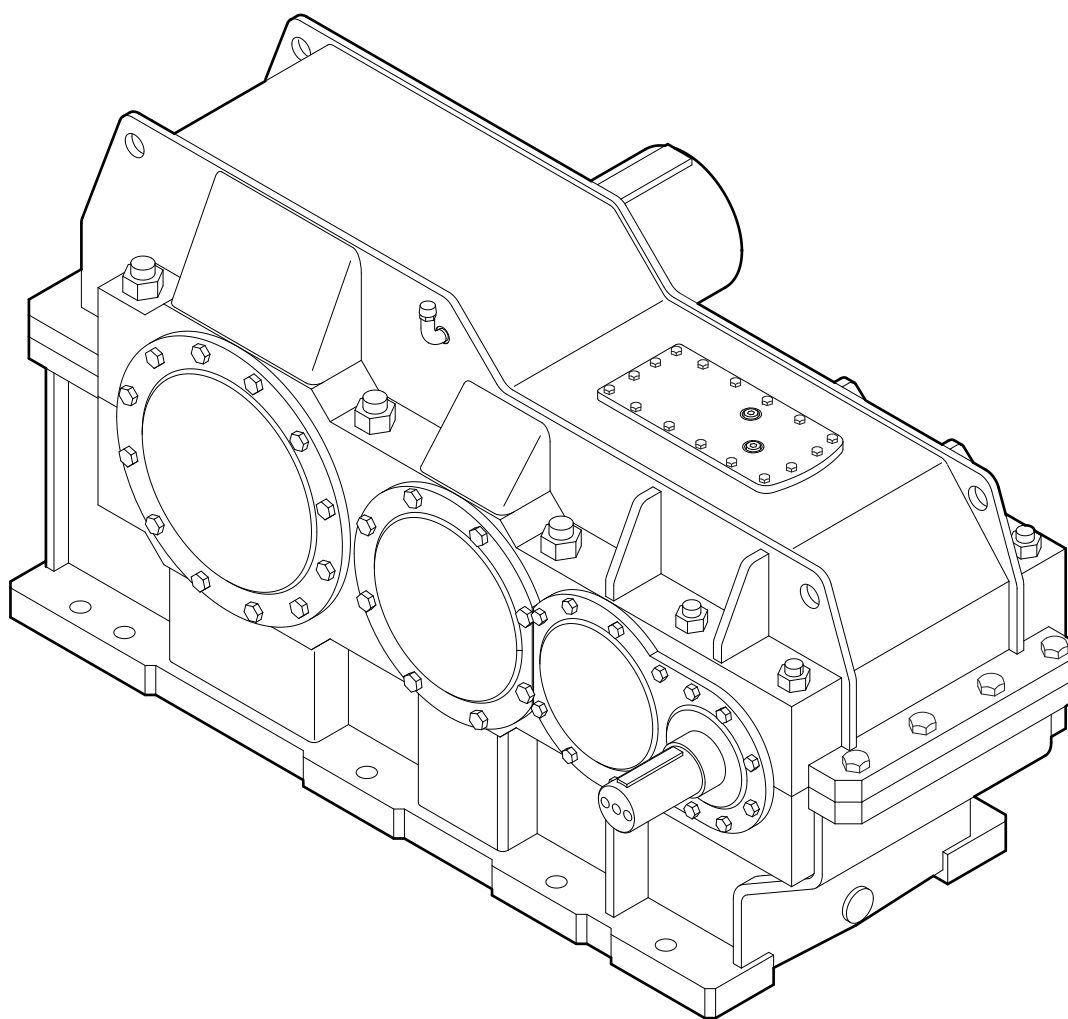




Assembly and Operating Instructions



Industrial Gear Units:

MD.. Series Helical and Bevel-Helical Gear Units

Torque Classes from 515 kNm – 2500 kNm



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1 General information

1.1 About this documentation

The documentation at hand is the original.

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

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

1.2 Structure of the safety notes

1.2.1 Meaning of signal words

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

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

1.2.2 Structure of section-related safety notes

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

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



SIGNAL WORD






Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

Meaning of the hazard symbols

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

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

1.2.3 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

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

1.3 Decimal separator in numerical values

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

Example: 30.5 kg

1.4 Product names and trademarks

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

1.5 Copyright notice

© 2025 SEW-EURODRIVE. All rights reserved. Copyright law prohibits the unauthorized reproduction, modification, distribution and use of this document – in whole or in part.

1.6 Rights to claim under limited warranty

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

1.7 Recycling, reprocessing, reuse

When manufacturing products, SEW-EURODRIVE makes sure to keep the use of new natural resources to a minimum in the interests of the circular economy. Key aspects here are the recycling of materials as well as the inspection and/or processing of returned components and their reuse in new products. These processes are only used at SEW-EURODRIVE if the resulting materials and components correspond to the quality of new products.

1.8 Other applicable documentation

The following documentation should also be observed:

- Order documents, such as technical specification, spare and wear parts list, dimension sheet, order confirmation, etc.
- If required, the operating instructions of the options installed such as:
 - Oil cooling system
 - Oil supply system
 - Flange coupling
 - Swing base and base frame
 - AC motors
 - DriveRadar®
 - Brake

- Coupling
- Separate assembly and operating instructions are available for the following gear units:
 - Bucket elevator gear unit
 - Hoist gear units /HC
 - Agitator gear unit /HM

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

www.sew-eurodrive.com

2 Safety notes

2.1 Preliminary information

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

2.2 General



⚠ WARNING

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

Severe or fatal injuries.

- All work related to transportation, storage, installation, assembly, connection, startup, maintenance and repair may only be carried out by qualified personnel, in strict observance of:
 - The relevant detailed operating instructions
 - Warning and safety signs on the gear unit
 - All other project planning documents, operating instructions and wiring diagrams related to the drive
 - The specific regulations and requirements for the system
 - The national/regional regulations governing safety and the prevention of accidents
- Never install damaged products.
- Report any damage to the shipping company immediately.
- Removing covers without authorization, improper use or incorrect installation and operation may result in severe injuries to persons or damage to machinery.

Refer to the documentation for additional information.

2.3 Target group

Specialist for mechanical work

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

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

Specialist for electrotechnical work

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

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

- Instructed persons All work in the areas of transport, storage, installation, operation and waste disposal may only be carried out by persons who are trained and instructed appropriately. These instructions must enable the persons to carry out the required activities and work steps safely and in accordance with regulations.
- 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 MD.. series industrial gear units are components for installation in machinery and systems. In the area of application of the EC directive, you must not start up the machinery in the designated fashion until you have established that the finished product complies with Machinery Directive 2006/42/EC.

2.5 Other applicable documentation

Also observe the following publications and documents:




- Order documents, such as dimension sheet, order confirmation, etc.
- If required, the "AC Motors" operating instructions
- If required, the operating instructions of the options installed














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

www.sew-eurodrive.de

2.6 Symbols on the gear unit

Observe the symbols on the gear unit. They have the following meaning:

Symbols	Meaning
	Indicates the oil filling point . Also serves as proper ventilation when changing the oil.
	Indicates the oil drain .
	Indicates the position of the breather . Serves to avoid mistaking the oil measuring position for the venting position.

Symbols	Meaning
	Used to avoid faults due to lack of understanding. Observe the information in the operating instructions.
	Indicates the magnetic oil dipstick .
	Indicates the magnetic oil drain plug .
	Indicates the position of the relubrication points and makes it easier to find the points to be lubricated. Helps prevent bearing damage.
	Indicates the water supply and is used to locate the connection option.
	Indicates the water return and is used to locate the connection option.
	Indicates the oil supply and is used to locate the connection option.
	Indicates the oil return and is used to locate the connection option.
	Indicates the mounting position of the gear unit for the oil control on the information sign for pivoted mounting positions.
	Indicates the position of the temperature sensor/temperature switch .
	Indicates the grease drain screw and is used to locate the grease drain option.
	Indicates the air outlet screw .
	Caution: Risk of burns due to hot surface.



Symbols	Meaning
	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 has not been set at the factory.							
<div> <div> </div> <div> <p>VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE</p> <table> <tr> <td> <p>DE Die Bremse ist ab Werk nicht eingestellt.</p> <p>Mögliche Sachschäden!</p> <ul style="list-style-type: none"> • Bremse vor der Inbetriebnahme gemäß Betriebsanleitung einstellen </td><td> <p>EN The brake has not been set at the factory</p> <p>Potential damage to property!</p> <ul style="list-style-type: none"> • Prior to startup, set the brake according to the operating instructions. </td></tr> <tr> <td> <p>F Le frein n'est pas réglé d'usine.</p> <p>Risque de dommages matériels !</p> <ul style="list-style-type: none"> • Avant la mise en service, régler le frein conformément aux instructions de la notice d'exploitation. </td><td> <p>ES El freno no viene ajustado de fábrica.</p> <p>¡Posibles daños materiales!</p> <ul style="list-style-type: none"> • Antes de la puesta en marcha, ajustar el freno según las instrucciones de funcionamiento. </td></tr> <tr> <td> <p>NL De rem is niet af fabriek ingesteld.</p> <p>Mogelijke materiële schade!</p> <ul style="list-style-type: none"> • Rem voor de inbedrijfstelling conform technische handleiding instellen. </td><td> <p>PL Hamulec nie jest ustawiony fabrycznie.</p> <p>Możliwe szkody materialne!</p> <ul style="list-style-type: none"> • Przed uruchomieniem należy ustawić hamulec zgodnie z wytycznymi z instrukcji obsługi. </td></tr> </table> <p>18855199</p> </div> </div>		<p>DE Die Bremse ist ab Werk nicht eingestellt.</p> <p>Mögliche Sachschäden!</p> <ul style="list-style-type: none"> • Bremse vor der Inbetriebnahme gemäß Betriebsanleitung einstellen 	<p>EN The brake has not been set at the factory</p> <p>Potential damage to property!</p> <ul style="list-style-type: none"> • Prior to startup, set the brake according to the operating instructions. 	<p>F Le frein n'est pas réglé d'usine.</p> <p>Risque de dommages matériels !</p> <ul style="list-style-type: none"> • Avant la mise en service, régler le frein conformément aux instructions de la notice d'exploitation. 	<p>ES El freno no viene ajustado de fábrica.</p> <p>¡Posibles daños materiales!</p> <ul style="list-style-type: none"> • Antes de la puesta en marcha, ajustar el freno según las instrucciones de funcionamiento. 	<p>NL De rem is niet af fabriek ingesteld.</p> <p>Mogelijke materiële schade!</p> <ul style="list-style-type: none"> • Rem voor de inbedrijfstelling conform technische handleiding instellen. 	<p>PL Hamulec nie jest ustawiony fabrycznie.</p> <p>Możliwe szkody materialne!</p> <ul style="list-style-type: none"> • Przed uruchomieniem należy ustawić hamulec zgodnie z wytycznymi z instrukcji obsługi.
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The coupling is delivered without grease.							
<div> <div> </div> <div> <p>VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE</p> <table> <tr> <td> <p>DE Kupplung wird ohne Fett geliefert.</p> <p>Mögliche Sachschäden!</p> <ul style="list-style-type: none"> • Vor der Inbetriebnahme Kupplung mit Fett befüllen. </td><td> <p>EN Coupling delivered without grease</p> <p>Possible damage to property.</p> <ul style="list-style-type: none"> • Fill coupling with grease prior to startup. </td></tr> <tr> <td> <p>F L'accouplement est livré sans graisse.</p> <p>Risque de dommages matériels !</p> <ul style="list-style-type: none"> • Avant la mise en service, remplir l'accouplement de graisse. </td><td> <p>ES El acoplamiento se suministra sin grasa.</p> <p>¡Posibles daños materiales!</p> <ul style="list-style-type: none"> • Llenar el acoplamiento con grasa antes de la puesta en marcha. </td></tr> <tr> <td> <p>NL Koppeling wordt zonder vet geleverd.</p> <p>Mogelijke materiële schade!</p> <ul style="list-style-type: none"> • Koppeling vóór de inbedrijfstelling met vet vullen. </td><td> <p>PL Sprzęgło jest dostarczane bez smaru.</p> <p>Możliwe szkody materialne!</p> <ul style="list-style-type: none"> • Przed uruchomieniem należy napęlić sprzęgło smarem. </td></tr> </table> <p>18977405</p> </div> </div>		<p>DE Kupplung wird ohne Fett geliefert.</p> <p>Mögliche Sachschäden!</p> <ul style="list-style-type: none"> • Vor der Inbetriebnahme Kupplung mit Fett befüllen. 	<p>EN Coupling delivered without grease</p> <p>Possible damage to property.</p> <ul style="list-style-type: none"> • Fill coupling with grease prior to startup. 	<p>F L'accouplement est livré sans graisse.</p> <p>Risque de dommages matériels !</p> <ul style="list-style-type: none"> • Avant la mise en service, remplir l'accouplement de graisse. 	<p>ES El acoplamiento se suministra sin grasa.</p> <p>¡Posibles daños materiales!</p> <ul style="list-style-type: none"> • Llenar el acoplamiento con grasa antes de la puesta en marcha. 	<p>NL Koppeling wordt zonder vet geleverd.</p> <p>Mogelijke materiële schade!</p> <ul style="list-style-type: none"> • Koppeling vóór de inbedrijfstelling met vet vullen. 	<p>PL Sprzęgło jest dostarczane bez smaru.</p> <p>Możliwe szkody materialne!</p> <ul style="list-style-type: none"> • Przed uruchomieniem należy napęlić sprzęgło smarem.
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9007204570573323							



Meaning

The coupling is delivered without oil.



VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE					
  18977413	(DE) Kupplung wird ohne Öl geliefert. Mögliche Sachschäden! • Vor der Inbetriebnahme Kupplung mit Öl befüllen.		(EN) Coupling delivered without oil Possible damage to property. • Fill coupling with oil prior to startup.		
	(F) L'accouplement est livré sans huile. Risque de dommages matériels ! • Avant la mise en service, remplir l'accouplement d'huile.		(ES) El acoplamiento se suministra sin aceite. ¡Posibles daños materiales! • Llenar el acoplamiento con aceite antes de la puesta en marcha.		
	(NL) Koppeling wordt zonder olie geleverd. Mogelijke materiële schade! • Koppeling vóór de inbedrijfstelling met olie vullen.		(PL) Sprzęgło jest dostarczane bez oleju. Możliwe szkody materialne! • Przed uruchomieniem należy napelnić sprzęgło olejem.		

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The gear unit is protected against corrosion with VCI.



VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE					
  18977421	(DE) Getriebe ist mit VCI rostgeschützt. Nicht öffnen! Mögliche Sachschäden! • Vor der Inbetriebnahme Vorarbeiten gemäß Betriebsanleitung durchführen. • Keine offene Flamme!		(EN) Gear unit with VCI corrosion protection. Do not open! Potential damage to property! • Prior to startup, perform preliminary work according to operating instructions • No open flames!		
	(F) Réducteur protégé contre la corrosion avec VCI. Ne pas ouvrir Risque de dommages matériels ! • Avant la mise en service, réaliser les travaux préliminaires indiqués dans la notice d'exploitation. • Pas de flammes ouvertes !		(ES) Reductor está protegido con VCI contra la corrosión. ¡No abrir! ¡Posibles daños materiales! • Antes de la puesta en marcha, efectuar los trabajos preparatorios según las instrucciones de funcionamiento. • No debe haber fuego abierto.		
	(NL) Tandwielkast is met VCI tegen corrosie beschermd. Niet openen! Mogelijke materiële schade! • Vóór de inbedrijfstelling voorbereidingen conform technische handleiding uitvoeren. • Geen open vuur!		(PL) Przekładnia zabezpieczona jest przed korozją za pomocą środka VCI. Nie otwierać! Możliwe szkody materialne! • Przed uruchomieniem należy przeprowadzić czynności przygotowawcze zgodnie z informacjami zawartymi w instrukcji obsługi! • Unikać otwartych płomieni!		

















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Meaning							
The gear unit is delivered without oil.							
<div style="border: 1px solid black; padding: 10px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 10px;"> VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE </div> <div style="display: flex;"> <div style="flex: 1; text-align: center; padding-right: 10px;">  <p>18977383</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 wird ohne Öl geliefert. Mögliche Sachschäden!</p> <ul style="list-style-type: none"> • Vor der Inbetriebnahme Ölbefüllung gemäß Betriebsanleitung durchführen. </td><td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(EN) Gear unit is delivered without oil. Potential damage to property!</p> <ul style="list-style-type: none"> • Prior to startup, fill in oil according to operating instructions. </td></tr> <tr> <td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(F) Le réducteur ne contient pas d'huile à la livraison. Dommages matériels possibles !</p> <ul style="list-style-type: none"> • Avant la mise en service, effectuer le remplissage d'huile conformément à la notice d'exploitation. </td><td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(ES) El reductor se suministra sin aceite. ¡Posibles daños materiales!</p> <ul style="list-style-type: none"> • Antes de la puesta en marcha, efectuar el llenado de aceite según las instrucciones de funcionamiento. </td></tr> <tr> <td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(NL) Tandwielkast wordt zonder olie geleverd. Mogelijke materiële schade!</p> <ul style="list-style-type: none"> • Vóór de inbedrijfstelling olie conform technische handleiding bijvullen. </td><td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(PL) Przekładnia dostarczana jest bez oleju. Możliwe straty rzeczowe!</p> <ul style="list-style-type: none"> • Przed uruchomieniem należy wlać olej zgodnie z informacjami zawartymi w instrukcji obsługi. </td></tr> </table> </div> </div> </div>		<p>(DE) Getriebe wird ohne Öl geliefert. Mögliche Sachschäden!</p> <ul style="list-style-type: none"> • Vor der Inbetriebnahme Ölbefüllung gemäß Betriebsanleitung durchführen. 	<p>(EN) Gear unit is delivered without oil. Potential damage to property!</p> <ul style="list-style-type: none"> • Prior to startup, fill in oil according to operating instructions. 	<p>(F) Le réducteur ne contient pas d'huile à la livraison. Dommages matériels possibles !</p> <ul style="list-style-type: none"> • Avant la mise en service, effectuer le remplissage d'huile conformément à la notice d'exploitation. 	<p>(ES) El reductor se suministra sin aceite. ¡Posibles daños materiales!</p> <ul style="list-style-type: none"> • Antes de la puesta en marcha, efectuar el llenado de aceite según las instrucciones de funcionamiento. 	<p>(NL) Tandwielkast wordt zonder olie geleverd. Mogelijke materiële schade!</p> <ul style="list-style-type: none"> • Vóór de inbedrijfstelling olie conform technische handleiding bijvullen. 	<p>(PL) Przekładnia dostarczana jest bez oleju. Możliwe straty rzeczowe!</p> <ul style="list-style-type: none"> • Przed uruchomieniem należy wlać olej zgodnie z informacjami zawartymi w instrukcji obsługi.
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27021603080059659							
The gear unit is delivered with GearOil by SEW-EURODRIVE.							
<div style="border: 1px solid black; padding: 10px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 10px;"> HINWEIS INFORMATION REMARQUE INFORMACIÓN INFORMATIE INFORMAJA </div> <div style="display: flex;"> <div style="flex: 1; text-align: center; padding-right: 10px;">  <p>22680829</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 wird mit SEW GearOil geliefert. Entfall des 1. Ölwechsels nach 500 h Betriebsstunden.</p> </td><td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(EN) The gear unit is delivered with SEW GearOil. Elimination of the initial oil change after 500 operating hours.</p> </td></tr> <tr> <td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(F) Réducteur livré avec GearOil by SEW-EURODRIVE Suppression du premier remplacement d'huile après 500 heures de fonctionnement.</p> </td><td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(ES) El reductor se suministra con SEW GearOil. Eliminación del primer cambio de aceite después de 500 horas de funcionamiento.</p> </td></tr> <tr> <td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(NL) De tandwielkast wordt geleverd met SEW GearOil. Vervallen van de eerste olieversing na 500 bedrijfsuren.</p> </td><td style="width: 33%; vertical-align: top; padding: 5px;"> <p>(PL) Przekładnia jest dostarczana z SEW GearOil. Brak konieczności początkowej wymiany oleju po 500 godzinach pracy.</p> </td></tr> </table> </div> </div> </div>		<p>(DE) Getriebe wird mit SEW GearOil geliefert. Entfall des 1. Ölwechsels nach 500 h Betriebsstunden.</p>	<p>(EN) The gear unit is delivered with SEW GearOil. Elimination of the initial oil change after 500 operating hours.</p>	<p>(F) Réducteur livré avec GearOil by SEW-EURODRIVE Suppression du premier remplacement d'huile après 500 heures de fonctionnement.</p>	<p>(ES) El reductor se suministra con SEW GearOil. Eliminación del primer cambio de aceite después de 500 horas de funcionamiento.</p>	<p>(NL) De tandwielkast wordt geleverd met SEW GearOil. Vervallen van de eerste olieversing na 500 bedrijfsuren.</p>	<p>(PL) Przekładnia jest dostarczana z SEW GearOil. Brak konieczności początkowej wymiany oleju po 500 godzinach pracy.</p>
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2.7 Symbols on the dimension sheet

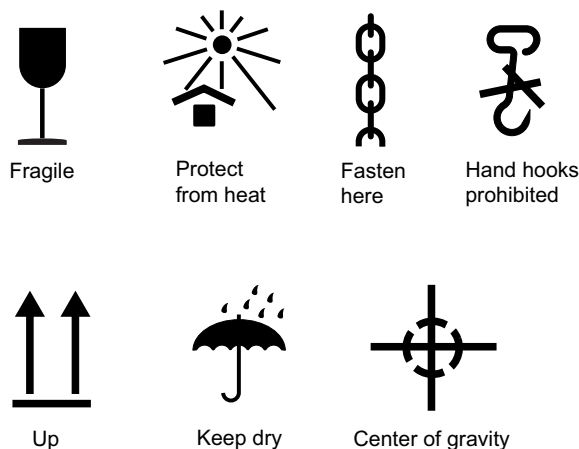
The symbols on the dimension sheet must be observed. They have the following meaning:

Symbols	Meaning
	Indicates the oil filling point .
	Indicates the oil drain .

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

2.8 Symbols on the packaging

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



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2.9 Transport

2.9.1 General information



⚠ WARNING

Suspended loads can fall.

Severe or fatal injuries.

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



⚠ WARNING

Lifted loads may fall over.

Severe or fatal injuries.

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



⚠ CAUTION

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

Potential risk of crushing due to falling parts.

- Secure the mount-on components.



⚠ CAUTION

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

Minor injuries.

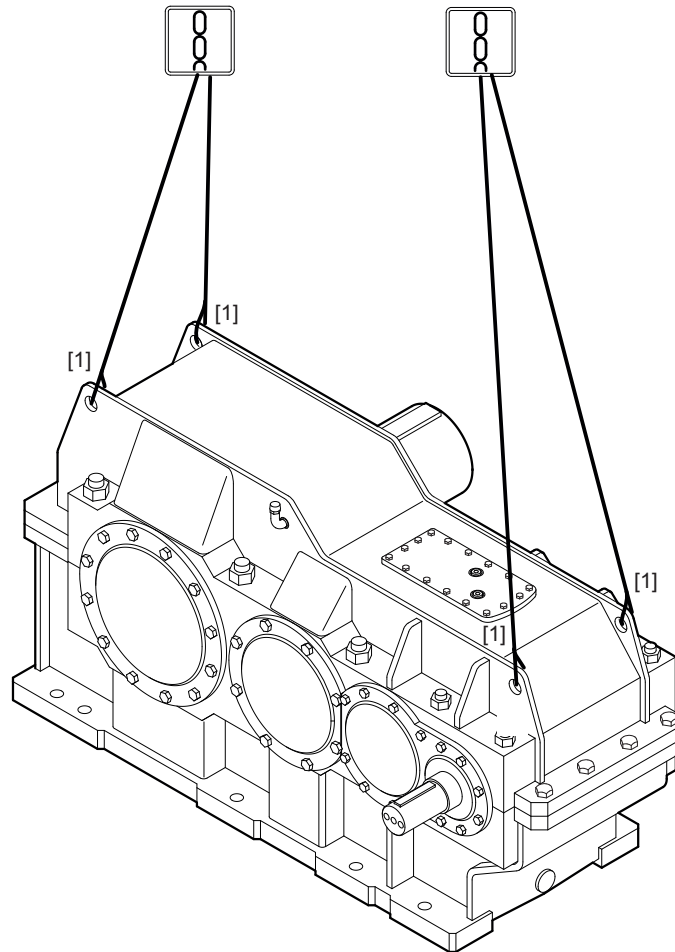
- Check the gear unit and mount-on components for leaking lubricant.
- The seals must not come in contact with cleaning agent as this may damage the seals.
- Protect the breather against damage.
- Make sure that there is not too much oil in the gear unit. If the oil level is too high and the temperature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

NOTICE

Improper transport may result in damage to the gear unit.

Possible damage to property.

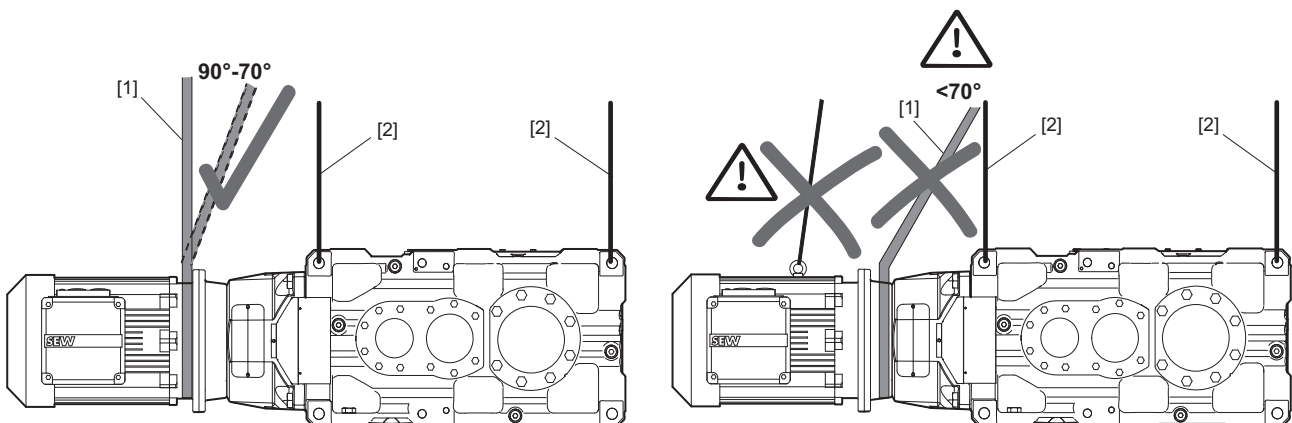
- Observe the following information.
- Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. It may be necessary to preclude startup.
- The weight of the gear unit (without oil) is indicated on the nameplate or on the dimension sheet. Observe the loads and specifications given on the nameplate.
- If possible, transport the gear unit without oil fill. If this is not possible, note that the weight indicated on the nameplate refers only to the gear unit without oil fill, and replace the breather with a screw plug.
- The gear unit must be transported in a manner that prevents damage to the gear unit and to mount-on components. For example, impacts against exposed shaft ends can damage the gear unit.
- Use only the prescribed suspension points to transport the gear unit [1] (see order documents). The load suspensions of the motor or mount-on components are provided for stabilization purposes only.



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2.9.2 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.

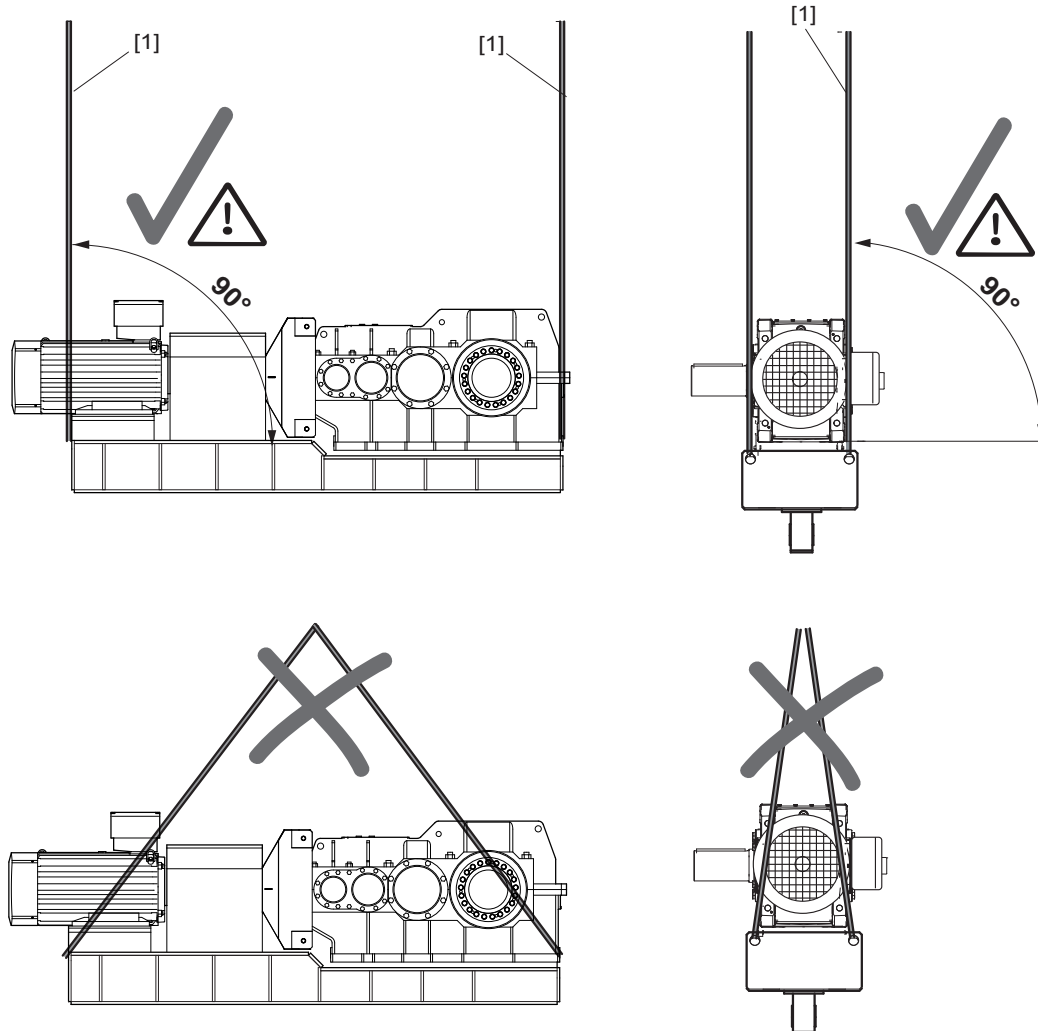


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2.9.3 Gear units on swing base/base frame

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. For more information, refer to the order-specific dimension sheet.

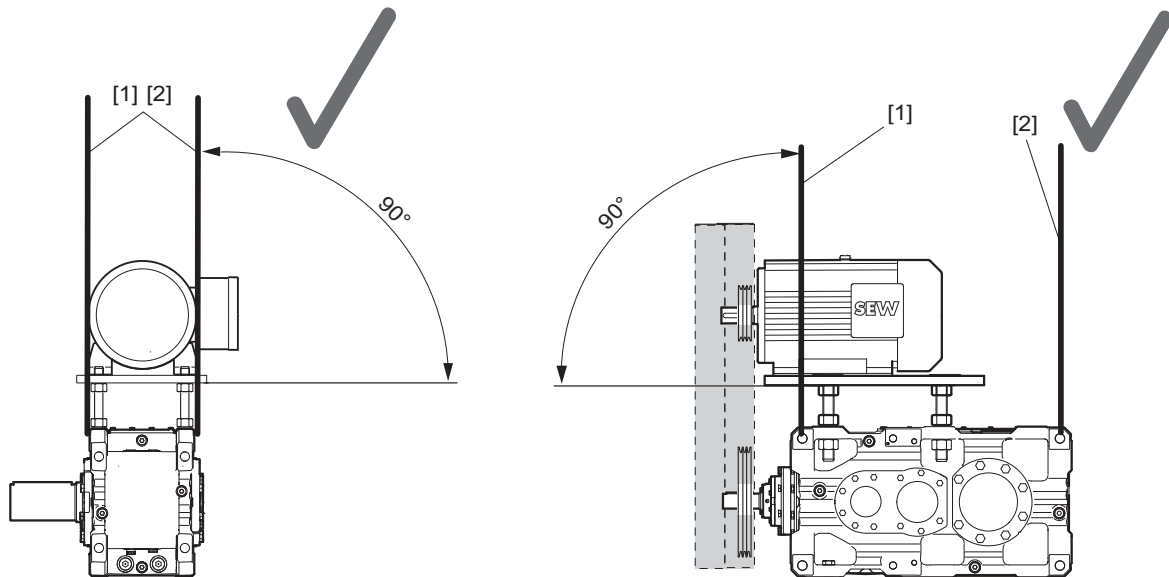


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2.9.4 Gear units with V-belt drive

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 illustrate how to transport the gear unit.



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2.10 Storage and transport conditions

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

2.10.1 Internal preservation

Standard preservation

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 preservation

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.

Preservation 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 preservation

The following measures are taken for exterior preservation:

- Anti-corrosion agent is applied to bare, non-painted functional surfaces of shafts, flanges, mounting and foot surfaces of the housing. The anti-corrosion agent must be removed only 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 with plastic plugs.
- If the gear unit is stored longer than 6 months, you must regularly check the protective coating of unpainted areas as well as the paint coating. Renew areas with damaged protective coating/paint.

2.10.3 Packaging

Standard packaging

The gear unit is delivered on a pallet without cover.

Use: transport by truck or rail

Long-term packaging

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

Use: transport by ship and/or extended storage

2.10.4 Storage conditions

NOTICE

Improper storage may result in damage to the gear unit.

Possible damage to property.

- While in storage until startup, the gear unit must be stored in a shock-free manner to prevent damage to the rolling bearing raceways.
- Only fill gear units with oil up to the uppermost rolling element. This ensures a remaining air volume for the oil to expand in case of higher temperatures. Add VCI Anticorit to the oil and tightly seal the gear unit (replace the breather with a screw plug).
- The permissible storage temperature is -30 °C to +50 °C.

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 a 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 and no shocks.	The storage time is max. 6 months with intact surface protection.
Long-term corrosion protection + standard packaging	Under a 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 and no shocks.	The storage time is max. 3 years with regular inspection and checking for intactness.
Long-term corrosion protection + long-term packaging	Under a roof, protected against rain and free from shocks.	The storage time is max. 3 years with regular inspection and checking for intactness.

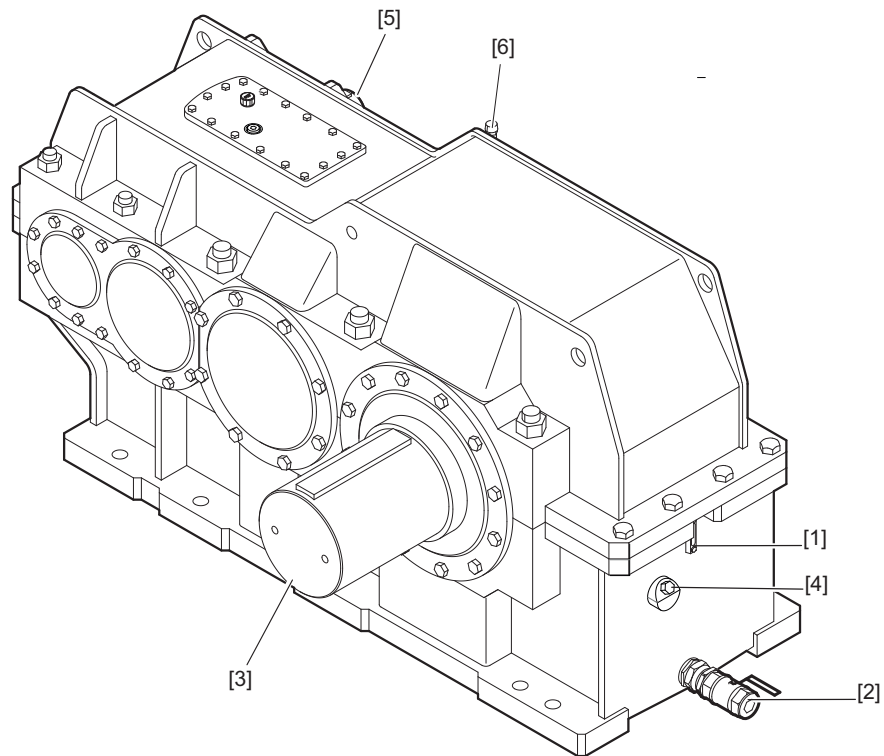
INFORMATION



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

3 Gear unit structure**3.1 Overview of gear unit and mount-on components**

The gear units are 3- and 4-stage helical gear units. The following figure shows the gear unit structure.



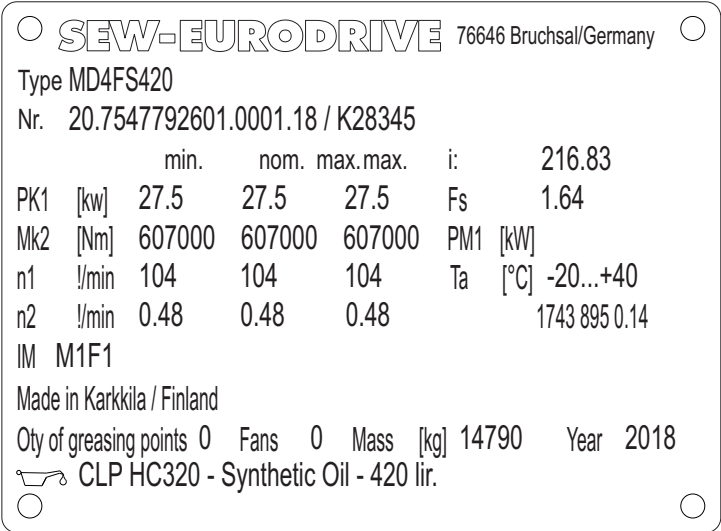
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- [1] Oil level glass
- [2] Oil drain
- [3] Output shaft
- [4] Oil dipstick (optional)


- [5] Input shaft
- [6] Breather

3.2 Nameplate

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



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Type		Type designation
No.		Serial number
P _{K1}	kW	Operating power on the input shaft (HSS)
M _{K2}	Nm	Gear unit output torque
n ₁	l/min	Input speed (HSS)
n ₂	l/min	Output speed (LSS)
min.		Minimum operating point
nom.		Normal operating point
max.		Maximum operating point
i		Exact gear unit ratio
F _s		Service factor
P _{M1}	kW	Nominal motor power
T _a	°C	Deviation from standard temperature range (−20 °C to +40 °C)
Mass	kg	Weight of the gear unit
Greasing points		Number of points that require regreasing
Fan		Number of installed fans
		Oil grade and viscosity class/oil quantity
Year		Year of manufacture
IM		Mounting position and mounting surface

3.3 Type designations

3.3.1 Gear units

The following example shows the structure of the type designation:

MD3FS360 /HH /B	
M	Industrial gear unit series*
E D	<ul style="list-style-type: none"> E = Customer specific solution D = Engineered to Order solution
3	Number of gear unit stages <ul style="list-style-type: none"> 2 = 2 stages 3 = 3 stages 4 = 4 stages 5 = 5 stages
F	Gear unit design <ul style="list-style-type: none"> F = Helical gear unit K = 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
420	Gear unit sizes <ul style="list-style-type: none"> 360 – 520
HH	Housing design <ul style="list-style-type: none"> HH = Horizontal housing
B	Gear unit mounting <ul style="list-style-type: none"> /B = Foot mounting /T = Torque arm /F = Flange

*M-series includes ME and MD variants.

- ME.. Customer specific solution
- MD.. Engineered to Order solution

3.3.2 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.

OWC	
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

3.3.3 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

3.3.4 Abbreviations for optional accessories

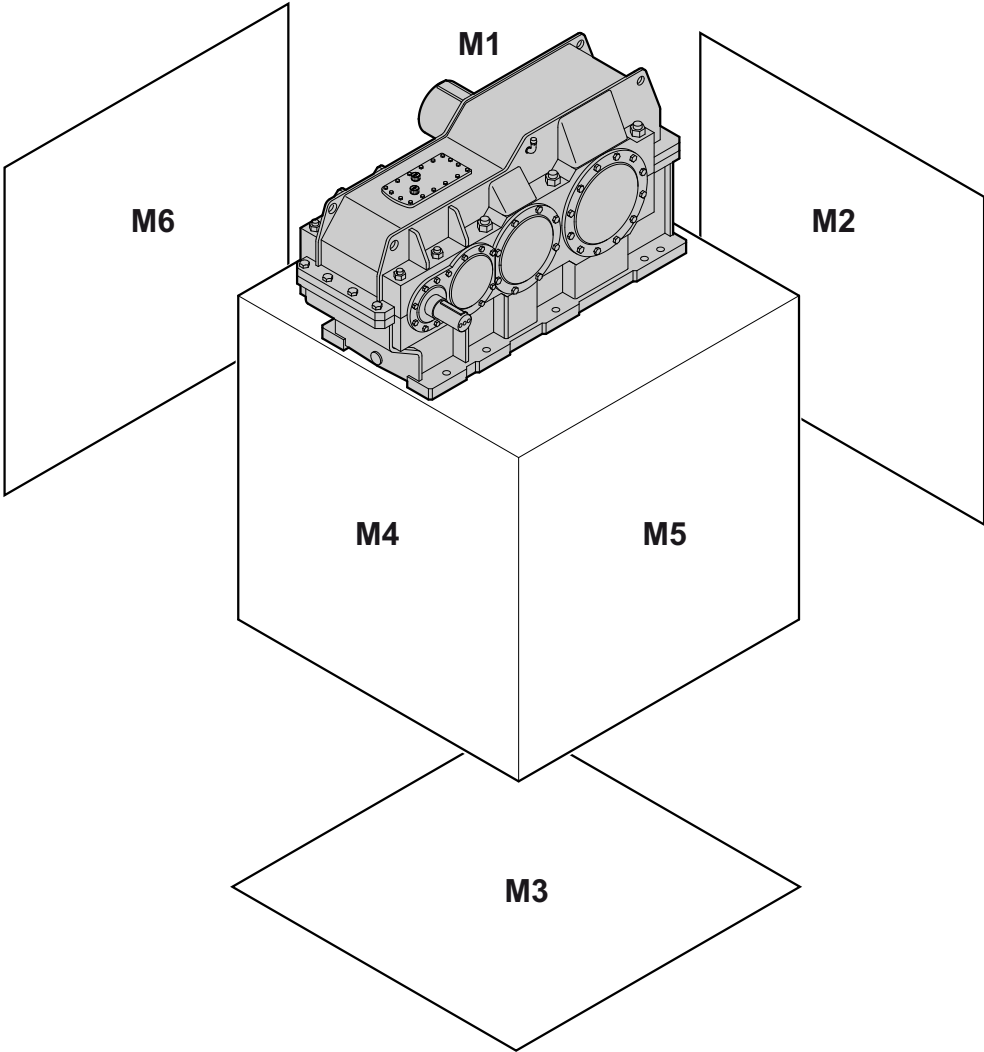
The table shows the abbreviations used and what they mean.

Abbreviation	Meaning
BF	Base frame
BS	Backstop
APL	Torque-limiting backstop
BPG	Breather
F	Mounting flange
FC	Flange coupling
FAN	Fan
FAN-ADV	Fan, Advanced design
HH	Horizontal 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
ODV	Oil drain valve
OLG	Oil level glass
OH	Oil heater
VBD	V-belt drives

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

3.4 Mounting position

The mounting position defines the spatial orientation of the gear unit housing and is designated **M1 – M6**. The gear unit is designed to be used in mounting position M1. The gear unit may not be installed in any other mounting position.



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3.4.1 Deviating mounting positions

Observe the following deviations from the mounting position permitted for MDF.. and MDK.. gear units. The information is based on a gear unit without pivoted mounting position.

MDK..	MDF..	MDF.. and MDK..

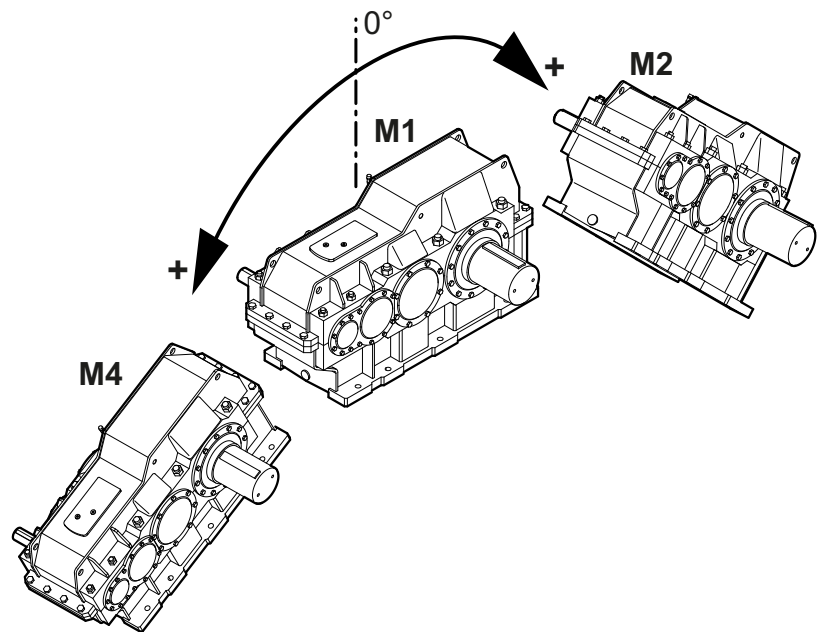
3.5 Fixed and variable pivoted mounting positions

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

INFORMATION



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



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3.5.1 Fixed pivoted mounting position

Definition:

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

Example:

The type designation is set up as follows:

M1-M4/9°

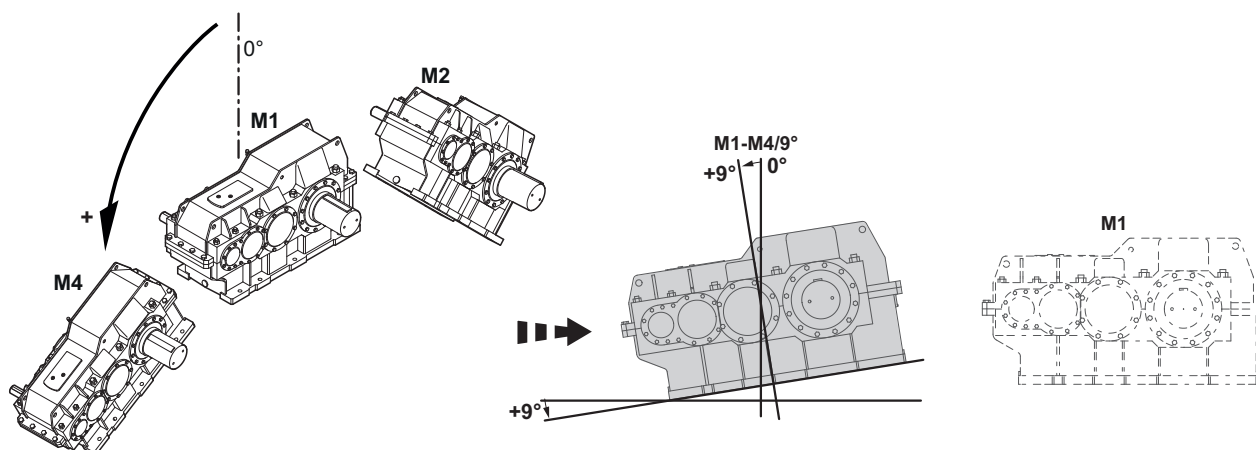
M1 = Initial mounting position

M4 = Pivoting direction

9° = Fixed pivoting angle

Pivoted from mounting position M1 to M4 by 9°.

This results in the following fixed pivoted mounting position:



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

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

SEW-EURODRIVE						76646 Bruchsal/Germany	
Type MD4FS420							
Nr. 20.7547792601.0001.18 / K28345							
		min.	nom.	max.	max.	i:	216.83
PK1	[kw]	27.5	27.5	27.5		Fs	1.64
Mk2	[Nm]	607000	607000	607000		PM1	[kW]
n1	1/min	104	104	104		Ta	[°C] -20...+40
n2	1/min	0.48	0.48	0.48			1743 895 0.14
IM M1-M4/9°/F1							
Made in Karkkila / Finland							
Qty of greasing points		0	Fans	0	Mass [kg]	14790	Year 2018
CLP HC320 - Synthetic Oil - 420 lir.							

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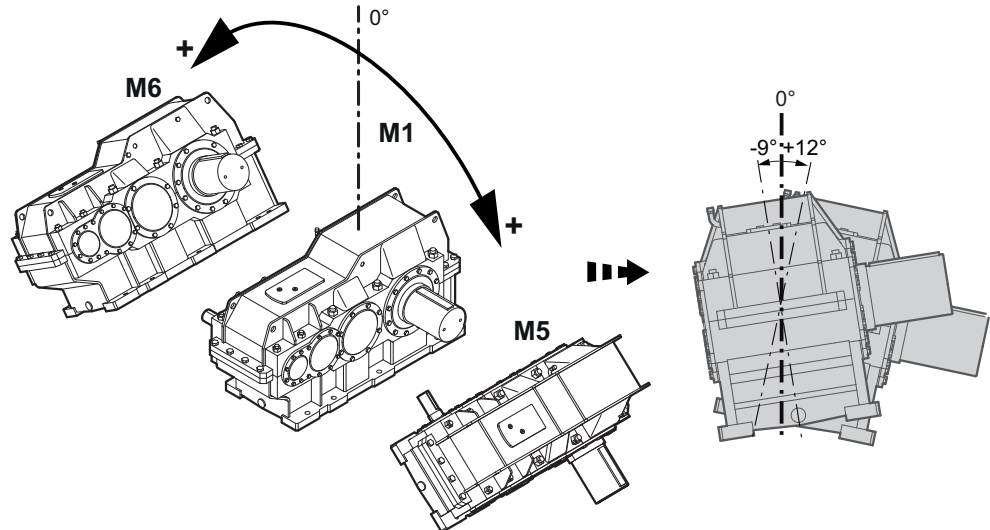
3.5.2 Variable pivoted mounting position

Definition:

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

Example:

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



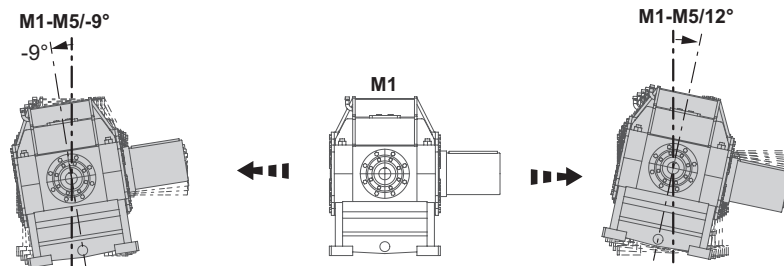
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Step 1:

The largest pivoting angle determines the positive pivoting direction ($12^\circ > 9^\circ$). 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 M5, pivoted by -9°



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The type designation for this example is:

M1-M5/-9°...12°


M1 = Initial mounting position

M5 = Pivoting direction

12° = Pivoted from M1 to M5 by 12°

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

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



76646 Bruchsal/Germany

Type MD4FS420

Nr. 20.7547792601.0001.18 / K28345

		min.	nom.	max.	max.	i:	216.83
PK1	[kw]	27.5	27.5	27.5		F _s	1.64
Mk2	[Nm]	607000	607000	607000		PM1	[kW]
n1	1/min	104	104	104		Ta	[°C] -20...+40
n2	1/min	0.48	0.48	0.48			1743 895 0.14

IM M1-M5/-9°...12°/F1


Made in Karkkila / Finland

Qty of greasing points 0

Fans 0

Mass [kg] 14790

Year 2018



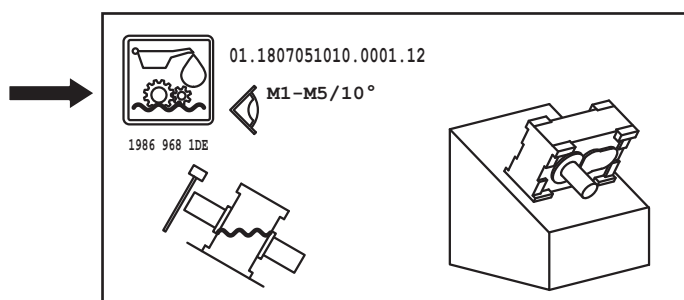
CLP HC320 - Synthetic Oil - 420 lir.

25196423307

Step 2:

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

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



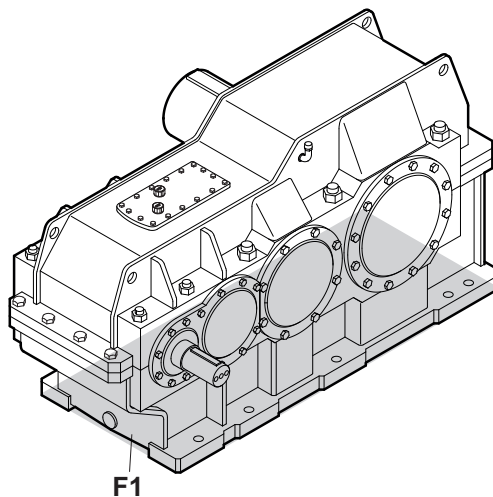
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3.6 Mounting surfaces

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

- Foot mounting (/B)

on which the gear unit is mounted.

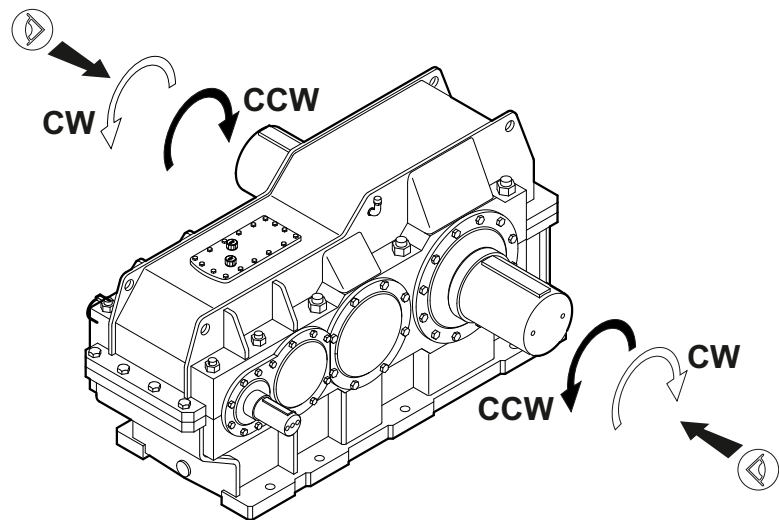


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3.7 Directions of rotation

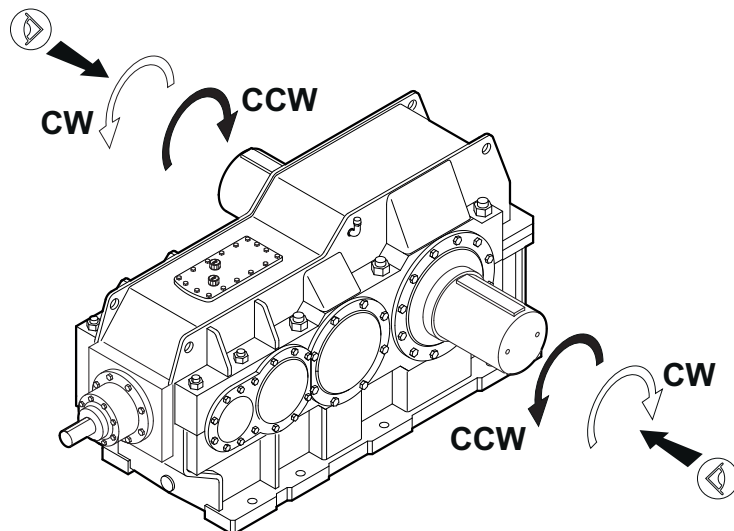
The direction of rotation of the output shaft is defined as follows:

3.7.1 MDF..



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3.7.2 MDK..

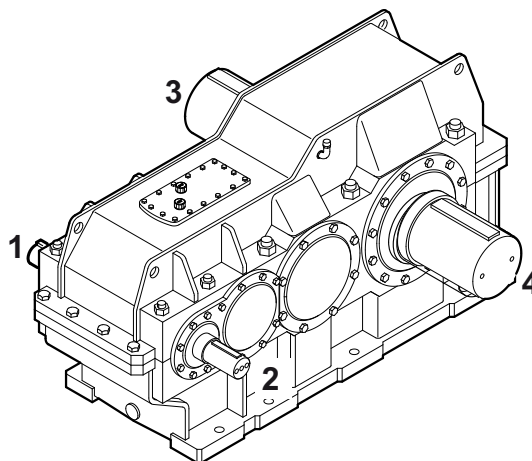


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3.8 Shaft positions

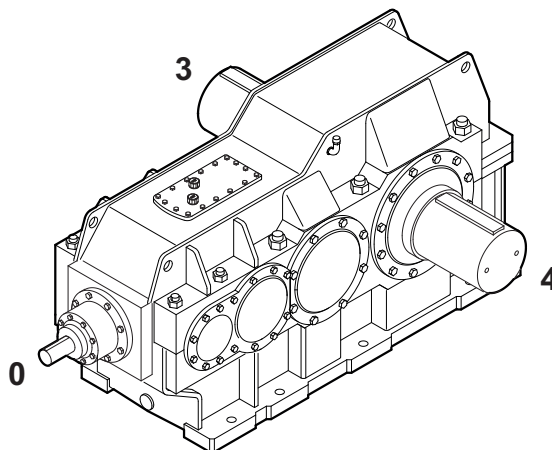
The shaft positions (1 to 4) shown in the following figure apply to solid output shafts (LSS). For other shaft positions, contact SEW-EURODRIVE.

3.8.1 MDF..



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3.8.2 MDK..

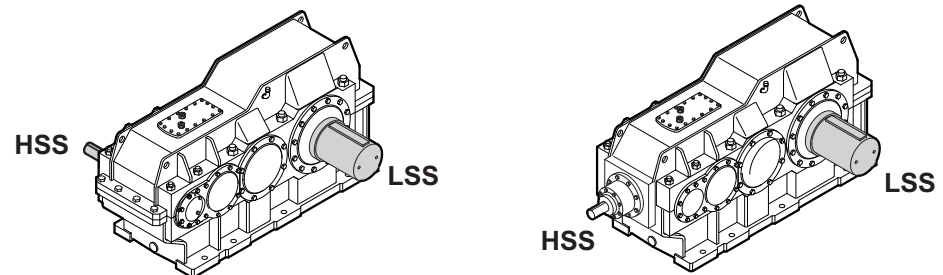


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3.9 Input and output shafts

There are 2 types of shafts:

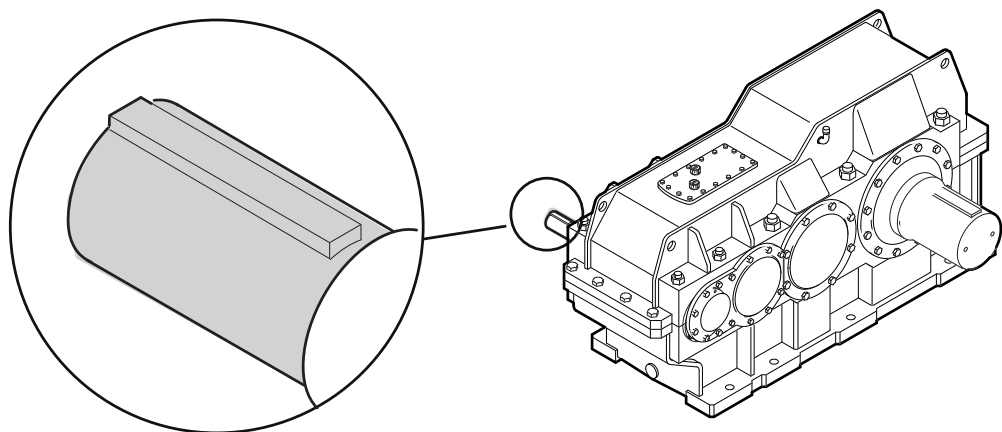
- High-speed shaft (**HSS**), usually the input shaft
- Low-speed shaft (**LSS**), usually the output shaft



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3.9.1 Input shaft

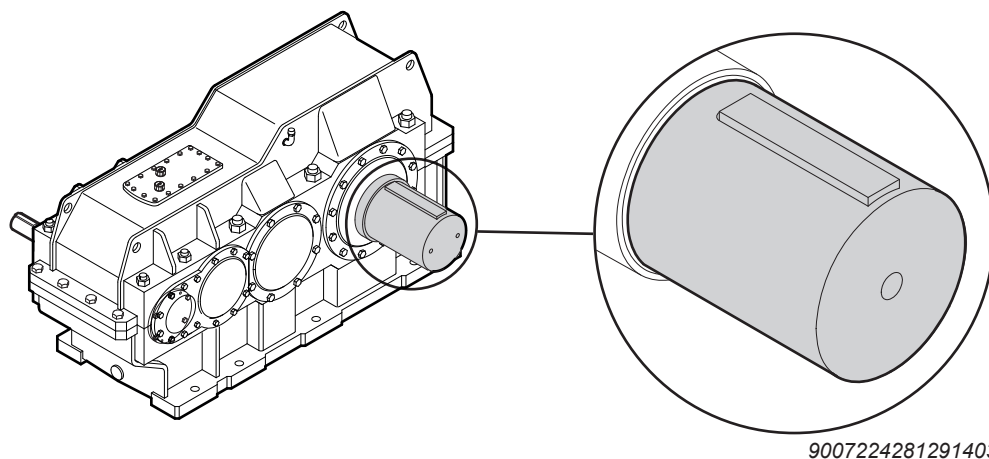
The input shaft is provided with a closed keyway according to DIN 6885/T1 and a centering bore according to DIN 332. The matching key according to DIN 6885/T1 - form A is included in the delivery.



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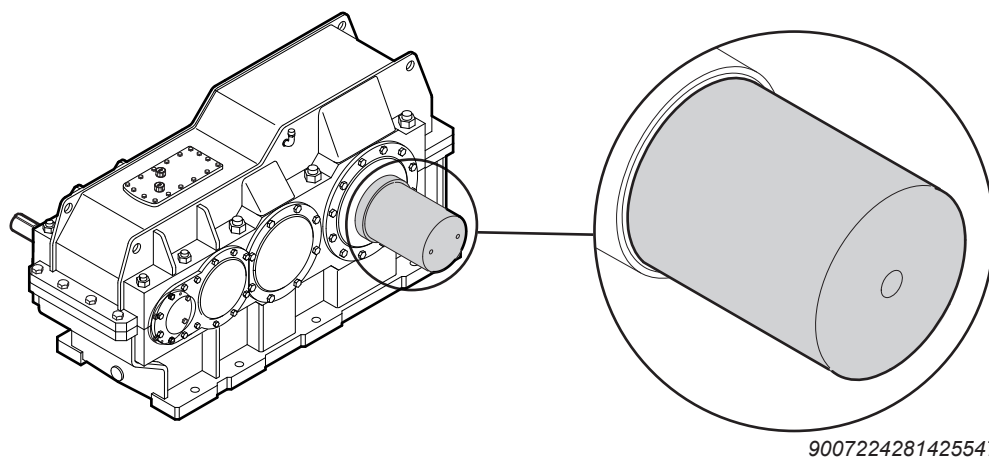
3.9.2 Output shaft as a solid shaft with key /..S

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



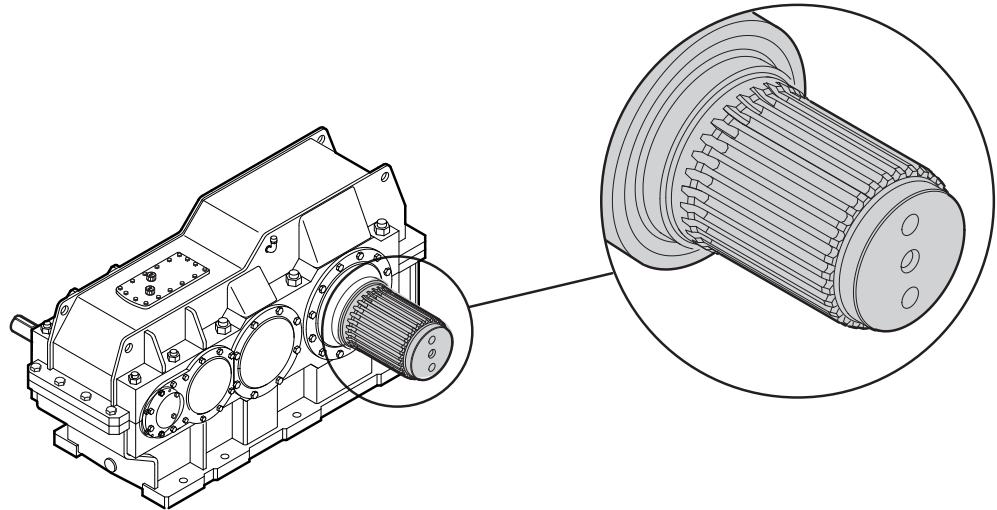
3.9.3 Smooth output shaft /..R

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



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

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



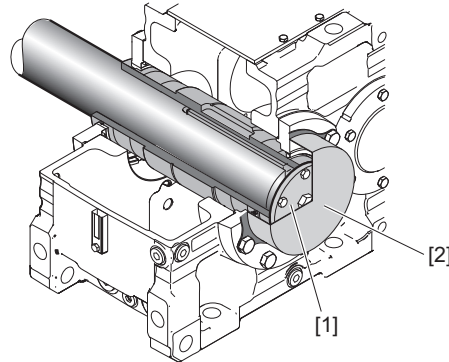
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3.9.5 Output shaft as a hollow shaft with keyway /..A

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

Included in the delivery:

- the hollow shaft guard [2]
- Retaining screws [1]



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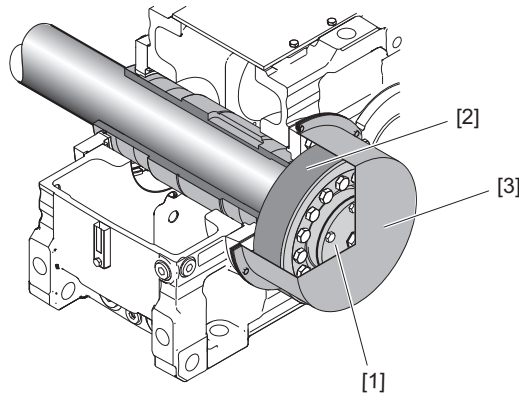
The protection cover is dust-tight. The standard sealing system is therefore normally used on the protection guard side.

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

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

Included in the delivery:

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



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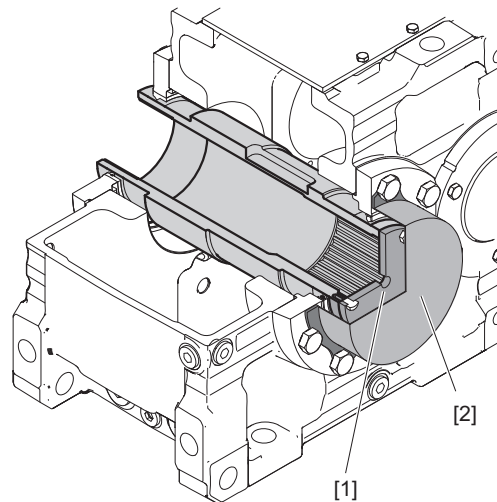
The protection cover is dust-tight. The standard sealing system is therefore normally used on the protection guard side.

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

The output shaft is a splined shaft according to DIN 5480.

Included in the delivery:

- the hollow shaft guard [2]
- Endplate with screws [1]



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3.9.8 Gear unit mounting for hollow shaft gear units

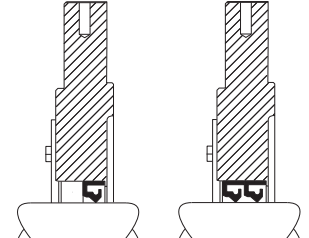
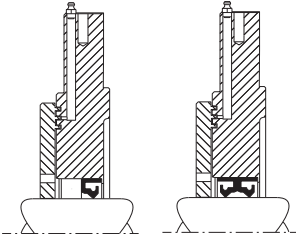
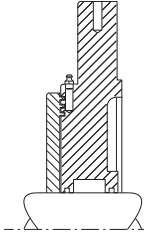
NOTICE

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.

3.10 Sealing systems

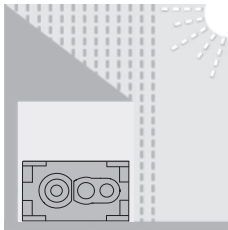
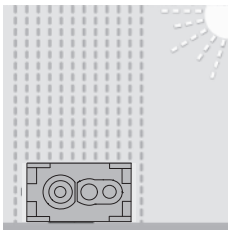
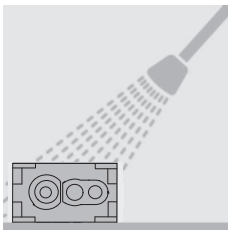
Dust-protected	Radial labyrinth seal (Taconite) Regreasable	Contactless radial labyrinth seal
Single and double oil seal with dust protection cover	Single and double oil seal with radial labyrinth seal	Contactless radial labyrinth seal
Medium dust load with abrasive particles	Very high dust load with abrasive particles	For high speeds and with pressure lubrication system
		

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3.11 Coating and surface protection systems

The following description provides an overview of the coating and surface protection system.

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

OS 1 low environmental pollution	
	For environments prone to condensation and atmospheres with low humidity or contamination, such as outdoor applications under roof or with protection, unheated buildings where condensation can build up. According to corrosivity category: C2 (low)
Sample applications	<ul style="list-style-type: none"> • Systems in saw mills • Agitators and mixers
Condensation test ISO 6270	120 h
Salt spray test ISO 7253	–
OS 2 medium environmental pollution	
	For environments with high humidity or moderate atmospheric contamination, such as applications outdoors subject to direct weathering. According to corrosivity category: C3 (moderate)
Sample applications	<ul style="list-style-type: none"> • Applications in gravel plants • Cableways
Condensation test ISO 6270	120 h
Salt spray test ISO 7253	240 h
OS 3 high environmental pollution	
	For environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasional acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt load. According to corrosivity category: C4 (high)
Sample applications	<ul style="list-style-type: none"> • Port cranes • Sewage treatment plants • Mining applications
Condensation test ISO 6270	240 h
Salt spray test ISO 7253	480 h

INFORMATION



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

3.12 Lubrication

3.12.1 Type of lubrication

Splash lubrication

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

Bath lubrication

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

- Standard lubrication type with oil compensator for:
 - Pivoted mounting positions with horizontal gear units beyond a certain angle of inclination (depending on type of gear unit, design and size)

Pressure lubrication

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

Pressure lubrication is used when

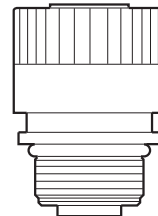
- Splash lubrication is not possible (see corresponding mounting positions and variants under "Bath lubrication"),
- Bath lubrication is not desired and/or is not advantageous for thermal reasons,
- A Drywell sealing system is required (only for vertical output shaft with LSS facing downwards), or
-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

3.13 Breather /BPG

The breather prevents non-permitted pressure increases generated by heating or cooling during operation.

Observe the following information.

3.13.1 Standard

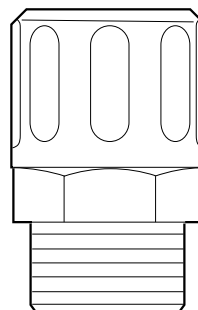


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Structure

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

3.13.2 Standard

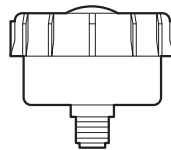


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Structure

Characteristics	
Filter inserts	Wire mesh, galvanized
Threads	3/4"

3.13.3 Breather with filter insert /PI



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The breather has the following characteristics:

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

Structure

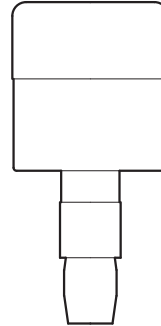
The breather has a corrosion-proof housing with an air intake opening at the top. The cover with protection lip keeps splashing water off.

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

3.13.4 Desiccant breather filter /DC

The filter contains a desiccant that absorbs water vapor from the inflowing air.

The filter can also retain oil mist from the outflowing air, which reduces the environmental impact and increases the efficiency of the system



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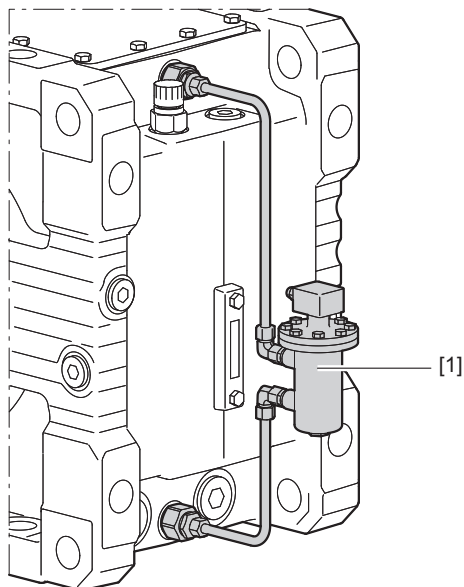
Structure

Features	
Housing material	Polycarbonate
Filter inserts	<ul style="list-style-type: none"> • Polyester filter: Removes air particles > 3 µm • Silica gel: Absorbs water and humidity. Saturation is indicated by the color changing from blue to pink. • Foam pad: Absorbs oil mist
Thread	3/8" or 1"

3.14 Float switch

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

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

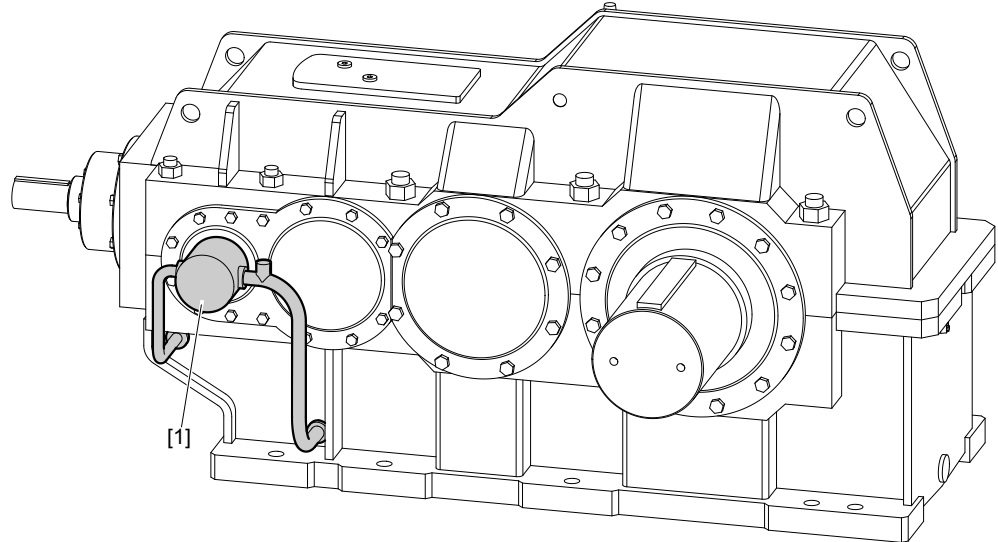


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4 Structure of options and additional features

4.1 Shaft end pump /SEP

The figure shows an example of a shaft end pump.



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With pressure lubrication, a shaft end pump [1] supplies all bearing points and gearing above the oil sump with oil via a tube system inside the gear unit. The shaft end pump only turns in one direction. As an option, a direction-independent shaft pump is available (the valve system in the shaft end pump provides continuous suction and pressure).

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

The adequate flow rate for the specific application depends on the following factors:

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

INFORMATION



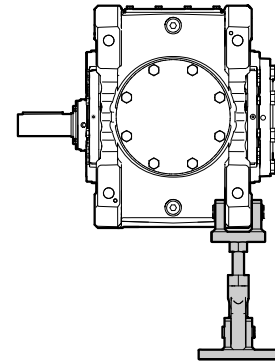
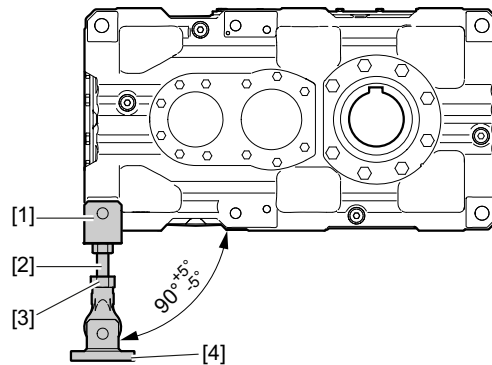
- Proper functioning of the shaft end pump is monitored via the connected pressure switch. For information, refer to chapter "Pressure switch".
- Contact SEW-EURODRIVE for selecting the suitable pump size.
- A minimum input speed is required for the shaft end pump to operate properly. If you use variable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

4.2 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.



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

4.3 Flange coupling with cylindrical interference fit /FC-S

NOTICE

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

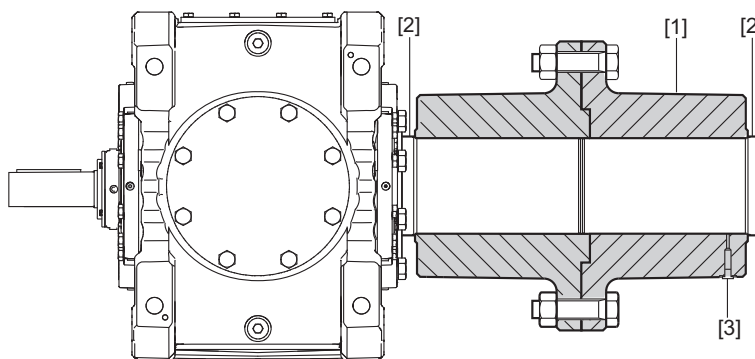
Possible damage to the gear unit.

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

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

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

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



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4.4 Flange coupling with keyway /FC-K

NOTICE

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

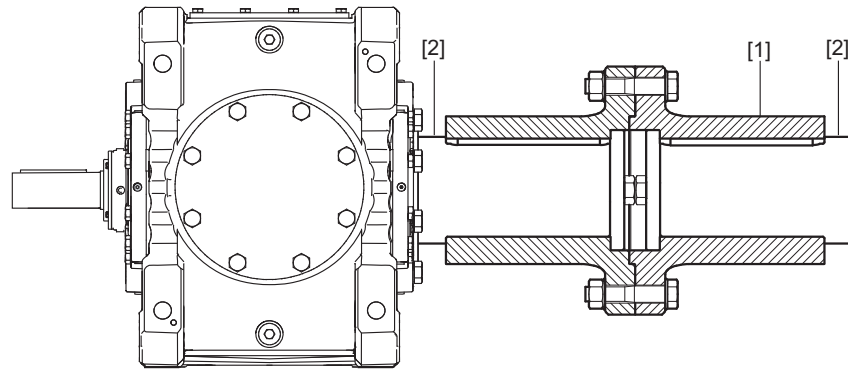
Possible damage to the gear unit.

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

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

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

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

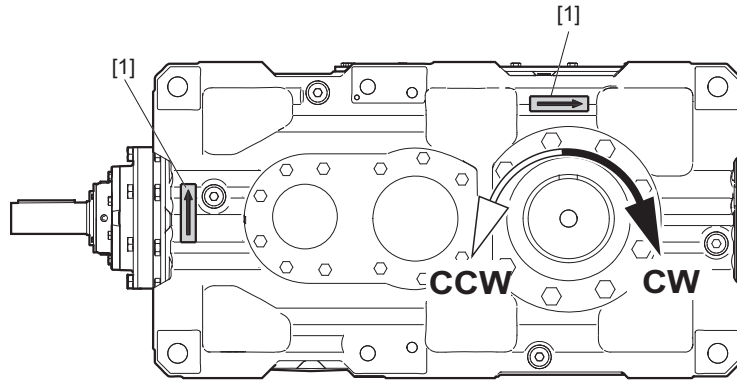


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4.5 Backstop /BS

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

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



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

- CW = Clockwise
- CCW = Counterclockwise

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

INFORMATION



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

Contact SEW-EURODRIVE if you have other requirements.

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

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

- Input speed rates $n_1 < 950 \text{ min}^{-1}$

4.6 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.

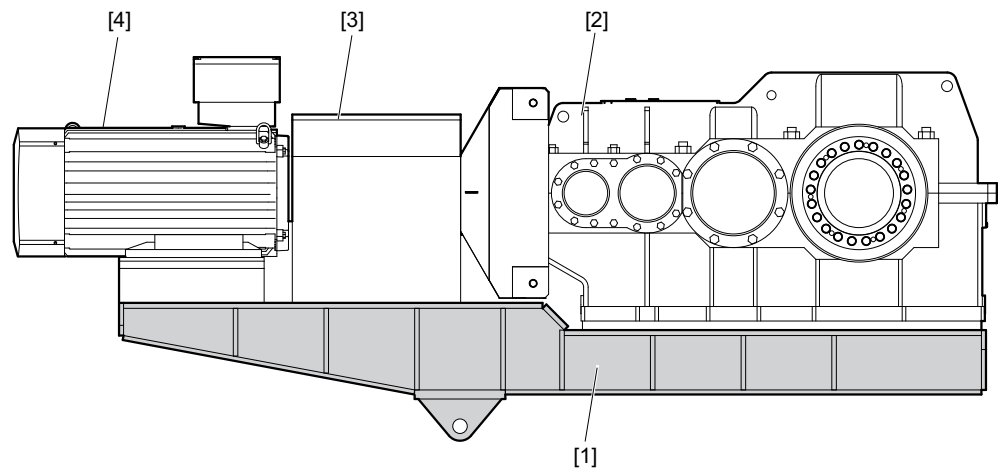
4.6.1 Swing base /SB

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 flange coupling on the output shaft.

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

Example: Swing base with coupling



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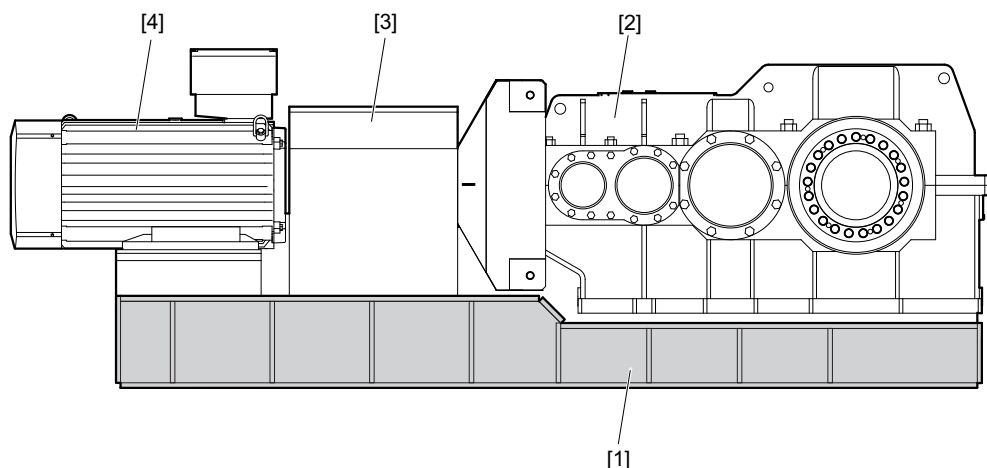
- [1] Swing base
- [3] Bevel-helical gear units
- [4] Coupling with protection cover
- [5] Motor

4.6.2 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. Such a frame is usually used for solid shaft gear units with elastic coupling on the output shaft.

Example: Base frame with coupling



25425238539

- [1] Base frame
- [2] Bevel-helical gear units
- [3] Protection cover for coupling
- [4] Motor

4.7 Motor adapter /MA

The motor adapter is a welded steel construction.

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

INFORMATION



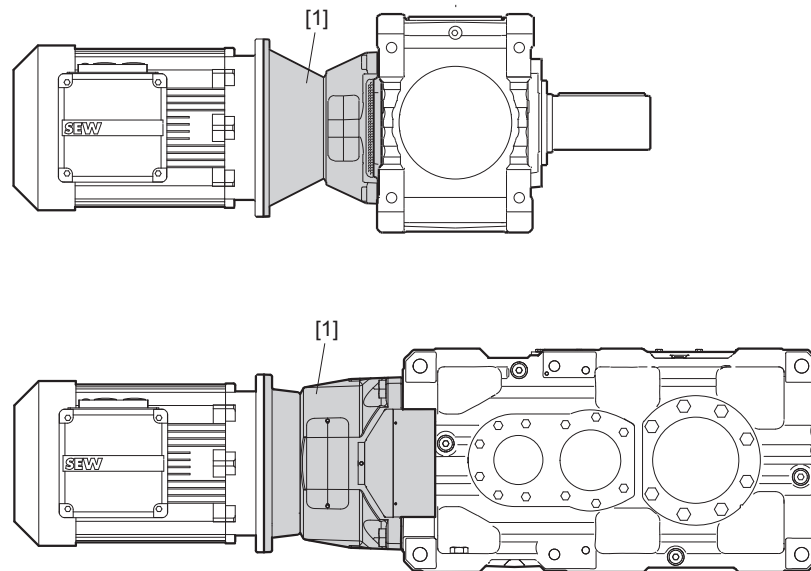
- The gear unit must be installed in such a way that liquids cannot enter the motor adapter (HSS end) and accumulate there. Otherwise, the oil seal can be damaged, and subsequent damage can create a possible ignition source.

INFORMATION



- An elastic claw coupling is included in the delivery.

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



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4.8 Oil cooling system

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

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

The following oil cooling systems can be used:

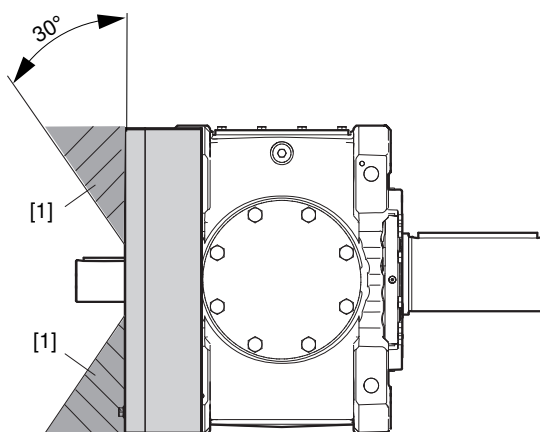
- Oil-air cooler for splash or bath lubrication /OAC1
- Oil-air cooler for pressure lubrication /OAP1
- Oil-water cooler for splash or bath lubrication /OWC1
- Oil-water cooler for pressure lubrication /OWP1

4.9 Fan /FAN

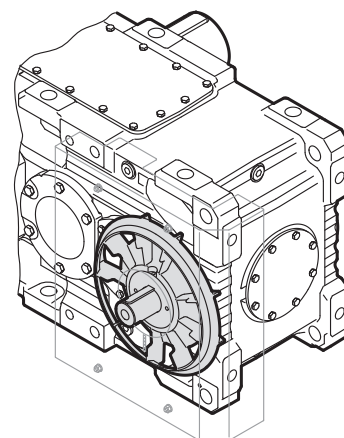
A fan may be retrofitted to raise the thermal rating or when the ambient conditions change after gear unit startup. The direction of rotation of the gear unit does not influence the operation of the fan.

The following fan designs are available:

4.9.1 F.. Fan (standard) /FAN

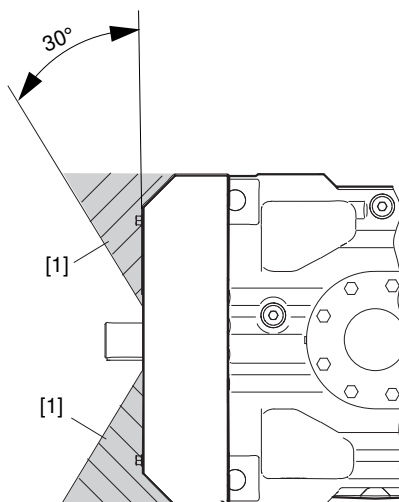


[1] Air intake clearance

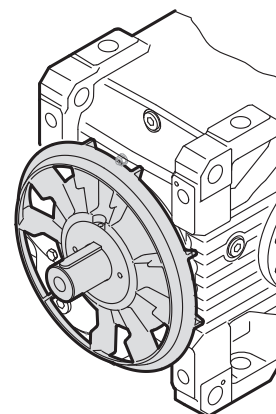


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4.9.2 K.. Fan (standard) /FAN



[1] Air intake clearance

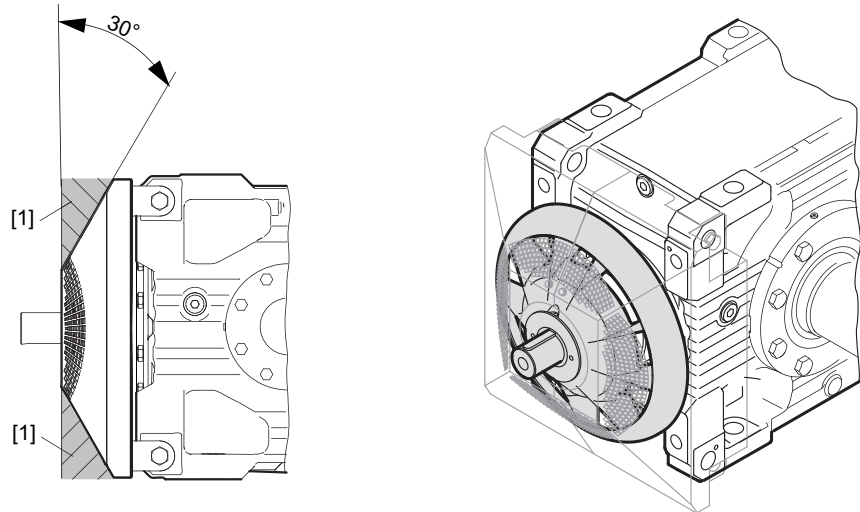


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4.9.3 K.. Advanced (option) /FAN-ADV

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

The air intake clearance is integrated into the fan guard.

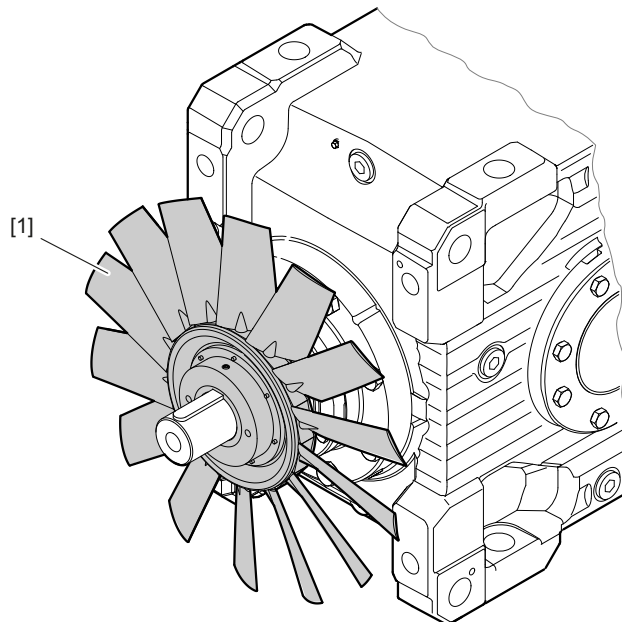


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[1] Air intake clearance

4.9.4 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 direction of rotation. Refer to the information on the order documents.



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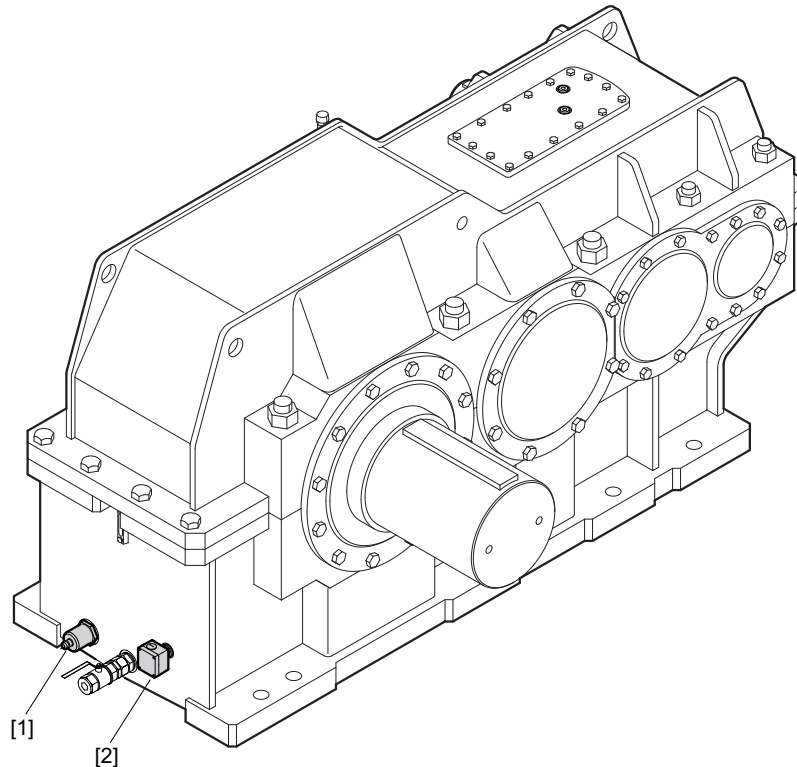
4.10 Oil heater /OH

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

4.10.1 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



25425245707

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

INFORMATION



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

4.11 Pressure switch /PS

The pressure switch shows the correct oil pressure in the pressure pipe and in this way confirms that the pressure lubrication is ready for operation. Therefore, the pressure switch must be monitored by the user.

Pressure might build up with a delay during the startup phase of the gear unit with a shaft end pump. This slow pressure build-up can trigger an error signal by the pressure switch, which can be bridged. The bridging time of the pressure switch should be limited to 5 to a maximum of 10 seconds.

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

4.12 Temperature sensor /Pt100

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

Observe the gear unit oil temperature in chapter "Permitted lubricants" (→ 147) and the information in the order-specific documents.

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

4.13 Temperature switch /NTB

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

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

- as an "early warning"
- or
- as a "main alarm" for switching off the main motor.

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

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

4.14 Temperature switch /TSK2

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

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

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

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

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

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

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

5 Installation/assembly

5.1 Required tools/resources

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

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

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

5.2 Tolerances

INFORMATION



Refer to the dimension sheet in your order documents for the tolerances of the interfaces for gear unit connection.

5.3 Important notes

Read the following information prior to installation/mounting.



⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



⚠ WARNING

Danger due to mounting in impermissible mounting position.

Severe or fatal injuries.

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



⚠ WARNING

Danger due to freely accessible, rotating parts.

Severe or fatal injuries.

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



⚠ WARNING

An operator's machine that is not appropriately secured can fall down during gear unit installation or removal.

Severe or fatal injuries.

- Protect the operator's machine against unintentional movement when installing or removing the gear unit.
- Before loosening the shaft connections, make sure that the system is no longer strained.



⚠ WARNING

Danger due to installing impermissible components.

Severe or fatal injuries.

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



⚠ WARNING

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

Severe injury.

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



⚠ CAUTION

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

Possible injuries.

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



⚠ CAUTION

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

Minor injuries.

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



⚠ CAUTION

Risk of injury due to protruding parts.

Minor injuries.

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

NOTICE

Improper installation and assembly can damage the gear unit.

Possible damage to property.

- Observe the following information.
- 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.
You find more information on operation together with the dimension sheet and further documents in the overall documentation for the gear unit.
- Do not modify the gear unit or the mount-on components without prior consultation with SEW-EURODRIVE.
- Install/mount the gear unit only in the specified mounting position on a level, vibration-damping, and torsionally rigid support structure. Do not twist housing legs and mounting flanges against each other.
- Make sure that the oil level plugs and oil drain plugs, as well as the breather are freely accessible.
- When installing a filter in the OAP and OWP cooling units, make sure there is sufficient height for removing the filter element and the filter hood.
- Use plastic inserts if there is a risk of electrochemical corrosion between the gear unit and the driven machine (connection between different metals such as cast iron and stainless steel). Install the bolts also with plastic washers. Always ground the gear unit housing.
- Only mechanical specialists may assemble gear head units with motors and adapters.
- Do not weld anywhere on the drive. Do not use the drive as a ground point for welding work. Welding may destroy gearing components and bearings.

- Units installed outdoors must be protected from the sun. Suitable protection devices are required, such as covers or roofs. Avoid heat from building up. The user must ensure that no foreign objects impair the function of the gear unit (e.g. due to falling objects or spillage).
- Protect the gear unit from direct cold air currents. Condensation may cause water to accumulate in the oil.
- Repair any damage to the paint work (e.g. on the breather).
- Do not modify the existing piping.

5.4 Prerequisites for installation

NOTICE

Danger due to insufficiently cleaned flange surfaces.

Possible damage to property.

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

Check that the following conditions have been met:

- The specifications on the nameplate of the motor and the electrical components 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.

5.4.1 Extended storage

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

Replace the breather with a screw plug.

5.5 Installing the gear unit



⚠ WARNING

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

Severe or fatal injuries.

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

NOTICE

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

Possible damage to property.

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

Tighten the retaining screws or nuts with the prescribed tightening torque. Use the screws and tightening torques specified in chapter "Tightening torques: Gear unit mounting of foot-mounted design".

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

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

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

Screw/nuts	Tightening torque Strength class 6.8 [Nm]
M48	5079
M56	8149
M60	10100
M64	12160

INFORMATION



Do not lubricate the screw connection during installation.

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

Observe the notes in chapter "Important information" (→ 63).

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 the flange coupling, torque arm, mounting flange, hollow shaft with shrink disk, etc. These features are described in the individual chapters.

Screw/nut	Tightening torque Strength class 8.8 Nm
M6	11
M8	27
M10	54
M12	93
M16	230
M18	329
M20	464
M24	798
M27	1176
M30	1597

INFORMATION



Do not lubricate the screw connection during installation.

5.5.3 Aligning the shaft axis



▲ WARNING

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

Severe or fatal injuries.

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

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

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

5.6 Filling the gear unit with oil

The gear unit is delivered without oil filling ex works as standard.

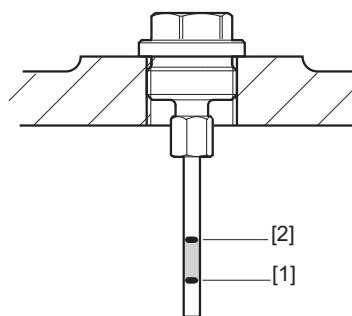
Check that the following conditions have been met:

5.6.1 General information

Information

- Use an oil from the current lubricant table:
www.sew-eurodrive.de/lubricants
- Fill in the oil when the gear unit is in the intended mounting position.
- Make sure the oil is fluid when filling it into the gear unit. The flowability can be improved by prior heating, e.g. by using an oil heater. SEW-EURODRIVE recommends an oil temperature of 20 °C to 40 °C for filling in oil.
- Fill the gear unit with the oil grade specified on the nameplate. The oil quantity specified on the nameplate is an approximate quantity. The markings [1] and [2] on the oil dipstick or oil level glass are the decisive indicators of the correct oil quantity to be filled in.
- Check the oil level only when the gear unit is cool and in idle state. SEW-EURODRIVE recommends checking the oil level at an oil temperature of 20 °C to 40 °C. The oil level must be between the markings [1] and [2] and should ideally be in the middle. Observe chapter "Checking the oil level" (→ 133).
- The required oil fill quantity is higher when additional attachments are mounted to the gear unit, such as an oil supply system. In this case, observe the respective "Oil Cooling System" operating instructions from SEW-EURODRIVE.
- For gear units with external supply pipes, e.g. oil cooling systems, establish the connections before filling the oil.
- Use a clean filling aid (plastic funnel or similar) for filling the oil. Avoid using galvanized filling aids.

Procedure



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

Video instructions

German

English



5.6.2 Gear units with shaft end pump /SEP

NOTICE

Improper installation and mounting of the shaft end pump [2] can damage the gear unit.

Possible damage to property.

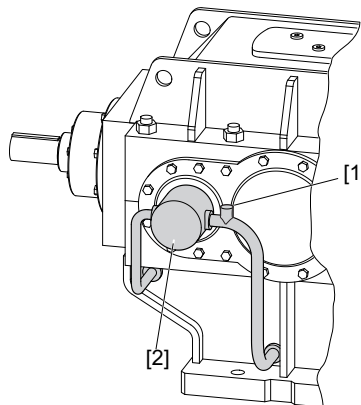
- Observe the following information.

- Fill the gear unit with the oil type and oil quantity corresponding to the nameplate data, see chapter "Changing the oil" (→ 140).
- Before initial startup or after having changed the oil, fill any additional mount-on components (such as piping, cooler matrix, etc.) with oil on the pressure side. Doing so ensures that sufficient oil is in the overall system during startup. The oil filling holes are marked in the order dimension sheet.
- Check the oil level using the oil dipstick or the oil level glass. For more information, refer to chapter "Checking the oil level" (→ 133).
- Before initial startup or after having changed the oil, open the screw plug [1] and fill the shaft end pump [2] completely with oil. After having filled in the oil, close the screw plug [1].

This procedure must be repeated after a downtime of more than 6 months or after an oil change.

- Gear units with shaft end pump [2] are equipped with a pressure switch for function monitoring as standard. The connection has to be carried out by the customer. Observe chapter "Pressure switch" (→ 116).

For more information, refer to chapter "Gear units with pressure lubrication" (→ 123) and the manufacturer's documentation.

Mounting position M1

[1] Screw plug

[2] Shaft end pump

As an option, a shaft end pump with oil filter and pressure switch is available.

5.7 Gear units delivered with oil fill (option)

Observe the notes in chapter "Important information" (→ 63).

NOTICE

Improper startup can result in damage to the gear unit.

Possible damage to property.

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

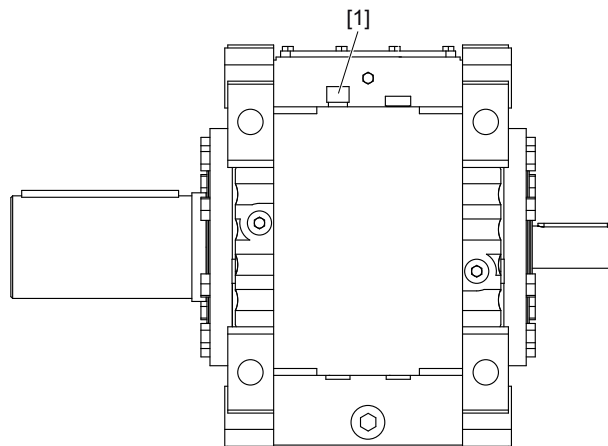
INFORMATION



The oil level may deviate during transport, or due to other ambient conditions at the destination. For this reason, the oil fill must be checked before startup and corrected if necessary.

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

The following illustration 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 chapter "Checking the oil level" (→ 133).

5.8 Gear units with solid shaft

5.8.1 Mounting input and output components

NOTICE

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

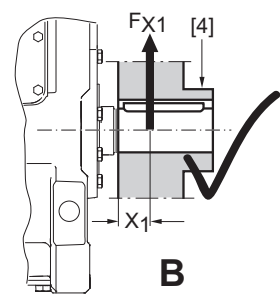
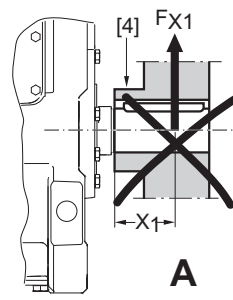
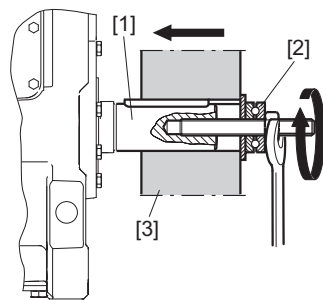
Possible damage to property.

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

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

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

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



12570941963

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

- A unfavorable
- B correct

5.9 Flange coupling with cylindrical interference fit /FC-S

Observe the notes in chapter "Important information" (→ 63).

INFORMATION



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

5.10 Flange coupling with keyway /FC-K

Observe the notes in chapter "Important information" (→ 63).

INFORMATION



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

5.11 Dimensioning the customer hub of solid shaft gear units

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

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

5.12.1 General information

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

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

- 360 N/mm²

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

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

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

5.12.2 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 MD360 – 520

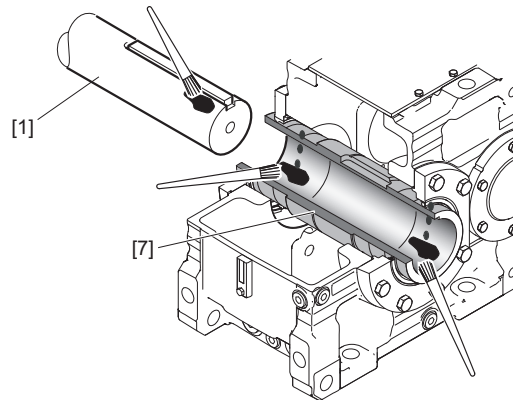
Observe the notes in chapter "Important information" (→ 63).

INFORMATION



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

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



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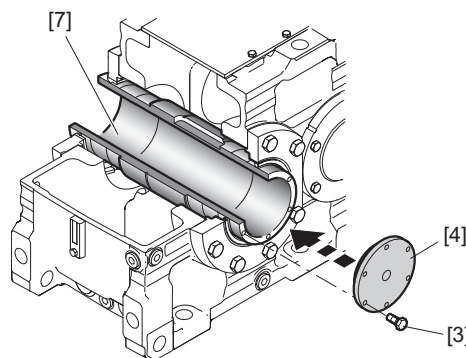
- [1] Machine shaft
[7] Hollow shaft

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].

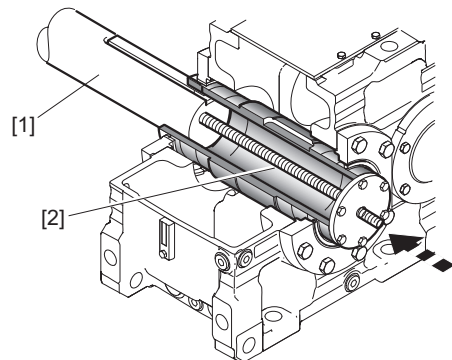
INFORMATION



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



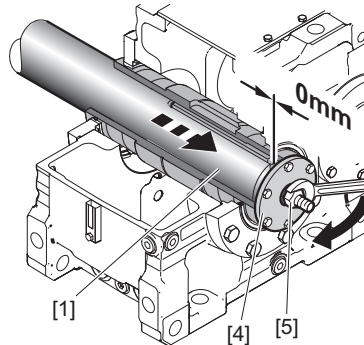
- [1] Machine shaft
[2] Threaded rod
[3] Retaining screw



- [4] End plate
[7] Hollow shaft

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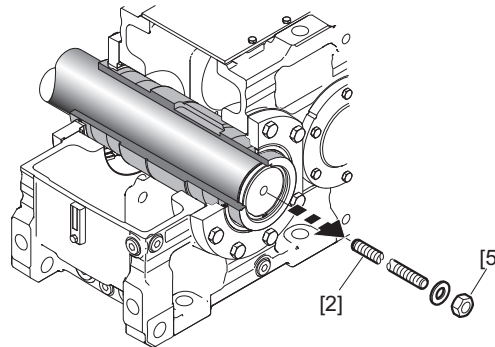
3. Tighten the machine shaft [1] with the nut [5] until the shaft end of the machine shaft [1] and the end plate [4] meet.



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

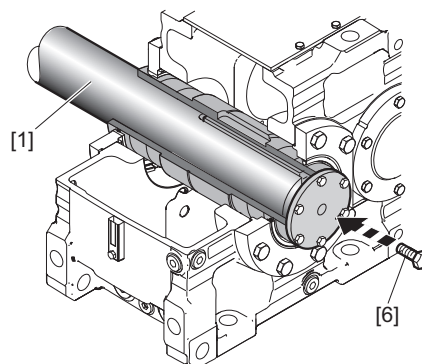
4. Loosen the nut [5]. Screw out the threaded rod [2].



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- [2] Threaded rod
- [5] Nut

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



9007199565156875

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

**⚠ CAUTION**

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

Possible injury to persons.

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

NOTICE

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

Possible damage to property.

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

5.12.3 Removing the gear unit from the machine shaft**NOTICE**

Improper disassembly may damage bearings and other components.

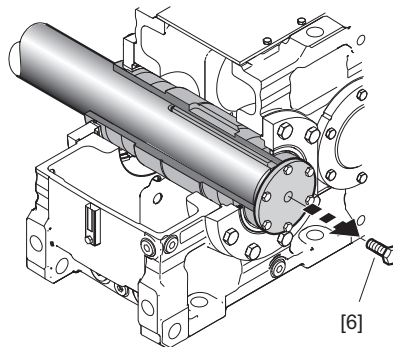
Possible damage to property.

- 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 MD360 – 520

Observe the notes in chapter "Important information" (→ 63).

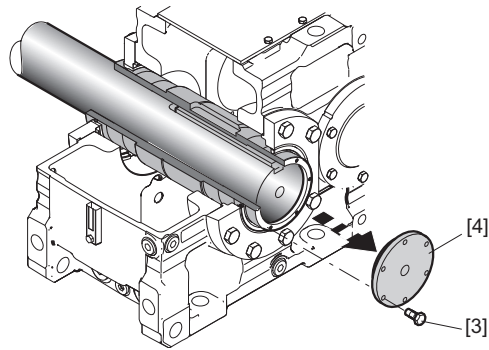
1. Loosen the retaining screw [6].



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- [6] Retaining screw

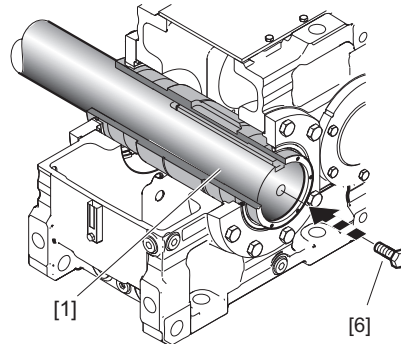
2. Remove the retaining screws [3] and the end plate [4].



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- [3] Retaining screw
- [4] End plate

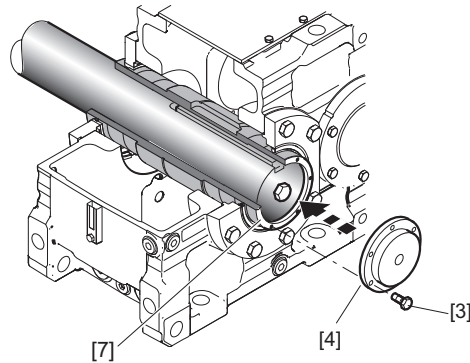
3. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



310470027

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

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



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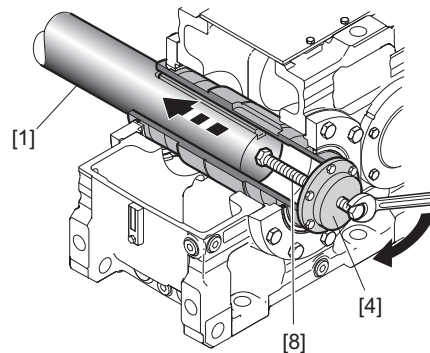
- [3] Retaining screw
- [4] End plate
- [7] Hollow shaft

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

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

5.13.1 General information



INFORMATION

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

- 360 N/mm²

5.13.2 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 MD360 – 520

Observe the notes in chapter "Important information" (→ 63).

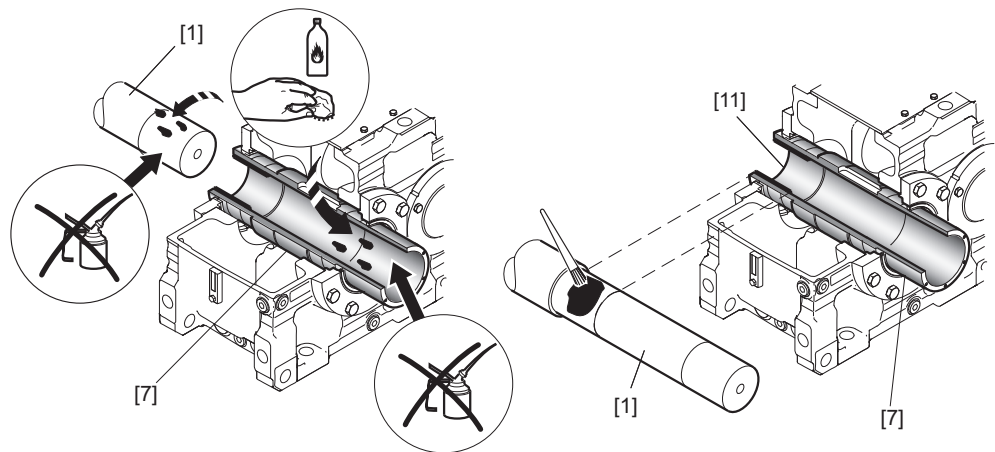


INFORMATION

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

1. Before mounting the gear unit, degrease the hollow shaft [7] and the machine shaft [1].

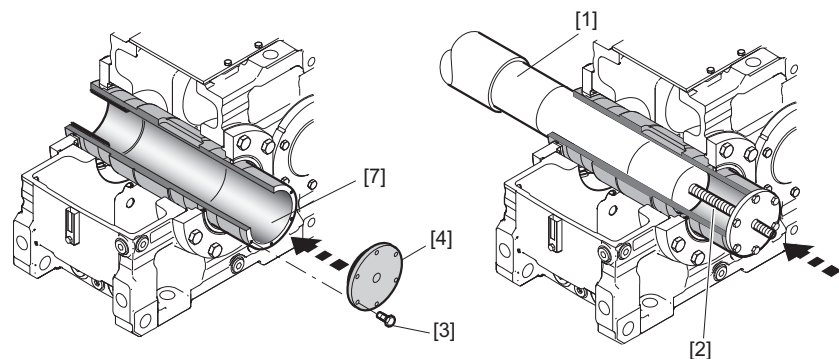
2. **NOTICE!** Never apply assembly paste directly to the bushing [11] since the compound may get into the clamping area of the shrink disk when the input shaft is connected. Possible damage to property.
The clamping area of the shrink disk between the machine shaft [1] and the hollow shaft [7] must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



[1] Machine shaft
[7] Hollow shaft

[11] Bushing

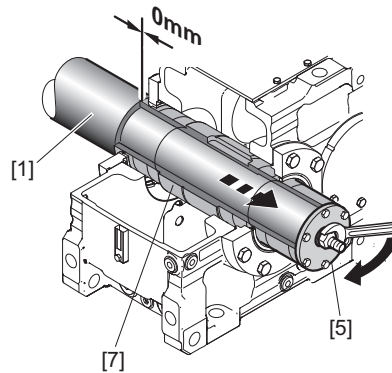
4. Use the retaining screws [3] to attach the end plate [4] centrally on the hollow shaft [7]. Thread the threaded rod [2] into the machine shaft [1].



[1] Machine shaft
[2] Threaded rod
[3] Retaining screws

[4] End plate
[7] Hollow shaft

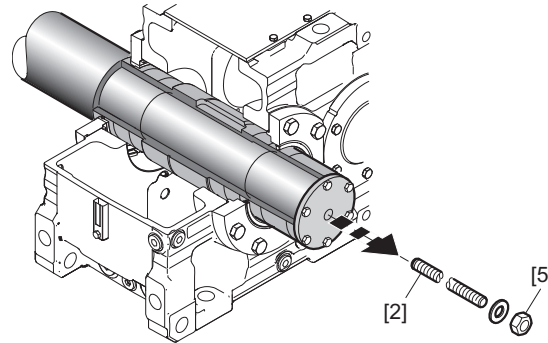
5. Screw the nut [5] onto the threaded rod up to the end plate [4]. Tighten the nut [5] until the shoulders of the machine shaft [1] and the hollow shaft meet.



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

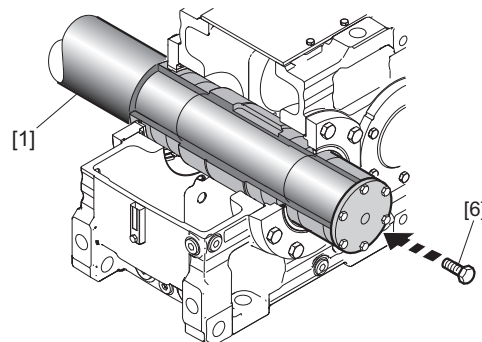
6. Loosen the nut [5]. Screw out the threaded rod [2].



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

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

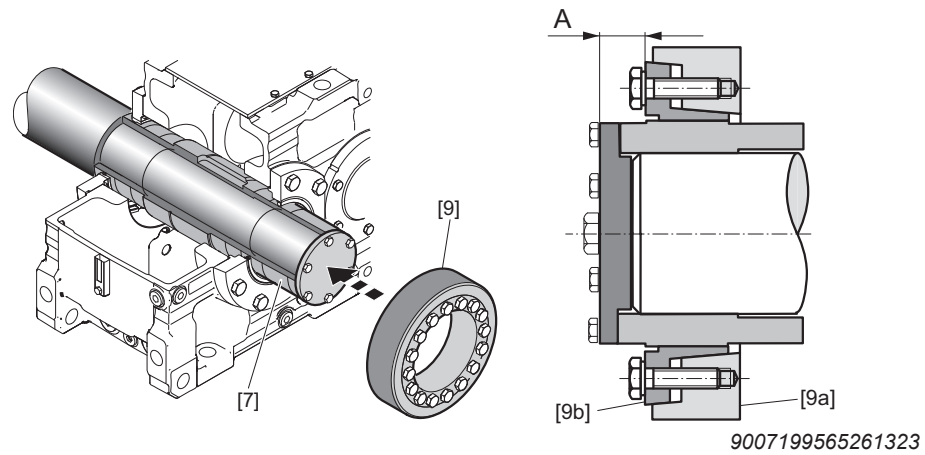


310510731

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

8. Slide the shrink disk [9] with untightened screws onto the hollow shaft [7] and position the inner ring of the shrink disk [9b] with dimension A.
9. **⚠ CAUTION!** The loose shrink disk could slip. Potential risk of crushing due to falling parts.
Secure the shrink disk against slipping.

10. **NOTICE!** Tightening the locking screws without installed shaft might deform the hollow shaft. Possible damage to property.
Never tighten the locking screws without installed shaft.



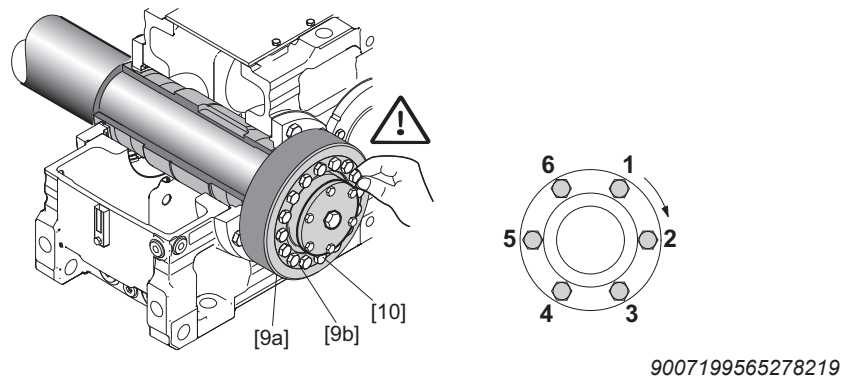
- | | | | |
|-----|--------------|------|----------------------------|
| [7] | Hollow shaft | [9a] | Taper (outer ring) |
| [9] | Shrink disk | [9b] | Taper bushing (inner ring) |

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

INFORMATION

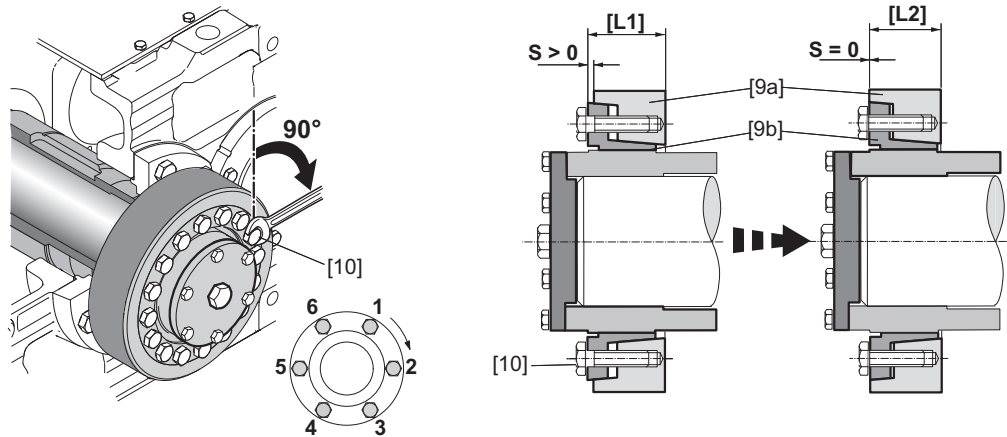


For shrink disks with a slotted taper bushing (inner ring) [9b], tighten the locking screws [10] to the left and right of the slot one after another, and then, in several stages, tighten the remaining screws at evenly spaced intervals.



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

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



18014398820023307

[9a] Taper (outer ring)

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

[9b] Taper bushing (inner ring)

[L2] Completely assembled (ready for operation)

[10] Locking screws

INFORMATION



If the taper (outer ring) and the taper bushing (inner ring) cannot be aligned on the face that holds the screws, disassemble the shrink disk again and carefully clean/lubricate it as shown in the next chapter.

CAUTION

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

Possible injury to persons.

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



NOTICE

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

Possible damage to property.

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

5.13.3 Disassembling the gear unit from the machine shaft

Sizes MD360 – 520

Observe the notes in chapter "Important information" (→ 63).

NOTICE

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

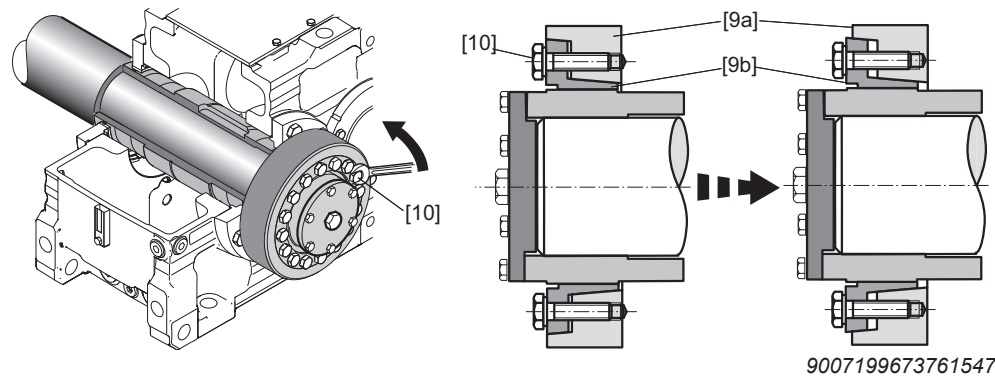
Possible damage to property.

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

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

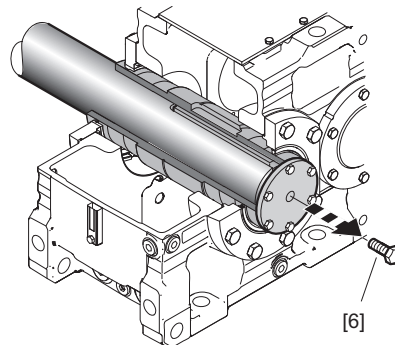
INFORMATION

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



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

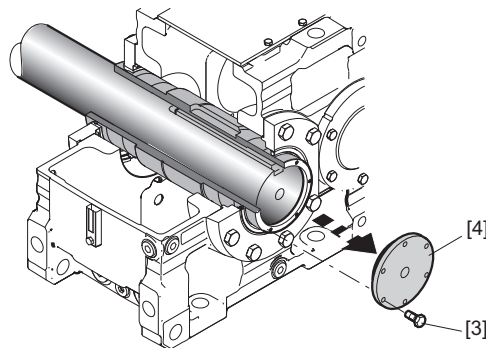
2. Loosen the retaining screw [6].



310460043

[6] Retaining screw

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

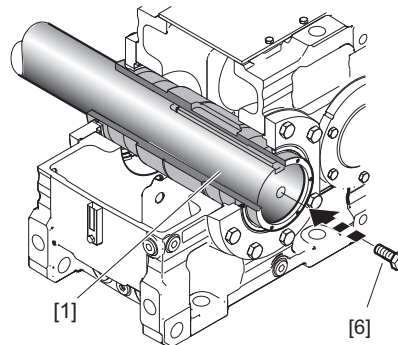


310464523

[3] Retaining screw

[4] End plate

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

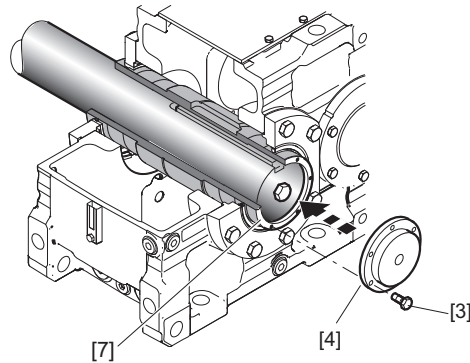


310470027

[1] Machine shaft

[6] Retaining screw

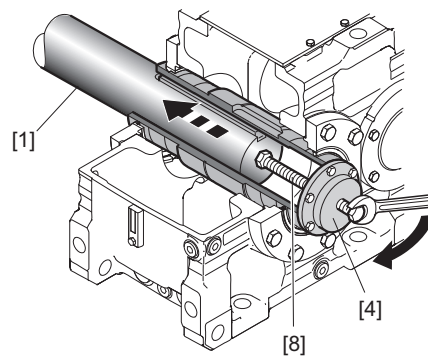
5. To disassemble the gear unit, flip the end plate [4] over and use the retaining screws [3] to reattach it centrally to the hollow shaft [7]. The retaining screws [3] should be tightened hand-tight.



310474123

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

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



310478219

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

Cleaning and lubricating the shrink disk

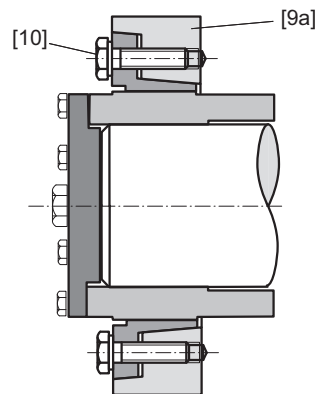
Observe the notes in chapter "Important information" (→ 63).

Clean and lubricate the shrink disk before installing it again.

INFORMATION



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



9007200781126155

[9a] Taper (outer ring)

[10] Locking screws

1. Thoroughly clean the shrink disk from dirt and any remaining lubricants after disassembly.
2. Lubricate the locking screws [10] on the threads and under the head with an 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).

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

5.14.1 General information



INFORMATION

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

- 320 N/mm²
-


5.14.2 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 MD360 – 520

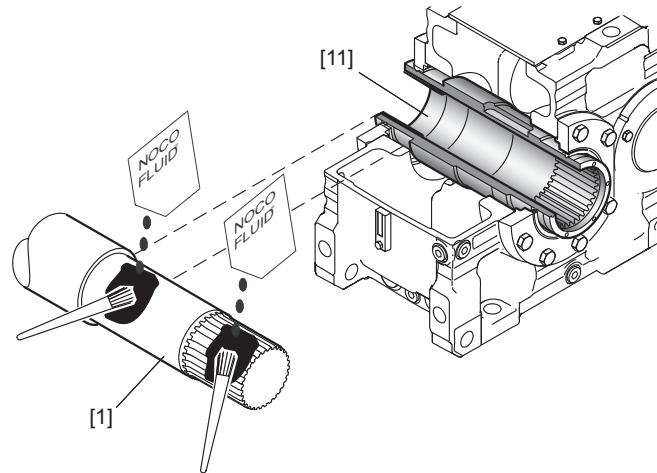
Observe the notes in chapter "Important information" (→  63).



INFORMATION

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

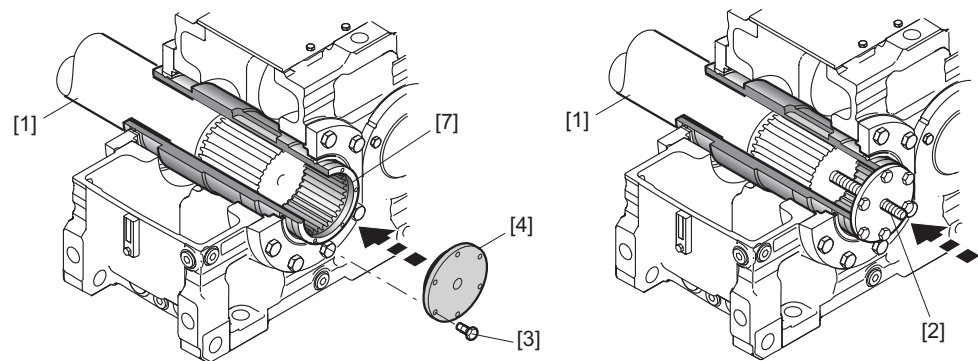
1. Apply some NOCO® fluid on the machine shaft [1] around the bushing [11] and the splining.



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- [1] Machine shaft
[11] Bushing

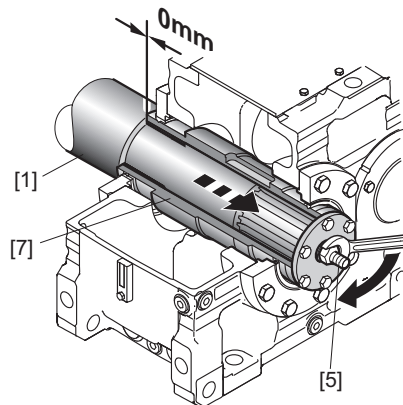
2. Push the gear unit onto the machine shaft. The splining of the hollow shaft must mesh with the splining of the machine shaft.
3. Tighten the retaining screws [3] and screw the threaded rod [2] onto the machine shaft [1].



9007200026433547

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

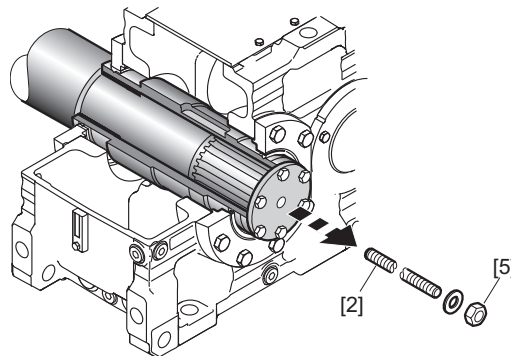
4. Tighten the machine shaft [1] with the nut [5] until the shoulders of the machine shaft and the hollow shaft [7] meet.



771696651

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

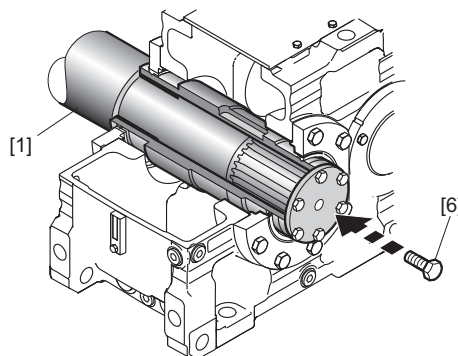
5. Loosen the nut [5]. Screw out the threaded rod [2].



771752587

- [2] Threaded rod
[5] Nut

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



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).

5.14.3 Disassembling the gear unit from the machine shaft**NOTICE**

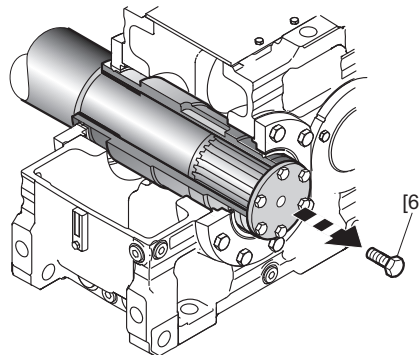
Improper disassembly of the gear unit and machine shaft may damage bearings and other components.

Possible damage to property.

- You may only use the hollow shaft as a support for disassembly. Note that supporting on any other parts of the gear unit may damage the material.

Sizes MD360 – 520

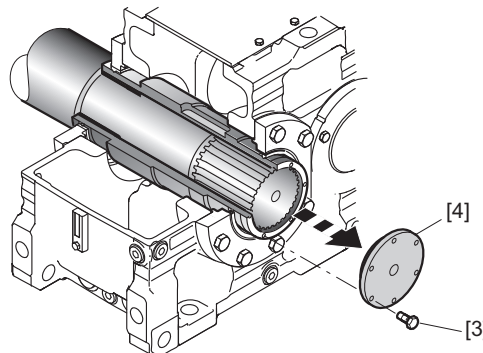
1. Loosen the retaining screw [6].



3241268619

- [6] Retaining screw

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

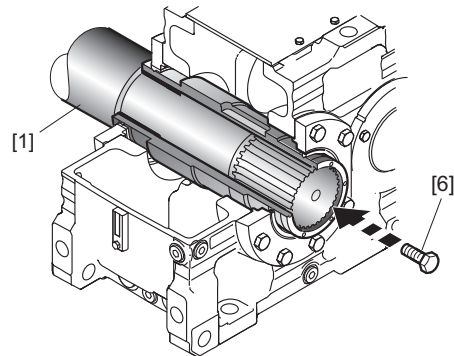


3241279627

- [3] Retaining screw

- [4] End plate

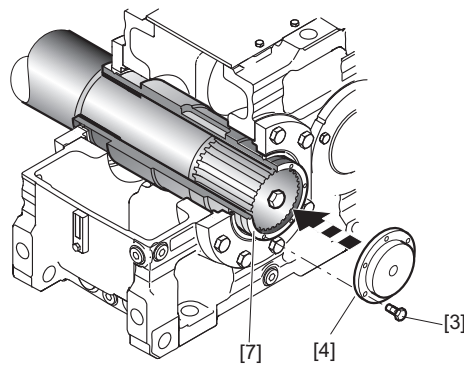
3. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



3241280139

- [1] Machine shaft
[6] Retaining screw

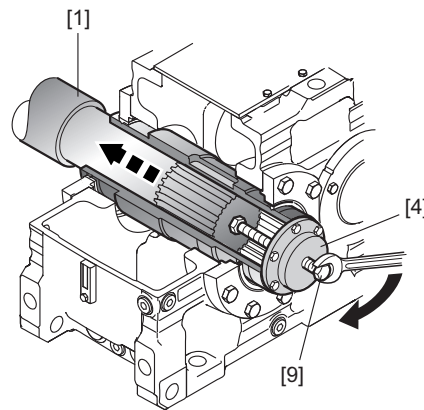
4. To disassemble the gear unit, flip the end plate [4] over and use the retaining screws [3] to reattach it centrally to the hollow shaft [7]. The retaining screws [3] should be tightened hand-tight.



3241286923

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

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



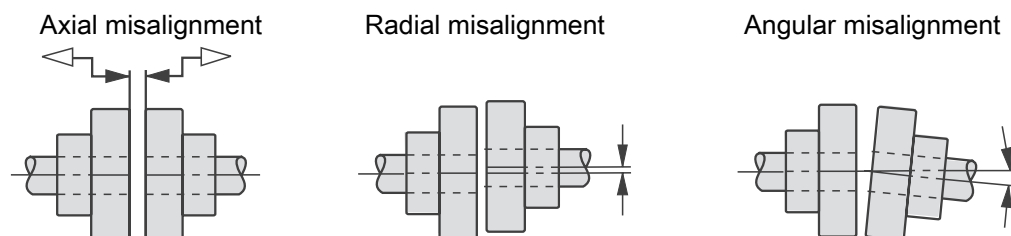
3241365131

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

5.15 Aligning couplings/assembly tolerances

5.15.1 Aligning the coupling

Adjust the following misalignments when mounting couplings.



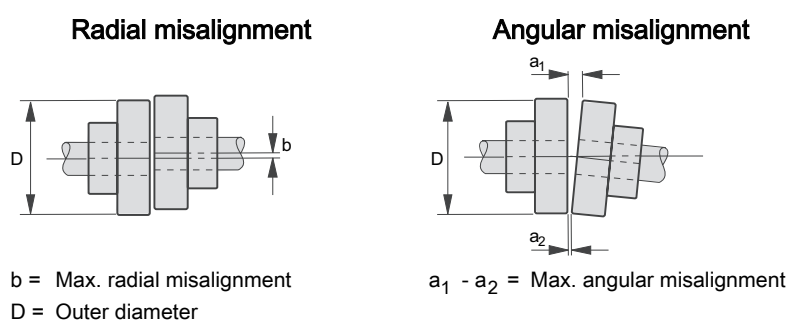
Use a laser-optical alignment system to align the coupling as accurately as possible.

5.15.2 Mounting tolerances

Observe the following points.

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

Observe the following information.



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

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

5.16 Motor mounting on a gear unit

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

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

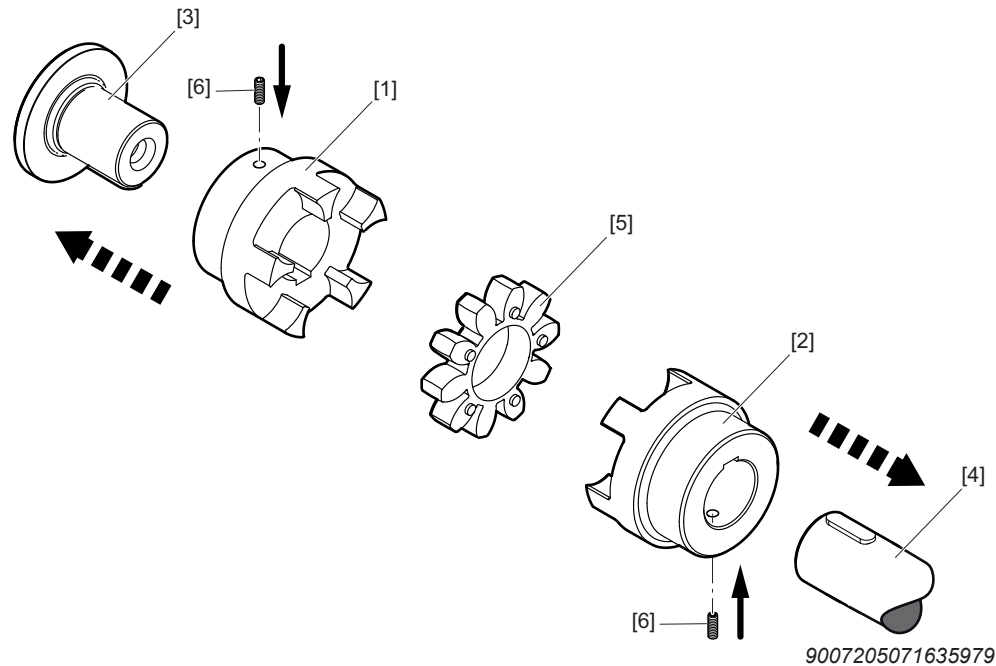
5.16.1 Claw coupling

Observe the operating instructions of the respective coupling manufacturer.

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

Torsionally flexible jaw-type coupling

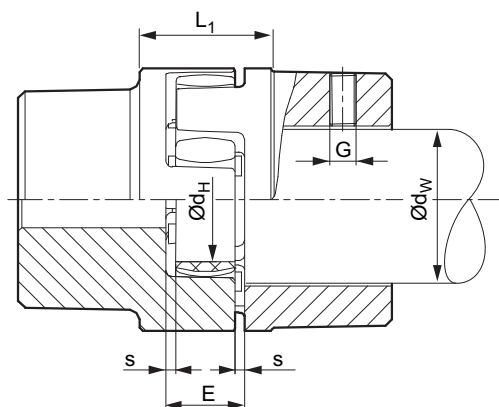
Mounting the coupling



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

3. **NOTICE!** Improper mounting can damage the coupling. Possible damage to property. During assembly, it is essential to observe dimension **E** so that the spider remains axially flexible during operation. The dimension **E** is listed in the following table.

Move the gear unit/motor in axial direction until dimension **E** is reached. If the gear unit and motor have already been installed permanently, set dimension **E** by moving the hubs [1][2] axially on the input and output shafts [3][4].



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

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

Misalignment – Aligning the coupling

NOTICE

Improper mounting of the coupling may result in damage.

Possible damage to property.

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

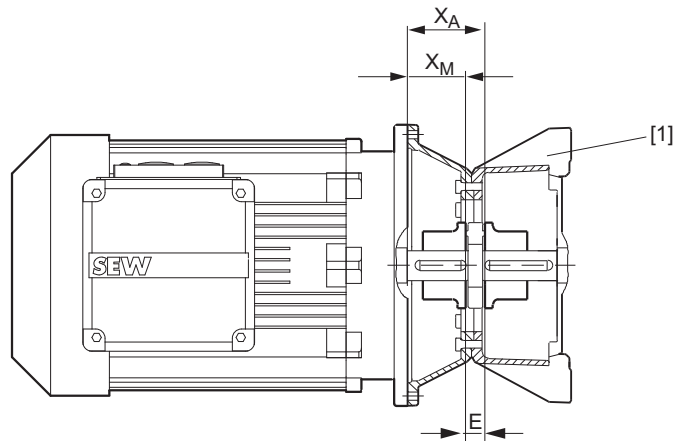
Displacement values

The following table shows the displacement values:

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

5.16.2 Attaching the motor to the motor adapter

1. Clean the motor shaft and flange surfaces of the motor and the motor adapter. These must be dry and free of grease!
2. To avoid contact corrosion, apply some assembly paste, for example NOCO®-Paste to the motor shaft.
3. Push the coupling half onto the motor shaft and position it. When doing this, observe the information in chapter "Claw coupling" (→ 97) and the figure below. The coupling size and the type are noted on the coupling.



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[1]	Motor adapter	XA	Distance of the coupling to the flange surface of the motor adapter
E	Mounting dimension	XM	Distance of the coupling to the flange surface of the motor
$\rightarrow XM = XA - E$			

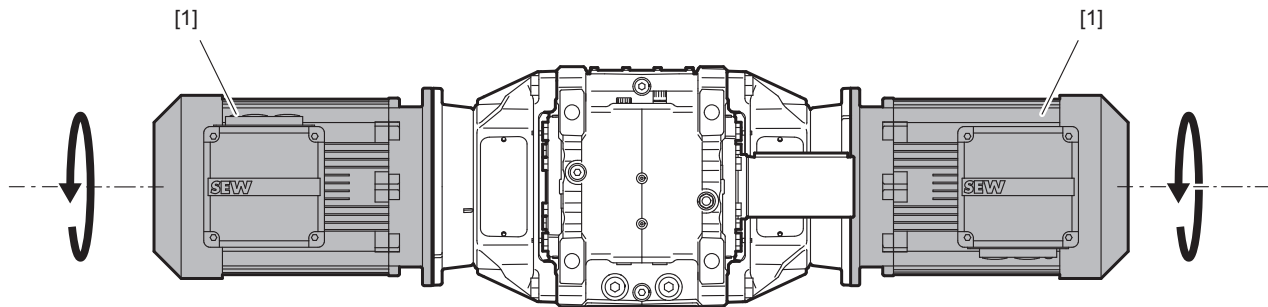
4. Secure the coupling half using the set screw.
5. Mount the motor onto the motor adapter, making sure that the claws of the coupling engage each other.

5.16.3 Mounting 2 motors

Motor direction of rotation

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

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



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5.17 V-belt drives /VBD



⚠ WARNING

Overspeed can damage the belt pulley.

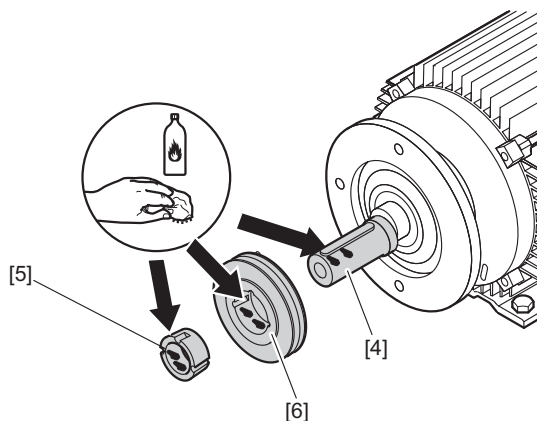
Severe or fatal injuries.

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

5.17.1 Mounting the V-belt drive

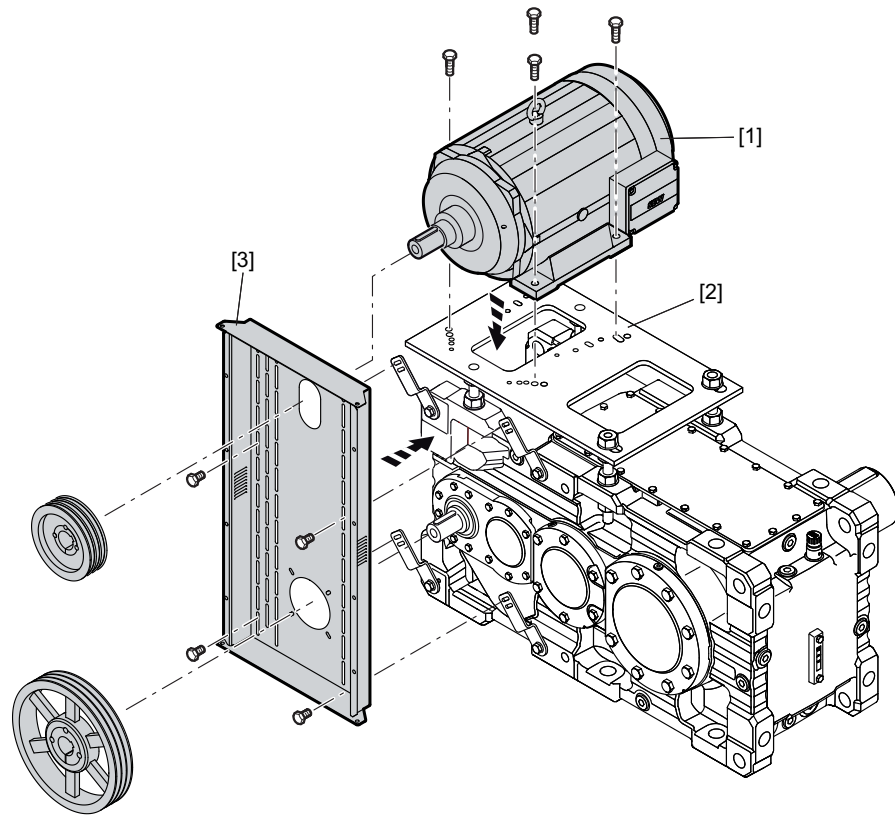
Observe the notes in chapter "Important information" (→ 63).

1. Mount the motor [1] to the base plate [2] (retaining screws are not included in the delivery).
2. Clean and degrease the shafts [4], the taper bushings [5] and the belt pulleys [6].



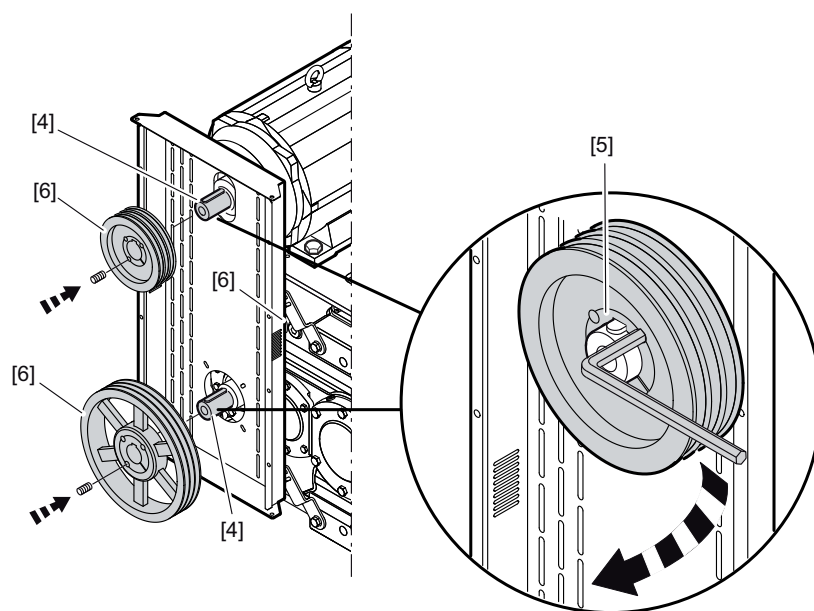
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3. Install the belt guard [3] using the provided fixtures. Take into account the room required for applying and tightening the belts, as well as the desired direction in which the cover will be opened.



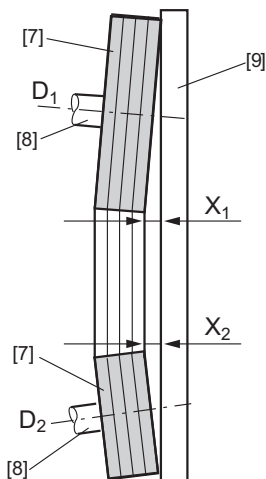
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4. Mount the belt pulleys with the taper bushings [6] on the gear unit and motor shaft [4]. Apply some grease to the screws of the taper bushings and fill the remaining boreholes with grease. Evenly tighten the locking screws of the taper bushings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



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

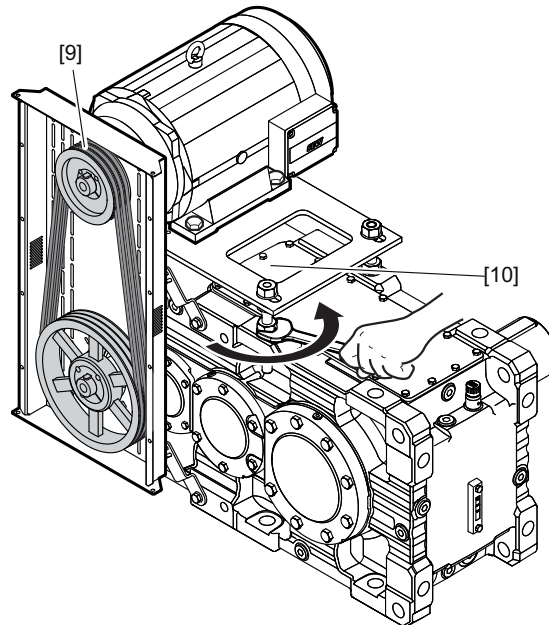


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Pulley diameter D_1, D_2 in mm	Maximum permitted distance X_1, X_2
112	0.5
224	1.0
450	2.0
630	3.0

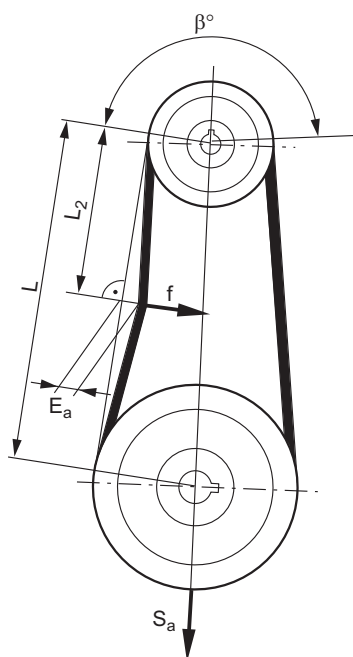
For other diameter values, you have to interpolate the intermediate values for X_1 , X_2 .

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



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7. Check the tension of the belts using a suitable measuring device. If no special measuring devices are available, you can roughly check the preload using the following method:
- Refer to the following table to determine the test force [f] required to deflect the belt by a specific distance [E_a] in the middle of the free belt length if the belt has the correct preload.
 - Compare the measured values with the values given in the table (on the following pages). Adjust the tension of the belt until the measured values correspond to the values of the table.



1068875787

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

INFORMATION



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

5.18 Base frame /BF

Observe the following notes:

NOTICE

Improper assembly may result in damage to the gear unit.

Possible damage to property.

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

5.19 Swing base /SB

Observe the following notes:

NOTICE

Improper assembly may result in damage to the gear unit.

Possible damage to property.

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

5.20 Fan /FAN

Ensure that the following requirements have been met:

- Never operate the gear unit if the fan guard is not installed.
- Protect the fan guard from external damage.
- Make sure that the air inlet of the fan remains unobstructed.
- Check that the air intake is kept free and that it is within the specified angle.
- For gear units with mounted coupling, sufficient clearance must be ensured for the intake of cooling air when attaching the protective cover. For information regarding the required clearance, refer to the order-specific dimension sheet in the overall documentation for the gear unit.

Observe the following tightening torques when installing the fan guard:

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

5.21 Limit temperature for gear unit startup

The minimum permitted ambient temperature/oil temperature for gear unit startup depends on the viscosity of the oil used and the lubrication type of the gear unit.

Before startup, the oil may have to be heated to the specified "starting temperature" by an oil heater. Observe the lubricant table in chapter "Permitted lubricants".

5.22 Oil heater /OH



⚠ WARNING

Danger of electric shock.

Severe or fatal injuries.

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

NOTICE

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

Possible damage to property.

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

NOTICE

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

Possible damage to property.

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

5.22.1 Information on the function of the oil heater

- The heater is screwed into the gear unit housing at the factory and is controlled by a thermostat. The set limit temperature on the thermostat below which the oil must be heated is set at the factory depending on the used lubricant.
- The switching point of the oil heater thermostat is factory-set to a temperature of about 5 K above the respective limit temperature for gear unit startup, see chapter "Limit temperature for gear unit startup" (→ 109).

At this temperature, the thermostat switches off the oil heater, see chapter "Limit temperature for gear unit startup" (→ 109). Only then may the gear unit be started up. The thermostat activates the oil heater again once the temperature is approximately 5 K below the switching point.

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

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

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

- The thermostat and oil heater are installed in the gear unit and ready for operation. Prior to startup, wire and connect them properly to the current supply.
- Contact SEW-EURODRIVE in the event of different viscosity classes or if ambient temperatures fall below the specified limit temperature.
- During installation, check the thermostat setting according to chapter "Thermostat".

5.22.2 Thermostat (manufacturer: Jumo)

Electrical connection



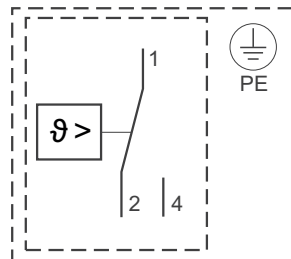
⚠ WARNING

Risk of injury due to electric shock.

Severe or fatal injuries.

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

The following figure shows the electrical connection.



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

INFORMATION



- Observe the manufacturer's documentation.

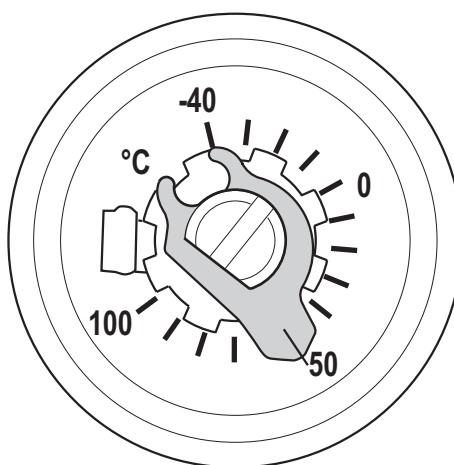
Technical data

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

Contact reliability:	
To ensure greatest possible contact reliability, the manufacturer recommends a minimum load of AC/DC 24 V, 100 mA for silver contacts.	
Nominal impulse voltage:	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 value: -40 °C to +100 °C
- Cable bushing: M20 ×1.5 for cable cross sections 6 to 13 mm
- Degree of protection IP65 according to EN 60529

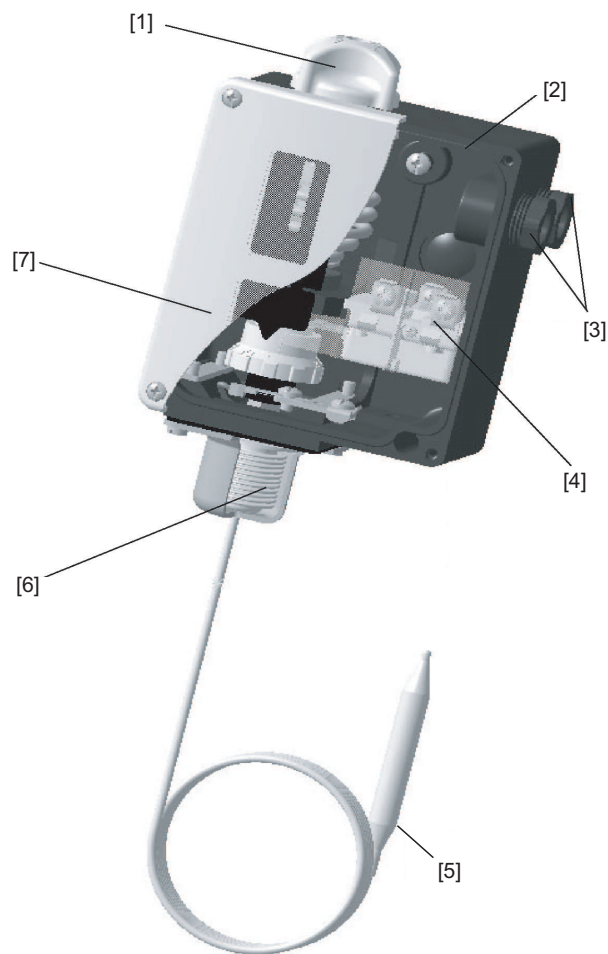
The following figure shows the possible setting range of the thermostat. The pointer is set to 50 °C as an example



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5.22.3 Thermostat (manufacturer: Danfoss)

Basic structure of thermostat



- [1] Adjustment knob
- [2] Degree of protection IP66 (IP54 in units with external reset)
- [3] 2 × PG 13.5 for cable diameter 6 mm – 14 mm
- [4] SPDT contact system Interchangeable
- [5] Capillary tube length up to 10 m
- [6] Stainless steel bellows
- [7] Polyamide housing

	Thermostat RT
Ambient temperature	-50 °C to +70 °C

Thermostat RT									
Connection diagram	<div><p>[1] Line [2] SPDT</p></div>								
Connection data	<div><div>Alternating current: AC-1: 10 A, 400 V AC-3: 4 A, 400V AC-15: 3 A, 400 V</div><div><table border="1"><caption>Data points from the 12 W graph</caption><thead><tr><th>Voltage (V)</th><th>Current (A)</th></tr></thead><tbody><tr><td>25</td><td>0.48</td></tr><tr><td>100</td><td>0.12</td></tr><tr><td>230</td><td>0.055</td></tr></tbody></table></div></div>	Voltage (V)	Current (A)	25	0.48	100	0.12	230	0.055
Voltage (V)	Current (A)								
25	0.48								
100	0.12								
230	0.055								
Contact material: AgCdO	<div><div>Direct current: DC-13: 12 W, 230 V</div></div>								
Cable entry	2 PG 13.5 for cable diameter of 6 – 14 mm								
Degree of protection	IP66 according to IEC 529 and EN 60529, IP54 for devices with external re-set. The thermostat housing is made of bakelite according to DIN 53470, the cover is made of polyamide.								

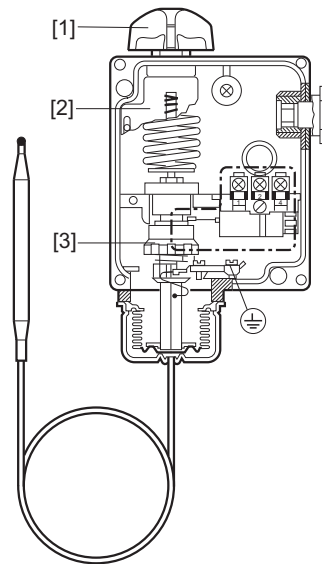
A contactor must be used in the following cases:

- 3-phase voltage supply
- when using 2 heating rods
- current ratings exceed nominal values of thermostat

Adjusting the setpoint

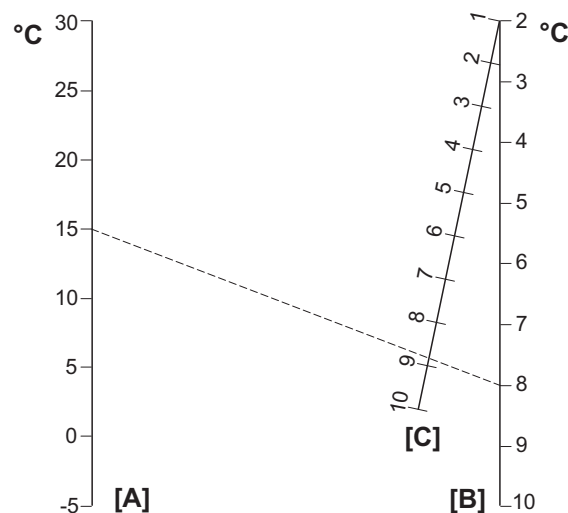
The setpoint is usually set at the factory. Proceed as follows for changing the value: The range is set using the adjustment knob [1] while reading the main scale [2]. Use a tool if the thermostat is equipped with a cap. The differential is set using the differential disk [3].

The size of the differential obtained for the relevant thermostat can be established by comparing the set main scale value and the scale value on the differential disk with the help of a nomogram.



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- [1] Adjustment knob
- [2] Main scale
- [3] Differential setting disk



25544698507

- [A] Setting range
- [B] Obtained differential
- [C] Differential setting

5.22.4 Temperature sensor for oil bath temperature

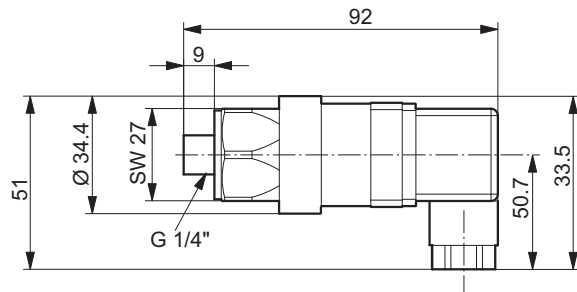
In standard design, the oil heater is controlled by a thermostat installed on the gear unit. Instead, the oil heater can be controlled by a temperature sensor installed on the gear unit.

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

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

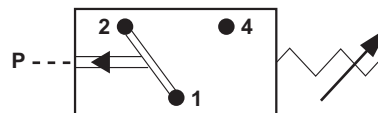
5.23 Pressure switch /PS

5.23.1 Dimensions



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5.23.2 Electrical connection



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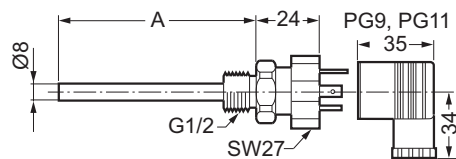
- [1] [2] NC contact
- [1] [4] NO contact

5.23.3 Technical data

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

5.24 Temperature sensor /Pt100

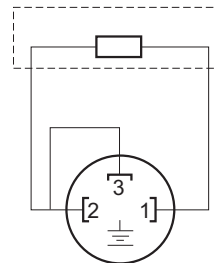
5.24.1 Dimensions



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A in mm
50
150

5.24.2 Electrical connection



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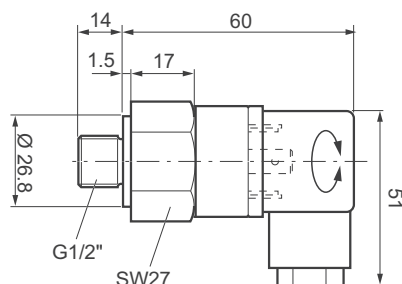
[1] [2] Resistor element connection

5.24.3 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 in °C
- Plug connector: DIN EN 175301-803 PG9 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

5.25 Temperature switch /NTB

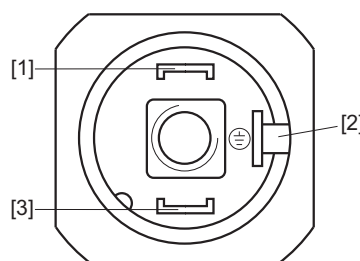
5.25.1 Dimensions



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5.25.2 Electrical connection

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



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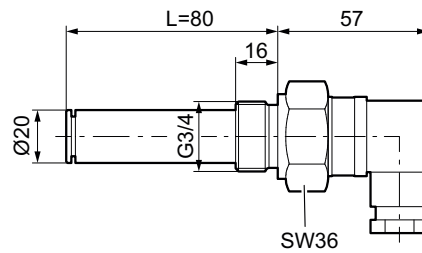
- [1] [3] NC contact
[2] Grounding terminal 6.3 × 0.8

5.25.3 Technical data

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

5.26 Temperature switch /TSK

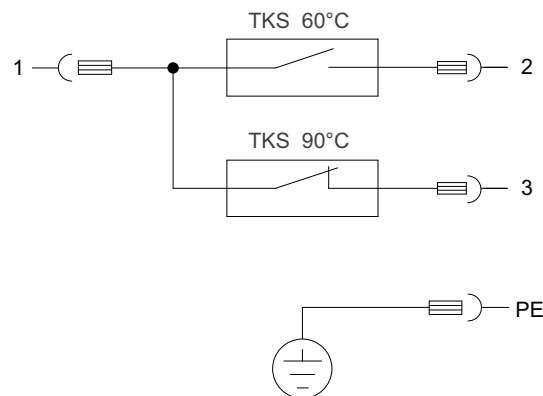
5.26.1 Dimensions



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5.26.2 Electrical connection

To ensure a long service life and proper function, it is recommended to use a relay in the 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

5.26.3 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.

6 Startup

6.1 Important notes

Read the following information prior to startup.



⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



⚠ WARNING

Danger due to freely accessible, rotating parts.

Severe or fatal injuries.

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



⚠ CAUTION

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

Possible injury to persons due to falling parts.

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



⚠ CAUTION

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

Minor injuries.

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

NOTICE

Improper startup may result in damage to the gear unit.

Possible damage to property.

- Observe the following notes.

- Fill the gear unit with the oil grade specified on the nameplate. The oil quantity specified on the nameplate is an approximate quantity. The markings on the oil dipstick are the decisive indicators for the oil quantity to be filled into the unit. For additional information, refer to chapter "Checking the oil level" (→ 133) and chapter "Changing the oil" (→ 140).

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

Check the oil level again after a few operating hours, see chapter "Checking the oil level" (→ 133).

- The most important technical data is provided on the nameplate. Additional data relevant for operation is available in drawings, on the order confirmation or any order-specific documentation.
- After installing the gear unit, check to see that all retaining screws are tight.
- Make sure that the alignment has not changed after tightening the mounting elements.
- If there are any oil drain valves, ensure that they cannot be opened unintentionally.
- Prior to startup, make sure the monitoring devices (pressure switch, temperature switch, etc.) are fully operational.
- Avoid a no-load operation that is independent of the driven machine because operation with a load below the minimum load may damage the rolling bearing of the gear unit.
- If an oil level glass is used for checking the oil level, ensure that it is protected against damage.
- Make sure that the external coolant supply is guaranteed for gear units with circulation cooling, water cooling cover, and water cooling cartridge.
- Gear units with pressure lubrication may only be taken into operation when the pressure switch is connected.
- It is essential that there is no open fire or risk of sparks when working on the gear unit.
- Make sure that the gear unit is grounded. Electrical mount-on components, such as motors, frequency inverters, etc. must be grounded separately.
- Protect the gear unit from falling objects.
- When ambient temperatures are low, adhere to the "limit temperature for gear unit start". Allow for sufficient warm-up time.
- When using gear units with long-term protection: Replace the screw plug at the location indicated on the gear unit with a breather (position → see order documents).
- Remove transport protection prior to startup.
- Adhere to the safety notes in the individual sections.

6.2 Startup of gear units with long-term protection

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

6.2.1 Removing anti-corrosion agent

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

NOTICE

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

Possible damage to property.

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

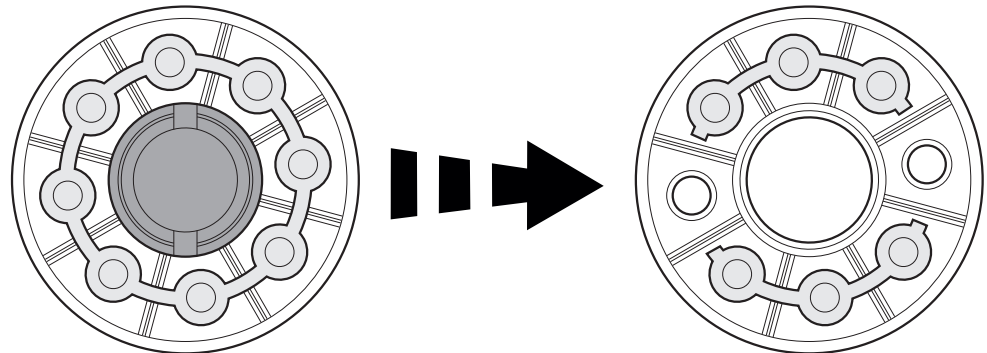
6.2.2 Insert breather

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

6.3 Desiccant breather filter /DC

Before startup

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



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6.4 Shaft end pump /SEP

Check the following to ensure safe operation of the shaft end pump:

- Do not start up the gear unit if the pressure switch is not connected.
- It is essential that the gear unit is sufficiently lubricated from the very beginning. Contact SEW-EURODRIVE if the shaft end pump does not build up pressure within 10 seconds after the gear unit has been started up.
- A minimum speed of $\geq 400 \text{ min}^{-1}$ is required for proper operation of the shaft end pump. If you use variable input speeds e.g. inverter-controlled drives or if you intend to change the input speed of a gear unit equipped with a shaft end pump, it is essential that you contact SEW-EURODRIVE.
- An oil heater is mandatory when operating gear units with shaft end pump at low ambient temperatures. For further information, refer to chapter "Permitted lubricants" (→ 147).
- Observe the notes in chapter "Gear units with shaft end pump /SEP".

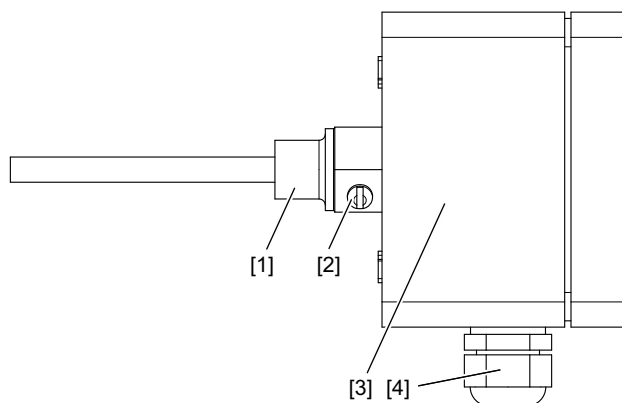
6.5 Oil heater /OH

6.5.1 Positioning the thermostat

Depending on the installation situation of the drive, it might be necessary to change the position of the thermostat.

To position the thermostat, proceed as follows:

1. Loosen the clamping screws [2].
2. **NOTICE!** Ensure that the cable gland is properly positioned during installation. Possible damage to property.
Mount it in such a way that no moisture can enter. Turn the thermostat to the required position.
3. Tighten the clamping screws [2] again.



2338432139

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

The screw-in sleeve [1] prevents oil from escaping. The sensor of the thermostat is located in the threaded jacket [1] and held in place by 2 clamping screws [2]. Observe the additional manufacturer's documentation.

6.6 Backstop /BS

NOTICE

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

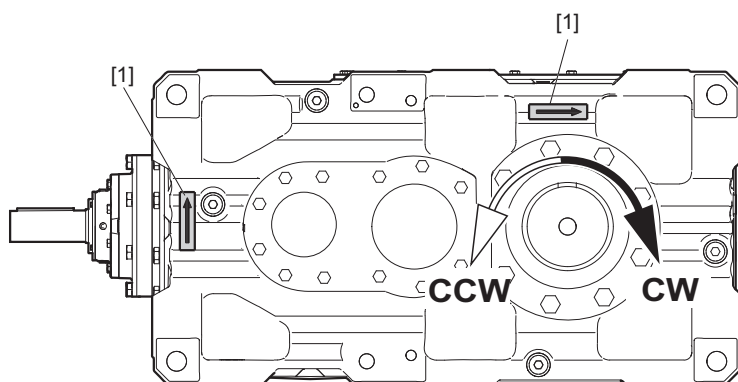
Possible damage to property.

- The motor must not start up in the blocking direction. Ensure that the motor is supplied with the correct power supply to achieve the required direction of rotation. Operating the motor in the blocking direction could destroy the backstop.

The gear unit's direction of rotation is defined with a view to the output shaft (LSS):

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

The direction of rotation of the backstop is indicated on the gear unit by a label [1].




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6.7 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.

- Note that prior to gear unit startup, the oil must be heated at least to the lowest cold start temperature by the oil heater (→  147).

6.8 Gear unit preservation/gear unit shutdown


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

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

6.8.1 Internal conservation

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

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

 - Replace the breather with a screw plug and close the gear unit so that it is air tight. Mount a new breather prior to startup.
- **After longer gear unit operation:**
 - The oil might be contaminated (e.g. oil sludge, water, ...) after long periods of operation. Therefore, drain the oil and thoroughly rinse the inside of the gear unit with new oil prior to preservation. Observe the information in chapter "Changing the oil" (→  140) in the corresponding operating instructions. The inside of the gear unit can then be protected again corrosion as described above.

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

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

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

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

6.8.2 External corrosion protection

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



INFORMATION

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

Observe the information in chapter "Storage and transport conditions" (→ 22) 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 for inspection and maintenance

Observe the following notes before starting inspection/maintenance work.



⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



⚠ WARNING

An operator's machine that is not appropriately secured can fall during gear unit installation or removal.

Severe or fatal injuries.

- Protect the operator's machine against unintentional movement when installing or removing the gear unit.
- Before releasing shaft connections, make sure that there are no active torsional moments present (tensions within the system).



⚠ WARNING

Danger due to using impermissible gear unit oil.

Severe or fatal injuries.

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



⚠ WARNING

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

Severe injuries.

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



⚠ CAUTION

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

Minor injuries.

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



⚠ CAUTION

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.

NOTICE

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

Possible damage to property.

- Do not mix oils of different types and from different manufacturers.

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

7.2 Inspection and maintenance intervals

Adhere to the following inspection and maintenance intervals:

Time interval	What to do?
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 for 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"> Check the oil consistency. Fill regreasable sealing systems with grease. In dusty environments, regrease every 3 months. For V-belt drives: Check the belt tension and condition of the V-belt pulleys and belts. Observe chapter "V-belt drives /VBD".
At least every 12 months, depending on the operating conditions	<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. Clean the oil filter. If required, replace the filter element. Check the breather. If required, replace it. Check the alignment of the input and output shaft. Check the condition and tightness of all the rubber tubes (aging effects). Check the condition of the oil-air cooler /OAC (see operating instructions of the oil-air cooler). Check the condition of the oil-air cooler /OAP. If required, replace the filter element (see operating instructions of the oil-air cooler). Check the condition of the oil-water cooler (OWP1/OWC1). Observe the separate operating instructions. You can find these together with the dimension sheet and further documents in the overall documentation for the gear unit. Check the condition of the oil-water cooler /OWP; replace the filter element if necessary (see operating instructions of the oil-water cooler).
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.

Time interval	What to do?
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/anti-corrosion coating. • Replace the backstop. <p>Wear may occur in the backstop when operated below lift-off speed. This is why you should consult SEW-EURODRIVE for defining the maintenance intervals.</p> <ul style="list-style-type: none"> • Check the oil heater /OH (at same time as the oil change): <ul style="list-style-type: none"> – Check whether all connection cables and terminals are securely fixed and free from corrosion. – Clean encrusted heating elements. Replace if necessary.

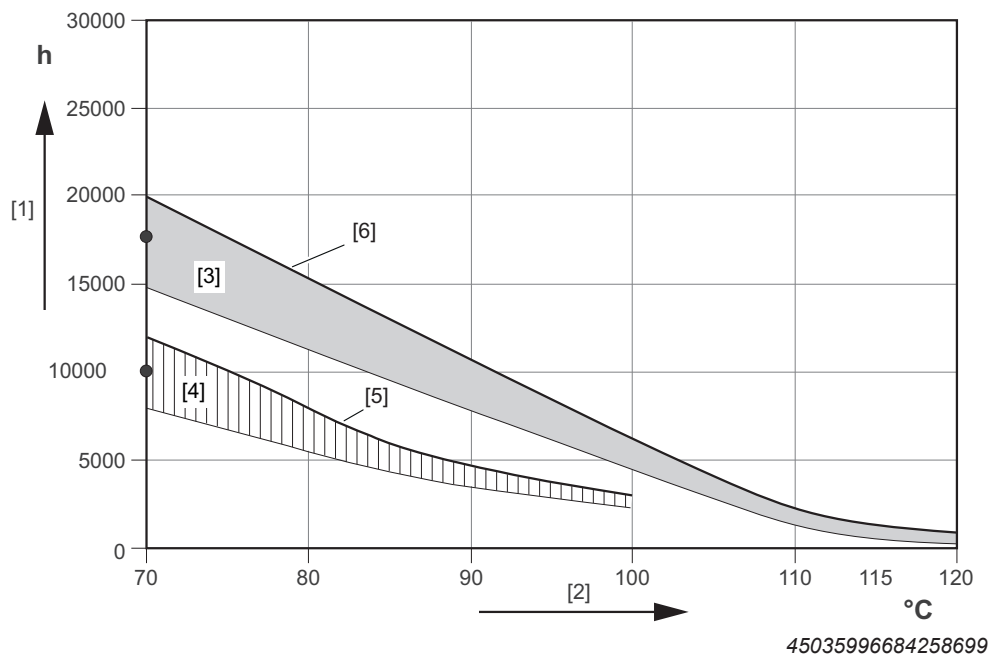
7.3 Lubricant change intervals

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

INFORMATION



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



- [1] Operating hours
- [2] Sustained oil bath temperature – average value per oil type at 70 °C
- [3] CLP HC/CLP HC NSF H1
- [4] CLP (CC)/E
- [5] SEW GearOil Base
- [6] SEW GearOil Synth

INFORMATION



SEW-EURODRIVE recommends that the gear unit oil is analyzed regularly (see chapter "Checking the oil consistency" (→ 139)) to optimize the lubricant change intervals.

7.4 Checking the oil level

7.4.1 General information

Note the following when checking the oil level:

NOTICE

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

Possible damage to property.

- Check the oil level only when the gear unit is at idle state.
- For gear units in fixed and variable pivoted mounting position, observe the notes on the following pages.
- 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

Video instructions

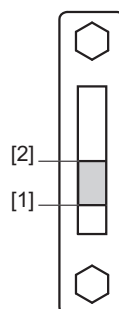
German



English



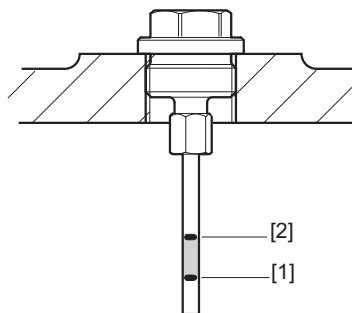
Oil level glass



36028812522665099

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

Oil dipstick

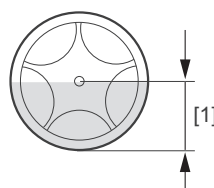


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1. Clean the area around the oil dipstick. Unscrew the oil dipstick and remove it.
2. Clean the oil dipstick with a clean cloth and screw it back into the gear unit hand-tight to the stop.
3. Remove the oil dipstick and check the oil level. The oil level must be between markings [1] and [2].
4. If the oil level is too low, proceed as follows:
 - Open the oil filling plug.
 - Fill in oil of the same oil grade until the oil level is in the middle between markings [1] and [2].
5. If you have filled in too much oil, proceed as follows:
 - Adjust the oil level. The oil level must be between markings [1] and [2].
6. Screw in the oil filling plug.
7. Screw in the oil dipstick.

Oil sight glass

The oil sight glass only shows the approximate oil level. Use the oil dipstick to read the exact oil level.



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

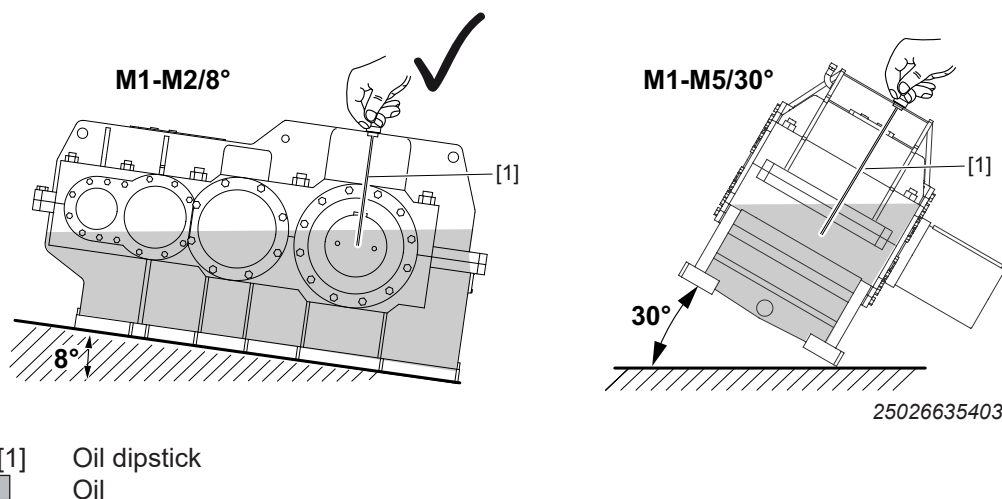
Observe the information on the nameplate and in the order documents.

Fixed pivoted mounting positions

Procedure

Check the oil level in the fixed, intended position. Observe the notes in chapter "Standard procedure" (→ 133).

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

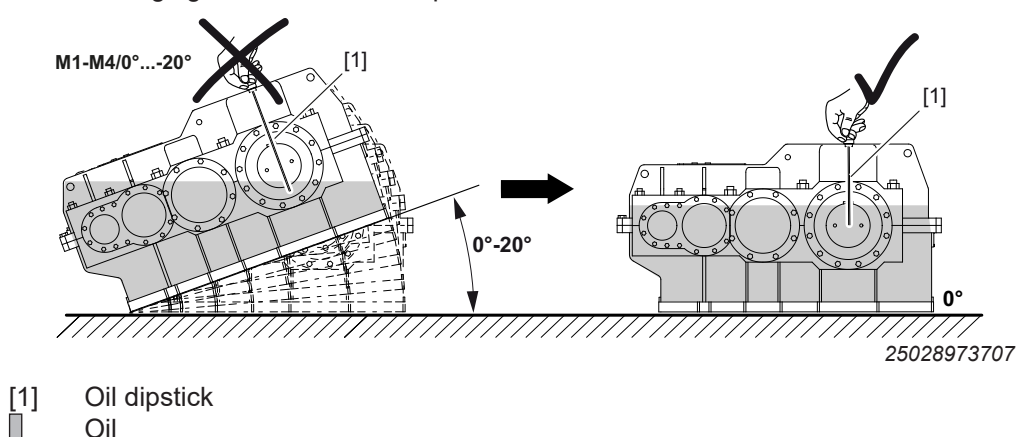


Variable pivoted mounting positions

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" (→ 133).

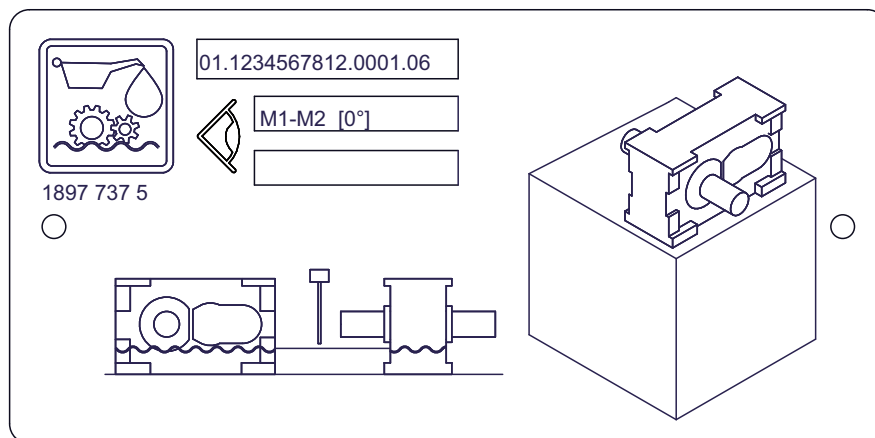
The following figure shows an example of how to check the oil level.



Information sign

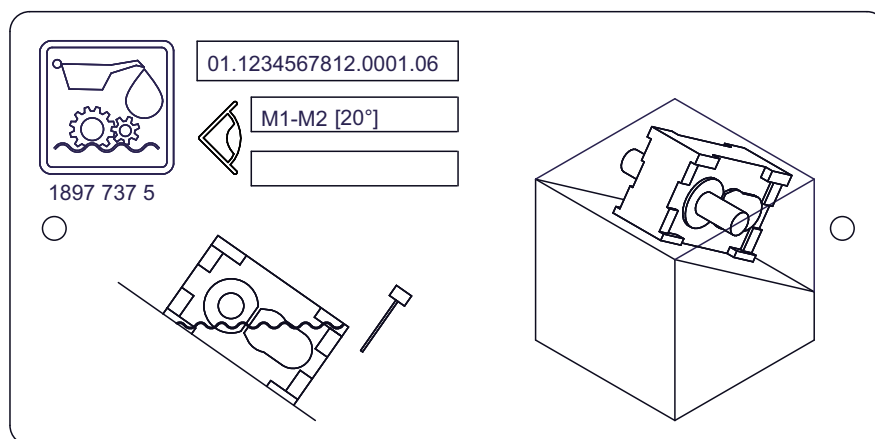
Observe the additional **information sign on the gear unit**. Check the oil level in the test mounting position specified on the information sign.

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°.



9007204944161675

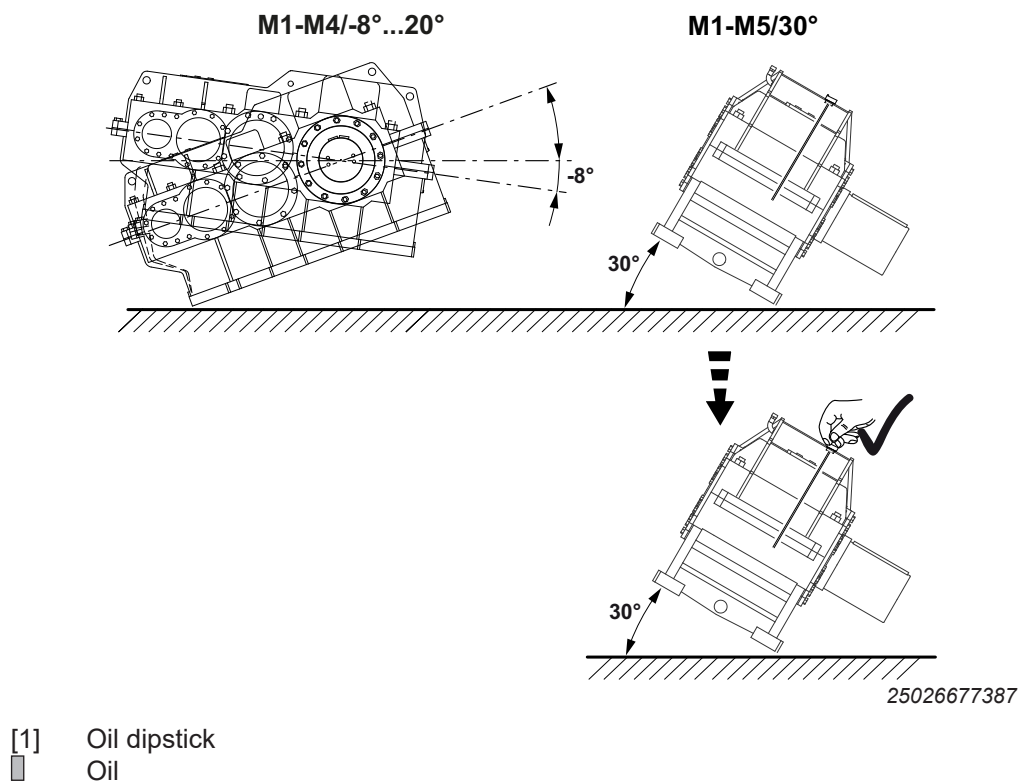
Combination of fixed and variable pivoted mounting positions

Procedure

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

Before checking the oil level of gear units with variable/fixed pivoted mounting position, position the gear unit in the mounting position defined in the order documents. Observe the notes in chapter "Standard procedure" (→ 133).

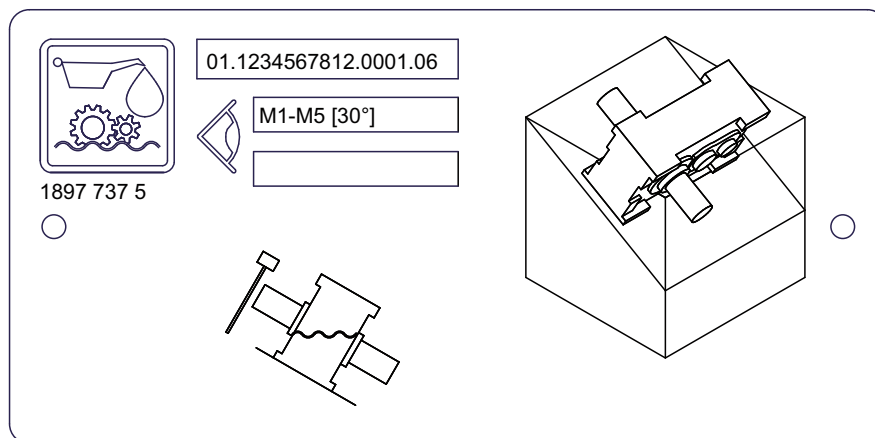
The following figure shows an example of how to check the oil level.



Information sign

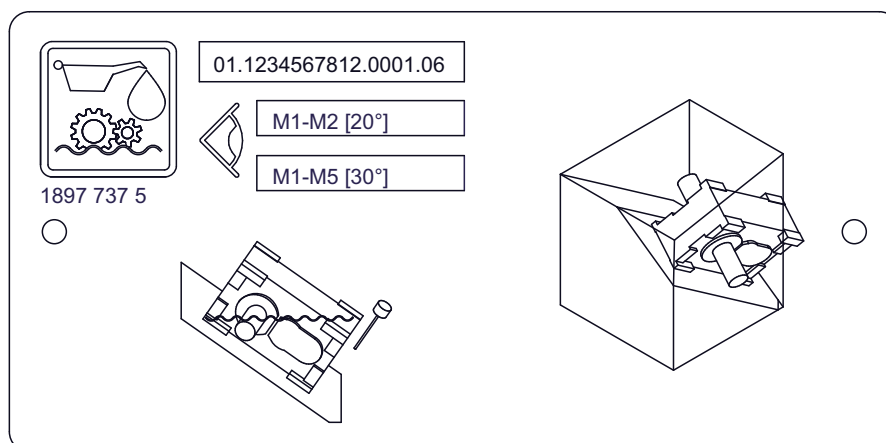
Observe the additional information sign on the gear unit. Check the oil level in the test mounting position specified on the nameplate.

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



9007204944186379

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



9007204944188555

7.5 Checking the oil consistency



INFORMATION

A detailed and reliable examination of the oil consistency is not possible with the naked eye. If you are unsure whether the oil is in good condition or whether an oil change is required, we recommend performing a laboratory analysis of the oil.

SEW-EURODRIVE offers a laboratory analysis in which the oil is checked for wear, water, and contamination. Furthermore, the viscosity, acid value, and additive content of the oil is checked. For this purpose, contact SEW-EURODRIVE.

Proceed as follows to check the oil consistency:

1. **▲ WARNING!** Risk of burns due to hot gear unit and hot gear unit oil. Severe injuries.
Allow the gear unit to cool down below 50 °C before you start working on it.
2. Start the gear unit for a short time for the oil to mix with suspended particles.
3. Determine the oil drain and place a clean and dry container underneath.
4. Slowly open the oil drain and drain some oil.
5. Close the oil drain valve.
6. Check the oil consistency:
 - Check the drained oil for appearance, color, and contamination.
 - If the oil sample is severely contaminated, e.g. water, cloudiness, change in color, dirt, consult a specialist to find out the cause.

7.6 Changing the oil

7.6.1 Notes

Observe the following information when changing the oil:



⚠ WARNING

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

Severe injury.

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

NOTICE

Improper oil change can damage the gear unit.

Possible damage to property.

- Observe the following information.

- Perform the oil change quickly after you have switched off the gear unit to prevent solids from settling. If possible, drain the oil while it is still warm. Avoid oil temperatures above 50 °C.

- Oil grade and oil viscosity are listed on the nameplate of the gear unit.

The required oil fill quantity is higher when additional attachments are mounted to the gear unit, such as an oil supply system. Observe the operating instructions of the oil supply system.

- Always fill the gear unit with the same oil grade as before. Mixing oils of different grades and/or manufacturers is not permitted. Synthetic oils in particular must not be mixed with mineral oils or other synthetic oils. When switching from mineral oil and/or when switching from synthetic oil of one basis to synthetic oil of another basis, thoroughly flush the gear unit with the new oil grade.

Refer to the lubricant table for information on the permitted oil of the various lubricant manufacturers.

- When changing the oil, flush the interior of the gear unit thoroughly with oil to remove oil sludge, oil residue, and abrasion. Use the same oil grade as for operating the gear unit. Fill in fresh oil only after all residues have been removed.
- An oil level above the max. marking might indicate that foreign liquids (e.g. water) have entered. An oil level below the min. marking might indicate a leakage. Find out and eliminate the cause before you fill in new oil.
- Replace any damaged seals on the oil drain plug.
- If present, clean the magnetic oil drain plug and the oil dipstick with magnet tip.
- Empty the oil-bearing system of gear units with oil cooling system and oil supply system according to the manufacturer's maintenance instructions. If required, empty accessories such as oil filters and pipes.
- Elements for controlling the oil level, oil drain, and oil fill openings are indicated by safety symbols on the gear unit.
- For gear units with reduced oil level, observe chapter "Gear units with reduced oil level".

Video instructions

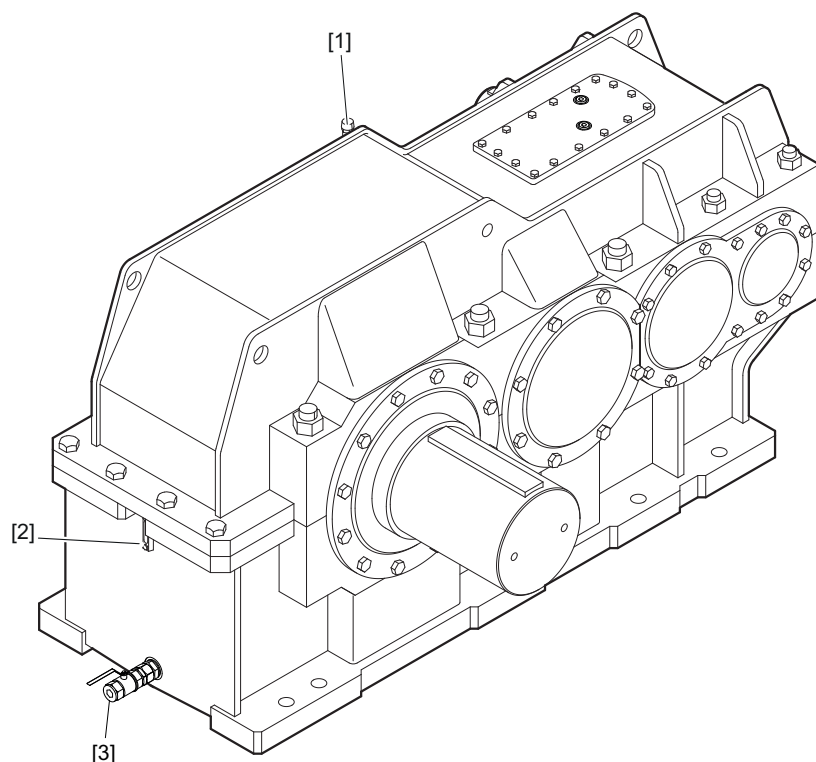
German



English



7.6.2 Procedure



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Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 128).

1. Place a suitable container underneath the oil drain plug [3].
2. Remove the oil fill plug/breather [1].
3. Open the oil drain valve [3] and drain all the oil.
4. Close the oil drain valve [3].
5. Fill in new oil of the same grade through the oil fill opening [1].
 - Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).
 - The oil quantity specified on the nameplate is an approximate quantity. The marks on the oil level glass [2] or on the oil dipstick are the decisive indicators of the correct oil quantity, see chapter "Checking the oil level" (→ 133).
6. Re-insert the oil fill plug/breather [1].



⚠ CAUTION

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.

7.6.3 Gear units with shaft end pump /SEP

Fill the shaft end pump completely with oil shortly before taking it into operation. Observe the procedure described in chapter "Gear units with shaft end pump /SEP".

7.7 Breather /BPG

7.7.1 Checking and cleaning the breather

NOTICE

Improper cleaning of the breather may damage the gear unit.

Possible damage to property.

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

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 128).

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

7.7.2 Replacing the desiccant breather filter

The service life of the filters usually is 12 months, after that time the filters must be replaced. In case the filters are operated in a highly contaminated environment, the service life of the filters can be limited to 2 months or less. The color of the granulate indicates whether a filter needs to be replaced or whether it can still be used.

Color/color transition	Distribution of color gradient	Meaning	Action
Blue → pink	Filter top → filter bottom	Moisture in the gear unit	Determine the cause
Entirely pink or white	Entire filter	Filter capacity exhausted	Replace the filter

Once the capacity of the filter is exhausted, the desiccant breather filters change their color from blue to pink, proceeding from the bottom of the filter to the top.

If the main part of the breather valve has changed its color to pink (or white after a longer time), the breather filter must be replaced by a new one.

If the color changes from top to bottom, this indicates that a large amount of moisture is in the gear unit.

Disposal

If the desiccant breather filter must be replaced, it is likely to contain oil vapor. The filter must be disposed of in accordance with the corresponding regulations.

7.8 Refill the regreasable sealing systems with grease**⚠ WARNING**

Risk of crushing due to rotating parts.

Severe or fatal injuries.

- Observe the 5 safety rules before commencing the work: Disconnect. Secure the device against a restart. Check that no voltage is applied. Ground and short-circuit. Cover or isolate neighboring live parts.

**INFORMATION**

- When you re-lubricate the seals, slowly turn the shaft to ensure a better distribution of the grease.
 - Immediately remove any old grease that has leaked out.
1. For the exact lubrication position, refer to the order-specific dimension sheet.
 2. Use moderate pressure to force grease into each lubrication point until new grease leaks out of the sealing gap. Observe the information in chapter "Sealing greases/rolling bearing greases" (→ 153).
 3. The used grease is pressed out of the sealing gap together with any contaminants it has absorbed.

7.9 Filling the shaft end pump with oil /SEP

Observe the procedure described in chapter "Gear units with shaft end pump /SEP".

For detailed information, refer to the manufacturer's documentation.

7.10 Fan /FAN

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 128).

**⚠ 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.

- Reassembly of a protective cover after disassembly may only be performed with original parts from SEW-EURODRIVE and sufficient distance to the fan. If the distance is not observed, the fan may touch the protection cover. Do not disconnect the fan from the fan hub. This may only be performed by qualified personnel.

7.11 Cleaning the oil heater /OH



⚠ WARNING

Danger of electric shock.

Severe or fatal injuries.

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

1. Remove the cabling of the heating element.
2. Before disassembling the heating element, drain the oil (→ 140).
3. **NOTICE!** Improper cleaning may damage the heating elements. Possible damage to property.
Clean the tubular heating elements with solvent. Replace the defective heating elements.
4. Screw the heating element out of the gear unit housing.
5. Apply LOCTITE® 577 to the 2 threads of the heating element.
6. Fasten the heating element by applying torque only to the head of the hex screw.
7. Close the oil drain valve.
8. Fill new oil of the same type as the old oil through the oil filling hole (if you want to change the oil type, contact SEW-EURODRIVE Service).
 - Fill in the oil quantity according to the information on the nameplate. The oil quantity specified on the nameplate is a guide value.
 - Use a clean filling aid (plastic funnel or similar). Avoid using galvanized filling aids.
 - Check to see that the oil level is correct, refer to chapter "Checking the oil level" (→ 133).
9. Connect the heating element.

7.12 Split housing

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

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

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

Improper lubricant selection can damage the gear unit.

Possible damage to property.

- The oil viscosity and type (mineral/synthetic) to be used are determined by SEW-EURODRIVE specifically for each order. This information is noted in the order confirmation and on the gear unit's nameplate. If other lubricants are used in the gear units and/or in other temperature ranges than those recommended, the right to claim under warranty will become invalid. Exceptions are approvals for specific applications that have to be confirmed by SEW-EURODRIVE in written form. This lubricant recommendation in the lubricant table does not imply approval in the sense of a guarantee for the quality of the lubricant supplied by the respective supplier. Lubricant manufacturers are responsible for the quality of their own products.
- Oils of the same viscosity class from different manufacturers do not have the same characteristics. In particular, the minimum permitted oil bath temperatures are manufacturer-specific. These temperatures are specified in the lubricant tables.
- The minimum permitted oil bath temperatures depend on the lubrication type used. These temperatures are specified in the lubricant tables. The values correspond to the maximum permitted viscosity of the individual lubricants.
- Do not mix different synthetic lubricants and do not mix synthetic lubricants with mineral lubricants.
- Check the compatibility of the greases and oils used.

The values specified in the lubricant tables apply as of the time of printing of this document. The data of the lubricants is subject to dynamic change by the lubricant manufacturers. For the latest information on lubricants, refer to:

https://www.sew-eurodrive.de/products/gear_units/standard_gear_units/accessories_and_options/lubricants/lubricants.html





8.2 Structure of the tables and abbreviations

			SEW EURODRIVE
[2]			-20
			-5
			+5
		VG 150 ¹⁾	+65
			SEW GearOil Base 150 E1
			SEW070040013
[1]			-15
			0
			+10
		VG 220	+75
			SEW GearOil Base 220 E1
			SEW070040013
			-10
			+5
			+15
		VG 320	+85
			SEW GearOil Base 320 E1
			SEW070040013

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- [1] Lubricant type
[2] Viscosity class

Abbreviations

Icons	Designation
CLP	= mineral oil
CLP HC	= synthetic polyalphaolefin (PAO)
E	= ester-based oil
	= mineral lubricant
	= synthetic lubricant
	= lubricant for the food industry (NSF H1 -compliant)
	= biodegradable oil (lubricant for agriculture, forestry, and water management)
1)	= lubricants may only be used if service factor $F_s \geq 1.3$

8.3 Explanation of the various lubricants

			[5]
[1]	-20		
[2]	-5	+65	[6]
[3]	+5		
[4]	xyz		
	SEW070040013		[7]

18014416413363467

- [1] Lowest cold start temperature in °C for splash lubrication¹⁾
- [2] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 5000 cSt¹⁾
- [3] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 2000 cSt¹⁾
- [4] Trade name
- [5] Manufacturer
- [6] Highest oil bath temperature in °C²⁾
- [7] Approvals

1) In case of lower temperatures, the oil must be heated to the specified minimum temperature, for example, by using an oil heater. For the maximum permitted oil viscosity per pump type, refer to chapter "Explanations on the oil supply system / oil cooling systems and oil viscosity".

2) Service life is significantly reduced when exceeded. Observe chapter "Lubricant change intervals".

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

8.5 Lubricant tables







This lubricant table is valid when the document is published. Refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

[1]	[2]								
CLP	VG 150	<div><div>-20</div><div>-5</div><div>+65</div></div>	<div><div>-20</div><div>-5</div><div>+65</div></div>	<div><div>-20</div><div>-5</div><div>+65</div></div>	<div><div>-20</div><div>-5</div><div>+65</div></div>	<div><div>-20</div><div>-5</div><div>+65</div></div>	<div><div>-20</div><div>-5</div><div>+65</div></div>	<div><div>-20</div><div>-5</div><div>+65</div></div>	
		<div><div>SEW GearOil Base 150 E1 / US1 / CN1 / BR1</div></div>	<div><div>Optigear BM 150</div></div>	<div><div>Alpha SP 150</div></div>	<div><div>Renolin CLP 150 Plus</div></div>	<div><div>Renolin HighGear 150</div></div>	<div><div>Mobilgear 600 XP 150</div></div>	<div><div>Küberoil GEM 1-150 N</div></div>	<div><div>AP-SGO 150</div></div>
		<div><div>SEW070040013</div></div>			<div><div>SEW070030013</div></div>				<div><div>SEW070030013</div></div>
	VG 220	<div><div>-15</div><div>0</div><div>+75</div></div>	<div><div>-15</div><div>0</div><div>+75</div></div>	<div><div>-15</div><div>0</div><div>+75</div></div>	<div><div>-15</div><div>0</div><div>+75</div></div>	<div><div>-15</div><div>0</div><div>+75</div></div>	<div><div>-15</div><div>0</div><div>+75</div></div>	<div><div>-15</div><div>0</div><div>+75</div></div>	
		<div><div>SEW GearOil Base 220 E1 / US1 / CN1 / BR1</div></div>	<div><div>Optigear BM 220</div></div>	<div><div>Alpha SP 220</div></div>	<div><div>Renolin CLP 220 Plus</div></div>	<div><div>Renolin HighGear 220</div></div>	<div><div>Mobilgear 600 XP 220</div></div>	<div><div>Küberoil GEM 1-220 N</div></div>	<div><div>AP-SGO 220</div></div>
		<div><div>SEW070040013</div></div>			<div><div>SEW070030013</div></div>				<div><div>SEW070030013</div></div>
	VG 320	<div><div>-10</div><div>+5</div><div>+85</div></div>	<div><div>-10</div><div>+5</div><div>+85</div></div>	<div><div>-10</div><div>+5</div><div>+85</div></div>	<div><div>-10</div><div>+5</div><div>+85</div></div>	<div><div>-10</div><div>+5</div><div>+85</div></div>	<div><div>-10</div><div>+5</div><div>+85</div></div>	<div><div>-10</div><div>+5</div><div>+85</div></div>	
		<div><div>SEW GearOil Base 320 E1 / US1 / CN1 / BR1</div></div>	<div><div>Optigear BM 320</div></div>	<div><div>Alpha SP 320</div></div>	<div><div>Renolin CLP 320 Plus</div></div>	<div><div>Renolin HighGear 320</div></div>	<div><div>Mobilgear 600 XP 320</div></div>	<div><div>Küberoil GEM 1-320 N</div></div>	<div><div>AP-SGO 320</div></div>
		<div><div>SEW070040013</div></div>			<div><div>SEW070030013</div></div>				<div><div>SEW070030013</div></div>
	VG 460	<div><div>-5</div><div>+10</div><div>+90</div></div>	<div><div>-5</div><div>+10</div><div>+90</div></div>	<div><div>-5</div><div>+10</div><div>+90</div></div>	<div><div>-5</div><div>+10</div><div>+90</div></div>	<div><div>-5</div><div>+10</div><div>+90</div></div>	<div><div>-5</div><div>+10</div><div>+90</div></div>	<div><div>-5</div><div>+10</div><div>+90</div></div>	
<div><div>SEW GearOil Base 460 E1 / US1 / CN1 / BR1</div></div>		<div><div>Optigear BM 460</div></div>	<div><div>Alpha SP 460</div></div>	<div><div>Renolin CLP 460 Plus</div></div>	<div><div>Renolin HighGear 460</div></div>	<div><div>Mobilgear 600 XP 460</div></div>	<div><div>Küberoil GEM 1-460 N</div></div>	<div><div>AP-SGO 460</div></div>	
<div><div>SEW070040013</div></div>				<div><div>SEW070030013</div></div>				<div><div>SEW070030013</div></div>	
VG 680	<div><div>0</div><div>+15</div><div>+90</div></div>	<div><div>0</div><div>+15</div><div>+90</div></div>	<div><div>0</div><div>+15</div><div>+90</div></div>	<div><div>0</div><div>+15</div><div>+90</div></div>	<div><div>0</div><div>+15</div><div>+90</div></div>	<div><div>0</div><div>+15</div><div>+90</div></div>	<div><div>0</div><div>+15</div><div>+90</div></div>		
	<div><div>SEW GearOil Base 680 E1 / US1 / CN1 / BR1</div></div>	<div><div>Optigear BM 680</div></div>	<div><div>Alpha SP 680</div></div>	<div><div>Renolin CLP 680 Plus</div></div>	<div><div>Renolin HighGear 680</div></div>	<div><div>Mobilgear 600 XP 680</div></div>	<div><div>Küberoil GEM 1-680 N</div></div>	<div><div>AP-SGO 460</div></div>	
	<div><div>SEW070040013</div></div>			<div><div>SEW070030013</div></div>				<div><div>SEW070030013</div></div>	
VG 1000	<div><div>+5</div><div>+20</div><div>+30</div></div>	<div><div>+5</div><div>+20</div><div>+30</div></div>							
	<div><div>Optigear BM 1000</div></div>								

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This lubricant table is valid when the document is published. Refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

[1]	[2]						
	VG 32 ¹⁾				<div><div>-40</div><div>-30</div><div>-25</div><div>+30</div></div> <div>SHC 624</div>		
	VG 68 ¹⁾			<div><div>-35</div><div>-20</div><div>-10</div><div>+50</div></div> <div>Renolin Unisyn CLP 68</div>	<div><div>-40</div><div>-25</div><div>-15</div><div>+50</div></div> <div>SHC 626</div>	<div><div>-35</div><div>-20</div><div>-10</div><div>+50</div></div> <div>Klüber synth GEM 4-68 N</div>	
	VG 150 ¹⁾	<div><div>-35</div><div>-15</div><div>-5</div><div>+75</div></div> <div>GearOil Synth 150 E1</div>	<div><div>-25</div><div>-10</div><div>0</div><div>+70</div></div> <div>Alpha syn EP 150</div>	<div><div>-30</div><div>-10</div><div>-10</div><div>+70</div></div> <div>Optigear Synthetic X 150</div>	<div><div>-30</div><div>-10</div><div>0</div><div>+75</div></div> <div>SHC 629</div>	<div><div>-25</div><div>-10</div><div>0</div><div>70</div></div> <div>Klüber synth GEM 4-150 N</div>	<div><div>-35</div><div>-15</div><div>-5</div><div>+75</div></div> <div>Carter SH 150</div>
	VG 220	<div><div>-30</div><div>-10</div><div>0</div><div>+85</div></div> <div>GearOil Synth 220 E1</div>	<div><div>-25</div><div>-5</div><div>+5</div><div>+80</div></div> <div>Alpha syn EP 220</div>	<div><div>-25</div><div>-5</div><div>+5</div><div>+80</div></div> <div>Optigear Synthetic X 220</div>	<div><div>-25</div><div>-5</div><div>0</div><div>+85</div></div> <div>SHC 630</div>	<div><div>-25</div><div>-5</div><div>+5</div><div>+80</div></div> <div>Klüber synth GEM 4-220 N</div>	<div><div>-25</div><div>-5</div><div>+5</div><div>+80</div></div> <div>Carter SH 220</div>
	VG 320	<div><div>-25</div><div>-5</div><div>+5</div><div>+100</div></div> <div>GearOil Synth 320 E1</div>	<div><div>-20</div><div>0</div><div>+10</div><div>+90</div></div> <div>Alpha syn EP 320</div>	<div><div>-20</div><div>0</div><div>+10</div><div>+90</div></div> <div>Optigear Synthetic X 320</div>	<div><div>-20</div><div>-5</div><div>+10</div><div>+95</div></div> <div>SHC 632</div>	<div><div>-20</div><div>0</div><div>+10</div><div>+95</div></div> <div>Klüber synth GEM 4-320 N</div>	<div><div>-20</div><div>0</div><div>+10</div><div>+90</div></div> <div>Carter SH 320</div>
	VG 460	<div><div>-20</div><div>0</div><div>+15</div><div>+110</div></div> <div>GearOil Synth 460 E1</div>	<div><div>-15</div><div>+5</div><div>+15</div><div>+100</div></div> <div>Alpha syn EP 460</div>	<div><div>-15</div><div>+5</div><div>+15</div><div>+100</div></div> <div>Optigear Synthetic X 460</div>	<div><div>-15</div><div>+5</div><div>+15</div><div>+105</div></div> <div>SHC 634</div>	<div><div>-15</div><div>+5</div><div>+20</div><div>+105</div></div> <div>Klüber synth GEM 4-460 N</div>	<div><div>-15</div><div>+5</div><div>+15</div><div>+100</div></div> <div>Carter SH 460</div>
	VG 680	<div><div>-15</div><div>+5</div><div>+20</div><div>+110</div></div> <div>GearOil Synth 680 E1</div>	<div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>Optigear Synthetic X 680</div>	<div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>Renolin Unisyn CLP 680</div>	<div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>SHC 636</div>	<div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>Klüber synth GEM 4-680 N</div>	<div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>Carter SH 680</div>
	VG 1000				<div><div>-10</div><div>+15</div><div>+30</div><div>+110</div></div> <div>SHC 639</div>	<div><div>-10</div><div>+15</div><div>+30</div><div>+110</div></div> <div>SHC Gear 1000</div>	<div><div>0</div><div>+20</div><div>+30</div><div>+110</div></div> <div>Klüber synth EG4-1000</div>

CLP HC

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[1]	[2]	[3]	SEW EURODRIVE	bremner & leguit	Castrol	FUCHS	KLÜBER LUBRICATION
		VG 68 ¹⁾		<div> <div>-35</div> <div>-20</div> <div>-10</div> </div> <div>+45</div> <div>Cassida Fluid HF 68</div>	<div> <div>-40</div> <div>-25</div> <div>-15</div> </div> <div>+45</div> <div>Optileb HY 68</div>	<div> <div>-35</div> <div>-20</div> <div>-10</div> </div> <div>+45</div> <div>Cassida Fluid HF 68</div>	<div> <div>-35</div> <div>-20</div> <div>-10</div> </div> <div>+45</div> <div>Klüberoil 4UH1-68 N</div>
	CLP HC ₂ NSF H1	VG 220 ¹⁾	<div> <div>-30</div> <div>-5</div> <div>0</div> </div> <div>+80</div> <div>SEW GearOil Synth 220 H1 E1</div> <div>SEW 070040313</div>	<div> <div>-20</div> <div>-5</div> <div>+5</div> </div> <div>+75</div> <div>Cassida Fluid GL 220</div>	<div> <div>-25</div> <div>-5</div> <div>+5</div> </div> <div>+75</div> <div>Optileb GT 220</div> <div>SEW 0700403113</div>	<div> <div>-20</div> <div>-5</div> <div>+5</div> </div> <div>+75</div> <div>Cassida Fluid GL 220</div>	<div> <div>-25</div> <div>-5</div> <div>+5</div> </div> <div>+75</div> <div>Klüberoil 4UH1-220 N</div>
		VG 460 ¹⁾	<div> <div>-20</div> <div>0</div> <div>+15</div> </div> <div>+100</div> <div>SEW GearOil Synth 460 H1 E1</div> <div>SEW 070040313</div>	<div> <div>-15</div> <div>+5</div> <div>+20</div> </div> <div>+90</div> <div>Cassida Fluid GL 460</div>	<div> <div>-15</div> <div>+5</div> <div>+20</div> </div> <div>+95</div> <div>Optileb GT 460</div> <div>SEW 070040313</div>	<div> <div>-15</div> <div>+5</div> <div>+20</div> </div> <div>+90</div> <div>Cassida Fluid GL 460</div>	<div> <div>-15</div> <div>+5</div> <div>+20</div> </div> <div>+95</div> <div>Klüberoil 4UH1-460 N</div>
		VG 680 ¹⁾		<div> <div>-10</div> <div>+10</div> <div>+25</div> </div> <div>+105</div> <div>Cassida Fluid GL 680</div>		<div> <div>-10</div> <div>+10</div> <div>+25</div> </div> <div>+105</div> <div>Cassida Fluid GL 680</div>	<div> <div>-10</div> <div>+10</div> <div>+25</div> </div> <div>+105</div> <div>Klüberoil 4UH1-680 N</div>
		VG 320				<div> <div>-20</div> <div>0</div> <div>+10</div> </div> <div>+8a5</div> <div>Plantogear 320 S</div>	<div> <div>-20</div> <div>0</div> <div>+10</div> </div> <div>+85</div> <div>Klüberbio EG2-320</div>
	E	VG 460				<div> <div>-15</div> <div>+5</div> <div>+15</div> </div> <div>+95</div> <div>Plantogear 460 S</div>	<div> <div>-15</div> <div>+5</div> <div>+15</div> </div> <div>+95</div> <div>Klüberoil 4UH1-460 N</div>

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1) Lubricants may only be used

if the service factor F_s and peak load factor $F_F \geq 1.6$.

The peak output torque M_{K2per} is limited as follows: $F_F \geq 1.6 \rightarrow M_{K2per} \leq 1.25 \times M_{N2}$ (nominal torque) \rightarrow

$M_{K2per} \leq 2 \times M_{N2} / F_F = 2 / 1.6 \times M_{N2}$.

In case of deviations, contact SEW-EURODRIVE.

2) NSF-H1 registered oils for the food processing industry cannot be combined with the gear unit option "Extended storage" (a VCI anti-corrosion agent is added).

NOTICE:

Also observe the thermal application limits of the oil seal materials, see chapter "Lubricant compatibility with oil seals".

8.6 Lubricant fill quantities

The specified lubricant fill quantities are guide values. Also observe the information provided on the nameplate or in the technical specification.

The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity. Observe chapter "Checking the oil level".

The stated lubricant fill quantity may deviate for pivoted mounting positions.

8.7 Sealing greases/rolling bearing greases

INFORMATION



- Do not mix permitted greases from different areas of application.
- If users want to use a grease that is not listed, it is their responsibility to ensure that the grease is suitable for the intended application.

The table shows the greases recommended by SEW-EURODRIVE with the "lower operating temperature".

The permitted operating temperature of the lubricant used must be taken into account for the lower and upper operating temperature. For further information, refer to chapter "Lubricant table" (→ 150).

Area of application	Manufacturer	Grease	Lower service temperature
Standard	SEW-EURODRIVE	SEW Grease HL 2 E1¹⁾	-40 °C
	Fuchs	Renolit CX TOM 15 OEM	-40 °C
	BP	Energrease LS EP-2	-30 °C
	Castrol	Longtime PD 2/ Tribol GR 100-1 PD	-35 °C
		Spheerol EPL 2	-20 °C
	Klüber	Centoplex EP 2	-20 °C
		Petamo GHY 133 N	-40 °C
	Mobil	Mobilux EP 2	-20 °C
	Shell	Gadus S2 V220 2	-20 °C
	Total	Multis EP 2	-20 °C
	SEW	SEW Grease HL 2 H1 E1¹⁾	-40 °C
	Bremer & Leguil	Cassida Grease GTS2	-40 °C
	Fuchs	Plantogel 2 S¹⁾	-40 °C

1) Use the greases used at the factory if possible.

9 Malfunctions/remedy

9.1 Troubleshooting information

Read the following information 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.

Severe injury.

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

NOTICE

Improper handling of the gear unit and the motor may lead to damage.

Possible damage to property.

- Only qualified personnel are permitted to separate the drive and motor and to carry out repair work on drives by SEW-EURODRIVE.
- Contact SEW-EURODRIVE.

9.2 Service

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

- Complete nameplate data
- Type and extent of the failure
- Time the failure occurred and any accompanying circumstances
- Assumed cause
- Video and audio recordings, if possible

9.3 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

Fault	Possible cause	Measure
Operating temperature too high	<ul style="list-style-type: none"> • Too much oil • Oil too old • Oil is heavily contaminated • Ambient temperature too high • Gear units with fan: Air intake opening/gear unit housing contaminated • Malfunction of the oil-air or oil-water cooling system • For gear units with built-in cooling: Cooling liquid flow rate too low; cooling liquid temperature too high; deposits in cooling system 	<ul style="list-style-type: none"> • Check the 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 • Observe the separate operating instructions for the oil-water or oil-air cooling system • Check the cooling liquid flow rate; check the entry temperature of the cooling liquid; clean the cooling system
Temperature at bearing points too high	<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 gear unit 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 – Gear unit 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 • Venting sealed • Oil seal damaged/worn 	<ul style="list-style-type: none"> • Check the oil level and correct, if necessary • Check the venting and replace the breather if necessary • Check the oil seals and replace if necessary
Oil leaking <ul style="list-style-type: none"> • At the 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 gear unit breather 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"> • Gasket not tight • Fittings loosened 	<ul style="list-style-type: none"> • Retighten screw • Retighten the fitting and screw. Secure screw fitting with Loctite®

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Fault	Possible cause	Measure
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 not switching	<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 suction pipe and oil pump with oil Vent the pump at the pressure side Check the connection Replace pressure switch Contact 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 heater faulty 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 if the oil heater is connected and working correctly and replace it if necessary Prevent the gear unit from cooling off during the warm-up phase
Operating temperature at backstop too high, no blocking function	<ul style="list-style-type: none"> Damaged/defective backstop 	<ul style="list-style-type: none"> Check the backstop, replace it if necessary Contact SEW-EURODRIVE

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

9.4 Waste disposal

Dispose of the product and all parts separately in accordance with their material structure and the national regulations. Put the product through a recycling process or contact a specialist waste disposal company. If possible, divide the product into the following categories:

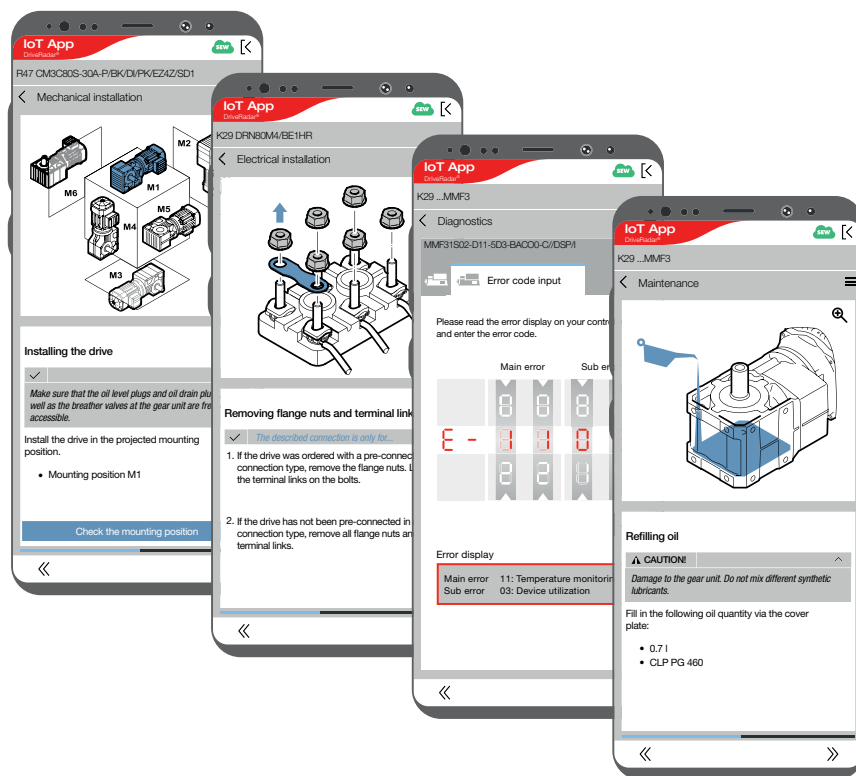
- Iron, steel or cast iron
- Stainless steel
- Aluminum
- Copper
- Plastics

The following materials are hazardous to health and the environment. These materials must be collected and disposed of separately:

- Oil and grease

Collect used oil and grease separately according to type. Ensure that the used oil is not mixed with solvent. Dispose of used oil and grease correctly.





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THE GREEN SIDE OF DRIVE

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Driving the world

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