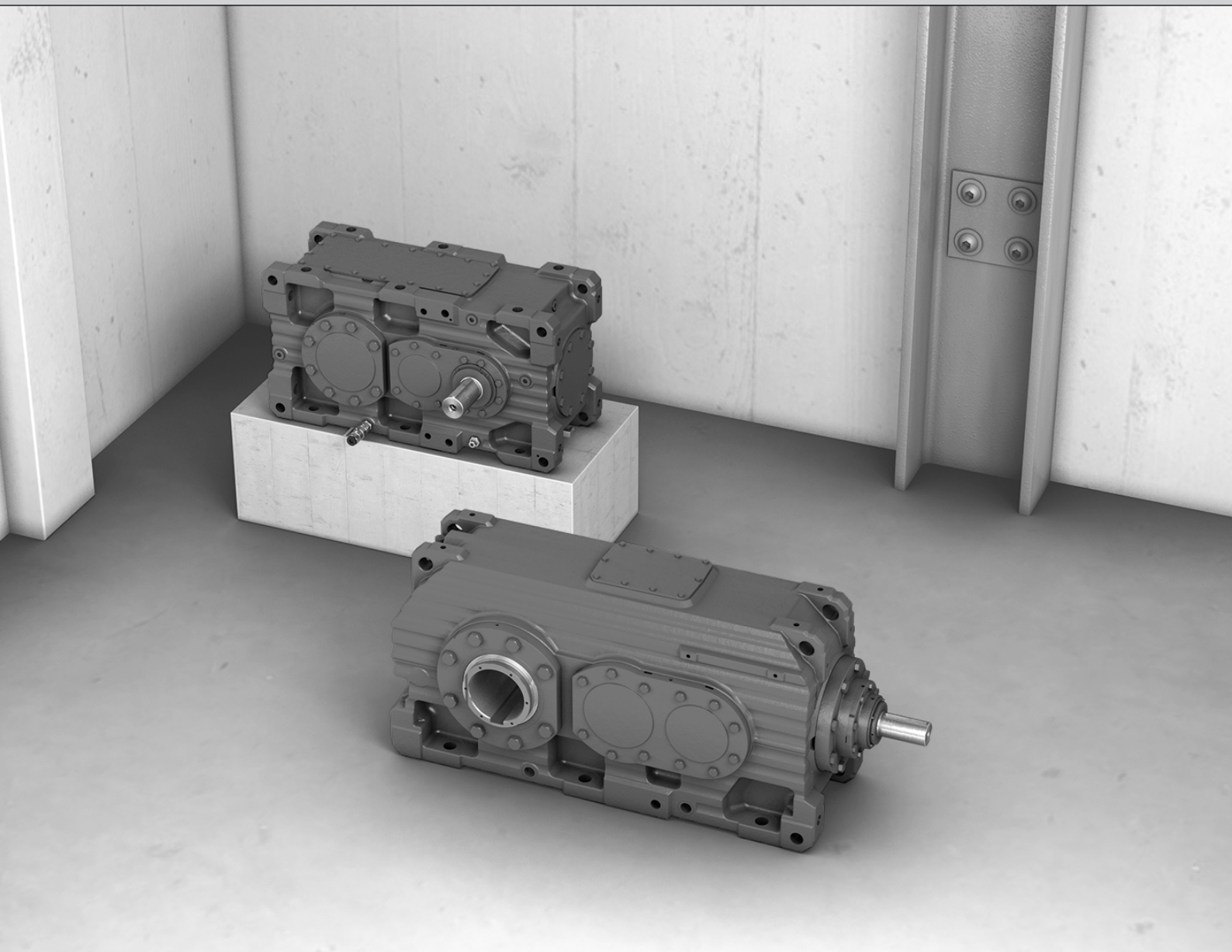




SEW
EURODRIVE

Assembly and Operating Instructions



Industrial Gear Units

X.. Series Helical and Bevel-Helical Gear Units

Torque Classes from 6.8 to 475 kNm



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1 General information

1.1 About this documentation

This documentation is an integral part of the product. The documentation is intended for all employees who perform assembly, installation, startup, and service work on the 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 device 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
▲ DANGER	Imminent hazard	Severe or fatal injuries.
▲ WARNING	Possible dangerous situation	Severe or fatal injuries.
▲ CAUTION	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the drive system or its environment.
INFORMATION	Useful information or tip: Simplifies handling of the drive system.	

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 unit!

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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Unauthorized reproduction, modification, distribution or any other use of the whole or any part of this documentation is strictly prohibited.

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, setup/mounting, 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
 - National/regional regulations governing safety and the prevention of accidents
- Never install damaged products
- Report any damage to the shipping company immediately.
- Unauthorized removal of covers, improper use, or incorrect installation and operation may result in severe injury to persons, or damage to machinery.

Refer to the documentation for additional information.

2.3 Target group

Any mechanical work may only be performed by adequately qualified personnel. Qualified personnel in this context are persons who are familiar with the setup, mechanical installation, troubleshooting and maintenance for this product. Further, they are qualified as follows:

- Training in mechanical engineering, e.g. as a mechanic or mechatronics technician (final examinations must have been passed).
- They are familiar with these operating instructions.

Any electronic work may only be performed by adequately qualified electricians. Qualified electricians in this context are persons who are familiar with the electronic installation, startup, troubleshooting and maintenance for this product. Further, they are qualified as follows:

- Training in electrical engineering, e.g. as an electrician or mechatronics technician (final examinations must have been passed).
- They are familiar with these operating instructions.

All work in the areas of transportation, storage, operation and waste disposal must be carried out by persons who are trained appropriately.

All qualified personnel must wear appropriate protective clothing.

2.4 Designated use

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

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

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

2.5 Other applicable documentation

The following publications and documents should also be observed:

- "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.
- Operating instructions of the options installed, if required.

2.6 Safety symbols on the gear unit














▲ CAUTION









Safety symbols or signs 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 symbols and signs.

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

Safety symbols	Meaning
	Indicates the bleeder screw .
	Indicates the oil dipstick .
	Indicates the oil level glass .
	Indicates the oil sight glass .
	Indicates the oil filling location . Also serves as proper venting during the oil change.
	Indicates the oil drain .
	Indicates the position of the breather . Serves to avoid mistaking the oil measuring position for the venting position.
	Indicates the positions for relubrication and makes it easier to find the locations to be lubricated. Helps avoid bearing damage.
	Indicates the water supply and serves to locate the connection option.
	Indicates the water return and serves to locate the connection option.
	Indicates the oil supply and serves to locate the connection option.





Safety symbols	Meaning
	Indicates the oil return and serves to locate the connection option.
	Indicates the position of the temperature sensor/temperature switch .
	Indicates the grease drain plug and serves to locate the grease drain. Helps avoid bearing damage.
	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 checking the oil .
	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.	
 <p>18855199</p>	<p>VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE</p> <p>DE Die Bremse ist ab Werk nicht eingestellt. Mögliche Sachschäden! • Bremse vor der Inbetriebnahme gemäß Betriebsanleitung einstellen</p>
	<p>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.</p>
	<p>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.</p>
	<p>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.</p>
 <p>18977405</p>	<p>DE Kupplung wird ohne Fett geliefert. Mögliche Sachschäden! • Vor der Inbetriebnahme Kupplung mit Fett befüllen.</p>
	<p>EN Coupling delivered without grease Possible damage to property. • Fill coupling with grease prior to startup.</p>
	<p>F L'accouplement est livré sans graisse. Risque de dommages matériels ! • Avant la mise en service, remplir l'accouplement de graisse.</p>
	<p>ES El acoplamiento se suministra sin grasa. ¡Posibles daños materiales! • Llenar el acoplamiento con grasa antes de la puesta en marcha.</p>
 <p>18977405</p>	<p>NL Koppeling wordt zonder vet geleverd. Mogelijke materiële schade! • Koppeling vóór de inbedrijfstelling met vet vullen.</p>
	<p>PL Sprzęgło jest dostarczane bez smaru. Możliwe szkody materialne! • Przed uruchomieniem należy wypełnić sprzęgło smarem.</p>

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









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Meaning							
The coupling is supplied without oil.							
<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE </div> <div style="display: flex;"> <div style="flex: 1; padding-right: 10px;">   <p>18977413</p> </div> <div style="flex: 2;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(DE) Kupplung wird ohne Öl geliefert. Mögliche Sachschäden!</p> <ul style="list-style-type: none"> • Vor der Inbetriebnahme Kupplung mit Öl befüllen. </td><td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(EN) Coupling delivered without oil Possible damage to property.</p> <ul style="list-style-type: none"> • Fill coupling with oil prior to startup. </td></tr> <tr> <td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(F) L'accouplement est livré sans huile. Risque de dommages matériels !</p> <ul style="list-style-type: none"> • Avant la mise en service, remplir l'accouplement d'huile. </td><td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(ES) El acoplamiento se suministra sin aceite. ¡Posibles daños materiales!</p> <ul style="list-style-type: none"> • Llenar el acoplamiento con aceite antes de la puesta en marcha. </td></tr> <tr> <td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(NL) Koppeling wordt zonder olie geleverd. Mogelijke materiële schade!</p> <ul style="list-style-type: none"> • Koppeling vóór de inbedrijfstelling met olie vullen. </td><td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(PL) Sprzęgło jest dostarczane bez oleju. Możliwe szkody materialne!</p> <ul style="list-style-type: none"> • Przed uruchomieniem należy wypełnić sprzęgło olejem. </td></tr> </table> </div> </div> </div>		<p>(DE) Kupplung wird ohne Öl geliefert. Mögliche Sachschäden!</p> <ul style="list-style-type: none"> • Vor der Inbetriebnahme Kupplung mit Öl befüllen. 	<p>(EN) Coupling delivered without oil Possible damage to property.</p> <ul style="list-style-type: none"> • Fill coupling with oil prior to startup. 	<p>(F) L'accouplement est livré sans huile. Risque de dommages matériels !</p> <ul style="list-style-type: none"> • Avant la mise en service, remplir l'accouplement d'huile. 	<p>(ES) El acoplamiento se suministra sin aceite. ¡Posibles daños materiales!</p> <ul style="list-style-type: none"> • Llenar el acoplamiento con aceite antes de la puesta en marcha. 	<p>(NL) Koppeling wordt zonder olie geleverd. Mogelijke materiële schade!</p> <ul style="list-style-type: none"> • Koppeling vóór de inbedrijfstelling met olie vullen. 	<p>(PL) Sprzęgło jest dostarczane bez oleju. Możliwe szkody materialne!</p> <ul style="list-style-type: none"> • Przed uruchomieniem należy wypełnić sprzęgło olejem.
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The gear unit is protected against corrosion with VCI.							
<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE </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: 33%; vertical-align: top; padding: 5px;"> <p>(DE) Getriebe ist mit VCI rostgeschützt. Nicht öffnen! Mögliche Sachschäden!</p> <ul style="list-style-type: none"> • Vor der Inbetriebnahme Vorarbeiten gemäß Betriebsanleitung durchführen. • Keine offene Flamme! </td><td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(EN) Gear unit with VCI corrosion protection. Do not open! Potential damage to property!</p> <ul style="list-style-type: none"> • Prior to startup, perform preliminary work according to operating instructions • No open flames! </td></tr> <tr> <td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(F) Réducteur protégé contre la corrosion avec VCI. Ne pas ouvrir Risque de dommages matériels !</p> <ul style="list-style-type: none"> • Avant la mise en service, réaliser les travaux préliminaires indiqués dans la notice d'exploitation. • Pas de flammes ouvertes ! </td><td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(ES) Reductor está protegido con VCI contra la corrosión. ¡No abrir! ¡Posibles daños materiales!</p> <ul style="list-style-type: none"> • Antes de la puesta en marcha, efectuar los trabajos preparatorios según las instrucciones de funcionamiento. • No debe haber fuego abierto. </td></tr> <tr> <td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(NL) Tandwielkast is met VCI tegen corrosie beschermd. Niet openen! Mogelijke materiële schade!</p> <ul style="list-style-type: none"> • Vóór de inbedrijfstelling voorbereidingen conform technische handleiding uitvoeren. • Geen open vuur! </td><td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(PL) Przekładnia zabezpieczona jest przed korozją za pomocą środka VCI. Nie otwierać! Możliwe szkody materialne!</p> <ul style="list-style-type: none"> • Przed uruchomieniem należy przeprowadzić czynności przygotowawcze zgodnie z informacjami zawartymi w instrukcji obsługi! • Unikać otwartych płomieni! </td></tr> </table> </div> </div> </div>		<p>(DE) Getriebe ist mit VCI rostgeschützt. Nicht öffnen! Mögliche Sachschäden!</p> <ul style="list-style-type: none"> • Vor der Inbetriebnahme Vorarbeiten gemäß Betriebsanleitung durchführen. • Keine offene Flamme! 	<p>(EN) Gear unit with VCI corrosion protection. Do not open! Potential damage to property!</p> <ul style="list-style-type: none"> • Prior to startup, perform preliminary work according to operating instructions • No open flames! 	<p>(F) Réducteur protégé contre la corrosion avec VCI. Ne pas ouvrir Risque de dommages matériels !</p> <ul style="list-style-type: none"> • Avant la mise en service, réaliser les travaux préliminaires indiqués dans la notice d'exploitation. • Pas de flammes ouvertes ! 	<p>(ES) Reductor está protegido con VCI contra la corrosión. ¡No abrir! ¡Posibles daños materiales!</p> <ul style="list-style-type: none"> • Antes de la puesta en marcha, efectuar los trabajos preparatorios según las instrucciones de funcionamiento. • No debe haber fuego abierto. 	<p>(NL) Tandwielkast is met VCI tegen corrosie beschermd. Niet openen! Mogelijke materiële schade!</p> <ul style="list-style-type: none"> • Vóór de inbedrijfstelling voorbereidingen conform technische handleiding uitvoeren. • Geen open vuur! 	<p>(PL) Przekładnia zabezpieczona jest przed korozją za pomocą środka VCI. Nie otwierać! Możliwe szkody materialne!</p> <ul style="list-style-type: none"> • Przed uruchomieniem należy przeprowadzić czynności przygotowawcze zgodnie z informacjami zawartymi w instrukcji obsługi! • Unikać otwartych płomieni!
<p>(DE) Getriebe ist mit VCI rostgeschützt. Nicht öffnen! Mögliche Sachschäden!</p> <ul style="list-style-type: none"> • Vor der Inbetriebnahme Vorarbeiten gemäß Betriebsanleitung durchführen. • Keine offene Flamme! 	<p>(EN) Gear unit with VCI corrosion protection. Do not open! Potential damage to property!</p> <ul style="list-style-type: none"> • Prior to startup, perform preliminary work according to operating instructions • No open flames! 						
<p>(F) Réducteur protégé contre la corrosion avec VCI. Ne pas ouvrir Risque de dommages matériels !</p> <ul style="list-style-type: none"> • Avant la mise en service, réaliser les travaux préliminaires indiqués dans la notice d'exploitation. • Pas de flammes ouvertes ! 	<p>(ES) Reductor está protegido con VCI contra la corrosión. ¡No abrir! ¡Posibles daños materiales!</p> <ul style="list-style-type: none"> • Antes de la puesta en marcha, efectuar los trabajos preparatorios según las instrucciones de funcionamiento. • No debe haber fuego abierto. 						
<p>(NL) Tandwielkast is met VCI tegen corrosie beschermd. Niet openen! Mogelijke materiële schade!</p> <ul style="list-style-type: none"> • Vóór de inbedrijfstelling voorbereidingen conform technische handleiding uitvoeren. • Geen open vuur! 	<p>(PL) Przekładnia zabezpieczona jest przed korozją za pomocą środka VCI. Nie otwierać! Możliwe szkody materialne!</p> <ul style="list-style-type: none"> • Przed uruchomieniem należy przeprowadzić czynności przygotowawcze zgodnie z informacjami zawartymi w instrukcji obsługi! • Unikać otwartych płomieni! 						
9007204570575499							

Meaning					
Gear unit is supplied without oil.					
VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE					
 18977383		DE	Getriebe wird ohne Öl geliefert. Mögliche Sachschäden! • Vor der Inbetriebnahme Ölbefüllung gemäß Betriebsanleitung durchführen.	EN	Gear unit is delivered without oil. Potential damage to property! • Prior to startup, fill in oil according to operating instructions.
		F	Le réducteur ne contient pas d'huile à la livraison. Dommages matériels possibles ! • Avant la mise en service, effectuer le remplissage d'huile conformément à la notice d'exploitation.	ES	El reductor se suministra sin aceite. ¡Posibles daños materiales! • Antes de la puesta en marcha, efectuar el llenado de aceite según las instrucciones de funcionamiento.
		NL	Tandwielkast wordt zonder olie geleverd. Mogelijke materiële schade! • Vóór de inbedrijfstelling olie conform technische handleiding bijvullen.	PL	Przekładnia jest dostarczana bez oleju. Możliwe szkody materialne! • Przed uruchomieniem należy wlać olej zgodnie z informacjami zawartymi w instrukcji obsługi.
		9007204570577675			

2.7 Safety symbols on the dimension sheet

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

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

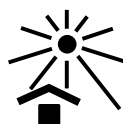
Safety symbols	Meaning
	Indicates the position of the oil heater .
	Indicates the oil level plug .

2.8 Symbols on the packaging

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



Fragile



Protect
from heat



Fasten
here



Hand hooks
prohibited



Up



Keep dry



Center of gravity

1811486091

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).



▲ 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

Risk of slipping due to lubricant leaking from damaged seals.

Minor injuries.

- Check the gear unit and mount-on components for leaking lubricant.

NOTICE

Improper transport can damage the gear unit.

Possible damage to property.

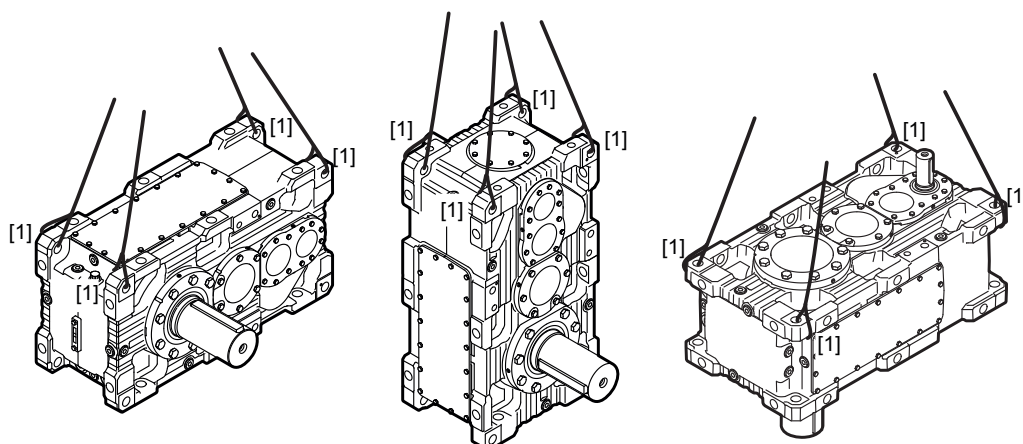
- Observe the following notes.
- Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. It may be necessary to suspend startup.
- The weight of the gear unit (without oil) is indicated on the nameplate or on the dimension sheet. 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.

- The figures on the following pages are exemplary.
- 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.

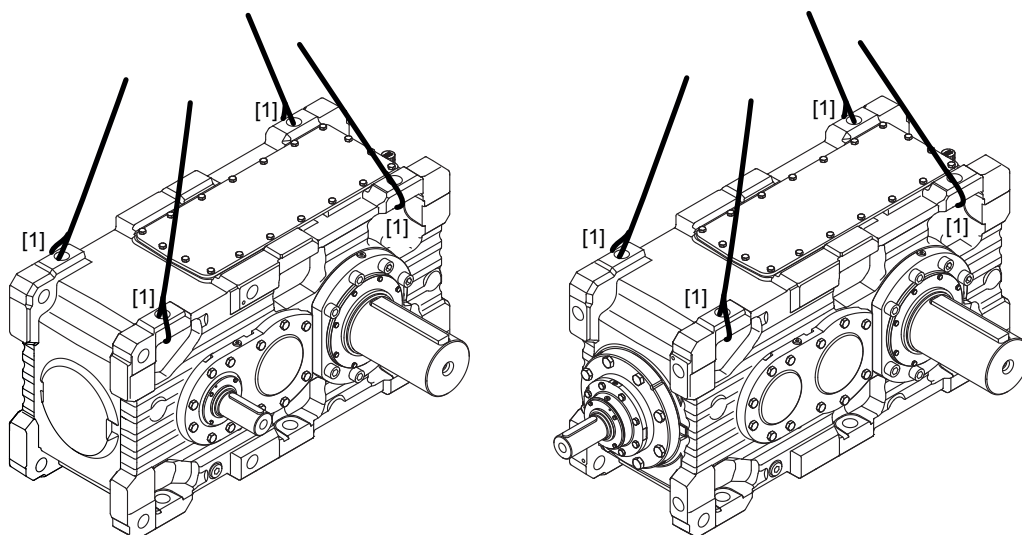


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2.9.3 Horizontal housing /HH

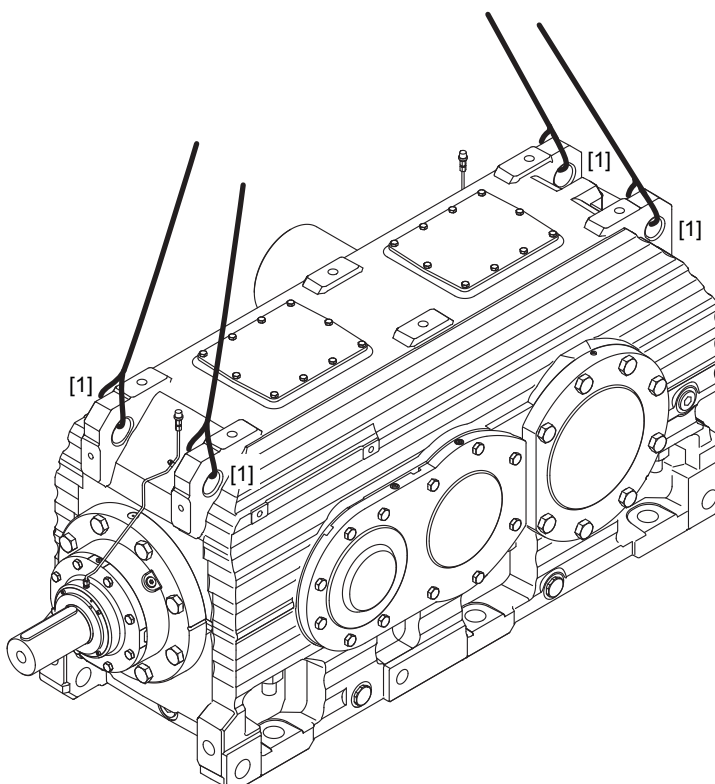
The following figure illustrates examples on how to transport the gear unit.

Sizes X100 – 210



13315118219

Sizes X220 – 320



13319419787

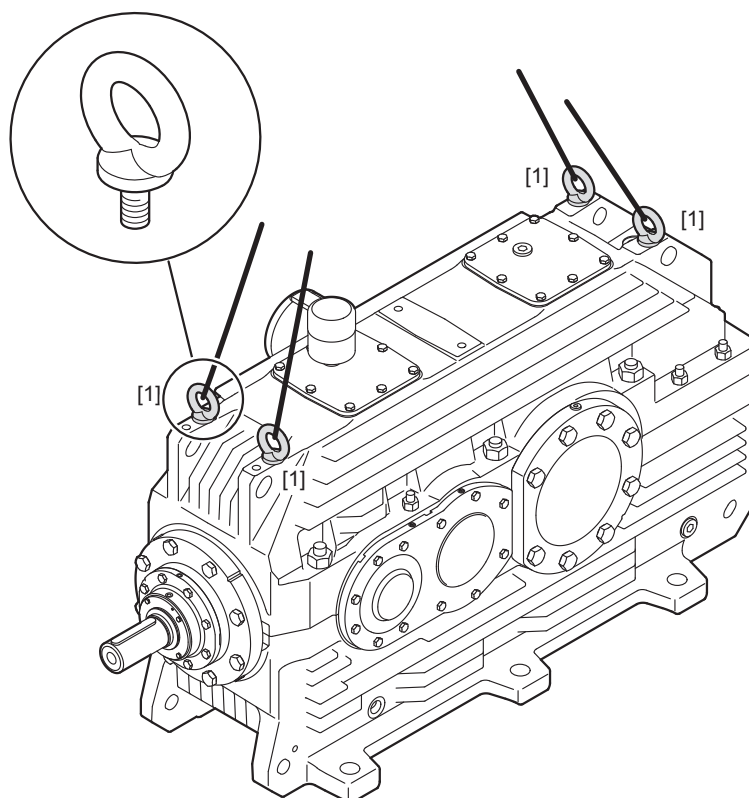
2.9.4 Thermal housing /HT

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

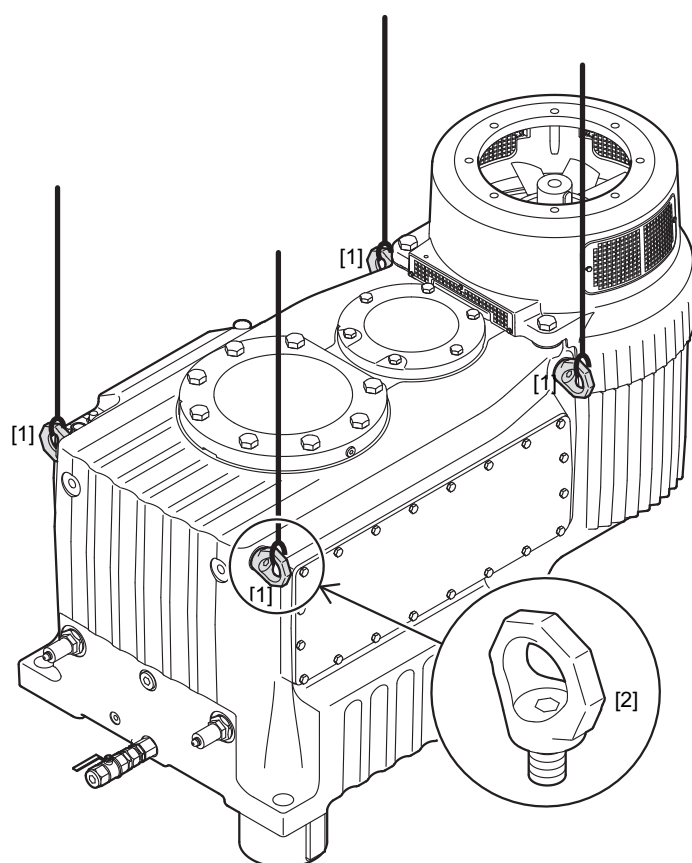
The user is responsible for transport. For an example of the internal SEW-EURODRIVE plant specifications, refer to the following table. The values in the table are only valid for transport with 4 attachment points [1] and without mount-on components, such as external cooling systems.

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
X140 – 150	4 x M16
X160 – 170	4 x M20
X180 – 190	4 x M24
X200 – 210	4 x M24

The following figure illustrates how to transport the gear unit.



15466449163

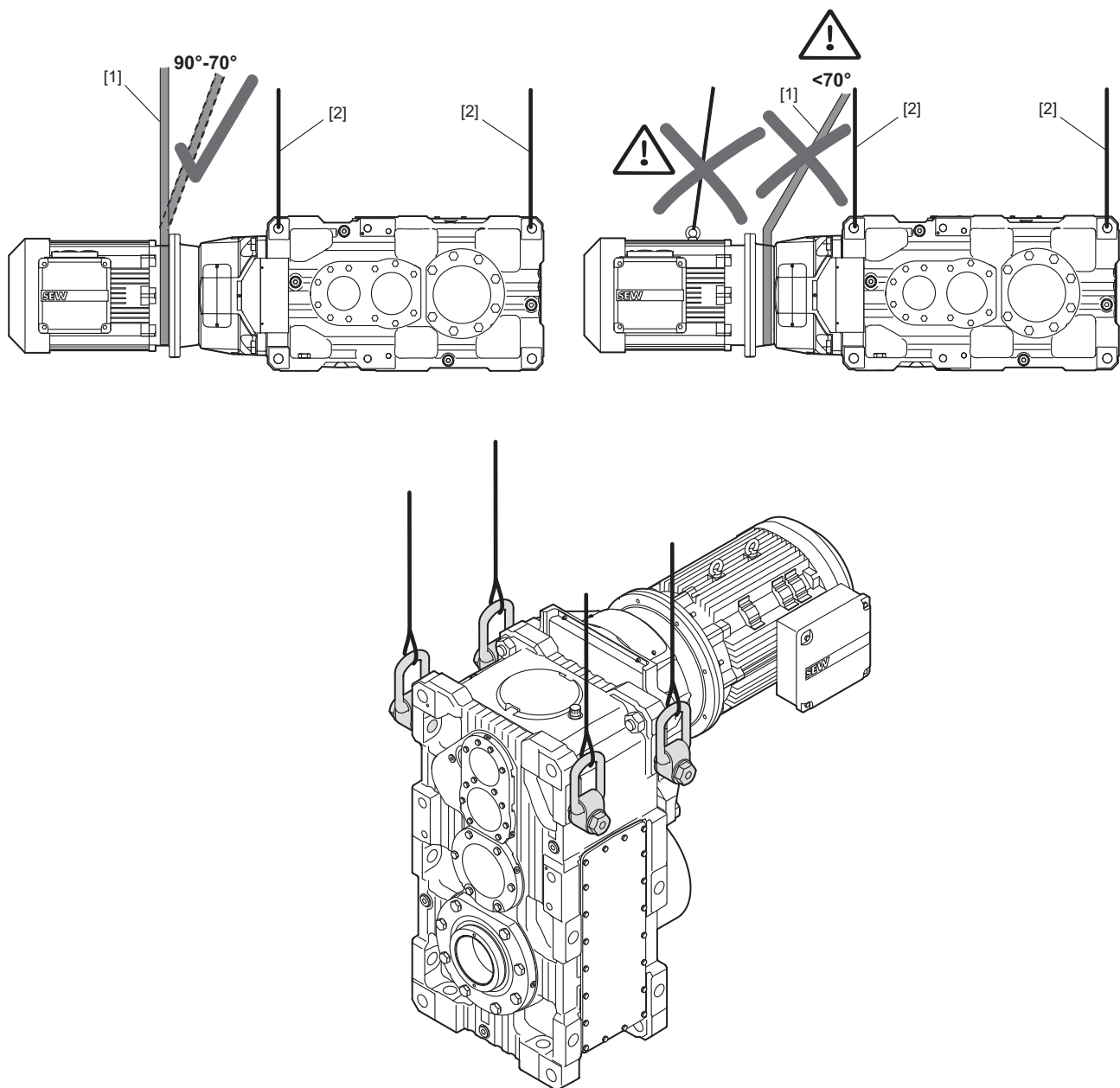
2.9.6 Gear units with motor adapter

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.

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.



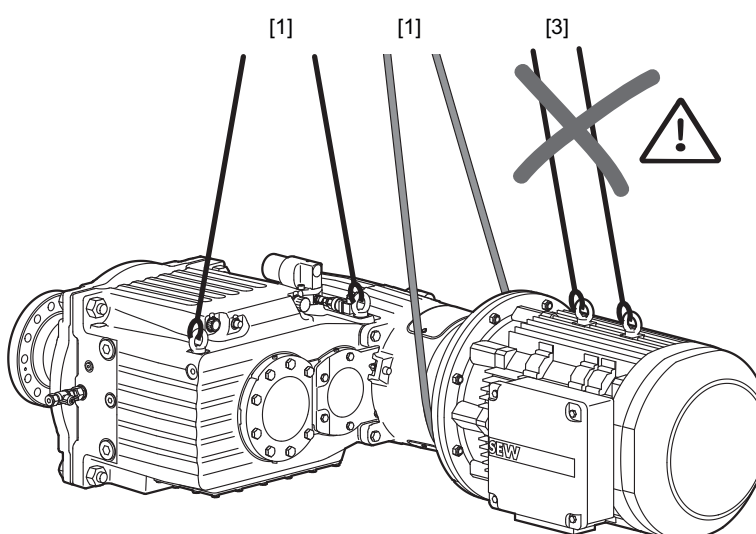
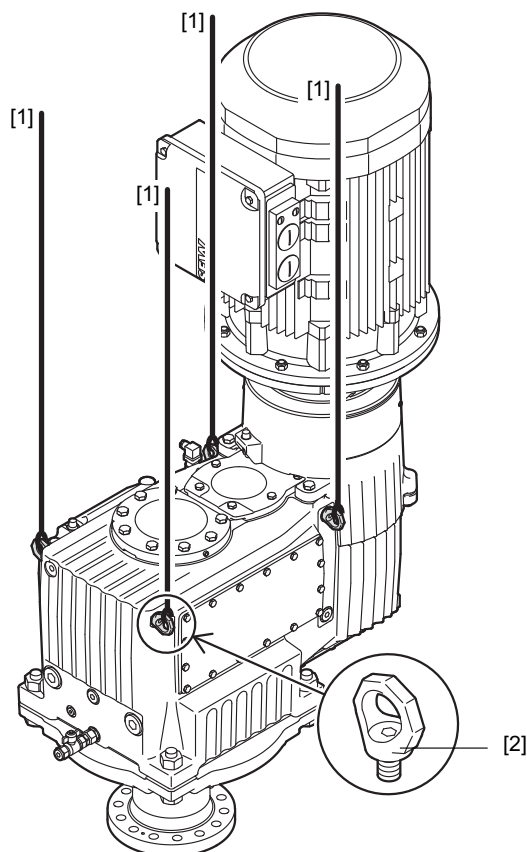
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Agitator housing /HA

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.

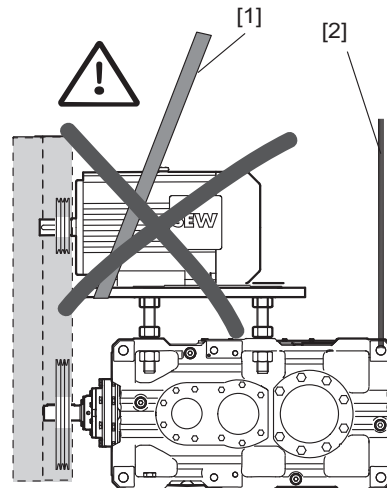
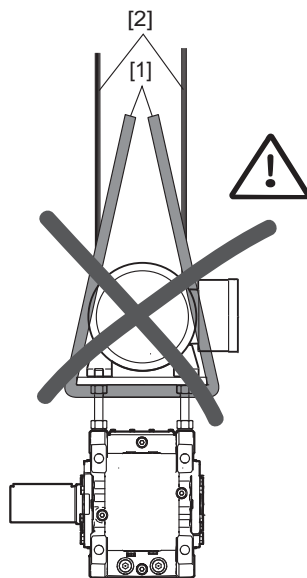
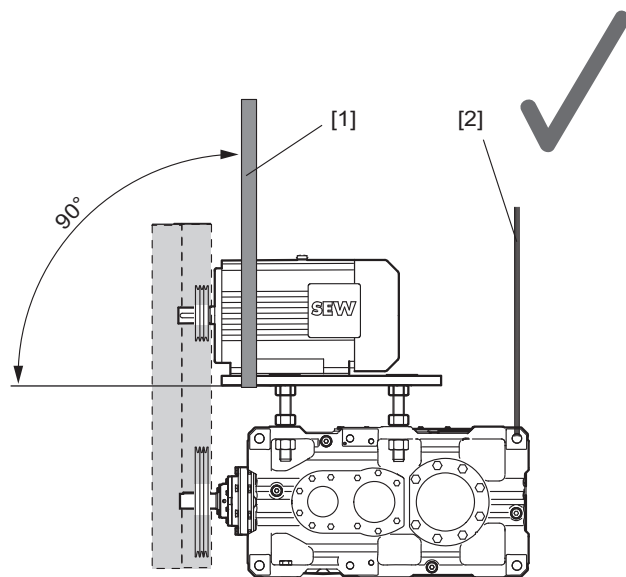
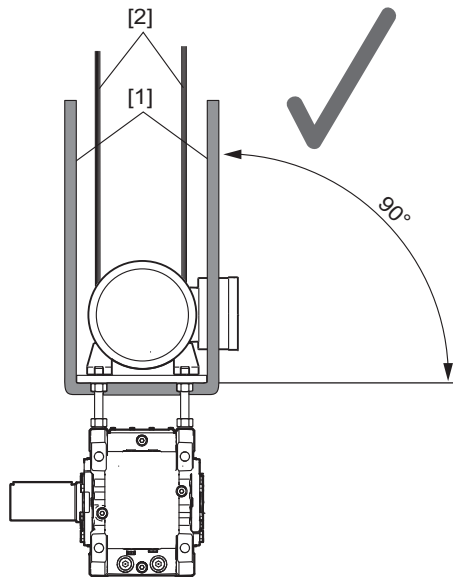


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2.9.7 Gear units with V-belt drive

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.

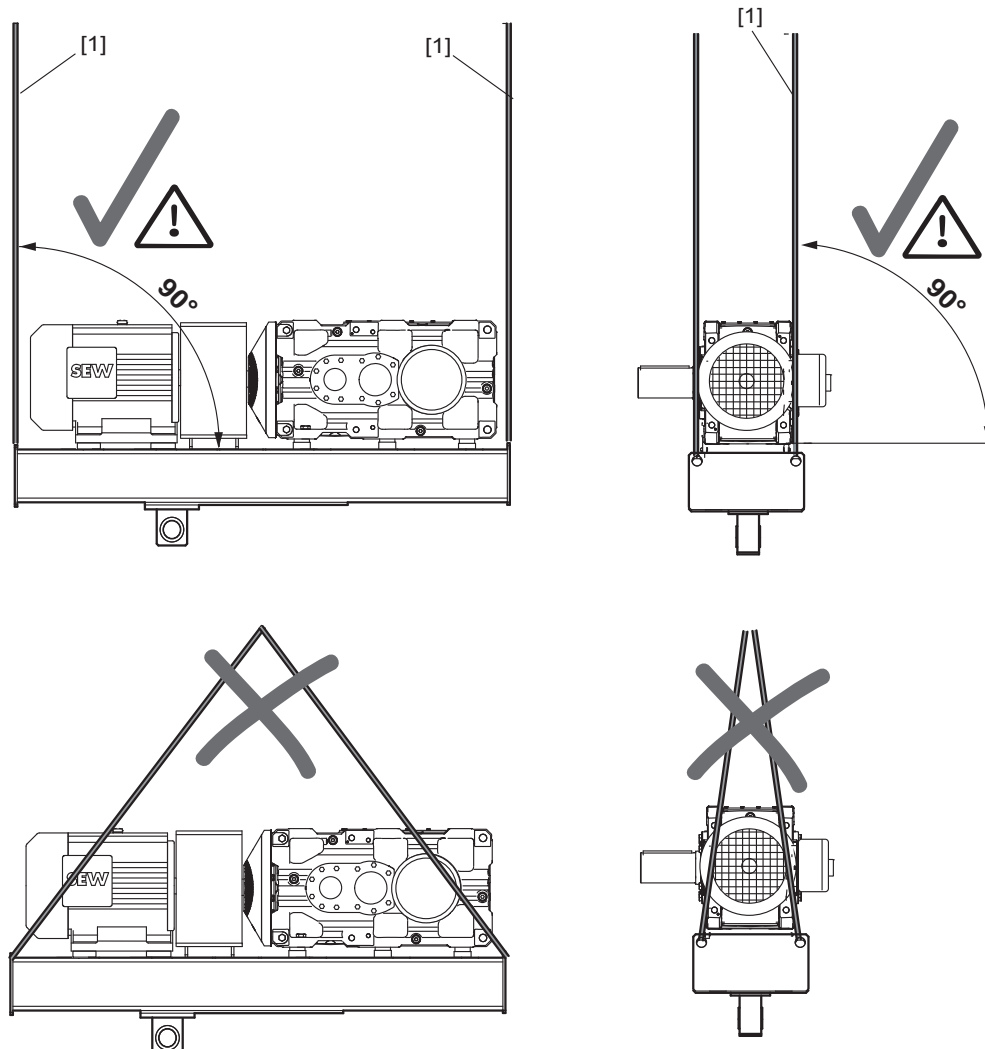


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2.9.8 Gear units on swing base/base frame

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.

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

INFORMATION



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

3

Basic gear unit structure

INFORMATION



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

3.1

Nameplate

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

SEW-EURODRIVE

Bruchsal/Germany

TypeX3FS190/B

Nr.01.1234567812.0001.06

	min.	norm.	max.	i	39,06			
PK1	[kW]	36	180	180	Fs	1,5		
MK2	[Nm]	43300	43300	43300	PM	[kW]	0	
n1	[1/min]	296	1480	1480	Ta	[°C]		
n2	[1/min]	7,6	37,9	37,9			1743 895 0.11	
IM	M4-M1/9°							
	Made in Germany							
Qty of greasing points	2	Fans	0	Mass	[kg]	1340	Year	2014
	CLP HC460 - Synthetic Oil - 90 ltr.							

63050395201832459

Type		Type designation
No. 1		Serial number
P _{K1}	[kW]	Operating power on the input shaft (HSS)
M _{K2}	[Nm]	Gear unit output torque
n ₁	[1/min]	Input speed (HSS)
n ₂	[1/min]	Output speed (LSS)
Norm.		Normal operating point
Min.		Minimum operating point
Max.		Maximum operating point
i		Exact gear unit ratio
F _s		Service factor
P _{Mot}	[kW]	Nominal motor power
T _a °C		Deviation from standard temperature range (−20 °C to +40 °C)
Mass	[kg]	Weight of the gear unit
Qty of greasing points		Number of regreasing points
Fans		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:

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

3.2.2 Oil supply systems

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

OWC020-00/M	
O	Oil supply system
W	Cooling medium <ul style="list-style-type: none"> W = Water A = Air N = Motor pump
C	Type <ul style="list-style-type: none"> C = Circulation cooling P = Pressure lubrication
020	Size <ul style="list-style-type: none"> 005 – 070
	Application
-0	Mounting positions <ul style="list-style-type: none"> 0 = M1/M2/M3/M4 1 = M5/M6
0	Option <ul style="list-style-type: none"> 0 = 50 Hz 1 = 60 Hz 2 = 50 Hz / 60 Hz 9 = Special design
M	Mounting type <ul style="list-style-type: none"> M = Mounted to the gear unit S = For separate installation

3.2.3 Flange couplings

The following example shows the structure of the type designation.

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

3.2.4 Abbreviations for optional accessories

The table shows the abbreviations used and what they mean.

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

All options are part of the type designation except for mounting flange, torque arm, horizontal and universal housing.

3.3 Mounting positions

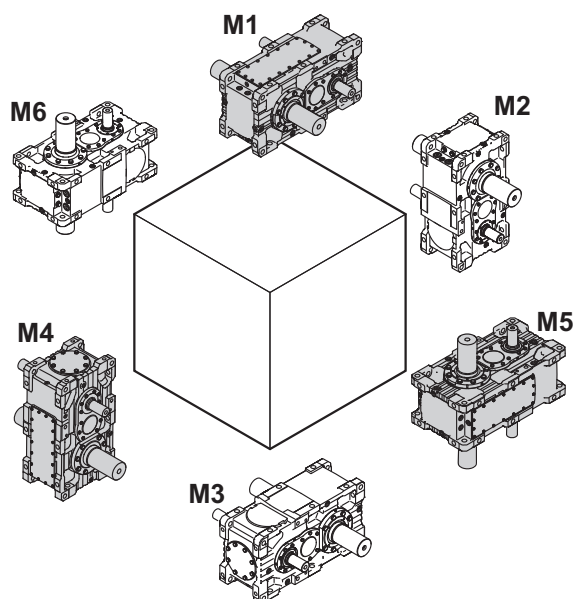
The mounting position defines the spatial orientation of the gear unit housing and is designated **M1...M6**.

The table below shows the mounting positions.

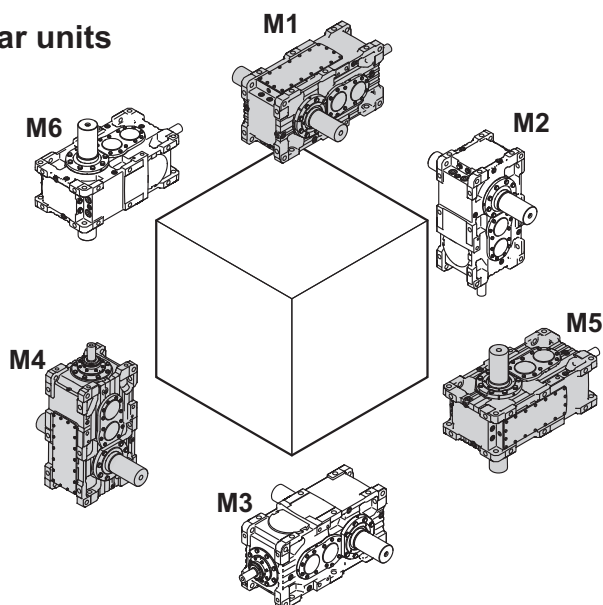
	Standard mounting position (marked in gray in the figure)	Alternative mounting position
Horizontal gear unit	M1	M3
Vertical gear unit	M5	M6
Upright gear unit	M4	M2

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

X.F.. helical gear units



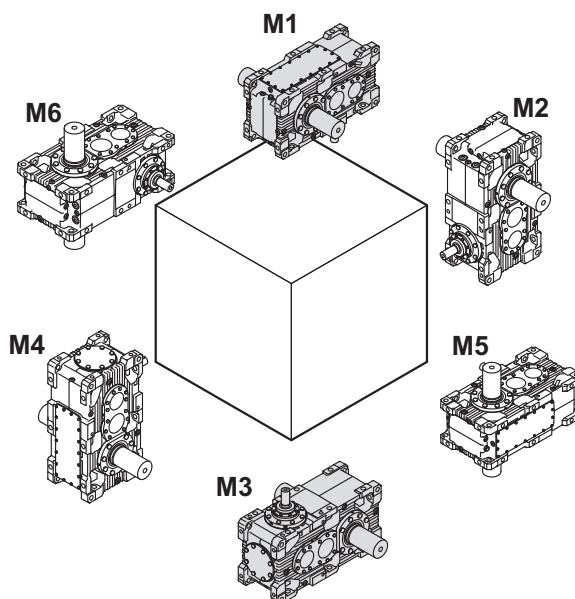
X.K.. bevel-helical gear units



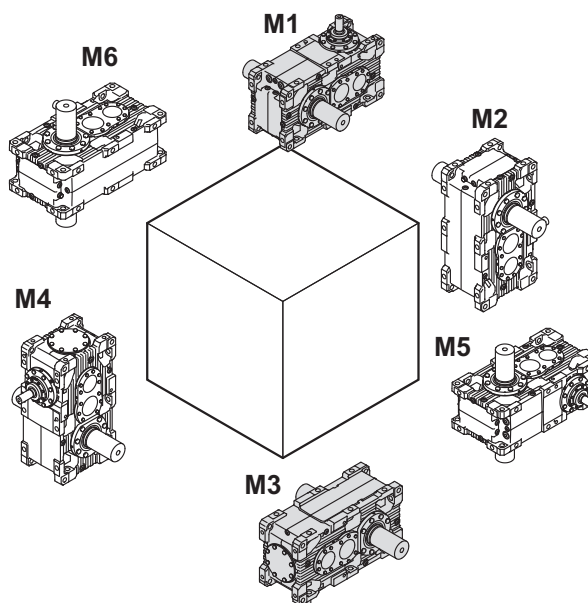
18014399846530059

Bevel-helical gear unit X.T..

Valid for sizes X100 – X210



Valid for sizes X220 – X320



18014401292607499

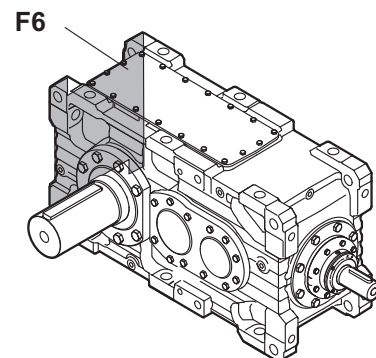
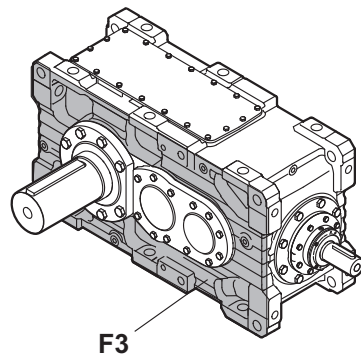
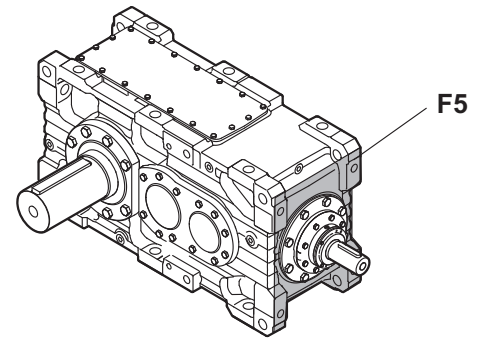
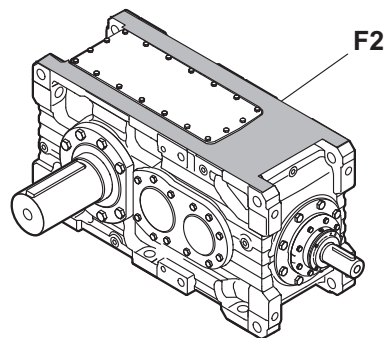
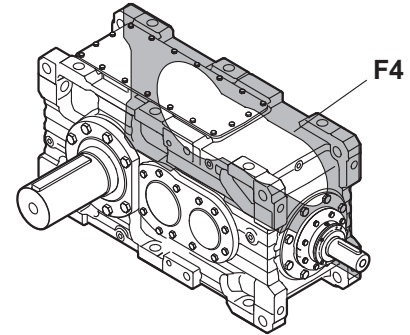
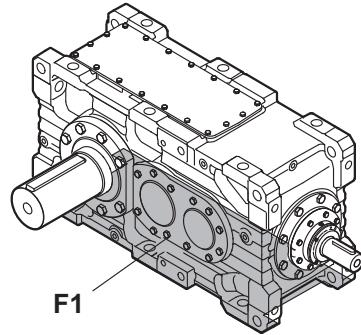
3.4 Mounting surfaces

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).

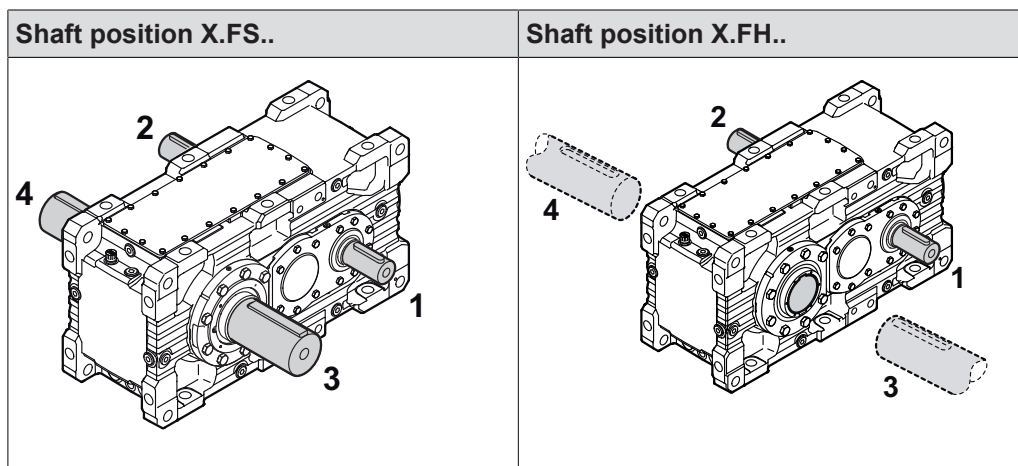


9007199434620683

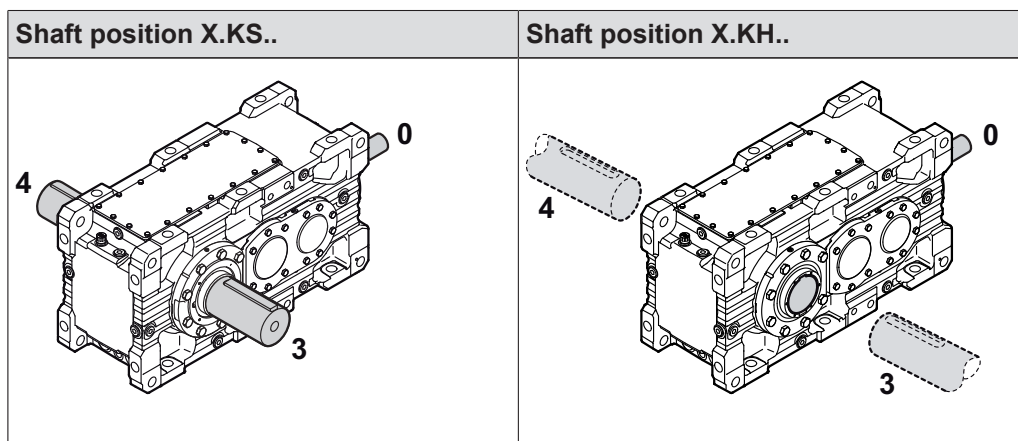
3.5 Shaft positions

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..

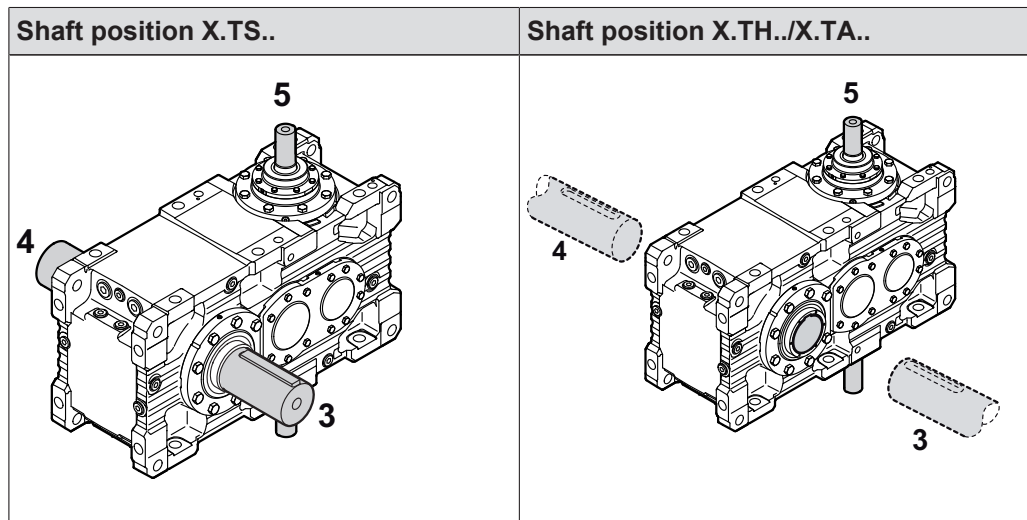


3.5.2 X.K..

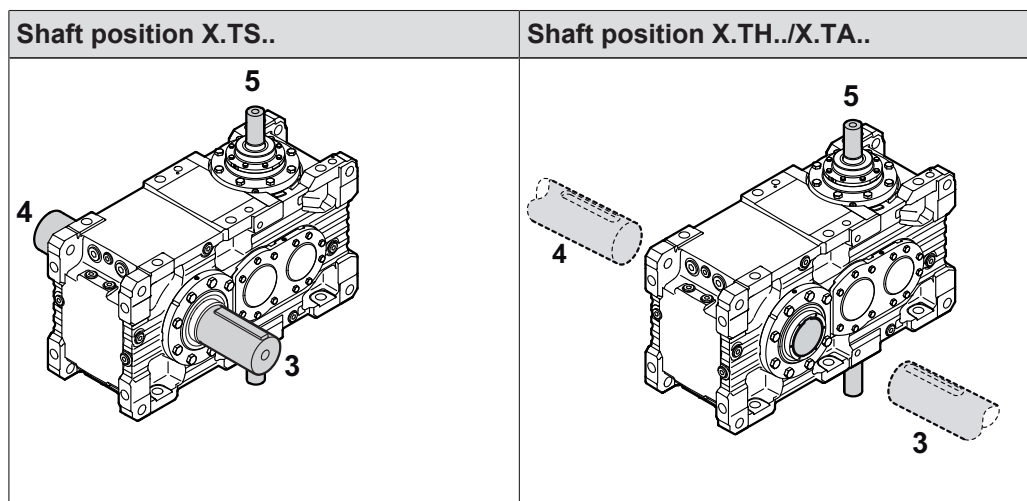


3.5.3 X.T..

Sizes X100 to X210



Sizes X220 to X320



3.6 Mounting positions and standard mounting surfaces

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

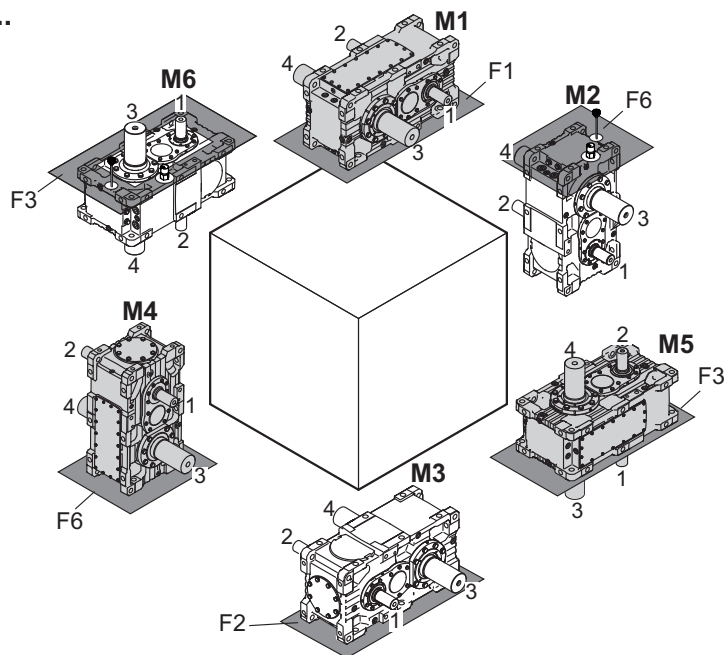


INFORMATION

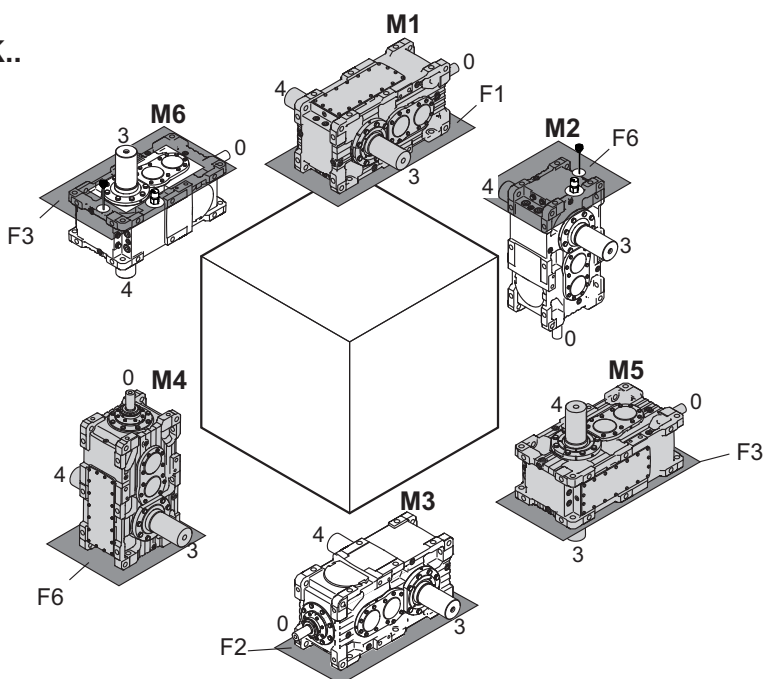
- The mounting position and/or mounting surface must not differ from the order.
- A deviation of $\pm 1^\circ$ is permitted.
- Other mounting surfaces are possible in combination with a certain mounting position. Refer to the order-specific drawing.

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

X.F..



X.K..



27021599101969547

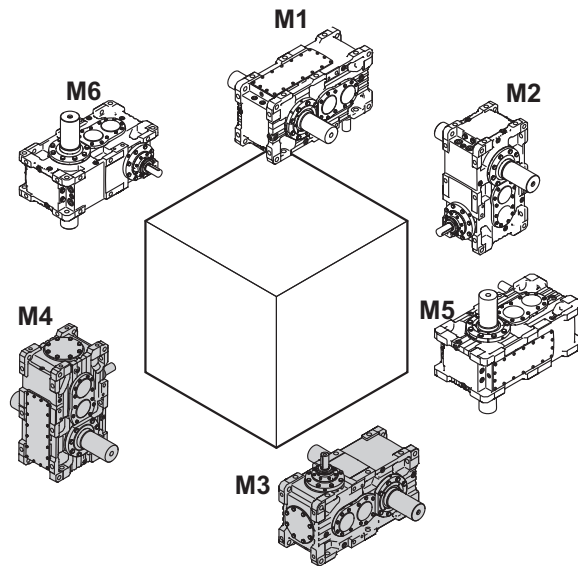
INFORMATION



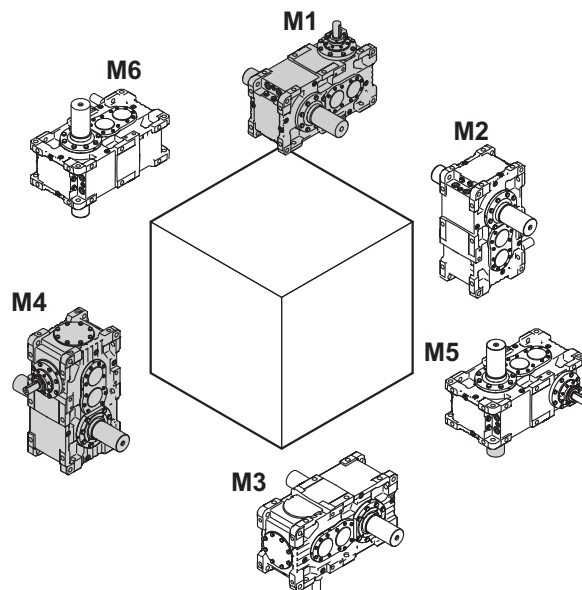
If you install the gear unit in mounting position M2, make sure that the customer's mounting structure leaves enough room for the breather and the oil dipstick.

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.

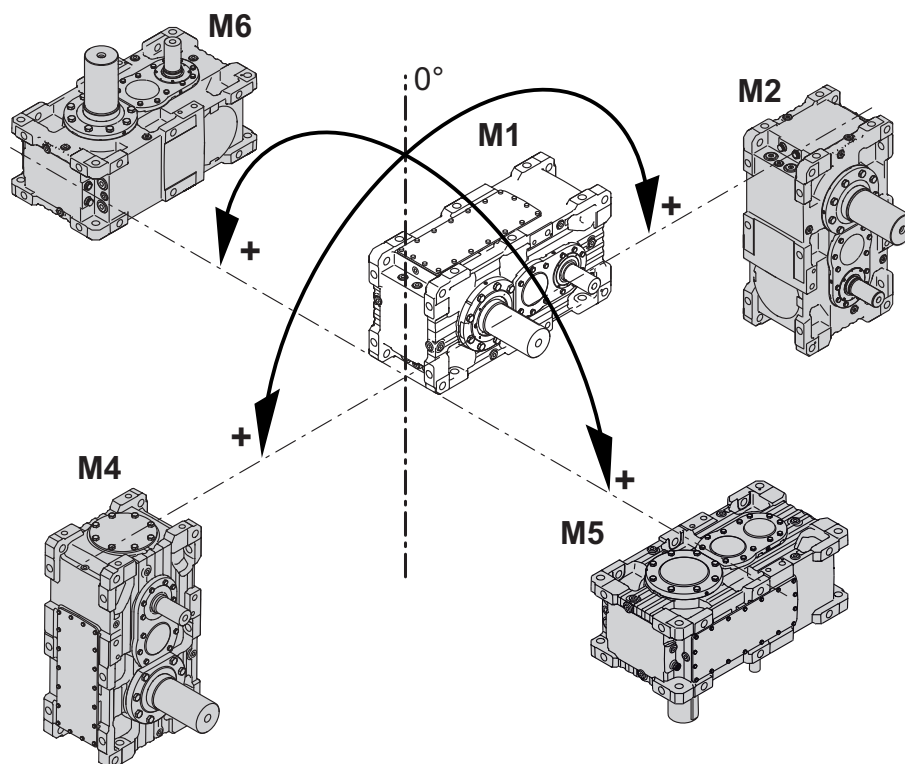
3.7 Fixed and variable pivoted mounting positions

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.



18014406531135115

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°

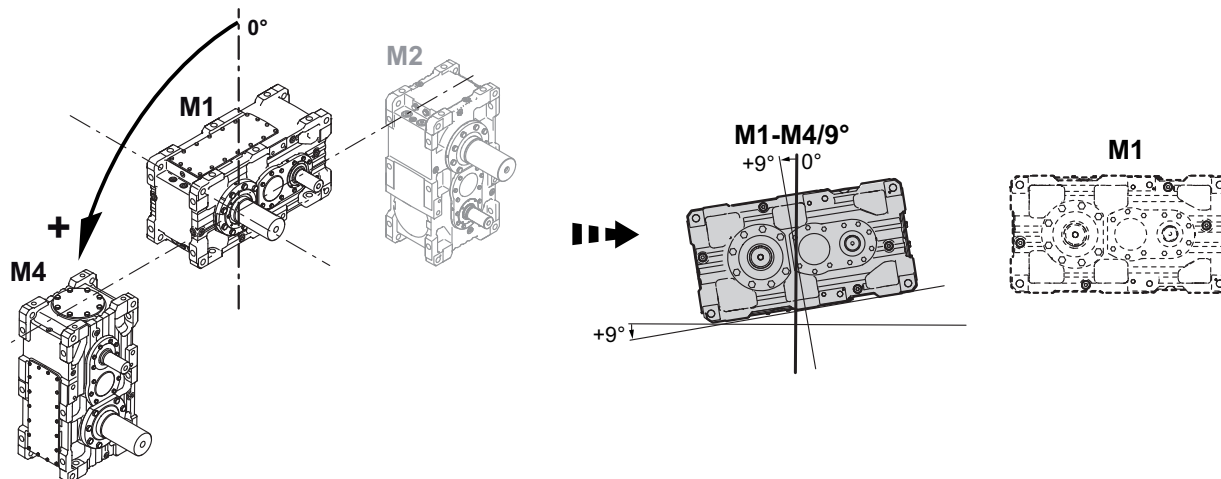
M1 = Initial mounting position

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:



8021658507

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 Bruchsal/Germany									
Type	X3FS190/B								
Nr.	01.1234567812.0001.06								
	min.	norm.	max.	i	39,06				
Pk1 [kW]	36	180	180	Fs	1,5				
Mk2 [Nm]	43300	43300	43300	P _{Mot} [kW]	0				
n1 [1/min]	296	1480	1480	T _a °C					
n2 [1/min]	7,6	37,9	37,9	1743 895 0.11					
IM	M1-M4/9°/F1								
Made in Germany									
Qty of greasing points	2	Fans	0	Mass [kg]	1340	Year	2012		
CLP HC460 - Synthetic Oil - 90 ltr.									

18014406531142155

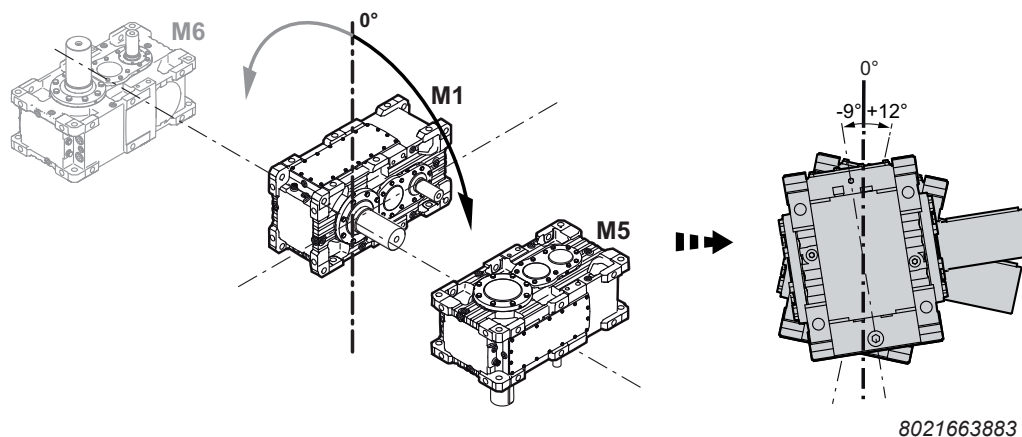
3.7.2 Variable pivoted mounting position

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°.

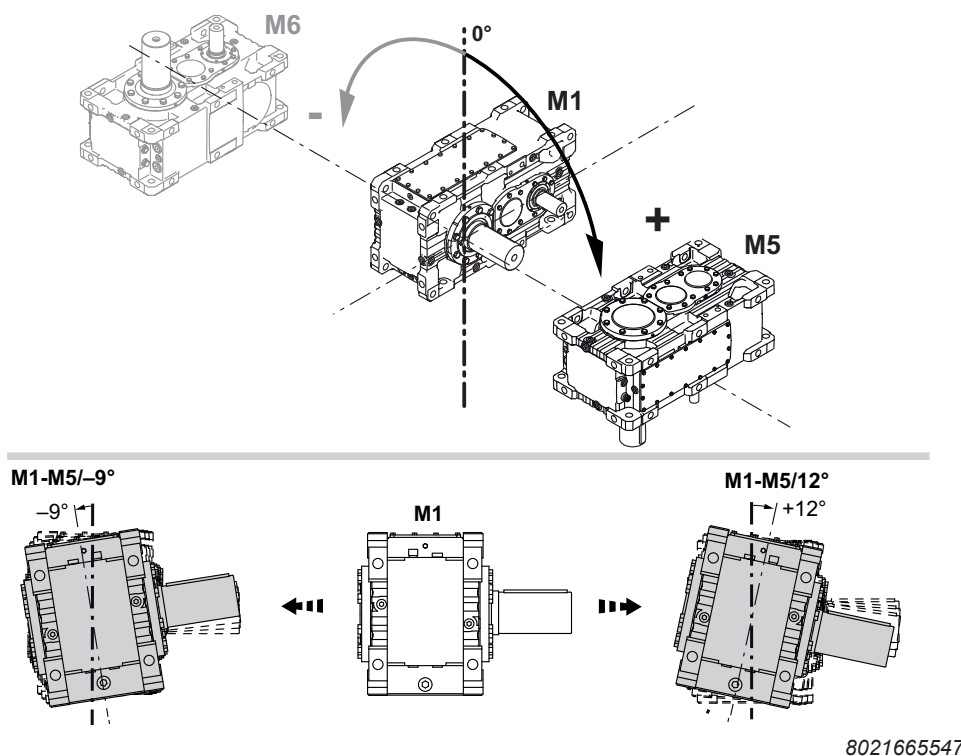


Step 1:

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

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

$9^\circ \rightarrow$ from M1 to M6, pivoted by -9°



The type designation for this example is:

M1-M5/-9°...12°

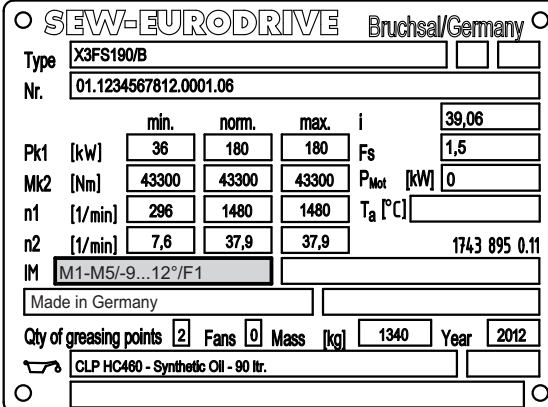
M1 = Initial mounting position

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:



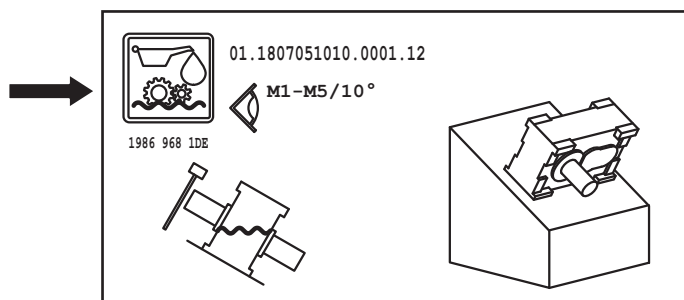
	min.	nom.	max.	i	
Pk1 [kW]	36	180	180		39,06
Mk2 [Nm]	43300	43300	43300	Fs	1,5
n1 [1/min]	296	1480	1480	P _{Mot} [kW]	0
n2 [1/min]	7,6	37,9	37,9	T _a [°C]	
IM	M1-M5/-9...12°/F1				1743 895 0.11

18014406531150859

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:

M1-M4/9° (fixed pivoted mounting position) **M1-M5/-9°...12°** (variable pivoted mounting position)

M1 = Initial mounting position

M4 = Pivoting direction

9° = Fixed pivoting angle

M1 = Initial mounting position

M5 = Pivoting direction

12° = 12° from M1 to M5

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

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

	min.	nom.	max.	i
Pk1 [kW]	36	180	180	39,06
Mk2 [Nm]	43300	43300	43300	F _s 1,5
n1 [1/min]	296	1480	1480	P _{Mot} [kW] 0
n2 [1/min]	7,6	37,9	37,9	T _a [°C]

IM **M1-M4/9° M1-M5/-9°...12°/F1**

Made in Germany

Qty of greasing points 2 Fans 0 Mass [kg] 1340 Year 2012

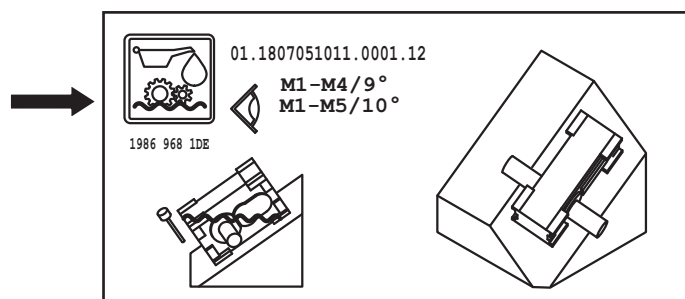
CLP HC480 - Synthetic Oil - 90 ltr.

18014406531158923

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°.



8021678603

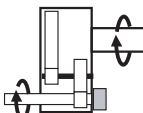
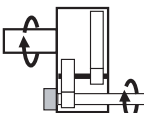
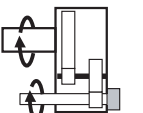
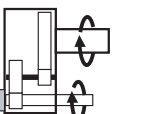
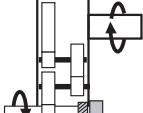
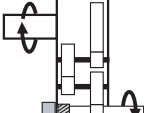
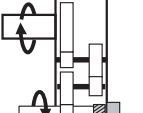
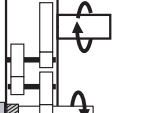
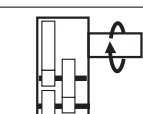
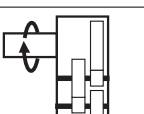
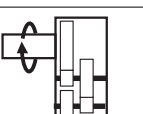
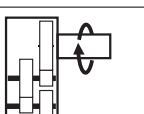
3.8 Corresponding directions of rotation

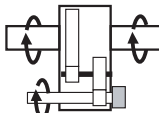
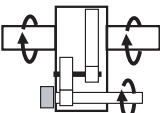

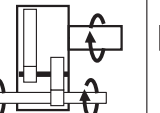
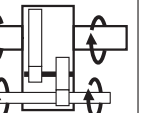
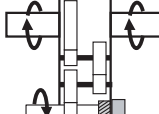
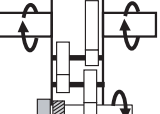
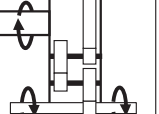
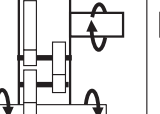
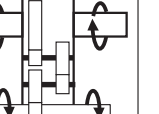
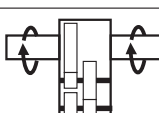
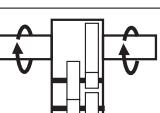
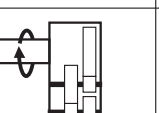
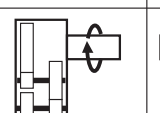
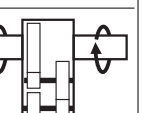
The gear unit can be operated in both directions of rotation. An exception are gear units with backstop.

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 pos. End gear pos.	14 3	23 4	13 ¹⁾ 3	24 ¹⁾ 4
X2F...				
X3F...				
X4F...				

Shaft pos. End gear pos.	134 ¹⁾ 3	243 ¹⁾ 4	213* 4	124* 3	1234* ¹⁾ 3
X2F...					
X3F...					
X4F...					

27021598122824075

-  = 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

3 Basic gear unit structure

Corresponding directions of rotation

3.8.2 X.K...

Standard

Shaft position	03	04	034 ¹⁾	043 ¹⁾
End gear pos.	4	3	3	4
X2K...				
X3K...				
X4K...				

45035996982590603

Direction of rotation reversal

Shaft position	03 ¹⁾	04 ¹⁾
End gear pos.	3	4
X2K...		
X3K...		
X4K...		

27021598473116683

- = 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

22299017/EN – 04/2016

3.8.3 X.T...

Standard

Shaft position	63	64	634 ¹⁾	643 ¹⁾
End gear pos.	4	3	3	4
X3T...				
X4T...				

27021600398028939

Direction of rotation reversal

Shaft position	53 ¹⁾	54 ¹⁾	63 ¹⁾	64 ¹⁾
End gear pos.	3	4	3	4
X3T...				
X4T...				

27021600398041867

- = 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

3.9 Housing designs

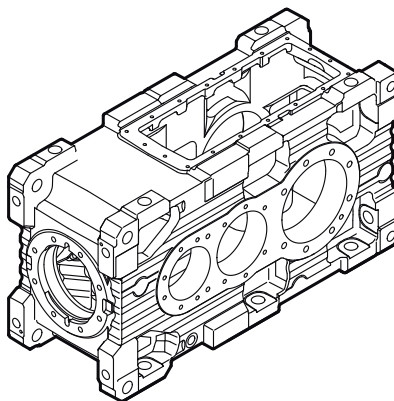
The gear unit comes equipped with the following housing type:

3.9.1 Horizontal housing /HH

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

Single-piece housing

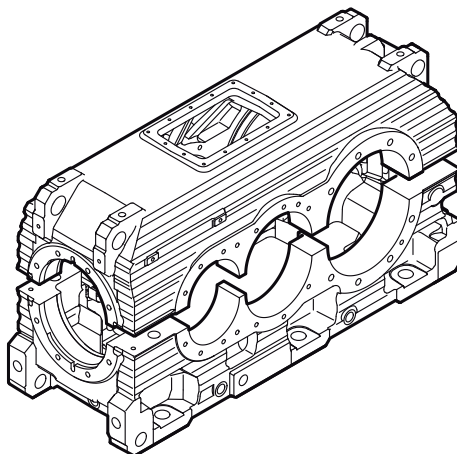
The following figure shows an example of a single-piece housing for gear unit sizes 100 – 210:



9007208285647499

Two-piece housing

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



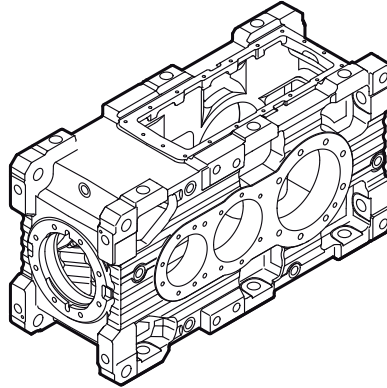
9453596299

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

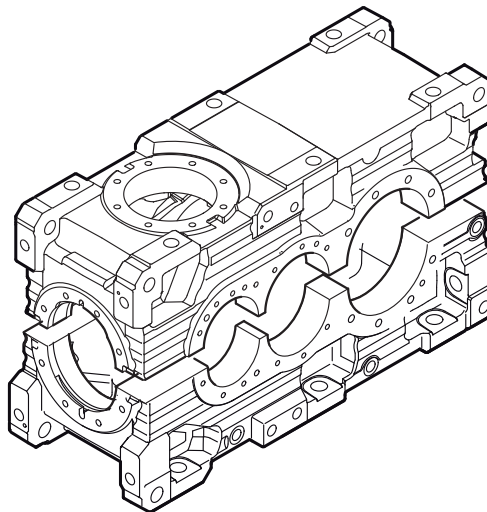
The following figure shows an example of a single-piece housing for gear unit sizes 100 to 210:



9007207839154827

Two-piece housing

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

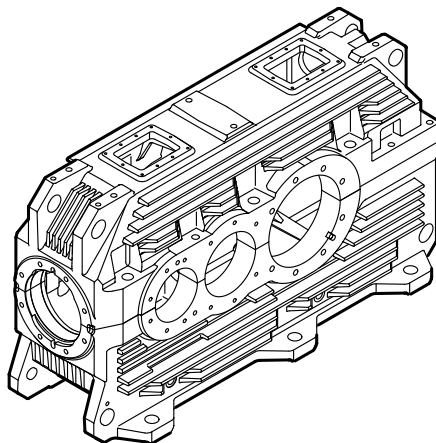


9007207839156491

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.

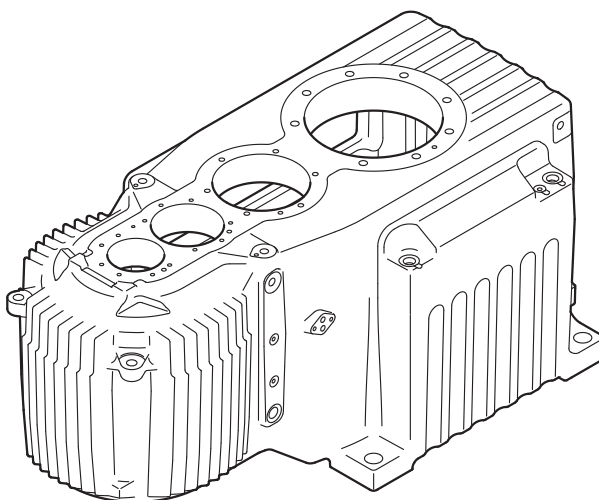
The following figure shows an example of a thermal housing for gear unit size 220:



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.



15466368139

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.

Abbreviation	Options	Gear unit sizes																
		X100-X210						X220-X250						X260-X320				
		2F	2K	3F	3K	4F	4K	2F	2K	3F	3K	4F	4K	2F	3F	3K	4F	4K
/BF	Base frame	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HU	HH	HH	HH	HH
/BS	Backstop	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HU	HH	HH	HH	HH
/BSL	Torque-limited 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	Rigid 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 Advanced	—	—	—	HH	—	—	—	—	—	HH	—	—	—	—	HH	—	—
/HSST	Through-going input shaft	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
/LSST	Through-going output shaft	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
/MA	Motor adapter	HU	HU	HH	HH	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU
/SB	Swing base	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
/SEP	Shaft end pump	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
/T	Torque arm	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
/OAC	Oil-air cooler	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
/OWC	Oil-water cooler	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
/OAP	Oil-air cooler	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
/OWP	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 drive	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU
/PT100	Temperature sensor	HU	HU	HH	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

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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**).

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

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3.10.3 Agitator housing /HA

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

Abbreviation	Options	X3F140-210
/BF	Base frame	HA
/BS	Backstop	HA
/BSL	Torque-limited backstop	HA
/CCT	Water cooling cartridge	HA
/F	Mounting flange B5/B14	HA
/FC	Rigid flange coupling	HA
/Fan	Axial fan in motor adapter	HA
/MA	Motor adapter	HA
/SEP	Shaft end pump	HA
/OAC	Oil-air cooler	HA
/OWC	Oil-water cooler	HA
/OAP	Oil-air cooler	HA
/OWP	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
	Oil filter	HA
/EBD	EBD – Bearing for medium/excessive strain	HA

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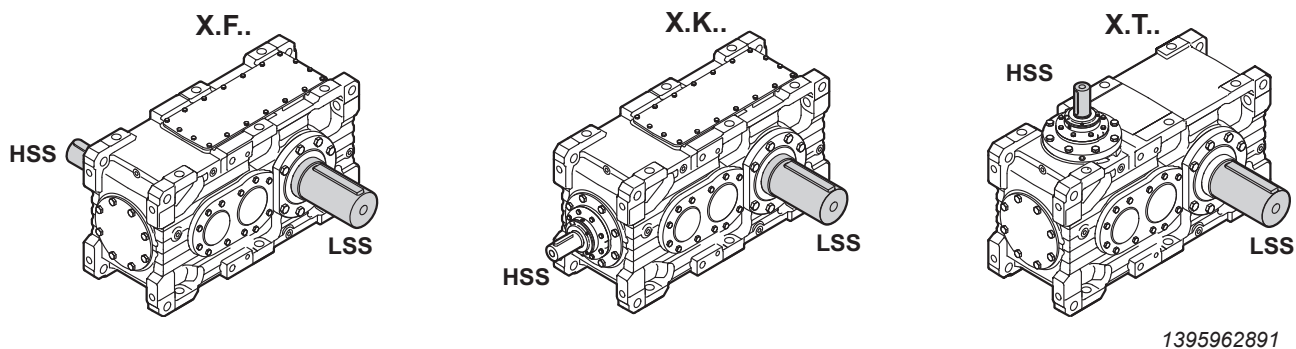
3.11 Gearing and shafts

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

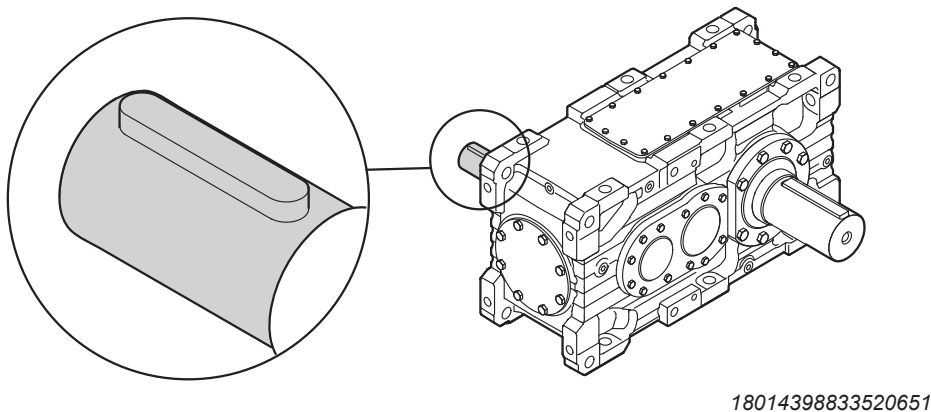
There are two types of shafts:

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



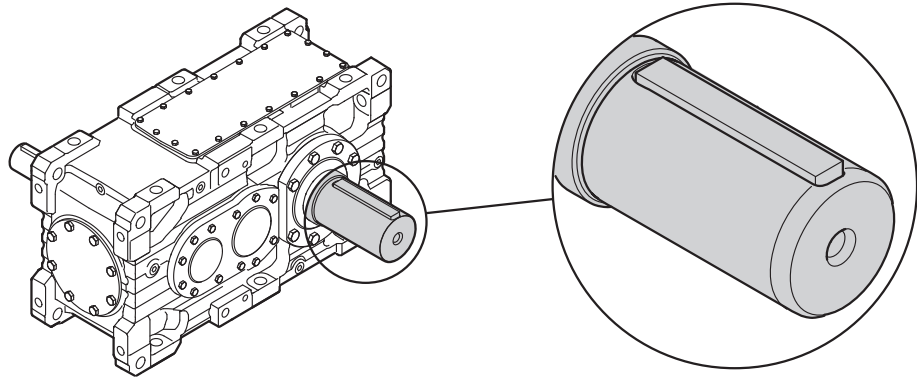
3.12.1 Input shaft

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.



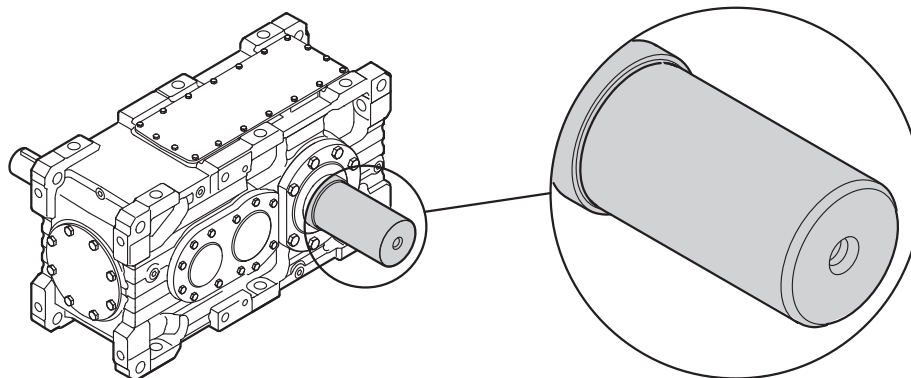
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3 Basic gear unit structure

Input and output shafts

3.12.3 Smooth output shaft /..R

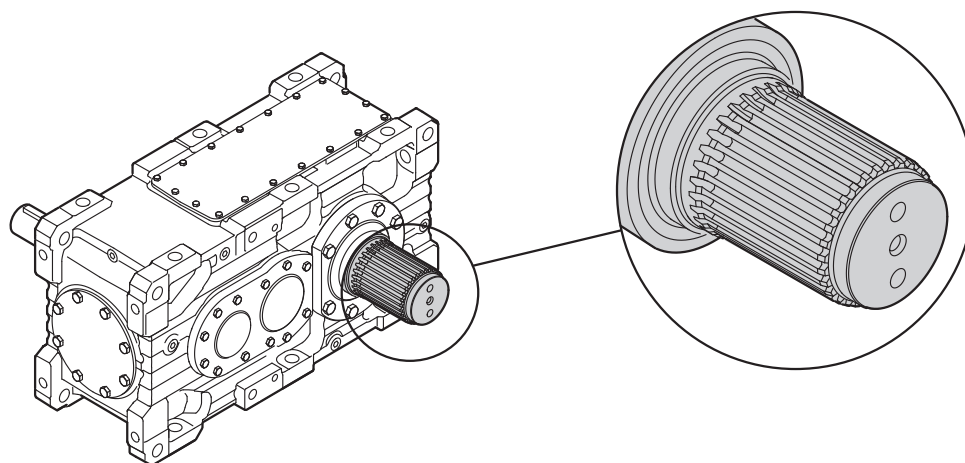
The gear units are available with a smooth output shaft to install non-positive output elements, such as flange couplings with a cylindrical interference fit. The face of the shaft has a center bore according to DIN 332. The insertion area with reduced diameter facilitates the mounting of output elements.



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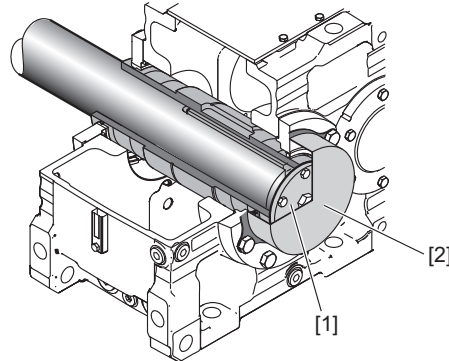
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3.12.5 Output shaft as a hollow shaft with keyway /..A

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

Included in the delivery:

End plate with retaining screws [1], or 2 retaining rings and protection guard [2].



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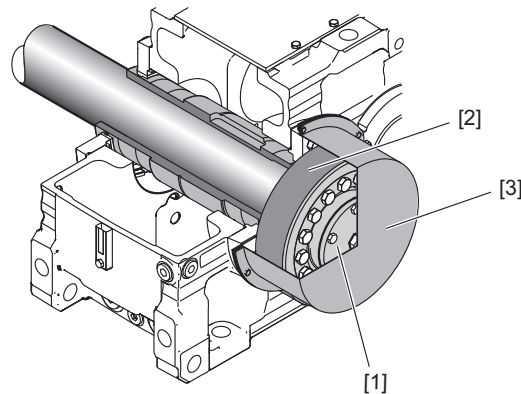
The protection cover is dust-proof. The standard sealing system is therefore normally used on the side of the cover.

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:

End plate with retaining screws [1], or 2 retaining rings, shrink disk [2], protection cover [3].



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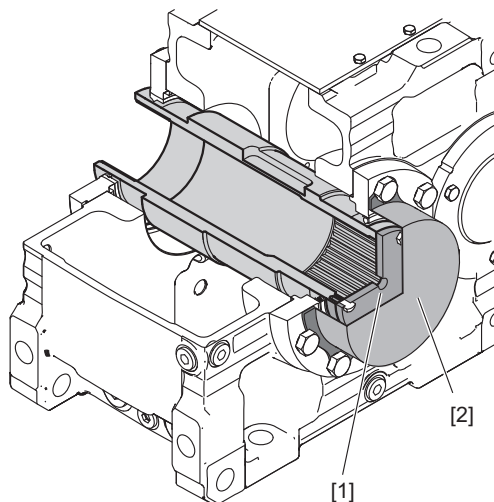
The protection cover is dust-proof. The standard sealing system is therefore normally used on the side of the cover.

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

The output shaft is splined according to DIN 5480.

Included in the delivery:

End plate with retaining screws [1], or 2 retaining rings and protection cover [2].



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3.12.8 Gear unit mounting for hollow shaft gear units

NOTICE

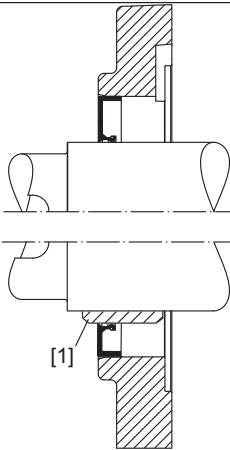
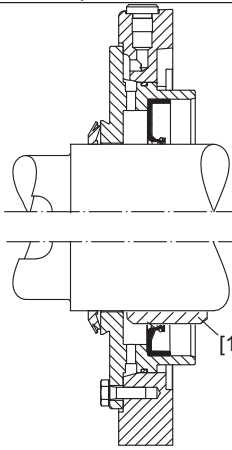
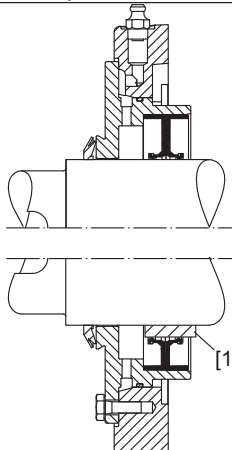
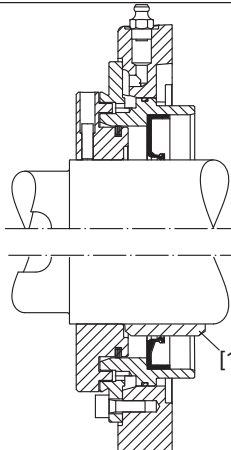
Constraining forces can occur on the output shaft bearing due to the rigid connection between the machine shaft and hollow shaft of the gear unit. This may result in damages to the output shaft bearing and increased fretting corrosion in the connection between the machine and the hollow shaft of the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

Possible damage to property.

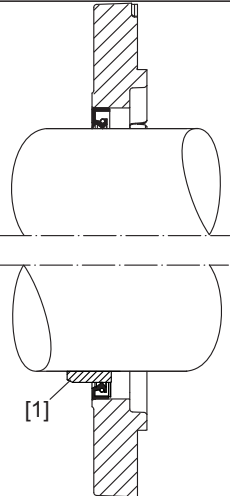
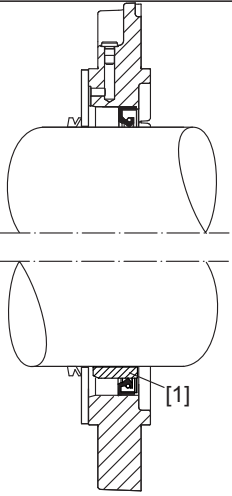
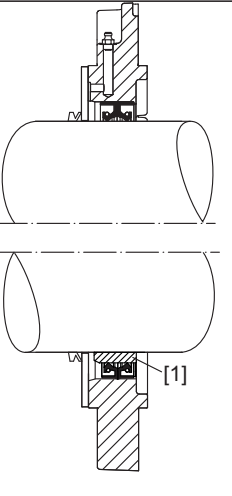
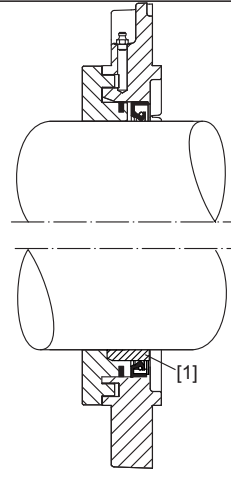
- The gear unit is usually foot or flange-mounted and used as bearing point when the machine shaft has no individual bearing or merely provides one bearing point. You have to provide for an accurate coaxial alignment with the bearing point.
- If the machine shaft has at least 2 bearing points, the gear 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	Medium dust load with abrasive particles	High dust load with abrasive particles	Very high 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	Medium dust load with abrasive particles	High dust load with abrasive particles	Very high dust load with abrasive particles
			
[1] Optional with oil seal sleeve			

INFORMATION



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

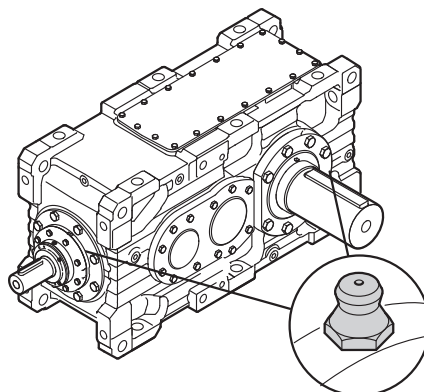
3.13.3 Position of lubrication points

Universal housing HU / horizontal housing HH / thermal housing HT

Grease nipple on inspection 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 output shaft. Observe chapter Maintenance intervals.

Example



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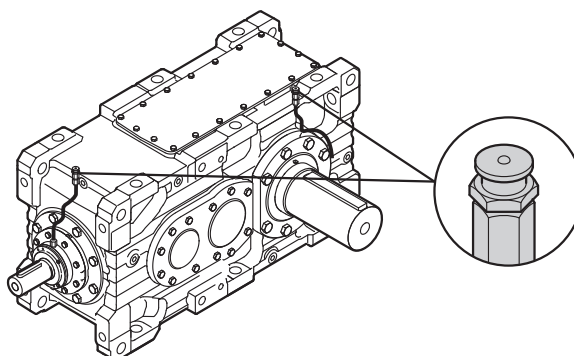
Grease nipple on the top side of the gear unit

When installed in a restricted space, the lubrication points can be relocated to the top side of the gear unit. Flat grease nipples according to DIN 3404 A G1/8 are used. Relubrication must be carried out at regular intervals. Observe chapter "Maintenance intervals" (→ 216).

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 output shaft(s).

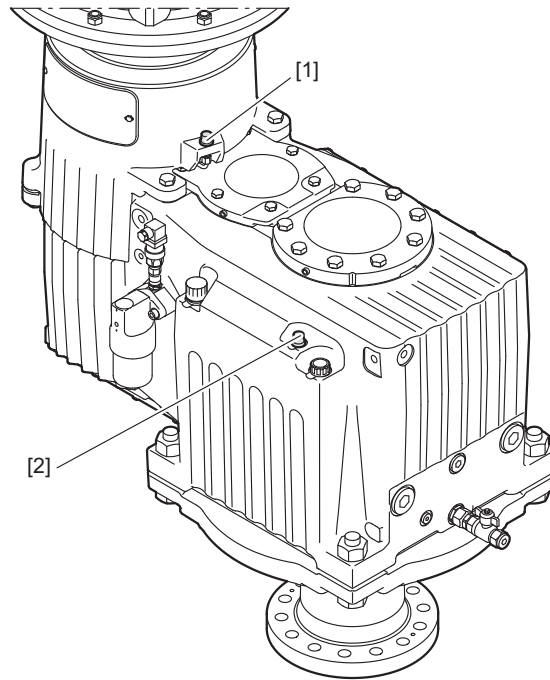
Example



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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"" (→ 216).

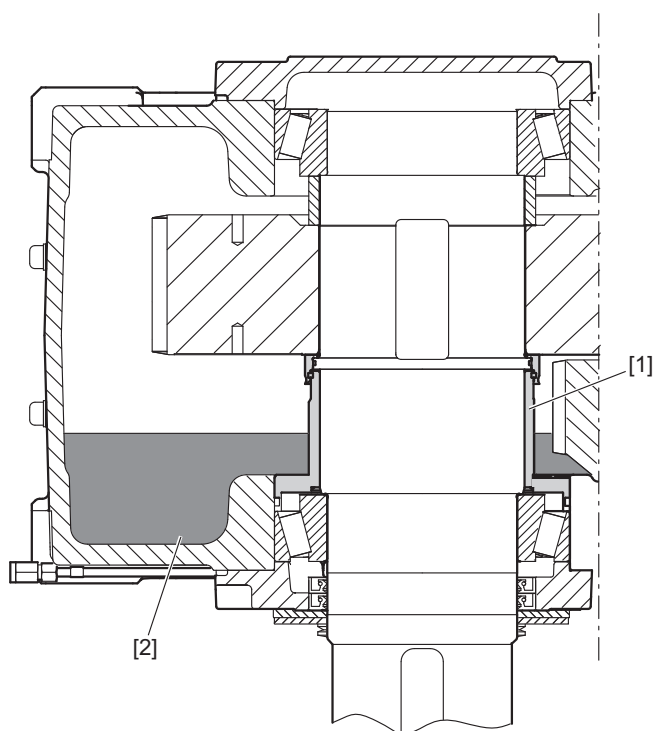


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3.13.4 Drywell sealing system

Vertical gear units with output shaft pointing downwards can be equipped with a Drywell sealing system in addition to the usual sealing. The lower bearing of the output shaft is separated from the oil chamber by an integrated tube [1]. The bearing is grease-lubricated and has to be relubricated at regular intervals (DIN 3404 A G1/8 flat grease nipple). The oil level is lower than the upper end of the tube to prevent oil [2] from leaking at this point. All gear units with pressure lubrication (shaft end pump or motor pump) are equipped with Drywell sealing system 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"" (→ 234).

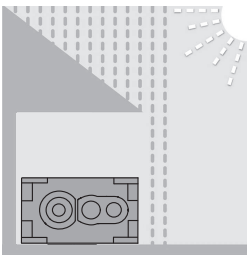
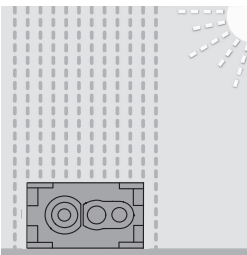
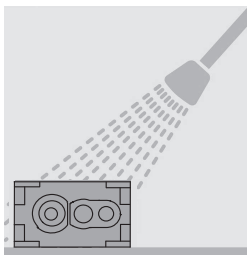



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3.14 Coating and surface protection systems

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 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"> Systems in saw mills Agitators and mixers 	<ul style="list-style-type: none"> Applications in gravel plants Cable cars 	<ul style="list-style-type: none"> Port cranes Sewage treatment plants Mining applications
Condensation test ISO 6270	120 h	120 h	240 h
Salt spray test ISO 7253	–	240 h	480 h
Top coat color ¹⁾	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 either completely or partly submerged in the oil bath.

- 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, version 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.

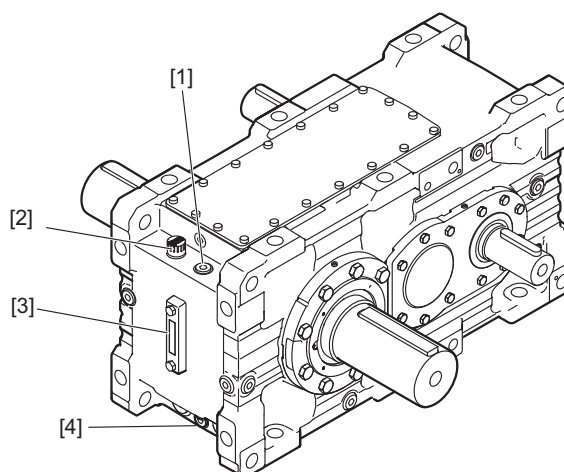
INFORMATION



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.



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[1] Oil dipstick (optional)

[2] Gear unit venting

[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

The purpose of a gear unit breather is to prevent that non-permitted pressure occurs from heating during operation. The gear units are normally equipped with a high-quality breather filter 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.

4 Design of options and accessories

4.1 Oil expansion tank /ET

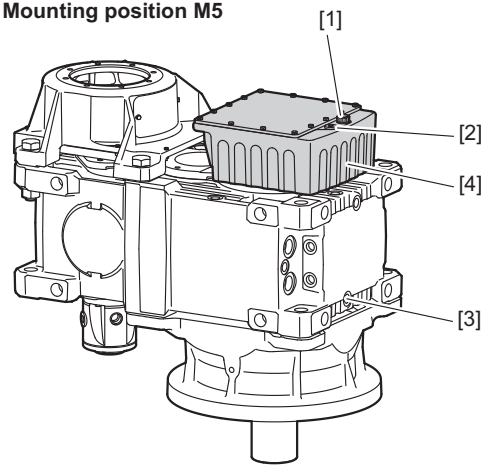
The oil expansion tank is designed to compensate for oil volume variations in the system caused by temperature fluctuations. When the gear unit temperature increases, the oil expansion tank absorbs some of the increasing oil volume and feeds it back to the gear unit as the temperature goes down, which 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 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 range causes an overfilling of the oil 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 expansion tank and the oil expansion tank does not overflow.

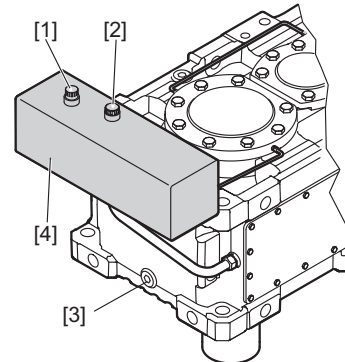
4.1.1 Universal housing /HU

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

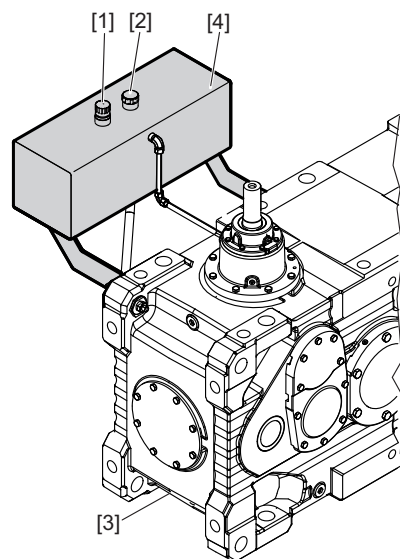
Mounting position M5



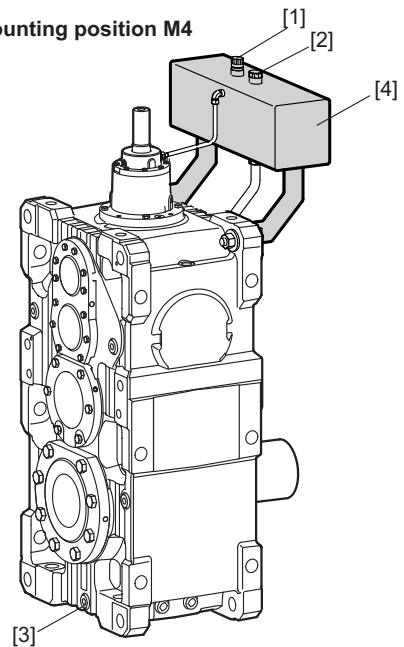
Mounting position M5



Mounting position M1



Mounting position M4



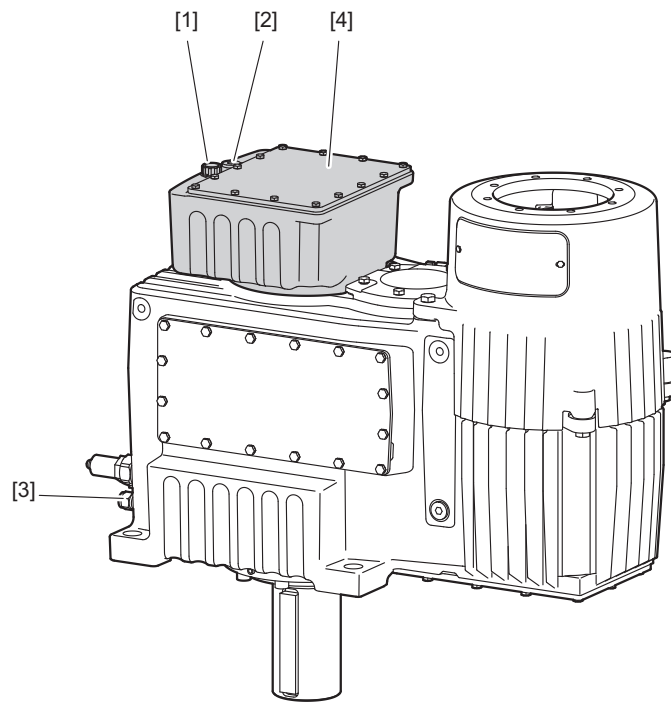
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- [1] Gear unit venting
- [2] Oil dipstick

- [3] Oil drain
- [4] Oil expansion tank

4.1.2 Agitator housing /HA

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

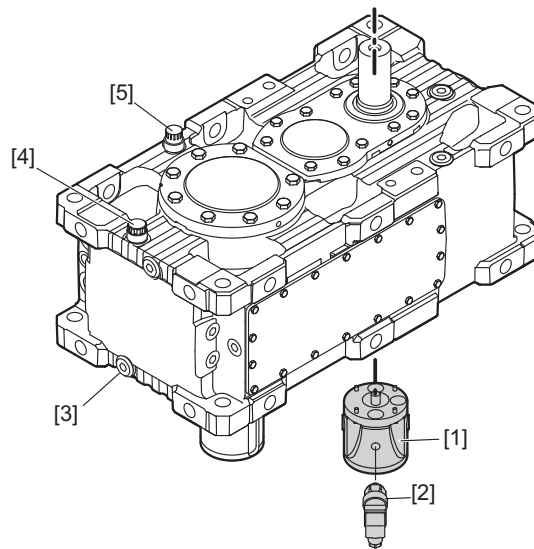


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- [1] Gear unit venting
- [2] Oil dipstick
- [3] Oil drain
- [4] Oil expansion tank

4.2 Shaft end pump /SEP

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



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- [1] Shaft end pump
- [2] Pressure switch
- [3] Oil drain
- [4] Gear unit venting
- [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"" (→ 101) 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 Design of options and accessories

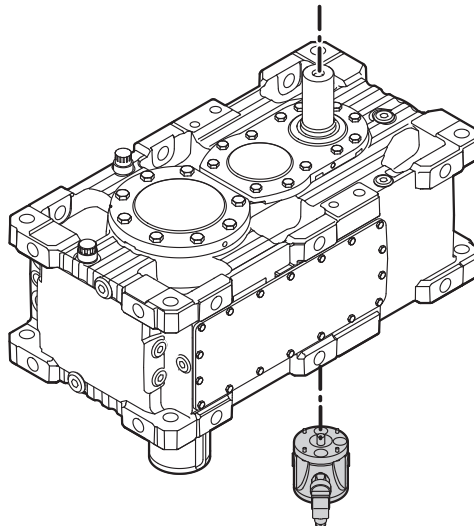
Shaft end pump /SEP

4.2.1 Position of the shaft end pump

X.F..

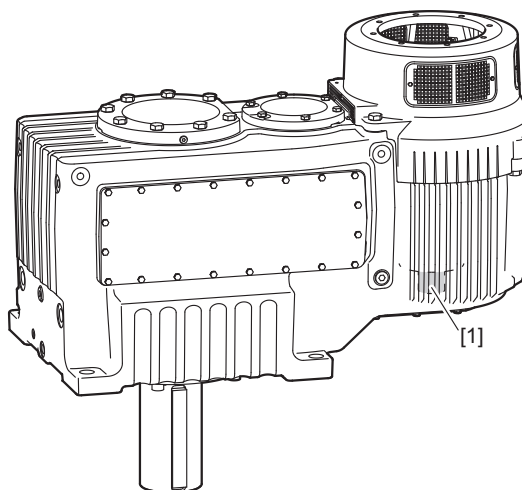
With helical gear units, the shaft end pump is positioned opposite the input shaft.

Universal
housing /HU



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Agitator housing
/HA

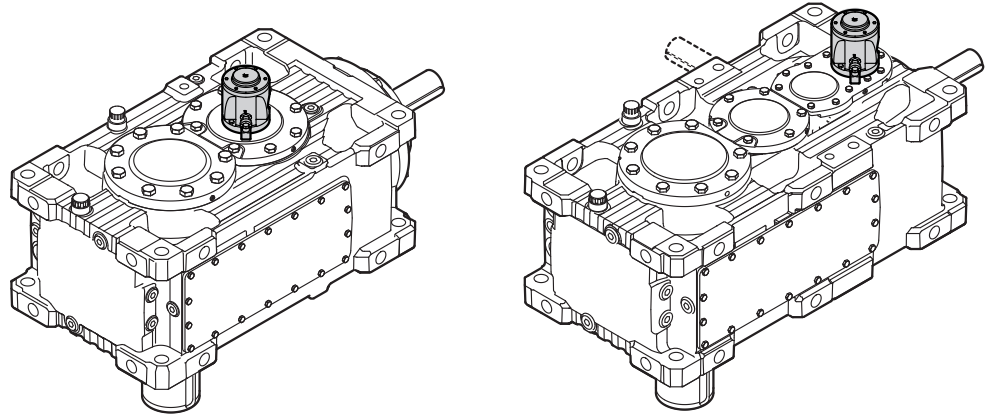


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X2K../X4K../X4T..

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

Universal housing /HU

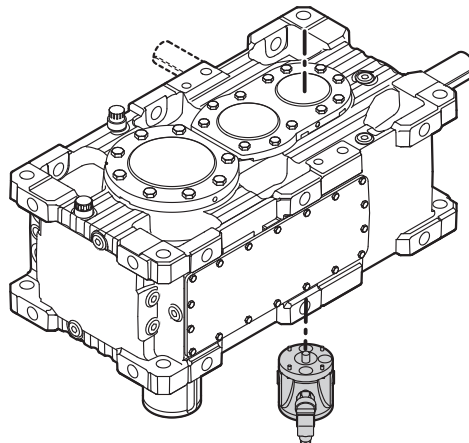


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X3K../X3T..

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



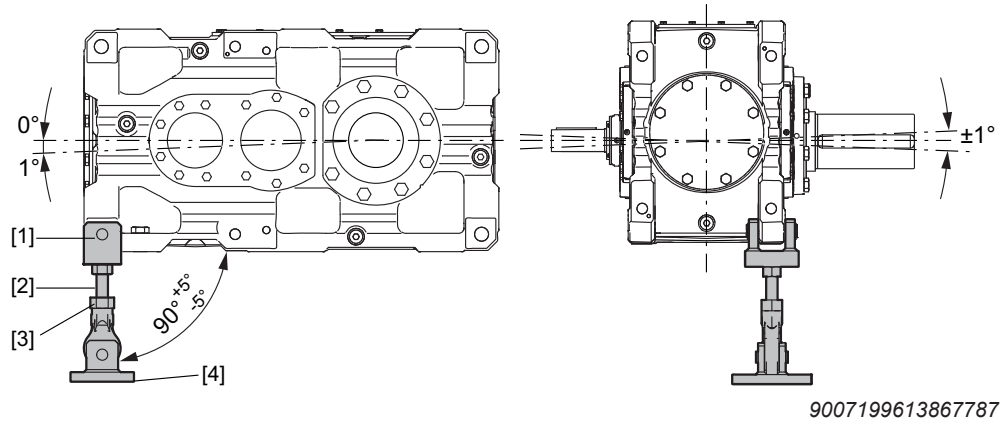
For descriptions on the unit structure, refer to the manufacturer's documentation and the addendum to the operating instructions "Motor Pump /ONP".

4.4 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.

4.5 Flange couplings with cylindrical interference fit /FC



NOTICE

Improper installation and assembly can damage the gear unit.

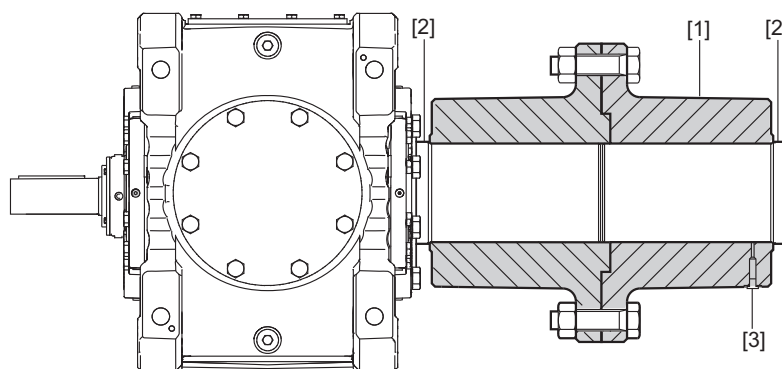
Possible damage to the gear unit.

- 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 interference fit. Both coupling halves are mounted together at their flanges. The couplings are equipped with several disassembly bores [3] for removing the interference fit hydraulically.



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4.6 Mounting flange /F

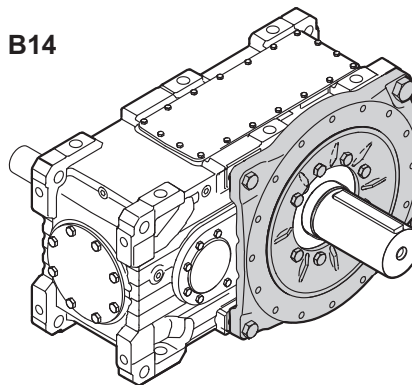
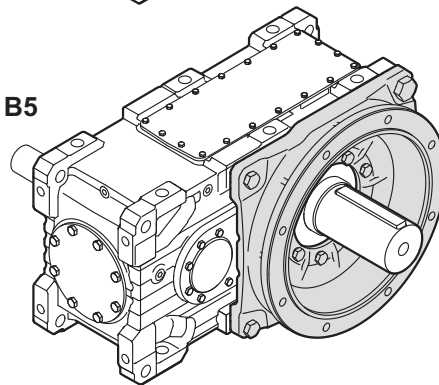
INFORMATION

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" (→ 60).

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 two design types:

The mounting flange in B14 design has 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.

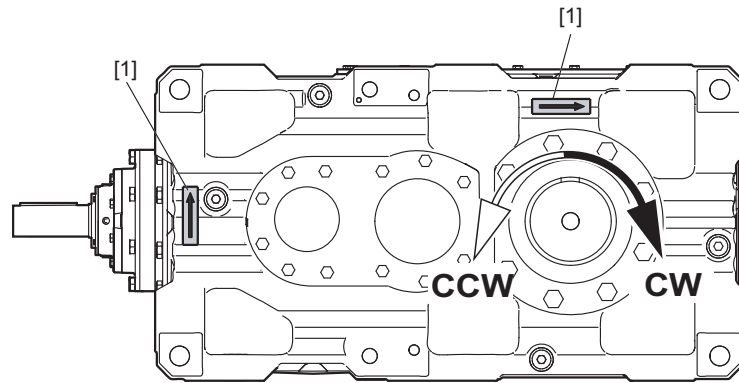
B14**B5**

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4.7 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:

$n_1 \text{ [min}^{-1}\text{]}$	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

4.8 Motor adapter /MA

Motor adapters [1] are available for mounting

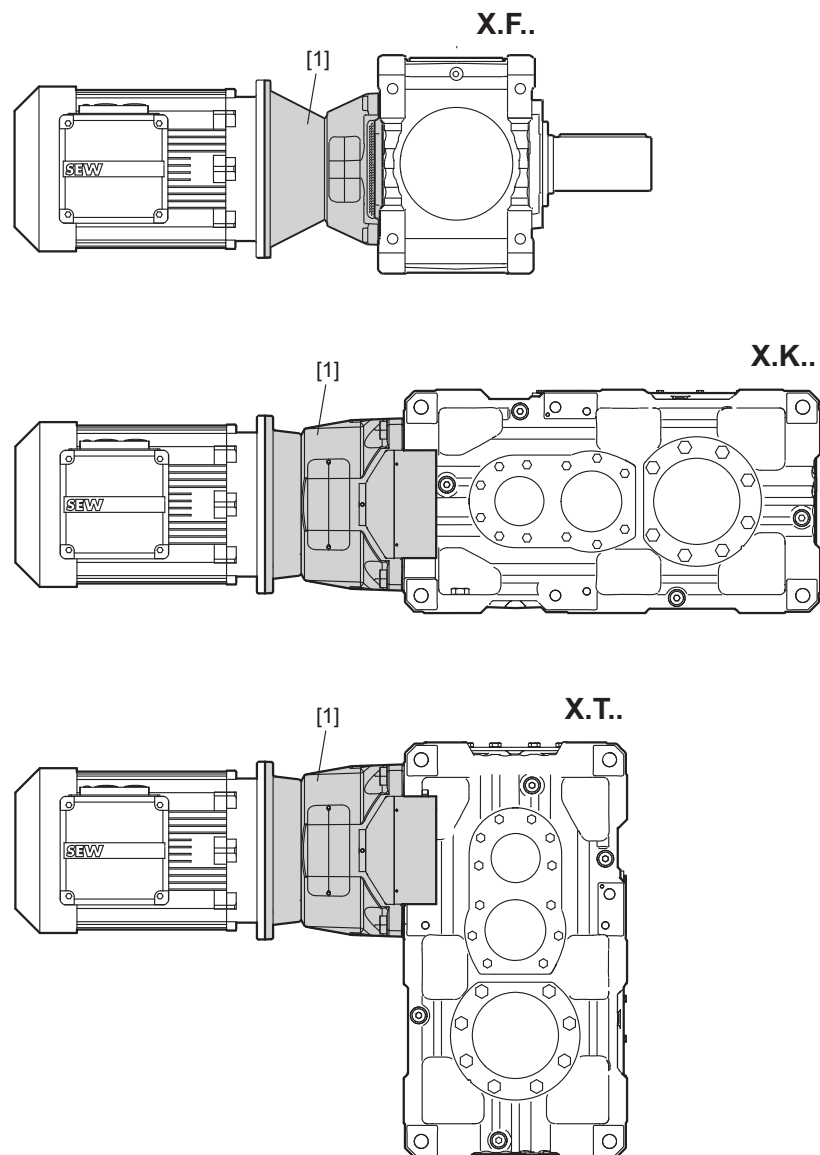
- **IEC (B5) motors** of sizes 100 – 355
- **NEMA ("C" face) motors** of sizes 182 – 449

INFORMATION



- The gear unit must be installed in such a way that no liquids can enter the motor adapter (on 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 of the motor adapter.
- 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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4.9 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.

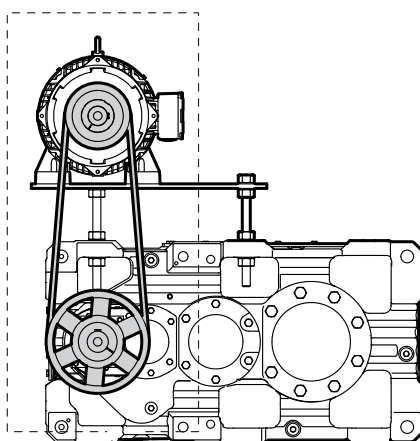
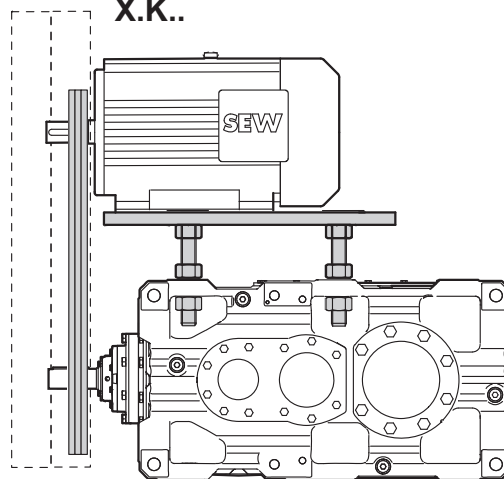
**▲ CAUTION**

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 Design of options and accessories

Drive packages on a steel frame

4.10 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.

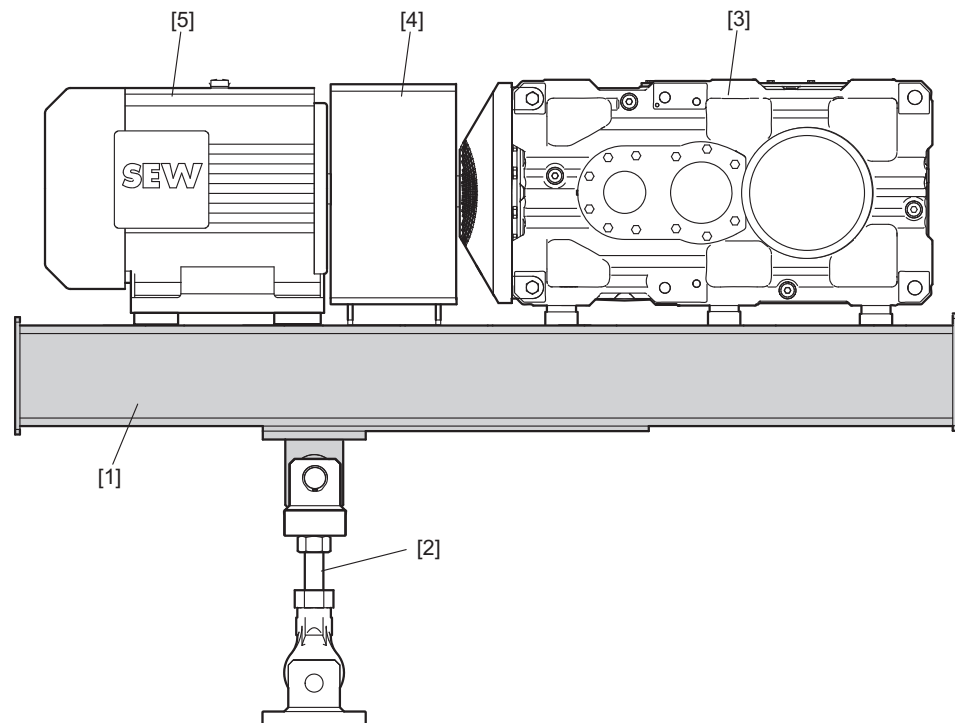
4.10.1 Swing base /SB

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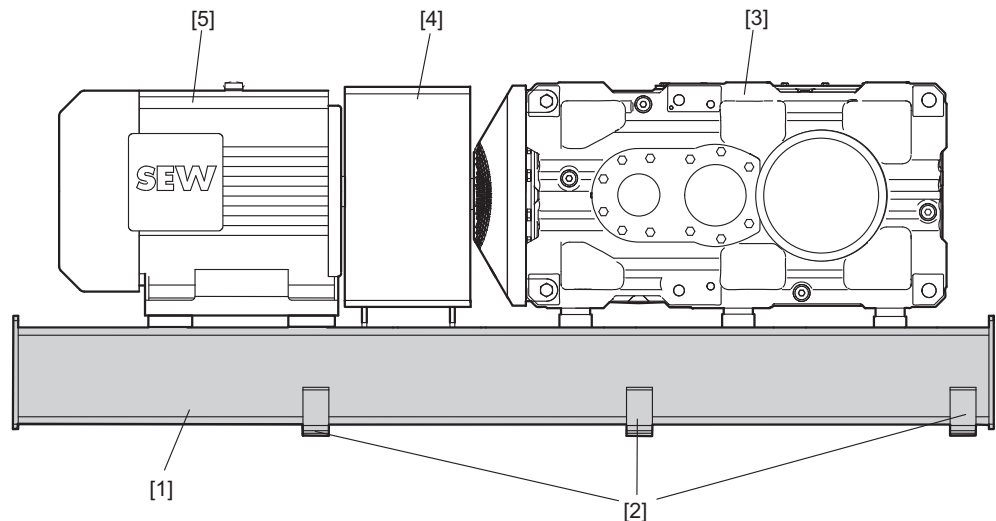
- [1] Swing base
- [2] Torque arm (optional)
- [3] Bevel-helical gear unit
- [4] Coupling with protection cover
- [5] Motor

4.10.2 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

4.11 Cooling types

4.11.1 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.

4.11.2 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.

4.11.3 Circulation cooling

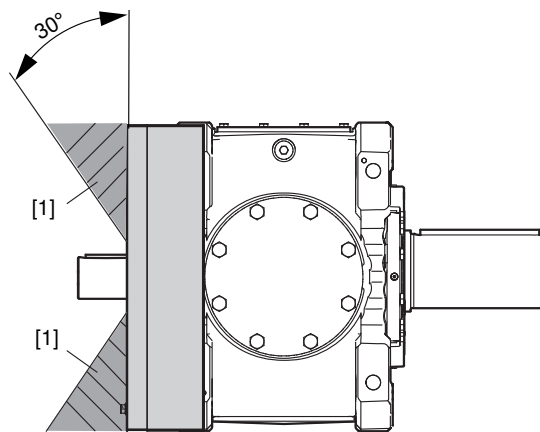
The gear unit oil is pumped out of the gear unit to an external heat exchanger by a pump (motor pump or shaft end pump). This normally involves oil supply systems with oil-water or oil-air heat exchangers.

4.12 Fan /FAN

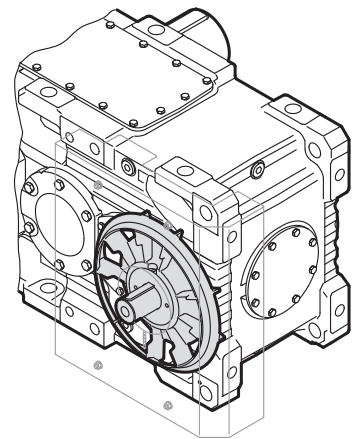
A fan may be retrofitted to raise the thermal rating or when the ambient conditions change after gear unit startup. The direction of rotation of the gear unit does not influence the operation of the fan.

The following fan designs are available:

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

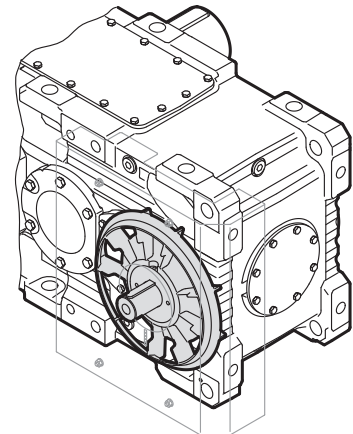
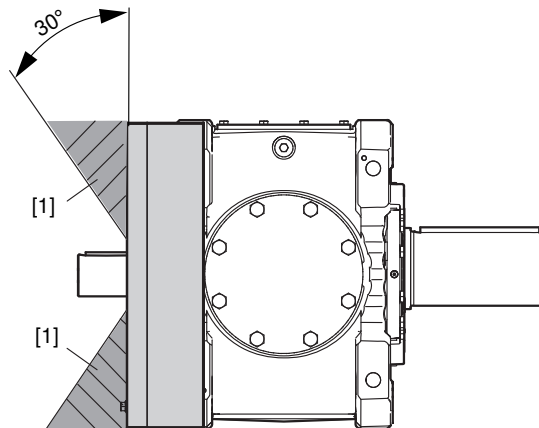


[1] Air intake clearance



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



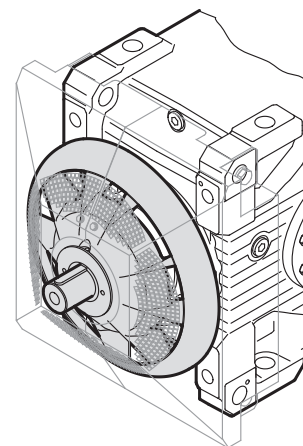
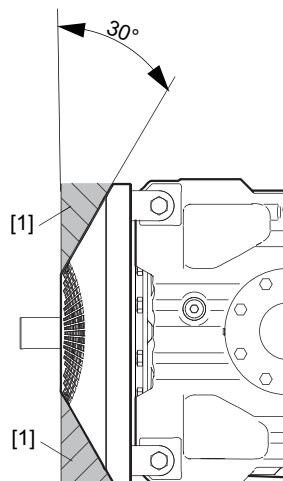
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[1] Air intake clearance

4.12.3 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

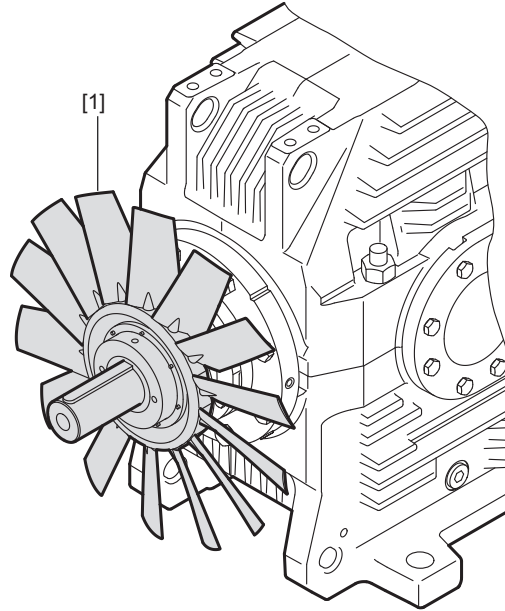


The X3K.. advanced fan cannot be used together with a torque arm because the fan guard is mounted to the attachment point of the torque arm.

4.12.4 Axial fan

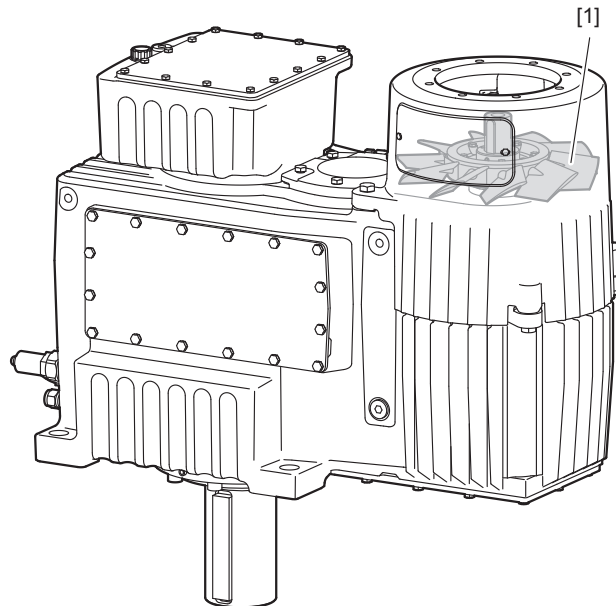
An axial fan [1] is integrated to increase the thermal rating. The fan depends on the direction of rotation. This is the reason why fans are available for CW or CCW rotation. Refer to the information on the order documents.

Universal housing HU / horizontal housing HH / thermal housing HT



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Agitator housing /HA



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4.13 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.

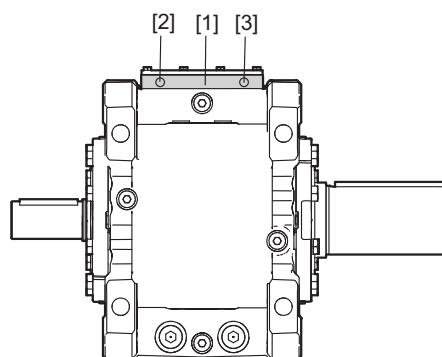
The amount of heat that can be dissipated depends on the intake temperature and the flow rate of the cooling medium that flows through the unit. The data given in the technical specifications must be observed.

INFORMATION



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

4.13.1 Structure



9007199568481675

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

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

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

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

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

4.13.2 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 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

4.14 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.

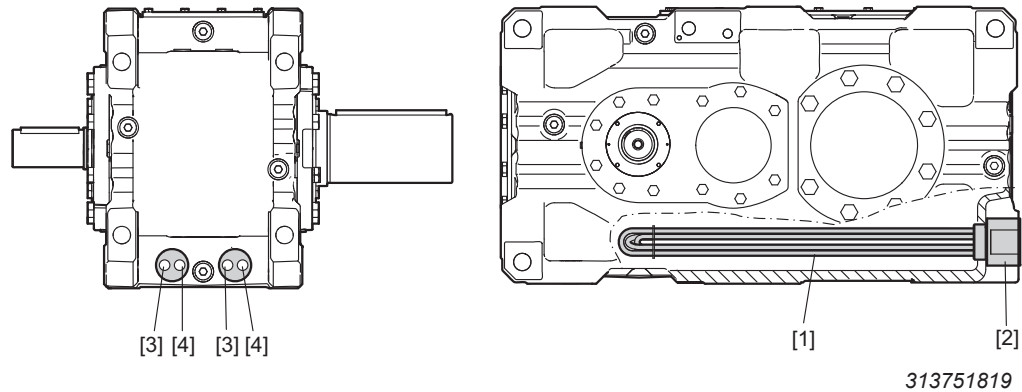
The amount of heat that can be dissipated depends on the inlet temperature and the flow rate of the cooling medium flowing through it. For the number of water cooling cartridges, refer to the technical specification. The data given in the technical specifications must be observed.

INFORMATION



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

4.14.1 Structure



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

The water cooling cartridge consists of 3 main parts:

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

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

- Pipe thread G1/4" for sizes X140 – 170
- Pipe thread G1/2" 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".

4.14.2 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 for 2 cooling cartridges.

Size	Cooling water volume flow [l/min] / per cooling cartridge			Max. cooling water volume flow [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	
X280 – 300	18	18	7	25
X310 – 320	22	22	9	

4.15 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".

4.16 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".

4.17 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".

4.18 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".

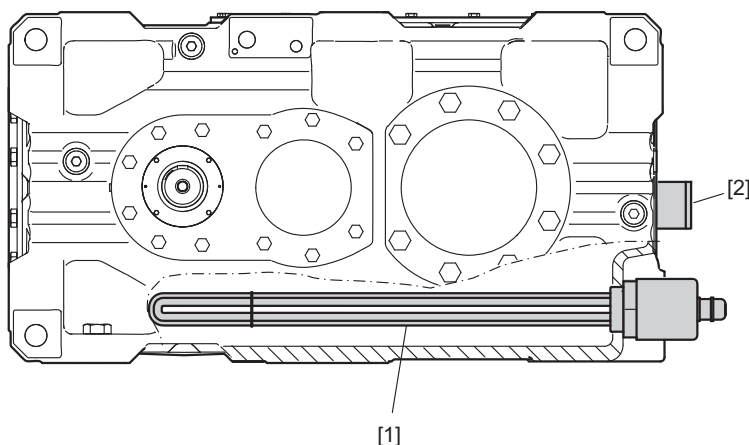
4.19 Oil heater /OH

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

4.19.1 Structure

The oil heater consists of 2 basic parts:

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



359104907

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

INFORMATION



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

4.20 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.

4.21 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.

4.22 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.

4.23 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.

4.24 Diagnostic unit DUO10A (oil aging)

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

The diagnostic unit consists of a PT100 temperature sensor and an evaluation unit. The temperature sensor installed in the gear unit measures the present gear unit oil temperature. The diagnostic unit calculates the estimated remaining service life for the gear unit oil based on the measured oil temperature. 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.

5 Assembly/installation

5.1 Required tools/resources

Not included in the delivery:

- Set of wrenches
- Torque wrench
- Mounting device
- Compensation elements (shims, 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 ¹⁾	→ M30
Ø > 30...38 mm	→ M12	Ø > 225...320 mm ¹⁾	→ M36
Ø > 38...50 mm	→ M16	Ø > 320...500 mm ¹⁾	→ M42

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

Keys according to DIN 6885 (domed type)

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

Observe the following notes before you start installing/assembling the system.



▲ 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.



▲ 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 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

Risk of slipping due to lubricant leaking from damaged seals.

Minor injuries.

- Check the gear unit and mount-on components for leaking lubricant.



▲ 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 any order-specific documentation.
- Do not modify the gear unit or the mount-on components without prior consultation of SEW-EURODRIVE.
- Protect rotating drive parts, such as couplings, gears, or belt drives from contact using suitable protection devices.
- 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 filter 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 drive as a ground point for welding work. Welding may destroy gearing components and bearings.
- Units installed outdoors must be protected from the sun. Suitable protective devices are required, such as covers or roofs. Avoid heat build-up. The operator 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 filter).
- Do not modify the existing piping.
- For gear units that are filled with oil at the factory, check to see that the breather filter is installed before you start up the gear unit.
- Strictly observe the safety notes in the individual chapters.

5.4 Requirements for assembly

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.
- 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 as this might damage the material.

5.4.1 Extended storage of gear units

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

Replace the provided breather filter with the screw plug.

5.5 Installing the gear unit

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

The following table shows the thread sizes and the tightening torques of the individual gear unit sizes (foot mounting).

Size	Screw/nut	Tightening torque Strength class 8.8
		[Nm]
X100 – X110	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 bolts 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 notes" (→ 93).

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 rigid 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 bolts must not be lubricated during assembly.

5.5.3 Foundation

To ensure quick and successful gear unit 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.

When mounting the gear unit on a steel construction, ensure adequate rigidity to avoid harmful vibrations and oscillations. The foundation 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" (→ 96).

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. Unevenness must be leveled out appropriately.
- Observe the weight specified on the nameplate.

5.5.4 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.
- 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 the filling process.
- 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" (→ 220) and chapter "Changing the oil" (→ 228).

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

- Use a funnel to fill the oil (max. filter mesh 25 µm).

5.6.2 Gear units with oil expansion tank /ET

Observe the following conditions to make sure that the gear unit is properly filled with oil:

- The temperature of the oil to be filled must generally be within a temperature range of 10 °C and 40 °C.
- In addition, the oil viscosity must not exceed 3500 mm²/s during the filling process.

A higher minimum filling temperature might therefore be required depending on the selected oil type. For guide values, refer to the following table.

min. oil filling temperature [°C]		
Viscosity class	mineral	synthetic
ISO VG 220	10	10
ISO VG 320	10	10
ISO VG 460	15	10
ISO VG 680	20	15

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.

- Observe the oil temperature during the filling process.

NOTICE

An oil viscosity above the permitted level of 3500 mm²/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.

5.6.3 Gear units with shaft end pump /SEP

NOTICE

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

Possible damage to property.

- Observe the following notes.

- Fill the gear unit with the oil type and oil quantity corresponding to the nameplate data, see chapter "Changing the oil" (→ 228).
- 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" (→ 220).
- 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].

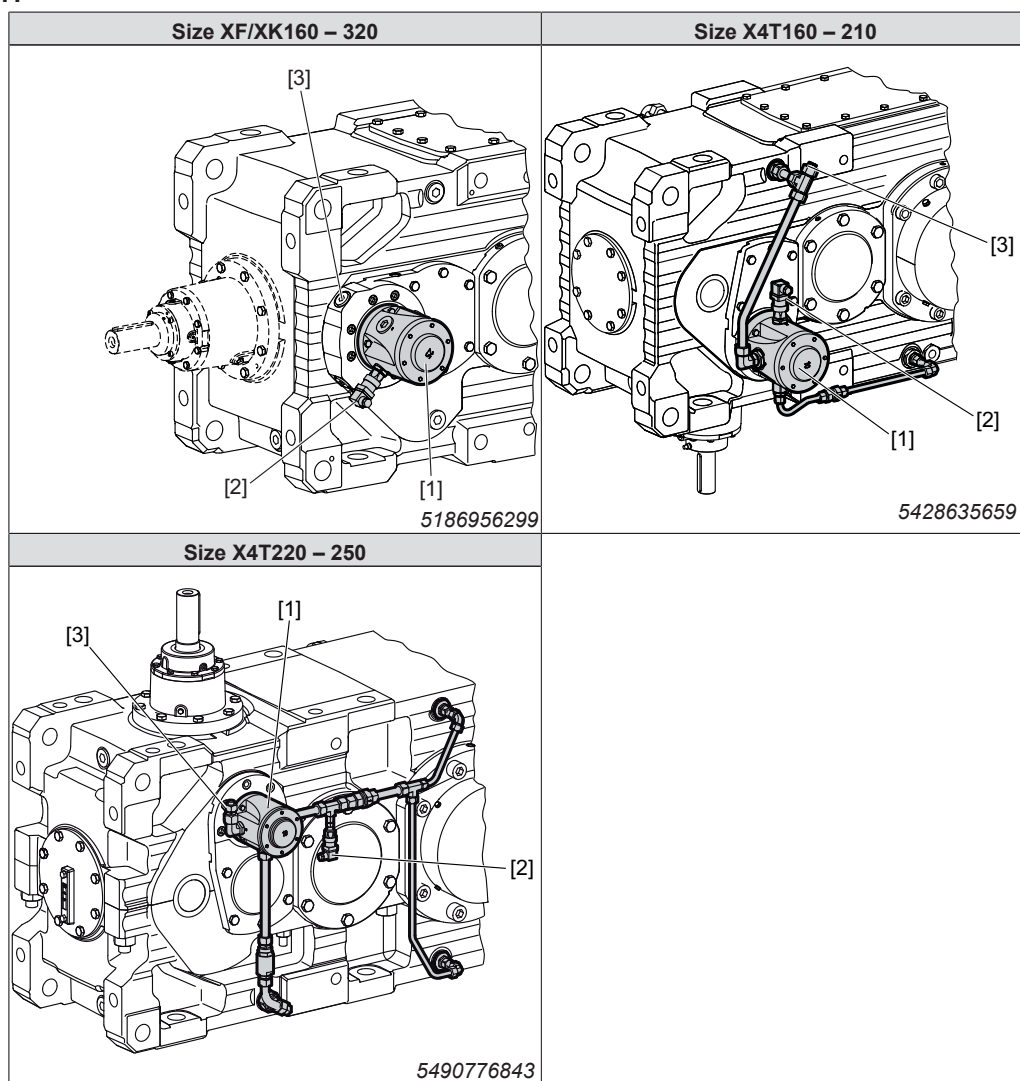
This procedure must be repeated after an idling time of more than 6 months.

- 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." (→ 203)

For further information, refer to chapter Gear units with pressure lubrication and the manufacturer's documentation.

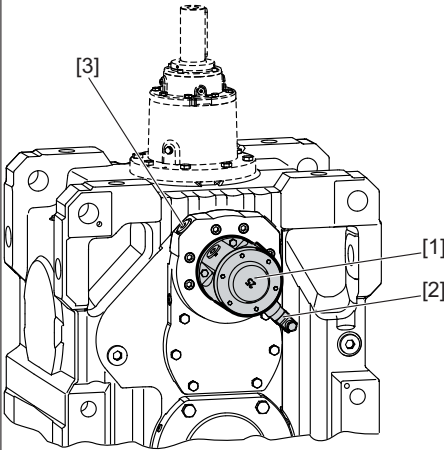
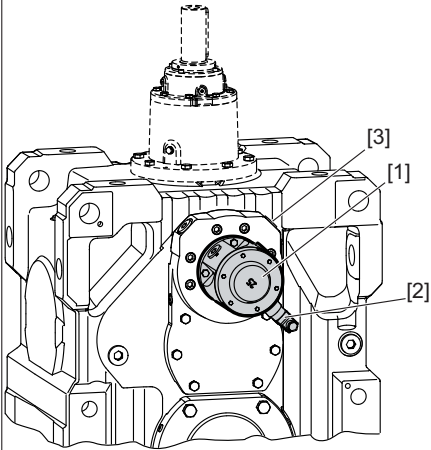
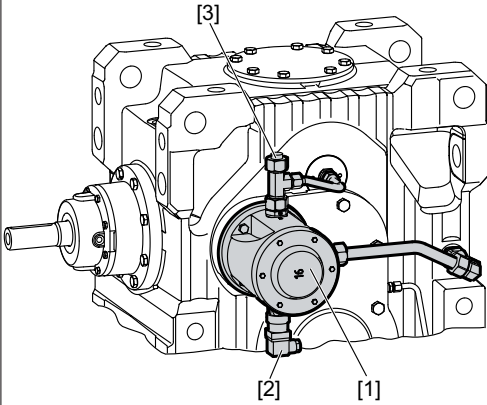
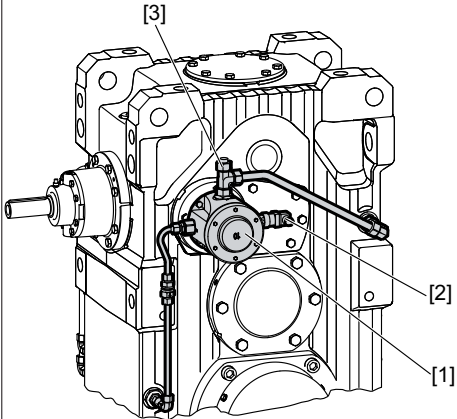
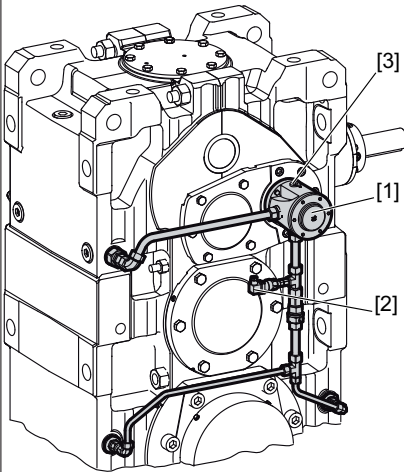
In case of a vertical mounting position and with the shaft end pump situated at the bottom, e.g. for mounting position M5/M6, the shaft end pump must not be manually filled at initial startup.

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

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

Mounting position M4

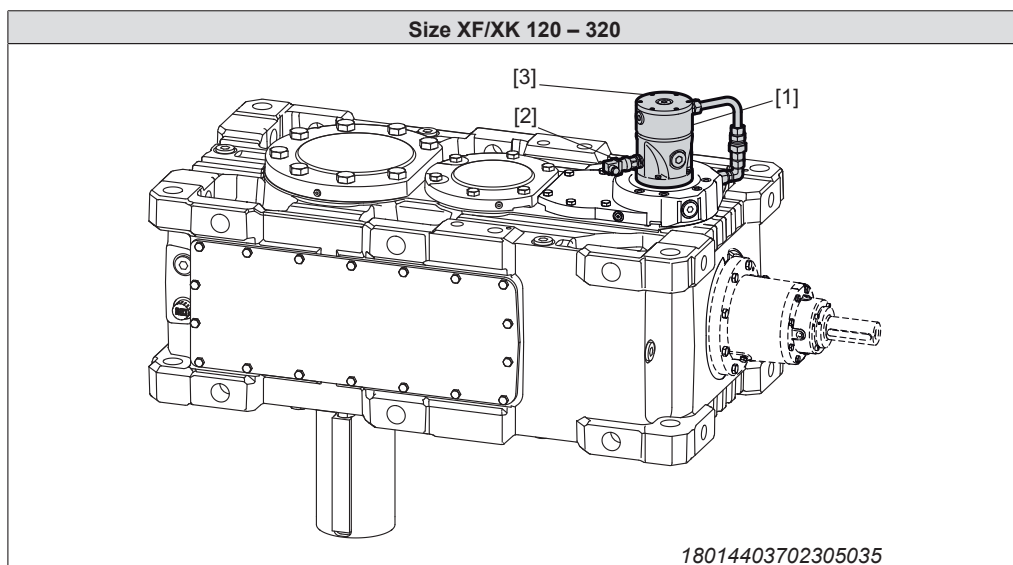
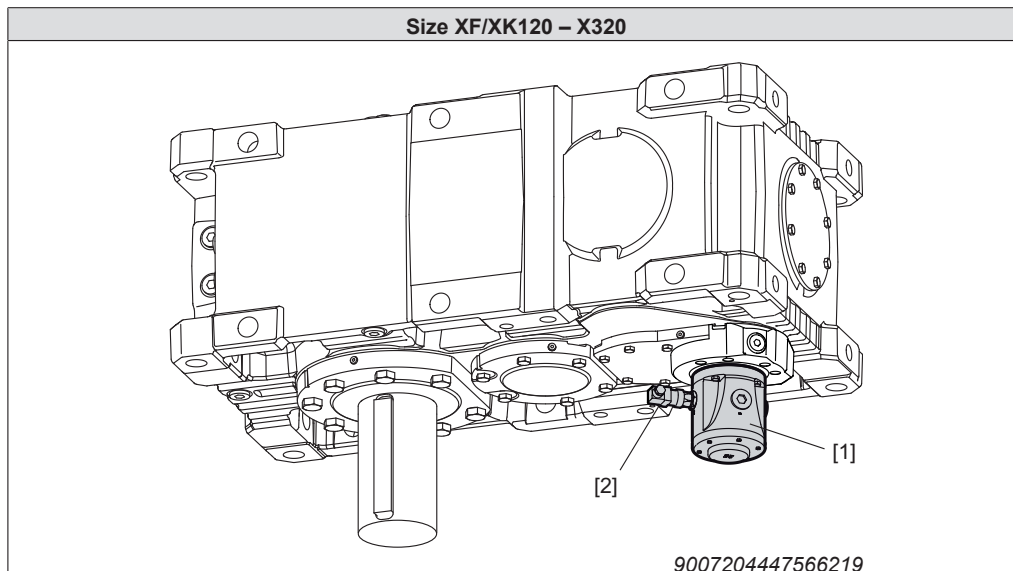
Size XF/XK 120 – 140	Size XF/XK 160 – 320
 <p>5186958475</p>	 <p>5380609803</p>
Size X4T120 – 150	Size X4T160 – 210
 <p>5490662027</p>	 <p>5432041867</p>
Size X4T220 – 250	
 <p>5490827019</p>	

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

- [3] Screw plug

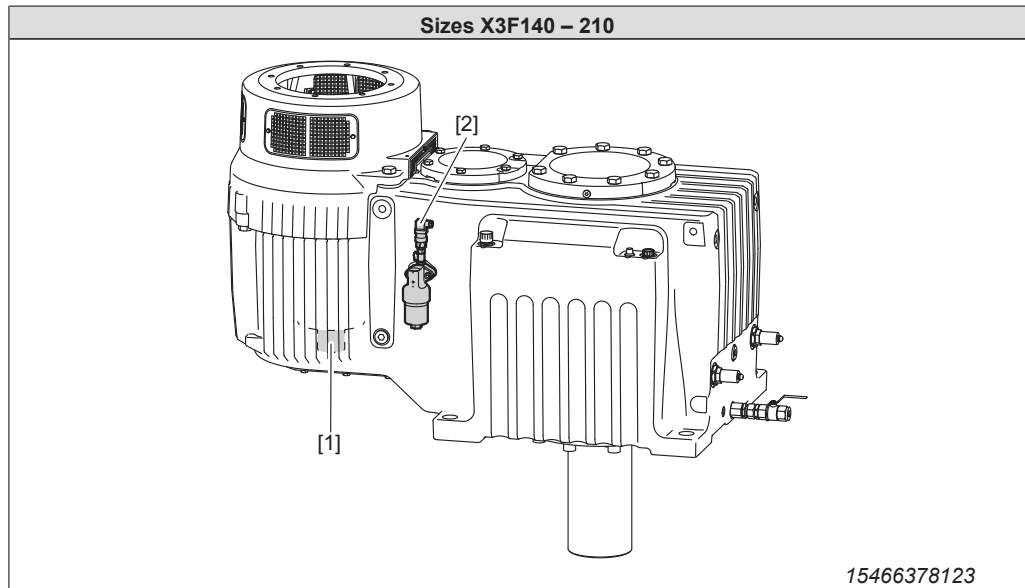
Mounting position M5*Universal housing /HU*

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 notes" (→ 93).

NOTICE

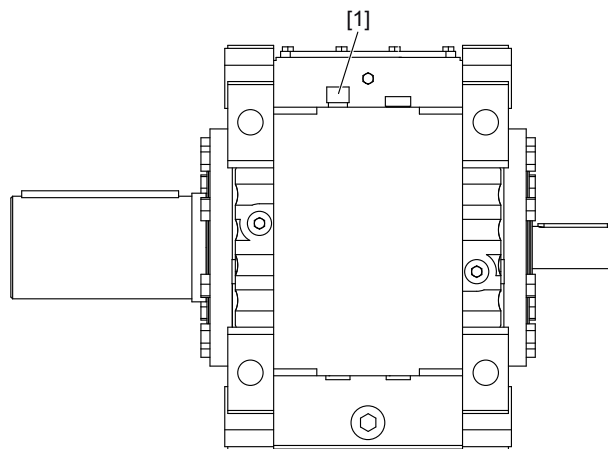
Improper startup can result in damage to the gear unit.

Possible damage to property.

- It is important that gear units with shaft end pump, motor pump or customer-installed cooling system is vented before taking them into operation the first time.

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.



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1. Remove the closing plug.
2. Insert the breather [1].
3. Check the oil level. Observe the information in chapter "Checking the oil level" (→ 220).

5.8 Gear unit with solid shaft

5.8.1 Mounting input and output components

Observe the notes in chapter "Important notes" (→ 93).

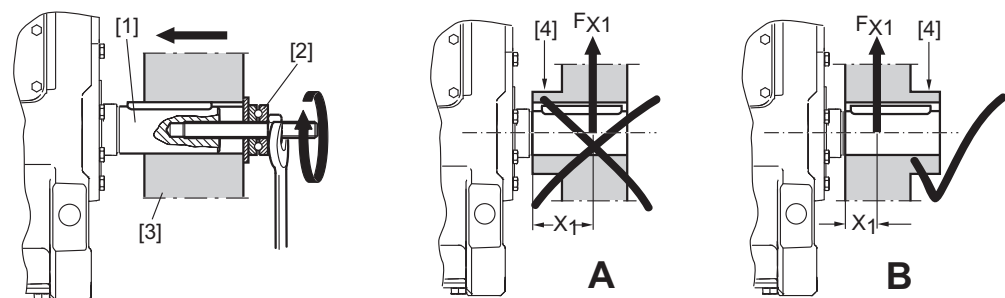
NOTICE

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.



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- [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 couplings with cylindrical interference fit /FC

NOTICE

Improper installation and assembly can damage the gear unit.

Possible damage to the gear unit.

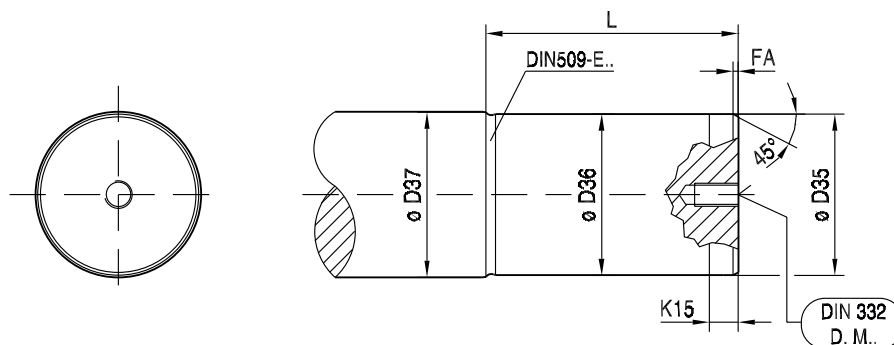
- Gear units with rigid flange couplings cannot be additionally secured on the floor with a rigid connection. Foot mounting of the gear unit or using a base frame are therefore not permitted.

5.9.1 Dimensions of the machine shaft

INFORMATION



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



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	ø D35	ø D36	ø D37	FA	K15	L	DIN 332 D.M..	DIN 509
X..R100	85 _{H9}	85 _{V6}	90	2	9	131	M20	E2.5x0.4
X..R110	85 _{H9}	85 _{V6}	100	2	9	131	M20	E2.5x0.4
X..R120	115 _{H9}	115 _{V6}	120	2	9	165	M24	E2.5x0.4
X..R130	115 _{H9}	115 _{V6}	130	2	9	165	M24	E2.5x0.4
X..R140	135 _{H9}	135 _{V6}	140	3	11	202	M30	E2.5x0.4
X..R150	135 _{H9}	135 _{V6}	160	3	11	202	M30	E2.5x0.4
X..R160	165 _{H9}	165 _{V6}	170	2	11	222	M30	E2.5x0.4
X..R170	165 _{H9}	165 _{V6}	170	2	11	222	M30	E2.5x0.4
X..R180	175 _{H9}	175 _{V6}	180	3	14	253	M30	E2.5x0.4
X..R190	175 _{H9}	175 _{V6}	180	3	14	253	M30	E2.5x0.4
X..R200	195 _{H9}	195 _{V6}	200	3	14	283	M30	E2.5x0.4
X..R210	195 _{H9}	195 _{V6}	200	3	14	283	M30	E2.5x0.4
X..R220	235 _{H9}	235 _{V6}	240	3	14	298	M36	E2.5x0.4
X..R230	235 _{H9}	235 _{V6}	240	3	14	298	M36	E2.5x0.4
X..R240	275 _{H9}	275 _{V6}	280	4	14	318	M36	E2.5x0.4
X..R250	275 _{H9}	275 _{V6}	280	4	14	318	M36	E2.5x0.4
X..R260	275 _{H9}	275 _{V6}	280	4	14	318	M36	E2.5x0.4
X..R270	295 _{H9}	295 _{V6}	300	4	19	343	M36	E2.5x0.4
X..R280	295 _{H9}	295 _{V6}	300	4	19	343	M36	E2.5x0.4
X..R290	315 _{H9}	315 _{V6}	320	4	19	373	M36	E2.5x0.4
X..R300	315 _{H9}	315 _{V6}	320	4	19	373	M36	E2.5x0.4
X..R310	355 _{H9}	355 _{V6}	360	4	19	413	M42	E2.5x0.4
X..R320	355 _{H9}	355 _{V6}	360	4	19	413	M42	E2.5x0.4

5.9.2 Mounting the coupling onto the machine shaft

Observe the notes in chapter "Important notes" (→ 93).

1. Clean the shaft and bore of the rigid flange coupling thoroughly and remove any grease. The disassembly bores of the coupling must also be free from dirt.

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.

2. Heat the rigid flange coupling to a joining temperature of 230 °C as long as no special joining temperature is specified for the order.

NOTICE

The required assembly clearance is achieved only by heating the coupling.

Risk of burns during the entire assembly process.

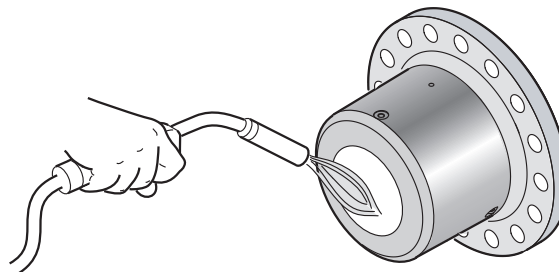
- Make sure that hot parts cannot be touched unintentionally.

NOTICE

Radiant heat from the rigid flange coupling can damage adjacent elements.

Possible damage to property.

- Protect adjacent elements (e.g. oil seals) with suitable heat shields.



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3. Mount the rigid flange coupling quickly onto the shaft up against the shaft shoulder.

INFORMATION

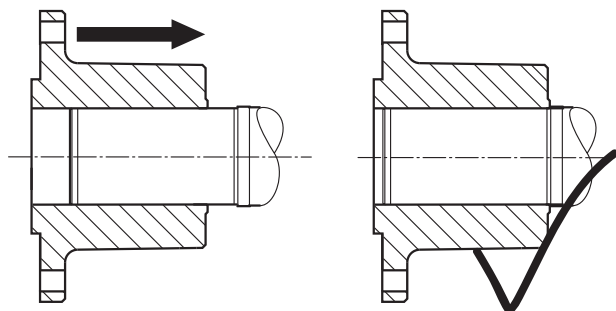


Prepare mounting tools and plan the process carefully so that the coupling can be fitted to the shaft quickly. During the cooling process, the coupling must be secured on the shaft.

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

Observe the notes in chapter "Important notes" (→ 93).

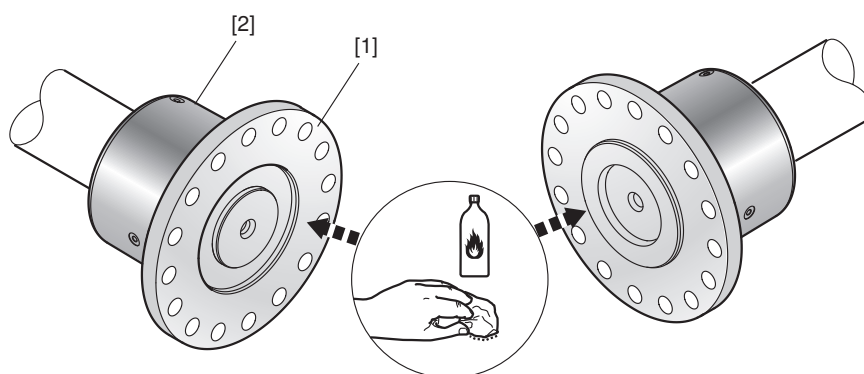
NOTICE

Improper mounting may result in damage to the coupling.

Possible damage to property.

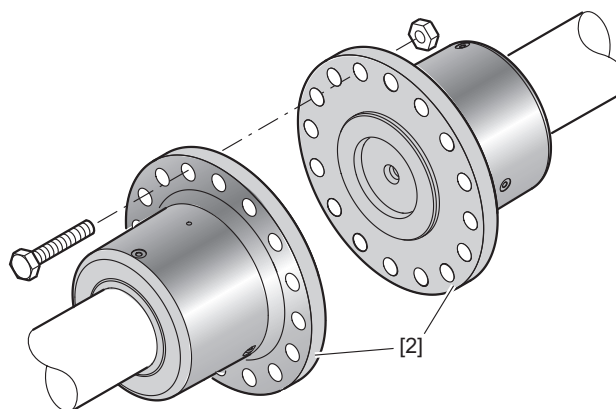
- Note that the rigid flange coupling cannot compensate shaft misalignments.

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



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



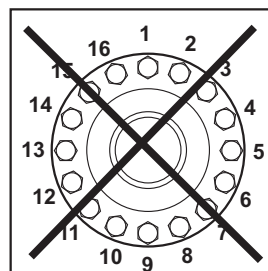
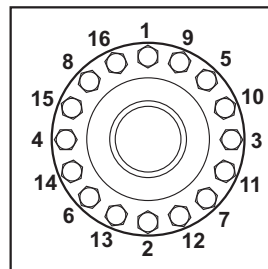
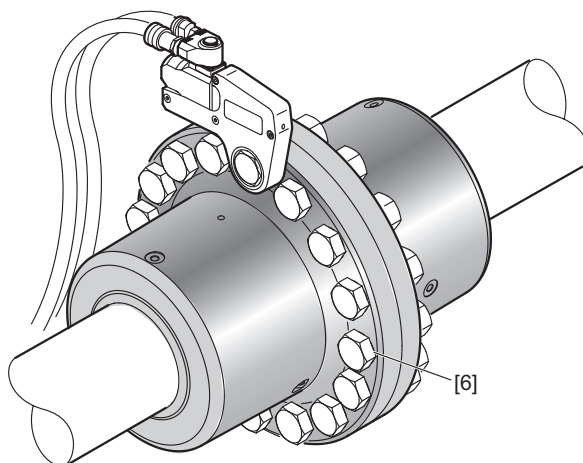
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3. Mount the bolts [3] and tighten them in diametrically opposite sequence with the tightening torques given in the following table.

INFORMATION



Do not lubricate the bolts [3] during assembly.



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Size	Screw size	Tightening torque Strength class 10.9 [Nm]
X100 – 110	M20	661
X120 – 130	M24	1136
X140 – 150	M30	2274
X160 – 170	M36	3957
X180 – 190		
X200 – 230	M42	5610
X240-280	M48	8475
X290-320	M56	13583

5.9.4 Removing the coupling from the shaft

Observe the notes in chapter "Important notes" (→ 93).

Notes



▲ CAUTION

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

Risk of injury.

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

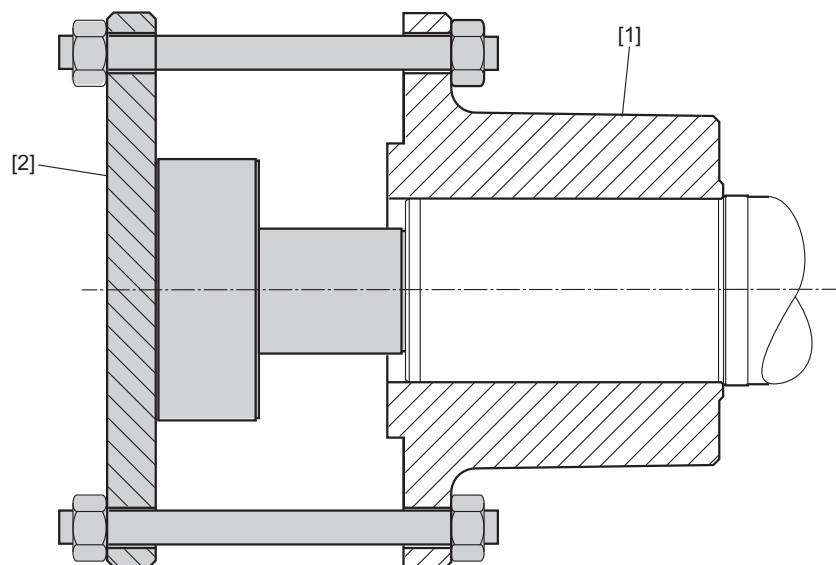
NOTICE

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 remove the coupling [1], the interference fit must first be widened hydraulically. The remaining holding force must then be overcome with a pull-off device [2]. The following figure shows an exemplary design of a hydraulic puller.



1071755147

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

The data required for the extractor dimensioning 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 rigid flange coupling	Required axial force of the extractor [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

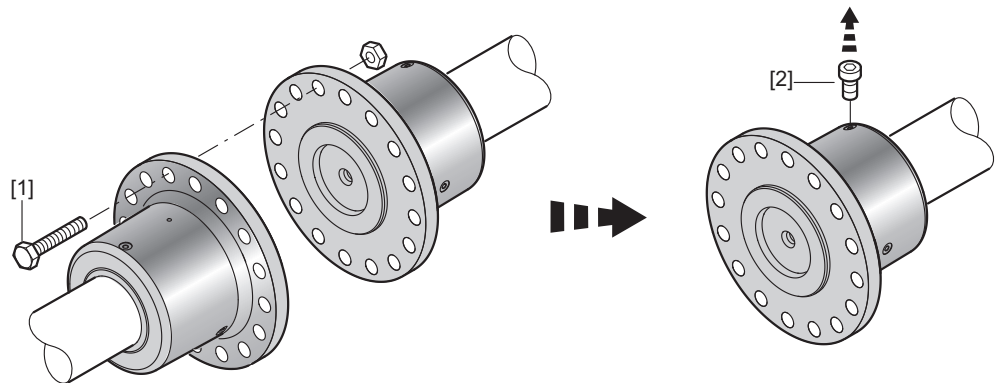
Procedure

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

INFORMATION



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



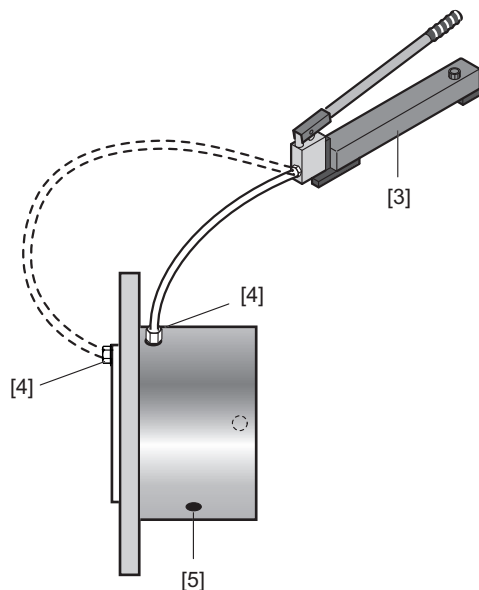
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2. Connect the first oil pump [3] to the disassembly bore closest to the flange [4] and apply pressure until oil comes out of the second disassembly bore [5]. Depending on the size, this bore can also be located on the flange surface of the coupling.

INFORMATION

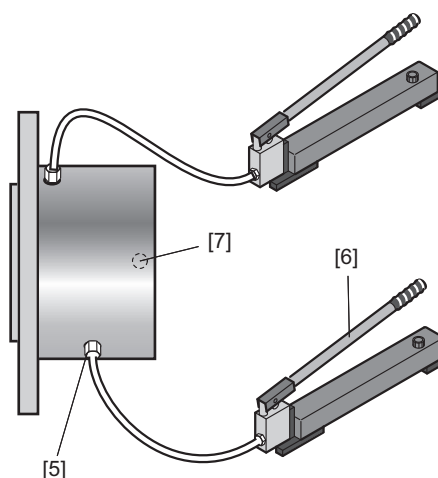


It is essential that you observe the manufacturers' safety notes of the hydraulic devices during the disassembly process.



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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.



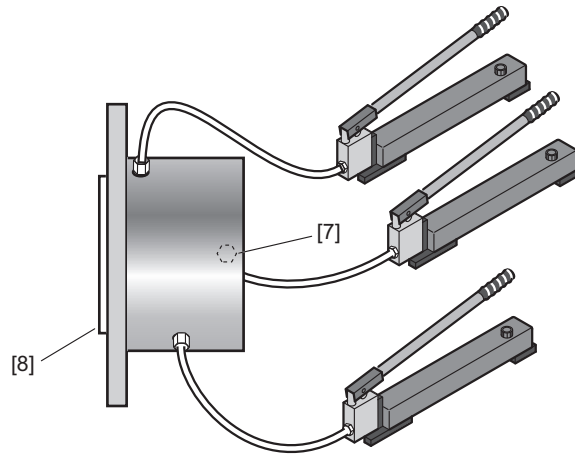
INFORMATION

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.



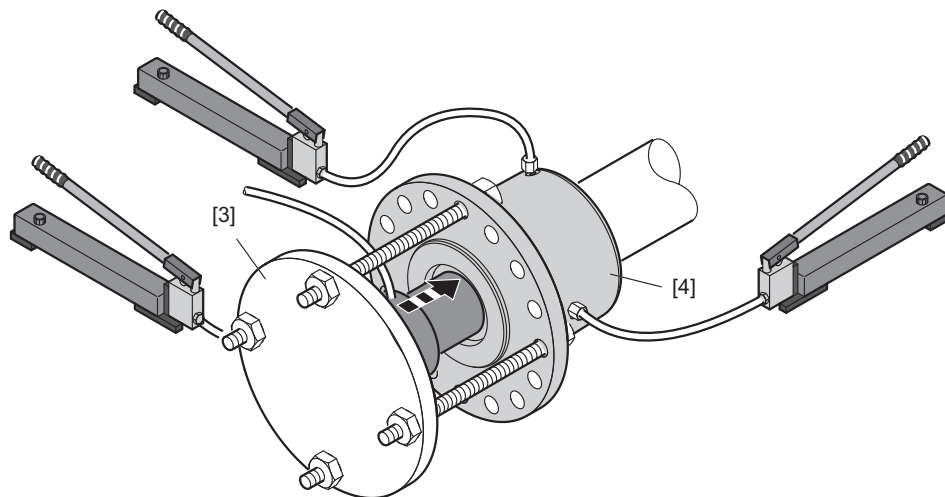
INFORMATION

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 at all bores throughout this time and the remaining disassembly process.



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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.



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

5.10 Flange couplings with keyway

5.10.1 Dimensions of the machine shaft

INFORMATION



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

5.10.2 Mounting the coupling onto the machine shaft

Observe the notes in chapter "Important notes" (→ 93).

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. 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.

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.

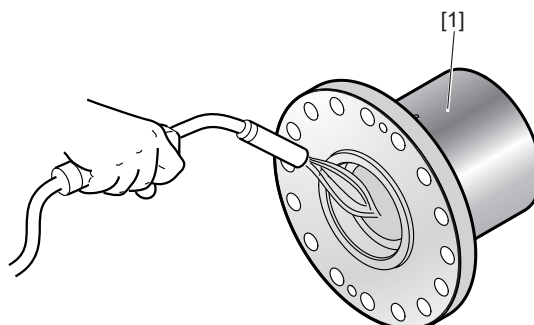


NOTICE

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.



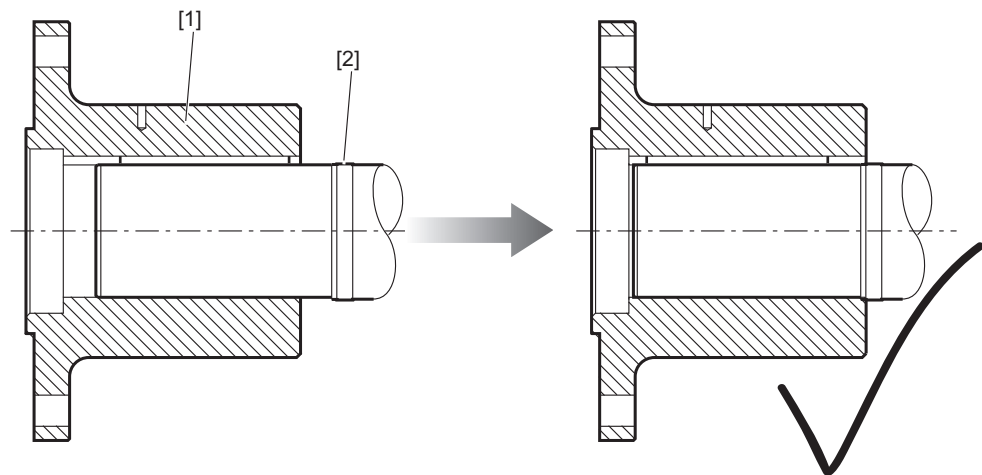
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3. Mount the flange coupling half [1] quickly onto the gear unit shaft all the way to the gear shaft [2].

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 notes" (→ 93).

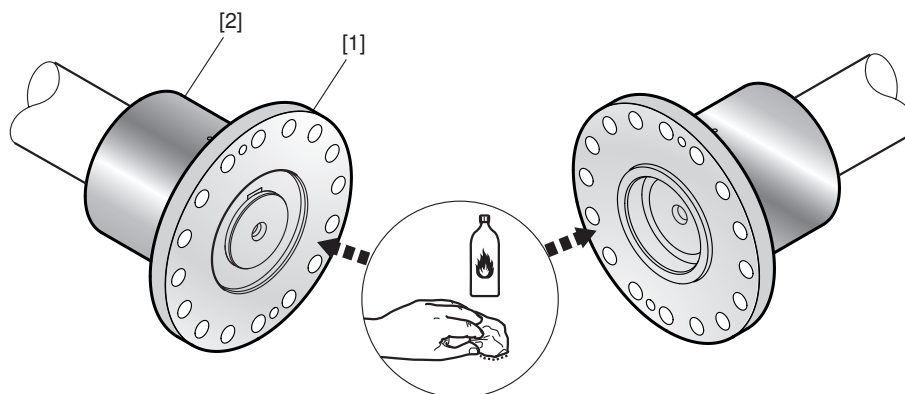
NOTICE

Improper assembly may damage the rigid flange coupling.

Possible damage to property.

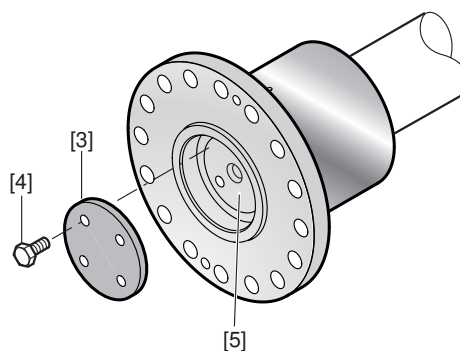
- Note that the rigid flange coupling cannot compensate shaft misalignments.

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



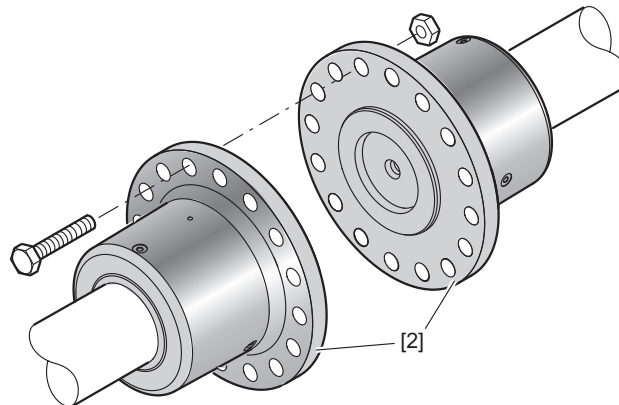
4349540107

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



4364607755

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



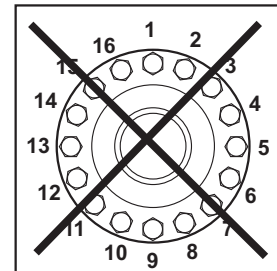
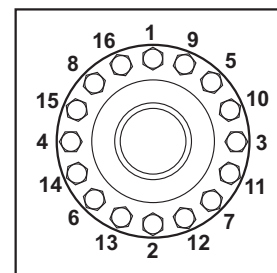
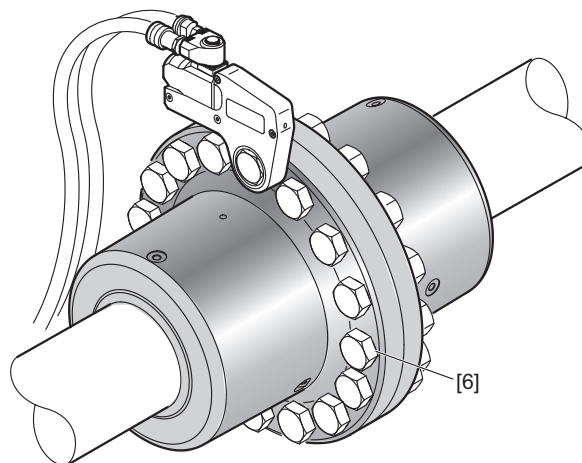
9007200247441547

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

INFORMATION



The bolts must not be lubricated during assembly.



9007200247444747

Size	Screw size	Tightening torque Strength class 10.9 [Nm]
X100 – 110	M20	661
X120 – 130	M24	1136
X140 – 150	M30	2274
X160 – 170	M36	3957
X180 – 190		
X200 – 230	M42	5610
X240 – 280	M48	8475
X290 – 320	M56	13583

5.10.4 Removing the coupling from the shaft

Observe the notes in chapter "Important notes" (→ 93).



⚠ CAUTION

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

Risk of injury.

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

NOTICE

Improper disassembly may damage the output shaft bearing.

Possible damage to property.

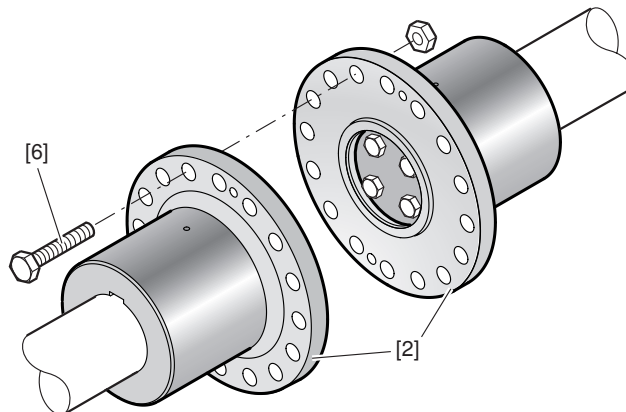
- Do not apply any tools between the coupling and the gear unit housing.

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

INFORMATION

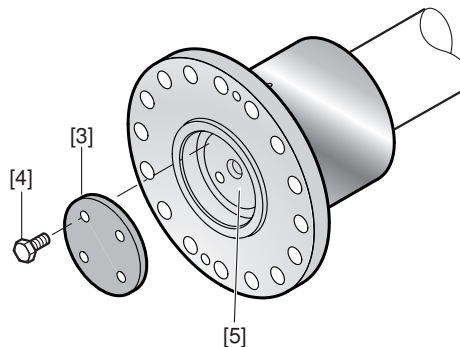


Prepare disassembly tools and the process carefully, so that the rigid flange coupling can be removed from the shaft quickly.



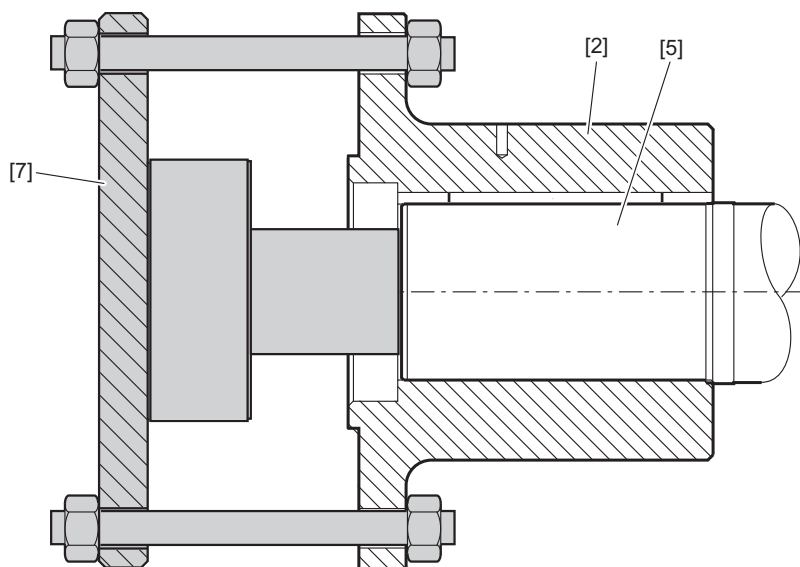
9007203604287627

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



4364607755

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



9007203604283275

4. Check the condition of the shaft and the rigid 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/mm².

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 Thread sizes / tightening torques

SEW-EURODRIVE recommends the following thread sizes and tightening torques:

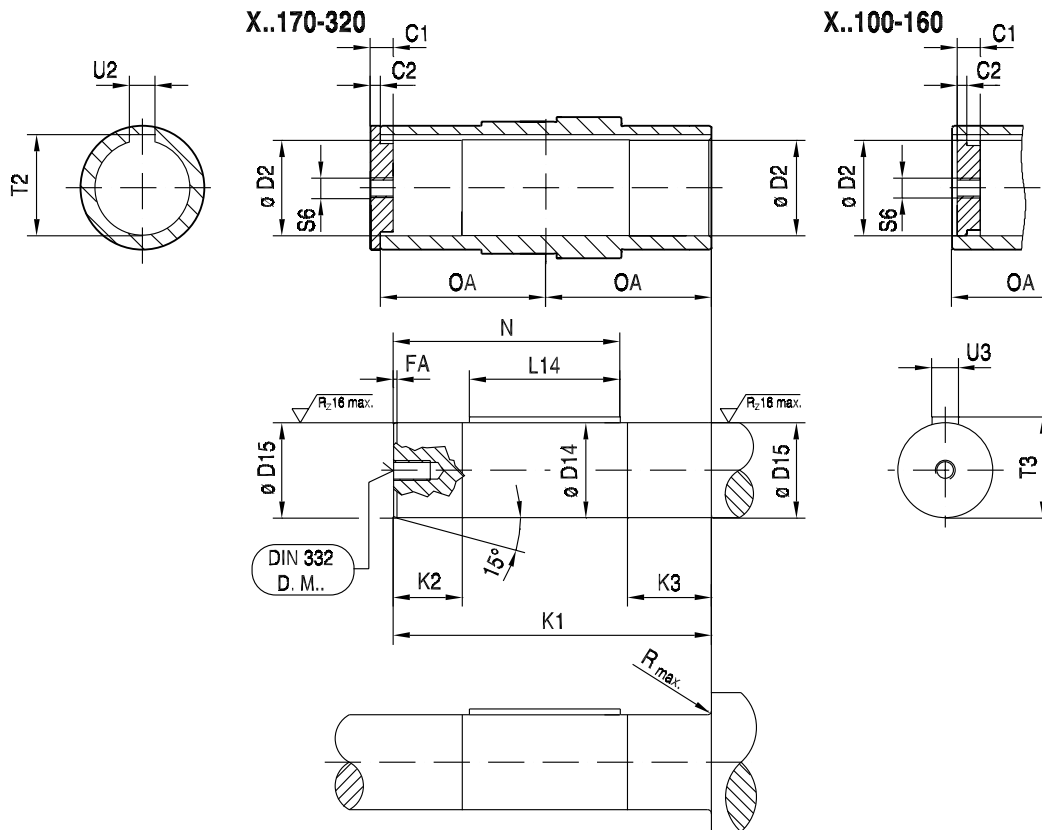
Size	Recommended thread size		Tightening torque [Nm] retaining screw [6] strength class 8.8 ¹⁾
	Ejector screw [8] (threads in the end plate) ¹⁾	Threaded rod [2] nut (DIN 934) [5] retaining screw [6] strength class 8.8 ¹⁾	
X..A100	M24	M20	464
X..A110 – 150	M30	M24	798
X..A160 – 230	M36	M30	1597
X..A240 – 300	M42	M36	2778
X..A310 – 320	M48	M42	3995

1) see the following pages

Size	Thread size for 6 x retaining screw [3] strength class 10.9 ¹⁾	Tightening torque		2 x retaining rings (bore) DIN 472
		Assembly/operat- ing state [Nm]	Disassembly [Nm]	
X..A100	-	-	-	75x2.5
X..A110	-	-	-	85x2.5
X..A120	-	-	-	95x3
X..A130	-	-	-	105x4
X..A140	-	-	-	115x4
X..A150	-	-	-	125x4
X..A160	-	-	-	135x4
X..A170 – 190	M10x30	48	Apply hand pressure	-
X..A200 – 230	M12x30	86	Apply hand pressure	-
X..A240 – 300	M16x40	210	Apply hand pressure	-
X..A310 – 320	M20x50	410	Apply hand pressure	-

1) see following pages

5.11.3 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 D.M..
X..A100	25	12	75 ^{H8}	75 ^{h11}	75 ^{h7}	2	312	47.5	81	90	205	173	1.6	M24	80.4	80	20 ^{JS9}	20 ^{h9}	M20
X..A110	30	14	85 ^{H8}	85 ^{h11}	85 ^{h7}	2	312.5	45	84	100	210	176	1.6	M24	90.4	90	22 ^{JS9}	22 ^{h9}	M20
X..A120	30	14	95 ^{H8}	95 ^{h11}	95 ^{h7}	2	342	53	92	140	244.5	190.5	1.6	M30	100.4	100	25 ^{JS9}	25 ^{h9}	M24
X..A130	30	14	105 ^{H8}	105 ^{h11}	105 ^{h7}	2	347	68	109	160	258	194	1.6	M30	111.4	111	28 ^{JS9}	28 ^{h9}	M24
X..A140	30	14	115 ^{H8}	115 ^{h11}	115 ^{h7}	2	403	61	102	200	306	222	1.6	M30	122.4	122	32 ^{JS9}	32 ^{h9}	M24
X..A150	30	14	125 ^{H8}	125 ^{h11}	125 ^{h7}	3	408	76	117	200	308.5	224.5	1.6	M30	132.4	132	32 ^{JS9}	32 ^{h9}	M24
X..A160	36	16	135 ^{H8}	135 ^{h11}	135 ^{h7}	3	465	80	127	250	361	256	1.6	M36	143.4	143	36 ^{JS9}	36 ^{h9}	M30
X..A170	36	17	150 ^{H8}	150 ^{h11}	150 ^{h7}	3	493	96	115	280	377	256	1.6	M36	158.4	158	36 ^{JS9}	36 ^{h9}	M30
X..A180	36	17	165 ^{H8}	165 ^{h11}	165 ^{h7}	3	565	109	128	300	423	292	2	M36	174.4	174	40 ^{JS9}	40 ^{h9}	M30
X..A190	36	17	165 ^{H8}	165 ^{h11}	165 ^{h7}	3	565	109	128	300	423	292	2	M36	174.4	174	40 ^{JS9}	40 ^{h9}	M30
X..A200	36	17	180 ^{H8}	180 ^{h11}	180 ^{h7}	3	620	130	149	320	460.5	319.5	2	M36	190.4	190	45 ^{JS9}	45 ^{h9}	M30
X..A210	36	17	190 ^{H8}	190 ^{h11}	190 ^{h7}	3	620	130	149	320	460.5	319.5	2	M36	200.4	200	45 ^{JS9}	45 ^{h9}	M30
X..A220	36	17	210 ^{H8}	210 ^{h11}	210 ^{h7}	3	686	133	152	370	518.5	352.5	2.5	M36	221.4	221	50 ^{JS9}	50 ^{h9}	M30
X2KA220	36	17	210 ^{H8}	210 ^{h11}	210 ^{h7}	3	756	133	152	370	554	388	2.5	M36	221.4	221	50 ^{JS9}	50 ^{h9}	M30
X..A230	36	17	210 ^{H8}	210 ^{h11}	210 ^{h7}	3	686	133	152	370	518.5	352.5	2.5	M36	221.4	221	50 ^{JS9}	50 ^{h9}	M30
X2KA230	36	17	210 ^{H8}	210 ^{h11}	210 ^{h7}	3	756	133	152	370	554	388	2.5	M36	221.4	221	50 ^{JS9}	50 ^{h9}	M30
X..A240	45	22	230 ^{H8}	230 ^{h11}	230 ^{h7}	3	778	147	170	370	562.5	400.5	2.5	M42	241.4	241	50 ^{JS9}	50 ^{h9}	M36
X2KA240	45	22	230 ^{H8}	230 ^{h11}	230 ^{h7}	3	853	147	170	370	600	438	2.5	M42	241.4	241	50 ^{JS9}	50 ^{h9}	M36
X..A250	45	22	240 ^{H8}	240 ^{h11}	240 ^{h7}	3	778	147	170	370	562.5	400.5	2.5	M42	252.4	252	56 ^{JS9}	56 ^{h9}	M36
X2KA250	45	22	240 ^{H8}	240 ^{h11}	240 ^{h7}	3	853	147	170	370	600	438	2.5	M42	252.4	252	56 ^{JS9}	56 ^{h9}	M36
X..A260	45	22	240 ^{H8}	240 ^{h11}	240 ^{h7}	3	851	143	166	450	639	437	2.5	M42	252.4	252	56 ^{JS9}	56 ^{h9}	M36
X..A270	45	22	275 ^{H8}	275 ^{h11}	275 ^{h7}	4	877	158	181	450	652	450	5	M42	287.4	287	63 ^{JS9}	63 ^{h9}	M36
X..A280	45	22	275 ^{H8}	275 ^{h11}	275 ^{h7}	4	877	158	181	500	677	450	5	M42	287.4	287	63 ^{JS9}	63 ^{h9}	M36
X..A290	45	22	290 ^{H8}	290 ^{h11}	290 ^{h7}	4	961	160	183	500	719	492	5	M42	302.4	302	63 ^{JS9}	63 ^{h9}	M36
X..A300	45	22	290 ^{H8}	290 ^{h11}	290 ^{h7}	4	961	160	183	500	719	492	5	M42	302.4	302	63 ^{JS9}	63 ^{h9}	M36
X..A310	55	28	320 ^{H8}	320 ^{h11}	320 ^{h7}	4	1030	170	197	560	781.5	528.5	5	M42	334.4	334	70 ^{JS9}	70 ^{h9}	M36
X..A320	55	28	320 ^{H8}	320 ^{h11}	320 ^{h7}	4	1030	170	197	560	781.5	528.5	5	M42	334.4	334	70 ^{JS9}	70 ^{h9}	M36

5.11.4 Mounting the gear unit onto the machine shaft

INFORMATION



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

Sizes X100 – 160

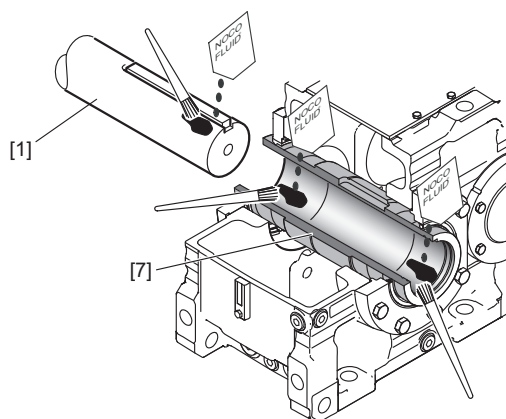
Observe the notes in chapter "Important notes" (→ 93).

INFORMATION



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

1. Apply NOCO® fluid to the hollow shaft [7] and to the shaft end of the machine shaft [1].



18014398819829899

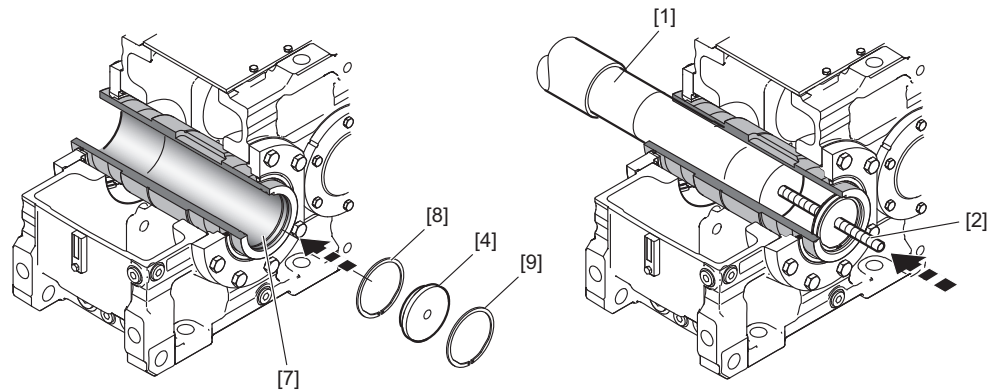
- [1] Machine shaft
[7] Hollow shaft

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 tightening torques in chapter "Thread sizes / tightening torques" (→ 122)".

INFORMATION



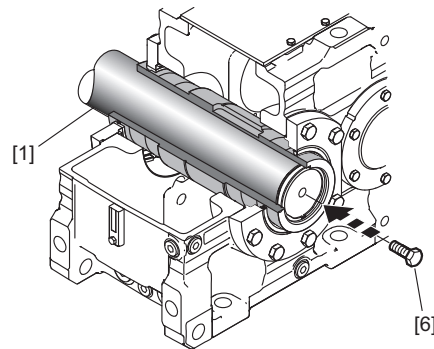
The assembly is easier if you first apply lubricant to the threaded rod and nut.



2888325003

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

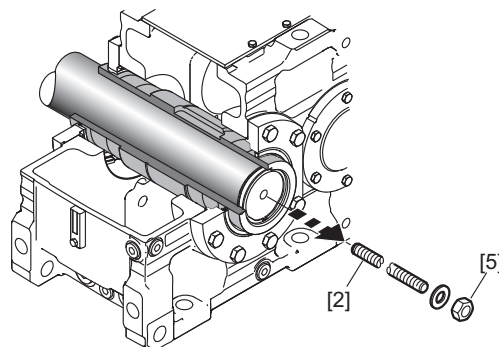
3. Tighten the machine shaft [1] with the nut [5] until the shaft end of the machine shaft [1] and the end plate [4] meet.



2879305611

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

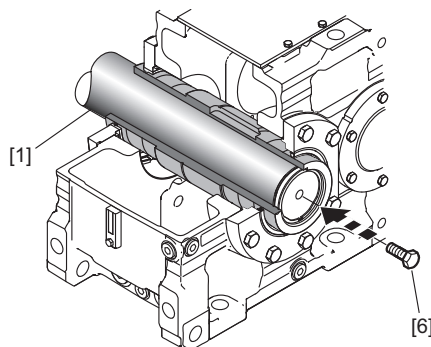
4. Loosen the nut [5]. Screw the threaded rod [2] out.



2887985163

- | | |
|-----|--------------|
| [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 tightening torques in chapter ""Thread sizes / tightening torques" (→ 122)".



2879305611

- [1] Machine shaft
[2] 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).

Sizes X170 – 320

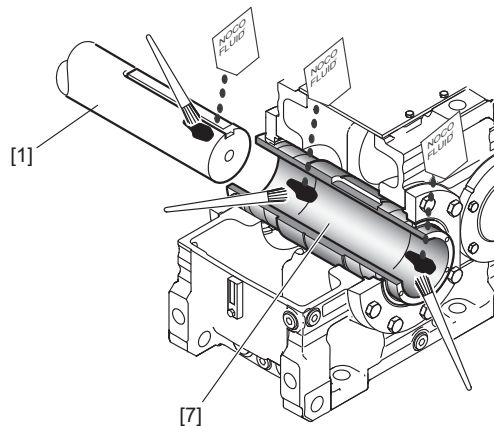
Observe the notes in chapter "Important notes" (→ 93).

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 NOCO® fluid to the hollow shaft [7] and to the shaft end of the machine shaft [1].



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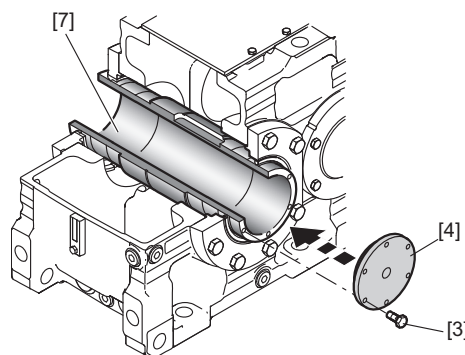
- [1] Machine shaft
[7] Hollow shaft

2. Use the retaining screws [3] to attach the end plate [4] centrally to the hollow shaft [7] and screw the threaded rod [2] onto the machine shaft [1]. Observe the tightening torques in chapter "Thread sizes / tightening torques" (→ 122).

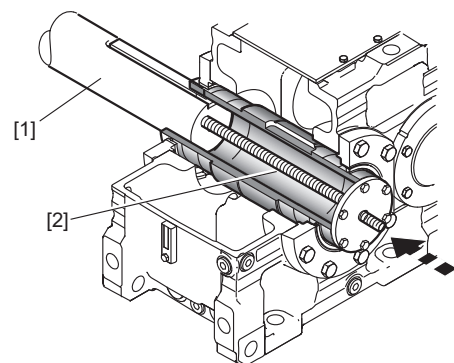
INFORMATION



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



- [1] Machine shaft
[2] Threaded rod
[3] Retaining screw



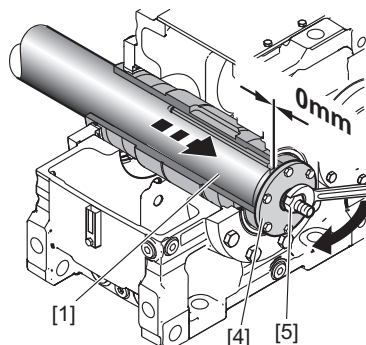
- [4] End plate
[7] Hollow shaft

310352011

5 Assembly/installation

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

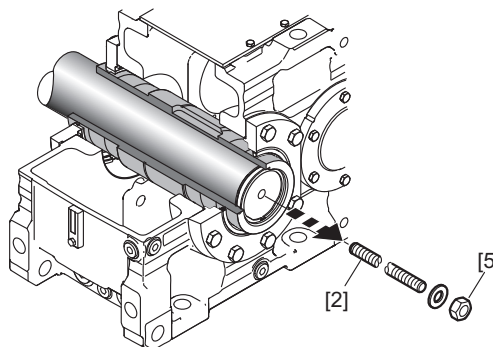
3. Tighten the machine shaft [1] with the nut [5] until the shaft end of the machine shaft [1] and the end plate [4] meet.



310407307

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

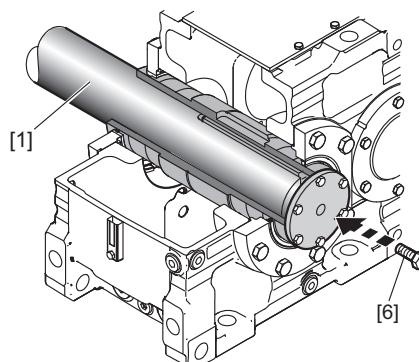
4. Loosen the nut [5]. Screw the threaded rod [2] out.



2887985163

- [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 tightening torques in chapter ""Thread sizes / tightening torques" (→ 122)".



310415883

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

22299017/EN – 04/2016

**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).

5.11.5 Removing the gear unit from the machine shaft

NOTICE

Improper disassembly may damage bearings and other components.

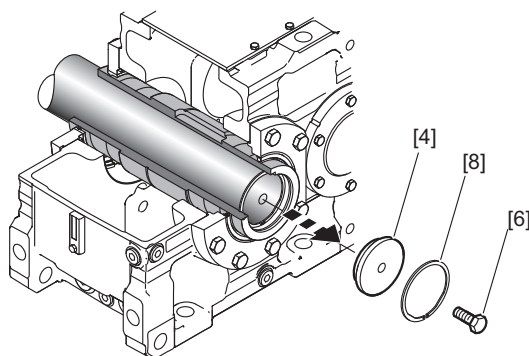
Possible damage to property.

- 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 notes" (→ 93).

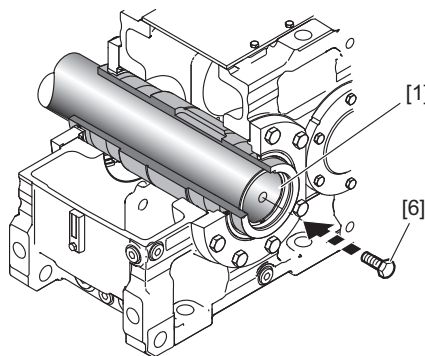
1. Loosen the retaining screw [6]. Remove the outer retaining ring [8] and the end plate [4].



9007202105918859

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

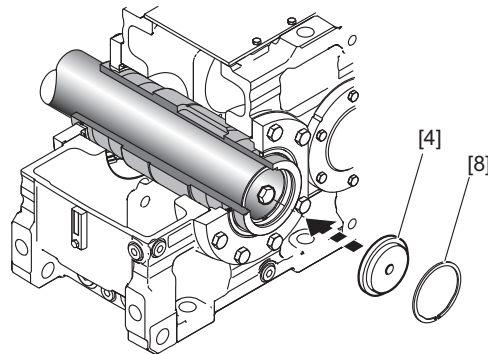
2. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



9007202105921291

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

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



9007202105924619

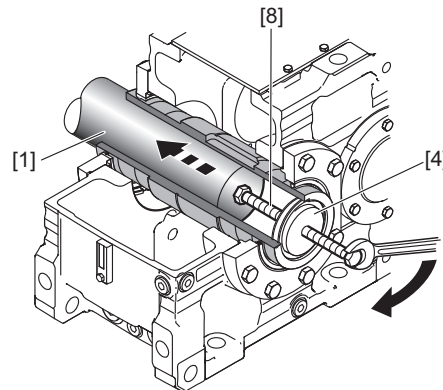
- [4] End plate
- [8] Retaining ring

4. Thread the ejector screw [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].



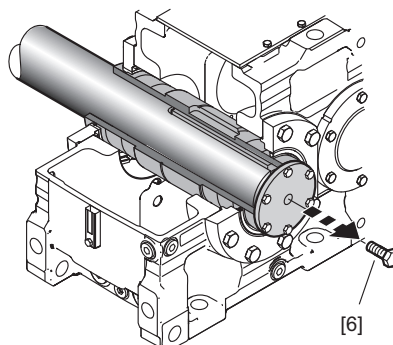
9007202105928587

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

Sizes X170 – 320

Observe the notes in chapter "Important notes" (→ 93).

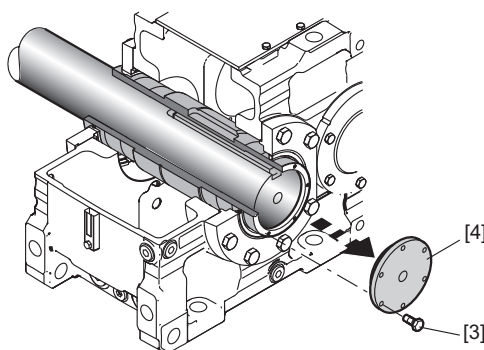
1. Loosen the retaining screw [6].



310460043

- [6] Retaining screw

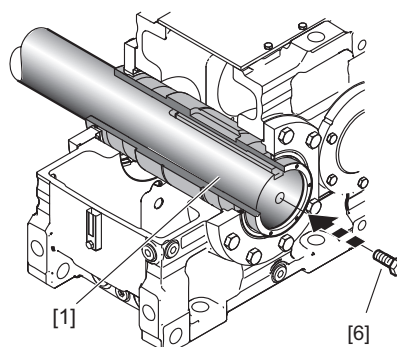
2. Remove the retaining screws [3] and the end plate [4].



310464523

- [3] Retaining screw
[4] End plate

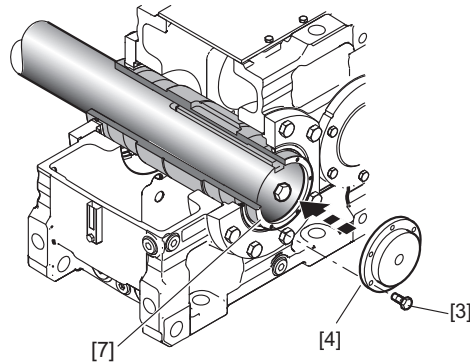
3. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



310470027

- [1] Machine shaft
[6] Retaining screw

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

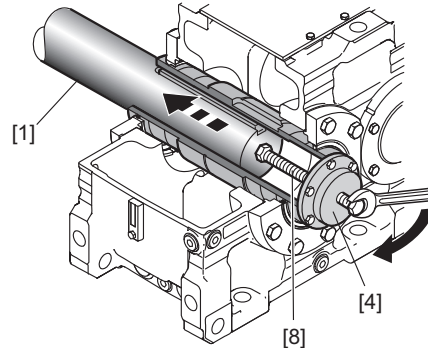
- [3] Retaining screw
- [4] End plate
- [7] Hollow shaft

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/mm².

5.12.2 Thread sizes / tightening torques

SEW-EURODRIVE recommends the following thread sizes and tightening torques:

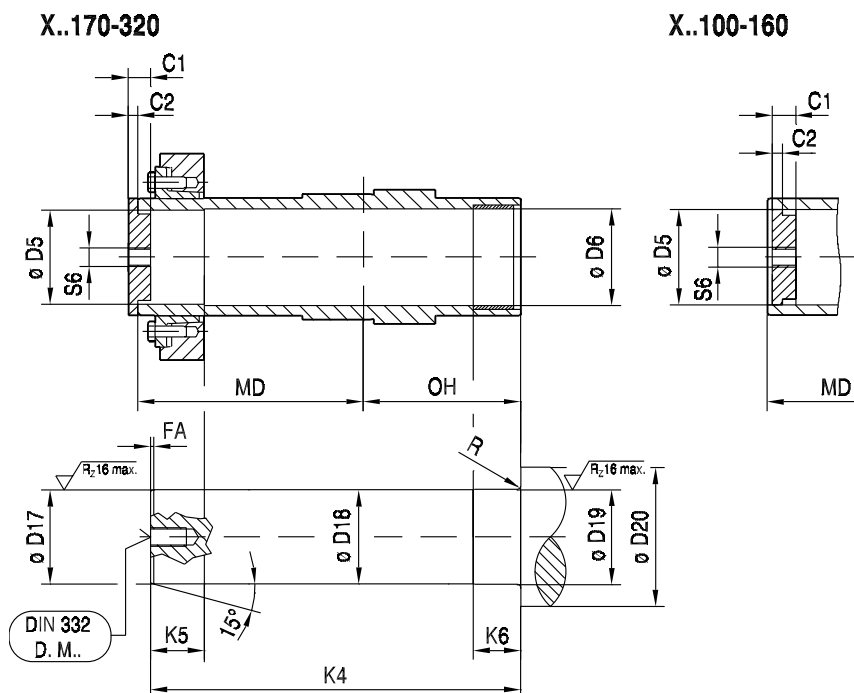
Size	Recommended thread size		Tightening torque [Nm] retaining screw [6] strength class 8.8 ¹⁾
	Ejector screw [8] (threads in the end plate) ¹⁾	Threaded rod [2] nut (DIN 934) [5] retaining screw [6] strength class 8.8 ¹⁾	
X..H100 – 150	M30	M24	798
X..H160 – 230	M36	M30	1597
X..H240 – 300	M42	M36	2778
X..H310 – 320	M48	M42	3995

1) see the following pages

Size	Thread size for 6 x retaining screw [3] strength class 10.9 ¹⁾	Tightening torque		2 x retaining rings (bore) DIN 472
		Assembly/operat- ing state [Nm]	Disassembly [Nm]	
X..H100	-	-	-	80x2.5
X..H110	-	-	-	90x2.5
X..H120	-	-	-	100x3
X..H130	-	-	-	110x4
X..H140	-	-	-	120x4
X..H150	-	-	-	130x4
X..H160	-	-	-	140x4
X..H170 – 190	M10x30	48	Apply hand pressure	-
X..H200 – 230	M12x30	86	Apply hand pressure	-
X..H240 – 300	M16x40	210	Apply hand pressure	-
X..H310 – 320	M20x50	410	Apply hand pressure	-

1) see following pages

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

5.12.4 Mounting the gear unit onto the machine shaft

INFORMATION



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

Sizes X100 – 160

Observe the notes in chapter "Important notes" (→ 93).

INFORMATION



- Included in the delivery:
 - 2 x 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].

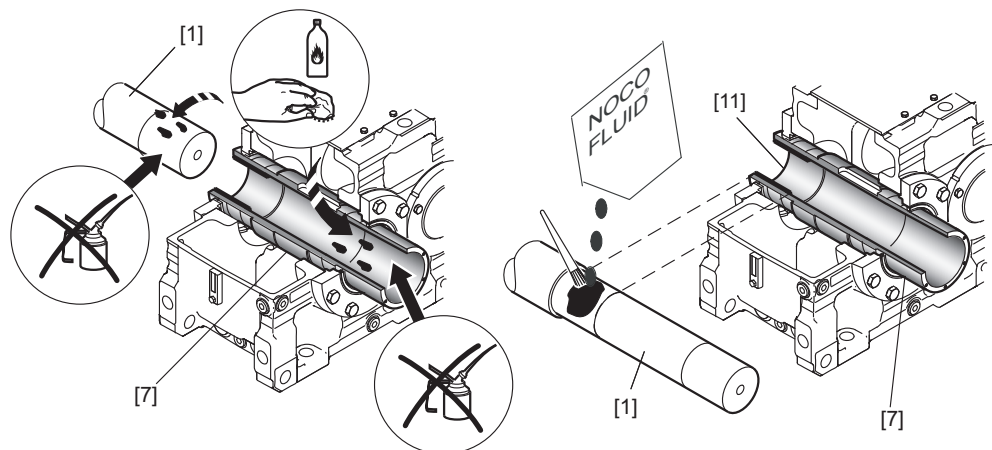
NOTICE

Never apply NOCO® fluid 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.

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



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[1] Machine shaft
[7] Hollow shaft

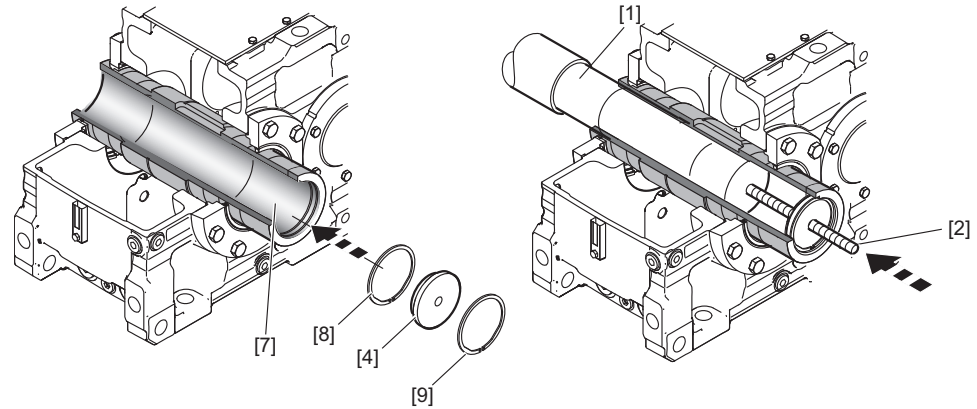
[11] Bushing

3. 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 tightening torques in chapter "Thread sizes / tightening torques" (→ 134)".

INFORMATION



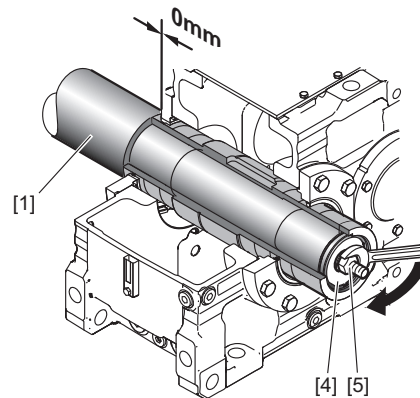
The assembly is easier if you first apply lubricant to the threaded rod and nut.



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

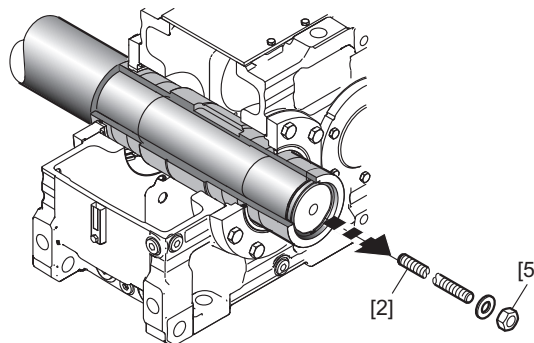
4. Tighten the machine shaft [1] with the nut [5] until the shaft end of the machine shaft [1] and the end plate [4] meet.



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

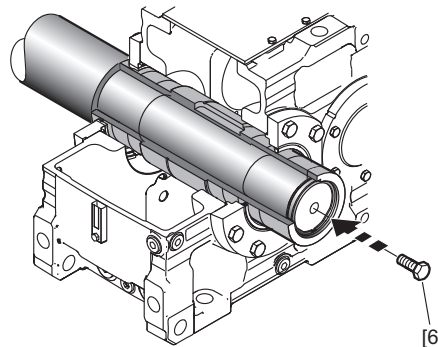
5. Loosen the nut [5]. Screw the threaded rod [2] out.



9007202134044427

- [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 tightening torques in chapter ""Thread sizes / tightening torques" (→ 134)".



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- [1] Machine shaft
[6] Retaining screw

7. 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.



▲ CAUTION

The loose shrink disk could slip.

Potential risk of crushing due to falling parts.

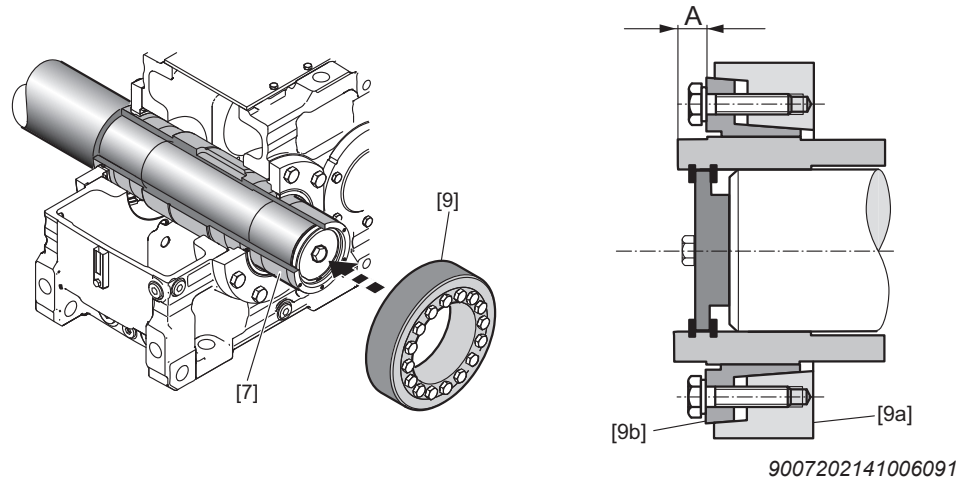
- Secure the shrink disk against slipping.

NOTICE

Tightening the clamping 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)

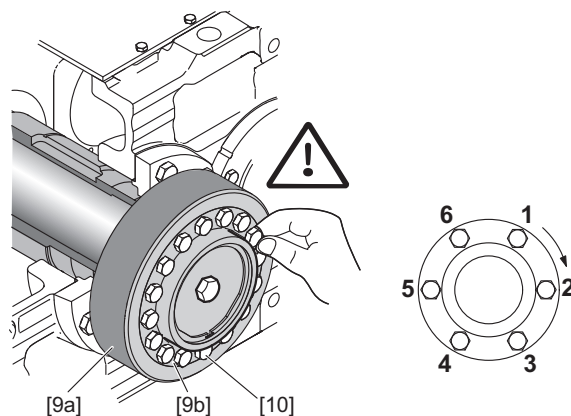
Size	A [mm]
XH100	37.5
XH110	38
XH120	39
XH130-140	41
XH150	42
XH160	48

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

INFORMATION



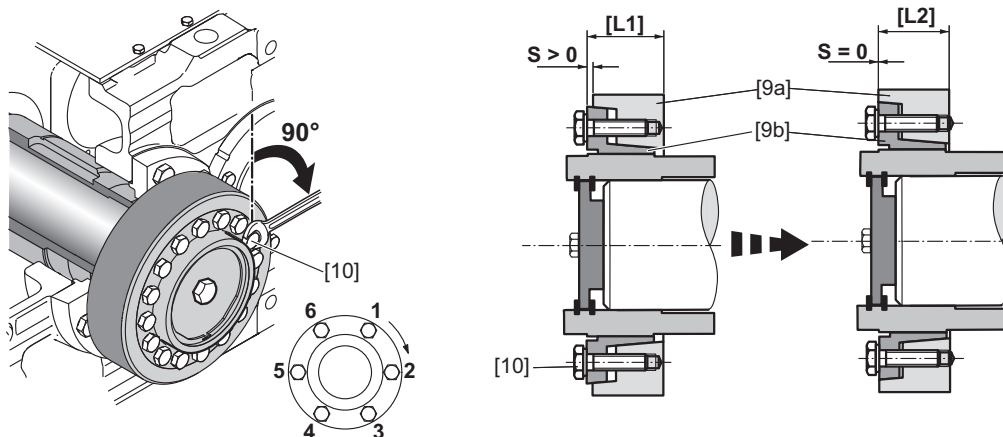
For shrink disks with a slotted taper bushing (inner ring) [9b], tighten the locking screws [10] to the left and right of the slot one after another, and then, in several stages, tighten the remaining screws at evenly spaced intervals.



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

9007202141008267

9. 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.



9007202141010443

[9a] Taper (outer ring)

[9b] Taper bushing (inner ring)

[10] Clamping 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.

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.

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

Sizes X170 – 320

Observe the notes in chapter "Important notes" (→ 93).

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].

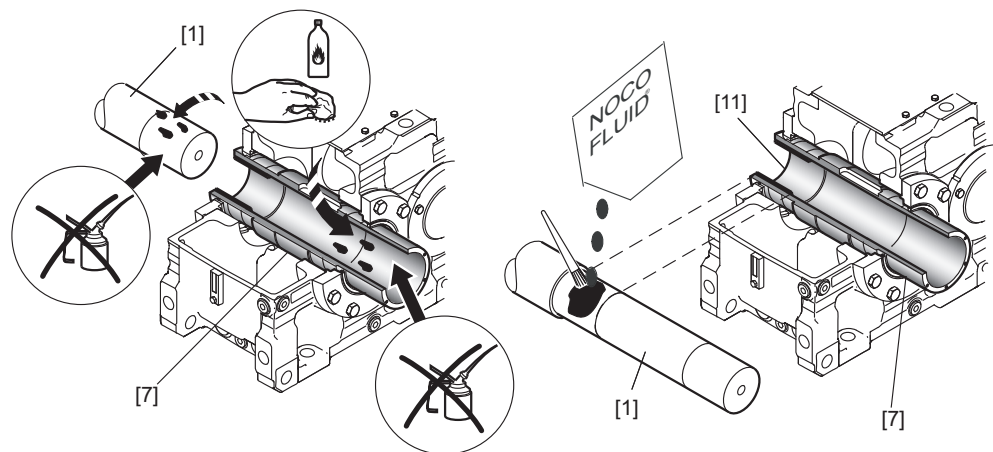
1. Before assembling the gear unit, degrease the hollow shaft [7] and the machine shaft [1] and apply some NOCO® fluid to the machine shaft [1] in the bushing area [11].

NOTICE

Never apply NOCO® fluid directly to the bushing [11] since the compound may get into the clamping area of the shrink disk when the input shaft is connected.

Possible damage to property.

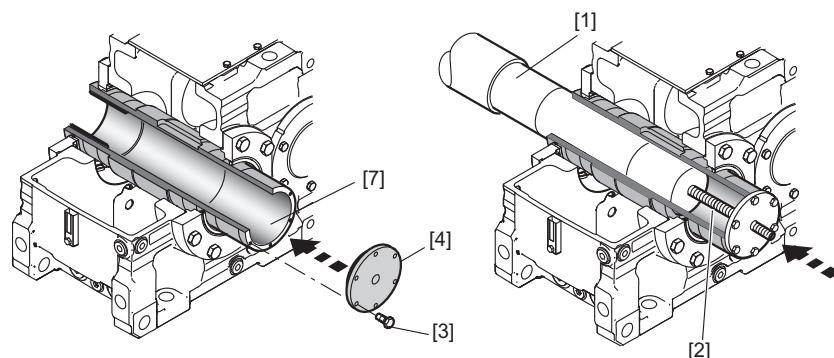
- The clamping area of the shrink disk between the machine shaft [1] and the hollow shaft [7] must remain absolutely free of any grease.



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

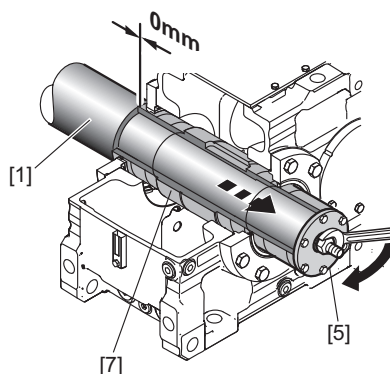
2. Use the retaining screws [3] to attach the end plate [4] centrally on the hollow shaft [7]. Thread the threaded rod [2] into the machine shaft [1]. Observe the tightening torques in chapter ""Thread sizes / tightening torques" (→ 134)".



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

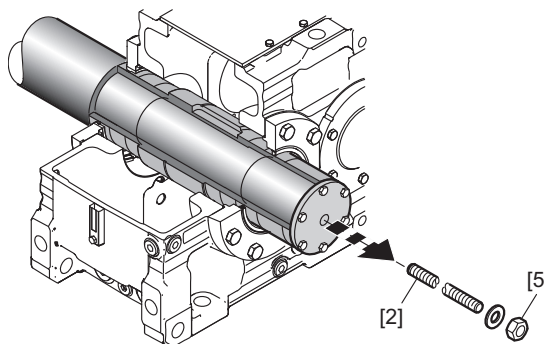
3. Tighten the machine shaft [1] with the nut [5] until the shoulders of the machine shaft and the hollow shaft [7] meet.



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

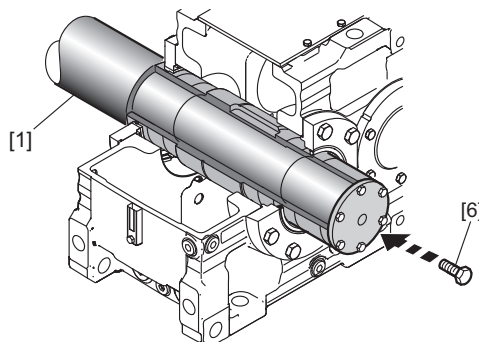
4. Loosen the nut [5]. Screw the threaded rod [2] out.



310506251

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

- Secure the machine shaft [1] using the retaining screw [6]. The retaining screw should also be locked with a suitable threadlocker. Observe the tightening torques in chapter "Thread sizes / tightening torques" (→ 134).



310510731

[1] Machine shaft

[6] Retaining screw

- 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.



CAUTION

The loose shrink disk could slip.

Risk of injury to persons and damage to property.

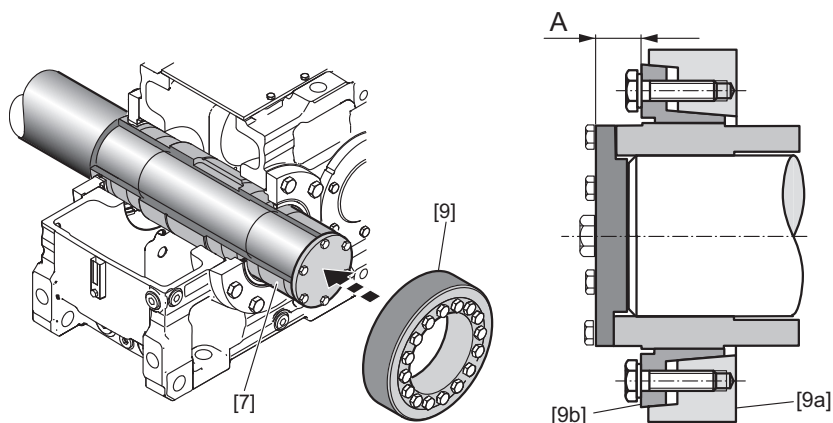
- Secure the shrink disk against slipping.

NOTICE

Tightening the clamping 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 [mm]
XH170 – 190	37
XH200 – 210	38

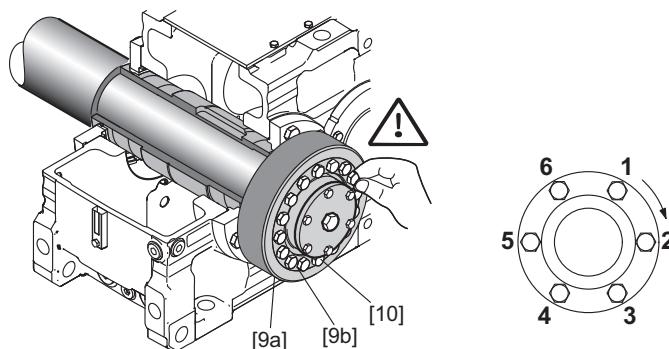
Size	A [mm]
XH220 – 230	39
XH240 – 260	48
XH270 – 300	49
XH310 – 320	60

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

INFORMATION



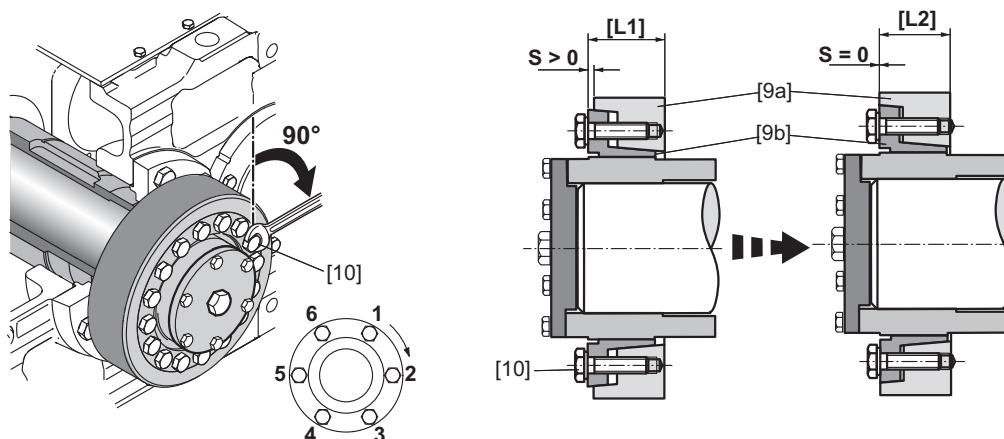
For shrink disks with a slotted taper bushing (inner ring) [9b], tighten the locking screws [10] to the left and right of the slot one after another, and then, in several stages, tighten the remaining screws at evenly spaced intervals.



310537227

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

8. 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.



9007199565282315

- [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] Clamping 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.

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).

5.12.5 Disassembling the gear unit from the machine shaft

Sizes X100 – 160

Observe the notes in chapter "Important notes" (→ 93).

NOTICE

Improper disassembly may damage bearings and other components.

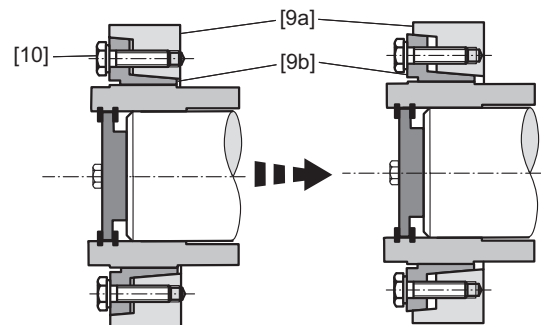
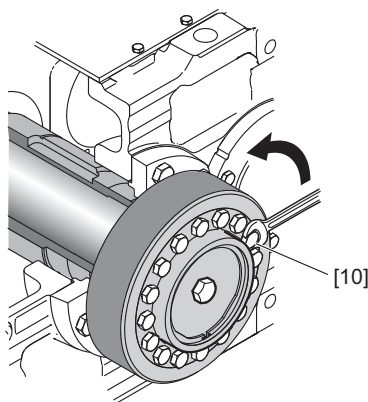
Possible damage to property.

- 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.
- Remove the shrink disk properly. Never completely unscrew the retaining screws because the shrink disk might jump off and cause an injury.
- Shrink disks and corresponding parts of different gear units must not be swapped.

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

INFORMATION

If the taper (outer ring) [9a] and the taper bushing (inner ring) [9b] do not separate by themselves: Take the necessary number of retaining 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.



9007202141012619

- [9a] Taper (outer ring)
 [9b] Taper bushing (inner ring)
 [10] Clamping 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 notes" (→ 93).

NOTICE

Improper disassembly may damage bearings and other components.

Possible damage to property.

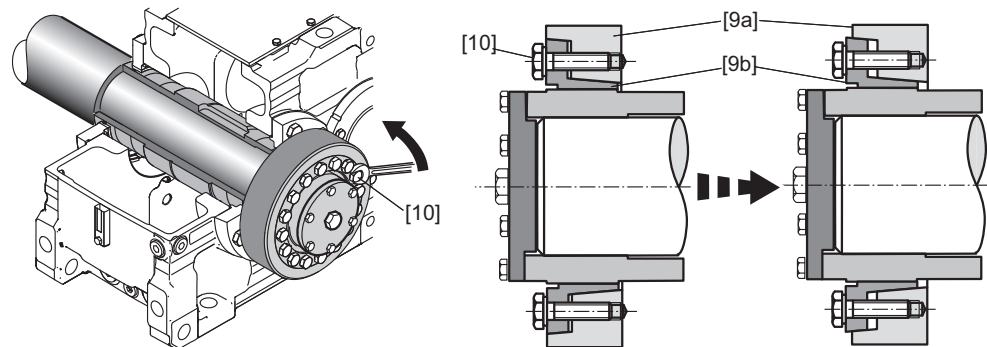
- You may only use the hollow shaft as a support for disassembly. Note that supporting on any other parts of the gear unit may damage the material.
- Remove the shrink disk properly. Never completely unscrew the retaining screws because the shrink disk might jump off and cause an injury.
- Shrink disks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

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

INFORMATION



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



9007199673761547

- [9a] Taper (outer ring)
- [9b] Taper bushing (inner ring)
- [10] Clamping 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".

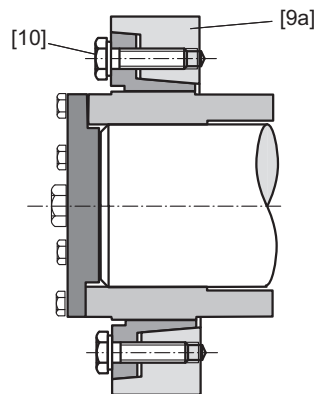
Cleaning and lubricating the shrink disk

Observe the notes in chapter "Important notes" (→ 93).

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.



1526385163

[9a] Taper (outer ring)

[10] Clamping screws

1. Thoroughly clean the shrink disk from dirt and any remaining lubricants after disassembly.
2. Lubricate the retaining screws [10] on the threads and under the head with an MoS₂ compound, e.g. "gleitmo 100" from FUCHS LUBRITECH (www.fuchs-lubritech.com).
3. Also evenly lubricate the tapered surface of the taper (outer ring) [9a] with a thin layer of an MoS₂ compound, for example "gleitmo 100" from FUCHS LUBRITECH (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/mm².

5.13.2 Thread sizes / tightening torques

SEW-EURODRIVE recommends the following thread sizes and tightening torques:

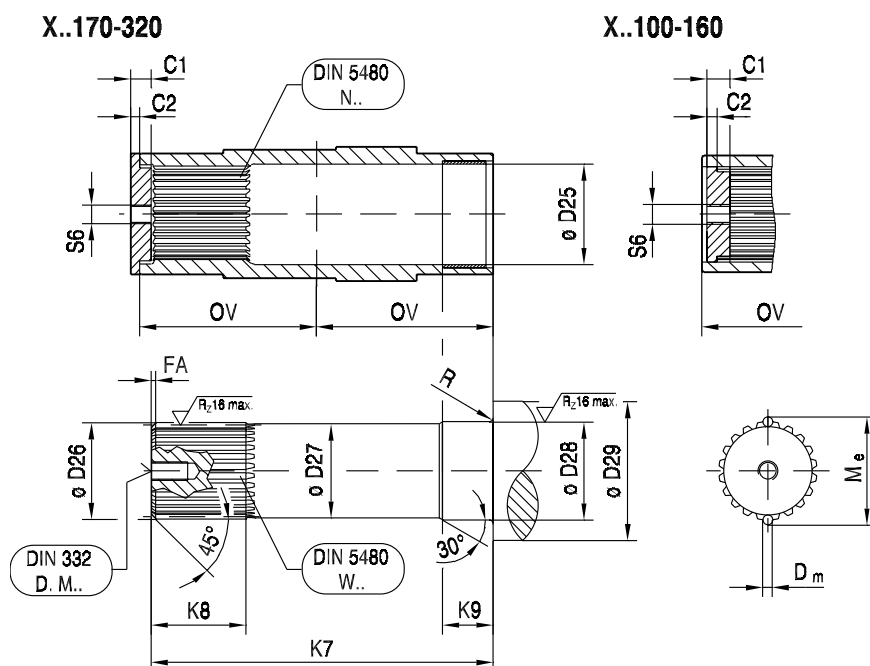
Size	Recommended thread size		Tightening torque [Nm] retaining screw [6] strength class 8.8 ¹⁾
	Ejector screw [8] (threads in the end plate) ¹⁾	Threaded rod [2] nut (DIN 934) [5] retaining screw [6] strength class 8.8 ¹⁾	
X..V100 – 150	M30	M24	798
X..V160 – 230	M36	M30	1597
X..V240 – 300	M42	M36	2778
X..V310 – 320	M48	M42	3995

1) see the following pages

Size	Thread size for 6 x retaining screw [3] strength class 10.9 ¹⁾	Tightening torque		2 x retaining rings (bore) DIN 472
		Assembly/operat- ing state [Nm]	Disassembly [Nm]	
X..V100	-	-	-	80x2.5
X..V110	-	-	-	90x2.5
X..V120	-	-	-	100x3
X..V130	-	-	-	110x4
X..V140	-	-	-	125x4
X..V150	-	-	-	130x4
X..V160	-	-	-	140x4
X..V170 – 190	M10x30	48	Apply hand pressure	-
X..V200 – 230	M12x30	86	Apply hand pressure	-
X..V240 – 300	M16x40	210	Apply hand pressure	-
X..V310 – 320	M20x50	410	Apply hand pressure	-

1) see following pages

5.13.3 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 D. M..	DIN 5480
X..100	30	14	81 ^{H9}	74.4 _{h10}	73	81 _{m6}	95	6	3	306 ₋₁	81	42 ₋₁	81.326 _{-0.069 -0.125}	173	3	M24	M20	W 75x3x30x24x8f N 75x3x30x24x9H
X..110	30	14	91 ^{H9}	84.4 _{h10}	83	91 _{m6}	105	6	3	311.5 ₋₁	81	42 ₋₁	91.092 _{-0.068 -0.123}	176	3	M24	M20	W 85x3x30x27x8f N 85x3x30x27x9H
X..120	30	14	101 ^{H9}	94.4 _{h10}	93	101 _{m6}	115	6	3	341 ₋₁	91	52 ₋₁	101.141 _{-0.068 -0.122}	190.5	3	M30	M24	W 95x3x30x30x8f N 95x3x30x30x9H
X..130	30	14	111 ^{H9}	109.4 _{h10}	108	111 _{m6}	125	6	3	346 ₋₁	86	52 ₋₁	116.076 _{-0.078 -0.139}	194	3	M30	M24	W 110x3x30x35x8f N 110x3x30x35x9H
X..V140	30	14	121 ^{H9}	119.4 _{h10}	118	121 _{m6}	135	6	3	402 ₋₁	101	62 ₋₁	126.095 _{-0.078 -0.138}	222	3	M30	M24	W 120x3x30x38x8f N 120x3x30x38x9H
X..150	30	14	131 ^{H9}	129.4 _{h10}	128	131 _{m6}	145	6	3	407 ₋₁	101	62 ₋₁	136.329 _{-0.081 -0.144}	224.5	3	M30	M24	W 130x3x30x42x8f N 130x3x30x42x9H
X..160	36	16	141 ^{H9}	139.4 _{h10}	138	141 _{m6}	155	6	3	464 ₋₁	111	73 ₋₁	146.167 _{-0.080 -0.143}	256	4	M36	M30	W 140x3x30x45x8f N 140x3x30x45x9H
X..170	36	17	151 ^{H9}	149.4 _{h10}	148	151 _{m6}	165	6	3	492 ₋₁	121	73 ₋₁	156.172 _{-0.079 -0.141}	256	4	M36	M30	W 150x3x30x48x8f N 150x3x30x48x9H
X..180	36	17	166 ^{H9}	159 _{h10}	158	166 _{m6}	180	10	5	564 ₋₁	166	83 ₋₁	170.009 _{-0.086 -0.152}	292	4	M36	M30	W 160x5x30x30x8f N 160x5x30x30x9H
X..190	36	17	166 ^{H9}	159 _{h10}	158	166 _{m6}	180	10	5	564 ₋₁	166	83 ₋₁	170.009 _{-0.086 -0.152}	292	4	M36	M30	W 160x5x30x30x8f N 160x5x30x30x9H
X..200	36	17	191 ^{H9}	179 _{h10}	178	191 _{m6}	205	10	5	619 ₋₁	176	83 ₋₁	190.090 _{-0.087 -0.155}	319.5	4	M36	M30	W 180x5x30x34x8f N 180x5x30x34x9H
X..210	36	17	191 ^{H9}	179 _{h10}	178	191 _{m6}	205	10	5	619 ₋₁	176	83 ₋₁	190.090 _{-0.087 -0.155}	319.5	4	M36	M30	W 180x5x30x34x8f N 180x5x30x34x9H
X..220	36	17	211 ^{H9}	199 _{h10}	198	211 _{m6}	230	10	5	685 ₋₁	201	108 ₋₁	210.158 _{-0.088 -0.157}	352.5	5	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X2K220	36	17	211 ^{H9}	199 _{h10}	198	211 _{m6}	230	10	5	755 ₋₁	201	108 ₋₁	210.158 _{-0.088 -0.157}	387.5	5	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X..230	36	17	211 ^{H9}	199 _{h10}	198	211 _{m6}	230	10	5	685 ₋₁	201	108 ₋₁	210.158 _{-0.088 -0.157}	352.5	5	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X2K230	36	17	211 ^{H9}	199 _{h10}	198	211 _{m6}	230	10	5	755 ₋₁	201	108 ₋₁	210.158 _{-0.088 -0.157}	387.5	5	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X..240	45	22	231 ^{H9}	219 _{h10}	218	231 _{m6}	250	10	5	777 ₋₁	216	108 ₋₁	230.215 _{-0.102 -0.179}	400.5	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X2K240	45	22	231 ^{H9}	219 _{h10}	218	231 _{m6}	250	10	5	852 ₋₁	216	108 ₋₁	230.215 _{-0.102 -0.179}	438	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X..250	45	22	241 ^{H9}	219 _{h10}	218	241 _{m6}	260	10	5	777 ₋₁	216	108 ₋₁	230.215 _{-0.102 -0.179}	400.5	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X2K250	45	22	241 ^{H9}	219 _{h10}	218	241 _{m6}	260	10	5	852 ₋₁	216	108 ₋₁	230.215 _{-0.102 -0.179}	438	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X..260	45	22	255 ^{H9}	239 _{h10}	238	255 _{m6}	275	10	5	850 ₋₁	216	108 ₋₁	250.264 _{-0.102 -0.180}	437	5	M42	M36	W 240x5x30x46x8f N 240x5x30x46x9H
X..270	45	22	285 ^{H9}	258.4 _{h10}	258	285 _{m6}	305	16	8	876 ₋₁	248	143 ₋₁	276.230 _{-0.101 -0.177}	450	5	M42	M36	W 260x8x30x31x8f N 260x8x30x31x9H

X.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 D.M..	DIN 5480
X..280	45	22	285 ^{H9}	258.4 _{h10}	258	285 _{m6}	305	16	8	876 ₋₁	248	143 ₋₁	276.230 ^{-0.101 -0.177}	450	5	M42	M36	W 260x8x30x31x8f N 260x8x30x31x9H
X..290	45	22	305 ^{H9}	278.4 _{h10}	278	305 _{m6}	325	16	8	960 ₋₁	268	143 ₋₁	297.014 ^{-0.105 -0.184}	492	5	M42	M36	W 280x8x30x34x8f N 280x8x30x34x9H
X..300	45	22	305 ^{H9}	278.4 _{h10}	278	305 _{m6}	325	16	8	960 ₋₁	268	143 ₋₁	297.014 ^{-0.105 -0.184}	492	5	M42	M36	W 280x8x30x34x8f N 280x8x30x34x9H
X..310	55	28	325 ^{H9}	298.4 _{h10}	298	325 _{m6}	345	16	8	1029 ₋₁	318	143 ₋₁	316.655 ^{-0.102 -0.180}	528.5	5	M42	M36	W 300x8x30x36x8f N 300x8x30x36x9H
X..320	55	28	325 ^{H9}	298.4 _{h10}	298	325 _{m6}	345	16	8	1029 ₋₁	318	143 ₋₁	316.655 ^{-0.102 -0.180}	528.5	5	M42	M36	W 300x8x30x36x8f N 300x8x30x36x9H

5.13.4 Mounting the gear unit onto the machine shaft

INFORMATION



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

Sizes X100 – 160

Observe the notes in chapter "Important notes" (→ 93).

INFORMATION



- Included in the delivery:
 - 2 x retaining rings [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.

Sizes X170 – 320

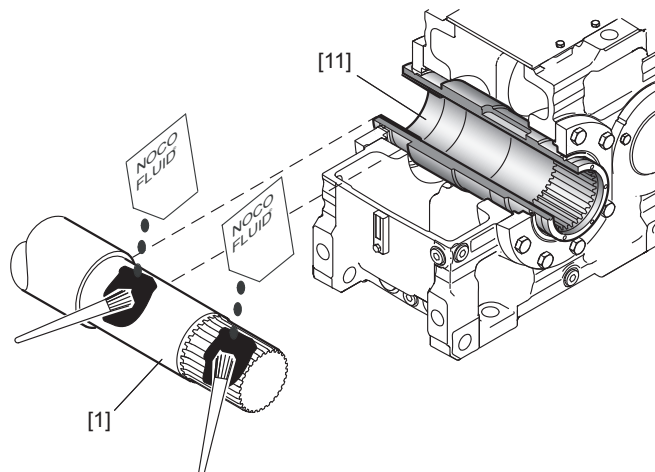
Observe the notes in chapter "Important notes" (→ 93).

INFORMATION



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

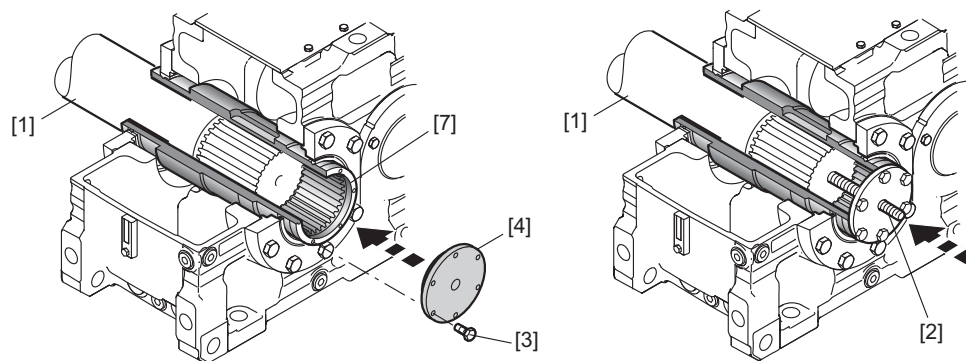
1. Apply some NOCO® fluid on the machine shaft [1] around the bushing [11] and the splining.



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- [1] Machine shaft
[11] Bushing

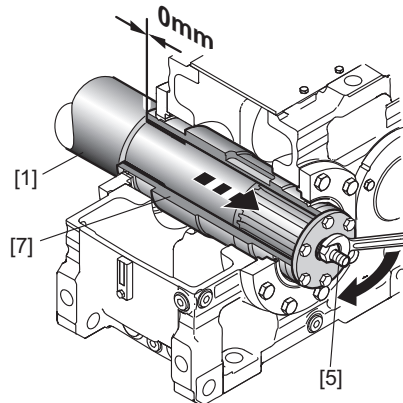
2. Push the gear unit onto the machine shaft. The splining of the hollow shaft must mesh with the splining of the machine shaft.
3. Tighten the retaining screws [3] and screw the threaded rod [2] onto the machine shaft [1]. Observe the tightening torques in chapter "Thread sizes / tightening torques" (→ 149).



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

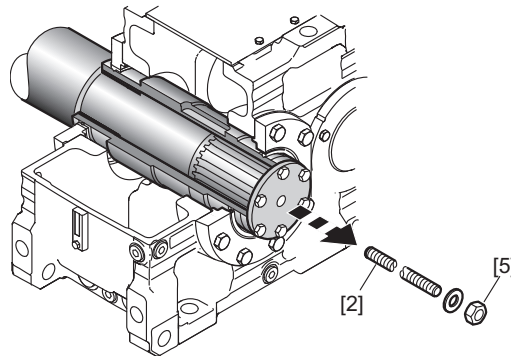
4. Tighten the machine shaft [1] with the nut [5] until the shoulders of the machine shaft and the hollow shaft [7] meet.



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

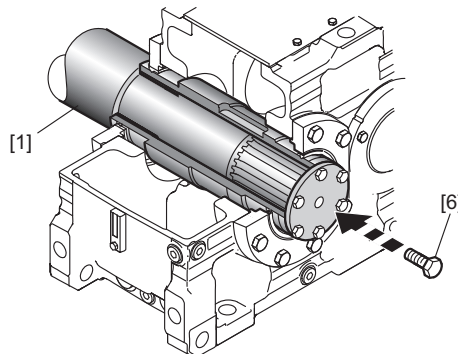
5. Loosen the nut [5]. Screw the threaded rod [2] out.



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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 tightening torques in chapter ""Thread sizes / tightening torques" (→ 149)".



771756683

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

NOTICE

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

Risk of injury to persons and damage to property.

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

5.13.5 Disassembling 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

Disassemble the gear unit from the machine shaft as described in chapter "Disassembling the gear unit from the machine shaft" (→ 130).

Sizes X170 – 320

Disassemble the gear unit from the machine shaft as described in chapter "Disassembling the gear unit from the machine shaft" (→ 132).

5.14 Torque arm /T

Observe the notes in chapter "Important notes" (→ 93).



▲ 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 bracket 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 bracket.

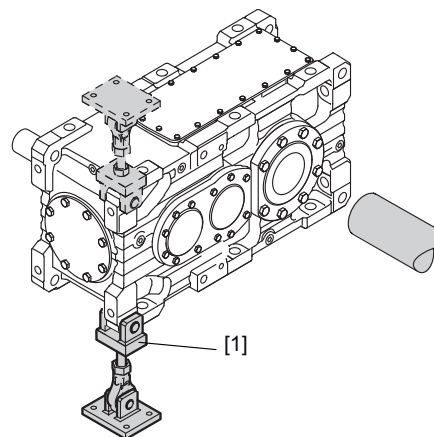
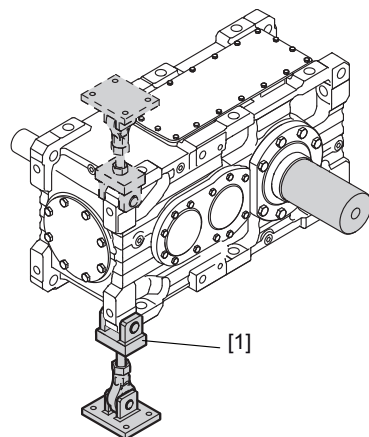
NOTICE

Strain on the torque bracket might break the housing.

Possible damage to property.

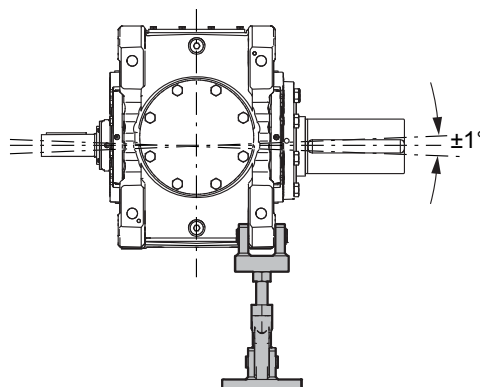
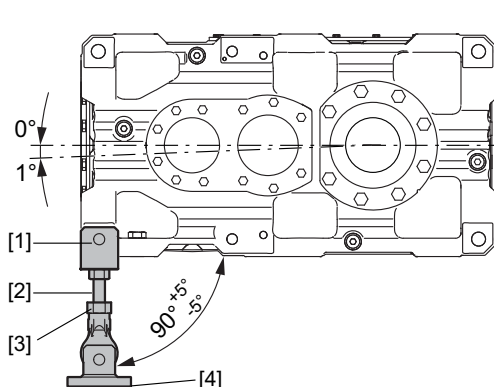
- Adhere to the specified screw size, tightening torques and required screw strength.

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. Align the gear unit horizontally over the threaded bolts and the nuts of the torque arm.



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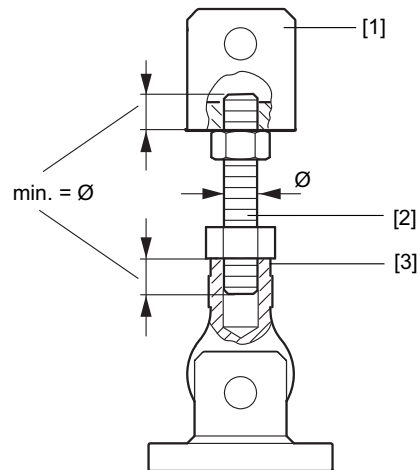
- [1] Yoke with bolt
- [2] Threaded bolt with nuts
- [3] Joint head
- [4] Yoke plate with bolt

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 cross section on both sides.



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- [1] Yoke with bolt
[2] Threaded 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

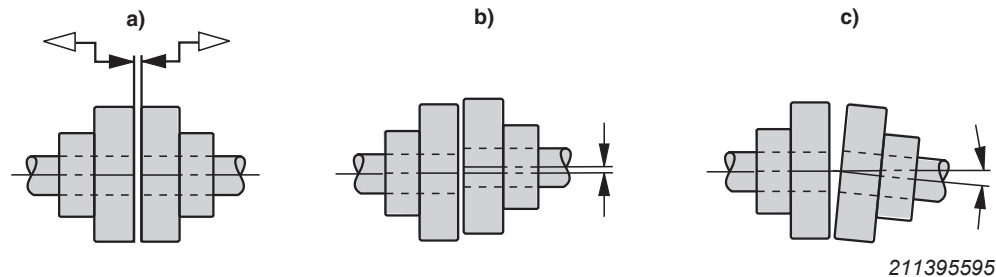


Observe the operating instructions of the respective coupling manufacturer.

5.16.1 Mounting tolerances

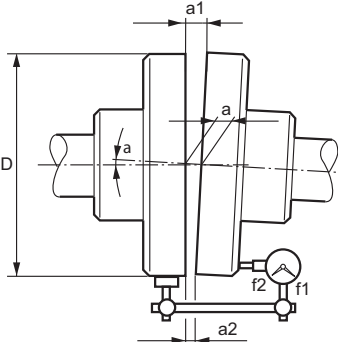
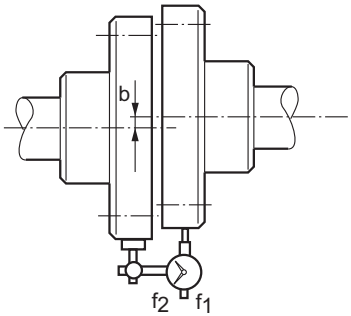
Adjust the following misalignments according to the coupling manufacturer's specifications when mounting couplings.

- Maximum and minimum clearance
- Radial misalignment
- 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 ($a1 - a2$).</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 version and type of mounting
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.

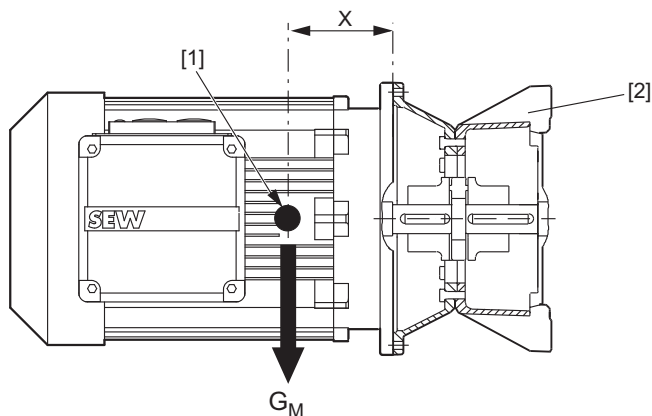
Mounting type	Mounting position M. / mounting surface F.		
	M5/F3 and M6/F4		
	X.F..	X.K..	X.T..
Foot-mounted design X../ B	$G_M \leq 2.0 G_G$	$G_M \leq 1.5 G_G$	$G_M \leq 1.75 G_G$
Flange-mounted design X../ F	$G_M \leq 1.5 G_G$	$G_M \leq 0.75 G_G$	$G_M \leq 1.25 G_G$

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

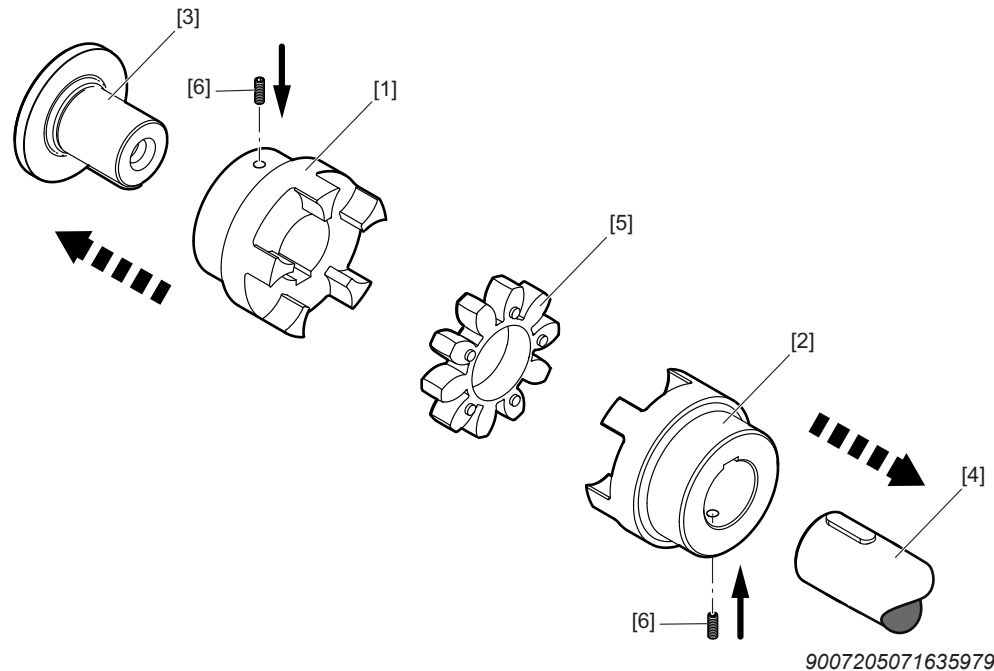
INFORMATION



Observe the operating instructions of the respective coupling manufacturer.

ROTEX® coupling

Observe the notes in chapter "Important notes" (→ 93).



Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

1. Mount the coupling halves [1][2] onto the input and output shafts [3][4].

NOTICE

Improper assembly can damage the coupling halves [1][2].

Possible damage to property.

- Heat the hub to about 80 °C to facilitate the assembly.

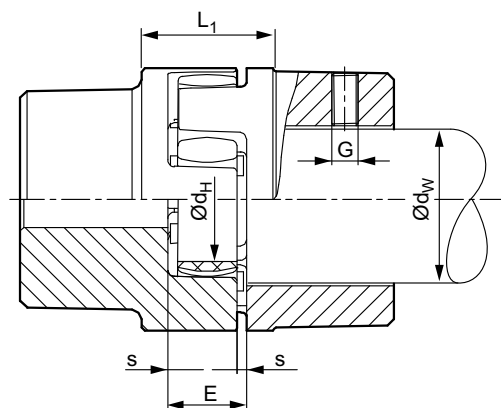
2. Insert the spider [5] and DZ elements in the cam section of the input/output hub [1][2].
3. Push the gear unit/motor in axial direction until dimension **E** is reached. If the gear unit/motor has already been installed permanently, set dimension **E** by moving the hubs [1][2] axially on the input and output shafts [3][4].

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 girth gear remains axially flexible during operation. The **dimension E** is listed in the following table.



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

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

Displacement – Aligning the coupling

NOTICE

Improper mounting of the coupling may result in damage.

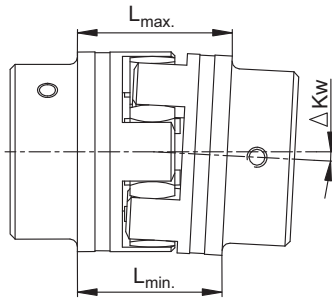
Possible damage to property.

- 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.

Important:

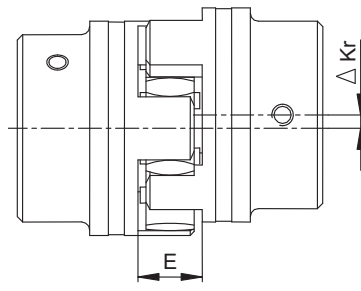
- The displacement values specified in the table (see next page) are maximum values that must not occur simultaneously. If radial offset and angular offset occur at the same time, the permitted displacement values may only be used proportionately.
- Use dial indicator, linear or feeler gauge to check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

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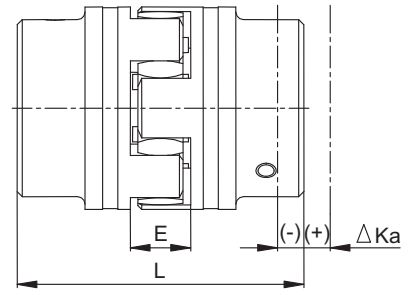


Angular misalignments

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



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:

$$\Delta K_r = 30\%$$

$$\Delta K_w = 70\%$$

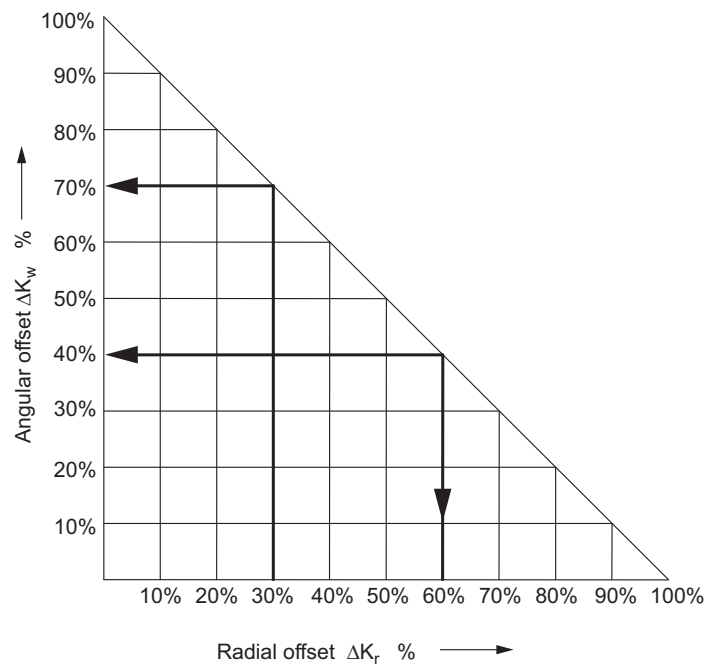
Example 2:

$$\Delta K_r = 60\%$$

$$\Delta K_w = 40\%$$

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

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Displacement values

The table below shows the displacement values:

ROTEX® size	14	19	24	28	38	42	48	55	65	75	90	100	110	125	140	160	180
Max. axial displacement ΔK_a [mm]	-0.5	-0.5	-0.5	-0.7	-0.7	-1.0	-1.0	-1.0	-1.0	-1.5	-1.5	-1.5	-2.0	-2.0	-2.0	-2.5	-2.5
	1.0	1.2	1.4	1.5	1.8	2.0	2.1	2.2	2.6	3.0	3.4	3.8	4.2	4.6	5.0	5.7	6.4

5 Assembly/installation

Motor adapter /MA

Max. radial displacement ΔK_r [mm]	1500 rpm	0.17	0.20	0.22	0.25	0.28	0.32	0.36	0.38	0.42	0.48	0.50	0.52	0.55	0.60	0.62	0.64	0.68
	1800 rpm	0.11	0.13	0.15	0.17	0.19	0.21	0.25	0.26	0.28	0.32	0.34	0.36	0.38	-	-	-	-
ΔK_w [degree] angular displacement when $n = 1500$ rpm ΔK_w [mm]		1.2	1.2	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.2	1.3	1.3	1.2	1.2	1.2
		0.67	0.82	0.85	1.05	1.35	1.7	2.0	2.3	2.7	3.3	4.3	4.8	5.6	6.5	6.6	7.6	9.0
ΔK_w [degree] angular displacement when $n = 3000$ rpm ΔK_w [mm]		1.1	1.1	0.8	0.8	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.1	1.1	-	-	-	-
		0.62	0.7	0.75	0.84	1.1	1.4	1.6	2.0	2.3	2.9	3.8	4.2	5.0	-	-	-	-

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5.17.3 Attaching the motor to the motor adapter

Observe the notes in chapter "Important information" (→ 93).

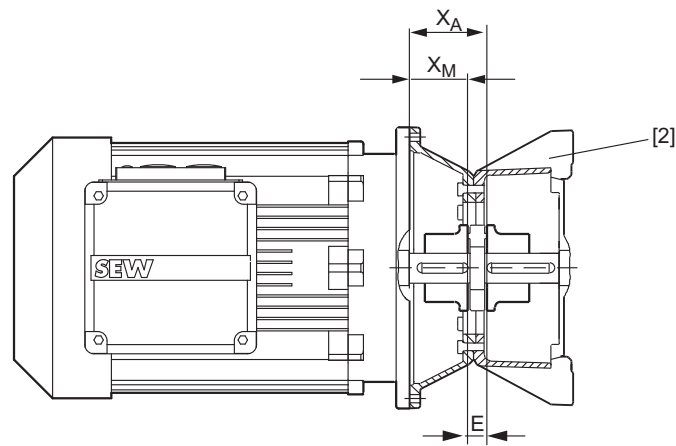
1. Clean the motor shaft and flange surfaces of the motor and the motor adapter. They must be dry and free of grease.

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" (→ 163) 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
$\rightarrow XM = XA - E$			

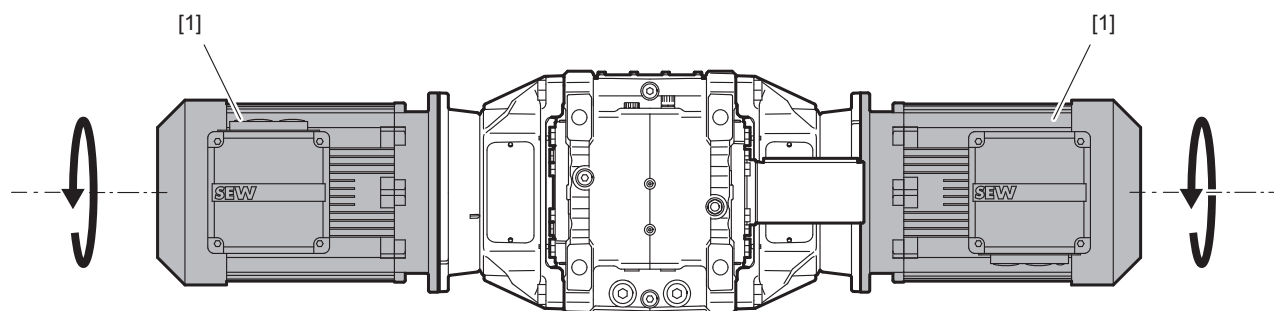
3. Secure the coupling halves using the set screw.
4. Mount the motor onto the motor adapter, making sure that the claws of the coupling engage each other.

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:

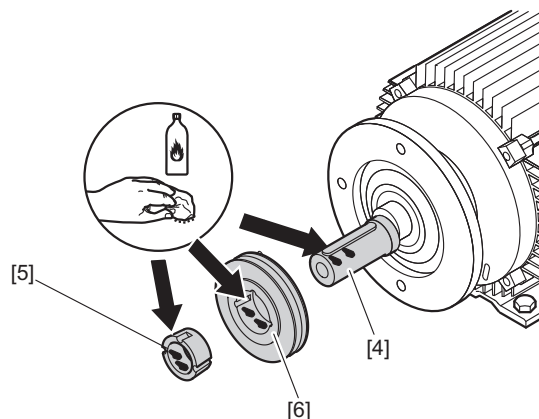
G_M = Motor weight

G_G = Gear unit weight

5.18.2 Mounting the V-belt drive

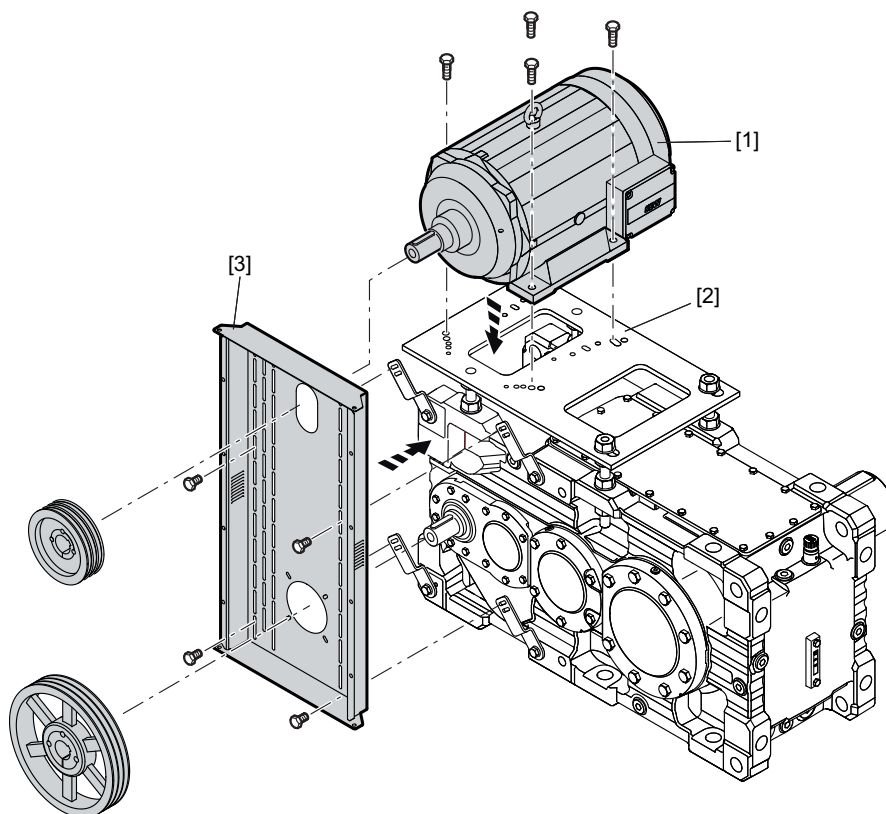
Observe the notes in chapter "Important notes" (→ 93).

1. Mount the motor [1] to the base plate [2] (mounting 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.

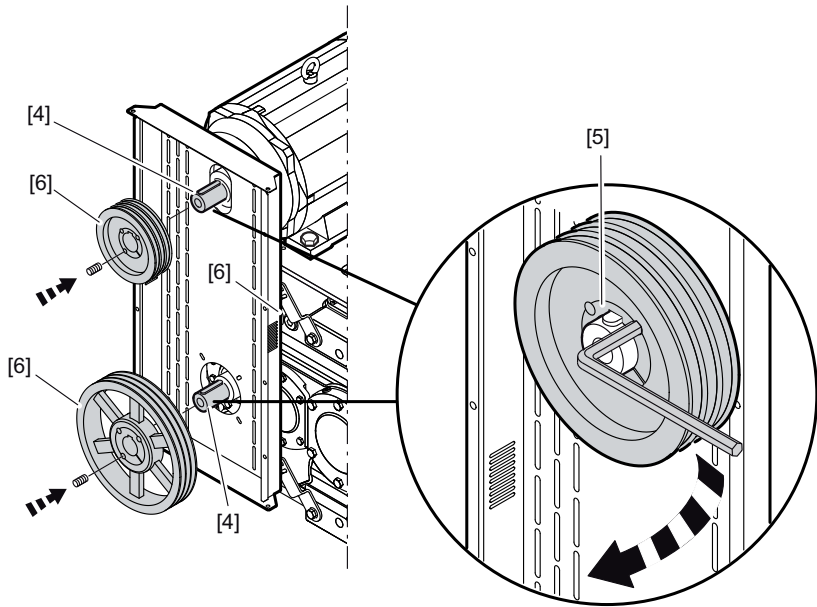


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4. Mount the belt pulleys with the taper bushings [6] on the gear unit and motor shaft [4]. Apply some grease to the screws of the taper bushings and fill the remaining boreholes with grease. Tighten the locking screws of the taper bushings [5] evenly.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

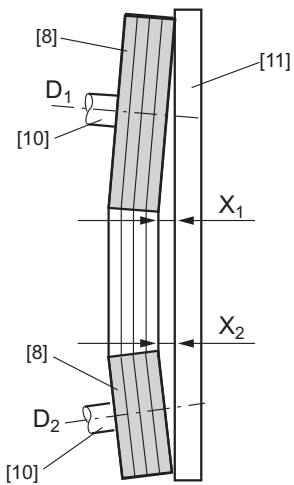
The following table shows the tightening torques for the taper lock bushings [5].

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 [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. Apply the V-belts [8] to the belt pulleys and tighten them by adjusting the base plate via the threaded rods [9].

NOTICE

Never apply force to mount the V-belt.

Possible damage to property.

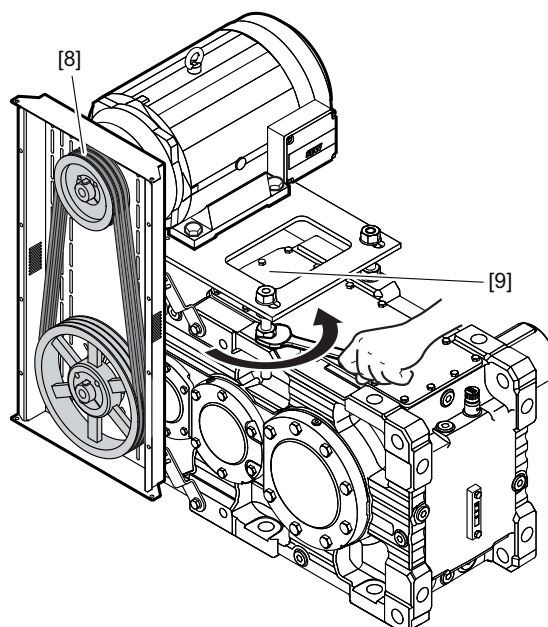
- Mounting using a screwdriver etc. will damage the V-belt externally and internally.

▲ CAUTION

Never apply force to mount the V-belt.

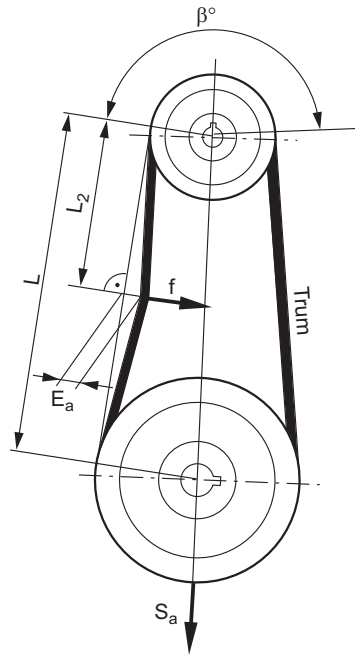
Possible dangerous situation.

- Be careful not to get your fingers between the disk and the V-belt when adjusting and turning the V-belt pulleys.



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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 tension.
 - 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

5 Assembly/installation

V-belt drives /VBD

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
	1.8	4	25	12.4	12.4	50	44
		5.5	25	13.4	15.2	45	40
		7.5	25	11.7	13.5	49	43
		9.2	25	13.5	15.3	45	39
		11	25	11.7	13.5	49	43
		15	50	17.0	18.7	44	39
		18.5	50	15.7	18.5	47	42
		22	50	14.9	17.2	48	42
		30	75	16.1	20.1	44	39
		37	50	13.7	15.8	52	46
		45	75	19.7	22.8	38	33
		55	75	14.4	17.8	44	39
		75	75	15.8	19.9	44	38
		90	75	12.7	17.0	47	41

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Size	Gear ratio	Motor power [kW]	Test force [N]	Indentation depth (mm)	Indentation depth (mm)	Frequency (1/s)	Frequency (1/s)
				Initial assembly	Used belts	Initial assembly	Used belts
XF180-190	1.25	7.5	25	11.7	13.5	49	43
		9.2	25	9.8	13.3	52	46
		11	25	11.7	13.5	48	43
		15	25	9.9	13.4	51	45
		18.5	50	15.8	18.6	47	41
		22	50	14.6	16.9	49	43
		30	75	18.3	21.2	42	37
		37	75	20.5	23.7	36	31
		45	75	17.4	22.0	38	33
		55	75	16.7	20.8	39	34
		75	75	20.2	25.5	34	30
		90	75	18.7	23.3	35	31
		110	75	15.5	20.7	39	34
		132	75	12.2	16.7	42	37
	1.4	7.5	25	11.7	13.5	49	43
		9.2	25	9.8	13.2	52	46
		11	25	11.7	13.5	49	43
		15	25	9.9	13.4	51	45
		18.5	50	15.8	18.7	47	41
		22	50	14.6	16.9	49	43
		30	50	15.9	18.7	47	41
		37	75	20.8	24.0	35	31
		45	75	17.8	22.5	39	34
		55	75	16.0	19.9	41	36
		75	75	19.8	25.0	35	30
		90	75	17.2	23.1	36	32
		110	75	16.5	22.2	37	32
		132	75	13.1	17.9	40	35
	1.6	7.5	25	11.7	13.5	49	43
		9.2	25	9.8	13.3	52	46
		11	25	11.7	13.5	48	42
		15	50	17.1	18.7	44	39
		18.5	50	15.7	18.5	47	41
		22	50	14.5	16.8	49	43
		30	75	15.9	19.8	45	39
		37	50	16.3	18.7	44	38
		45	75	16.0	21.6	40	35
		55	75	17.0	21.4	39	35
XF180-190	1.6	75	75	20.3	25.6	34	30
		90	75	17.4	23.3	36	32
		110	75	15.7	19.6	39	34
		132	75	12.4	17.0	42	37
	1.8	7.5	25	11.7	13.5	49	43
		9.2	25	9.7	13.1	53	47
		11	25	11.7	13.5	49	43
		15	50	17.0	18.7	44	39
		18.5	50	15.7	18.5	47	42
		22	50	14.9	17.2	48	42
		30	75	16.1	20.1	44	39
		37	50	16.1	18.6	44	39
		45	75	20.3	23.4	37	32
		55	75	17.2	21.7	39	34
		75	75	19.8	24.9	35	30
		90	75	17.5	23.4	36	31
		110	75	15.0	20.0	38	33
		132	75	12.7	17.4	41	36

5 Assembly/installation

V-belt drives /VBD

Size	Gear ratio	Motor power [kW]	Test force [N]	Indentation depth (mm)	Indentation depth (mm)	Frequency (1/s)	Frequency (1/s)
				Initial assembly	Used belts	Initial assembly	Used belts
XF200 – 210	1.25	7.5	25	11.7	13.5	49	43
		9.2	25	9.8	13.3	52	46
		11	25	11.7	13.5	48	43
		15	25	9.9	13.4	51	45
		18.5	50	15.8	18.6	47	41
		22	50	14.6	16.9	49	43
		30	75	18.3	21.2	42	37
		37	75	20.5	23.7	36	31
		45	75	17.4	22.0	38	33
		55	75	16.7	20.8	39	34
		75	75	20.2	25.5	34	30
		90	75	18.7	23.3	35	31
		110	75	15.5	20.7	39	34
		132	75	12.2	16.7	42	37
	1.4	7.5	25	11.7	13.5	49	43
		9.2	25	9.8	13.2	52	46
		11	25	11.7	13.5	49	43
		15	25	9.9	13.4	51	45
		18.5	50	15.8	18.7	47	41
		22	50	14.6	16.9	49	43
		30	50	15.9	18.7	47	41
		37	75	20.8	24.0	35	31
		45	75	17.8	22.5	39	34
		55	75	16.0	19.9	41	36
		75	75	19.8	25.0	35	30
		90	75	17.2	23.1	36	32
		110	75	16.5	22.2	37	32
		132	75	13.1	17.9	40	35
	1.6	7.5	25	11.7	13.5	49	43
		9.2	25	9.8	13.3	52	46
		11	25	11.7	13.5	48	42
		15	50	17.1	18.7	44	39
		18.5	50	15.7	18.5	47	41
		22	50	14.5	16.8	49	43
		30	75	15.9	19.8	45	39
		37	50	16.3	18.7	44	38
		45	75	16.0	21.6	40	35
		55	75	17.0	21.4	39	35
XF200 – 210	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
		155	75	10.0	14.5	45	40
	1.8	7.5	25	11.7	13.5	49	43
		9.2	25	9.7	13.1	53	47
		11	25	11.7	13.5	49	43
		15	50	17.0	18.7	44	39
		18.5	50	15.7	18.5	47	42
		22	50	14.9	17.2	48	42
		30	75	16.1	20.1	44	39
		37	50	16.1	18.6	44	39
		45	75	20.3	23.4	37	32
		55	75	17.2	21.7	39	34

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Size	Gear ratio	Motor power [kW]	Test force [N]	Indentation depth (mm)	Indentation depth (mm)	Frequency (1/s)	Frequency (1/s)
				Initial assembly	Used belts	Initial assembly	Used belts
XF220 – 230	1.25	11	50	19.7	21.7	38	33
		15	50	19.8	21.8	38	33
		18.5	50	18.6	21.8	40	35
		22	50	17.5	20.3	41	36
		30	25	11.9	16.1	43	38
		37	75	20.5	23.7	36	31
		45	75	17.4	22.0	38	33
		55	75	18.3	22.8	36	31
		75	75	20.2	25.5	34	30
		90	75	18.7	23.3	35	31
		110	75	19.8	25.0	34	30
		132	75	17.2	23.1	37	32
		160	125	19.1	23.2	32	28
		200	125	16.6	20.5	35	31
	1.4	11	50	20.0	22.0	38	33
		15	25	11.9	16.1	43	38
		18.5	50	19.0	22.3	39	34
		22	50	17.5	20.3	41	36
		30	25	11.9	16.1	43	38
		37	75	18.9	23.6	37	32
		45	75	17.8	22.5	39	34
		55	75	17.5	23.4	36	32
		75	75	19.8	25.0	35	30
		90	75	17.2	23.1	36	32
		110	75	19.4	24.5	35	31
		132	75	16.9	22.6	37	33
		160	125	18.2	22.1	34	30
		200	125	15.8	19.6	37	32
	1.6	11	50	19.7	21.6	38	34
		15	50	20.4	22.4	37	32
		18.5	50	18.7	22.1	40	35
		22	50	17.4	20.1	41	36
		30	75	18.9	23.6	37	33
		37	50	16.3	18.7	44	38
		45	75	16.0	21.6	40	35
		55	75	19.9	25.1	34	30
		75	75	20.3	25.6	34	30
		90	75	17.4	23.3	36	32
		110	75	19.6	24.7	35	30
		132	75	17.0	22.8	37	33
XF220 – 230	1.6	160	125	18.2	22.1	34	30
		200	125	15.8	19.6	37	33
	1.8	11	25	14.0	16.2	40	36
		15	50	20.0	22.0	38	33
		18.5	50	18.8	22.2	39	35
		22	50	17.2	19.9	42	37
		30	75	19.4	24.2	36	32
		37	50	16.1	18.6	44	39
		45	75	20.3	23.4	37	32
		55	75	17.4	21.6	36	32
		75	75	19.8	24.9	35	30
		90	75	17.5	23.4	36	31
		110	75	20.0	25.3	34	30
		132	75	17.4	21.6	36	32
		160	125	18.9	23.0	33	29
		200	125	16.4	20.4	36	31

X.K..

Size	Gear ratio	Motor power [kW]	Test force [N]	Indentation depth (mm)	Indentation depth (mm)	Frequency (1/s)	Frequency (1/s)
				Initial assembly	Used belts	Initial assembly	Used belts
XK100 – 110	1.25	4	25	9.4	10.7	64	56
		5.5	25	8.2	9.4	67	59
		7.5	25	8.1	9.4	70	62
		9.2	25	8.2	9.4	68	59
		11	25	8.1	9.4	70	61
		15	25	7.0	9.5	73	64
		18.5	50	11.0	13.0	64	57
	1.4	4	25	9.5	10.8	63	55
		5.5	25	8.2	9.5	67	59
		7.5	25	8.1	9.4	71	62
		9.2	25	8.2	9.4	67	59
		11	25	8.1	9.4	70	61
		15	25	7.0	9.5	73	64
		18.5	50	11.2	13.2	66	58
	1.6	4	25	9.5	10.7	64	56
		5.5	25	8.2	9.4	68	59
		7.5	25	8.0	9.3	71	63
		9.2	25	8.3	9.5	67	59
		11	25	8.0	9.3	71	62
		15	50	12.0	13.2	63	55
		18.5	50	11.1	13.1	67	58
	1.8	4	25	9.5	10.7	64	56
		5.5	25	8.2	9.5	67	59
		7.5	25	8.1	9.4	71	62
		9.2	25	8.1	9.3	69	60
		11	25	8.1	9.4	70	61
		15	50	11.9	13.0	64	56
		18.5	50	11.0	12.9	68	60
XK120-130	1.25	5.5	25	9.6	11.0	57	50
		7.5	25	9.5	11.0	60	53
		9.2	25	9.6	11.1	57	50
		11	25	9.5	11.0	60	52
		15	25	8.2	11.1	62	55
		18.5	50	13.0	15.3	57	50
		22	50	12.1	13.9	59	52
		30	25	8.2	11.1	62	55
		37	75	14.0	16.2	52	46
		45	75	14.7	18.5	45	40
	1.4	5.5	25	9.6	11.1	57	50
		7.5	25	9.6	11.1	60	52
		9.2	25	9.6	11.0	58	51
		11	25	9.6	11.1	59	52
		15	25	8.2	11.1	63	55
		18.5	50	13.0	15.4	57	50
		22	50	12.0	13.9	59	52
		30	25	8.2	11.1	63	55
		37	75	13.9	16.1	53	46
		45	75	14.1	19.0	46	40
	1.6	5.5	25	9.5	11.0	58	51
		7.5	25	9.5	11.0	60	53
		9.2	25	9.6	11.1	57	50
		11	25	9.5	11.0	59	52
XK120-130	1.6	15	50	13.9	15.3	54	48
		18.5	50	13.0	15.3	57	50
		22	50	11.9	13.8	60	53
		30	75	12.7	15.9	56	49
		37	50	11.1	12.8	64	57
	1.8	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
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
	1.4	132	75	11.2	12.0	56	49
		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
	1.6	110	75	13.3	17.8	45	40
		132	75	10.8	11.1	57	50
		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
	1.8	90	75	13.5	18.2	44	39
		110	75	16.1	17.2	47	41
		132	75	13.9	14.6	51	45
		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

5 Assembly/installation

V-belt drives /VBD

Size	Gear ratio	Motor power [kW]	Test force [N]	Indentation depth (mm)	Indentation depth (mm)	Frequency (1/s)	Frequency (1/s)
				Initial assembly	Used belts	Initial assembly	Used belts
XK180-190	1.25	30	75	18.3	21.2	42	37
		37	75	20.5	23.7	36	31
		45	75	17.4	22.0	38	33
		55	75	16.7	20.8	39	34
		75	75	20.2	25.5	34	30
		90	75	18.7	23.3	35	31
		110	75	15.5	20.7	39	34
		132	75	12.2	16.7	42	37
	1.4	30	50	15.9	18.7	47	41
		37	75	20.8	24.0	35	31
		45	75	17.8	22.5	39	34
		55	75	16.0	19.9	41	36
		75	75	19.8	25.0	35	30
		90	75	17.2	23.1	36	32
		110	75	16.5	22.2	37	32
		132	75	13.1	17.9	40	35
	1.6	30	75	15.9	19.8	45	39
		37	50	16.3	18.7	44	38
		45	75	16.0	21.6	40	35
XK180-190	1.6	55	75	17.0	21.4	39	35
		75	75	20.3	25.6	34	30
		90	75	17.4	23.3	36	32
		110	75	15.7	19.6	39	34
		132	75	12.4	17.0	42	37
	1.8	30	75	16.1	20.1	44	39
		37	50	16.1	18.6	44	39
		45	75	20.3	23.4	37	32
		55	75	17.2	21.7	39	34
		75	75	19.8	24.9	35	30
		90	75	17.5	23.4	36	31
		110	75	15.0	20.0	38	33
		132	75	12.7	17.4	41	36
XK200 – 210	1.25	30	50	20.1	23.8	36	32
		37	50	18.8	22.1	40	35
		45	75	18.7	23.4	38	33
		55	75	18.3	22.8	36	31
		75	75	20.2	25.5	34	30
		90	75	18.7	23.3	35	31
		110	75	19.8	25.0	34	30
		132	75	17.2	23.1	37	32
		160	125	19.1	23.2	32	28
		200	125	16.6	20.5	35	31
	1.4	30	75	23.4	27.1	33	29
		37	75	20.2	25.3	36	31
		45	75	17.2	21.7	39	34
		55	75	17.5	23.4	36	32
		75	75	19.8	25.0	35	30
		90	75	17.2	23.1	36	32
		110	75	19.4	24.5	35	31
		132	75	16.9	22.6	37	33
		160	125	18.2	22.1	34	30
		200	125	15.8	19.6	37	32
	1.6	30	75	22.4	27.8	33	29
		37	75	19.1	23.9	36	32
		45	75	16.0	21.6	40	35
		55	75	19.9	25.1	34	30
		75	75	20.3	25.6	34	30
		90	75	17.4	23.3	36	32
		110	75	19.6	24.7	35	30
		132	75	17.0	22.8	37	33
		160	125	18.2	22.1	34	30
		200	125	15.8	19.6	37	33
	1.8	30	75	21.9	27.2	34	30
		37	75	18.8	23.4	37	33
		45	75	20.3	23.4	37	32
		55	75	17.4	21.6	36	32
		75	75	19.8	24.9	35	30
		90	75	17.5	23.4	36	31
		110	75	20.0	25.3	34	30
		132	75	17.4	21.6	36	32
		160	125	18.9	23.0	33	29
		200	125	16.4	20.4	36	31

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Size	Gear ratio	Motor power [kW]	Test force [N]	Indentation depth (mm)	Indentation depth (mm)	Frequency (1/s)	Frequency (1/s)
				Initial assembly	Used belts	Initial assembly	Used belts
XK220 – 230	1.25	37	50	18.8	22.1	40	35
		45	75	18.7	23.4	38	33
XK220 – 230	1.25	55	75	18.3	22.8	36	31
		75	75	20.2	25.5	34	30
		90	75	18.7	23.3	35	31
		110	75	19.8	25.0	34	30
		132	75	17.2	23.1	37	32
		160	125	19.1	23.2	32	28
		200	125	16.6	20.5	35	31
	1.4	30	75	23.4	27.1	33	29
		37	75	20.2	25.3	36	31
		45	75	17.2	21.7	39	34
		55	75	17.5	23.4	36	32
		75	75	19.8	25.0	35	30
		90	75	17.2	23.1	36	32
		110	75	19.4	24.5	35	31
		132	75	16.9	22.6	37	33
		160	125	18.2	22.1	34	30
		200	125	15.8	19.6	37	32
	1.6	30	75	22.4	27.8	33	29
		37	75	19.1	23.9	36	32
		45	75	16.0	21.6	40	35
		55	75	19.9	25.1	34	30
		75	75	20.3	25.6	34	30
		90	75	17.4	23.3	36	32
		110	75	19.6	24.7	35	30
		132	75	17.0	22.8	37	33
	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

INFORMATION



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

5.22 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

5.23 Water cooling cover /CCV

5.23.1 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.

5.23.2 Removal

Observe the notes in chapter ""Inspection/Maintenance"" (→ 244).

5.23.3 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.

5.24 Water cooling cartridge /CCT

5.24.1 Notes on connection / installation

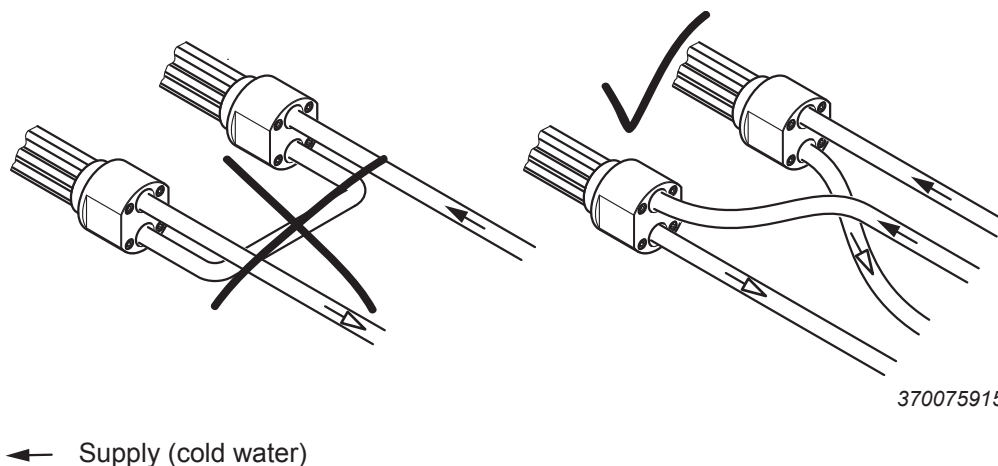
NOTICE

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"" (→ 185) 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.



→ 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.

5.24.2 Removal

Observe the notes in chapter "Inspection/Maintenance" (→ 246).

5.24.3 Requirements on the water quality



INFORMATION

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

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

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

Water hardness

Water hardness is defined by the amount of hardeners (carbonates and bicarbonates) in the water. Hardeners accumulate on the surface of the water cooling cartridge in particular at high temperatures and in this way impair the performance. Take these deposits into account when selecting the water cooling cartridge for extremely hard water.

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

Degree of hardness ¹⁾	Water quality
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 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

5.25 Oil-water cooler for splash lubrication /OWC

Observe the notes in chapter "Important notes" (→ 93).

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.

5.26 Oil-air cooler for splash lubrication /OAC

Observe the notes in chapter "Important notes" (→ 93).

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.

5.27 Oil-water cooler for pressure lubrication /OWP

Observe the notes in chapter "Important notes" (→ 93).

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.

5.28 Oil-air cooler for pressure lubrication /OAP

Observe the notes in chapter "Important notes" (→ 93).

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.

5.29 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" (→ 252). 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" (→ 252).
-

5.30 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.

5.30.1 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 thermostat of the oil heater, see table Thermostat setting on delivery, is factory-set to a temperature of about 5 K above the respective limit temperature "initial temperature for gear unit startup". For the permitted initial temperature of oil of various lubricant manufacturers, refer to the lubricant table in chapter "Permitted lubricants".

The thermostat turns off the oil heater at the initial temperature. 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.

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

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

If the drive is at standstill over a longer period, 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".

5.30.2 Thermostat

Electrical connection



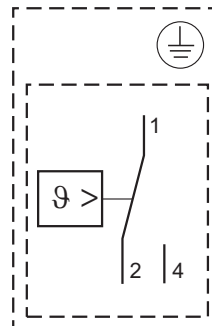
▲ WARNING

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

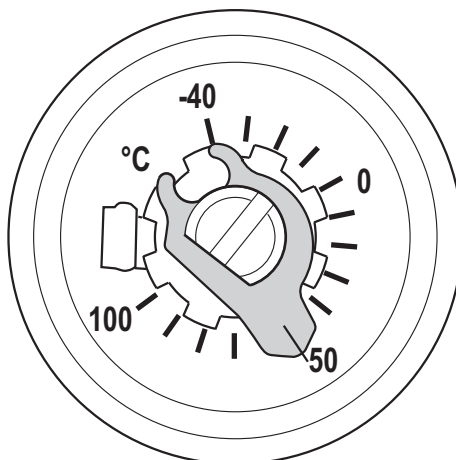
Maximum switching capacity:			
AMTHs-SW-2	Current		Voltage
	Terminal 2	Terminal 4	
	10 A	10 A	AC 230 + 10% cosφ = 1 (0.6)
	0.25 A	0.25 A	DC 230 + 10%
Contact reliability:			
To ensure the greatest contact reliability possible, the manufacturer recommends a minimum load of AC / DC 24 V, 100 mA for silver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

- Permitted ambient temperature: -40 °C to +80 °C
- Permitted storage temperature: min. -50 °C, max. +50 °C
- Scale range: -40 °C to +100 °C
- Cable entry: M20x1.5 for a cable diameter of 6 to 13 mm
- IP65 degree of protection according to EN 60529

5 Assembly/installation

Oil heater

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



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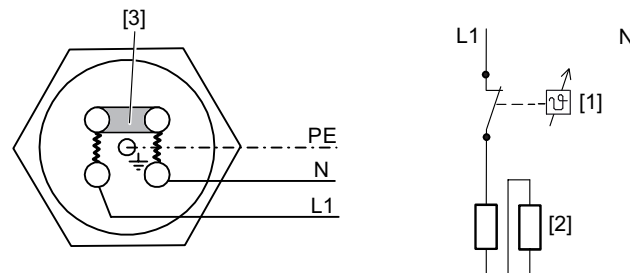
22299017/EN – 04/2016

5.30.3 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 ex works (connection space):



9007202007368715

- [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]
X100	X2K / X2F / X3K	1 x 0.4	6	2 x 0.4	11
	X3T / X3F	1 x 0.3	3	2 x 0.3	7
X110	X3T / X3F	1 x 0.3	4	-	-
X120	X4F / X3T / X4T	1 x 0.3	3	2 x 0.3	5
X130	X4F / X3T / X4T	1 x 0.4	3	-	-
X140	X4F / X3T / X4T	1 x 0.4	3	2 x 0.4	5

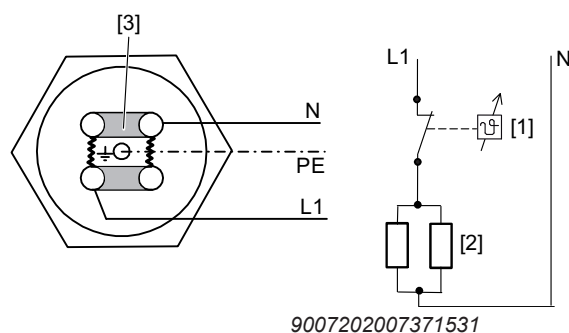
K/h = Heating capacity [Kelvin/hour]

P_{inst} = Power of the installed heater

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

The following figure shows the wiring ex works (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 x 0.6	6	-	-
X120	X2K	1 x 0.6	6	2 x 0.6	11
	X2F / X3K / X3F / X4K	1 x 0.7	6	2 x 0.7	11
X130	X2F / X2K / X3K / X3F / X4K	1 x 0.7	5	-	-
X140	X2K	1 x 0.7	4	2 x 0.7	9
	X2F / X3F / X3K / X4K	1 x 0.8	5	2 x 0.8	10
X150	X2K	1 x 0.8	5	-	-
	X2F / X3F / X3K / X4K	1 x 0.9	5	-	-
	X4F / X3T / X4T	1 x 0.6	3	-	-
X160	X2K	1 x 0.9	4	2 x 0.9	8
	X2F / X3F / X3K / X4K	1 x 1.1	4	2 x 1.1	8
	X4F / X3T / X4T	1 x 0.7	3	2 x 0.7	5
X170	X2K	1 x 0.9	4	-	-
	X2F / X3F / X3K / X4K	1 x 1.1	4	-	-
	X4F / X3T / X4T	1 x 0.7	3	-	-

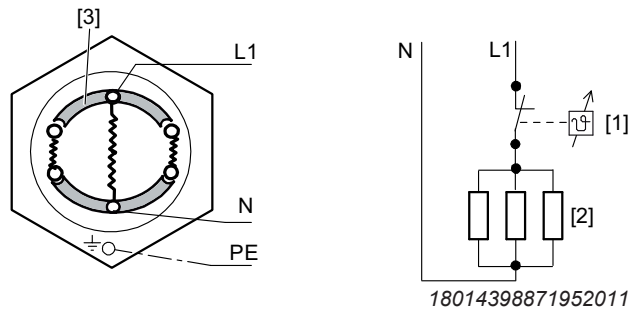
K/h = Heating capacity [Kelvin/hour]

P_{inst} = Power of the installed heater

AC voltage / 1-phase / 230 V / parallel connection / $I \leq 10 \text{ A}$

The following figure shows the wiring ex works (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.

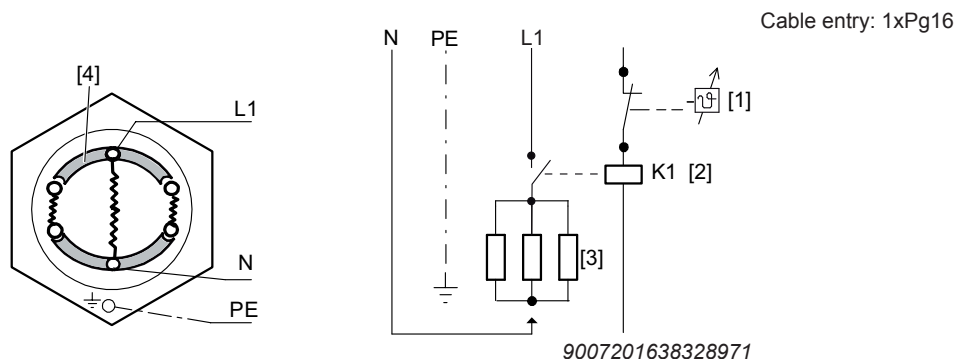
		P_{inst}		P_{inst}	
Gear unit		1 heating element		2 heating elements	
Size	Design		[K/h]		[K/h]
X180	X2F / X2K / X3K / X3F / X4K	1 x 1.6	5	-	-
	X3T / X4F / X4T	1 x 1.1	4	2 x 1.1	7
X190	X2F / X2K / X3K / X3F / X4K	1 x 1.6	5	-	-
	X3T / X4F / X4T	1 x 1.1	3	-	-
X200	X2K	1 x 1.6	4	-	-
	X2F / X3K / X3F / X4K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

K/h = Heating capacity [Kelvin/hour]

P_{inst} = Power of the installed heater

AC voltage / 1-phase / 230 V / parallel connection / $I \geq 10$ A

The following figure shows the wiring ex works (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.

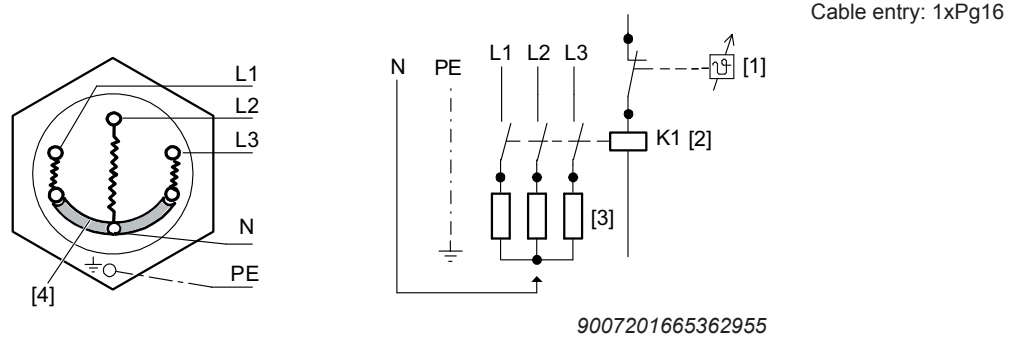
		P_{inst}		P_{inst}	
Gear unit		1 heating element		2 heating elements	
Size	Design		[K/h]		[K/h]
X180	X2F / X2K / X3K / X3F / X4K	-	-	2 x 1.6	10
X200	X2K	-	-	2 x 1.5	8
	X2F / X3K / X3F / X4K	-	-	2 x 1.8	8
	X4F / X4T	-	-	2 x 1.3	6
X220	X2K	-	-	2 x 1.8	7
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	-	-	2 x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

K/h = Heating capacity [Kelvin/hour]

P_{inst} = Power of the installed heater

Three-phase current / 3-phase / 30/400 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 x 1.6	5	2 x 1.6	10
	X3T / X4F / X4T	1 x 1.1	4	2 x 1.1	7
X190	X2F / X2K / X3K / X3F / X4K	1 x 1.6	5	-	-
	X3T / X4F / X4T	1 x 1.1	3	-	-
X200	X2K	1 x 1.6	4	2 x 1.6	8
	X2F / X3K / X3F / X4K	1 x 1.8	5	2 x 1.8	8
	X4F / X4T	1 x 1.3	3	2 x 1.3	6
	X3T	1 x 1.1	2	2 x 1.1	5
X210	X2K	1 x 1.6	4	-	-
	X2F / X3K / X3F / X4K	1 x 1.8	4	-	-
	X3T / X4F / X4T	1 x 1.3	3	-	-
X220	X2K	1 x 1.8	3	2 x 1.8	7
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 2.2	4	2 x 2.2	8
X230	X2K	1 x 1.8	3	-	-
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 2.2	4	-	-
X240	X2K	1 x 1.8	3	2 x 1.8	5
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 2.2	3	2 x 2.2	6
X250	X2K	1 x 2.2	3	-	-
	X2F / X3F / X4F / X3K / X4K / X3T / X4T	1 x 2.6	3	-	-

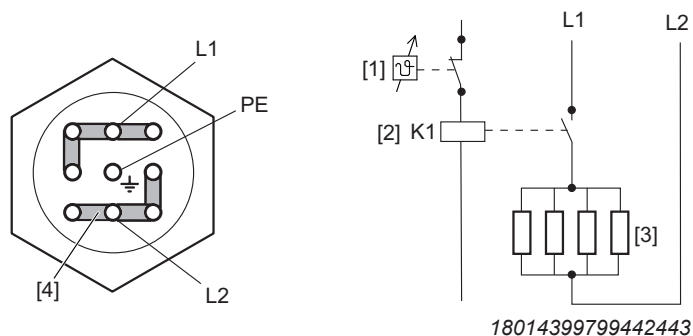
K/h = Heating capacity [Kelvin/hour]

P_{inst} = Power of the installed heater

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

The following figure shows the wiring ex works (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.

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

K/h = Heating capacity [Kelvin/hour]
P_{inst} = Power of the installed heater

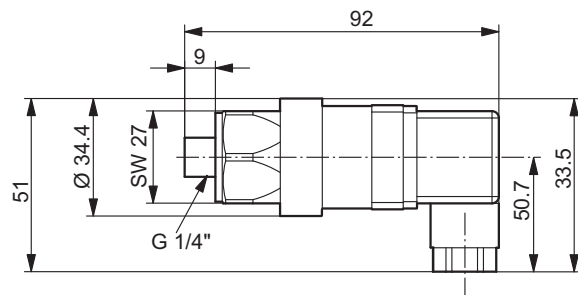
5.31 Pressure switch /PS

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**.

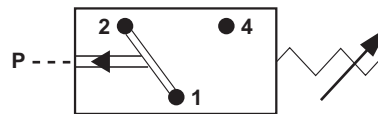
Another switch-off delay is not permitted as this might damage the gear unit.

5.31.1 Dimensions



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5.31.2 Electrical connection



722003723

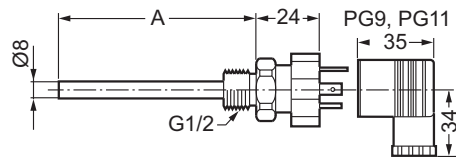
[1][2]	NC contact
[1][4]	NO contact

5.31.3 Technical data

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

5.32 Temperature sensor /PT100

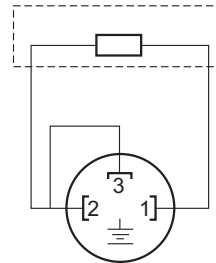
5.32.1 Dimensions



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A [mm]
50
150

5.32.2 Electrical connection



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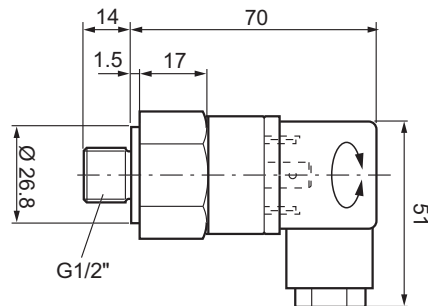
[1][2] Resistor element connection

5.32.3 Technical data

- Design with thermowell and changeable measuring insert
- Sensor tolerance [K] $\pm (0.3 + 0.005 \times T)$, (corresponds to DIN IEC 751 class B),
T = Oil temperature [°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.

5.33 Temperature switch /NTB

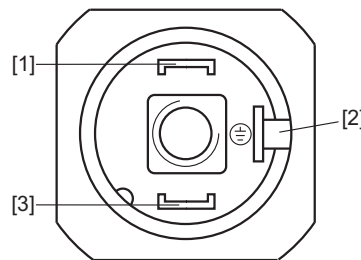
5.33.1 Dimensions



9007199621265931

5.33.2 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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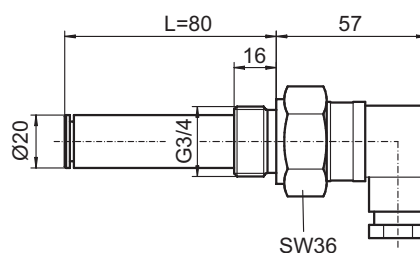
- [1][3] NC contact (without vacuum)
[2] Grounding terminal 6.3 x 0.8

5.33.3 Technical data

- Trigger 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

5.34 Temperature switch /TSK

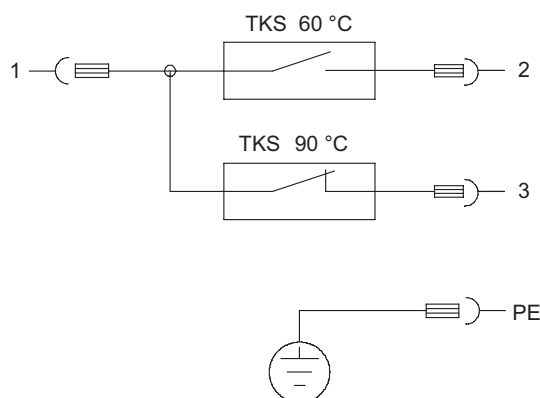
5.34.1 Dimensions



893872779

5.34.2 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][2] Switch 60 °C NO contact
 [1][3] Switch 90 °C NC contact
 PE Grounding terminal

5.34.3 Technical data

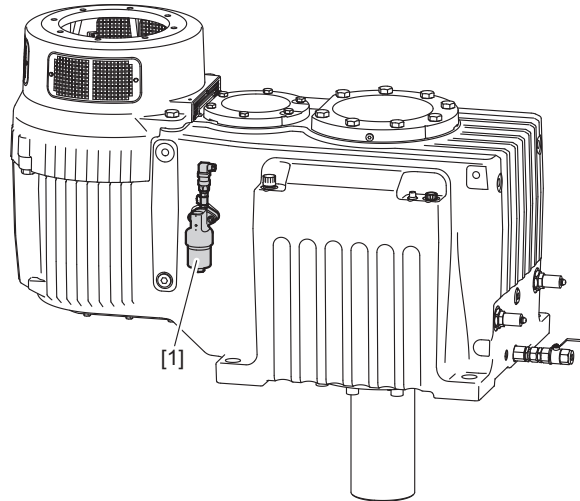
- Switching temperatures: 60 °C and 90 °C
- Contact capacity: 2 A - AC 240 V
- Plug connector: DIN EN 175301-803 PG11 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm

5.35 Oil filter

INFORMATION



Observe the operating instructions of the oil filter manufacturer.



15800209419

[1] Oil filter

5.36 Brake

INFORMATION



The brake is not set at the factory.

Observe the operating instructions of the respective brake manufacturer.

6 Startup



6.1 Important notes

NOTICE


Improper startup may result in damage to the gear unit.

Possible damage to property.

- Observe the following notes.

- 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" (→  220) and chapter "Changing the oil" (→  228).

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" (→  220).

- The most important technical data is provided on the nameplate. Additional data relevant for operation is available in drawings, on the order confirmation or any order-specific documentation.
- 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.
- Prior to startup, ensure that rotating shafts as well as couplings are equipped with suitable protective covers.
- 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 ambient temperatures are low, adhere to 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 ≥ 400 1/min is required for proper operation of the shaft end pump. If you use variable input speeds (e.g. inverter-controlled drives) or if you intend to change the input speed of a gear unit equipped with a shaft end pump, it is essential that you contact SEW-EURODRIVE.
- An oil heater is mandatory when operating gear units with shaft end pump at low ambient temperatures. For more information, refer to chapter "Limit temperature for gear unit startup".
- Observe the notes in chapter "Filling the gear unit with oil".

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 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.

6.5 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.

6.6 Oil-water cooler with motor pump for splash lubrication /OWC

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.

6.7 Oil-air cooler with motor pump for splash lubrication /OAC

INFORMATION



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

6.8 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.

6.9 Oil-air cooler with motor pump for pressure lubrication /OAP

INFORMATION



Before startup, first read the addendum to the operating instructions "Oil-Air Cooler with Motor Pump for Pressure Lubrication /OAP", which includes the manufacturer's documentation.

6.10 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.

6.10.1 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. Turn the thermostat to the required position.

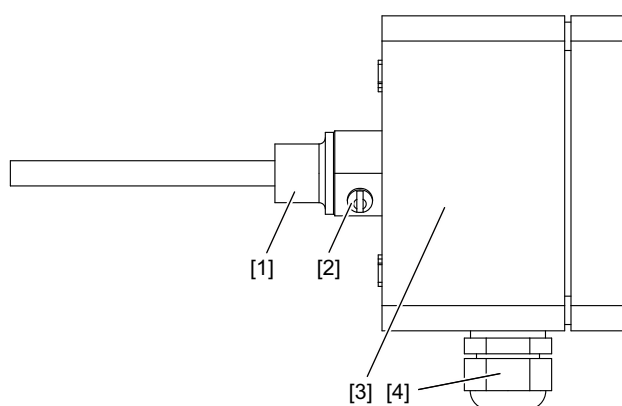
NOTICE

Observe the position of the cable gland during assembly.

Possible damage to property.

- Mount it in such a way that no moisture can enter.

3. Tighten the clamping screws [2].



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- | | |
|-----|-----------------|
| [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.

6.11 Backstop /BS

NOTICE

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

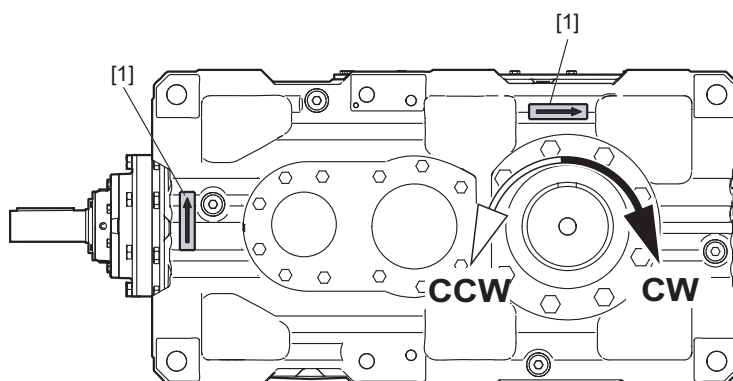
Possible damage to property

- The motor may not be operated in 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 might 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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6.12 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".

6.13 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.

6.13.1 Internal conservation

- **New or hardly used gear units:**
 - For internal conservation, SEW-EURODRIVE recommends the VCI conservation method.

- Apply the required amount of VCI anti-corrosion agent to the inside of the gear unit (e.g. FUCHS LUBRITECH Anticorit VCI UNI IP-40, www.fuchs-lubritech.com). The amount depends on the free space inside the gear unit. Any existing oil may usually remain in the drive.
- Replace the breather filter with a screw plug and close the gear unit so that it is air tight. Prior to startup, re-install the breather filter.
- **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" (→ 228) 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 filter 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 filter. Only use the oil grade specified on the nameplate.

6.13.2 External corrosion protection

- Clean the respective surfaces.
- Grease the shaft near the sealing lip to separate the sealing lip of the oil seal and the anti-corrosion agent.
- Apply a wax-based protective coating to shaft ends and unpainted surfaces as external corrosion protection (e.g. Herm. Hölterhoff Hölterol MF 1424, www.hoelterhoff.de).

INFORMATION



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

Observe the information in chapter "Storage and Transport Conditions" 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.



▲ 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 oil drain plug.

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. Otherwise, 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.
- Strictly 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"> • Check the housing temperature: <ul style="list-style-type: none"> – Mineral oil: max 90 °C – Synthetic oil: max 100 °C • Check gear unit noise
Monthly	<ul style="list-style-type: none"> • Check the gear unit for signs of leakage • Check the oil level
After 500 operating hours	<ul style="list-style-type: none"> • First oil change after initial startup
Every 6 months	<ul style="list-style-type: none"> • Check the screw fittings and piping for leakage.
Every 3000 operating hours, at least every 6 months	<ul style="list-style-type: none"> • Checking the oil consistency • Fill regreasable sealing systems with grease • For V-belt drives: Check the belt tension and condition of the V-belt pulleys and belts

Frequency	What is to be done?
Depending on the operating conditions, at least every 12 months	<ul style="list-style-type: none"> • Check whether retaining screws are tightly secured. • Check if the gear unit surface is free of dust and dirt, so that the gear unit can be optimally cooled. • Check the condition of the motor pump /ONP, replace filter element if necessary. • Check the condition of the oil-water cooler /OWC (see addendum to the operating instructions). • Check the condition of the oil-air cooler /OAC (see addendum to the operating instructions). • Check the condition of the oil-water cooler /OWP, replace filter element if necessary (see addendum to the operating instructions). • Check the condition of the oil-air cooler /OAP, replace filter element if necessary (see addendum to the operating instructions). • Clean the oil filter, replace filter element if necessary • Check the condition of the water cooling cartridge /CCT • Check the condition of the water cooling cover /CCV • Check the breather, replace them if necessary • Check the alignment of the input and output shaft • Check the condition and tightness of all the rubber tubes (aging effects)
At least every 3 years depending on the operating conditions (see figure on next page)	<ul style="list-style-type: none"> • Change mineral oil
At least every 5 years depending on the operating conditions (see figure on next page)	<ul style="list-style-type: none"> • Change synthetic oil

Frequency	What is to be done?
Varying (depending on external factors)	<ul style="list-style-type: none"> • Check the installed hose pipes • Clean the gear unit housing surface and the fan • Touch up or renew the surface/anticorrosion coating • Replace backstop <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"> – Speed on input shaft < 950 1/min – See backstop, chapter 4 <ul style="list-style-type: none"> • Check built-in cooler (such as water cooling cover /CCT and cartridge /CCV) for deposits • Check the oil heater /OH (at same time as the oil change): <ul style="list-style-type: none"> – Are all connecting leads and terminals tightened securely and free from corrosion? – Clean encrusted heating elements, replace if necessary

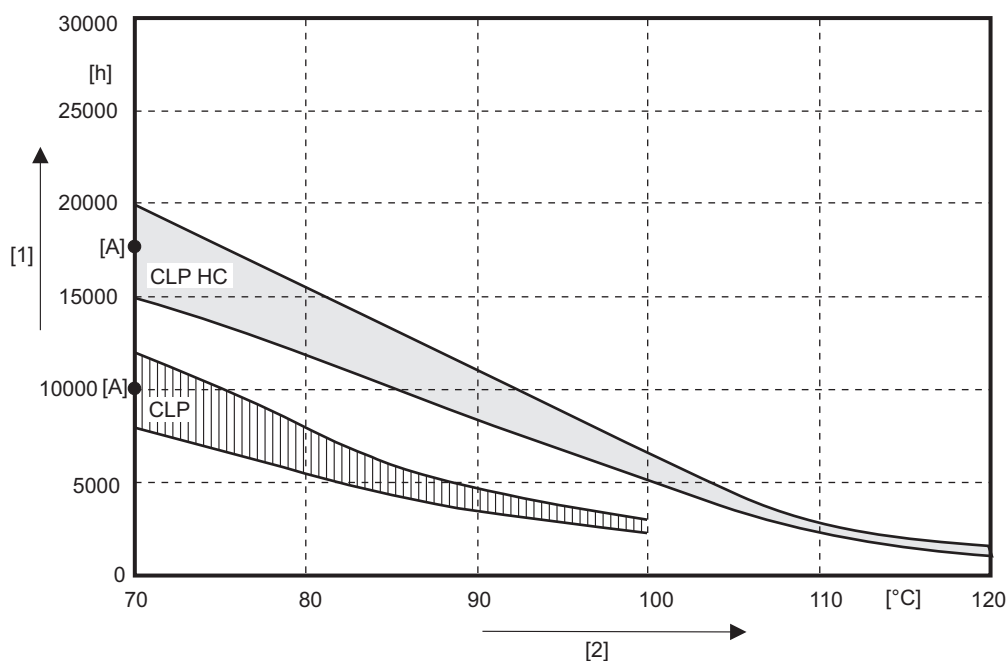
7.3 Lubricant change intervals

Change the oil more frequently when using special designs subject to more severe/aggressive ambient conditions.

INFORMATION



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



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

INFORMATION



SEW-EURODRIVE recommends that the gear unit oil is analyzed regularly to optimize the lubricant change intervals, see "Checking the oil consistency" (→ 227).

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.

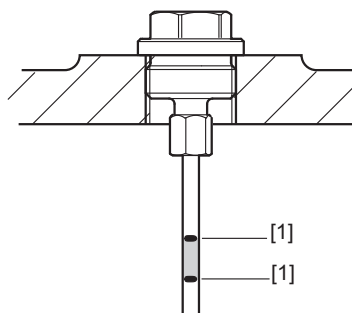
Possible damage to property.

- 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 chapter "Preliminary work regarding inspection/maintenance" (→ 215).



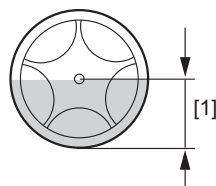
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1. Unscrew the oil dipstick and remove it.
2. Clean the oil dipstick and re-insert it by turning it hand-tight into the gear unit up to the stop.
3. Remove the oil dipstick and check the oil level. The oil level must be between the markings [1].
4. Proceed as follows if the oil level is too low:
 - Open the oil fill plug.
 - Fill in oil of the same oil grade until the oil level is between the markings [1].
5. If you filled in too much oil, proceed as follows:
 - Adjust the oil level. The oil level must be between the markings [1].
6. Screw in the oil dipstick.

Oil sight glass

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

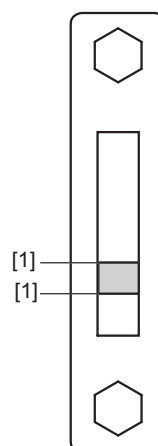
The oil sight glass only shows the oil level. The oil level is determined using the **oil dipstick**.



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Oil level glass

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).



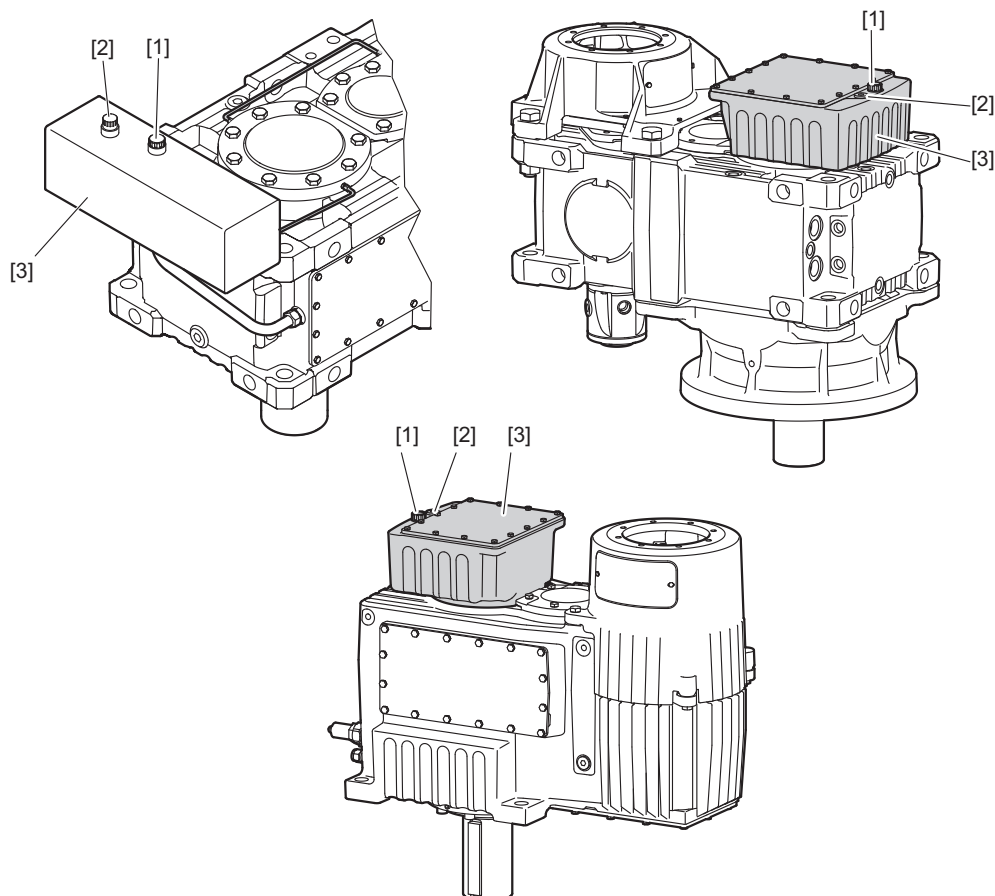
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1. The oil level must be between the markings [1].
2. Proceed as follows if the oil level is too low:
 - Open the oil fill plug.
 - Fill in oil of the same oil grade until the oil level is between the markings [1].
3. If you filled in too much oil,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

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].



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[1] Breather
[2] Oil dipstick

[3] Oil expansion tank

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

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" (→ 220).

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

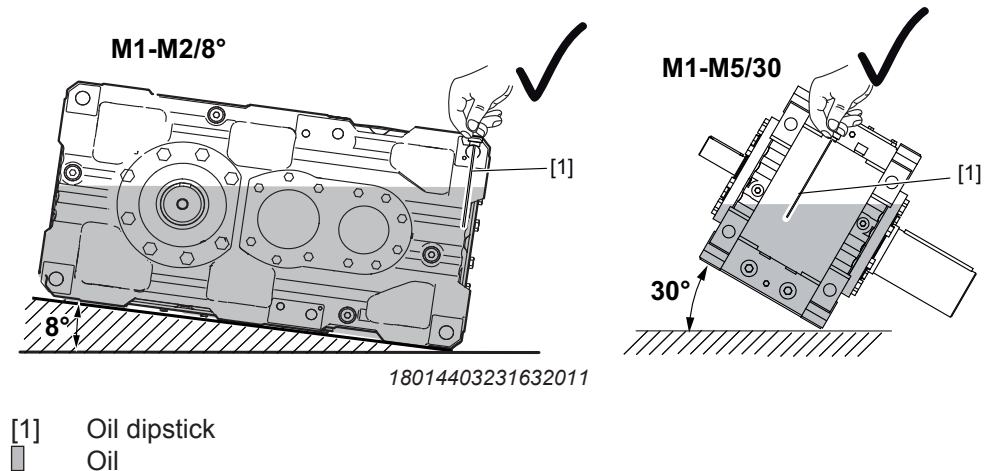
Observe the information on the nameplate and in the order documents.

Fixed pivoted mounting positions

Procedure

Check the oil level in the fixed, intended position. Observe the notes in chapter "Standard procedure" (→ 220).

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

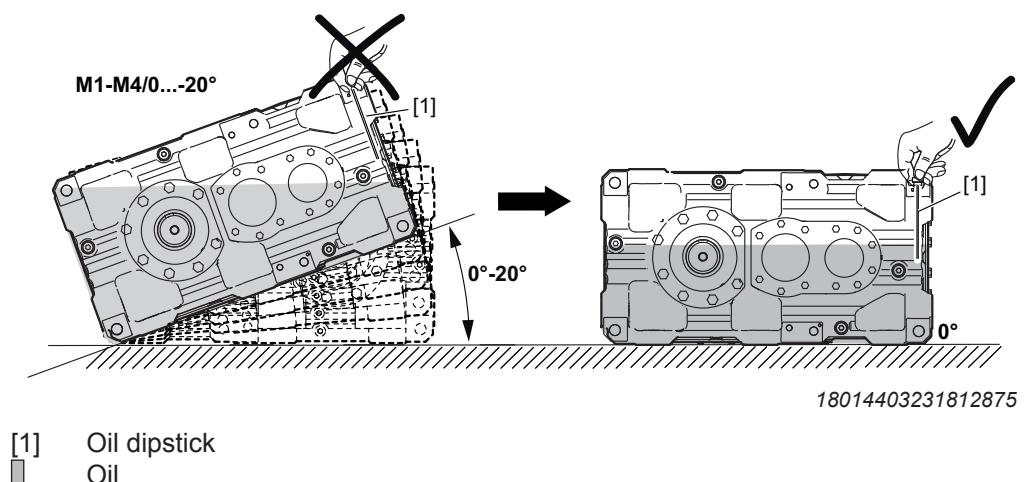


Variable pivoted mounting positions

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" (→ 220).

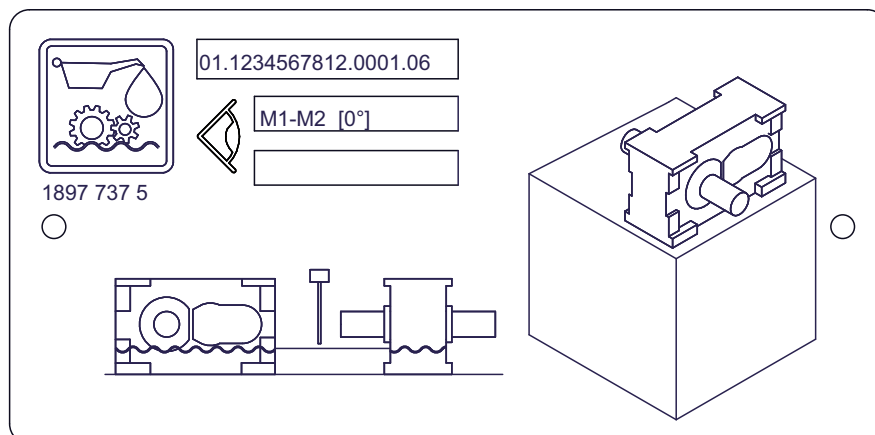
The following figure shows an example of how to check the oil level.



Information sign

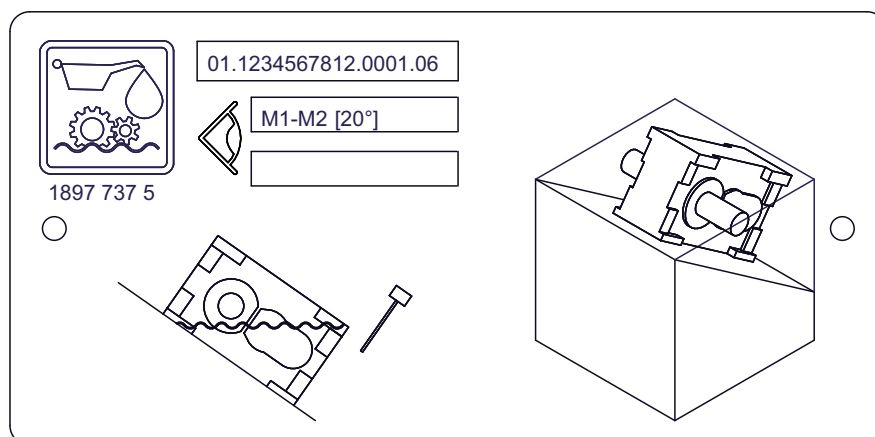
Observe the additional **information sign on the gear unit**. Check the oil level in the test mounting position specified on the information sign.

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



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



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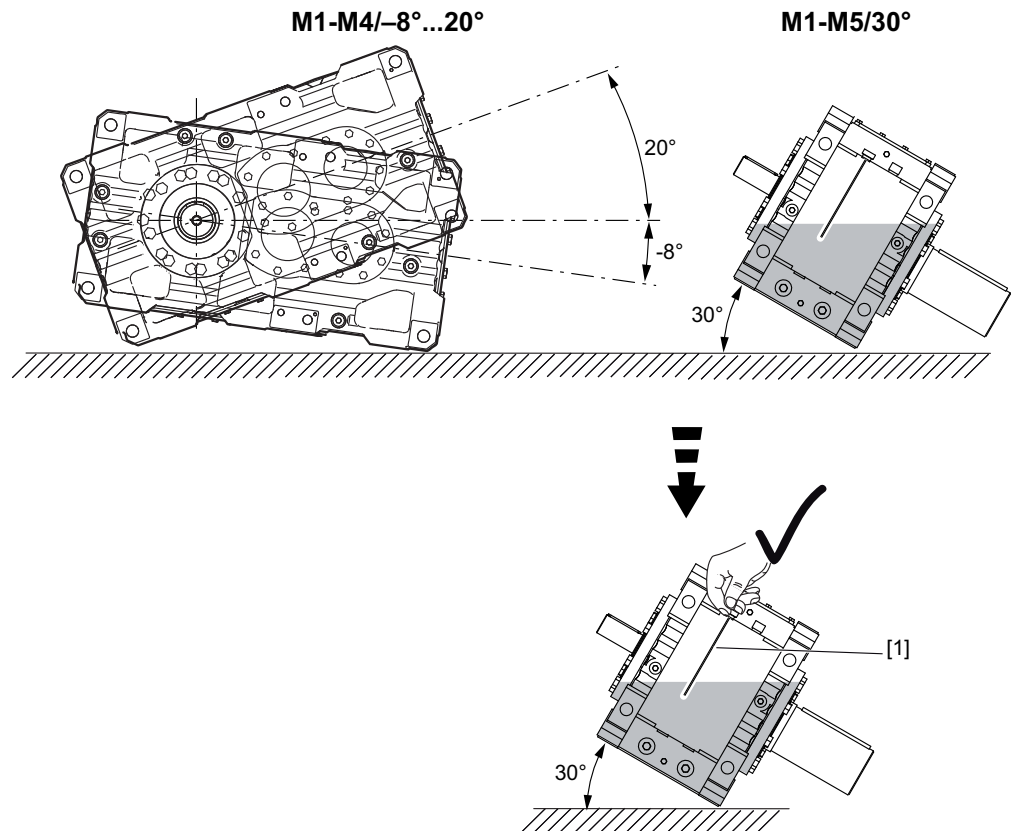
Combination of fixed and variable pivoted mounting positions

Procedure

Observe the following procedure when combining **fixed and variable pivoted mounting 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" (→ 220).

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



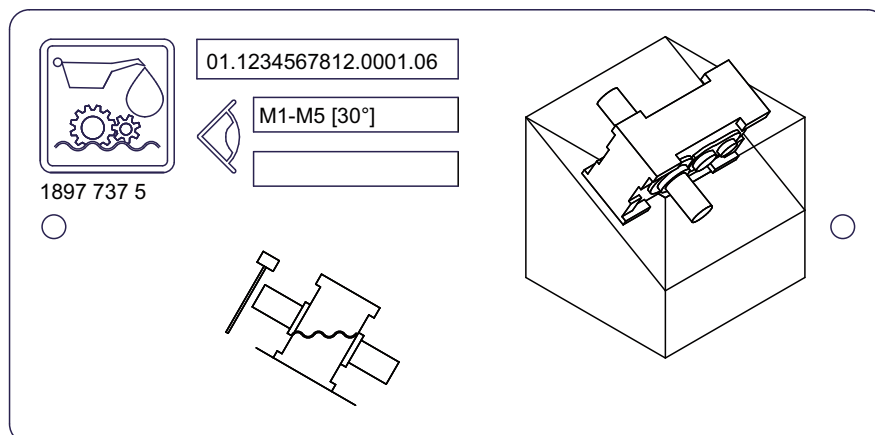
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[1] Oil dipstick
Oil

Information sign

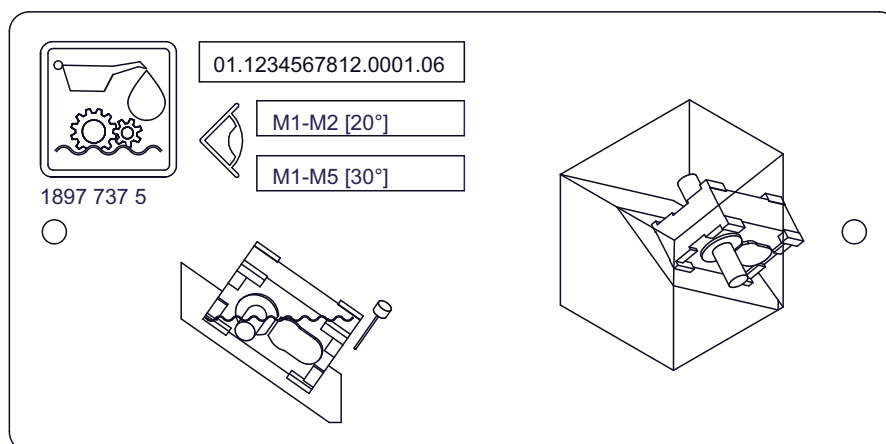
Observe the additional information sign on the gear unit. Check the oil level in the test mounting position specified on the nameplate.

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



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



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7.5 Checking the oil consistency

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

Proceed as follows to check the oil consistency:

1. Determine the oil drain position and place a container underneath.
2. Slowly open the oil drain and drain some oil.
3. Close the oil drain valve.
4. 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 oil drain plug.

NOTICE

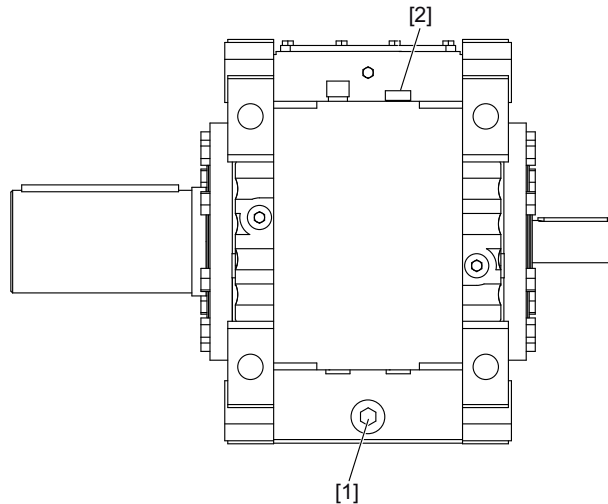
Improper oil change may result in damage to the gear unit.

Possible damage to property.

- Observe the following notes.
- 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. Flush the gear unit with the new oil grade thoroughly when switching from mineral oil and/or when switching from synthetic oil of one basis to synthetic oil of a different basis.
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 breather plug, 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 plugs 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 funnel to fill the oil (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



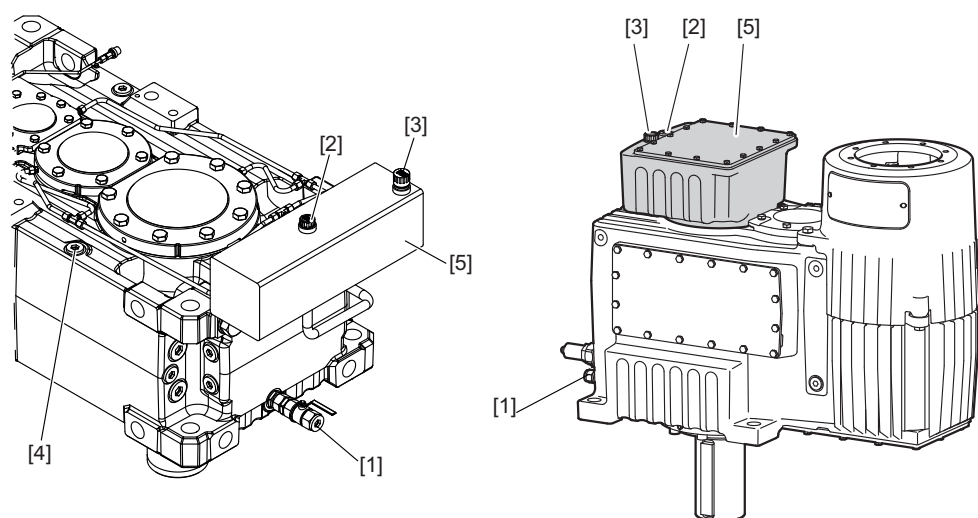
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Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 215).

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 funnel to fill the oil (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" (→ 220).
6. If present, insert the oil fill plug(s) [2] / breather and the oil dipstick.

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) or open the oil drain valve [1].

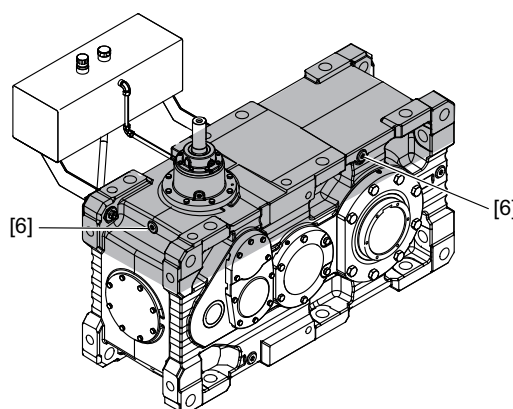
INFORMATION



The oil drains faster if the upper closing elements, such as oil dipstick [2], breather [3] or screw plugs [4] are removed and when the oil change is performed when the gear unit is warm.

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

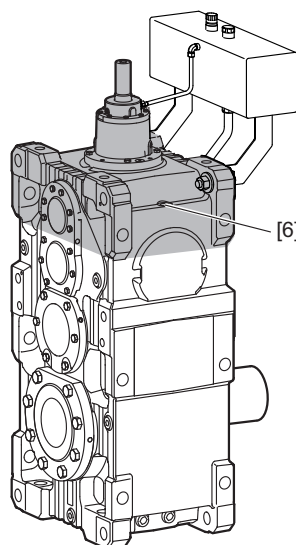
Mounting positions M1 and M3:



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

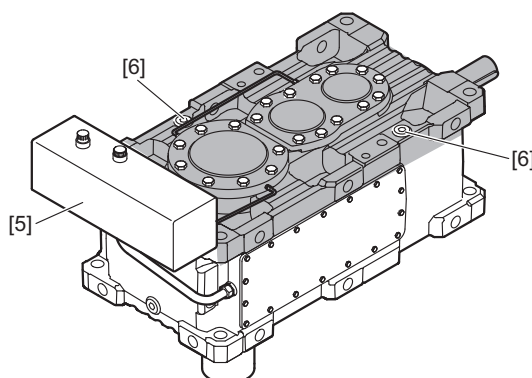
Mounting positions M2 and M4:



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

Mounting positions M5 and M6:



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

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. Until the gear unit has reached the operating temperature, check the oil level at least every 30 minutes and 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.

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 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 chapter "Preliminary work regarding inspection/maintenance" (→ 215).

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

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 chapter "Preliminary work regarding inspection/maintenance" (→ 215).

Regreasable sealing systems may be filled with "lithium soap grease" (→ 270). 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.

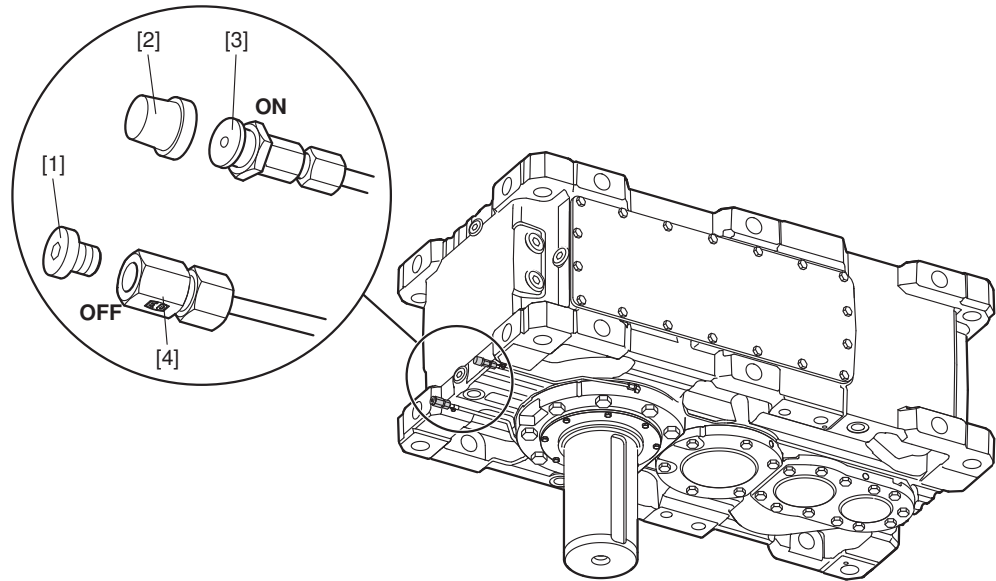
NOTICE

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 / horizontal housing HH / thermal housing HT



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Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

1. Remove the screw plug [1] at the grease drain pipe [4]. Thus, 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" (→ 270).

Size	Amount of grease [g]	Size	Amount of grease [g]	Size	Amount of grease [g]
X120	50	X180 – X190	110	X260	300
X130 – X140	60	X200 – X210	200	X270 – X280	450
X150	70	X220 – X230	200	X290 – X300	400
X110 – X170	90	X240 – X250	300	X310 – X320	550

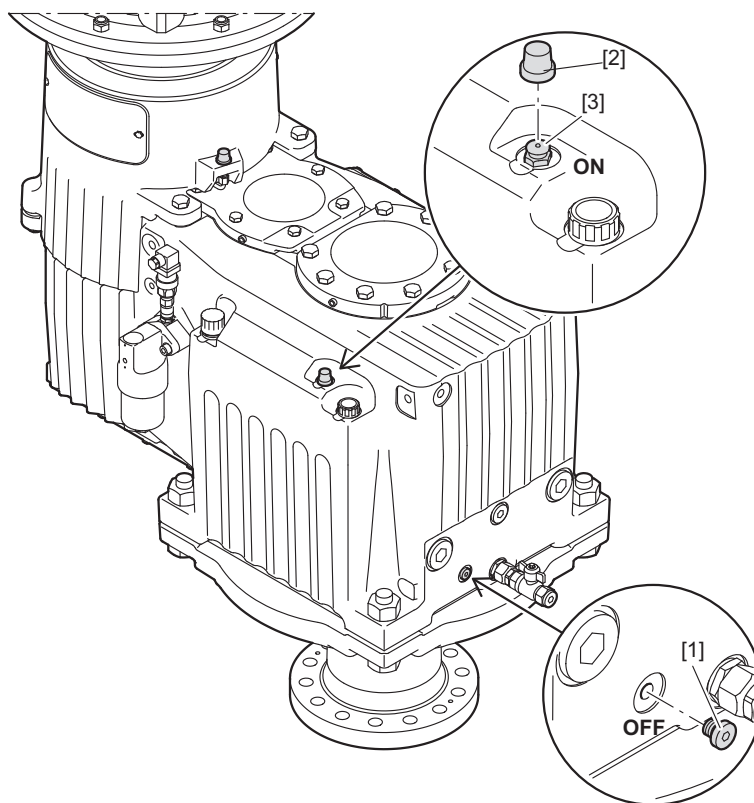
3. Place the protection cap [2] on the flat grease nipple [3].
4. Screw the screw plug [1] in the grease drain pipe [4].

INFORMATION



Immediately remove the old grease that leaked out.

7.9.2 Agitator housing HA



15934764427

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

1. Remove the screw plug [1]. Thus, 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" (→ 270).

Size	Amount of grease [g]	Size	Amount of grease [g]
X140	120	X110 – X170	180
X150	140	X200 – X210	400

3. Place the protection cap [2] on the grease nipple [3].
4. Insert the screw plug [1].

INFORMATION



Immediately remove the old grease that leaked out.

7.10 Motor pump /ONP



INFORMATION

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

Observe the notes in chapter "Preliminary work for inspection/maintenance" (→ 215).

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7.11 Shaft end pump /SEP

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

7.12 Fan /FAN

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

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.

7.13 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.

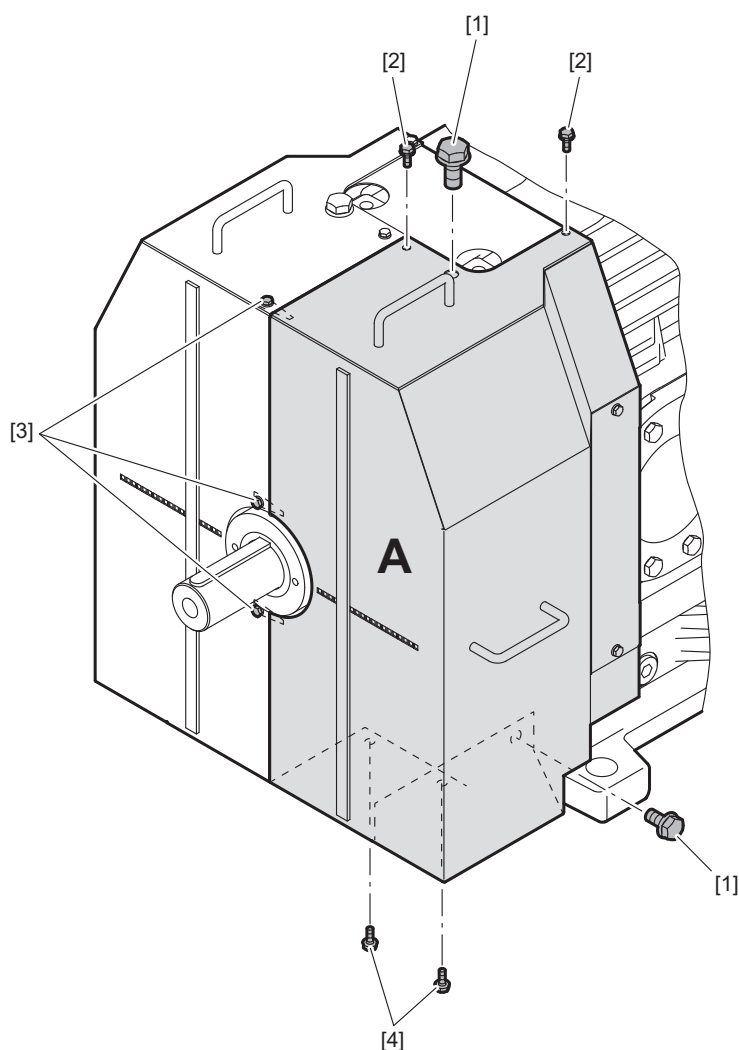
Possible damage to property.

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

7.13.1 Removing the protection cover half

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

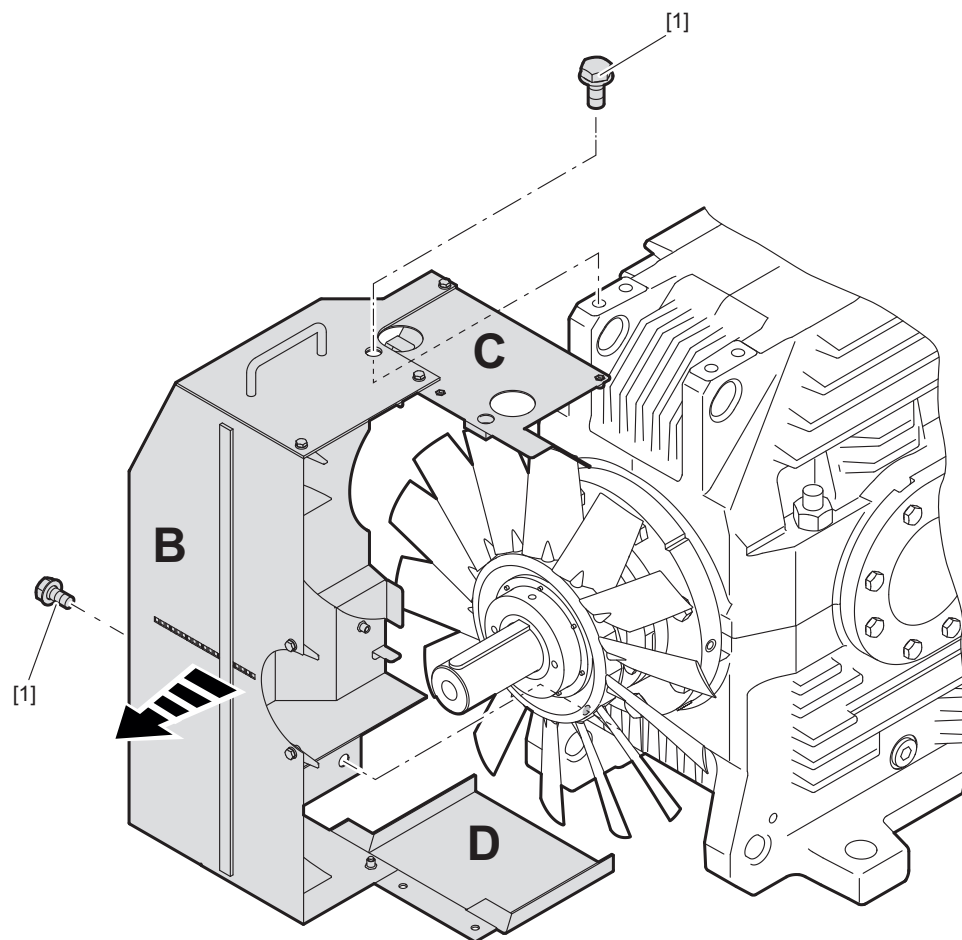
1. Protection cover half



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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



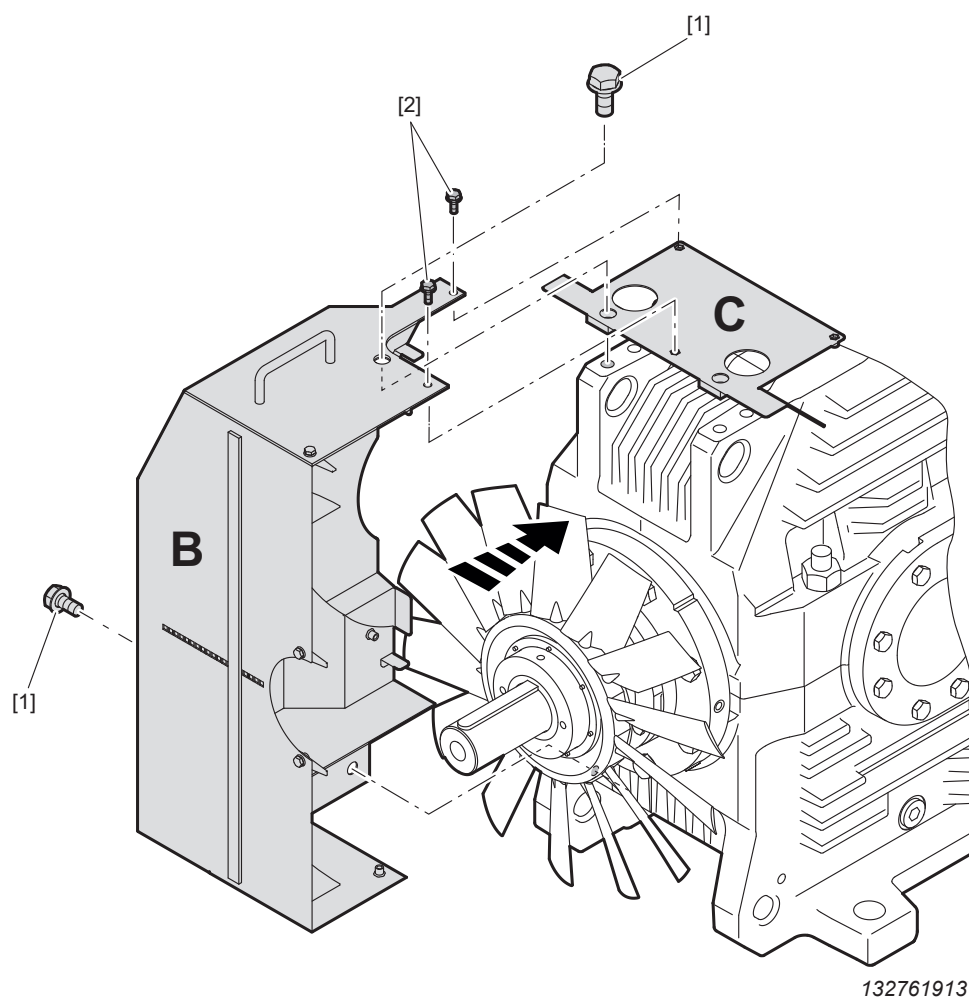
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1. Loosen the 2 screws [1].
2. Remove protection cover half **BCD**.

7.13.2 Mounting the protection cover half

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

1. Protection cover half



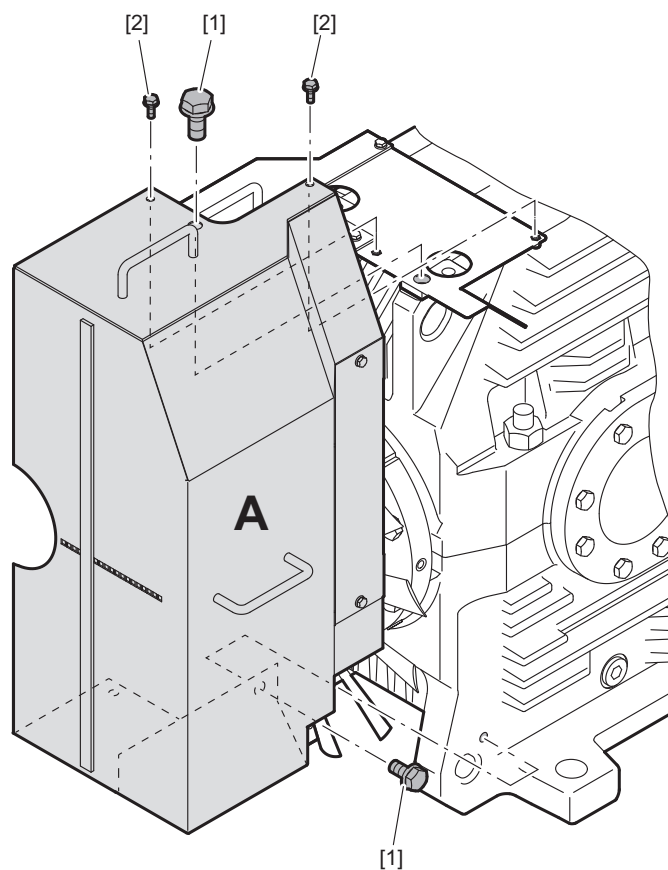
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1. Screw metal sheet **C** and protection cover half **B** to the gear unit using the screws [1].
2. Screw in the 2 screws [2].

2. Protection cover half

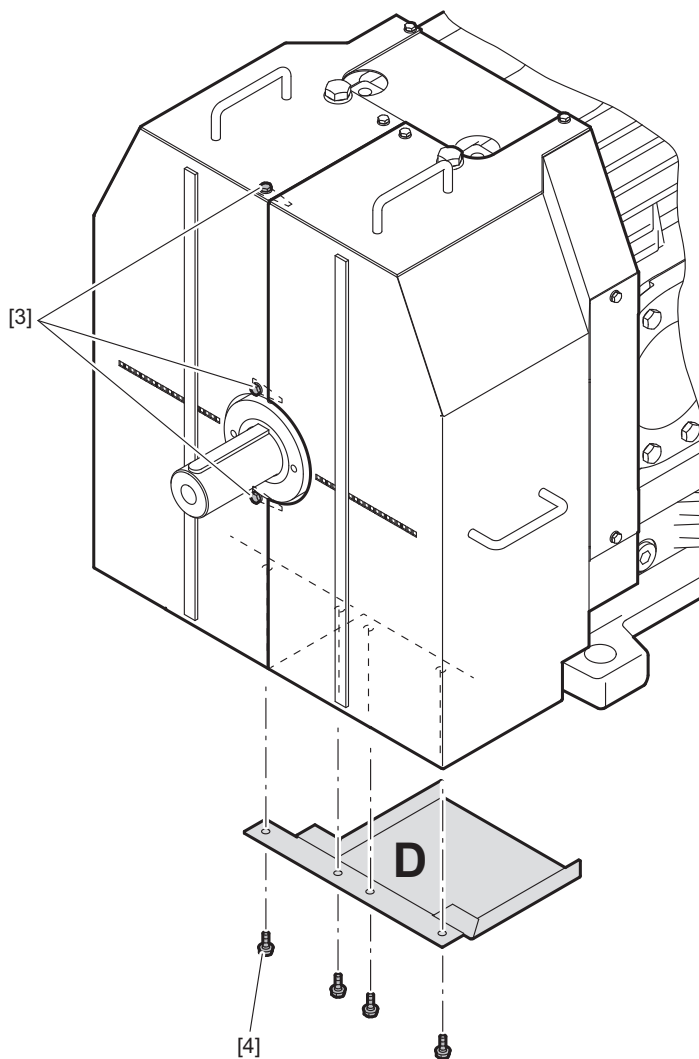
1. Screw protection cover half **A** using the 2 screws [1].

2. Screw in the 2 screws [2].



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



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7.14 Water cooling cover /CCV

7.14.1 Safety notes



▲ WARNING

Risk of burns due to media under pressure and hot component parts.

Serious injury.

- Unpressurize all systems before carrying out any disassembly work on the water cooling cover. Safeguard the systems according to the applicable accident prevention regulations.
- Risk of burns when touching hot parts (such as supply lines) of the water cooling cover. Let the parts cool down before you remove the water cooling cover and the supply lines.

NOTICE

Risk of damaging components of the water cooling cover.

Possible damage to property.

- For information on suitable cleaning agents, contact SEW-EURODRIVE.
- Properly vent the water cooling cover and the connected systems before taking them into operation again.

NOTICE

Risk of contamination of the medium.

Possible damage to property.

- According to experience, it is not possible to remove the cleaning agent without any residues. It is therefore important that you select only cleaning agents that are compatible with the medium.

NOTICE

Risk of destroying components of the water cooling cover.

Possible damage to property.

- To prevent damage resulting from improper handling of the functional components, always contact SEW-EURODRIVE before you use other comparable, aggressive cleaning agents.

NOTICE

Risk of contamination due to drained media.

Possible damage to property.

- Drain media in such a way that it is not discharged into the soil or sewage system. Drain media in suitable containers and dispose of them according to the applicable environmental regulations.

7.14.2 Disassembly

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

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.

7.15 Water cooling cartridge /CCT

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

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.

7.15.1 Maintenance intervals

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

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

7.15.2 Cleaning

Use the performance parameters and power rating determined during operation to define the cleaning intervals. Specify the intervals in such a way that a power loss of the water cooling cartridge does not pose a hazard to the operation of the system.

Safety notes



▲ WARNING

Risk of burns due to media under pressure and hot component parts.

Serious injury.

- Unpressurize all systems before carrying out any disassembly work on the water cooling cartridge. Safeguard the systems according to the applicable accident prevention regulations.
- Risk of burns when touching hot parts (such as supply lines) of the water cooling cartridge. Let the parts cool down before you remove the water cooling cartridge and the supply lines.



▲ WARNING

Cleaning the water cooling cartridge with cleaning agents such as hydrochloric acid and comparable cleaning agents can pose a risk of chemical burn to parts of the body and the eyes if the applicable work safety regulations are not adhered to.

Serious injury.

- Always adhere to the applicable work safety regulations when handling cleaning agents. Wear protective clothing, protective gloves and, if necessary, safety goggles and breathing protection when working with aggressive cleaning media.

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.

- 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 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.

Disassembly

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

1. Unpressurize the water cooling cartridge and the connected system pipes. Shut them off with the corresponding valve.
2. Before "disassembly" (→ 228), 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

Damage to the sealing surfaces can result in leakage.

Possible damage to property.

- Be careful not to damage the sealing surface.

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 and tighten the hex head screw by applying torque only to the head of the screw on the tube plate using an adequate tool.
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 SEW-EURODRIVE customer service first).
 - Use a funnel to fill the oil (max. filter mesh 25 µm).
 - Fill in the oil according to the 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.

7.16 Oil-water cooler for splash lubrication /OWC

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

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.

7.17 Oil-air cooler for splash lubrication /OAC

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

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.

7.18 Oil-water cooler for pressure lubrication /OWP

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

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.

7.19 Oil-air cooler for pressure lubrication /OAP

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

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.

7.20 Oil heater /OH



▲ WARNING

Danger of electric shock.

Severe or fatal injuries.

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

Observe the chapter "Preliminary work regarding inspection/maintenance" (→ 215).

1. Before disassembling the oil heater, "drain the oil completely" (→ 228).

2. Disassemble the oil heater.

NOTICE

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.

3. Apply LOCTITE® 577 to 2 threads and screw on the oil heater and tighten the hex head screw.
4. Screw in the oil drain plug again.
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 the SEWEURODRIVE customer service first).
 - Use a funnel to fill the oil (max. filter mesh 25 µm).
 - Fill in the oil according to the 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" (→ 220).
6. Connect the oil heater.

7.21 Split housing

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

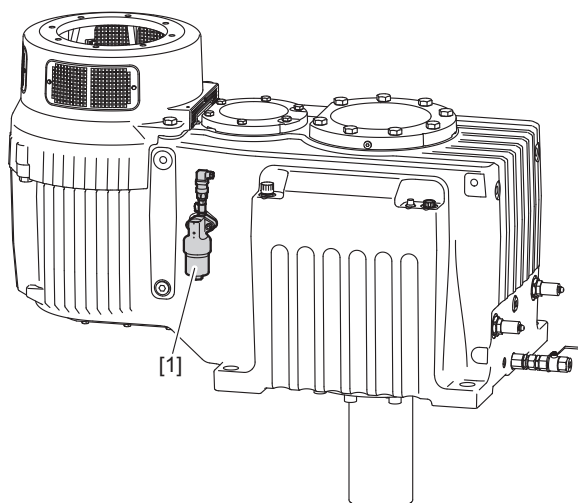
- the parting lines are sealed again carefully, and
- the screw connections are re-tightened using the tightening torques given in chapter "tightening torques" (→ 97).

7.22 Oil filter



INFORMATION

Observe the operating instructions of the oil filter manufacturer.



[1] Oil filter

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8 Permitted lubricants

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

8.1 Lubricant selection

Note the following when selecting the lubricants.

NOTICE

Selecting improper lubricants may damage the gear unit.

Possible damage to property.

- Observe the following notes.

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

If other lubricants are used in the gear units and/or in other temperature ranges as those recommended, the right to claim under warranty will become invalid. Exceptions are application-specific approvals that have to be confirmed by SEW-EURODRIVE in written form.


The lubricant recommendation in the lubricant table in no way represents a guarantee regarding the quality of the lubricant delivered by each respective supplier. Each lubricant manufacturer is responsible for the quality of its product.

- Oils of the same viscosity class from different manufacturers do not have the same characteristics. In particular, the minimum permitted oil bath temperatures are manufacturer-specific. These temperatures are specified in the lubricant tables.
- The minimum permitted oil bath temperatures depend on the lubrication type used. These temperatures are specified in the lubricant tables. The values correspond to the maximum viscosity of the individual lubricants.
- The values specified in the lubricant tables apply as of the time of printing of this document. The data of the lubricants are subject to dynamic change on the part of the lubricant manufacturers. For up-to-date information about the lubricants, visit:

www.sew-eurodrive.de/lubricants

- Do not mix different synthetic lubricants and do not mix synthetic with mineral lubricants.
- Check the compatibility of the greases and oils used.
- Strictly observe the safety notes in the individual chapters.

8.2 Structure of the tables and abbreviations





		DIN (ISO) API	ISO,SAE NLGI					
[1]				-20	+65	-20	+65	
				-5		-5		
				+5		+5		
				Optigear BM 150		Alpha SP 150		
[2]	CLP	VG 150 ¹⁾		S0		S0		
				-15	+75	-15	+75	
				0		0		
				+10		+10		
				Optigear BM 220		Alpha SP 220		
		S0		S0				
		VG 220		S0		S0		
				-10	+85	-10	+80	
				+5		+5		
				+15		+15		
				Optigear BM 320		Alpha SP 320		
S0		S0						

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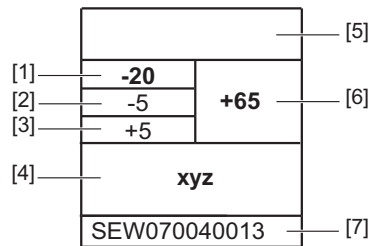
[1] Viscosity class

[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 (NSF H1 -compliant)
	= Biodegradable oil (lubricant for agriculture, forestry, and water management)
1)	= Lubricants may only be used if service factor $F_s \geq 1.3$

8.3 Explanation of the various lubricants



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- [1] Lowest cold start temperature in °C for splash lubrication*
- [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

Shaft end pumps in HU, HH, and HT housing design are exceptions. They are designed for an oil viscosity of 5000 cSt.

8.5 Lubricant tables

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

DIN (ISO) API	ISO, SAE NLGI	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TEACCO	Total
CLP	VG 150 ¹⁾	-20 -5 +65 +5	-20 -5 +65 +5	-20 -5 +65 +5	-20 -5 +65 +5	-20 -5 +65 +5	-20 -5 +65 +5	-15 -5 +75 +10
		Optigear BM 150	Alpha SP 150	Renolin CLP 150 Plus	Renolin HighGear 150	Mobilgear 600 XP 150	Kluberoil GEM 1-150 N	Meropa 150
		SO	SO	SO	SO	SO	SO	SO
		-15 0 +75 +10	-15 0 +75 +10	-15 0 +75 +10	-15 0 +75 +10	-15 0 +75 +10	-15 0 +75 +10	-15 0 +75 +10
	VG 220	Optigear BM 220	Alpha SP 220	Renolin CLP 220 Plus	Renolin HighGear 220	Mobilgear 600 XP 220	Kluberoil GEM 1-220 N	Shell Omala Oil F 220
		SO	SO	SO	SO	SO	SO	SO
		-10 -5 +85 +15	-10 -5 +85 +15	-10 -5 +85 +15	-10 -5 +85 +15	-10 -5 +85 +15	-10 -5 +85 +15	-10 -5 +85 +15
		Optigear BM 320	Alpha SP 320	Renolin CLP 320 Plus	Renolin HighGear 320	Mobilgear 600 XP 320	Kluberoil GEM 1-320 N	Shell Omala Oil F 320
	VG 320	SO	SO	SO	SO	SO	SO	SO
		-5 +10 +20	-5 +10 +20	-5 +10 +20	-5 +10 +20	-5 +10 +20	-5 +10 +20	-5 +10 +20
		Optigear BM 460	Alpha SP 460	Renolin CLP 460 Plus	Renolin HighGear 460	Mobilgear 600 XP 460	Kluberoil GEM 1-460 N	Shell Omala Oil F 460
		SO	SO	SO	SO	SO	SO	SO
	VG 680	0 +15 +25	0 +15 +25	0 +15 +25	0 +15 +25	0 +15 +25	0 +15 +25	0 +15 +25
		Optigear BM 680	Alpha SP 680	Renolin CLP 680 Plus	Renolin HighGear 680	Mobilgear 600 XP 680	Kluberoil GEM 1-680 N	Meropa 680
		SO	SO	SO	SO	SO	SO	SO
		+5 +20 +30	+5 +20 +30	+5 +20 +30	+5 +20 +30	+5 +20 +30	+5 +20 +30	+5 +20 +30
	VG 1000	Optigear BM 1000	Alpha SP 1000	Renolin CLP 1000 Plus	Renolin HighGear 1000	Mobilgear 600 XP 1000	Kluberoil GEM 1-1000 N	Meropa 1000
		SO	SO	SO	SO	SO	SO	SO
		-5 +10 +20	-5 +10 +20	-5 +10 +20	-5 +10 +20	-5 +10 +20	-5 +10 +20	-5 +10 +20
		Optigear BM 1000	Alpha SP 1000	Renolin CLP 1000 Plus	Renolin HighGear 1000	Mobilgear 600 XP 1000	Kluberoil GEM 1-1000 N	Meropa 1000

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

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

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DIN (ISO) API	ISO SAE NLGI				
CLP HC NSF H1	VG 68 ¹⁾	-35	-40		-35
		-20	-25		-20
		-10	-15		-10
		+45	+45		+45
		Cassida Fluid HF 68	Optileb HY 68		Küberoil 4UH1-68 N
	VG 220 ¹⁾	S0	S0		S0
		-20	-25		-25
		-5	-5		-5
		+5	+5		+5
		Cassida Fluid GL 220	Optileb GT 220		Küberoil 4UH1-220 N
VG 460 ¹⁾		S0	S0		S0
		-15	-15		-15
		+5	+5		+5
		+20	+20		+15
		+90	+95		+95
	Cassida Fluid GL 460				Küberoil 4UH1-460 N
E	VG 460	S0	S0		S0
					-15
					+5
					+15
					+95
	VG 460				Plantogear 460 S
					Küberbio CA2-460

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8.6 Horizontal housing /HH and universal housing /HU

INFORMATION



- The specified fill quantities are recommended 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.

8.6.1 Oil fill quantities for horizontal gear units/mounting position M1

X.F..

X2F..	Oil quantity [l]		X3F..	Oil quantity [l]		X4F..	Oil quantity [l]	
	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 [l]		X3K..	Oil quantity [l]		X4K..	Oil quantity [l]	
	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	61	61
X2K170	47	47	X3K170	59	59	X4K170	61	61
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 [l]			X4T..	Oil quantity [l]		
	Splash lubrication	Pressure lubrication	Oil bath lubrication		Splash lubrication	Pressure lubrication	Oil 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 Lubricant fill quantities for horizontal gear units / mounting position M3

X.F..

X2F..	Oil quantity [l]	X3F..	Oil quantity [l]	X4F..	Oil quantity [l]
	Splash lubrication		Splash lubrication		Splash lubrication
X2F100	14	X3F100	14	X4F100	-
X2F110	15	X3F110	16	X4F110	-
X2F120	20	X3F120	20	X4F120	24
X2F130	22	X3F130	23	X4F130	26
X2F140	37	X3F140	38	X4F140	42
X2F150	37	X3F150	38	X4F150	42
X2F160	62	X3F160	64	X4F160	82
X2F170	62	X3F170	64	X4F170	82
X2F180	77	X3F180	78	X4F180	108
X2F190	80	X3F190	82	X4F190	105
X2F200	105	X3F200	110	X4F200	140
X2F210	105	X3F210	110	X4F210	140
X2F220	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 [l]	X3K..	Oil quantity [l]		X4K..	Oil quantity [l]
	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 [l]	X3K..	Oil quantity [l]		X4K..	Oil quantity [l]
	Splash lubrication		Splash lubrication	Oil bath lubrication		Splash lubrication
X2K320	-	X3K320	540	-	X4K320	545

X.T..

X3T..	Oil quantity [l]		X4T..	Oil quantity [l]	
	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 vertical gear units / 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.. ¹⁾	Oil quantity [l]			X3F.. ¹⁾	Oil quantity [l]			X4F.. ¹⁾	Oil quantity [l]		
	Oil bath lubrication	Pressure lubrication	Pressure lubrication with Drywell		Oil bath lubrication	Pressure lubrication	Pressure lubrication with Drywell		Oil 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.. ¹⁾	Oil quantity [l]			X3K.. ¹⁾	Oil quantity [l]			X4K.. ¹⁾	Oil quantity [l]		
	Oil bath lubrication	Pressure lubrication	Pressure lubrication with Drywell		Oil bath lubrication	Pressure lubrication	Pressure lubrication with Drywell		Oil 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.. ¹⁾	Oil quantity [l]			X3K.. ¹⁾	Oil quantity [l]			X4K.. ¹⁾	Oil quantity [l]		
	Oil bath lubrication	Pressure lubrication	Pressure lubrication with Drywell		Oil bath lubrication	Pressure lubrication	Pressure lubrication with Drywell		Oil 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

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 [l]			X4T..	Oil quantity [l]		
	Oil bath lubrication	Pressure lubrication	Pressure lubrication with Dry-well		Oil 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 vertical gear units / mounting positions M2

X.F..

X2F..	Oil quantity [l]	X3F..	Oil quantity [l]	X4F..	Oil quantity [l]
	Oil bath lubrication		Oil bath lubrication		Oil 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 [l]	X3K..	Oil quantity [l]	X4K..	Oil quantity [l]
	Oil bath lubrication		Oil bath lubrication		Oil 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 [l]	X4T..	Oil quantity [l]
	Oil bath lubrication		Oil 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 [l]	X4T..	Oil quantity [l]
	Oil bath lubrication		Oil 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 vertical gear units / mounting positions M4

X.F..

X2F..	Oil quantity [l]		X3F..	Oil quantity [l]		X4F..	Oil quantity [l]	
	Oil bath lubrication	Pressure lubrication		Oil bath lubrication	Pressure lubrication		Oil 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 [l]		X3K..	Oil quantity [l]		X4K..	Oil quantity [l]	
	Oil bath lubrication	Pressure lubrication		Oil bath lubrication	Pressure lubrication		Oil 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 [l]		X4T..	Oil quantity [l]	
	Oil bath lubrication	Pressure lubrication		Oil 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 / mounting position M1

INFORMATION



- The specified fill quantities are recommended 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.K..

X3K..	Oil quantity [l]	
	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 / mounting position M5

INFORMATION




- The specified fill quantities are recommended 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 [l]		
	Oil 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.

	Hersteller	Fette
Standard	Fuchs	Renolit CX TOM 15 OEM¹⁾
	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 ¹⁾
	Fuchs	Plantogel 2¹⁾

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 an operator wants to use a grease that is not listed in the table, the operator 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 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 SEW drives.
- 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"> Gear unit mounting has loosened 	<ul style="list-style-type: none"> Tighten retaining screws and nuts to the specified torque Replace the damaged/defective retaining screws or nuts
Operating temperature too high	<ul style="list-style-type: none"> Too much oil Oil too old The oil is heavily contaminated Ambient temperature too high Gear units with fan: Air intake opening/gear unit housing contaminated For gear units with built-in cooling: Cooling liquid flow rate too low; cooling liquid temperature too high; deposits in cooling system Malfunction of the oil-air or oil-water cooling system Malfunction in the water cooling (water cooling cover, water cooling cartridge) 	<ul style="list-style-type: none"> Check oil level, correct if necessary Check when the oil was last changed; change the oil, if necessary Analyze the oil to determine the cause; take measures, if necessary; change the oil Protect the gear unit from external heat sources (e.g. provide shade) Check air intake openings, clean them if necessary; clean the gear unit housing Check the cooling liquid flow rate; check the entry temperature of the cooling liquid; clean the cooling system Observe the separate operating instructions for the oil-water and oil-air cooling system. Check the cooling water throughput and the entry temperature of the cooling water, clean the cooling system
Temperature at bearing points too high	<ul style="list-style-type: none"> Not enough oil Oil too old Bearing damaged 	<ul style="list-style-type: none"> Check oil level, correct if necessary Check when the oil was last changed; change the oil, if necessary Check the bearing and replace it if necessary. Contact SEW-EURODRIVE.
Oil leaking <ul style="list-style-type: none"> From cover plate From inspection cover From bearing cover From mounting flange 	<ul style="list-style-type: none"> Seal not tight at: <ul style="list-style-type: none"> Cover plate Inspection cover Bearing cover Mounting flange 	<ul style="list-style-type: none"> Tighten the bolts on the respective cover. Observe the gear unit. Contact SEW-EURODRIVE if oil is still leaking
Oil leaking ¹⁾ <ul style="list-style-type: none"> From oil seal 	<ul style="list-style-type: none"> Too much oil Sealing lip of the oil seal turned up Oil seal damaged/worn 	<ul style="list-style-type: none"> Check oil level, correct if necessary Vent the gear unit, observe the gear unit. Contact SEW-EURODRIVE if oil is still leaking. Check oil seals; replace if necessary

Fault	Possible cause	Measure
Oil leaking <ul style="list-style-type: none"> from gear unit breather 	<ul style="list-style-type: none"> Too much oil Drive not installed in proper mounting position Frequent cold starts (oil foaming) and/or high oil level 	<ul style="list-style-type: none"> Check oil level, correct if necessary Install breather plug correctly and adjust the oil level Install oil expansion tank
Oil leaking <ul style="list-style-type: none"> from the screw plug from the oil drain valve 	<ul style="list-style-type: none"> Seal not tight Fittings loosened 	<ul style="list-style-type: none"> Retighten screw Retighten the fitting and screw
Severe V-belt wear	<ul style="list-style-type: none"> Inadequately aligned belt pulleys Harmful ambient conditions (e.g. abrasive particles, chemical substances) V-belt overloaded 	<ul style="list-style-type: none"> Check V-belt pulley alignment and pre-tension of the belts Protect V-belt drive from environmental influences; sufficient ventilation must be ensured Replace V-belt if necessary; contact SEW-EURODRIVE
No oil pump suction	<ul style="list-style-type: none"> Air in the suction line of the oil pump Oil pump defective 	<ul style="list-style-type: none"> Fill oil into the suction line and the oil pump, vent the pump at the pressure side Consult SEW-EURODRIVE.
Pressure switch does not switch	<ul style="list-style-type: none"> Air in the suction line of the oil pump Pressure switch connected incorrectly Pressure switch defective Oil pump defective 	<ul style="list-style-type: none"> Fill the suction line and oil pump with oil Vent the pump at the pressure side Check the connection Replace pressure switch Consult SEW-EURODRIVE.
Malfunction in the oil-water or oil-air cooling system	<ul style="list-style-type: none"> Malfunction of the oil-water or oil-air cooling system 	<ul style="list-style-type: none"> Observe the separate operating instructions for the oil-water or oil-air cooling system.
Gear unit does not reach cold start temperature	<ul style="list-style-type: none"> Thermostat set incorrectly Oil heating defective or connected incorrectly Heat dissipation too great due to unfavorable climatic conditions 	<ul style="list-style-type: none"> Check the setting of the thermostat Check the oil heater for proper connection and function; replace if necessary Protect the gear unit from cooling off during the warm-up phase
Operating temperature at backstop too high, no blocking function	<ul style="list-style-type: none"> Damaged/defective backstop 	<ul style="list-style-type: none"> Check the backstop, replace it if necessary Consult SEW-EURODRIVE.

1) During the run-in phase (24-hour runtime), it is normal for (small amounts of) oil/grease to leak from the oil seal (see also DIN 3761).

9.3 Service

Please have the following information available if you require customer service assistance:

- Complete nameplate data
- Type and extent of the problem
- Time the problem occurred and any accompanying circumstances
- Assumed cause
- A digital photograph, if possible

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

Algeria			
Sales	Algiers	REDUCOM Sarl 16, rue des Frères Zaghroune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 http://www.reducom-dz.com info@reducom-dz.com
Argentina			
Assembly Sales	Buenos Aires	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 http://www.sew-eurodrive.com.ar sewar@sew-eurodrive.com.ar
Australia			
Assembly Sales Service	Melbourne	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
Austria			
Assembly Sales Service	Vienna	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at
Bangladesh			
Sales	Bangladesh	SEW-EURODRIVE INDIA PRIVATE LIMITED 345 DIT Road East Rampura Dhaka-1219, Bangladesh	Tel. +88 01729 097309 salesdhaka@seweurodrivebangladesh.com
Belarus			
Sales	Minsk	Foreign unitary production enterprise SEW- EURODRIVE RybalkoStr. 26 220033 Minsk	Tel. +375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 http://www.sew.by sales@sew.by
Belgium			
Assembly Sales Service	Brussels	SEW-EURODRIVE n.v./s.a. Researchpark Haasrode 1060 Evenementenlaan 7 3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Center	Industrial Gears	SEW-EURODRIVE n.v./s.a. Rue de Parc Industriel, 31 6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be
Brazil			
Production Sales Service	São Paulo	SEW-EURODRIVE Brasil Ltda. Estrada Municipal José Rubim, 205 – Rodovia Santos Dumont Km 49 Indaiatuba – 13347-510 – SP	Tel. +55 19 3835-8000 sew@sew.com.br
Assembly Sales Service	Rio Claro	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
Bulgaria			
Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg

Cameroon			
Sales	Douala	SEW-EURODRIVE S.A.R.L. Ancienne Route Bonaberi P.O. Box B.P 8674 Douala-Cameroun	Tel. +237 233 39 02 10 Fax +237 233 39 02 10 sew@sew-eurodrive.cm
Canada			
Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
Chile			
Assembly Sales Service	Santiago de Chile	SEW-EURODRIVE CHILE LTDA Las Encinas 1295 Parque Industrial Valle Grande LAMP Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 2757 7000 Fax +56 2 2757 7001 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl
China			
Production Assembly Sales Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 78, 13th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 http://www.sew-eurodrive.cn info@sew-eurodrive.cn
Assembly Sales Service	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Taiyuan	SEW-EURODRIVE (Taiyuan) Co., Ltd. No.3, HuaZhang Street, TaiYuan Economic & Technical Development Zone ShanXi, 030032	Tel. +86-351-7117520 Fax +86-351-7117522 taiyuan@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
Sales Service	Hong Kong	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

Colombia			
Assembly Sales Service	Bogota	SEW-EURODRIVE COLOMBIA LTDA. Calle 17 No. 132-18 Interior 2 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sew@sew-eurodrive.com.co
Croatia			
Sales Service	Zagreb	KOMPEKS d. o. o. Zeleni dol 10 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr
Czech Republic			
Assembly Sales Service	Hostivice	SEW-EURODRIVE CZ s.r.o. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
	Drive Service Hotline / 24 Hour Service	+420 800 739 739 (800 SEW SEW)	Service Tel. +420 255 709 632 Fax +420 235 358 218 servis@sew-eurodrive.cz
Denmark			
Assembly Sales Service	Copenhagen	SEW-EURODRIVEA/S Geminivej 28-30 2670 Greve	Tel. +45 43 95 8500 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Egypt			
Sales Service	Cairo	Copam Egypt for Engineering & Agencies Building 10, Block 13005, First Industrial Zone, Obour City Cairo	Tel. +202 44812673 / 79 (7 lines) Fax +202 44812685 http://www.copam-egypt.com copam@copam-egypt.com
Estonia			
Sales	Tallin	ALAS-KUUL AS Reti tee 4 75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 http://www.alas-kuul.ee veiko.soots@alas-kuul.ee
Finland			
Assembly Sales Service	Hollola	SEW-EURODRIVE OY Vesimäentie 4 15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Service	Hollola	SEW-EURODRIVE OY Keskikankaantie 21 15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Production Assembly	Karkkila	SEW Industrial Gears Oy Santasalonkatu 6, PL 8 03620 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 http://www.sew-eurodrive.fi sew@sew.fi
France			
Production Sales Service	Hagenau	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocom.com sew@usocom.com
Production	Forbach	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 57604 Forbach Cedex	Tel. +33 3 87 29 38 00
	Brumath	SEW-USOCOME 1 Rue de Bruxelles 67670 Mommenheim Cedex	Tel. +33 3 88 37 48 00
Assembly Sales Service	Bordeaux	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan – B. P. 182 33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09

France			
	Lyon	SEW-USOCOME 75 rue Antoine Condorcet 38090 Vaulx-Milieu	Tel. +33 4 74 99 60 00 Fax +33 4 74 99 60 15
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin 77390 Verneuil l'Étang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
Gabon			
Sales	Libreville	SEW-EURODRIVE SARL 183, Rue 5.033.C, Lalala à droite P.O. Box 15682 Libreville	Tel. +241 03 28 81 55 +241 06 54 81 33 http://www.sew-eurodrive.cm sew@sew-eurodrive.cm
Germany			
Headquarters Production Sales	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 76646 Bruchsal P.O. Box Postfach 3023 – D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Production / Industrial Gears	Bruchsal	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str. 10 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Production	Graben	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf P.O. Box Postfach 1220 – D-76671 Graben-Neudorf	Tel. +49 7251 75-0 Fax +49 7251-2970
	Östringen	SEW-EURODRIVE GmbH & Co KG, Werk Östringen Franz-Gurk-Straße 2 76684 Östringen	Tel. +49 7253 9254-0 Fax +49 7253 9254-90 oesstringen@sew-eurodrive.de
Service Competence Center	Mechanics / Mechatronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 scc-mechanik@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 scc-elektronik@sew-eurodrive.de
Drive Technology Center	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 30823 Garbsen (Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 dtc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 08393 Meerane (Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 dtc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 85551 Kirchheim (München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 dtc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 40764 Langenfeld (Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 dtc-west@sew-eurodrive.de
Drive Center	Berlin	SEW-EURODRIVE GmbH & Co KG Alexander-Meißner-Straße 44 12526 Berlin	Tel. +49 306331131-30 Fax +49 306331131-36 dc-berlin@sew-eurodrive.de
	Ludwigshafen	SEW-EURODRIVE GmbH & Co KG c/o BASF SE Gebäude W130 Raum 101 67056 Ludwigshafen	Tel. +49 7251 75 3759 Fax +49 7251 75 503759 dc-ludwigshafen@sew-eurodrive.de
	Saarland	SEW-EURODRIVE GmbH & Co KG Gottlieb-Daimler-Straße 4 66773 Schwalbach Saar – Hülzweiler	Tel. +49 6831 48946 10 Fax +49 6831 48946 13 dc-saarland@sew-eurodrive.de
	Ulm	SEW-EURODRIVE GmbH & Co KG Dieselstraße 18 89160 Dornstadt	Tel. +49 7348 9885-0 Fax +49 7348 9885-90 dc-ulm@sew-eurodrive.de

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Drive Service Hotline / 24 Hour Service			0 800 SEWHELP 0 800 7394357
Great Britain			
Assembly Sales Service	Normanton	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
Drive Service Hotline / 24 Hour Service			Tel. 01924 896911
Greece			
Sales	Athens	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr
Hungary			
Sales Service	Budapest	SEW-EURODRIVE Kft. Csillaghegyi út 13. 1037 Budapest	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu
Iceland			
Sales	Reykjavik	Varma & Vélaverk ehf. Knarrarvogi 4 104 Reykjavik	Tel. +354 585 1070 Fax +354 585)1071 http://www.varmaverk.is vov@vov.is
India			
Registered Office Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200 Fax +91 265 3045300 http://www.seweurodriveindia.com salesvadodara@seweurodriveindia.com
Assembly Sales Service	Chennai	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com
	Pune	SEW-EURODRIVE India Private Limited Plant: Plot No. D236/1, Chakan Industrial Area Phase- II, Warale, Tal- Khed, Pune-410501, Maharashtra	Tel. +91 21 35 628700 Fax +91 21 35 628715 salespune@seweurodriveindia.com
Indonesia			
Sales	Medan	PT. Serumpun Indah Lestari Jl.Pulau Solor no. 8, Kawasan Industri Medan II Medan 20252	Tel. +62 61 687 1221 Fax +62 61 6871429 / +62 61 6871458 / +62 61 30008041 sil@serumpunindah.com serumpunindah@yahoo.com http://www.serumpunindah.com
	Jakarta	PT. Cahaya Sukses Abadi Komplek Rukan Puri Mutiara Blok A no 99, Sunter Jakarta 14350	Tel. +62 21 65310599 Fax +62 21 65310600 csajkt@cbn.net.id
	Jakarta	PT. Agrindo Putra Lestari Jl.Pantai Indah Selatan, Komplek Sentra Industri Terpadu, Pantai indah Kapuk Tahap III, Blok E No. 27 Jakarta 14470	Tel. +62 21 2921-8899 Fax +62 21 2921-8988 aplindo@indosat.net.id http://www.aplindo.com

Indonesia			
	Surabaya	PT. TRIAGRI JAYA ABADI Jl. Sukosemolo No. 63, Galaxi Bumi Permai G6 No. 11 Surabaya 60111	Tel. +62 31 5990128 Fax +62 31 5962666 sales@triagri.co.id http://www.triagri.co.id
	Surabaya	CV. Multi Mas Jl. Raden Saleh 43A Kav. 18 Surabaya 60174	Tel. +62 31 5458589 Fax +62 31 5317220 sianhwa@sby.centrin.net.id http://www.cvmultimas.com
Ireland			
Sales Service	Dublin	Alpert Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 http://www.alpert.ie info@alpert.ie
Israel			
Sales	Tel Aviv	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il
Italy			
Assembly Sales Service	Milan	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 20020 Solaro (Milano)	Tel. +39 02 96 980229 Fax +39 02 96 980 999 http://www.sew-eurodrive.it milano@sew-eurodrive.it
Ivory Coast			
Sales	Abidjan	SEW-EURODRIVE SARL Ivory Coast Rue des Pêcheurs, Zone 3 26 BP 916 Abidjan 26	Tel. +225 21 21 81 05 Fax +225 21 25 30 47 info@sew-eurodrive.ci http://www.sew-eurodrive.ci
Japan			
Assembly Sales Service	Iwata	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp hamamatsu@sew-eurodrive.co.jp
Kazakhstan			
Sales	Almaty	SEW-EURODRIVE LLP 291-291A, Tole bi street 050031, Almaty	Tel. +7 (727) 350 5156 Fax +7 (727) 350 5156 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz
	Tashkent	SEW-EURODRIVE LLP Representative office in Uzbekistan 96A, Sharaf Rashidov street, Tashkent, 100084	Tel. +998 71 2359411 Fax +998 71 2359412 http://www.sew-eurodrive.uz sew@sew-eurodrive.uz
	Ulaanbaatar	IM Trading LLC Narny zam street 62 Sukhbaatar district, Ulaanbaatar 14230	Tel. +976-77109997 Fax +976-77109997 imt@imt.mn
Kenya			
Sales	Nairobi	SEW-EURODRIVE Pty Ltd Transnational Plaza, 5th Floor Mama Ngina Street P.O. Box 8998-00100 Nairobi	Tel. +254 791 398840 http://www.sew-eurodrive.co.tz info@sew.co.tz
Latvia			
Sales	Riga	SIA Alas-Kuul Katlakalna 11C 1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.lv info@alas-kuul.com

Lebanon			
Sales (Lebanon)	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
Sales (Jordan, Kuwait , Beirut Saudi Arabia, Syria)		Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 http://www.medrives.com info@medrives.com
Lithuania			
Sales	Alytus	UAB Irseva Statybininku 106C 63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 http://www.irseva.lt irmantas@irseva.lt
Luxembourg			
representation: Belgium			
Macedonia			
Sales	Skopje	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 http://www.boznos.mk
Madagascar			
representation: South Africa			
Malaysia			
Assembly Sales Service	Johor	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Mexiko			
Assembly Sales Service	Quéretaro	SEW-EURODRIVE MEXICO S.A. de C.V. SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Querétaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@sew-eurodrive.com.mx
Sales Service	Puebla	SEW-EURODRIVE MEXICO S.A. de C.V. Calzada Zavaleta No. 3922 Piso 2 Local 6 Col. Santa Cruz Buenavista C.P. 72154 Puebla, México	Tel. +52 (222) 221 248 http://www.sew-eurodrive.com.mx scmexico@sew-eurodrive.com.mx
Mongolia			
Technical Office	Ulaanbaatar	IM Trading LLC Naryn zam street 62 Union building, Suite A-403-1 Sukhbaatar district, Ulaanbaatar 14230	Tel. +976-77109997 Tel. +976-99070395 Fax +976-77109997 http://imt.mn/ imt@imt.mn
Morocco			
Sales Service	Bouskoura	SEW-EURODRIVE Morocco Parc Industriel CFCIM, Lot 55 and 59 Bouskoura	Tel. +212 522 88 85 00 Fax +212 522 88 84 50 http://www.sew-eurodrive.ma sew@sew-eurodrive.ma
Namibia			
Sales	Swakopmund	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 anton@dbminingnam.com

Netherlands			
Assembly Sales Service	Rotterdam	SEW-EURODRIVE B.V. Industrieweg 175 3044 AS Rotterdam Postbus 10085 3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl
New Zealand			
Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 30 Lodestar Avenue, Wigram Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Nigeria			
Sales	Lagos	Greenpeg Nig. Ltd Plot 296A, Adeyemo Akapo Str. Omole GRA Ikeja Lagos-Nigeria	Tel. +234-701-821-9200-1 http://www.greenpeg ltd.com bolaji.adekunle@greenpeg ltd.com
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no
Pakistan			
Sales	Karachi	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Com- mercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk
Paraguay			
Sales	Fernando de la Mora	SEW-EURODRIVE PARAGUAY S.R.L De la Victoria 112, Esquina nueva Asunción Departamento Central Fernando de la Mora, Barrio Bernardino	Tel. +595 991 519695 Fax +595 21 3285539 sewpy@sew-eurodrive.com.py
Peru			
Assembly Sales Service	Lima	SEW EURODRIVE DEL PERU S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe
Philippines			
Sales	Makati	P.T. Cerna Corporation 4137 Ponte St., Brgy. Sta. Cruz Makati City 1205	Tel. +63 2 519 6214 Fax +63 2 890 2802 mech_drive_sys@ptcerna.com http://www.ptcerna.com
Poland			
Assembly Sales Service	Łódź	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 92-518 Łódź	Tel. +48 42 293 00 00 Fax +48 42 293 00 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	Service	Tel. +48 42 293 0030 Fax +48 42 293 0043	24 Hour Service Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl
Portugal			
Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Av. da Fonte Nova, n.º 86 3050-379 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales Service	Bucharest	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro
Russia			
Assembly Sales Service	St. Petersburg	ЗАО «СЕВ-ЕВРОДРАЙФ» а. я. 36 195220 Санкт-Петербург	Tel. +7 812 3332522 / +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Sambia			
representation: South Africa.			
Senegal			
Sales	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 http://www.senemeca.com senemeca@senemeca.sn
Serbia			
Sales	Belgrade	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor 11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs
Singapore			
Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Slovakia			
Sales	Bratislava	SEW-Eurodrive SK s.r.o. Rybničná 40 831 06 Bratislava	Tel. +421 2 33595 202, 217, 201 Fax +421 2 33595 200 http://www.sew-eurodrive.sk sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 Mobile +421 907 671 976 sew@sew-eurodrive.sk
Slovenia			
Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. Ul. XIV. divizije 14 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
South Africa			
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	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 bggriffiths@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospecton Road Isipingo Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 902 3815 Fax +27 31 902 3826 cdejager@sew.co.za

South Africa			
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South Korea			
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	Busan	SEW-EURODRIVE KOREA CO., LTD. 28, Noksansandan 262-ro 50beon-gil, Gangseo-gu, Busan, Zip 618-820	Tel. +82 51 832-0204 Fax +82 51 832-0230
Spain			
Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es
Sri Lanka			
Sales	Colombo	SM International (Pte) Ltd 254, Galle Raod Colombo 4, Sri Lanka	Tel. +94 1 2584887 Fax +94 1 2582981
Swaziland			
Sales	Manzini	C G Trading Co. (Pty) Ltd PO Box 2960 Manzini M200	Tel. +268 2 518 6343 Fax +268 2 518 5033 engineering@cgtrading.co.sz
Sweden			
Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 553 03 Jönköping Box 3100 S-550 03 Jönköping	Tel. +46 36 34 42 00 Fax +46 36 34 42 80 http://www.sew-eurodrive.se jonkoping@sew.se
Switzerland			
Assembly Sales Service	Basel	Alfred Imhof A.G. Jurastrasse 10 4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch
Taiwan			
Sales	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Huw S. Road Taipei	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 sewtwn@ms63.hinet.net http://www.tingshou.com.tw
	Nan Tou	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878 sewtwn@ms63.hinet.net http://www.tingshou.com.tw
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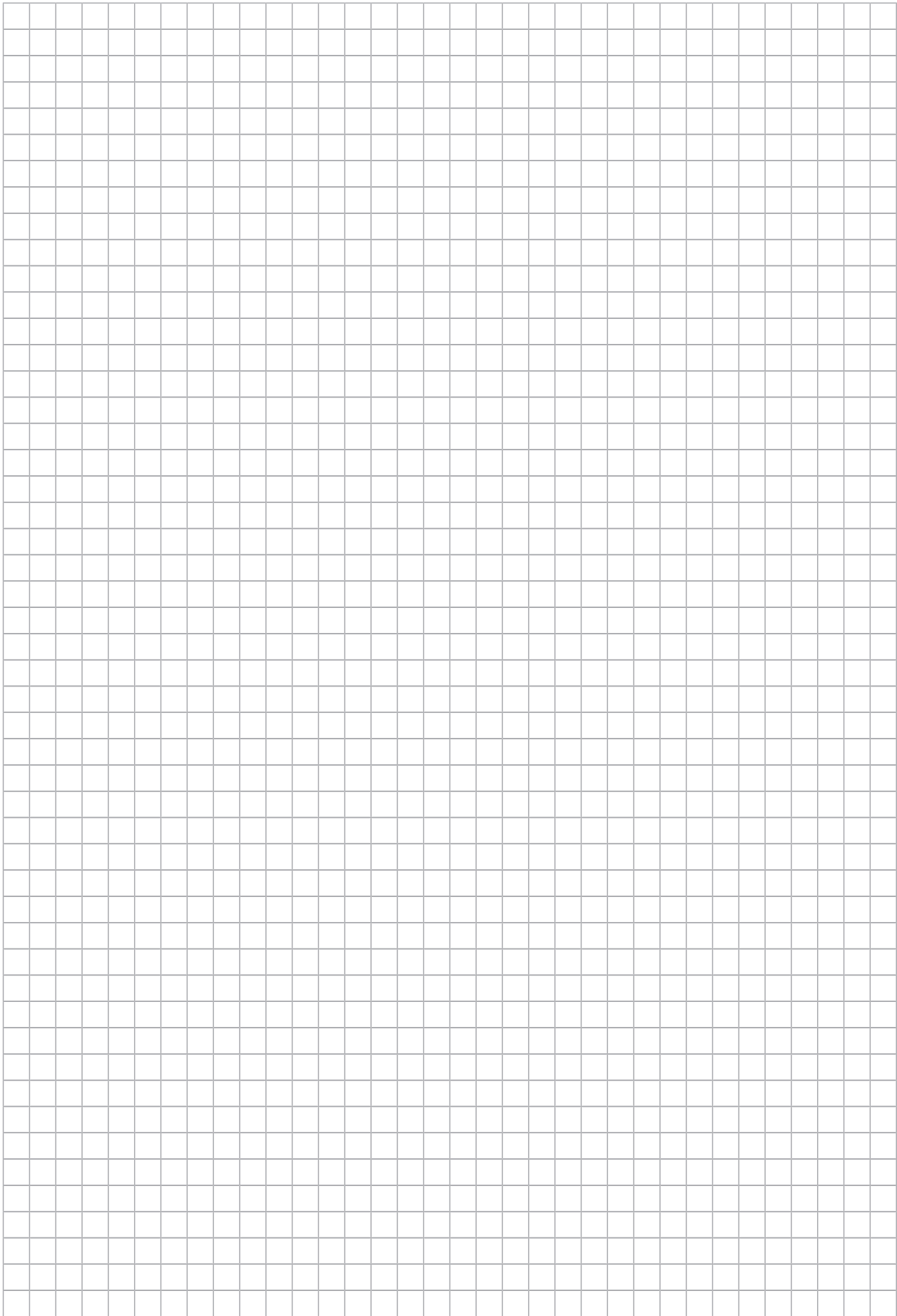
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