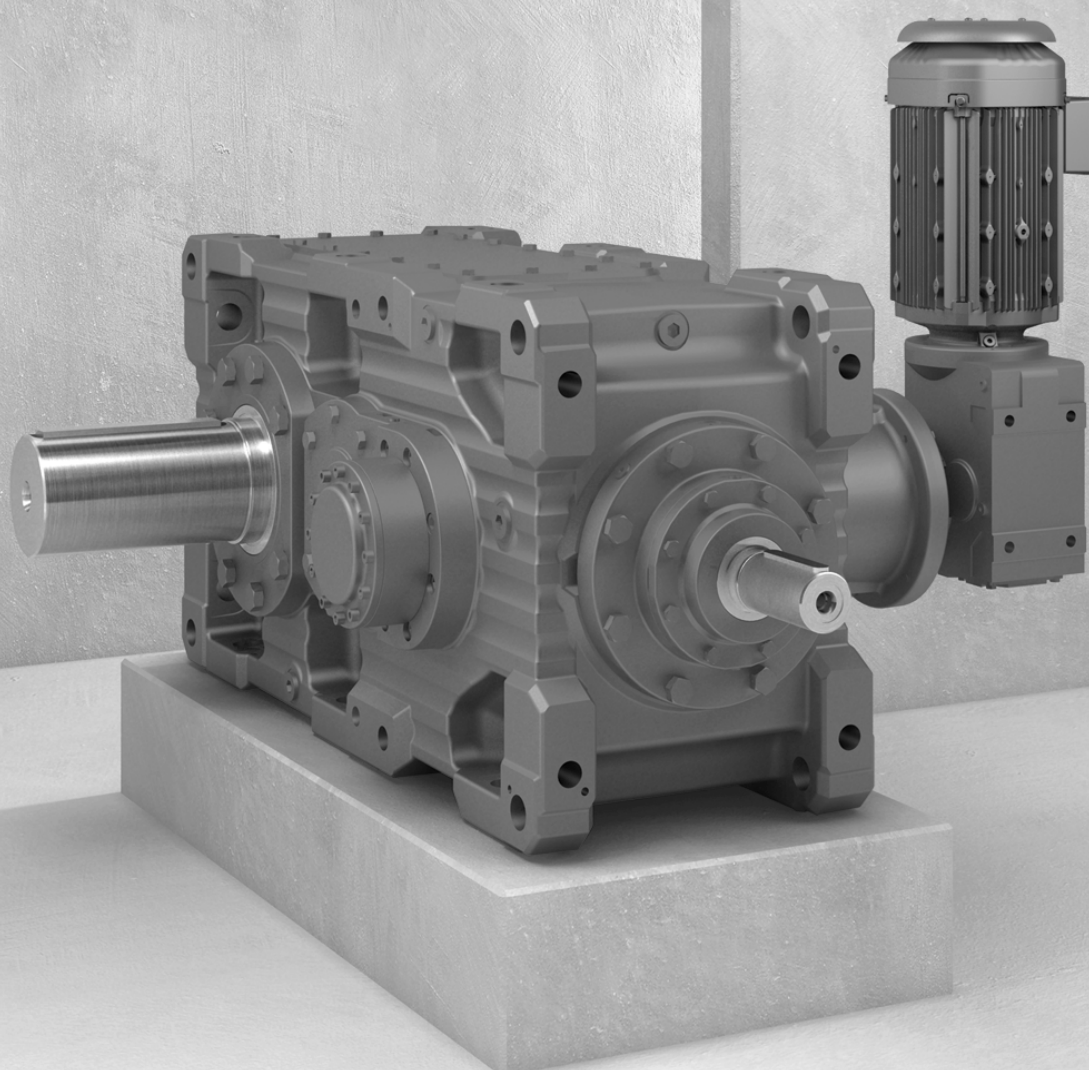




SEW
EURODRIVE

Assembly and Operating Instructions



Industrial Gear Units

X.. Series Bevel-Helical Gear Units Bucket Elevator Drives

Torque Classes from 6.8 – 270 kNm



Table of contents

1	General information.....	7
1.1	About this documentation	7
1.2	Structure of the safety notes	7
1.3	Rights to claim under limited warranty	8
1.4	Copyright notice	9
2	Safety notes	10
2.1	Preliminary remark	10
2.2	General	10
2.3	Target group	11
2.4	Designated use of bucket elevator drives	11
2.5	Other applicable documentation	11
2.6	Safety symbols on the gear unit.....	12
2.7	Symbols on the dimension sheet.....	15
2.8	Symbols on the packaging.....	17
2.9	Transport.....	17
2.10	Storage and transport conditions	20
3	Structure.....	22
3.1	Bucket elevator drive	22
3.2	Auxiliary drive / IEC motor standard IE1 and IE3.....	23
3.3	Overrunning clutch.....	25
3.4	Speed monitoring.....	26
3.5	Torque-limited backstop.....	27
3.6	Gear ratio of the backstop.....	28
3.7	Position of motor terminal box and cable entry.....	29
3.8	X.. series nameplate	30
3.9	Type designations.....	31
3.10	Mounting positions	34
3.11	Mounting positions and standard mounting surfaces.....	35
3.12	Fixed and variable pivoted mounting positions	36
3.13	Direction of rotation dependencies	41
3.14	Housing types	42
3.15	Combination overview of housing designs and options	45
3.16	Input and output shaft	47
3.17	Shaft positions, directions of rotation, backstops, auxiliary drives	52
3.18	Sealing systems.....	53
3.19	Coating and surface protection systems.....	56
3.20	Lubrication	58
3.21	Accessories.....	59
4	Design of options and accessories	61
4.1	Torque arm /T	61
4.2	Flange coupling with cylindrical interference fit /FC-S	62
4.3	Flange coupling with keyway /FC-K.....	63
4.4	Backstop /BS	64

4.5	Motor adapter /MA	65
4.6	Drive packages on a steel frame	66
4.7	Cooling types	68
4.8	Fan /FAN.....	68
4.9	Water cooling cover /CCV.....	71
4.10	Water cooling cartridge /CCT.....	72
4.11	Oil-water cooler for splash lubrication /OWC	75
4.12	Oil-air cooler for splash lubrication /OAC.....	75
4.13	Oil-water cooler for pressure lubrication /OWP.....	75
4.14	Oil-air cooler for pressure lubrication /OAP	75
4.15	Motor pump /ONP1L	75
4.16	Motor pump /ONP1	76
4.17	Oil heater /OH	76
4.18	Pressure switch /PS.....	77
4.19	Temperature sensor /PT100	77
4.20	Temperature switch /NTB	77
4.21	Temperature switch /TSK	78
4.22	Diagnostic unit/DUO10A (oil ageing)	78
4.23	Breather /BPG.....	79
5	Installation/assembly	81
5.1	Required tools/resources	81
5.2	Tolerances	81
5.3	Important notes	82
5.4	Prerequisites for installation	84
5.5	Installing the gear unit.....	86
5.6	Speed monitoring.....	88
5.7	Filling the gear unit and auxiliary drive adapter with oil	89
5.8	Gear units delivered with oil fill (option)	90
5.9	Gear units with solid shaft.....	91
5.10	Flange coupling with cylindrical interference fit /FC-S	92
5.11	Flange coupling with keyway /FC-K.....	92
5.12	Dimensioning the customer hub of solid shaft gear units	92
5.13	Output shaft as a hollow shaft with keyed connection /..A.....	92
5.14	Output shaft as a hollow shaft with shrink disk /..H.....	104
5.15	Output shaft as a splined hollow shaft /..V	123
5.16	Torque arm /T	132
5.17	Couplings	134
5.18	Motor adapter /MA	136
5.19	Base frame /BF	143
5.20	Swing base /SB.....	144
5.21	Fan /FAN.....	144
5.22	Water cooling cover /CCV.....	145
5.23	Water cooling cartridge /CCT.....	147
5.24	Oil-water cooler for splash lubrication /OWC	152
5.25	Oil-air cooler for splash lubrication /OAC.....	152
5.26	Oil-water cooler for pressure lubrication /OWP.....	152

5.27	Oil-air cooler for pressure lubrication /OAP	152
5.28	Motor pump /ONP1L	153
5.29	Motor pump /ONP1	153
5.30	Limit temperature for gear unit start.....	154
5.31	Oil heater /OH	155
5.32	Pressure switch /PS.....	165
5.33	Temperature sensor /PT100	166
5.34	Temperature switch /NTB	167
5.35	Temperature switch /TSK	168
5.36	Brake.....	169
6	Startup	170
6.1	Important information	170
6.2	Startup sequence.....	172
6.3	Backstop /BS	174
6.4	Torque-limited backstop.....	175
6.5	Water cooling cover /CCV.....	175
6.6	Water cooling cartridge /CCT.....	176
6.7	Oil-water cooler for splash lubrication /OWC	176
6.8	Oil-air cooler for splash lubrication /OAC.....	176
6.9	Oil-water cooler for pressure lubrication /OWP.....	177
6.10	Oil-air cooler for pressure lubrication /OAP	177
6.11	Motor pump /ONP1L	177
6.12	Motor pump /ONP1	177
6.13	Oil heater /OH	178
6.14	Starting up the gear unit at low ambient temperatures	179
6.15	Gear unit shutdown / gear unit conservation	179
7	Inspection/maintenance.....	181
7.1	Preliminary work for inspection and maintenance	181
7.2	Inspection and maintenance intervals.....	182
7.3	Lubricant change intervals	185
7.4	Checking the oil level	186
7.5	Checking the oil consistency.....	192
7.6	Changing the oil.....	192
7.7	Breather /BPG.....	196
7.8	Refilling sealing grease.....	197
7.9	Fan /FAN.....	198
7.10	Axial fan	198
7.11	Water cooling cover /CCV.....	204
7.12	Water cooling cartridge /CCT.....	206
7.13	Oil-water cooler for splash lubrication /OWC	209
7.14	Oil-air cooler for splash lubrication /OAC.....	209
7.15	Oil-water cooler for pressure lubrication /OWP.....	209
7.16	Oil-air cooler for pressure lubrication /OAP	209
7.17	Motor pump /ONP1L	209
7.18	Motor pump /ONP1	210

7.19	Oil heater /OH	210
7.20	Torque-limited backstop	211
7.21	Split housing	212
8	Permitted lubricants	213
8.1	Lubricant selection	213
8.2	Structure of the tables and abbreviations	214
8.3	Explanation of the various lubricants	215
8.4	Explanation of the oil supply systems and the oil viscosity	215
8.5	Lubricant tables	216
8.6	Lubricant fill quantities	219
8.7	Sealing greases/rolling bearing greases	221
9	Malfunctions/remedy	222
9.1	Troubleshooting information	222
9.2	Possible malfunctions/remedy	223
9.3	Service	226
9.4	Waste disposal	226
	Index	227

1 General information

1.1 About this documentation

The current version of the documentation is the original.

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

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

1.2 Structure of the safety notes

1.2.1 Meaning of signal words

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

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

1.2.2 Structure of section-related safety notes

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

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



SIGNAL WORD







Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

Meaning of the hazard symbols

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

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

1.2.3 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

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

1.3 Rights to claim under limited warranty

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

1.4 Copyright notice

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2 Safety notes

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

2.1 Preliminary remark

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

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

2.2 General



⚠ WARNING

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

Severe or fatal injuries

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

Refer to the documentation for additional information.

2.3 Target group

Specialist for mechanical work	<p>Any mechanical work may only be performed by adequately qualified specialists. Specialists in the context of this documentation are persons familiar with the design, mechanical installation, troubleshooting, and maintenance of the product who possess the following qualifications:</p> <ul style="list-style-type: none"> • Qualification in the mechanical area in accordance with the national regulations • Familiarity with this documentation
Specialist for electrotechnical work	<p>Any electrotechnical work may only be performed by electrically skilled persons with a suitable education. Electrically skilled persons in the context of this documentation are persons familiar with electrical installation, startup, troubleshooting, and maintenance of the product who possess the following qualifications:</p> <ul style="list-style-type: none"> • Qualification in the electrotechnical area in accordance with the national regulations • Familiarity with this documentation
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 of bucket elevator drives

Bucket elevator drives are 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 not permitted without prior consultation of SEW-EURODRIVE.

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

2.5 Other applicable documentation

The following publications and documents have to be observed as well:

- Operating instructions: "AC Motors"
- Operating instructions: Gear unit series R..7, F..7, K..7, S..7, SPIROPLAN®
- Operating instructions of any attached options
- Catalog: X.. series helical and bevel-helical gear units
- Catalog: X.. series bevel-helical gear units Bucket elevator drives

2.6 Safety symbols on the gear unit



⚠ CAUTION

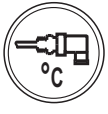





Safety/caution signs and safety symbols can become dirty or illegible over time.

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 symbol	Meaning
	Indicates the oil filling location . Also serves as proper venting during the oil change.
	Indicates the oil drain .
	Indicates the position of the breather . Serves to avoid mistaking the oil measuring position for the venting position.
	Helps avoid errors caused by lack of understanding. Read the information in the operating instructions.
	Indicates the positions for relubrication and makes it easier to find the locations to be lubricated. Helps avoid bearing damage.
	Indicates the water supply and serves to locate the connection option.
	Indicates the water return and serves to locate the connection option.
	Indicates the oil supply and serves to locate the connection option.
	Indicates the oil return and serves to locate the connection option.
	For pivoted mounting positions, this symbol on the information sign indicates the mounting position of the gear unit for checking the oil .



Safety symbol	Meaning
	Indicates the position of the temperature sensor/temperature switch .
	Indicates the grease drain plug and serves to locate the grease drain. Helps avoid bearing damage.
	Indicates the air outlet screw .
	Caution: Burns caused by hot surface.
	Caution: Removing the oil dipstick during operation may result in damage to the gear unit.
	Caution: Risk of burns due to hot gear oil.



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

Meaning							
The brake is not set at the factory.							
	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; margin: 0;">VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px; vertical-align: top;"> <p>DE Die Bremse ist ab Werk nicht eingestellt.</p> <p>Mögliche Sachschäden!</p> <ul style="list-style-type: none"> • Bremse vor der Inbetriebnahme gemäß Betriebsanleitung einstellen </td> <td style="width: 50%; padding: 5px; vertical-align: top;"> <p>EN The brake has not been set at the factory</p> <p>Potential damage to property!</p> <ul style="list-style-type: none"> • Prior to startup, set the brake according to the operating instructions. </td> </tr> <tr> <td style="padding: 5px; vertical-align: top;"> <p>F Le frein n'est pas réglé d'usine</p> <p>Risque de dommages matériels !</p> <ul style="list-style-type: none"> • Avant la mise en service, régler le frein conformément aux instructions de la notice d'exploitation. </td> <td style="padding: 5px; vertical-align: top;"> <p>ES El freno no viene ajustado de fábrica.</p> <p>¡Posibles daños materiales!</p> <ul style="list-style-type: none"> • Antes de la puesta en marcha, ajustar el freno según las instrucciones de funcionamiento. </td> </tr> <tr> <td style="padding: 5px; vertical-align: top;"> <p>NL De rem is niet af fabriek ingesteld.</p> <p>Mogelijke materiële schade!</p> <ul style="list-style-type: none"> • Rem voor de inbedrijfstelling conform technische handleiding instellen. </td> <td style="padding: 5px; vertical-align: top;"> <p>PL Hamulec nie jest ustawiony fabrycznie.</p> <p>Możliwe szkody materialne!</p> <ul style="list-style-type: none"> • Przed uruchomieniem należy ustawić hamulec zgodnie z wytycznymi z instrukcji obsługi. </td> </tr> </table> </div>	<p>DE Die Bremse ist ab Werk nicht eingestellt.</p> <p>Mögliche Sachschäden!</p> <ul style="list-style-type: none"> • Bremse vor der Inbetriebnahme gemäß Betriebsanleitung einstellen 	<p>EN The brake has not been set at the factory</p> <p>Potential damage to property!</p> <ul style="list-style-type: none"> • Prior to startup, set the brake according to the operating instructions. 	<p>F Le frein n'est pas réglé d'usine</p> <p>Risque de dommages matériels !</p> <ul style="list-style-type: none"> • Avant la mise en service, régler le frein conformément aux instructions de la notice d'exploitation. 	<p>ES El freno no viene ajustado de fábrica.</p> <p>¡Posibles daños materiales!</p> <ul style="list-style-type: none"> • Antes de la puesta en marcha, ajustar el freno según las instrucciones de funcionamiento. 	<p>NL De rem is niet af fabriek ingesteld.</p> <p>Mogelijke materiële schade!</p> <ul style="list-style-type: none"> • Rem voor de inbedrijfstelling conform technische handleiding instellen. 	<p>PL Hamulec nie jest ustawiony fabrycznie.</p> <p>Możliwe szkody materialne!</p> <ul style="list-style-type: none"> • Przed uruchomieniem należy ustawić hamulec zgodnie z wytycznymi z instrukcji obsługi.
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Meaning							
The coupling is supplied without grease.							
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The coupling is supplied without oil.							
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











Meaning	
The gear unit is protected against corrosion with VCI.	
VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE	
<div></div> <div></div> <div>18977421</div>	<div><div>DEGetriebe ist mit VCI rostgeschützt. Nicht öffnen!</div><div>Mögliche Sachschäden!</div><div><ul style="list-style-type: none">• Vor der Inbetriebnahme Vorarbeiten gemäß Betriebsanleitung durchführen.• Keine offene Flamme!</div></div> <div><div>ENGear unit with VCI corrosion protection. Do not open!</div><div>Potential damage to property!</div><div><ul style="list-style-type: none">• Prior to startup, perform preliminary work according to operating instructions• No open flames!</div></div> <div><div>FRéducteur protégé contre la corrosion avec VCI. Ne pas ouvrir</div><div>Risque de dommages matériels !</div><div><ul style="list-style-type: none">• Avant la mise en service, réaliser les travaux préliminaires indiqués dans la notice d'exploitation.• Pas de flammes ouvertes !</div></div> <div><div>ESReductor está protegido con VCI contra la corrosión. ¡No abrir!</div><div>¡Posibles daños materiales!</div><div><ul style="list-style-type: none">• Antes de la puesta en marcha, efectuar los trabajos preparatorios según las instrucciones de funcionamiento.• No debe haber fuego abierto.</div></div> <div><div>NLTandwielkast is met VCI tegen corrosie beschermd. Niet openen!</div><div>Mogelijke materiële schade!</div><div><ul style="list-style-type: none">• Vóór de inbedrijfstelling voorbereidingen conform technische handleiding uitvoeren.• Geen open vuur!</div></div> <div><div>PLPrzekładnia zabezpieczona jest przed korozją za pomocą środka VCI. Nie otwierać!</div><div>Możliwe szkody materialne!</div><div><ul style="list-style-type: none">• Przed uruchomieniem należy przeprowadzić czynności przygotowawcze zgodnie z informacjami zawartymi w instrukcji obsługi!• Unikać otwartych płomieni!</div></div>
9007204570575499	

The gear unit is supplied without oil.	
VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE	
<div></div> <div></div> <div>18977383</div>	<div><div>DEGetriebe wird ohne Öl geliefert.</div><div>Mögliche Sachschäden!</div><div><ul style="list-style-type: none">• Vor der Inbetriebnahme Ölbefüllung gemäß Betriebsanleitung durchführen.</div></div> <div><div>ENGear unit is delivered without oil.</div><div>Potential damage to property!</div><div><ul style="list-style-type: none">• Prior to startup, fill in oil according to operating instructions.</div></div> <div><div>FRLe réducteur ne contient pas d'huile à la livraison.</div><div>Dommages matériels possibles !</div><div><ul style="list-style-type: none">• Avant la mise en service, effectuer le remplissage d'huile conformément à la notice d'exploitation.</div></div> <div><div>ESEl reductor se suministra sin aceite.</div><div>¡Posibles daños materiales!</div><div><ul style="list-style-type: none">• Antes de la puesta en marcha, efectuar el llenado de aceite según las instrucciones de funcionamiento.</div></div> <div><div>NLTandwielkast wordt zonder olie geleverd.</div><div>Mogelijke materiële schade!</div><div><ul style="list-style-type: none">• Vóór de inbedrijfstelling olie conform technische handleiding bijvullen.</div></div> <div><div>PLPrzekładnia jest dostarczana bez oleju.</div><div>Możliwe szkody materialne!</div><div><ul style="list-style-type: none">• Przed uruchomieniem należy wlać olej zgodnie z informacjami zawartymi w instrukcji obsługi.</div></div>
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2.7 Symbols on the dimension sheet

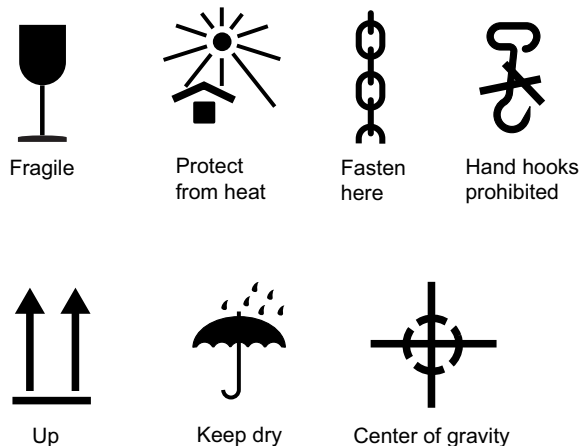
The symbols on the dimension sheet must be observed. They have the following meaning:

Symbol	Meaning
	Indicates the position of the oil dipstick .
	Indicates the position of the oil level glass .
	Indicates the position of the oil sight glass .

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

2.8 Symbols on the packaging

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



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2.9 Transport

2.9.1 General information



⚠ WARNING

Suspended loads can fall.

Severe or fatal injuries.

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



⚠ CAUTION

Risk of slipping of unsecured mount-on components, e.g. keys.

Potential risk of crushing due to falling parts.

- Secure the mount-on components.



⚠ CAUTION

Risk of slipping due to lubricant leaking from damaged seals.

Minor injuries.

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



NOTICE

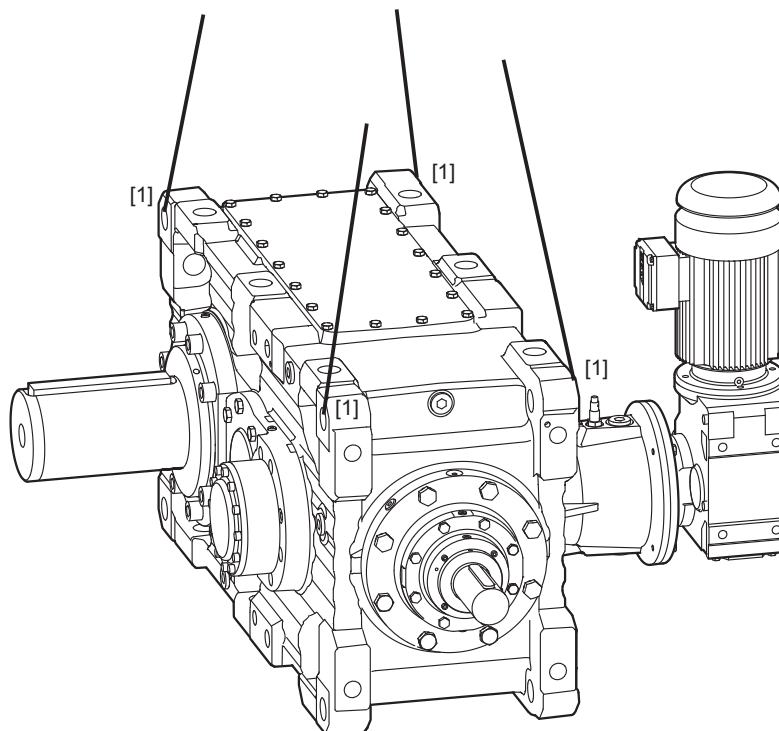
Improper transport can damage the gear unit.

Possible damage to property.

- Note the following:

- Inspect the shipment for any damage that may have occurred in transit 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 on the nameplate.
- If possible, transport the gear unit without oil fill. If this is not possible, note that the weight indicated on the nameplate refers only to the gear unit without oil fill, and replace the breather filter with a screw plug.
- Transport the gear unit in such a way that the lifting gear is tensioned only vertically.
- 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 provided eyebolts to transport the gear unit [1]. Keep in mind that the auxiliary drive [2] and auxiliary drive adapter [3] must not be used as load bearing device.

The following figure shows an example of how the gear unit can be transported.

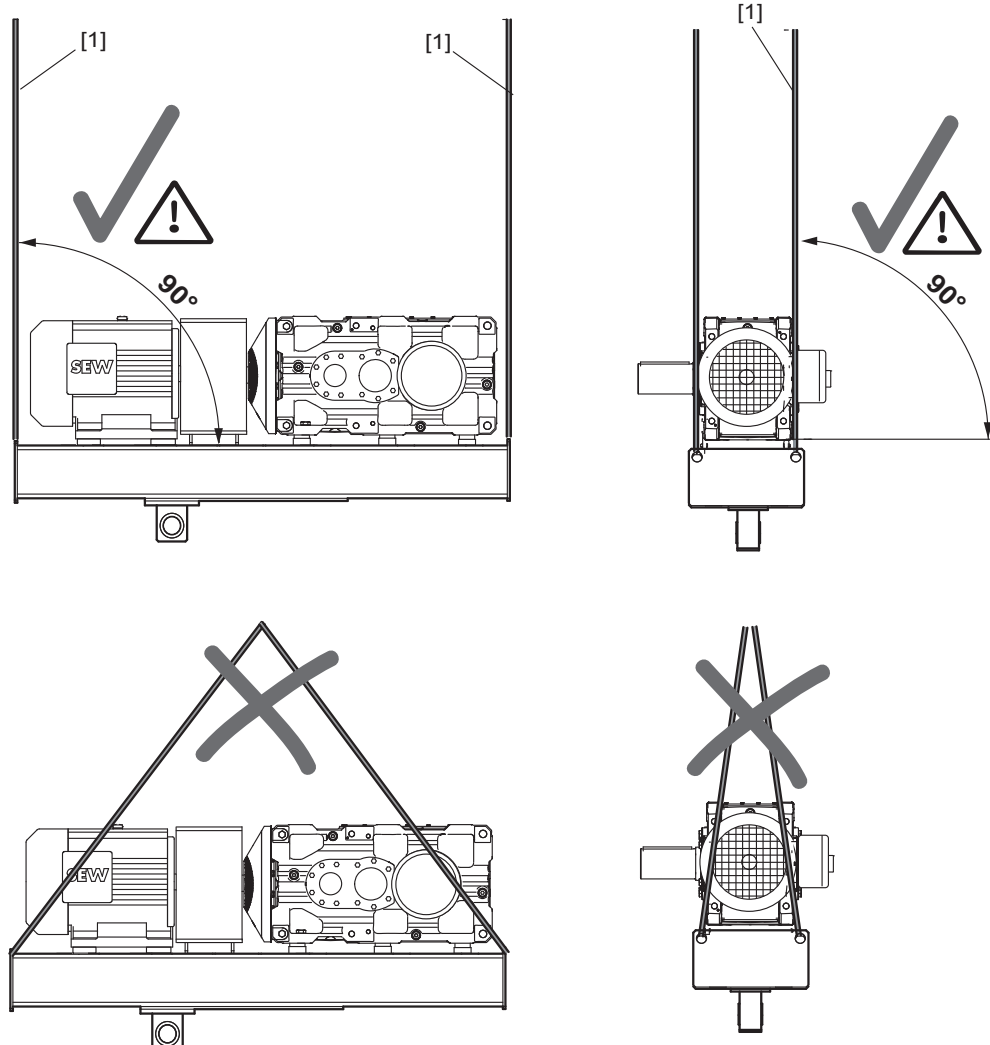


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2.9.2 Gear units on swing base/base frame

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

The following figures show a transportation example.



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2.10 Storage and transport conditions

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

2.10.1 Internal conservation

Standard corrosion protection

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

Long-term corrosion protection

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

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

2.10.2 Exterior corrosion protection

The following measures are taken for exterior corrosion protection:

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

2.10.3 Packaging

Standard packaging

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

Use: Land transport

Long-term packaging

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

Use: Sea transport and/or for extended storage

2.10.4 Storage conditions

NOTICE

Improper storage may result in damages to the gear unit.

Possible damage to property.

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

INFORMATION



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

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

3.1 Bucket elevator drive

Bucket elevators are conveyor systems that vertically lift large quantities of bulk material. Depending on the volume of the buckets and on the needed conveyor height, high drive powers may be required.

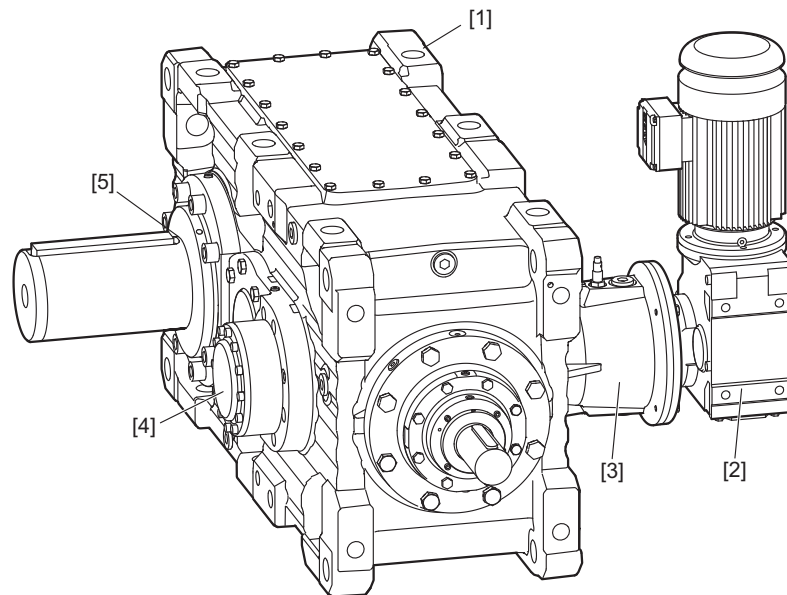
Especially during maintenance, the bucket elevator drive may only be operated at a reduced speed. For this reason the bucket elevator drives are equipped with an auxiliary drive [2] and a backstop [4].

The auxiliary drive is connected to the X.. series 3-stage bevel-helical gear unit [1] using an auxiliary drive adapter [3] with overrunning clutch.

INFORMATION



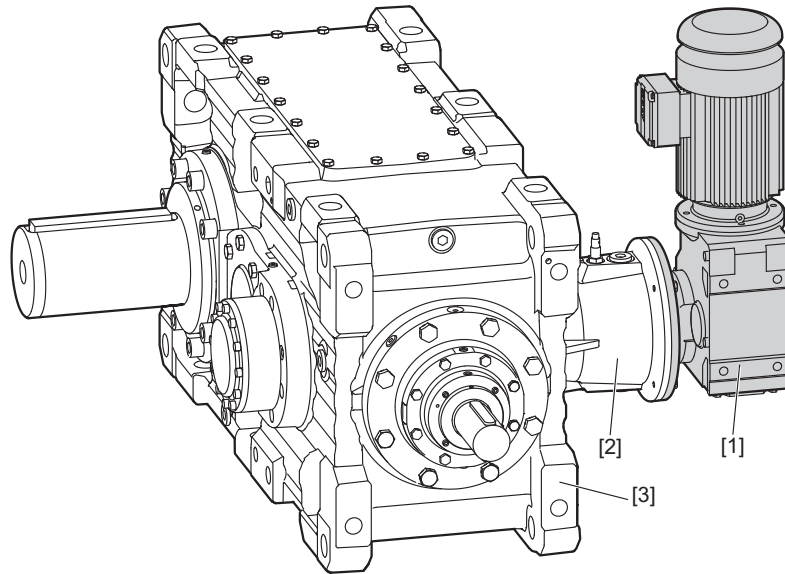
Three-stage bevel-helical gear units [1] are delivered **without** lubricant fill. The auxiliary drive [2] is already filled **with** lubricant.



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- [1] Three-stage bevel-helical gear unit X.K..
- [2] Auxiliary drive
- [3] Auxiliary drive adapter with overrunning clutch and incremental encoder for speed monitoring
- [4] Backstop

3.2 Auxiliary drive / IEC motor standard IE1 and IE3



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The auxiliary drive [1] is available in "empty buckets" design (solely for maintenance purposes) or "full buckets" design. The auxiliary drive is mounted to the bevel-helical gear unit [3] via an auxiliary drive adapter [2]. Refer to the order documents for the exact output torque ratings in auxiliary drive operation.

The auxiliary drive has its own oil circuit which is separated from the oil circuit of the bevel-helical gear unit. The auxiliary drive is delivered filled with oil.

3.2.1 IEC motor standard IE1 and IE3

DR.. motors comply with all international standards and meet the currently valid IEC motor standard.

The auxiliary drive is equipped with DRN.. (IE3) design motors by SEW-EURODRIVE as standard. In case of operating modes without special requirements on the energy efficiency class, DRS.. (IE1) motors may optionally be used. The following table describes both variants.

IE3 motor standard: DRN.. type AC motors
<ul style="list-style-type: none"> • IE3 (High Efficiency) • Copper or aluminum die-cast rotor cage • Operating mode: S1/75

You can also install DRS.. motors:

IE1 motor standard: DRS.. type AC motors
<ul style="list-style-type: none"> • IE1 (Standard Efficiency) • Copper or aluminum die-cast rotor cage • Operating mode: S3/75

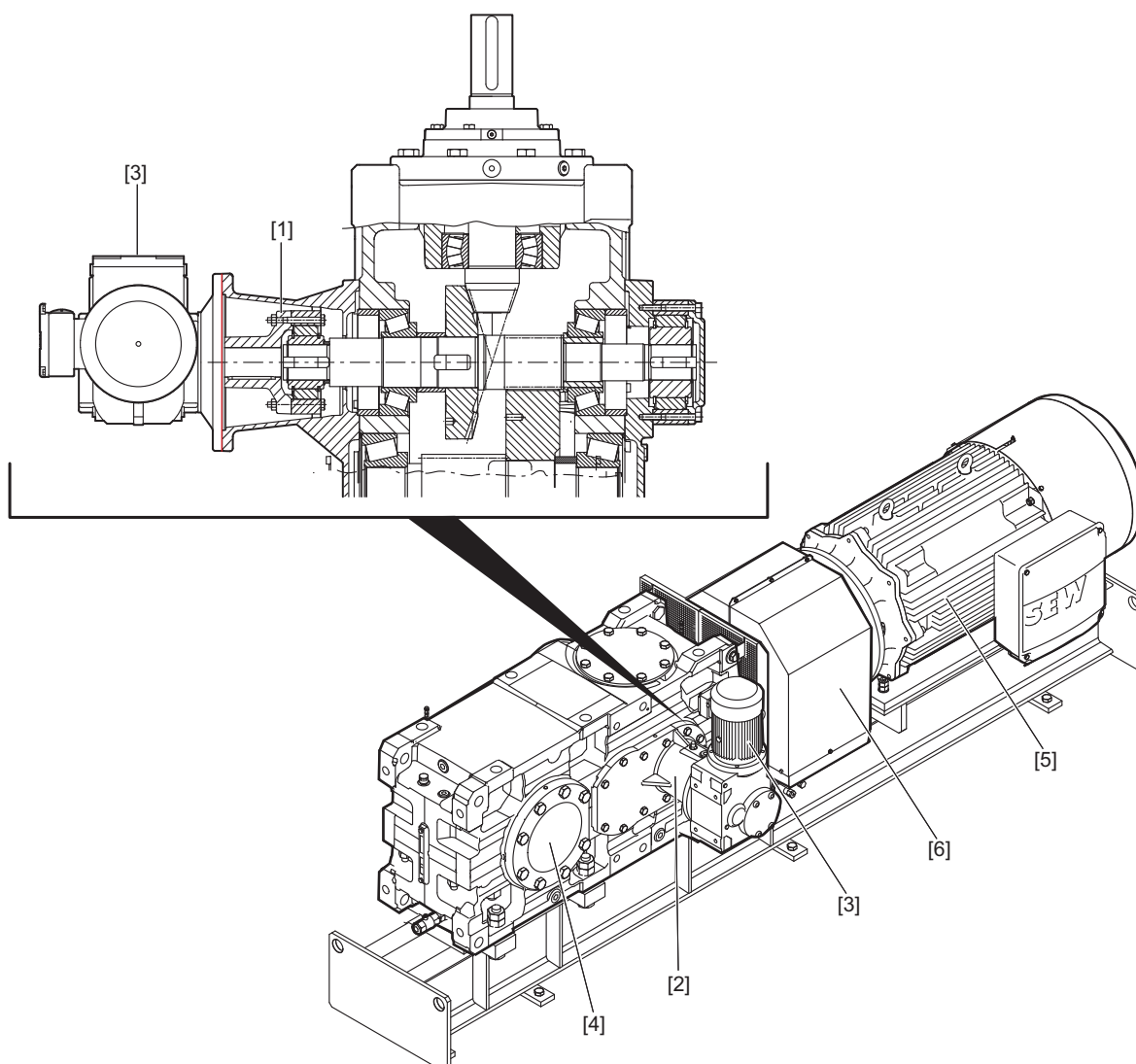
INFORMATION



Type and source of the hazard

- Since the typical area of application of the auxiliary drive is not S1 continuous duty, the motor is designed for S3 / 75 duty type. The cyclic duration factor (cdf) is 7.5 minutes or less over a period of 10 minutes (max. cdf 75%). This means that an IE1 motor can also be used in countries where an IE1 motor in S1 duty is no longer permitted due to energy efficiency regulations (for example EU Europe).
- The SEW-EURODRIVE website (www.sew-eurodrive.com) provides further information about DR.. motors. If you are unclear about any of the information in this documentation, or if you require further information, consult SEW-EURODRIVE.

3.3 Overrunning clutch



The overrunning clutch [1] is a part of the auxiliary drive adapter [2] and allows for operation in one direction of rotation via the auxiliary drive [3].

The gear unit can be operated in 2 ways:

- Operation via main drive: The overrunning clutch [1] disengages the auxiliary drive [3], preventing the auxiliary drive [3] from rotating. The overrunning clutch is free-wheeling.
- Operation via auxiliary drive: The overrunning clutch [1] locks and drives the pinion shaft of the gear unit. In this case, the input shaft of the bevel-helical gear unit [4] is rotating slowly (driving operation).

Electrically interlock the main drive and auxiliary drive in such a way that only one of the two motors can be switched on at the same time.

The rotary motion of the input shaft of the bevel-helical gear unit [4] must not be obstructed. A brake [6] on the input side of the main drive [5] must be released for operation via the auxiliary drive [3].

The overrunning clutch [1] is integrated in the oil circuit of the bevel-helical gear unit [4]. This means maintenance and oil change for the overrunning clutch and the bevel-helical gear unit are carried out at the same time.

3.4 Speed monitoring

NOTICE

In case of a malfunction of the overrunning clutch, the auxiliary drive can be destroyed due to overspeed.

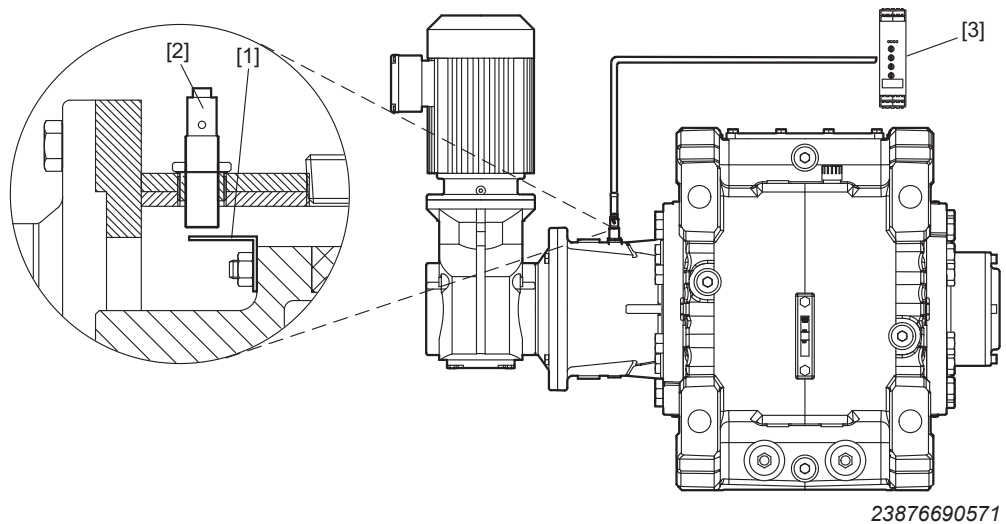
Possible damage to property.

- The overrunning clutch must be equipped with a speed monitoring function for safety reasons.

INFORMATION



Contact SEW-EURODRIVE if other components than those listed here are used for speed monitoring. The incremental encoder is included in the standard delivery. The speed monitor, which is not included, can be ordered separately from SEW-EURODRIVE.

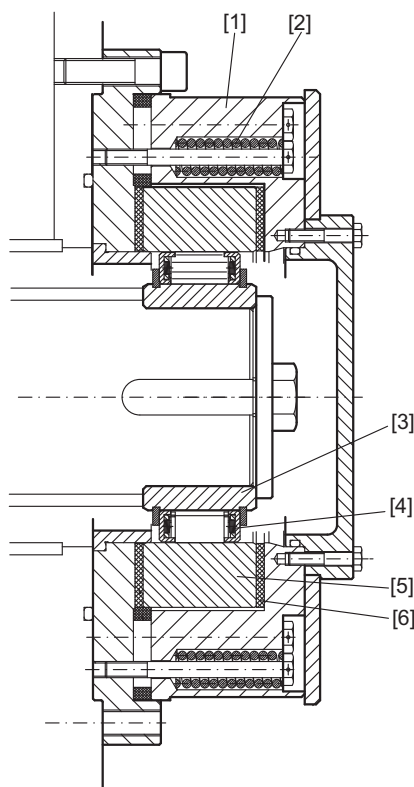


- [1] Trigger cam
- [2] Inductive incremental encoder
- [3] Speed monitor (optional)

The speed of the overrunning clutch is detected in a contactless manner via trip cam [1] and an inductive incremental encoder [2]. The speed monitor [3] compares the pulses with a preset switching speed, see chapter "Startup".

If the switching speed is exceeded (e.g. due to a malfunction of the overrunning clutch), the output relay switches (optionally NC contact or NO contact). The connection must be made in such a way that the main drive is switched off in this situation. Overspeed at the auxiliary drive will be prevented in this way.

3.5 Torque-limited backstop



539377931

- | | |
|-------------------------|---------------------|
| [1] Housing | [4] Freewheel cage |
| [2] Compression springs | [5] Outer ring |
| [3] Inner ring | [6] Friction lining |

Torque-controlled backstops are used in dual drives where both drives are equipped with a backstop.

The torque limitation prevents the restoring torque from being unevenly distributed to the individual backstops. Dynamic torque peaks are also reduced during the blocking phase.

As with a backstop without torque control, the locking torque is transmitted to the outer ring via sprags.

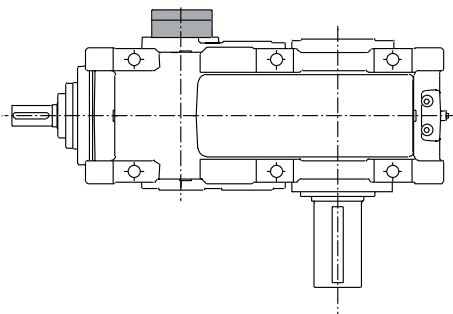
However, for a torque-controlled backstop, the outer ring [5] is not securely bolted on the gear unit housing. It is held between two friction linings [6]. The friction linings are loaded via a housing [1] with screws and compression springs [2].

INFORMATION



The slip torque is factory-set. Changing the slip torque is not permitted.

3.6 Gear ratio of the backstop



6144189579

X3K..	i_{tot}	X3K..	i_{tot}
X3K.100	14 – 80	X3K.200	12.5 – 71
X3K.110	16 – 90	X3K.210	14 – 80
X3K.120	12.5 – 71	X3K.220	12.5 – 71
X3K.130	16 – 90	X3K.230	14 – 80
X3K.140	12.5 – 71	X3K.240	12.5 – 71
X3K.150	16 – 90	X3K.250	14 – 80
X3K.160	12.5 – 71	X3K.260	12.5 – 71
X3K.170	16 – 90	X3K.270	14 – 80
X3K.180	12.5 – 71	X3K.280	16 – 90
X3K.190	14 – 80		

3.7 Position of motor terminal box and cable entry

The position of the motor terminal box has so far been indicated with 0°, 90°, 180° or 270° as viewed onto the fan guard (see figure below). A change in the product standard EN 60034 specifies that the following designations will have to be used for terminal box positions for foot-mounted motors in the future:

- As viewed onto the output shaft = A-side
- Designation as R (right), B (bottom), L (left) and T (top)

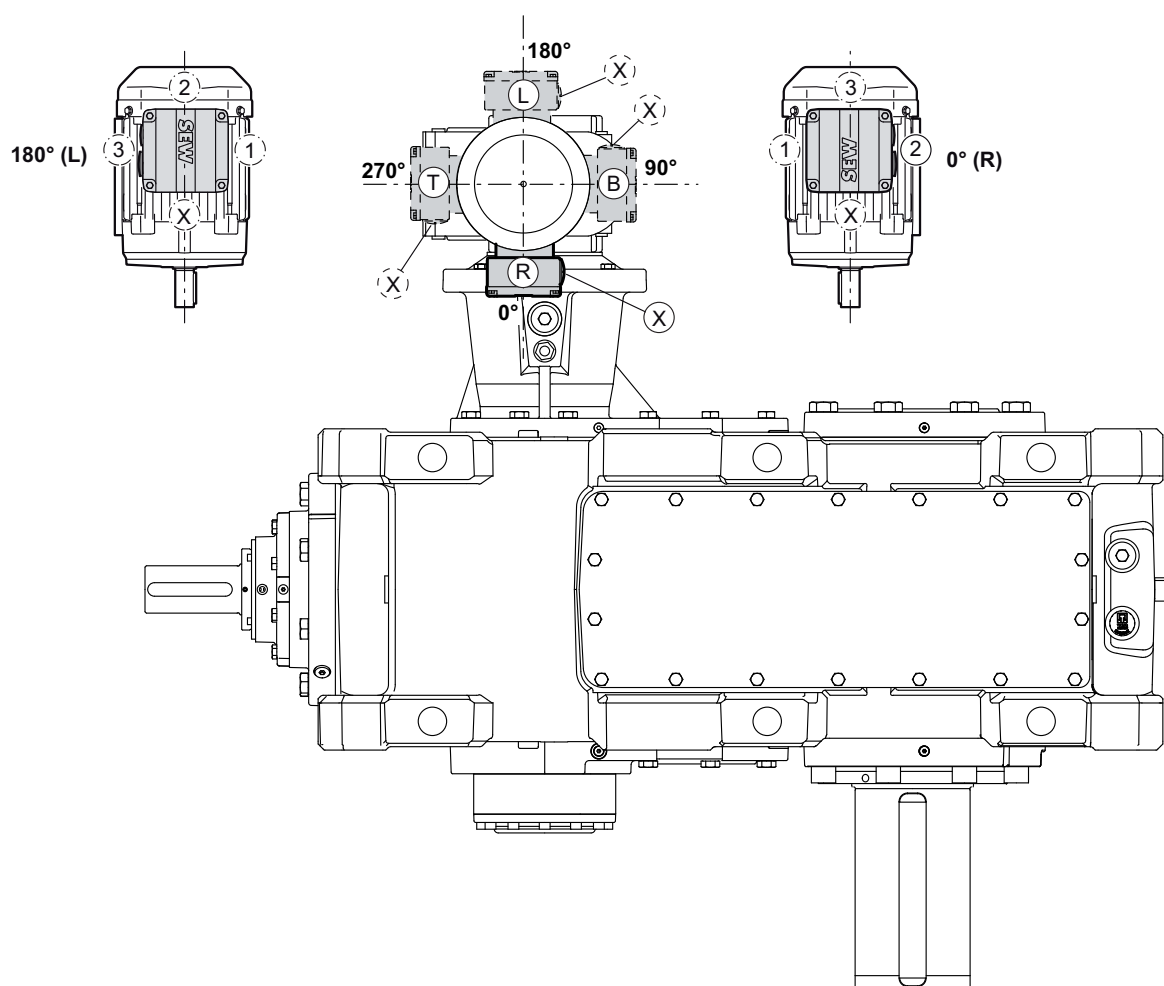
This new designation applies to foot-mounted motors without a gear unit in mounting position B3 (= M1). For gearmotors, the previous designation is maintained. The following figure shows both designations. Where the mounting position of the motor changes, R, B, L and T are rotated accordingly.

The position of the cable entry can be selected as well. Available positions are "X" (= standard position), "1," "2" or "3" (see the following figure).

INFORMATION



Unless other information is given regarding the terminal box, the 0° type (R) with "X" cable entry will be supplied.



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3.8 X.. series nameplate

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

SEW-EURODRIVE
76646 Bruchsal/Germany

Type

Nr.

		min.	nom.	max.	i	<input type="text" value="-39.06"/>
PK1	[kW]	<input type="text" value="36"/>	<input type="text" value="180"/>	<input type="text" value="180"/>	F _s	<input type="text" value="1.5"/>
MK	[Nm]	<input type="text" value="43300"/>	<input type="text" value="43300"/>	<input type="text" value="43300"/>	PM	[kW] <input type="text" value="0"/>
n1	[1/min]	<input type="text" value="296"/>	<input type="text" value="1480"/>	<input type="text" value="1480"/>	T	[°C] <input type="text" value="-25...+40"/>
n2	[1/min]	<input type="text" value="7.6"/>	<input type="text" value="37.9"/>	<input type="text" value="37.9"/>		<input type="text" value="1743 895 0.13"/>
IM	<input type="text"/>					

Made by SEW

Qty. of greasing points
 Fans
 Mass [kg]
 Year

99079192220796427

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

23461659/EN – 05/2018

3.9 Type designations

3.9.1 Gear units

The following example shows the structure of the type designation:

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

3.9.2 Oil supply systems

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

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

3.9.3 Flange couplings

The following example shows the structure of the type designation.

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

3.9.4 Abbreviations for optional accessories

The table shows the abbreviations used and what they mean.

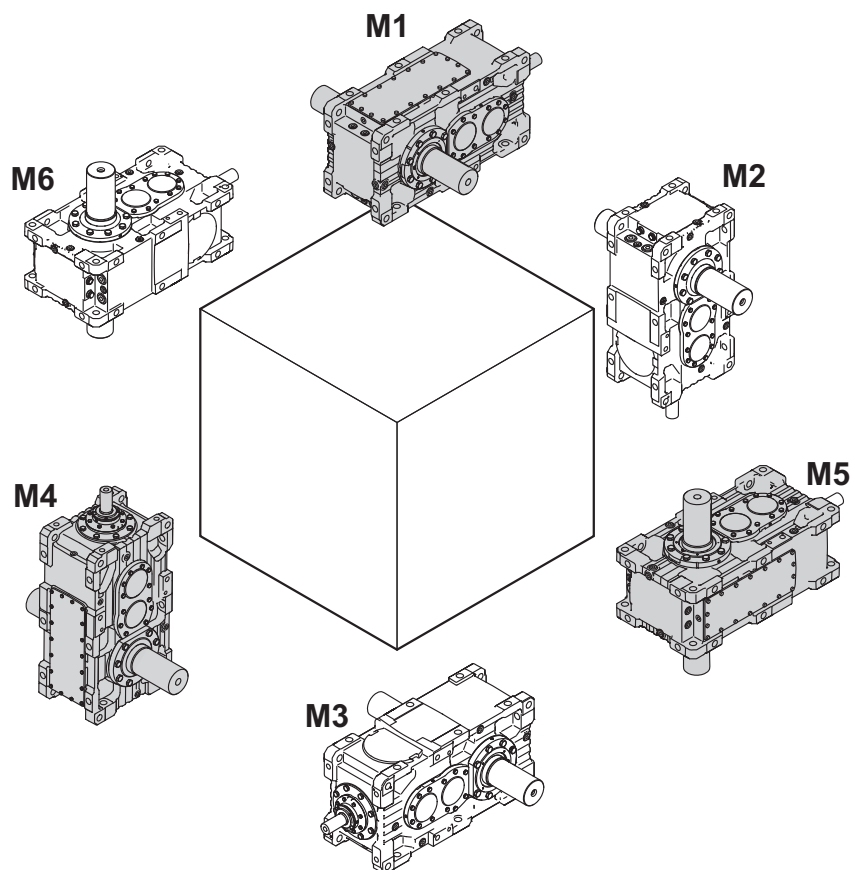
Abbreviation	Meaning
BF	Base frame
BS	Backstop
BSL	Torque-limited backstop
BPG	Breather
CCV	Water cooling cover
CCT	Water cooling cartridge
FC	Flange coupling
FAN	Fan
FAN-ADV	Fan, Advanced design
HH	Horizontal housing
HU	Universal housing
HT	Thermal housing
HSST	Through-going input shaft
LSST	Through-going output shaft
MA	Motor adapter
SB	Swing base
T	Torque arm
OAC	Circulation cooling oil-air cooler with motor pump
OWC	Circulation cooling oil-water cooler with motor pump
OAP	Circulation cooling oil-air cooler with pressure lubrication and motor pump
OWP	Circulation cooling oil-water cooler with pressure lubrication and motor pump
ONP	Pressure lubrication and motor pump
ONP1	Pressure lubrication and motor pump
ONP1L	Pressure lubrication and motor pump
OD	Oil dipstick
ODV	Oil drain valve
OLG	Oil level glass
OH	Oil heater

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

3.10 Mounting positions

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

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



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3.10.1 Deviating mounting positions

Note that the following deviating mounting positions are permitted for X3K.. gear units in mounting positions M1 and M3. Data is based on a gear unit without pivoted mounting position.

X3K100 – 280	
Mounting position M1 and M3	Mounting position M1 and M3

23461659/EN – 05/2018

3.11 Mounting positions and standard mounting surfaces

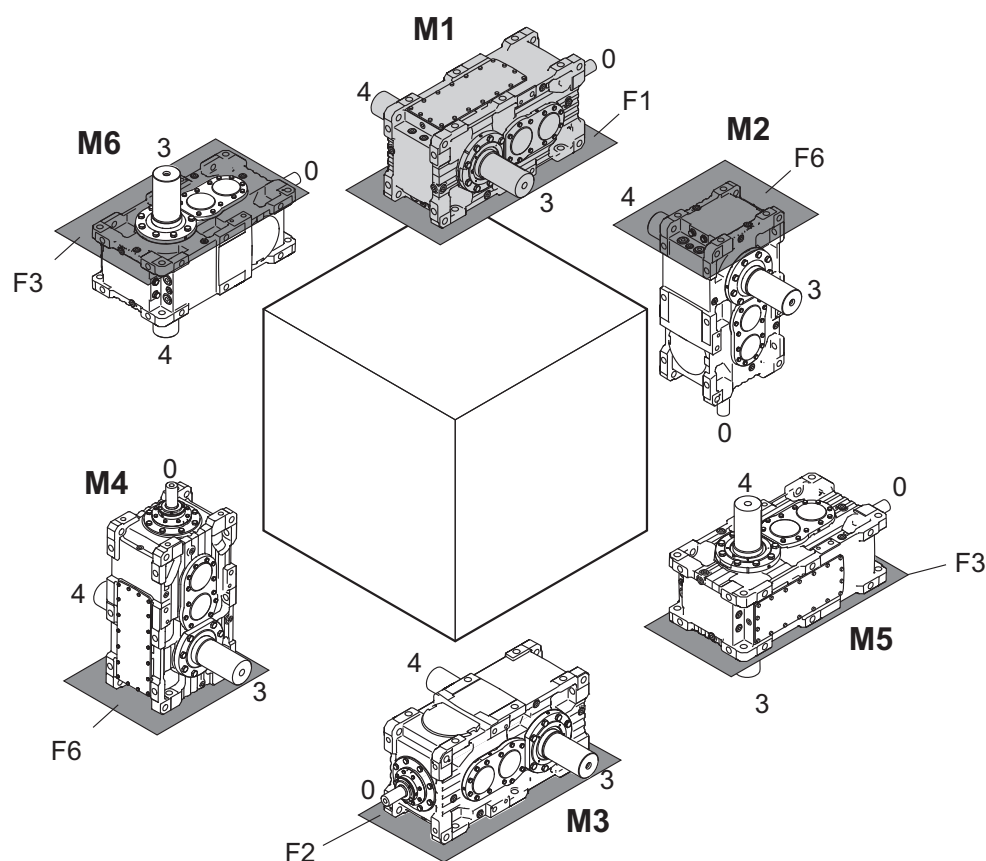
A certain standard mounting surface is assigned to each mounting position.

INFORMATION



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

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



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INFORMATION



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

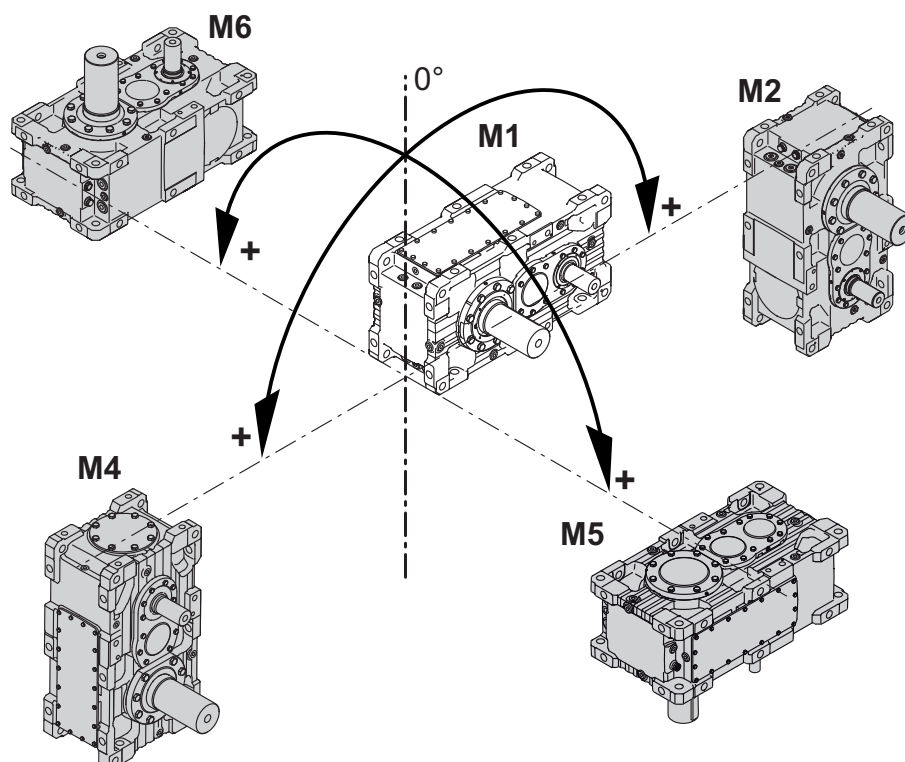
3.12 Fixed and variable pivoted mounting positions

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

INFORMATION



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



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3.12.1 Fixed pivoted mounting position

Definition:

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

Example:

The type designation is set up as follows:

M1-M4/9°

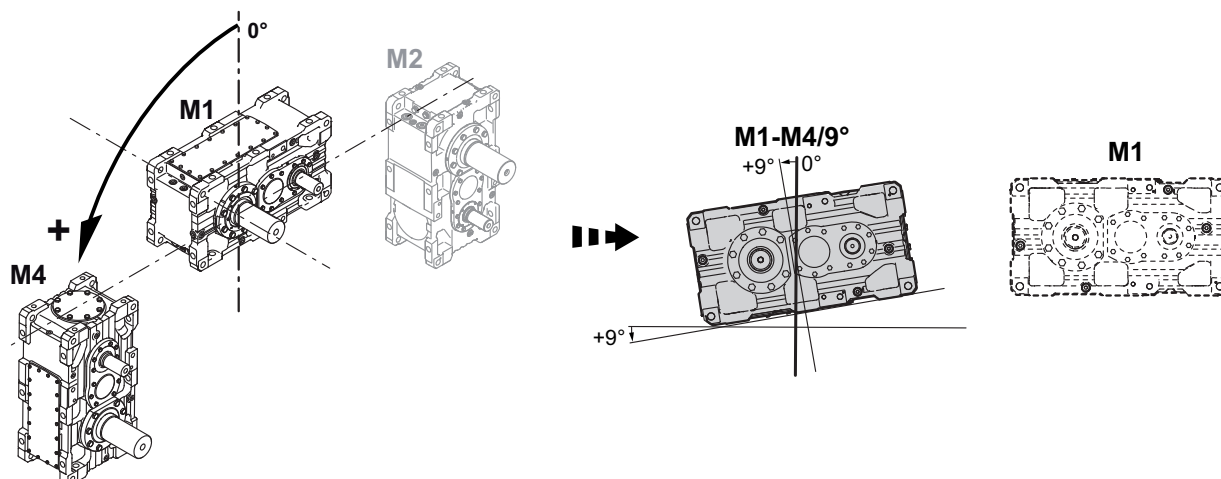
M1 = Initial mounting position

M4 = Pivoting direction

9° = Fixed pivoting angle

Pivoted from mounting position M1 to M4 by 9°

This results in the following fixed pivoted mounting position:



8021658507

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

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

		min.		norm.		max.		i		-39.06	
PK1	kW	36	180	180	Fs	1.5					
MK2	Nm	43300	43300	43300	PM	kW	0				
n1	rpm	296	1480	1480	T _a	°C	-25 ... 40				
n2	rpm	7.6	37.9	37.9			1743 895 0.11				
IM	M1-M4/9°/F1										
Made in Germany											
Greasing points		2	Fan		0	Mass kg		1340	Year		2016
CLP HC460 - Synthetic Oil ~90 L											

45036004295365131

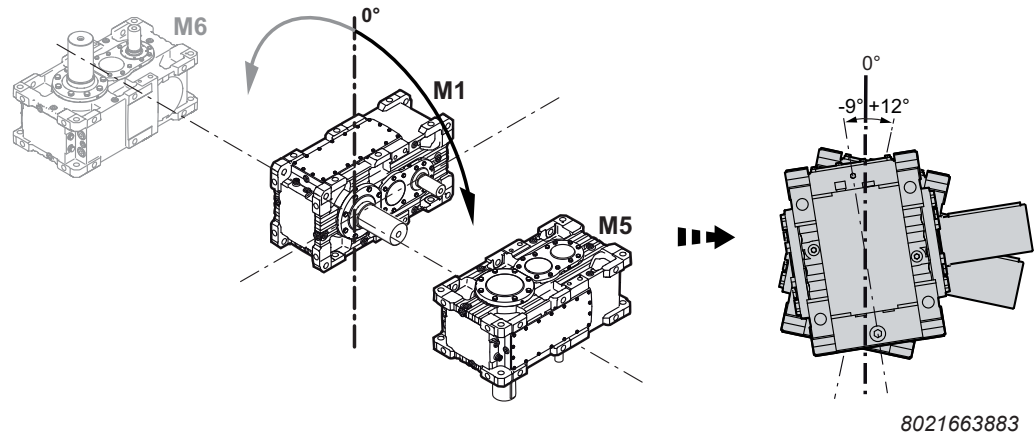
3.12.2 Variable pivoted mounting position

Definition:

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

Example:

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

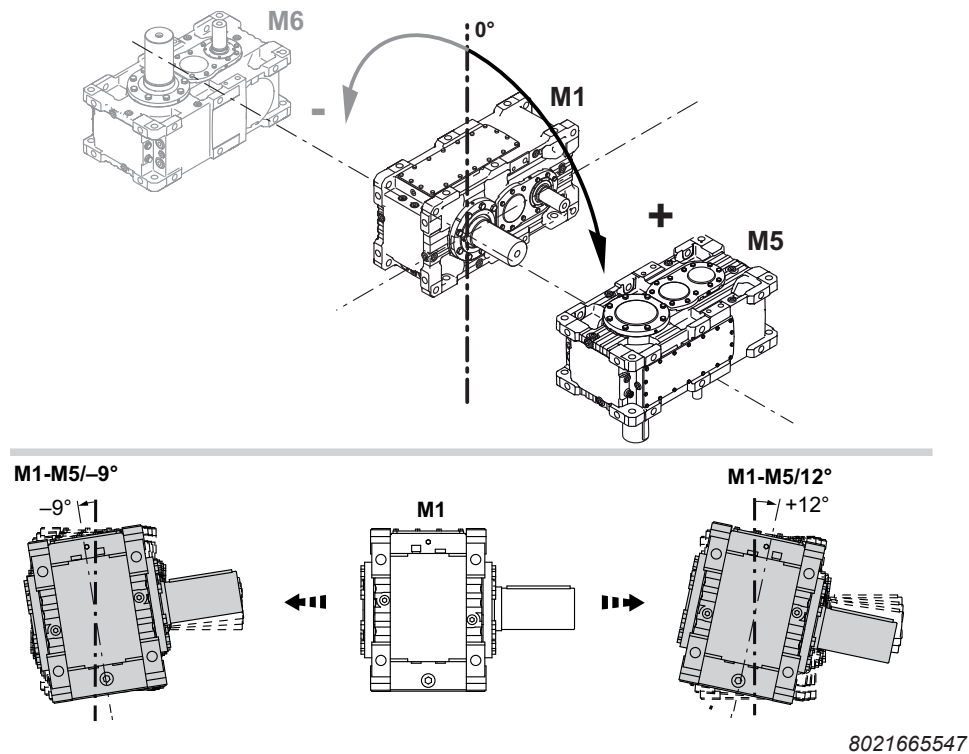


Step 1:

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

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

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



The type designation for this example is:

M1-M5/-9°...12°

M1 = Initial mounting position

M5 = Pivoting direction

12° = pivoted from M1 to M5 by 12°

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

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

	min.	norm.	max.	i	
PK1 kW	36	180	180	Fs	-39.06
MK2 Nm	43300	43300	43300	PM kW	0
n1 rpm	296	1480	1480	Ta °C	-25 ... 40
n2 rpm	7.6	37.9	37.9		1743 895 0.11

IM **M1-M5/-9 ... 12°/F1**

Made in Germany

Greasing points 2 Fan 0 Mass kg 1340 Year 2016

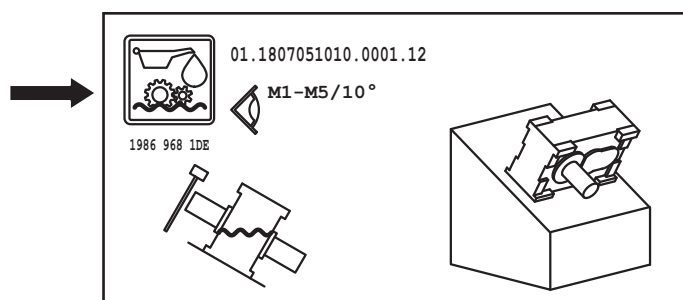
CLP HC460 - Synthetic Oil ~90 L

36028805040632843

Step 2:

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

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



8021670539

3.12.3 Combination of variable and fixed pivoted mounting positions

Fixed and variable pivoted mounting positions can be combined.

Example:

The following example shows a combination of fixed and variable pivoted mounting position. The type designation is set up as follows:

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

M1 = Initial mounting position

M4 = Pivoting direction

9° = Fixed pivoting angle

M1 = Initial mounting position

M5 = Pivoting direction

12° = 12° from M1 to M5

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

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

SEW-EURODRIVE 76646 Bruchsal/Germany

Type: X3FS190/B

No.: 01.1234567812.0001.06

	min.	norm.	max.	i	
PK1 kW	36	180	180	Fs	-39.06
MK2 Nm	43300	43300	43300	PM kW	0
n1 rpm	296	1480	1480	T _a °C	-25 ... 40
n2 rpm	7.6	37.9	37.9		1743 895 0.11

IM: M1-M4/9° M1-M5/-9°...12°/F1

Made in Germany

Greasing points: 2 Fan: 0 Mass kg: 1340 Year: 2016

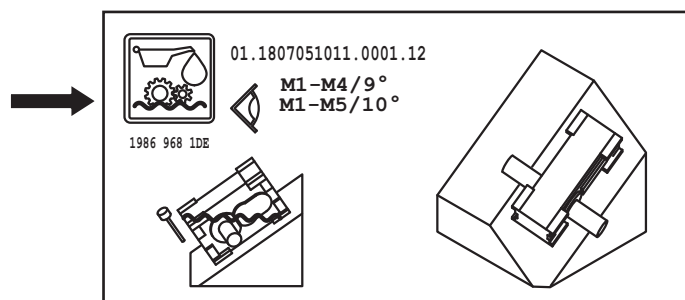
CLP HC460 - Synthetic Oil -90 L

36028805040640907

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

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

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

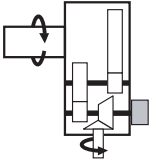
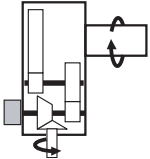
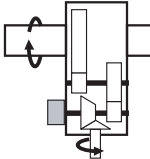
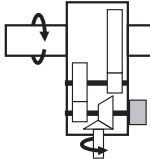




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3.13 Direction of rotation dependencies

3.13.1 X.K..

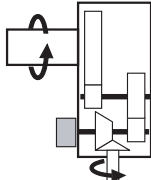
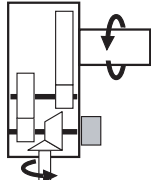
Standard



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

-  = Position of the backstop
-  = Alternative backstop position (depending on size and gear ratio)
- * = Contact SEW-EURODRIVE when using a backstop
- 1) Note the restrictions regarding external forces on the LSS

INFORMATION: For more information and a 3D view of the gear unit, refer to chapter Shaft positions.

Direction of rotation reversal

Shaft position	03 ¹⁾	04 ¹⁾
Position of final gear	3	4
X3K..		

-  = Position of the backstop
-  = Alternative backstop position (depending on size and gear ratio)
- * = Contact SEW-EURODRIVE when using a backstop
- 1) Note the restrictions regarding external forces on the LSS

INFORMATION: For more information and a 3D view of the gear unit, refer to chapter Shaft positions.

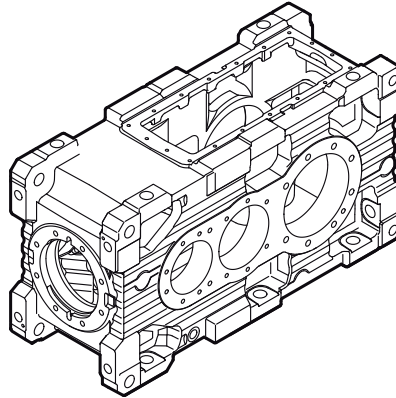
3.14 Housing types

SEW-EURODRIVE distinguishes between the following housing types:

3.14.1 Horizontal housing /HH

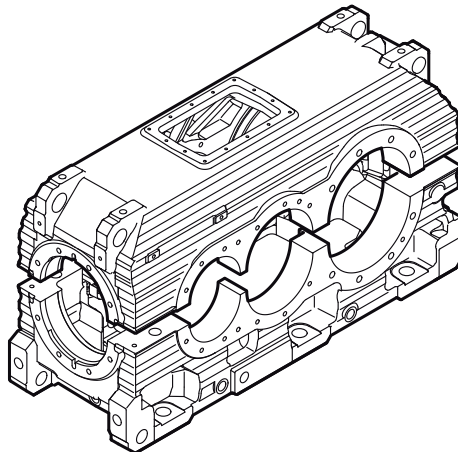
The horizontal housing is designed for mounting position M1. This housing design is non-reversible.

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



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The following figure shows an example of a two-piece housing for sizes 220 – 280:

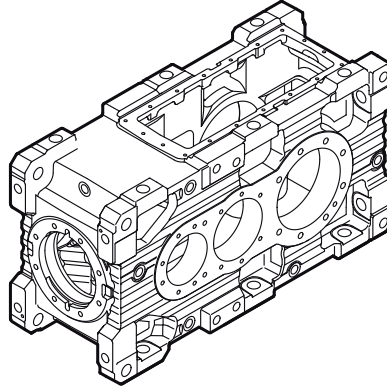


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3.14.2 Universal housing /HU

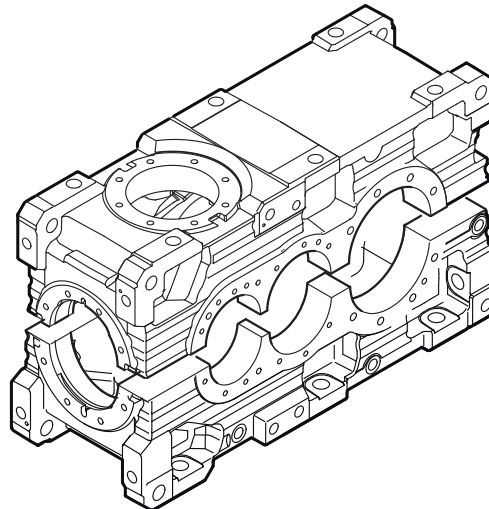
The universal housing can be installed in any mounting position (M1 to M6). The housings can be reversible if required.

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



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The following figure shows an example of a two-piece housing for sizes 220 – 280:

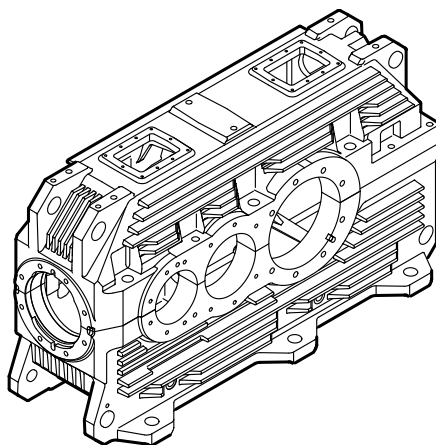


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3.14.3 Thermal housing /HT

The thermal housing is designed for mounting position M1. This housing design is non-reversible. Various measures make this gear unit suitable for increased thermal requirements.

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



9007208902548235



3.15 Combination overview of housing designs and options

3.15.1 Horizontal housing /HH and universal housing /HU

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

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

Options		Sizes																
		X100 – 210						X220 – 250						X260 – 320				
		2F	2K	3F	3K	4F	4K	2F	2K	3F	3K	4F	4K	2F	2K	3F	3K	4F
BF	Base frame	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HU	HH	HH	HH	HH
BS	Backstop	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HU	HH	HH	HH	HH
BSL	Torque-limiting backstop	-	-	-	HH	-	-	-	-	-	HH	-	-	-	-	HH	-	-
CCV	Water cooling cover	HU	HU	HH	HH	HU	HU	-	-	-	-	-	-	-	-	-	-	-
CCT	Water cooling cartridge	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
FC	Flange coupling	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HU	HH	HH	HH	HH
FAN	Fan	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
FAN-ADV	Fan version Advanced	-	-	-	HH	-	-	-	-	-	HH	-	-	-	-	HH	-	-
HSST	Through-going input shaft	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HU	HH	HH	HH	HH	HH
LSST	Through-going output shaft	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HU	HH	HH	HH	HH	HH
MA	Motor adapter	HU	HU	HH	HH	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU
SB	Swing base	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
T	Torque arm	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
OAC	Oil-air cooler	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
OWC	Oil-water cooler	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
OAC	Oil-air cooler	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
OWC	Oil-water cooler	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
ONP1	Motor pump	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
OD	Oil dipstick	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
ODV	Oil drain valve	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
OH	Oil heater	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
OLG	Oil level glass	HU	HU	HH	HH	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
PT100	Temperature sensor	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
NTB	Temperature switch	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
TSK	Temperature switch	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH
DUO10A	Diagnostic unit	HU	HU	HU	HU	HU	HU	HH	HU	HH	HH	HH	HH	HH	HH	HH	HH	HH

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

3.15.2 Thermal housing /HT

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

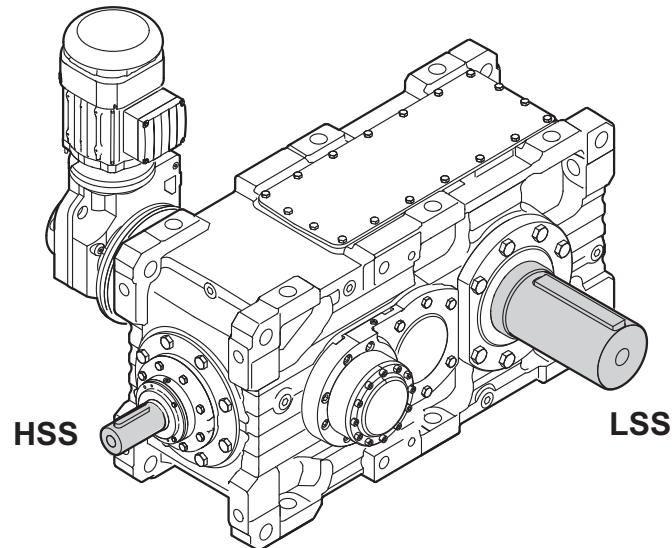
	Options	
BF	Base frame	HT
BS	Backstop	HT
BSL	Torque-limiting backstop	HT
FC	Flange coupling	HT
FAN	Fan	HT
HSST	Through-going input shaft	HT
LSST	Through-going output shaft	HT
MA	Motor adapter	HT
SB	Swing base	HT
T	Torque arm	HT
OD	Oil dipstick	HT
ODV	Oil drain valve	HT
OH	Oil heater	HT
OLG	Oil level glass	HT
PT100	Temperature sensor	HT
NTB	Temperature switch	HT
TSK	Temperature switch	HT
DUO10A	Diagnostic unit	HT

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

3.16 Input and output shaft

There are two types of shafts:

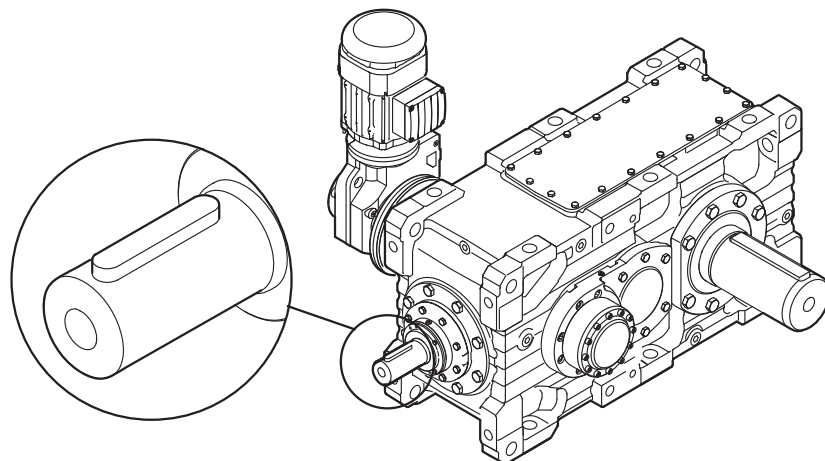
- High-speed shaft (**HSS**)
- Low-speed shaft (**LSS**)



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3.16.1 Input shaft

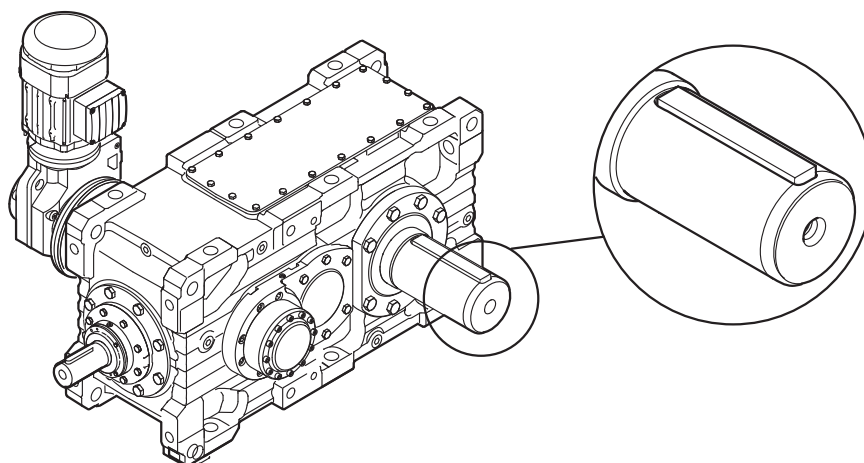
The input shaft is provided with a closed keyway according to DIN 6885/T1 and a centering bore according to DIN 332. The matching key according to DIN 6885/T1 - form A is included in the scope of delivery.



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

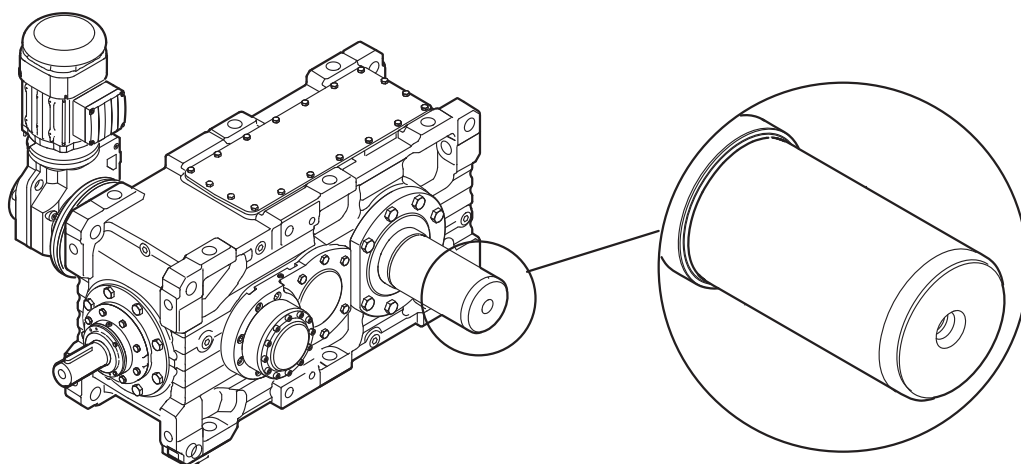
The output shaft is provided with a closed keyway according to DIN 6885/T1 and a centering bore (according to DIN 332). The delivery includes a key according to DIN 6885/T1 – form B. The shaft has an insertion area with a reduced diameter to simplify the mounting of output elements, such as a coupling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



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3.16.3 Smooth output shaft /..R

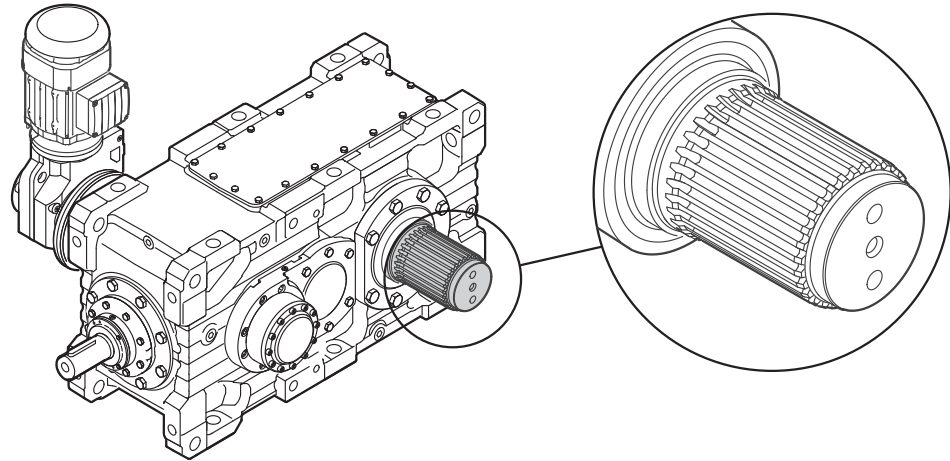
The gear units are available with a smooth output shaft to install non-positive output elements, such as flange couplings with a cylindrical interference fit. The shaft's face has a centering bore according to DIN 332. The insertion area with reduced diameter facilitates the mounting of output elements.



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

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



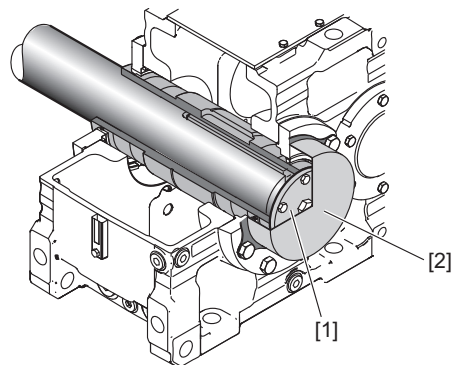
21272019595

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

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

Included in the delivery:

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



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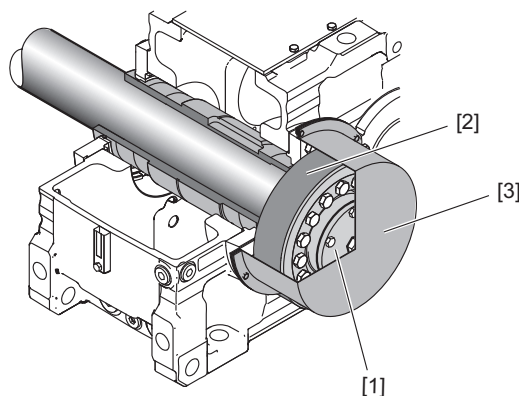
The protection cover is dust-tight. The standard sealing system is therefore normally used on the side of the safety cover.

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

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

Included in the delivery:

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



324304523

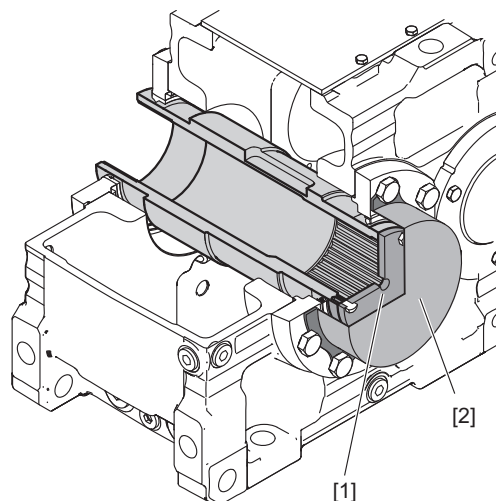
The protection cover is dust-tight. The standard sealing system is therefore normally used on the side of the safety cover.

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

The output shaft is splined according to DIN 5480.

Included in the delivery:

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



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3.16.8 Gear unit mounting for hollow shaft gear units

NOTICE

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

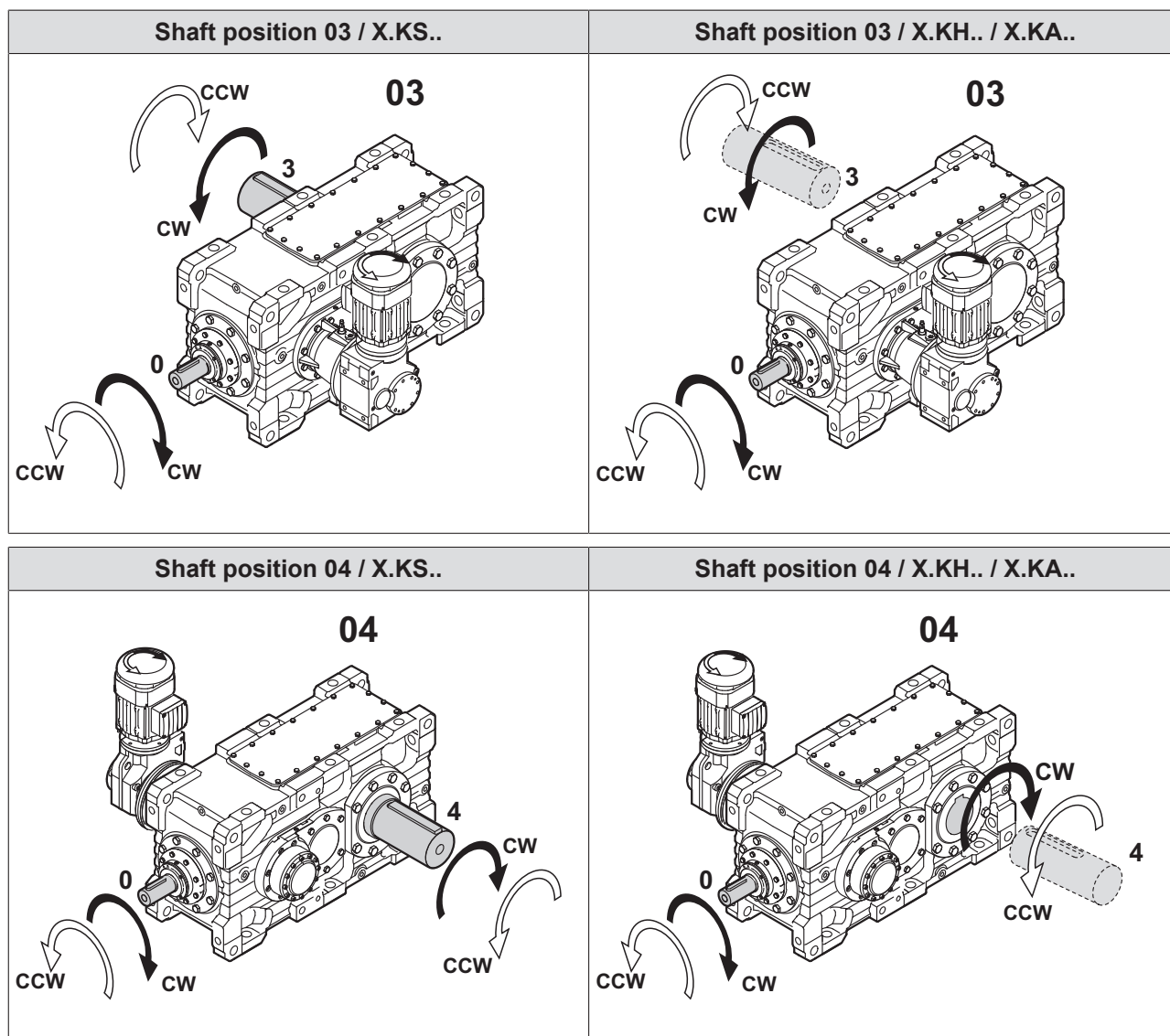
Possible damage to property.

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

3.17 Shaft positions, directions of rotation, backstops, auxiliary drives

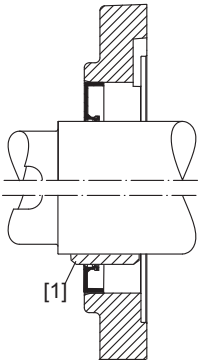
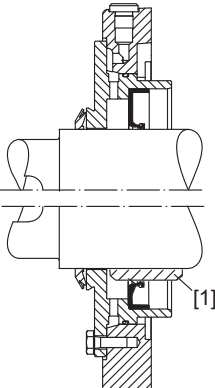
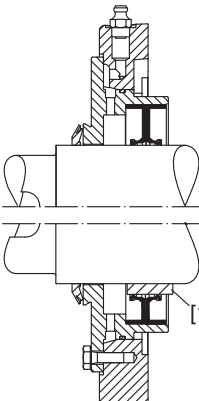
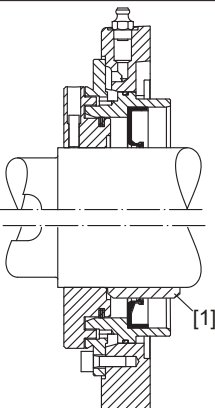
The following figures show the standard variants of the bucket elevator gear units. The auxiliary drives are mounted in mounting position M4A with motor terminal box position 0°.

The shaft positions (**03** and **04**) and corresponding directions of rotation shown in the following diagrams apply to solid and hollow output shafts (LSS).



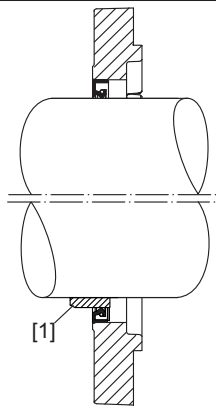
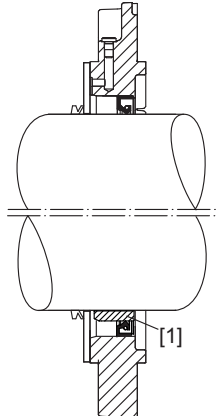
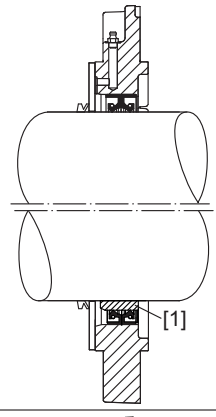
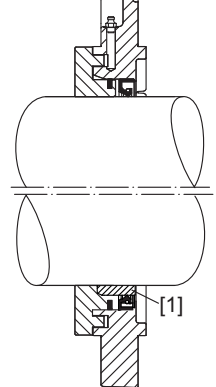
3.18 Sealing systems

3.18.1 Input shaft

Designation	Property	Environment	Illustration
Standard	Single oil seal with dust protection lip	Normal environment	
Dust-protected	Single oil seal with dust protection cover	Medium dust load with abrasive particles	
Protected against dust, regreasable	Double lip seal with dust protection cover	High dust load with abrasive particles	
Radial labyrinth seal (Taconite), regreasable	Single oil seal with radial labyrinth seal	Very high dust load with abrasive particles	

[1] Optional with oil seal sleeve

3.18.2 Output shaft

Designation	Property	Environment	Illustration
Standard	Single oil seal with dust protection lip	Normal environment	
Dust-protected	Single oil seal with dust protection cover	Medium dust load with abrasive particles	
Protected against dust, regreasable	Double lip seal with dust protection cover	High dust load with abrasive particles	
Radial labyrinth seal (Taconite), regreasable	Single oil seal with radial labyrinth seal	Very high dust load with abrasive particles	

[1] Optional with oil seal sleeve

23461659/EN – 05/2018

INFORMATION



Make sure the gear unit shaft is rotating during regreasing.

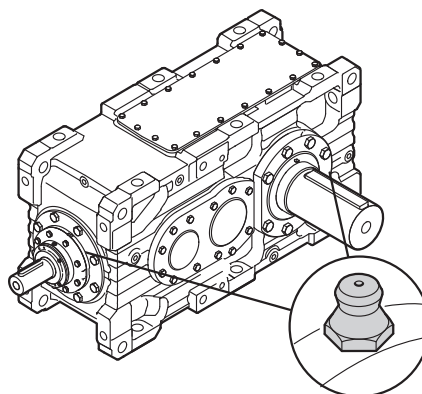
3.18.3 Position of lubrication points

Universal housing HU / horizontal housing HH / thermal housing HT

Grease nipple on gear unit cover

Regreasable sealing systems are usually equipped with taper greasing nipples according to DIN 71412 A R1/8. Relubrication must be carried out at regular intervals. The lubrication points are near the input and/or output shaft. Observe chapter Maintenance intervals.

Example



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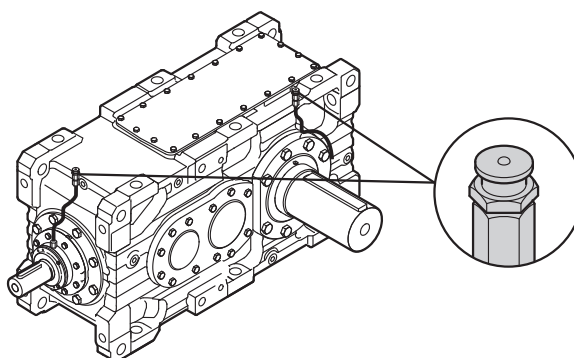
Grease nipple on the top side of the gear unit

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

Note the following points:

- This option is normally used on drives with fans, motor adapters, or V-belt drives.
- The option applies to both input and/or output shaft(s).

Example

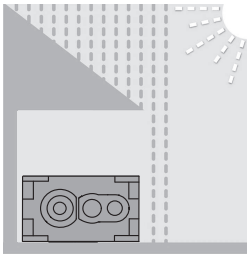
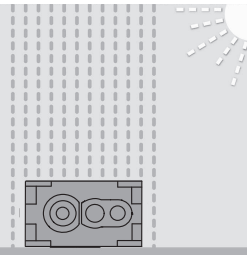
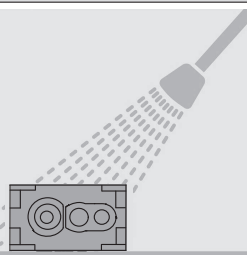


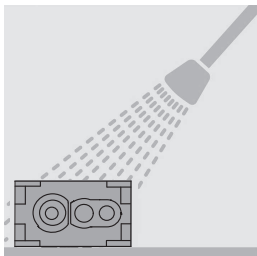
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3.19 Coating and surface protection systems

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

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

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

OS 3 high environmental pollution	
Salt spray test ISO 7253	480 h
OS 4 high environmental pollution	
	<p>Suitable for environments with permanent humidity or severe atmospheric or chemical contamination. Regular acidic and caustic wet cleaning also with chemical cleaning agents. According to corrosivity category: C5 (very high)</p>
Sample applications	<ul style="list-style-type: none"> • Drives in malting plants • Wet areas in the beverage industry • Conveyor belts in the food industry
Condensation test ISO 6270	360 h
Salt spray test ISO 7253	600 h

INFORMATION



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

3.20 Lubrication

3.20.1 Lubrication types

Splash lubrication

The oil level is low; gearing and bearing parts that are not immersed in the oil bath are lubricated by splashing oil. Standard lubrication type for horizontal mounting positions (M1 or M3).

Bath lubrication

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

- Standard lubrication type with oil compensator for:
 - Pivoted mounting positions with horizontal gear units beyond a certain angle of inclination (depending on type of gear unit, design and size)
 - Vertical gear units (mounting position M5)
 - Upright mounting position (M4) with X.K.. gear units
- Standard lubrication type without oil expansion tank for:
 - Upright mounting position (M4) with X.F../X.T.. gear units

Pressure lubrication

The gear unit is equipped with a pump (shaft end pump or motor pump). The oil level is low and might even be reduced when compared to splash lubrication. The gearing and bearing parts that are not immersed in the oil bath are lubricated by oil through lubrication lines.

Pressure lubrication is used when:

- Splash lubrication is not possible (see the relevant mounting positions and variants under "oil bath lubrication").
- Instead of oil bath lubrication if it is not desired and/or is not thermally advantageous.
- Drywell sealing system is required (only with a vertical output shaft with LSS facing down).
- High input speeds are present and the maximum speed for the other types of lubrication is exceeded (dependent on the gear unit size, design, and number of stages).

3.21 Accessories

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

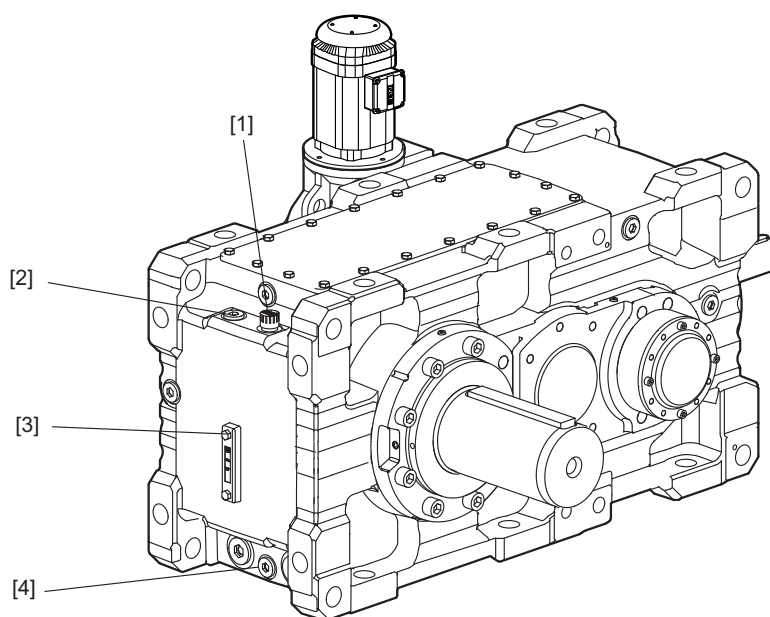
INFORMATION



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

3.21.1 General accessories

The following figure shows the general accessories.



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[1] Oil dipstick (optional)

[3] Oil level glass

[2] Gear unit venting

[4] Oil drain

Visual oil level check

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

- Oil dipstick for gear unit sizes X.100 to X.170
- Oil level glass for gear unit sizes X.180 to X.280

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

Gear unit venting

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

Oil drain

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

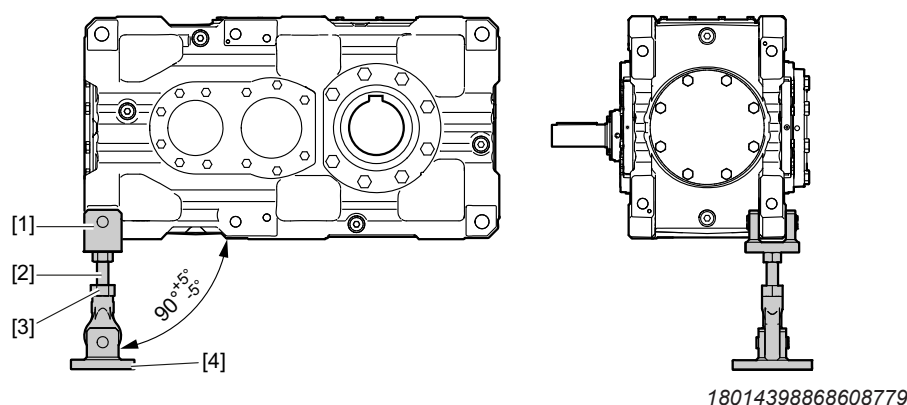
4 Design of options and accessories

4.1 Torque arm /T

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

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

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



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

INFORMATION



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

4.2 Flange coupling with cylindrical interference fit /FC-S

NOTICE

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

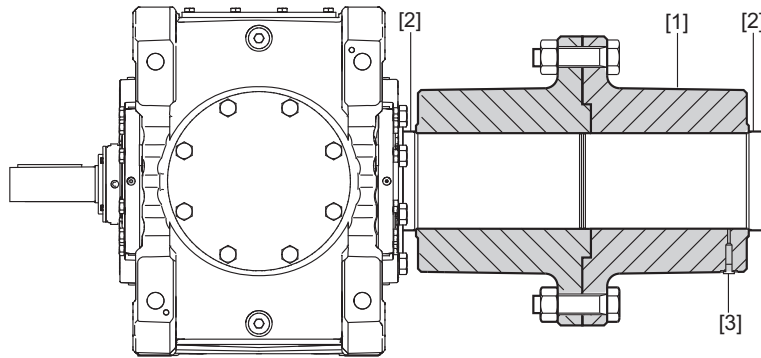
Possible damage to the gear unit.

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

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

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

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



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4.3 Flange coupling with keyway /FC-K

NOTICE

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

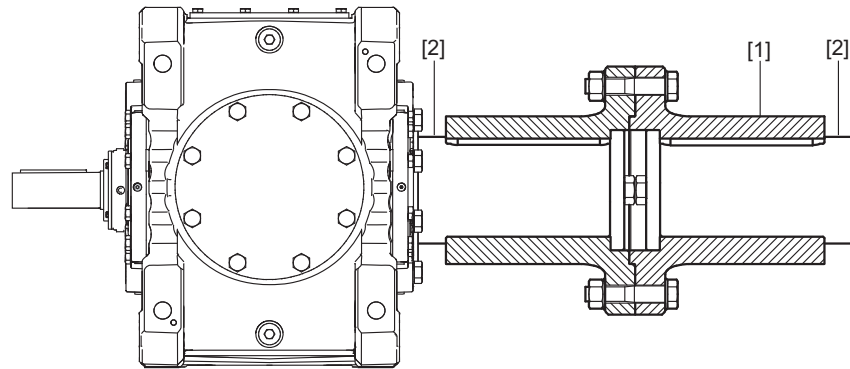
Possible damage to the gear unit.

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

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

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

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

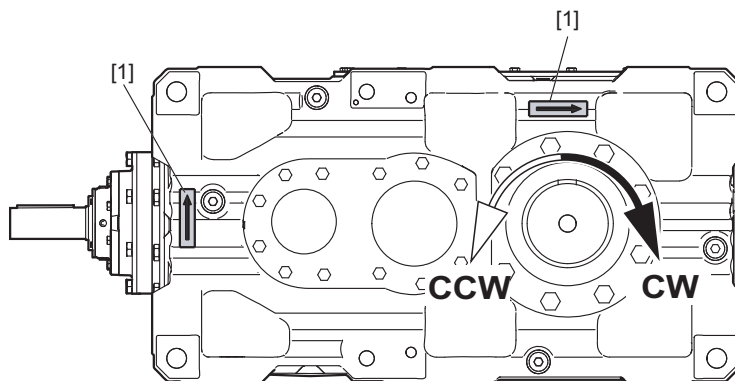


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4.4 Backstop /BS

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

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



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

- CW = Clockwise
- CCW = Counterclockwise

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

INFORMATION



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

Contact SEW-EURODRIVE if you have other requirements.

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

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

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

n_1 min^{-1}	Size X3K..	
950 – 1150	X100 – 130	All i_N
	X140 – 170	$i_N \geq 31.5$
	X180 – 280	$i_N \geq 50$
1150 – 1400	X100 – 110	$i_N \geq 25$
	X120 – 130	$i_N \geq 40$
	X140 – 170	$i_N \geq 50$
	X180 – 280	$i_N \geq 63$
> 1400	X100 – 130	$i_N \geq 35.5$
	X140 – 170	$i_N \geq 63$

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4.5 Motor adapter /MA

Motor adapters [1] are available for mounting:

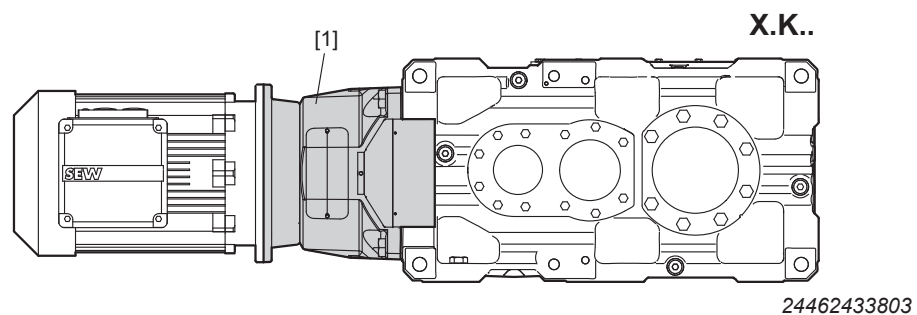
- **IEC (B5) motors** of sizes 100 to 355
- **NEMA ("C" face) motors** of sizes 182 to 449

INFORMATION



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



4.6 Drive packages on a steel frame

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

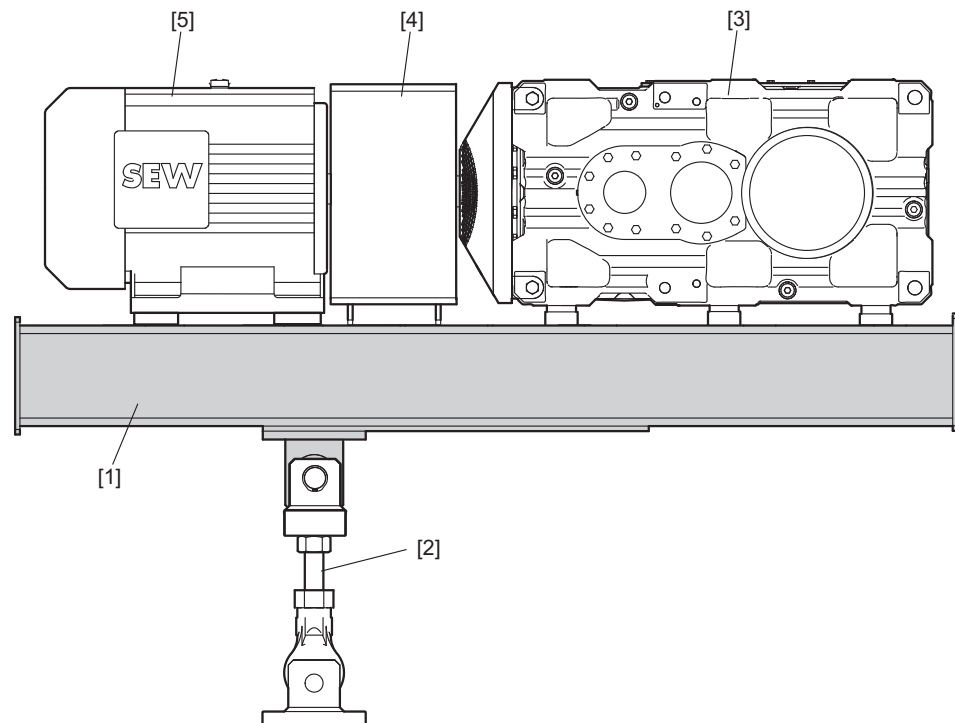
4.6.1 Swing base /SB

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

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

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

Example: Swing base with coupling



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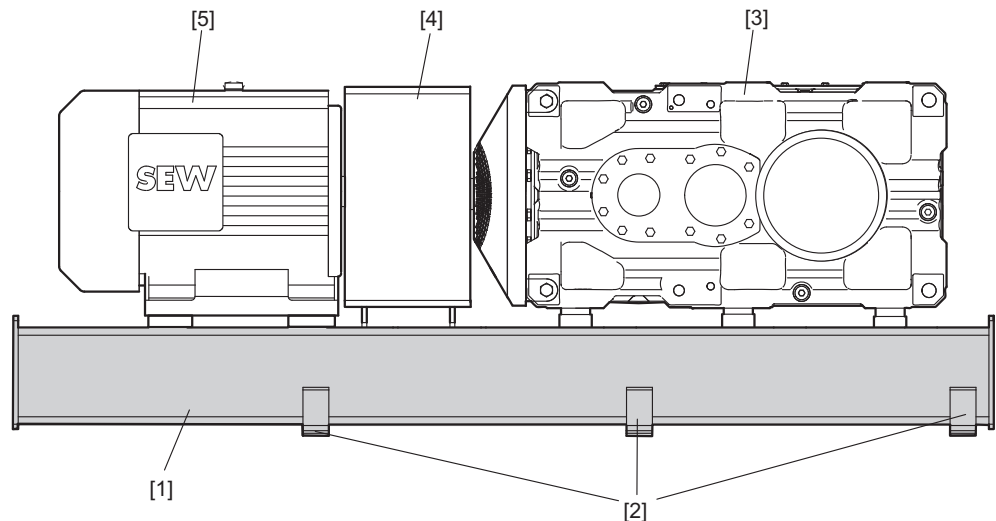
- [1] Swing base
- [2] Torque arm (optional)
- [3] Bevel-helical gear unit
- [4] Coupling with protection cover
- [5] Motor

4.6.2 Base frame /BF

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

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

Example: Base frame with coupling



219858571

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

4.7 Cooling types

4.7.1 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.

4.7.2 Built-in cooling

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

4.7.3 Circulation cooling

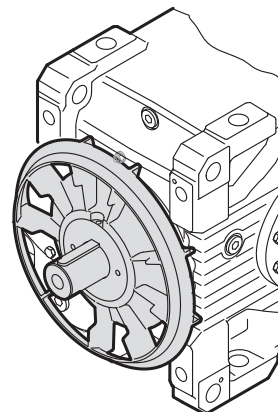
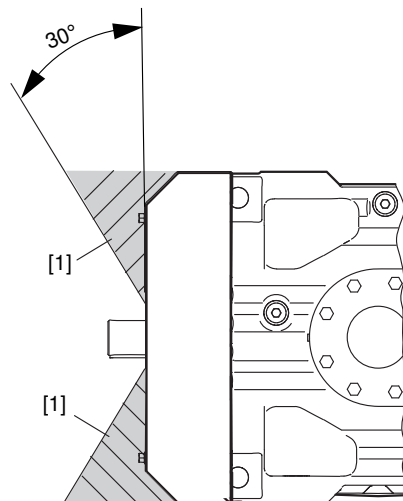
The gear unit oil is pumped out of the gear unit to an external heat exchanger by a pump (motor pump or shaft end pump). This normally involves oil supply systems with oil-water or oil-air heat exchangers.

4.8 Fan /FAN

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

The following fan designs are available:

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



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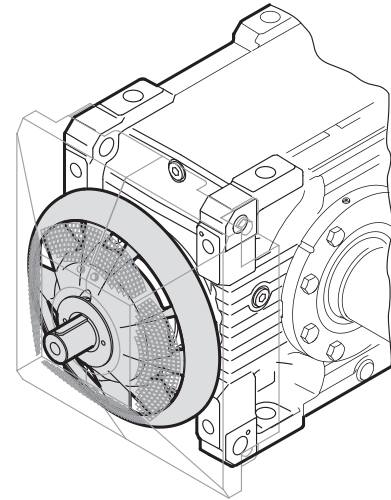
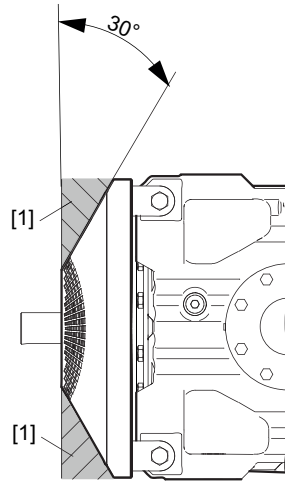
674450059

[1] The air intake must be kept clear

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

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

The air intake clearance is integrated into the fan guard.



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[1] Air intake clearance

INFORMATION

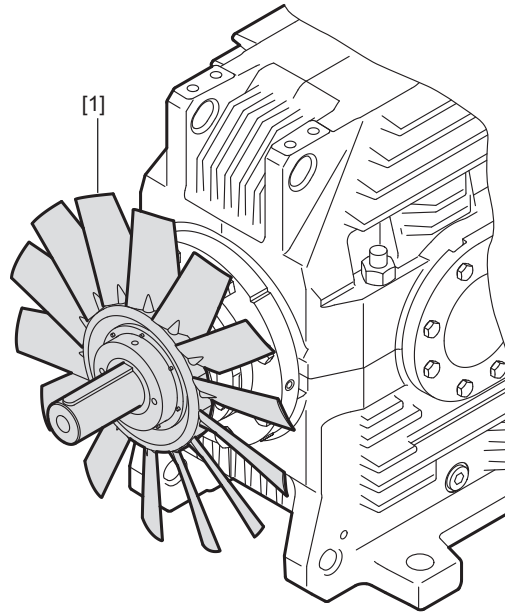


The X3K.. Advanced fan cannot be used together with a torque arm because the fan guard is mounted to the attachment point of the torque arm.

4.8.3 Axial fan

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

Universal housing HU / horizontal housing HH / thermal housing HT



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4.9 Water cooling cover /CCV

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

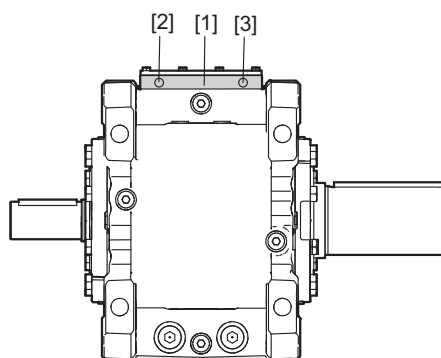
The amount of heat that can be dissipated depends on the intake temperature and the flow rate of the cooling medium that flows through the unit. The data given in the technical specifications must be observed.

INFORMATION



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

4.9.1 Structure



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

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

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

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

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

4.9.2 Notes on connection and operation

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

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

4.10 Water cooling cartridge /CCT

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

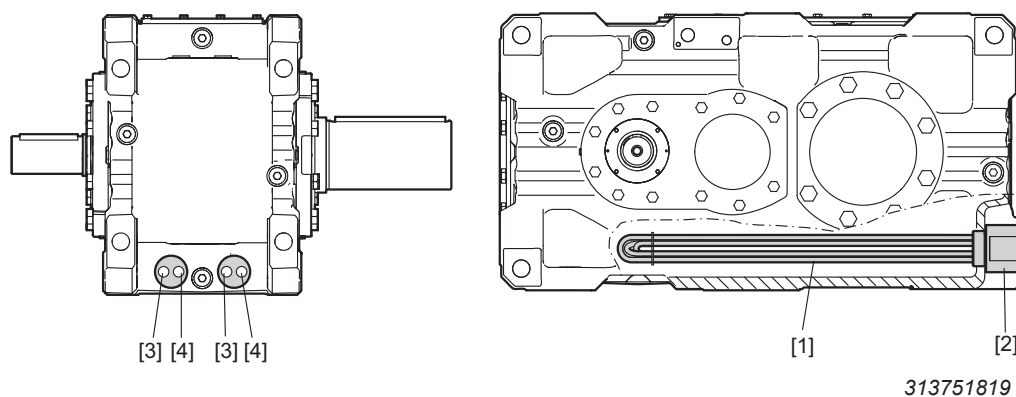
The amount of heat that can be dissipated depends on the intake temperature and the flow rate of the cooling medium that flows through the unit. See the technical specifications to determine the number of water cooling cartridges required. The data given in the technical specifications must be observed.

INFORMATION



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

4.10.1 Structure



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

The water cooling cartridge consists of 3 main parts:

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

Two bores with pipe threads are available to connect to the cooling circuit:

- Pipe thread G1 1/4" for sizes X140 – 170
- Pipe thread G 1 1/2" for sizes X180 – 280

. The piping is not included in the delivery.

Gear units with water cooling cartridge are delivered completely assembled.

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

INFORMATION



The cooling circuit must be connected in parallel for gear units with two water cooling cartridges. Observe chapter "Built-in cooling – water cooling cartridge" (→ 147).

4.10.2 Notes on connection and operation

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

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

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

Twice the cooling water volume flow is required when using 2 water cooling cartridges.

Size	Cooling water flow rate in in/per cooling cartridge	Max. cooling water flow rate l/min
X140 – 150	8	15
X160 – 170	10	
X180 – 190	13	
X200 – 210	15	28
X220 – 230	19	
X240 – 250	21	
X260 – 270	16	25
X280	18	

4.11 Oil-water cooler for splash lubrication /OWC

INFORMATION



For descriptions on the unit structure, refer to the addendum to the operating instructions "Oil-Water Cooler for Splash Lubrication /OWC".

4.12 Oil-air cooler for splash lubrication /OAC

INFORMATION



For descriptions on the unit structure, refer to the addendum to the operating instructions "Oil-Air Cooler for Splash Lubrication /OAC".

4.13 Oil-water cooler for pressure lubrication /OWP

INFORMATION



For descriptions on the unit structure, refer to the addendum to the operating instructions "Oil-Water Cooler for Pressure Lubrication /OWP".

4.14 Oil-air cooler for pressure lubrication /OAP

INFORMATION



For descriptions on the unit structure, refer to the addendum to the operating instructions "Oil-Air Cooler for Pressure Lubrication /OAP".

4.15 Motor pump /ONP1L

INFORMATION



For a description of the unit structure, refer to the addendum to the operating instructions "Motor pump /ONP1L".

4.16 Motor pump /ONP1

INFORMATION



For a description of the unit structure, refer to the addendum to the operating instructions "Motor pump /ONP1".

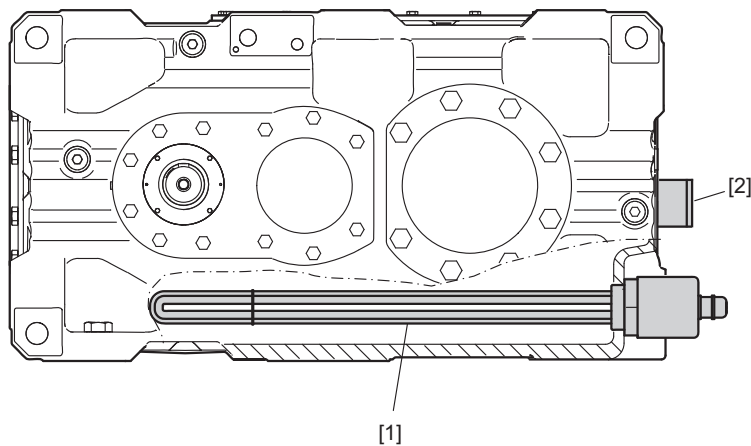
4.17 Oil heater /OH

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

4.17.1 Structure

The oil heater consists of 2 basic parts:

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



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

INFORMATION



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

4.18 Pressure switch /PS

The pressure switch signals the correct oil pressure in the pressure pipe and in this way indicates that the pressure lubrication is ready for operation. The pressure switch must be monitored by the operator.

Pressure might build up with a delay during the startup phase of the gear unit with shaft end pump. The slow pressure build-up in this phase can lead to an error signal by the pressure switch that can be bridged. The pressure switch signal must then be bridged for **5 to a maximum of 10 seconds**.

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

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 gear unit's oil sump. The exact position depends on the gear unit version and position of the shaft.

4.21 Temperature switch /TSK

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

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

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

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

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

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

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

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

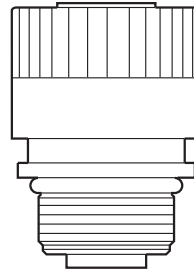


You find more information on the evaluation unit in the "DUO10A Diagnostic Unit" manual, publication number 11473428.

4.23 Breather /BPG

The following breathers can be used.

4.23.1 Standard

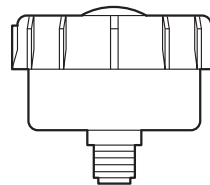


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Structure

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

4.23.2 Breather with filter insert /PI



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The breather has the following characteristics:

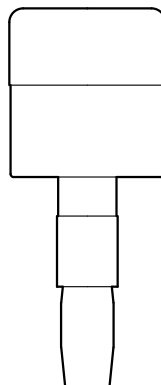
- Corrosion-resistant
- Robust filter housing
- High dirt-absorbing capacity

Structure

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

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

4.23.3 Desiccant breather filter /DC



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The breather has the following characteristics:

- Absorbs water moisture and humidity
- Reduces oil mist

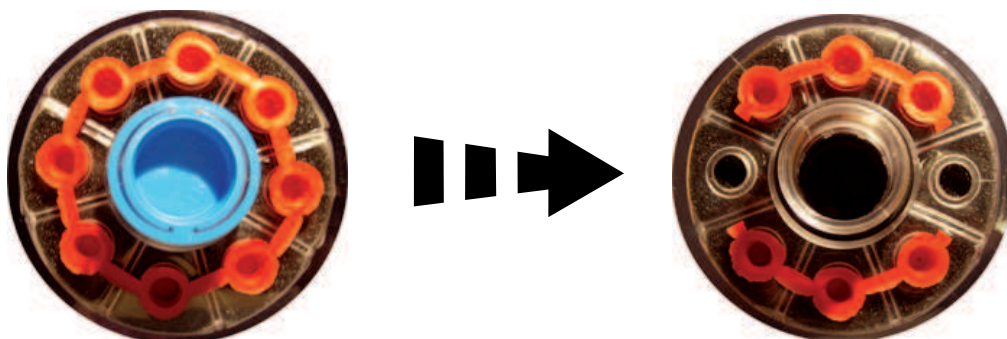
Structure

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

Usage

Before startup

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



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5 Installation/assembly

5.1 Required tools/resources

Not included in the delivery:

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

5.2 Tolerances

Observe the following tolerances.

5.2.1 Shaft end

Diameter tolerance according to DIN 748:

Ø = Smooth output shaft / ..R → ISO v6

Ø = Output shaft as a solid shaft with key /..S → ISO m6

Center bores according to DIN 332, part 2 (type D..):

Ø > 16...21 mm	→ M6	Ø > 50...85 mm	→ M20
Ø > 21...24 mm	→ M8	Ø > 85...130 mm	→ M24
Ø > 24...30 mm	→ M10	Ø > 130...225 mm ¹⁾	→ M30
Ø > 30...38 mm	→ M12	Ø > 225...320 mm ¹⁾	→ M36
Ø > 38...50 mm	→ M16	Ø > 320...500 mm ¹⁾	→ M42

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

Keys according to DIN 6885 (domed type)

5.2.2 Hollow shaft

Diameter tolerance:

Ø → ISO H7 for hollow shafts for shrink disk

Ø → ISO H8 for hollow shafts with keyway

5.2.3 Mounting flange

Centering shoulder tolerance: ISO f7

5.3 Important notes

Read the following notes prior to installation/mounting.



⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



⚠ WARNING

Danger due to mounting in impermissible mounting position.

Severe or fatal injuries.

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



⚠ WARNING

Danger due to freely accessible, rotating parts.

Severe or fatal injuries.

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



⚠ WARNING

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

Severe or fatal injuries.

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



⚠ WARNING

Danger due to installing impermissible components.

Severe or fatal injuries.

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



⚠ WARNING

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

Serious injury.

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



⚠ CAUTION

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

Possible injuries.

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



⚠ CAUTION

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

Minor injuries.

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



⚠ CAUTION

Risk of injury due to protruding parts.

Minor injuries.

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

NOTICE

Improper installation and assembly can damage the gear unit.

Possible damage to property.

- Observe the following notes.

- Make sure that the customer components are designed for the load.
- The gear units are delivered without an oil fill as standard.
- Do not change the mounting position without prior consultation of 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 an order-specific documentation.
- Do not modify the gear unit or the mount-on components without prior consultation of SEW-EURODRIVE.

- Install/mount the gear unit only in the specified mounting position on a level, vibration-damping, and torsionally rigid support structure. Do not twist housing legs and mounting flanges against each other.
- Make sure that the oil level plugs and oil drain plugs, as well as the breather are freely accessible.
- When installing a filter in the OAP and OWP cooling units, make sure there is sufficient height for removing the filter element and the filter hood.
- Use plastic inserts if there is a risk of electrochemical corrosion between the gear unit and the driven machine (connection between different metals such as cast iron and stainless steel). Also install the bolts with plastic washers. Always ground the gear unit housing.
- It is important that only authorized personnel is allowed to assemble gear head units with motors and adapters. Contact SEW-EURODRIVE.
- Do not weld anywhere on the drive. Do not use the drive as a ground point for welding work. Welding may destroy gearing components and bearings.
- Units installed outdoors must be protected from the sun. Suitable protection devices are required, such as covers or roofs. Avoid heat from building up. The user must ensure that foreign objects do not impair the function of the gear unit (e.g. falling objects or coverings).
- Protect the gear unit from direct cold air currents. Condensation may cause water to accumulate in the oil.
- The gear units are delivered with the ordered painting. Repair any damage to the paint work (e.g. on the breather).
- Do not modify the existing piping.
- For gear units that are filled with oil at the factory, check to see that the breather is installed before you start up the gear unit.
- Adhere to 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 ≥ 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" (→ 87).

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

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

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

INFORMATION



Do not lubricate the screw connection during installation.

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

Observe the notes in chapter "Important information" (→ 82).

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

INFORMATION



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

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

INFORMATION



Do not lubricate the bolts connection during assembly.

5.5.3 Aligning the shaft axis



▲ WARNING

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

Severe or fatal injuries.

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

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

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

5.6 Speed monitoring

The speed monitor serves for monitoring the output speed of the auxiliary drive. After the speed monitor is installed, reference speed, switching hysteresis, and start bypass must be set at the speed monitor. Observe the operating instructions of the manufacturer.

5.7 Filling the gear unit and auxiliary drive adapter with oil

5.7.1 Notes

Observe the notes in chapter "Important information" (→ 82).

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



⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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

NOTICE

Improper oil filling may cause damage to the gear unit.

Possible damage to property.

- Observe the following notes.
- Fill in the oil when the gear unit is in the intended mounting position.
- Use an oil from the current lubricant table www.sew-eurodrive.de/lubricants.
- Make sure the oil is at the ambient temperature when filling it into the gear unit.
- For gear units with external supply pipes, e.g. oil supply systems, establish the connections before filling the oil.
- Observe the additional notes depending on the lubrication type in the following chapters.
- The overrunning clutch and the gear unit have a **shared oil chamber**.
- The gear unit and the auxiliary drive have a **separate oil chamber**.
- Fill the gear unit and the auxiliary drive adapter with the oil grade specified on the nameplate. The oil quantity specified on the nameplate is an approximate quantity. The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity. When the gear unit is equipped with an oil dipstick and an oil sight glass, refer to the oil dipstick for the correct oil level. For additional information, refer to chapter "Checking the oil level" (→ 186) and chapter "Changing the oil" (→ 192).
- The required oil fill quantity is higher when additional attachments are mounted to the gear unit, such as an oil supply system. In this case, observe the respective operating instructions "Oil Supply System" by SEW-EURODRIVE.
- Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).

5.8 Gear units delivered with oil fill (option)

Observe the notes in chapter "Important information" (→ 82).

NOTICE

Improper startup can result in damage to the gear unit.

Possible damage to property.

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

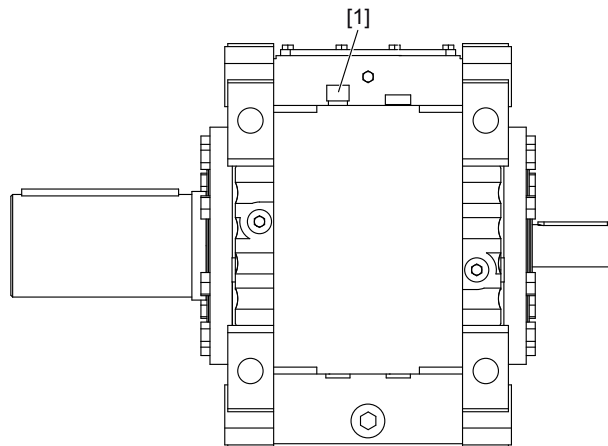
INFORMATION



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

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

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



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1. Remove the closing plug.
2. Insert the breather [1].
3. Check the oil level. Observe chapter "Checking the oil level" (→ 186).

5.9 Gear units with solid shaft

5.9.1 Mounting input and output components

Observe the notes in chapter "Important information" (→ 82).

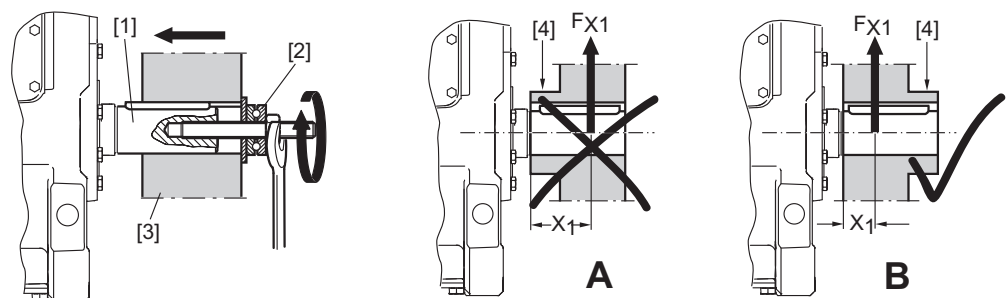
NOTICE

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

Possible damage to property.

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

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



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

- A Incorrect
B Correct

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

INFORMATION



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

5.10 Flange coupling with cylindrical interference fit /FC-S

Observe the notes in chapter "Important information" (→ 82).

INFORMATION

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

5.11 Flange coupling with keyway /FC-K

Observe the notes in chapter "Important information" (→ 82).

INFORMATION

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

5.12 Dimensioning the customer hub of solid shaft gear units

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

5.13 Output shaft as a hollow shaft with keyed connection /..A**5.13.1 General information**

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

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

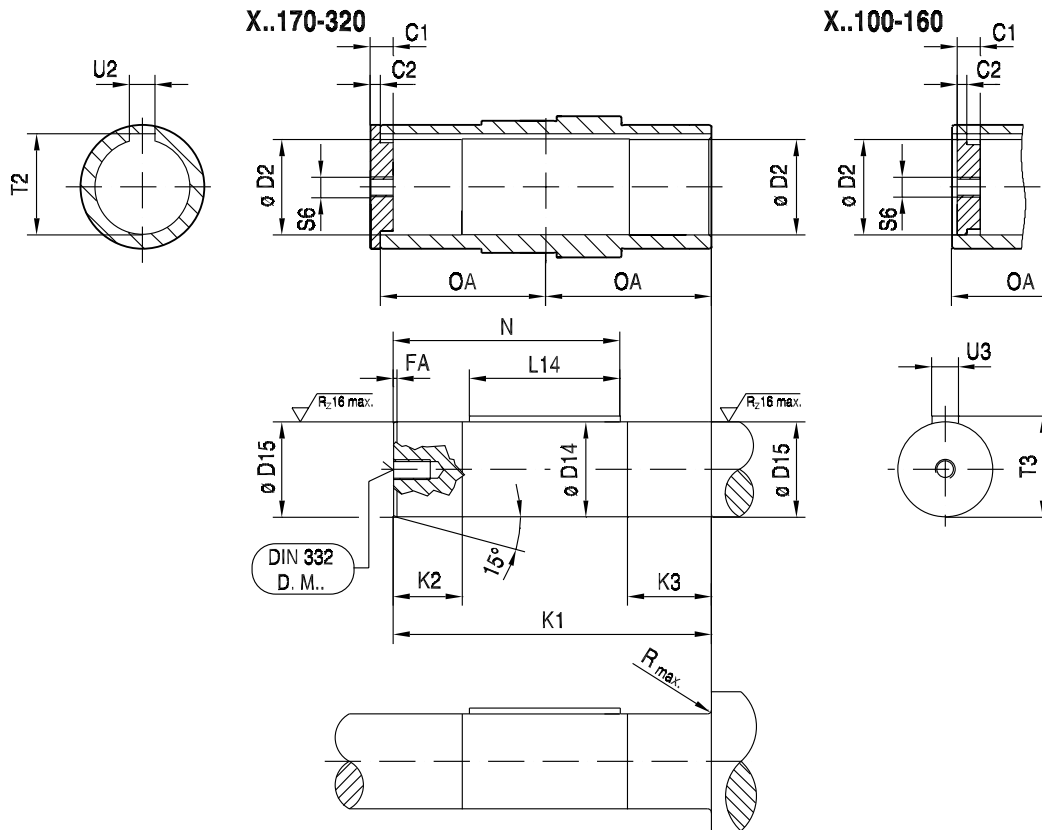
- 320 N/mm² for sizes X..A100 – X..A280

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

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

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

5.13.2 Dimensions of the machine shaft



X.K	C1	C2	ø D2	ø D14	ø D15	FA	K1	K2	K3	L14	N	OA	Rmax.	S6	T2	T3	U2	U3	DIN 332 2 DR.M..
X..A100	25	12	75 ^{H8}	75 _{h11}	75 _{B7}	2	312	47.5	81	90	205	173	1.6	M24	80.4	80	20 ^{JS9}	20 _{h9}	M20
X..A110	30	14	85 ^{H8}	85 _{h11}	85 _{B7}	2	312.5	45	84	100	210	176	1.6	M24	90.4	90	22 ^{JS9}	22 _{h9}	M20
X..A120	30	14	95 ^{H8}	95 _{h11}	95 _{B7}	2	342	53	92	140	244.5	190.5	1.6	M30	100.4	100	25 ^{JS9}	25 _{h9}	M24
X..A130	30	14	105 ^{H8}	105 _{h11}	105 _{B7}	2	347	68	109	160	258	194	1.6	M30	111.4	111	28 ^{JS9}	28 _{h9}	M24
X..A140	30	14	115 ^{H8}	115 _{h11}	115 _{B7}	2	403	61	102	200	306	222	1.6	M30	122.4	122	32 ^{JS9}	32 _{h9}	M24
X..A150	30	14	125 ^{H8}	125 _{h11}	125 _{B7}	3	408	76	117	200	308.5	224.5	1.6	M30	132.4	132	32 ^{JS9}	32 _{h9}	M24
X..A160	36	16	135 ^{H8}	135 _{h11}	135 _{B7}	3	465	80	127	250	361	256	1.6	M36	143.4	143	36 ^{JS9}	36 _{h9}	M30
X..A170	36	17	150 ^{H8}	150 _{h11}	150 _{B7}	3	493	96	115	280	377	256	1.6	M36	158.4	158	36 ^{JS9}	36 _{h9}	M30
X..A180	36	17	165 ^{H8}	165 _{h11}	165 _{B7}	3	565	109	128	300	423	292	2	M36	174.4	174	40 ^{JS9}	40 _{h9}	M30
X..A190	36	17	165 ^{H8}	165 _{h11}	165 _{B7}	3	565	109	128	300	423	292	2	M36	174.4	174	40 ^{JS9}	40 _{h9}	M30
X..A200	36	17	180 ^{H8}	180 _{h11}	180 _{B7}	3	620	130	149	320	460.5	319.5	2	M36	190.4	190	45 ^{JS9}	45 _{h9}	M30
X..A210	36	17	190 ^{H8}	190 _{h11}	190 _{B7}	3	620	130	149	320	460.5	319.5	2	M36	200.4	200	45 ^{JS9}	45 _{h9}	M30
X..A220	36	17	210 ^{H8}	210 _{h11}	210 _{B7}	3	686	133	152	370	518.5	352.5	2.5	M36	221.4	221	50 ^{JS9}	50 _{h9}	M30
X2KA220	36	17	210 ^{H8}	210 _{h11}	210 _{B7}	3	756	133	152	370	554	388	2.5	M36	221.4	221	50 ^{JS9}	50 _{h9}	M30
X..A230	36	17	210 ^{H8}	210 _{h11}	210 _{B7}	3	686	133	152	370	518.5	352.5	2.5	M36	221.4	221	50 ^{JS9}	50 _{h9}	M30
X2KA230	36	17	210 ^{H8}	210 _{h11}	210 _{B7}	3	756	133	152	370	554	388	2.5	M36	221.4	221	50 ^{JS9}	50 _{h9}	M30
X..A240	45	22	230 ^{H8}	230 _{h11}	230 _{B7}	3	778	147	170	370	562.5	400.5	2.5	M42	241.4	241	50 ^{JS9}	50 _{h9}	M36
X2KA240	45	22	230 ^{H8}	230 _{h11}	230 _{B7}	3	853	147	170	370	600	438	2.5	M42	241.4	241	50 ^{JS9}	50 _{h9}	M36
X..A250	45	22	240 ^{H8}	240 _{h11}	240 _{B7}	3	778	147	170	370	562.5	400.5	2.5	M42	252.4	252	56 ^{JS9}	56 _{h9}	M36
X2KA250	45	22	240 ^{H8}	240 _{h11}	240 _{B7}	3	853	147	170	370	600	438	2.5	M42	252.4	252	56 ^{JS9}	56 _{h9}	M36
X..A260	45	22	240 ^{H8}	240 _{h11}	240 _{B7}	3	851	143	166	450	639	437	2.5	M42	252.4	252	56 ^{JS9}	56 _{h9}	M36
X..A270	45	22	275 ^{H8}	275 _{h11}	275 _{B7}	4	877	158	181	450	652	450	5	M42	287.4	287	63 ^{JS9}	63 _{h9}	M36
X..A280	45	22	275 ^{H8}	275 _{h11}	275 _{B7}	4	877	158	181	500	677	450	5	M42	287.4	287	63 ^{JS9}	63 _{h9}	M36

5.13.3 Mounting the gear unit onto the machine shaft

INFORMATION



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

Size X100 – 160

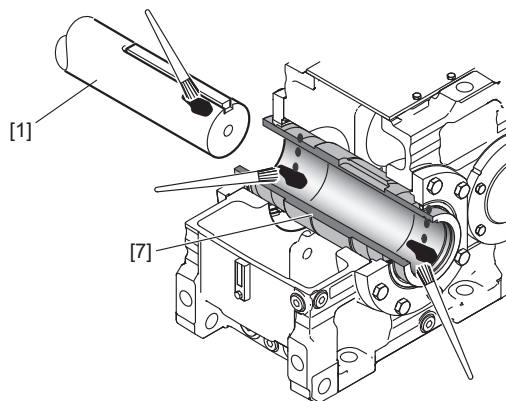
Observe the notes in chapter "Important information" (→ 82).

INFORMATION



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

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



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- [1] Machine shaft
[7] Hollow shaft

2. Attach the inner retaining ring [8] to the hollow shaft [7].
3. Secure the end plate [4] using the outer retaining ring [9].
4. Thread the threaded rod [2] into the machine shaft [1].

Observe the following thread sizes of the threaded rods [2].

Size	Strength class 8.8
X..A100	M20
X..A110 – 150	M24
X..A160	M30

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

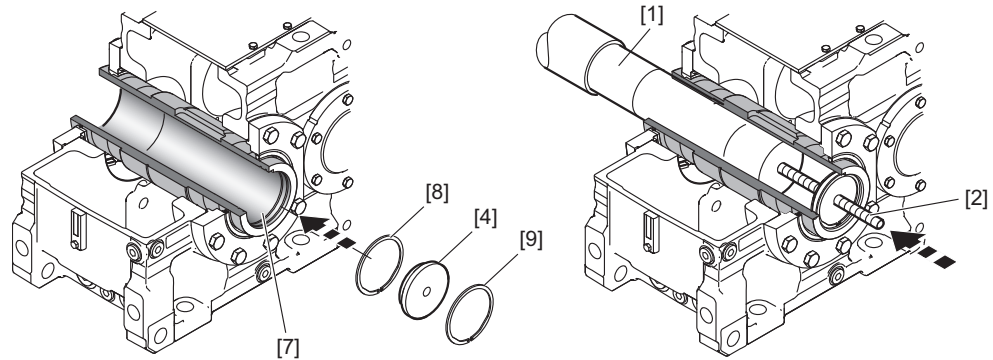
Size	2 × retaining ring (bore) DIN 472
X..A100	75 × 2.5
X..A110	85 × 2.5
X..A120	95 × 3
X..A130	105 × 4
X..A140	115 × 4

Size	2 × retaining ring (bore) DIN 472
X..A150	125 × 4
X..A160	135 × 4

INFORMATION



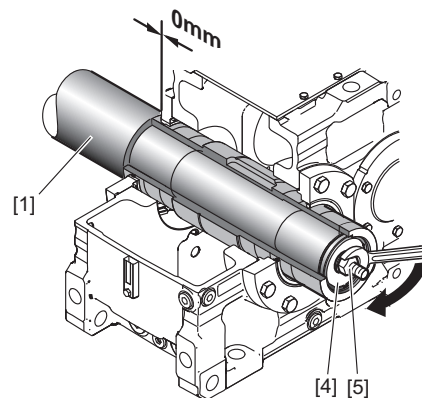
Applying lubricant to the threaded rod and nut prior to assembly makes the job easier.



- [1] Machine shaft
- [2] Threaded rod
- [4] End plate

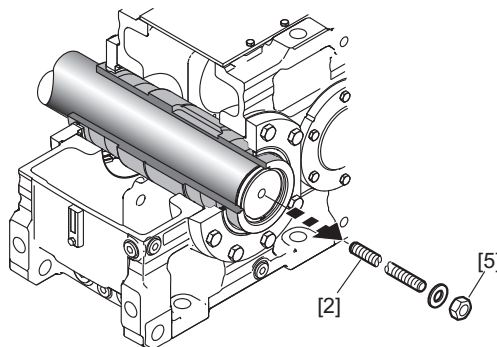
- [7] Hollow shaft
- [8] Retaining ring, inside
- [9] Retaining ring, outside

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



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

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



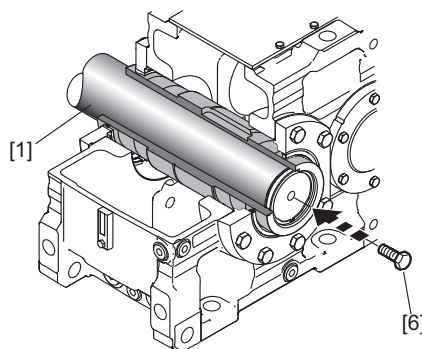
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[2] Threaded rod

[5] Nut

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

Size	Retaining screw	Tightening torque in Nm strength class 8.8
X..A120 – 150	M24	798
X..A160	M30	1597



27021600643528587

[1] Machine shaft

[6] Retaining screw



⚠ CAUTION

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

Possible injury to persons.

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

NOTICE

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

Possible damage to property.

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

Size X170 – 280

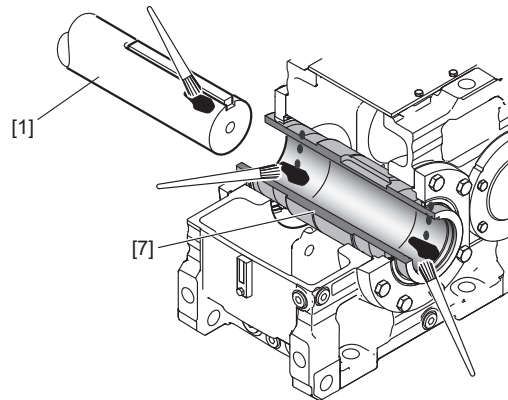
Observe the notes in chapter "Important information" (→ 82).

INFORMATION



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

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



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[1] Machine shaft

[7] Hollow shaft

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

Size	Strength class 8.8
X..A170 – 230	M30
X..A240 – 280	M36

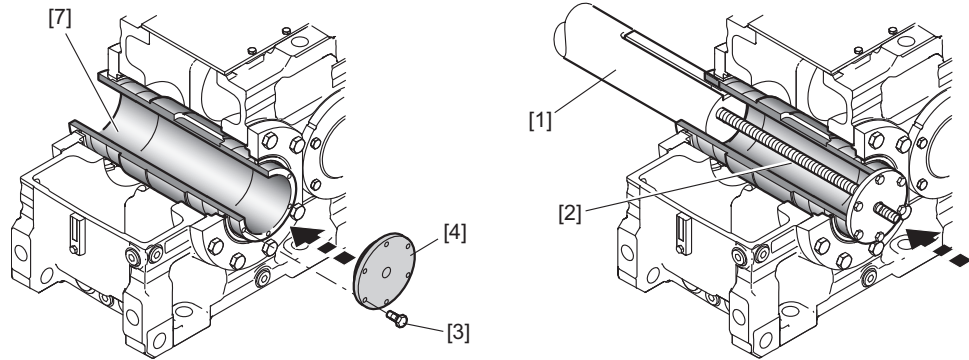
Observe the following information on the retaining screws [3].

Size	Thread size for 6 x retaining screws strength class 10.9	Tightening torque	
		Assembly/ operating state Nm	Disassembly Nm
X..A170 – 190	M10×30	79	Apply hand pressure
X..A200 – 230	M12×30	137	Apply hand pressure
X..A240 – 280	M16×30	338	Apply hand pressure

INFORMATION



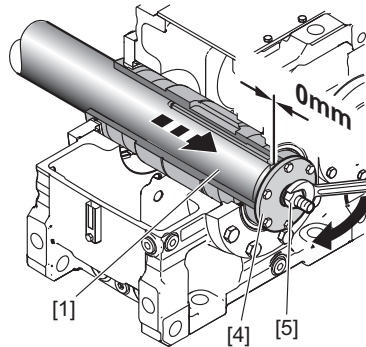
Applying lubricant to the threaded rod and nut prior to assembly makes the job easier.



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

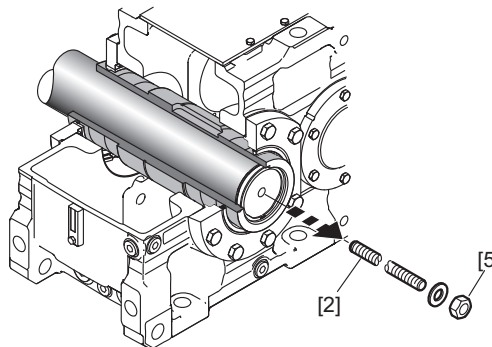
3. Tighten the machine shaft [1] with the nut [5] until the shaft end of the machine shaft [1] and the end plate [4] meet.



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

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

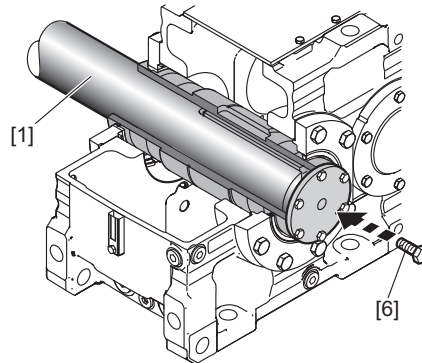


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- | |
|------------------|
| [2] Threaded rod |
| [5] Nut |

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

Size	Retaining screw	Tightening torque in Nm strength class 8.8
X..A170 – 230	M30	1597
X..A240 – 280	M36	2778



9007199565156875

- [1] Machine shaft
[6] Retaining screw

**CAUTION**

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

Possible injury to persons.

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

NOTICE

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

Possible damage to property.

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

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

Improper disassembly may damage bearings and other components.

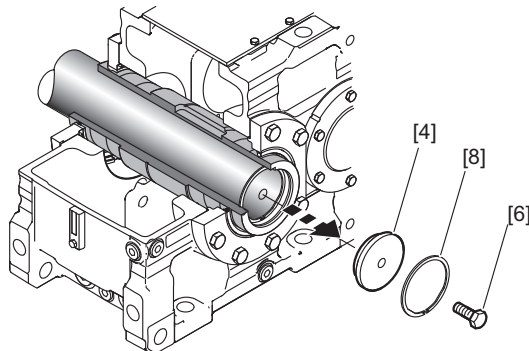
Possible damage to property.

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

Sizes X100 – 160

Observe the notes in chapter "Important information" (→ 82).

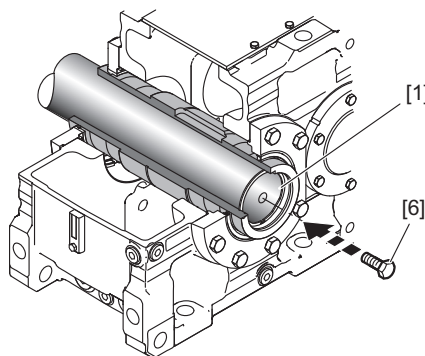
1. Loosen the retaining screw [6]. Remove the outer retaining ring [8] and the end plate [4].



9007202105918859

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

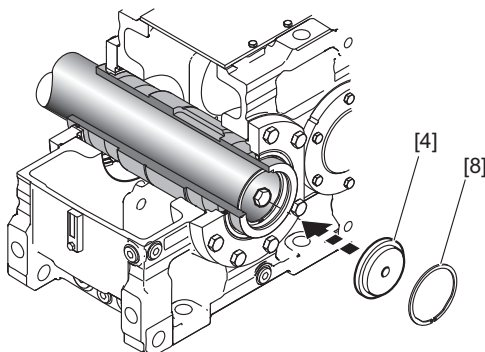
2. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



9007202105921291

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

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



9007202105924619

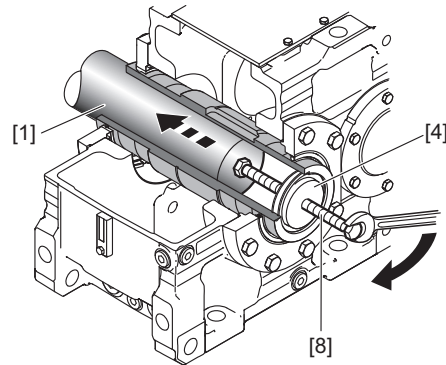
- [4] End plate
- [8] Retaining ring

4. Thread the ejector screw [9] into the end plate [4] to remove the gear unit from the machine shaft [1].

INFORMATION



Disassembly is easier if you first apply lubricant to the ejector screw [9] and the thread in the end plate [4].



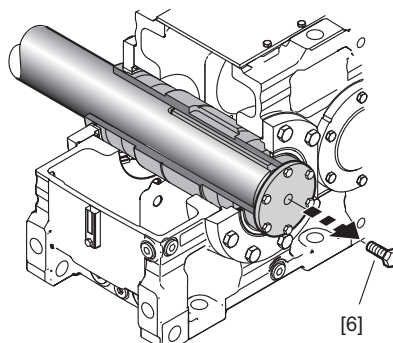
36028799870151563

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

Size X170 – 280

Observe the notes in chapter "Important information" (→ 82).

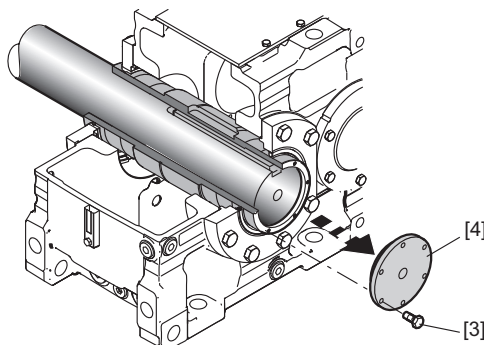
1. Loosen the retaining screw [6].



310460043

- [6] Retaining screw

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

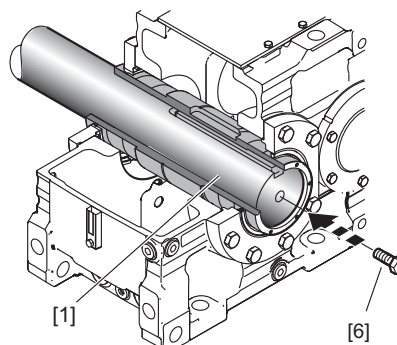


310464523

- [3] Retaining screw

- [4] End plate

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

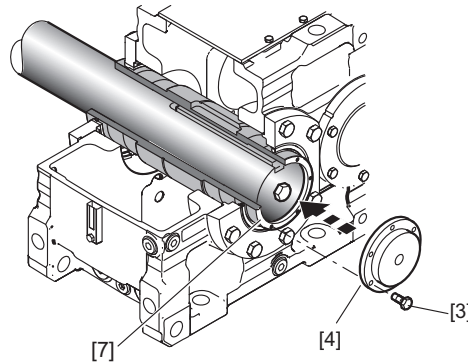


310470027

- [1] Machine shaft

- [6] Retaining screw

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



310474123

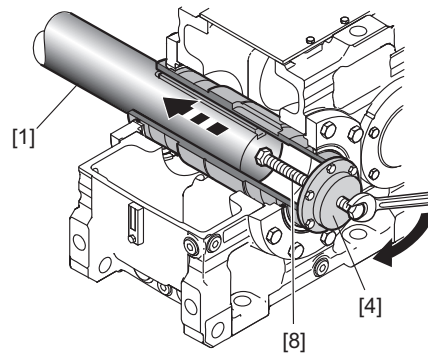
- [3] Retaining screw
- [4] End plate
- [7] Hollow shaft

5. Thread the ejector screw [8] into the end plate [4] to remove the gear unit from the machine shaft [1].

INFORMATION



Disassembly is easier if you first apply lubricant to the ejector screw [8] and the thread in the end plate [4].



310478219

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

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

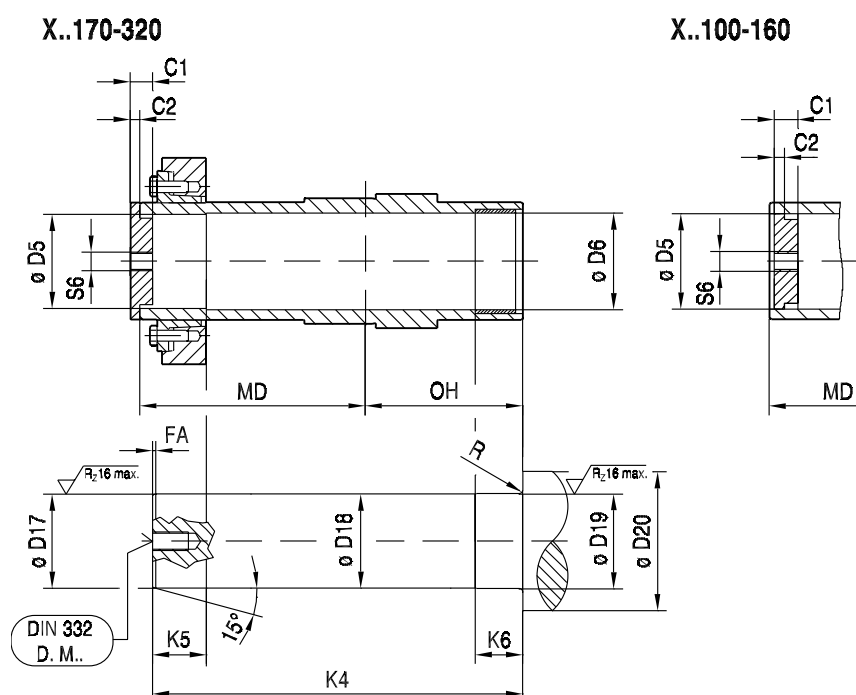
5.14.1 General information

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

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

- 360 N/mm² for sizes X..100 to X..280

5.14.2 Dimensions of the machine shaft



9007199906389771

X.F.. X.K.. X.T..	C1	C2	ø D5	ø D6	ø D17	ø D18	ø D19	ø D20	FA	K4	K5	K6	MD	OH	R	S6	DIN 33 2 DR.M..
X..H100	30	14	80 ^{H7}	81 ^{H9}	80 _{h6}	80 _{h11}	81 _{m6}	95	2	394.5 ₋₁	46	42 ₋₁	261	173	3	M30	M24
X..H110	30	14	90 ^{H7}	91 ^{H9}	90 _{h6}	90 _{h11}	91 _{m6}	105	2	400.5 ₋₁	46	42 ₋₁	265	176	3	M30	M24
X..H120	30	14	100 ^{H7}	101 ^{H9}	100 _{h6}	100 _{h11}	101 _{m6}	115	2	437 ₋₁	51	52 ₋₁	286.5	190.5	3	M30	M24
X..H130	30	14	110 ^{H7}	111 ^{H9}	110 _{h6}	110 _{h11}	111 _{m6}	125	2	449 ₋₁	55	52 ₋₁	297	194	3	M30	M24
X..H140	30	14	120 ^{H7}	121 ^{H9}	120 _{h6}	120 _{h11}	121 _{m6}	135	2	509 ₋₁	59	62 ₋₁	329	222	3	M30	M24
X..H150	30	14	130 ^{H7}	131 ^{H9}	130 _{h6}	130 _{h11}	131 _{m6}	145	3	520 ₋₁	66	62 ₋₁	337.5	224.5	3	M30	M24
X..H160	36	16	140 ^{H7}	141 ^{H9}	140 _{h6}	140 _{h11}	141 _{m6}	155	3	583 ₋₁	66	73 ₋₁	375	256	4	M36	M30
X..H170	36	17	150 ^{H7}	151 ^{H9}	150 _{h6}	150 _{h11}	151 _{m6}	165	3	600 ₋₁	83	73 ₋₁	364	256	4	M36	M30
X..H180	36	17	165 ^{H7}	166 ^{H9}	165 _{g6}	165 _{h11}	166 _{m6}	180	3	672 ₋₁	83	83 ₋₁	400	292	4	M36	M30
X..H190	36	17	165 ^{H7}	166 ^{H9}	165 _{g6}	165 _{h11}	166 _{m6}	180	3	672 ₋₁	83	83 ₋₁	400	292	4	M36	M30
X..H200	36	17	180 ^{H7}	181 ^{H9}	180 _{g6}	180 _{h11}	181 _{m6}	195	3	750 ₋₁	101	83 ₋₁	450.5	319.5	4	M36	M30
X..H210	36	17	190 ^{H7}	191 ^{H9}	190 _{g6}	190 _{h11}	191 _{m6}	205	3	753 ₋₁	106	83 ₋₁	453.5	319.5	4	M36	M30
X..H220	36	17	210 ^{H7}	211 ^{H9}	210 _{g6}	210 _{h11}	211 _{m6}	230	3	830 ₋₁	118	108 ₋₁	497.5	352.5	5	M36	M30
X2KH220	36	17	210 ^{H7}	211 ^{H9}	210 _{g6}	210 _{h11}	211 _{m6}	230	3	900 ₋₁	118	108 ₋₁	532.5	387.5	5	M36	M30
X..H230	36	17	210 ^{H7}	211 ^{H9}	210 _{g6}	210 _{h11}	211 _{m6}	230	3	830 ₋₁	118	108 ₋₁	497.5	352.5	5	M36	M30
X2KH230	36	17	210 ^{H7}	211 ^{H9}	210 _{g6}	210 _{h11}	211 _{m6}	230	3	900 ₋₁	118	108 ₋₁	532.5	387.5	5	M36	M30
X..H240	45	22	230 ^{H7}	231 ^{H9}	230 _{g6}	230 _{h11}	231 _{m6}	250	3	948 ₋₁	140	108 ₋₁	571.5	400.5	5	M42	M36
X2KH240	45	22	230 ^{H7}	231 ^{H9}	230 _{g6}	230 _{h11}	231 _{m6}	250	3	1023 ₋₁	140	108 ₋₁	609	438	5	M42	M36
X..H250	45	22	240 ^{H7}	241 ^{H9}	240 _{g6}	240 _{h11}	241 _{m6}	260	3	948 ₋₁	140	108 ₋₁	571.5	400.5	5	M42	M36
X2KH250	45	22	240 ^{H7}	241 ^{H9}	240 _{g6}	240 _{h11}	241 _{m6}	260	3	1023 ₋₁	140	108 ₋₁	609	438	5	M42	M36
X..H260	45	22	250 ^{H7}	255 ^{H9}	250 _{g6}	250 _{h11}	255 _{m6}	280	4	1021 ₋₁	140	108 ₋₁	608	437	5	M42	M36
X..H270	45	22	280 ^{H7}	285 ^{H9}	280 _{g6}	280 _{h11}	285 _{m6}	310	4	1056 ₋₁	146	143 ₋₁	630	450	5	M42	M36
X..H280	45	22	280 ^{H7}	285 ^{H9}	280 _{g6}	280 _{h11}	285 _{m6}	310	4	1056 ₋₁	146	143 ₋₁	630	450	5	M42	M36

5.14.3 Mounting the gear unit onto the machine shaft

INFORMATION



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

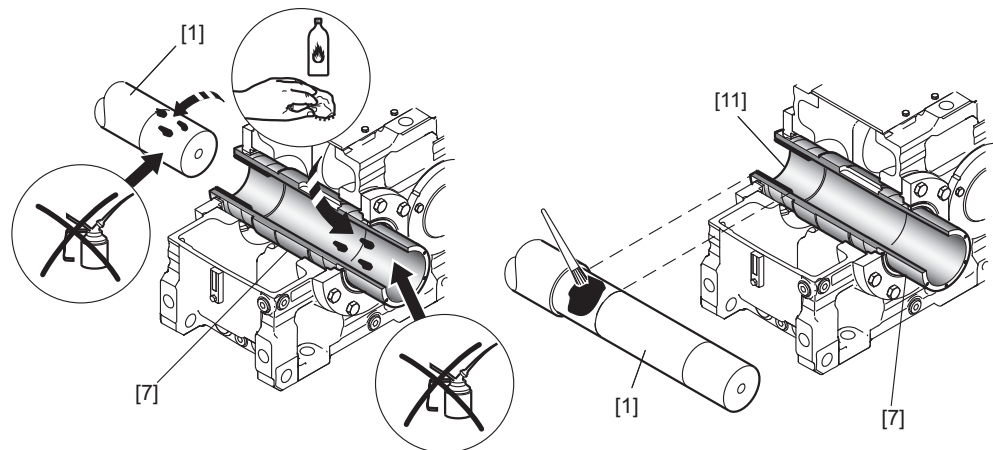
Size X100 – 160

Observe the notes in chapter "Important information" (→ 82).

INFORMATION



- Included in the delivery:
 - 2 × retaining ring [8]/[9] and end plate [4].
 - **Not** included in the delivery:
 - Threaded rod [2], nut [5], retaining screw [6], ejector screw [8].
1. Before mounting the gear unit, degrease the hollow shaft [7] and the machine shaft [1].
 2. **NOTICE!** Never apply assembly paste directly to the bushing [11] since the compound may get into the clamping area of the shrink disk when the input shaft is connected. Possible damage to property.
The clamping area of the shrink disk between the machine shaft [1] and the hollow shaft [7] must remain absolutely free of any grease.
 3. Apply some assembly paste, such as NOCO® fluid or Rivolta F.L.A. to the machine shaft [1] in the area of the bushing [11].



16839935371

[1] Machine shaft

[11] Bushing

[7] Hollow shaft

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

Observe the following thread sizes of the threaded rods [2].

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

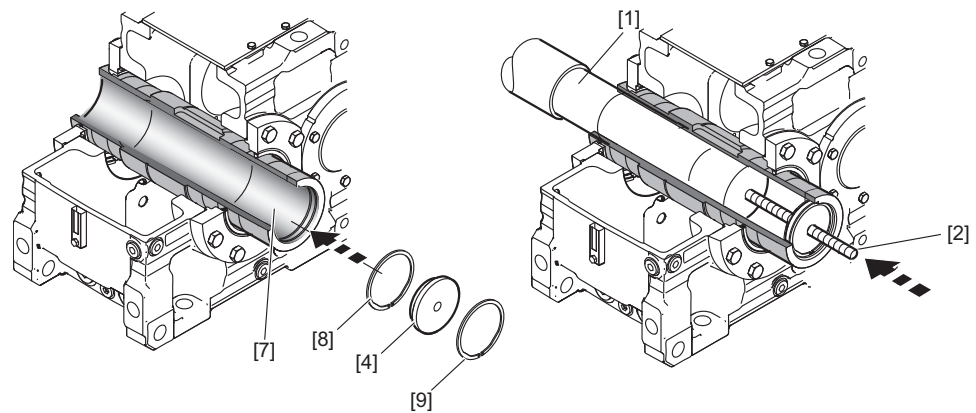
Observe the following information on the retaining rings [8][9].

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

INFORMATION



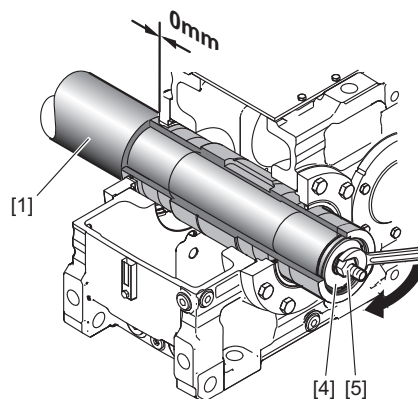
Applying lubricant to the threaded rod and nut prior to assembly makes the job easier.



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

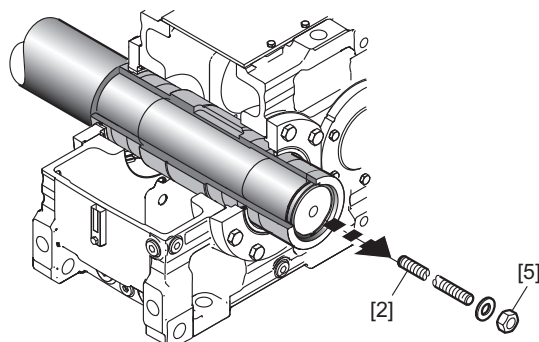
5. Screw the nut [5] onto the threaded rod up to the end plate [4]. Tighten the nut [5] until the shoulders of the machine shaft [1] and the hollow shaft meet.



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

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

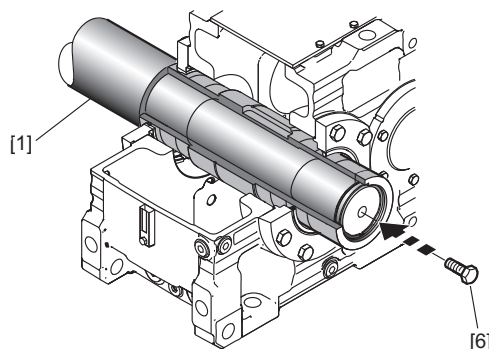


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- [2] Threaded rod
[5] Nut

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

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

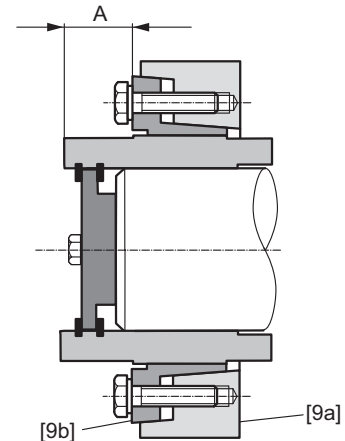
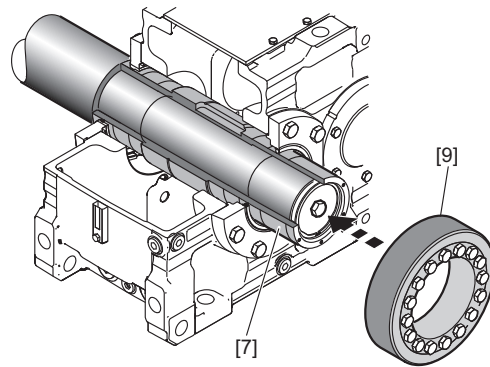


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- [1] Machine shaft
[6] Retaining screw

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

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



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[7] Hollow shaft
[9] Shrink disk

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

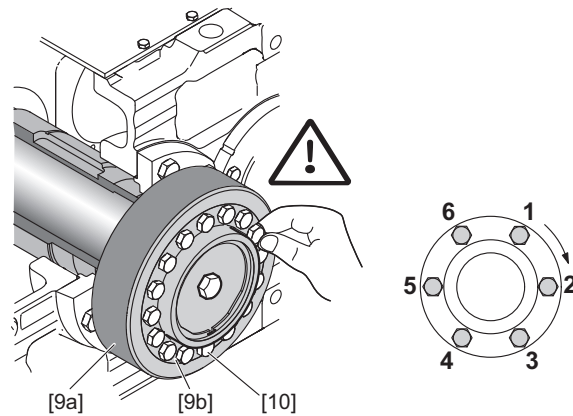
Size	A ± 0.5 in mm
XH100	37.5
XH110	38
XH120	39
XH130 – 140	41
XH150	42
XH160	48

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

INFORMATION



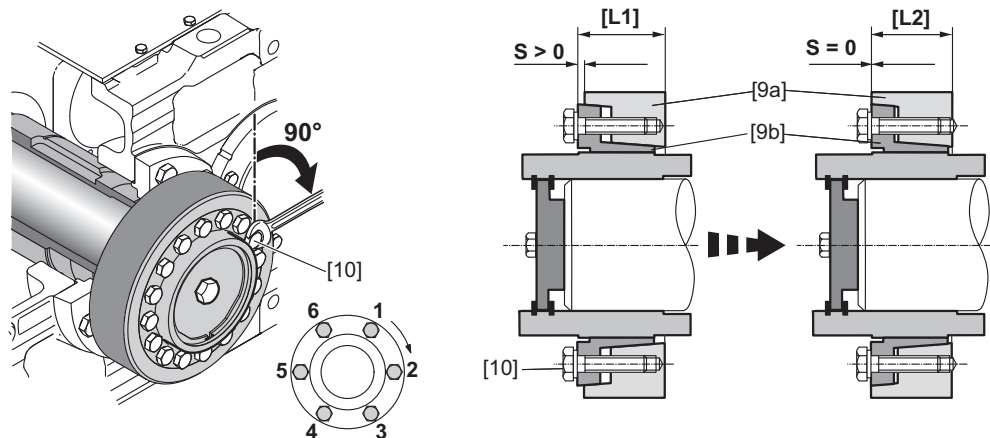
For shrink disks with a slotted taper bushing (inner ring) [9b], tighten the locking screws [10] to the left and right of the slot one after another, and then, in several stages, tighten the remaining screws at evenly spaced intervals.



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

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



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

INFORMATION



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

**⚠ CAUTION**

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

Possible injury to persons.

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

NOTICE

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

Possible damage to property.

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

Size X170 – 280

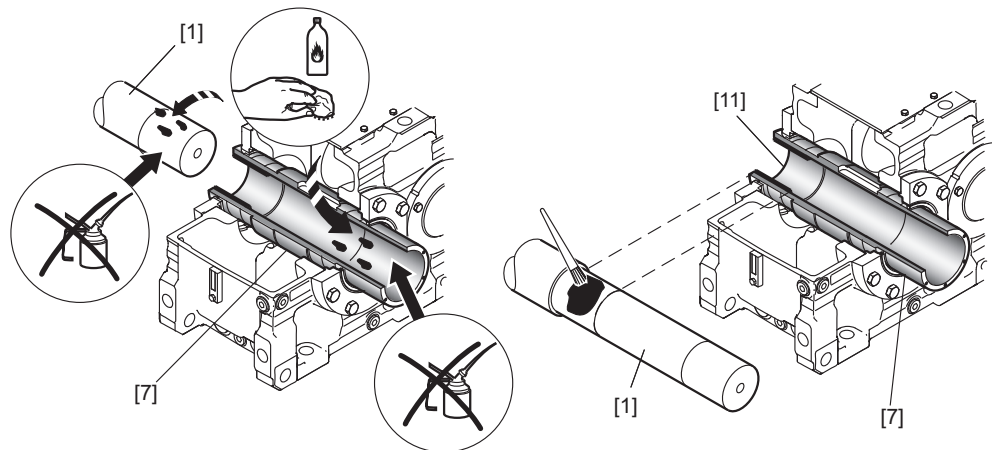
Observe the notes in chapter "Important information" (→ 📄 82).

INFORMATION



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

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



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[1] Machine shaft

[11] Bushing

[7] Hollow shaft

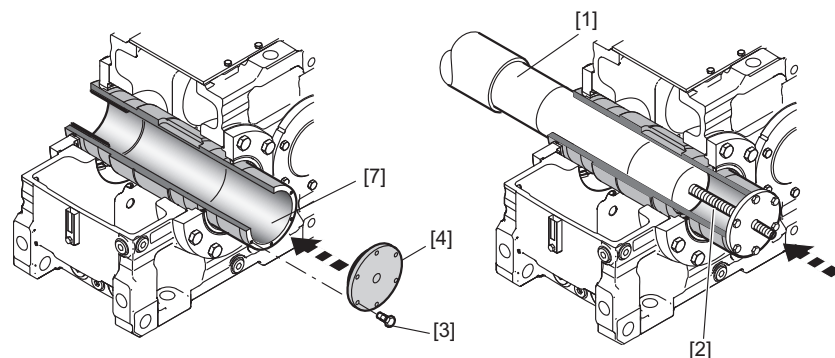
4. Use the retaining screws [3] to attach the end plate [4] centricly on the hollow shaft [7]. Thread the threaded rod [2] into the machine shaft [1].

Observe the following thread sizes of the threaded rods [2].

Size	Strength class 8.8
X..H170 – 230	M30
X..H240 – 280	M36

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

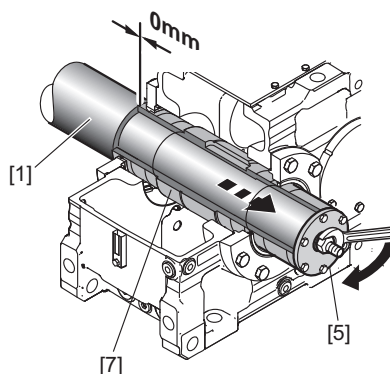
Size	Thread size for 6 x retaining screws strength class 10.9	Tightening torque	
		Assembly/operating state Nm	Disassembly Nm
X..H170 – 190	M10×30	79	Apply hand pressure
X..H200 – 230	M12×30	137	Apply hand pressure
X..H240 – 280	M16x40	338	Apply hand pressure



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

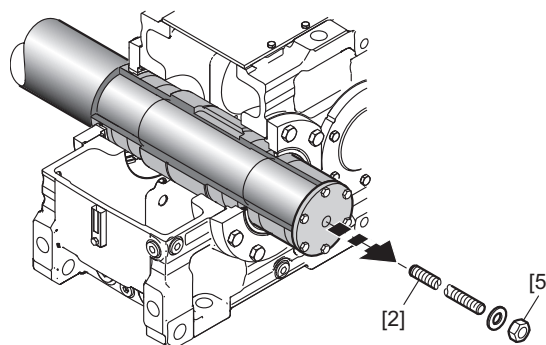
5. Screw the nut [5] onto the threaded rod up to the end plate [4]. Tighten the nut [5] until the shoulders of the machine shaft [1] and the hollow shaft meet.



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

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

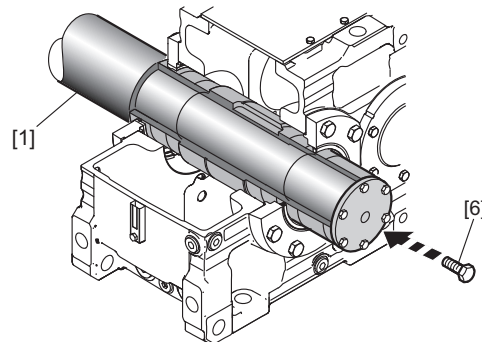


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- | | |
|------------------|---------|
| [2] Threaded rod | [5] Nut |
|------------------|---------|

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

Size	Strength class 8.8	Tightening torque Nm Strength class 8.8
X..H170 – 230	M30	1597
X..H240 – 280	M36	2778

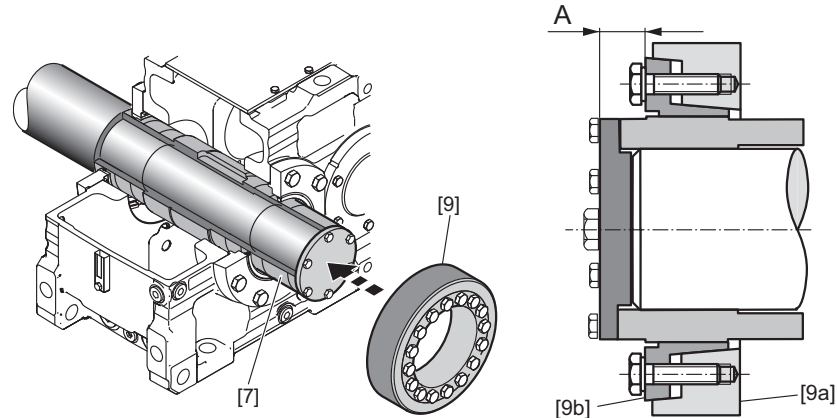


310510731

[1] Machine shaft

[6] Retaining screw

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



9007199565261323

[7] Hollow shaft

[9a] Taper (outer ring)

[9] Shrink disk

[9b] Taper bushing (inner ring)

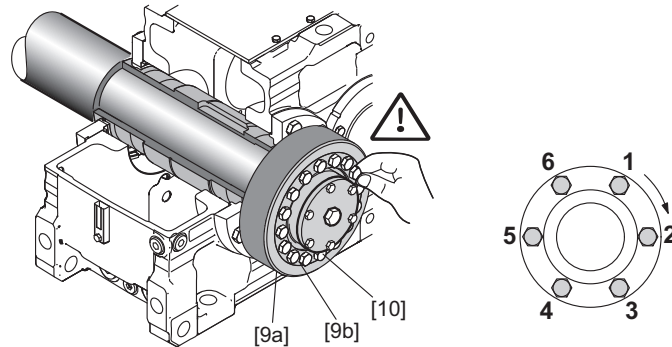
Size	A ± 0.5 in mm
XH170 – 190	37
XH200 – 210	38
XH220 – 230	39
XH240 – 260	48
XH270 – 280	49

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

INFORMATION



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



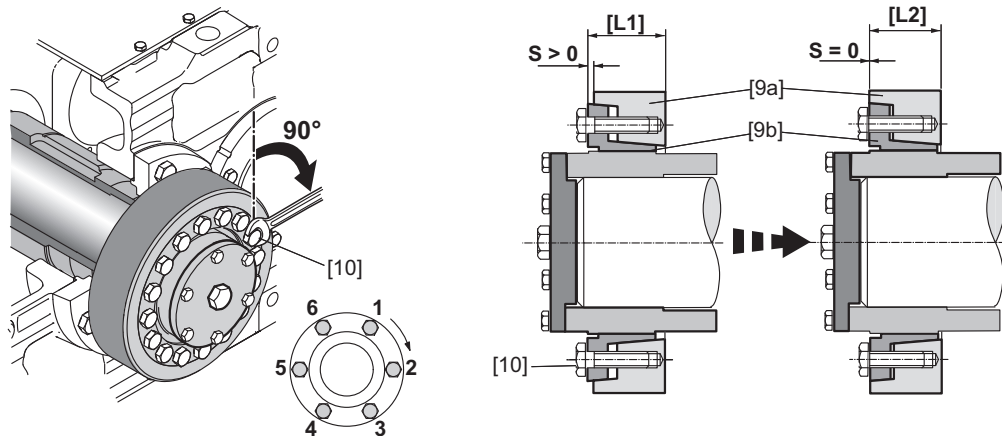
9007199565278219

[9a] Taper (outer ring)

[10] Locking screws

[9b] Taper bushing (inner ring)

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



18014398820023307

[9a] Taper (outer ring)

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

[9b] Taper bushing (inner ring)

[L2] Completely assembled (ready for operation)

[10] Locking screws

INFORMATION



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



⚠ CAUTION

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

Possible injury to persons.

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

NOTICE

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

Possible damage to property.

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

5.14.4 Disassembling the gear unit from the machine shaft

Sizes X100 – 160

Observe the notes in chapter "Important information" (→ 82).

NOTICE

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

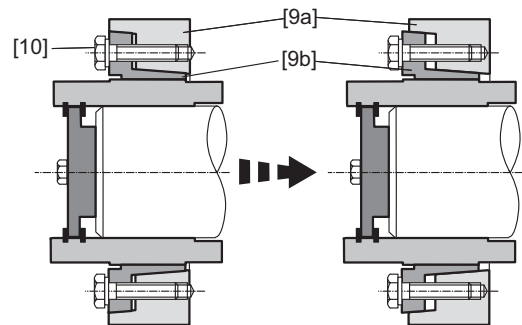
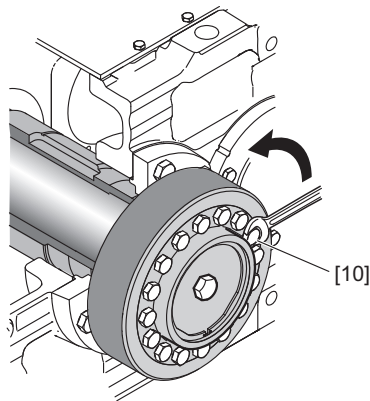
Possible damage to property.

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

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

INFORMATION

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

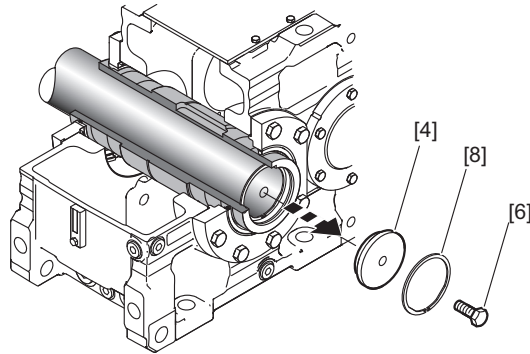


18014401395753611

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

2. Remove the shrink disk from the hollow shaft.

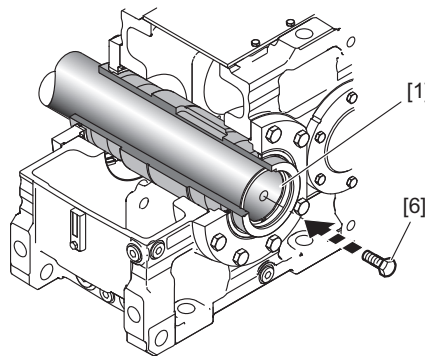
- Loosen the retaining screw [6]. Remove the outer retaining ring [8] and the end plate [4].



9007202105918859

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

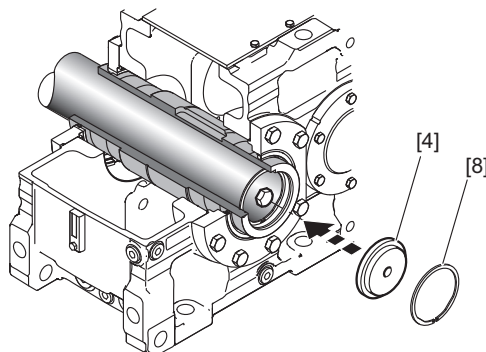
- To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



9007202105921291

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

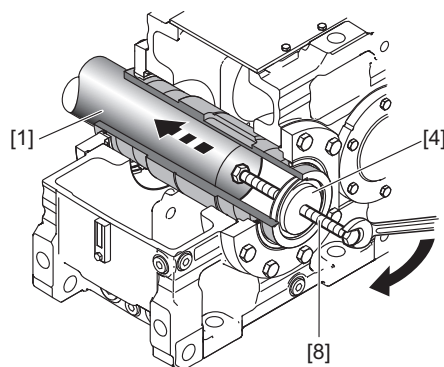
- Turn the end plate [4] and reinstall the end plate [4] and the outer retaining ring [8].



9007202105924619

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

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



36028799870151563

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

Size X170 – 280

Observe the notes in chapter "Important information" (→ 82).

NOTICE

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

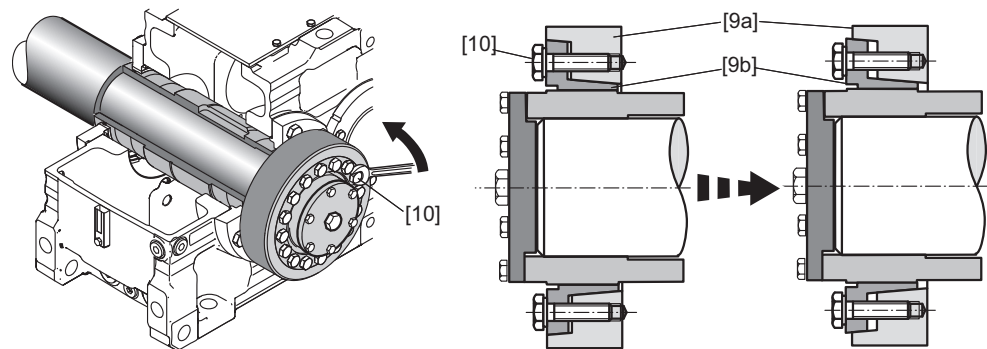
Possible damage to property.

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

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

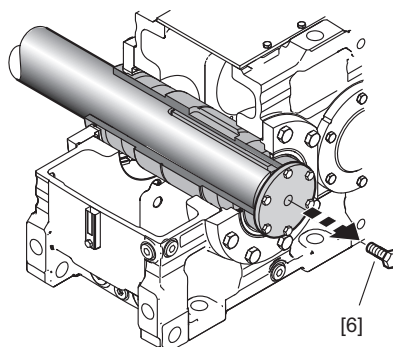
INFORMATION

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



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

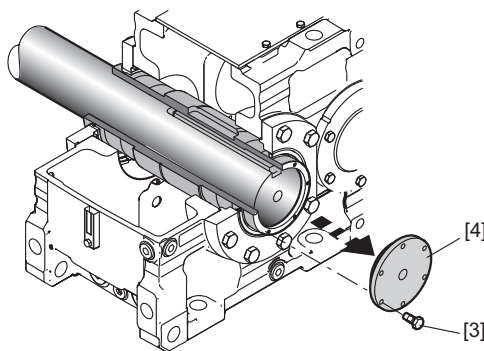
2. Loosen the retaining screw [6].



310460043

- [6] Retaining screw

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

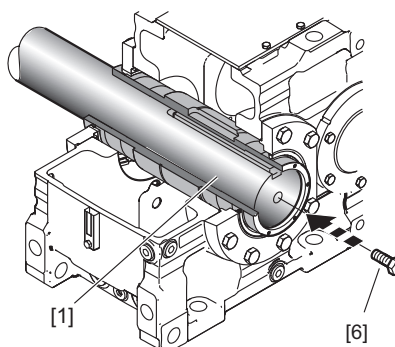


310464523

- [3] Retaining screw

- [4] End plate

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

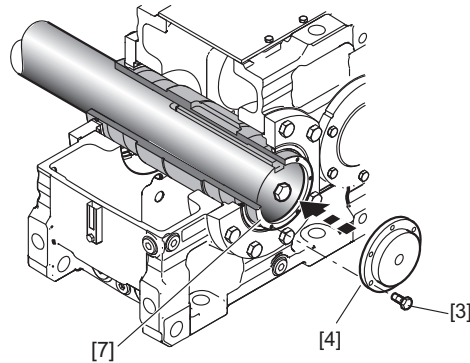


310470027

- [1] Machine shaft

- [6] Retaining screw

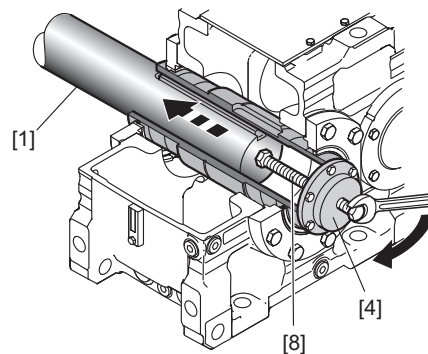
5. To disassemble the gear unit, flip the end plate [4] over and use the retaining screws [3] to reattach it centrally to the hollow shaft [7]. The retaining screws [3] should be tightened hand-tight.



310474123

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

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



310478219

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

Cleaning and lubricating the shrink disk

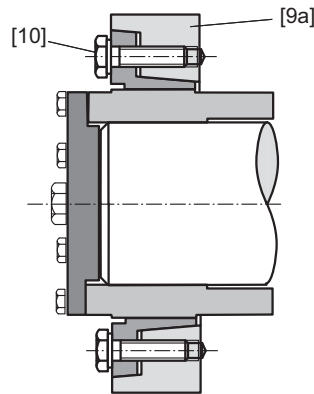
Observe the notes in chapter "Important information" (→ 82).

Clean and lubricate the shrink disk before installing it again.

INFORMATION



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



9007200781126155

[9a] Taper (outer ring)

[10] Locking screws

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

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

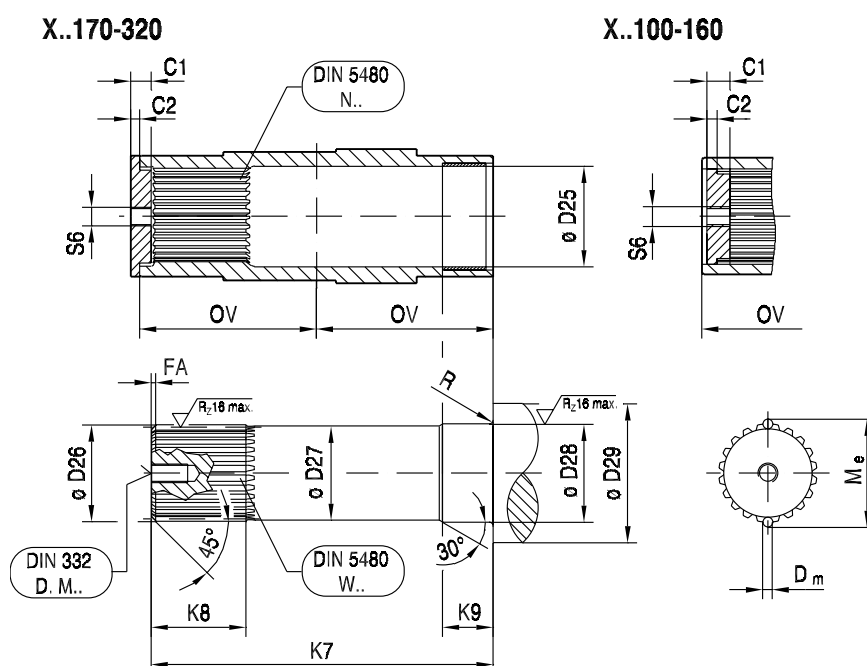
5.15.1 General information

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

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

- 320 N/mm² for sizes X..100 to X..280

5.15.2 Dimensions of the machine shaft



X.F.. X.K.. X.T..	C1	C2	Ø D25	Ø D26	Ø D27	Ø D28	Ø D29	Dm	FA	K7	K8	K9	Me	OV	R	S6	DIN 332 DR.M..	DIN 5480
X..100	30	14	81 ^{H9}	74.4 _{h10}	73	81 _{m6}	95	6	3	306 ₋₁	81	42 ₋₁	81.326 _{-0.069 -0.125}	173	3	M24	M20	W 75x3x30x24x8f N 75x3x30x24x9H
X..110	30	14	91 ^{H9}	84.4 _{h10}	83	91 _{m6}	105	6	3	311.5 ₋₁	81	42 ₋₁	91.092 _{-0.068 -0.123}	176	3	M24	M20	W 85x3x30x27x8f N 85x3x30x27x9H
X..120	30	14	101 ^{H9}	94.4 _{h10}	93	101 _{m6}	115	6	3	341 ₋₁	91	52 ₋₁	101.141 _{-0.068 -0.122}	190.5	3	M30	M24	W 95x3x30x30x8f N 95x3x30x30x9H
X..130	30	14	111 ^{H9}	109.4 _{h10}	108	111 _{m6}	125	6	3	346 ₋₁	86	52 ₋₁	116.076 _{-0.078 -0.139}	194	3	M30	M24	W 110x3x30x35x8f N 110x3x30x35x9H
X..V140	30	14	121 ^{H9}	119.4 _{h10}	118	121 _{m6}	135	6	3	402 ₋₁	101	62 ₋₁	126.095 _{-0.078 -0.138}	222	3	M30	M24	W 120x3x30x38x8f N 120x3x30x38x9H
X..150	30	14	131 ^{H9}	129.4 _{h10}	128	131 _{m6}	145	6	3	407 ₋₁	101	62 ₋₁	136.329 _{-0.081 -0.144}	224.5	3	M30	M24	W 130x3x30x42x8f N 130x3x30x42x9H
X..160	36	16	141 ^{H9}	139.4 _{h10}	138	141 _{m6}	155	6	3	464 ₋₁	111	73 ₋₁	146.167 _{-0.080 -0.143}	256	4	M36	M30	W 140x3x30x45x8f N 140x3x30x45x9H
X..170	36	17	151 ^{H9}	149.4 _{h10}	148	151 _{m6}	165	6	3	492 ₋₁	121	73 ₋₁	156.172 _{-0.079 -0.141}	256	4	M36	M30	W 150x3x30x48x8f N 150x3x30x48x9H
X..180	36	17	166 ^{H9}	159 _{h10}	158	166 _{m6}	180	10	5	564 ₋₁	166	83 ₋₁	170.009 _{-0.086 -0.152}	292	4	M36	M30	W 160x5x30x30x8f N 160x5x30x30x9H
X..190	36	17	166 ^{H9}	159 _{h10}	158	166 _{m6}	180	10	5	564 ₋₁	166	83 ₋₁	170.009 _{-0.086 -0.152}	292	4	M36	M30	W 160x5x30x30x8f N 160x5x30x30x9H
X..200	36	17	191 ^{H9}	179 _{h10}	178	191 _{m6}	205	10	5	619 ₋₁	176	83 ₋₁	190.090 _{-0.087 -0.155}	319.5	4	M36	M30	W 180x5x30x34x8f N 180x5x30x34x9H
X..210	36	17	191 ^{H9}	179 _{h10}	178	191 _{m6}	205	10	5	619 ₋₁	176	83 ₋₁	190.090 _{-0.087 -0.155}	319.5	4	M36	M30	W 180x5x30x34x8f N 180x5x30x34x9H
X..220	36	17	211 ^{H9}	199 _{h10}	198	211 _{m6}	230	10	5	685 ₋₁	201	108 ₋₁	210.158 _{-0.088 -0.157}	352.5	5	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X2K220	36	17	211 ^{H9}	199 _{h10}	198	211 _{m6}	230	10	5	755 ₋₁	201	108 ₋₁	210.158 _{-0.088 -0.157}	387.5	5	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H

X.F.. X.K.. X.T..	C1	C2	ø D25	ø D26	ø D27	ø D28	ø D29	Dm	FA	K7	K8	K9	Me	OV	R	S6	DIN 332 DR.M..	DIN 5480
X..230	36	17	211 ^{H9}	199 _{h10}	198	211 _{m6}	230	10	5	685 ₋₁	201	108 ₋₁	210.158 ^{-0.088 -0.157}	352.5	5	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X2K230	36	17	211 ^{H9}	199 _{h10}	198	211 _{m6}	230	10	5	755 ₋₁	201	108 ₋₁	210.158 ^{-0.088 -0.157}	387.5	5	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X..240	45	22	231 ^{H9}	219 _{h10}	218	231 _{m6}	250	10	5	777 ₋₁	216	108 ₋₁	230.215 ^{-0.102 -0.179}	400.5	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X2K240	45	22	231 ^{H9}	219 _{h10}	218	231 _{m6}	250	10	5	852 ₋₁	216	108 ₋₁	230.215 ^{-0.102 -0.179}	438	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X..250	45	22	241 ^{H9}	219 _{h10}	218	241 _{m6}	260	10	5	777 ₋₁	216	108 ₋₁	230.215 ^{-0.102 -0.179}	400.5	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X2K250	45	22	241 ^{H9}	219 _{h10}	218	241 _{m6}	260	10	5	852 ₋₁	216	108 ₋₁	230.215 ^{-0.102 -0.179}	438	5	M36	M30	W 220x5x30x42x8f N 220x5x30x42x9H
X..260	45	22	255 ^{H9}	239 _{h10}	238	255 _{m6}	275	10	5	850 ₋₁	216	108 ₋₁	250.264 ^{-0.102 -0.180}	437	5	M42	M36	W 240x5x30x46x8f N 240x5x30x46x9H
X..270	45	22	285 ^{H9}	258.4 _{h10}	258	285 _{m6}	305	16	8	876 ₋₁	248	143 ₋₁	276.230 ^{-0.101 -0.177}	450	5	M42	M36	W 260x8x30x31x8f N 260x8x30x31x9H
X..280	45	22	285 ^{H9}	258.4 _{h10}	258	285 _{m6}	305	16	8	876 ₋₁	248	143 ₋₁	276.230 ^{-0.101 -0.177}	450	5	M42	M36	W 260x8x30x31x8f N 260x8x30x31x9H

5.15.3 Mounting the gear unit onto the machine shaft

INFORMATION



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

Size X100 – 160

Observe the notes in chapter "Important information" (→ 82).

INFORMATION



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

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

Mount the gear unit to the machine shaft as described in chapter "Mounting the gear unit to the machine shaft" (→ 94).

Observe the following information on the retaining rings.

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

Observe the following information.

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

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

Size X170 – 280

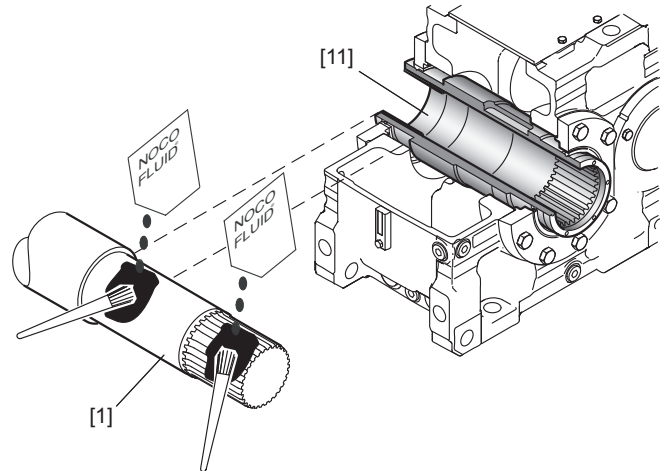
Observe the notes in chapter "Important information" (→ 82).

INFORMATION



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

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



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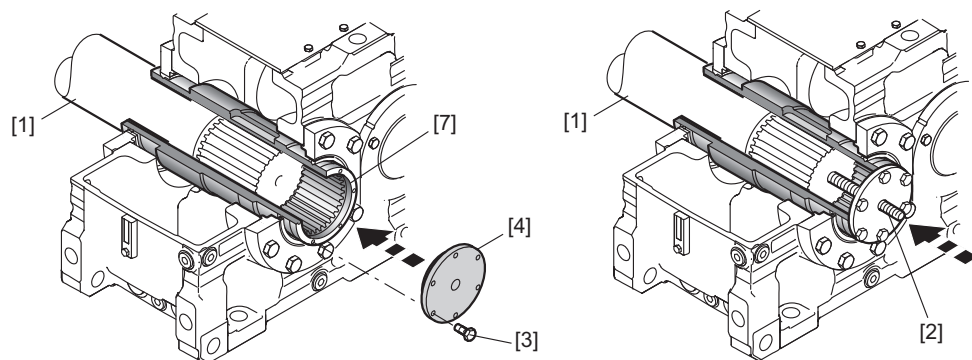
- [1] Machine shaft
[11] Connector

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

Size	Strength class 8.8
X..V170 – 230	M30
X..V240 – 280	M36

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

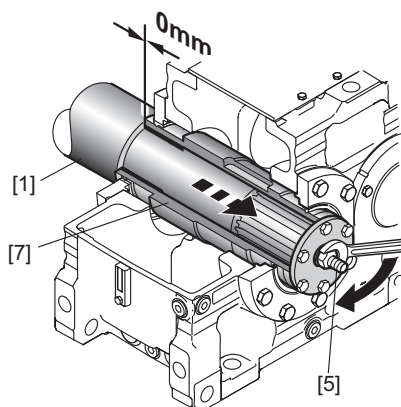
Size	Thread size for 6 x retaining screws [3] strength class 10.9	Tightening torque	
		Assembly/operat- ing state Nm	Disassembly Nm
X..V170 – 190	M10×30	79	Apply hand pressure
X..V200 – 230	M12×30	137	Apply hand pressure
X..V240 – 280	M16×40	338	Apply hand pressure



9007200026433547

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

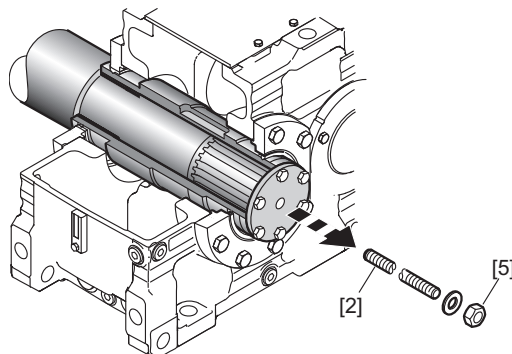
4. Tighten the machine shaft [1] with the nut [5] until the shoulders of the machine shaft and the hollow shaft [7] meet.



771696651

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

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

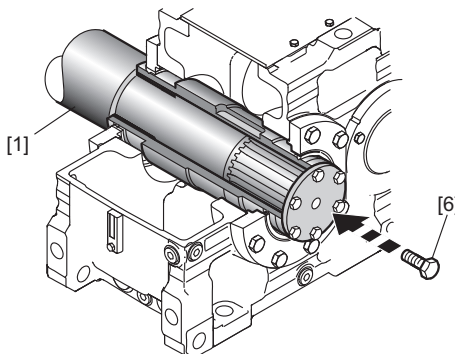


771752587

- [2] Threaded rod
[5] Nut

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

Size	Strength class 8.8	Tightening torque in Nm strength class 8.8
X..V170 – 230	M30	1597
X..V240 – 280	M36	2778



771756683

- [1] Machine shaft
[6] Retaining screw



⚠ CAUTION

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

Possible injury to persons.

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

NOTICE

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

Possible damage to property.

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

5.15.4 Disassembling the gear unit from the machine shaft

NOTICE

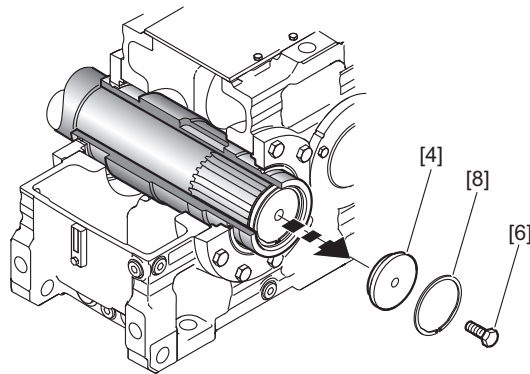
Improper disassembly of the gear unit and machine shaft may damage bearings and other components.

Possible damage to property.

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

Sizes X100 – 160

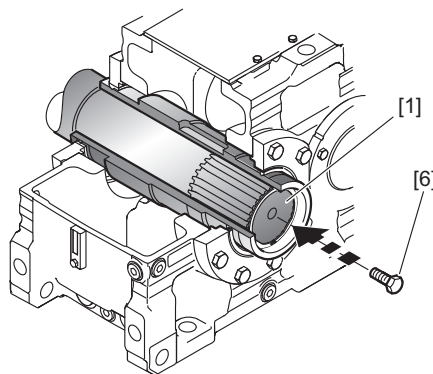
1. Loosen the retaining screw [6]. Remove the outer retaining ring [8] and the end plate [4].



3053726603

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

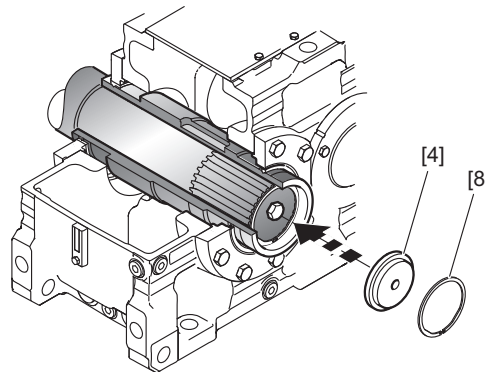
2. To protect the centering bore, screw the retaining screw [6] into the machine shaft [1].



3240994059

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

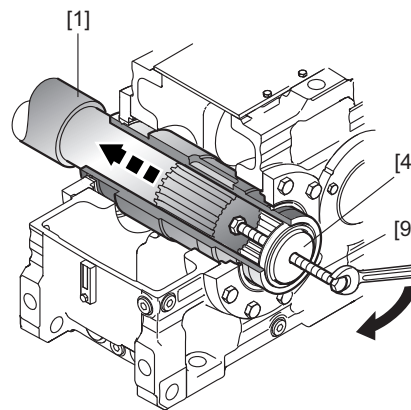
3. Turn the end plate [4] and reinstall the end plate [4] and the outer retaining ring [8].



3241265291

- [4] End plate
[8] Retaining ring

4. Thread the ejector screw [9] into the end plate [4] to remove the gear unit from the machine shaft [1]. Applying lubricant to the ejector screw [8] and the thread in the end plate [4] prior to disassembly makes the job easier.

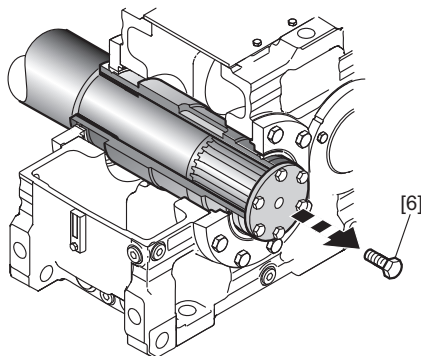


3241268107

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

Size X170 – 280

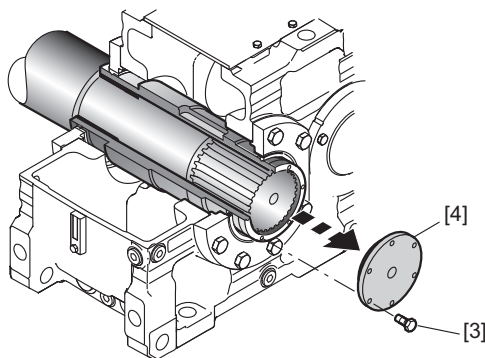
1. Loosen the retaining screw [6].



3241268619

[6] Retaining screw

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

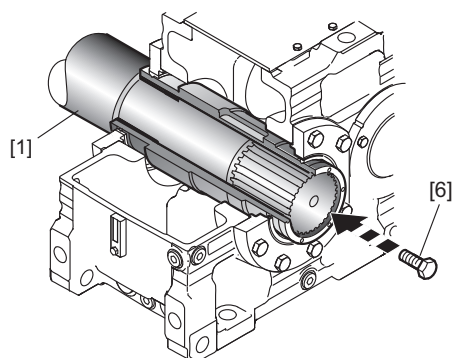


3241279627

[3] Retaining screw

[4] End plate

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

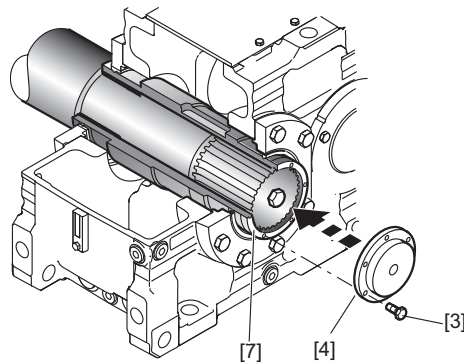


3241280139

[1] Machine shaft

[6] Retaining screw

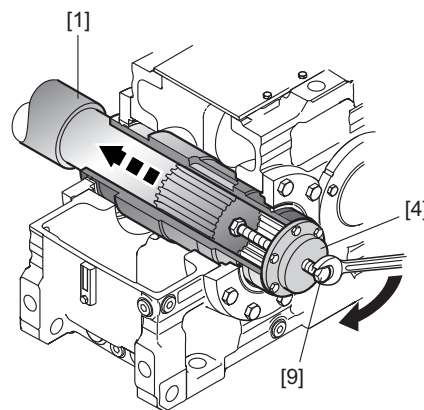
4. To disassemble the gear unit, flip the end plate [4] over and use the retaining screws [3] to reattach it centrally to the hollow shaft [7]. The retaining screws [3] should be tightened hand-tight.



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

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



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

5.16 Torque arm /T

Observe the notes in chapter "Important information" (→ 82).



▲ WARNING

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

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

NOTICE

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

Possible damage to property.

- Do not deform the torque arm.

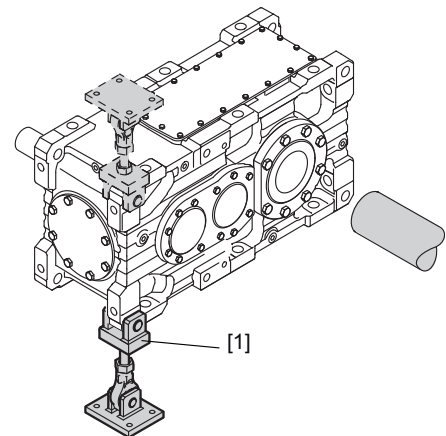
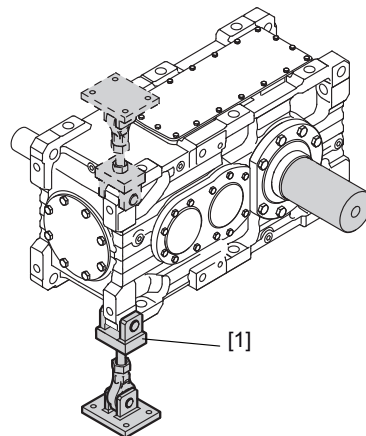
NOTICE

Strain on the torque arm might break the housing.

Possible damage to property.

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

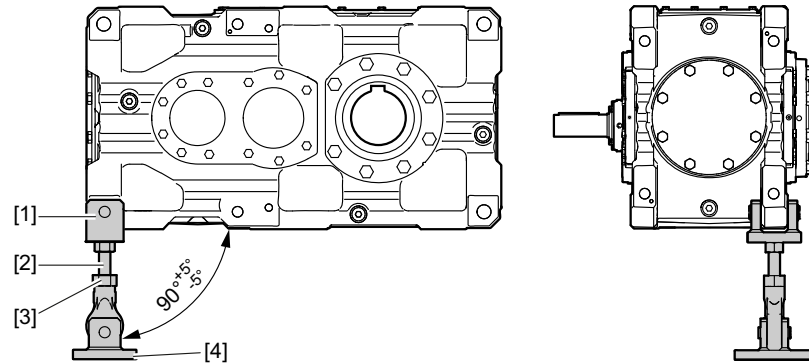
1. To keep the flexural torque on the machine shaft as low as possible, the torque arm [1] must always be mounted on the same side as the machine that is driven. The torque arm [1] can be mounted on the top or bottom of the gear unit.



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

Align the gear unit horizontally with the stud bolts and the nuts of the torque arm.



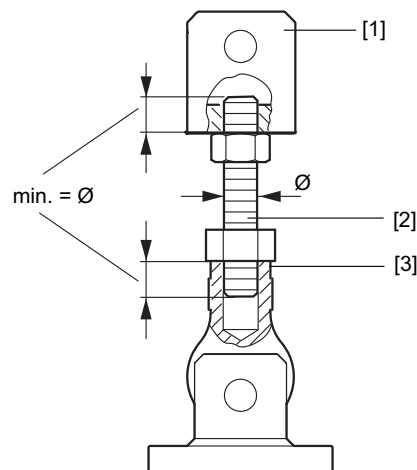
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[1] Yoke head with bolt

[2] Stud bolt with nuts

[3] Joint head

[4] Yoke plate with bolt



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[1] Yoke head with bolt

[2] Stud bolt with nuts

[3] Joint head

3. After the alignment process, tighten the nuts with the tightening torques listed in the following table. Secure it using a suitable threadlocker (e.g. Loctite® 243).

Size	Screw/nut	Tightening torque
		Nm
X100 – 110	M20	140
X120 – 130	M24	140
X140 – 150	M24	140
X160 – 190	M36	200
X200 – 230	M42	350
X240 – 280	M48	500

5.17 Couplings

INFORMATION

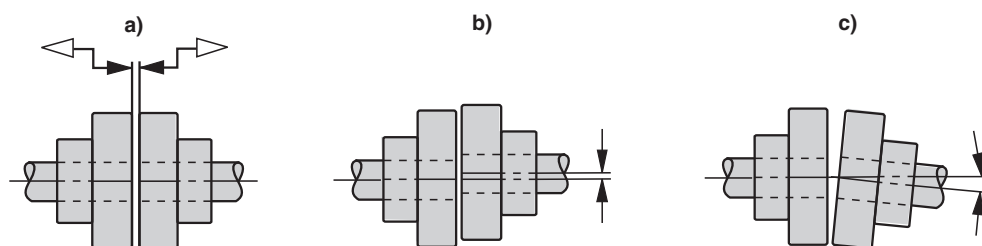


Observe the operating instructions of the respective coupling manufacturer.

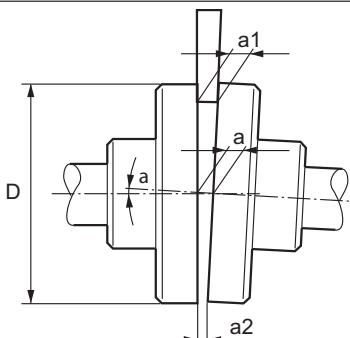
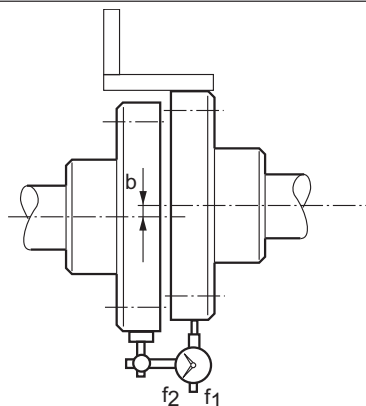
5.17.1 Mounting tolerances

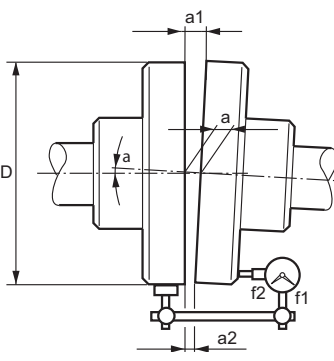
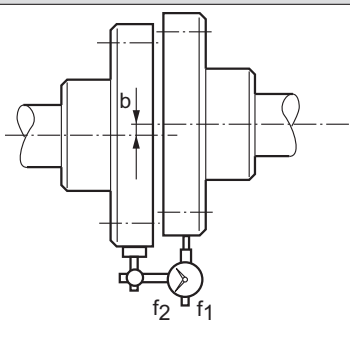
Adjust the following misalignments according to the coupling manufacturer's specifications when mounting couplings.

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



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

Measuring instruments	Angular offset	Axis offset
Feeler gauge	 <p>This method only achieves an accurate result when the deviation of the coupling faces is eliminated by turning both coupling halves by 180° and then calculating the mean value from the difference ($a_1 - a_2$).</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>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>

5.18 Motor adapter /MA

5.18.1 Maximum permitted motor weight

Two criteria are to be checked when mounting a motor onto the gear unit:

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

INFORMATION



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

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

INFORMATION



Result:

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

The following applies to all tables:

G_M = Motor weight

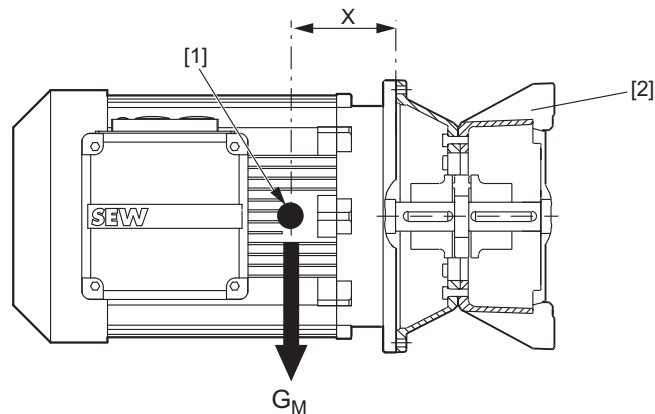
G_G = Gear unit weight

Gear units in mounting position M1/M3

Type of mounting	
Foot-mounted X../ B	$G_M \leq 1.75 G_G$
Shaft-mounted X../ T	$G_M \leq 1.5 G_G$
Flange-mounted X../ F	$G_M \leq 0.5 G_G$

2. Maximum motor weight depends on motor adapter size

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



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

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

INFORMATION



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

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

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

5.18.2 Claw coupling

INFORMATION

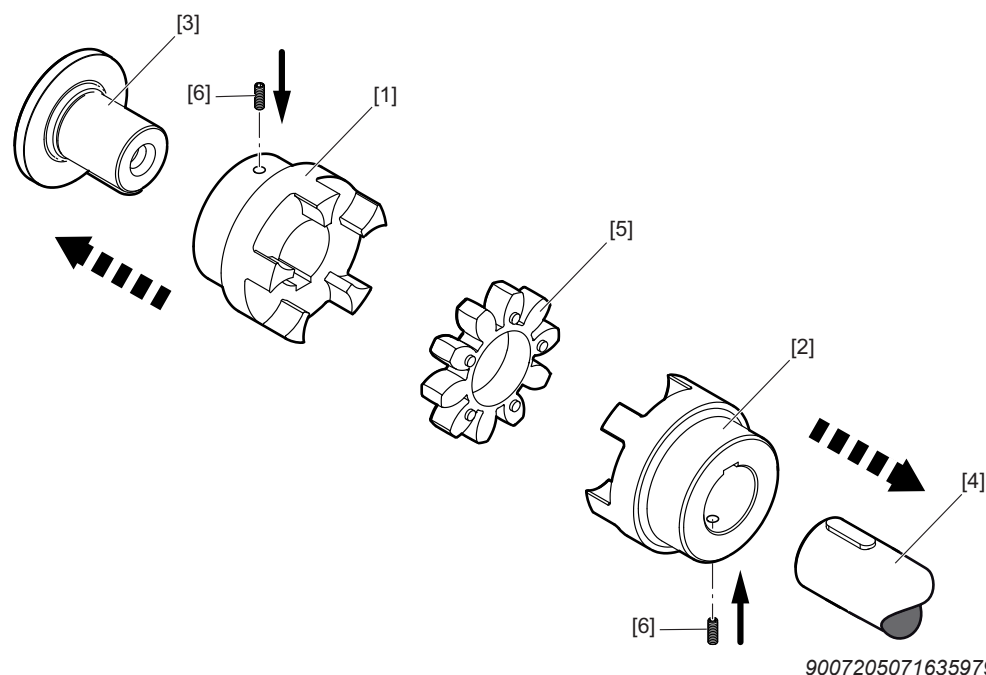


Observe the operating instructions of the respective coupling manufacturer.

ROTEX® coupling

Observe the notes in chapter "Important information" (→ 82).

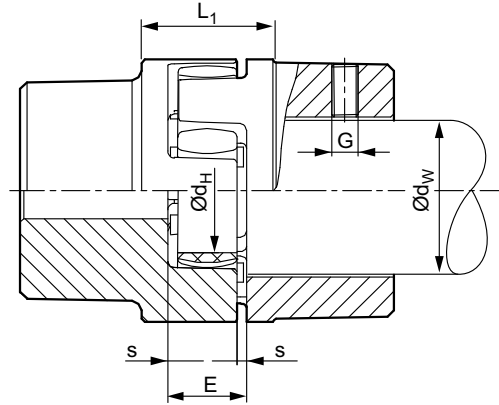
Mounting the coupling



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

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

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



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

Coupling size	Mounting dimensions			Set screw	
	E mm	s mm	d_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

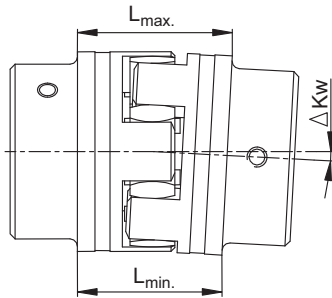
Improper mounting of the coupling may result in damage.

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.

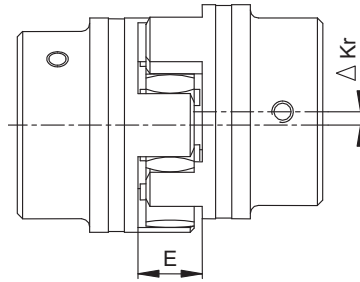
Observe:

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

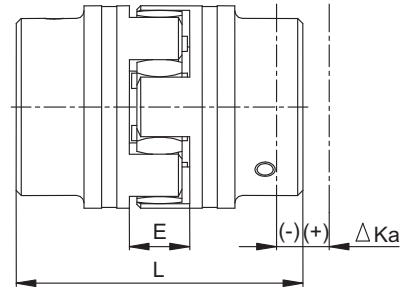


Angular misalignments

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



Radial misalignments



Axial misalignments

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

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Example of specified displacement combinations (see diagram):

Example 1:

$$\Delta K_r = 30\%$$

$$\Delta K_w = 70\%$$

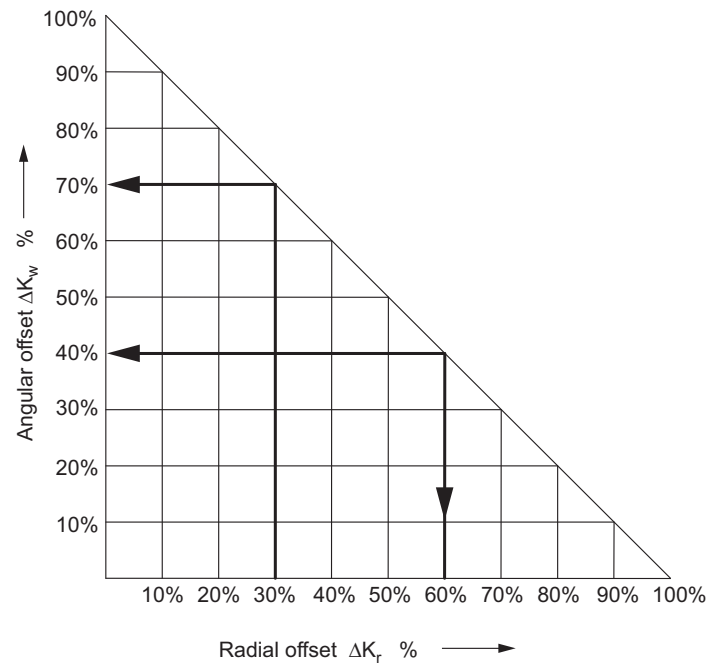
Example 2:

$$\Delta K_r = 60\%$$

$$\Delta K_w = 40\%$$

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

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Displacement values

The following table shows the displacement values:

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

5.18.3 Attaching the motor to the motor adapter

Observe the notes in chapter "Important information" (→ 82).

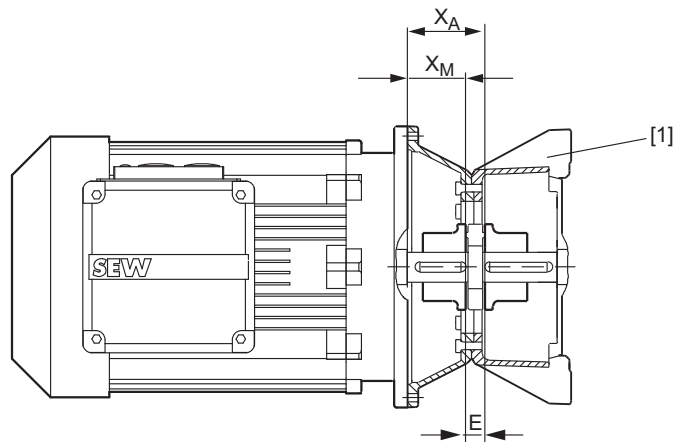
1. Clean the motor shaft and flange surfaces of the motor and the motor adapter. They must be dry and free of grease.

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" (→ 138) and the figure below. The coupling size and type are indicated on the coupling.



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[1] Motor adapter

XA Distance between the coupling and the motor adapter flange surface

E Installation dimensions

XM Distance between the coupling and the motor flange surface

$$\rightarrow XM = XA - E$$

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

5.19 Base frame /BF

Observe the following notes:

NOTICE

Improper assembly may result in damage to the gear unit.

Possible damage to property.

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

5.20 Swing base /SB

Observe the following notes:

NOTICE

Improper assembly may result in damage to the gear unit.

Possible damage to property.

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

5.21 Fan /FAN

Note the following

- When protective devices for couplings or similar are installed on gear units equipped with a fan, sufficient clearance must be provided for cooling air intake.
See the dimension drawing in the catalog or the order documents for the required distance.
- Never operate the gear unit without the protective housing.
- Protect the fan guard from external damage.
- Make sure the air intake vents of the fan are not blocked or covered.

Observe the following tightening torques for installing the fan guard:

Screws/nuts	Tightening torques Strength class 8.8 Nm
M8	27

5.22 Water cooling cover /CCV

5.22.1 Notes on connection / installation

NOTICE

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

Possible damage to property.

• Observe the following notes:

- Using thread seal tape on the pipe threads increases the resistance between the connection parts as well as the risk of cracking in the water cooling cover. Do not tighten the threads excessively.
- The water cooling cover is not equipped with a water drain. In the event of repair work, you have to install a drain on the cooling water outlet to ensure proper draining of the cooling water.
- Connect the water cooling cover to the existing cooling circuit. The direction of flow is user-defined.
- For information regarding the cooling water temperature and the flow rate, refer to the order documents.
- Make sure the cooling water pressure does not exceed 6 bar.
- In the event of temperature levels below 0 °C and longer downtimes, drain the cooling water from the circuit. Use compressed air to remove any remaining water.
- Refer to chapter "Cooling media" to determine the permitted cooling media.

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

- Install a safety valve in the cooling water supply pipe for protection against severe deviations in the flow rate or pressure.
- Install a filter into the cooling water supply pipe, especially 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.

5.22.2 Removal

Observe the notes in chapter Inspection/Maintenance.

5.22.3 Cooling media

INFORMATION



- Note that the service life, the efficiency, and the maintenance intervals of the heat exchanger depend to a great degree on the quality and ingredients of the cooling medium.
 - Special procedures are required when sea water or brackish water is used. Contact SEW-EURODRIVE.
-

Permitted cooling media

- The permitted cooling media is pure water. The use of cooling water additives, such as antifreeze or corrosion inhibitor, might negatively influence the cooling capacity and compatibility of materials. Contact SEW-EURODRIVE.
- Cooling water temperature and flow rate of oil and cooling water according to the order documents.

Dirt

The quantity of suspended solids (ball-shaped, particle size < 0.25 mm) should be less than 10 mg/l. Threadlike contaminants increase the risk of pressure loss.

Corrosion

Limit values: free chlorine < 0.5 ppm, chlorine ions < 200 ppm, sulfate < 100 ppm, ammonia < 10 ppm, free CO < 10 ppm, pH value 7-9.

The following ions do not have a corrosive effect under normal conditions: phosphate, nitrate, nitrite, iron, manganese, sodium, potassium.

5.23 Water cooling cartridge /CCT

5.23.1 Notes on connection/installation

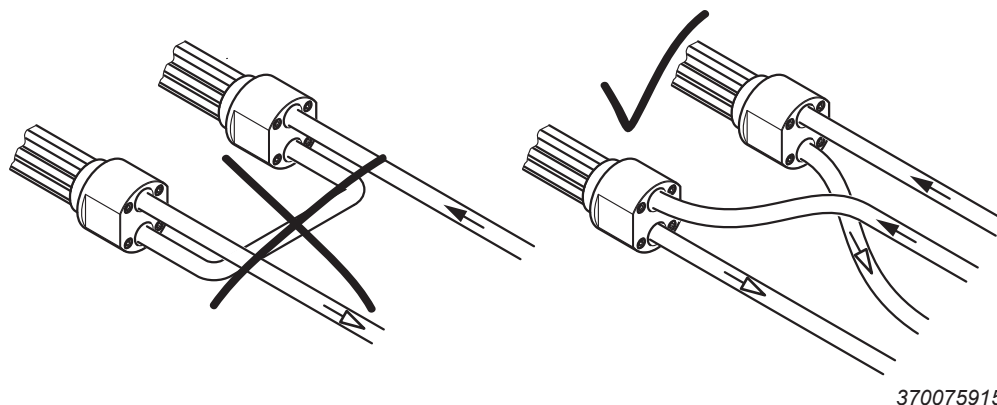
NOTICE

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

Possible damage to property.

• Observe the following notes:

- Using thread seal tape on the pipe threads increases the resistance between the connection parts as well as the risk of cracking in the cast parts of the water cooling cartridge. Do not tighten the threads excessively.
- The water cooling cartridges are not equipped with a water drain. In the event of repair work, you have to install a drain on the cooling water outlet to ensure proper draining of the cooling water.
- For connecting the water cooling cartridge, use only piping and mounting parts of the same or of compatible material.
- Check the water cooling cartridge to see that it is free from soiling and foreign objects in the pipe connection to ensure unobstructed flow of the cooling media.
- Avoid tensions on the connection points when connecting the piping. Support the pipes properly, if required.
- Install the cooling water outlet pipe in such a way that the water cooling cartridge is permanently flooded by cooling water.
- Refer to chapter "Cooling media" (→ 146) to determine the permitted cooling media.
- Cooling water temperature and volume flow according to the order documents.
- Make sure the cooling water pressure does not exceed 10 bar.
- In the event of temperature levels below 0 °C and longer downtimes, drain the cooling water from the circuit. Use compressed air to remove any remaining water.
- The recommended filtering is 100 µm.
- Connect the water cooling cartridge to the existing cooling circuit. The direction of flow is user-defined.
- For gear units with 2 water cooling cartridges, connect the cooling circuit in parallel, see following figure.



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

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

- Install a safety valve in the cooling water supply pipe for protection against severe deviations in the flow rate or pressure.
- Install a filter into the cooling water supply pipe, especially if the cooling water is obtained from sources other than the municipal water supply system.
- Install an automatic throttle valve in the respective inlet to compensate pressure.

5.23.2 Removal

Observe the notes in chapter Inspection/maintenance.

5.23.3 Requirements on the water quality

INFORMATION



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

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

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

Water hardness

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

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

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

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

pH value

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

Smaller values can cause corrosion due to free carbonic acid.

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

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

Cooling water assessment based on water substances

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

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

Key

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

Types of cooling water/characteristics

Note the following conditions:

Industrial water

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

Stream water and river water

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

5.24 Oil-water cooler for splash lubrication /OWC

Observe the notes in chapter "Important information" (→ 82).

INFORMATION

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

5.25 Oil-air cooler for splash lubrication /OAC

Observe the notes in chapter "Important information" (→ 82).

INFORMATION

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

5.26 Oil-water cooler for pressure lubrication /OWP

Observe the notes in chapter "Important information" (→ 82).

INFORMATION

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

5.27 Oil-air cooler for pressure lubrication /OAP

Observe the notes in chapter "Important information" (→ 82).

INFORMATION

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

5.28 Motor pump /ONP1L

Observe the notes in chapter "Important information" (→ 82).

INFORMATION



Before installation/assembly, first read the addendum to the operating instructions "Motor Pump /ONP1L".

5.29 Motor pump /ONP1

Observe the notes in chapter "Important information" (→ 82).

INFORMATION



Before installation/assembly, first read the addendum to the operating instructions "Motor Pump /ONP1".

5.30 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" (→ 213). 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" (→ 213).
-

5.31 Oil heater /OH



⚠ WARNING

Danger of electric shock!

Severe or fatal injuries!

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

NOTICE

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

Possible damage to property.

- Note that the heating elements must be completely immersed in the oil bath to prevent damages.

NOTICE

An improper change of the mounting position may cause the gear unit heater to malfunction.

Possible damage to property.

- Do not change the mounting position without prior consultation 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 specialists 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.

5.31.1 Information on the function of the oil heater

- The heater is screwed into the gear unit housing at the factory and is controlled by a thermostat. The trip temperature of the heater is set at the factory depending on the lubricant used.
- The trip point of the oil heater thermostat is factory-set to a temperature of about 5 K above the respective limit temperature initial temperature for gear unit startup, see chapter "Limit temperature for gear unit startup" (→ 154).

At this temperature, the thermostat disables the oil heater, see chapter "Minimum temperature for gear unit start" (→ 154). Only then the gear unit may be started up. The thermostat activates the oil heater again once the temperatures is about 5 K below the switching point.

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

This is why 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" (→ 157).

5.31.2 Thermostat

Electrical connection



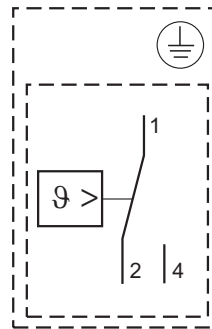
⚠ WARNING

Risk of injury due to electric shock.

Severe or fatal injuries.

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

The following figure shows the electrical connection.



18014398960475019

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

INFORMATION



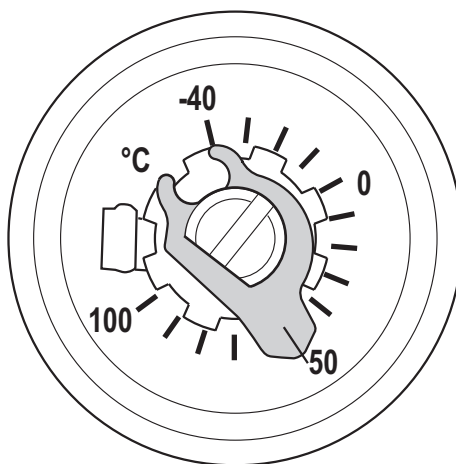
- Observe the manufacturer's documentation.

Technical data

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

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

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



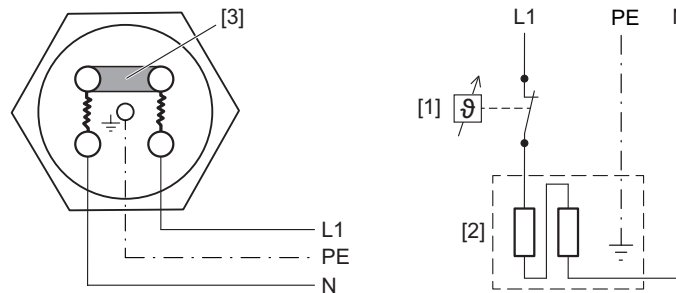
16834938379

5.31.3 Connection power and electrical connection of resistor element

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

Alternating current/1-phase/230 V/series connection

The following figure shows the wiring ex works (view of the connection space):



27021600516850699

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

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

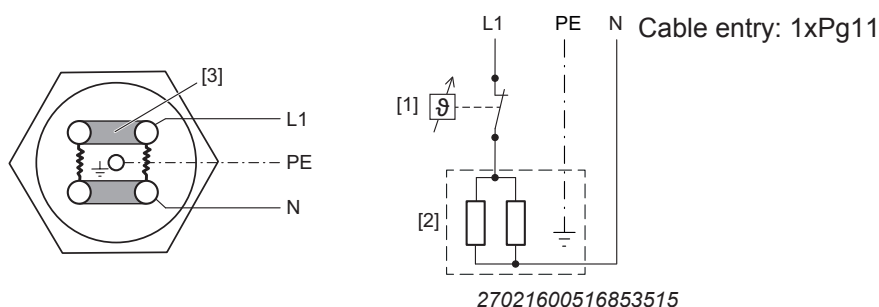
		P_{inst}		P_{inst}	
Gear unit		1 heating element		2 heating elements	
Size	Design		K/h		K/h
X100	X3K	1 × 0.4	6	2 × 0.4	11

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heater

Alternating current/1-phase/230 V/parallel connection

The following figure shows the wiring ex works (view of the connection space):



Observe the electrical characteristics of the control range

[1] Thermostat

[2] Heater

[3] Jumper

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

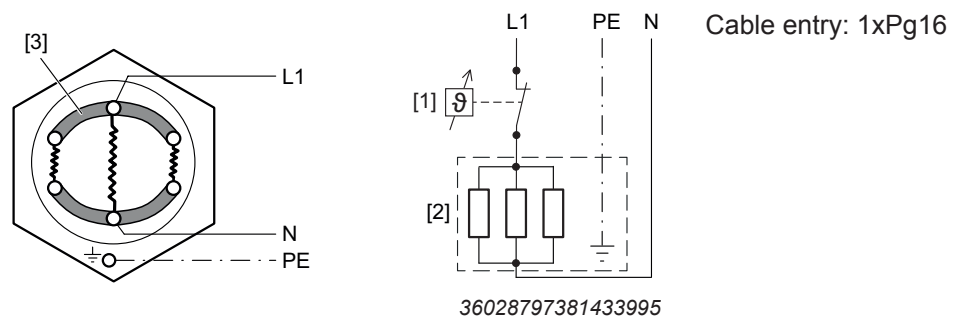
		P_{inst}		P_{inst}	
Gear unit		1 heating element		2 heating elements	
Size	Design		K/h		K/h
X110	X3K	1 × 0.6	6	-	-
X120	X3K	1 × 0.7	6	2 × 0.7	11
X130	X3K	1 × 0.7	5	-	-
X140	X3K	1 × 0.8	5	2 × 0.8	10
X150	X3K	1 × 0.9	5	-	-
X160	X3K	1 × 1.1	4	2 × 1.1	8
X170	X3K	1 × 1.1	4	-	-

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heater

Alternating current/1-phase/230 V/parallel connection/ $I \leq 10$ A

The following figure shows the wiring ex works (view of the connection space):



Observe the electrical characteristics of the control range

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

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

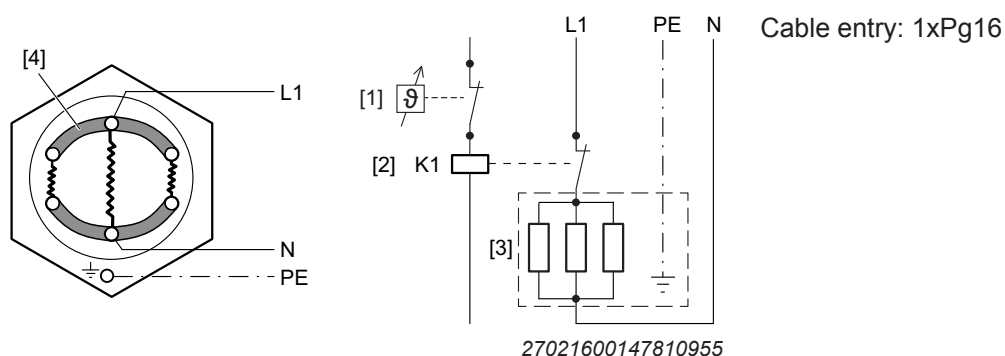
		P_{inst}		P_{inst}	
Gear unit		1 heating element		2 heating elements	
Size	Design		K/h		K/h
X180	X3K	1 × 1.6	5	-	-
X190	X3K	1 × 1.6	5	-	-
X200	X3K	1 × 1.8	4	-	-
X210	X3K	1 × 1.8	4	-	-
X220	X3K	1 × 2.2	4	-	-
X230	X3K	1 × 2.2	4	-	-
X240	X3K	1 × 2.2	3	-	-

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heater

Alternating current/1-phase/230 V/parallel connection/I ≥ 10 A

The following figure shows the wiring ex works (view of the connection space):



Observe the electrical characteristics of the control range

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

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

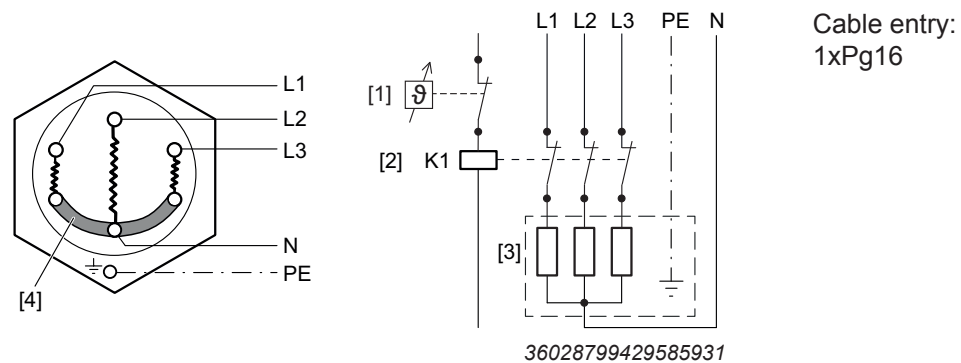
		P_{inst}		P_{inst}	
Gear unit		1 heating element		2 heating elements	
Size	Design		K/h		K/h
X180	X3K	-	-	2 × 1.6	10
X200	X3K	-	-	2 × 1.8	8
X220	X3K	-	-	2 × 2.2	8
X240	X3K	-	-	2 × 2.2	6
X250	X3K	1 × 2.6	3	-	-

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heater

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

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



Observe the electrical characteristics of the control range

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

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

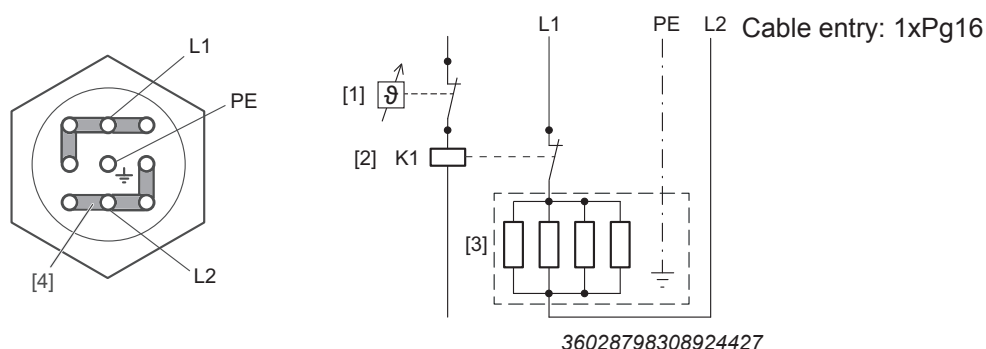
		P_{inst}		P_{inst}	
Gear unit		1 heating element		2 heating elements	
Size	Design		K/h		K/h
X180	X3K	1 × 1.6	5	2 × 1.6	10
X190	X3K	1 × 1.6	5	-	-
X200	X3K	1 × 1.8	5	2 × 1.8	8
X210	X3K	1 × 1.8	4	-	-
X220	X3K	1 × 2.2	4	2 × 2.2	8
X230	X3K	1 × 2.2	4	-	-
X240	X3K	1 × 2.2	3	2 × 2.2	6
X250	X3K	1 × 2.6	3	-	-

K/h = Heating power [Kelvin/hour]

P_{inst} = Power of the installed heater

Alternating current/2-phase/400 V/parallel connection

The following figure shows the wiring ex works (view of the connection space):



Observe the electrical characteristics of the control range

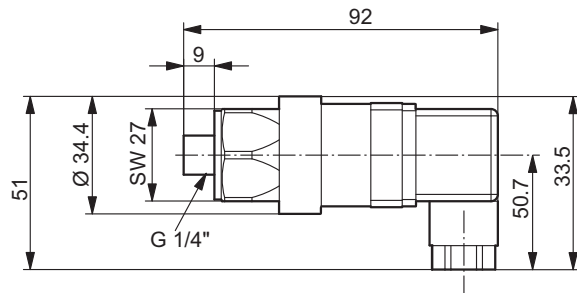
- [1] Thermostat
- [2] Contactor (not included in the delivery)
- [3] Heater
- [4] Jumper

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

		P_{inst}		P_{inst}	
Gear unit		1 heating element		2 heating elements	
Size	Design		K/h		K/h
X260	X3K	1 × 3.8	4	2 × 3.8	8
X270	X3K	1 × 3.8	4	-	-
X280	X3K	1 × 4.2	4	-	-

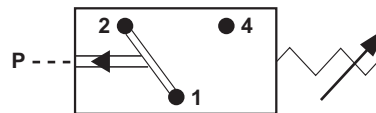
5.32 Pressure switch /PS

5.32.1 Dimensions



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5.32.2 Electrical connection



722003723

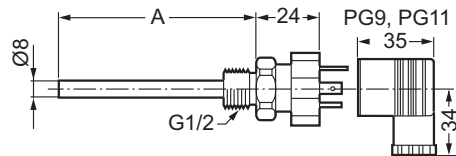
[1][2]	NC contact
[1][4]	NO contact

5.32.3 Technical data

- Switching pressure: 0.5 ± 0.2 bar
- Maximum switching capacity: $4 \text{ A} - V_{AC} 250$; $4 \text{ A} - V_{DC} 24$
- 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.

5.33 Temperature sensor /PT100

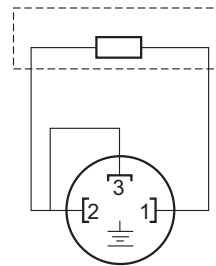
5.33.1 Dimensions



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A in mm
50
150

5.33.2 Electrical connection



359158539

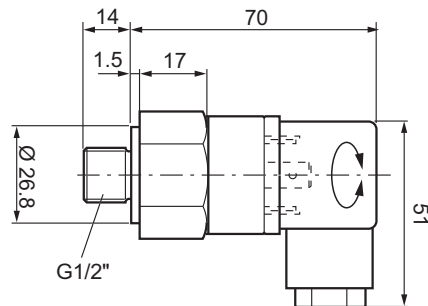
[1][2] Resistor element connection

5.33.3 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.

5.34 Temperature switch /NTB

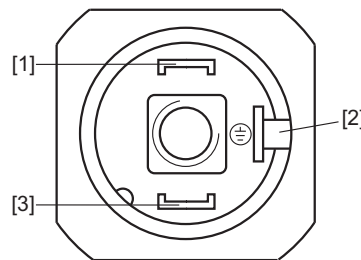
5.34.1 Dimensions



9007199621265931

5.34.2 Electrical connection

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



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

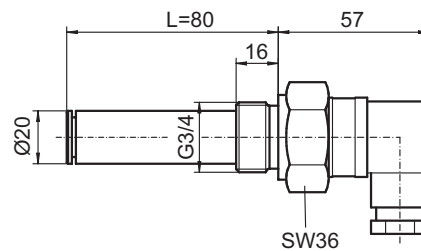
5.34.3 Technical data

- 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.

5.35 Temperature switch /TSK

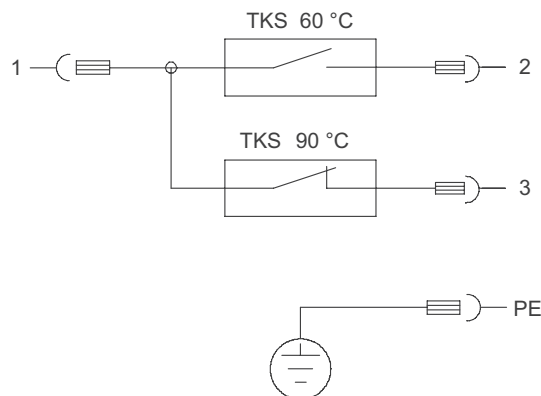
5.35.1 Dimensions



893872779

5.35.2 Electrical connection

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



36028797912842123

[1][2] Switch 60 °C NO contact

[1][3] Switch 90 °C NC contact

PE Grounding terminal

5.35.3 Technical data

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

5.36 Brake



INFORMATION

The brake is not set at the factory.

Observe the operating instructions of the respective brake manufacturer.

6 Startup

6.1 Important information

Read the following notes prior to startup.



⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



⚠ WARNING

Danger due to freely accessible, rotating parts.

Severe or fatal injuries.

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



⚠ CAUTION

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

Possible injury to persons due to falling parts.

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



⚠ CAUTION

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

Minor injuries.

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

NOTICE

Improper startup may result in damage to the gear unit.

Possible damage to property.

- Observe the following 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 markings on the oil dipstick are the decisive indicators for the oil quantity to be filled into the unit. For additional information, refer to chapter "Checking the oil level" (→ 186) and chapter "Changing the oil" (→ 192).

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

Check the oil level again after a few operating hours, see chapter "Checking the oil level" (→ 186).

- Check the correct direction of rotation of the bevel-helical gear unit and make sure that the auxiliary drive does not rotate in operating direction.
- Before connecting the main and auxiliary drive, determine the rotating field of the three-phase system using a phase-sequence indicator. Check as to whether both drives are connected according to the direction of rotation.
- Make sure, that it is not possible to operate the main drive against the blocking direction of the bevel-helical gear unit. Do observe the direction arrow on the bevel-helical gear unit.
- Interlock the main drive and the auxiliary drive so that only one of the two motors can be switched on.
- Check the disconnection function of the speed control.
- Make sure that the auxiliary drive is not overloaded. The auxiliary drive may only be operated with the output torque rates indicated in the order documents.
- Make sure that the rotary motion of the input shaft of the bevel-helical is not obstructed during auxiliary drive operation (e.g. maintenance). A brake on the input end of the main drive must be released for auxiliary drive operation.
- After installing the gear unit, check to see that all retaining screws are tight.
- Make sure that the alignment has not changed after tightening the mounting elements.
- If there are any oil drain valves, ensure that they cannot be opened unintentionally.
- 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.
- Make sure that the external coolant supply is guaranteed for gear units with circulation cooling, water cooling cover and water cooling cartridge.
- When ambient temperatures are low, adhere to the limit temperature for gear unit start. Allow for sufficient warm-up time.
- Gear units with pressure lubrication may only be taken into operation when the pressure switch is connected.
- When using gear units with long-term protection: Replace the screw plug at the location indicated on the gear unit with a breather (position → see order documents).
- Remove transport protection prior to startup.

6.2 Startup sequence

NOTICE

Improper startup may result in damage to the gear unit.

Possible damage to property.

- Observe the following sequence for startup.
-

1. Startup of the auxiliary drive
2. Startup of the speed monitor
3. Startup of the main drive

6.2.1 Starting up the auxiliary drive

Make sure that the rotary motion of the input shaft of the main gear unit is not obstructed during auxiliary drive operation. A brake on the input end of the main drive must be released for auxiliary drive operation.

6.2.2 Starting up speed monitoring

The speed monitor can be included in the delivery.

Check if the speed monitor is programmed correctly before startup.

Speed monitor settings

Only qualified personnel is permitted to program or change the speed monitoring.

NOTICE

Improper startup may result in damage to the gear unit.

Possible damage to property.

- Integrate the speed monitor into the system circuitry so that the power supply to main drive and auxiliary drive is interrupted if the preset switching speed is overrun.
-

Observe the startup sequence in the manufacturer documentation included in the delivery.

Observe the following settings for safe operation:

- Set a switching speed of 70 pulses/min
- Set the hysteresis to $\leq 5\%$
- Set the startup bypass time to 0.5 s

Functional test of the speed monitoring

1. Switch on the auxiliary drive of the bucket elevator drive.
2. Briefly set the switching speed to a lower value than the output speed of the auxiliary drive.
3. The speed monitor detects overspeed and the output relay becomes operative. The functional test is successful when the current supply to the main and auxiliary drives is interrupted.
4. After the functional test has been successfully completed, set the switching speed back to the initial value.

6.2.3 Starting up the main drive

Before starting up the main drive, determine the rotating field of the three-phase system using a phase-sequence indicator. Make sure that it is not possible to operate the main drive against the blocking direction of the bevel-helical gear unit. Do observe the direction arrow on the bevel-helical gear unit.

6.3 Backstop /BS

NOTICE

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

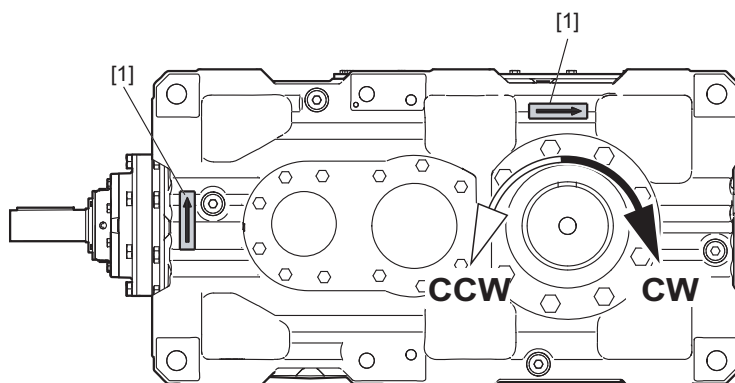
Possible damage to property

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

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

- CW rotation
- CCW rotation

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



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6.4 Torque-limited backstop

NOTICE

The slipping torque may not be changed by any means for safety reasons.

Possible damage to property.

- There is a risk that the load cannot be kept safely in its position after the motor is switched off and that it can accelerate in the opposite direction.

NOTICE

Operating the motor in blocking direction could destroy the backstop.

Possible damage to property.

- Do not start up the motor in blocking direction. Ensure a correct current supply to the motor, so that it rotates in the required direction.

6.5 Water cooling cover /CCV

NOTICE

Risk of damage to the system due to performance loss.

Possible damage to property.

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

NOTICE

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

Possible damage to property.

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

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

Make the following checks:

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

6.6 Water cooling cartridge /CCT

NOTICE

Risk of damage to the system due to performance loss.

Possible damage to property.

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

NOTICE

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

Possible damage to property.

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

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

Make the following checks:

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

6.7 Oil-water cooler for splash lubrication /OWC

INFORMATION



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

6.8 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".

6.9 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".

6.10 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".

6.11 Motor pump /ONP1L

INFORMATION



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

6.12 Motor pump /ONP1

INFORMATION



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

6.13 Oil heater /OH

NOTICE

Malfunctioning oil heater when changing the mounting position

Possible damage to property.

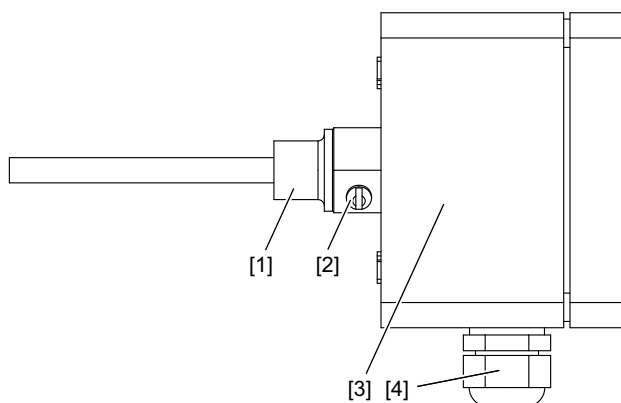
- Do not change the mounting position without prior consultation with SEW-EURODRIVE, otherwise proper functioning is no longer ensured.

6.13.1 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].



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

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

INFORMATION




- Observe the manufacturer's documentation.

6.14 Starting up the gear unit at low ambient temperatures

NOTICE

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

Possible damage to property.

- Before starting up the gear unit, make sure that the oil heater heats up the oil to the temperature specified for "without heater" (→  213).

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). 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" (→  192) 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).

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" (→  20) in the corresponding operating instructions. This chapter provides information on the possible storage periods in conjunction with adequate packaging – depending on the storage location.

7 Inspection/maintenance

7.1 Preliminary work for inspection and maintenance

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



⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



⚠ WARNING

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

Severe or fatal injuries.

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



⚠ WARNING

Danger due to using impermissible gear unit oil.

Severe or fatal injuries.

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



⚠ WARNING

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

Serious injury.

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



⚠ CAUTION

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

Minor injuries.

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

**⚠ CAUTION**

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.

NOTICE

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

Possible damage to property.

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

NOTICE

Improper maintenance may result in damage to the gear unit.

Possible damage to property.

- Observe the following notes.

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

7.2 Inspection and maintenance intervals

Adhere to the following inspection and maintenance intervals:

Time interval	What to do?
Daily	<ul style="list-style-type: none"> • Check the housing temperature: <ul style="list-style-type: none"> – Mineral oil: max. 90 °C – Synthetic oil: max. 100 °C • Check for gear unit noise
Monthly	<ul style="list-style-type: none"> • Check the gear unit for signs of leakage. • Check the oil level
After 500 operating hours	<ul style="list-style-type: none"> • First oil change after initial startup
Every 6 months	<ul style="list-style-type: none"> • Check the screw fittings and piping for leakage.
Every 3000 operating hours, at least every 6 months	<ul style="list-style-type: none"> • Check the oil consistency • Fill regreasable sealing systems with grease.
Depending on the operating conditions, at least every 12 months	<ul style="list-style-type: none"> • Check whether retaining screws are tightly secured. • Check if the gear unit surface is free of dust and dirt, so that the gear unit can be optimally cooled. • Clean the oil filter. If required, replace the filter element. • Check the breather. If required, replace it. • Check the alignment of the input and output shaft. • Check the condition and tightness of all the rubber tubes (aging effects). • Check the condition of the motor pump /ONP1L. If required (see addendum to the operating instructions), replace the filter element. • Check the condition of the motor pump /ONP1. If required (see addendum to the operating instructions), replace the filter element. • Check the condition of the oil-air cooler /OAC (see addendum to the operating instructions). • Check the condition of the oil-air cooler /OAP. If required (see addendum to the operating instructions), replace the filter element. • Check the condition of the oil-water cooler /OWC (see addendum to the operating instructions). • Check the condition of the oil-water cooler /OWP; replace the filter element if necessary (see addendum to the operating instructions). • Check the condition of the water cooling cartridge /CCT. • Check the condition of the water cooling cover /CCV.
At least every 3 years depending on the operating conditions (see figure on next page)	<ul style="list-style-type: none"> • Change mineral oil.
At least every 5 years depending on the operating conditions (see figure on next page)	<ul style="list-style-type: none"> • Change synthetic oil.

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Time interval	What to do?
Varying (depending on external factors)	<ul style="list-style-type: none"> • Check the installed hose pipes. • Clean the gear unit housing surface and the fan. • Touch up or renew the surfaces/anti-corrosion coating. • Replace backstop <p>The backstop might wear off when operated below lift-off speed. This is why you should consult SEW-EURODRIVE for defining the maintenance intervals for:</p> <ul style="list-style-type: none"> – Input speed rates $n_1 < 1400 \text{ min}^{-1}$ – X4K.. design with $i_{\text{tot}} \geq 200$ <ul style="list-style-type: none"> • Check the built-in cooler (such as water cooling cover / CCT and water cooling cartridge /CCV) for deposits. • Check the oil heater (at same time as the oil change): <ul style="list-style-type: none"> – Check whether all connection cables and terminals are securely fixed and free from corrosion. – Clean encrusted heating elements. Replace if necessary.

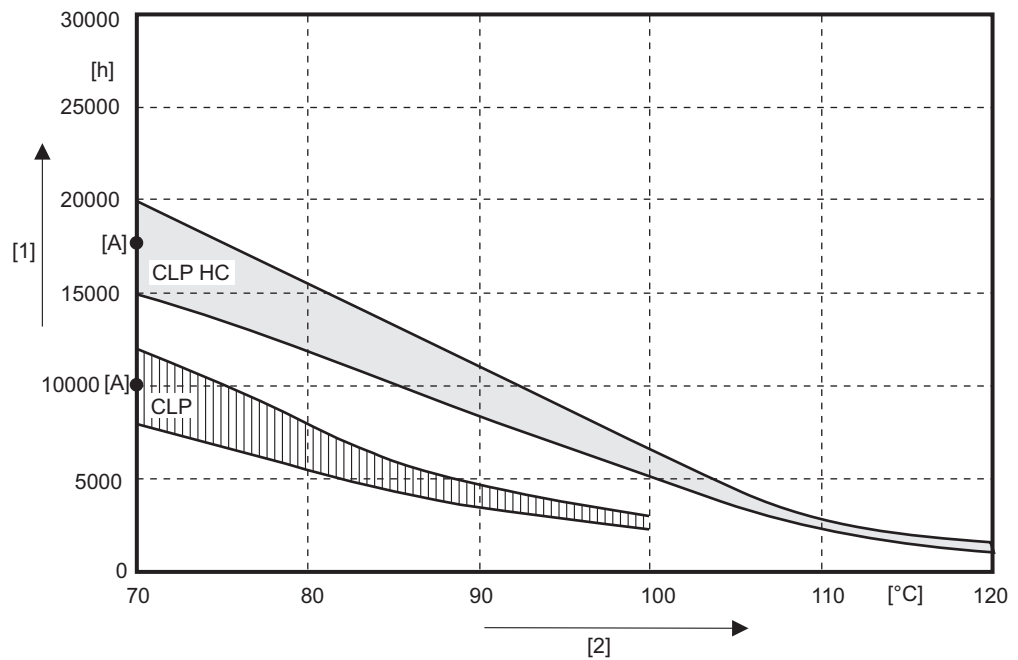
7.3 Lubricant change intervals

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

INFORMATION



Mineral CLP lubricants and synthetic polyalphaolefin-based (PAO) lubricants are used for lubrication. The synthetic lubricant CLP HC (according to DIN 51502) shown in the following 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" (→ 192)) to optimize the lubricant change intervals.

7.4 Checking the oil level

7.4.1 General information

Note the following when checking the oil level.

NOTICE

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

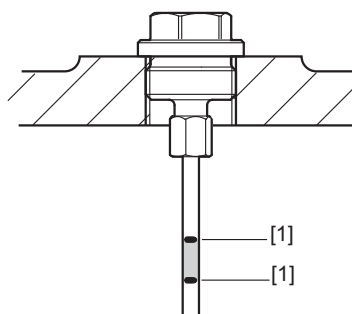
Possible damage to property.

- Check the oil level only when the gear unit is at idle state.
- For gear units in fixed and variable pivoted mounting position, observe the notes on the following pages.
- When the gear unit is equipped with an oil dipstick and an oil sight glass, refer to the oil dipstick to check the oil level. The oil level of the oil sight glass is only a guide value.
- Elements for controlling the oil level, oil drain, and oil fill openings are indicated on the gear unit by safety symbols.
- Check the oil level again after a few operating hours.
- For the auxiliary drive, observe the notes and procedures in the operating instructions: Gear unit series R..7, F..7, K..7, S..7, SPIROPLAN®.

7.4.2 Standard procedure

Oil dipstick

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).



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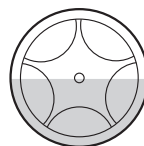
1. Unscrew the oil dipstick and remove it.
2. Clean the oil dipstick and re-insert it by turning it hand-tight into the gear unit up to the stop.
3. Remove the oil dipstick and check the oil level. The oil level must be between the markings [1].
4. Proceed as follows if the oil level is too low:
 - Open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

6. Screw in the oil fill plug.
7. Insert the oil dipstick.

Oil sight glass

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

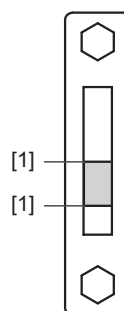
The oil sight glass only shows the oil level. The oil level is determined using the **oil dipstick**.



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Oil level glass

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).



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

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

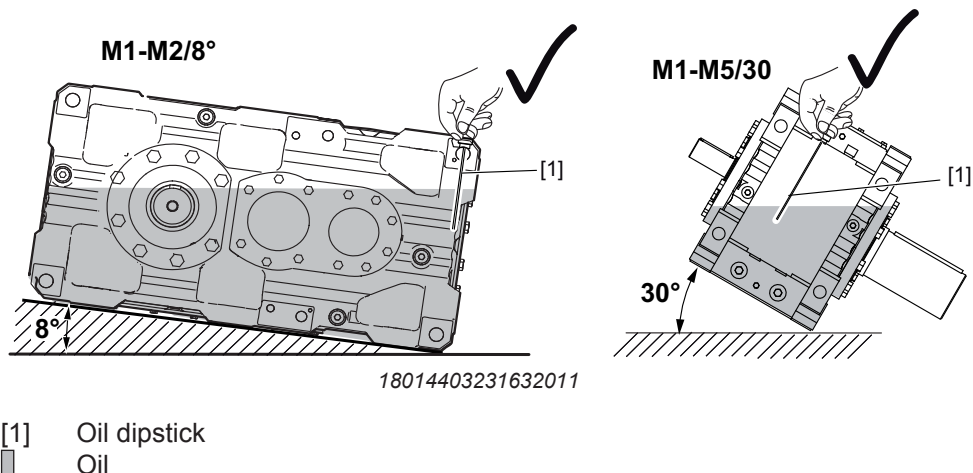
Observe the information on the nameplate and in the order documents.

Fixed pivoted mounting positions

Procedure

Check the oil level in the fixed, intended position. Observe the notes in chapter "Standard procedure" (→ 186).

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

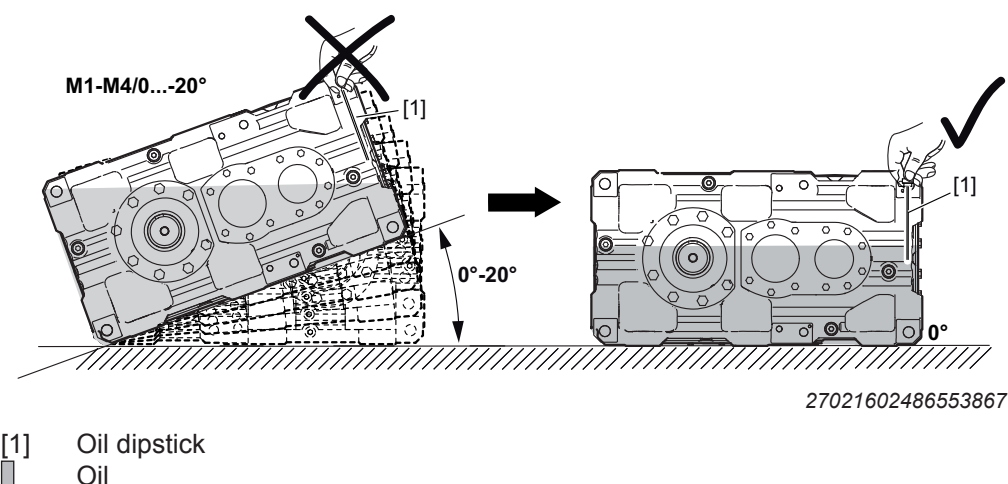


Variable pivoted mounting positions

Procedure

Before checking the oil level of gear units with variable pivoted mounting position, position the gear unit in the mounting position defined in the order documents. Observe the notes in chapter "Standard procedure" (→ 186).

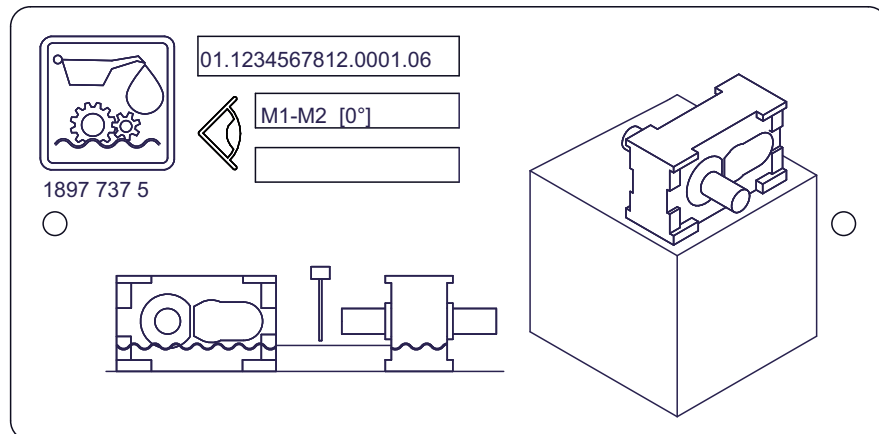
The following figure shows an example of how to check the oil level.



Information sign

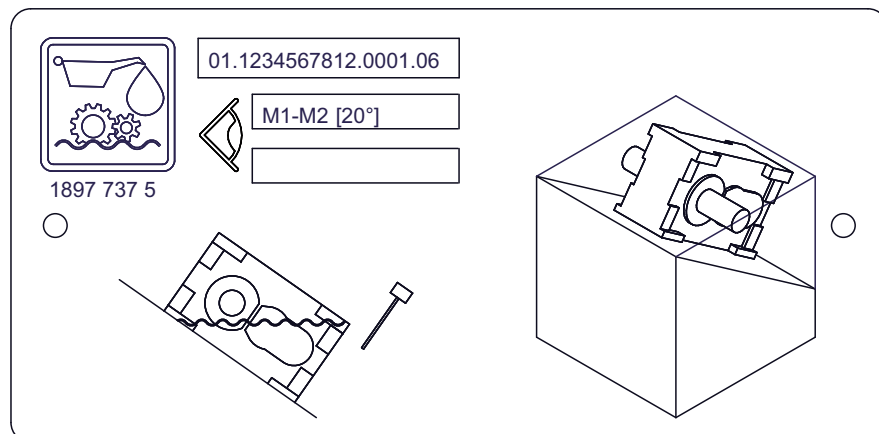
Observe the additional **information sign on the gear unit**. Check the oil level in the test mounting position specified on the information sign.

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



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



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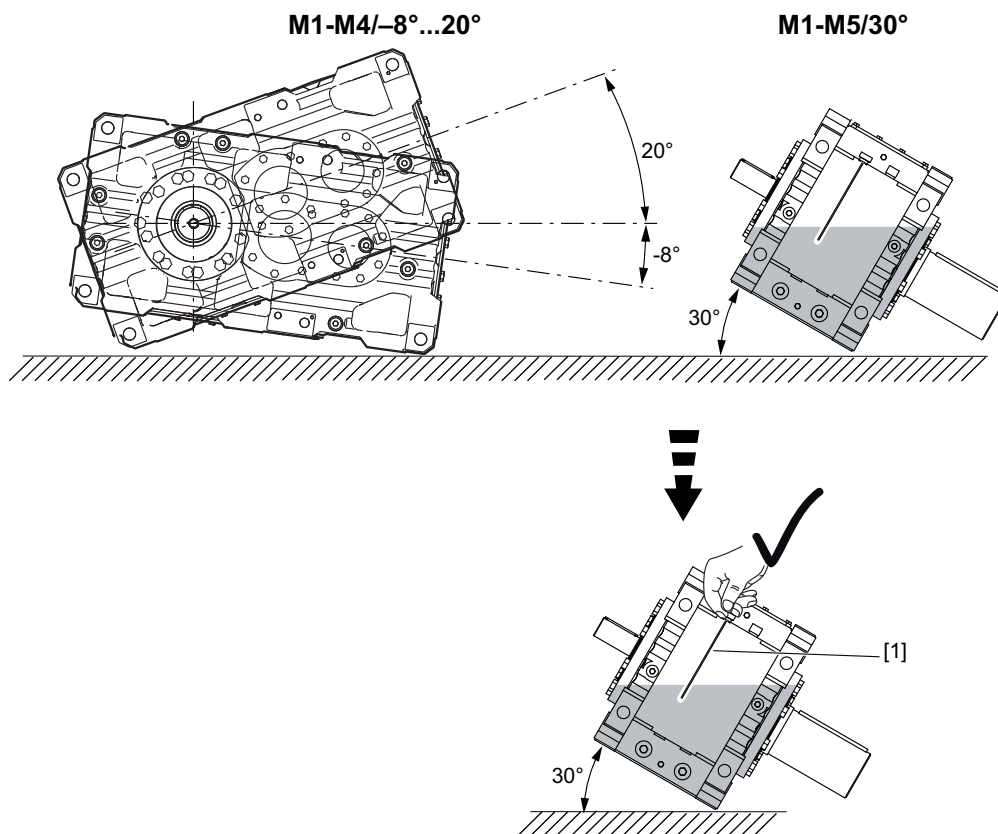
Combination of fixed and variable pivoted mounting positions

Procedure

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

Before checking the oil level of gear units with variable/fixed pivoted mounting position, position the gear unit in the mounting position defined in the order documents. Observe the notes in chapter "Standard procedure" (→ 186).

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



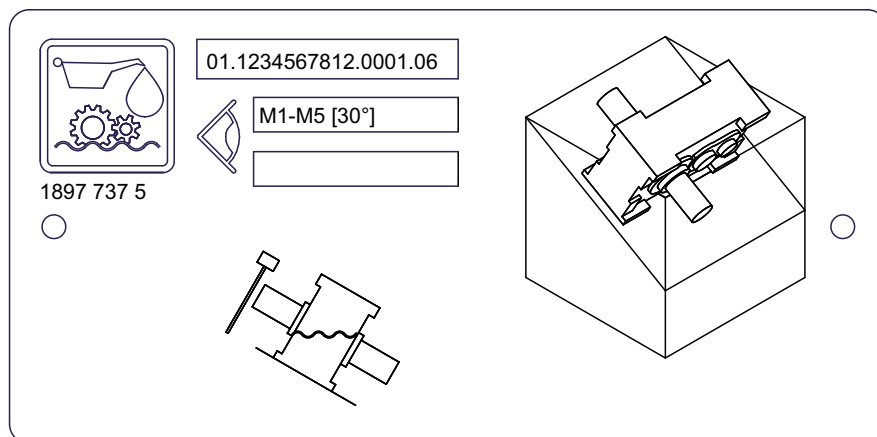
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[1] Oil dipstick
Oil

Information sign

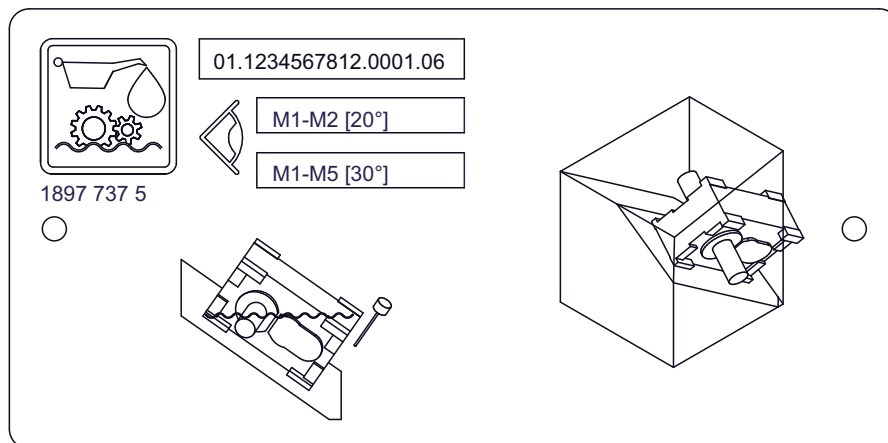
Observe the additional information sign on the gear unit. Check the oil level in the test mounting position specified on the nameplate.

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




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



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7.5 Checking the oil consistency

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→  181).

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.

- Observe the following information.
- Perform the oil change quickly after you have switched off the gear unit to prevent solids from settling. You should drain the oil while it is still warm. Avoid oil temperatures well above 50 °C.
- Always fill the gear unit with the same oil grade as before. Mixing oils of different grades and/or manufacturers is not permitted. Synthetic oils in particular must not be mixed with mineral oils or other synthetic oils. When switching from mineral oil and/or when switching from synthetic oil of one basis to synthetic oil of another basis, thoroughly flush the gear unit with the new oil grade.

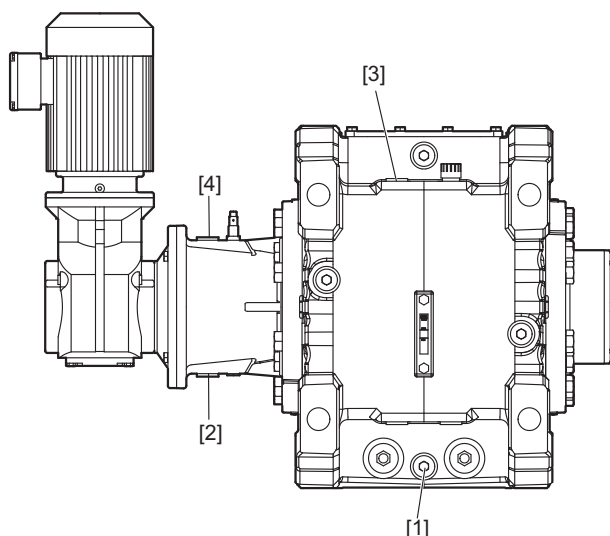
Refer to the lubricant table for information on the permitted oil of the various lubricant manufacturers.

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

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

- When changing the oil, flush the gear unit interior thoroughly with oil to remove oil sludge, oil residue, and abrasion. Use the same oil grade you use to operate the gear unit. Fill in fresh oil only after all residues have been removed.
- For the position of the oil level plug, oil drain plug and the breather, refer to the order documents.
- An oil level above the max marking might indicate that foreign liquids (e.g. water) have entered. An oil level below the min marking might indicate a leakage. Find out and eliminate the cause before you fill in new oil.
- If required, empty accessories e.g. filters and pipes.
- Replace any damaged gaskets of the oil drain plug.
- If present, clean the magnetic oil drain plug and the oil dipstick with magnet tip.
- Empty the oil-bearing system of gear units with circulation lubrication and oil supply systems according to the manufacturer's maintenance instructions.
- Elements for controlling the oil level, oil drain, and oil fill openings are indicated by safety symbols on the gear unit.
- 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.
- For the auxiliary drive, observe the notes and procedures in the operating instructions: Gear Unit Series R..7, F..7, K..7, S..7, SPIROPLAN®.

7.6.2 Procedure





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- [1] Oil drain plug bevel-helical gear units
- [2] Oil drain plug auxiliary drive adapter
- [3] Oil filling plug bevel-helical gear unit
- [4] Oil filling plug of the auxiliary drive adapter

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

1. Place a container underneath the oil drain plugs [1/2].
2. Remove the screw plugs [3/4] and the oil drain plugs [1/2].
3. Drain all the oil.
4. Insert the oil drain plugs [1/2].
5. Fill the prescribed oil quantity (see the following table) into the auxiliary drive adapter via the oil fill plug [4].
 - Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).

Size X3K..	Oil quantity in liters	
	"Empty buckets" 	"Full buckets" 
X3K100 – 110	1	1
X3K120 – 130	1	2
X3K140 – 150	1	2
X3K160 – 170	1	3
X3K180 – 190	1	4
X3K200 – 210	2	5
X3K220 – 230	1	7
X3K240 – 250	1	9
X3K260 – 270	2	12
X3K280	2	12

6. Fill the prescribed oil quantity (see the following table) into the gear unit via the oil fill plug [4].

Size	Oil quantity in liters	Size	Oil quantity in liters
X3K100	12	X3K200	105
X3K110	14	X3K210	105
X3K120	20	X3K220	135

Size	Oil quantity in liters	Size	Oil quantity in liters
X3K130	22	X3K230	139
X3K140	34	X3K240	175
X3K150	34	X3K250	175
X3K160	59	X3K260	279
X3K170	59	X3K270	279
X3K180	74	X3K280	330
X3K190	77		

- Use a filling filter to fill the oil into the gear unit (max. filter mesh 25 µm).
 - The oil quantity specified on the nameplate is an approximate quantity. The mark on the oil dipstick or oil level glass is the decisive indicator of the correct oil quantity, see chapter "Checking the oil level" (→ 186).
7. If present, re-insert the oil fill plugs [3/4] and the oil dipstick.

⚠ CAUTION

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.



7.7 Breather /BPG

7.7.1 Checking and cleaning the breather

NOTICE

Improper cleaning of the breather may damage the gear unit.

Possible damage to property.

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

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

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

7.7.2 Desiccant breather filter /DC

Proper operation:

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

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

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

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

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

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

Disposal

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

7.8 Refilling sealing grease



⚠ WARNING

Risk of crushing due to rotating parts.

Severe or fatal injuries.

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

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

Regreasable sealing systems may be filled with "lithium soap grease" (→ 221). Use moderate pressure to force about 30 g of grease into each lubrication point until new grease leaks out of the sealing gap.

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



INFORMATION

Immediately remove the old grease that leaked out.

7.9 Fan /FAN

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

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.

7.10 Axial fan



⚠ CAUTION

The protection cover can slip during assembly and disassembly.

Potential risk of crushing due to falling parts.

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

NOTICE

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

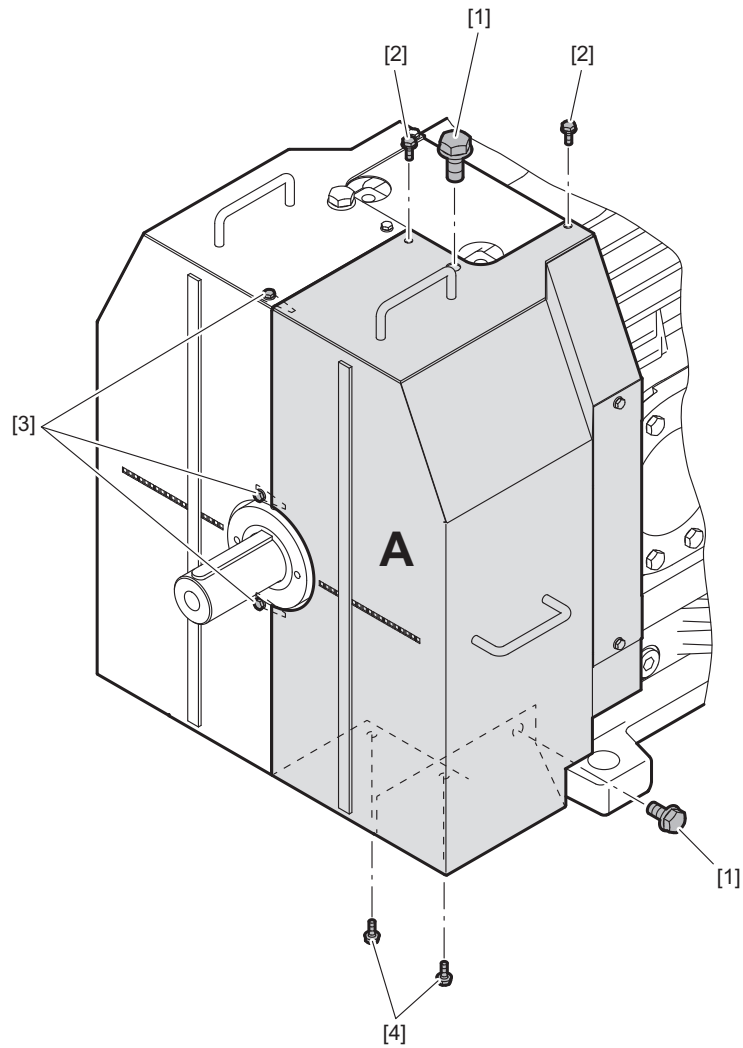
Possible damage to property.

- The re-assembly of the protection cover may only be performed with original parts from SEW. The specified distance to the fan must be observed. If the distance is not observed, the axial fan may touch the protection cover. Do not disconnect the axial fan from the fan hub. This may only be performed by qualified personnel.

7.10.1 Removing the protection cover half

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

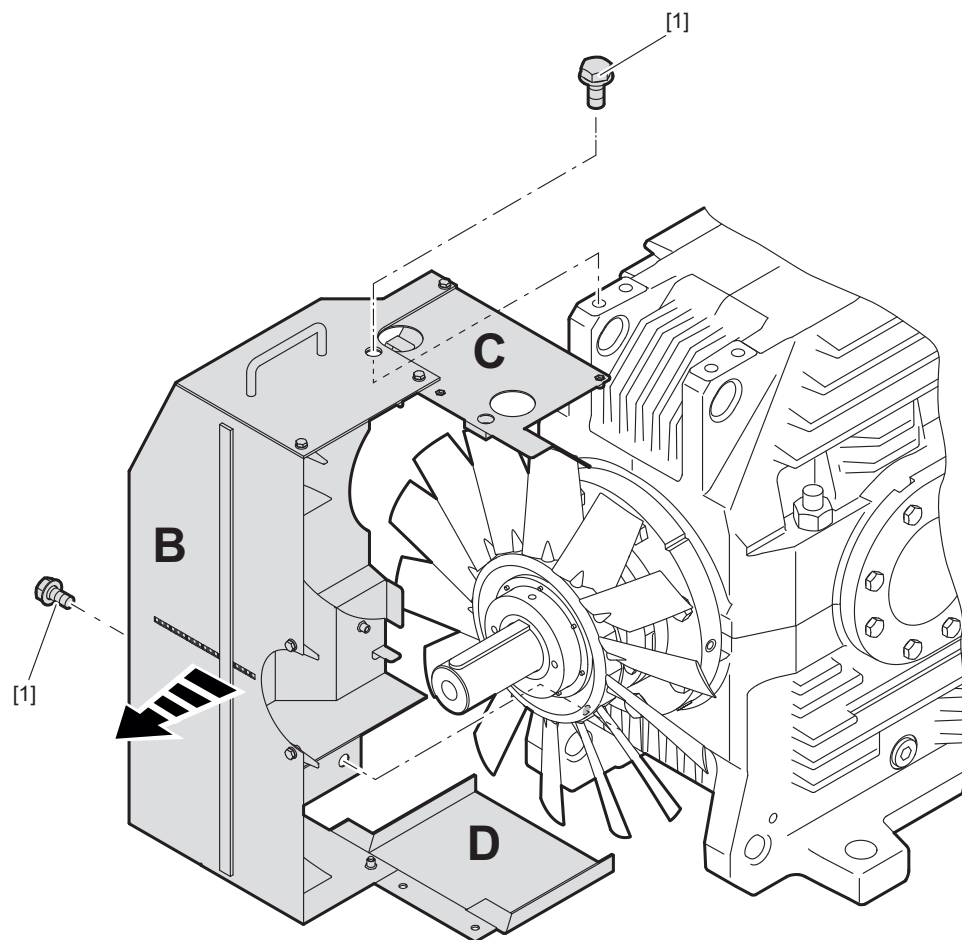
1. Protection cover half



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1. Loosen the 2 screws [1].
2. Loosen the 2 screws [2].
3. Loosen the 3 screws [3].
4. Loosen the 2 screws [4].
5. Remove protection cover half **A**.

2. Protection cover half



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

7.10.2 Mounting the protection cover half

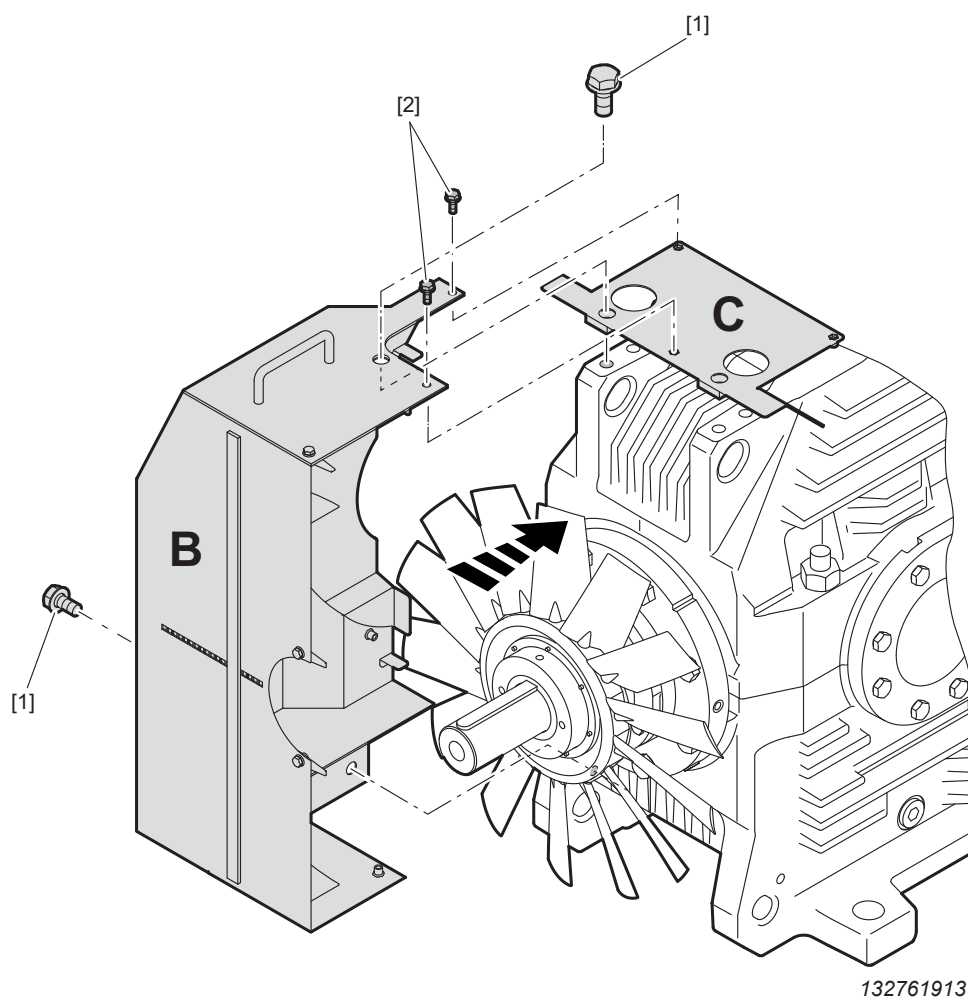
Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

INFORMATION



- The re-assembly of the protection cover may only be performed with original parts from SEW. The specified distance to the fan must be observed. If the distance is not observed, the axial fan may touch the protection cover.

1. Protection cover half

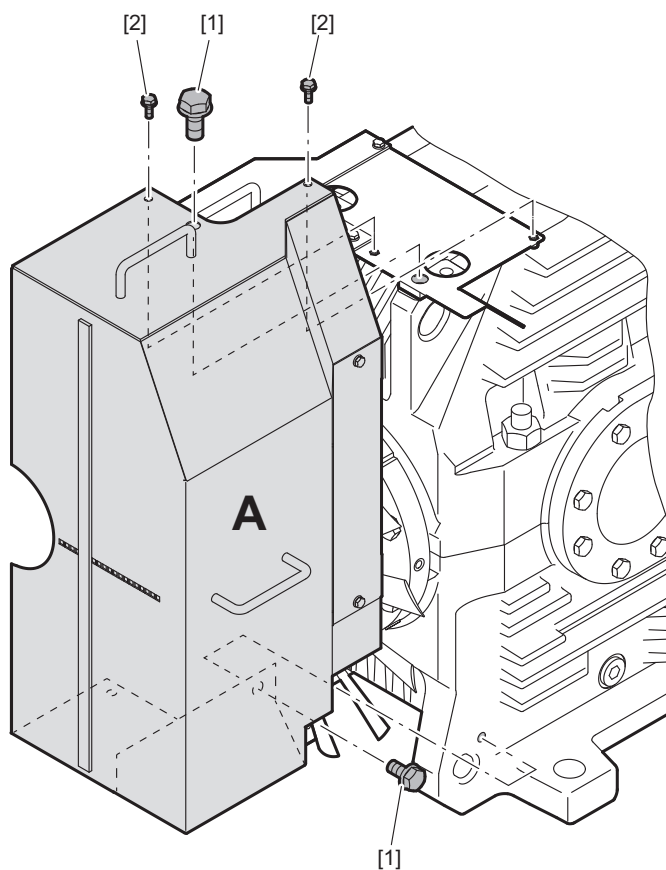


1. Screw metal sheet **C** and protection cover half **B** to the gear unit using the screws [1].
2. Screw in the 2 screws [2].

2. Protection cover half

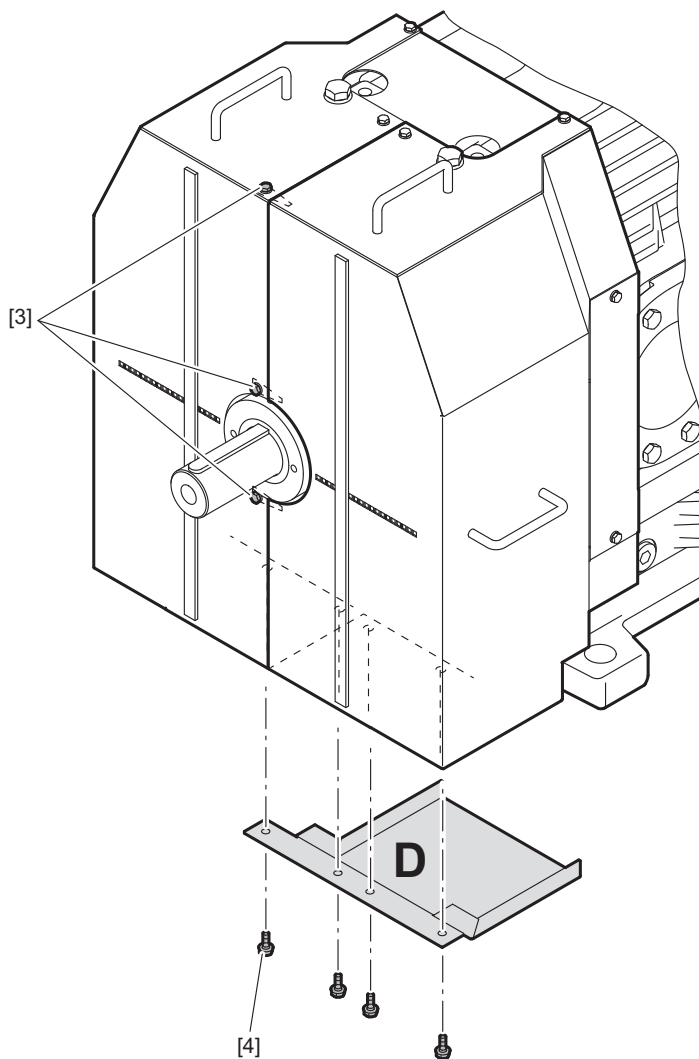
1. Screw protection cover half **A** using the 2 screws [1].

2. Screw in the 2 screws [2].



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



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7.11 Water cooling cover /CCV

7.11.1 Safety notes



⚠ WARNING

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

Serious injury.

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

NOTICE

Risk of damaging components of the water cooling cover.

Possible damage to property.

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

NOTICE

Risk of contamination of the medium.

Possible damage to property.

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

NOTICE

Risk of destroying components of the water cooling cover.

Possible damage to property.

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

NOTICE

Risk of contamination due to drained media.

Possible damage to property.

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

7.11.2 Disassembly

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

1. Remove the cooling water inflow and return pipes from the water cooling cover.
2. Open the inspection cover.
3. Carefully remove the water cooling cover and the gasket.
4. Check the water cooling cover for deposits.

INFORMATION



Clean light dirt on the water cooling cover with a suitable cleaning agent. If heavily soiled, replace the water cooling cover with a new one. Contact SEW-EURODRIVE.

5. Insert the water cooling cover into the gear unit housing.
6. Apply Loctite® 5188 over the entire edge of the cooling cover.
7. Insert the gasket.
8. Put the inspection cover back on and align it.
9. Reinsert the screws and tighten them in 2 goes starting from the inside. Observe the chapter "Tightening torques" (→ 87).
10. Re-connect the water cooling inflow and return pipes to the water cooling cover.

7.12 Water cooling cartridge /CCT

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

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.

7.12.1 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.

7.12.2 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" (→ 181).

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

7.13 Oil-water cooler for splash lubrication /OWC

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

INFORMATION



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

7.14 Oil-air cooler for splash lubrication /OAC

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

INFORMATION



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

7.15 Oil-water cooler for pressure lubrication /OWP

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

INFORMATION



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

7.16 Oil-air cooler for pressure lubrication /OAP

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

INFORMATION



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

7.17 Motor pump /ONP1L

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

INFORMATION



Before starting inspection/maintenance work, first read the addendum to the operating instructions "Motor Pump /ONP1L".

7.18 Motor pump /ONP1

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 181).

INFORMATION



Before starting inspection/maintenance work, first read the addendum to the operating instructions "Motor Pump /ONP1".

7.19 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" (→ 181).

1. Before disassembling the oil heater, drain the oil completely.
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" (→ 186).
6. Connect the oil heater.

7.20 Torque-limited backstop

INFORMATION



Observe the operating instructions of the respective backstop manufacturer. The following chapter describes the procedure for backstops from the company RING-SPANN GmbH.

7.20.1 Checking the wear of the lining

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Shutdown the drives when conveyor belt is empty, i.e. no backdriving torque at the backstop caused by material on the conveyor belt. Make sure that there is no torque applied to the backstop.



⚠ 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.

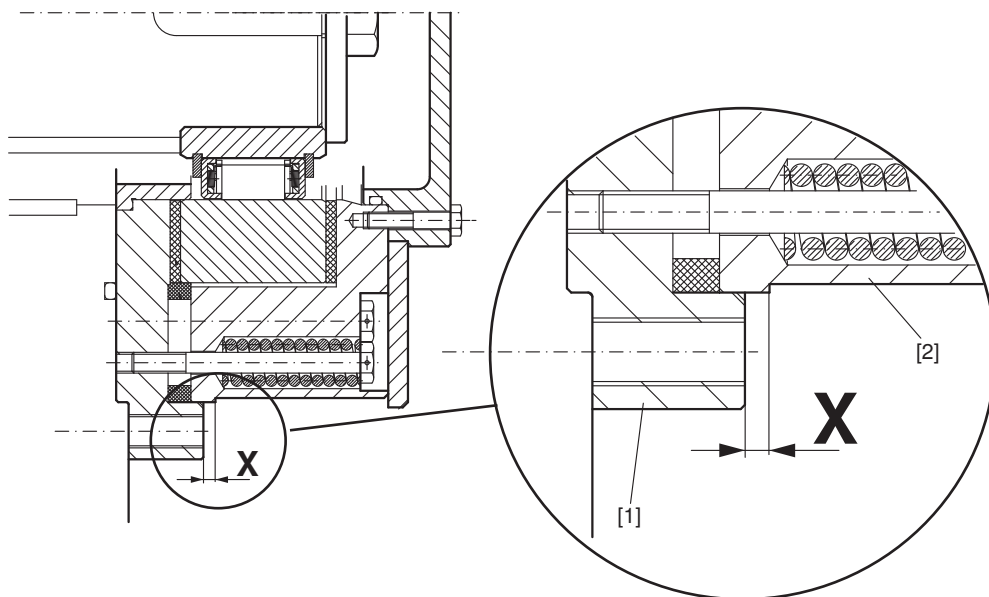


NOTICE

Improper maintenance of the torque arm may result in damage to the gear unit.

Possible damage to property.


- If the distance "X" is equal to or smaller than 0.8 mm, the proper functioning of the torque limiting is not guaranteed. Contact SEW-EURODRIVE.



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[1] Backstop flange


[2] Housing

Observe the notes in chapter "Preliminary work regarding inspection/maintenance" (→  181).

Check the wear of the lining by measuring the **reference dimension "X"** between the fixed backstop flange [1] and the bottom edge of the groove of the housing [2]. The distance must not be shorter than 0.8 mm.

7.21 Split housing

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

- The parting lines are sealed again carefully, and
- The screw connections are re-tightened using the tightening torques specified in chapter "Tightening torques" (→  87).

8 Permitted lubricants

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

8.1 Lubricant selection

Note the following when selecting the lubricants.

NOTICE

Selecting improper lubricants may damage the gear unit.


Possible damage to property.

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

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

The lubricant recommendation in the lubricant table in no way represents a guarantee regarding the quality of the lubricant delivered by each respective supplier. Each lubricant manufacturer is responsible for the quality of its product.
 - Oils of the same viscosity class from different manufacturers do not have the same characteristics. In particular, the minimum permitted oil bath temperatures are manufacturer-specific. These temperatures are specified in the lubricant tables.
 - The minimum permitted oil bath temperatures depend on the lubrication type used. These temperatures are specified in the lubricant tables. The values correspond to the maximum viscosity of the individual lubricants.
 - The values specified in the lubricant tables apply as of the time of printing of this document. The data of the lubricants are subject to dynamic change on the part of the lubricant manufacturers. For up-to-date information about the lubricants, visit:
www.sew-eurodrive.de/lubricants
 - Do not mix different synthetic lubricants and do not mix synthetic with mineral lubricants.
 - Check the compatibility of the greases and oils used.
 - Strictly observe the safety notes in the individual chapters.

8.2 Structure of the tables and abbreviations





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

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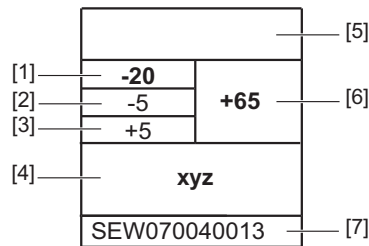
[1] Viscosity class

[2] Lubricant type

Abbreviations

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

8.3 Explanation of the various lubricants



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

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

- Motor pump for pressure lubrication /ONPL
- Motor pump for pressure lubrication /ONP1L
- Shaft end pumps in HU, HH, and HT housing design

8.5 Lubricant tables

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





DIN (ISO) API	ISO,SAE NLGI	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TEXACO	TOTAL																							
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This lubricant table is valid when the document is published. Please refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

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

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

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8.6 Lubricant fill quantities



INFORMATION



- Different oil quantities are required for the auxiliary drive adapter in **"empty bucket"** design and in **"full bucket"** design. Observe the information specified in the following table.
- The specified fill quantities are guide values. The exact values vary depending on the number of gear stages and gear ratio.
- The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity.
- For pivoted mounting positions, the lubricant fill quantity on the nameplate may vary from the standard. The fill quantity specified on the nameplate is a guide value. The mark on the oil dipstick or the oil level glass is the decisive indicator of the correct oil quantity.



8.6.1 Universal gear unit housing with auxiliary drive adapter

The following table shows the lubricant quantities for gear units and auxiliary drive adapters.

Size	Oil quantity in liters		
	Gear unit	"Empty buckets" 	"Full buckets" 
X3K.100	12	1	1
X3K.110	14	1	1
X3K.120	20	1	2
X3K.130	22	1	2
X3K.140	34	1	2
X3K.150	34	1	2
X3K.160	59	1	3
X3K.170	59	1	3
X3K.180	74	1	4
X3K.190	77	1	4
X3K.200	105	2	5
X3K.210	105	2	5
X3K.220	135	1	7
X3K.230	139	1	7
X3K.240	175	1	9
X3K.250	175	1	9
X3K.260	279	2	12
X3K.270	279	2	12
X3K.280	330	2	12



8.6.2 Auxiliary drive

The following table shows the lubricant quantities for auxiliary drives.

Size	Auxiliary drive "empty buckets" 		Auxiliary drive "full buckets" 	
	Type	Oil quantity in liters	Type	Oil quantity in liters
X3K.100	KF37	1.5	KF57	3.15
X3K.110	KF37	1.5	KF57	3.15
X3K.120	KF47	2.2	KF77	5.9
X3K.130	KF47	2.2	KF77	5.9
X3K.140	KF57	3.15	KF77	5.9
X3K.150	KF57	3.15	KF77	5.9
X3K.160	KF67	3.7	KF87	11.9
X3K.170	KF67	3.7	KF87	11.9
X3K.180	KF77	5.9	KF97	21.5
X3K.190	KF77	5.9	KF97	21.5
X3K.200	KF77	5.9	KF97	21.5
X3K.210	KF77	5.9	KF97	21.5
X3K.220	KF87	11.9	KF107	35.1
X3K.230	KF87	11.9	KF107	35.1
X3K.240	KF87	11.9	KF127	55
X3K.250	KF87	11.9	KF127	55
X3K.260	KF87	11.9	KF127	55
X3K.270	KF87	11.9	KF127	55
X3K.280	KF87	11.9	KF127	55

8.7 Sealing greases/rolling bearing greases

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

Area of operation	Manufacturer	Grease	Lower limit temperature °C
Standard	Fuchs	Renolit CX TOM 15 OEM¹⁾	-40
	BP	Energrease LS EP-2	-30
	Castrol	Longtime PD 2	-35
		Spheerol EPL 2	-20
	Klüber	Centoplex EP 2	-25
		Petamo GHY 133 N	-40
	Mobil	Moliux EP 2	-20
	Shell	Gadus S2 V220 2	-20
	Total	Multis EP 2	-20
	Bremer & Leguil	Cassida Grease GTS2 ¹⁾	-40
	Fuchs	Plantogel 2¹⁾	-40

1) Grease used by the factory should be preferred.

INFORMATION



- Do not mix permitted greases from different areas of application.
- If the lubricant used is not listed in the above table, you have to make sure that it is suitable for the intended application.

9 Malfunctions/remedy

9.1 Troubleshooting information

Read the following notes before you proceed with troubleshooting.



⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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



⚠ WARNING

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

Serious injury.

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

NOTICE

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

Possible damage to property.

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

9.2 Possible malfunctions/remedy

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

Fault	Possible cause	Measure
Oil leaking <ul style="list-style-type: none"> At the gear unit breather 	<ul style="list-style-type: none"> Too much oil Drive not installed in proper mounting position Frequent cold starts (oil foaming) and/or high oil level 	<ul style="list-style-type: none"> Check oil level, correct if necessary Install gear unit breather correctly and adjust the oil level Install oil expansion tank
Oil leaking <ul style="list-style-type: none"> From the screw plug From the oil drain valve 	<ul style="list-style-type: none"> Seal not tight Fittings loosened 	<ul style="list-style-type: none"> Retighten the screw Retighten the fitting and screw
No oil pump suction	<ul style="list-style-type: none"> Air in the suction line of the oil pump Oil pump defective 	<ul style="list-style-type: none"> Fill oil into the suction line and the oil pump, vent the pump at the pressure side Consult SEW-EURODRIVE.
Pressure switch does not switch	<ul style="list-style-type: none"> Air in the suction line of the oil pump Pressure switch connected incorrectly Pressure switch defective Oil pump defective 	<ul style="list-style-type: none"> Fill the suction line and oil pump with oil Vent the pump at the pressure side Check the connection Replace pressure switch Consult SEW-EURODRIVE.
Malfunction in the oil-water or oil-air cooling system	<ul style="list-style-type: none"> Malfunction of the oil-water or oil-air cooling system 	<ul style="list-style-type: none"> Observe the separate operating instructions for the oil-water or oil-air cooling system.
Gear unit does not reach cold start temperature	<ul style="list-style-type: none"> Thermostat set incorrectly Oil heating defective or connected incorrectly Heat dissipation too great due to unfavorable climatic conditions 	<ul style="list-style-type: none"> Check the setting of the thermostat Check the oil heater for proper connection and function; replace if necessary Protect the gear unit from cooling off during the warm-up phase
Operating temperature at backstop too high, no blocking function	<ul style="list-style-type: none"> Damaged/defective backstop 	<ul style="list-style-type: none"> Check the backstop, replace it if necessary Contact SEW-EURODRIVE
Main drive does not start	<ul style="list-style-type: none"> Speed monitor of the overrunning clutch not set correctly Wrong direction of rotation, motor rotates in blocking direction of the overrunning clutch Main drive and auxiliary drive not interlocked correctly Overload at the output side Overrunning clutch blocked (cage with sprags of the overrunning clutch not installed correctly or overrunning clutch defective) Main drive defective 	<ul style="list-style-type: none"> Check the speed monitoring setting Change the direction of rotation of the motor (switch 2 phases) Check wiring, correct if necessary Reduce load Install cage of the overrunning clutch the other way around (180°) or replace it Repair motor in a specialist workshop

Fault	Possible cause	Measure
Auxiliary drive does not start	<ul style="list-style-type: none"> • Overload at the output side • Auxiliary drive rotates against blocking direction of the overrunning clutch • Overrunning clutch defective • Auxiliary drive is defective 	<ul style="list-style-type: none"> • Reduce load • Determine correct direction of rotation. Based on the result either turn the cage of the overrunning clutch by 180° or change the direction of rotation of the motor (switch 2 phases) • Replace overrunning clutch • Repair motor in a specialist workshop
Worn brake lining, wear marker "X" below 0.8 mm	<ul style="list-style-type: none"> • Constantly switching the system on and off or driving it in blocking direction always leads to frequent engaging and disengaging of the backstops and torque limiting. This can cause exceptional heat generation and lining wear in the torque limiting. The generated heat can destroy the lining. In normal operation, the torque limiting distributes a too high torque through relatively small rotational movements. This causes only very little wear on the lining. 	<ul style="list-style-type: none"> • Send the torque limiting to the manufacturer for overhaul.

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

9.3 Service

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

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

9.4 Waste disposal

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

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

Index

A

Accessories	33
Accessories, abbreviations	33
Ambient conditions	84
Auxiliary drive	23
Cable entry	29
Direction of rotation	52
Motor terminal box position	29
Startup	172
Structure	22
Axial fan	198

B

Backstop	52
Maintenance intervals	182
Structure	64
Base frame	67, 143
Bath lubrication	58
Bearing greases	221
Breather	

Breather with filter insert /PI	79
Desiccant breather filter /DC	80
Maintenance	196
Standard	79

Bucket elevator drive	22
-----------------------------	----

C

CCW rotation	64
Change of mounting position	178
Changing the oil	192
Check the oil consistency	192
Checking and cleaning the venting	196
Checking the oil level	186
Notes on the procedure for fixed and variable pivoted mounting positions	188
Standard procedure	186
Circulation cooling	68
Coating system	
OS 1	56
OS 2	56
OS 3	56
OS 4	57
Cooling types	68

Copyright notice	9
Couplings	134
Mounting tolerance	134
Customer service	226
CW rotation	64

D

Desiccant breather filter	80
Directions of rotation	52
DRE	24
DRP	24
DRS	24
DUO10A diagnostic unit	78
Dust protection lip	53

E

Embedded safety notes	8
Exterior corrosion protection	20

F

Failure	223
Backstop	224
Cold start temperature	224
Oil leaking	223
Operating temperature	223
Fan	68
X.K.. Fan (standard)	68
Installation	144
Maintenance	198
X.K.. Advanced (option)	69
Fan cooling	68
Fill quantities: Lubricant	219
Fixed pivoted mounting position	37
Checking the oil level	188
Flange coupling	
Structure	62, 63

G

Gear unit	
Shutdown	179
Gear unit oil	213
Gear unit structure	22
Gear unit venting	60
Grease nipple on gear unit cover	55

H

Hazard symbols	
Meaning.....	8
High Efficiency.....	24
Horizontal housing /HH	
Description	42
Housing design	
Horizontal housing /HH	42
Universal housing /HH.....	43

I

IEC.....	65
IEC motor standard	24
Inspection intervals.....	182
Installing the gear unit	86
Internal conservation	20

L

Labels on the gear unit.....	12
Labyrinth seal	53
Limit temperature for gear unit startup	154
Lubricant change intervals	185
Lubricant fill quantities	219
Lubricants	213
Lubricating greases	221
Lubrication	58
Lubrication points	55
Lubrication types	58

M

Maintenance intervals	182
Malfunction	
Oil cooling system	224
Oil drain leaking.....	224
Oil leaking.....	223
Oil pump	224
Pressure switch	224
Temperature of the bearing.....	223
Venting	224
Motor adapter	
Installation	136
Structure	65
Motor pump	
Mechanical connection.....	153
Startup.....	177

Structure.....	75, 76
Motor terminal box	
Cable entry	29
Position.....	29
Mounting position	34
Mounting position and standard mounting surface	35

N

Nameplate	30
NEMA	65
Notes	
Designation in the documentation	7
Meaning of the hazard symbols	8
NTB	77
NTB temperature switch.....	77
Dimensions.....	167
Electrical connection	167
Technical data	167

O

Oil dipstick	59
Oil drain plug	60
Oil drain valve.....	60
Oil heater	
Electrical connection	159
Failure	223
Information on the function.....	156
Limit temperature for gear unit startup	154
Maintenance	210
Startup	178
Structure	76
Oil level glass	59
Oil seal	53, 84
Oil seals.....	84
Oil-air cooler for pressure lubrication	
Failure	223
Maintenance	209
Mechanical connection.....	152
Structure	75
Oil-air cooler for splash lubrication	
Inspection	209
Structure	75
Oil-air cooler with motor pump for pressure lubrication	
Startup.....	177

Oil-air cooler with motor pump for splash lubrication	
Startup	176
Oil-water cooler for splash lubrication	
Cooling medium	146
Maintenance	209
Mechanical connection	92, 152
Structure	75
Oil-water cooler with motor pump for pressure lubrication	
Startup	177
Oil-water cooler with motor pump for splash lubrication	
Startup	176
Oil-water cooler with pressure lubrication	
Maintenance	209
Malfunctions	223
Mechanical installation	152
Structure	75
Output shaft as hollow shaft with keyway	
Installation	92
Structure	50
Output shaft as hollow shaft with shrink disk	
Installation	104
Structure	50
Output shaft as splined hollow shaft	
Structure	51
Overrunning clutch	25
Overview of housing designs and options	45
OWC	75

P

Packaging	20
Pivoted mounting position	36
Checking the oil level	188
Preliminary work	84
Premium Efficiency	24
Pressure lubrication	58
Pressure switch	
Dimensions	165
Electrical connection	165
Structure	77
Technical data	165
PT100	77, 166
PT100 temperature sensor	
Dimensions	166

Electrical connection	166
Technical data	166

R

Refilling sealing grease	197
Rights to claim under limited warranty	8

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	15
Sealing grease	221
Sealing lips	84
Sealing systems	53
Section-related safety notes	7
Shaft positions	52
Shrink disk	
Installation	104
Structure	50
Signal words in safety notes	7
Smooth output shaft	48
Speed monitoring	
Functional test	173
Installation	88
Startup	172
Structure	26
Splash lubrication	58
Splined hollow shaft as output shaft	
Installation	123
Splined solid shafts	49
Split housing	212
Starting up the gear unit at low ambient temperatures	179
Startup sequence	172
Storage conditions	20, 21
Structure	22
Swing base	144
Structure	66
Symbols on the gear unit	12

T

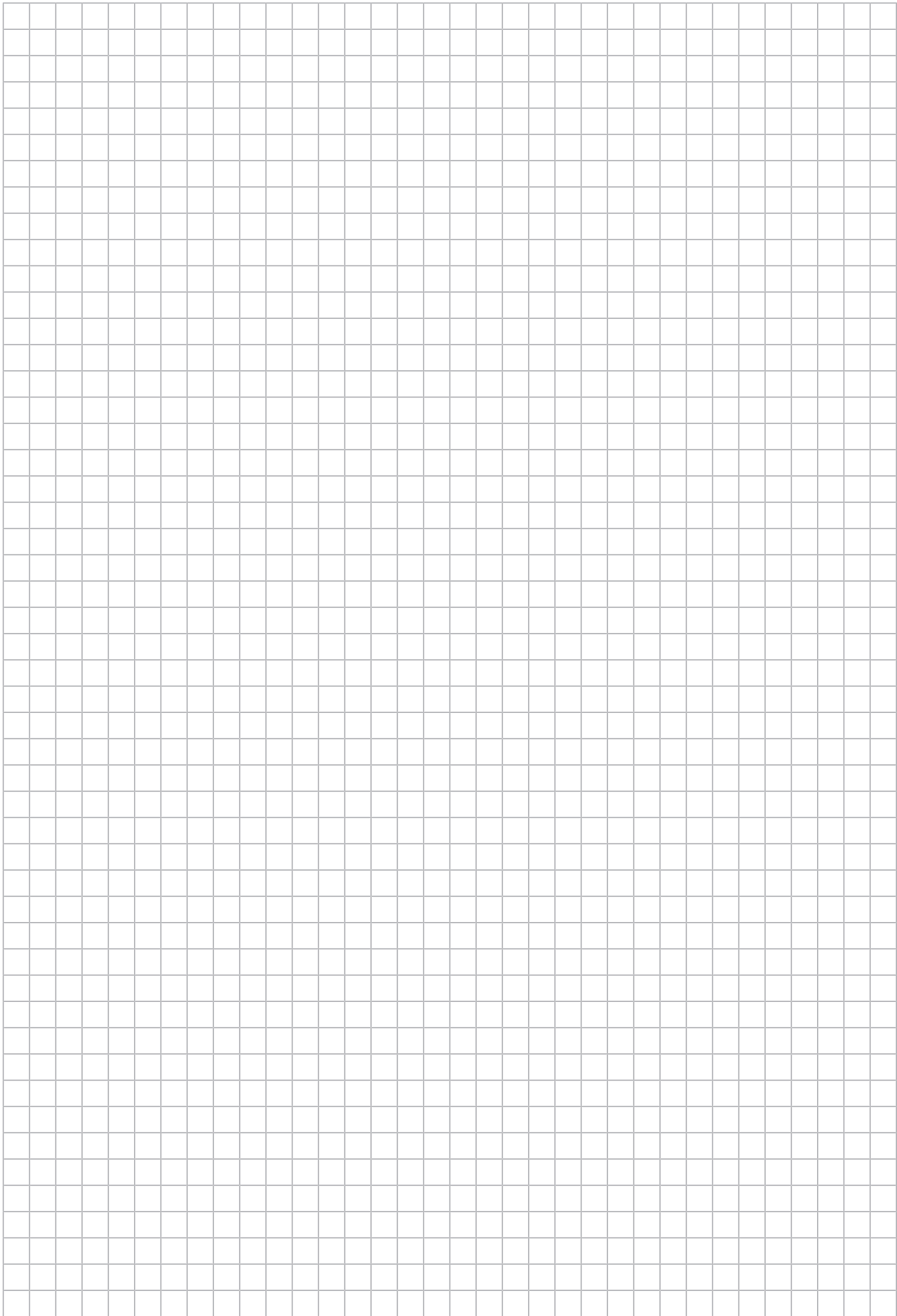
Taconite	53
Temperature sensor PT100	77

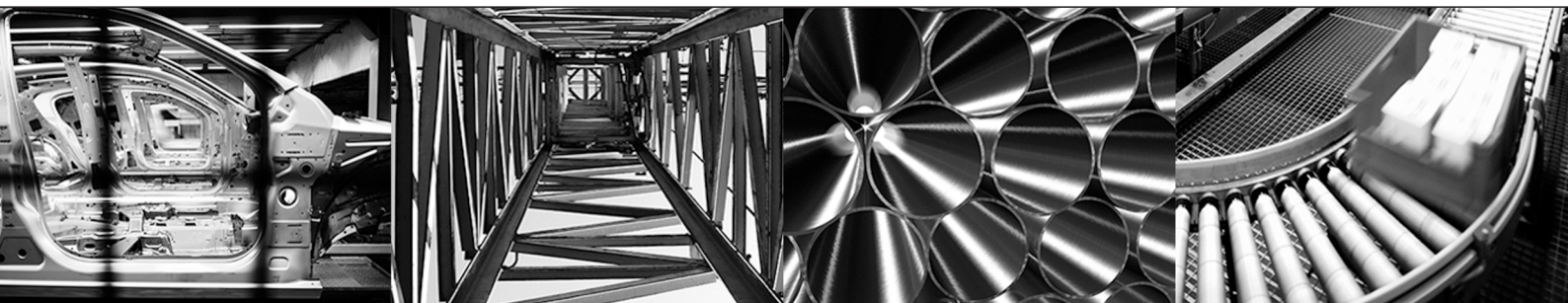
Tightening torques		Visual oil level check	59
Gear unit mounting with foot-mounted design	87	W	
Of mount-on components for gear units	87	Warning notes on the gear unit	12
Tolerances	81	Waste disposal	226
Torque arm		Waste oil	226
Assembly	132	Water cooling cartridge	
Structure	61	Cleaning	206
Torque-limited backstop		Connection	147
Maintenance	211	Expansion	207
Structure	27	Installation	147
Torque-limiting backstop	27	Interior cleaning	208
Transport	17	Maintenance	206
Transport conditions	20	Maintenance intervals	206
TSK	78	Malfunctions	223
TSK temperature switch	78	Removing	148
Dimensions	168	Requirements on the water quality	149
Electrical connection	168	Startup	175, 176
Technical data	168	Structure	72
Type designation of the gear unit	31	Types of cooling water	151
Type designation of the oil supply system	32	Water cooling cover	
U		Connection	72
Universal housing /HU		Expansion	205
Description	43	Installation	145
V		Maintenance	204
Variable pivoted mounting position	38	Malfunctions	223
Checking the oil level	188	Removing	145
V-belt drives		Structure	71
Malfunctions	223	Wear of the torque-limited backstop	211

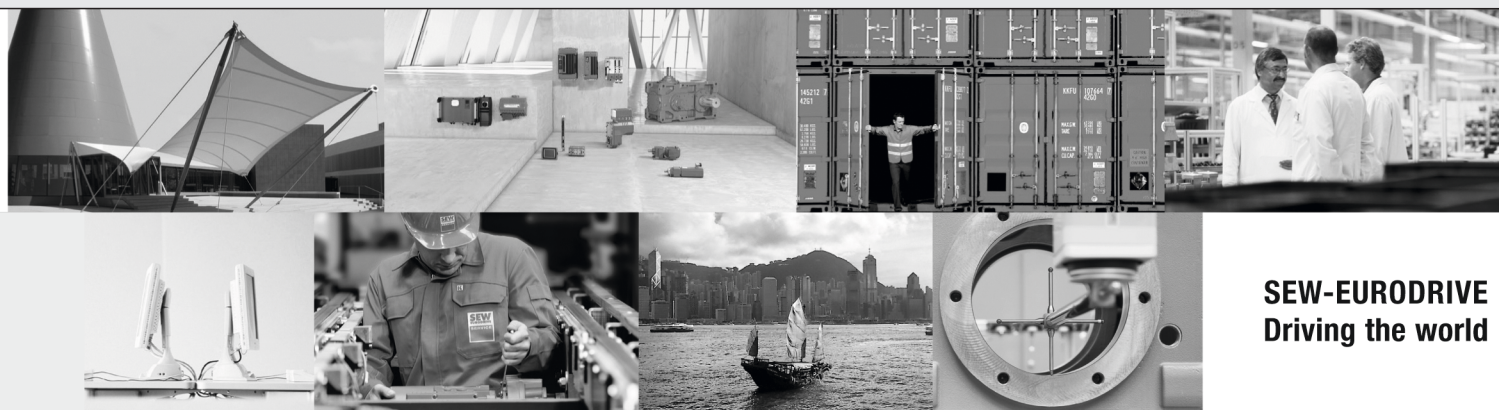












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