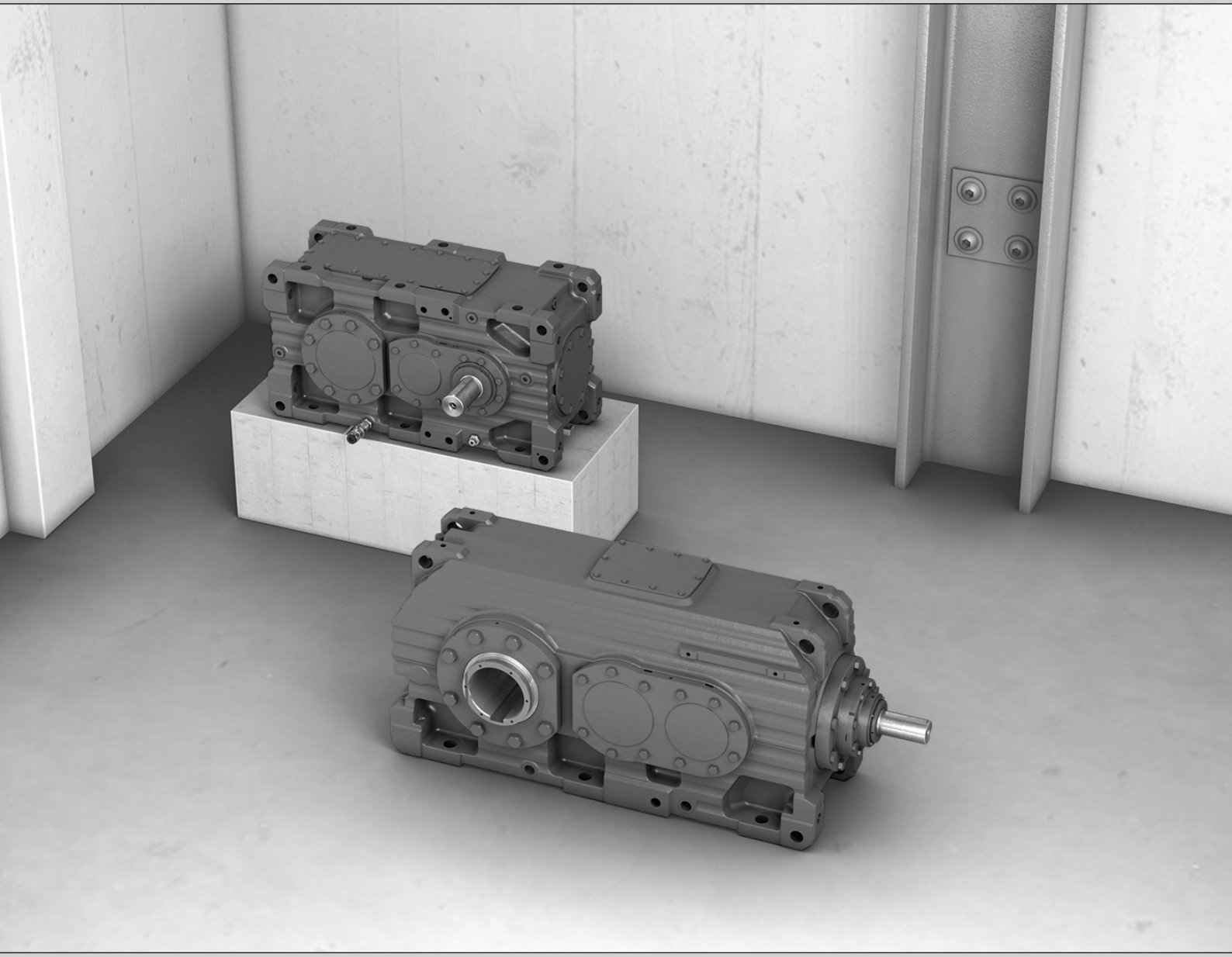
SEW EURODRIVE

Assembly and Operating Instructions



Industrial Gear Units

X.. Series Helical and Bevel-Helical Gear Units

Torque Classes from 6.8 kNm – 475 kNm

Edition 06/2020

25938673/EN

Contents

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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 grading and meaning of the signal words for safety notes.

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

1.2.2 Structure of section-related safety notes

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

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

SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

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Meaning of the hazard symbols

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

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

1.2.3 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

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

1.3 Rights to claim under limited warranty

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

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1.4 Decimal separator in numerical values

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

Example: 30.5 kg

1.5 Product names and trademarks

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

1.6 Copyright notice

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2 Safety notes

2.1 Preliminary information

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

2.2 Duties of the user

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

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

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

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

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

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

2.3 Target group

Specialist for mechanical work

Any mechanical work may 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 who possess the following qualifications:

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

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Specialist for electrotechnical work

Any electrotechnical work may be performed only by electrically skilled persons with a suitable education. Electrically skilled persons in the context of this documentation are persons who are familiar with electrical installation, startup, troubleshooting, and maintenance of the product 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 transportation, storage, operation and waste disposal must be carried out by persons who are trained appropriately. The purpose of the training is to give persons the ability to perform the required tasks and work steps in a safe and correct manner.

2.4 Designated use

The industrial gear units are gear units run by motors for industrial and commercial systems. The units may only be run at the speeds and powers shown in the technical data or on the nameplate. Implementing gear unit loads other than the permitted values or operating the gear units in areas of application other than industrial and commercial systems is only permitted after consultation with SEW-EURODRIVE.

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

In compliance with the EC Machinery Directive 2006/42/EC, the industrial gear units are partly completed machinery for installation in machinery and systems. In the scope of the EC directive, you must not take the machinery into operation in the designated fashion until you have established that the end product complies with Machinery Directive 2006/42/EC.

2.5 Other applicable documentation

Note also the following documentation:

- "X.. Series Helical and Bevel-Helical Gear Units" catalog
- Order documents, e.g. dimension sheet, order confirmation, etc.
- If required, the "AC Motors" operating instructions
- If required, the operating instructions of the options installed

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2.6 Safety symbols on the gear unit

⚠ CAUTION

Safety/caution signs and safety symbols can become dirty or illegible over time.

Risk of injury due to illegible symbols.

- Always make sure that safety, warning, and operating notes are legible.
- Replace damaged safety/caution signs and safety symbols.

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

Safety symbol	Meaning
	Indicates the **oil filling location**. Also serves as proper venting during the oil change.
	Indicates the **oil drain**.
	Indicates the position of the **breather**. Serves to avoid mistaking the oil measuring position for the venting position.
	Helps avoid errors caused by lack of understanding. Read the information in the operating instructions.
	Indicates the **magnetic oil dipstick**.
	Indicates the **magnetic oil drain plug**.
	Indicates the **relubrication points** and makes it easier to find the locations to be lubricated. Helps avoid bearing damage.
	Indicates the **water supply** and serves to locate the connection option.
	Indicates the **water return** and serves to locate the connection option.
	Indicates the **oil supply** and serves to locate the connection option.

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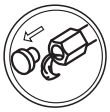
Safety symbol	Meaning
	Indicates the **oil return** and serves to locate the connection option.
	For pivoted mounting positions, this symbol on the information sign indicates the mounting position of the gear unit for **checking the oil**.
	Indicates the position of the **temperature sensor/temperature switch**.
	Indicates the **grease drain plug** and serves to locate the grease drain. Helps avoid bearing damage.
	Indicates the **air outlet screw**.
	Caution: Risk of burns due to hot surface.
	Caution: Removing the dipstick during operation may result in damage to the gear unit.
	Caution: Risk of burns due to hot gear oil.

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After startup, you may remove the following labels from the gear unit.

Meaning
The brake is not set at the factory.

VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE

SEW EURODRIVE

18855199

(DE) **Die Bremse ist ab Werk nicht eingestellt.**
Mögliche Sachschäden!
- Bremse vor der Inbetriebnahme gemäß Betriebsanleitung einstellen

(EN) **The brake has not been set at the factory**
Potential damage to property!
- Prior to startup, set the brake according to the operating instructions.

(F) **Le frein n'est pas réglé d'usine**
Risque de dommages matériels !
- Avant la mise en service, régler le frein conformément aux instructions de la notice d'exploitation.

(ES) **El freno no viene ajustado de fábrica.**
¡Posibles daños materiales!
- Antes de la puesta en marcha, ajustar el freno según las instrucciones de funcionamiento.

(NL) **De rem is niet af fabriek ingesteld.**
Mogelijke materiële schade!
- Rem voor de inbedrijfstelling conform technische handleiding instellen.

(PL) **Hamulec nie jest ustawiony fabrycznie.**
Możliwe szkody materialne!
- Przed uruchomieniem należy ustawić hamulec zgodnie z wytycznymi z instrukcji obsługi.

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The coupling is delivered without grease.

VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE

SEW EURODRIVE

18977405

(DE) **Kupplung wird ohne Fett geliefert.**
Mögliche Sachschäden!
- Vor der Inbetriebnahme Kupplung mit Fett befüllen.

(EN) **Coupling delivered without grease**
Possible damage to property.
- Fill coupling with grease prior to startup.

(F) **L'accouplement est livré sans graisse.**
Risque de dommages matériels !
- Avant la mise en service, remplir l'accouplement de graisse.

(ES) **El acoplamiento se suministra sin grasa.**
¡Posibles daños materiales!
- Llenar el acoplamiento con grasa antes de la puesta en marcha.

(NL) **Koppeling wordt zonder vet geleverd.**
Mogelijke materiële schade!
- Koppeling vóór de inbedrijfstelling met vet vullen.

(PL) **Sprzęgło jest dostarczane bez smaru.**
Możliwe szkody materialne!
- Przed uruchomieniem należy napełnić sprzęgło smarem.

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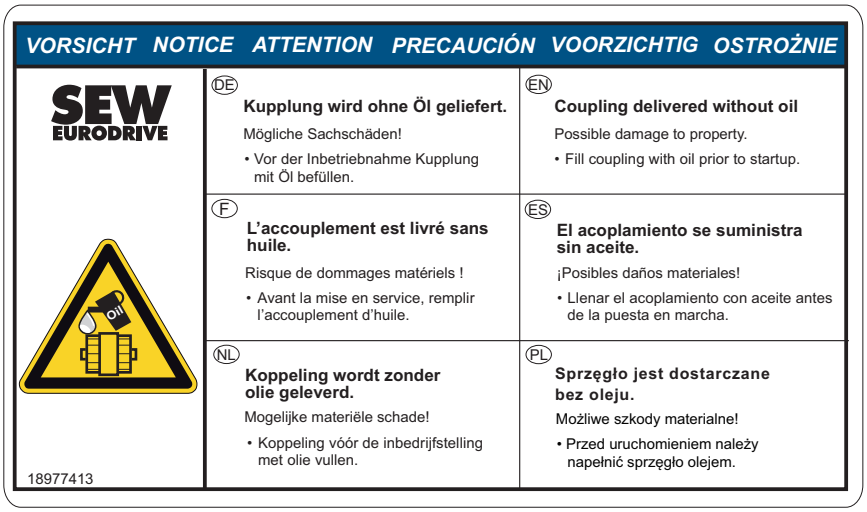
Meaning

The coupling is delivered without oil.



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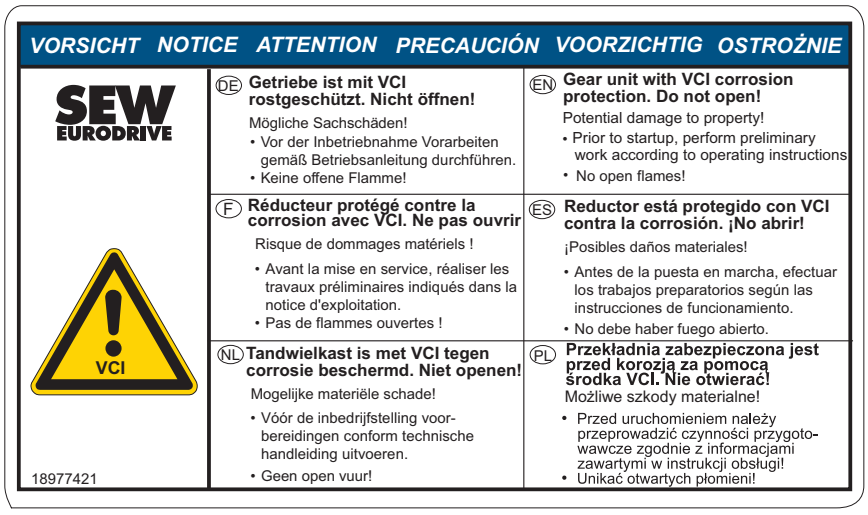
The gear unit is protected against corrosion with VCI.



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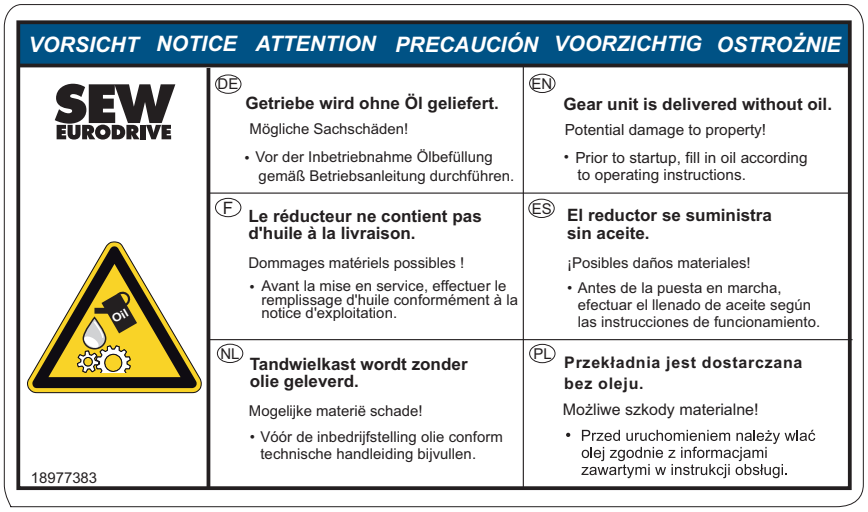
Meaning

The gear unit is delivered without oil.



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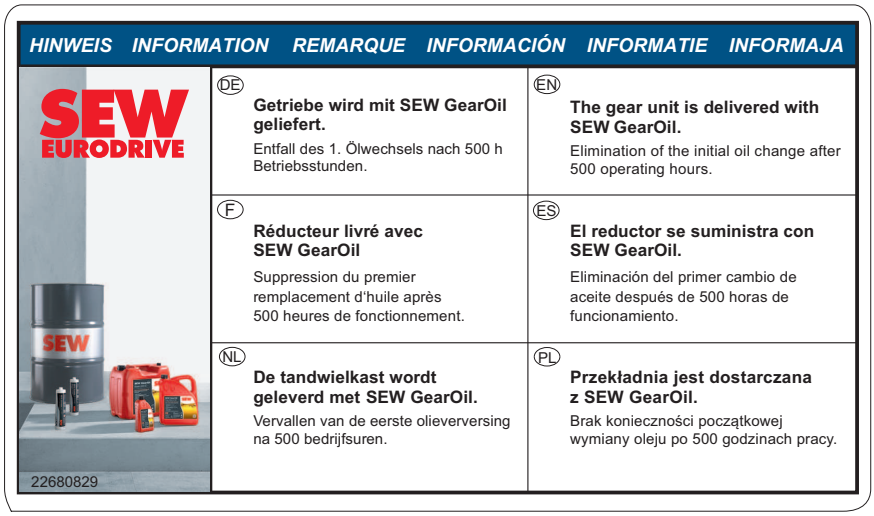
The gear unit is delivered with SEW GearOil.



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2.7 Symbols on the dimension sheet

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

Symbols	Meaning
	Indicates the **oil filling location**.
	Indicates the **oil drain**.
	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**.

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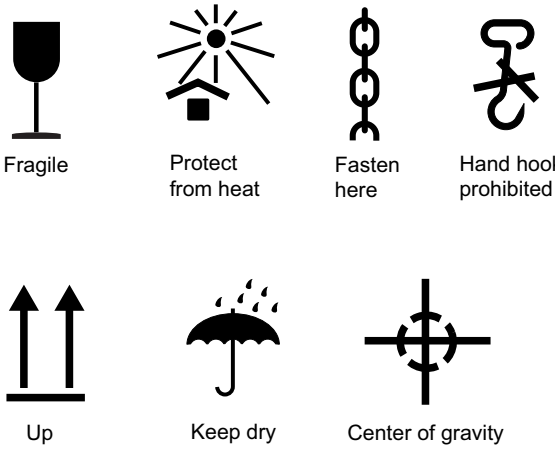
2.8 Symbols on the packaging

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



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2.9 Transport

2.9.1 General information

⚠ WARNING

Suspended loads can fall.

Severe or fatal injuries.

- Do not stand under the suspended load.
- Secure the danger zone.
- Use suitable, sufficiently rated, and undamaged handling equipment.
- Consider the gear unit dimensions, the center of gravity, and the weight that has to be moved when selecting lifting equipment or crane (see dimension drawing). The weight to be moved is the total weight of the drive package including mount-on components (not only the weight of the gear unit).

⚠ WARNING

Lifted loads may fall over.

Severe or fatal injuries.

- Secure the gear unit against falling over during the lifting process.
- Secure the danger zone.
- Use suitable, sufficiently rated, and undamaged handling equipment.
- Consider the gear unit dimensions, the center of gravity, and the weight that has to be moved when selecting lifting equipment or crane (see order documents). The weight to be moved is the total weight of the drive package including mount-on components (not only the weight of the gear unit).

⚠ CAUTION

Risk of slipping of unsecured mount-on components, such as keys.

Potential risk of crushing due to falling parts.

- Secure the mount-on components.

⚠ CAUTION

Danger due to lubricant leaking from damaged seals and the breather.

Minor injuries.

- Check the gear unit and mount-on components for leaking lubricant.
- The seals must not come in contact with cleaning agent as this may damage the seals.
- Protect the breather against damage.
- 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.

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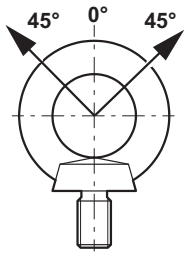
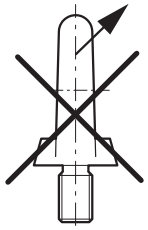
NOTICE

Improper transport may cause damage to the gear unit.

Possible damage to property.

- Observe the following information.

- Inspect the shipment for possible transport damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. In the event of damage, do not start up the gear unit.
- The weight of the gear unit (without oil) is indicated on the nameplate or on the dimension sheet. Observe the loads and specifications given on the nameplate.
- 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, and replace the breather with a screw plug.
- The gear unit must be transported in a manner that prevents damage to the gear unit and to attached components. For example, impacts against exposed shaft ends can damage the gear unit.
- Use only the prescribed attachment points [1] to transport the gear unit (see order documents). The load suspensions of the motor or attached components are provided for stabilization purposes only.
- 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 taking the fan into operation, make sure the fan guard is mounted properly.
- The lifting eyebolts must be screwed in completely and must be flush with the contact surface. Observe the following note.

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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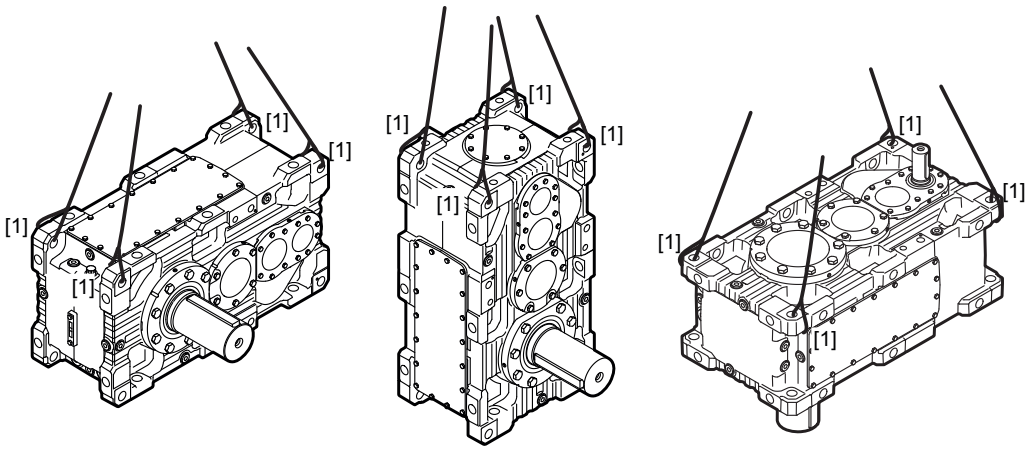
2.9.2 Universal housing /HU

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



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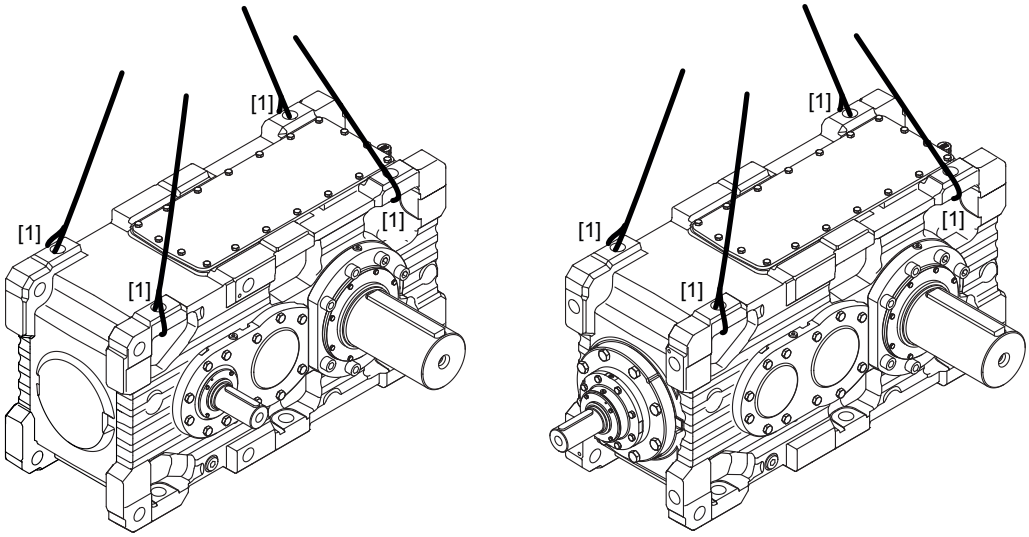
2.9.3 Horizontal housing /HH

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

Sizes X100 – 210



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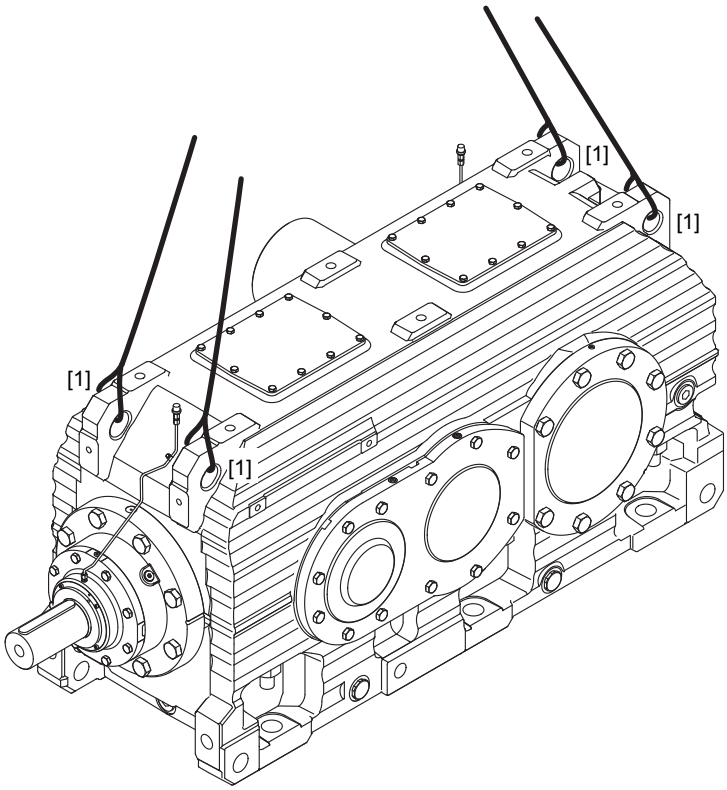
Sizes X220 – 320



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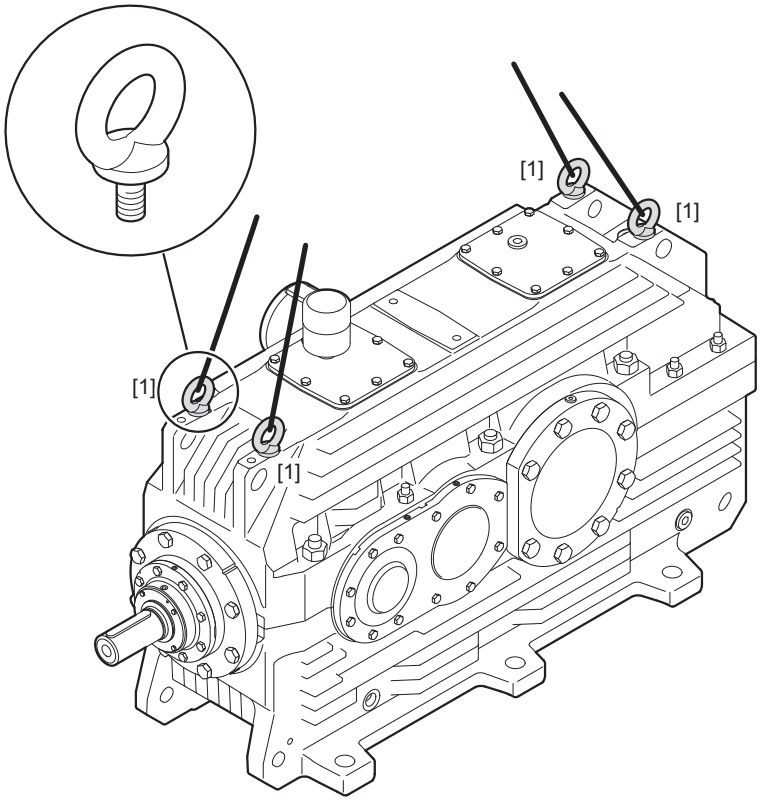
2.9.4 Thermal housing /HT

The user is responsible for transport. For an example of the internal SEW-EURODRIVE plant specifications, refer to the following table. 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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2.9.5 Agitator housing /HA

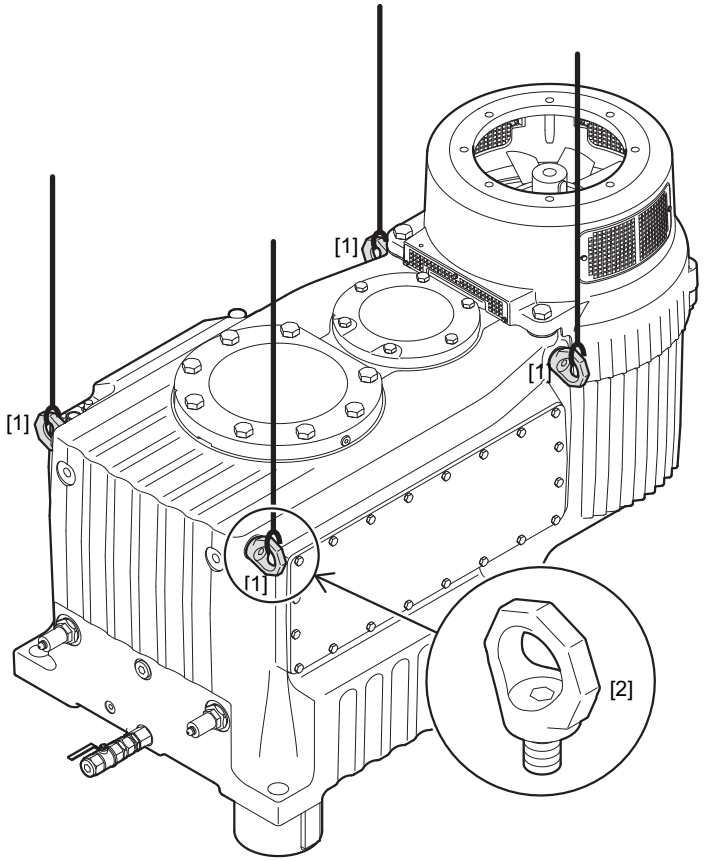
The user is responsible for transport. For an example of the internal SEW-EURODRIVE plant specifications, refer to the following table. The values in the table are only valid for transport with **4** attachment points [1] and without mount-on components, such as external cooling systems.

Use 5 star-shaped lifting eyebolts [2] for transport. Transport with eyebolts according to DIN 580 and DIN 582 is not permitted.

Transport with only 2 attachment points is not permitted.

Size	Thread
X140 – 150	4 × M16
X160 – 170	4 × M20
X180 – 190	4 × M24
X200 – 210	4 × M24

The following figure illustrates how to transport the gear unit.



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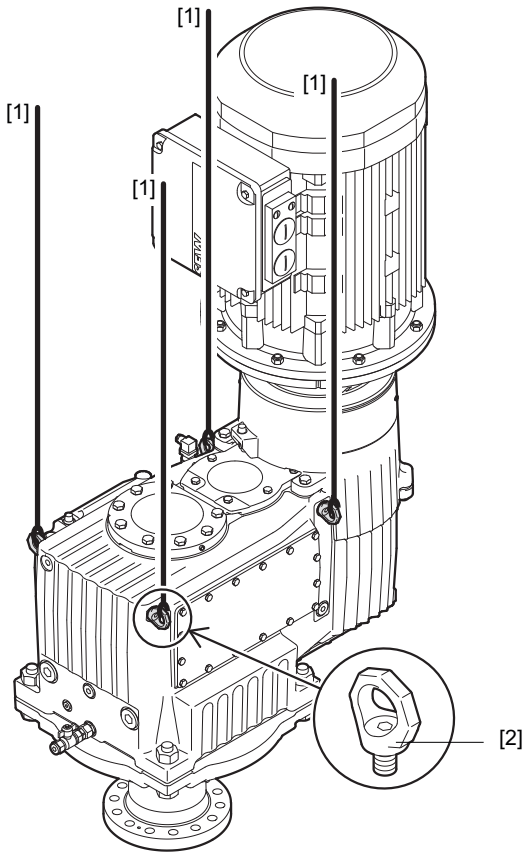
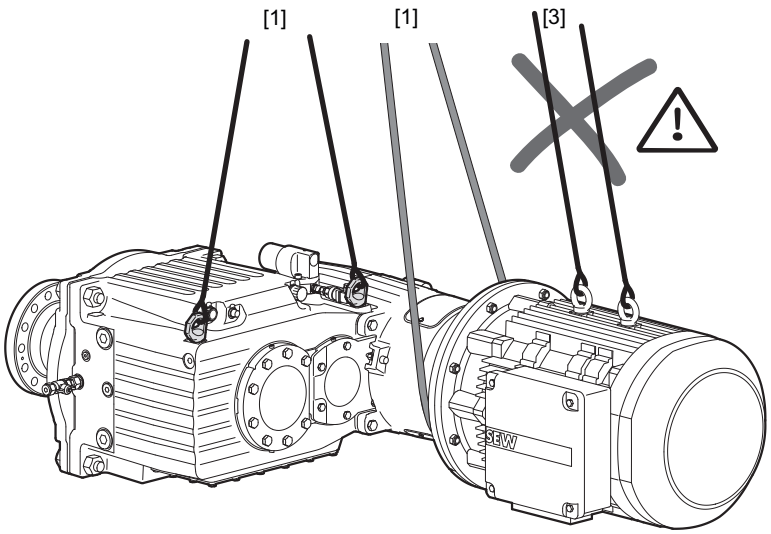
With motor





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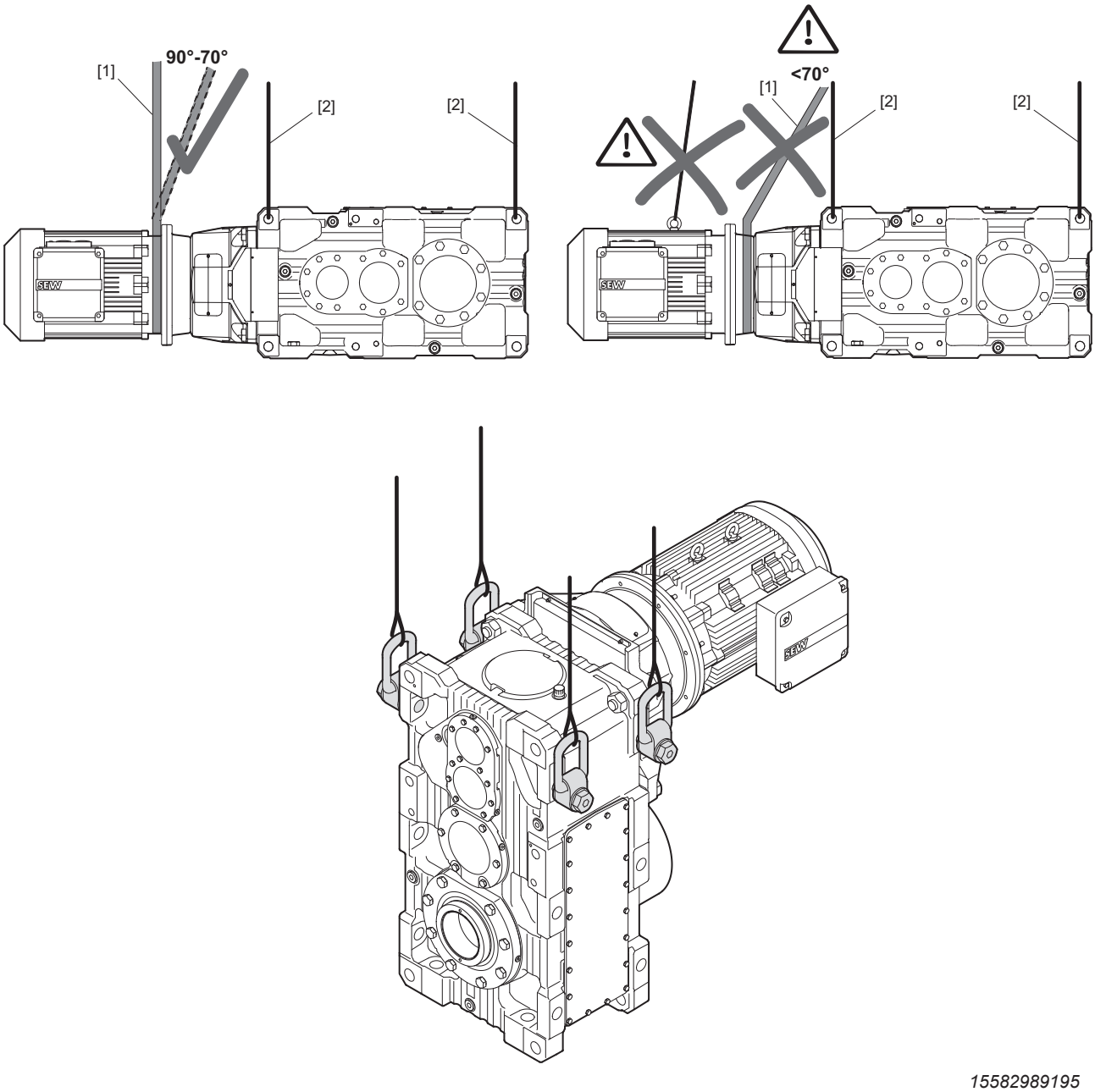
2.9.6 Gear units with motor adapter

Universal and horizontal housing /HU/HH

Gear units with motor adapter may only be transported using lifting cables/chains [2] or lifting straps [1] at an angle from 90° (vertical) up to 70° from the horizontal. The eyebolts on the motor must not be used for transport. The following figures show a transportation example.



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Agitator housing /HA

Use only the prescribed suspension points [1] and star-shaped eyebolts [2] to transport the gear unit. Transport with eybolts according to DIN 580 and DIN 582 is not permitted.

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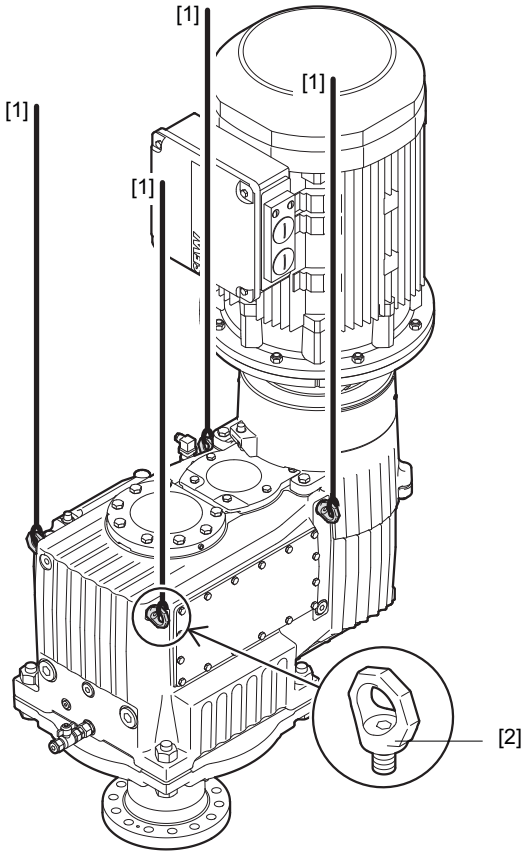
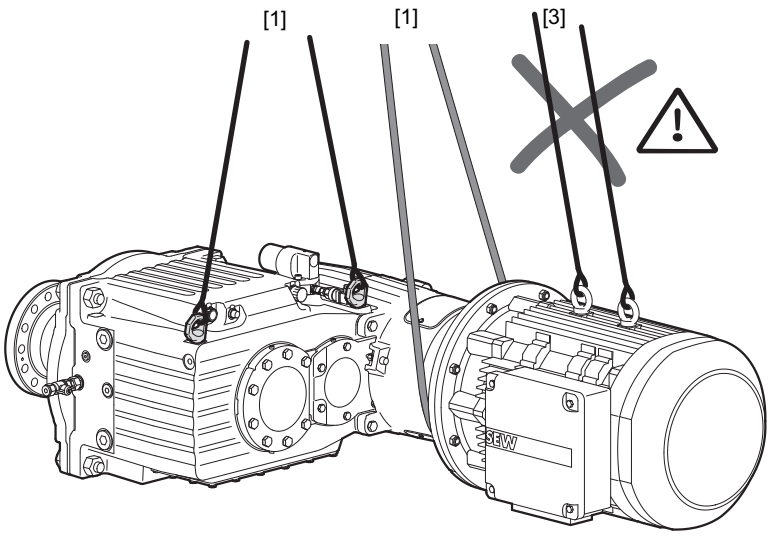
The eyebolts [3] on the motor must not be used for transport. The following figures illustrate how to transport the gear unit.





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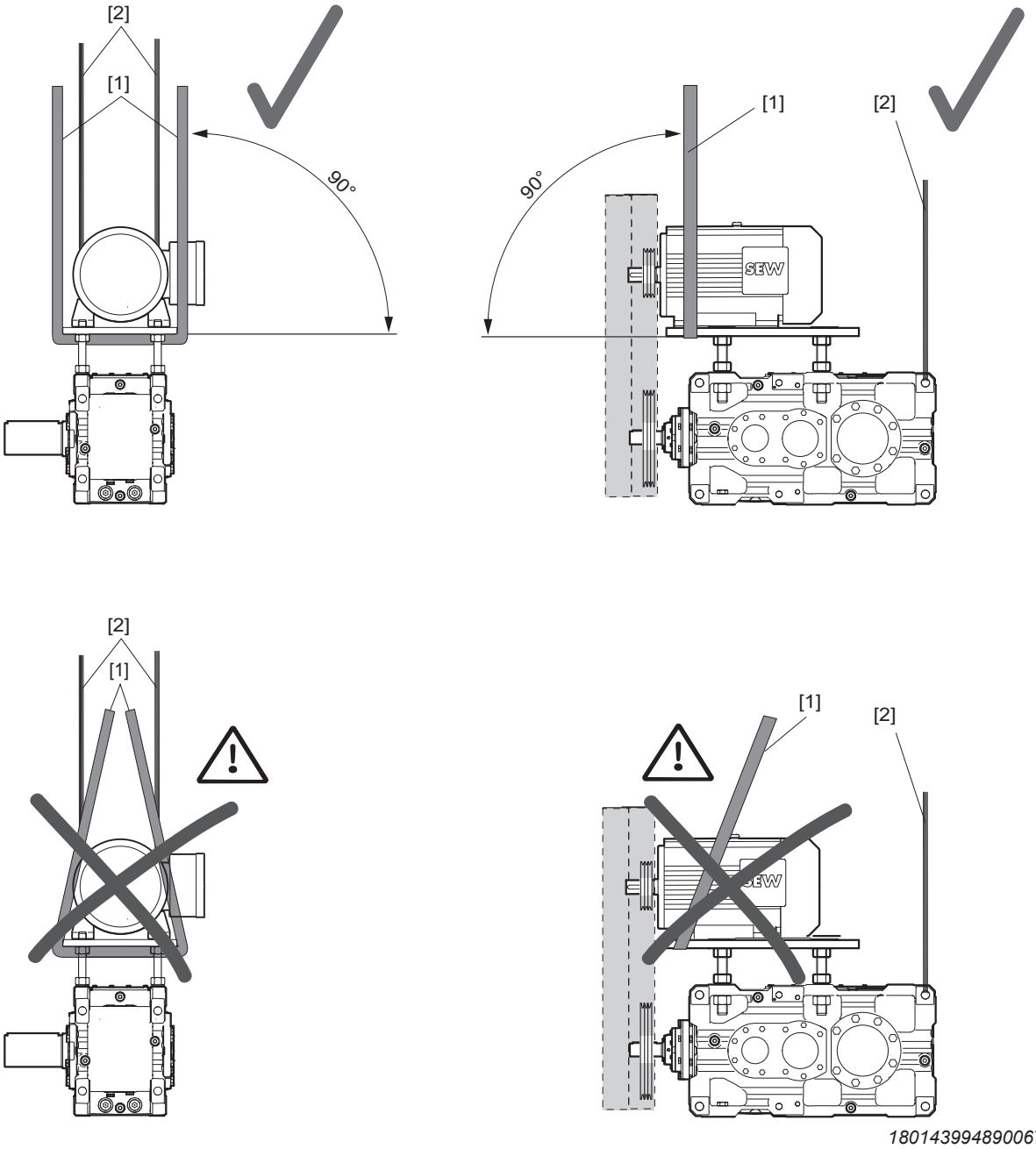
2.9.7 Gear units with V-belt drive

Gear units with a V-belt drive must only be transported using lifting straps [1] and cables [2] at an angle of 90° (vertical). The eyebolts on the motor must not be used for transport.

The following figures show a transportation example.



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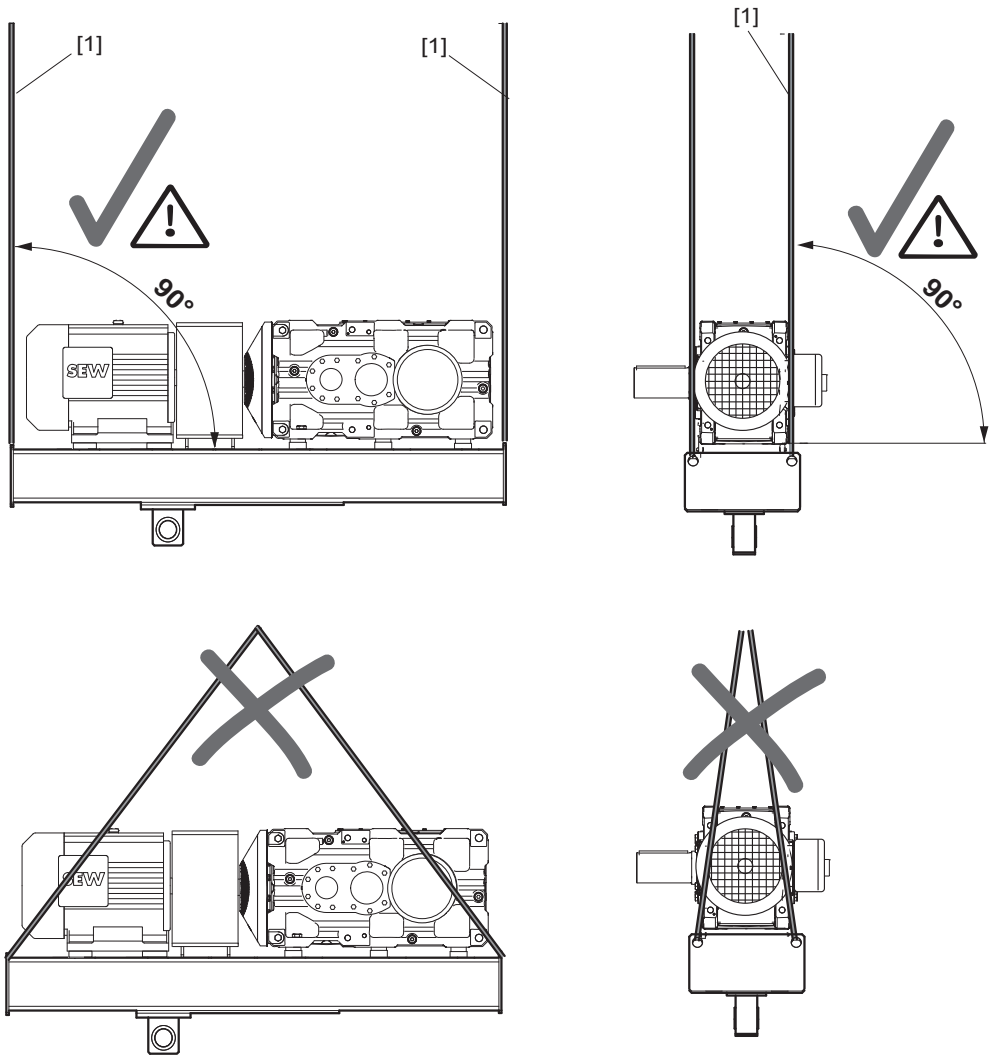
2.9.8 Gear units on swing base/base frame

Gear units on a swing base/base frame may only be transported using vertically tensioned lifting cables [1] or chains.

The following figures show a transportation example.



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2.10 Storage and transport conditions

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

2.10.1 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.

2.10.2 Exterior corrosion protection

The following measures are taken for exterior corrosion protection:

- 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).
- Threaded holes and blind holes are covered by 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 in which the protective coating and/or painting has been damaged may have to be repainted.

2.10.3 Packaging

Standard packaging

The gear unit is delivered on a pallet, securely attached and without a cover.

Use: Land transport

Long-term packaging

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

Use: Sea transport and/or for extended storage

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2.10.4 Storage conditions

NOTICE

Improper storage may result in damage to the gear unit.

Possible damage to property.

- While in storage until startup, the gear unit must be stored in a shock-free manner to prevent damage to the rolling bearing raceways.
- 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 VCI Anticorit to the oil and tightly seal the gear unit (replace the breather with a screw plug).

INFORMATION

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

Corrosion protection + packaging	Storage location	Storage duration
Standard corrosion protection + standard packaging	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 60 °C, < 50% relative humidity). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). No aggressive vapors, no shocks.	Max. 6 months with intact surface corrosion protection.
Long-term corrosion protection + standard packaging	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 60 °C, < 50% relative humidity). No sudden temperature fluctuations. Controlled ventilation of the storage location with filter (free from dust and dirt). No aggressive vapors, no shocks.	Max. 3 years with regular inspection and checking for intactness.
Long-term corrosion protection + long-term packaging	Under roof, protected against rain and shocks.	Max. 3 years with regular inspection and checking for intactness.

INFORMATION

If stored in tropical zones, provide for sufficient protection against insect damage. Contact SEW-EURODRIVE for differing requirements.

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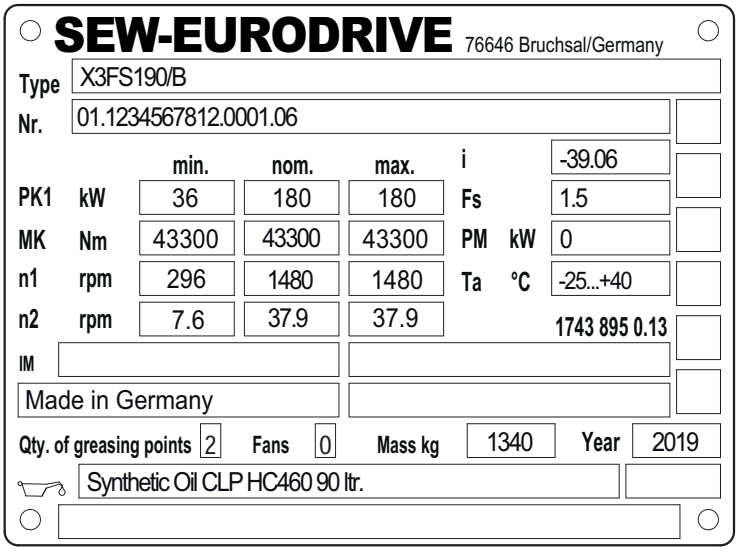
3 Basic gear unit structure

INFORMATION

The basic gear unit comprises: Gear units with mounted options, such as oil heater, water cooling cover, water cooling cartridge, oil expansion tank, etc. The cooling systems OAC, OAP, OWC, OWP, ONP, ONP1 and ONP1L are not part of a basic gear unit.

3.1 X.. series nameplate

The following example shows the structure of the nameplate. The oil quantity specified on the nameplate refers only to the basic unit.



117093590730278411

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	min^{-1}	Input speed (HSS)
n_2	min^{-1}	Output speed (LSS)
min.		Minimum operating point
nom.		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 standard temperature range (−20 °C to +40 °C)
Mass	kg	Weight of the gear unit
Greasing points		Number of points that require relubrication
Fan		Number of installed fans
		Oil grade and viscosity class/oil quantity
Year		Year of manufacture
IM		Mounting position and mounting surface

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3.2 Type designations

3.2.1 Gear units

The following example shows the structure of the type designation:

X3KS250 /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
HU	Housing design • HU = Universal housing • HH = Horizontal housing • /HA = Agitator housing • HT = Thermal housing • HC = Hoist housing
B	Gear unit mounting • /B = Foot • /T = Torque arm • /F = Flange

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3.2.2 Oil supply systems

The gear unit can be equipped with an oil supply system for cooling and lubrication purposes. The following example shows the structure of the type designation:

OWC020-00/M	
O	Oil supply system
W	Cooling medium • W = Water • A = Air • N = Motor pump
C	Type • C = Circulation cooling • P = Pressure lubrication
020	Size • 005 – 070
	Application
-0	Mounting positions • 0 = M1/M2/M3/M4 • 1 = M5/M6
0	Option • 0 = 50 Hz • 1 = 60 Hz • 2 = 50 Hz / 60 Hz • 9 = Special design
M	Mounting type • M = Mounted to the gear unit • S = For separate installation

3.2.3 Flange couplings

The following example shows the structure of the type designation.

FC530/175SM	
FC	Rigid flange coupling
530	Outer diameter of the flange
175	Bore diameter
S	Type of shaft-hub connection: • S = Cylindrical interference fit • K = Keyed connection • T = Conical interference fit
M	Type of centering: • M = External centering • F = Internal centering

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3.2.4 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
FAN-ADV	Fan, Advanced design
ET	Oil expansion tank
HH	Horizontal housing
HU	Universal housing
HA	Agitator housing
HT	Thermal housing
AI	Motor adapter
SB	Swing base
SEP	Shaft end pump
T	Torque arm
OAC	Circulation cooling oil-air cooler with motor pump
OWC	Circulation cooling oil-water cooler with motor pump
OAP	Circulation cooling oil-air cooler with pressure lubrication and motor pump
OWP	Circulation cooling oil-water cooler with pressure lubrication and motor pump
ONP	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.

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3.3 Mounting position

3.3.1 Definition

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

With "alternative mounting positions", there might be limitations regarding certain options. Consult SEW-EURODRIVE in this case.

The table below shows the mounting positions.

	Standard mounting position	Alternative mounting position
Horizontal gear unit	M1	M3
Vertical gear unit	M5	M6
Upright gear unit	M4	M2

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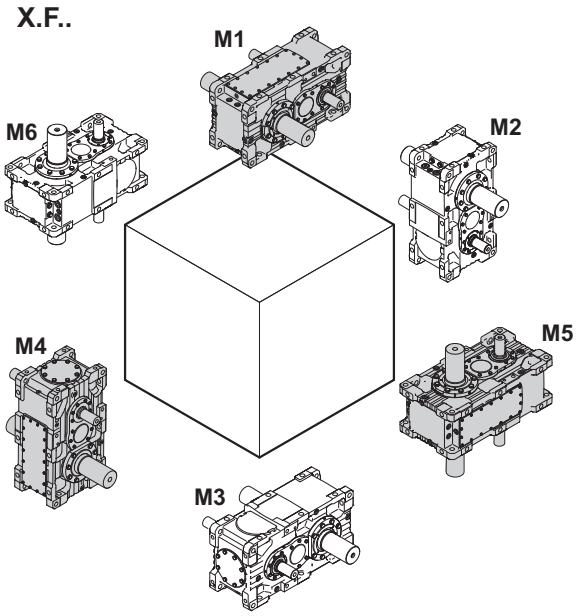

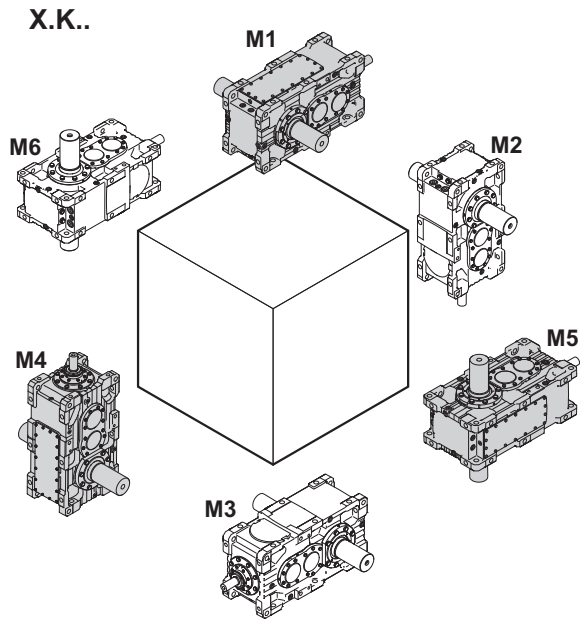

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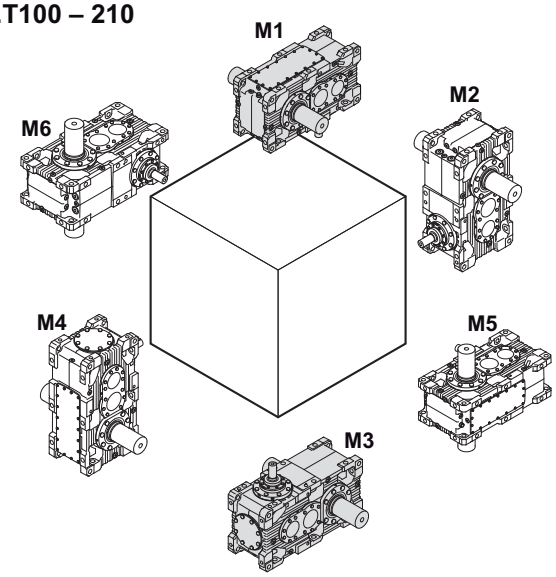
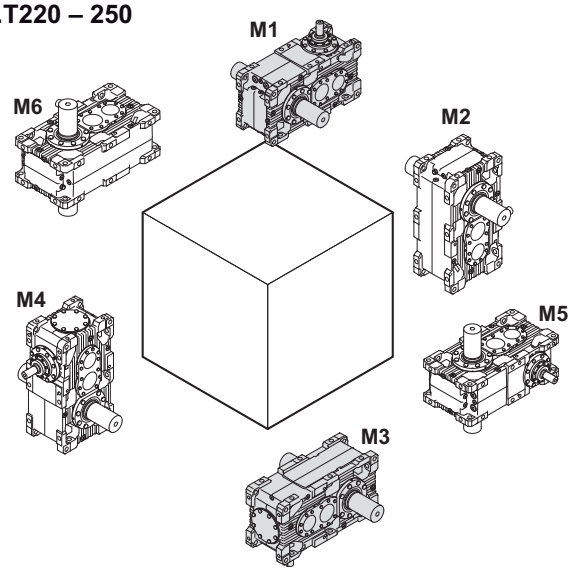
X.T100 – 210



X.T220 – 250



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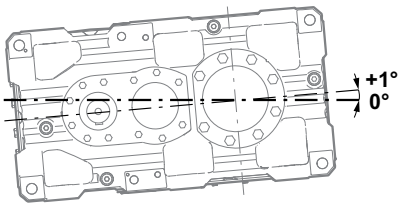
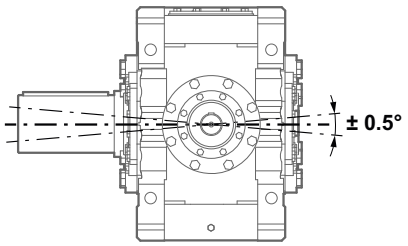
3.3.2 Deviating mounting positions

The information on the permitted deviating mounting position is based on a gear unit without pivoted mounting position.

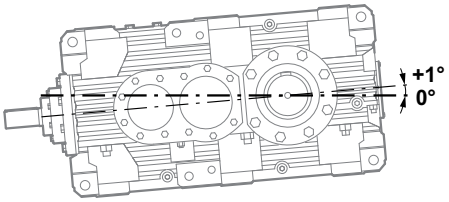
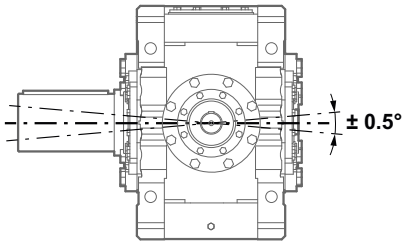
X.F..

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.

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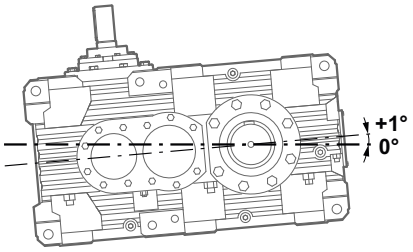
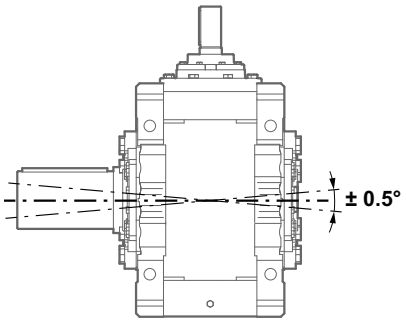
X.T..

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.

3.4 Mounting surface

The mounting surface is defined as the surface of a gear unit with

- foot mounting (X.... /B) or
- flange mounting (X.... /F),

on which the gear unit is mounted.

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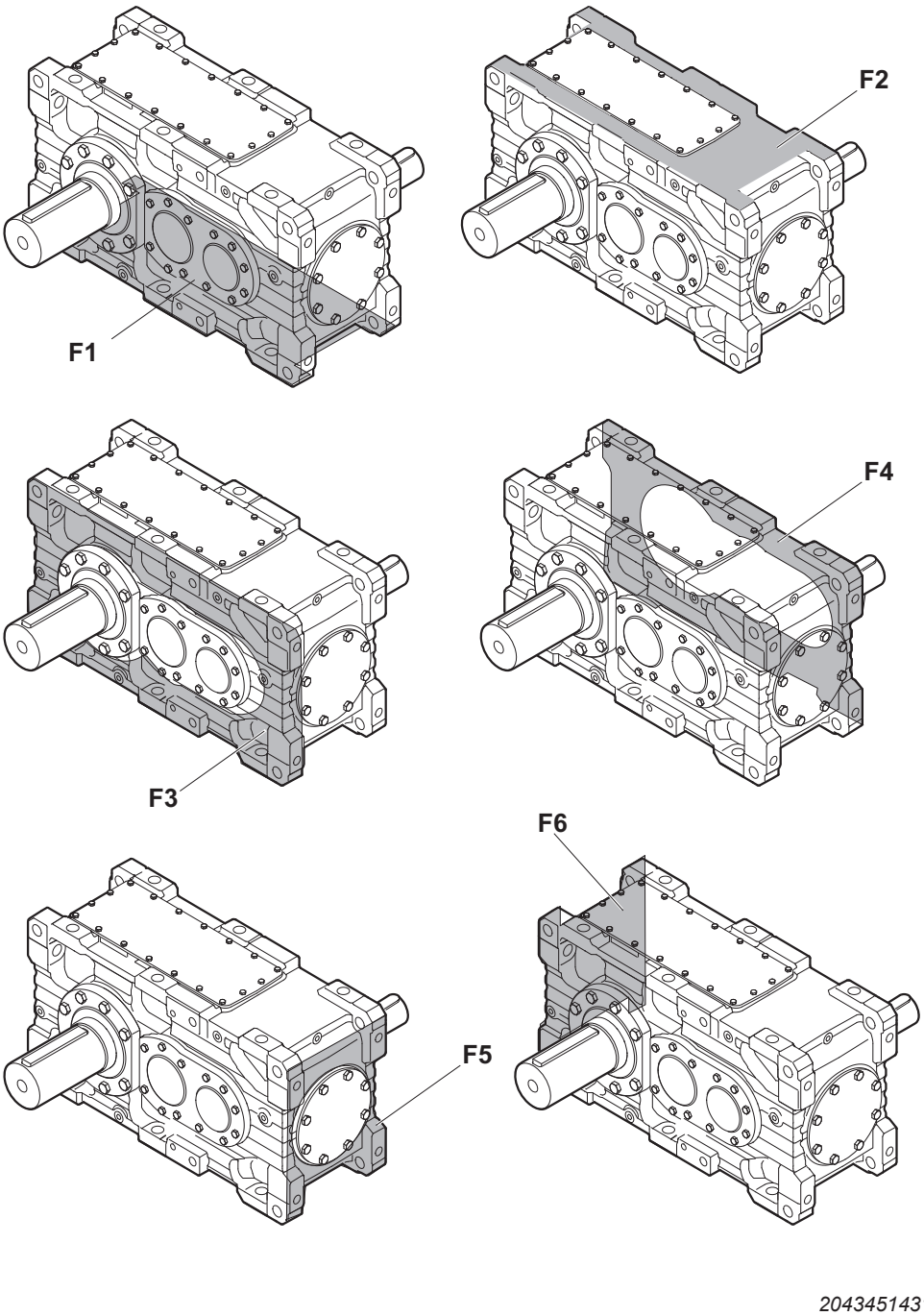
Six different mounting surfaces are defined (designation F1 to F6).



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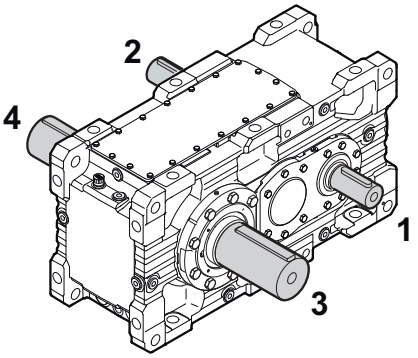
3.5 Shaft position

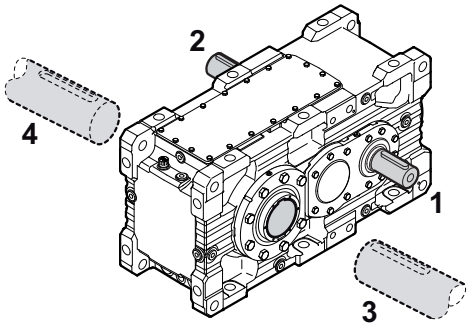
The shaft positions (**0 - 6**) shown in the following figures apply to solid and hollow output shafts. For other shaft positions or for gear units with backstop, contact SEW-EURODRIVE.

3.5.1 X.F..

Shaft position X.FS..

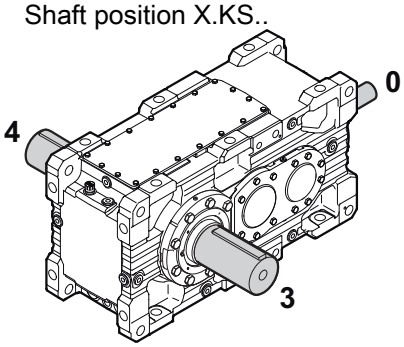


Shaft position X.FA..

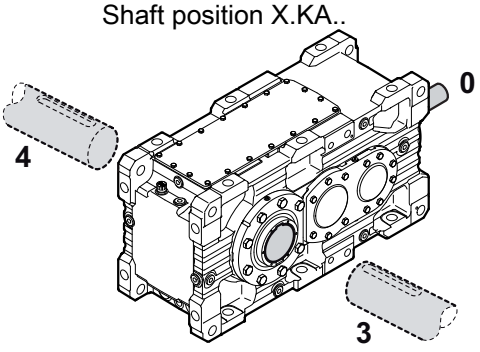


3.5.2 X.K..

Shaft position X.KS..



Shaft position X.KA..



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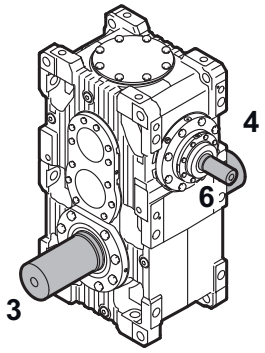
3.5.3 X.T..

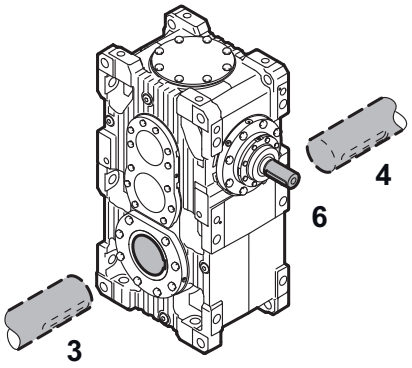
The following shaft positions are possible for gear unit type X.T..

Sizes X100 – 210

Shaft position X.TS..

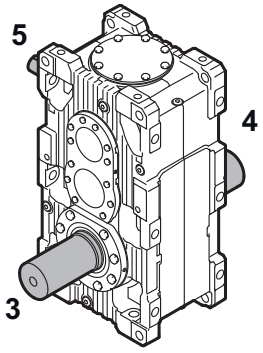


Shaft position X.TA..

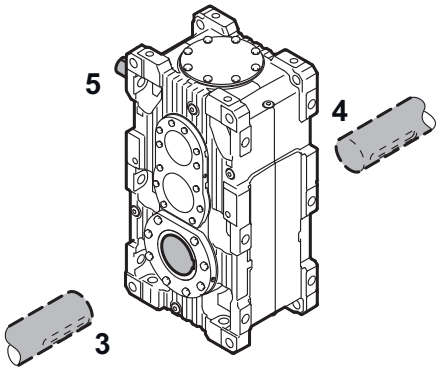


Sizes X220 – 250

Shaft positions X.TS..



Shaft position X.TA..



3.6 Mounting positions and standard mounting surfaces

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

INFORMATION

- The mounting position and/or mounting surface must not differ from the order.
- Other mounting surfaces are possible in combination with a certain mounting position. Refer to the order-specific dimension drawing.

The following figure provides an overview of mounting positions and standard mounting surfaces.

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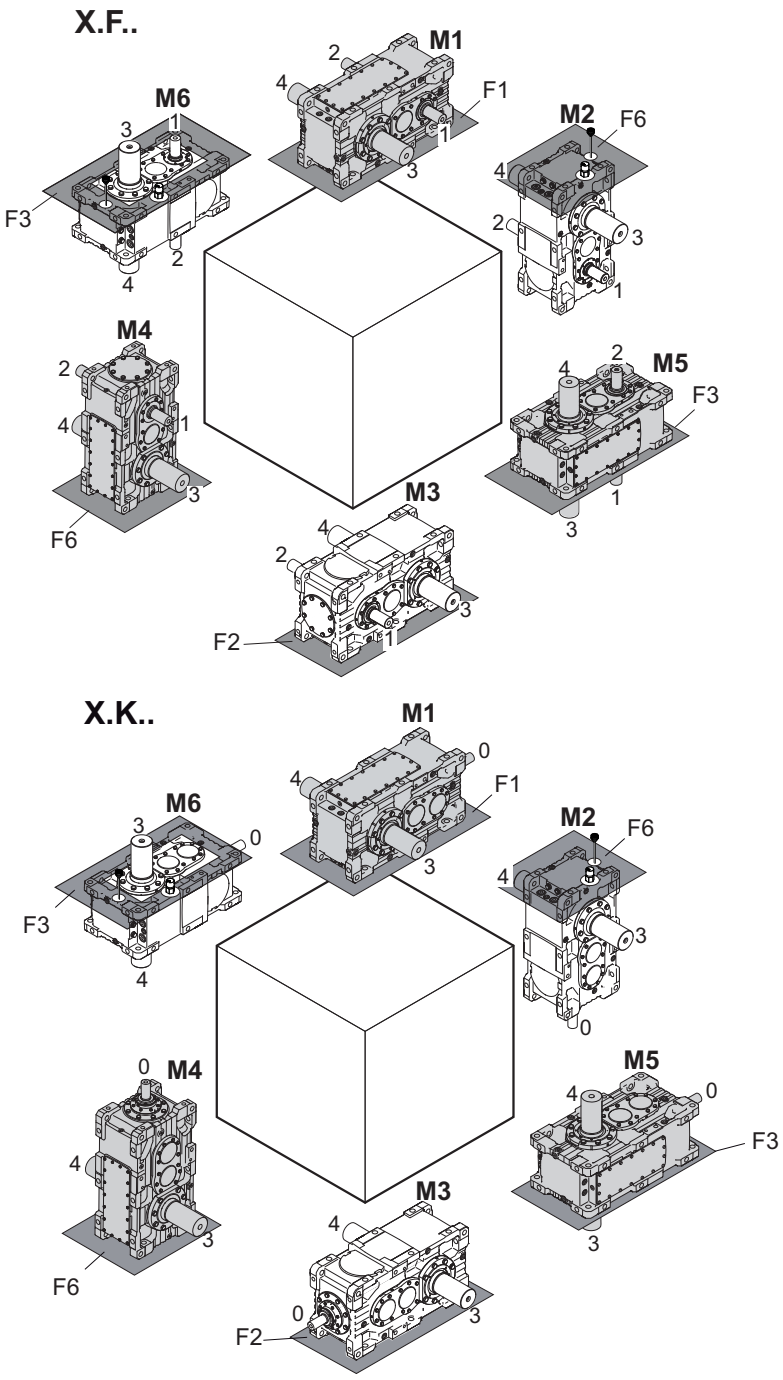
INFORMATION

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.



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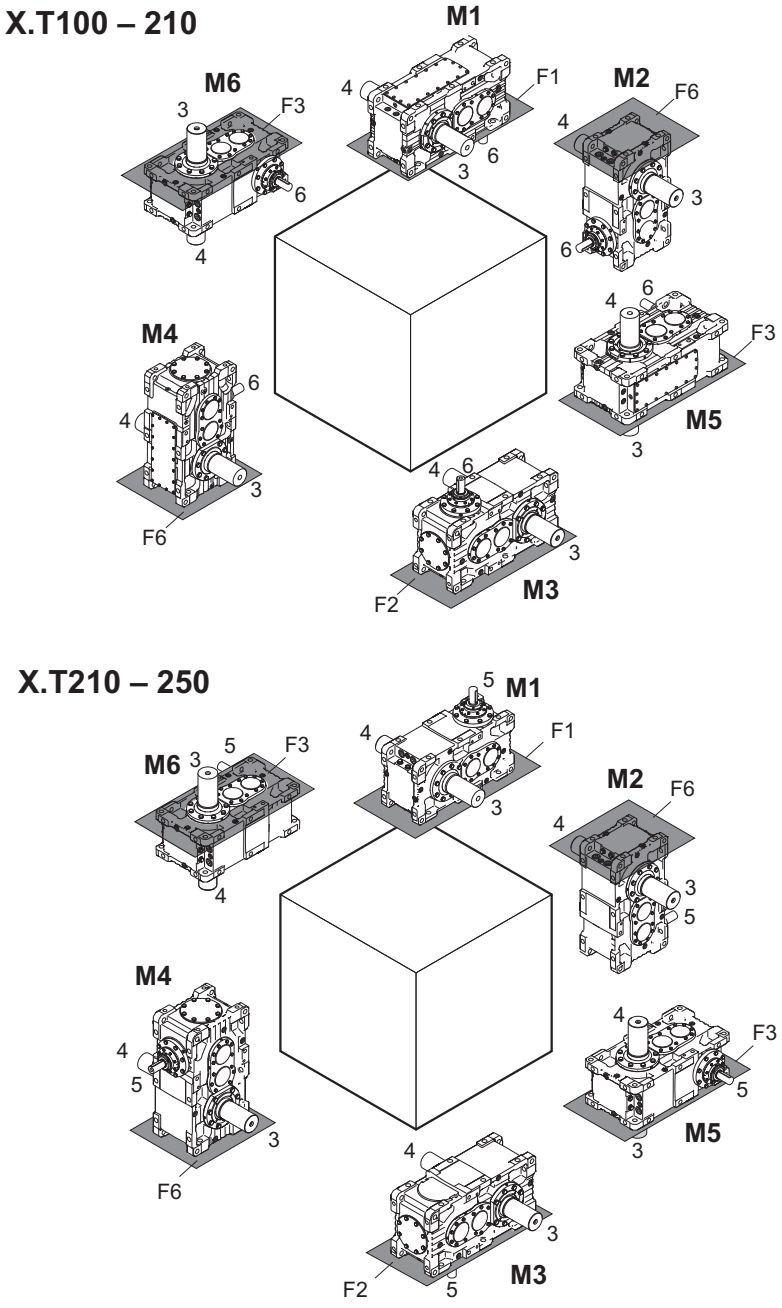

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INFORMATION

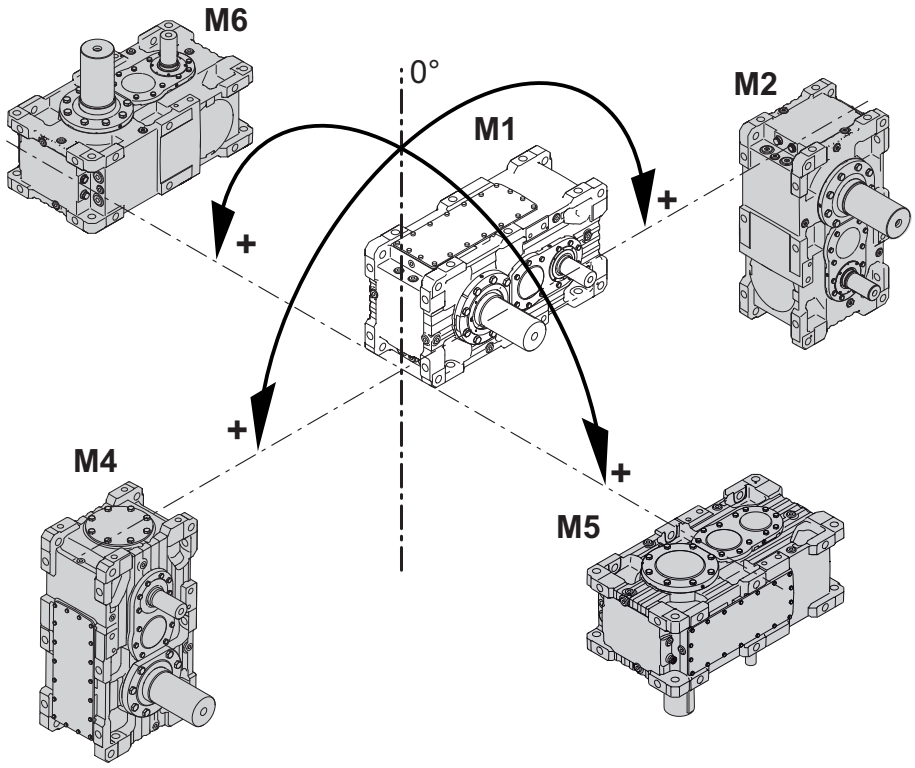
If you install the gear unit in mounting position M2, make sure that the customer's mounting structure leaves enough room for the breather and the oil dipstick.

3.7 Fixed and variable pivoted mounting positions

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

INFORMATION

- Fixed and variable pivoted mounting positions are only possible after consultation with SEW-EURODRIVE. Observe the order documents, such as the dimension sheet.
- Fixed and variable pivoted mounting positions might involve restrictions concerning accessories and technical data. Also, delivery times might be longer. Contact SEW-EURODRIVE.



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3.7.1 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°

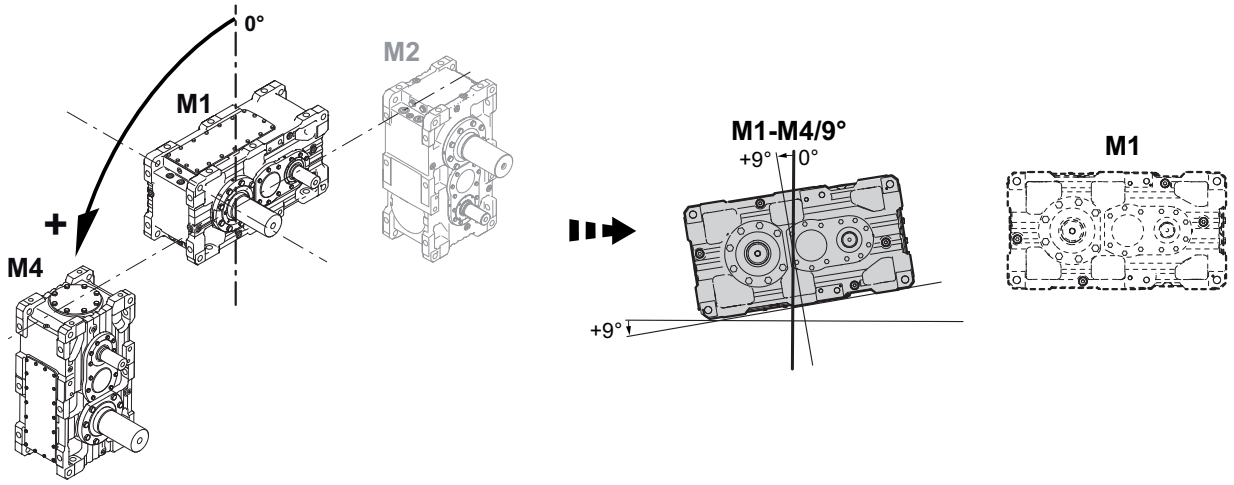
M1 = Initial mounting position

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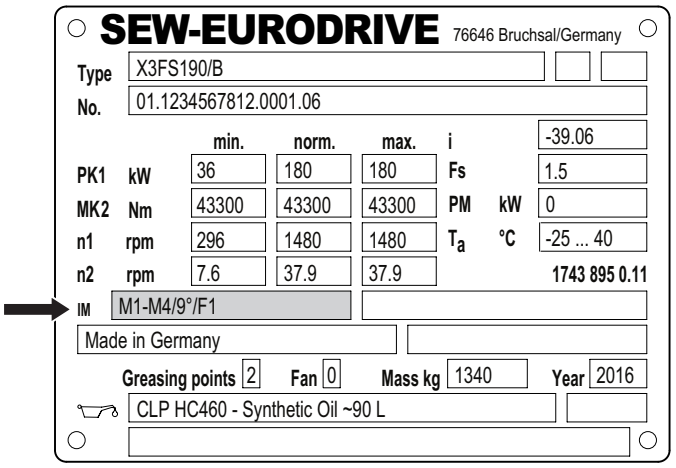
The oil level is checked in the selected fixed pivoted mounting position.

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



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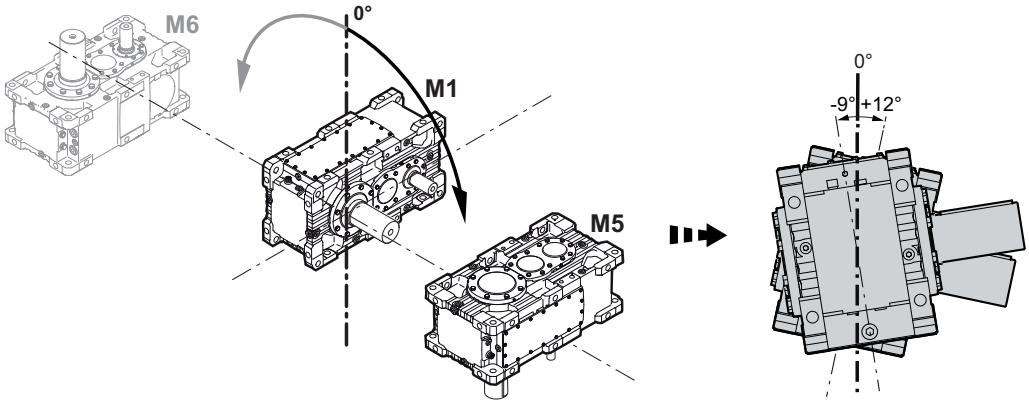
3.7.2 Variable pivoted mounting position

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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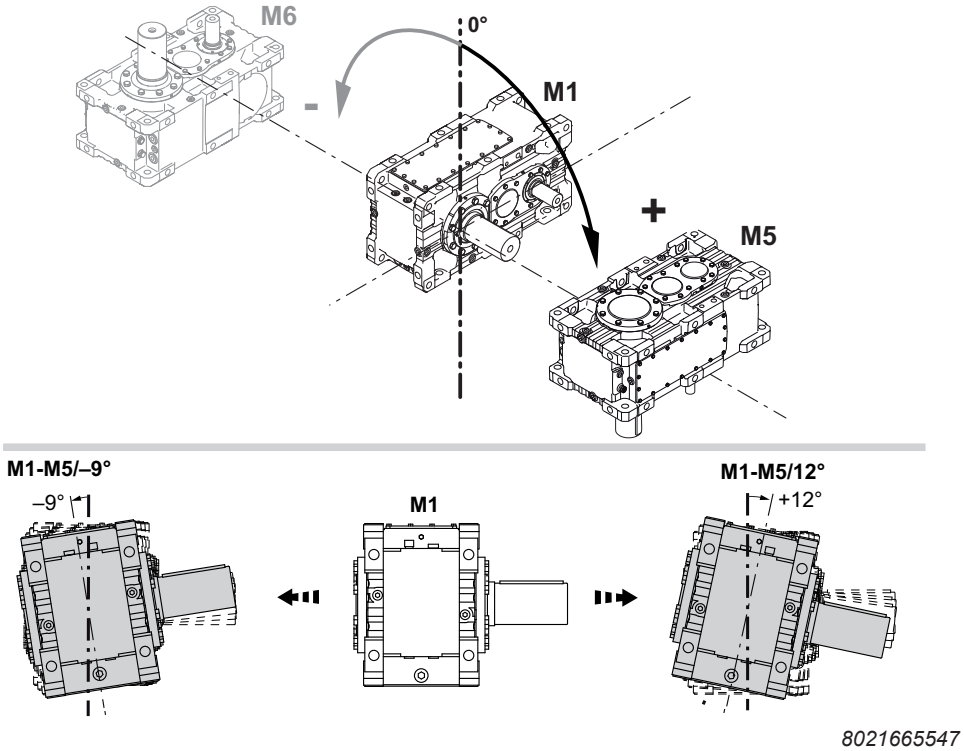
Step 1:

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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The type designation for this example is:

M1-M5/–9°...12°

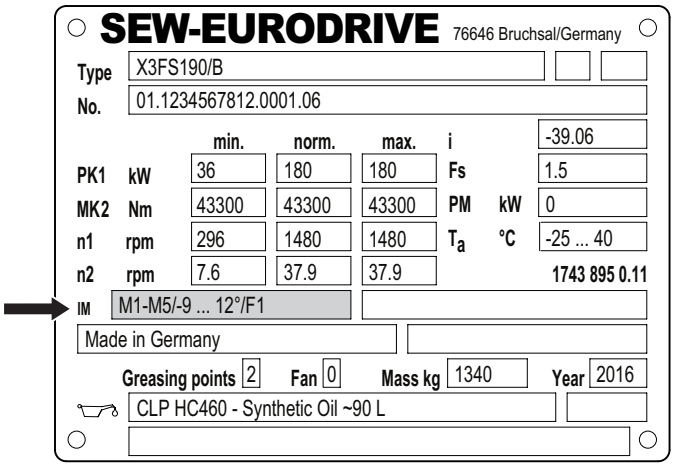
M1 = Initial mounting position

M5 = Pivoting direction

12° = pivoted from M1 to M5 by 12°

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

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



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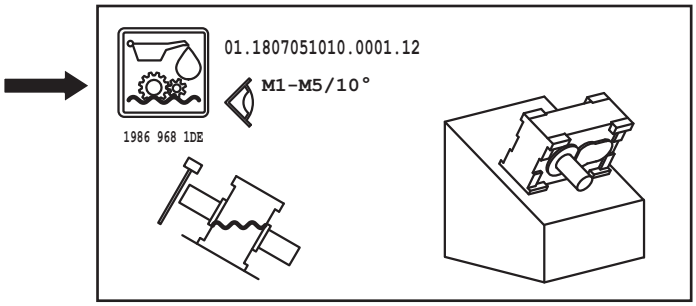
Step 2:

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

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



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3.7.3 Combination of variable and fixed pivoted mounting positions

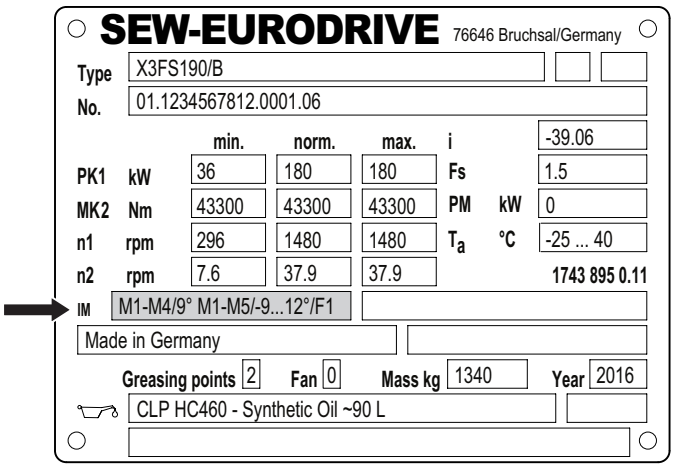
Fixed and variable pivoted mounting positions can be combined.

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-M5/–9°...12°** (variable pivoted mounting position)	
M1	= Initial mounting position	**M1**	= Initial mounting position
M4	= Pivoting direction	**M5**	= Pivoting direction
9°	= Fixed pivoting angle	**12°**	= 12° from M1 to M5
		-9°	= –9° from M1 to M5 (= 9° from M1 to M6)

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



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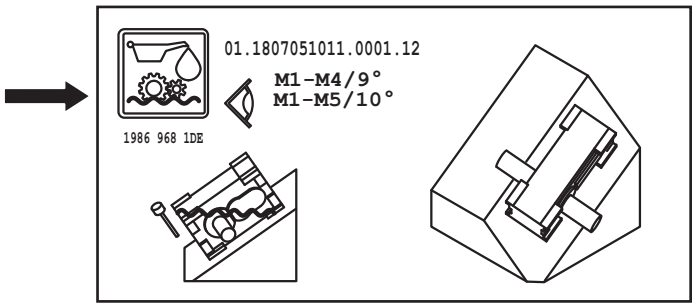
When combining fixed and variable pivoted mounting position, the customer must determine the variable pivoting angle in which the oil level is checked. The fixed angle for the oil level check is already defined.

The gear unit has an additional nameplate to ensure correct oil level checks. This nameplate lists the mounting position for the oil level check.

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



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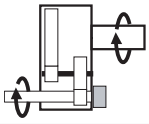
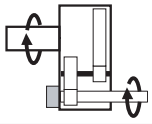
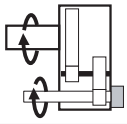
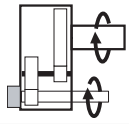
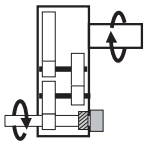
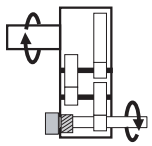
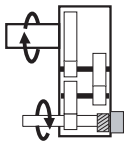
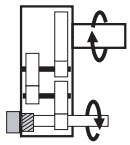
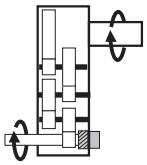
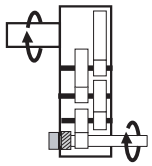
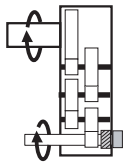
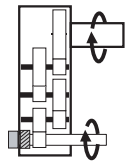
3.8 Corresponding directions of rotation

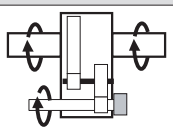
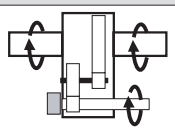
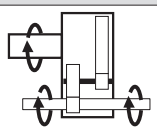
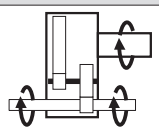
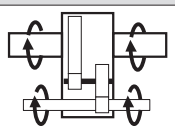
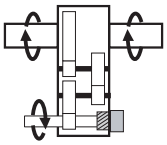
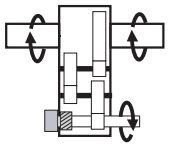
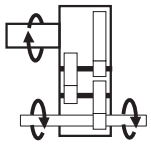
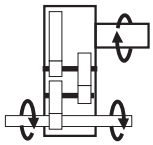
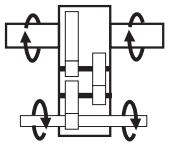
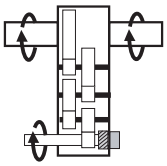
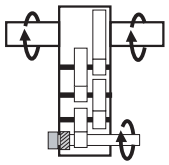
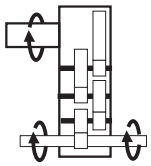
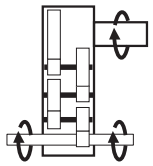
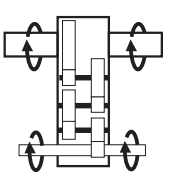
The gear unit can be operated in both directions of rotation. An exception are gear units with backstop.

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.

3.8.1 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 a 3D view of the gear unit, refer to chapter "Shaft positions" (→ 🗎 42).

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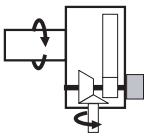
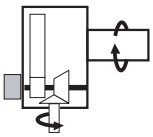
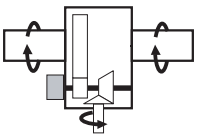
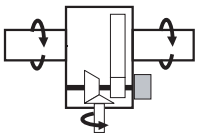
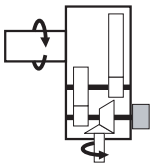
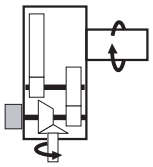
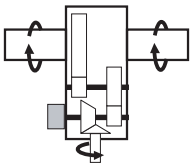
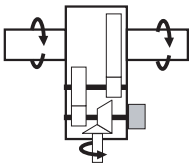
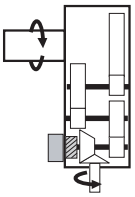
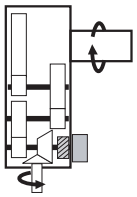
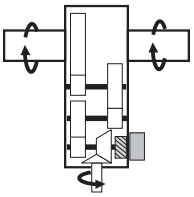
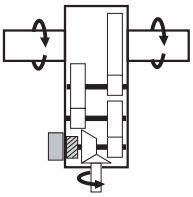
3.8.2 X.K..

Standard

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

▯ = Position of the backstop

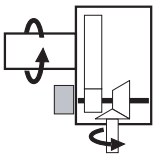
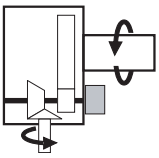
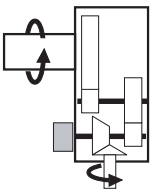
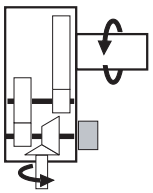
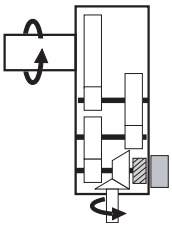
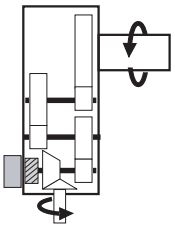
▨ = Alternative backstop position (depending on size and gear ratio)

* = Contact SEW-EURODRIVE when using a backstop

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" (→ 🗎 42).

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)

* = Contact SEW-EURODRIVE when using a backstop

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" (→ 🗎 42).

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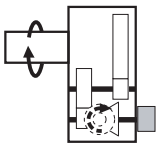
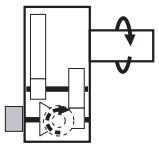
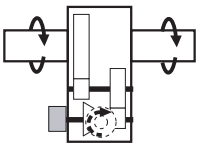
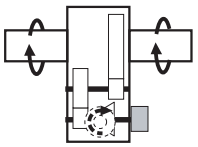
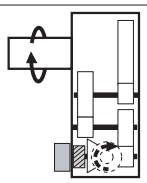
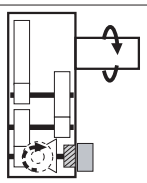
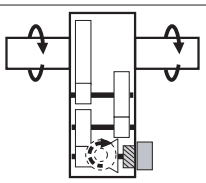
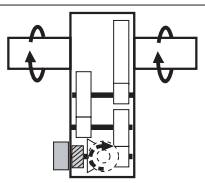
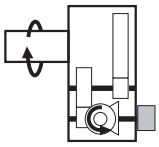
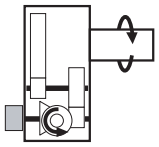
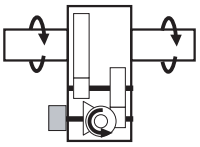
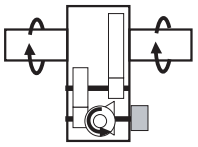
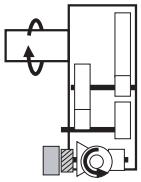
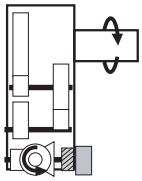
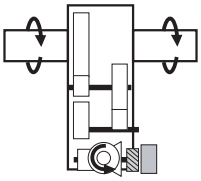
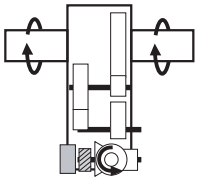
3.8.3 X.T..

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

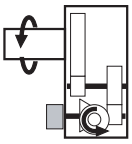
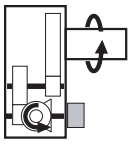
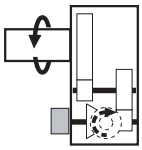
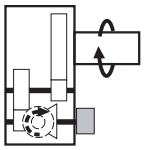
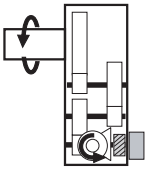
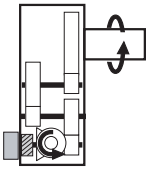
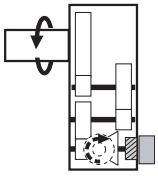
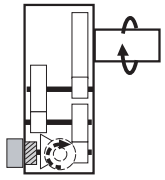
▨ = Alternative backstop position (depending on size and gear ratio)

* = Contact SEW-EURODRIVE when using a backstop

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" (→ 🖹 42).

Direction of rotation reversal

Shaft position	53[1)]	54[1)]	63[1)]	64[1)]
Position of final gear	3	4	3	4
X3T...				
X4T...				

▯ = 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 a 3D view of the gear unit, refer to chapter "Shaft positions" (→ 🖹 42).

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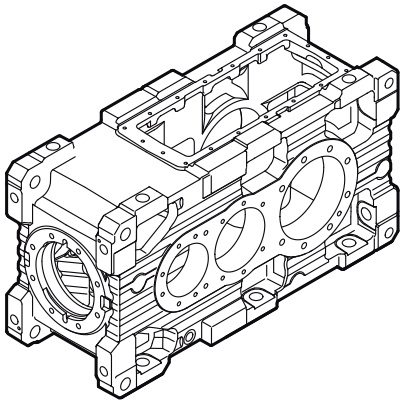
3.9 Housing design

3.9.1 Horizontal housing /HH

The horizontal housing is designed for mounting position M1. This housing design is non-reversible.

Single-piece housing

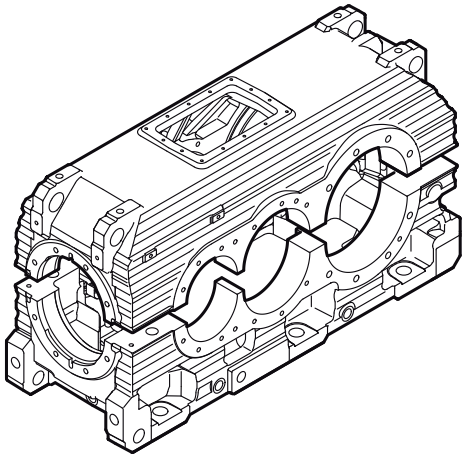
The following figure shows an example of a single-piece housing for sizes 100 to 210:



9007208285647499

Two-piece housing

The following figure shows an example of a two-piece housing for sizes 220 to 320:



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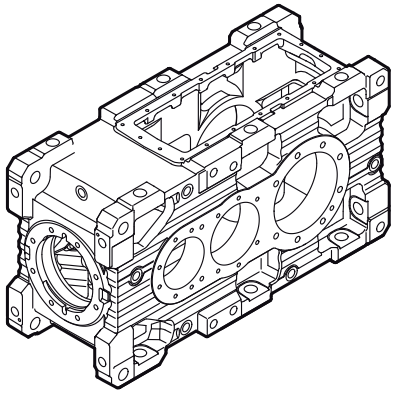
3.9.2 Universal housing /HU

Universal housings can be installed in any mounting positions (M1 to M6). The housings can be reversible if required.

Single-piece housing

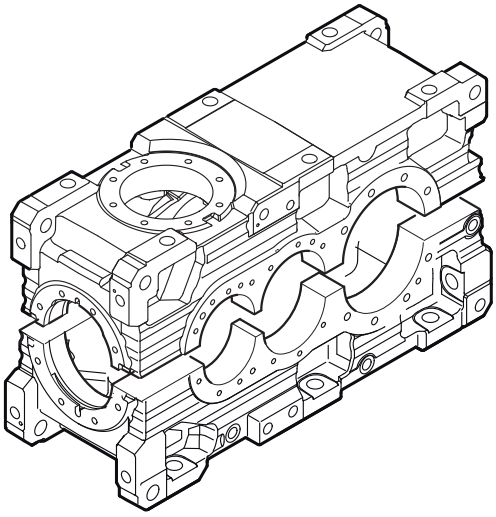
The following figure shows an example of a single-piece housing for sizes 100 to 210:



9007207839154827

Two-piece housing

The following figure shows an example of a two-piece housing for sizes 220 to 320:



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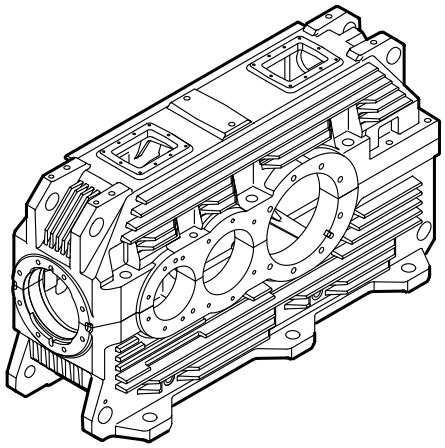
3.9.3 Thermal housing /HT

The thermal housing is designed for mounting position M1. This housing design is non-reversible. Various measures make this gear unit suitable for increased thermal requirements.

The following figure shows an example of a thermal housing for gear unit size 220:

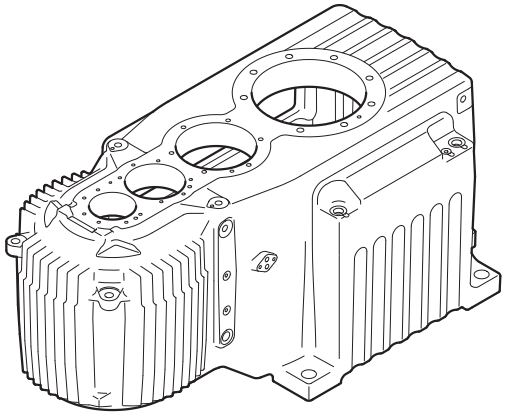


9007208902548235

3.9.4 Agitator housing/HA

The agitator housing is designed as single-piece housing only for mounting position M5 and sizes X3F140 – 210.

For further information, refer to the technical brochure "Technology for Agitators and Aerators".



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3.10 Combination overview of housing types and options

This chapter shows an overview of which options are available for which mounting positions/housing designs.

3.10.1 Horizontal housing /HH and universal housing /HU

Single-piece and split gear unit housings for horizontal applications **(HH)** as well as universal housings **(HU)** offer a wide range of possible variants. The following table shows the options that can be combined with horizontal housings **(HH)** and the options that can be combined with universal housings **(HU)**. The universal housing can be combined with all options listed in the table.

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Horizontal mounting position M1

Options		X100 – 210						X220 – 250						X260 – 320			
		2F	2K	3F	3K	4F	4K	2F	2K	3F	3K	4F	4K	2F	2K	3F	3K
BF	**Base frame**	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	HU	**HH**	**HH**	**HH**
BS	**Backstop**	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	HU	**HH**	**HH**	**HH**
APL	**Torque-limiting Backstop**	-	-	-	**HH**	-	-	-	-	-	HH	-	-	-	-	-	**HH**
CCV	**Water cooling cover**	HU	HU	**HH**	**HH**	HU	HU	-	-	-	-	-	-	-	-	-	-
CCT	**Water cooling cartridge**	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
F	**Mounting flange**	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU
FC	**Flange coupling**	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	HU	**HH**	**HH**	**HH**
FAN	**Fan**	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
FAN-ADV	**Fan version Advanced**	-	-	-	-	-	-	-	-	-	**HH**	-	-	-	-	-	**HH**
HSST	**Through-going input shaft**	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	HU	**HH**	**HH**	**HH**	**HH**
LSST	**Through-going output shaft**	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	HU	**HH**	**HH**	**HH**	**HH**
AI	**Motor adapter**	HU	HU	**HH**	**HH**	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU
SB	**Swing base**	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
SEP	**Shaft end pump**	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
T	**Torque arm**	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
OAC	**Oil-air cooler**	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
OWC	**Oil-water cooler**	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
OAP	**Oil-air cooler**	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
OWC	**Oil-water cooler**	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
ONP	**Motor pump**	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
OD	**Oil dipstick**	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
ODV	**Oil drain valve**	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
OH	**Oil heater**	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
OLG	**Oil level glass**	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
VBD	**V-belt drives**	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU
PT100	**Temperature sensor**	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
NTB	**Temperature switch**	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
TSK	**Temperature switch**	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
DUO10A	**Diagnostic unit**	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**

HH Horizontal housing (and universal housing) HU Only universal housing

□ Options are available in all gear unit sizes

▨ Options are not available in all gear unit sizes

INFORMATION

Reversible gear units are based exclusively on the universal housing design (HU). The horizontal housing (HH) is not reversible. Refer to the chapter "Reversible gear units" (→ 🗎 75) for further information.

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Vertical mounting position M5

Options		X100-X130	X140-210		X210-250	X260-320
		2F, 2K, 3F, 3K, 4F, 4K, 3F, 3T, 4T	2F, 2K, 3K, 4F, 4K, 3T, 4T	3F	2F, 2K, 3F, 3K, 4F, 4K, 3T, 4T	2F, 2K, 3F, 3K, 4F, 4K
BF	**Base frame**				HU	HU
	Monoblock	HU	HU	HA/HU	-	-
	Split	-	-	-	HU	HU
BS	**Backstop**	HU	HU	HA/HU	HU	HU
CCV	**Water cooling cover**	HU	HU	HU	-	-
CCT	**Water cooling cartridge**	HU(**)	HU(**)	HA/HU(**)	HU	HU
F	**Mounting flange B5**	HU	HU	HA/HU	HU	HU
F	**Mounting flange B14**	HU	HU	HA/HU	HU	HU
F	**Mounting flange (special design)**	HU(*)	HU(*)	HA(*)/HU(*)	HU	HU
	Flange coupling with/without key	HU	HU	HA/HU	HU	HU
FAN	**Standard radial fan**	HU	HU	HU	HU	HU
FAN	**Standard radial fan in MA**	HU	HU	HU	HU	HU
FAN	**Axial fan in MA**	HU(*)	HU(*)	HA	-	-
	Through-going HSS	HU	HU	-	HU	HU
	Through-going LSS	HU	HU	HU	HU	HU
AI	**IEC/NEMA motor adapter**	HU	HU	HA/HU	HU	HU
SEP	**Shaft end pump**	HU	HU	HA/HU	HU	HU
	Bath lubrication with oil expansion tank	HU	HU	HA/HU	HU	HU
	Torque arm	HU	HU	HU	HU	HU
OAC	**Oil-air cooler**	HU	HU	HA/HU	HU	HU
OWC	**Oil-water cooler**	HU	HU	HA/HU	HU	HU
OD	**Oil dipstick**	HU	HU	HA/HU	HU	HU
	Oil drain valve	HU	HU	HA/HU	HU	HU
OH	**Oil heater**	HU(**)	HU(**)	HA/HU(**)	HU	HU
	Oil sight glass	HU	HU	HA/HU	HU	HU
VBD	**V-belt drive**	HU(*)	HU(*)	HA(*)/HU(*)	HU(*)	HU(*)
PT100	**Temperature sensor**	HU	HU	HA/HU	HU	HU
NTB	**Temperature switch**	HU	HU	HA/HU	HU	HU
TSK	**Temperature switch**	HU	HU	HA/HU	HU	HU
DUO10A	**Diagnostic unit for oil aging**	HU	HU	HA/HU	HU	HU
	Pressure switch	HU	HU	HA/HU		
	Oil filter (single filter)	HU	HU	HA/HU		
	Oil filter (duplex filter)	HU	HU	HA/HU		
	Standard bearing for solid and hollow low-speed shaft (LSS)	HU	HU	HU	HU	HU
	Reinforced bearing for solid low-speed shaft (LSS)	-	-	-	HU	HU
	Reinforced bearing for hollow low-speed shaft (LSS)	HU	HU	HU	-	-
	EBD bearing for medium loads at solid low-speed shaft (LSS)	HU(*)	HU	HA/HU	HU(*)	HU(*)
	EBD bearing for heavy loads at solid low-speed shaft (LSS)	HU(*)	HU	HA/HU	HU(*)	HU(*)
	Drywell seal for M5 WL23	-	HU	HA/HU	HU(*)	HU(*)
	Central monitoring interface	-	-	HA	-	-
	Central relubrication point	-	-	HA	-	-

* Available on request.

** In combination with Drywell seal only available on request.

HU Universal housing

HA Agitator housing

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3.10.2 Thermal housing /HT

The thermal housing **(HT)** allows for a wide range of possible variants. The following table shows the options that can be combined with the thermal housing **(HT)**.

	Options	X3K180 – 320
BF	Base frame	HT
BS	Backstop	HT
APL	Torque-limiting backstop	HT
FC	Flange coupling	HT
FAN	Fan	HT
HSST	Through-going input shaft	HT
LSST	Through-going output shaft	HT
AI	Motor adapter	HT
SB	Swing base	HT
SEP	Shaft end pump	HT
T	Torque arm	HT
OD	Oil dipstick	HT
ODV	Oil drain valve	HT
OH	Oil heater	HT
OLG	Oil level glass	HT
VBD	V-belt drives	HT
PT100	Temperature sensor	HT
NTB	Temperature switch	HT
TSK	Temperature switch	HT
DUO10A	Diagnostic unit	HT

□ Options are available in all sizes

▨ Options are not available in all sizes

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3.10.3 Agitator housing /HA

The agitator housing **(HA)** allows for a wide range of possible variants. The following table shows the options that can be combined with the agitator housing **(HA)**.

	Options	X3F140 – 210
BF	Base frame	HA
BS	Backstop	HA
APL	Torque-limiting backstop	HA
CCT	Water cooling cartridge	HA
F	Mounting flange B5/B14	HA
FC	Flange coupling	HA
FAN	Fan	HA
AI	Motor adapter	HA
SEP	Shaft end pump	HA
OAC	Oil-air cooler	HA
OWC	Oil-water cooler	HA
OAC	Oil-air cooler	HA
OWC	Oil-water cooler	HA
OD	Oil dipstick	HA
ODV	Oil drain valve	HA
OH	Oil heater	HA
OLG	Oil level glass	HA
PT100	Temperature sensor	HA
NTB	Temperature switch	HA
TSK	Temperature switch	HA
DUO10A	Diagnostic unit	HA
	Filter	HA
EBD	Extended bearing distance	HA

3.11 Gearing and shafts

The hardened and ground gearing is made from high-quality hardened steels. The output shafts are made of tough quenched and tempered steel.

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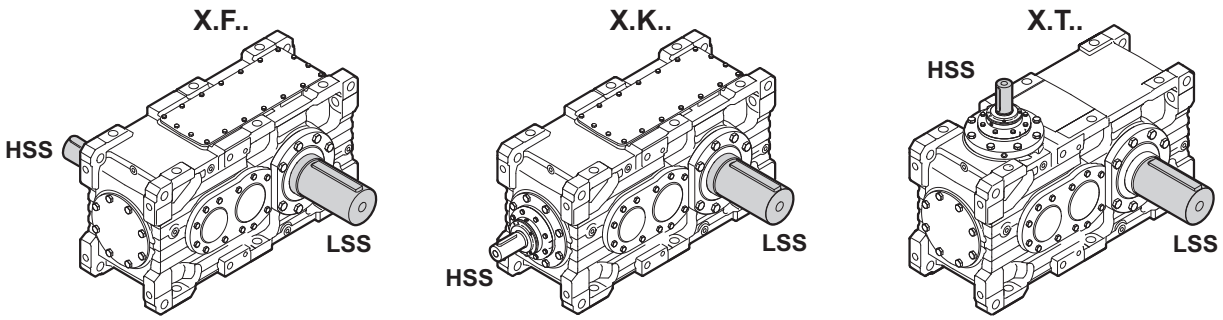
3.12 Input and output shafts

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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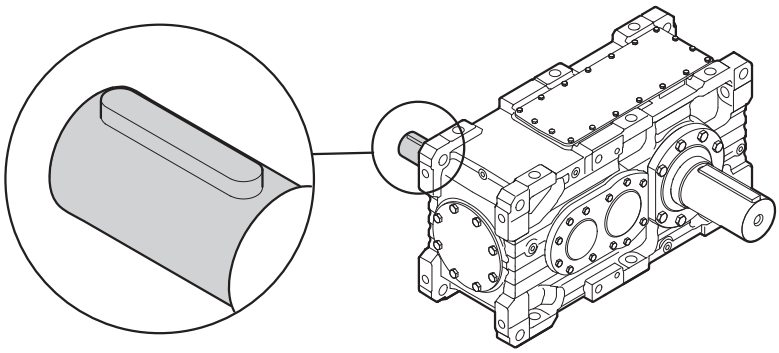
3.12.1 Input shaft

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.



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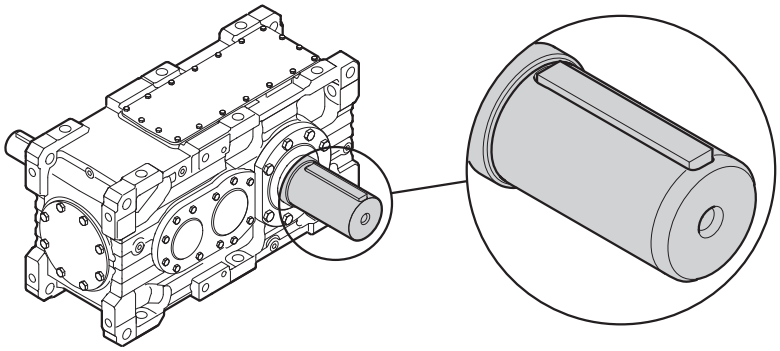
3.12.2 Output shaft as a solid shaft with key /..S

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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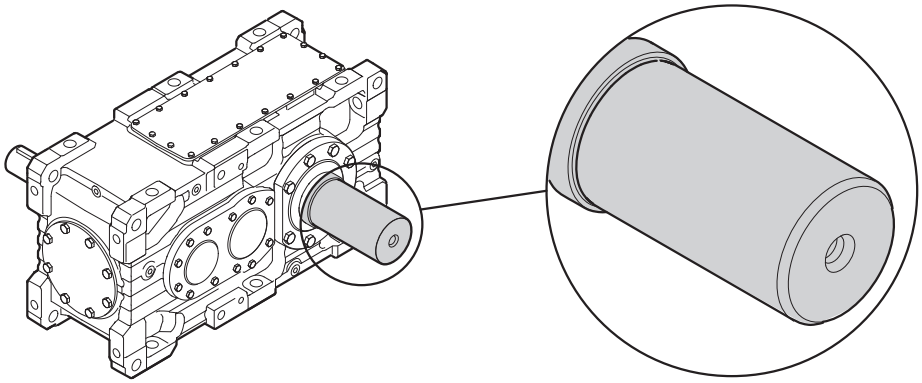
3.12.3 Smooth output shaft /..R

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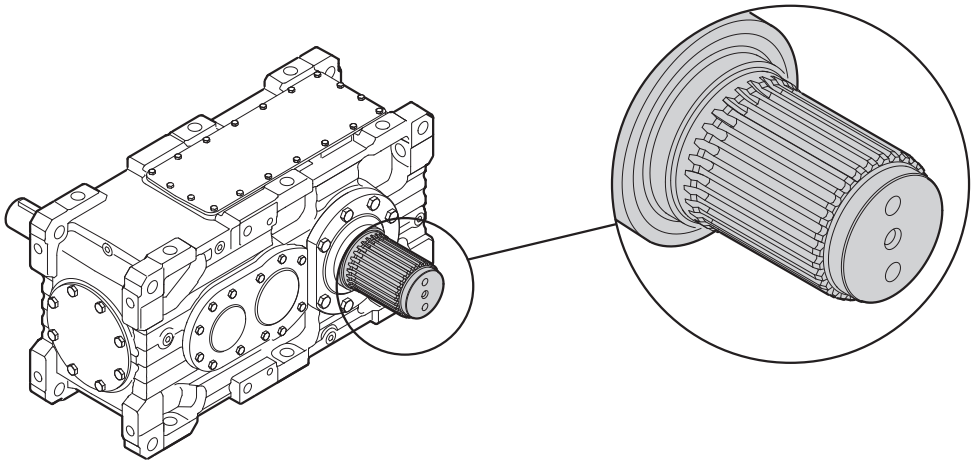
3.12.4 Output shaft as a splined solid shaft /..L

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.



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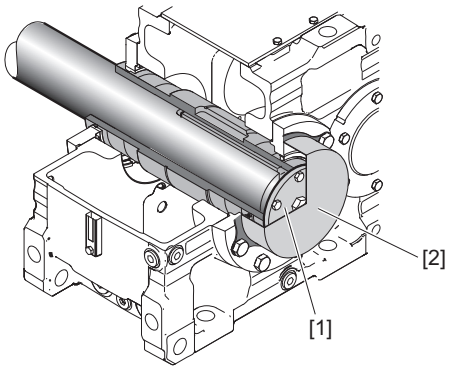
3.12.5 Output shaft as a hollow shaft with keyway /..A

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



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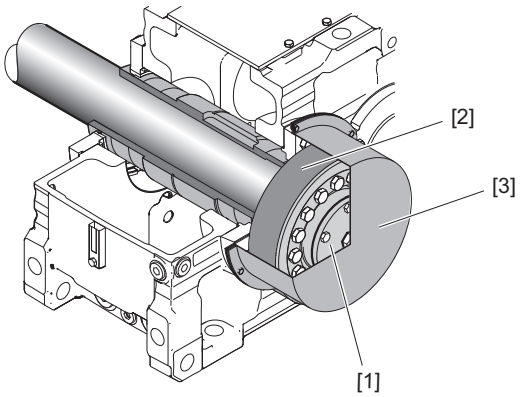
3.12.6 Output shaft as a hollow shaft with shrink disk /..H

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

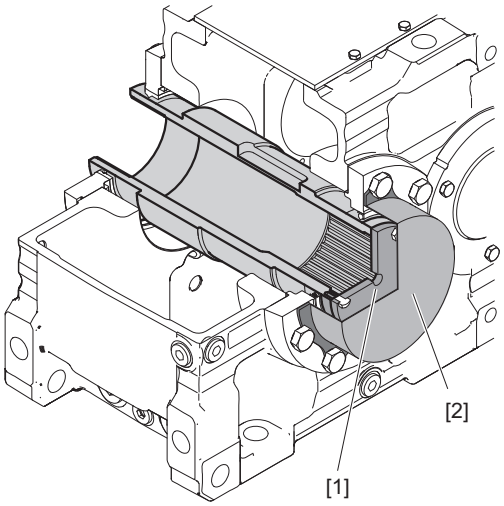
The protection cover is dust-tight. The standard sealing system is therefore normally used on the side of the safety cover.

3.12.7 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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3.12.8 Gear unit mounting for hollow shaft gear units

NOTICE

Constraining forces can occur on the output shaft bearing due to the rigid connection between the machine shaft and hollow shaft of the gear unit. This may result in damages to the output shaft bearing and increased fretting corrosion in the connection between the machine and the hollow shaft of the gear unit.

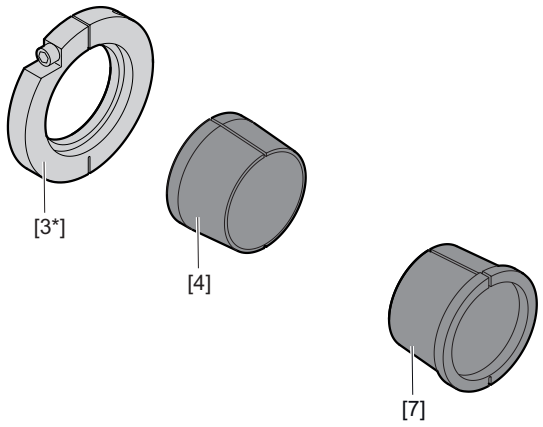
Possible damage to property.

- The gear unit is usually foot or flange-mounted and used as bearing point when the machine shaft has no individual bearing or merely provides one bearing point. You have to provide for an accurate coaxial alignment with the bearing point.
- If the machine shaft has at least 2 bearing points, the gear unit should be connected merely to the machine shaft and supported with a torque arm. In order to prevent excess stress on the bearing, gear units with foot or flange mounting are to be avoided.

3.12.9 Hollow-shaft gear units with TorqLOC®

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:



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

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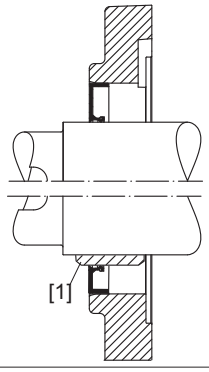
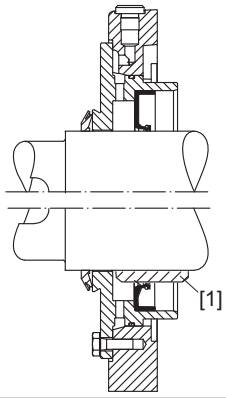
3.13 Sealing system

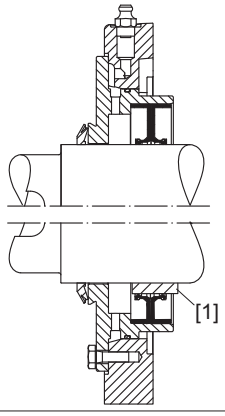
3.13.1 Input shaft

Non-regreasable seal

Designation	Property	Environment	Illustration
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	Illustration
Protected against dust, regreasable	Double lip seal with dust protection cover	**High** dust load with abrasive particles	

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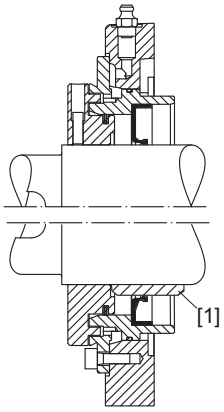
Designation	Property	Environment	Illustration
Radial labyrinth seal (Taconite), regreasable	Single oil seal with radial labyrinth seal	**Very high** dust load with abrasive particles	

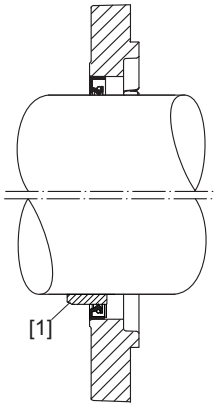
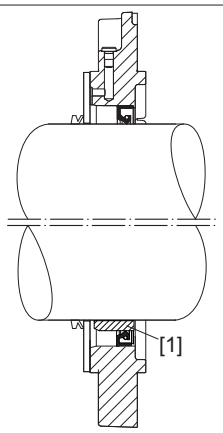
[1] Optional with oil seal sleeve

3.13.2 Output shaft

INFORMATION

Make sure the gear unit shaft is rotating during regreasing.

Non-regreasable seal

Designation	Property	Environment	Illustration
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

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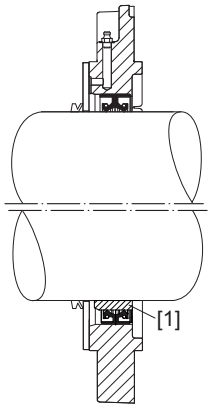
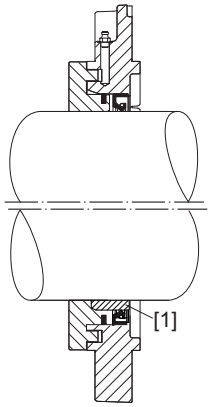
Regreasable seal

Designation	Property	Environment	Illustration
Protected against dust, regreasable	Double lip 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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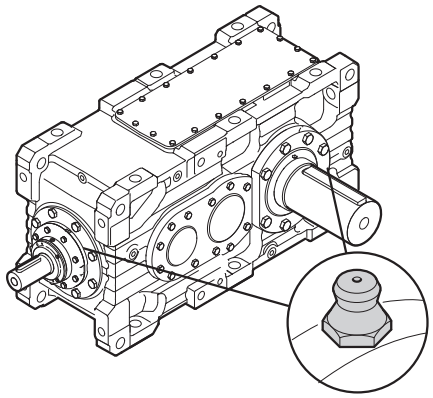
3.13.3 Position of lubrication points

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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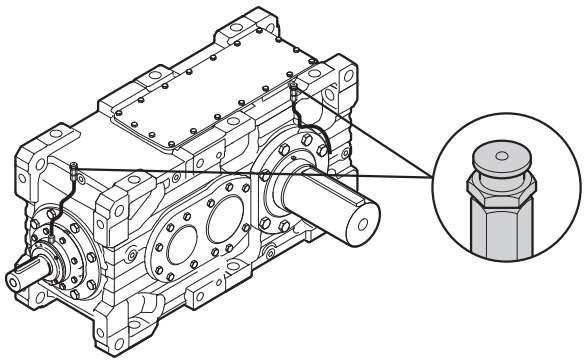
Grease nipple on the top side of the gear unit

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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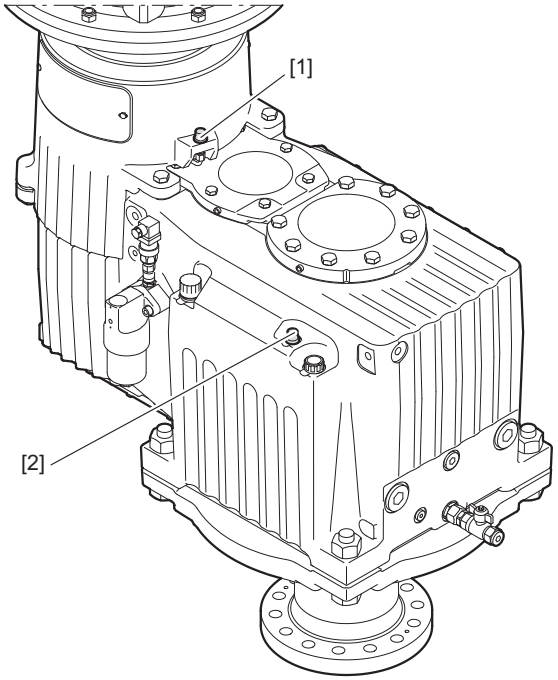
Agitator housing /HA

Regreasable sealing systems are equipped with domed head lubricating nipples as standard. Relubrication must be carried out 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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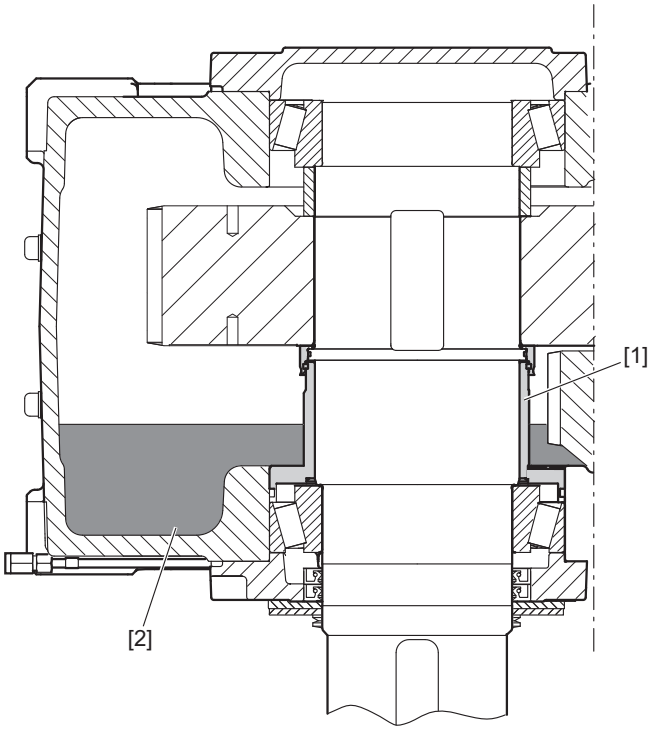
3.13.4 Drywell sealing system

Vertical gear units with output shaft pointing downwards can be equipped with a Drywell sealing system in addition to the usual sealing. The lower bearing of the output shaft is separated from the oil chamber by an integrated tube [1]. The bearing is grease-lubricated and has to be relubricated at regular intervals (DIN 3404 A G1/8 flat grease nipple). The oil level is lower than the upper end of the tube to prevent oil [2] from leaking at this point. All gear units with Drywell sealing system are equipped with pressure lubrication (shaft end pump or motor pump) to ensure sufficient lubrication of the upper bearing and the gearing.

For the lubrication points of drywell sealing systems, refer to chapter "Relubricating drywell sealing system bearings" (→ 279).



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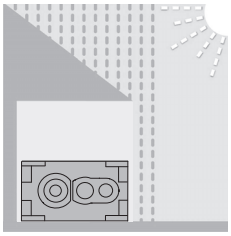
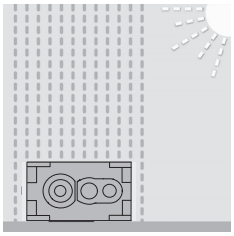
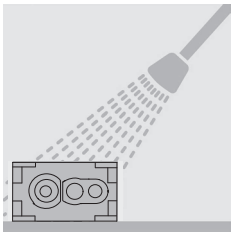
3.14 Coating and surface protection systems

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	
	For environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasional acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt load. According to corrosivity category: C4 (high)
Sample applications	• Port cranes • Sewage treatment plants • Mining applications
Condensation test ISO 6270	240 h

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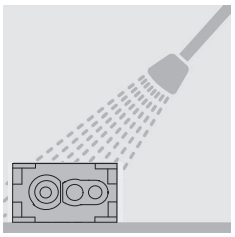
OS 3 high environmental pollution	
Salt spray test ISO 7253	480 h

OS 4 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. According to 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.
- Colors according to RAL – Yes
- 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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3.15 Type of lubrication

3.15.1 Splash lubrication

The oil level is low; gearing and bearing parts that are not immersed in the oil bath are lubricated by splashing oil. Standard lubrication type for horizontal mounting positions (M1 or M3).

3.15.2 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

3.15.3 Pressure lubrication

The gear unit is equipped with a pump (shaft end pump or motor pump). The oil level is low and might even be reduced when compared to splash lubrication. The gearing and bearing parts that are not immersed in the oil bath are lubricated by oil through lubrication lines.

Pressure lubrication is used when:

- Splash lubrication is not possible (see the relevant mounting positions and variants under "oil bath lubrication").
- Instead of oil bath lubrication if it is not desired and/or is not thermally advantageous.
- Drywell sealing system is required (only with a vertical output shaft with LSS facing down).
- High input speeds are present and the maximum speed for the other types of lubrication is exceeded (dependent on the gear unit size, design, and number of stages).

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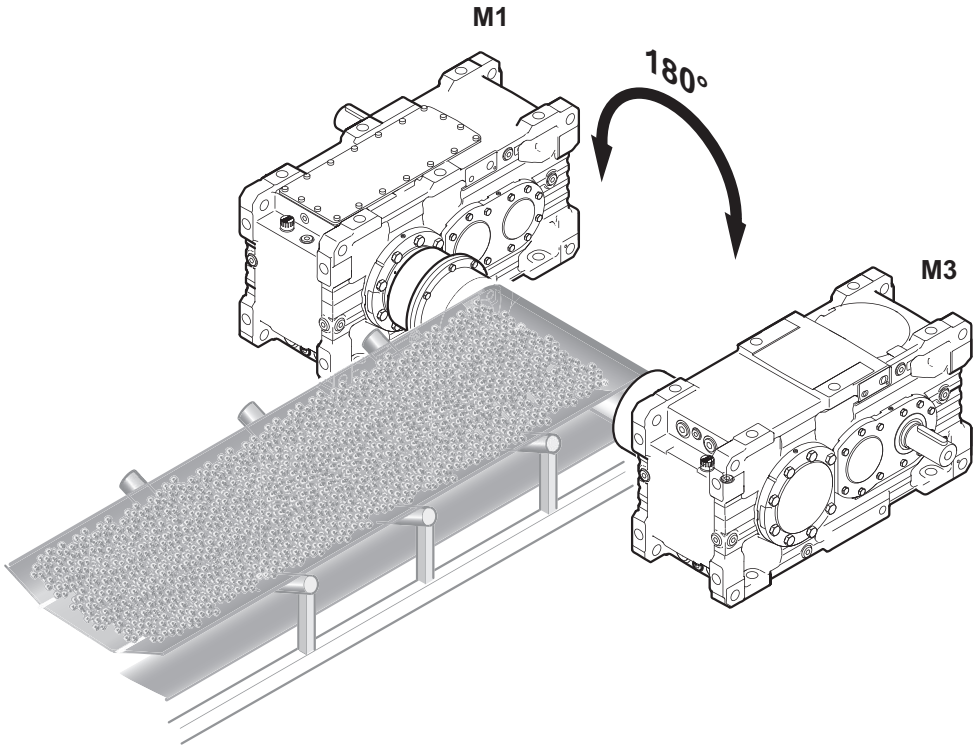
3.16 Reversible gear units

INFORMATION

Reversible gear units are only available with universal housing /HU.

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

For more information, refer to the order-specific "Addendum to the Operating Instructions".



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4 Design of options and accessories

4.1 Oil expansion tank /ET

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 change within the permitted operating temperature range. 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 might result in insufficient lubrication and a malfunction of the gear unit. An increase above the permitted temperature range causes an overfilling of the expansion tank and oil might leak from the gear unit. 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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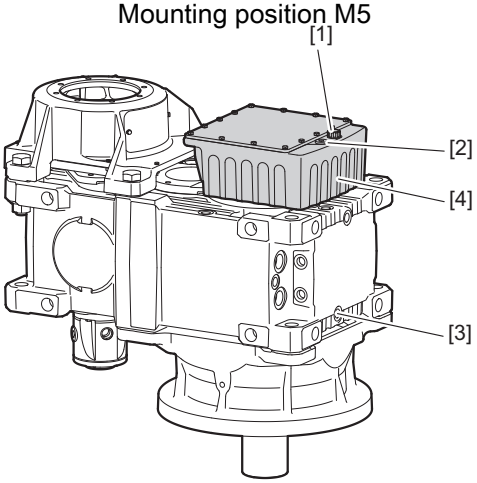
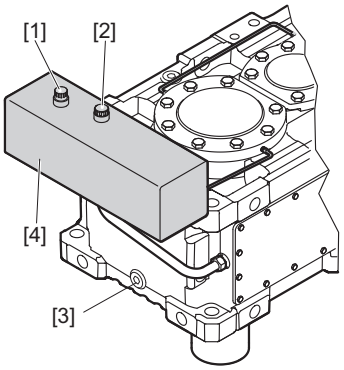
4.1.1 Universal housing /HU

The following figure shows an example of the accessories.

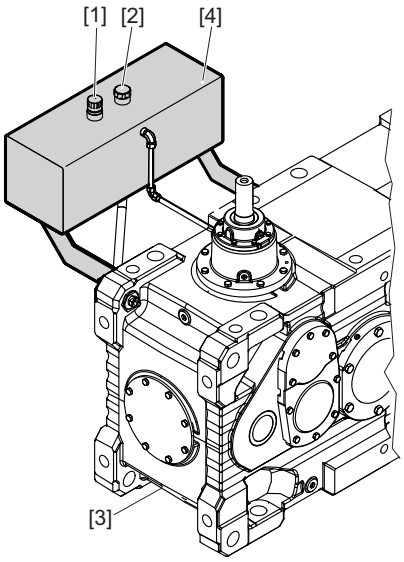
Mounting position M5



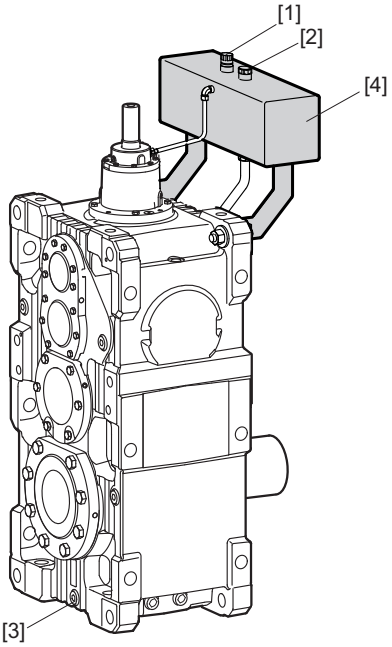
Mounting position M5



Mounting position M1



Mounting position M4



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

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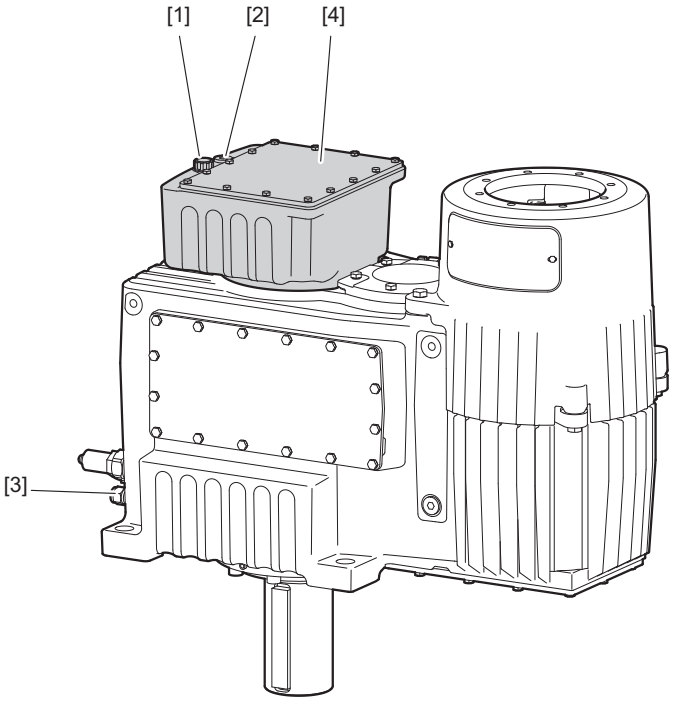
4.1.2 Agitator housing /HA

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



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

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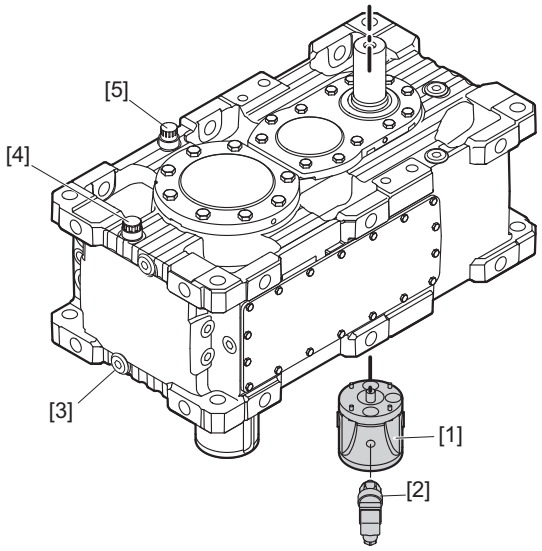
4.2 Shaft end pump /SEP

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

In case of pressure lubrication, a direction-independent shaft end pump [1] supplies all bearing points and gearing outside the oil sump with oil via a tube system.

The shaft end pump [1] is mounted externally to the gear unit and is driven by the input shaft or intermediate shaft of the gear unit. A high reliability of the pump function is ensured in this way.

The shaft end pump [1] is available in 5 different pump sizes. The adequate flow rate for the specific application depends on the following factors:

- Oil quantity required to supply the lubrication points
- Pump position (connected to input shaft or intermediate shaft)
- Gear unit ratio
- Dimensioned for a speed of the gear unit

INFORMATION

- Proper functioning of the shaft end pump is monitored via the connected pressure switch. For information, refer to chapter "Pressure switch" (→ 🗎 120).
- Contact SEW-EURODRIVE for selecting the suitable pump size.
- A minimum input speed is required for the shaft end pump to operate properly. If you use variable input speeds (e.g. inverter-controlled drives) or if you intend to change the input speed of an already delivered gear unit with a shaft end pump, it is essential that you contact SEW-EURODRIVE.

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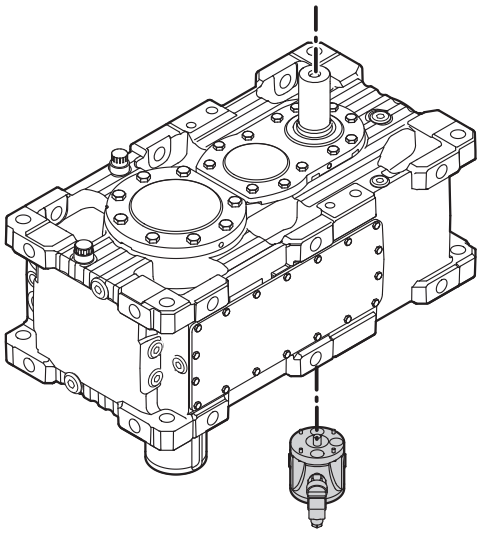
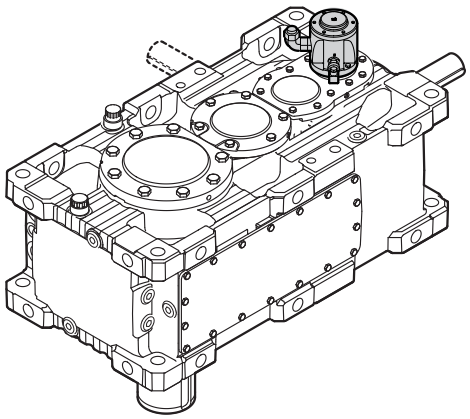
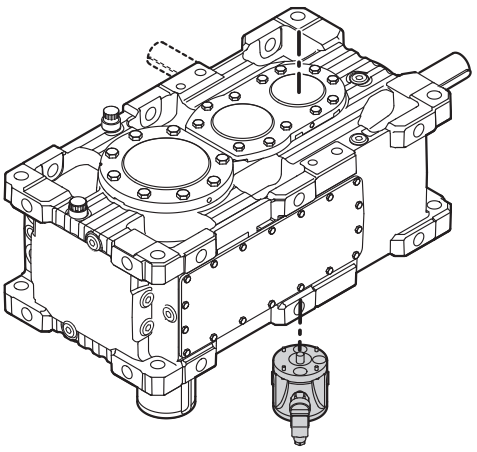
4.2.1 Overview: Position of shaft end pump

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.	

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4.3 Pressure switch /PS

The pressure switch signals the correct oil pressure in the pressure pipe und 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 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 damage the gear unit and are not permitted.

4.4 Motor pump /ONP

INFORMATION

For a description of the unit structure, refer to the addendum to the operating instructions "Motor pump /ONP".

4.5 Motor pump ONP1/ONP1L

INFORMATION

For a description of the device structure, refer to the operating instructions "Motor pump ONP1/ONP1L".

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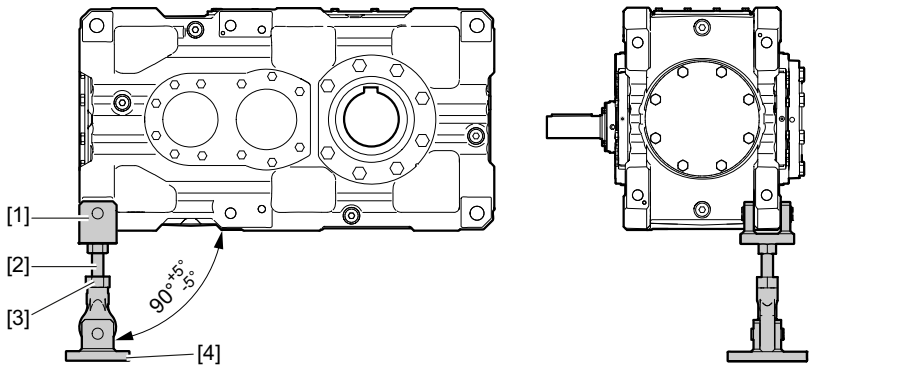
4.6 Torque arm /T

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 using the joint head allows for compensating assembly tolerances and operational displacements. Constraining forces on the output shaft are avoided in this way.



27021598123349771

[1] Yoke with bolt
[2] Threaded bolt with nut
[3] Joint head
[4] Yoke plate with bolt

INFORMATION

Fan version X.K.. Advanced cannot be used together with a torque arm because the fan guard is mounted to the attachment point of the torque arm.

4.7 Flange coupling with cylindrical interference fit /FC-S

NOTICE

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

Possible damage to the gear unit.

- Gear units with flange couplings cannot be additionally secured on the floor with a rigid connection. This is why foot mounting of the gear unit or using a base frame is not permitted.

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

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

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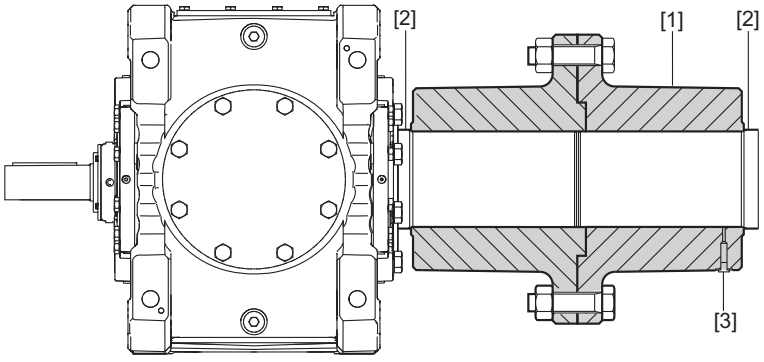
Torque between the shaft and the coupling is transmitted via a cylindrical shrink fit. Both coupling halves are mounted together at their flanges. The couplings are equipped with several disassembly bores [3] for removing the interference fit hydraulically.



45035997225573259

4.8 Flange coupling with keyway /FC-K

NOTICE

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

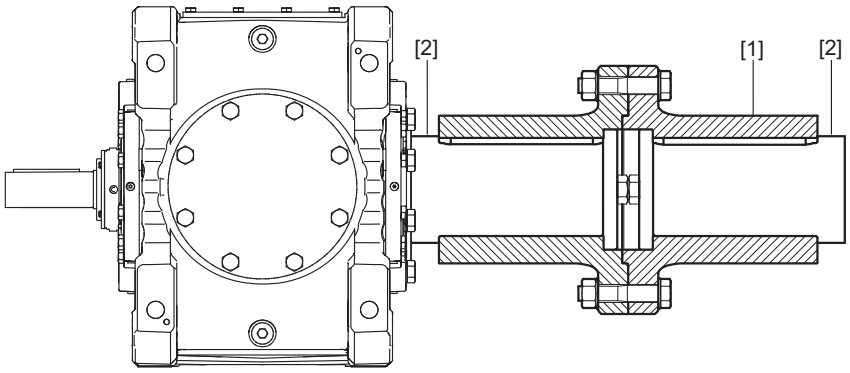
Possible damage to the gear unit.

- Gear units with flange couplings cannot be additionally secured on the floor with a rigid connection. This is why foot mounting of the gear unit or using a base frame is not permitted.

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

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

Torque between the shaft and the coupling is transmitted via a keyed connection. Both coupling halves are mounted together at their flanges.



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4.9 Mounting flange /F

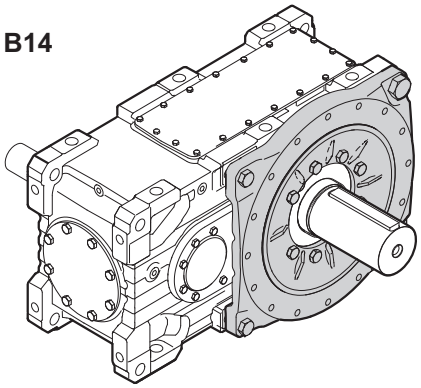
INFORMATION

- The mounting flange can be combined with all output shaft types but cannot be used with the standard sealing system. Observe the limitations for hollow-shaft gear units in chapter "Gear unit mounting for hollow-shaft gear units" (→ 🗎 65).
- For mounting flanges with external overhung loads, contact SEW-EURODRIVE.

A mounting flange is available for the gear units as an alternative to foot mounting.

4.9.1 B14

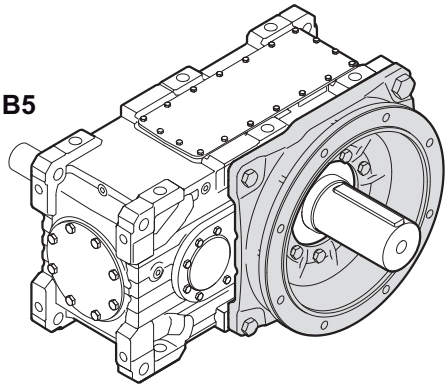
The mounting flange in B14 design has an outer centering and retaining threads.



20891934731

4.9.2 B5

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



20891937675

4.10 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.

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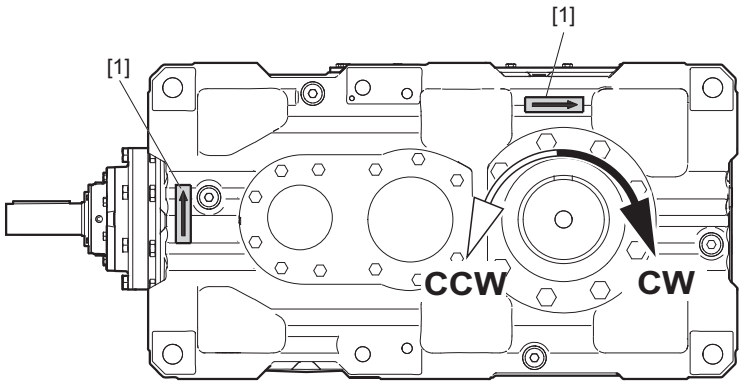
The backstop functions by using centrifugal lift-off sprags. Once the lift-off speed is reached, the sprags completely lift off from the contact surface of the outer ring. The backstop is lubricated with gear oil.



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

- CW = Clockwise
- CCW = Counterclockwise

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

INFORMATION

If the drive has a through-going output shaft, the direction of rotation of the backstop should be given as viewed towards shaft position 3.

Contact SEW-EURODRIVE if you have other requirements.

The backstop might wear off when operated below lift-off speed.

This is why you should **always** contact SEW-EURODRIVE for defining the maintenance intervals for:

- Input speed rates $n_1 < 950\ min^{-1}$
- or any of the following gear unit designs:

Size	Input speed (HSS) n_1 in min^{-1}	Nominal gear unit ratio i_N
X2K100 – 230	950 – 1150	≥10
X3K/X3T100 – 130	950 – 1150	All I_N
X3K/X3T140 – 170	950 – 1150	≥ 31.5
X3K/X3T180 – 320	950 – 1150	≥ 50
X3K/X3T100 – 110	1150 – 1400	≥ 25
X3K/X3T120 – 130	1150 – 1400	≥ 40
X3K/X3T140 – 170	1150 – 1400	≥ 50
X3K/X3T180 – 320	1150 – 1400	≥ 63
X3K/X3T100 – 130	> 1400	≥ 35.5
X3K/X3T140 – 170	> 1400	≥ 63
X4K/X4T120 – 190	950 – 1150	All I_N
X4K/X4T200 – 320	950 – 1150	I_N ≥ 200
X4K/X4T120 – 170	1150 – 1400	All I_N
X4K/X4T180 – 320	1150 – 1400	≥ 200
X4K/X4T120 – 130	> 1400	All i_N
X4K/X4T140 – 250	> 1400	i_N ≥ 200

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4.11 Motor adapter /MA

Motor adapters [1] are available for mounting:

- **IEC (B5) motors** of sizes 100 to 355
- **NEMA ("C" face) motors** of sizes 182 to 449

INFORMATION

- The gear unit must be installed in such a way that liquids cannot enter the motor adapter (HSS end) and accumulate there. Otherwise, the oil seal can be damaged, and subsequent damage can create a possible ignition source.
- An elastic claw coupling is included in the delivery.
- All motor adapters can be equipped with a fan for 2- and 3-stage gear units.

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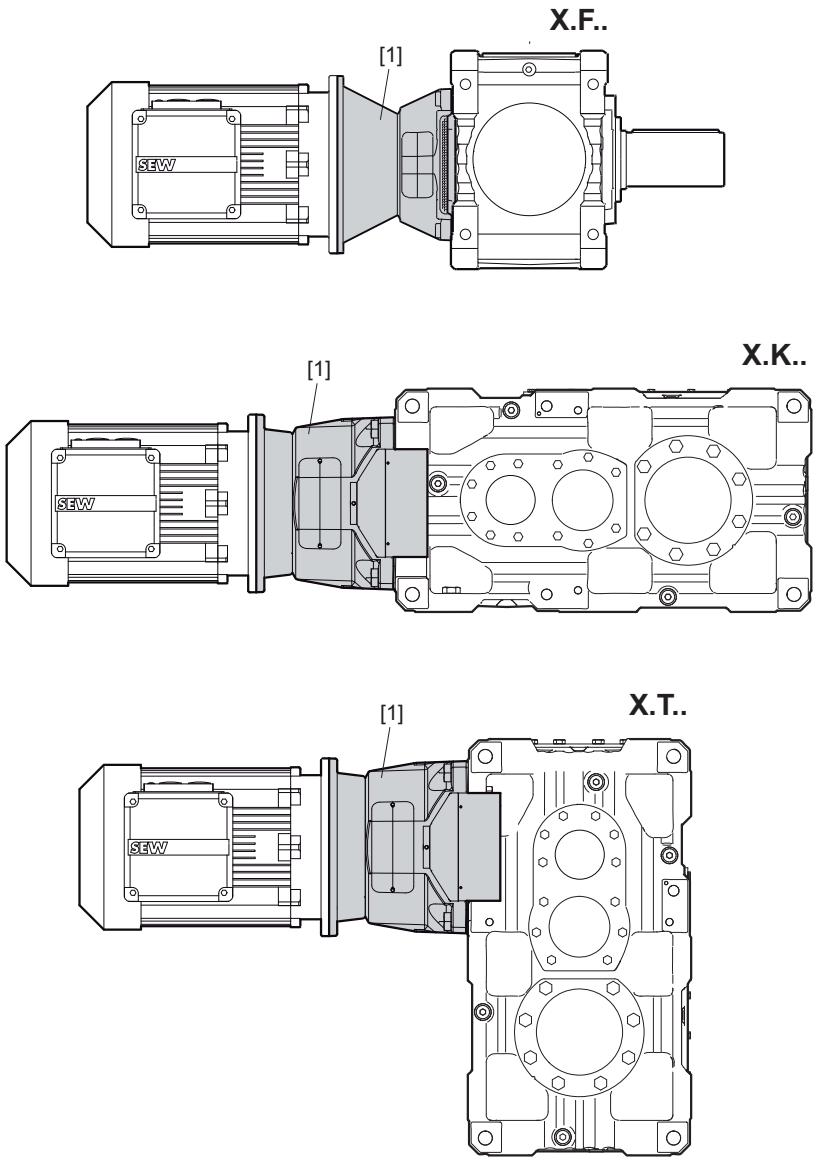
The following figure shows an example of the motor adapter [1] connected to the gear unit:



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4.12 V-belt drives /VBD

⚠ WARNING

Observe the maximum circumferential velocity according to the respective manufacturer specifications.

Severe or fatal injuries.

- Overspeed can damage the belt pulley.

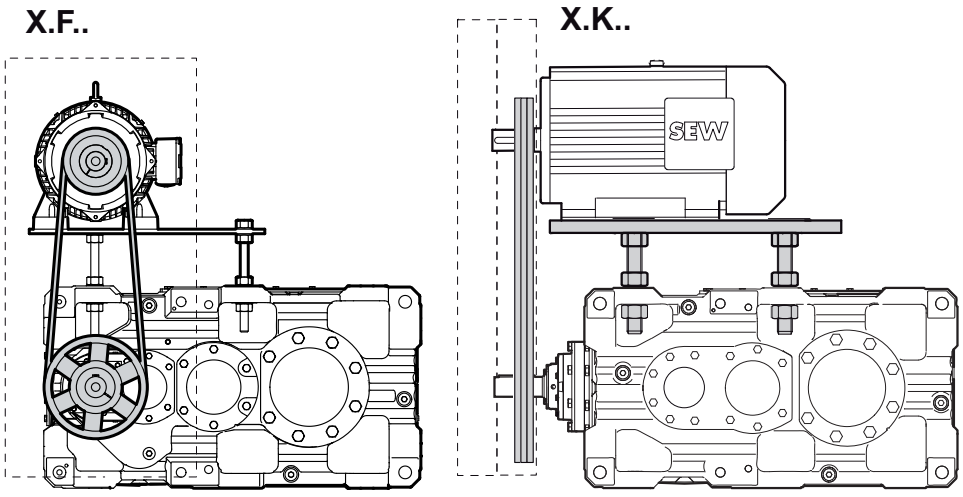
INFORMATION

In standard design, V-belt drives cannot be combined with a mounting flange or a fan as these options would collide with the V-belt drive.

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. As an alternative, the drive can be supplied as completely mounted unit with motor.

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



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4.13 Drive packages on a steel frame

For gear units in a horizontal mounting position, complete pre-assembled drive packages on a steel frame (swing base or base frame) are available.

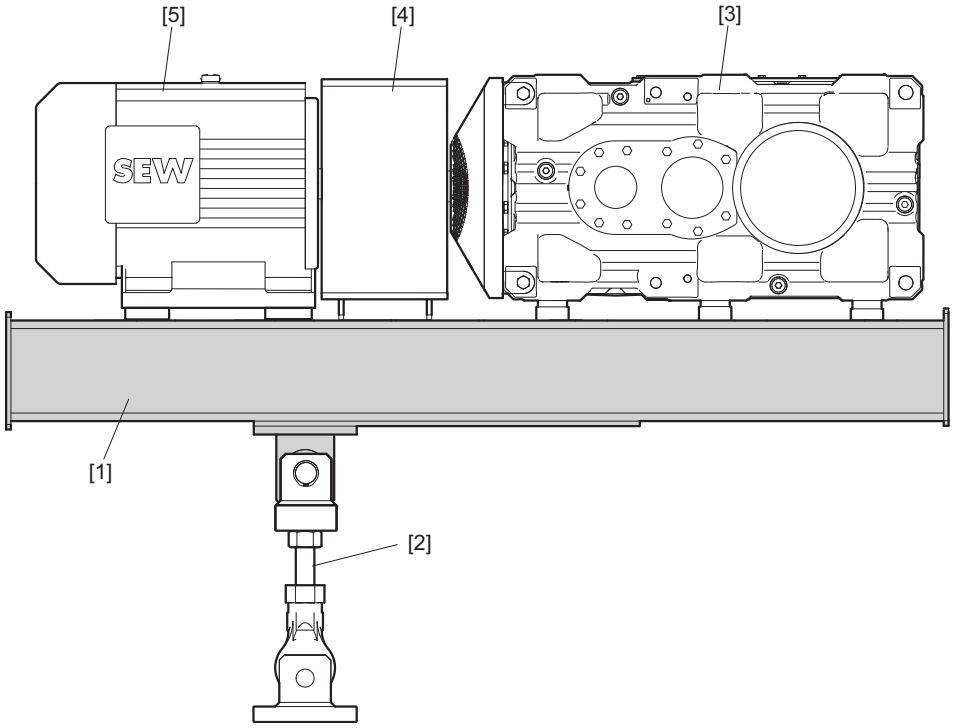
4.13.1 Swing base /SB

A swing base is a steel frame [1] that accommodates the gear unit, (hydro) coupling and motor (and brake, if required), including protection devices, such as a guard, etc. A swing base is normally used for:

- Hollow shaft gear units or
- solid shaft gear units with rigid flange coupling on the output shaft.

The steel frame [1] is supported by a torque arm [2].

Example: Swing base with coupling



216568971

[1] Swing base
[2] Torque arm (optional)
[3] Bevel-helical gear unit
[4] Coupling with protection cover
[5] Motor

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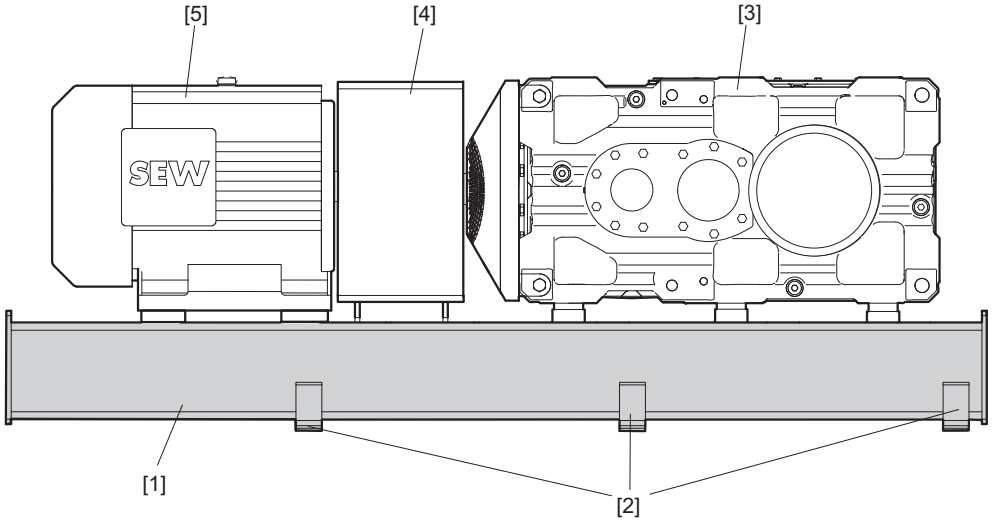
4.13.2 Base frame /BF

For gear units in a horizontal mounting position, complete pre-assembled drive packages on a base frame are available.

A base frame is a steel frame [1] that accommodates the gear unit, (hydro) coupling and motor (and brake, if required), including protection devices, such as guards, etc. The steel frame is supported by several foot mountings [2]. Such a frame is usually used for solid shaft gear units with elastic coupling on the output shaft.

Example: Base frame with coupling



219858571

[1] Base frame
[2] Foot mounting
[3] Bevel-helical gear unit
[4] Coupling with protection cover
[5] Motor

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4.14 Type of cooling

4.14.1 Fan cooling

A fan is installed on the gear unit drive shaft; its airflow improves the transmission of heat from the gear unit surface to the environment. Refer to the section "Fan / FAN" (→ 🗎 91) for further information.

4.14.2 Built-in cooling

This refers to cooling systems installed directly in the gear unit housing or mounted very close to it, e.g. a water cooling cover or a water cooling cartridge.

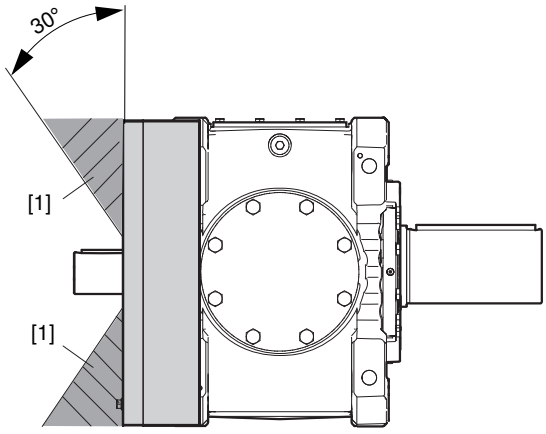
4.14.3 Circulation cooling

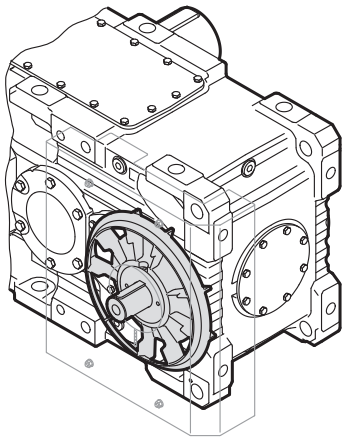
The gear unit oil is pumped out of the gear unit to an external heat exchanger by a pump (motor pump or shaft end pump). This normally involves oil supply systems with oil-water or oil-air heat exchangers.

4.15 Fan /FAN

A fan may be retrofitted to raise 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.

4.15.1 X.F.. Radial fan basis





18014399183926283

[1] Air intake clearance

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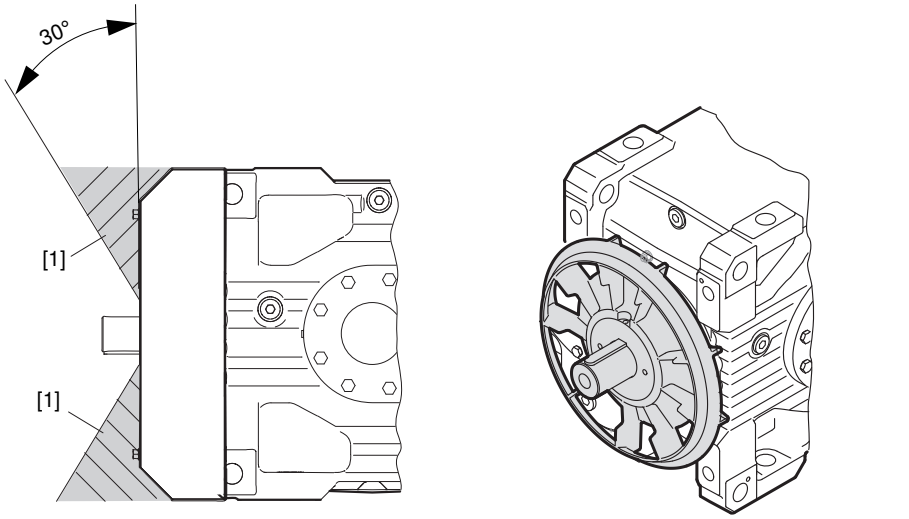
4.15.2 X.K.. Radial fan basis



27021598438673035

[1] Air intake clearance

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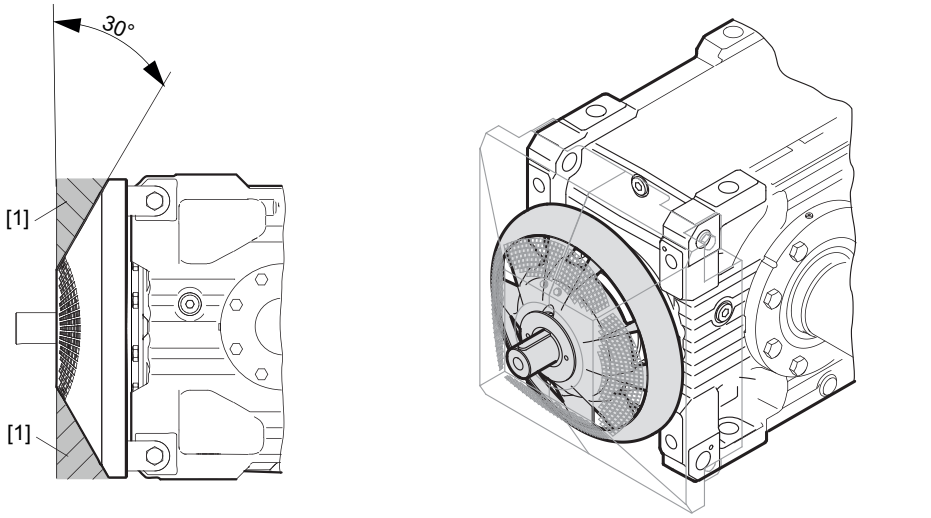
4.15.3 X3K.. Diagonal fan basis

When the type X3K.. Advanced is used, the connection element (e.g. hydraulic start-up coupling) can be mounted flush to the fan guard.

The air intake clearance is integrated into the fan guard.



18014399183937419

[1] Air intake clearance

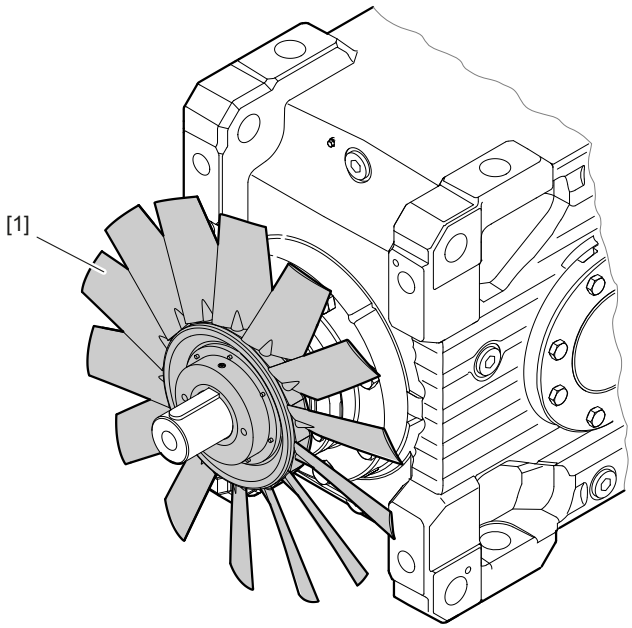
INFORMATION

The X3K.. Advanced fan cannot be used together with a torque arm because the fan guard is mounted to the attachment point of the torque arm.

4.15.4 Axial fan basis

An axial fan [1] is integrated to increase the thermal rating. The fan depends on the direction of rotation. This is the reason why fans are available for CW or CCW direction of rotation. Refer to the information on the order documents.

Universal housing HU / horizontal housing HH / thermal housing HT



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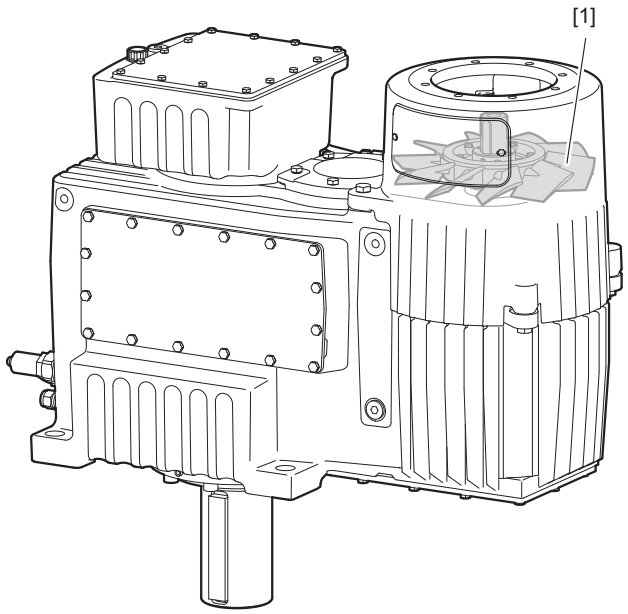
Agitator housing /HA



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4.16 Water cooling cover /CCV

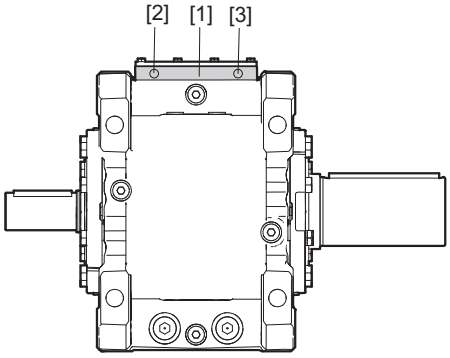
The water cooling cover is located on the assembly opening of the gear unit, and is provided with cooling water through a water connection. The customer is to provide for the water connection.

The amount of heat that can be dissipated depends on the intake temperature and the flow rate of the cooling medium that flows through the unit. The data given in the technical specifications must be observed.

INFORMATION

Contact SEW-EURODRIVE if you use cooling media such as brackish water or process water.

4.16.1 Structure



9007199568481675

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

The water cooling cover [1] is made of a corrosion-resistant aluminum alloy. 2 bores with pipe threads are available to connect to the cooling circuit.

- Sizes X100 – 130: G3/8"
- Sizes X180 – 210: G1/2"

The piping is not included in the delivery. Gear units with water cooling cover are delivered completely assembled.

A water cooling cover can be retrofitted. Contact SEW-EURODRIVE.

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4.16.2 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
X180 – 190	28	6
X200 – 210	28	6

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4.17 Water cooling cartridge /CCT

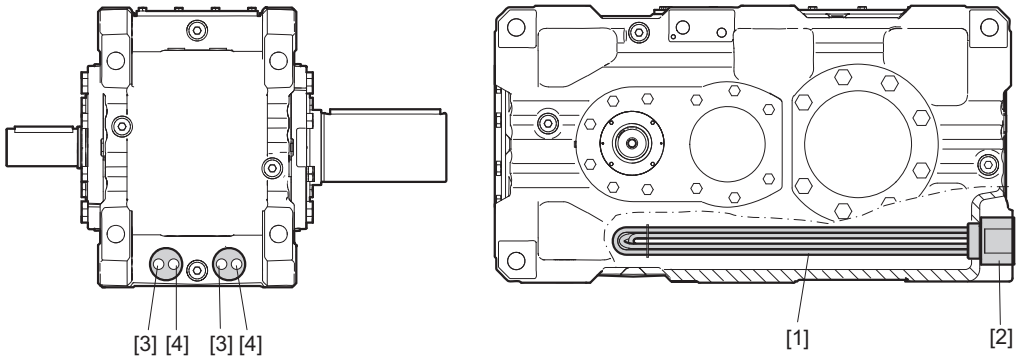
The water cooling cartridge is mounted in the gear unit's oil sump and is provided with cooling water through a water connection. The customer is responsible for providing the water connection.

The amount of heat that can be dissipated depends on the intake temperature and the flow rate of the cooling medium that flows through the unit. See the technical specifications to determine the number of water cooling cartridges required. Observe the data given in the technical specifications.

INFORMATION

Contact SEW-EURODRIVE if you use cooling media such as brackish water or process water.

4.17.1 Structure



313751819

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

The water cooling cartridge consists of 3 main parts:

- Cooling pipes (CuNi alloy)
- Tube plate (brass)
- Connection piece (brass; gray cast iron; steel)

Two bores with pipe threads are available for connection to the cooling circuit:

- Pipe thread G1/4" for sizes X100 – 170
- Pipe thread G1/2" for sizes X180 – 320

. The piping is not included in the delivery.

Gear units with water cooling cartridge are delivered completely assembled.

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

INFORMATION

The cooling circuit must be connected in parallel for gear units with 2 water cooling cartridges. Observe chapter "Built-in cooling – water cooling cartridge" (→ 🗎 222).

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4.17.2 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 has to be dimensioned individually for each cooling cartridge.

Twice the cooling water flow rate is required when using 2 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
X260 – 270	25	10
X280 – 300	25	10
X310 – 320	25	10

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4.18 Oil-water cooler for splash lubrication /OWC

INFORMATION

For descriptions on the unit structure, refer to the addendum to the operating instructions "Oil-Water Cooler for Splash Lubrication /OWC".

4.19 Oil-air cooler for splash lubrication /OAC

INFORMATION

For descriptions on the unit structure, refer to the addendum to the operating instructions "Oil-Air Cooler for Splash Lubricaton /OAC".

4.20 Oil-air cooler for splash lubrication /OAC1

INFORMATION

For descriptions on the unit structure, refer to the operating instructions "Oil-Air Cooler for Splash Lubrication /OAC1".

4.21 Oil-water cooler for pressure lubrication /OWP

INFORMATION

For descriptions on the unit structure, refer to the addendum to the operating instructions "Oil-Water Cooler for Pressure Lubrication /OWP".

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4.22 Oil-water cooler for pressure lubrication /OWP1

INFORMATION

For descriptions of the unit structure, refer to the operating instructions "Oil-Water Cooler for Pressure Lubrication /OWP1".

4.23 Oil-air cooler for pressure lubrication /OAP

INFORMATION

For descriptions on the unit structure, refer to the addendum to the operating instructions "Oil-Air Cooler for Pressure Lubrication /OAP".

4.24 Oil-air cooler for pressure lubrication /OAP1

INFORMATION

For descriptions of the unit structure, refer to the operating instructions "Oil-Air Cooler for Pressure Lubrication / OAP1".

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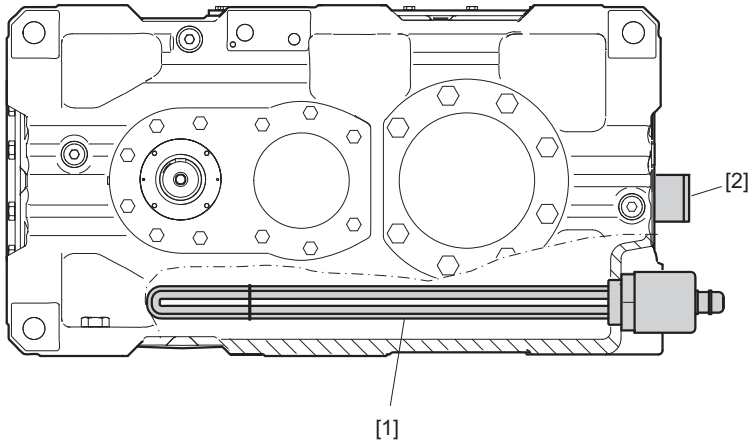
4.25 Oil heater /OH

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

4.25.1 Structure

The oil heater consists of 2 basic parts:

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



18014398868586891

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

INFORMATION

The position of the thermostat varies depending on the variant and mounting position of the gear unit.

4.26 Temperature sensor /PT100

The temperature sensor PT100 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" (→ 🗎 300) 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.

4.27 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 limit value switch, for example

- as "early warning"

  or

- as "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.

4.28 Temperature switch /TSK

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 controller of the operator in such a way that the order-specific switching points are achieved.

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4.29 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 calculated value is continuously shown on the display of the evaluation unit; when needed, the display can be changed to the current gear unit oil temperature.

INFORMATION

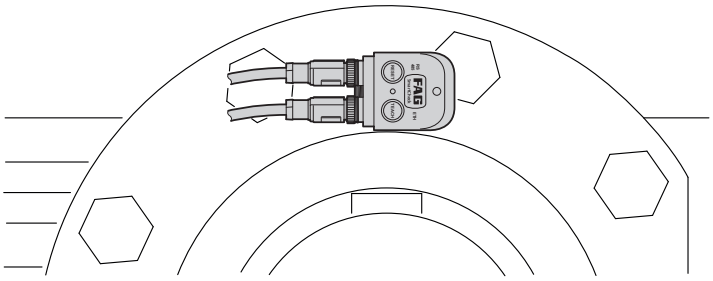
You find more information on the evaluation unit in the "DUO10A Diagnostic Unit" manual, publication number 11473428.

4.30 DUV40A (Diagnostic Unit Vibration)

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

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

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



INFORMATION

Further information about the evaluation unit and accessories can be found in the "DUV40A (Diagnostic Unit Vibration)" addendum (installation instructions).

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4.30.1 Scope of delivery

- Device Vibration SmartCheck with integrated software FAG SmartWeb
- User documentation Vibration SmartCheck and FAG SmartWeb on CD-ROM
- FAG SmartUtility Light software with user documentation on CD-ROM
- 1 retaining screw: Hexagon socket head screw M6 × 45
- 1 O-ring to secure the retaining screw against loss
- 1 plug with logo to close assembly opening
- 3 closing plugs to close unused M12 connections

INFORMATION

Cables for connecting the device are not included in the standard delivery of Vibration SmartCheck devices.

4.30.2 Technical data

DUV40A (Diagnostic Unit Vibration)	
Housing	Glass fiber reinforced plastic
Fastening	Hexagon socket head screw M6 × 45 Contact surface on the machine: 25 mm Ø
Current consumption	< 200 mA at 24 V
Ambient temperature	-20 to +70 °C
Internal operating temperature	-20 to +85 °C
Voltage supply	11 – 32 VDC or Power over Ethernet (PoE) based on 802.3af Mode A
Size	44 mm × 57 mm × 55 mm
Weight	ca. 210 g
Degree of protection	IP 67
Operating system	Embedded Linux
Software	FAG SmartWeb (Mozilla Firefox ESR 38 (recommended), Internet Explorer 11, Internet Explorer 9 not recommended due to performance reasons) Vibration SmartUtility Light or optionally Vibration SmartUtility Languages: German, English, Chinese, Spanish, and French

Internal sensor technology	
Vibration	Acceleration sensor (piezoelectric sensor) Frequency range 0.8 Hz to 10 kHz Measuring range ±50 g
Temperature	Measuring range -20 to +70 °C

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Measurement	
Measurement functions	Acceleration Speed and distance by integration System temperature Process parameters (e.g. speed, load, pressure)
Diagnostic methods	Time signal, envelope, spectrum and trend analysis, speed and frequency checking

Characteristic values (time and frequency range)	
Defined characteristic values	DIN/ISO 10816
Calculated characteristic values	RMS, frequency selected RMS, direct component, peak, peak to peak, crest factor, Wellhausen count, carpet level, condition monitoring Other user-defined characteristic values are available.

Signal processor	
Frequency resolution	1600, 3200, 6400, or 12800 lines Line width min. 0.0039 Hz at 50 Hz (depending on low pass)
Measurement resolution	24 Bit (A/D converter)
Frequency range	0.8 Hz – 10 kHz
Low passes	50 Hz – 10 kHz (50 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz, 5 kHz, 10 kHz)
High passes (only envelope)	750 Hz, 1 kHz, 2 kHz (other filters upon request)

Memory	
Program and data	64 MB RAM, 128 MB flash

Inputs and outputs	
Inputs	**2 analog inputs** (0 – 10 V / 0 – 24 V / 0 – 20 mA / 4 – 20 mA), frequency range 0 – 500 Hz, 12 Bit **1 digital input** (0 – 30 V, 0.1 Hz – 1 kHz)
Outputs	**1 analog output** (0 – 10 V / -20 mA / 4 – 20 mA), 12 Bit **1 switching output** (open collector, max. 1 A, 28 V) Optional galvanic isolation between inputs and outputs

Interfaces	
Control elements	2 capacitive pushbuttons (learning mode, alarm reset, restart, factory settings)
Display elements	1 LED to display status and alarm 1 LED to acknowledge the pushbuttons 2 LEDs to display communication
Communication	Ethernet 100 Mb/s RS485 (currently not yet supported)
Electrical connections	3 M12 plug connectors (polarity reversal protected) for supply, RS485, inputs/outputs, and Ethernet

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4.30.3 Part numbers

	Description	Part number
Sensor	DUV40A (Diagnostic Unit Vibration)	19175892
Cables	Voltage supply cable 8-pin for SmartCheck 5 m; M12(B) <-> open end	19179596
Cables	Ethernet cable for SmartCheck 5 m; M12 <-> RJ45	19179618
Cables	I/O cable 8-pin for SmartCheck 5 m; M12(St) <-> open end	19179626
Cables	Power/Ethernet/I-O signals in 10m and 20m	

	Description	Part number
Base for mounting on standard gear units (R, F, K, and S gear units)	Mounting base with sealing ring M10 × 1	20593422
	Mounting base with sealing ring M12 × 1.5	20593430
	Mounting base with sealing ring M22 × 1.5	20593449
	Mounting base with sealing ring M33 × 2	20593457
	Mounting base with sealing ring M42 × 2	20593465

	Description	Part number
Base for mounting on industrial gear units	Mounting base with sealing ring G3/4"	20593384
	Mounting base with sealing ring G1"	20593392
	Mounting base with sealing ring G1 1/4"	20593406
	Mounting base with sealing ring G1 1/2"	20593414

	Description	Part number
Base for mounting on standard motors	Mounting base M5	21014175
	Mounting base M6	21014167
	Mounting base M8	20593503
	Mounting base M10	21014248
	Mounting base M12	20593473
	Mounting base M16	20593481
	Mounting base M20	20593511

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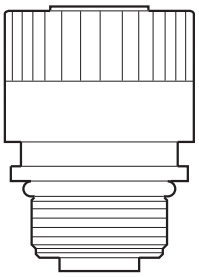
4.31 Breather /BPG

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

The following breathers can be used.

4.31.1 Standard



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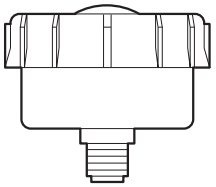
Structure

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

4.31.2 Breather with filter insert /PI



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The breather has the following characteristics:

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

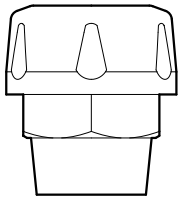
Structure

The breather has a corrosion-proof housing with 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"

4.31.3 Breather made of steel

Structure



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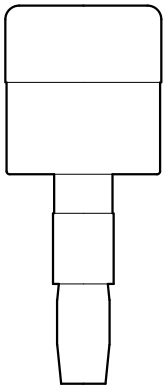
Features	
Housing material	Steel
Filter inserts	Wire mesh
Threads	3/4" or 1"

4.31.4 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 moisture and humidity. Saturation is indicated by the color changing from blue to pink. • Foam pad: Absorbs oil mist.
Threads	3/8" or 1"

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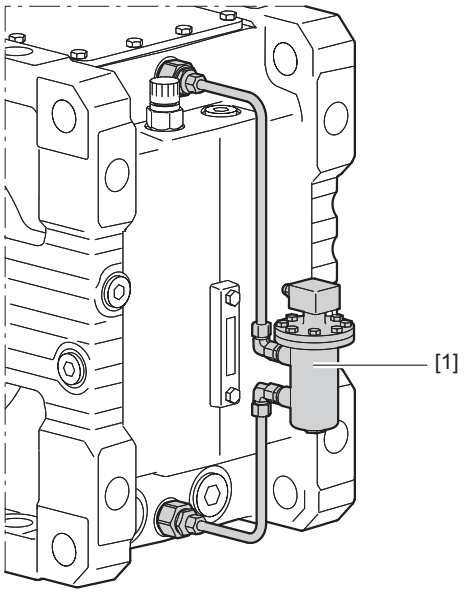
4.32 Float switch

The float switch [1] is used if level monitoring in the bypass is necessary due to limited space or due to high temperatures.

As soon as the float switch housing is filled half with liquid, the float switch moves upwards and triggers a switching contact. This switching contact activates e.g. solenoid valves, signal lamps or pumps via suitable electric auxiliary equipment (relays, contactors).



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5 Installation/assembly

5.1 Required tools/resources

Not included in the delivery:

- Set of wrenches
- Torque wrench
- Mounting device
- Compensation elements (washers, spacing rings), if necessary
- Fasteners for input and output elements
- Lubricant, e.g. NOCO® fluid from SEW-EURODRIVE → except for hollow shaft gear units
- For hollow shaft gear units → aids for mounting onto/removal from the machine shaft
- Fasteners for the gear unit base

5.2 Tolerances

Observe the following tolerances.

5.2.1 Shaft end

Diameter tolerance in accordance with DIN 748:

Ø = Smooth output shaft / ..R→ ISO v6

Ø = Output shaft as a solid shaft with key /..S → ISO m6

Center bores according to DIN 332, part 2 (type D..):

Ø > 16 – 21 mm	→ M6	Ø > 50 – 85 mm	→ M20
Ø > 21 – 24 mm	→ M8	Ø > 85 – 130 mm	→ M24
Ø > 24 – 30 mm	→ M10	Ø > 130 – 225 mm[1)]	→ M30
Ø > 30 – 38 mm	→ M12	Ø > 225 – 320 mm[1)]	→ M36
Ø > 38 – 50 mm	→ M16	Ø > 320 – 500 mm[1)]	→ M42

1) Dimensions not according to DIN 332; the thread depth including the counterbore is at least twice that of the rated thread diameter.

Keys according to DIN 6885 (domed type)

5.2.2 Hollow shaft

Diameter tolerance:

Ø → ISO H7 for hollow shafts for shrink disk

Ø → ISO H8 for hollow shafts with keyway

5.2.3 Mounting flange

Centering shoulder tolerance: ISO f7

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5.3 Important notes

Read the following notes prior to installation/mounting.

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Work on the gear unit only when the machine is not in use. Secure the drive unit against unintentional power-up. Attach an information sign near the ON switch to warn that the gear unit is being worked on.

⚠ WARNING

Danger due to mounting in impermissible mounting position.

Severe or fatal injuries.

- 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 legs and mounting flanges against each other.
- Contact SEW-EURODRIVE before mounting the gear unit in another mounting position than the one permitted.

⚠ WARNING

Danger due to freely accessible, rotating parts.

Severe or fatal injuries.

- Secure rotating components such as shafts, couplings, gears or belt drives using suitable protection covers.
- Ensure that installed protection covers are sufficiently attached.

⚠ 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 releasing shaft connections, make sure that there are no active torsional moments present (tensions within the system).

⚠ WARNING

Danger due to installing impermissible components.

Severe or fatal injuries.

- 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.

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⚠ WARNING

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

Serious injury.

- Let the gear unit cool down before you start working on it.
- Remove the oil drain plug very carefully.

⚠ CAUTION

Risk of falling or ejection of unsecured mount-on components, such as keys.

Possible injuries.

- Install appropriate protective devices.
- Secure the mount-on components.

⚠ CAUTION

Danger due to lubricant leaking from damaged seals and the breather.

Minor injuries.

- Check the gear unit and mount-on components for leaking lubricant.
- The seals must not come in contact with cleaning agent as this may damage the seals.
- Protect the breather against damage.
- 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.

⚠ CAUTION

Risk of injury due to protruding parts.

Minor injuries.

- Gear units and mount-on components must not protrude into footways.

NOTICE

Improper installation and assembly can damage the gear unit.

Possible damage to property.

- Observe the following notes.

- Make sure that the customer components are designed for the load.
- The gear units are delivered without an oil fill as standard.
- Do not change the mounting position without prior consultation with SEW-EURODRIVE. The warranty will become void without prior consultation.
- The most important technical data is provided on the nameplate.

  Additional data relevant for operation is available in drawings, on the order confirmation, or in an order-specific documentation.
- Do not modify the gear unit or the mount-on components without prior consultation of SEW-EURODRIVE.

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- 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 legs and mounting flanges against each other.
- Make sure that the oil level plugs and oil drain plugs, as well as the breather are freely accessible.
- When installing a filter in the OAP and OWP cooling units, make sure there is sufficient height for removing the filter element and the filter hood.
- Use plastic inserts if there is a risk of electrochemical corrosion between the gear unit and the driven machine (connection between different metals such as cast iron and stainless steel). Also install the bolts with plastic washers. Always ground the gear unit housing.
- It is important that only authorized personnel is allowed to assemble gear head units with motors and adapters. Contact SEW-EURODRIVE.
- Do not weld anywhere on the drive. Do not use the drive as a ground point for welding work. Welding may destroy gearing components and bearings.
- Units installed outdoors must be protected from the sun. Suitable protection devices are required, such as covers or roofs. Avoid heat from building up. The user must 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 may cause water to accumulate in the oil.
- The gear units are delivered with the ordered painting. Repair any damage to the paint work (e.g. on the breather).
- Do not modify the existing piping.
- For gear units that are filled with oil at the factory, check to see that the breather is installed before you start up the gear unit.
- Adhere to the safety notes in the individual chapters.

5.4 Prerequisites for installation

Check that the following conditions have been met:

- The information on the motor's nameplate must match the voltage supply system.
- The drive has not been damaged during transportation or storage.
- The ambient temperature matches the information in the order documents.
- No harmful oils, acids, gases, vapors, radiation etc. in the vicinity.

NOTICE

Danger due to insufficiently cleaned flange surfaces.

Possible damage to property.

- Clean the output shafts and flange surfaces thoroughly to ensure they are free of anti-corrosion agents, contamination or similar. Use a standard solvent. Do not let the solvent come into contact with the sealing lips of the oil seals.

5.4.1 Extended storage

Observe the following: The service life of the lubricant in the bearings is reduced if the unit is stored for ≥ 1 year (applies only to bearings with grease lubrication).

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Replace the screw plug with the breather.

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5.5 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 the retaining screws are tightened. Any irregularity of the surface must be leveled out appropriately.
- Observe the weight specified on the nameplate.

To ensure the quick and reliable mounting of a gear unit with foot mounting, the proper foundation should be selected and the mounting carefully planned in advance. System drawings with all necessary construction and dimension details should be available.

To prevent harmful vibrations and oscillations, ensure sufficient rigidity of the foundation or the steel construction during installation of the gear unit with foot or flange mounting. The foundation and steel construction must be dimensioned according to the weight and torque of the gear unit, taking into account the forces acting on the gear unit.

Tighten retaining screws or nuts to the specified torque. Use the screws and tightening torques specified in chapter "Gear unit mounting" (→ 🗎 116).

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5.5.1 Tightening torques: Gear unit mounting of foot-mounted design

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

Size	Screw/nut	Tightening torque Nm Strength class 8.8
X100 – 110	M20	464
X120 – 130	M24	798
X140 – 150	M30	1597
X160 – 170	M36	2778
X180 – 190	M36	2778
X200 – 230	M42	3995
X240 – 280	M48	6022
X290 – 320	M56	9650

INFORMATION

Do not lubricate the screw connections during installation.

5.5.2 Tightening torques: Retaining screws of gear unit mount-on parts

Observe the notes in chapter "Important information" (→ 🗎 111).

Tighten the screws of gear unit mount-on parts and protection covers using the following tightening torque.

INFORMATION

The tightening torques do not apply to mounting types like flange coupling, torque arm, mounting flange, hollow shaft with shrink disk etc. Those are described in the individual chapters.

Screw/nut	Tightening torque Nm Strength class 8.8
M6	11
M8	27
M10	54
M12	93
M14	148
M16	230

INFORMATION

Do not lubricate the screw connections during installation.

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5.5.3 Aligning the shaft axis

⚠ WARNING

Shafts can break if shaft axes are not aligned exactly.

Severe or fatal injuries.

- Refer to the separate operation instructions regarding the requirements of the couplings.

The service life of the shafts, bearings and couplings depends on the precision of the alignment of the shaft axes with each other.

Always try to achieve zero misalignment. When doing so, also consult the special operating instructions regarding the requirements of the couplings, for example.

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5.6 Filling gear units with oil / delivered without oil fill (standard)

5.6.1 General information

The gear unit is delivered without oil fill as standard.

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Work on the gear unit only when the machine is not in use. Secure the drive unit against unintentional power-up. Attach an information sign near the ON switch to warn that the gear unit is being worked on.

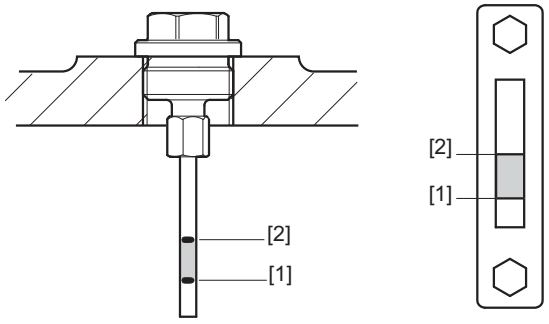
NOTICE

Improper oil filling may cause damage to the gear unit.

Possible damage to property.

- Observe the following notes.

- Fill in the oil when the gear unit is in the intended mounting position.
- Use an oil from the current lubricant table www.sew-eurodrive.de/lubricants.
- Make sure the oil is flowable when filling it into the gear unit. The flowability can be enhanced by 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.
- 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.
- Check the oil level only when the gear unit is cool and in idle state. SEW-EURODRIVE recommends to check 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 chapter "Checking the oil level" (→ 🗎 264).



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- When the gear unit is equipped with an oil dipstick and an oil sight glass, refer to the oil dipstick for the correct oil level.
- The required oil fill quantity is higher when additional attachments are mounted to the gear unit, such as an oil supply system. In this case, observe the respective "Oil Cooling System" operating instructions from SEW-EURODRIVE.
- For gear units with external supply pipes, e.g. oil cooling systems, establish the connections before filling the oil.

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- Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).
- Observe the additional notes depending on the lubrication type in the following chapters.

5.6.2 Gear units with oil expansion tank /ET

INFORMATION

Observe the notes in chapter "Changing the oil" (→ 🗎 274).

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 cause damage to 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.

A higher minimum filling temperature might be required depending on the selected oil type. The following table lists guide values.

Min. 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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5.6.3 Gear units with shaft end pump /SEP

NOTICE

Improper installation and mounting of the shaft end pump [1] can damage the gear unit.

Possible damage to property.

- Observe the following information.

- Fill the gear unit with the oil type and oil quantity corresponding to the nameplate data; see the chapter "Changing the oil" (→ 🗎 272).
- 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 sufficient oil is in the overall system during startup. The oil filling holes are marked in the order dimension sheet.
- Check the oil level using the oil dipstick or the oil level glass. For more information, refer to the chapter "Checking the oil level" (→ 🗎 264).
- 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 with shaft end pump [1] are equipped with a pressure switch [2] for function monitoring as standard. The connection has to be carried out at the customer site. Observe the chapter "Pressure switch" (→ 🗎 239).
- In case of a vertical mounting position and with the shaft end pump located at the bottom, as is the case with gear units in M5/M6 (vertical) mounting position, the shaft end pump must not be filled manually at initial startup.

For more information, refer to the chapter "Gear units with pressure lubrication" (→ 🗎 249) and the manufacturer's documentation.

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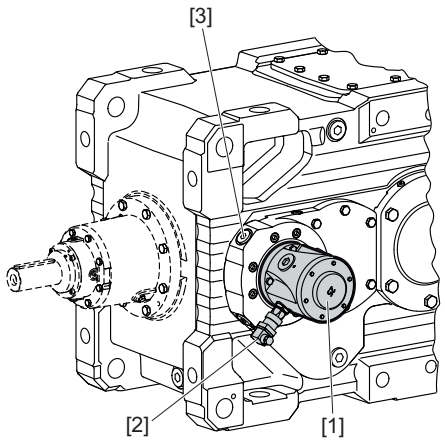
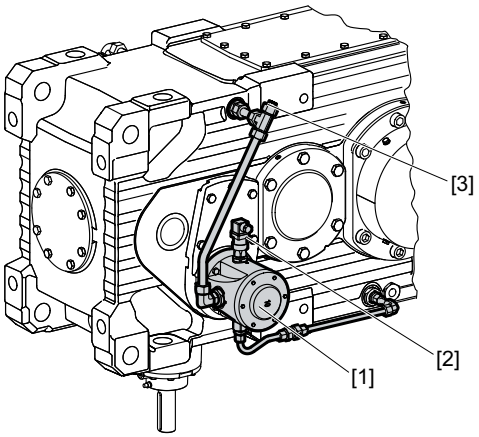
Mounting position M1

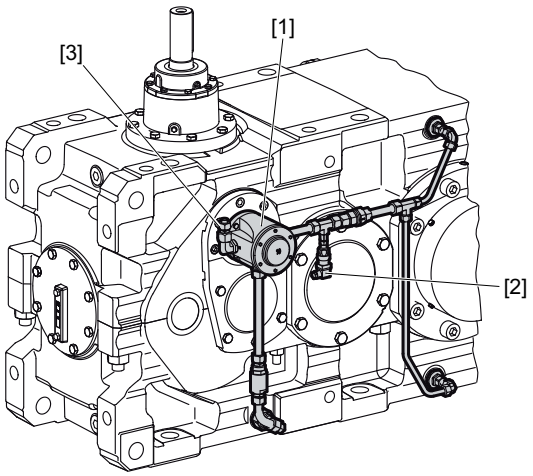
Size XF/XK160 – 320



Size X4T160 – 210



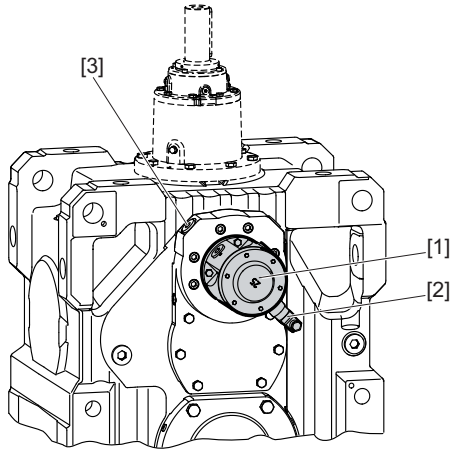
Size X4T220 – 250



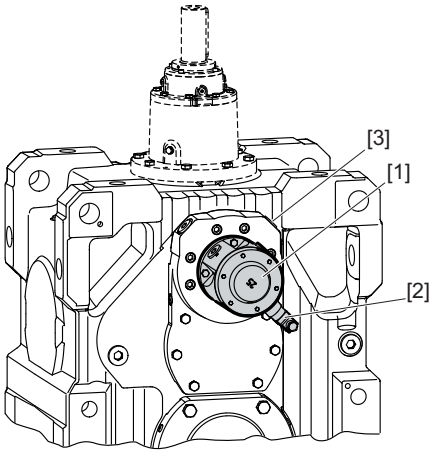
[1] Shaft end pump
[2] Pressure switch
[3] Screw plug

Mounting position M4

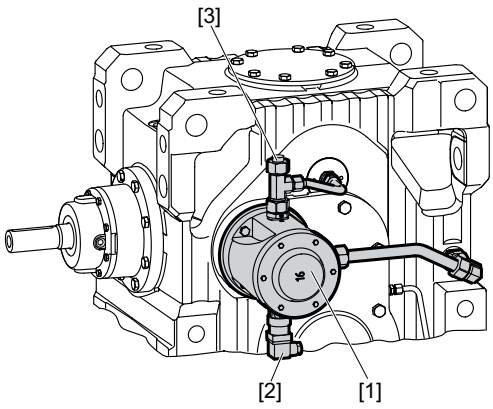
Size XF/XK 120 – 150



Size XF/XK 160 – 320



Size X4T120 – 150



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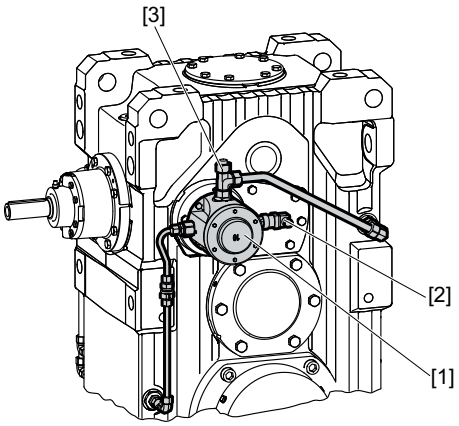
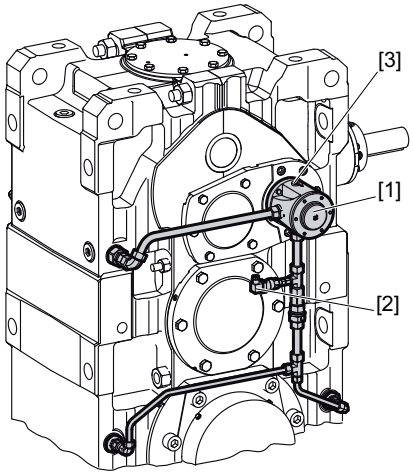
Size X4T160 – 210



Size X4T220 – 250



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

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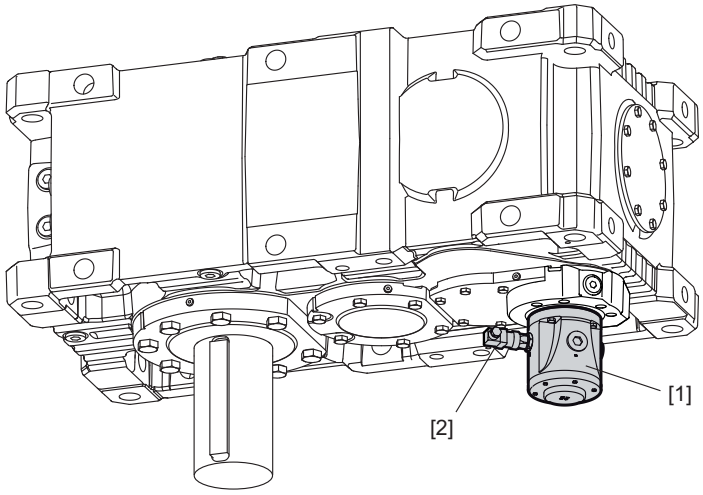
Mounting position M5

Universal housing /HU

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

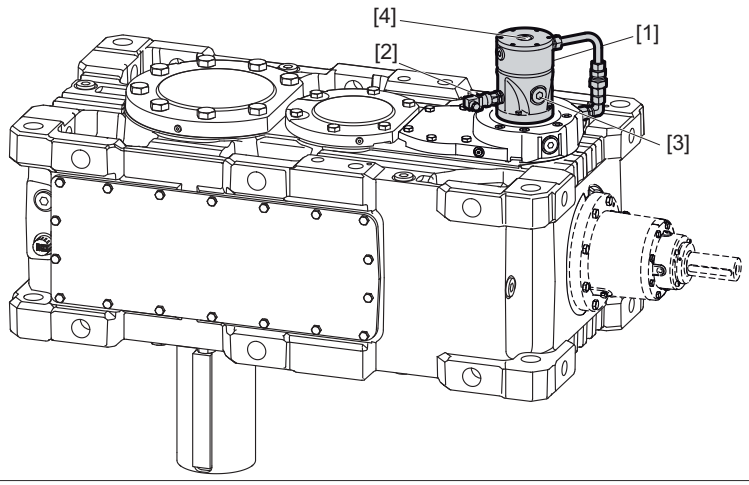
Size XF/XK120 – X320



If the shaft end pump [1] is mounted above the oil level, the pump must be filled with oil as follows:

1. 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].
2. Open the screw plug [4] and fill the shaft end pump [1] completely with oil. After having filled in the oil, close the screw plug [4].

Size XF/XK 120 – 320



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

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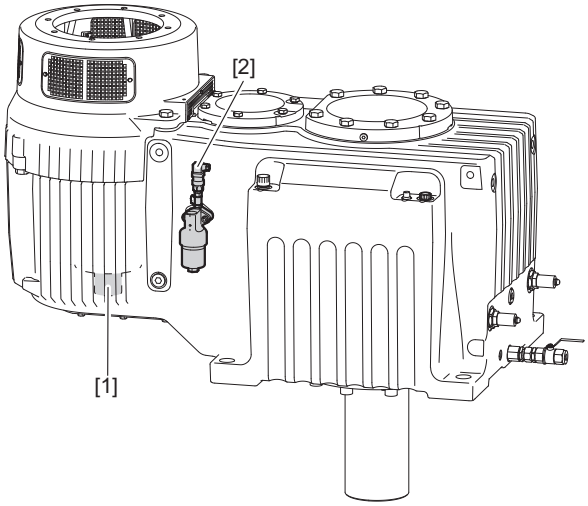
Agitator housing /HA

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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5.7 Gear units delivered with oil fill (option)

Observe the notes in chapter "Important information" (→ 🗎 111).

NOTICE

Improper startup can result in damage to the gear unit.

Possible damage to property.

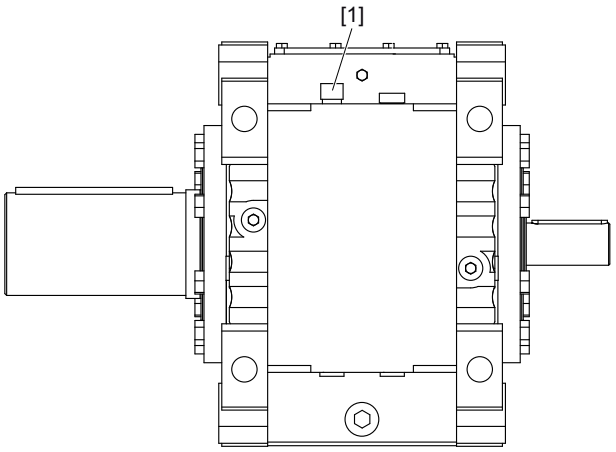
- It is important that gear units with shaft end pump, motor pump or customer-installed cooling system are vented before taking them into operation the first time.
- Fill the shaft end pump completely with oil shortly before initial startup. Observe the information in chapter "Gear units with shaft end pump /SEP" (→ 🗎 120).

INFORMATION

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 before startup and corrected if necessary.

For gear units that are delivered with oil fill, the breather must be installed prior to startup. It is enclosed with the delivery.

The following illustration serves as an example. The position of the breather is specified in the order documents.



4688864907

1. Remove the closing plug.
2. Insert the breather [1].
3. Check the oil level. Observe chapter "Checking the oil level" (→ 🗎 264).

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5.8 Gear units with solid shaft

5.8.1 Mounting input and output components

Observe the notes in chapter "Important information" (→ 🗎 111).

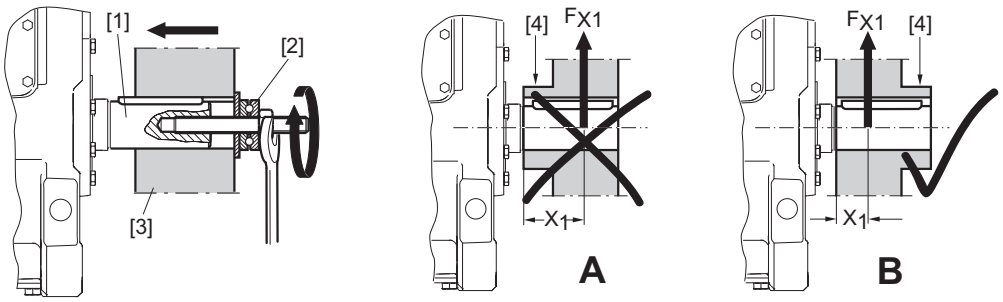
NOTICE

Bearing, housings, or shafts may be damaged due to improper assembly.

Possible damage to property.

- Always use a mounting device for installing input and output elements. Use the threaded centering bore on the shaft end for positioning.
- Never force belt pulleys, couplings, pinions, etc. onto the shaft end by hitting them with a hammer. This may damage the bearing, the housing and the shaft.
- If belt pulleys are used, make sure the belt is tensioned correctly in accordance with the manufacturer's instructions.

The following figure shows a mounting device for installing couplings or hubs on gear unit or motor shaft ends. It may be possible to dispense with the thrust bearing on the mounting device.



[1] Shaft end
[2] Thrust bearing
[3] Coupling hub
[4] Hub

A Incorrect
B Correct

To avoid impermissibly high overhung loads: Install gears or sprockets as shown in figure **B**.

INFORMATION

Mounting is easier if you first apply lubricant to the output element and/or heat it up briefly (to 80 ... 100 ˚C).

5.9 Flange coupling with cylindrical interference fit /FC-S

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

Before installation/assembly, first read the addendum to the operating instructions "Flange Coupling with Cylindrical Interference Fit /FC-S".

5.10 Flange coupling with keyway /FC-K

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

Before installation/assembly, first read the addendum to the operating instructions "Flange Coupling with Keyway /FC-K".

5.11 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.

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

5.12.1 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:

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

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

The minimum key length given in the dimension sheets (see next page) must be observed. If a longer key is used, it should be aligned symmetrically to the hollow shaft.

With a continuous machine shaft or axial forces, SEW-EURODRIVE recommends that the machine shaft is designed with a contact shoulder. To prevent the retaining screw of the machine shaft from loosening upon a reversing load direction, it should be secured with a suitable threadlocker. If necessary, two eccentric retaining screws may be used.

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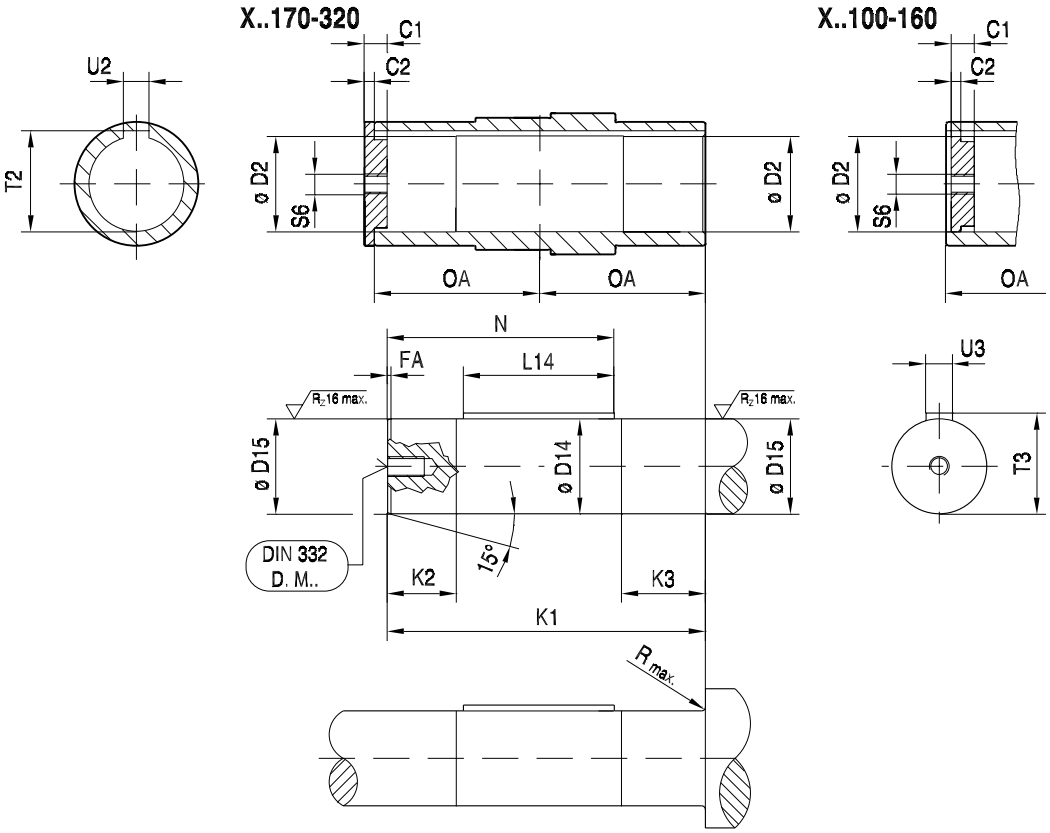
5.12.2 Dimensions of the machine shaft



	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	M24	90.4	90	22^{JS9}	22_{h9}	M20
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

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5.12.3 Mounting the gear unit onto the machine shaft

INFORMATION

Make sure the dimensions of the machine shaft correspond to SEW-EURODRIVE specifications → see previous page.

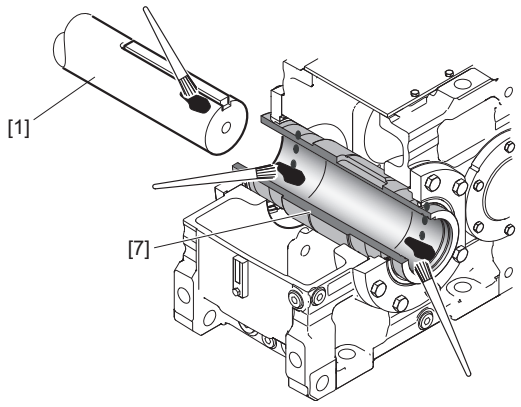
Size X100 – 160

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

- The delivery includes the following:
  - 2× retaining rings [8]/[9] and end plate [4]
- **Not** included in the delivery:
  - Threaded rod [2], nut [5], retaining screw [6], ejector screw [8]

1. Apply some assembly paste, such as NOCO® fluid or F.L.A. from Rivolta onto the hollow shaft [7] and onto the shaft end of the machine shaft [1].



9007216094671627

[1] Machine shaft
[7] Hollow shaft

2. Attach the inner retaining ring [8] to the hollow shaft [7].
3. Secure the end plate [4] using 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..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

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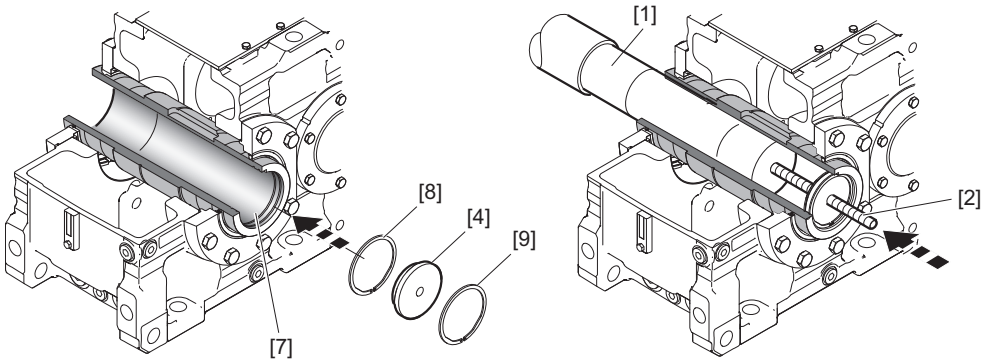
Size	2 × retaining ring (bore) DIN 472
X..A150	125 × 4
X..A160	135 × 4

INFORMATION

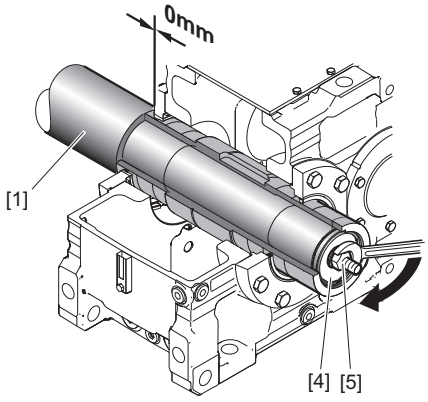
Applying lubricant to the threaded rod and nut prior to assembly makes the job easier.



9007202143065995

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

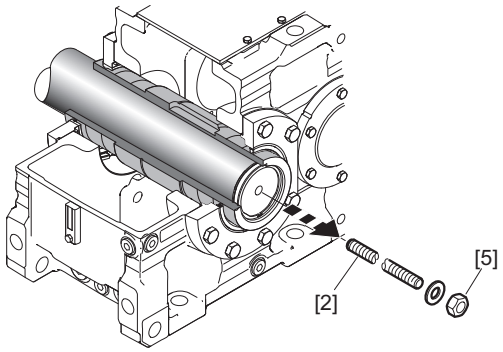
5. Screw the nut [5] onto the threaded rod up to the end plate [4]. Tighten the nut [5] until the shoulders of the machine shaft [1] and the hollow shaft meet.



18014401397909131

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

6. Loosen the nut [5]. Screw out the threaded rod [2].



9007202142726155

[2] Threaded rod
[5] Nut

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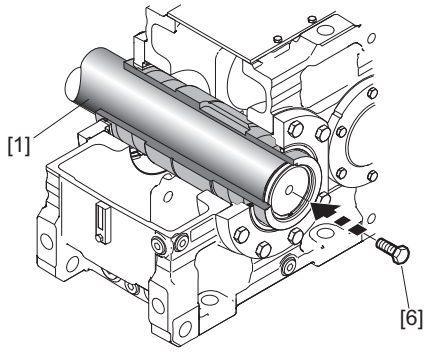
7. Secure the machine shaft [1] with the retaining screw [6]. The retaining screw should also be locked with a suitable threadlocker. Observe the following information on the retaining screw [6].

Size	Retaining screw	Tightening torque in Nm strength class 8.8
X..A120 – 150	M24	798
X..A160	M30	1597



27021600643528587

[1] Machine shaft
[6] Retaining screw

⚠ CAUTION

Improper assembly of the protection cover may result in risk of injury due to rotating parts.

Possible injury to persons.

- After assembly, check to see that the protection cover is properly attached.

NOTICE

Dust and dirt may damage the sealing system of the gear unit.

Possible damage to property.

- Make sure to attach the protection cover correctly and dust-tight after completing assembly.

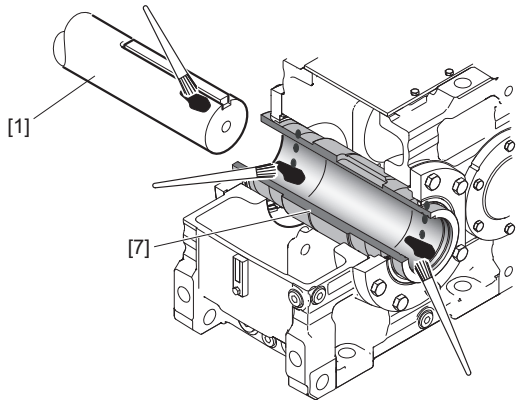
Size X170 – 320

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

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

1. Apply some assembly paste, such as NOCO® fluid or F.L.A. from Rivolta onto the hollow shaft [7] and onto the shaft end of the machine shaft [1].



9007216094671627

[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 screw the threaded rod [2] onto the machine shaft [1]. Observe the following thread sizes of the threaded rods [2].

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 x retaining screws strength class 10.9	Tightening torque	
		Assembly/ operating state Nm	Disassembly Nm
X..A170 – 190	M10×30	79	Apply hand pressure
X..A200 – 230	M12×30	137	Apply hand pressure
X..A240 – 300	M16x30	338	Apply hand pressure
X..A310 – 320	M20x50	661	Apply hand pressure

INFORMATION

Applying lubricant to the threaded rod and nut prior to assembly makes the job easier.

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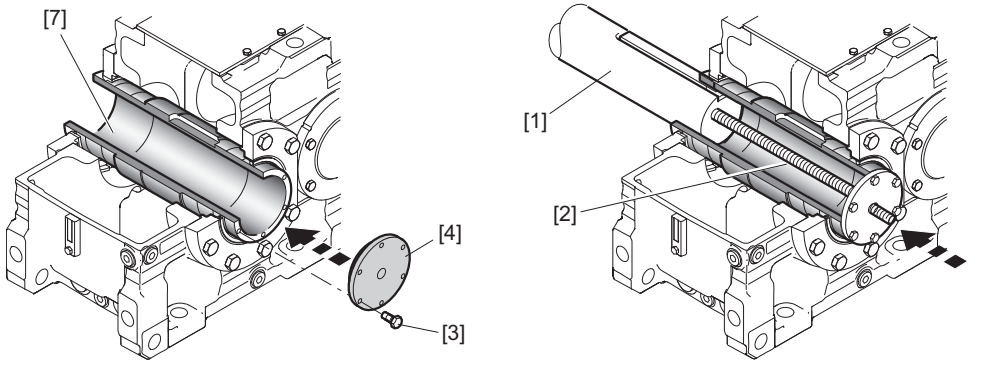
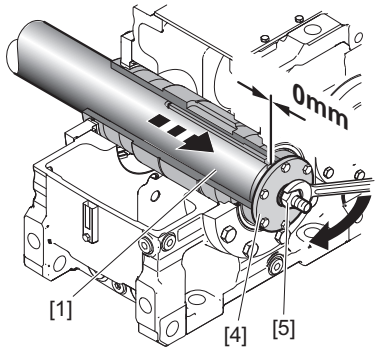


9007199565093003

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

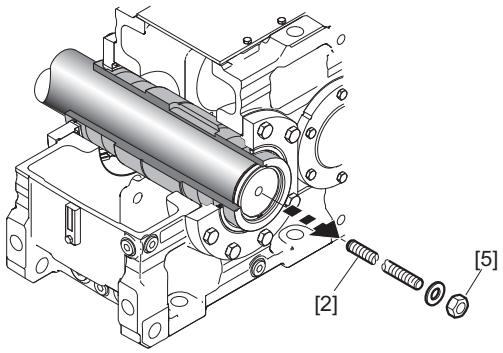
3. Tighten the machine shaft [1] with the nut [5] until the shaft end of the machine shaft [1] and the end plate [4] meet.



9007199565148299

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

4. Loosen the nut [5]. Screw out the threaded rod [2].

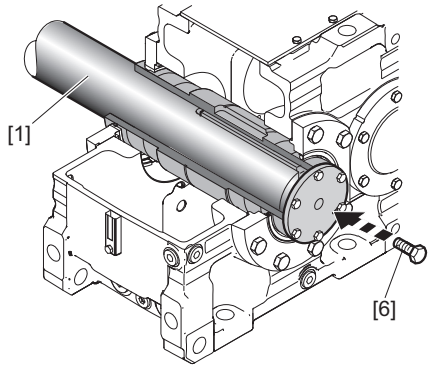


9007202142726155

[2] Threaded rod
[5] Nut

5. Secure the machine shaft [1] with the retaining screw [6]. The retaining screw should also 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..A170 – 230	M30	1597
X..A240 – 300	M36	2778
X..A310 – 320	M42	3995



9007199565156875

[1] Machine shaft
[6] Retaining screw

⚠ CAUTION

Improper assembly of the protection cover may result in risk of injury due to rotating parts.

Possible injury to persons.

- After assembly, check to see that the protection cover is properly attached.

NOTICE

Dust and dirt may damage the sealing system of the gear unit.

Possible damage to property.

- Make sure to attach the protection cover correctly and dust-tight after completing assembly.

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5.12.4 Removing the gear unit from the machine shaft

NOTICE

Improper disassembly may damage bearings and other components.

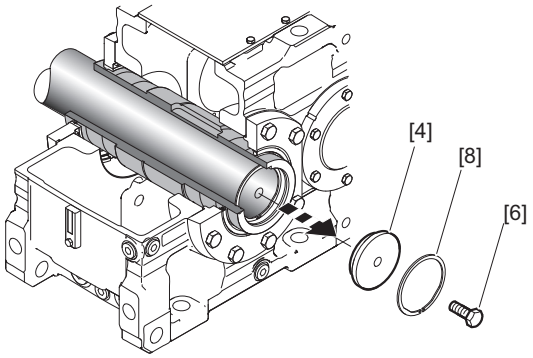
Possible damage to property.

- 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.

Sizes X100 – 160

Observe the notes in chapter "Important information" (→ 🗎 111).

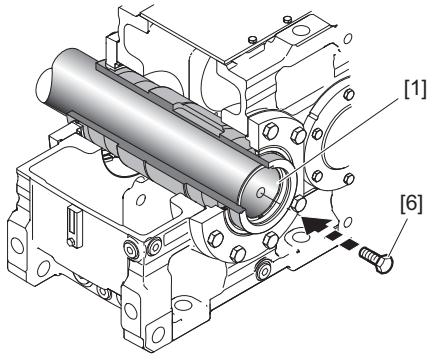
1. Loosen the retaining screw [6]. Remove the outer retaining ring [8] and the end plate [4].



9007202105918859

[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].



9007202105921291

[1] Machine shaft
[6] Retaining screw

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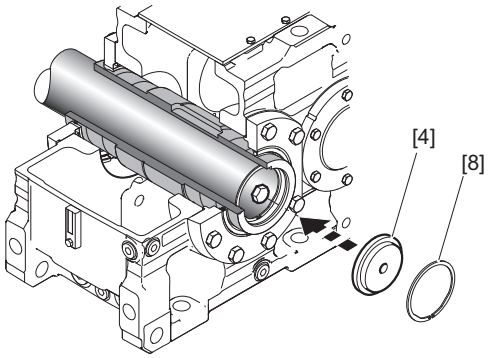
3. Turn the end plate [4] and remount it with the outer retaining ring [8].



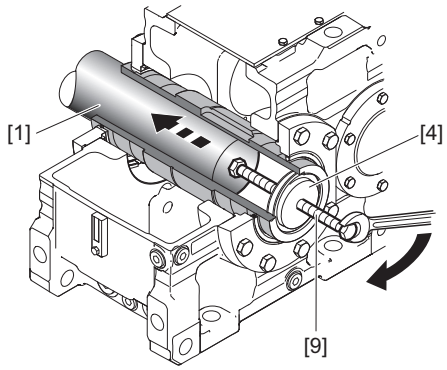
9007202105924619

[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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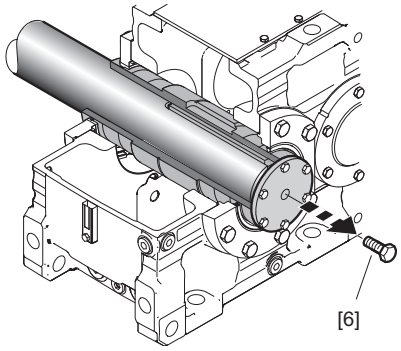
Sizes X170 – 320

Observe the notes in chapter "Important information" (→ 🗎 111).

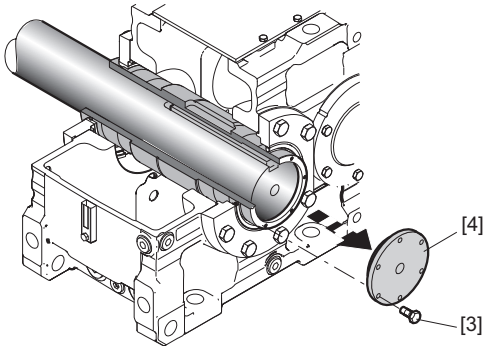
1. Loosen the retaining screw [6].



310460043

[6] Retaining screw

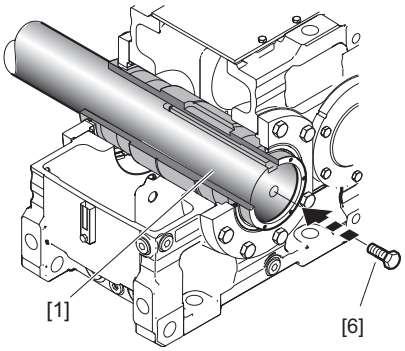
2. Remove the retaining screws [3] and the end plate [4].



310464523

[3] Retaining screw
[4] End plate

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



310470027

[1] Machine shaft
[6] Retaining screw

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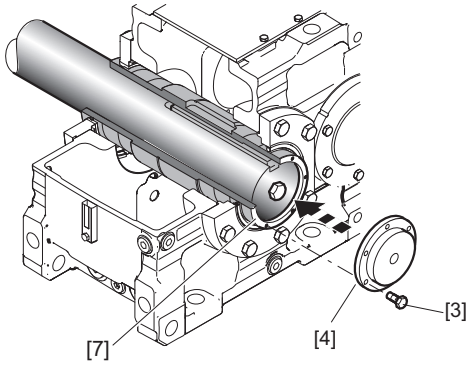
4. To disassemble the gear unit, flip the end plate [4] over and use the retaining screws [3] to reattach it centrically to the hollow shaft [7]. The retaining screws [3] should be tightened hand-tight.



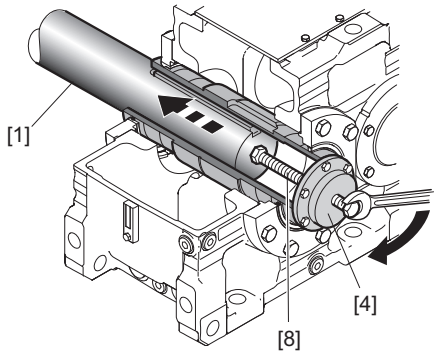
310474123

[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 lubricant to the ejector screw [8] and the thread in the end plate [4].



310478219

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

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

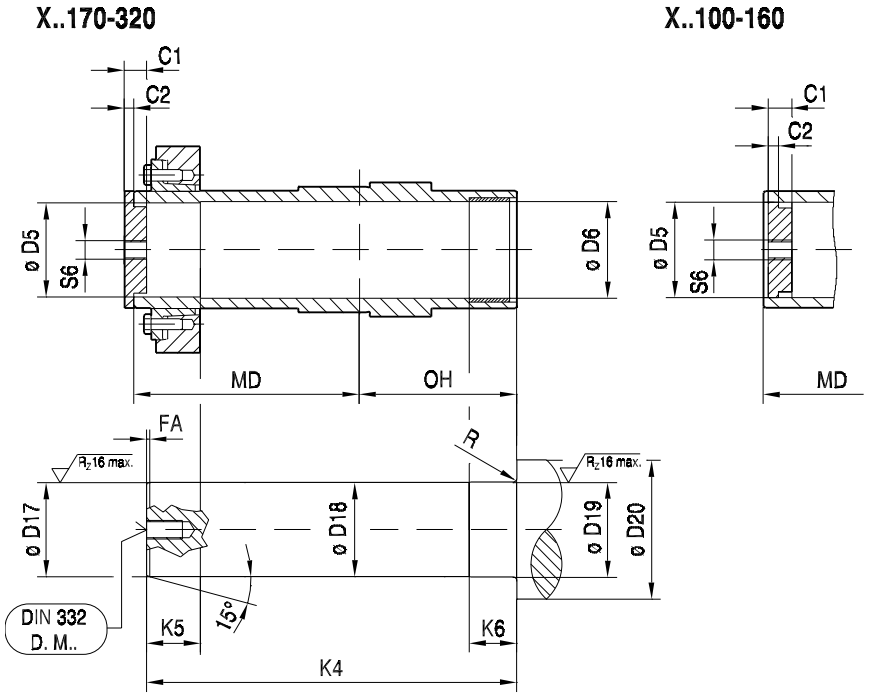
5.13.1 General information

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/mm^2 for sizes X..100 to X..320

5.13.2 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

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	C1	C2	ø D5	ø D6	ø D17	ø D18	ø D19	ø D20	FA	K4	K5	K6	MD	OH	R	S6	DIN 33 2 DR.M..
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

5.13.3 Mounting the gear unit onto the machine shaft

INFORMATION

- Make sure the dimensions of the machine shaft correspond to SEW-EURODRIVE specifications → see previous page.
- Observe the manufacturer's shrink disk documentation.

Size X100 – 160

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

- Included in the delivery:
  - 2 × retaining ring [8]/[9] and end plate [4].
- **Not** included in the 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].
2. **NOTICE!** Never apply assembly paste directly to the bushing [11] since the compound may get into the clamping area of the shrink disk when the input shaft is connected. Possible damage to property.
   The clamping area of the shrink disk between the machine shaft [1] and the hollow shaft [7] must remain absolutely free of any grease.

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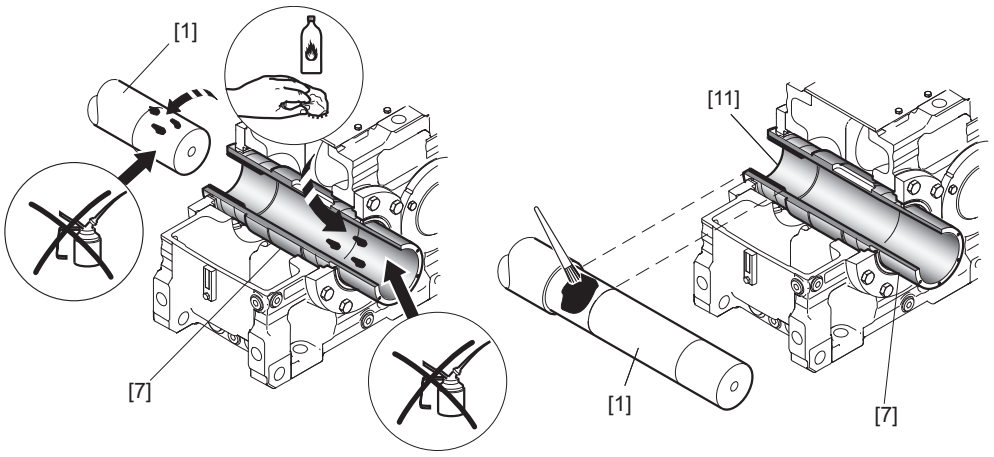
3. Apply some assembly paste, such as NOCO® fluid or Rivolta F.L.A. to the machine shaft [1] in the area of the bushing [11].



16839935371

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

4. Attach the inner retaining ring [8] to the hollow shaft [7]. Secure the end plate [4] using the outer retaining ring [9]. 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..H100 – 150	M24
X..H160	M30

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

Size	2 x retaining ring (bore) DIN 472
X..H100	80x2.5
X..H110	90x2.5
X..H120	100x3
X..H130	110x4
X..H140	120x4
X..H150	130x4
X..H160	140x4

INFORMATION

Applying lubricant to the threaded rod and nut prior to assembly makes the job easier.

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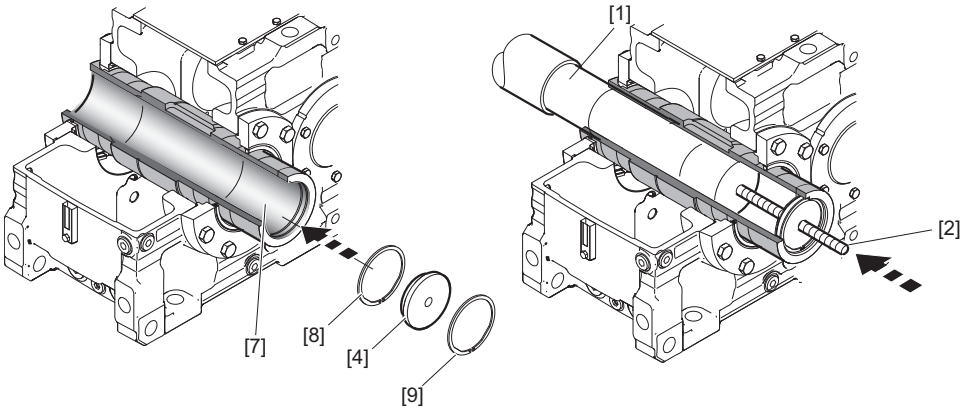
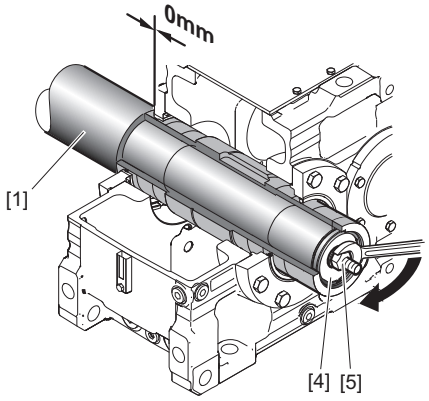


9007202134039819

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

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



18014401397909131

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

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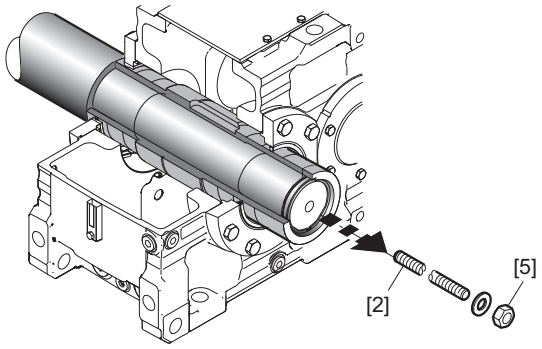
6. Loosen the nut [5]. Screw out the threaded rod [2].

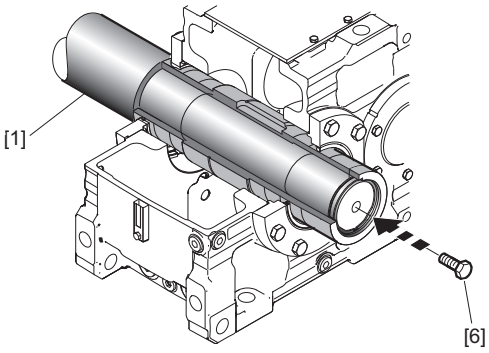


9007202134044427

[2] Threaded rod
[5] Nut

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

Size	Retaining screw	Tightening torque Nm Strength class 8.8
X..H100 – 150	M24	798
X..H160	M30	1597

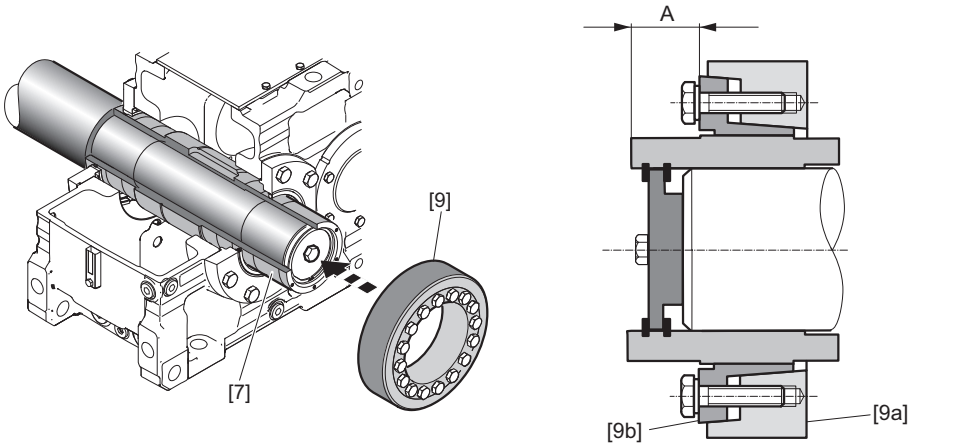


18014401397813131

[1] Machine shaft
[6] Retaining screw

8. Slide the shrink disk [9] with untightened screws onto the hollow shaft [7] and position the inner ring of the shrink disk [9b] with dimension A.

9. ⚠ **CAUTION!** The loose shrink disk could slip. Potential risk of crushing due to falling parts.
   Secure the shrink disk against slipping.
10. **NOTICE!** Tightening the locking screws without installed shaft might deform the hollow shaft. Possible damage to property.
    Never tighten the locking screws without installed shaft.



18014401395747083

[7] Hollow shaft
[9] Shrink disk
[9a] Taper (outer ring)
[9b] Taper bushing (inner ring)

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] by hand. In doing so, align the bevel (outer ring) [9a] parallel to the taper bushing (inner ring) [9b] of the shrink disk. Successively tighten the locking screws [10] in a clockwise direction (not in a diametrically opposite sequence), each with a quarter turn. Do not tighten the locking screws [10] in a diametrically opposite sequence.

INFORMATION

For shrink disks with a slotted taper bushing (inner ring) [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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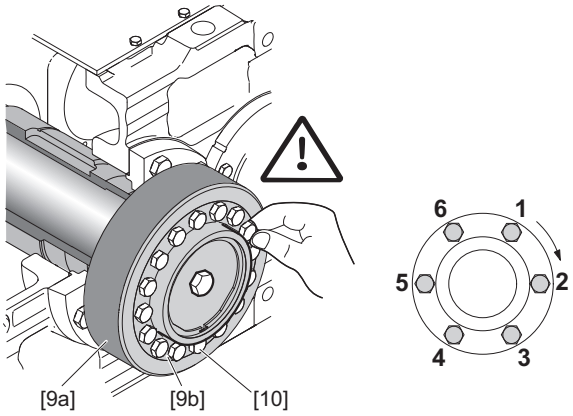
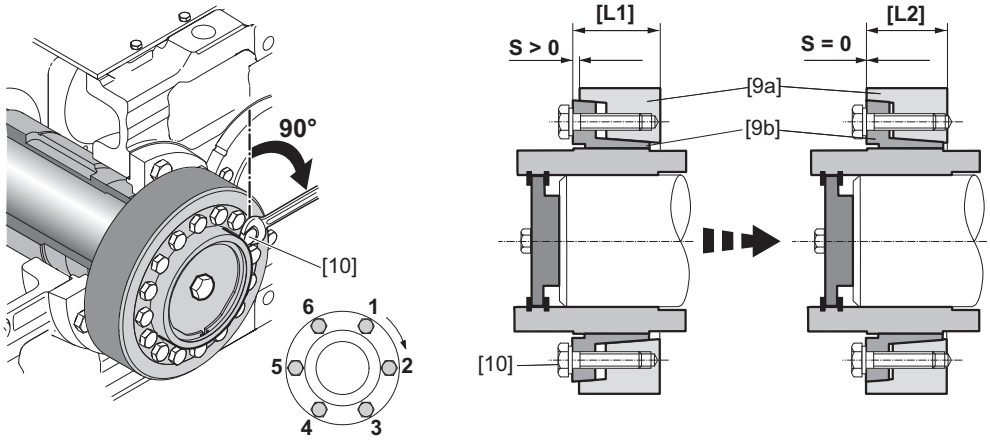


18014401395749259

[9a] Taper (outer ring)
[9b] Taper bushing (inner ring)
[10] Locking screws

12. Work around the ring in several stages, evenly tighten the locking screws [10] by quarter turns until the bevel (outer ring) [9a] and the taper bushing (inner ring) [9b] align on the face that holds the screws as is shown in the figure below.



18014401395751435

[9a] Taper (outer ring)

[9b] Taper bushing (inner ring)

[10] Locking screws

[L1] Condition at the time of shipment (pre-assembled)

[L2] Completely assembled (ready for operation)

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 as shown in the next chapter.

⚠ CAUTION

Improper assembly of the protection cover may result in risk of injury due to rotating parts.

Possible injury to persons.

- After assembly, check to see that the protection cover is properly attached.

NOTICE

Dust and dirt may damage the sealing system of the gear unit.

Possible damage to property.

- Make sure to attach the protection cover correctly and dust-tight after completing assembly.

Size X170 – 320

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

- The delivery includes the following:
  - Retaining screws [3] and end plate [4].
- **Not** included in the 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].

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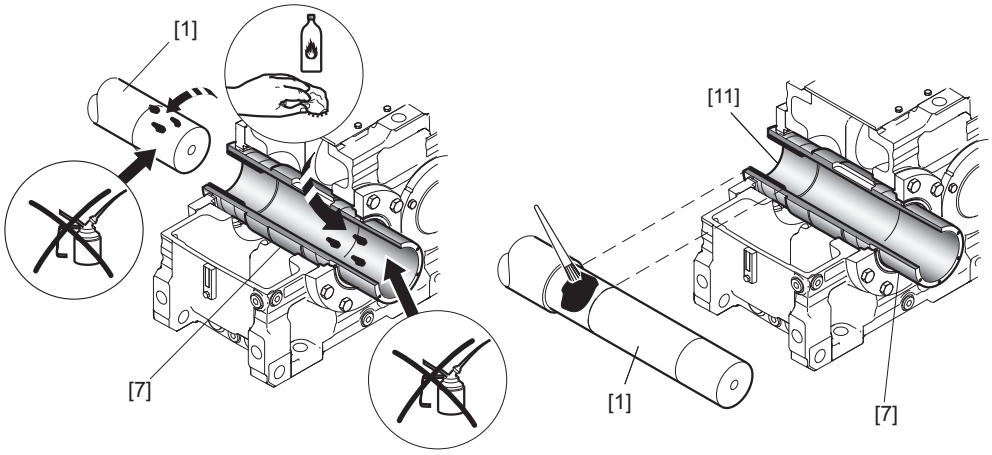
2. **NOTICE!** Never apply assembly paste directly to the bushing [11] since the compound may get into the clamping area of the shrink disk when the input shaft is connected. Possible damage to property.
   The clamping area of the shrink disk between the machine shaft [1] and the hollow shaft [7] must remain absolutely free of any grease.
3. Apply some assembly paste, such as NOCO® fluid or Rivolta F.L.A. to the machine shaft [1] in the area of the bushing [11].



16839935371

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

4. Use the retaining screws [3] to attach the end plate [4] centrically on the hollow shaft [7]. 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..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 x retaining screws strength class 10.9	Tightening torque	
		Assembly/operating state Nm	Disassembly Nm
X..H170 – 190	M10×30	79	Apply hand pressure
X..H200 – 230	M12×30	137	Apply hand pressure
X..H240 – 300	M16x40	338	Apply hand pressure
X..H310 – 320	M20x50	661	Apply hand pressure

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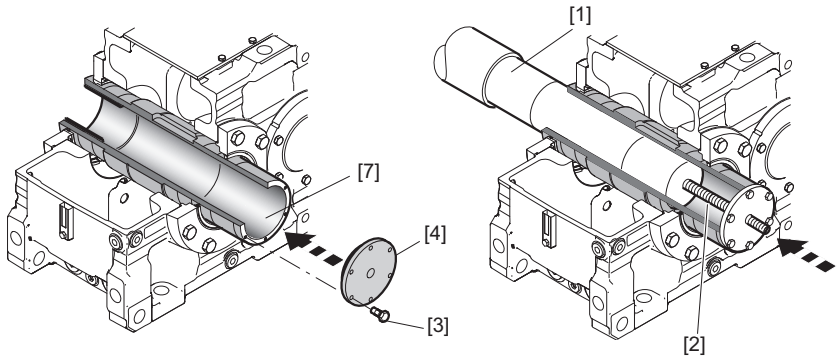
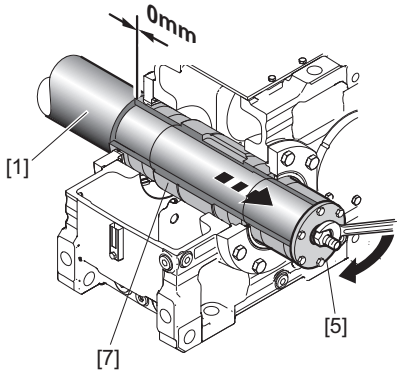


310497035

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

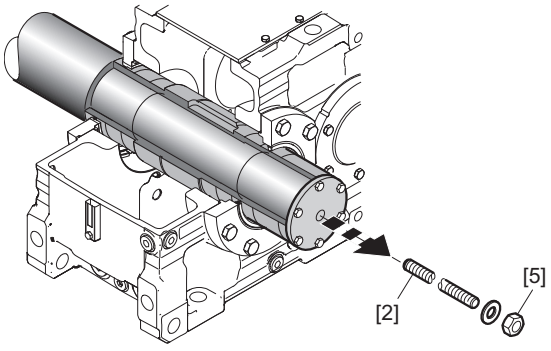
5. Screw the nut [5] onto the threaded rod up to the end plate [4]. Tighten the nut [5] until the shoulders of the machine shaft [1] and the hollow shaft meet.



310501387

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

6. Loosen the nut [5]. Screw out the threaded rod [2].



310506251

[2] Threaded rod
[5] Nut

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

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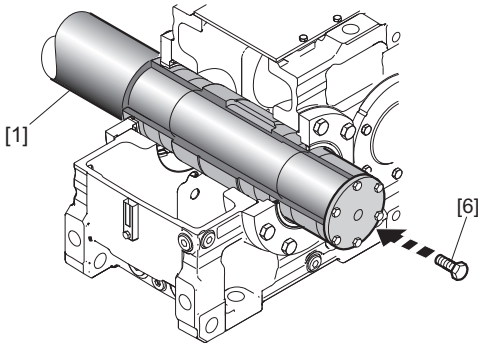
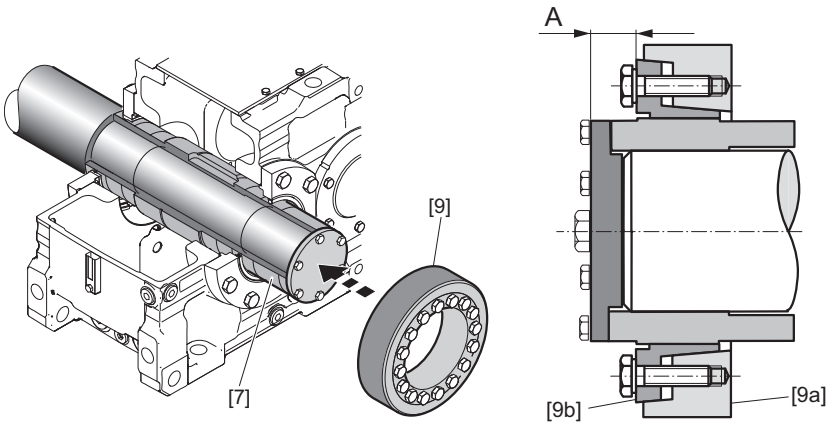
Size	Strength class 8.8	Tightening torque Nm Strength class 8.8
X..H170 – 230	M30	1597
X..H240 – 300	M36	2778
X..H310 – 320	M42	3995



310510731

[1] Machine shaft
[6] Retaining screw

8. Slide the shrink disk [9] with untightened screws onto the hollow shaft [7] and position the inner ring of the shrink disk [9b] with dimension A.
9. ⚠ **CAUTION!** The loose shrink disk could slip. Potential risk of crushing due to falling parts.
   Secure the shrink disk against slipping.
10. **NOTICE!** Tightening the locking screws without installed shaft might deform the hollow shaft. Possible damage to property.
    Never tighten the locking screws without installed shaft.



9007199565261323

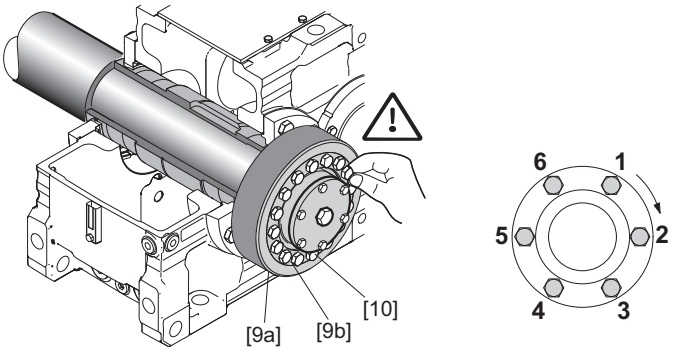
[7] Hollow shaft
[9] Shrink disk
[9a] Taper (outer ring)
[9b] Taper bushing (inner ring)

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] by hand. In doing so, align the bevel (outer ring) [9a] parallel to the taper bushing (inner ring) [9b] of the shrink disk. Successively tighten the locking screws [10] in a clockwise direction (not in a diametrically opposite sequence), each with a quarter turn. Do not tighten the locking screws [10] in a diametrically opposite sequence.

INFORMATION

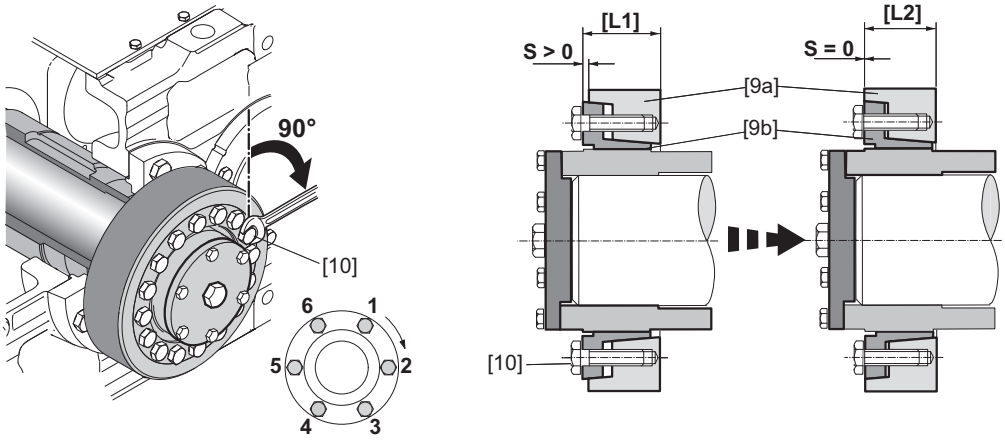
For shrink disks with a slotted taper bushing (inner ring) [9b], tighten the locking screws [10] to the left and right of the slot one after another, and then, in several stages, tighten the remaining screws at evenly spaced intervals.



9007199565278219

[9a] Taper (outer ring)
[9b] Taper bushing (inner ring)
[10] Locking screws

12. Work around the ring in several stages, evenly tighten the locking screws [10] by a quarter turns until the taper (outer ring) [9a] and the taper bushing (inner ring) [9b] align on the face that holds the screws as is shown in the illustration below.



18014398820023307

[9a] Taper (outer ring)
[9b] Taper bushing (inner ring)
[10] Locking screws
[L1] Condition at the time of shipment (pre-assembled)
[L2] Completely assembled (ready for operation)

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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 as shown in the next chapter.

⚠ CAUTION

Improper assembly of the protection cover may result in risk of injury due to rotating parts.

Possible injury to persons.

- After assembly, check to see that the protection cover is properly attached.

NOTICE

Dust and dirt can damage the sealing system of the gear unit.

Possible damage to property.

- Make sure to attach the protection cover correctly and dust-tight after completing assembly.

5.13.4 Disassembling the gear unit from the machine shaft

Sizes X100 – 160

Observe the notes in chapter "Important information" (→ 🗎 111).

NOTICE

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

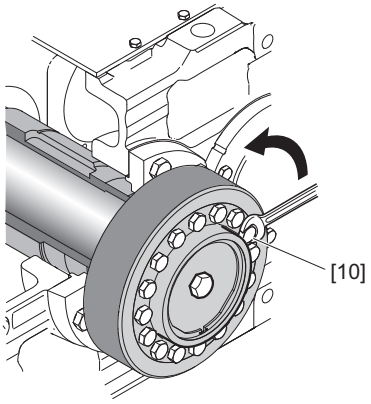
Possible damage to property.

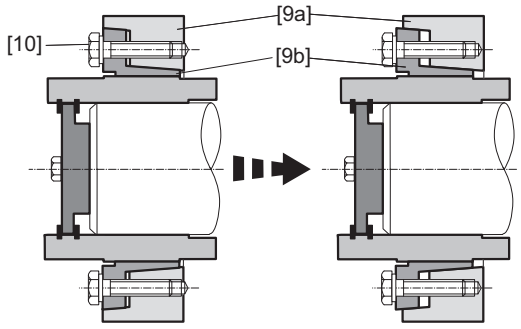
- You may only use the hollow shaft as a support for disassembly. Note that supporting on any other parts of the gear unit may damage the material.
- Remove the shrink disk properly. Never completely unscrew the retaining screws because the shrink disk might jump off and cause an injury.
- Shrink disks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

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

INFORMATION

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

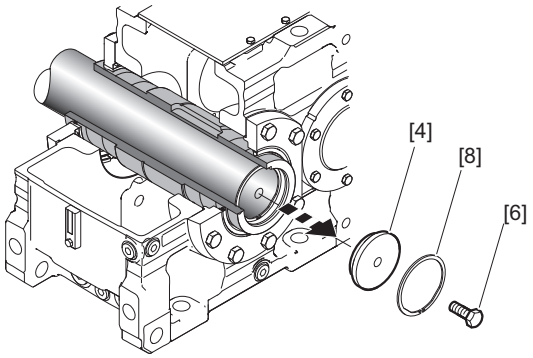




18014401395753611

[9a] Taper (outer ring)
[9b] Taper bushing (inner ring)
[10] Locking screws

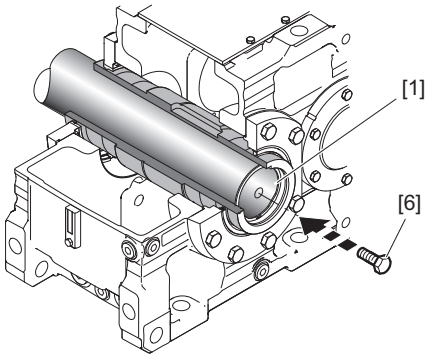
2. Remove the shrink disk from the hollow shaft.
3. Loosen the retaining screw [6]. Remove the outer retaining ring [8] and the end plate [4].



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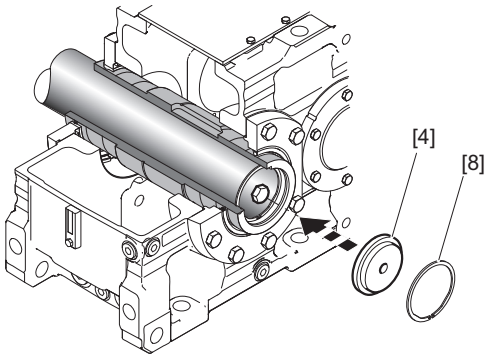
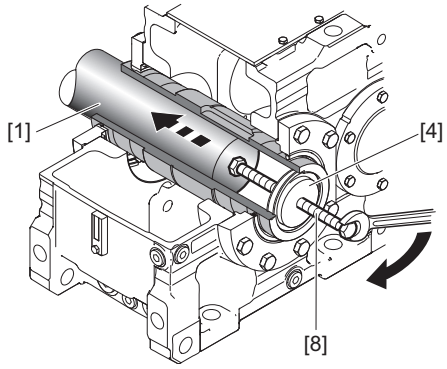
5. Turn the end plate [4] and reinstall the end plate [4] and the outer retaining ring [8].



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]. Applying lubricant to the ejector screw [8] and the thread in the end plate [4] prior to disassembly makes the job easier.



36028799870151563

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

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Sizes X170 – 320

Observe the notes in chapter "Important information" (→ 🗎 111).

NOTICE

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

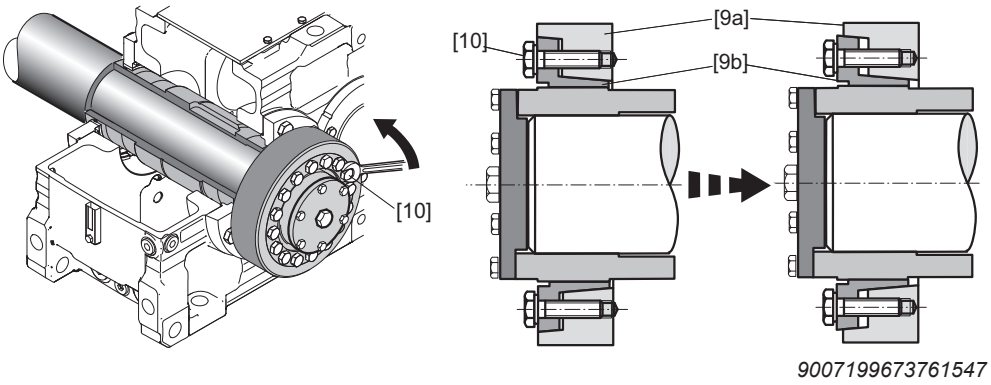
Possible damage to property.

- 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.

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

INFORMATION

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



9007199673761547

[9a] Taper (outer ring)
[9b] Taper bushing (inner ring)
[10] Locking screws

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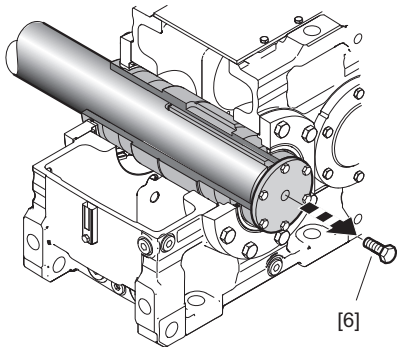
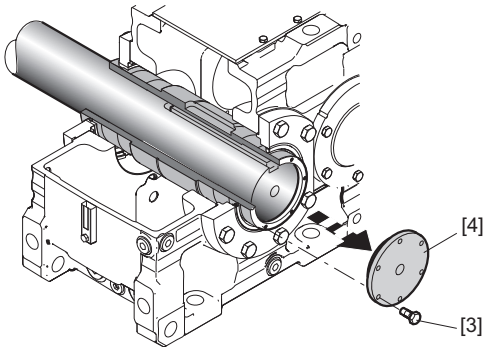
2. Loosen the retaining screw [6].



310460043

[6] Retaining screw

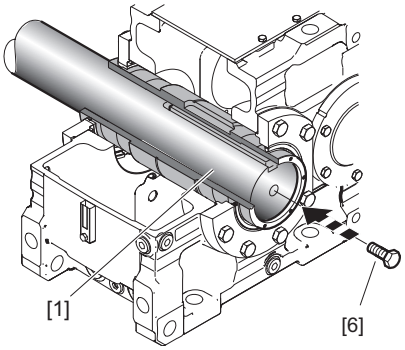
3. Remove the retaining screws [3] and the end plate [4].



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

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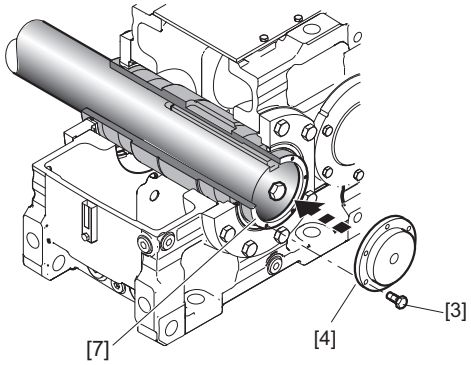
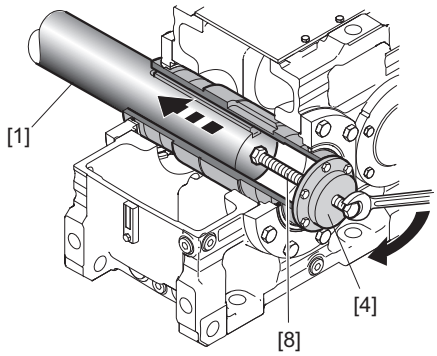
5. To disassemble the gear unit, flip the end plate [4] over and use the retaining screws [3] to reattach it centrically to the hollow shaft [7]. The retaining screws [3] should be tightened hand-tight.



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 in the end plate [4].



310478219

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

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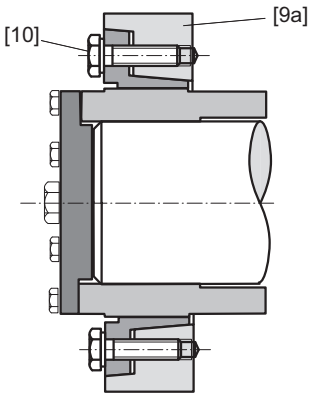
Cleaning and lubricating the shrink disk

Observe the notes in chapter "Important information" (→ 🗎 111).

Clean and lubricate the shrink disk before installing it again.

INFORMATION

- You must perform the following steps carefully to ensure proper functioning of the shrink disk. Use only products that are comparable to the specified lubricant.
- If the tapered surfaces of the shrink disk are damaged, the shrink disk can no longer be used and must be replaced.



9007200781126155

[9a] Taper (outer ring)
[10] Locking screws

1. Thoroughly clean the shrink disk from dirt and any remaining lubricants after disassembly.
2. Lubricate the locking screws [10] on the threads and under the head with an MoS_2 compound, e.g. "gleitmo 100" from FUCHS LUBRITECH (www.fuchs-lubritech.com).
3. Also evenly lubricate the tapered surface of the taper (outer ring) [9a] with a thin layer of an MoS_2 compound, for example "gleitmo 100" from FUCHS LUBRITECH (www.fuchs-lubritech.com).

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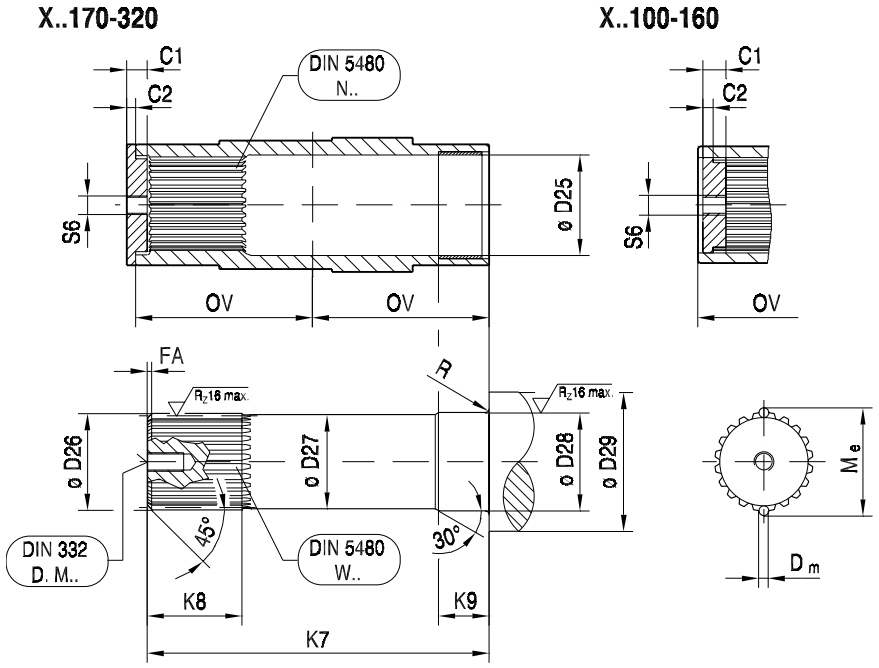
5.14 Output shaft as a splined hollow shaft /..V

5.14.1 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.

- 320 N/mm^2 for sizes X..100 – X..320

5.14.2 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

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	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

5.14.3 Mounting the gear unit onto the machine shaft

INFORMATION

Make sure the dimensions of the machine shaft correspond to SEW-EURODRIVE specifications → see previous page.

Size X100 – 160

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

- The delivery includes the following:
  - 2× retaining rings [8]/[9] and end plate [4]
- **Not** included in the delivery:
  - Threaded rod [2], nut [5], retaining screw [6], ejector screw [8]

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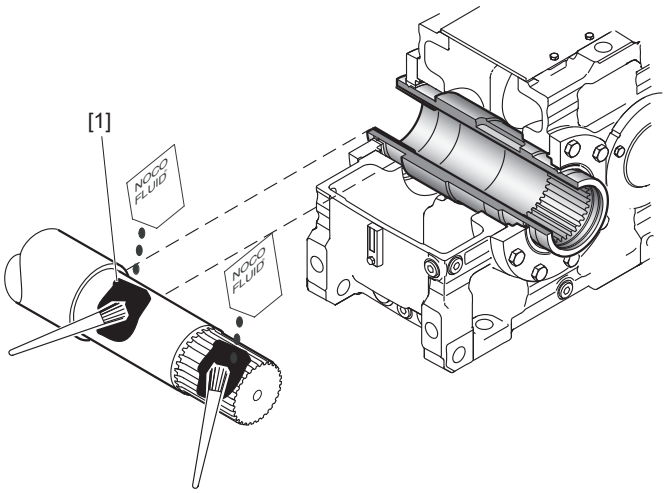
1. Apply some assembly paste, such as NOCO® fluid or F.L.A. from Rivolta onto the hollow shaft [7] and onto the shaft end of the machine shaft [1].



3053368715

[1] Machine shaft
[7] Hollow shaft

2. Attach the inner retaining ring [8] to the hollow shaft [7].
3. Secure the end plate [4] using 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 ring (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

Applying lubricant to the threaded rod and nut prior to assembly makes the job easier.

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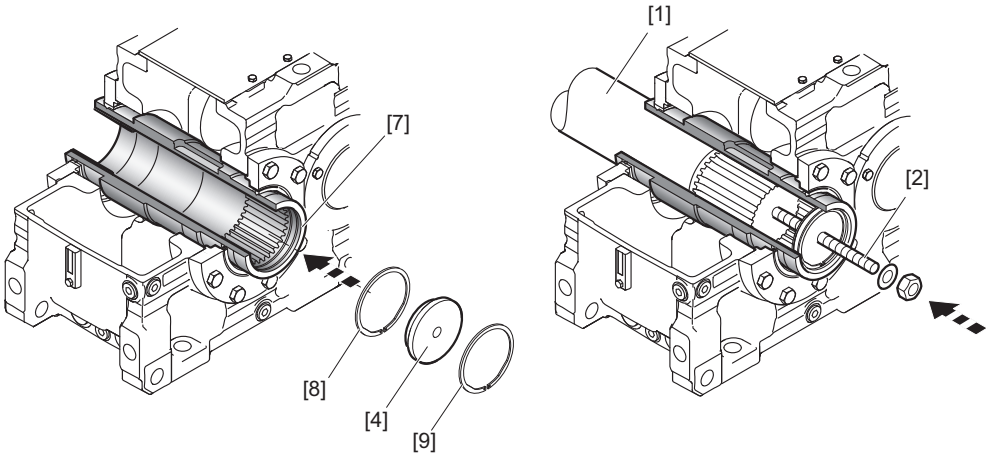
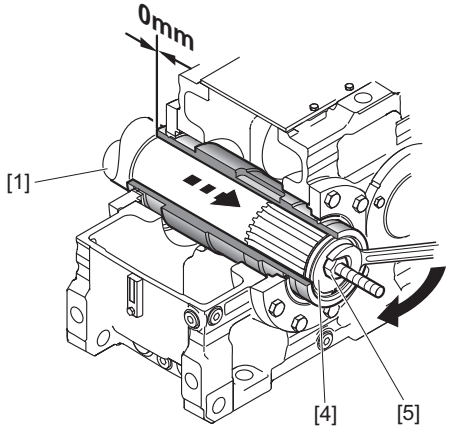


9007202308111883

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

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



3053373579

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

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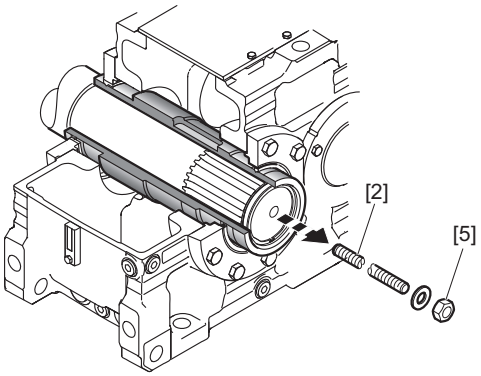
6. Loosen the nut [5]. Screw out the threaded rod [2].

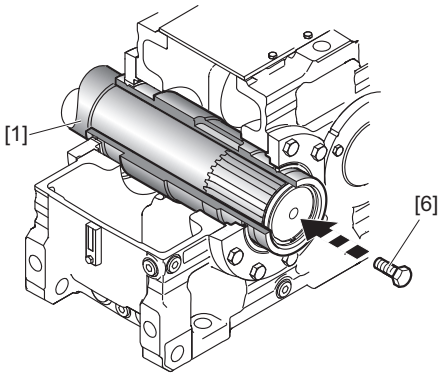


3053375755

[2] Threaded rod
[5] Nut

7. Secure the machine shaft [1] with the retaining screw [6]. The retaining screw should also 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	798
X..A160	M30	1597



3053685131

[1] Machine shaft
[6] Retaining screw

⚠ CAUTION

Improper assembly of the protection cover may result in risk of injury due to rotating parts.

Possible injury to persons.

- After assembly, check to see that the protection cover is properly attached.

NOTICE

Dust and dirt may damage the sealing system of the gear unit.

Possible damage to property.

- Make sure to attach the protection cover correctly and dust-tight after completing assembly.

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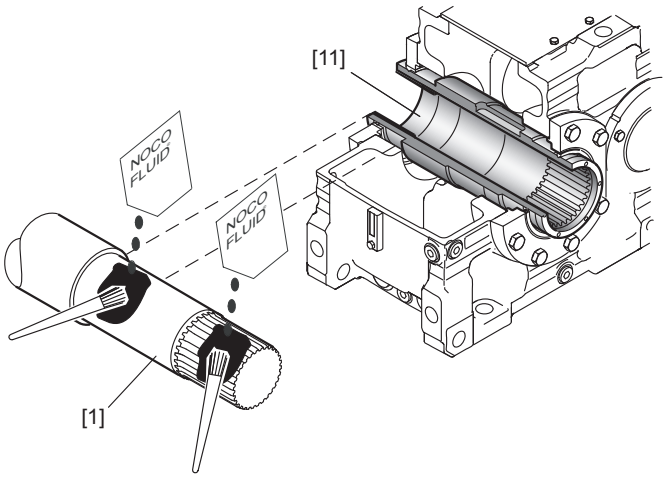
Size X170 – 320

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

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

1. Apply some NOCO® fluid on the machine shaft [1] around the bushing [11] and the splining.



9007200026427915

[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 screw the threaded rod [2] onto the machine shaft [1]. Observe the following thread size of the threaded rod [2].

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 x retaining screws [3] strength class 10.9	Tightening torque	
		Assembly/operating state Nm	Disassembly Nm
X..V170 – 190	M10×30	79	Apply hand pressure
X..V200 – 230	M12×30	137	Apply hand pressure
X..V240 – 300	M16x40	338	Apply hand pressure
X..V310 – 320	M20x50	661	Apply hand pressure

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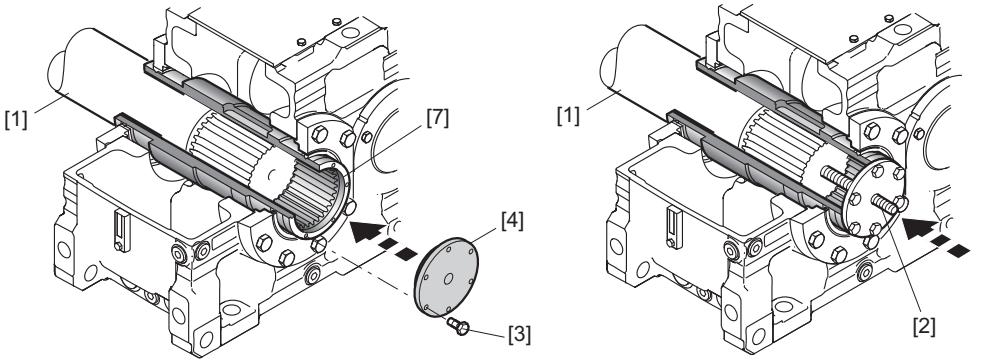
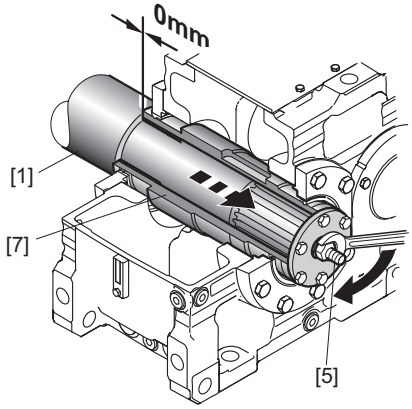


9007200026433547

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

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



771696651

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

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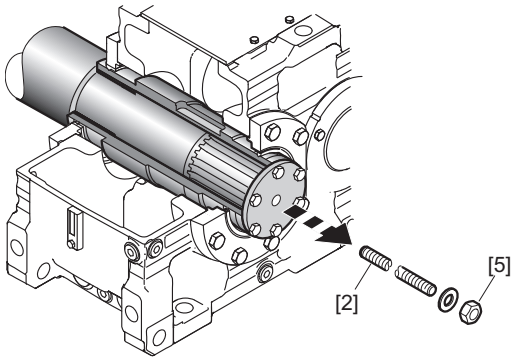
5. Loosen the nut [5]. Screw out the threaded rod [2].

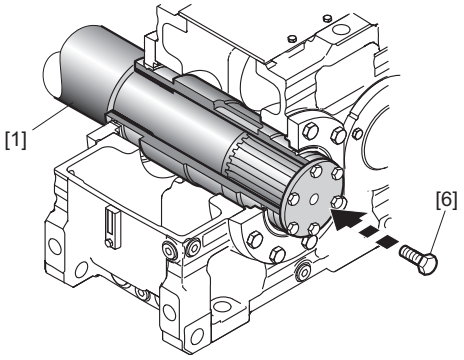


771752587

[2] Threaded rod
[5] Nut

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

Size	Strength class 8.8	Tightening torque in Nm strength class 8.8
X..V170 – 230	M30	1597
X..V240 – 300	M36	2778
X..V310 – 320	M42	3995



771756683

[1] Machine shaft
[6] Retaining screw

NOTICE

Improper assembly of the protection cover may result in risk of injury due to rotating parts. In addition, dust and dirt may damage the sealing system of the gear unit.

Risk of injury to persons and damage to property.

- Be sure to properly attach the protection cover after completing assembly (dust-proof).

5.14.4 Disassembling the gear unit from the machine shaft

NOTICE

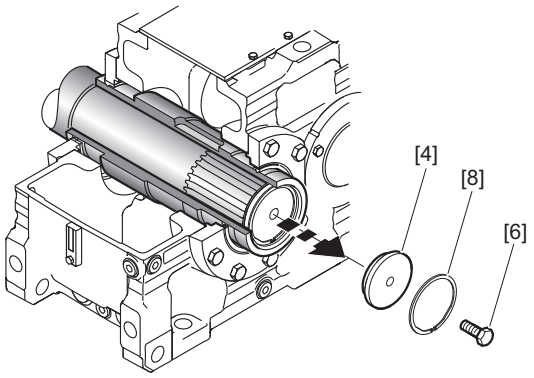
Improper disassembly of the gear unit and machine shaft may damage bearings and other components.

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.

Sizes X100 – 160

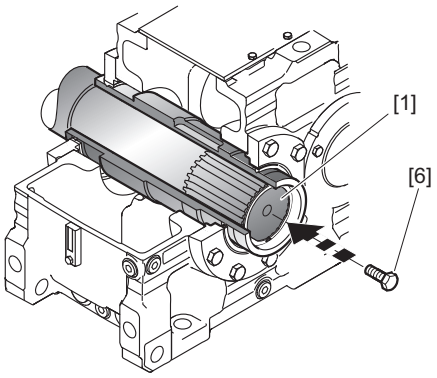
1. Loosen the retaining screw [6]. Remove the outer retaining ring [8] and the end plate [4].



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

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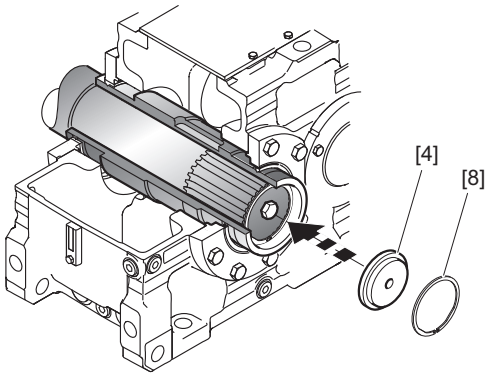
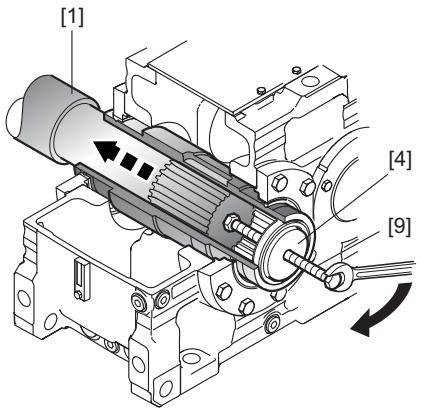
3. Turn the end plate [4] and reinstall the end plate [4] and the outer retaining ring [8].



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]. Applying lubricant to the ejector screw [8] and the thread in the end plate [4] prior to disassembly makes the job easier.

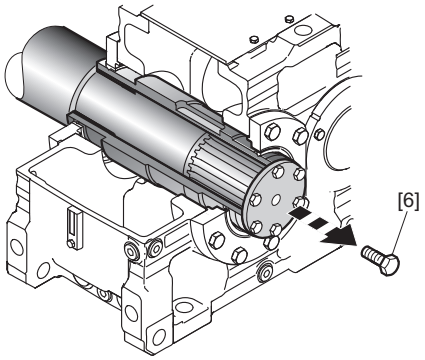


3241268107

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

Sizes X170 – 320

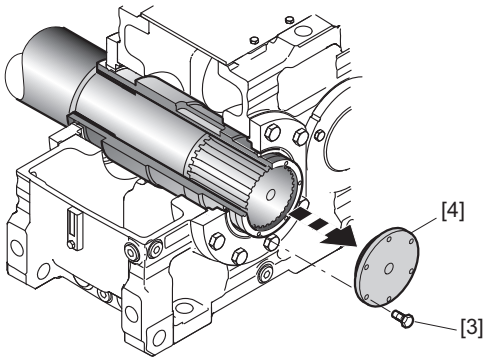
1. Loosen the retaining screw [6].



3241268619

[6] Retaining screw

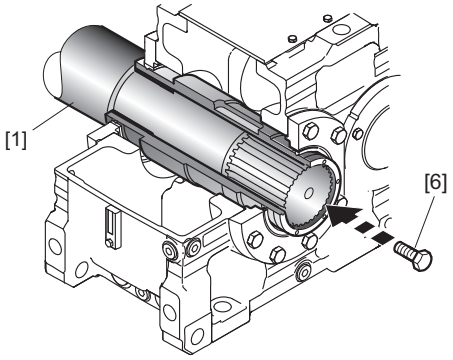
2. Remove the retaining screws [3] and the end plate [4].



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

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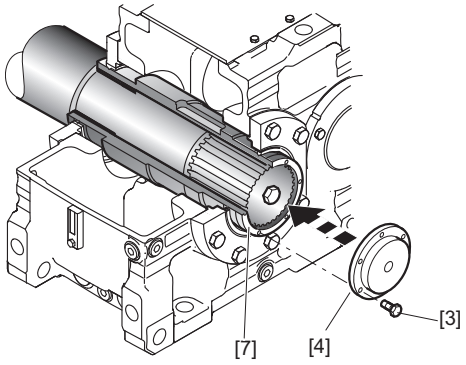
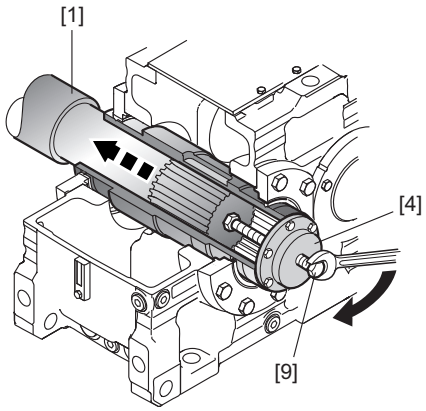
4. To disassemble the gear unit, flip the end plate [4] over and use the retaining screws [3] to reattach it centrically to the hollow shaft [7]. The retaining screws [3] should be tightened hand-tight.



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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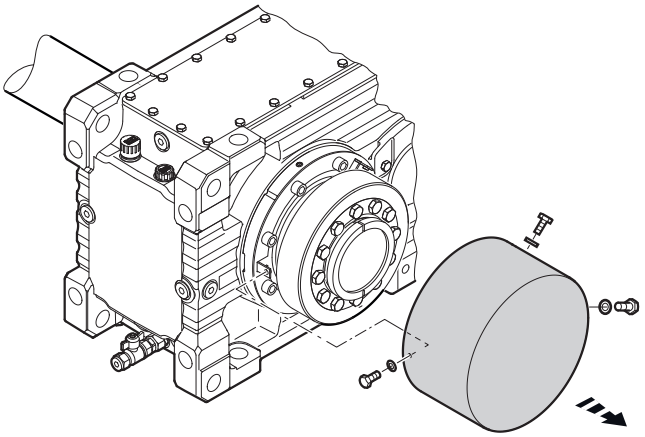
5.15 Hollow-shaft gear units with TorqLOC®

5.15.1 Removing the protection cover



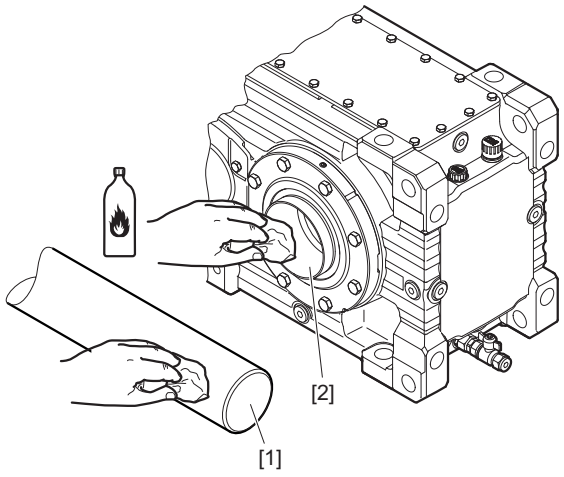
14235823371

Proceed as follows to disassemble the protection cover:

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

5.15.2 Mounting to customer shaft without shaft shoulder

1. Clean the customer shaft [1] and the inside of the hollow shaft [2]. Ensure that all traces of grease or oil are removed.



14226920971

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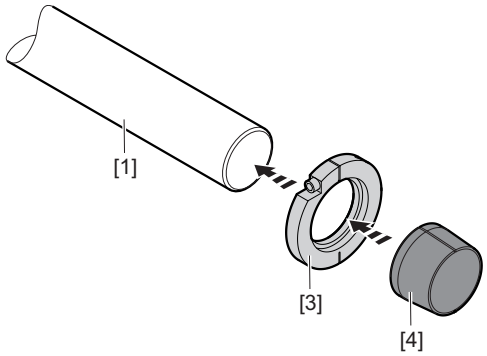
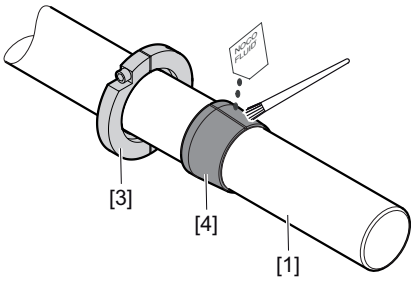
2. Push the stop ring [3] and the bushing [4] on the customer shaft.



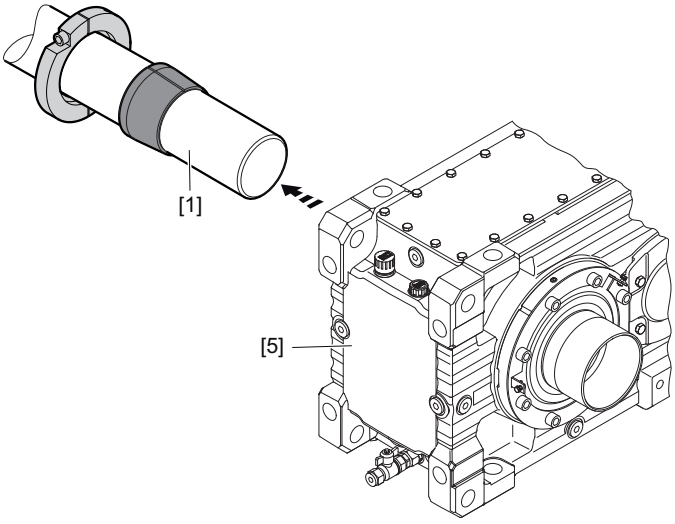
14226361483

3. Apply NOCO® fluid on the bushing [4] and spread thoroughly.



14226911243

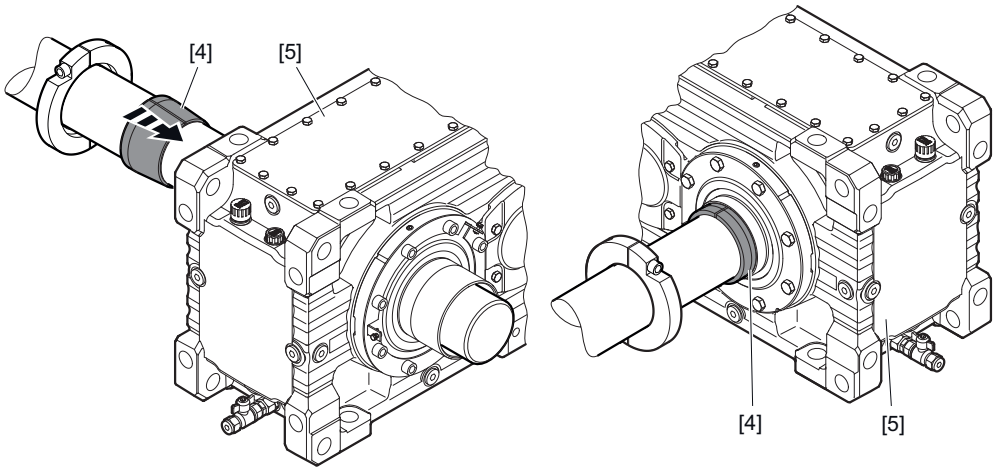
4. Push the gear unit [5] onto the customer shaft.



14226906379

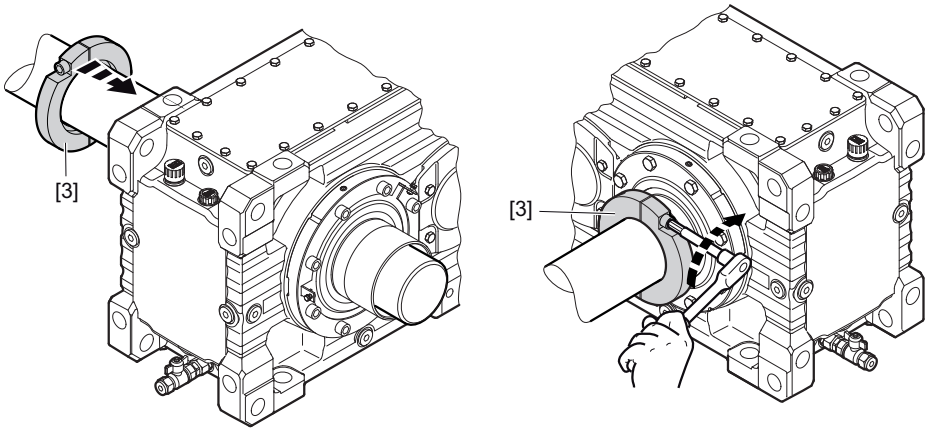
5. Fasten the gear unit on the mounting surface (Do not tighten the screws).

6. Push the busing [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] on the bushing using the appropriate torque as specified 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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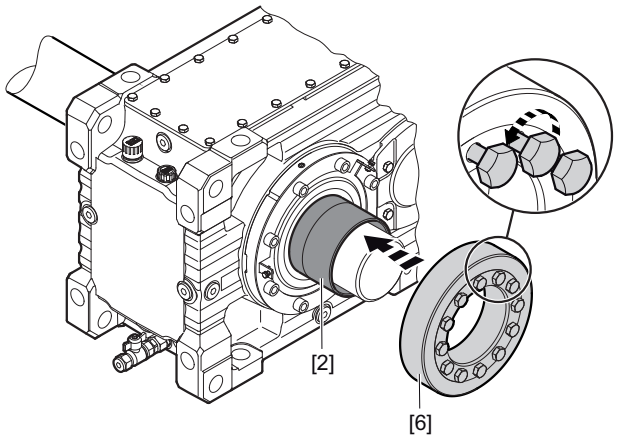
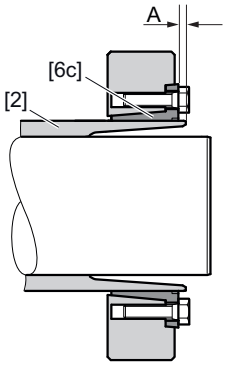
8. ⚠ **CAUTION!** The loose shrink disk could slip. Potential risk of crushing due to falling parts. Secure the shrink disk against slipping.
   NOTICE! Tightening the locking screws without first installing a shaft may result in the hollow shaft being deformed. Possible damage to property. Never tighten 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

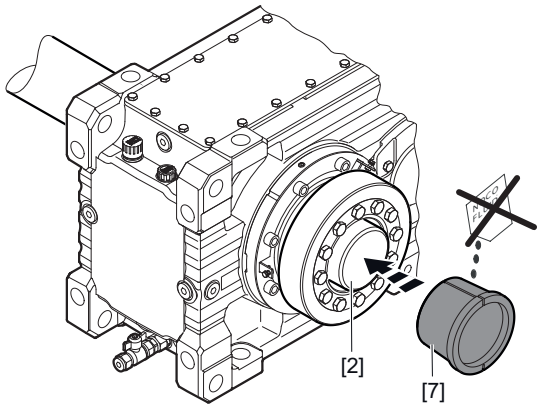
9. Position the inner ring [6c] of the shrink disk to dimension A.



14382672779

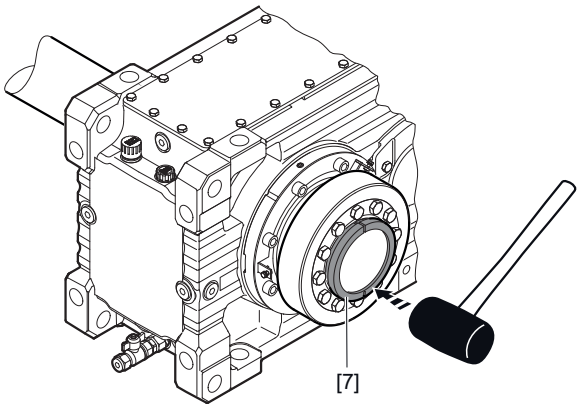
Size	Dimension A in mm
X100	2.5
X110	4
X120	7
X130	7
X140	3
X150	5
X160	5
X170	10
X180	10
X190	10
X200	3
X210	3

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



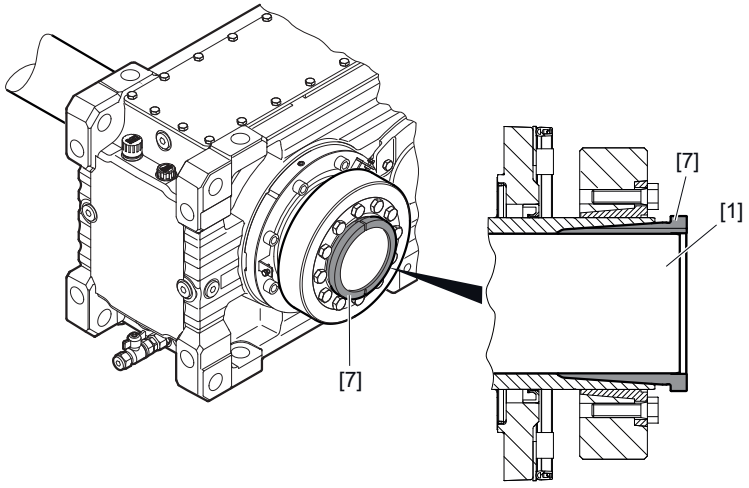
14226923403

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.



14226918539

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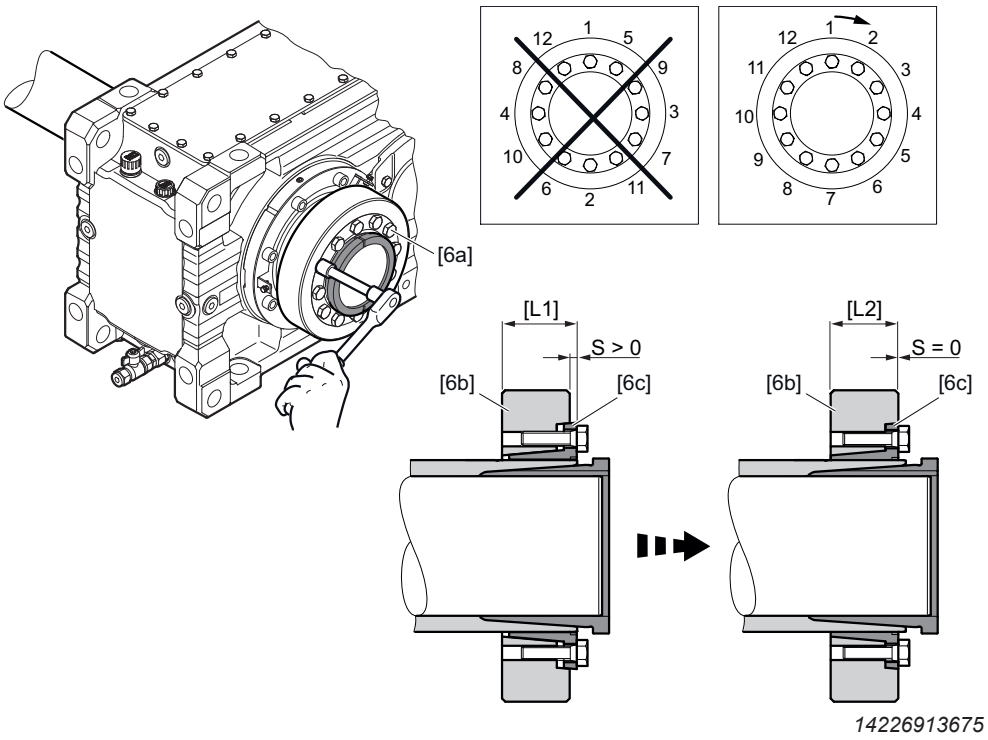
13. First tighten the locking screws [6a] of the shrink disk manually. Align the taper (outer ring) [6b] parallel to the taper bushing (inner ring) [6c].



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

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 and "sufficiently lubricate it" (→ 🗎 188).

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 1/4 turns 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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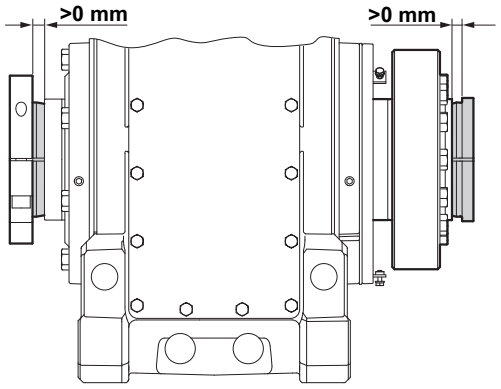
15. The remaining gap between stop ring and hollow shaft end as well as counter bushing and hollow shaft end must be > 0 mm.



14226366347

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

5.15.3 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

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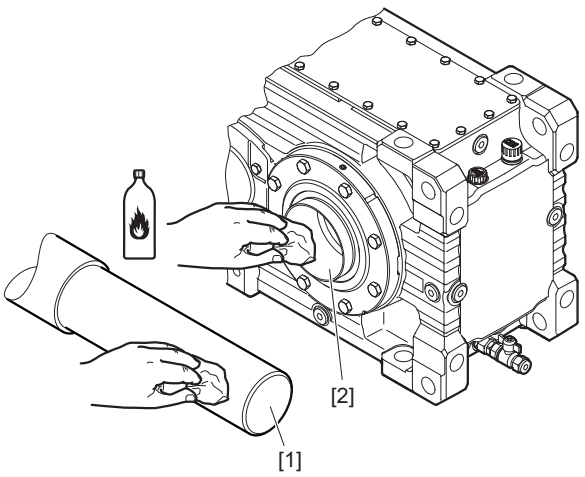
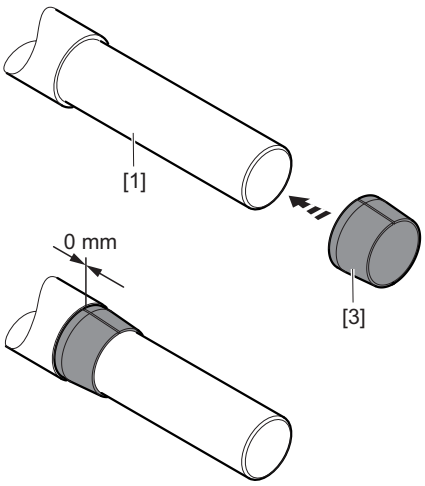
Size	Ø shaft shoulder in mm	Ø area of hollow shaft in mm
X200	185	170
X200	190	175
X210	180	165
X210	185	170
X210	190	175
X210	195	180
X210	200	185

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



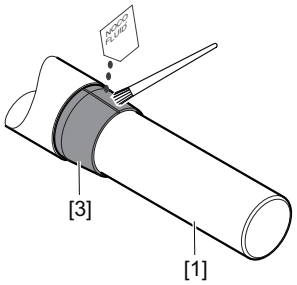
14227827083

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



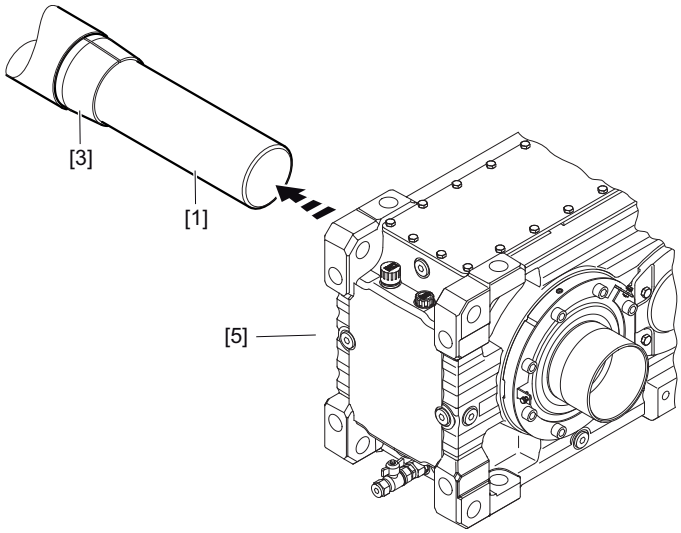
14227829515

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



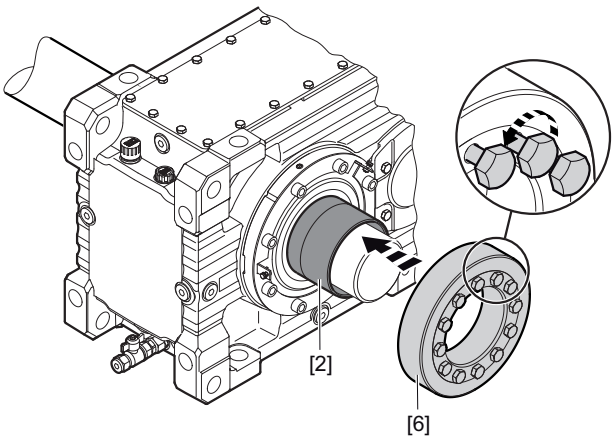
14227831947

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



14227834379

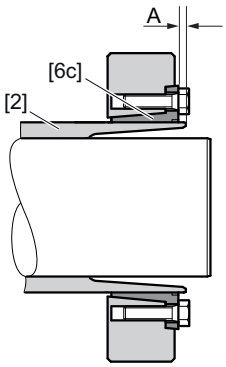
5. Fasten the gear unit on the mounting surface (Do not tighten the screws).
6. ⚠ **CAUTION!** The loose shrink disk could slip. Potential risk of crushing due to falling parts. Secure the shrink disk against slipping.
   NOTICE! Tightening the locking screws without first installing a shaft may result 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

25938673/EN – 06/2020

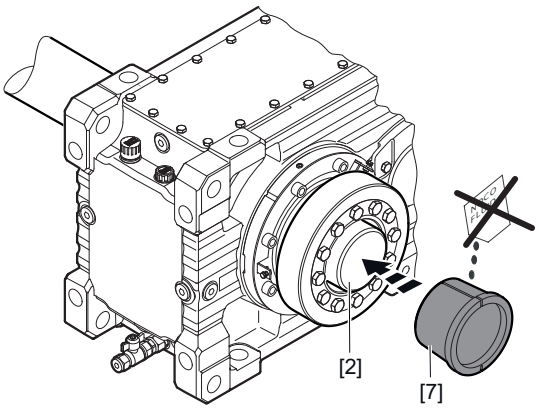
7. Position the inner ring [6c] of the shrink disk to dimension A.



14382672779

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].



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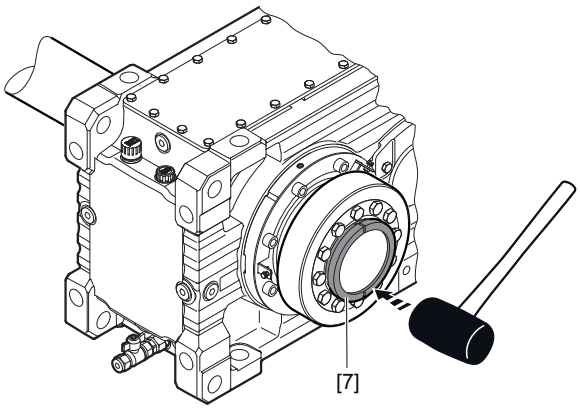
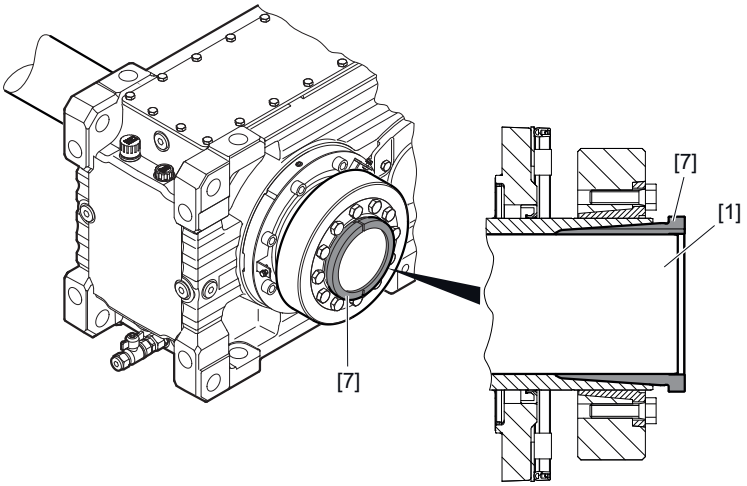
9. Tap lightly on the flange of the counter bushing [7] to ensure that the bushing is fitted securely in the hollow shaft.



14226925835

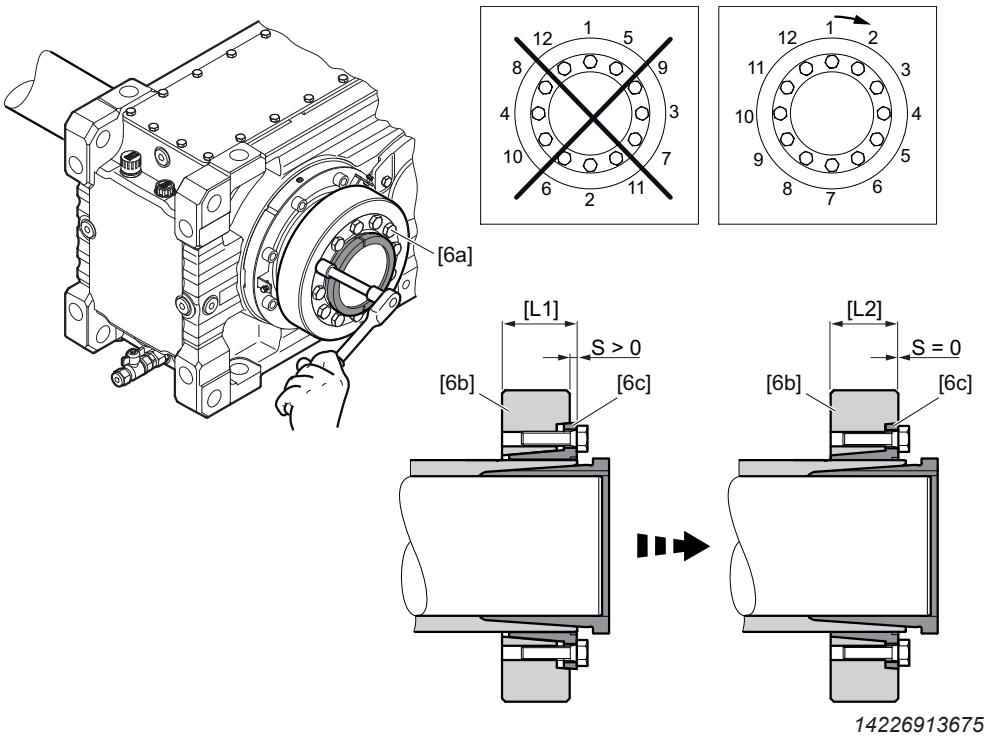
10. Make sure that the customer shaft is seated in the counter bushing.



14226918539

25938673/EN – 06/2020

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



[6a] Locking screws
[6b] Outer ring
[6c] Inner ring

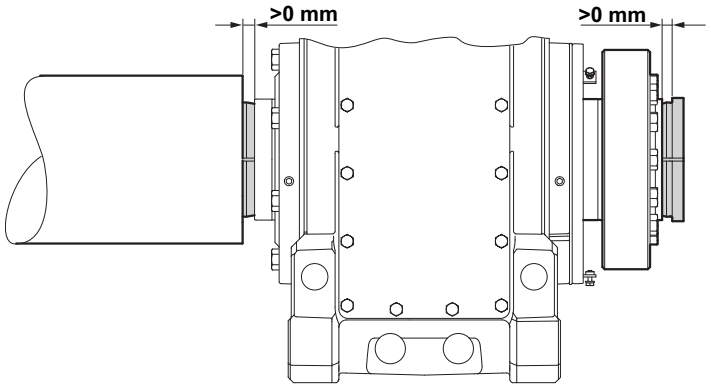
[L1] Delivery state (pre-assembled)
[L2] Completely assembled (ready for operation)

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 and "sufficiently lubricate it" (→ 🗎 188).

12. Then tighten the locking screws by working round equally (not in diametrically opposite sequence) in 1/4 turn increments. Work around the ring in several stages, evenly tighten the locking screws by 1/4 turns until the taper (outer ring) [6a] and the taper bushing (inner ring) [6b] align on the face that holds the screws.

13. The remaining gap between bushing and hollow shaft end as well as counter bushing and hollow shaft end must be > 0 mm.



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14. Tighten the retaining screws of the gear unit with the prescribed tightening torque. Refer to the operating instructions for the tightening torque of the gear unit.

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5.15.4 Disassembling the customer shaft

⚠ CAUTION

Risk of burns caused by hot surfaces.

Severe injuries.

- Let the units cool down sufficiently before touching them.

NOTICE

Improper disassembly of the gear unit and 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 separate 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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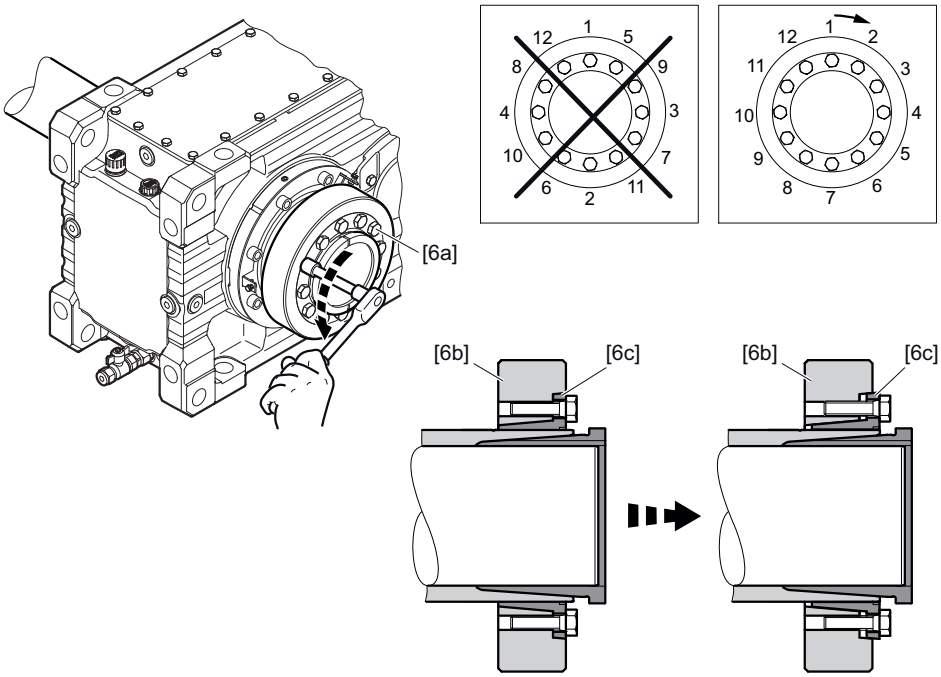

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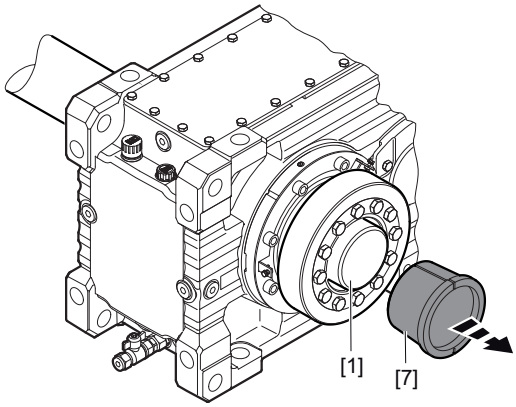
2. Disassemble the conical steel bushing [7]. If the steel bushing is locked, use a puller for the disassembly.



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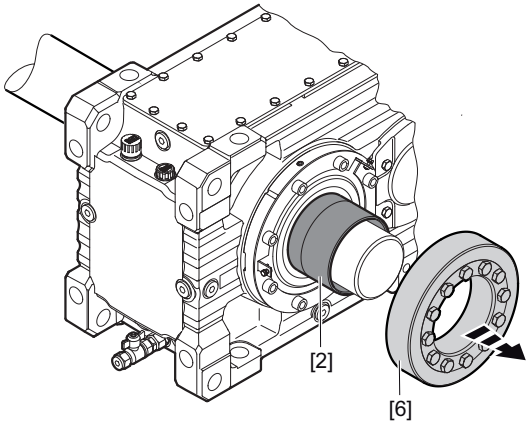
3. Remove the shrink disk [6] from the hollow shaft [2].



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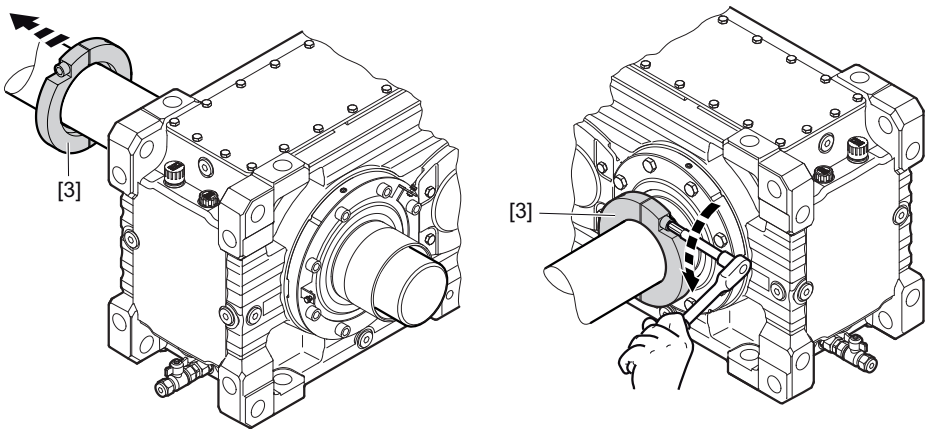
4. Loosen the retaining screw of the stop ring [3] and remove the stop ring [3] from the gear unit.



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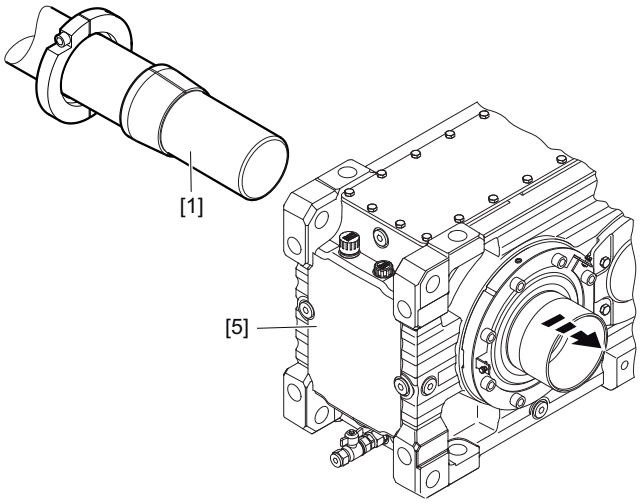
INFORMATION

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]. For more information, refer to the operating instructions "X.. Series Helical and Bevel-Helical Industrial Gear Units".



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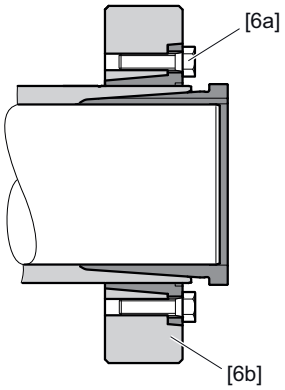
5.15.5 Cleaning and lubricating the shrink disk

Clean and lubricate the shrink disk before installing it again.

INFORMATION

- You must perform the following steps carefully to ensure proper functioning of the shrink disk. Use only products that are comparable to the specified lubricant.
- 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 shrink disk from dirt and any remaining lubricants after disassembly.
2. Apply an MoS_2 compound onto the threads and under the screw heads of the locking screws [6a], for example "gleitmo 100" by FUCHS LUBRITECH (www.fuchs-lubritech.com).
3. Also evenly lubricate the tapered surface of the taper (outer ring) [9a] with a thin layer of an MoS_2 compound.

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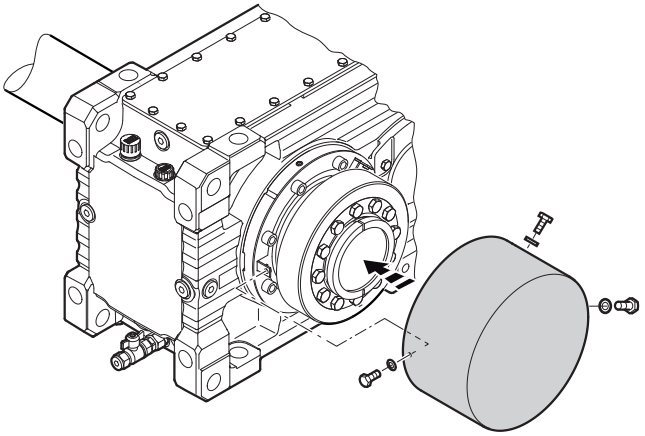
5.15.6 Installing the protection cover

NOTICE

Improper assembly of the protection cover may result in risk of injury due to rotating parts. Dust and dirt may damage the sealing system of the gear unit.

Risk of injury to persons and damage to property.

- After assembly, check to see that the protection cover is properly attached.



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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 them.

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5.16 Torque arm /T

Observe the notes in chapter "Important information" (→ 🗎 111).

⚠ WARNING

Insufficiently secured gear units can fall down during assembly and disassembly.

Severe or fatal injuries.

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

NOTICE

Deforming the torque arm leads to constraining forces on the output shaft, which may negatively influence the service life of the output shaft bearings.

Possible damage to property.

- Do not deform the torque arm.

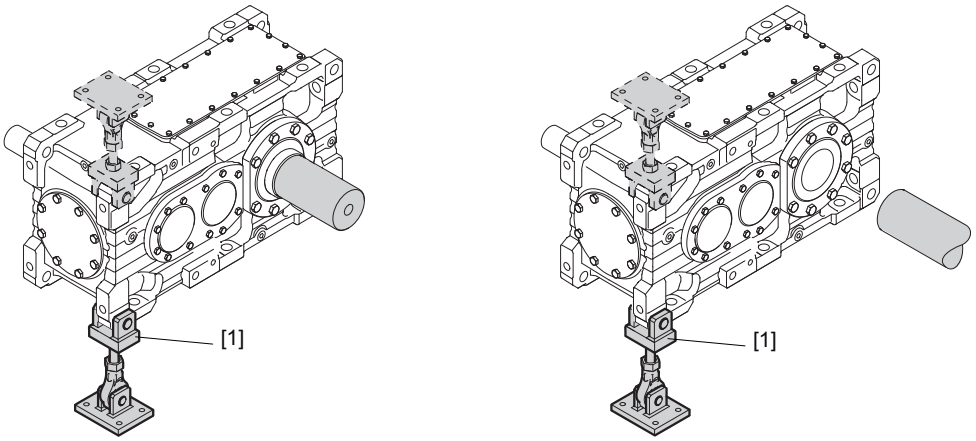
NOTICE

Strain on the torque arm might break the housing.

Possible damage to property.

- Adhere to the specified screw size, tightening torques and required screw strength.

1. To keep the flexural torque on the machine shaft as low as possible, the torque arm [1] must always be mounted on the same side as the machine that is driven. The torque arm [1] can be mounted on the top or bottom of the gear unit.



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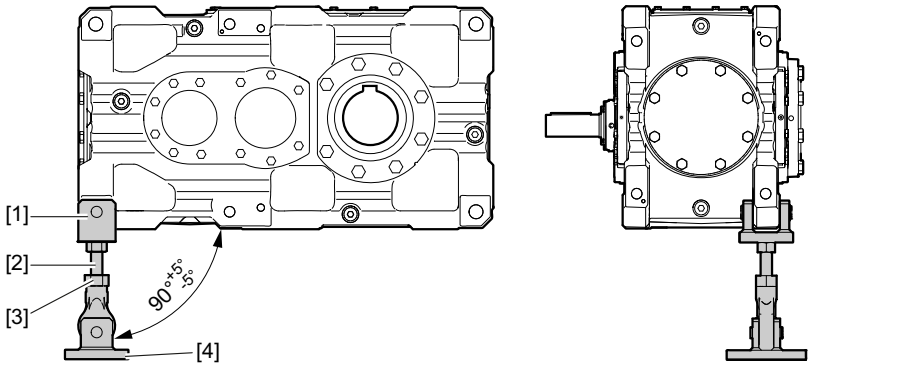
2. **NOTICE!** Make sure that the stud bolt [2] is screwed simultaneously into the yoke [1] and the joint head [3]. Possible damage to property. The stud bolt [2] must be screwed evenly into the yoke [1] and the joint head [3], covering a length of at least 1 x the bolt's diameter.
   Align the gear unit horizontally with the stud bolts and the nuts of the torque arm.



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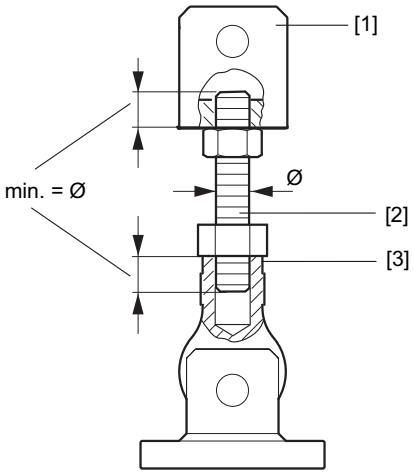
[1] Yoke head with bolt
[2] Stud bolt with nuts
[3] Joint head
[4] Yoke plate with bolt



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

3. 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
X160 – 190	M36	200
X200 – 230	M42	350
X240 – 280	M48	500
X290 – 320	M56	700

5.17 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 customer service.

NOTICE

Improper installation and mounting can damage the gear unit.

Possible damage to the gear unit.

- Gear units with mounting flange cannot 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.

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	137
M16	338
M20	661
M24	1136

INFORMATION

- Do not lubricate the screws during assembly.
- Clean the threads of the bolts and apply a bolt locking compound (e.g. Loctite® 243) to the first few threads.

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5.18 Couplings

INFORMATION

Observe the operating instructions of the respective coupling manufacturer.

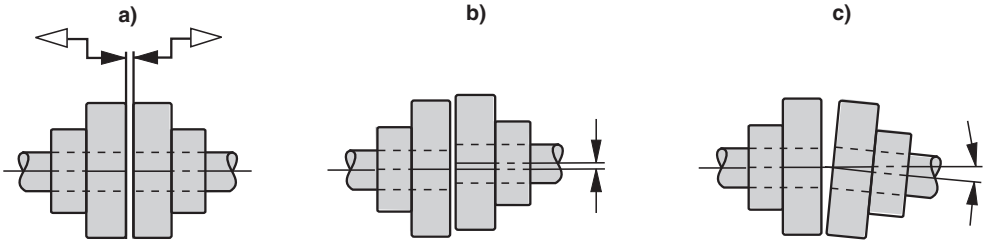
5.18.1 Mounting tolerances

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

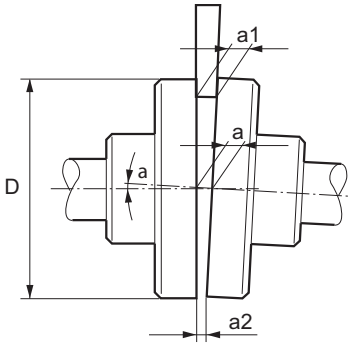
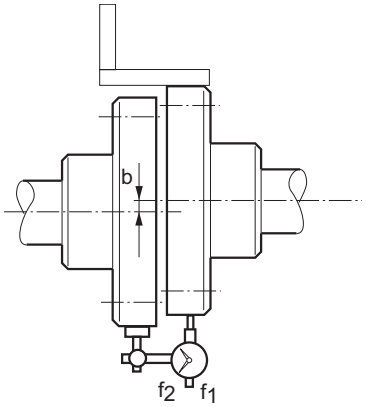
a) Axial misalignment

b) Radial misalignment

c) Angular misalignment



The following table shows various methods for measuring the differing tolerances.

Measuring instruments	Angular offset	Axis offset
Feeler gauge		
	This method only achieves an accurate result when the deviation of the coupling faces is eliminated by turning both coupling halves by 180° and then calculating the mean value from the difference (a1 – a2).	The following figure shows the measurement of axial offset using a straight-edge. Permissible values for axial offset are usually so small that the best measurement results can be achieved with a micrometer dial. If you rotate one coupling half together with the micrometer dial and divide the deviation by two, the deviation displayed on the dial indicator indicates the offset (dimension "b") that includes the axial offset of the other coupling half.

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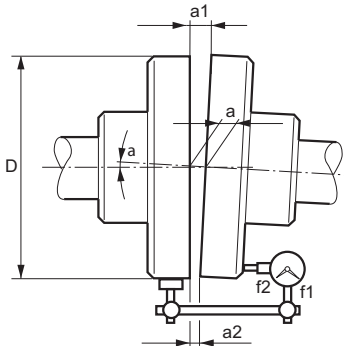
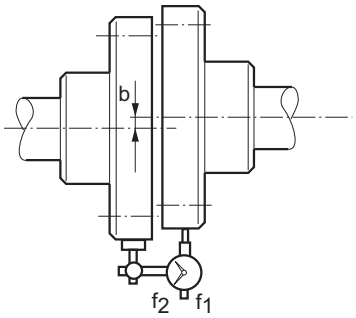
Measuring instruments	Angular offset	Axis offset
Micrometer dial		
	A prerequisite for this measuring method is that there is no axial play in the shaft bearings when the shafts rotate. If this condition is not fulfilled, the axial play between the faces of the coupling halves must be eliminated. As an alternative, you can use two micrometer dials positioned on the opposite sides of the coupling (to calculate the difference of the two dial indicators when rotating the coupling).	The following figure shows the how to measure axial offset using a more accurate measuring method, as described above. The coupling halves are rotated together without letting the point of the dial indicator slide onto the measuring surface. The axial offset is obtained by dividing the deviation displayed on the dial indicator (dimension "b").

5.19 Motor adapter /MA

5.19.1 Maximum permitted motor weight

Two criteria are to be checked when mounting a motor onto the gear unit:

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

INFORMATION

The motor weight may not exceed either one of these 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

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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	$G_M \leq 2.0\ G_G$
Flange-mounted design X../F	$G_M \leq 1.5\ G_G$

X.K..

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

X.T..

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

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Upright gear units

X.F..

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

X.K..

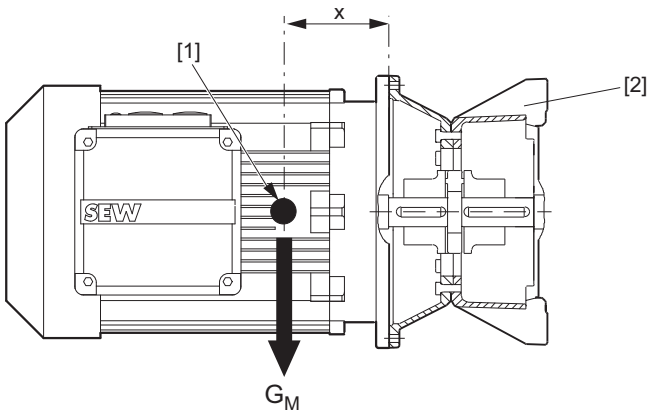
Type of mounting	Mounting position M. / mounting surface F.
	M4/F6
Foot-mounted X../ B	$G_M \leq 1.75\ G_G$
Shaft-mounted X../ T	$G_M \leq 1.0\ G_G$
Flange-mounted X../ F	$G_M \leq 1.25\ G_G$

X.T..

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

2. 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 = Distance from the center of gravity
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

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Motor adapter		G_M	X
IEC	NEMA	kg	mm
250 / 280	364 - 405	820	480
315S-L	444 - 449	1450	680
315		2000	740
355		2500	740

The maximum permitted weight G_M must be linearly reduced if the centroidal distance **X** is increased. G_M cannot be increased if the centroidal distance is reduced.

5.19.2 Claw coupling

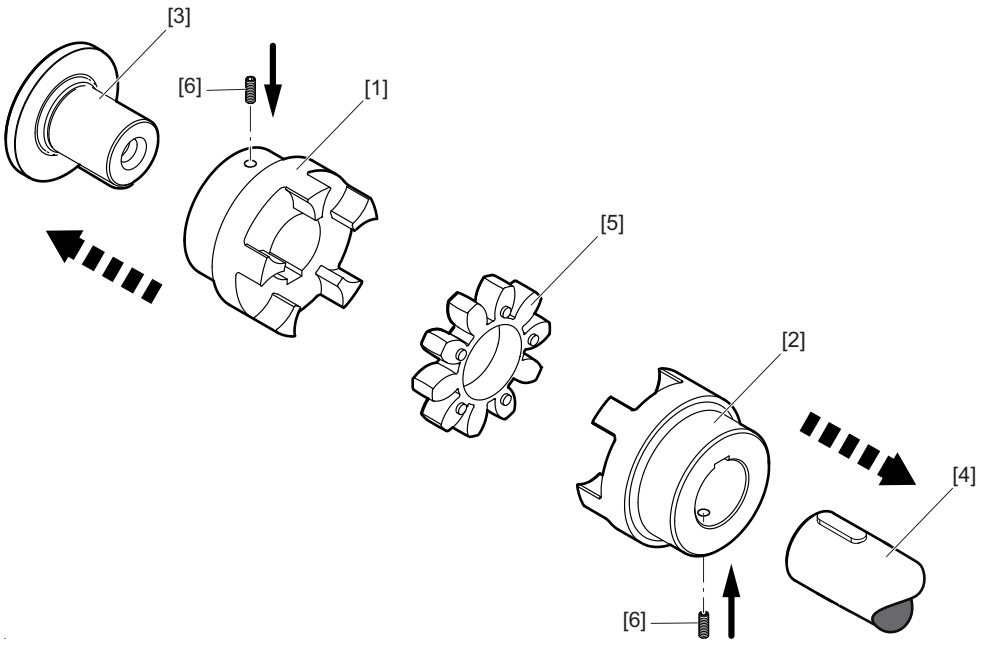
INFORMATION

Observe the operating instructions of the respective coupling manufacturer.

ROTEX® coupling

Observe the notes in chapter "Important information" (→ 🗎 111).

Mounting the coupling



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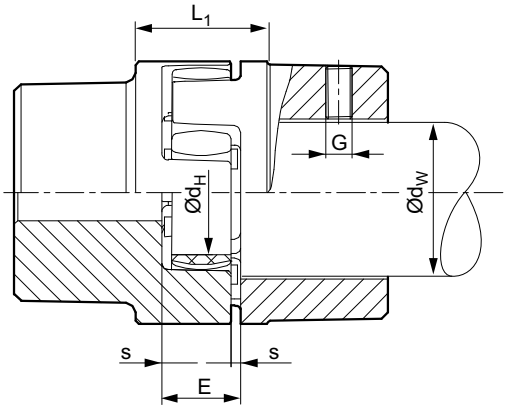
1. **NOTICE!** Improper assembly can damage the coupling hubs [1], [2]. Possible damage to property. Heat the hub to about 80 °C to facilitate assembly.
   Mount the coupling halves [1][2] onto the input and output end [3][4].
2. Insert the spider [5] or DZ elements into the cam section of the input and output hubs [1], [2].

3. **NOTICE!** Improper assembly 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].

Size – coupling	Mounting dimensions			Set 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

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Displacement – Aligning the coupling

NOTICE

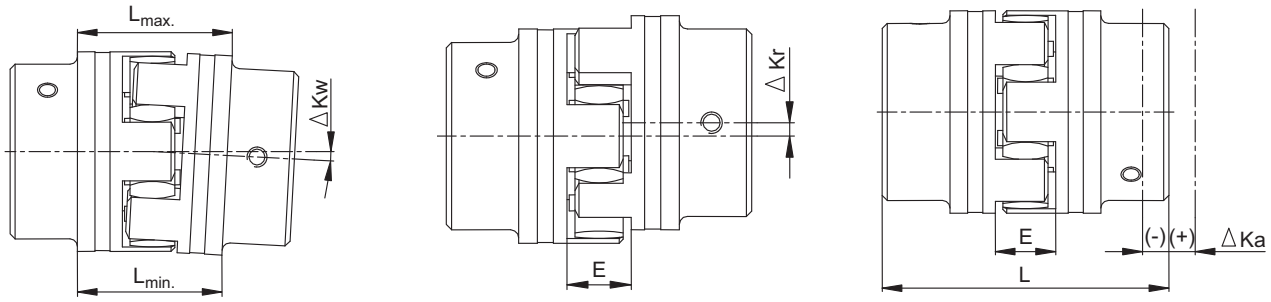
Improper mounting of the coupling may result in damage.

Possible damage to property.

- The shaft ends must be aligned accurately to ensure a long service life of the coupling. Strictly adhere to the displacement values specified in the following chapters. Exceeding these values will damage the coupling. Exact coupling alignment increases its service life.

Notice:

- The displacement values specified in the table (see next page) are maximum values that must not occur simultaneously. If radial offset and angular offset occur at the same time, the permitted displacement values may only be used proportionately.
- Use dial indicator, linear or feeler gauge to check whether the permitted displacement values specified in the table (see next page) are adhered to.



Angular misalignments | Radial misalignments | Axial misalignments

$\Delta K_w = L_{1max.} - L_{1min.}$ [mm]

$L_{max} = L + \Delta K_a$ [mm]

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Example of specified displacement combinations (see diagram):

Example 1:	Example 2:
ΔK_r = 30%	ΔK_r =60%
ΔK_w = 70%	ΔK_w =40%

$\Delta K_{total} = \Delta K_r + \Delta K_w \leq 100\%$

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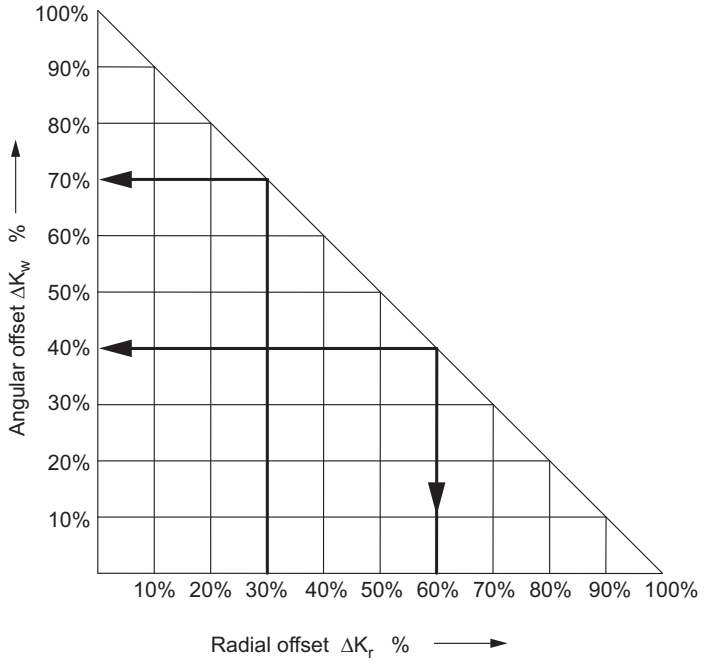

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Displacement values

The following table shows the displacement values:

Coupling size	Max. axial displacement ΔK_a in mm		Max. radial misalignment ΔK_r in mm		Angular displacement ΔK_w for n = 1500 min^{-1}		Angular displacement ΔK_w for n = 3000 min^{-1}	
	(-)	(+)	1500 min^{-1}	3000 min^{-1}	Degree	mm	Degree	mm
14	-0.5	1.0	0.17	0.11	1.2	0.67	1.1	0.60
19	-0.5	1.2	0.20	0.13	1.2	0.82	1.1	0.70
24	-0.5	1.4	0.22	0.15	0.9	0.85	0.8	0.75
28	-0.7	1.5	0.25	0.17	0.9	1.05	0.8	0.85
38	-0.7	1.8	0.28	0.19	1.0	1.35	0.9	1.1
42	-1.0	2.0	0.32	0.21	1.0	1.7	0.9	1.4
48	-1.0	2.1	0.36	0.25	1.1	2.0	1.0	1.6
55	-1.0	2.2	0.38	0.26	1.1	2.3	1.0	2.0
65	-1.0	2.6	0.42	0.28	1.2	2.7	1.1	2.3
75	-1.5	3.0	0.48	0.32	1.2	3.3	1.1	2.9
90	-1.5	3.4	0.5	0.34	1.2	4.3	1.1	3.8
100	-1.5	3.8	0.52	0.36	1.2	4.8	1.1	4.2
110	-2.0	4.2	0.55	0.38	1.3	5.6	1.2	5.0
125	-2.0	4.6	0.6	–	1.3	6.5	–	–
140	-2.0	5.0	0.62	–	1.2	6.6	–	–
160	-2.5	5.7	0.64	–	1.2	7.6	–	–
180	-3.0	6.4	0.68	–	1.2	9.0	–	–

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5.19.3 Attaching the motor to the motor adapter

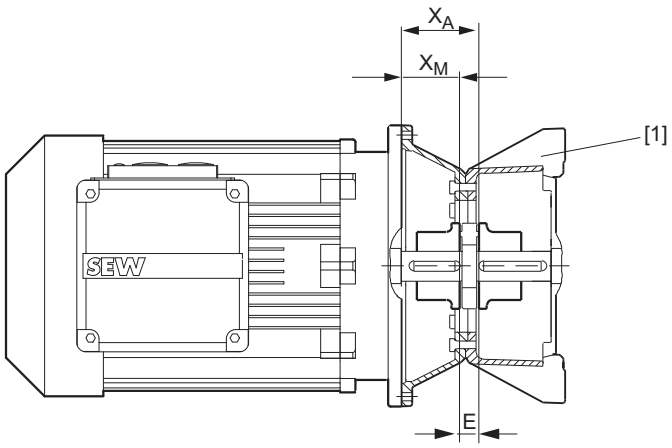
Observe the notes in chapter "Important information" (→ 🗎 111).

1. Clean the motor shaft and flange surfaces of the motor and the motor adapter. They must be dry and free of grease.

INFORMATION

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

2. Push the coupling half onto the motor shaft and position it. When doing this, observe the information in the chapter "Claw coupling" (→ 🗎 197) and the figure below. The coupling size and type are indicated on the coupling.



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[1]	Motor adapter	XA	Distance between the coupling and the motor adapter flange surface
E	Installation dimension	XM	Distance between the coupling and the motor flange surface
	→ XM = XA - E		

3. Secure the coupling half using the setscrew.
4. Mount the motor onto the motor adapter, making sure that the claws of the coupling engage with each other.

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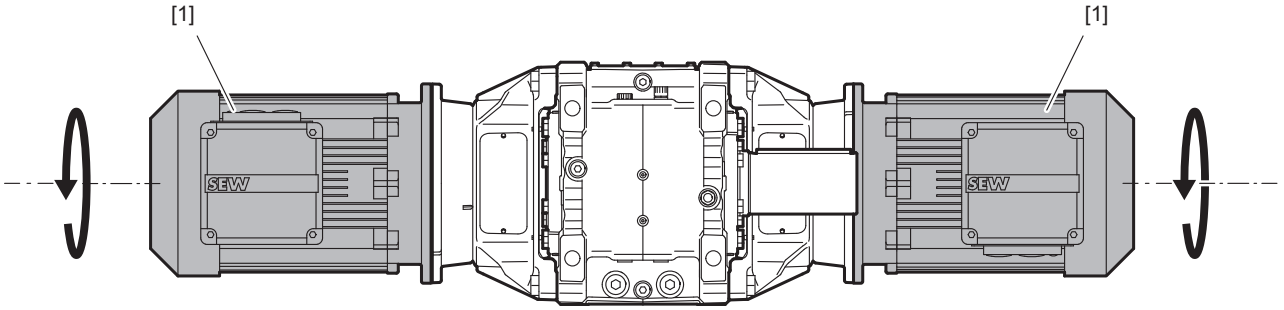
5.19.4 Mounting 2 motors

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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5.20 V-belt drives /VBD

5.20.1 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:

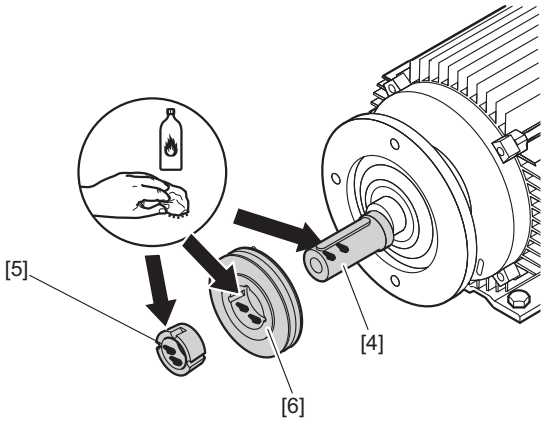
G_M = Motor weight

G_G = Gear unit weight

5.20.2 Mounting the V-belt drive

Observe the notes in chapter "Important information" (→ 🗎 111).

1. Mount the motor [1] to the base plate [2] (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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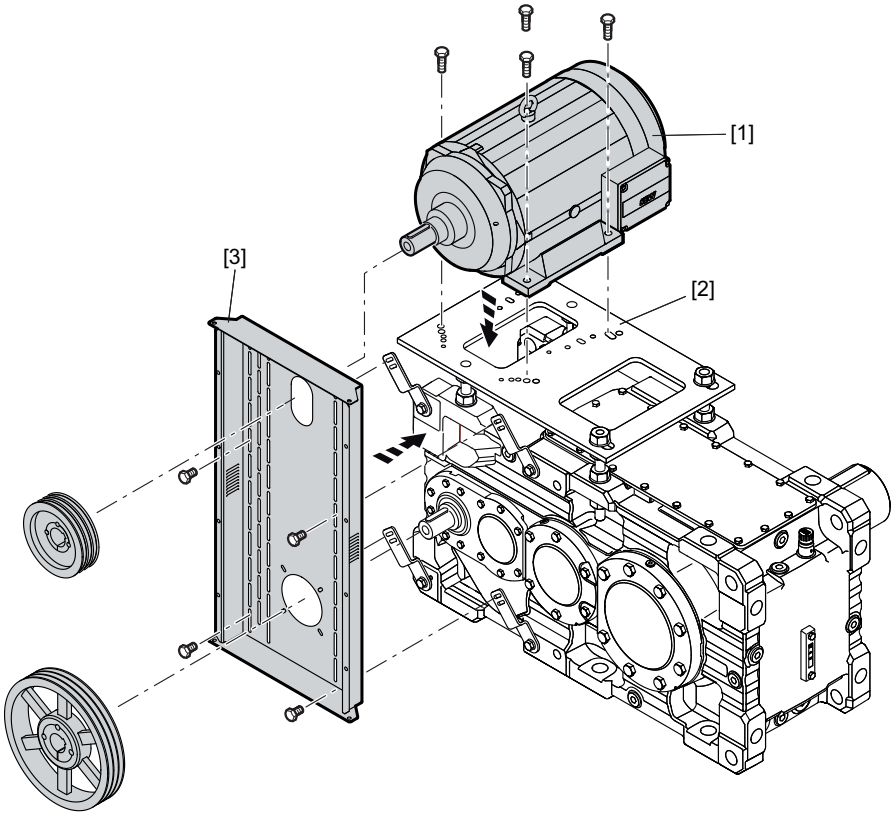
3. Install the belt guard [3] using the provided fixtures. Take into account the room required for applying and tightening the belts, as well as the desired direction in which the cover will be opened.



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

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

Dimension	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
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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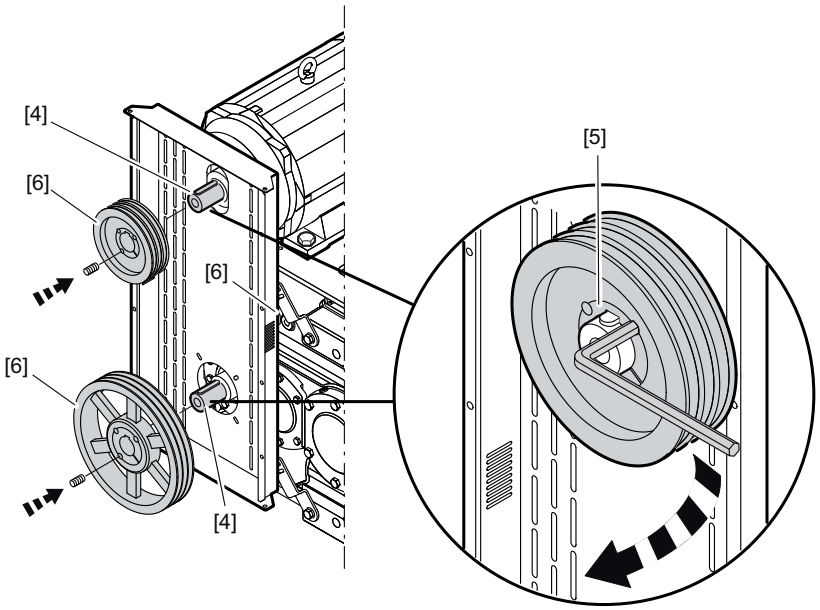

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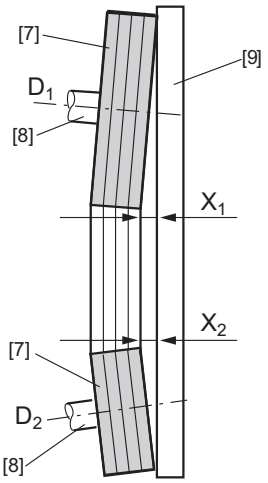
5. Position the belt pulleys [7] as close to the shaft shoulder as possible [8]. If the respective rim widths differ, you will have to take this into account accordingly for the positioning. Check the alignment of the belt pulleys before and after you have tightened the taper bushings using a straightedge [9] or a suitable alignment tool. The following table lists the maximum permitted misalignment value.



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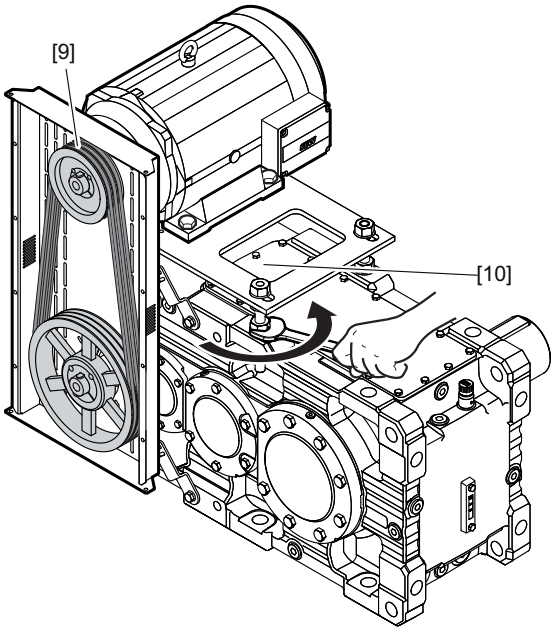
Pulley diameter D_1, D_2 in mm	Maximum permitted distance X_1, X_2
112	0.5
224	1.0
450	2.0
630	3.0

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

6. ⚠ **CAUTION!** Never apply force to mount the V-belt. Possible dangerous situation and damage to property. Be careful not to get your fingers between the disk and the V-belt when adjusting and turning the V-belt pulleys. Mounting using a screwdriver or similar 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 via the threaded rods [10].



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7. Check the tension of the belts using a suitable measuring device. If no special measuring devices are available, you can roughly check the preload using the following method:

- 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 preload.
- Compare the measured values with the values given 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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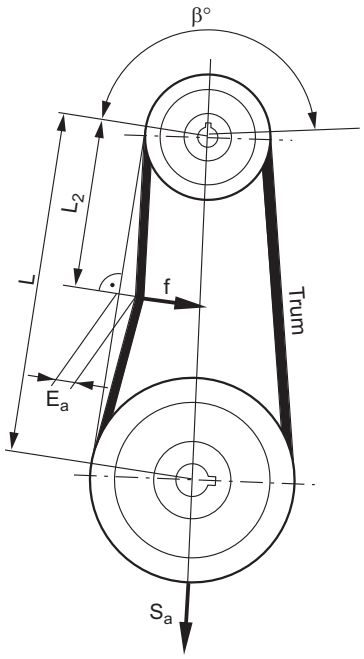

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8. Tighten all the screws and nuts, then once again check the alignment of the belt pulleys as well as the tension of the belt.
9. Check the fastening of the V-belt guard. Close and bolt it correctly using the designated bores.
10. Check the tension of the belt after about 24 hours of operation to compensate the initial tension of the V-belts. Also check the taper bushings and the respective locking screws.

INFORMATION

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

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X.F..

Size	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
XF100-110	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
XF120-130	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

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Size	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
XF140 – 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

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Size	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
XF160 – 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

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Size	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
XF180-190	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	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
XF200-210	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

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Size	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
XF220-230	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	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
XK100 – 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
XK120-130	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	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
XK140 – 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
XK160 – 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
	1.8	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	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
XK180-190	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
XK200-210	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	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
XK220-230	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

5.21 Base frame /BF

Observe the following notes:

NOTICE

Improper assembly may result in damage to the gear unit.

Possible damage to property.

- Check to see that the support structure of the foot mounting is adequately dimensioned and rigid.
- Fasten the frame to the gear unit foundation using only the mounting holes provided for this purpose. It is important that the base frame is not deformed (risk of damage to gear unit and coupling).
- Make sure that the base frame is not deformed through incorrect alignment of the gear unit output shaft to the machine shaft.

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5.22 Swing base /SB

Observe the following notes:

NOTICE

Improper assembly may result in damage to the gear unit.

Possible damage to property.

- The system frame must be sufficiently dimensioned to absorb the torque of the torque arm.
- Make sure that the swing base is not deformed during installation (risk of damage to gear unit and coupling).

5.23 Motor pump /ONP

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

Before installation/assembly, first read the addendum to the operating instructions "Motor Pump /ONP".

5.24 Motor pump ONP1/ONP1L

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

Before installation/assembly, first read the operating instructions "Motor Pump ONP1/ ONP1L".

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5.25 Fan /FAN

Note the following

- When protective devices for couplings or similar are installed on gear units equipped with a fan, sufficient clearance must be provided for cooling air intake.

  See the dimension drawing in the catalog or the order documents for the required distance.
- Never operate the gear unit without the protective housing.
- Protect the fan guard from external damage.
- Make sure the air intake vents of the fan are not blocked or covered.

Observe the following tightening torques for installing the fan guard:

Screws/nuts	Tightening torques Strength class 8.8 Nm
M8	27

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5.26 Water cooling cover /CCV

5.26.1 Notes on connection / installation

NOTICE

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

Possible damage to property.

- Observe the following notes:

- 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 excessively.
- The water cooling cover is not equipped with a water drain. In the event of repair work, you have to install a drain on the cooling water outlet to ensure proper draining of the cooling water.
- Connect the water cooling cover to the existing cooling circuit. The direction of flow is user-defined.
- For information regarding the cooling water temperature and the flow rate, refer to the order documents.
- Make sure the cooling water pressure does not exceed 6 bar.
- In the event of temperature levels below 0 °C and longer downtimes, drain the cooling water from the circuit. Use compressed air to remove any remaining water.
- Refer to chapter "Cooling media" (→ 🗎 221) for permitted cooling media.

The following measures can be taken 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 pressure.

5.26.2 Removal

Observe the notes in chapter "Inspection/maintenance" (→ 🗎 293).

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5.26.3 Cooling media

INFORMATION

- Note that the service life, the efficiency, and the maintenance intervals of the heat exchanger depend to a great degree on the quality and ingredients of the cooling medium.
- Special measures have to be taken when using sea water or brackish water. Contact SEW-EURODRIVE.

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 oil and cooling water according to the order documents.

Dirt

The quantity of suspended solids (ball-shaped, particle size < 0.25 mm) should be less than 10 mg/l. Threadlike contaminants increase the risk of pressure loss.

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 have a corrosive effect under normal conditions: phosphate, nitrate, nitrite, iron, manganese, sodium, potassium.

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5.27 Water cooling cartridge /CCT

5.27.1 Notes on connection/installation

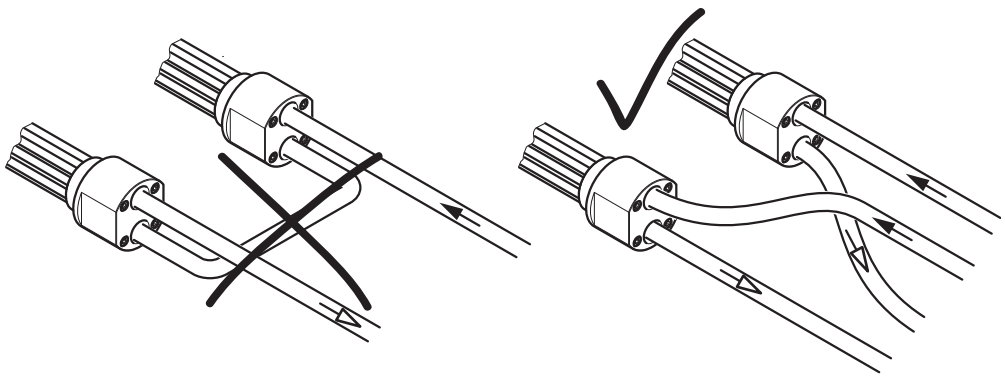
NOTICE

Improper installation of the water cooling cartridge can damage the gear unit.

Possible damage to property.

- Observe the following notes:

- Using thread seal tape on the pipe threads increases the resistance between the connection parts as well as the risk of cracking in the cast parts of the water cooling cartridge. Do not tighten the threads excessively.
- The water cooling cartridges are not equipped with a water drain. In the event of repair work, you have to install a drain on the cooling water outlet to ensure proper draining of the cooling water.
- For connecting the water cooling cartridge, use only piping and mounting parts of the same or of compatible material.
- Check the water cooling cartridge to see that it is free from soiling and foreign objects in the pipe connection to ensure unobstructed flow of the cooling media.
- Avoid tensions on the connection points when connecting the piping. Support the pipes properly, if required.
- Install the cooling water outlet pipe in such a way that the water cooling cartridge is permanently flooded by cooling water.
- Refer to chapter "Cooling media" (→ 🗎 221) to determine the permitted cooling media.
- Cooling water temperature and volume flow according to the order documents.
- Make sure the cooling water pressure does not exceed 10 bar.
- In the event of temperature levels below 0 °C and longer downtimes, drain the cooling water from the circuit. Use compressed air to remove any remaining water.
- The recommended filtering is 100 µm.
- Connect the water cooling cartridge to the existing cooling circuit. The direction of flow is user-defined.
- For gear units with 2 water cooling cartridges, connect the cooling circuit in parallel, see following figure.



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◄— Supply (cold water)

—► Return (warm water discharge)

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The following measures can be taken 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 pressure.

5.27.2 Removal

Observe the notes in chapter Inspection/maintenance.

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5.27.3 Requirements on the water quality

INFORMATION

Contact SEW-EURODRIVE if you use cooling media such as brackish water or process water.

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. Hardeners accumulate on the surface of the water cooling cartridge in particular at high temperatures and in this way impair the performance. Take these deposits into account when selecting the water cooling cartridge for extremely hard water.

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 problems when **pH value < 6**
- With alkaline water:

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

  Smaller values can cause corrosion due to free carbonic acid.

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

pH Value	Water quality
4.5	Very 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	Very alkaline

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Cooling water assessment based on water substances

The following table provides an overview of the resistance of copper-nickel pipes against substances in non-potable water.

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

\+ = usually good resistivity

0 = corrosion problems can occur in particular if several factors are assessed with 0

– = we advise against use

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Types of cooling water/characteristics

Note the following conditions:

Industrial water

- Copper, brass and steel are very resistant against industrial water.
- Usually untreated water (no drinking water).
- Often very contaminated.
- A water analysis is necessary for assessment.

Stream water and river water

- We recommend using copper nickel pipes.
- Cast iron parts must be protected against corrosion by suitable coating.
- Usually untreated water (no drinking water).
- Often very contaminated.
- A water analysis is necessary for assessment.

Salt water

- We recommend using brass pipes or copper nickel pipes.

Brackish water

- We recommend using copper nickel pipes.
- Mixture of sea water and river water.

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5.28 Oil-water cooler for splash lubrication /OWC

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

Before installation/assembly, first read the addendum to the operating instructions "Oil-Water Cooler with Motor Pump for Splash Lubricaton /OWC".

5.29 Oil-air cooler for splash lubrication /OAC

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

Before installation/assembly, first read the addendum to the operating instructions "Oil-Air Cooler for Splash Lubricaton /OAC".

5.30 Oil-air cooler for splash lubrication /OAC1

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

Before installation/assembly, first read the operating instructions "Oil-Air Cooler for Splash Lubrication /OAC1".

5.31 Oil-water cooler for pressure lubrication /OWP

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

Before installation/assembly, first read the addendum to the operating instructions "Oil-Water Cooler for Pressure Lubrication /OWP".

5.32 Oil-water cooler for pressure lubrication /OWP1

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

Before installation/assembly, first read the operating instructions "Oil-Water Cooler for Pressure Lubrication /OWP1".

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5.33 Oil-air cooler for pressure lubrication /OAP

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

Before installation/assembly, first read the addendum to the operating instructions "Oil-Air Cooler for Pressure Lubrication /OAP".

5.34 Oil-air cooler for pressure lubrication /OAP1

Observe the notes in chapter "Important information" (→ 🗎 111).

INFORMATION

Before installation/assembly, first read the operating instructions "Oil-Air Cooler for Pressure Lubrication /OAP1".

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5.35 Limit temperature for gear unit start

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.

INFORMATION

- Before startup, it might be necessary to heat up the oil with an oil heater to the temperature specified under "Initial temperature". Observe the lubricant table in the chapter "Permitted lubricants" (→ 🗎 300). For the design and dimensioning of the required oil heater, contact SEW-EURODRIVE.
- For the minimally permitted initial temperature for mineral and synthetic oil, refer to the chapter "Permitted lubricants" (→ 🗎 300).

5.36 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.

NOTICE

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

Possible damage to property.

- Observe that the heating elements must be completely immersed in the oil bath to avoid damages.

NOTICE

An improper change of the mounting position may cause the gear unit heater to malfunction.

Possible damage to property.

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

INFORMATION

The electrical connection of the heating elements and the thermostat may only be established by specialists according to the current supply conditions on site.

Observe the connection voltage and the switching capacity of the thermostat. Improper or incorrect cabling can damage electrical components.

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5.36.1 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 trip temperature on the thermostat under the oil is set at the factory depending on the lubricant used.
- The trip point of the oil heater thermostat is factory-set to a temperature of about 5 K above the respective limit temperature initial temperature for gear unit startup; see the chapter "Limit temperature for gear unit startup" (→ 🗎 229).

  At this temperature, the thermostat disables the oil heater, see chapter "Limit temperature for gear unit startup" (→ 🗎 229). The gear unit may not be started up until then. The thermostat activates the oil heater again once the temperature is about 5 K below the switching point.
- In order 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 has to be energized permanently even when the drive is at a brief standstill.

  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 are ready for operation. Prior to startup, wire them properly and connect them 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 the chapter "Thermostat" (→ 🗎 231).

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5.36.2 Thermostat

Electrical connection

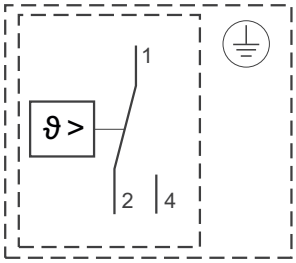
⚠ WARNING

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

INFORMATION

- Observe the manufacturer's documentation.

Technical data

Maximum switching capacity:			
AMTHs-SW-2	Current		Voltage
	Terminal 2	Terminal 4	
	10 A	10 A	AC 230 + 10% cosφ = 1 (0.6)
	0.25 A	0.25 A	DC 230 + 10%
Contact reliability: To ensure the greatest contact reliability possible, the manufacturer recommends a minimum load of AC/DC 24 V, 100 mA for silver terminals.			
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 range: -40 ˚C to +100 °C
- Cable entry: M20x1.5 for a cable diameter of 6 to 13 mm
- IP65 degree of protection according to EN 60529

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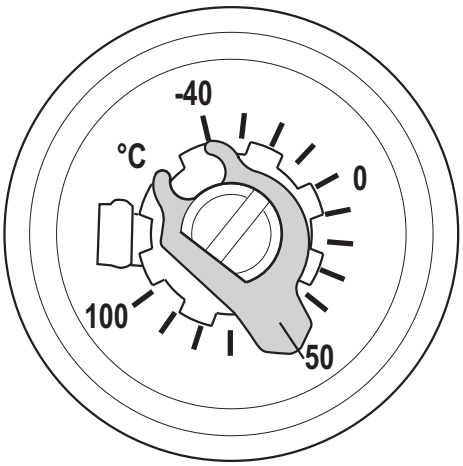
The following figure shows the possible setting range of the thermostat. In this example, the pointer is on 50 °C.



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5.36.3 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 included in the delivery.

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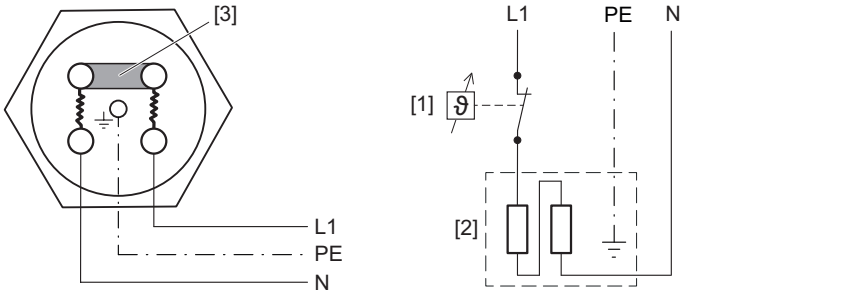
5.36.4 Connection power and electrical connection of resistor element

The gear unit heater comes equipped with cable glands and jumpers. They are included in the scope of 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.

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 of the oil heater:



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Observe the electrical characteristics of the control area.

[1] Thermostat

[2] Heating element

[3] Jumper

Cable entry: 1xPg11

The following table shows the connected load of the installed heater.

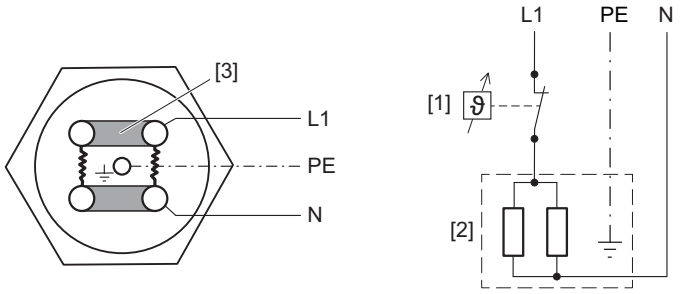
		P_{inst}		P_{inst}	
Gear units		**1 heating element**		**2 heating elements**	
Size	**Design**		**K/h**		**K/h**
X100	X2K / X2F / X3K	1 x 0.4	6	2 x 0.4	11
	X3T / X3F	1 x 0.3	3	2 x 0.3	7
X110	X3T / X3F	1 x 0.3	4	-	-
X120	X4F / X3T / X4T	1 x 0.3	3	2 x 0.3	5
X130	X4F / X3T / X4T	1 x 0.4	3	-	-
X140	X4F /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

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heating element

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 of the oil heater:



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Observe the electrical characteristics of the control area.

[1] Thermostat

[2] Heating element

[3] Jumper

Cable entry: 1xPg11

The following table shows the connected load of the installed heater.

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

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heater

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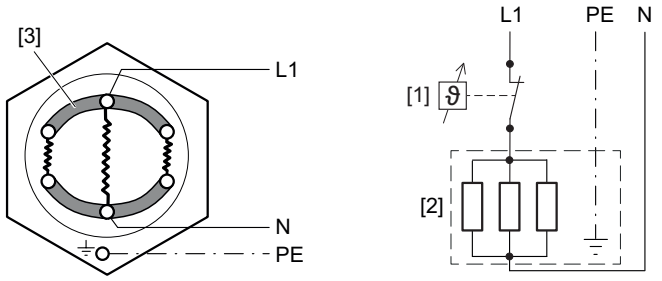
Alternating current/1-phase/230 V/parallel connection/I ≤ 10 A

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 connection of the oil heater:



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Observe the electrical characteristics of the control area.

[1] Thermostat

[2] Heating element

[3] Jumper

Cable entry: 1xPg16

The following table shows the connected load of the installed heater.

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

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heater

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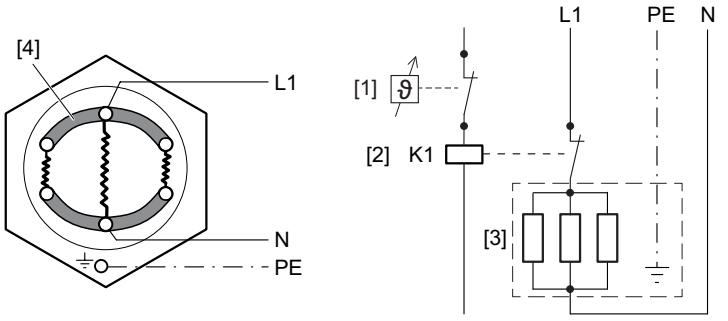
Alternating current/1-phase/230 V/parallel connection/I ≥ 10 A

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 at the time of delivery (as viewed into the connection space):



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Observe the electrical characteristics of the control area.

[1] Thermostat
[2] Contactor (not included in the delivery)
[3] Heating element
[4] Jumper

Cable entry: 1xPg16

The following table shows the connected load of the installed heater.

		P_{inst}		P_{inst}	
Gear units		**1 heating element**		**2 heating elements**	
Size	**Design**		**K/h**		**K/h**
X180	X2F / X2K / X3K / X3F / X4K	-	-	2 x 1.6	10
X200	X2K	-	-	2 x 1.5	8
	X2F / X3K / X3F / X4K	-	-	2 x 1.8	8
	X4F / X4T	-	-	2 x 1.3	6
X220	X2K	-	-	2 x 1.8	7
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	-	-	2 x 2.2	8
X240	X2K	-	-	2 x 1.8	5
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	-	-	2 x 2.2	6
X250	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 2.6	3	-	-

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heating element

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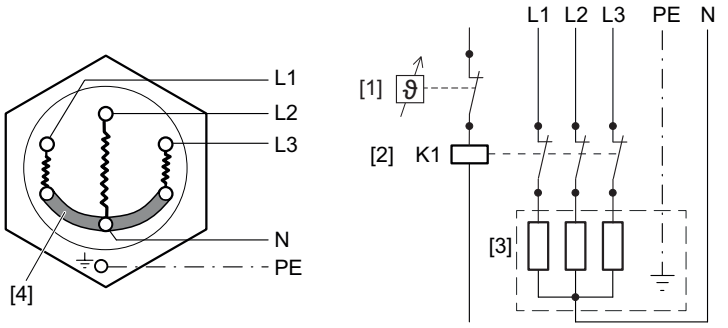
AC current/3-phase/230/400 V/star connection

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 of the oil heater:



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Observe the electrical characteristics of the control area.

[1] Thermostat
[2] Contactor (not included in the delivery)
[3] Heating element
[4] Jumper

Cable entry: 1xPg16

The following table shows the connected load of the installed heater.

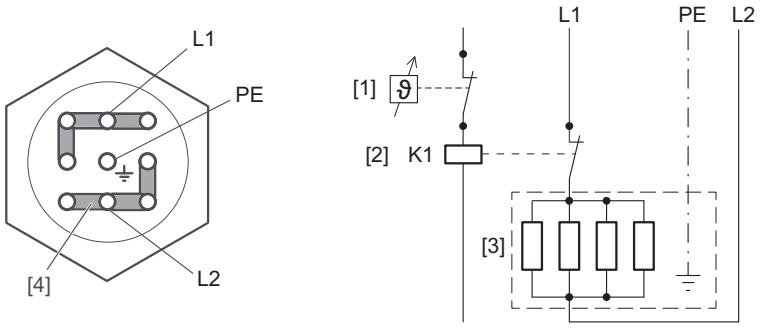
		P_{inst}		P_{inst}	
Gear units		**1 heating element**		**2 heating elements**	
Size	**Design**		**K/h**		**K/h**
X180	X2F / X2K / X3K / X3F / X4K	1 x 1.6	5	2 x 1.6	10
	X3T / X4F / X4T	1 x 1.1	4	2 x 1.1	7
X190	X2F / X2K / X3K / X3F / X4K	1 x 1.6	5	-	-
	X3T / X4F / X4T	1 x 1.1	3	-	-
X200	X2K	1 x 1.6	4	2 x 1.6	8
	X2F / X3K / X3F / X4K	1 x 1.8	5	2 x 1.8	8
	X4F / X4T	1 x 1.3	3	2 x 1.3	6
	X3T	1 x 1.1	2	2 x 1.1	5
X210	X2K	1 x 1.6	4	-	-
	X2F / X3K / X3F / X4K	1 x 1.8	4	-	-
	X3T / X4F / X4T	1 x 1.3	3	-	-
X220	X2K	1 x 1.8	3	2 x 1.8	7
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 2.2	4	2 x 2.2	8
X230	X2K	1 x 1.8	3	-	-
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 2.2	4	-	-
X240	X2K	1 x 1.8	3	2 x 1.8	5
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 2.2	3	2 x 2.2	6
X250	X2K	1 x 2.2	3	-	-
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 2.6	3	-	-

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heater

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 at the time of delivery (as viewed into the connection space):



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Observe the electrical characteristics of the control area.

[1] Thermostat
[2] Contactor (not included in the delivery)
[3] Heating element
[4] Jumper

The following table shows the connected load of the installed heater.

		P_{inst}		P_{inst}	
Gear units		**1 heating element**		**2 heating elements**	
Size	**Design**		**K/h**		**K/h**
X260	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 3.8	4	2 x 3.8	8
X270	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 3.8	4	-	-
X280	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 4.2	4	-	-
X290	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 4.2	3	2 x 4.2	6
X300	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 4.2	3	-	-
X310	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 5.0	3	2 x 5.0	6
X320	2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 5.0	3	-	-

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heater

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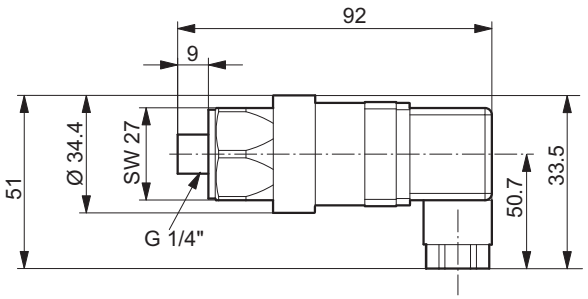
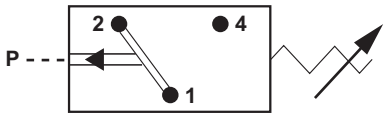
5.37 Pressure switch /PS

5.37.1 Dimensions



721994635

5.37.2 Electrical connection



722003723

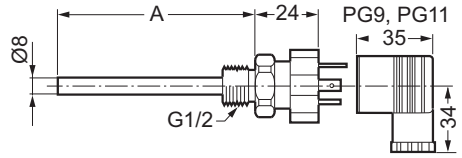
[1][2] NC contact
[1][4] NO contact

5.37.3 Technical data

- Switching pressure: 0.5 ± 0.2 bar
- Maximum switching capacity: 4 A – V_{AC} 250; 4 A – V_{DC} 24
- Plug connector: DIN EN 175301-803
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

5.38 Temperature sensor /PT100

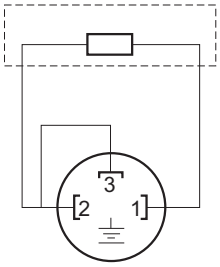
5.38.1 Dimensions



18014398868636427

A in mm
50
150

5.38.2 Electrical connection



359158539

[1][2] Resistor element connection

5.38.3 Technical data

- Design with thermowell and changeable measuring insert
- Sensor tolerance in 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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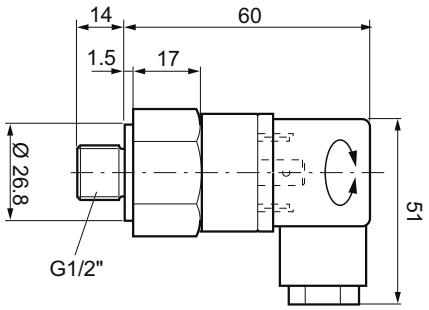
5.39 Temperature switch /NTB

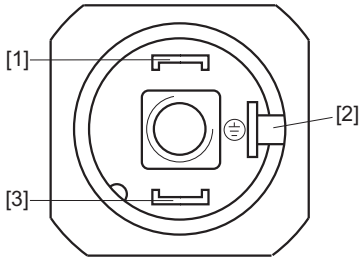
5.39.1 Dimensions



18014398876006923

5.39.2 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 x 0.8

5.39.3 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.

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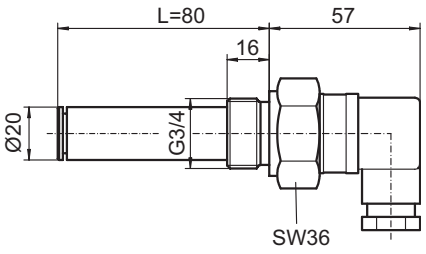
5.40 Temperature switch /TSK

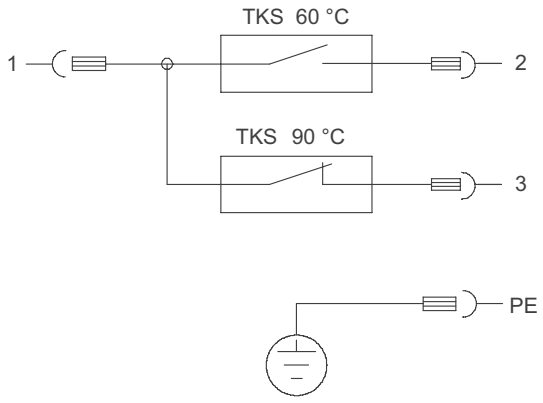
5.40.1 Dimensions



893872779

5.40.2 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.



36028797912842123

[1][2] Switch 60 °C NO contact
[1][3] Switch 90 °C NC contact
PE Grounding terminal

5.40.3 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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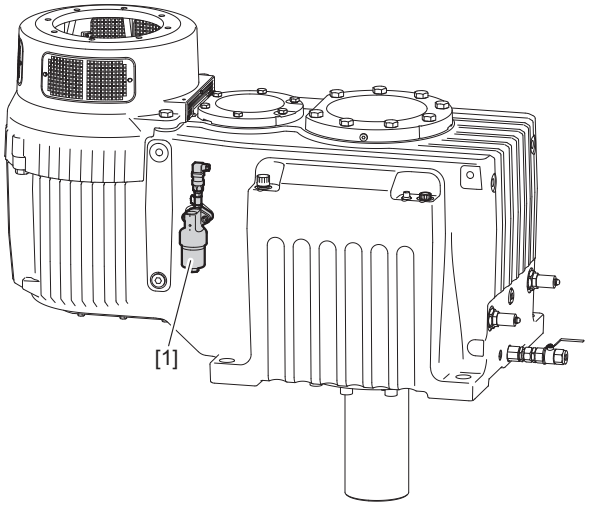
5.41 Oil filter

INFORMATION

Observe the operating instructions of the oil filter manufacturer.



15800209419

[1] Oil filter

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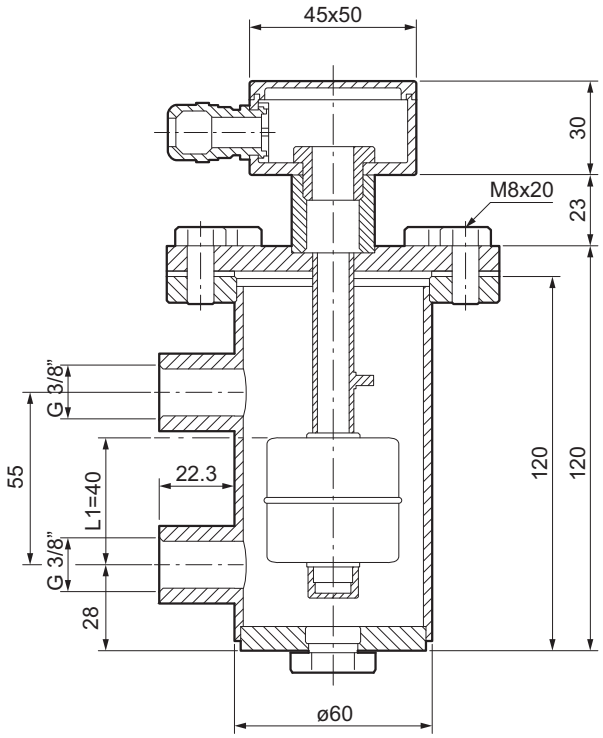
5.42 Float switch

5.42.1 Dimensions



18888473995

5.42.2 Technical data

Technical data	
Connections	G3/8“ female thread
Tightening torque (Fittings 3/8”)	20 Nm
Switching capacity	Max. 24 VA
Switching voltage	SELV 24 V DC
Inrush current	Max. 1 A
Hysteresis	Approx. 3 – 5 mm
Cable gland	PSG9 (M16)

5.42.3 Electrical connection

18888476683

[10] White
[12] Green
[14] Brown

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5.43 Brake

INFORMATION

The brake is not set at the factory.

Observe the operating instructions of the respective brake manufacturer.

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6 Startup

6.1 Important notes

Read the following notes prior to startup.

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Work on the gear unit only when the machine is not in use. Secure the drive unit against unintentional power-up. Attach an information sign near the ON switch to warn that the gear unit is being worked on.

⚠ WARNING

Danger due to freely accessible, rotating parts.

Severe or fatal injuries.

- Secure rotating components such as shafts, couplings, gears or belt drives using suitable protection covers.
- Ensure that installed protection covers are sufficiently attached.

⚠ CAUTION

Danger due to unsecured mount-on components, e.g. keys.

Possible injury to persons due to falling parts.

- Install appropriate protective devices.
- Secure the mount-on components.

⚠ CAUTION

Danger due to lubricant leaking from damaged seals and the breather.

Minor injuries.

- Check the gear unit and mount-on components for leaking lubricant.
- The seals must not come in contact with cleaning agent as this may damage the seals.
- Protect the breather against damage.
- 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.

NOTICE

Improper startup may result in damage to the gear unit.

Possible damage to property.

- Observe the following notes.

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- 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 on the oil dipstick are the decisive indicators for the oil quantity to be filled into the unit. For additional information, refer to chapter "Checking the oil level" (→ 🗎 264) and chapter "Changing the oil" (→ 🗎 272).

  The required oil fill quantity is higher when additional attachments are mounted to the gear unit, such as an oil supply system. In this case, observe the respective "Oil Supply System" operating instructions.

  Check the oil level again after the first few operating hours; see chapter "Checking the oil level" (→ 🗎 264).
- The most important technical data is provided on the nameplate. Additional data relevant for operation is available in drawings, on the order confirmation, or any order-specific documentation.
- After installing the gear unit, check to see that all retaining screws are tight.
- Make sure that the alignment has not changed after tightening the mounting elements.
- If there are any oil drain valves, ensure that they cannot be opened unintentionally.
- Prior to startup, make sure the monitoring devices (pressure switch, temperature switch, etc.) are fully operational.
- As of size X..220 and for X2F..180 to 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.
- If an oil level glass is used for checking the oil level, ensure that it is protected against damage.
- If the gear unit is equipped with a fan on the input shaft, check for free air intake within the specified angle.
- Make sure that the external coolant supply is guaranteed for gear units with circulation cooling, water cooling cover and water cooling cartridge.
- Gear units with pressure lubrication may only be taken into operation when the pressure switch is connected.
- It is essential that there is no open fire or risk of sparks when working on the gear unit.
- Make sure that the gear unit is grounded. Electrical mount-on components, such as motors, frequency inverters, etc., must be grounded separately.
- Protect the gear unit from falling objects.
- When ambient temperatures are low, adhere to the limit temperature for gear unit startup. Allow for sufficient warm-up time.
- Remove any available transport protection prior to startup.
- Adhere to the safety notes in the individual chapters.

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6.1.1 Permitted external loads

During project planning, the drives are dimensioned according to the radial and axial loads described in the order confirmation.

INFORMATION

If the configured loads are exceeded during operation, the drive may be damaged and impermissibly high temperatures may occur.

The warranty will become void without prior consultation with SEW-EURODRIVE.

6.2 Startup of gear units with long-term protection

Adhere to the following points for gear units with long-term protection:

6.2.1 Anti-corrosion agent

Clean the output shafts and flange surfaces thoroughly to ensure they are free of anti-corrosion agents, contamination or similar. Use a standard solvent.

NOTICE

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

Possible damage to property.

- Do not let the solvent come into contact with the sealing lips.

6.2.2 Breather

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

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6.3 Shaft end pump /SEP

NOTICE

Improper startup of gear units with pressure lubrication can damage the gear unit.

Possible damage to property.

- 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 pump does not build up pressure within 20 seconds after the gear unit has been started up.
- A minimum speed of ≥ 400 rpm is required for proper operation of the shaft end pump. It is therefore important that you contact SEW-EURODRIVE if you use variable input speeds (e.g. inverter-controlled drives) or if you intend to change the input speed of an already delivered gear unit with shaft end pump.
- An oil heater is mandatory when operating gear units with shaft end pump at low ambient temperatures. For more information, refer to chapter "Permitted lubricants" (→ 🗎 300).
- Observe the information in chapter "Gear units with shaft end pump / SEP" (→ 🗎 120).

6.4 Motor pump /ONP

INFORMATION

Before startup, first read the addendum to the operating instructions "Motor Pump / ONP".

6.5 Motor pump ONP1/ONP1L

INFORMATION

Before startup, first read the operating instructions "Motor Pump ONP1/ONP1L", which includes the manufacturer's documentation.

6.6 Desiccant breather filter /DC

6.6.1 Usage

Before startup

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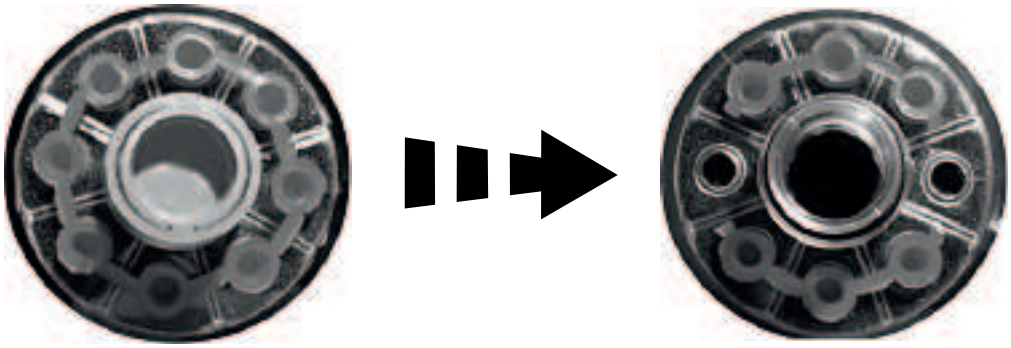
Open only 2 of the air openings (180° opposite) at the bottom of the breather filter. Remove the blue cap that protects the rising pipe. If required install a suitable adapter to the filter before installing the filter at the gear unit.



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6.7 Water cooling cover /CCV

NOTICE

Risk of damage to the system due to performance loss.

Possible damage to property.

- A loss of performance may result from the formation of scale on the inside of the pipe. Refer to chapter "Inspection/Maintenance".

NOTICE

Risk of damage to components caused by aggressive cooling media, such as sea water or brackish water.

Possible damage to property.

- Sea water or brackish water and other caustic fluids must not be used as cooling media for the standard models. Special materials are necessary when using these aggressive cooling media.

After having installed the water cooling cover in the system, it can be taken into operation and operated without taking further preparatory measures. After startup, check the water cooling cover for proper function.

Make the following checks:

- Check the connection points for tightness.
- If necessary, check the valves, fittings, and filters for unrestricted flow and proper functioning.
- Check for proper function of the water cooling cover.

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6.8 Water cooling cartridge /CCT

NOTICE

Risk of damage to the system due to performance loss.

Possible damage to property.

- A loss of performance may result from the formation of scale on the inside of the pipe. Refer to chapter "Inspection/Maintenance".

NOTICE

Risk of damage to components caused by aggressive cooling media, such as sea water or brackish water.

Possible damage to property.

- Sea water or brackish water and other caustic fluids must not be used as cooling media for the standard models. Special materials are necessary when using these aggressive cooling media.

After having installed the water cooling cartridge in the system, it can be taken into operation and operated without taking further preparatory measures. After startup, check the water cooling cartridge for proper function.

Make the following checks:

- Check the connection points for tightness.
- If necessary, check the valves, fittings, and filters for unrestricted flow and proper functioning.
- Check for proper function of the water cooling cartridge.

6.9 Oil-water cooler for splash lubrication /OWC

INFORMATION

Before startup, first read the addendum to the operating instructions "Oil-Water Cooler for Splash or Bath Lubrication /OWC".

6.10 Oil-air cooler for splash lubrication /OAC

INFORMATION

Before startup, first read the addendum to the operating instructions "Oil-Air Cooler for Splash Lubricaton /OAC".

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6.11 Oil-air cooler for splash lubrication /OAC1

INFORMATION

Before startup, first read the operating instructions "Oil-Air Cooler for Splash Lubrication /OAC1".

6.12 Oil-water cooler for pressure lubrication /OWP

INFORMATION

Before startup, first read the addendum to the operating instructions "Oil-Water Cooler for Pressure Lubrication /OWP".

6.13 Oil-water cooler for pressure lubrication /OWP1

INFORMATION

Before startup, first read the operating instructions "Oil-Water Cooler for Pressure Lubrication /OWP1".

6.14 Oil-air cooler for pressure lubrication /OAP

INFORMATION

Before startup, first read the addendum to the operating instructions "Oil-Air Cooler for Pressure Lubrication /OAP".

6.15 Oil-air cooler for pressure lubrication /OAP1

INFORMATION

Before startup, first read the operating instructions "Oil-Air Cooler for Pressure Lubrication /OAP1".

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6.16 Oil heater /OH

NOTICE

Malfunctioning oil heater when changing the mounting position

Possible damage to property.

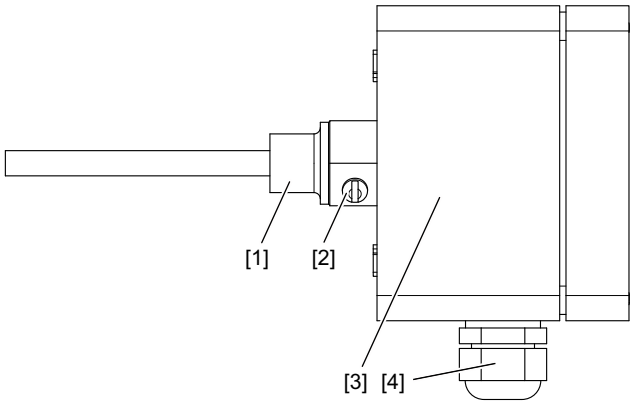
- Do not change the mounting position without prior consultation with SEW-EURODRIVE, otherwise proper functioning is no longer ensured.

6.16.1 Positioning the thermostat

The required position of the thermostat may vary depending on the installation space.

Proceed as follows to position the thermostat:

1. Open the clamping screws [2].
2. **NOTICE!** Observe the position of the cable gland during assembly. 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].



2338432139

[1] Threaded jacket
[2] Clamping screw
[3] Thermostat
[4] Cable gland

A protective sleeve prevents oil from leaking. The sensor of the thermostat is inserted in the sleeve and attached via the 2 clamping screws.

INFORMATION

- Observe the manufacturer's documentation.

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6.17 Backstop /BS

NOTICE

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

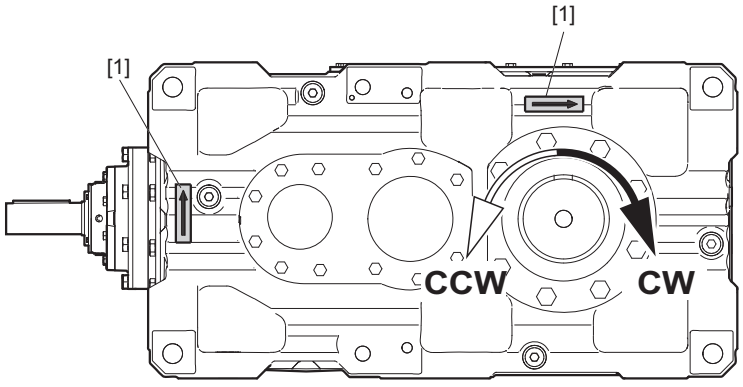
Possible damage to property

- Do not start up the motor in the blocking direction. Ensure a correct current supply to the motor, so that it rotates in the required direction. Operating the motor in the blocking direction could destroy the backstop.
- Observe the addendum to the operating instructions when you change the blocking direction.

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

- CW rotation
- CCW rotation

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



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6.18 Starting up the gear unit at low ambient temperatures

NOTICE

Starting up the gear unit below the permitted minimum oil temperature for gear unit startup may damage the unit.

Possible damage to property.

- Before starting up the gear unit, make sure that the oil heater heats up the oil to the temperature specified for "without heater" (→ 🗎 300).

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6.19 Gear unit shutdown / gear unit conservation

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Work on the gear unit only when the machine is not in use. Secure the drive unit against unintentional power-up. Attach an information sign near the ON switch to warn that the gear unit is being worked on.

INFORMATION

Gear units with water cooling system: disrupt the cooling water supply and drain the water from the cooling circuit. Gear units with oil supply system: Please contact SEW-EURODRIVE.

Additional conservation measures are required if the gear unit is to be shut down for a longer period. Depending on the location, the ambient conditions, and the lubrication state, even a few weeks of downtime might require conservation measures.

6.19.1 Internal conservation

- **New or hardly used gear units:**
  - For internal conservation, SEW-EURODRIVE recommends the VCI conservation method.
  - Apply the required amount of VCI anti-corrosion agent to the inside of the gear unit (e.g. FUCHS LUBRITECH Anticorit VCI UNI IP-40, www.fuchs-lubritech.com). The amount depends on the free space inside the gear unit. Any existing oil may usually remain in the drive.
  - Replace the breather with a screw plug and close the gear unit so that it is air tight. Prior to startup, re-install the breather.
- **After longer gear unit operation:**
  - The oil might be contaminated (oil sludge, water, etc.) after long periods of operation. Therefore, drain the oil and thoroughly rinse the inside of the gear unit with new oil prior to conservation. Observe the information in the chapter "Changing the oil" (→ 🗎 272) in the corresponding operating instructions. The inside of the gear unit can then be conserved as described above.

INFORMATION

For gear units with contactless sealing systems, contact SEW-EURODRIVE.

For gear units without contactless sealing systems, you may also use the oil type indicated on the nameplate to perform the conservation. 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. In order to provide for sufficient conservation, all the gearing components and bearing points must be completely covered in oil.

Prior to startup, re-install the breather. Observe the information on the nameplate regarding the oil grade and oil quantity.

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6.19.2 External corrosion protection

- Clean the respective surfaces.
- Grease the shaft near the sealing lip to separate the sealing lip of the oil seal and the anti-corrosion agent.
- Apply a wax-based protective coating to shaft ends and unpainted surfaces as external corrosion protection (e.g. Herm. Hölterhoff Hölterol MF 1424, 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 the chapter "Storage and transport conditions" (→ 🗎 30) in the corresponding operating instructions. This chapter provides information on the possible storage periods in conjunction with adequate packaging – depending on the storage location.

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7 Inspection/maintenance

7.1 Preliminary work regarding inspection and maintenance

Observe the following notes before you start with inspection/maintenance work.

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Work on the gear unit only when the machine is not in use. Secure the drive unit against unintentional power-up. Attach an information sign near the ON switch to warn that the gear unit is being worked on.

⚠ 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 releasing shaft connections, make sure that there are no active torsional moments present (tensions within the system).

⚠ WARNING

Danger due to using impermissible gear unit oil.

Severe or fatal injuries.

- Only use food-grade oils when the gear unit is used in the food industry.

⚠ WARNING

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

Serious injury.

- Let the gear unit cool down before you start working on it.
- Remove the oil drain plug very carefully.

⚠ CAUTION

Danger due to lubricant leaking from damaged seals and the breather.

Minor injuries.

- Check the gear unit and mount-on components for leaking lubricant.
- The seals must not come in contact with cleaning agent as this may damage the seals.
- Protect the breather against damage.
- 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.

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⚠ CAUTION

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.

NOTICE

Filling in the wrong oil may result in significantly different lubricant characteristics.

Possible damage to property.

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

NOTICE

Improper maintenance may result in damage to the gear unit.

Possible damage to property.

- Observe the following notes.

- Strict adherence to the inspection and maintenance intervals is absolutely necessary to ensure safe working conditions.
- When using primary gearmotors, also observe the maintenance notes for motors and primary gear units in the accompanying operating instructions.
- Use only original spare parts according to the delivered spare and wearing parts list.
- If you remove the gear unit cover, you must apply new sealing compound to the sealing surface. Else, the sealing properties of the gear unit might be impaired. Contact SEW-EURODRIVE in this case.
- Prevent foreign particles from entering into the gear unit during maintenance and inspection work.
- Never clean the gear unit with a high-pressure cleaning device. If one is used, water may enter into the gear unit and the seals may be damaged.
- Replace any damaged seals.
- The gear unit must be cleaned in such a way that liquids cannot enter the motor adapter (HSS end) or the mounting flange (LSS end) and accumulate there.
- Perform a safety and functional check following all maintenance and repair work.
- For third-party parts, such as cooling systems, observe the separate inspection and maintenance intervals of the manufacturer's documentation.
- Observe the safety notes in the individual chapters.

7.2 Inspection and maintenance intervals

Adhere to the following inspection and maintenance intervals:

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Time interval	What to do?
Daily	• Check the housing temperature: – Mineral oil: max. 90 °C – Synthetic oil: max. 100 °C • Check 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. • Refill sealing grease of the lower bearing on the output shaft with drywell sealing systems. • For V-belt drives: Check the belt tension and condition of the V-belt pulleys and belts.

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Time interval	What to do?
Depending on the operating conditions, at the latest every 12 months	• Check whether the retaining screws are tightly secured. • Check whether the gear unit surface is free of dust and dirt, so that the gear unit can be optimally cooled. • Check the breather. If required, replace it. • Check the alignment of the input and output shaft. • Check the condition and tightness of all the rubber tubes (aging effects). • Clean the oil filter. If required, replace the filter element. • Check the condition of the motor pump /ONP. If required, replace the filter element (see operating instructions of the motor pump). • Check the condition of the motor pump ONP1/ONP1L. If required, replace the filter element (see operating instructions of the motor pump). • Check the condition of the oil-air cooler /OAC (see operating instructions of the oil-air cooler). • Check the condition of the oil-air cooler /OAC1 (see operating instructions of the oil-air cooler). • Check the condition of the oil-air cooler /OAP. If required, replace the filter element (see operating instructions of the oil-air cooler). • Check the condition of the oil-air cooler /OAP1. If required, replace the filter element (see operating instructions of the oil-air cooler). • Check the condition of the oil-water cooler /OWC (see operating instructions of the oil-water cooler). • Check the condition of the oil-water cooler /OWP; replace the filter element if necessary (see operating instructions of the oil-water cooler). • Check the condition of the oil-water cooler / OWP1; replace the filter element if necessary (see operating instructions). • Check the condition of the water cooling cartridge /CCT. • Check the condition of the water cooling cover /CCV.
At least every 3 years, depending on the operating conditions (see figure on next page)	• Change the mineral oil.
At least every 5 years, depending on the operating conditions (see figure on next page)	• Change the synthetic oil.

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Time interval	What to do?
Varying (depending on external factors)	• Check the installed hose pipes. • Clean the gear unit housing surface and the fan. • Touch up or renew the surface/anti-corrosion coating. • Replace the backstop. The backstop might wear off when operated below lift-off speed. This is why you should consult SEW-EURODRIVE for defining the maintenance intervals for: – Speed on input shaft < 950 1/min – Or for specific gear unit designs, see chapter "Backstop" (→ 🗎 85). • Check the built-in cooler (such as water cooling cover / CCT and water cooling cartridge /CCV) for deposits. • Check the oil heater (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 the first oil change after 500 operating hours may not be necessary under certain circumstances. For detailed information, refer to the order documents. If you have any questions, contact SEW-EURODRIVE.

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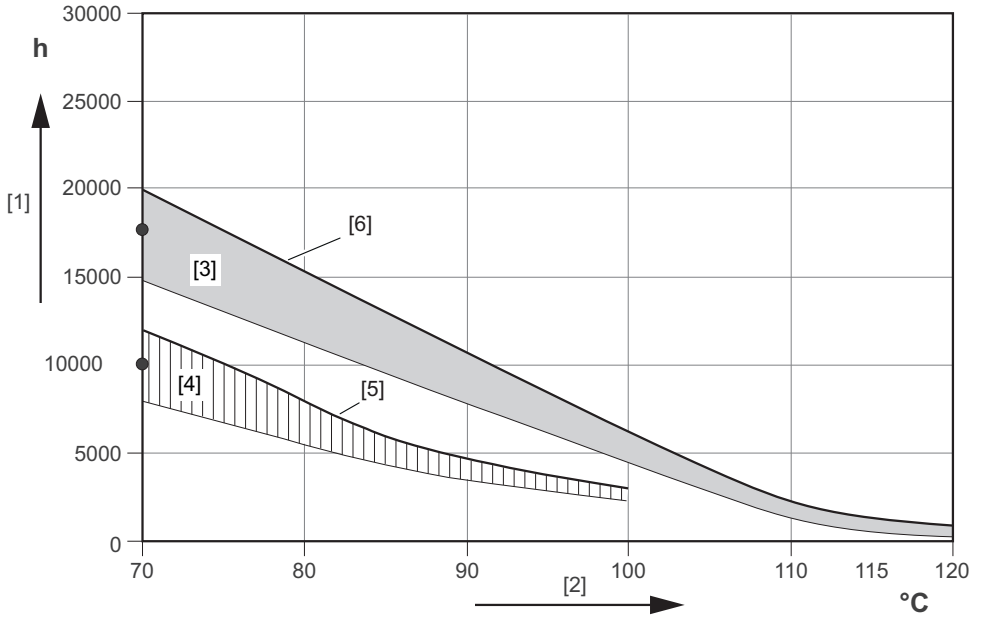
7.3 Lubricant change intervals

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" (→ 🗎 271)) to optimize the lubricant change intervals.

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7.4 Checking the oil level

7.4.1 General information

Note the following when checking the oil level.

NOTICE

Improper checking of the oil level may result in damage to the gear unit.

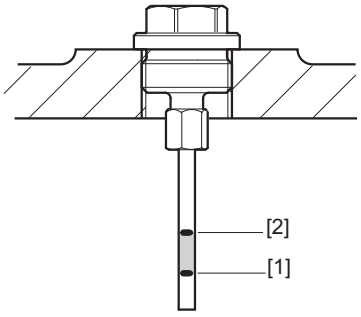
Possible damage to property.

- Check the oil level only when the gear unit is cool and in idle state. SEW-EURODRIVE recommends to check the oil level at an oil temperature of 20 °C to 40 °C. The oil level must be between the markings [1] and [2] at the oil dipstick or oil level glass and should ideally be in the middle.
- 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, refer to the oil dipstick to check the oil level. The oil level of the oil sight glass is only a guide value.
- Elements for checking the oil level and the oil drain and oil fill openings are indicated on the gear unit by safety symbols.
- Check the oil level again after the first few operating hours.

7.4.2 Standard procedure

Oil dipstick

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).



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1. Unscrew the oil dipstick and remove it.
2. Clean the oil dipstick and re-insert it by turning it hand-tight into the gear unit up 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. Proceed as follows if the oil level is too low:

- Open the oil fill plug.
- Fill in oil of the same oil grade until the oil level is centrally between the markings [1] and [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].

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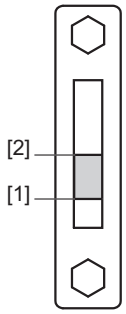
6. Screw in the oil fill plug.
7. Screw in the oil dipstick.

Oil level glass

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).



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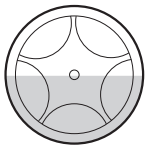
1. The oil level must be in the middle between marking [1] and marking [2].
2. Proceed as follows if the oil level is too low:
   - Open the oil fill plug.
   - Fill in oil of the same oil grade until the oil level is in the middle between marking [1] and marking [2].
3. If you filled in too much oil, 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

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

The oil sight glass only shows the oil level. The oil level is determined using the **oil dipstick**.



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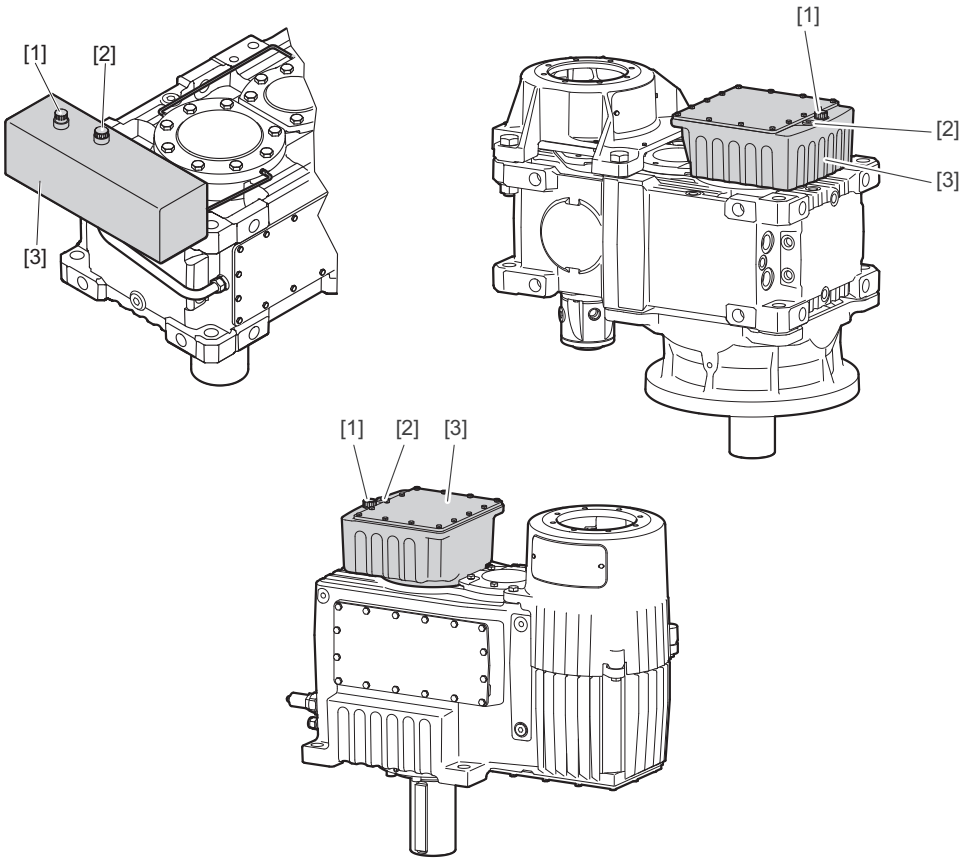
7.4.3 Procedure for gear units with oil expansion tank /ET

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 carried out properly within a certain temperature range.



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

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

1. Switch off the gear unit and allow it to cool down until the temperature is between 10 °C and 40 °C.
2. Check the oil level at the oil dipstick or the oil level glass. Observe chapter "Standard procedure" (→ 🗎 264).

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7.4.4 Notes on the procedure for fixed and variabel pivoted mounting positions

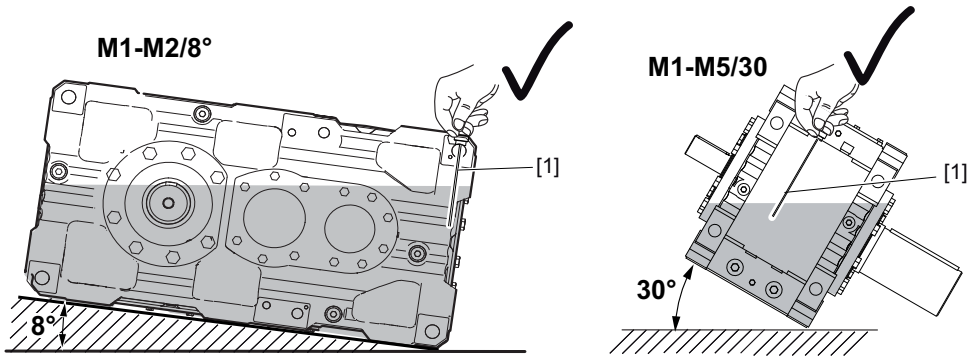
Observe the information on the nameplate and in the order documents.

Fixed pivoted mounting positions

Procedure

Check the oil level in the fixed, intended position. Observe the notes in chapter "Standard procedure" (→ 🗎 264).

The following figure shows an example of how to check the oil level.



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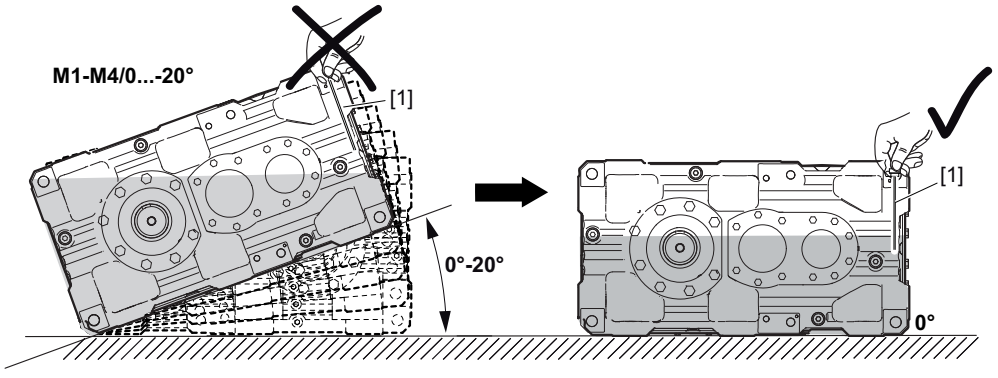
[1] Oil dipstick
▯ Oil

Variable pivoted mounting positions

Procedure

Before checking the oil level of gear units with variable pivoted mounting position, position the gear unit in the mounting position defined in the order documents. Observe the notes in chapter "Standard procedure" (→ 🗎 264).

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.

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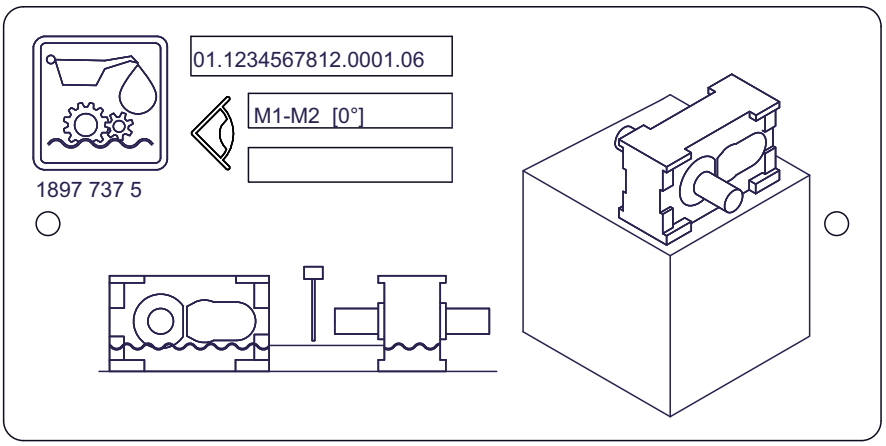
The following figure shows an example of the information sign for check mounting position 0°.



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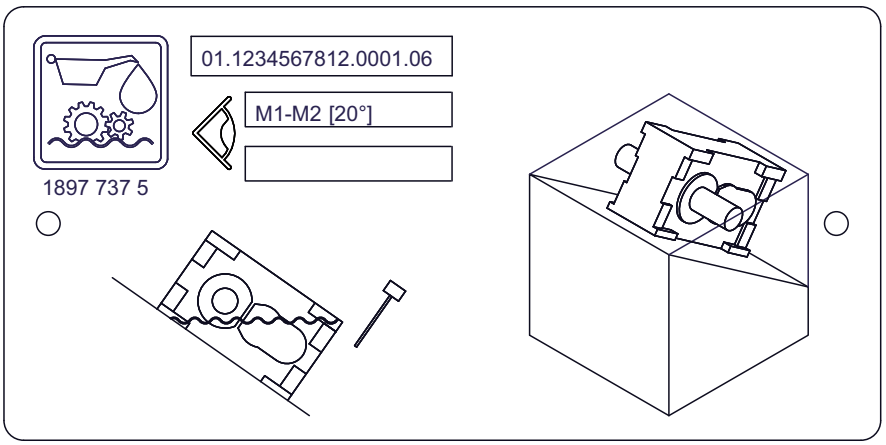
The following figure shows an example of the information sign for check mounting position 20°.



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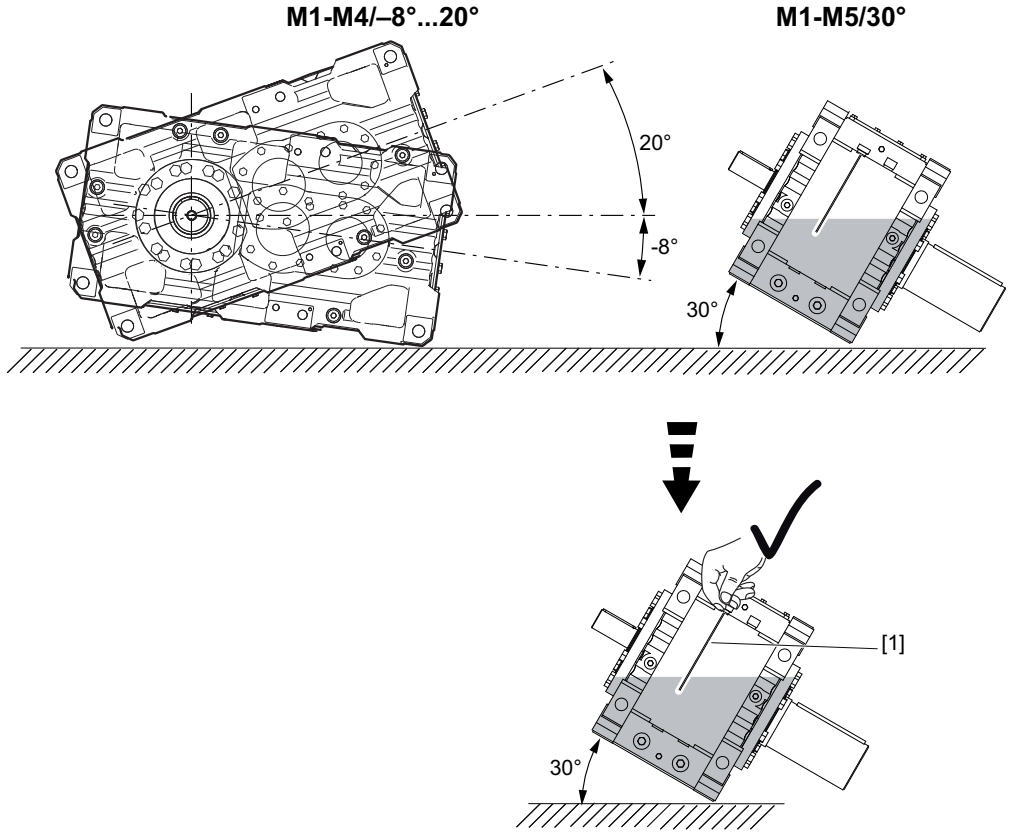
Combination of fixed and variable pivoted mounting positions

Procedure

Observe the following procedure when combining **fixed and variable pivoted mounting positions**.

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" (→ 🗎 264).

The following figure shows an example of how to check the oil level.

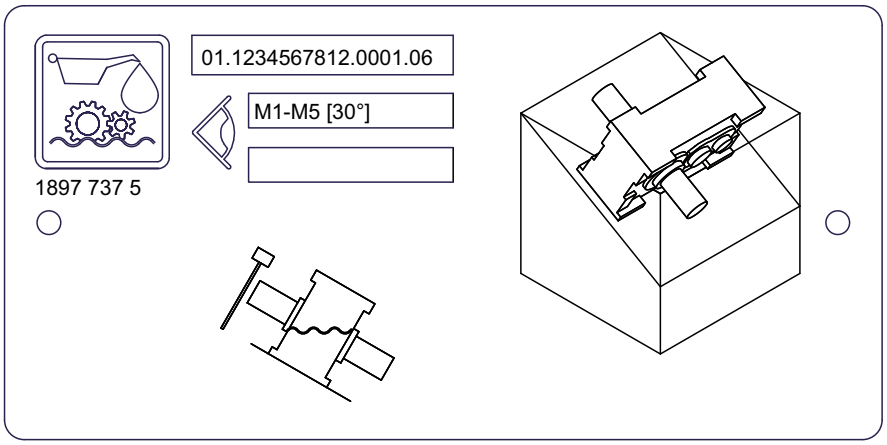


[1] Oil dipstick
Oil

Information sign

Observe the additional information sign on the gear unit. Check the oil level in the test mounting position specified on the nameplate.

Following an example of the information sign for checking the mounting position at 30°.



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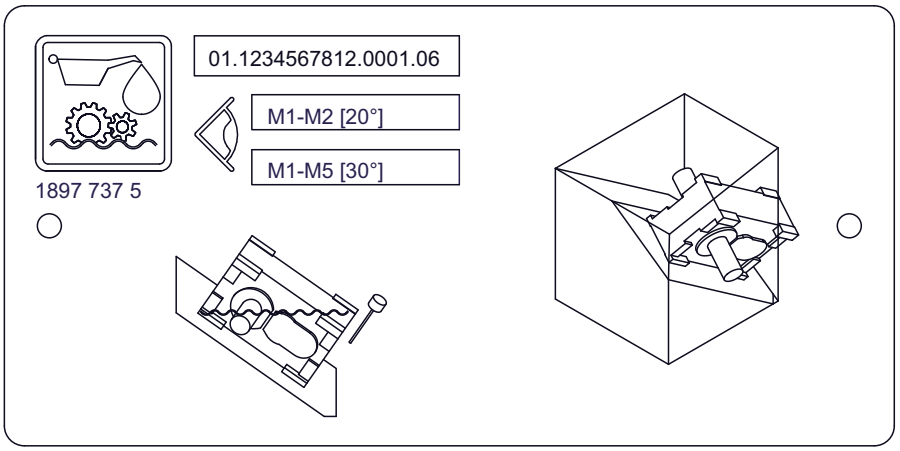
Following an example of the information sign for checking the mounting position at 30°.



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7.5 Checking the oil consistency

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

Proceed as follows to check the oil consistency:

1. Start the gear unit for a short time for the oil to mix with suspended particles.
2. Determine the oil drain position and place a container underneath.
3. ⚠ **WARNING!** Risk of burns due to hot gear unit and hot gear unit oil. Serious injury. Let the gear unit cool down before you start working on it. Remove the oil level plug and oil drain plug carefully.
   Open the oil drain carefully and drain some oil.
4. Close the oil drain valve.
5. Check the oil consistency:

- Check the drained oil for appearance, color, and contamination.
- If the oil sample is severely contaminated (e.g. water, color, dirt), consult a specialist to find out the cause.
- For more detailed information on checking the oil for water content and viscosity, contact your lubricant manufacturer.

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7.6 Changing the oil

7.6.1 Notes

Observe the following when changing the oil.

⚠ WARNING

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

Serious injury.

- Let the gear unit cool down before you start working on it.
- Remove the oil drain plug very carefully.

NOTICE

Improper oil change may result in damage to the gear unit.

Possible damage to property.

- Observe the following information.

- Perform the oil change quickly after you have switched off the gear unit to prevent solids from settling. You should drain the oil while it is still warm. Avoid oil temperatures well above 50 °C.
- Always fill the gear unit with the same oil grade as before. Mixing oils of different grades and/or manufacturers is not permitted. Synthetic oils in particular must not be mixed with mineral oils or other synthetic oils. When switching from mineral oil and/or when switching from synthetic oil of one basis to synthetic oil of another basis, thoroughly flush the gear unit with the new oil grade.

  Refer to the lubricant table for information on the permitted oil of the various lubricant manufacturers.
- The oil grade and oil viscosity are listed on the nameplate of the gear unit. The oil quantity specified on the nameplate is an approximate quantity. The mark on the oil dipstick or oil level glass is the decisive indicator of the correct oil quantity to be filled in.

  The required oil fill quantity is higher when additional attachments are mounted to the gear unit, such as an oil supply system. Observe the operating instructions of the oil supply system.
- When changing the oil, flush the gear unit interior thoroughly with oil to remove oil sludge, oil residue, and abrasion. Use the same oil grade as for operating the gear unit. Fill in fresh oil only after all residues have been removed.
- For the position of the oil level plug, the oil drain plug, and the breather, refer to the order documents.
- 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.
- If required, empty accessories e.g. filters and pipes.
- Replace any damaged seals on the oil drain plug.
- If present, clean the magnetic oil drain plug and the oil dipstick with magnet tip.
- Empty the oil-bearing system of gear units with circulation lubrication and oil supply systems according to the manufacturer's maintenance instructions.

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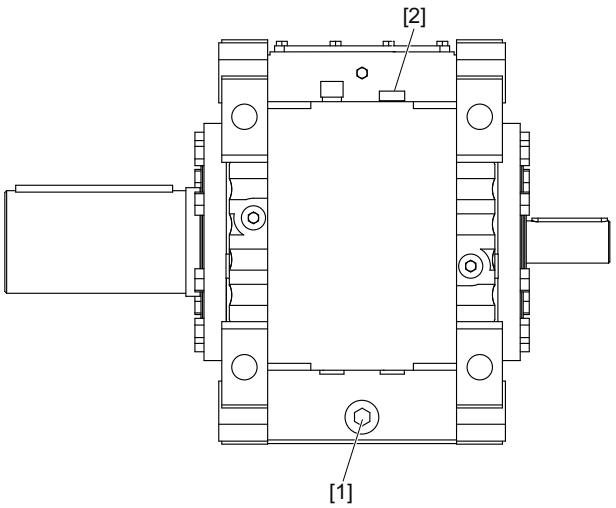
- Elements for controlling the oil level, oil drain, and oil fill openings are indicated by safety symbols on the gear unit.
- Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).
- Remove any dripping oil immediately with oil binding agent. Dispose of the used oil in accordance with the applicable regulations.

7.6.2 Basic gear unit



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Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

1. Place a suitably large container under the oil drain [1].
2. Remove the oil fill plug(s)/breather [2].
3. Open the oil drain valve [1] and drain all the oil into the container.
4. Close the oil drain valve [1].
5. Fill in new oil of the same grade through the oil fill opening [2].

- Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).
- The oil quantity specified on the nameplate is an approximate quantity. The mark on the oil dipstick or oil level glass is the decisive indicator of the correct oil quantity, see chapter "Checking the oil level" (→ 🗎 264).

6. If present, screw the oil fill plug(s)/breather [2] and the oil dipstick back into place.

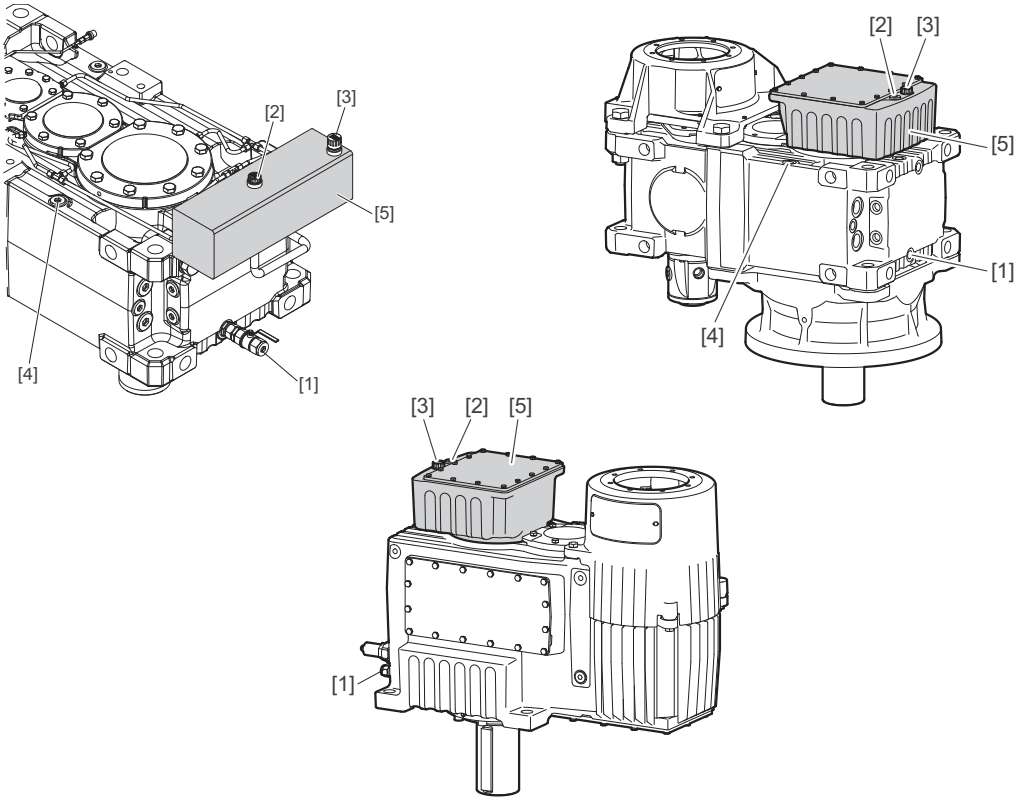
⚠ CAUTION

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.

7.6.3 Gear units with oil expansion tank /ET



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Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

1. Remove the oil drain plug(s). Open the oil drain [1].

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.

2. Place a suitable container underneath the oil drain plug(s) or the oil drain valve [1].
3. Drain all the oil into the container.
4. Close the oil drain plug(s) or oil drain valve [1].
5. Open the oil fill plugs. Observe the mounting position and the following notes:

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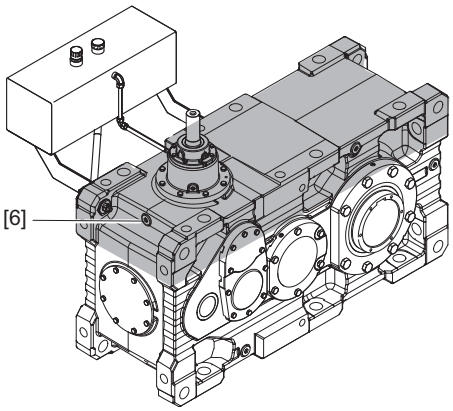
Mounting positions M1 and M3:



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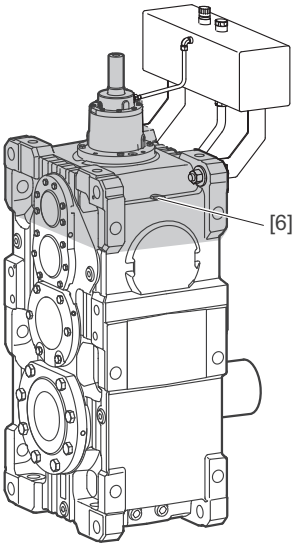
6. Open at least one of the screw plugs [6] located on the side in the upper fifth (marked gray) of the gear unit housing.

Mounting positions M2 and M4:



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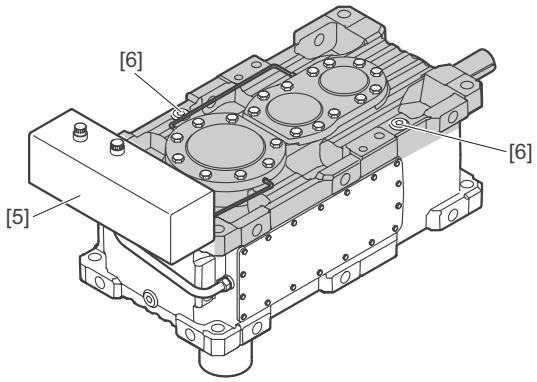
7. Open at least one of the screw plugs [6] on the top or at least one of the screw plugs [6] located on the side in the upper fifth (marked gray) of the gear unit housing.

Mounting position M5 and M6:



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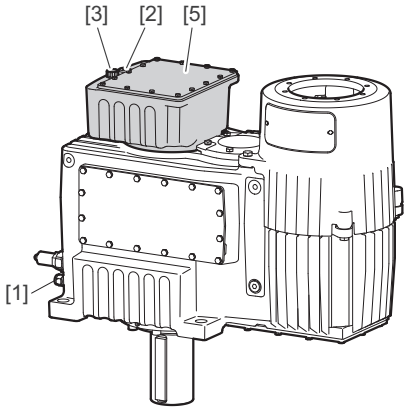
8. Open all accessible screw plugs [6] on the top of the gear unit housing and all accessible screw plugs located on the side in the upper fifth (marked gray) of the gear unit housing.

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].

9. 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

Preheat the oil to max. 40 °C to accelerate the filling process.

You may as well use a pump to fill the gear unit.

During the filling process, the oil level in the oil expansion tank [5] must never increase to a point that oil leaks from the expansion tank [5] into the breather pipes.

10. Check the breather [3] for proper functioning before you install it.
11. Screw in the oil dipstick [2].
12. Start up the gear unit.

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13. Check the oil level every 30 minutes until the operating temperature is reached. Fill in more oil if required.
14. Allow the gear unit to cool down to a temperature between 10 °C and 40 °C and check the oil level again. Fill in more oil if required.

INFORMATION

Usually, trapped air escapes from the gear unit during the initial hours of operation so that you have to fill in more oil.

⚠ CAUTION

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.

7.6.4 Gear units with shaft end pump /SEP

INFORMATION

- Read the manufacturer's documentation first before beginning inspection/maintenance work.
- 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" (→ 🗎 120).
- Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

7.7 Breather /BPG

7.7.1 Checking and cleaning the breather

NOTICE

Improper cleaning of the breather may damage the gear unit.

Possible damage to property.

- Prevent foreign particles from entering into the gear unit when performing the following work.

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

1. Remove any deposits near the breather.
2. If the breather is clogged, replace it.

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7.7.2 Desiccant breather filter /DC

Proper operation:

If possible, use desiccant breather filters only for gear units filled with new oil that do not contain water. Only then can the maximum service life of the filter be ensured.

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.

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.

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7.8 Refilling sealing greases (except for drywell)

Standard procedure, not valid for gear units with drywell design.

⚠ WARNING

Risk of crushing due to rotating parts.

Severe or fatal injuries.

- Make sure to provide for sufficient safety measures for relubrication.

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

Regreasable sealing systems may be filled with "lithium soap grease" (→ 🗎 334). Use moderate pressure to force about 30 g of grease into each lubrication point until new grease leaks out of the sealing gap.

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

INFORMATION

Immediately remove the old grease that leaked out.

7.9 Relubricating the bearing for Drywell sealing systems

⚠ WARNING

Risk of crushing due to rotating parts.

Severe or fatal injuries.

- Make sure to provide for sufficient safety measures during relubrication.

NOTICE

High pressure forces the grease out between the sealing lip and the shaft. The sealing lip might be damaged or slip, grease might seep into the workflow.

Possible damage to property.

- Fill the grease while the gear unit is running by carefully pressing in the required quantity.

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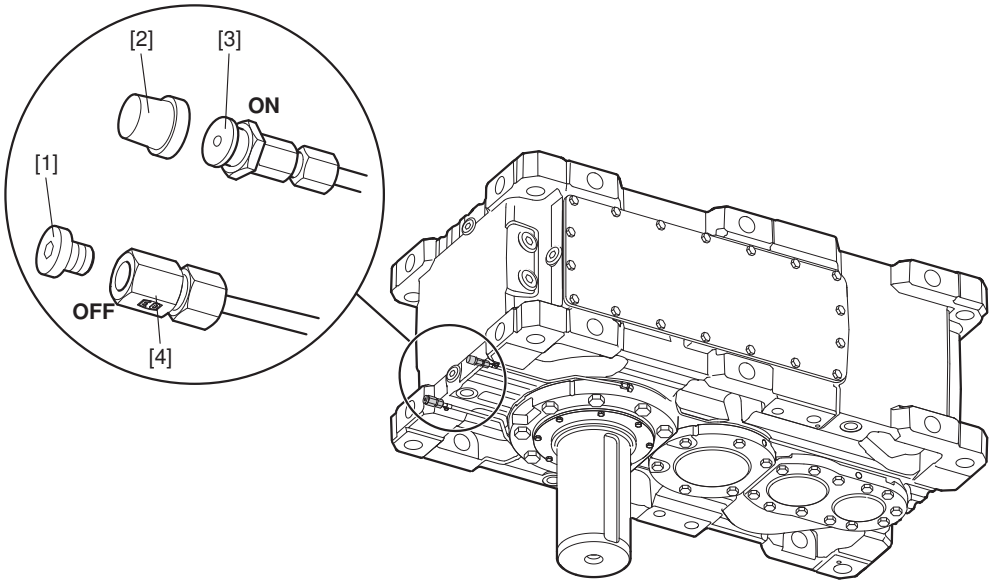
7.9.1 Universal housing HU



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Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

1. Remove the screw plug [1] at the grease drain pipe [4]. The old excess grease can escape.
2. Remove the protection cap [2]. Fill in the grease via the flat grease nipple (DIN 3404 A G1/8) [3]. Amount of lubricant according to the following table. For lubricants you can use, refer to chapter "Sealing greases" (→ 🗎 334).

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].

INFORMATION

Immediately remove the old grease that leaked out.

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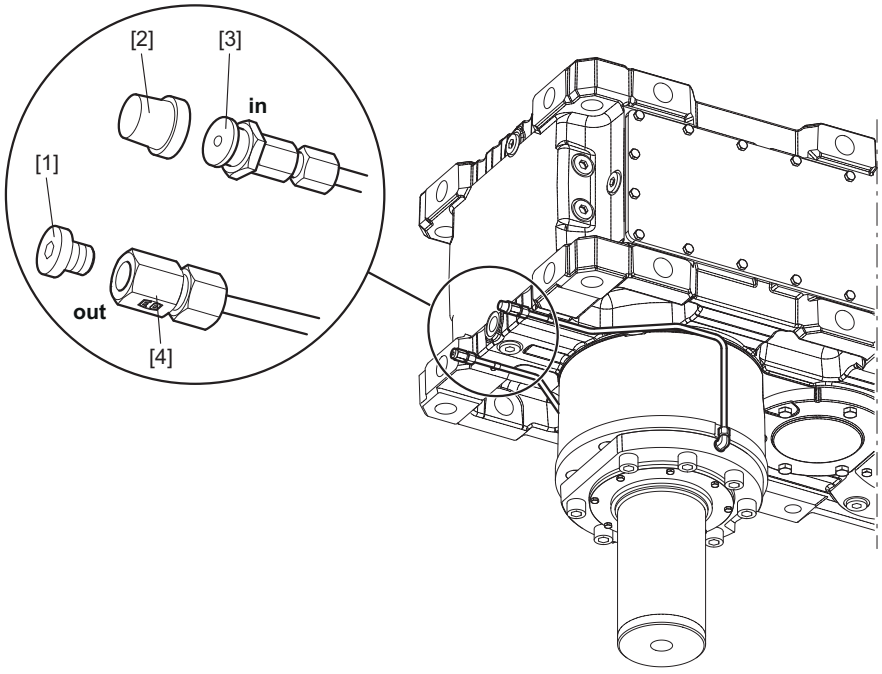
7.9.2 HU universal housing with EBD



18485252107

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

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 in the grease via the flat grease nipple (DIN 3404 A G1/8) [3]. Amount of lubricant according to the following table. For lubricants you can use, refer to chapter "Sealing greases" (→ 🗎 334).

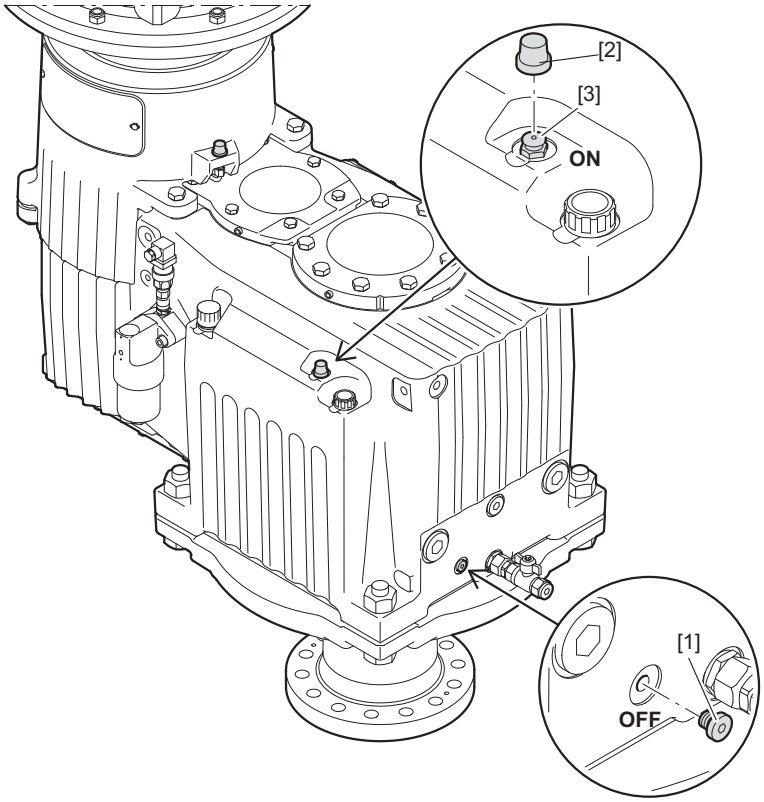
Size	Amount of grease in g
X140	120
X150	140
X160	180
X170	180
X180	220
X190	220
X200	400
X210	400

3. Place the protection cap [2] on the flat grease nipple [3].
4. Screw the screw plug [1] onto the grease drain pipe [4].

INFORMATION

Immediately remove the old grease that leaked out.

7.9.3 Agitator housing HA



15934764427

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

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]. Amount of lubricant according to the following table. For the lubricants to be used, refer to the chapter "Sealing greases" (→ 🗎 334).

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].

INFORMATION

Immediately remove the old grease that leaked out.

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7.10 Motor pump /ONP

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

INFORMATION

Before inspection/maintenance, first read the addendum to the operating instructions "Motor Pump For Pressure Lubrication /ONP".

7.11 Motor pump ONP1/ONP1L

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

INFORMATION

Before inspection/maintenance, first read the operating instructions "Motor Pump ONP1/ONP1L", which includes the manufacturer's documentation.

7.12 Shaft end pump /SEP

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

INFORMATION

- Observe the procedure described in chapter "Gear units with shaft end pump / SEP" (→ 🗎 120).
- Observe the manufacturer's documentation.

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7.13 Fan /FAN

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

1. Remove the fan guard.
2. Remove any dirt from the fan wheel, fan guard and protective grid using a hard brush, for example.
3. Before starting the fan again, make sure the fan guard is mounted properly. The fan must not touch the fan guard.

7.14 Axial 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 re-assembly of the protection cover may only be performed with original parts from SEW. The specified distance to the fan must be observed. If the distance is not observed, the axial fan may touch the protection cover. Do not disconnect the axial fan from the fan hub. This may only be performed by qualified personnel.

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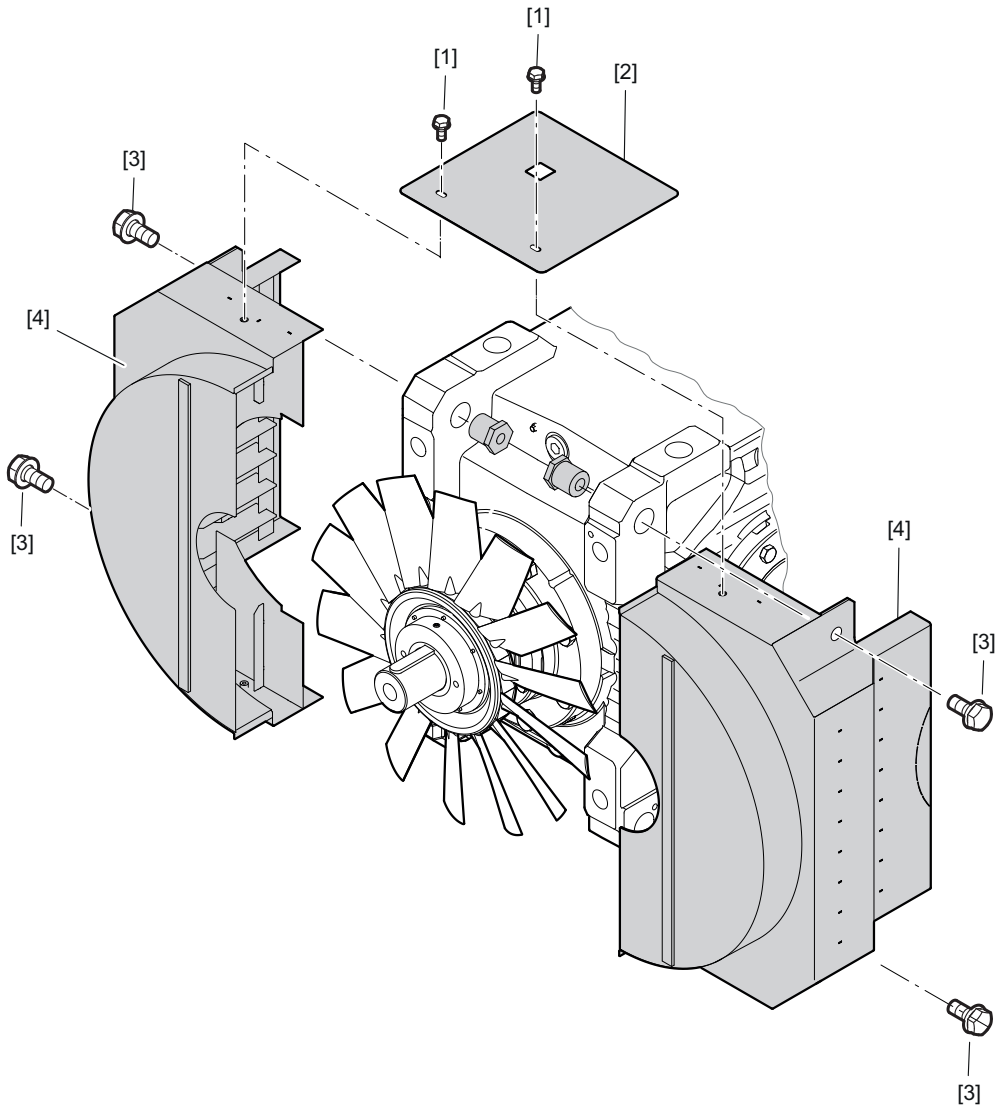
7.14.1 Universal and horizontal housing /HU,HH

Size X100 – 250



28163661451

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

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 again, make sure the fan guard is mounted properly. For mounting the protection cover, proceed in the reverse order.

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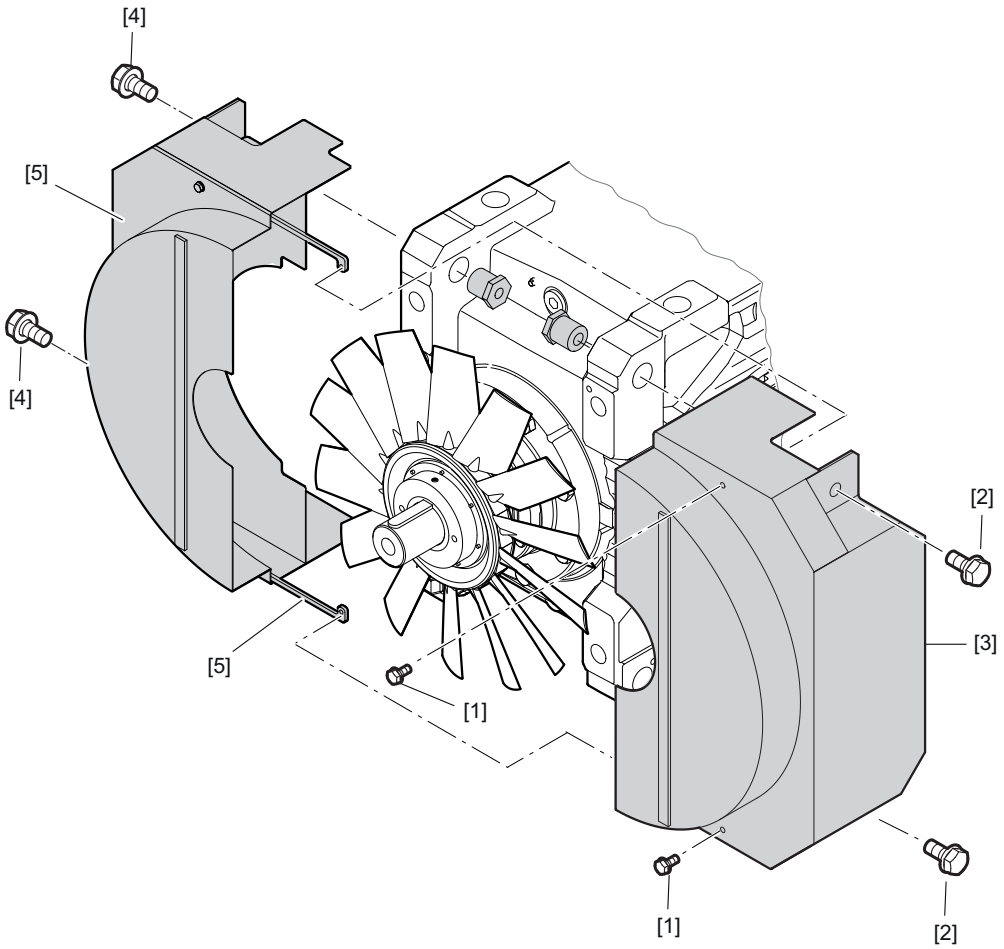
Size X260 – 320



28235995275

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

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. For mounting the protection cover, proceed in the reverse order.

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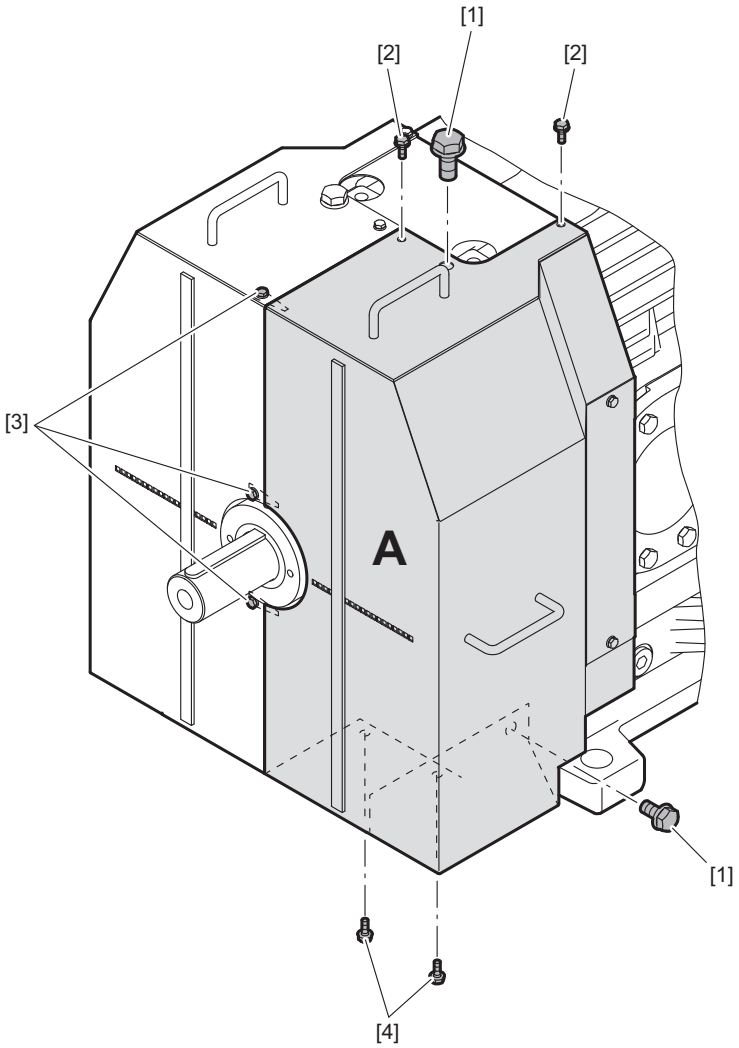
7.14.2 Thermal housing /HT

Removing the fan guards

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

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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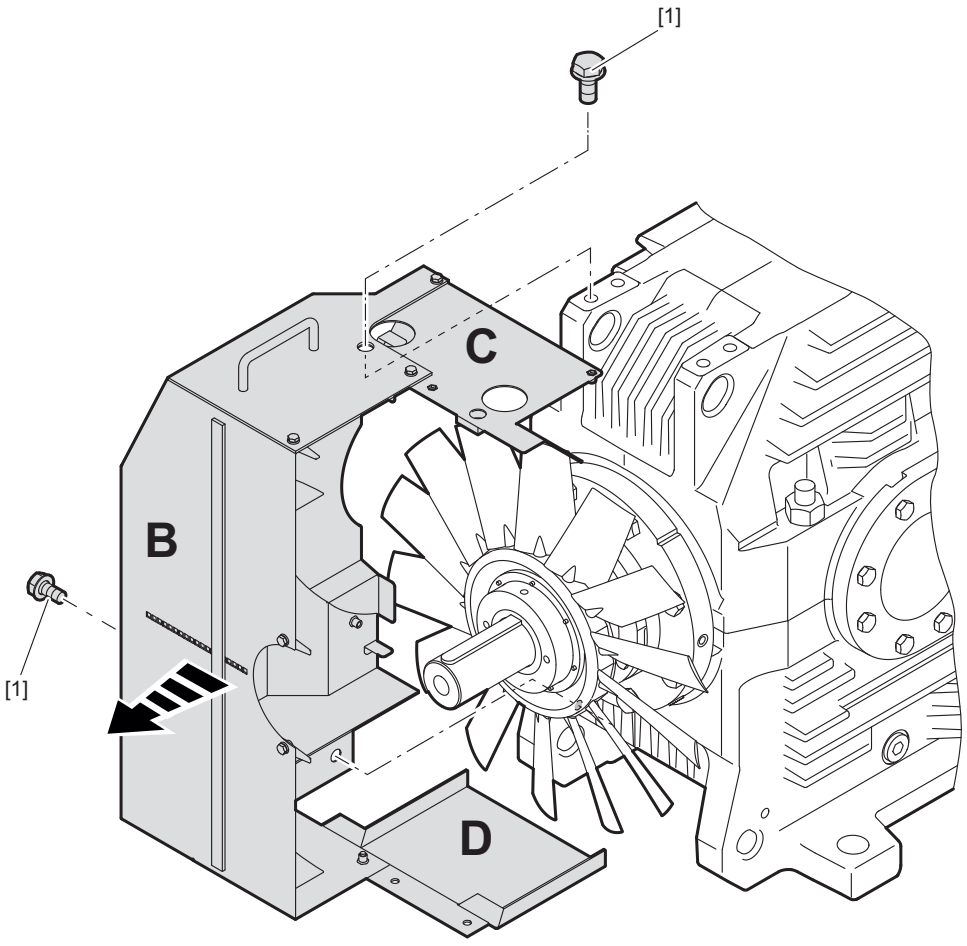
2. Fan guards B, C, D



13272061707

1. Loosen the 2 screws [1].
2. Remove the fan guards **B, C, D**.
3. Remove any dirt from the fan wheel, fan guard and protective grid using a hard brush, for example

Mounting the fan guards

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

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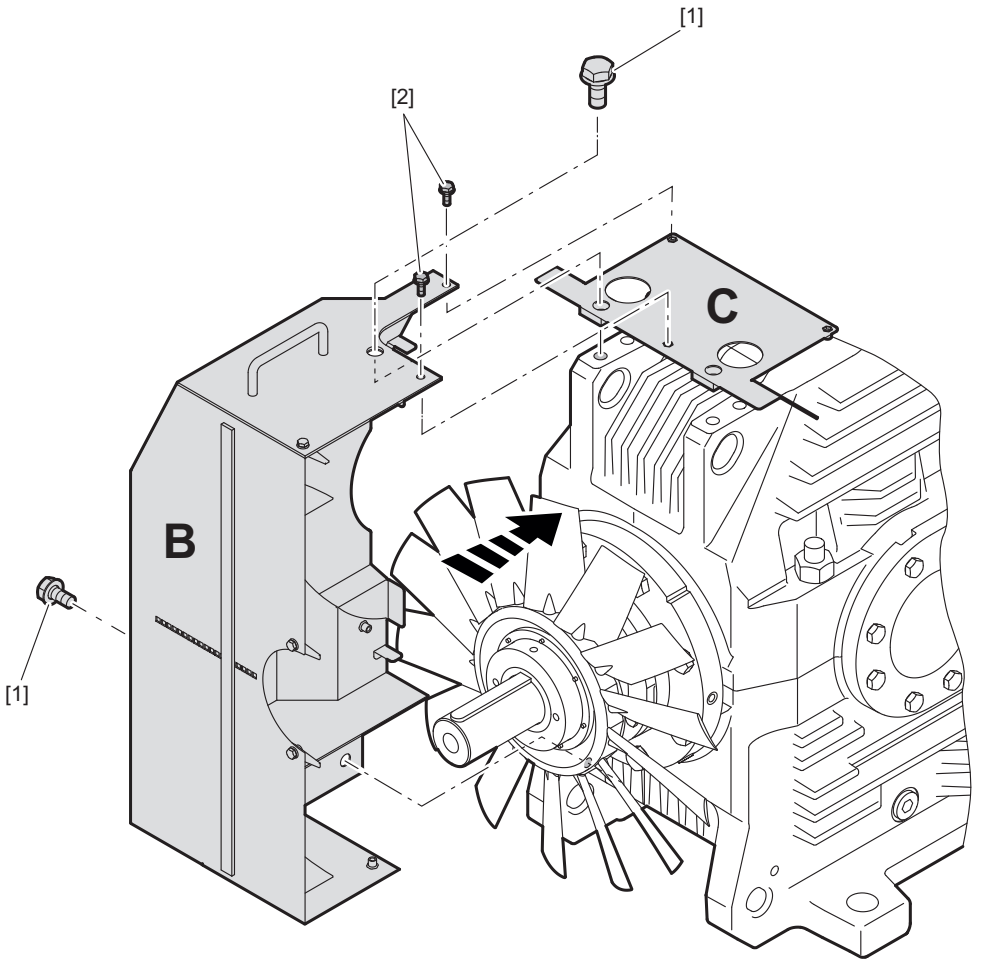
1. Fan guards B, C



1. Mount the fan guards **B and C** onto the gear unit, using screws [1].
2. Tighten the 2 screws [2].

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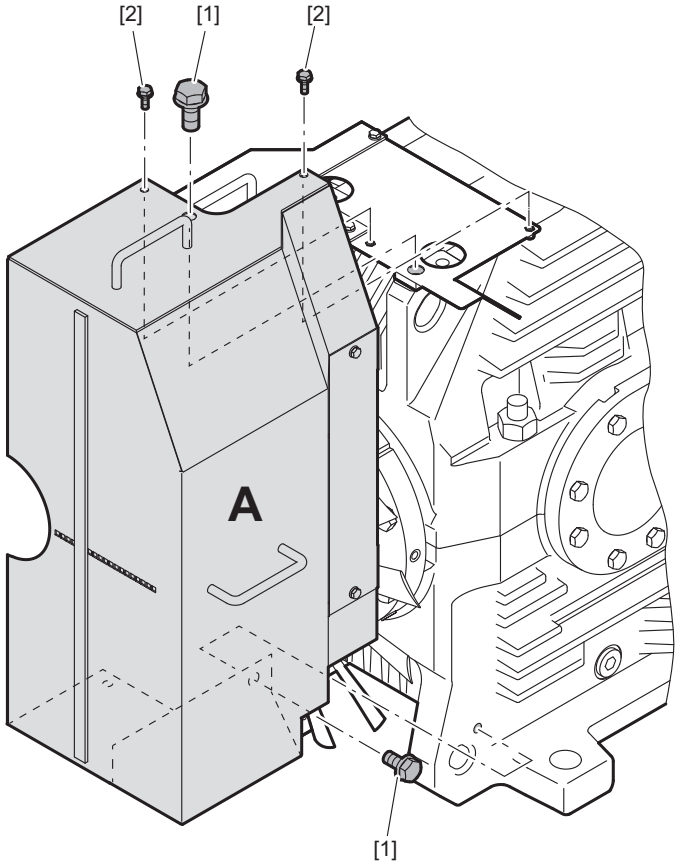
2. Fan guard A

1. Mount the fan guard **A** using the 2 screws [1].
2. Tighten the 2 screws [2].



13276194187

3. Insert the 3 screws [3].

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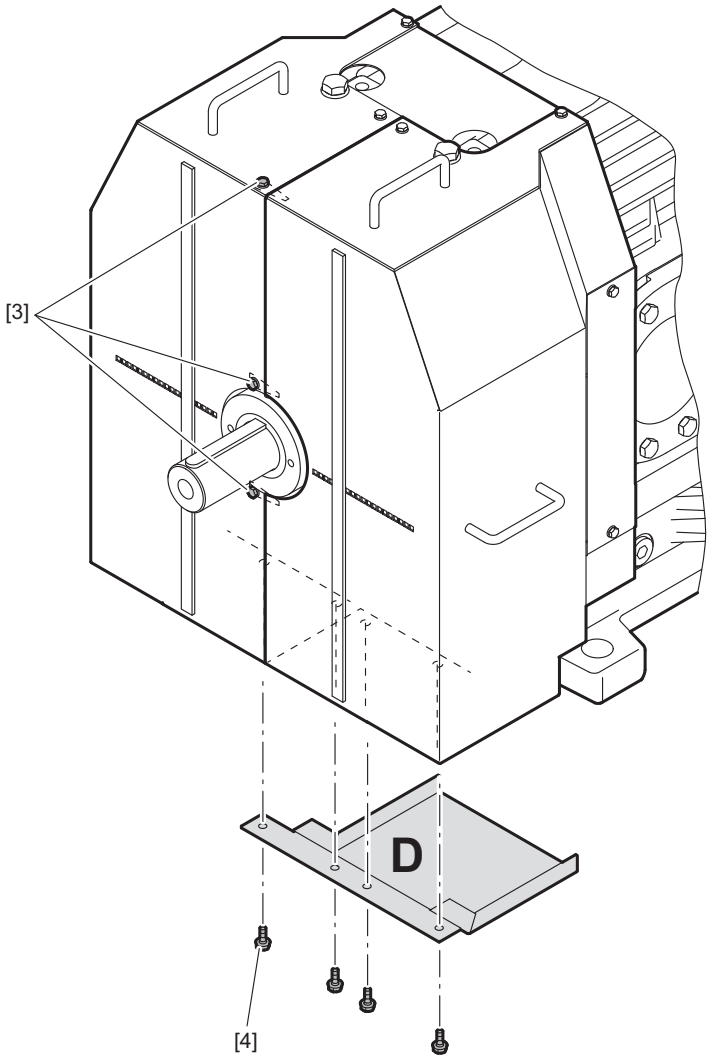
4. Mount the fan guards **D** using 4 screws [4].



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.

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7.15 Water cooling cover /CCV

7.15.1 Safety notes

⚠ WARNING

Risk of burns due to media under pressure and hot component parts.

Serious injury.

- Unpressurize all systems before carrying out any disassembly work on the water cooling cover. Safeguard the systems according to the applicable accident prevention regulations.
- Risk of burns when touching hot parts (such as supply lines) of the water cooling cover. Let the parts cool down before you remove the water cooling cover and the supply lines.

NOTICE

Risk of damaging components of the water cooling cover.

Possible damage to property.

- For information on suitable cleaning agents, contact SEW-EURODRIVE.
- Properly vent the water cooling cover and the connected systems before taking them into operation again.

NOTICE

Risk of contamination of the medium.

Possible damage to property.

- According to experience, it is not possible to remove the cleaning agent without any residues. It is therefore important that you select only cleaning agents that are compatible with the medium.

NOTICE

Risk of destroying components of the water cooling cover.

Possible damage to property.

- To prevent damage resulting from improper handling of the functional components, always contact SEW-EURODRIVE before you use other comparable, aggressive cleaning agents.

NOTICE

Risk of contamination due to drained media.

Possible damage to property.

- Drain media in such a way that it is not discharged into the soil or sewage system. Drain media in suitable containers and dispose of them according to the applicable environmental regulations.

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7.15.2 Disassembly

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

1. Remove the cooling water inflow and return pipes from the water cooling cover.
2. Open the inspection cover.
3. Carefully remove the water cooling cover and the gasket.
4. Check the water cooling cover for deposits.

INFORMATION

Clean light dirt on the water cooling cover with a suitable cleaning agent. If heavily soiled, replace the water cooling cover with a new one. Contact SEW-EURODRIVE.

5. Insert the water cooling cover into the gear unit housing.
6. Apply Loctite® 5188 over the entire edge of the cooling cover.
7. Insert the gasket.
8. Put the inspection cover back on and align it.
9. Reinsert the screws and tighten them in 2 goes starting from the inside. Observe the chapter "Tightening torques" (→ 🗎 116).
10. Re-connect the water cooling inflow and return pipes to the water cooling cover.

7.16 Water cooling cartridge /CCT

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

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 in that case. Analyze the situation and report the failure symptoms.

7.16.1 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.

7.16.2 Cleaning

Use the performance parameters and power rating determined during operation to define the cleaning intervals. Specify the 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.

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Safety notes

⚠ WARNING

Risk of burns due to media under pressure and hot component parts.

Serious injury.

- Unpressurize all systems before carrying out any disassembly work on the water cooling cartridge. Safeguard the systems according to the applicable accident prevention regulations.
- Risk of burns when touching hot parts (such as supply lines) of the water cooling cartridge. Let the parts cool down before you remove the water cooling cartridge and the supply lines.

⚠ WARNING

Cleaning the water cooling cartridge with cleaning agents such as hydrochloric acid and comparable cleaning agents can pose a risk of chemical burn to parts of the body and the eyes if the applicable work safety regulations are not adhered to.

Serious injury.

- Always adhere to the applicable work safety regulations when handling cleaning agents. Wear protective clothing, protective gloves and, if necessary, safety goggles and breathing protection when working with aggressive cleaning media.

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 comparable, aggressive cleaning agents.

NOTICE

Risk of contamination of the medium.

Possible damage to property.

- From our experience, it is not possible to remove the cleaning agent without any residues. It is therefore important that you select only cleaning agents that are compatible with the medium.

NOTICE

Risk of damaging 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.

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NOTICE

Risk of contamination due to drained media.

Possible damage to property.

- Drain media in such a way that it is not discharged into the soil or sewage system. Drain media in suitable containers and dispose of them according to the applicable environmental regulations.

Expansion

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

1. Unpressurize the water cooling cartridge and the connected system pipes. Shut them off with the corresponding valve.
2. Before "disassembly" (→ 🗎 272), drain all the gear unit oil.
3. Completely drain the cooling medium using the drain screws and/or drains provided for this purpose.
4. Loosen the water cooling cartridge by applying torque only to the head of the hex screw on the tube plate and remove the water cooling cartridge.
5. Remove the flat gasket. Remove any gasket residues from the sealing surface.
   - **NOTICE** Be careful not to damage the sealing surface.

     Possible damage to property.

     – Damage to the sealing surfaces can result in leakage.
6. Clean the water cooling cartridge.
7. Insert a new gasket and make sure it is seated properly. If present, replace the O-ring.
8. Apply LOCTITE® 577 to 2 threads and screw on the water cooling cartridge by tightening the hex head screw on the tube plate.
9. Re-connect the cooling water supply and return pipes to the water cooling cartridges.
10. Fill new oil of the same type as the old oil through the oil fill plug (if you want to change the oil type, contact our customer service first).
    - Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).
    - Fill in the oil according to the oil quantity specified on the nameplate. The oil quantity specified on the nameplate is an approximate value.
    - Check the oil level.
11. Before starting the system again, vent the lines.

Cleaning the inside of the water cooling cartridge

Observe the notes in the previous chapter.

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NOTICE

Risk of corrosion due to scratches.

Possible damage to property.

- Scratches on the inner surface of the pipe bundle can result in increased corrosion. Use a brush with soft bristles to clean the inner surface of the pipe bundle.

NOTICE

Risk of damaging components of the water cooling cartridge.

Possible damage to property.

- For information on suitable cleaning agents, contact SEW-EURODRIVE.

We recommend that you take the following measures for cleaning:

- To remove scale deposits from the inside of pipes, use a mixture of 50% hydrochloric acid with inhibitors and 50% water.
- To clean the inside of the pipe bundle, you can use a brush if the pipe diameter is > 5 mm. Make sure you use a brush with soft bristles to prevent the surface from pipe walls from being scratched.
- Contact SEW-EURODRIVE if you want to use other cleaning agents to remove scale deposits.
- After cleaning, make sure all cleaning agents have been removed completely from the pipes before taking the water cooling cartridge into operation again.

7.17 Oil-water cooler for splash or bath lubrication /OWC

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

INFORMATION

Before inspection/maintenance, first read the operating instructions "Oil-Water Cooler for Splash or Bath Lubrication /OWC".

7.18 Oil-air cooler for splash or bath lubrication /OAC

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

INFORMATION

Before inspection/maintenance, first read the operating instructions "Oil-Air Cooler for Splash or Bath Lubrication /OAC".

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7.19 Oil-air cooler for splash or bath lubrication / OAC1

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

INFORMATION

Before inspection/maintenance, first read the operating instructions "Oil-Air Cooler for Splash or Bath Lubrication /OAC1".

7.20 Oil-water cooler for pressure lubrication /OWP

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

INFORMATION

Before inspection/maintenance, first read the operating instructions "Oil-Water Cooler for Pressure Lubrication /OWP".

7.21 Oil-water cooler for pressure lubrication /OWP1

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

INFORMATION

Before inspection/maintenance, first read the operating instructions "Oil-Water Cooler for Pressure Lubrication /OWP1".

7.22 Oil-air cooler for pressure lubrication /OAP

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

INFORMATION

Before inspection/maintenance, first read the operating instructions "Oil-Air Cooler for Pressure Lubrication /OAP".

7.23 Oil-air cooler for pressure lubrication /OAP1

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

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INFORMATION

Before inspection/maintenance, first read the operating instructions "Oil-Air Cooler for Pressure Lubrication /OAP1".

7.24 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.

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 258).

1. Remove the cabling of the heating element.
2. Before disassembling the heating element, drain the "oil" (→ 🗎 272).
3. **NOTICE!** Improper cleaning may damage the heating elements. Possible damage to property. Do not destroy the heating elements by scratching or scraping. Clean the tubular heating elements with solvent. Replace the defective heating elements. Screw the heating element out of the gear unit housing.
4. Apply LOCTITE® 577 to the 2 threads of the heating element.
5. Screw in the heating element using the hexagon only.
6. Close the oil drain valve.
7. Fill new oil of the same type as the old oil through the oil fill plug (if you want to change the oil type, contact our customer service first).

- Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).
- Fill the oil according to the oil quantity specified on the nameplate. The oil quantity specified on the nameplate is an approximate value.
- Check to see that the oil level is correct, refer to chapter "Checking the oil level" (→ 🗎 264).

8. Connect the heating element.

7.25 Split housing

If the split gear unit housing is divided during maintenance, be sure that:

- The parting lines are sealed again carefully, and
- The screw connections are re-tightened using the tightening torques specified in chapter "Tightening torques" (→ 🗎 116).

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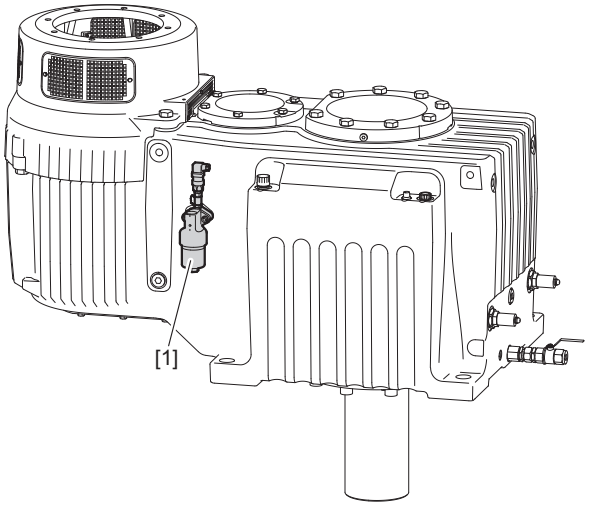
7.26 Oil filter

INFORMATION

Observe the operating instructions of the oil filter manufacturer.



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[1] Oil filter

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8 Permitted lubricants

This chapter describes the permitted lubricants and the permitted temperatures for industrial gear units from SEW-EURODRIVE.

8.1 Lubricant selection

Note the following when selecting the lubricants.

NOTICE

Selecting improper lubricants may damage the gear unit.

Possible damage to property.

- Observe the following notes.

- 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 as 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.

  The lubricant recommendation in the lubricant table in no way represents a guarantee regarding the quality of the lubricant delivered by each respective supplier. Each lubricant manufacturer is responsible for the quality of its product.
- 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 viscosity of the individual lubricants.
- The values specified in the lubricant tables apply as of the time of printing of this document. The data of the lubricants are subject to dynamic change on the part of the lubricant manufacturers. For up-to-date information about the lubricants, visit:

  www.sew-eurodrive.de/lubricants
- Do not mix different synthetic lubricants and do not mix synthetic with mineral lubricants.
- Check the compatibility of the greases and oils used.
- Strictly observe the safety notes in the individual chapters.

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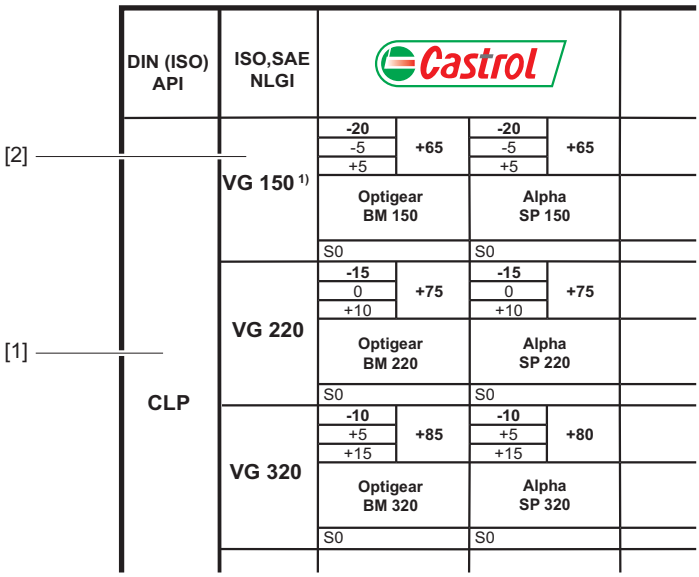
8.2 Structure of the tables and abbreviations



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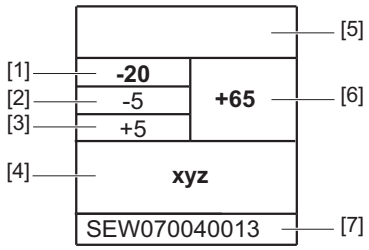
[1] Lubricant type
[2] Viscosity class

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 $F_s \geq 1.3$

8.3 Explanation of the various lubricants



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[1] Lowest cold start temperature in °C for splash lubrication[1)]
[2] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 5000 cSt[1)]
[3] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 2000 cSt[1)]
[4] Trade name
[5] Manufacturer
[6] Highest oil bath temperature in °C[2)]
[7] Approvals

1) In the case of low 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 the following chapter.
2) Service life is significantly reduced when exceeded. Observe chapter "Lubricant change intervals".

8.4 Explanations on external oil supply / oil cooling systems and oil viscosity

Adhere to the following oil viscosity:

Pressure lubrication	Oil viscosity
Motor pump incl. air cooler for pressure lubrication /OAP	2000 cSt.
Motor pump incl. water cooler for pressure lubrication /OWP	2000 cSt.
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.

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8.5 Lubricant tables

This lubricant table is valid when the document is published. Please refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

[1]	[2]	SEW EURODRIVE			Castrol			FUCHS			Mobil			KLÜBER LUBRICATION			Shell			TOTAL		
CLP	VG 150 [1]	-20	-5	+5	-20	-5	+5	-20	-5	+5	-20	-5	+5	-20	-5	+5						
		SEW GearOil Base 150 E1		+65	Optigear BM 150		+65	Renolin CLP 150 Plus		+65	Renolin HighGear 150		+65	Mobilgear 600 XP 150		+65	Klüberoil GEM 1-150 N		+65			
		SEW070040013						SEW070030013						SEW070030013								
	VG 220	-15	0	+10	-15	0	+10	-15	0	+10	-15	0	+10	-15	0	+10	-15	0	+10	-15	0	+10
		SEW GearOil Base 220 E1		+75	Optigear BM 220		+75	Renolin CLP 220 Plus		+75	Renolin HighGear 220		+75	Mobilgear 600 XP 220		+75	Klüberoil GEM 1-220 N		+75	Shell Omala Oil F 220		+75	Carter EP 220
		SEW070040013						SEW070030013						SEW070030013								
	VG 320	-10	+5	+15	-10	+5	+15	-10	+5	+15	-10	+5	+15	-10	+5	+15	-10	+5	+15	-10	+5	+15
		SEW GearOil Base 320 E1		+85	Optigear BM 320		+80	Renolin CLP 320 Plus		+80	Renolin HighGear 320		+80	Mobilgear 600 XP 320		+80	Klüberoil GEM 1-320 N		+80	Shell Omala Oil F 320		+80	Carter EP 320
		SEW070040013						SEW070030013						SEW070030013								
	VG 460	-5	+10	+20	-5	+10	+20	-5	+10	+20	-5	+10	+20	-5	+10	+20	-5	+10	+20	-5	+10	+20
		SEW GearOil Base 480 E1		+90	Optigear BM 460		+90	Renolin CLP 460 Plus		+90	Renolin HighGear 460		+90	Mobilgear 600 XP 460		+90	Klüberoil GEM 1-460 N		+90	Shell Omala Oil F 460		+90	Carter EP 460
		SEW070040013												SEW070030013								
	VG 680	0	+15	+25	0	+15	+25	0	+15	+25	0	+15	+25	0	+15	+25	0	+15	+25	0	+15	+25
		SEW GearOil Base 680 E1		+90	Optigear BM 680		+90	Renolin CLP 680 Plus		+90	Renolin HighGear 680		+90	Mobilgear 600 XP 680		+90	Klüberoil GEM 1-680 N		+90				Carter EP 680
		SEW070040013						SEW070030013						SEW070030013								
	VG 1000	+5	+20	+30	Optigear BM 1000		+90															

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[1]	[2]	SEW EURODRIVE	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TOTAL
CLP HC	VG 32 [1]				-40 -30 -25 +30 SHC 624	-40 -35 -20 -25 -10 -15 +50 Klübersynth GEM 4-68 N	-40 -20 -10 +50 Omala S4 GX 68	
	VG 68 [1]	-35 -15 -5 +75 SEW GearOil Synth 150 E1 SEW 07004031 3	-25 -10 0 +70 Alphasyn EP 150	-30 -10 0 +70 Optigear Synthetic X 150	-30 -10 +0 +70 Renolin Unisyn CLP 150	-40 -35 -20 -25 -10 -15 +50 SHC 626	-35 -20 -10 +50 Klübersynth GEM 4-68 N	-30 -10 0 +75 Omala S4 GX 150	-35 -15 -5 +75 Carter SH 150
	VG 150 [1]					-30 -25 -10 -15 0 -5 +75 SHC 629	-25 -10 0 70 Klübersynth GEM 4-150 N	-25 -10 0 +75 Omala S4 GX 150	-25 -10 -5 +75 Carter SH 150
	VG 220	-30 -10 0 +85 SEW GearOil Synth 220 E1 SEW 07004031 3	-25 -10 -5 +5 +80 Alphasyn EP 220	-25 -5 +5 +80 Optigear Synthetic X 220	-25 -5 +5 +80 Renolin Unisyn CLP 220	-30 -25 -10 -15 -5 0 +85 SHC 630	-25 -10 -5 +5 +80 Klübersynth GEM 4-220 N	-25 -10 -5 +5 +85 Omala S4 GX 220	-25 -10 -5 +5 +80 Carter SH 220
	VG 320	-25 -5 +5 +100 SEW GearOil Synth 320 E1 SEW 07004031 3	-20 0 +10 +90 Alphasyn EP 320	-20 0 +10 +90 Optigear Synthetic X 320	-20 0 +10 +90 Renolin Unisyn CLP 320	-25 -20 -5 0 +10 +95 SHC 632	-20 0 +10 +95 Klübersynth GEM 4-320 N	-20 0 +10 +95 Omala S4 GX 320	-20 0 +10 +90 Carter SH 320
	VG 460	-20 0 +15 +110 SEW GearOil Synth 460 E1 SEW 07004031 3	-15 +5 +15 +100 Alphasyn EP 460	-15 +5 +15 +100 Optigear Synthetic X 460	-15 +5 +15 +100 Renolin Unisyn CLP 460	-20 -15 -5 0 +15 +105 SHC 634	-15 -5 +5 +20 +105 Klübersynth GEM 4-460 N	-15 -5 +5 +15 +105 Omala S4 GX 460	-15 -5 +5 +15 +100 Carter SH 460
	VG 680	-15 +5 +20 +110 SEW GearOil Synth 680 E1 SEW 07004031 3	-10 +10 +25 +110 Optigear Synthetic X 680	-10 +10 +25 +110 Renolin Unisyn CLP 680	-5 +10 +25 +110 HighGear Synth 680	-15 -10 +10 +25 +110 SHC 636	-10 +10 +25 +110 Klübersynth GEM 4-680 N	-10 +10 +25 +110 Omala S4 GX 680	-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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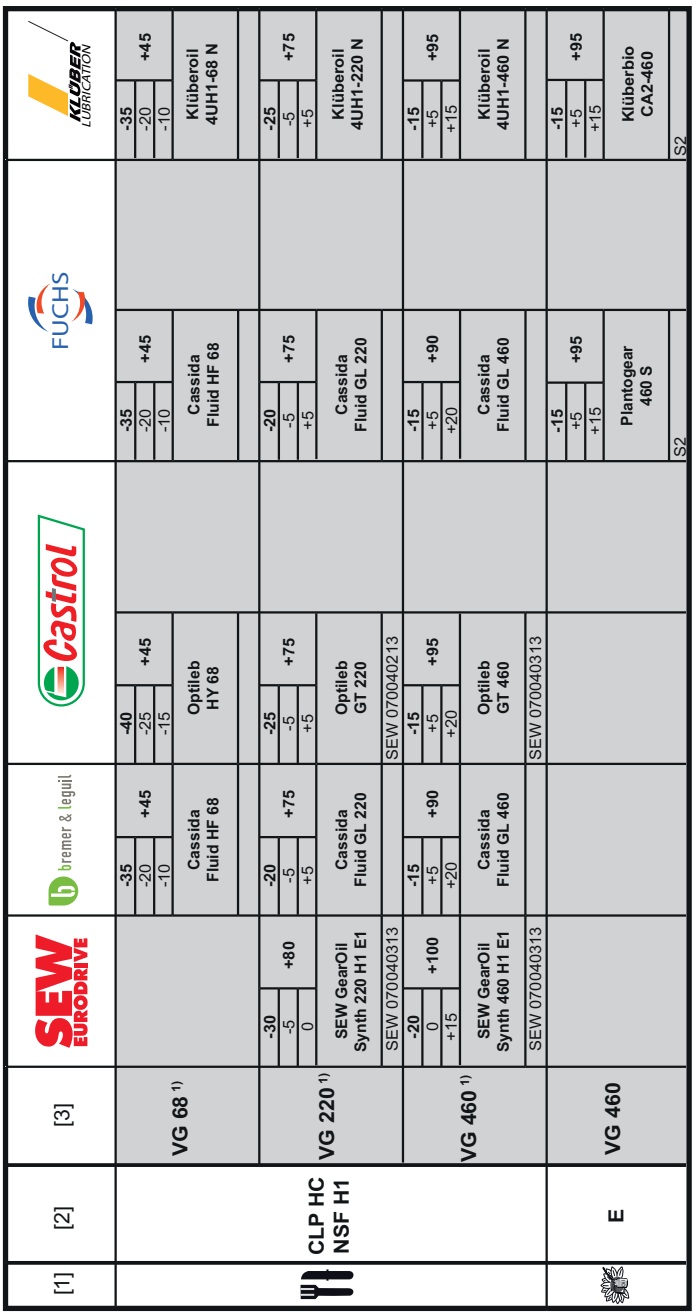

[1]	[2]	[3]	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	KLÜBER LUBRICATION
	CLP HC NSF H1	VG 68 [1]		-35 -20 -10 / +45 Cassida Fluid HF 68	-40 -25 -15 / +45 Optileb HY 68	-35 -20 -10 / +45 Cassida Fluid HF 68	-35 -20 -10 / +45 Klüberoil 4UH1-68 N
		VG 220 [1]	-30 -5 0 / +80 SEW GearOil Synth 220 H1 E1 SEW 070040313	-20 -5 +5 / +75 Cassida Fluid GL 220	-25 -5 +5 / +75 Optileb GT 220 SEW 070040213	-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	-20 -5 +5 / +90 Cassida Fluid GL 460	-15 +5 +15 / +95 Klüberoil 4UH1-460 N
	E	VG 460				-15 +5 +15 / +95 Plantogear 460 S S2	-15 +5 +15 / +95 Klüberbio CA2-460 S2

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8.6 Lubricant fill quantities

INFORMATION

- The specified lubricant fill quantities are guide values. The exact values vary depending on the number of gear stages and gear ratio.
- The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity.
- For pivoted mounting positions, the lubricant fill quantity on the nameplate may vary from the standard. The fill quantity specified on the nameplate is a guide value. The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity.

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8.6.1 Horizontal housing /HH and universal housing /HU

Mounting position M1

XF..

	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X2F100	14	–
X2F110	15	–
X2F120	22	–
X2F130	24	–
X2F140	37	–
X2F150	39	–
X2F160	63	63
X2F170	63	63
X2F180	80	80
X2F190	82	82
X2F200	110	110
X2F210	110	110
X2F220	145	145
X2F230	145	145
X2F240	180	180
X2F250	180	180
X2F260	284	284
X2F270	285	285
X2F280	335	335
X2F290	410	410
X2F300	410	410
X2F310	555	555
X2F320	555	555
X3F100	15	–
X3F110	16	–
X3F120	22	–
X3F130	25	–
X3F140	36	–
X3F150	38	–
X3F160	61	61
X3F170	61	61
X3F180	78	78
X3F190	80	80
X3F200	110	110
X3F210	110	110
X3F220	145	145
X3F230	145	145
X3F240	180	180
X3F250	182	182

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	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X3F260	287	287
X3F270	288	288
X3F280	350	350
X3F290	415	415
X3F300	418	418
X3F310	545	545
X3F320	545	545
X4F120	19	–
X4F130	19	–
X4F140	33	–
X4F150	33	–
X4F160	57	57
X4F170	57	57
X4F180	77	77
X4F190	80	80
X4F200	97	97
X4F210	97	97
X4F220	150	150
X4F230	150	150
X4F240	165	165
X4F250	172	172
X4F260	290	290
X4F270	295	295
X4F280	325	325
X4F290	415	415
X4F300	425	425
X4F310	537	537
X4F320	537	537

XK..

	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X2K100	12	–
X2K110	29	29
X2K120	17	–
X2K130	47	47
X2K140	26	–
X2K150	93	93
X2K160	47	47
X2K170	119	119
X2K180	64	64
X2K190	66	66
X2K200	87	87
X2K210	87	87

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	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X2K220	135	135
X2K230	135	135
X2K240	170	170
X2K250	170	170
X3K100	12	–
X3K110	14	–
X3K120	20	–
X3K130	22	–
X3K140	34	–
X3K150	34	–
X3K160	59	59
X3K170	59	59
X3K180	74	74
X3K190	77	77
X3K200	105	105
X3K210	105	105
X3K220	135	135
X3K230	139	139
X3K240	175	175
X3K250	175	175
X3K260	279	279
X3K270	279	279
X3K280	330	330
X3K290	432	432
X3K300	432	432
X3K310	540	540
X3K320	540	540
X4K120	25	–
X4K130	23	–
X4K140	35	–
X4K150	39	–
X4K160	61	61
X4K170	61	61
X4K180	81	81
X4K190	84	84
X4K200	107	107
X4K210	109	109
X4K220	145	145
X4K230	145	145
X4K240	181	181
X4K250	181	181
X4K260	275	275
X4K270	275	275
X4K280	335	335

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	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X4K290	425	425
X4K300	425	425
X4K310	545	545
X4K320	545	545

XT..

	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication
X3T100	14	–	–
X3T110	15	–	–
X3T120	20	–	–
X3T130	22	–	–
X3T140	32	–	–
X3T150	32	–	–
X3T160	53	53	–
X3T170	53	53	–
X3T180	67	67	–
X3T190	67	67	–
X3T200	87	87	–
X3T210	87	87	–
X3T220	–	140	305
X3T230	–	140	305
X3T240	–	170	400
X3T250	–	170	400
X4T120	20	–	–
X4T130	22	–	–
X4T140	31	–	–
X4T150	34	–	–
X4T160	56	56	–
X4T170	56	56	–
X4T180	77	77	–
X4T190	77	77	–
X4T200	97	97	–
X4T210	97	97	–
X4T220	–	210	310
X4T230	–	210	310
X4T240	–	265	405
X4T250	–	265	405

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Mounting position M3

XF..

	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X2F100	14	–
X2F110	15	–
X2F120	20	–
X2F130	22	–
X2F140	37	–
X2F150	37	–
X2F160	62	62
X2F170	62	62
X2F180	77	77
X2F190	80	80
X2F200	105	105
X2F210	105	105
X2F220	135	135
X2F230	135	135
X2F240	175	175
X2F250	175	175
X2F260	280	280
X2F270	280	280
X2F280	335	335
X2F290	410	410
X2F300	410	410
X2F310	555	555
X2F320	555	555
X3F100	14	–
X3F110	16	–
X3F120	20	–
X3F130	23	–
X3F140	38	–
X3F150	38	–
X3F160	64	64
X3F170	64	64
X3F180	78	78
X3F190	82	82
X3F200	110	110
X3F210	110	110
X3F220	145	145
X3F230	145	145
X3F240	180	180
X3F250	180	180
X3F260	275	275
X3F270	275	275

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	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X3F280	340	340
X3F290	405	405
X3F300	405	405
X3F310	545	545
X3F320	545	545
X4F120	24	–
X4F130	26	–
X4F140	42	–
X4F150	42	–
X4F160	82	82
X4F170	82	82
X4F180	108	108
X4F190	105	105
X4F200	140	140
X4F210	140	140
X4F220	185	185
X4F230	185	185
X4F240	231	231
X4F250	227	227
X4F260	360	360
X4F270	360	360
X4F280	425	425
X4F290	520	520
X4F300	520	520
X4F310	690	690
X4F320	690	690

XK..

	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X2K100	12	–
X2K110	29	29
X2K120	16	–
X2K130	47	47
X2K140	25	–
X2K150	93	93
X2K160	46	46
X2K170	119	119
X2K180	62	62
X2K190	64	64
X2K200	82	82
X2K210	82	82
X2K220	140	135
X2K230	140	140

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	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X2K240	175	175
X2K250	175	175
X3K100	17	–
X3K110	15	–
X3K120	20	–
X3K130	23	–
X3K140	34	–
X3K150	35	–
X3K160	59	59
X3K170	59	59
X3K180	77	77
X3K190	80	80
X3K200	100	100
X3K210	108	108
X3K220	130	130
X3K230	130	130
X3K240	170	170
X3K250	170	170
X3K260	260	260
X3K270	260	260
X3K280	330	330
X3K290	405	405
X3K300	405	405
X3K310	540	540
X3K320	540	540
X4K120	20	–
X4K130	23	–
X4K140	36	–
X4K150	38	–
X4K160	60	60
X4K170	60	60
X4K180	77	77
X4K190	78	78
X4K200	110	110
X4K210	110	110
X4K220	145	145
X4K230	145	145
X4K240	180	180
X4K250	180	180
X4K260	275	275
X4K270	275	275
X4K280	335	335
X4K290	415	415
X4K300	415	415

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	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X4K310	545	545
X4K320	545	545

XT..

	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for bath lubrication
X3T100	–	–	36
X3T110	–	–	36
X3T120	–	–	46
X3T130	–	–	47
X3T140	–	–	79
X3T150	–	–	81
X3T160	–	61	139
X3T170	–	61	139
X3T180	–	72	175
X3T190	–	72	175
X3T200	–	92	235
X3T210	–	92	235
X3T220	120	120	–
X3T230	120	120	–
X3T240	155	155	–
X3T250	155	155	–
X4T120	–	–	50
X4T130	–	–	53
X4T140	–	–	79
X4T150	–	–	81
X4T160	–	75	143
X4T170	–	75	143
X4T180	–	119	180
X4T190	–	119	180
X4T200	–	155	240
X4T210	–	155	230
X4T220	145	145	–
X4T230	145	145	–
X4T240	180	180	–
X4T250	180	180	–

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Mounting position M5

Note that the oil quantity has to be increased by 20% for gear unit combinations with mounting positions M5 or M6 with pressure lubrication or oil heating. Observe the information on the nameplate.

In case of "Universal housing with EBD", additional oil quantities must be added, as listed in the table "Additional oil quantities for universal housing HU with extended bearing distance (EBD)".

XF..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X2F100	33	–	–
X2F110	34	–	–
X2F120	48	17	12
X2F130	55	20	13
X2F140	79	36	22
X2F150	84	38	22
X2F160	157	60	39
X2F170	157	60	39
X2F180	185	74	51
X2F190	190	77	56
X2F200	255	110	77
X2F210	255	110	77
X2F220	340	130	97
X2F230	340	130	97
X2F240	415	160	105
X2F250	415	160	105
X2F260	655	225	197
X2F270	655	225	197
X2F280	785	270	239
X2F290	955	305	289
X2F300	955	305	289
X2F310	1290	421	421
X2F320	1290	421	421
X3F100	33	–	–
X3F110	34	–	–
X3F120	47	17	12
X3F130	48	20	15
X3F140	77	38	22
X3F150	85	36	24
X3F160	151	58	38
X3F170	151	58	38
X3F180	184	71	54
X3F190	190	73	56
X3F200	245	110	71
X3F210	245	110	72

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X3F220	317	125	95
X3F230	317	125	95
X3F240	405	150	113
X3F250	405	150	113
X3F260	630	215	188
X3F270	630	215	188
X3F280	775	265	235
X3F290	925	300	280
X3F300	925	300	280
X3F310	1245	404	404
X3F320	1245	404	404
X4F120	43	17	13
X4F130	48	18	13
X4F140	74	25	20
X4F150	78	26	20
X4F160	142	44	38
X4F170	142	44	38
X4F180	174	66	51
X4F190	180	68	53
X4F200	235	105	70
X4F210	236	105	70
X4F220	320	155	95
X4F230	320	155	95
X4F240	415	190	115
X4F250	415	190	115
X4F260	645	255	191
X4F270	645	255	191
X4F280	770	310	235
X4F290	940	395	278
X4F300	940	395	278
X4F310	1225	520	398
X4F320	1225	520	398

XK..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X2K100	30	–	–
X2K110	29	–	–
X2K120	41	17	11
X2K130	43	17	13
X2K140	61	26	19
X2K150	64	27	19
X2K160	129	50	34

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X2K170	129	50	34
X2K180	155	62	41
X2K190	155	62	41
X2K200	210	87	62
X2K210	210	87	62
X2K220	335	135	137
X2K230	335	135	137
X2K240	410	160	145
X2K250	410	160	145
X3K100	34	–	–
X3K110	34	–	–
X3K120	46	17	11
X3K130	50	18	14
X3K140	80	34	20
X3K150	81	36	20
X3K160	143	55	38
X3K170	143	55	38
X3K180	177	72	55
X3K190	180	74	55
X3K200	242	97	76
X3K210	245	105	81
X3K220	320	120	91
X3K230	320	120	91
X3K240	405	150	99
X3K250	405	150	99
X3K260	615	215	190
X3K270	615	215	190
X3K280	750	270	241
X3K290	930	305	287
X3K300	930	305	287
X3K310	1250	416	416
X3K320	1250	416	416
X4K120	46	20	12
X4K130	48	23	13
X4K140	77	37	20
X4K150	83	38	20
X4K160	147	61	38
X4K170	147	61	38
X4K180	179	80	55
X4K190	188	87	55
X4K200	241	115	76
X4K210	244	115	76
X4K220	318	155	95

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X4K230	318	155	95
X4K240	415	177	116
X4K250	415	177	116
X4K260	630	280	190
X4K270	630	280	190
X4K280	775	350	236
X4K290	965	420	281
X4K300	965	420	281
X4K310	1260	560	413
X4K320	1260	560	413

XT..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X3T100	36	–	–
X3T110	36	–	–
X3T120	46	17	13
X3T130	47	18	14
X3T140	79	32	20
X3T150	81	33	20
X3T160	139	53	34
X3T170	139	53	34
X3T180	175	72	52
X3T190	175	72	52
X3T200	235	97	70
X3T210	235	97	70
X3T220	305	120	91
X3T230	305	120	91
X3T240	400	150	112
X3T250	400	150	112
X4T120	50	18	13
X4T130	53	22	14
X4T140	79	32	20
X4T150	81	33	20
X4T160	143	55	34
X4T170	143	55	34
X4T180	180	82	52
X4T190	180	82	52
X4T200	240	110	68
X4T210	240	110	68
X4T220	310	150	94
X4T230	310	150	94
X4T240	405	190	112

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X4T250	405	190	112

Mounting position M6

Note that the oil quantity has to be increased by 20% for gear unit combinations with mounting positions M5 or M6 with pressure lubrication or oil heating. Observe the information on the nameplate.

In case of "Universal housing with EBD", additional oil quantities must be added, as listed in the table "Additional oil quantities for universal housing HU with extended bearing distance (EBD)".

XF..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X2F100	33	–	–
X2F110	34	–	–
X2F120	48	17	12
X2F130	55	20	13
X2F140	79	36	22
X2F150	84	38	22
X2F160	157	60	39
X2F170	157	60	39
X2F180	185	74	51
X2F190	190	77	56
X2F200	255	110	77
X2F210	255	110	77
X2F220	340	130	97
X2F230	340	130	97
X2F240	415	160	105
X2F250	415	160	105
X2F260	655	225	197
X2F270	655	225	197
X2F280	785	270	239
X2F290	955	305	289
X2F300	955	305	289
X2F310	1290	421	421
X2F320	1290	421	421
X3F100	33	–	–
X3F110	34	–	–
X3F120	47	17	12
X3F130	48	20	15
X3F140	77	38	22
X3F150	85	36	24
X3F160	151	58	38

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X3F170	151	58	38
X3F180	184	71	54
X3F190	190	73	56
X3F200	245	110	71
X3F210	245	110	72
X3F220	317	125	95
X3F230	317	125	95
X3F240	405	150	113
X3F250	405	150	113
X3F260	630	215	188
X3F270	630	215	188
X3F280	775	265	235
X3F290	925	300	280
X3F300	925	300	280
X3F310	1245	404	404
X3F320	1245	404	404
X4F120	43	17	13
X4F130	48	18	13
X4F140	74	25	20
X4F150	78	26	20
X4F160	142	44	38
X4F170	142	44	38
X4F180	174	66	51
X4F190	180	68	53
X4F200	235	105	70
X4F210	236	105	70
X4F220	320	155	95
X4F230	320	155	95
X4F240	415	190	115
X4F250	415	190	115
X4F260	645	255	191
X4F270	645	255	191
X4F280	770	310	235
X4F290	940	395	278
X4F300	940	395	278
X4F310	1225	520	398
X4F320	1225	520	398

XK..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X2K100	30	–	–
X2K110	29	–	–

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X2K120	41	17	11
X2K130	43	17	13
X2K140	61	26	19
X2K150	64	27	19
X2K160	129	34	34
X2K170	129	50	34
X2K180	155	62	41
X2K190	155	62	41
X2K200	210	87	62
X2K210	210	87	62
X2K220	335	135	137
X2K230	335	135	137
X2K240	410	160	145
X2K250	410	160	145
X3K100	34	–	–
X3K110	34	–	–
X3K120	46	17	11
X3K130	50	18	14
X3K140	80	34	20
X3K150	81	36	20
X3K160	143	55	38
X3K170	143	55	38
X3K180	177	72	55
X3K190	180	74	55
X3K200	242	97	76
X3K210	245	105	81
X3K220	320	120	91
X3K230	320	120	91
X3K240	405	150	99
X3K250	405	150	99
X3K260	615	215	190
X3K270	615	215	190
X3K280	750	270	241
X3K290	930	305	287
X3K300	930	305	287
X3K310	1250	416	416
X3K320	1250	416	416
X4K120	46	20	12
X4K130	48	23	13
X4K140	77	37	20
X4K150	83	38	20
X4K160	147	61	38
X4K170	147	61	38

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X4K180	179	80	55
X4K190	185	87	55
X4K200	241	115	76
X4K210	244	115	76
X4K220	318	155	95
X4K230	318	155	95
X4K240	415	177	116
X4K250	415	177	116
X4K260	630	280	190
X4K270	630	280	190
X4K280	775	350	236
X4K290	965	420	281
X4K300	965	420	281
X4K310	1260	560	413
X4K320	1260	560	413

XT..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X3T100	36	–	–
X3T110	36	–	–
X3T120	46	17	13
X3T130	47	18	14
X3T140	79	32	20
X3T150	81	33	20
X3T160	139	53	34
X3T170	139	53	34
X3T180	175	72	52
X3T190	175	72	52
X3T200	235	97	70
X3T210	235	97	70
X3T220	305	120	91
X3T230	305	120	91
X3T240	400	150	112
X3T250	400	150	112
X4T120	50	18	13
X4T130	53	22	14
X4T140	79	32	20
X4T150	81	33	20
X4T160	143	55	34
X4T170	143	55	34
X4T180	180	82	52
X4T190	180	82	52

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication	Oil quantity in l for pressure lubrication with Drywell
X4T200	240	110	68
X4T210	240	110	68
X4T220	310	150	94
X4T230	310	150	94
X4T240	405	190	112
X4T250	405	190	112

Additional oil quantity for universal housing HU with extended bearing distance (EBD)

X.F.. / X.K..	Additional oil quantity in l
140	2
150	2
160	3
170	3
180	4
190	4
200	6
210	6

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Mounting position M2

XF..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X2F100	23	–
X2F110	23	–
X2F120	33	–
X2F130	36	–
X2F140	58	–
X2F150	58	–
X2F160	101	101
X2F170	101	101
X2F180	125	125
X2F190	125	125
X2F200	164	164
X2F210	164	164
X2F220	225	225
X2F230	225	225
X2F240	285	285
X2F250	285	285
X2F260	655	445
X2F270	655	445
X2F280	785	525
X2F290	955	655
X2F300	955	655
X2F310	1290	875
X2F320	1290	875
X3F100	20	–
X3F110	22	–
X3F120	35	–
X3F130	36	–
X3F140	56	–
X3F150	57	–
X3F160	93	93
X3F170	93	93
X3F180	125	125
X3F190	125	125
X3F200	164	164
X3F210	164	164
X3F220	207	207
X3F230	207	207
X3F240	270	270
X3F250	270	270
X3F260	630	430
X3F270	630	430

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X3F280	775	510
X3F290	925	630
X3F300	925	630
X3F310	1245	835
X3F320	1245	835
X4F120	29	–
X4F130	33	–
X4F140	49	–
X4F150	49	–
X4F160	82	82
X4F170	82	82
X4F180	115	115
X4F190	115	115
X4F200	152	152
X4F210	152	152
X4F220	211	211
X4F230	211	211
X4F240	275	275
X4F250	267	267
X4F260	645	430
X4F270	645	430
X4F280	770	505
X4F290	940	635
X4F300	940	635
X4F310	1225	815
X4F320	1225	815

XK..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X2K100	18	–
X2K110	16	–
X2K120	26	–
X2K130	26	–
X2K140	38	–
X2K150	41	–
X2K160	64	64
X2K170	64	64
X2K180	92	92
X2K190	97	97
X2K200	130	130
X2K210	130	130
X2K220	200	200
X2K230	200	200

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X2K240	255	255
X2K250	255	255
X3K100	22	–
X3K110	19	–
X3K120	32	–
X3K130	32	–
X3K140	49	–
X3K150	49	–
X3K160	87	87
X3K170	87	87
X3K180	120	120
X3K190	122	122
X3K200	160	160
X3K210	160	160
X3K220	205	205
X3K230	205	205
X3K240	270	270
X3K250	270	270
X3K260	615	410
X3K270	615	410
X3K280	750	495
X3K290	930	620
X3K300	930	620
X3K310	1250	835
X3K320	1250	835
X4K120	33	–
X4K130	34	–
X4K140	54	–
X4K150	56	–
X4K160	88	88
X4K170	88	88
X4K180	125	125
X4K190	129	129
X4K200	165	165
X4K210	165	165
X4K220	220	220
X4K230	220	220
X4K240	280	280
X4K250	280	280
X4K260	630	420
X4K270	630	420
X4K280	775	515
X4K290	965	630
X4K300	965	630

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X4K310	1260	845
X4K320	1260	845

XT..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X3T100	19	–
X3T110	19	–
X3T120	30	–
X3T130	31	–
X3T140	46	–
X3T150	48	–
X3T160	80	80
X3T170	85	85
X3T180	115	115
X3T190	115	115
X3T200	150	150
X3T210	150	150
X3T220	205	205
X3T230	205	205
X3T240	265	265
X3T250	265	265
X4T120	36	–
X4T130	36	–
X4T140	55	–
X4T150	59	–
X4T160	89	89
X4T170	94	94
X4T180	120	120
X4T190	120	120
X4T200	155	155
X4T210	155	155
X4T220	215	215
X4T230	215	215
X4T240	275	275
X4T250	275	275

Mounting position M4

XF..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X2F100	20	–
X2F110	23	–

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X2F120	36	17
X2F130	37	19
X2F140	55	26
X2F150	60	27
X2F160	106	53
X2F170	106	53
X2F180	133	57
X2F190	135	57
X2F200	180	72
X2F210	180	72
X2F220	223	105
X2F230	223	105
X2F240	290	120
X2F250	290	120
X2F260	655	185
X2F270	655	185
X2F280	785	240
X2F290	955	260
X2F300	955	260
X2F310	1290	365
X2F320	1290	365
X3F100	26	–
X3F110	27	–
X3F120	37	17
X3F130	40	19
X3F140	65	26
X3F150	69	27
X3F160	120	53
X3F170	120	53
X3F180	155	57
X3F190	157	57
X3F200	197	72
X3F210	197	72
X3F220	263	105
X3F230	263	105
X3F240	335	120
X3F250	335	120
X3F260	630	185
X3F270	630	185
X3F280	775	240
X3F290	925	260
X3F300	925	260
X3F310	1245	365
X3F320	1245	365

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X4F120	34	17
X4F130	40	19
X4F140	59	26
X4F150	59	27
X4F160	127	53
X4F170	127	53
X4F180	152	57
X4F190	152	57
X4F200	197	72
X4F210	197	72
X4F220	270	105
X4F230	270	105
X4F240	345	120
X4F250	345	120
X4F260	645	185
X4F270	645	185
X4F280	770	240
X4F290	940	260
X4F300	940	260
X4F310	1225	365
X4F320	1225	365

XK..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X2K100	30	–
X2K110	29	–
X2K120	41	18
X2K130	43	18
X2K140	66	26
X2K150	70	27
X2K160	136	50
X2K170	136	50
X2K180	155	57
X2K190	155	57
X2K200	210	72
X2K210	210	72
X2K220	335	105
X2K230	335	105
X2K240	410	120
X2K250	410	120
X3K100	34	–
X3K110	34	–
X3K120	50	19

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	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X3K130	53	19
X3K140	79	26
X3K150	86	29
X3K160	143	50
X3K170	148	50
X3K180	177	57
X3K190	180	57
X3K200	239	75
X3K210	239	75
X3K220	320	105
X3K230	320	105
X3K240	405	120
X3K250	405	120
X3K260	615	185
X3K270	615	185
X3K280	750	240
X3K290	930	260
X3K300	930	260
X3K310	1250	365
X3K320	1250	365
X4K120	47	18
X4K130	50	19
X4K140	82	26
X4K150	88	29
X4K160	147	50
X4K170	147	50
X4K180	184	56
X4K190	188	57
X4K200	255	72
X4K210	255	72
X4K220	335	105
X4K230	335	105
X4K240	415	120
X4K250	415	120
X4K260	630	185
X4K270	630	185
X4K280	775	240
X4K290	965	260
X4K300	965	260
X4K310	1260	365
X4K320	1260	365

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XT..

	Oil quantity in l for bath lubrication	Oil quantity in l for pressure lubrication
X3T100	23	–
X3T110	23	–
X3T120	33	17
X3T130	34	17
X3T140	49	25
X3T150	59	29
X3T160	92	50
X3T170	92	50
X3T180	125	57
X3T190	125	57
X3T200	165	72
X3T210	165	72
X3T220	220	105
X3T230	220	105
X3T240	275	120
X3T250	275	120
X4T120	37	17
X4T130	39	17
X4T140	54	25
X4T150	55	29
X4T160	95	50
X4T170	95	50
X4T180	130	57
X4T190	130	57
X4T200	165	72
X4T210	165	72
X4T220	220	105
X4T230	220	105
X4T240	290	120
X4T250	290	120

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8.6.2 Thermal housing /HT

	Oil quantity in l for splash lubrication	Oil quantity in l for pressure lubrication
X3K180	117	117
X3K190	117	117
X3K200	165	165
X3K210	165	165
X3K220	229	229
X3K230	229	229
X3K240	308	308
X3K250	297	297
X3K260	480	480
X3K270	480	480
X3K280	555	555
X3K290	735	735
X3K300	735	735
X3K310	1020	1020
X3K320	1020	1020

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8.6.3 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	112	61	61
X3F150	119	66	66
X3F160	176	92	92
X3F170	183	96	96
X3F180	259	133	133
X3F190	265	137	137
X3F200	391	202	202
X3F210	396	207	207

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8.7 Sealing greases/rolling bearing greases

The table shows the grease types recommended by SEW-EURODRIVE for operating temperatures from the lower limit temperature to 100 °C.

Area of operation	Manufacturer	Greases	Lower temperature limit
Standard	SEWEURODRIVE	**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	-35 °C
		Spheerol EPL 2	-20 °C
	Klüber	Centoplex EP 2	-25° 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
	SEWEURODRIVE	**SEW Grease HL 2 H1 E1**[1)]	-40° C
	Bremer & Leguil	Cassida Grease GTS2	-40° C
	Fuchs	**Plantogel 2**[1)]	-40° C

1) Use the greases used at the factory if possible.

INFORMATION

- Do not mix permitted greases from different areas of application.
- If the grease used is not listed in the above table, you have to make sure that it is suitable for the intended application.

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9 Malfunctions/remedy

9.1 Troubleshooting information

Read the following notes before you proceed with troubleshooting.

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Work on the gear unit only when the machine is not in use. Secure the drive unit against unintentional power-up. Attach an information sign near the ON switch to warn that the gear unit is being worked on.

⚠ WARNING

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

Serious injury.

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

NOTICE

Improper handling of the gear unit and the motor may lead to damage.

Possible damage to property.

- Only qualified personnel is permitted to separate drive and motor and to carry out repair work on drives by SEW-EURODRIVE.
- Please contact the SEW-EURODRIVE Service.

9.2 Possible malfunctions/remedy

Fault	Possible cause	Measure
Unusual, regular running noise	• Meshing/grinding noise: Bearing damage	• Check oil consistency, change bearings
	• Knocking noise: Irregularity in the gearing	• Consult SEW-EURODRIVE
	• Deformation of the housing upon tightening	• Check the gear unit mounting for possible deformation and correct if necessary
	• Noise generated by insufficient stiffness of the gear unit foundation	• Reinforce the gear unit foundation
Unusual, irregular running noises	• Foreign objects in the oil	• Check the oil consistency • Stop the drive, contact SEW-EURODRIVE

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Fault	Possible cause	Measure
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
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.
Temperature at bearing points too high	• Not enough oil	• Check oil level; correct if necessary
	• Oil too old	• Check when the oil was last changed; change the oil if necessary
	• Bearing damaged	• 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	• Check oil level; correct if necessary
	• Sealing lip of the oil seal turned up	• Vent the gear unit, observe the gear unit. Contact SEW-EURODRIVE if oil is still leaking.
	• Oil seal damaged/worn	• Check oil seals; replace if necessary
Oil leaking • At the gear unit breather	• Too much oil	• Check oil level, correct if necessary
	• Drive not installed in proper mounting position	• Install gear unit breather correctly and adjust the oil level
	• Frequent cold starts (oil foaming) and/or high oil level	• Install oil expansion tank

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Fault	Possible cause	Measure
Oil leaking • From the screw plug • From the oil drain valve	• Seal not tight • Fittings loosened	• Retighten the screw • Retighten the fitting and screw
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 does not switch	• Air in the suction line of the oil pump • Pressure switch connected incorrectly • Pressure switch defective • Oil pump defective	• Fill the suction line and oil pump with oil • Vent the pump at the pressure side • Check the connection • Replace pressure switch • Consult SEW-EURODRIVE
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 heating defective or connected incorrectly • Heat dissipation too great due to unfavorable climatic conditions	• Check the setting of the thermostat • Check the oil heater for proper connection and function; replace if necessary • Protect 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).

9.3 Service

Please have the following information available if you require customer service assistance:

- Complete nameplate data
- Type and extent of the problem
- Time the problem occurred and any accompanying circumstances
- Assumed cause
- A digital photograph, if possible

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9.4 Waste disposal

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

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

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

- Oil and grease

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

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10 Address list

Argentina			
Assembly Sales	Buenos Aires	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 http://www.sew-eurodrive.com.ar sewar@sew-eurodrive.com.ar
Australia			
Assembly Sales Service	Melbourne	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
Austria			
Assembly Sales Service	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			
Sales	Bangladesh	SEW-EURODRIVE INDIA PRIVATE LIMITED 345 DIT Road East Rampura Dhaka-1219, Bangladesh	Tel. +88 01729 097309 salesdhaka@seweurodrivebangladesh.com
Belarus			
Sales	Minsk	Foreign unitary production enterprise SEW-EURODRIVE RybalkoStr. 26 220033 Minsk	Tel. +375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 http://www.sew.by sales@sew.by
Belgium			
Assembly Sales Service	Brussels	SEW-EURODRIVE n.v./s.a. Researchpark Haasrode 1060 Evenementenlaan 7 3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Center	Industrial Gears	SEW-EURODRIVE n.v./s.a. Rue du Parc Industriel, 31 6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be info@sew.be
Brazil			
Production Sales Service	São Paulo	SEW-EURODRIVE Brasil Ltda. Estrada Municipal José Rubim, 205 – Rodovia Santos Dumont Km 49 Indaiatuba – 13347-510 – SP	Tel. +55 19 3835-8000 sew@sew.com.br
Assembly Sales Service	Rio Claro	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. 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			
Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg

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Cameroon			
Sales	Douala	SEW-EURODRIVE S.A.R.L. Ancienne Route Bonabéri P.O. Box B.P 8674 Douala-Cameroun	Tel. +237 233 39 02 10 Fax +237 233 39 02 10 sew@sew-eurodrive-cm
Canada			
Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2001 Ch. de l'Aviation Dorval Quebec H9P 2X6	Tel. +1 514 367-1124 Fax +1 514 367-3677 n.paradis@sew-eurodrive.ca
Chile			
Assembly Sales Service	Santiago de Chile	SEW-EURODRIVE CHILE LTDA Las Encinas 1295 Parque Industrial Valle Grande LAMPA Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 2757 7000 Fax +56 2 2757 7001 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl
China			
Production Assembly Sales Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 78, 13th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 http://www.sew-eurodrive.cn info@sew-eurodrive.cn
Assembly Sales Service	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Taiyuan	SEW-EURODRIVE (Taiyuan) Co,. Ltd. No.3, HuaZhang Street, TaiYuan Economic & Technical Development Zone ShanXi, 030032	Tel. +86-351-7117520 Fax +86-351-7117522 taiyuan@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
Sales Service	Hong Kong	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

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Colombia			
Assembly Sales Service	Bogota	SEW-EURODRIVE COLOMBIA LTDA. Calle 17 No. 132-18 Interior 2 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sew@sew-eurodrive.com.co
Croatia			
Sales Service	Zagreb	KOMPEKS d. o. o. Zeleni dol 10 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr
Czech Republic			
Assembly Sales Service	Hostivice	SEW-EURODRIVE CZ s.r.o. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
Denmark			
Assembly Sales Service	Copenhagen	SEW-EURODRIVEA/S Geminivej 28-30 2670 Greve	Tel. +45 43 95 8500 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Service	Vejle	SEW-EURODRIVE A/S Bødkervej 2 7100 Vejle	Tel. +45 43 9585 00 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Egypt			
Sales Service	Cairo	Copam Egypt for Engineering & Agencies Building 10, Block 13005, First Industrial Zone, Obour City Cairo	Tel. +202 44812673 / 79 (7 lines) Fax +202 44812685 http://www.copam-egypt.com copam@copam-egypt.com
Estonia			
Sales	Tallin	ALAS-KUUL AS Loomäe tee 1, Lehmja küla 75306 Rae vald Harjumaa	Tel. +372 6593230 Fax +372 6593231 http://www.alas-kuul.ee info@alas-kuul.ee
Finland			
Assembly Sales Service	Hollola	SEW-EURODRIVE OY Vesimäentie 4 15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Service	Hollola	SEW-EURODRIVE OY Keskikankaantie 21 15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
	Tornio	SEW-EURODRIVE Oy Lossirannankatu 5 95420 Tornio	Tel. +358 201 589 300 Fax +358 3 780 6211 http://www.sew-eurodrive.fi sew@sew.fi
Production Assembly	Karkkila	SEW Industrial Gears Oy Santasalonkatu 6, PL 8 03620 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 http://www.sew-eurodrive.fi sew@sew.fi
France			
Production Sales Service	Hagenau	SEW USOCOME 48-54 route de Soufflenheim B. P. 20185 67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	Forbach	SEW USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 57604 Forbach Cedex	Tel. +33 3 87 29 38 00
	Brumath	SEW USOCOME 1 Rue de Bruxelles 67670 Mommenheim Cedex	Tel. +33 3 88 37 48 00

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France			
Assembly Sales Service	Bordeaux	SEW USOCOME Parc d'activités de Magellan 62 avenue de Magellan – B. P. 182 33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW USOCOME 75 rue Antoine Condorcet 38090 Vaulx-Milieu	Tel. +33 4 74 99 60 00 Fax +33 4 74 99 60 15
	Nantes	SEW USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW USOCOME Zone industrielle 2 rue Denis Papin 77390 Verneuil l'Étang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
Gabon			
Representation: Cameroon			
Germany			
Headquarters Production Sales	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Production / Industrial Gears	Bruchsal	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str. 10 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Production / Precision Gear Units	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 sew@sew-eurodrive.de
Production	Graben	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-0 Fax +49 7251-2970
Service Competence Center	Mechanics / Mechatronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 scc-mechanik@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Straße 12 76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 scc-elektronik@sew-eurodrive.de
	MAXOLUTION® Factory Automation	SEW-EURODRIVE GmbH & Co KG Eisenbahnstraße 11 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 sew@sew-eurodrive.de
Drive Technology Center	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 43 30823 Garbsen (Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 dtc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 08393 Meerane (Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-20 dtc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 85551 Kirchheim (München)	Tel. +49 89 909551-21 Fax +49 89 909551-50 dtc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 40764 Langenfeld (Düsseldorf)	Tel. +49 2173 8507-10 Fax +49 2173 8507-50 dtc-west@sew-eurodrive.de
Drive Center	Berlin	SEW-EURODRIVE GmbH & Co KG Alexander-Meißner-Straße 44 12526 Berlin	Tel. +49 306331131-30 Fax +49 306331131-36 dc-berlin@sew-eurodrive.de
	Hamburg	SEW-EURODRIVE GmbH & Co KG Hasselbinnen 44 22869 Schenefeld	Tel. +49 40298109-60 Fax +49 40298109-70 dc-hamburg@sew-eurodrive.de
	Ludwigshafen	SEW-EURODRIVE GmbH & Co KG c/o BASF SE c/o BASF SE Gebäude W130 67056 Ludwigshafen	Tel. +49 7251 75 3759 Fax +49 7251 75 503759 dc-ludwigshafen@sew-eurodrive.de

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Germany			
	Saarland	SEW-EURODRIVE GmbH & Co KG Gottlieb-Daimler-Straße 4 66773 Schwalbach Saar – Hülzweiler	Tel. +49 6831 48946 10 Fax +49 6831 48946 13 dc-saarland@sew-eurodrive.de
	Ulm	SEW-EURODRIVE GmbH & Co KG Dieselstraße 18 89160 Dornstadt	Tel. +49 7348 9885-0 Fax +49 7348 9885-90 dc-ulm@sew-eurodrive.de
	Würzburg	SEW-EURODRIVE GmbH & Co KG Nürnbergerstraße 118 97076 Würzburg-Lengfeld	Tel. +49 931 27886-60 Fax +49 931 27886-66 dc-wuerzburg@sew-eurodrive.de
Drive Service Hotline / 24 Hour Service			0 800 SEWHELP 0 800 7394357
Great Britain			
Assembly Sales Service	Normanton	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
Greece			
Sales	Athens	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr
Hungary			
Sales Service	Budapest	SEW-EURODRIVE Kft. Csillaghegyí út 13. 1037 Budapest	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu
Iceland			
Sales	Reykjavik	Varma & Vélaverk ehf. Knarrarvogi 4 104 Reykjavík	Tel. +354 585 1070 Fax +354 585)1071 https://vov.is/ vov@vov.is
India			
Registered Office Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200 Fax +91 265 3045300 http://www.seweurodriveindia.com salesvadodara@seweurodriveindia.com
Assembly Sales Service	Chennai	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com
	Pune	SEW-EURODRIVE India Private Limited Plant: Plot No. D236/1, Chakan Industrial Area Phase- II, Warale, Tal- Khed, Pune-410501, Maharashtra	Tel. +91 21 35 628700 Fax +91 21 35 628715 salespune@seweurodriveindia.com
Sales Service	Gurgaon	SEW-EURODRIVE India Private Limited Drive Center Gurugram Plot no 395, Phase-IV, UdyogVihar Gurugram , 122016 Haryana	Tel. +91 99588 78855 salesgurgaon@seweurodriveindia.com
Indonesia			
Sales	Medan	PT. Serumpun Indah Lestari Jl.Pulau Solor no. 8, Kawasan Industri Medan II Medan 20252	Tel. +62 61 687 1221 Fax +62 61 6871429 / +62 61 6871458 / +62 61 30008041 sil@serumpunindah.com serumpunindah@yahoo.com http://www.serumpunindah.com

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Indonesia			
	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 20020 Solaro (Milano)	Tel. +39 02 96 980229 Fax +39 02 96 980 999 http://www.sew-eurodrive.it milano@sew-eurodrive.it
Ivory Coast			
Sales	Abidjan	SEW-EURODRIVE SARL Ivory Coast Rue des Pêcheurs, Zone 3 26 BP 916 Abidjan 26	Tel. +225 21 21 81 05 Fax +225 21 25 30 47 info@sew-eurodrive.ci http://www.sew-eurodrive.ci
Japan			
Assembly Sales Service	Iwata	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
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.kz sew@sew-eurodrive.kz
	Tashkent	Representative Office SEW-EURODRIVE Representative office in Uzbekistan 95A Amir Temur ave, office 401/3 100084 Tashkent	Tel. +998 97 134 01 99 Fax 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

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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

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

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Russia			
Assembly Sales Service	St. Petersburg	ЗАО «СЕВ-ЕВРОДРАЙФ» 188660, Russia, Leningrad Region, Vsevolozhsky District, Korabselki, Aleksandra Nevskogo str. building 4, block 1 P.O. Box 36 195220 St. Petersburg	Tel. +7 812 3332522 / +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Senegal			
Sales	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 http://www.senemeca.com senemeca@senemeca.sn
Serbia			
Sales	Belgrade	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor 11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs
Singapore			
Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Slovakia			
Sales	Bernolákovo	SEW-Eurodrive SK s.r.o. Priemyselná ulica 6267/7 900 27 Bernolákovo	Tel.+421 2 33595 202, 217, 201 Fax +421 2 33595 200 http://www.sew-eurodrive.sk sew@sew-eurodrive.sk
Slovenia			
Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
South Africa			
Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 248-7289 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 bgriffiths@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospecton Road Isipingo Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 902 3815 Fax +27 31 902 3826 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PROPRIETARY) LIMITED 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za
South Korea			
Assembly Sales Service	Ansan	SEW-EURODRIVE Korea Co., Ltd. 7, Dangjaengi-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-eurodrive.kr master.korea@sew-eurodrive.com

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South Korea			
	Busan	SEW-EURODRIVE Korea Co., Ltd. 28, Noksansandan 262-ro 50beon-gil, Gangseo-gu, Busan, Zip 618-820	Tel. +82 51 832-0204 Fax +82 51 832-0230
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 A.G. Jurastrasse 10 4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch
Taiwan			
Sales	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Huw S. Road Taipei	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 sewtwn@ms63.hinet.net http://www.tingshou.com.tw
	Nan Tou	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878 sewtwn@ms63.hinet.net http://www.tingshou.com.tw
Tanzania			
Sales	Daressalam	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam	Tel. +255 0 22 277 5780 Fax +255 0 22 277 5788 http://www.sew-eurodrive.co.tz info@sew.co.tz
Thailand			
Assembly Sales Service	Chonburi	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Tunisia			
Sales	Tunis	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 http://www.tms.com.tn tms@tms.com.tn

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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 Assembly Sales Service	Southeast Region	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Production +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly Sales Service	Northeast Region	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Wellford	SEW-EURODRIVE INC. 148/150 Finch Rd. Wellford, S.C. 29385	Tel. +1 864 439-7537 Fax +1 864 661 1167 IGOrders@seweurodrive.com
	Additional addresses for service provided on request!		
Vietnam			
Sales	Ho Chi Minh City	SEW-EURODRIVE PTE. LTD. RO at Hochiminh 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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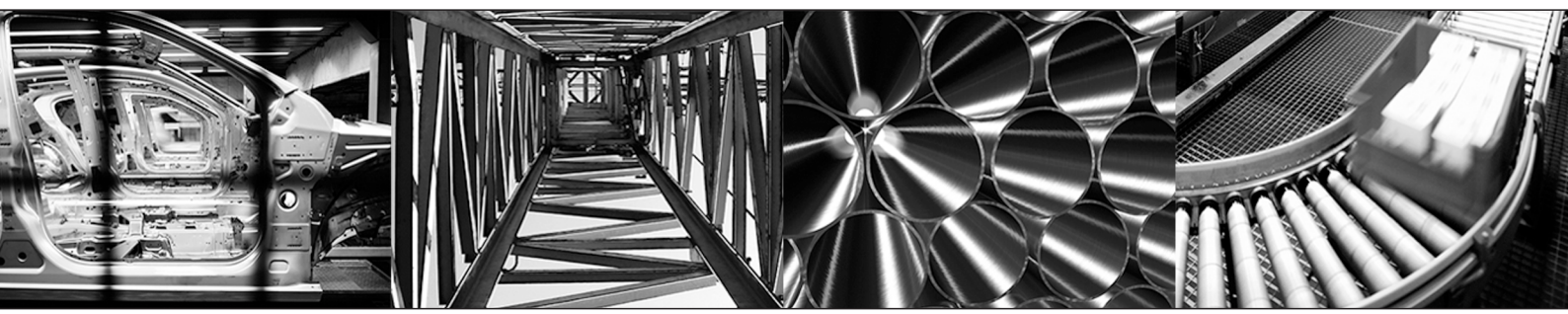

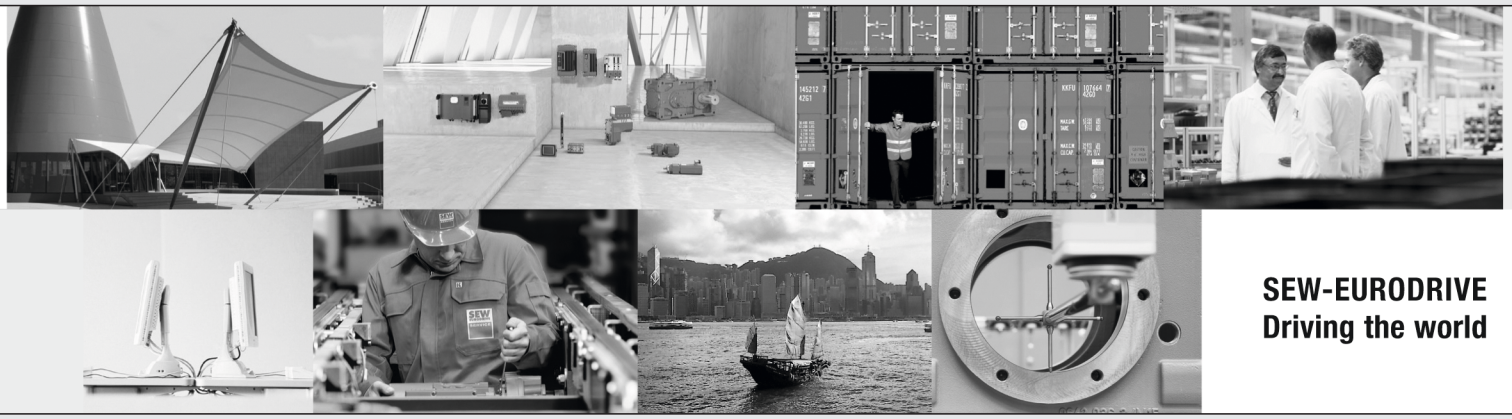

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