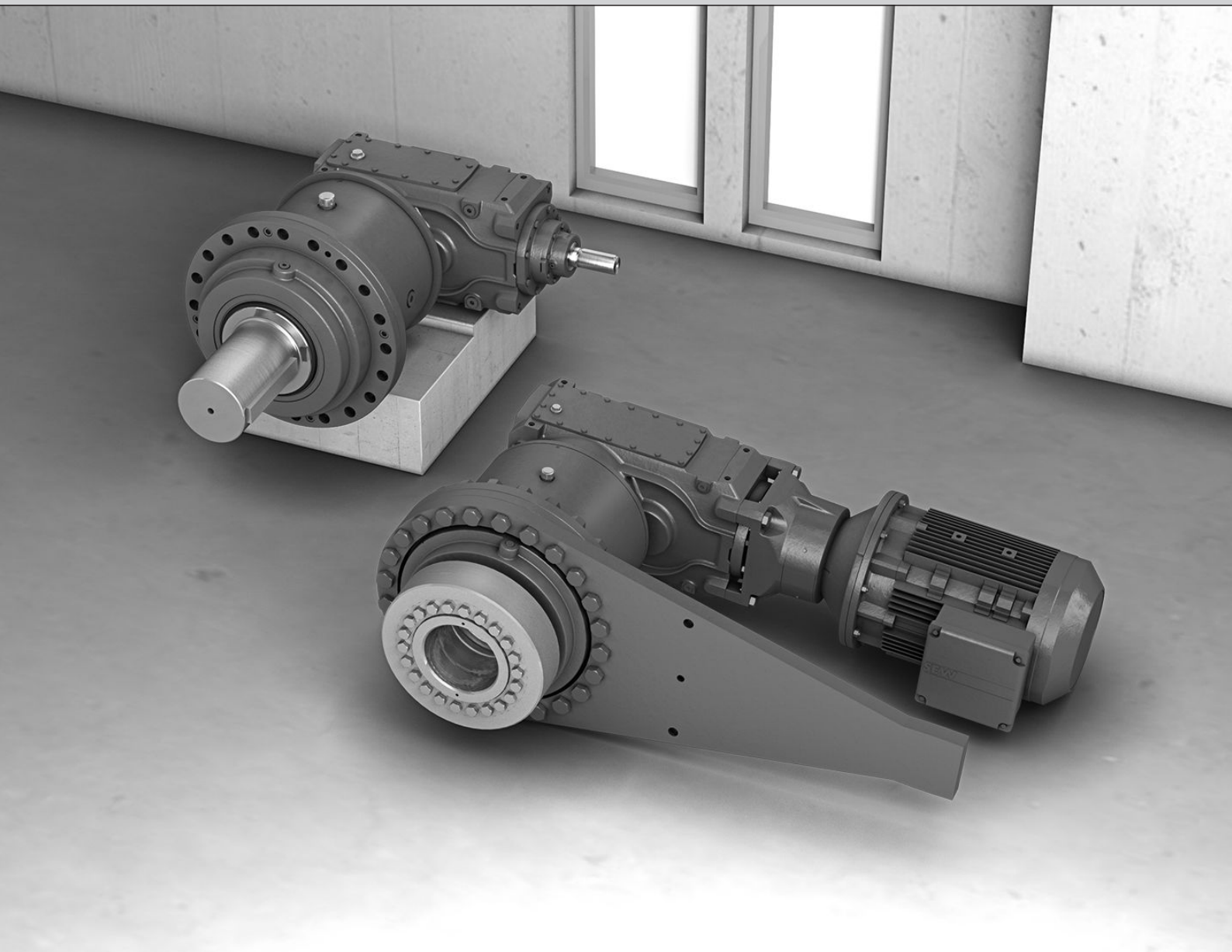




**SEW**  
**EURODRIVE**

# Assembly and Operating Instructions



Industrial Gear Units

**P-X Series**

Torque classes from 100 kNm to 500 kNm







## Table of contents

<b>1</b>	<b>General information.....</b>	<b>7</b>
1.1	About the operating instructions .....	7
1.2	Structure of the safety notes .....	7
1.3	Rights to claim under limited warranty .....	9
1.4	Exclusion of liability .....	9
1.5	Copyright notice .....	9
<b>2</b>	<b>Safety notes .....</b>	<b>10</b>
2.1	Preliminary remark .....	10
2.2	General .....	10
2.3	Target group .....	11
2.4	Designated use .....	11
2.5	Other applicable documentation .....	11
2.6	Safety symbols on the gear unit.....	12
2.7	Safety symbols on the dimension sheet .....	17
2.8	Symbols on the packaging .....	18
2.9	Transport.....	19
2.10	Storage and transport conditions .....	22
<b>3</b>	<b>Gear unit structure .....</b>	<b>25</b>
3.1	P-X gear unit series .....	25
3.2	Nameplate .....	26
3.3	Type designation.....	27
3.4	Abbreviations for output shaft designs.....	27
3.5	Mounting positions .....	28
3.6	Fixed and variable pivoted mounting positions .....	29
3.7	Directions of rotation dependencies.....	36
3.8	Mounting position of the primary gear unit.....	37
3.9	Sealing system.....	39
3.10	Oil level check and gear unit venting .....	40
3.11	Oil filling .....	40
3.12	Oil drain.....	41
3.13	Lubrication type.....	42
3.14	Corrosion and surface protection.....	42
<b>4</b>	<b>Structure of options .....</b>	<b>43</b>
4.1	Shaft end pump /SEP .....	43
4.2	Motor pump /ONP .....	44
4.3	Motor pump/ONP1L .....	44
4.4	Motor pump/ONP1 .....	44
4.5	Cooling types .....	44
4.6	Fan .....	44
4.7	Water cooling cartridge /CCT .....	45
4.8	Oil heater/OH .....	47
4.9	Motor adapter /MA .....	48
4.10	Backstop /BS .....	49



4.11	Torque arm /T .....	50
4.12	Output shaft as a splined hollow shaft /..V .....	51
4.13	Output shaft as a splined solid shaft/..L .....	52
4.14	Oil-water cooler for splash lubrication /OWC .....	53
4.15	Oil-air cooler for splash lubrication /OAC .....	53
4.16	Oil-water cooler for pressure lubrication /OWP .....	53
4.17	Oil-air cooler for pressure lubrication/OAP .....	53
4.18	Pressure switch/PS .....	53
4.19	Temperature sensor /PT100 .....	54
4.20	Temperature switch /NTB .....	54
4.21	Temperature switch /TSK .....	54
4.22	Diagnostic unit/DUO10A (oil ageing) .....	55
4.23	Vibration SmartCheck .....	55
4.24	Breather .....	56
<b>5</b>	<b>Installation/assembly .....</b>	<b>60</b>
5.1	Required tools/resources .....	60
5.2	Tolerances .....	60
5.3	Important notes .....	61
5.4	Prerequisites for installation .....	63
5.5	Installing the gear unit .....	65
5.6	Filling gear units with oil/delivered without oil fill (standard) .....	67
5.7	Gear units delivered with oil fill (option) .....	69
5.8	Gear units with solid shaft .....	70
5.9	Couplings .....	72
5.10	Motor adapter /MA .....	74
5.11	Motor pump /ONP .....	79
5.12	Motor pump/ONP1L .....	79
5.13	Motor pump/ONP1 .....	79
5.14	Fan /FAN .....	80
5.15	Limit temperature for gear unit start .....	80
5.16	Oil heater .....	81
5.17	Water cooling cartridge .....	88
5.18	Torque arm .....	93
5.19	Flange-mounted gear units .....	96
5.20	Output shaft as hollow shaft with shrink disk .....	97
5.21	Gear unit with splining .....	104
5.22	Oil-water cooler for splash lubrication /OWC .....	107
5.23	Oil-air cooler for splash lubrication /OAC .....	107
5.24	Oil-water cooler for pressure lubrication /OWP .....	107
5.25	Oil-air cooler for pressure lubrication /OAP .....	107
5.26	Pressure switch /PS .....	108
5.27	Temperature sensor /PT100 .....	109
5.28	Temperature switch /NTB .....	110
5.29	Temperature switch /TSK .....	111
<b>6</b>	<b>Startup .....</b>	<b>112</b>



6.1	Important notes .....	112
6.2	Shaft end pump /SEP .....	114
6.3	Motor pump /ONP .....	115
6.4	Motor pump/ONP1L .....	115
6.5	Motor pump/ONP1 .....	115
6.6	Water cooling cartridge /CCT .....	116
6.7	Oil heater /OH .....	116
6.8	Starting up the gear unit at low ambient temperatures .....	117
6.9	Backstop /BS .....	118
6.10	Measuring surface and oil temperature .....	119
6.11	Oil-water cooler for splash lubrication/OWC .....	120
6.12	Oil-air cooler for splash lubrication /OAC .....	120
6.13	Oil-water cooler for pressure lubrication /OWP .....	120
6.14	Oil-air cooler for pressure lubrication/OAP .....	120
6.15	Gear unit shutdown / gear unit conservation .....	121
<b>7</b>	<b>Inspection/maintenance .....</b>	<b>123</b>
7.1	Preliminary work regarding inspection and maintenance .....	123
7.2	Inspection and maintenance intervals .....	124
7.3	Lubricant change intervals .....	126
7.4	Checking the oil level .....	127
7.5	Checking the oil consistency .....	131
7.6	Changing the oil .....	132
7.7	Checking and cleaning the breather .....	135
7.8	Refilling grease .....	138
7.9	Oil heater /OH .....	140
7.10	Water cooling cartridge /CCT .....	141
7.11	Fan /FAN .....	144
7.12	Motor pump /ONP .....	144
7.13	Motor pump/ONP1L .....	144
7.14	Motor pump/ONP1 .....	144
7.15	Oil-water cooler for splash lubrication /OWC .....	145
7.16	Oil-air cooler for splash lubrication /OAC .....	145
7.17	Oil-water cooler for pressure lubrication /OWP .....	146
7.18	Oil-air cooler for pressure lubrication /OAP .....	146
7.19	Shaft end pump /SEP .....	146
<b>8</b>	<b>Permitted lubricants .....</b>	<b>147</b>
8.1	Lubricant selection .....	147
8.2	Structure of the tables and abbreviations .....	148
8.3	Explanation of the various lubricants .....	149
8.4	Explanation of the oil supply systems and the oil viscosity .....	149
8.5	Lubricant tables .....	150
8.6	Lubricant fill quantities .....	153
8.7	Sealing greases/rolling bearing greases .....	154
<b>9</b>	<b>Malfunctions/remedy .....</b>	<b>155</b>
9.1	Troubleshooting information .....	155



9.2 Service ..... 155

9.3 Possible malfunctions/remedy ..... 155

9.4 Waste disposal..... 158

**10 Address list ..... 159**

**Index ..... 170**



## 1 General information

### 1.1 About the operating instructions

Operating instructions are an integral part of the product and contain important information for operation and service. The operating instructions are written for all employees who assemble, install, start up, and service the product.

The operating instructions must be legible and accessible at all times. Ensure that persons responsible for the machinery and its operation as well as persons who work on the device independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation or require further information, please contact SEW-EURODRIVE.

### 1.2 Structure of the safety notes

#### 1.2.1 Meaning of signal words

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

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

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

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

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



##### **SIGNAL WORD**

Type and source of hazard.







Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.



### Meaning of the hazard symbols

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

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

#### 1.2.3 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

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



### **1.3 Rights to claim under limited warranty**

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

### **1.4 Exclusion of liability**

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

### **1.5 Copyright notice**

© 2016 SEW-EURODRIVE. All rights reserved. Unauthorized reproduction, modification, distribution or any other use of the whole or any part of this documentation is strictly prohibited.



## 2 Safety notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The user must ensure that the basic safety notes are read and observed. Ensure that persons responsible for the machinery and its operation as well as persons who work on the unit independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation, or if you require further information, please contact SEW-EURODRIVE.

### 2.1 Preliminary remark

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

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

### 2.2 General



#### ▲ WARNING

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

Severe or fatal injuries

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

Refer to the documentation for additional information.



## 2.3 Target group

Specialist for mechanical work	<p>Any mechanical work may only be performed by adequately qualified personnel. Qualified personnel in the context of this documentation are persons familiar with the design, mechanical installation, troubleshooting and maintenance of the product, who possess the following qualifications:</p> <ul style="list-style-type: none"> <li>• Qualification in the field of mechanics according to applicable national regulation.</li> <li>• They are familiar with this documentation</li> </ul>
Specialist for electrotechnical work	<p>Any electronic work may only be performed by adequately skilled persons (electrically). Qualified electricians in the context of this documentation are persons familiar with electrical installation, startup, troubleshooting and servicing of the product who possess the following qualifications:</p> <ul style="list-style-type: none"> <li>• Qualification in the field of electrical engineering according to applicable national regulation.</li> <li>• They are familiar with this documentation</li> </ul>
Instructed persons	<p>All work in the areas of transportation, storage, operation and waste disposal must be carried out by persons who are trained appropriately. The purpose of the instruction is that the persons are capable of performing the required tasks and work steps in a safe and correct manner.</p> <p>All qualified personnel must wear appropriate protective clothing.</p>

## 2.4 Designated use

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

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

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

## 2.5 Other applicable documentation

The following documentation and documents should also be observed:

- Catalog P-X series
- Order documents, e.g. dimension sheet, order confirmation, etc.
- If required, the "AC Motors" operating instructions
- Operating instructions of the options installed, if required



## 2.6 Safety symbols on the gear unit




## ▲ CAUTION

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









Risk of injury due to illegible symbols.

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

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




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



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







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

Meaning	
<b>The brake is not set at the factory.</b>	
 <p>18855199</p>	<p><b>VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE</b></p> <p><b>DE Die Bremse ist ab Werk nicht eingestellt.</b> Mögliche Sachschäden! • Bremse vor der Inbetriebnahme gemäß Betriebsanleitung einstellen</p>
	<p><b>EN The brake has not been set at the factory</b> Potential damage to property! • Prior to startup, set the brake according to the operating instructions.</p>
	<p><b>F Le frein n'est pas réglé d'usine</b> Risque de dommages matériels ! • Avant la mise en service, régler le frein conformément aux instructions de la notice d'exploitation.</p>
	<p><b>ES El freno no viene ajustado de fábrica.</b> ¡Posibles daños materiales! • Antes de la puesta en marcha, ajustar el freno según las instrucciones de funcionamiento.</p>
 <p>18977405</p>	<p><b>NL De rem is niet af fabriek ingesteld.</b> Mogelijke materiële schade! • Rem voor de inbedrijfstelling conform technische handleiding instellen.</p>
	<p><b>PL Hamulec nie jest ustawiony fabrycznie.</b> Możliwe szkody materialne! • Przed uruchomieniem należy ustawić hamulec zgodnie z wytycznymi z instrukcji obsługi.</p>
	<p><b>DE Kupplung wird ohne Fett geliefert.</b> Mögliche Sachschäden! • Vor der Inbetriebnahme Kupplung mit Fett befüllen.</p>
	<p><b>EN Coupling delivered without grease</b> Possible damage to property. • Fill coupling with grease prior to startup.</p>
 <p>18977405</p>	<p><b>ES El acoplamiento se suministra sin grasa.</b> ¡Posibles daños materiales! • Llenar el acoplamiento con grasa antes de la puesta en marcha.</p>
	<p><b>PL Sprzęgło jest dostarczane bez smaru.</b> Możliwe szkody materialne! • Przed uruchomieniem należy wypełnić sprzęgło smarem.</p>
	<p><b>NL Koppeling wordt zonder vet geleverd.</b> Mogelijke materiële schade! • Koppeling vóór de inbedrijfstelling met vet vullen.</p>
	<p><b>F L'accouplement est livré sans graisse.</b> Risque de dommages matériels ! • Avant la mise en service, remplir l'accouplement de graisse.</p>


9007204570571147

9007204570573323



Meaning							
<b>The coupling is supplied without oil.</b>							
<div style="border: 1px solid black; padding: 10px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 10px;"> <span>VORSICHT</span> <span>NOTICE</span> <span>ATTENTION</span> <span>PRECAUCIÓN</span> <span>VOORZICHTIG</span> <span>OSTROŻNIE</span> </div> <div style="display: flex;"> <div style="flex: 1; padding-right: 10px;">   <p>18977413</p> </div> <div style="flex: 4;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px; vertical-align: top;"> <p><b>(DE)</b> Kupplung wird ohne Öl geliefert. Mögliche Sachschäden!</p> <ul style="list-style-type: none"> <li>• Vor der Inbetriebnahme Kupplung mit Öl befüllen.</li> </ul> </td><td style="width: 50%; padding: 5px; vertical-align: top;"> <p><b>(EN)</b> Coupling delivered without oil Possible damage to property.</p> <ul style="list-style-type: none"> <li>• Fill coupling with oil prior to startup.</li> </ul> </td></tr> <tr> <td style="padding: 5px; vertical-align: top;"> <p><b>(F)</b> L'accouplement est livré sans huile. Risque de dommages matériels !</p> <ul style="list-style-type: none"> <li>• Avant la mise en service, remplir l'accouplement d'huile.</li> </ul> </td><td style="padding: 5px; vertical-align: top;"> <p><b>(ES)</b> El acoplamiento se suministra sin aceite. ¡Posibles daños materiales!</p> <ul style="list-style-type: none"> <li>• Llenar el acoplamiento con aceite antes de la puesta en marcha.</li> </ul> </td></tr> <tr> <td style="padding: 5px; vertical-align: top;"> <p><b>(NL)</b> Koppeling wordt zonder olie geleverd. Mogelijke materiële schade!</p> <ul style="list-style-type: none"> <li>• Koppeling vóór de inbedrijfstelling met olie vullen.</li> </ul> </td><td style="padding: 5px; vertical-align: top;"> <p><b>(PL)</b> Sprzęgło jest dostarczane bez oleju. Możliwe szkody materialne!</p> <ul style="list-style-type: none"> <li>• Przed uruchomieniem należy wypełnić sprzęgło olejem.</li> </ul> </td></tr> </table> </div> </div> </div>		<p><b>(DE)</b> Kupplung wird ohne Öl geliefert. Mögliche Sachschäden!</p> <ul style="list-style-type: none"> <li>• Vor der Inbetriebnahme Kupplung mit Öl befüllen.</li> </ul>	<p><b>(EN)</b> Coupling delivered without oil Possible damage to property.</p> <ul style="list-style-type: none"> <li>• Fill coupling with oil prior to startup.</li> </ul>	<p><b>(F)</b> L'accouplement est livré sans huile. Risque de dommages matériels !</p> <ul style="list-style-type: none"> <li>• Avant la mise en service, remplir l'accouplement d'huile.</li> </ul>	<p><b>(ES)</b> El acoplamiento se suministra sin aceite. ¡Posibles daños materiales!</p> <ul style="list-style-type: none"> <li>• Llenar el acoplamiento con aceite antes de la puesta en marcha.</li> </ul>	<p><b>(NL)</b> Koppeling wordt zonder olie geleverd. Mogelijke materiële schade!</p> <ul style="list-style-type: none"> <li>• Koppeling vóór de inbedrijfstelling met olie vullen.</li> </ul>	<p><b>(PL)</b> Sprzęgło jest dostarczane bez oleju. Możliwe szkody materialne!</p> <ul style="list-style-type: none"> <li>• Przed uruchomieniem należy wypełnić sprzęgło olejem.</li> </ul>
<p><b>(DE)</b> Kupplung wird ohne Öl geliefert. Mögliche Sachschäden!</p> <ul style="list-style-type: none"> <li>• Vor der Inbetriebnahme Kupplung mit Öl befüllen.</li> </ul>	<p><b>(EN)</b> Coupling delivered without oil Possible damage to property.</p> <ul style="list-style-type: none"> <li>• Fill coupling with oil prior to startup.</li> </ul>						
<p><b>(F)</b> L'accouplement est livré sans huile. Risque de dommages matériels !</p> <ul style="list-style-type: none"> <li>• Avant la mise en service, remplir l'accouplement d'huile.</li> </ul>	<p><b>(ES)</b> El acoplamiento se suministra sin aceite. ¡Posibles daños materiales!</p> <ul style="list-style-type: none"> <li>• Llenar el acoplamiento con aceite antes de la puesta en marcha.</li> </ul>						
<p><b>(NL)</b> Koppeling wordt zonder olie geleverd. Mogelijke materiële schade!</p> <ul style="list-style-type: none"> <li>• Koppeling vóór de inbedrijfstelling met olie vullen.</li> </ul>	<p><b>(PL)</b> Sprzęgło jest dostarczane bez oleju. Możliwe szkody materialne!</p> <ul style="list-style-type: none"> <li>• Przed uruchomieniem należy wypełnić sprzęgło olejem.</li> </ul>						
9007204571876363							
<b>The gear unit is protected against corrosion with VCI.</b>							
<div style="border: 1px solid black; padding: 10px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 10px;"> <span>VORSICHT</span> <span>NOTICE</span> <span>ATTENTION</span> <span>PRECAUCIÓN</span> <span>VOORZICHTIG</span> <span>OSTROŻNIE</span> </div> <div style="display: flex;"> <div style="flex: 1; padding-right: 10px;">   <p>18977421</p> </div> <div style="flex: 4;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px; vertical-align: top;"> <p><b>(DE)</b> Getriebe ist mit VCI rostgeschützt. Nicht öffnen! Mögliche Sachschäden!</p> <ul style="list-style-type: none"> <li>• Vor der Inbetriebnahme Vorarbeiten gemäß Betriebsanleitung durchführen.</li> <li>• Keine offene Flamme!</li> </ul> </td><td style="width: 50%; padding: 5px; vertical-align: top;"> <p><b>(EN)</b> Gear unit with VCI corrosion protection. Do not open! Potential damage to property!</p> <ul style="list-style-type: none"> <li>• Prior to startup, perform preliminary work according to operating instructions</li> <li>• No open flames!</li> </ul> </td></tr> <tr> <td style="padding: 5px; vertical-align: top;"> <p><b>(F)</b> Réducteur protégé contre la corrosion avec VCI. Ne pas ouvrir Risque de dommages matériels !</p> <ul style="list-style-type: none"> <li>• Avant la mise en service, réaliser les travaux préliminaires indiqués dans la notice d'exploitation.</li> <li>• Pas de flammes ouvertes !</li> </ul> </td><td style="padding: 5px; vertical-align: top;"> <p><b>(ES)</b> Reductor está protegido con VCI contra la corrosión. ¡No abrir! ¡Posibles daños materiales!</p> <ul style="list-style-type: none"> <li>• Antes de la puesta en marcha, efectuar los trabajos preparatorios según las instrucciones de funcionamiento.</li> <li>• No debe haber fuego abierto.</li> </ul> </td></tr> <tr> <td style="padding: 5px; vertical-align: top;"> <p><b>(NL)</b> Tandwielkast is met VCI tegen corrosie beschermd. Niet openen! Mogelijke materiële schade!</p> <ul style="list-style-type: none"> <li>• Vóór de inbedrijfstelling voorbereidingen conform technische handleiding uitvoeren.</li> <li>• Geen open vuur!</li> </ul> </td><td style="padding: 5px; vertical-align: top;"> <p><b>(PL)</b> Przekładnia zabezpieczona jest przed korozją za pomocą środka VCI. Nie otwierać! Możliwe szkody materialne!</p> <ul style="list-style-type: none"> <li>• Przed uruchomieniem należy przeprowadzić czynności przygotowawcze zgodnie z informacjami zawartymi w instrukcji obsługi!</li> <li>• Unikać otwartych płomieni!</li> </ul> </td></tr> </table> </div> </div> </div>		<p><b>(DE)</b> Getriebe ist mit VCI rostgeschützt. Nicht öffnen! Mögliche Sachschäden!</p> <ul style="list-style-type: none"> <li>• Vor der Inbetriebnahme Vorarbeiten gemäß Betriebsanleitung durchführen.</li> <li>• Keine offene Flamme!</li> </ul>	<p><b>(EN)</b> Gear unit with VCI corrosion protection. Do not open! Potential damage to property!</p> <ul style="list-style-type: none"> <li>• Prior to startup, perform preliminary work according to operating instructions</li> <li>• No open flames!</li> </ul>	<p><b>(F)</b> Réducteur protégé contre la corrosion avec VCI. Ne pas ouvrir Risque de dommages matériels !</p> <ul style="list-style-type: none"> <li>• Avant la mise en service, réaliser les travaux préliminaires indiqués dans la notice d'exploitation.</li> <li>• Pas de flammes ouvertes !</li> </ul>	<p><b>(ES)</b> Reductor está protegido con VCI contra la corrosión. ¡No abrir! ¡Posibles daños materiales!</p> <ul style="list-style-type: none"> <li>• Antes de la puesta en marcha, efectuar los trabajos preparatorios según las instrucciones de funcionamiento.</li> <li>• No debe haber fuego abierto.</li> </ul>	<p><b>(NL)</b> Tandwielkast is met VCI tegen corrosie beschermd. Niet openen! Mogelijke materiële schade!</p> <ul style="list-style-type: none"> <li>• Vóór de inbedrijfstelling voorbereidingen conform technische handleiding uitvoeren.</li> <li>• Geen open vuur!</li> </ul>	<p><b>(PL)</b> Przekładnia zabezpieczona jest przed korozją za pomocą środka VCI. Nie otwierać! Możliwe szkody materialne!</p> <ul style="list-style-type: none"> <li>• Przed uruchomieniem należy przeprowadzić czynności przygotowawcze zgodnie z informacjami zawartymi w instrukcji obsługi!</li> <li>• Unikać otwartych płomieni!</li> </ul>
<p><b>(DE)</b> Getriebe ist mit VCI rostgeschützt. Nicht öffnen! Mögliche Sachschäden!</p> <ul style="list-style-type: none"> <li>• Vor der Inbetriebnahme Vorarbeiten gemäß Betriebsanleitung durchführen.</li> <li>• Keine offene Flamme!</li> </ul>	<p><b>(EN)</b> Gear unit with VCI corrosion protection. Do not open! Potential damage to property!</p> <ul style="list-style-type: none"> <li>• Prior to startup, perform preliminary work according to operating instructions</li> <li>• No open flames!</li> </ul>						
<p><b>(F)</b> Réducteur protégé contre la corrosion avec VCI. Ne pas ouvrir Risque de dommages matériels !</p> <ul style="list-style-type: none"> <li>• Avant la mise en service, réaliser les travaux préliminaires indiqués dans la notice d'exploitation.</li> <li>• Pas de flammes ouvertes !</li> </ul>	<p><b>(ES)</b> Reductor está protegido con VCI contra la corrosión. ¡No abrir! ¡Posibles daños materiales!</p> <ul style="list-style-type: none"> <li>• Antes de la puesta en marcha, efectuar los trabajos preparatorios según las instrucciones de funcionamiento.</li> <li>• No debe haber fuego abierto.</li> </ul>						
<p><b>(NL)</b> Tandwielkast is met VCI tegen corrosie beschermd. Niet openen! Mogelijke materiële schade!</p> <ul style="list-style-type: none"> <li>• Vóór de inbedrijfstelling voorbereidingen conform technische handleiding uitvoeren.</li> <li>• Geen open vuur!</li> </ul>	<p><b>(PL)</b> Przekładnia zabezpieczona jest przed korozją za pomocą środka VCI. Nie otwierać! Możliwe szkody materialne!</p> <ul style="list-style-type: none"> <li>• Przed uruchomieniem należy przeprowadzić czynności przygotowawcze zgodnie z informacjami zawartymi w instrukcji obsługi!</li> <li>• Unikać otwartych płomieni!</li> </ul>						
9007204570575499							






















Meaning		
Gear unit is supplied without oil.		
VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE		
<div><b>SEW</b> <b>EURODRIVE</b></div> <div></div>	<div><b>(DE)</b> <b>Getriebe wird ohne Öl geliefert.</b> Mögliche Sachschäden! <ul style="list-style-type: none"><li>• Vor der Inbetriebnahme Ölbefüllung gemäß Betriebsanleitung durchführen.</li></ul></div>	<div><b>(EN)</b> <b>Gear unit is delivered without oil.</b> Potential damage to property! <ul style="list-style-type: none"><li>• Prior to startup, fill in oil according to operating instructions.</li></ul></div>
	<div><b>(F)</b> <b>Le réducteur ne contient pas d'huile à la livraison.</b> Dommages matériels possibles ! <ul style="list-style-type: none"><li>• Avant la mise en service, effectuer le remplissage d'huile conformément à la notice d'exploitation.</li></ul></div>	<div><b>(ES)</b> <b>El reductor se suministra sin aceite.</b> ¡Posibles daños materiales! <ul style="list-style-type: none"><li>• Antes de la puesta en marcha, efectuar el llenado de aceite según las instrucciones de funcionamiento.</li></ul></div>
	<div><b>(NL)</b> <b>Tandwielkast wordt zonder olie geleverd.</b> Mogelijke materiële schade! <ul style="list-style-type: none"><li>• Vóór de inbedrijfstelling olie conform technische handleiding bijvullen.</li></ul></div>	<div><b>(PL)</b> <b>Przekładnia jest dostarczana bez oleju.</b> Możliwe szkody materialne! <ul style="list-style-type: none"><li>• Przed uruchomieniem należy wlać olej zgodnie z informacjami zawartymi w instrukcji obsługi.</li></ul></div>
18977383	9007204570577675	





## 2.7 Safety symbols on the dimension sheet

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

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



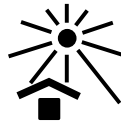
Safety symbol	Meaning
	Indicates the position of the <b>oil heater</b> .
	Indicates the <b>oil level plug</b> .

## 2.8 Symbols on the packaging

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



Fragile



Protect  
from heat



Fasten  
here



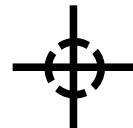
Hand hooks  
prohibited



Up



Keep dry



Center of gravity

1811486091



## 2.9 Transport

### 2.9.1 General information



#### **▲ WARNING**

Suspended loads can fall.

Severe or fatal injuries.

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



#### **▲ WARNING**

Lifted loads may fall over.

Severe or fatal injuries.

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



#### **▲ CAUTION**

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

Potential risk of crushing due to falling parts.

- Secure the mount-on components.



#### **▲ CAUTION**

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

Minor injuries.

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



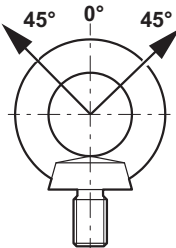
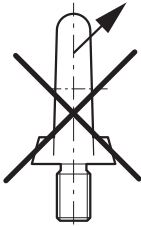
**NOTICE**

Improper transport can damage the gear unit.

Possible damage to property.

- Note the following information.

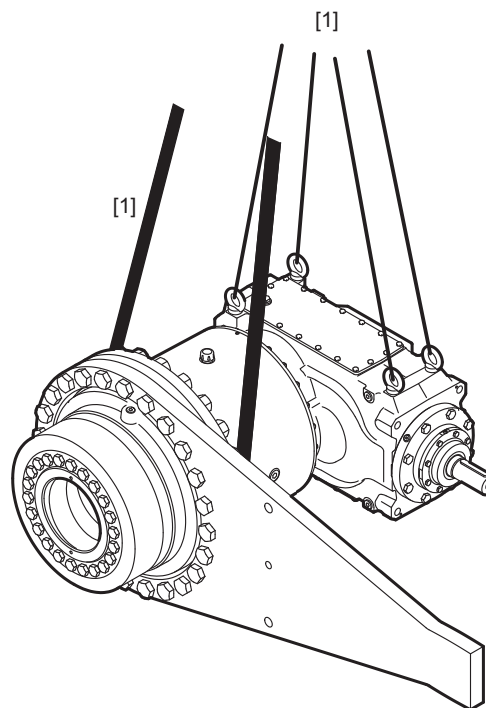
- Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. It may be necessary to suspend startup.
- The weight of the gear unit (without oil) is indicated on the nameplate or on the dimension sheet. Observe the loads and specifications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

Eyebolts DIN 580/DIN 582	
Correct: Angle of tension force vector towards the ring plane, max. 45°	Incorrect: Tension away from the ring plane
	



### 2.9.2 Transport without motor

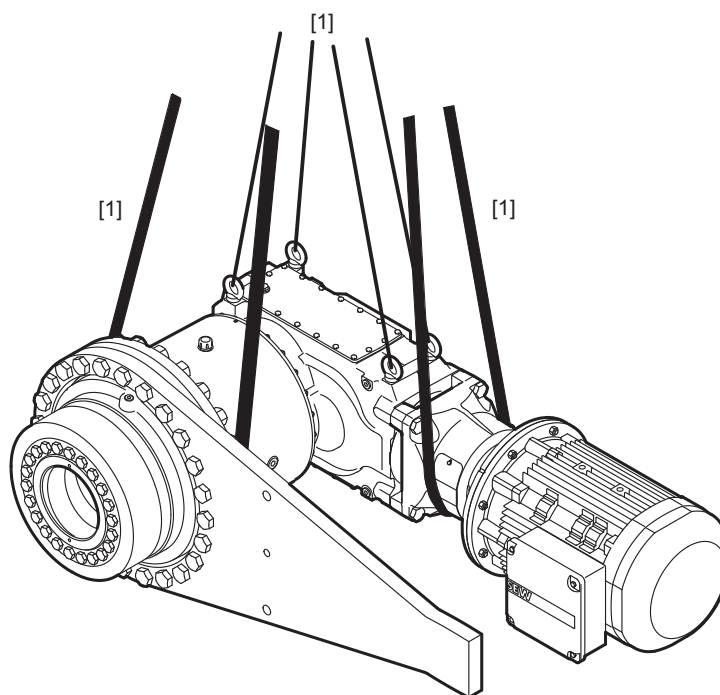
The following figure illustrates how to transport the gear unit with the provided lifting points [1].



14124642443

### 2.9.3 Transport with motor

The following figure illustrates how to transport the gear unit with the provided lifting points [1].

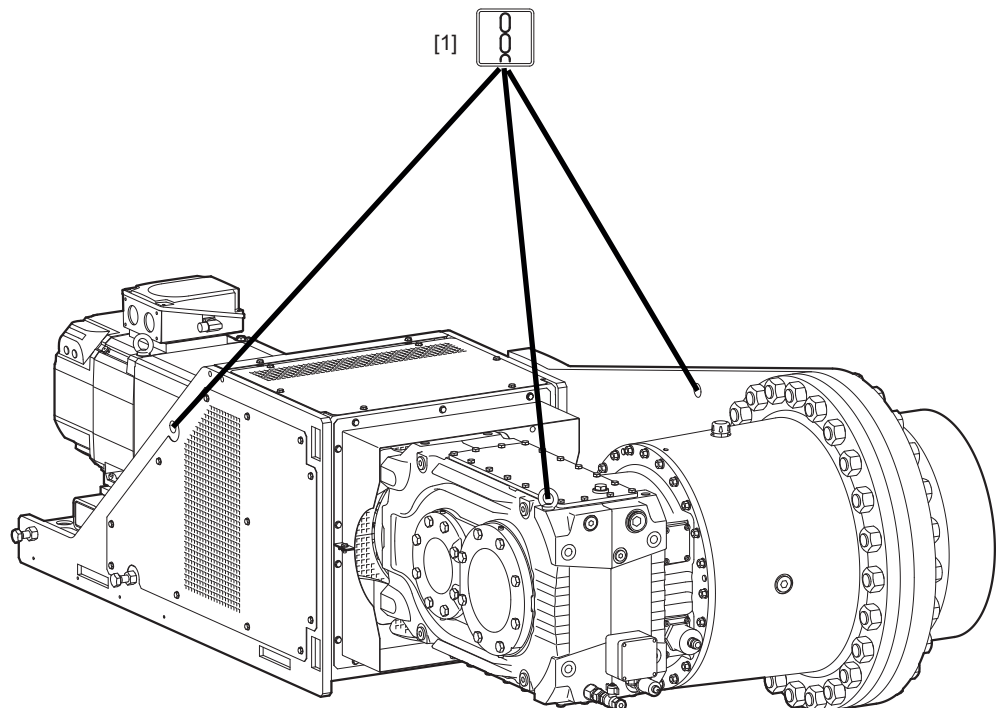


14124722571



### 2.9.4 Transport with motor scoop

The following figure illustrates how to transport the gear unit with the provided lifting points [1]. For the actual lifting points refer to the order dimension sheet.



14416502027

## 2.10 Storage and transport conditions

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

### 2.10.1 Internal conservation

#### Standard corrosion protection

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

#### Long-term corrosion protection

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

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



### 2.10.2 Exterior corrosion protection

The following measures are taken for exterior corrosion protection:

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

### 2.10.3 Packaging

#### Standard packaging

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

Use: Land transport

#### Long-term packaging

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

Use: Sea transport and/or for extended storage

### 2.10.4 Storage conditions

#### NOTICE

Improper storage may result in damages to the gear unit.

Possible damage to property.

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

#### INFORMATION



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

Corrosion protection + packaging	Storage location	Storage duration
Standard corrosion protection + Standard packaging	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < $\vartheta$ < 60 °C, < 50% relative humidity).  No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). No aggressive vapors, no shocks.	Max. 6 months with intact surface protection.



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

## INFORMATION



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



### 3 Gear unit structure

#### 3.1 P-X gear unit series

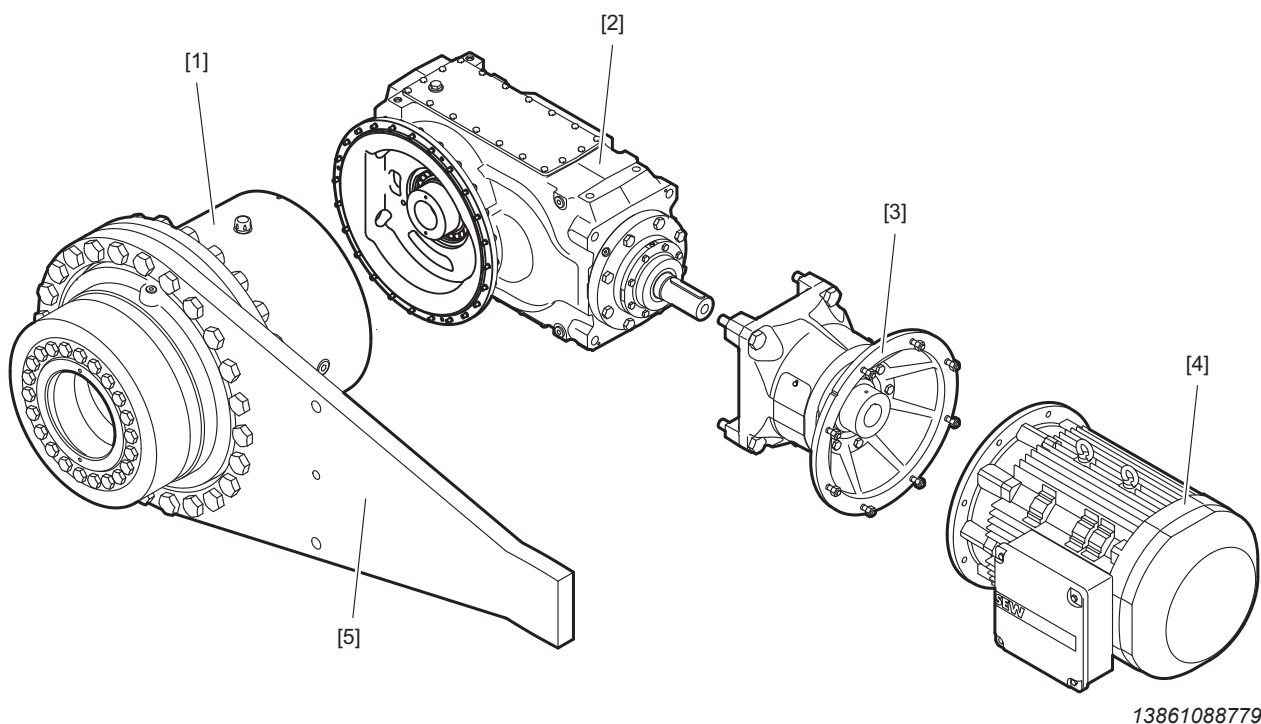
The P-X gear unit is a combination of:

- P.. planetary gear unit output stage
- X.. series primary gear unit bevel-helical gear unit
- Mount-on components: Motor, coupling and motor adapter

There are 7 sizes of P-X series gear units with rated torques from 10070 Nm to 50000 Nm.

The gear units have a **shared oil chamber**.

The following figure shows a sample combination of a planetary gear unit, a primary gear unit and a motor with torque arm design.



13861088779

- [1] Planetary gear unit
- [2] X.. series bevel-helical gear unit
- [3] Motor adapter

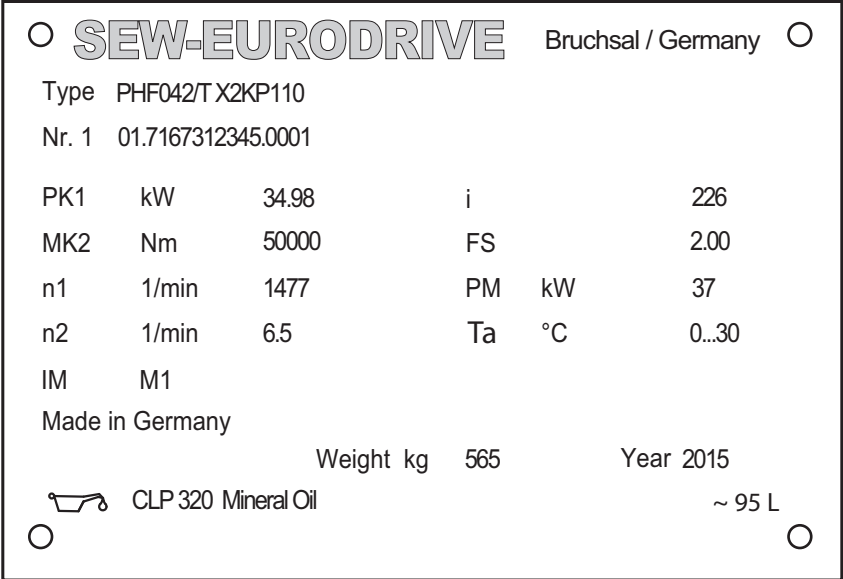
- [4] Motor
- [5] Torque arm design




3.2      Nameplate

3.2.1    P-X gear unit series

The following example shows the structure of the nameplate.



9007212064450315

Type		Type designation
No. 1		Production number
P <sub>K1</sub>	kW	Operating power on the input shaft (HSS)
M <sub>K2</sub>	Nm	Gear unit output torque
n <sub>1</sub>	1/min	Input speed (HSS)
n <sub>2</sub>	1/min	Output speed (LSS)
i		Exact gear unit ratio
F <sub>S</sub>		Service factor
P <sub>M</sub>	kW	Nominal motor power
T <sub>a</sub>	°C	Approved temperature range
IM		Mounting position
Weight	kg	Weight of the gear unit
Year		Year of manufacture
		Oil grade and viscosity class/oil quantity



### 3.3 Type designation

The type designation is set up as follows:

<b>PHF042 /T X2KP110/HP/F</b>	
<b>P..</b>	P.. series planetary gear unit
<b>PH..</b>	Foot-mounted design, hollow shaft with shrink disk
<b>PF..</b>	Flange-mounted design, solid shaft
<b>PHF..</b>	Flange-mounted design, hollow shaft with shrink disk
<b>042</b>	Size
<b>/T</b>	Torque arm
<b>X2KP</b>	X series bevel-helical gear unit
<b>110</b>	Size
<b>/HP</b>	Housing for planetary gear unit
<b>/F</b>	Flange-mounted design

### 3.4 Abbreviations for output shaft designs

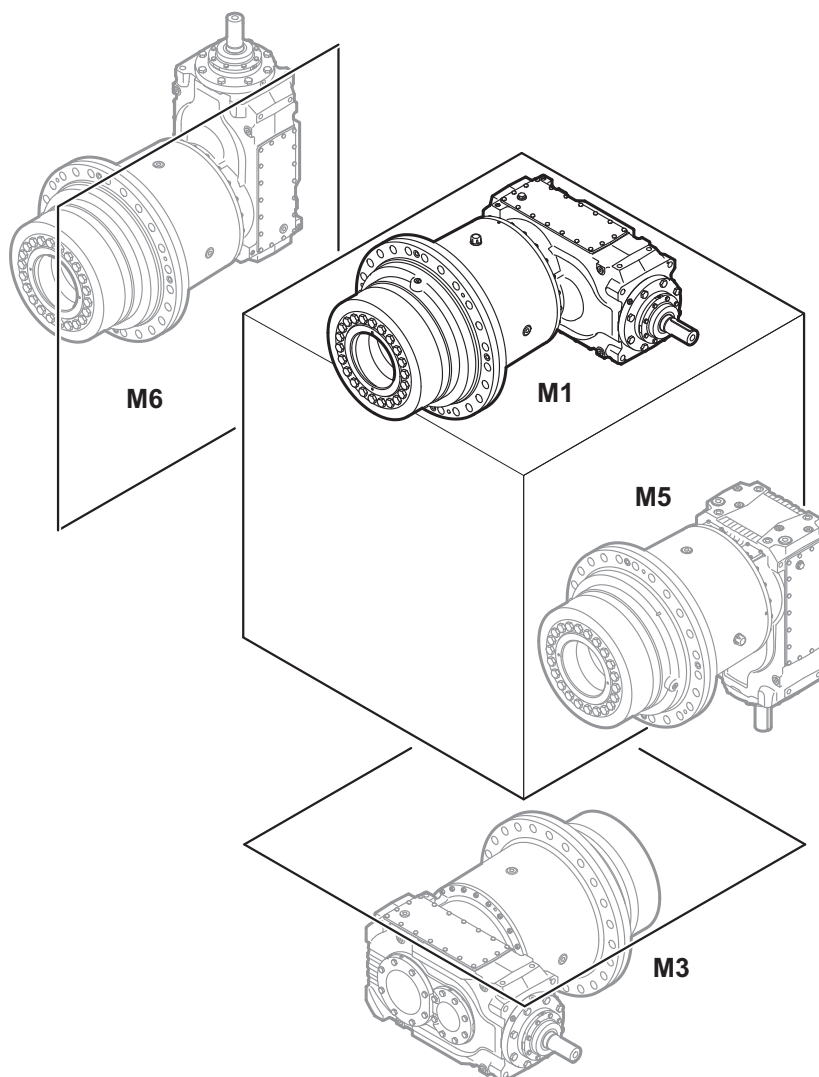
<b>Gear unit design</b>	<b>Abbreviation</b>	<b>Meaning</b>
Foot-mounted design (solid shaft)	P	<ul style="list-style-type: none"> <li>Solid shaft with key</li> <li>Solid shaft with 2 keys (optional)</li> </ul>
	PR	Solid shaft with key
	PL	Splined solid shaft
Flange-mounted design (solid shaft)	PF	<ul style="list-style-type: none"> <li>Solid shaft with key</li> <li>Solid shaft with 2 keys (optional)</li> </ul>
	PRF	Solid shaft with key
	PLF	Splined solid shaft
Foot-mounted design (hollow shaft)	PH	Hollow shaft with shrink disk
	PV	Splined hollow shaft
Flange-mounted design (hollow shaft)	PHF	Hollow shaft with shrink disk
	PVF	Splined hollow shaft



### 3.5 Mounting positions

#### 3.5.1 Standard mounting position

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



9007213115881099

### INFORMATION



Contact SEW-EURODRIVE in case of a mounting position deviating from M1.



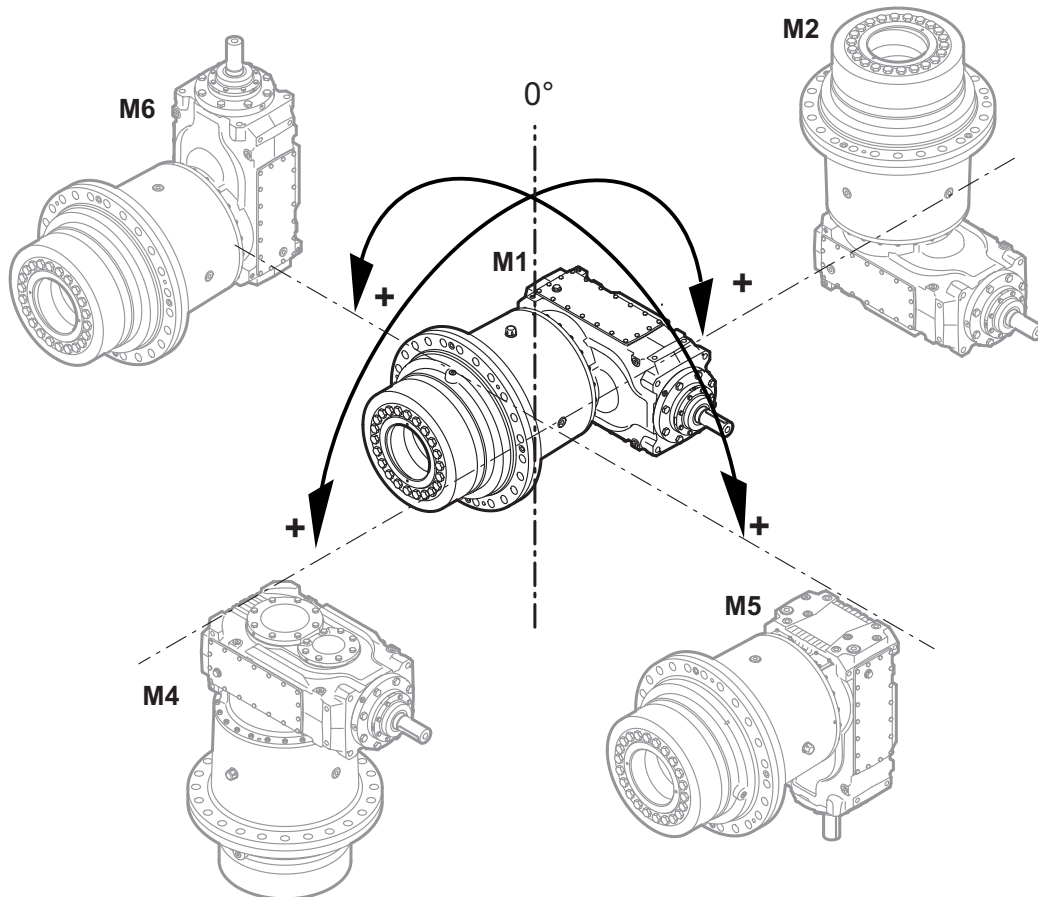
### 3.6 Fixed and variable pivoted mounting positions

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.



14442483979



### 3.6.1 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:

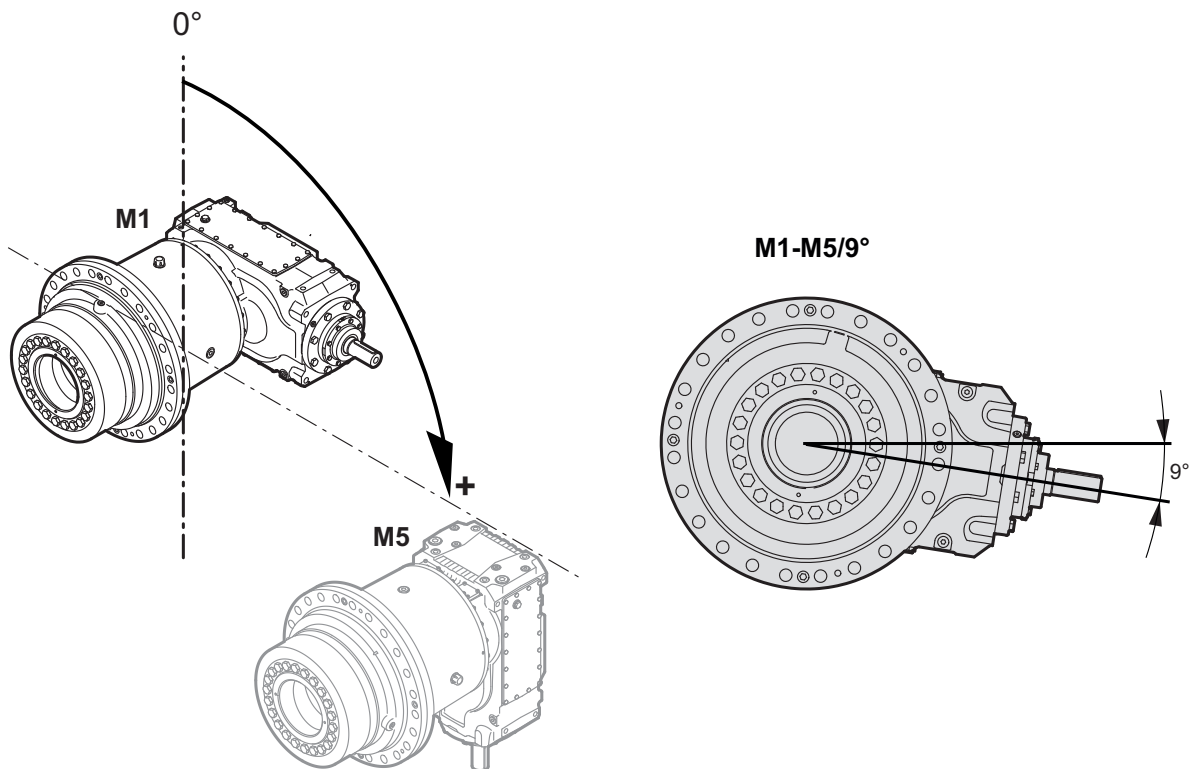
**M1** = initial mounting position

**M5** = pivoting direction

**9°** = fixed pivoting angle

Pivoted from mounting position M1 to M5 by 9°

This results in the following fixed pivoted mounting position:



9007213705011339

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



The fixed pivoted mounting position is shown on the nameplate.

SEW-EURODRIVE

Bruchsal / Germany

Type

PHF042/T X2KP110

Nr. 1

01.7167312345.0001

PK1

kW

34.98

i

226

MK2

Nm

50000

FS

2.00

n1

1/min

1477

PM

kW

37

n2

1/min

6.5

Ta

°C

0...30

IM

M1-M5/9°

Made in Germany

Weight

kg

565

Year

2015

CLP 320 Mineral Oil

~ 95 L

14618364299



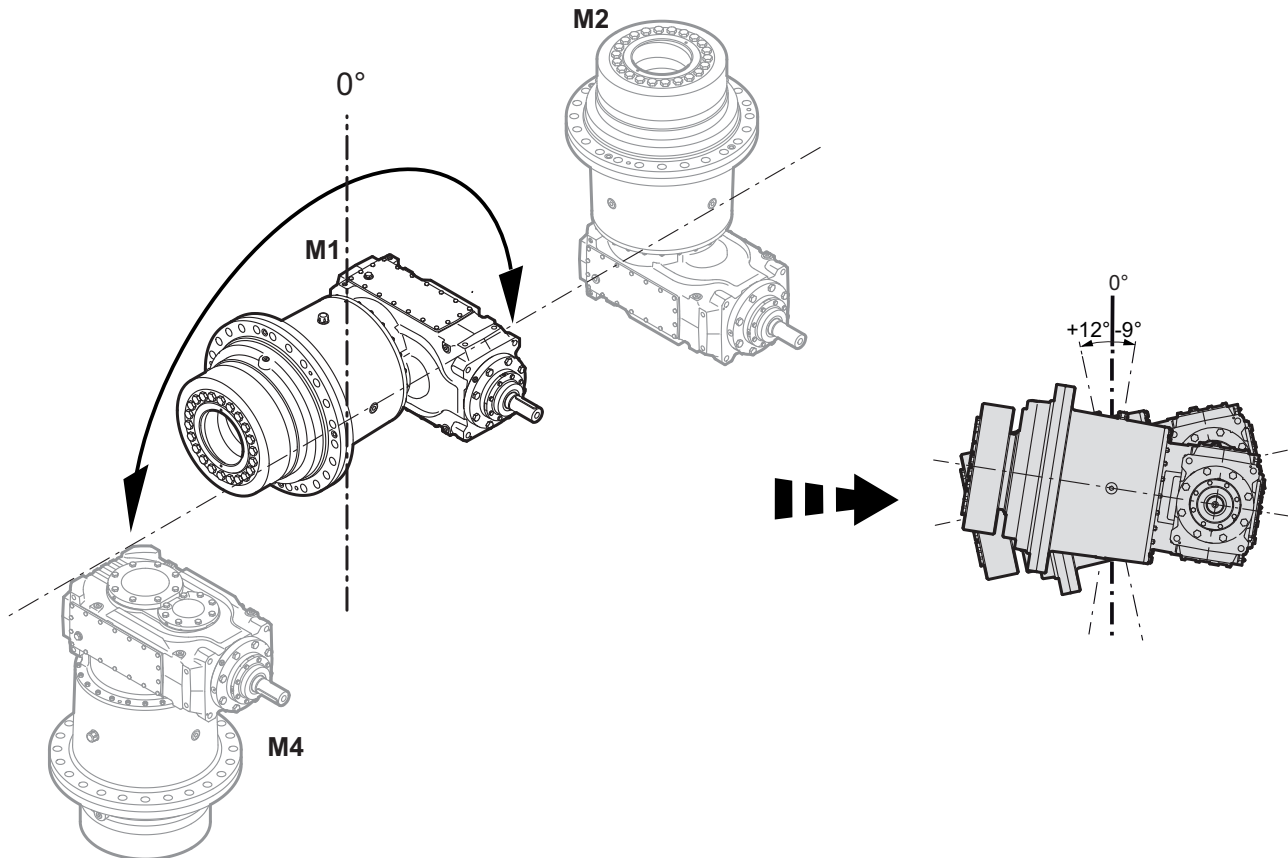
### 3.6.2 Variable pivoted mounting position

#### Definition:

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

#### Example:

The gear unit is operated in variable pivoted mounting position M1 to M2 = 9° and M1 to M4 = 12°.



14457396107

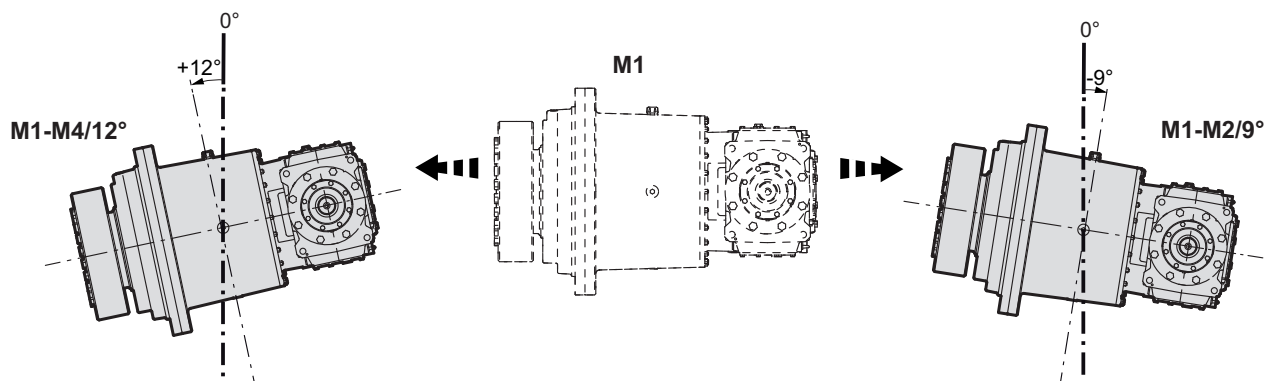
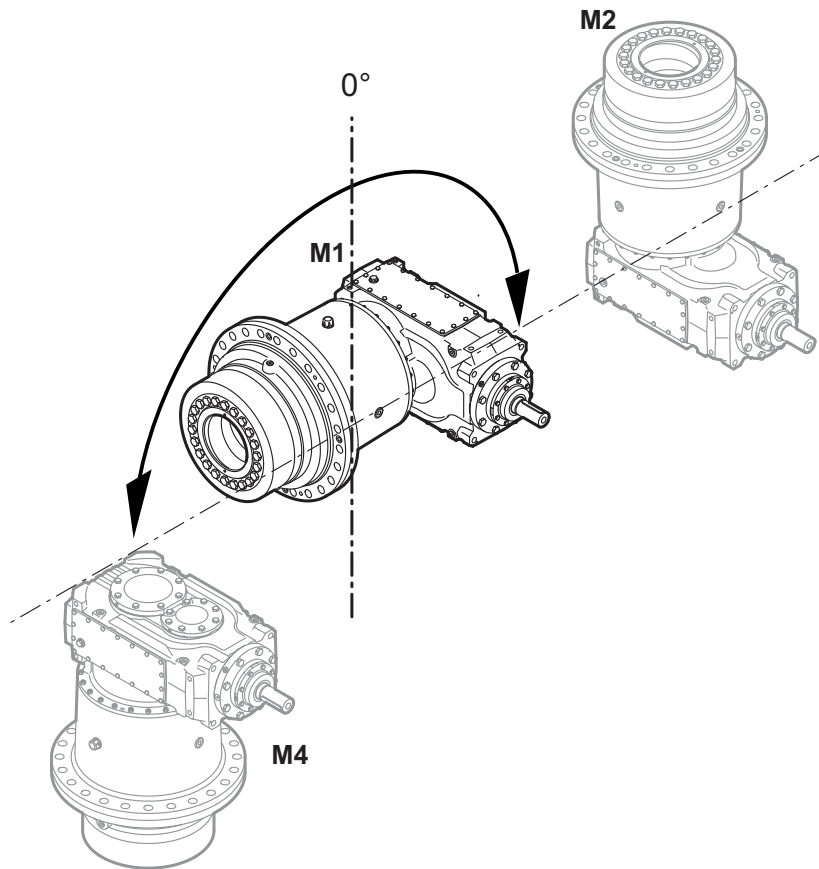
#### Step 1:

The largest pivoting angle determines the positive pivoting direction ( $12^\circ > 9^\circ$ ). In this example, this is  $12^\circ$  towards M4.

Pivoted from M1 to M4 by  $+12^\circ$



Pivoted from M1 to M2 by  $-9^\circ$



14457419019

The type designation for this example is:

**M1-M4/-9°...12°**

**M1** = Initial mounting position


**M4** = Pivoting direction

**12°** = pivoted from M1 to M4 by  $12^\circ$

**-9°** = pivoted from M1 to M2 by  $9^\circ$  (= pivoted from M1 to M4 by  $-9^\circ$ )



The variable pivoted mounting position is shown on the nameplate.



○

SEW-EURODRIVE

Bruchsal / Germany

○

Type

PHF042/T X2KP110

Nr. 1

01.7167312345.0001

PK1

kW

34.98

i

226

MK2

Nm

50000

FS

2.00

n1

1/min

1477

PM

kW

37

n2

1/min

6.5

Ta

°C

0...30

IM

M1-M4/-9°...12°

Made in Germany


Weight

kg

565

Year

2015



CLP 320 Mineral Oil

~ 95 L

○

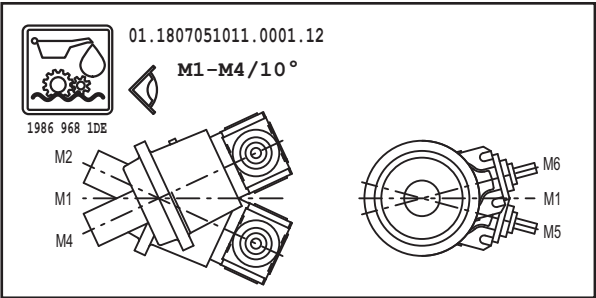
○

19149503243

#### Step 2:

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

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



14618845195



### 3.6.3 Combination of fixed and variable pivoted mounting positions

Fixed and variable pivoted mounting positions can be combined.

#### Example:

The following example shows a combination of fixed and variable pivoted mounting position.

The type designation is set up as follows:

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

**M1** = initial mounting position

**M4** = pivoting direction

**9°** = fixed pivoting angle

**M1-M6/-9°...12°** (variable pivoted mounting position)

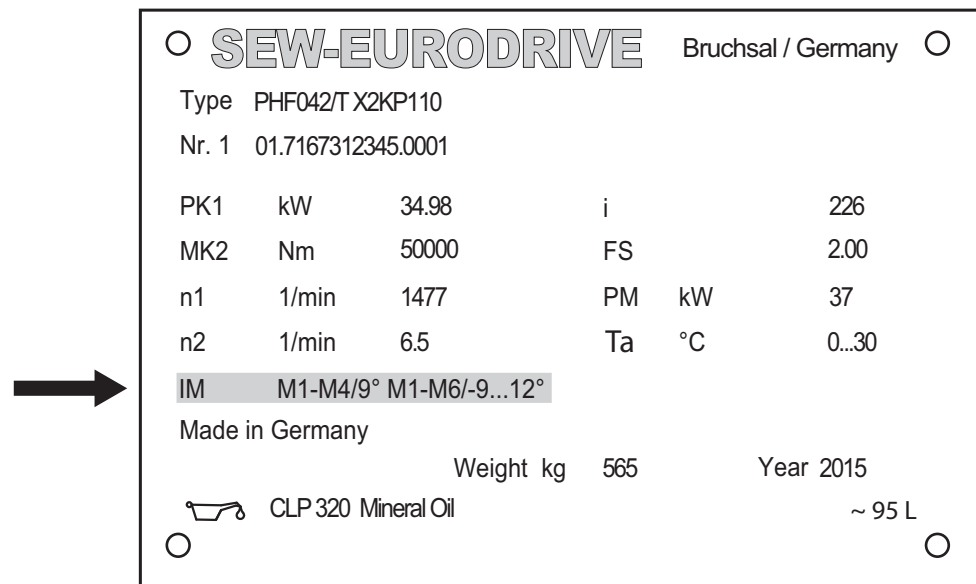
**M1** = initial mounting position

**M6** = pivoting direction

**12°** = 12° from M1 to M6

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

The fixed and variable pivoted mounting position are shown on the nameplate.



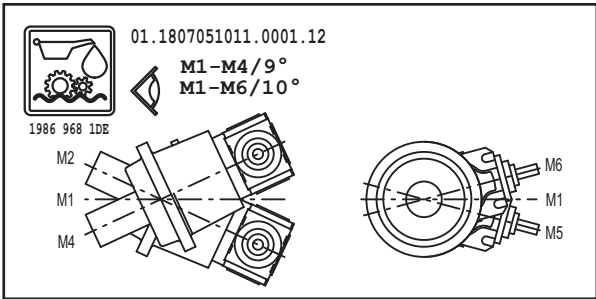
14618853899

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

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



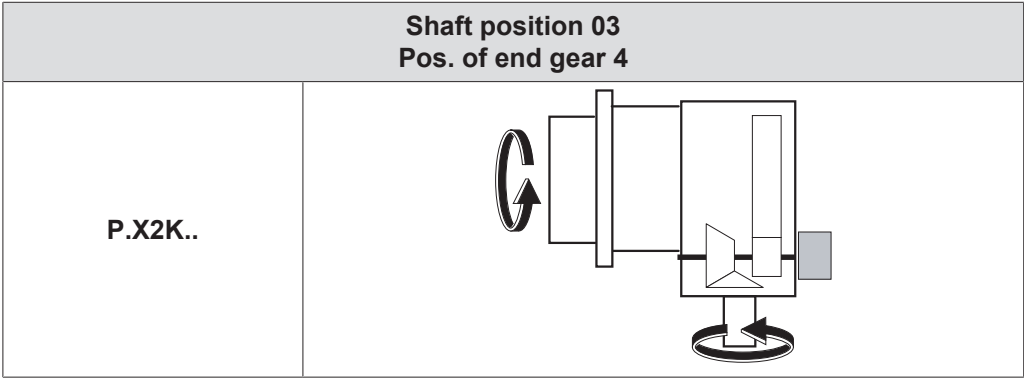
In this example, the operator checks the oil level at M1-M4/9° M1-M6/10°.



14618847627

### 3.7      Directions of rotation dependencies

The following figure shows the direction of rotation dependency between input and output shaft. The gear units as well as the position of the backstop are schematically shown.



= Position of the backstop

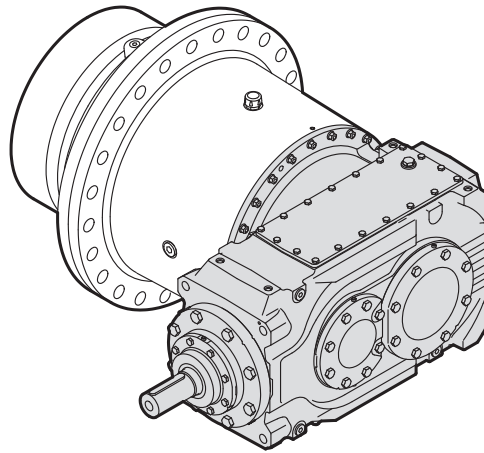


### 3.8 Mounting position of the primary gear unit

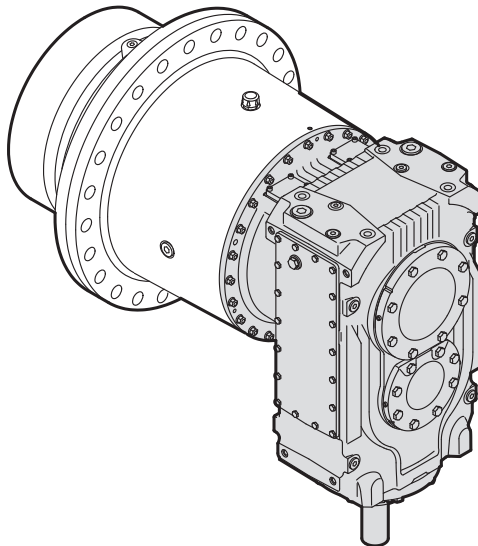
As standard, the primary gear unit can be mounted in the mounting positions **0°**, **90°**, **180°** and **270°**.

The following figure shows the planetary gear unit in mounting position M1. For additional information on the mounting position, refer to chapter "Mounting position" (→ 28).

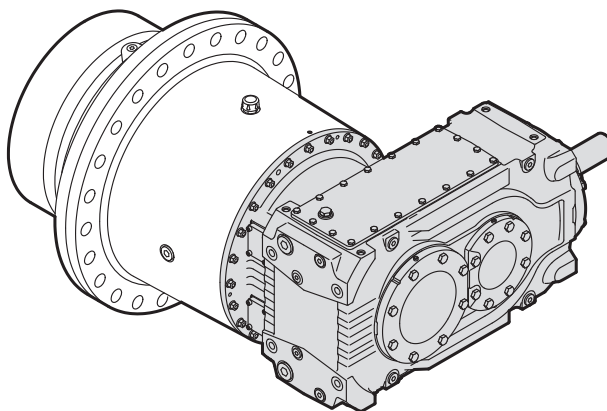
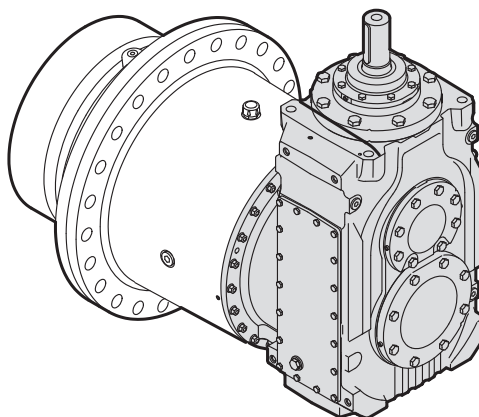
**Primary gear unit mounting position 0°**



**Primary gear unit mounting position 90°**





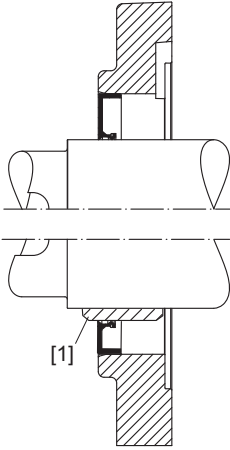
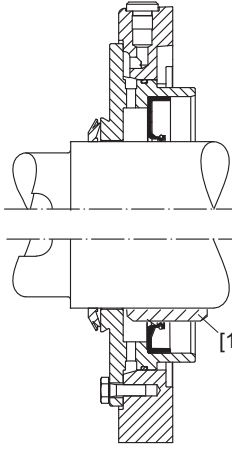
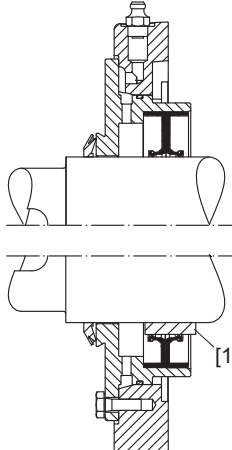
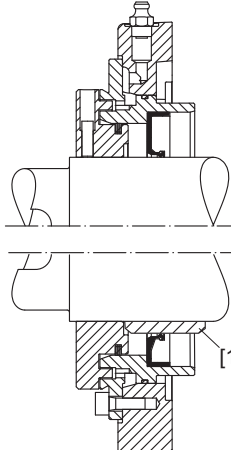
**Primary gear unit mounting position 180°****Primary gear unit mounting position 270°****INFORMATION**

In case of mounting positions of the primary gear unit of 90° (lower input shaft) and 270° (upper input shaft) contact SEW-EURODRIVE. In this case different accessories are available.

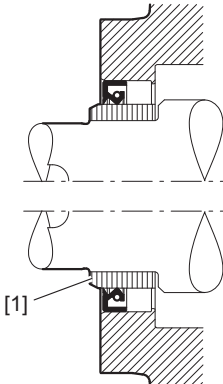
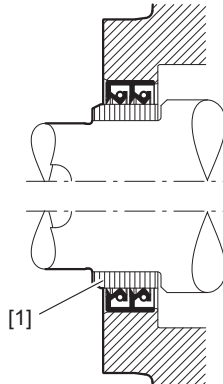
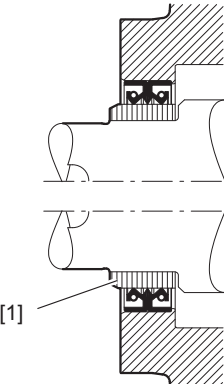
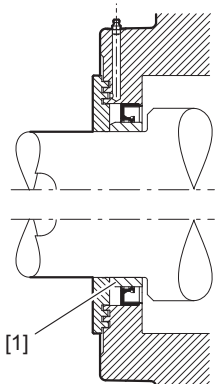


### 3.9 Sealing system

#### 3.9.1 Input shaft

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

#### 3.9.2 Output shaft

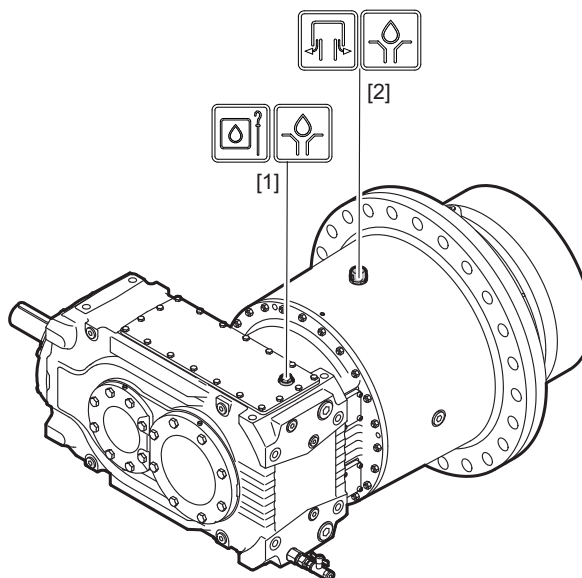
Standard for mounting positions M1/M3/M5/M6	Standard for mounting positions M1/M3/M5/M6	Standard for mounting positions M1/M3/M5/M6	Radial labyrinth seal Regreasable for mounting positions M1/M3/M5/M6
Single oil seal, inside sealing with dust protection lip on a hardened sleeve [1]	2 oil seals, inside sealing on a hardened sleeve [1]	1 oil seal, inside sealing, and 1 oil seal, outside sealing, on a hardened sleeve [1]	Single oil seal with radial labyrinth seal on a hardened sleeve [1]
• Normal environment	• <b>Medium</b> dust load with abrasive particles	• <b>High</b> dust load with abrasive particles and splash water load	• <b>Very high</b> dust load with abrasive particles
			



**3.10 Oil level check and gear unit venting**

Due to the shared oil chamber, the oil level check is performed via oil dipstick [1] at the upper inspection cover of the primary gear unit depending on the mounting position. The gear unit venting [2] is performed at the planetary gear unit.

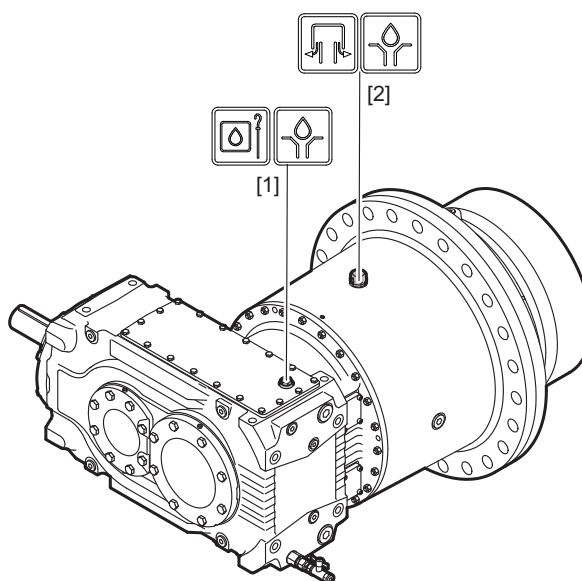
As standard, oil dipstick [1] and breather [2] are made of steel. They are available made of plastic or stainless steel as an option.



13861204619

**3.11 Oil filling**

Oil filling can be performed either via the oil dipstick bores [1] on the primary gear unit or via the breather [2] on the planetary gear unit.



13861204619

23039728/EN – 11/2016



### 3.12 Oil drain

As standard the oil drain is performed via the oil drain valve [1] at the primary gear unit.

In case a complete oil drain is required, additional screw plugs [2] at the planetary gear unit or the primary gear unit [3] can be used.

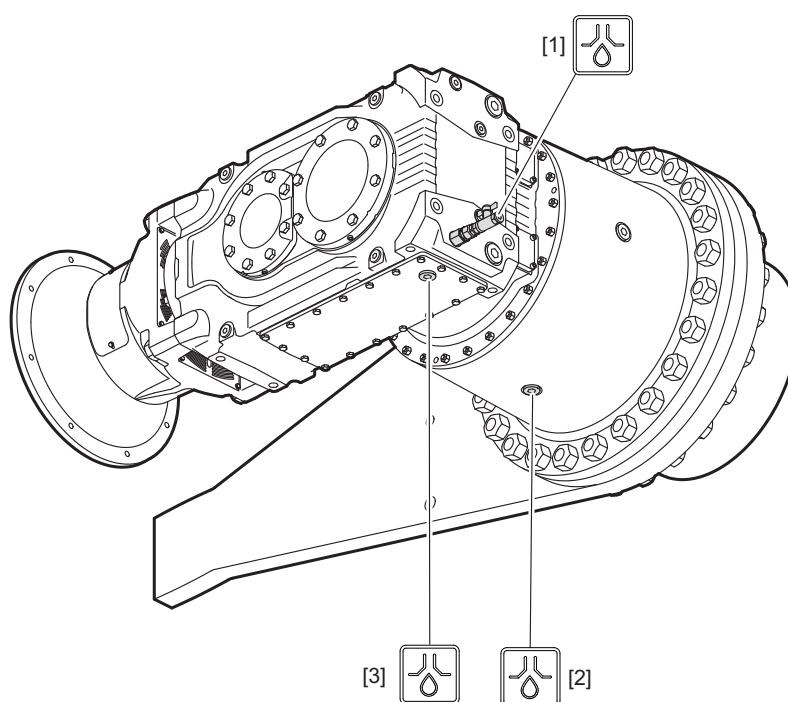
These screw plugs are optionally also available in magnetic design.

As an alternative, an additional oil drain valve can be attached to the planetary gear unit instead of the screw plug [2].

#### INFORMATION



The position of the oil drain can change at pivoted mounting positions. Please contact SEW-EURODRIVE in this case.



13886291851

#### NOTICE

The oil drain valve might be damaged if it is not sufficiently secured.

Possible damage to property.

- The oil drain valve must be additionally secured using a screw plug. At temperatures below -20 °C, the permeability of the valve might be limited.



### 3.13 Lubrication type

Splash lubrication is the standard lubrication type.

The mark on the oil dipstick is decisive for filling of the gear unit. Gearing and bearing parts that are not immersed in the oil bath are lubricated by splashing oil.

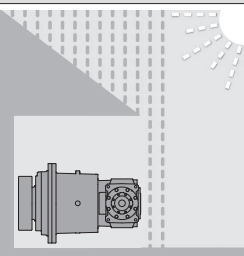
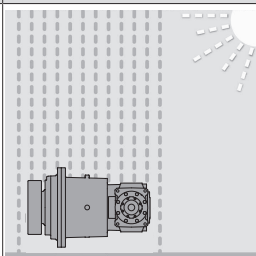
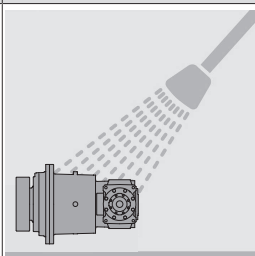
For other mounting positions than the mounting position M1 oil bath lubrication might be necessary. Please contact SEW-EURODRIVE in such cases.

### 3.14 Corrosion and surface protection

#### 3.14.1 OS surface protection

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

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

SEW-EURODRIVE design	OS1 Low environmental impact	OS2 Medium environmental impact	OS3 High environmental impact
Used as surface protection with typical ambient conditions Corrosivity categories DIN EN ISO 12944-2			
	Suited for environments prone to condensation and atmospheres with low humidity or contamination, such as outdoor applications under roof or with protection, unheated buildings where condensation can build up. According to corrosivity category: C2 (low)	Suitable for environments with high humidity or mean atmospheric contamination, such as applications outdoors subject to direct weathering. According to corrosivity category: C3 (moderate)	Suitable for environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasionally acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt load. According to corrosivity category: C4 (high)
Sample applications	<ul style="list-style-type: none"> <li>• Systems in saw mills</li> <li>• Agitators and mixers</li> </ul>	<ul style="list-style-type: none"> <li>• Applications in gravel plants</li> <li>• Cableways</li> </ul>	<ul style="list-style-type: none"> <li>• Port cranes</li> <li>• Sewage treatment plants</li> <li>• Mining applications</li> </ul>
Condensation test ISO 6270	120 h	120 h	240 h
Salt spray test ISO 7253	–	240 h	480 h
Top coat color <sup>1)</sup>	RAL 7031	RAL 7031	RAL 7031
Color according to RAL	Yes	Yes	Yes
Uncoated parts shaft end/flanges	Water and hand perspiration repelling anticorrosion agent applied at the factory for external preservation		

1) Standard color

### INFORMATION



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

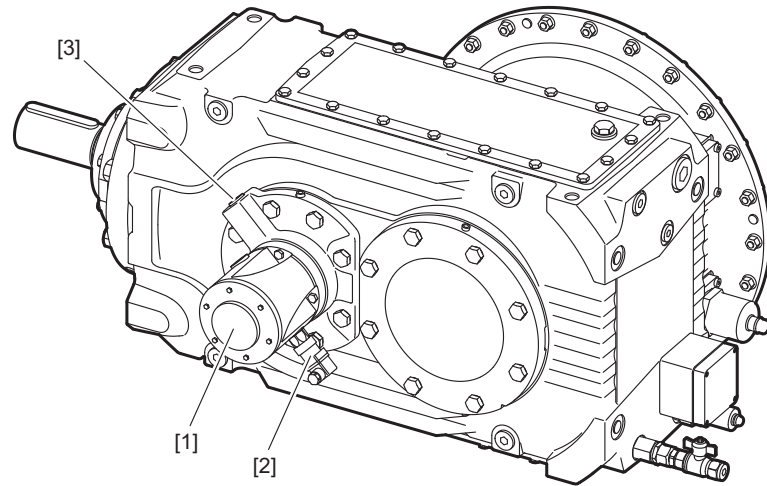
Special surface protection is also available, please contact SEW-EURODRIVE.



## 4 Structure of options

### 4.1 Shaft end pump /SEP

The figure shows an example of a shaft end pump.



14665697419

- [1] Shaft end pump
- [2] Pressure switch
- [3] Oil filling hole

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

The shaft end pump [1] is mounted externally to the gear unit and is driven by the input shaft or intermediate shaft of the gear unit via a coupling. This ensures a high degree of reliability of the pump functions.

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

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

### INFORMATION



- Proper functioning of the shaft end pump is monitored via the connected pressure switch. Refer to chapter "Pressure switch" (→ 53) for information.
- Contact SEW-EURODRIVE for information on the pump size selection.
- A minimum input speed is required for the shaft end pump to operate properly. If you use variable input speeds (e.g. inverter-controlled drives) or if you intend to change the input speed of a gear unit equipped with a shaft end pump, it is essential that you contact SEW-EURODRIVE.



## 4.2 Motor pump /ONP

### INFORMATION



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

---

## 4.3 Motor pump/ONP1L

### INFORMATION



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

---

## 4.4 Motor pump/ONP1

### INFORMATION



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

---

## 4.5 Cooling types

### 4.5.1 Fan cooling

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

### 4.5.2 Built-in cooling

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

### 4.5.3 Circulation cooling

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

## 4.6 Fan

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



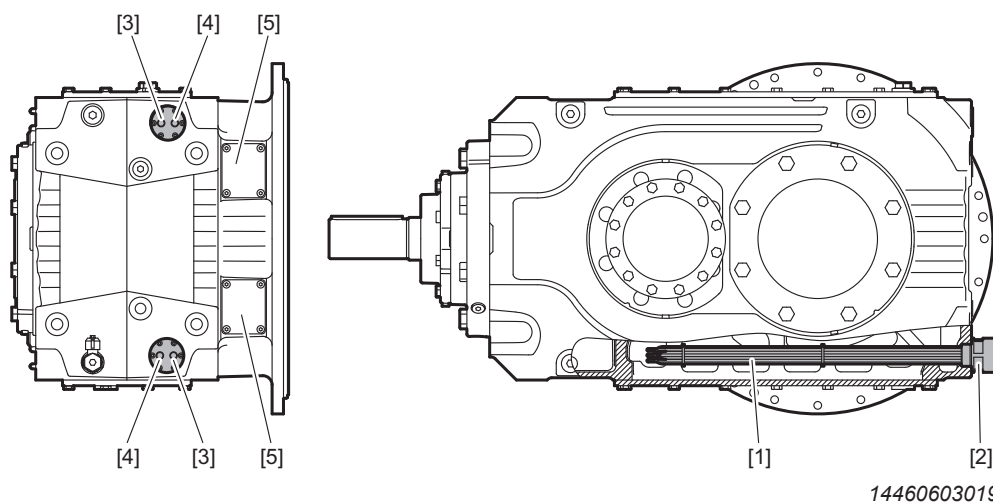
## 4.7 Water cooling cartridge /CCT

The water cooling cartridge can be installed above or beneath the oil level. The water connection must be installed by the user.

The amount of heat that can be dissipated depends on the intake temperature and the flow rate of the cooling medium that flows through the unit.

The data given in the technical specifications must be observed.

### 4.7.1 Structure



- [1] Cooling pipes
- [2] Tube plate with connection piece
- [3] Return
- [4] Supply
- [5] Assembly opening for optional water cooling cartridge

The water cooling cartridge consists of 3 main parts:

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

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

- pipe thread G1/4" for sizes X110 – X170

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

Gear units with water cooling cartridge are delivered completely assembled.

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



#### 4.7.2 Notes on connection and operation

Thermal rating is specified in the selection tables of the Industrial Gear Units P-X Series catalog. To achieve the thermal rating, various cooling water flow rates are required for the different gear unit designs. The required cooling water flow rate depends on the following characteristics:

- Gear unit size
- Mounting position
- Lubrication type

The cooling water quantity has to be dimensioned individually for each cooling cartridge.

Size/Connection	Max. cooling water flow rate l/min
X2K110/X2K130 – G1"	12
X2K150/X2K170 – G1 1/4"	15

### INFORMATION



The cooling circuit must be connected in parallel for gear units with several water cooling cartridges. Observe chapter "Installation > Water cooling cartridge" (→ 88).

### INFORMATION



Contact SEW-EURODRIVE in the following cases:

- When special cooling media are used (then the cooling capacity of the water cooling cartridge changes).
- When aggressive cooling media are used, such as brackish water or salt water.

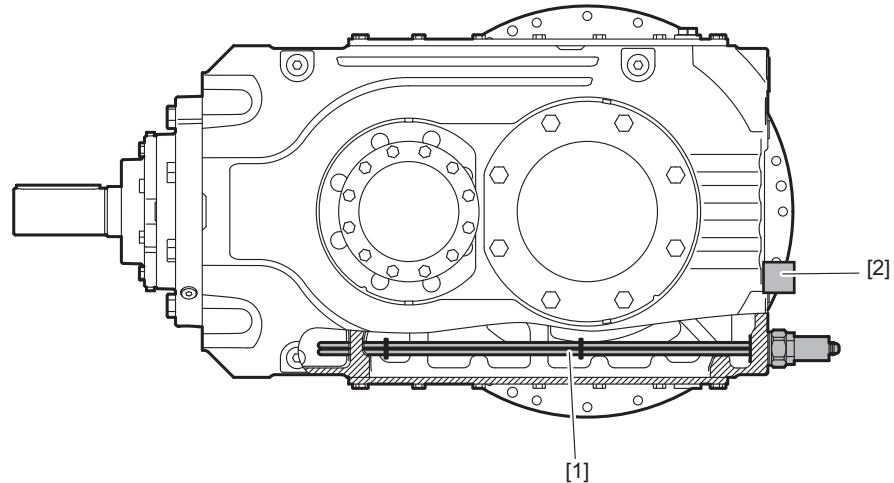


## 4.8 Oil heater/OH

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

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



14221631115

[1] Oil heater

[2] Thermostat with integrated temperature sensor

## INFORMATION



- For reduced heating times a second heating element (OH-F) can optionally be used at the mounting flange. Contact SEW-EURODRIVE in this case.
- The position of the thermostat varies with design and mounting position of the gear unit.



#### 4.9 Motor adapter /MA

Motor adapters [1] are available for mounting

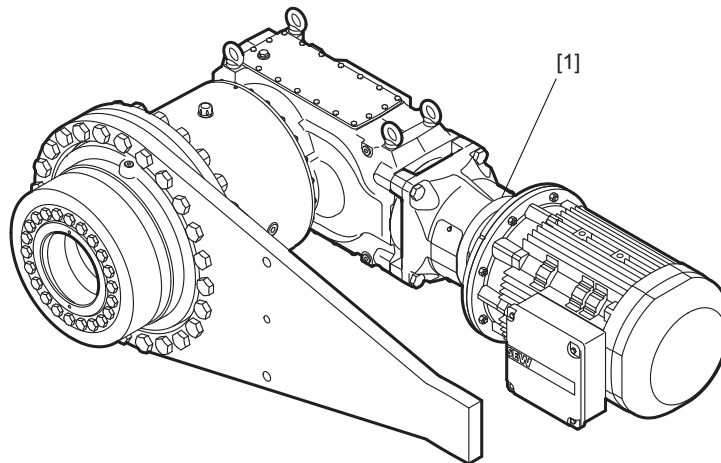
- **IEC (B5) motors** of sizes 200 – 355
- **NEMA ("C" face) motors** of sizes 324 – 449

#### INFORMATION



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

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



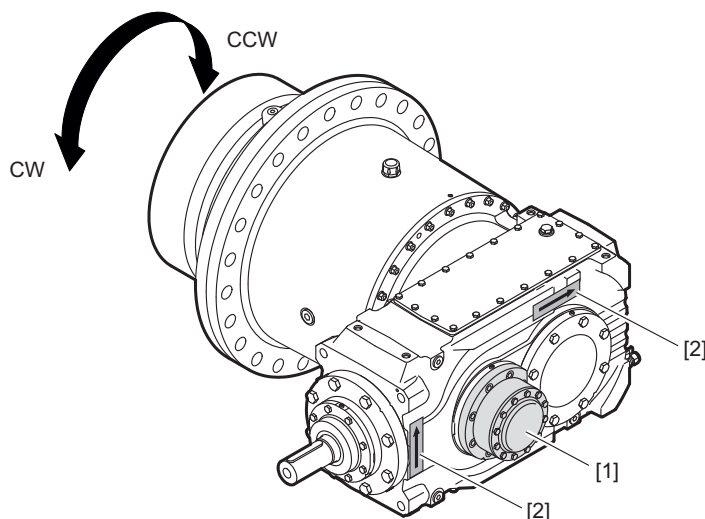
14273472011



## 4.10 Backstop /BS

The purpose of a backstop [1] is to prevent unwanted directions of rotation. During operation, the backstop permits rotation in only one specified direction of rotation.

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



14645541643

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

- CW = Clockwise rotation
- CCW = Counterclockwise rotation

The permitted direction of rotation [2] is indicated on the housing.

Contact SEW-EURODRIVE for differing requirements.

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

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

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

$n_1$ $\text{min}^{-1}$	Size
950...1150	X2K100..170 $i_N \geq 10$

$n_1$  = Input speed (HSS)

$i_N$  = Nominal gear unit ratio

## INFORMATION



X2K primary gear units with a gear unit ratio  $i_N \geq 10$  are marked with \* in the chapter "Selection tables".



### 4.11 Torque arm /T

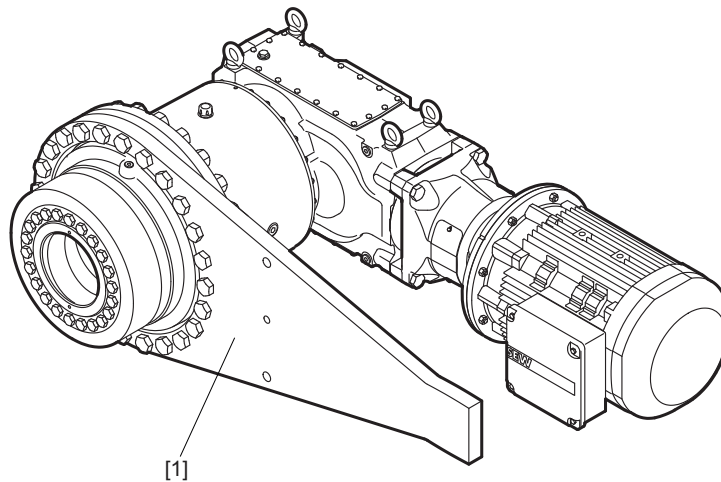
A torque arm is available to support the reaction torque of solid and hollow shaft gear units in the shaft-mounted design.

Depending on the load direction and type of the customer load bearing point, the reaction torque acts as a tensile or compressive force.

#### 4.11.1 Single-sided torque arm

The torque arm [1] is enclosed in the delivery or can be mounted according to customer requirements. The retaining screws are included in the scope of delivery.

The following figure shows a sample combination of a planetary gearmotor with a torque arm on one side.

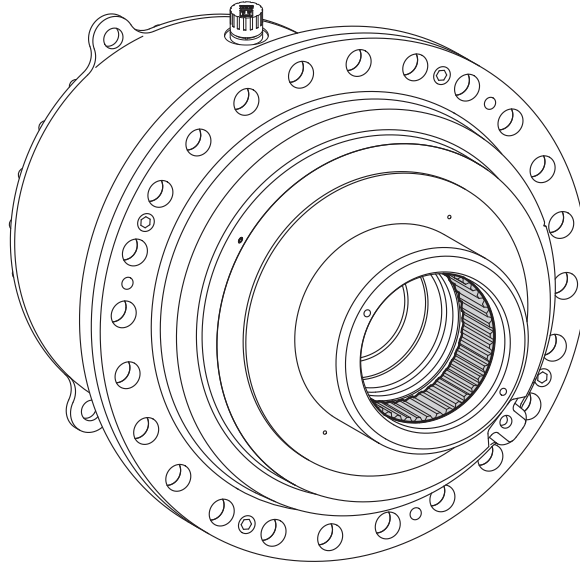


14301287691



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

The hollow shaft has splining according to DIN 5480. There is a centering in front of and behind the splined shaft for absorbing radial loads as well as for easier assembly of the output element.



15633041419



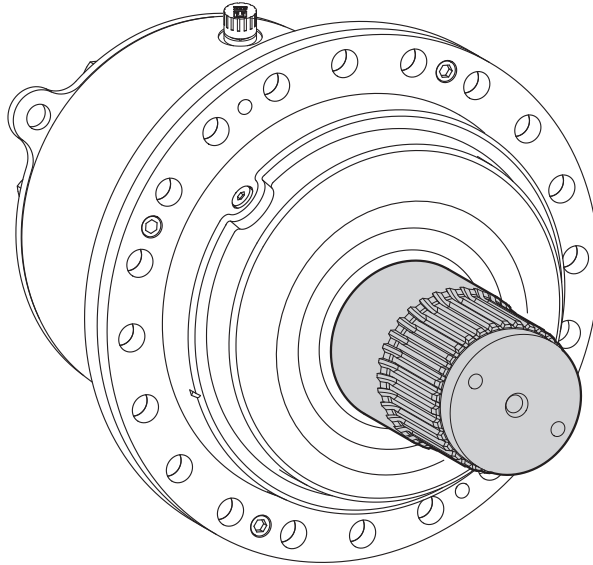
#### INFORMATION

Contact SEW-EURODRIVE regarding the permitted radial load.



#### 4.13 Output shaft as a splined solid shaft/..L

The solid shaft has splining according to DIN 5480. There is a centering in front of and behind the splined shaft for absorbing radial loads as well as for easier assembly of the output element. There are threads for mounting an end plate at the front of the shaft.



15633043851



#### INFORMATION

Contact SEW-EURODRIVE regarding the permitted radial load.

---



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

##### INFORMATION



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

---

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

##### INFORMATION



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

---

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

##### INFORMATION



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

---

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

##### INFORMATION



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

---

#### 4.18 Pressure switch/PS

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

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

Customers are responsible for the electrical connection and the evaluation of the signal.



#### **4.19 Temperature sensor /PT100**

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

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

#### **4.20 Temperature switch /NTB**

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

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

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

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

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

#### **4.21 Temperature switch /TSK**

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

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

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

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

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



## 4.22 Diagnostic unit/DUO10A (oil ageing)

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

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

### INFORMATION



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

## 4.23 Vibration SmartCheck

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

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

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

### INFORMATION



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

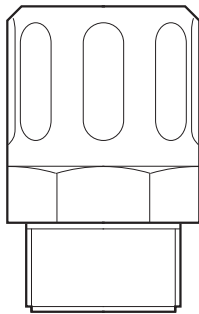


### 4.24 Breather

The following breathers can be used.

#### 4.24.1 Breather (standard)

##### Structure

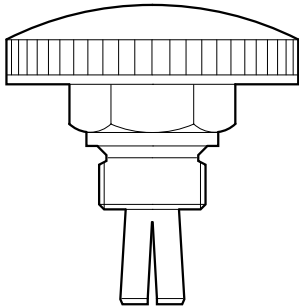


19118686347

<b>Housing material</b>	Steel
<b>Filter inserts</b>	Wire mesh
<b>Design</b>	Pipe taper thread according to DIN 3858

#### 4.24.2 Breather for harsh operating conditions

##### Structure



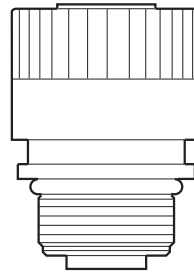
19118584971

<b>Housing material</b>	Stainless steel
<b>Filter inserts</b>	Steel and aluminum wire mesh
<b>Design</b>	Cylindrical pipe thread according to DIN EN ISO 228-1 Dimensioned for operating conditions with special protection against drip and splash water

23039728/EN – 11/2016



#### 4.24.3 Plastic breather



18847956107

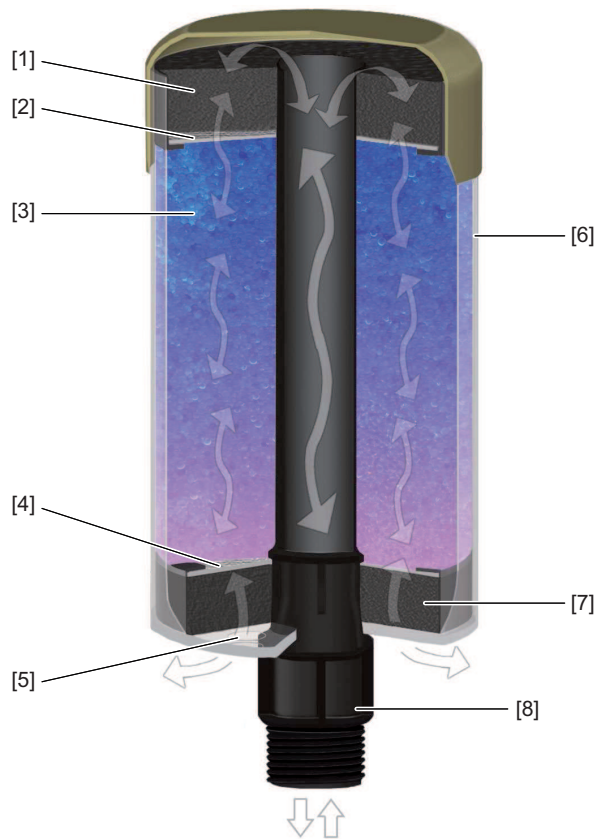
#### Structure

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



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

## Structure



9099314827

9099314827

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



### Standard one-way breather filter

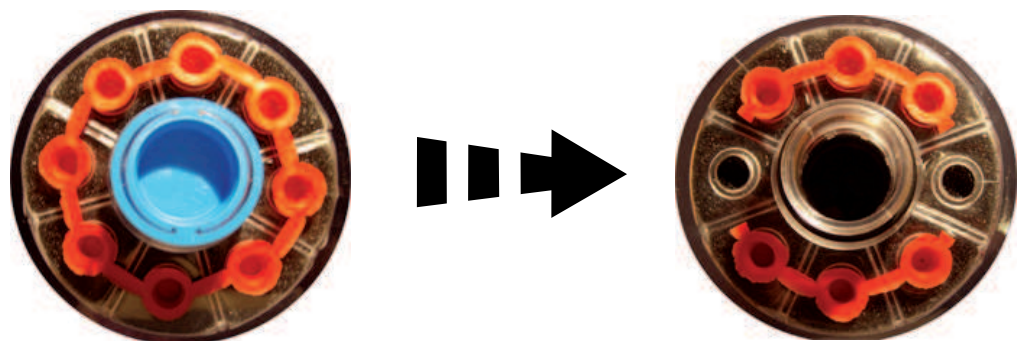
Type #	DC-2	DC-3	DC-4
Size (height × diameter in cm)	11.4 × 10.2	16.5 × 10.2	21.6 × 10.2
Filter area (cm <sup>2</sup> per filter)	25.4	25.4	25.4
Amount of silica gel (kg)	0.45	0.68	0.91
Amount of remaining water (l)	0.18	0.27	0.36
Amount of retained water (l)	0.65	1.15	1.6
Operating temperature range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

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

### Usage

#### Before startup

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



9099325323



## **5 Installation/assembly**

### **5.1 Required tools/resources**

Not included in the delivery:

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

### **5.2 Tolerances**

#### **5.2.1 Gear unit P-X series**

#### **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 notes prior to installation/mounting.



#### ▲ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



#### ▲ WARNING

Danger due to mounting in impermissible mounting position.

Severe or fatal injuries.

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



#### ▲ WARNING

Danger due to freely accessible, rotating parts.

Severe or fatal injuries.

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



#### ▲ WARNING

A customer machine that is not appropriately secured can fall during gear unit installation or removal.

Severe or fatal injuries.

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



#### ▲ WARNING

Danger due to installing impermissible components.

Severe or fatal injuries.

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





### ▲ WARNING

Danger due to using impermissible gear unit oil.

Severe or fatal injuries.

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



### ▲ WARNING

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

Serious injury.

- Let the gear unit cool down before you start working on it.
- Carefully remove the oil level plug and the oil drain plug.



### ▲ CAUTION

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

Possible injury to persons due to falling parts.

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



### ▲ CAUTION

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

Minor injuries.

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



### ▲ CAUTION

Risk of injury due to protruding parts.

Minor injuries.

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

### NOTICE

Starting up the gear unit below the permitted ambient temperature may damage the unit.

Possible damage to property.

- Before startup, the oil must be heated up to the specified temperature.



## NOTICE

Improper installation and assembly can damage the gear unit.

Possible damage to property.

- Observe the following notes.

- Make sure that the customer components are designed for the load.
- The gear units are delivered without oil fill as standard.
- Do not change the mounting position without prior consultation with SEW-EURODRIVE. The warranty will become void without prior consultation.
- The most important technical data is provided on the nameplate.  
Additional data relevant for operation is available in drawings, on the order confirmation or in any order-specific documentation.
- Do not modify the gear unit or the mount-on components without prior consultation with SEW-EURODRIVE.
- Note that the oil quantities on the nameplates are approximate values. The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity.
- Make sure that the oil level plugs and oil drain plugs, as well as the breather plug are freely accessible.
- When installing a filter in the OAP and OWP cooling units, make sure there is sufficient height for removing the filter element and the filter hood.
- Use plastic inserts if there is a risk of electrochemical corrosion between the gear unit and the driven machine (connection between different metals such as cast iron and stainless steel). Likewise, fit the screws with plastic washers. Always ground the gear unit housing.
- It is important that only authorized personnel is allowed to assemble gear head units with motors and adapters. Contact SEW-EURODRIVE.
- Do not weld anywhere on the drive. Do not use the drives as a ground point for welding work. Welding may destroy gearing components and bearings.
- Units installed outdoors must be protected from the sun. Suitable protective devices are required, such as covers or roofs. Avoid heat build-up. The user must ensure that foreign objects do not impair the function of the gear unit (e.g. falling objects or coverings).
- Protect the gear unit from direct cold air currents. Condensation may cause water to accumulate in the oil.
- For use in damp areas or outdoors, the gear units can be supplied with a suitable painting. Repair any damage to the paint work (e.g. on the breather plug).
- Do not modify the existing piping.
- For gear units that are filled with oil at the factory, check to see that the breather plug is installed before you start up the gear unit.
- Observe the safety notes in the individual chapters.

## 5.4 Prerequisites for installation

Check that the following conditions have been met:

- The information on the motor's nameplate must match the voltage supply system.



- The drive has not been damaged during transportation or storage.
- The ambient temperature matches the information in the order documents.
- No harmful oils, acids, gases, vapors, radiation etc. in the vicinity

**NOTICE**

Danger due to insufficiently cleaned flange surfaces.

Possible damage to property.

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

**5.4.1 Extended storage**

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

Replace the breather with a screw plug.



## 5.5 Installing the gear unit



### ▲ WARNING

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

Severe or fatal injuries.

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

### NOTICE

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

Possible damage to property.

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

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

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

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

Tighten retaining screws or nuts to the specified torque. Use the screws and tightening torques specified in chapter Gear unit mounting.



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

Observe the notes in chapter "Important information" (→ 61).

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

#### INFORMATION



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

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

#### INFORMATION



The screws must not be lubricated during assembly.

### 5.5.2 Aligning the shaft axis



#### ▲ WARNING

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

Severe or fatal injuries.

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

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

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



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

Observe the notes in chapter "Important information" (→ 61).

### 5.6.1 General information

The gear unit is delivered without oil fill as standard.



#### ▲ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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

#### NOTICE

Improper oil filling may cause damage to the gear unit.

Possible damage to property.

- Note the following information.
- Fill the oil only when the gear unit is in the intended mounting position.
- Make sure the oil has ambient temperature when filling it into the gear unit.
- For gear units with external supply pipes, e.g. oil supply systems, establish the connections prior to filling the oil.
- Observe the additional notes depending on the lubrication type in the following chapters.
- Fill the gear unit with the oil grade and oil quantity specified on the nameplate. The oil quantity specified on the nameplate is an approximate quantity. The mark on the oil dipstick is the decisive indicator of the correct oil quantity.  
For additional information, refer to chapter "Changing the oil" (→ 132) and chapter "Checking the oil level" (→ 127).  
When additional attachments, e.g. an oil supply system, are mounted to the gear unit, the required oil fill quantity is higher. In this case, observe the respective operating instructions "Oil Supply System" by SEW-EURODRIVE.
- Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).



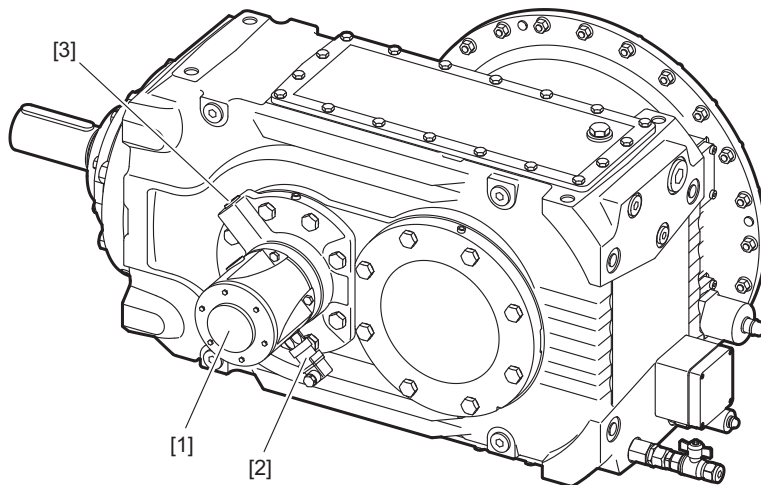
**5.6.2 Gear units with shaft end pump /SEP****NOTICE**

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

Possible damage to property.

- Note the following information.

- Fill the gear unit with the oil type and oil quantity corresponding to the nameplate data, see chapter "Changing the oil" (→ 132).
- Check the oil level using the oil dipstick. For additional information, refer to chapter "Checking the oil level" (→ 127).
- Before startup, fill the additional mount-on components (such as piping, cooler matrix...) with oil on the pressure side. This ensures that sufficient oil is in the over-all system during startup. The oil filling holes are marked in the order dimension sheet.
- Directly before taking the gear unit into operation the first time, open the screw plug [3] and fill the shaft end pump [1] completely with oil. After having filled in the oil, close the screw plug [3].



14665697419

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

For detailed information, refer to chapter "Startup > Shaft end pump /SEP" (→ 114) and the manufacturer documentation.

**Pressure switch**

Gear units with shaft end pump are equipped with a pressure switch [2] for function monitoring as standard. Connection has to be carried out by the operator. Observe the chapter "Pressure switch" (→ 108).



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

Observe the notes in chapter "Important information" (→ 61).

### NOTICE

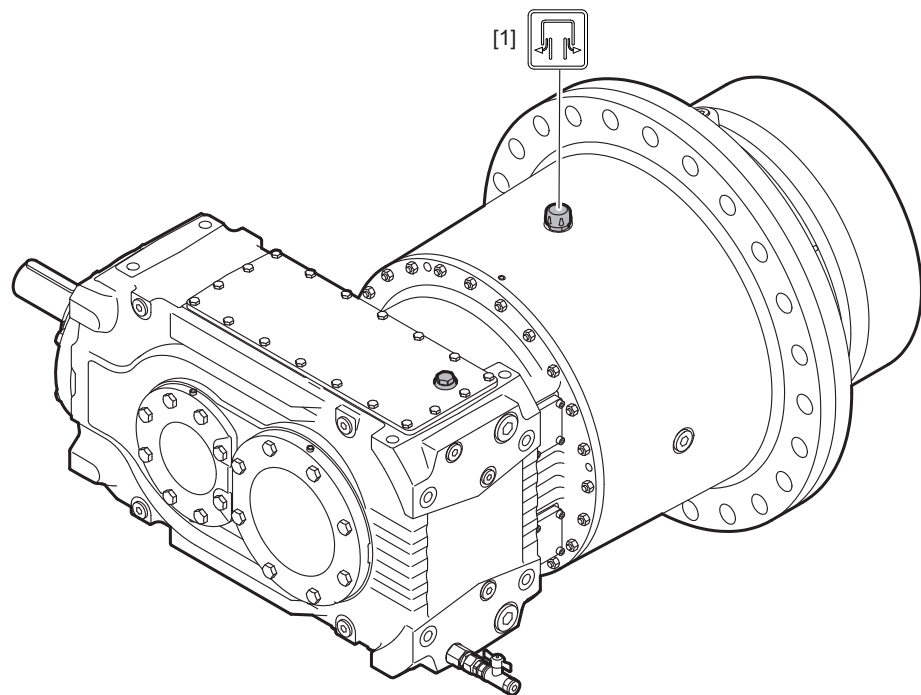
Improper startup can result in damage to the gear unit.

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.

If the gear unit is delivered with oil fill, you have to install the breather plug prior to startup. It is enclosed with the delivery.

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



14299527563

1. Remove the closing plug.
2. Insert the breather plug [1].
3. Check the oil level. Observe the information in chapter "Checking the oil level" (→ 127).



## 5.8 Gear units with solid shaft

### INFORMATION



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

#### 5.8.1 Assembling the input and output components

### NOTICE

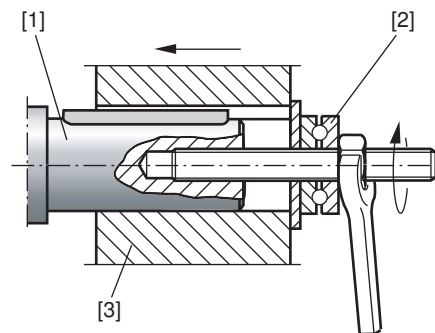
Bearings, housing or shaft may be damaged due to improper assembly.

Possible damage to property.

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

#### Installation with mounting device

The following figure shows a mounting device for installing couplings or hubs on gear unit or motor shaft ends. Should you be able to tighten the screw without any problems, you may not need the thrust bearing on the mounting device.



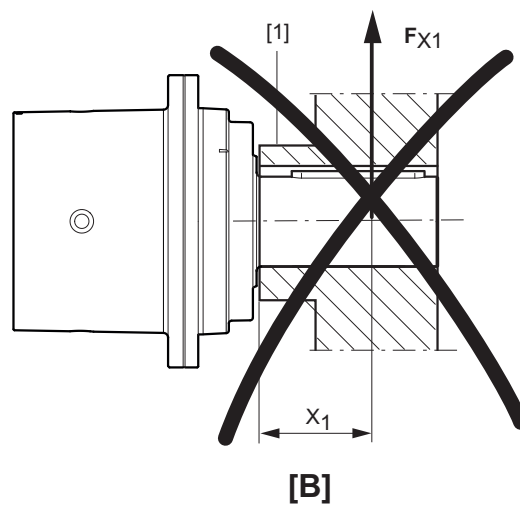
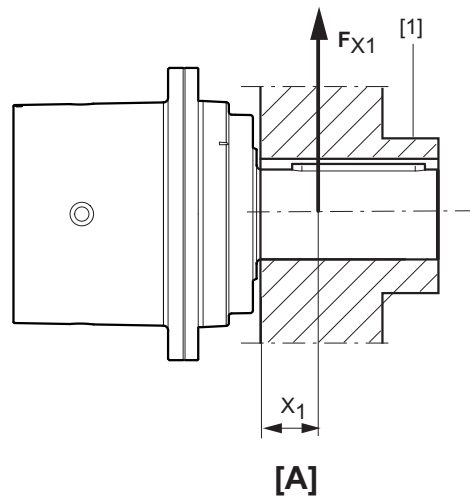
211368587

- [1] Gear unit shaft end
- [2] Thrust bearing
- [3] Coupling hub



### Avoid excessive overhung loads

To avoid high overhung loads: Install the gear or chain sprocket according to figure A if possible.



- [1] Hub
- [A] Correct
- [B] Incorrect

19114510347

### INFORMATION



Mounting is easier if you first apply lubricant to the output element and/or heat it up briefly (to 80 ... 140 °C).



## 5.9 Couplings

### INFORMATION

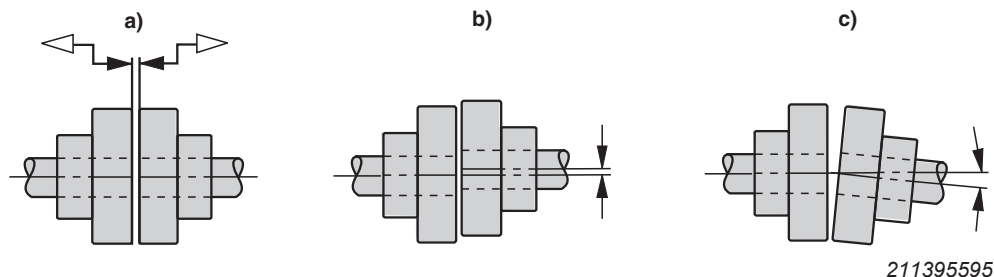


Observe the operating instructions of the respective coupling manufacturer.

#### 5.9.1 Mounting tolerances

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

- a) Axial misalignment
- b) Radial misalignment
- c) Angular misalignment

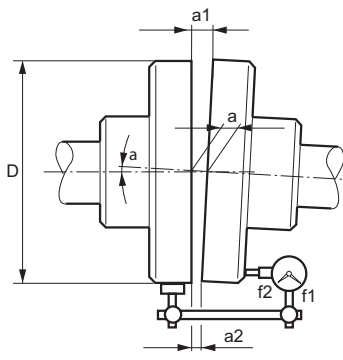
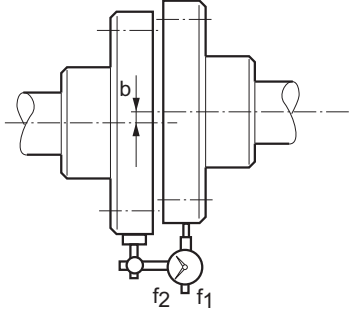


211395595

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

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



Measuring instruments	Angular offset	Axis offset
Micrometer dial	 <p>899597451</p> <p>A prerequisite for this measuring method is that there is no axial play in the shaft bearings when the shafts rotate. If this condition is not fulfilled, the axial play between the faces of the coupling halves must be eliminated. As an alternative, you can use two micrometer dials positioned on the opposite sides of the coupling (to calculate the difference of the two dial indicators when rotating the coupling).</p>	 <p>The following figure shows the how to measure axial offset using a more accurate measuring method, as described above. The coupling halves are rotated together without letting the point of the dial indicator slide onto the measuring surface. The axial offset is obtained by dividing the deviation displayed on the dial indicator (dimension "b").</p>



### 5.10 Motor adapter /MA

#### 5.10.1 Max. permitted motor weight

When mounting a motor at the gear unit the approved maximum motor weight in regard to the motor adapter size must be verified.

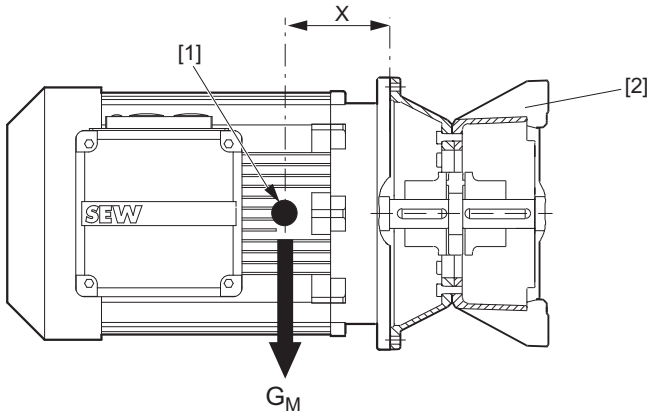
### INFORMATION



- The maximally permitted motor weight may not be exceeded.
- In case of a deviating mounting position, contact SEW-EURODRIVE.

#### 2. Maximum motor weight depending on motor adapter size

The following maximum loads on the motor adapter must not be exceeded.



9007199611271819

- [1] Center of gravity of the motor  
[2] Motor adapter

X = Distance from the center of gravity  
 $G_M$  = Weight of the mounted motor

### INFORMATION



The table only applies to stationary applications. For mobile applications (e.g. travel drives), contact SEW-EURODRIVE.

Motor adapter		$G_M$	X
IEC	NEMA	kg	mm
100/112	182/184	60	190
132	213/215	110	230
160/180	254/286	220	310
200	324	280	340
225	326	400	420
250 / 280	364 - 405	820	480
315S-L	444 - 449	1450	680
315		2000	740
355		2500	740

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

23039728/EN – 11/2016



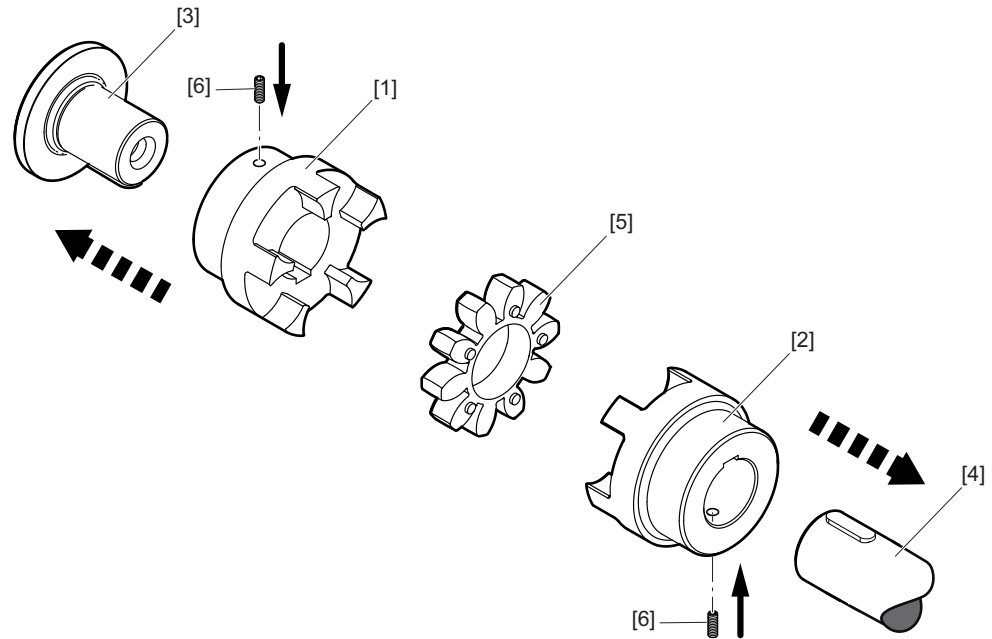
### 5.10.2 Claw coupling

## INFORMATION



Observe the operating instructions of the respective coupling manufacturer.

### ROTEX® coupling

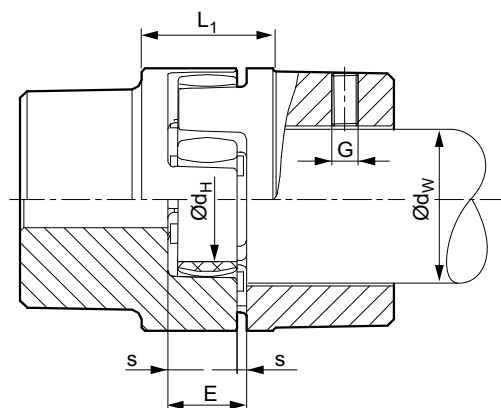


9007205071635979

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).

1. **NOTICE!** Improper assembly can damage the coupling halves [1][2]. Possible damage to property.  
Heat the hub to about 80 °C to facilitate the assembly.
2. Mount the coupling halves [1][2] onto the input and output side [3][4].
3. Insert the spider [5] or DZ elements into the claws of the input and output coupling halves [1][2].
4. Push the gear unit/motor in axial direction until dimension **E** is reached. If the gear unit/motor has already been installed permanently, set dimension **E** by moving the hubs [1][2] axially on the input and output shafts [3][4].
5. **NOTICE!** Improper mounting may result in damage to the coupling. Possible damage to property.  
During assembly, it is essential to observe dimension **E** so that the spider remains axially flexible during operation. The dimension **E** is listed in the following table.





9007205070369419

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

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

### Displacement – Aligning the coupling

#### NOTICE

Improper mounting of the coupling may result in damage.

Possible damage to property.

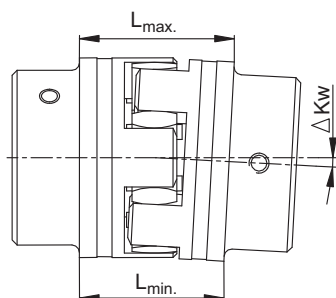
- The shaft ends must be aligned accurately to ensure a long service life of the coupling. Strictly adhere to the displacement values specified in the following chapter. Exceeding these values will damage the coupling. Exact coupling alignment increases its service life.

23039728/EN – 11/2016



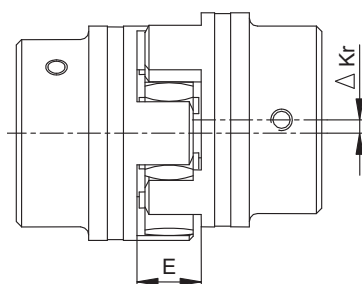
Important:

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

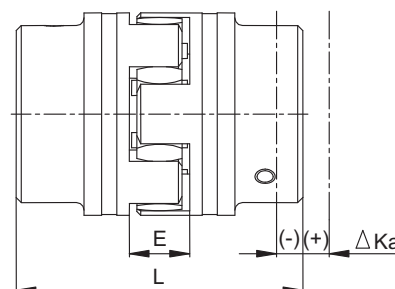


Angular misalignments

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



Radial misalignments



Axial misalignments

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

5989511307

Example of specified displacement combinations (see diagram):

Example 1:

$$\Delta K_r = 30\%$$

$$\Delta K_w = 70\%$$

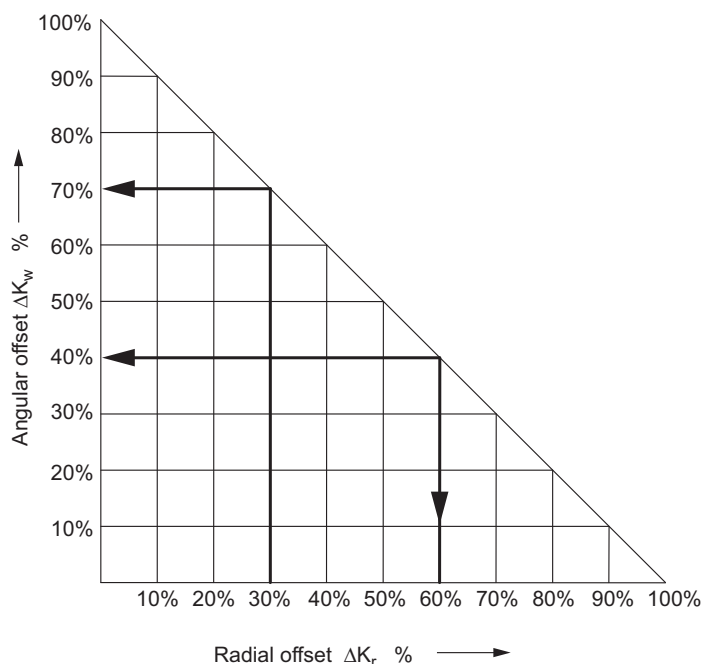
Example 2:

$$\Delta K_r = 60\%$$

$$\Delta K_w = 40\%$$

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

6001385227



5989508747



## Displacement values

The table below shows the displacement values:

ROTEX® size	14	19	24	28	38	42	48	55	65	75	90	100	110	125	140	160	180
Max. axial displacement $\Delta K_a$ [mm]	-0.5	-0.5	-0.5	-0.7	-0.7	-1.0	-1.0	-1.0	-1.0	-1.5	-1.5	-1.5	-2.0	-2.0	-2.0	-2.5	-2.5
	1.0	1.2	1.4	1.5	1.8	2.0	2.1	2.2	2.6	3.0	3.4	3.8	4.2	4.6	5.0	5.7	6.4
Max. radial displacement $\Delta K_r$ [mm]	1500 1/min	0.17	0.20	0.22	0.25	0.28	0.32	0.36	0.38	0.42	0.48	0.50	0.52	0.55	0.60	0.62	0.64
	1800 1/min	0.11	0.13	0.15	0.17	0.19	0.21	0.25	0.26	0.28	0.32	0.34	0.36	0.38	-	-	-
$\Delta K_w$ [degree] angular displacement when $n = 1500$ 1/min	1.2	1.2	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.2	1.3	1.3	1.2	1.2	1.2
$\Delta K_w$ [mm]	0.67	0.82	0.85	1.05	1.35	1.7	2.0	2.3	2.7	3.3	4.3	4.8	5.6	6.5	6.6	7.6	9.0
$\Delta K_w$ [degree] angular displacement when $n = 3000$ 1/min	1.1	1.1	0.8	0.8	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.1	1.1	-	-	-	-
$\Delta K_w$ [mm]	0.62	0.7	0.75	0.84	1.1	1.4	1.6	2.0	2.3	2.9	3.8	4.2	5.0	-	-	-	-

## 5.10.3 Attaching the motor to the motor adapter

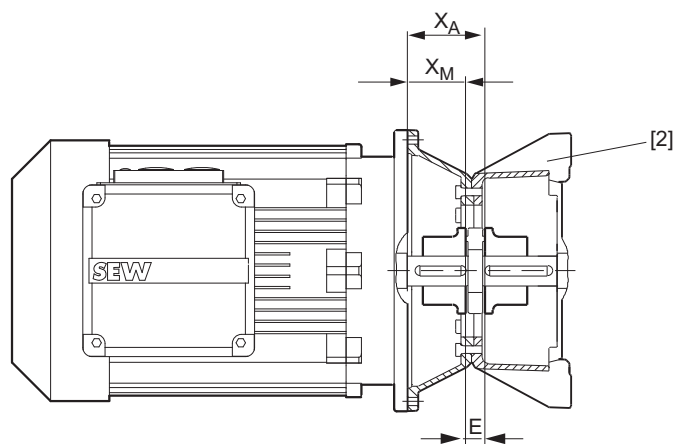
1. Clean the motor shaft and flange surfaces of the motor and the motor adapter. They must be dry and free of grease.

## INFORMATION



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

2. Push the coupling half onto the motor shaft and position it. When doing this, observe the information in chapter "Claw coupling" (→ 75) and the figure below. The coupling size and type are indicated on the coupling.



9007199705735691

- |     |                         |       |  |
|-----|-------------------------|-------|--|
| [1] | Motor adapter           | $X_A$ | Distance between the coupling and the motor adapter flange surface |
| E   | Installation dimensions | $X_M$ | Distance between the coupling and the motor flange surface         |

$$\rightarrow X_M = X_A - E$$

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



### 5.11 Motor pump /ONP

Observe the notes in chapter "Important information" (→ 61).

#### INFORMATION



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

---

### 5.12 Motor pump/ONP1L

Observe the notes in chapter "Important information" (→ 61).

#### INFORMATION



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

---

### 5.13 Motor pump/ONP1

Observe the notes in chapter "Important information" (→ 61).

#### INFORMATION



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

---



## 5.14 Fan /FAN

Note the following

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

For the required clearance, refer to the dimension drawing in the catalog or the order documents.

- Never operate the gear unit if the protective housing is not installed.
- Protect the fan guard from external damage.
- Make sure the air intake vents of the fan are not blocked or covered.

Observe the following tightening torques for installing the fan guard:

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

## 5.15 Limit temperature for gear unit start

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

### INFORMATION



- Before startup, it might be necessary to heat up the oil with an oil heater to the temperature specified under "Initial temperature". Observe the lubricant table in chapter "Permitted lubricants" (→ 147). For the design and dimensioning of the required oil heater, contact SEW-EURODRIVE.
- For the minimally permitted initial temperature for mineral and synthetic oil, refer to the chapter "Permitted lubricants" (→ 147).



## 5.16 Oil heater



### ⚠ WARNING

Danger of electric shock.

Severe or fatal injuries.

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

### NOTICE

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

Possible damage to property.

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

### NOTICE

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

Possible damage to property.

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



### INFORMATION

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

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



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

- The heater is screwed into the gear unit housing ex works and is controlled by a thermostat. The trip temperature of the thermostat is set at the factory depending on the lubricant used.
- The trip point of the oil heater thermostat is factory-set to a temperature of about 5 K above the respective limit temperature "initial temperature for gear unit startup", see chapter "Limit temperature for gear unit startup" (→ 80).

At this temperature, the thermostat disables the oil heater see chapter "Minimum temperature for gear unit start" (→ 80). Only then, the gear unit can be started. The thermostat activates the oil heater again once the temperature is about 5 K below the trip point.

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

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

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

- Thermostat and oil heater are installed in the gear unit and ready for operation. Prior to startup, wire them properly and connect them to the current supply.
- Contact SEW-EURODRIVE if a differing oil viscosity class is used or if ambient temperatures fall below the specified limit temperature.
- During installation, check the thermostat setting according to chapter "Thermostat" (→ 83).



### 5.16.2 Thermostat

#### Electrical connection



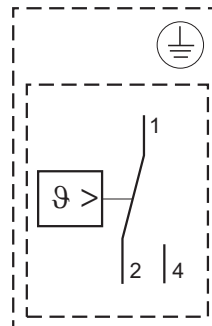
#### ⚠ WARNING

Risk of injury due to electric shock.

Severe or fatal injuries.

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

The following figure shows the electrical connection.



18014398960475019

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

#### INFORMATION



- Observe the manufacturer's documentation.

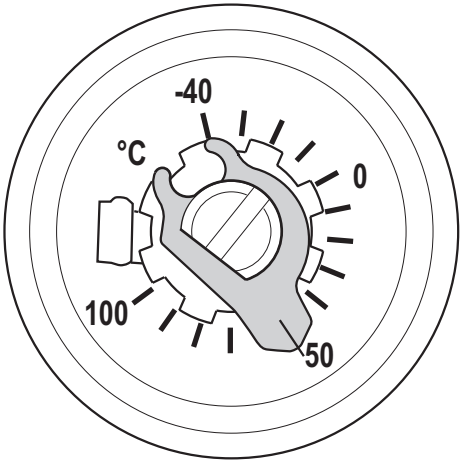


### Technical data

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

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

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



16834938379



### 5.16.3 Connection power

The table shows the power of the heating that may be installed.

Peripheral Conditions: $T_{Amb} = -20\text{ °C}$ ; Mounting position M1 (Splash lubrication)					
Size	Heating element		$P_{inst}$ W	Heating after 4h K	Max. heating K
P042 X2K110	1	OH	550	15.3	18.5
	2	OH-F + OH	250 + 550	22.2	26.9
P052 X2K110	1	OH	550	14.1	17.6
	2	OH-F + OH	250 + 550	20.6	25.6
P052 X2K130	1	OH	680	15	18.6
	2	OH-F + OH	250 + 680	20.5	25.4
P062 X2K130	1	OH	680	12.5	16.1
	2	OH-F + OH	250 + 680	17.6	22
P072 X2K130	1	OH	680	10.8	14.5
	2	OH-F + OH	250 + 680	14.7	19.8
P072 X2K150	1	OH	800	11.3	15.6
	2	OH-F + OH	700 + 800	21.2	29.3
P082 X2K150	1	OH	800	9.7	14
	2	OH-F + OH	700 + 800	18.2	16.3
P092 X2K150	1	OH	800	8.5	12.9
	2	OH-F + OH	700 + 800	16	24.3
P102 X2K150	1	OH	800	7.4	11.7
	2	OH-F + OH	700 + 800	13.8	21.9
P092 X2K170	1	OH	940	8.6	12.7
	2	OH-F + OH	780 + 940	15.6	23.2
P102 X2K170	1	OH	940	7.5	11.6
	2	OH-F + OH	780 + 940	13.8	21.3

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

OH = Oil heater in the gear unit

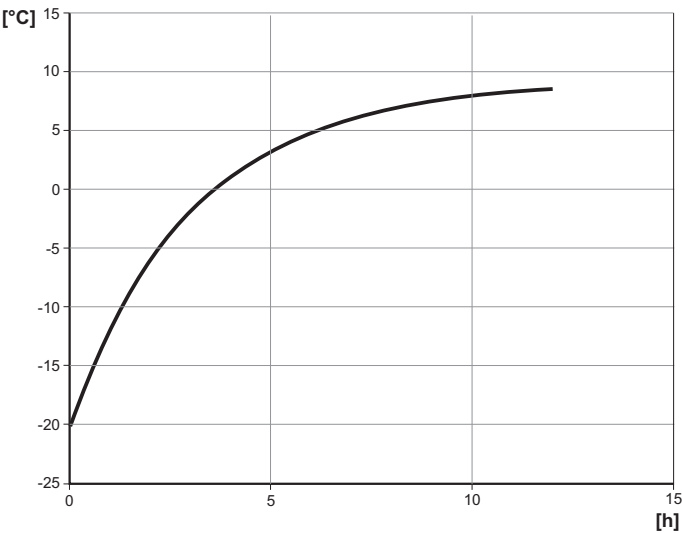
OH-F = Oil heater in the flange



### 5.16.4 Example of heating

Example of heating with the gear unit combination P072 X2K150  
 With the following basic conditions:

2 heating elements		
Peripheral Conditions: T <sub>Amb</sub> = -20 °C; Mounting position M1 (Splash lubrication)		
Duration h	Heating K	Temperature °C
0	0	-20
1	8.0	-12.0
2	13.9	-6.1
3	18.1	-1.9
4	21.2	1.2
5	23.4	3.4
6	25.0	5.0
7	26.2	6.2
8	27.1	7.1
9	27.7	7.7
10	28.1	8.1
11	28.5	8.5
12	28.7	8.7



14381964939

°C = Temperature  
 h = Heating duration

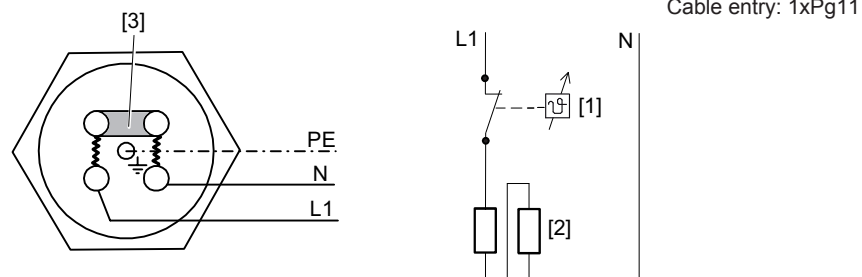


### 5.16.5 Connection power and electrical connection of resistor element

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

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

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



9007202007368715

Observe the electrical characteristics of the control range

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

	X2K size	Heating element
OH	X2K110 – 170	G1"
OH-F	X2K110 – 130	

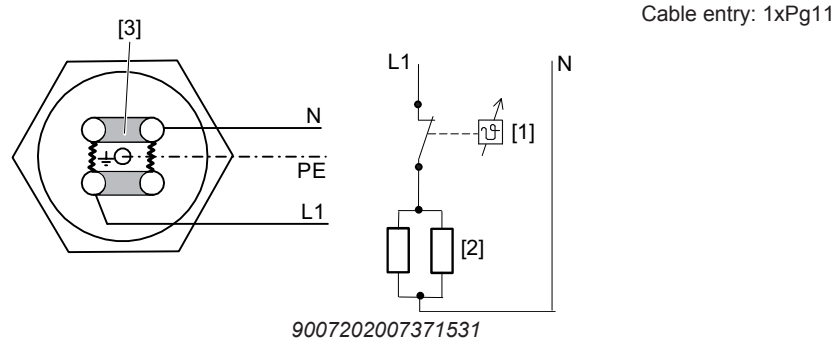
OH = Oil heater in the gear unit

OH-F = Oil heater in the flange



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

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



Observe the electrical characteristics of the control range

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

	X2K size	Heating element
OH-F	X2K150 – 170	G1,5"

OH-F = Oil heater in the flange

**5.17 Water cooling cartridge****5.17.1 Notes on connection / installation****NOTICE**

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

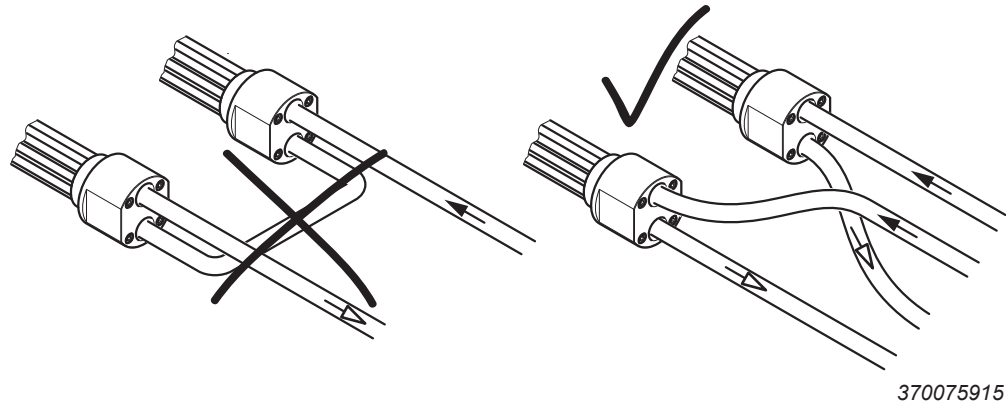
Possible damage to property.

- Observe the following information:

- Using thread seal tape on the pipe threads increases the resistance between the connection parts as well as the risk of cracking in the cast parts of the water cooling cartridge. Do not tighten the threads excessively.
- The water cooling cartridges are not equipped with a water drain. In the event of repair work, you have to install a drain on the cooling water outlet to ensure proper draining of the cooling water.
- For connecting the water cooling cartridge, use only piping and mounting parts of the same or of compatible material.
- Check the water cooling cartridge to see that it is free from soiling and foreign objects in the pipe connection to ensure unobstructed flow of the cooling media.
- Avoid tensions on the connection points when connecting the piping. Support the pipes properly, if required.
- Install the cooling water outlet pipe in such a way that the water cooling cartridge is permanently flooded by cooling water.
- Refer to chapter "Requirements on the water quality" (→ 90) to determine the permitted cooling media.



- Cooling water temperature and flow rate according to the order documents.
- Make sure the cooling water pressure does not exceed 10 bars.
- In the event of temperature levels below 0 °C and longer downtimes, drain the cooling water from the circuit. Use compressed air to remove any remaining water.
- SEW-EURODRIVE recommends to filter the cooling media to 100 µm.
- Connect the water cooling cartridge to the existing cooling circuit. The direction of flow is user-defined.
- For gear units with more than one water cooling cartridge, connect the cooling circuit in parallel, see following figure.



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

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

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



## 5.17.2 Removal

Observe the notes in chapter Inspection/maintenance.

## 5.17.3 Requirements on the water quality

## INFORMATION



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

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

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

## Water hardness

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

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

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

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

## pH value

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

Smaller values can cause corrosion due to free carbonic acid.

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

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



## Cooling water assessment based on water substances

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

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

### Key

+	= usually good resistivity
0	= corrosion problems can occur in particular if several factors are assessed with 0
–	= we advise against use



**Types of cooling water/characteristics**

Note the following conditions:

*Industrial water*

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

*Stream water and river water*

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



## 5.18 Torque arm

### 5.18.1 Notes on installation



#### ⚠ WARNING

Insufficiently secured gear units can fall down during assembly/disassembly.  
Severe or fatal injuries.

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

#### NOTICE

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

Possible damage to property.

- Do not deform the torque arm.

#### NOTICE

Strain on the torque arm might break the housing.

Possible damage to property.

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



#### INFORMATION

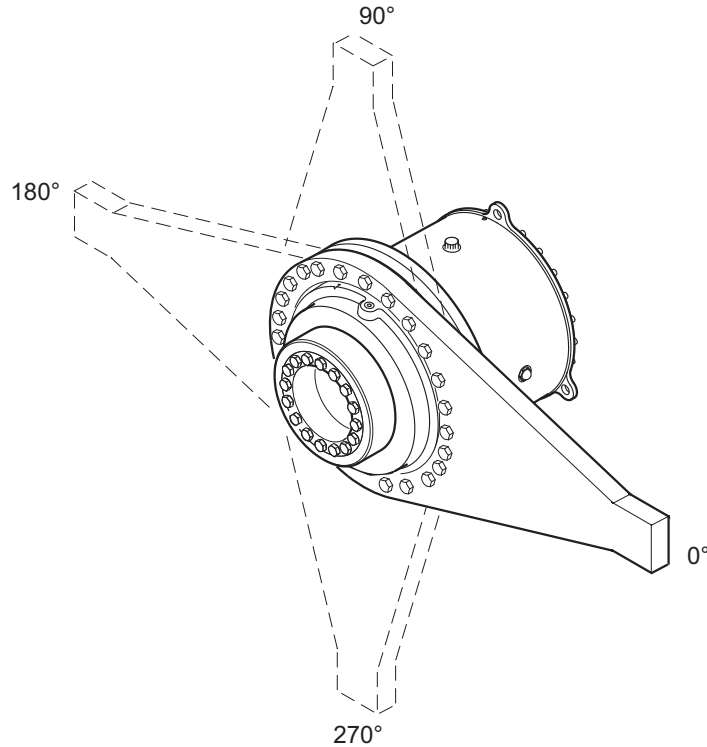
- Retaining screws are included in the delivery.
- When using a shrink disk cover, install the torque arm before mounting the cover.



### 5.18.2 Single-sided torque arm (standard)

#### Installation situation

The torque arm can be installed at 0° to 360° in consideration of the order-specific configuration.



9007203491563787

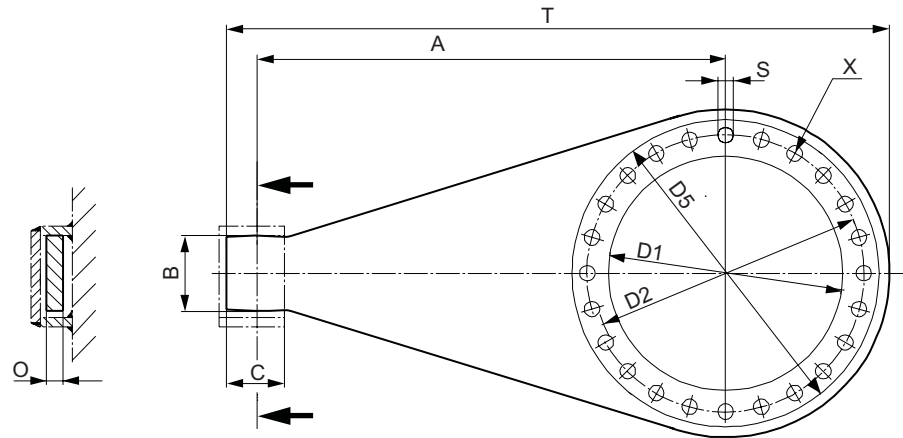
The reactive force resulting from the gear unit torque is absorbed via the torque arm with lever arm A. The figure on the next page shows an example of a customer fixture in a welded structure. Two supporting plates are welded on the machine design with the suggested dimensions. Once the gear unit has been mounted, a connecting cover plate is welded onto the two supporting plates. The force of the gear unit torque acts on the support, divided by the length of the lever arm A. The reaction force also acts on the gear unit and machine shafts.

The figure shows a sample mounting position and the combination of a planetary gear unit with torque arm.



## Dimensions

The following figure shows a sample torque arm with dimensions.



1143100811

Size	Dimensions in mm								Quantity	Weight
	A	B	C	D1	D2	O	S	T	X	kg
P.042	900	150	120	484	560	40	33	1270	20	93
P.052	1000	160	130	534	590	40	33	1390	24	102
P.062	1200	180	150	614	690	50	39	1655	24	183
P.072	1500	230	200	694	770	60	39	2020	24	317
P.082	1600	230	200	754	840	70	45	2160	24	420
P.092	1650	250	220	804	870	70	45	2235	24	440
P.102	1700	250	220	854	960	70	45	2335	24	510

## INFORMATION



The torque arm bearing must be sufficiently dimensioned by the user.

## Tightening torques

## INFORMATION



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

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

Only use the following tools for the installation:

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

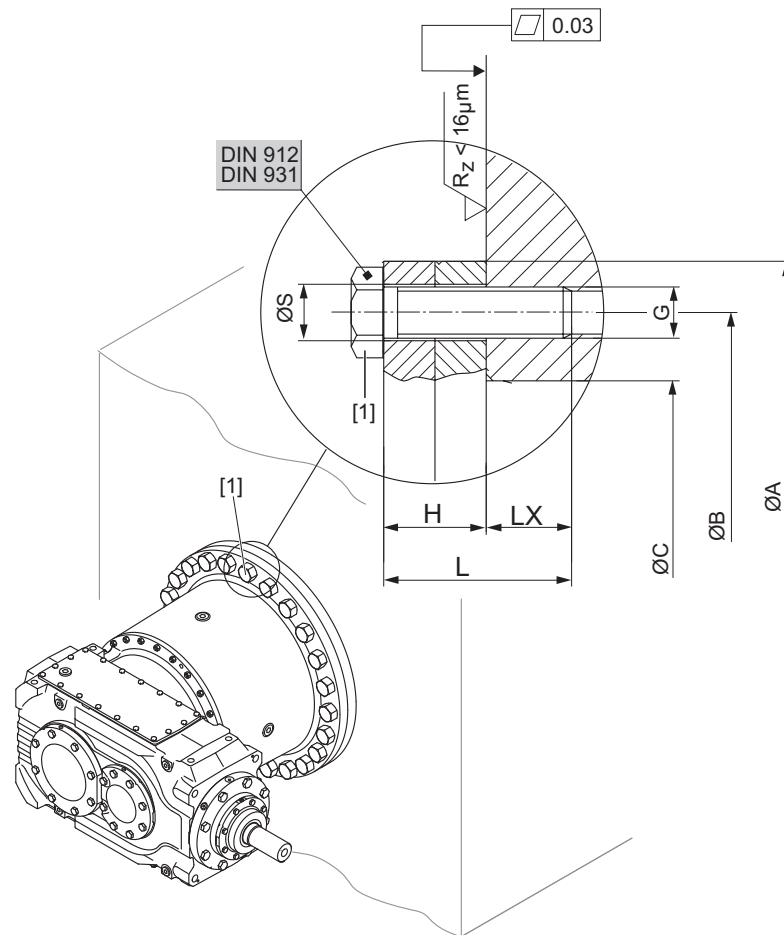
Size	Thread	Tightening torque Nm	Strength class	DIN screws
P.042 – P.052	M30	1910	10.9	DIN EN ISO 4017 DIN EN ISO 4762
P.062 – P.072	M36	3320		
P.082 – P.102	M42	5310		



### 5.19 Flange-mounted gear units

The following figure shows an example of how flange-mounted gear units are installed.

Retaining screws [1] are not included in the delivery.



14301903243

### INFORMATION



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

Screws are not included in the delivery. Adjust the tightening torques to the new friction conditions.

Only use the following tools for the installation:

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



The following values in the table apply to steel constructions. Observe the additional information on the customer dimension sheet.

Size	Thread	Quantity	Tightening torque	Dimensions in mm						Strength classes	Screws EN ISO	
			Nm	Ø S	H	min. L	min. LX	Ø A	Ø B			Ø C
P.042	M30	20	1910	33	64	114	50	620	560	480 <sub>f9</sub>	10.9	4017 4762
P.052	M30	24	1910	33	64	114	50	650	590	530 <sub>f9</sub>		
P.062	M36	24	3320	39	74	134	60	760	690	610 <sub>f9</sub>		
P.072	M36	24	3320	39	84	144	60	840	770	690 <sub>f9</sub>		
P.082	M42	24	5310	45	84	154	70	920	840	750 <sub>f9</sub>		
P.092	M42	24	5310	45	90	160	70	950	870	800 <sub>f9</sub>		
P.102	M42	24	5310	45	100	180	80	1050	960	850 <sub>f9</sub>		

## 5.20 Output shaft as hollow shaft with shrink disk

### INFORMATION



Ensure that the dimensions of the machine shaft correspond to the SEW-EURODRIVE specifications.

### INFORMATION

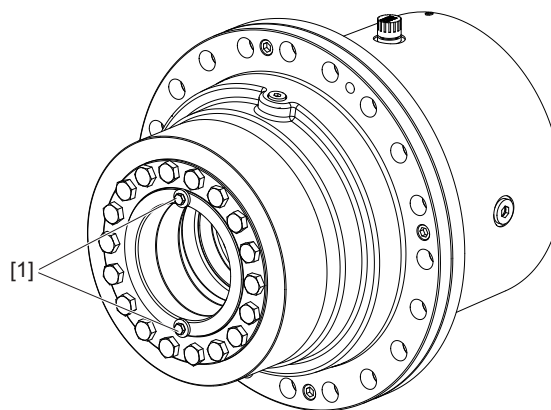


The material of the machine shaft should be dimensioned by the customer according to the loads that will occur. The shaft material should have a yield point of at least 320 N/mm<sup>2</sup>.

### INFORMATION



Note that the shrink disk is secured with 2 screws [1] on delivery. Remove the screws prior to assembly.



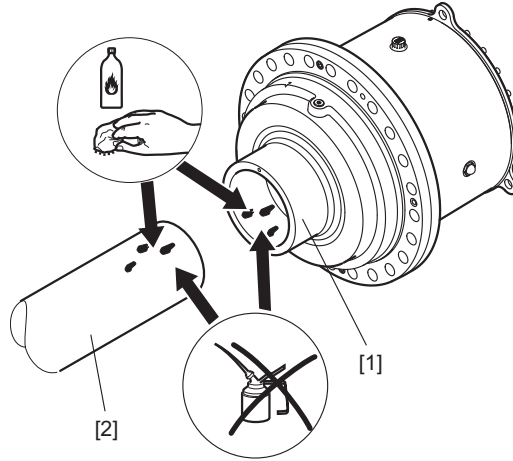
18014401949251467



## 5.20.1 Assembly

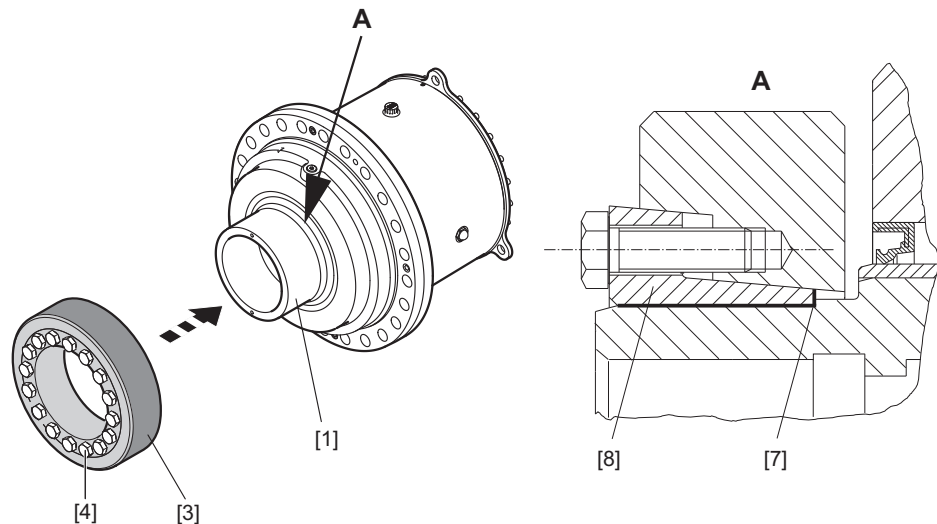
Observe the notes in chapter "Important information" (→ 61).

1. Before installing the shrink disk, clean and degrease the hub [1] and the machine shaft [2]. This is very important for reliable torque transmission.



9007200307592459

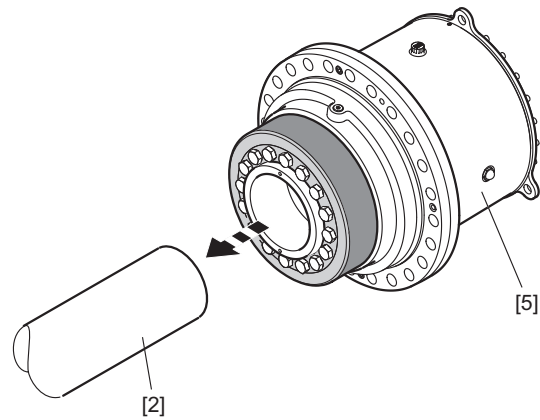
2. **▲ CAUTION!** The loose shrink disk could slip. Risk of injury to persons and damage to property. Secure the shrink disk against slipping. Slide the shrink disk with untightened screws onto the hollow shaft [1] and position the inner ring of the shrink disk [8].
3. **NOTICE!** Tightening the locking screws [4] without installed machine shaft may result in the hollow shaft being deformed. Possible damage to property. Only tighten the locking screws [4] with the machine shaft [2] installed. Check for correct position of the shrink disk [3]. The shrink disk is positioned correctly when it is in contact with the shaft shoulder [7].



18014399563015051

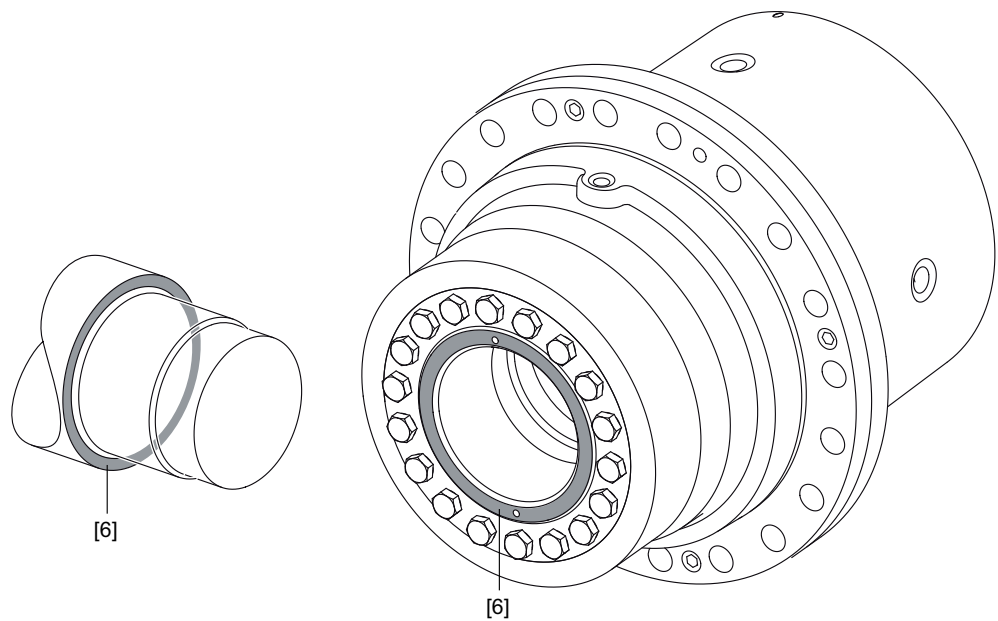


4. Install the machine shaft [2], or push the gear unit [5] onto the machine shaft [2] to the stop. Carry out the individual installation steps slowly to allow the compressed air to escape around the outside of the shaft.



9007200308277259

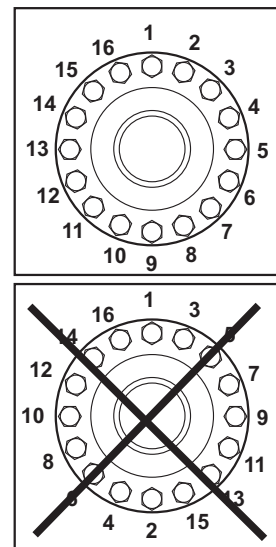
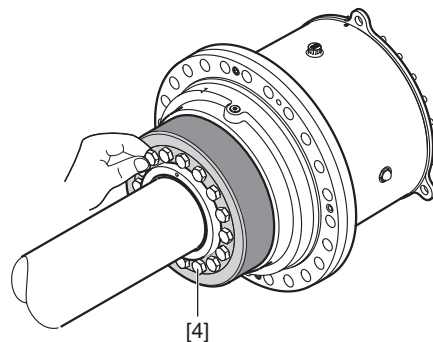
5. To guarantee a complete torque transmission from the gear unit to the machine shaft, observe the following procedure during assembly. Push the gear unit onto the machine shaft until the contact surfaces [6] touch.



18587815179

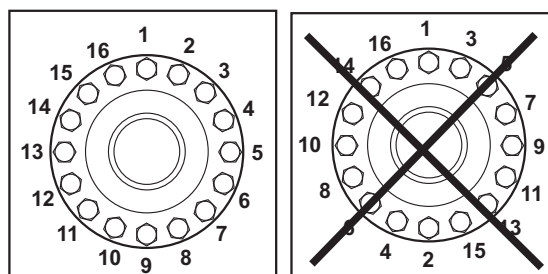
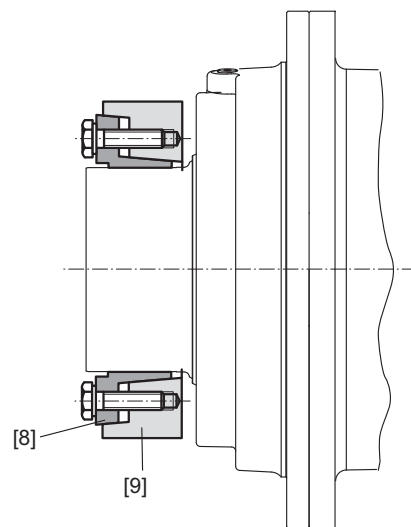
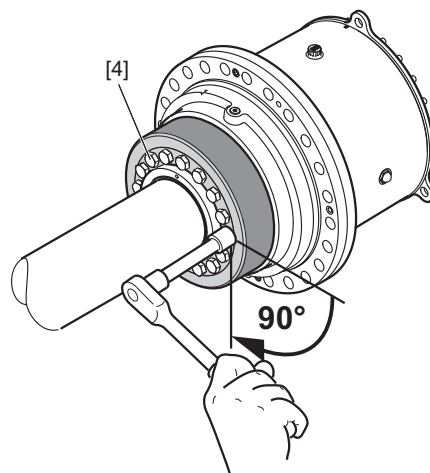


6. First tighten the locking screws [4] manually. Then tighten all locking screws by working round equally (not in diametrically opposite sequence) in 1/4 turn increments.



9007200308280459

7. Adhere to the tightening torque in the table below. Continue to tighten the locking screws [4] by working round in 1/4 turns until you reach the tightening torque.



18014399563025291

8. Verify the type details on your shrink disk and choose the tightening torque.



Shrink disk type	Size	Screws	Rated torque Nm	Tightening torque Nm ± 20%
3181	P.042	M20	194000	570
	P.052	M20	255000	570
	P.062	M24	405000	980
	P.072	M24	525000	980
	P.082	M24	720000	980
	P.092	M27	906000	1450
	P.102	M27	1160000	1450

## INFORMATION



The front end surfaces of inner ring [8] and outer ring [9] must not necessarily be flush when the locking screws are tightened.

For gear units with hollow shaft with shrink disk, a protection cover may be installed as an option. The protection cover provides protection against touching the rotating output shaft.

### ⚠ CAUTION



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

Possible injury to persons.

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

## 5.20.2 Removal



### ⚠ WARNING

Improper disassembly may cause the shrink disk and/or the gear unit to fall down.  
Serious injury.

- Never completely unscrew the shrink disk locking screw.
- Secure the shrink disk and the gear unit against slipping.

### 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.
- Shrink disks and corresponding parts of different gear units must not be swapped.

Observe the notes in chapter "Important information" (→ 61).

1. **NOTICE!** Improper loosening of the locking screws can lead to straining of the connecting surface. Possible damage to property.  
Loosen the locking screws [4] by a quarter turn one after the other to avoid straining the connecting surface.

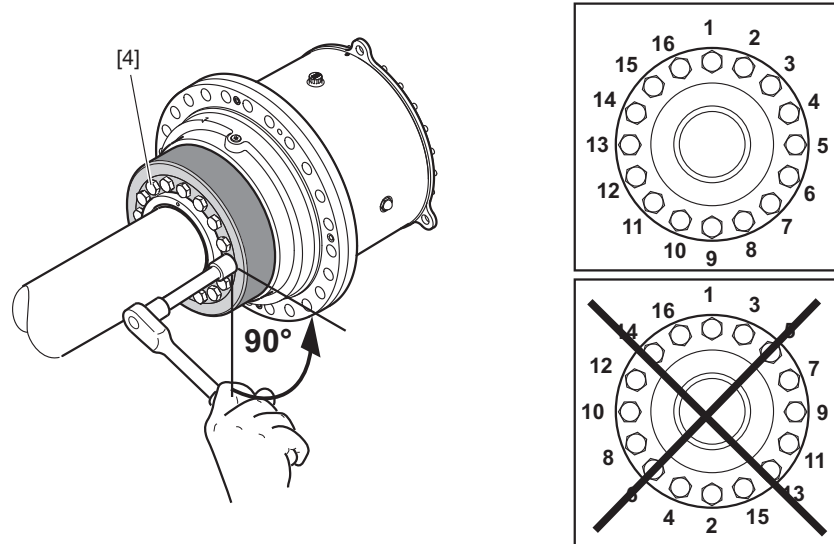


## INFORMATION



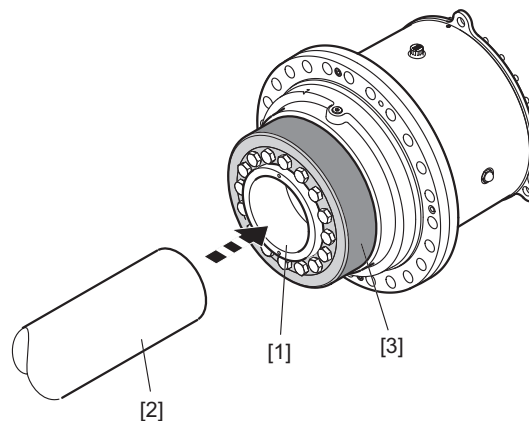
If the bevel (outer ring) [9] and the taper bushing (inner ring) [8] do not separate by themselves:

- Take the necessary number of locking screws and screw them evenly into the disassembly bores. Tighten the locking screws in several steps until the tapered bushing separates from the tapered ring.



9007200311656203

- Remove the machine shaft [2] or pull the hub [1] off the machine shaft. If rust has formed on the shaft in front of the hub, you must remove the rust first.



18014399566400395

- Remove the shrink disk [3] from the hub [1].



## 5.20.3 Cleaning and lubrication

**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.
- Used shrink disks have to be disassembled and cleaned. The manufacturer has applied a solid lubricant to the tapered surfaces (for example Weicon "Anti-Seize"). Use "Anti-Seize" for regreasing undamaged tapered surfaces. Grease screw threads with Weicon "Anti-Seize".
- Use a solid lubricant with a friction coefficient of  $\mu = 0.04$ .

Lubricant	Sold as
Molykote 321 R (lube coat)	Spray
Molykote spray (powder spray)	Spray
Molykote G Rapid	Spray or compound
Aemasol MO 19R	Spray or compound
Molykombin UMFT 1	Spray
Unimoly P5	Powder



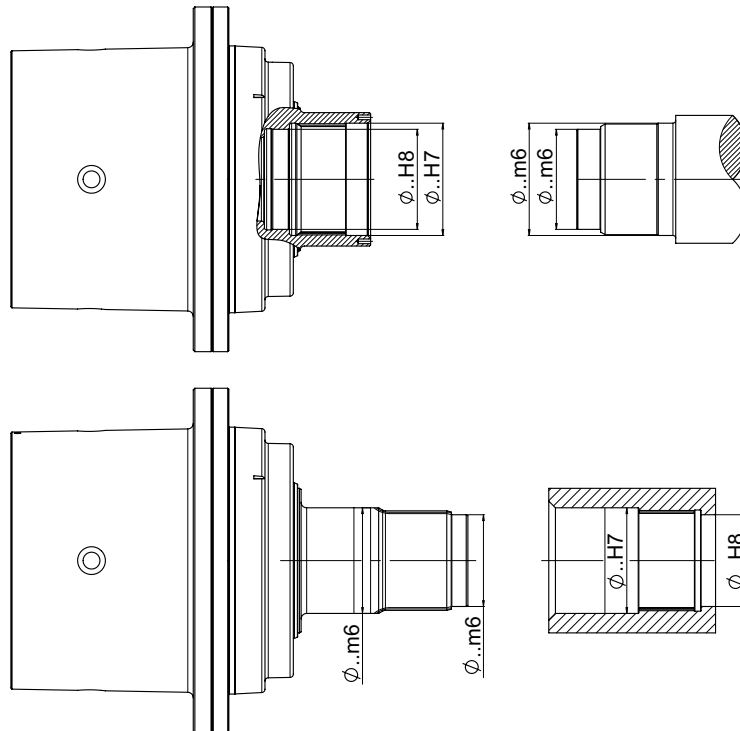
## 5.21 Gear unit with splining

### 5.21.1 Notes for mounting the gear unit

#### INFORMATION



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



9007214912962443

The specified tolerances for gear shaft and machine shaft correspond to the standard design. If requested by the customer, other tolerances of the gear shaft are possible.

#### NOTICE

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

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.



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

#### INFORMATION

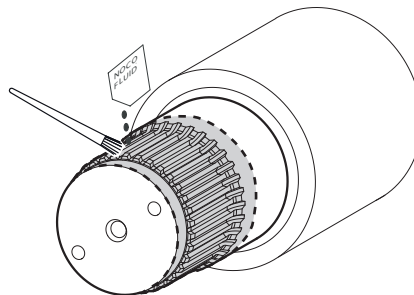


Make sure the dimensions of the machine shaft correspond to SEW-EURODRIVE specifications → see dimension sheet in your order documents.

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

Observe the notes in chapter "Important information" (→ 61).

1. Apply some NOCO® fluid on the machine shaft around the centering seat and the splining.



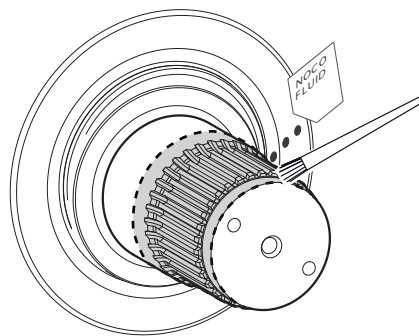
15633485323

2. Push the gear unit onto the machine shaft. The splining of the gear shaft must mesh with the splining of the machine shaft.
3. Make sure that the customer shaft is at the correct position in axial direction.

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

Observe the notes in chapter "Important information" (→ 61).

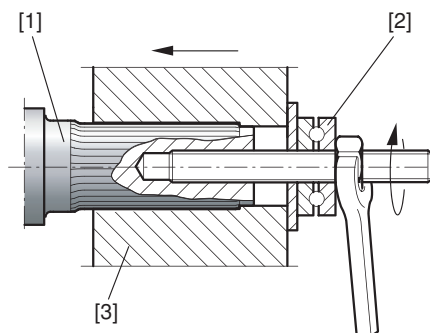
1. Apply some NOCO® fluid on the gear shaft around the centering seat and the splining.



15634076939

2. Push the gear unit onto the machine shaft. Use a mounting device, if necessary. The splining of the gear shaft must mesh with the splining of the machine shaft.





15637823371

- [1] Splined solid shaft
- [2] Thrust bearing
- [3] Coupling hub

3. Make sure that the customer shaft is at the correct position in axial direction.

### 5.21.3 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 gear shaft as a support for disassembly. Note that supporting on any other parts of the gear unit may damage the material.



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

Observe the notes in chapter "Important information" (→ 61).

### INFORMATION



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

---

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

Observe the notes in chapter "Important information" (→ 61).

### INFORMATION



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

---

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

Observe the notes in chapter "Important information" (→ 61).

### INFORMATION



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

---

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

Observe the notes in chapter "Important information" (→ 61).

### INFORMATION



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

---



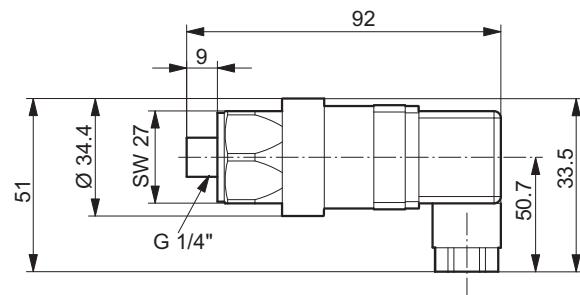
## 5.26 Pressure switch /PS

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

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

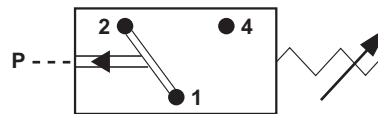
Another switch-off delay is not permitted as this might damage the gear unit.

### 5.26.1 Dimensions



721994635

### 5.26.2 Electrical connection



722003723

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

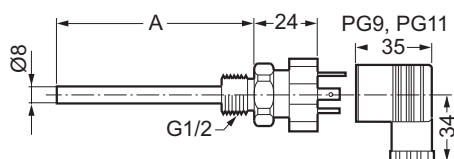
### 5.26.3 Technical data

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



## 5.27 Temperature sensor /PT100

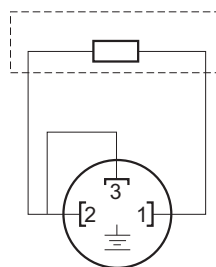
### 5.27.1 Dimensions



18014398868636427

A in mm
50
150

### 5.27.2 Electrical connection



359158539

[1][2] Resistor element connection

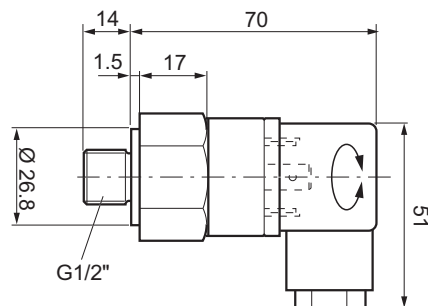
### 5.27.3 Technical data

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



## 5.28 Temperature switch /NTB

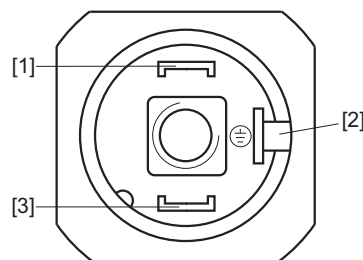
### 5.28.1 Dimensions



9007199621265931

### 5.28.2 Electrical connection

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



366532491

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

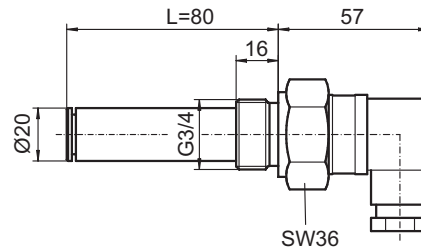
### 5.28.3 Technical data

- 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.



## 5.29 Temperature switch /TSK

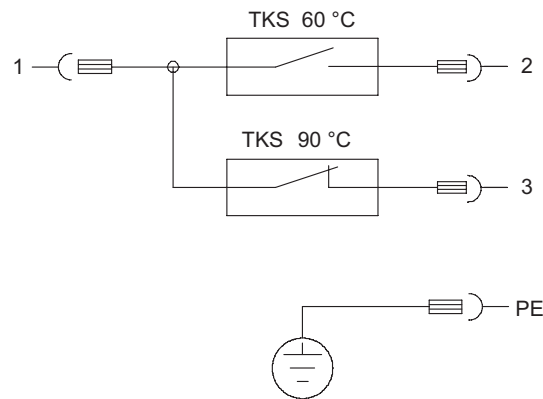
### 5.29.1 Dimensions



893872779

### 5.29.2 Electrical connection

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



27021598658101131

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

### 5.29.3 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 notes prior to startup.



#### ▲ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



#### ▲ WARNING

Danger due to freely accessible, rotating parts.

Severe or fatal injuries.

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



#### ▲ 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.



#### ▲ 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 valve.



**NOTICE**

Improper startup may result in damage to the gear unit.

Possible damage to property.

- Note the following information.

- Fill the gear unit with the oil grade specified on the nameplate. The oil quantity specified on the nameplate is an approximate quantity. The mark on the oil dipstick is the decisive indicator of the correct oil quantity. For additional information, refer to chapter "Checking the oil level" (→ 127).

When additional attachments, e.g. an oil supply system, are mounted to the gear unit, the required oil fill quantity is higher. In this case, observe the respective operating instructions "Oil Supply System" by SEW-EURODRIVE. For more information, refer to chapter "Changing the oil" (→ 132).

- The most important technical data is provided on the nameplate. Additional data relevant for operation is available in drawings, on the order confirmation or in any order-specific documentation.
- Prior to startup, make sure that monitoring devices (such as pressure switch, temperature switch) are fully operational.
- After having installed the gear unit, check to see that all retaining screws are tight.
- Make sure that the alignment has not changed after tightening the mounting elements.
- If there are any oil drain valves, ensure that they cannot be opened unintentionally.
- If an oil level glass is used for checking the oil level, ensure that it is protected against damage.
- It is essential that there is no open fire or risk of sparks when working on the gear unit.
- Make sure that the gear unit is grounded. Electrical mount-on components, such as motors, frequency inverters, etc. must be grounded separately.
- Protect the gear unit from falling objects.
- If the gear unit is equipped with a fan on the input shaft, check for free air intake within the specified angle.
- Ensure that the external coolant supply is guaranteed for gear units with circulation cooling, water cooling covers and water cooling cartridges.
- When operated in areas with low ambient temperatures, observe the limit temperature for gear unit startup. Allow for a sufficient heating period.
- Gear units with pressure lubrication may only be taken into operation when the pressure switch is connected.
- For gear units with long-term protection: Replace the screw plug at the location indicated on the gear unit with a breather plug (position → see order documents).
- Remove transport protection prior to startup.
- Observe the safety notes in the individual chapters.



**6.1.1 Permitted axial force**

For applications with axial loads, consult SEW-EURODRIVE.

**INFORMATION**

- Please consult SEW-EURODRIVE if you use the PH.. design in combination with overhung forces, or the PHF.. variant with flange mounting.
  - If only an axial load but no additional overhung load act on the output shaft, it is necessary that you contact SEW-EURODRIVE.
- 

**6.2 Shaft end pump /SEP****NOTICE**

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

Possible damage to property.

- Observe the following notes.
- 
- Do not start up the gear unit if the pressure switch is not connected.
  - It is essential that the gear unit is sufficiently lubricated from the very beginning. Contact SEW-EURODRIVE if the pump does not build up pressure within 20 seconds after the gear unit has been started up.
  - A minimum speed of  $\geq 400$  rpm is required for proper operation of the shaft end pump. If you use variable input speeds (e.g. inverter-controlled drives) or if you intend to change the input speed of a gear unit equipped with a shaft end pump, it is essential that you contact SEW-EURODRIVE.
  - An oil heater is mandatory when operating gear units with shaft end pump at low ambient temperatures. For more information, refer to chapter Limit temperature for gear unit startup.
  - Observe the notes in chapter "Filling the gear unit with oil" (→ 67).



### 6.3 Motor pump /ONP

#### **INFORMATION**



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

---

### 6.4 Motor pump/ONP1L

#### **INFORMATION**



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

---

### 6.5 Motor pump/ONP1

#### **INFORMATION**



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

---



## 6.6 Water cooling cartridge /CCT

### NOTICE

Risk of damage to the system due to power loss.

Possible damage to property.

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

### NOTICE

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

Possible damage to property.

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

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

Make the following checks:

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

## 6.7 Oil heater /OH

### NOTICE

Malfunctioning oil heater when changing the mounting position.

Possible damage to property.

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

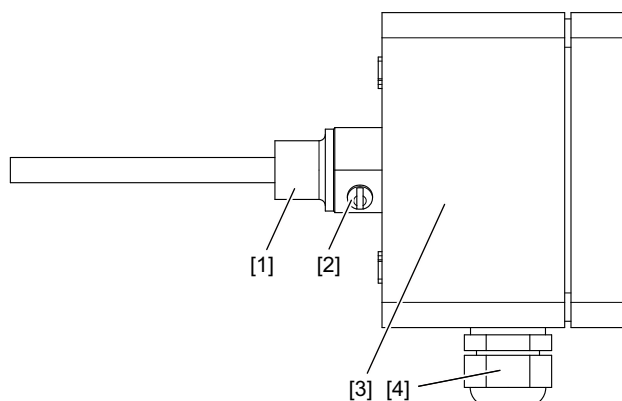
The oil heater comes equipped with cable glands and jumpers. They are included in the delivery of the heating elements and are already installed in the gear unit. The oil heater is connected to the current supply using terminal studs. They do not depend on the size of the heating element and always have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



### 6.7.1 Positioning the thermostat

The required position of the thermostat may vary depending on the installation space. Proceed as follows to position the thermostat:

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



2338432139

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

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

### INFORMATION



- Observe the manufacturer's documentation.

## 6.8 Starting up the gear unit at low ambient temperatures

### NOTICE

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

Possible damage to property.

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




## 6.9 Backstop /BS

**NOTICE**

Operating the motor in the blocking direction could destroy the backstop [1].

Possible damage to property

- Do not start up the motor in the blocking direction. Ensure a correct current supply to the motor, so that it rotates in the required direction. Operating the motor in the blocking direction could destroy the backstop [1].
- Observe the Addendum to the operating instructions when you change the blocking direction.
- When a backstop is used, additional values for the speed range that must be adhered can be found on the nameplate.



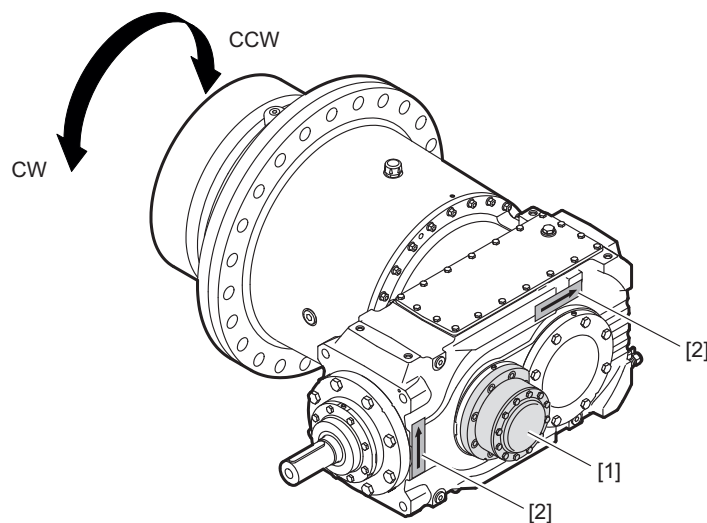
○ SEW-EURODRIVE		Bruchsal / Germany		○	
Type	PHF042/T X2KP110				
No.	01.7167312345.0001				
	Min	Norm	Max	i	226
PK1 [kW]	20.0	35.0	42.0	Fs	2.00
MK2 [Nm]	50000	50000	50000	PM [kW]	37.00
n1 [rpm]	820	1490	1738	Ta [°C]	0...30
n2 [rpm]	3.6	6.5	7.5	1743 895 0 EN	

- Operation that exceeds the speed range specified on the nameplate is not permitted.

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

- CW rotation
- CCW rotation

The permitted direction of rotation [2] is indicated on the housing.





## 6.10 Measuring surface and oil temperature

### 6.10.1 Measuring the surface temperature

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

The measurement can be made using standard thermometers. The surface temperature must be measured in a steady-state condition. The temperature must not exceed 100 °C.

Stop the drive immediately if the temperature is above this value. Contact SEW-EURODRIVE.

The measuring of the surface temperature depends on the mounting position of the planetary gear unit.

### 6.10.2 Measuring the oil temperature

The oil temperature must be measured to determine the oil change intervals.

See chapter "Lubricant change intervals" (→ 126) for a description. Measure the temperature at the bottom of the gear unit. If the gear unit has an oil drain plug, measure the temperature on this screw. Add 10 K to the measured value. This value is the basis for the oil change intervals.



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

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

---

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

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

---

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

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

---

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

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

---



## 6.15 Gear unit shutdown / gear unit conservation



### ▲ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



### INFORMATION

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

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

#### 6.15.1 Internal conservation

- **New or hardly used gear units:**
  - For internal conservation, SEW-EURODRIVE recommends the VCI conservation method.
  - Apply the required amount of VCI anti-corrosion agent to the inside of the gear unit (e.g. FUCHS LUBRITECH Anticorit VCI UNI IP-40, [www.fuchs-lubritech.com](http://www.fuchs-lubritech.com)). The amount depends on the free space inside the gear unit. Any existing oil may usually remain in the drive.
  - Replace the breather with a screw plug and close the gear unit so that it is air tight. Prior to startup, re-install the breather.
- **After longer gear unit operation:**
  - The oil might be contaminated (oil sludge, water, etc.) after long periods of operation. Therefore, drain the oil and thoroughly rinse the inside of the gear unit with new oil prior to conservation. Observe the information in chapter "Changing the oil" (→ 132) in the corresponding operating instructions. The inside of the gear unit can then be conserved as described above.



### INFORMATION

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

For gear units without contactless sealing systems, you may also use the oil type indicated on the nameplate to perform the conservation. In this case, the gear unit must be completely filled with clean oil. Replace the breather with a screw plug and fill in the oil from the highest point of the gear unit. In order to provide for sufficient conservation, all the gearing components and bearing points must be completely covered in oil.

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

#### 6.15.2 External corrosion protection

- Clean the respective surfaces.




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



### INFORMATION

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

Observe the information in chapter "Storage and transport conditions" (→  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 regarding inspection and maintenance

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

#### ▲ WARNING



Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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

#### ▲ WARNING



A customer machine that is not appropriately secured can fall during gear unit installation or removal.

Severe or fatal injuries.

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

#### ▲ WARNING



Danger due to using impermissible gear unit oil.

Severe or fatal injuries.

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

#### ▲ WARNING



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

Serious injury.

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

#### ▲ CAUTION



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

Minor injuries.

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





### ▲ CAUTION

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.

### NOTICE

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

Possible damage to property.

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

### NOTICE

Improper maintenance may result in damage to the gear unit.

Possible damage to property.

- Observe the following notes.

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

## 7.2 Inspection and maintenance intervals

Adhere to the following inspection and maintenance intervals:



Frequency	What is to be done?
Daily	<ul style="list-style-type: none"> <li>Check the housing temperature:                             <ul style="list-style-type: none"> <li>Mineral oil: max 90 °C</li> <li>Synthetic oil: max 100 °C</li> </ul> </li> <li>Check gear unit noise</li> </ul>
Once a month	<ul style="list-style-type: none"> <li>Check the gear unit for signs of leakage.</li> <li>Check the oil level.</li> </ul>
After 500 operating hours	<ul style="list-style-type: none"> <li>First oil change after initial startup</li> </ul>
Every 6 months	<ul style="list-style-type: none"> <li>Check the screw fittings and piping for leakage.</li> </ul>
Every 3000 operating hours, at least every 6 months	<ul style="list-style-type: none"> <li>Check the oil consistency.</li> <li>Fill regreasable sealing systems with grease.</li> <li>For V-belt drives: Check the belt tension and condition of the V-belt pulleys and belts.</li> </ul>
Depending on the operating conditions, at least every 12 months	<ul style="list-style-type: none"> <li>Check whether retaining screws are tightly secured.</li> <li>Check if the gear unit surface is free of dust and dirt, so that the gear unit can be optimally cooled.</li> <li>Check the condition of the motor pump/ONP. If required, replace filter element.</li> <li>Check the condition of the oil-water cooler/OWC (see addendum to the operating instructions).</li> <li>Check the condition of the oil-air cooler/OAC (see addendum to the operating instructions).</li> <li>Check the condition of the oil-water cooler/OWP, replace filter element if necessary (see addendum to the operating instructions).</li> <li>Check the condition of the oil-air cooling system/OAP. If required (see addendum to the operating instructions), replace the filter element.</li> <li>Clean the oil filter. If required, replace filter element.</li> <li>Check the condition of the water cooling cartridge/CCT.</li> <li>Check the condition of the water cooling cover/CCV.</li> <li>Check breather. If required, replace it.</li> <li>Check the alignment of the input and output shaft.</li> <li>Check the condition and tightness of all the rubber tubes (aging effects).</li> </ul>
At least every 3 years depending on the operating conditions (see figure on next page)	<ul style="list-style-type: none"> <li>Change mineral oil.</li> </ul>
At least every 5 years depending on the operating conditions (see figure on next page)	<ul style="list-style-type: none"> <li>Change synthetic oil.</li> </ul>
Varying (depending on external factors)	<ul style="list-style-type: none"> <li>Check the installed hose pipes.</li> <li>Clean the gear unit housing surface and the fan.</li> <li>Touch up or renew the surfaces/anti-corrosion coating.</li> <li>Replace backstop. The backstop might wear off when operated below lift-off speed. This is why you should contact SEW-EURODRIVE for defining the maintenance intervals for:                             <ul style="list-style-type: none"> <li>Speed on input shaft &lt; 950 1/min</li> <li>See backstop, chapter 4</li> </ul> </li> <li>Check built-in cooler (such as water cooling cover/CCT and cartridge/CCV) for deposits.</li> <li>Check the oil heater/OH (at same time as the oil change):                             <ul style="list-style-type: none"> <li>Are all connecting leads and terminals tightened securely and free from corrosion?</li> <li>Clean encrusted heating elements. Replace is required.</li> </ul> </li> </ul>



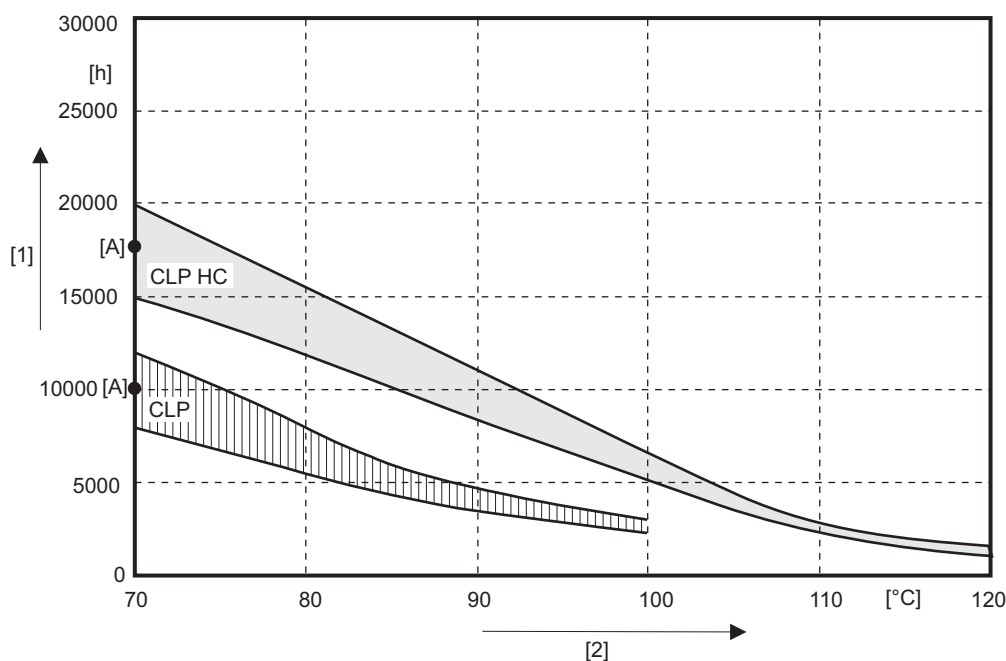
### 7.3 Lubricant change intervals

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

#### INFORMATION



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



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

#### INFORMATION



SEW-EURODRIVE recommends that the gear unit oil is analyzed regularly (see chapter "Checking the oil consistency" (→ 131)) to optimize the lubricant change intervals.



## 7.4 Checking the oil level

### 7.4.1 General information

Note the following when checking the oil level.

#### NOTICE

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

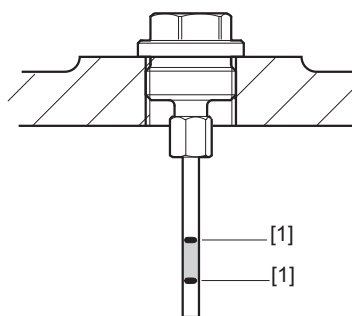
Possible damage to property.

- Check the oil level only when the gear unit is at standstill.
- For gear units in fixed and variable pivoted mounting position, observe the notes on the following pages.
- Elements for controlling the oil level, oil drain, and oil fill openings are indicated on the gear unit by safety symbols.
- Check the oil level again after a few operating hours.

### 7.4.2 Standard procedure

#### Oil dipstick

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).



27021598223908235

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



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

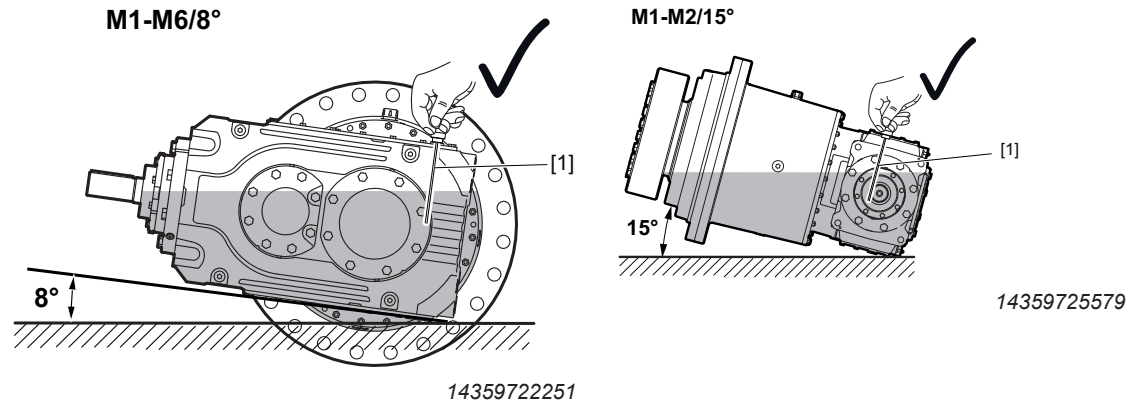
Observe the information on the nameplate and in the order documents.

#### Fixed pivoted mounting positions

##### Procedure

Check the oil level in the fixed, intended position. Observe the notes in chapter "Standard procedure" (→ 127).

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



[1] Oil dipstick

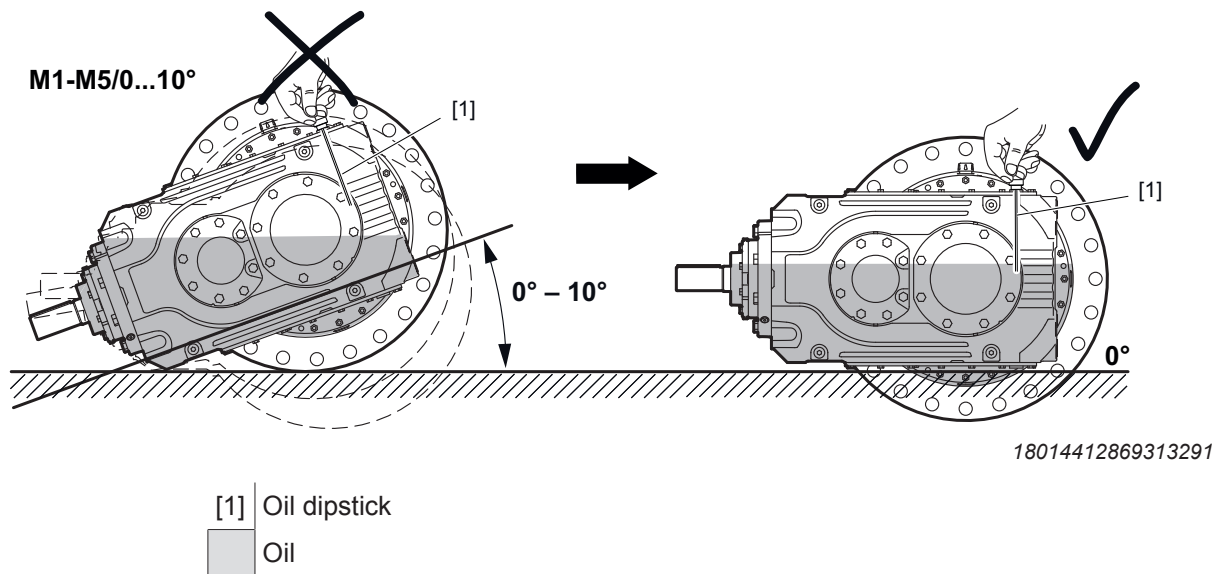


#### Variable pivoted mounting positions

##### 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" (→ 127).

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



[1] Oil dipstick

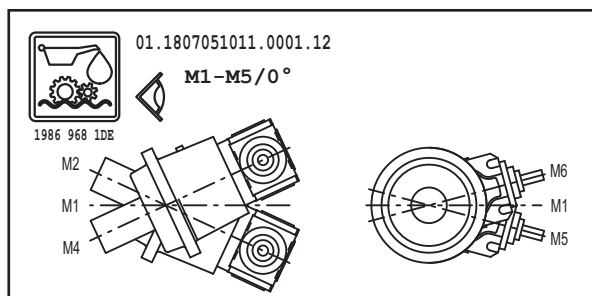




### Information sign

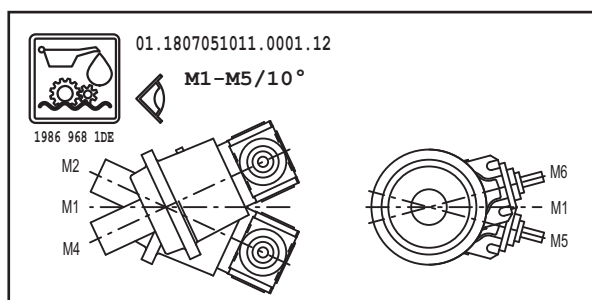
Observe the additional **information sign on the gear unit**. Check the oil level in the test mounting position specified on the information sign.

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



14623164683

The following figure shows an example of the information sign for check mounting position 10°.



14623167115

### Combination of fixed and variable pivoted mounting positions

#### Procedure

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

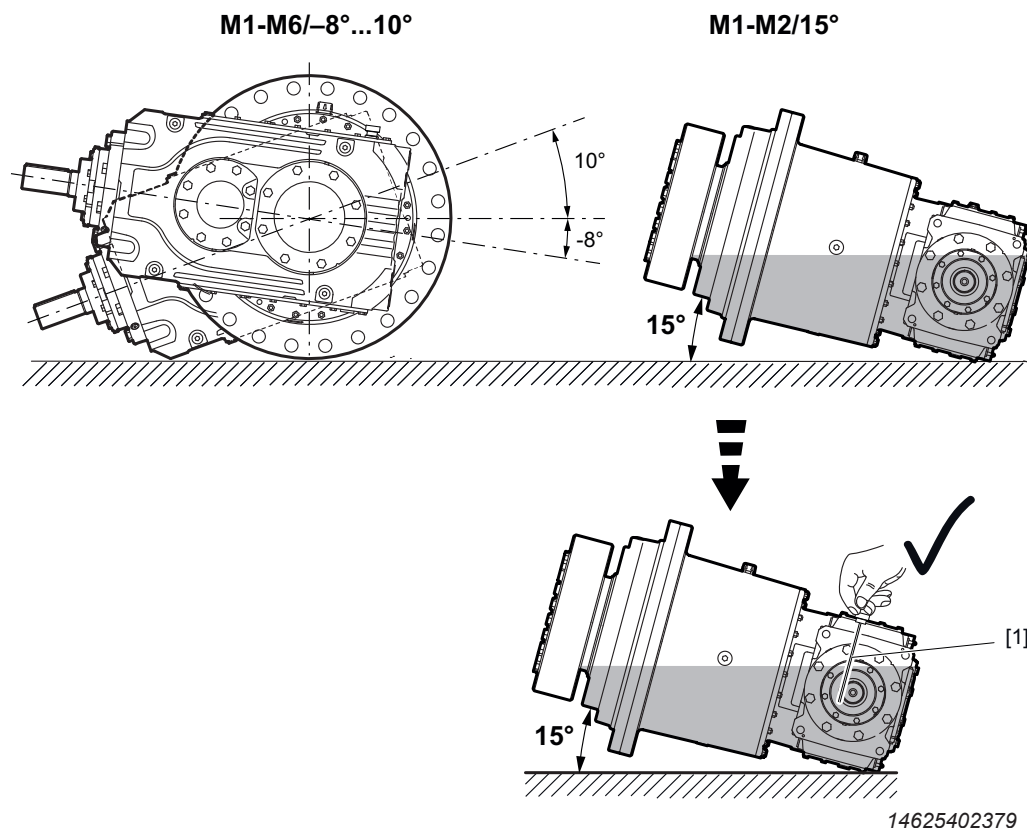
Before checking the oil level of gear units with fixed and variable pivoted mounting position, position the gear unit in the mounting position defined in the order documents. Observe the notes in chapter "Standard procedure" (→ 127).



# 7 Inspection/maintenance

## Checking the oil level

The following figure shows an example of the position that must be used to check the oil level.



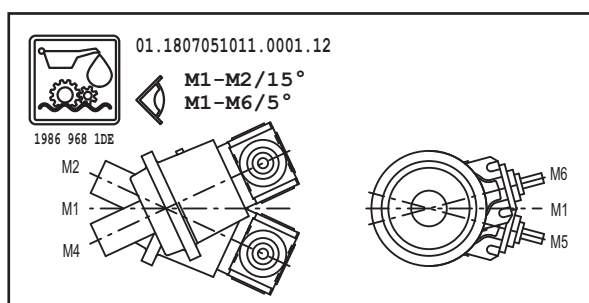
[1] Oil dipstick



### Information sign

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

The following figure shows an example of the information sign for check mounting position M1-M2/15° at M1-M6/5°.



14625406091

23039728/EN – 11/2016



## 7.5 Checking the oil consistency

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).

Proceed as follows to check the oil consistency:

1. Start the gear unit for a short time for the oil to mix with suspended particles.
2. Determine the oil drain position and place a container underneath.
3. **▲ WARNING!** Risk of burns due to hot gear unit and hot gear unit oil. Serious injury. Let the gear unit cool down before you start working on it. Remove the oil level plug and oil drain plug carefully.  
Open the oil drain carefully and drain some oil.
4. Close the oil drain valve.
5. Check the oil consistency:
  - Check the drained oil for appearance, color, and contamination.
  - If the oil sample is severely contaminated (e.g. water, color, dirt), consult a specialist to find out the cause.
  - For more detailed information on checking the oil for water content and viscosity, contact your lubricant manufacturer.



## 7.6 Changing the oil

### 7.6.1 Notes

Observe the following when changing the oil.



#### ▲ WARNING

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

Serious injury.

- Let the gear unit cool down before you start working on it.
- Carefully remove the oil level plug and the oil drain plug.

#### NOTICE

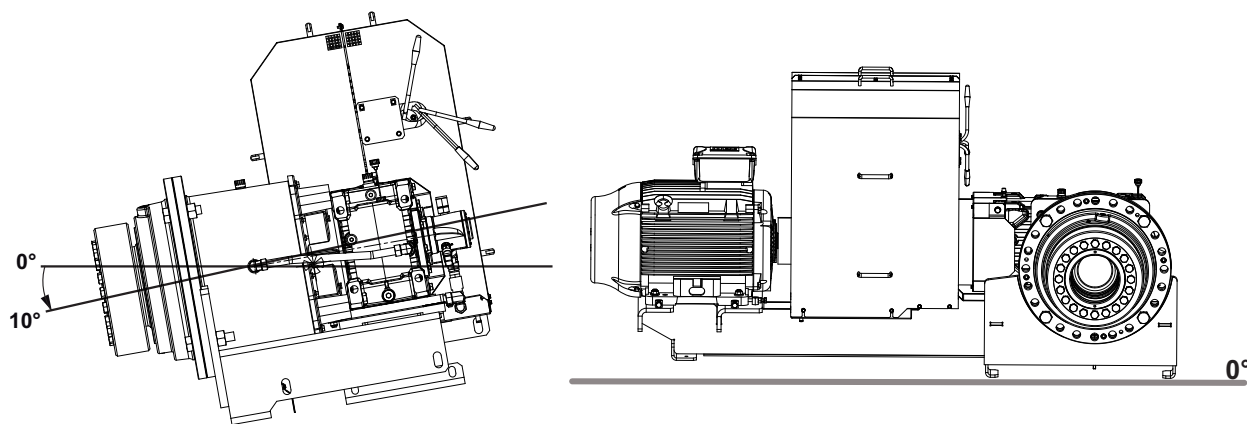
Improper oil change may result in damage to the gear unit.

Possible damage to property.

- Note the following information.
- Perform the oil change quickly after you have switched off the gear unit to prevent solids from settling. Drain the oil while it is still warm. Avoid oil temperatures well above 50 °C.
- Always fill the gear unit with the same oil grade as before. Mixing oils of different grades and/or manufacturers is not permitted. Especially synthetic oils may not be mixed with mineral oils or other synthetic oils. When switching from mineral oil and/or when switching from synthetic oil of one basis to synthetic oil of another basis, thoroughly flush the gear unit with the new oil grade.  
Refer to the lubricant table for information on the permitted oil of the various lubricant manufacturers.
- The oil grade and oil viscosity are listed on the nameplate of the gear unit. The oil quantity specified on the nameplate is an approximate quantity. The mark on the oil dipstick is the decisive indicator of the correct oil quantity.
- When changing the oil, flush the gear unit interior thoroughly with oil to remove oil sludge, oil residue, and abrasion. Use the same oil grade for this purpose as for operating the gear unit. Fill in fresh oil only after all residues have been removed.
- For the position of the oil level plug, oil drain plug and breather plug, refer to the order documents.
- An oil level above the max marking might indicate that foreign liquids (e.g. water) have entered. An oil level below the min marking might indicate a leakage. Find out and eliminate the cause before you fill in new oil.
- If required, empty accessories e.g. filters and pipes.
- Replace any damaged gaskets of the oil drain plug.
- If present, clean the magnetic oil drain plug and the oil dipstick with magnet tip.
- Empty the oil-bearing system of gear units with circulation lubrication and oil supply systems according to the manufacturer's maintenance instructions.
- Elements for controlling the oil level, oil drain, and oil fill openings are indicated on the gear unit by safety symbols.
- Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).



- Remove any dripping oil immediately with oil binding agent. Dispose of the used oil in accordance with applicable regulations.
- Before changing the oil, bring the gear unit into the following initial mounting position.

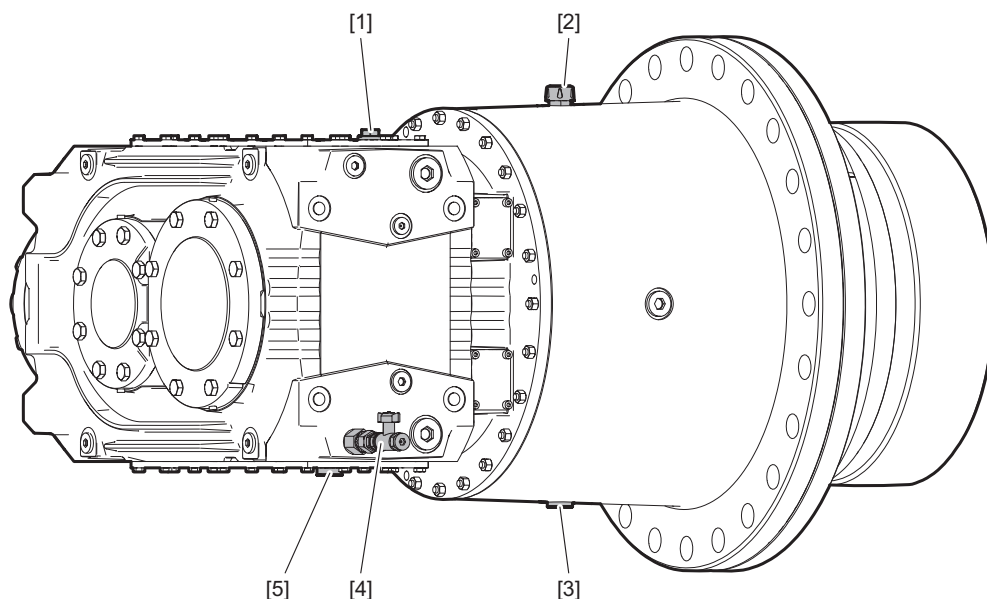


15026701835



#### 7.6.2 Procedure

The following figure shows an example of a gear unit.



14303237643

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).

1. Place a suitable container underneath the oil drain [3][4][5].
2. Open the oil drain valve [4].
3. Remove the oil dipstick [1] and the breather plugs [2].
4. Drain the oil into the container.

To completely drain the remaining oil remove the oil drain plugs [3][5].

5. Close the oil drain [3][4][5] appropriately.
6. Fill the oil via the openings [2].
  - Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).
  - Fill the gear unit with the oil grade specified on the nameplate. The oil quantity specified on the nameplate is an approximate quantity. The mark on the oil dipstick is the decisive indicator of the correct oil quantity, see chapter "Checking the oil level" (→ 127).
7. Insert the breather plug [2] and the oil dipstick [1].

#### ▲ CAUTION

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.





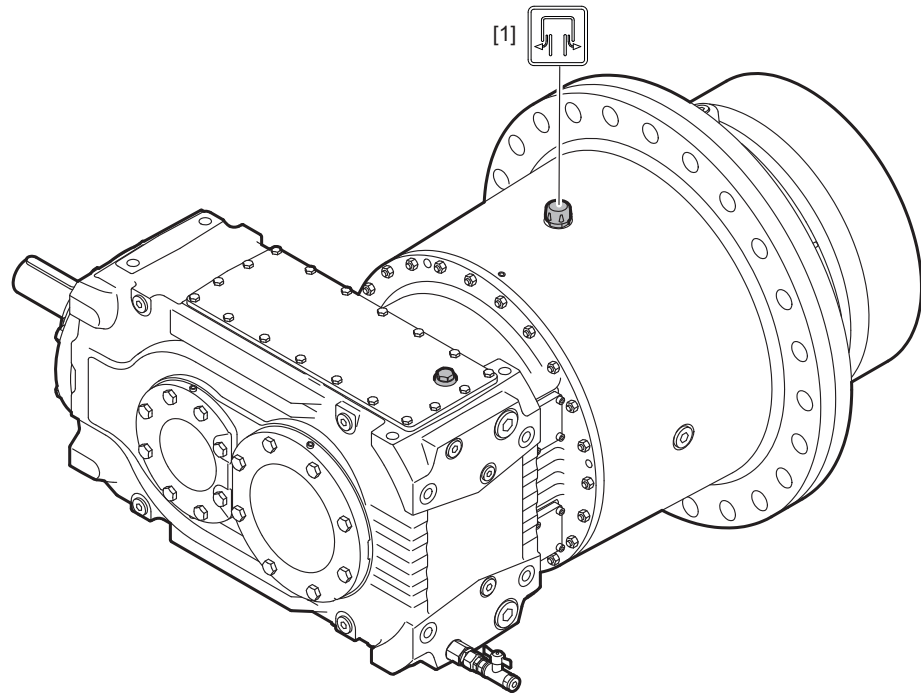
## 7.7 Checking and cleaning the breather

### NOTICE

Improper cleaning of the breather may damage the gear unit.

Possible damage to property.

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



14299527563

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).

1. Remove any deposits near the breather plug [1].
2. Replace clogged breather valves [1] with a new one.

### 7.7.1 Desiccant breather filters

#### Proper operation:

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

The service life of the filters usually is 12 months, after that time the filters must be replaced. In case the filters are operated in a highly contaminated environment, the service life of the filters can be limited to 2 months or less. Once the capacity of the filter is exhausted, the DES-CASE breather filters change their color from blue to pink, proceeding from the bottom of the filter to the top. In case the color changes from the top to the bottom, this indicates that a large amount of moisture is in the gear unit.

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



**Examples:**

False

Water in the gear unit

Determine the cause



False

Water in the gear unit

Determine the cause



Correct



Correct

**Inspection/maintenance****Proper operation of the breather**

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

The service life of the filters usually is 12 months, after that time the filters must be replaced. In case the filters are operated in a highly contaminated environment, the service life of the filters can be limited to 2 months or less. Once the capacity of the filter is exhausted, the breather changes its color from blue to pink, proceeding from the bottom of the filter to the top. In case the color changes from the top to the bottom, this indicates that a large amount of moisture is in the gear unit.

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



Examples:



False  
Water in the gear unit  
Determine the cause



False  
Water in the gear unit  
Determine the cause



Correct



Correct

*Disposal*

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



## 7.8 Refilling grease

### ▲ WARNING



Risk of crushing due to rotating parts.

Severe or fatal injuries.

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

### INFORMATION

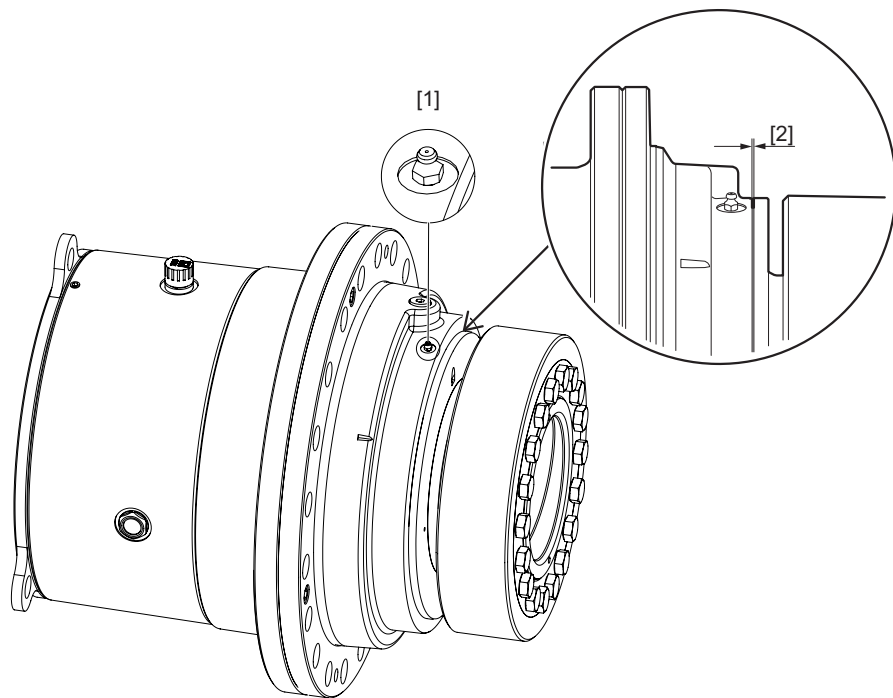


- Slowly turn the shaft when you relubricate the gaskets to ensure a better spreading of the grease.
- Immediately remove the old grease that leaked out.

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).

#### 7.8.1 Planetary gear unit

1. Use moderate pressure to force grease into each lubrication point [1] until grease leaks out of the sealing gap [2]. The grease must leak out evenly over the entire circumference of the sealing gap.



27021601999355915

### INFORMATION

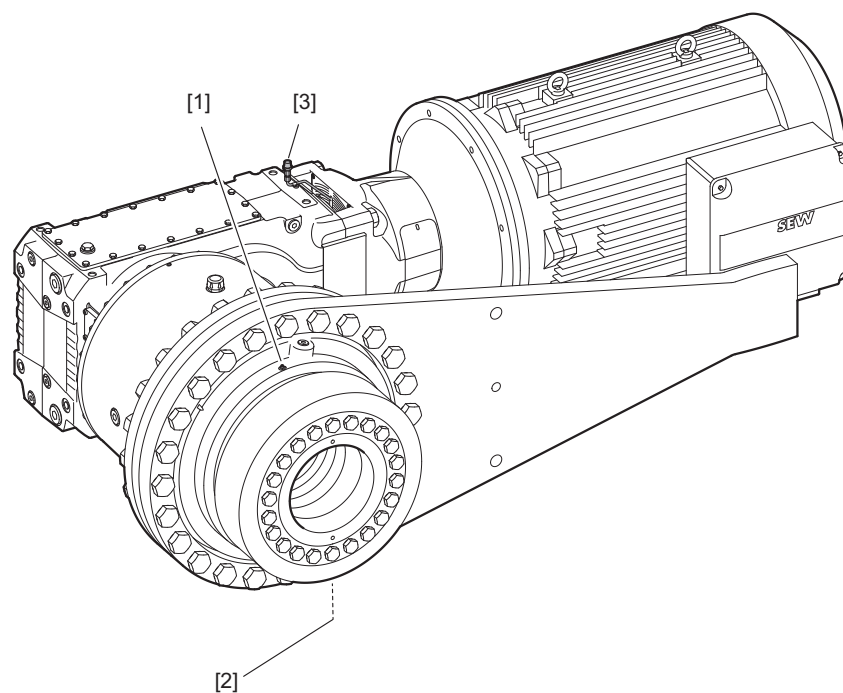


Immediately remove the old grease that leaked out. Old grease can leak out between labyrinth ring and output flange.



### 7.8.2 Bevel-helical gear unit

1. Use moderate pressure to force grease into lubrication point [3].



14419897483



## 7.9 Oil heater /OH

**▲ WARNING**

Danger of electric shock.

Severe or fatal injuries.

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

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).

1. Before disassembling the oil heater, "drain the oil completely" (→ 132).
2. **NOTICE!** Improper cleaning of the oil heater may damage the heating elements. Possible damage to property. Do not destroy the heating elements by scratching or scraping. Clean the tubular heating elements with solvent. Replace the defective heating elements.  
Disassemble the oil heater.
3. Apply LOCTITE® 577 to 2 threads and screw on the oil heater and tighten the hex head screw.
4. Close the oil drain valve.
5. Fill new oil of the same type as the old oil through the oil fill plug (if you want to change the oil type, contact our customer service first).
  - Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).
  - Fill in the oil according to the oil quantity specified on the nameplate. The oil quantity specified on the nameplate is an approximate value.
  - Check to see that the oil level is correct, refer to chapter "Checking the oil level" (→ 127).
6. Connect the oil heater.



## 7.10 Water cooling cartridge /CCT

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).

### INFORMATION



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

#### 7.10.1 Maintenance intervals

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

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

#### 7.10.2 Cleaning

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

### Safety notes



#### ▲ WARNING

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

Serious injury.

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



#### ▲ WARNING

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

Serious injury.

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



**NOTICE**

Risk of destroying components of the water cooling cartridge.

Possible damage to property.

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

**NOTICE**

Risk of contamination of the medium.

Possible damage to property.

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

**NOTICE**

Risk of damaging components of the water cooling cartridge.

Possible damage to property.

- Properly vent the water cooling cartridge and the connected systems before taking them into operation again.

**NOTICE**

Risk of contamination due to drained media.

Possible damage to property.

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

**Expansion**

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).

1. Unpressurize the water cooling cartridge and the connected system pipes. Shut them off with the corresponding valve.
2. Before "disassembly" (→ 132), drain all the gear unit oil.
3. Completely drain the cooling medium using the drain screws and/or drains provided for this purpose.
4. Loosen the water cooling cartridge by applying torque only to the head of the hex screw on the tube plate and remove the water cooling cartridge.
5. Remove the flat gasket. Remove any gasket residues from the sealing surface.
  - **NOTICE** Be careful not to damage the sealing surface.  
Possible damage to property.  
– Damage to the sealing surfaces can result in leakage.
6. Clean the water cooling cartridge.
7. Insert a new gasket and make sure it is seated properly. If present, replace the O-ring.



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

### Cleaning the inside of the water cooling cartridge

Observe the notes in the previous chapter.

#### NOTICE

Risk of corrosion due to scratches.

Possible damage to property.

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

#### NOTICE

Risk of damaging components of the water cooling cartridge.

Possible damage to property.


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

We recommend that you take the following measures for cleaning:

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




### 7.11 Fan /FAN

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→  123).

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

### 7.12 Motor pump /ONP

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→  123).


#### INFORMATION



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

---

### 7.13 Motor pump/ONP1L

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→  123).


#### INFORMATION



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

---

### 7.14 Motor pump/ONP1

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→  123).

#### INFORMATION



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

---



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

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).

#### INFORMATION



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

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

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).

#### INFORMATION



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



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

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).

**INFORMATION**

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

---

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

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).

**INFORMATION**

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

---

**7.19 Shaft end pump /SEP**

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 123).

**INFORMATION**

Observe the manufacturer's documentation before beginning inspection/maintenance work.

---



## 8 Permitted lubricants

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

### 8.1 Lubricant selection

Note the following when selecting the lubricants.

#### NOTICE

Selecting improper lubricants may damage the gear unit.

Possible damage to property.

- Observe the following notes.

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

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

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


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

**[www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants)**

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



## 8.2 Structure of the tables and abbreviations





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

9007217174587531

[1] Viscosity class

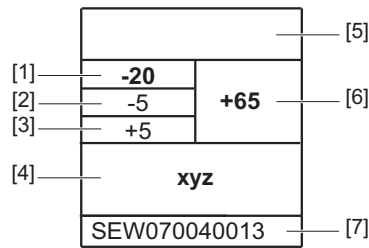
[2] Lubricant type

## Abbreviations

Icons	Designation
CLP	= Mineral oil
CLP HC	= Synthetic polyalphaolefin (PAO)
E	= Ester-based oil
	= Mineral lubricant
	= Synthetic lubricant
	= Lubricant for the food industry ( <b>NSF H1</b> -compliant)
	= Biodegradable oil (lubricant for agriculture, forestry, and water management)
1)	= Lubricants may only be used if service factor $F_s \geq 1.3$



### 8.3 Explanation of the various lubricants



18014416413363467

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

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

### 8.4 Explanation of the oil supply systems and the oil viscosity

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








- Motor pump for pressure lubrication /ONP
- Motor pump incl. air cooler for pressure lubrication /OAP
- Motor pump incl. water cooler for pressure lubrication /OWP

Exceptions are the shaft end pumps. They are designed for an oil viscosity of 5000 cSt.










## 8.5 Lubricant tables

This lubricant table is valid when the document is published. Please refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest version of the table.

DIN (ISO) API	ISO,SAE NLGI																															
VG 150 <sup>(1)</sup>	S0	<table><tr><td>-20</td><td>+65</td></tr><tr><td>-5</td><td></td></tr><tr><td>+5</td><td></td></tr></table>	-20	+65	-5		+5		<table><tr><td>-20</td><td>+65</td></tr><tr><td>-5</td><td></td></tr><tr><td>+5</td><td></td></tr></table>	-20	+65	-5		+5		<table><tr><td>-20</td><td>+65</td></tr><tr><td>-5</td><td></td></tr><tr><td>+5</td><td></td></tr></table>	-20	+65	-5		+5		<table><tr><td>-20</td><td>+65</td></tr><tr><td>-5</td><td></td></tr><tr><td>+5</td><td></td></tr></table>	-20	+65	-5		+5		Meropa 150	S0	
		-20	+65																													
		-5																														
		+5																														
-20	+65																															
-5																																
+5																																
-20	+65																															
-5																																
+5																																
-20	+65																															
-5																																
+5																																
<table><tr><td>-15</td><td>+75</td></tr><tr><td>0</td><td></td></tr><tr><td>+10</td><td></td></tr></table>	-15	+75	0		+10		<table><tr><td>-15</td><td>+75</td></tr><tr><td>0</td><td></td></tr><tr><td>+10</td><td></td></tr></table>	-15	+75	0		+10		<table><tr><td>-15</td><td>+75</td></tr><tr><td>0</td><td></td></tr><tr><td>+10</td><td></td></tr></table>	-15	+75	0		+10		<table><tr><td>-15</td><td>+75</td></tr><tr><td>0</td><td></td></tr><tr><td>+10</td><td></td></tr></table>	-15	+75	0		+10						
-15	+75																															
0																																
+10																																
-15	+75																															
0																																
+10																																
-15	+75																															
0																																
+10																																
-15	+75																															
0																																
+10																																
VG 220	S0	<table><tr><td>-15</td><td>+75</td></tr><tr><td>0</td><td></td></tr><tr><td>+10</td><td></td></tr></table>	-15	+75	0		+10		<table><tr><td>-15</td><td>+75</td></tr><tr><td>0</td><td></td></tr><tr><td>+10</td><td></td></tr></table>	-15	+75	0		+10		<table><tr><td>-15</td><td>+75</td></tr><tr><td>0</td><td></td></tr><tr><td>+10</td><td></td></tr></table>	-15	+75	0		+10		<table><tr><td>-15</td><td>+75</td></tr><tr><td>0</td><td></td></tr><tr><td>+10</td><td></td></tr></table>	-15	+75	0		+10		Meropa 220	S0	Carter EP 220
		-15	+75																													
		0																														
		+10																														
-15	+75																															
0																																
+10																																
-15	+75																															
0																																
+10																																
-15	+75																															
0																																
+10																																
<table><tr><td>-10</td><td>+85</td></tr><tr><td>+5</td><td></td></tr><tr><td>+15</td><td></td></tr></table>	-10	+85	+5		+15		<table><tr><td>-10</td><td>+85</td></tr><tr><td>+5</td><td></td></tr><tr><td>+15</td><td></td></tr></table>	-10	+85	+5		+15		<table><tr><td>-10</td><td>+85</td></tr><tr><td>+5</td><td></td></tr><tr><td>+15</td><td></td></tr></table>	-10	+85	+5		+15		<table><tr><td>-10</td><td>+85</td></tr><tr><td>+5</td><td></td></tr><tr><td>+15</td><td></td></tr></table>	-10	+85	+5		+15						
-10	+85																															
+5																																
+15																																
-10	+85																															
+5																																
+15																																
-10	+85																															
+5																																
+15																																
-10	+85																															
+5																																
+15																																
VG 320	S0	<table><tr><td>-10</td><td>+80</td></tr><tr><td>+5</td><td></td></tr><tr><td>+15</td><td></td></tr></table>	-10	+80	+5		+15		<table><tr><td>-10</td><td>+80</td></tr><tr><td>+5</td><td></td></tr><tr><td>+15</td><td></td></tr></table>	-10	+80	+5		+15		<table><tr><td>-10</td><td>+80</td></tr><tr><td>+5</td><td></td></tr><tr><td>+15</td><td></td></tr></table>	-10	+80	+5		+15		<table><tr><td>-10</td><td>+80</td></tr><tr><td>+5</td><td></td></tr><tr><td>+15</td><td></td></tr></table>	-10	+80	+5		+15		Meropa 320	S0	Carter EP 320
		-10	+80																													
		+5																														
		+15																														
-10	+80																															
+5																																
+15																																
-10	+80																															
+5																																
+15																																
-10	+80																															
+5																																
+15																																
<table><tr><td>-5</td><td>+90</td></tr><tr><td>+20</td><td></td></tr></table>	-5	+90	+20		<table><tr><td>-5</td><td>+90</td></tr><tr><td>+10</td><td></td></tr><tr><td>+20</td><td></td></tr></table>	-5	+90	+10		+20		<table><tr><td>-5</td><td>+90</td></tr><tr><td>+10</td><td></td></tr><tr><td>+20</td><td></td></tr></table>	-5	+90	+10		+20		<table><tr><td>-5</td><td>+90</td></tr><tr><td>+10</td><td></td></tr><tr><td>+20</td><td></td></tr></table>	-5	+90	+10		+20								
-5	+90																															
+20																																
-5	+90																															
+10																																
+20																																
-5	+90																															
+10																																
+20																																
-5	+90																															
+10																																
+20																																
VG 460	S0	<table><tr><td>-5</td><td>+90</td></tr><tr><td>+10</td><td></td></tr><tr><td>+20</td><td></td></tr></table>	-5	+90	+10		+20		<table><tr><td>-5</td><td>+90</td></tr><tr><td>+10</td><td></td></tr><tr><td>+20</td><td></td></tr></table>	-5	+90	+10		+20		<table><tr><td>-5</td><td>+90</td></tr><tr><td>+10</td><td></td></tr><tr><td>+20</td><td></td></tr></table>	-5	+90	+10		+20		<table><tr><td>-5</td><td>+90</td></tr><tr><td>+10</td><td></td></tr><tr><td>+20</td><td></td></tr></table>	-5	+90	+10		+20		Meropa 460	S0	Carter EP 460
		-5	+90																													
		+10																														
		+20																														
-5	+90																															
+10																																
+20																																
-5	+90																															
+10																																
+20																																
-5	+90																															
+10																																
+20																																
<table><tr><td>0</td><td>+90</td></tr><tr><td>+15</td><td></td></tr><tr><td>+25</td><td></td></tr></table>	0	+90	+15		+25		<table><tr><td>0</td><td>+90</td></tr><tr><td>+15</td><td></td></tr><tr><td>+25</td><td></td></tr></table>	0	+90	+15		+25		<table><tr><td>0</td><td>+90</td></tr><tr><td>+15</td><td></td></tr><tr><td>+25</td><td></td></tr></table>	0	+90	+15		+25		<table><tr><td>0</td><td>+90</td></tr><tr><td>+15</td><td></td></tr><tr><td>+25</td><td></td></tr></table>	0	+90	+15		+25						
0	+90																															
+15																																
+25																																
0	+90																															
+15																																
+25																																
0	+90																															
+15																																
+25																																
0	+90																															
+15																																
+25																																
VG 680	S0	<table><tr><td>0</td><td>+90</td></tr><tr><td>+15</td><td></td></tr><tr><td>+25</td><td></td></tr></table>	0	+90	+15		+25		<table><tr><td>0</td><td>+90</td></tr><tr><td>+15</td><td></td></tr><tr><td>+25</td><td></td></tr></table>	0	+90	+15		+25		<table><tr><td>0</td><td>+90</td></tr><tr><td>+15</td><td></td></tr><tr><td>+25</td><td></td></tr></table>	0	+90	+15		+25		<table><tr><td>0</td><td>+90</td></tr><tr><td>+15</td><td></td></tr><tr><td>+25</td><td></td></tr></table>	0	+90	+15		+25		Meropa 680	S0	Carter EP 680
		0	+90																													
		+15																														
		+25																														
0	+90																															
+15																																
+25																																
0	+90																															
+15																																
+25																																
0	+90																															
+15																																
+25																																
<table><tr><td>+5</td><td>+90</td></tr><tr><td>+20</td><td></td></tr><tr><td>+30</td><td></td></tr></table>	+5	+90	+20		+30		<table><tr><td>+5</td><td>+90</td></tr><tr><td>+20</td><td></td></tr><tr><td>+30</td><td></td></tr></table>	+5	+90	+20		+30		<table><tr><td>+5</td><td>+90</td></tr><tr><td>+20</td><td></td></tr><tr><td>+30</td><td></td></tr></table>	+5	+90	+20		+30		<table><tr><td>+5</td><td>+90</td></tr><tr><td>+20</td><td></td></tr><tr><td>+30</td><td></td></tr></table>	+5	+90	+20		+30						
+5	+90																															
+20																																
+30																																
+5	+90																															
+20																																
+30																																
+5	+90																															
+20																																
+30																																
+5	+90																															
+20																																
+30																																
VG 1000	S0	<table><tr><td>+5</td><td>+90</td></tr><tr><td>+20</td><td></td></tr><tr><td>+30</td><td></td></tr></table>	+5	+90	+20		+30		<table><tr><td>+5</td><td>+90</td></tr><tr><td>+20</td><td></td></tr><tr><td>+30</td><td></td></tr></table>	+5	+90	+20		+30		<table><tr><td>+5</td><td>+90</td></tr><tr><td>+20</td><td></td></tr><tr><td>+30</td><td></td></tr></table>	+5	+90	+20		+30		<table><tr><td>+5</td><td>+90</td></tr><tr><td>+20</td><td></td></tr><tr><td>+30</td><td></td></tr></table>	+5	+90	+20		+30		Meropa 1000	S0	
		+5	+90																													
		+20																														
		+30																														
+5	+90																															
+20																																
+30																																
+5	+90																															
+20																																
+30																																
+5	+90																															
+20																																
+30																																
<table><tr><td>+5</td><td>+90</td></tr><tr><td>+20</td><td></td></tr><tr><td>+30</td><td></td></tr></table>	+5	+90	+20		+30		<table><tr><td>+5</td><td>+90</td></tr><tr><td>+20</td><td></td></tr><tr><td>+30</td><td></td></tr></table>	+5	+90	+20		+30		<table><tr><td>+5</td><td>+90</td></tr><tr><td>+20</td><td></td></tr><tr><td>+30</td><td></td></tr></table>	+5	+90	+20		+30		<table><tr><td>+5</td><td>+90</td></tr><tr><td>+20</td><td></td></tr><tr><td>+30</td><td></td></tr></table>	+5	+90	+20		+30						
+5	+90																															
+20																																
+30																																
+5	+90																															
+20																																
+30																																
+5	+90																															
+20																																
+30																																
+5	+90																															
+20																																
+30																																







This lubricant table is valid when the document is published. Please refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest version of the table.

DIN (ISO) API	ISO, SAE NLGI									
	VG 32 <sup>1)</sup>			<div><div>-40</div><div>-30</div><div>-25</div><div>+30</div></div> <div>SHC 624</div>						
	VG 68 <sup>1)</sup>		<div><div>-35</div><div>-20</div><div>-10</div><div>+50</div></div> <div>Renolin Unisyn CLP 68</div>	<div><div>-40</div><div>-25</div><div>-15</div><div>+50</div></div> <div>SHC 626</div>	<div><div>-35</div><div>-20</div><div>-10</div><div>+50</div></div> <div>Klübersynth GEM 4-68 N</div>	<div><div>-40</div><div>-20</div><div>-10</div><div>+50</div></div> <div>Omala S4 GX 68</div>				
	VG 150 <sup>1)</sup>	<div><div>-25</div><div>-10</div><div>0</div><div>+70</div></div> <div>Optigear Synthetic X 150</div>	<div><div>-30</div><div>-10</div><div>+0</div><div>+70</div></div> <div>Renolin Unisyn CLP 150</div>	<div><div>-30</div><div>-10</div><div>0</div><div>+75</div></div> <div>SHC 629</div>	<div><div>-25</div><div>-10</div><div>0</div><div>70</div></div> <div>Klübersynth GEM 4-150 N</div>	<div><div>-30</div><div>-10</div><div>0</div><div>+75</div></div> <div>Omala S4 GX 150</div>	<div><div>-25</div><div>-10</div><div>0</div><div>+70</div></div> <div>Pinnacle EP 150</div>	<div><div>-35</div><div>-15</div><div>-5</div><div>+75</div></div> <div>Carter SH 150</div>		
CLP HC	VG 220	<div><div>-25</div><div>-5</div><div>+80</div></div> <div>Optigear Synthetic X 220</div>	<div><div>-25</div><div>-5</div><div>+5</div><div>+80</div></div> <div>Renolin Unisyn CLP 220</div>	<div><div>-20</div><div>0</div><div>+10</div><div>+75</div></div> <div>HighGear Synth 220</div>	<div><div>-25</div><div>-5</div><div>0</div><div>+85</div></div> <div>SHC 630</div>	<div><div>-30</div><div>-10</div><div>+5</div><div>+85</div></div> <div>SHC Gear 220</div>	<div><div>-25</div><div>-5</div><div>+5</div><div>+80</div></div> <div>Klübersynth GEM 4-220 N</div>	<div><div>-25</div><div>-5</div><div>+5</div><div>+85</div></div> <div>Omala S4 GX 220</div>	<div><div>-25</div><div>-5</div><div>+5</div><div>+80</div></div> <div>Pinnacle EP 220</div>	<div><div>-25</div><div>-5</div><div>+5</div><div>+80</div></div> <div>Carter SH 220</div>
	VG 320	<div><div>-20</div><div>0</div><div>+10</div></div> <div>Optigear Synthetic X 320</div>	<div><div>-20</div><div>0</div><div>+10</div></div> <div>Renolin Unisyn CLP 320</div>	<div><div>-15</div><div>0</div><div>+15</div><div>+85</div></div> <div>HighGear Synth 320</div>	<div><div>-20</div><div>0</div><div>+10</div><div>+95</div></div> <div>SHC 632</div>	<div><div>-25</div><div>-5</div><div>+10</div><div>+95</div></div> <div>SHC Gear 320</div>	<div><div>-20</div><div>0</div><div>+10</div><div>+95</div></div> <div>Klübersynth GEM 4-320 N</div>	<div><div>-20</div><div>0</div><div>+10</div><div>+95</div></div> <div>Omala S4 GX 320</div>	<div><div>-20</div><div>0</div><div>+10</div><div>+90</div></div> <div>Pinnacle EP 320</div>	<div><div>-20</div><div>0</div><div>+10</div><div>+90</div></div> <div>Carter SH 320</div>
	VG 460	<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>+100</div></div> <div>Renolin Unisyn CLP 460</div>	<div><div>-10</div><div>+5</div><div>+20</div><div>+95</div></div> <div>HighGear Synth 460</div>	<div><div>-15</div><div>+5</div><div>+15</div><div>+105</div></div> <div>SHC 634</div>	<div><div>-20</div><div>0</div><div>+15</div><div>+110</div></div> <div>SHC Gear 460</div>	<div><div>-15</div><div>+5</div><div>+20</div><div>+105</div></div> <div>Klübersynth GEM 4-460 N</div>	<div><div>-15</div><div>+5</div><div>+15</div><div>+105</div></div> <div>Omala S4 GX 460</div>	<div><div>-15</div><div>+5</div><div>+15</div><div>+100</div></div> <div>Pinnacle EP 460</div>	<div><div>-15</div><div>+5</div><div>+15</div><div>+100</div></div> <div>Carter SH 460</div>
	VG 680	<div><div>-10</div><div>+25</div></div> <div>Optigear Synthetic X 680</div>	<div><div>-10</div><div>+25</div><div>+110</div></div> <div>Renolin Unisyn CLP 680</div>	<div><div>-5</div><div>+10</div><div>+25</div><div>+110</div></div> <div>HighGear Synth 680</div>	<div><div>-10</div><div>+25</div><div>+110</div></div> <div>SHC 636</div>	<div><div>-15</div><div>+10</div><div>+25</div><div>+110</div></div> <div>SHC Gear 680</div>	<div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>Klübersynth GEM 4-680 N</div>	<div><div>-10</div><div>+10</div><div>+25</div><div>+110</div></div> <div>Omala S4 GX 680</div>		<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> <div>SHC 639</div>	<div><div>-10</div><div>+15</div><div>+30</div><div>+110</div></div> <div>SHC Gear 1000</div>	<div><div>0</div><div>+20</div><div>+30</div><div>+110</div></div> <div>Klübersynth EG4-1000</div>		

17909429899



This lubricant table is valid when the document is published. Please refer to [www.sew-eurodrive.de/lubricants](http://www.sew-eurodrive.de/lubricants) for the latest version of the table.

DIN (ISO) API	ISO,SAE NLGI				
CLP HC NSF H1	VG 68 <sup>1)</sup>	-35 -20 -10	+45 -40 -25 -15		-35 -20 -10
		Cassida Fluid HF 68	Optileb HY 68		Klüberoil 4UH1-68 N
		S0	S0		S0
	VG 220 <sup>1)</sup>	-20 -5 +5	+75 -25 -5 +5		-25 -5 +5
		Cassida Fluid GL 220	Optileb GT 220		Klüberoil 4UH1-220 N
		S0	S0		S0
E	VG 460 <sup>1)</sup>	-15 +5 +20	+90 -15 +5 +20		-15 +5 +15
		Cassida Fluid GL 460	Optileb GT 460		Klüberoil 4UH1-460 N
		S0	S0		S0
	VG 460			-15 +5 +15	-15 +5 +15
				Plantogear 460 S	Klüberbio CA2-460
				S0	S0

17909424523



## 8.6 Lubricant fill quantities

The specified lubricant fill quantities are **guide values** and apply only to the gear unit without mount-on components such as the oil supply system. The precise value varies depending on the gear ratio and the number of stages.

### INFORMATION



- P-X gear units are supplied without lubricant.
- The required oil quantity depends on the mark on the oil dipstick.
- In case of pivoted mounting positions, the lubricant fill quantity on the nameplate may vary from the standard. The fill quantity specified on the nameplate is a guide value. The required oil quantity depends on the respective marks on the oil dipstick.
- For variable pivoted mounting positions adhere to the control mounting position on the additional nameplate "Oil control angle".



The following table shows the lubricant quantities for splash lubrication.

X2K..	P042		P052		P062		P072		P082		P092		P102	
i <sub>tot</sub>	155- 285	≥285 -550	155- 285	≥285 -550	155- 285	≥285 -550	155- 285	≥285 -550	155- 285	≥285 -550	155- 285	≥285 -550	155- 285	≥285 -550
<b>110</b>	27	27	-	29	-	-	-	-	-	-	-	-	-	-
<b>130</b>	-	-	36	-	43	43	-	47	-	-	-	-	-	-
<b>150</b>	-	-	-	-	-	-	63	-	74	74	-	84		93
<b>170</b>	-	-	-	-	-	-		-	-	-	111	-	119	-



### 8.7 Sealing greases/rolling bearing greases

The table shows the grease types recommended by SEW-EURODRIVE for operating temperatures from -40 °C to 100 °C.

	Manufacturer	Grease
Default	Fuchs	<b>Renolit CX TOM 15 OEM<sup>1)</sup></b>
	Castrol	Spheerol EPL 2
	Klüber	Petamo GHY 133 N
	Shell	Gadus S2 V220 2
	Texaco	Mulifak EP2
	Total	Multis EP 2
	Bremer & Leguil	Cassida Grease GTS2 <sup>1)</sup>
	Fuchs	<b>Plantogel 2<sup>1)</sup></b>

1) Grease used by the factory should be preferred.

### INFORMATION



- The greases may only be interchanged within the same group. It is not permitted to mix different groups.
- If a customer wants to use a grease that is not listed in the table, the customer has to make sure that it is suitable for the intended application.



## 9 Malfunctions/remedy

### 9.1 Troubleshooting information

Read the following notes before you proceed with troubleshooting.



#### **▲ WARNING**

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



#### **▲ WARNING**

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

Serious injury.

- Let the gear unit cool down before you start working on it.
- Carefully remove the oil level plug and the oil drain plug.

#### **NOTICE**

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

Possible damage to property.

- Only qualified personnel is permitted to separate drive and motor and to carry out repair work on drives by SEW-EURODRIVE.
- Please contact the SEW-EURODRIVE Service.

### 9.2 Service

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

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

### 9.3 Possible malfunctions/remedy

Fault	Possible cause	Measure
Unusual noise in the area where the gear unit is mounted	<ul style="list-style-type: none"> <li>• Gear unit mounting has loosened</li> </ul>	<ul style="list-style-type: none"> <li>• Tighten retaining screws and nuts to the specified torque</li> <li>• Replace the damaged/defective retaining screws or nuts</li> </ul>



Fault	Possible cause	Measure
Operating temperature too high	<ul style="list-style-type: none"> <li>• Too much oil</li> <li>• Oil too old</li> <li>• The oil is heavily contaminated</li> <li>• Ambient temperature too high</li> </ul>	<ul style="list-style-type: none"> <li>• Check oil level, correct if necessary</li> <li>• Check when the oil was last changed; change the oil, if necessary</li> <li>• Analyze the oil to determine the cause; take measures, if necessary; change the oil</li> <li>• Protect the gear unit from external heat sources (e.g. provide shade)</li> </ul>
Operating temperature too high	<ul style="list-style-type: none"> <li>• Too much oil</li> <li>• Oil too old</li> <li>• The oil is heavily contaminated</li> <li>• Ambient temperature too high</li> <li>• Gear units with fan: Air intake opening/gear unit housing contaminated</li> <li>• For gear units with built-in cooling: Cooling liquid flow rate too low; cooling liquid temperature too high; deposits in cooling system</li> <li>• Malfunctions of the oil/air or oil-water cooling system</li> <li>• Malfunction in the water cooling (water cooling cover, water cooling cartridge)</li> </ul>	<ul style="list-style-type: none"> <li>• Check oil level, correct if necessary</li> <li>• Check when the oil was last changed; change the oil, if necessary</li> <li>• Analyze the oil to determine the cause; take measures, if necessary; change the oil</li> <li>• Protect the gear unit from external heat sources (e.g. provide shade)</li> <li>• Check air intake openings, clean them if necessary; clean the gear unit housing</li> <li>• Check the cooling liquid flow rate; check the entry temperature of the cooling liquid; clean the cooling system</li> <li>• Observe the separate operating instructions for the oil-water and oil-air cooling system.</li> <li>• Check the cooling water throughput and the entry temperature of the cooling water, clean the cooling system</li> </ul>
Temperature at bearing points too high	<ul style="list-style-type: none"> <li>• Not enough oil</li> <li>• Oil too old</li> <li>• Bearing damaged</li> </ul>	<ul style="list-style-type: none"> <li>• Check oil level, correct if necessary</li> <li>• Check when the oil was last changed; change the oil, if necessary</li> <li>• Check the bearing and replace it if necessary. Contact SEW-EURODRIVE.</li> </ul>
Oil leaking <ul style="list-style-type: none"> <li>• From cover plate</li> <li>• From inspection cover</li> <li>• From bearing cover</li> <li>• From mounting flange</li> </ul>	<ul style="list-style-type: none"> <li>• Seal not tight at: <ul style="list-style-type: none"> <li>– Cover plate</li> <li>– Inspection cover</li> <li>– Bearing cover</li> <li>– Mounting flange</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Tighten the bolts on the respective cover. Observe the gear unit. Contact SEW-EURODRIVE if oil is still leaking</li> </ul>



<b>Fault</b>	<b>Possible cause</b>	<b>Measure</b>
Oil leaking <sup>1)</sup> <ul style="list-style-type: none"> <li>From oil seal</li> </ul>	<ul style="list-style-type: none"> <li>Too much oil</li> <li>Sealing lip of the oil seal turned up</li> <li>Oil seal damaged/worn</li> </ul>	<ul style="list-style-type: none"> <li>Check oil level, correct if necessary</li> <li>Vent the gear unit, observe the gear unit. Contact SEW-EURODRIVE if oil is still leaking.</li> <li>Check oil seals; replace if necessary</li> </ul>
Oil leaking <ul style="list-style-type: none"> <li>At the gear unit breather</li> </ul>	<ul style="list-style-type: none"> <li>Too much oil</li> <li>Drive not installed in proper mounting position</li> <li>Frequent cold starts (oil foaming) and/or high oil level</li> </ul>	<ul style="list-style-type: none"> <li>Check oil level, correct if necessary</li> <li>Install gear unit breather correctly and adjust the oil level</li> <li>Install oil expansion tank</li> </ul>
Oil leaking <ul style="list-style-type: none"> <li>from the screw plug</li> <li>from the oil drain valve</li> </ul>	<ul style="list-style-type: none"> <li>Seal not tight</li> <li>Fittings loosened</li> </ul>	<ul style="list-style-type: none"> <li>Retighten screw</li> <li>Retighten the fitting and screw</li> </ul>
Gear unit does not reach cold start temperature	<ul style="list-style-type: none"> <li>Thermostat set incorrectly</li> <li>Oil heating defective or connected incorrectly</li> <li>Heat dissipation too great due to unfavorable climatic conditions</li> </ul>	<ul style="list-style-type: none"> <li>Check the setting of the thermostat</li> <li>Check the oil heater for proper connection and function; replace if necessary</li> <li>Protect the gear unit from cooling off during the warm-up phase</li> </ul>
Operating temperature at backstop too high, no blocking function	<ul style="list-style-type: none"> <li>Damaged/defective backstop</li> </ul>	<ul style="list-style-type: none"> <li>Check the backstop, replace it if necessary</li> <li>Contact SEW-EURODRIVE</li> </ul>
Malfunction in the oil-water or oil-air cooling system	<ul style="list-style-type: none"> <li>Malfunction of the oil-water or oil-air cooling system</li> </ul>	<ul style="list-style-type: none"> <li>Observe the separate operating instructions for the oil-water or oil-air cooling system.</li> </ul>

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

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



## 10 Address list

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



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



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



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



**Germany**

Würzburg SEW-EURODRIVE GmbH & Co KG  
Nürnbergerstraße 118  
97076 Würzburg-Lengfeld

Tel. +49 931 27886-60  
Fax +49 931 27886-66  
dc-wuerzburg@sew-eurodrive.de

Drive Service Hotline / 24 Hour Service

0 800 SEWHELP  
0 800 7394357

**Great Britain**

Assembly Normanton SEW-EURODRIVE Ltd.  
Sales DeVilliers Way  
Service Trident Park  
Normanton  
West Yorkshire  
WF6 1GX

Tel. +44 1924 893-855  
Fax +44 1924 893-702  
<http://www.sew-eurodrive.co.uk>  
info@sew-eurodrive.co.uk

Drive Service Hotline / 24 Hour Service

Tel. 01924 896911

**Greece**

Sales Athens Christ. Boznos & Son S.A.  
12, K. Mavromichali Street  
P.O. Box 80136  
18545 Piraeus

Tel. +30 2 1042 251-34  
Fax +30 2 1042 251-59  
<http://www.boznos.gr>  
info@boznos.gr

**Hungary**

Sales Budapest SEW-EURODRIVE Kft.  
Service Csillaghegyi út 13.  
1037 Budapest

Tel. +36 1 437 06-58  
Fax +36 1 437 06-50  
<http://www.sew-eurodrive.hu>  
office@sew-eurodrive.hu

**Iceland**

Sales Reykjavik Varma & Vélaverk ehf.  
Knarrarvogi 4  
104 Reykjavik

Tel. +354 585 1070  
Fax +354 585)1071  
<http://www.varmaverk.is>  
vov@vov.is

**India**

Registered Office Vadodara SEW-EURODRIVE India Private Limited  
Assembly Plot No. 4, GIDC  
Sales POR Ramangamdi • Vadodara - 391 243  
Service Gujarat

Tel. +91 265 3045200  
Fax +91 265 3045300  
<http://www.seweurodriveindia.com>  
salesvadodara@seweurodriveindia.com

Assembly Chennai SEW-EURODRIVE India Private Limited  
Sales Plot No. K3/1, Sipcot Industrial Park Phase II  
Service Mambakkam Village  
Sriperumbudur - 602105  
Kancheepuram Dist, Tamil Nadu

Tel. +91 44 37188888  
Fax +91 44 37188811  
saleschennai@seweurodriveindia.com

Pune SEW-EURODRIVE India Private Limited  
Plant: Plot No. D236/1,  
Chakan Industrial Area Phase- II,  
Warale, Tal- Khed,  
Pune-410501, Maharashtra

Tel. +91 21 35 628700  
Fax +91 21 35 628715  
salespune@seweurodriveindia.com

**Indonesia**

Sales Medan PT. Serumpun Indah Lestari  
Jl.Pulau Solor no. 8, Kawasan Industri Medan II  
Medan 20252

Tel. +62 61 687 1221  
Fax +62 61 6871429 / +62 61 6871458 / +62 61 30008041  
sil@serumpunindah.com  
serumpunindah@yahoo.com  
<http://www.serumpunindah.com>

Jakarta PT. Cahaya Sukses Abadi  
Komplek Rukan Puri Mutiara Blok A no 99,  
Sunter  
Jakarta 14350

Tel. +62 21 65310599  
Fax +62 21 65310600  
csajkt@cbn.net.id

Jakarta PT. Agrindo Putra Lestari  
Jl.Pantai Indah Selatan, Komplek Sentra Industri Terpadu, Pantai indah Kapuk Tahap III,  
Blok E No. 27  
Jakarta 14470

Tel. +62 21 2921-8899  
Fax +62 21 2921-8988  
aplindo@indosat.net.id  
<http://www.aplindo.com>



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



**Lebanon**

Sales (Lebanon)	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
Sales (Jordan, Kuwait , Beirut Saudi Arabia, Syria)		Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 <a href="http://www.medrives.com">http://www.medrives.com</a> info@medrives.com

**Lithuania**

Sales	Alytus	UAB Irseva Statybininku 106C 63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 <a href="http://www.irseva.lt">http://www.irseva.lt</a> irmantas@irseva.lt
-------	--------	---	--

**Luxembourg**

representation: Belgium

**Macedonia**

Sales	Skopje	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 <a href="http://www.boznos.mk">http://www.boznos.mk</a>
-------	--------	--	--

**Malaysia**

Assembly Sales Service	Johor	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
------------------------------	-------	---	---

**Mexiko**

Assembly Sales Service	Quéretaro	SEW-EURODRIVE MEXICO S.A. de C.V. SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Querétaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 <a href="http://www.sew-eurodrive.com.mx">http://www.sew-eurodrive.com.mx</a> scmexico@seweurodrive.com.mx
Sales Service	Puebla	SEW-EURODRIVE MEXICO S.A. de C.V. Calle Zavaleta No. 3922 Piso 2 Local 6 Col. Santa Cruz Buenavista C.P. 72154 Puebla, México	Tel. +52 (222) 221 248 <a href="http://www.sew-eurodrive.com.mx">http://www.sew-eurodrive.com.mx</a> scmexico@seweurodrive.com.mx

**Mongolia**

Technical Office	Ulaanbaatar	IM Trading LLC Naryn street 62 Union building, Suite A-403-1 Sukhbaatar district, Ulaanbaatar 14230	Tel. +976-77109997 Tel. +976-99070395 Fax +976-77109997 <a href="http://imt.mn/">http://imt.mn/</a> imt@imt.mn
------------------	-------------	---	--

**Morocco**

Sales Service	Bouskoura	SEW-EURODRIVE Morocco Parc Industriel CFCIM, Lot 55 and 59 Bouskoura	Tel. +212 522 88 85 00 Fax +212 522 88 84 50 <a href="http://www.sew-eurodrive.ma">http://www.sew-eurodrive.ma</a> sew@sew-eurodrive.ma
------------------	-----------	--	--

**Namibia**

Sales	Swakopmund	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 anton@dbminingnam.com
-------	------------	--	--

**Netherlands**

Assembly Sales Service	Rotterdam	SEW-EURODRIVE B.V. Industrieweg 175 3044 AS Rotterdam Postbus 10085 3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP <a href="http://www.sew-eurodrive.nl">http://www.sew-eurodrive.nl</a> info@sew-eurodrive.nl
------------------------------	-----------	---	--



New Zealand			
Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 <a href="http://www.sew-eurodrive.co.nz">http://www.sew-eurodrive.co.nz</a> <a href="mailto:sales@sew-eurodrive.co.nz">sales@sew-eurodrive.co.nz</a>
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 30 Lodestar Avenue, Wigram Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 <a href="mailto:sales@sew-eurodrive.co.nz">sales@sew-eurodrive.co.nz</a>
Nigeria			
Sales	Lagos	Greenpeg Nig. Ltd Plot 296A, Adeyemo Akapo Str. Omole GRA Ikeja Lagos-Nigeria	Tel. +234-701-821-9200-1 <a href="http://www.greenpeg ltd.com">http://www.greenpeg ltd.com</a> <a href="mailto:bolaji.adekunle@greenpeg ltd.com">bolaji.adekunle@greenpeg ltd.com</a>
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 <a href="http://www.sew-eurodrive.no">http://www.sew-eurodrive.no</a> <a href="mailto:sew@sew-eurodrive.no">sew@sew-eurodrive.no</a>
Pakistan			
Sales	Karachi	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Com- mercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 <a href="mailto:seweurodrive@cyber.net.pk">seweurodrive@cyber.net.pk</a>
Paraguay			
Sales	Fernando de la Mora	SEW-EURODRIVE PARAGUAY S.R.L De la Victoria 112, Esquina nueva Asunción Departamento Central Fernando de la Mora, Barrio Bernardino	Tel. +595 991 519695 Fax +595 21 3285539 <a href="mailto:sewpy@sew-eurodrive.com.py">sewpy@sew-eurodrive.com.py</a>
Peru			
Assembly Sales Service	Lima	SEW EURODRIVE DEL PERU S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 <a href="http://www.sew-eurodrive.com.pe">http://www.sew-eurodrive.com.pe</a> <a href="mailto:sewperu@sew-eurodrive.com.pe">sewperu@sew-eurodrive.com.pe</a>
Philippines			
Sales	Makati	P.T. Cerna Corporation 4137 Ponte St., Brgy. Sta. Cruz Makati City 1205	Tel. +63 2 519 6214 Fax +63 2 890 2802 <a href="mailto:mech_drive_sys@ptcerna.com">mech_drive_sys@ptcerna.com</a> <a href="http://www.ptcerna.com">http://www.ptcerna.com</a>
Poland			
Assembly Sales Service	Łódź	SEW-EURODRIVE Polska Sp.z o.o. ul. Techniczna 5 92-518 Łódź	Tel. +48 42 293 00 00 Fax +48 42 293 00 49 <a href="http://www.sew-eurodrive.pl">http://www.sew-eurodrive.pl</a> <a href="mailto:sew@sew-eurodrive.pl">sew@sew-eurodrive.pl</a>
	Service	Tel. +48 42 293 0030 Fax +48 42 293 0043	24 Hour Service Tel. +48 602 739 739 (+48 602 SEW SEW) <a href="mailto:serwis@sew-eurodrive.pl">serwis@sew-eurodrive.pl</a>
Portugal			
Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Av. da Fonte Nova, n.º 86 3050-379 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 <a href="http://www.sew-eurodrive.pt">http://www.sew-eurodrive.pt</a> <a href="mailto:infosew@sew-eurodrive.pt">infosew@sew-eurodrive.pt</a>
Romania			
Sales Service	Bucharest	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 <a href="mailto:sialco@sialco.ro">sialco@sialco.ro</a>
Russia			
Assembly Sales Service	St. Petersburg	ЗАО «СЕВ-ЕВРОДРАЙФ» а. я. 36 195220 Санкт-Петербург	Tel. +7 812 3332522 / +7 812 5357142 Fax +7 812 3332523 <a href="http://www.sew-eurodrive.ru">http://www.sew-eurodrive.ru</a> <a href="mailto:sew@sew-eurodrive.ru">sew@sew-eurodrive.ru</a>



**Sambia**

representation: South Africa

**Senegal**

Sales	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 <a href="http://www.senemeca.com">http://www.senemeca.com</a> <a href="mailto:senemeca@senemeca.sn">senemeca@senemeca.sn</a>
-------	-------	---	--

**Serbia**

Sales	Belgrade	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor 11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 <a href="mailto:office@dipar.rs">office@dipar.rs</a>
-------	----------	---	--

**Singapore**

Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 <a href="http://www.sew-eurodrive.com.sg">http://www.sew-eurodrive.com.sg</a> <a href="mailto:sewsingapore@sew-eurodrive.com">sewsingapore@sew-eurodrive.com</a>
------------------------------	-----------	---	--

**Slovakia**

Sales	Bratislava	SEW-Eurodrive SK s.r.o. Rybničná 40 831 06 Bratislava	Tel. +421 2 33595 202, 217, 201 Fax +421 2 33595 200 <a href="http://www.sew-eurodrive.sk">http://www.sew-eurodrive.sk</a> <a href="mailto:sew@sew-eurodrive.sk">sew@sew-eurodrive.sk</a>
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 Mobile +421 907 671 976 <a href="mailto:sew@sew-eurodrive.sk">sew@sew-eurodrive.sk</a>

**Slovenia**

Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. Ul. XIV. divizije 14 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 <a href="mailto:pakman@siol.net">pakman@siol.net</a>
------------------	-------	--	---

**South Africa**

Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 248-7289 <a href="http://www.sew.co.za">http://www.sew.co.za</a> <a href="mailto:info@sew.co.za">info@sew.co.za</a>
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 <a href="mailto:bgriffiths@sew.co.za">bgriffiths@sew.co.za</a>
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospect Road Isipingo Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 902 3815 Fax +27 31 902 3826 <a href="mailto:cdejager@sew.co.za">cdejager@sew.co.za</a>
	Nelspruit	SEW-EURODRIVE (PROPRIETARY) LIMITED 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 <a href="mailto:robermeyer@sew.co.za">robermeyer@sew.co.za</a>

**South Korea**

Assembly Sales Service	Ansan	SEW-EURODRIVE KOREA CO., LTD. 7, Dangjaengi-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 <a href="http://www.sew-eurodrive.kr">http://www.sew-eurodrive.kr</a> <a href="mailto:master.korea@sew-eurodrive.com">master.korea@sew-eurodrive.com</a>
------------------------------	-------	--	--



South Korea			
	Busan	SEW-EURODRIVE KOREA CO., LTD. 28, Noksansandan 262-ro 50beon-gil, Gangseo-gu, Busan, Zip 618-820	Tel. +82 51 832-0204 Fax +82 51 832-0230
Spain			
Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 <a href="http://www.sew-eurodrive.es">http://www.sew-eurodrive.es</a> <a href="mailto:sew.spain@sew-eurodrive.es">sew.spain@sew-eurodrive.es</a>
Sri Lanka			
Sales	Colombo	SM International (Pte) Ltd 254, Galle Raod Colombo 4, Sri Lanka	Tel. +94 1 2584887 Fax +94 1 2582981
Swaziland			
Sales	Manzini	C G Trading Co. (Pty) Ltd PO Box 2960 Manzini M200	Tel. +268 2 518 6343 Fax +268 2 518 5033 <a href="mailto:engineering@cgtrading.co.sz">engineering@cgtrading.co.sz</a>
Sweden			
Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 553 03 Jönköping Box 3100 S-550 03 Jönköping	Tel. +46 36 34 42 00 Fax +46 36 34 42 80 <a href="http://www.sew-eurodrive.se">http://www.sew-eurodrive.se</a> <a href="mailto:jonkoping@sew.se">jonkoping@sew.se</a>
Switzerland			
Assembly Sales Service	Basel	Alfred Imhof A.G. Jurastrasse 10 4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 <a href="http://www.imhof-sew.ch">http://www.imhof-sew.ch</a> <a href="mailto:info@imhof-sew.ch">info@imhof-sew.ch</a>
Taiwan			
Sales	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Huw S. Road Taipei	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 <a href="mailto:sewtwn@ms63.hinet.net">sewtwn@ms63.hinet.net</a> <a href="http://www.tingshou.com.tw">http://www.tingshou.com.tw</a>
	Nan Tou	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878 <a href="mailto:sewtwn@ms63.hinet.net">sewtwn@ms63.hinet.net</a> <a href="http://www.tingshou.com.tw">http://www.tingshou.com.tw</a>
Tanzania			
Sales	Daressalam	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam	Tel. +255 0 22 277 5780 Fax +255 0 22 277 5788 <a href="http://www.sew-eurodrive.co.tz">http://www.sew-eurodrive.co.tz</a> <a href="mailto:info@sew.co.tz">info@sew.co.tz</a>
Thailand			
Assembly Sales Service	Chonburi	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 <a href="mailto:sewthailand@sew-eurodrive.com">sewthailand@sew-eurodrive.com</a>
Tunisia			
Sales	Tunis	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 <a href="http://www.tms.com.tn">http://www.tms.com.tn</a> <a href="mailto:tms@tms.com.tn">tms@tms.com.tn</a>
Turkey			
Assembly Sales Service	Kocaeli-Gebze	SEW-EURODRIVE Hareket Sistemleri San. Ve TIC. Ltd. Sti Gebze Organize Sanayi Böl. 400 Sok No. 401 41480 Gebze Kocaeli	Tel. +90 262 9991000 04 Fax +90 262 9991009 <a href="http://www.sew-eurodrive.com.tr">http://www.sew-eurodrive.com.tr</a> <a href="mailto:sew@sew-eurodrive.com.tr">sew@sew-eurodrive.com.tr</a>



**Ukraine**

Assembly Sales Service	Dnipropetrovsk	ООО «СЕВ-Евродрайв» ул. Рабочая, 23-В, офис 409 49008 Днепропетровск	Tel. +380 56 370 3211 Fax +380 56 372 2078 <a href="http://www.sew-eurodrive.ua">http://www.sew-eurodrive.ua</a> <a href="mailto:sew@sew-eurodrive.ua">sew@sew-eurodrive.ua</a>
------------------------------	----------------	--	--

**Uruguay**

Assembly Sales	Montevideo	SEW-EURODRIVE Uruguay, S. A. Jose Serrato 3569 Esquina Corumbe CP 12000 Montevideo	Tel. +598 2 21181-89 Fax +598 2 21181-90 <a href="mailto:sewuy@sew-eurodrive.com.uy">sewuy@sew-eurodrive.com.uy</a>
-------------------	------------	--	---

**USA**

Production Assembly Sales Service	Southeast Region	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Production +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 <a href="http://www.seweurodrive.com">http://www.seweurodrive.com</a> <a href="mailto:cslyman@seweurodrive.com">cslyman@seweurodrive.com</a>
Assembly Sales Service	Northeast Region	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 <a href="mailto:csbridgeport@seweurodrive.com">csbridgeport@seweurodrive.com</a>
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 <a href="mailto:cstroy@seweurodrive.com">cstroy@seweurodrive.com</a>
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 <a href="mailto:csdallas@seweurodrive.com">csdallas@seweurodrive.com</a>
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 <a href="mailto:cshayward@seweurodrive.com">cshayward@seweurodrive.com</a>
	Wellford	SEW-EURODRIVE INC. 148/150 Finch Rd. Wellford, S.C. 29385	<a href="mailto:IGLogistics@seweurodrive.com">IGLogistics@seweurodrive.com</a>

Additional addresses for service provided on request!

**Uzbekistan**

Technical Office	Tashkent	SEW-EURODRIVE LLP Representative office in Uzbekistan 96A, Sharaf Rashidov street, Tashkent, 100084	Tel. +998 71 2359411 Fax +998 71 2359412 <a href="http://www.sew-eurodrive.uz">http://www.sew-eurodrive.uz</a> <a href="mailto:sew@sew-eurodrive.uz">sew@sew-eurodrive.uz</a>
------------------	----------	--	--

**Vietnam**

Sales	Ho Chi Minh City	Nam Trung Co., Ltd Huế - South Vietnam / Construction Materials 250 Binh Duong Avenue, Thu Dau Mot Town, Binh Duong Province HCM office: 91 Tran Minh Quyen Street District 10, Ho Chi Minh City	Tel. +84 8 8301026 Fax +84 8 8392223 <a href="mailto:khanh-nguyen@namtrung.com.vn">khanh-nguyen@namtrung.com.vn</a> <a href="http://www.namtrung.com.vn">http://www.namtrung.com.vn</a>
	Hanoi	MICO LTD Quảng Trị - North Vietnam / All sectors except Construction Materials 8th Floor, Ocean Park Building, 01 Dao Duy Anh St, Ha Noi, Viet Nam	Tel. +84 4 39386666 Fax +84 4 3938 6888 <a href="mailto:nam_ph@micogroup.com.vn">nam_ph@micogroup.com.vn</a> <a href="http://www.micogroup.com.vn">http://www.micogroup.com.vn</a>



## Index

### A

Ambient conditions ..... 63

### B

#### Backstop

Maintenance intervals ..... 124

Startup ..... 118

Structure ..... 49

Bearing greases ..... 154

Belt pulley ..... 70

### C

CCW rotation ..... 49

Change of mounting position ..... 116

Check the oil consistency ..... 131

Checking and cleaning the venting ..... 135

Checking the oil level ..... 127

Notes on the procedure for fixed and variable  
pivoted mounting positions ..... 128

Standard procedure ..... 127

Circulation cooling ..... 44

Cooling types ..... 44

Copyright notice ..... 9

Corrosion and surface protection ..... 42

Couplings ..... 72

Mounting tolerance ..... 72

Customer service ..... 155

CW rotation ..... 49

### D

Direction of rotation dependencies ..... 36

DUO10A diagnostic unit ..... 55

### E

Embedded safety notes ..... 8

Exclusion of liability ..... 9

Exterior corrosion protection ..... 23

### F

#### Failure

Backstop ..... 157

Cold start temperature ..... 157

Oil leaking ..... 157

Operating temperature ..... 156

Fan ..... 44

Installation ..... 80

Maintenance ..... 144

Fan cooling ..... 44

#### Fixed pivoted mounting position

Checking the oil level ..... 128

Definition ..... 30

Flange-mounted design ..... 96

### G

Gear unit oil ..... 147

Gear unit venting ..... 40

Gear unit with solid shaft ..... 70

### H

#### Hazard symbols

Meaning ..... 8

Hollow shaft ..... 97

### I

IEC ..... 48

#### Information

Designation in the documentation ..... 7

Inspection intervals ..... 124

Installing the gear unit ..... 65

Internal conservation ..... 22

### L

Labels on the gear unit ..... 12

Limit temperature for gear unit startup ..... 80

Lubricant change intervals ..... 126

Lubricant fill quantity ..... 153

Lubricants ..... 147

Lubricating greases ..... 154

Lubrication type ..... 42

### M

Maintenance intervals ..... 124

#### Malfunction

Oil cooling system ..... 157

Oil drain leaking ..... 157

Oil leaking ..... 156

Operating temperature ..... 156

Temperature of the bearing ..... 156

Venting ..... 157



Motor adapter	
Installation .....	74
Structure .....	48
Motor pump	
Mechanical connection .....	79
Startup .....	115
Structure .....	44
Mounting input elements .....	70
Mounting position .....	28
Mounting position of the primary gear unit .....	37

## N

Nameplate .....	26
NEMA .....	48
Notes	
Meaning of the hazard symbols .....	8
NTB .....	54
NTB temperature switch .....	54
Dimensions .....	110
Electrical connection .....	110
Technical data .....	110

## O

Oil change .....	132
Oil drain .....	41
Oil fill for pressure lubrication .....	68
Oil filling .....	40
Oil heater	
Connected load .....	85
Electrical connection .....	87
Limit temperature for gear unit startup .....	80
Maintenance .....	140
Note on the function .....	82
Startup .....	116
Oil quantities .....	153
Oil seal .....	63
Oil seals .....	63
Oil temperature .....	119
Oil-air cooler for pressure lubrication	
Maintenance .....	146
Mechanical connection .....	107
Structure .....	53
Oil-air cooler for splash lubrication	
Inspection .....	145
Structure .....	53

Oil-air cooler with motor pump for pressure lubrication	
Startup .....	120
Oil-air cooler with motor pump for splash lubrication	
Startup .....	120
Oil-water cooler for pressure lubrication	
Maintenance .....	146
Mechanical installation .....	107
Structure .....	53
Oil-water cooler for splash lubrication	
Maintenance .....	145
Mechanical connection .....	107
Structure .....	53
Oil-water cooler with motor pump for pressure lubrication	
Startup .....	120
Oil-water cooler with motor pump for splash lubrication	
Startup .....	120
OS .....	42
OWC .....	53

## P

Packaging .....	23
Pinion .....	70
Pivoted mounting position	
Checking the oil level .....	128
Definition .....	29
Preliminary work .....	63
Pressure lubrication .....	68
Pressure switch .....	68
Dimensions .....	108
Electrical connection .....	108
Startup .....	114
Structure .....	53
Technical data .....	108
PT100 .....	54, 109
PT100 temperature sensor	
Dimensions .....	109
Electrical connection .....	109
Technical data .....	109

## R

Refill the sealing grease .....	138
Removing the shrink disk .....	101
Rights to claim under limited warranty .....	9



## S

Safety notes .....	10
Designation in the documentation .....	7
Meaning of the hazard symbols .....	8
Structure of embedded .....	8
Structure of the section-related .....	7
Safety symbols on the dimension sheet .....	17
Sealing grease .....	154
Sealing lips .....	63
Section-related safety notes .....	7
SEP .....	43
Shaft end pump	
Filling with oil .....	68
Pressure switch .....	68
Startup .....	114
Structure .....	43
Shrink disk .....	97
Shutting down gear units .....	121
Signal words in safety notes .....	7
Solid shaft .....	70
Splined hollow shaft .....	104
Starting up the gear unit at low ambient temperatures .....	117
Storage conditions .....	22, 23
Structure	
Oil heater .....	47
Surface temperature .....	119
Symbols on the gear unit .....	12

## T

Temperature sensor PT100 .....	54
Tightening torques	
Of mount-on components for gear units .....	66

Torque arm .....	50
Transport .....	19
Transport conditions .....	22
TSK .....	54
TSK temperature switch .....	54
Dimensions .....	111
Electrical connection .....	111
Technical data .....	111
Type designation .....	27

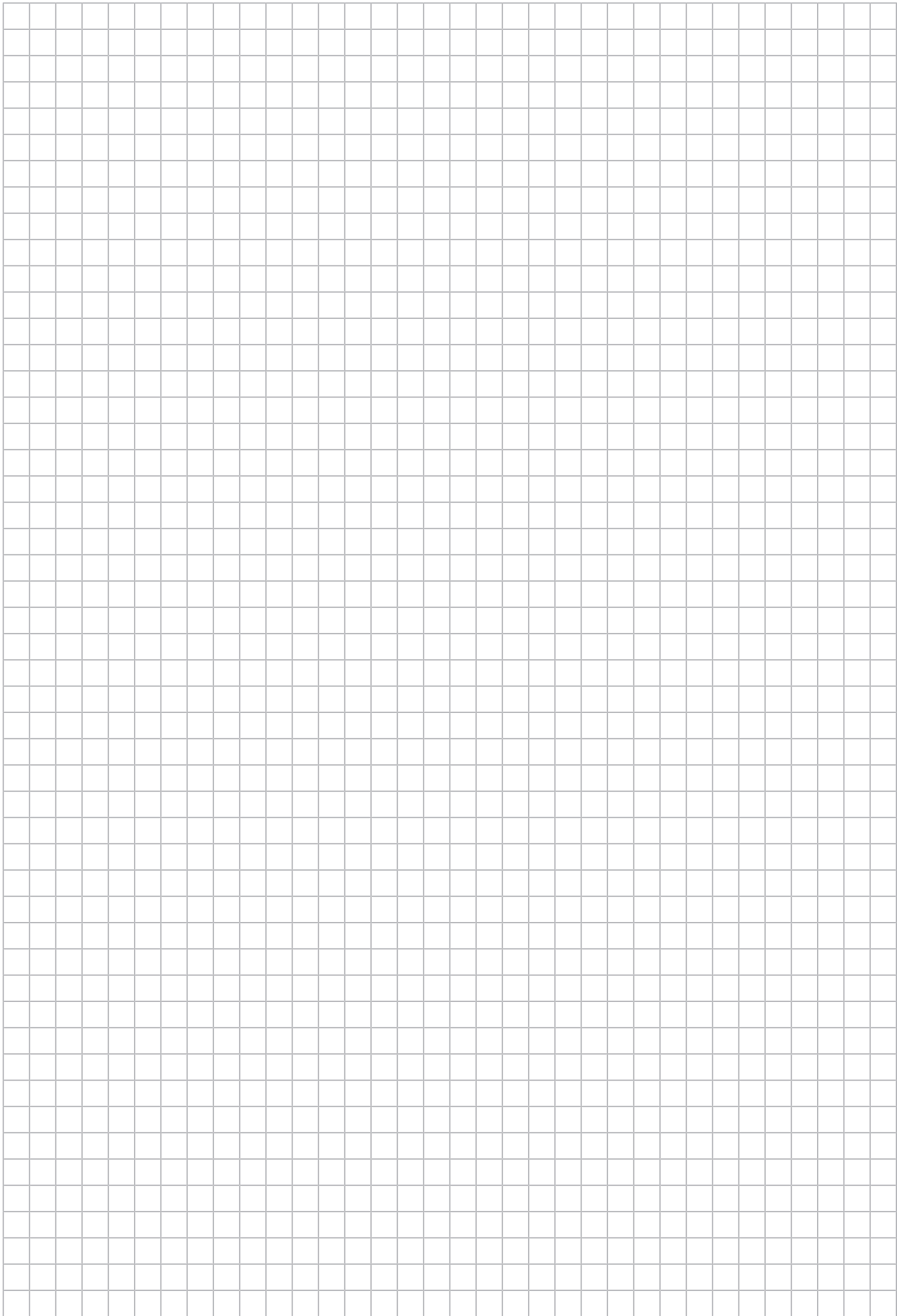
## V

Variable pivoted mounting position	
Checking the oil level .....	128
Definition .....	32
Vibration SmartCheck .....	55

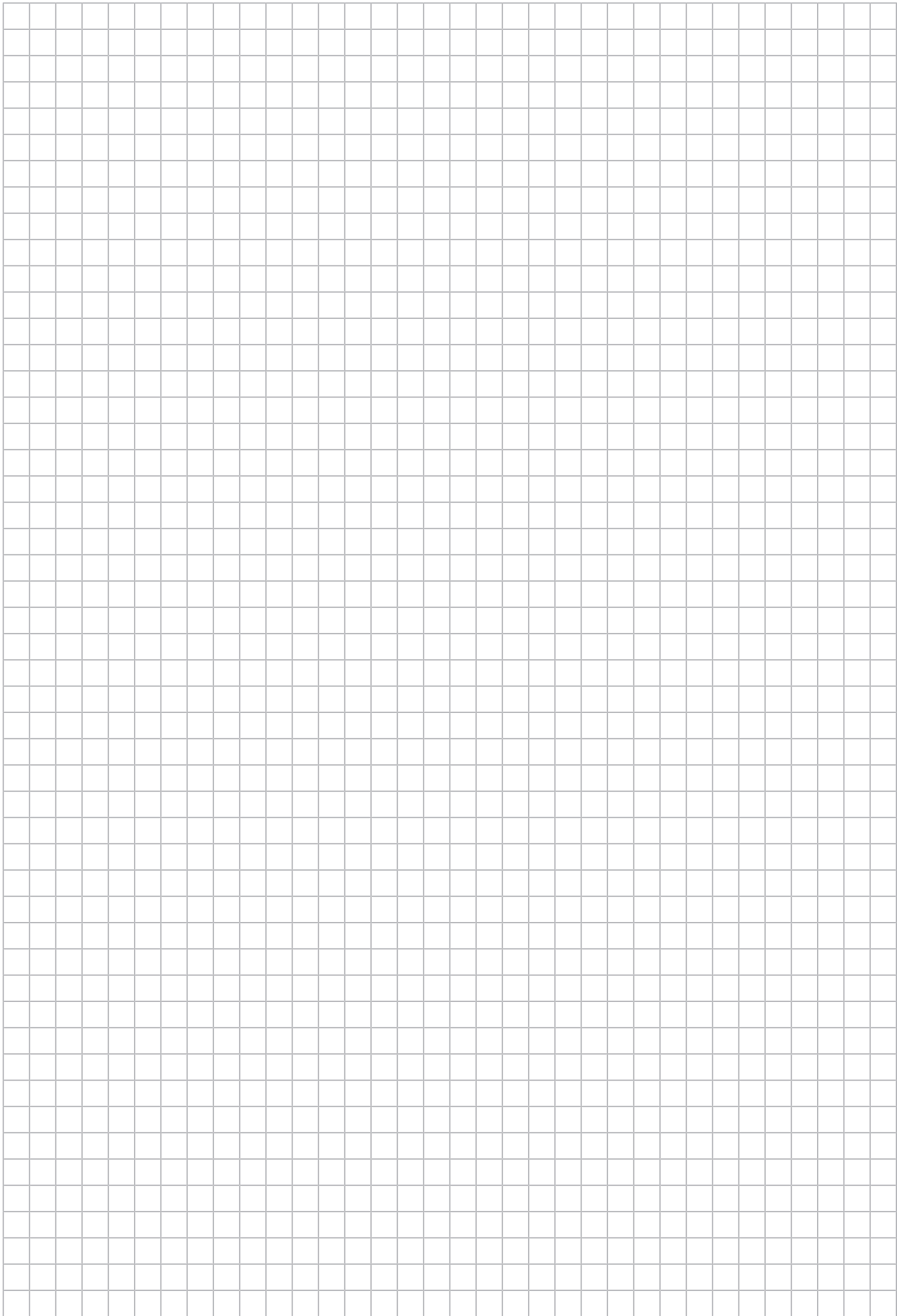
## W

Warning notes on the gear unit .....	12
Waste disposal .....	158
Waste oil .....	158
Water cooling cartridge	
Assembly .....	88
Cleaning .....	141
Connecting .....	88
Expansion .....	142
Interior cleaning .....	143
Maintenance .....	141
Maintenance intervals .....	141
Removing .....	90
Requirements on the water quality .....	90
Sizes .....	46
Startup .....	116
Structure .....	45
Types of cooling water .....	92

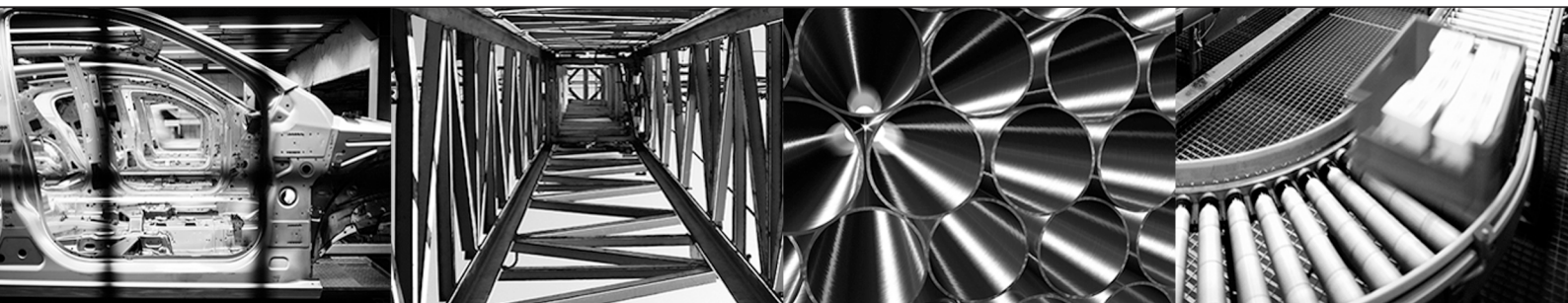
















**SEW-EURODRIVE**  
Driving the world

**SEW**  
**EURODRIVE**

SEW-EURODRIVE GmbH & Co KG  
P.O. Box 3023  
76642 BRUCHSAL  
GERMANY  
Phone +49 7251 75-0  
Fax +49 7251 75-1970  
sew@sew-eurodrive.com  
→ [www.sew-eurodrive.com](http://www.sew-eurodrive.com)