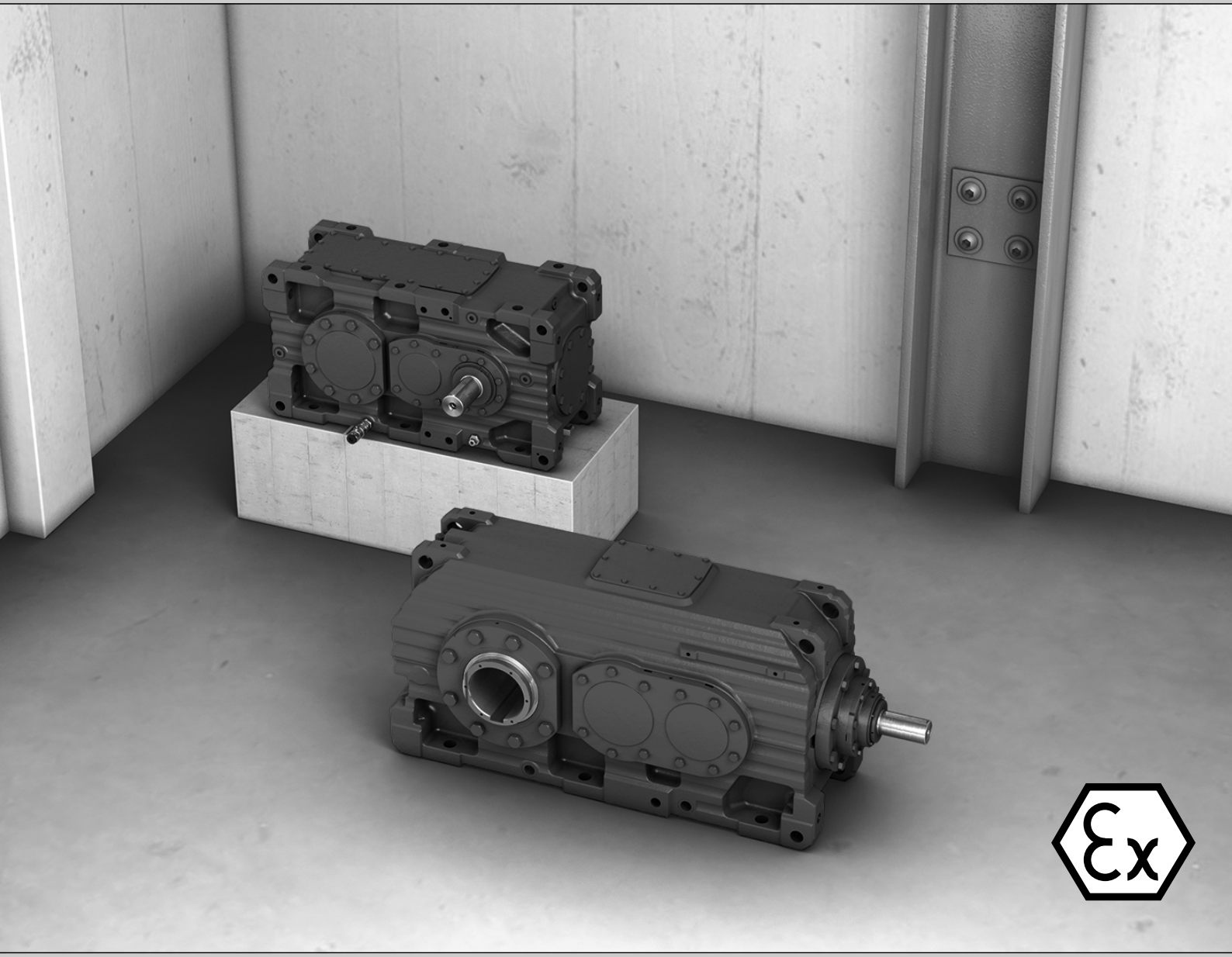
SEW EURODRIVE

Assembly and Operating Instructions



Explosion-Proof Industrial Gear Units

X.. Series Helical and Bevel-Helical Gear Units

Torque Classes from 6.8 kNm – 475 kNm

Edition 05/2018

23491256/EN

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1 General information

1.1 About this documentation

The current version of the documentation is the original.

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

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

1.2 Structure of the safety notes

1.2.1 Meaning of signal words

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

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

1.2.2 Structure of section-related safety notes

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

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

SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

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Meaning of the hazard symbols

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

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

1.2.3 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

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

1.3 Rights to claim under limited warranty

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

1.4 Copyright notice

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2 Safety notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The user must ensure that the basic safety notes are read and observed. Ensure that persons responsible for the machinery and its operation as well as persons who work on the unit 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, please contact SEW-EURODRIVE.

2.1 Preliminary remark

The following safety notes are primarily concerned with the use of gear units. If using gearmotors, also refer to the safety notes for motors in the corresponding operating instructions.

Also observe the supplementary safety notes in the individual sections of these operating instructions.

2.2 EAC marking

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

2.3 General information

INFORMATION

Explosive gas mixtures or concentrations of dust can lead to severe or fatal injuries in conjunction with hot, live, or moving parts of electrical machinery.

During operation, the gear units can have movable or rotating parts and hot surfaces.

Never install or start up damaged products. Submit a complaint to the shipping company immediately in the event of damage.

Removing covers without authorization, improper use, or incorrect installation and operation may result in severe injuries to persons or damage to machinery.

All work related to transportation, storage, installation, assembly, connection, startup, operation, maintenance and repair may only be carried out by qualified specialists, in strict observance of:

- The relevant detailed operating instructions.
- The warning and safety signs on the gear unit and, if necessary, on the motor.
- All other project planning documents, operating instructions and wiring diagrams related to the drive.
- The specific regulations and requirements for the system.
- The national/regional regulations governing safety and the prevention of accidents.

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Refer to the documentation for more information.

2.4 Target group

Specialist for mechanical work

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

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

Specialist for electrotechnical work

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

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

Instructed persons

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

All qualified personnel must wear appropriate protective clothing.

2.5 Designated use

The gear units are intended for industrial systems and may only be used in accordance with the information provided in SEW-EURODRIVE's technical documentation and the information given on the nameplate. They meet the requirements of the applicable standards and regulations and comply with the following directives and standards regarding explosion protection:

- Directive 2014/34/EU
- EN ISO 80079-36
- EN ISO 80079-37
- EN 60079-11

In compliance with the EC Machinery Directive 2006/42/EC, the industrial gear units are components 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.

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INFORMATION

It is essential that you observe the following information on explosion protection:

- A drive motor connected to the gear unit may only be operated under the conditions described in the chapter "Starting up gear units in potentially explosive atmospheres" (→ 🗎 229).
- Operate any motor connected to the gear unit on the frequency inverter only if the data on the gear unit nameplate is met.
- A motor mounted to a gear unit by means of an adapter or belt may only be operated if the data on the gear unit nameplate is met.
- Make sure that there are no aggressive substances in the vicinity that could damage the paint and seals.
- SEW-EURODRIVE delivers the gear units with a painting that complies with the requirements for preventing electrostatic charging according to EN ISO 80079-36. If you have to repaint a gear unit, you have to meet the requirements for preventing electrostatic charging according to EN ISO 80079-36.

2.6 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 "Explosion-Proof AC Motors" operating instructions
- If required, the operating instructions of the options installed

2.7 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**.

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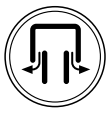
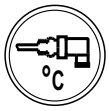
Safety symbol	Meaning
	Indicates the position of the **breather**. Serves to avoid mistaking the oil measuring position for the venting position.
	Helps avoid errors caused by lack of understanding. Read the information in the operating instructions.
	Indicates the positions for **relubrication** and 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.
	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: Burns caused by hot surface.
	Caution: Removing the oil dipstick during operation may result in damage to the gear unit.

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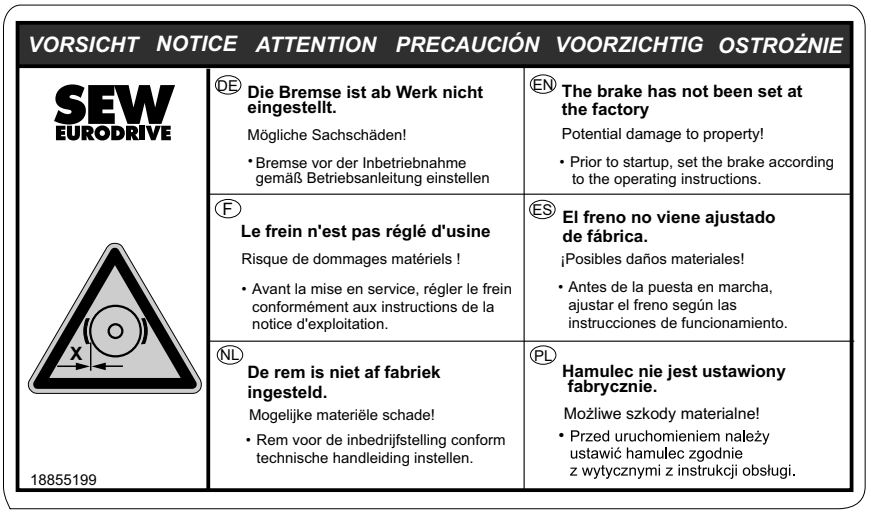
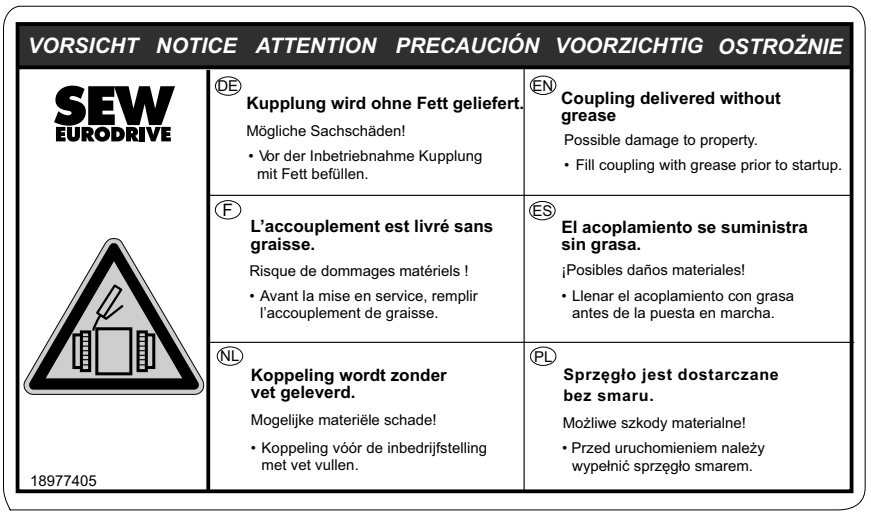
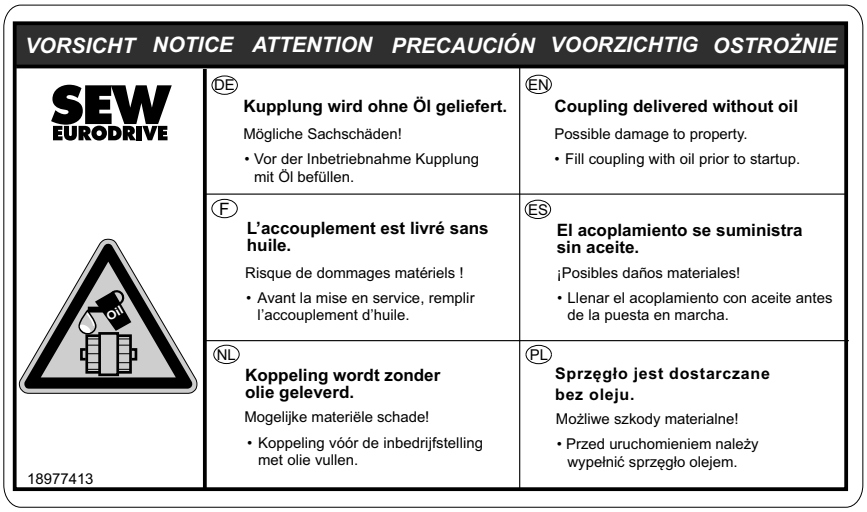
Safety symbol	Meaning
	Caution: Risk of burns due to hot gear oil.

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

Meaning
The brake is not set at the factory.  *9007204570571147*
The coupling is supplied without grease.  *9007204570573323*

Meaning

The coupling is supplied without oil.



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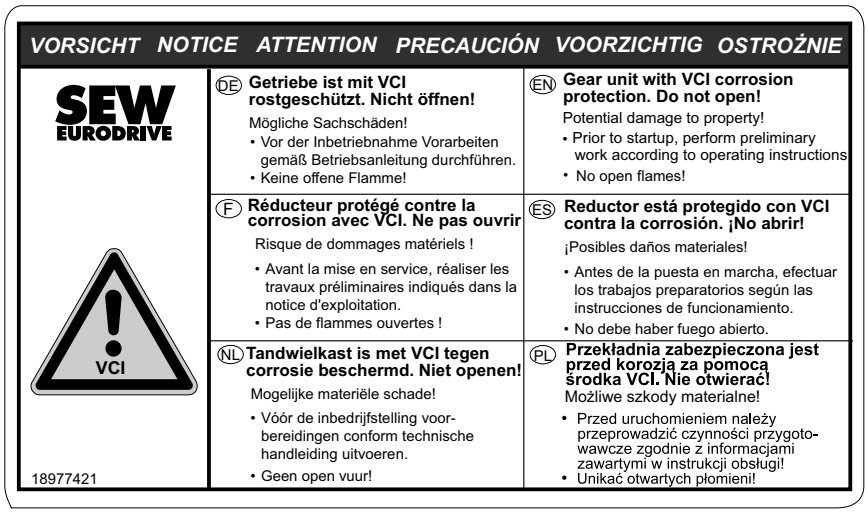
The gear unit is protected against corrosion with VCI.



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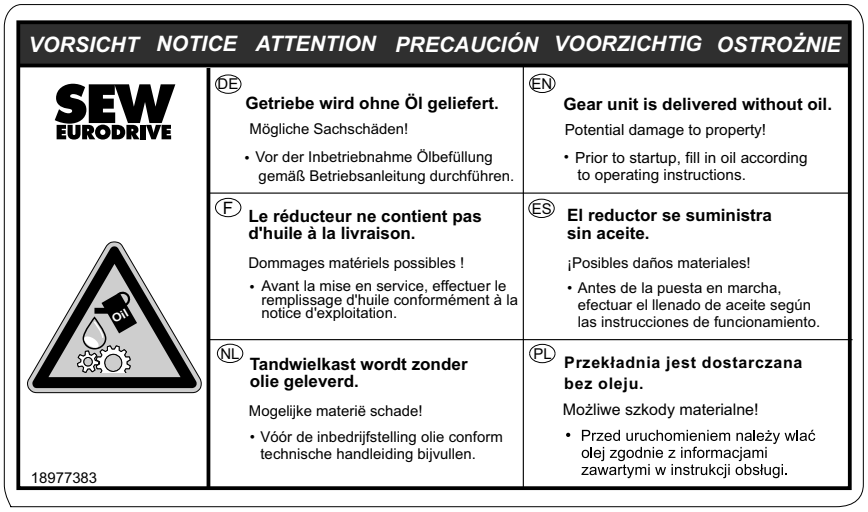
Meaning
The gear unit is supplied without oil.



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2.8 Symbols on the dimension sheet

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

Symbol	Meaning
	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 **oil filling location**.
	Indicates the **oil drain**.
	Indicates the position of the **breather**.
	Indicates the position of the **relubrication points**.
	Indicates the position of the **relubrication points**.
	Indicates the position of the **relubrication points**.
	Indicates the position of the **grease outlet**.

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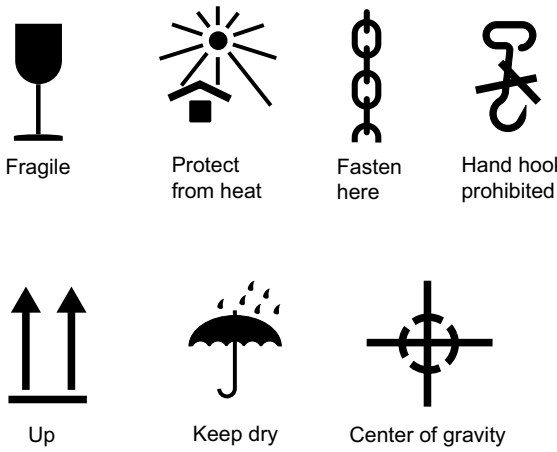
Symbol	Meaning
	Indicates the **water inflow** with connection dimensions.
	Indicates the **water return** with connection dimensions.
	Indicates the **oil inflow**.
	Indicates the **oil return**.
	Indicates the position of the **magnetic screw plug**.
	Indicates the position of the **inspection cover**.
	Indicates the position of the attachment points for **transport**.
	Indicates the position of the **torque arm**.
	Indicates the position of the operator's **vibration sensor** with connection dimensions.
	Indicates the position of the **air outlet screw**.
	Indicates the position of the **oil heater**.
	Indicates the **oil level plug**.

2.9 Symbols on the packaging

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



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2.10 Transport

2.10.1 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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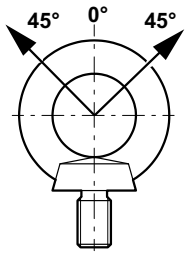
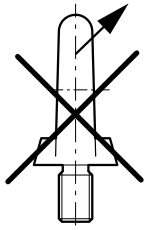
NOTICE

Improper transport can damage the gear unit.

Possible damage to property.

- Note the following information.

- Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. It may be necessary to suspend startup.
- The weight of the gear unit (without oil) is indicated on the nameplate or on the dimension sheet. Observe the loads and specifications given there.
- If possible, transport the gear unit without oil fill. If this is not possible, note that the weight indicated on the nameplate refers only to the no-load weight of the gear unit, 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 mount-on components. For example, impacts against exposed shaft ends can damage the gear unit.
- Use only the prescribed suspension points [1] to transport the gear unit (see order documents). The load suspensions of the motor or mount-on components are provided for stabilization purposes only.
- Observe that the eyebolts are screwed in completely and must be flush to 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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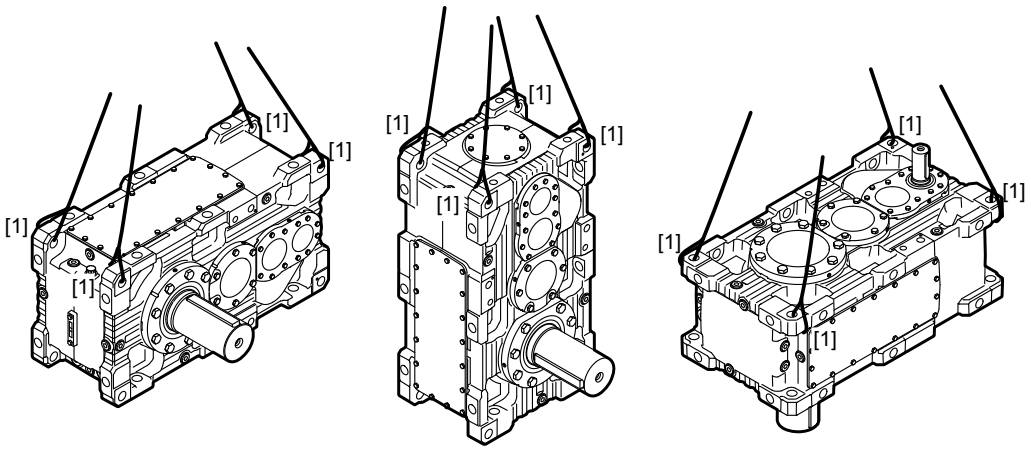
2.10.2 Universal housing /HU

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



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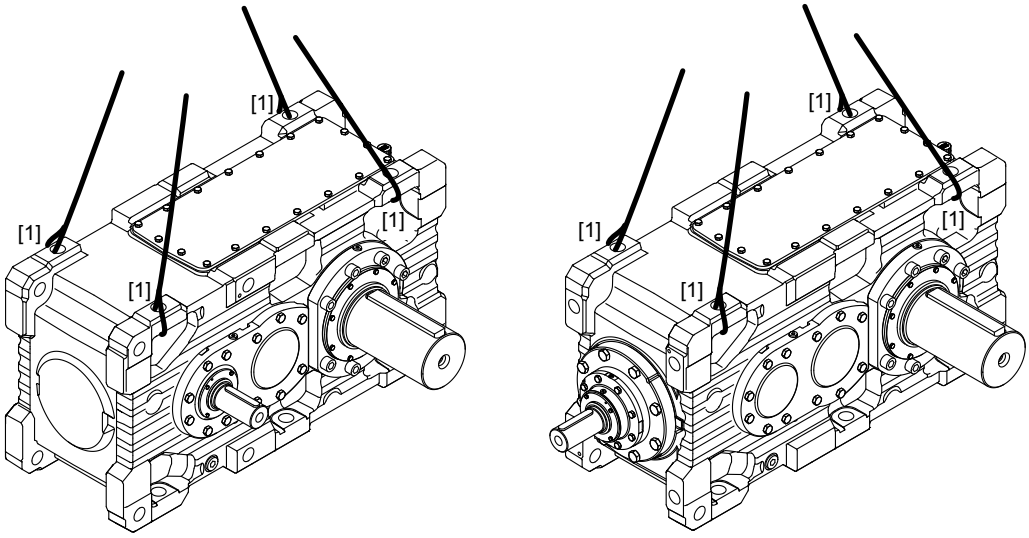
2.10.3 Horizontal housing /HH

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

Sizes X100 – 210



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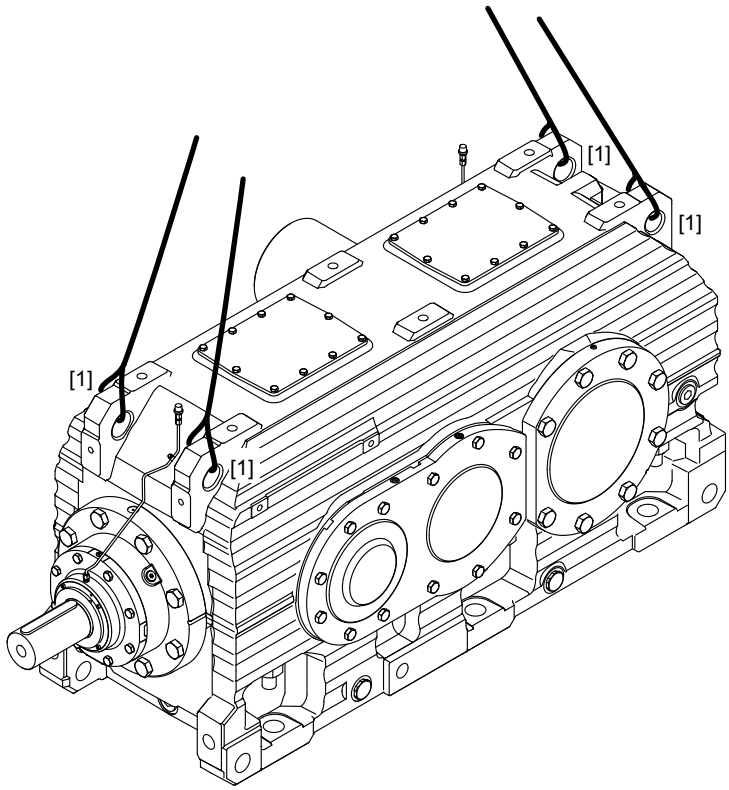
Sizes X220 – 320



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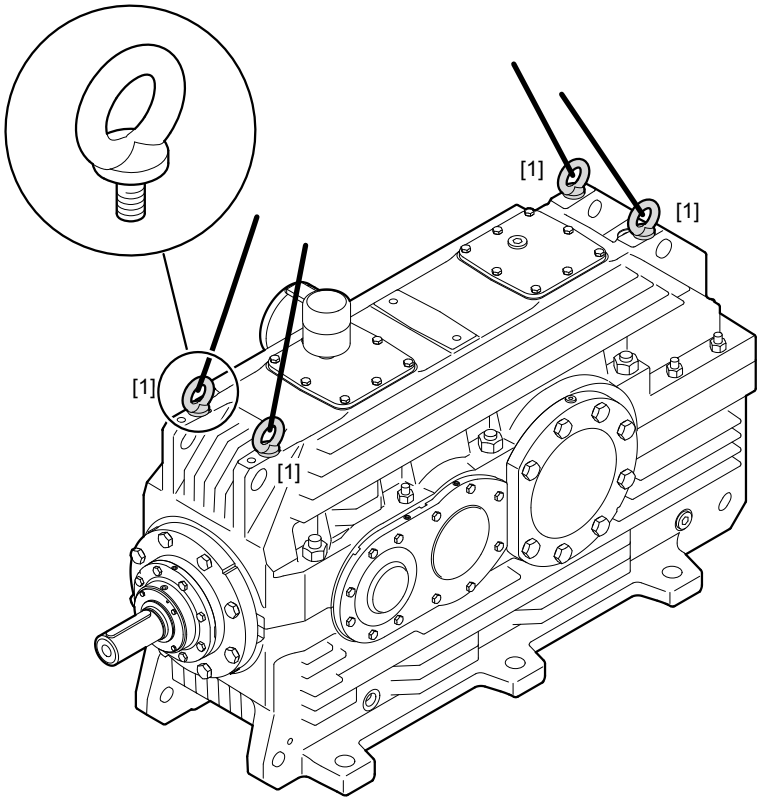
2.10.4 Thermal housing /HT

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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2.10.5 Agitator housing /HA

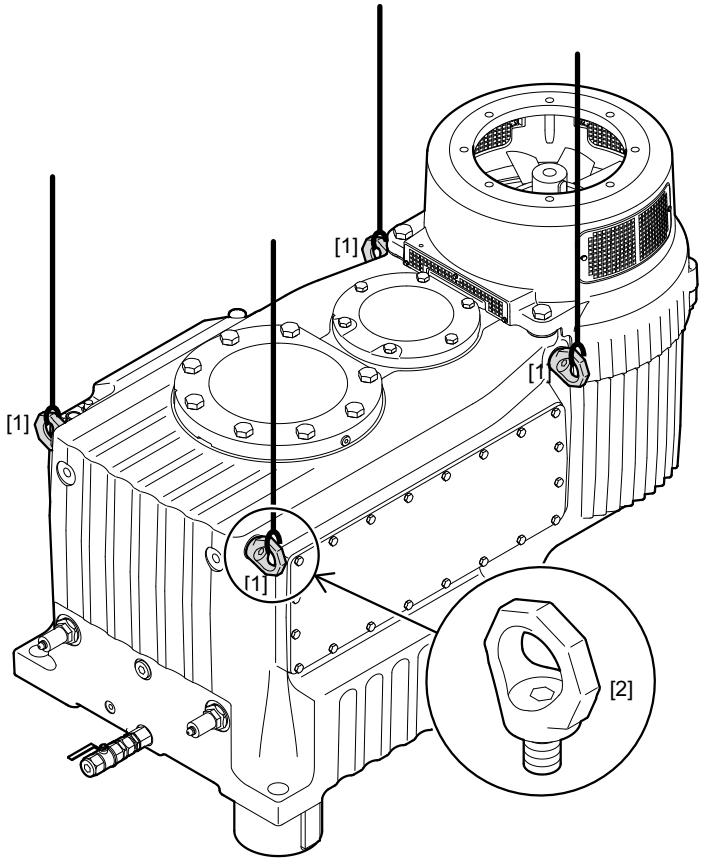
The user is responsible for transport. For an example of the internal SEW-EURODRIVE plant specifications, refer to the following table. The values in the table are only valid for transport with **4** attachment points [1] and without mount-on components, such as external cooling systems.

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.



15466449163

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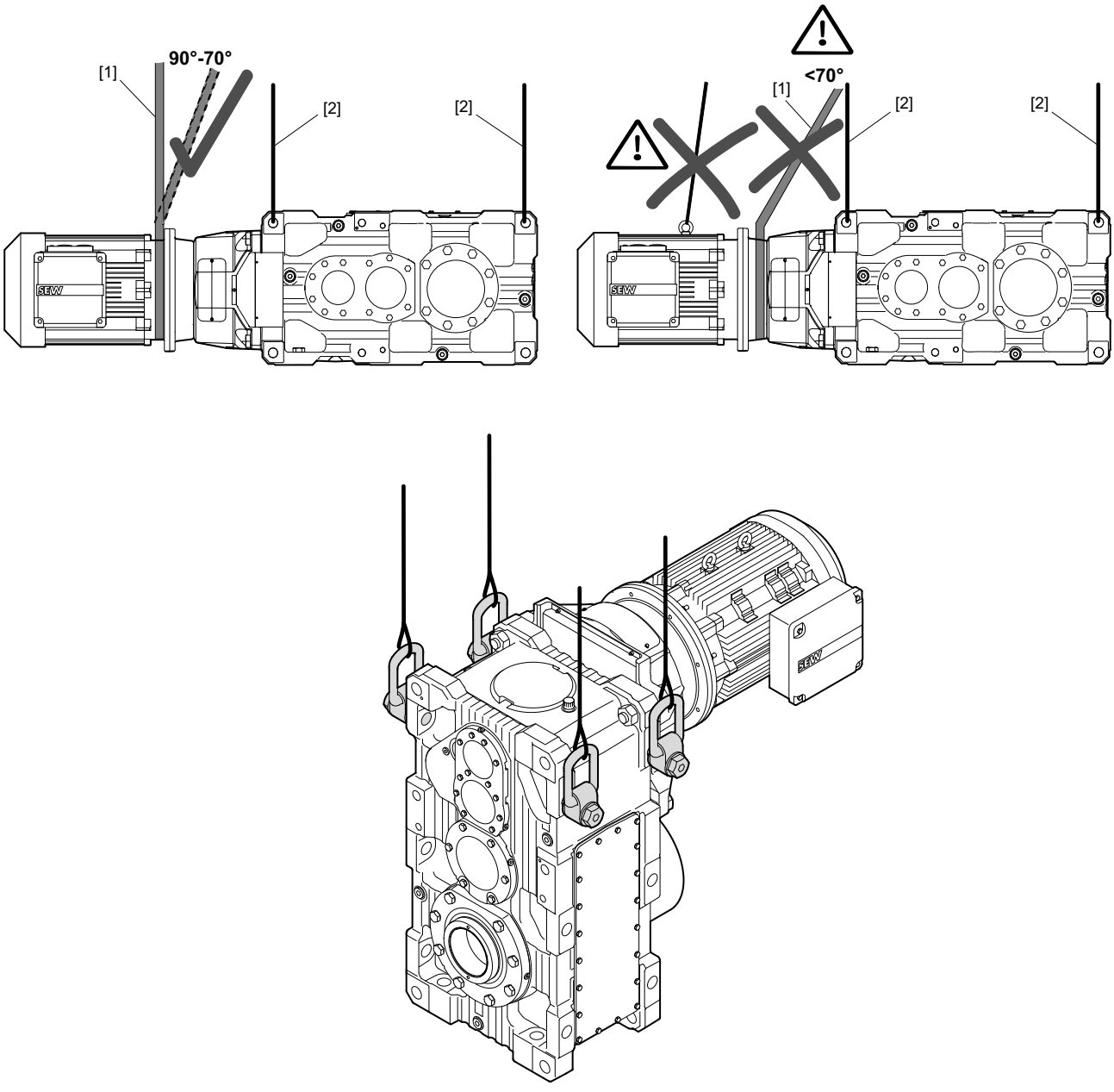
2.10.6 Gear units with motor adapter

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.

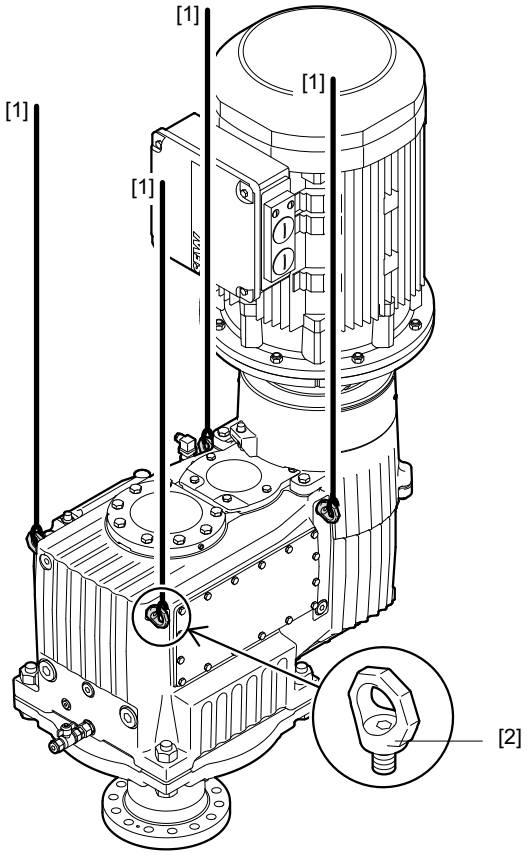


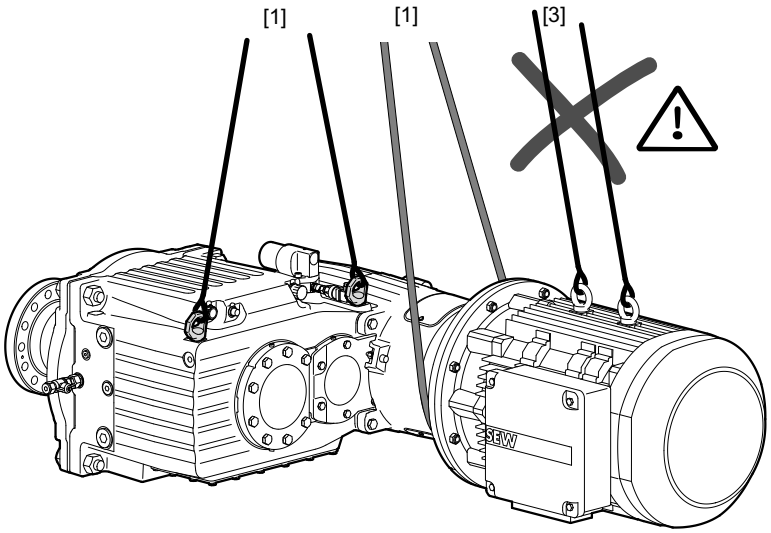
15582989195

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.

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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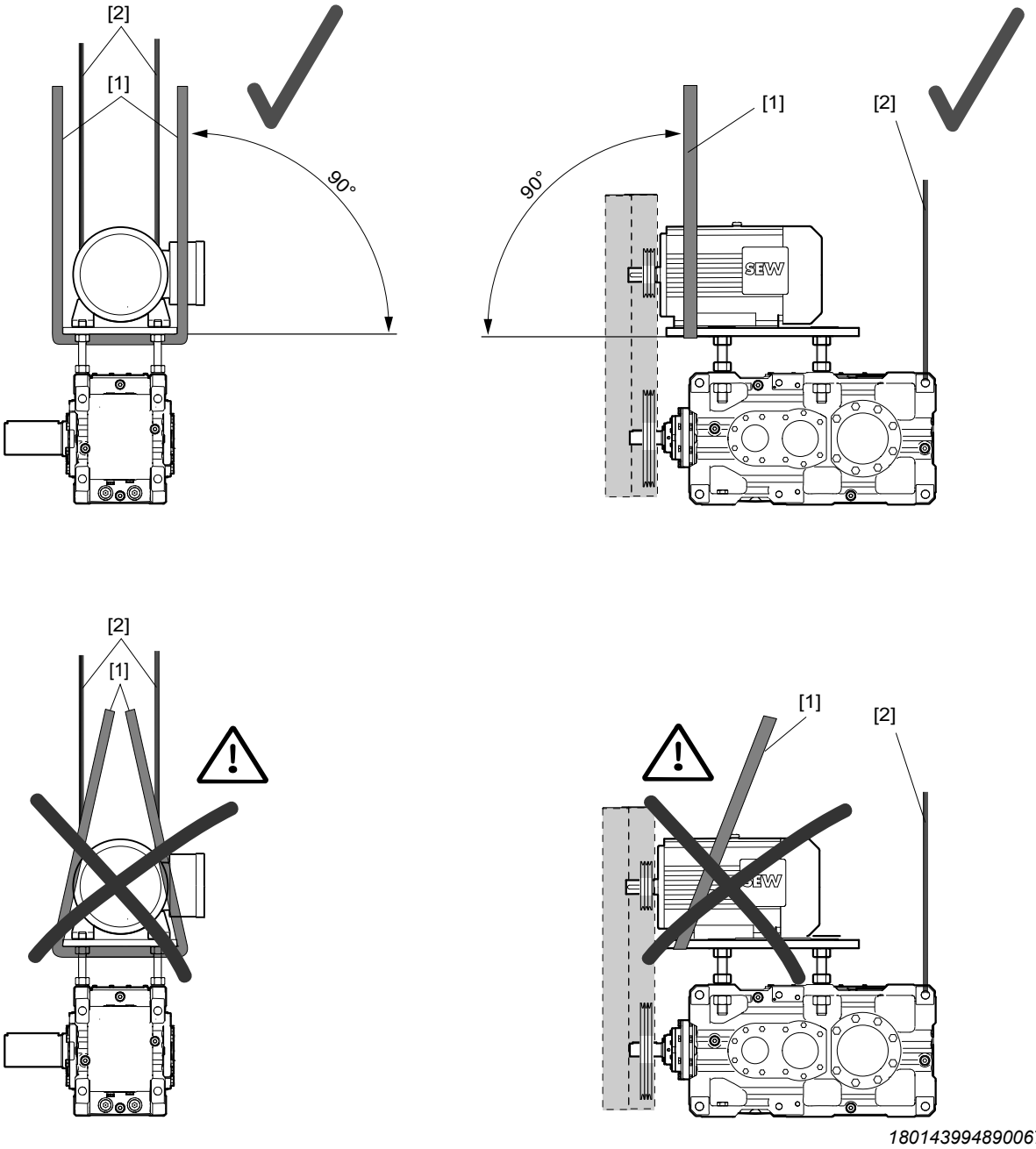
2.10.7 Gear units with V-belt drive

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.

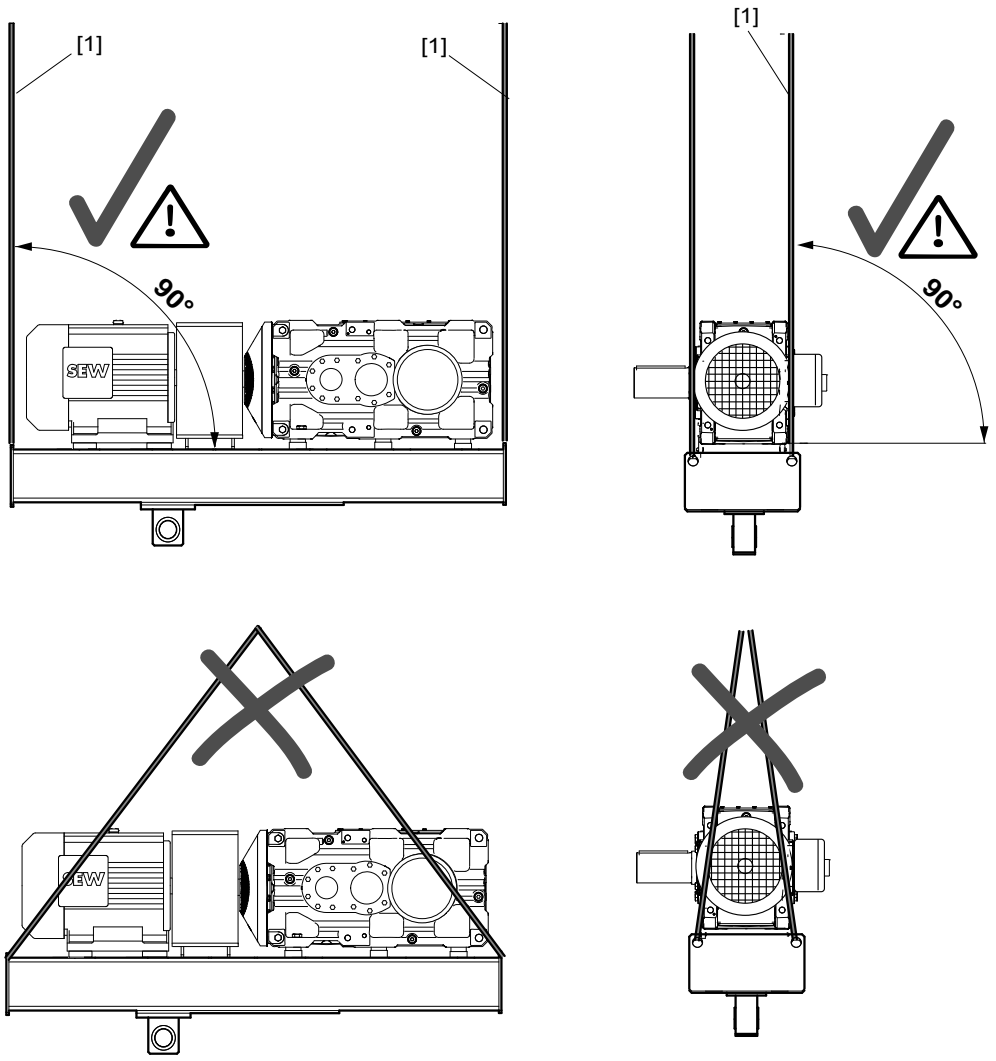


18014399489006731

2.10.8 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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2.11 Storage and transport conditions

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

2.11.1 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.

2.11.2 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.

2.11.3 Packaging

Standard packaging

The gear unit is delivered on a pallet, securely attached and without 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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2.11.4 Storage conditions

NOTICE

Improper storage may result in damages to the gear unit.

Possible damage to property.

- During storage up to startup, the gear unit must be stored in a shock-free manner to prevent damage to the rolling bearing raceways.
- The output shaft must be rotated at least one full rotation every 6 months so that the position of the rolling elements in the bearings of the input and output shafts changes.

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 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	With 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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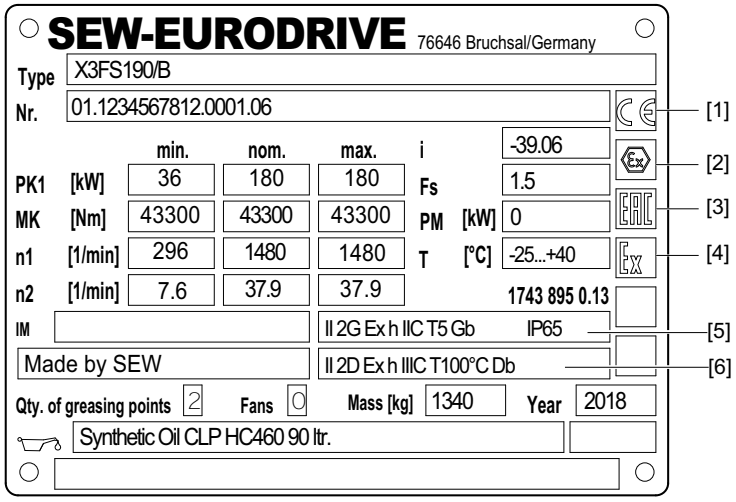
3 Basic gear unit structure

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.



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Type		Type designation
Nr.		Serial number
P_{K1}	kW	Operating power on the input shaft (HSS)
M_{K2}	Nm	Gear unit output torque
n_1	1/min	Input speed (HSS)
n_2	1/min	Output speed (LSS)
min.		Minimum operating point
norm.		Normal operating point
Max.		Maximum operating point
i		Exact gear unit ratio
F_S		Service factor
PM1	kW	Nominal motor power
T_a	°C	Deviation from standard temperature range (−20 °C to +40 °C)
IM		Mounting position and mounting surface
Qty. of greasing points		Number of points that require regreasing
Fans		Number of installed fans
Mass	kg	Weight of the gear unit
Year		Year of manufacture
		Oil grade and viscosity class/oil quantity
[1]		CE symbol
[2]		ATEX symbol
[3]		EAC symbol
[4]		Explosion protection symbol

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[5]		Indicates gas explosion protection with degree of protection
[6]		Indicates dust explosion protection

INFORMATION

In some cases, SEW gear units may only be operated in compliance with special measures. These cases are indicated by the special mark **"X"** on the nameplate (for example II2G Ex h IIC T5 Gb **X**). These special measures may be necessary for various reasons (e.g. only intermittent duty, etc.). Special measures are documented in an addendum to the operating instructions. The addendum to the operating instructions must be adhered to.

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-stage • 3 = 3-stage • 4 = 4-stage
K	Gear unit design • F = Helical gear unit • K = Bevel-helical gear unit • T = Helical-bevel 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
250	Gear unit sizes • 100 – 320
HU	Housing design • HU = Universal housing • HH = Horizontal housing • /HA = Agitator housing • HT = Thermal housing

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B	Gear unit mounting • /B = Foot mounting • /T = Torque arm • /F = Flange

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

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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

3.2.4 Abbreviations for optional accessories

The table shows the abbreviations used and what they mean.

Abbreviation	Meaning
BF	Base frame
BS	Backstop
BSL	Torque-limited 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
HSST	Through-going input shaft
LSST	Through-going output shaft
MA	Motor adapter
SB	Swing base
SEP	Shaft end pump
T	Torque arm

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Abbreviation	Meaning
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	Pressure lubrication and motor pump
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 and universal housing.

3.3 Mounting positions

3.3.1 Definition

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

	Standard mounting position (shown in gray in the illustration below)	Alternative mounting position
Horizontal gear unit	M1	M3
Vertical gear unit	M5	M6
Upright gear unit	M4	M2

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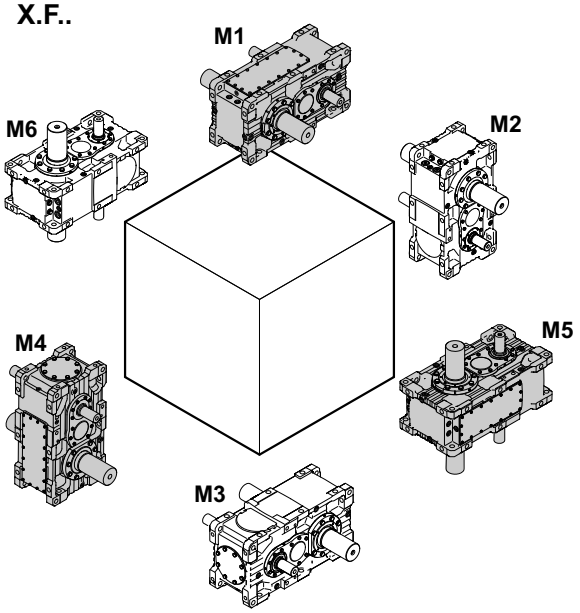
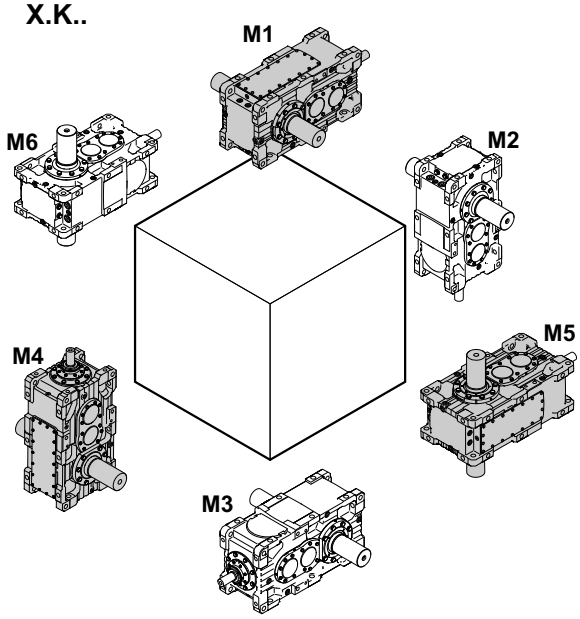
With the alternative mounting positions, there might be limitations regarding certain options. Consult SEW-EURODRIVE in this case.

X.F..



X.K..



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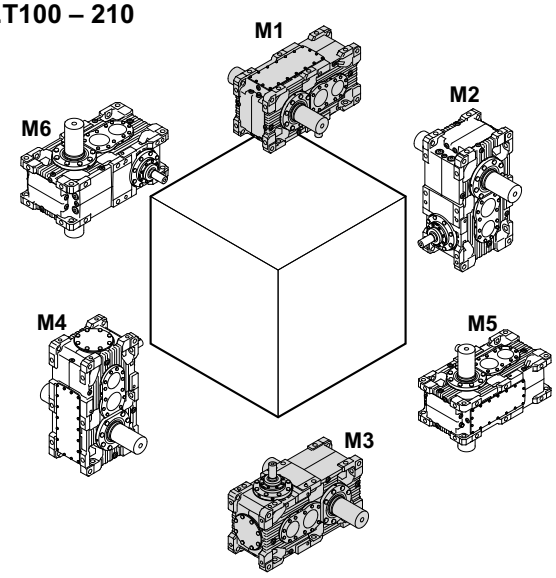
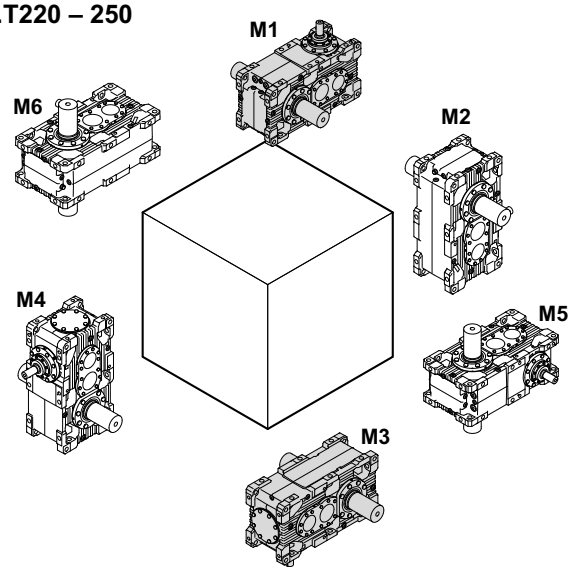
X.T100 – 210



X.T220 – 250



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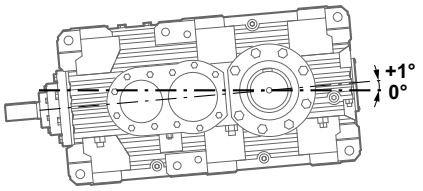
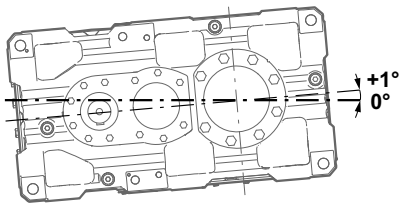
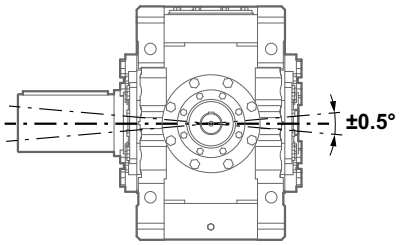
3.3.2 Deviating mounting positions

Note that the following deviating mounting positions are permitted for X.F.. and X.K.. gear units in mounting positions M1 and M3. Data is based on a gear unit without pivoted mounting position.

X.F100 – 320 and X.K100 – 320		
X.K.. Mounting position M1 and M3	**X.F.. Mounting position M1 and M3**	**X.F.. and X.K.. Mounting position M1 and M3**
		

INFORMATION

Deviations in mounting position of **±1°** are permitted for the following gear units:

- X.F.. and X.K.. in mounting positions M2, M4, M5, M6.
- X.T.. in mounting positions M1, M2, M3, M4, M5, M6.

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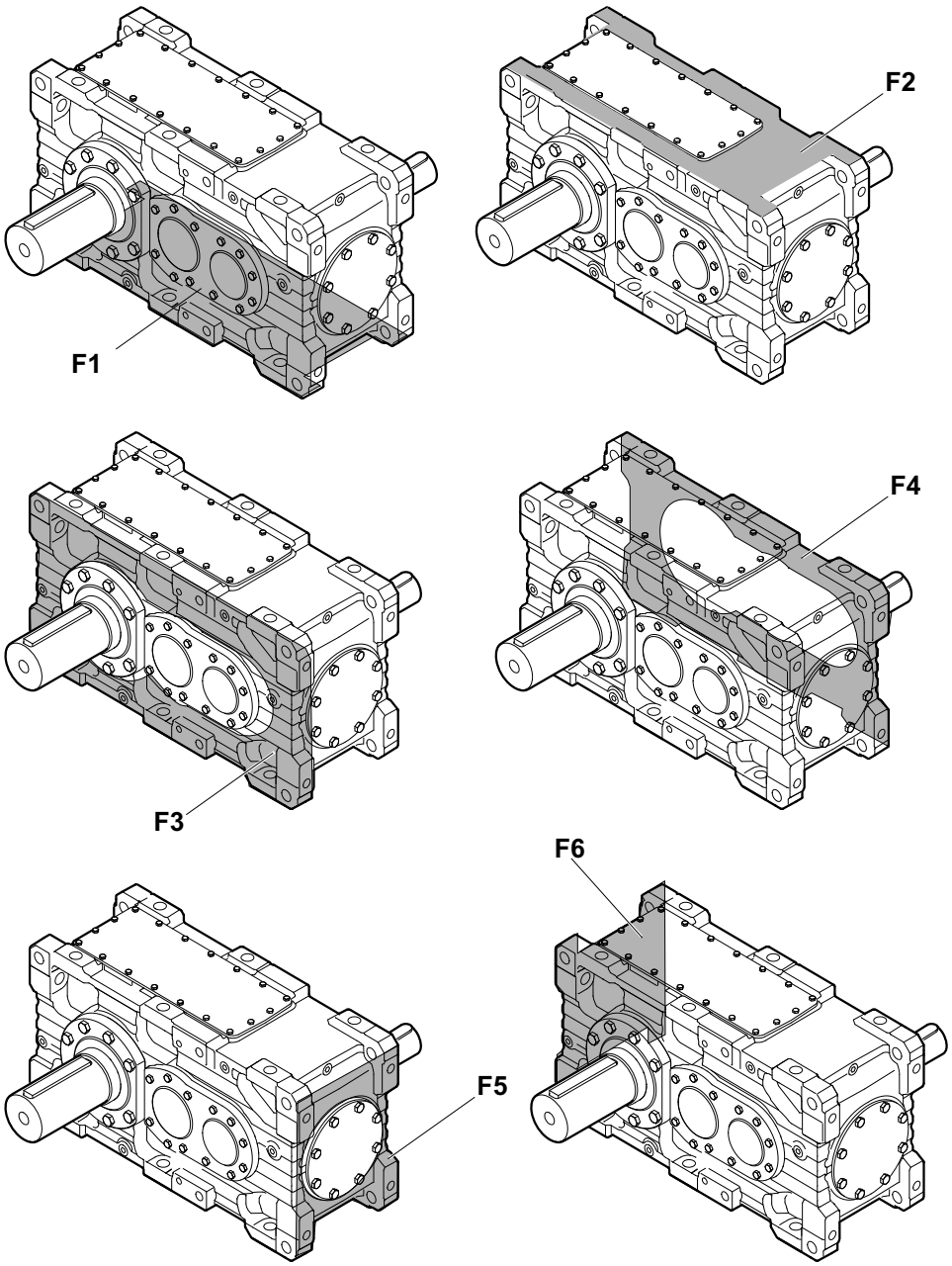
3.4 Mounting surfaces

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.

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



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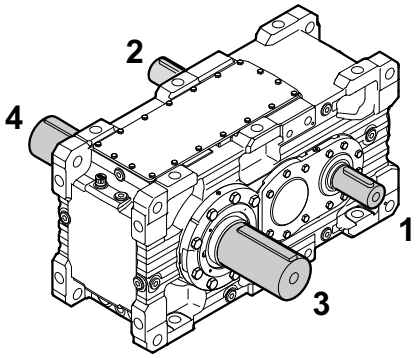
3.5 Shaft positions

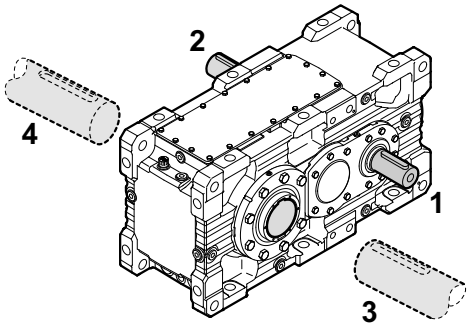
The shaft positions (**0 – 6**) shown in the following figures apply to solid and hollow output shafts. For other shaft positions or gear units with backstop, contact SEW-EURODRIVE.

3.5.1 X.F..

Shaft position X.FS..

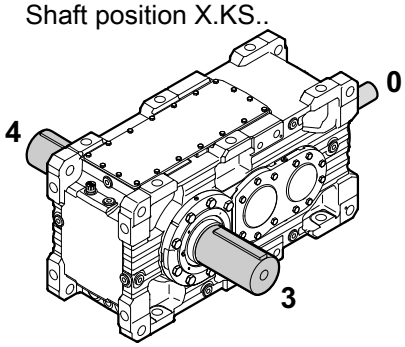


Shaft position X.FH..

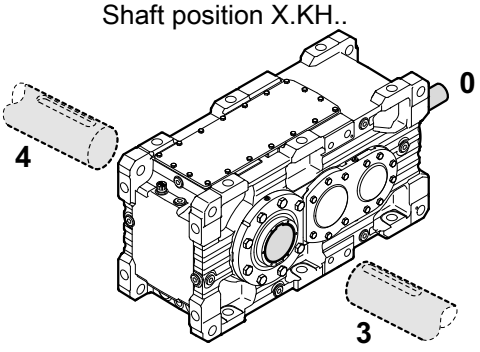


3.5.2 X.K..

Shaft position X.KS..



Shaft position X.KH..



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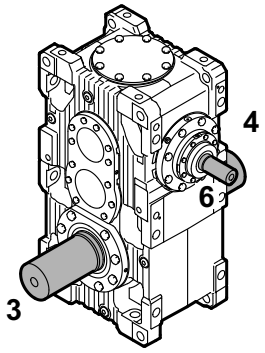
3.5.3 X.T..

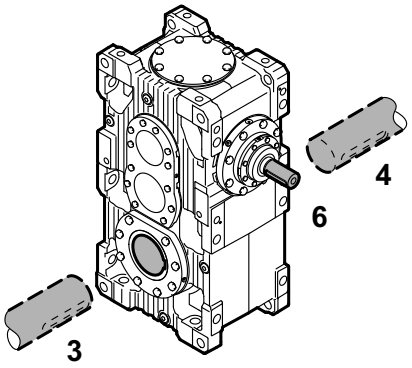
The following shaft positions are possible for gear unit type X.T..

Sizes X100 – 210

Shaft position X.TS..

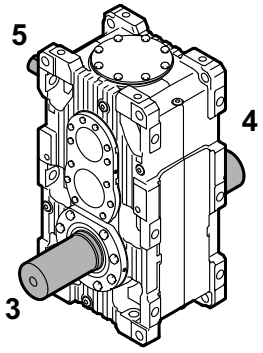


Shaft position X.TH..

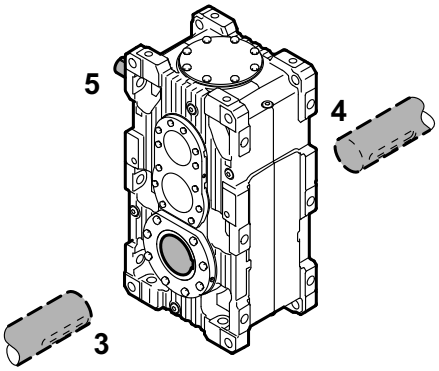


Sizes X220 – 250

Shaft positions X.TS..



Shaft positions X.TH..



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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.

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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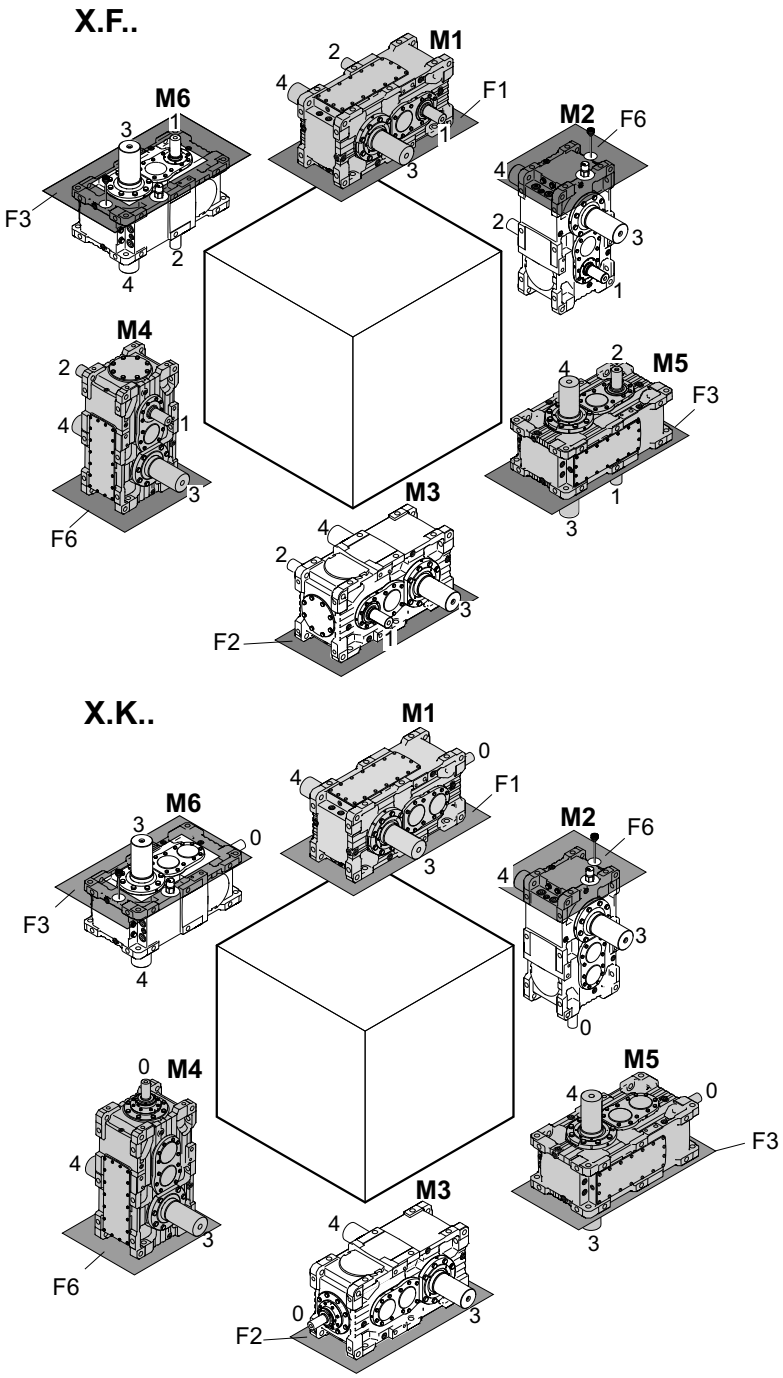

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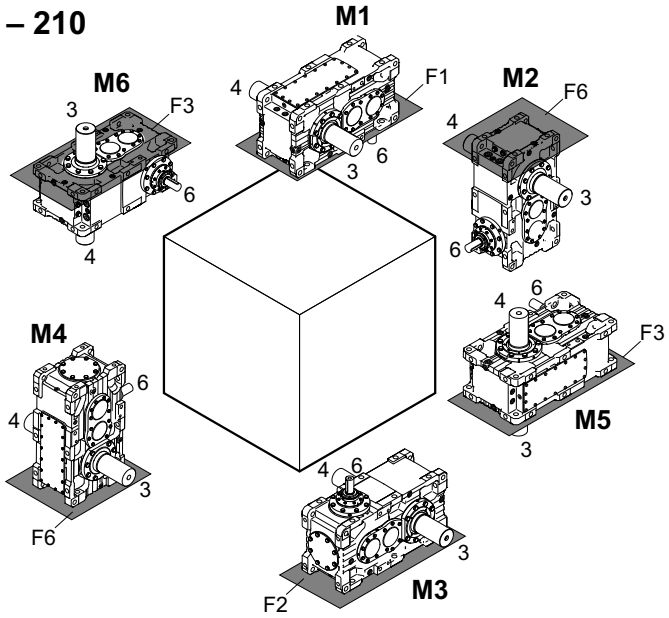
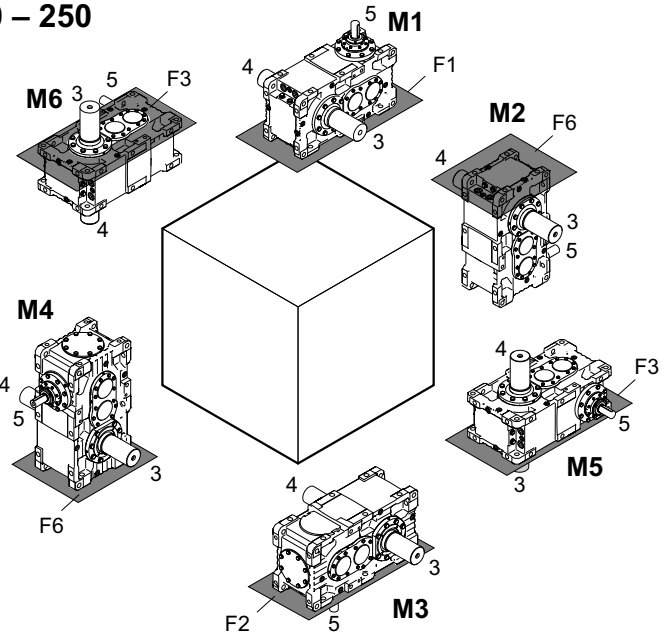
X.T100 – 210



X.T210 – 250



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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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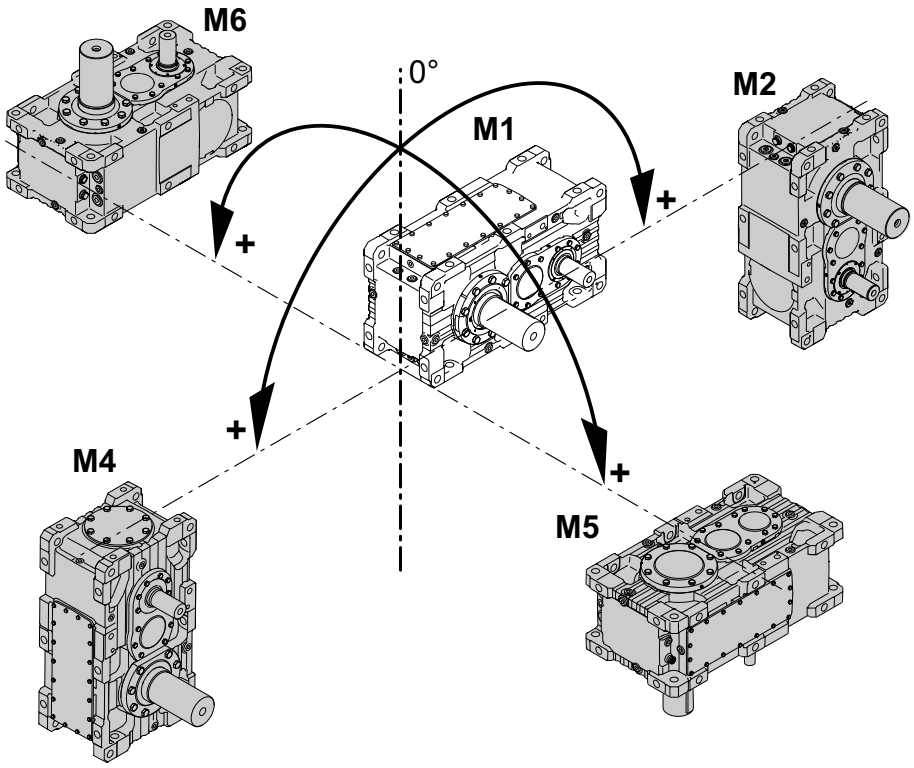
3.7 Fixed and variable pivoted mounting positions

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°

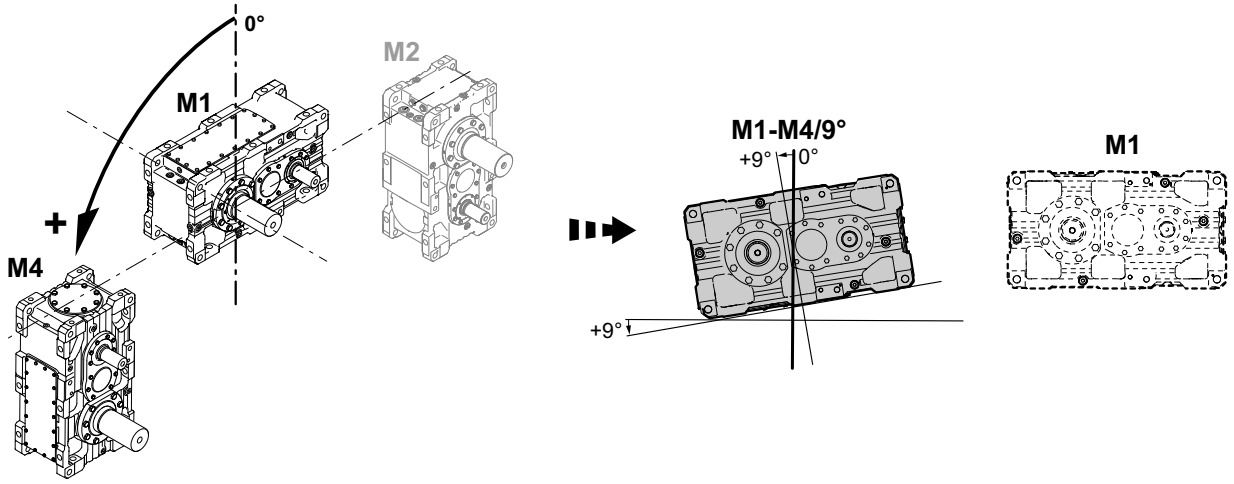
M1 = Initial mounting position

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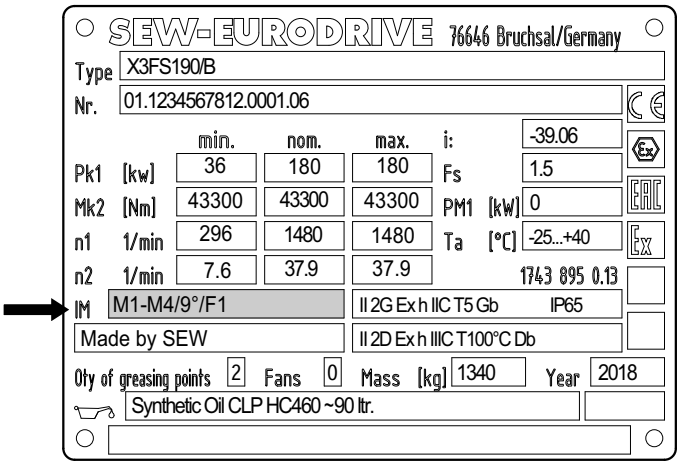
The oil level is checked in the selected fixed pivoted mounting position.

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



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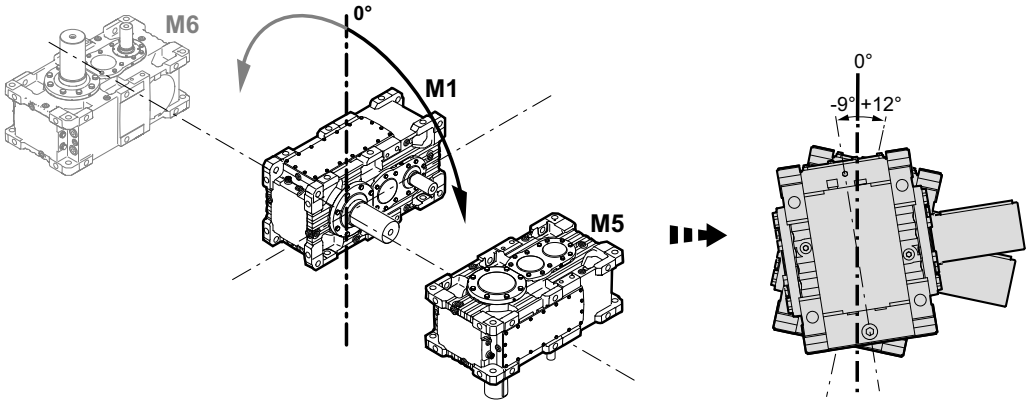
3.7.2 Variable pivoted mounting position

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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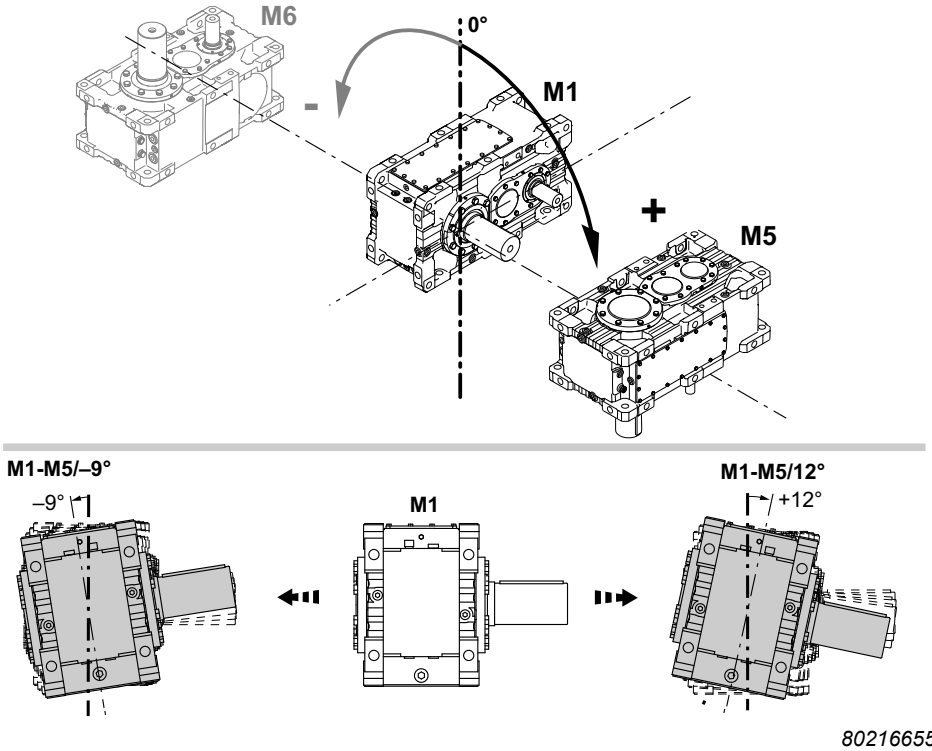
Step 1:

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°

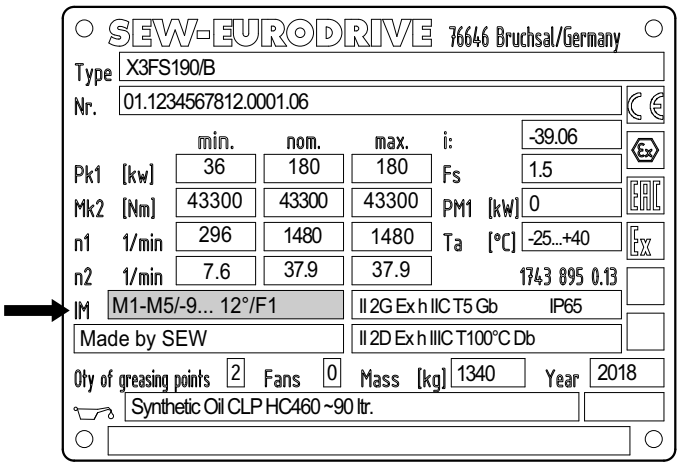
M1 = Initial mounting position

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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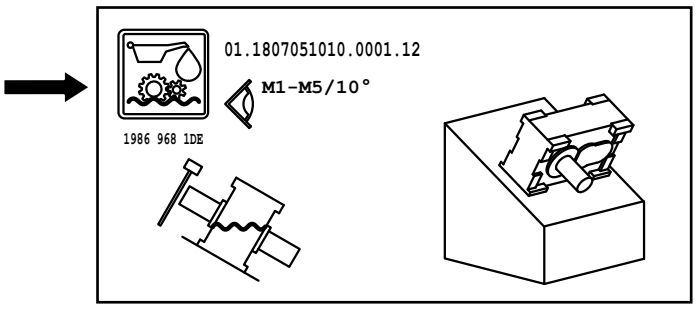
Step 2:

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 indicates the mounting position for checking the oil level.



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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:

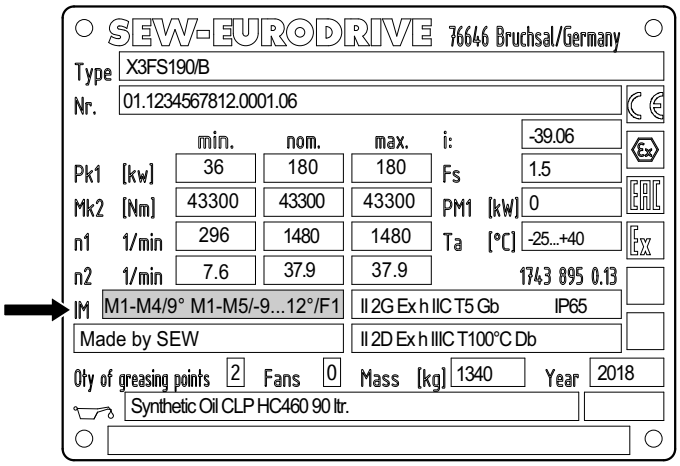
M1-M4/9° (fixed pivoted mounting position)

M1	= Initial mounting position
M4	= Pivoting direction
9°	= Fixed pivoting angle

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

M1	= Initial mounting position
M5	= Pivoting direction
12°	= 12° from M1 to M5
–9°	= -9° from M1 to M5 (= 9° from M1 to M6)

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



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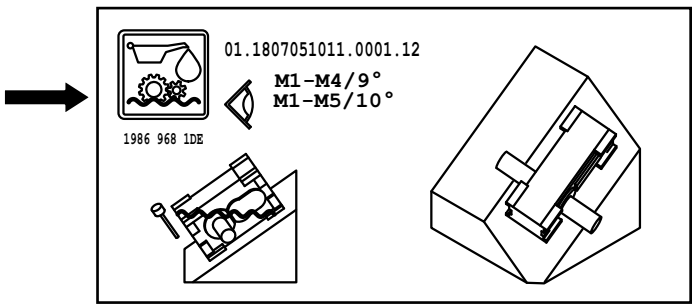
When combining fixed and variable pivoted mounting positions, the customer must determine the variable pivoting angle at which the oil level is checked. The fixed angle for the oil level check is already defined.

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

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



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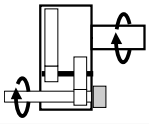
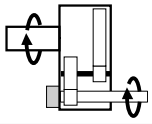
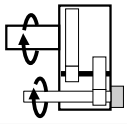
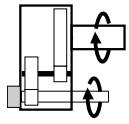
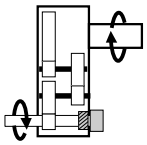
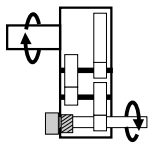
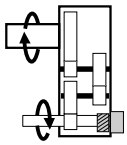
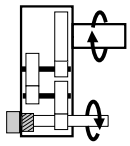
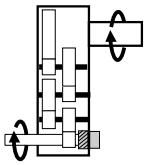
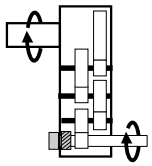
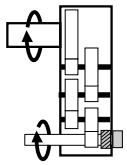
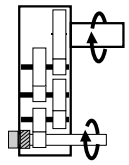
3.8 Corresponding directions of rotation

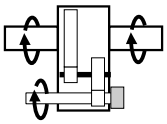
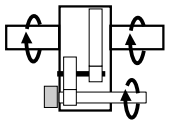
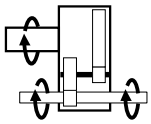
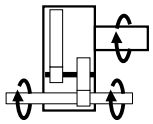
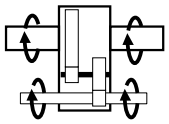
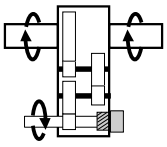
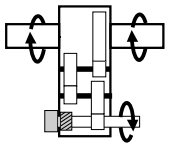
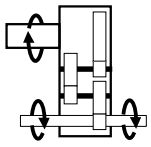
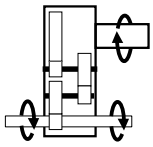
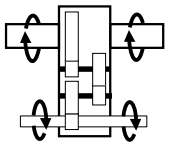
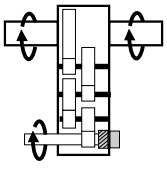
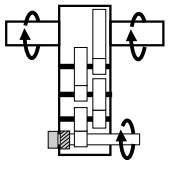
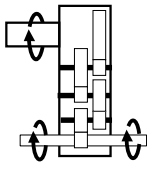
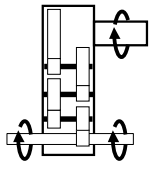
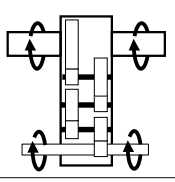
The gear unit can be operated in both directions of rotation. An exception are gear units with backstop.

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" (→ 🗎 38).

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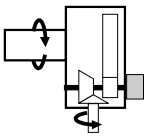
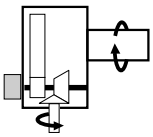
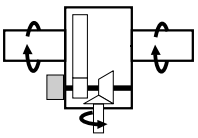
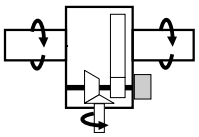
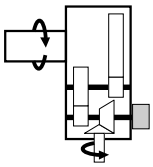
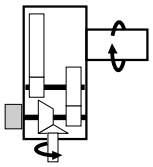
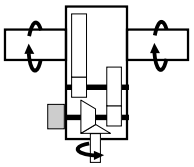
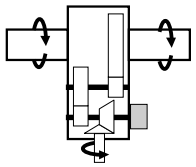
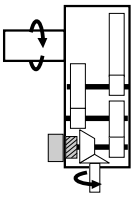
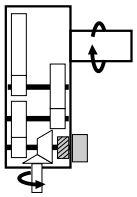
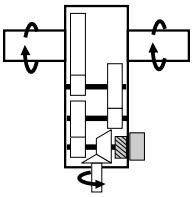
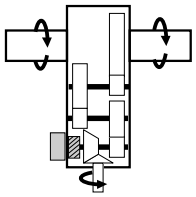
3.8.2 X.K..

Standard

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

▯ = Position of the backstop

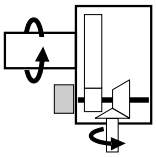
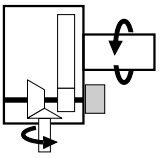
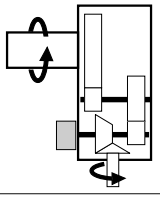
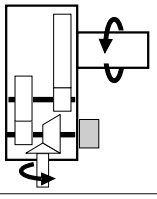
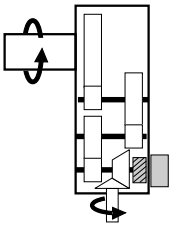
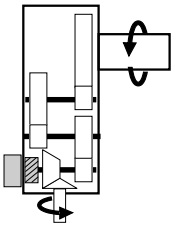
▨ = Alternative backstop position (depending on size and gear ratio)

* = 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" (→ 🗎 38).

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" (→ 🗎 38).

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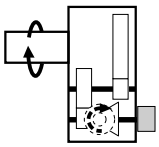
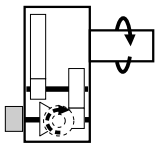
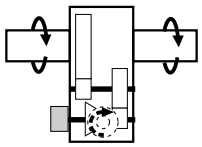
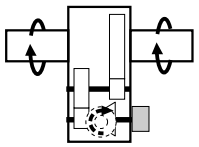
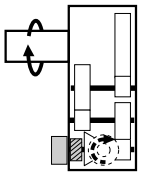
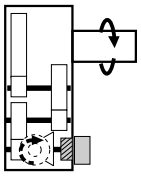
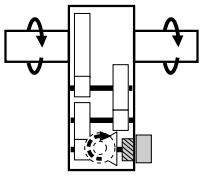
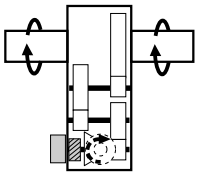
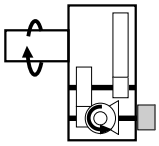
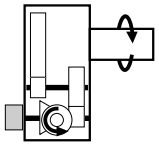
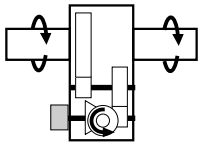
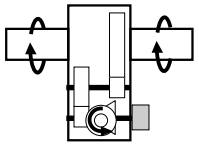
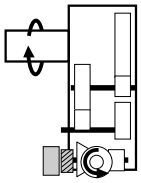
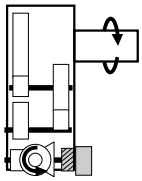
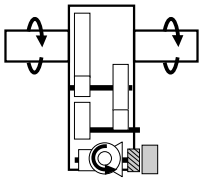
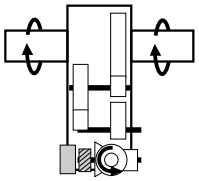
3.8.3 X.T..

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

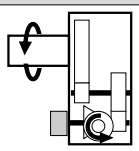
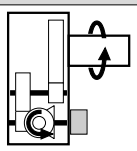
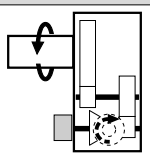
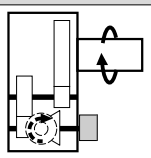
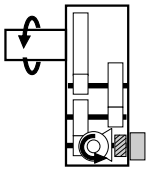
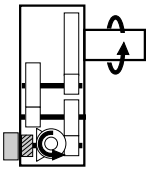
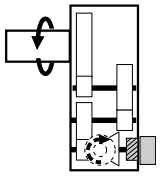
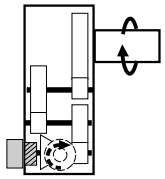
▨ = Alternative backstop position (depending on size and gear ratio)

* = 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" (→ 🗎 38).

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" (→ 🗎 38).

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3.9 Housing designs

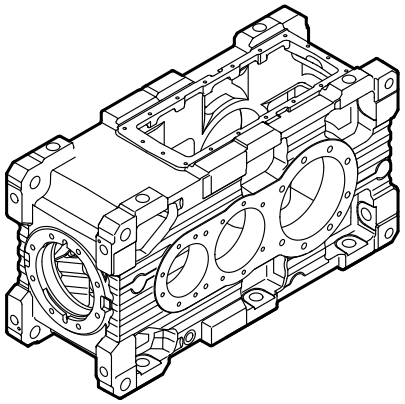
The gear unit comes equipped with the following housing type:

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:



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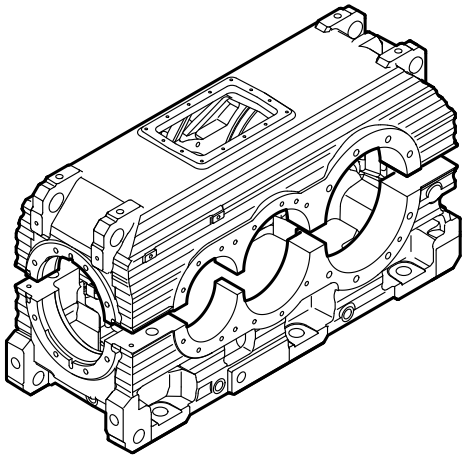
Two-piece housing

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



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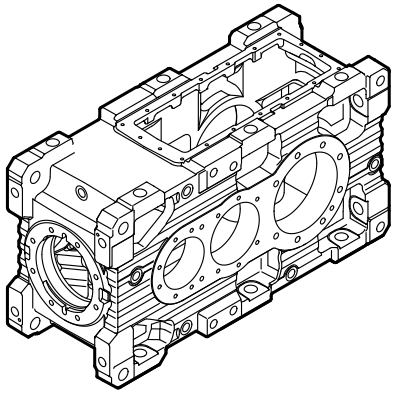
3.9.2 Universal housing /HU

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:



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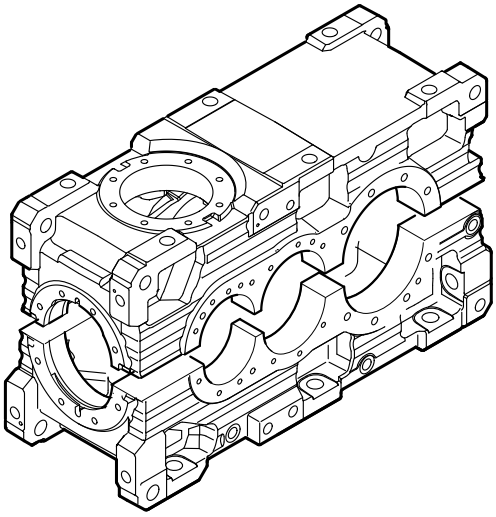
Two-piece housing

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



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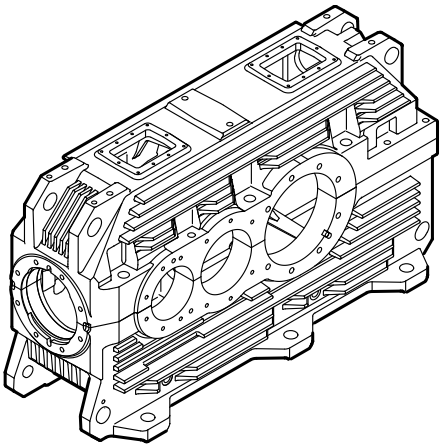
3.9.3 Thermal housing /HT

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:



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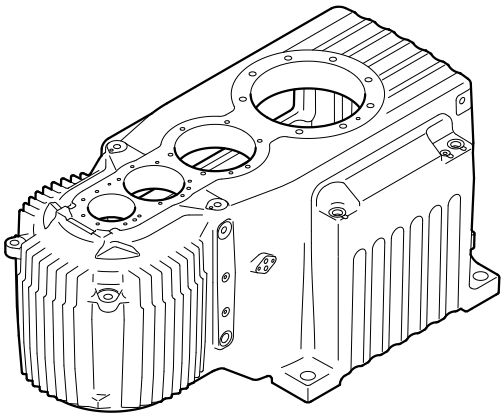
3.9.4 Agitator housing/HA

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



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3.10 Combination overview of housing designs and options

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)**.

Installing options later may lead to impairments. Not all options can be mounted to the housing design. Contact SEW-EURODRIVE.

Options		Sizes																
		X100 – 210						X220 – 250						X260 – 320				
		2F	2K	3F	3K	4F	4K	2F	2K	3F	3K	4F	4K	2F	2K	3F	3K	4F
BF	Base frame	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	HU	**HH**	**HH**	**HH**	**HH**
BS	Backstop	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	HU	**HH**	**HH**	**HH**	**HH**
BSL	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**	**HH**
F	Mounting flange	HU	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**	**HH**
FAN	Fan	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**	**HH**
FAN-ADV	Fan version Advanced	-	-	-	HH	-	-	-	-	-	HH	-	-	-	-	**HH**	**-**	-
HSST	Through-going input shaft	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**HH**	**HH**	HU	**HH**	**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**	**HH**
MA	Motor adapter	HU	HU	**HH**	**HH**	HU	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**	**HH**
SEP	Shaft end pump	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**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**	**HH**
OAC	Oil-air cooler	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**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**	**HH**
OAC	Oil-air cooler	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**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**	**HH**
ONP	Motor pump	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**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**	**HH**
ODV	Oil drain valve	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**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**	**HH**
OLG	Oil level glass	HU	HU	**HH**	**HH**	HU	HU	**HH**	HU	**HH**	**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	HU
PT100	Temperature sensor	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**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**	**HH**
TSK	Temperature switch	HU	HU	HU	HU	HU	HU	**HH**	HU	**HH**	**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**
EBD	Extended bearing distance	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU

□ Options are available in all gear unit sizes
▨ Options are not available for all gear unit sizes
HH Horizontal and universal housings are available
HU Universal housings are available

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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
BSL	Torque-limiting backstop	HT
FC	Flange coupling	HT
FAN	Fan	HT
HSST	Through-going input shaft	HT
LSST	Through-going output shaft	HT
MA	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
BSL	Torque-limiting backstop	HA
CCT	Water cooling cartridge	HA
F	Mounting flange B5/B14	HA
FC	Flange coupling	HA
FAN	Fan	HA
MA	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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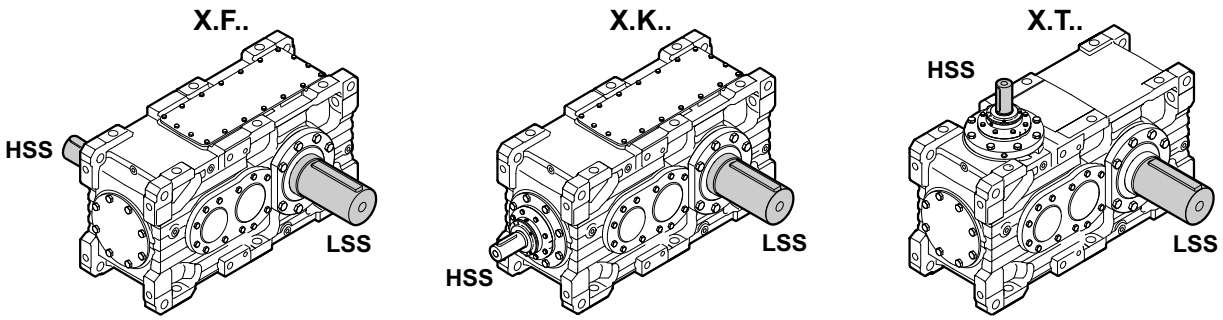
3.12 Input and output shafts

There are two types of shafts:

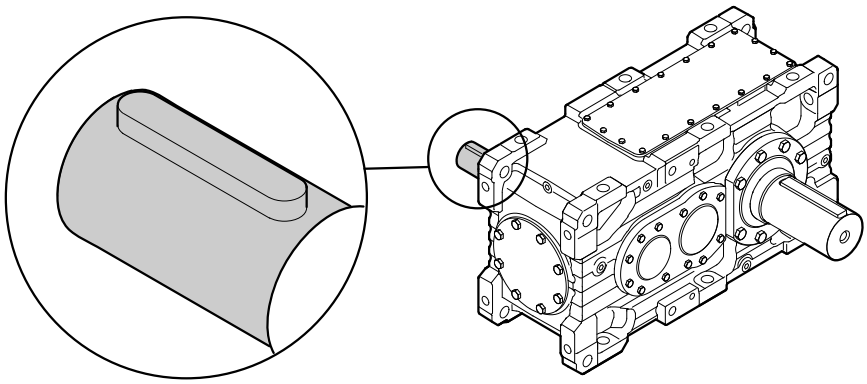
- High-speed shaft (**HSS**), usually the input shaft
- Low-speed shaft (**LSS**), usually the output shaft



20611259531

3.12.1 Input shaft

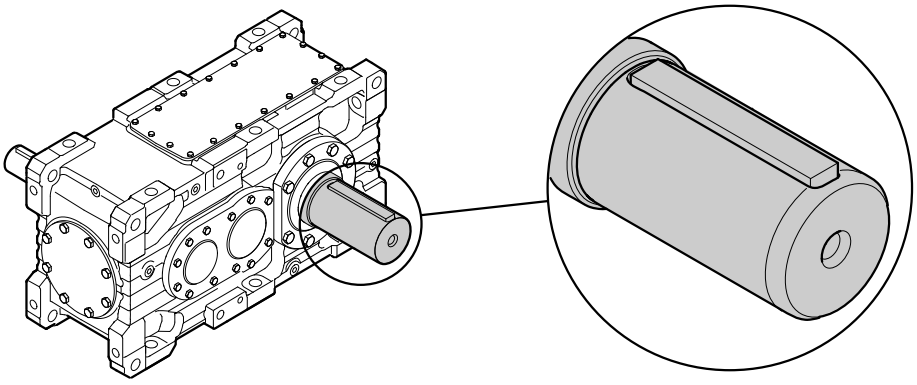
The input shaft is provided with a closed keyway according to DIN 6885/T1 and a center bore (according to DIN 332). The matching key according to DIN 6885/T1 - form A is included in the delivery.



18014398833520651

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

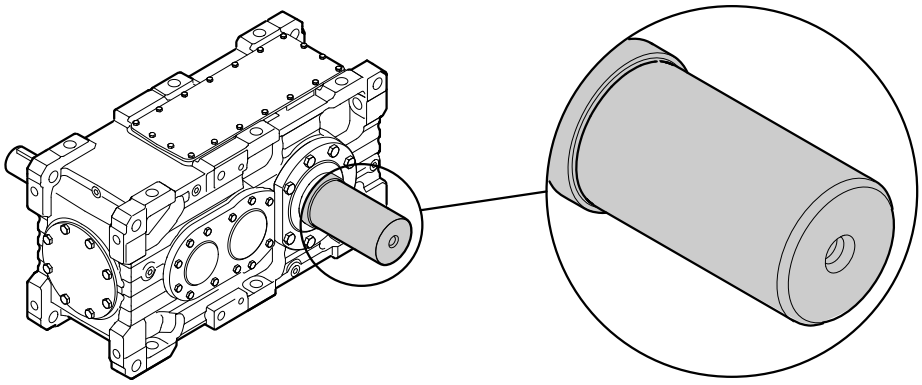
The output shaft is provided with a closed keyway according to DIN 6885/T1 and a centering bore (according to DIN 332). The delivery includes a key according to DIN 6885/T1 – form B. The shaft has an insertion area with a reduced diameter to simplify the mounting of output elements, such as a coupling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



18014398833719819

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 face of the shaft has a center bore according to DIN 332. The insertion area with reduced diameter facilitates the mounting of output elements.



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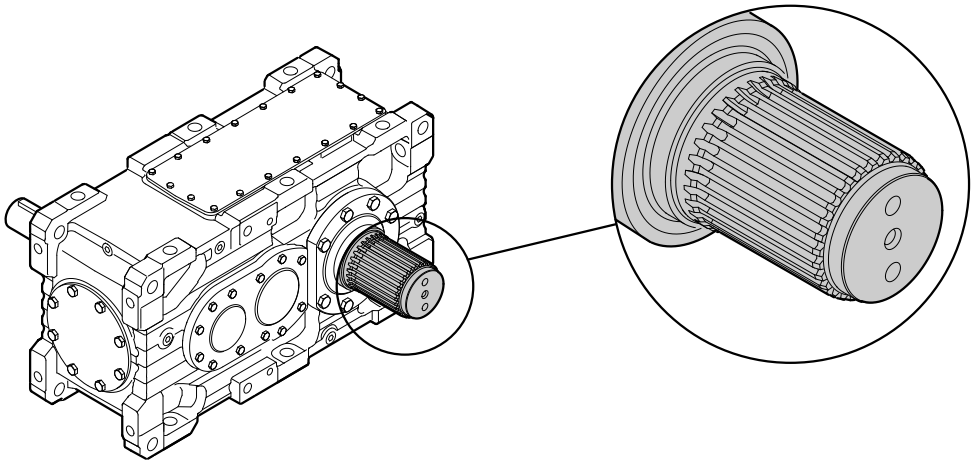
3.12.4 Output shaft as a splined solid shaft /..L

The output shaft is splined 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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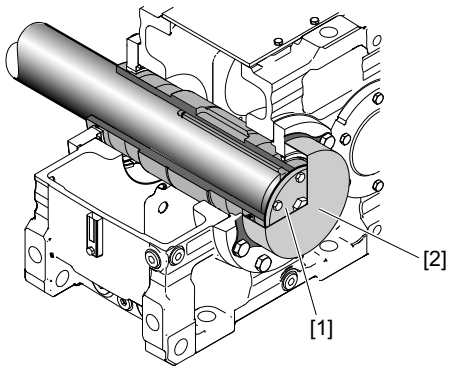
3.12.5 Output shaft as a hollow shaft with keyway /..A

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



9007199579038987

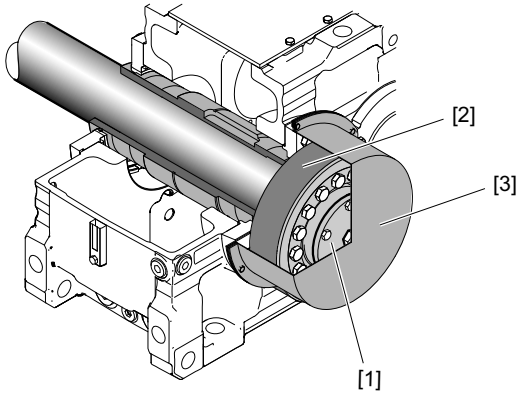
The protection cover is dust-tight. The standard sealing system is therefore normally used on the side of the safety cover.

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.

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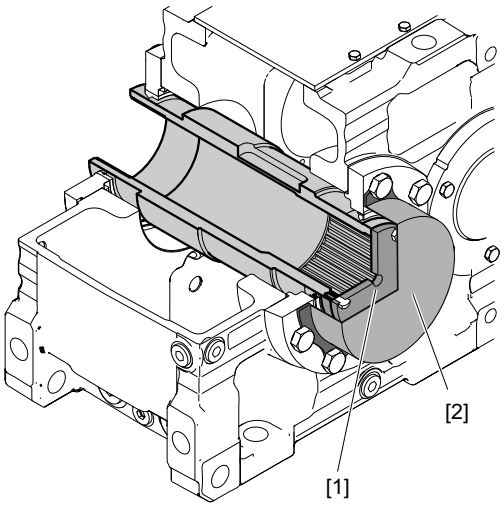
3.12.7 Output shaft as a splined hollow shaft /..V

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.

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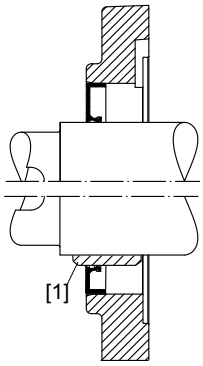
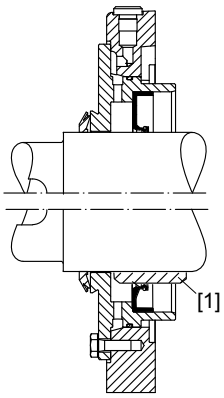
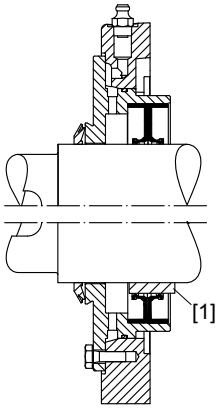
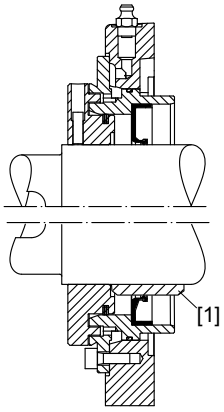
3.13 Sealing systems

3.13.1 Input shaft

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	
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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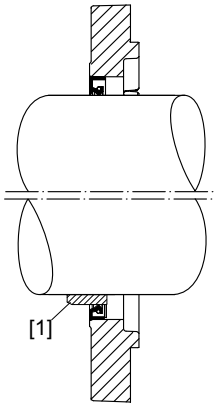
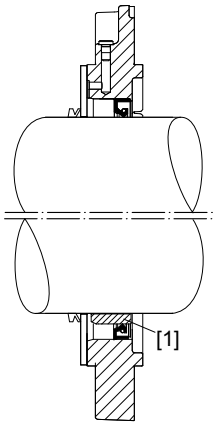
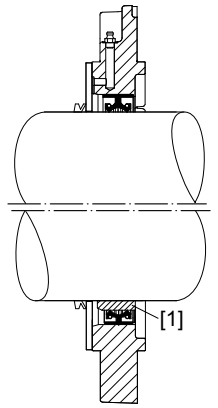
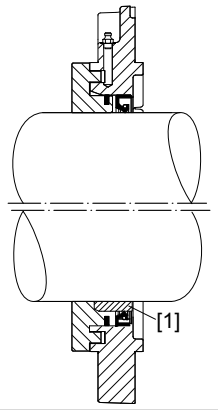
3.13.2 Output shaft

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	
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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INFORMATION

Make sure the gear unit shaft is rotating during regreasing.

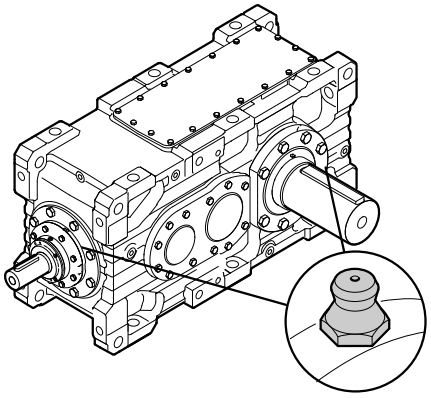
3.13.3 Position of lubrication points

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. Observe chapter Maintenance intervals.

Example



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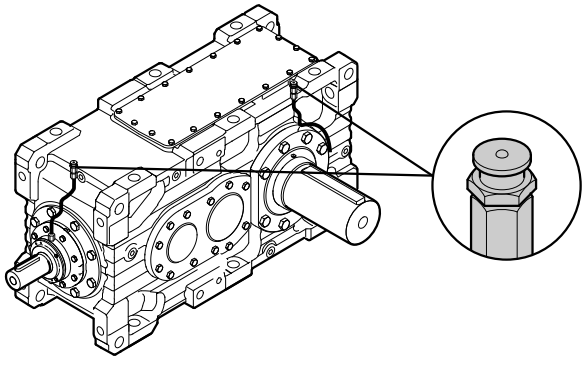
Grease nipple on the top side of the gear unit

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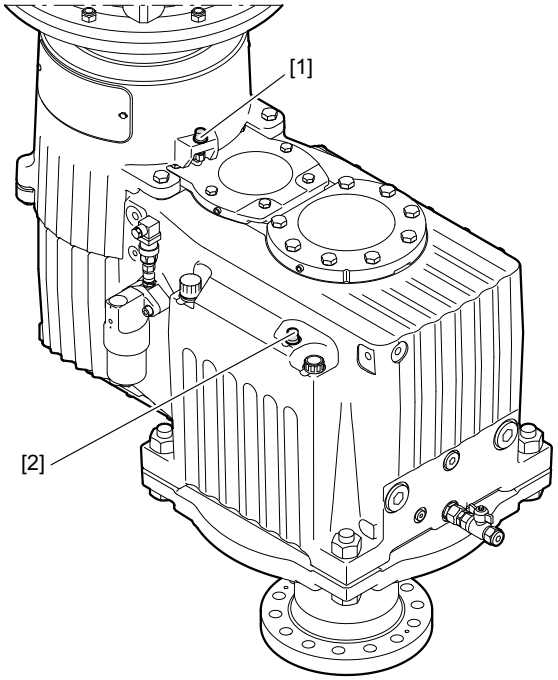
Agitator housing HA

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. Observe chapter Maintenance intervals.



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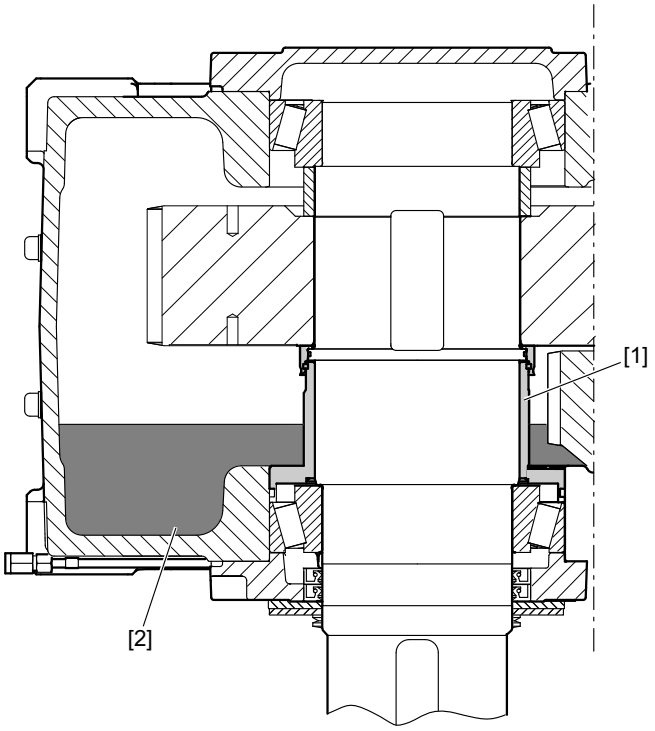
3.13.4 Drywell sealing system

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" (→ 257).



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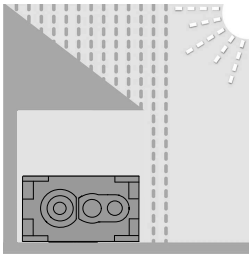
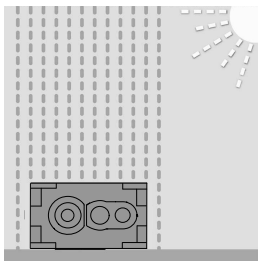
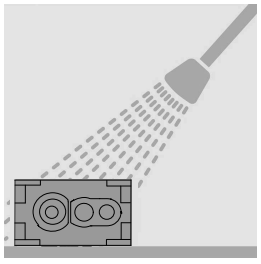
3.14 Coating and surface protection systems

The following tables give an overview of coating and surface protection systems.

Used as surface protection under typical ambient conditions, corrosivity category DIN EN ISO 12944-2.

OS 1 low environmental pollution	
	Suited 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	
	Suitable for environments with high humidity or moderate atmospheric contamination, such as applications outdoors subject to direct weathering. According to corrosivity category: C3 (moderate)
Sample applications	• Applications in gravel plants • Cableways
Condensation test ISO 6270	120 h
Salt spray test ISO 7253	240 h

OS 3 high environmental pollution	
	Suitable for environments with high humidity and occasionally severe atmospheric and chemical contamination. 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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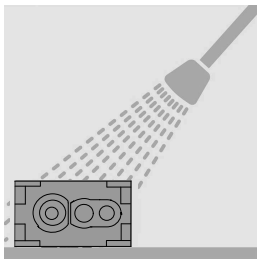
OS 3 high environmental pollution	
Salt spray test ISO 7253	480 h

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 Lubrication

3.15.1 Lubrication types

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).

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

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 Accessories

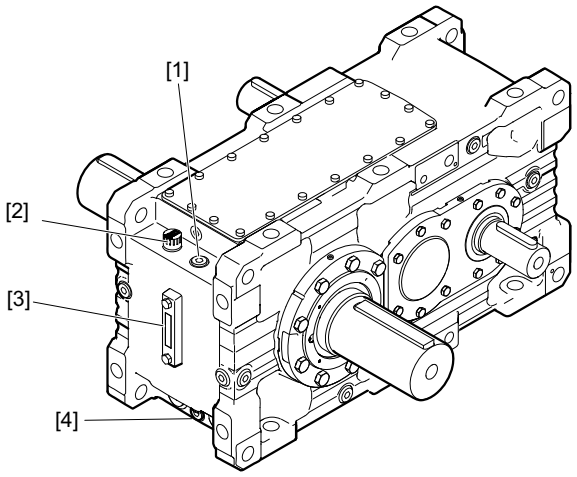
The following section describes the accessories for the several lubrication types.

INFORMATION

The position of the accessories may vary depending on gear unit design and gear unit size.

3.16.1 General accessories

The following figure shows the general accessories.



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[1]	Oil dipstick (optional)	[3]	Oil level glass
[2]	Breather	[4]	Oil drain

Visual oil level check

The following types are available as standard for gear units in **M1** mounting position with splash lubrication:

- Oil dipstick for gear unit sizes X.100 to X.170
- Oil level glass for gear unit sizes X.180 to X.320

For other mounting positions and types of lubrication, the gear unit is equipped with an oil dipstick as standard.

Gear unit venting

A breather serves to prevent non-permitted pressure generated by heating during operation. The gear units are equipped with a breather as standard.

Oil drain

The gear unit is equipped with an oil drain plug as standard. An oil drain valve may be provided as option. This valve allows for a drain pipe to be easily attached when changing the gear unit oil.

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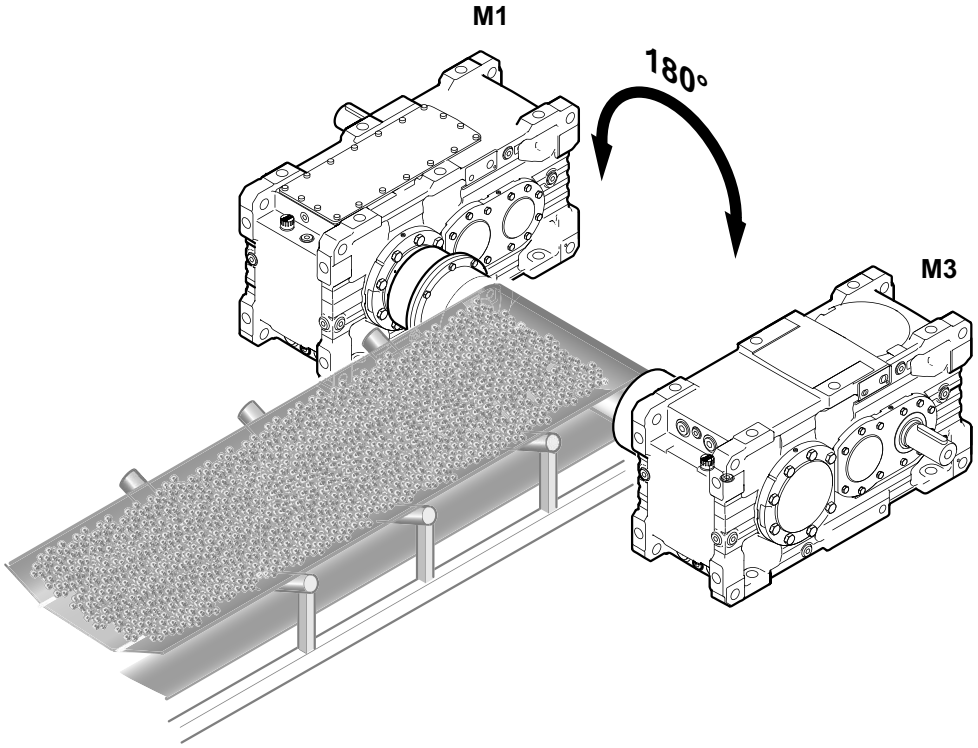
3.17 Reversible gear units

INFORMATION

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

The universal housings 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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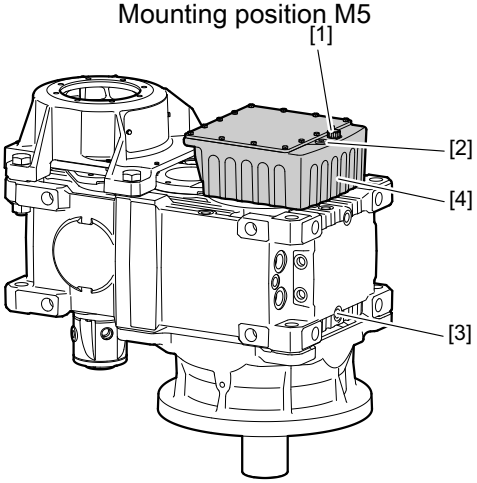
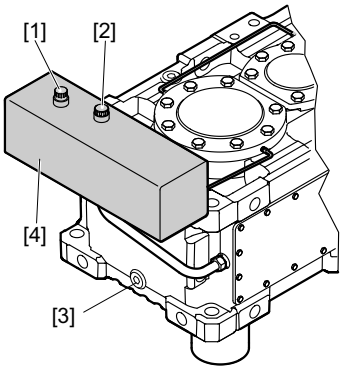
4.1.1 Universal housing /HU

The following figure shows an example of the accessories.

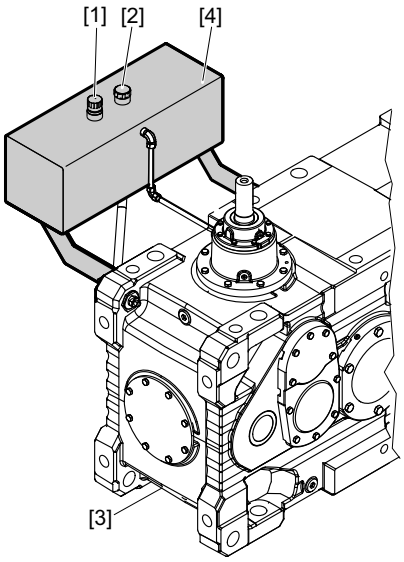
Mounting position M5



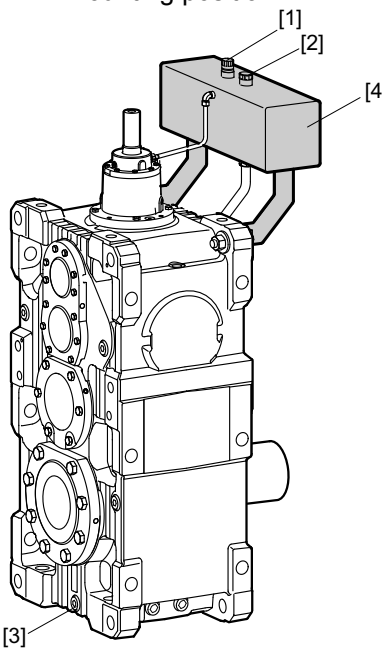
Mounting position M5



Mounting position M1



Mounting position M4



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

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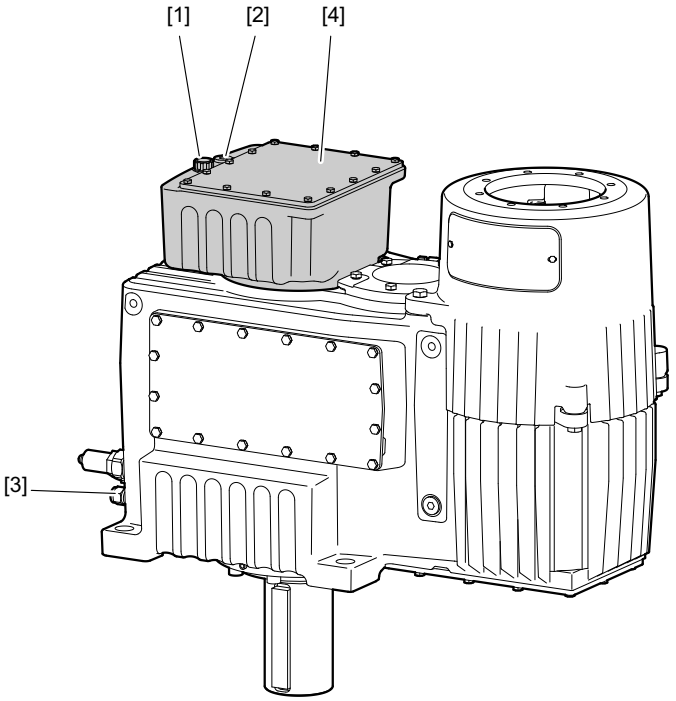
4.1.2 Agitator housing /HA

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



15485987211

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

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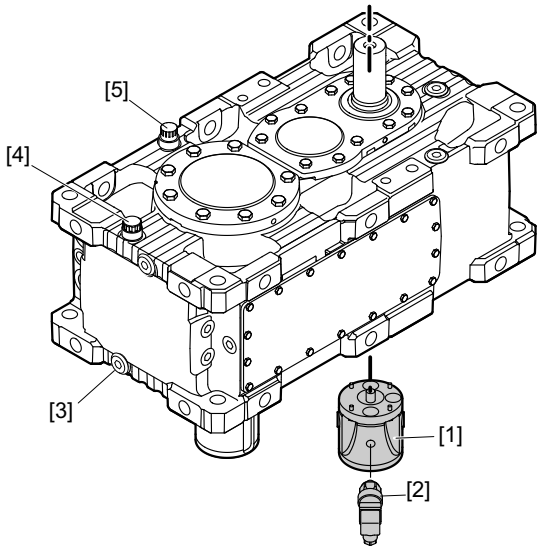
4.2 Shaft end pump /SEP

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" (→ 🗎 117).
- 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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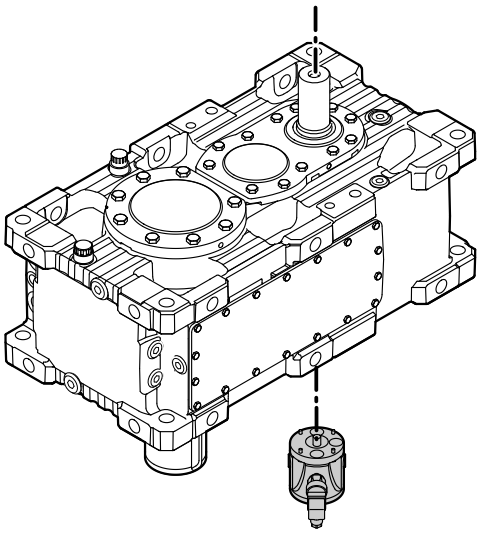
4.2.1 Position of the shaft end pump

X.F..

The shaft end pump of helical gear units is located opposite the input shaft.

Universal housing /HU



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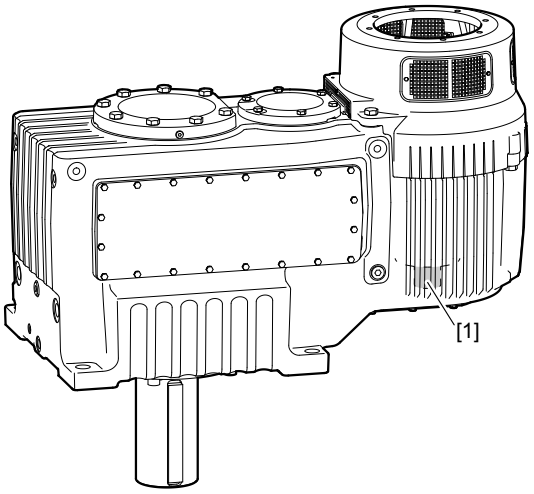
Agitator housing /HA



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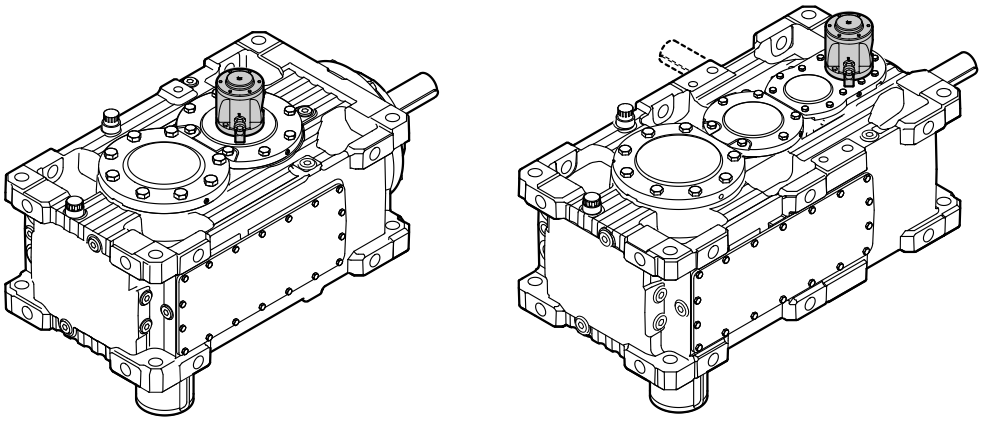
X2K../X4K../X4T..

The shaft end pump of X2K/X4K/X4T bevel-helical gear units is located opposite the output shaft.

Universal housing /HU



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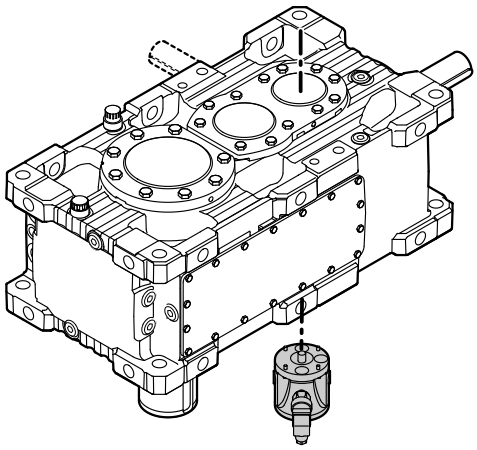
X3K../X3T..

The shaft end pump of X3K/X3T gear units is located on the output shaft side.

Universal housing /HU



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4.3 Motor pump /ONP

INFORMATION

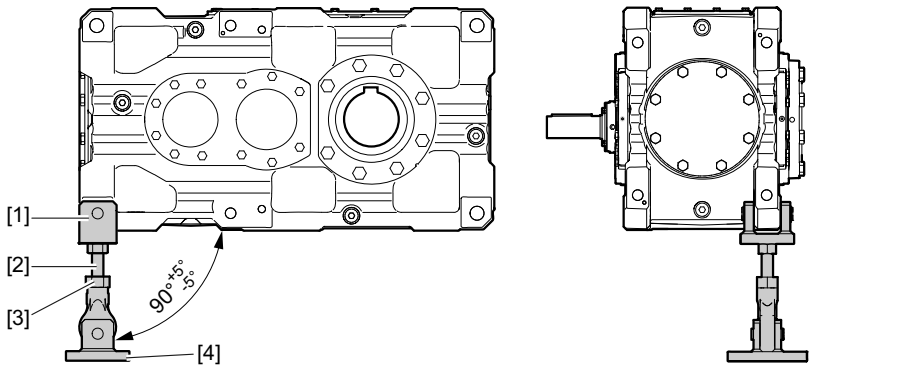
For a description of the unit structure, refer to the addendum to the operating instructions "Motor pump /ONP".

4.4 Torque arm /T

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

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

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



18014398868608779

[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.

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4.5 Flange coupling with cylindrical interference fit /FC-S

NOTICE

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

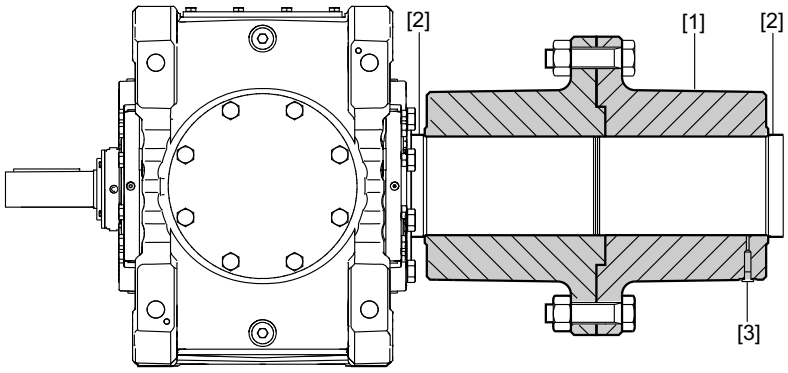
Possible damage to the gear unit.

- 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.

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.



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4.6 Flange coupling with keyway /FC-K

NOTICE

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

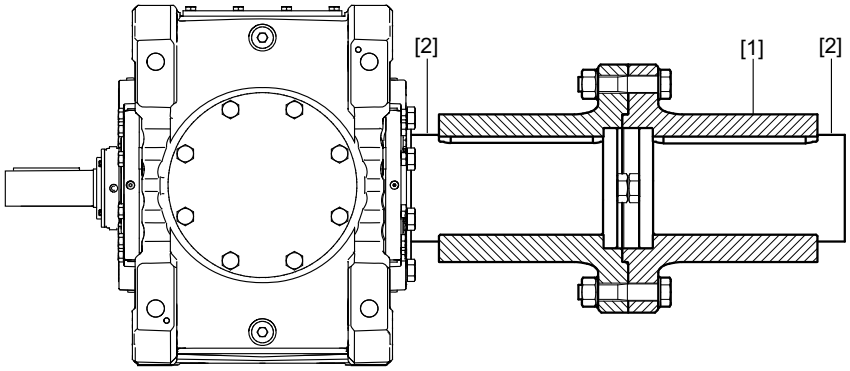
Possible damage to the gear unit.

- 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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4.7 Mounting flange /F

INFORMATION

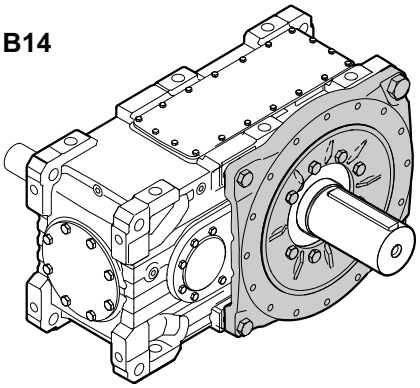
- The mounting flange can be combined with all output shaft types but cannot be used with the standard sealing system. Observe the limitations for hollow-shaft gear units in chapter "Gear unit mounting for hollow-shaft gear units" (→ 🗎 61).
- For mounting flanges with external overhung loads, contact SEW-EURODRIVE.

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

4.7.1 B14

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

B14

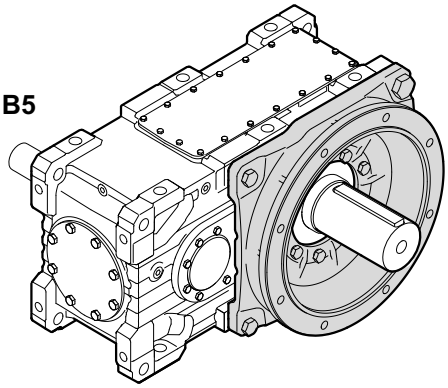


20891934731

4.7.2 B5

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

B5

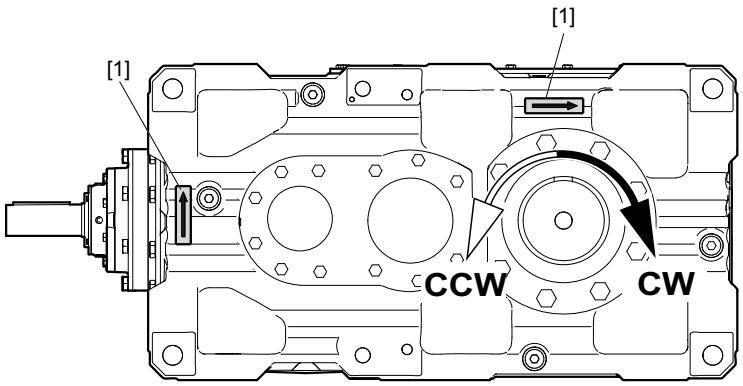


20891937675

4.8 Backstop /BS

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

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



199930635

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

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Size	Input speed (HSS) n_1 in min^{-1}	Nominal gear unit ratio i_N
X4K/X4T120 – 130	> 1400	All i_N
X4K/X4T140 – 250	> 1400	$i_N \geq 200$

4.9 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.

INFORMATION

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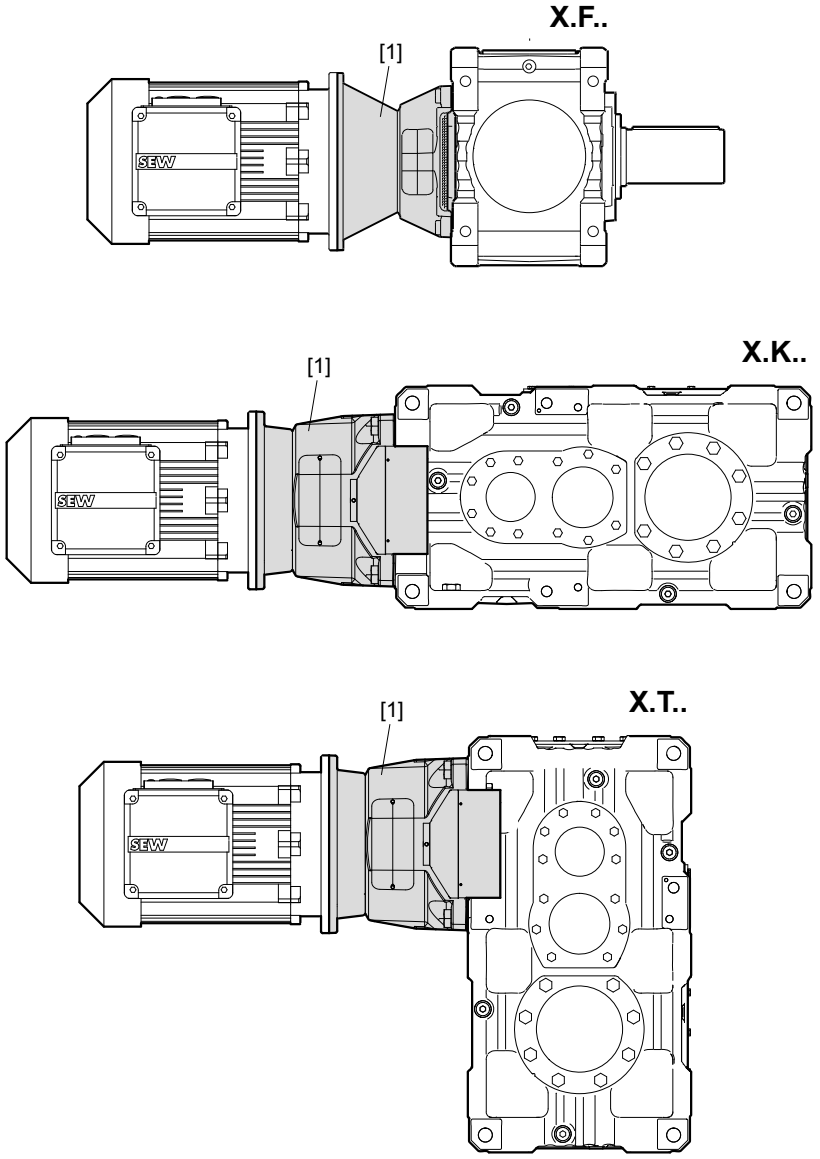
The following figure shows an example of the motor adapter [1] connected to the gear unit:



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4.10 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.

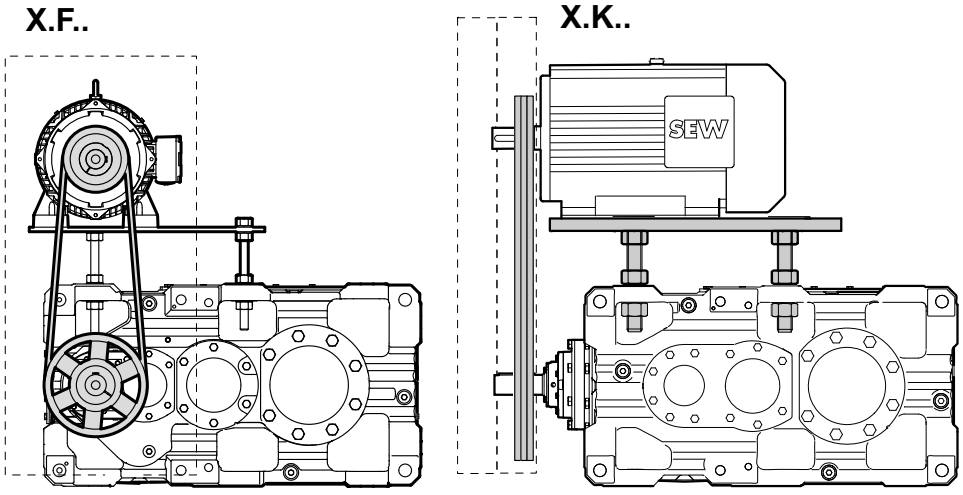
INFORMATION

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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4.11 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.

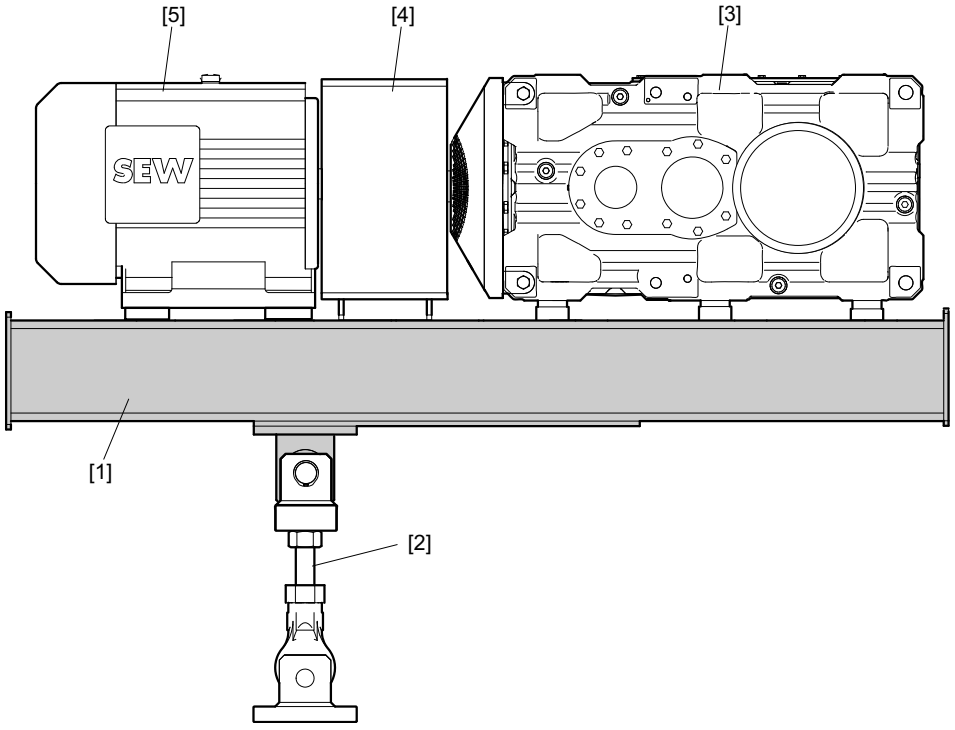
4.11.1 Swing base /SB

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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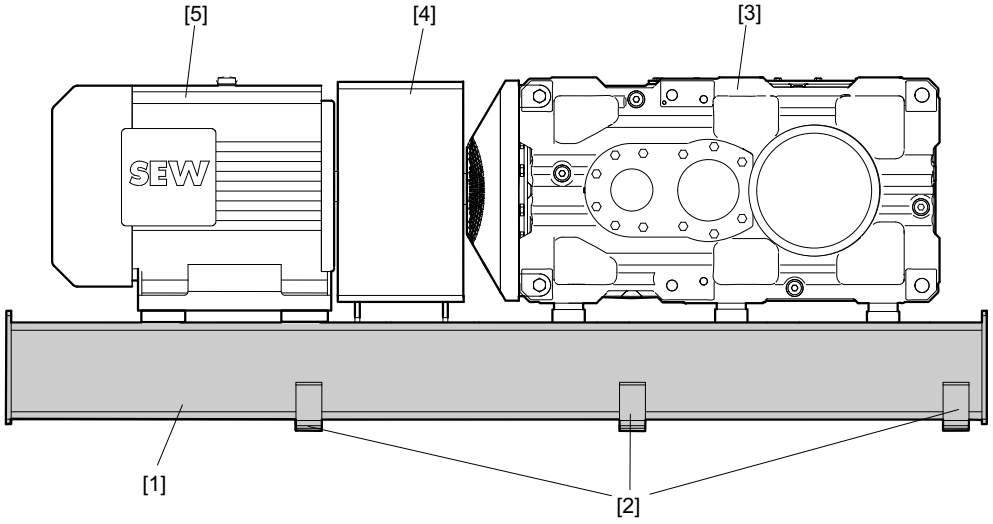
4.11.2 Base frame /BF

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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4.12 Cooling types

4.12.1 Fan cooling

A fan is installed on the gear unit input shaft. Its airflow improves the transmission of heat from the gear unit surface to the environment. Refer to chapter "Fan" for further information.

4.12.2 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.

4.12.3 Circulation cooling

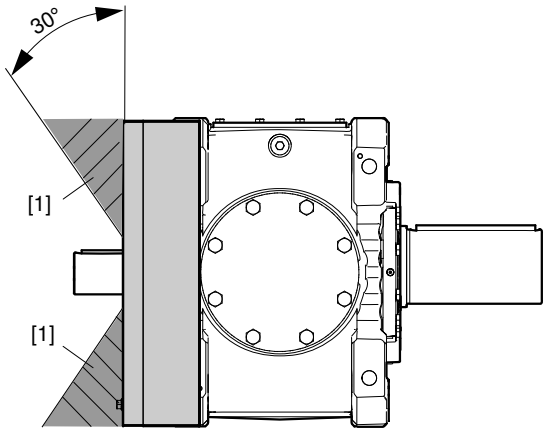
The gear unit oil is pumped out of the gear unit to an external heat exchanger by a pump (motor pump or shaft end pump). This normally involves oil supply systems with oil-water or oil-air heat exchangers.

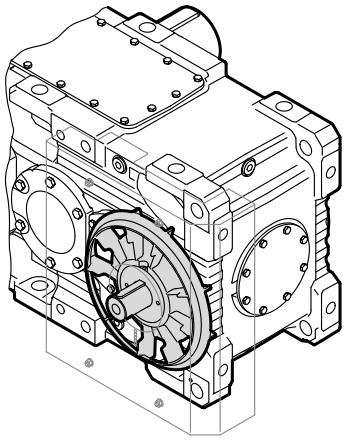
4.13 Fan /FAN

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.

The following fan designs are available:

4.13.1 X.F.. Fan (standard) /FAN





18014399183926283

[1] Air intake clearance

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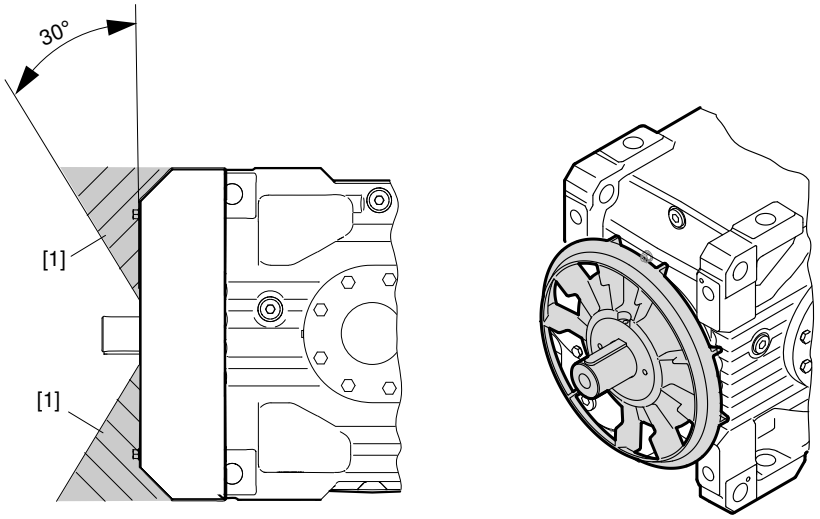
4.13.2 X.K.. Fan (standard) /FAN



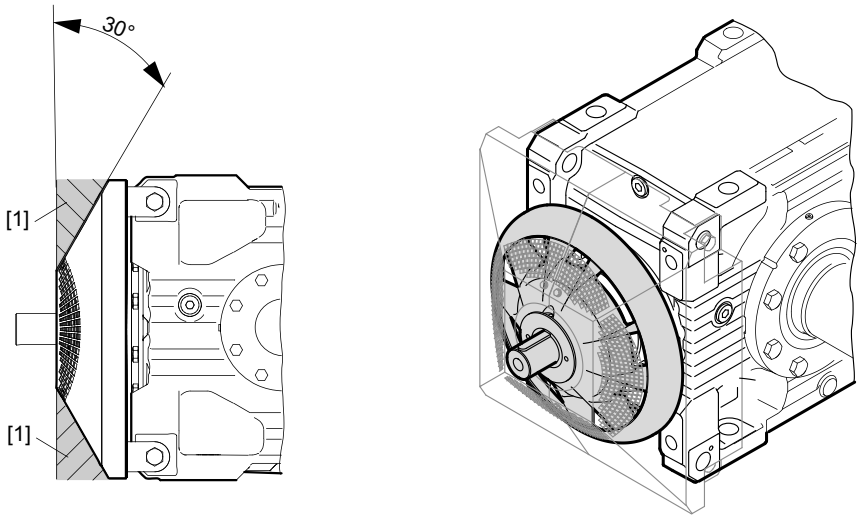
27021598438673035

[1] Air intake clearance

4.13.3 X3K.. Advanced (option) /FAN-ADV

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

The air intake clearance is integrated into the fan guard.



18014399183937419

[1] Air intake clearance

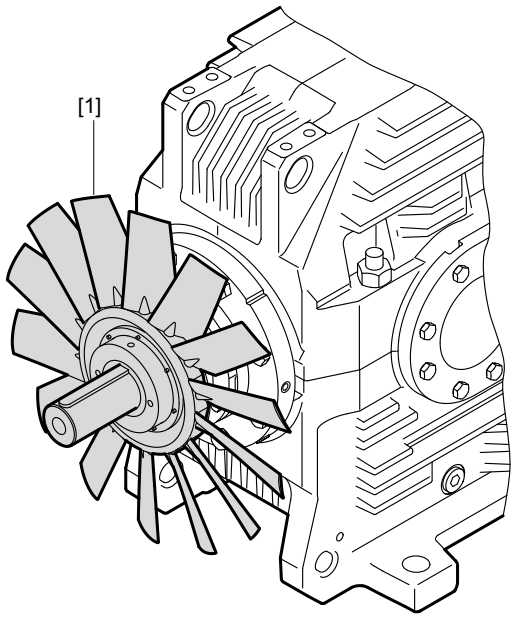
INFORMATION

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.

4.13.4 Axial fan

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 rotation. Refer to the information on the order documents.

Universal housing HU / horizontal housing HH / thermal housing HT



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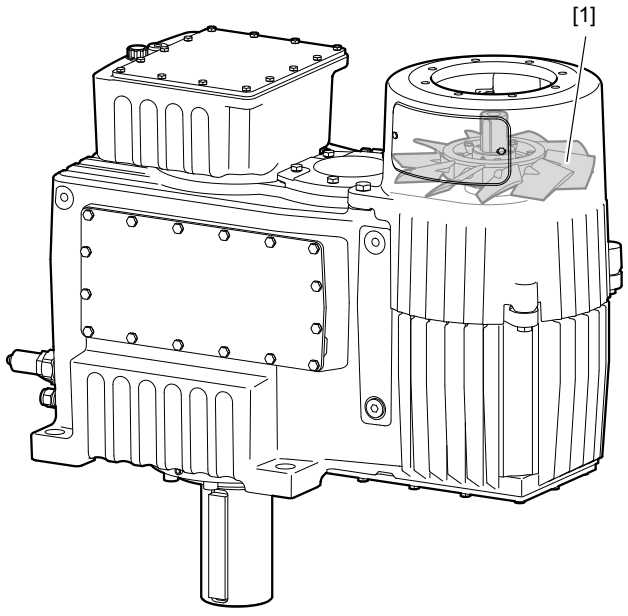
Agitator housing /HA



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4.14 Water cooling cover /CCV

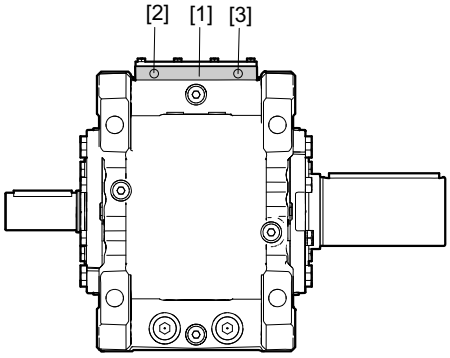
The water cooling cover is located on the assembly opening of the gear unit, and is provided with cooling water through a water connection. The customer is to provide for the water connection.

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 chemically aggressive cooling media, such as brackish water or salt water.

4.14.1 Structure



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

The water cooling cover [1] is made of a corrosion-resistant aluminum alloy. 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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4.14.2 Notes on connection and operation

A cooling water volume flow (water inflow temperature 15 °C) depending on the gear unit size is necessary according to the following table to achieve the thermal rating given in the catalog. The cooling capacity of the water cooling cover changes when the cooling water quantity or cooling water temperature changes or when specific cooling media are used. Contact SEW-EURODRIVE, if required.

Size	Cooling water flow rate l/min
X100 – 110	4
X120 – 130	5
X180 – 190	8
X200 – 210	11

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4.15 Water cooling cartridge /CCT

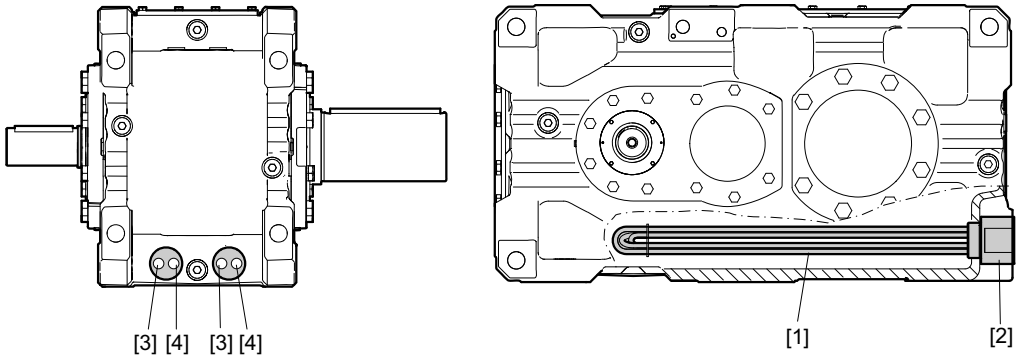
The water cooling cartridge is mounted in the gear unit's oil sump and is provided with cooling water through a water connection. The customer is to provide for the water connection.

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. See the technical specifications to determine the number of water cooling cartridges required. The data given in the technical specifications must be observed.

INFORMATION

Contact SEW-EURODRIVE if you use chemically aggressive cooling media, such as brackish water or salt water.

4.15.1 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 to connect to the cooling circuit:

- Pipe thread G1 1/4" for sizes X140 – 170
- Pipe thread G 1 1/2" 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 two water cooling cartridges. Observe chapter Built-in cooling – water cooling cartridge.

4.15.2 Notes on connection and operation

To achieve the thermal rating specified in the selection tables of the "X.. Series Industrial Gear Units" catalog, different cooling water flow rates are required depending on the size, mounting position, and type of lubrication. The following table lists approximate values for the flow rate for the M5 mounting position (water inflow temperature 15 °C).

Contact SEW-EURODRIVE when using another cooling water flow rate, another cooling water temperature, special cooling media (the cooling capacity of the water-cooling cartridge changes), aggressive cooling media, such as brackish water or salt water.

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	Cooling water flow rate in in/per cooling cartridge			Max. cooling water flow rate l/min
	2 stages	3 stages	4 stages	
X140 – 150	10	8	3	15
X160 – 170	12	10	4	15
X180 – 190	16	13	5	28
X200 – 210	19	15	6	28
X220 – 230	23	19	8	28
X240 – 250	24	21	9	28
X260 – 270	17	16	6	25
X280 – 300	18	18	7	25
X310 – 320	22	22	9	25

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4.16 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".

4.17 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".

4.18 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".

4.19 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".

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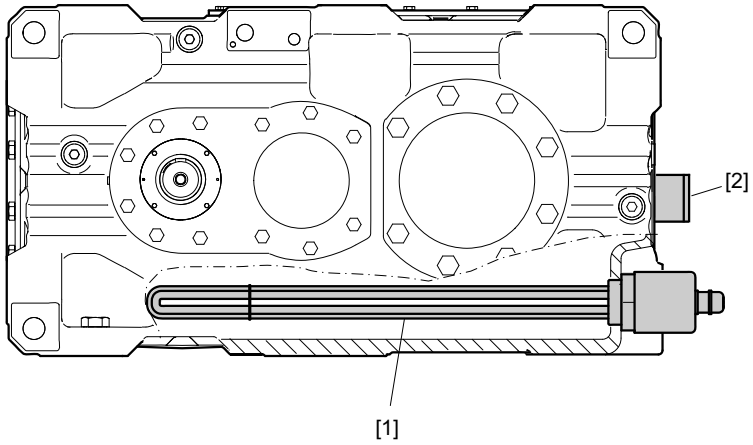
4.20 Oil heater /OH

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

4.20.1 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



359104907

[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.

4.21 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.

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4.22 Temperature sensor /PT100

The temperature sensor PT100 can be used to measure the temperature of the oil in the gear unit.

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

4.23 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.

4.24 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:

- Warning signal or stopping the gear unit if the maximum oil bath temperature is exceeded.
- Switching off the oil heater when the oil temperature reaches 60 °C.

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.

The temperature switch must be integrated in the controller of the operator that the order-specific switching points are achieved. For more information, refer to chapter Electrical connection.

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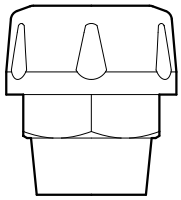
4.25 Breather /BPG

The following breathers can be used.

4.25.1 Standard

Structure



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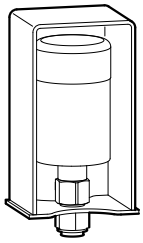
Housing material	Steel
Filter inserts	Wire mesh
Threads	3/4" or 1"

4.25.2 Desiccant breather filter /DC

INFORMATION

For explosion-proof drives, the desiccant breather filter is protected by a guard plate. The gear unit leaves the factory with the guard plate already mounted.



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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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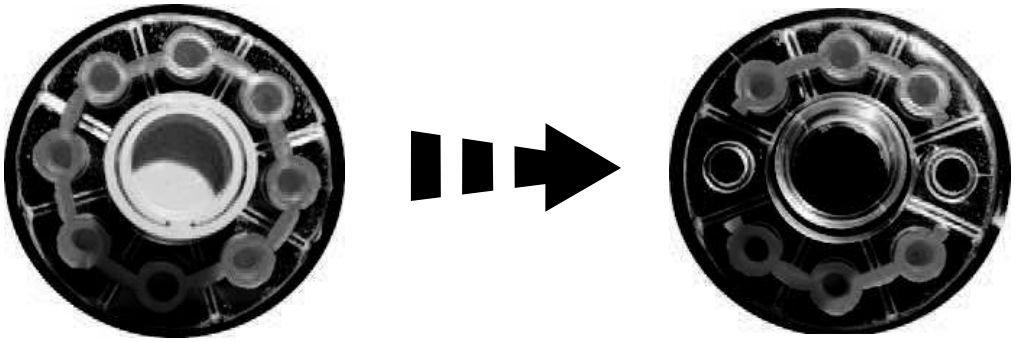
Usage

Before startup

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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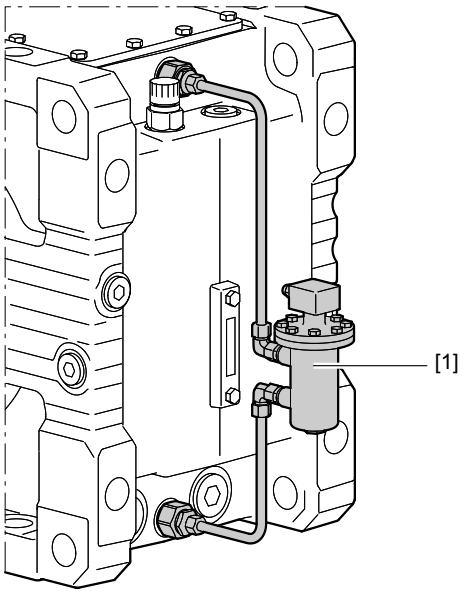
4.26 Float switch

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 Checklist

5.1 Before startup

This checklist provides an overview of the points that must be checked **before starting up** a gear unit in a potentially explosive area in accordance with Directive 2014/34/EU.

Check the following points before starting up a gear unit in a potentially explosive atmosphere:	Checked	See chapter
Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. It may be necessary to suspend startup. Remove any transport protection prior to startup.		2.10
Does the data on the nameplate of the drive match the situation on site for operation in a potentially explosive area? • Equipment group • Explosion protection category • Temperature class • Ambient temperature range		6.6 and 7.2
Have arrangements been made to prevent potentially explosive atmospheres (oils, acids, gases, vapors or radiation) during installation of the gear unit?		6.4
Does the ambient temperature comply with the specifications (nameplate and order confirmation)?		6.6
Have measures been taken to ensure that the gear units are sufficiently ventilated and that they are not heated by an external heat source (e.g. the coupling)?		4 and 6
Does the mounting position correspond to the specification on the gear unit nameplate? Please note: Contact SEW-EURODRIVE before you change the mounting position. Else the ATEX EU declaration of conformity may no longer be valid.		3.3
Does the current mounting position correspond to the specified mounting position for the oil level check? (Refer to the nameplate for the required mounting position.)		3.1
Does the oil level in this mounting position comply with the markings of the oil dipstick?		8.4
Do you have ready access to all oil level plugs and oil drain plugs as well as to the breather plugs and valves?		6.3
Have measures been taken to ensure that the performance data and ambient conditions specified on the nameplate of the gear unit are not exceeded?		7.2
For motors operated on the supply system: • Check that the data specified on the nameplate of the gear unit and the motor corresponds to real conditions at the location where the drive is to be installed.		7.2
Check that oil level monitoring and oil heater have been set and connected properly.		6.33
General information on how to mount accessories: If operators change the gear unit after having installed it into the system, they must re-assess the gear unit in terms of additional/new ignition sources.		6.3
If the "extended storage" option applies, check if the loosely enclosed breather plug has been replaced by the respective screw plug (see dimension sheet for position) and if thread locking compound has been applied.		7.3

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5.2 During startup

This checklist includes all activities that have to be performed **during startup** of a gear unit in a potentially explosive atmosphere according to Directive 94/9/EC and 2014/34/EU.

Check the following points during gear unit startup in a potentially explosive area:	Checked	See chapter
Measure the surface temperature after initial startup. Before measuring the surface temperature, operate the gear unit under load in continuous duty for about 6 hours.		3.1 and 6.7
Measure the oil temperature to determine the oil change intervals. Observe chapter "Lubricant change intervals" (→ 🗎 242).		7.14

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6 Installation/assembly

6.1 Required tools/resources

Not included in the delivery:

- Set of wrenches
- Torque wrench
- Mounting device
- Compensation elements (washers, spacer 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

6.2 Tolerances

Observe the following tolerances.

6.2.1 Shaft end

Diameter tolerance according to 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 nominal thread diameter

Keys according to DIN 6885 (domed type)

6.2.2 Hollow shaft

Diameter tolerance:

Ø → ISO H7 for hollow shafts for shrink disk

Ø → ISO H8 for hollow shafts with keyway

6.2.3 Mounting flange

Centering shoulder tolerance: ISO f7

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6.3 Important information

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

A customer machine that is not appropriately secured can fall 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, be sure that there are no active torsional moments present (tensions within the system).

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⚠ WARNING

Danger due to installing impermissible components.

Severe or fatal injuries.

- Do not mount any impermissible components to the gear unit.
- Additional installation of invalid components or assemblies that impact on the functioning of the gear unit can invalidate the conformity.
- Additional installation of invalid components or assemblies can cause new ignition sources. Manufacturers must ensure that the machine/overall system complies with applicable regulations by performing their own ignition hazard analysis and their own compliance assessment method.
- Mounting impermissible components may lead to material failure at the gear unit. This may cause the gear unit to fall over or down.

⚠ 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.

⚠ CAUTION

Danger due to unsecured mount-on components, such as 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.

⚠ CAUTION

Risk of injury due to protruding parts.

Minor injuries.

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

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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 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.
- Note that the oil quantities on the nameplates are approximate values. The mark on the oil sight glass or oil dipstick is the decisive indicator of the correct oil quantity.
- Do not modify the gear unit or the mount-on components without prior consultation of SEW-EURODRIVE.
- 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 parts and bearings.
- Units installed outdoors must be protected from the sun. Suitable protection devices are required, such as covers or roofs. Avoid a heat build-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 ordered and delivered with appropriate paint. 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.

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INFORMATION

- Depending on the order, the gear unit can be delivered with or without oil. Observe the information on the nameplate.
- The electrical installation must comply with the standard EN 60079-14.
- The gear unit must be mounted in such a way that liquids cannot enter the motor adapter (HSS end) or the mounting flange (LSS end) and accumulate there. Otherwise, the oil seal can be damaged, and subsequent damage can create a possible ignition source.
- When touching up the surface coating, make sure that used coatings have a sufficiently low leakage resistance to avoid the risk of ignition due to electrostatic charge. Observe standard EN ISO 80079-36.
- Do not change the mounting position without prior consultation of SEW-EURODRIVE. Warranty as well as EU declaration of conformity will become void without prior consultation.
- Make sure that the gear unit housing is grounded. Electrical mount-on components, such as motors, frequency inverters, etc., must be grounded separately.
- Only electrically conductive belts may be used according to ISO 1813. These have to meet the requirements of EN 60695-11-10, category FV-0. Transmission elements should be balanced after fitting and must not give rise to any impermissible radial or axial forces (see the "Gearmotors" or "Explosion-Proof Drives" catalog for permitted values).
- Observe the instructions in chapter "Installing the gear unit".

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6.4 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.
- Ambient temperature according to the order documents and the nameplate.
- 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 commercially available solvent. Do not let the solvent come into contact with the sealing lips of the oil seals.

INFORMATION

The drive must **not** be assembled in the following ambient conditions:

- Presence of explosive atmosphere
- Oils
- Acids
- Gases
- Vapors
- Radiation

INFORMATION

The ambient temperature must comply with the specifications on the nameplate. If the nameplate does not specify any ambient temperature range, contact SEW-EURODRIVE.

6.4.1 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).

Replace the breather with a screw plug.

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6.5 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 may not be deformed when the retaining screws are tightened. Irregularity of the surface must be leveled out appropriately.
- Observe the weight specified on the nameplate.

INFORMATION

Processes that cause strong electrical charge due to fast moving particles on the coating must be excluded (e.g. due to fluid liquids and solids)!

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

To ensure quick and successful mounting of a gear unit with foot mounting, a suitable steel construction should be selected and the mounting carefully planned in advance. Foundation 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" (→ 🗎 109).

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6.5.1 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 Strength class 8.8
		Nm
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 connection during installation.

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

Observe the notes in chapter "Important information" (→ 🗎 103).

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 such as flange coupling, torque arm, mounting flange, hollow shaft with shrink disk, etc. Those are described in the individual chapters.

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

INFORMATION

Do not lubricate the bolts connection during assembly.

6.5.3 Aligning the shaft axis

⚠ WARNING

Shafts can break if the shaft axis is not aligned accurately.

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, you should also consult the special operating instructions regarding the requirements of the couplings, for example.

6.6 Gear unit mounting in potentially explosive atmospheres

INFORMATION

Make sure to observe the safety notes in chapter 2 when installing the gear unit in a potentially explosive atmosphere.

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6.7 Gear units and gearmotor in equipment groups I and II

INFORMATION

Explosion-proof X.. series industrial gear units correspond with the design requirements for equipment groups I and II.

The operating instructions describe the use of a gear unit in potentially explosive atmospheres. Potentially explosive atmospheres are specified in EU Directive 2014/34/EU.

Explosion-proof X.. series industrial gear units from SEW-EURODRIVE meet the following requirements on explosion-protection:

- Equipment group I, category M2 (underground mining and their above-ground systems that may be subject to hazards from firedamp and/or flammable dusts).
- Equipment group II, category 2G or 3G (potentially explosive gas atmosphere), 2D or 3D (potentially explosive dust atmosphere).

This means the gear units are suitable for use in the following zones:

- **Underground mining hazard zone 2:**

  Underground areas of mines and their systems above ground that may be subject to hazards from firedamp and/or flammable dusts.

  Comment: The gear units must be switched off if there is a potentially explosive atmosphere.

- **Industrial areas above ground:**

  Equipment of this category is intended for use in potentially explosive atmospheres with a mixture of air and gas, vapors, mists, or dust/air occurring occasionally or briefly.

6.7.1 Temperature information

Limit values have been defined for gear units regarding surface temperature, oil bath temperature, and ambient temperature.

The limit values for the surface temperature are indicated on the nameplate in the Ex labeling for dust and gas.

The limit values for the ambient temperature are also specified on the nameplate.

The limit values for the oil bath temperature are indicated in the lubricant table depending on the oil in use.

Observe the descriptions in the following chapters.

Determine the lowest and highest limit value from the temperature ranges for surface and oil bath temperatures. Make sure that the gear unit is only operated within this temperature range.

Do the following to determine the temperature range permitted for operating the gear unit:

Choose the lower value from the upper limits of surface temperature and oil bath temperature. This value is the upper limit value of the new operating temperature range.

Next, choose the higher value from the lower limits of surface temperature and oil bath temperature. This value is the lower limit value of the new operating temperature range.

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Example:

Ex labeling gas: II 2G Ex h IIC **T5** Gb IP65

Ex labeling dust: II 2D Ex h IIIC **T100°C** Gb IP65

Oil in use: CLP HC 320 from Castrol

Temperature information	Limit values °C	
	Min.	Max.
Ambient temperature (standard)	-20	+40
Oil bath temperature (according to lubricant table)	-20	+90
Surface temperature (according to Ex labeling)	-	+100

Result:

Oil bath temperature and housing temperature must not exceed a maximum value of 90 °C and must not drop below a minimum value of -20 °C.

If these limit values are adhered to during operation, gear units may be operated in an ambient temperature range from -20 °C to +40 °C as standard.

If the max. or min. limit values are exceeded during operation, for example because the gear unit heats up, the gear unit must be stopped immediately.

Temperature class

The maximum surface temperature differs depending on power, speed, housing size, lubrication type, reduction ratio, mounting position, etc.

The maximum surface temperature results from the division into temperature classes. The temperature classes indicate the maximum surface temperature for potentially explosive gas atmospheres. The maximum surface temperature for potentially explosive dust atmospheres is indicated in the separate dust labeling.

- **Equipment of group I**

  The maximum permitted surface temperature for SEW-EURODRIVE gear units deviates from the values specified in directive 2014/34/EU and is less than 450 °C. For information on the maximum surface temperature, refer to the "nameplate" (→ 🗎 29) and to chapter "Temperature information" (→ 🗎 111). Also observe the following chapters.

- **Equipment of group II G**

  Equipment of group II G must be categorized in a temperature class from which the maximum surface temperature results, see the following table.

  For information on temperature classes and surface temperatures of the electrical and electromechanical equipment used, refer to the nameplate of the equipment and to the declaration of conformity according to directive 2014/34/EU.

Temperature class	Maximum surface temperature in °C
T1	450
T2	300
T3	200
T4	135
T5	100

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Temperature class	Maximum surface temperature in °C
T6	85

- **Equipment of group II D**

  Equipment of group II D must be clearly defined according to the actual maximum surface temperature. They are marked accordingly.

Ambient temperature

The ambient temperatures permitted for gear units in equipment groups I and II deviate from the range of validity of the directive from -20 °C to +60 °C.

Gear units in equipment groups I and II may only be operated at ambient temperatures of –20 °C to +40 °C as standard. Deviations are allowed in individual cases and are indicated on the nameplate.

INFORMATION

Directive 2014/34/EU specifies a temperature range from -20 °C to +60 °C for the ambient temperature. Ambient temperatures that deviate from the normal range of validity of the directive are indicated on the nameplate. If the nameplate does not specify any ambient temperature range, contact SEW-EURODRIVE.

Surface temperature

The maximum surface temperature of gear units of categories I M2 as well as II2D and II3D, II2G and II3G differs depending on the power rating, speed, reduction ratio, and mounting position.

The maximum permitted surface temperature results from the Ex classification on the nameplate. Other temperatures are only permitted after consultation with SEW-EURODRIVE.

To determine the temperature range for the drive at which the gear unit may be operated, you have to compare the information for the surface temperature (Ex classification) and the information for the oil bath temperature (lubricant table).

The surface temperature must not exceed the following values:

- The maximum permitted surface temperature according to the assigned temperature class (gas).
- The maximum surface temperature for dust (see Ex labeling on the nameplate).

The system operator must ensure that the accumulation of dust does not exceed a maximum thickness of 5 mm in accordance with EN 60079-17.

The surface temperature of the drive may deviate ≤ 70 K from the ambient temperature if the maximum surface temperatures of the "Ex classification or the oil bath temperature" (→ 🗎 111) are not exceeded. If the specified limit values are exceeded, switch off the drive immediately and contact SEW-EURODRIVE.

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6.7.2 Degree of protection

The IP code on the nameplate indicates the degree of protection.

6.7.3 Ambient conditions

Provide for sufficient ventilation for the gear units and prevent external heat generation (e.g. via couplings).

6.7.4 Output power and output torque

Ensure that the output torque, speed and permitted overhung and axial loads are maintained according to the data given on the nameplate.

6.7.5 Special designs

Special designs (e.g. modified output shaft) may only be operated in potentially explosive atmospheres after prior approval by SEW-EURODRIVE.

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

6.8.1 Notes

Observe the notes in chapter "Important information" (→ 🗎 103).

The gear unit is delivered without an oil fill as standard. Observe the following information for gear units:

⚠ 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 at the ambient temperature when filling it into the gear unit.
- For gear units with external supply pipes, e.g. oil supply systems, establish the connections before filling the oil.
- Observe the additional notes in the following chapters depending on the lubrication type.
- Fill the gear unit with the oil grade specified on the nameplate. The oil quantity specified on the nameplate is an approximate quantity. The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity. 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. For further information, refer to chapters "Checking the oil level" (→ 🗎 243) and "Changing the oil" (→ 🗎 251).

  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 operating instructions by SEW-EURODRIVE: Oil supply system.
- Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).

INFORMATION

- The oil level and drain plugs as well as the breather valves must be easily accessible.
- Check the correct oil fill specified for the relevant mounting position prior to startup (data on the nameplate).

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6.8.2 Gear units with oil expansion tank /ET

INFORMATION

Observe the notes in chapter "Changing the oil" (→ 🗎 253).

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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6.8.3 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 chapter "Changing the oil" (→ 🗎 251).
- 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.
- In case of a vertical mounting position and with the shaft end pump located at the bottom, as is the case with housing HA, the shaft end pump must not be filled manually at initial startup.
- Check the oil level using the oil dipstick or the oil level glass. For more information, refer to chapter "Checking the oil level" (→ 🗎 243).
- 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 by the customer. Observe chapter Pressure switch.

For more information, refer to chapter "Gear units with pressure lubrication" (→ 🗎 230) and the manufacturer's documentation.

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.

The following figures show gear units in mounting positions M1, M4 and M5 with the corresponding screw plugs [3] and pressure switch [2].

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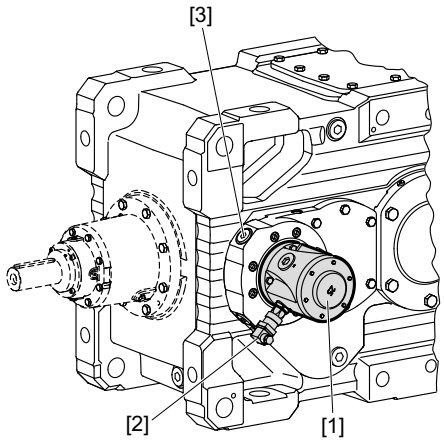
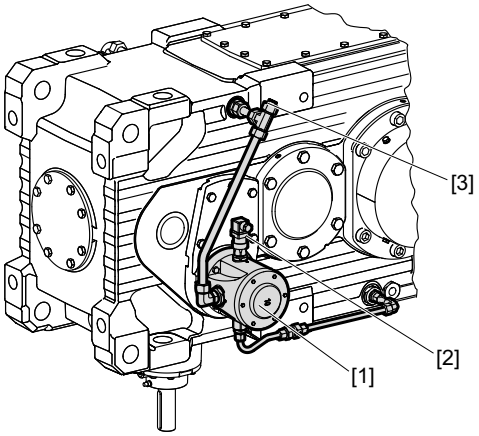
Mounting position M1

Size XF/XK160 – 320



Size X4T160 – 210



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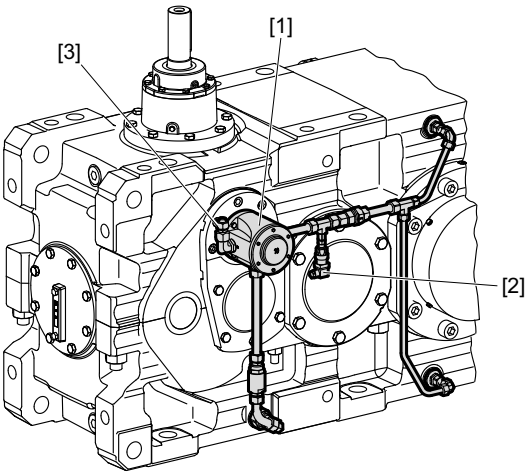

[1] Shaft end pump
[2] Pressure switch
[3] Screw plug

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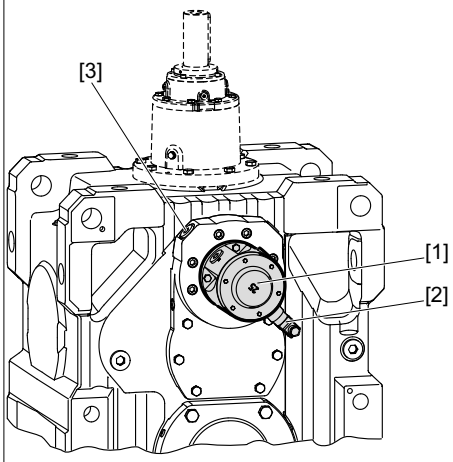
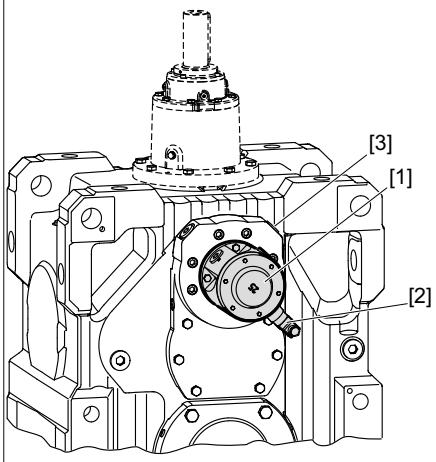
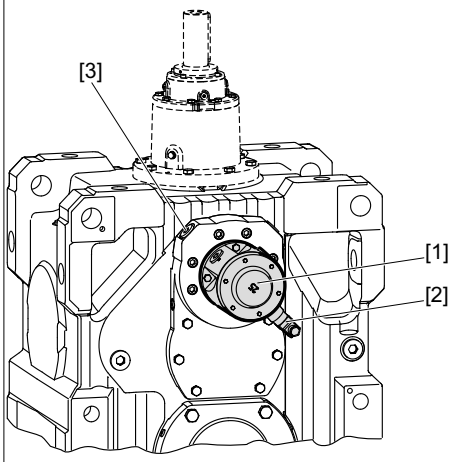
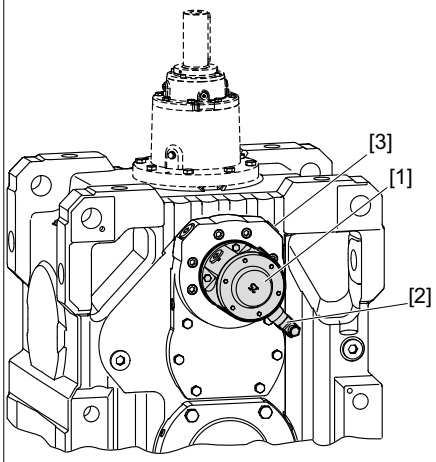
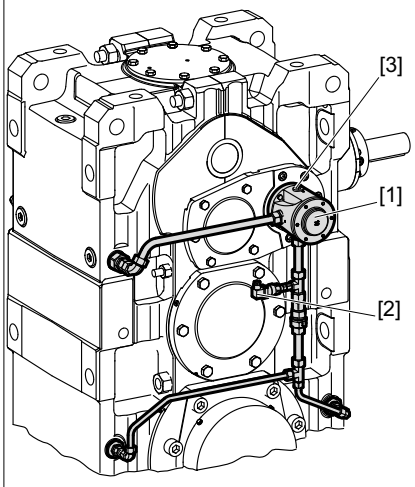
Mounting position M4

Size XF/XK 120 – 140	Size XF/XK 160 – 320
	
Size XF/XK 120 – 140	**Size XF/XK 160 – 320**
	
Size X4T220 – 250	
	

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

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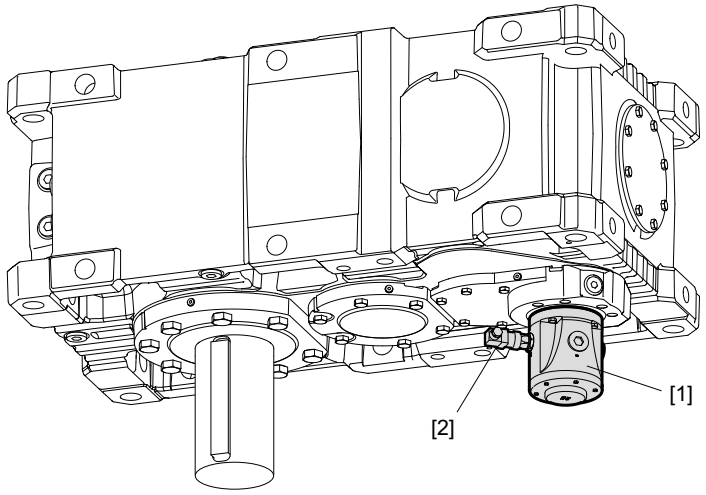
Mounting position M5

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



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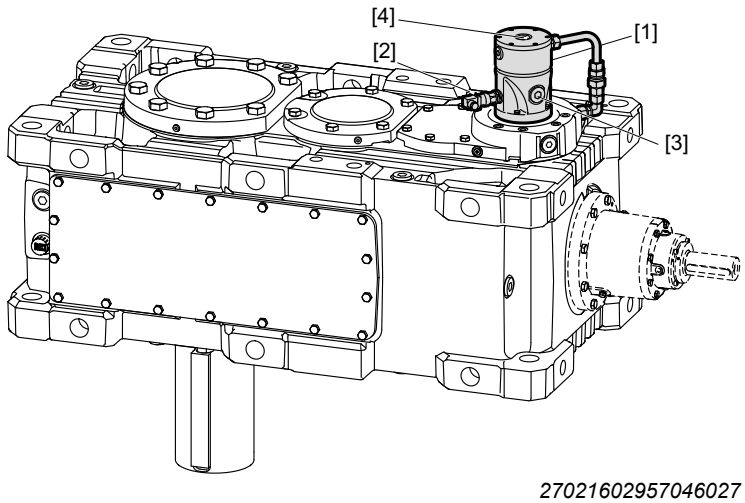
If the shaft end pump [1] is mounted above the oil level, the pump must be filled with oil as follows:

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



27021602957046027

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

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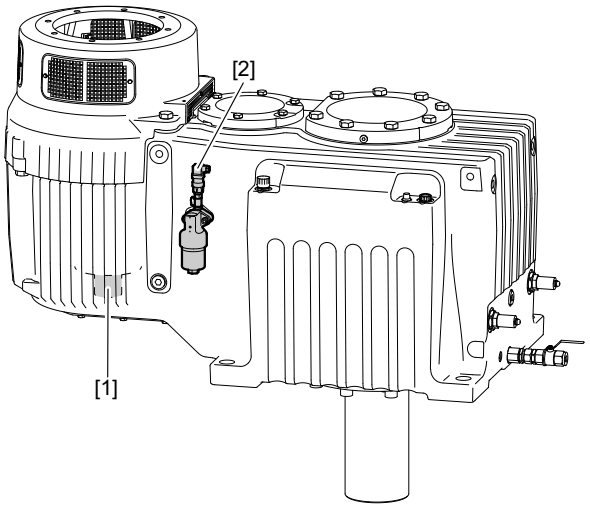
Agitator housing /HA

Sizes X3F140 – 210



15466378123

[1] Shaft end pump
[2] Pressure switch

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6.9 Gear units delivered with oil fill (option)

Observe the notes in chapter "Important information" (→ 🗎 103).

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 taking it into operation for the first time. Observe the information in chapter "Gear units with shaft end pump /SEP" (→ 🗎 117).

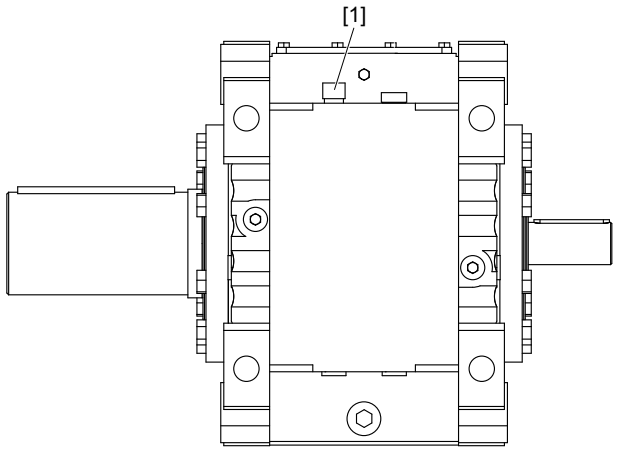
INFORMATION

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.

Explosion-proof drives come equipped with a guard plate for a desiccant breather filter. The guard plate need not be removed when mounting the desiccant breather filter.



4688864907

1. Remove the closing plug.
2. Insert the breather [1].
3. Check the oil level. Observe chapter "Checking the oil level" (→ 🗎 243).

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6.10 Gear units with solid shaft

6.10.1 Mounting input and output components

Observe the notes in chapter "Important information" (→ 🗎 103).

NOTICE

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

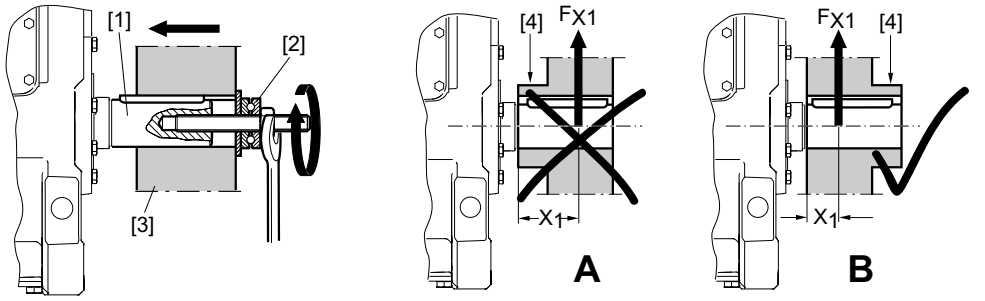
Possible damage to property.

- Only use a mounting device for installing input and output elements. Use the center bore and the thread on the shaft end for positioning.
- Never force belt pulleys, couplings, pinions, etc. onto the shaft end by hitting them with a hammer. Doing so can damage bearings, housing, and shaft.
- Make sure the belt of belt pulleys is tensioned correctly in accordance with the manufacturer's specifications.

INFORMATION

Only drive components with corresponding ATEX approval are permitted, assuming that these components are covered by Directive 2014/34/EU.

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



15791002763

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

A Incorrect
B Correct

To avoid impermissibly high overhung load: Install gear or chain 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).

6.11 Flange coupling with cylindrical interference fit /FC-S

Observe the notes in chapter "Important information" (→ 🗎 103).

INFORMATION

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

6.12 Flange coupling with keyway /FC-K

Observe the notes in chapter "Important information" (→ 🗎 103).

INFORMATION

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

6.13 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.

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6.14 Output shaft as hollow shaft with keyed connection /..A

INFORMATION

Only drive components with corresponding ATEX approval are permitted, assuming that these components are covered by Directive 2014/34/EU.

6.14.1 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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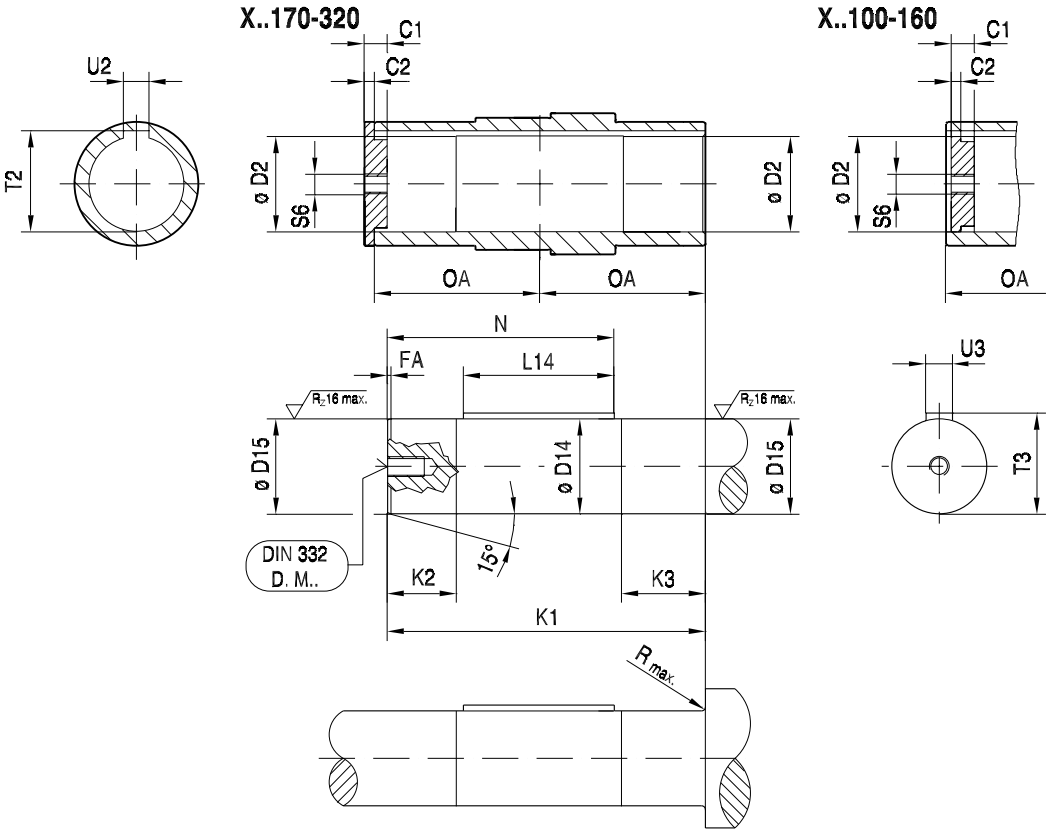
6.14.2 Dimensions of the machine shaft



X.F X.K X.T	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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6.14.3 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.

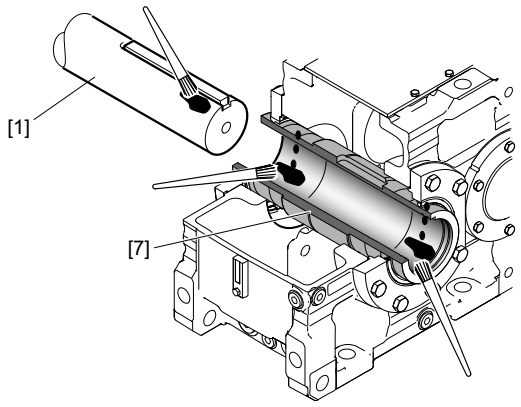
Sizes X100 – 160

Observe the notes in chapter "Important information" (→ 🗎 103).

INFORMATION

- Included in the delivery:
  - 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	2x retaining rings (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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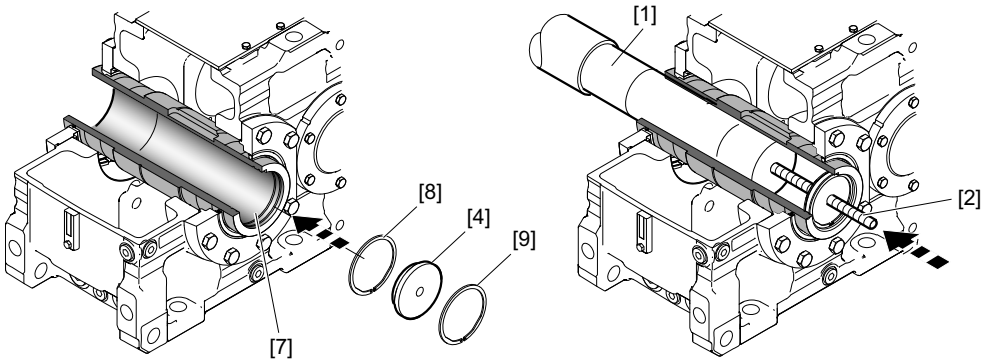
Size	2x retaining rings (bore) DIN 472
X..A150	125×4
X..A160	135×4

INFORMATION

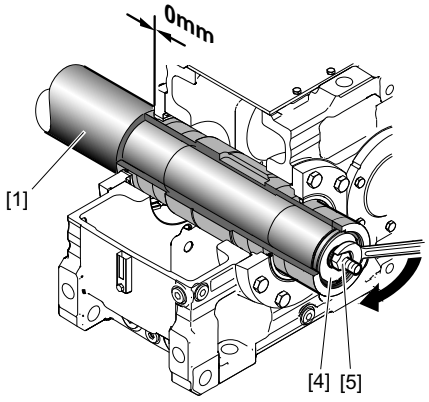
Applying lubricant to the threaded rod and nut prior to assembly makes the job easier.



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

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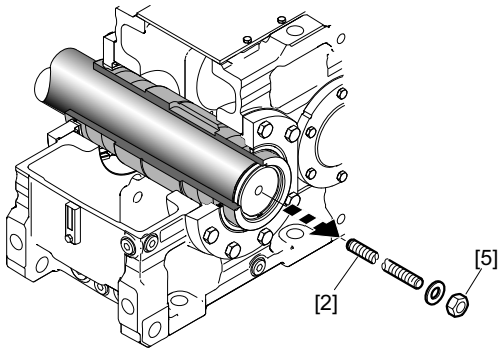
6. Loosen the nut [5]. Screw out the threaded rod [2].



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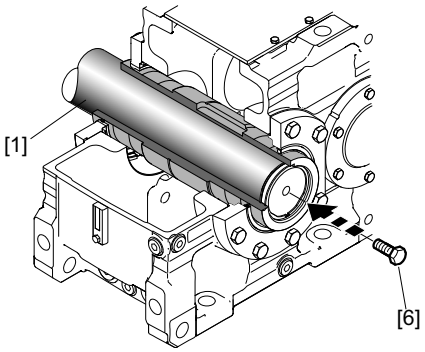
[2] Threaded rod
[5] Nut

7. Secure the machine shaft [1] with the retaining screw [6]. The retaining screw 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.

INFORMATION

When mounting the protection cover (see chapter "Input and output shafts" (→ 🗎 60)), make sure it entirely covers the gasket to guarantee it is dust-proof.

If the gear unit is subject to increased vibrations during operation, secure the screws against loosening (e.g. Loctite®).

INFORMATION

If the SEW cover is not used, the system manufacturer undertakes to use appropriate accessories in line with EN ISO 80079-36 and EN ISO 80079-37 to prevent possible ignition sources between housing and shrink disk (e.g. friction due to high amount of built-up dirt).

If special maintenance work is necessary for this purpose, it must be described in the operating instructions for the machine or components.

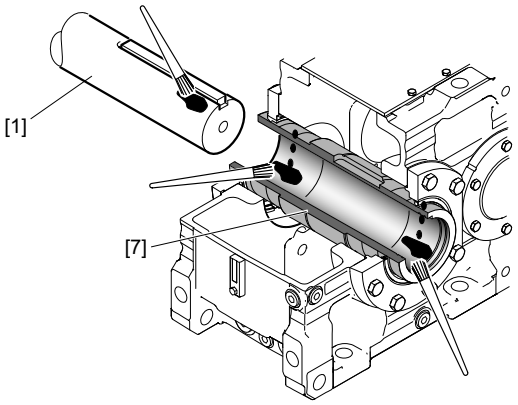
Sizes X170 – 320

Observe the notes in chapter "Important information" (→ 🗎 103).

INFORMATION

- Included in the delivery:
  - 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

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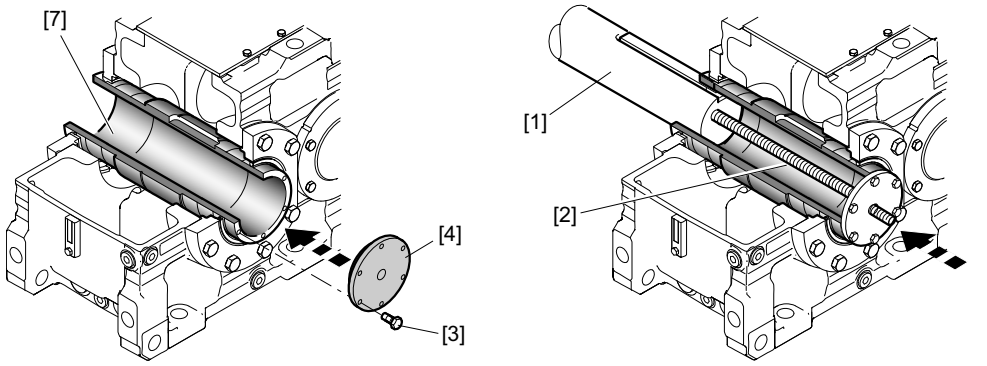
Observe the following information on the retaining screws [3].

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

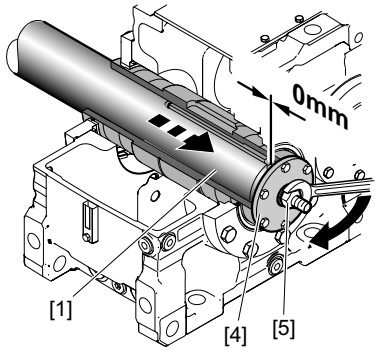
Applying lubricant to the threaded rod and nut prior to assembly makes the job easier.



9007199565093003

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

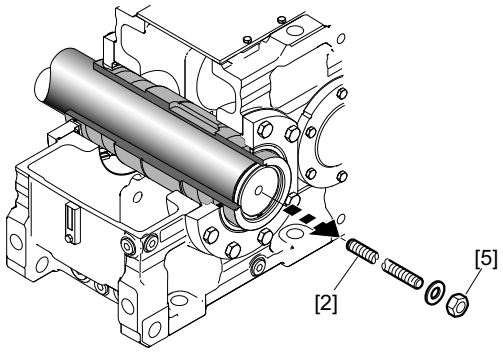
3. Tighten the machine shaft [1] with the nut [5] until the shaft end of the machine shaft [1] and the end plate [4] meet.



9007199565148299

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

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

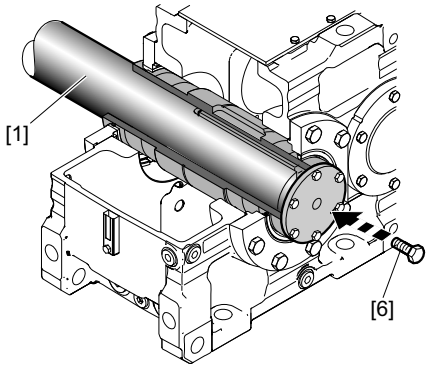


9007202142726155

[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 thread locker. 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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INFORMATION

When mounting the protection cover (see chapter "Input and output shafts" (→ 🗎 60)), make sure it entirely covers the gasket to guarantee it is dust-proof.

If the gear unit is subject to increased vibrations during operation, secure the screws against loosening (e.g. Loctite®).

INFORMATION

If the SEW cover is not used, the system manufacturer undertakes to use appropriate accessories in line with EN ISO 80079-36 and EN ISO 80079-37 to prevent possible ignition sources between housing and shrink disk (e.g. friction due to high amount of built-up dirt).

If special maintenance work is necessary for this purpose, it must be described in the operating instructions for the machine or components.

6.14.4 Removing the gear unit from the machine shaft

NOTICE

Improper disassembly may damage bearings and other components.

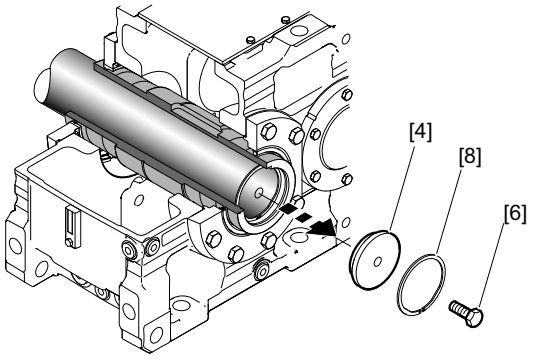
Possible damage to property.

- 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" (→ 🗎 103).

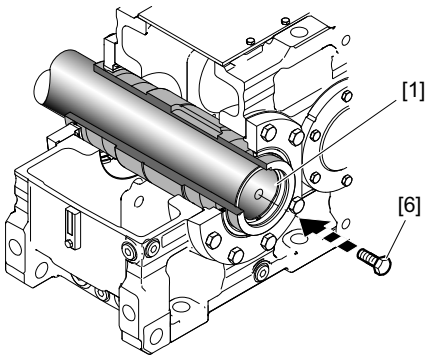
1. Loosen the retaining screw [6]. Remove the outer retaining ring [8] and the end plate [4].



9007202105918859

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

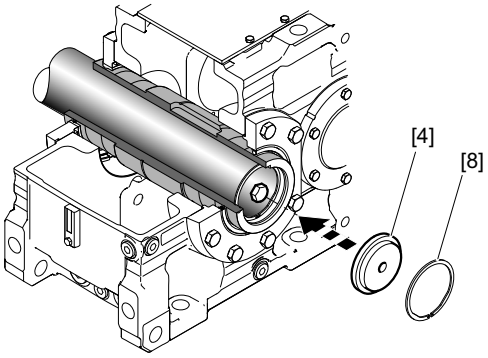
2. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



9007202105921291

[1] Machine shaft
[6] Retaining screw

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].

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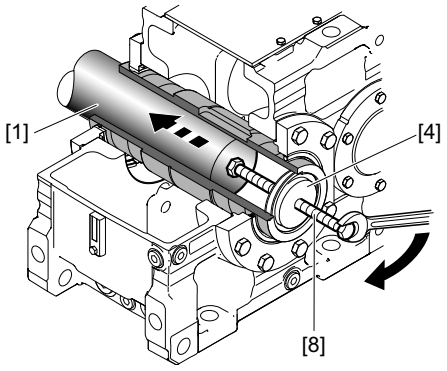

36028799870151563

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

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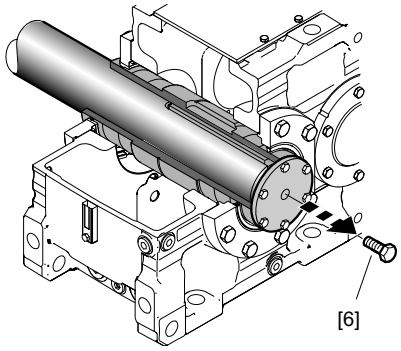
Sizes X170 – 320

Observe the notes in chapter "Important information" (→ 🗎 103).

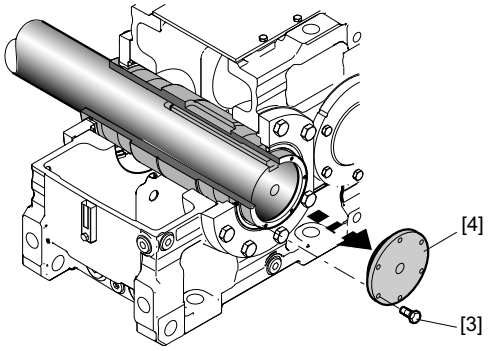
1. Loosen the retaining screw [6].



310460043

[6] Retaining screw

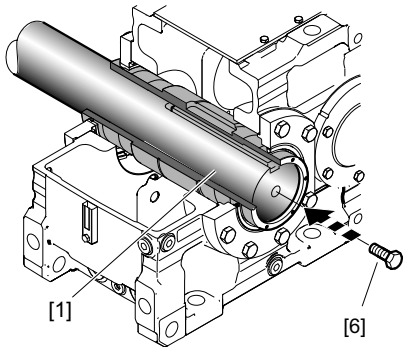
2. Remove the retaining screws [3] and the end plate [4].



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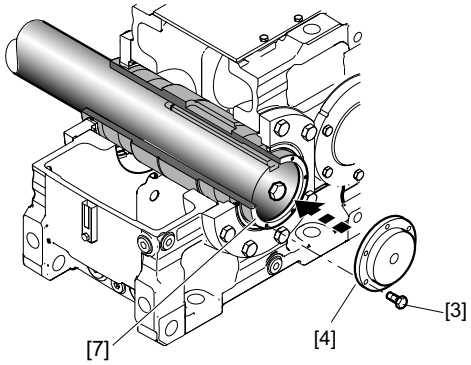
4. To disassemble the gear unit, flip the end plate [4] over and use the retaining screws [3] to reattach it centrically to the hollow shaft [7]. The retaining screws [3] should be tightened hand-tight.



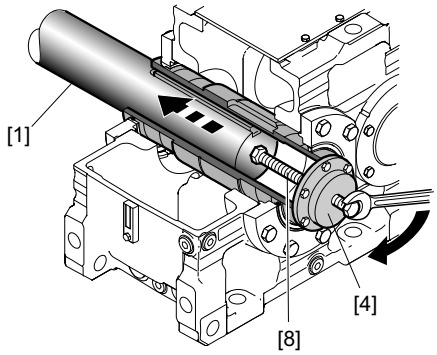
310474123

[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

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

INFORMATION

Only drive components with corresponding ATEX approval are permitted, assuming that these components are covered by Directive 2014/34/EU.

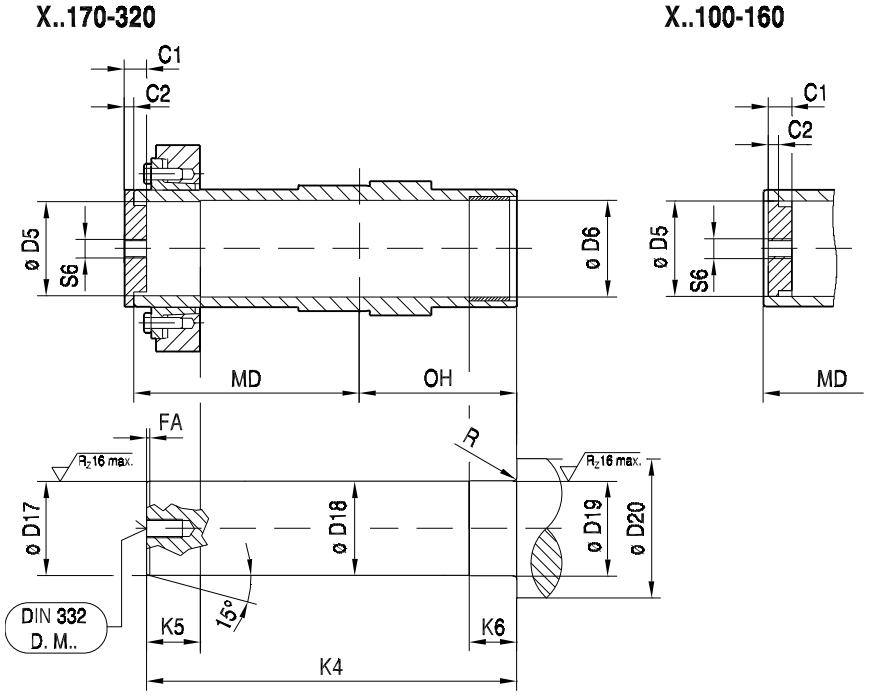
6.15.1 General information

The material of the machine shaft should be dimensioned by the customer according to the loads that will occur (e.g. impact).

The shaft material must have the following minimum yield point for transferring the nominal torque.

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

6.15.2 Dimensions of the machine shaft



9007199906389771

X.F.. X.K.. X.T..	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

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X.F.. X.K.. X.T..	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..H240	45	22	230^{H7}	231^{H9}	230_{g6}	230_{h11}	231_{m6}	250	3	948_{-1}	140	108_{-1}	571.5	400.5	5	M42	M36
X2KH240	45	22	230^{H7}	231^{H9}	230_{g6}	230_{h11}	231_{m6}	250	3	1023_{-1}	140	108_{-1}	609	438	5	M42	M36
X..H250	45	22	240^{H7}	241^{H9}	240_{g6}	240_{h11}	241_{m6}	260	3	948_{-1}	140	108_{-1}	571.5	400.5	5	M42	M36
X2KH250	45	22	240^{H7}	241^{H9}	240_{g6}	240_{h11}	241_{m6}	260	3	1023_{-1}	140	108_{-1}	609	438	5	M42	M36
X..H260	45	22	250^{H7}	255^{H9}	250_{g6}	250_{h11}	255_{m6}	280	4	1021_{-1}	140	108_{-1}	608	437	5	M42	M36
X..H270	45	22	280^{H7}	285^{H9}	280_{g6}	280_{h11}	285_{m6}	310	4	1056_{-1}	146	143_{-1}	630	450	5	M42	M36
X..H280	45	22	280^{H7}	285^{H9}	280_{g6}	280_{h11}	285_{m6}	310	4	1056_{-1}	146	143_{-1}	630	450	5	M42	M36
X..H290	45	22	300^{H7}	305^{H9}	300_{g6}	300_{h11}	305_{m6}	330	4	1147_{-1}	152	143_{-1}	679	492	5	M42	M36
X..H300	45	22	300^{H7}	305^{H9}	300_{g6}	300_{h11}	305_{m6}	330	4	1147_{-1}	152	143_{-1}	679	492	5	M42	M36
X..H310	55	28	320^{H7}	325^{H9}	320_{g6}	320_{h11}	325_{m6}	350	4	1241_{-1}	165	143_{-1}	740.5	528.5	5	M48	M42
X..H320	55	28	320^{H7}	325^{H9}	320_{g6}	320_{h11}	325_{m6}	350	4	1241_{-1}	165	143_{-1}	740.5	528.5	5	M48	M42

6.15.3 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.

Sizes X100 – 160

Observe the notes in chapter "Important information" (→ 🗎 103).

INFORMATION

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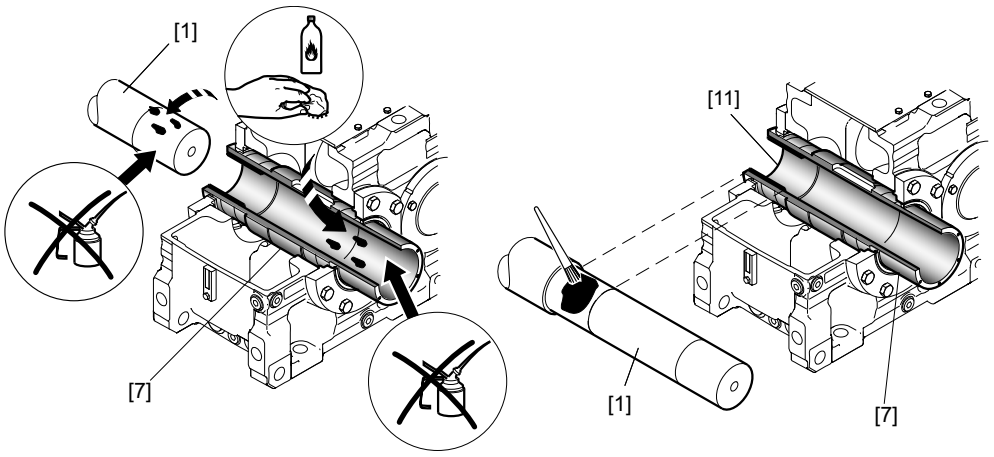
3. Apply some assembly paste, such as NOCO® fluid or Rivolta F.L.A. to the machine shaft [1] in the area of the bushing [11].



16839935371

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

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	2x retaining rings (bore) DIN 472
X..H100	80×2.5
X..H110	90×2.5
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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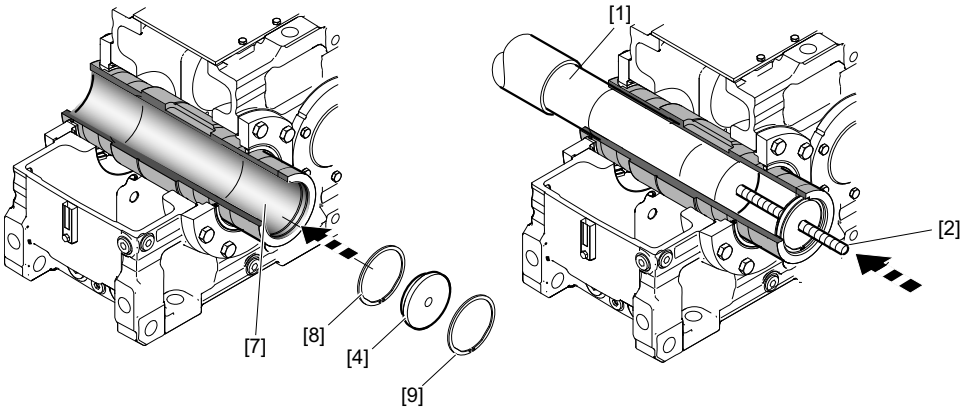
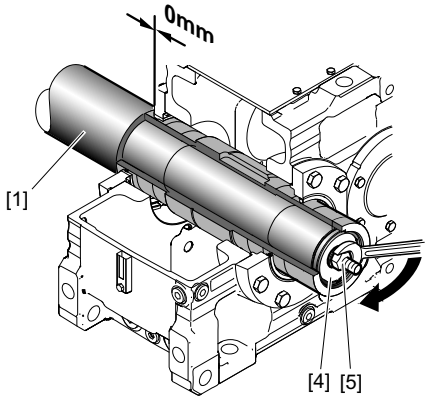


9007202134039819

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

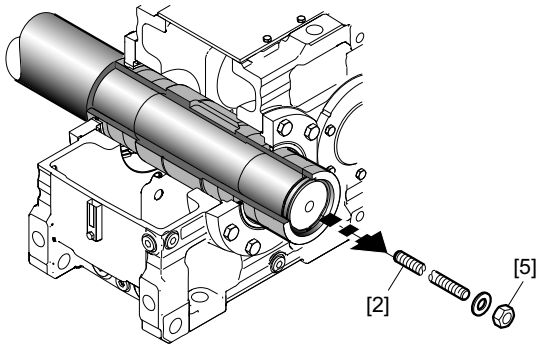
5. Screw the nut [5] onto the threaded rod up to the end plate [4]. Tighten the nut [5] until the shoulders of the machine shaft [1] and the hollow shaft meet.



18014401397909131

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

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

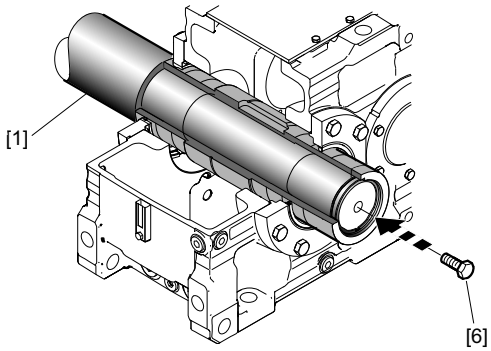


9007202134044427

[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 in 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.

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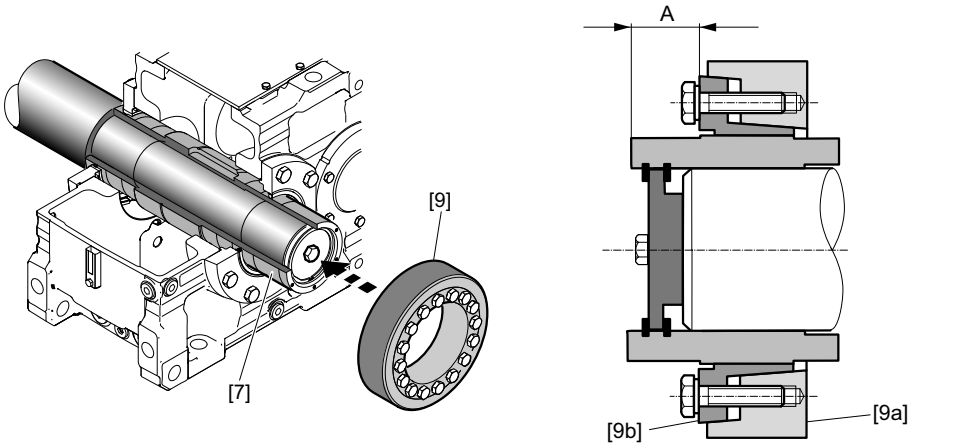
9. ⚠ **CAUTION!** The loose shrink disk could slip. Potential risk of crushing due to falling parts.
   Secure the shrink disk against slipping.
10. **NOTICE!** Tightening the screws without installed shaft might deform the hollow shaft. Possible damage to property.
    Never tighten the screws without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



18014401395747083

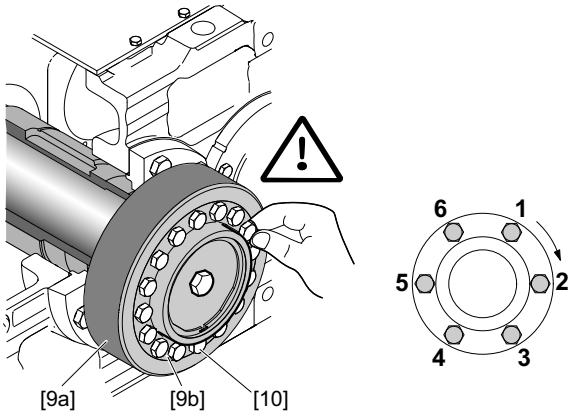
[7] Hollow shaft
[9] Shrink disk
[9a] Taper (outer ring)
[9b] Taper bushing (inner ring)

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

11. Tighten the retaining 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 retaining screws [10] in a clockwise direction (not in a diametrically opposite sequence), each with a quarter turn. Do not tighten the retaining screws [10] in a diametrically opposite sequence.

INFORMATION

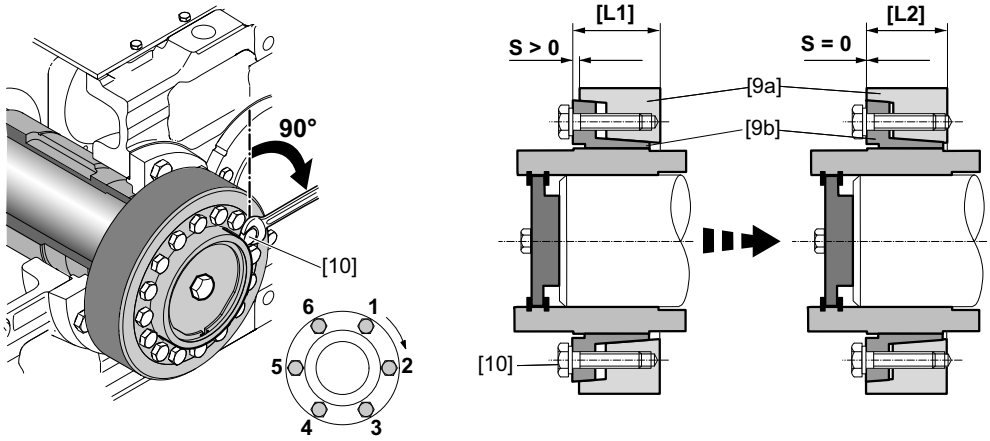
For shrink disks with a slotted taper bushing (inner ring) [9b], tighten the locking screws [10] to the left and right of the slot one after another, and then, in several stages, tighten the remaining screws at evenly spaced intervals.



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 ¼ 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.

INFORMATION

When mounting the protection cover (see chapter "Input and output shafts" (→ 🗎 60)), make sure it entirely covers the gasket to guarantee it is dust-proof.

If the gear unit is subject to increased vibrations during operation, secure the screws against loosening (e.g. Loctite®).

INFORMATION

If the SEW cover is not used, the system manufacturer undertakes to use appropriate accessories in line with EN ISO 80079-36 and EN ISO 80079-37 to prevent possible ignition sources between housing and shrink disk (e.g. friction due to high amount of built-up dirt).

If special maintenance work is necessary for this purpose, it must be described in the operating instructions for the machine or components.

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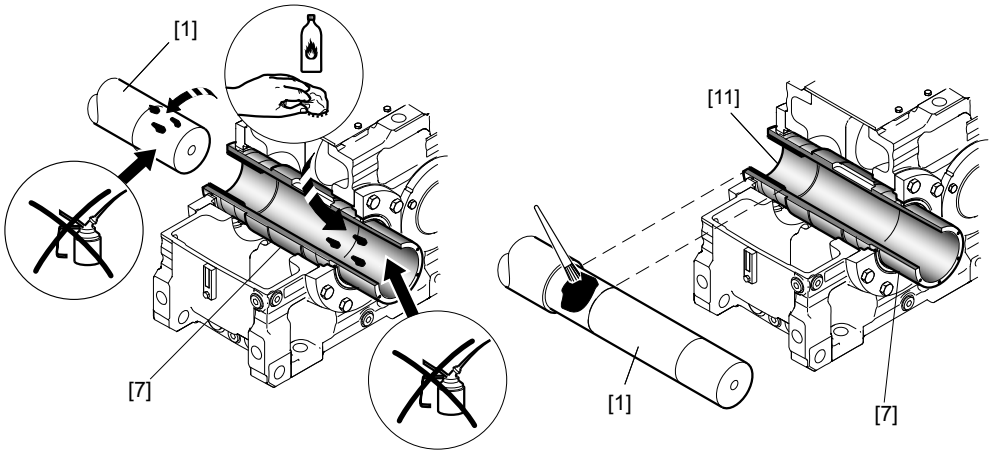
Sizes X170 – 320

Observe the notes in chapter "Important information" (→ 🗎 103).

INFORMATION

- Included in the delivery:
  - 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].
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] Connector

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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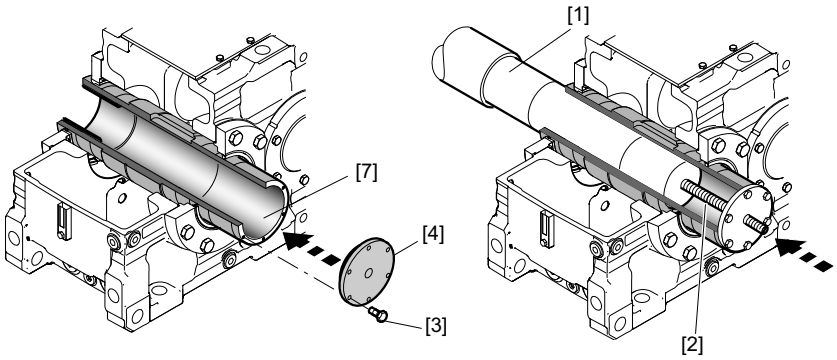
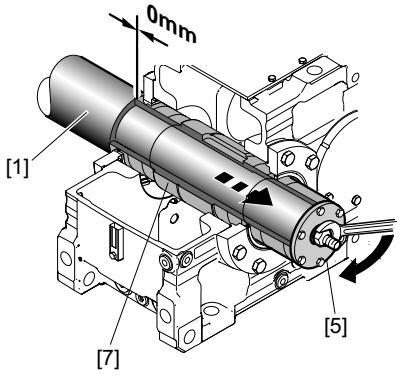


310497035

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

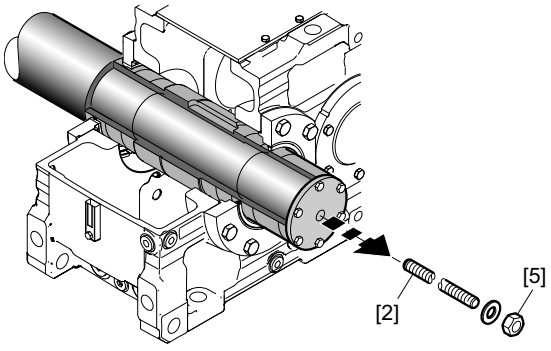
5. Screw the nut [5] onto the threaded rod up to the end plate [4]. Tighten the nut [5] until the shoulders of the machine shaft [1] and the hollow shaft meet.



310501387

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

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

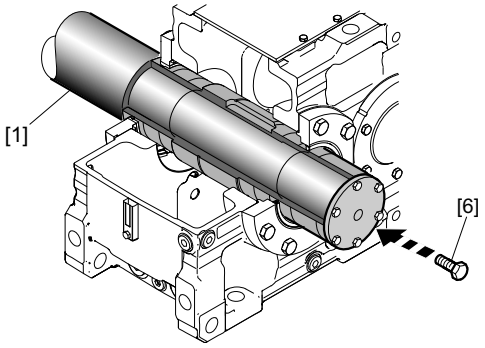


310506251

[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 thread locker. Observe the following information on the retaining screw [6].

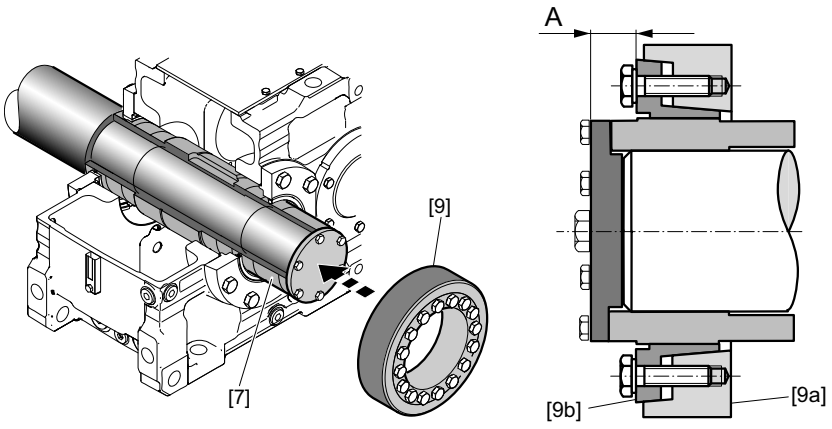
Size	Strength class 8.8	Tightening torque in Nm Strength class 8.8
X..H170 – 230	M30	1597
X..H240 – 300	M36	2778
X..H310 – 320	M42	3995



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 screws without installed shaft might deform the hollow shaft. Possible damage to property.
    Never tighten the 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

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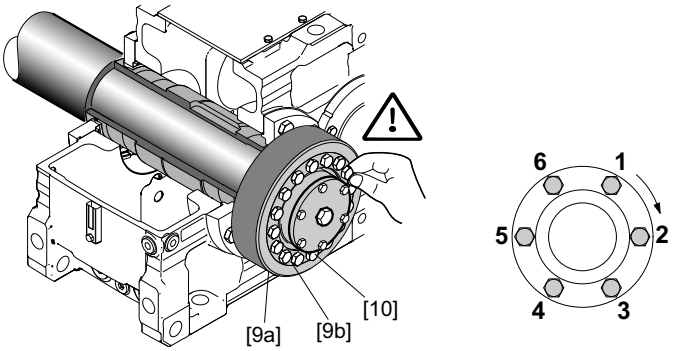
11. Tighten the retaining screws [10] by hand. In doing so, align the bevel (outer ring) [9a] parallel to the taper bushing (inner ring) [9b] of the shrink disk. Successively tighten the retaining screws [10] in a clockwise direction (not in a diametrically opposite sequence), each with a quarter turn.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

INFORMATION

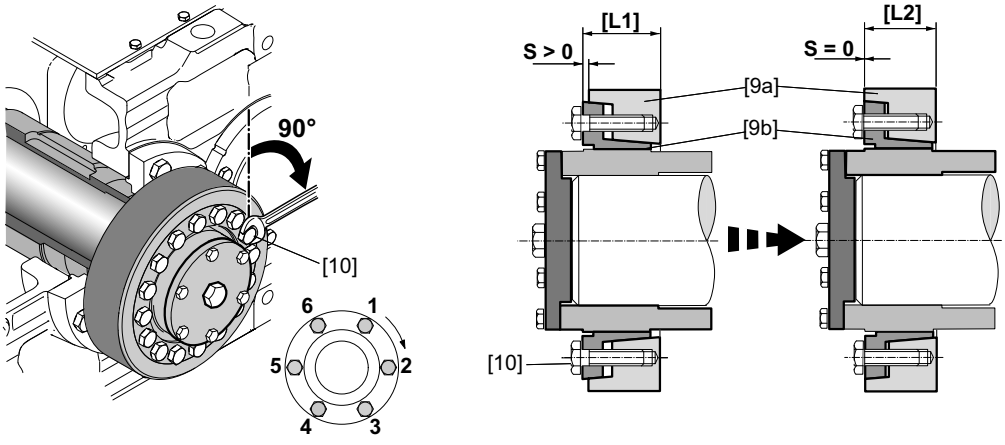
For shrink disks with a slotted taper bushing (inner ring) [9b], tighten the locking screws [10] to the left and right of the slot one after another, and then, in several stages, tighten the remaining screws at evenly spaced intervals.



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 ¼ 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)

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.

INFORMATION

When mounting the protection cover (see chapter "Input and output shafts" (→ 🗎 60)), make sure it entirely covers the gasket to guarantee it is dust-proof.

If the gear unit is subject to increased vibrations during operation, secure the screws against loosening (e.g. Loctite®).

INFORMATION

If the SEW cover is not used, the system manufacturer undertakes to use appropriate accessories in line with EN ISO 80079-36 and EN ISO 80079-37 to prevent possible ignition sources between housing and shrink disk (e.g. friction due to high amount of built-up dirt).

If special maintenance work is necessary for this purpose, it must be described in the operating instructions for the machine or components.

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6.15.4 Disassembling the gear unit from the machine shaft

Sizes X100 – 160

Observe the notes in chapter "Important information" (→ 🗎 103).

NOTICE

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

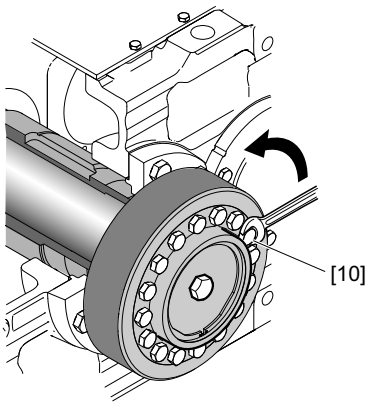
Possible damage to property.

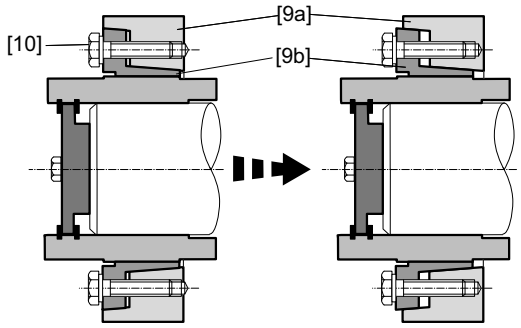
- You may only use the hollow shaft as a support for disassembly. Note that supporting on any other parts of the gear unit may damage the material.
- Remove the shrink disk properly. Never completely unscrew the retaining screws because the shrink disk might jump off and cause an injury.
- Shrink disks 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.



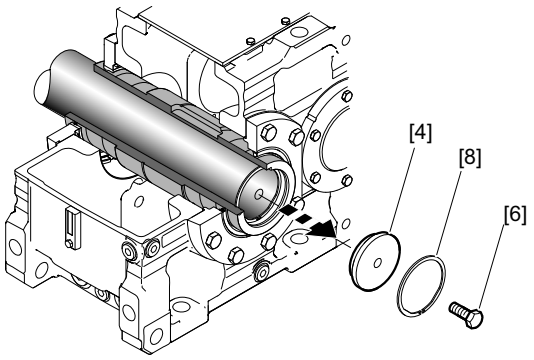


18014401395753611

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

2. Remove the shrink disk from the hollow shaft.

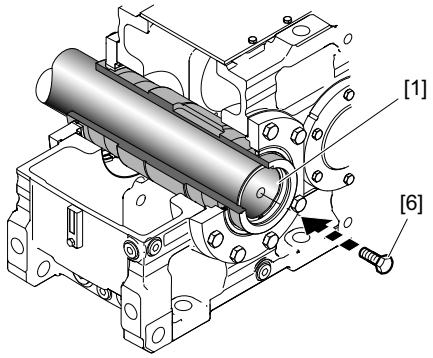
3. Loosen the retaining screw [6]. Remove the outer retaining ring [8] and the end plate [4].



9007202105918859

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

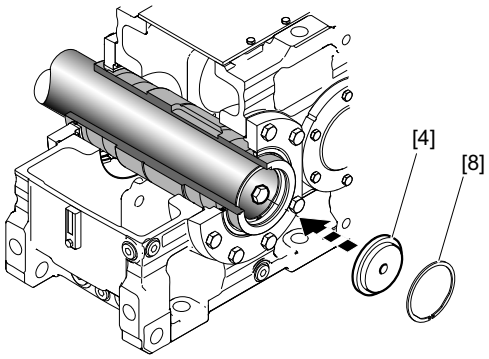
4. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



9007202105921291

[1] Machine shaft
[6] Retaining screws

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

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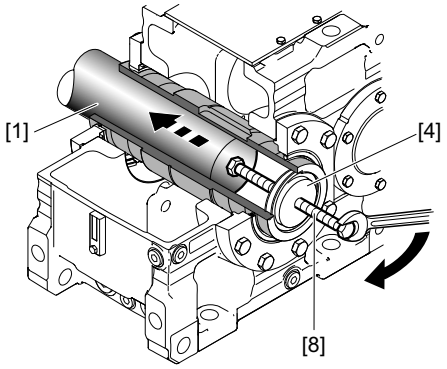
6. Thread the ejector screw [8] into the end plate [4] to remove the gear unit from the machine shaft [1]. Applying lubricant to the ejector screw [8] and the thread in the end plate [4] prior to disassembly makes the job easier.



36028799870151563

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

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Sizes X170 – 320

Observe the notes in chapter "Important information" (→ 🗎 103).

NOTICE

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

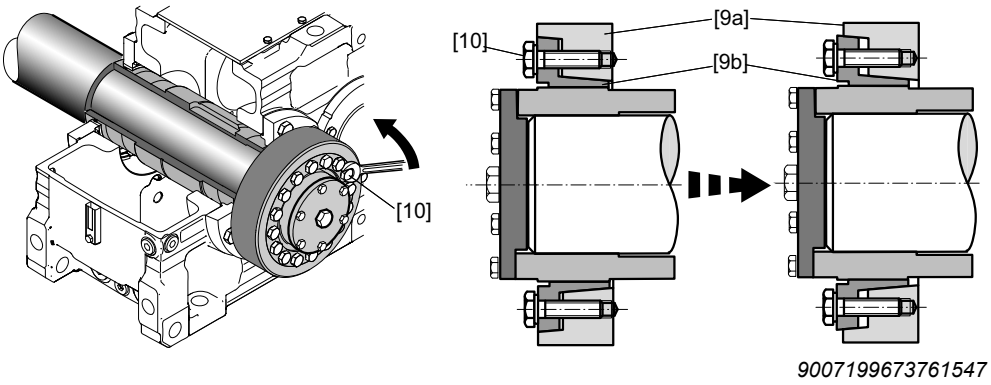
Possible damage to property.

- 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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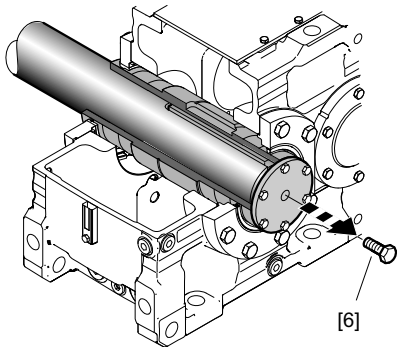
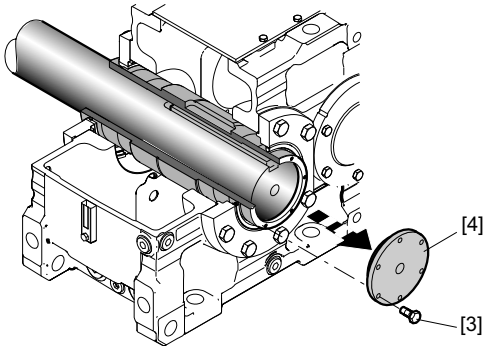
2. Loosen the retaining screw [6].



310460043

[6] Retaining screw

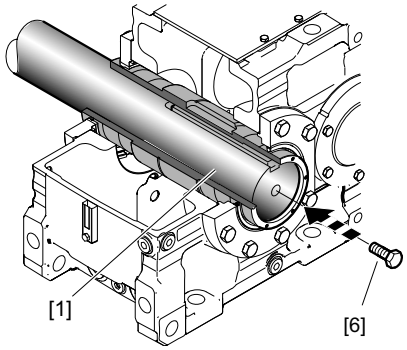
3. Remove the retaining screws [3] and the end plate [4].



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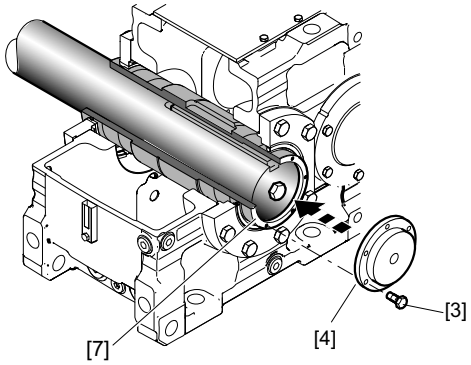
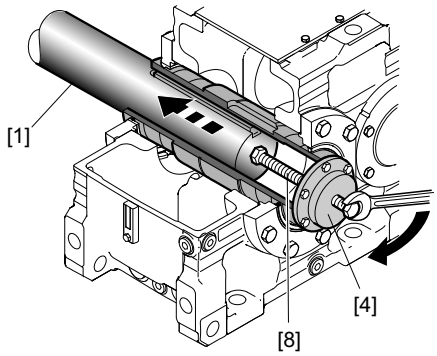
5. To disassemble the gear unit, flip the end plate [4] over and use the retaining screws [3] to reattach it centrically to the hollow shaft [7]. The retaining screws [3] should be tightened hand-tight.



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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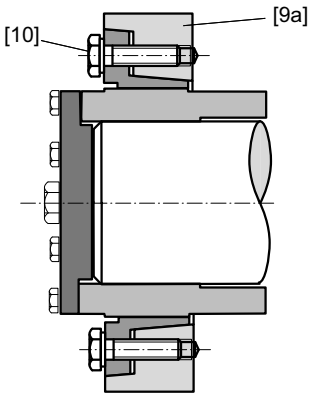
Cleaning and lubricating the shrink disk

Observe the notes in chapter "Important information" (→ 🗎 103).

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

INFORMATION

Only drive components with corresponding ATEX approval are permitted, assuming that these components are covered by Directive 2014/34/EU.

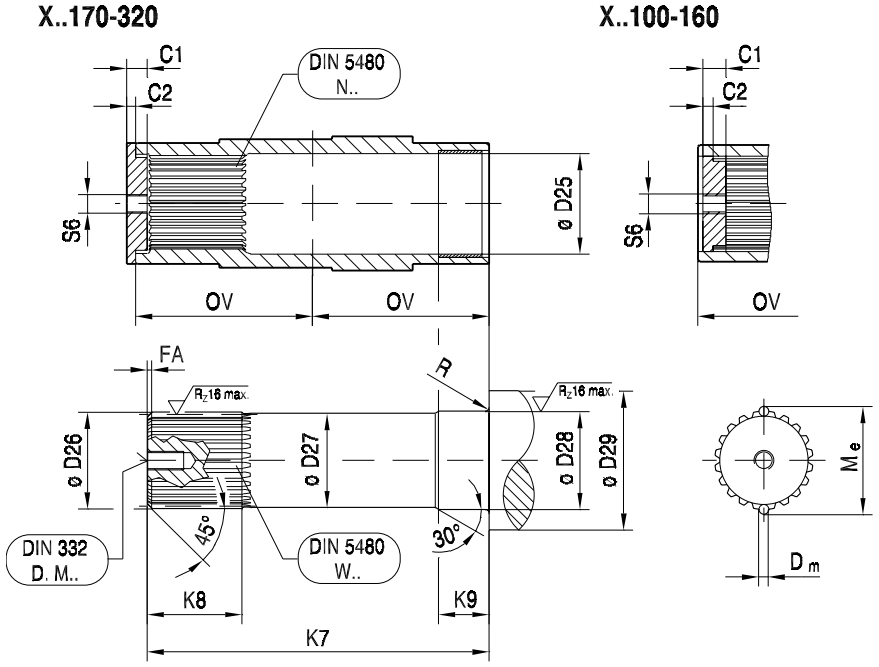
6.16.1 General information

The material of the machine shaft should be dimensioned by the customer according to the loads that will occur (e.g. impact).

The shaft material must have the following minimum yield point for transferring the nominal torque.

- 360 N/mm² for sizes X..100 to X..320

6.16.2 Dimensions of the machine shaft



18014399272577419

X.F.. X.K.. X.T..	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

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X.F.. X.K.. X.T..	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..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
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

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6.16.3 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" (→ 🗎 103).

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]

Apply some NOCO® fluid on the machine shaft around the bushing and the splining.

Mount the gear unit to the machine shaft as described in chapter Mounting the gear unit to the machine shaft.

Observe the following information on the retaining rings.

Size	2x retaining ring (bore) DIN 472
X..V100	80x2.5
X..V110	90x2.5
X..V120	100x3
X..V130	110x4
X..V140	125x4
X..V150	130x4
X..V160	140x4

Observe the following information.

Size	Recommended thread size		Tightening torque in Nm Retaining screw [6] Strength class 8.8
	Ejector screw [8] (thread in the end plate)	Threaded rod [2] Nut (DIN 934) [5] Retaining screw [6] Strength class 8.8	
X..V100 – 150	M30	M24	798
X..V160	M36	M30	1597

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.

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

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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.

INFORMATION

When mounting the protection cover (see chapter "Input and output shafts" (→ 🗎 60)), make sure it entirely covers the gasket to guarantee it is dust-proof.

If the gear unit is subject to increased vibrations during operation, secure the screws against loosening (e.g. Loctite®).

INFORMATION

If the SEW cover is not used, the system manufacturer undertakes to use appropriate accessories in line with EN ISO 80079-36 and EN ISO 80079-37 to prevent possible ignition sources between housing and shrink disk (e.g. friction due to high amount of built-up dirt).

If special maintenance work is necessary for this purpose, it must be described in the operating instructions for the machine or components.

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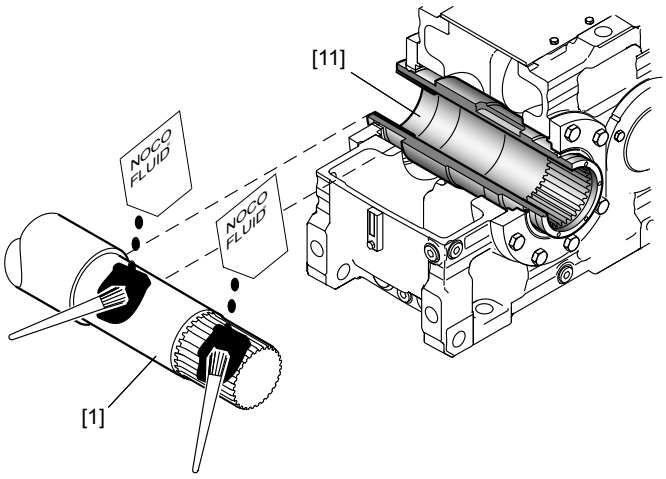
Size X170 – 320

Observe the notes in chapter "Important information" (→ 🗎 103).

INFORMATION

- Included in the delivery:
  - 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] Connector

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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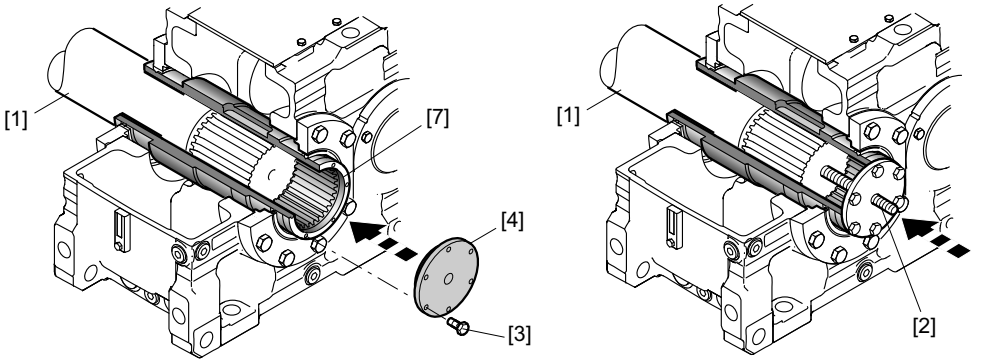
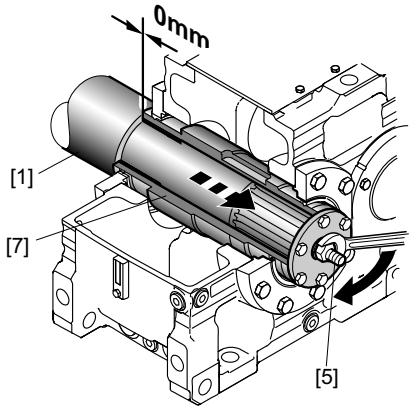


9007200026433547

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

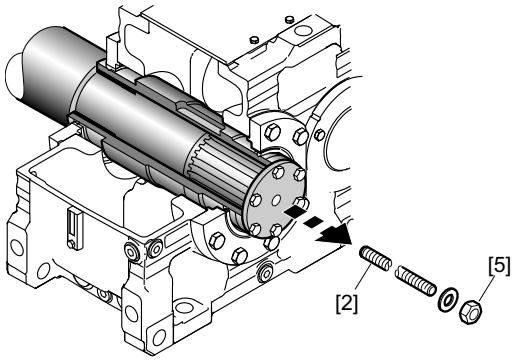
4. Tighten the machine shaft [1] with the nut [5] until the shoulders of the machine shaft and the hollow shaft [7] meet.



771696651

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

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

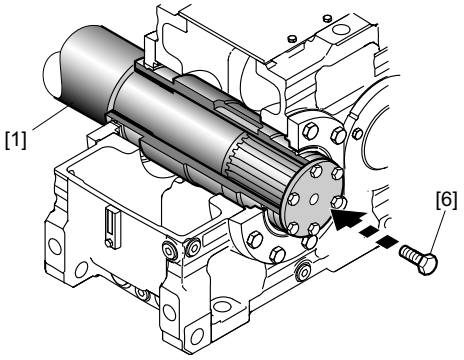


771752587

[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 thread locker. 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. 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).

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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.

INFORMATION

When mounting the protection cover (see chapter "Input and output shafts" (→ 🗎 60)), make sure it entirely covers the gasket to guarantee it is dust-proof.

If the gear unit is subject to increased vibrations during operation, secure the screws against loosening (e.g. Loctite®).

INFORMATION

If the SEW cover is not used, the system manufacturer undertakes to use appropriate accessories in line with EN ISO 80079-36 and EN ISO 80079-37 to prevent possible ignition sources between housing and shrink disk (e.g. friction due to high amount of built-up dirt).

If special maintenance work is necessary for this purpose, it must be described in the operating instructions for the machine or components.

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6.16.4 Disassembling the gear unit from the machine shaft

NOTICE

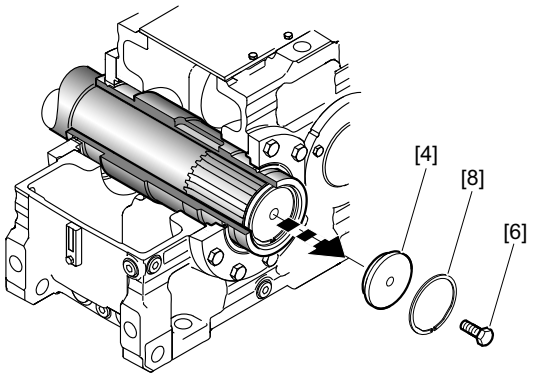
Improper disassembly of the gear unit and machine shaft may damage bearings and other components.

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

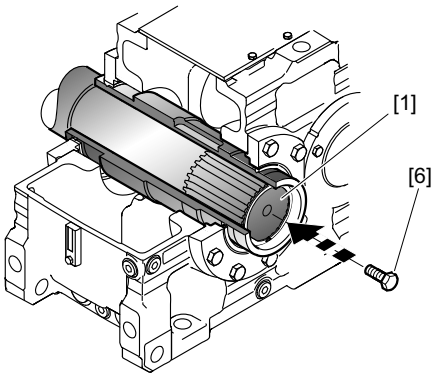
1. Loosen the retaining screw [6]. Remove the outer retaining ring [8] and the end plate [4].



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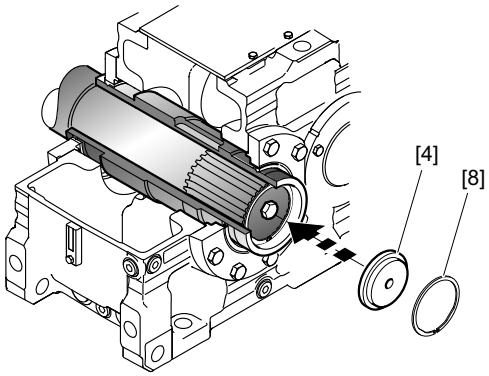
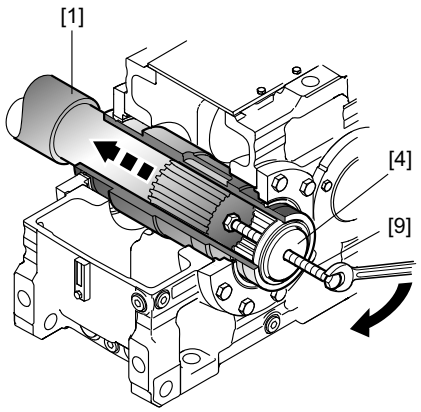
3. Turn the end plate [4] and reinstall the end plate [4] and the outer retaining ring [8].



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.

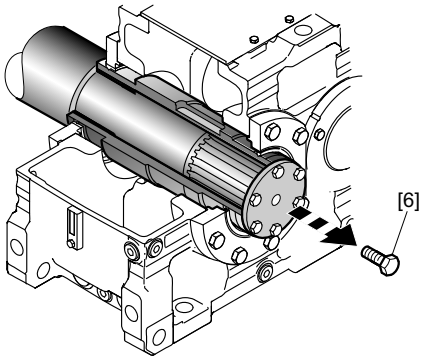


3241268107

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

Sizes X170 – 320

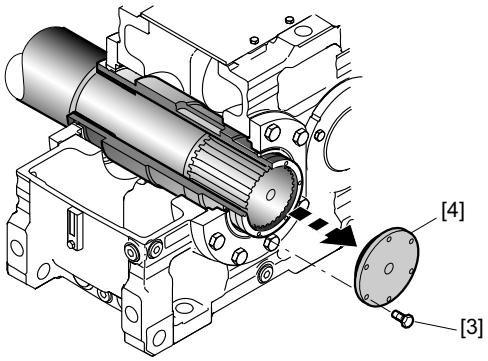
1. Loosen the retaining screw [6].



3241268619

[6] Retaining screw

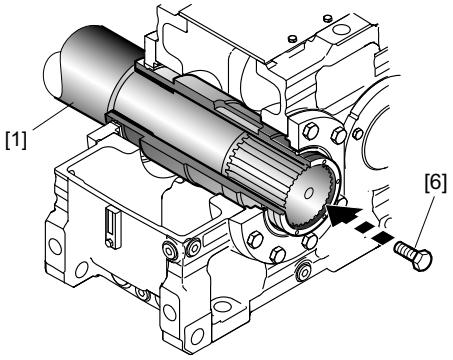
2. Remove the retaining screws [3] and the end plate [4].



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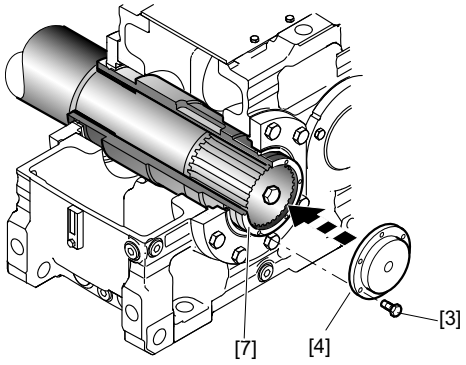
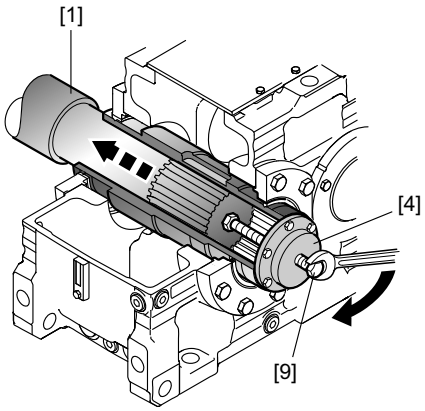
4. To disassemble the gear unit, flip the end plate [4] over and use the retaining screws [3] to reattach it centrically to the hollow shaft [7]. The retaining screws [3] should be tightened hand-tight.



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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6.17 Torque arm /T

Observe the notes in chapter "Important information" (→ 🗎 103).

⚠ WARNING

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

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.

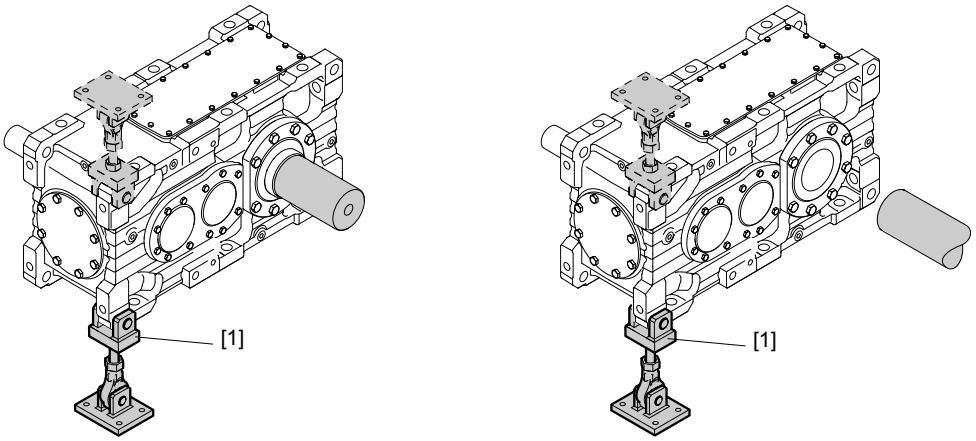
NOTICE

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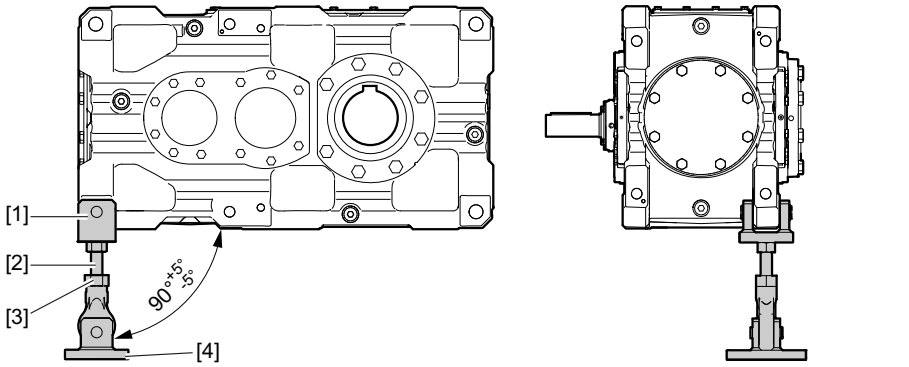
2. **NOTICE!** Make sure that the stud bolt [2] is screwed simultaneously into the yoke [1] and the joint head [3]. Possible damage to property. The stud bolt [2] must be screwed evenly into the yoke [1] and the joint head [3], covering a length of at least 1 x the bolt's diameter.
   Align the gear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



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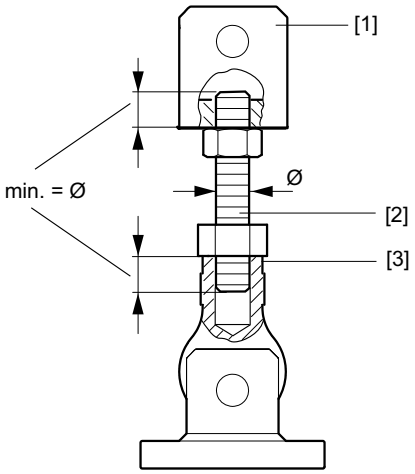
[1] Yoke head with bolt
[2] Stud bolt with nuts
[3] Joint head
[4] Yoke plate with bolt



1154061707

[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. Secure it using a suitable threadlocker (e.g. Loctite® 243).

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

6.18 Mounting flange /F

⚠ WARNING

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

Severe or fatal injuries.

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

NOTICE

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

Possible damage to property.

- The mounting flange must only be disassembled or assembled under the instruction of the SEW customer service.

NOTICE

Improper installation and mounting may result in damage to 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. Foot mounting of the gear unit or using a base frame are therefore not permitted.

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 bolts 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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6.19 Couplings

INFORMATION

The couplings must be marked for the use in potentially explosive areas.

Also adhere to the special operating instructions given by the respective coupling manufacturer.

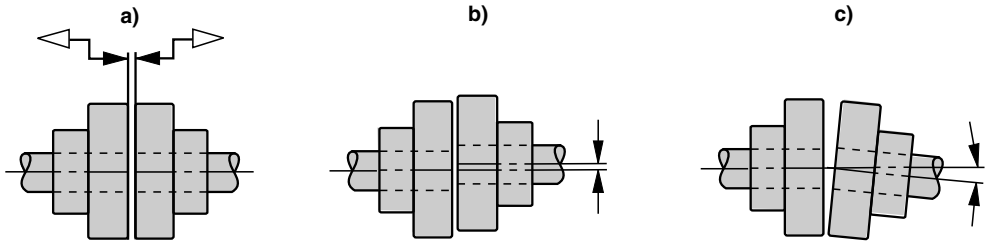
6.19.1 Mounting tolerances

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

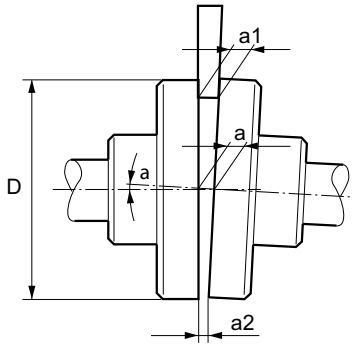
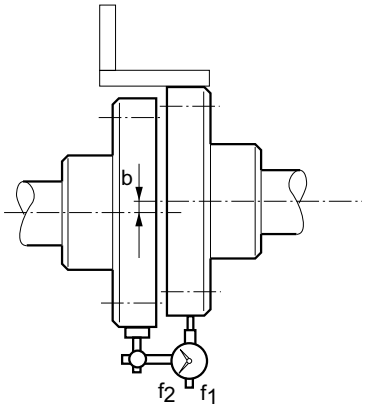
a) Axial misalignment

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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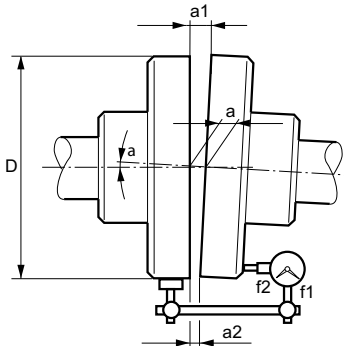
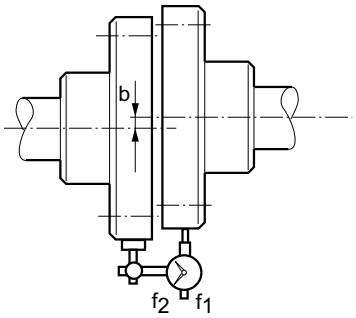
Measuring instruments	Angular offset	Axis offset
Micrometer dial		
	A prerequisite for this measuring method is that there is no axial play in the shaft bearings when the shafts rotate. If this condition is not fulfilled, the axial play between the faces of the coupling halves must be eliminated. As 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").

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6.20 Motor adapter /MA

6.20.1 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

Result:

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

The following applies to all tables:

G_M = Motor weight

G_G = Gear unit weight

Horizontal gear units

Type of mounting	Mounting position M. / mounting surface F.		
	M1/F1 and M3/F2		
	X.F..	X.K..	X.T..
Foot-mounted X../ B	$G_M \leq 1.5\ G_G$	$G_M \leq 1.75\ G_G$	$G_M \leq 2.0\ G_G$
Shaft-mounted X../ T	$G_M \leq 0.5\ G_G$	$G_M \leq 1.5\ G_G$	$G_M \leq 1.5\ G_G$
Flange-mounted X../ F	$G_M \leq 0.5\ G_G$	$G_M \leq 0.5\ G_G$	$G_M \leq 0.5\ G_G$

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.

Type of mounting	Mounting position M. / mounting surface F.		
	M5/F3 and M6/F4		
	X.F..	X.K..	X.T..
Foot-mounted X../ B	$G_M \leq 2.0\ G_G$	$G_M \leq 1.5\ G_G$	$G_M \leq 1.75\ G_G$
Flange-mounted X../ F	$G_M \leq 1.5\ G_G$	$G_M \leq 0.75\ G_G$	$G_M \leq 1.25\ G_G$

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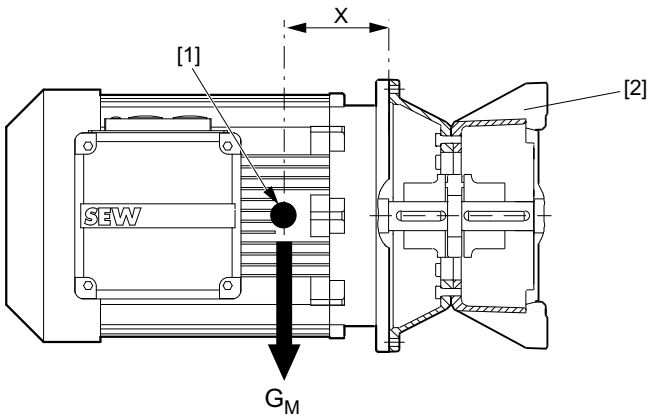
Upright gear units

Type of mounting	Mounting position M. / mounting surface F.		
	M4/F6		
	X.F..	X.K..	X.T..
Foot-mounted X../ B	$G_M \leq 1.25\ G_G$	$G_M \leq 1.75\ G_G$	$G_M \leq 1.5\ G_G$
Shaft-mounted X../ T	$G_M \leq 0.75\ G_G$	$G_M \leq 1.0\ G_G$	$G_M \leq 0.75\ G_G$
Flange-mounted X../ F	$G_M \leq 1.0\ G_G$	$G_M \leq 1.25\ G_G$	$G_M \leq 1.0\ G_G$

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
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.

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6.20.2 Claw coupling

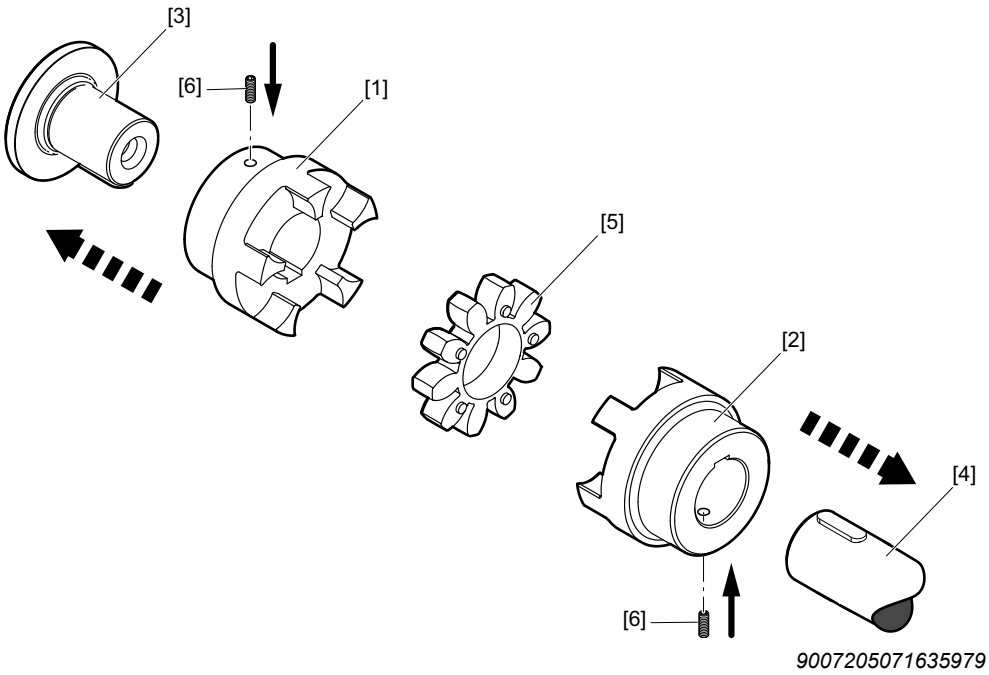
INFORMATION

Observe the operating instructions of the respective coupling manufacturer.

ROTEX® coupling

Observe the notes in chapter "Important information" (→ 🗎 103).

Mounting the coupling



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1. **NOTICE!** Improper assembly can damage the coupling halves [1][2]. Possible damage to property. Heat the coupling half to about 80 °C to facilitate assembly. Mount the coupling halves [1][2] onto the input and output shafts [3][4].
2. Insert the spider [5] and the DZ elements into the claws of the input and output coupling halves [1][2].

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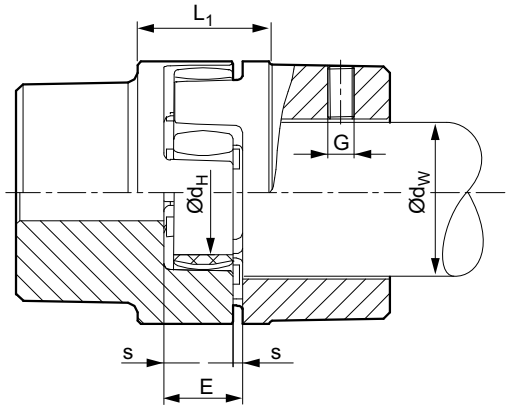
3. **NOTICE!** Improper mounting may result in damage to the coupling. Possible damage to property. During assembly, it is essential to observe dimension E so that the spider remains axially flexible during operation. The dimension E is listed in the following table.
   Push the gear unit/motor in axial direction until dimension **E** is reached. If the gear unit/motor has already been installed permanently, set dimension **E** by moving the coupling halves [1][2] axially on the input and output shafts [3][4].



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4. Secure the coupling halves by tightening the set screws [6].

Coupling size	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

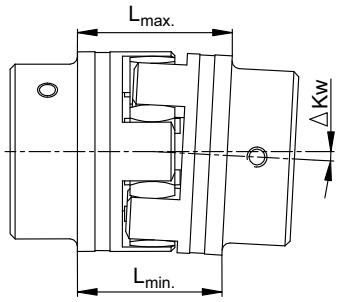
Improper mounting of the coupling may result in damage.

Possible damage to property.

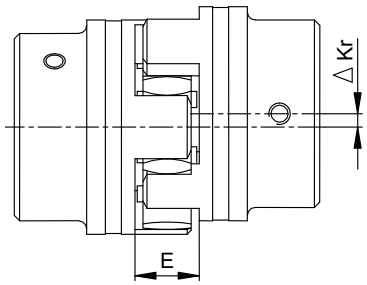
- The shaft ends must be aligned accurately to ensure a long service life of the coupling. Strictly adhere to the displacement values specified in the following chapter. Exceeding these values will damage the coupling. Exact coupling alignment increases its service life.

Observe:

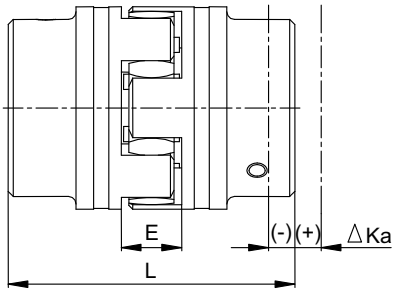
- The displacement values specified in the table (see next page) are maximum values that must not occur simultaneously. If radial offset and angular offset occur at the same time, the permitted displacement values may only be used proportionately.
- Use dial indicator, linear or feeler gauge to check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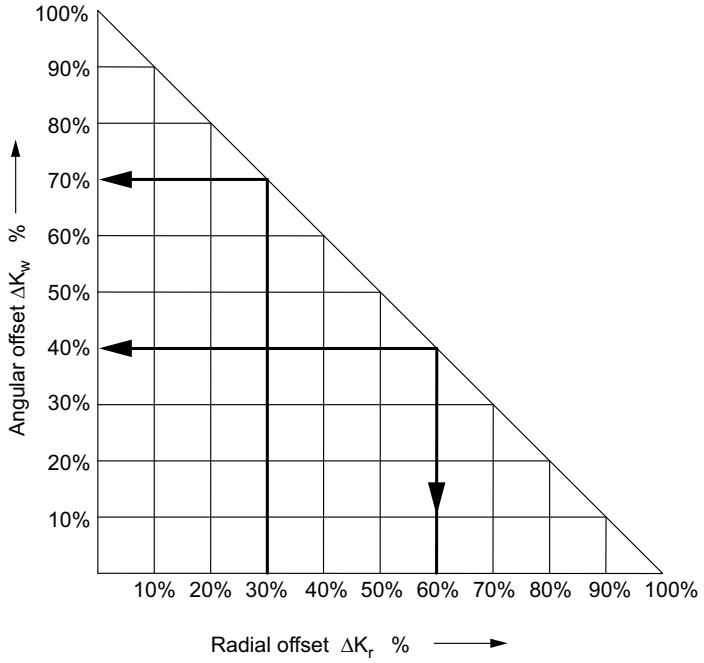

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Displacement values

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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6.20.3 Attaching the motor to the motor adapter

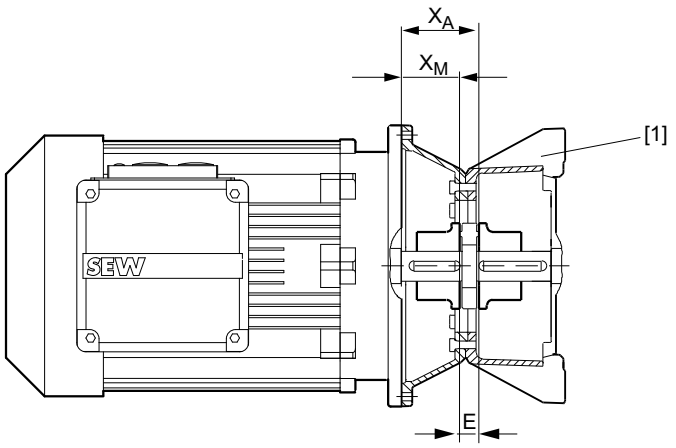
Observe the notes in chapter "Important information" (→ 🗎 103).

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 chapter "Claw coupling" (→ 🗎 177) 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 dimensions	XM	Distance between the coupling and the motor flange surface
	→ XM = XA - E		

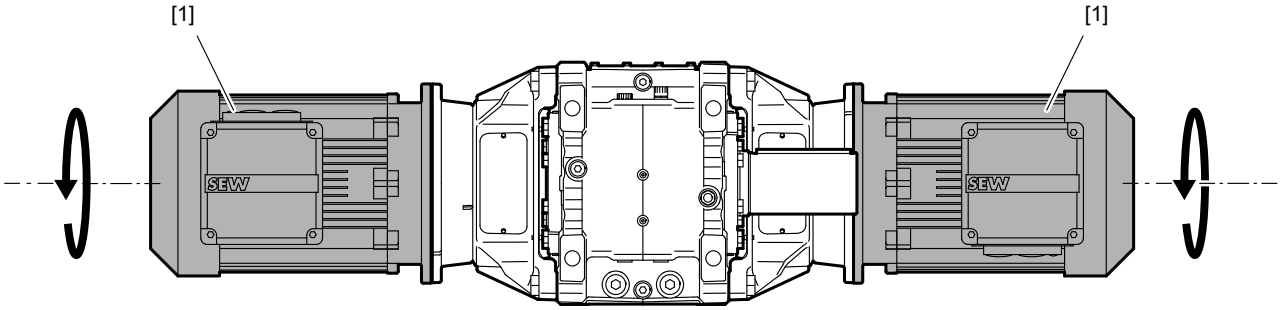
3. Secure the coupling halves using the set screw.
4. Mount the motor onto the motor adapter, making sure that the claws of the coupling engage each other.

6.20.4 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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Motor weight

When using shaft-mounted X../T and flange-mounted X../F gear units, the total weight of the 2 motors must not exceed the permitted value of one motor (see the detailed operating instructions for more information).

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6.21 V-belt drives /VBD

INFORMATION

Using a V-belt drive is permitted after consultation with SEW-EURODRIVE.

If belt pulleys, belts and protective covers are not included in the delivery, observe the following:

Only electrically conductive belts may be used according to ISO 1813.

Before a protection cover can be installed, an ignition hazard analysis must demonstrate that no sources of ignition (e.g. impact sparks from contact between the protective cover and rotating parts) can occur. The ignition hazard assessment for the belt drive with protection cover must be part of the conformity assessment procedure.

6.21.1 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.

Gear unit design	Type of mounting	
	Foot-mounted X../ B	Shaft-mounted X../ T
X.F..	$G_M \leq 1.75\ G_G$	$G_M \leq 1.5\ G_G$
X.K..	$G_M \leq 1.75\ G_G$	$G_M \leq 1.5\ G_G$

In this table:

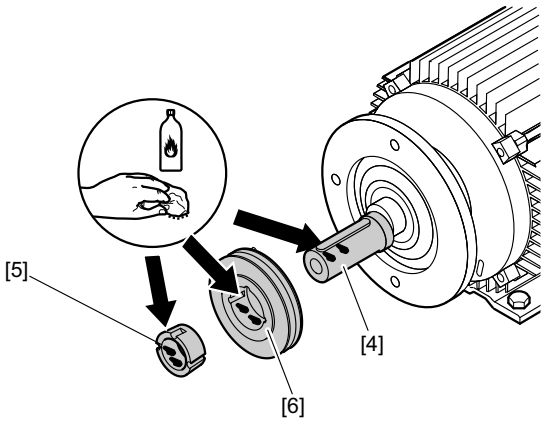
G_M = Motor weight

G_G = Gear unit weight

6.21.2 Mounting the V-belt drive

Observe the notes in chapter "Important information" (→ 🗎 103).

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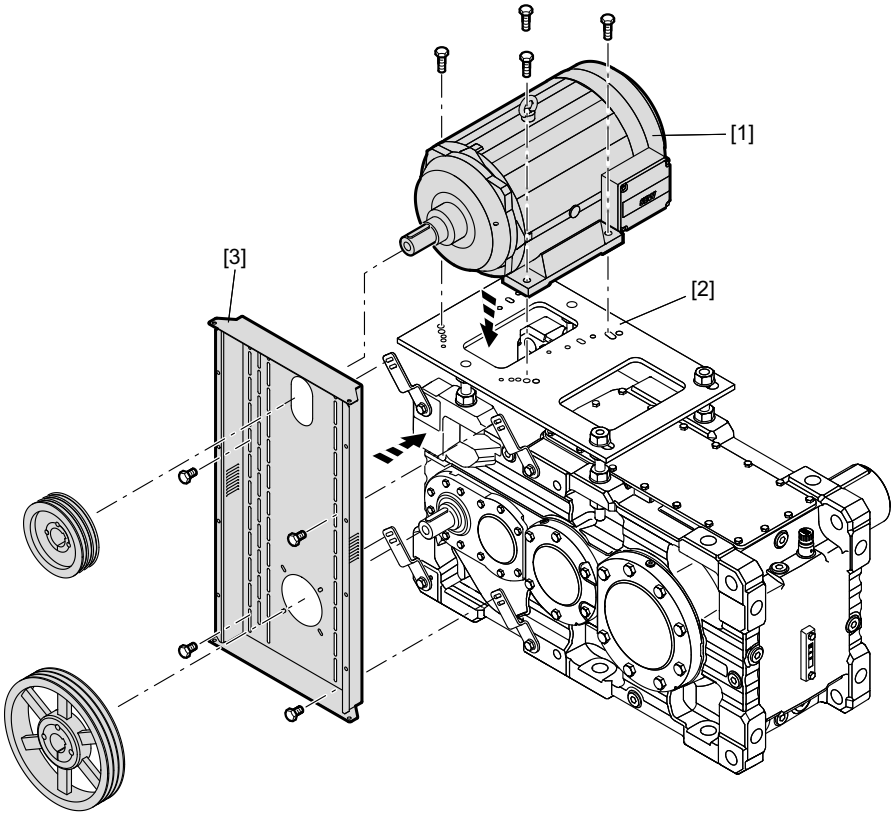
3. Install the belt guard [3] using the provided fixtures. Take into account the room required for applying and tightening the belts, as well as the desired direction in which the cover will be opened.



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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 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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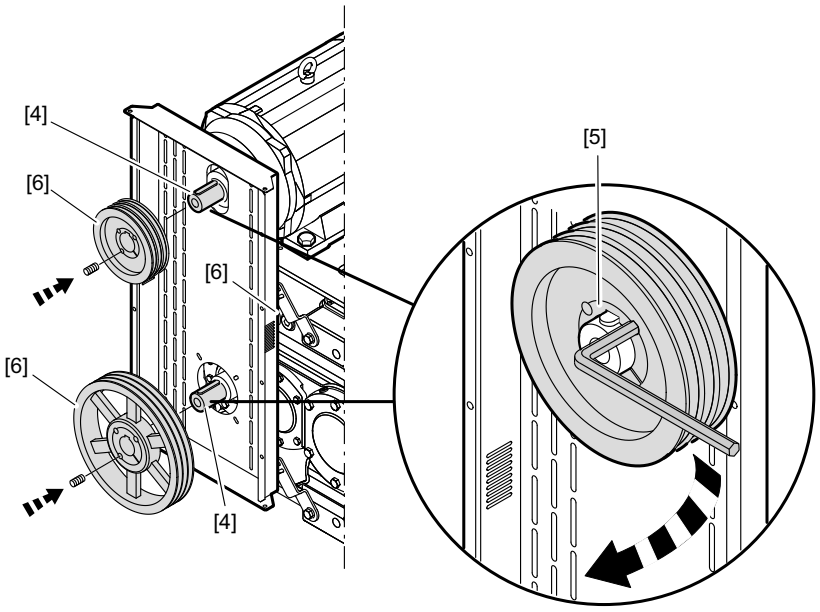

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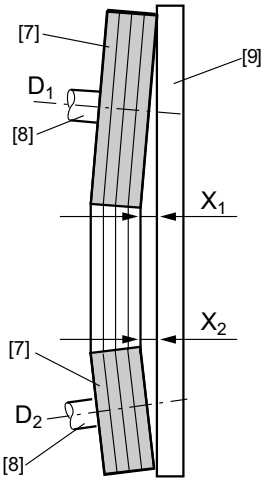
5. Position the belt pulleys [7] as close to the shaft shoulder as possible [8]. If the respective rim widths differ, you will have to take this into account accordingly for the positioning. Check the alignment of the belt pulleys before and after you have tightened the taper bushings using a straightedge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



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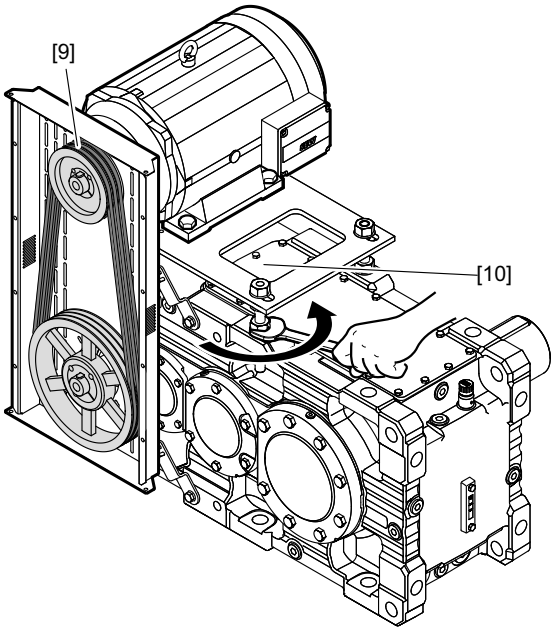
Pulley diameter D_1, D_2 in mm	Maximum permitted distance X_1, X_2
112	0.5
224	1.0
450	2.0
630	3.0

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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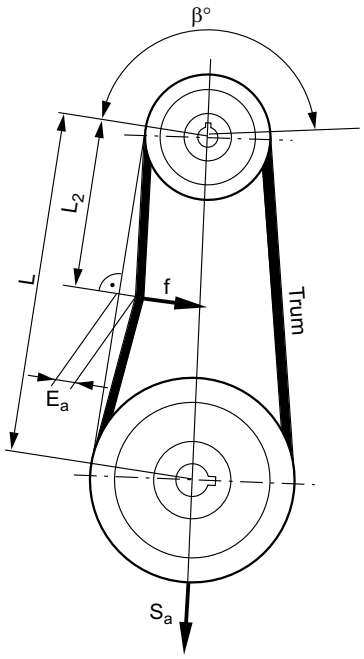

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8. Tighten all the screws and nuts, then once again check the alignment of the belt pulleys as well as the tension of the belt.
9. Check the fastening of the V-belt guard. Close and bolt it correctly using the designated bores.

INFORMATION

Make sure that the protection cover has a **minimum distance** of **8 mm** to all rotating parts.

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.

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
XF120-130	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
	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
XF140-150	1.6	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
XF160-170	1.6	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
XF180-190	1.6	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
XF200-210	1.6	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
XF220-230	1.6	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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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
XK120-130	1.6	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

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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
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
XK180-190	1.6	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
XK220 – 230	1.25	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

6.22 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.

6.23 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).

6.24 Motor pump /ONP

Observe the notes in chapter "Important information" (→ 🗎 103).

INFORMATION

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

6.25 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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6.26 Water cooling cover /CCV

INFORMATION

A water cooling cover can only be used in connection with a temperature monitoring device on the gear unit.

6.26.1 Notes on connection/installation

INFORMATION

Make sure that the connection to the cooling circuit complies with ATEX requirements. If connections with a limited service life are used (e.g. rubber hoses), the operator must be informed about the relevant maintenance and service measures. The connection must ensure permanent operational capability of the cooling system.

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 calking strip 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.
- Cooling water temperature and volume flow according to the order documents.
- Make sure the cooling water pressure does not exceed 6 bars.
- 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 section "Cooling media" to determine the permitted cooling media.

The following measures can be taken to ensure proper functioning in different systems:

- Install a safety valve in the cooling water inlet to prevent fluctuations in pressure and volume.

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- Install filters in the cooling water inlet to prevent the heat exchanger from dirt and mud in particular if the cooling water is obtained from sources other than the public water supply system.
- Install an automatic throttle valve in the respective inlet to compensate pressure.

6.26.2 Removal

Observe the information in chapter "Inspection/maintenance" (→ 🗎 238).

6.26.3 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 procedures are required when sea water or brackish water is used. 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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6.27 Water cooling cartridge /CCT

INFORMATION

Water cooling cartridges may only be used in connection with a temperature monitoring device on the gear unit.

6.27.1 Notes on connection/installation

INFORMATION

Make sure that the connection to the cooling circuit complies with ATEX requirements. If connections with a limited service life are used (e.g. rubber hoses), the operator must be informed about the relevant maintenance and service measures. The connection must ensure permanent operational capability of the cooling system.

NOTICE

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

Possible damage to property.

- Observe the following notes:

- Using calking strip 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" (→ 🗎 200) 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 bars.
- 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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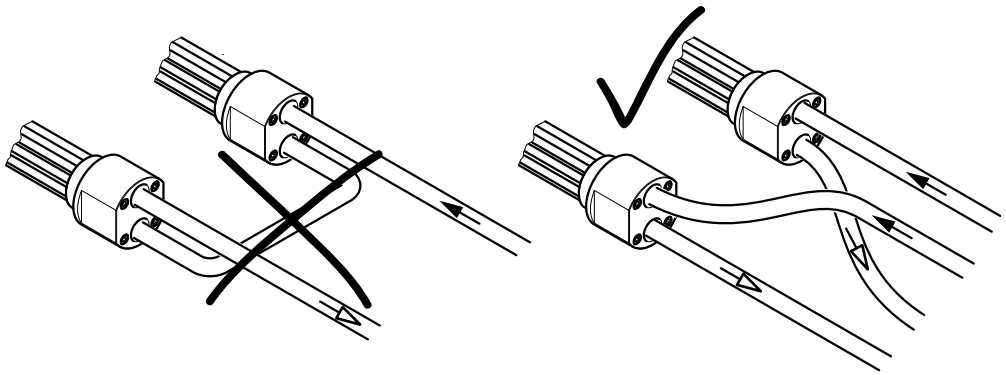

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← Supply (cold water)

→ Return (warm water discharge)

The following measures can be taken to ensure proper functioning in different systems:

- Install a safety valve in the cooling water inlet to prevent fluctuations in pressure and volume.
- Install filters in the cooling water inlet to prevent the heat exchanger from dirt and mud in particular if the cooling water is obtained from sources other than the public water supply system.
- Install an automatic throttle valve in the respective inlet to compensate pressure.

6.27.2 Removal

Observe the notes in chapter Inspection/maintenance.

6.27.3 Requirements on the water quality

INFORMATION

Special measures have to be taken when using sea water or brackish water. Contact SEW-EURODRIVE.

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

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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	up to 70	+
	70 to 300	+
	> 300	+ (< 25000 mg/l)
Nitrate	up to 100	+
	> 100	0
Free (aggressive) carbonic acid	up to 20	+
	20 to 50	0
	> 50	–
Oxygen	up to 2	+
	> 2	+
Ammonium	up to 2	+
	2 to 20	+
	> 20	–
Iron (dissolved)	up to 10	0
	> 10	–
Manganese (dissolved)	up to 1	0
	> 1	–
Free chlorine	up to 5	permanently < 0.5 mg/l
	> 5	intermittently < 3.0 mg/l
Sulfide		0
Ammonia		+ (< 15 mg/l)

Key

+	= 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

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

Stream water and river water

- We recommend using copper brass 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

6.28 Oil-water cooler for splash lubrication /OWC

Observe the notes in chapter "Important information" (→ 🗎 103).

INFORMATION

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

6.29 Oil-air cooler for splash lubrication /OAC

Observe the notes in chapter "Important information" (→ 🗎 103).

INFORMATION

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

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6.30 Oil-water cooler for pressure lubrication /OWP

Observe the notes in chapter "Important information" (→ 🗎 103).

INFORMATION

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

6.31 Oil-air cooler for pressure lubrication /OAP

Observe the notes in chapter "Important information" (→ 🗎 103).

INFORMATION

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

6.32 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 chapter "Permitted lubricants" (→ 🗎 276). 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" (→ 🗎 276).

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6.33 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.

- Make sure that all the heating elements are fully immersed in the oil bath in order to avoid any damage.

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

INFORMATION

- Using an oil heater is only permitted after consultation with SEW-EURODRIVE. Also observe the separate operating instructions of the manufacturer.
- The oil heater may only be operated with properly connected oil level monitoring.

INFORMATION

The explosion-proof oil heating elements are monitored and controlled using a control circuit that is separated from oil temperature monitoring. The control circuits for excessive temperature in the oil heating rods and for the oil temperature must be evaluated separately by the operator's controller. The separate control circuits must be implemented by the operator by means of an appropriate cabling of the oil heater.

INFORMATION

The electrical connection of the oil heater may only be established by qualified personnel according to the power supply conditions on site.

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

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6.33.1 Notes regarding 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 trip temperature of the heater 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 chapter "Limit temperature for gear unit startup" (→ 🗎 206).

  At this temperature, the thermostat disables the oil heater, see chapter "Limit temperature for gear unit startup" (→ 🗎 206). Only then the gear unit may be started up. The thermostat activates the oil heater again once the temperatures 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, type, mounting position, oil quantity, and ambient temperature.

  This is why heating control must be running permanently even if the drive is at standstill for a short time.

  If the drive is at standstill over a longer period, for example during holidays, and the heating control is not active, you have to make sure that the control is activated in due time before the drive is started up.
- Thermostat and oil heater are installed in the gear unit and ready for operation. Prior to startup, wire them properly and connect them to the control provided by the operator.
- 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.
- Oil heaters come equipped with integrated temperature sensor to prevent overheating. The temperature sensor must be evaluated by the control provided by the operator. Observe chapter "Temperature sensors in heating elements" (→ 🗎 211).

6.33.2 Thermostat

INFORMATION

Observe the manufacturer's documentation included in the delivery.

INFORMATION

- The thermostat must be used with an isolation amplifier that enables intrinsically safe switching operations. The isolation amplifier must be located outside the potentially explosive atmosphere.
- The isolation amplifier must be designed according to EN 60079-11 taking account of the minimum ignition energy (gas group); for dust at least IIB. The thermostat itself is a simple electrical device according to EN 60079-11 and does not require a separate Ex marking. The isolation amplifier and the thermostat must be installed in compliance with EN 60079-14.

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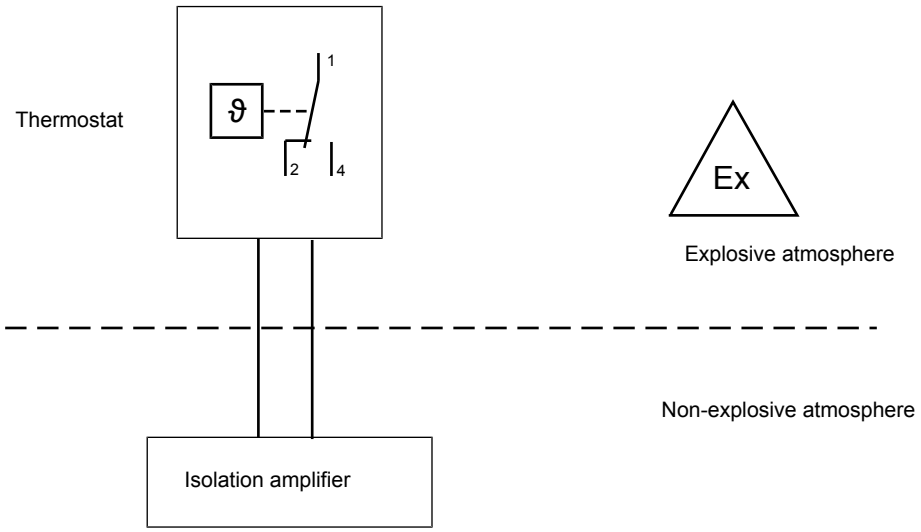

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Electrical connection

⚠ 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.

If you operate the oil heater in potentially explosive atmospheres, do not switch on or off the oil heater directly via the thermostat.

Requirements for operating the oil heater in potentially explosive atmospheres:

- The switching signal of the thermostat must be routed to the operator's control via isolation amplifier.
- The switching signal of the thermostat is evaluated by the operator's control.
- The oil heater must be supplied with voltage directly fron the operator's control.
- The voltage supply of the oil heater is switched on and off using a power contactor in the operator's control.

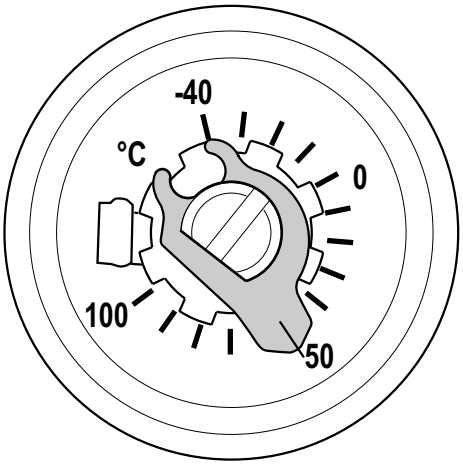
Technical data

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.			

Maximum switching capacity:	
Nominal impulse voltage:	2500 V
Overvoltage category II	(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

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



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INFORMATION

When operating the thermostat via isolation amplifier, only a small amount of current flows across the switch contact.

The small amount of switching current results in a reduced switching reliability.

- Using a thermostat with gold-plated switch contacts will significantly increase the switching reliability.

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6.33.3 Oil level monitoring

INFORMATION

- Observe the manufacturer's operating instructions.
- If the oil level is too low, switch off the drive and the oil heater.

6.33.4 Temperature sensors in heating elements

The operator's control evaluates the temperature sensor and controls the operator's switching devices. The switch-off temperature depends on the operating temperature range specified for the gear unit. Observe chapter "Gear units and gearmotor in equipment groups I and II" (→ 🗎 111). Integrate the temperature sensors in the oil heating elements in the operator's control in such a way that the following switching points are realized:

Maximum operating temperature	Switching temperature	Switching operation
≥120 °C	110 °C	**WARNING/SWITCH OFF**
≥100 °C	90 °C	
≥85 °C	75 °C	

INFORMATION

Observe the manufacturer's documentation included in the delivery.

6.33.5 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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6.33.6 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.

In order to reduce the operating current that occurs with increased heating power, you can operate the oil heaters with 3 heating resistors on three-phase current. Oil heaters with 4 heating resistors can be operated on 2 phases. For information on connection for mulit-phase voltage supply, refer to the manufacturer's documentation.

AC voltage/1-phase/230 V/1 heating resistor

The oil heaters described in this chapter are equipped with 1 heating resistor per heating element. For connecting the oil heater, refer to the manufacturer's documentation included in the delivery.

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

Gear unit		P_{inst}		P_{inst}	
		1 heating element		2 heating elements	
Size	Design	kW	K/h	kW	K/h
X100	X2K	1 × 0.17	2.5	2 × 0.17	4.5
	X3T	1 × 0.17	1.7	2 × 0.17	3
	X3F	1 × 0.20	2	2 × 0.20	4.5
	X2F / X3K	1 × 0.27	4	2 × 0.27	7.5
X110	X3F / X3T	1 × 0.20	2.5	-	-
	X2K / X2F / X3K	1 × 0.34	3.5	-	-
X120	X4F / X3T / X4T	1 × 0.20	2	2 × 0.20	4.5
	X2K	1 × 0.34	3.5	2 × 0.34	6.5
	X2F / X3K / X3F / X4K	1 × 0.41	3.5	2 × 0.41	6.5
X130	X4F / X3T / X4T	1 × 0.27	2	-	-
	X2K / X2F / X3K / X3F / X4K	1 × 0.41	3	-	-
X140	X4F / X3T / X4T	1 × 0.27	2	2 × 0.27	3.5
	X2K	1 × 0.41	2.5	2 × 0.41	5
	X2F / X3K / X3F / X4K	1 × 0.49	3	2 × 0.49	6
X150	X4F / X3T / X4T	1 × 0.34	2	-	-
	X2K / X2F / X3K	1 × 0.49	3	-	-
	X3F / X4K	1 × 0.57	3	-	-
X160	X4F / X3T / X4T	1 × 0.41	2	2 × 0.41	3.5
	X2K	1 × 0.57	2.5	2 × 0.57	5
	X2F / X3K / X3F / X4K	1 X 0.66	2.5	2 × 0.66	5
X170	X4F / X3T / X4T	1 × 0.41	1.7	-	-
	X2K	1 × 0.57	2.5	-	-
	X2F / X3K / X3F / X4K	1 X 0.66	1.5	-	-

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heater

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AC voltage/1-phase/230 V/3 heating resistors

The oil heaters described in this chapter are equipped with 3 heating resistors per heating element. For connecting the oil heater, refer to the manufacturer's documentation included in the delivery.

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

Gear unit		P_{inst}		P_{inst}	
		1 heating element		2 heating elements	
Size	Design	kW	K/h	kW	K/h
X180	X2F / X2K / X3K / X3F / X4K	1 × 1.6	5	2 × 1.6	10
	X3T / X4F / X4T	1 × 1.1	4	2 × 1.1	7
X190	X2F / X2K / X3K / X3F / X4K	1 × 1.6	5	-	-
	X3T / X4F / X4T	1 × 1.1	3	-	-
X200	X2K	1 × 1.6	4	2 × 1.6	8
	X2F / X3K / X3F / X4K	1 × 1.8	4	2 × 1.8	8
	X4F / X4T	1 × 1.3	3	2 × 1.3	6
	X3T	1 × 1.1	2	2 × 1.1	5
X210	X2K	1 × 1.6	4	-	-
	X2F / X3K / X3F / X4K	1 × 1.8	4	-	-
	X3T / X4F / X4T	1 × 1.3	3	-	-
X220	X2K	1 × 1.8	3	2 × 1.8	7
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.2	4	2 × 2.2	8
230X	X2K	1 × 1.8	3	-	-
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.2	4	-	-
X240	X2K	1 × 1.8	3	2 × 1.8	5
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.2	3	2 × 2.2	6
X250	X2K	1 × 2.2	3	-	-
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.6	3	-	-

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heater

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AC voltage/1-phase/230 V/4 heating resistors

The oil heaters described in this chapter are equipped with 4 heating resistors per heating element. For connecting the oil heater, refer to the manufacturer's documentation included in the delivery.

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

Gear unit		P_{inst} 1 heating element		P_{inst} 2 heating elements	
Size	**Design**	**kW**	**K/h**	**kW**	**K/h**
X260	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 3.8	4	2 × 3.8	8
X270		1 × 3.8	4	-	-
X280		1 × 4.2	4	-	-
X290		1 × 4.2	3	2 × 4.2	6
X300		1 × 4.2	3	-	-
X310		1 × 5.0	3	2 × 5.0	6
X320		1 × 5.0	3	-	-

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heater

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6.34 Pressure switch /PS

INFORMATION

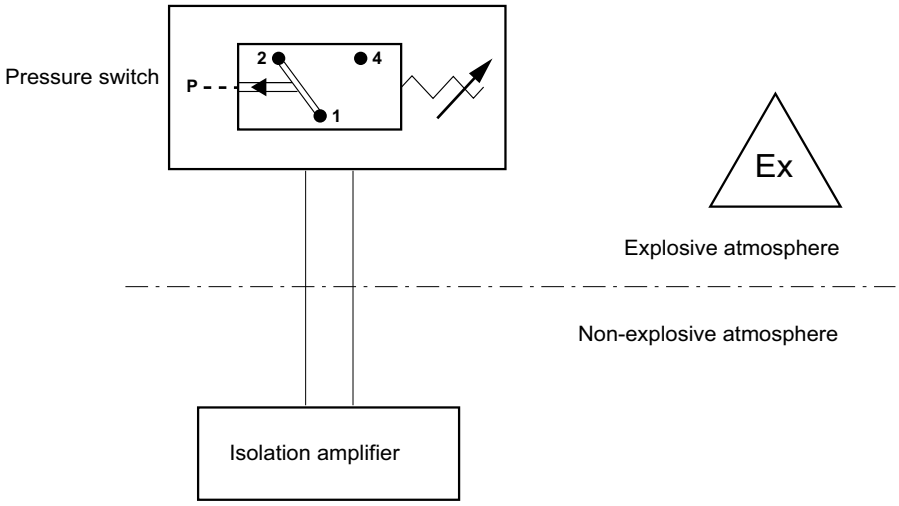
All gear units with pressure lubrication are equipped with a pressure switch for function monitoring.

The pressure switch is to be connected and integrated into the system in such a way that the gear unit can only be operated when the oil pump is building up pressure. A short-term compensation (max 10 s) during startup is permitted.

6.34.1 Notes

INFORMATION

- The pressure switch must be used together with a switch amplifier that enables intrinsically safe switching operations. The isolation amplifier must be located outside the potentially explosive atmosphere.
- The isolation amplifier must be designed according to EN 60079-11 taking account of the minimum ignition energy (gas group); for dust at least IIB. The pressure switch itself is a simple electrical device according to EN 60079-11 and does not require a separate Ex marking. The isolated switch amplifier and the pressure switch must be installed in compliance with EN 60079-14.



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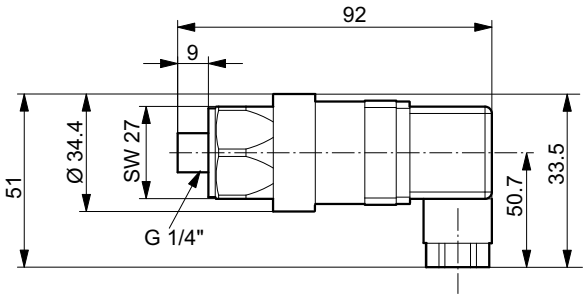
6.34.2 Dimensions



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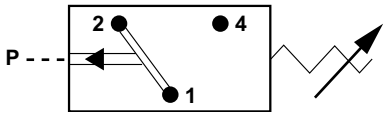
6.34.3 Electrical connection



722003723

[1][2] NC contact

[1][4] NO contact

6.34.4 Technical data

- Switching pressure 0.5 ± 0.2 bars
- Maximum switching capacity 4 A - 250 V_{AC}; 4 A - 24 V_{DC}
- 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

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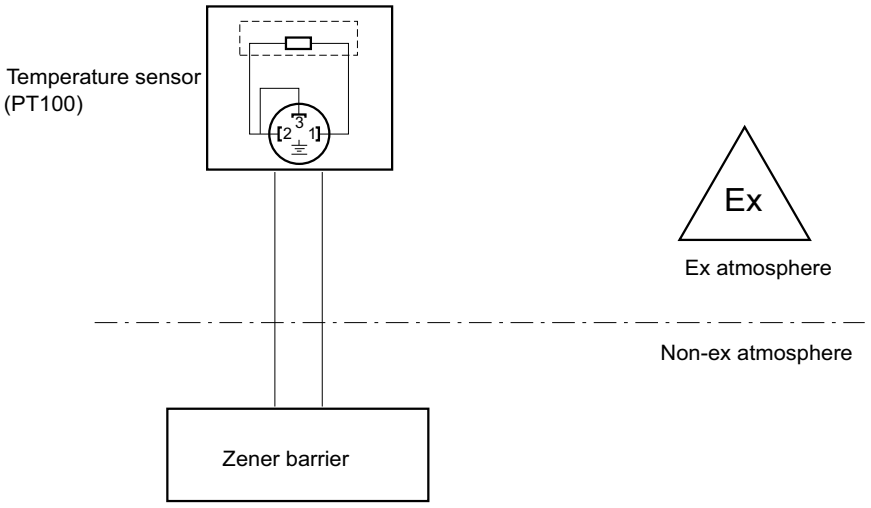
6.35 Temperature sensor /PT100

6.35.1 Information

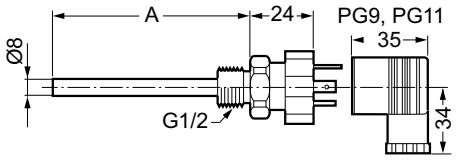
INFORMATION

- To ensure intrinsically safe wiring, the temperature sensor must be used with a Zener barrier whose current consumption enables correct measuring operation.
- The Zener barrier must be located outside the potentially explosive atmosphere.
- The Zener barrier must be designed according to EN 60079-11 taking account of the minimum ignition energy (gas group); for dust at least IIB. The temperature sensor itself is a simple electrical device according to EN 60079-11 and does not require a separate Ex marking. The Zener barrier and the temperature sensor must be installed in compliance with EN 60079-14.



9007199869992331

6.35.2 Dimensions



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Size	A [mm]
X100-170	50
X180 – 320	150

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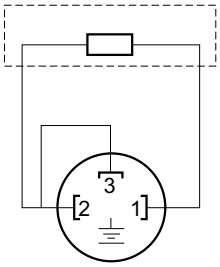
6.35.3 Electrical connection



359158539

[1] [2] Resistor element connection

6.35.4 Technical data

- Design with thermowell and changeable measuring insert
- Sensor tolerance [K] ± (0.3 + 0.005 x T), (corresponds to DIN IEC 751 class B),
  T = Oil temperature [°C]
- Plug connector: EN 60751
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

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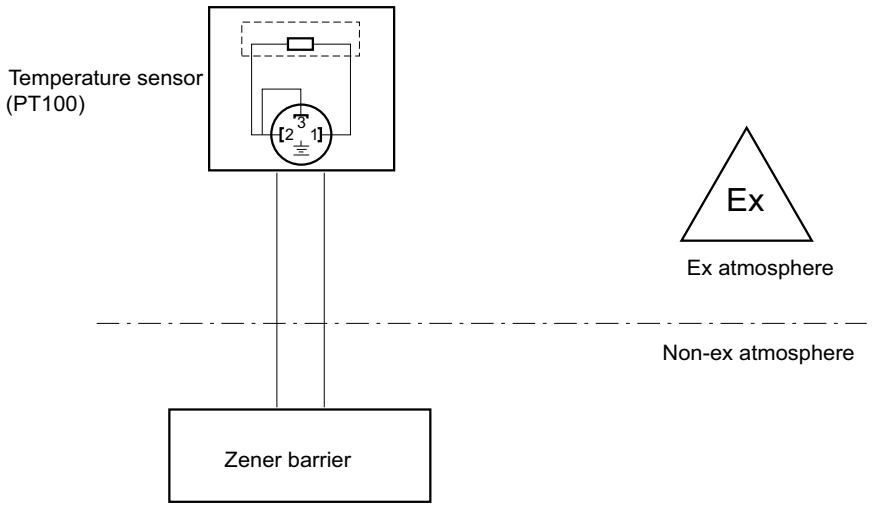
6.36 Temperature sensor /PT100 (metallic)

INFORMATION

- To ensure intrinsically safe wiring, the temperature sensor must be used with a Zener barrier whose current consumption enables correct measuring operation.
- The Zener barrier must be located outside the potentially explosive atmosphere.
- The Zener barrier must be designed according to EN 60079-11 taking account of the minimum ignition energy (gas group); for dust at least IIB. The temperature sensor itself is a simple electrical device according to EN 60079-11 and does not require a separate Ex marking. The Zener barrier and the temperature sensor must be installed in compliance with EN 60079-14.



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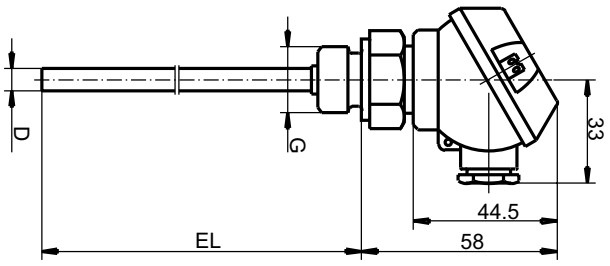
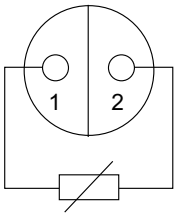
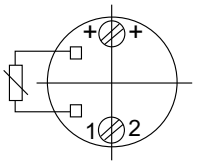
6.36.1 Technical data



4401813899

Area of application	For monitoring the oil temperature
Operating temperature	-50 °C to 400 °C
Thermowell diameter	Ø 7 mm
Installation length	100 mm
Process connection	G1/2 screw fitting
Measuring insert	1 x PT100 in double-wire circuit
Tolerance class in accordance with EN 60751	Class B (standard)

6.36.2 Electrical connection

Connection type	Double-wire
Standard connector	
Connection socket	

[1] [2] Resistor element connection

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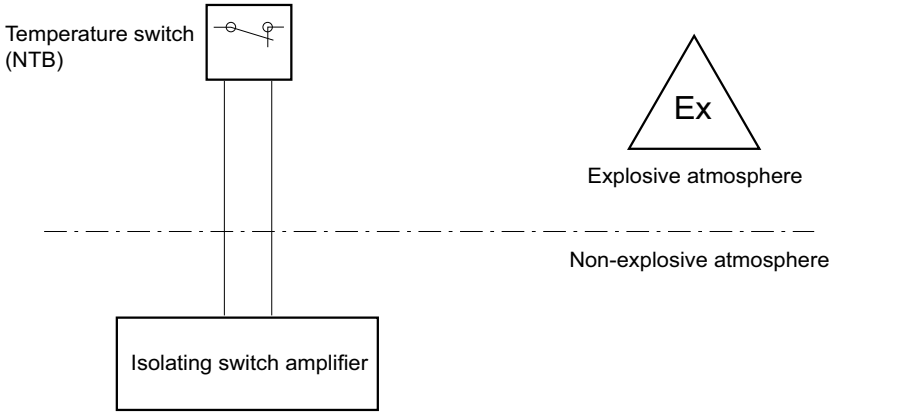
6.37 Temperature switch /NTB

6.37.1 Notes

INFORMATION

- The temperature switch must be used with an isolation amplifier that enables intrinsically safe switching operations. The isolation amplifier must be located outside the potentially explosive atmosphere.
- The isolation amplifier must be designed according to EN 60079-11 taking account of the minimum ignition energy (gas group); for dust at least IIB. The temperature switch itself is a simple electrical device according to EN 60079-11 and does not require a separate Ex marking. The isolated switch amplifier and the temperature switch must be installed in compliance with EN 60079-14.



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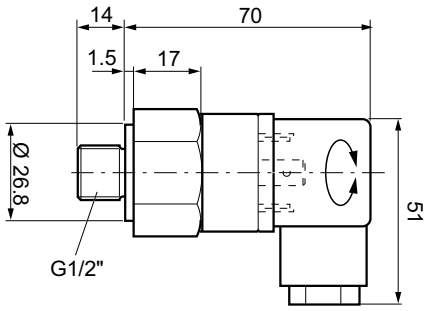
6.37.2 Dimensions



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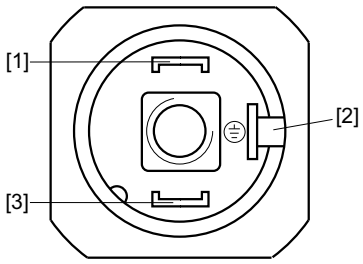
6.37.3 Electrical connection

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 (without vacuum)

[2] Grounding terminal 6.3 x 0.8

6.37.4 Technical data

- Trip temperature: 70 °C, 80 °C, 90 °C, 100 °C ± 5 °C
- Contact capacity: 10 A - AC 240 V
- Plug connector: EN 175301-803 PG9 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm

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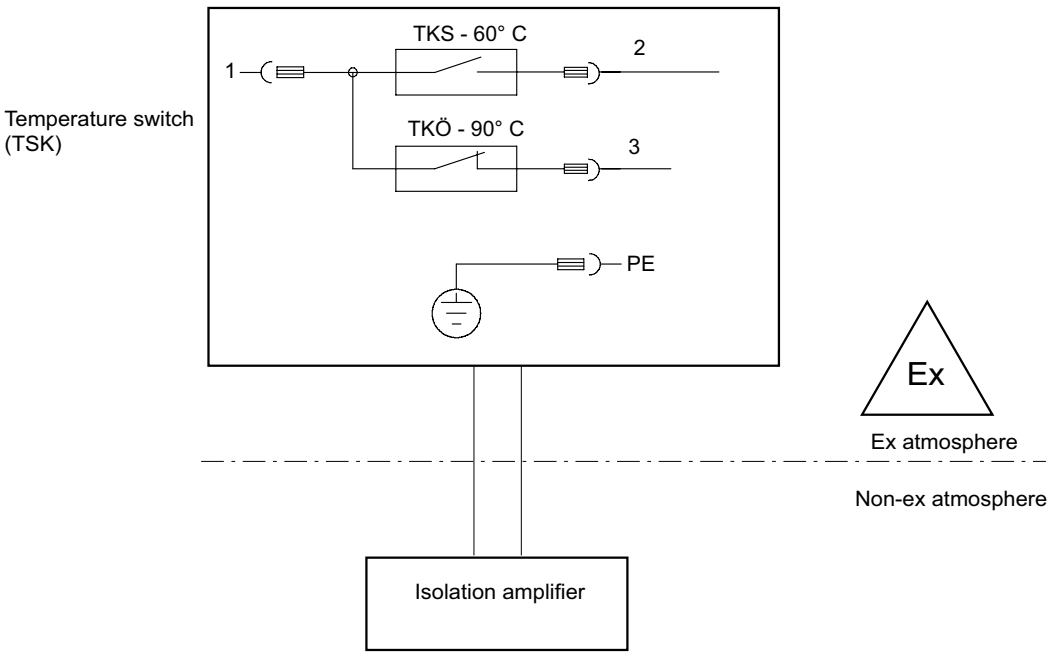
6.38 Temperature switch /TSK

6.38.1 Notes

INFORMATION

- The temperature switch must be used with an isolation amplifier that enables intrinsically safe switching operations. The isolation amplifier must be located outside the potentially explosive atmosphere.
- The isolation amplifier must be designed according to EN 60079-11 taking account of the minimum ignition energy (gas group); for dust at least IIB. The temperature switch itself is a simple electrical device according to EN 60079-11 and does not require a separate Ex marking. The isolated switch amplifier and the temperature switch must be installed in compliance with EN 60079-14.



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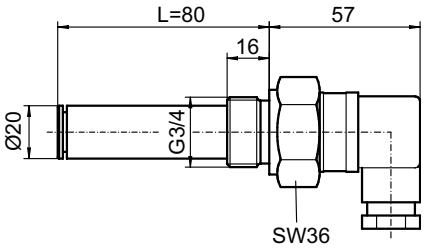
6.38.2 Dimensions



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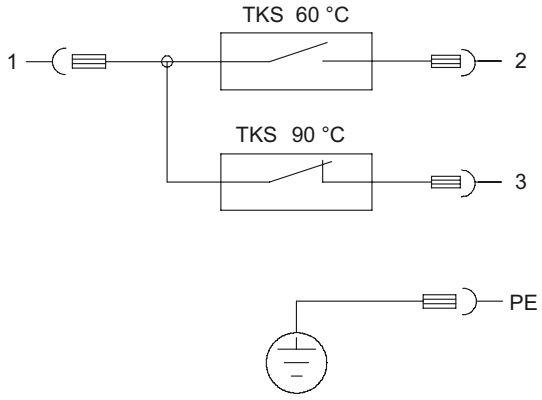
6.38.3 Electrical connection

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

6.38.4 Technical data

- Switching temperatures: 60 °C and 90 °C
- Contact capacity: 2 A - AC 240 V
- Plug connector: EN 175301-803 PG11 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm

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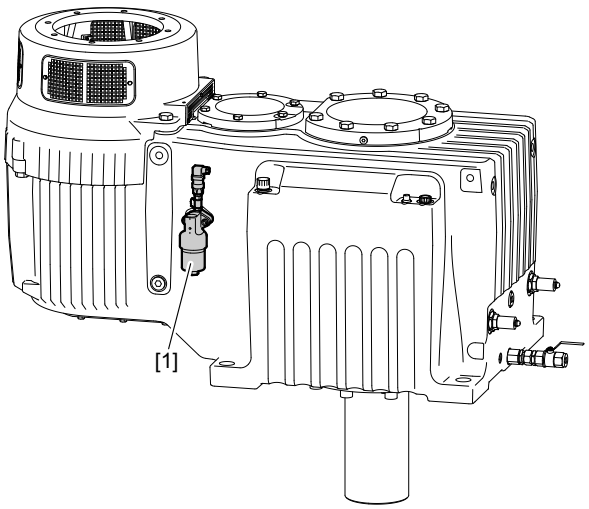
6.39 Oil filter

INFORMATION

Observe the operating instructions of the oil filter manufacturer.

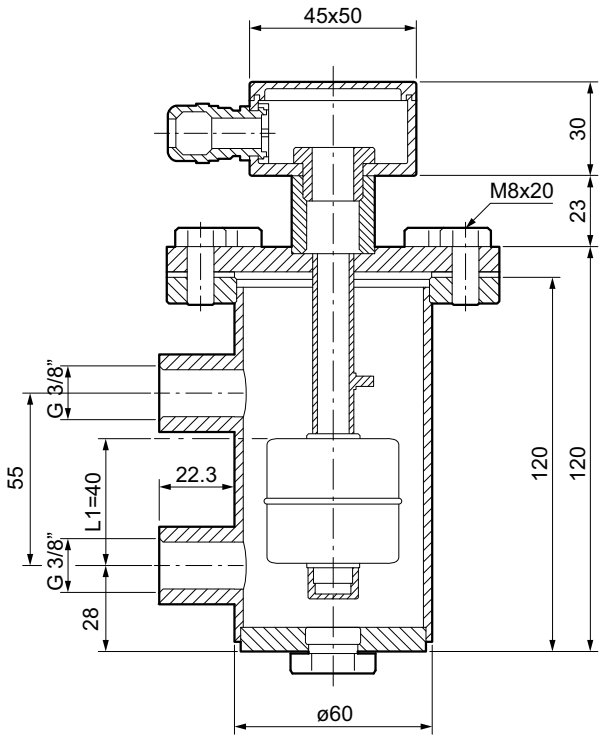


15800209419

[1] Oil filter

6.40 Float switch

6.40.1 Dimensions



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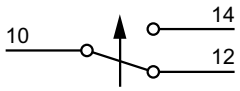
6.40.2 Technical data

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)

6.40.3 Electrical connection



18888476683

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

6.41 Brake

INFORMATION

The brake is not set at the factory.

Observe the operating instructions of the respective brake manufacturer.

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7 Startup

7.1 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" (→ 🗎 243) and chapter "Changing the oil" (→ 🗎 251).

  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 operating instructions "Oil Supply System" by SEW-EURODRIVE.

  Check the oil level again after a few operating hours, see chapter "Checking the oil level" (→ 🗎 243).
- 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.
- 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 start. Allow for sufficient warm-up time.
- For gear units with long-term protection: Replace the screw plug at the location indicated on the gear unit with a breather (position → see order documents).
- Remove transport protection prior to startup.
- Adhere to the safety notes in the individual chapters.

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7.1.1 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 ATEX EU declaration of conformity and the guarantee no longer apply without prior consultation with SEW-EURODRIVE.

7.2 Starting up gear units in potentially explosive atmospheres

Note the following information.

INFORMATION

- Define measures to ensure that the values on the nameplate of the gear unit are not exceeded. It is essential that the gear unit is not overloaded. Make sure that the data specified on the nameplate of the gear unit corresponds to real conditions at the location where the drive is to be installed.
- If the project planning documents require the use of oil temperature monitoring, the gear unit may only be started up with an installed oil temperature monitor.
- Check the monitoring system for proper functioning prior to startup. The shutdown temperature of the drive is specified in the delivered documents.
- **I M2**: The devices must be switched off in a potentially explosive atmosphere.
- Processes that cause strong electrical charge are not permitted.

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7.3 Startup of gear units with long-term protection

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

7.3.1 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.

7.3.2 Breather

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

7.4 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" (→ 🗎 276).
- Observe the information in chapter "Gear units with shaft end pump / SEP" (→ 🗎 117).

7.5 Motor pump /ONP

INFORMATION

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

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7.6 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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7.7 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.

7.8 Oil-water cooler for splash lubrication /OWC

INFORMATION

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

7.9 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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7.10 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".

7.11 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".

7.12 Oil heater /OH

⚠ WARNING

Risk of explosion due to an incorrect oil level.

Severe or fatal injuries.

- If the heater is operated with insufficient oil level, surfaces might heat up and turn into an ignition source.
- Oil heaters may only be used together with oil level monitoring, see chapter "Float switch" (→ 🗎 225). Operators must make sure that oil level monitoring and heater are wired in such a way that the oil heater can only be operated when the oil level is sufficiently high.

INFORMATION

- Observe the manufacturer's documentation.

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.

Oil heaters come equipped with integrated overtemperature switching-off. This function prevents the heating rod from overheating if it is sufficiently covered by oil.

Observe the respective manufacturer's documentation for electrical connection and operation.

The oil heater is switched on or switched off by the operator depending on the oil temperature and based on the evaluation of the temperature sensor. For information on the minimum oil temperature required for starting the gear unit and depending on the oil type in use, refer to the table in chapter "Permitted lubricants" (→ 🗎 276).

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7.13 Backstop /BS

INFORMATION

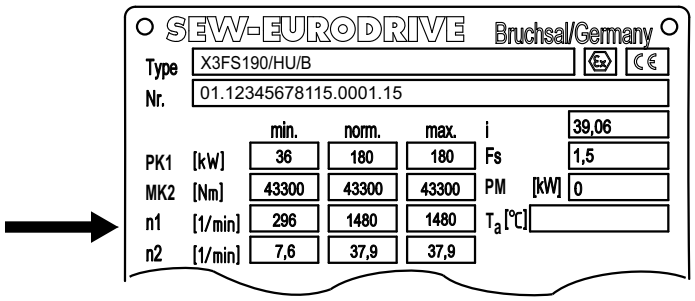
Regular operation of the backstop below the lift-off speed is not permitted, except during temporary starting and braking and in auxiliary drive mode. The permitted minimum speed rating is listed on the nameplate.

NOTICE

Operating the motor in blocking direction could destroy the backstop.

Possible damage to property

- Do not start up the motor in blocking direction. Ensure a correct voltage supply to the motor, so that it rotates in the required direction. Operating the motor in blocking direction could destroy the backstop.
- Observe the addendum to the operating instructions when you change the blocking direction.
- When a backstop is used, additional values for the speed range that must be adhered can be found on the nameplate. Operation that exceeds the speed range specified on the nameplate is not permitted.



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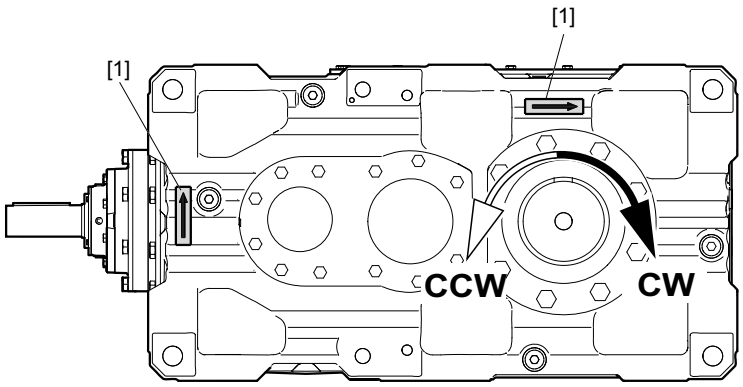
The direction of rotation is determined with a view to the output shaft (LSS):

- Clockwise rotation (CW)
- Counterclockwise rotation (CCW)

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



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7.14 Measuring the surface and oil temperatures

INFORMATION

Even slight changes in the ambient conditions (such as limited installation space) can have a significant impact on the temperature profile. For more information, refer to chapters "Temperature information" (→ 🗎 111) and "Permitted lubricants" (→ 🗎 276).

Ambient conditions (such as installation space) may not be changed without consultation of SEW-EURODRIVE.

Measure the surface temperature and oil temperature to make sure that the "limit values permitted" (→ 🗎 111) for the drive are not exceeded. Determine the limit values for your drive and measure the surface temperature according to the "inspection and maintenance intervals" (→ 🗎 240). Check the oil temperature by means of temperature monitoring.

It is essential to measure the surface temperature at maximum load when starting up the gear unit.

The measurement can be made using standard thermometers. The surface temperature must be measured in a steady-state condition. The surface temperature must not exceed the maximum surface temperatures for gas and dust of the drive according to Ex classification.

INFORMATION

Stop the drive immediately if the temperature exceeds the limit value. Contact SEW-EURODRIVE.

7.15 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" (→ 🗎 276).

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7.16 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.

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7.16.1 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 chapter "Changing the oil" (→ 🗎 251) 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.

7.16.2 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 chapter "Storage and transport conditions" (→ 🗎 27) 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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8 Inspection/maintenance

8.1 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

A customer machine that is not appropriately secured can fall 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, be 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.
- Carefully remove the oil level plug and the oil drain plug.

⚠ 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.

INFORMATION

- Processes that cause strong electrical charge are not permitted. Do not use dry cotton cloth to clean the gear unit.
- Avoid dust accumulation of more than 5 mm.

NOTICE

Improper maintenance may result in damage to the gear unit.

Possible damage to property.

- Observe the following notes.

- Maintenance work on explosion-proof gear units must only be carried out by qualified personnel (qualified according to Directive 1999/92/EC). See chapter "Target group" (→ 🗎 10).
- 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 lists.
- If you remove the gear unit cover, you must apply new sealing compound to the sealing surface. Otherwise, the sealing properties of the gear unit may be impaired. Consult SEW-EURODRIVE in this case.
- Prevent foreign particles from entering into the gear unit during maintenance and inspection work.
- Never clean the gear unit using a high-pressure cleaning device. Water might enter the gear unit and the seals might 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 check 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.
- Strictly observe the safety notes in the individual chapters.

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8.2 Inspection and maintenance intervals

Adhere to the following inspection and maintenance intervals:

Time interval	What to do?
Daily	• "Check the housing temperature/surface temperature" (→ 🗎 111) • Check for gear unit noise.
Monthly	• Check the gear unit for signs of leakage. • Check the oil level.
After 500 operating hours	• First oil change after initial startup.
Every 6 months	• Check 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. • For V-belt drives: Check the belt tension and condition of the V-belt pulleys and belts.
Depending on the operating conditions, at least every 12 months	• Check whether retaining screws are tightly secured. • Check if the gear unit surface is free of dust and dirt, so that the gear unit can be optimally cooled. • Clean the oil filter. If required, replace the filter element. • 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). • Check the condition of the motor pump /ONP. If required (see addendum to the operating instructions), replace the filter element. • Check the condition of the oil-air cooler /OAC (see addendum to the operating instructions). • Check the condition of the oil-air cooler /OAP. If required (see addendum to the operating instructions), replace the filter element. • Check the condition of the oil-water cooler /OWC (see addendum to the operating instructions). • Check the condition of the oil-water cooler /OWP; replace the filter element if necessary (see addendum to the 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 mineral oil.
At least every 5 years depending on the operating conditions (see figure on next page)	• Change 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 surfaces/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 – See backstop in chapter 4 • 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.

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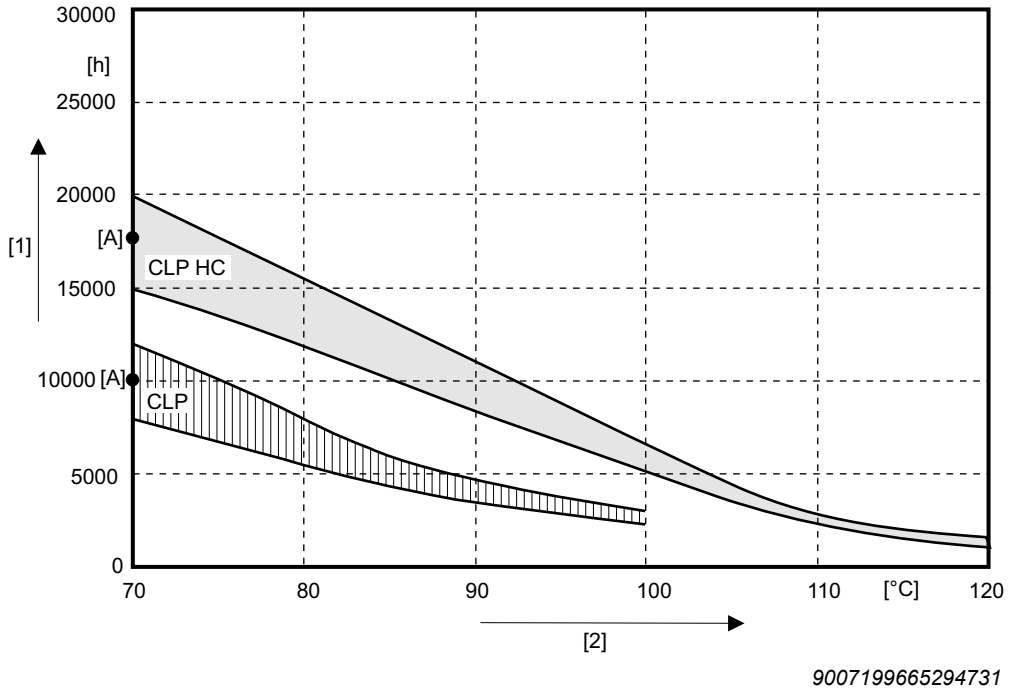
8.3 Lubricant change intervals

It might be necessary to change the oil more frequently when using special designs or under more severe/aggressive ambient conditions.

INFORMATION

Mineral CLP lubricants and synthetic polyalphaolefin-based (PAO) lubricants are used for lubrication. The synthetic lubricant CLP HC (according to DIN 51502) shown in the following illustration corresponds to the PAO oils.



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[1] Operating hours
[2] Sustained oil bath temperature
[A] Average value per oil type at 70 °C

INFORMATION

SEW-EURODRIVE recommends that the gear unit oil is analyzed regularly (see chapter "Checking the oil consistency" (→ 🗎 250)) to optimize the lubricant change intervals.

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8.4 Checking the oil level

8.4.1 General information

Note the following when checking the oil level.

NOTICE

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

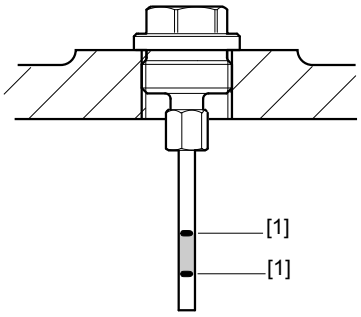
Possible damage to property.

- Check the oil level only when the gear unit is at standstill.
- 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 for the correct oil level. The oil level of the oil sight glass is only a guide value.
- Elements for controlling the oil level, oil drain, and oil fill openings are indicated on the gear unit by safety symbols.
- Check the oil level again after a few operating hours.

8.4.2 Standard procedure

Oil dipstick

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).



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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].
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 between the markings [1].
5. If you filled in too much oil, proceed as follows:
   - Adjust the oil level. The oil level must be between the markings [1].
6. Screw in the oil fill plug.
7. Insert the oil dipstick.

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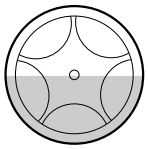
Oil sight glass

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

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



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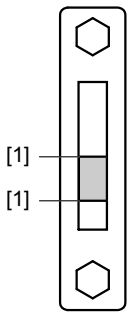
Oil level glass

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).



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1. The oil level must be between the markings [1].
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 between the markings [1].
3. If you filled in too much oil, proceed as follows:
   - Adjust the oil level. The oil level must be between the markings [1].
4. Screw in the oil fill plug.

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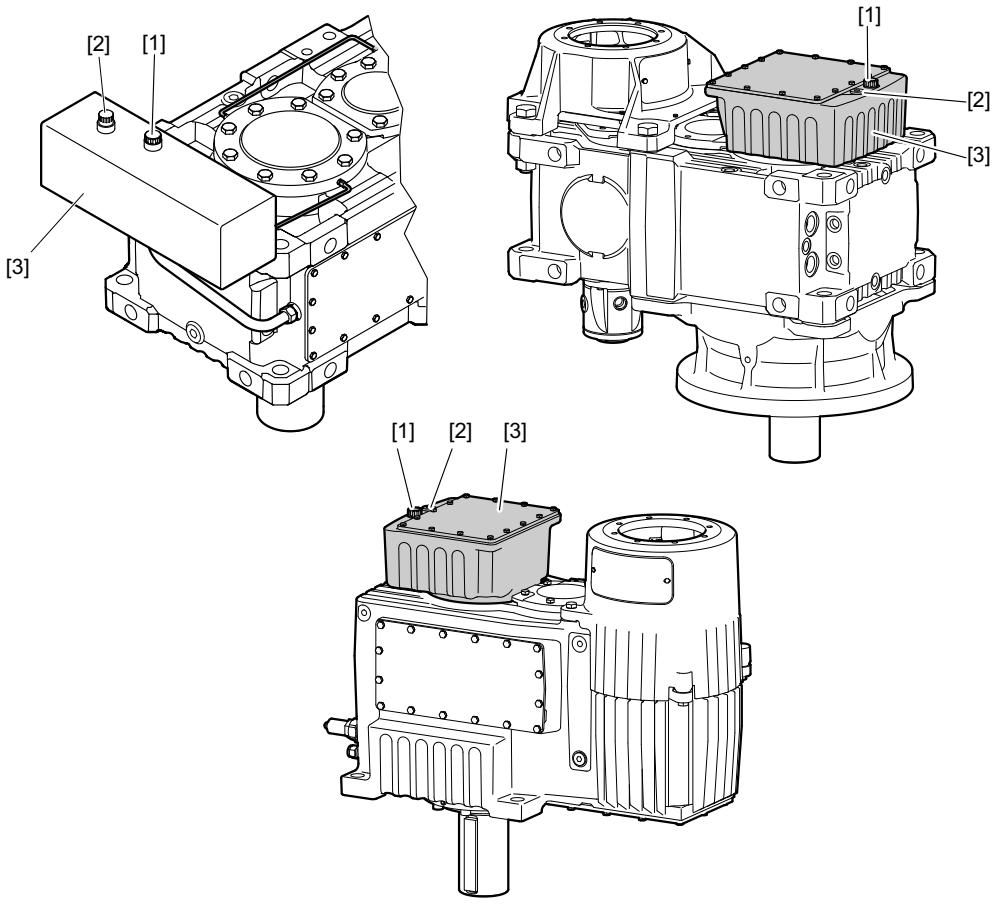
8.4.3 Procedure for gear units with oil expansion tank /ET

During operation, any oil level below or above the level specified by SEW-EURODRIVE is permitted as long as there is oil in the oil expansion tank [3] and the oil expansion tank does not overflow. However, to provide for 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.

The following figures show the possible designs of the oil expansion tank [3].



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

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

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. Note the chapter "Standard procedure" (→ 🗎 243).

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

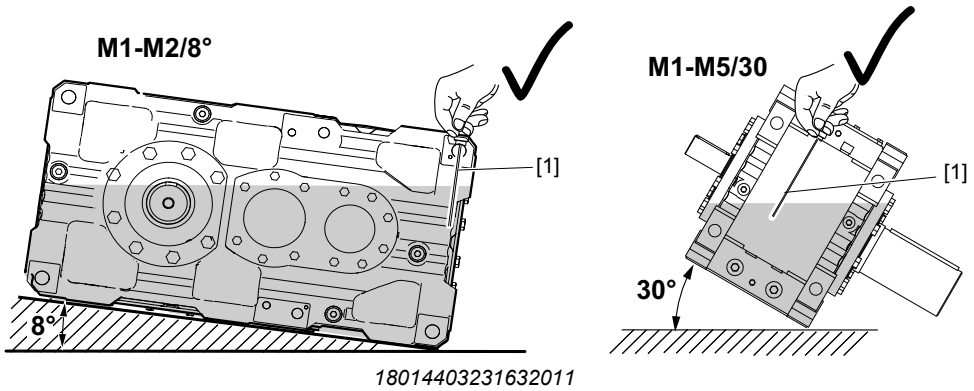
Observe the information on the nameplate and in the order documents.

Fixed pivoted mounting positions

Procedure

Check the oil level in the fixed, intended position. Observe the notes in chapter "Standard procedure" (→ 🗎 243).

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



18014403231632011

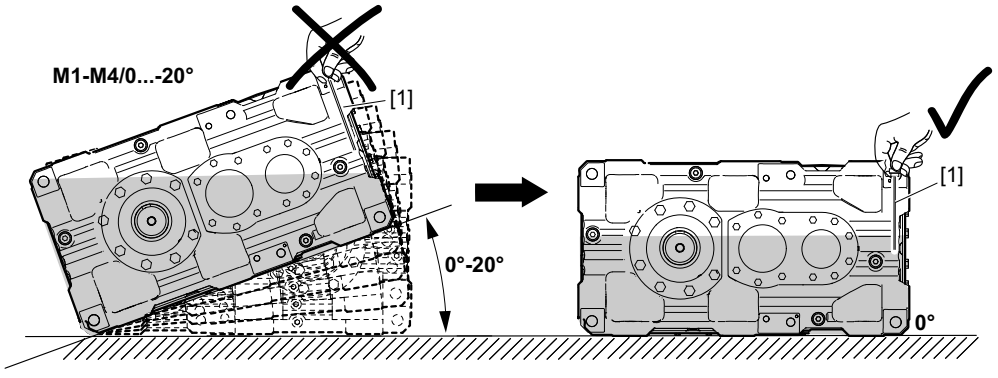
[1] Oil dipstick
▯ Oil

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" (→ 🗎 243).

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



27021602486553867

[1] Oil dipstick
▯ Oil

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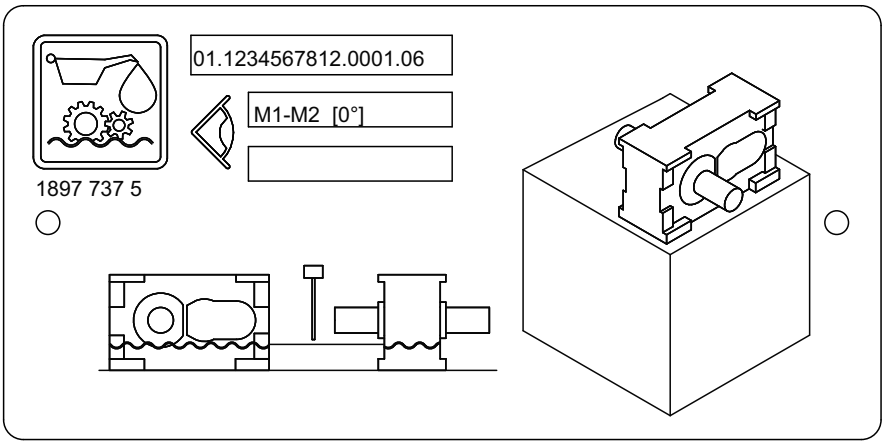
Information sign

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

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



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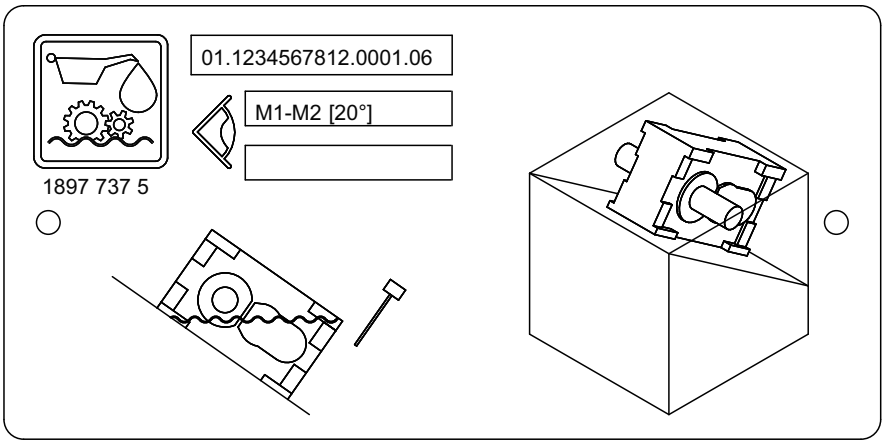
The following figure shows an example of the information sign for check mounting position 20°.



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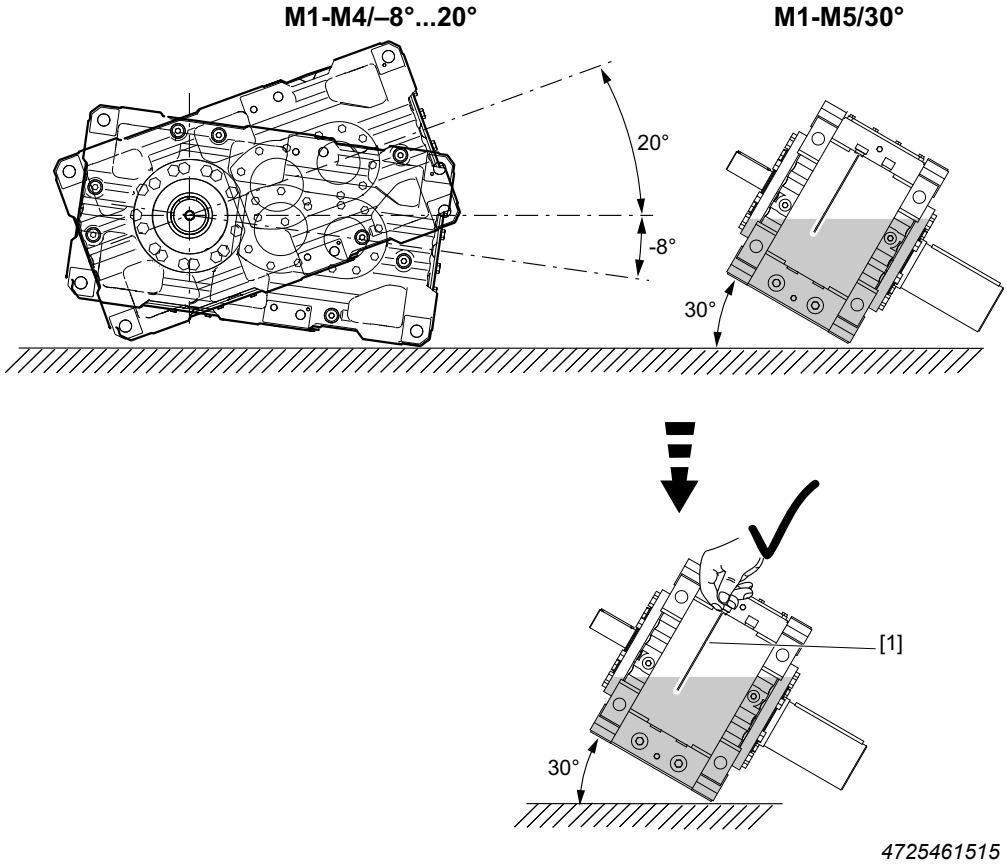
Combination of fixed and variable pivoted mounting positions

Procedure

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" (→ 🗎 243).

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



[1] Oil dipstick
▯ Oil

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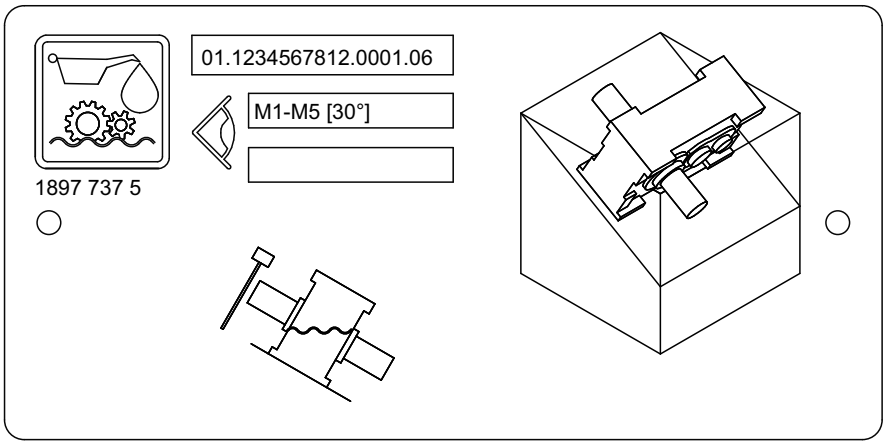
Information sign

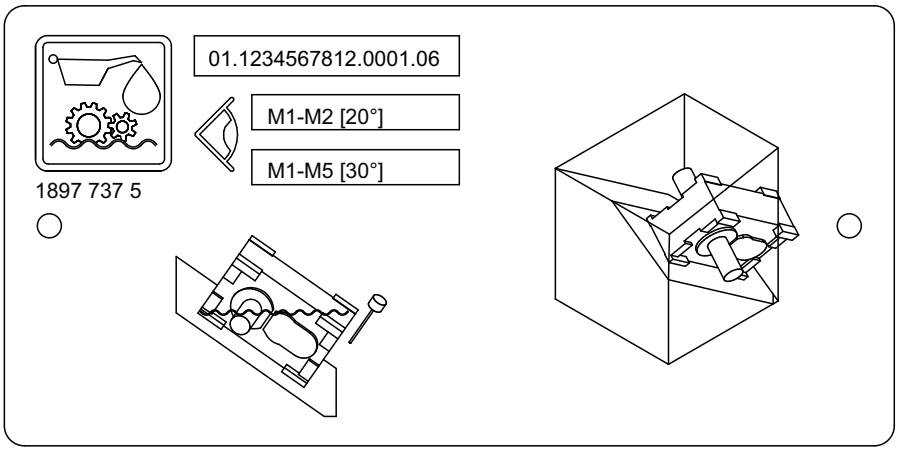
Observe the additional information sign on the gear unit. Check the oil level in the test mounting position specified on the nameplate.

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



9007204944186379

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



9007204944188555

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8.5 Checking the oil consistency

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

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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8.6 Changing the oil

8.6.1 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.
- Carefully remove the oil level plug and the oil drain plug.

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 the oil level glass is the decisive indicator of the correct oil quantity.

  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 you use to operate the gear unit. Fill in fresh oil only after all residues have been removed.
- For the position of the oil level plug, 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 gaskets of 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.
- Elements for controlling the oil level, oil drain, and oil fill openings are indicated by safety symbols on the gear unit.

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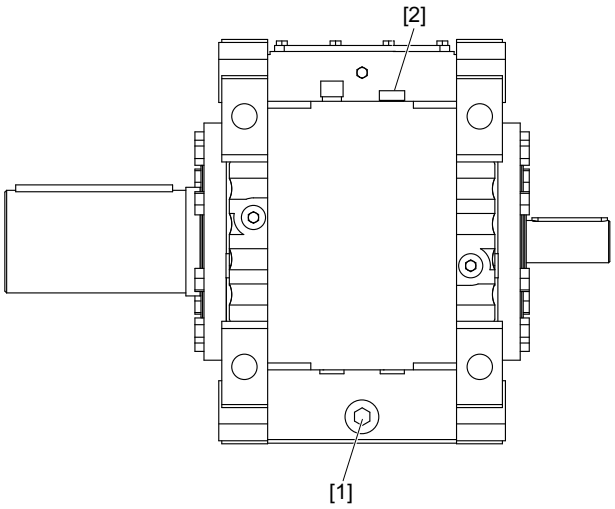
- Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).
- Remove any dripping oil immediately with oil binding agent. Dispose of the used oil in accordance with applicable regulations.

8.6.2 Basic gear unit



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Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

1. Place a suitable container underneath the oil drain [1].
2. Remove the oil fill plug(s) [2] / breather.
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" (→ 🗎 243).

6. If present, insert the oil fill plug(s) [2] / breather and the oil dipstick.

⚠ CAUTION

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.

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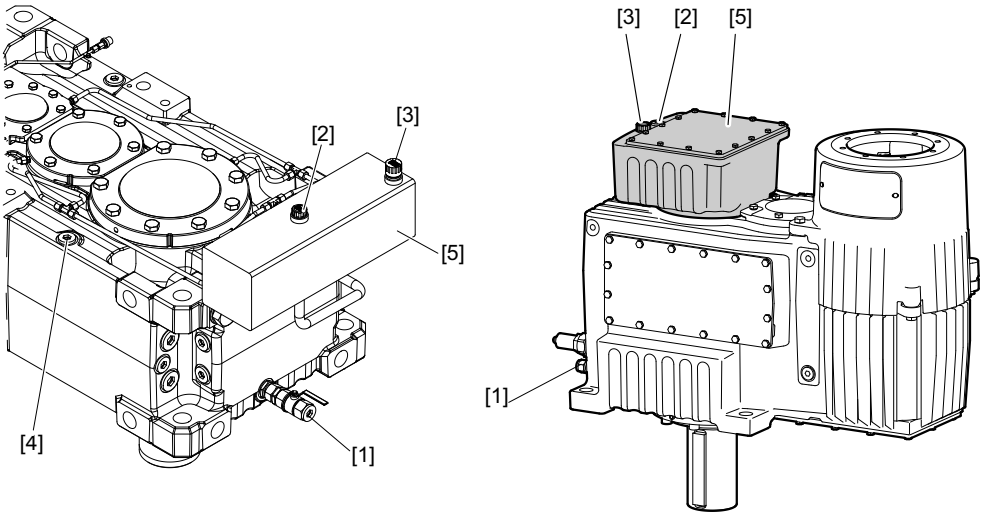
8.6.3 Gear units with oil expansion tank /ET

The following figure shows an example of a gear unit with oil expansion tank in mounting position M5.



15645122571

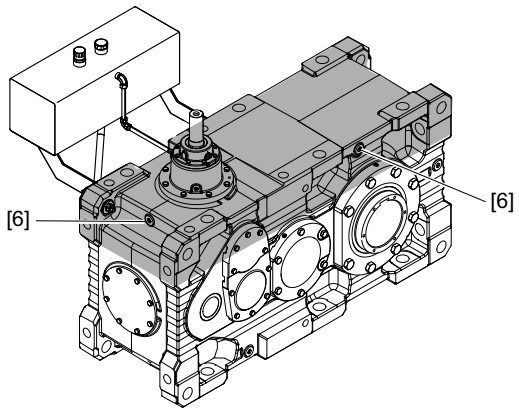
1. Remove the oil drain plug(s). Open the oil drain [1].

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:

Mounting positions M1 and M3:



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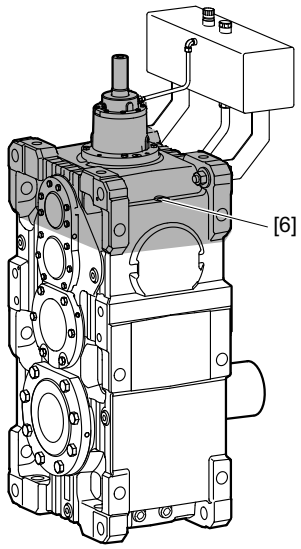
6. Open at least one of the screw plugs [6] located on the side in the upper fifth (marked gray) of the gear unit housing.

Mounting positions M2 and M4:



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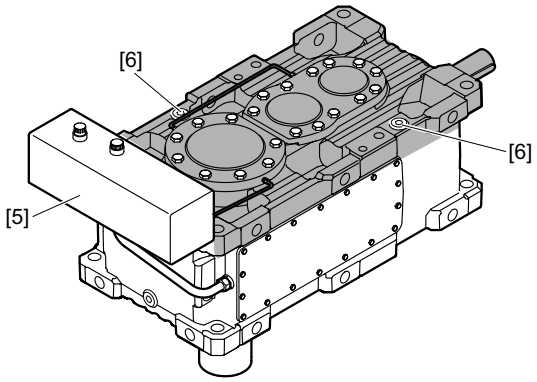
7. Open at least one of the screw plugs [6] on the top or at least one of the screw plugs [6] located on the side in the upper fifth (marked gray) of the gear unit housing.

Mounting positions M5 and M6:



3326671243

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.

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 and the oil filling hole.

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].

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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. Close all openings [6] of the gear unit housing and the oil expansion tank [5].
11. Check the breather [3] for proper functioning before you install it.
12. Screw in the oil dipstick [2].
13. Start up the gear unit.
14. Check the oil level every 30 minutes until the operating temperature is reached. Fill in more oil if required.
15. 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.

8.6.4 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" (→ 🗎 117).
- Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

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8.7 Breather /BPG

8.7.1 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" (→ 🗎 238).

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

8.7.2 Desiccant breather filter /DC

Proper operation:

If possible, only use DES-CASE breather filters 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	Top of the filter → bottom of the filter	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 DES-CASE 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 DES-CASE 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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8.8 Refilling grease

⚠ WARNING

Risk of crushing due to rotating parts.

Severe or fatal injuries.

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

INFORMATION

Make sure that the old grease cannot escape uncontrolled (preventing explosions, e.g. due to chemical reactions).

Regreasable sealing systems can be refilled with lithium-soap grease, see chapter "Sealing greases/bearing greases" (→ 🗎 294). Use moderate pressure to force about 30 g of grease into each lubrication point until new grease leaks out of the sealing gap.

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

8.9 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 for relubrication.

NOTICE

High pressure presses out the grease 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.

INFORMATION

Make sure that the old grease cannot escape uncontrolled (preventing explosions, e.g. due to chemical reactions).

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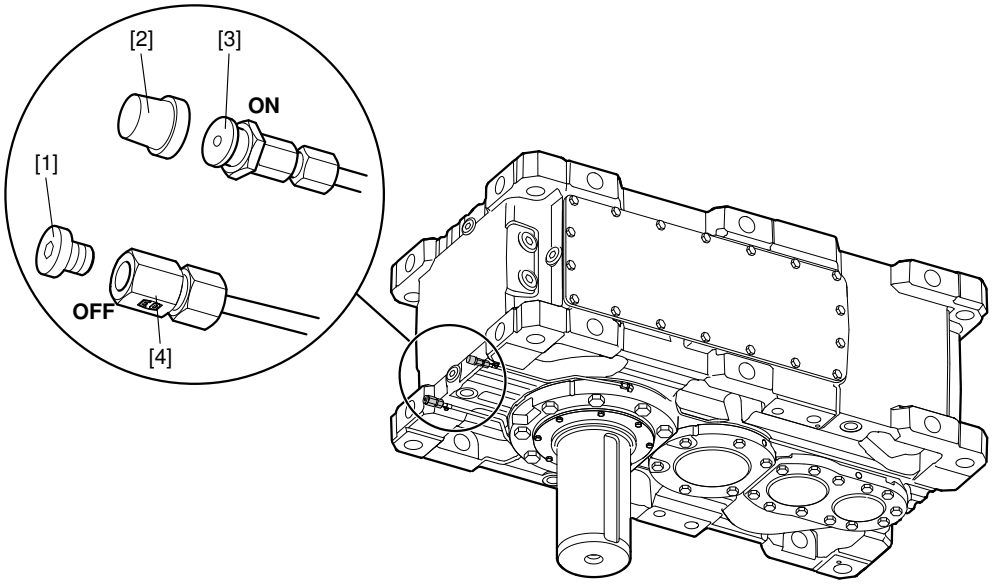
8.9.1 Universal housing HU



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Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

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" (→ 🗎 294).

Size	Amount of grease in g	Size	Amount of grease in g	Size	Amount of grease in g
X120	50	X180 – 190	110	X260	300
X130 – 140	60	X200 – 210	200	X270 – 280	450
X150	70	X220 – 230	200	X290 – 300	400
X160 – 170	90	X240 – 250	300	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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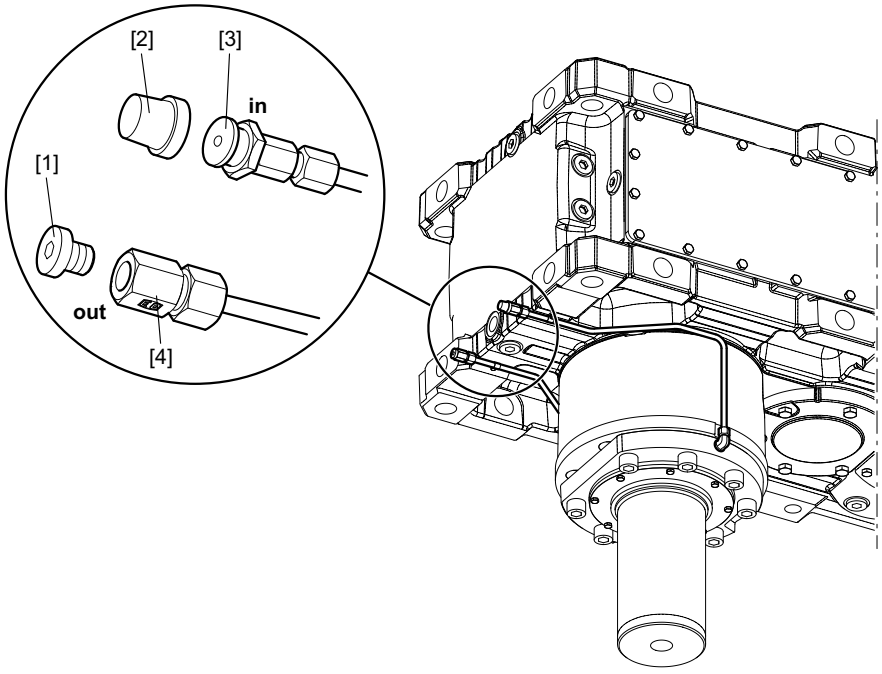
8.9.2 HU universal housing with EBD



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Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

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" (→ 🗎 294).

Size	Amount of grease in g	Size	Amount of grease in g
X140	120	X180	220
X150	140	X190	220
X160	180	X200	400
X170	180	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.

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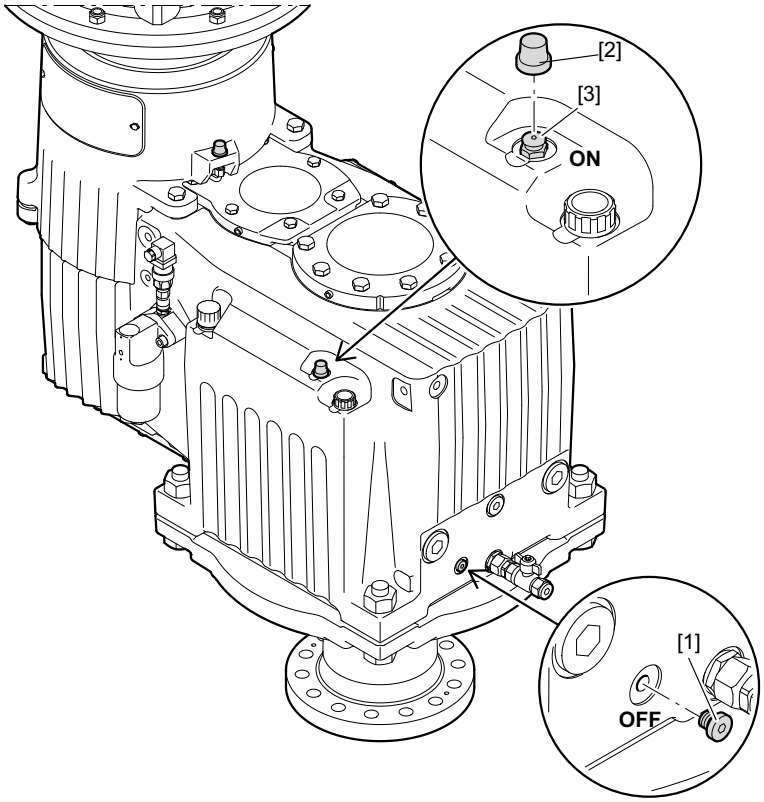
8.9.3 Agitator housing HA



15934764427

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

1. Remove the screw plug [1]. The old excess grease can escape.
2. Remove the protection cap [2]. Fill the grease via the grease nipple [3]. Amount of lubricant according to the following table. For lubricants you can use, refer to chapter "Sealing greases" (→ 🗎 294).

Size	Amount of grease in g
X140	120
X150	140
X160 – 170	180
X200 – 210	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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8.10 Motor pump /ONP

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

INFORMATION

Before starting inspection/maintenance work, first read the addendum to the operating instructions "Motor Pump /ONP".

8.11 Shaft end pump /SEP

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

INFORMATION

- Observe the procedure described in chapter "Gear units with shaft end pump / SEP" (→ 🗎 117).
- Observe the manufacturer's documentation.

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8.12 Fan /FAN

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

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.

8.13 Axial fan

⚠ CAUTION

The protection cover can slip during disassembly/assembly.

Potential risk of crushing due to falling parts.

- Secure the protection cover against slipping during disassembly/assembly.

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.

INFORMATION

- Do not disconnect the axial fan from the fan hub. This may only be performed by qualified personnel.
- In case of changes to the fan guard, the EU declaration of conformity becomes void.

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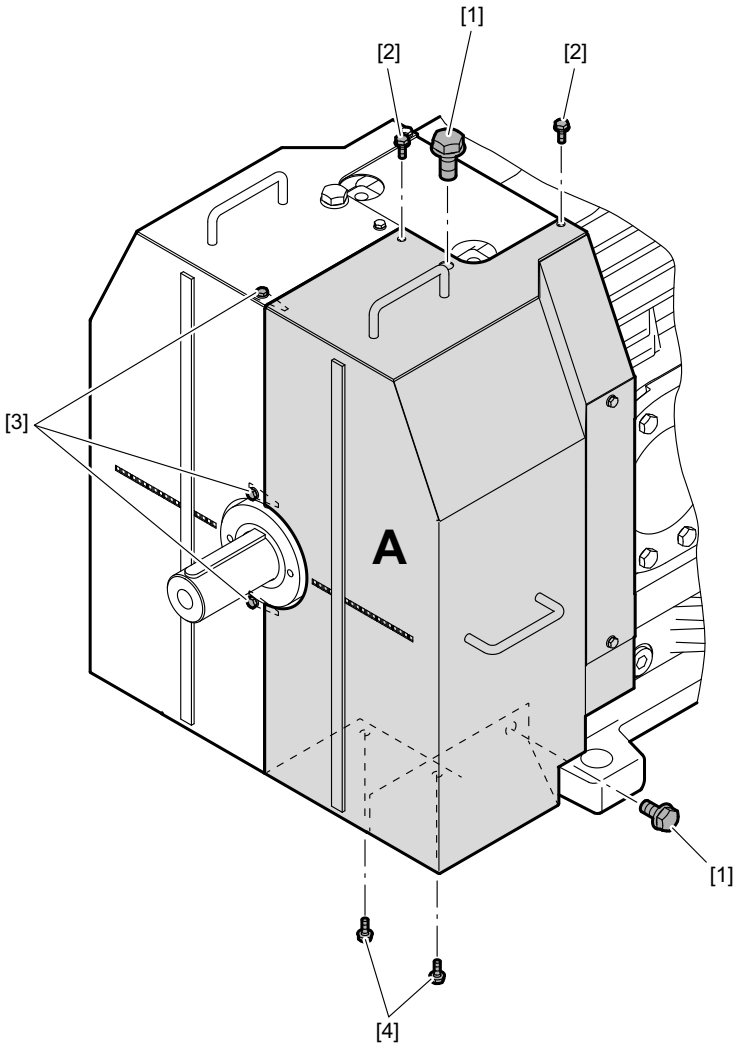
8.13.1 Removing the protection cover half

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

1. Protection cover half



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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 protection cover half **A**.

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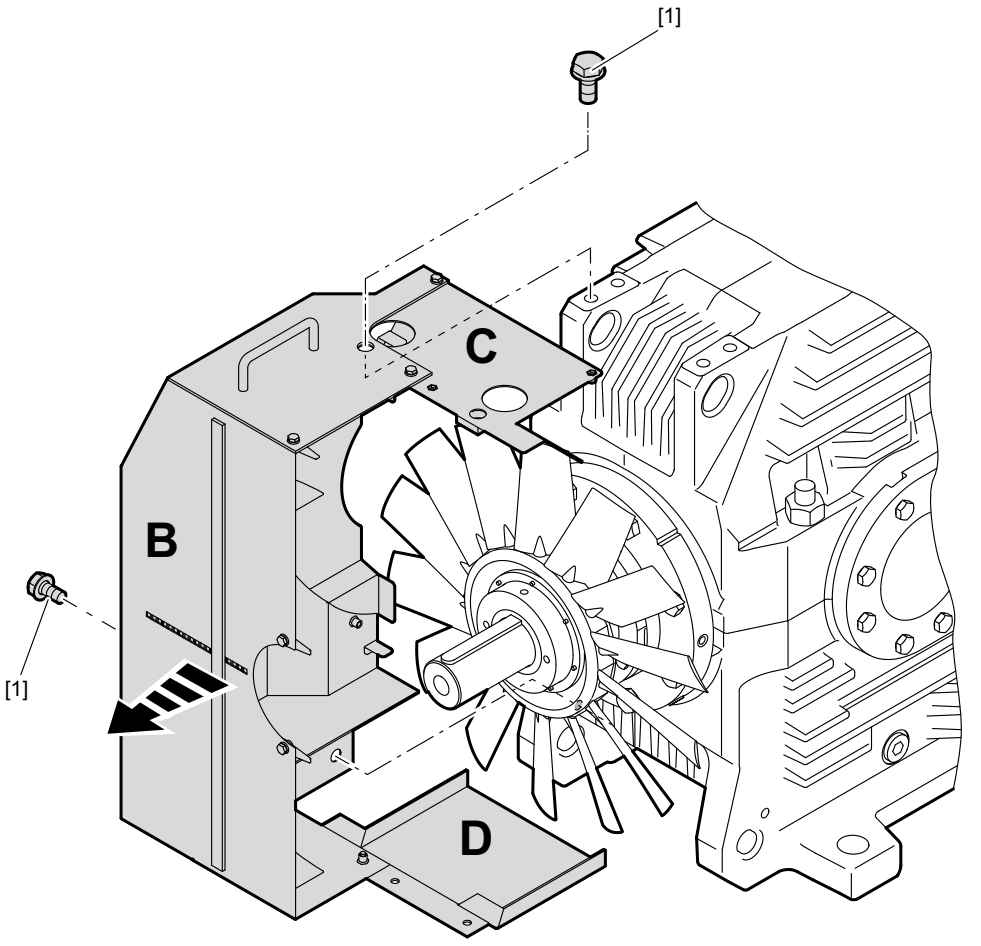
2. Protection cover half



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1. Loosen the 2 screws [1].
2. Remove protection cover half **BCD**.

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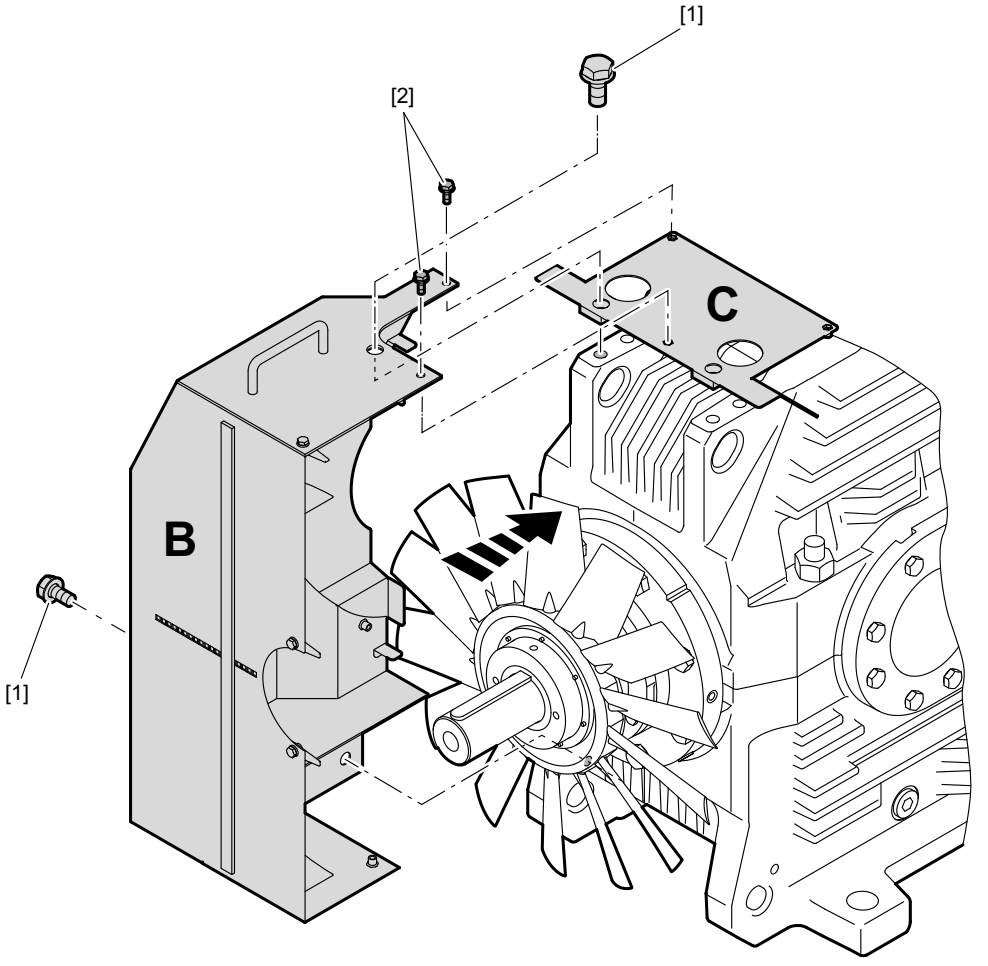
8.13.2 Mounting the protection cover half

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

INFORMATION

- 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.

1. Protection cover half



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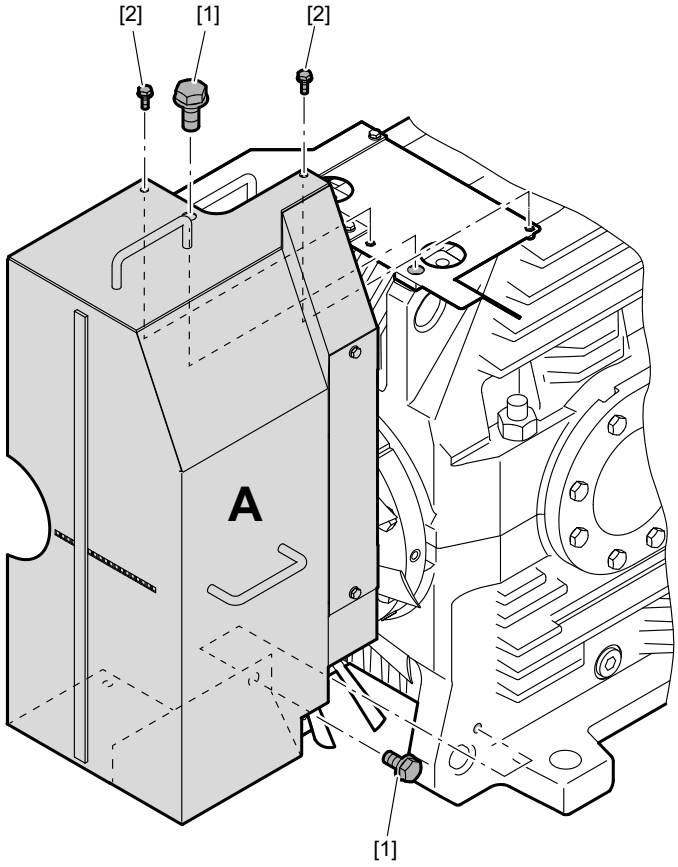
1. Screw metal sheet **C** and protection cover half **B** to the gear unit using the screws [1].
2. Screw in the 2 screws [2].

2. Protection cover half

1. Screw protection cover half **A** using the 2 screws [1].
2. Screw in the 2 screws [2].



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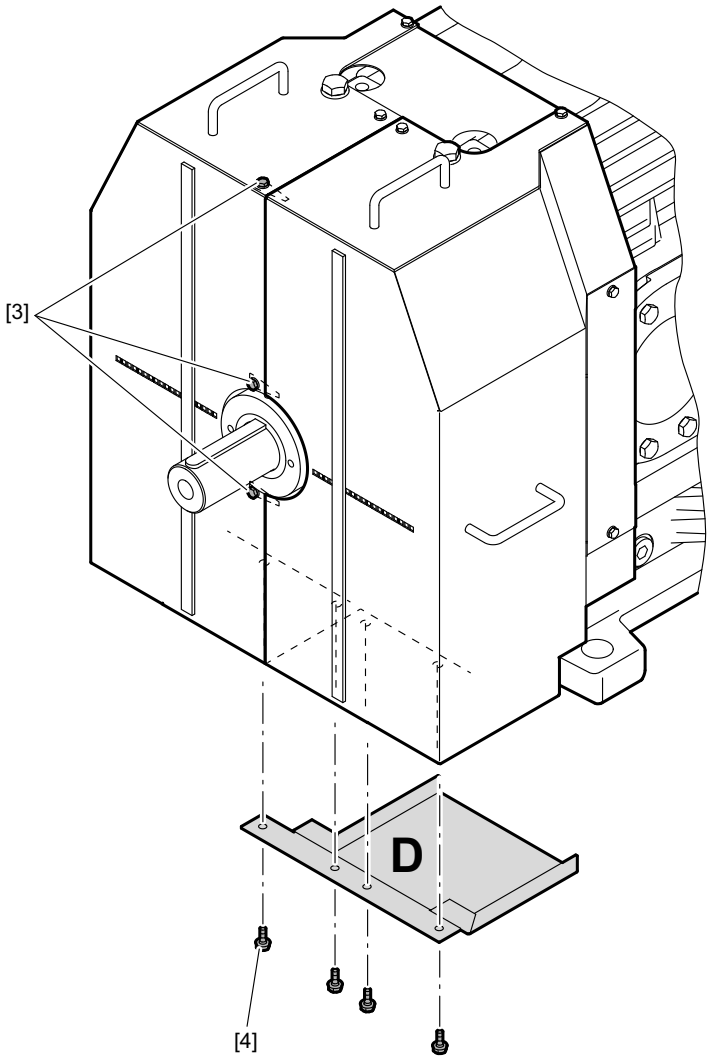
3. Screw in the 3 screws [3].
4. Screw metal sheet **D** using the 4 screws [4].



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8.14 Water cooling cover /CCV

8.14.1 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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8.14.2 Disassembly

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

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" (→ 🗎 109).
10. Re-connect the water cooling inflow and return pipes to the water cooling cover.

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8.15 Water cooling cartridge /CCT

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

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.

8.15.1 Maintenance intervals

The service life of the water cooling cartridge depends to a large degree on the quality of the media and their substances. The operator is responsible for specifying the maintenance intervals. Use the performance parameters and power rating determined during operation to define the maintenance intervals.

Specify the maintenance intervals in such a way that a power loss of the water cooling cartridge does not pose a hazard to the operation of the system.

8.15.2 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.

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.

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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.

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" (→ 🗎 238).

1. Unpressurize the water cooling cartridge and the connected system pipes. Shut them off with the corresponding valve.
2. Before "disassembly" (→ 🗎 251), 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.

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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.

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.

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8.16 Oil-water cooler for splash lubrication /OWC

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

INFORMATION

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

8.17 Oil-air cooler for splash lubrication /OAC

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

INFORMATION

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

8.18 Oil-water cooler for pressure lubrication /OWP

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

INFORMATION

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

8.19 Oil-air cooler for pressure lubrication /OAP

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

INFORMATION

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

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8.20 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.

INFORMATION

Deactivate the heating resistor before you drain the oil. The heating resistor can cause the evaporating oil to explode.

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 238).

1. Before disassembling the oil heater, drain the "oil" (→ 🗎 251).
2. **NOTICE!** Improper cleaning of the oil heater 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.
   Remove the oil heater.
3. Apply LOCTITE® 577 to two threads and screw on the oil heater and tighten the hex head screw by applying torque only to the head of the screw using an adequate tool.
4. Close the oil drain valve.
5. 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" (→ 🗎 243).

6. Connect the oil heater.

8.21 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" (→ 🗎 109).

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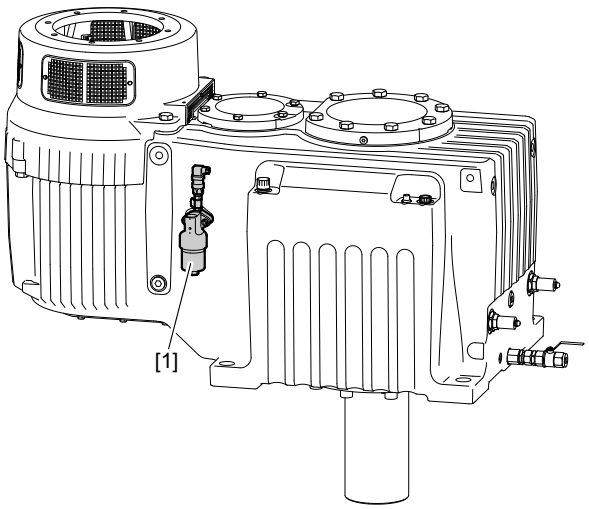
8.22 Oil filter

INFORMATION

Observe the operating instructions of the oil filter manufacturer.



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[1] Oil filter

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9 Permitted lubricants

This chapter describes the permitted lubricants and the permitted temperatures for industrial gear units from SEW-EURODRIVE.

9.1 Lubricant selection

Note the following when selecting the lubricants.

INFORMATION

- Always contact SEW-EURODRIVE before changing the mounting position to a mounting position other than the one specified on the nameplate. Otherwise, the ATEX certification will become void.

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 lubricants with mineral lubricants.
- Check the compatibility of the greases and oils used.
- Adhere to the safety notes in the individual chapters.

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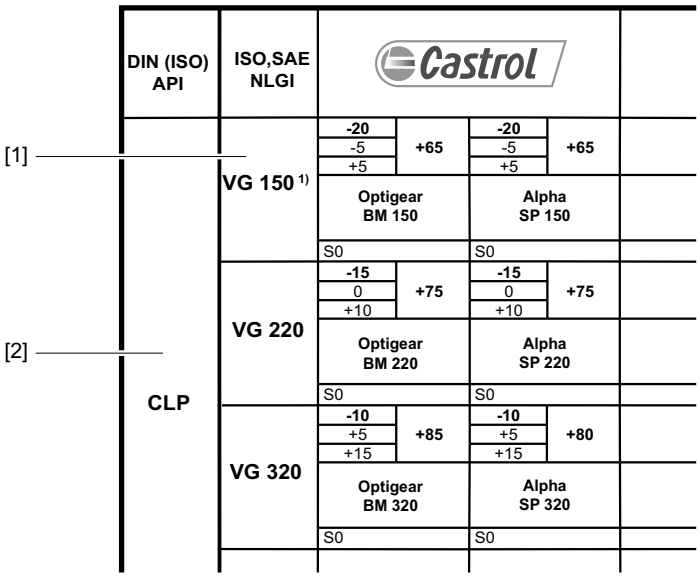
9.2 Structure of the tables and abbreviations



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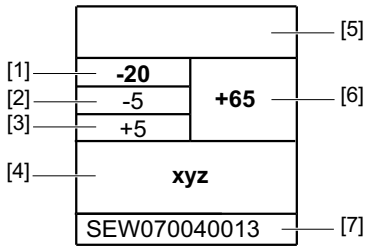
[1] Viscosity class
[2] Lubricant type

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 $F_s \geq 1.3$

9.3 Explanation of the various lubricants



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[1] Lowest cold start temperature in °C for splash lubrication*
[2] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 5000 cSt*
[3] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 2000 cSt*
[4] Trade name
[5] Manufacturer
[6] Highest oil bath temperature in °C. MUST NOT BE EXCEEDED.
[7] Approvals

*In case of low temperatures, the oil must be heated to the specified minimum temperature, for example by using an oil heater. The maximally permitted oil viscosity per pump type is specified in the following chapter.

9.4 Explanation of oil supply systems and oil viscosity

The following pressure lubrications are designed for an oil viscosity of **2000 cSt**:

- Motor pump for pressure lubrication /ONP
- Motor pump incl. air cooler for pressure lubrication /OAP
- Motor pump incl. water cooler for pressure lubrication /OWP
- Shaft end pump for pressure lubrication /SEP for agitator gear units HA

The following pressure lubrications are designed for an oil viscosity of **5000 cSt**:

- Shaft end pumps in HU, HH, and HT housing design

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9.5 Lubricant tables

The lubricant table is valid when this document is printed. Please refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

DIN (ISO) API	ISO,SAE NLGI	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TEXACO	TOTAL
CLP	VG 150 [1]	-20 -5 +5 +65 S0 Optigear BM 150	-20 -5 +5 +65 S0 Alpha SP 150	-20 -5 +5 +65 S0 Renolin CLP 150 Plus	-20 -5 +5 +65 S0 Renolin HighGear 150	-20 -5 +5 +65 S0 Mobilgear 600 XP 150	-20 -5 +5 +65 S0 Klüberoil GEM 1-150 N	-20 -5 +5 +65 S0 Meropa 150
	VG 220	-15 0 +10 +75 S0 Optigear BM 220	-15 0 +10 +75 S0 Alpha SP 220	-15 0 +10 +75 S0 Renolin CLP 220 Plus	-15 0 +10 +75 S0 Renolin HighGear 220	-15 0 +10 +75 SEW07003013 Mobilgear 600 XP 220	-15 0 +10 +75 S0 Klüberoil GEM 1-220 N	-15 0 +10 +75 S0 Meropa 220
	VG 320	-10 +5 +15 +80 S0 Optigear BM 320	-10 +5 +15 +80 S0 Alpha SP 320	-10 +5 +15 +80 S0 Renolin CLP 320 Plus	-10 +5 +15 +80 S0 Renolin HighGear 320	-10 +5 +15 +80 SEW07003013 Mobilgear 600 XP 320	-10 +5 +15 +80 S0 Klüberoil GEM 1-320 N	-10 +5 +15 +80 S0 Meropa 320
	VG 460	-5 +10 +20 +90 S0 Optigear BM 460	-5 +10 +20 +90 S0 Alpha SP 460	-5 +10 +20 +90 S0 Renolin CLP 460 Plus	-5 +10 +20 +90 S0 Renolin HighGear 460	-5 +10 +20 +90 SEW07003013 Mobilgear 600 XP 460	-5 +10 +20 +90 S0 Klüberoil GEM 1-460 N	-5 +10 +20 +90 S0 Meropa 460
	VG 680	0 +15 +25 +90 S0 Optigear BM 680	0 +15 +25 +90 S0 Alpha SP 680	0 +15 +25 +90 S0 Renolin CLP 680 Plus	0 +15 +25 +90 S0 Renolin HighGear 680	0 +15 +25 +90 SEW07003013 Mobilgear 600 XP 680	0 +15 +25 +90 S0 Klüberoil GEM 1-680 N	0 +15 +25 +90 S0 Meropa 680
	VG 1000	+5 +20 +30 +90 S0 Optigear BM 1000						-5 +10 +20 +90 S0 Carter EP 680
								-10 +5 +15 +80 S0 Carter EP 320
								-15 0 +10 +75 S0 Carter EP 220
								-15 0 +10 +75 S0 Carter EP 460

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DIN (ISO) API	ISO,SAE NLGI	Castrol			FUCHS			Mobil®			KLÜBER LUBRICATION			Shell			TEXACO			TOTAL		
CLP HC	VG 32 [1]							-40 / -30 / -25	+30	SHC 624												
								S0														
	VG 68 [1]				-35 / -20 / -10	+50	Renolin Unisyn CLP 68	-40 / -25 / -15	+50	SHC 626	-35 / -20 / -10	+50	Klübersynth GEM 4-68 N	-40 / -20 / -10	+50	Omala S4 GX 68						
					S0			S0			S0			S0								
	VG 150 [1]	-25 / -10 / 0	+70	Alphasyn EP 150	-30 / -10 / +0	+70	Renolin Unisyn CLP 150	-30 / -10 / -10	+75	SHC 629	-25 / -10 / 0	+70	Klübersynth GEM 4-150 N	-30 / -10 / 0	+75	Omala S4 GX 150	-25 / -10 / 0	+70	Pinnacle EP 150	-35 / -15 / -5	+75	Carter SH 150
		S0			S0			S0			S0			S0			S0			S0		
	VG 220	-25 / -5 / +5	+80	Alphasyn EP 220	-25 / -5 / +5	+80	Renolin Unisyn CLP 220	-20 / 0 / +10	+75	HighGear Synth 220	-25 / -5 / 0	+85	SHC 630	-25 / -10 / +5	+85	Omala S4 GX 220	-25 / -5 / +5	+80	Pinnacle EP 220	-25 / -5 / +5	+80	Carter SH 220
		S0			S0			S0			S0			S0			S0			S0		
	VG 320	-20 / 0 / +10	+90	Alphasyn EP 320	-20 / 0 / +10	+90	Renolin Unisyn CLP 320	-15 / 0 / +15	+85	HighGear Synth 320	-20 / 0 / +10	+95	SHC 632	-25 / -5 / +10	+95	Omala S4 GX 320	-20 / 0 / +10	+90	Pinnacle EP 320	-20 / 0 / +10	+90	Carter SH 320
		S0			S0			S0			S0			S0			S0			S0		
	VG 460	-15 / +5 / +15	+100	Alphasyn EP 460	-15 / +5 / +15	+100	Renolin Unisyn CLP 460	-10 / +5 / +20	+95	HighGear Synth 460	-15 / +5 / +15	+105	SHC 634	-20 / 0 / +15	+110	Omala S4 GX 460	-15 / +5 / +15	+105	Pinnacle EP 460	-15 / +5 / +15	+100	Carter SH 460
		S0			S0			S0			S0			S0			S0			S0		
	VG 680	-10 / +10 / +25	+110	Optigear Synthetic X 680	-10 / +10 / +25	+110	Renolin Unisyn CLP 680	-5 / +10 / +25	+110	HighGear Synth 680	-10 / +10 / +25	+110	SHC 636	-15 / +10 / +25	+110	Omala S4 GX 680	-10 / +10 / +25	+110		-10 / +10 / +25	+110	Carter SH 680
		S0			S0			S0			S0			S0			S0			S0		
	VG 1000							-10 / +15 / +30	+110	SHC 639	0 / +20 / +30	+110	Klübersynth EG4-1000									
								S0			S0												

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DIN (ISO) API	ISO,SAE NLGI	bremer & leguil	Castrol	FUCHS	KLÜBER LUBRICATION
CLP HC NSF H1	VG 68 [1]	S0 -35 -20 -10 +45 Cassida Fluid HF 68	S0 -40 -25 -15 +45 Optileb HY 68		S0 -35 -20 -10 +45 Klüberoil 4UH1-68 N
		S0 -20 -5 +5 +75 Cassida Fluid GL 220	S0 -25 -5 +5 +75 Optileb GT 220		S0 -25 -5 +5 +75 Klüberoil 4UH1-220 N
	VG 220 [1]	S0 -15 +5 +20 +90 Cassida Fluid GL 460	S0 -15 +5 +20 +95 Optileb GT 460		S0 -15 +5 +15 +95 Klüberoil 4UH1-460 N
	VG 460 [1]	S0		S0 -15 +5 +15 +95 Plantogear 460 S	S0 -15 +5 +15 +95 Klüberbio CA2-460
E	VG 460				

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9.6 Lubricant fill quantities

9.6.1 Horizontal housing /HH and universal housing /HU

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.

Mounting position M1

X.F.. (M1)

X2F..	Oil quantity in liters		X3F..	Oil quantity in liters		X4F..	Oil quantity in liters	
	Splash lubrication	Pressure lubrication		Splash lubrication	Pressure lubrication		Splash lubrication	Pressure lubrication
X2F100	14	-	X3F100	15	-	X4F100	-	-
X2F110	15	-	X3F110	16	-	X4F110	-	-
X2F120	22	-	X3F120	22	-	X4F120	19	-
X2F130	24	-	X3F130	25	-	X4F130	19	-
X2F140	37	-	X3F140	36	-	X4F140	33	-
X2F150	39	-	X3F150	38	-	X4F150	33	-
X2F160	63	63	X3F160	61	61	X4F160	57	57
X2F170	63	63	X3F170	61	61	X4F170	57	57
X2F180	79	79	X3F180	80	80	X4F180	77	77
X2F190	83	83	X3F190	82	82	X4F190	76	76
X2F200	110	110	X3F200	110	110	X4F200	97	97
X2F210	110	110	X3F210	110	110	X4F210	97	97
X2F220	145	145	X3F220	150	150	X4F220	150	150
X2F230	145	145	X3F230	150	150	X4F230	150	150
X2F240	180	180	X3F240	180	180	X4F240	165	165
X2F250	180	180	X3F250	182	182	X4F250	172	172
X2F260	284	284	X3F260	287	287	X4F260	290	290
X2F270	285	285	X3F270	288	288	X4F270	295	295
X2F280	335	335	X3F280	350	350	X4F280	325	325
X2F290	410	410	X3F290	415	415	X4F290	415	415
X2F300	410	410	X3F300	418	418	X4F300	425	425
X2F310	555	555	X3F310	545	545	X4F310	537	537
X2F320	555	555	X3F320	545	545	X4F320	537	537

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X.K.. (M1)

X2K..	Oil quantity in liters		X3K..	Oil quantity in liters		X4K..	Oil quantity in liters	
	Splash lubrication	Pressure lubrication		Splash lubrication	Pressure lubrication		Splash lubrication	Pressure lubrication
X2K100	12	-	X3K100	12	-	X4K100	-	-
X2K110	12	-	X3K110	14	-	X4K110	-	-
X2K120	17	-	X3K120	20	-	X4K120	25	-
X2K130	17	-	X3K130	22	-	X4K130	23	-
X2K140	26	-	X3K140	34	-	X4K140	36	-
X2K150	29	-	X3K150	34	-	X4K150	39	-
X2K160	47	47	X3K160	59	59	X4K160	67	67
X2K170	47	47	X3K170	59	59	X4K170	67	67
X2K180	64	64	X3K180	74	74	X4K180	81	81
X2K190	68	68	X3K190	77	77	X4K190	84	84
X2K200	87	87	X3K200	105	105	X4K200	107	107
X2K210	87	87	X3K210	105	105	X4K210	109	109
X2K220	135	135	X3K220	135	135	X4K220	145	145
X2K230	135	135	X3K230	139	139	X4K230	145	145
X2K240	170	170	X3K240	175	175	X4K240	181	181
X2K250	170	170	X3K250	175	175	X4K250	181	181
X2K260	-	-	X3K260	279	279	X4K260	275	275
X2K270	-	-	X3K270	279	279	X4K270	275	275
X2K280	-	-	X3K280	330	330	X4K280	335	335
X2K290	-	-	X3K290	432	432	X4K290	425	425
X2K300	-	-	X3K300	432	432	X4K300	425	425
X2K310	-	-	X3K310	540	540	X4K310	545	545
X2K320	-	-	X3K320	540	540	X4K320	545	545

X.T.. (M1)

X3T..	Oil quantity in liters			X4T..	Oil quantity in liters		
	Splash lubrication	Pressure lubrication	Bath lubrication		Splash lubrication	Pressure lubrication	Bath lubrication
X3T100	14	-	-	X4T100	-	-	-
X3T110	15	-	-	X4T110	-	-	-
X3T120	20	-	-	X4T120	20	-	-
X3T130	22	-	-	X4T130	22	-	-
X3T140	32	-	-	X4T140	31	-	-
X3T150	32	-	-	X4T150	34	-	-
X3T160	53	53	-	X4T160	56	56	-
X3T170	53	53	-	X4T170	56	56	-
X3T180	67	67	-	X4T180	77	77	-
X3T190	67	67	-	X4T190	77	77	-
X3T200	87	87	-	X4T200	97	97	-
X3T210	87	87	-	X4T210	97	97	-
X3T220	-	140	305	X4T220	-	210	310
X3T230	-	140	305	X4T230	-	210	310
X3T240	-	170	400	X4T240	-	265	405
X3T250	-	170	400	X4T250	-	265	405

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Mounting position M3

X.F.. (M3)

X2F..	Oil quantity in liters	X3F..	Oil quantity in liters	X4F..	Oil quantity in liters
	Splash lubrication		Splash lubrication		Splash lubrication
X2F100	14	X3F100	14	X4F100	-
X2F110	15	X3F110	16	X4F110	-
X2F120	20	X3F120	20	X4F120	24
X2F130	22	X3F130	23	X4F130	26
X2F140	37	X3F140	38	X4F140	42
X2F150	37	X3F150	38	X4F150	42
X2F160	62	X3F160	64	X4F160	82
X2F170	62	X3F170	64	X4F170	82
X2F180	77	X3F180	78	X4F180	108
X2F190	80	X3F190	82	X4F190	105
X2F200	105	X3F200	110	X4F200	140
X2F210	105	X3F210	110	X4F210	140
X2F220	135	X3F220	145	X4F220	185
X2F230	135	X3F230	145	X4F230	185
X2F240	175	X3F240	180	X4F240	231
X2F250	175	X3F250	180	X4F250	227
X2F260	280	X3F260	275	X4F260	360
X2F270	280	X3F270	275	X4F270	360
X2F280	335	X3F280	340	X4F280	425
X2F290	410	X3F290	405	X4F290	520
X2F300	410	X3F300	405	X4F300	520
X2F310	555	X3F310	545	X4F310	690
X2F320	555	X3F320	545	X4F320	690

X.K.. (M3)

X2K..	Oil quantity in liters	X3K..	Oil quantity in liters	X4K..	Oil quantity in liters
	Splash lubrication		Splash lubrication		Splash lubrication
X2K100	12	X3K100	17	X4K100	-
X2K110	12	X3K110	15	X4K110	-
X2K120	16	X3K120	20	X4K120	20
X2K130	17	X3K130	23	X4K130	23
X2K140	25	X3K140	34	X4K140	36
X2K150	28	X3K150	35	X4K150	38
X2K160	46	X3K160	59	X4K160	60
X2K170	46	X3K170	59	X4K170	60
X2K180	62	X3K180	77	X4K180	77
X2K190	64	X3K190	80	X4K190	78
X2K200	82	X3K200	100	X4K200	110
X2K210	82	X3K210	108	X4K210	110
X2K220	140	X3K220	130	X4K220	145
X2K230	140	X3K230	130	X4K230	145
X2K240	175	X3K240	170	X4K240	180
X2K250	175	X3K250	170	X4K250	180
X2K260	-	X3K260	260	X4K260	275
X2K270	-	X3K270	260	X4K270	275
X2K280	-	X3K280	330	X4K280	335
X2K290	-	X3K290	405	X4K290	415
X2K300	-	X3K300	405	X4K300	415
X2K310	-	X3K310	540	X4K310	545
X2K320	-	X3K320	540	X4K320	545

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X.T.. (M3)

X3T..	Oil quantity in liters		X4T..	Oil quantity in liters	
	Splash lubrication	Bath lubrication		Splash lubrication	Bath lubrication
X3T100	-	36	X4T100	-	-
X3T110	-	36	X4T110	-	-
X3T120	-	46	X4T120	-	50
X3T130	-	47	X4T130	-	53
X3T140	-	79	X4T140	-	79
X3T150	-	81	X4T150	-	81
X3T160	-	139	X4T160	-	143
X3T170	-	139	X4T170	-	143
X3T180	-	175	X4T180	-	180
X3T190	-	175	X4T190	-	180
X3T200	-	235	X4T200	-	240
X3T210	-	235	X4T210	-	230
X3T220	120	-	X4T220	145	-
X3T230	120	-	X4T230	145	-
X3T240	155	-	X4T240	180	-
X3T250	155	-	X4T250	180	-

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Mounting positions M5 and M6

Note that the oil quantity has to be increased by 20% for gear unit combinations with mounting positions M5 or M6, pressure lubrication, and oil heating. Adhere to the information on the nameplate.

X.F.. (M5 and M6)

X2F..[1]	Oil quantity in liters			X3F..[1]	Oil quantity in liters			X4F..[1]	Oil quantity in liters		
	Bath lubrication	Pressure lubrication	Pressure lubrication with Drywell		Bath lubrication	Pressure lubrication	Pressure lubrication with Drywell		Bath lubrication	Pressure lubrication	Pressure lubrication with Drywell
X2F100	33	-	-	X3F100	33	-	-	X4F100	-	-	-
X2F110	34	-	-	X3F110	34	-	-	X4F110	-	-	-
X2F120	48	17	12	X3F120	47	17	12	X4F120	43	17	13
X2F130	52	20	13	X3F130	50	20	15	X4F130	50	18	13
X2F140	79	36	22	X3F140	77	38	22	X4F140	74	25	20
X2F150	84	38	22	X3F150	85	36	24	X4F150	78	26	20
X2F160	157	60	39	X3F160	151	58	38	X4F160	142	44	38
X2F170	157	60	39	X3F170	151	58	38	X4F170	142	44	38
X2F180	185	74	51	X3F180	184	71	54	X4F180	174	66	51
X2F190	190	77	56	X3F190	190	73	56	X4F190	180	68	53
X2F200	255	110	77	X3F200	245	110	71	X4F200	235	105	70
X2F210	255	110	77	X3F210	245	110	72	X4F210	236	105	70
X2F220	340	130	97	X3F220	317	125	95	X4F220	320	155	95
X2F230	340	130	97	X3F230	317	125	95	X4F230	320	155	95
X2F240	415	160	105	X3F240	405	150	113	X4F240	415	190	115
X2F250	415	160	105	X3F250	405	150	113	X4F250	415	190	115
X2F260	-	225	197	X3F260	-	215	188	X4F260	-	255	191
X2F270	-	225	197	X3F270	-	215	188	X4F270	-	255	191
X2F280	-	270	239	X3F280	-	265	235	X4F280	-	310	235
X2F290	-	305	289	X3F290	-	300	280	X4F290	-	395	278
X2F300	-	305	289	X3F300	-	300	280	X4F300	-	395	278
X2F310	-	421	421	X3F310	-	404	404	X4F310	-	520	398
X2F320	-	421	421	X3F320	-	404	404	X4F320	-	520	398

1) In case of EBD design with universal housing, additional oil quantities must be added, as listed in the table "Additional oil quantities for universal housing HU with extended bearing distance (EBD)".

X.K.. (M5 and M6)

X2K..[1]	Oil quantity in liters			X3K..[1]	Oil quantity in liters			X4K..[1]	Oil quantity in liters		
	Bath lubrication	Pressure lubrication	Pressure lubrication with Drywell		Bath lubrication	Pressure lubrication	Pressure lubrication with Drywell		Bath lubrication	Pressure lubrication	Pressure lubrication with Drywell
X2K100	30	-	-	X3K100	34	-	-	X4K100	-	-	-
X2K110	29	-	-	X3K110	34	-	-	X4K110	-	-	-
X2K120	41	17	11	X3K120	46	17	11	X4K120	46	20	12
X2K130	43	17	13	X3K130	52	18	14	X4K130	48	23	13
X2K140	61	26	19	X3K140	80	34	20	X4K140	77	37	20
X2K150	64	27	19	X3K150	81	36	20	X4K150	83	38	20
X2K160	129	50	34	X3K160	143	55	38	X4K160	147	61	38
X2K170	129	50	34	X3K170	143	55	38	X4K170	147	61	38
X2K180	155	62	41	X3K180	177	72	55	X4K180	179	80	55
X2K190	155	62	41	X3K190	182	76	55	X4K190	188	87	55
X2K200	210	87	62	X3K200	242	97	76	X4K200	241	115	76
X2K210	210	87	62	X3K210	245	105	81	X4K210	244	115	76
X2K220	335	135	137	X3K220	320	120	91	X4K220	318	155	95

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X2K..[1]	Oil quantity in liters			X3K..[1]	Oil quantity in liters			X4K..[1]	Oil quantity in liters		
	Bath lubrication	Pressure lubrication	Pressure lubrication with Drywell		Bath lubrication	Pressure lubrication	Pressure lubrication with Drywell		Bath lubrication	Pressure lubrication	Pressure lubrication with Drywell
X2K230	335	135	137	X3K230	320	120	91	X4K230	318	155	95
X2K240	410	160	145	X3K240	405	150	99	X4K240	415	177	116
X2K250	410	160	145	X3K250	405	150	99	X4K250	415	177	116
X2K260	-	-	-	X3K260	-	215	190	X4K260	-	280	190
X2K270	-	-	-	X3K270	-	215	190	X4K270	-	280	190
X2K280	-	-	-	X3K280	-	270	241	X4K280	-	350	236
X2K290	-	-	-	X3K290	-	305	287	X4K290	-	420	281
X2K300	-	-	-	X3K300	-	305	287	X4K300	-	420	281
X2K310	-	-	-	X3K310	-	416	416	X4K310	-	560	413
X2K320	-	-	-	X3K320	-	416	416	X4K320	-	560	413

1) In case of EBD design with universal housing, additional oil quantities must be added, as listed in the table "Additional oil quantities for universal housing HU with extended bearing distance (EBD)".

Additional oil quantities for universal housing HU with extended bearing distance (EBD)

X.F.. / X.K..	Liter
140	2
150	2
160	3
170	3
180	4
190	4
200	6
210	6

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X.T.. (M5 and M6)

X3T..	Oil quantity in liters			X4T..	Oil quantity in liters		
	Bath lubrication	Pressure lubrication	Pressure lubrication with Drywell		Bath lubrication	Pressure lubrication	Pressure lubrication with Drywell
X3T100	36	-	-	X4T100	-	-	-
X3T110	36	-	-	X4T110	-	-	-
X3T120	46	17	13	X4T120	50	18	13
X3T130	47	18	14	X4T130	53	22	14
X3T140	79	32	20	X4T140	79	32	20
X3T150	81	33	20	X4T150	81	33	20
X3T160	139	53	34	X4T160	143	55	34
X3T170	139	53	34	X4T170	143	55	34
X3T180	175	72	52	X4T180	180	82	52
X3T190	175	72	52	X4T190	180	82	52
X3T200	235	97	70	X4T200	240	110	68
X3T210	235	97	70	X4T210	240	110	68
X3T220	305	120	91	X4T220	310	150	94
X3T230	305	120	91	X4T230	310	150	94
X3T240	400	150	112	X4T240	405	190	112
X3T250	400	150	112	X4T250	405	190	112

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Mounting position M2

X.F.. (M2)

X2F..	Oil quantity in liters	X3F..	Oil quantity in liters	X4F..	Oil quantity in liters
	Bath lubrication		Bath lubrication		Bath lubrication
X2F100	23	X3F100	20	X4F100	-
X2F110	23	X3F110	22	X4F110	-
X2F120	33	X3F120	35	X4F120	29
X2F130	36	X3F130	36	X4F130	33
X2F140	58	X3F140	56	X4F140	49
X2F150	58	X3F150	57	X4F150	49
X2F160	93	X3F160	93	X4F160	82
X2F170	93	X3F170	93	X4F170	82
X2F180	125	X3F180	125	X4F180	115
X2F190	125	X3F190	125	X4F190	115
X2F200	164	X3F200	164	X4F200	152
X2F210	164	X3F210	164	X4F210	152
X2F220	225	X3F220	207	X4F220	211
X2F230	225	X3F230	207	X4F230	211
X2F240	285	X3F240	270	X4F240	275
X2F250	285	X3F250	270	X4F250	267

X.K.. (M2)

X2K..	Oil quantity in liters	X3K..	Oil quantity in liters	X4K..	Oil quantity in liters
	Bath lubrication		Bath lubrication		Bath lubrication
X2K100	18	X3K100	22	X4K100	-
X2K110	16	X3K110	19	X4K110	-
X2K120	26	X3K120	32	X4K120	33
X2K130	26	X3K130	32	X4K130	34
X2K140	38	X3K140	56	X4K140	54
X2K150	41	X3K150	56	X4K150	56
X2K160	64	X3K160	87	X4K160	88
X2K170	64	X3K170	87	X4K170	88
X2K180	92	X3K180	120	X4K180	125
X2K190	97	X3K190	122	X4K190	129
X2K200	130	X3K200	160	X4K200	165
X2K210	130	X3K210	160	X4K210	165
X2K220	200	X3K220	205	X4K220	220
X2K230	200	X3K230	205	X4K230	220
X2K240	255	X3K240	270	X4K240	280
X2K250	255	X3K250	270	X4K250	280

X.T.. (M2)

X3T..	Oil quantity in liters	X4T..	Oil quantity in liters
	Bath lubrication		Bath lubrication
X3T100	19	X4T100	-
X3T110	19	X4T110	-
X3T120	30	X4T120	36
X3T130	31	X4T130	36
X3T140	46	X4T140	55
X3T150	48	X4T150	59
X3T160	80	X4T160	89
X3T170	85	X4T170	94
X3T180	115	X4T180	120
X3T190	115	X4T190	120

X3T..	Oil quantity in liters	X4T..	Oil quantity in liters
	Bath lubrication		Bath lubrication
X3T200	150	X4T200	155
X3T210	150	X4T210	155
X3T220	205	X4T220	215
X3T230	205	X4T230	215
X3T240	265	X4T240	275
X3T250	265	X4T250	275

Mounting position M4

X.F.. (M4)

X2F..	Oil quantity in liters		X3F..	Oil quantity in liters		X4F..	Oil quantity in liters	
	Bath lubrication	Pressure lubrication		Bath lubrication	Pressure lubrication		Bath lubrication	Pressure lubrication
X2F100	20	-	X3F100	26	-	X4F100	-	-
X2F110	23	-	X3F110	27	-	X4F110	-	-
X2F120	36	17	X3F120	37	17	X4F120	34	17
X2F130	37	19	X3F130	40	19	X4F130	40	19
X2F140	55	26	X3F140	65	26	X4F140	59	26
X2F150	62	27	X3F150	69	27	X4F150	69	27
X2F160	106	53	X3F160	120	53	X4F160	119	53
X2F170	106	53	X3F170	120	53	X4F170	119	53
X2F180	133	57	X3F180	155	57	X4F180	152	57
X2F190	135	57	X3F190	157	57	X4F190	152	57
X2F200	180	72	X3F200	197	72	X4F200	197	72
X2F210	180	72	X3F210	197	72	X4F210	197	72
X2F220	223	105	X3F220	263	105	X4F220	270	105
X2F230	223	105	X3F230	263	105	X4F230	270	105
X2F240	290	120	X3F240	335	120	X4F240	345	120
X2F250	290	120	X3F250	335	120	X4F250	345	120
X2F260	655	185	X3F260	630	185	X4F260	645	185
X2F270	655	185	X3F270	630	185	X4F270	645	185
X2F280	785	240	X3F280	775	240	X4F280	770	240
X2F290	955	260	X3F290	925	260	X4F290	940	260
X2F300	955	260	X3F300	925	260	X4F300	940	260
X2F310	1290	365	X3F310	1245	365	X4F310	1225	365
X2F320	1290	365	X3F320	1245	365	X4F320	1225	365

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X.K.. (M4)

X2K..	Oil quantity in liters		X3K..	Oil quantity in liters		X4K..	Oil quantity in liters	
	Bath lubrication	Pressure lubrication		Bath lubrication	Pressure lubrication		Bath lubrication	Pressure lubrication
X2K100	30	-	X3K100	34	-	X4K100	-	-
X2K110	29	-	X3K110	34	-	X4K110	-	-
X2K120	41	18	X3K120	50	19	X4K120	47	18
X2K130	43	18	X3K130	53	19	X4K130	52	19
X2K140	66	26	X3K140	79	26	X4K140	82	26
X2K150	70	27	X3K150	86	29	X4K150	88	29
X2K160	136	50	X3K160	148	50	X4K160	147	50
X2K170	136	50	X3K170	148	50	X4K170	147	50
X2K180	155	57	X3K180	177	57	X4K180	188	57
X2K190	155	57	X3K190	180	57	X4K190	188	57
X2K200	210	72	X3K200	239	75	X4K200	255	72
X2K210	210	72	X3K210	239	75	X4K210	255	72
X2K220	335	105	X3K220	320	105	X4K220	335	105
X2K230	335	105	X3K230	320	105	X4K230	335	105
X2K240	410	120	X3K240	405	120	X4K240	415	120
X2K250	410	120	X3K250	405	120	X4K250	415	120
X2K260	-	-	X3K260	615	185	X4K260	630	185
X2K270	-	-	X3K270	615	185	X4K270	630	185
X2K280	-	-	X3K280	750	240	X4K280	775	240
X2K290	-	-	X3K290	930	260	X4K290	965	260
X2K300	-	-	X3K300	930	260	X4K300	965	260
X2K310	-	-	X3K310	1250	365	X4K310	1260	365
X2K320	-	-	X3K320	1250	365	X4K320	1260	365

X.T.. (trolley drives M4)

X3T..	Oil quantity in liters		X4T..	Oil quantity in liters	
	Bath lubrication	Pressure lubrication		Bath lubrication	Pressure lubrication
X3T100	23	-	X4T100	-	-
X3T110	23	-	X4T110	-	-
X3T120	33	17	X4T120	37	17
X3T130	34	17	X4T130	34	17
X3T140	49	25	X4T140	54	25
X3T150	59	29	X4T150	55	29
X3T160	92	50	X4T160	95	50
X3T170	92	50	X4T170	95	50
X3T180	125	57	X4T180	130	57
X3T190	125	57	X4T190	130	57
X3T200	165	72	X4T200	165	72
X3T210	165	72	X4T210	165	72
X3T220	220	105	X4T220	220	105
X3T230	220	105	X4T230	220	105
X3T240	275	120	X4T240	290	120
X3T250	275	120	X4T250	290	120

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9.6.2 Thermal housing /HT

Mounting position M1

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.

X.K..

X3K..	Oil quantity in liters	
	Splash lubrication	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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9.6.3 Agitator housing /HA

Mounting position M5

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 required oil quantity depends on the respective marks on the oil dipstick.

X.F..

X3F..	Oil quantity in liters		
	Bath lubrication	Pressure lubrication	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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9.7 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	Grease	Lower limit temperature °C
Standard	Fuchs	**Renolit CX TOM 15 OEM**[1)]	-40
	BP	Energrease LS EP-2	-30
	Castrol	Longtime PD 2	-35
		Spheerol EPL 2	-20
	Klüber	Centoplex EP 2	-25
		Petamo GHY 133 N	-40
	Mobile	Moliux EP 2	-20
	Shell	Gadus S2 V220 2	-20
	Total	Multis EP 2	-20
	Bremer & Leguil	Cassida Grease GTS2[1)]	-40
	Fuchs	**Plantogel 2**[1)]	-40

1) Grease used by the factory should be preferred.

INFORMATION

- Do not mix permitted greases from different areas of application.
- If the lubricant 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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10 Malfunctions/remedy

10.1 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.

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10.2 Possible malfunctions/remedy

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 oil level, correct if necessary
	• Oil too old	• Check when the oil was last changed; change the oil, if necessary
	• The 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
	• 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
	• Malfunctions of the oil/air or oil-water cooling system	• Observe the separate operating instructions for the oil-water and oil-air cooling system.
	• Malfunction in the water cooling (water cooling cover, water cooling cartridge)	• Check the cooling water throughput and the entry temperature of the cooling water, 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

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Fault	Possible cause	Measure
Oil leaking • At the gear unit breather	• Too much oil • Drive not installed in proper mounting position • Frequent cold starts (oil foaming) and/or high oil level	• Check oil level, correct if necessary • Install gear unit breather correctly and adjust the oil level • Install oil expansion tank
Oil leaking • from the screw plug • from the oil drain valve	• Seal not tight • Fittings loosened	• Retighten 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).

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10.3 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

10.4 Waste disposal

Dispose gear units in accordance with the regulations in force regarding respective materials:

- Steel scrap
  - Housing parts
  - Gears
  - Shafts
  - Rolling bearing
- Collect waste oil and dispose of it according to the regulations in force.

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11 Declaration of conformity

EU Declaration of Conformity

SEW EURODRIVE

Translation of the original text **900760215/EN**

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

industrial gear units of the series	**X...100.. - X...320..** **P..002.. - P..102..** **P..042-X2K110-P..102-X2K170**	
according to		
Category	**2G** **2D**	
Designation	**Ex h IIC T4 Gb or** **Ex h IIC T4 Gb X or** **Ex h IIIC T120 °C Db or** **Ex h IIIC T120 °C Db X**	**15)**
in accordance with		
ATEX Directive	**2014/34/EU** **(L 96, 29.03.2014, 309-356)**	**2)**
Applied harmonized standards:	**EN ISO 80079-36:2016** **EN ISO 80079-37:2016** **EN 60529:1991/A1:2000/A2:2013**	

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

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

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

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

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EU Declaration of Conformity

SEW EURODRIVE

Translation of the original text **900770215/EN**

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

Industrial gear units of the series	**X...100.. - X...320..** **P..002.. - P..102..** **P..042-X2K110 - P..102-X2K170**	
according to		
Category	**3G** **3D**	
Designation	**Ex h IIC T4 Gc or** **Ex h IIC T4 Gc X or** **Ex h IIIC T120 °C Dc or** **Ex h IIIC T120 °C Dc X**	**15)**
in accordance with		
ATEX Directive	**2014/34/EU** **(L 96, 29.03.2014, 309-356)**	
Applied harmonized standards:	**EN ISO 80079-36:2016** **EN ISO 80079-37:2016** **EN 60529:1991/A1:2000/A2:2013**	

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

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

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

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EU Declaration of Conformity

SEW EURODRIVE

Translation of the original text **902160213/EN**

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

industrial gear units of the series	**X...100.. - X...320..**	
Category	**I M2**	
Designation	**Ex h Mb** **Ex h Mb X**	
in accordance with		
ATEX Directive	**2014/34/EU** **(L 96, 29.03.2014, 309-356)**	**2)**
Applied harmonized standards:	**EN ISO 80079-36:2016** **EN ISO 80079-37:2016** **EN 60529:1991/A1:2000/A2:2013** **EN 1710:2005+A1:2008/AC:2010**	

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

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

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

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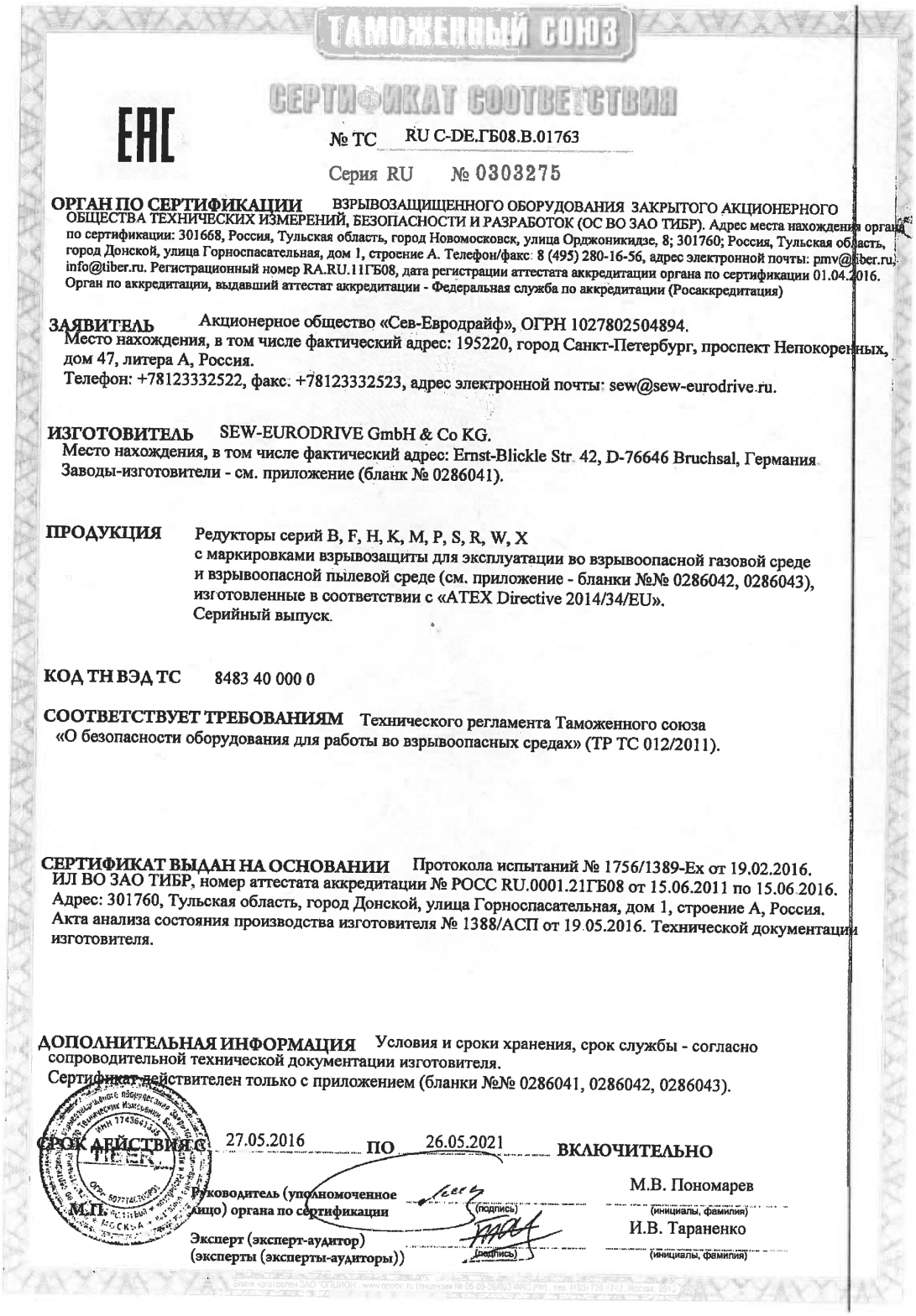
12 Ex EAC certificates



ТАМОЖЕННЫЙ СОЮЗ

СЕРТИФИКАТ СООТВЕТСТВИЯ

EAC

№ ТС RU C-DE.ГБ08.В.01763

Серия RU № 0303275

ОРГАН ПО СЕРТИФИКАЦИИ ВЗРЫВОЗАЩИЩЕННОГО ОБОРУДОВАНИЯ ЗАКРЫТОГО АКЦИОНЕРНОГО ОБЩЕСТВА ТЕХНИЧЕСКИХ ИЗМЕРЕНИЙ, БЕЗОПАСНОСТИ И РАЗРАБОТОК (ОС ВО ЗАО ТИБР). Адрес места нахождения органа по сертификации: 301668, Россия, Тульская область, город Новомосковск, улица Орджоникидзе, 8; 301760; Россия, Тульская область, город Донской, улица Горноспасательная, дом 1, строение А. Телефон/факс: 8 (495) 280-16-56, адрес электронной почты: pmv@tiber.ru, info@tiber.ru. Регистрационный номер RA.RU.11ГБ08, дата регистрации аттестата аккредитации органа по сертификации 01.04.2016. Орган по аккредитации, выдавший аттестат аккредитации - Федеральная служба по аккредитации (Росаккредитация)

ЗАЯВИТЕЛЬ Акционерное общество «Сев-Евродрайф», ОГРН 1027802504894.
Место нахождения, в том числе фактический адрес: 195220, город Санкт-Петербург, проспект Непокоренных, дом 47, литера А, Россия.
Телефон: +78123332522, факс: +78123332523, адрес электронной почты: sew@sew-eurodrive.ru.

ИЗГОТОВИТЕЛЬ SEW-EURODRIVE GmbH & Co KG.
Место нахождения, в том числе фактический адрес: Ernst-Blickle Str. 42, D-76646 Bruchsal, Германия.
Заводы-изготовители - см. приложение (бланк № 0286041).

ПРОДУКЦИЯ Редукторы серий B, F, H, K, M, P, S, R, W, X
с маркировками взрывозащиты для эксплуатации во взрывоопасной газовой среде и взрывоопасной пылевой среде (см. приложение - бланки №№ 0286042, 0286043), изготовленные в соответствии с «ATEX Directive 2014/34/EU».
Серийный выпуск.

КОД ТН ВЭД ТС 8483 40 000 0

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ Технического регламента Таможенного союза «О безопасности оборудования для работы во взрывоопасных средах» (ТР ТС 012/2011).

СЕРТИФИКАТ ВЫДАН НА ОСНОВАНИИ Протокола испытаний № 1756/1389-Ех от 19.02.2016. ИЛ ВО ЗАО ТИБР, номер аттестата аккредитации № РОСС RU.0001.21ГБ08 от 15.06.2011 по 15.06.2016. Адрес: 301760, Тульская область, город Донской, улица Горноспасательная, дом 1, строение А, Россия. Акта анализа состояния производства изготовителя № 1388/АСП от 19.05.2016. Технической документации изготовителя.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ Условия и сроки хранения, срок службы - согласно сопроводительной технической документации изготовителя.
Сертификат действителен только с приложением (бланки №№ 0286041, 0286042, 0286043).

СРОК ДЕЙСТВИЯ С 27.05.2016 **ПО** 26.05.2021 **ВКЛЮЧИТЕЛЬНО**

М.П.

Руководитель (уполномоченное лицо) органа по сертификации — (подпись) — М.В. Пономарев (инициалы, фамилия)

Эксперт (эксперт-аудитор) (эксперты (эксперты-аудиторы)) — (подпись) — И.В. Тараненко (инициалы, фамилия)

23491256/EN – 05/2018

ТАМОЖЕННЫЙ СОЮЗ

СЕРТИФИКАТ СООТВЕТСТВИЯ

EAC

№ ТС RU C-DE.ГБ08.В.01762

Серия RU № 0303274

ОРГАН ПО СЕРТИФИКАЦИИ ВЗРЫВОЗАЩИЩЕННОГО ОБОРУДОВАНИЯ ЗАКРЫТОГО АКЦИОНЕРНОГО ОБЩЕСТВА ТЕХНИЧЕСКИХ ИЗМЕРЕНИЙ, БЕЗОПАСНОСТИ И РАЗРАБОТОК (ОС ВО ЗАО ТИБР). Адрес места нахождения органа по сертификации: 301668, Россия, Тульская область, город Новомосковск, улица Орджоникидзе, 8; 301760; Россия, Тульская область, город Донской, улица Горноспасательная, дом 1, строение А. Телефон/факс: 8 (495) 280-16-56, адрес электронной почты: pmv@tiber.ru, info@tiber.ru. Регистрационный номер RA.RU.11ГБ08, дата регистрации аттестата аккредитации органа по сертификации 01.04.2016. Орган по аккредитации, выдавший аттестат аккредитации - Федеральная служба по аккредитации (Росаккредитация)

ЗАЯВИТЕЛЬ Акционерное общество «Сев-Евродрайф», ОГРН 1027802504894.
Место нахождения, в том числе фактический адрес: 195220, город Санкт-Петербург, проспект Непокоренных, дом 47, литера А, Россия.
Телефон: +78123332522, факс: +78123332523, адрес электронной почты: sew@sew-eurodrive.ru.

ИЗГОТОВИТЕЛЬ SEW-EURODRIVE GmbH & Co KG.
Место нахождения, в том числе фактический адрес: Ernst-Blickle Str. 42, D-76646 Bruchsal, Германия.
Заводы-изготовители - см. приложение (бланк № 0286038).

ПРОДУКЦИЯ Электродвигатели переменного тока серий D, ED, C
с маркировками взрывозащиты для эксплуатации во взрывоопасной газовой среде и взрывоопасной пылевой среде (см. приложение - бланки №№ 0286039, 0286040), изготовленные в соответствии с «ATEX Directive 2014/34/EU».
Серийный выпуск.

КОД ТН ВЭД ТС 8501 51 000 0, 8501 52 200 0, 8501 52 300 0, 8501 52 900 0

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ Технического регламента Таможенного союза «О безопасности оборудования для работы во взрывоопасных средах» (ТР ТС 012/2011).

СЕРТИФИКАТ ВЫДАН НА ОСНОВАНИИ Протокола испытаний № 1755/1388-Ех от 19.02.2016. ИЛ ВО ЗАО ТИБР, номер аттестата аккредитации № РОСС RU.0001.21ГБ08 от 15.06.2011 по 15.06.2016. Адрес: 301760, Тульская область, город Донской, улица Горноспасательная, дом 1, строение А, Россия. Акта анализа состояния производства изготовителя № 1388/АСП от 19.05.2016. Технической документации изготовителя.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ Условия и сроки хранения, срок службы - согласно сопроводительной технической документации изготовителя.
Сертификат действителен только с приложением (бланки №№ 0286038, 0286039, 0286040).

СРОК ДЕЙСТВИЯ С 27.05.2016 **ПО** 26.05.2021 **ВКЛЮЧИТЕЛЬНО**

М.П.

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13 Address list

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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 de Parc Industriel, 31 6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-IG@sew-eurodrive.be
Brazil			
Production Sales Service	São Paulo	SEW-EURODRIVE Brasil Ltda. Estrada Municipal José Rubim, 205 – Rodovia Santos Dumont Km 49 Indaiatuba – 13347-510 – SP	Tel. +55 19 3835-8000 sew@sew.com.br
Assembly Sales Service	Rio Claro	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
Bulgaria			
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Cameroon			
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Canada			
Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
Chile			
Assembly Sales Service	Santiago de Chile	SEW-EURODRIVE CHILE LTDA Las Encinas 1295 Parque Industrial Valle Grande LAMPA Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 2757 7000 Fax +56 2 2757 7001 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl
China			
Production Assembly Sales Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 78, 13th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 http://www.sew-eurodrive.cn info@sew-eurodrive.cn
Assembly Sales Service	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	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
	Drive Service Hotline / 24 Hour Service	+420 800 739 739 (800 SEW SEW)	Service Tel. +420 255 709 632 Fax +420 235 358 218 servis@sew-eurodrive.cz
Denmark			
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
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 Reti tee 4 75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 http://www.alas-kuul.ee veiko.soots@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
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
Assembly Sales Service	Bordeaux	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan – B. P. 182 33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09

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France			
	Lyon	SEW-USOCOME 75 rue Antoine Condorcet 38090 Vaulx-Milieu	Tel. +33 4 74 99 60 00 Fax +33 4 74 99 60 15
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin 77390 Verneuil l'Étang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
Gabon			
Sales	Libreville	SEW-EURODRIVE SARL 183, Rue 5.033.C, Lalala à droite P.O. Box 15682 Libreville	Tel. +241 03 28 81 55 +241 06 54 81 33 http://www.sew-eurodrive.cm sew@sew-eurodrive.cm
Germany			
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Production / Industrial Gears	Bruchsal	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str. 10 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Production	Graben	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-0 Fax +49 7251-2970
	Östringen	SEW-EURODRIVE GmbH & Co KG, Werk Östringen Franz-Gurk-Straße 2 76684 Östringen	Tel. +49 7253 9254-0 Fax +49 7253 9254-90 oestringen@sew-eurodrive.de
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 Ernst-Blickle-Straße 42 76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 scc-elektronik@sew-eurodrive.de
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	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 08393 Meerane (Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 dtc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 85551 Kirchheim (München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 dtc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 40764 Langenfeld (Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 dtc-west@sew-eurodrive.de
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
	Ludwigshafen	SEW-EURODRIVE GmbH & Co KG c/o BASF SE Gebäude W130 Raum 101 67056 Ludwigshafen	Tel. +49 7251 75 3759 Fax +49 7251 75 503759 dc-ludwigshafen@sew-eurodrive.de
	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

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Drive Service Hotline / 24 Hour Service			0 800 SEWHELP 0 800 7394357
Great Britain			
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	Drive Service Hotline / 24 Hour Service		Tel. 01924 896911
Greece			
Sales	Athens	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr
Hungary			
Sales Service	Budapest	SEW-EURODRIVE Kft. Csillaghegyí út 13. 1037 Budapest	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu
Iceland			
Sales	Reykjavik	Varma & Vélaverk ehf. Knarrarvogi 4 104 Reykjavík	Tel. +354 585 1070 Fax +354 585)1071 http://www.varmaverk.is vov@vov.is
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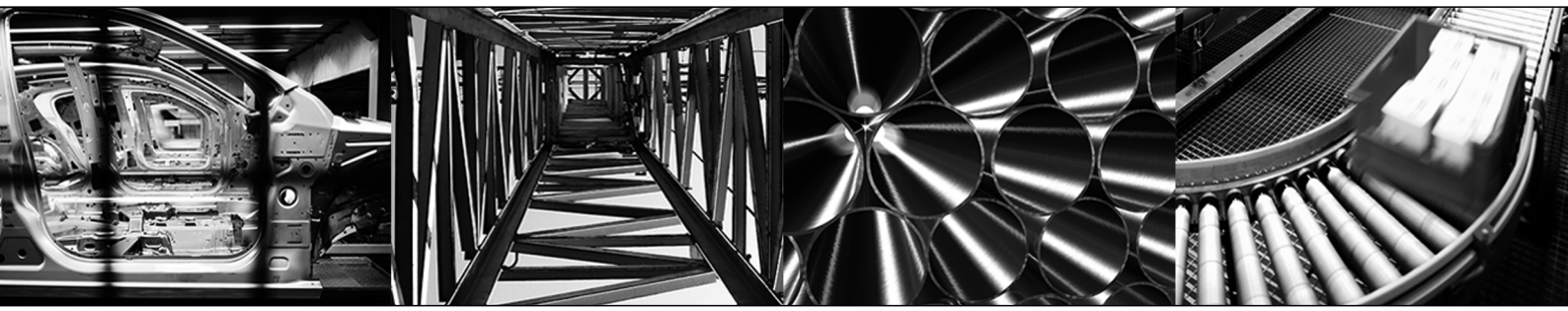

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