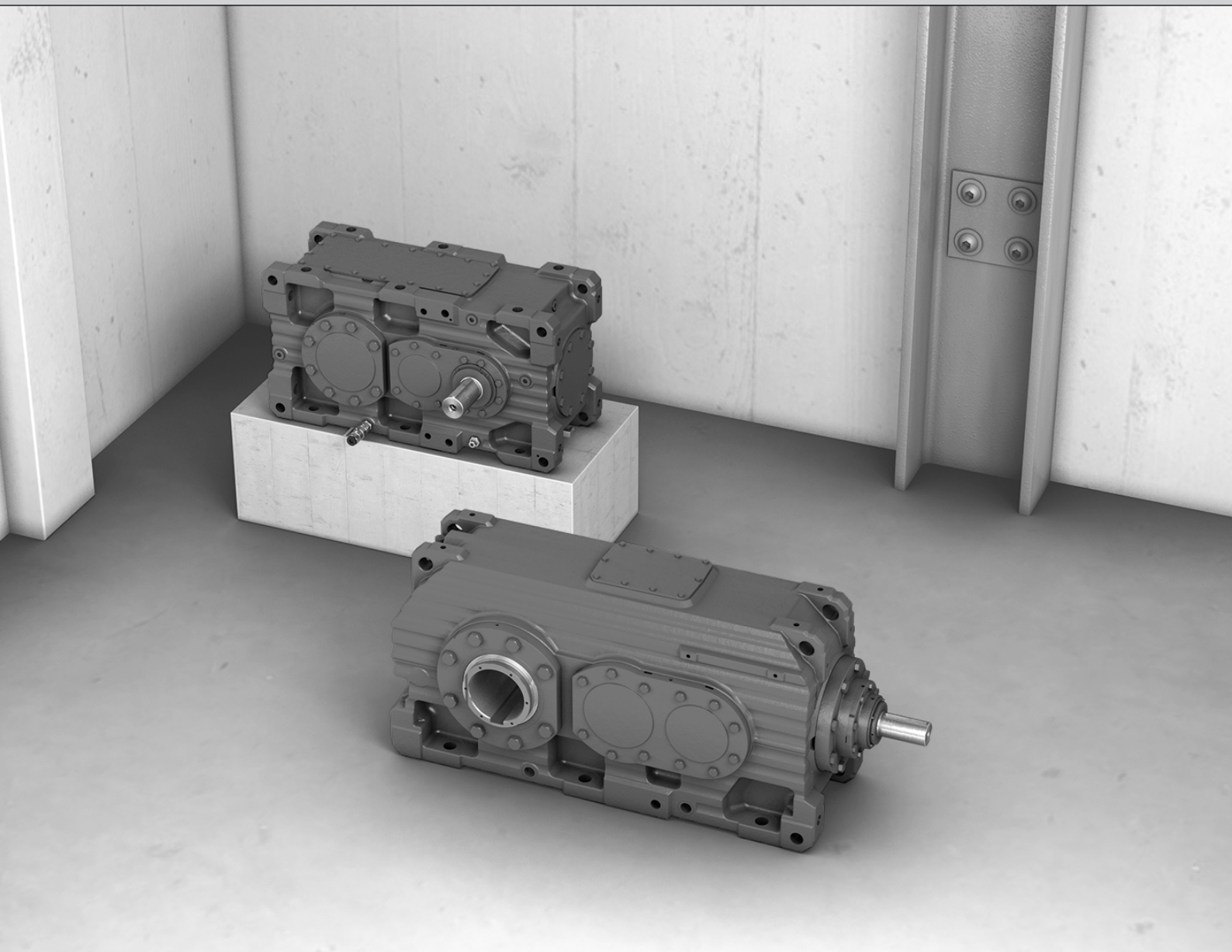




**SEW**  
**EURODRIVE**

# Assembly and Operating Instructions



Industrial Gear Units

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

Torque Classes from 6.8 kNm – 475 kNm





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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 grading and meaning of the signal words for safety notes.

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

#### 1.2.2 Structure of section-related safety notes

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

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



##### **SIGNAL WORD**







Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

### Meaning of the hazard symbols

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

Hazard symbol	Meaning
	General hazard
	Warning of dangerous electrical voltage
	Warning of 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 Exclusion of liability

Read the information in this documentation, otherwise safe operation is impossible. You must comply with the information contained in this documentation to achieve the specified product characteristics and performance features. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, SEW-EURODRIVE assumes no liability for defects.

## 1.5 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 General



#### ▲ WARNING

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

Severe or fatal injuries

- All work related to transportation, storage, installation, assembly, connection, startup, maintenance and repair may only be carried out by qualified personnel, in strict observance of:
  - The relevant detailed operating instructions
  - Warning and safety signs on the gear unit
  - 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
- Never install damaged products.
- Report any damage to the shipping company immediately.
- Removing covers without authorization, improper use or incorrect installation and operation may result in severe injuries to persons or damage to machinery.

Refer to the documentation for additional information.



## 2.3 Target group

Specialist for mechanical work	<p>Any mechanical work may only be performed by adequately qualified personnel. Qualified personnel 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:</p> <ul style="list-style-type: none"> <li>• Qualification in the field of mechanics according to applicable national regulation.</li> <li>• They are familiar with this documentation</li> </ul>
Specialist for electrotechnical work	<p>Any electronic work may only be performed by adequately skilled persons (electrically). Qualified electricians in the context of this documentation are persons familiar with electrical installation, startup, troubleshooting and servicing of the product who possess the following qualifications:</p> <ul style="list-style-type: none"> <li>• Qualification in the field of electrical engineering according to applicable national regulation.</li> <li>• They are familiar with this documentation</li> </ul>
Instructed persons	<p>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.</p> <p>All qualified personnel must wear appropriate protective clothing.</p>

## 2.4 Designated use

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

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

In compliance with the EC Machinery Directive 2006/42/EC, the industrial gear units are components for installation in machinery and systems. In the area of application of the EC directive, you must not start up the machinery in the designated fashion until you have established that the finished product complies with Machinery Directive 2006/42/EC.

## 2.5 Other applicable documentation

Note also the following documentation:

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

## 2.6 Safety symbols on the gear unit



### ▲ CAUTION







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

Risk of injury due to illegible symbols.

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

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

Safety symbols	Meaning
	Indicates the <b>oil filling location</b> . Also serves as proper venting during the oil change.
	Indicates the <b>oil drain</b> .
	Indicates the position of the <b>breather</b> . Serves to avoid mistaking the oil measuring position for the venting position.
	Indicates the positions for <b>relubrication</b> and makes it easier to find the locations to be lubricated. Helps avoid bearing damage.
	Indicates the <b>water supply</b> and serves to locate the connection option.
	Indicates the <b>water return</b> and serves to locate the connection option.
	Indicates the <b>oil supply</b> and serves to locate the connection option.
	Indicates the <b>oil return</b> and serves to locate the connection option.
	Indicates the position of the <b>temperature sensor/temperature switch</b> .
	Indicates the <b>grease drain plug</b> and serves to locate the grease drain. Helps avoid bearing damage.

Safety symbols	Meaning
	Helps avoid errors caused by lack of understanding. Read the information in the operating instructions.
	For pivoted mounting positions, this symbol on the information sign indicates the mounting position of the gear unit for <b>checking the oil</b> .
	Indicates the <b>bleeder screw</b> .
	Caution: Risk of burns caused by hot surface.
	Caution: Removing the dipstick during operation may result in damage to the gear unit.
	Caution: Risk of burns due to hot gear oil.

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

## Meaning

**The brake is not set at the factory.**

**VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE**

**SEW  
EURODRIVE**

18855199

(DE)

**Die Bremse ist ab Werk nicht eingestellt.**

Mögliche Sachschäden!

- Bremse vor der Inbetriebnahme gemäß Betriebsanleitung einstellen

(F)

**Le frein n'est pas réglé d'usine**

Risque de dommages matériels !

- Avant la mise en service, régler le frein conformément aux instructions de la notice d'exploitation.

(NL)

**De rem is niet af fabriek ingesteld.**

Mogelijke materiële schade!

- Rem voor de inbedrijfstelling conform technische handleiding instellen.

(EN)

**The brake has not been set at the factory**

Potential damage to property!

- Prior to startup, set the brake according to the operating instructions.

(ES)

**El freno no viene ajustado de fábrica.**

¡Posibles daños materiales!

- Antes de la puesta en marcha, ajustar el freno según las instrucciones de funcionamiento.

(PL)

**Hamulec nie jest ustawiony fabrycznie.**



Możliwe szkody materialne!

- Przed uruchomieniem należy ustawić hamulec zgodnie z wytycznymi z instrukcji obsługi.

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## Meaning

## The coupling is supplied without grease.

VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE			
<div></div> <div></div> <div>18977405</div>	<div>(DE)</div> <div><b>Kupplung wird ohne Fett geliefert.</b></div> <div>Mögliche Sachschäden!</div> <div><ul style="list-style-type: none"><li>• Vor der Inbetriebnahme Kupplung mit Fett befüllen.</li></ul></div>	<div>(EN)</div> <div><b>Coupling delivered without grease</b></div> <div>Possible damage to property.</div> <div><ul style="list-style-type: none"><li>• Fill coupling with grease prior to startup.</li></ul></div>	
	<div>(F)</div> <div><b>L'accouplement est livré sans graisse.</b></div> <div>Risque de dommages matériels !</div> <div><ul style="list-style-type: none"><li>• Avant la mise en service, remplir l'accouplement de graisse.</li></ul></div>	<div>(ES)</div> <div><b>El acoplamiento se suministra sin grasa.</b></div> <div>¡Posibles daños materiales!</div> <div><ul style="list-style-type: none"><li>• Llenar el acoplamiento con grasa antes de la puesta en marcha.</li></ul></div>	
	<div>(NL)</div> <div><b>Koppeling wordt zonder vet geleverd.</b></div> <div>Mogelijke materiële schade!</div> <div><ul style="list-style-type: none"><li>• Koppeling vóór de inbedrijfstelling met vet vullen.</li></ul></div>	<div>(PL)</div> <div><b>Sprzęgło jest dostarczane bez smaru.</b></div> <div>Możliwe szkody materialne!</div> <div><ul style="list-style-type: none"><li>• Przed uruchomieniem należy wypełnić sprzęgło smarem.</li></ul></div>	



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## The coupling is supplied without oil.

VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE			
  18977413	<p><b>(DE)</b></p> <p><b>Kupplung wird ohne Öl geliefert.</b></p> <p>Mögliche Sachschäden!</p> <ul style="list-style-type: none"><li>• Vor der Inbetriebnahme Kupplung mit Öl befüllen.</li></ul>	<p><b>(EN)</b></p> <p><b>Coupling delivered without oil</b></p> <p>Possible damage to property.</p> <ul style="list-style-type: none"><li>• Fill coupling with oil prior to startup.</li></ul>	
	<p><b>(F)</b></p> <p><b>L'accouplement est livré sans huile.</b></p> <p>Risque de dommages matériels !</p> <ul style="list-style-type: none"><li>• Avant la mise en service, remplir l'accouplement d'huile.</li></ul>	<p><b>(ES)</b></p> <p><b>El acoplamiento se suministra sin aceite.</b></p> <p>¡Posibles daños materiales!</p> <ul style="list-style-type: none"><li>• Llenar el acoplamiento con aceite antes de la puesta en marcha.</li></ul>	
	<p><b>(NL)</b></p> <p><b>Koppeling wordt zonder olie geleverd.</b></p> <p>Mogelijke materiële schade!</p> <ul style="list-style-type: none"><li>• Koppeling vóór de inbedrijfstelling met olie vullen.</li></ul>	<p><b>(PL)</b></p> <p><b>Sprzęgło jest dostarczane bez oleju.</b></p> <p>Możliwe szkody materialne!</p> <ul style="list-style-type: none"><li>• Przed uruchomieniem należy wypełnić sprzęgło olejem.</li></ul>	




















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Meaning							
<b>The gear unit is protected against corrosion with VCI.</b>							
<div style="border: 1px solid black; padding: 10px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 10px;"> <span>VORSICHT</span> <span>NOTICE</span> <span>ATTENTION</span> <span>PRECAUCIÓN</span> <span>VOORZICHTIG</span> <span>OSTROŻNIE</span> </div> <div style="display: flex;"> <div style="flex: 1; padding-right: 10px;">  <p>18977421</p> </div> <div style="flex: 2;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><b>(DE)</b> Getriebe ist mit VCI rostgeschützt. Nicht öffnen!</p> <p>Mögliche Sachschäden!</p> <ul style="list-style-type: none"> <li>• Vor der Inbetriebnahme Vorarbeiten gemäß Betriebsanleitung durchführen.</li> <li>• Keine offene Flamme!</li> </ul> </td><td style="width: 50%; vertical-align: top;"> <p><b>(EN)</b> Gear unit with VCI corrosion protection. Do not open!</p> <p>Potential damage to property!</p> <ul style="list-style-type: none"> <li>• Prior to startup, perform preliminary work according to operating instructions</li> <li>• No open flames!</li> </ul> </td></tr> <tr> <td style="vertical-align: top;"> <p><b>(F)</b> Réducteur protégé contre la corrosion avec VCI. Ne pas ouvrir</p> <p>Risque de dommages matériels !</p> <ul style="list-style-type: none"> <li>• Avant la mise en service, réaliser les travaux préliminaires indiqués dans la notice d'exploitation.</li> <li>• Pas de flammes ouvertes !</li> </ul> </td><td style="vertical-align: top;"> <p><b>(ES)</b> Reductor está protegido con VCI contra la corrosión. ¡No abrir!</p> <p>¡Posibles daños materiales!</p> <ul style="list-style-type: none"> <li>• Antes de la puesta en marcha, efectuar los trabajos preparatorios según las instrucciones de funcionamiento.</li> <li>• No debe haber fuego abierto.</li> </ul> </td></tr> <tr> <td style="vertical-align: top;"> <p><b>(NL)</b> Tandwielkast is met VCI tegen corrosie beschermd. Niet openen!</p> <p>Mogelijke materiële schade!</p> <ul style="list-style-type: none"> <li>• Vóór de inbedrijfstelling voorbereidingen conform technische handleiding uitvoeren.</li> <li>• Geen open vuur!</li> </ul> </td><td style="vertical-align: top;"> <p><b>(PL)</b> Przekładnia zabezpieczona jest przed korozją za pomocą środka VCI. Nie otwierać!</p> <p>Możliwe szkody materialne!</p> <ul style="list-style-type: none"> <li>• Przed uruchomieniem należy przeprowadzić czynności przygotowawcze zgodnie z informacjami zawartymi w instrukcji obsługi!</li> <li>• Unikać otwartych płomieni!</li> </ul> </td></tr> </table> </div> </div> </div>		<p><b>(DE)</b> Getriebe ist mit VCI rostgeschützt. Nicht öffnen!</p> <p>Mögliche Sachschäden!</p> <ul style="list-style-type: none"> <li>• Vor der Inbetriebnahme Vorarbeiten gemäß Betriebsanleitung durchführen.</li> <li>• Keine offene Flamme!</li> </ul>	<p><b>(EN)</b> Gear unit with VCI corrosion protection. Do not open!</p> <p>Potential damage to property!</p> <ul style="list-style-type: none"> <li>• Prior to startup, perform preliminary work according to operating instructions</li> <li>• No open flames!</li> </ul>	<p><b>(F)</b> Réducteur protégé contre la corrosion avec VCI. Ne pas ouvrir</p> <p>Risque de dommages matériels !</p> <ul style="list-style-type: none"> <li>• Avant la mise en service, réaliser les travaux préliminaires indiqués dans la notice d'exploitation.</li> <li>• Pas de flammes ouvertes !</li> </ul>	<p><b>(ES)</b> Reductor está protegido con VCI contra la corrosión. ¡No abrir!</p> <p>¡Posibles daños materiales!</p> <ul style="list-style-type: none"> <li>• Antes de la puesta en marcha, efectuar los trabajos preparatorios según las instrucciones de funcionamiento.</li> <li>• No debe haber fuego abierto.</li> </ul>	<p><b>(NL)</b> Tandwielkast is met VCI tegen corrosie beschermd. Niet openen!</p> <p>Mogelijke materiële schade!</p> <ul style="list-style-type: none"> <li>• Vóór de inbedrijfstelling voorbereidingen conform technische handleiding uitvoeren.</li> <li>• Geen open vuur!</li> </ul>	<p><b>(PL)</b> Przekładnia zabezpieczona jest przed korozją za pomocą środka VCI. Nie otwierać!</p> <p>Możliwe szkody materialne!</p> <ul style="list-style-type: none"> <li>• Przed uruchomieniem należy przeprowadzić czynności przygotowawcze zgodnie z informacjami zawartymi w instrukcji obsługi!</li> <li>• Unikać otwartych płomieni!</li> </ul>
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## 2.7 Safety symbols on the dimension sheet

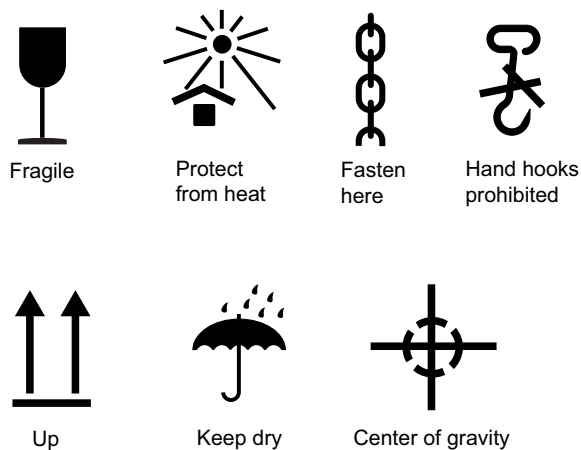
The safety symbols on the dimension sheet must be observed. They have the following meaning:

Safety symbol	Meaning
	Indicates the position of the <b>oil dipstick</b> .
	Indicates the position of the <b>oil level glass</b> .
	Indicates the position of the <b>oil sight glass</b> .
	Indicates the <b>oil filling location</b> .
	Indicates the <b>oil drain</b> .
	Indicates the position of the <b>breather</b> .
	Indicates the position of the <b>relubrication points</b> .
	Indicates the position of the <b>relubrication points</b> .
	Indicates the position of the <b>grease outlet</b> .
	Indicates the <b>water inflow</b> with connection dimensions.
	Indicates the <b>water return</b> with connection dimensions.
	Indicates the <b>oil inflow</b> .
	Indicates the <b>oil return</b> .
	Indicates the position of the <b>magnetic screw plug</b> .
	Indicates the position of the <b>inspection cover</b> .
	Indicates the position of the attachment points for <b>transport</b> .
	Indicates the position of the <b>torque arm</b> .
	Indicates the position of the operator's <b>vibration sensor</b> with connection dimensions.
	Indicates the position of the <b>air outlet screw</b> .

Safety symbol	Meaning
	Indicates the position of the <b>oil heater</b> .
	Indicates the <b>oil level plug</b> .

## 2.8 Symbols on the packaging

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



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## 2.9 Transport

### 2.9.1 General information



#### ▲ WARNING

Suspended loads can fall.

Severe or fatal injuries.

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



#### ▲ WARNING

Lifted loads may fall over.

Severe or fatal injuries.

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



#### ▲ CAUTION

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

Potential risk of crushing due to falling parts.

- Secure the mount-on components.



#### ▲ CAUTION

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

Minor injuries.

- Check the gear unit and mount-on components for leaking lubricant.
- The seals must not come in contact with cleaning agent as this may damage the seals.
- Protect the breather against damage.
- Make sure that there is not too much oil in the gear unit. If the oil level is too high and the temperature rises, lubricant may escape from the breather.



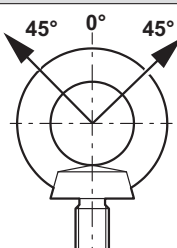
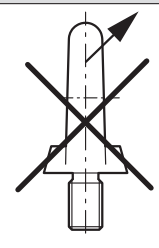
## NOTICE

Improper transport can damage the gear unit.

Possible damage to property.

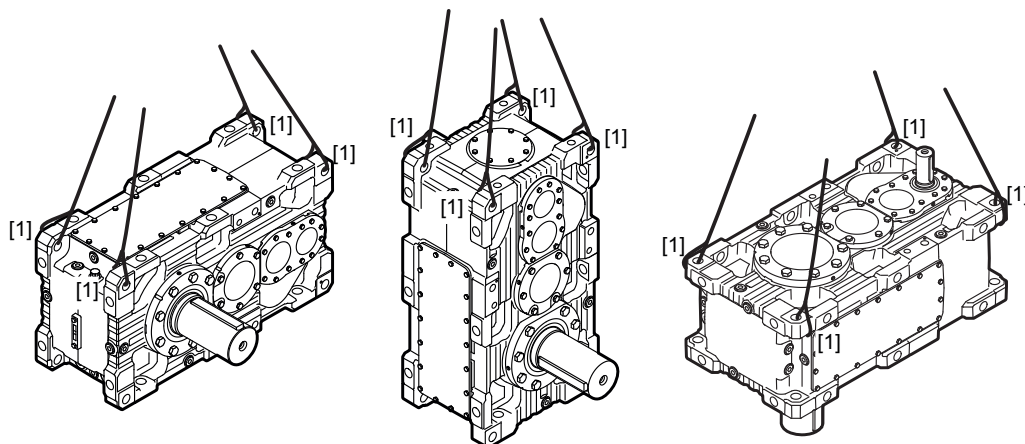
- Note the following information.

- 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 eyebolt 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
	

### 2.9.2 Universal housing/HU

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

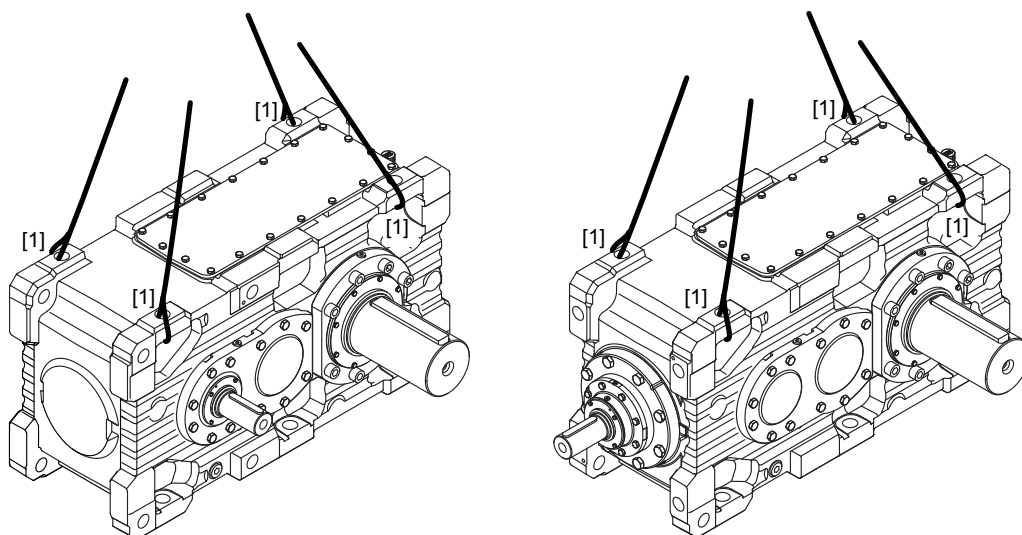


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### 2.9.3 Horizontal housing /HH

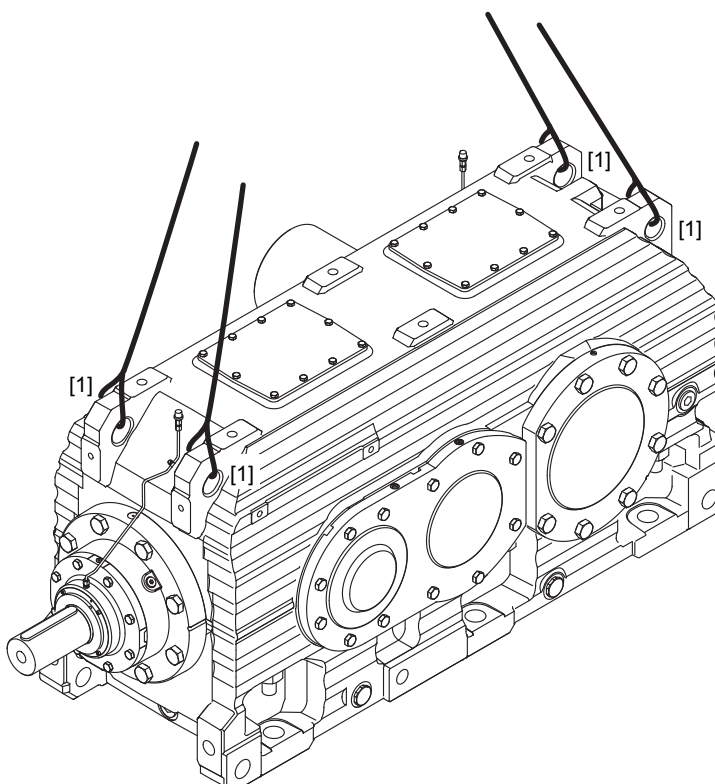
The following figure illustrates examples on how to transport the gear unit.

#### Sizes X100 – 210



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#### Sizes X220 – 320



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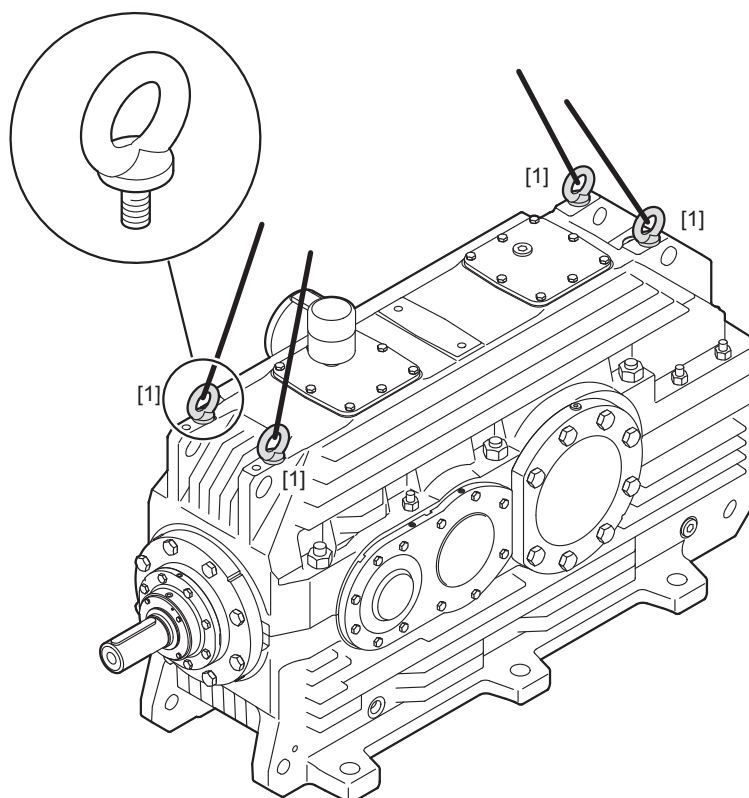
### 2.9.4 Thermal housing/HT

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

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

Eyebolts DIN 580/DIN 582	
Size	Thread
X220 – 230	4 x M24
X240 – 250	4 x M30
X260 – 280	4 x M30
X290 – 300	4 x M36
X310 – 320	4 x M36

The following figure illustrates how to transport the gear unit.



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### 2.9.5 Agitator housing /HA

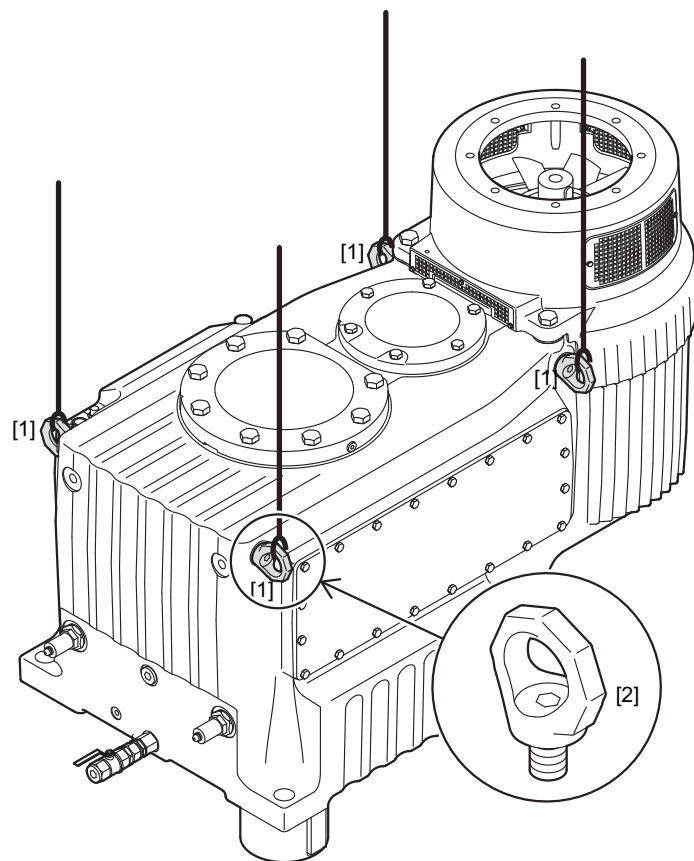
The user is responsible for transport. For an example of the internal SEW-EURODRIVE plant specifications, refer to the following table. The values in the table are only valid for transport with 4 attachment points [1] and without mount-on components, such as external cooling systems.

Use star-shaped eyebolts [2] for the 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
<b>X140 – 150</b>	4 x M16
<b>X160 – 170</b>	4 x M20
<b>X180 – 190</b>	4 x M24
<b>X200 – 210</b>	4 x M24

The following figure illustrates how to transport the gear unit.

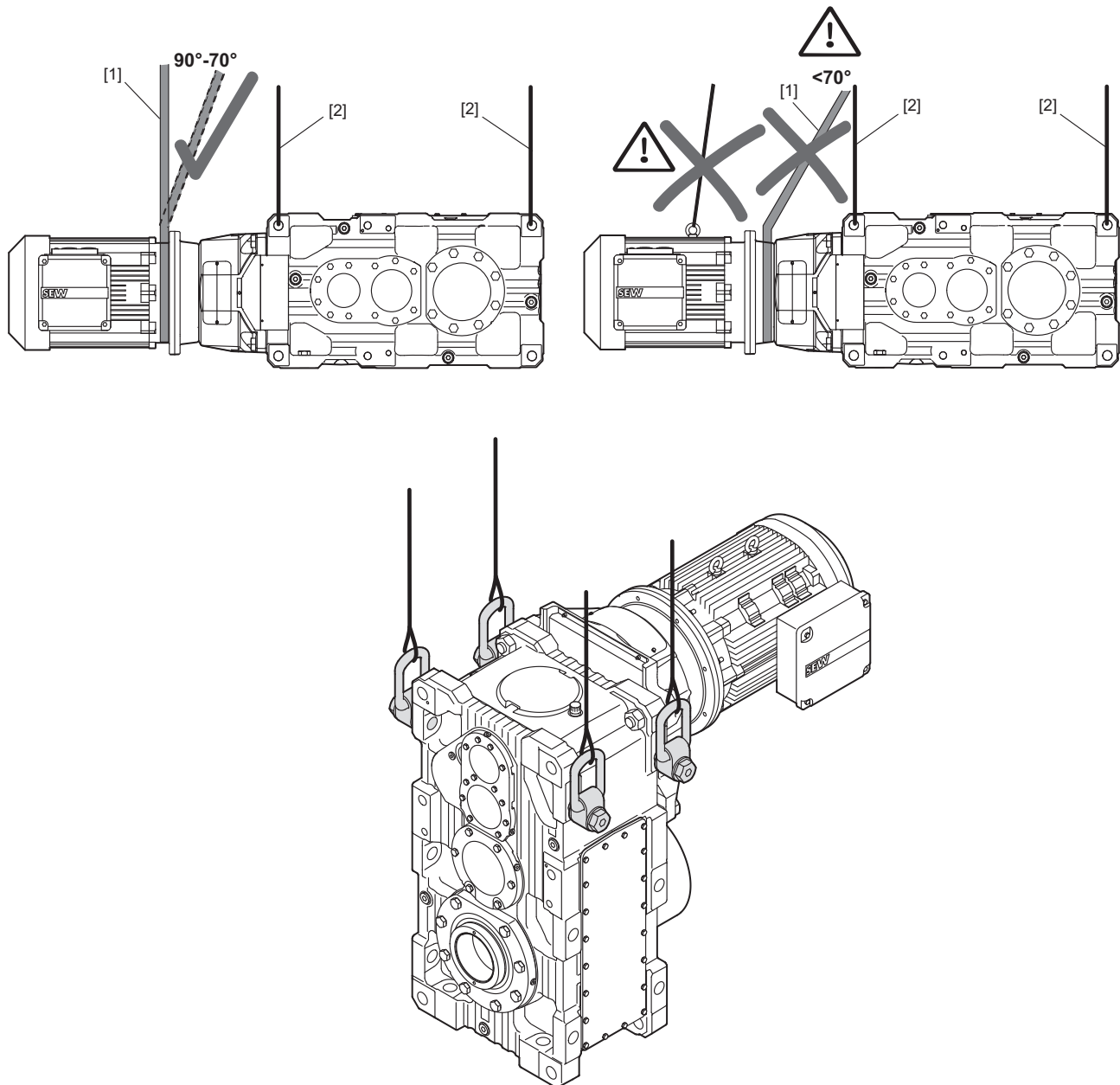


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### 2.9.6 Gear units with motor adapter

#### Universal and horizontal housing /HU/HH

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



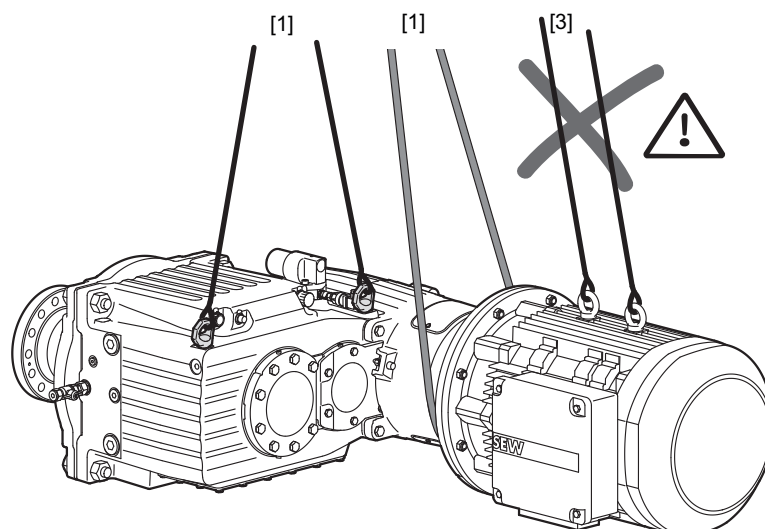
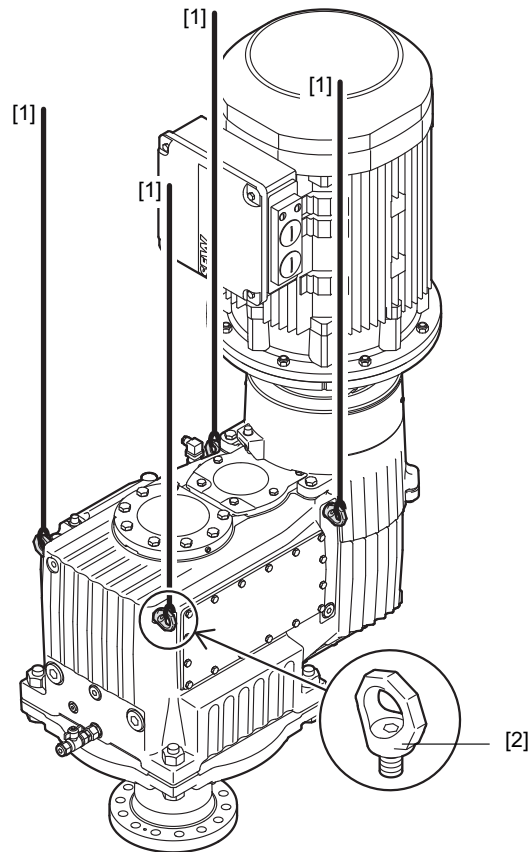
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## Agitator housing/HA

Use only the prescribed suspension points [1] and star-shaped eyebolts [2] to transport the gear unit. Transport with eyebolts 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.

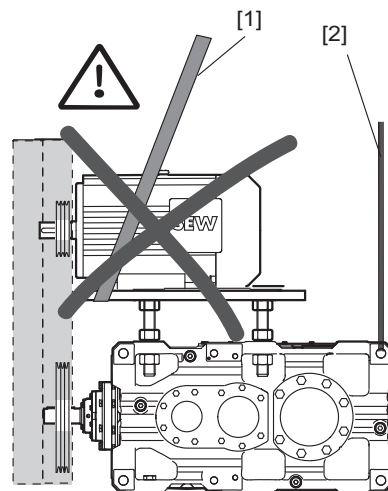
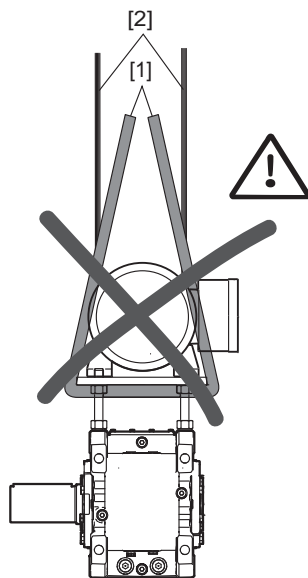
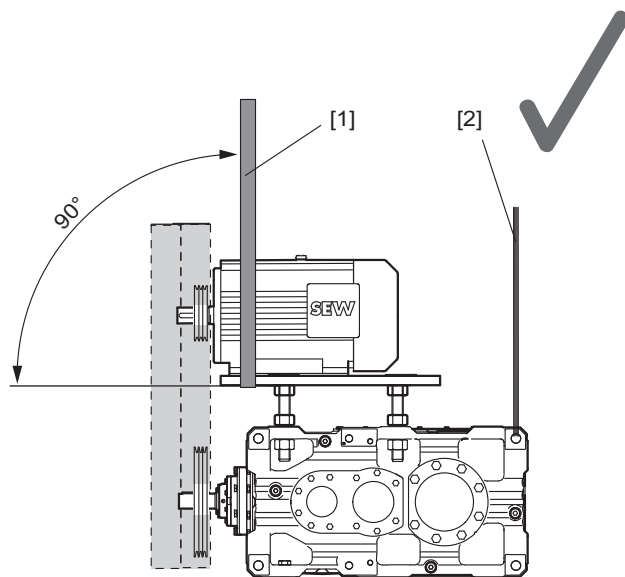
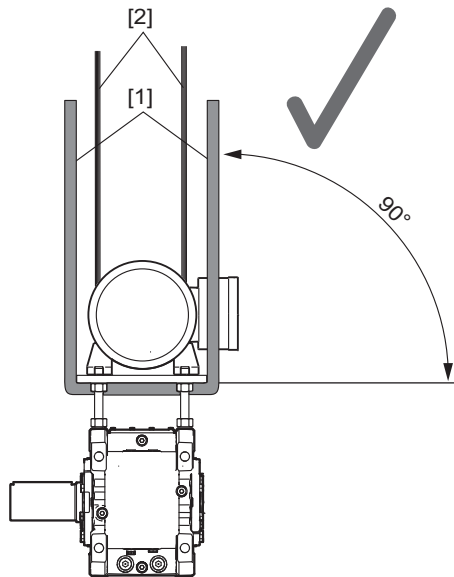


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### 2.9.7 Gear units with V-belt drive

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

The following figures show a transportation example.



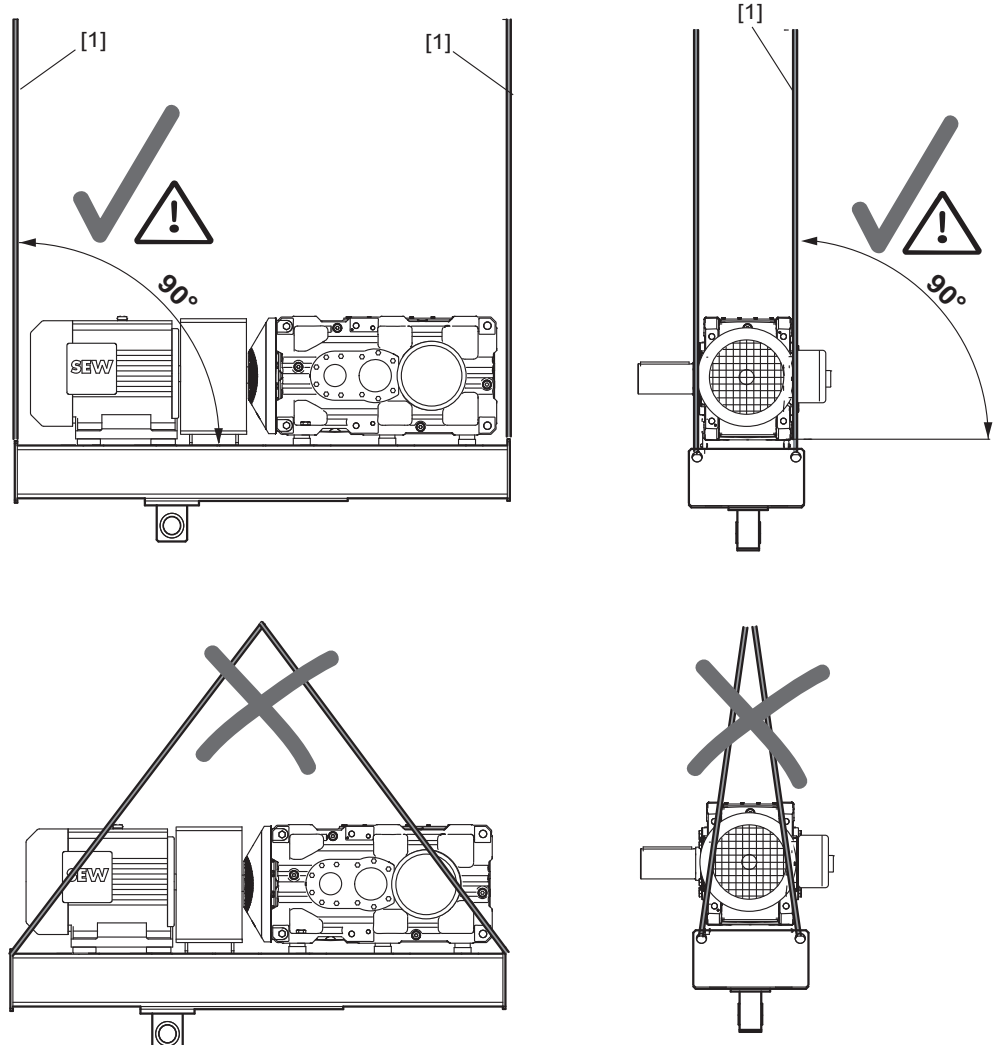
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### 2.9.8 Gear units on swing base/base frame

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

The following figures show a transportation example.



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## **2.10 Storage and transport conditions**

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

### **2.10.1 Internal conservation**

#### **Standard corrosion protection**

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

#### **Long-term corrosion protection**

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

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

### **2.10.2 Exterior corrosion protection**

The following measures are taken for exterior corrosion protection:

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

### **2.10.3 Packaging**

#### **Standard packaging**

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

#### 2.10.4 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.

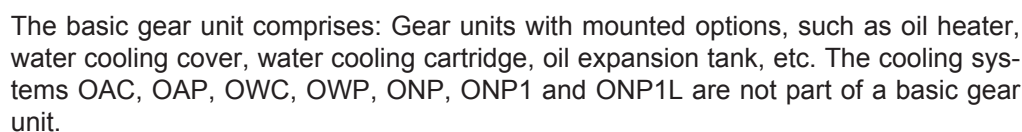
Corrosion protection + packaging	Storage location	Storage duration
Standard corrosion protection + Standard packaging	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < $\vartheta$ < 60 °C, < 50% relative humidity).  No sudden temperature fluctuations. Controlled ventilation 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 < $\vartheta$ < 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.


## INFORMATION



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

<b>SEW-EURODRIVE</b>		76646 Bruchsal/Germany	
Type	X3FS190/B		
No.	01.1234567812.0001.06		
	min.	nom.	i
PK1 kW	36	180	Fs -39,06
MK2 Nm	43300	43300	PM kW 0
n1 rpm	296	1480	T <sub>a</sub> °C -25...40
n2 rpm	7,6	37,9	1743 895 0.11
IM	M4-M1/9°		
Made in Germany			
Greasing points	2	Fan	0
Mass kg	1340	Year	2016
	CLP HC460 - Synthetic Oil ~ 90 L		

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Type		Type designation
No.		Serial number
P <sub>K1</sub>	kW	Operating power on the input shaft (HSS)
M <sub>K2</sub>	Nm	Gear unit output torque
n <sub>1</sub>	rpm	Input speed (HSS)
n <sub>2</sub>	rpm	Output speed (LSS)
Min.		Minimum operating point
Norm.		Normal operating point
max.		Maximum operating point
i		Exact gear unit ratio
F <sub>s</sub>		Service factor
P <sub>M</sub>	kW	Nominal motor power
T <sub>a</sub>	°C	Deviation from standard temperature range (−20 °C to +40 °C)
Mass	kg	Weight of the gear unit
Greasing points		Number of regreasing points
Fan		Number of installed fans
		Oil grade and viscosity class/oil quantity
Year		Year of manufacture
IM		Mounting position and mounting surface

## 3.2 Type designations

### 3.2.1 Gear units

The following example shows the structure of the type designation:

<b>X3KS250 /HU /B</b>	
X	Industrial gear unit series
3	Number of gear unit stages <ul style="list-style-type: none"> <li>• 2 = 2 stages</li> <li>• 3 = 3 stages</li> <li>• 4 = 4 stages</li> </ul>
K	Gear unit variant <ul style="list-style-type: none"> <li>• F = Helical gear unit</li> <li>• K = Bevel-helical gear unit</li> <li>• T = Bevel-helical gear unit</li> </ul>
S	Type of output shaft <ul style="list-style-type: none"> <li>• S = Solid shaft with key</li> <li>• R = Smooth solid shaft</li> <li>• L = Splined solid shaft</li> <li>• A = Hollow shaft with keyway</li> <li>• H = Hollow shaft with shrink disk</li> <li>• V = Splined hollow shaft</li> </ul>
250	Gear unit sizes <ul style="list-style-type: none"> <li>• 100 – 320</li> </ul>
HU	Housing design <ul style="list-style-type: none"> <li>• HU = Universal housing</li> <li>• HH = Horizontal housing</li> <li>• HA = Agitator housing</li> <li>• HT = Thermal housing</li> </ul>
B	Gear unit mounting <ul style="list-style-type: none"> <li>• /B = Foot</li> <li>• /T = Torque arm</li> <li>• /F = Flange</li> </ul>

### 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 <ul style="list-style-type: none"> <li>W = Water</li> <li>A = Air</li> <li>N = Motor pump</li> </ul>
C	Type <ul style="list-style-type: none"> <li>C = Circulation cooling</li> <li>P = Pressure lubrication</li> </ul>
020	Size <ul style="list-style-type: none"> <li>005 – 070</li> </ul>
	Application
-0	Mounting positions <ul style="list-style-type: none"> <li>0 = M1/M2/M3/M4</li> <li>1 = M5/M6</li> </ul>
0	Option <ul style="list-style-type: none"> <li>0 = 50 Hz</li> <li>1 = 60 Hz</li> <li>2 = 50 Hz / 60 Hz</li> <li>9 = Special design</li> </ul>
M	Mounting type <ul style="list-style-type: none"> <li>M = Mounted to the gear unit</li> <li>S = For separate installation</li> </ul>

### 3.2.3 Flange couplings

The following example shows the structure of the type designation.

<b>FC530/175SM</b>	
FC	Rigid flange coupling
530	Outer diameter of the flange
175	Bore diameter
S	Type of shaft-hub connection: <ul style="list-style-type: none"> <li>• S = Cylindrical interference fit</li> <li>• K = Keyed connection</li> <li>• T = Conical interference fit</li> </ul>
M	Type of centering: <ul style="list-style-type: none"> <li>• M = External centering</li> <li>• F = Internal centering</li> </ul>

## 3.2.4 Abbreviations for optional accessories

The table shows the abbreviations used and what they mean.

Abbreviation	Meaning
<b>BF</b>	Base frame
<b>BS</b>	Backstop
<b>APL</b>	Torque-limited backstop
<b>CCV</b>	Water cooling cover
<b>CCT</b>	Water cooling cartridge
<b>F</b>	Mounting flange
<b>FC</b>	Flange coupling
<b>FAN</b>	Fan
<b>FAN-ADV</b>	Fan, Advanced design
<b>ET</b>	Oil expansion tank
<b>HH</b>	Horizontal housing
<b>HU</b>	Universal housing
<b>HA</b>	Agitator housing
<b>HT</b>	Thermal housing
<b>HSST</b>	Through-going input shaft
<b>LSST</b>	Through-going output shaft
<b>AI</b>	Motor adapter
<b>SB</b>	Swing base
<b>SEP</b>	Shaft end pump
<b>T</b>	Torque arm
<b>OAC</b>	Circulation cooling oil-air cooler with motor pump
<b>OWC</b>	Circulation cooling oil-water cooler with motor pump
<b>OAP</b>	Circulation cooling oil-air cooler with pressure lubrication and motor pump
<b>OWP</b>	Circulation cooling oil-water cooler with pressure lubrication and motor pump
<b>ONP</b>	Pressure lubrication and motor pump
<b>ONP1</b>	Pressure lubrication and motor pump
<b>ONP1L</b>	Pressure lubrication and motor pump
<b>OD</b>	Oil dipstick
<b>DV</b>	Oil drain valve
<b>OLG</b>	Oil level glass
<b>OH</b>	Oil heater
<b>VBD</b>	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

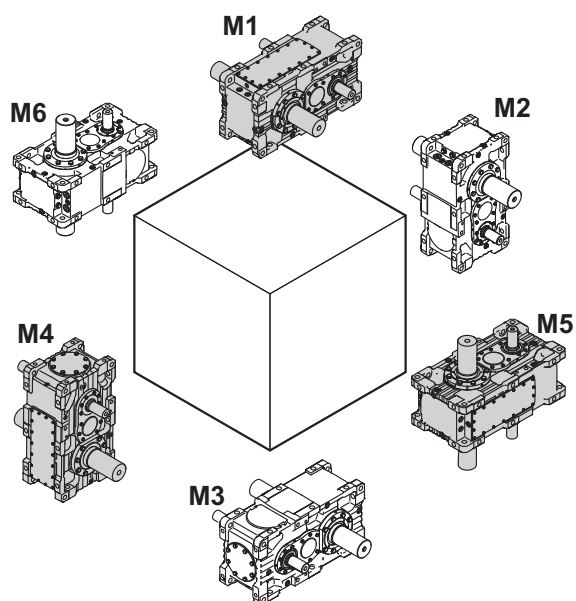
#### 3.3.1 Definition

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.

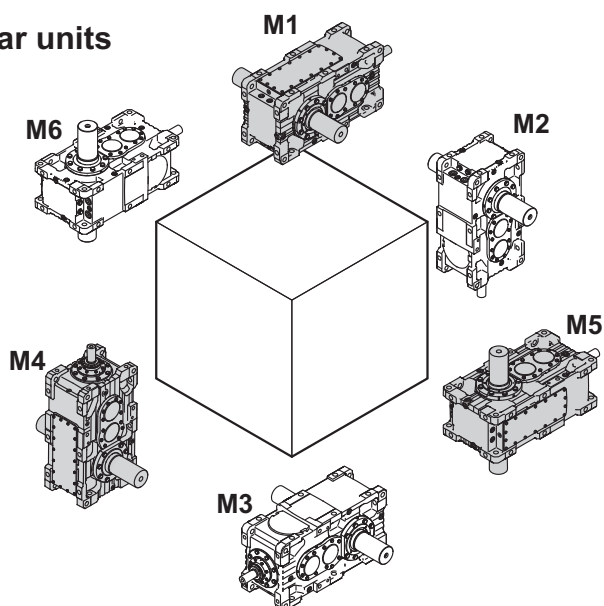
	Standard mounting position (marked in gray in the figure)	Alternative mounting position
Horizontal gear unit	M1	M3
Vertical gear unit	M5	M6
Upright gear unit	M4	M2

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

#### X.F.. helical gear units

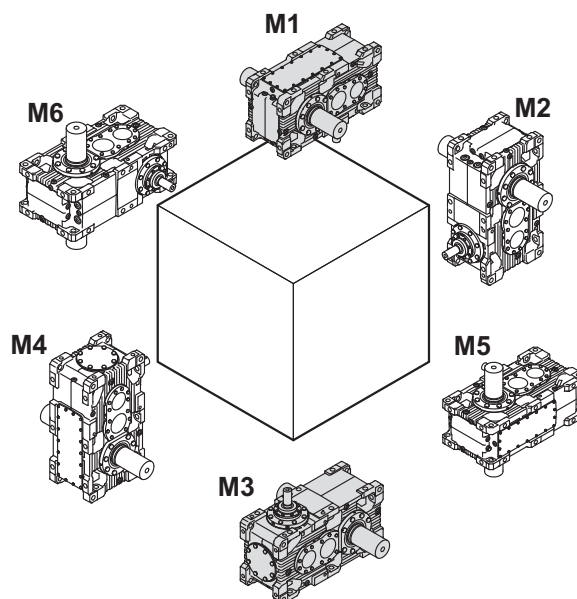


#### X.K.. bevel-helical gear units

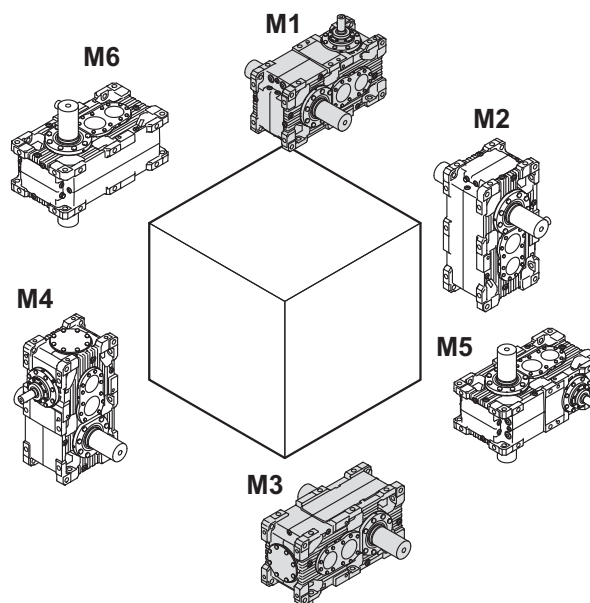


### Bevel-helical gear unit X.T..

Valid for sizes X100 – X210

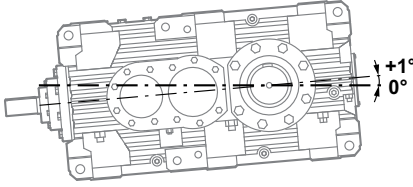
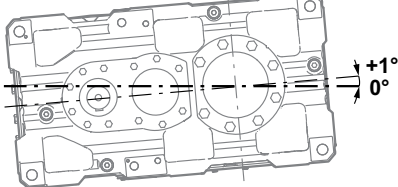
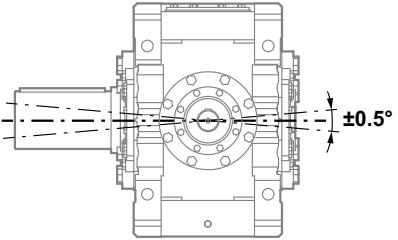


Valid for sizes X220 – X320



### 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  $\pm 1^\circ$  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.

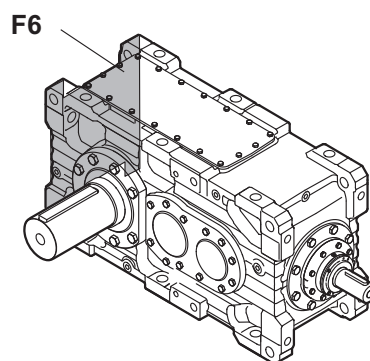
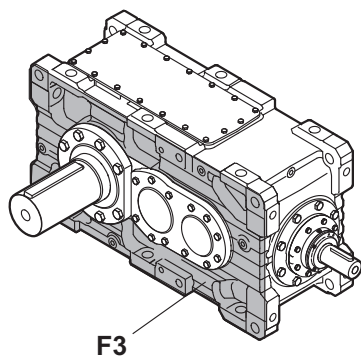
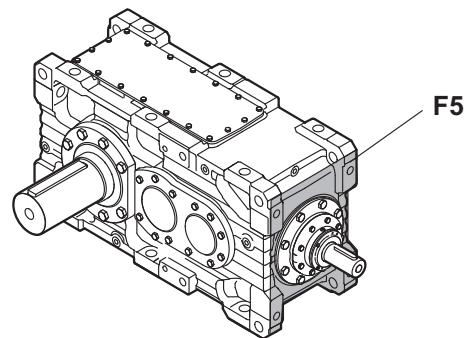
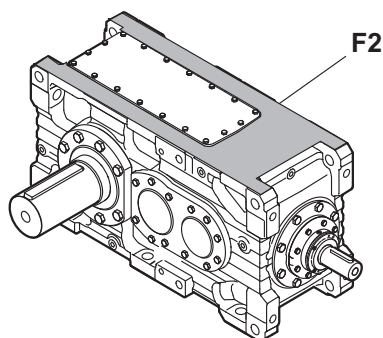
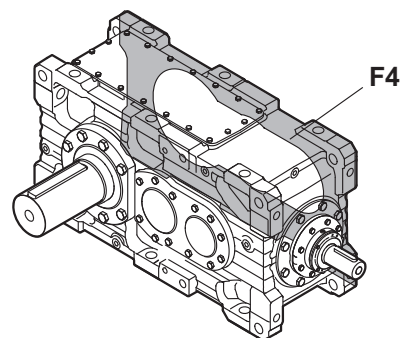
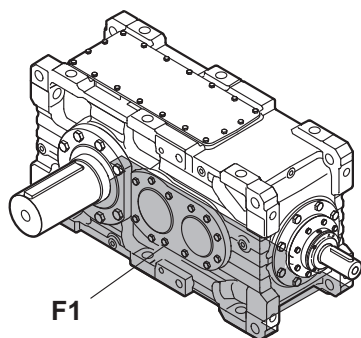
### 3.4 Mounting surfaces

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...F6).

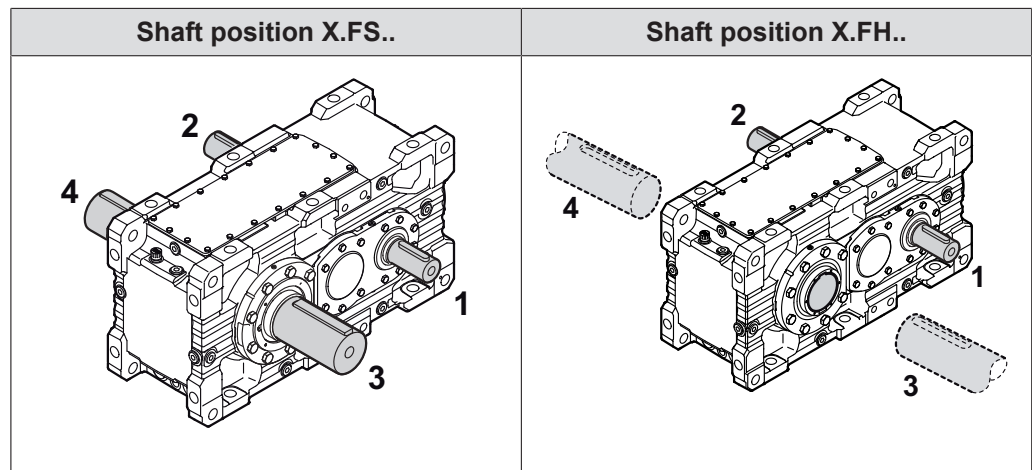


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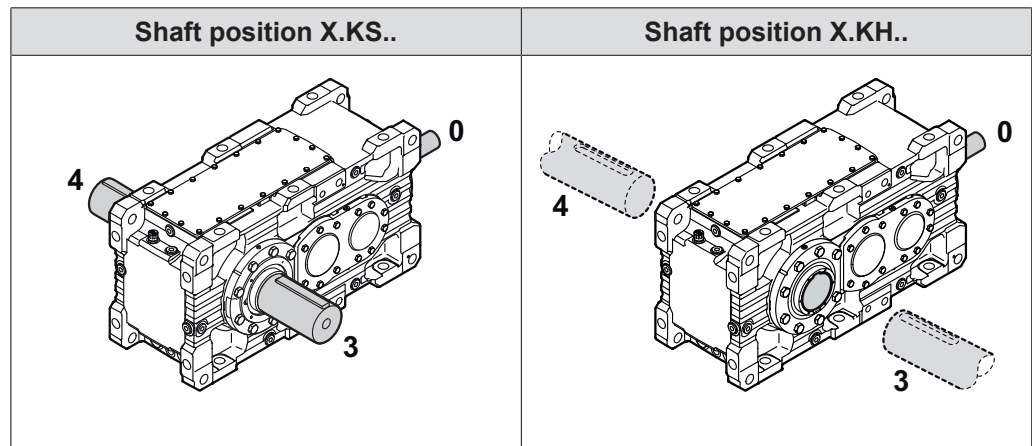
### 3.5 Shaft positions

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..



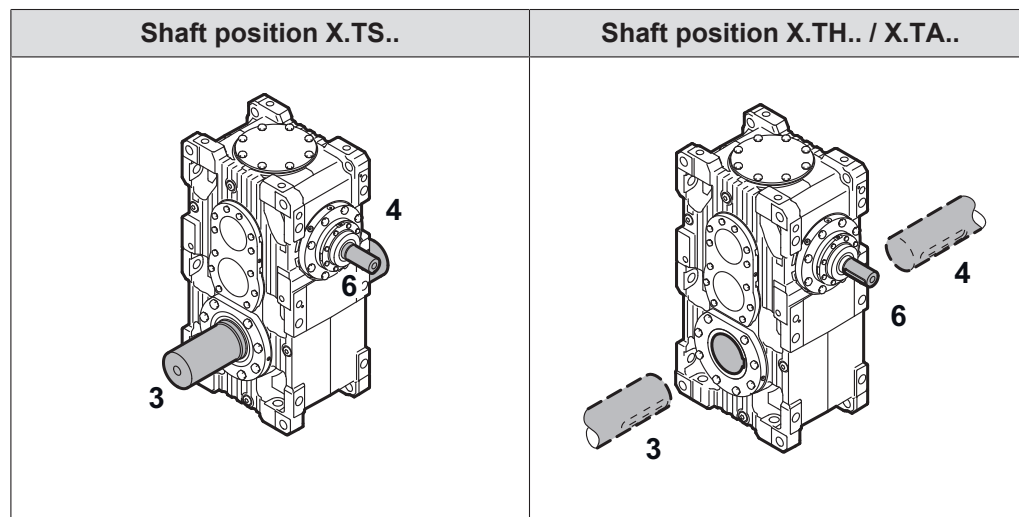
#### 3.5.2 X.K..



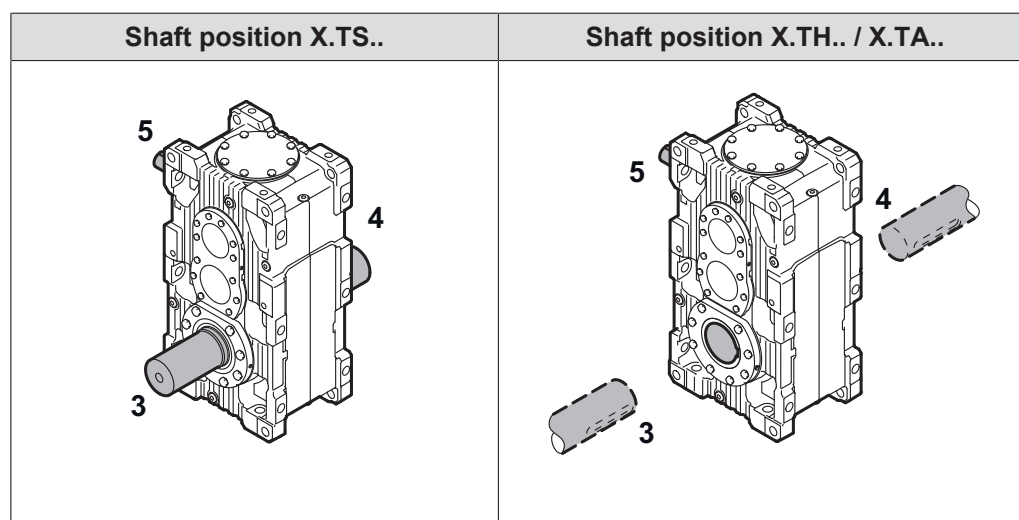
## 3.5.3 X.T..

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

## Sizes X100 to 210



## Sizes X220 to 250



## 3.6 Mounting positions and standard mounting surfaces

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

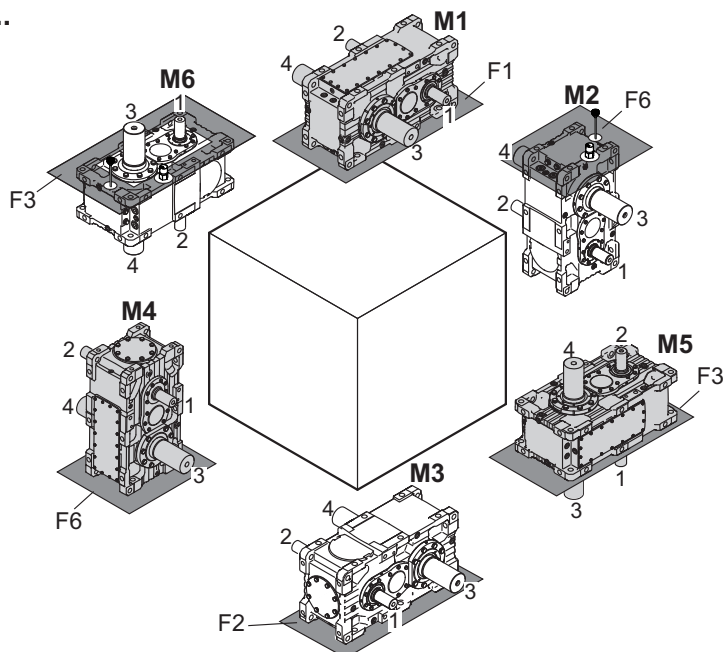
## INFORMATION



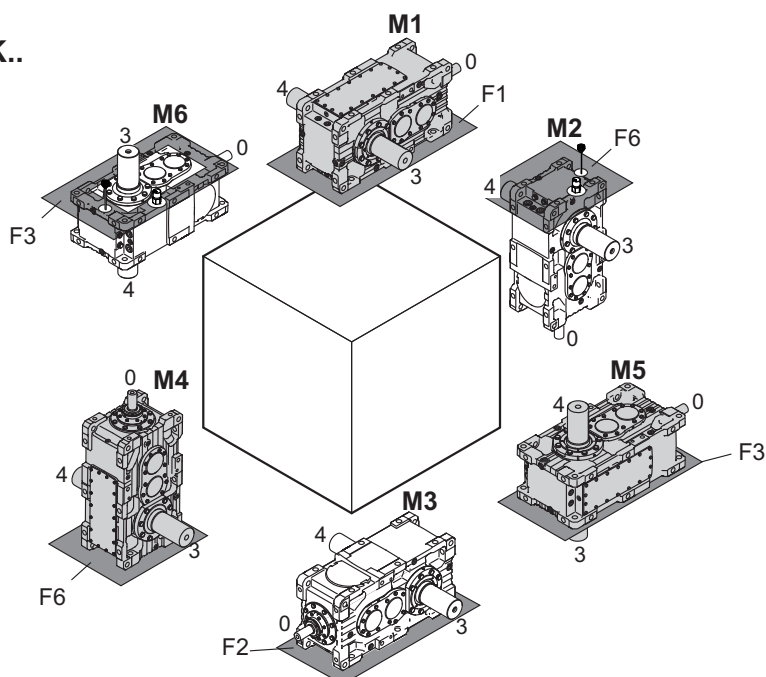
- The mounting position and/or mounting surface must not differ from the order.
- Other mounting surfaces are possible in combination with a certain mounting position. Refer to the order-specific dimension drawing.

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

### X.F..



### X.K..



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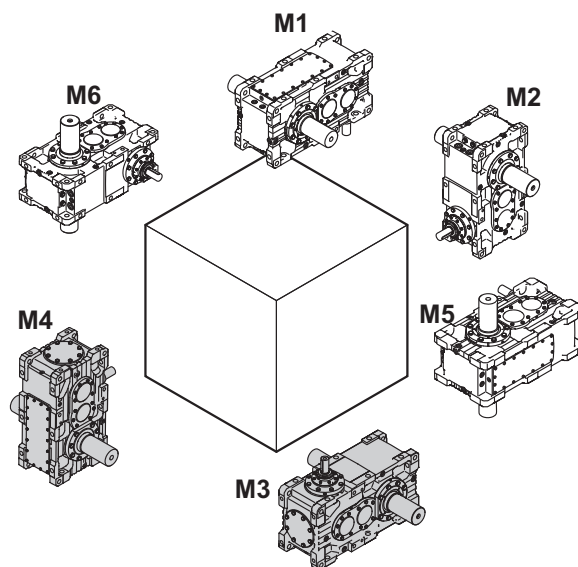
## INFORMATION



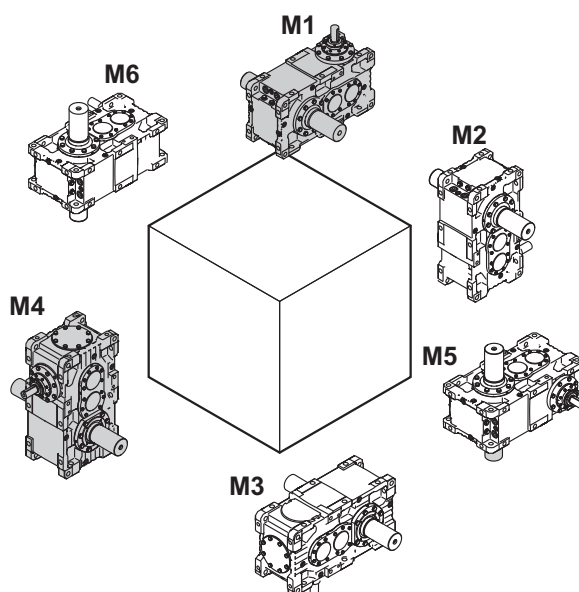
If you install the gear unit in mounting position M2, make sure that the customer's mounting structure leaves enough room for the breather and the oil dipstick.

**X.T..**

Valid for sizes X100 – X210



Valid for sizes X220 – X250



54043196953073291

**INFORMATION**

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



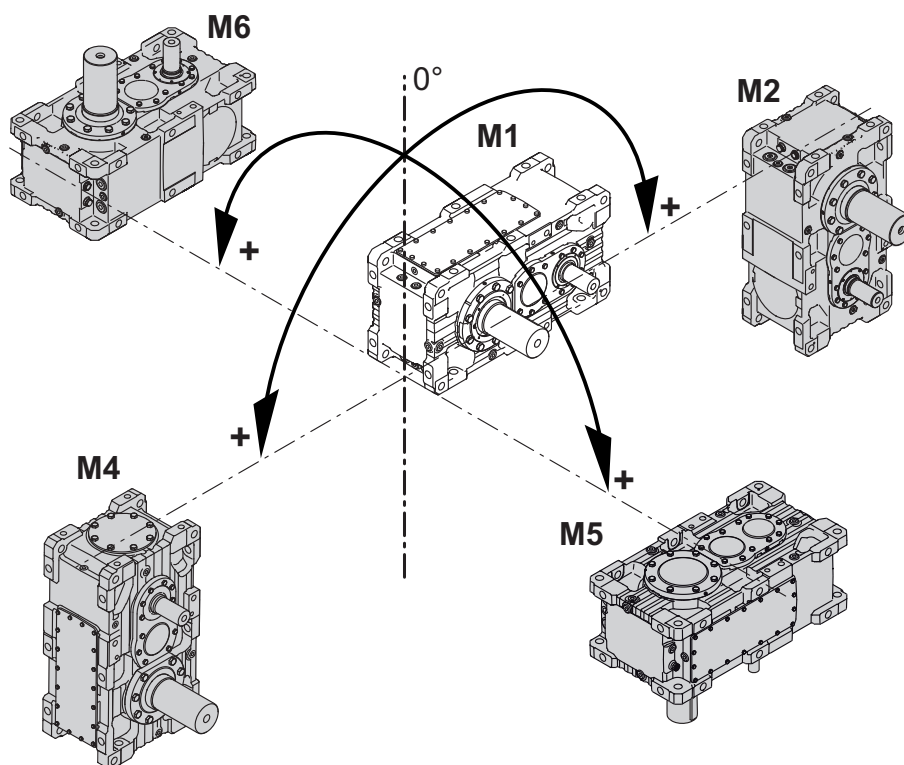
### 3.7 Fixed and variable pivoted mounting positions

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

#### INFORMATION



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



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## 3.7.1 Fixed pivoted mounting position

## Definition:

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

## Example:

The type designation is set up as follows:

**M1-M4/9°**

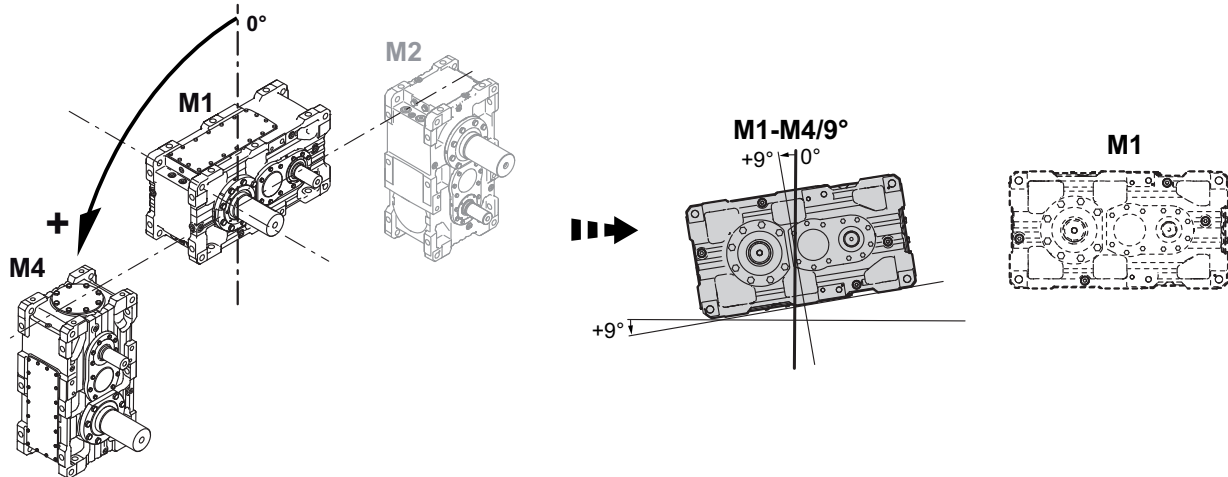
**M1** = Initial mounting position

**M4** = Pivoting direction

**9°** = Fixed pivoting angle

Pivoted from mounting position M1 to M4 by 9°

This results in the following fixed pivoted mounting position:



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

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

SEW-EURODRIVE		76646 Bruchsal/Germany	
Type	X3FS190/B		
Nr.	01.1234567812.0001.06		
	min.	nom.	max.
PK1 kW	36	180	180
MK2 Nm	43300	43300	43300
n1 rpm	296	1480	1480
n2 rpm	7,6	37,9	37,9
IM	M1-M4/9°/F1		
Made in Germany			
Qty of greasing points	2	Fans	0
Mass kg	1340	Year	2016
CLP HC460 - Synthetic Oil ~ 90 L			

36028805040624139

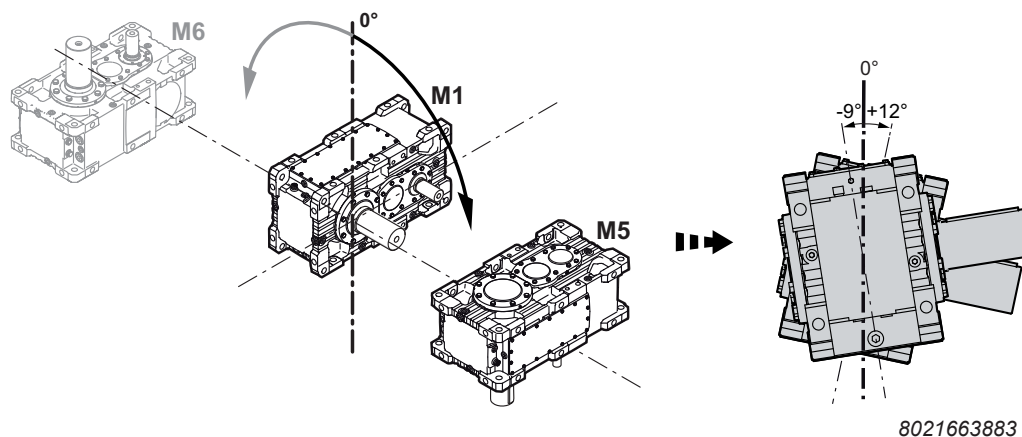
### 3.7.2 Variable pivoted mounting position

#### 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°.

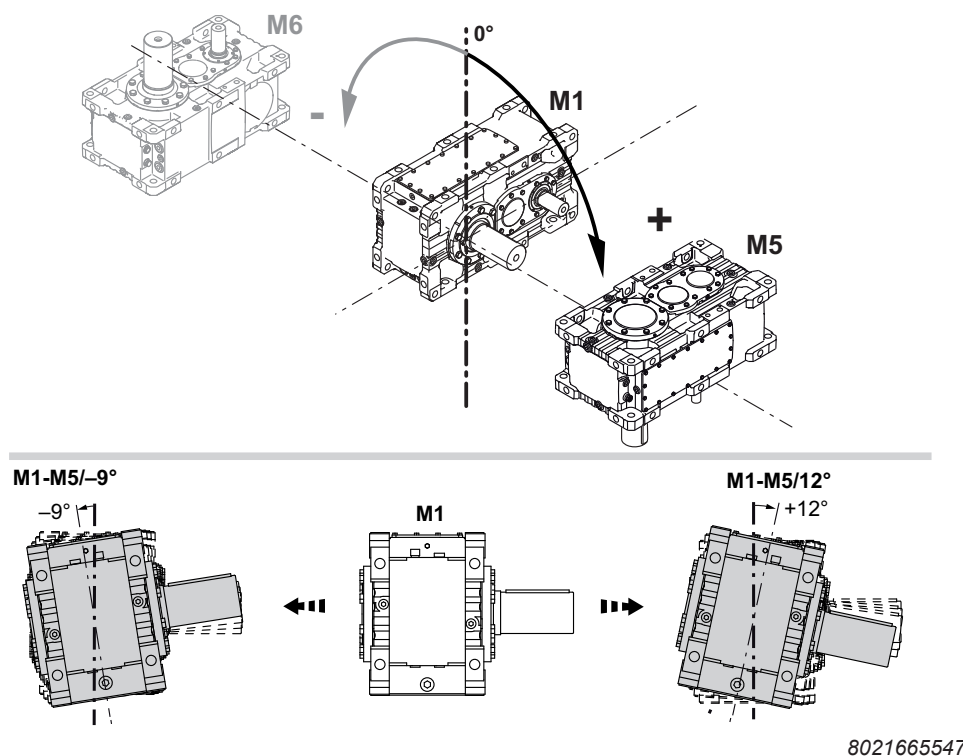


#### Step 1:

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

$12^\circ \rightarrow$  from M1 to M5, pivoted by  $+12^\circ$

$9^\circ \rightarrow$  from M1 to M5, pivoted by  $-9^\circ$



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:

	min.	nom.	max.	i	
PK1 kW	36	180	180	Fs	-39,06
MK2 Nm	43300	43300	43300	PM kW	1,5
n1 rpm	296	1480	1480	Ta °C	0
n2 rpm	7,6	37,9	37,9		-25...40
IM	M1-M5/-9...12°/F1				

Made in Germany

Qty of greasing points 2 Fans 0 Mass kg 1340 Year 2016

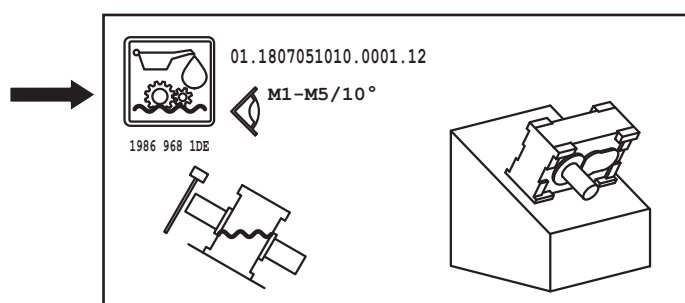
CLP HC460 - Synthetic Oil ~ 90 L

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## Step 2:

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

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



8021670539

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:

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

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

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

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

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

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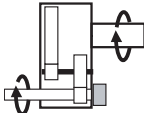
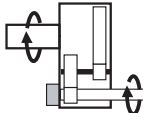
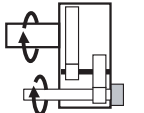
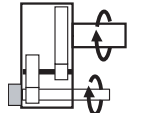
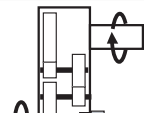
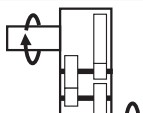
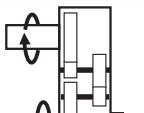
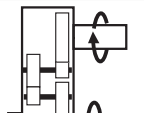
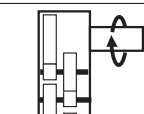
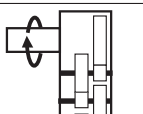
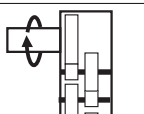
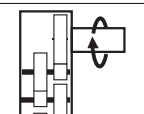
### 3.8 Corresponding directions of rotation

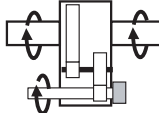
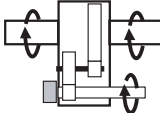
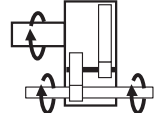
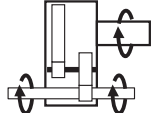
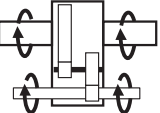
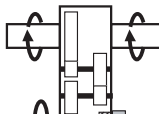
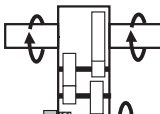
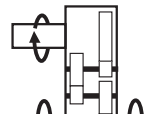
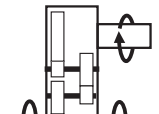
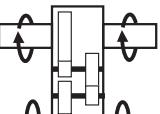
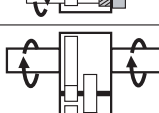
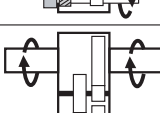
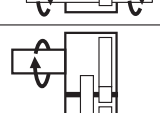
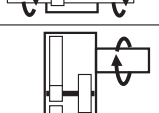
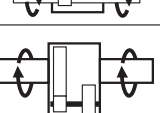
The gear unit can be operated in both directions of rotation. An exception are gear units with backstop.


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


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

#### 3.8.1 X.F..

Shaft position	14	23	13 <sup>1)</sup>	24 <sup>1)</sup>
Position of final gear	3	4	3	4
X2F..				
X3F..				
X4F..				

Shaft position	134 <sup>1)</sup>	243 <sup>1)</sup>	213	124	1234 <sup>1)</sup> *
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" (→ 39).

### 3.8.2 X.K...

#### Standard

Shaft position	03	04	034 <sup>1)</sup>	043 <sup>1)</sup>
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" (→ 39).

#### Direction of rotation reversal

Shaft position	03 <sup>1)</sup>	04 <sup>1)</sup>
Position of final gear	4	3
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" (→ 39).

## 3.8.3 X.T...

## Standard

Shaft position	63	64	634 <sup>1)</sup>	643 <sup>1)</sup>
Position of final gear	4	3	3	4
X3T100 – 210				
X4T100 – 210				
Shaft position	53	54	534 <sup>1)</sup>	543 <sup>1)</sup>
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" (→ 39).

## Direction of rotation reversal

Shaft position	53 <sup>1)</sup>	54 <sup>1)</sup>	63 <sup>1)</sup>	64 <sup>1)</sup>
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" (→ 39).



### 3.9 Housing designs

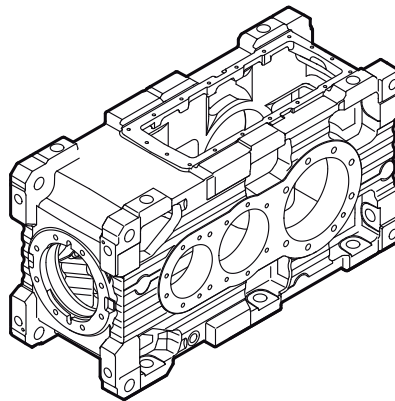
The gear unit comes equipped with the following housing type:

#### 3.9.1 Horizontal housing /HH

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

##### Single-piece housing

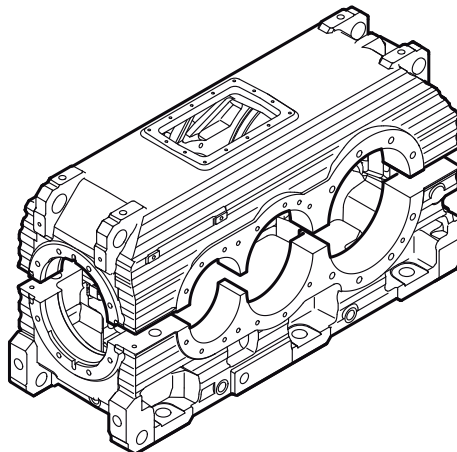
The following figure shows an example of a single-piece housing for gear unit sizes 100 – 210:



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##### Two-piece housing

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



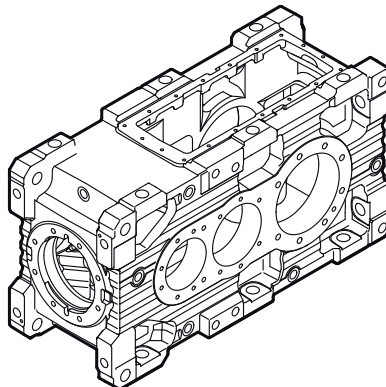
9453596299

### 3.9.2 Universal housing/HU

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

#### Single-piece housing

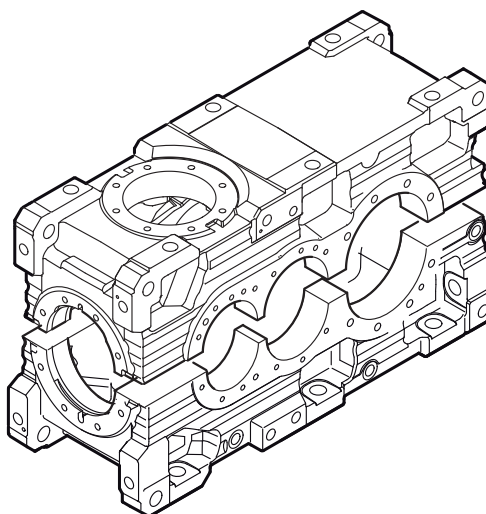
The following figure shows an example of a single-piece housing for gear unit sizes 100 – 210:



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#### Two-piece housing

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

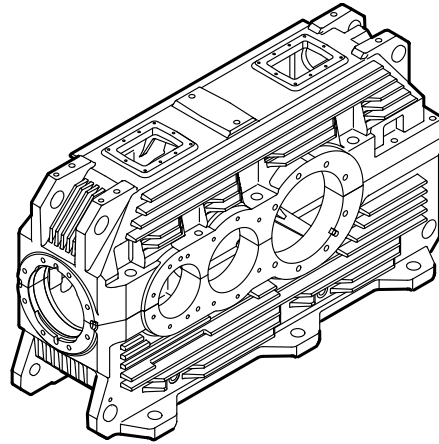


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### 3.9.3 Thermal housing /HT

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.

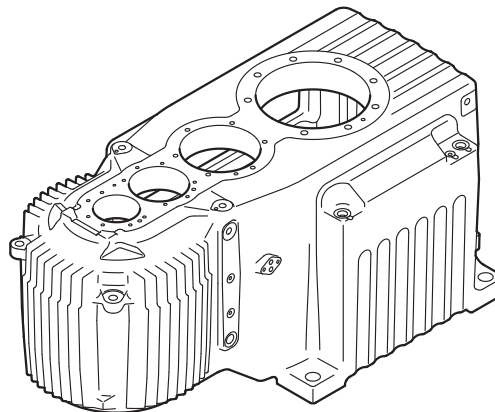
The following figure shows an example of a thermal housing for gear unit size 220:



9647807243

### 3.9.4 Agitator housing/HA

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



9007214721109131

### 3.10 Combination overview of housing designs and options

#### 3.10.1 Horizontal housing/HH and universal housing/HU

Single-piece and two-piece gear unit housings for horizontal applications (**HH**) as well as universal housings (**HU**) offer a wide range of possible variants. The following table shows which options can be combined with horizontal housings (**HH**) and which can be combined with universal housings (**HU**).

If options are installed later, it 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	
APL	Torque-limiting backstop	-	-	-	HH	-	-	-	-	-	HH	-	-	-	-	HH	-	-	
CCV	Water cooling cover	HU	HU	HH	HH	HU	HU	-	-	-	-	-	-	-	-	-	-	-	
CCT	Water cooling cartridge	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	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	
AI	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 in all gear unit sizes

HH

Horizontal housing

HU

Universal housing

### 3.10.2 Thermal housing/HT

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

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

- ☐ Options are available in all sizes  
☒ Options are not available in all sizes

### 3.10.3 Agitator housing/HA

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

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

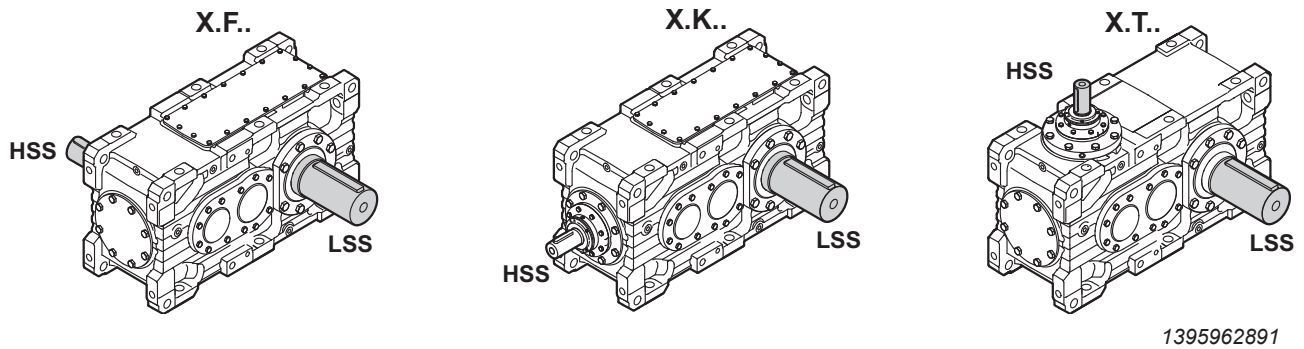
### 3.11 Gearing and shafts

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

### 3.12 Input and output shafts

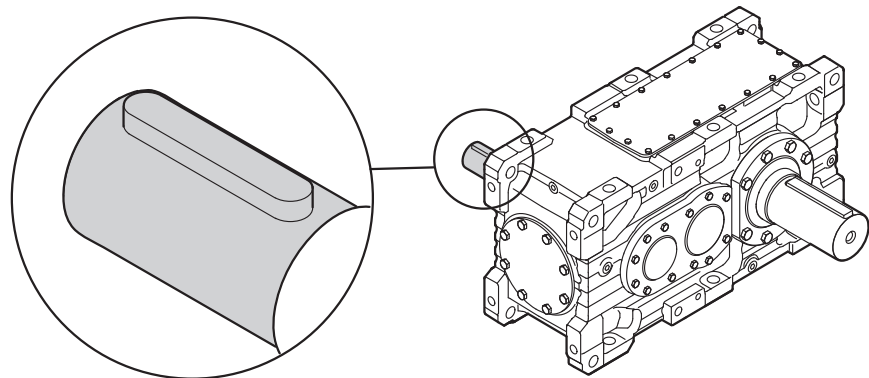
There are two types of shafts:

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



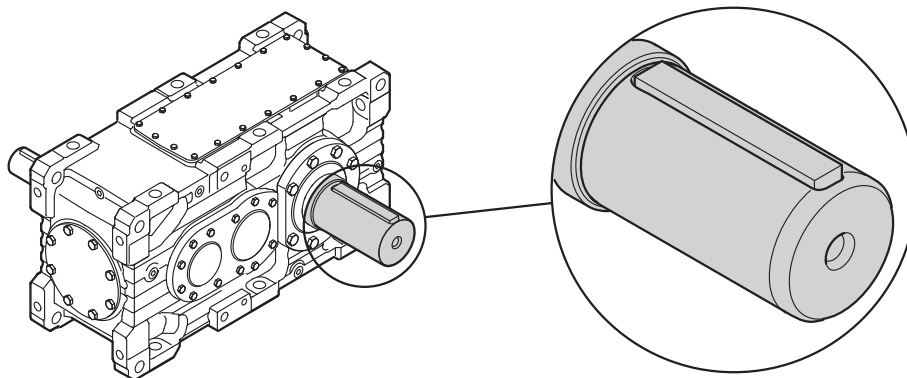
#### 3.12.1 Input shaft

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.



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

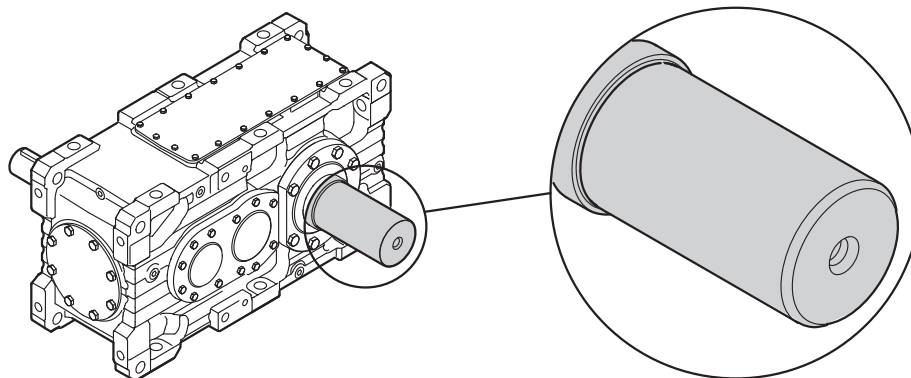


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### 3.12.3 Smooth output shaft /..R

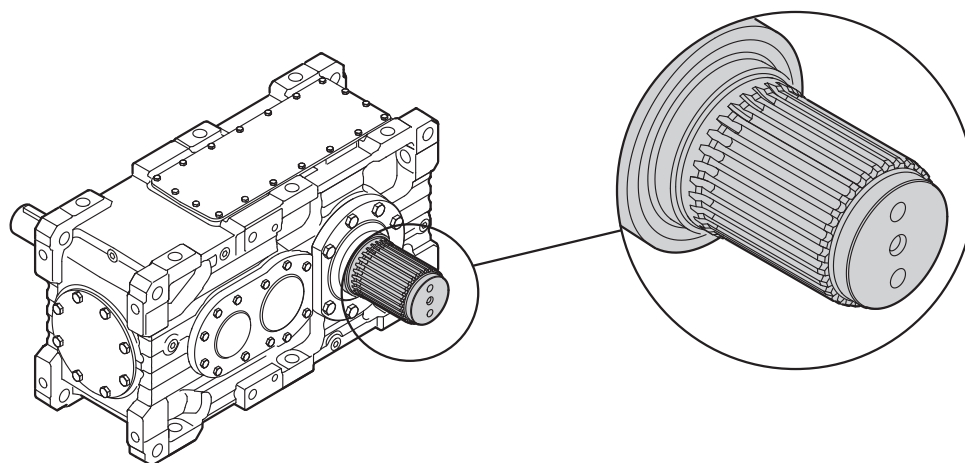
The gear units are available with a smooth output shaft to install non-positive output elements, such as flange couplings with a cylindrical interference fit. The face of the shaft has a center bore according to DIN 332. The insertion area with reduced diameter facilitates the mounting of output elements.



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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. 2 threads are available on the front end of the shaft for mounting an end plate.



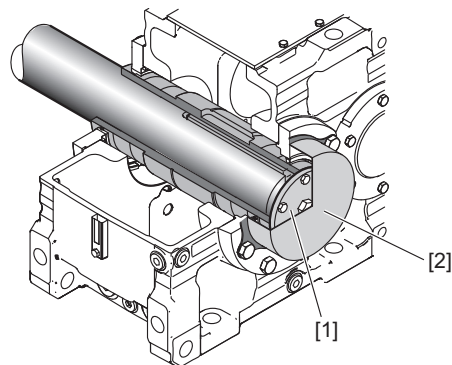
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### 3.12.5 Output shaft as a hollow shaft with keyway/..A

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

Included in the delivery:

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



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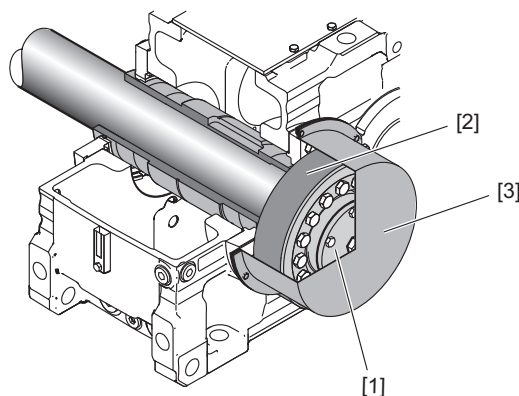
The protection cover is dust-tight. The standard sealing system is therefore normally used on the side of the safety cover.

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

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

Included in the delivery:

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



324304523

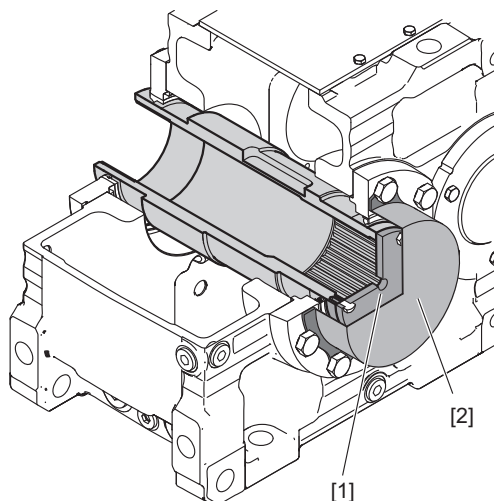
The protection cover is dust-tight. The standard sealing system is therefore normally used on the side of the safety cover.

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

The output shaft is splined according to DIN 5480.

Included in the delivery:

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



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### 3.12.8 Gear unit mounting for hollow shaft gear units

#### NOTICE

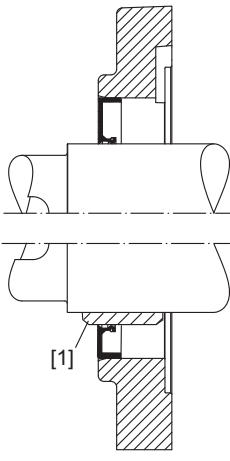
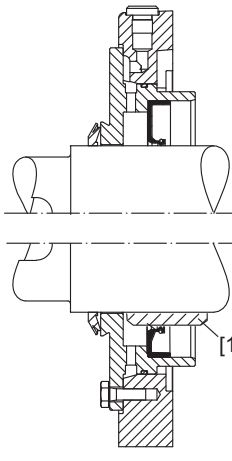
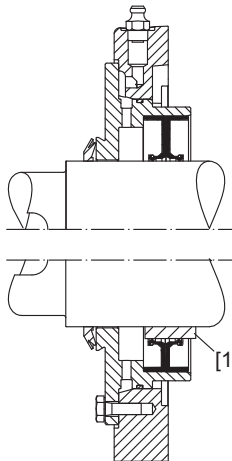
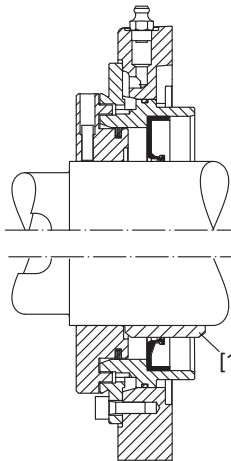
Constraining forces can occur on the output shaft bearing due to the rigid connection between the machine shaft and hollow shaft of the gear unit. This may result in damages to the output shaft bearing and increased fretting corrosion in the connection between the machine and the hollow shaft of the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

Possible damage to property.

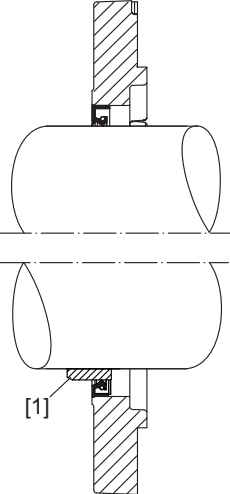
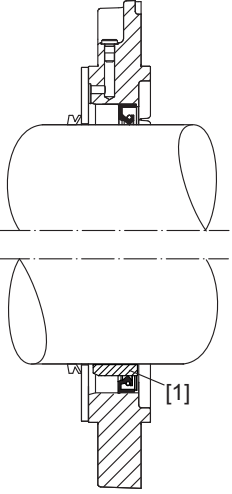
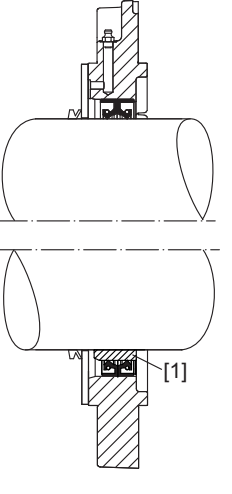
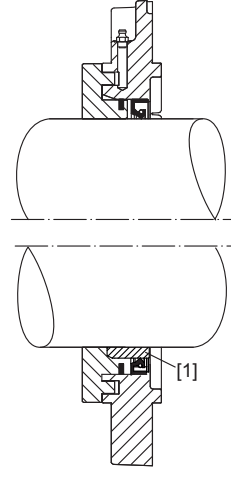
- The gear unit is usually foot or flange-mounted and used as bearing point when the machine shaft has no individual bearing or merely provides one bearing point. You have to provide for an accurate coaxial alignment with the bearing point.
- If the machine shaft has at least 2 bearing points, the gear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

### 3.13 Sealing systems

#### 3.13.1 Input shaft

Standard	Dust-proof	Dust-proof Regreasable	Radial labyrinth seal (Taconite) Regreasable
Single oil seal with dust protection lip	Single oil seal with dust protection cover	Double oil seal with dust protection cover	Single oil seal with radial labyrinth seal
Normal environment	<b>Medium</b> dust load with abrasive particles	<b>High</b> dust load with abrasive particles	<b>Very high</b> dust load with abrasive particles
			
[1] Optional with oil seal sleeve			

#### 3.13.2 Output shaft

Standard	Dust-proof	Dust-proof Regreasable	Radial labyrinth seal (Taconite) Regreasable
Single oil seal with dust protection lip	Single oil seal with dust protection cover	Double oil seal with dust protection cover	Single oil seal with radial labyrinth seal
Normal environment	<b>Medium</b> dust load with abrasive particles	<b>High</b> dust load with abrasive particles	<b>Very high</b> dust load with abrasive particles
			
[1] Optional with oil seal sleeve			

## INFORMATION



Make sure that the gear shaft is rotating during the regreasing process.

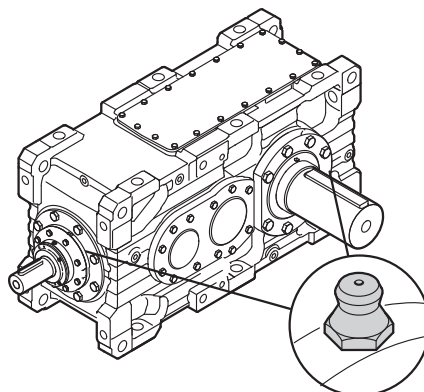
### 3.13.3 Position of lubrication points

#### 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" (→ 231).

##### *Example*



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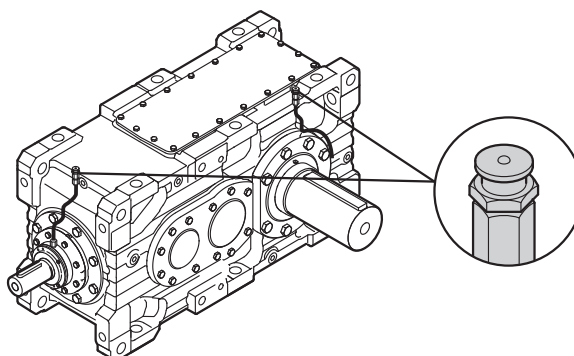
##### *Grease nipple on the top side of the gear unit*

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" (→ 231).

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).

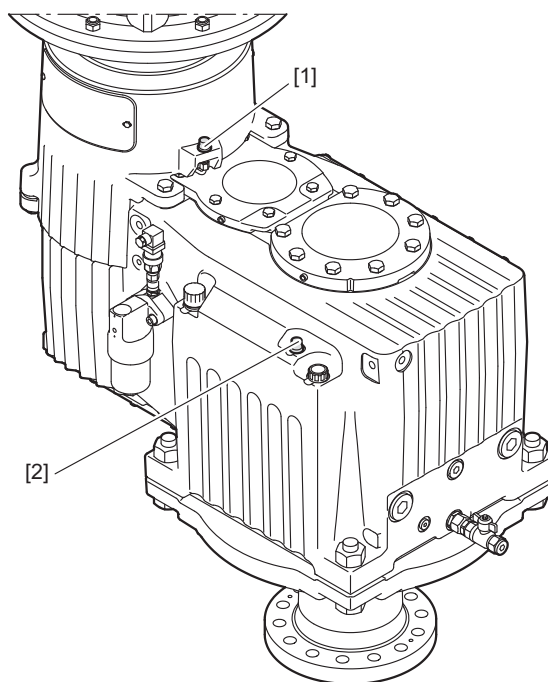
##### *Example*



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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" (→ 231).

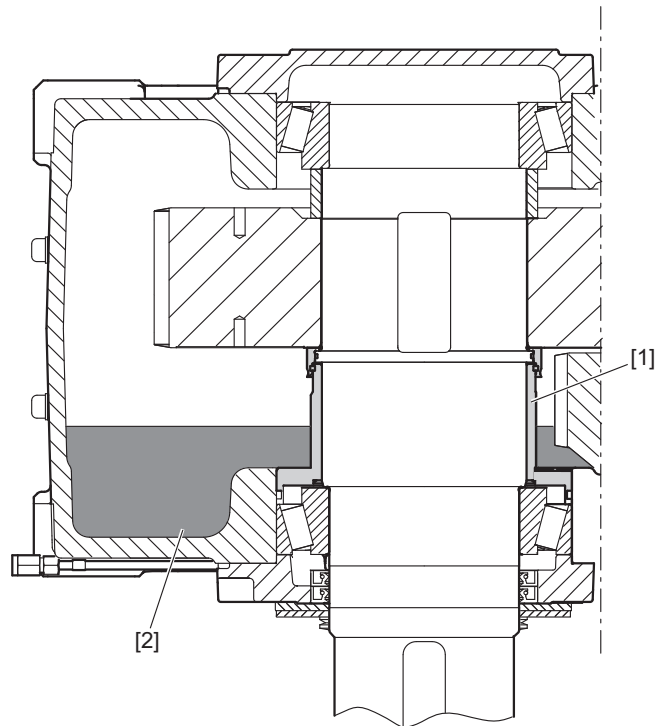


15644535179

### 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 "Relubrication of drywell sealing system bearings" (→ 251).

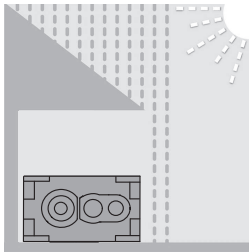
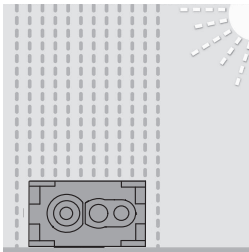
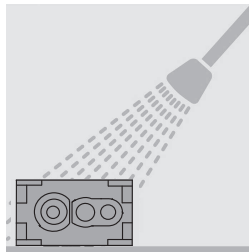


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### 3.14 Coating and surface protection systems

Gear units are available with surface protection OS1, OS2, and OS3.

The following table gives an overview of coating and surface protection systems.

SEW design	OS 1 Low environmental pollution	OS 2 Medium environmental pollution	OS 3 High environmental pollution
<p>Used as surface protection under typical ambient conditions</p> <p>Corrosivity categories DIN EN ISO 12944-2</p>	 <p>Suited for environments prone to condensation and atmospheres with low humidity or contamination, such as outdoor applications under roof or with protection devices, unheated buildings where condensation can build up. According to corrosivity category: C2 (low)</p>	 <p>Suited for environments with high humidity or moderate atmospheric contamination, such as applications outdoors subject to direct weathering. According to corrosivity category: C3 (moderate)</p>	 <p>Suitable for environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasionally acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt load. According to corrosivity category: C4 (high)</p>
Sample applications	<ul style="list-style-type: none"> <li>• Systems in saw mills</li> <li>• Agitators and mixers</li> </ul>	<ul style="list-style-type: none"> <li>• Applications in gravel plants</li> <li>• Cable cars</li> </ul>	<ul style="list-style-type: none"> <li>• Port cranes</li> <li>• Sewage treatment plants</li> <li>• Mining applications</li> </ul>
Condensation test ISO 6270	120 h	120 h	240 h
Salt spray test ISO 7253	–	240 h	480 h
Top coat color <sup>1)</sup>	RAL 7031	RAL 7031	RAL 7031
Color according to RAL	Yes	Yes	Yes
Uncoated parts, shaft end/flanges	Water and hand perspiration repelling rust preventive applied at the factory for external preservation		

1) Standard color

#### INFORMATION



Sheet metal parts (e.g. protection covers) are painted in RAL 1003.

Special surface protection is also available, please contact SEW-EURODRIVE.



### 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 expansion tank 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).

### 3.16 Accessories

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

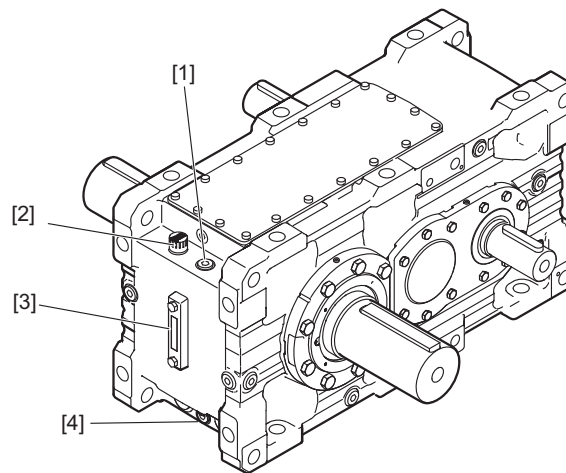
#### INFORMATION



The position of the accessory may vary depending on the gear unit version and the gear unit size.

#### 3.16.1 General accessories

The following figure shows the general accessories.



2671413899

[1] Oil dipstick (optional)  
[2] Breather

[3] Oil level glass  
[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 – X.170
- Oil level glass for gear unit sizes X.180 – 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 normally equipped with a breather with a filter mesh of 2 µm.

#### 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.

### 3.17 Reversible gear units

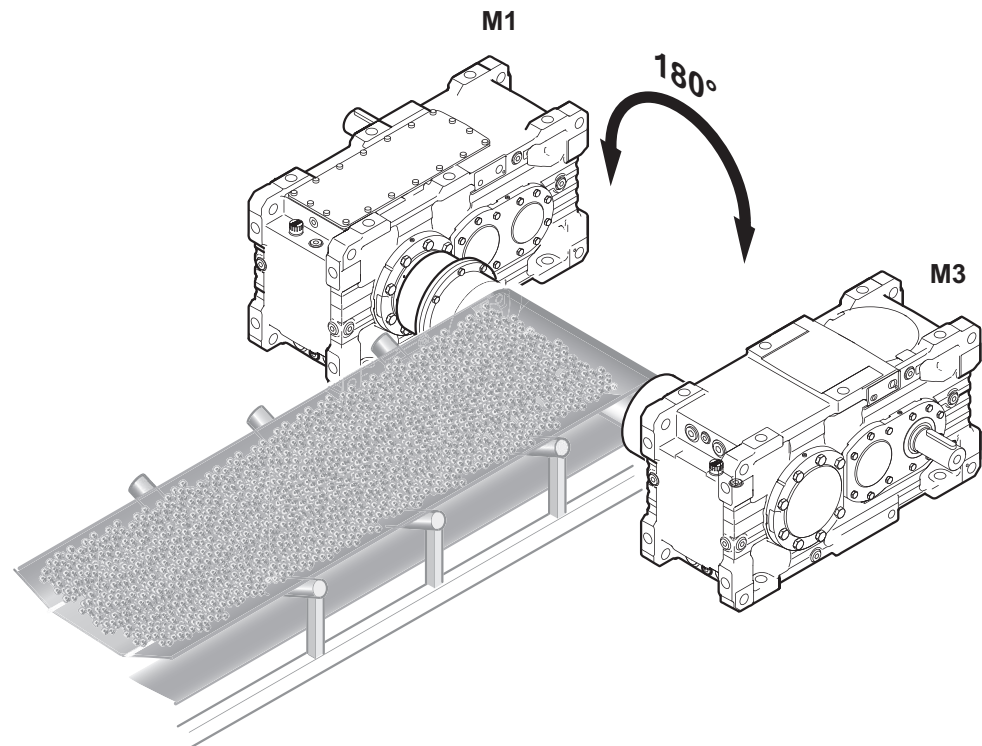
#### INFORMATION



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**

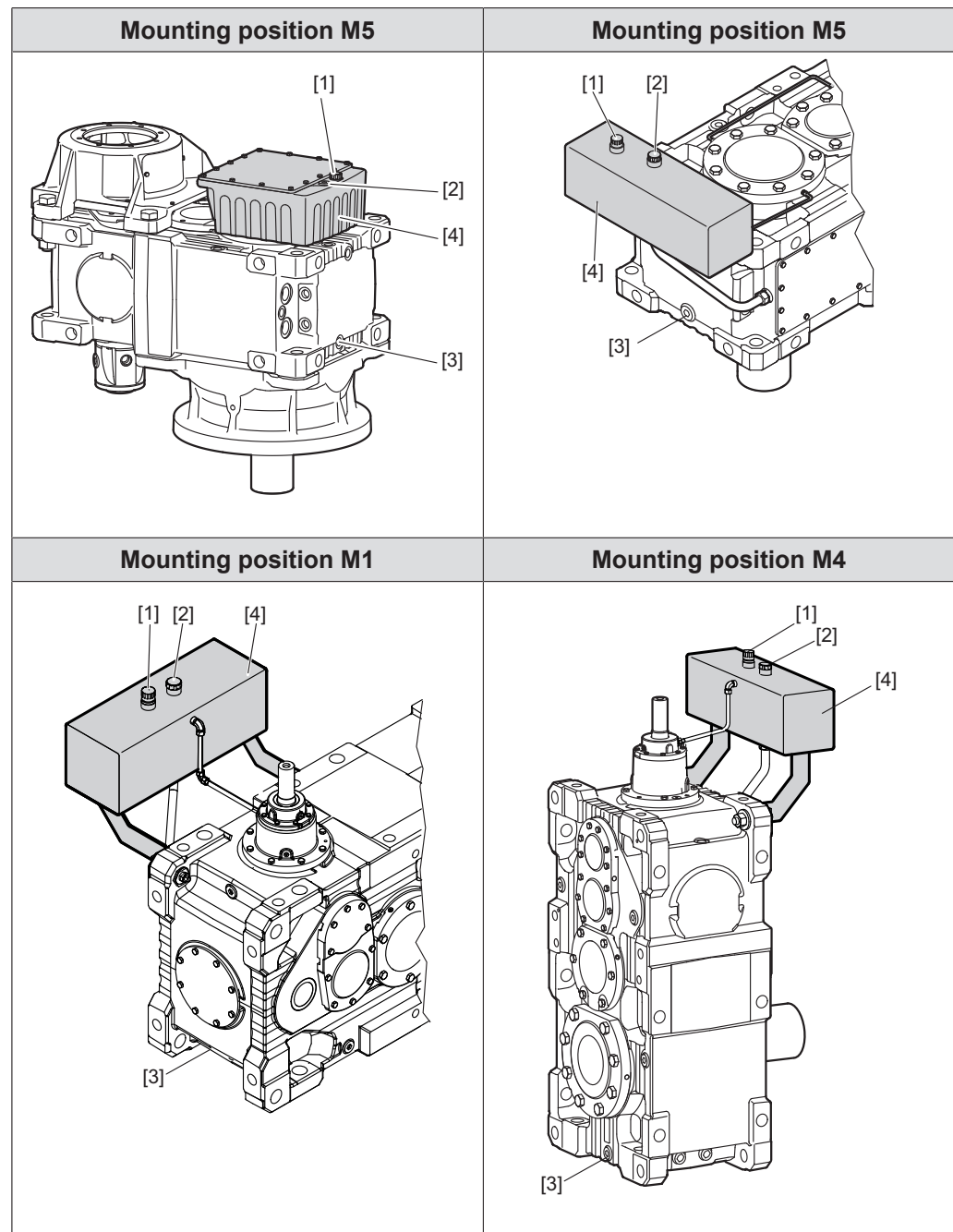
### **4.1 Oil expansion tank/ET**

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. 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 and the oil expansion tank does not overflow.

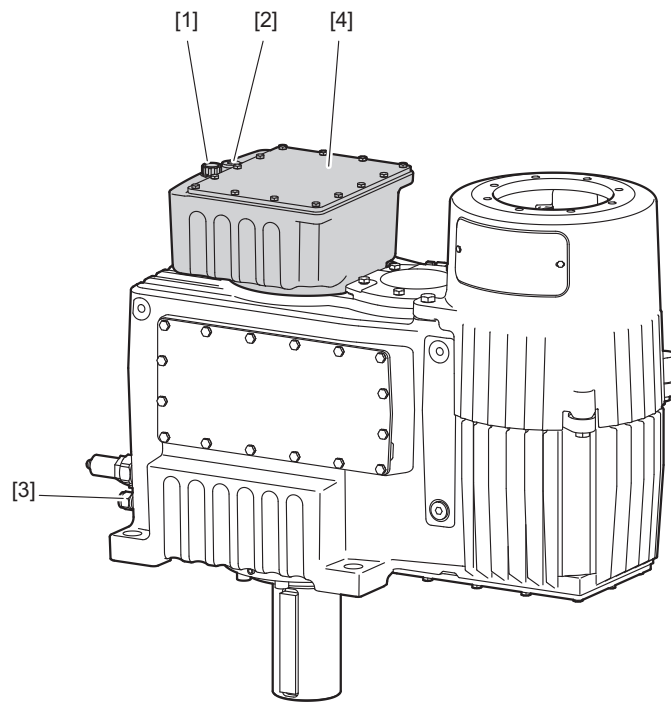
## 4.1.1 Universal housing/HU

The following figure shows the accessories for mounting positions M1, M4 and M5.



#### 4.1.2 Agitator housing/HA

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

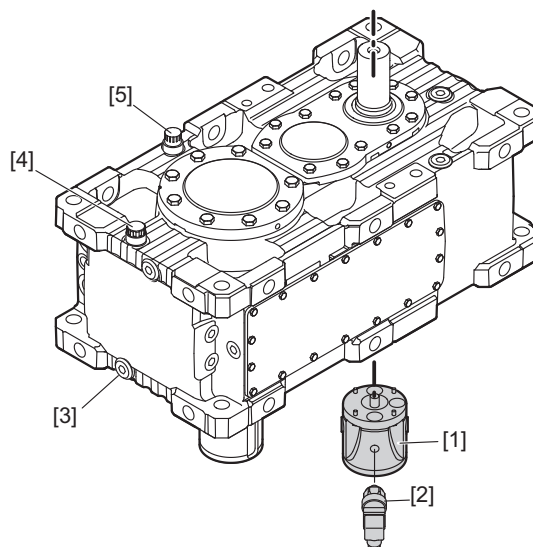


15485987211

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

## 4.2 Shaft end pump/SEP

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



9007199962408331

- [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 via a coupling. This ensures a high degree of reliability of the pump functions.

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:

- Required oil quantity for supplying lubrication points
- Position of the pump (connected with input shaft or intermediate shaft)
- Gear unit ratio
- Dimensioned for a speed of the gear unit

### INFORMATION



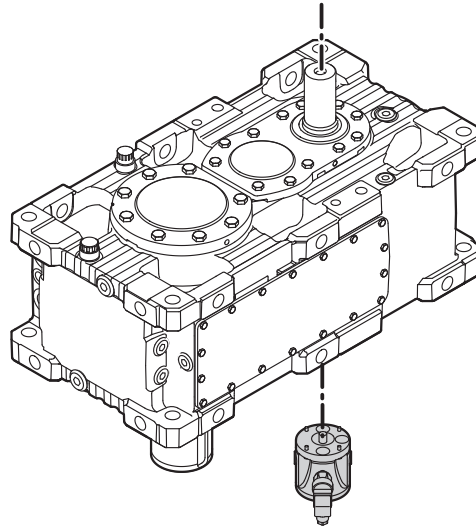
- Proper functioning of the shaft end pump is monitored via the connected pressure switch. Refer to chapter "Pressure switch" (→ 111) for information.
- Contact SEW-EURODRIVE for information on the pump size selection.
- A minimum input speed is required for the shaft end pump to operate properly. If you use variable input speeds (e.g. inverter-controlled drives) or if you intend to change the input speed of a gear unit equipped with a shaft end pump, it is essential that you contact SEW-EURODRIVE.

## 4.2.1 Position of the shaft end pump

X.F..

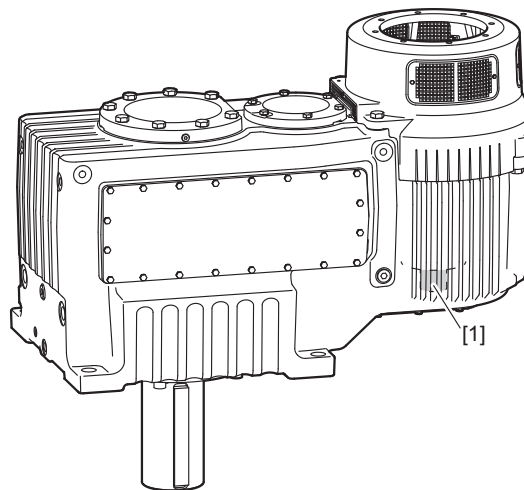
With helical gear units, the shaft end pump is positioned opposite the input shaft.

Universal  
housing /HU



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Agitator housing  
/HA



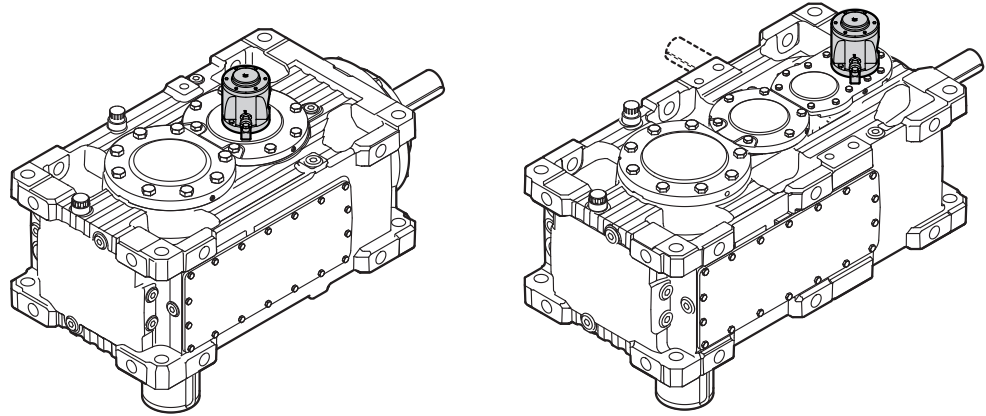
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**X2K../X4K../X4T..**

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

Universal housing /HU

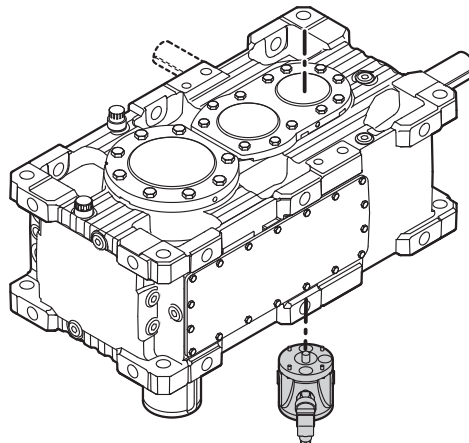


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**X3K../X3T..**

Universal housing /HU

For X3K/X3T gear units, the shaft end pump is located on the output shaft side.



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### 4.3 Motor pump /ONP

#### INFORMATION



For descriptions on the unit structure, refer to the manufacturer's documentation and the addendum to the operating instructions "Motor Pump /ONP".

---

### 4.4 Motor pump/ONP1L

#### INFORMATION



For descriptions on the unit structure, refer to the manufacturer's documentation and the addendum to the operating instructions "Motor Pump/ONP1L".

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### 4.5 Motor pump/ONP1

#### INFORMATION



For descriptions on the unit structure, refer to the manufacturer's documentation and the addendum to the operating instructions "Motor Pump/ONP1".

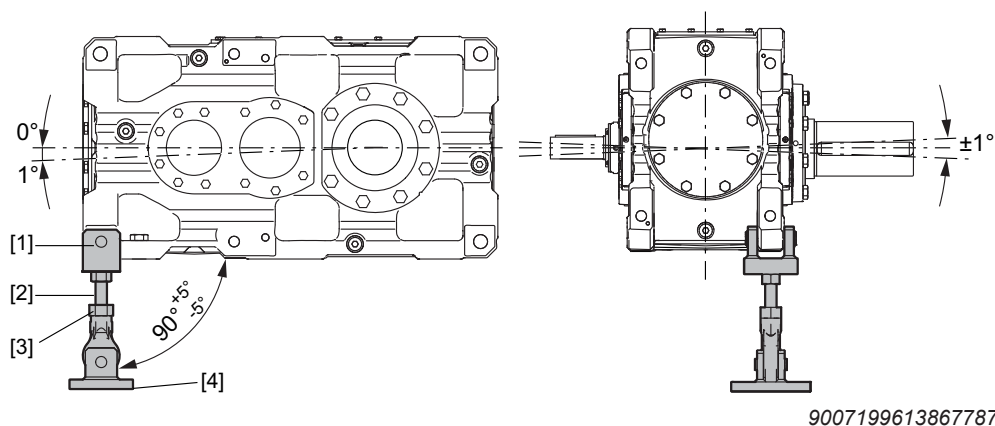
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## 4.6 Torque arm /T

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

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

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



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

### INFORMATION



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

#### 4.7 Flange coupling with cylindrical interference fit/FC-S

##### NOTICE

Improper installation and assembly can damage the gear unit.

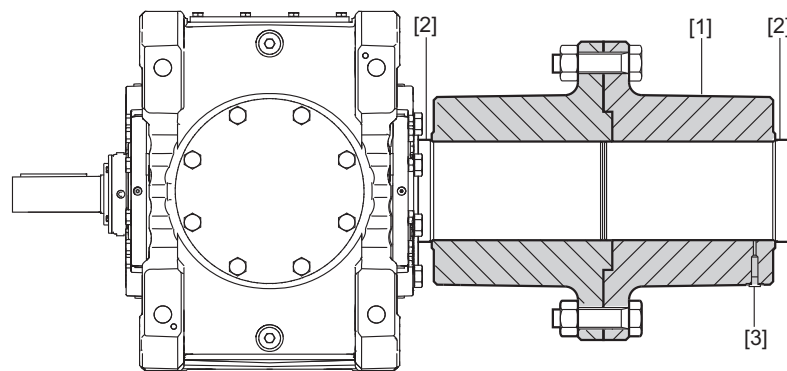
Possible damage to the gear unit.

- Gear units with rigid 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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## 4.8 Flange coupling with keyway/FC-K



### NOTICE

Improper installation and assembly can damage the gear unit.

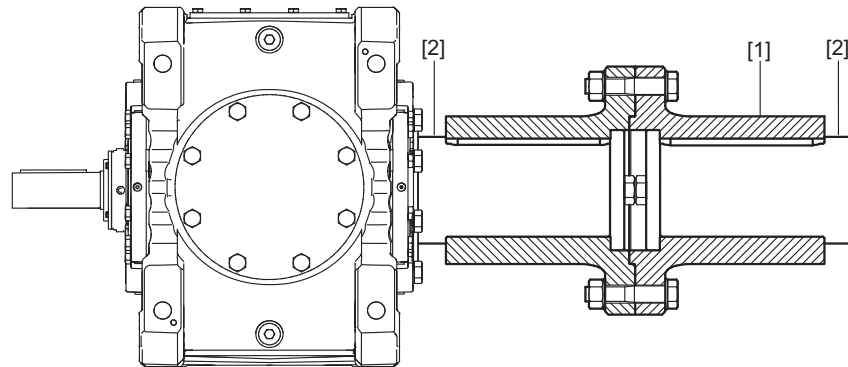
Possible damage to the gear unit.

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

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

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

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



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## 4.9 Mounting flange/F

## INFORMATION



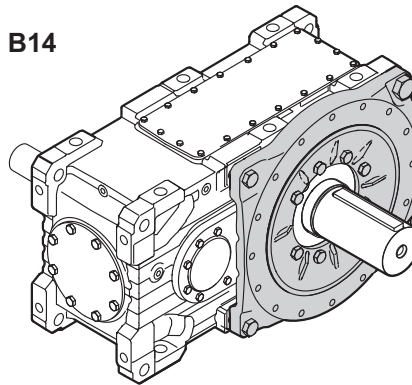
The mounting flange can be combined with all output shaft types but cannot be used with the standard sealing system. Observe the limitations for hollow-shaft gear units in chapter "Gear unit mounting for hollow-shaft gear units" (→ 61).

As an alternative to foot mounting, a mounting flange is available for gear units up to size 210. The gear unit can be attached to the operator's machine via the following 2 design types:

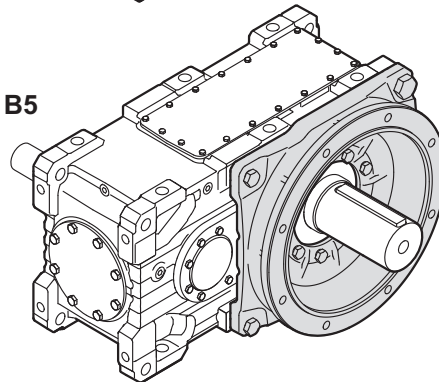
The mounting flange in B14 design have an outer centering and retaining threads.

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

B14



B5

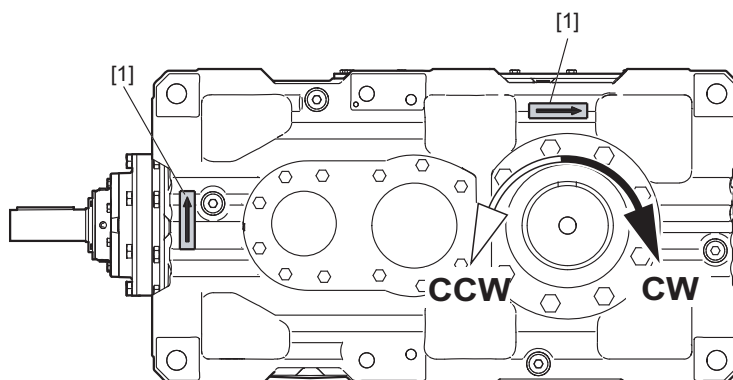


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## 4.10 Backstop/BS

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

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



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

- CW = Clockwise rotation
- CCW = Counterclockwise rotation

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

## INFORMATION



If the drive has a continuous output shaft, the direction of rotation of the backstop should be given as one views shaft position 3.

Contact SEW-EURODRIVE for differing requirements.

Wear can occur on the backstop when operated below lift-off speed.

In the following cases **always** contact SEW-EURODRIVE for specifying the maintenance intervals:

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

$n_1$ $\text{min}^{-1}$	Size				
	X2K..	X3K../X3T..		X4K../X4T..	
950...1150	X2K100...230 $i_N \geq 10$	X100...130 X140...170 X180...320	all $i_N$ $i_N \geq 31.5$ $i_N \geq 50$	X120...190 X200...320	all $i_N$ $i_N \geq 200$
1150...1400	-	X100...110 X120...130 X140...170 X180...320	$i_N \geq 25$ $i_N \geq 40$ $i_N \geq 50$ $i_N \geq 63$	X120...170 X180...320	all $i_N$ $i_N \geq 200$
> 1400	-	X100...130 X140...170	$i_N \geq 35.5$ $i_N \geq 63$	X120...130 X140...250	all $i_N$ $i_N \geq 200$

$n_1$  = Input speed (HSS)

$i_N$  = Nominal gear unit ratio

### 4.11 Motor adapter/MA

Motor adapters [1] are available for mounting

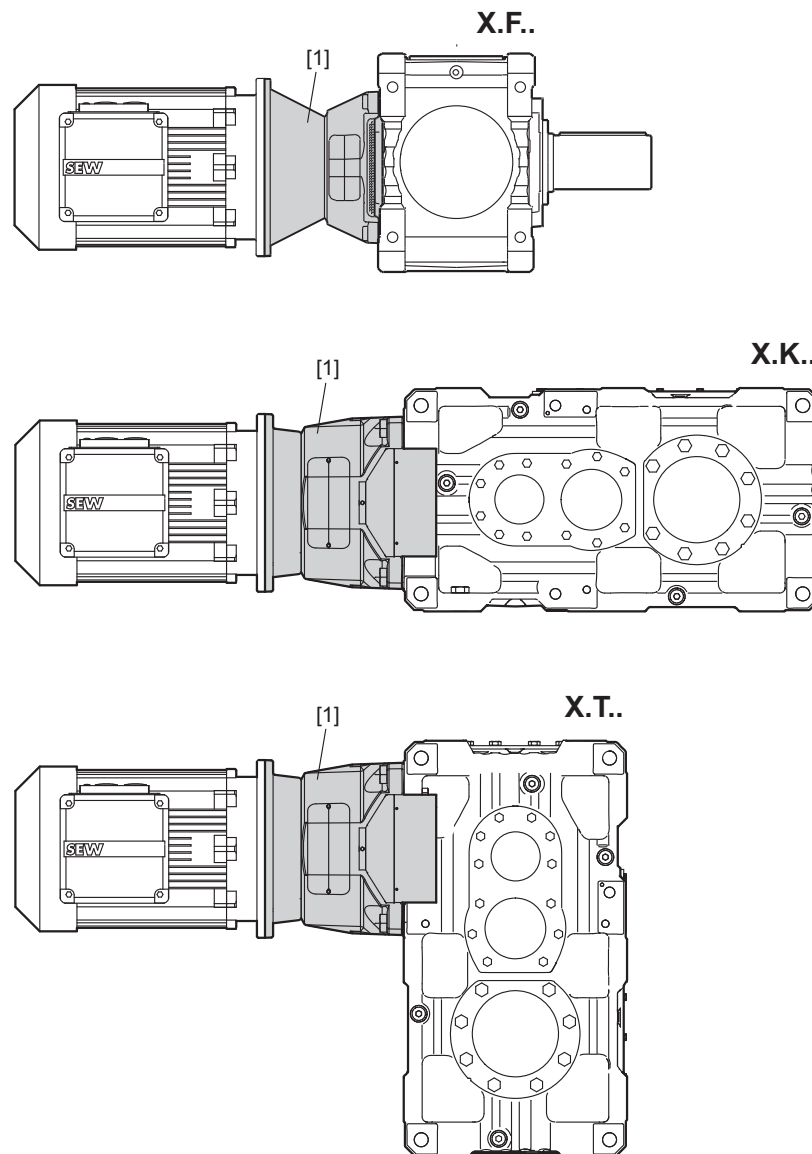
- **IEC (B5) motors** of sizes 100 – 355
- **NEMA ("C" face) motors** of sizes 182 – 449

#### INFORMATION



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

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



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## 4.12 V-belt drives /VBD

**▲ WARNING**

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

Severe or fatal injuries.

- Belt pulley may be destroyed due to excessive speed rates.

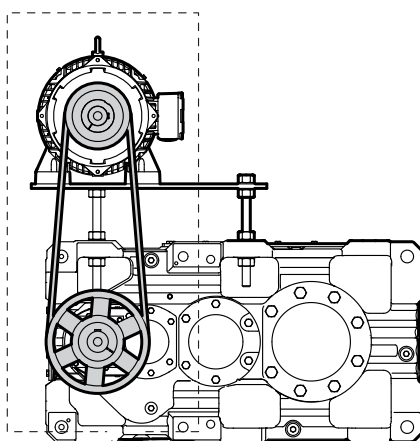
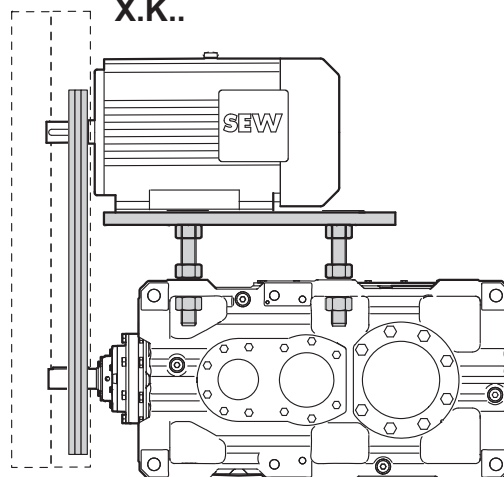
**▲ CAUTION**

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

V-belt drives are used wherever you need to adjust the total ratio or wherever the installation space requires a certain motor configuration.

The standard scope of delivery comprises motor scoop, belt pulleys, V-belt, and protective cover for the V-belt. As an alternative, the drive can be supplied as completely mounted unit with motor.

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

**X.F..****X.K..**

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### 4.13 Drive packages on a steel frame

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

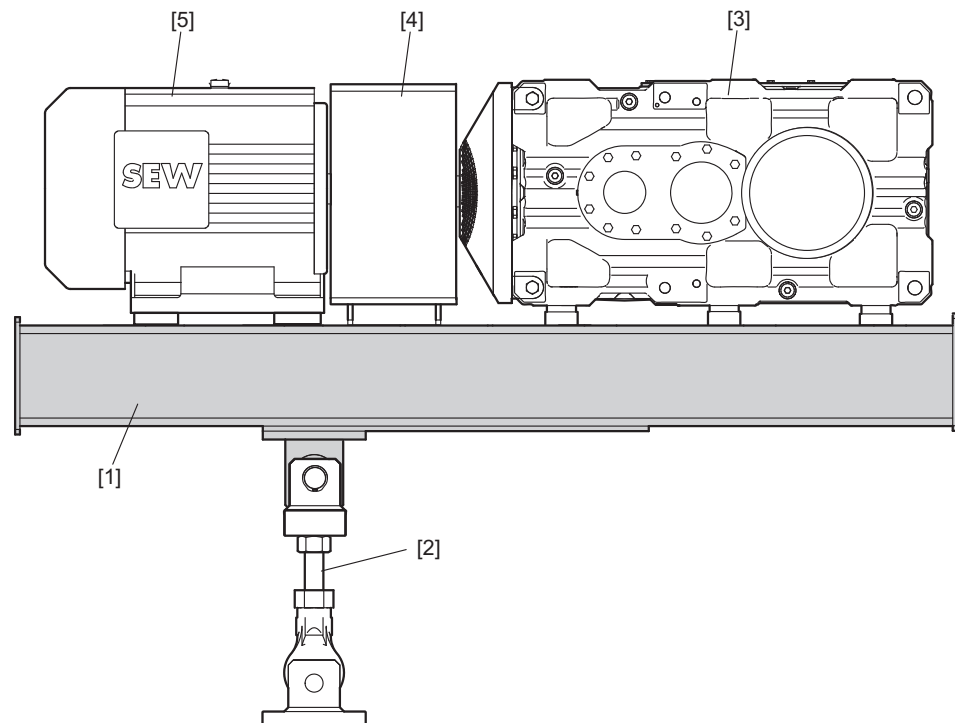
#### 4.13.1 Swing base /SB

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

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

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

#### Example: Swing base with coupling



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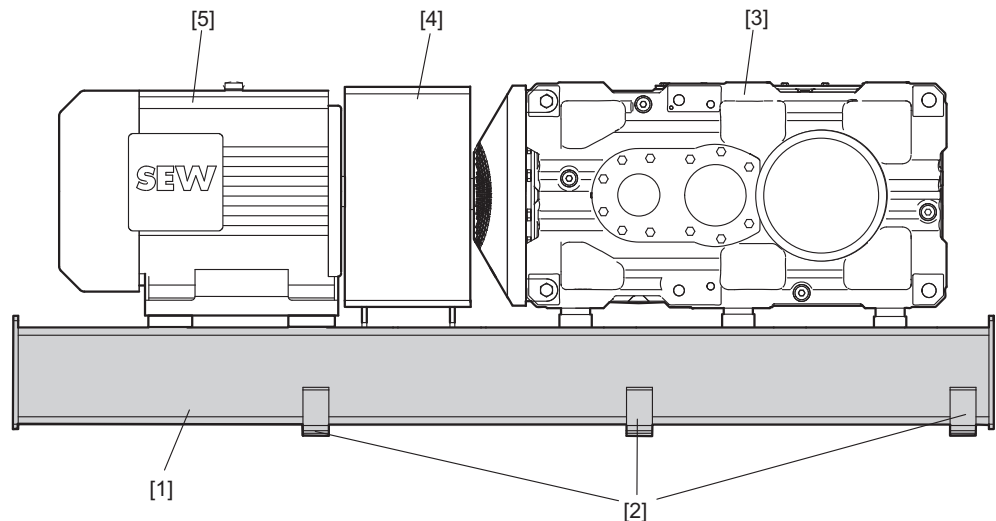
- [1] Swing base
- [2] Torque arm (optional)
- [3] Bevel-helical gear unit
- [4] Coupling with protection cover
- [5] Motor

#### 4.13.2 Base frame /BF

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

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

##### Example: Base frame with coupling



219858571

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

## 4.14 Cooling types

### 4.14.1 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.

### 4.14.2 Built-in cooling

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

### 4.14.3 Circulation cooling

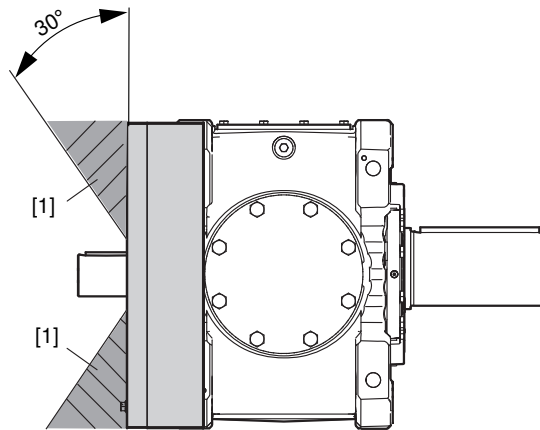
The gear unit oil is pumped out of the gear unit to an external heat exchanger by a pump (motor pump or shaft end pump). This normally involves oil supply systems with oil-water or oil-air heat exchangers.

## 4.15 Fan /FAN

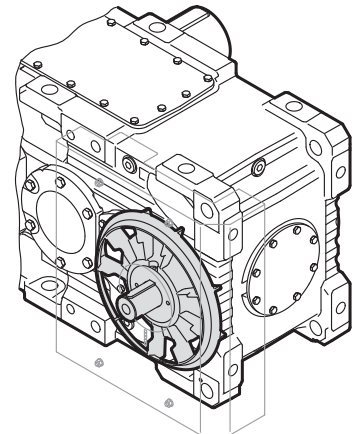
A fan may be retrofitted to raise the thermal rating or when the ambient conditions change after gear unit startup. The direction of rotation of the gear unit does not influence the operation of the fan.

The following fan designs are available:

### 4.15.1 X.F.. Fan (standard) /FAN

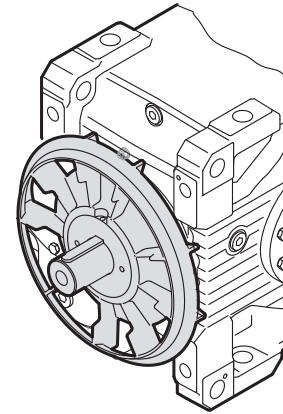
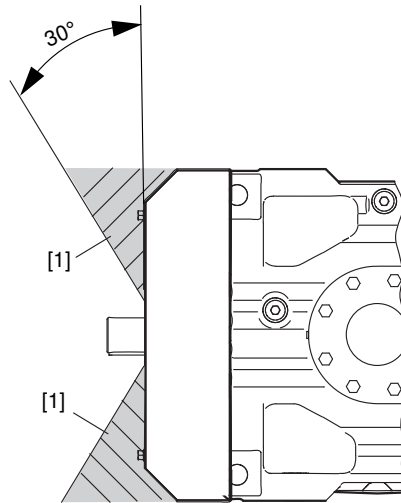


[1] Air intake clearance



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#### 4.15.2 X.K.. Fan (standard) /FAN



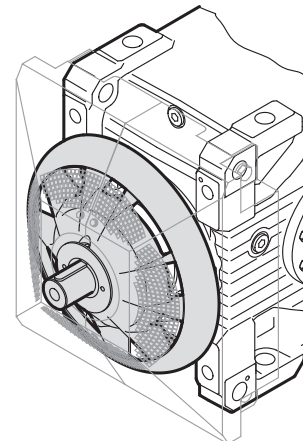
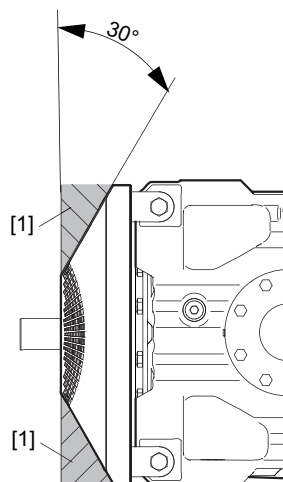
27021598438673035

[1] Air intake clearance

#### 4.15.3 X3K.. Advanced (option) /FAN-ADV

When the X3K.. Advanced design 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.



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[1] Air intake clearance

### INFORMATION

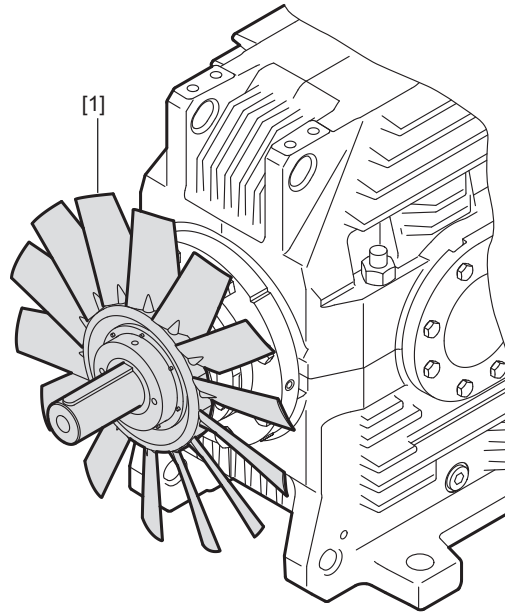


The X3K.. advanced fan cannot be used together with a torque arm because the fan guard is mounted to the attachment point of the torque arm.

#### 4.15.4 Axial fan

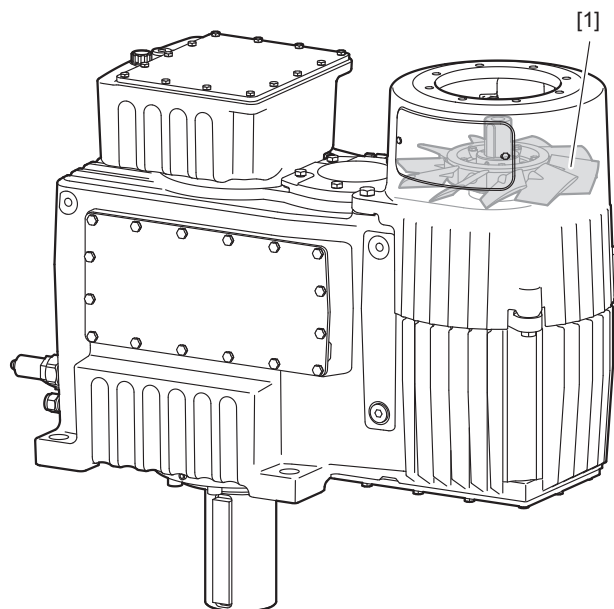
An axial fan [1] is integrated to increase the thermal rating. The fan depends on the direction of rotation. This is the reason why fans are available for CW or CCW rotation. Refer to the information on the order documents.

Universal housing HU / horizontal housing HH / thermal housing HT



15527273739

#### Agitator housing /HA



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## 4.16 Water cooling cover/CCV

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

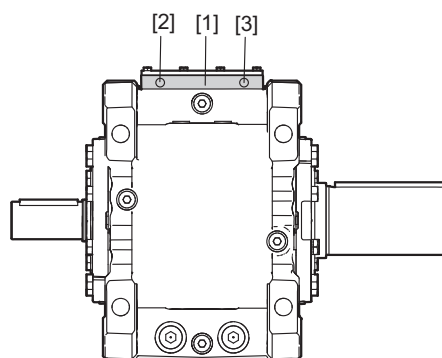
The amount of heat that can be dissipated depends on the intake temperature and the flow rate of the cooling medium that flows through the unit. The data given in the technical specifications must be observed.

### INFORMATION



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

#### 4.16.1 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.

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

### 4.17 Water cooling cartridge/CCT

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

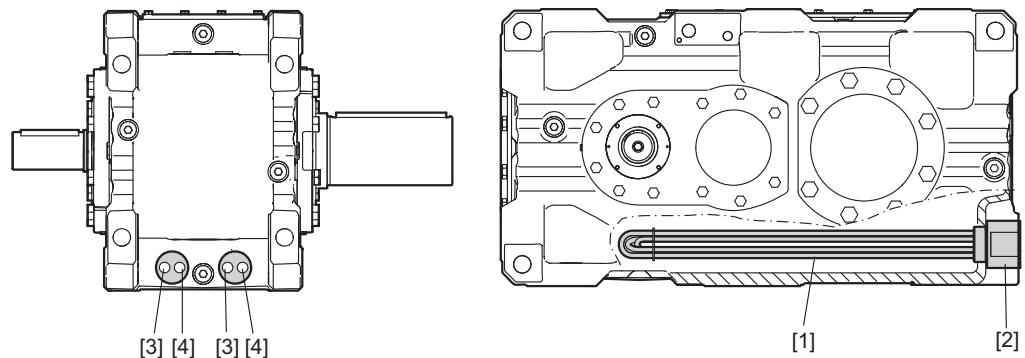
The amount of heat that can be dissipated depends on the inlet temperature and the flow rate of the cooling medium flowing through it. For the number of water cooling cartridges, refer to the technical specification. The data given in the technical specifications must be observed.

#### INFORMATION



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

#### 4.17.1 Structure



- [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)

For connection to the cooling circuit, the following 2 bores with

- Pipe thread G1 1/4" for sizes X140 – 170
- Pipe thread G1 1/2" for sizes X180 – 320

are available. The piping is not included in the delivery.

Gear units with water cooling cartridge are delivered completely assembled.

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

#### INFORMATION



The cooling circuit must be connected in parallel for gear units with 2 water cooling cartridges. Observe chapter "Built-in cooling – water cooling cartridge" (→ 197).



#### 4.17.2 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 lubrication type. 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 volume flow is required when using 2 cooling cartridges.

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

**4.18 Oil-water cooler for splash lubrication /OWC****INFORMATION**

For descriptions on the unit structure, refer to the manufacturer's documentation and the addendum to the operating instructions "Oil-water cooler for splash lubrication / OWC".

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**4.19 Oil-air cooler for splash lubrication /OAC****INFORMATION**

For descriptions on the unit structure, refer to the manufacturer's documentation and the addendum to the operating instructions "Oil-air cooler for splash lubrication / OAC".

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**4.20 Oil-water cooler for pressure lubrication /OWP****INFORMATION**

For descriptions on the unit structure, refer to the manufacturer's documentation and the addendum to the operating instructions "Oil-water cooler for pressure lubrication / OWP".

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**4.21 Oil-air cooler for pressure lubrication/OAP****INFORMATION**

For descriptions on the unit structure, refer to the manufacturer's documentation and the addendum to the operating instructions "Oil-air cooler for pressure lubrication / OAP".

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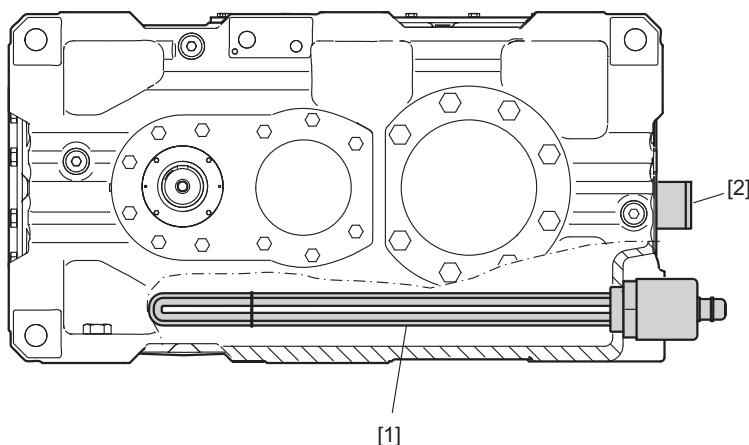
## 4.22 Oil heater /OH

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

### 4.22.1 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



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

## INFORMATION



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

## 4.23 Pressure switch /PS

The pressure switch indicates the correct oil pressure in the pressure pipe and in this way indicates the operational readiness of pressure lubrication. The pressure switch must be monitored by the operator.

During the starting phase of a gear unit with shaft end pump, pressure might build up with a delay. The slow building up of pressure during this phase can cause the pressure switch to issue a fault signal. You can prevent this by timing the pressure switch to **5 seconds up to a maximum of 10 seconds**.

Another switch-off delay is not permitted as this might damage the gear unit.

#### 4.24 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.

#### 4.25 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 oil sump of the gear unit. The exact position depends on the gear unit type and shaft position.

#### 4.26 Temperature switch /TSK

The TSK temperature switch is used with oil supply systems for circulation cooling. It is provided with two fixed switching points (60 °C and 90 °C) for controlling and monitoring the system.

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

- The cooling system is activated when the oil temperature reaches 60 °C.
- Warning signal or disconnection of the gear unit when the oil temperature exceeds 90 °C (usually a sign of malfunction in the oil supply system)

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 oil sump of the gear unit. The exact position depends on the gear unit design and shaft position.

#### 4.27 Diagnostic unit/DUO10A (oil ageing)

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

The diagnostic unit consists of a PT100 temperature sensor and an evaluation unit. The temperature sensor installed in the gear unit measures the present gear unit oil temperature. The diagnostic unit uses the oil temperature values to calculate the predicted remaining service life of the oil. This calculated value is continuously shown on the display of the evaluation unit; when needed, the display can be changed to the current gear unit oil temperature.

#### INFORMATION



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

#### 4.28 Vibration SmartCheck

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

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

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

#### INFORMATION



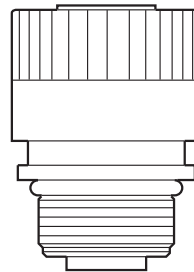
Further information about the evaluation unit and accessories is found in the "Vibration SmartCheck" operating instructions, part no. 23085312.

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## 4.29 Breather

The following breathers can be used.

### 4.29.1 Breather (standard)

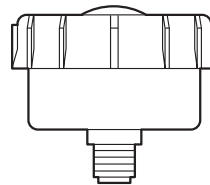


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#### Structure

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

### 4.29.2 Breather with filter insert (manufacturer: MAHLE)



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The breather has the following characteristics:

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

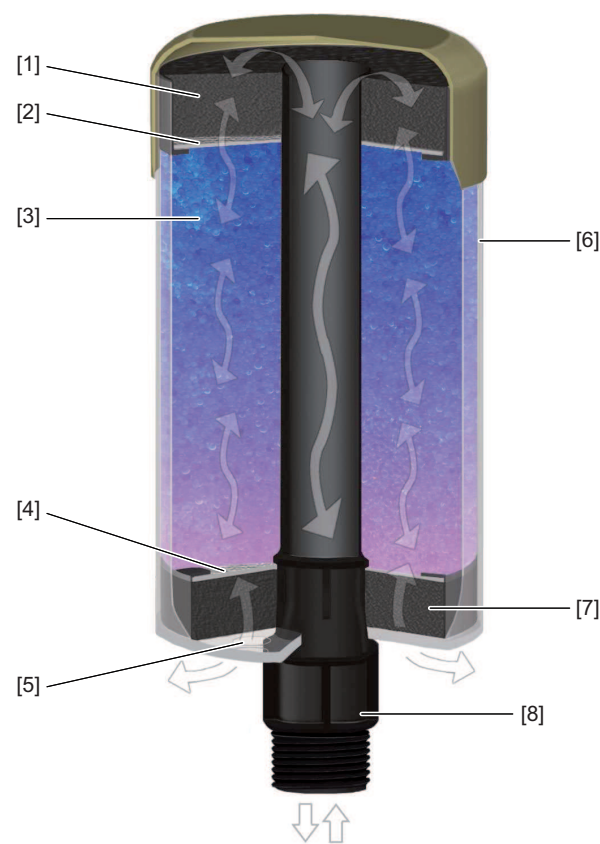
#### Structure

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

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

### 4.29.3 Desiccant breather filter (manufacturer: Des Case)

#### Structure



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[1] Foam inlay	Reduces oil mist that comes in contact with silica gel when air escapes and ensures that the escaping air is distributed equally to the filter and the desiccant.
[2] Filter element	Second polyester filter element that prevents the spreading of desiccant dust. Maximum efficiency due to backwashing.
[3] Steam absorbent	Silica gel absorbs water of the flowing in air. The desiccant changes its color from blue to pink to indicate the state.
[4] Filter element	Patented polyester filter element that filters contamination of up to 3 µm (absolute) from the air (74% efficiency at 0.5 µm). Special openings release particles if air escapes extending the service life of the filter.
[5] Ventilation openings	Individual openings are opened depending on the required air volume in the system. Dimensioned for 20 cfm (0.566438 m). (Unit is inactive due to plug until it is used).
[6] Loadable polycarbonate housing	Shock-absorbing, transparent casing for reliable operation and easy maintenance.
[7] Foam inlay	Absorbs oil mist and distributes the flowing in air equally to the filter and desiccant.
[8] Fastening via thread	Simple replacement of standard filter/breather caps with one or two adapters.

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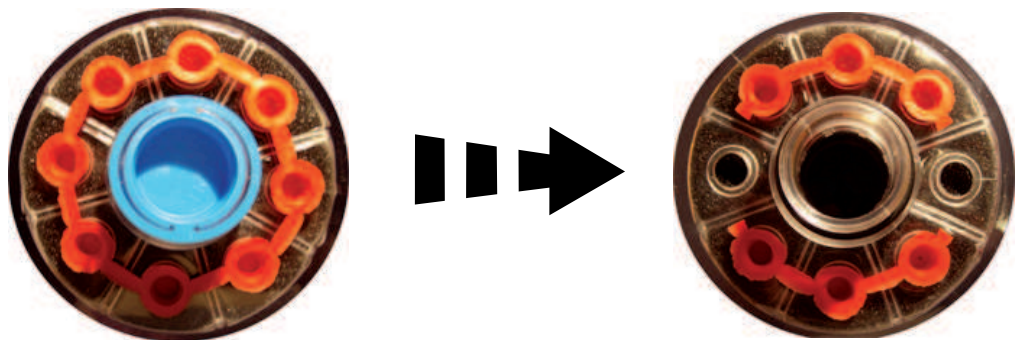
**Standard one-way breather filter**

Design	DC-2	DC-3	DC-4
Size (height × diameter in cm)	11.4 × 10.2	16.5 × 10.2	21.6 × 10.2
Filter area (cm <sup>2</sup> per filter)	25.4	25.4	25.4
Amount of silica gel (kg)	0.45	0.68	0.91
Amount of remaining water (l)	0.18	0.27	0.36
Amount of retained water (l)	0.65	1.15	1.6
Operating temperature range (°C)	-50 to +100	+50 to +100	+50 to +100
Max. flow rate (l/mn at 70 mb)	600	600	600
Desiccant	Silica gel	Silica gel	Silica gel
Filtering (μ absolute)	3	3	3
Connection dimension	1" NPT	1" NPT	1" NPT

DES-CASE breather filters comply with the European REACH requirements (valid as of 2007).

**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.

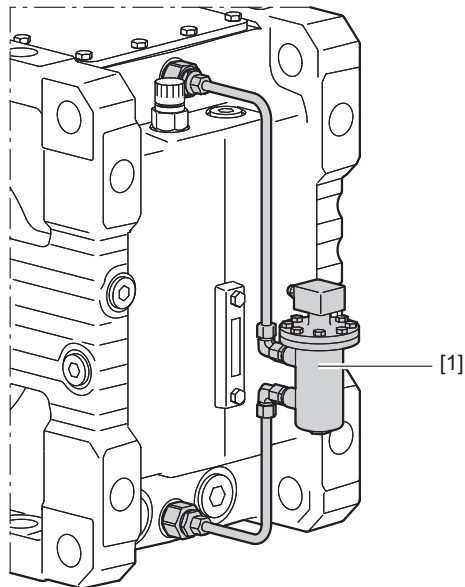


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### 4.30 Float switch

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

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



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## 5 Installation/assembly

### 5.1 Required tools/resources

Not included in the delivery:

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

### 5.2 Tolerances

Observe the following tolerances.

#### 5.2.1 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 <sup>1)</sup>	→ M30
Ø > 30...38 mm	→ M12	Ø > 225...320 mm <sup>1)</sup>	→ M36
Ø > 38...50 mm	→ M16	Ø > 320...500 mm <sup>1)</sup>	→ 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)

#### 5.2.2 Hollow shaft

Diameter tolerance:

Ø → ISO H7 for hollow shafts for shrink disk

Ø → ISO H8 for hollow shafts with keyway

#### 5.2.3 Mounting flange

Centering shoulder tolerance: ISO f7

### 5.3 Important notes

Read the following notes prior to installation/mounting.



#### ▲ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



#### ▲ WARNING

Danger due to mounting in impermissible mounting position.

Severe or fatal injuries.

- Install/mount the gear unit only in the specified mounting position on a level, vibration-damping, and torsionally rigid support structure. Do not twist housing legs and mounting flanges against each other.
- Contact SEW-EURODRIVE before mounting the gear unit in another mounting position than the one permitted.



#### ▲ WARNING

Danger due to freely accessible, rotating parts.

Severe or fatal injuries.

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



#### ▲ WARNING

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 installing impermissible components.

Severe or fatal injuries.

- Do not mount any impermissible components to the gear unit.
- Mounting impermissible components may lead to material failure at the gear unit. This may cause the gear unit to fall over or down.



### ▲ 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.

### NOTICE

Improper installation and assembly can damage the gear unit.

Possible damage to property.

- Observe the following notes.

- Make sure that the customer components are designed for the load.
- The gear units are delivered without oil fill as standard.
- Do not change the mounting position without prior consultation with SEW-EURODRIVE. The warranty will become void without prior consultation.
- The most important technical data is provided on the nameplate.  
Additional data relevant for operation is available in drawings, on the order confirmation or in any order-specific documentation.
- Do not modify the gear unit or the mount-on components without prior consultation of SEW-EURODRIVE.

- Install/mount the gear unit only in the specified mounting position on a level, vibration-damping, and torsionally rigid support structure. Do not twist housing legs and mounting flanges against each other.
- Make sure that the oil level plugs and oil drain plugs, as well as the breather are freely accessible.
- When installing a filter in the OAP and OWP cooling units, make sure there is sufficient height for removing the filter element and the filter hood.
- Use plastic inserts if there is a risk of electrochemical corrosion between the gear unit and the driven machine (connection between different metals such as cast iron and stainless steel). Likewise, fit the screws 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 drives as a ground point for welding work. Welding may destroy gearing components and bearings.
- Units installed outdoors must be protected from the sun. Suitable protective devices are required, such as covers or roofs. Avoid 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.
- For use in damp areas or outdoors, the gear units can be supplied with a suitable painting. Repair any damage to the paint work (e.g. on the breather).
- Do not modify the existing piping.
- For gear units that are filled with oil at the factory, check to see that the breather is installed before you start up the gear unit.
- Strictly observe the safety notes in the individual chapters.

## 5.4 Prerequisites for installation

Check that the following conditions have been met:

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

### NOTICE

Danger due to insufficiently cleaned flange surfaces.

Possible damage to property.

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

### 5.4.1 Extended storage

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

Replace the breather with a screw plug.

## 5.5 Installing the gear unit



### ▲ WARNING

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

Severe or fatal injuries.

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

### NOTICE

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

Possible damage to property.

- The foundation must be level and flat; the gear unit may not be deformed when tightening the retaining screws. Irregularity of the surface must be leveled out appropriately.
- Observe the weight specified on the nameplate.

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" (→ 107).



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

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

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

## INFORMATION



The screws must not be lubricated during assembly.

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

Observe the notes in chapter "Important information" (→ 102).

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



The screws must not be lubricated during assembly.

### 5.5.3 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.

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

### 5.6.1 General information

The gear unit is delivered without oil fill as standard.



#### ▲ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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

#### NOTICE

Improper oil filling may cause damage to the gear unit.

Possible damage to property.

- Observe the following notes.

- Fill the oil only when the gear unit is in the intended mounting position.
- Use an oil from the current lubricant table [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants).
- Make sure the oil has ambient temperature when filling it into the gear unit.
- For gear units with external supply pipes, e.g. oil supply systems, establish the connections prior to filling the oil.
- Observe the additional notes depending on the lubrication type in the following chapters.
- 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 additional information, refer to chapter "Checking the oil level" (→ 235) and chapter "Changing the oil" (→ 243).

When additional attachments, e.g. an oil supply system, are mounted to the gear unit, the required oil fill quantity is higher. In this case, observe the respective operating instructions "Oil Supply System" by SEW-EURODRIVE.

- Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).

## 5.6.2 Gear units with oil expansion tank/ET

## INFORMATION



Observe the notes in chapter "Changing the oil" (→ 245).

## NOTICE

An oil viscosity above the permitted level of 3500 mm<sup>2</sup>/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 therefore be required depending on the selected oil type. For guide values, refer to the following table.

Viscosity class	Min. oil filling temperature in °C	
	mineral	Synthetic
ISO VG 220	10	10
ISO VG 320	10	10
ISO VG 460	15	10
ISO VG 680	20	15

### 5.6.3 Gear units with shaft end pump/SEP

#### NOTICE

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

Possible damage to property.

- Note the following information.

- Fill the gear unit with the oil type and oil quantity corresponding to the nameplate data, see chapter "Changing the oil" (→ 243).
- Before startup, fill the additional mount-on components (such as piping, cooler matrix...) with oil on the pressure side. This 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 situated at the bottom, e.g. for the housing HA, the shaft end pump must not be manually filled at initial startup.
- Check the oil level using the oil dipstick or the oil level glass. For additional information, refer to chapter "Checking the oil level" (→ 235).
- Directly before taking the gear unit into operation the first time, 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].

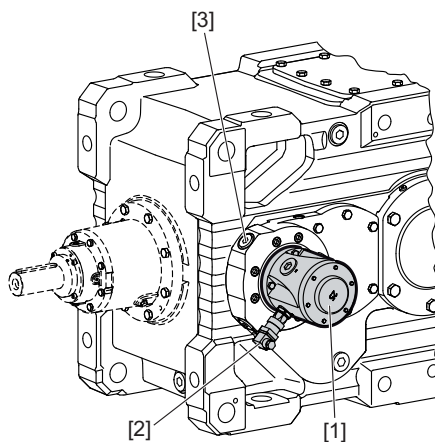
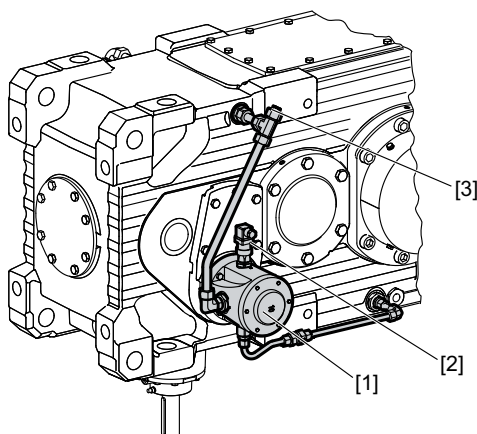
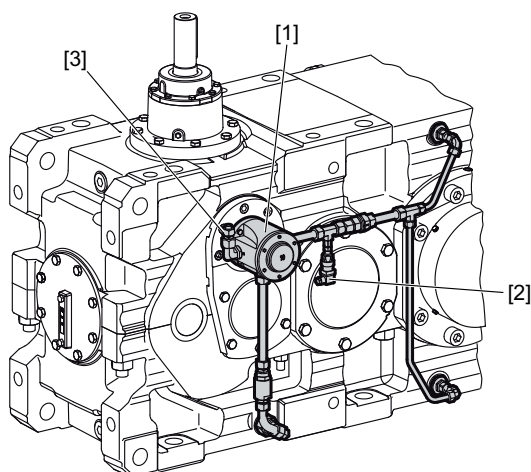
This procedure must be repeated after an idling time of more than 6 months.

- Gear units with shaft end pump [1] are equipped with a pressure switch [2] for function monitoring as standard. Connection has to be carried out by the customer. Observe chapter "Pressure switch" (→ 214).

For further information, refer to chapter "Gear units with pressure lubrication" (→ 222) and the manufacturer's documentation.

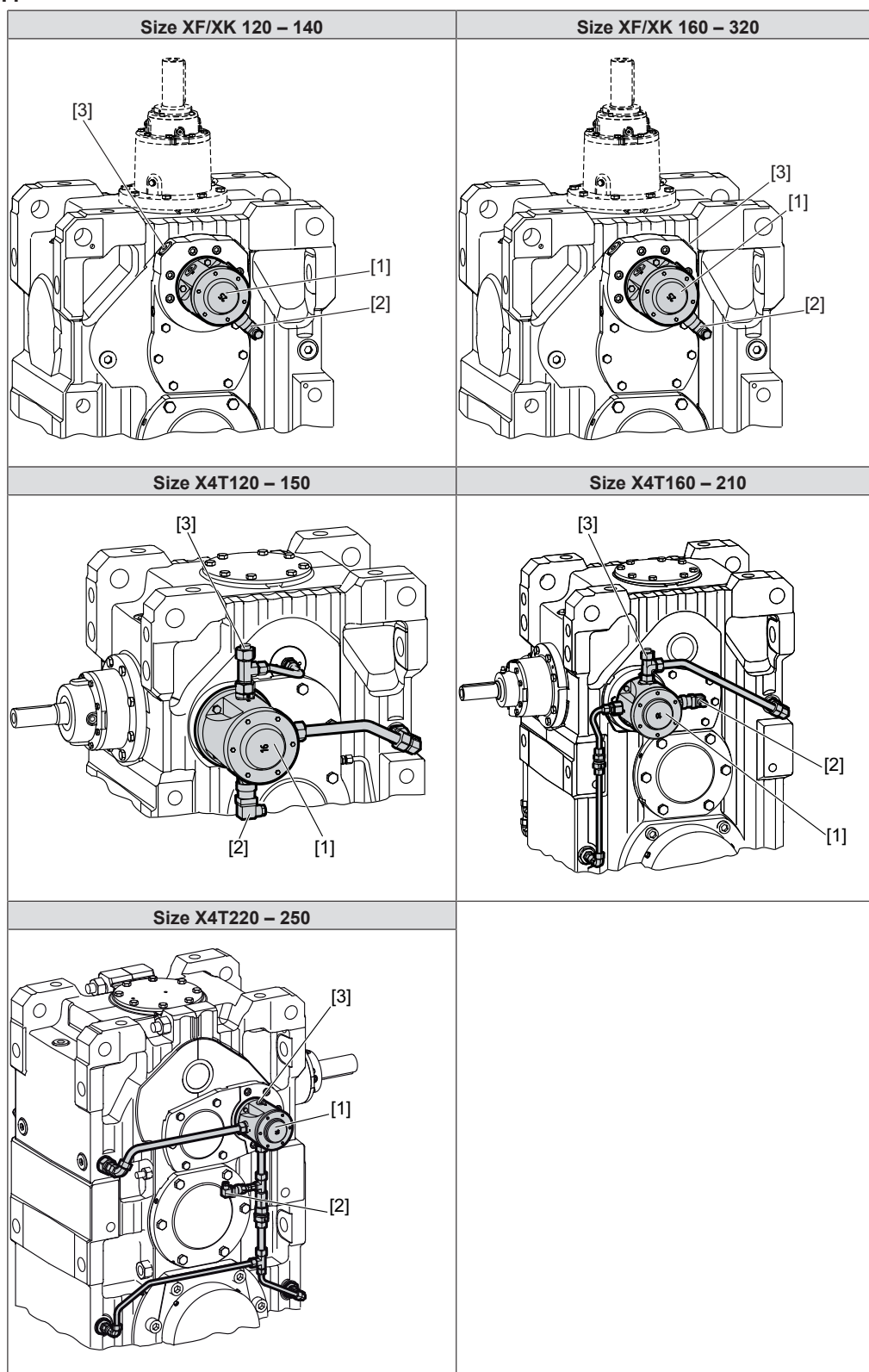
In case of a vertical mounting position and with the shaft end pump situated at the bottom, e.g. for gear units in mounting position M5/M6, the shaft end pump must not be manually filled at initial startup.

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

**Mounting position M1****Size XF/XK160 – 320****Size X4T160 – 210****Size X4T220 – 250**

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

### Mounting position M4

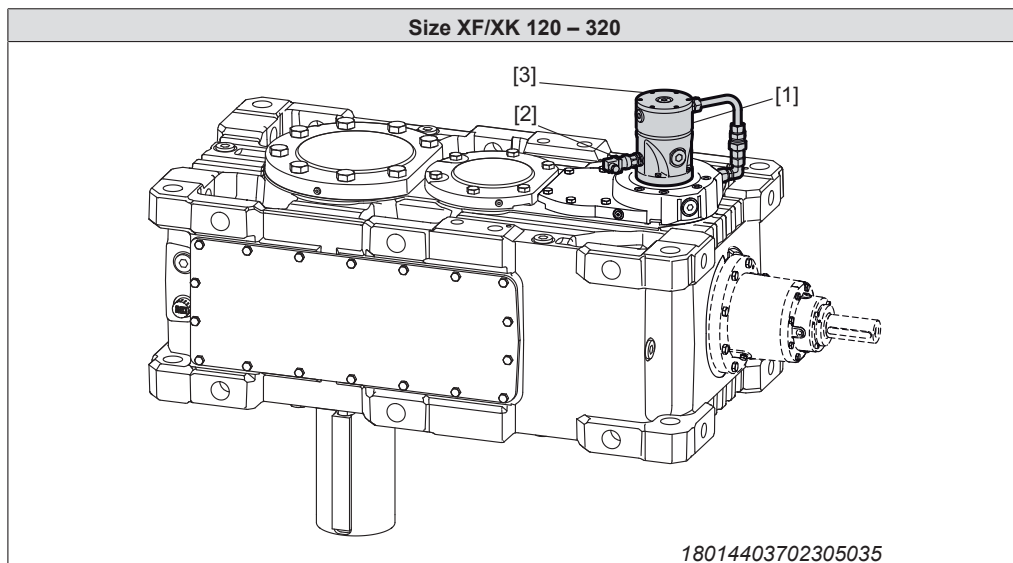
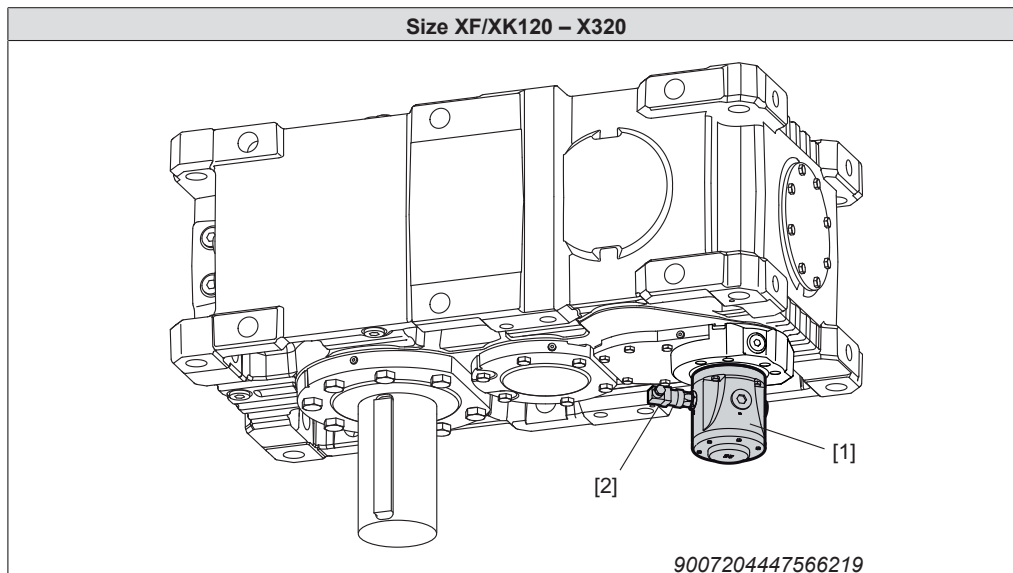


- [1] Shaft end pump  
[2] Pressure switch

- [3] Screw plug

**Mounting position M5***Universal housing /HU*

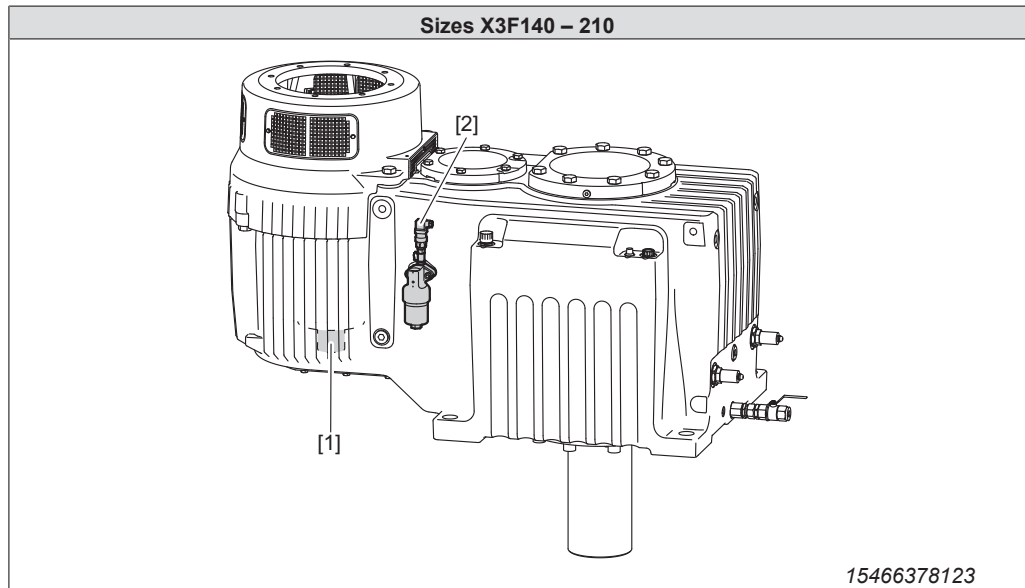
If the shaft end pump [1] is mounted below the oil level, the pump need not be filled with oil.



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



### Agitator housing /HA



- [1] Shaft end pump
- [2] Pressure switch

### 5.7 Gear units delivered with oil fill (option)

Observe the notes in chapter "Important information" (→ 102).

#### 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.

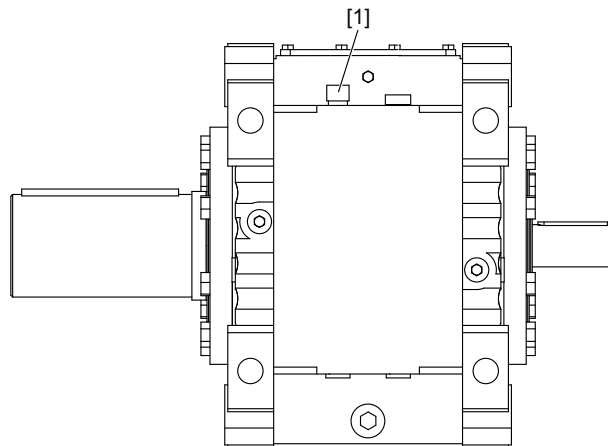
#### INFORMATION



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



4688864907

1. Remove the closing plug.
2. Insert the breather [1].
3. Check the oil level. Observe the information in chapter "Checking the oil level" (→ 235).

## 5.8 Gear unit with solid shaft

### 5.8.1 Mounting input and output components

Observe the notes in chapter "Important notes" (→ 102).

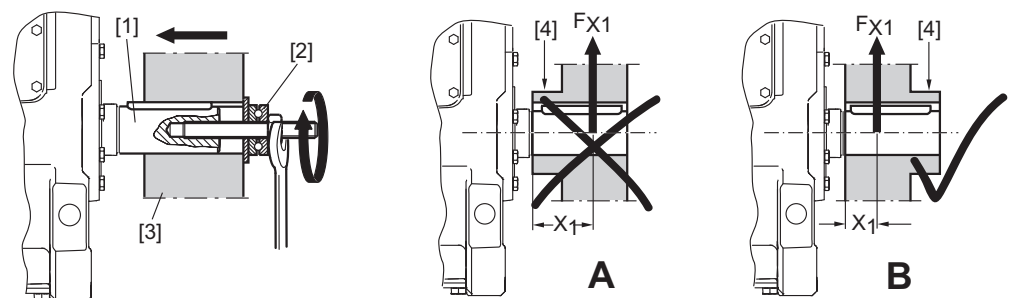
#### NOTICE

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

Possible damage to property.

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

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



12570941963

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

- A Incorrect  
B Correct

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

#### INFORMATION



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

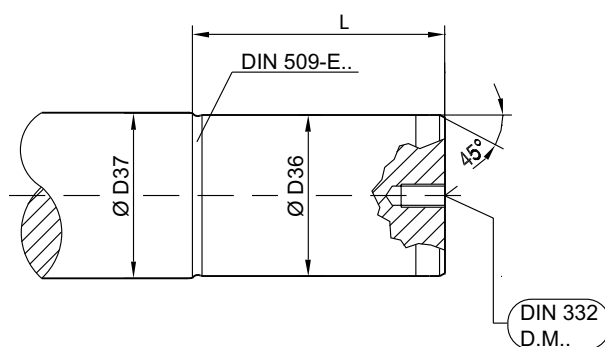
## 5.9 Flange coupling with cylindrical interference fit/FC-S

### 5.9.1 Dimensions of the machine shaft

#### INFORMATION



Make sure the dimensions of the machine shaft correspond to SEW specifications.

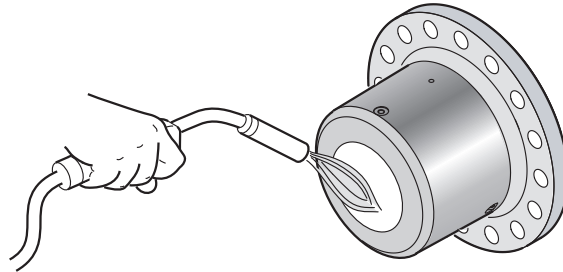


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	Ø D36	Ø D37	L	DIN 332 D.M..	DIN 509-E..
<b>X100</b>	85 <sub>v6</sub>	90	131	M20	E2.5x0.4
<b>X110</b>	85 <sub>v6</sub>	100	131	M20	E2.5x0.4
<b>X120</b>	115 <sub>v6</sub>	120	165	M24	E2.5x0.4
<b>X130</b>	115 <sub>v6</sub>	130	165	M24	E2.5x0.4
<b>X140</b>	135 <sub>v6</sub>	140	202	M30	E2.5x0.4
<b>X150</b>	135 <sub>v6</sub>	160	202	M30	E2.5x0.4
<b>X160</b>	165 <sub>v6</sub>	170	222	M30	E2.5x0.4
<b>X170</b>	165 <sub>v6</sub>	170	222	M30	E2.5x0.4
<b>X180</b>	175 <sub>v6</sub>	180	253	M30	E2.5x0.4
<b>X190</b>	175 <sub>v6</sub>	180	253	M30	E2.5x0.4
<b>X200</b>	195 <sub>v6</sub>	200	283	M30	E2.5x0.4
<b>X210</b>	195 <sub>v6</sub>	200	283	M30	E2.5x0.4
<b>X220</b>	235 <sub>v6</sub>	240	298	M36	E2.5x0.4
<b>X230</b>	235 <sub>v6</sub>	240	298	M36	E2.5x0.4
<b>X240</b>	275 <sub>v6</sub>	280	318	M36	E2.5x0.4
<b>X250</b>	275 <sub>v6</sub>	280	318	M36	E2.5x0.4
<b>X260</b>	275 <sub>v6</sub>	280	318	M36	E2.5x0.4
<b>X270</b>	295 <sub>v6</sub>	300	343	M36	E2.5x0.4
<b>X280</b>	295 <sub>v6</sub>	300	343	M36	E2.5x0.4
<b>X290</b>	315 <sub>v6</sub>	320	373	M36	E2.5x0.4
<b>X300</b>	315 <sub>v6</sub>	320	373	M36	E2.5x0.4
<b>X310</b>	355 <sub>v6</sub>	360	413	M42	E2.5x0.4
<b>X320</b>	355 <sub>v6</sub>	360	413	M42	E2.5x0.4

### 5.9.2 Mounting the coupling onto the machine shaft

1. Clean the shaft and bore of the flange coupling thoroughly and remove any grease. The disassembly bores of the coupling must also be free from dirt.
2. **NOTICE!** Improper mounting may result in damage to the coupling. Possible damage to property.  
Make sure that the shaft and bore are completely free from grease to ensure proper functioning of the interference fit. Do not use assembly paste during assembly.
3. Heat the flange coupling to a joining temperature of 230 °C as long as no special joining temperature is specified for the order.
4. **▲ CAUTION!** The required assembly clearance is achieved only by heating the coupling. Important: Risk of burns during the assembly process.  
Make sure that hot parts cannot be touched unintentionally.
5. **NOTICE!** Radiant heat from the flange coupling can damage adjacent elements. Possible damage to property.  
Protect adjacent elements (e.g. oil seals) with suitable heat shields.



1153862283

6. Mount the flange coupling quickly onto the shaft up against the shaft shoulder.

### INFORMATION

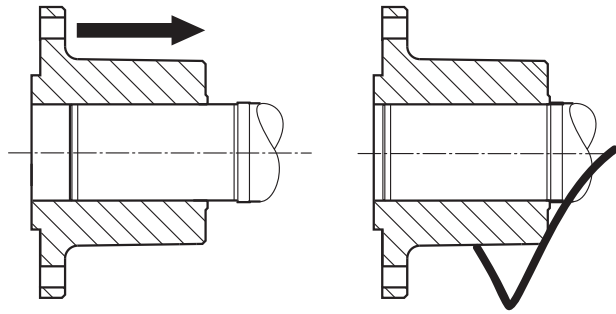


Prepare mounting tools and plan the process carefully so that the coupling can be fitted to the shaft quickly. During the cooling process, the coupling must be secured on the shaft.

### INFORMATION



Once the coupling has cooled down, spray the disassembly bores with clean mineral oil and close them using the supplied screw plugs.



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### 5.9.3 Mounting the flange connection

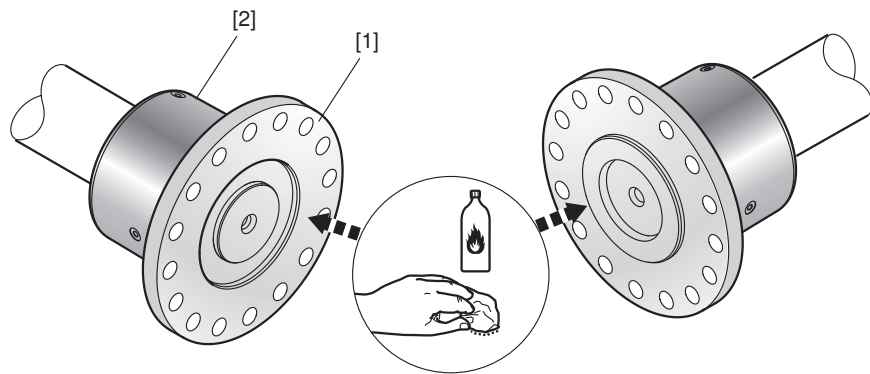
#### NOTICE

Improper mounting may result in damage to the coupling.

Possible damage to property.

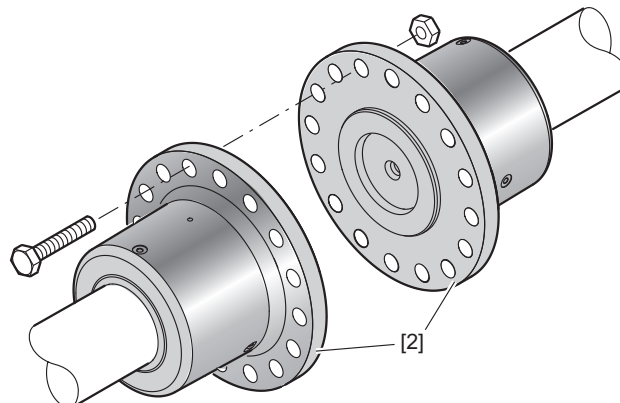
- Note that the flange coupling cannot compensate shaft misalignments.

1. Clean the flange surfaces [1] of the coupling halves [2].



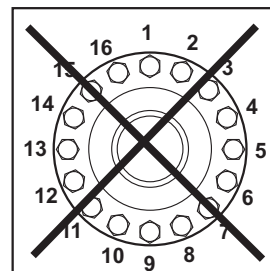
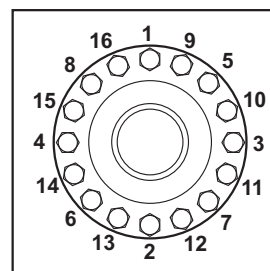
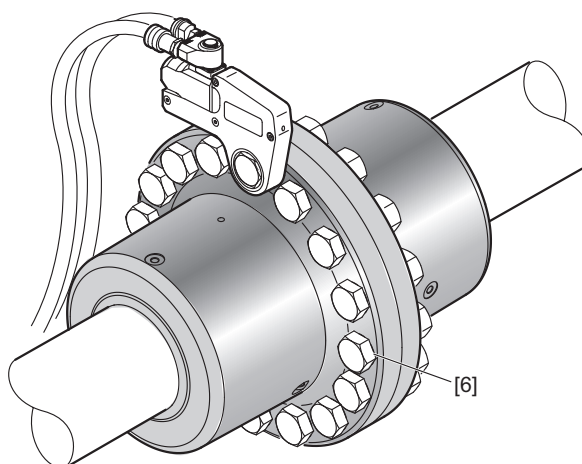
992697355

2. Align the bore patterns of the two coupling halves [2] and join the flange coupling.



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3. Mount the bolts [3] and tighten them in diametrically opposite sequence with the tightening torques given in the following table.



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## INFORMATION



The tightening torques listed in the following table are based on the friction coefficient for thread and bearing surface of  $\mu = 0.11$ .

When you use other screws than the screws included in the delivery, the tightening torques must be adjusted to the new friction conditions.

Only use the following tools for the installation:

- Signal-generating torque wrench
- Motorized torque wrench with dynamic torque measuring
- Torque-controlled, gradual hydraulic tools

Size	Thread	Tightening torque	Strength class
		Nm	
X100 – 110	M20	555	10.9
X120 – 130	M24	960	
X140 – 150	M30	1910	
X160 – 190	M36	3320	
X200 – 230	M42	5310	
X240 – 280	M48	7990	
X290 – 320	M56	12690	

## 5.9.4 Removing the coupling from the shaft

## Notes

**▲ CAUTION**

Risk of trapping and crushing due to improper disassembly of heavy components.

Risk of injury.

- Disassemble the flange coupling properly.
- Observe the following instructions for disassembly.

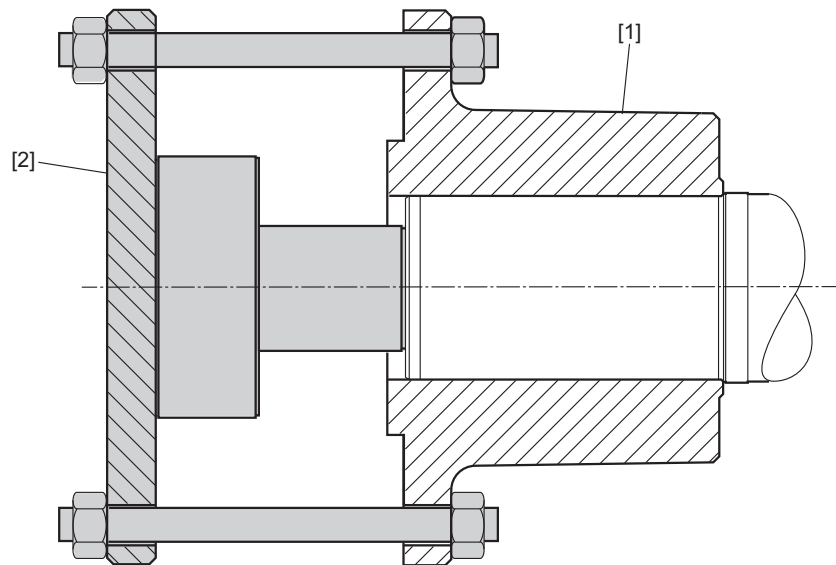
**NOTICE**

Improper disassembly may damage the output shaft bearing.

Possible damage to property

- Do not apply any tools between the coupling and the gear unit housing.

To disassemble the coupling [1], the interference fit must first be expanded hydraulically. The remaining holding force must then be overcome with an extractor [2]. The following figure shows an exemplary design of a hydraulic extractor.



1071755147

For disassembling the coupling, one oil pump is required per disassembly bore.



The data required for dimensioning the extractor is listed in the following table.

Size	Oil pressure required for disassembly bar	Number of disassembly bores/number of required oil pumps	Connection thread of the pressure oil bores in the flange coupling	Required axial force of the pull-off device kN
X100 – 110	1600	2	G 1/4"	85
X120 – 130		2		115
X140 – 150		2		160
X160 – 170		2		190
X180 – 190		3		220
X200 – 210		3		280
X220 – 230		3		360
X240 – 260		3		420
X270 – 280		3		490
X290 – 300		3		550
X310 – 320		3		670

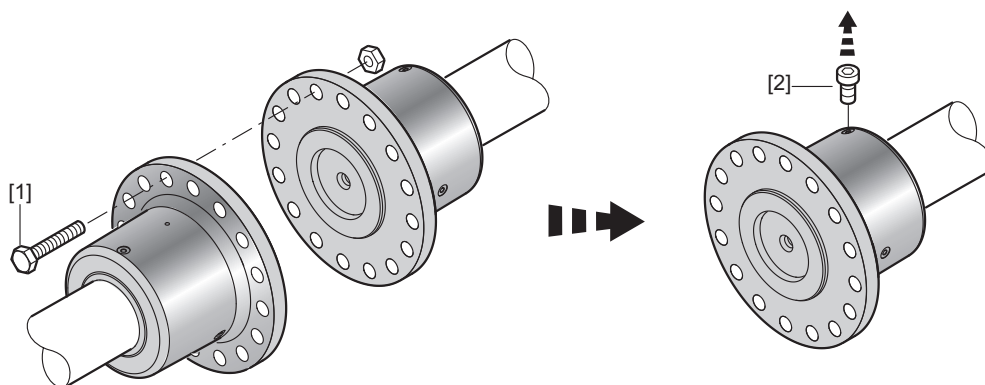
## Procedure

1. Loosen the bolts [1] and separate the flange coupling. Remove the screw plugs [2] of the disassembly bores.

## INFORMATION



Prepare disassembly tools and the process carefully, so that the flange coupling can be removed from the shaft quickly.



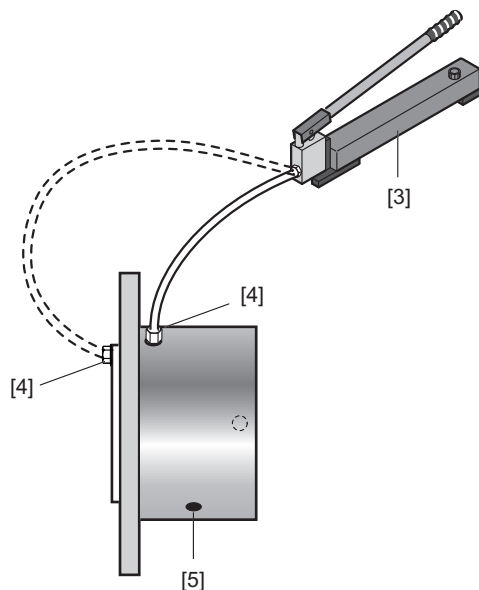
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2. Connect the first oil pump [3] to the disassembly bore closest to the flange [4] and apply pressure until oil comes out of the second disassembly bore [5]. Depending on the size, this bore can also be located on the flange surface of the coupling.

## INFORMATION

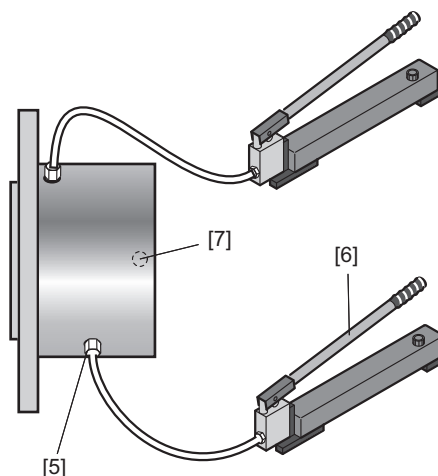


It is essential that you observe the manufacturers' safety notes of the hydraulic devices during the disassembly process.



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3. Connect the next oil pump [6] to this bore [5] and press in oil until it comes out at the next disassembly bore [7].



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4. Repeat this process until all disassembly bores are connected to an oil pump and pressure is applied. At the last disassembly bore [7], the pressure must be increased until at both front faces of the coupling [8] oil comes out in the shape of a ring.



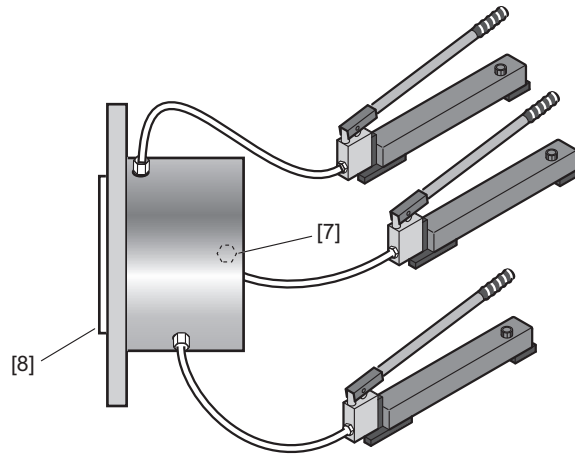
## INFORMATION

The coupling can also be disassembled with only one oil pump. In this case, the individual disassembly bores must be blocked after pressure has been applied. Provide for a consistent pressure throughout the disassembly procedure.



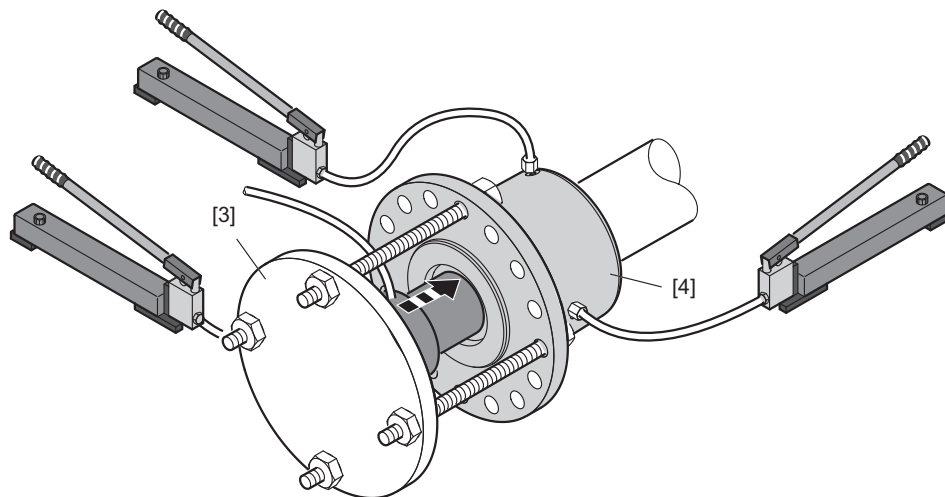
## INFORMATION

Before removing the coupling, keep the oil pressure constant for approximately 30 minutes to create an evenly distributed oil film inside the interference fit. The pressure must be kept constant during this time and the remaining disassembly process at all bores.



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5. Install the extractor [3]. Remove the coupling from the shaft. Since the oil pressure breaks down after the last disassembly bore has been reached, the required force for removing the coupling is significantly higher at the end.



1000624651

6. Check the condition of the shaft and the coupling bore after the disassembly process. Damaged parts must be replaced.

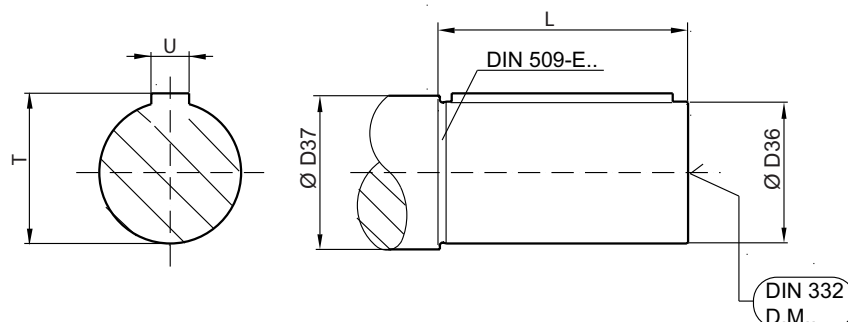
## 5.10 Flange coupling with keyway/FC-K

### 5.10.1 Dimensions of the machine shaft

#### INFORMATION



Make sure the dimensions of the machine shaft correspond to SEW specifications.



	Ø D36	Ø D37	L	T	V	DIN 332 D.M..	DIN 509-E..
X100	80 <sub>m6</sub>	90	170	85	22 <sub>h9</sub>	20	2.5×0.4
X110	90 <sub>m6</sub>	90	170	95	25 <sub>h9</sub>	24	2.5×0.4
X120	100 <sub>m6</sub>	120	210	106	28 <sub>h9</sub>	24	2.5×0.4
X130	110 <sub>m6</sub>	130	210	116	28 <sub>h9</sub>	24	2.5×0.4
X140	120 <sub>m6</sub>	140	210	127	32 <sub>h9</sub>	24	2.5×0.4
X150	130 <sub>m6</sub>	160	250	137	32 <sub>h9</sub>	24	4.0×0.5
X160	140 <sub>m6</sub>	170	250	148	36 <sub>h9</sub>	30	4.0×0.5
X170	160 <sub>m6</sub>	170	300	169	40 <sub>h9</sub>	30	4.0×0.5
X180	170 <sub>m6</sub>	180	300	179	40 <sub>h9</sub>	30	2.5×0.4
X190	170 <sub>m6</sub>	180	300	179	40 <sub>h9</sub>	30	2.5×0.4
X200	180 <sub>m6</sub>	200	300	190	45 <sub>h9</sub>	30	4.0×0.5
X210	190 <sub>m6</sub>	200	350	200	45 <sub>h9</sub>	30	2.5×0.4
X220	210 <sub>m6</sub>	240	350	221	50 <sub>h9</sub>	30	4.0×0.5
X230	230 <sub>m6</sub>	240	410	241	50 <sub>h9</sub>	36	2.5×0.4
X240	230 <sub>m6</sub>	280	410	241	50 <sub>h9</sub>	36	4.0×0.5
X250	240 <sub>m6</sub>	280	410	252	56 <sub>h9</sub>	36	4.0×0.5
X260	250 <sub>m6</sub>	280	410	262	56 <sub>h9</sub>	36	4.0×0.5
X270	270 <sub>m6</sub>	300	470	282	63 <sub>h9</sub>	36	4.0×0.5
X280	290 <sub>m6</sub>	300	470	302	63 <sub>h9</sub>	36	4.0×0.5
X290	290 <sub>m6</sub>	320	470	302	63 <sub>h9</sub>	36	4.0×0.5
X300	300 <sub>m6</sub>	320	470	314	70 <sub>h9</sub>	36	4.0×0.5
X310	320 <sub>m6</sub>	360	470	334	70 <sub>h9</sub>	42	4.0×0.5
X320	340 <sub>m6</sub>	360	550	355	80 <sub>h9</sub>	42	4.0×0.5

### 5.10.2 Mounting the coupling onto the machine shaft

Observe the notes in chapter "Important information" (→ 102).

#### NOTICE

Improper mounting may result in damage to the coupling.

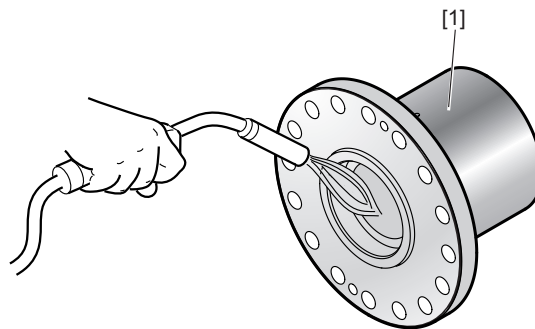
Possible damage to property.

- Make sure that the shaft and bore are completely free from grease to ensure proper functioning of the interference fit / keyed connection. Do not use assembly paste during assembly.

1. Clean the shaft and bore of the rigid flange coupling thoroughly and remove any grease.
2. **▲ CAUTION!** The required assembly clearance is achieved only by heating the coupling. Risk of burns during the entire assembly process. Make sure that hot parts cannot be touched unintentionally.

**NOTICE!** Radiant heat from the flange coupling half [1] can damage adjacent elements. Possible damage to property. Protect adjacent elements (e.g. oil seals) with suitable heat shields.

Heat the flange coupling half [1] to a joining temperature of 130 °C, as long as no special joining temperature is specified for the order.



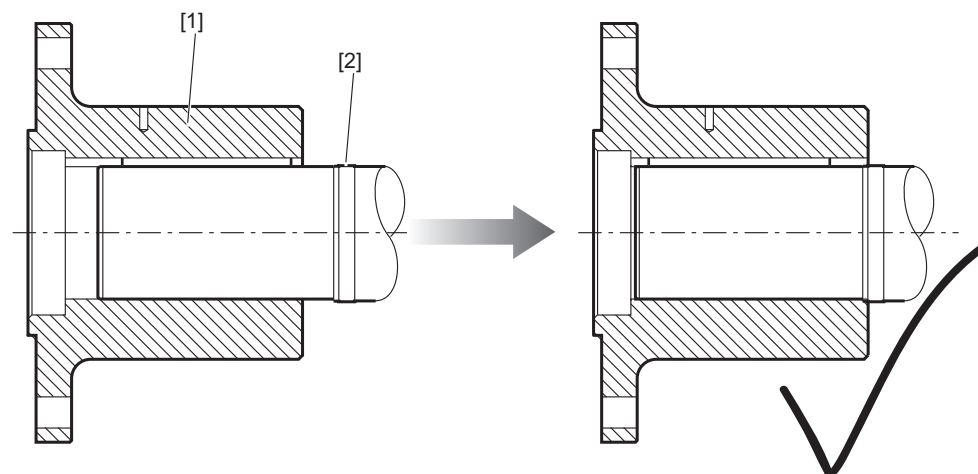
4349544459

3. Mount the flange coupling half [1] quickly onto the gear unit shaft all the way to the gear shaft [2].

#### INFORMATION



Prepare mounting tools and plan the process carefully so that the coupling can be fitted to the shaft quickly. During the cooling process, the coupling must be secured on the shaft.



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### 5.10.3 Mounting the flange connection

Observe the notes in chapter "Important information" (→ 102).

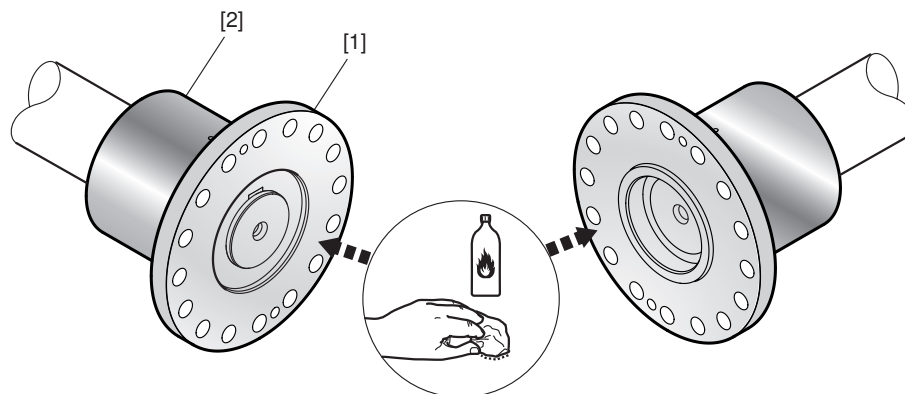
#### NOTICE

Improper assembly may damage the flange coupling.

Possible damage to property.

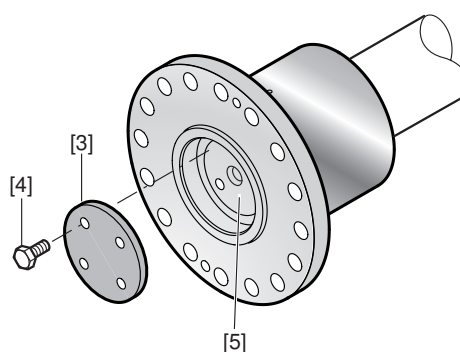
- Note that the flange coupling cannot compensate shaft misalignments.

1. Clean the flange surfaces [1] of the flange coupling halves [2].



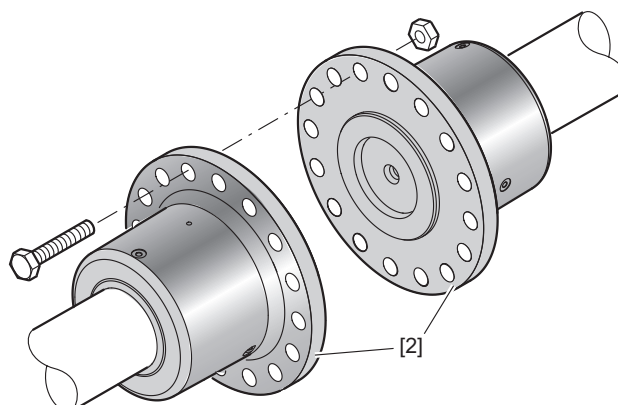
4349540107

2. Mount the end plate [3] to the gear shaft [5] with screws [4].



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- Align the bore patterns of the two flange coupling halves [2] and join the flange coupling.



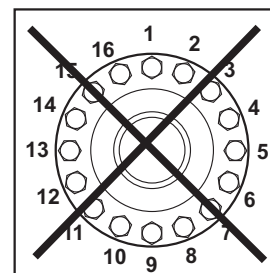
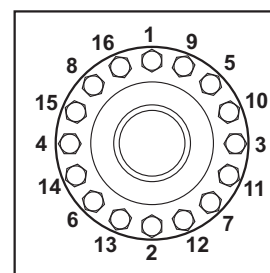
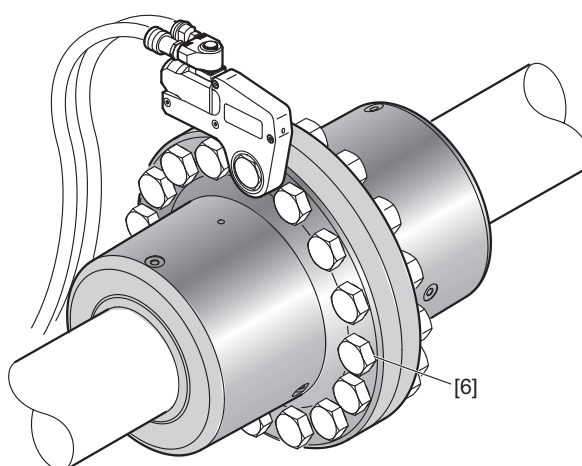
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- Mount the bolts [6] and tighten them in diametrically opposite sequence with the tightening torques given in the following table.

## INFORMATION



The screws must not be lubricated during assembly.



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## INFORMATION



The tightening torques listed in the following table are based on the friction coefficient for thread and bearing surface of  $\mu = 0.11$ .

When you use other screws than the screws included in the delivery, the tightening torques must be adjusted to the new friction conditions.

Only use the following tools for the installation:

- Signal-generating torque wrench
- Motorized torque wrench with dynamic torque measuring
- Torque-controlled, gradual hydraulic tools

Size	Screw size	Tightening torque Nm Strength class 10.9
X100 – 110	M16	285
X120 – 140	M20	555
X150 – 170	M24	960
X180 – 220	M30	1910
X230 – 300	M36	3320
X310 – 320	M42	5310



#### 5.10.4 Removing the coupling from the shaft

Observe the notes in chapter "Important notes" (→ 102).



#### CAUTION

Risk of trapping and crushing due to improper disassembly of heavy components.

Risk of injury.

- Disassemble the flange coupling properly.
- Observe the following instructions for disassembly.

#### NOTICE

Improper disassembly may damage the output shaft bearing.

Possible damage to property.

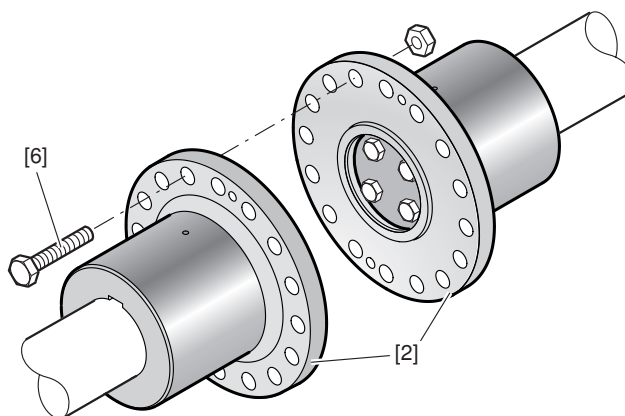
- Do not apply any tools between the coupling and the gear unit housing.

1. Loosen the screws [6] and separate the flange coupling [2].

#### INFORMATION

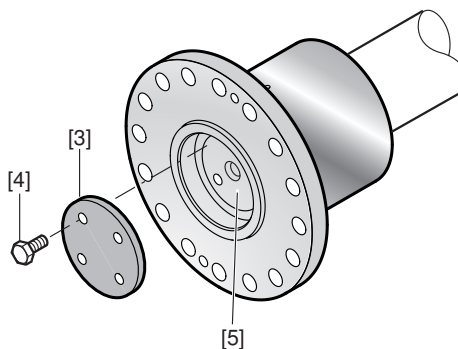


Prepare disassembly tools and the process carefully, so that the flange coupling can be removed from the shaft quickly.



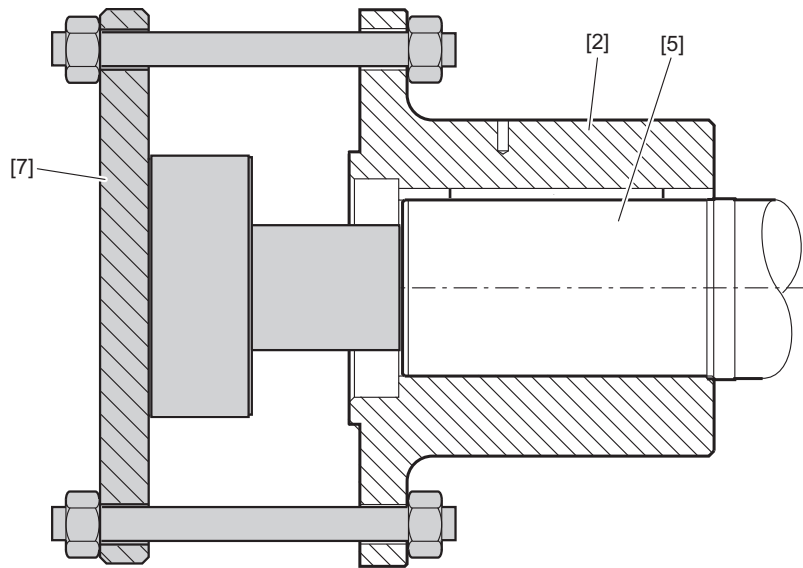
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2. Loosen the screws [4] and remove the end plate [3] from the gear shaft [5].



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3. Install the extractor [7]. Remove the flange coupling half [2] from the shaft [5].



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4. Check the condition of the shaft and the flange coupling after the disassembly process. Damaged parts must be replaced.

## 5.11 Output shaft as hollow shaft with keyed connection/..A

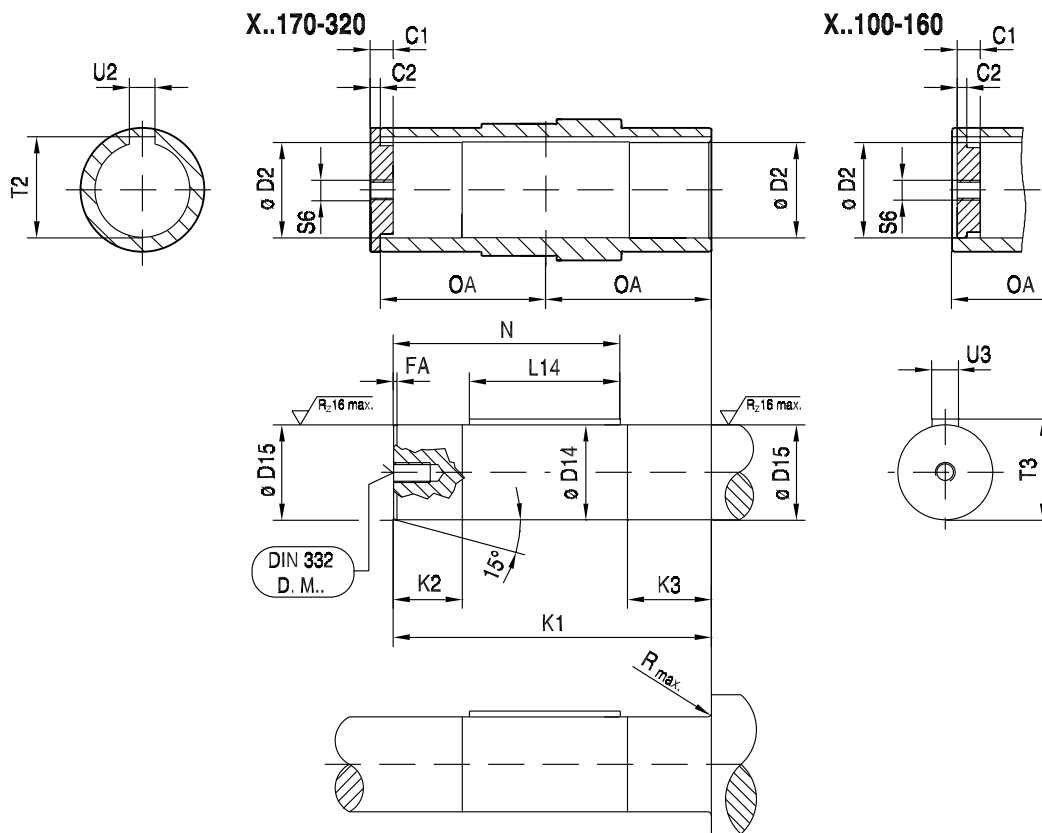
### 5.11.1 General information

The material of the machine shaft as well as the keyed connection should be dimensioned by the customer according to the loads that will occur. The shaft material should have a yield point of at least 320 N/mm<sup>2</sup>.

The minimum key length given in the dimension sheet (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 be designed with a contact shoulder. It should be secured with a suitable threadlocker to prevent the retaining screw of the machine shaft from loosening in the case of a reversing load direction. If necessary, two eccentric retaining screws may be used.

## 5.11.2 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 33 2 DR.M..
X..A100	25	12	75 <sup>H8</sup>	75 <sub>h11</sub>	75 <sub>B7</sub>	2	312	47.5	81	90	205	173	1.6	M24	80.4	80	20 <sup>JS9</sup>	20 <sub>h9</sub>	M20
X..A110	30	14	85 <sup>H8</sup>	85 <sub>h11</sub>	85 <sub>B7</sub>	2	312.5	45	84	100	210	176	1.6	M24	90.4	90	22 <sup>JS9</sup>	22 <sub>h9</sub>	M20
X..A120	30	14	95 <sup>H8</sup>	95 <sub>h11</sub>	95 <sub>B7</sub>	2	342	53	92	140	244.5	190.5	1.6	M30	100.4	100	25 <sup>JS9</sup>	25 <sub>h9</sub>	M24
X..A130	30	14	105 <sup>H8</sup>	105 <sub>h11</sub>	105 <sub>B7</sub>	2	347	68	109	160	258	194	1.6	M30	111.4	111	28 <sup>JS9</sup>	28 <sub>h9</sub>	M24
X..A140	30	14	115 <sup>H8</sup>	115 <sub>h11</sub>	115 <sub>B7</sub>	2	403	61	102	200	306	222	1.6	M30	122.4	122	32 <sup>JS9</sup>	32 <sub>h9</sub>	M24
X..A150	30	14	125 <sup>H8</sup>	125 <sub>h11</sub>	125 <sub>B7</sub>	3	408	76	117	200	308.5	224.5	1.6	M30	132.4	132	32 <sup>JS9</sup>	32 <sub>h9</sub>	M24
X..A160	36	16	135 <sup>H8</sup>	135 <sub>h11</sub>	135 <sub>B7</sub>	3	465	80	127	250	361	256	1.6	M36	143.4	143	36 <sup>JS9</sup>	36 <sub>h9</sub>	M30
X..A170	36	17	150 <sup>H8</sup>	150 <sub>h11</sub>	150 <sub>B7</sub>	3	493	96	115	280	377	256	1.6	M36	158.4	158	36 <sup>JS9</sup>	36 <sub>h9</sub>	M30
X..A180	36	17	165 <sup>H8</sup>	165 <sub>h11</sub>	165 <sub>B7</sub>	3	565	109	128	300	423	292	2	M36	174.4	174	40 <sup>JS9</sup>	40 <sub>h9</sub>	M30
X..A190	36	17	165 <sup>H8</sup>	165 <sub>h11</sub>	165 <sub>B7</sub>	3	565	109	128	300	423	292	2	M36	174.4	174	40 <sup>JS9</sup>	40 <sub>h9</sub>	M30
X..A200	36	17	180 <sup>H8</sup>	180 <sub>h11</sub>	180 <sub>B7</sub>	3	620	130	149	320	460.5	319.5	2	M36	190.4	190	45 <sup>JS9</sup>	45 <sub>h9</sub>	M30
X..A210	36	17	190 <sup>H8</sup>	190 <sub>h11</sub>	190 <sub>B7</sub>	3	620	130	149	320	460.5	319.5	2	M36	200.4	200	45 <sup>JS9</sup>	45 <sub>h9</sub>	M30
X..A220	36	17	210 <sup>H8</sup>	210 <sub>h11</sub>	210 <sub>B7</sub>	3	686	133	152	370	518.5	352.5	2.5	M36	221.4	221	50 <sup>JS9</sup>	50 <sub>h9</sub>	M30
X2KA220	36	17	210 <sup>H8</sup>	210 <sub>h11</sub>	210 <sub>B7</sub>	3	756	133	152	370	554	388	2.5	M36	221.4	221	50 <sup>JS9</sup>	50 <sub>h9</sub>	M30
X..A230	36	17	210 <sup>H8</sup>	210 <sub>h11</sub>	210 <sub>B7</sub>	3	686	133	152	370	518.5	352.5	2.5	M36	221.4	221	50 <sup>JS9</sup>	50 <sub>h9</sub>	M30
X2KA230	36	17	210 <sup>H8</sup>	210 <sub>h11</sub>	210 <sub>B7</sub>	3	756	133	152	370	554	388	2.5	M36	221.4	221	50 <sup>JS9</sup>	50 <sub>h9</sub>	M30
X..A240	45	22	230 <sup>H8</sup>	230 <sub>h11</sub>	230 <sub>B7</sub>	3	778	147	170	370	562.5	400.5	2.5	M42	241.4	241	50 <sup>JS9</sup>	50 <sub>h9</sub>	M36
X2KA240	45	22	230 <sup>H8</sup>	230 <sub>h11</sub>	230 <sub>B7</sub>	3	853	147	170	370	600	438	2.5	M42	241.4	241	50 <sup>JS9</sup>	50 <sub>h9</sub>	M36
X..A250	45	22	240 <sup>H8</sup>	240 <sub>h11</sub>	240 <sub>B7</sub>	3	778	147	170	370	562.5	400.5	2.5	M42	252.4	252	56 <sup>JS9</sup>	56 <sub>h9</sub>	M36
X2KA250	45	22	240 <sup>H8</sup>	240 <sub>h11</sub>	240 <sub>B7</sub>	3	853	147	170	370	600	438	2.5	M42	252.4	252	56 <sup>JS9</sup>	56 <sub>h9</sub>	M36
X..A260	45	22	240 <sup>H8</sup>	240 <sub>h11</sub>	240 <sub>B7</sub>	3	851	143	166	450	639	437	2.5	M42	252.4	252	56 <sup>JS9</sup>	56 <sub>h9</sub>	M36
X..A270	45	22	275 <sup>H8</sup>	275 <sub>h11</sub>	275 <sub>B7</sub>	4	877	158	181	450	652	450	5	M42	287.4	287	63 <sup>JS9</sup>	63 <sub>h9</sub>	M36
X..A280	45	22	275 <sup>H8</sup>	275 <sub>h11</sub>	275 <sub>B7</sub>	4	877	158	181	500	677	450	5	M42	287.4	287	63 <sup>JS9</sup>	63 <sub>h9</sub>	M36
X..A290	45	22	290 <sup>H8</sup>	290 <sub>h11</sub>	290 <sub>B7</sub>	4	961	160	183	500	719	492	5	M42	302.4	302	63 <sup>JS9</sup>	63 <sub>h9</sub>	M36
X..A300	45	22	290 <sup>H8</sup>	290 <sub>h11</sub>	290 <sub>B7</sub>	4	961	160	183	500	719	492	5	M42	302.4	302	63 <sup>JS9</sup>	63 <sub>h9</sub>	M36
X..A310	55	28	320 <sup>H8</sup>	320 <sub>h11</sub>	320 <sub>B7</sub>	4	1030	170	197	560	781.5	528.5	5	M42	334.4	334	70 <sup>JS9</sup>	70 <sub>h9</sub>	M36
X..A320	55	28	320 <sup>H8</sup>	320 <sub>h11</sub>	320 <sub>B7</sub>	4	1030	170	197	560	781.5	528.5	5	M42	334.4	334	70 <sup>JS9</sup>	70 <sub>h9</sub>	M36

## 5.11.3 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

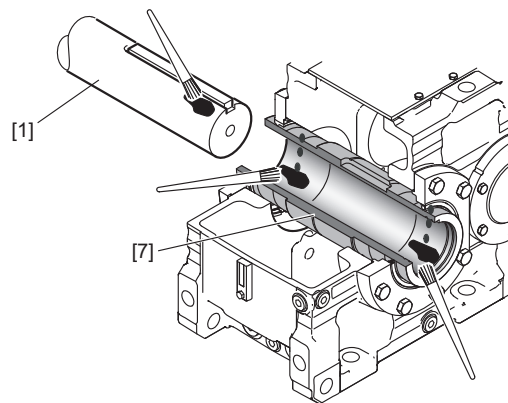
Observe the notes in chapter "Important information" (→ 102).

## INFORMATION



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

1. Apply assembly paste, such as Rivolta F.L.A. to the hollow shaft [7] and the machine shaft end [1].



9007216094671627

- [1] Machine shaft  
[7] Hollow shaft

2. 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..A100	M20
X..A110 – 150	M24
X..A160	M30

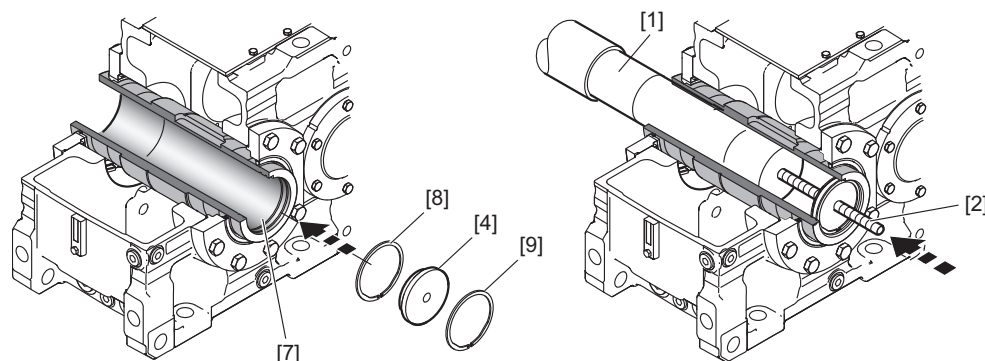
Observe the following information on the retaining rings [8]/[9].

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

## INFORMATION

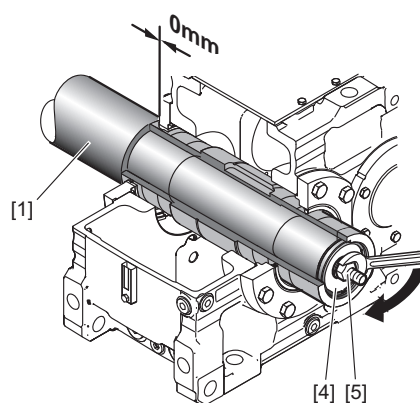


The assembly is easier if you first apply lubricant to the threaded rod and nut.



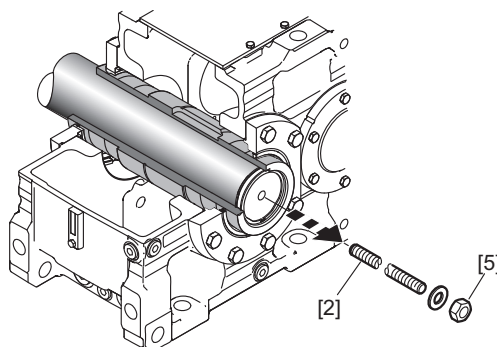
- |     |               |     |                         |
|-----|---------------|-----|-------------------------|
| [1] | Machine shaft | [7] | Hollow shaft            |
| [2] | Threaded rod  | [8] | Retaining ring, inside  |
| [4] | End plate     | [9] | Retaining ring; outside |

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.



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

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

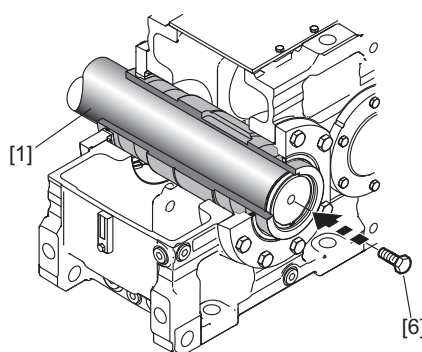


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- [2] Threaded rod  
[5] Nut

5. Secure the machine shaft [1] using 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 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.

- Be sure to properly attach the protection cover after completing assembly.

### 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-proof after completing assembly.

## Size X170 – 320

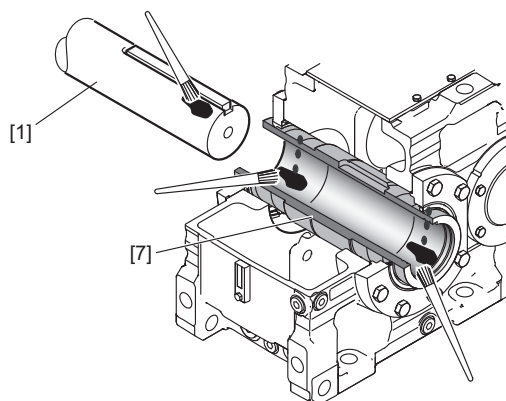
Observe the notes in chapter "Important information" (→ 102).

## 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 assembly paste, such as Rivolta F.L.A. to the hollow shaft [7] and the machine shaft end [1].



9007216094671627

- [1] Machine shaft  
[7] Hollow shaft

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

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

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

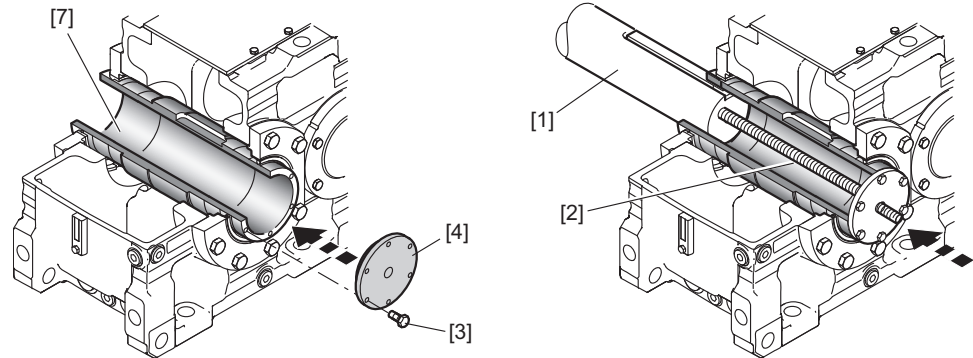
Size	Thread size for 6 × retaining screws Strength class 10.9	Tightening torque	
		Assembly/ operating state Nm	Disassembly Nm
X..A170 – 190	M10x30	79	Apply hand pressure
X..A200 – 230	M12x30	137	Apply hand pressure
X..A240 – 300	M16x30	338	Apply hand pressure
X..A310 – 320	M20x50	661	Apply hand pressure

## INFORMATION



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

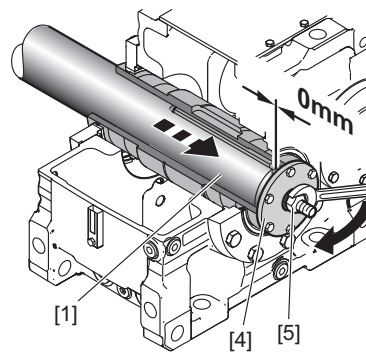




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- |     |                 |     |              |
|-----|-----------------|-----|--------------|
| [1] | Machine shaft   | [4] | End plate    |
| [2] | Threaded rod    | [7] | Hollow shaft |
| [3] | Retaining screw |     |              |

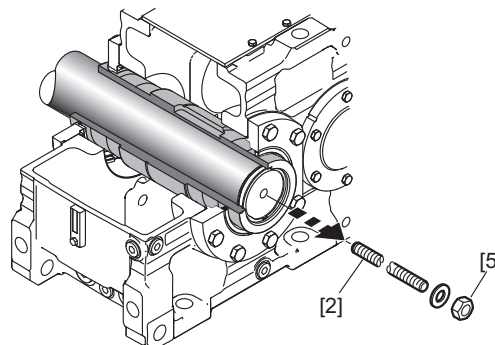
3. Tighten the machine shaft [1] with the nut [5] until the shaft end of the machine shaft [1] and the end plate [4] meet.



9007199565148299

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

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

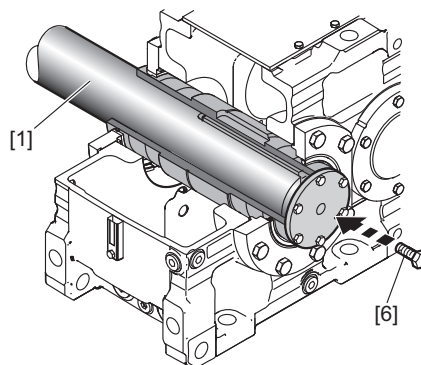


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- |     |              |
|-----|--------------|
| [2] | Threaded rod |
| [5] | Nut          |

5. Secure the machine shaft [1] using 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 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.

- Be sure to properly attach the protection cover after completing assembly.

### 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-proof after completing assembly.

#### 5.11.4 Removing the gear unit from the machine shaft

### NOTICE

Improper disassembly may damage bearings and other components.

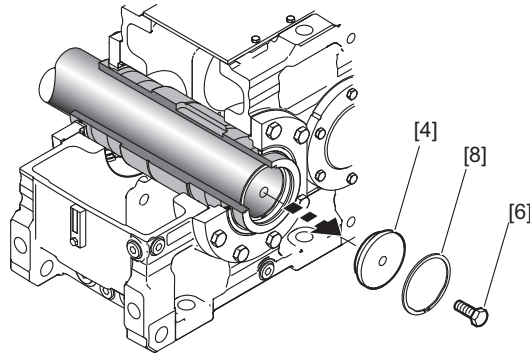
Possible damage to property.

- 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" (→ 102).

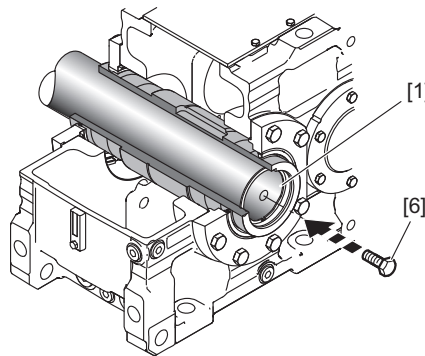
1. Loosen the retaining screw [6]. Remove the outer retaining ring [8] and the end plate [4].



9007202105918859

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

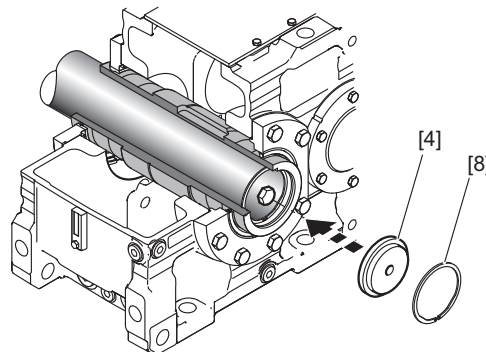
2. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



9007202105921291

- [1] Machine shaft
- [6] Retaining screw

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



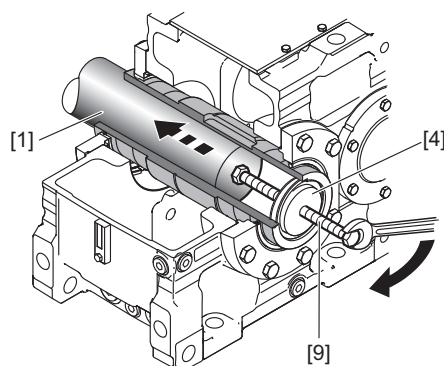
9007202105924619

- [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].



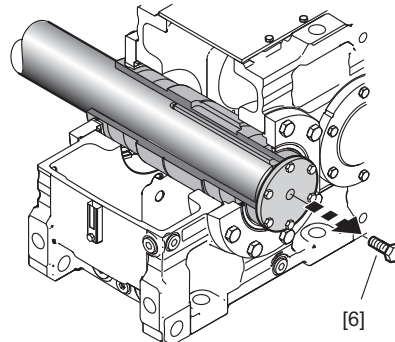
27021600615410571

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

Sizes X170 – 320

Observe the notes in chapter "Important notes" (→ 102).

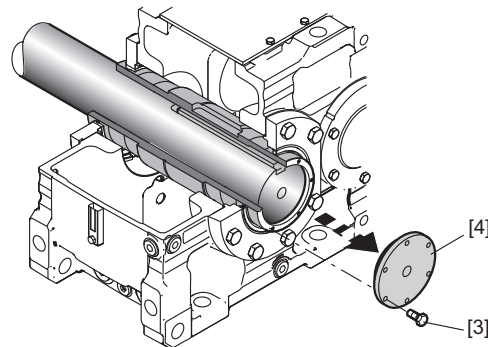
1. Loosen the retaining screw [6].



310460043

- [6] Retaining screw

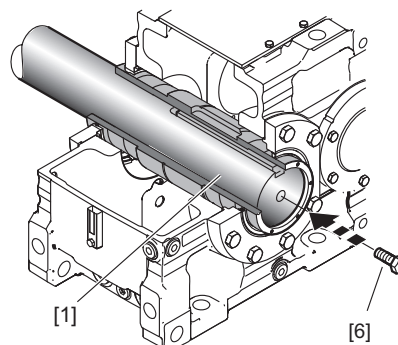
2. Remove the retaining screws [3] and the end plate [4].



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- [3] Retaining screw  
[4] End plate

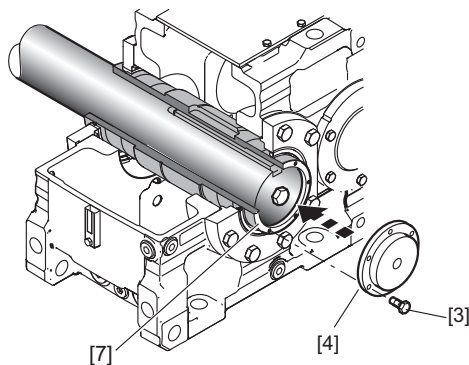
3. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



310470027

- [1] Machine shaft  
[6] Retaining screw

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



310474123

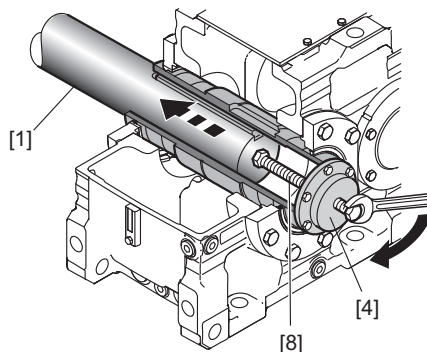
- [3] Retaining screw
- [4] End plate
- [7] Hollow shaft

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

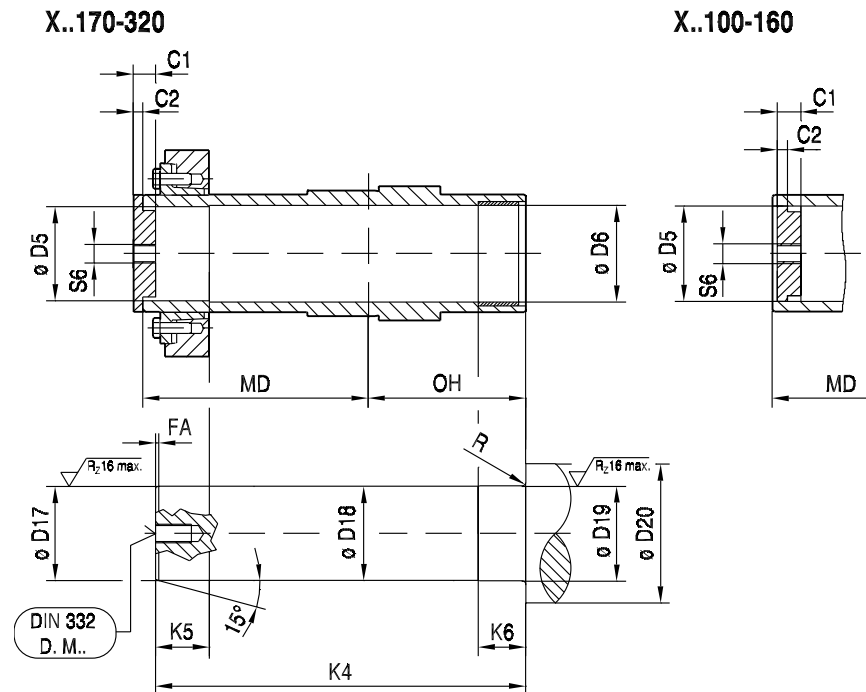
- [1] Machine shaft
- [4] End plate
- [8] Ejector screw

## 5.12 Output shaft as a hollow shaft with shrink disk/..H

### 5.12.1 General information

The material of the machine shaft should be dimensioned by the customer according to the loads that will occur. The shaft material should have a yield point of at least 320 N/mm<sup>2</sup>.

### 5.12.2 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 33 2 DR.M..
X..H100	30	14	80 <sup>H7</sup>	81 <sup>H9</sup>	80 <sub>h6</sub>	80 <sub>h11</sub>	81 <sub>m6</sub>	95	2	394.5 <sub>-1</sub>	46	42 <sub>-1</sub>	261	173	3	M30	M24
X..H110	30	14	90 <sup>H7</sup>	91 <sup>H9</sup>	90 <sub>h6</sub>	90 <sub>h11</sub>	91 <sub>m6</sub>	105	2	400.5 <sub>-1</sub>	46	42 <sub>-1</sub>	265	176	3	M30	M24
X..H120	30	14	100 <sup>H7</sup>	101 <sup>H9</sup>	100 <sub>h6</sub>	100 <sub>h11</sub>	101 <sub>m6</sub>	115	2	437 <sub>-1</sub>	51	52 <sub>-1</sub>	286.5	190.5	3	M30	M24
X..H130	30	14	110 <sup>H7</sup>	111 <sup>H9</sup>	110 <sub>h6</sub>	110 <sub>h11</sub>	111 <sub>m6</sub>	125	2	449 <sub>-1</sub>	55	52 <sub>-1</sub>	297	194	3	M30	M24
X..H140	30	14	120 <sup>H7</sup>	121 <sup>H9</sup>	120 <sub>h6</sub>	120 <sub>h11</sub>	121 <sub>m6</sub>	135	2	509 <sub>-1</sub>	59	62 <sub>-1</sub>	329	222	3	M30	M24
X..H150	30	14	130 <sup>H7</sup>	131 <sup>H9</sup>	130 <sub>h6</sub>	130 <sub>h11</sub>	131 <sub>m6</sub>	145	3	520 <sub>-1</sub>	66	62 <sub>-1</sub>	337.5	224.5	3	M30	M24
X..H160	36	16	140 <sup>H7</sup>	141 <sup>H9</sup>	140 <sub>h6</sub>	140 <sub>h11</sub>	141 <sub>m6</sub>	155	3	583 <sub>-1</sub>	66	73 <sub>-1</sub>	375	256	4	M36	M30
X..H170	36	17	150 <sup>H7</sup>	151 <sup>H9</sup>	150 <sub>h6</sub>	150 <sub>h11</sub>	151 <sub>m6</sub>	165	3	600 <sub>-1</sub>	83	73 <sub>-1</sub>	364	256	4	M36	M30
X..H180	36	17	165 <sup>H7</sup>	166 <sup>H9</sup>	165 <sub>g6</sub>	165 <sub>h11</sub>	166 <sub>m6</sub>	180	3	672 <sub>-1</sub>	83	83 <sub>-1</sub>	400	292	4	M36	M30
X..H190	36	17	165 <sup>H7</sup>	166 <sup>H9</sup>	165 <sub>g6</sub>	165 <sub>h11</sub>	166 <sub>m6</sub>	180	3	672 <sub>-1</sub>	83	83 <sub>-1</sub>	400	292	4	M36	M30
X..H200	36	17	180 <sup>H7</sup>	181 <sup>H9</sup>	180 <sub>g6</sub>	180 <sub>h11</sub>	181 <sub>m6</sub>	195	3	750 <sub>-1</sub>	101	83 <sub>-1</sub>	450.5	319.5	4	M36	M30
X..H210	36	17	190 <sup>H7</sup>	191 <sup>H9</sup>	190 <sub>g6</sub>	190 <sub>h11</sub>	191 <sub>m6</sub>	205	3	753 <sub>-1</sub>	106	83 <sub>-1</sub>	453.5	319.5	4	M36	M30
X..H220	36	17	210 <sup>H7</sup>	211 <sup>H9</sup>	210 <sub>g6</sub>	210 <sub>h11</sub>	211 <sub>m6</sub>	230	3	830 <sub>-1</sub>	118	108 <sub>-1</sub>	497.5	352.5	5	M36	M30
X2KH220	36	17	210 <sup>H7</sup>	211 <sup>H9</sup>	210 <sub>g6</sub>	210 <sub>h11</sub>	211 <sub>m6</sub>	230	3	900 <sub>-1</sub>	118	108 <sub>-1</sub>	532.5	387.5	5	M36	M30
X..H230	36	17	210 <sup>H7</sup>	211 <sup>H9</sup>	210 <sub>g6</sub>	210 <sub>h11</sub>	211 <sub>m6</sub>	230	3	830 <sub>-1</sub>	118	108 <sub>-1</sub>	497.5	352.5	5	M36	M30
X2KH230	36	17	210 <sup>H7</sup>	211 <sup>H9</sup>	210 <sub>g6</sub>	210 <sub>h11</sub>	211 <sub>m6</sub>	230	3	900 <sub>-1</sub>	118	108 <sub>-1</sub>	532.5	387.5	5	M36	M30
X..H240	45	22	230 <sup>H7</sup>	231 <sup>H9</sup>	230 <sub>g6</sub>	230 <sub>h11</sub>	231 <sub>m6</sub>	250	3	948 <sub>-1</sub>	140	108 <sub>-1</sub>	571.5	400.5	5	M42	M36
X2KH240	45	22	230 <sup>H7</sup>	231 <sup>H9</sup>	230 <sub>g6</sub>	230 <sub>h11</sub>	231 <sub>m6</sub>	250	3	1023 <sub>-1</sub>	140	108 <sub>-1</sub>	609	438	5	M42	M36
X..H250	45	22	240 <sup>H7</sup>	241 <sup>H9</sup>	240 <sub>g6</sub>	240 <sub>h11</sub>	241 <sub>m6</sub>	260	3	948 <sub>-1</sub>	140	108 <sub>-1</sub>	571.5	400.5	5	M42	M36
X2KH250	45	22	240 <sup>H7</sup>	241 <sup>H9</sup>	240 <sub>g6</sub>	240 <sub>h11</sub>	241 <sub>m6</sub>	260	3	1023 <sub>-1</sub>	140	108 <sub>-1</sub>	609	438	5	M42	M36
X..H260	45	22	250 <sup>H7</sup>	251 <sup>H9</sup>	250 <sub>g6</sub>	250 <sub>h11</sub>	251 <sub>m6</sub>	280	4	1021 <sub>-1</sub>	140	108 <sub>-1</sub>	608	437	5	M42	M36
X..H270	45	22	280 <sup>H7</sup>	281 <sup>H9</sup>	280 <sub>g6</sub>	280 <sub>h11</sub>	281 <sub>m6</sub>	310	4	1056 <sub>-1</sub>	146	143 <sub>-1</sub>	630	450	5	M42	M36
X..H280	45	22	280 <sup>H7</sup>	281 <sup>H9</sup>	280 <sub>g6</sub>	280 <sub>h11</sub>	281 <sub>m6</sub>	310	4	1056 <sub>-1</sub>	146	143 <sub>-1</sub>	630	450	5	M42	M36
X..H290	45	22	300 <sup>H7</sup>	301 <sup>H9</sup>	300 <sub>g6</sub>	300 <sub>h11</sub>	301 <sub>m6</sub>	330	4	1147 <sub>-1</sub>	152	143 <sub>-1</sub>	679	492	5	M42	M36
X..H300	45	22	300 <sup>H7</sup>	301 <sup>H9</sup>	300 <sub>g6</sub>	300 <sub>h11</sub>	301 <sub>m6</sub>	330	4	1147 <sub>-1</sub>	152	143 <sub>-1</sub>	679	492	5	M42	M36
X..H310	55	28	320 <sup>H7</sup>	321 <sup>H9</sup>	320 <sub>g6</sub>	320 <sub>h11</sub>	321 <sub>m6</sub>	350	4	1241 <sub>-1</sub>	165	143 <sub>-1</sub>	740.5	528.5	5	M48	M42
X..H320	55	28	320 <sup>H7</sup>	321 <sup>H9</sup>	320 <sub>g6</sub>	320 <sub>h11</sub>	321 <sub>m6</sub>	350	4	1241 <sub>-1</sub>	165	143 <sub>-1</sub>	740.5	528.5	5	M48	M42

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## 5.12.3 Mounting the gear unit onto the machine shaft

## INFORMATION



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

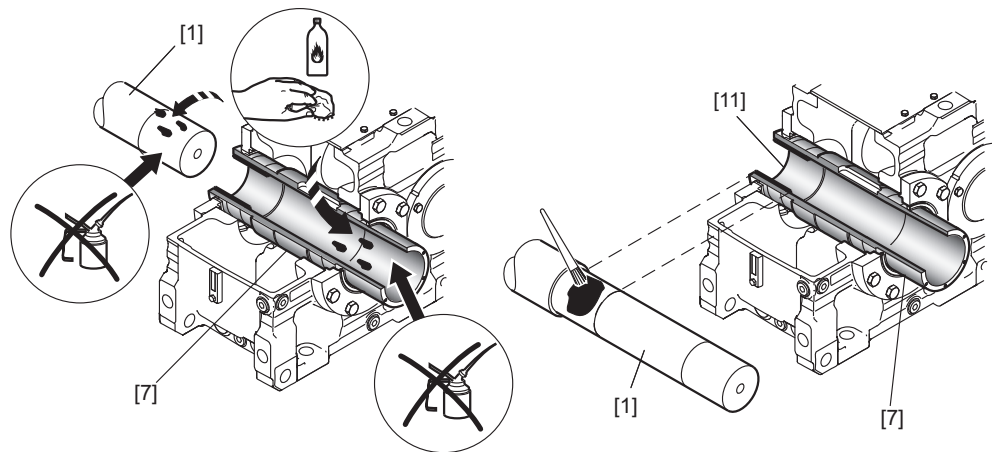
## Size X100 – 160

Observe the notes in chapter "Important information" (→ 102).

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



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[1] Machine shaft  
[7] Hollow shaft

[11] Bushing

4. Attach the inner retaining ring [8] to the hollow shaft [7]. Secure the end plate [4] using the outer retaining ring [9]. Thread the threaded rod [2] into the machine shaft [1]. Observe the following thread sizes of the threaded rods [2].

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



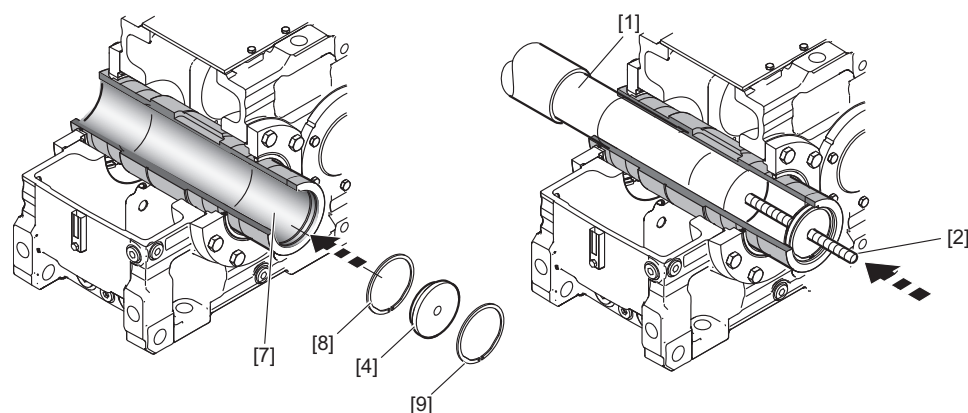
Observe the following information on the retaining rings [8][9].

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

## INFORMATION



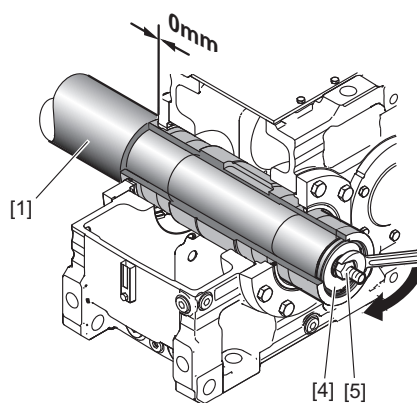
The assembly is easier if you first apply lubricant to the threaded rod and nut.



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

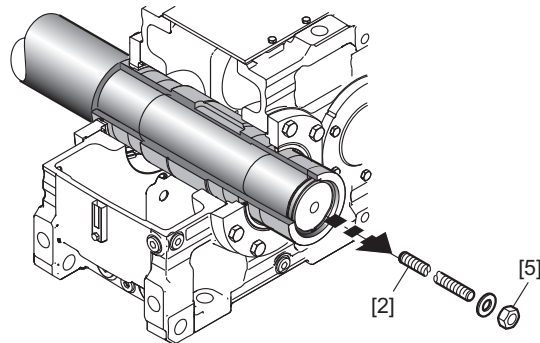
5. Tighten the machine shaft [1] with the nut [5] until the shaft end of the machine shaft [1] and the end plate [4] meet.



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

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

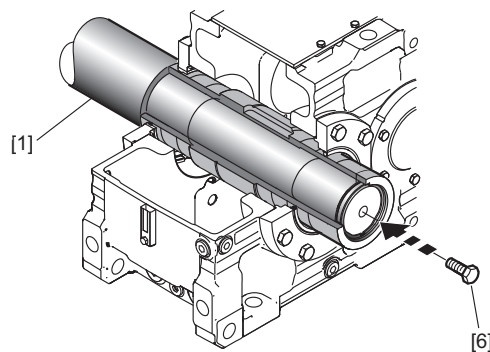


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- [2] Threaded rod  
[5] Nut

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

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

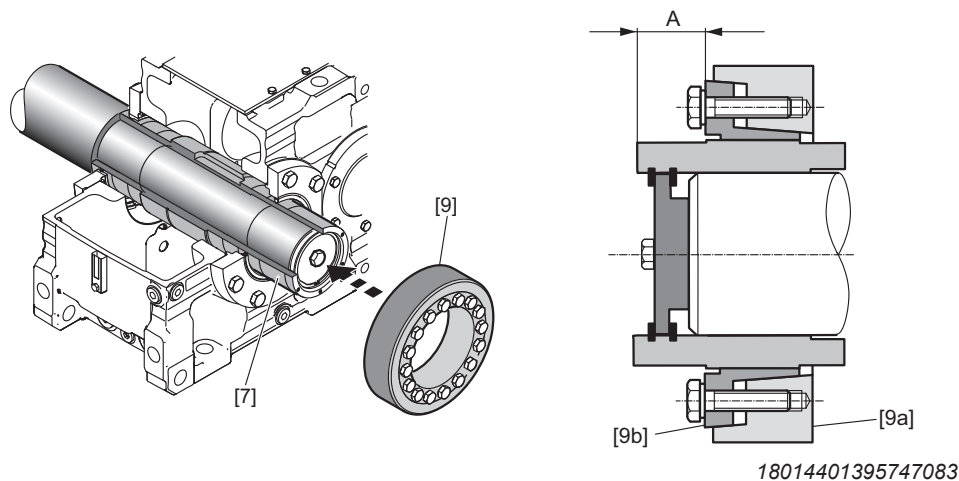


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- [1] Machine shaft  
[6] Retaining screw

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

9. **▲ CAUTION!** The loose shrink disk could slip. Potential risk of crushing due to falling parts.  
Secure the shrink disk against slipping.
10. **NOTICE!** Tightening the locking screws without first installing a shaft may result in the hollow shaft being deformed. Possible damage to property.  
Never tighten the screws without the shaft installed.



[7] Hollow shaft  
[9] Shrink disk

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

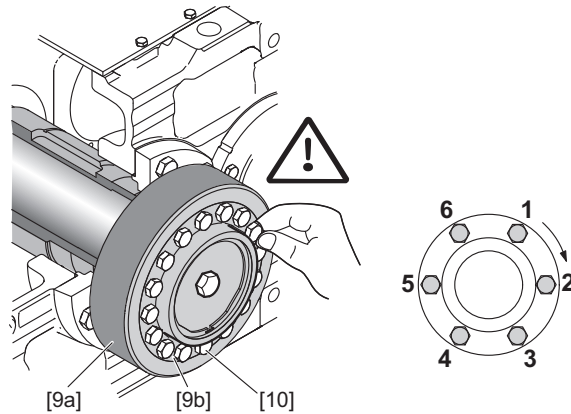
Size	A $\pm 0.5$ in mm
XH100	37.5
XH110	38
XH120	39
XH130 – 140	41
XH150	42
XH160	48

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



## INFORMATION

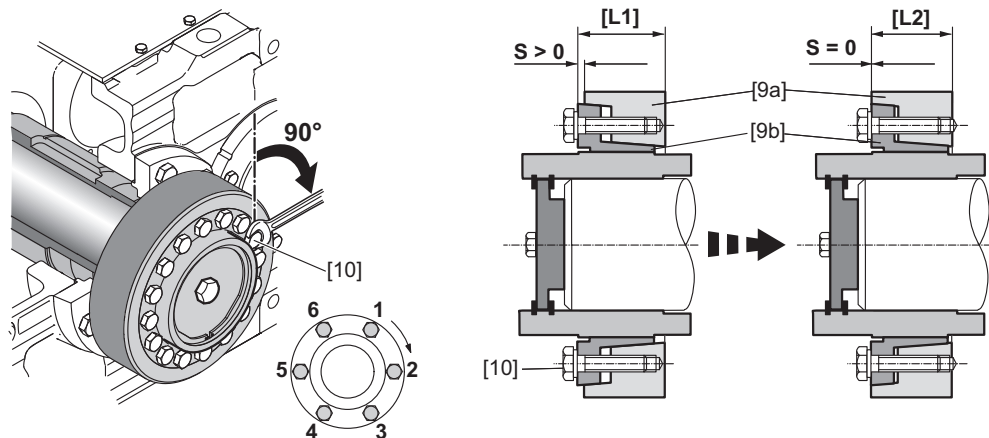
For shrink disks with a slotted taper bushing (inner ring) [9b], tighten the locking screws [10] to the left and right of the slot one after another, and then, in several stages, tighten the remaining screws at evenly spaced intervals.



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- [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  $\frac{1}{4}$  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.



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- [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.

- Be sure to properly attach the protection cover after completing assembly.

**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-proof after completing assembly.

## Size X170 – 320

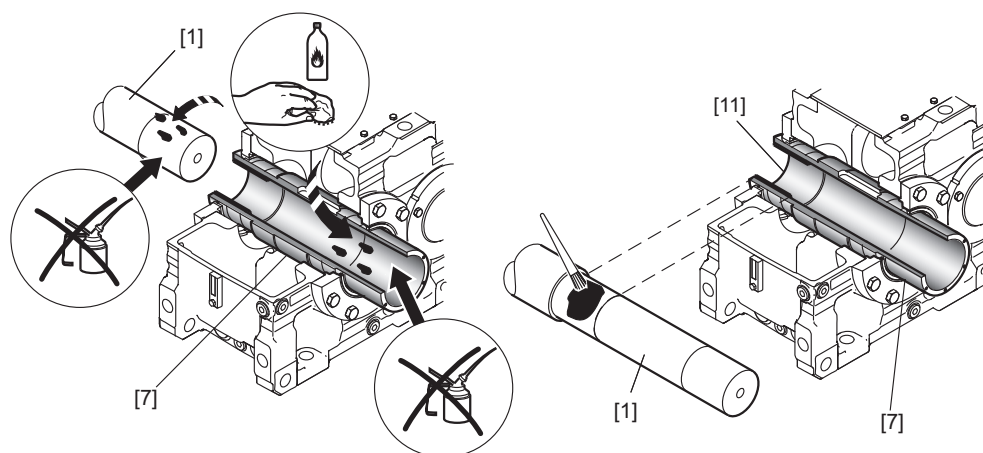
Observe the notes in chapter "Important information" (→ 102).

## 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 Rivolta F.L.A. to the machine shaft [1] in the area of the bushing [11].



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[1] Machine shaft  
[7] Hollow shaft

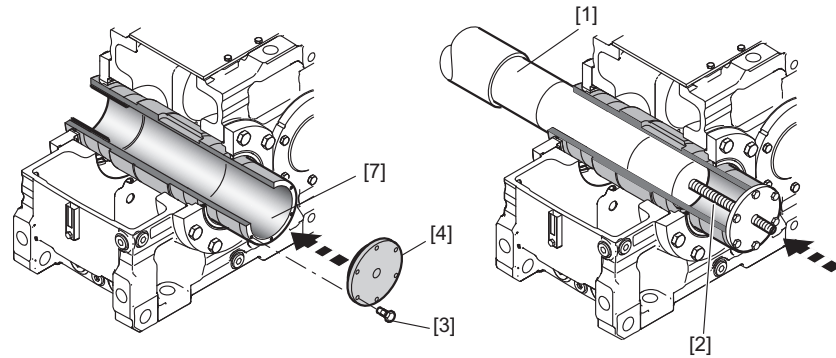
[11] Bushing

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].

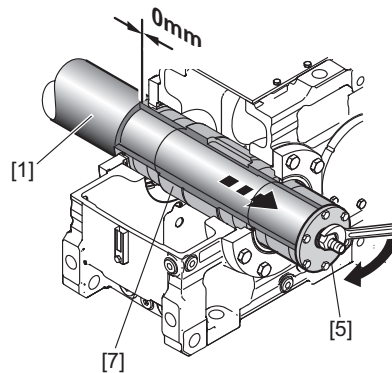
Size	Thread size for 6 × retaining screws Strength class 10.9	Tightening torque	
		Assembly/operating state Nm	Disassembly Nm
X..H170 – 190	M10x30	79	Apply hand pressure
X..H200 – 230	M12x30	137	Apply hand pressure
X..H240 – 300	M16x40	338	Apply hand pressure
X..H310 – 320	M20x50	661	Apply hand pressure



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

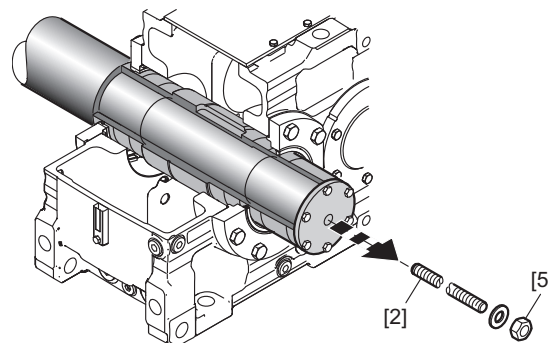
5. Tighten the machine shaft [1] with the nut [5] until the shoulders of the machine shaft and the hollow shaft [7] meet.



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

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



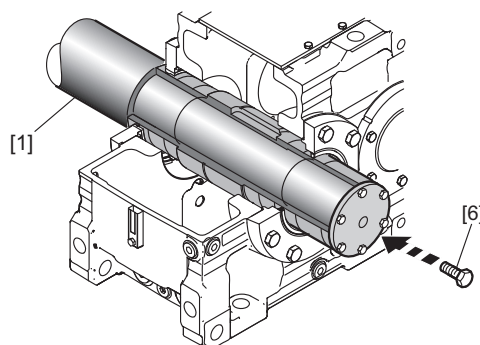
310506251

- [2] Threaded rod
- [5] Nut

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

Size	Strength class 8.8	Tightening torque Nm Strength class 8.8
X..H170 – 230	M30	1597

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

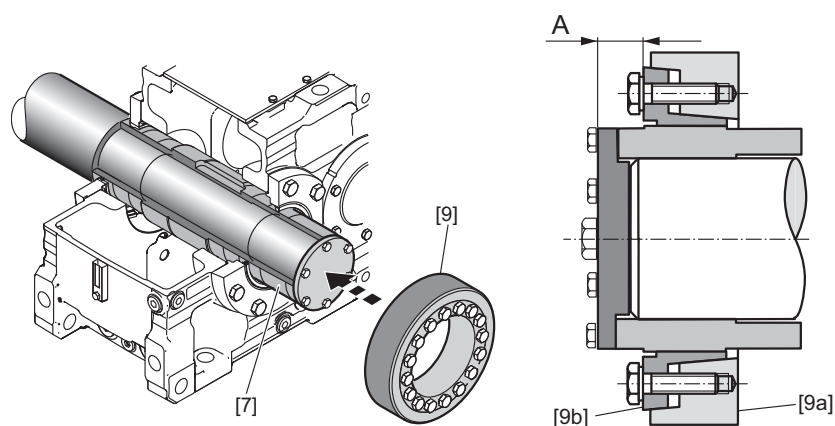


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[1] Machine shaft

[6] Retaining screw

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



9007199565261323

[7] Hollow shaft

[9a] Taper (outer ring)

[9] Shrink disk

[9b] Taper bushing (inner ring)

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

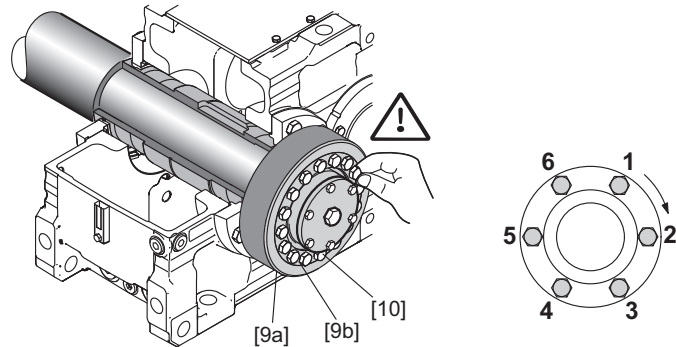


11. Tighten the locking screws [10] hand-tight. In doing so, align the taper (outer ring) [9a] parallel to the taper bushing (inner ring) [9b] of the shrink disk. Successively tighten the locking screws [10] in a clockwise direction (not in diametrically opposite sequence), each with a quarter turn.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

## INFORMATION



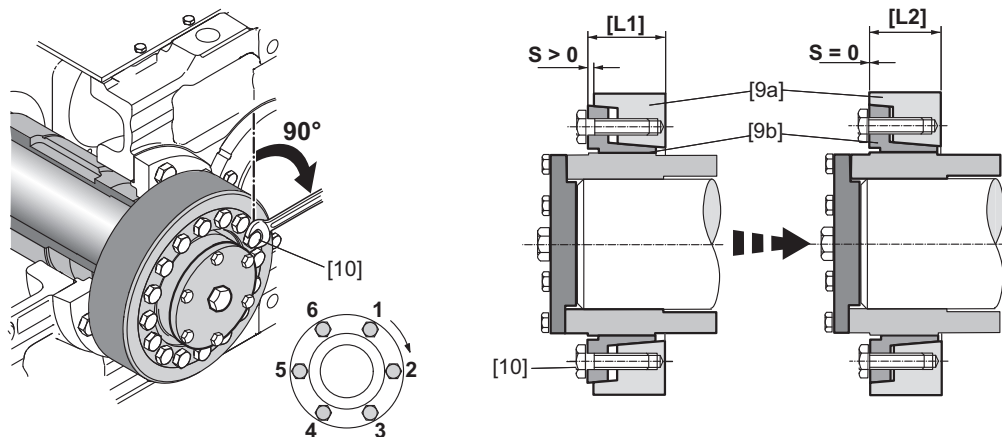
For shrink disks with a slotted taper bushing (inner ring) [9b], tighten the locking screws [10] to the left and right of the slot one after another, and then, in several stages, tighten the remaining screws at evenly spaced intervals.



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

12. Work around the ring in several stages, evenly tighten the locking screws [10] by  $\frac{1}{4}$  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 illustration below.



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

## 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.

- Be sure to properly attach the protection cover after completing assembly.
- 

**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-proof after completing assembly.
-

#### 5.12.4 Disassembling the gear unit from the machine shaft

Sizes X100 – 160

Observe the notes in chapter "Important information" (→ 102).

### NOTICE

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

Possible damage to property.

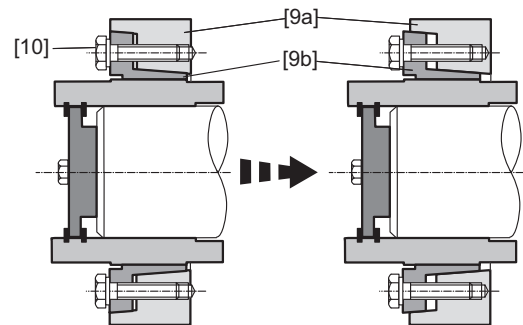
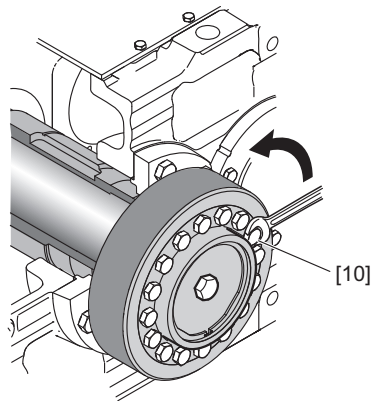
- You may only use the hollow shaft as a support for disassembly. Note that supporting on any other parts of the gear unit may damage the material.
- Remove the shrink disk properly. Never completely unscrew the locking screws because the shrink disk might jump off and cause an injury.
- Shrink disks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



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

2. Remove the shrink disk from the hollow shaft. Disassemble the gear unit from the machine shaft as described in chapter "Disassembling the gear unit from the machine shaft".

## Sizes X170 – 320

Observe the notes in chapter "Important information" (→ 102).

**NOTICE**

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

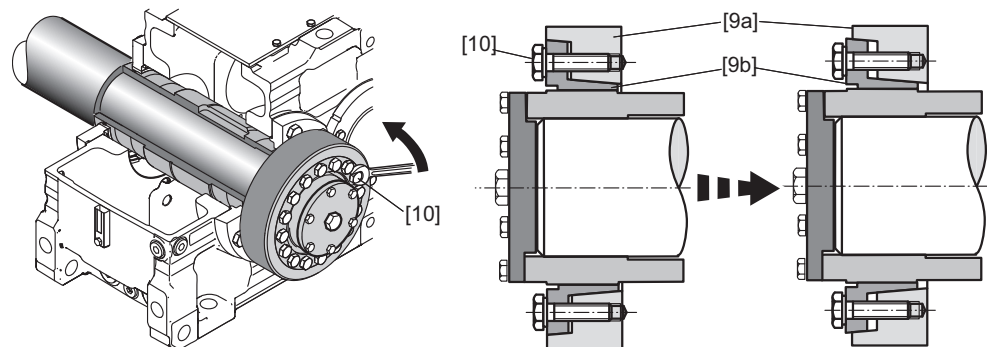
Possible damage to property.

- You may only use the hollow shaft as a support for disassembly. Note that supporting on any other parts of the gear unit may damage the material.
- Remove the shrink disk properly. Never completely unscrew the locking 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 taper (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.



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

2. Remove the shrink disk from the hollow shaft. Disassemble the gear unit from the machine shaft as described in chapter "Disassembling the gear unit from the machine shaft".

### Cleaning and lubricating the shrink disk

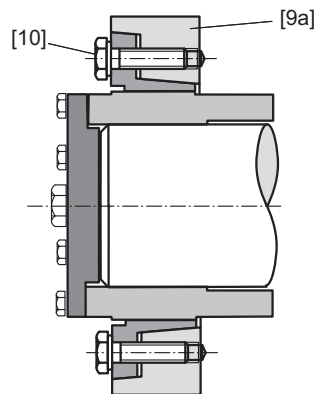
Observe the notes in chapter "Important notes" (→ 102).

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.



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[9a] Taper (outer ring)

[10] Locking screws

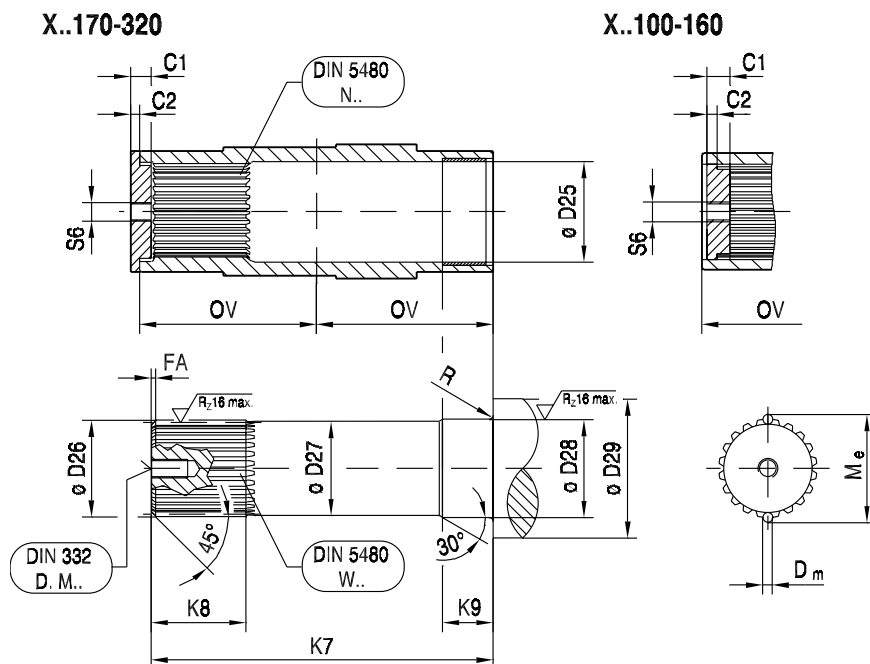
1. Thoroughly clean the shrink disk from dirt and any remaining lubricants after disassembly.
2. Lubricate the locking screws [10] on the threads and under the head with an MoS<sub>2</sub> compound, e.g. "gleitmo 100" from FUCHS LUBRITECH ([www.fuchs-lubritech.com](http://www.fuchs-lubritech.com)).
3.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

### 5.13 Output shaft as a splined hollow shaft /..V

#### 5.13.1 General information

The material of the machine shaft should be dimensioned by the customer according to the loads that will occur. The shaft material should have a yield point of at least 320 N/mm<sup>2</sup>.

#### 5.13.2 Dimensions of the machine shaft



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

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
X2K230	36	17	211 <sup>H9</sup>	199 <sub>h10</sub>	198	211 <sub>m6</sub>	230	10	5	755 <sub>-1</sub>	201	108 <sub>-1</sub>	210.158 <sup>-0.088 -0.157</sup>	387.5	5	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X..240	45	22	231 <sup>H9</sup>	219 <sub>h10</sub>	218	231 <sub>m6</sub>	250	10	5	777 <sub>-1</sub>	216	108 <sub>-1</sub>	230.215 <sup>-0.102 -0.179</sup>	400.5	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X2K240	45	22	231 <sup>H9</sup>	219 <sub>h10</sub>	218	231 <sub>m6</sub>	250	10	5	852 <sub>-1</sub>	216	108 <sub>-1</sub>	230.215 <sup>-0.102 -0.179</sup>	438	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X..250	45	22	241 <sup>H9</sup>	219 <sub>h10</sub>	218	241 <sub>m6</sub>	260	10	5	777 <sub>-1</sub>	216	108 <sub>-1</sub>	230.215 <sup>-0.102 -0.179</sup>	400.5	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X2K250	45	22	241 <sup>H9</sup>	219 <sub>h10</sub>	218	241 <sub>m6</sub>	260	10	5	852 <sub>-1</sub>	216	108 <sub>-1</sub>	230.215 <sup>-0.102 -0.179</sup>	438	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X..260	45	22	255 <sup>H9</sup>	239 <sub>h10</sub>	238	255 <sub>m6</sub>	275	10	5	850 <sub>-1</sub>	216	108 <sub>-1</sub>	250.264 <sup>-0.102 -0.180</sup>	437	5	M42	M36	W 240x5x30x46x8f N 240x5x30x46x9H
X..270	45	22	285 <sup>H9</sup>	258.4 <sub>h10</sub>	258	285 <sub>m6</sub>	305	16	8	876 <sub>-1</sub>	248	143 <sub>-1</sub>	276.230 <sup>-0.101 -0.177</sup>	450	5	M42	M36	W 260x8x30x31x8f N 260x8x30x31x9H
X..280	45	22	285 <sup>H9</sup>	258.4 <sub>h10</sub>	258	285 <sub>m6</sub>	305	16	8	876 <sub>-1</sub>	248	143 <sub>-1</sub>	276.230 <sup>-0.101 -0.177</sup>	450	5	M42	M36	W 260x8x30x31x8f N 260x8x30x31x9H
X..290	45	22	305 <sup>H9</sup>	278.4 <sub>h10</sub>	278	305 <sub>m6</sub>	325	16	8	960 <sub>-1</sub>	268	143 <sub>-1</sub>	297.014 <sup>-0.105 -0.184</sup>	492	5	M42	M36	W 280x8x30x34x8f N 280x8x30x34x9H
X..300	45	22	305 <sup>H9</sup>	278.4 <sub>h10</sub>	278	305 <sub>m6</sub>	325	16	8	960 <sub>-1</sub>	268	143 <sub>-1</sub>	297.014 <sup>-0.105 -0.184</sup>	492	5	M42	M36	W 280x8x30x34x8f N 280x8x30x34x9H
X..310	55	28	325 <sup>H9</sup>	298.4 <sub>h10</sub>	298	325 <sub>m6</sub>	345	16	8	1029 <sub>-1</sub>	318	143 <sub>-1</sub>	316.655 <sup>-0.102 -0.180</sup>	528.5	5	M42	M36	W 300x8x30x36x8f N 300x8x30x36x9H
X..320	55	28	325 <sup>H9</sup>	298.4 <sub>h10</sub>	298	325 <sub>m6</sub>	345	16	8	1029 <sub>-1</sub>	318	143 <sub>-1</sub>	316.655 <sup>-0.102 -0.180</sup>	528.5	5	M42	M36	W 300x8x30x36x8f N 300x8x30x36x9H

### 5.13.3 Mounting the gear unit onto the machine shaft

## INFORMATION



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

### Size X100 – 160

Observe the notes in chapter "Important information" (→ 102).

## 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	2 × retaining ring (bore) DIN 472
X..V100	80×2.5
X..V110	90×2.5
X..V120	100×3
X..V130	110×4
X..V140	125×4
X..V150	130×4
X..V160	140×4

Observe the following information.

Size	Recommended thread size		Tightening torque in Nm Retaining screw [6] Strength class 8.8
	Ejector screw [8] (threads 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

### Size X170 – 320

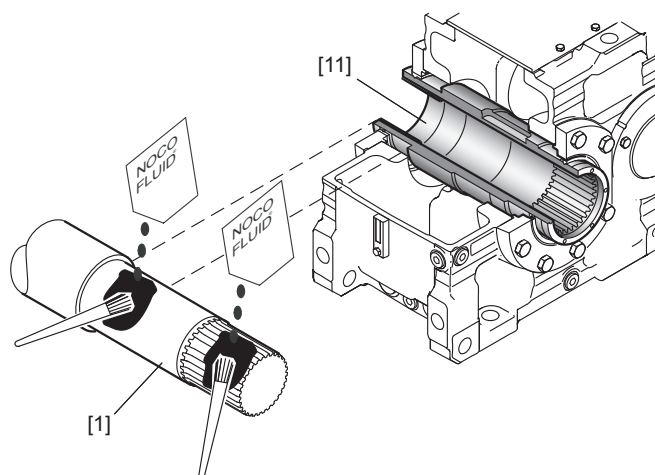
Observe the notes in chapter "Important information" (→ 102).

## 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 splined hollow shaft.



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- [1] Machine shaft  
[11] Bushing

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].

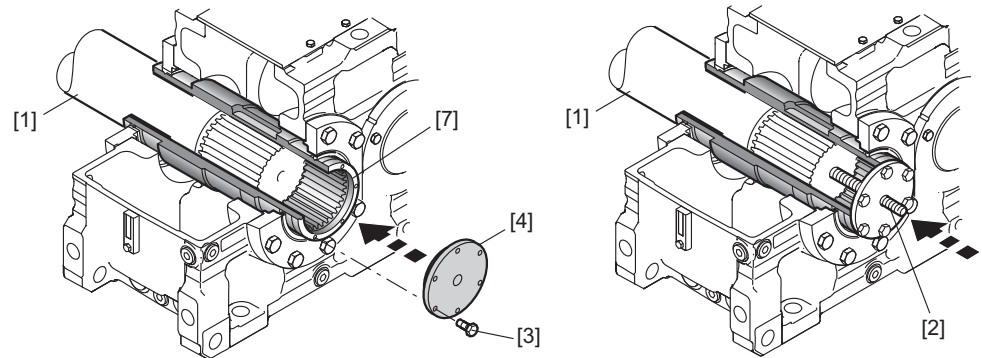
Size	Strength class 8.8
X..V170 – 230	M30
X..V240 – 300	M36
X..V310 – 320	M42

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

Size	Thread size for 6 × retaining screws [3] Strength class 10.9	Tightening torque	
		Assembly/operating state Nm	Disassembly Nm
X..V170 – 190	M10x30	79	Apply hand pressure



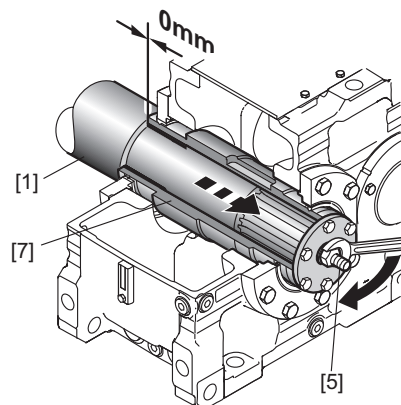
Size	Thread size for 6 × retaining screws [3] Strength class 10.9	Tightening torque	
		Assembly/operating state Nm	Disassembly Nm
X..V200 – 230	M12×30	137	Apply hand pressure
X..V240 – 300	M16×40	338	Apply hand pressure
X..V310 – 320	M20×50	661	Apply hand pressure



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

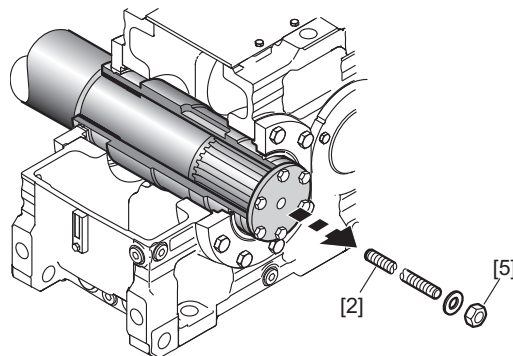
4. Tighten the machine shaft [1] with the nut [5] until the shoulders of the machine shaft and the hollow shaft [7] meet.



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

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

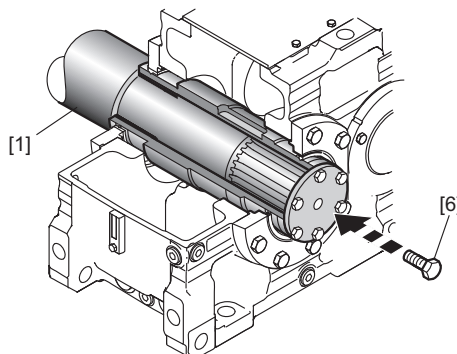


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- [2] Threaded rod  
[5] Nut

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

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



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- [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).

#### 5.13.4 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

Disassemble the gear unit from the machine shaft as described in chapter "Disassembling the gear unit from the machine shaft" (→ 140).

#### Sizes X170 – 320

Disassemble the gear unit from the machine shaft as described in chapter "Disassembling the gear unit from the machine shaft" (→ 143).

### 5.14 Torque arm/T

Observe the notes in chapter "Important information" (→ 102).



##### ▲ 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.

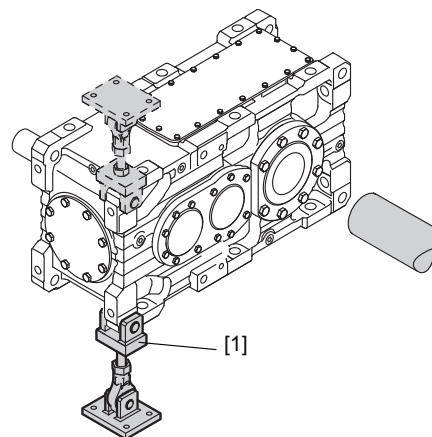
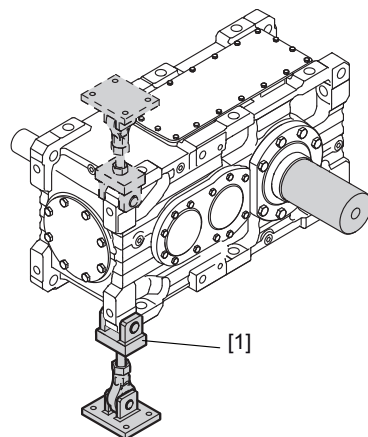
##### NOTICE

Strain on the torque arm might break the housing.

Possible damage to property.

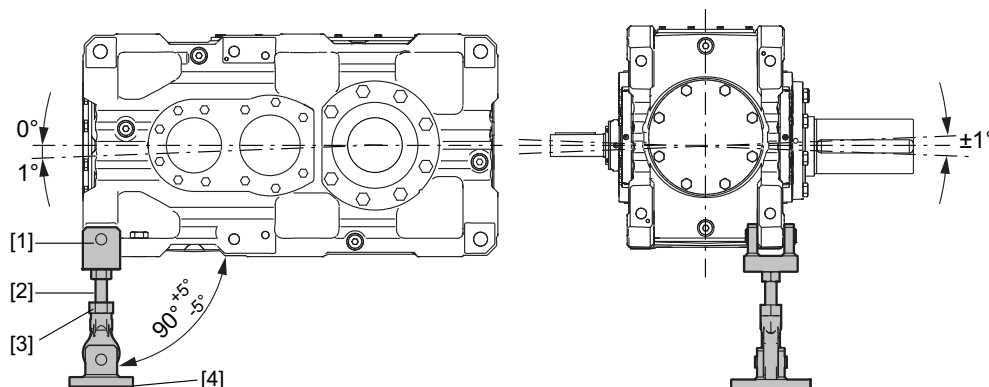
- Adhere to the specified screw size, tightening torques and required screw strength.

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.



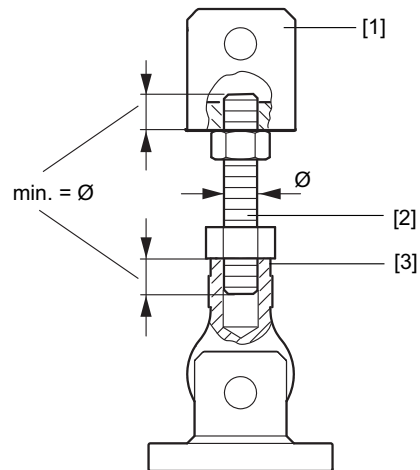
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2. **NOTICE!** Make sure that the stud bolt [2] is screwed simultaneously into the yoke [1] and the joint head [3]. Possible damage to property. The stud bolt [2] must be screwed evenly into the yoke [1] and the joint head [3], covering a length of 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 with bolt
- [2] Stud bolt with nuts
- [3] Joint head
- [4] Yoke plate with bolt



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- [1] Yoke 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	
X140 – 150	M24	
X160 – 190	M36	200
X200 – 230	M42	350
X240 – 280	M48	500
X290 – 320	M56	700

## 5.15 Mounting flange/F

**▲ WARNING**

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

Severe or fatal injuries.

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

**NOTICE**

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

Possible damage to property.

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

**NOTICE**

Improper installation and assembly can damage the gear unit.

Possible damage to the gear unit.

- Gear units with mounting flange cannot be additionally secured on the floor with a rigid connection. 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**

- The screws must not be lubricated during assembly.
- Clean the threads of the screws and apply a thread locking compound (e.g. Loctite® 243) to the first few threads.

## 5.16 Couplings

### INFORMATION

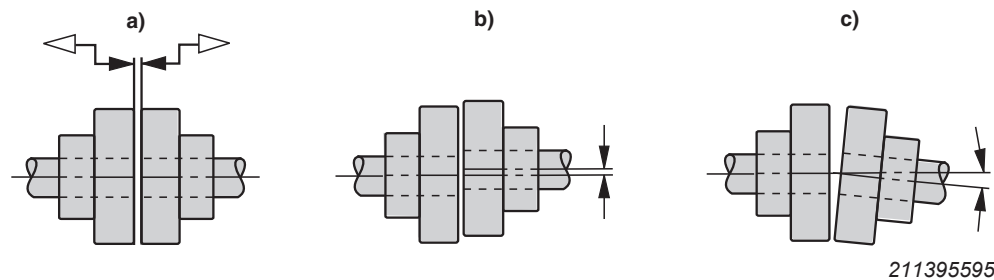


Observe the operating instructions of the respective coupling manufacturer.

#### 5.16.1 Mounting tolerances

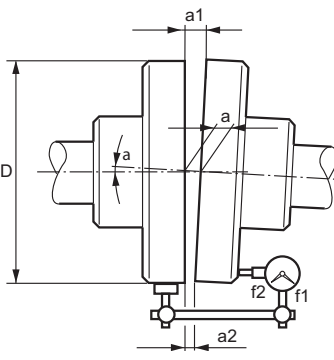
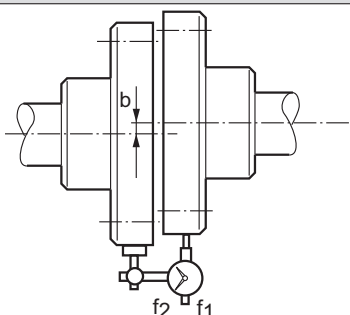
Adjust the following misalignments according to the coupling manufacturer's specifications when mounting couplings.

- 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	<p>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 (<math>a1 - a2</math>).</p>	<p>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.</p>

Measuring instruments	Angular offset	Axis offset
Micrometer dial	 <p>899597451</p>	
	<p>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).</p>	<p>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").</p>



## 5.17 Motor adapter /MA

### 5.17.1 Maximum permitted motor weight

Two criteria must be checked when mounting a motor onto the gear unit.

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

### INFORMATION



The motor weight may not exceed either one of these criteria.

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

### INFORMATION



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

The following applies to all tables:

$G_M$  = Motor weight

$G_G$  = Gear unit weight

#### Horizontal gear units

Mounting type	Mounting position M. / mounting surface F.		
	M1/F1 and M3/F2		
	X.F..	X.K..	X.T..
Foot-mounted design 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 design 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 design 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 design, please contact SEW-EURODRIVE.
- Gear unit with mounting position M. / mounting surface F.: For M5/F4 and M6/F3, please contact SEW-EURODRIVE.

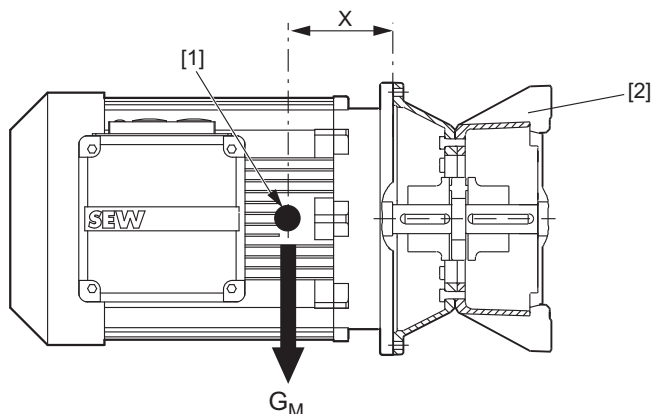
Mounting type	Mounting position M. / mounting surface F.		
	M5/F3 and M6/F4		
	X.F..	X.K..	X.T..
Foot-mounted design X../ B	$G_M \leq 2.0 G_G$	$G_M \leq 1.5 G_G$	$G_M \leq 1.75 G_G$
Flange-mounted design X../ F	$G_M \leq 1.5 G_G$	$G_M \leq 0.75 G_G$	$G_M \leq 1.25 G_G$

### Upright gear units

Mounting type	Mounting position M. / mounting surface F.		
	M4/F6		
	X.F..	X.K..	X.T..
Foot-mounted design 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 design 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 design 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 depending 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), consult 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.

### 5.17.2 Claw coupling

## INFORMATION

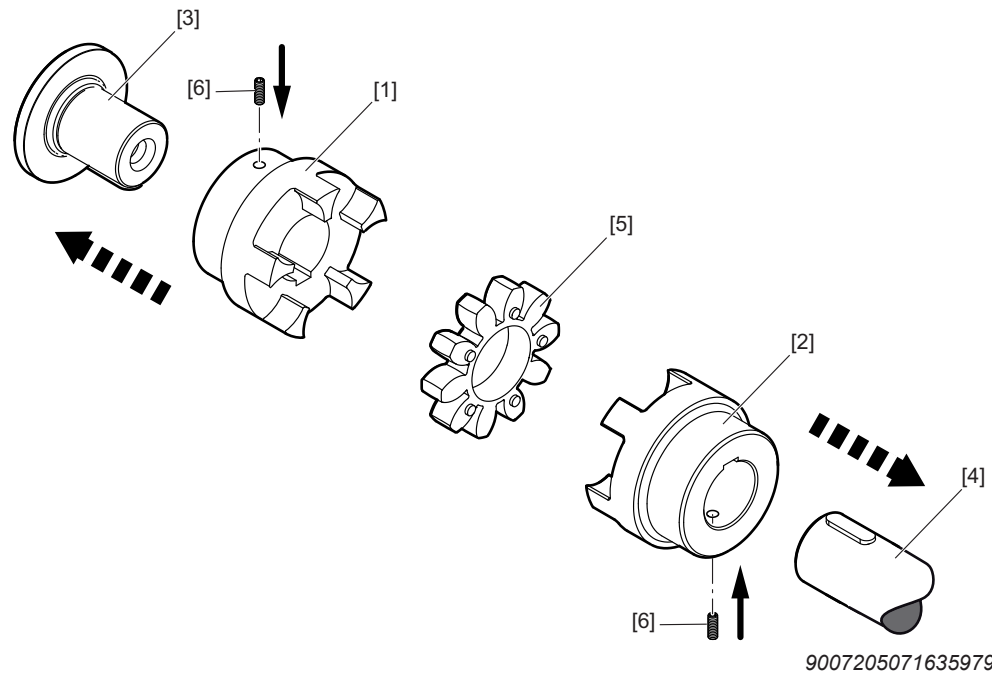


Observe the operating instructions of the respective coupling manufacturer.

### ROTEX® coupling

Observe the notes in chapter "Important information" (→ 102).

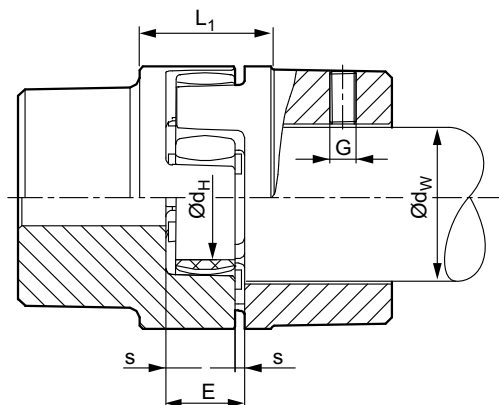
#### Mounting the coupling



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].

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 <sub>H</sub> 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

## Displacement – Aligning the coupling

### NOTICE

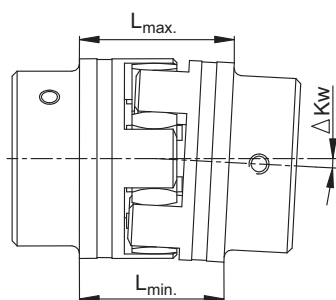
Improper mounting of the coupling may result in damage.

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.

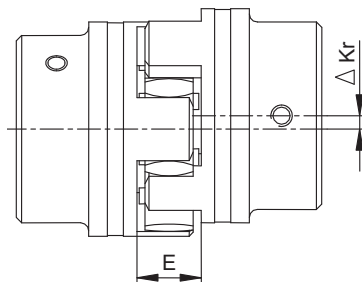
Observe:

- 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.

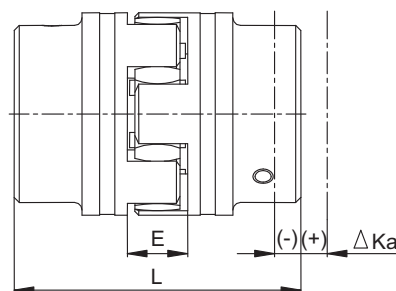


Angular misalignments

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



Radial misalignments



Axial misalignments

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

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Example of specified displacement combinations (see diagram):

Example 1:

$$\Delta K_r = 30\%$$

$$\Delta K_w = 70\%$$

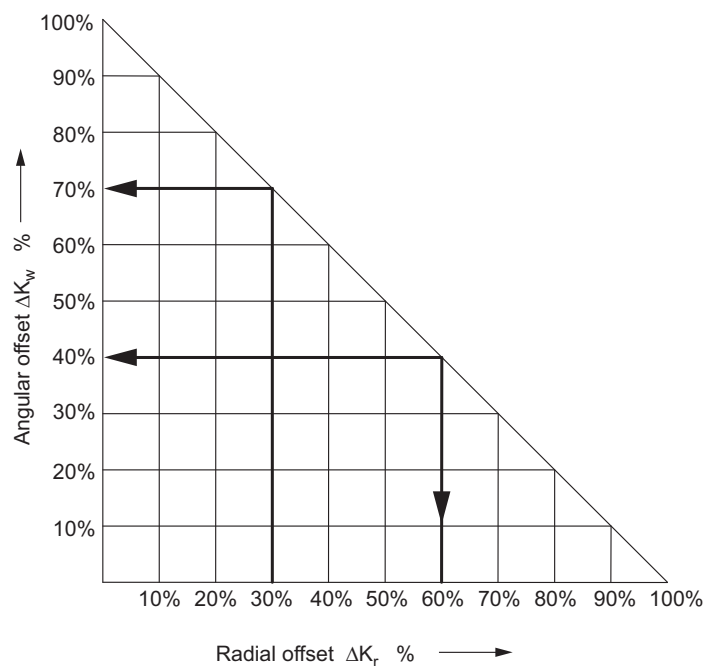
Example 2:

$$\Delta K_r = 60\%$$

$$\Delta K_w = 40\%$$

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

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### Displacement values

The following table shows the displacement values:

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

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### 5.17.3 Attaching the motor to the motor adapter

Observe the notes in chapter "Important information" (→ 102).

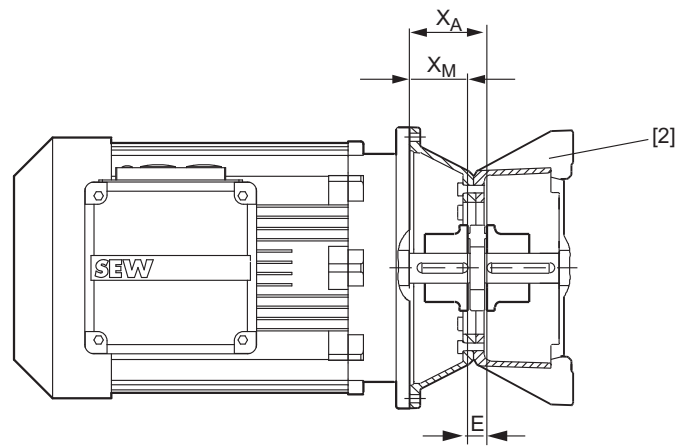
1. Clean the motor shaft and flange surfaces of the motor and the motor adapter. They must be dry and free of grease.

## 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" (→ 173) 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
$\rightarrow XM = XA - E$			

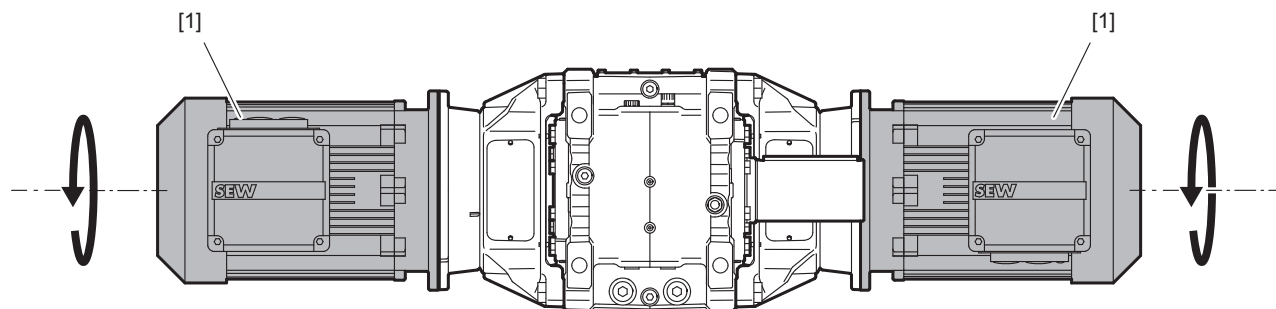
3. Secure the coupling halves using the set screw.
4. Mount the motor onto the motor adapter, making sure that the claws of the coupling engage each other.

### 5.17.4 Mounting 2 motors

#### Motor direction of rotation

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

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



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#### 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).



## 5.18 V-belt drives/VBD

### 5.18.1 Maximum permitted motor weight

When selecting a motor, observe the permitted motor weight, the gear unit version 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.

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

In this table:

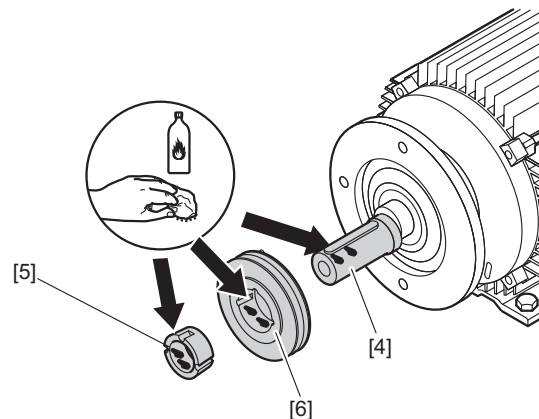
$G_M$  = Motor weight

$G_G$  = Gear unit weight

### 5.18.2 Mounting the V-belt drive

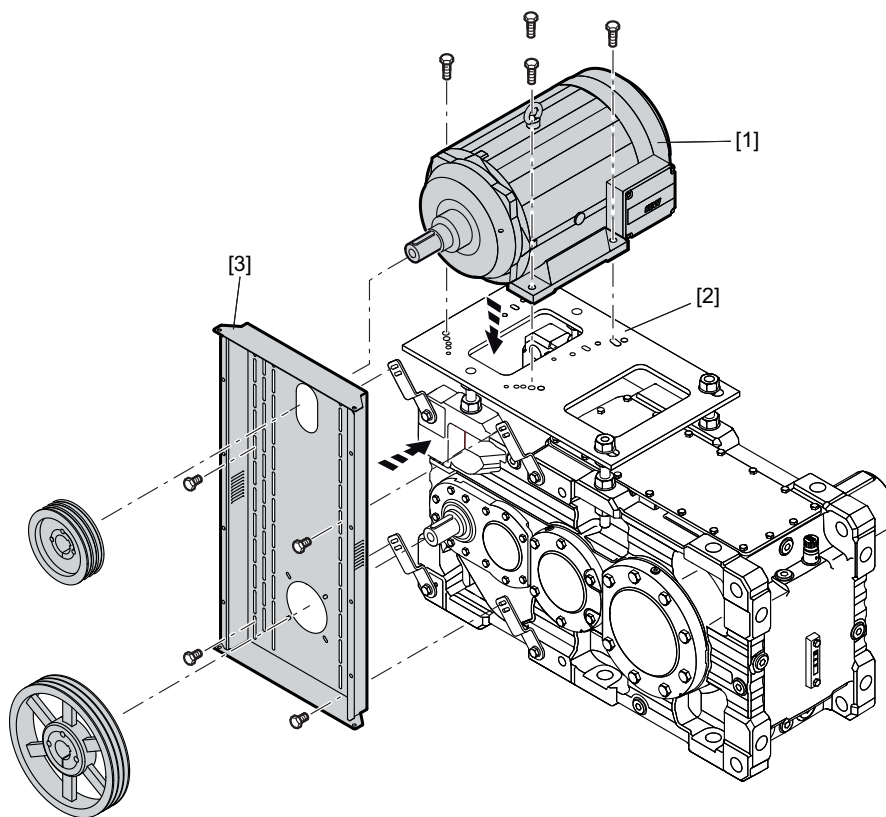
Observe the notes in chapter "Important information" (→ 102).

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 V-belt guard [3] using the provided holding 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.

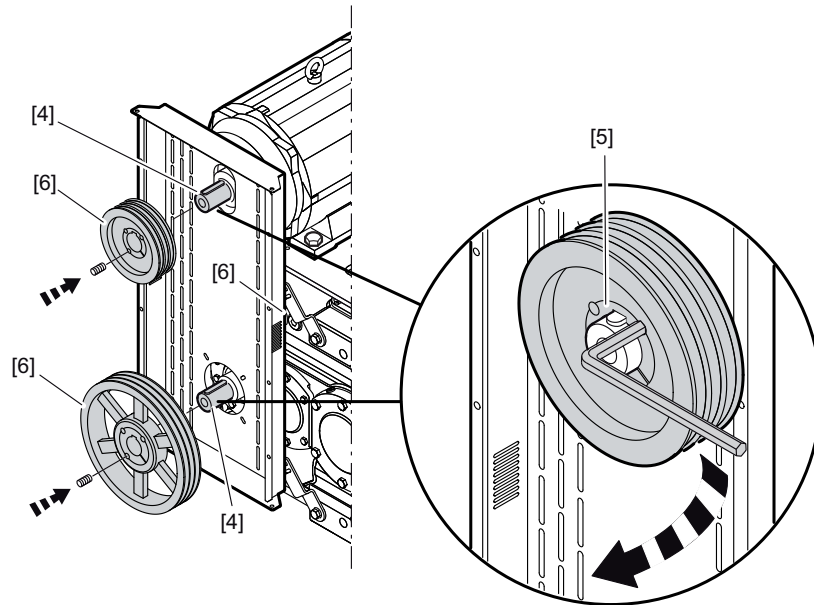


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4. Mount the belt pulleys with the taper bushings [6] on the gear unit and motor shaft [4]. Apply some grease to the screws of the taper bushings and fill the remaining boreholes with grease. Tighten the locking screws of the taper bushings [5] evenly.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

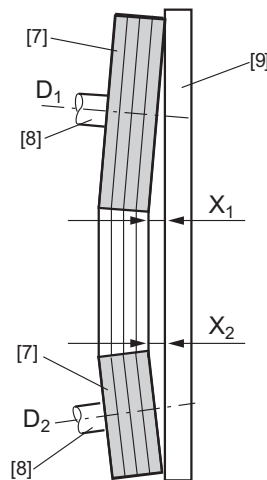
The following table shows the tightening torques for the taper lock bushings [5].

Dimensions	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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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.

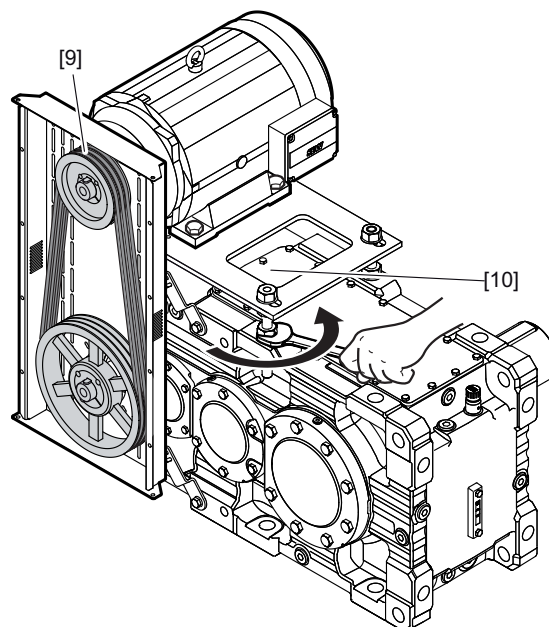


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Pulley diameter $D_1, D_2$ in mm	Maximum permitted distance $X_1, X_2$
112	0.5
224	1.0
450	2.0
630	3.0

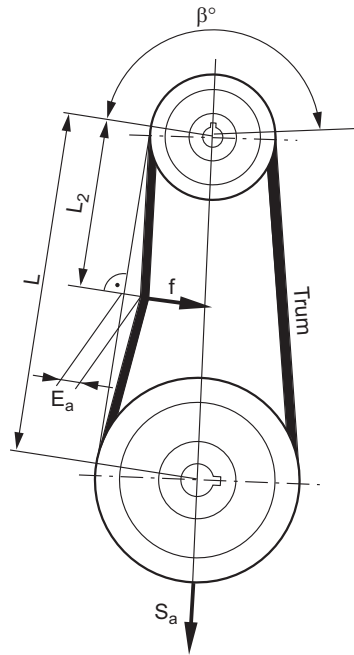
For other diameter values, you have to interpolate the intermediate values for  $X_1$ ,  $X_2$ .

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. Apply the V-belts [9] to 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 device is 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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8. Tighten all the screws and nuts, then once again check the alignment of the belt pulleys as well as the tension of the belt.
9. Check the fastening of the V-belt guard. Close and bolt it correctly using the designated bores.
10. Check the initial belt tension after about 24 hours of operation to compensate the initial stretching 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
	1.4	30	25	8.2	11.1	62	55
		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
	1.6	22	50	12.0	13.9	59	52
		30	25	8.2	11.1	63	55
		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

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

Size	Gear ratio	Motor power [kW]	Test force [N]	Indentation depth (mm)	Indentation depth (mm)	Frequency (1/s)	Frequency (1/s)
				Initial assembly	Used belts	Initial assembly	Used belts
XF160-170	1.25	4	25	12.5	12.5	49	43
		5.5	25	13.5	15.3	45	39
		7.5	25	11.7	13.5	49	43
		9.2	25	13.5	15.3	45	39
		11	25	11.7	13.5	48	43
		15	25	9.9	13.4	51	45
		18.5	50	15.8	18.6	47	41
		22	50	14.6	16.9	49	43
		30	25	9.9	13.4	51	45
		37	75	17.0	19.7	43	38
		45	75	16.5	20.8	40	35
		55	75	15.6	19.5	42	37
		75	75	16.9	21.3	40	35
		90	75	13.6	18.2	44	38
	1.4	4	25	12.6	12.6	49	43
		5.5	25	13.4	15.2	45	40
		7.5	25	11.7	13.5	49	43
		9.2	25	13.5	15.2	45	39
		11	25	11.7	13.5	49	43
		15	25	9.9	13.4	51	45
		18.5	50	15.8	18.7	47	41
		22	50	14.6	16.9	49	43
		30	25	9.9	13.4	51	45
		37	75	16.7	19.4	44	39
		45	75	16.5	20.7	42	37
		55	75	16.0	19.9	41	36
		75	75	16.1	20.3	42	37
		90	75	13.0	17.4	46	40
	1.6	4	25	12.5	12.5	50	44
		5.5	25	13.4	15.2	45	40
		7.5	25	11.7	13.5	49	43
		9.2	25	13.5	15.3	45	39
		11	25	11.7	13.5	48	42
		15	50	17.1	18.7	44	39
		18.5	50	15.7	18.5	47	41
		22	50	14.5	16.8	49	43
		30	75	15.9	19.8	45	39
		37	50	13.8	15.9	52	45
		45	75	16.0	21.6	40	35
		55	75	16.5	20.9	41	36
XF160-170	1.6	75	75	16.8	21.2	41	36
		90	75	13.5	18.2	44	39
		4	25	12.4	12.4	50	44
	1.8	5.5	25	13.4	15.2	45	40
		7.5	25	11.7	13.5	49	43
		9.2	25	13.5	15.3	45	39
		11	25	11.7	13.5	49	43
		15	50	17.0	18.7	44	39
		18.5	50	15.7	18.5	47	42
		22	50	14.9	17.2	48	42
		30	75	16.1	20.1	44	39
		37	50	13.7	15.8	52	46
		45	75	19.7	22.8	38	33
		55	75	14.4	17.8	44	39
		75	75	15.8	19.9	44	38
		90	75	12.7	17.0	47	41



Size	Gear ratio	Motor power [kW]	Test force [N]	Indentation depth (mm)		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

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

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

## X.K..

Size	Gear ratio	Motor power [kW]	Test force [N]	Indentation depth (mm)	Indentation depth (mm)	Frequency (1/s)	Frequency (1/s)
				Initial assembly	Used belts	Initial assembly	Used belts
XK100 – 110	1.25	4	25	9.4	10.7	64	56
		5.5	25	8.2	9.4	67	59
		7.5	25	8.1	9.4	70	62
		9.2	25	8.2	9.4	68	59
		11	25	8.1	9.4	70	61
		15	25	7.0	9.5	73	64
		18.5	50	11.0	13.0	64	57
	1.4	4	25	9.5	10.8	63	55
		5.5	25	8.2	9.5	67	59
		7.5	25	8.1	9.4	71	62
		9.2	25	8.2	9.4	67	59
		11	25	8.1	9.4	70	61
		15	25	7.0	9.5	73	64
		18.5	50	11.2	13.2	66	58
	1.6	4	25	9.5	10.7	64	56
		5.5	25	8.2	9.4	68	59
		7.5	25	8.0	9.3	71	63
		9.2	25	8.3	9.5	67	59
		11	25	8.0	9.3	71	62
		15	50	12.0	13.2	63	55
		18.5	50	11.1	13.1	67	58
	1.8	4	25	9.5	10.7	64	56
		5.5	25	8.2	9.5	67	59
		7.5	25	8.1	9.4	71	62
		9.2	25	8.1	9.3	69	60
		11	25	8.1	9.4	70	61
		15	50	11.9	13.0	64	56
XK120-130	1.25	18.5	50	11.0	12.9	68	60
		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	37	75	14.0	16.2	52	46
		45	75	14.7	18.5	45	40
		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
	1.6	30	25	8.2	11.1	63	55
		37	75	13.9	16.1	53	46
		45	75	14.1	19.0	46	40
		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
XK120-130	1.6	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	37	50	11.1	12.8	64	57
		45	75	13.4	18.1	48	42
		5.5	25	9.5	11.0	58	51
		7.5	25	9.4	10.8	61	54
		9.2	25	9.4	10.9	59	51
		11	25	9.4	10.8	61	53
		15	50	14.0	15.4	54	47
		18.5	50	12.9	15.1	58	51
		22	50	11.9	13.8	60	53
		30	75	13.1	16.3	54	48

Size	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

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
	1.8	160	125	18.2	22.1	34	30
		200	125	15.8	19.6	37	33
		30	75	21.9	27.2	34	30
		37	75	18.8	23.4	37	33
		45	75	20.3	23.4	37	32
		55	75	17.4	21.6	36	32
		75	75	19.8	24.9	35	30
		90	75	17.5	23.4	36	31
		110	75	20.0	25.3	34	30
		132	75	17.4	21.6	36	32
		160	125	18.9	23.0	33	29

### 5.19 Base frame /BF

Observe the following information:

- The support structure of the foot mounting must be rigid and adequately dimensioned.
- The base frame must only be bolted onto the gear unit foundation at the mounting hole positions provided for this purpose. It is important that the base frame is not deformed (hazard of damage to gear unit and coupling).
- Do not twist the base frame by misaligning the gear unit output shaft to the machine shaft.

### 5.20 Swing base /SB

Observe the following information:

- The system must be adequately dimensioned to be able to absorb the torque of the torque arm.
- Do not twist the swing base during assembly (hazard of damage to gear unit and coupling).

## 5.21 Motor pump /ONP

Observe the notes in chapter "Important information" (→ 102).

### INFORMATION



Before installation/assembly, first read the addendum to the operating instructions "Motor Pump/ONP", which includes the manufacturer's documentation.

## 5.22 Motor pump/ONP1L

Observe the notes in chapter "Important information" (→ 102).

### INFORMATION



Before installation/assembly, first read the addendum to the operating instructions "Motor Pump/ONP1L", which includes the manufacturer's documentation.

## 5.23 Motor pump/ONP1

Observe the notes in chapter "Important information" (→ 102).

### INFORMATION



Before installation/assembly, first read the addendum to the operating instructions "Motor Pump/ONP1", which includes the manufacturer's documentation.

## 5.24 Fan/FAN

Note the following

- If protective devices for couplings or similar are installed on gear units equipped with a fan, sufficient clearance must be provided for the intake of cooling air.  
For the required clearance, refer to the dimension drawing in the catalog or the order documents.
- Never operate the gear unit if the protective housing is not installed.
- 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



## 5.25 Water cooling cover/CCV

### 5.25.1 Notes on connection / installation

#### NOTICE

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

Possible damage to property.

- Observe the following information:

- Using thread seal tape on the pipe threads increases the resistance between the connection parts as well as the risk of cracking in the water cooling cover. Do not tighten the threads excessively.
- The water cooling cover is not equipped with a water drain. In the event of repair work, you have to install a drain on the cooling water outlet to ensure proper draining of the cooling water.
- Connect the water cooling cover to the existing cooling circuit. The direction of flow is user-defined.
- Cooling water temperature and flow rate 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 chapter "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.
- Install filters in the cooling water inlet to protect the heat exchanger from dirt and mud in particular if the cooling water is obtained from sources other than the municipal water supply system.
- Install an automatic throttle valve in the respective inlet to compensate pressure.

**5.25.2 Removal**

Observe the notes in chapter "Inspection/maintenance" (→ 262).

**5.25.3 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.

## 5.26 Water cooling cartridge/CCT

### 5.26.1 Notes on connection/installation

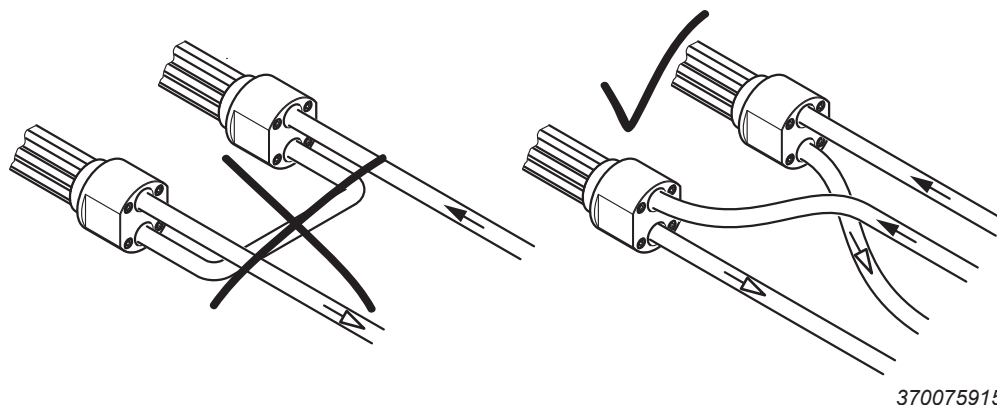
#### NOTICE

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

Possible damage to property.

• Observe the following information:

- Using thread seal tape on the pipe threads increases the resistance between the connection parts as well as the risk of cracking in the cast parts of the water cooling cartridge. Do not tighten the threads excessively.
- The water cooling cartridges are not equipped with a water drain. In the event of repair work, you have to install a drain on the cooling water outlet to ensure proper draining of the cooling water.
- For connecting the water cooling cartridge, use only piping and mounting parts of the same or of compatible material.
- Check the water cooling cartridge to see that it is free from soiling and foreign objects in the pipe connection to ensure unobstructed flow of the cooling media.
- Avoid tensions on the connection points when connecting the piping. Support the pipes properly, if required.
- Install the cooling water outlet pipe in such a way that the water cooling cartridge is permanently flooded by cooling water.
- Refer to chapter "Cooling media" (→ 196) to determine the permitted cooling media.
- Cooling water temperature and flow rate 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.



- ← Supply (cold water)  
→ Return (warm water outflow)

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

#### **5.26.2 Removal**

Observe the notes in chapter Inspection/maintenance.

### 5.26.3 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 <sup>1)</sup>	Water quality
0 – 5 °dH	Very soft water
5 – 10 °dH	Soft water
10 – 20 °dH	Medium hard water
20 – 30 °dH	Hard water
> 30 °dH	Very hard water

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

### pH value

- The water cooling cartridge partially consists of a copper and nickel alloy, to which the following applies:  
→ Corrosion problems when **pH value < 6**
- With alkaline water:  
→ Corrosion problems when **water hardness < 6°dH**

Smaller values can cause corrosion due to free carbonic acid.

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

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

## 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

### 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

**5.27 Oil-water cooler for splash lubrication /OWC**

Observe the notes in chapter "Important information" (→ 102).

**INFORMATION**

Before installation/assembly, first read the addendum to the operating instructions "Oil-Water Cooler with Motor Pump for Splash Lubrication /OWC", which includes the manufacturer's documentation.

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**5.28 Oil-air cooler for splash lubrication /OAC**

Observe the notes in chapter "Important information" (→ 102).

**INFORMATION**

Before installation/assembly, first read the addendum to the operating instructions "Oil-Air Cooler for Splash Lubrication /OAC", which includes the manufacturer's documentation.

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**5.29 Oil-water cooler for pressure lubrication /OWP**

Observe the notes in chapter "Important information" (→ 102).

**INFORMATION**

Before installation/assembly, first read the addendum to the operating instructions "Oil-Water Cooler for Pressure Lubrication /OWP", which includes the manufacturer's documentation.

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**5.30 Oil-air cooler for pressure lubrication /OAP**

Observe the notes in chapter "Important information" (→ 102).

**INFORMATION**

Before installation/assembly, first read the addendum to the operating instructions "Oil-Air Cooler for Splash Lubrication /OAP", which includes the manufacturer's documentation.

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### 5.31 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" (→ 270). 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" (→ 270).

## 5.32 Oil heater

**▲ 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 the heating elements are fully immersed in the oil bath to avoid any damage.

**NOTICE**

Improper change of the mounting position might result in malfunction of the gear unit heater.

Possible damage to property.

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

**INFORMATION**

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

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

### 5.32.1 Information on the function of the oil heater

- The heater is screwed into the gear unit housing ex works and is controlled by a thermostat. The trip temperature of the thermostat 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" (→ 203).

At this temperature, the thermostat disables the oil heater see chapter "Minimum temperature for gear unit start" (→ 203). Only then, the gear unit can be started. The thermostat activates the oil heater again once the temperature is about 5 K below the trip point.

- To prevent the oil from burning, the heating elements of the heater have a maximum surface load. This is why the heating process for cold gear unit oil can take between one and several hours. The exact duration of the heating process before the start varies depending on the gear unit size, design, mounting position, oil quantity, and ambient temperature.

This is why the thermostat has to be energized permanently even when the drive is at a brief standstill.

If the drive is at standstill over a longer period, for example during holidays, and the thermostat is not energized, you have to make sure that the thermostat is energized in due time before the drive is started up.

- Thermostat and oil heater are installed in the gear unit and ready for operation. Prior to startup, wire them properly and connect them to the current supply.
- Contact SEW-EURODRIVE if a differing oil viscosity class is used or if ambient temperatures fall below the specified limit temperature.
- During installation, check the thermostat setting according to chapter "Thermostat" (→ 206).

## 5.32.2 Thermostat

## Electrical connection

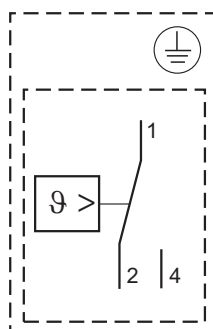
**▲ WARNING**

Risk of injury due to electric shock.

Severe or fatal injuries.

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

The following figure shows the electrical connection.



18014398960475019

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

**INFORMATION**

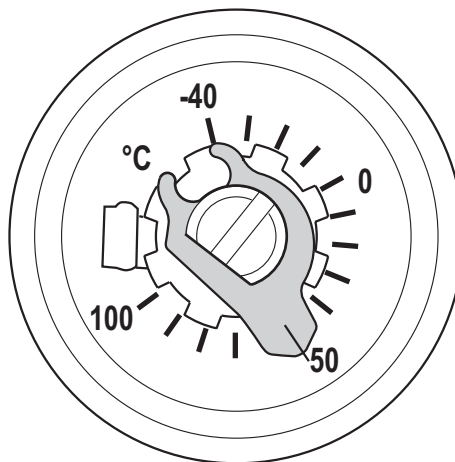
- Observe the manufacturer's documentation.

## Technical data

Maximum switching capacity:			
AMTHs-SW-2	Current		Voltage
	Terminal 2	Terminal 4	
	10 A	10 A	AC 230 + 10% $\cos\phi = 1$ (0.6)
	0.25 A	0.25 A	DC 230 + 10%
<b>Contact reliability:</b> To ensure the greatest contact reliability possible, the manufacturer recommends a minimum load of AC/DC 24 V, 100 mA for silver terminals.			
<b>Nominal impulse voltage:</b>		2500 V	
<b>Overvoltage category II</b>		(via the switching contacts 400 V)	
<b>Required fusing:</b>		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.



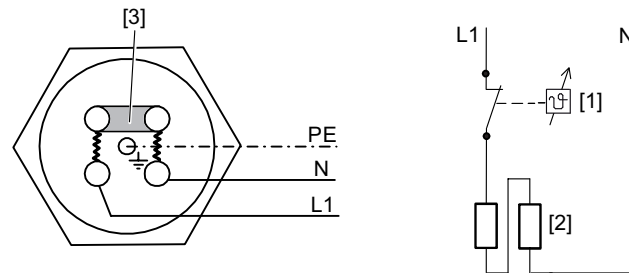
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### 5.32.3 Connection power and electrical connection of resistor element

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. They do not depend on the size of the heater and always have an M4 thread. We recommend using RKS4 ring cable lugs with small grommets.

#### AC voltage/1-phase/230 V/series connection

The following figure shows the wiring upon delivery (connection space):



9007202007368715

- [1] Thermostat
- [2] Heater
- [3] Jumper

The table below shows the connected load of the heaters that can be installed.

Gear unit		P <sub>inst</sub>		P <sub>inst</sub>	
		1 heating element		2 heating elements	
Size	Design		K/h		K/h
X100	X2K / X2F / X3K	1 × 0.4	6	2 × 0.4	11
	X3T / X3F	1 × 0.3	3	2 × 0.3	7
X110	X3T / X3F	1 × 0.3	4	-	-
X120	X4F / X3T / X4T	1 × 0.3	3	2 × 0.3	5
X130	X4F / X3T / X4T	1 × 0.4	3	-	-
X140	X4F / X3T / X4T	1 × 0.4	3	2 × 0.4	5

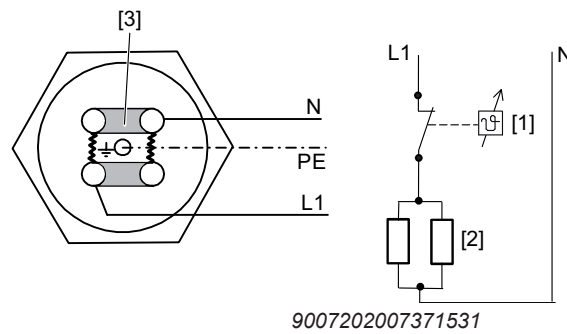
K/h = Heating capacity [Kelvin/hour]

P<sub>inst</sub> = Power of the installed heater

## AC voltage/1-phase/230 V/parallel connection

The following figure shows the wiring upon delivery (connection space):

Cable entry: 1xPg11



Observe the electrical characteristics of the control range

[1] Thermostat

[2] Heater

[3] Jumper

The table below shows the connected load of the heaters that can be installed.

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

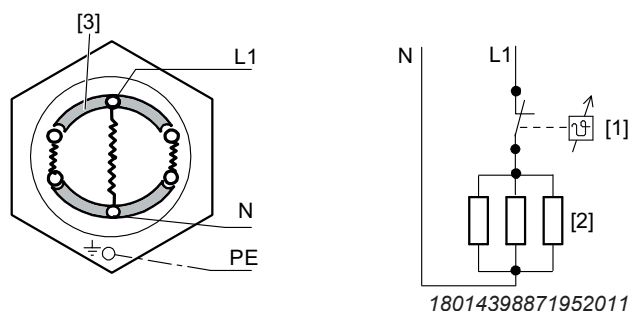
K/h = Heating capacity [Kelvin/hour]

$P_{inst}$  = Power of the installed heater

### AC voltage/1-phase/230 V/parallel connection/I ≤ 10 A

The following figure shows the wiring upon delivery (connection space):

Cable entry: 1xPg16



Observe the electrical characteristics of the control range

- [1] Thermostat
- [2] Heater
- [3] Jumper

The table below shows the connected load of the heaters that can be installed.

		<b>P<sub>inst</sub></b>		<b>P<sub>inst</sub></b>	
<b>Gear unit</b>		<b>1 heating element</b>		<b>2 heating elements</b>	
<b>Size</b>	<b>Design</b>		<b>K/h</b>		<b>K/h</b>
X180	X2F / X2K / X3K / X3F / X4K	1 × 1.6	5	-	-
	X3T / X4F / X4T	1 × 1.1	4	2 × 1.1	7
X190	X2F / X2K / X3K / X3F / X4K	1 × 1.6	5	-	-
	X3T / X4F / X4T	1 × 1.1	3	-	-
X200	X2K	1 × 1.6	4	-	-
	X2F / X3K / X3F / X4K	1 × 1.8	4	-	-
	X4F / X4T	1 × 1.3	3	-	-
	X3T	1 × 1.1	2	2 × 1.1	5
X210	X2K	1 × 1.6	4	-	-
	X2F / X3K / X3F / X4K	1 × 1.8	4	-	-
	X3T / X4F / X4T	1 × 1.3	3	-	-
X220	X2K	1 × 1.8	3	-	-
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.2	4	-	-
230X	X2K	1 × 1.8	3	-	-
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.2	4	-	-
X240	X2K	1 × 1.8	3	-	-
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 × 2.2	3	-	-
X250	X2K	1 × 2.2	3	-	-

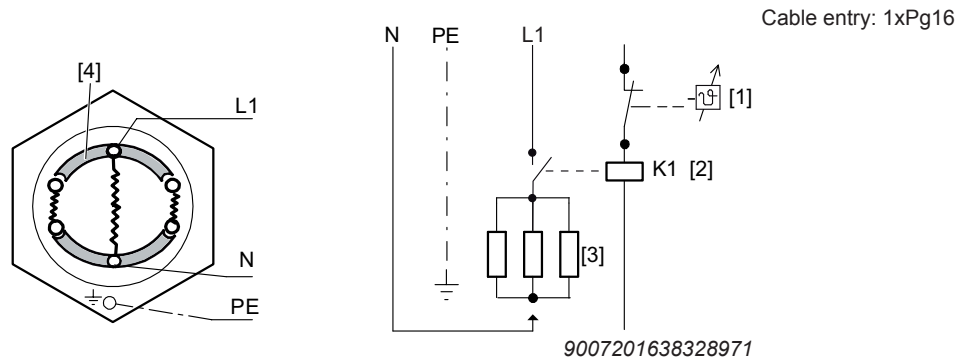
K/h = Heating capacity [Kelvin/hour]

P<sub>inst</sub> = Power of the installed heater



# AC voltage/1-phase/230 V/parallel connection/I ≥ 10 A

The following figure shows the wiring upon delivery (connection space):



Observe the electrical characteristics of the control range

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

The table below shows the connected load of the heaters that can be installed.

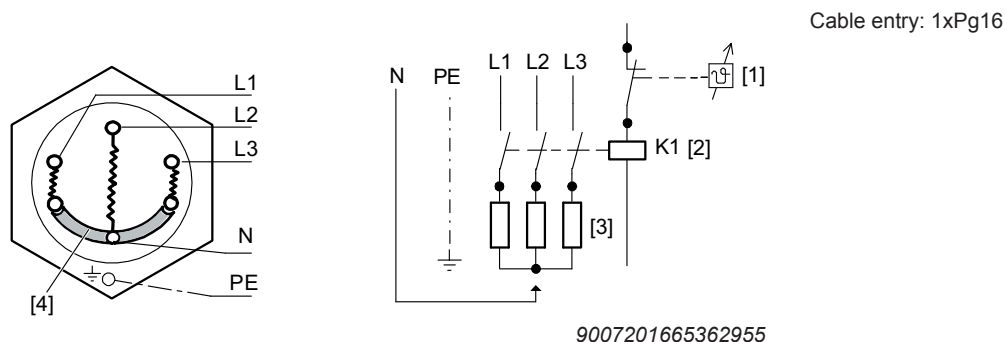
		$P_{inst}$		$P_{inst}$	
Gear unit		1 heating element		2 heating elements	
Size	Design		K/h		K/h
X180	X2F / X2K / X3K / X3F / X4K	-	-	2 × 1.6	10
X200	X2K	-	-	2 × 1.5	8
	X2F / X3K / X3F / X4K	-	-	2 × 1.8	8
	X4F / X4T	-	-	2 × 1.3	6
X220	X2K	-	-	2 × 1.8	7
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	-	-	2 ×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

K/h = Heating capacity [Kelvin/hour]

$P_{inst}$  = Power of the installed heater

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

The following figure shows the connection that results from removing the jumpers that are plugged in upon delivery (view of the connection space):



Observe the electrical characteristics of the control range

- [1] Thermostat
- [2] Contactor (not included in the delivery)
- [3] Heater
- [4] Jumper (modified delivery condition)

The table below shows the connected load of the heaters that can be installed.

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

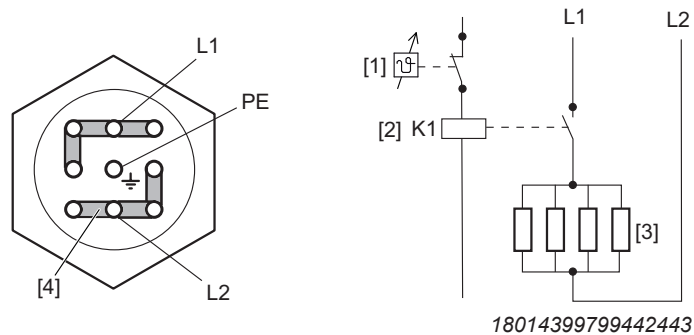
K/h = Heating capacity [Kelvin/hour]

$P_{inst}$  = Power of the installed heater

## AC voltage/2-phase/400 V/parallel connection

The following figure shows the wiring upon delivery (connection space):

Cable entry: 1xPg16



Observe the electrical characteristics of the control range

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

The table below shows the connected load of the heaters that can be installed.

		$P_{inst}$		$P_{inst}$	
Gear unit		1 heating element		2 heating elements	
Size	Design		K/h		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 capacity [Kelvin/hour]  
 $P_{inst}$  = Power of the installed heater

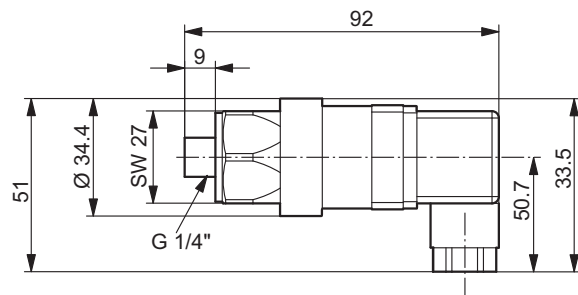
### 5.33 Pressure switch /PS

The pressure switch indicates the correct oil pressure in the pressure pipe and in this way indicates the operational readiness of pressure lubrication. The pressure switch must be monitored by the operator.

During the starting phase of a gear unit with shaft end pump, pressure might build up with a delay. The slow building up of pressure during this phase can cause the pressure switch to issue a fault signal. You can prevent this by timing the pressure switch to **5 seconds up to a maximum of 10 seconds**.

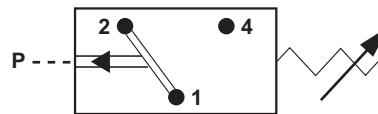
Another switch-off delay is not permitted as this might damage the gear unit.

#### 5.33.1 Dimensions



721994635

#### 5.33.2 Electrical connection



722003723

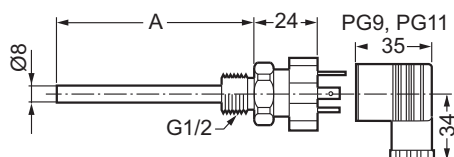
[1][2] NC contact  
[1][4] NO contact

#### 5.33.3 Technical data

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

## 5.34 Temperature sensor /PT100

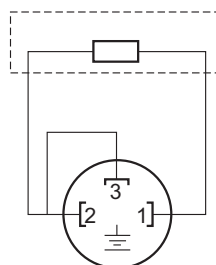
### 5.34.1 Dimensions



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A in mm
50
150

### 5.34.2 Electrical connection



359158539

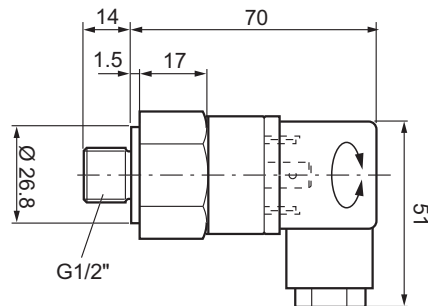
[1][2] Resistor element connection

### 5.34.3 Technical data

- Design with thermowell and changeable measuring insert
- Sensor tolerance in  $K \pm (0.3 + 0.005 \times T)$ , (corresponds to DIN IEC 751 class B),  
T = Oil temperature in °C
- Plug connector: DIN EN 175301-803 PG9 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

## 5.35 Temperature switch /NTB

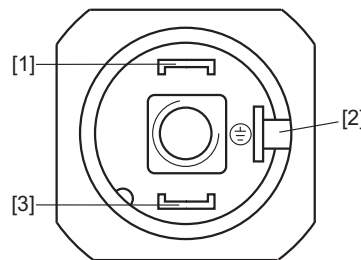
### 5.35.1 Dimensions



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### 5.35.2 Electrical connection

To guarantee a long service life and trouble-free functioning, we recommend that you use a relay in the power circuit instead of a direct connection through the temperature switch.



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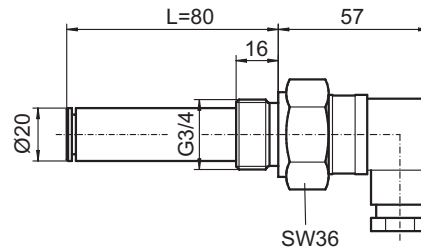
- [1] [3] NC contact  
[2] Grounding terminal 6.3 x 0.8

### 5.35.3 Technical data

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

## 5.36 Temperature switch /TSK

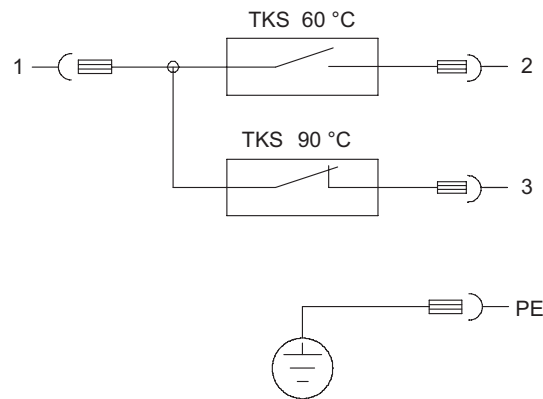
### 5.36.1 Dimensions



893872779

### 5.36.2 Electrical connection

To guarantee a long service life and trouble-free functioning, we recommend that you use a relay in the power circuit instead of a direct connection through the temperature switch.



27021598658101131

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

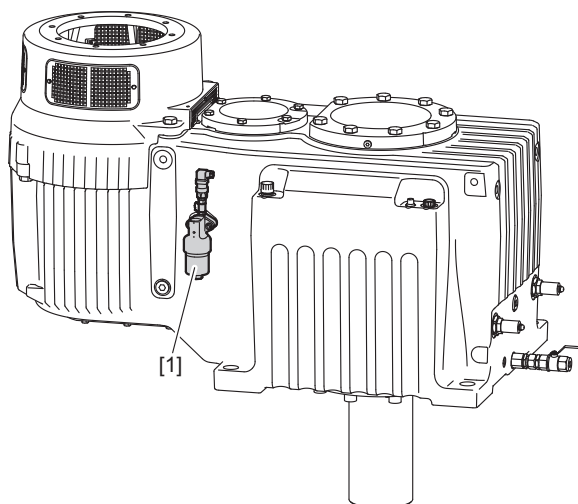
### 5.36.3 Technical data

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

## 5.37 Oil filter

**INFORMATION**

Observe the operating instructions of the oil filter manufacturer.



15800209419

[1] Oil filter

## 5.38 Brake

**INFORMATION**

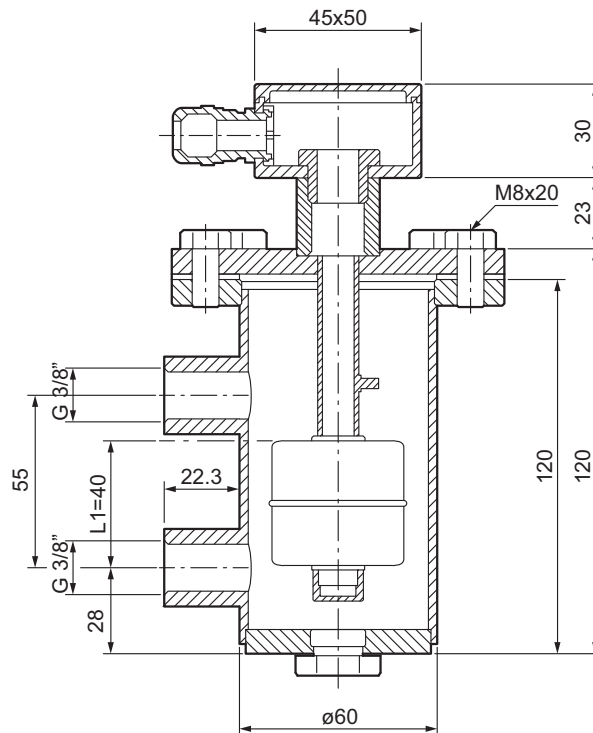
The brake is not set at the factory.

Observe the operating instructions of the respective brake manufacturer.



### 5.39 Float switch

### 5.39.1 Dimensions

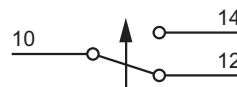


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### 5.39.2 Technical data

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

### 5.39.3 Electrical connection



18888476683

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

## 6 Startup

### 6.1 Important notes

Read the following notes prior to startup.



#### ▲ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



#### ▲ WARNING

Danger due to freely accessible, rotating parts.

Severe or fatal injuries.

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



#### ▲ CAUTION

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

Possible injury to persons due to falling parts.

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



#### ▲ CAUTION

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

Minor injuries.

- Check the gear unit and mount-on components for leaking lubricant.
- The seals must not come in contact with cleaning agent as this may damage the seals.
- Protect the breather against damage.
- Make sure that there is not too much oil in the gear unit. If the oil level is too high and the temperature rises, lubricant may escape from the breather.

#### NOTICE

Improper startup may result in damage to the gear unit.

Possible damage to property.

- Note the following information.

- 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 is the decisive indicator of the correct oil quantity. For additional information, refer to chapter "Checking the oil level" (→ 235) and chapter "Changing the oil" (→ 243).

When additional attachments, e.g. an oil supply system, are mounted to the gear unit, the required oil fill quantity is higher. 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" (→ 235).

- 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 any order-specific documentation.
- Prior to startup, make sure that monitoring devices (such as pressure switch, temperature switch) are fully operational.
- As of size X..220 and for X2F..180 – 210, avoid no-load operation independent of the driven machine because operation with a load below the minimum load can damage the rolling bearings of the gear unit.
- After having installed 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.
- If an oil level glass is used for checking the oil level, ensure that it is protected against damage.
- 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.
- If the gear unit is equipped with a fan on the input shaft, check for free air intake within the specified angle.
- Ensure that the external coolant supply is guaranteed for gear units with circulation cooling, water cooling covers and water cooling cartridges.
- When operated in areas with low ambient temperatures, observe the limit temperature for gear unit startup. Allow for a sufficient heating period.
- Gear units with pressure lubrication may only be taken into operation when the pressure switch is connected.
- 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.
- Strictly observe the safety notes in the individual chapters.

## 6.2 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  $\geq 400$  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 further information, refer to chapter Limit temperature for gear unit start.
- Observe the notes in chapter "Filling the gear unit with oil" (→ 111).

## 6.3 Motor pump /ONP

### INFORMATION



Before startup, first read the addendum to the operating instructions "Motor Pump / ONP", which includes the manufacturer's documentation.

## 6.4 Motor pump/ONP1L

### INFORMATION



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

## 6.5 Motor pump/ONP1

### INFORMATION



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

## 6.6 Water cooling cover /CCV

### NOTICE

Risk of damage to the system due to power loss.

Possible damage to property.

- A power loss 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.

## 6.7 Water cooling cartridge /CCT

### NOTICE

Risk of damage to the system due to power loss.

Possible damage to property.

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

### NOTICE

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

Possible damage to property.

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

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

Make the following checks:

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

## 6.8 Oil-water cooler for splash lubrication/OWC

### INFORMATION



Before installation/assembly, first read the addendum to the operating instructions "Oil-Water Cooler for Splash Lubrication /OWC", which includes the manufacturer's documentation.

## 6.9 Oil-air cooler for splash lubrication /OAC

### INFORMATION



Before startup, first read the addendum to the operating instructions "Oil-Air Cooler for Splash Lubrication/OAC", which includes the manufacturer's documentation.

## 6.10 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", which includes the manufacturer's documentation.

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## 6.11 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", which includes the manufacturer's documentation.

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## 6.12 Oil heater /OH

### NOTICE

Malfunctioning oil heater when changing the mounting position.

Possible damage to property.

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

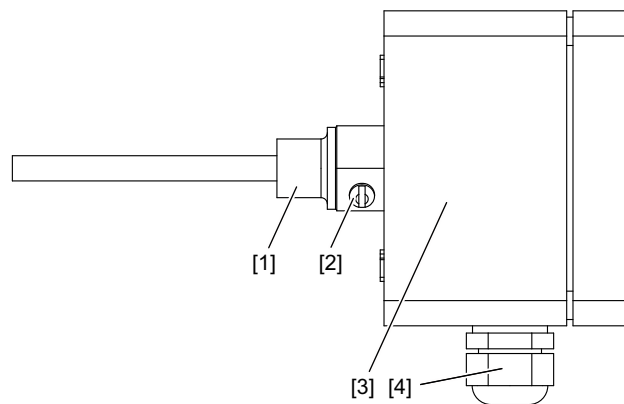
The oil heater comes equipped with cable glands and jumpers. They are included in the delivery of the heating elements and are already installed in the gear unit. The oil heater is connected to the current supply using terminal studs. They do not depend on the size of the heating element and always have an M4 thread. We recommend using RKS4 ring cable lugs with small grommets.

#### 6.12.1 Positioning the thermostat

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

Proceed as follows to position the thermostat:

1. Open the clamping screws [2].
2. **NOTICE!** Observe the position of the cable gland during assembly. Possible damage to property.  
Mount it in such a way that no moisture can enter. Turn the thermostat to the required position.
3. Tighten the clamping screws [2].



2338432139

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

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

### INFORMATION

- Observe the manufacturer's documentation.





## 6.13 Backstop /BS

### NOTICE

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

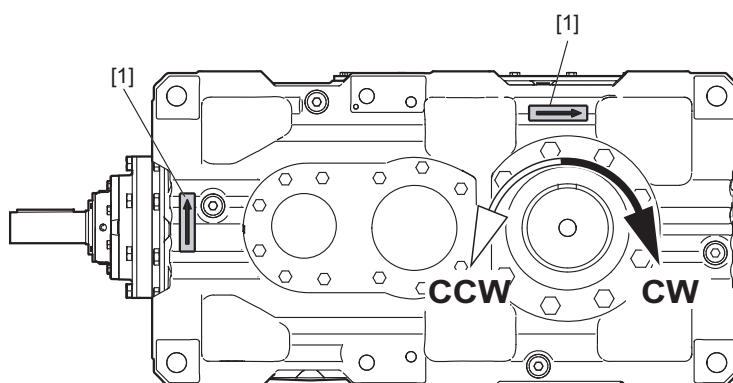
Possible damage to property

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

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

- CW rotation
- CCW rotation

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



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## 6.14 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.

- Prior to starting up the gear unit, make sure that the oil heater heats up the oil to the temperature specified for "without heater".

## 6.15 Gear unit shutdown / gear unit conservation



### ▲ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



### INFORMATION

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

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

### 6.15.1 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](http://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" (→ 243) 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.


### 6.15.2 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](http://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" (→  28) in the corresponding operating instructions. This chapter provides information on the possible storage periods in conjunction with adequate packaging – depending on the storage location.

**7 Inspection/maintenance****7.1 Preliminary work regarding inspection and maintenance**

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

**▲ WARNING**

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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

**▲ WARNING**

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.
- Remove the oil drain plug very carefully.

**▲ CAUTION**

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

Minor injuries.

- Check the gear unit and mount-on components for leaking lubricant.
- The seals must not come in contact with cleaning agent as this may damage the seals.
- Protect the breather against damage.
- Make sure that there is not too much oil in the gear unit. If the oil level is too high and the temperature rises, lubricant may escape from the breather.



### **▲ CAUTION**

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.

### **NOTICE**

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

Possible damage to property.

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

### **NOTICE**

Improper maintenance may result in damage to the gear unit.

Possible damage to property.

- Observe the following notes.

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

## **7.2 Inspection and maintenance intervals**

Adhere to the following inspection and maintenance intervals:

| Frequency                                                                              | What is to be done?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Daily                                                                                  | <ul style="list-style-type: none"> <li>• Check the housing temperature: <ul style="list-style-type: none"> <li>– Mineral oil: max 90 °C</li> <li>– Synthetic oil: max 100 °C</li> </ul> </li> <li>• Check gear unit noise</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Once a month                                                                           | <ul style="list-style-type: none"> <li>• Check the gear unit for signs of leakage.</li> <li>• Check the oil level.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| After 500 operating hours                                                              | <ul style="list-style-type: none"> <li>• First oil change after initial startup</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Every 6 months                                                                         | <ul style="list-style-type: none"> <li>• Check the screw fittings and piping for leakage.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Every 3000 operating hours, at least every 6 months                                    | <ul style="list-style-type: none"> <li>• Check the oil consistency.</li> <li>• Fill regreasable sealing systems with grease.</li> <li>• For V-belt drives: Check the belt tension and condition of the V-belt pulleys and belts.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Depending on the operating conditions, at least every 12 months                        | <ul style="list-style-type: none"> <li>• Check whether retaining screws are tightly secured.</li> <li>• Check if the gear unit surface is free of dust and dirt, so that the gear unit can be optimally cooled.</li> <li>• Check the condition of the motor pump/ONP. If required, replace filter element.</li> <li>• Check the condition of the oil-water cooler/OWC (see addendum to the operating instructions).</li> <li>• Check the condition of the oil-air cooler/OAC (see addendum to the operating instructions).</li> <li>• Check the condition of the oil-water cooler/OWP, replace filter element if necessary (see addendum to the operating instructions).</li> <li>• Check the condition of the oil-air cooling system/OAP. If required (see addendum to the operating instructions), replace the filter element.</li> <li>• Clean the oil filter. If required, replace filter element.</li> <li>• Check the condition of the water cooling cartridge/CCT.</li> <li>• Check the condition of the water cooling cover/CCV.</li> <li>• Check breather. If required, replace it.</li> <li>• Check the alignment of the input and output shaft.</li> <li>• Check the condition and tightness of all the rubber tubes (aging effects).</li> </ul> |
| At least every 3 years depending on the operating conditions (see figure on next page) | <ul style="list-style-type: none"> <li>• Change mineral oil.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| At least every 5 years depending on the operating conditions (see figure on next page) | <ul style="list-style-type: none"> <li>• Change synthetic oil.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Frequency                                             | What is to be done?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Varying (depending on external factors)</b></p> | <ul style="list-style-type: none"> <li>• Check the installed hose pipes.</li> <li>• Clean the gear unit housing surface and the fan.</li> <li>• Touch up or renew the surfaces/anti-corrosion coating.</li> <li>• Replace backstop.</li> </ul> <p>The backstop might wear off when operated below lift-off speed. This is why you should contact SEW-EURODRIVE for defining the maintenance intervals for:</p> <ul style="list-style-type: none"> <li>– Speed on input shaft &lt; 950 1/min</li> <li>– See backstop, chapter 4</li> </ul> <ul style="list-style-type: none"> <li>• Check built-in cooler (such as water cooling cover/CCT and cartridge/CCV) for deposits.</li> <li>• Check the oil heater/OH (at same time as the oil change): <ul style="list-style-type: none"> <li>– Are all connecting leads and terminals tightened securely and free from corrosion?</li> <li>– Clean encrusted heating elements. Replace is required.</li> </ul> </li> </ul> |

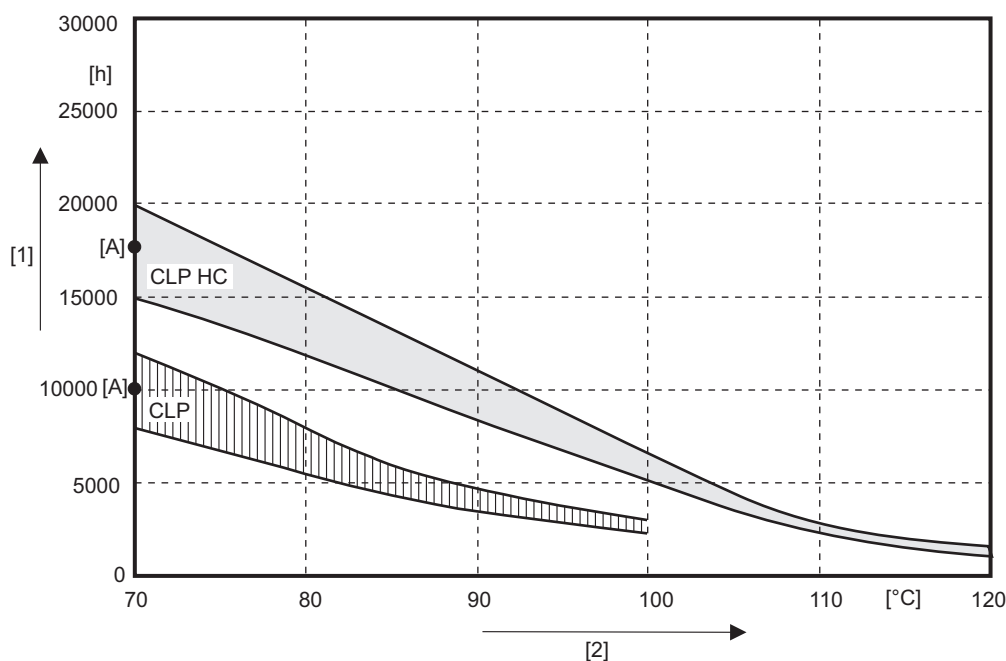
### 7.3 Lubricant change intervals

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

#### INFORMATION



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



- [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" (→ 242)) to optimize the lubricant change intervals.



## 7.4 Checking the oil level

### 7.4.1 General information

Note the following when checking the oil level.

#### NOTICE

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

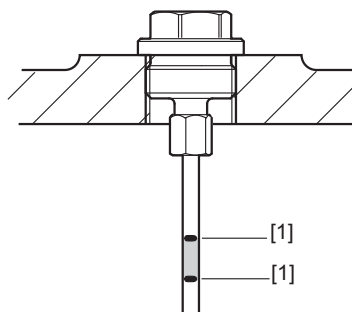
Possible damage to property.

- Check the oil level only when the gear unit is 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.

### 7.4.2 Standard procedure

#### Oil dipstick

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).



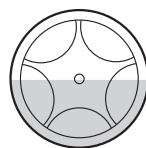
27021598223908235

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.

**Oil sight glass**

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

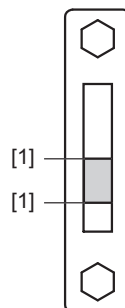
The oil sight glass only shows the oil level. The oil level is determined using the **oil dipstick**.



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**Oil level glass**

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).



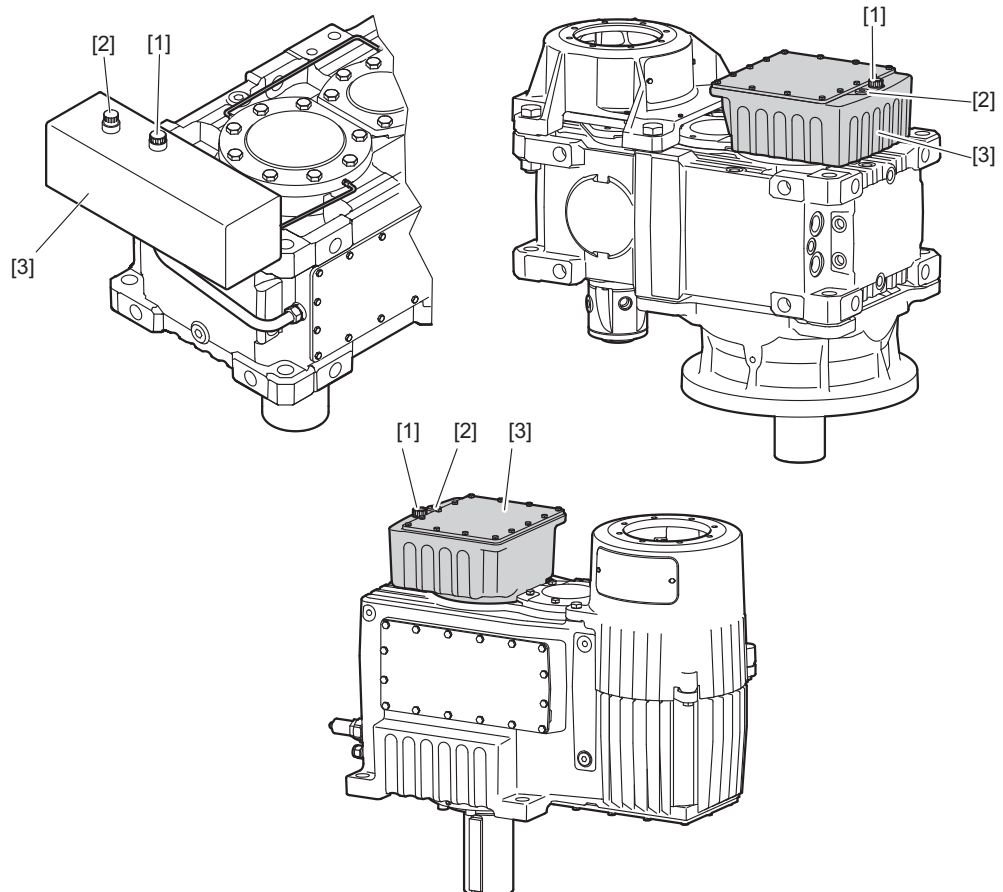
9007214758442123

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.

### 7.4.3 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].



15514764939

[1] Breather  
[2] Oil dipstick

[3] Oil expansion tank

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

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" (→ 235).

#### 7.4.4 Notes on the procedure for fixed and variable pivoted mounting positions

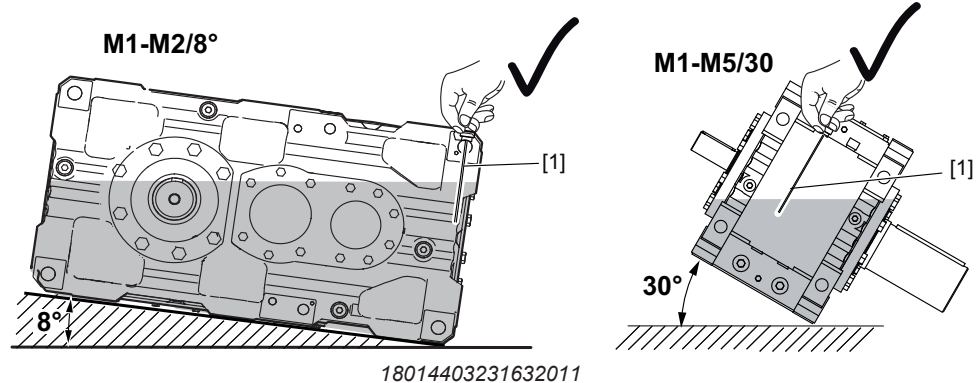
Observe the information on the nameplate and in the order documents.

##### Fixed pivoted mounting positions

###### Procedure

Check the oil level in the fixed, intended position. Observe the notes in chapter "Standard procedure" (→ 235).

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



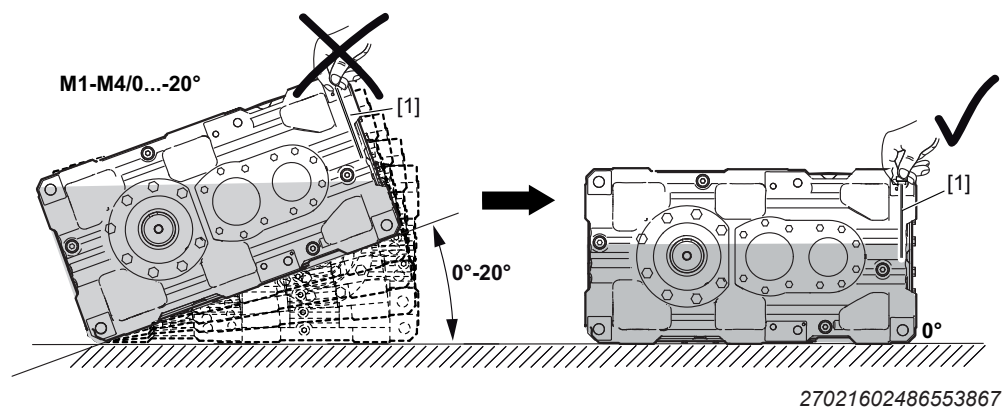
[1] Oil dipstick  
Oil

##### 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" (→ 235).

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

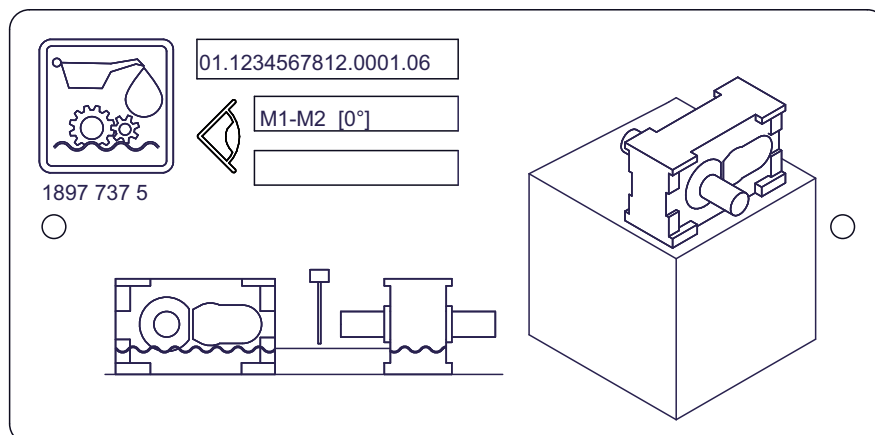


[1] Oil dipstick  
Oil

###### Information sign

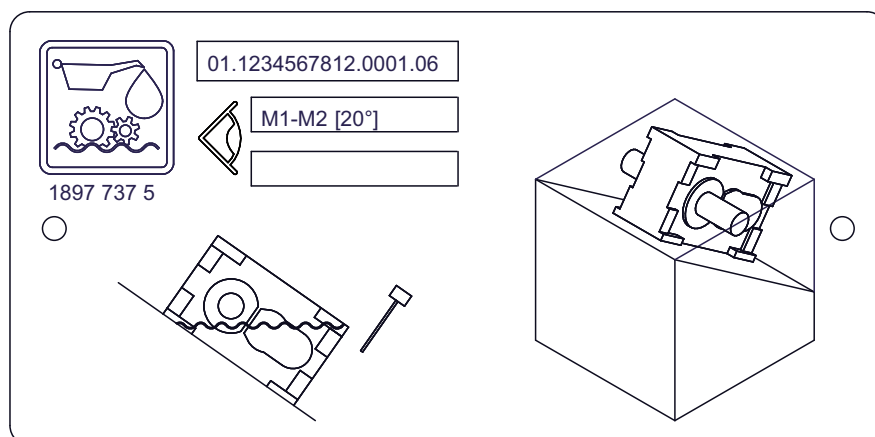
Observe the additional **information sign on the gear unit**. Check the oil level in the test mounting position specified on the information sign.

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



9007204944147979

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



9007204944161675

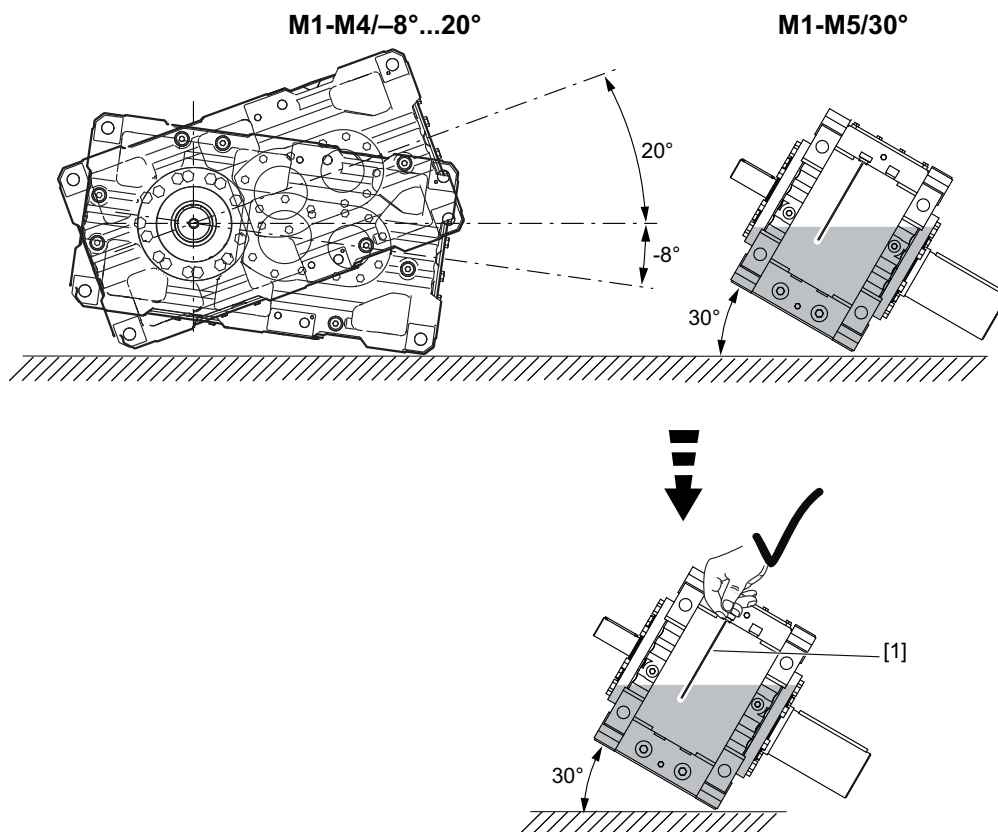
### Combination of fixed and variable pivoted mounting positions

#### Procedure

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

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" (→ 235).

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



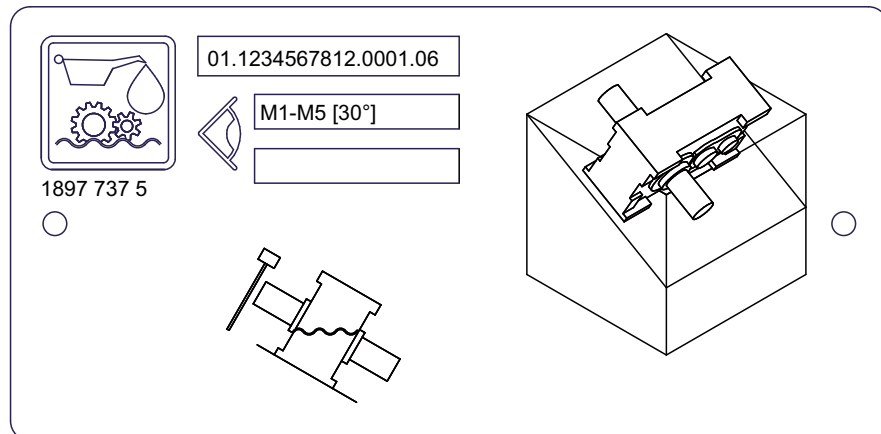
4725461515

[1] Oil dipstick  
Oil

#### Information sign

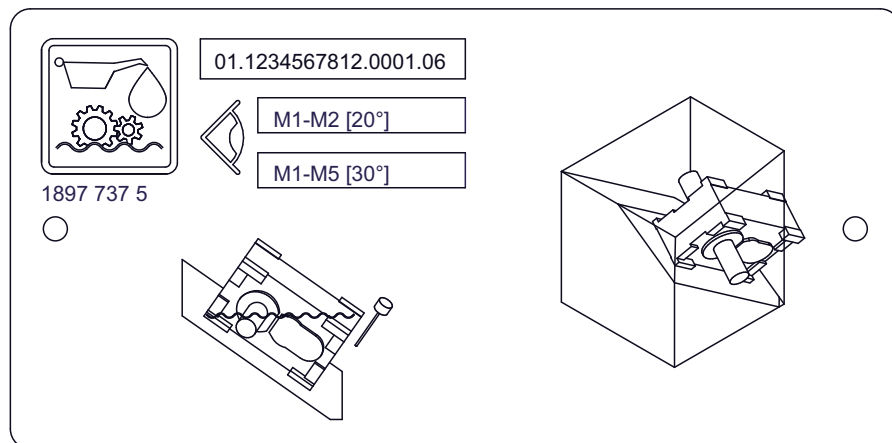
Observe the additional information sign on the gear unit. Check the oil level in the test mounting position specified on the nameplate.

The following figure shows an example of the information sign for check mounting position 30°.




9007204944186379

The following figure shows an example of the information sign for check mounting position 30°.



9007204944188555

## 7.5 Checking the oil consistency

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→  230).

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.



## 7.6 Changing the oil

### 7.6.1 Notes

Observe the following when changing the oil.



#### ▲ WARNING

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

Serious injury.

- Let the gear unit cool down before you start working on it.
- 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.

- Note the following information.

- Perform the oil change quickly after you have switched off the gear unit to prevent solids from settling. 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. Especially synthetic oils may 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.

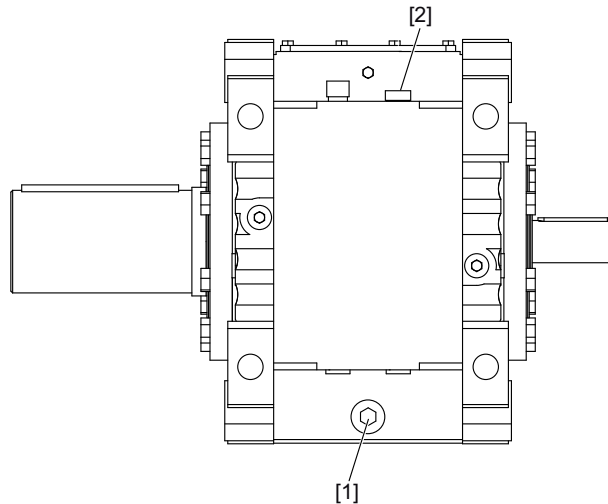
- The oil grade and oil viscosity are listed on the nameplate of the gear unit. The oil quantity specified on the nameplate is an approximate quantity. The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity.

When additional attachments, e.g. an oil supply system, are mounted to the gear unit, the oil fill quantity is higher. Observe the operating instructions of the oil supply system.

- 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 for this purpose as for operating the gear unit. Fill in fresh oil only after all residues have been removed.
- For the position of the oil level plug, 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 on the gear unit by safety symbols.

- 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.

### 7.6.2 Basic gear unit



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Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

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 filling hole [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" (→ 235).
6. If present, insert the oil fill plug(s) [2] / breather and the oil dipstick.

#### ⚠ CAUTION

Danger due to leakage of lubricant.

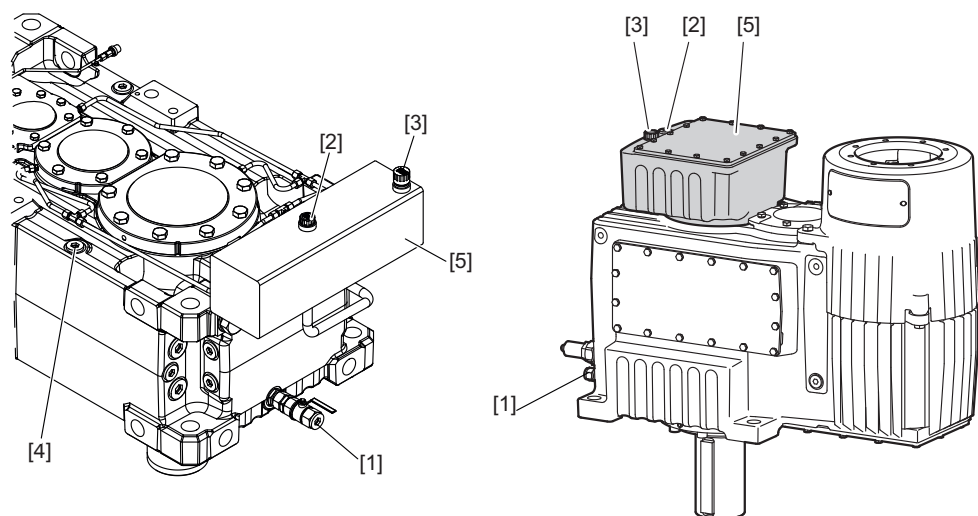
Injuries.

- Remove any dripping oil immediately with oil binding agent.



### 7.6.3 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.



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

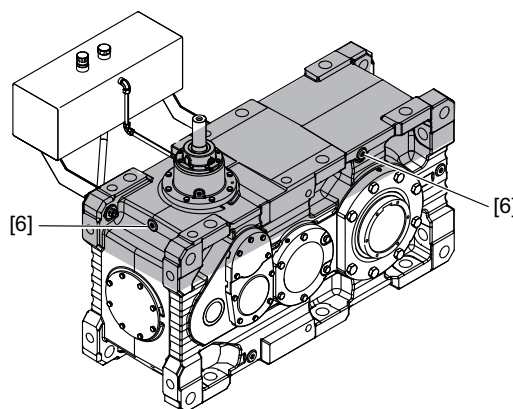
## INFORMATION



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.

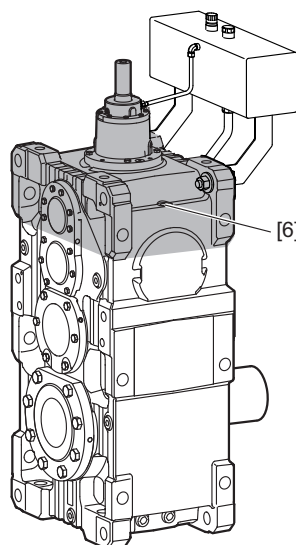
2. Place a suitable container underneath the oil drain plug(s) or the oil drain valve [1].
3. Drain all the oil into the container.
4. Close the oil drain plug(s) or oil drain valve [1].
5. Open the oil fill plugs. Observe the mounting position and the following notes.

### Mounting positions M1 and M3:



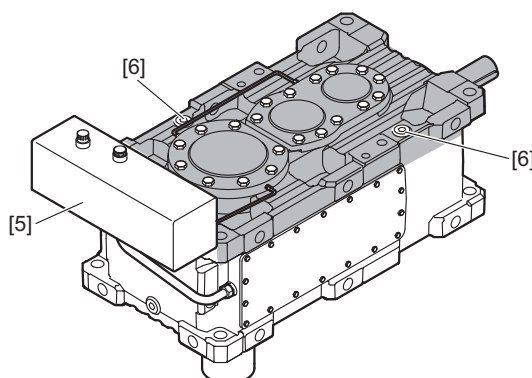
9007202583734923

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**

In case of the agitator housing/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].

## INFORMATION



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

You can also 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 operating hours so that you have to fill in more oil.

### ⚠ CAUTION

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.



### 7.6.4 Gear units with shaft end pump /SEP

## INFORMATION



- Read the manufacturer's documentation first before beginning inspection/maintenance work.
- Observe the notes in chapter "Preliminary work for inspection/maintenance".
- Observe the chapter "Installation/Assembly".

## 7.7 Breather

### 7.7.1 Checking and cleaning the breather


#### NOTICE

Improper cleaning of the breather may damage the gear unit.

Possible damage to property.

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

---

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→  230).

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

### 7.7.2 Desiccant breather filters

#### Proper operation:

If possible, only use DES-CASE breather filters for gear units filled with new oil that does 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. 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. In case the color changes from the top to the bottom, this indicates that a large amount of moisture is in the gear unit.

In case 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.

#### Examples:



False

Water in the gear unit  
Determine the cause



False

Water in the gear unit  
Determine the cause



Correct



Correct

### 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.

## 7.8 Refilling sealing grease



### ▲ WARNING

Risk of crushing due to rotating parts.

Severe or fatal injuries.

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

---

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

Regreasable sealing systems may be filled with "lithium soap grease" (→ 288). 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.

### INFORMATION



Immediately remove the old grease that leaked out.

---



## 7.9 Relubricating the bearing for Drywell sealing systems



### ▲ WARNING

Risk of crushing due to rotating parts.

Severe or fatal injuries.

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

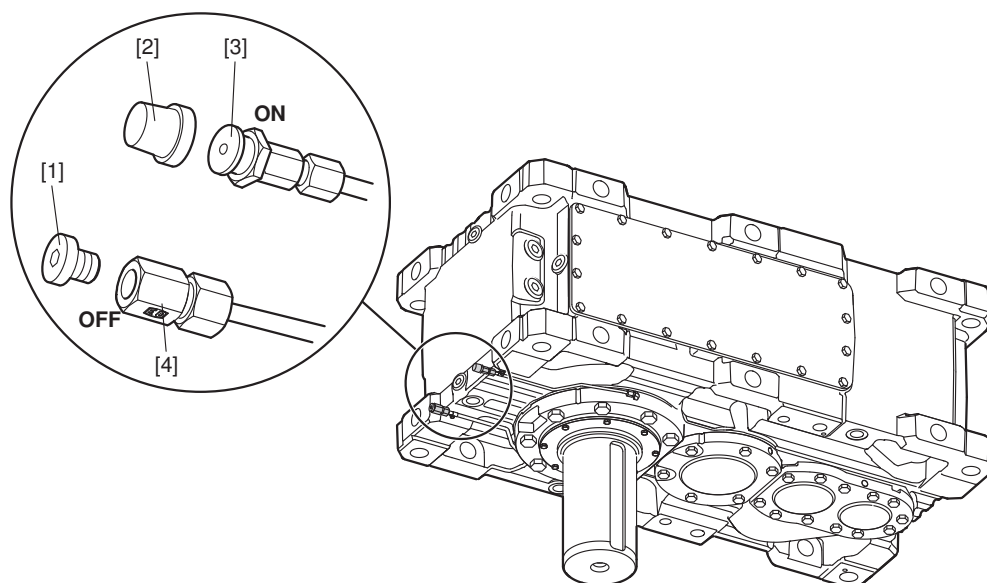
### NOTICE

High pressure forces the grease out between the sealing lip and the shaft. The sealing lip might be damaged or slip, grease might seep into the workflow.

Possible damage to property.

- Fill the grease while the gear unit is running by carefully pressing in the required quantity.

## 7.9.1 Universal housing HU



18014399247940619

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

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]. Lubricant quantities according to the following table. For lubricants you can use, refer to chapter "Sealing greases" (→ 288).

| 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                   |

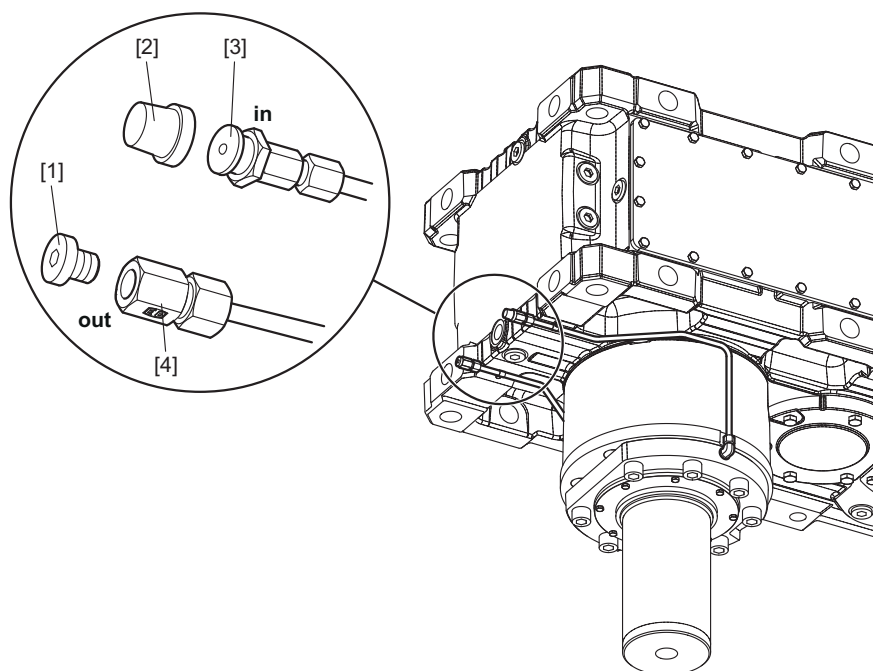
3. Place the protection cap [2] on the flat grease nipple [3].
4. Screw the screw plug [1] onto the grease drain pipe [4].

## INFORMATION



Immediately remove the old grease that leaked out.

## 7.9.2 HU universal housing with EBD



18485252107

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

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]. Lubricant quantities according to the following table. For lubricants you can use, refer to chapter "Sealing greases" (→ 288).

| 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                   |

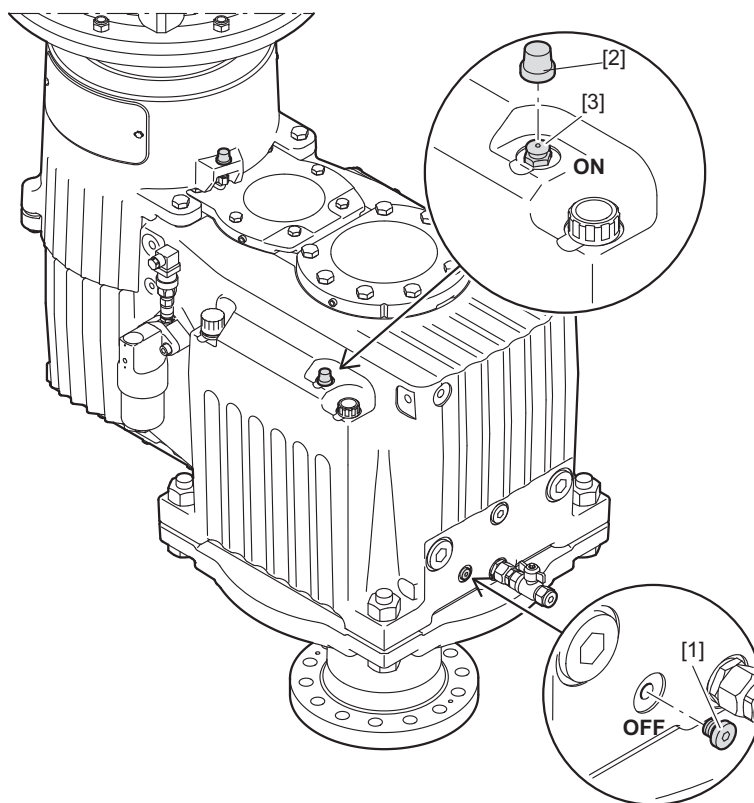
3. Place the protection cap [2] on the flat grease nipple [3].
4. Screw the screw plug [1] onto the grease drain pipe [4].

## INFORMATION



Immediately remove the old grease that leaked out.

## 7.9.3 Agitator housing HA



15934764427

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

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]. Lubricant quantities according to the following table. For lubricants you can use, refer to chapter "Sealing greases" (→ 288).

| Size | Amount of grease in g | Size       | Amount of grease in g |
|------|-----------------------|------------|-----------------------|
| X140 | 120                   | X160 – 170 | 180                   |
| X150 | 140                   | 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.

**7.10 Motor pump/ONP**

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

**INFORMATION**

Before inspection/maintenance, first read the addendum to the operating instructions "Motor pump/ONP" including the manufacturer's documentation.

**7.11 Motor pump/ONP1L**

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

**INFORMATION**

Before inspection/maintenance, first read the addendum to the operating instructions "Motor pump /ONP1L" including the manufacturer's documentation.

**7.12 Motor pump/ONP1**

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

**INFORMATION**

Before inspection/maintenance, first read the addendum to the operating instructions "Motor pump /ONP1" including the manufacturer's documentation.

**7.13 Shaft end pump /SEP**

Observe the procedure described in chapter "Installation/Assembly" and the manufacturer's documentation.

**7.14 Fan /FAN**

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 230).

1. Remove the fan guard.
2. Remove any dirt from the fan wheel, fan guard and protective grid using a hard brush, for example.
3. Before starting the fan again, make sure the fan guard is mounted properly. The fan must not touch the fan guard.

### 7.15 Axial fan



#### ▲ CAUTION

The protection cover can slip during assembly and disassembly.

Potential risk of crushing due to falling parts.

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

#### NOTICE

Improper assembly of the fan guard after disassembly (e.g. for inspection purposes) may result in damage to the fan.

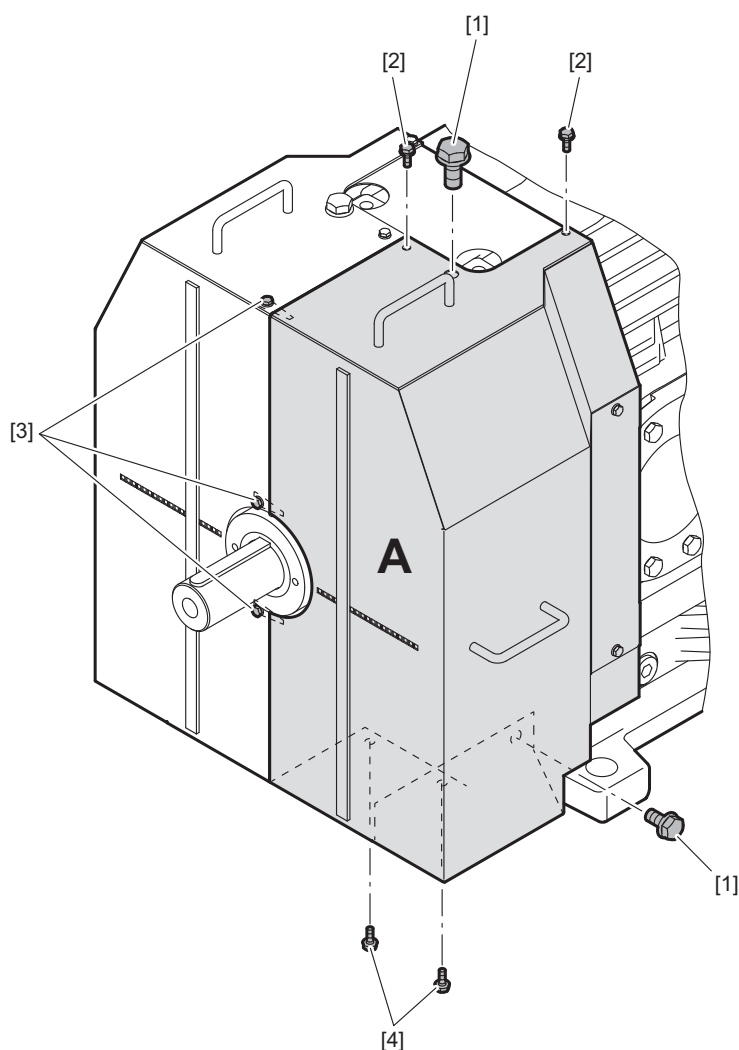
Possible damage to property.

- The re-assembly of the protection cover may only be performed with original parts from SEW-EURODRIVE. 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.

#### 7.15.1 Removing the protection cover half

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 230).

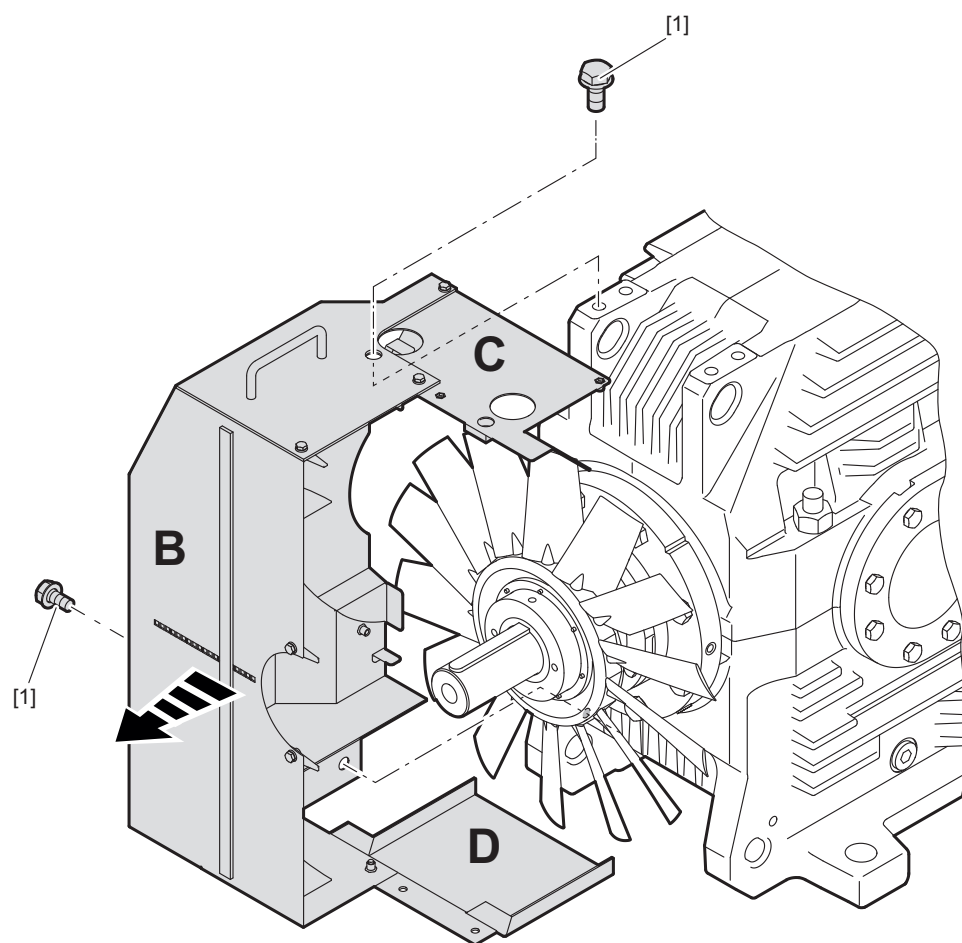
## 1. Protection cover half



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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**.

### 2. Protection cover half



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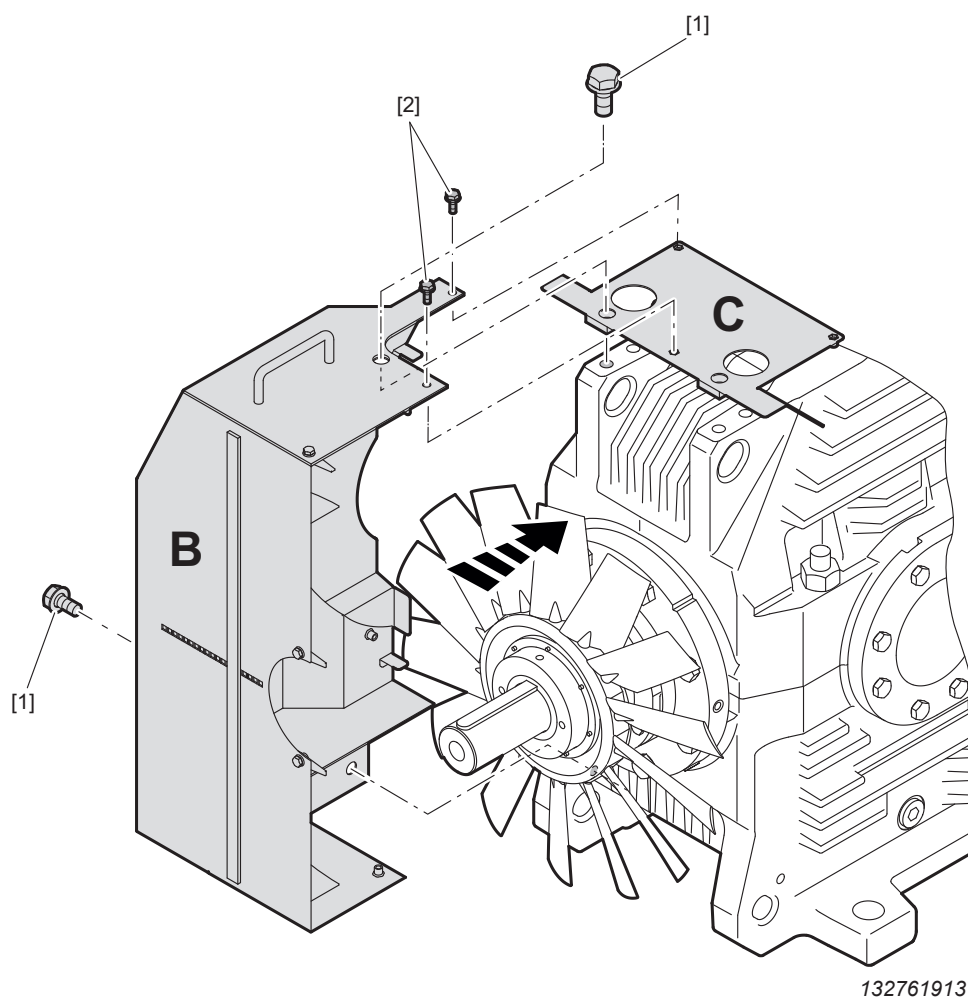
1. Loosen the 2 screws [1].
2. Remove protection cover half **BCD**.

#### 7.15.2 Mounting the protection cover half

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 230).



## 1. Protection cover half



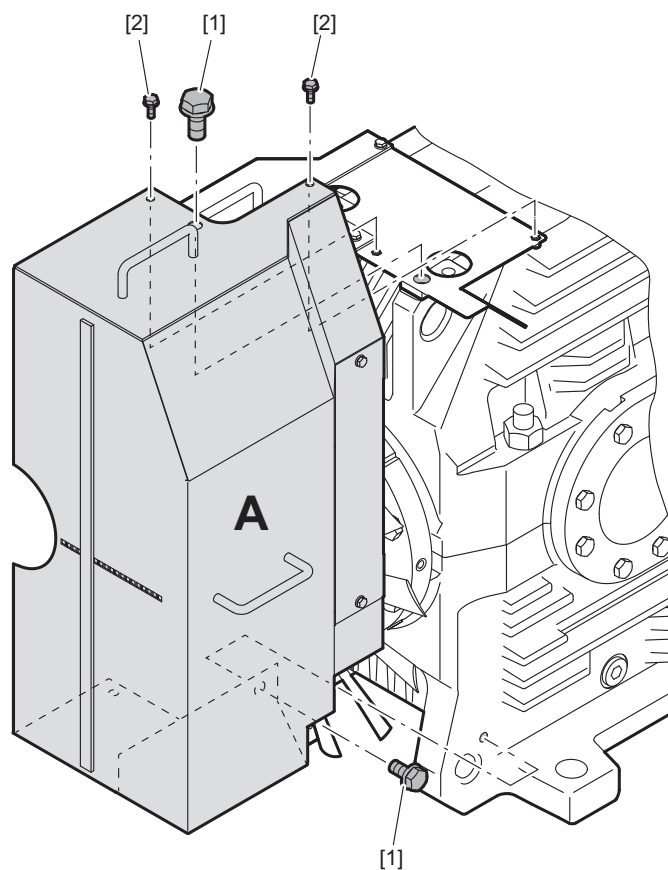
13276191371

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

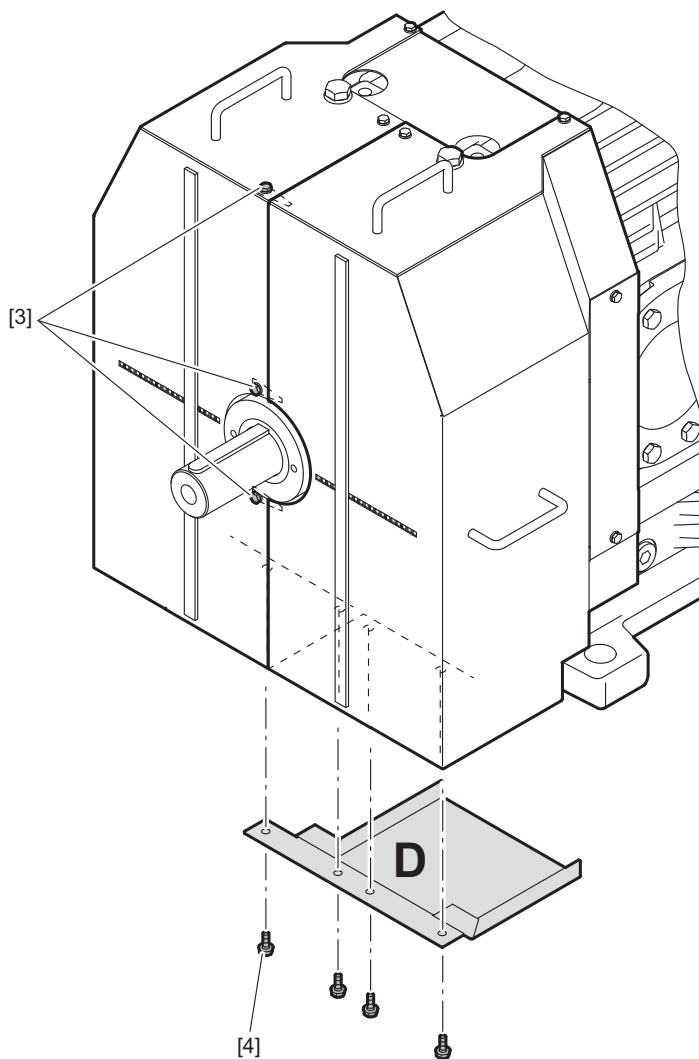
1. Screw protection cover half **A** using the 2 screws [1].

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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## 7.16 Water cooling cover/CCV

### 7.16.1 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.

### 7.16.2 Disassembly

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

1. Remove the cooling water inflow and return lines 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. Place the inspection cover onto the gear unit and align it.
9. Reinsert the screws and tighten them in two goes starting from the inside. Observe chapter "Tightening torques".
10. Re-connect the water cooling inflow and return pipes to the water cooling cover.

## 7.17 Water cooling cartridge /CCT

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

### INFORMATION



Do not carry out any repair work on the pipe bundle of the water cooling cartridge unless in case of an emergency. Contact SEW-EURODRIVE in that case. Analyze the situation and report the failure symptoms.

#### 7.17.1 Maintenance intervals

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

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

#### 7.17.2 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.

**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" (→ 230).

1. Unpressurize the water cooling cartridge and the connected system pipes. Shut them off with the corresponding valve.
2. Before "disassembly" (→ 243), drain all the gear unit oil.
3. Completely drain the cooling medium using the drain screws and/or drains provided for this purpose.
4. Loosen the water cooling cartridge by applying torque only to the head of the hex screw on the tube plate and remove the water cooling cartridge.
5. Remove the flat gasket. Remove any gasket residues from the sealing surface.
  - **NOTICE** Be careful not to damage the sealing surface.

Possible damage to property.

  - Damage to the sealing surfaces can result in leakage.
6. Clean the water cooling cartridge.

7. Insert a new gasket and make sure it is seated properly. If present, replace the O-ring.
8. Apply LOCTITE® 577 to 2 threads and screw on the water cooling cartridge by tightening the hex head screw on the tube plate.
9. Re-connect the cooling water supply and return pipes to the water cooling cartridges.
10. Fill new oil of the same type as the old oil through the oil fill plug (if you want to change the oil type, contact our customer service first).
  - Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).
  - Fill in the oil according to the oil quantity specified on the nameplate. The oil quantity specified on the nameplate is an approximate value.
  - Check the oil level.
11. Before starting the system again, vent the lines.

### Cleaning the inside of the water cooling cartridge

Observe the notes in the previous chapter.

#### NOTICE

Risk of corrosion due to scratches.

Possible damage to property.

- Scratches on the inner surface of the pipe bundle can result in increased corrosion. Use a brush with soft bristles to clean the inner surface of the pipe bundle.

#### NOTICE

Risk of damaging components of the water cooling cartridge.

Possible damage to property.

- For information on suitable cleaning agents, contact SEW-EURODRIVE.

We recommend that you take the following measures for cleaning:

- To remove scale deposits from the inside of pipes, use a mixture of 50% hydrochloric acid with inhibitors and 50% water.
- To clean the inside of the pipe bundle, you can use a brush if the pipe diameter is > 5 mm. Make sure you use a brush with soft bristles to prevent the surface from pipe walls from being scratched.
- Contact SEW-EURODRIVE if you want to use other cleaning agents to remove scale deposits.
- After cleaning, make sure all cleaning agents have been removed completely from the pipes before taking the water cooling cartridge into operation again.



## 7.18 Oil-water cooler for splash lubrication /OWC

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

### INFORMATION



Before inspection/maintenance, first read the addendum to the operating instructions "Oil-Water Cooler for Splash Lubrication /OWC", which includes the manufacturer's documentation.

## 7.19 Oil-air cooler for splash lubrication /OAC

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

### INFORMATION



Before inspection/maintenance, first read the addendum to the operating instructions "Oil-Air Cooler for Splash Lubrication /OAC", which includes the manufacturer's documentation.

## 7.20 Oil-water cooler for pressure lubrication /OWP

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

### INFORMATION



Before inspection/maintenance, first read the addendum to the operating instructions "Oil-Water Cooler for Pressure Lubrication /OWP", which includes the manufacturer's documentation.

## 7.21 Oil-air cooler for pressure lubrication /OAP

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

### INFORMATION



Before inspection/maintenance, first read the addendum to the operating instructions "Oil-Air Cooler for Splash Lubrication /OAP", which includes the manufacturer's documentation.

## 7.22 Oil heater /OH



### ▲ WARNING

Danger of electric shock.

Severe or fatal injuries.

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

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 230).

1. Before disassembling the oil heater, "drain the oil completely" (→ 243).
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.  
Disassemble the oil heater.
3. Apply LOCTITE® 577 to 2 threads and screw on the oil heater and tighten the hex head screw.
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 in 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" (→ 235).
6. Connect the oil heater.

## 7.23 Split housing

If the split gear unit housing is divided during maintenance, be sure that:

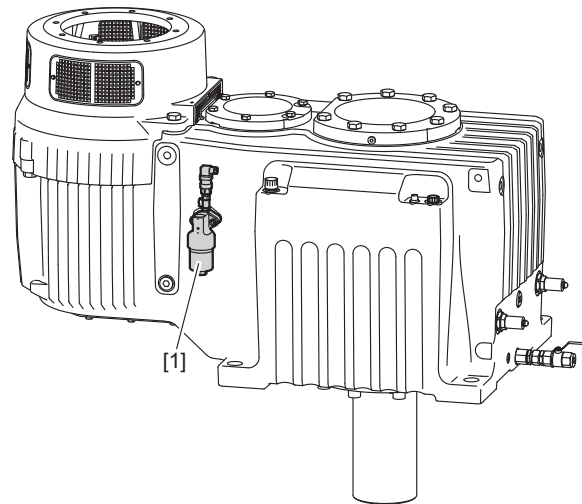
- The parting lines are sealed again carefully, and
- The screw connections are re-tightened using the tightening torques specified in chapter "Tightening torques" (→ 107).

## 7.24 Oil filter

### INFORMATION



Observe the operating instructions of the oil filter manufacturer.



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[1] Oil filter

## 8 Permitted lubricants

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

### 8.1 Lubricant selection

Note the following when selecting the lubricants.

#### NOTICE

Selecting improper lubricants may damage the gear unit.

Possible damage to property.

- Observe the following notes.

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

If other lubricants are used in the gear units and/or in other temperature ranges as those recommended, the right to claim under warranty will become invalid. Exceptions are application-specific approvals that have to be confirmed by SEW-EURODRIVE in written form.


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

- Oils of the same viscosity class from different manufacturers do not have the same characteristics. In particular, the minimum permitted oil bath temperatures are manufacturer-specific. These temperatures are specified in the lubricant tables.
- The minimum permitted oil bath temperatures depend on the lubrication type used. These temperatures are specified in the lubricant tables. The values correspond to the maximum viscosity of the individual lubricants.
- The values specified in the lubricant tables apply as of the time of printing of this document. The data of the lubricants are subject to dynamic change on the part of the lubricant manufacturers. For up-to-date information about the lubricants, visit:

**[www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants)**

- Do not mix different synthetic lubricants and do not mix synthetic with mineral lubricants.
- Check the compatibility of the greases and oils used.
- Strictly observe the safety notes in the individual chapters.

## 8.2 Structure of the tables and abbreviations





|     |     | DIN (ISO)<br>API     | ISO,SAE<br>NLGI |  |                    |                 |                 |  |
|-----|-----|----------------------|-----------------|------------------------------------------------------------------------------------|--------------------|-----------------|-----------------|--|
| [1] |     |                      |                 | -20                                                                                | +65                | -20             | +65             |  |
|     |     |                      | -5              | -5                                                                                 |                    |                 |                 |  |
|     |     |                      | +5              | +5                                                                                 |                    |                 |                 |  |
|     |     | VG 150 <sup>1)</sup> |                 | Optigear<br>BM 150                                                                 |                    | Alpha<br>SP 150 |                 |  |
| [2] | CLP |                      |                 | S0                                                                                 |                    | S0              |                 |  |
|     |     |                      |                 | -15                                                                                | +75                | -15             | +75             |  |
|     |     |                      |                 | 0                                                                                  |                    | 0               |                 |  |
|     |     |                      |                 | +10                                                                                |                    | +10             |                 |  |
|     |     |                      | VG 220          |                                                                                    | Optigear<br>BM 220 |                 | Alpha<br>SP 220 |  |
|     |     |                      |                 | S0                                                                                 |                    | S0              |                 |  |
|     |     |                      |                 | -10                                                                                | +85                | -10             | +80             |  |
|     |     |                      |                 | +5                                                                                 |                    | +5              |                 |  |
|     |     |                      |                 | +15                                                                                |                    | +15             |                 |  |
|     |     |                      | VG 320          |                                                                                    | Optigear<br>BM 320 |                 | Alpha<br>SP 320 |  |
|     |     |                      |                 | S0                                                                                 |                    | S0              |                 |  |

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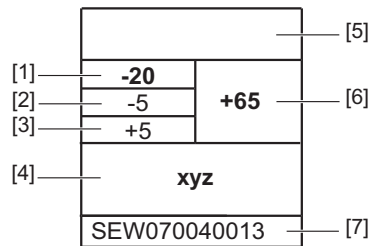
[1] Viscosity class

[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 ( <b>NSF H1</b> -compliant)                   |
|  | = Biodegradable oil (lubricant for agriculture, forestry, and water management) |
| 1)                                                                                  | = Lubricants may only be used if service factor $F_s \geq 1.3$                  |

### 8.3 Explanation of the various lubricants



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- [1] Lowest cold start temperature in °C for splash lubrication\*
- [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.

### 8.4 Explanation of the oil supply systems and the 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**:








- Motor pump for pressure lubrication /ONPL
- Motor pump for pressure lubrication /ONP1L
- Shaft end pumps in HU, HH, and HT housing design

This lubricant table is valid when the document is published. Please refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest version of the table.

| ISO SAE<br>NLGI       | Castrol             | FUCHS                    | Mobil®                   | Shell                     | TEXACO      | TOTAL          |
|-----------------------|---------------------|--------------------------|--------------------------|---------------------------|-------------|----------------|
| VG 150 <sup>(1)</sup> | Optigear<br>BM 150  | Renolin<br>CLP 150 Plus  | Mobilgear 600<br>XP 150  | Klüberoil<br>GEM 1-150 N  | Meropa 150  |                |
|                       | -20                 | -20                      | -20                      | -20                       | -20         |                |
|                       | +65                 | +65                      | +65                      | +65                       | +65         |                |
|                       | -5                  | -5                       | -5                       | -5                        | -5          |                |
| VG 220                | Optigear<br>BM 220  | Renolin<br>CLP 220 Plus  | Mobilgear 600<br>XP 220  | Klüberoil<br>GEM 1-220 N  | Meropa 220  | Carter EP 220  |
|                       | -15                 | -15                      | -15                      | -15                       | -15         |                |
|                       | +75                 | +75                      | +75                      | +75                       | +75         |                |
|                       | 0                   | 0                        | 0                        | 0                         | 0           |                |
| VG 320                | Optigear<br>BM 320  | Renolin<br>CLP 320 Plus  | Mobilgear 600<br>XP 320  | Klüberoil<br>GEM 1-320 N  | Meropa 320  | Carter EP 320  |
|                       | -10                 | -10                      | -10                      | -10                       | -10         |                |
|                       | +85                 | +80                      | +80                      | +80                       | +80         |                |
|                       | +5                  | +5                       | +5                       | +5                        | +5          |                |
| VG 460                | Optigear<br>BM 460  | Renolin<br>CLP 460 Plus  | Mobilgear 600<br>XP 460  | Klüberoil<br>GEM 1-460 N  | Meropa 460  | Carter EP 460  |
|                       | -5                  | -5                       | -5                       | -5                        | -5          |                |
|                       | +90                 | +90                      | +90                      | +90                       | +90         |                |
|                       | +20                 | +20                      | +20                      | +20                       | +20         |                |
| VG 680                | Optigear<br>BM 680  | Renolin<br>CLP 680 Plus  | Mobilgear 600<br>XP 680  | Klüberoil<br>GEM 1-680 N  | Meropa 680  | Carter EP 680  |
|                       | 0                   | 0                        | 0                        | 0                         | 0           |                |
|                       | +15                 | +15                      | +15                      | +15                       | +15         |                |
|                       | +25                 | +25                      | +25                      | +25                       | +25         |                |
| VG 1000               | Optigear<br>BM 1000 | Renolin<br>CLP 1000 Plus | Mobilgear 600<br>XP 1000 | Klüberoil<br>GEM 1-1000 N | Meropa 1000 | Carter EP 1000 |
|                       | +5                  | +5                       | +5                       | +5                        | +5          |                |
|                       | +20                 | +20                      | +20                      | +20                       | +20         |                |
|                       | +30                 | +30                      | +30                      | +30                       | +30         |                |

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This lubricant table is valid when the document is published. Please refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest version of the table.

| DIN (ISO)<br>API | ISO, SAE<br>NLGI     |                 |                           |                       |                      |              |             |                        |                                                                                                     |                                                                                                    |                                                                                                   |
|------------------|----------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
|                  | VG 32 <sup>1)</sup>  |                                                                                                    |                                                                                                              | <div><div>-40</div><div>-30</div><div>-25</div><div>+30</div></div> <div>SHC 624</div>                     |                                                                                                           |                                                                                                   |                                                                                                  |                                                                                                             |                                                                                                     |                                                                                                    |                                                                                                   |
|                  | VG 68 <sup>1)</sup>  |                                                                                                    | <div><div>-35</div><div>-20</div><div>-10</div><div>+50</div></div> <div>Renolin<br/>Unisyn CLP 68</div>     | <div><div>-40</div><div>-25</div><div>-15</div><div>+50</div></div> <div>SHC 626</div>                     | <div><div>-35</div><div>-20</div><div>-10</div><div>+50</div></div> <div>Klübersynth<br/>GEM 4-68 N</div> | <div><div>-40</div><div>-20</div><div>-10</div><div>+50</div></div> <div>Omala<br/>S4 GX 68</div> |                                                                                                  |                                                                                                             |                                                                                                     |                                                                                                    |                                                                                                   |
|                  | VG 150 <sup>1)</sup> | <div><div>-25</div><div>-10</div><div>0</div><div>+70</div></div> <div>Alphasyn<br/>EP 150</div>   | <div><div>-30</div><div>-10</div><div>0</div><div>+70</div></div> <div>Optigear<br/>Synthetic X 150</div>    | <div><div>-30</div><div>-10</div><div>0</div><div>+75</div></div> <div>SHC 629</div>                       | <div><div>-25</div><div>-10</div><div>0</div><div>70</div></div> <div>Klübersynth<br/>GEM 4-150 N</div>   | <div><div>-30</div><div>-10</div><div>0</div><div>+75</div></div> <div>Omala<br/>S4 GX 150</div>  | <div><div>-25</div><div>-10</div><div>0</div><div>+70</div></div> <div>Pinnacle<br/>EP 150</div> | <div><div>-35</div><div>-15</div><div>-5</div><div>+75</div></div> <div>Carter<br/>SH 150</div>             |                                                                                                     |                                                                                                    |                                                                                                   |
|                  | VG 220               | <div><div>-25</div><div>-5</div><div>+80</div><div>+5</div></div> <div>Alphasyn<br/>EP 220</div>   | <div><div>-25</div><div>-5</div><div>+80</div><div>+5</div></div> <div>Optigear<br/>Synthetic X 220</div>    | <div><div>-25</div><div>-5</div><div>+80</div><div>+5</div></div> <div>Renolin<br/>Unisyn CLP 220</div>    | <div><div>-20</div><div>0</div><div>+10</div><div>+75</div></div> <div>HighGear<br/>Synth 220</div>       | <div><div>-25</div><div>-5</div><div>0</div><div>+85</div></div> <div>SHC 630</div>               | <div><div>-30</div><div>-10</div><div>+5</div><div>+85</div></div> <div>SHC Gear 220</div>       | <div><div>-25</div><div>-5</div><div>+5</div><div>+80</div></div> <div>Klübersynth<br/>GEM 4-220 N</div>    | <div><div>-25</div><div>-5</div><div>+5</div><div>+85</div></div> <div>Omala<br/>S4 GX 220</div>    | <div><div>-25</div><div>-5</div><div>+5</div><div>+80</div></div> <div>Pinnacle<br/>EP 220</div>   | <div><div>-25</div><div>-5</div><div>+5</div><div>+80</div></div> <div>Carter<br/>SH 220</div>    |
|                  | VG 320               | <div><div>-20</div><div>0</div><div>+10</div><div>+90</div></div> <div>Alphasyn<br/>EP 320</div>   | <div><div>-20</div><div>0</div><div>+10</div><div>+90</div></div> <div>Optigear<br/>Synthetic X 320</div>    | <div><div>-20</div><div>0</div><div>+10</div><div>+90</div></div> <div>Renolin<br/>Unisyn CLP 320</div>    | <div><div>-15</div><div>0</div><div>+15</div><div>+85</div></div> <div>HighGear<br/>Synth 320</div>       | <div><div>-20</div><div>0</div><div>+10</div><div>+95</div></div> <div>SHC 632</div>              | <div><div>-25</div><div>-5</div><div>+10</div><div>+95</div></div> <div>SHC Gear 320</div>       | <div><div>-20</div><div>0</div><div>+10</div><div>+95</div></div> <div>Klübersynth<br/>GEM 4-320 N</div>    | <div><div>-20</div><div>0</div><div>+10</div><div>+95</div></div> <div>Omala<br/>S4 GX 320</div>    | <div><div>-20</div><div>0</div><div>+10</div><div>+90</div></div> <div>Pinnacle<br/>EP 320</div>   | <div><div>-20</div><div>0</div><div>+10</div><div>+90</div></div> <div>Carter<br/>SH 320</div>    |
|                  | VG 460               | <div><div>-15</div><div>+5</div><div>+15</div><div>+100</div></div> <div>Alphasyn<br/>EP 460</div> | <div><div>-15</div><div>+5</div><div>+15</div><div>+100</div></div> <div>Optigear<br/>Synthetic X 460</div>  | <div><div>-15</div><div>+5</div><div>+15</div><div>+100</div></div> <div>Renolin<br/>Unisyn CLP 460</div>  | <div><div>-10</div><div>+5</div><div>+20</div><div>+95</div></div> <div>HighGear<br/>Synth 460</div>      | <div><div>-15</div><div>+5</div><div>+15</div><div>+105</div></div> <div>SHC 634</div>            | <div><div>-20</div><div>0</div><div>+15</div><div>+110</div></div> <div>SHC Gear 460</div>       | <div><div>-15</div><div>+5</div><div>+20</div><div>+105</div></div> <div>Klübersynth<br/>GEM 4-460 N</div>  | <div><div>-15</div><div>+5</div><div>+15</div><div>+105</div></div> <div>Omala<br/>S4 GX 460</div>  | <div><div>-15</div><div>+5</div><div>+15</div><div>+100</div></div> <div>Pinnacle<br/>EP 460</div> | <div><div>-15</div><div>+5</div><div>+15</div><div>+100</div></div> <div>Carter<br/>SH 460</div>  |
|                  | VG 680               |                                                                                                    | <div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>Optigear<br/>Synthetic X 680</div> | <div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>Renolin<br/>Unisyn CLP 680</div> | <div><div>-5</div><div>+10</div><div>+25</div><div>+110</div></div> <div>HighGear<br/>Synth 680</div>     | <div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>SHC 636</div>           | <div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>SHC Gear 680</div>     | <div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>Klübersynth<br/>GEM 4-680 N</div> | <div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>Omala<br/>S4 GX 680</div> |                                                                                                    | <div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>Carter<br/>SH 680</div> |
|                  | VG 1000              |                                                                                                    |                                                                                                              |                                                                                                            |                                                                                                           | <div><div>-10</div><div>+15</div><div>+30</div><div>+110</div></div> <div>SHC 639</div>           | <div><div>-10</div><div>+15</div><div>+30</div><div>+110</div></div> <div>SHC Gear 1000</div>    | <div><div>0</div><div>+20</div><div>+30</div><div>+110</div></div> <div>Klübersynth<br/>EG4-1000</div>      |                                                                                                     |                                                                                                    |                                                                                                   |

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This lubricant table is valid when the document is published. Please refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest version of the table.

| DIN (ISO)<br>API | ISO,SAE<br>NLGI      | bremner & leguit              | Castrol                 | FUCHS                     | KLÜBER<br>LUBRICATION         |
|------------------|----------------------|-------------------------------|-------------------------|---------------------------|-------------------------------|
| CLP HC<br>NSF H1 | VG 68 <sup>1)</sup>  | Cassida<br>Fluid HF 68<br>S0  | Optileb<br>HY 68<br>S0  |                           | Klüberoil<br>4UH1-68 N<br>S0  |
|                  |                      |                               |                         |                           |                               |
|                  |                      |                               |                         |                           |                               |
|                  |                      |                               |                         |                           |                               |
| CLP HC<br>NSF H1 | VG 220 <sup>1)</sup> | Cassida<br>Fluid GL 220<br>S0 | Optileb<br>GT 220<br>S0 |                           | Klüberoil<br>4UH1-220 N<br>S0 |
|                  |                      |                               |                         |                           |                               |
|                  |                      |                               |                         |                           |                               |
|                  |                      |                               |                         |                           |                               |
| CLP HC<br>NSF H1 | VG 460 <sup>1)</sup> | Cassida<br>Fluid GL 460<br>S0 | Optileb<br>GT 460<br>S0 |                           | Klüberoil<br>4UH1-460 N<br>S0 |
|                  |                      |                               |                         |                           |                               |
|                  |                      |                               |                         |                           |                               |
|                  |                      |                               |                         |                           |                               |
| E                | VG 460               |                               |                         | Plantogear<br>460 S<br>S0 | Klüberbio<br>CA2-460<br>S0    |
|                  |                      |                               |                         |                           |                               |
|                  |                      |                               |                         |                           |                               |
|                  |                      |                               |                         |                           |                               |

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## 8.6 Horizontal housing/HH and universal housing/HU

### INFORMATION



- The specified fill quantities are guide values. The precise values vary depending on the number of stages and gear ratio.
- The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity.
- In case of 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.

## 8.6.1 Oil quantities for mounting position M1

## X.F..

| X2F..  | Oil quantity in liter |                      | X3F..  | Oil quantity in liter |                      | X4F..  | Oil quantity in liter |                      |
|--------|-----------------------|----------------------|--------|-----------------------|----------------------|--------|-----------------------|----------------------|
|        | 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 | 80                    | 80                   |
| 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                  |

### X.K..

| X2K..  | Oil quantity in liter |                      | X3K..  | Oil quantity in liter |                      | X4K..  | Oil quantity in liter |                      |
|--------|-----------------------|----------------------|--------|-----------------------|----------------------|--------|-----------------------|----------------------|
|        | 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 | 65                    | 65                   |
| X2K170 | 47                    | 47                   | X3K170 | 59                    | 59                   | X4K170 | 65                    | 65                   |
| 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..

| X3T..  | Oil quantity in liter |                      |                  | X4T..  | Oil quantity in liter |                      |                  |
|--------|-----------------------|----------------------|------------------|--------|-----------------------|----------------------|------------------|
|        | Splash lubrication    | Pressure lubrication | Bath lubrication |        | Splash lubrication    | Pressure lubrication | Bath lubrication |
| X3T100 | 13                    | -                    | -                | X4T100 | -                     | -                    | -                |
| X3T110 | 14                    | -                    | -                | X4T110 | -                     | -                    | -                |
| X3T120 | 20                    | -                    | -                | X4T120 | 20                    | -                    | -                |
| X3T130 | 21                    | -                    | -                | X4T130 | 21                    | -                    | -                |
| X3T140 | 33                    | -                    | -                | X4T140 | 31                    | -                    | -                |
| X3T150 | 34                    | -                    | -                | X4T150 | 32                    | -                    | -                |
| X3T160 | 60                    | 51                   | -                | X4T160 | 54                    | 54                   | -                |
| X3T170 | 60                    | 51                   | -                | X4T170 | 54                    | 54                   | -                |
| X3T180 | 75                    | 65                   | -                | X4T180 | 75                    | 75                   | -                |
| X3T190 | 75                    | 65                   | -                | X4T190 | 75                    | 75                   | -                |
| X3T200 | 100                   | 85                   | -                | X4T200 | 95                    | 95                   | -                |
| X3T210 | 100                   | 85                   | -                | X4T210 | 95                    | 95                   | -                |
| X3T220 | -                     | 135                  | 315              | X4T220 | -                     | 205                  | 325              |
| X3T230 | -                     | 135                  | 315              | X4T230 | -                     | 205                  | 325              |
| X3T240 | -                     | 165                  | 395              | X4T240 | -                     | 260                  | 400              |
| X3T250 | -                     | 165                  | 395              | X4T250 | -                     | 260                  | 400              |

## 8.6.2 Oil quantities for mounting position M3

## X.F..

| X2F..  | Oil quantity in liter<br>Splash lubrication | X3F..  | Oil quantity in liter<br>Splash lubrication | X4F..  | Oil quantity in liter<br>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 | 130                                         | 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 | 335                                         | 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..

| X2K..  | Oil quantity in liter | X3K..  | Oil quantity in liter |                      | X4K..  | Oil quantity in liter |
|--------|-----------------------|--------|-----------------------|----------------------|--------|-----------------------|
|        | Splash lubrication    |        | Splash lubrication    | Oil bath lubrication |        | Splash lubrication    |
| X2K100 | 12                    | X3K100 | 17                    | 29                   | X4K100 | -                     |
| X2K110 | 12                    | X3K110 | 15                    | 29                   | 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 | 125                   | -                    | X4K230 | 145                   |
| X2K240 | 175                   | X3K240 | 170                   | -                    | X4K240 | 175                   |
| 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                   |

| X2K..  | Oil quantity in liter | X3K..  | Oil quantity in liter |                      | X4K..  | Oil quantity in liter |
|--------|-----------------------|--------|-----------------------|----------------------|--------|-----------------------|
|        | Splash lubrication    |        | Splash lubrication    | Oil bath lubrication |        | Splash lubrication    |
| X2K320 | -                     | X3K320 | 540                   | -                    | X4K320 | 545                   |

**X.T..**

| X3T..  | Oil quantity in liter |                      | X4T..  | Oil quantity in liter |                      |
|--------|-----------------------|----------------------|--------|-----------------------|----------------------|
|        | Splash lubrication    | Oil bath lubrication |        | Splash lubrication    | Oil 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 | -                     | 230                  |
| X3T210 | -                     | 235                  | X4T210 | -                     | 240                  |
| X3T220 | 120                   | -                    | X4T220 | 120                   | -                    |
| X3T230 | 120                   | -                    | X4T230 | 120                   | -                    |
| X3T240 | 155                   | -                    | X4T240 | 155                   | -                    |
| X3T250 | 155                   | -                    | X4T250 | 155                   | -                    |

## 8.6.3 Oil quantities for 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..

| X2F.. <sup>1)</sup> | Oil quantity in liter |                      |                                   | X3F.. <sup>1)</sup> | Oil quantity in liter |                      |                                   | X4F.. <sup>1)</sup> | Oil quantity in liter |                      |                                   |
|---------------------|-----------------------|----------------------|-----------------------------------|---------------------|-----------------------|----------------------|-----------------------------------|---------------------|-----------------------|----------------------|-----------------------------------|
|                     | 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                   | -                                 | X3F120              | 47                    | 17                   | -                                 | X4F120              | 43                    | 17                   | -                                 |
| X2F130              | 52                    | 20                   | 13                                | X3F130              | 50                    | 20                   | 15                                | X4F130              | 50                    | 18                   | 13                                |
| X2F140              | 79                    | 36                   | -                                 | X3F140              | 77                    | 38                   | -                                 | X4F140              | 74                    | 25                   | -                                 |
| X2F150              | 84                    | 38                   | 22                                | X3F150              | 85                    | 36                   | 24                                | X4F150              | 78                    | 26                   | 20                                |
| X2F160              | 157                   | 60                   | -                                 | X3F160              | 151                   | 58                   | -                                 | X4F160              | 142                   | 44                   | -                                 |
| 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..

| X2K.. <sup>1)</sup> | Oil quantity in liter |                      |                                   | X3K.. <sup>1)</sup> | Oil quantity in liter |                      |                                   | X4K.. <sup>1)</sup> | Oil quantity in liter |                      |                                   |
|---------------------|-----------------------|----------------------|-----------------------------------|---------------------|-----------------------|----------------------|-----------------------------------|---------------------|-----------------------|----------------------|-----------------------------------|
|                     | 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                   | -                                 | X3K120              | 46                    | 17                   | -                                 | X4K120              | 46                    | 20                   | -                                 |
| X2K130              | 43                    | 17                   | 13                                | X3K130              | 52                    | 18                   | 14                                | X4K130              | 48                    | 23                   | 13                                |
| X2K140              | 61                    | 26                   | -                                 | X3K140              | 80                    | 34                   | -                                 | X4K140              | 77                    | 37                   | -                                 |
| X2K150              | 64                    | 27                   | 19                                | X3K150              | 81                    | 36                   | 20                                | X4K150              | 83                    | 38                   | 20                                |
| X2K160              | 129                   | 50                   | -                                 | X3K160              | 143                   | 55                   | -                                 | X4K160              | 147                   | 61                   | -                                 |
| 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                                |

| X2K.. <sup>1)</sup> | Oil quantity in liter |                      |                                   | X3K.. <sup>1)</sup> | Oil quantity in liter |                      |                                   | X4K.. <sup>1)</sup> | Oil quantity in liter |                      |                                   |
|---------------------|-----------------------|----------------------|-----------------------------------|---------------------|-----------------------|----------------------|-----------------------------------|---------------------|-----------------------|----------------------|-----------------------------------|
|                     | 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     |

## X.T..

| X3T..  | Oil quantity in liter |                      |                                    | X4T..  | Oil quantity in liter |                      |                                    |
|--------|-----------------------|----------------------|------------------------------------|--------|-----------------------|----------------------|------------------------------------|
|        | Bath lubrication      | Pressure lubrication | Pressure lubrication with Dry-well |        | Bath lubrication      | Pressure lubrication | Pressure lubrication with Dry-well |
| X3T100 | 36                    | -                    | -                                  | X4T100 | -                     | -                    | -                                  |
| X3T110 | 36                    | -                    | -                                  | X4T110 | -                     | -                    | -                                  |
| X3T120 | 46                    | 17                   | -                                  | X4T120 | 50                    | 18                   | -                                  |
| X3T130 | 47                    | 18                   | 14                                 | X4T130 | 53                    | 22                   | 14                                 |
| X3T140 | 79                    | 32                   | -                                  | X4T140 | 79                    | 32                   | -                                  |
| X3T150 | 81                    | 33                   | 20                                 | X4T150 | 81                    | 33                   | 20                                 |
| X3T160 | 139                   | 53                   | -                                  | X4T160 | 143                   | 55                   | -                                  |
| 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                                |



## 8.6.4 Oil quantities for mounting position M2

## X.F..

| X2F..  | Oil quantity in liter | X3F..  | Oil quantity in liter | X4F..  | Oil quantity in liter |
|--------|-----------------------|--------|-----------------------|--------|-----------------------|
|        | 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 | 101                   | X3F160 | 93                    | X4F160 | 82                    |
| X2F170 | 101                   | 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..

| X2K..  | Oil quantity in liter | X3K..  | Oil quantity in liter | X4K..  | Oil quantity in liter |
|--------|-----------------------|--------|-----------------------|--------|-----------------------|
|        | 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 | 49                    | X4K140 | 54                    |
| X2K150 | 41                    | X3K150 | 49                    | 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..

| X3T..  | Oil quantity in liter | X4T..  | Oil quantity in liter |
|--------|-----------------------|--------|-----------------------|
|        | 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 liter | X4T..  | Oil quantity in liter |
|--------|-----------------------|--------|-----------------------|
|        | 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                   |

### 8.6.5 Oil quantities for mounting position M4

#### X.F..

| X2F..  | Oil quantity in liter |                      | X3F..  | Oil quantity in liter |                      | X4F..  | Oil quantity in liter |                      |
|--------|-----------------------|----------------------|--------|-----------------------|----------------------|--------|-----------------------|----------------------|
|        | 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 | 59                    | 27                   |
| X2F160 | 106                   | 53                   | X3F160 | 120                   | 53                   | X4F160 | 127                   | 53                   |
| X2F170 | 106                   | 53                   | X3F170 | 120                   | 53                   | X4F170 | 127                   | 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                  |

### X.K..

| X2K..  | Oil quantity in liter |                      | X3K..  | Oil quantity in liter |                      | X4K..  | Oil quantity in liter |                      |
|--------|-----------------------|----------------------|--------|-----------------------|----------------------|--------|-----------------------|----------------------|
|        | 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..

| X3T..  | Oil quantity in liter |                      | X4T..  | Oil quantity in liter |                      |
|--------|-----------------------|----------------------|--------|-----------------------|----------------------|
|        | Bath lubrication      | Pressure lubrication |        | Bath lubrication      | Pressure lubrication |
| X3T100 | 23                    | -                    | X4T100 | -                     | -                    |
| X3T110 | 23                    | -                    | X4T110 | -                     | -                    |
| X3T120 | 33                    | 17                   | X4T120 | 37                    | 17                   |
| X3T130 | 34                    | 17                   | X4T130 | 39                    | 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                  |

## 8.7 Thermal housing/HT

### 8.7.1 Oil quantities for mounting position M1

#### INFORMATION



- The specified fill quantities are guide values. The precise values vary depending on the number of stages and gear ratio.
- The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity.
- In case of 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 liter |                      |
|--------|-----------------------|----------------------|
|        | 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                 |

## 8.8 Agitator housing/HA

### 8.8.1 Oil quantities for mounting position M5

#### INFORMATION





- The specified fill quantities are guide values. The precise values vary depending on the number of stages and gear ratio.
- The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity.
- In case of 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 liter |                      |                                   |
|--------|-----------------------|----------------------|-----------------------------------|
|        | 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                               |

## 8.9 Sealing greases/rolling bearing greases

The table shows the grease types recommended by SEW-EURODRIVE for operating temperatures from -40 °C to 100 °C.

|                                                                                   | Manufacturer    | Grease                                    |
|-----------------------------------------------------------------------------------|-----------------|-------------------------------------------|
| Default                                                                           | Fuchs           | <b>Renolit CX TOM 15 OEM<sup>1)</sup></b> |
|                                                                                   | Castrol         | Spheerol EPL 2                            |
|                                                                                   | Klüber          | Petamo GHY 133 N                          |
|                                                                                   | Shell           | Gadus S2 V220 2                           |
|                                                                                   | Texaco          | Mulifak EP2                               |
|                                                                                   | Total           | Multis EP 2                               |
|  | Bremer & Leguil | Cassida Grease GTS2 <sup>1)</sup>         |
|  | Fuchs           | <b>Plantogel 2<sup>1)</sup></b>           |

1) Grease used by the factory should be preferred.

### INFORMATION



- The greases may only be interchanged within the same group. It is not permitted to mix different groups.
- If a customer wants to use a grease that is not listed in the table, the customer has to make sure that it is suitable for the intended application.

## **9 Malfunctions/remedy**

### **9.1 Troubleshooting information**

Read the following notes before you proceed with troubleshooting.



#### **▲ WARNING**

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



#### **▲ WARNING**

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

Serious injury.

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

#### **NOTICE**

Improper handling of the gear unit and the motor may lead to damage.

Possible damage to property.

- Only qualified personnel is permitted to separate drive and motor and to carry out repair work on drives by SEW-EURODRIVE.
- Please contact the SEW-EURODRIVE Service.

## 9.2 Possible malfunctions/remedy

| Fault                                                                                                                                                                   | Possible cause                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Unusual noise in the area where the gear unit is mounted                                                                                                                | <ul style="list-style-type: none"> <li>Gear unit mounting has loosened</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Tighten retaining screws and nuts to the specified torque</li> <li>Replace the damaged/defective retaining screws or nuts</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Operating temperature too high                                                                                                                                          | <ul style="list-style-type: none"> <li>Too much oil</li> <li>Oil too old</li> <li>The oil is heavily contaminated</li> <li>Ambient temperature too high</li> <li>Gear units with fan: Air intake opening/gear unit housing contaminated</li> <li>For gear units with built-in cooling: Cooling liquid flow rate too low; cooling liquid temperature too high; deposits in cooling system</li> <li>Malfunctions of the oil/air or oil-water cooling system</li> <li>Malfunction in the water cooling (water cooling cover, water cooling cartridge)</li> </ul> | <ul style="list-style-type: none"> <li>Check oil level, correct if necessary</li> <li>Check when the oil was last changed; change the oil, if necessary</li> <li>Analyze the oil to determine the cause; take measures, if necessary; change the oil</li> <li>Protect the gear unit from external heat sources (e.g. provide shade)</li> <li>Check air intake openings, clean them if necessary; clean the gear unit housing</li> <li>Check the cooling liquid flow rate; check the entry temperature of the cooling liquid; clean the cooling system</li> <li>Observe the separate operating instructions for the oil-water and oil-air cooling system.</li> <li>Check the cooling water throughput and the entry temperature of the cooling water, clean the cooling system</li> </ul> |
| Temperature at bearing points too high                                                                                                                                  | <ul style="list-style-type: none"> <li>Not enough oil</li> <li>Oil too old</li> <li>Bearing damaged</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Check oil level, correct if necessary</li> <li>Check when the oil was last changed; change the oil, if necessary</li> <li>Check the bearing and replace it if necessary. Contact SEW-EURODRIVE.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Oil leaking <ul style="list-style-type: none"> <li>From cover plate</li> <li>From inspection cover</li> <li>From bearing cover</li> <li>From mounting flange</li> </ul> | <ul style="list-style-type: none"> <li>Seal not tight at: <ul style="list-style-type: none"> <li>Cover plate</li> <li>Inspection cover</li> <li>Bearing cover</li> <li>Mounting flange</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Tighten the bolts on the respective cover. Observe the gear unit. Contact SEW-EURODRIVE if oil is still leaking</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Oil leaking <sup>1)</sup> <ul style="list-style-type: none"> <li>From oil seal</li> </ul>                                                                               | <ul style="list-style-type: none"> <li>Too much oil</li> <li>Sealing lip of the oil seal turned up</li> <li>Oil seal damaged/worn</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Check oil level, correct if necessary</li> <li>Vent the gear unit, observe the gear unit. Contact SEW-EURODRIVE if oil is still leaking.</li> <li>Check oil seals; replace if necessary</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



| Fault                                                                                                               | Possible cause                                                                                                                                                                                                  | Measure                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oil leaking <ul style="list-style-type: none"> <li>At the gear unit breather</li> </ul>                             | <ul style="list-style-type: none"> <li>Too much oil</li> <li>Drive not installed in proper mounting position</li> <li>Frequent cold starts (oil foaming) and/or high oil level</li> </ul>                       | <ul style="list-style-type: none"> <li>Check oil level, correct if necessary</li> <li>Install gear unit breather correctly and adjust the oil level</li> <li>Install oil expansion tank</li> </ul>                                                                           |
| Oil leaking <ul style="list-style-type: none"> <li>from the screw plug</li> <li>from the oil drain valve</li> </ul> | <ul style="list-style-type: none"> <li>Seal not tight</li> <li>Fittings loosened</li> </ul>                                                                                                                     | <ul style="list-style-type: none"> <li>Retighten screw</li> <li>Retighten the fitting and screw</li> </ul>                                                                                                                                                                   |
| Severe V-belt wear                                                                                                  | <ul style="list-style-type: none"> <li>Inadequately aligned belt pulleys</li> <li>Harmful ambient conditions (e.g. abrasive particles, chemical substances)</li> <li>V-belt overloaded</li> </ul>               | <ul style="list-style-type: none"> <li>Check V-belt pulley alignment and pre-tension of the belts</li> <li>Protect V-belt drive from environmental influences; sufficient ventilation must be ensured</li> <li>Replace V-belt if necessary; contact SEW-EURODRIVE</li> </ul> |
| No oil pump suction                                                                                                 | <ul style="list-style-type: none"> <li>Air in the suction line of the oil pump</li> <li>Oil pump defective</li> </ul>                                                                                           | <ul style="list-style-type: none"> <li>Fill oil into the suction line and the oil pump, vent the pump at the pressure side</li> <li>Consult SEW-EURODRIVE.</li> </ul>                                                                                                        |
| Pressure switch does not switch                                                                                     | <ul style="list-style-type: none"> <li>Air in the suction line of the oil pump</li> <li>Pressure switch connected incorrectly</li> <li>Pressure switch defective</li> <li>Oil pump defective</li> </ul>         | <ul style="list-style-type: none"> <li>Fill the suction line and oil pump with oil</li> <li>Vent the pump at the pressure side</li> <li>Check the connection</li> <li>Replace pressure switch</li> <li>Consult SEW-EURODRIVE.</li> </ul>                                     |
| Malfunction in the oil-water or oil-air cooling system                                                              | <ul style="list-style-type: none"> <li>Malfunction of the oil-water or oil-air cooling system</li> </ul>                                                                                                        | <ul style="list-style-type: none"> <li>Observe the separate operating instructions for the oil-water or oil-air cooling system.</li> </ul>                                                                                                                                   |
| Gear unit does not reach cold start temperature                                                                     | <ul style="list-style-type: none"> <li>Thermostat set incorrectly</li> <li>Oil heating defective or connected incorrectly</li> <li>Heat dissipation too great due to unfavorable climatic conditions</li> </ul> | <ul style="list-style-type: none"> <li>Check the setting of the thermostat</li> <li>Check the oil heater for proper connection and function; replace if necessary</li> <li>Protect the gear unit from cooling off during the warm-up phase</li> </ul>                        |
| Operating temperature at backstop too high, no blocking function                                                    | <ul style="list-style-type: none"> <li>Damaged/defective backstop</li> </ul>                                                                                                                                    | <ul style="list-style-type: none"> <li>Check the backstop, replace it if necessary</li> <li>Contact SEW-EURODRIVE</li> </ul>                                                                                                                                                 |

1) During the run-in phase (24-hour runtime), it is normal for (small amounts of) oil/grease to leak from the oil seal (see also DIN 3761).

### 9.3 Service

**Please have the following information available if you require customer service assistance:**

- Complete nameplate data

- Type and extent of the problem
- Time the problem occurred and any accompanying circumstances
- Assumed cause
- A digital photograph, if possible

#### **9.4 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.

## 10 Address list

|                                |                     |                                                                                                                                                   |                                                                                                                                                                                                                  |
|--------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Algeria</b>                 |                     |                                                                                                                                                   |                                                                                                                                                                                                                  |
| Sales                          | Algiers             | REDUCOM Sarl<br>16, rue des Frères Zaghroune<br>Bellevue<br>16200 El Harrach Alger                                                                | Tel. +213 21 8214-91<br>Fax +213 21 8222-84<br><a href="http://www.reducom-dz.com">http://www.reducom-dz.com</a><br><a href="mailto:info@reducom-dz.com">info@reducom-dz.com</a>                                 |
| <b>Argentina</b>               |                     |                                                                                                                                                   |                                                                                                                                                                                                                  |
| Assembly<br>Sales              | Buenos Aires        | SEW EURODRIVE ARGENTINA S.A.<br>Ruta Panamericana Km 37.5, Lote 35<br>(B1619IEA) Centro Industrial Garín<br>Prov. de Buenos Aires                 | Tel. +54 3327 4572-84<br>Fax +54 3327 4572-21<br><a href="http://www.sew-eurodrive.com.ar">http://www.sew-eurodrive.com.ar</a><br><a href="mailto:sewar@sew-eurodrive.com.ar">sewar@sew-eurodrive.com.ar</a>     |
| <b>Australia</b>               |                     |                                                                                                                                                   |                                                                                                                                                                                                                  |
| Assembly<br>Sales<br>Service   | Melbourne           | SEW-EURODRIVE PTY. LTD.<br>27 Beverage Drive<br>Tullamarine, Victoria 3043                                                                        | Tel. +61 3 9933-1000<br>Fax +61 3 9933-1003<br><a href="http://www.sew-eurodrive.com.au">http://www.sew-eurodrive.com.au</a><br><a href="mailto:enquires@sew-eurodrive.com.au">enquires@sew-eurodrive.com.au</a> |
|                                | Sydney              | SEW-EURODRIVE PTY. LTD.<br>9, Sleigh Place, Wetherill Park<br>New South Wales, 2164                                                               | Tel. +61 2 9725-9900<br>Fax +61 2 9725-9905<br><a href="mailto:enquires@sew-eurodrive.com.au">enquires@sew-eurodrive.com.au</a>                                                                                  |
| <b>Austria</b>                 |                     |                                                                                                                                                   |                                                                                                                                                                                                                  |
| Assembly<br>Sales<br>Service   | Vienna              | SEW-EURODRIVE Ges.m.b.H.<br>Richard-Strauss-Straße 24<br>1230 Wien                                                                                | Tel. +43 1 617 55 00-0<br>Fax +43 1 617 55 00-30<br><a href="http://www.sew-eurodrive.at">http://www.sew-eurodrive.at</a><br><a href="mailto:sew@sew-eurodrive.at">sew@sew-eurodrive.at</a>                      |
| <b>Bangladesh</b>              |                     |                                                                                                                                                   |                                                                                                                                                                                                                  |
| Sales                          | Bangladesh          | SEW-EURODRIVE INDIA PRIVATE LIMITED<br>345 DIT Road<br>East Rampura<br>Dhaka-1219, Bangladesh                                                     | Tel. +88 01729 097309<br><a href="mailto:salesdhaka@seweurodrivebangladesh.com">salesdhaka@seweurodrivebangladesh.com</a>                                                                                        |
| <b>Belarus</b>                 |                     |                                                                                                                                                   |                                                                                                                                                                                                                  |
| Sales                          | Minsk               | Foreign unitary production enterprise SEW-<br>EURODRIVE<br>RybalkoStr. 26<br>220033 Minsk                                                         | Tel. +375 17 298 47 56 / 298 47 58<br>Fax +375 17 298 47 54<br><a href="http://www.sew.by">http://www.sew.by</a><br><a href="mailto:sales@sew.by">sales@sew.by</a>                                               |
| <b>Belgium</b>                 |                     |                                                                                                                                                   |                                                                                                                                                                                                                  |
| Assembly<br>Sales<br>Service   | Brussels            | SEW-EURODRIVE n.v./s.a.<br>Researchpark Haasrode 1060<br>Evenementenlaan 7<br>3001 Leuven                                                         | Tel. +32 16 386-311<br>Fax +32 16 386-336<br><a href="http://www.sew-eurodrive.be">http://www.sew-eurodrive.be</a><br><a href="mailto:info@sew-eurodrive.be">info@sew-eurodrive.be</a>                           |
| Service Competence<br>Center   | Industrial<br>Gears | SEW-EURODRIVE n.v./s.a.<br>Rue de Parc Industriel, 31<br>6900 Marche-en-Famenne                                                                   | Tel. +32 84 219-878<br>Fax +32 84 219-879<br><a href="http://www.sew-eurodrive.be">http://www.sew-eurodrive.be</a><br><a href="mailto:service-IG@sew-eurodrive.be">service-IG@sew-eurodrive.be</a>               |
| <b>Brazil</b>                  |                     |                                                                                                                                                   |                                                                                                                                                                                                                  |
| Production<br>Sales<br>Service | São Paulo           | SEW-EURODRIVE Brasil Ltda.<br>Estrada Municipal José Rubim, 205 – Rodovia<br>Santos Dumont Km 49<br>Indaiatuba – 13347-510 – SP                   | Tel. +55 19 3835-8000<br><a href="mailto:sew@sew.com.br">sew@sew.com.br</a>                                                                                                                                      |
| Assembly<br>Sales<br>Service   | Rio Claro           | SEW-EURODRIVE Brasil Ltda.<br>Rodovia Washington Luiz, Km 172<br>Condomínio Industrial Conpark<br>Caixa Postal: 327<br>13501-600 – Rio Claro / SP | Tel. +55 19 3522-3100<br>Fax +55 19 3524-6653<br><a href="mailto:montadora.rc@sew.com.br">montadora.rc@sew.com.br</a>                                                                                            |
|                                | Joinville           | SEW-EURODRIVE Brasil Ltda.<br>Rua Dona Francisca, 12.346 – Pirabeiraba<br>89239-270 – Joinville / SC                                              | Tel. +55 47 3027-6886<br>Fax +55 47 3027-6888<br><a href="mailto:filial.sc@sew.com.br">filial.sc@sew.com.br</a>                                                                                                  |
| <b>Bulgaria</b>                |                     |                                                                                                                                                   |                                                                                                                                                                                                                  |
| Sales                          | Sofia               | BEVER-DRIVE GmbH<br>Bogdanovetz Str.1<br>1606 Sofia                                                                                               | Tel. +359 2 9151160<br>Fax +359 2 9151166<br><a href="mailto:bever@bever.bg">bever@bever.bg</a>                                                                                                                  |

| Cameroon                                   |                   |                                                                                                                                                                           |                                                                                                         |
|--------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Sales                                      | Douala            | SEW-EURODRIVE S.A.R.L.<br>Ancienne Route Bonabéri<br>P.O. Box<br>B.P 8674<br>Douala-Cameroun                                                                              | Tel. +237 233 39 02 10<br>Fax +237 233 39 02 10<br>info@sew-eurodrive-cm                                |
| Canada                                     |                   |                                                                                                                                                                           |                                                                                                         |
| Assembly<br>Sales<br>Service               | Toronto           | SEW-EURODRIVE CO. OF CANADA LTD.<br>210 Walker Drive<br>Bramalea, ON L6T 3W1                                                                                              | Tel. +1 905 791-1553<br>Fax +1 905 791-2999<br>http://www.sew-eurodrive.ca<br>l.watson@sew-eurodrive.ca |
|                                            | Vancouver         | SEW-EURODRIVE CO. OF CANADA LTD.<br>Tilbury Industrial Park<br>7188 Honeyman Street<br>Delta, BC V4G 1G1                                                                  | Tel. +1 604 946-5535<br>Fax +1 604 946-2513<br>b.wake@sew-eurodrive.ca                                  |
|                                            | Montreal          | SEW-EURODRIVE CO. OF CANADA LTD.<br>2555 Rue Leger<br>Lasalle, PQ H8N 2V9                                                                                                 | Tel. +1 514 367-1124<br>Fax +1 514 367-3677<br>a.peluso@sew-eurodrive.ca                                |
| Chile                                      |                   |                                                                                                                                                                           |                                                                                                         |
| Assembly<br>Sales<br>Service               | Santiago de Chile | SEW-EURODRIVE CHILE LTDA<br>Las Encinas 1295<br>Parque Industrial Valle Grande<br>LAMP<br>Santiago de Chile<br>P.O. Box<br>Casilla 23 Correo Quilicura - Santiago - Chile | Tel. +56 2 2757 7000<br>Fax +56 2 2757 7001<br>http://www.sew-eurodrive.cl<br>ventas@sew-eurodrive.cl   |
| China                                      |                   |                                                                                                                                                                           |                                                                                                         |
| Production<br>Assembly<br>Sales<br>Service | Tianjin           | SEW-EURODRIVE (Tianjin) Co., Ltd.<br>No. 78, 13th Avenue, TEDA<br>Tianjin 300457                                                                                          | Tel. +86 22 25322612<br>Fax +86 22 25323273<br>http://www.sew-eurodrive.cn<br>info@sew-eurodrive.cn     |
| Assembly<br>Sales<br>Service               | Suzhou            | SEW-EURODRIVE (Suzhou) Co., Ltd.<br>333, Suhong Middle Road<br>Suzhou Industrial Park<br>Jiangsu Province, 215021                                                         | Tel. +86 512 62581781<br>Fax +86 512 62581783<br>suzhou@sew-eurodrive.cn                                |
|                                            | Guangzhou         | SEW-EURODRIVE (Guangzhou) Co., Ltd.<br>No. 9, JunDa Road<br>East Section of GETDD<br>Guangzhou 510530                                                                     | Tel. +86 20 82267890<br>Fax +86 20 82267922<br>guangzhou@sew-eurodrive.cn                               |
|                                            | Shenyang          | SEW-EURODRIVE (Shenyang) Co., Ltd.<br>10A-2, 6th Road<br>Shenyang Economic Technological Development Area<br>Shenyang, 110141                                             | Tel. +86 24 25382538<br>Fax +86 24 25382580<br>shenyang@sew-eurodrive.cn                                |
|                                            | Taiyuan           | SEW-EURODRIVE (Taiyuan) Co., Ltd.<br>No.3, HuaZhang Street,<br>TaiYuan Economic & Technical Development Zone<br>ShanXi, 030032                                            | Tel. +86-351-7117520<br>Fax +86-351-7117522<br>taiyuan@sew-eurodrive.cn                                 |
|                                            | Wuhan             | SEW-EURODRIVE (Wuhan) Co., Ltd.<br>10A-2, 6th Road<br>No. 59, the 4th Quanli Road, WEDA<br>430056 Wuhan                                                                   | Tel. +86 27 84478388<br>Fax +86 27 84478389<br>wuhan@sew-eurodrive.cn                                   |
|                                            | Xi'An             | SEW-EURODRIVE (Xi'An) Co., Ltd.<br>No. 12 Jinye 2nd Road<br>Xi'An High-Technology Industrial Development Zone<br>Xi'An 710065                                             | Tel. +86 29 68686262<br>Fax +86 29 68686311<br>xian@sew-eurodrive.cn                                    |
| Sales<br>Service                           | Hong Kong         | SEW-EURODRIVE LTD.<br>Unit No. 801-806, 8th Floor<br>Hong Leong Industrial Complex<br>No. 4, Wang Kwong Road<br>Kowloon, Hong Kong                                        | Tel. +852 36902200<br>Fax +852 36902211<br>contact@sew-eurodrive.hk                                     |

| <b>Colombia</b>                |                                               |                                                                                                                   |                                                                                                                                                                                                      |
|--------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Assembly<br>Sales<br>Service   | Bogota                                        | SEW-EURODRIVE COLOMBIA LTDA.<br>Calle 17 No. 132-18<br>Interior 2 Bodega 6, Manzana B<br>Santafé de Bogotá        | Tel. +57 1 54750-50<br>Fax +57 1 54750-44<br><a href="http://www.sew-eurodrive.com.co">http://www.sew-eurodrive.com.co</a><br><a href="mailto:sew@sew-eurodrive.com.co">sew@sew-eurodrive.com.co</a> |
| <b>Croatia</b>                 |                                               |                                                                                                                   |                                                                                                                                                                                                      |
| Sales<br>Service               | Zagreb                                        | KOMPEKS d. o. o.<br>Zeleni dol 10<br>10 000 Zagreb                                                                | Tel. +385 1 4613-158<br>Fax +385 1 4613-158<br><a href="mailto:kompeks@inet.hr">kompeks@inet.hr</a>                                                                                                  |
| <b>Czech Republic</b>          |                                               |                                                                                                                   |                                                                                                                                                                                                      |
| Assembly<br>Sales<br>Service   | Hostivice                                     | SEW-EURODRIVE CZ s.r.o.<br>Floriánova 2459<br>253 01 Hostivice                                                    | Tel. +420 255 709 601<br>Fax +420 235 350 613<br><a href="http://www.sew-eurodrive.cz">http://www.sew-eurodrive.cz</a><br><a href="mailto:sew@sew-eurodrive.cz">sew@sew-eurodrive.cz</a>             |
|                                | Drive Service<br>Hotline / 24<br>Hour Service | +420 800 739 739 (800 SEW SEW)                                                                                    | Service<br>Tel. +420 255 709 632<br>Fax +420 235 358 218<br><a href="mailto:servis@sew-eurodrive.cz">servis@sew-eurodrive.cz</a>                                                                     |
| <b>Denmark</b>                 |                                               |                                                                                                                   |                                                                                                                                                                                                      |
| Assembly<br>Sales<br>Service   | Copenhagen                                    | SEW-EURODRIVEA/S<br>Geminivej 28-30<br>2670 Greve                                                                 | Tel. +45 43 95 8500<br>Fax +45 43 9585-09<br><a href="http://www.sew-eurodrive.dk">http://www.sew-eurodrive.dk</a><br><a href="mailto:sew@sew-eurodrive.dk">sew@sew-eurodrive.dk</a>                 |
| <b>Egypt</b>                   |                                               |                                                                                                                   |                                                                                                                                                                                                      |
| Sales<br>Service               | Cairo                                         | Copam Egypt<br>for Engineering & Agencies<br>Building 10, Block 13005, First Industrial Zone,<br>Obour City Cairo | Tel. +202 44812673 / 79 (7 lines)<br>Fax +202 44812685<br><a href="http://www.copam-egypt.com">http://www.copam-egypt.com</a><br><a href="mailto:copam@copam-egypt.com">copam@copam-egypt.com</a>    |
| <b>Estonia</b>                 |                                               |                                                                                                                   |                                                                                                                                                                                                      |
| Sales                          | Tallin                                        | ALAS-KUUL AS<br>Reti tee 4<br>75301 Peetri küla, Rae vald, Harjumaa                                               | Tel. +372 6593230<br>Fax +372 6593231<br><a href="http://www.alas-kuul.ee">http://www.alas-kuul.ee</a><br><a href="mailto:veiko.soots@alas-kuul.ee">veiko.soots@alas-kuul.ee</a>                     |
| <b>Finland</b>                 |                                               |                                                                                                                   |                                                                                                                                                                                                      |
| Assembly<br>Sales<br>Service   | Hollola                                       | SEW-EURODRIVE OY<br>Vesimäentie 4<br>15860 Hollola                                                                | Tel. +358 201 589-300<br>Fax +358 3 780-6211<br><a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a><br><a href="mailto:sew@sew.fi">sew@sew.fi</a>                                  |
| Service                        | Hollola                                       | SEW-EURODRIVE OY<br>Keskikankaantie 21<br>15860 Hollola                                                           | Tel. +358 201 589-300<br>Fax +358 3 780-6211<br><a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a><br><a href="mailto:sew@sew.fi">sew@sew.fi</a>                                  |
| Production<br>Assembly         | Karkkila                                      | SEW Industrial Gears Oy<br>Santasalonkatu 6, PL 8<br>03620 Karkkila, 03601 Karkkila                               | Tel. +358 201 589-300<br>Fax +358 201 589-310<br><a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a><br><a href="mailto:sew@sew.fi">sew@sew.fi</a>                                 |
| <b>France</b>                  |                                               |                                                                                                                   |                                                                                                                                                                                                      |
| Production<br>Sales<br>Service | Hagenau                                       | SEW-USOCOME<br>48-54 route de Soufflenheim<br>B. P. 20185<br>67506 Haguenau Cedex                                 | Tel. +33 3 88 73 67 00<br>Fax +33 3 88 73 66 00<br><a href="http://www.usocom.com">http://www.usocom.com</a><br><a href="mailto:sew@usocom.com">sew@usocom.com</a>                                   |
| Production                     | Forbach                                       | SEW-USOCOME<br>Zone industrielle<br>Technopôle Forbach Sud<br>B. P. 30269<br>57604 Forbach Cedex                  | Tel. +33 3 87 29 38 00                                                                                                                                                                               |
|                                | Brumath                                       | SEW-USOCOME<br>1 Rue de Bruxelles<br>67670 Mommenheim Cedex                                                       | Tel. +33 3 88 37 48 00                                                                                                                                                                               |
| Assembly<br>Sales<br>Service   | Bordeaux                                      | SEW-USOCOME<br>Parc d'activités de Magellan<br>62 avenue de Magellan – B. P. 182<br>33607 Pessac Cedex            | Tel. +33 5 57 26 39 00<br>Fax +33 5 57 26 39 09                                                                                                                                                      |

| France                              |                             |                                                                                                                                    |                                                                                                                                                                                       |
|-------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     | Lyon                        | SEW-USOCOME<br>75 rue Antoine Condorcet<br>38090 Vaulx-Milieu                                                                      | Tel. +33 4 74 99 60 00<br>Fax +33 4 74 99 60 15                                                                                                                                       |
|                                     | Nantes                      | SEW-USOCOME<br>Parc d'activités de la forêt<br>4 rue des Fontenelles<br>44140 Le Bignon                                            | Tel. +33 2 40 78 42 00<br>Fax +33 2 40 78 42 20                                                                                                                                       |
|                                     | Paris                       | SEW-USOCOME<br>Zone industrielle<br>2 rue Denis Papin<br>77390 Verneuil l'Étang                                                    | Tel. +33 1 64 42 40 80<br>Fax +33 1 64 42 40 88                                                                                                                                       |
| Gabon                               |                             |                                                                                                                                    |                                                                                                                                                                                       |
| Sales                               | Libreville                  | SEW-EURODRIVE SARL<br>183, Rue 5.033.C, Lalala à droite<br>P.O. Box 15682<br>Libreville                                            | Tel. +241 03 28 81 55<br>+241 06 54 81 33<br><a href="http://www.sew-eurodrive.cm">http://www.sew-eurodrive.cm</a><br><a href="mailto:sew@sew-eurodrive.cm">sew@sew-eurodrive.cm</a>  |
| Germany                             |                             |                                                                                                                                    |                                                                                                                                                                                       |
| Headquarters<br>Production<br>Sales | Bruchsal                    | SEW-EURODRIVE GmbH & Co KG<br>Ernst-Blickle-Straße 42<br>76646 Bruchsal<br>P.O. Box<br>Postfach 3023 – D-76642 Bruchsal            | Tel. +49 7251 75-0<br>Fax +49 7251 75-1970<br><a href="http://www.sew-eurodrive.de">http://www.sew-eurodrive.de</a><br><a href="mailto:sew@sew-eurodrive.de">sew@sew-eurodrive.de</a> |
| Production / Industrial<br>Gears    | Bruchsal                    | SEW-EURODRIVE GmbH & Co KG<br>Christian-Pähr-Str. 10<br>76646 Bruchsal                                                             | Tel. +49 7251 75-0<br>Fax +49 7251 75-2970                                                                                                                                            |
| Production                          | Graben                      | SEW-EURODRIVE GmbH & Co KG<br>Ernst-Blickle-Straße 1<br>76676 Graben-Neudorf<br>P.O. Box<br>Postfach 1220 – D-76671 Graben-Neudorf | Tel. +49 7251 75-0<br>Fax +49 7251-2970                                                                                                                                               |
|                                     | Östringen                   | SEW-EURODRIVE GmbH & Co KG, Werk<br>Östringen<br>Franz-Gurk-Straße 2<br>76684 Östringen                                            | Tel. +49 7253 9254-0<br>Fax +49 7253 9254-90<br><a href="mailto:oesstringen@sew-eurodrive.de">oesstringen@sew-eurodrive.de</a>                                                        |
| Service Competence<br>Center        | Mechanics /<br>Mechatronics | SEW-EURODRIVE GmbH & Co KG<br>Ernst-Blickle-Straße 1<br>76676 Graben-Neudorf                                                       | Tel. +49 7251 75-1710<br>Fax +49 7251 75-1711<br><a href="mailto:scc-mechanik@sew-eurodrive.de">scc-mechanik@sew-eurodrive.de</a>                                                     |
|                                     | Electronics                 | SEW-EURODRIVE GmbH & Co KG<br>Ernst-Blickle-Straße 42<br>76646 Bruchsal                                                            | Tel. +49 7251 75-1780<br>Fax +49 7251 75-1769<br><a href="mailto:scc-elektronik@sew-eurodrive.de">scc-elektronik@sew-eurodrive.de</a>                                                 |
| Drive Technology<br>Center          | North                       | SEW-EURODRIVE GmbH & Co KG<br>Alte Ricklinger Straße 40-42<br>30823 Garbsen (Hannover)                                             | Tel. +49 5137 8798-30<br>Fax +49 5137 8798-55<br><a href="mailto:dtc-nord@sew-eurodrive.de">dtc-nord@sew-eurodrive.de</a>                                                             |
|                                     | East                        | SEW-EURODRIVE GmbH & Co KG<br>Dänkritzter Weg 1<br>08393 Meerane (Zwickau)                                                         | Tel. +49 3764 7606-0<br>Fax +49 3764 7606-30<br><a href="mailto:dtc-ost@sew-eurodrive.de">dtc-ost@sew-eurodrive.de</a>                                                                |
|                                     | South                       | SEW-EURODRIVE GmbH & Co KG<br>Domagkstraße 5<br>85551 Kirchheim (München)                                                          | Tel. +49 89 909552-10<br>Fax +49 89 909552-50<br><a href="mailto:dtc-sued@sew-eurodrive.de">dtc-sued@sew-eurodrive.de</a>                                                             |
|                                     | West                        | SEW-EURODRIVE GmbH & Co KG<br>Siemensstraße 1<br>40764 Langenfeld (Düsseldorf)                                                     | Tel. +49 2173 8507-30<br>Fax +49 2173 8507-55<br><a href="mailto:dtc-west@sew-eurodrive.de">dtc-west@sew-eurodrive.de</a>                                                             |
| Drive Center                        | Berlin                      | SEW-EURODRIVE GmbH & Co KG<br>Alexander-Meißner-Straße 44<br>12526 Berlin                                                          | Tel. +49 306331131-30<br>Fax +49 306331131-36<br><a href="mailto:dc-berlin@sew-eurodrive.de">dc-berlin@sew-eurodrive.de</a>                                                           |
|                                     | Ludwigshafen                | SEW-EURODRIVE GmbH & Co KG<br>c/o BASF SE<br>Gebäude W130 Raum 101<br>67056 Ludwigshafen                                           | Tel. +49 7251 75 3759<br>Fax +49 7251 75 503759<br><a href="mailto:dc-ludwigshafen@sew-eurodrive.de">dc-ludwigshafen@sew-eurodrive.de</a>                                             |
|                                     | Saarland                    | SEW-EURODRIVE GmbH & Co KG<br>Gottlieb-Daimler-Straße 4<br>66773 Schwalbach Saar – Hülzweiler                                      | Tel. +49 6831 48946 10<br>Fax +49 6831 48946 13<br><a href="mailto:dc-saarland@sew-eurodrive.de">dc-saarland@sew-eurodrive.de</a>                                                     |
|                                     | Ulm                         | SEW-EURODRIVE GmbH & Co KG<br>Dieselstraße 18<br>89160 Dornstadt                                                                   | Tel. +49 7348 9885-0<br>Fax +49 7348 9885-90<br><a href="mailto:dc-ulm@sew-eurodrive.de">dc-ulm@sew-eurodrive.de</a>                                                                  |

| Germany                                           |           |                                                                                                                                                                       |                                                                                                                                                                                                              |
|---------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                   | Würzburg  | SEW-EURODRIVE GmbH & Co KG<br>Nürnbergerstraße 118<br>97076 Würzburg-Lengfeld                                                                                         | Tel. +49 931 27886-60<br>Fax +49 931 27886-66<br>dc-wuerzburg@sew-eurodrive.de                                                                                                                               |
| Drive Service Hotline / 24 Hour Service           |           |                                                                                                                                                                       | 0 800 SEWHELP<br>0 800 7394357                                                                                                                                                                               |
| Great Britain                                     |           |                                                                                                                                                                       |                                                                                                                                                                                                              |
| Assembly<br>Sales<br>Service                      | Normanton | SEW-EURODRIVE Ltd.<br>DeVilliers Way<br>Trident Park<br>Normanton<br>West Yorkshire<br>WF6 1GX                                                                        | Tel. +44 1924 893-855<br>Fax +44 1924 893-702<br><a href="http://www.sew-eurodrive.co.uk">http://www.sew-eurodrive.co.uk</a><br>info@sew-eurodrive.co.uk                                                     |
| Drive Service Hotline / 24 Hour Service           |           |                                                                                                                                                                       | Tel. 01924 896911                                                                                                                                                                                            |
| Greece                                            |           |                                                                                                                                                                       |                                                                                                                                                                                                              |
| Sales                                             | Athens    | Christ. Boznos & Son S.A.<br>12, K. Mavromichali Street<br>P.O. Box 80136<br>18545 Piraeus                                                                            | Tel. +30 2 1042 251-34<br>Fax +30 2 1042 251-59<br><a href="http://www.boznos.gr">http://www.boznos.gr</a><br>info@boznos.gr                                                                                 |
| Hungary                                           |           |                                                                                                                                                                       |                                                                                                                                                                                                              |
| Sales<br>Service                                  | Budapest  | SEW-EURODRIVE Kft.<br>Csillaghegyi út 13.<br>1037 Budapest                                                                                                            | Tel. +36 1 437 06-58<br>Fax +36 1 437 06-50<br><a href="http://www.sew-eurodrive.hu">http://www.sew-eurodrive.hu</a><br>office@sew-eurodrive.hu                                                              |
| Iceland                                           |           |                                                                                                                                                                       |                                                                                                                                                                                                              |
| Sales                                             | Reykjavik | Varma & Vélaverk ehf.<br>Knarrarvogi 4<br>104 Reykjavik                                                                                                               | Tel. +354 585 1070<br>Fax +354 585)1071<br><a href="http://www.varmaverk.is">http://www.varmaverk.is</a><br>vov@vov.is                                                                                       |
| India                                             |           |                                                                                                                                                                       |                                                                                                                                                                                                              |
| Registered Office<br>Assembly<br>Sales<br>Service | Vadodara  | SEW-EURODRIVE India Private Limited<br>Plot No. 4, GIDC<br>POR Ramangamdi • Vadodara - 391 243<br>Gujarat                                                             | Tel. +91 265 3045200<br>Fax +91 265 3045300<br><a href="http://www.seweurodriveindia.com">http://www.seweurodriveindia.com</a><br>salesvadodara@seweurodriveindia.com                                        |
| Assembly<br>Sales<br>Service                      | Chennai   | SEW-EURODRIVE India Private Limited<br>Plot No. K3/1, Sipcot Industrial Park Phase II<br>Mambakkam Village<br>Sriperumbudur - 602105<br>Kancheepuram Dist, Tamil Nadu | Tel. +91 44 37188888<br>Fax +91 44 37188811<br>saleschennai@seweurodriveindia.com                                                                                                                            |
|                                                   | Pune      | SEW-EURODRIVE India Private Limited<br>Plant: Plot No. D236/1,<br>Chakan Industrial Area Phase- II,<br>Warale, Tal- Khed,<br>Pune-410501, Maharashtra                 | Tel. +91 21 35 628700<br>Fax +91 21 35 628715<br>salespune@seweurodriveindia.com                                                                                                                             |
| Indonesia                                         |           |                                                                                                                                                                       |                                                                                                                                                                                                              |
| Sales                                             | Medan     | PT. Serumpun Indah Lestari<br>Jl.Pulau Solor no. 8, Kawasan Industri Medan II<br>Medan 20252                                                                          | Tel. +62 61 687 1221<br>Fax +62 61 6871429 / +62 61 6871458 / +62 61 30008041<br>sil@serumpunindah.com<br>serumpunindah@yahoo.com<br><a href="http://www.serumpunindah.com">http://www.serumpunindah.com</a> |
|                                                   | Jakarta   | PT. Cahaya Sukses Abadi<br>Komplek Rukan Puri Mutiara Blok A no 99,<br>Sunter<br>Jakarta 14350                                                                        | Tel. +62 21 65310599<br>Fax +62 21 65310600<br>csajkt@cbn.net.id                                                                                                                                             |
|                                                   | Jakarta   | PT. Agrindo Putra Lestari<br>Jl.Pantai Indah Selatan, Komplek Sentra Industri Terpadu, Pantai indah Kapuk Tahap III,<br>Blok E No. 27<br>Jakarta 14470                | Tel. +62 21 2921-8899<br>Fax +62 21 2921-8988<br>aplindo@indosat.net.id<br><a href="http://www.aplindo.com">http://www.aplindo.com</a>                                                                       |



| Indonesia                    |             |                                                                                                                |                                                                                                                                              |
|------------------------------|-------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
|                              | Surabaya    | PT. TRIAGRI JAYA ABADI<br>Jl. Sukosemolo No. 63, Galaxi Bumi Permai<br>G6 No. 11<br>Surabaya 60111             | Tel. +62 31 5990128<br>Fax +62 31 5962666<br>sales@triagri.co.id<br>http://www.triagri.co.id                                                 |
|                              | Surabaya    | CV. Multi Mas<br>Jl. Raden Saleh 43A Kav. 18<br>Surabaya 60174                                                 | Tel. +62 31 5458589<br>Fax +62 31 5317220<br>sianhwa@sby.centrin.net.id<br>http://www.cvmultimas.com                                         |
| Ireland                      |             |                                                                                                                |                                                                                                                                              |
| Sales<br>Service             | Dublin      | Alperton Engineering Ltd.<br>48 Moyle Road<br>Dublin Industrial Estate<br>Glasnevin, Dublin 11                 | Tel. +353 1 830-6277<br>Fax +353 1 830-6458<br>http://www.alperton.ie<br>info@alperton.ie                                                    |
| Israel                       |             |                                                                                                                |                                                                                                                                              |
| Sales                        | Tel Aviv    | Liraz Handasa Ltd.<br>Ahofer Str 34B / 228<br>58858 Holon                                                      | Tel. +972 3 5599511<br>Fax +972 3 5599512<br>http://www.liraz-handasa.co.il<br>office@liraz-handasa.co.il                                    |
| Italy                        |             |                                                                                                                |                                                                                                                                              |
| Assembly<br>Sales<br>Service | Milan       | SEW-EURODRIVE di R. Blickle & Co.s.a.s.<br>Via Bernini, 14<br>20020 Solaro (Milano)                            | Tel. +39 02 96 980229<br>Fax +39 02 96 980 999<br>http://www.sew-eurodrive.it<br>milano@sew-eurodrive.it                                     |
| Ivory Coast                  |             |                                                                                                                |                                                                                                                                              |
| Sales                        | Abidjan     | SEW-EURODRIVE SARL<br>Ivory Coast<br>Rue des Pêcheurs, Zone 3<br>26 BP 916 Abidjan 26                          | Tel. +225 21 21 81 05<br>Fax +225 21 25 30 47<br>info@sew-eurodrive.ci<br>http://www.sew-eurodrive.ci                                        |
| Japan                        |             |                                                                                                                |                                                                                                                                              |
| Assembly<br>Sales<br>Service | Iwata       | SEW-EURODRIVE JAPAN CO., LTD<br>250-1, Shimoman-no,<br>Iwata<br>Shizuoka 438-0818                              | Tel. +81 538 373811<br>Fax +81 538 373814<br>http://www.sew-eurodrive.co.jp<br>sewjapan@sew-eurodrive.co.jp<br>hamamatsu@sew-eurodrive.co.jp |
| Kazakhstan                   |             |                                                                                                                |                                                                                                                                              |
| Sales                        | Almaty      | SEW-EURODRIVE LLP<br>291-291A, Tole bi street<br>050031, Almaty                                                | Tel. +7 (727) 350 5156<br>Fax +7 (727) 350 5156<br>http://www.sew-eurodrive.kz<br>sew@sew-eurodrive.kz                                       |
|                              | Tashkent    | SEW-EURODRIVE LLP<br>Representative office in Uzbekistan<br>96A, Sharaf Rashidov street,<br>Tashkent, 100084   | Tel. +998 71 2359411<br>Fax +998 71 2359412<br>http://www.sew-eurodrive.uz<br>sew@sew-eurodrive.uz                                           |
|                              | Ulaanbaatar | IM Trading LLC<br>Narny zam street 62<br>Sukhbaatar district,<br>Ulaanbaatar 14230                             | Tel. +976-77109997<br>Fax +976-77109997<br>imt@imt.mn                                                                                        |
| Kenya                        |             |                                                                                                                |                                                                                                                                              |
| Sales                        | Nairobi     | SEW-EURODRIVE Pty Ltd<br>Transnational Plaza, 5th Floor<br>Mama Ngina Street<br>P.O. Box 8998-00100<br>Nairobi | Tel. +254 791 398840<br>http://www.sew-eurodrive.co.tz<br>info@sew.co.tz                                                                     |
| Latvia                       |             |                                                                                                                |                                                                                                                                              |
| Sales                        | Riga        | SIA Alas-Kuul<br>Katlakalna 11C<br>1073 Riga                                                                   | Tel. +371 6 7139253<br>Fax +371 6 7139386<br>http://www.alas-kuul.lv<br>info@alas-kuul.com                                                   |



|                                                        |             |                                                                                                                                                |                                                                                                                                                                        |
|--------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lebanon</b>                                         |             |                                                                                                                                                |                                                                                                                                                                        |
| Sales (Lebanon)                                        | Beirut      | Gabriel Acar & Fils sarl<br>B. P. 80484<br>Bourj Hammoud, Beirut                                                                               | Tel. +961 1 510 532<br>Fax +961 1 494 971<br>ssacar@inco.com.lb                                                                                                        |
| Sales (Jordan, Kuwait , Beirut<br>Saudi Arabia, Syria) |             | Middle East Drives S.A.L. (offshore)<br>Sin El Fil.<br>B. P. 55-378<br>Beirut                                                                  | Tel. +961 1 494 786<br>Fax +961 1 494 971<br><a href="http://www.medrives.com">http://www.medrives.com</a><br>info@medrives.com                                        |
| <b>Lithuania</b>                                       |             |                                                                                                                                                |                                                                                                                                                                        |
| Sales                                                  | Alytus      | UAB Irseva<br>Statybininku 106C<br>63431 Alytus                                                                                                | Tel. +370 315 79204<br>Fax +370 315 56175<br><a href="http://www.irseva.lt">http://www.irseva.lt</a><br>irmantas@irseva.lt                                             |
| <b>Luxembourg</b>                                      |             |                                                                                                                                                |                                                                                                                                                                        |
| representation: Belgium                                |             |                                                                                                                                                |                                                                                                                                                                        |
| <b>Macedonia</b>                                       |             |                                                                                                                                                |                                                                                                                                                                        |
| Sales                                                  | Skopje      | Boznos DOOEL<br>Dime Anicin 2A/7A<br>1000 Skopje                                                                                               | Tel. +389 23256553<br>Fax +389 23256554<br><a href="http://www.boznos.mk">http://www.boznos.mk</a>                                                                     |
| <b>Malaysia</b>                                        |             |                                                                                                                                                |                                                                                                                                                                        |
| Assembly<br>Sales<br>Service                           | Johor       | SEW-EURODRIVE SDN BHD<br>No. 95, Jalan Seroja 39, Taman Johor Jaya<br>81000 Johor Bahru, Johor<br>West Malaysia                                | Tel. +60 7 3549409<br>Fax +60 7 3541404<br>sales@sew-eurodrive.com.my                                                                                                  |
| <b>Mexiko</b>                                          |             |                                                                                                                                                |                                                                                                                                                                        |
| Assembly<br>Sales<br>Service                           | Quéretaro   | SEW-EURODRIVE MEXICO S.A. de C.V.<br>SEM-981118-M93<br>Tequisquiapan No. 102<br>Parque Industrial Quéretaro<br>C.P. 76220<br>Querétaro, México | Tel. +52 442 1030-300<br>Fax +52 442 1030-301<br><a href="http://www.sew-eurodrive.com.mx">http://www.sew-eurodrive.com.mx</a><br>scmexico@seweurodrive.com.mx         |
| Sales<br>Service                                       | Puebla      | SEW-EURODRIVE MEXICO S.A. de C.V.<br>Calle Zavaleta No. 3922 Piso 2 Local 6<br>Col. Santa Cruz Buenavista<br>C.P. 72154<br>Puebla, México      | Tel. +52 (222) 221 248<br><a href="http://www.sew-eurodrive.com.mx">http://www.sew-eurodrive.com.mx</a><br>scmexico@seweurodrive.com.mx                                |
| <b>Mongolia</b>                                        |             |                                                                                                                                                |                                                                                                                                                                        |
| Technical Office                                       | Ulaanbaatar | IM Trading LLC<br>Naryn street 62<br>Union building, Suite A-403-1<br>Sukhbaatar district,<br>Ulaanbaatar 14230                                | Tel. +976-77109997<br>Tel. +976-99070395<br>Fax +976-77109997<br><a href="http://imt.mn/">http://imt.mn/</a><br>imt@imt.mn                                             |
| <b>Morocco</b>                                         |             |                                                                                                                                                |                                                                                                                                                                        |
| Sales<br>Service                                       | Bouskoura   | SEW-EURODRIVE Morocco<br>Parc Industriel CFCIM, Lot 55 and 59<br>Bouskoura                                                                     | Tel. +212 522 88 85 00<br>Fax +212 522 88 84 50<br><a href="http://www.sew-eurodrive.ma">http://www.sew-eurodrive.ma</a><br>sew@sew-eurodrive.ma                       |
| <b>Namibia</b>                                         |             |                                                                                                                                                |                                                                                                                                                                        |
| Sales                                                  | Swakopmund  | DB Mining & Industrial Services<br>Einstein Street<br>Strauss Industrial Park<br>Unit1<br>Swakopmund                                           | Tel. +264 64 462 738<br>Fax +264 64 462 734<br>anton@dbminingnam.com                                                                                                   |
| <b>Netherlands</b>                                     |             |                                                                                                                                                |                                                                                                                                                                        |
| Assembly<br>Sales<br>Service                           | Rotterdam   | SEW-EURODRIVE B.V.<br>Industrieweg 175<br>3044 AS Rotterdam<br>Postbus 10085<br>3004 AB Rotterdam                                              | Tel. +31 10 4463-700<br>Fax +31 10 4155-552<br>Service: 0800-SEWHELP<br><a href="http://www.sew-eurodrive.nl">http://www.sew-eurodrive.nl</a><br>info@sew-eurodrive.nl |

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

**Sambia**

representation: South Africa

**Senegal**

|       |       |                                                                               |                                                                                                                                                                                  |
|-------|-------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sales | Dakar | SENEMECA<br>Mécanique Générale<br>Km 8, Route de Rufisque<br>B.P. 3251, Dakar | Tel. +221 338 494 770<br>Fax +221 338 494 771<br><a href="http://www.senemeca.com">http://www.senemeca.com</a><br><a href="mailto:senemeca@senemeca.sn">senemeca@senemeca.sn</a> |
|-------|-------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Serbia**

|       |          |                                                                       |                                                                                                                          |
|-------|----------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Sales | Belgrade | DIPAR d.o.o.<br>Ustanicka 128a<br>PC Košum, IV floor<br>11000 Beograd | Tel. +381 11 347 3244 / +381 11 288 0393<br>Fax +381 11 347 1337<br><a href="mailto:office@dipar.rs">office@dipar.rs</a> |
|-------|----------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|

**Singapore**

|                              |           |                                                                                               |                                                                                                                                                                                                              |
|------------------------------|-----------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Assembly<br>Sales<br>Service | Singapore | SEW-EURODRIVE PTE. LTD.<br>No 9, Tuas Drive 2<br>Jurong Industrial Estate<br>Singapore 638644 | Tel. +65 68621701<br>Fax +65 68612827<br><a href="http://www.sew-eurodrive.com.sg">http://www.sew-eurodrive.com.sg</a><br><a href="mailto:sewsingapore@sew-eurodrive.com">sewsingapore@sew-eurodrive.com</a> |
|------------------------------|-----------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Slovakia**

|       |            |                                                                |                                                                                                                                                                                                    |
|-------|------------|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sales | Bratislava | SEW-Eurodrive SK s.r.o.<br>Rybničná 40<br>831 06 Bratislava    | Tel. +421 2 33595 202, 217, 201<br>Fax +421 2 33595 200<br><a href="http://www.sew-eurodrive.sk">http://www.sew-eurodrive.sk</a><br><a href="mailto:sew@sew-eurodrive.sk">sew@sew-eurodrive.sk</a> |
|       | Košice     | SEW-Eurodrive SK s.r.o.<br>Slovenská ulica 26<br>040 01 Košice | Tel. +421 55 671 2245<br>Fax +421 55 671 2254<br>Mobile +421 907 671 976<br><a href="mailto:sew@sew-eurodrive.sk">sew@sew-eurodrive.sk</a>                                                         |

**Slovenia**

|                  |       |                                                                        |                                                                                                       |
|------------------|-------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Sales<br>Service | Celje | Pakman - Pogonska Tehnika d.o.o.<br>Ul. XIV. divizije 14<br>3000 Celje | Tel. +386 3 490 83-20<br>Fax +386 3 490 83-21<br><a href="mailto:pakman@siol.net">pakman@siol.net</a> |
|------------------|-------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|

**South Africa**

|                              |              |                                                                                                                                                                           |                                                                                                                                                              |
|------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Assembly<br>Sales<br>Service | Johannesburg | SEW-EURODRIVE (PROPRIETARY) LIMITED<br>Eurodrive House<br>Cnr. Adcock Ingram and Aerodrome Roads<br>Aeroton Ext. 2<br>Johannesburg 2013<br>P.O.Box 90004<br>Bertsham 2013 | Tel. +27 11 248-7000<br>Fax +27 11 248-7289<br><a href="http://www.sew.co.za">http://www.sew.co.za</a><br><a href="mailto:info@sew.co.za">info@sew.co.za</a> |
|                              | Cape Town    | SEW-EURODRIVE (PROPRIETARY) LIMITED<br>Rainbow Park<br>Cnr. Racecourse & Omuramba Road<br>Montague Gardens<br>Cape Town<br>P.O.Box 36556<br>Chempet 7442                  | Tel. +27 21 552-9820<br>Fax +27 21 552-9830<br>Telex 576 062<br><a href="mailto:bgriffiths@sew.co.za">bgriffiths@sew.co.za</a>                               |
|                              | Durban       | SEW-EURODRIVE (PROPRIETARY) LIMITED<br>48 Prospect Road<br>Isipingo<br>Durban<br>P.O. Box 10433, Ashwood 3605                                                             | Tel. +27 31 902 3815<br>Fax +27 31 902 3826<br><a href="mailto:cdejager@sew.co.za">cdejager@sew.co.za</a>                                                    |
|                              | Nelspruit    | SEW-EURODRIVE (PROPRIETARY) LIMITED<br>7 Christie Crescent<br>Vintonia<br>P.O.Box 1942<br>Nelspruit 1200                                                                  | Tel. +27 13 752-8007<br>Fax +27 13 752-8008<br><a href="mailto:robermeyer@sew.co.za">robermeyer@sew.co.za</a>                                                |

**South Korea**

|                              |       |                                                                                                        |                                                                                                                                                                                                            |
|------------------------------|-------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Assembly<br>Sales<br>Service | Ansan | SEW-EURODRIVE KOREA CO., LTD.<br>7, Dangjaengi-ro,<br>Danwon-gu,<br>Ansan-si, Gyeonggi-do, Zip 425-839 | Tel. +82 31 492-8051<br>Fax +82 31 492-8056<br><a href="http://www.sew-eurodrive.kr">http://www.sew-eurodrive.kr</a><br><a href="mailto:master.korea@sew-eurodrive.com">master.korea@sew-eurodrive.com</a> |
|------------------------------|-------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| South Korea                  |               |                                                                                                                                |                                                                                                                                                                                                           |
|------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              | Busan         | SEW-EURODRIVE KOREA CO., LTD.<br>28, Noksansandan 262-ro 50beon-gil,<br>Gangseo-gu,<br>Busan, Zip 618-820                      | Tel. +82 51 832-0204<br>Fax +82 51 832-0230                                                                                                                                                               |
| Spain                        |               |                                                                                                                                |                                                                                                                                                                                                           |
| Assembly<br>Sales<br>Service | Bilbao        | SEW-EURODRIVE ESPAÑA, S.L.<br>Parque Tecnológico, Edificio, 302<br>48170 Zamudio (Vizcaya)                                     | Tel. +34 94 43184-70<br>Fax +34 94 43184-71<br><a href="http://www.sew-eurodrive.es">http://www.sew-eurodrive.es</a><br><a href="mailto:sew.spain@sew-eurodrive.es">sew.spain@sew-eurodrive.es</a>        |
| Sri Lanka                    |               |                                                                                                                                |                                                                                                                                                                                                           |
| Sales                        | Colombo       | SM International (Pte) Ltd<br>254, Galle Raod<br>Colombo 4, Sri Lanka                                                          | Tel. +94 1 2584887<br>Fax +94 1 2582981                                                                                                                                                                   |
| Swaziland                    |               |                                                                                                                                |                                                                                                                                                                                                           |
| Sales                        | Manzini       | C G Trading Co. (Pty) Ltd<br>PO Box 2960<br>Manzini M200                                                                       | Tel. +268 2 518 6343<br>Fax +268 2 518 5033<br><a href="mailto:engineering@cgtrading.co.sz">engineering@cgtrading.co.sz</a>                                                                               |
| Sweden                       |               |                                                                                                                                |                                                                                                                                                                                                           |
| Assembly<br>Sales<br>Service | Jönköping     | SEW-EURODRIVE AB<br>Gnejsvägen 6-8<br>553 03 Jönköping<br>Box 3100 S-550 03 Jönköping                                          | Tel. +46 36 34 42 00<br>Fax +46 36 34 42 80<br><a href="http://www.sew-eurodrive.se">http://www.sew-eurodrive.se</a><br><a href="mailto:jonkoping@sew.se">jonkoping@sew.se</a>                            |
| Switzerland                  |               |                                                                                                                                |                                                                                                                                                                                                           |
| Assembly<br>Sales<br>Service | Basel         | Alfred Imhof A.G.<br>Jurastrasse 10<br>4142 Münchenstein bei Basel                                                             | Tel. +41 61 417 1717<br>Fax +41 61 417 1700<br><a href="http://www.imhof-sew.ch">http://www.imhof-sew.ch</a><br><a href="mailto:info@imhof-sew.ch">info@imhof-sew.ch</a>                                  |
| Taiwan                       |               |                                                                                                                                |                                                                                                                                                                                                           |
| Sales                        | Taipei        | Ting Shou Trading Co., Ltd.<br>6F-3, No. 267, Sec. 2<br>Tung Huw S. Road<br>Taipei                                             | Tel. +886 2 27383535<br>Fax +886 2 27368268<br>Telex 27 245<br><a href="mailto:sewtwn@ms63.hinet.net">sewtwn@ms63.hinet.net</a><br><a href="http://www.tingshou.com.tw">http://www.tingshou.com.tw</a>    |
|                              | Nan Tou       | Ting Shou Trading Co., Ltd.<br>No. 55 Kung Yeh N. Road<br>Industrial District<br>Nan Tou 540                                   | Tel. +886 49 255353<br>Fax +886 49 257878<br><a href="mailto:sewtwn@ms63.hinet.net">sewtwn@ms63.hinet.net</a><br><a href="http://www.tingshou.com.tw">http://www.tingshou.com.tw</a>                      |
| Tanzania                     |               |                                                                                                                                |                                                                                                                                                                                                           |
| Sales                        | Daressalam    | SEW-EURODRIVE PTY LIMITED TANZANIA<br>Plot 52, Regent Estate<br>PO Box 106274<br>Dar Es Salaam                                 | Tel. +255 0 22 277 5780<br>Fax +255 0 22 277 5788<br><a href="http://www.sew-eurodrive.co.tz">http://www.sew-eurodrive.co.tz</a><br><a href="mailto:info@sew.co.tz">info@sew.co.tz</a>                    |
| Thailand                     |               |                                                                                                                                |                                                                                                                                                                                                           |
| Assembly<br>Sales<br>Service | Chonburi      | SEW-EURODRIVE (Thailand) Ltd.<br>700/456, Moo.7, Donhuaroh<br>Muang<br>Chonburi 20000                                          | Tel. +66 38 454281<br>Fax +66 38 454288<br><a href="mailto:sewthailand@sew-eurodrive.com">sewthailand@sew-eurodrive.com</a>                                                                               |
| Tunisia                      |               |                                                                                                                                |                                                                                                                                                                                                           |
| Sales                        | Tunis         | T. M.S. Technic Marketing Service<br>Zone Industrielle Mghira 2<br>Lot No. 39<br>2082 Fouchana                                 | Tel. +216 79 40 88 77<br>Fax +216 79 40 88 66<br><a href="http://www.tms.com.tn">http://www.tms.com.tn</a><br><a href="mailto:tms@tms.com.tn">tms@tms.com.tn</a>                                          |
| Turkey                       |               |                                                                                                                                |                                                                                                                                                                                                           |
| Assembly<br>Sales<br>Service | Kocaeli-Gebze | SEW-EURODRIVE Hareket<br>Sistemleri San. Ve TIC. Ltd. Sti<br>Gebze Organize Sanayi Böl. 400 Sok No. 401<br>41480 Gebze Kocaeli | Tel. +90 262 9991000 04<br>Fax +90 262 9991009<br><a href="http://www.sew-eurodrive.com.tr">http://www.sew-eurodrive.com.tr</a><br><a href="mailto:sew@sew-eurodrive.com.tr">sew@sew-eurodrive.com.tr</a> |

**Ukraine**

|                              |                |                                                                            |                                                                                                                                                                                          |
|------------------------------|----------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Assembly<br>Sales<br>Service | Dnipropetrovsk | ООО «СЕВ-Евродрайв»<br>ул. Рабочая, 23-В, офис 409<br>49008 Днепропетровск | Tel. +380 56 370 3211<br>Fax +380 56 372 2078<br><a href="http://www.sew-eurodrive.ua">http://www.sew-eurodrive.ua</a><br><a href="mailto:sew@sew-eurodrive.ua">sew@sew-eurodrive.ua</a> |
|------------------------------|----------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Uruguay**

|                   |            |                                                                                          |                                                                                                                           |
|-------------------|------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Assembly<br>Sales | Montevideo | SEW-EURODRIVE Uruguay, S. A.<br>Jose Serrato 3569 Esquina Corumbe<br>CP 12000 Montevideo | Tel. +598 2 21181-89<br>Fax +598 2 21181-90<br><a href="mailto:sewuy@sew-eurodrive.com.uy">sewuy@sew-eurodrive.com.uy</a> |
|-------------------|------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|

**USA**

|                                            |                     |                                                                                                                  |                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Production<br>Assembly<br>Sales<br>Service | Southeast<br>Region | SEW-EURODRIVE INC.<br>1295 Old Spartanburg Highway<br>P.O. Box 518<br>Lyman, S.C. 29365                          | Tel. +1 864 439-7537<br>Fax Sales +1 864 439-7830<br>Fax Production +1 864 439-9948<br>Fax Assembly +1 864 439-0566<br>Fax Confidential/HR +1 864 949-5557<br><a href="http://www.seweurodrive.com">http://www.seweurodrive.com</a><br><a href="mailto:cslyman@seweurodrive.com">cslyman@seweurodrive.com</a> |
| Assembly<br>Sales<br>Service               | Northeast<br>Region | SEW-EURODRIVE INC.<br>Pureland Ind. Complex<br>2107 High Hill Road, P.O. Box 481<br>Bridgeport, New Jersey 08014 | Tel. +1 856 467-2277<br>Fax +1 856 845-3179<br><a href="mailto:csbridgeport@seweurodrive.com">csbridgeport@seweurodrive.com</a>                                                                                                                                                                               |
|                                            | Midwest<br>Region   | SEW-EURODRIVE INC.<br>2001 West Main Street<br>Troy, Ohio 45373                                                  | Tel. +1 937 335-0036<br>Fax +1 937 332-0038<br><a href="mailto:cstroy@seweurodrive.com">cstroy@seweurodrive.com</a>                                                                                                                                                                                           |
|                                            | Southwest<br>Region | SEW-EURODRIVE INC.<br>3950 Platinum Way<br>Dallas, Texas 75237                                                   | Tel. +1 214 330-4824<br>Fax +1 214 330-4724<br><a href="mailto:csdallas@seweurodrive.com">csdallas@seweurodrive.com</a>                                                                                                                                                                                       |
|                                            | Western<br>Region   | SEW-EURODRIVE INC.<br>30599 San Antonio St.<br>Hayward, CA 94544                                                 | Tel. +1 510 487-3560<br>Fax +1 510 487-6433<br><a href="mailto:cshayward@seweurodrive.com">cshayward@seweurodrive.com</a>                                                                                                                                                                                     |
|                                            | Wellford            | SEW-EURODRIVE INC.<br>148/150 Finch Rd.<br>Wellford, S.C. 29385                                                  | <a href="mailto:IGLogistics@seweurodrive.com">IGLogistics@seweurodrive.com</a>                                                                                                                                                                                                                                |

Additional addresses for service provided on request!

**Uzbekistan**

|                  |          |                                                                                                              |                                                                                                                                                                                        |
|------------------|----------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Technical Office | Tashkent | SEW-EURODRIVE LLP<br>Representative office in Uzbekistan<br>96A, Sharaf Rashidov street,<br>Tashkent, 100084 | Tel. +998 71 2359411<br>Fax +998 71 2359412<br><a href="http://www.sew-eurodrive.uz">http://www.sew-eurodrive.uz</a><br><a href="mailto:sew@sew-eurodrive.uz">sew@sew-eurodrive.uz</a> |
|------------------|----------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Vietnam**

|       |                     |                                                                                                                                                                                                                 |                                                                                                                                                                                                  |
|-------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sales | Ho Chi Minh<br>City | Nam Trung Co., Ltd<br>Huế - South Vietnam / Construction Materials<br>250 Binh Duong Avenue, Thu Dau Mot Town,<br>Binh Duong Province<br>HCM office: 91 Tran Minh Quyen Street<br>District 10, Ho Chi Minh City | Tel. +84 8 8301026<br>Fax +84 8 8392223<br><a href="mailto:khanh-nguyen@namtrung.com.vn">khanh-nguyen@namtrung.com.vn</a><br><a href="http://www.namtrung.com.vn">http://www.namtrung.com.vn</a> |
|       | Hanoi               | MICO LTD<br>Quảng Trị - North Vietnam / All sectors except<br>Construction Materials<br>8th Floor, Ocean Park Building, 01 Dao Duy<br>Anh St, Ha Noi, Viet Nam                                                  | Tel. +84 4 39386666<br>Fax +84 4 3938 6888<br><a href="mailto:nam_ph@micogroup.com.vn">nam_ph@micogroup.com.vn</a><br><a href="http://www.micogroup.com.vn">http://www.micogroup.com.vn</a>      |

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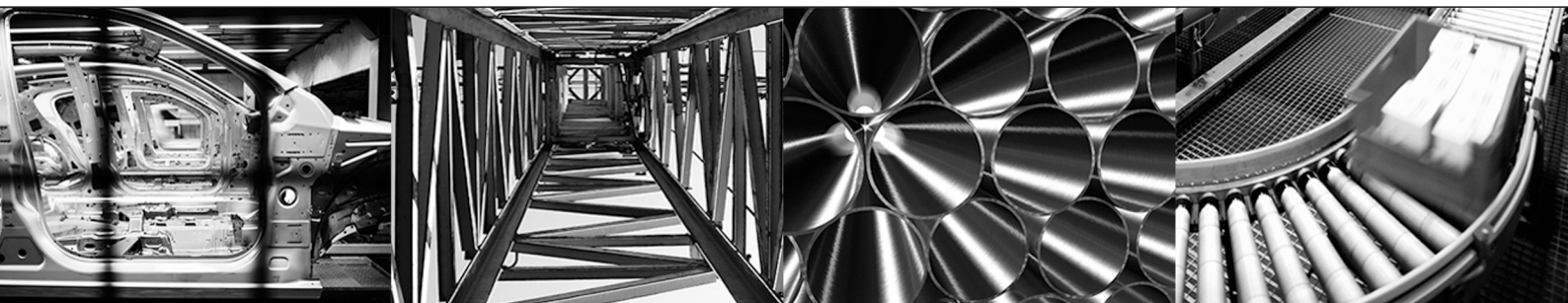
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