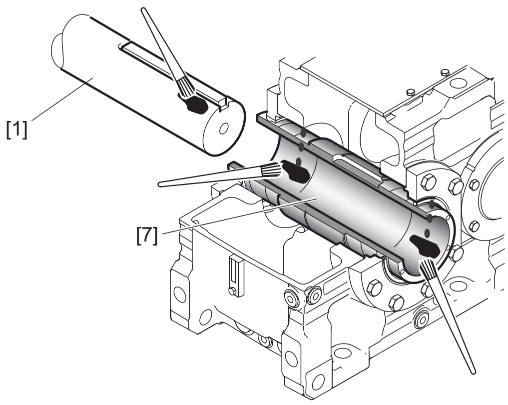
8. Mount the protection cover dust-tight to the gear unit.

Size X170 – 320

INFORMATION

- Included in the scope of delivery:
  - Retaining screws [3] and end plate [4]
- **Not** included in the scope of delivery:
  - Threaded rod [2], nut [5], retaining screw [6], ejector screw [8]

1. Apply some assembly paste, such as NOCO-Paste onto the hollow shaft [7] and onto the shaft end of the machine shaft [1].



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[1] Machine shaft
[7] Hollow shaft

2. Use the retaining screws [3] to attach the end plate [4] centrically to the hollow shaft [7] and thread the threaded rod [2] into the machine shaft [1]. Observe the following thread sizes of the threaded rods [2].

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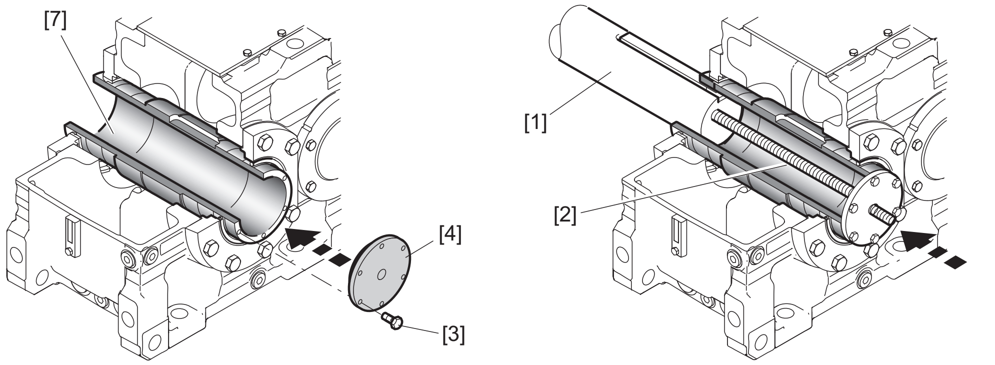

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[1]	Machine shaft	[4]	End plate
[2]	Threaded rod	[7]	Hollow shaft
[3]	Retaining screw		

Size	Strength class 8.8
X..A170 – 230	M30
X..A240 – 300	M36
X..A310 – 320	M42

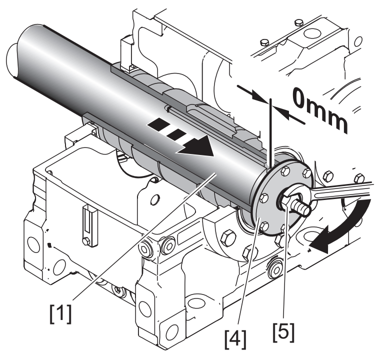
Observe the following information on the retaining screws [3].

Size	Thread size for 6 × retaining screws Strength class 10.9	Tightening torque Assembly/ operating state Nm
X..A170 – 190	M10 x 30	78
X..A200 – 230	M12 x 30	135
X..A240 – 300	M16 x 30	330
X..A310 – 320	M20 x 50	645

INFORMATION

Mounting is easier if you first apply assembly paste to the threaded rod and the nut.

3. Tighten the machine shaft [1] with the nut [5] until the shaft end of the machine shaft [1] and the end plate [4] meet.



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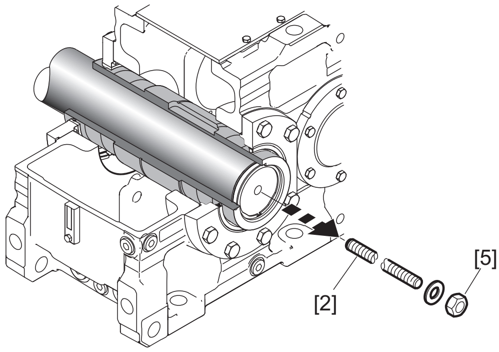
[1] Machine shaft
[4] End plate
[5] Nut

4. Loosen the nut [5]. Remove the threaded rod [2].



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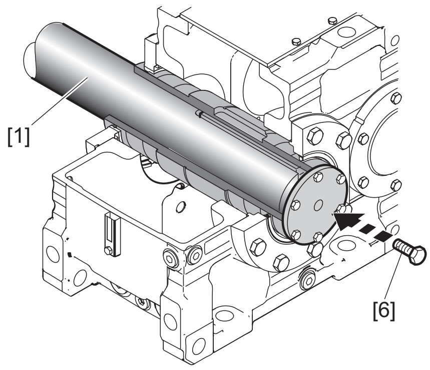
[2] Threaded rod
[5] Nut

5. Secure the machine shaft [1] with the retaining screw [6]. The retaining screw is also to be locked with a suitable threadlocker. Observe the following information on the retaining screw [6].



9007199565156875

[1] Machine shaft
[6] Retaining screw

Size	Retaining screw	Tightening torque in Nm Strength class 8.8
X..A170 – 230	M30	1590
X..A240 – 300	M36	2760
X..A310 – 320	M42	4410

6. Mount the protection cover dust-tight to the gear unit.

6.11.4 Removing the gear unit from the machine shaft

NOTICE

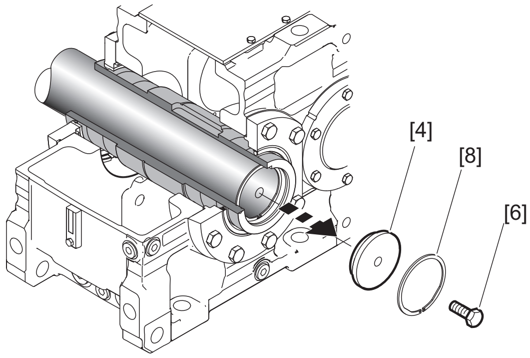
Incorrect disassembly of the gear unit from the machine shaft can damage bearings and other components.

Possible damage to property.

- During disassembly, you may only use the hollow shaft for support. Note that putting weight onto other gear unit parts can cause damage.

Sizes X100 – 160

1. Loosen the retaining screw [6]. Remove the outer retaining ring [8] and pull off the end plate [4].



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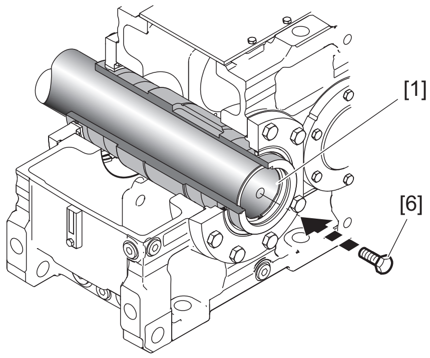
[4] End plate
[6] Retaining screw
[8] Retaining ring

2. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



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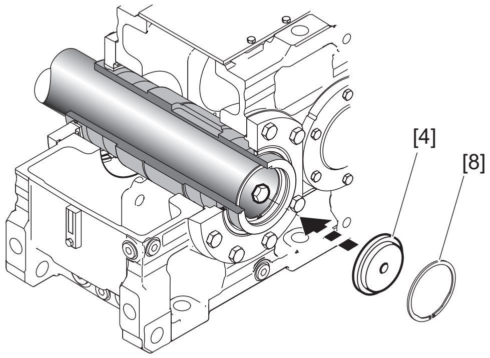
[1] Machine shaft
[6] Retaining screw

3. Turn over the end plate [4] and reinstall the end plate [4] and the outer retaining ring [8].



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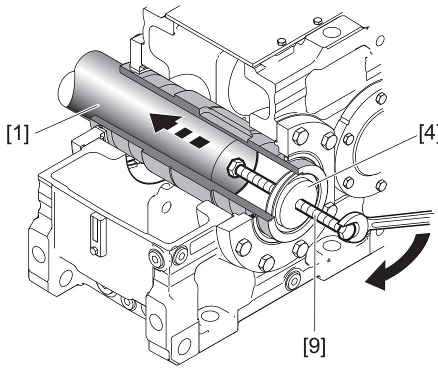
[4] End plate
[8] Retaining ring

4. Thread the ejector screw [9] into the end plate [4] to remove the gear unit from the machine shaft [1].

INFORMATION

Disassembly is easier if you first apply lubricant to the ejector screw [9] and the thread in the end plate [4].



45035999124892555

[1] Machine shaft
[4] End plate
[9] Ejector screw

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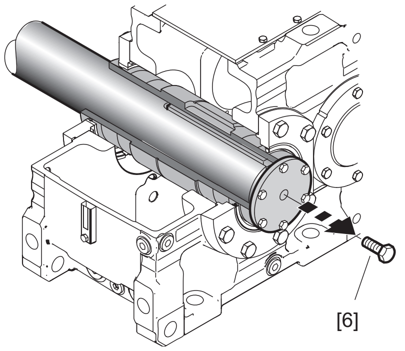
Sizes X170 – 320

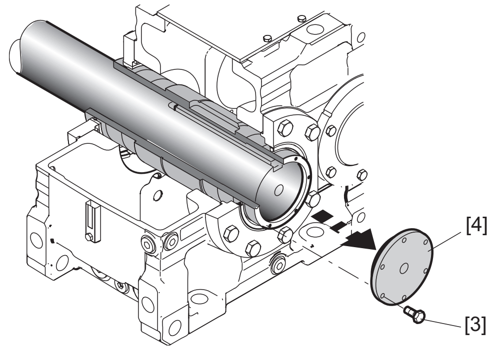
1. Loosen the retaining screw [6].



310460043

[6] Retaining screw

2. Remove the retaining screws [3] and remove the end plate [4].



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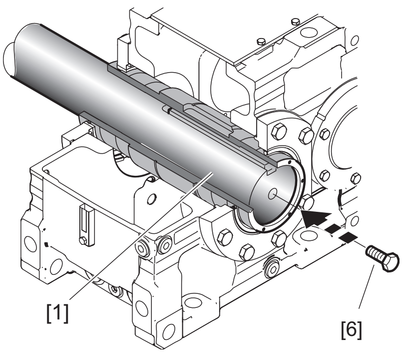
[3] Retaining screw
[4] End plate

3. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1]. The screw head must rest on the shaft end face.



310470027

[1] Machine shaft
[6] Retaining screw

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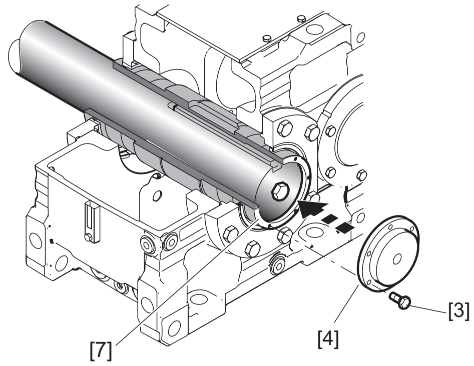
4. For disassembly of the gear unit, use the retaining screws [3] to attach the end plate [4] centrically to the hollow shaft [7]. The retaining screws [3] should be tightened hand-tight.



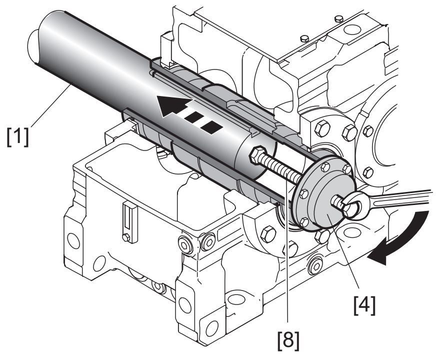
310474123

[3] Retaining screw
[4] End plate
[7] Hollow shaft

5. Thread the ejector screw [8] into the end plate [4] to remove the gear unit from the machine shaft [1].

INFORMATION

Disassembly is easier if you first apply assembly paste to the ejector screw [8] and the thread of the end plate [4].



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[1] Machine shaft
[4] End plate
[8] Ejector screw

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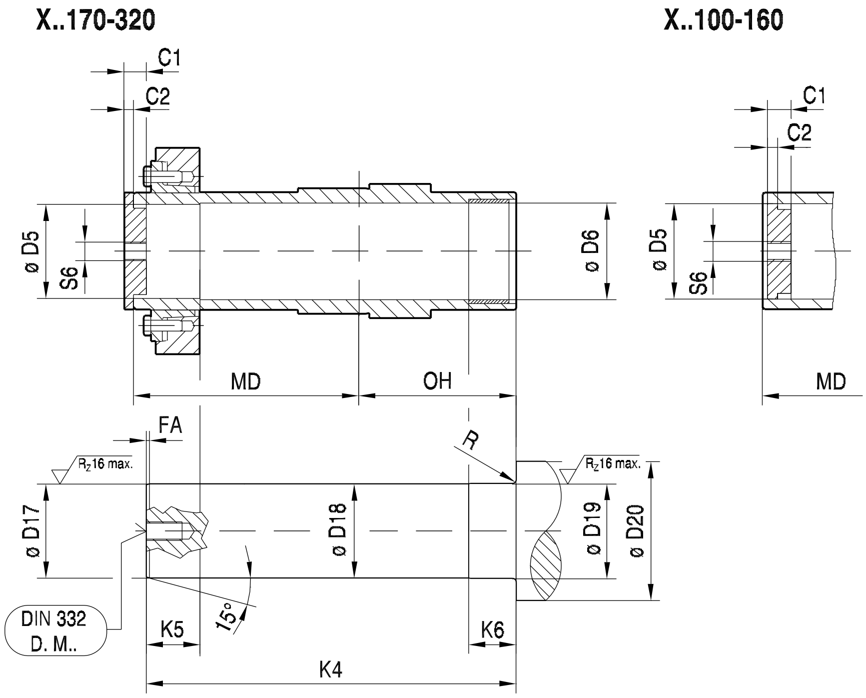
6.12 Output shaft as a hollow shaft with shrink disk /..H

6.12.1 General information

The material of the machine shaft should be dimensioned by the customer according to the loads that will occur (e.g. impact). The shaft material must have the following minimum yield point for transferring the nominal torque:

R_e = 360 N/mm^2 for the sizes X..100 – X..320

6.12.2 Dimensions of the machine shaft



	C1	C2	ø D5	ø D6	ø D17	ø D18	ø D19	ø D20	FA	K4	K5	K6	MD	OH	R	S6	DIN 332 DR.M..
X..H100	30	14	80^{H7}	81^{H9}	80_{h6}	80_{h11}	81_{m6}	95	2	394.5_{-1}	46	42_{-1}	261	173	3	M30	M24
X..H110	30	14	90^{H7}	91^{H9}	90_{h6}	90_{h11}	91_{m6}	105	2	400.5_{-1}	46	42_{-1}	265	176	3	M30	M24
X..H120	30	14	100^{H7}	101^{H9}	100_{h6}	100_{h11}	101_{m6}	115	2	437_{-1}	51	52_{-1}	286.5	190.5	3	M30	M24
X..H130	30	14	110^{H7}	111^{H9}	110_{h6}	110_{h11}	111_{m6}	125	2	449_{-1}	55	52_{-1}	297	194	3	M30	M24
X..H140	30	14	120^{H7}	121^{H9}	120_{h6}	120_{h11}	121_{m6}	135	2	509_{-1}	59	62_{-1}	329	222	3	M30	M24
X..H150	30	14	130^{H7}	131^{H9}	130_{h6}	130_{h11}	131_{m6}	145	3	520_{-1}	66	62_{-1}	337.5	224.5	3	M30	M24
X..H160	36	16	140^{H7}	141^{H9}	140_{h6}	140_{h11}	141_{m6}	155	3	583_{-1}	66	73_{-1}	375	256	4	M36	M30
X..H170	36	17	150^{H7}	151^{H9}	150_{h6}	150_{h11}	151_{m6}	165	3	600_{-1}	83	73_{-1}	364	256	4	M36	M30
X..H180	36	17	165^{H7}	166^{H9}	165_{g6}	165_{h11}	166_{m6}	180	3	672_{-1}	83	83_{-1}	400	292	4	M36	M30
X..H190	36	17	165^{H7}	166^{H9}	165_{g6}	165_{h11}	166_{m6}	180	3	672_{-1}	83	83_{-1}	400	292	4	M36	M30
X..H200	36	17	180^{H7}	181^{H9}	180_{g6}	180_{h11}	181_{m6}	195	3	750_{-1}	101	83_{-1}	450.5	319.5	4	M36	M30
X..H210	36	17	190^{H7}	191^{H9}	190_{g6}	190_{h11}	191_{m6}	205	3	753_{-1}	106	83_{-1}	453.5	319.5	4	M36	M30
X..H220	36	17	210^{H7}	211^{H9}	210_{g6}	210_{h11}	211_{m6}	230	3	830_{-1}	118	108_{-1}	497.5	352.5	5	M36	M30
X2KH220	36	17	210^{H7}	211^{H9}	210_{g6}	210_{h11}	211_{m6}	230	3	900_{-1}	118	108_{-1}	532.5	387.5	5	M36	M30
X..H230	36	17	210^{H7}	211^{H9}	210_{g6}	210_{h11}	211_{m6}	230	3	830_{-1}	118	108_{-1}	497.5	352.5	5	M36	M30
X2KH230	36	17	210^{H7}	211^{H9}	210_{g6}	210_{h11}	211_{m6}	230	3	900_{-1}	118	108_{-1}	532.5	387.5	5	M36	M30
X..H240	45	22	230^{H7}	231^{H9}	230_{g6}	230_{h11}	231_{m6}	250	3	948_{-1}	140	108_{-1}	571.5	400.5	5	M42	M36
X2KH240	45	22	230^{H7}	231^{H9}	230_{g6}	230_{h11}	231_{m6}	250	3	1023_{-1}	140	108_{-1}	609	438	5	M42	M36
X..H250	45	22	240^{H7}	241^{H9}	240_{g6}	240_{h11}	241_{m6}	260	3	948_{-1}	140	108_{-1}	571.5	400.5	5	M42	M36
X2KH250	45	22	240^{H7}	241^{H9}	240_{g6}	240_{h11}	241_{m6}	260	3	1023_{-1}	140	108_{-1}	609	438	5	M42	M36
X..H260	45	22	250^{H7}	255^{H9}	250_{g6}	250_{h11}	255_{m6}	280	4	1021_{-1}	140	108_{-1}	608	437	5	M42	M36
X..H270	45	22	280^{H7}	285^{H9}	280_{g6}	280_{h11}	285_{m6}	310	4	1056_{-1}	146	143_{-1}	630	450	5	M42	M36
X..H280	45	22	280^{H7}	285^{H9}	280_{g6}	280_{h11}	285_{m6}	310	4	1056_{-1}	146	143_{-1}	630	450	5	M42	M36
X..H290	45	22	300^{H7}	305^{H9}	300_{g6}	300_{h11}	305_{m6}	330	4	1147_{-1}	152	143_{-1}	679	492	5	M42	M36
X..H300	45	22	300^{H7}	305^{H9}	300_{g6}	300_{h11}	305_{m6}	330	4	1147_{-1}	152	143_{-1}	679	492	5	M42	M36
X..H310	55	28	320^{H7}	325^{H9}	320_{g6}	320_{h11}	325_{m6}	350	4	1241_{-1}	165	143_{-1}	740.5	528.5	5	M48	M42
X..H320	55	28	320^{H7}	325^{H9}	320_{g6}	320_{h11}	325_{m6}	350	4	1241_{-1}	165	143_{-1}	740.5	528.5	5	M48	M42

6.12.3 Mounting the gear unit onto the machine shaft

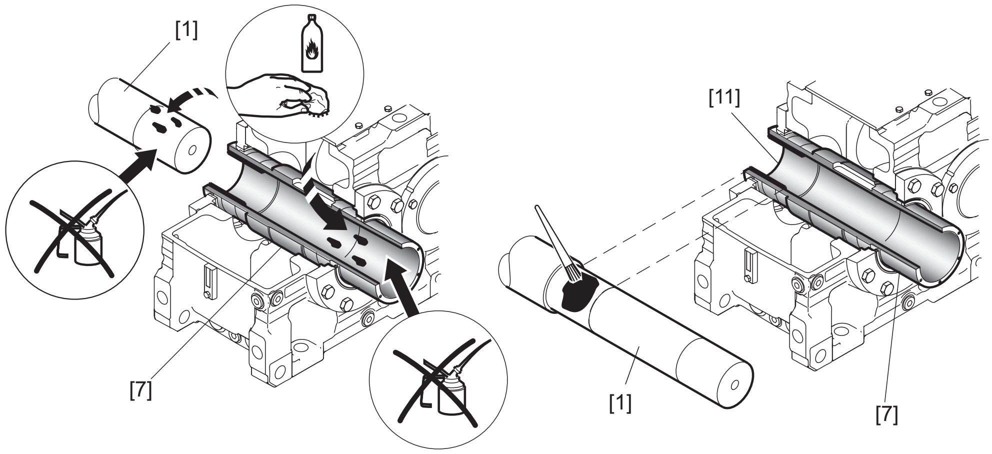
1. Make sure the dimensions of the machine shaft correspond to SEW specifications. Observe chapter "Dimensions of the machine shaft" (→ 🗎 127).
2. Loosen the retaining screws of the protection cover.
3. Remove the protection cover.

Size X100 – 160

INFORMATION

- Included in the scope of delivery:
  - 2× retaining rings [8][9] and end plate [4].
- **Not** included in the scope of delivery:
  - Threaded rod [2], nut [5], retaining screw [6], ejector screw [8].

1. Before mounting the gear unit, degrease the hollow shaft [7] and the machine shaft [1]. Use a commercially available solvent. Do not let the solvent come into contact with the sealing lips of the oil seals.
2. **NOTICE!** Never apply assembly paste directly to the bushing [11] because the compound may get into the clamping area of the shrink disk when connecting the input shaft. Possible damage to property.
   It is essential that the clamping area of the shrink disk between the machine shaft [1] and the hollow shaft [7] remains free of grease.
3. Apply some assembly paste, such as NOCO-Paste to the machine shaft [1] in the area of the bushing [11].



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[1]	Machine shaft	[11]	Socket
[7]	Hollow shaft		

4. Attach the inner retaining ring [8] to the hollow shaft [7]. Secure the end plate [4] with the outer retaining ring [9]. Thread the threaded rod [2] into the machine shaft [1].

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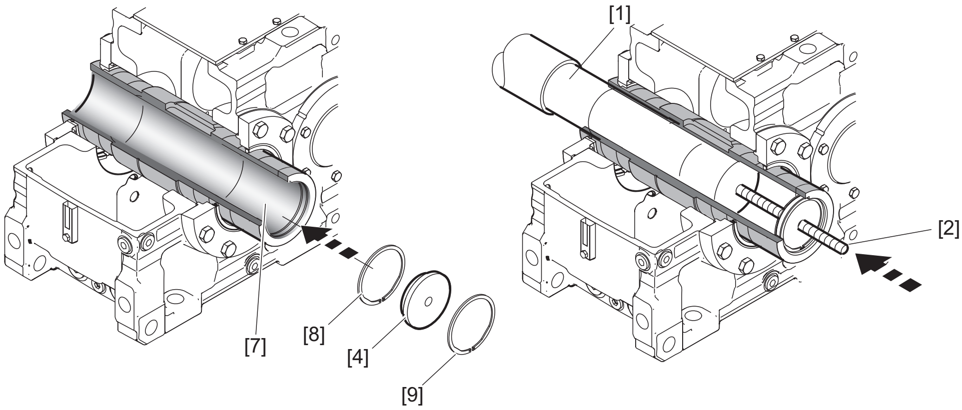

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[1]	Machine shaft	[7]	Hollow shaft
[2]	Threaded rod	[8]	Retaining ring, inner
[4]	End plate	[9]	Retaining ring, outer

Observe the following thread sizes of the threaded rods [2].

Size	Strength class 8.8
X..H100 – 150	M24
X..H160	M30

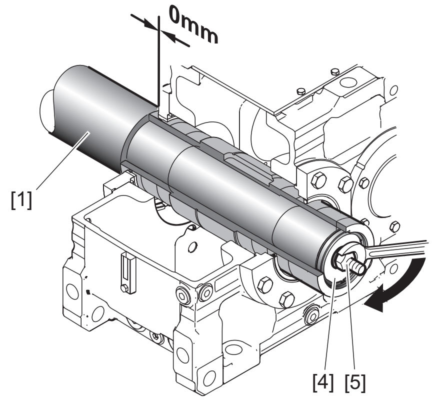
Observe the following information on the retaining rings [8][9].

Size	2 × retaining ring (bore) DIN 472
X..H100	80 × 2.5
X..H110	90 × 2.5
X..H120	100 × 3
X..H130	110 × 4
X..H140	120 × 4
X..H150	130 × 4
X..H160	140 × 4

INFORMATION

Mounting is easier if you first apply assembly paste to the threaded rod and the nut.

5. Screw the nut [5] onto the threaded rod up to the end plate [4]. Tighten the nut [5] until the shaft shoulders of the machine shaft [1] and the hollow shaft meet.



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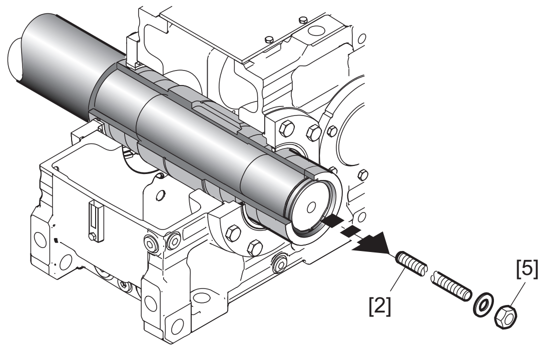
[1] Machine shaft
[4] End plate
[5] Nut

6. Loosen the nut [5]. Remove the threaded rod [2].



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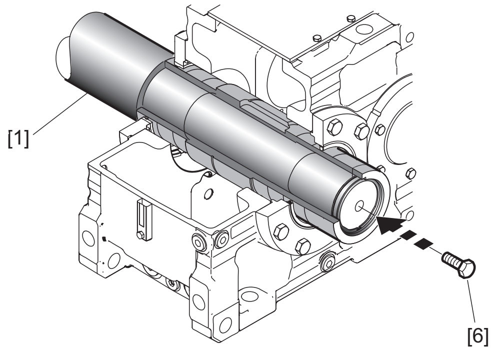
[2] Threaded rod
[5] Nut

7. Secure the machine shaft [1] with the retaining screw [6]. The retaining screw [6] must also be locked with a suitable threadlocker. Observe the following information on the retaining screw [6].



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[1] Machine shaft
[6] Retaining screw

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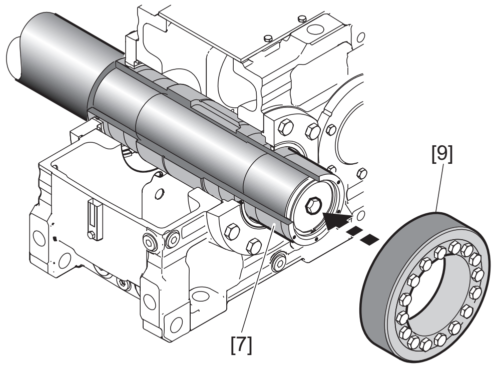
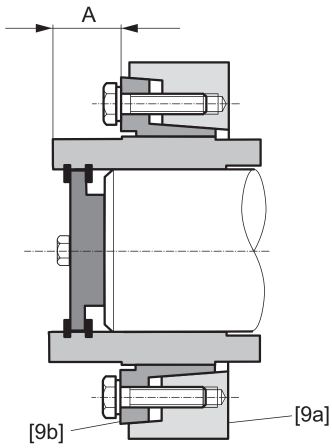
Size	Retaining screw	Tightening torque in Nm Strength class 8.8
X..H100 – 150	M24	795
X..H160	M30	1590

8. Slide the shrink disk [9] with untightened screws onto the hollow shaft [7] and position the inner ring of the shrink disk [9b] at dimension A.
9. ⚠ **CAUTION!** The shrink disk can slip when not tightened. Potential risk of crushing due to falling parts.
   Secure the shrink disk against slipping.
10. **NOTICE!** Tightening the locking screws without installed shaft may lead to deformation of the hollow shaft. Possible damage to property.
    Never tighten the locking screws without the shaft installed.





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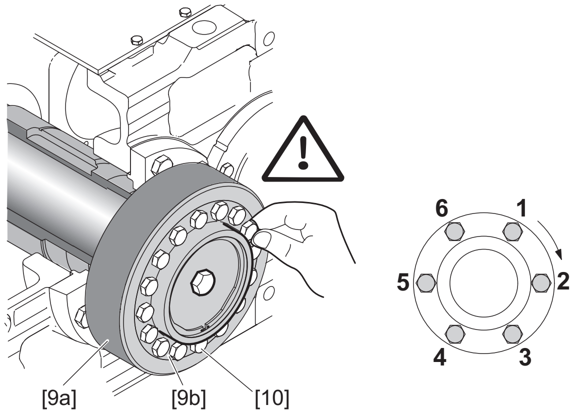
[7] Hollow shaft
[9] Shrink disk
[9a] Outer ring (stepped tapered ring)
[9b] Inner ring (stepped tapered bushing)

Size	A ±0.5 in mm
XH100	37.5
XH110	38
XH120	39
XH130 – 140	41
XH150	42
XH160	48

11. Tighten the locking screws [10] hand-tight. In doing so, align the outer ring (stepped tapered ring) [9a] parallel to the inner ring (stepped tapered bushing) [9b] of the shrink disk. Tighten the locking screws [10] one after the other in a clockwise direction (not in diametrically opposite sequence), each by a quarter turn. Do not tighten the locking screws [10] in a diametrically opposite sequence.

INFORMATION

For shrink disks with a slotted inner ring (stepped tapered bushing) [9b], tighten the locking screws [10] to the left and right of the slot one after another, and then, in several stages, tighten the remaining screws at evenly spaced intervals.



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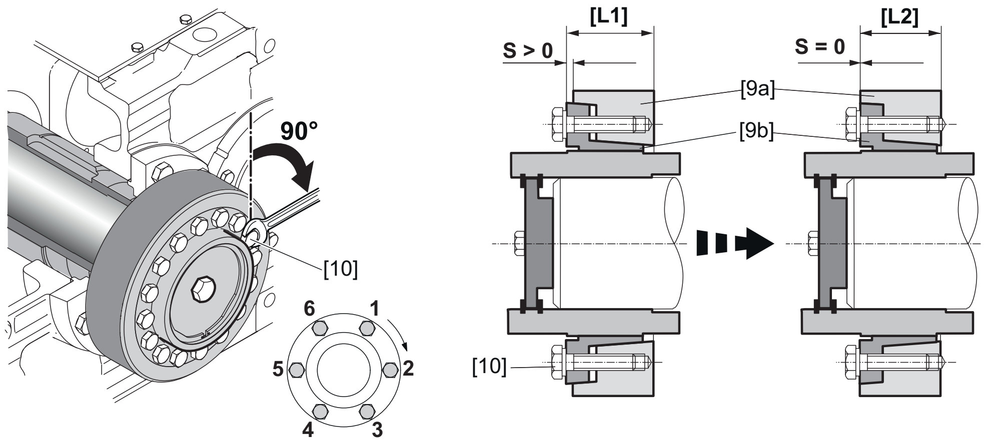
[9a] Outer ring (stepped tapered ring)
[9b] Inner ring (stepped tapered bushing)
[10] Locking screws

12. Work around the ring in several stages, evenly tighten the locking screws [10] by a quarter turn until the outer ring (stepped tapered ring) [9a] and the inner ring (stepped tapered bushing) [9b] align on the face that holds the screws.



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[9a] Outer ring (stepped tapered ring)
[9b] Inner ring (stepped tapered bushing)
[10] Locking screws
[L1] Condition at the time of shipment (pre-assembled)
[L2] Completely assembled (ready for operation)

If the outer ring (stepped tapered ring) and the inner ring (stepped tapered bushing) cannot be installed in alignment on the screw-side face, check the following tolerances for dimension S. These must not be exceeded while adhering to the maximum tightening torques (e.g. using a torque wrench) of the clamping screws [10].

Dimension S:

Outer diameter of the shrink disk	Dimension S
≤Ø 100	+0.1
≤Ø 300	+0.2
above	+0.25

Maximum tightening torques of the clamping screws [10]:

Clamping screws [10]	Maximum tightening torque in Nm
M10	62
M12	108
M14	171
M16	262
M18	367
M20	513
M22	696
M24	882
M27	1287
M30	1755

If the tolerance values are not adhered to, remove the shrink disk again and clean/lubricate it carefully according to the following chapter.

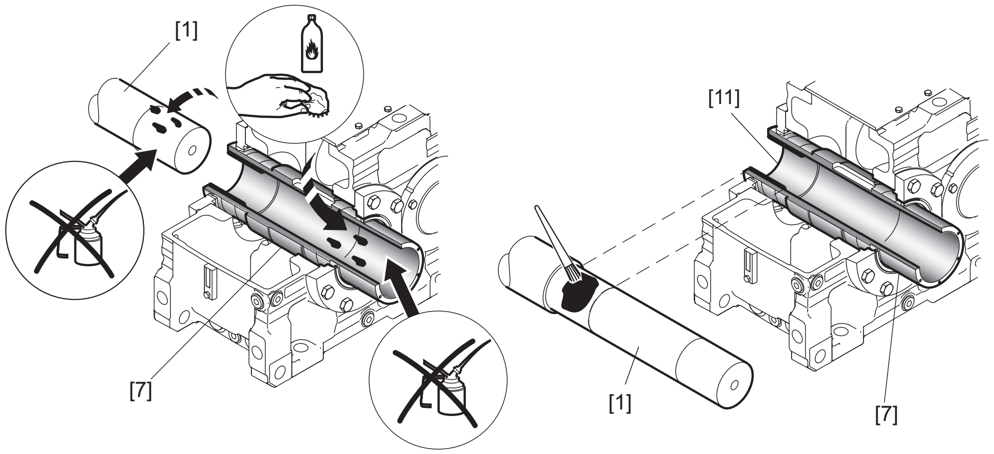
13. Mount the protection cover dust-tight to the gear unit.

Size X170 – 320

INFORMATION

- Included in the scope of delivery:
  – Retaining screws [3] and end plate [4].
- **Not** included in the scope of delivery:
  – Threaded rod [2], nut [5], retaining screw [6], ejector screw [8].

1. Before mounting the gear unit, degrease the hollow shaft [7] and the machine shaft [1]. Use a commercially available solvent. Do not let the solvent come into contact with the sealing lips of the oil seals.
2. **NOTICE!** Never apply assembly paste directly to the bushing [11] because the compound may get into the clamping area of the shrink disk when connecting the input shaft. Possible damage to property.
   It is essential that the clamping area of the shrink disk between the machine shaft [1] and the hollow shaft [7] remains free of grease.
3. Apply some assembly paste, such as NOCO-Paste to the machine shaft [1] in the area of the bushing [11].



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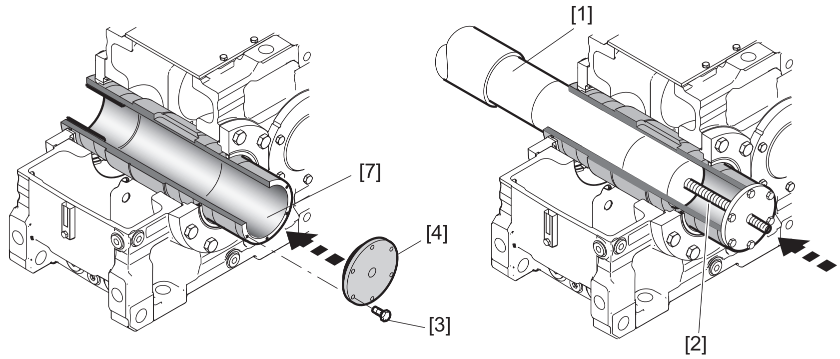
[1]	Machine shaft	[11]	Socket
[7]	Hollow shaft		

4. Use the retaining screws [3] to attach the end plate [4] centrically to the hollow shaft [7]. Thread the threaded rod [2] into the machine shaft [1].



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[1]	Machine shaft	[4]	End plate
[2]	Threaded rod	[7]	Hollow shaft
[3]	Retaining screws		

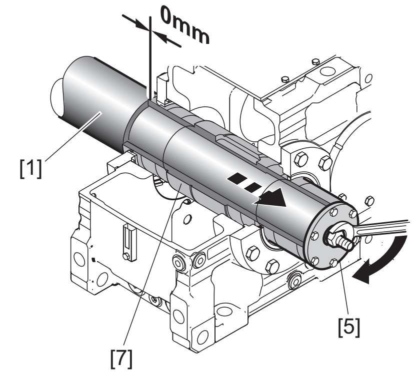
Observe the following thread sizes of the threaded rods [2].

Size	Strength class 8.8
X..H170 – 230	M30
X..H240 – 300	M36
X..H310 – 320	M42

Observe the following information on the retaining screws [3].

Size	Thread size for 6 × retaining screws Strength class 10.9	Tightening torque	
		Assembly/operating state Nm	Disassembly Nm
X..H170 – 190	M10 x 30	78	Tighten hand-tight
X..H200 – 230	M12x30	135	Tighten hand-tight
X..H240 – 300	M16x40	330	Tighten hand-tight
X..H310 – 320	M20x50	645	Tighten hand-tight

5. Screw the nut [5] onto the threaded rod up to the end plate [4]. Tighten the nut [5] until the shaft shoulders of the machine shaft [1] and the hollow shaft meet.



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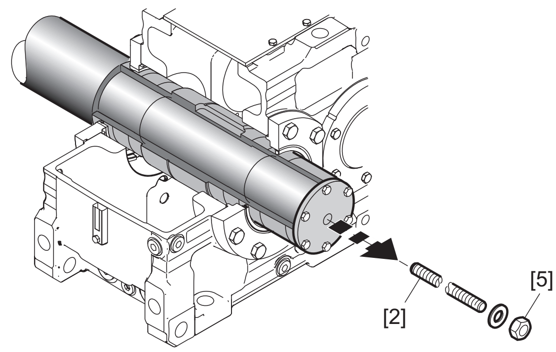
[1]	Machine shaft	[7]	Hollow shaft
[5]	Nut		

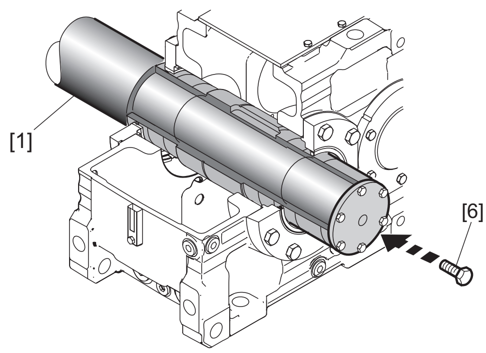
6. Loosen the nut [5]. Remove the threaded rod [2].



310506251

[2]	Threaded rod	[5]	Nut

7. Secure the machine shaft [1] with the retaining screw [6]. The retaining screw is also to be locked with a suitable threadlocker. Observe the following information on the retaining screw [6].

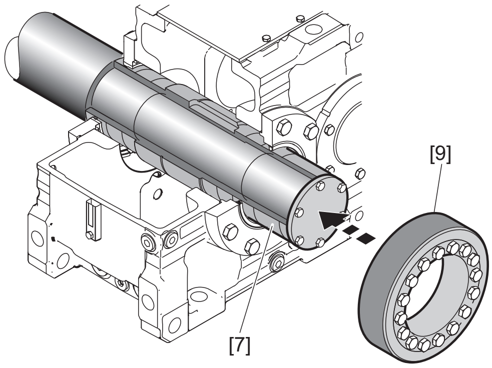


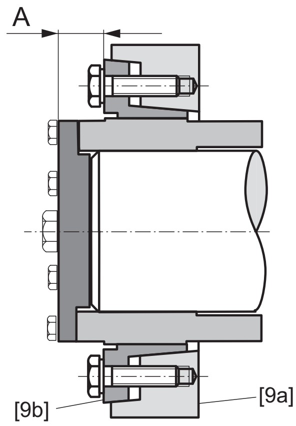
310510731

[1]	Machine shaft	[6]	Retaining screw

Size	Strength class 8.8	Tightening torque in Nm Strength class 8.8
X..H170 – 230	M30	1590
X..H240 – 300	M36	2760
X..H310 – 320	M42	4410

8. Slide the shrink disk [9] with untightened screws onto the hollow shaft [7] and position the inner ring of the shrink disk [9b] at dimension A.
9. ⚠ **CAUTION!** The shrink disk can slip when not tightened. Potential risk of crushing due to falling parts.
   Secure the shrink disk against slipping.
10. **NOTICE!** Tightening the locking screws without installed shaft may lead to deformation of the hollow shaft. Possible damage to property.
    Never tighten the locking screws without the shaft installed.





9007199565261323

[7]	Hollow shaft	[9a]	Outer ring (stepped tapered ring)
[9]	Shrink disk	[9b]	Inner ring (stepped tapered bushing)

Size	A ±0.5 in mm
XH170 – 190	37
XH200 – 210	38
XH220 – 230	39
XH240 – 260	48
XH270 – 300	49
XH310 – 320	60

11. Tighten the locking screws [10] hand-tight. In doing so, align the outer ring (stepped tapered ring) [9a] parallel to the inner ring (stepped tapered bushing) [9b] of the shrink disk. Tighten the locking screws [10] one after the other in a clockwise direction (not in diametrically opposite sequence), each by a quarter turn. Do not tighten the locking screws [10] in a diametrically opposite sequence.

INFORMATION

For shrink disks with a slotted inner ring (stepped tapered bushing) [9b], tighten the locking screws [10] to the left and right of the slot one after another, and then, in several stages, tighten the remaining screws at evenly spaced intervals.

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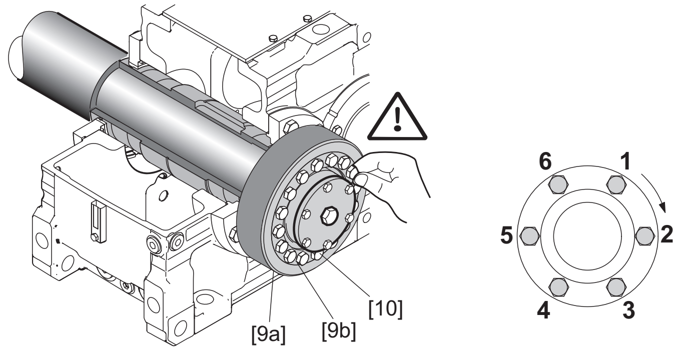
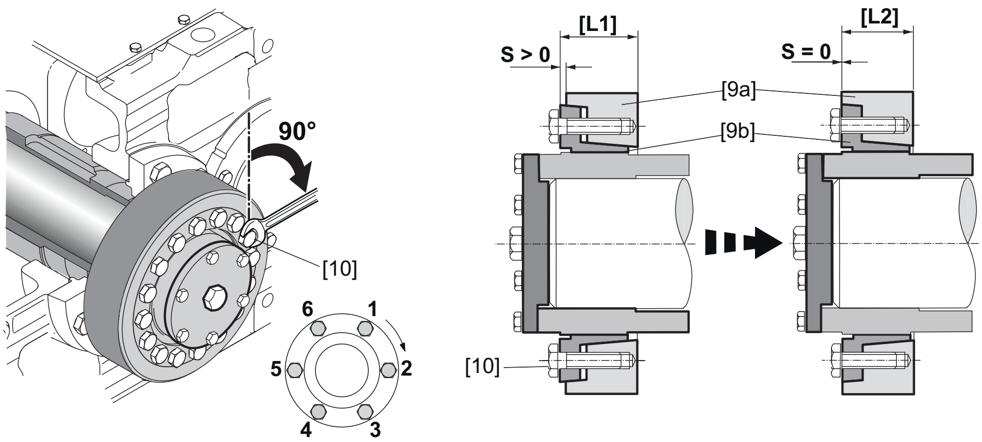


9007199565278219

[9a] Outer ring (stepped tapered ring)
[9b] Inner ring (stepped tapered bushing)
[10] Locking screws

12. Work around the ring in several stages, evenly tighten the locking screws [10] by a quarter turn until the outer ring (stepped tapered ring) [9a] and the inner ring (stepped tapered bushing) [9b] align on the face that holds the screws.



27021598074764299

[9a] Outer ring (stepped tapered ring)
[9b] Inner ring (stepped tapered bushing)
[10] Locking screws
[L1] Condition at the time of shipment (pre-assembled)
[L2] Completely assembled (ready for operation)

If the outer ring (stepped tapered ring) and the inner ring (stepped tapered bushing) cannot be installed in alignment on the screw-side face, check the following tolerances for dimension S. These must not be exceeded while adhering to the maximum tightening torques (e.g. using a torque wrench) of the clamping screws [10].

Dimension S:

Outer diameter of the shrink disk	Dimension S
≤Ø 100	+0.1
≤Ø 300	+0.2
above	+0.25

Maximum tightening torques of the clamping screws [10]:

Clamping screws [10]	Maximum tightening torque in Nm
M10	62
M12	108

Clamping screws [10]	Maximum tightening torque in Nm
M14	171
M16	262
M18	367
M20	513
M22	696
M24	882
M27	1287
M30	1755

If the tolerance values are not adhered to, remove the shrink disk again and clean/lubricate it carefully according to the following chapter.

13. Mount the protection cover dust-tight to the gear unit.

6.12.4 Disassembling the gear unit from the machine shaft

NOTICE

Removing the gear unit incorrectly from the machine shaft may damage bearings and other components.

Possible damage to property.

- You may only support yourself on the hollow shaft during disassembly. Note that supporting on any other parts of the gear unit may damage the material.
- Remove the shrink disk properly. Never completely unscrew the retaining screws because the shrink disk might jump off and cause an injury.
- Shrink disks and corresponding parts of different gear units must not be swapped.

Sizes X100 – 160

1. Loosen the locking screws [10] by a quarter turn one after the other to avoid straining the connecting surface.

INFORMATION

If the outer ring (stepped tapered ring) [9a] and the inner ring (stepped tapered bushing) [9b] do not loosen by themselves: Take the necessary number of screws and screw them evenly into the disassembly bores. Tighten the locking screws in several steps until the tapered bushing separates from the bevel ring.

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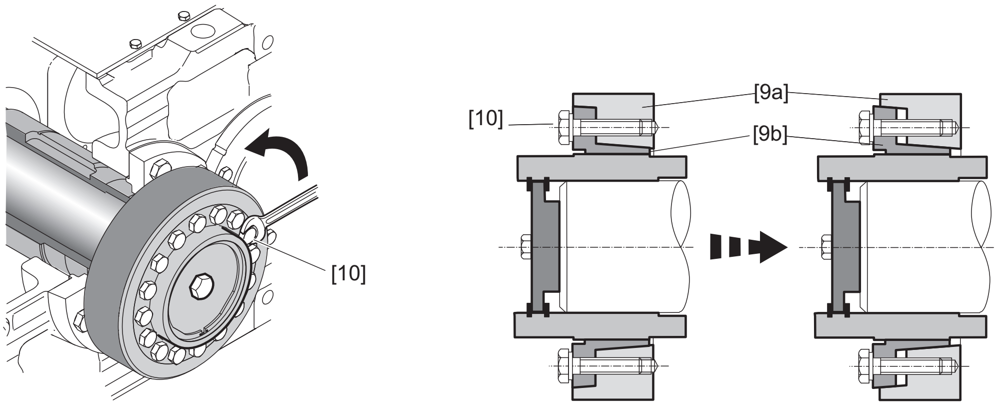
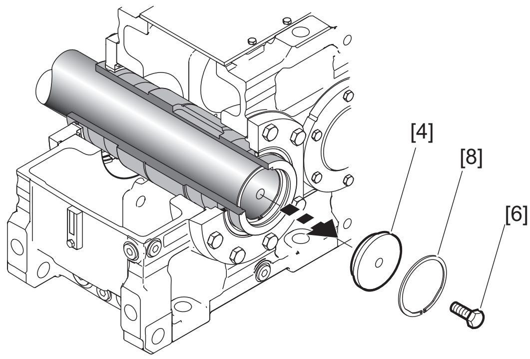


27021600650494603

[9a] Outer ring (stepped tapered ring)
[9b] Taper bushing (inner ring)
[10] Locking screws

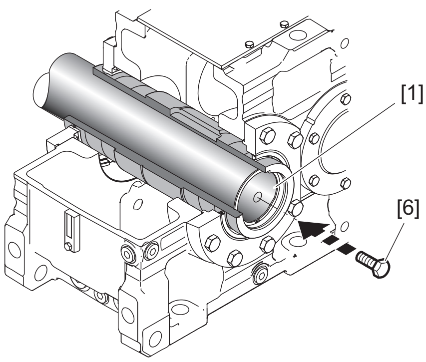
2. Remove the shrink disk from the hollow shaft.
3. Loosen the retaining screw [6]. Remove the outer retaining ring [8] and pull off the end plate [4].



9007202105918859

[4] End plate
[6] Retaining screws
[8] Retaining ring

4. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



9007202105921291

[1] Machine shaft
[6] Retaining screws

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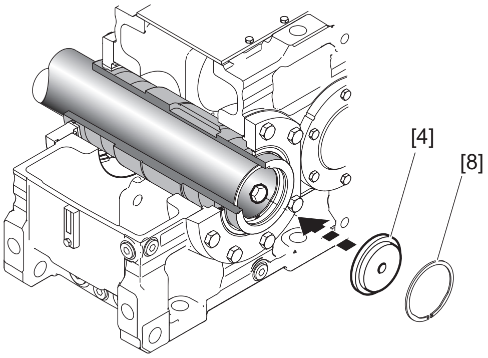
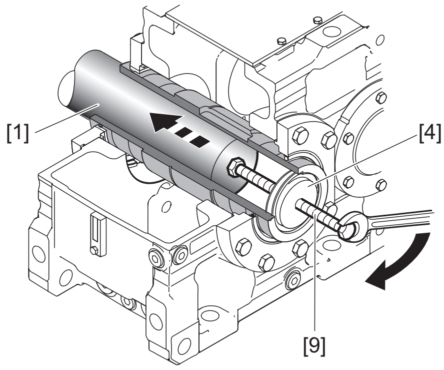
5. Turn the end plate [4] and reinstall the end plate [4] and the outer retaining ring [8].



9007202105924619

[4] End plate
[8] Retaining ring

6. Thread the ejector screw [8] into the end plate [4] to remove the gear unit from the machine shaft [1]. Disassembly is easier if you first apply lubricant to the ejector screw [8] and the thread in the end plate [4].

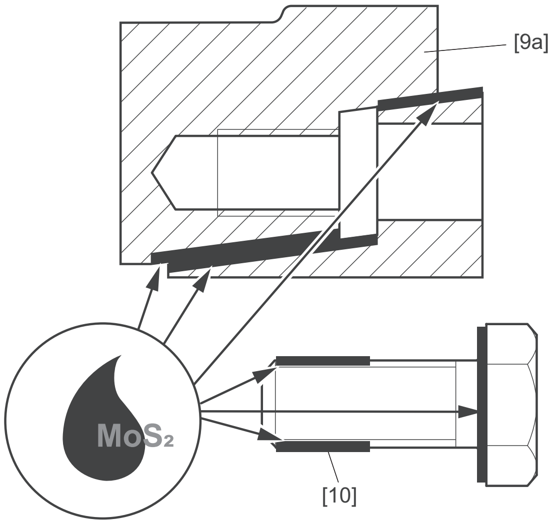


45035999124892555

[1] Machine shaft
[4] End plate
[8] Retaining ring

7. Thoroughly clean the removed shrink disk from dirt and the remaining adhering lubricants.

8. Apply an MoS_2 compound onto the threads and under the screw heads of the locking screws [10], for example "gleitmo 100" from FUCHS LUBRITECH (www.fuchs-lubritech.com).
9. Apply a thin layer of an MoS_2 compound onto the tapered surface, as shown in the following figure, for example "gleitmo 100" from FUCHS LUBRITECH (www.fuchs-lubritech.com).



36028798545349131

INFORMATION

If the tapered surfaces of the shrink disk are damaged, the shrink disk can no longer be used. Replace the shrink disk.

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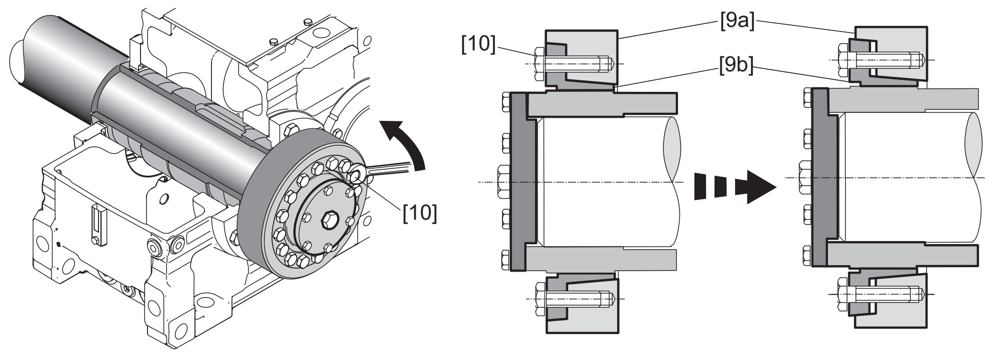
Sizes X170 – 320

1. Loosen the locking screws [10] by a quarter turn one after the other to avoid straining the connecting surface.

INFORMATION

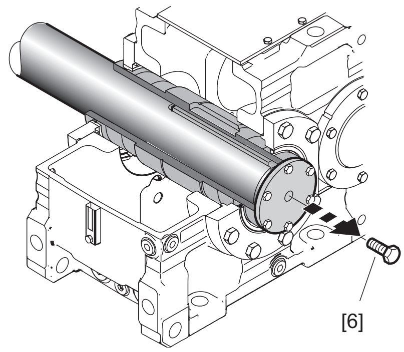
If the outer ring (stepped tapered ring) [9a] and the inner ring (stepped tapered bushing) [9b] do not loosen by themselves: Take the necessary number of screws and screw them evenly into the disassembly bores. Tighten the locking screws in several steps until the tapered bushing separates from the bevel ring.



18014398928502539

[9a] Outer ring (stepped tapered ring)
[9b] Inner ring (stepped tapered bushing)
[10] Locking screws

2. Loosen the retaining screw [6].

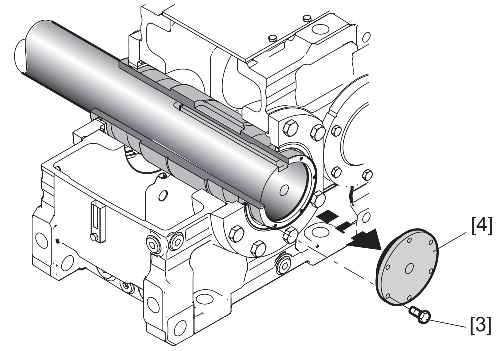


310460043

[6] Retaining screw

31551947/EN – 02/2024

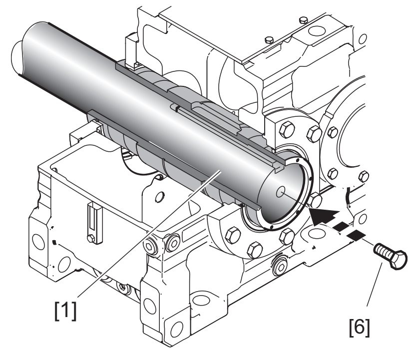
3. Remove the retaining screws [3] and remove the end plate [4].



310464523

[3] Retaining screw
[4] End plate

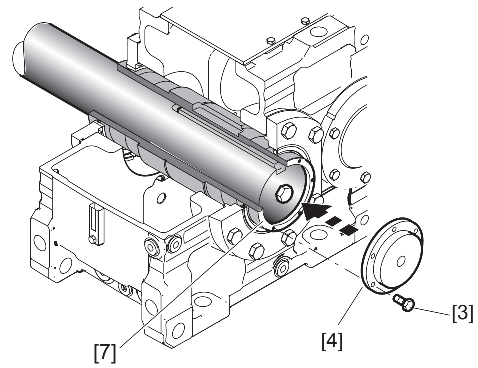
4. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



310470027

[1] Machine shaft
[6] Retaining screw

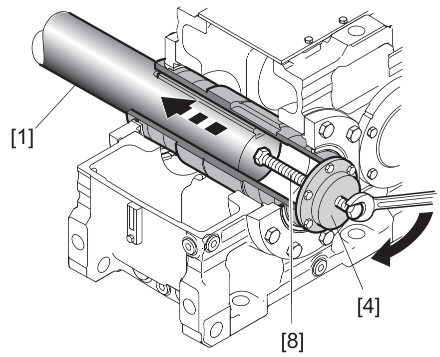
5. For disassembly of the gear unit, use the retaining screws [3] to attach the end plate [4] centrically to the hollow shaft [7]. The retaining screws [3] should be tightened hand-tight.



310474123

[3] Retaining screw
[4] End plate
[7] Hollow shaft

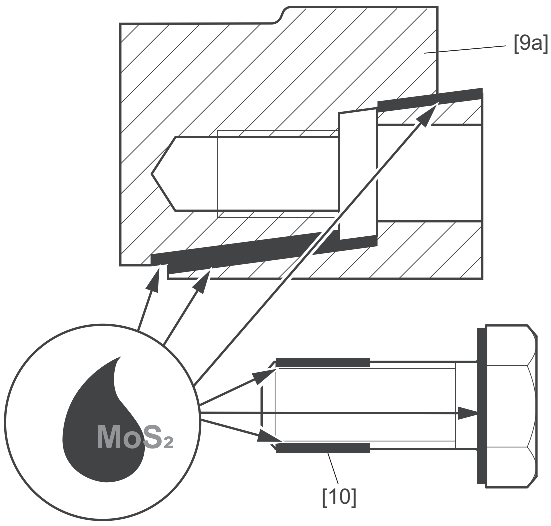
6. Thread the ejector screw [8] into the end plate [4] to remove the gear unit from the machine shaft [1]. Disassembly is easier if you first apply lubricant to the ejector screw [8] and the thread of the end plate [4].



310478219

[1] Machine shaft
[4] End plate
[8] Ejector screw

7. Thoroughly clean the removed shrink disk from dirt and the remaining adhering lubricants.
8. Apply an MoS_2 compound onto the threads and under the screw heads of the locking screws [10], for example "gleitmo 100" from FUCHS LUBRITECH (www.fuchs-lubritech.com).
9. Apply a thin layer of an MoS_2 compound onto the tapered surface, as shown in the following figure, for example "gleitmo 100" from FUCHS LUBRITECH (www.fuchs-lubritech.com).



36028798545349131

INFORMATION

If the tapered surfaces of the shrink disk are damaged, the shrink disk can no longer be used. Replace the shrink disk.

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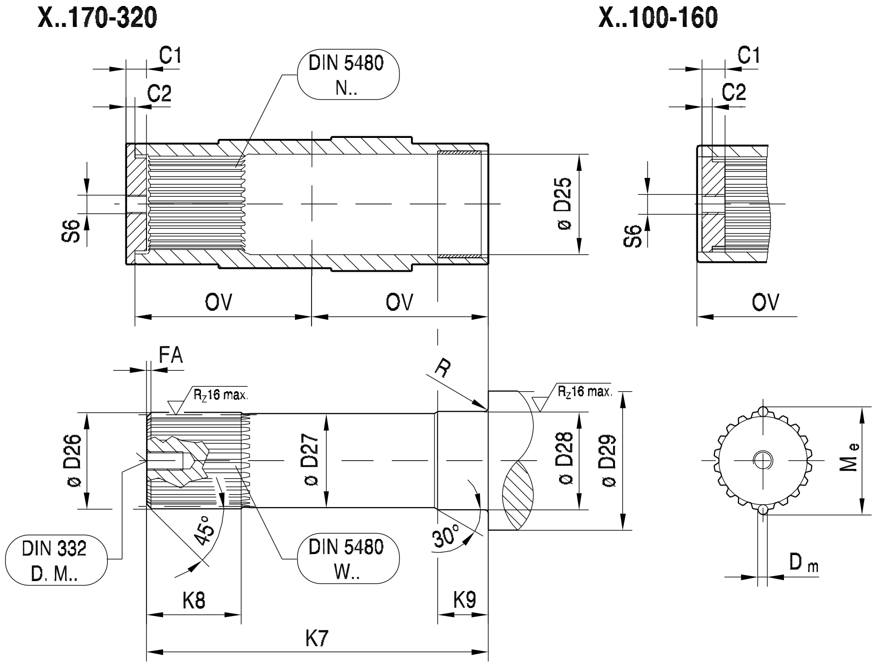
6.13 Output shaft as a splined hollow shaft /..V

6.13.1 General information

The material of the machine shaft should be dimensioned by the customer according to the loads that will occur (e.g. impact). The shaft material must have the following minimum yield point for transferring the nominal torque:

R_e = 320 N/mm^2 for the sizes X..100 – X..320

6.13.2 Dimensions of the machine shaft



18014399272577419

	C1	C2	ø D25	ø D26	ø D27	ø D28	ø D29	Dm	FA	K7	K8	K9	Me	OV	R	S6	DIN 332 DR.M..	DIN 5480
X..100	30	14	81^{H9}	74.4_{h10}	73	81_{m6}	95	6	3	306_{-1}	81	42_{-1}	$81.326^{-0.069}_{-0.125}$	173	3	M24	M20	W 75x3x30x24x8f N 75x3x30x24x9H
X..110	30	14	91^{H9}	84.4_{h10}	83	91_{m6}	105	6	3	311.5_{-1}	81	42_{-1}	$91.092^{-0.068}_{-0.123}$	176	3	M24	M20	W 85x3x30x27x8f N 85x3x30x27x9H
X..120	30	14	101^{H9}	94.4_{h10}	93	101_{m6}	115	6	3	341_{-1}	91	52_{-1}	$101.141^{-0.068}_{-0.122}$	190.5	3	M30	M24	W 95x3x30x30x8f N 95x3x30x30x9H
X..130	30	14	111^{H9}	109.4_{h10}	108	111_{m6}	125	6	3	346_{-1}	86	52_{-1}	$116.076^{-0.078}_{-0.139}$	194	3	M30	M24	W 110x3x30x35x8f N 110x3x30x35x9H
X..V140	30	14	121^{H9}	119.4_{h10}	118	121_{m6}	135	6	3	402_{-1}	101	62_{-1}	$126.095^{-0.078}_{-0.138}$	222	3	M30	M24	W 120x3x30x38x8f N 120x3x30x38x9H
X..150	30	14	131^{H9}	129.4_{h10}	128	131_{m6}	145	6	3	407_{-1}	101	62_{-1}	$136.329^{-0.081}_{-0.144}$	224.5	3	M30	M24	W 130x3x30x42x8f N 130x3x30x42x9H
X..160	36	16	141^{H9}	139.4_{h10}	138	141_{m6}	155	6	3	464_{-1}	111	73_{-1}	$146.167^{-0.080}_{-0.143}$	256	4	M36	M30	W 140x3x30x45x8f N 140x3x30x45x9H
X..170	36	17	151^{H9}	149.4_{h10}	148	151_{m6}	165	6	3	492_{-1}	121	73_{-1}	$156.172^{-0.079}_{-0.141}$	256	4	M36	M30	W 150x3x30x48x8f N 150x3x30x48x9H
X..180	36	17	166^{H9}	159_{h10}	158	166_{m6}	180	10	5	564_{-1}	166	83_{-1}	$170.009^{-0.086}_{-0.152}$	292	4	M36	M30	W 160x5x30x30x8f N 160x5x30x30x9H
X..190	36	17	166^{H9}	159_{h10}	158	166_{m6}	180	10	5	564_{-1}	166	83_{-1}	$170.009^{-0.086}_{-0.152}$	292	4	M36	M30	W 160x5x30x30x8f N 160x5x30x30x9H
X..200	36	17	191^{H9}	179_{h10}	178	191_{m6}	205	10	5	619_{-1}	176	83_{-1}	$190.090^{-0.087}_{-0.155}$	319.5	4	M36	M30	W 180x5x30x34x8f N 180x5x30x34x9H
X..210	36	17	191^{H9}	179_{h10}	178	191_{m6}	205	10	5	619_{-1}	176	83_{-1}	$190.090^{-0.087}_{-0.155}$	319.5	4	M36	M30	W 180x5x30x34x8f N 180x5x30x34x9H
X..220	36	17	211^{H9}	199_{h10}	198	211_{m6}	230	10	5	685_{-1}	201	108_{-1}	$210.158^{-0.088}_{-0.157}$	352.5	5	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X2K220	36	17	211^{H9}	199_{h10}	198	211_{m6}	230	10	5	755_{-1}	201	108_{-1}	$210.158^{-0.088}_{-0.157}$	387.5	5	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X..230	36	17	211^{H9}	199_{h10}	198	211_{m6}	230	10	5	685_{-1}	201	108_{-1}	$210.158^{-0.088}_{-0.157}$	352.5	5	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H

	C1	C2	ø D25	ø D26	ø D27	ø D28	ø D29	Dm	FA	K7	K8	K9	Me	OV	R	S6	DIN 332 DR.M..	DIN 5480
X2K230	36	17	211^{H9}	199_{h10}	198	211_{m6}	230	10	5	755_{-1}	201	108_{-1}	$210.158^{-0.088}_{-0.157}$	387.5	5	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X..240	45	22	231^{H9}	219_{h10}	218	231_{m6}	250	10	5	777_{-1}	216	108_{-1}	$230.215^{-0.102}_{-0.179}$	400.5	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X2K240	45	22	231^{H9}	219_{h10}	218	231_{m6}	250	10	5	852_{-1}	216	108_{-1}	$230.215^{-0.102}_{-0.179}$	438	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X..250	45	22	241^{H9}	219_{h10}	218	241_{m6}	260	10	5	777_{-1}	216	108_{-1}	$230.215^{-0.102}_{-0.179}$	400.5	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X2K250	45	22	241^{H9}	219_{h10}	218	241_{m6}	260	10	5	852_{-1}	216	108_{-1}	$230.215^{-0.102}_{-0.179}$	438	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X..260	45	22	255^{H9}	239_{h10}	238	255_{m6}	275	10	5	850_{-1}	216	108_{-1}	$250.264^{-0.102}_{-0.180}$	437	5	M42	M36	W 240x5x30x46x8f N 240x5x30x46x9H
X..270	45	22	285^{H9}	258.4_{h10}	258	285_{m6}	305	16	8	876_{-1}	248	143_{-1}	$276.230^{-0.101}_{-0.177}$	450	5	M42	M36	W 260x8x30x31x8f N 260x8x30x31x9H
X..280	45	22	285^{H9}	258.4_{h10}	258	285_{m6}	305	16	8	876_{-1}	248	143_{-1}	$276.230^{-0.101}_{-0.177}$	450	5	M42	M36	W 260x8x30x31x8f N 260x8x30x31x9H
X..290	45	22	305^{H9}	278.4_{h10}	278	305_{m6}	325	16	8	960_{-1}	268	143_{-1}	$297.014^{-0.105}_{-0.184}$	492	5	M42	M36	W 280x8x30x34x8f N 280x8x30x34x9H
X..300	45	22	305^{H9}	278.4_{h10}	278	305_{m6}	325	16	8	960_{-1}	268	143_{-1}	$297.014^{-0.105}_{-0.184}$	492	5	M42	M36	W 280x8x30x34x8f N 280x8x30x34x9H
X..310	55	28	325^{H9}	298.4_{h10}	298	325_{m6}	345	16	8	1029_{-1}	318	143_{-1}	$316.655^{-0.102}_{-0.180}$	528.5	5	M42	M36	W 300x8x30x36x8f N 300x8x30x36x9H
X..320	55	28	325^{H9}	298.4_{h10}	298	325_{m6}	345	16	8	1029_{-1}	318	143_{-1}	$316.655^{-0.102}_{-0.180}$	528.5	5	M42	M36	W 300x8x30x36x8f N 300x8x30x36x9H

6.13.3 Mounting the gear unit onto the machine shaft

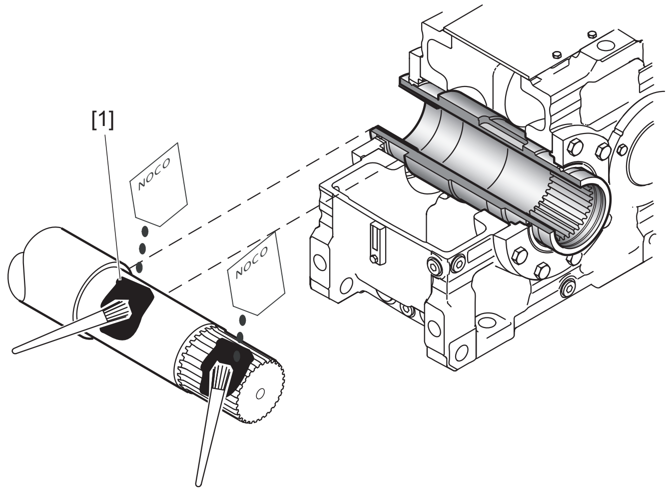
1. Make sure the dimensions of the machine shaft correspond to SEW specifications. Observe chapter "Dimensions of the machine shaft" (→ 🗎 145).
2. Loosen the retaining screws of the protection cover.
3. Remove the protection cover.

Size X100 – 160

INFORMATION

- Included in the scope of delivery:
  - 2 × retaining ring [8]/[9] and end plate [4]
- **Not** included in the scope of delivery:
  - Threaded rod [2], nut [5], retaining screw [6], ejector screw [8]

1. Apply some assembly paste, such as NOCO-Paste onto the hollow shaft [7] and onto the shaft end of the machine shaft [1].



9007202308109707

[1] Machine shaft
[7] Hollow shaft

2. Attach the inner retaining ring [8] to the hollow shaft [7].
3. Secure the end plate [4] with the outer retaining ring [9].
4. Thread the threaded rod [2] into the machine shaft [1].

Observe the following thread sizes of the threaded rods [2].

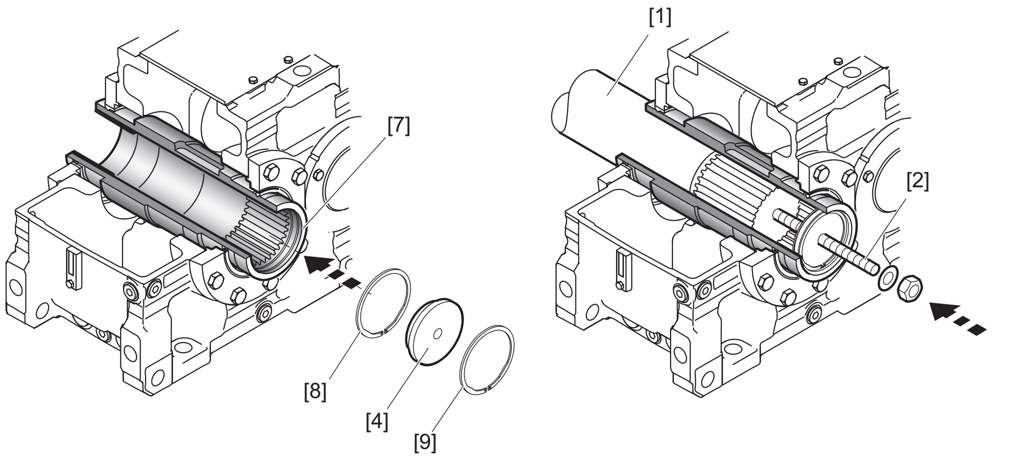
Size	Strength class 8.8
X..V100 – 150	M24
X..V160	M30

Observe the following information on the retaining rings [8][9].

Size	2 × retaining rings (bore) DIN 472
X..V100	80 × 2.5
X..V110	90 × 2.5
X..V120	100 × 3
X..V130	110 × 4
X..V140	125 × 4
X..A150	130 × 4
X..A160	140 × 4

INFORMATION

Mounting is easier if you first apply lubricant to the threaded rod and the nut.



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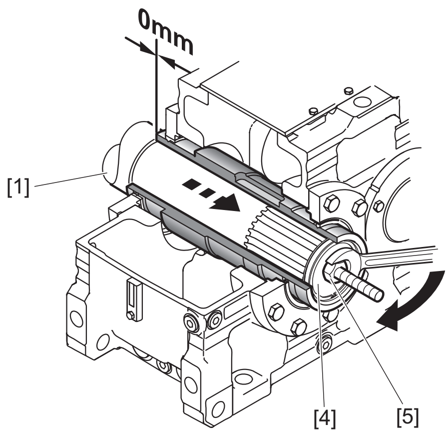
[1]	Machine shaft	[7]	Hollow shaft
[2]	Threaded rod	[8]	Retaining ring, inner
[4]	End plate	[9]	Retaining ring, outer

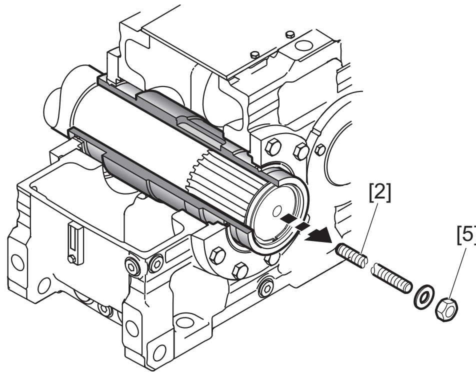
5. Screw the nut [5] onto the threaded rod up to the end plate [4]. Tighten the nut [5] until the shaft shoulders of the machine shaft [1] and the hollow shaft meet.



3053373579

[1]	Machine shaft
[4]	End plate
[5]	Nut

6. Loosen the nut [5]. Remove the threaded rod [2].

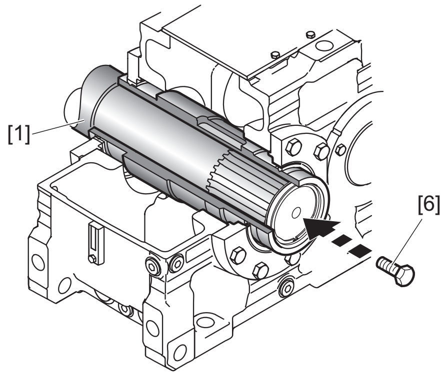


3053375755

[2] Threaded rod
[5] Nut

7. Secure the machine shaft [1] with the retaining screw [6]. The retaining screw is also to be locked with a suitable threadlocker. Observe the following information on the retaining screw [6].

Size	Retaining screw	Tightening torque in Nm Strength class 8.8
X..A100 – 150	M24	795
X..A160	M30	1590



3053685131

[1] Machine shaft
[6] Retaining screw

8. Mount the protection cover dust-tight to the gear unit.

Size X170 – 320

INFORMATION

- Included in the scope of delivery:
  – Retaining screws [3] and end plate [4].
- **Not** included in the scope of delivery:
  – Threaded rod [2], nut [5], retaining screw [6], ejector screw [8].

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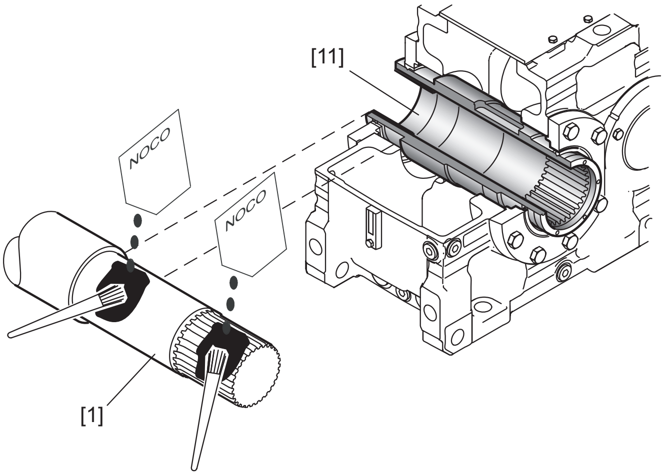
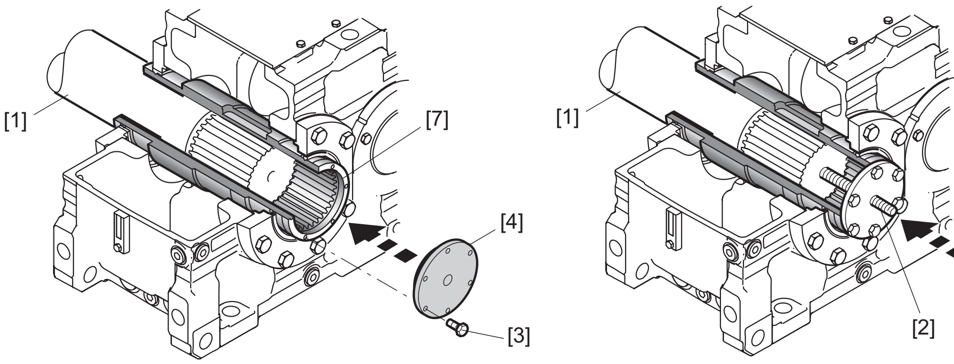
1. Apply some assembly paste, such as NOCO® fluid to the machine shaft [1] in the area of the bushing [11] and the splining.



18014399281168907

[1] Machine shaft
[11] Socket

2. Push the gear unit onto the machine shaft. The splining of the hollow shaft must mesh with the splining of the machine shaft.
3. Tighten the retaining screws [3] and thread the threaded rod [2] into the machine shaft [1]. Observe the following thread size of the threaded rod [2].



9007200026433547

[1] Machine shaft
[2] Threaded rod
[3] Retaining screws
[4] End plate
[7] Hollow shaft

Size	Strength class 8.8
X..V170 – 230	M30
X..V240 – 300	M36
X..V310 – 320	M42

Observe the following information on the retaining screws [3].

Size	Thread size for 6 × retaining screws [3] Strength class 10.9	Tightening torque	
		Assembly/operating state Nm	Disassembly Nm
X..V170 – 190	M10 x 30	78	Tighten hand-tight
X..V200 – 230	M12 x 30	135	Tighten hand-tight
X..V240 – 300	M16 x 40	330	Tighten hand-tight
X..V310 – 320	M20 x 50	645	Tighten hand-tight

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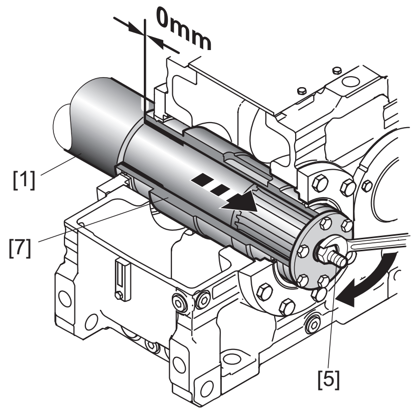
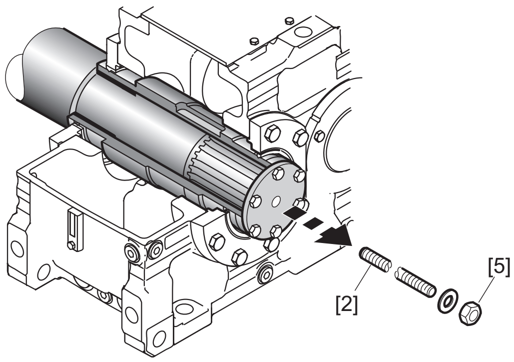
4. Screw the nut [5] onto the threaded rod up to the end plate [4]. Tighten the nut [5] until the shaft shoulders of the machine shaft [1] and the hollow shaft meet.



771696651

[1] Machine shaft
[5] Nut
[7] Hollow shaft

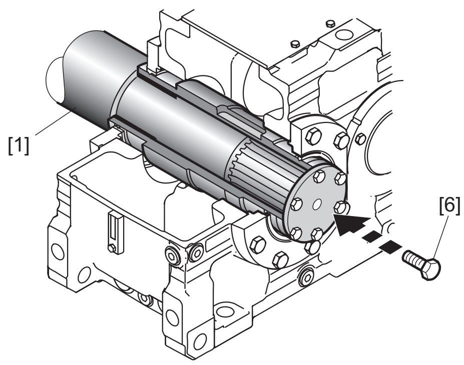
5. Loosen the nut [5]. Remove the threaded rod [2].



771752587

[2] Threaded rod
[5] Nut

6. Secure the machine shaft [1] with the retaining screw [6]. The retaining screw is also to be locked with a suitable threadlocker. Observe the following information on the retaining screw [6].



771756683

[1] Machine shaft
[6] Retaining screw

Size	Retaining screw	Tightening torque in Nm Strength class 8.8
X..V170 – 230	M30	1590
X..V240 – 300	M36	2760
X..V310 – 320	M42	4410

7. Mount the protection cover dust-tight to the gear unit.

6.13.4 Disassembling the gear unit from the machine shaft

NOTICE

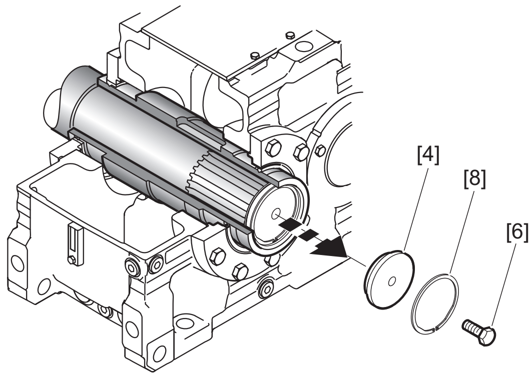
Incorrect disassembly of the gear unit from the machine shaft can damage bearings and other components.

Possible damage to property.

- During disassembly, you may only use the hollow shaft for support. Note that putting weight onto other gear unit parts can cause damage.

Sizes X100 – 160

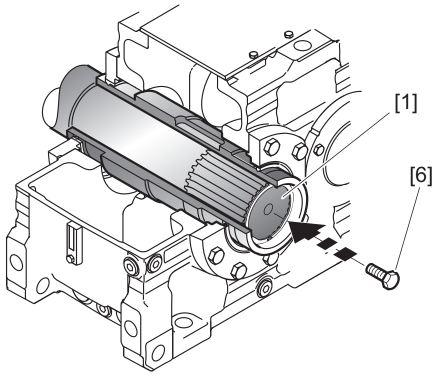
1. Loosen the retaining screw [6]. Remove the outer retaining ring [8] and pull off the end plate [4].



3053726603

[4] End plate
[6] Retaining screw
[8] Retaining ring

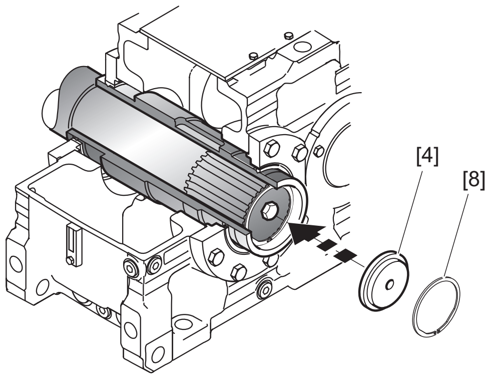
2. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



3240994059

[1] Machine shaft
[6] Retaining screw

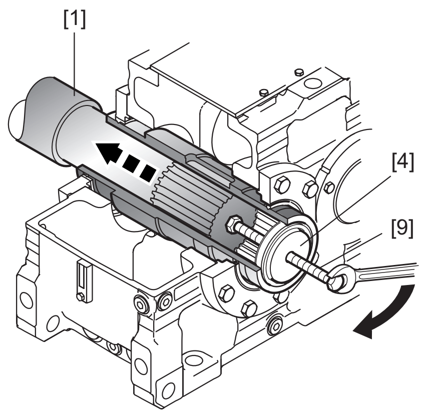
3. Turn the end plate [4] and reinstall the end plate [4] and the outer retaining ring [8].



3241265291

[4] End plate
[8] Retaining ring

4. Thread the ejector screw [9] into the end plate [4] to remove the gear unit from the machine shaft [1]. Disassembly is easier if you first apply lubricant to the ejector screw [9] and the thread in the end plate [4].

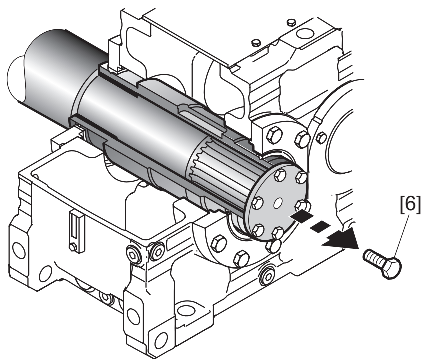


3241268107

[1] Machine shaft
[4] End plate
[9] Ejector screw

Sizes X170 – 320

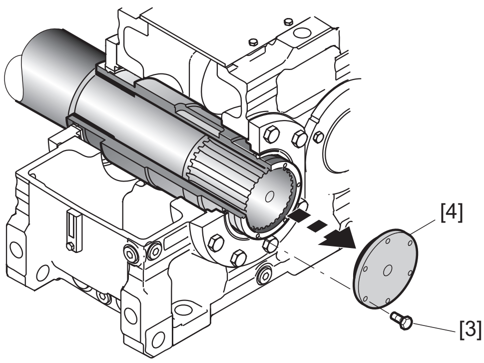
1. Loosen the retaining screw [6].



3241268619

[6] Retaining screw

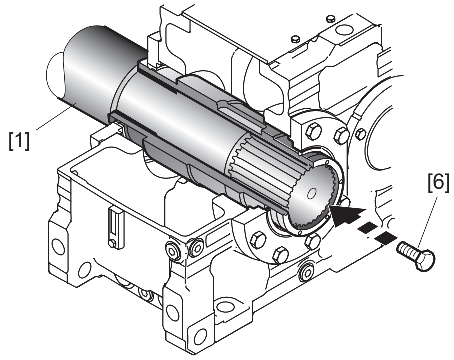
2. Remove the retaining screws [3] and the end plate [4].



3241279627

[3] Retaining screw
[4] End plate

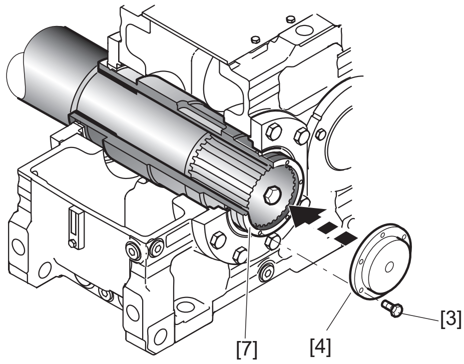
3. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



3241280139

[1] Machine shaft
[6] Retaining screw

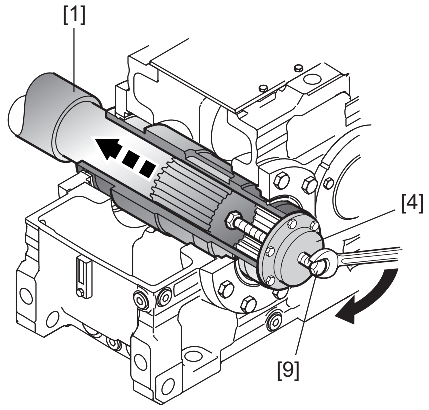
4. To disassemble the gear unit, flip the end plate [4] over and use the retaining screws [3] to reattach it centrically to the hollow shaft [7]. The retaining screws [3] should be tightened hand-tight.



3241286923

[3] Retaining screw
[4] End plate
[7] Hollow shaft

5. Thread the ejector screw [8] into the end plate [4] to remove the gear unit from the machine shaft [1]. Applying lubricant to the ejector screw [8] and the thread in the end plate [4] prior to disassembly makes the job easier.



3241365131

[1] Machine shaft
[4] End plate
[8] Ejector screw

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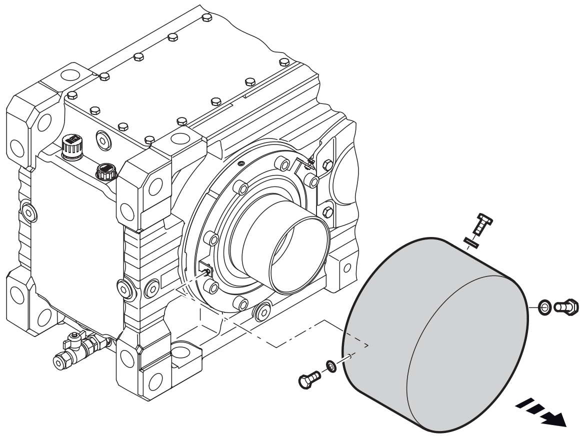
6.14 Output shaft with TorqLOC® /..T

6.14.1 General information

The material of the machine shaft should be dimensioned by the customer according to the loads that will occur (e.g. impact). The shaft material must have the following minimum yield point for transferring the nominal torque:

- 360 N/mm² for the sizes X..100 – X..210

6.14.2 Removing the protection cover



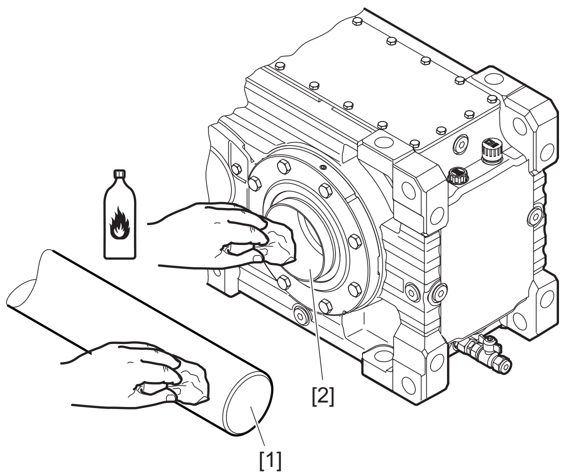
9007213490564363

Proceed as follows to disassemble the protection cover:

1. Remove the retaining screws holding the protection cover.
2. Remove the protection cover.

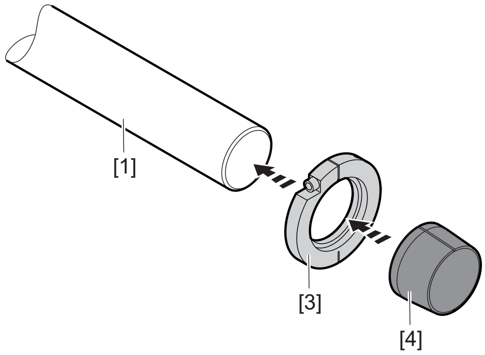
6.14.3 Mounting to customer shaft without shaft shoulder

1. Clean the customer shaft [1] and the inside of the hollow shaft [2]. Make sure that all grease and oil residues are removed.



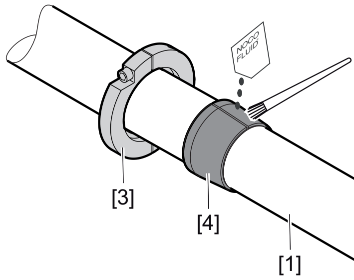
14226920971

2. Mount the stop ring [3] and the bushing [4] on the customer shaft.



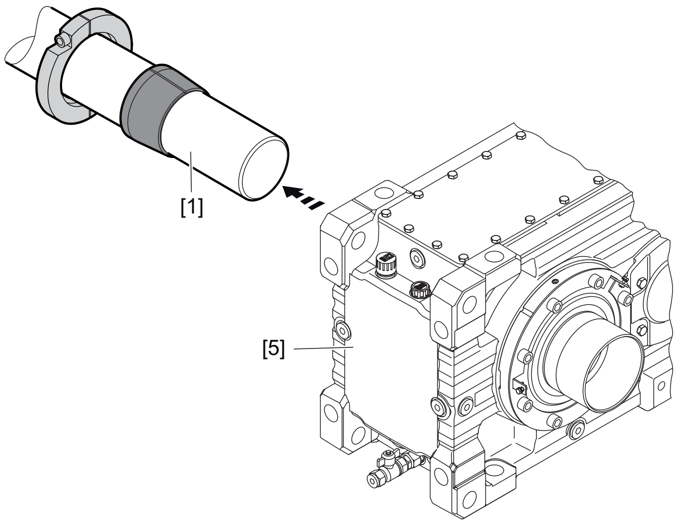
14226361483

3. Apply NOCO-Paste onto the bushing [4] and spread it thoroughly.



14226911243

4. Push the gear unit [5] onto the customer shaft.



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5. Fasten the gear unit on the mounting surface (do not tighten the screws).

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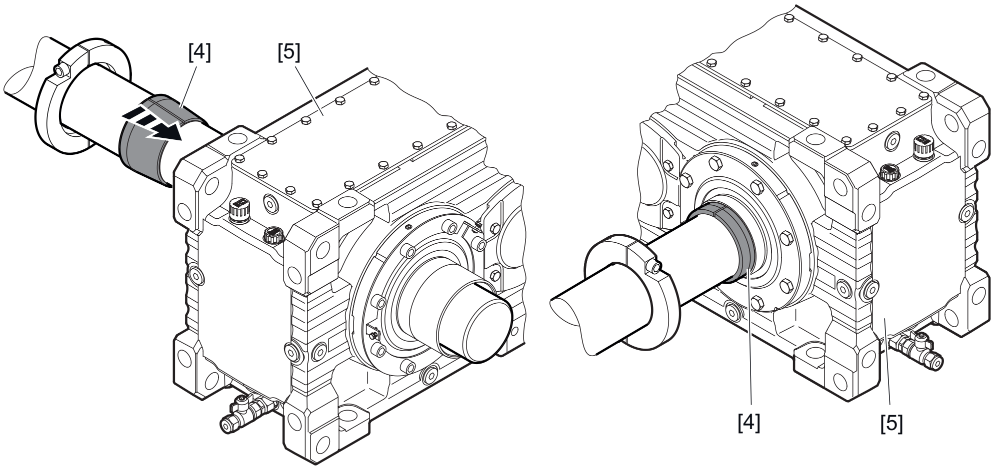
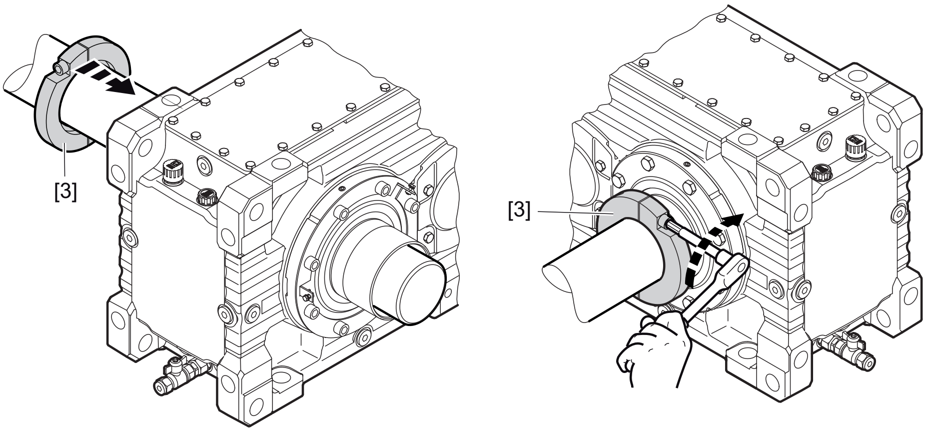
6. Slide the bushing [4} into the gear unit [5] up to the stop.



14226908811

7. Secure the bushing with the stop ring [3]. Tighten the stop ring [3] to the bushing with the tightening torque listed in the following table.



14226363915

Size	Screw	Tightening torque Nm
XT100	M10	79
XT110	M10	79
XT120	M10	79
XT130	M12	116
XT140	M12	116
XT150	M16	285
XT160	M16	285
XT170	M16	285

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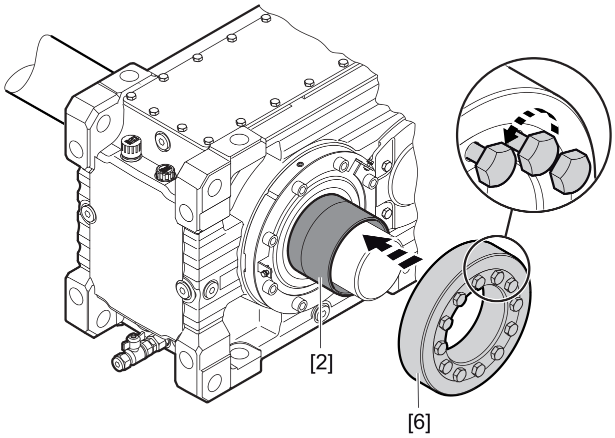
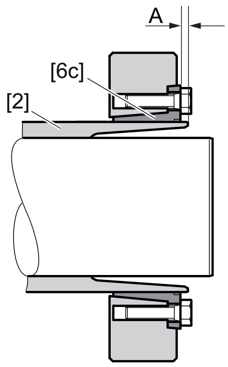
8. ⚠ **CAUTION!** The shrink disk can slip when not tightened. Potential risk of crushing due to falling parts. Secure the shrink disk against slipping.
   NOTICE! Tightening the locking screws without first installing a shaft may result in the hollow shaft being deformed. Possible damage to property. Never tighten the screws without the shaft installed.
   Make sure that all locking screws are loosened and slide the shrink disk [6] onto the hollow shaft [2].



14226916107

9. Position the inner ring [6c] of the shrink disk to dimension A.



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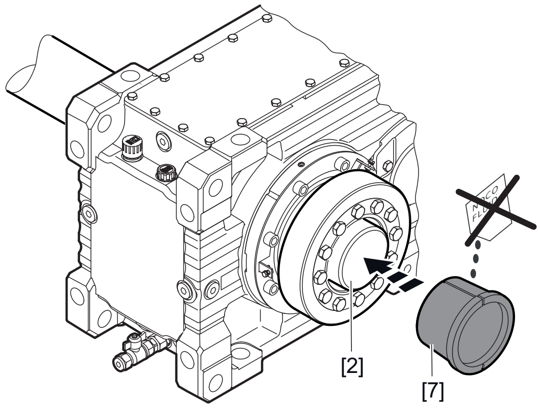
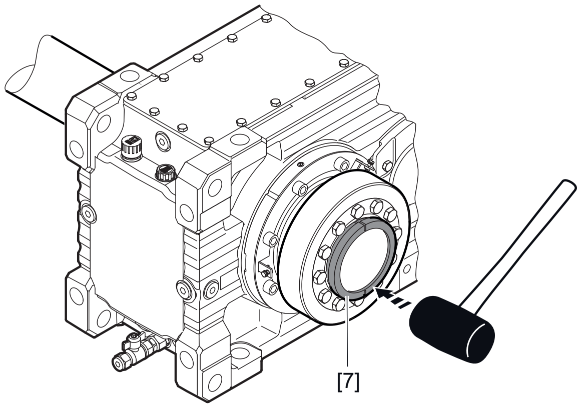
Size	Dimension A in mm
X100	2.5
X110	4
X120	7
X130	7
X140	3
X150	5
X160	5
X170	10
X180	10
X190	10
X200	3
X210	3

10. Slide the counter bushing [7] onto the customer shaft and into the hollow shaft [2].



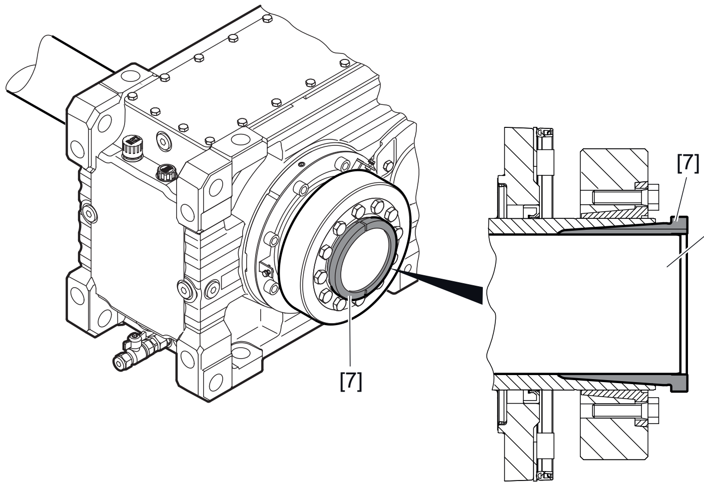
14226923403

11. Tap lightly on the flange of the counter bushing [7] to ensure that the bushing is fitted securely in the hollow shaft.



14226925835

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



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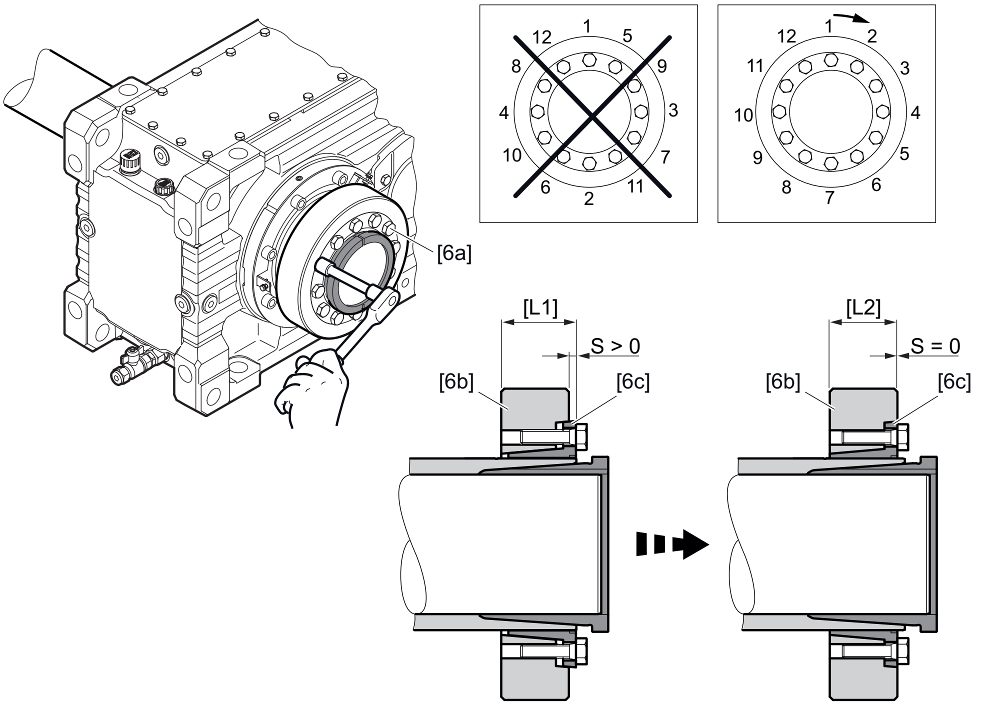
13. Tighten the locking screws [6a] of the shrink disk only manually. Align the taper (outer ring) [6b] parallel to the taper bushing (inner ring) [6c].



14226913675

[6a]	Locking screws	[L1]	Delivery state (pre-assembled)
[6b]	Outer ring	[L2]	Completely assembled (ready for operation)
[6c]	Inner ring		

INFORMATION

If the taper (outer ring) and the taper bushing (inner ring) cannot be aligned on the face that holds the screws, disassemble the shrink disk again and carefully "clean/lubricate it sufficiently" (→ 🗎 171).

14. Tighten the locking screws clockwise (not in diametrically opposite sequence) by 1/4 revolution. Work around the ring in several stages, evenly tighten the locking screws by a quarter turn each until the taper (outer ring) [6b] and the taper bushing (inner ring) [6c] align on the face that holds the screws.

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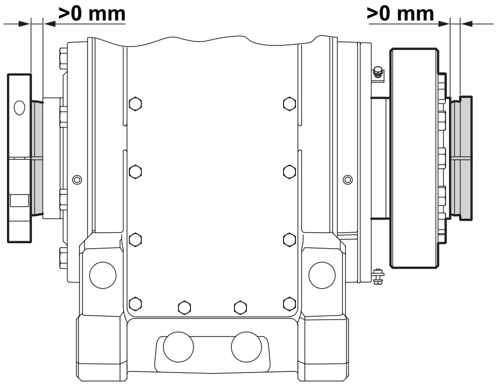
15. The remaining gap between stop ring and hollow shaft end, as well as mating bushing and hollow shaft end must be > 0 mm.



14226366347

16. Tighten the retaining screws of the gear unit with the specified tightening torque. Refer to the operating instructions of the gear unit for the tightening torques.

6.14.4 Mounting to customer shaft with shaft shoulder

If a shaft with shaft shoulder is used, the shaft shoulder must have a minimum height. For the dimensions for the shaft diameter at the shaft shoulder and at the shaft at the area of hollow shaft, refer to the following table.

Size	Ø shaft shoulder in mm	Ø area of hollow shaft in mm
X100	90	75
X110	95	80
X110	100	85
X120	105	90
X120	110	95
X130	115	100
X130	120	105
X140	125	110
X140	130	115
X150	130	115
X150	135	120
X150	140	125
X160	140	125
X160	145	130
X160	150	135
X170	145	130
X170	150	135
X170	155	140
X170	160	145
X180	155	140
X180	160	145
X180	165	150
X180	170	155
X180	175	160
X190	165	150
X190	170	155
X190	175	160
X200	170	155
X200	175	160
X200	180	165
X200	185	170

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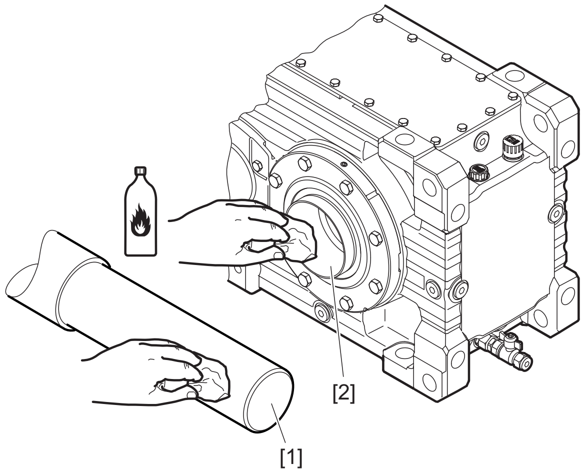
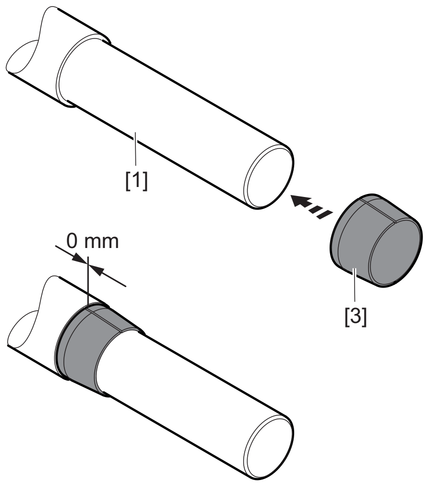
Size	Ø shaft shoulder in mm	Ø area of hollow shaft in mm
X200	190	175
X210	180	165
X210	185	170
X210	190	175
X210	195	180
X210	200	185

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



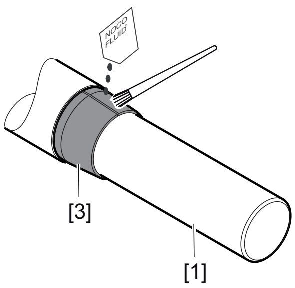
14227827083

2. Push the bushing onto the customer shaft up to the shaft shoulder.



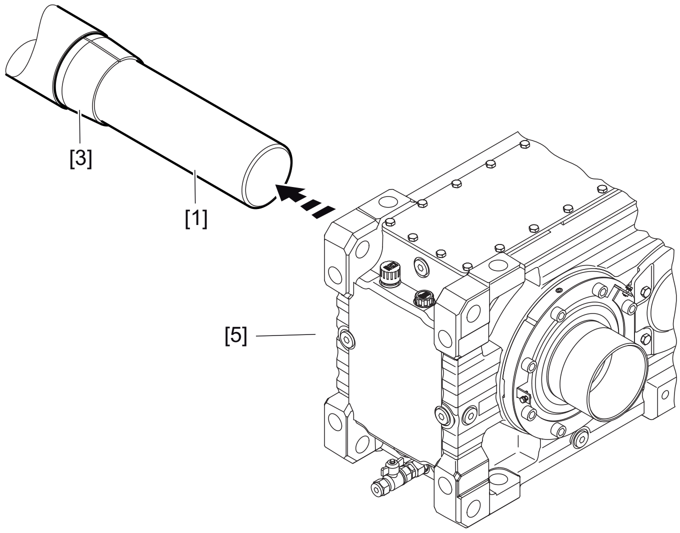
14227829515

3. Apply NOCO-Paste onto the bushing and spread it thoroughly.



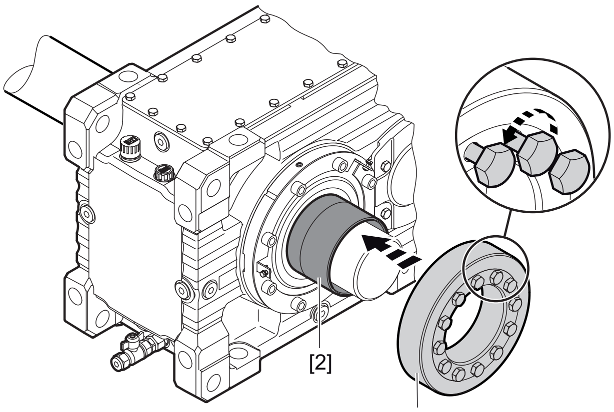
14227831947

4. Push the gear unit [5] onto the customer shaft up to the stop.



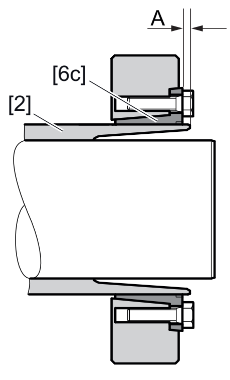
14227834379

5. Fasten the gear unit on the mounting surface (do not tighten the screws).
6. ⚠ **CAUTION!** The shrink disk can slip when not tightened. Potential risk of crushing due to falling parts. Secure the shrink disk against slipping.
   NOTICE! Tightening the locking screws without first installing a shaft may result in the hollow shaft being deformed. Possible damage to property. Never tighten the screws without the shaft installed.
   Make sure that all locking screws are loosened and slide the shrink disk [6] onto the hollow shaft [2].



14226916107

7. Position the inner ring [6c] of the shrink disk to dimension A.



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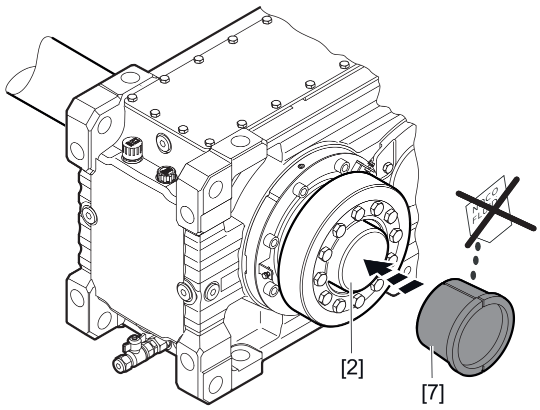
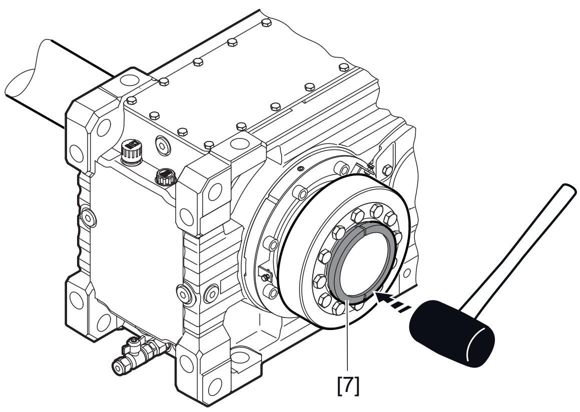
Size	Dimension A in mm
X100	2.5
X110	4
X120	7
X130	7
X140	3
X150	5
X160	5
X170	10
X180	10
X190	10
X200	3
X210	3

8. Slide the counter bushing [7] onto the customer shaft and into the hollow shaft [2].



14226923403

9. Tap lightly on the flange of the counter bushing [7] to ensure that the bushing is fitted securely in the hollow shaft.



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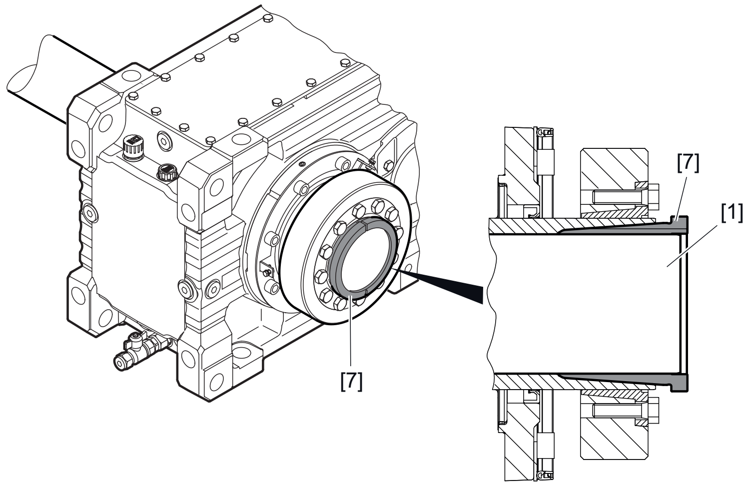
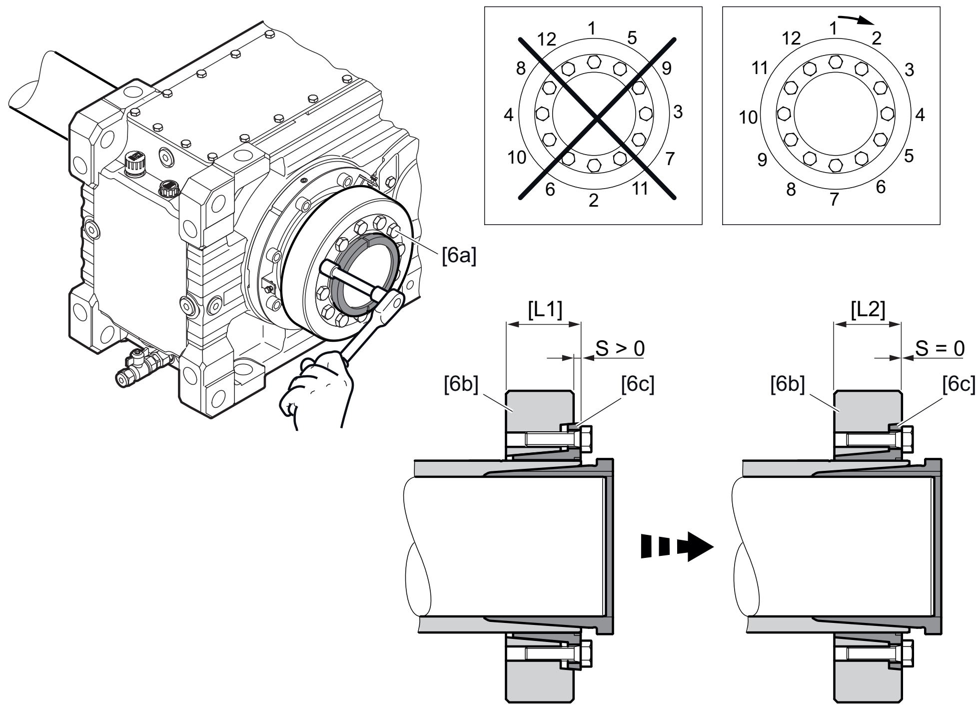
10. Make sure that the conical bushing [7] is pushed into the shaft until there is no play between the customer's shaft [1], bushing [7], and hollow shaft.



14226918539

11. Tighten the locking screws [6a] of the shrink disk only manually. Align the taper (outer ring) [6b] parallel to the taper bushing (inner ring) [6c].



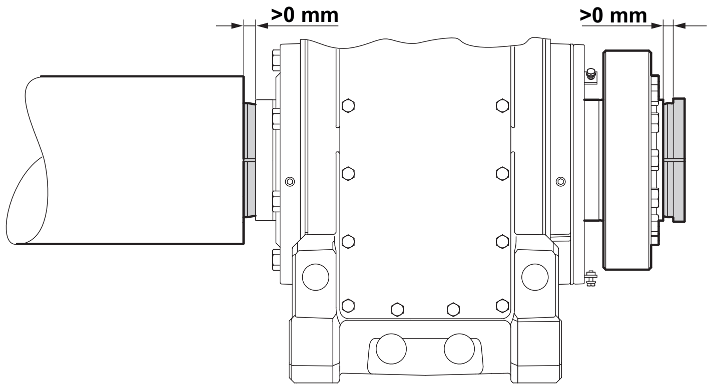
14226913675

[6a]	Locking screws	[L1]	Delivery state (pre-assembled)
[6b]	Outer ring	[L2]	Completely assembled (ready for operation)
[6c]	Inner ring		

INFORMATION

If the taper (outer ring) and the taper bushing (inner ring) cannot be aligned on the face that holds the screws, disassemble the shrink disk again and carefully "clean/lubricate it sufficiently" (→ 🗎 171).

12. Tighten the locking screws clockwise (not in diametrically opposite sequence) by a quarter turn each. Work around the ring in several stages, evenly tighten the locking screws [10] by a quarter turn until the taper (outer ring) [9a] and the taper bushing (inner ring) [6c] align on the face that holds the screws as is shown in the illustration below.
13. The remaining gap between bushing and hollow shaft end, as well as mating bushing and hollow shaft end must be > 0 mm.



14299101579

14. Tighten the retaining screws of the gear unit with the specified tightening torque. For the tightening torque, refer to the operating instructions of the gear unit.

6.14.5 Disassembling the customer shaft

NOTICE

Removing the gear unit incorrectly from the machine shaft may damage bearings and other components.

Possible damage to property.

- You may only use the hollow shaft as a support for disassembly. Note that supporting on any other parts of the gear unit may damage the material.
- Remove the shrink disk properly. Never completely unscrew the retaining screws because the shrink disk might jump off and cause an injury.
- Shrink disks and corresponding parts of different gear units must not be swapped.

Proceed as follows:

1. Loosen the locking screws [6a] by a quarter turn one after the other to avoid straining the connecting surface.

INFORMATION

If the taper (outer ring) [6b] and the taper bushing (inner ring) [6c] do not loosen by themselves:

Take the necessary number of screws and screw them evenly into the disassembly bores. Tighten the clamping screws in several steps until the tapered bushing separates from the tapered ring.

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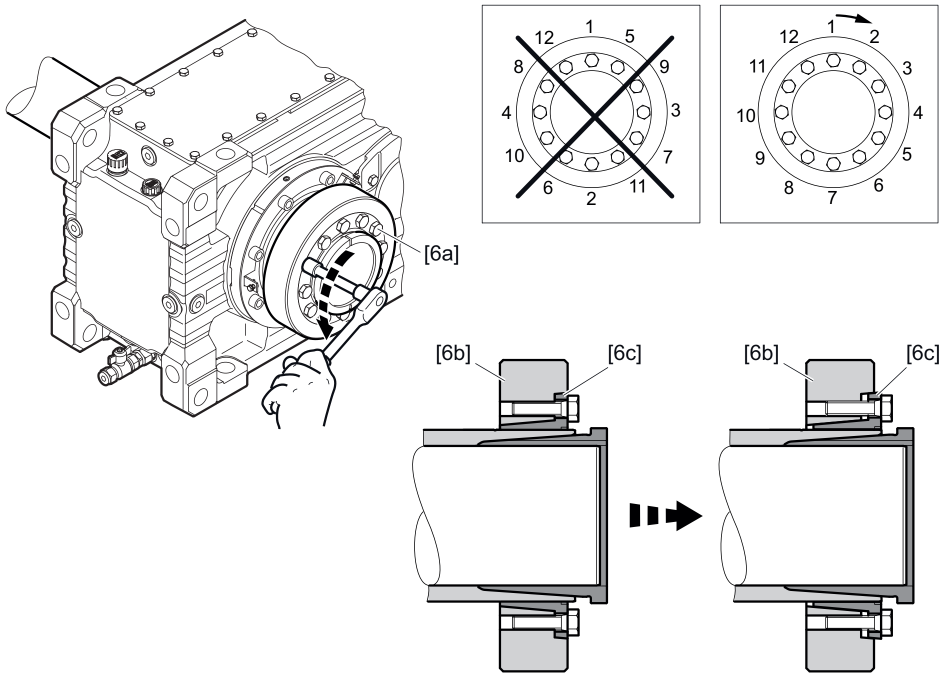

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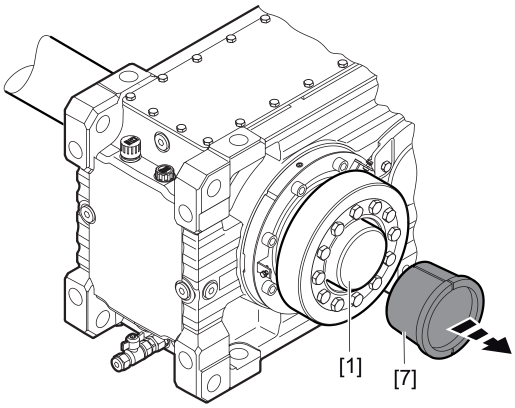
2. Remove the conical steel bushing [7]. If the steel bushing is locked, use a puller for the disassembly.



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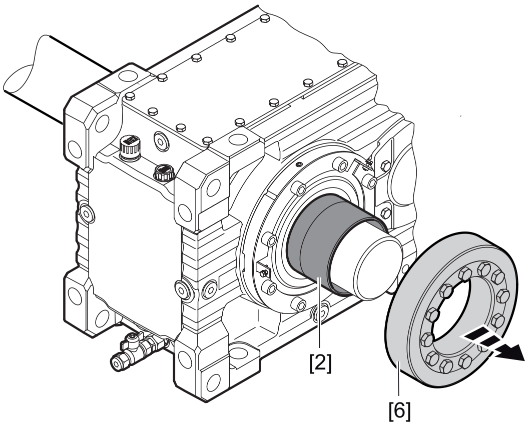
3. Remove the shrink disk [6] from the hollow shaft [2].



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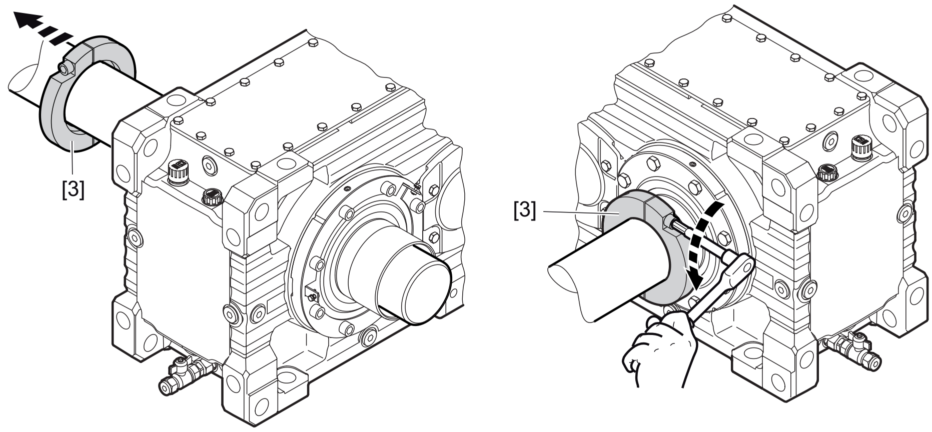
4. Loosen the retaining screw of the stop ring [3] and remove the stop ring [3] from the gear unit.



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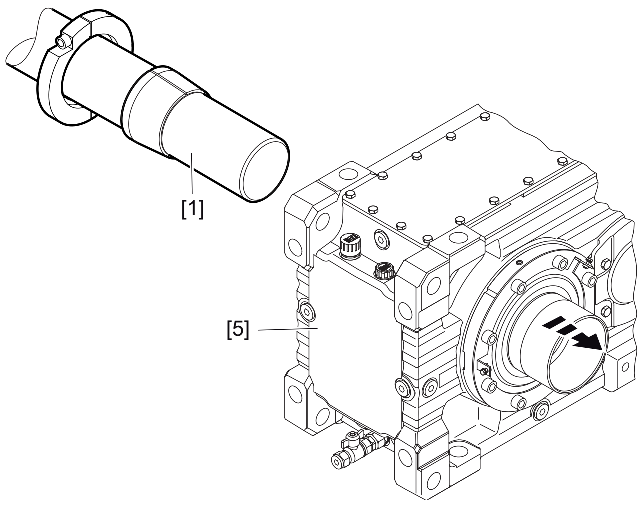
INFORMATION

The removal of the stop ring is not necessary for customer shafts with shaft shoulder.

5. Remove the retaining screws of the gear unit.
6. Remove the gear unit [5] from the customer shaft [1].



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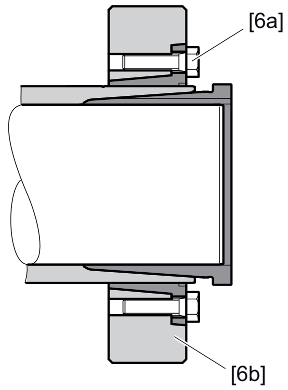
6.14.6 Cleaning and lubricating the shrink disk

Before reassembly, clean and lubricate the shrink disk.

Perform the following steps carefully to ensure proper functioning of the shrink disk. Use only products that are comparable to the specified lubricant.

INFORMATION

- If the tapered surfaces of the shrink disk are damaged, the shrink disk can no longer be used. Replace the shrink disk.



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[6a] Locking screws
[6b] Taper (outer ring)

1. Thoroughly clean the removed shrink disk from dirt and the remaining adhering lubricants.
2. Apply an MoS_2 compound onto the threads and under the screw heads of the locking screws [6a], for example "gleitmo 100" from FUCHS LUBRITECH (www.fuchs-lubritech.com).
3. Also evenly lubricate the tapered surface of the taper (outer ring) [6b] with a thin layer of an MoS2 compound.

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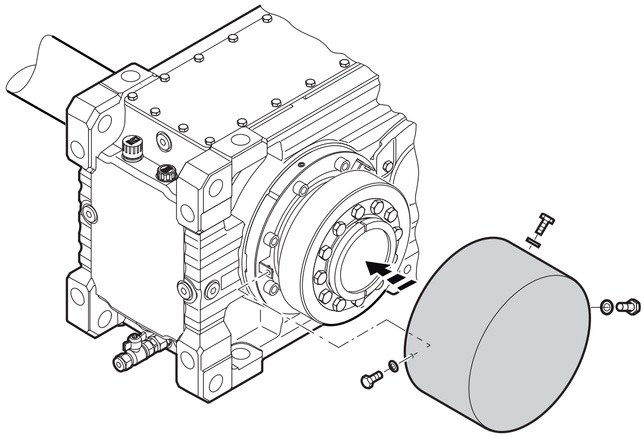
6.14.7 Installing the protection cover



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Proceed as follows to mount the protection cover:

1. Push the protection cover onto the gear unit.
2. Align the protection cover. The bolt holes of the protection cover must be in alignment with the retaining nuts.
3. Insert the retaining screws with washers and tighten the screws.
4. Check whether the protection cover is dust-tight and properly mounted to the gear unit.

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6.15 Torque arm /T

⚠ WARNING

Insufficiently secured gear units can fall down during disassembly and assembly to the customer machine.

Severe or fatal injuries.

- Secure the gear unit during assembly and disassembly. Support the gear unit using appropriate tools.

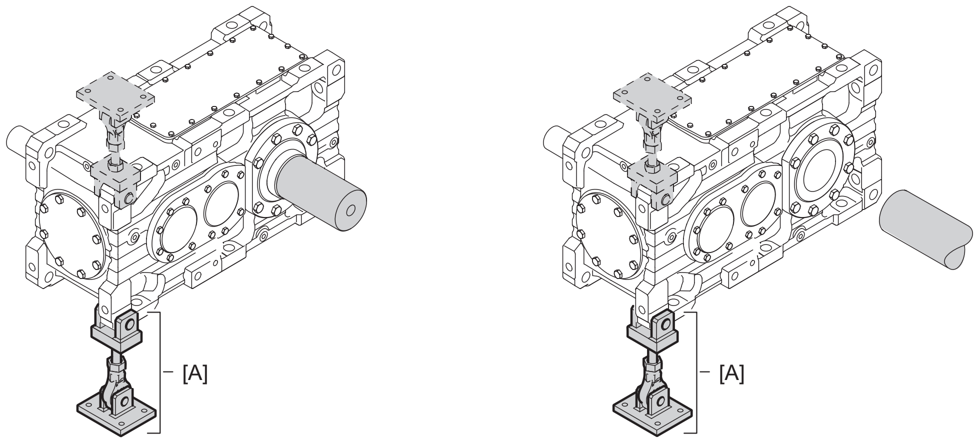
NOTICE

Danger due to overhung loads acting on the torque arm.

Possible damage to the gear unit.

- The torque arm can only transfer tensile/compressive forces in the direction of support. Overhung loads can damage the gear unit.

To keep the bending moments on the machine shaft as low as possible, always mount the torque arm [A] on the side of the driven machine. The torque arm can be mounted on the top or bottom of the gear unit.



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1. Lift the gear unit with a suitable lifting device.
2. Mount the output shaft of the gear unit to the customer machine.
3. Mount the torque arm on the gear unit.

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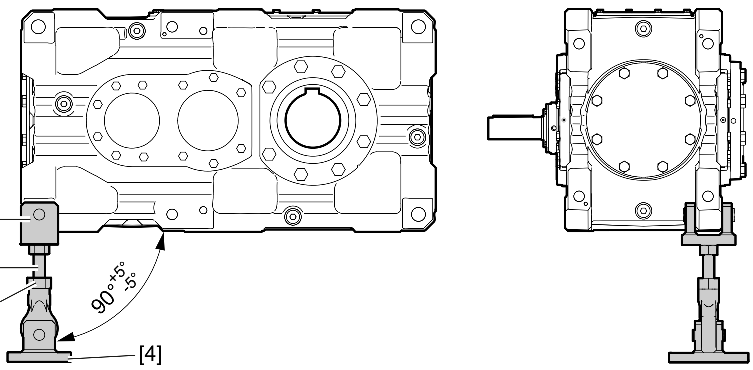
4. **NOTICE!** Make sure that the stud bolt [2] is simultaneously screwed into the yoke head [1] and joint head [3]. Possible damage to property. The stud bolt [2] must be screwed evenly into the yoke head [1] and joint head [3] by at least once the length of the thread diameter.



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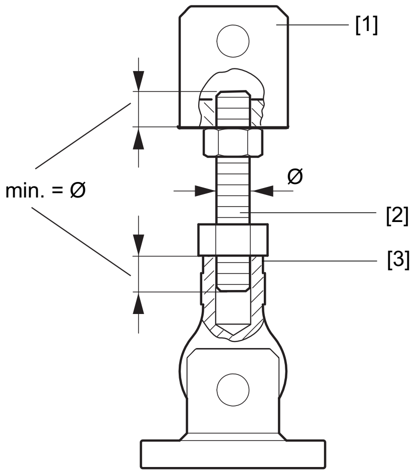
[1] Yoke head with bolt	[3] Joint head
[2] Stud bolt with nuts	[4] Yoke plate with bolt

5. Use the lifting device to position the gear unit horizontally above the customer's mounting position.
6. Adjust the length of the threaded bolt by turning the yoke plate in such a way that the base plate rests on the ground without play. Also observe the tolerances in chapter "Permitted deviation of the mounting position during installation" (→ 98).



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[1] Yoke head with bolt
[2] Stud bolt with nuts
[3] Joint head

7. Use this position of the yoke plate to define the fastening points.
8. After the alignment process, tighten the nuts with the tightening torques listed in the following table.

Size	Screw/nut	Tightening torque
		Nm
X100 – 110	M20	140
X120 – 130	M24	140
X140 – 150	M24	140

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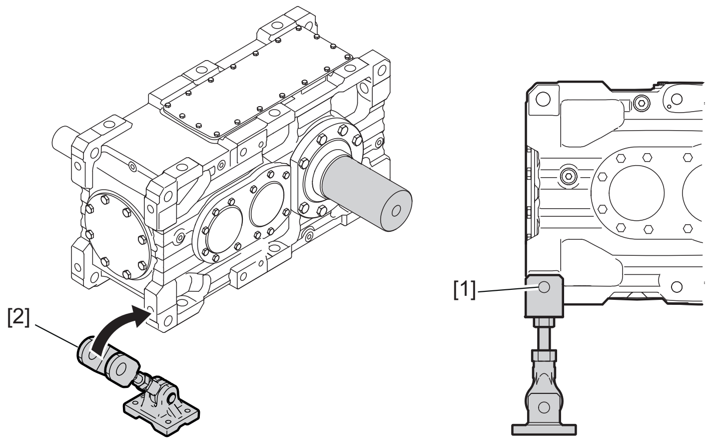
Size	Screw/nut	Tightening torque
		Nm
X160 – 190	M36	200
X200 – 230	M42	350
X240 – 280	M48	500
X290 – 320	M56	700

9. The yoke plate can be mounted on the customer's mounting surface using suitable mounting material.
10. To ensure that only tensile and compressive forces are transmitted, it is recommended to check this. For checking, you can detach the torque arm from the gear unit (remove bolt from [2]) and tilt it outwards and back inwards. The torque arm is adjusted correctly if the bolt [1] can be mounted without the yoke head [2] touching the gear unit.



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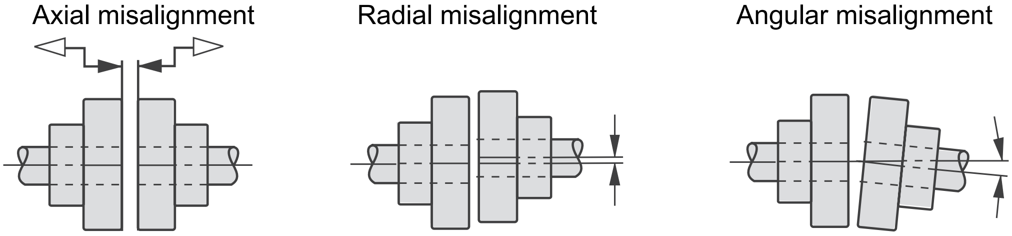
11. Fasten the yoke head [2] with the bolt [1].
12. Remove the lifting device from the gear unit.

6.16 Align couplings/assembly tolerances

6.16.1 Aligning the coupling

Adjust the following misalignments when mounting couplings.



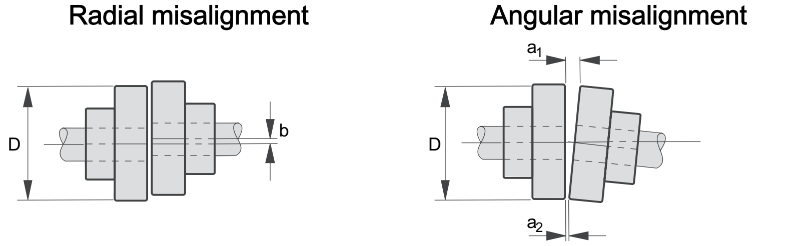
Use a laser-optical alignment system to align the coupling as accurately as possible.

6.16.2 Mounting tolerances

Observe the following points.

- The table values for radial misalignment and angular misalignment apply to common mechanical couplings, such as elastic claw couplings or couplings with a steel lamella package.
- The values listed below result from the consideration of the entire drive train and therefore differ from the tolerance values of the coupling manufacturers.
- Drive speeds greater than 1500 min^{-1} in conjunction with coupling diameters greater than 400 mm require a case-by-case test and approval.
- All tooth and barrel couplings must be set and aligned according to the respective manufacturer's operating instructions.
- The setting and alignment tolerances for special couplings must be checked and agreed on in individual cases.

Observe the following information.



b = Max. radial misalignment
D = Outer diameter

a_1 - a_2 = Max. angular misalignment

The installation tolerances stated in the table apply to flexible couplings.

Outer diameter D in mm	Mounting tolerances in mm					
	n < 500 min^{-1}		n: 500 – 1500 min^{-1}		n > 1500 min^{-1}	
	a_1 - a_2	b	a_1 - a_2	b	a_1 - a_2	b
0 – 200	0.2	0.2	0.2	0.2	0.2	0.2
200 – 400	0.3	0.3	0.3	0.3	0.3	0.3
> 400	0.3	0.3	0.3	0.3	–	–

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6.17 Motor mounting on a gear unit

The gear unit with motor adapter must be installed in such a way that no liquids can enter the motor adapter (HSS end) and accumulate there. Otherwise there is a risk that the respective oil seal can be damaged and subsequent damage could create a potential ignition source.

An elastic claw coupling is included in the scope of delivery.

6.17.1 Maximum permitted motor weight

Check the following 2 criteria when mounting a motor to the gear unit:

1. Maximum motor weight depending on gear unit design and mounting type
2. Maximum motor weight depends on motor adapter size

→ The motor weight must not exceed either of the two criteria.

1. Maximum motor weight depends on gear unit design and mounting type

INFORMATION

- The following tables apply only to stationary applications. For mobile applications (e.g. travel drives), contact SEW-EURODRIVE.
- Contact SEW-EURODRIVE in case of deviating mounting positions/mounting surfaces.

The following applies to all tables:

G_M = Motor weight

G_G = Gear unit weight

Horizontal gear units

X.F..

Type of mounting	Mounting position M. / mounting surface F.
	M1/F1 and M3/F2
Foot-mounted X../ B	$G_M \leq 1.5\ G_G$
Shaft-mounted X../ T	$G_M \leq 0.5\ G_G$
Flange-mounted X../ F	$G_M \leq 0.5\ G_G$

X.K..

Type of mounting	Mounting position M. / mounting surface F.
	M1/F1 and M3/F2
Foot-mounted X../ B	$G_M \leq 1.75\ G_G$
Shaft-mounted X../ T	$G_M \leq 1.5\ G_G$
Flange-mounted X../ F	$G_M \leq 0.5\ G_G$

X.T..

Type of mounting	Mounting position M. / mounting surface F.
	M1/F1 and M3/F2
Foot-mounted X../ B	$G_M \leq 2.0\ G_G$
Shaft-mounted X../ T	$G_M \leq 1.5\ G_G$
Flange-mounted X../ F	$G_M \leq 0.5\ G_G$

Vertical gear units

INFORMATION

- When using the shaft-mounted version, contact SEW-EURODRIVE.
- Gear unit with mounting position M. / mounting surface F.: For M5/F4 and M6/F3, contact SEW-EURODRIVE.

X.F..

Type of mounting	Mounting position M. / mounting surface F.
	M5/F3 and M6/F4
Foot-mounted X../ B	$G_M \le 2.0\ G_G$
Flange-mounted design X../F	$G_M \le 1.5\ G_G$

X.K..

Type of mounting	Mounting position M. / mounting surface F.
	M5/F3 and M6/F4
Foot-mounted X../ B	$G_M \le 1.5\ G_G$
Flange-mounted design X../F	$G_M \le 0.75\ G_G$

X.T..

Type of mounting	Mounting position M. / mounting surface F.
	M5/F3 and M6/F4
Foot-mounted X../ B	$G_M \le 1.75\ G_G$
Flange-mounted design X../F	$G_M \le 1.25\ G_G$

Upright gear units

X.F..

Type of mounting	Mounting position M. / mounting surface F.
	M4/F6
Foot-mounted X../ B	$G_M \le 1.25\ G_G$
Shaft-mounted X../ T	$G_M \le 0.75\ G_G$
Flange-mounted X../ F	$G_M \le 1.0\ G_G$

X.K..

Type of mounting	Mounting position M. / mounting surface F.
	M4/F6
Foot-mounted X../ B	$G_M \le 1.75\ G_G$
Shaft-mounted X../ T	$G_M \le 1.0\ G_G$
Flange-mounted X../ F	$G_M \le 1.25\ G_G$

X.T..

Type of mounting	Mounting position M. / mounting surface F.
	M4/F6
Foot-mounted X../ B	$G_M \le 1.5\ G_G$
Shaft-mounted X../ T	$G_M \le 0.75\ G_G$
Flange-mounted X../ F	$G_M \le 1.0\ G_G$

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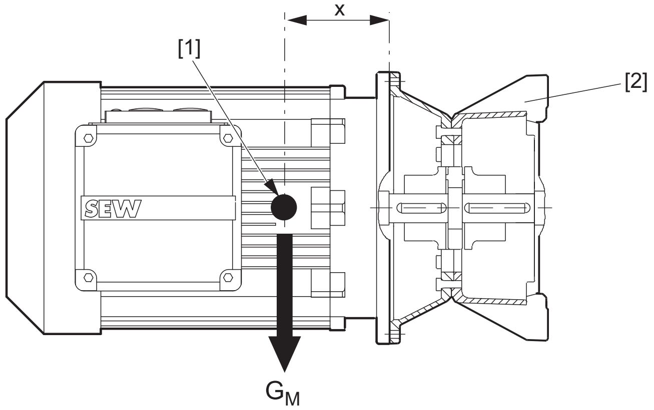
2nd Maximum motor weight depends on motor adapter size

The following maximum loads on the motor adapter must not be exceeded.



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[1] Center of gravity of the motor
[2] Motor adapter

X = Center of gravity distance
G_M = Weight of the mounted motor

INFORMATION

The table only applies to stationary applications. For mobile applications (e.g. travel drives), contact SEW-EURODRIVE.

Motor adapter		G_M	X
IEC	**NEMA**	**kg**	**mm**
100/112	182/184	60	190
132	213/215	110	230
160/180	254/286	220	310
200	324	280	340
225	326	400	420
250/280	364 – 405	820	480
315S-L	444 – 449	1450	680
315		2000	740
355		2500	740

If the center of gravity distance **X** is increased, the maximum permitted weight G_M must be reduced linearly. G_M cannot be increased if the center of gravity distance is reduced.

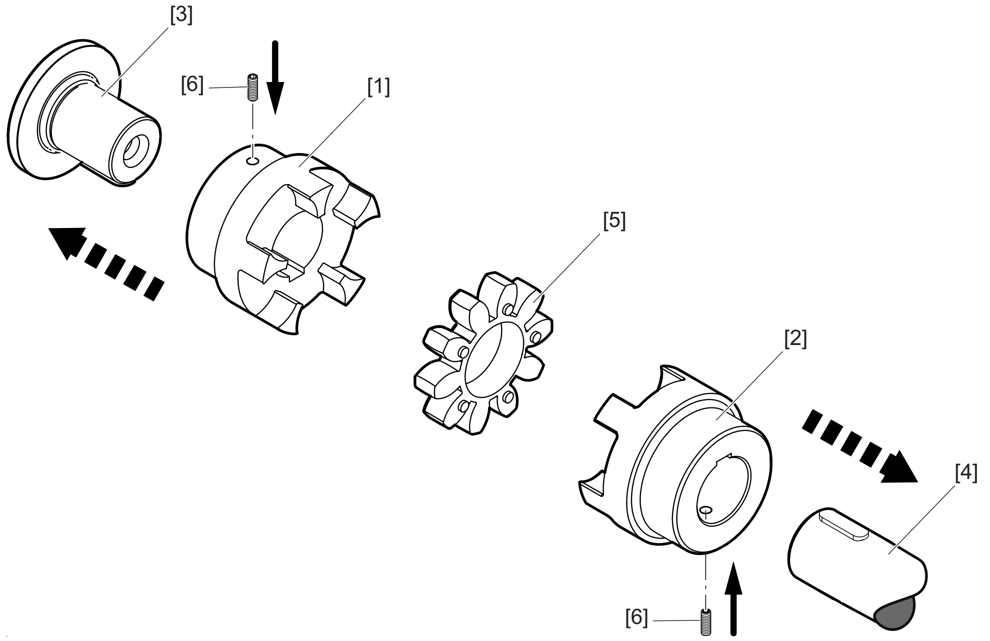
6.17.2 Claw coupling

Observe the operating instructions of the respective coupling manufacturer.

You can find these together with the dimension sheet and further documents in the overall documentation for the gear unit.

Torsionally flexible jaw-type coupling

Mounting the coupling



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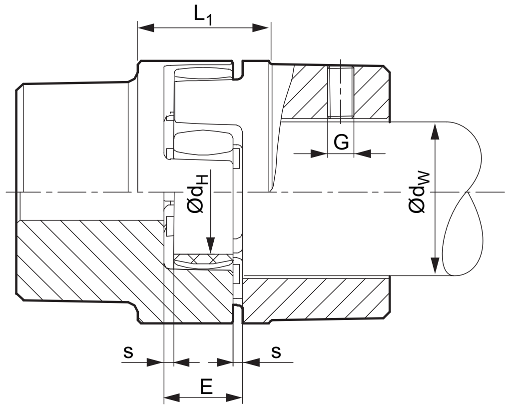
1. **NOTICE!** Improper assembly may damage the hubs [1][2]. Possible damage to property. Heat the hub to about 80 °C to facilitate mounting.
   Mount the hubs [1][2] onto the input and output shafts [3][4].
2. Insert the spider [5] or DZ elements into the cam section of the input and output hubs [1][2].
3. **NOTICE!** Improper mounting can damage the coupling. Possible damage to property. During assembly, it is essential to observe dimension E so that the spider remains axially flexible during operation. The dimension E is listed in the following table.
   Move the gear unit/motor in axial direction until dimension **E** is reached. If the gear unit and motor have already been installed permanently, set dimension **E** by moving the hubs [1][2] axially on the input and output shafts [3][4].



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4. Secure the hubs by tightening the set screws [6].

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Coupling size	Mounting dimensions			Retaining screw	
	E mm	s mm	d_H mm	G	Tightening torque Nm
14	13	1.5	10	M4	1.5
19	16	2	18	M5	2
24	18	2	27	M5	2
28	20	2.5	30	M8	10
38	24	3	38	M8	10
42	26	3	46	M8	10
48	28	3.5	51	M8	10
55	30	4	60	M10	17
65	35	4.5	68	M10	17
75	40	5	80	M10	17
90	45	5.5	100	M12	40
100	50	6	113	M12	40
110	55	6.5	127	M16	80
125	60	7	147	M16	80
140	65	7.5	165	M20	140
160	75	9	190	M20	140
180	85	10.5	220	M20	140

Misalignment – Aligning the coupling

NOTICE

Improper mounting of the coupling may result in damage.

Possible damage to property.

- The shaft ends must be aligned accurately to ensure a long service life of the coupling. It is essential that you adhere to the specified displacement values, see manufacturer documentation. Exceeding these values will damage the coupling. Exact coupling alignment increases its service life.

6.17.3 Attaching the motor to the motor adapter

1. Clean the motor shaft and flange surfaces of the motor and the motor adapter. These must be dry and free of grease!
2. To avoid contact corrosion, apply some assembly paste, for example NOCO®-Paste to the motor shaft.

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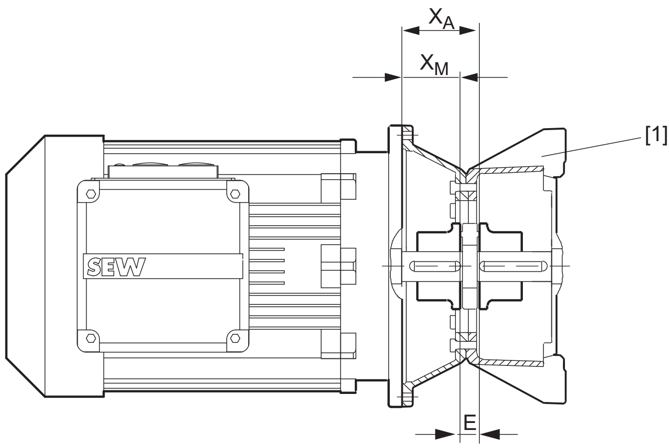
3. Push the coupling half onto the motor shaft and position it. When doing this, observe the information in chapter "Claw coupling" (→ 🗎 179) and the figure below. The coupling size and the type are noted on the coupling.



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[1]	Motor adapter	XA	Distance of the coupling to the flange surface of the motor adapter
E	Mounting dimension	XM	Distance of the coupling to the flange surface of the motor

→ XM = XA - E

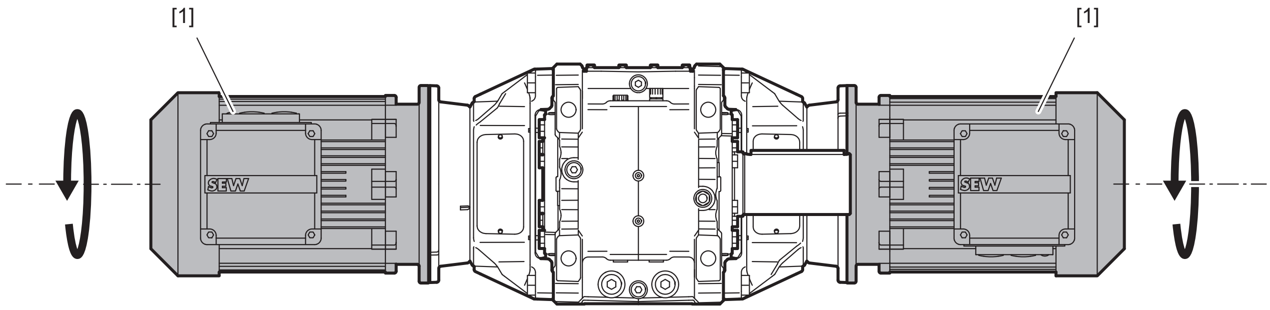
4. Secure the coupling half using the set screw.
5. Mount the motor onto the motor adapter, making sure that the claws of the coupling engage each other.

6.17.4 Mounting 2 motors

Motor direction of rotation

For operation of the gear unit with 2 motors [1], make sure that the motors have a common direction of rotation in regard of the gear unit input shaft.

The following figure illustrates an example of the motor direction of rotation.



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6.18 Mounting flange /F

⚠ WARNING

Insufficiently secured gear units can fall down during disassembly and assembly to the customer machine.

Severe or fatal injuries.

- Secure the gear unit during assembly and disassembly. Support the gear unit using appropriate tools.

NOTICE

Improper assembly or disassembly of the mounting flange may result in damage to the gear unit.

Possible damage to property.

- The mounting flange must only be disassembled and assembled under the instruction of the SEW-EURODRIVE Service.

NOTICE

Improper installation and mounting can damage the gear unit.

Possible damage to the gear unit.

- Gear units with mounting flange must not be additionally secured on the floor with a rigid connection. This is why neither foot mounting of the gear unit is permitted nor using a base frame.

The screws must not be lubricated during assembly.

Clean the screw thread. Coat the first few turns of the thread with a thread-locking compound (e.g. Loctite® 243). Adhere to the following tightening torques when mounting the mounting flange to the operator's machine.

Screw/nut	Tightening torque Strength class 10.9
	Nm
M12	135
M16	330
M20	645
M24	1120

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6.19 V-belt drives /VBD

⚠ WARNING

Overspeed can damage the belt pulley.

Severe or fatal injuries.

- Observe the maximum circumferential speed according to the manufacturer's specifications.

6.19.1 Maximum permitted motor weight

When selecting a motor, observe the permitted motor weight, the gear unit design and the type of gear unit mounting according to the following table.

The table only applies to stationary applications. For mobile applications (e.g. travel drives), contact SEW-EURODRIVE.

X.F..

Type of mounting	
Foot-mounted X../ B	$G_M \leq 1.75\ G_G$
Shaft-mounted X../ T	$G_M \leq 1.5\ G_G$

In this table:

G_M = Motor weight

G_G = Gear unit weight

X.K..

Type of mounting	
Foot-mounted X../ B	$G_M \leq 1.75\ G_G$
Shaft-mounted X../ T	$G_M \leq 1.5\ G_G$

In this table:

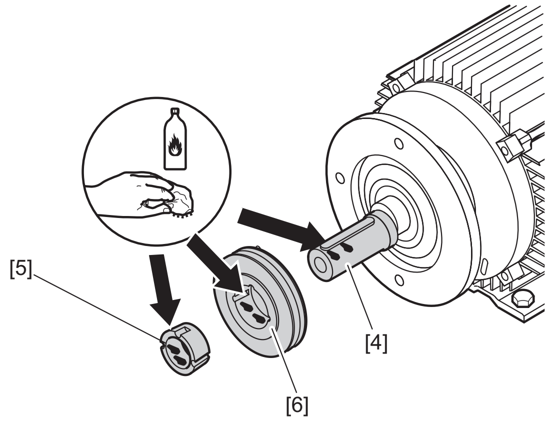
G_M = Motor weight

G_G = Gear unit weight

6.19.2 Mounting the V-belt drive

1. Mount the motor [1] on the base plate [2] (the retaining screws are not included in the delivery).

2. Clean and degrease the shafts [4], the taper bushings [5], and the belt pulleys [6].



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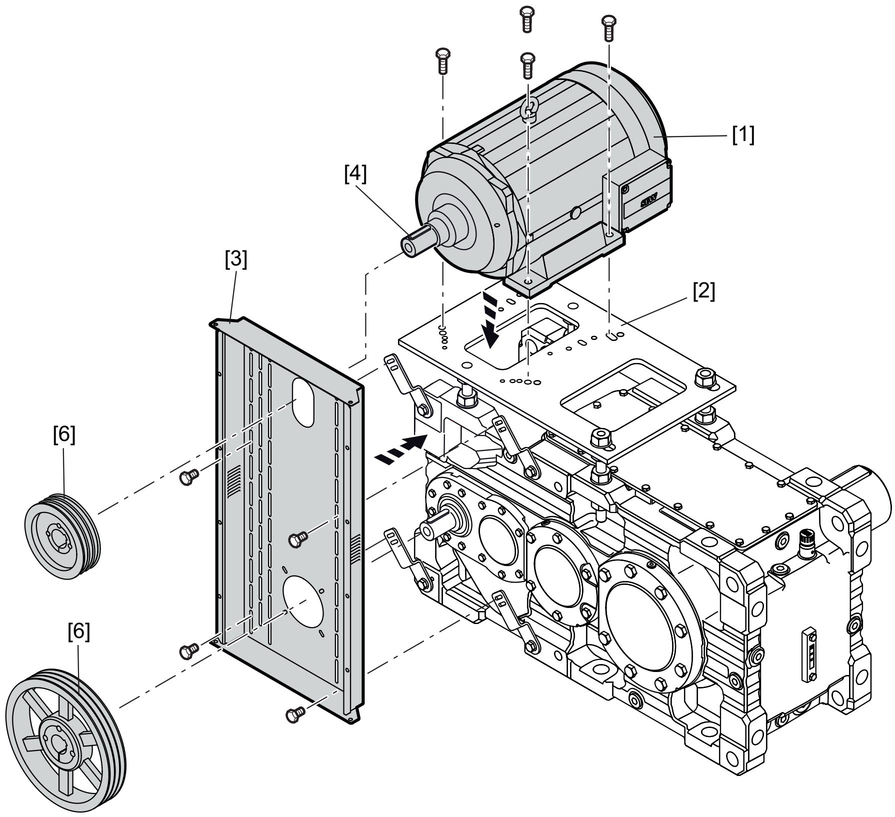
3. Use the specified holding fixtures to secure the V-belt guard [3]. Take into account the room required for positioning and tightening the belts, as well as the desired direction in which the guard will be opened.



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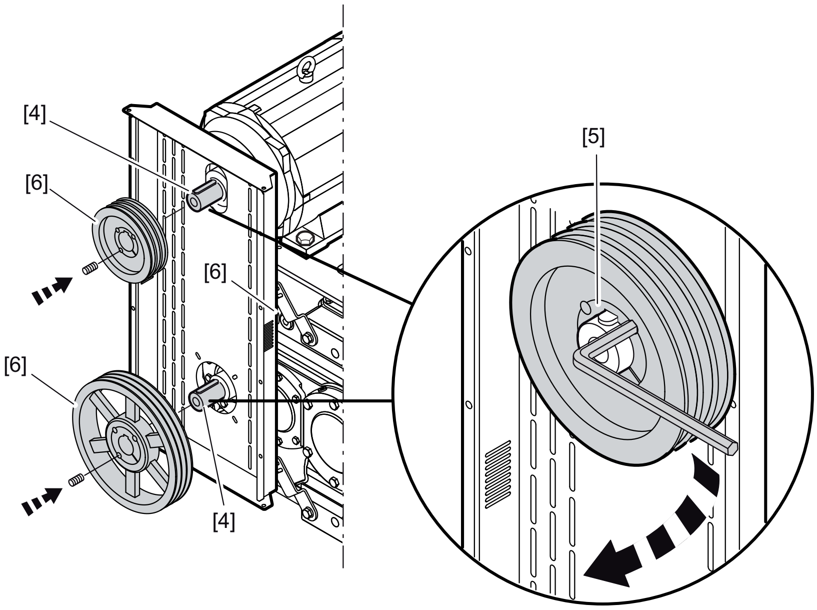
4. Mount the belt pulleys [6] completed with taper bushings on the gear unit and motor shaft [4]. Apply a little grease to the screws of the taper bushings and fill the unoccupied boreholes with grease to prevent soiling. Evenly tighten the locking screws of the taper bushings [5]. While tightening the screws, apply some light strokes to the hub to make the connection fit properly.

The following table shows the tightening torques for the taper bushings [5].

Dimensions	Wrench size	Number of screws	Tightening torque in Nm
TB 1008, 1108	3	2	5.7
TB 1210, 1215, 1310, 1610, 1615	5	2	20

Dimensions	Wrench size	Number of screws	Tightening torque in Nm
TB 2012	6	2	31
TB 2517	6	2	49
TB 3020, 3030	8	2	92
TB 3525, 3535	10	3	115
TB 4040	12	3	172
TB 4545	14	3	195
TB 5050	14	3	275



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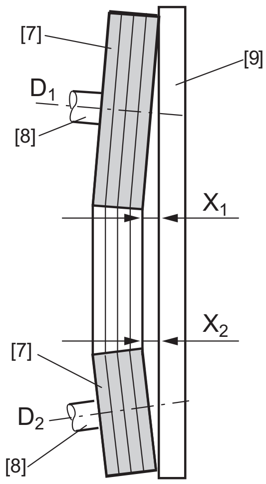
5. Position the belt pulleys [7] as closely as possible to the shaft shoulder [8]. If the rim widths of the two disks deviate from each other, this must be taken into account during positioning. Check the alignment of the belt pulleys before and after you have tightened the taper bushings using a straightedge [9] or a suitable alignment tool. For the maximum permitted misalignment, refer to the following table.



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Pulley diameter D_1, D_2 in mm	Maximum permitted distance X_1, X_2
112	0.5
224	1.0
450	2.0
630	3.0

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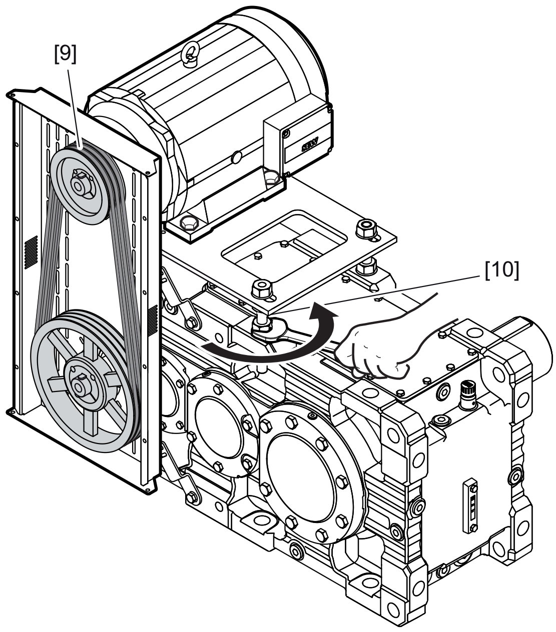
For other diameter values, you have to interpolate the intermediate values for X_1 and X_2.

6. ⚠ **CAUTION!** Never apply force to mount the V-belt. Possible dangerous situation and damage to property. Be careful not to place your fingers between the belt pulley and the V-belt when adjusting and turning the V-belt pulley. Mounting using a screwdriver, etc. will damage the V-belt externally and internally.
   Place the V-belts [9] onto the belt pulleys and tighten them by adjusting the base plate using the threaded rods [10].



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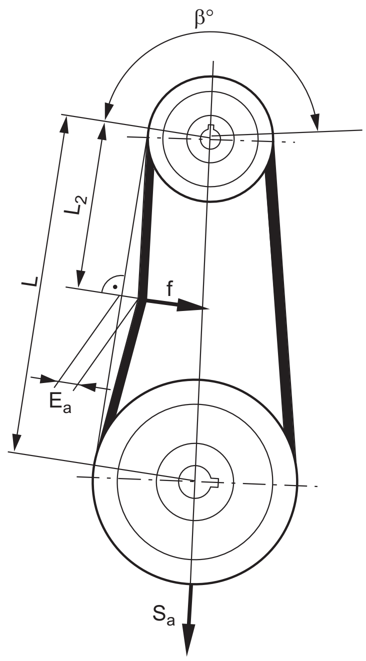
7. Check the belt tension with a suitable preload measuring device. If no special measuring device is available, you can estimate the preload using the method described below.

- Refer to the following table to determine the test force [f] required to deflect the belt by a specific distance [E_a] in the middle of the free belt length if the belt has the correct tension.
- Compare the measured values with the values in the table (on the following pages). Adjust the tension of the belt until the measured values correspond to the values of the table.



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8. Tighten all the screws and nuts and once again check the alignment of the belt pulleys as well as the correct tension of the belt.
9. **NOTICE!** Exceeding the permitted bending moments can cause damage to the gear unit (leaks, premature bearing failure, shaft breakage). Possible damage to property.
   Adhere to the correct belt tension.
10. Install the protection cover for the V-belt drive properly.
11. Check the initial belt tension after about 24 hours of operation to compensate for the initial stretching of the V-belts. At the same time, also review the tight fit of the taper bushings and their locking screws.

INFORMATION

The data in the following table only applies if V-belts from SEW-EURODRIVE are used. When using V-belts from other manufacturers, the user is responsible for determining the belt tension and for observing the permitted bending moments.

X.F..

Size X.F..	Gear ratio	Motor power kW	Test force N	Indentation depth mm	Indentation depth mm	Frequency 1/s	Frequency 1/s
				Initial assembly	Used belts	Initial assembly	Used belts
X100 – 110	1.25	4	25	9.4	10.7	64	56
		5.5	25	8.2	9.4	67	59
		7.5	25	8.1	9.4	70	62
		9.2	25	8.2	9.4	68	59
		11	25	8.1	9.4	70	61
		15	25	7.0	9.5	73	64
	1.4	4	25	9.5	10.8	63	55
		5.5	25	8.2	9.5	67	59
		7.5	25	8.1	9.4	71	62
		9.2	25	8.2	9.4	67	59
		11	25	8.1	9.4	70	61
		15	25	7.0	9.5	73	64
	1.6	4	25	9.5	10.7	64	56
		5.5	25	8.2	9.4	68	59
		7.5	25	8.0	9.3	71	63
		9.2	25	8.3	9.5	67	59
		11	25	8.0	9.3	71	62
		15	50	12.0	13.2	63	55
	1.8	4	25	9.5	10.7	64	56
		5.5	25	8.2	9.5	67	59
		7.5	25	8.1	9.4	71	62
		9.2	25	8.1	9.3	69	60
		11	25	8.1	9.4	70	61
		15	50	11.9	13.0	64	56
X120 – 130	1.25	2.2	25	11.0	12.5	52	45
		3	25	9.6	11.0	60	53
		4	25	12.5	12.5	49	43
		5.5	25	9.6	11.0	57	50
		7.5	25	9.5	11.0	60	53
		9.2	25	9.6	11.1	57	50
		11	25	9.5	11.0	60	52
		15	25	8.2	11.1	62	55
		18.5	50	13.0	15.3	57	50
		22	50	12.1	13.9	59	52
		30	25	8.2	11.1	62	55
	1.4	2.2	25	11.1	12.6	51	45
		3	25	9.6	11.1	60	52
		4	25	12.6	12.6	49	43
		5.5	25	9.6	11.1	57	50
		7.5	25	9.6	11.1	60	52
		9.2	25	9.6	11.0	58	51
		11	25	9.6	11.1	59	52
		15	25	8.2	11.1	63	55
		18.5	50	13.0	15.4	57	50
		22	50	12.0	13.9	59	52
		30	25	8.2	11.1	63	55
	1.6	2.2	25	11.0	12.5	52	46
		3	25	9.5	11.0	60	53
		4	25	12.5	12.5	50	44
		5.5	25	9.5	11.0	58	51
		7.5	25	9.5	11.0	60	53
		9.2	25	9.6	11.1	57	50
		11	25	9.5	11.0	59	52
		15	50	13.9	15.3	54	48
		18.5	50	13.0	15.3	57	50
		22	50	11.9	13.8	60	53
		30	75	12.7	15.9	56	49
	1.8	2.2	25	11.0	12.4	52	46
		3	25	9.5	11.0	61	53
		4	25	12.4	12.4	50	44
		5.5	25	9.5	11.0	58	51
		7.5	25	9.4	10.8	61	54
		9.2	25	9.4	10.9	59	51
		11	25	9.4	10.8	61	53
		15	50	14.0	15.4	54	47
		18.5	50	12.9	15.1	58	51
		22	50	11.9	13.8	60	53
		30	75	13.1	16.3	54	48

Size X.F..	Gear ratio	Motor power kW	Test force N	Indentation depth mm	Indentation depth mm	Frequency 1/s	Frequency 1/s
				Initial assembly	Used belts	Initial assembly	Used belts
X140 – 150	1.25	2.2	25	11.0	12.5	52	45
		3	25	9.6	11.0	60	53
		4	25	12.5	12.5	49	43
		5.5	25	9.6	11.0	57	50
		7.5	25	9.5	11.0	60	53
		9.2	25	9.6	11.1	57	50
		11	25	9.5	11.0	60	52
		15	25	8.2	11.1	62	55
		18.5	50	15.8	18.6	47	41
		22	50	14.6	16.9	49	43
		30	25	9.9	13.4	51	45
		37	75	17.0	19.7	43	38
		45	75	14.7	18.5	45	40
	1.4	2.2	25	11.1	12.6	51	45
		3	25	9.6	11.1	60	52
		4	25	12.6	12.6	49	43
		5.5	25	9.6	11.1	57	50
		7.5	25	9.6	11.1	60	52
		9.2	25	9.6	11.0	58	51
		11	25	9.6	11.1	59	52
		15	25	8.2	11.1	63	55
		18.5	50	15.8	18.7	47	41
		22	50	14.6	16.9	49	43
		30	25	9.9	13.4	51	45
		37	75	16.7	19.4	44	39
		45	75	14.1	19.0	46	40
	1.6	2.2	25	11.0	12.5	52	46
		3	25	9.5	11.0	60	53
		4	25	12.5	12.5	50	44
		5.5	25	9.5	11.0	58	51
		7.5	25	9.5	11.0	60	53
		9.2	25	9.6	11.1	57	50
		11	25	9.5	11.0	59	52
		15	50	13.9	15.3	54	48
		18.5	50	15.7	18.5	47	41
		22	50	14.5	16.8	49	43
		30	75	15.9	19.8	45	39
		37	50	13.8	15.9	52	45
		45	75	13.4	18.1	48	42
	1.8	2.2	25	11.0	12.4	52	46
		3	25	9.5	11.0	61	53
		4	25	12.4	12.4	50	44
		5.5	25	9.5	11.0	58	51
		7.5	25	9.4	10.8	61	54
		9.2	25	9.4	10.9	59	51
		11	25	9.4	10.8	61	53
		15	50	14.0	15.4	54	47
		18.5	50	15.7	18.5	47	42
		22	50	14.9	17.2	48	42
		30	75	16.1	20.1	44	39
		37	50	13.7	15.8	52	46
		45	75	15.6	19.5	44	39

Size X.F..	Gear ratio	Motor power kW	Test force N	Indentation depth mm Initial assembly	Indentation depth mm Used belts	Frequency 1/s Initial assembly	Frequency 1/s Used belts
X160 – 170	1.25	4	25	12.5	12.5	49	43
		5.5	25	13.5	15.3	45	39
		7.5	25	11.7	13.5	49	43
		9.2	25	13.5	15.3	45	39
		11	25	11.7	13.5	48	43
		15	25	9.9	13.4	51	45
		18.5	50	15.8	18.6	47	41
		22	50	14.6	16.9	49	43
		30	25	9.9	13.4	51	45
		37	75	17.0	19.7	43	38
		45	75	16.5	20.8	40	35
		55	75	15.6	19.5	42	37
		75	75	16.9	21.3	40	35
		90	75	13.6	18.2	44	38
	1.4	4	25	12,6	12,6	49	43
		5,5	25	13,4	15,2	45	40
		7,5	25	11,7	13,5	49	43
		9,2	25	13,5	15,2	45	39
		11	25	11,7	13,5	49	43
		15	25	9,9	13,4	51	45
		18,5	50	15,8	18,7	47	41
		22	50	14,6	16,9	49	43
		30	25	9,9	13,4	51	45
		37	75	16,7	19,4	44	39
		45	75	16,5	20,7	42	37
		55	75	16,0	19,9	41	36
		75	75	16,1	20,3	42	37
		90	75	13,0	17,4	46	40
	1.6	4	25	12,5	12,5	50	44
		5,5	25	13,4	15,2	45	40
		7,5	25	11,7	13,5	49	43
		9,2	25	13,5	15,3	45	39
		11	25	11,7	13,5	48	42
		15	50	17,1	18,7	44	39
		18,5	50	15,7	18,5	47	41
		22	50	14,5	16,8	49	43
		30	75	15,9	19,8	45	39
		37	50	13,8	15,9	52	45
		45	75	16,0	21,6	40	35
		55	75	16,5	20,9	41	36
		75	75	16,8	21,2	41	36
		90	75	13,5	18,2	44	39
	1.8	4	25	12,4	12,4	50	44
		5,5	25	13,4	15,2	45	40
		7,5	25	11,7	13,5	49	43
		9,2	25	13,5	15,3	45	39
		11	25	11,7	13,5	49	43
		15	50	17,0	18,7	44	39
		18,5	50	15,7	18,5	47	42
		22	50	14,9	17,2	48	42
		30	75	16,1	20,1	44	39
		37	50	13,7	15,8	52	46
		45	75	19,7	22,8	38	33
		55	75	14,4	17,8	44	39
		75	75	15,8	19,9	44	38
		90	75	12,7	17,0	47	41

Size X.F..	Gear ratio	Motor power kW	Test force N	Indentation depth mm	Indentation depth mm	Frequency 1/s	Frequency 1/s
				Initial assembly	Used belts	Initial assembly	Used belts
X180 – 190	1.25	7.5	25	11.7	13.5	49	43
		9.2	25	9.8	13.3	52	46
		11	25	11.7	13.5	48	43
		15	25	9.9	13.4	51	45
		18.5	50	15.8	18.6	47	41
		22	50	14.6	16.9	49	43
		30	75	18.3	21.2	42	37
		37	75	20.5	23.7	36	31
		45	75	17.4	22.0	38	33
		55	75	16.7	20.8	39	34
		75	75	20.2	25.5	34	30
		90	75	18.7	23.3	35	31
		110	75	15.5	20.7	39	34
		132	75	12.2	16.7	42	37
	1.4	7.5	25	11.7	13.5	49	43
		9.2	25	9.8	13.2	52	46
		11	25	11.7	13.5	49	43
		15	25	9.9	13.4	51	45
		18.5	50	15.8	18.7	47	41
		22	50	14.6	16.9	49	43
		30	50	15.9	18.7	47	41
		37	75	20.8	24.0	35	31
		45	75	17.8	22.5	39	34
		55	75	16.0	19.9	41	36
		75	75	19.8	25.0	35	30
		90	75	17.2	23.1	36	32
		110	75	16.5	22.2	37	32
		132	75	13.1	17.9	40	35
	1.6	7.5	25	11.7	13.5	49	43
		9.2	25	9.8	13.3	52	46
		11	25	11.7	13.5	48	42
		15	50	17.1	18.7	44	39
		18.5	50	15.7	18.5	47	41
		22	50	14.5	16.8	49	43
		30	75	15.9	19.8	45	39
		37	50	16.3	18.7	44	38
		45	75	16.0	21.6	40	35
		55	75	17.0	21.4	39	35
		75	75	20.3	25.6	34	30
		90	75	17.4	23.3	36	32
		110	75	15.7	19.6	39	34
		132	75	12.4	17.0	42	37
	1.8	7.5	25	11.7	13.5	49	43
		9.2	25	9.7	13.1	53	47
		11	25	11.7	13.5	49	43
		15	50	17.0	18.7	44	39
		18.5	50	15.7	18.5	47	42
		22	50	14.9	17.2	48	42
		30	75	16.1	20.1	44	39
		37	50	16.1	18.6	44	39
		45	75	20.3	23.4	37	32
		55	75	17.2	21.7	39	34
		75	75	19.8	24.9	35	30
		90	75	17.5	23.4	36	31
		110	75	15.0	20.0	38	33
		132	75	12.7	17.4	41	36

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Size X.F..	Gear ratio	Motor power kW	Test force N	Indentation depth mm	Indentation depth mm	Frequency 1/s	Frequency 1/s
				Initial assembly	Used belts	Initial assembly	Used belts
X200 – 210	1.25	7.5	25	11.7	13.5	49	43
		9.2	25	9.8	13.3	52	46
		11	25	11.7	13.5	48	43
		15	25	9.9	13.4	51	45
		18.5	50	15.8	18.6	47	41
		22	50	14.6	16.9	49	43
		30	75	18.3	21.2	42	37
		37	75	20.5	23.7	36	31
		45	75	17.4	22.0	38	33
		55	75	16.7	20.8	39	34
		75	75	20.2	25.5	34	30
		90	75	18.7	23.3	35	31
		110	75	15.5	20.7	39	34
		132	75	12.2	16.7	42	37
	1.4	7.5	25	11.7	13.5	49	43
		9.2	25	9.8	13.2	52	46
		11	25	11.7	13.5	49	43
		15	25	9.9	13.4	51	45
		18.5	50	15.8	18.7	47	41
		22	50	14.6	16.9	49	43
		30	50	15.9	18.7	47	41
		37	75	20.8	24.0	35	31
		45	75	17.8	22.5	39	34
		55	75	16.0	19.9	41	36
		75	75	19.8	25.0	35	30
		90	75	17.2	23.1	36	32
		110	75	16.5	22.2	37	32
		132	75	13.1	17.9	40	35
	1.6	7.5	25	11.7	13.5	49	43
		9.2	25	9.8	13.3	52	46
		11	25	11.7	13.5	48	42
		15	50	17.1	18.7	44	39
		18.5	50	15.7	18.5	47	41
		22	50	14.5	16.8	49	43
		30	75	15.9	19.8	45	39
		37	50	16.3	18.7	44	38
		45	75	16.0	21.6	40	35
		55	75	17.0	21.4	39	35
		75	75	20.3	25.6	34	30
		90	75	17.4	23.3	36	32
		110	75	15.7	19.6	39	34
		132	75	12.4	17.0	42	37
	1.8	7.5	25	11.7	13.5	49	43
		9.2	25	9.7	13.1	53	47
		11	25	11.7	13.5	49	43
		15	50	17.0	18.7	44	39
		18.5	50	15.7	18.5	47	42
		22	50	14.9	17.2	48	42
		30	75	16.1	20.1	44	39
		37	50	16.1	18.6	44	39
		45	75	20.3	23.4	37	32
		55	75	17.2	21.7	39	34

Size X.F..	Gear ratio	Motor power kW	Test force N	Indentation depth mm Initial assembly	Indentation depth mm Used belts	Frequency 1/s Initial assembly	Frequency 1/s Used belts
X220 – 230	1.25	11	50	19.7	21.7	38	33
		15	50	19.8	21.8	38	33
		18.5	50	18.6	21.8	40	35
		22	50	17.5	20.3	41	36
		30	25	11.9	16.1	43	38
		37	75	20.5	23.7	36	31
		45	75	17.4	22.0	38	33
		55	75	18.3	22.8	36	31
		75	75	20.2	25.5	34	30
		90	75	18.7	23.3	35	31
		110	75	19.8	25.0	34	30
		132	75	17.2	23.1	37	32
		160	125	19.1	23.2	32	28
		200	125	16.6	20.5	35	31
	1.4	11	50	20.0	22.0	38	33
		15	25	11.9	16.1	43	38
		18.5	50	19.0	22.3	39	34
		22	50	17.5	20.3	41	36
		30	25	11.9	16.1	43	38
		37	75	18.9	23.6	37	32
		45	75	17.8	22.5	39	34
		55	75	17.5	23.4	36	32
		75	75	19.8	25.0	35	30
		90	75	17.2	23.1	36	32
		110	75	19.4	24.5	35	31
		132	75	16.9	22.6	37	33
		160	125	18.2	22.1	34	30
		200	125	15.8	19.6	37	32
	1.6	11	50	19.7	21.6	38	34
		15	50	20.4	22.4	37	32
		18.5	50	18.7	22.1	40	35
		22	50	17.4	20.1	41	36
		30	75	18.9	23.6	37	33
		37	50	16.3	18.7	44	38
		45	75	16.0	21.6	40	35
		55	75	19.9	25.1	34	30
		75	75	20.3	25.6	34	30
		90	75	17.4	23.3	36	32
		110	75	19.6	24.7	35	30
		132	75	17.0	22.8	37	33
		160	125	18.2	22.1	34	30
		200	125	15.8	19.6	37	33
	1.8	11	25	14.0	16.2	40	36
		15	50	20.0	22.0	38	33
		18.5	50	18.8	22.2	39	35
		22	50	17.2	19.9	42	37
		30	75	19.4	24.2	36	32
		37	50	16.1	18.6	44	39
		45	75	20.3	23.4	37	32
		55	75	17.4	21.6	36	32
		75	75	19.8	24.9	35	30
		90	75	17.5	23.4	36	31
		110	75	20.0	25.3	34	30
		132	75	17.4	21.6	36	32
		160	125	18.9	23.0	33	29
		200	125	16.4	20.4	36	31

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X.K..

Size X.K..	Gear ratio	Motor power kW	Test force N	Indentation depth mm	Indentation depth mm	Frequency 1/s	Frequency 1/s
				Initial assembly	Used belts	Initial assembly	Used belts
X100 – 110	1.25	4	25	9,4	10,7	64	56
		5,5	25	8,2	9,4	67	59
		7,5	25	8,1	9,4	70	62
		9,2	25	8,2	9,4	68	59
		11	25	8,1	9,4	70	61
		15	25	7,0	9,5	73	64
		18,5	50	11,0	13,0	64	57
	1.4	4	25	9,5	10,8	63	55
		5,5	25	8,2	9,5	67	59
		7,5	25	8,1	9,4	71	62
		9,2	25	8,2	9,4	67	59
		11	25	8,1	9,4	70	61
		15	25	7,0	9,5	73	64
		18,5	50	11,2	13,2	66	58
	1.6	4	25	9,5	10,7	64	56
		5,5	25	8,2	9,4	68	59
		7,5	25	8,0	9,3	71	63
		9,2	25	8,3	9,5	67	59
		11	25	8,0	9,3	71	62
		15	50	12,0	13,2	63	55
		18,5	50	11,1	13,1	67	58
	1.8	4	25	9,5	10,7	64	56
		5,5	25	8,2	9,5	67	59
		7,5	25	8,1	9,4	71	62
		9,2	25	8,1	9,3	69	60
		11	25	8,1	9,4	70	61
		15	50	11,9	13,0	64	56
		18,5	50	11,0	12,9	68	60
X120 – 130	1.25	5,5	25	9,6	11,0	57	50
		7,5	25	9,5	11,0	60	53
		9,2	25	9,6	11,1	57	50
		11	25	9,5	11,0	60	52
		15	25	8,2	11,1	62	55
		18,5	50	13,0	15,3	57	50
		22	50	12,1	13,9	59	52
		30	25	8,2	11,1	62	55
		37	75	14,0	16,2	52	46
		45	75	14,7	18,5	45	40
	1.4	5,5	25	9,6	11,1	57	50
		7,5	25	9,6	11,1	60	52
		9,2	25	9,6	11,0	58	51
		11	25	9,6	11,1	59	52
		15	25	8,2	11,1	63	55
		18,5	50	13,0	15,4	57	50
		22	50	12,0	13,9	59	52
		30	25	8,2	11,1	63	55
		37	75	13,9	16,1	53	46
		45	75	14,1	19,0	46	40
	1.6	5,5	25	9,5	11,0	58	51
		7,5	25	9,5	11,0	60	53
		9,2	25	9,6	11,1	57	50
		11	25	9,5	11,0	59	52
		15	50	13,9	15,3	54	48
		18,5	50	13,0	15,3	57	50
		22	50	11,9	13,8	60	53
		30	75	12,7	15,9	56	49
		37	50	11,1	12,8	64	57
		45	75	13,4	18,1	48	42
	1.8	5,5	25	9,5	11,0	58	51
		7,5	25	9,4	10,8	61	54
		9,2	25	9,4	10,9	59	51
		11	25	9,4	10,8	61	53
		15	50	14,0	15,4	54	47
		18,5	50	12,9	15,1	58	51
		22	50	11,9	13,8	60	53
		30	75	13,1	16,3	54	48

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Size X.K..	Gear ratio	Motor power kW	Test force N	Indentation depth mm	Indentation depth mm	Frequency 1/s	Frequency 1/s
				Initial assembly	Used belts	Initial assembly	Used belts
X140 – 150	1.25	15	25	8,2	11,1	62	55
		18,5	50	15,8	18,6	47	41
		22	50	14,6	16,9	49	43
		30	25	9,9	13,4	51	45
		37	75	17,0	19,7	43	38
		45	75	14,7	18,5	45	40
		55	75	15,5	19,4	42	37
		75	75	16,9	21,3	40	35
		90	75	13,6	18,2	44	38
	1.4	15	25	8,2	11,1	62	55
		18,5	50	15,8	18,6	47	41
		22	50	14,6	16,9	49	43
		30	25	9,9	13,4	51	45
		37	75	17,0	19,7	43	38
		45	75	14,7	18,5	45	40
		55	75	15,5	19,4	42	37
		75	75	16,9	21,3	40	35
		90	75	13,6	18,2	44	38
	1.6	15	25	8,2	11,1	62	55
		18,5	50	15,8	18,6	47	41
		22	50	14,6	16,9	49	43
		30	25	9,9	13,4	51	45
		37	75	17,0	19,7	43	38
		45	75	14,7	18,5	45	40
		55	75	15,5	19,4	42	37
		75	75	16,9	21,3	40	35
		90	75	13,6	18,2	44	38
	1.8	15	25	8,2	11,1	62	55
		18,5	50	15,8	18,6	47	41
		22	50	14,6	16,9	49	43
		30	25	9,9	13,4	51	45
		37	75	17,0	19,7	43	38
		45	75	14,7	18,5	45	40
		55	75	15,5	19,4	42	37
		75	75	16,9	21,3	40	35
		90	75	13,6	18,2	44	38
X160 – 170	1.25	22	50	14,6	16,9	49	43
		30	25	9,9	13,4	51	45
		37	75	17,0	19,7	43	38
		45	75	16,5	20,8	40	35
		55	75	15,5	19,4	42	37
		75	75	16,9	21,3	40	35
		90	75	13,6	18,2	44	38
		110	75	12,4	16,5	46	41
		132	75	11,2	12,0	56	49
	1.4	22	50	14,6	16,9	49	43
		30	25	9,9	13,4	51	45
		37	75	16,7	19,4	44	39
		45	75	16,5	20,7	42	37
		55	75	14,9	18,6	44	39
		75	75	16,1	20,3	42	37
		90	75	13,0	17,4	46	40
		110	75	13,3	17,8	45	40
		132	75	10,8	11,1	57	50
	1.6	22	50	14,5	16,8	49	43
		30	75	15,9	19,8	45	39
		37	50	13,8	15,9	52	45
		45	75	16,0	21,6	40	35
		55	75	16,5	20,9	41	36
		75	75	16,8	21,2	41	36
		90	75	13,5	18,2	44	39
		110	75	16,1	17,2	47	41
		132	75	13,9	14,6	51	45
	1.6	22	50	14,9	17,2	48	42
		30	75	16,1	20,1	44	39
		37	50	13,7	15,8	52	46
		45	75	19,7	22,8	38	33
		55	75	16,1	20,3	42	37
		75	75	15,8	19,9	44	38
		90	75	12,7	17,0	47	41
		110	75	15,1	15,8	49	43
		132	75	12,6	13,7	53	47

Size X.K..	Gear ratio	Motor power kW	Test force N	Indentation depth mm	Indentation depth mm	Frequency 1/s	Frequency 1/s
				Initial assembly	Used belts	Initial assembly	Used belts
X180 – 190	1.25	30	75	18,3	21,2	42	37
		37	75	20,5	23,7	36	31
		45	75	17,4	22,0	38	33
		55	75	16,7	20,8	39	34
		75	75	20,2	25,5	34	30
		90	75	18,7	23,3	35	31
		110	75	15,5	20,7	39	34
		132	75	12,2	16,7	42	37
	1.4	30	50	15,9	18,7	47	41
		37	75	20,8	24,0	35	31
		45	75	17,8	22,5	39	34
		55	75	16,0	19,9	41	36
		75	75	19,8	25,0	35	30
		90	75	17,2	23,1	36	32
		110	75	16,5	22,2	37	32
		132	75	13,1	17,9	40	35
	1.6	30	75	15,9	19,8	45	39
		37	50	16,3	18,7	44	38
		45	75	16,0	21,6	40	35
		55	75	17,0	21,4	39	35
		75	75	20,3	25,6	34	30
		90	75	17,4	23,3	36	32
		110	75	15,7	19,6	39	34
		132	75	12,4	17,0	42	37
	1.8	30	75	16,1	20,1	44	39
		37	50	16,1	18,6	44	39
		45	75	20,3	23,4	37	32
		55	75	17,2	21,7	39	34
		75	75	19,8	24,9	35	30
		90	75	17,5	23,4	36	31
		110	75	15,0	20,0	38	33
		132	75	12,7	17,4	41	36
X200 – 210	1.25	30	50	20,1	23,8	36	32
		37	50	18,8	22,1	40	35
		45	75	18,7	23,4	38	33
		55	75	18,3	22,8	36	31
		75	75	20,2	25,5	34	30
		90	75	18,7	23,3	35	31
		110	75	19,8	25,0	34	30
		132	75	17,2	23,1	37	32
		160	125	19,1	23,2	32	28
		200	125	16,6	20,5	35	31
	1.4	30	75	23,4	27,1	33	29
		37	75	20,2	25,3	36	31
		45	75	17,2	21,7	39	34
		55	75	17,5	23,4	36	32
		75	75	19,8	25,0	35	30
		90	75	17,2	23,1	36	32
		110	75	19,4	24,5	35	31
		132	75	16,9	22,6	37	33
		160	125	18,2	22,1	34	30
		200	125	15,8	19,6	37	32
	1.6	30	75	22,4	27,8	33	29
		37	75	19,1	23,9	36	32
		45	75	16,0	21,6	40	35
		55	75	19,9	25,1	34	30
		75	75	20,3	25,6	34	30
		90	75	17,4	23,3	36	32
		110	75	19,6	24,7	35	30
		132	75	17,0	22,8	37	33
		160	125	18,2	22,1	34	30
		200	125	15,8	19,6	37	33
	1.8	30	75	21,9	27,2	34	30
		37	75	18,8	23,4	37	33
		45	75	20,3	23,4	37	32
		55	75	17,4	21,6	36	32
		75	75	19,8	24,9	35	30
		90	75	17,5	23,4	36	31
		110	75	20,0	25,3	34	30
		132	75	17,4	21,6	36	32
		160	125	18,9	23,0	33	29
		200	125	16,4	20,4	36	31

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Size X.K..	Gear ratio	Motor power kW	Test force N	Indentation depth mm	Indentation depth mm	Frequency 1/s	Frequency 1/s
				Initial assembly	Used belts	Initial assembly	Used belts
X220 – 230	1.25	37	50	18,8	22,1	40	35
		45	75	18,7	23,4	38	33
		55	75	18,3	22,8	36	31
		75	75	20,2	25,5	34	30
		90	75	18,7	23,3	35	31
		110	75	19,8	25,0	34	30
		132	75	17,2	23,1	37	32
		160	125	19,1	23,2	32	28
		200	125	16,6	20,5	35	31
	1.4	30	75	23,4	27,1	33	29
		37	75	20,2	25,3	36	31
		45	75	17,2	21,7	39	34
		55	75	17,5	23,4	36	32
		75	75	19,8	25,0	35	30
		90	75	17,2	23,1	36	32
		110	75	19,4	24,5	35	31
		132	75	16,9	22,6	37	33
		160	125	18,2	22,1	34	30
		200	125	15,8	19,6	37	32
	1.6	30	75	22,4	27,8	33	29
		37	75	19,1	23,9	36	32
		45	75	16,0	21,6	40	35
		55	75	19,9	25,1	34	30
		75	75	20,3	25,6	34	30
		90	75	17,4	23,3	36	32
		110	75	19,6	24,7	35	30
		132	75	17,0	22,8	37	33
		160	125	18,2	22,1	34	30
		200	125	15,8	19,6	37	33
	1.8	30	75	21,9	27,2	34	30
		37	75	18,8	23,4	37	33
		45	75	20,3	23,4	37	32
		55	75	17,4	21,6	36	32
		75	75	19,8	24,9	35	30
		90	75	17,5	23,4	36	31
		110	75	20,0	25,3	34	30
		132	75	17,4	21,6	36	32
		160	125	18,9	23,0	33	29

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6.20 Fan /FAN

Ensure that the following requirements have been met:

- Never operate the gear unit if the fan guard is not installed.
- Protect the fan guard against damage from the outside.
- Keep the air inlet of the fan clear.
- Check that the air intake is kept free and that it is within the specified angle. For further information, refer to chapter "Fan /FAN" (→ 🗎 83).
- If protective devices for couplings or similar are installed on gear units equipped with a fan, sufficient clearance must be provided for the intake of cooling air. Refer to the order-specific dimension sheet for the required distance. Refer to the overall documentation for the gear unit.

Note the following tightening torques when installing the fan guard:

Screws/nuts	Tightening torque Strength class 8.8 Nm
M6	12
M8	28
M10	56
M12	96

6.21 Water cooling cartridge /CCT

6.21.1 Notes on connection/installation

NOTICE

Improper mounting of the water cooling cover may result in damage to the gear unit.

Possible damage to property.

- Using thread seal tape on the pipe threads increases the resistance between the connection parts as well as the risk of cracking in the casting parts of the water cooling cartridge. Do not tighten the threads so tightly.
- For connecting the water cooling cartridge, use only piping and mounting parts of the same or compatible material.
- Make sure the cooling water pressure does not exceed 10 bar.
- In the event of frost or longer idle states, drain the cooling water from the cooling circuit. Use compressed air to remove any remaining water.
- Check the water cooling cartridge for soiling and foreign objects in the pipe connection to ensure unobstructed flow of the media.
- Avoid stresses on the connection points when connecting the piping system. Support the pipes properly, if necessary.

The following measures are recommended by SEW-EURODRIVE to ensure proper functioning in different systems:

- Install a safety valve in the cooling water supply pipe for protection against severe deviations in the flow rate or pressure.
- Install a filter into the cooling water supply pipe, especially if the cooling water is obtained from sources other than the municipal water supply system.
- Install an automatic throttle valve in the respective inlet to compensate for overpressure.
- Filtering to 100 µm is recommended.

6.21.2 Technical data

Adhere to the following values in the table. Do not exceed these values. Lower values are permitted. Also observe the information in the order-specific documents.

The cooling water quantity must be dimensioned individually for each cooling cartridge.

Twice the cooling water flow rate is required when using 2 water cooling cartridges.

Size	Max. cooling water volume flow l/min	Max. water pressure bar
X100 – 110	11	10
X120 – 130	11	10
X140 – 150	15	10
X140 – 150	15	10
X140 – 150	15	10
X160 – 170	15	10
X180 – 190	28	10
X200 – 210	28	10
X220 – 230	28	10
X240 – 250	28	10

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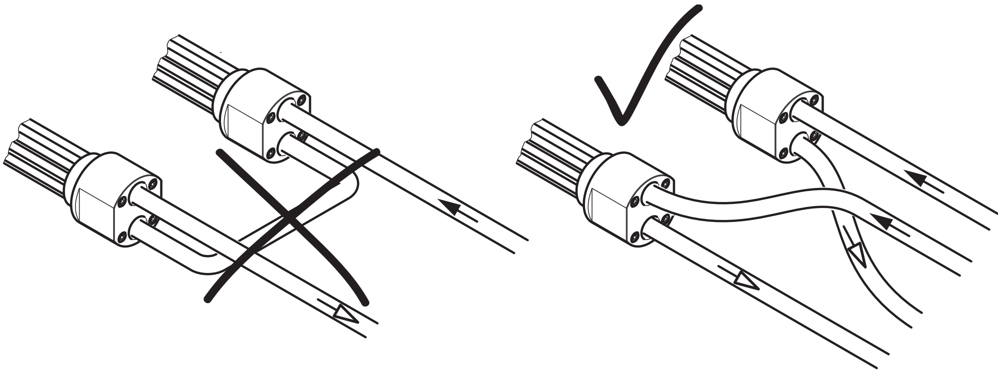
Size	Max. cooling water volume flow l/min	Max. water pressure bar
X260 – 270	25	10
X280 – 300	25	10
X310 – 320	25	10

6.21.3 Procedure

1. Observe the information on cooling water temperature and flow rate. You can find it in the order documents.
2. Install the cooling water outlet pipe in such a way that the water cooling cartridge is permanently flooded by cooling water.
3. The water cooling cartridge is not equipped with a water drain. In the event of repair work, install a drain on the cooling water outlet to ensure proper draining of the cooling water.
4. Connect the water cooling cartridge to the existing cooling circuit. With 2 water cooling cartridges, connect the water cooling cartridges parallel to the cooling circuit, see the following figure.



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◄—	Supply (cold water inflow)
—▷	Return (warm water outflow)

5. The flow direction of the cooling water is arbitrary. Two bores with pipe threads are available to connect to the cooling circuit.

Size	Pipe thread
X100 – 130	1"
X140 – 170	1 1/4"
X180 – 250	1 1/2"
X260 – 320	2"

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6.21.4 Requirements on the water quality

INFORMATION

Contact SEW-EURODRIVE if fully desalinated or demineralized water is used as cooling medium.

The following requirements on the water quality are recommendations. In exceptional cases, certain concentrations of substances of content might cause unforeseen reactions.

The quality of the water as well as its substances are important factors for assessing the cooling water available for water cooling cartridges. The water quality is determined by the water hardness and the pH value of the water.

Water hardness

Water hardness is defined by the amount of hardeners (carbonates and bicarbonates) in the water. Particularly at higher temperatures, the hardeners accumulate to the surface of the water cooling cartridge and lead to a reduction in performance. In case of very hard water, these deposits must be taken into account when designing the water cooling cartridge.

The following table shows the classification of German degrees of hardness to water quality °dH:

Degree of hardness[1]	Water quality
0 – 5 °dH	Very soft water
5 – 10 °dH	Soft water
10 – 20 °dH	Medium hard water
20 – 30 °dH	Hard water
> 30 °dH	Very hard water

1) 10 mg/l of hardener corresponds to 1 °dH

pH value

The water cooling cartridge partially consists of a copper and nickel alloy, to which the following applies:

- Corrosion issues when **pH value is < 6**
- The following applies to alkaline water:

  → Corrosion problems when **water hardness is < 6°dH**.

  Lower values can lead to corrosion due to free carbon dioxide.

  The following table describes the classification of the water quality based on the pH value:

pH value	Water quality
4.5	Strongly acidic
4.5 – 6.0	Acidic
6.0 – 6.8	Slightly acidic
7.0	Neutral
7.2 – 7.7	Slightly alkaline
7.7 – 8.2	Alkaline
8.2	Strongly alkaline

Cooling water assessment based on water substances

The following table provides an overview of the resistance of copper-nickel pipes to water content in non-drinking water.

Evaluation criterion	Approximate concentration mg/l	Evaluation CuNi10Fe1Mn
pH value	< 6	0
	6 to 9	+
	> 9	0
Chloride	to 1000	+
	> 1000	+ (< 25000 mg/l)
Sulfate	Up to 70	+
	70 to 300	+
	> 300	+ (< 25000 mg/l)
Nitrate	Up to 100	+
	> 100	0
Free (aggressive) carbon dioxide	Up to 20	+
	20 to 50	0
	> 50	–
Oxygen	Up to 2	+
	> 2	+
Ammonium	Up to 2	+
	2 to 20	+
	> 20	–
Iron (dissolved)	Up to 10	0
	> 10	–
Manganese (dissolved)	Up to 1	0
	> 1	–
Free chlorine	Up to 5	Permanently < 0.5 mg/l
	> 5	Intermittently < 3.0 mg/l
Sulfide		0
Ammonia		+ (< 15 mg/l)

+ = Usually good resistance
0 = Corrosion problems can occur, particularly if multiple factors are valued at 0
– = Use is not recommended

Types of cooling water/characteristics

As standard, water cooling cartridges are made of copper nickel pipes. Observe the following special features.

Industrial water

Industrial water is usually untreated water (not drinking water), which is often strongly contaminated. A water analysis is required to assess the use.

For industrial water, water cooling cartridges made of copper, brass and steel have a good resistance. Contact SEW-EURODRIVE.

Stream water and river water

Stream and river water is usually untreated water (not drinking water), which is often strongly contaminated. A water analysis is required to assess the use.

For stream and river water, water cooling cartridges made of stainless steel and titanium have a good resistance. Contact SEW-EURODRIVE.

Cast iron parts must be protected against corrosion by a suitable coating.

Salt water

For salt water, water cooling cartridges made of stainless steel and titanium have a good resistance. Contact SEW-EURODRIVE.

Brackish water

Brackish water is usually a mixture of sea and river water.

For brackish water, water cooling cartridges made of stainless steel and titanium have a good resistance. Contact SEW-EURODRIVE.

6.22 Water cooling cover /CCV

6.22.1 Notes on connection / installation

NOTICE

Improper mounting of the water cooling cover may result in damage to the gear unit.

Possible damage to property.

- Using thread seal tape on the pipe threads increases the resistance between the connection parts as well as the risk of cracking in the water cooling cover. Do not tighten the threads too tightly.
- Use only piping and mounting parts of the same or of compatible material for the connection.
- Make sure the cooling water pressure does not exceed 6 bar.
- In the event of frost or longer idle states, drain the cooling water from the cooling circuit. Use compressed air to remove any remaining water.

The following measures are recommended by SEW-EURODRIVE to ensure proper functioning in different systems:

- Install a safety valve in the cooling water supply pipe for protection against severe deviations in the flow rate or pressure.
- Install a filter into the cooling water supply pipe, especially if the cooling water is obtained from sources other than the municipal water supply system.
- Install an automatic throttle valve in the respective inlet to compensate for over-pressure.

6.22.2 Technical data

Adhere to the following values in the table. Do not exceed these values. Lower values are permitted. Also observe the information in the order-specific documents.

Size	Max. cooling water volume flow l/min	Max. water pressure bar
X100 – 110	15	6
X120 – 130	15	6
X140 – 150	15	6
X160 – 170	20	6
X180 – 190	28	6
X200 – 210	28	6

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6.22.3 Procedure

1. Observe the information on cooling water temperature and flow rate. You can find it in the order documents.
2. The water cooling cover is not equipped with a water drain. In the event of repair work, install a drain on the cooling water outlet to ensure proper draining of the cooling water.
3. Connect the water cooling cover to the existing cooling circuit. The direction of flow is user-defined. Two bores with pipe threads are available to connect to the cooling circuit.
   – Sizes X100 – 170: G3/8"
   – Sizes X180 – 210: G1/2"

6.22.4 Cooling media

INFORMATION

- Note that the service life, efficiency and maintenance intervals of the heat exchanger depend to a large extent on the quality and the ingredients of the cooling medium.
- Contact SEW-EURODRIVE if fully desalinated or demineralized water is used as cooling medium.

Permitted cooling media

- The permitted cooling media is pure water. The use of cooling water additives, such as antifreeze or corrosion inhibitor, might negatively influence the cooling capacity and compatibility of materials. Contact SEW-EURODRIVE.
- Cooling water temperature and flow rate of cooling water according to order documents.

Dirt

The content of suspended solids (spherical, particle size < 0.25 mm) must be less than 10 mg/l. Thread-shaped contaminants increase the risk of pressure losses.

Corrosion

Limit values: Free chlorine < 0.5 ppm, chlorine ions < 200 ppm, sulfate < 100 ppm, ammonia < 10 ppm, free CO < 10 ppm, pH value 7 – 9.

The following ions do not corrode under normal conditions: Phosphate, nitrate, nitrite, iron, manganese, sodium and potassium.

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6.23 Oil heater /OH

⚠ WARNING

Danger of electric shock.

Severe or fatal injuries.

- Before you start working on the unit, de-energize the oil heater and the thermostat.
- Secure the oil heater and thermostat against accidental activation.

NOTICE

Improper operation of the oil heater may result in damage to the gear unit.

Possible damage to property.

- It is important that the heating elements are completely immersed in the oil bath.

NOTICE

Improper changes to the mounting position of the gear unit can lead to malfunctions of the gear unit heater.

Possible damage to property.

- Do not change the mounting position without prior consultation with SEW-EURODRIVE. The warranty will become void without prior consultation.

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6.23.1 Information on the function of the oil heater

- The heater is screwed into the gear unit housing at the factory and is controlled by a thermostat. The set limit temperature on the thermostat below which the oil must be heated is set at the factory depending on the used lubricant.
- The trip point of the oil heater thermostat is factory-set to a temperature of about 5 K above the respective limit temperature for gear unit startup, see chapter "Limit temperature for gear unit startup" (→ 🗎 225).

  At this temperature, the thermostat disables the oil heater, see chapter "Limit temperature for gear unit startup" (→ 🗎 225). Only then may the gear unit be started up. The thermostat activates the oil heater again once the temperature is approximately 5 K below the switching point.
- To prevent the oil from burning, the heating elements of the heater have a maximum surface load. This is why the heating process for cold gear unit oil can take between one and several hours. The exact duration of the heating process before the start varies depending on the gear unit size, design, mounting position, oil quantity, and ambient temperature.

  This is why the thermostat must be permanently supplied with power even if the drive is at standstill for a short time.

  If the drive is at standstill over a longer period and the thermostat is not energized, you have to make sure that the thermostat is energized in due time before the drive is started up.
- Thermostat and oil heater are installed in the gear unit and ready for operation. Prior to startup, wire and connect them properly to the current supply.
- Contact SEW-EURODRIVE if a differing oil viscosity class is used or if ambient temperatures fall below the specified limit temperature.
- During installation, check the thermostat setting according to chapter "Thermostat" (→ 🗎 210).

6.23.2 Thermostat

Electrical connection

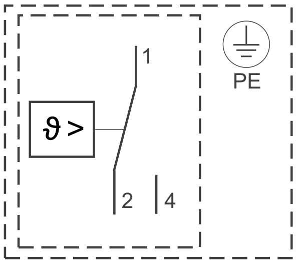
⚠ WARNING

Risk of injury due to electric shock.

Severe or fatal injuries.

- Disconnect the unit from the supply system if live parts can be touched during work on the unit.

The following figure shows the electrical connection.



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- Connect to the terminals (1, 2 and 4) according to wiring diagram
- Connect the protective earth to terminal "PE"

INFORMATION

- Observe the manufacturer's documentation.

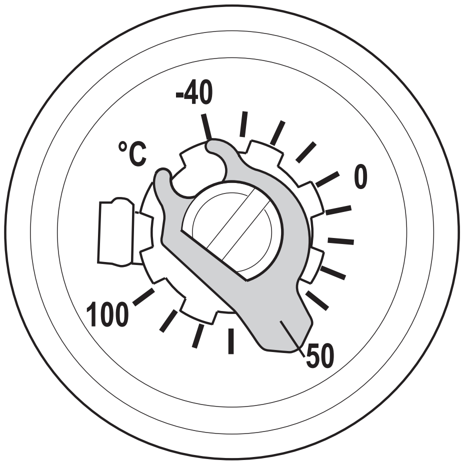
Technical data

Maximum switching capacity:		
AMTHs-SW-2	Voltage	Current
		Terminal 2/4
	AC 230 + 10% cosφ = 1 (0.6)	10 A
	DC 230 + 10%	0.25 A

Contact reliability:	
To ensure greatest possible contact reliability, the manufacturer recommends a minimum load of AC/DC 24 V, 100 mA for silver contacts.	
Nominal impulse voltage: **Overvoltage category II**	2500 V (via the switching contacts 400 V)
Required fusing:	See maximum switching current

- Permitted ambient temperature: -40 °C to +80 °C
- Permitted storage temperature: min. -50° C, max. +50° C
- Scale value: -40 °C to +100 °C
- Cable bushing: M20 ×1.5 for cable cross sections 6 to 13 mm
- Degree of protection IP65 according to EN 60529

The following figure shows the possible setting range of the thermostat. The pointer is set to 50 °C as an example



16834938379

6.23.3 Temperature sensor for oil bath temperature

In standard design, the oil heater is controlled by a thermostat installed on the gear unit. Instead, the oil heater can be controller by a temperature sensor installed on the gear unit.

The operator's control evaluates the temperature sensor and controls the operator's switching devices. Integrate the temperature sensor for the oil temperature to the operator's control in such a way that the order-specific switching points are implemented.

INFORMATION

Observe the manufacturer's documentation.

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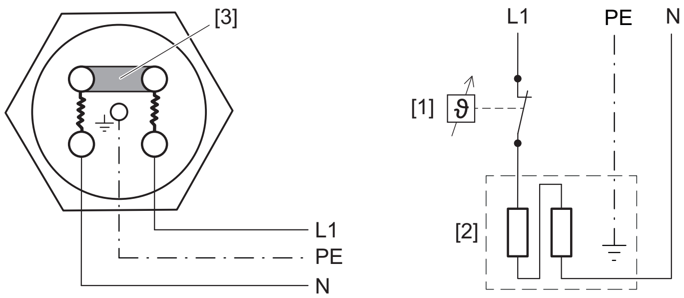
6.23.4 Connection power and electrical connection of resistor element

The gear unit heater comes equipped with cable glands and jumpers. These are included in the delivery of the screw-in heaters and are already preassembled. The gear unit heater is connected to the current supply via terminal studs. Use suitable ring cable lugs for connecting the supply cable according to the connection thread of the terminal studs (M4).

Alternating current/1-phase/230 V/series connection

A heating element consists of 2 tubular heating elements. The tubular heating elements of the heater are connected in series. The following figure shows the connection in the connection area of the heating element:



27021600516850699

Observe the electrical characteristic data of the control zone.

[1] Thermostat
[2] Heating element
[3] Jumper

Cable bushing: 1 x PG11

The following table shows the connected load of the heater that can be installed.

		P_{inst}		P_{inst}	
Gear unit		1 heating element		2 heating elements	
Size	**Design**		**K/h**		**K/h**
X100	X2K / X2F / X3K	1 × 0.4	6	2 × 0.4	11
	X3T / X3F	1 × 0.3	3	2 × 0.3	7
X110	X3T / X3F	1 × 0.3	4	–	–
X120	X4F / X3T / X4T	1 × 0.3	3	2 × 0.3	5
X130	X4F / X3T / X4T	1 × 0.4	3	–	–
X140	X4F / X3T / X4T	1 × 0.4	3	2 × 0.4	5

K/h = heating capacity (Kelvin/hour)
P_{inst} = Power of the installed heating element

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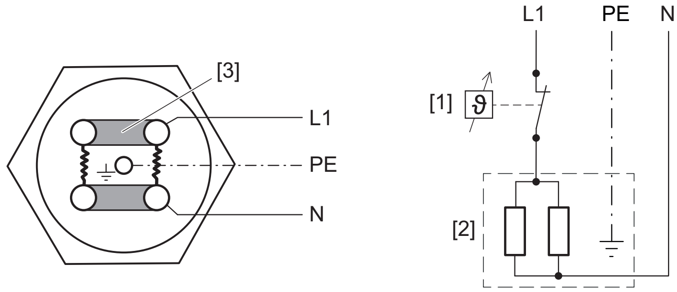
Alternating current/1-phase/230 V/parallel connection

A heating element consists of 2 tubular heating elements. The tubular heating elements of the heater are connected in parallel. The following figure shows the connection in the connection area of the heating element:



27021600516853515

Observe the electrical characteristic data of the control zone.

[1] Thermostat
[2] Heating element
[3] Jumper

Cable bushing: 1 x PG11

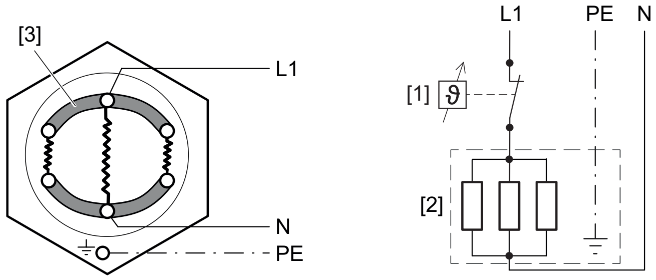
The following table shows the connected load of the heater that can be installed.

		P_{inst}		P_{inst}	
Gear unit		**1 heating element**		**2 heating elements**	
Size	**Design**		**K/h**		**K/h**
X110	X2F / X2K / X3K	1 × 0.6	6	–	–
X120	X2K	1 × 0.6	6	2 × 0.6	11
	X2F / X3K / X3F / X4K	1 × 0.7	6	2 × 0.7	11
X130	X2F / X2K / X3K / X3F / X4K	1 × 0.7	5	–	–
X140	X2K	1 × 0.7	4	2 × 0.7	9
	X2F / X3F / X3K / X4K	1 × 0.8	5	2 × 0.8	10
X150	X2K	1 × 0.8	5	–	–
	X2F / X3F / X3K / X4K	1 × 0.9	5	–	–
	X4F / X3T / X4T	1 × 0.6	3	–	–
X160	X2K	1 × 0.9	4	2 × 0.9	8
	X2F / X3F / X3K / X4K	1 × 1.1	4	2 × 1.1	8
	X4F / X3T / X4T	1 × 0.7	3	2 × 0.7	5
X170	X2K	1 × 0.9	4	–	–
	X2F / X3F / X3K / X4K	1 × 1.1	4	–	–
	X4F / X3T / X4T	1 × 0.7	3	–	–

K/h = heating capacity (Kelvin/hour)
P_{inst} = Power of the installed heating element

Alternating current/1-phase/230 V/parallel connection/I ≤ 10 A

A heating element consists of 3 tubular heating elements. The tubular heating elements of the heater are connected in parallel. The following figure shows the connection in the connection area of the heating element:



36028797381433995

Observe the electrical characteristic data of the control zone.

[1] Thermostat

[2] Heating element

[3] Jumper

Cable bushing: 1 x PG16

The following table shows the connected load of the heater that can be installed.

		P_{inst}		P_{inst}	
Gear unit		1 heating element		2 heating elements	
Size	Design		K/h		K/h
X180	X2F / X2K / X3K / X3F / X4K	1 × 1.6	5	–	–
	X3T / X4F / X4T	1 × 1.1	4	2 × 1.1	7
X190	X2F / X2K / X3K / X3F / X4K	1 × 1.6	5	–	–
	X3T / X4F / X4T	1 × 1.1	3	–	–
X200	X2K	1 × 1.6	4	–	–
	X2F / X3K / X3F / X4K	1 × 1.8	4	–	–
	X4F / X4T	1 × 1.3	3	–	–
	X3T	1 × 1.1	2	2 × 1.1	5
X210	X2K	1 × 1.6	4	–	–
	X2F / X3K / X3F / X4K	1 × 1.8	4	–	–
	X3T / X4F / X4T	1 × 1.3	3	–	–
X220	X2K	1 × 1.8	3	–	–
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 2.2	4	–	–
X230	X2K	1 × 1.8	3	–	–
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.2	4	–	–
X240	X2K	1 × 1.8	3	–	–
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.2	3	–	–
X250	X2K	1 × 2.2	3	–	–

K/h = heating capacity (Kelvin/hour)

P_{inst} = Power of the installed heating element

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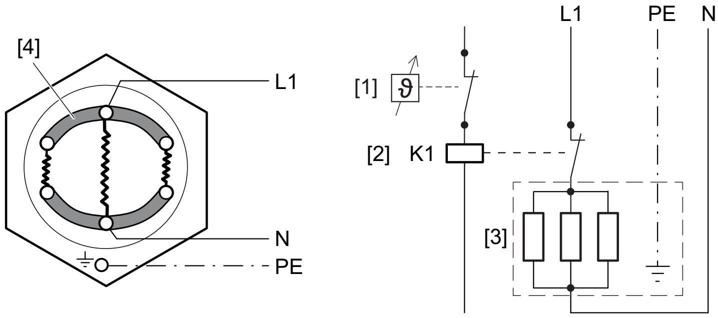
Alternating current/1-phase/230 V/parallel connection/I ≥ 10 A

A heating element consists of 3 tubular heating elements. The tubular heating elements of the heater are connected in parallel. The following figure shows the wiring ex works (as viewed into the connection space):



27021600147810955

Observe the electrical characteristic data of the control zone.

[1] Thermostat
[2] Contactor (not included in the scope of delivery)
[3] Heating element
[4] Jumper

Cable bushing: 1 x PG16

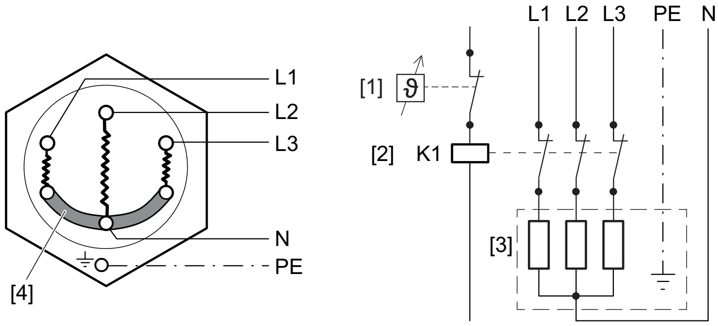
The following table shows the connected load of the heater that can be installed.

		P_{inst}		P_{inst}	
Gear unit		**1 heating element**		**2 heating elements**	
Size	**Design**		**K/h**		**K/h**
X180	X2F / X2K / X3K / X3F / X4K	–	–	2 × 1.6	10
X200	X2K	–	–	2 × 1.5	8
	X2F / X3K / X3F / X4K	–	–	2 × 1.8	8
	X4F / X4T	–	–	2 × 1.3	6
X220	X2K	–	–	2 × 1.8	7
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	–	–	2 × 2.2	8
X240	X2K	–	–	2 × 1.8	5
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	–	–	2 × 2.2	6
X250	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.6	3	–	–

K/h = heating capacity (Kelvin/hour)
P_{inst} = Power of the installed heating element

Three-phase current/3-phase/230/400 V/star connection

A heating element consists of 3 tubular heating elements. The tubular heating elements of the heater are in star connection. The following figure shows the connection in the connection area of the heating element:



36028799429585931

Observe the electrical characteristic data of the control zone.

[1] Thermostat
[2] Contactor (not included in the delivery)
[3] Heating element
[4] Jumper

Cable bushing: 1 x PG16

The following table shows the connected load of the heater that can be installed.

		P_{inst}		P_{inst}	
Gear unit		1 heating element		2 heating elements	
Size	**Design**		**K/h**		**K/h**
X180	X2F / X2K / X3K / X3F / X4K	1 × 1.6	5	2 × 1.6	10
	X3T / X4F / X4T	1 × 1.1	4	2 × 1.1	7
X190	X2F / X2K / X3K / X3F / X4K	1 × 1.6	5	–	–
	X3T / X4F / X4T	1 × 1.1	3	–	–
X200	X2K	1 × 1.6	4	2 × 1.6	8
	X2F / X3K / X3F / X4K	1 × 1.8	5	2 × 1.8	8
	X4F / X4T	1 × 1.3	3	2 × 1.3	6
	X3T	1 × 1.1	2	2 × 1.1	5
X210	X2K	1 × 1.6	4	–	–
	X2F / X3K / X3F / X4K	1 × 1.8	4	–	–
	X3T / X4F / X4T	1 × 1.3	3	–	–
X220	X2K	1 × 1.8	3	2 × 1.8	7
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.2	4	2 × 2.2	8
X230	X2K	1 × 1.8	3	–	–
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.2	4	–	–
X240	X2K	1 × 1.8	3	2 × 1.8	5
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.2	3	2 × 2.2	6
X250	X2K	1 × 2.2	3	–	–
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.6	3	–	–

K/h = heating capacity (Kelvin/hour)
P_{inst} = Power of the installed heating element

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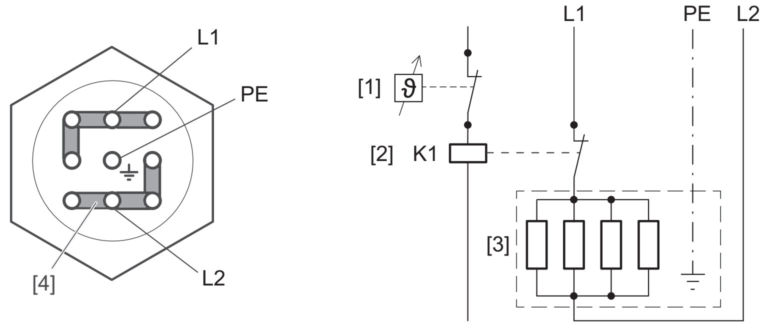
Alternating current/2-phase/400 V/parallel connection

A heating element consists of 4 tubular heating elements. The tubular heating elements of the heater are connected in parallel. The following figure shows the wiring ex works (as viewed into the connection space):



36028798308924427

Observe the electrical characteristic data of the control zone.

[1] Thermostat
[2] Contactor (not included in the delivery)
[3] Heating element
[4] Jumper

Cable bushing: 1 x PG16

The following table shows the connected load of the heater that can be installed.

		P_{inst}		P_{inst}	
Gear unit		1 heating element		2 heating elements	
Size	**Design**		**K/h**		**K/h**
X260	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 3.8	4	2 × 3.8	8
X270	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 3.8	4	–	–
X280	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 4.2	4	–	–
X290	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 4.2	3	2 × 4.2	6
X300	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 4.2	3	–	–
X310	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 5.0	3	2 × 5.0	6
X320	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 5.0	3	–	–

K/h = heating capacity (Kelvin/hour)
P_{inst} = Power of the installed heating element

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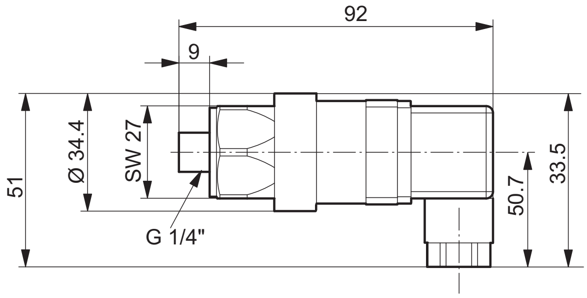
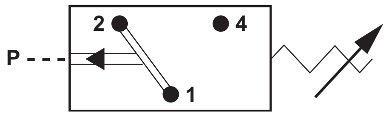
6.24 Pressure switch /PS

6.24.1 Dimensions



721994635

6.24.2 Electrical connection



722003723

[1] [2] NC contact
[1] [4] NO contact

6.24.3 Technical data

- Switching pressure: 0.5 ± 0.2 bar
- Maximum switching capacity: 4 A – AC 250 V; 4 A – DC 24 V
- Plug connector: DIN EN 175301-803
- The tightening torque for the retaining screw on the back of the plug connector for electrical connection is 0.25 Nm.

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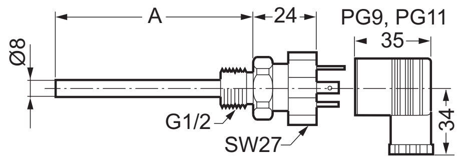
6.25 Temperature sensor /Pt100

6.25.1 Dimensions



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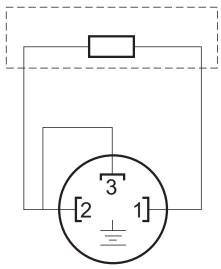
A in mm
50
150

6.25.2 Electrical connection



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[1] [2] Resistor element connection

6.25.3 Technical data

- Design with thermowell and changeable measuring insert
- Sensor tolerance K ± (0.3 + 0.005 × T), (corresponds to DIN IEC 751 class B)

  T = Oil temperature in °C
- Plug connector: DIN EN 175301-803 PG9 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

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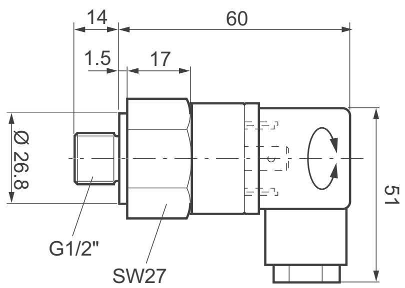
6.26 Temperature switch /NTB

6.26.1 Dimensions



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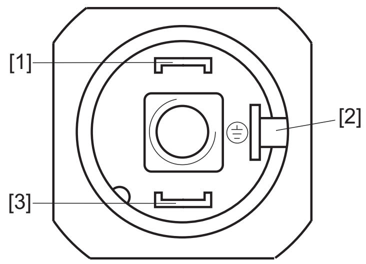
6.26.2 Electrical connection

To guarantee a long service life and trouble-free functioning, we recommend that you use a relay in the power circuit instead of a direct connection through the temperature switch.



366532491

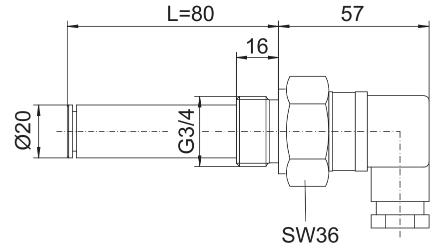
[1] [3] NC contact
[2] Grounding terminal 6.3 × 0.8

6.26.3 Technical data

- Trip temperature: 70 °C, 80 °C, 90 °C, 100 °C ± 5 °C
- Contact capacity: 10 A – AC 240 V
- Plug connector: DIN EN 175301-803 PG9 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

6.27 Temperature switch /TSK

6.27.1 Dimensions



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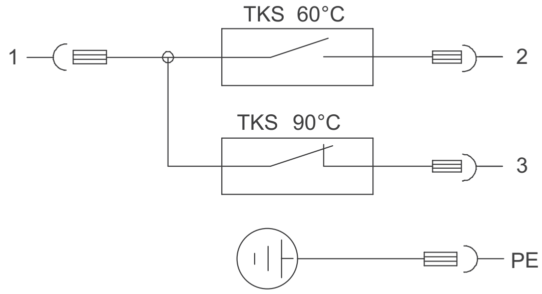
6.27.2 Electrical connection

To guarantee a long service life and trouble-free functioning, we recommend that you use a relay in the power circuit instead of a direct connection through the temperature switch.



45035997167583115

[1][2]	Switch 60 °C NO contact
[1][3]	Switch 90 °C NC contact
PE	Grounding terminal

6.27.3 Technical data

- Switching temperatures: 60 °C and 90 °C
- Contact capacity: 2 A – AC 240 V
- Plug connector: DIN EN 175301-803 PG11 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

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6.28 Brake

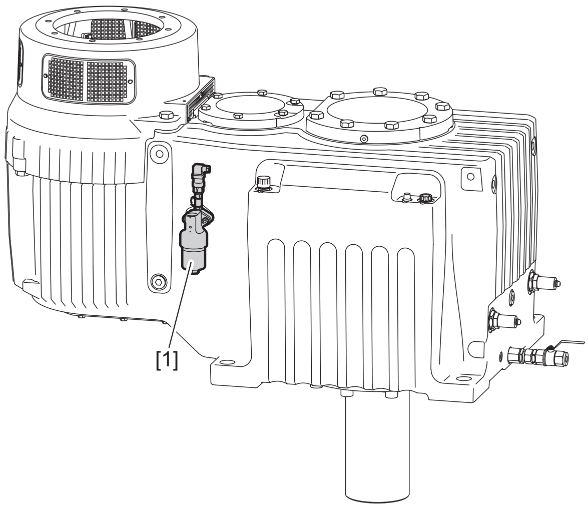
The Brake not set at the factory!

Observe the information on the structure, function, startup, maintenance, etc. in the operating instructions by the brake manufacturer. You can find these together with the dimension sheet and further documents in the overall documentation for the gear unit.

6.29 Oil filter

Observe the operating instructions of the oil filter manufacturer.

You can find these together with the dimension sheet and further documents in the overall documentation for the gear unit.



15800209419

[1] Oil filter

7 Startup

7.1 Before startup

Ensure that the following requirements have been met:

NOTICE

Improper startup may result in damage to the gear unit.

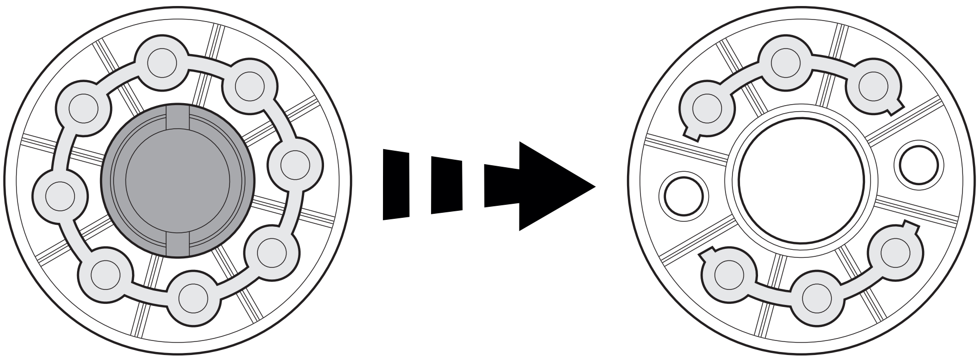
Possible damage to property.

- For gear units with extended storage option, observe the information in chapter "Gear unit with long-term preservation" (→ 🗎 97).
- Remove present transport protection.
- Secure the existing oil drain valves against unintended opening.
- As of size X..220 and for X2F..180 – 210, avoid no-load operation independent of the driven machine because operation with a load below the minimum load can damage the rolling bearings of the gear unit.
- When operated in areas with low ambient temperatures, be sure that the limit temperature are adhered to, see chapter "Limit temperature for gear unit start-up" (→ 🗎 225). Ensure that the heating time is sufficient.

7.1.1 Desiccant breather filter /DC

Before startup

Open only 2 of the air openings (offset by 180°) at the bottom of the breather filter. Remove the blue cap that protects the rising pipe. If required, attach a suitable adapter to the filter before installing the filter at the gear unit.



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7.2 Shaft end pump /SEP

Check the following to ensure safe operation of the shaft end pump:

- Do not start up the gear unit if the pressure switch is not connected.
- It is essential that the gear unit is sufficiently lubricated from the very beginning. Contact SEW-EURODRIVE if the shaft end pump does not build up pressure within 10 seconds after the gear unit has been started up.
- A minimum speed of ≥ 400 min^{-1} is required for proper operation of the shaft end pump. If you use variable input speeds e.g. inverter-controlled drives or if you intend to change the input speed of a gear unit equipped with a shaft end pump, it is essential that you contact SEW-EURODRIVE.
- An oil heater is mandatory when operating gear units with shaft end pump at low ambient temperatures. For further information, refer to chapter "Permitted lubricants" (→ 🗎 274).
- Observe the notes in chapter "Gear units with shaft end pump /SEP" (→ 🗎 106).

7.3 Backstop /BS

NOTICE

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

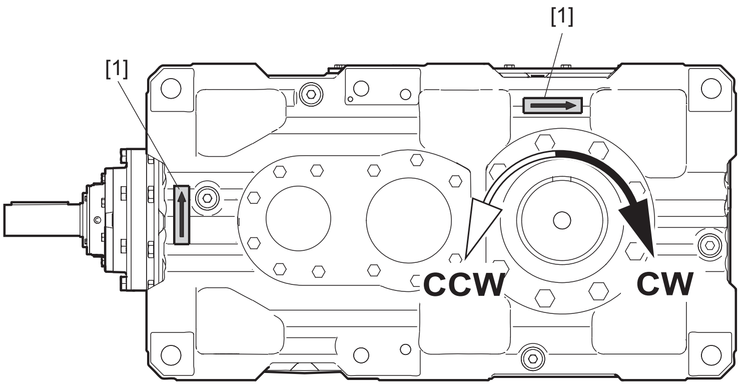
Possible damage to property.

- The motor must not start up in the blocking direction. Ensure that the motor is supplied with the correct power supply to achieve the required direction of rotation. Operating the motor in the blocking direction could destroy the backstop.

The gear unit's direction of rotation is defined with a view to the output shaft (LSS):

- Clockwise rotation (CW)
- Counterclockwise rotation (CCW)

The direction of rotation of the backstop is indicated on the gear unit by a label [1].



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7.4 Limit temperature for gear unit startup

The minimum permitted ambient temperature/oil temperature for gear unit startup depends on the viscosity of the oil used and the lubrication type of the gear unit.

Before startup, the oil may have to be heated to the specified "starting temperature" by an oil heater. Observe the lubricant table in chapter "Permitted lubricants" (→ 🗎 274).

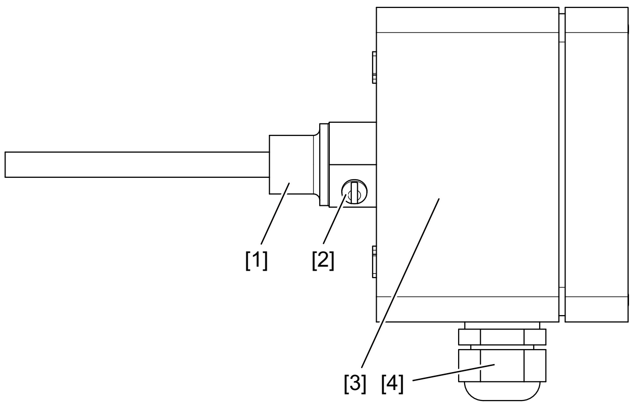
7.5 Oil heater /OH

7.5.1 Positioning the thermostat

Depending on the installation situation of the drive, it might be necessary to change the position of the thermostat.

To position the thermostat, proceed as follows:

1. Loosen the clamping screws [2].
2. **NOTICE!** Ensure that the cable gland is properly positioned during installation. Possible damage to property.
   Mount it in such a way that no moisture can enter. Turn the thermostat to the required position.
3. Tighten the clamping screws [2] again.



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[1] Threaded jacket
[2] Clamping screw
[3] Thermostat
[4] Cable gland

The screw-in sleeve [1] prevents oil from escaping. The sensor of the thermostat is located in the threaded jacket [1] and held in place by 2 clamping screws [2]. Observe the additional manufacturer's documentation.

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7.6 Water cooling cover /CCV

NOTICE

Risk of power loss due to contamination.

Possible damage to property.

- A loss of power can be caused by scale deposits on the inside of the pipe. Proceed as described in chapter "Cleaning the water cooling cover / CCV" (→ 🗎 270).

After having installed the water-cooling cover in the system, it can be taken into operation and operated without taking further preparatory measures.

Perform the following checks:

- Check the connection points for leaks.
- If necessary, check the valves, fittings, and filters for unrestricted flow and proper functioning.
- Observe the required temperature specifications of the cooling media given in your order documents.

7.7 Water cooling cartridge /CCT

NOTICE

Risk of power loss due to contamination.

Possible damage to property.

- A loss of power can be caused by scale deposits on the inside of the pipe. Proceed as described in chapter "Cleaning the water cooling cartridge / CCT" (→ 🗎 271).

After having installed the water cooling cartridge in the system, it can be taken into operation and operated without taking further preparatory measures.

Perform the following checks:

- Check the connection points for leaks.
- If necessary, check the valves, fittings, and filters for unrestricted flow and proper functioning.
- Observe the required temperature specifications of the cooling media given in your order documents.

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7.8 Speed limits with reduced oil level

INFORMATION

For gear units with reduced oil level: To ensure sufficient lubrication of the gear unit components, the gear unit must not be operated below the following speed limits.

The speed limits also apply to maintenance operation and startup.

For inverter operation, set the startup ramp in such a way that the motor reaches the minimum input speed within 30 seconds.

Observe the order-specific information about the minimum speed on the nameplate.

7.8.1 X2F..

Size	i	Minimum input speed min^{-1}
X2F.180e	6.49	690
X2F.180e	7.27	690
X2F.180e	8.1	810
X2F.180e	9.08	810
X2F.180e	9.97	940
X2F.180e	11.17	940
X2F.180e	12.19	1100
X2F.180e	13.65	1100
X2F.180e	16.06	1380
X2F.180e	17.98	1380
X2F.180e	7.25	690
X2F.190e	9.05	810
X2F.190e	10.17	810
X2F.190e	11.14	940
X2F.190e	12.52	940
X2F.190e	13.61	1100
X2F.190e	15.3	1100
X2F.190e	17.93	1380
X2F.190e	20.15	1380
X2F.200e	6.44	600
X2F.200e	7.31	600
X2F.200e	7.98	700
X2F.200e	9.05	700
X2F.200e	10.09	830
X2F.200e	11.44	830
X2F.200e	12.69	990
X2F.200e	14.39	990
X2F.200e	16.28	1220
X2F.200e	18.47	1220
X2F.200e	7.29	600
X2F.200e	8.26	600
X2F.210e	9.04	700
X2F.210e	10.24	700
X2F.210e	11.42	830
X2F.210e	12.93	830
X2F.210e	14.37	990
X2F.210e	16.27	990
X2F.210e	18.44	1220

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Size	i	Minimum input speed min^{-1}
X2F.210e	20.88	1220
X2F.210e	9.04	700
X2F.210e	10.24	700
X2F.220e	6.42	530
X2F.220e	7.08	530
X2F.220e	7.97	620
X2F.220e	8.8	620
X2F.220e	10.06	730
X2F.220e	11.1	730
X2F.220e	12.61	870
X2F.220e	13.92	870
X2F.220e	16.21	1070
X2F.220e	17.89	1070
X2F.230e	7.27	530
X2F.230e	7.98	530
X2F.230e	9.03	620
X2F.230e	9.91	620
X2F.230e	11.39	730
X2F.230e	12.5	730
X2F.230e	14.28	870
X2F.230e	15.68	870
X2F.230e	18.36	1070
X2F.230e	20.16	1070
X2F.240e	6.3	500
X2F.240e	7.26	500
X2F.240e	8.01	540
X2F.240e	9.22	540
X2F.240e	10.14	650
X2F.240e	11.67	650
X2F.240e	12.34	760
X2F.240e	14.21	760
X2F.240e	15.69	920
X2F.240e	18.06	920
X2F.250e	6.78	500
X2F.250e	7.78	500
X2F.250e	8.61	540
X2F.250e	9.89	540
X2F.250e	10.89	650
X2F.250e	12.51	650
X2F.250e	13.26	760
X2F.250e	15.24	760
X2F.250e	16.86	920
X2F.250e	19.37	920
X2F.260e	6.3	417
X2F.260e	7.1	417
X2F.260e	8	488
X2F.260e	9	488
X2F.260e	10	571
X2F.260e	11.2	571
X2F.260e	12.5	686
X2F.260e	14	686
X2F.260e	16	820
X2F.260e	18	820
X2F.270e	7.1	416

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Size	i	Minimum input speed min^{-1}
X2F.270e	8	416
X2F.270e	9	488
X2F.270e	10	488
X2F.270e	11.2	571
X2F.270e	12.5	571
X2F.270e	14	686
X2F.270e	16	686
X2F.270e	18	820
X2F.270e	20	820
X2F.280e	9	416
X2F.280e	10	416
X2F.280e	11.2	488
X2F.280e	12.5	488
X2F.280e	14	571
X2F.280e	16	571
X2F.280e	18	686
X2F.280e	20	686
X2F.280e	22.4	820
X2F.280e	9	416
X2F.290e	6.3	358
X2F.290e	7.1	358
X2F.290e	8	423
X2F.290e	9	423
X2F.290e	10	495
X2F.290e	11.2	495
X2F.290e	12.5	596
X2F.290e	14	596
X2F.290e	16	720
X2F.290e	18	720
X2F.300e	7.1	358
X2F.300e	8	358
X2F.300e	9	423
X2F.300e	10	423
X2F.300e	11.2	495
X2F.300e	12.5	495
X2F.300e	14	596
X2F.300e	16	596
X2F.300e	18	720
X2F.300e	20	720
X2F.310e	6.3	382
X2F.310e	7.1	382
X2F.310e	8	442
X2F.310e	9	442
X2F.310e	10	530
X2F.310e	11.2	530
X2F.310e	12.5	644
X2F.310e	14	644
X2F.310e	16	644
X2F.310e	18	644
X2F.320e	7.1	382
X2F.320e	8	382
X2F.320e	9	442
X2F.320e	10	442
X2F.320e	11.2	530

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Size	i	Minimum input speed min^{-1}
X2F.320e	12.5	530
X2F.320e	14	644
X2F.320e	16	644
X2F.320e	18	644
X2F.320e	20	644

7.8.2 X2K..

Size	i	Minimum input speed min^{-1}
X2K.180e	6.32	500
X2K.180e	7.07	
X2K.180e	8	
X2K.180e	8.96	
X2K.180e	9.77	
X2K.180e	10.95	
X2K.190e	7.05	500
X2K.190e	7.92	
X2K.190e	8.93	
X2K.190e	10.04	
X2K.190e	10.91	
X2K.190e	12.26	
X2K.200e	6.4	500
X2K.200e	7.26	
X2K.200e	8.11	
X2K.200e	9.2	
X2K.200e	9.91	
X2K.200e	11.24	
X2K.210e	7.25	500
X2K.210e	8.21	
X2K.210e	9.19	
X2K.210e	10.4	
X2K.210e	11.22	
X2K.210e	12.71	
X2K.220e	6.4	500
X2K.220e	7.07	
X2K.220e	8.11	
X2K.220e	8.95	
X2K.220e	9.91	
X2K.220e	10.94	
X2K.230e	7.25	500
X2K.230e	7.96	
X2K.230e	9.19	
X2K.230e	10.09	
X2K.230e	11.22	
X2K.230e	12.32	
X2K.240e	6.38	500
X2K.240e	7.34	
X2K.240e	8.09	
X2K.240e	9.31	
X2K.240e	9.82	
X2K.240e	11.31	

Size	i	Minimum input speed min^{-1}
X2K.250e	6.86	500
X2K.250e	7.88	
X2K.250e	8.69	
X2K.250e	9.99	
X2K.250e	10.56	
X2K.250e	12.13	

7.8.3 X3K..

Size	i	Minimum input speed min^{-1}
X3K.180e	12.57	610
X3K.180e	14.08	610
X3K.180e	16.17	780
X3K.180e	18.11	780
X3K.180e	19.74	910
X3K.180e	22.1	910
X3K.180e	25.55	1120
X3K.180e	28.61	1120
X3K.180e	32.36	1420
X3K.180e	36.24	1420
X3K.180e	38.93	1650
X3K.180e	43.6	1650
X3K.180e	47.57	2010
X3K.180e	53.27	2010
X3K.180e	60.9	2200
X3K.180e	68.2	2200
X3K.200e	61.95	2200
X3K.200e	70.26	2200
X3K.190e	14.04	610
X3K.190e	15.77	610
X3K.190e	18.05	780
X3K.190e	20.29	780
X3K.190e	22.04	910
X3K.190e	24.77	910
X3K.190e	28.53	1120
X3K.190e	32.06	1120
X3K.190e	36.14	1420
X3K.190e	40.61	1420
X3K.190e	43.48	1650
X3K.190e	48.85	1650
X3K.190e	53.11	2010
X3K.190e	59.68	2010
X3K.190e	68	2200
X3K.190e	76.41	2200
X3K.200e	12.45	530
X3K.200e	14.12	530
X3K.200e	16.32	690
X3K.200e	18.5	690
X3K.200e	20.56	820
X3K.200e	23.31	820
X3K.200e	25.72	980
X3K.200e	29.17	980

Size	i	Minimum input speed min^{-1}
X3K.200e	31.97	1220
X3K.200e	36.26	1220
X3K.200e	39.61	1460
X3K.200e	44.92	1460
X3K.200e	48.39	1780
X3K.200e	54.88	1780
X3K.200e	61.95	2200
X3K.200e	70.26	2200
X3K.210e	14.1	530
X3K.210e	15.96	530
X3K.210e	18.48	690
X3K.210e	20.92	690
X3K.210e	23.28	820
X3K.210e	26.36	820
X3K.210e	29.13	980
X3K.210e	32.97	980
X3K.210e	36.2	1220
X3K.210e	40.99	1220
X3K.210e	44.85	1460
X3K.210e	50.78	1460
X3K.210e	54.79	1780
X3K.210e	62.03	1780
X3K.210e	70.15	2200
X3K.210e	79.42	2200
X3K.220e	12.56	500
X3K.220e	13.86	500
X3K.220e	16.15	600
X3K.220e	17.82	600
X3K.220e	20.64	730
X3K.220e	22.78	730
X3K.220e	25.28	850
X3K.220e	27.9	850
X3K.220e	32.02	1090
X3K.220e	35.34	1090
X3K.220e	39.55	1290
X3K.220e	43.65	1290
X3K.220e	48.32	1570
X3K.220e	53.33	1570
X3K.220e	61.86	2010
X3K.220e	68.27	2010
X3K.230e	14.22	500
X3K.230e	15.61	500
X3K.230e	18.29	600
X3K.230e	20.08	600
X3K.230e	23.37	730
X3K.230e	25.66	730
X3K.230e	28.63	850
X3K.230e	31.43	850
X3K.230e	36.26	1080
X3K.230e	39.82	1080
X3K.230e	44.78	1290
X3K.230e	49.17	1290
X3K.230e	54.71	1570
X3K.230e	60.08	1570

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Size	i	Minimum input speed min^{-1}
X3K.230e	70.05	2010
X3K.230e	76.91	2010
X3K.240e	11.92	500
X3K.240e	13.71	500
X3K.240e	15.32	510
X3K.240e	17.64	510
X3K.240e	20.36	630
X3K.240e	23.44	630
X3K.240e	25.64	760
X3K.240e	29.51	760
X3K.240e	32.47	960
X3K.240e	37.38	960
X3K.240e	39.96	1150
X3K.240e	46	1150
X3K.240e	48.83	1410
X3K.240e	56.2	1410
X3K.240e	62.51	1800
X3K.240e	71.95	1800
X3K.250e	12.8	500
X3K.250e	14.71	500
X3K.250e	16.47	510
X3K.250e	18.92	510
X3K.250e	21.88	630
X3K.250e	25.14	630
X3K.250e	27.55	760
X3K.250e	31.64	760
X3K.250e	34.89	960
X3K.250e	40.08	960
X3K.250e	42.95	1150
X3K.250e	49.33	1150
X3K.250e	52.47	1410
X3K.250e	60.27	1410
X3K.250e	67.18	1800
X3K.250e	77.17	1800
X3K.260e	12.5	734
X3K.260e	14	734
X3K.260e	16	945
X3K.260e	18	945
X3K.260e	20	1153
X3K.260e	22.4	1153
X3K.260e	25	1367
X3K.260e	28	1367
X3K.260e	31.5	1570
X3K.260e	35.5	1570
X3K.260e	40	1989
X3K.260e	45	1989
X3K.260e	50	2430
X3K.260e	56	2430
X3K.260e	63	3111
X3K.260e	71	3111
X3K.270e	12.5	630
X3K.270e	14	630
X3K.270e	16	810
X3K.270e	18	810

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Size	i	Minimum input speed min^{-1}
X3K.270e	20	981
X3K.270e	22.4	981
X3K.270e	25	1214
X3K.270e	28	1214
X3K.270e	31.5	1410
X3K.270e	35.5	1410
X3K.270e	40	1766
X3K.270e	45	1766
X3K.270e	50	2158
X3K.270e	56	2158
X3K.270e	63	2762
X3K.270e	71	2762
X3K.280e	16	734
X3K.280e	18	734
X3K.280e	20	945
X3K.280e	22.4	945
X3K.280e	25	1153
X3K.280e	28	1153
X3K.280e	31.5	1367
X3K.280e	35.5	1367
X3K.280e	40	1570
X3K.280e	45	1570
X3K.280e	50	1989
X3K.280e	56	1989
X3K.280e	63	2430
X3K.280e	71	2430
X3K.280e	80	3111
X3K.280e	90	3111
X3K.290e	12.5	630
X3K.290e	14	630
X3K.290e	16	810
X3K.290e	18	810
X3K.290e	20	981
X3K.290e	22.4	981
X3K.290e	25	1214
X3K.290e	28	1214
X3K.290e	31.5	1410
X3K.290e	35.5	1410
X3K.290e	40	1766
X3K.290e	45	1766
X3K.290e	50	2158
X3K.290e	56	2158
X3K.290e	63	2762
X3K.290e	71	2762
X3K.300e	14	630
X3K.300e	16	630
X3K.300e	18	810
X3K.300e	20	810
X3K.300e	22.4	981
X3K.300e	25	981
X3K.300e	28	1214
X3K.300e	31.5	1214
X3K.300e	35.5	1410
X3K.300e	40	1410

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Size	i	Minimum input speed min^{-1}
X3K.300e	45	1766
X3K.300e	50	1766
X3K.300e	56	2158
X3K.300e	63	2158
X3K.300e	71	2762
X3K.300e	80	2762
X3K.310e	12.5	581
X3K.310e	14	581
X3K.310e	16	747
X3K.310e	18	747
X3K.310e	20	882
X3K.310e	22.4	882
X3K.310e	25	1049
X3K.310e	28	1049
X3K.310e	31.5	1261
X3K.310e	35.5	1261
X3K.310e	40	1598
X3K.310e	45	1598
X3K.310e	50	1941
X3K.310e	56	1941
X3K.310e	63	2470
X3K.310e	71	2470
X3K.320e	14	581
X3K.320e	16	581
X3K.320e	18	747
X3K.320e	20	747
X3K.320e	22.4	882
X3K.320e	25	882
X3K.320e	28	1049
X3K.320e	31.5	1049
X3K.320e	35.5	1261
X3K.320e	40	1261
X3K.320e	45	1598
X3K.320e	50	1598
X3K.320e	56	1941
X3K.320e	63	1941
X3K.320e	71	2470
X3K.320e	80	2470

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8 Inspection/maintenance

8.1 Information

Ensure that the following requirements have been met.

⚠ WARNING

An operator machine that is not appropriately secured can fall down during gear unit installation or removal.

Severe or fatal injuries.

- Protect the operator's machine against unintentional movement when installing or removing the gear unit.
- Before loosening the shaft connections, make sure that the system is no longer strained.

NOTICE

Improper inspection/maintenance may result in damage to the gear unit.

Possible damage to property.

- Prevent foreign particles from entering into the gear unit during maintenance and inspection work.
- If you remove the gear unit cover, you must apply new sealing compound to the sealing surface. Otherwise, the tightness of the gear unit is not guaranteed! Contact SEW-EURODRIVE in this case.
- Do not clean the gear unit with a high-pressure cleaning device.

When using primary gearmotors, also observe the maintenance notes for motors and primary gear unit in the accompanying operating instructions.

Use only original spare parts according to the delivered spare and wearing parts lists.

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8.2 Inspection and maintenance intervals

Adhere to the following inspection and maintenance intervals:

Time interval	What should I do?
Daily	• Check the housing temperature: – Mineral oil: max. 90 °C – Synthetic oil: max. 100 °C • Check the gear unit noise.
Monthly	• Check the gear unit for signs of leakage. • Check the oil level.
After 500 operating hours[1)]	• First oil change after initial startup.
Every 6 months	• Check all the screw fittings and piping for leakage.
Every 3000 operating hours, at least every 6 months	• Check the oil consistency. • Fill regreasable sealing systems with grease. In dusty environments, regrease every 3 months. • Refill sealing grease of the lower bearing on the output shaft with drywell sealing systems. In dusty environments, regrease every 3 months. • For V-belt drives: Check the belt tension and condition of the V-belt pulleys and belts. Observe chapter "V-belt drives /VBD".

Time interval	What should I do?
Depending on the operating conditions, at least every 12 months	• Check whether the retaining screws are tightly secured. • Check whether the gear unit surface is free of dust and dirt to ensure optimal cooling of the gear unit. • Check the breather. Replace if necessary. It is recommended to replace the breather once a year. • Check the alignment of the input and output shaft. • Check the condition and tightness of all rubber tubes (aging effects). • Clean the oil filter. If required, replace the filter element. • Check the condition of the motor pump (ONP1/ONP1L). Observe the separate operating instructions. You can find these together with the dimension sheet and further documents in the overall documentation for the gear unit. • Check the condition of the oil-air cooler (OAP1/OAC1). Observe the separate operating instructions. You can find these together with the dimension sheet and further documents in the overall documentation for the gear unit. • Check the condition of the oil-water cooler (OWP1/ OWC1). Observe the separate operating instructions. You can find these together with the dimension sheet and further documents in the overall documentation for the gear unit. • Check the condition of the water cooling cartridge /CCT. Perform the work together with the oil change. • Check the condition of the water cooling cover /CCV. Perform the work together with the oil change.
Depending on the operating conditions (see figure in the following chapter)	• Change the oil. Observe the specifications of the oil manufacturer.

Time interval	What should I do?
Varies (depending on external factors)	• Check the installed hose pipes. • Clean the outer gear unit housing. • Cleaning the fan • Touch up or renew the surface/corrosion protection paint. • Replace damaged seals. • Replace the backstop. Wear may occur in the backstop when operated below lift-off speed. This is why you should consult SEW-EURODRIVE for defining the maintenance intervals. • Check the built-in cooler (such as the water cooling cover /CCT and the water cooling cartridge /CCV) for deposits. • Check the oil heater /OH (at same time as the oil change): – Check whether all connection cables and terminals are securely fixed and free from corrosion. – Clean encrusted heating elements. Replace if necessary.

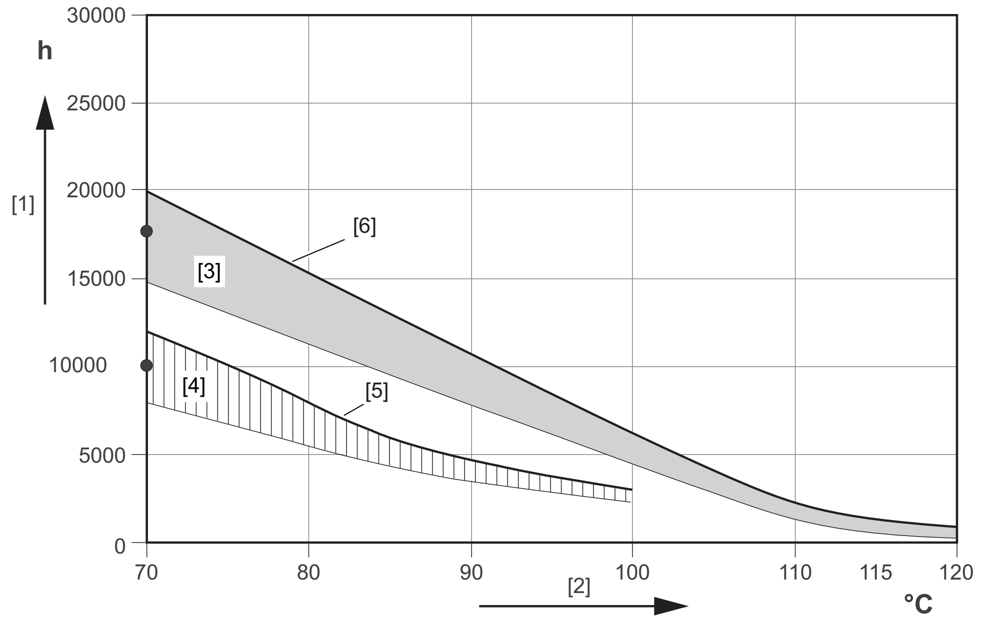
1) Note that under certain conditions you can forgo the first oil change after 500 operating hours. For detailed information, refer to the order documents. If you have any questions, contact SEW-EURODRIVE.

8.3 Lubricant change intervals

It might be necessary to change the oil more frequently when using special designs or under more severe/aggressive ambient conditions.

INFORMATION

Mineral CLP lubricants and synthetic polyalphaolefin-based (PAO) lubricants are used for lubrication. The synthetic lubricant CLP HC (according to DIN 51502) shown in the following figure corresponds to the PAO oils:



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

INFORMATION

SEW-EURODRIVE recommends that the gear unit oil is analyzed regularly (see chapter "Checking the oil consistency" (→ 🗎 249)) to optimize the lubricant change intervals.

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8.4 Checking the oil level

8.4.1 General information

Note the following when checking the oil level:

NOTICE

Improper check of the oil level may result in damage to the gear unit.

Possible damage to property.

- Check the oil level only when the gear unit has cooled down in idle state. SEW-EURODRIVE recommends checking the oil level at an oil temperature of 20 °C to 40 °C. The oil level must be in the middle between the markings [1] and [2] at the oil dipstick or oil level glass.
- For gear units in fixed and variable pivoted mounting position, observe the notes on the following pages.
- When the gear unit is equipped with an oil dipstick and an oil sight glass, the oil level on the oil dipstick is decisive. The oil level on the oil sight glass is only an approximate value.
- Elements for checking the oil level, oil drain, and oil fill openings are indicated on the gear unit by symbols.
- Check the oil level again after the first few operating hours when the gear unit is at standstill.

8.4.2 Standard procedure

Video instructions

Deutsch	English

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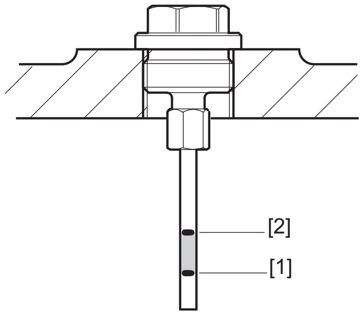
Oil dipstick



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1. Clean the area around the oil dipstick. Unscrew the oil dipstick and remove it.
2. Clean the oil dipstick with a clean cloth and screw it back into the gear unit hand-tight to the stop.
3. Remove the oil dipstick and check the oil level. The oil level must be between the markings [1] and [2].
4. If the oil level is too low, proceed as follows:
   - Open the oil fill plug.
   - Fill in oil of the same oil grade until the oil level is in the middle between marking [1] and marking [2].
5. If you filled in too much oil, proceed as follows:
   - Adjust the oil level. The oil level must be between the markings [1] and [2].
6. Screw in the oil fill plug.
7. Screw in the oil dipstick.

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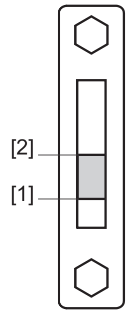
Oil level glass



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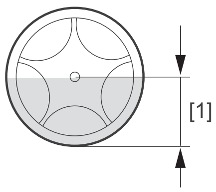
1. The oil level must be in the middle between marking [1] and marking [2].
2. If the oil level is too low, proceed as follows:
   - Open the oil fill plug.
   - Fill in oil of the same oil grade until the oil level is in the middle between marking [1] and marking [2].
3. If you filled in too much oil, proceed as follows:
   - Adjust the oil level. The oil level must be between the markings [1] and [2].
4. Screw in the oil fill plug.

Oil sight glass

The oil sight glass only shows the oil level. The oil level is determined using the **oil dipstick**.



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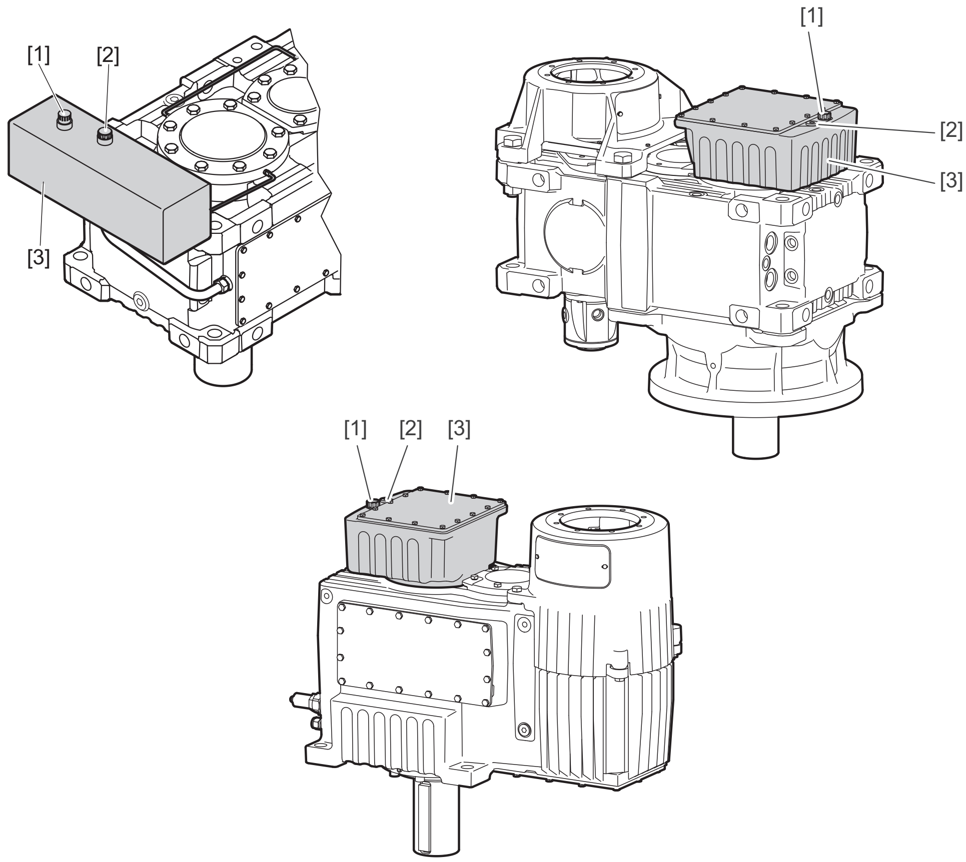
8.4.3 Procedure for gear units with oil expansion tank /ET

Any oil level below or above the level specified by SEW-EURODRIVE is permitted during operation as long as there is oil in the oil expansion tank [3] and the oil expansion tank does not overflow. However, in order to provide for an adequate lubrication of the gear unit in any operating state, you have to check the oil level accurately on a regular basis. This can only be performed correctly in a certain temperature range.



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[1] Breather
[2] Oil dipstick
[3] Oil expansion tank

1. Shut down the gear unit and allow for it to cool down until the gear unit temperature is between 20 °C and 40 °C.
2. Check the oil level using the oil dipstick or the oil level glass. Observe chapter "Standard procedure" (→ 🗎 241).

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8.4.4 Notes on the procedure for fixed and variabel pivoted mounting positions

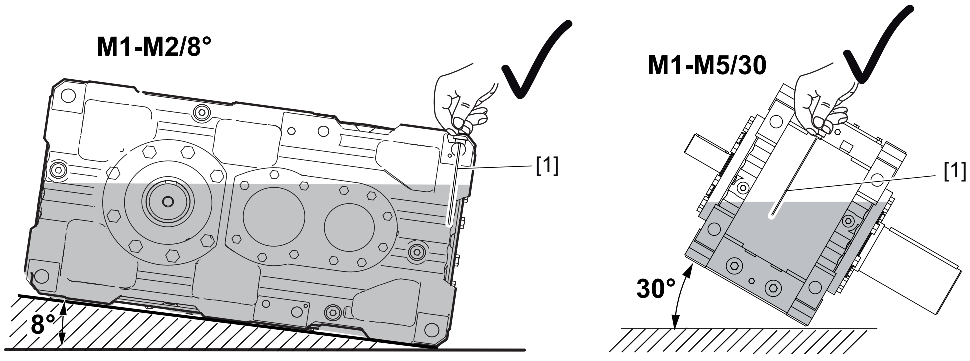
Observe the information on the nameplate and in the order documents.

Fixed pivoted mounting positions

Procedure

Check the oil level in the fixed, intended position. Observe the notes in chapter "Standard procedure" (→ 🗎 241).

The following figure shows an example of how to check the oil level.



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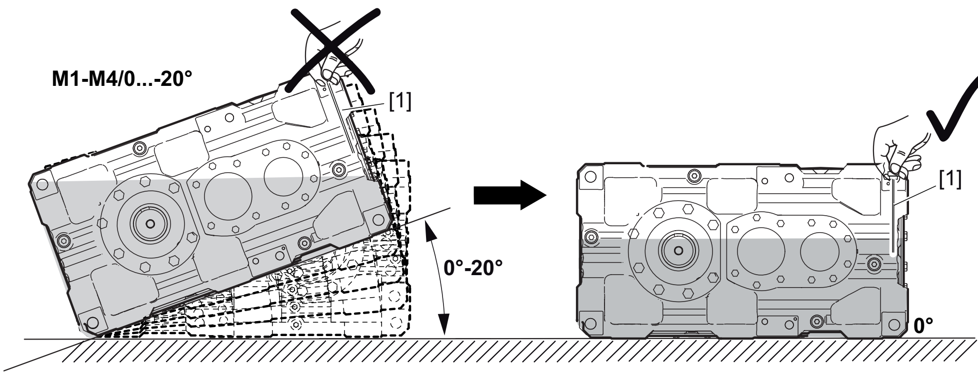
[1] Oil dipstick
▯ Oil

Variable pivoted mounting positions

Procedure

Before checking the oil level, position the gear unit in the mounting position defined in the order documents. Observe the notes in chapter "Standard procedure" (→ 🗎 241).

The following figure shows an example of how to check the oil level.



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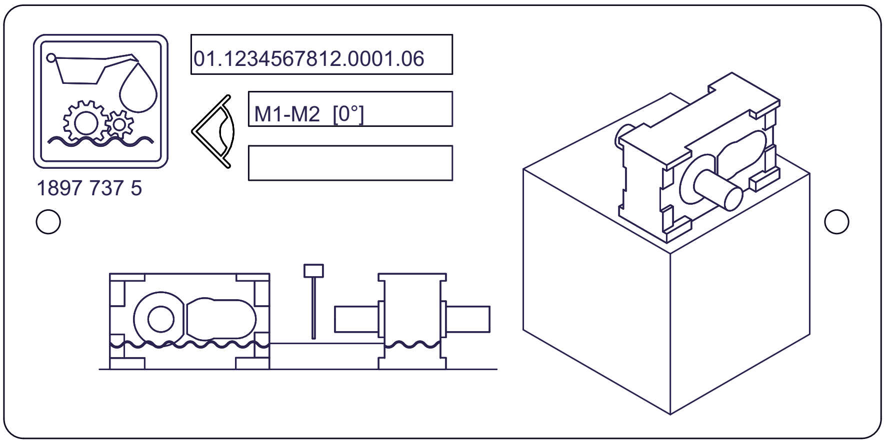
[1] Oil dipstick
▯ Oil

Information sign

Observe the additional **information sign on the gear unit**. Check the oil level in the test mounting position specified on the information sign.

The following figure shows an example of the information sign for check mounting position 0°.



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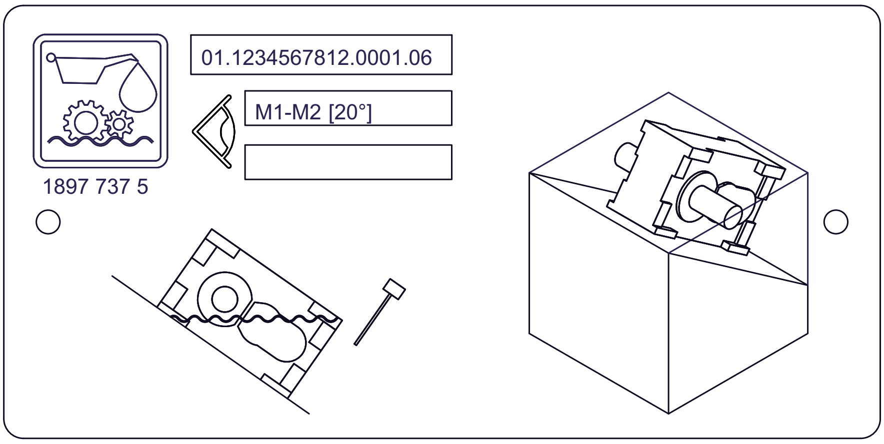
The following figure shows an example of the information sign for check mounting position 20°.



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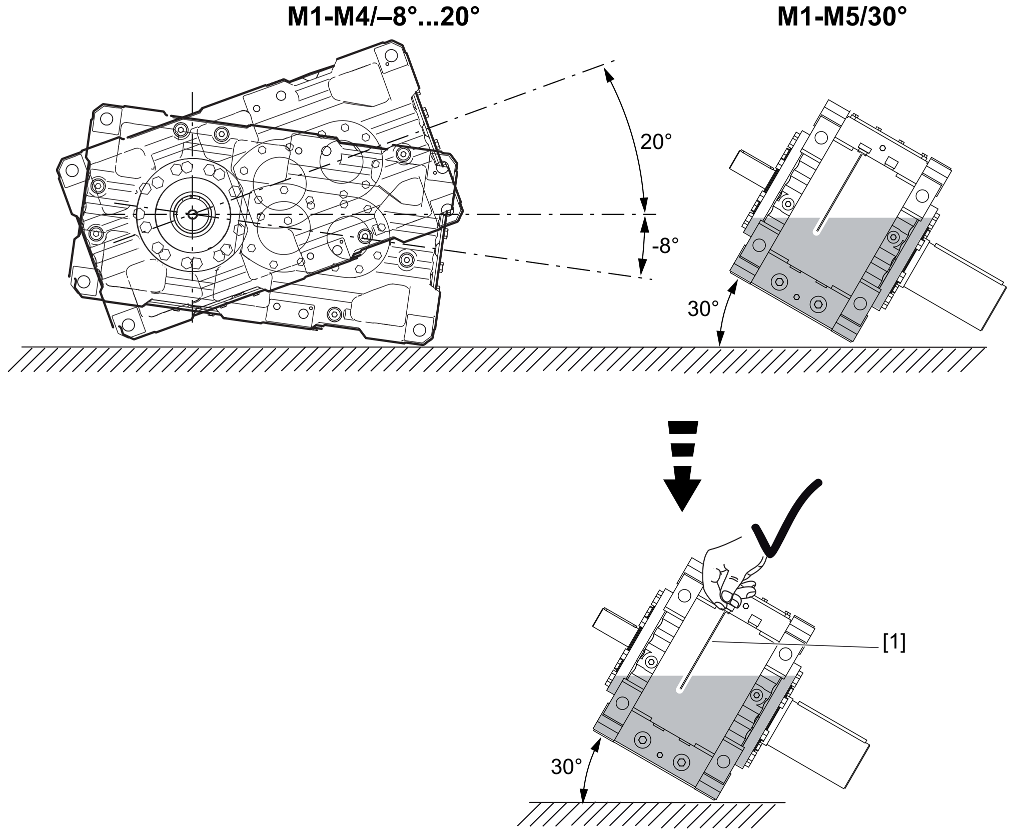
Combination of fixed and variable pivoted mounting positions

Procedure

Before checking the oil level of gear units with variable/fixed pivoted mounting position, position the gear unit in the mounting position defined in the order documents. Observe the notes in chapter "Standard procedure" (→ 🗎 241).

The following figure shows an example of how to check the oil level.



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[1] Oil dipstick
▯ Oil

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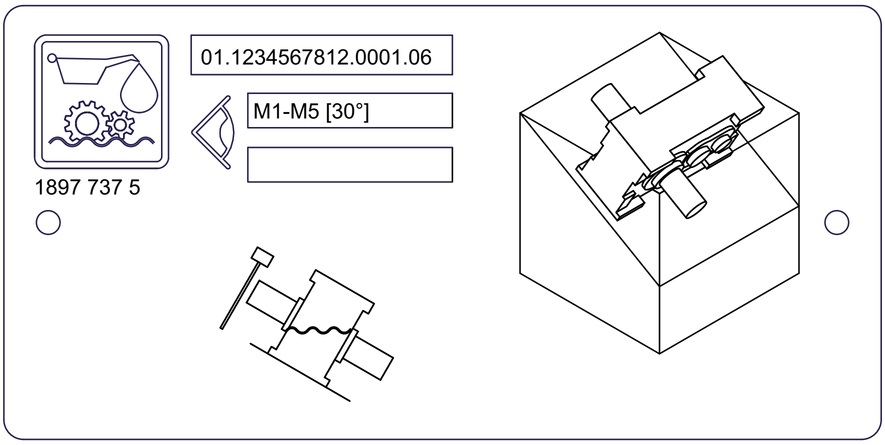
Information sign

Observe the additional information sign on the gear unit. Check the oil level in the test mounting position specified on the nameplate.

Following an example of the information sign for checking the mounting position at 30°.



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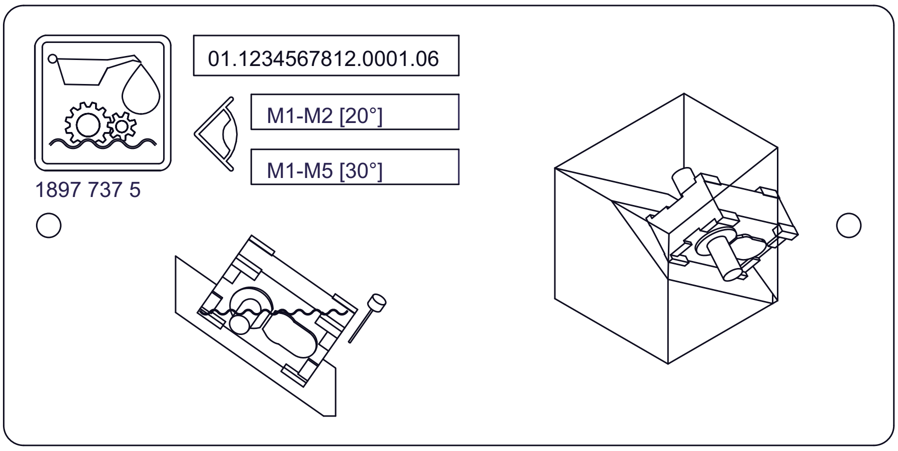
Following an example of the information sign for checking the mounting position at 30°.



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8.5 Checking the oil consistency

INFORMATION

A detailed and reliable examination of the oil consistency is not possible with the naked eye. If you are unsure whether the oil is in good condition or whether an oil change is required, we recommend performing a laboratory analysis of the oil.

SEW-EURODRIVE offers a laboratory analysis in which the oil is checked for wear, water and contamination. Furthermore, the viscosity, acid value and additive content of the oil is checked. For this purpose, contact SEW-EURODRIVE.

Proceed as follows to check the oil consistency:

1. ⚠ **WARNING!** Risk of burns due to hot gear unit and hot gear unit oil. Severe injuries.
   Allow the gear unit to cool down below 50 °C before you start working on it.
2. Start the gear unit for a short time for the oil to mix with suspended particles.
3. Determine the oil drain and place a clean and dry container underneath.
4. Slowly open the oil drain and drain some oil.
5. Close the oil drain valve.
6. Check the oil consistency:

- Check the drained oil for appearance, color, and contamination.
- If the oil sample is severely contaminated, e.g. water, cloudiness, change in color, dirt, consult a specialist to find out the cause.

8.6 Changing the oil

8.6.1 Notes

Observe the following when changing the oil:

- Perform the oil change immediately after you have switched off the gear unit to prevent solids from settling. If possible, you should drain the oil while it is still warm. Avoid oil temperatures above 50 °C.
- Oil grade and oil viscosity are listed on the nameplate of the gear unit.

  When additional attachments, e.g. an oil supply system, are mounted to the gear unit, the oil fill quantity is higher. Observe the operating instructions of the oil supply system.
- Always fill the gear unit with the same oil grade that was used before. Mixing oils of different grades and/or manufacturers is not permitted. In particular, synthetic oils must not be mixed with mineral oils or other synthetic oils. Flush the gear unit with the new oil grade thoroughly when switching from mineral oil to synthetic oil and/or from synthetic oil of a certain basis to synthetic oil of a different basis.

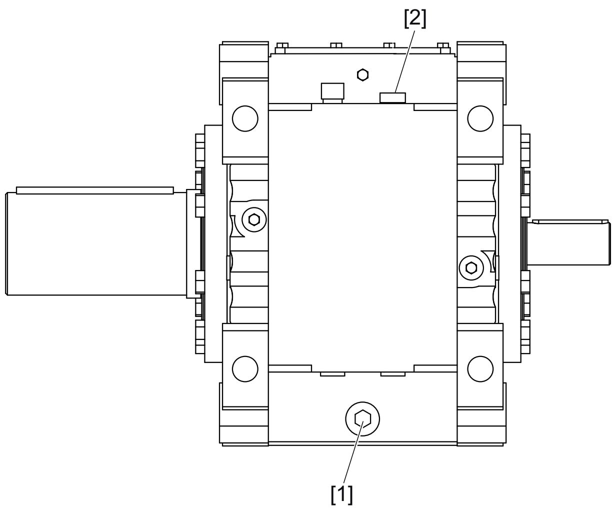
  Refer to the lubricant table for information on the permitted oil of the various lubricant manufacturers.
- When changing the oil, flush the interior of the gear unit thoroughly with oil to remove oil sludge, abrasive wear, and oil residues. Use the same oil grade that is used for operating the gear unit. Fill in the fresh oil only after all residues have been removed.

- An oil level above the max. marking might indicate that foreign liquids (e.g. water) have entered. An oil level below the min. marking might indicate a leakage. Find out and eliminate the cause before you fill in new oil.
- Replace any damaged gaskets of the oil drain plug.
- Empty the oil-bearing system of gear units with oil cooling system and oil supply system according to the manufacturer's maintenance instructions. If required, empty accessories such as oil filters and pipes.
- For gear units with reduced oil level, observe chapter "Gear units with reduced oil level" (→ 🗎 104).

Video instructions

German | English

8.6.2 Basic gear unit



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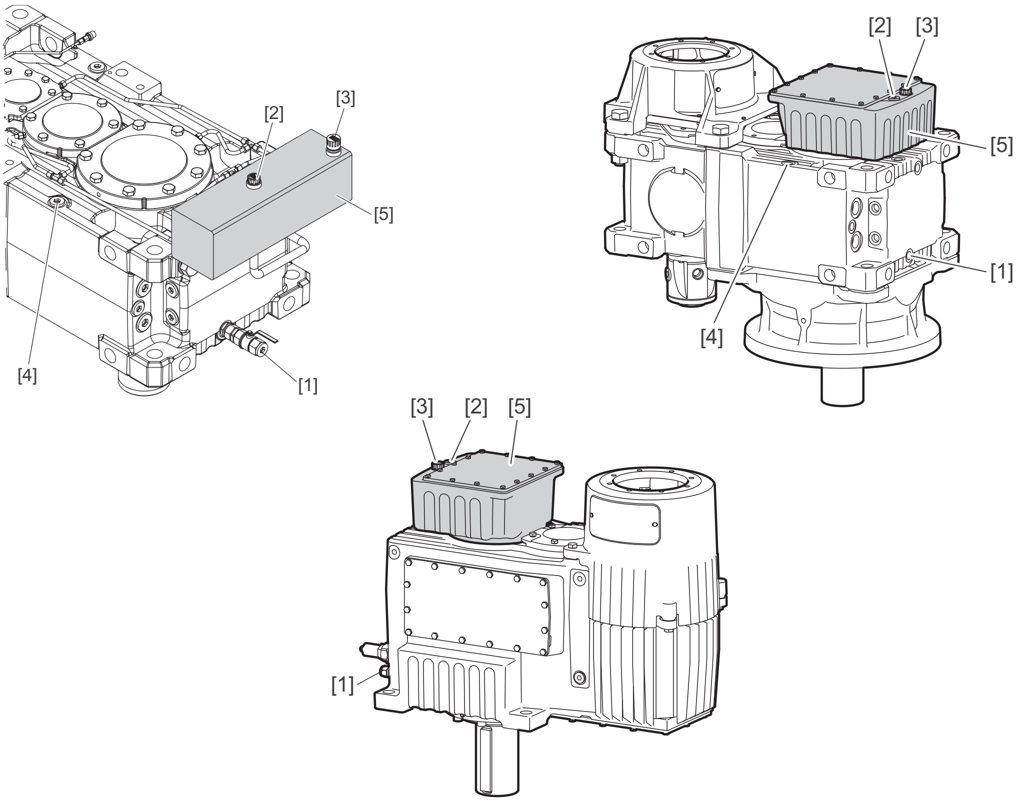
1. ⚠ **WARNING!** Risk of burns due to hot gear unit and hot gear unit oil. Severe injuries.
   Allow the gear unit to cool down below 50 °C before you start working on it.
2. Place a suitable container underneath the oil drain [1].

3. Remove the oil fill plug(s)/breather [2]. If needed, remove the splash guard adapter [2].
4. Only open the oil drain [1] with caution. Drain all the oil into the container.
5. Clean the magnetic oil drain plugs, if applicable.
6. Close the oil drain [1].
7. Pour in new oil of the same grade through the oil fill opening [2].

- The oil quantity specified on the nameplate is an approximate quantity. The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity, see chapter "Checking the oil level" (→ 🗎 241).
- Use a clean filling aid without zinc coating (plastic funnel or similar).

8. Re-insert the splash guard adapter, if available. For further information, refer to chapter "Installing the splash guard adapter" (→ 🗎 111).
9. If present, screw the oil fill plug(s)/breather [2] and the oil dipstick back into place.
10. ⚠ **CAUTION!** Danger due to leakage of lubricant. Possible risk of slipping. Immediately remove any oil that has escaped with oil binder.

8.6.3 Gear units with oil expansion tank /ET



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INFORMATION

The oil drains faster if the upper closing elements, such as oil dipstick [2], breather [3] or screw plugs [4] are removed and when the oil change is performed when the gear unit is warm.

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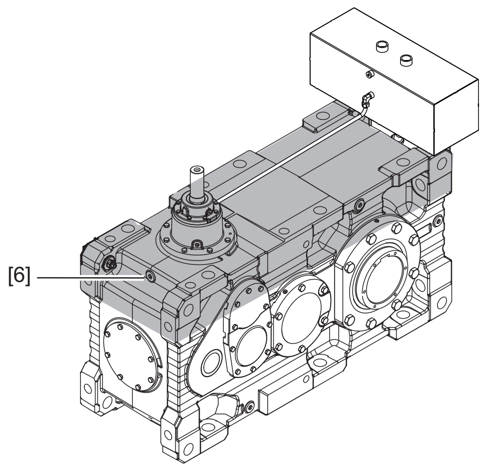
1. ⚠ **WARNING!** Risk of burns due to hot gear unit and hot gear unit oil. Severe injuries.
   Allow the gear unit to cool down below 50 °C before you start working on it.
2. Remove the oil drain plug(s). Open the oil drain [1].
3. Place a suitable container underneath the oil drain plug(s) or oil drain valve [1].
4. Drain all the oil into the container.
5. Clean the magnetic oil drain plugs, if applicable.
6. Close the oil drain [1].
7. Open the oil fill plug. Observe the mounting position and the following notes:

Mounting positions M1 and M3:



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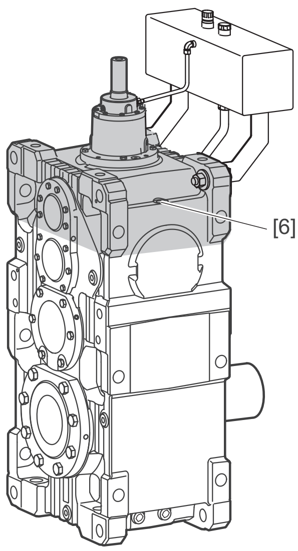
8. Open at least one of the screw plugs [6] located on the side in the upper fifth (marked gray) of the gear unit housing.

Mounting positions M2 and M4:



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9. Open at least one of the screw plugs [6] on the top or at least one of the screw plugs [6] located on the side in the upper fifth (marked gray) of the gear unit housing.

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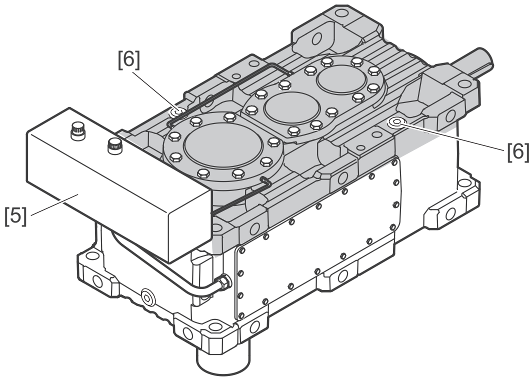
Mounting position M5 and M6:



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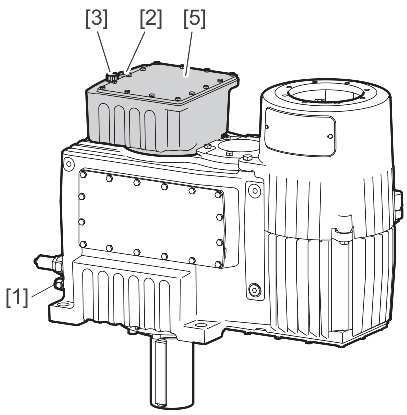
10. Open all accessible screw plugs [6] on the top of the gear unit housing and all accessible screw plugs located on the side in the upper fifth (marked gray) of the gear unit housing.

Agitator housing mounting position M5:



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INFORMATION

With agitator housings /HA, no screw plug needs to be opened at the top of the gear unit. The gear unit is vented via the breather [3] and the oil filling hole [2].

11. Fill in oil of the same type through one of the housing openings [6] or the oil expansion tank [5]. If oil leaks from an opening, close the opening and keep filling the gear unit until the specified oil level is reached in the oil expansion tank [5].

INFORMATION

Preheating the oil to max. 40 °C accelerates the filling process. You may also use a pump to fill the gear unit. During the filling process, the oil level in the oil expansion tank must never increase to a point that oil leaks from the expansion tank into the breather pipes.

12. Check the breather [3] for proper functioning before you install it.
13. Screw in the oil dipstick [2].
14. Start up the gear unit.

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15. Check the oil level every 30 minutes until the operating temperature is reached. If necessary, fill in additional oil.
16. Let the gear unit cool down to a temperature between 20 °C and 40 °C and check the oil level again. Add oil if necessary.
17. ⚠ **CAUTION!** Danger due to leakage of lubricant. Possible risk of slipping. Immediately remove any oil that has escaped with oil binder.

INFORMATION

During the first operating hours, air pockets loosen from the gear unit and escape through the breather, so that the oil level needs to be checked.

8.6.4 Gear units with shaft end pump /SEP

Fill the shaft end pump completely with oil shortly before taking it into operation. Observe the procedure described in chapter "Gear units with shaft end pump / SEP" (→ 🗎 106).

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8.7 Checking and cleaning the breather

1. **NOTICE!** Improper cleaning of the venting may result in damage to the gear unit.
   Possible damage to property.
   Remove any deposits near the breather. Prevent foreign particles from entering into the gear unit.
2. If the breather is clogged, replace it.

8.8 Replacing the desiccant breather filter

The service life of the filters usually is 12 months, after that time the filters must be replaced. In case the filters are operated in a highly contaminated environment, the service life of the filters can be limited to 2 months or less. The color of the granulate indicates whether a filter needs to be replaced or whether it can still be used.

Color/color transition	Distribution of color gradient	Meaning	Action
Blue → pink	Filter top → filter bottom	Moisture in the gear unit	Determine the cause
Entirely pink or white	Entire filter	Filter capacity exhausted	Replace the filter

Once the capacity of the filter is exhausted, the desiccant breather filters change their color from blue to pink, proceeding from the bottom of the filter to the top.

If the main part of the breather valve has changed its color to pink (or white after a longer time), the breather filter must be replaced by a new one.

If the color changes from top to bottom, this indicates that a large amount of moisture is in the gear unit.

8.8.1 Disposal

If the desiccant breather filter must be replaced, it is likely to contain oil vapor. The filter must be disposed of in accordance with the corresponding regulations.

8.9 Refill the regreasable sealing systems with grease

⚠ WARNING

Risk of crushing due to rotating parts.

Severe or fatal injuries.

- Observe that sufficient safety measures have been provided when relubricating, refer to chapter "Creating a safe working environment" (→ 🗎 18).

INFORMATION

- Slowly turn the shaft when you relubricate the gaskets to ensure a better spreading of the grease.
- Immediately remove the old grease that leaked out.

1. For the exact lubrication position, refer to the order-specific dimension sheet.
2. Use moderate pressure to force grease into each lubrication point until new grease leaks out of the sealing gap. Observe the information in chapter "Sealing greases/ rolling bearing greases" (→ 🗎 299).
3. The used grease is pressed out of the sealing gap together with any contaminants it has absorbed.

8.10 Relubricating the bearing for Drywell sealing systems

⚠ WARNING

Risk of crushing due to rotating parts.

Severe or fatal injuries.

- Observe that sufficient safety measures have been provided when relubricating, refer to chapter "Creating a safe working environment" (→ 🗎 18).

NOTICE

Excessive press-in pressure can cause grease to leak between the sealing lip of the oil seal and the shaft. The sealing lip can be damaged or slip.

Possible damage to property.

- Make sure that the grease drain is open and the excess used grease can escape.

INFORMATION

- Slowly turn the shaft when you relubricate the bearings to ensure a better spreading of the grease.
- Immediately remove the old grease that leaked out.

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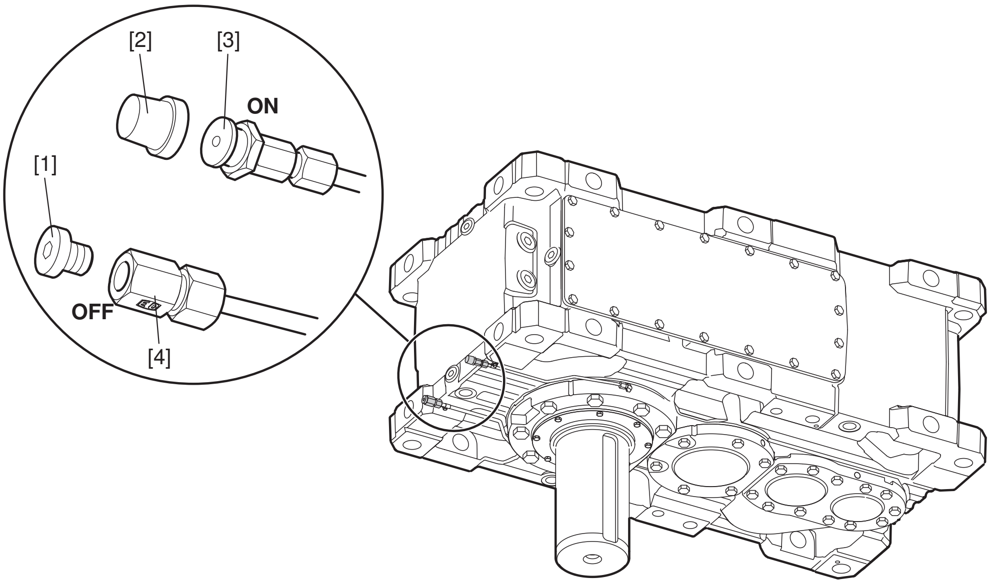
8.10.1 Gear unit with universal housing /HU



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1. Remove the screw plug [1] at the grease drain pipe [4]. The old excess grease can then escape.
2. Remove the protection cap [2]. Fill the grease via the flat grease nipple (DIN 3404 A G1/8) [3]. Lubricant quantities according to the following table. For lubricants you can use, refer to chapter "Sealing greases" (→ 🗎 299).

Size	Amount of grease in g
X120	50
X130 – 140	60
X150	70
X160 – 170	90
X180 – 190	110
X200 – 210	200
X220 – 230	200
X240 – 250	300
X260	300
X270 – 280	450
X290 – 300	400
X310 – 320	550

3. Place the protection cap [2] on the flat grease nipple [3].
4. Screw the screw plug [1] onto the grease drain pipe [4].

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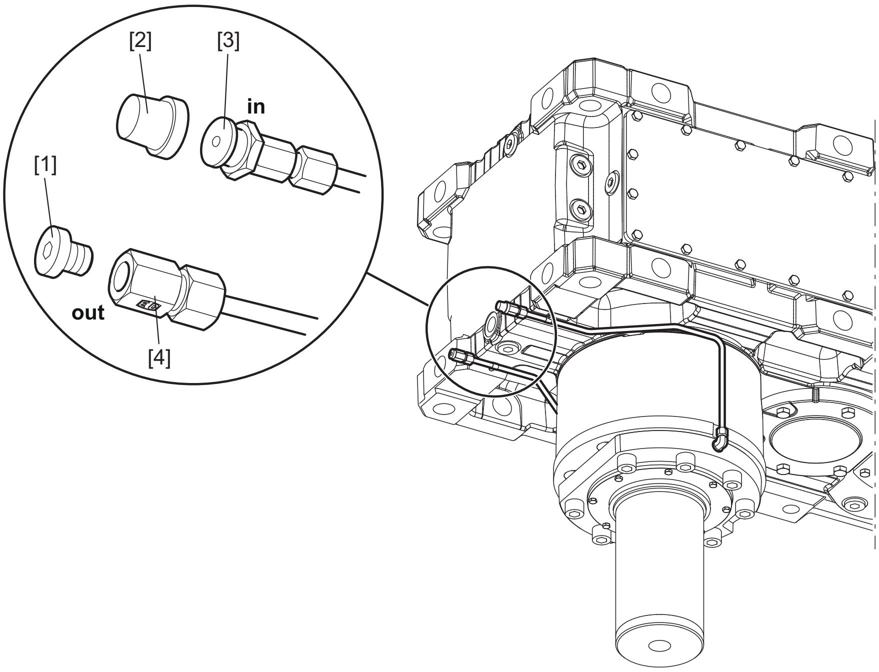
8.10.2 Gear unit with universal housing /HU and EBD



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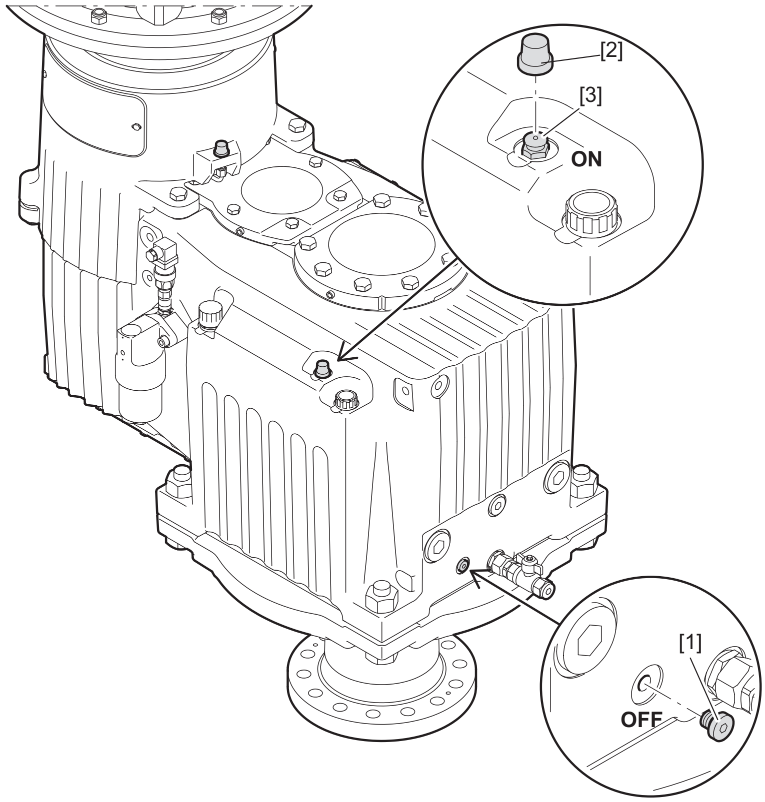
1. Remove the screw plug [1] at the grease drain pipe [4]. The old excess grease can then escape.
2. Remove the protection cap [2]. Fill the grease via the flat grease nipple (DIN 3404 A G1/8) [3]. Lubricant quantities according to the following table. For lubricants you can use, refer to chapter "Sealing greases" (→ 🗎 299).

Size	Amount of grease in g
X140	120
X150	140
X160	180
X170	180
X180	220
X190	220
X200	400
X210	400

3. Place the protection cap [2] on the flat grease nipple [3].
4. Screw the screw plug [1] onto the grease drain pipe [4].

8.10.3 Gear unit with agitator housing /HA



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1. Remove the screw plug [1]. The old excess grease can then escape.
2. Remove the protection cap [2]. Fill the grease via the grease nipple [3]. Lubricant quantities according to the following table. For the lubricants to be used, refer to chapter "Sealing greases" (→ 🗎 299).

Size	Amount of grease in g
X140	120
X150	140
X160	180
X170	180
X180	220
X190	220
X200	400
X210	400

3. Place the protection cap [2] on the grease nipple [3].
4. Insert the screw plug [1].

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8.11 Cleaning the fan /FAN

⚠ CAUTION

The protection cover can slip during assembly and disassembly.

Potential risk of crushing due to falling parts.

- Secure the protection cover against slipping during assembly and disassembly.

NOTICE

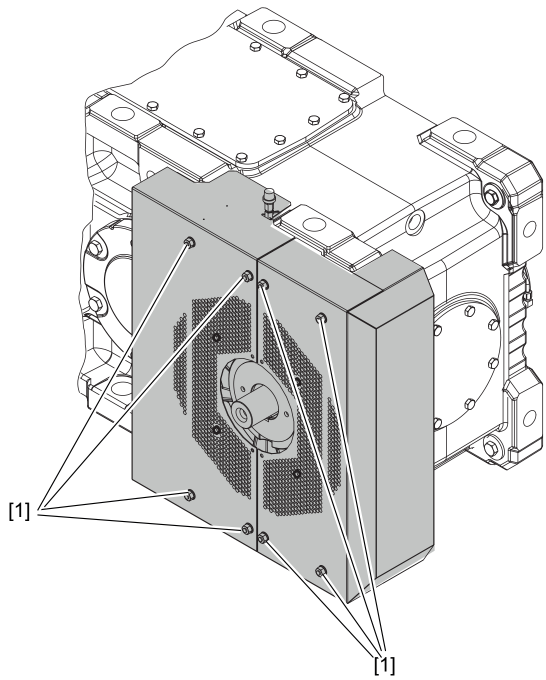
Improper assembly of the fan guard after disassembly (e.g. for inspection purposes) may result in damage to the fan.

Possible damage to property.

- The reassembly of the protection cover may only be performed with original parts from SEW-EURODRIVE and with sufficient distance to the fan. If the distance is not observed, the fan may touch the protection cover. Do not disconnect the fan from the fan hub. This may only be performed by qualified personnel.

8.11.1 X.F..

1. Loosen the 8 screws [1].
2. Remove the 2 fan guards



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3. Remove any dirt from the fan wheel, fan guard, and protective grid using a hard brush, for example.
4. Assemble the two fan guards in reverse order.
5. Before restarting the fan, make sure the fan guards are mounted properly. The fan must not touch the fan guard.

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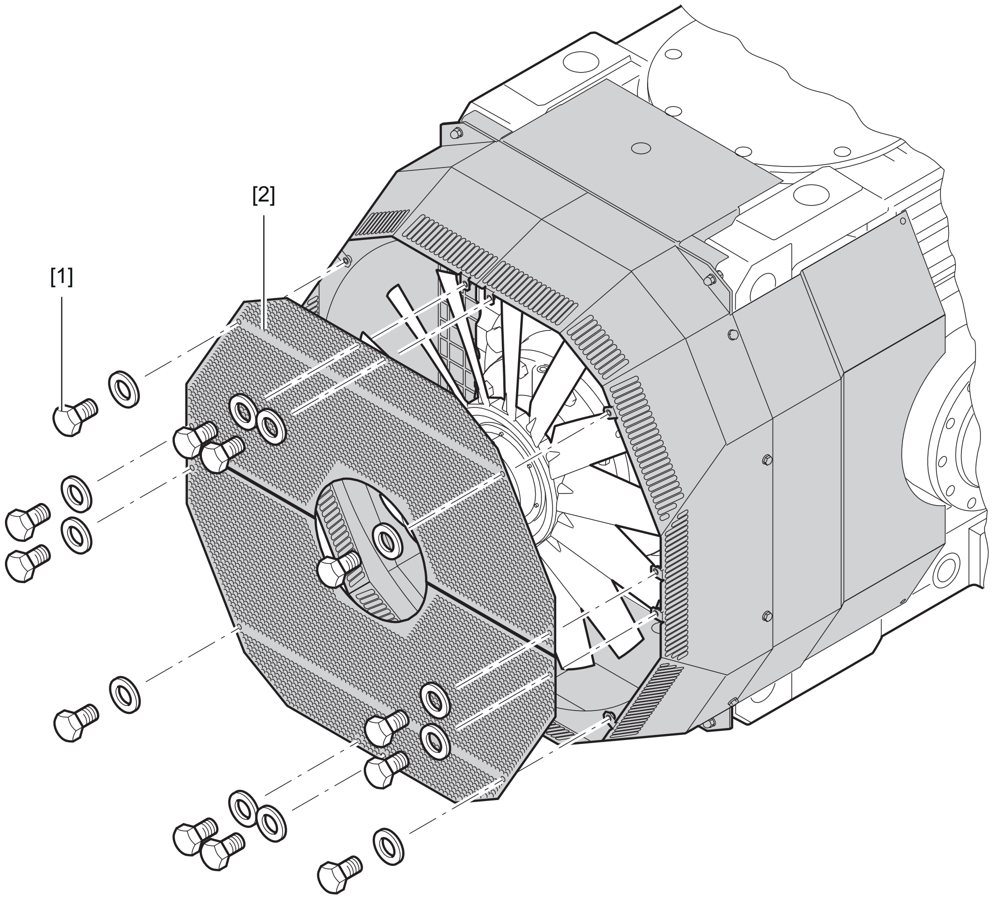
8.11.2 X.K.. with universal fan guard

1. Loosen the screws [1].
2. Remove the 2 protective grids [2].



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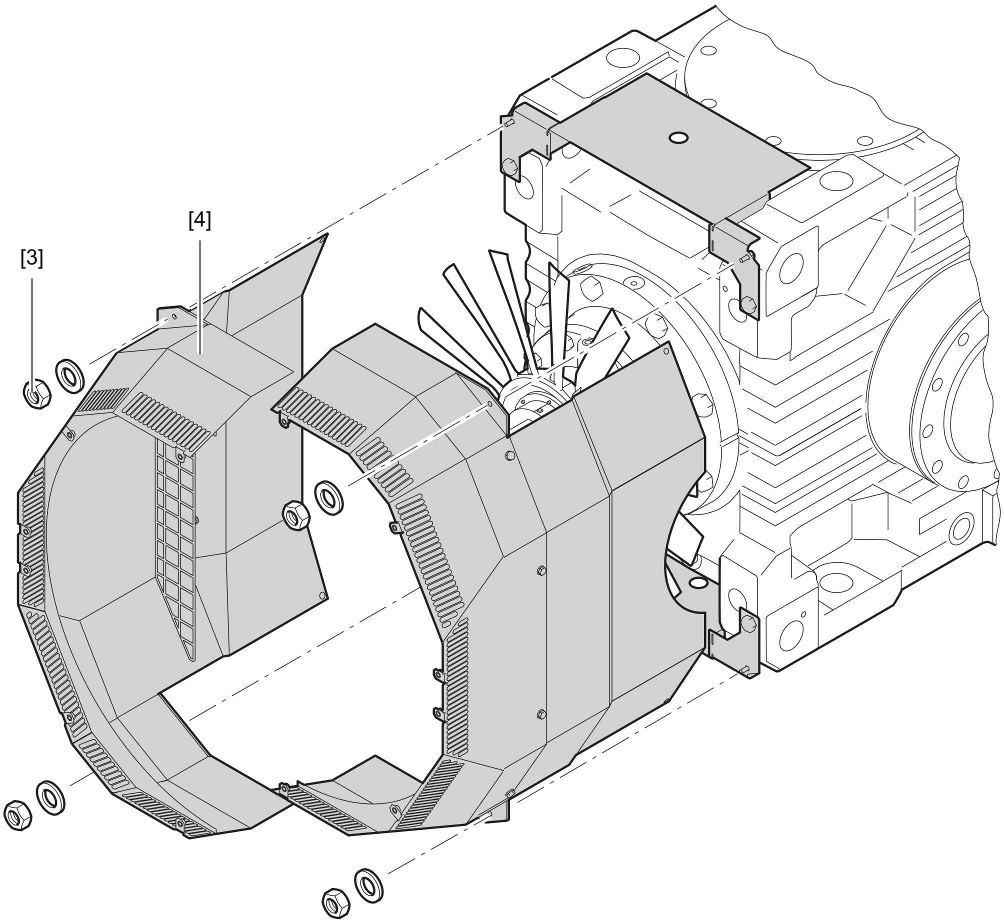
3. Loosen the 4 nuts [3] and remove the 2 fan guards [4].



28350245387

4. Remove any dirt from the fan wheel, fan guard and protective grid using a hard brush, for example.
5. Assemble the fan guard in reverse order.
6. Before restarting the fan again, make sure the fan guard is mounted properly. The fan must not touch the fan guard.

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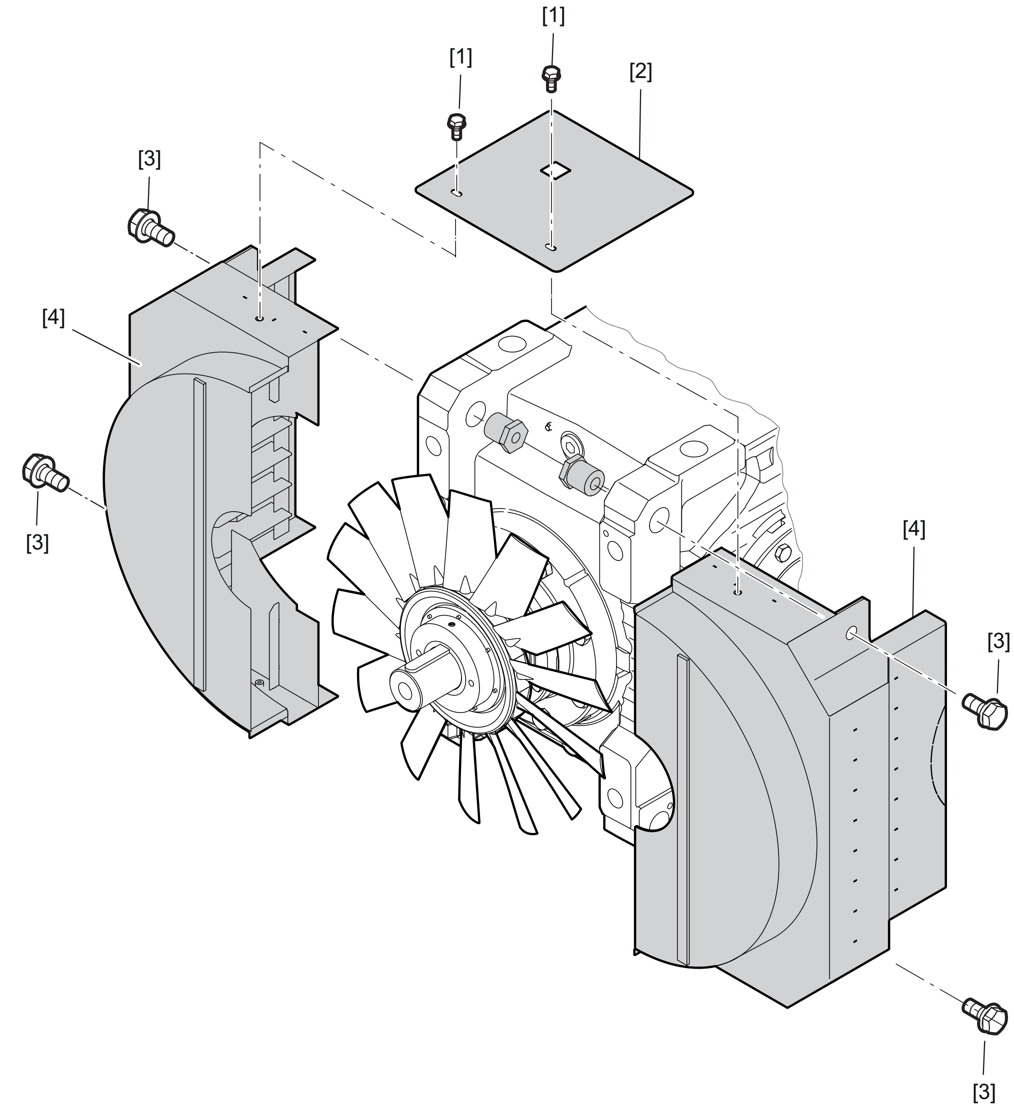
8.11.3 Axial fan

Universal and horizontal housing /HU /HH

Size X100 – 250



28163661451

1. Loosen the screws [1] and remove the fan guard [2].
2. Loosen the screws [3] and remove the fan guards [4].
3. Remove any dirt from the fan wheel, fan guard, and protective grid using a hard brush, for example.
4. Before restarting the fan, make sure the fan guard is mounted properly. Mount the wheel in the reverse order.

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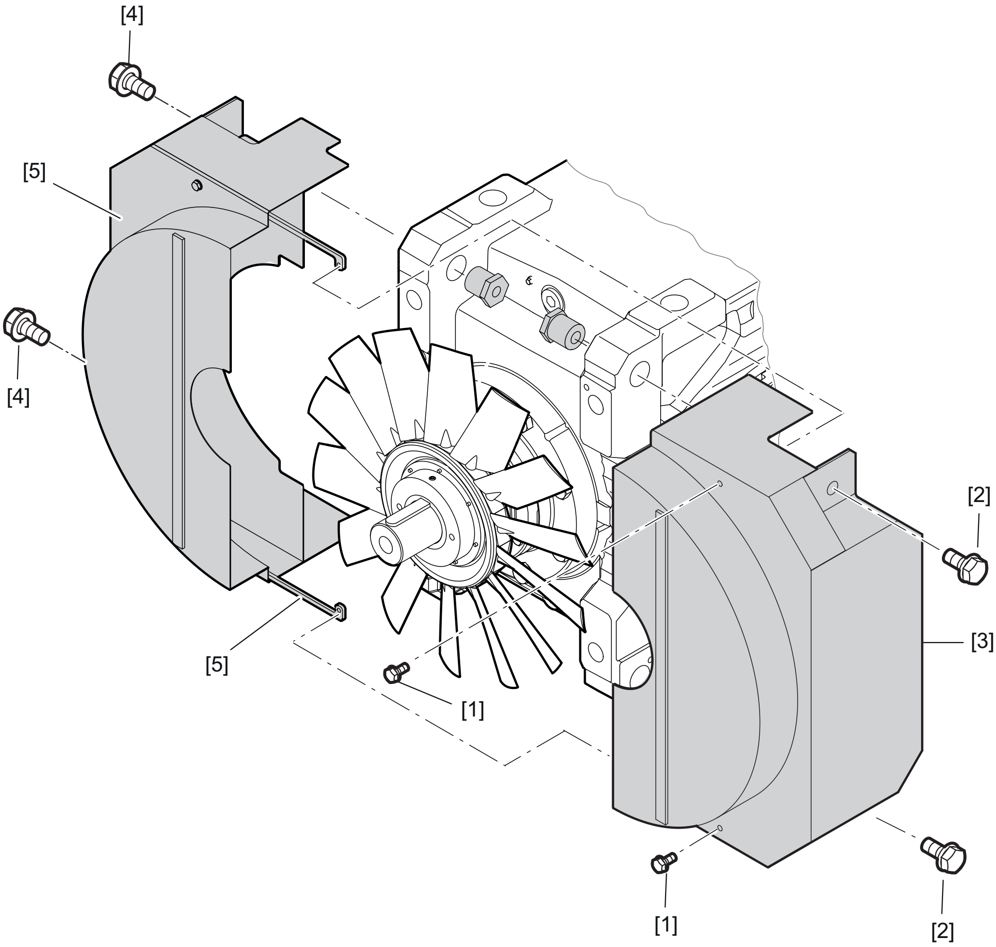
Size X260 – 320



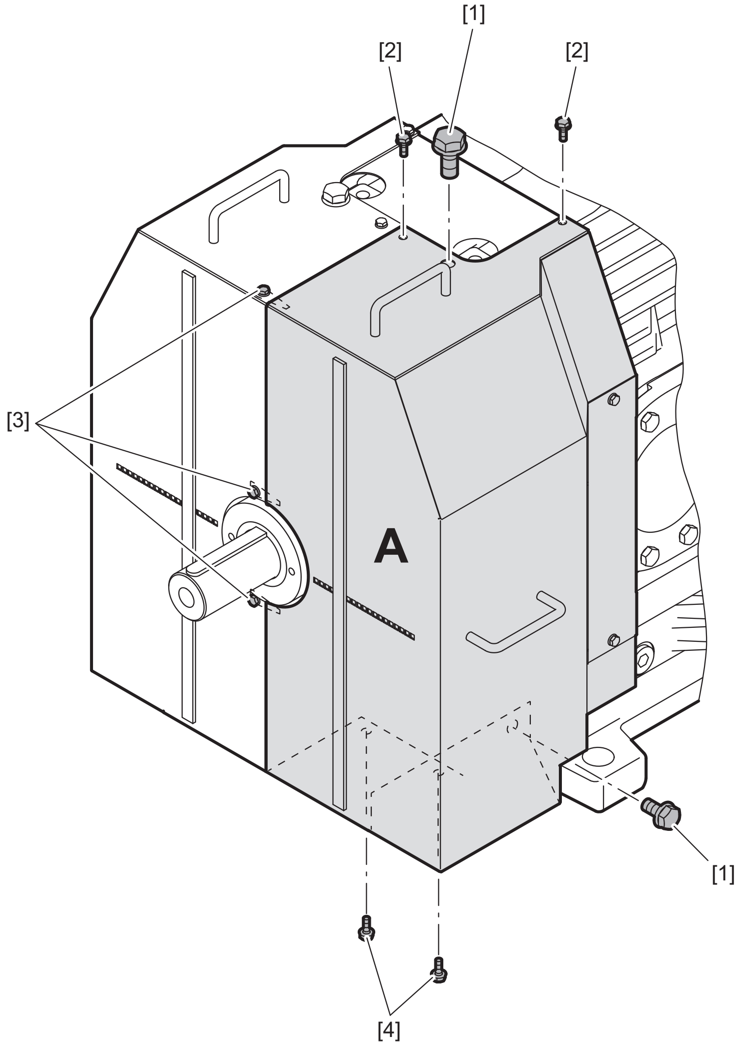
28235995275

1. Loosen the 2 screws [1].
2. Loosen the screws [2] and remove the fan guard [3].
3. Loosen the screws [4] and remove the fan guard [5].
4. Remove any dirt from the fan wheel, fan guard, and protective grid using a hard brush, for example.
5. Before restarting the fan, make sure the fan guard is mounted properly. Mount the wheel in the reverse order.

Thermal housing /HT

Removing the fan guards

1. Fan guard A



13270713483

1. Loosen the 2 screws [1].
2. Loosen the 2 screws [2].
3. Loosen the 3 screws [3].
4. Loosen the 2 screws [4].
5. Remove the fan guard **A**.

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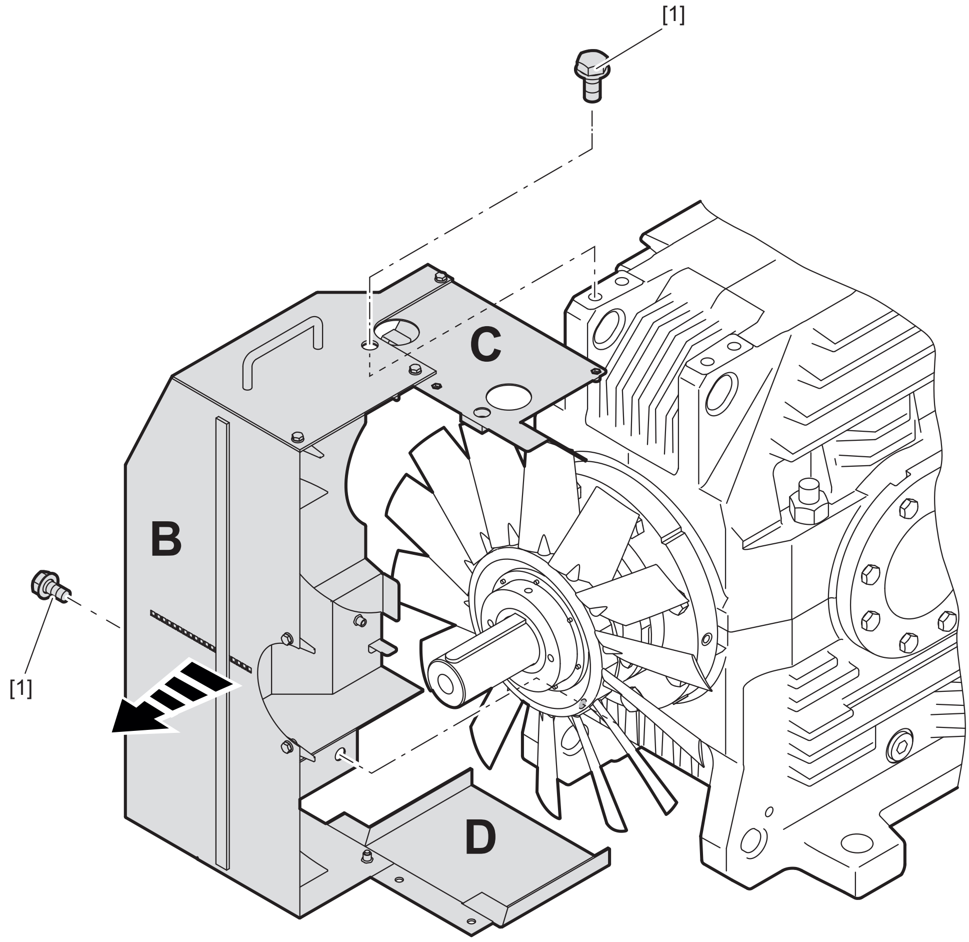
2. Fan guards B, C, D

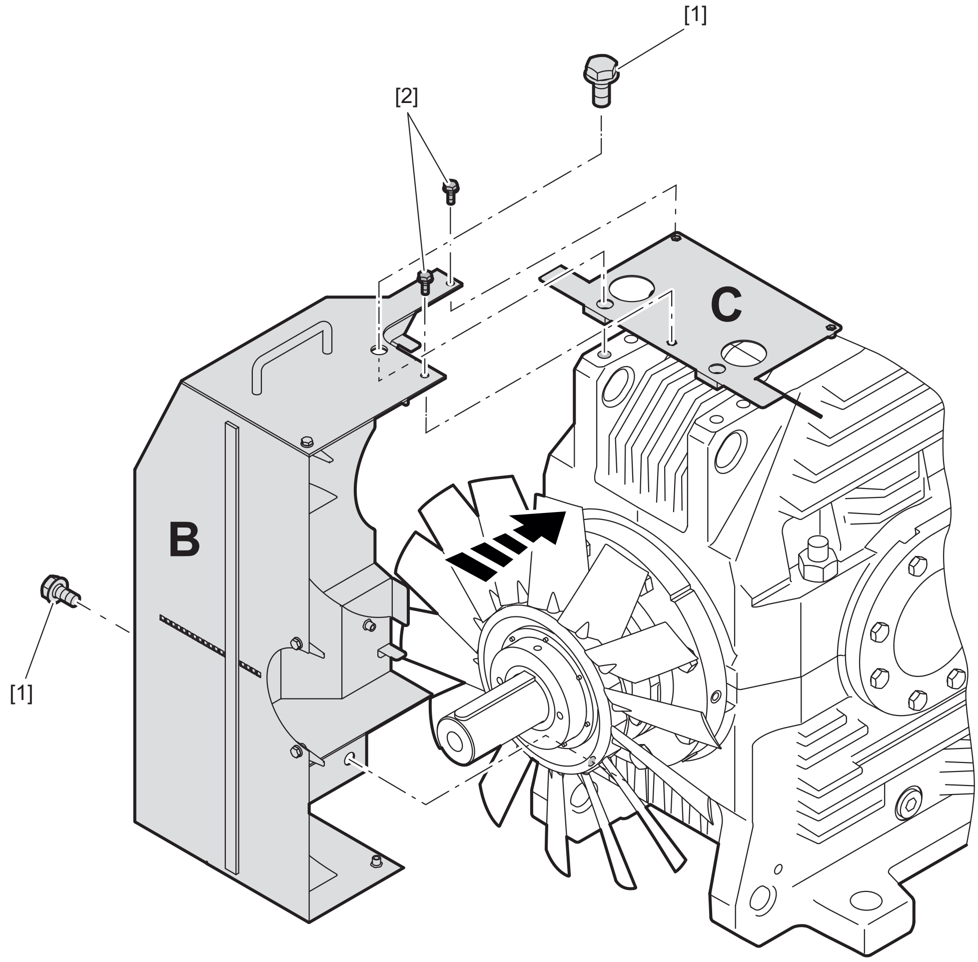


13272061707

1. Loosen the 2 screws [1].
2. Remove the fan guards **B, C, and D**.
3. Remove any dirt from the fan wheel, fan guard, and protective grid using a hard brush, for example.

Mounting the fan guards

1. Fan guards B, C



13276191371

1. Mount the fan guards **B and C** onto the gear unit, using screws [1].
2. Tighten the 2 screws [2].

2. Fan guard A

1. Mount the fan guard **A** using the 2 screws [1].

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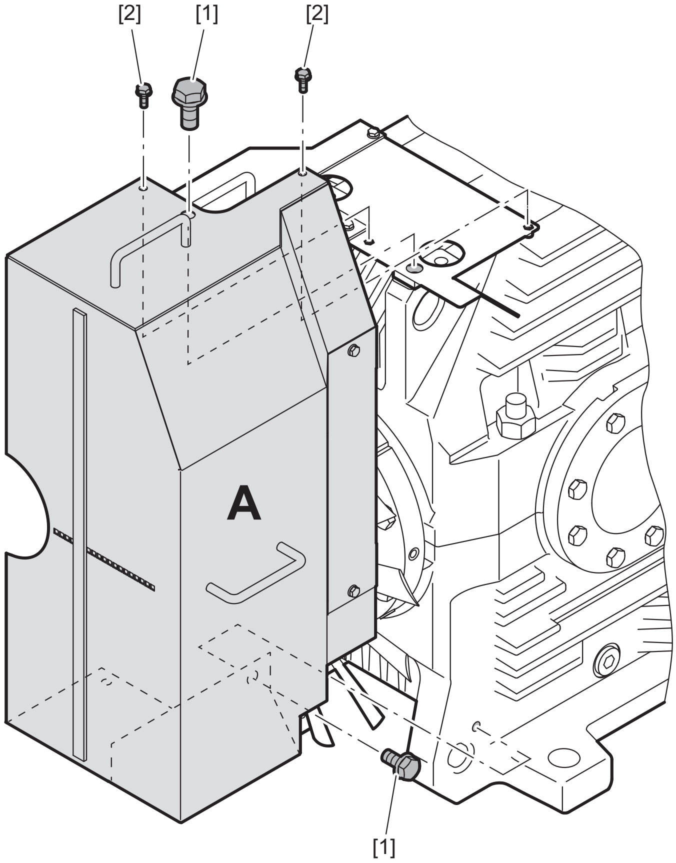
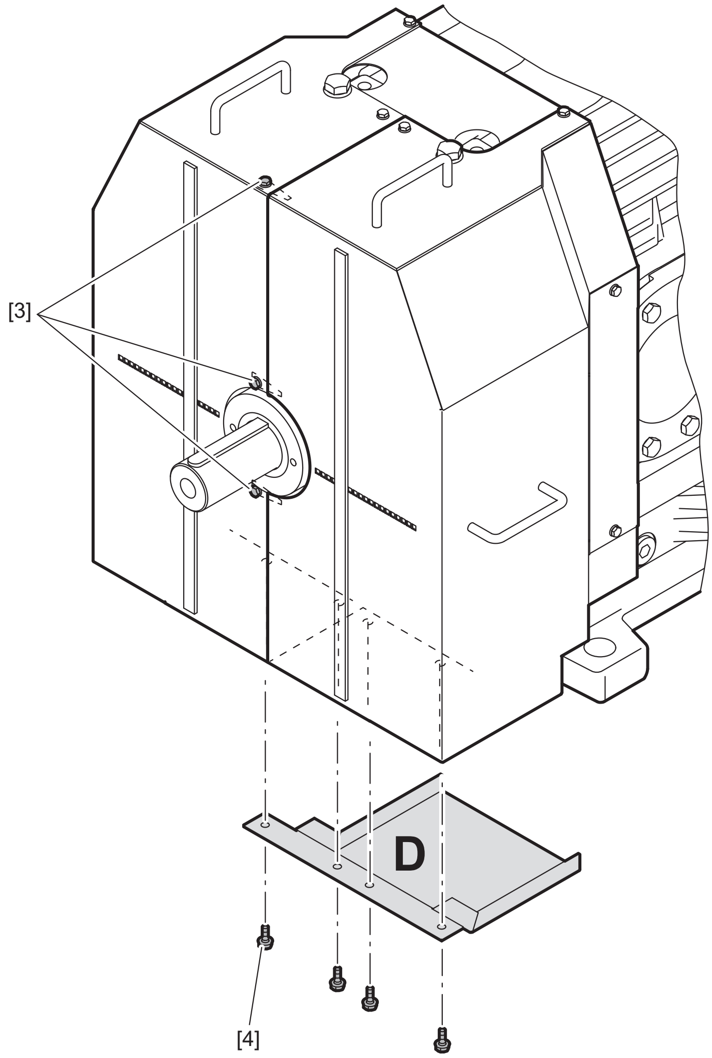
2. Tighten the 2 screws [2].



13276194187

3. Insert the 3 screws [3].

4. Mount the fan guards **D** using 4 screws [4].



13276965003

5. Before restarting the fan again, make sure the fan guard is mounted properly. For mounting the protection cover, proceed in the reverse order.

8.12 Cleaning the water cooling cover /CCV

8.12.1 Information before you start

NOTICE

Risk of damage to components of the water cooling cover.

Possible damage to property.

- Properly vent the water cooling cover and the connected systems before taking them into operation again.
- For information on suitable cleaning agents, contact SEW-EURODRIVE.
- To prevent damage resulting from improper handling of the functional components, always contact SEW-EURODRIVE before you use comparable, aggressive cleaning agents.

NOTICE

Risk of contamination of the medium.

Possible damage to property.

- Experience has shown that the cleaning agent cannot be removed without residue. For this reason, when selecting cleaning agents, make sure they are compatible to cleaning agents and the medium.

8.12.2 Procedure

1. Let the components cool down before you start working on the unit.
2. Depressurize all systems before carrying out any disassembly work on the water cooling cover. Shut them off with the corresponding valve.
3. **NOTICE!** Risk of contamination due to drained media. Possible environmental damage.
   When draining the media, they must not get into the soil or the sewer system. They must be collected and disposed of in secured containers in accordance with the applicable environmental regulations.
4. Disconnect the cooling water supply and return from the water cooling cover. Drain all the cooling medium.
5. Open the inspection cover.
6. Remove the water cooling cover and the gasket.
7. Check the water cooling cover for deposits. Clean slight contamination on the water cooling cover with suitable cleaning agent. Replace the water cooling cover with a new one if the contamination is particularly heavy. Contact SEW-EURODRIVE.
8. Apply Loctite® 5188 to the contact surfaces of the cooling cover rim.
9. Insert the water cooling cover into the gear unit housing.
10. Clean and insert the gasket.
11. Attach the inspection cover.
12. Screw in the screws and tighten them in two steps from the inside to the outside. Observe chapter "Tightening torques" (→ 🗎 100).

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13. Re-connect the water cooling inflow and return pipes to the water cooling cover.
14. Properly vent the water cooling cover and the connected systems before taking them into operation again.
15. Check the tightness.

8.13 Cleaning the water cooling cartridge /CCT

INFORMATION

Do not carry out any repair work on the pipe bundle of the water cooling cartridge unless in case of an emergency. Contact SEW-EURODRIVE to do so. Analyze and report failure symptoms.

8.13.1 Maintenance intervals

The service life of the water cooling cartridge depends to a large degree on the quality of the media and their substances. The operator is responsible for specifying the maintenance intervals. Use the performance parameters and power rating determined during operation to define the maintenance intervals.

Specify the maintenance intervals in such a way that a power loss of the water cooling cartridge does not pose a hazard to the operation of the system.

8.13.2 Information before you start

NOTICE

Risk of destroying components of the water cooling cartridge.

Possible damage to property.

- To prevent damage resulting from improper handling of the water cooling cartridge, always contact SEW-EURODRIVE before you use other comparably aggressive cleaning agents.

NOTICE

Risk of contamination of the medium.

Possible damage to property.

- Experience has shown that the cleaning agent cannot be removed without residue. For this reason, when selecting cleaning agents, make sure they are compatible to cleaning agents and the medium.

NOTICE

Risk of damage to components of the water cooling cartridge.

Possible damage to property.

- Properly vent the water cooling cartridge and the connected systems before taking them into operation again.

8.13.3 Procedure

1. Let the components cool down before you start working on the unit.
2. Depressurize the water cooling cartridge and the connected system pipes. Shut them off with the corresponding valve.
3. Completely drain the gear unit oil prior to disassembly.
4. **NOTICE!** Risk of contamination due to drained media. Possible environmental damage.
   When draining the media, they must not get into the soil or the sewer system. They must be collected and disposed of in secured containers in accordance with the applicable environmental regulations.
5. Disconnect the cooling water supply and return from the water cooling cartridge. Drain all the cooling medium.
6. Only loosen the water cooling cartridge via the hexagon on the tube bottom and remove it.
7. **NOTICE!** The sealing surfaces must not be damaged. Possible damage to property.
   Damage to the sealing surfaces can result in leakage.
8. Remove the flat gasket. Remove any gasket residues from the sealing surfaces.
9. Clean the water cooling cartridge.
   NOTICE! Risk of corrosion due to scratches. Possible damage to property.
   Use a brush with soft bristles for cleaning the inside.
   The following measures are recommended for cleaning:
   - A mixture of 50% hydrochloric acid with inhibitors and 50% water can be used to remove lime deposits on the inside of the pipe.
   - The inner cleaning of the tube bundle can be done with a brush at a Ø of the pipes of > 5 mm. Make sure that you use a brush with soft bristles so that the surface of the pipe walls is not scratched.
   - Contact SEW-EURODRIVE if you plan to remove scale deposits using other cleaning agents.
   - After cleaning, make sure all cleaning agents have been removed completely from the pipes before taking the water cooling cartridge into operation again.
10. Coat 2 threads with LOCTITE® 577 and screw the water cooling cartridge only via the hexagon to the tube bottom.

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11. Re-connect the water cooling inflow and return pipes to the water cooling cartridge.
12. Pour in new oil of the same grade through the oil fill opening.
- The oil quantity specified on the nameplate is an approximate quantity. The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity, see chapter "Checking the oil level" (→ 🗎 241).
- Use a clean filling aid without zinc coating (plastic funnel or similar).
13. Before restarting the system, vent the pipes.
14. Check the tightness.

8.14 Cleaning the oil heater /OH

⚠ WARNING

Danger of electric shock.

Severe or fatal injuries.

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

1. Remove the cabling of the heating element.
2. Before disassembling the heating element, drain the oil (→ 🗎 249).
3. **NOTICE!** Improper cleaning may damage the heating elements. Possible damage to property.
   Clean the tubular heating elements with solvent. Replace the defective heating elements.
4. Screw the heating element out of the gear unit housing.
5. Apply LOCTITE® 577 to the 2 threads of the heating element.
6. Fasten the heating element by applying torque only to the head of the hex screw.
7. Close the oil drain valve.
8. Fill new oil of the same type as the old oil through the oil filling hole (if you want to change the oil type, contact SEW-EURODRIVE Service).
- Fill in the oil quantity according to the information on the nameplate. The oil quantity specified on the nameplate is a guide value.
- Use a clean filling aid (plastic funnel or similar). Avoid using galvanized filling aids.
- Check to see that the oil level is correct, refer to chapter "Checking the oil level" (→ 🗎 241).
9. Connect the heating element.

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9 Permitted lubricants

This chapter describes the permitted lubricants and the permitted temperatures for industrial gear units from SEW-EURODRIVE.

9.1 Lubricant selection

Note the following when selecting the lubricants.

NOTICE

Improper lubricant selection can damage the gear unit.

Possible damage to property.

- The oil viscosity and type (mineral/synthetic) to be used are determined by SEW-EURODRIVE specifically for each order. This information is noted in the order confirmation and on the gear unit's nameplate. If other lubricants are used in the gear units and/or in other temperature ranges than those recommended, the right to claim under warranty will become invalid. Exceptions are application-specific approvals that have to be confirmed by SEW-EURODRIVE in written form. This lubricant recommendation in the lubricant table does not imply approval in the sense of a guarantee for the quality of the lubricant supplied by the respective supplier. Lubricant manufacturers are responsible for the quality of their own products.
- Oils of the same viscosity class from different manufacturers do not have the same characteristics. In particular, the minimum permitted oil bath temperatures are manufacturer-specific. These temperatures are specified in the lubricant tables.
- The minimum permitted oil bath temperatures depend on the lubrication type used. These temperatures are specified in the lubricant tables. The values correspond to the maximum permitted viscosity of the individual lubricants.
- Do not mix different synthetic lubricants and do not mix synthetic lubricants with mineral lubricants.
- Check the compatibility of the greases and oils used.

The values specified in the lubricant tables apply as of the time of printing of this document. The data of the lubricants is subject to dynamic change by the lubricant manufacturers. For the latest information on lubricants, refer to:

https://www.sew-eurodrive.de/products/gear_units/standard_gear_units/accessories_and_options/lubricants/lubricants.html

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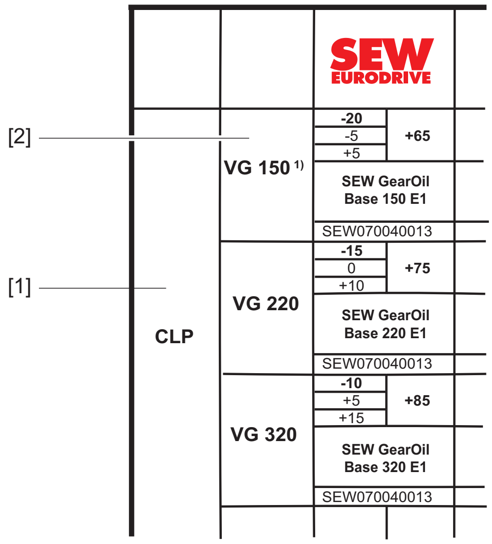
9.2 Structure of the tables and abbreviations



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[1] Lubricant type
[2] Viscosity class

Abbreviations

Icons	Designation
CLP	= Mineral oil
CLP HC	= Synthetic polyalphaolefin (PAO)
E	= Ester-based oil
	= Mineral lubricant
	= Synthetic lubricant
	= Lubricant for the food industry (**NSF H1**-compliant)
	= Biodegradable oil (lubricant for agriculture, forestry, and water management)
1)	= Lubricants may only be used if service factor $F_s \geq 1.3$

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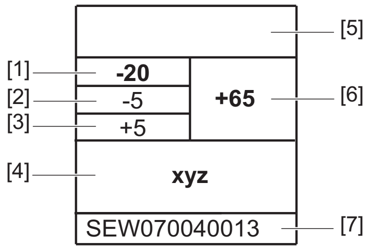
9.3 Explanation of the various lubricants



18014416413363467

[1] Lowest cold start temperature in °C for splash lubrication1)
[2] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 5000 cSt1)
[3] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 2000 cSt1)
[4] Trade name
[5] Manufacturer
[6] Highest oil bath temperature in °C2)
[7] Approvals

1) In case of lower temperatures, the oil must be heated to the specified minimum temperature, for example, by using an oil heater. For the maximum permitted oil viscosity per pump type, refer to chapter "Explanations on the oil supply system / oil cooling systems and oil viscosity".
2) Service life is significantly reduced when exceeded. Observe chapter "Lubricant change intervals".

9.4 Explanations on the oil supply system / oil cooling systems and oil viscosity

Adhere to the following oil viscosity: For up-to-date information about the lubricants, visit:

www.sew-eurodrive.de/lubricants

Pressure lubrication	Oil viscosity
Motor pump for pressure lubrication /ONP1	5000 cSt.
Motor pump for pressure lubrication /ONP1L	5000 cSt.
Motor pump incl. air cooler for pressure lubrication /OAP1	5000 cSt.
Shaft end pump /SEP	5000 cSt.
Motor pump incl. water cooler for pressure lubrication /OWP1	5000 cSt.

9.5 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.

Permitted 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

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 from Freudenberg 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.

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9.6 Lubricant tables

This lubricant table is valid when the document is published. Refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

[1]	[2]	SEW EURODRIVE	Castrol	Castrol	FUCHS	FUCHS	Mobil	KLÜBER LUBRICATION	SINOPEC	TOTAL
CLP	VG 150	-20 / -5 / +5 … +65 SEW GearOil Base 150 E1 / US1 / CN1 / BR1 SEW070040013	-20 / -5 / +5 … +65 Optigear BM 150	-20 / -5 / +5 … +65 Alpha SP 150	-20 / -5 / +5 … +65 Renolin CLP 150 Plus SEW070030013	-20 / -5 / +5 … +65 Renolin HighGear 150	-20 / -5 / +5 … +65 Mobilgear 600 XP 150 SEW070030013	-20 / -5 / +5 … +65 Klüberoil GEM 1-150 N	-20 / -5 / +5 … +65 AP-SGO 150 SEW070030013	
	VG 220	-15 / 0 / +10 … +75 SEW GearOil Base 220 E1 / US1 / CN1 / BR1 SEW070040013	-15 / 0 / +10 … +75 Optigear BM 220	-15 / 0 / +10 … +75 Alpha SP 220	-15 / 0 / +10 … +75 Renolin CLP 220 Plus SEW070030013	-15 / 0 / +10 … +75 Renolin HighGear 220	-15 / 0 / +10 … +75 Mobilgear 600 XP 220 SEW070030013	-15 / 0 / +10 … +75 Klüberoil GEM 1-220 N	-15 / 0 / +10 … +75 AP-SGO 220 SEW070030013	-15 / 0 / +10 … +75 Carter EP 220
	VG 320	-10 / +5 / +15 … +85 SEW GearOil Base 320 E1 / US1 / CN1 / BR1 SEW070040013	-10 / +5 / +15 … +85 Optigear BM 320	-10 / +5 / +15 … +80 Alpha SP 320	-10 / +5 / +15 … +80 Renolin CLP 320 Plus SEW070030013	-10 / +5 / +15 … +80 Renolin HighGear 320	-10 / +5 / +15 … +80 Mobilgear 600 XP 320 SEW070030013	-10 / +5 / +15 … +80 Klüberoil GEM 1-320 N	-10 / +5 / +15 … +80 AP-SGO 320 SEW070030013	-10 / +5 / +15 … +80 Carter EP 320
	VG 460	-5 / +10 / +20 … +90 SEW GearOil Base 460 E1 / US1 / CN1 / BR1 SEW070040013	-5 / +10 / +20 … +90 Optigear BM 460	-5 / +10 / +20 … +90 Alpha SP 460	-5 / +10 / +20 … +90 Renolin CLP 460 Plus	-5 / +10 / +20 … +90 Renolin HighGear 460	-5 / +10 / +20 … +90 Mobilgear 600 XP 460 SEW070030013	-5 / +10 / +20 … +90 Klüberoil GEM 1-460 N	-5 / +10 / +20 … +90 AP-SGO 460 SEW070030013	-5 / +10 / +20 … +90 Carter EP 460
	VG 680	0 / +15 / +25 … +90 SEW GearOil Base 680 E1 / US1 / CN1 / BR1 SEW070040013	0 / +15 / +25 … +90 Optigear BM 680	0 / +15 / +25 … +90 Alpha SP 680	0 / +15 / +25 … +90 Renolin CLP 680 Plus SEW070030013	0 / +15 / +25 … +90 Renolin HighGear 680	0 / +15 / +25 … +90 Mobilgear 600 XP 680 SEW070030013	0 / +15 / +25 … +90 Klüberoil GEM 1-680 N	-5 / +10 / +20 … +90 AP-SGO 460 SEW070030013	0 / +15 / +25 … +90 Carter EP 680
	VG 1000		+5 / +20 / +30 … +90 Optigear BM 1000							

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This lubricant table is valid when the document is published. Refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

[1]	[2]	SEW EURODRIVE	Castrol		FUCHS		Mobil		KLÜBER LUBRICATION	TOTAL
CLP HC	VG 32 1)						-40 / -30 / -25 … +30 SHC 624			
	VG 68 1)				-35 / -20 / -10 … +50 Renolin Unisyn CLP 68		-40 / -25 / -15 … +50 SHC 626		-35 / -20 / -10 … +50 Klübersynth GEM 4-68 N	
	VG 150 1)	-35 / -15 / -5 … +75 GearOil Synth 150 E1 SEW 070040313	-25 / -10 / 0 … +70 Alphasyn EP 150	-30 / -10 / 0 … +70 Optigear Synthetic X 150	-30 / -10 / +0 … +70 Renolin Unisyn CLP 150		-30 / -10 / 0 … +75 SHC 629	-35 / -15 / -5 … +75 SHC Gear 150	-25 / -10 / 0 … 70 Klübersynth GEM 4-150 N	-35 / -15 / -5 … +75 Carter SH 150
	VG 220	-30 / -10 / 0 … +85 GearOil Synth 220 E1 SEW 070040313	-25 / -5 / +5 … +80 Alphasyn EP 220	-25 / -5 / +5 … +80 Optigear Synthetic X 220	-25 / -5 / +5 … +80 Renolin Unisyn CLP 220		-25 / -5 / 0 … +85 SHC 630	-30 / -10 / +5 … +85 SHC Gear 220	-25 / -5 / +5 … +80 Klübersynth GEM 4-220 N	-25 / -5 / +5 … +80 Carter SH 220
	VG 320	-25 / -5 / +5 … +100 GearOil Synth 320 E1 SEW 070040313	-20 / 0 / +10 … +90 Alphasyn EP 320	-20 / 0 / +10 … +90 Optigear Synthetic X 320	-20 / 0 / +10 … +90 Renolin Unisyn CLP 320		-20 / 0 / +10 … +95 SHC 632	-25 / -5 / +10 … +95 SHC Gear 320	-20 / 0 / +10 … +95 Klübersynth GEM 4-320 N	-20 / 0 / +10 … +90 Carter SH 320
	VG 460	-20 / 0 / +15 … +110 GearOil Synth 460 E1 SEW 070040313	-15 / +5 / +15 … +100 Alphasyn EP 460	-15 / +5 / +15 … +100 Optigear Synthetic X 460	-15 / +5 / +15 … +100 Renolin Unisyn CLP 460		-15 / +5 / +15 … +105 SHC 634	-20 / 0 / +15 … +110 SHC Gear 460	-15 / +5 / +20 … +105 Klübersynth GEM 4-460 N	-15 / +5 / +15 … +100 Carter SH 460
	VG 680	-15 / +5 / +20 … +110 GearOil Synth 680 E1 SEW 070040313		-10 / +10 / +25 … +110 Optigear Synthetic X 680	-10 / +10 / +25 … +110 Renolin Unisyn CLP 680		-10 / +10 / +25 … +110 SHC 636	-15 / +10 / +25 … +110 SHC Gear 680	-10 / +10 / +25 … +110 Klübersynth GEM 4-680 N	-10 / +10 / +25 … +110 Carter SH 680
	VG 1000						-10 / +15 / +30 … +110 SHC 639	-10 / +15 / +30 … +110 SHC Gear 1000	0 / +20 / +30 … +110 Klübersynth EG4-1000	

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[1]	[2]	[3]	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	KLÜBER LUBRICATION
	CLP HC NSF H1 2)	VG 68 1)		-35 / -20 / -10 · +45 Cassida Fluid HF 68	-40 / -25 / -15 · +45 Optileb HY 68	-35 / -20 / -10 · +45 Cassida Fluid HF 68	-35 / -20 / -10 · +45 Klüberoil 4UH1-68 N
		VG 220 1)	-30 / -5 / 0 · +80 SEW GearOil Synth 220 H1 E1 SEW 070040313	-20 / -5 / +5 · +75 Cassida Fluid GL 220	-25 / -5 / +5 · +75 Optileb GT 220 SEW 0700403113	-20 / -5 / +5 · +75 Cassida Fluid GL 220	-25 / -5 / +5 · +75 Klüberoil 4UH1-220 N
		VG 460 1)	-20 / 0 / +15 · +100 SEW GearOil Synth 460 H1 E1 SEW 070040313	-15 / +5 / +20 · +90 Cassida Fluid GL 460	-15 / +5 / +20 · +95 Optileb GT 460 SEW 070040313	-15 / +5 / +20 · +90 Cassida Fluid GL 460	-15 / +5 / +15 · +95 Klüberoil 4UH1-460 N
		VG 680 1)		-10 / +10 / +25 · +105 Cassida Fluid GL 680		-10 / +10 / +25 · +105 Cassida Fluid GL 680	-10 / +10 / +25 · +105 Klüberoil 4UH1-680 N
	E	VG 320				-20 / 0 / +10 · +8a5 Plantogear 320 S S2	-20 / 0 / +10 · +85 Klüberbio EG2-320 S2
		VG 460				-15 / +5 / +15 · +95 Plantogear 460 S S2	

1) Lubricants may only be used
if the service factor F_s and peak load factor $F_F \geq 1.6$.
The peak output torque $MK2_{per}$ is limited as follows: $F_F \geq 1.6 \rightarrow M_{K2per} \leq 1.25 \times MN2$ (nominal torque) $\rightarrow M_{K2per} \leq 2 \times M_{N2}/F_F = 2/1.6 \times M_{N2}$.
In case of deviations, contact SEW-EURODRIVE.

2) NSF-H1 registered oils for the food processing industry cannot be combined with the gear unit option “Extended storage” (a VCI anti-corrosion agent is added).

NOTICE:
Also observe the thermal application limits of the oil seal materials, see chapter "Lubricant compatibility with oil seal" (→ 🗎 277).

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9.7 Lubricant fill quantities

The specified lubricant fill quantities are guide values. Also observe the information provided on the nameplate or in the technical specification.

The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity. Observe chapter "Checking the oil level" (→ 🗎 241).

The stated lubricant fill quantity may deviate for pivoted mounting positions.

9.7.1 Gear unit with horizontal and universal housing /HH /HU

Mounting position M1

XF..

	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X2F100e	13	–
X2F110e	14	–
X2F120e	20	–
X2F130e	22	–
X2F140e	35	–
X2F150e	37	–
X2F160e	61	61
X2F170e	61	61
X2F180e	77	77
X2F190e	81	81
X2F200e	105	105
X2F210e	105	105
X2F220e	140	140
X2F230e	140	140
X2F240e	175	175
X2F250e	175	175
X2F260e	279	279
X2F270e	280	280
X2F280e	330	330
X2F290e	405	405
X2F300e	405	405
X2F310e	550	550
X2F320e	550	550
X3F100e	14	–
X3F110e	15	–
X3F120e	20	–
X3F130e	23	–
X3F140e	34	–
X3F150e	36	–
X3F160e	59	59
X3F170e	59	59
X3F180e	83	78
X3F190e	85	80

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	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X3F200e	105	105
X3F210e	105	105
X3F220e	145	145
X3F230e	145	145
X3F240e	175	175
X3F250e	177	177
X3F260e	282	282
X3F270e	283	283
X3F280e	345	345
X3F290e	410	410
X3F300e	413	413
X3F310e	540	540
X3F320e	540	540
X4F120e	18	–
X4F130e	18	–
X4F140e	31	–
X4F150e	31	–
X4F160e	55	55
X4F170e	55	55
X4F180e	75	75
X4F190e	74	74
X4F200e	95	95
X4F210e	95	95
X4F220e	145	145
X4F230e	145	145
X4F240e	160	160
X4F250e	167	167
X4F260e	285	285
X4F270e	290	290
X4F280e	320	320
X4F290e	410	410
X4F300e	420	420
X4F310e	532	532
X4F320e	532	532

XK..

	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X2K100e	11	–
X2K110e	11	–
X2K120e	16	–
X2K130e	16	–
X2K140e	24	–
X2K150e	27	–

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	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X2K160e	45	45
X2K170e	45	45
X2K180e	62	62
X2K190e	66	66
X2K200e	85	85
X2K210e	85	85
X2K220e	130	130
X2K230e	130	130
X2K240e	165	165
X2K250e	165	165
X3K100e	11	–
X3K110e	13	–
X3K120e	19	–
X3K130e	20	–
X3K140e	32	–
X3K150e	32	–
X3K160e	57	57
X3K170e	57	57
X3K180e	72	72
X3K190e	75	75
X3K200e	100	100
X3K210e	100	100
X3K220e	130	130
X3K230e	134	134
X3K240e	170	170
X3K250e	170	170
X3K260e	274	274
X3K270e	274	274
X3K280e	325	325
X3K290e	427	427
X3K300e	427	427
X3K310e	535	535
X3K320e	535	535
X4K120e	23	–
X4K130e	21	–
X4K140e	34	–
X4K150e	37	–
X4K160e	65	65
X4K170e	65	65
X4K180e	79	79
X4K190e	82	82
X4K200e	102	102
X4K210e	104	104
X4K220e	140	140

	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X4K230e	140	140
X4K240e	176	176
X4K250e	176	176
X4K260e	270	270
X4K270e	270	270
X4K280e	330	330
X4K290e	420	420
X4K300e	420	420
X4K310e	540	540
X4K320e	540	540

XT..

	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication
X3T230e	–	135	300
X3T220e	–	135	300
X3T250e	–	165	395
X3T240e	–	165	395
X4T230e	–	205	305
X4T220e	–	205	305
X4T240e	–	260	400
X4T250e	–	260	400

Mounting position M3

XT..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X3T100e	34	–
X3T110e	34	–
X3T120e	44	–
X3T130e	45	–
X3T140e	77	–
X3T150e	79	–
X3T160e	134	59
X3T170e	134	59
X3T180e	170	70
X3T190e	170	70
X3T200e	230	90
X3T210e	230	90
X4T120e	48	–
X4T130e	51	–
X4T140e	77	–
X4T150e	79	–

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X4T160e	138	73
X4T170e	138	90
X4T180e	175	114
X4T190e	175	114
X4T200e	235	150
X4T210e	225	150

Mounting position M5

For the "Universal housing with EBD" version, you must add the additional oil quantity specified in the table, see chapter "Additional oil quantity for universal housing HU with extended bearing distance (EBD)" (→ 🗎 289).

XF..

	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication with Drywell
X2F100e	–	31	–
X2F110e	–	32	–
X2F120e	16	46	11
X2F130e	19	50	12
X2F140e	34	77	20
X2F150e	36	82	20
X2F160e	58	152	37
X2F170e	58	152	37
X2F180e	72	180	49
X2F190e	75	185	54
X2F200e	105	250	75
X2F210e	105	250	75
X2F220e	125	335	95
X2F230e	125	335	95
X2F240e	155	410	100
X2F250e	155	410	100
X2F260e	220	650	192
X2F270e	220	650	192
X2F280e	265	780	234
X2F290e	300	950	284
X2F300e	300	950	284
X2F310e	416	1285	416
X2F320e	416	1285	416
X3F100e	–	31	–
X3F110e	–	32	–
X3F120e	16	45	11
X3F130e	19	48	14
X3F140e	36	75	20
X3F150e	34	83	22

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	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication with Drywell
X3F160e	56	146	36
X3F170e	56	146	36
X3F180e	69	179	52
X3F190e	71	185	54
X3F200e	105	240	69
X3F210e	105	240	70
X3F220e	120	312	93
X3F230e	120	312	93
X3F240e	145	400	108
X3F250e	145	400	108
X3F260e	210	625	183
X3F270e	210	625	183
X3F280e	260	770	230
X3F290e	295	920	275
X3F300e	295	920	275
X3F310e	399	1240	399
X3F320e	399	1240	399
X4F120e	16	41	12
X4F130e	17	48	12
X4F140e	23	72	19
X4F150e	24	76	19
X4F160e	42	137	36
X4F170e	42	137	36
X4F180e	64	169	49
X4F190e	66	175	51
X4F200e	100	230	68
X4F210e	100	231	68
X4F220e	150	315	93
X4F230e	150	315	93
X4F240e	185	410	110
X4F250e	185	410	110
X4F260e	250	640	186
X4F270e	250	640	186
X4F280e	305	765	230
X4F290e	390	935	273
X4F300e	390	935	273
X4F310e	515	1220	393
X4F320e	515	1220	393

XK..

	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication with Drywell
X2K100e	–	28	–

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	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication with Drywell
X2K110e	–	27	–
X2K120e	16	39	10
X2K130e	16	41	12
X2K140e	24	59	18
X2K150e	25	62	18
X2K160e	48	124	32
X2K170e	48	124	32
X2K180e	60	150	39
X2K190e	60	150	39
X2K200e	85	205	60
X2K210e	85	205	60
X2K220e	130	330	132
X2K230e	130	330	132
X2K240e	155	405	140
X2K250e	155	405	140
X3K100e	–	32	–
X3K110e	–	32	–
X3K120e	16	44	10
X3K130e	17	50	13
X3K140e	32	78	19
X3K150e	34	79	19
X3K160e	53	138	36
X3K170e	53	138	36
X3K180e	70	172	53
X3K190e	74	177	53
X3K200e	95	237	74
X3K210e	100	240	79
X3K220e	115	315	89
X3K230e	115	315	89
X3K240e	145	400	97
X3K250e	145	400	97
X3K260e	210	610	185
X3K270e	210	610	185
X3K280e	265	745	236
X3K290e	300	925	282
X3K300e	300	925	282
X3K310e	411	1245	411
X3K320e	411	1245	411
X4K120e	19	44	11
X4K130e	21	46	12
X4K140e	35	75	19
X4K150e	36	81	19
X4K160e	59	142	36

	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication with Drywell
X4K170e	59	142	36
X4K180e	78	174	53
X4K190e	85	183	53
X4K200e	110	236	74
X4K210e	110	239	74
X4K220e	150	313	93
X4K230e	150	313	93
X4K240e	172	410	111
X4K250e	172	410	111
X4K260e	275	625	185
X4K270e	275	625	185
X4K280e	345	770	231
X4K290e	415	960	276
X4K300e	415	960	276
X4K310e	555	1255	408
X4K320e	555	1255	408

XT..

	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication with Drywell
X3T100e	–	34	–
X3T110e	–	34	–
X3T120e	16	44	12
X3T130e	17	45	13
X3T140e	30	77	19
X3T150e	31	79	19
X3T160e	51	134	32
X3T170e	51	134	32
X3T180e	70	170	50
X3T190e	70	170	50
X3T200e	95	230	68
X3T210e	95	230	68
X3T220e	115	300	89
X3T230e	115	300	89
X3T240e	145	395	107
X3T250e	145	395	107
X4T120e	17	48	12
X4T130e	20	51	13
X4T140e	30	77	19
X4T150e	31	79	19
X4T160e	53	138	32
X4T170e	53	138	32
X4T180e	80	175	50

	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication with Drywell
X4T190e	80	175	50
X4T200e	105	235	66
X4T210e	105	235	66
X4T220e	145	305	92
X4T230e	145	305	92
X4T240e	185	400	107
X4T250e	185	400	107

Additional oil quantity for universal housing HU with extended bearing distance (EBD)

X.F.. / X.K..	Additional oil quantity in l
X140e	2
X150e	2
X160e	3
X170e	3
X180e	4
X190e	4
X200e	6
X210e	6

Mounting position M4

XF..

	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication
X2F100e	–	19
X2F110e	–	21
X2F120e	16	34
X2F130e	18	35
X2F140e	24	53
X2F150e	25	60
X2F160e	51	101
X2F170e	51	101
X2F180e	55	128
X2F190e	55	130
X2F200e	70	175
X2F210e	70	175
X2F220e	100	218
X2F230e	100	218
X2F240e	115	285
X2F250e	115	285
X2F260e	180	650
X2F270e	180	650
X2F280e	235	780
X2F290e	255	950
X2F300e	255	950

	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication
X2F310e	360	1285
X2F320e	360	1285
X3F100e	–	24
X3F110e	–	25
X3F120e	16	35
X3F130e	18	38
X3F140e	24	63
X3F150e	25	67
X3F160e	51	115
X3F170e	51	115
X3F180e	55	150
X3F190e	55	152
X3F200e	70	192
X3F210e	70	192
X3F220e	100	258
X3F230e	100	258
X3F240e	115	330
X3F250e	115	330
X3F260e	180	625
X3F270e	180	625
X3F280e	235	770
X3F290e	255	920
X3F300e	255	920
X3F310e	360	1240
X3F320e	360	1240
X4F120e	16	32
X4F130e	18	38
X4F140e	24	57
X4F150e	25	67
X4F160e	51	122
X4F170e	51	122
X4F180e	55	147
X4F190e	55	147
X4F200e	70	192
X4F210e	70	192
X4F220e	100	265
X4F230e	100	265
X4F240e	115	340
X4F250e	115	340
X4F260e	180	640
X4F270e	180	640
X4F280e	235	765
X4F290e	255	935
X4F300e	255	935

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	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication
X4F310e	360	1220
X4F320e	360	1220

XK..

	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication
X2K100e	–	28
X2K110e	–	27
X2K120e	17	39
X2K130e	17	41
X2K140e	24	64
X2K150e	25	68
X2K160e	48	131
X2K170e	48	131
X2K180e	55	150
X2K190e	55	150
X2K200e	70	205
X2K210e	70	205
X2K220e	100	330
X2K230e	100	330
X2K240e	115	405
X2K250e	115	405
X3K100e	–	32
X3K110e	–	32
X3K120e	18	48
X3K130e	18	51
X3K140e	24	77
X3K150e	27	84
X3K160e	48	143
X3K170e	48	143
X3K180e	55	172
X3K190e	55	175
X3K200e	73	234
X3K210e	73	234
X3K220e	100	315
X3K230e	100	315
X3K240e	115	400
X3K250e	115	400
X3K260e	180	610
X3K270e	180	610
X3K280e	235	745
X3K290e	255	925
X3K300e	255	925
X3K310e	360	1245

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	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication
X3K320e	360	1245
X4K120e	17	45
X4K130e	18	50
X4K140e	24	80
X4K150e	27	86
X4K160e	48	142
X4K170e	48	142
X4K180e	55	183
X4K190e	55	183
X4K200e	70	250
X4K210e	70	250
X4K220e	100	330
X4K230e	100	330
X4K240e	115	410
X4K250e	115	410
X4K260e	180	625
X4K270e	180	625
X4K280e	235	770
X4K290e	255	960
X4K300e	255	960
X4K310e	360	1255
X4K320e	360	1255

XT..

	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication
X3T100e	–	21
X3T110e	–	21
X3T120e	16	31
X3T130e	16	32
X3T140e	23	47
X3T150e	27	57
X3T160e	48	90
X3T170e	48	90
X3T180e	55	120
X3T190e	55	120
X3T200e	70	160
X3T210e	70	160
X3T220e	100	215
X3T230e	100	215
X3T240e	115	270
X3T250e	115	270
X4T120e	16	35
X4T130e	16	37

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	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication
X4T140e	23	52
X4T150e	27	53
X4T160e	48	93
X4T170e	48	93
X4T180e	55	125
X4T190e	55	125
X4T200e	70	160
X4T210e	70	160
X4T220e	100	215
X4T230e	100	215
X4T240e	115	285
X4T250e	115	285

9.7.2 Gear unit with thermal housing /HT

	Oil quantity in l for pressure lubrication	Oil quantity in l for splash lubrication
X3K180e	112	112
X3K190e	112	112
X3K200e	160	160
X3K210e	160	160
X3K220e	224	224
X3K230e	224	224
X3K240e	303	303
X3K250e	292	292
X3K260e	475	475
X3K270e	475	475
X3K280e	550	550
X3K290e	730	730
X3K300e	730	730
X3K310e	1015	1015
X3K320e	1015	1015

9.7.3 Gear unit with agitator housing /HA

Mounting position M5

XF..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X3F140	107	59	61
X3F150	114	64	66
X3F160	171	90	92
X3F170	178	94	96
X3F180	254	128	133
X3F190	260	132	137
X3F200	387	197	202

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X3F210	391	202	207

9.7.4 Gear units with reduced oil level

Horizontal and universal housing /HH /HU

Mounting position M1 with splash and bath lubrication

X2F..

Size	Oil quantity in l
X2F.180e	58
X2F.190e	58
X2F.200e	79
X2F.210e	79
X2F.220e	109
X2F.230e	109
X2F.240e	130
X2F.250e	130

X2K..

Size	Oil quantity in l
X2K.180e	49
X2K.190e	51
X2K.200e	67
X2K.210e	69
X2K.220e	107
X2K.230e	108
X2K.240e	125
X2K.250e	125

X3K..

Size	Oil quantity in l
X3K.180e	58
X3K.190e	58
X3K.200e	78
X3K.210e	79
X3K.220e	108
X3K.230e	108
X3K.240e	128
X3K.250e	128
X3K.260e	214
X3K.270e	205
X3K.280e	267
X3K.290e	320
X3K.300e	321
X3K.310e	413
X3K.320e	429

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Mounting position M1 with pressure lubrication

X2F..

Size	Oil quantity in l
X2F.160e	49
X2F.170e	50
X2F.180e	60
X2F.190e	61
X2F.200e	81
X2F.210e	81
X2F.220e	114
X2F.230e	114
X2F.240e	135
X2F.250e	135
X2F.260e	220
X2F.270e	212
X2F.280e	274
X2F.290e	328
X2F.300e	329
X2F.310e	422
X2F.320e	442

X3F..

Size	Oil quantity in l
X3F.160e	50
X3F.170e	51
X3F.180e	60
X3F.190e	61
X3F.200e	82
X3F.210e	82
X3F.220e	113
X3F.230e	114
X3F.240e	132
X3F.250e	132
X3F.260e	220
X3F.270e	211
X3F.280e	273
X3F.290e	326
X3F.300e	327
X3F.310e	432
X3F.320e	433

X4F..

Size	Oil quantity in l
X4F.160e	46
X4F.170e	47
X4F.180e	54
X4F.190e	55
X4F.200e	73
X4F.210e	74
X4F.220e	112
X4F.230e	113
X4F.240e	130

Size	Oil quantity in l
X4F.250e	130
X4F.260e	218
X4F.270e	210
X4F.280e	271
X4F.290e	324
X4F.300e	325
X4F.310e	426
X4F.320e	427

X2K..

Size	Oil quantity in l
X2K.160e	40
X2K.170e	42
X2K.180e	51
X2K.190e	53
X2K.200e	69
X2K.210e	71
X2K.220e	112
X2K.230e	113
X2K.240e	130
X2K.250e	130

X3K..

Size	Oil quantity in l
X3K.160e	49
X3K.170e	50
X3K.180e	60
X3K.190e	60
X3K.200e	80
X3K.210e	80
X3K.220e	113
X3K.230e	113
X3K.240e	133
X3K.250e	133
X3K.260e	279
X3K.270e	279
X3K.280e	272
X3K.290e	325
X3K.300e	326
X3K.310e	418
X3K.320e	434

X4K..

Size	Oil quantity in l
X4K.160e	50
X4K.170e	50
X4K.180e	61
X4K.190e	62
X4K.200e	82
X4K.210e	83
X4K.220e	113

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Size	Oil quantity in l
X4K.230e	114
X4K.240e	132
X4K.250e	132
X4K.260e	220
X4K.270e	211
X4K.280e	272
X4K.290e	326
X4K.300e	327
X4K.310e	431
X4K.320e	432

X3T..

Size	Oil quantity in l
X3T.160e	42
X3T.170e	44
X3T.180e	50
X3T.190e	51
X3T.200e	67
X3T.210e	68
X3T.220e	113
X3T.230e	113
X3T.240e	133
X3T.250e	133

X4T..

Size	Oil quantity in l
X4T.160e	45
X4T.170e	46
X4T.180e	54
X4T.190e	55
X4T.200e	68
X4T.210e	69
X4T.220e	114
X4T.230e	113
X4T.240e	133
X4T.250e	133

Thermal housing /HT

Size	Oil quantity in l for splash lubrication
X3K.180e	92
X3K.190e	92
X3K.200e	132
X3K.210e	132
X3K.220e	185
X3K.230e	185
X3K.240e	240
X3K.250e	240
X3K.260e	400
X3K.270e	384
X3K.280e	470
X3K.290e	630

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Size	Oil quantity in l for splash lubrication
X3K.300e	630
X3K.310e	870
X3K.320e	870

9.8 Sealing greases/rolling bearing greases

INFORMATION

- Do not mix permitted greases from different areas of application.
- If users want to use a grease that is not listed, it is their responsibility to ensure that the grease is suitable for the intended application.

The table shows the greases recommended by SEW-EURODRIVE with the "lower operating temperature".

The permitted operating temperature of the lubricant used must be taken into account for the lower and upper operating temperature. For further information, refer to chapter "Lubricant table" (→ 🗎 278).

Area of application	Manufacturer	Grease	Lower service temperature
Standard	SEW-EURODRIVE	**SEW Grease HL 2 E1**[1)]	-40 °C
	Fuchs	Renolit CX TOM 15 OEM	-40 °C
	BP	Energrease LS EP-2	-30 °C
	Castrol	Longtime PD 2/ Tribol GR 100-1 PD	-35 °C
		Spheerol EPL 2	-20 °C
	Klüber	Centoplex EP 2	-20 °C
		Petamo GHY 133 N	-40 °C
	Mobil	Mobilux EP 2	-20 °C
	Shell	Gadus S2 V220 2	-20 °C
	Total	Multis EP 2	-20 °C
	SEW	**SEW Grease HL 2 H1 E1**[1)]	-40 °C
	Bremer & Leguil	Cassida Grease GTS2	-40 °C
	Fuchs	**Plantogel 2 S** [1)]	-40 °C

1) Use the greases used at the factory if possible.

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10 Malfunctions/remedy

Before you begin read the following notes in chapter "Creating a safe working environment" (→ 🗎 18).

10.1 Possible malfunctions/remedy

Fault	Possible cause	Measure
Operating temperature too high	• Too much oil	• Check the oil level; correct if necessary
	• Oil too old	• Check when the oil was last changed; change the oil, if necessary
	• Oil is heavily contaminated	• Analyze the oil to determine the cause; take measures, if necessary; change the oil
	• Ambient temperature too high	• Protect the gear unit from external heat sources (e.g. provide shade)
	• Gear units with fan: Air intake opening/gear unit housing contaminated	• Check air intake openings, clean them if necessary; clean the gear unit housing
	• Malfunction of the oil-air or oil-water cooling system	• Observe the separate operating instructions for the oil-water or oil-air cooling system.
	• For gear units with built-in cooling: Cooling liquid flow rate too low; cooling liquid temperature too high; deposits in cooling system	• Check the cooling liquid flow rate; check the entry temperature of the cooling liquid; clean the cooling system.
Unusual, regular running noise	• Meshing/grinding noise: Bearing damage	• Check the oil consistency; change bearings
	• Knocking noise: Irregularity in the gearing	• Contact SEW-EURODRIVE. For a better assessment of the failure, send an audio recording of the noise
	• Deformation of the housing upon tightening	• Check the gear unit mounting for possible deformation and correct if necessary
	• Noise generation caused by insufficient rigidity of the gear unit foundation	• Reinforce the gear unit foundation
Unusual, irregular running noises	• Foreign objects in the oil	• Check the oil consistency • Stop the drive, contact SEW-EURODRIVE
Unusual noise in the area where the gear unit is mounted	• Gear unit mounting has loosened	• Tighten retaining screws and nuts to the specified torque • Replace the damaged/defective retaining screws or nuts

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Fault	Possible cause	Measure
Temperature at bearing points too high	• Not enough oil • Oil too old • Bearing damaged	• Check oil level; correct if necessary • Check when the oil was last changed; change the oil if necessary • Check the bearing and replace it if necessary. Contact SEW-EURODRIVE
Oil leaking • From cover plate • From inspection cover • From bearing cover • From mounting flange	• Seal not tight at: – Cover plate – Inspection cover – Bearing cover – Mounting flange	• Tighten the bolts on the respective cover. Observe the gear unit. Contact SEW-EURODRIVE if oil is still leaking
Oil leaking[1)] • From oil seal	• Too much oil • Venting sealed • Oil seal damaged/worn	• Check the oil level and correct, if necessary • Check the breather and replace if necessary • Check the oil seals and replace if necessary
Oil leaking • At the gear unit breather	• Too much oil • Drive not installed in proper mounting position • Frequent cold starts (oil foaming) and/or high oil level	• Check oil level, correct if necessary • Install gear unit breather correctly and adjust the oil level • Install oil expansion tank
Oil leaking • from the screw plug • from the oil drain valve	• Gasket not tight • Fittings loosened	• Retighten screw • Retighten the fitting and screw. Secure screw fitting with Loctite®.
Severe V-belt wear	• Inadequately aligned belt pulleys • Harmful ambient conditions (e.g. abrasive particles, chemical substances) • V-belt overloaded	• Check V-belt pulley alignment and pretension of the belts • Protect V-belt drive from environmental influences; sufficient ventilation must be ensured • Replace V-belt if necessary; contact SEW-EURODRIVE
No oil pump suction	• Air in the suction line of the oil pump • Oil pump defective	• Fill oil into the suction line and the oil pump, vent the pump at the pressure side • Consult SEW-EURODRIVE
Pressure switch not switching	• Air in the suction line of the oil pump • Pressure switch connected incorrectly • Pressure switch defective • Oil pump defective	• Fill suction pipe and oil pump with oil • Vent the pump at the pressure side • Check the connection • Replace pressure switch • Contact SEW-EURODRIVE

Fault	Possible cause	Measure
Malfunction in the oil-water or oil-air cooling system	• Malfunction of the oil-water or oil-air cooling system	• Observe the separate operating instructions for the oil-water or oil-air cooling system.
Gear unit does not reach cold start temperature	• Thermostat set incorrectly • Oil heater faulty or connected incorrectly • Heat dissipation too great due to unfavorable climatic conditions	• Check the setting of the thermostat • Check the oil heater is connected and working correctly and replace it if necessary. • Prevent the gear unit from cooling off during the warm-up phase.
Operating temperature at backstop too high, no blocking function	• Damaged/defective backstop	• Check the backstop, replace it if necessary • Contact SEW-EURODRIVE

1) During the run-in phase (24-hour runtime), it is normal for (small amounts of) oil/grease to leak from the oil seal (see also DIN 3761).

10.2 Service

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

- Complete nameplate data
- Type and extent of the failure
- Time the failure occurred and any accompanying circumstances
- Assumed cause
- Video and audio recordings, if possible

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10.3 Waste disposal

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

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

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

- Oil and grease

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

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11 Address list

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Service	Tomago	SEW-EURODRIVE PTY. LTD. 8 Epson Drive Tomago, New South Wales, 2322	Tel. +61 2 49505585 mail@sew-eurodrive.com.au

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

Bangladesh			
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Belgium			
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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. Jvl / Ind 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			
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Service	Vejle	SEW-EURODRIVE A/S Bødkervej 2 7100 Vejle	Tel. +45 43 9585 00 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
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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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	Tapukara	SEW-EURODRIVE India Private Limited Plot No SP-6-46, Tapukara, Karoli Industrial Area, No. 1, district : Alwar , Rajasthan - 301707	Tel. +91 265 3045200 Fax +91 265 3045300 tapukara.plant@seweurodriveindia.com

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Indonesia			
Registered Office Sales Service	Jakarta	PT SEW EURODRIVE INDONESIA Palma Tower, 16th Floor, Unit H & I, Jl R.A. Kartini II-S Kav 06 Pondok Pinang, Kebayoran Lama Jakarta Selatan 12310	Tel. +62 21 7593 0272 Fax +62 21 7593 0273 sales.indonesia@sew-eurodrive.com https://www.sew-eurodrive.com.sg
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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
	Jakarta	PT. Agrindo Putra Lestari JL.Pantai Indah Selatan, Komplek Sentra Industri Terpadu, Pantai indah Kapuk Tahap III, Blok E No. 27 Jakarta 14470	Tel. +62 21 2921-8899 Fax +62 21 2921-8988 aplindo@indosat.net.id http://www.aplindo.com
	Surabaya	PT. TRIAGRI JAYA ABADI Jl. Sukosemolo No. 63, Galaxi Bumi Permai G6 No. 11 Surabaya 60111	Tel. +62 31 5990128 Fax +62 31 5962666 sales@triagri.co.id http://www.triagri.co.id
	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 S.a.s. di SEW S.r.l. & Co. Via Bernini,12 20033 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 27 21 21 81 05 Fax +225 27 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

Kazakhstan			
Sales Service	Almaty	SEW-EURODRIVE LLP 291-291A, Tole bi street 050031, Almaty	Tel. +7 (727) 350 5156 Fax +7 (727) 350 5156 http://www.sew-eurodrive.com kazakhstan@sew-eurodrive.com
	Tashkent	Representative Office SEW-EURODRIVE Representative office in Uzbekistan 95A Amir Temur ave, office 401/3 100084 Tashkent	Tel. +998 97 134 01 99 http://www.sew-eurodrive.uz sew@sew-eurodrive.uz
	Ulaanbaatar	IM Trading LLC Olympic street 28B/3 Sukhbaatar district, Ulaanbaatar 14230, MN	Tel. +976-77109997 Fax +976-77109997 imt@imt.mn
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
Lebanon			
Sales (Lebanon)	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
Sales (Jordan, Kuwait , 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
Mexico			
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, MN	Tel. +976-77109997 Tel. +976-99070395 Fax +976-77109997 http://imt.mn/ imt@imt.mn

Morocco			
Sales Service Assembly	Bouskoura	SEW-EURODRIVE Morocco SARL Parc Industriel CFCIM, Lot. 55/59 27182 Bouskoura Grand Casablanca	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 SUPPLIES CC 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
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 64C Toyin Street Opebi-Allen Ikeja Lagos-Nigeria	Tel. +234-701-821-9200-1 http://www.greenpegltd.com sales@greenpegltd.com
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Hornebergvegen 11 B 7038 Trondheim	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 Nu Guazu No. 642 casi Campo Esperanza Santisima Trinidad Asuncion	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

Poland			
	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 http://www.sialco.ro sialco@sialco.ro
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. 9, Tuas Drive 2 Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Slovakia			
Drive Technology Center	Bernolákovo	SEW-Eurodrive SK s.r.o. Priemyselná ulica 6267/7 900 27 Bernolákovo	Tel.+421 2 48 212 800 http://www.sew-eurodrive.sk sew@sew-eurodrive.sk
Slovenia			
Representation: Austria			
South Africa			
Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED 32 O'Connor Place Eurodrive House Aeroton Johannesburg 2190 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

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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
	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
Assembly Service	Siheung	SEW-EURODRIVE Korea Co., Ltd. 35, Emtibeui 26-ro 58beon-gil, Siheung-si, Gyeonggi-do	http://www.sew-eurodrive.kr
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 Simunye street Matsapha, Manzini	Tel. +268 7602 0790 Fax +268 2 518 5033 charles@cgtrading.co.sz www.cgtradingswaziland.com
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 AG Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 17 17 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 https://www.sew-eurodrive.co.th
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

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Turkey			
Assembly Sales Service	Kocaeli-Gebze	SEW-EURODRIVE Ana Merkez 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
Ukraine			
Assembly Sales Service	Dnipropetrovsk	SEW-EURODRIVE, LLC Robochya str., bld. 23-B, office 409 49008 Dnipro	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
United Arab Emirates			
Drive Technology Center	Dubai	SEW-EURODRIVE FZE PO Box 263835 Jebel Ali Free Zone – South, P.O. Box Dubai, United Arab Emirates	Tel. +971 (0)4 8806461 Fax +971 (0)4 8806464 info@sew-eurodrive.ae
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 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. 202 W. Danieldale Rd. DeSoto, TX 75115	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
		SEW-EURODRIVE INC. 220 Finch Rd. Wellford, S.C. 29385-9630	
	Additional addresses for service provided on request!		
Vietnam			
Sales	Ho Chi Minh City	SEW-EURODRIVE PTE. LTD. RO at Hochim- inh City Floor 8, KV I, Loyal building, 151-151 Bis Vo Thi Sau street, ward 6, District 3, Ho Chi Minh City, Vietnam	Tel. +84 937 299 700 huytam.phan@sew-eurodrive.com
	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
Zambia			
Representation: South Africa			

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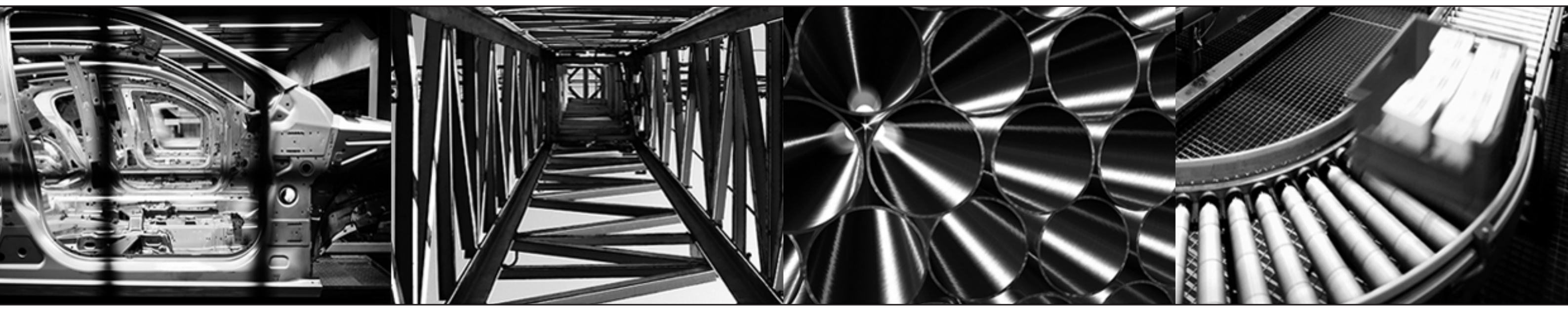

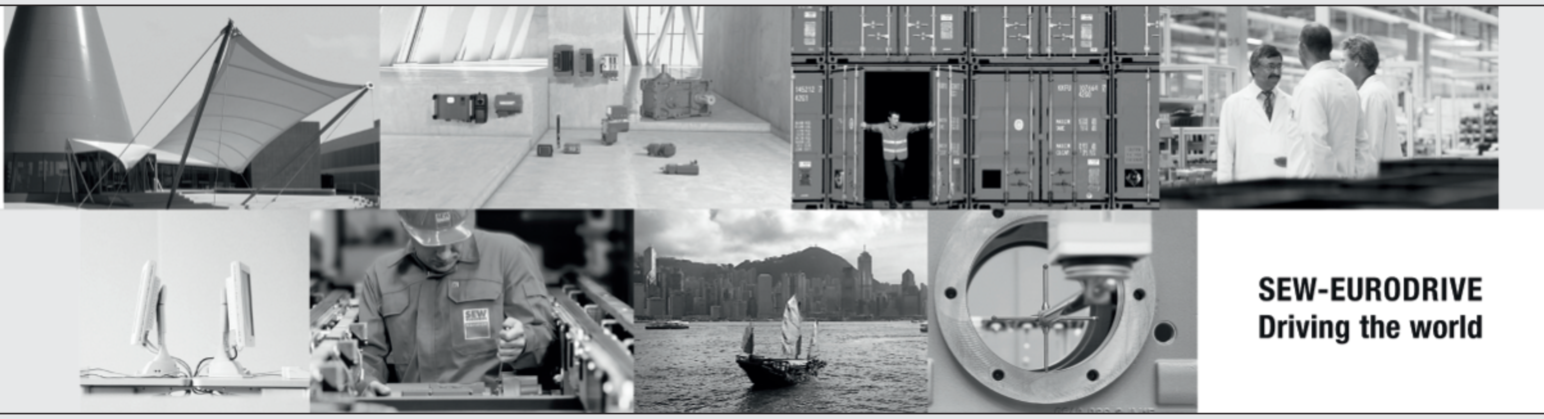

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