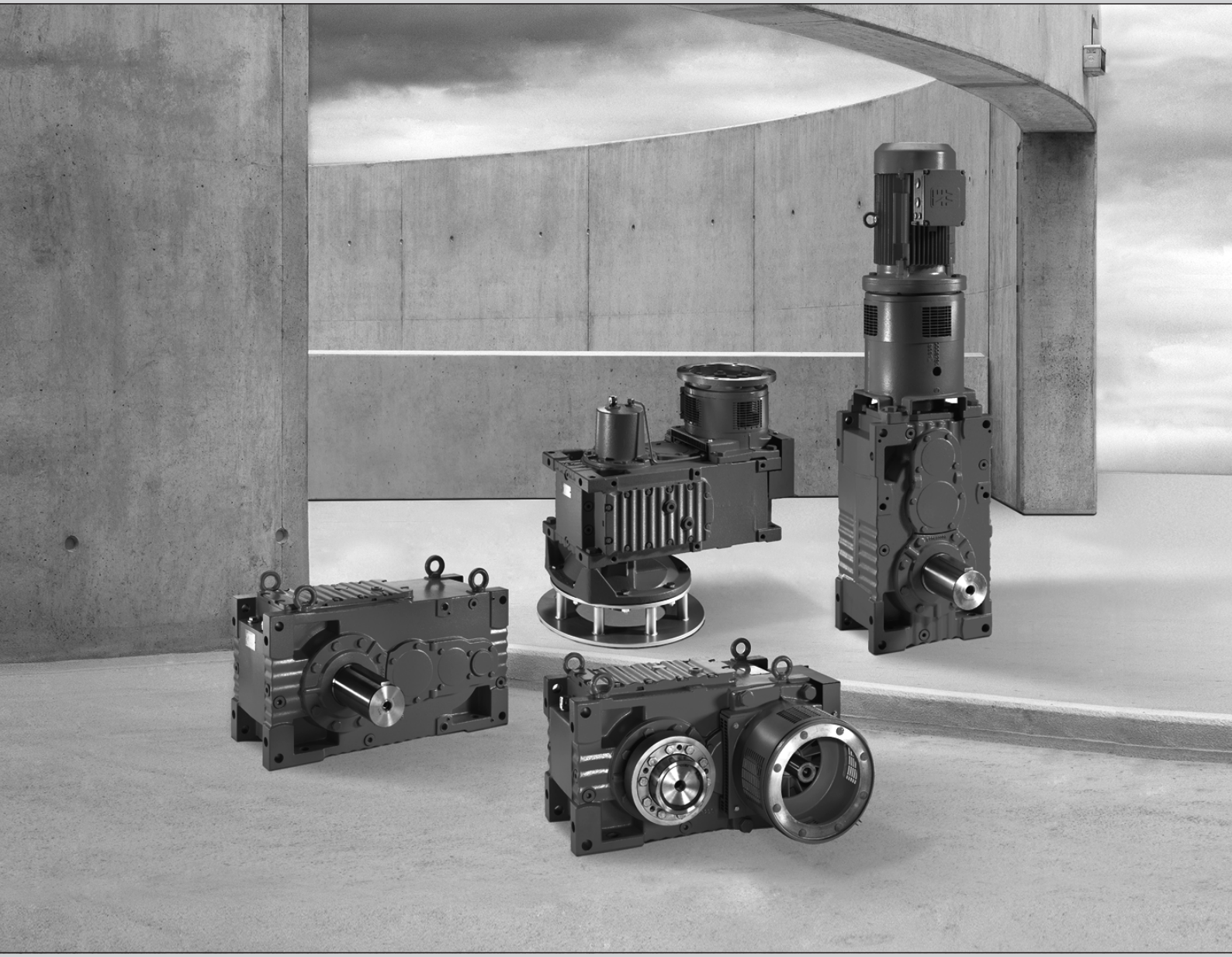
SEW EURODRIVE

Assembly and Operating Instructions



Industrial Gear Units

MC.. Series Helical and Bevel-Helical Gear Units

Edition 01/2024

31958788/EN

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1 General information

1.1 About this documentation

The documentation at hand is the original.

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

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

1.2 Structure of the safety notes

1.2.1 Meaning of signal words

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

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

1.2.2 Structure of section-related safety notes

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

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

SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

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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 about 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 step.

This is the formal structure of an embedded safety note:

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

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1.3 Decimal separator in numerical values

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

Example: 30.5 kg

1.4 Product names and trademarks

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

1.5 Copyright notice

1.6 Other applicable documentation

Also observe the following publications and documents:

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

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

www.sew-eurodrive.de

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2 Safety notes

2.1 Preliminary information

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

2.2 Duties of the user

As the user, you must ensure that the basic safety notes are observed and complied with. Make sure that persons responsible for the machinery and its operation as well as persons who work on the device independently have read through the documentation carefully and understood it.

As the user, you must ensure that all of the work listed in the following is carried out only by qualified specialists:

- Setup and installation
- Installation and connection
- Startup
- Maintenance and repairs
- Shutdown
- Disassembly

Ensure that the persons who work on the product pay attention to the following regulations, conditions, documentation, and information:

- The national and regional regulations governing safety and the prevention of accidents
- Product safety label on the product
- All other associated project planning documents, installation and startup instructions, as well as wiring diagrams
- Do not assemble, install or operate damaged products
- All system-specific specifications and regulations

Ensure that systems in which the product is installed are equipped with additional monitoring and protection devices. Observe the applicable safety regulations and legislation governing technical work equipment and accident prevention regulations.

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2.3 Target group

Specialist for mechanical work

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

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

Specialist for electrotechnical work

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

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

Additional qualifications

In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives, and laws specified in this documentation.

The persons must have the express authorization of the company to operate, program, parameterize, label, and ground devices, systems, and circuits in accordance with the standards of safety technology.

Instructed persons

All work in the areas of transport, storage, installation, operation and waste disposal may only be carried out by persons who are trained and instructed appropriately. These instructions must enable the persons to carry out the required activities and work steps safely and in accordance with regulations.

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2.4 Designated use

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

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

In compliance with the EC Machinery Directive 2006/42/EC, the industrial gear units are partly completed machinery 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 Machinery Directive 2006/42/EC.

2.5 Symbols on the gear unit

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

Icons	Meaning
	Indicates the **oil filling point**. At the same time, it serves as the correct breather when changing the oil.
	Indicates the **oil drain**.
	Indicates the position of the **breather**. Serves to avoid mistaking the oil measuring position for the venting position.
	Used to avoid faults due to lack of understanding. Observe the information in the operating instructions.
	Indicates the **magnetic oil dipstick**.
	Indicates the **magnetic oil drain plug**.
	Indicates the position of the **relubrication points** and makes it easier to find the points to be lubricated. Helps prevent bearing damage.
	Indicates the **water supply** and is used to find the connection option.

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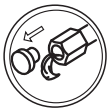
Icons	Meaning
	Indicates the **water return** and is used to find the connection option.
	Indicates the **oil supply** and is used to find the connection option.
	Indicates the **oil return** and is used to find the connection option.
	Indicates the mounting position of the gear unit for the **oil control** on the information sign for pivoted mounting positions.
	Indicates the position of the **temperature sensor/temperature switch**.
	Identifies the **grease drain screw** and is used to find the grease drain option.
	Indicates the **air outlet screw**.
	Caution: Risk of burns due to hot surface.
	Caution: Removing the dipstick during operation may result in damage to the gear unit.
	Caution: Risk of burns due to hot gear oil.

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

Meaning
The brake is not set at the factory.

VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE

SEW EURODRIVE

18855199

(DE) **Die Bremse ist ab Werk nicht eingestellt.**
Mögliche Sachschäden!
- Bremse vor der Inbetriebnahme gemäß Betriebsanleitung einstellen

(EN) **The brake has not been set at the factory**
Potential damage to property!
- Prior to startup, set the brake according to the operating instructions.

(F) **Le frein n'est pas réglé d'usine.**
Risque de dommages matériels !
- Avant la mise en service, régler le frein conformément aux instructions de la notice d'exploitation.

(ES) **El freno no viene ajustado de fábrica.**
¡Posibles daños materiales!
- Antes de la puesta en marcha, ajustar el freno según las instrucciones de funcionamiento.

(NL) **De rem is niet af fabriek ingesteld.**
Mogelijke materiële schade!
- Rem voor de inbedrijfstelling conform technische handleiding instellen.

(PL) **Hamulec nie jest ustawiony fabrycznie.**
Możliwe szkody materialne!
- Przed uruchomieniem należy ustawić hamulec zgodnie z wytycznymi z instrukcji obsługi.

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The coupling is delivered without grease.

VORSICHT NOTICE ATTENTION PRECAUCIÓN VOORZICHTIG OSTROŻNIE

SEW EURODRIVE

18977405

(DE) **Kupplung wird ohne Fett geliefert.**
Mögliche Sachschäden!
- Vor der Inbetriebnahme Kupplung mit Fett befüllen.

(EN) **Coupling delivered without grease**
Possible damage to property.
- Fill coupling with grease prior to startup.

(F) **L'accouplement est livré sans graisse.**
Risque de dommages matériels !
- Avant la mise en service, remplir l'accouplement de graisse.

(ES) **El acoplamiento se suministra sin grasa.**
¡Posibles daños materiales!
- Llenar el acoplamiento con grasa antes de la puesta en marcha.

(NL) **Koppeling wordt zonder vet geleverd.**
Mogelijke materiële schade!
- Koppeling vóór de inbedrijfstelling met vet vullen.

(PL) **Sprzęgło jest dostarczane bez smaru.**
Możliwe szkody materialne!
- Przed uruchomieniem należy napełnić sprzęgło smarem.

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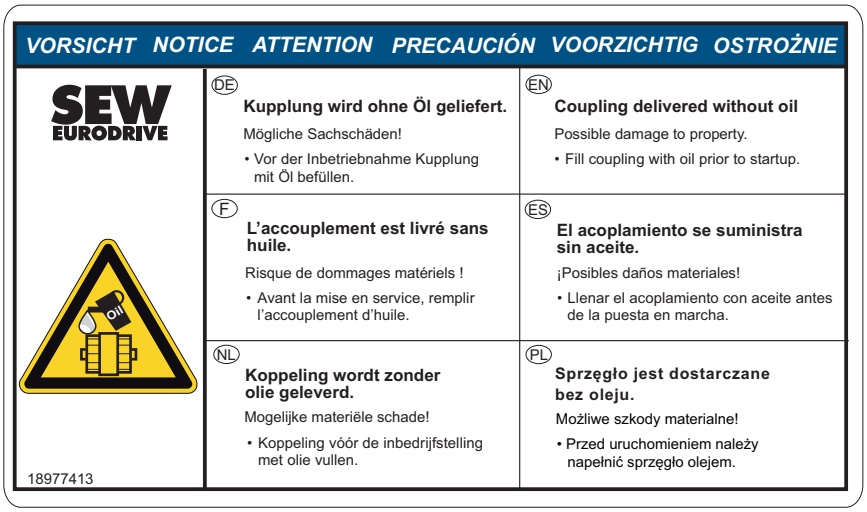
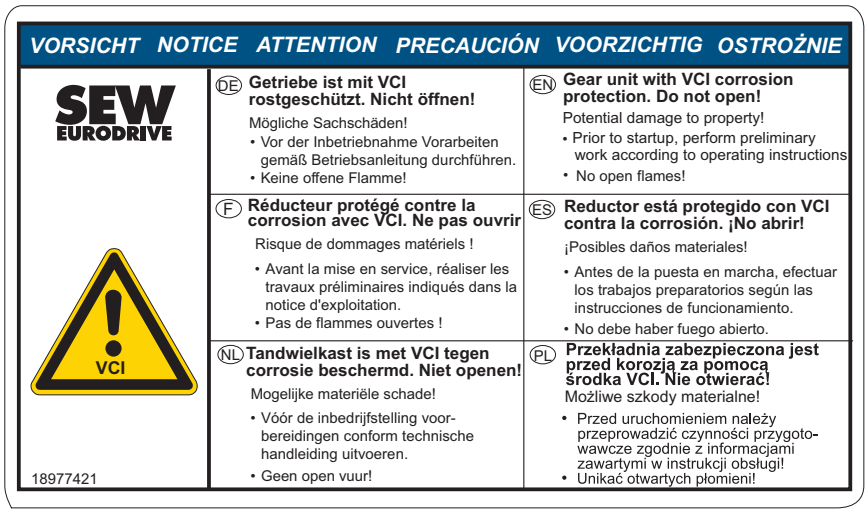
Meaning
The coupling is delivered without oil.  *9007204571876363*
The gear unit is protected against corrosion with VCI.  *9007204570575499*

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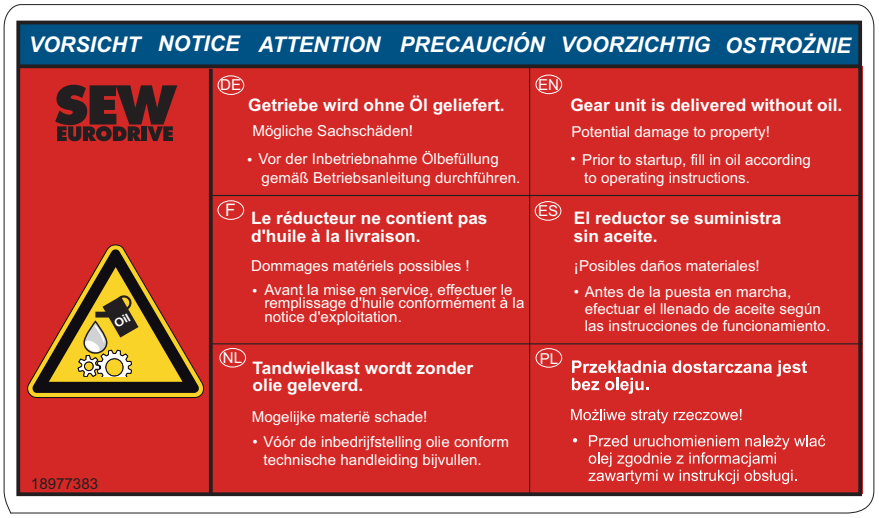
Meaning

The gear unit is delivered without oil.



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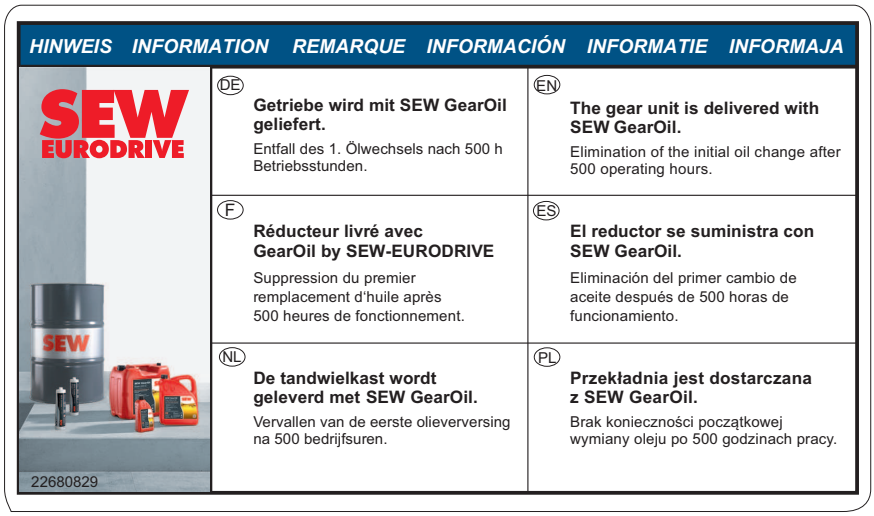
The gear unit is delivered with SEW GearOil.



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2.6 Symbols on the dimension sheet

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

Symbols	Meaning
	Indicates the **oil filling location**.
	Indicates the **oil drain**.
	Indicates the position of the **breather**.
	Indicates the position of the **inspection cover**.
	Indicates the position of the attachment points for **transport**.
	Indicates the position of the **oil dipstick**.
	Indicates the position of the **oil level glass**.
	Indicates the position of the **oil sight glass**.
	Indicates the position of the **relubrication points**.
	Indicates the position of the **relubrication points**.
	Indicates the position of the **grease outlet**.
	Indicates the **water supply** with connection dimensions.
	Indicates the **water return** with connection dimensions.
	Indicates the **oil supply**.
	Indicates the **oil return**.
	Indicates the position of the **magnetic screw plug**.
	Indicates the position of the **torque bracket**.
	Indicates the position of the operator's **vibration sensor** with connection dimensions.
	Indicates the position of the **oil heater**.

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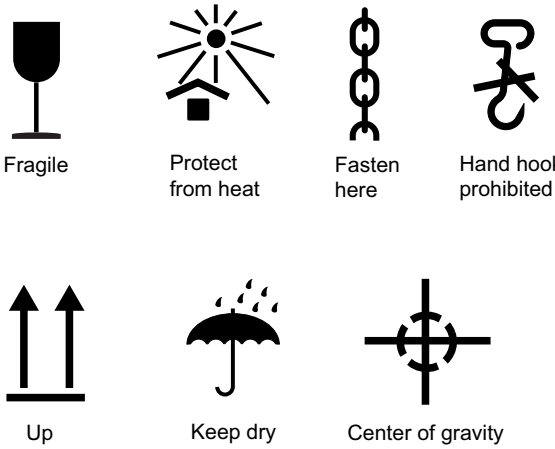
2.7 Symbols on the packaging

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



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2.8 Transport

2.8.1 General information

Observe the following information during transport:

⚠ WARNING

Suspended loads can fall.

Severe or fatal injuries.

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

⚠ WARNING

Lifted loads may fall over.

Severe or fatal injuries.

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

⚠ CAUTION

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

Potential risk of crushing due to falling parts.

- Secure the mount-on components.

⚠ CAUTION

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

Minor injuries.

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

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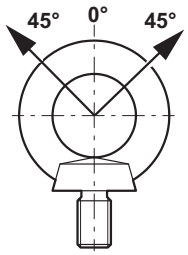
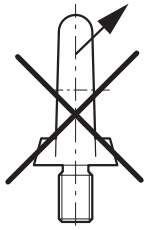
NOTICE

Improper transport may cause damage to the gear unit.

Possible damage to property.

- Observe the following information.

- Inspect the shipment for any possible transport damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. In the event of damage, do not start up the gear unit.
- The weight of the gear unit (without oil) is indicated on the nameplate or on the dimension sheet. Observe the loads and specifications given on the nameplate.
- If possible, transport the gear unit without oil fill. If this is not possible, note that the weight indicated on the nameplate refers only to the gear unit without oil fill, and replace the breather with a screw plug.
- The gear unit must be transported in a manner that prevents damage to the gear unit and to attached components. For example, impacts against exposed shaft ends can damage the gear unit.
- Use only the prescribed attachment points [1] to transport the gear unit (see order documents). The load suspensions of the motor or attached components are provided for stabilization purposes only.
- For gear units with a fan, the specified attachment points [1] might be inaccessible because of the fan guard. In this case, remove the fan guard before transporting the gear unit. Before taking the fan into operation, make sure the fan guard is mounted properly.
- The lifting eyebolts must be screwed in completely and must be flush with the contact surface. Tighten the lifting eyebolts at least hand-tight. Observe the following note.

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

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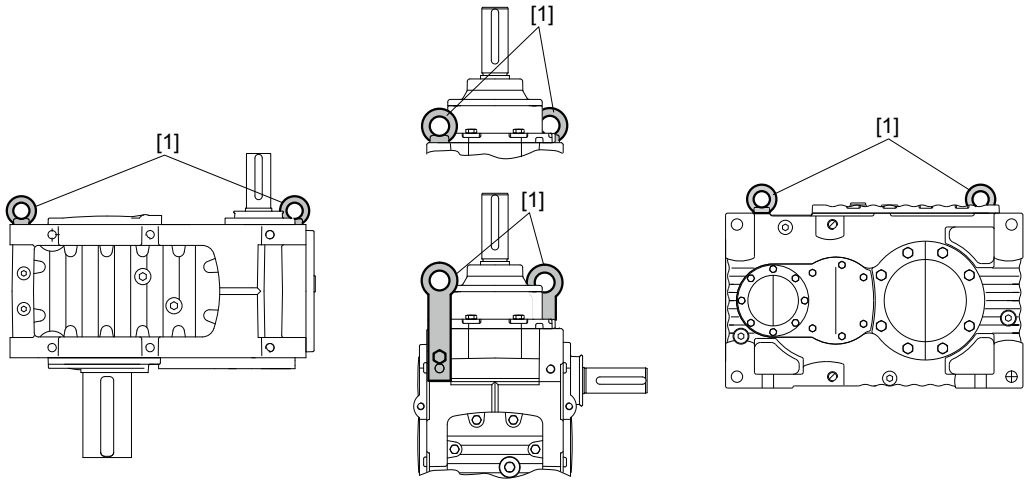
2.8.2 Standard

The following figure illustrates how to transport the gear unit.



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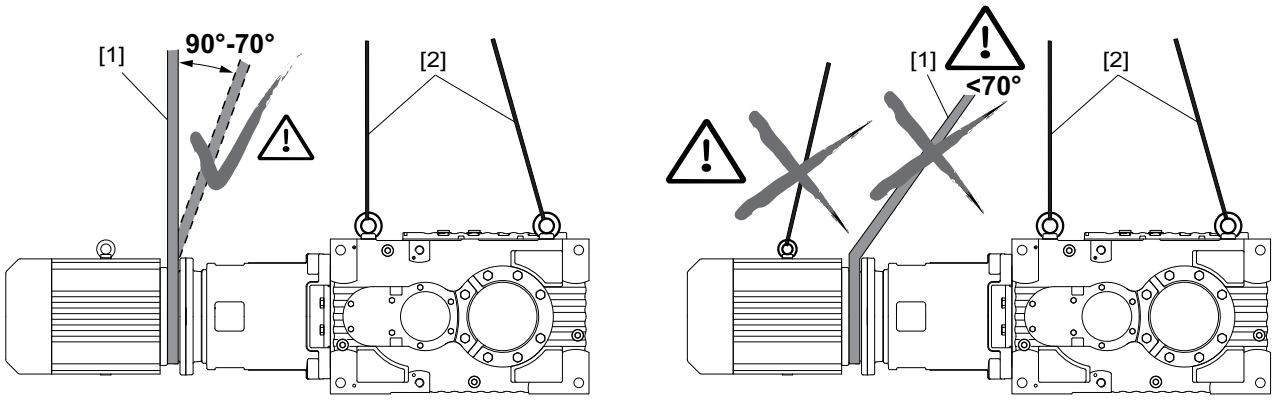
2.8.3 Gear units with motor adapter

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



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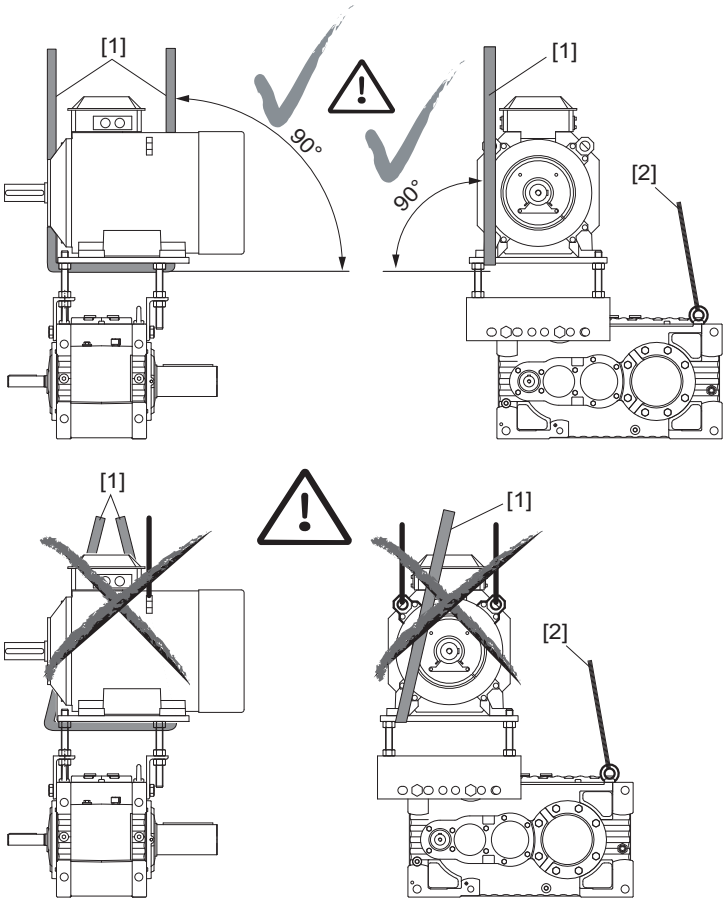
2.8.4 Gear units with V-belt drive

The gear units must only be transported at an angle of 90° (vertical) using lifting straps [1] and lifting ropes [2]. The eyebolts on the motor must not be used for transport.

The following figures illustrate how to transport the gear unit.



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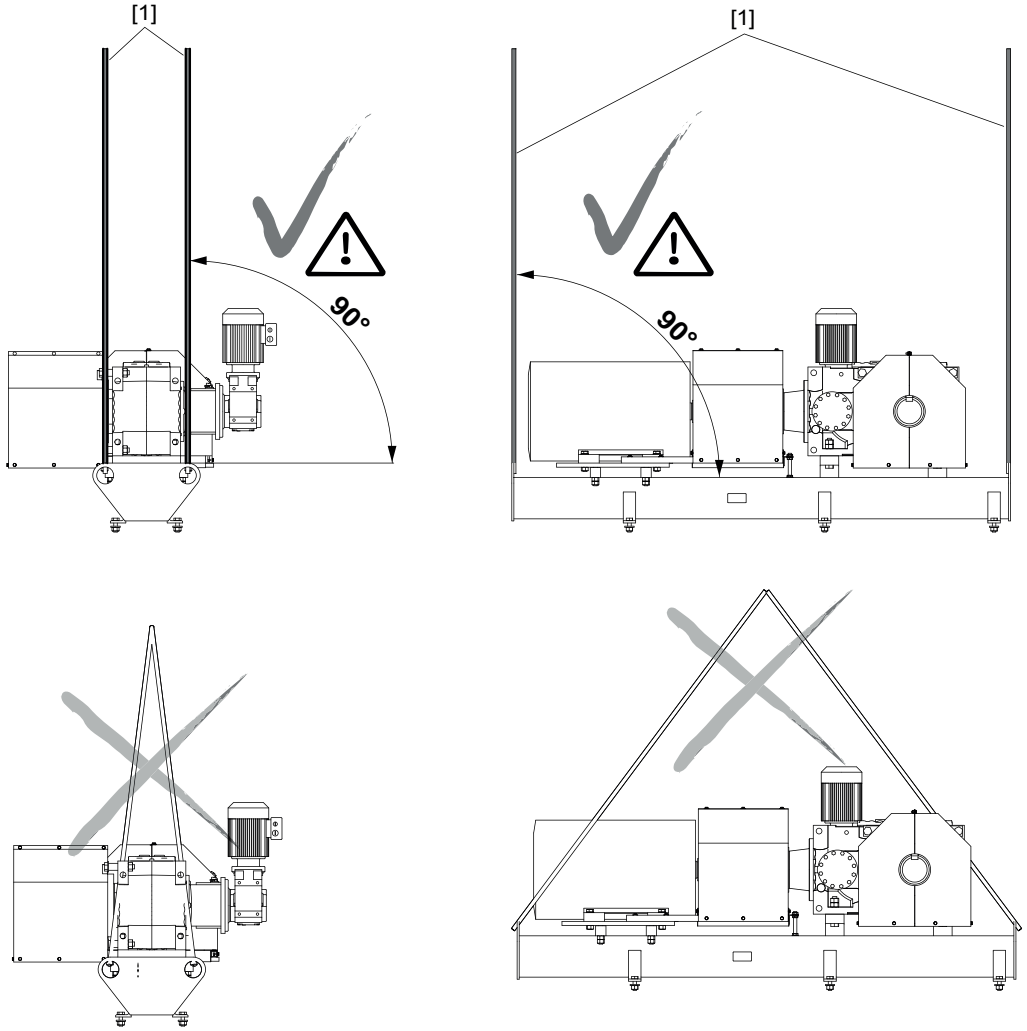
2.8.5 Transporting on a base plate

Gear units on a base frame may only be transported with lifting ropes [1] or chains (90° angle) vertically secured to the base frame:



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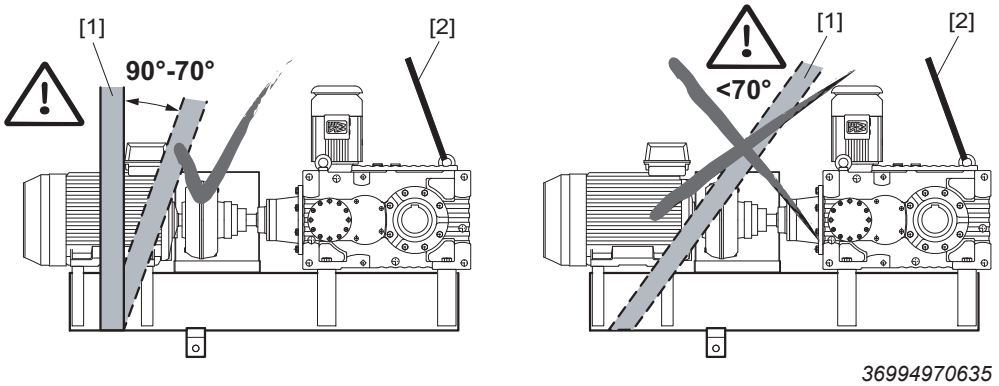
2.8.6 Transporting on swing base

Gear units on a swing base may only be transported using lifting belts [1] and lifting ropes [2] at an angle of 90° (vertical) to 70°.



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2.9 Storage and transport conditions

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

2.9.1 Internal preservation

Standard preservation

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

Long-term preservation

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

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

2.9.2 Exterior preservation

The following measures are taken for exterior preservation:

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

2.9.3 Packaging

Standard packaging

The gear unit is delivered on a pallet without cover.

Use: transport by truck or rail

Long-term packaging

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

Use: transport by ship and/or extended storage

2.9.4 Storage conditions

Improper storage may result in damage to the gear unit. Observe the following information to prevent damage to the gear unit:

- While in storage until startup, the gear unit must be stored in a shock-free manner to prevent damage to the rolling bearing races.

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- Only fill gear units with oil up to the uppermost rolling element. This ensures a remaining air volume for the oil to expand in case of higher temperatures. Add VCI Anticorit to the oil and tightly seal the gear unit (replace the breather with a screw plug).
- The permissible storage temperature is -30 °C to +50 °C.
- When storing in tropical areas, ensure adequate protection against insect damage. Contact SEW-EURODRIVE in case of deviating requirements.

The gear unit is delivered without any oil filling as standard; different protection systems are required depending on the storage period and storage conditions as shown in the following table:

Preservation + packaging	Storage location	Storage duration
Standard preservation + Standard packaging	• Under roof and enclosed at constant temperature and humidity (5 °C < ϑ < 60 °C, < 50% relative humidity) • No sudden temperature variations and controlled ventilation with filter (free of dirt and dust) • No aggressive vapors or shocks	Maximum 6 months with intact surface protection
Long-term preservation + Standard packaging	• Under roof and enclosed at constant temperature and humidity (5 °C < ϑ < 60 °C, < 50% relative humidity) • No sudden temperature variations and controlled ventilation of the storage room with filter (free of dirt and dust) • No aggressive vapors or shocks	Maximum 3 years with regular inspection and checking for intactness
Long-term preservation + Long-term packaging	• Covered, protection against rain, vibration-free	Maximum 3 years with regular inspection and checking for intactness

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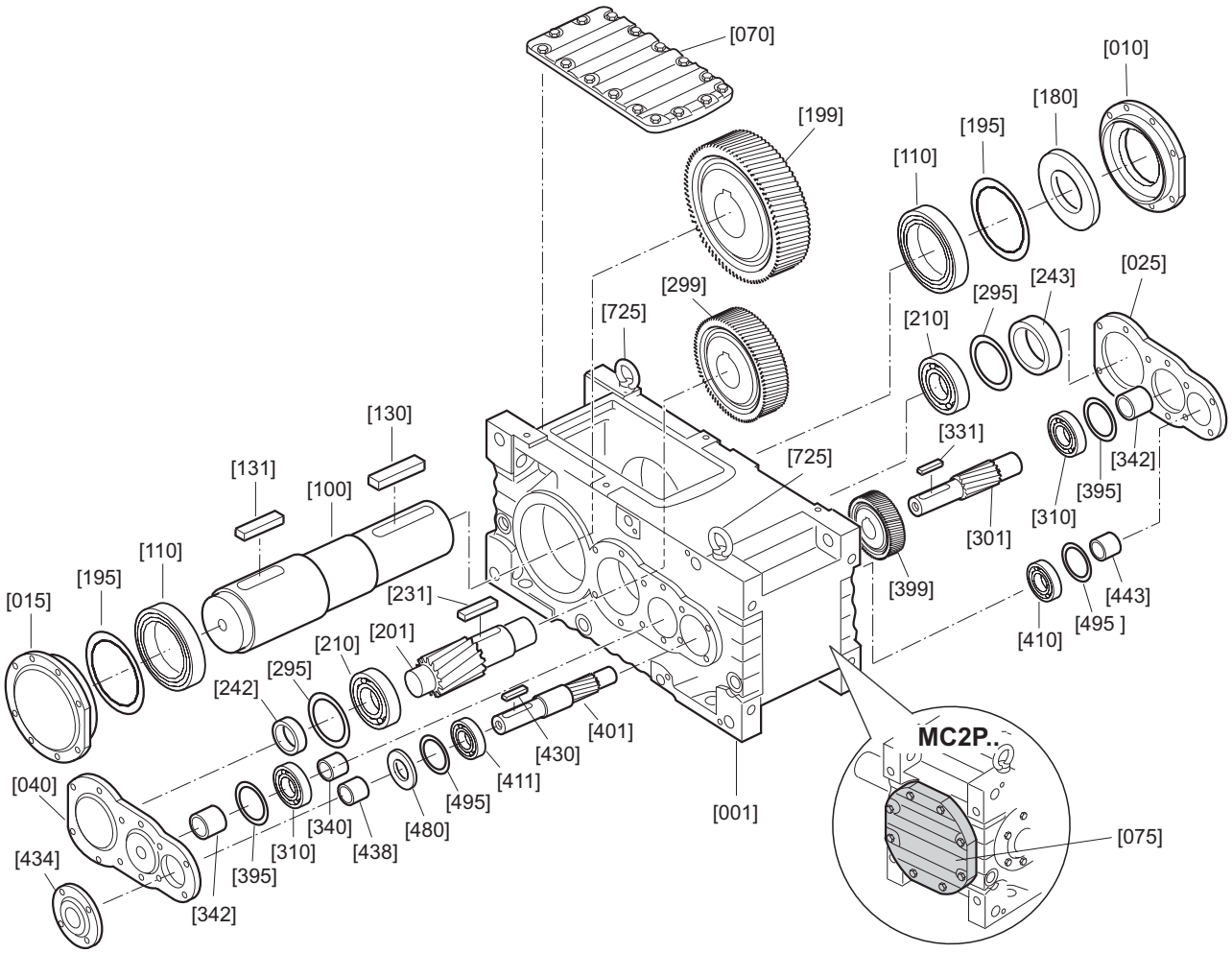
3 Gear unit structure

INFORMATION

The following illustrations allow to easily assign components to the spare parts lists. Discrepancies are possible depending on the gear unit size and version.

3.1 Basic structure of industrial gear units of the MC..P.. series



Basic structure of industrial gear units of the MC..P.. series

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[099] Gear unit housing	[131] Key	[299] Gear wheel	[410] Bearing
[8010] Bearing cover	[180] Oil seal	[301] Pinion shaft	[411] Rolling bearing
[8015] Bearing cover	[195] Shim	[310] Bearing	[430] Key
[8025] Bearing cover	[199] End gear	[331] Key	[434] Cover
[8040] Bearing cover	[201] Pinion shaft	[340] Spacer tube	[438] Socket contact
[8070] Gear unit cover	[210] Bearing	[342] Spacer tube	[443] Spacer bushing
[8075] Cover plate	[231] Key	[395] Shim	[480] Oil seal
[100] Output shaft	[242] Spacer tube	[399] Gear wheel	[495] Shim
[110] Bearing	[243] Spacer tube	[401] Input shaft	[725] Lifting eyebolt
[130] Key	[295] Shim		

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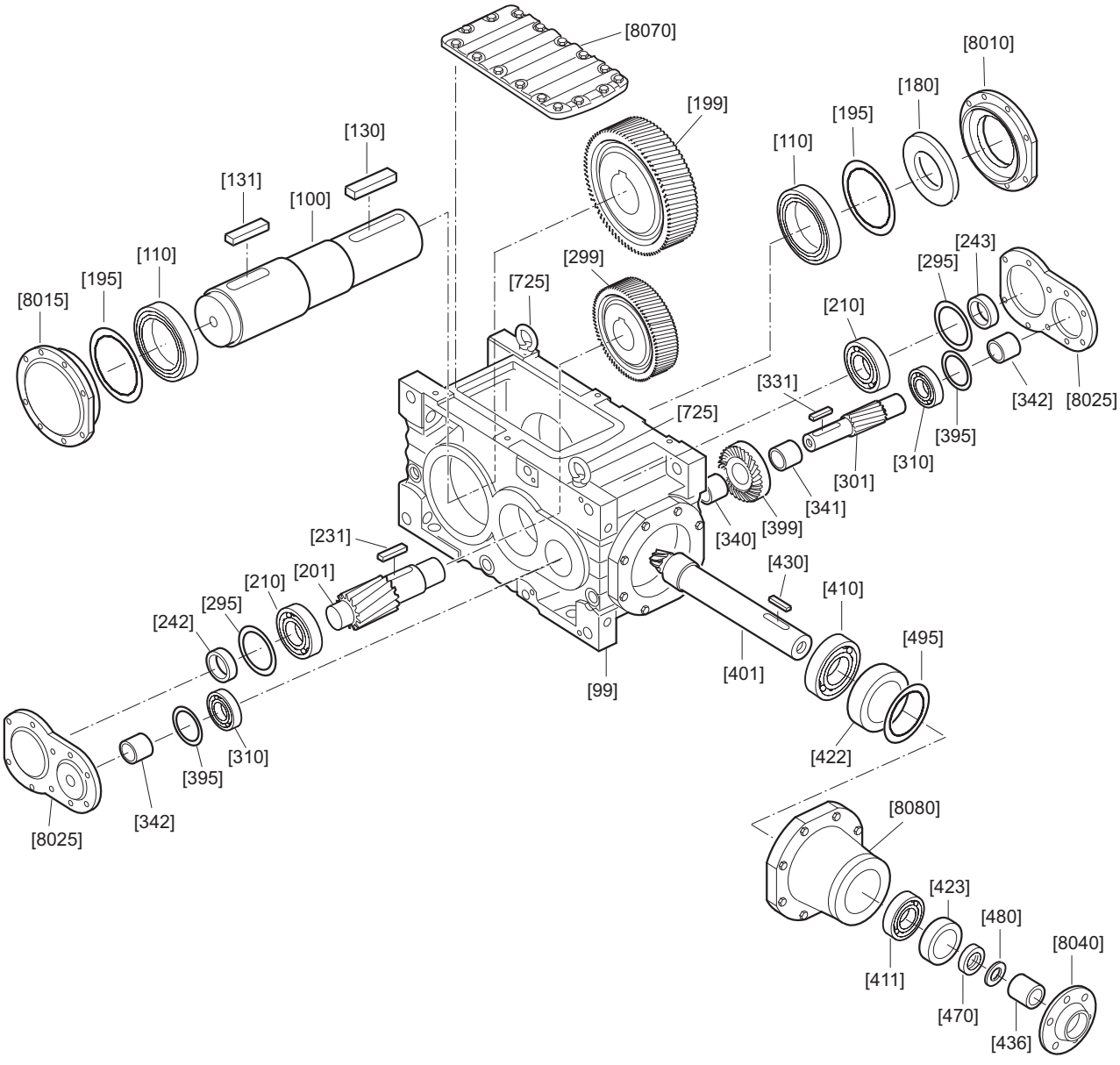
3.2 Basic structure of industrial gear units of the MC..R.. series



Basic structure of industrial gear units of the MC..R.. series

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[099]	Gear unit housing	[131]	Key	[299]	Gear wheel	[410]	Bearing
[8010]	Bearing cover	[180]	Oil seal	[301]	Pinion shaft	[411]	Bearing
[8015]	Bearing cover	[195]	Shim	[310]	Bearing	[422]	Bearing sleeve
[8025]	Bearing cover	[199]	End gear	[331]	Key	[423]	Bearing sleeve
[8040]	Cover	[201]	Pinion shaft	[340]	Spacer tube	[430]	Key
[8070]	Gear unit cover	[210]	Bearing	[341]	Spacer tube	[436]	Bushing
[8075]	Bearing cover	[231]	Key	[342]	Spacer tube	[470]	Clamping nut
[100]	Output shaft	[242]	Spacer tube	[395]	Shim	[480]	Oil seal
[110]	Bearing	[243]	Spacer tube	[399]	Bevel gear	[495]	Shim
[130]	Key	[295]	Shim	[401]	Bevel pinion shaft	[725]	Lifting eyebolt

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3.3 Type designation

The following example shows the structure of the type designation:

MC2RLSF05	
MC	Industrial gear unit series
2	Number of gear unit stages • 2 = 2 stages • 3 = 3 stages
R	Gear unit design • R = Bevel-helical gear unit • P = Helical gear unit
L	Mounting position • L = Horizontal • V = Vertical • E = Upright
S	Application • S = Solid shaft • H = Hollow shaft (key or shrink disk connection)
F	Gear unit mounting • F = Foot mounting • T = Torque arm
05	Gear unit sizes • 02 – 09

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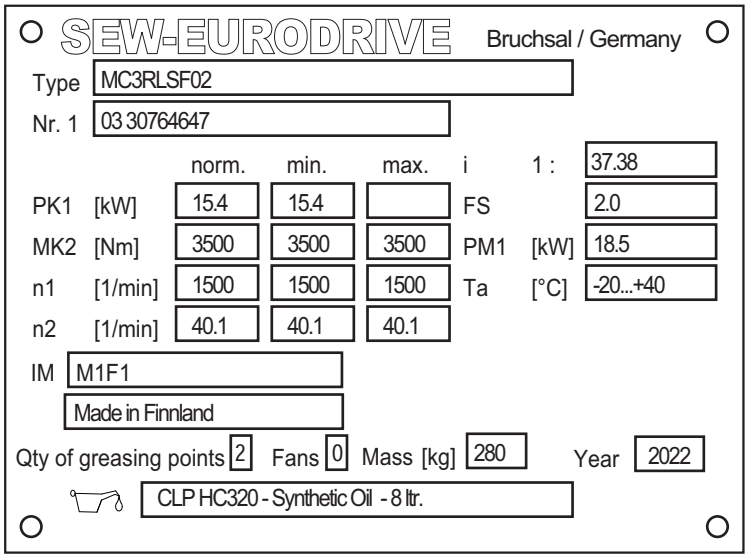
3.4 Nameplate

3.4.1 Nameplate of the industrial gear units of the MC.. series, SEW-EURODRIVE



25351018123

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 points that require relubrication
Fan		Number of installed fans
		Oil grade and viscosity class/oil quantity
Year		Year of manufacture
IM		Mounting position and mounting surface

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3.5 Mounting positions

The following features uniquely define the mounting position and corresponding design of MC.. series gear units:

- Mounting surface (F1...F6) → Chapter 3.5
- Housing position (M1...M6) → Chapter 3.6

In addition, the shaft position (0...4) must be defined → Chapter 3.7.

The "horizontal output shaft (L)", "vertical output shaft (V)" and "upright mounting (E)" gear unit designs refer to the housing position.

3.5.1 Symbols used

The following table contains the symbols used in the following illustrations and explains their meaning.

Symbol	Meaning
	Breather plug
	Inspection opening
	Oil dipstick
	Oil drain plug
	Oil filling plug
	Oil sight glass
	Air outlet screw

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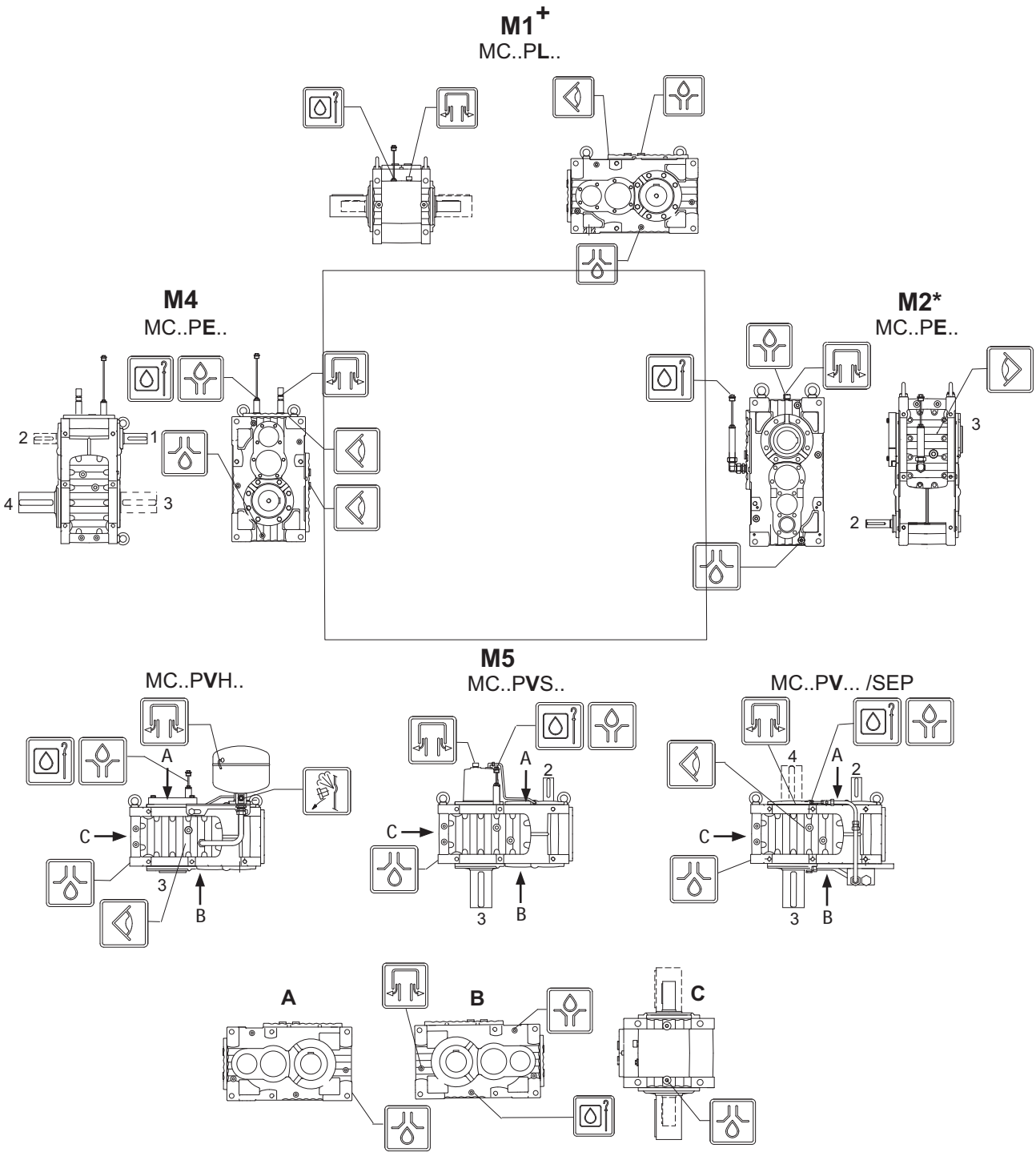
3.5.2 Mounting positions of MC.P.. gear units



* = Non-standard mounting position / housing position. The positions of the heater, dipstick and oil drain plug are only examples. Refer to the order-specific dimension drawing.

\+ = In horizontal mounting position, the oil drain plug is always installed on the opposite side of the output shaft.

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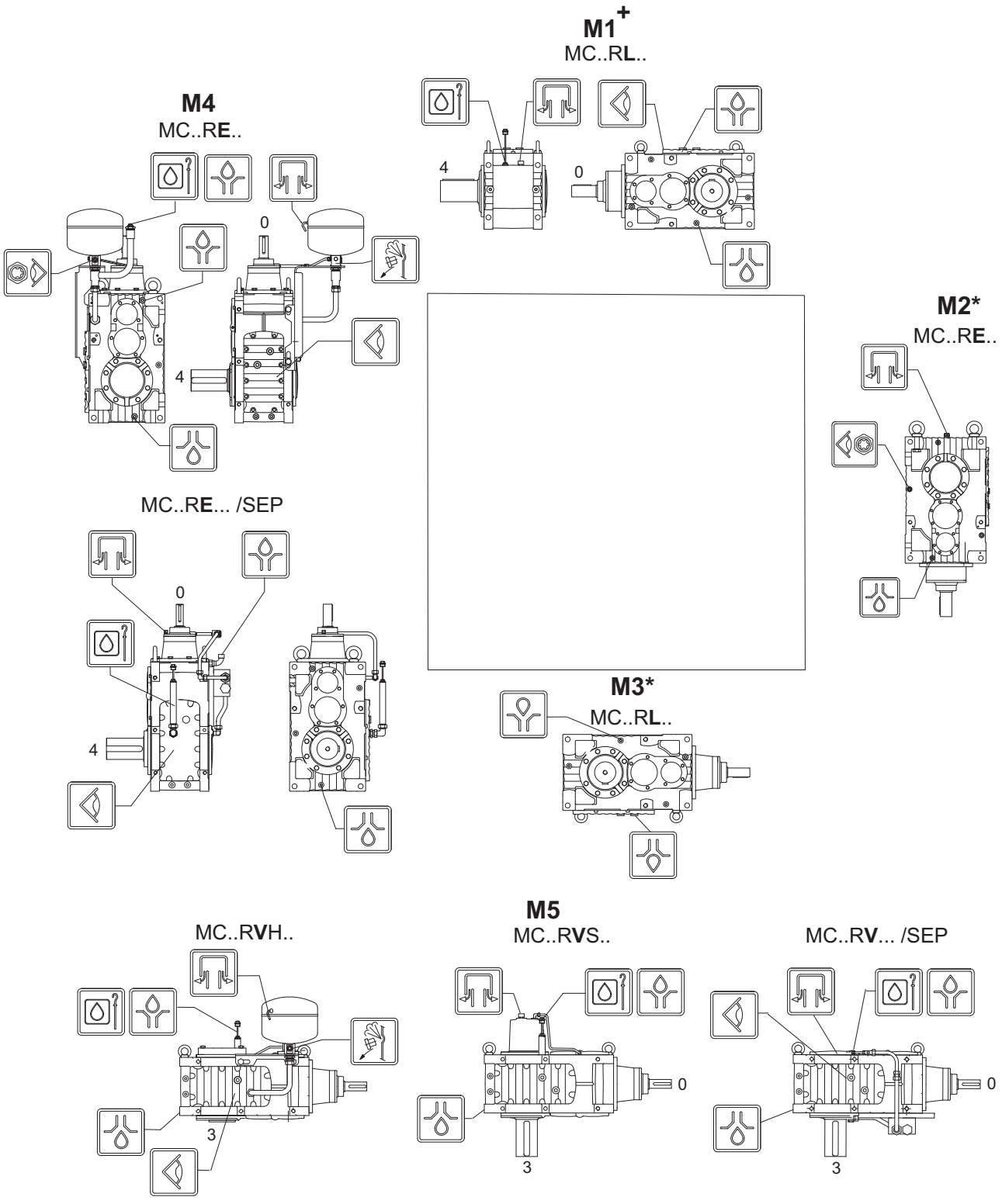
3.5.3 Mounting positions of MC.R.. series industrial gear units



25761402379

* = Non-standard mounting position / housing position. The positions of the heater, dipstick and oil drain plug are only examples. Refer to the order-specific dimension drawing.

\+ = In horizontal mounting position, the oil drain plug is always installed on the opposite side of the output shaft.

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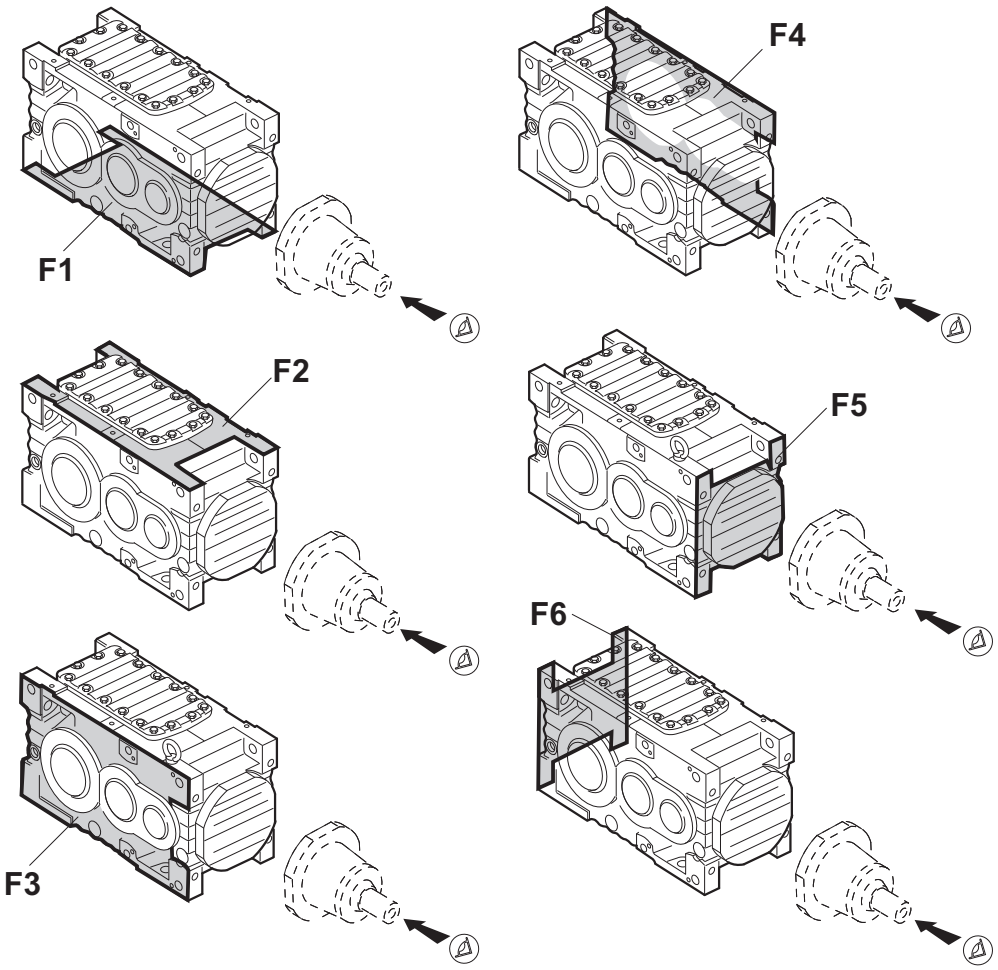
3.6 Mounting surface

3.6.1 Definition

The mounting surface is defined as the surface(s) of the foot or flange mounted gear unit that the customer's machine is mounted on.

3.6.2 Designations

Six different mounting surfaces were defined (designation "F1" to "F6"):



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3.7 Housing position M1...M6

The housing position defines the spatial position of the housing and is designated with M1....M6.

Each housing position corresponds to a certain

- Gear unit design (L, V, E)
- Standard mounting surface (F1...F6)

The housing position is defined separately for

- Helical gear units MC.P..
- Bevel-helical gear units MC.R..

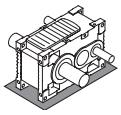
Unless specified otherwise, the standard **correlation** of

- Gear unit design
- Housing position, and
- Mounting surface

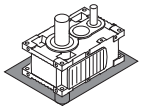
is as follows (for foot mounted gear units):

3.7.1 Standard assignment of gear unit design and mounting surface

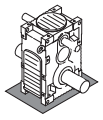
MC..PL: M1, F1



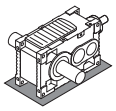
MC..PV: M5, F3



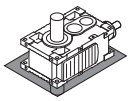
MC..PE: M4, F6



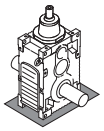
MC..RL: M1, F1



MC..RV: M5, F3



MC..RE: M4, F6



For gear units with a mounting flange on the output shaft, the standard position of the flange depends on the shaft position of the output shaft unless specified otherwise:

1. Shaft position 3 → LSS mounting flange F3
2. Shaft position 4 → LSS mounting flange F4

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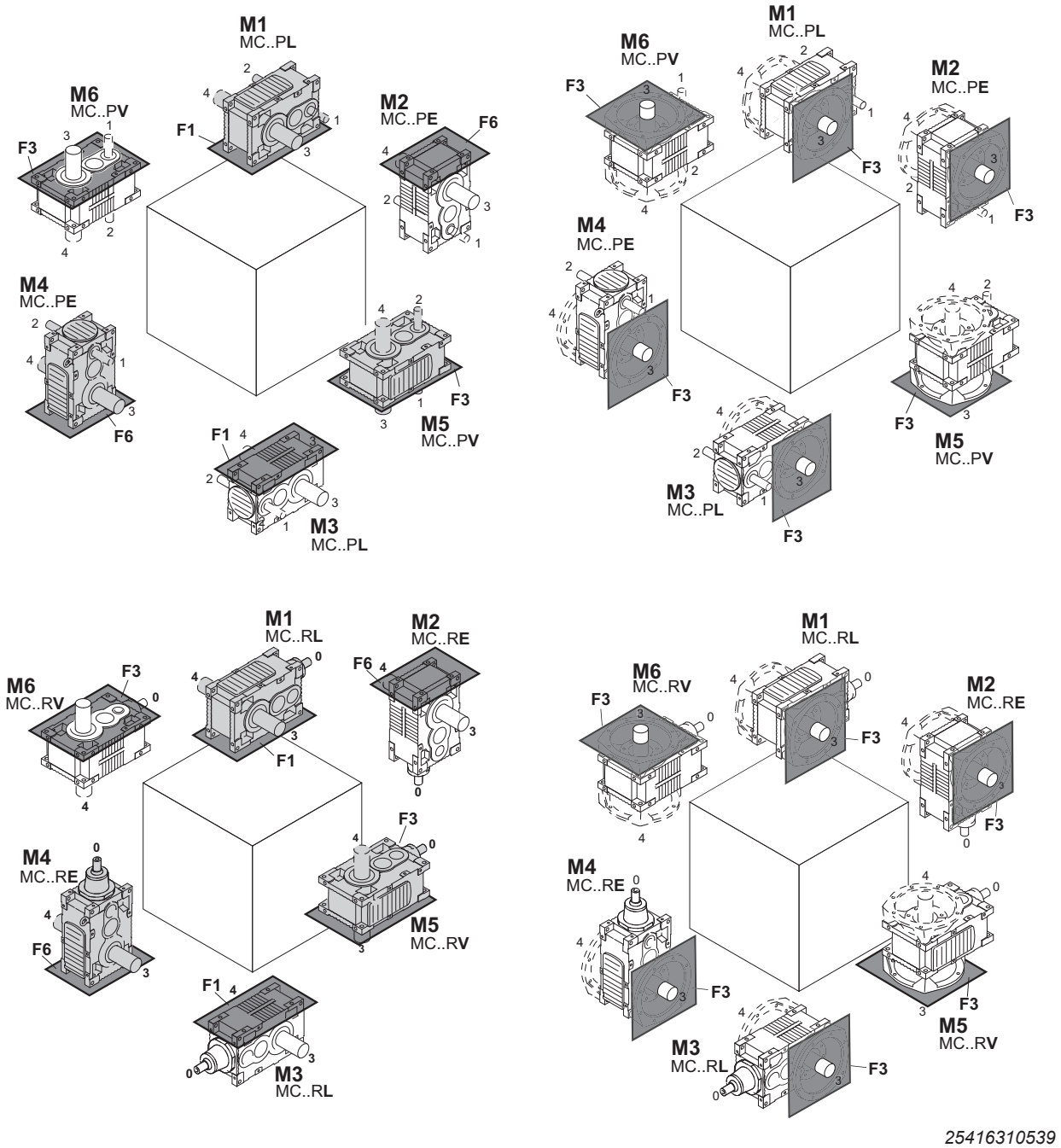
3.7.2 Housing position and standard mounting surface

The housing position and/or mounting surface must not deviate from the order.

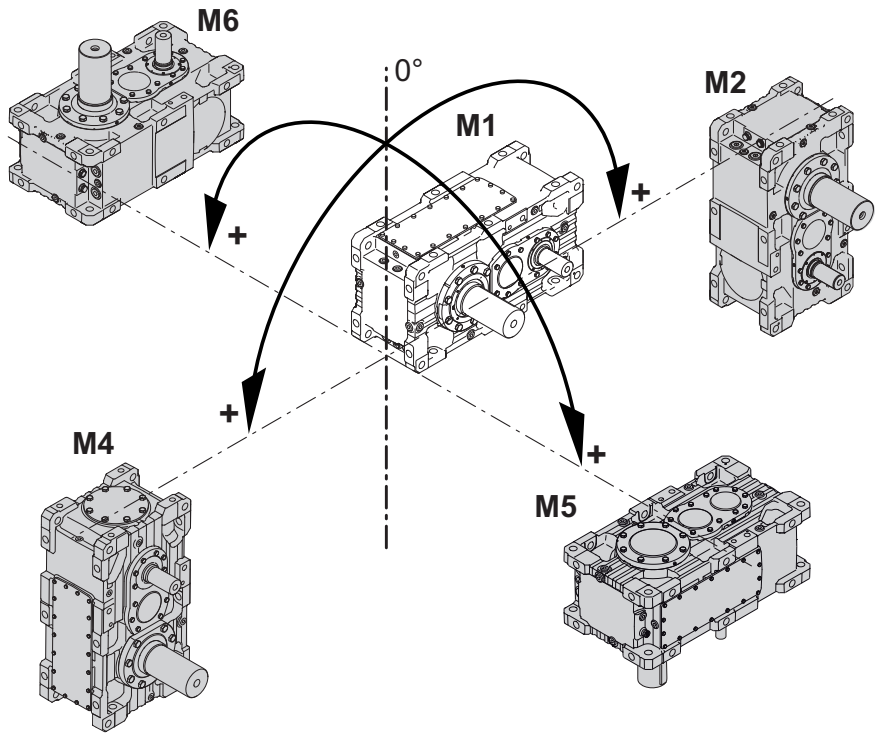
INFORMATION

- The gear units marked in gray are standard designs.
- Other mounting surfaces are possible in conjunction with a certain housing position. Refer to the order-specific dimension drawing.



3.8 Fixed and variable pivoted mounting positions

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



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3.8.1 Fixed pivoted mounting position

Definition:

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

Example:

The type designation is set up as follows:

M1-M4/9°

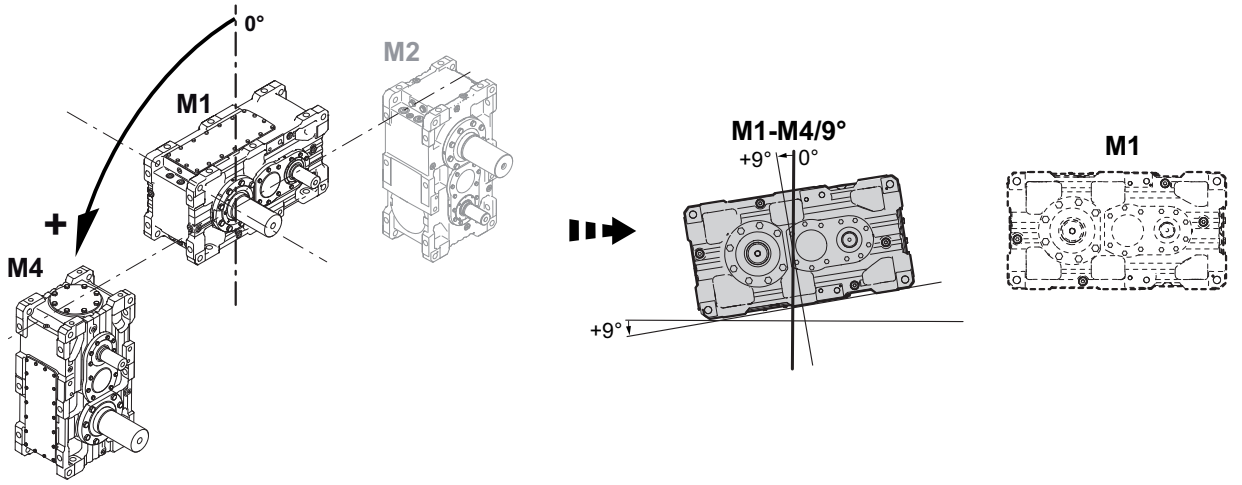
M1 = Initial mounting position

M4 = Pivoting direction

9° = Fixed pivoting angle

Pivoted from mounting position M1 to M4 by 9°

This results in the following fixed pivoted mounting position:



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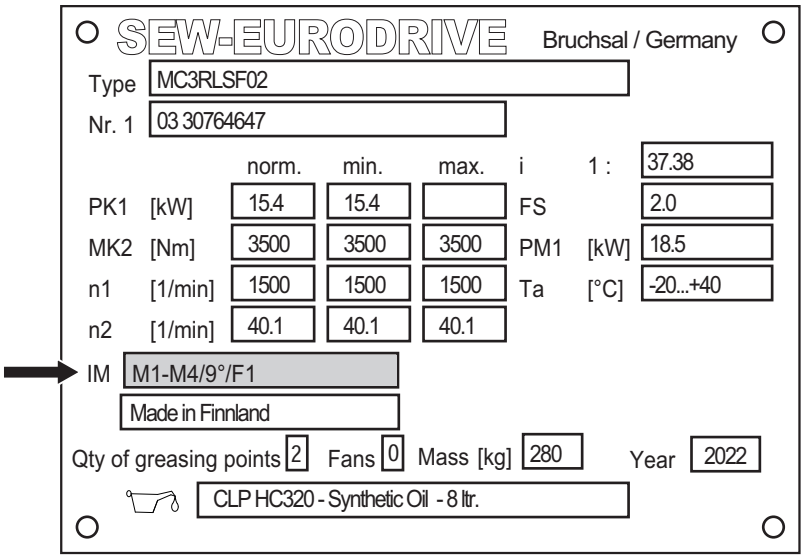
The oil level is checked in the selected fixed pivoted mounting position.

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



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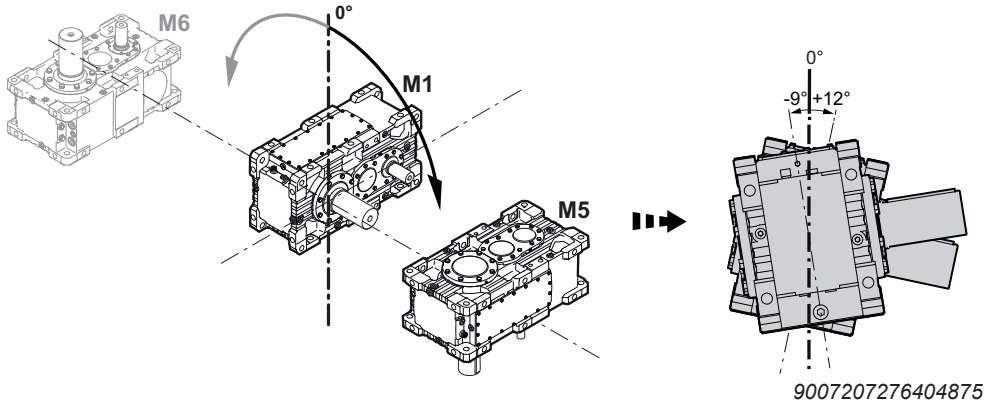
3.8.2 Variable pivoted mounting position

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°.



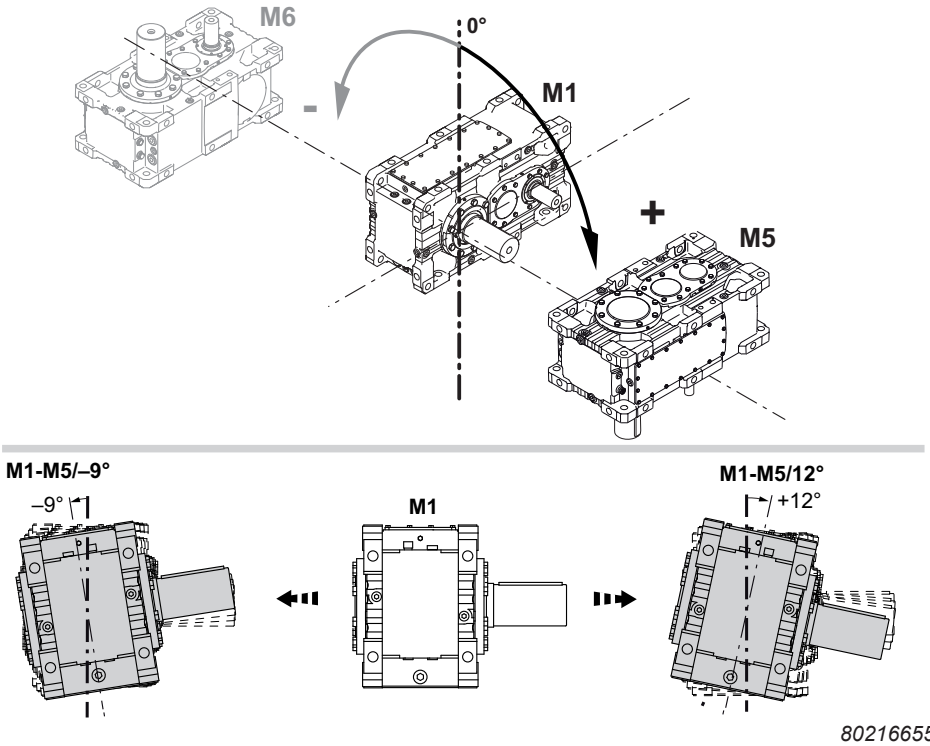
9007207276404875

Step 1:

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

12° → from M1 to M5, pivoted by +12°

9° → from M1 to M5, pivoted by –9°



8021665547

The type designation for this example is:

M1-M5/–9°...12°

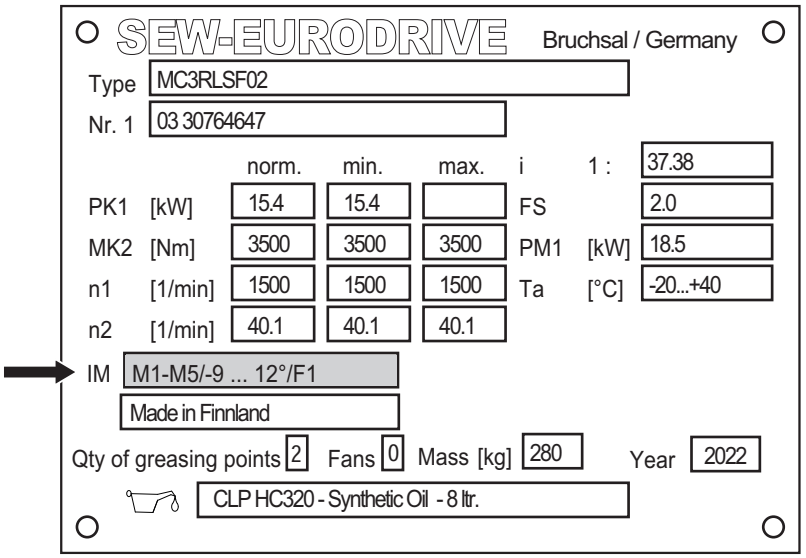
M1 = Initial mounting position

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:

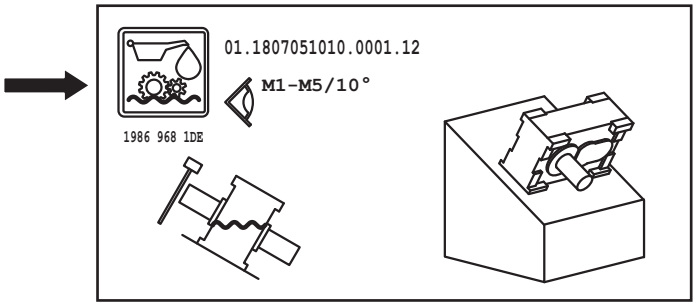


38319481995

Step 2:

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

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



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3.8.3 Combination of variable and fixed pivoted mounting positions

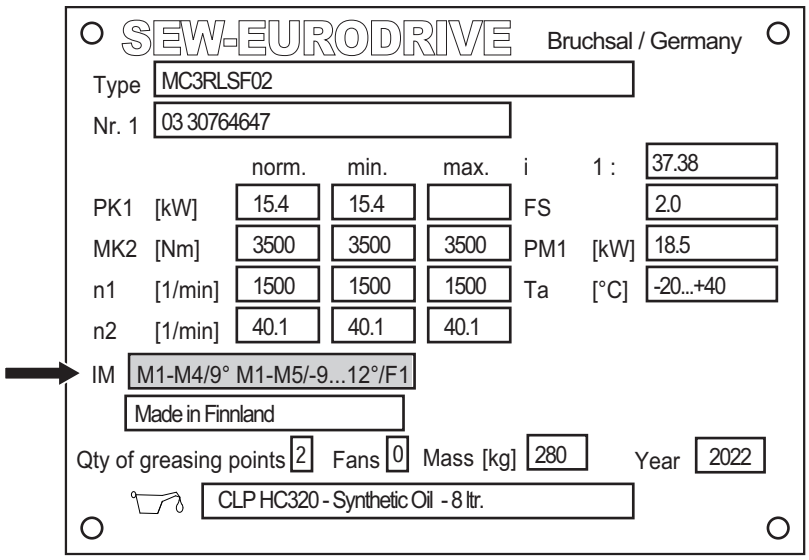
Fixed and variable pivoted mounting positions can be combined.

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	**M1**	= Initial mounting position
M4	= Pivoting direction	**M5**	= Pivoting direction
9°	= Fixed pivoting angle	**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:

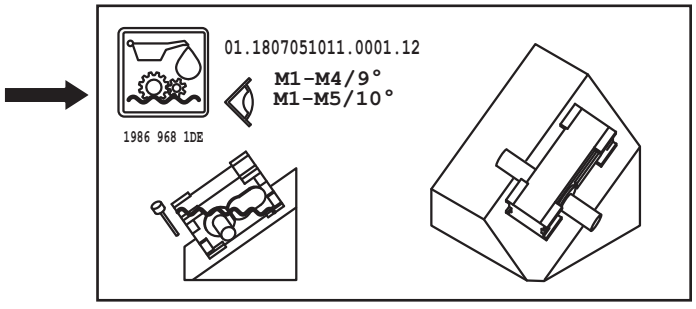


38323135883

When combining the fixed and variable pivoted mounting positions, 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 indicates the mounting position for checking the oil level.

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



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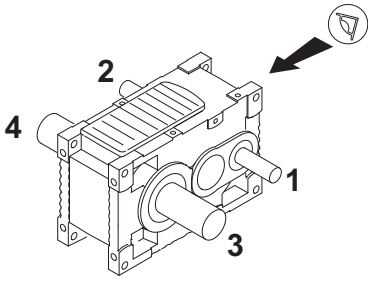
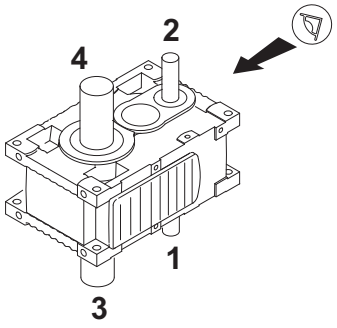
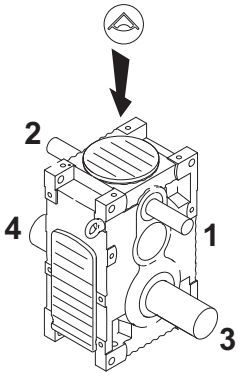
3.9 Shaft positions

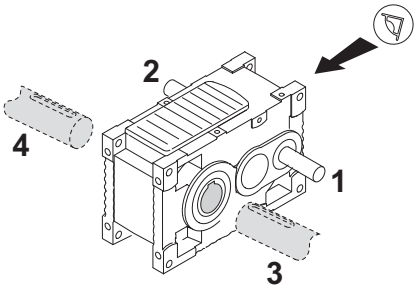
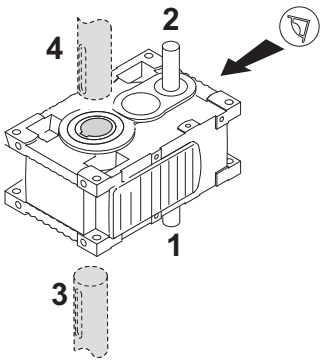
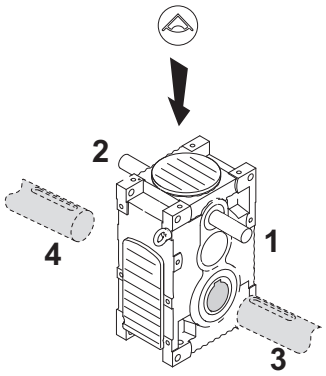
The shaft positions (0, 1, 2, 3, 4) and direction of rotation dependencies shown in the following figures apply to output shafts (LSS) in **solid and hollow shaft design**. For other shaft positions or for gear units with backstop, contact SEW-EURODRIVE.

The following shaft positions (0, 1, 2, 3, 4) are possible:

3.9.1 Shaft positions MC.P.S..

M1	Housing position M5	M4
Horizontal LSS (L)	Gear unit design vertical output shaft (V)	Upright mounted (E)
		

3.9.2 Shaft positions MC.P.H..

M1	Housing position M5	M4
Horizontal LSS (L)	Gear unit design vertical output shaft (V)	Upright mounted (E)
		

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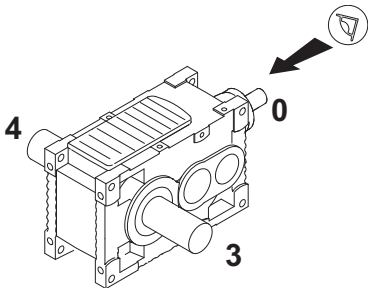
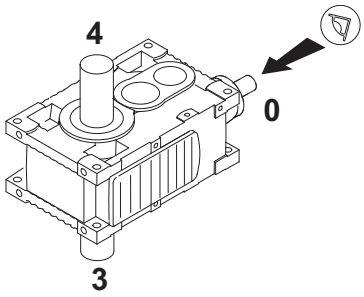
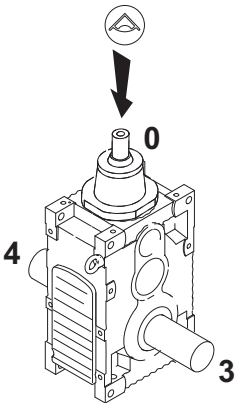
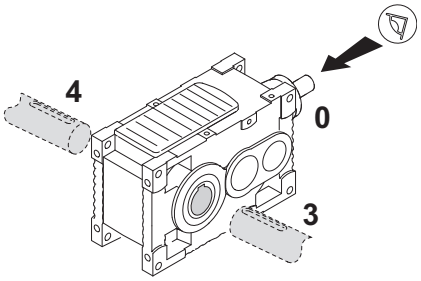
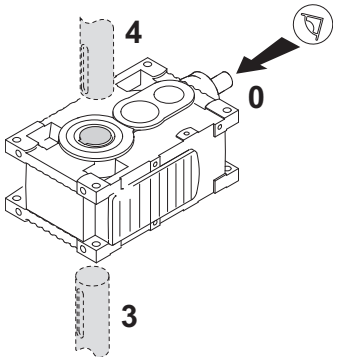
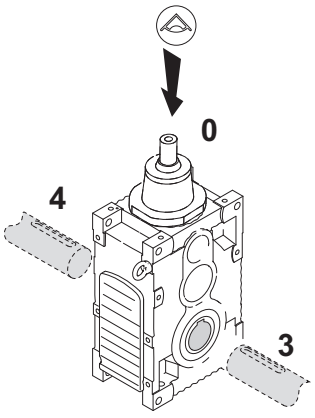
3.9.3 Shaft positions MC.R.S..

M1	Housing position M5	M4
Horizontal LSS (L)	Gear unit design vertical output shaft (V)	Upright mounted (E)
		

3.9.4 Shaft positions MC.R.H..

M1	Housing position M5	M4
Horizontal LSS (L)	Gear unit design vertical output shaft (V)	Upright mounted (E)
		

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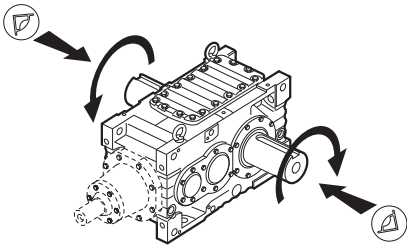
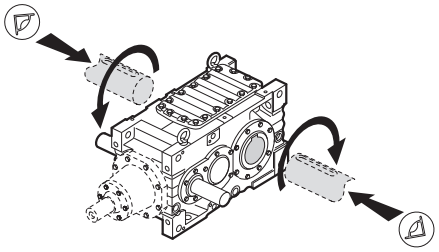
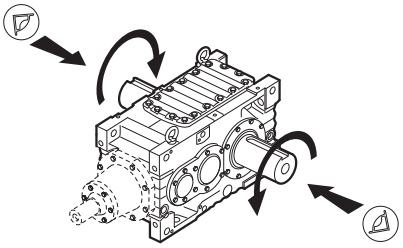
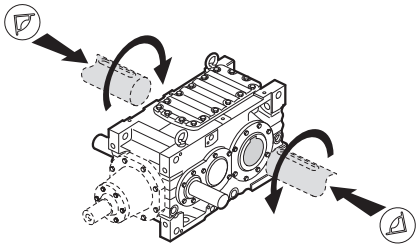
3.10 Direction of rotation

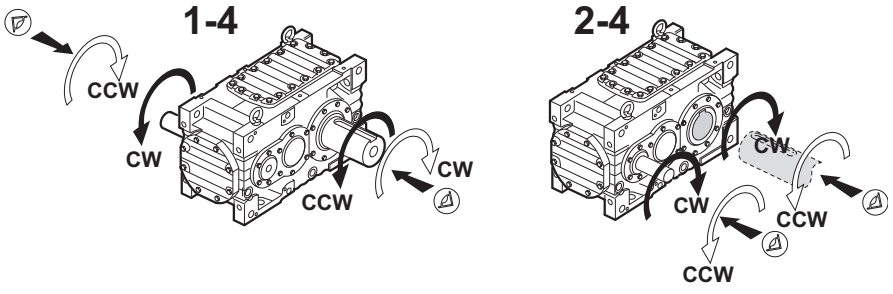
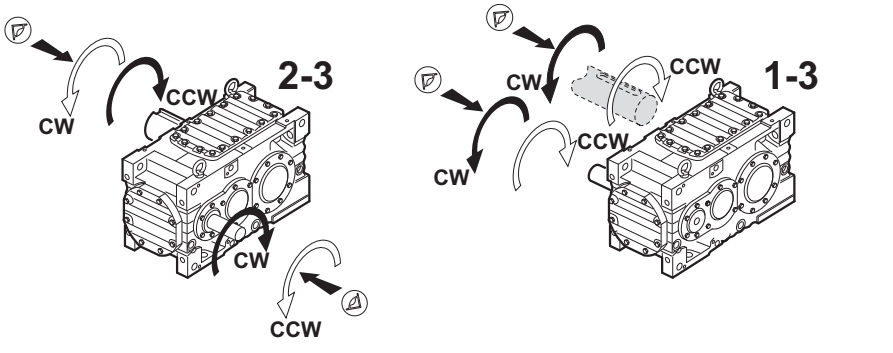
3.10.1 Directions of rotation

The directions of rotation of the outputs shaft (LSS) are defined as follows:

Direction of rotation	Gear unit design	
	MC.P.S.. MC.R.S..	MC.P.H.. MC.R.H..
Clockwise rotation (CW)		
Counterclockwise rotation (CCW)		

3.10.2 Shaft positions and corresponding directions of rotation of MC2P..

The following figures show shaft positions and corresponding directions of rotation for industrial gear units of the MC3P.. series.

2-stage



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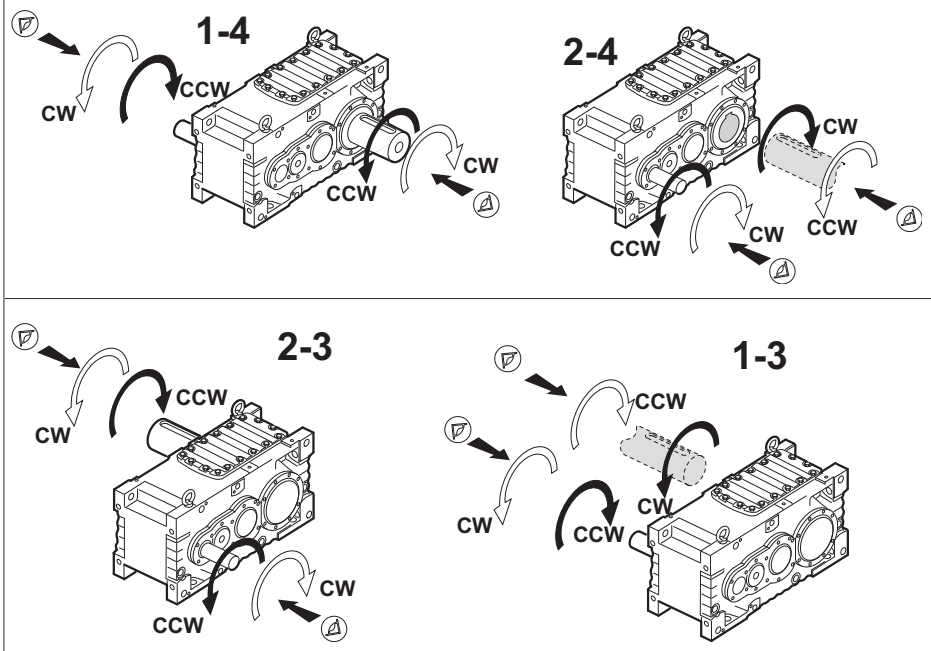
3.10.3 Shaft positions and corresponding directions of rotation of MC3P..

The following figures show shaft positions and corresponding directions of rotation for industrial gear units of the MC3P.. series.

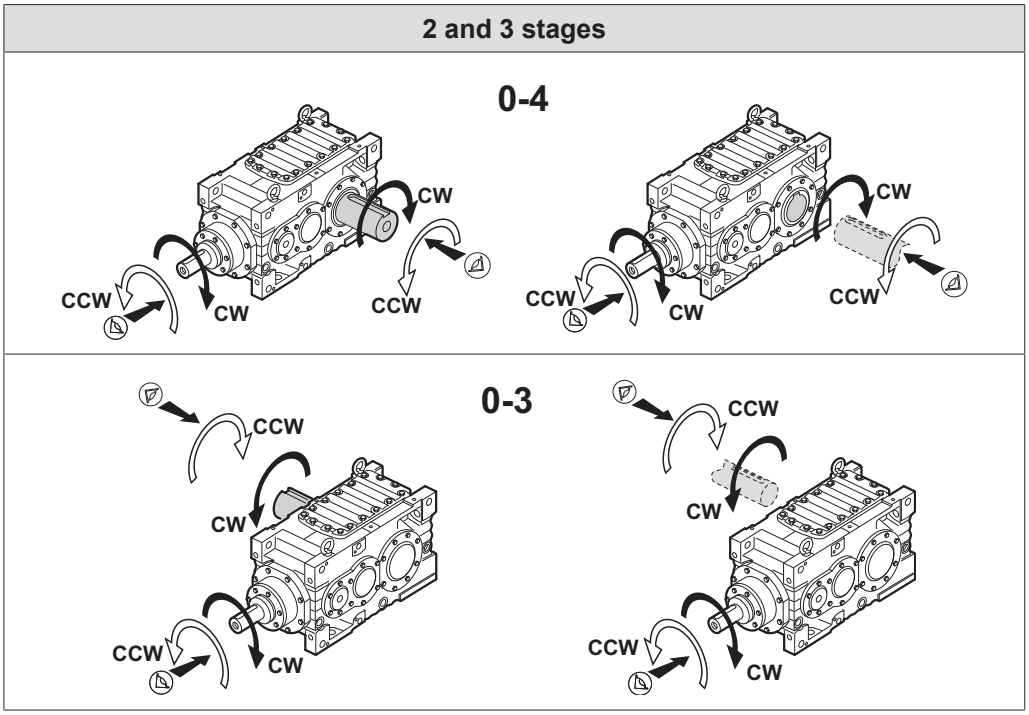
3-stage



3.10.4 MC.R.. without backstop shaft positions and direction of rotation dependencies

The following figures show shaft positions and direction of rotation dependencies for MC.R.. two- and three-stage series industrial gear units without backstop.

2 and 3 stages



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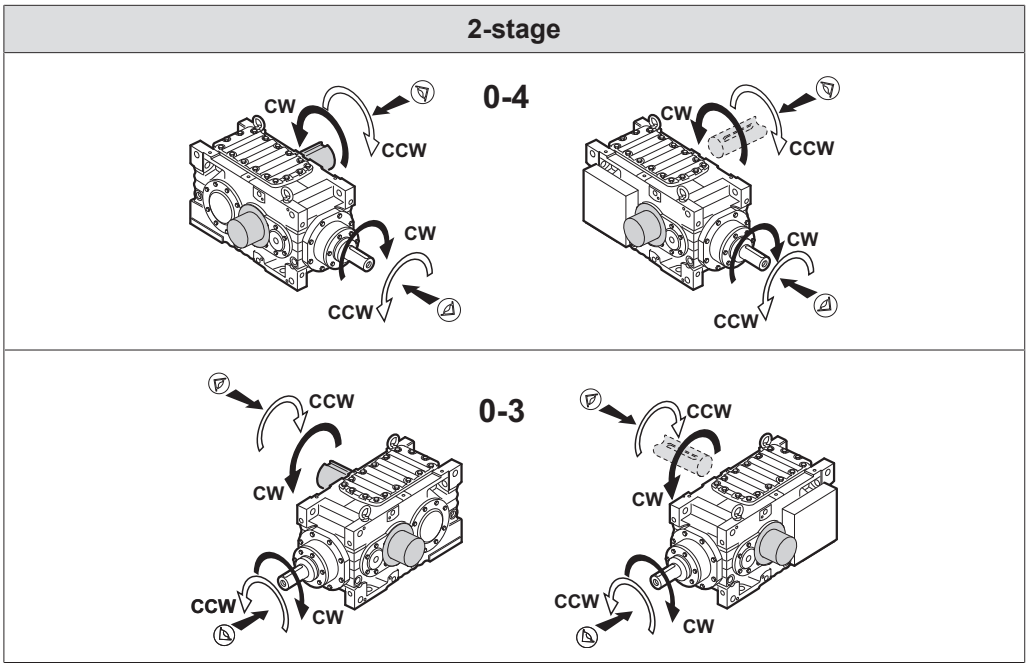
3.10.5 Shaft positions and direction of rotation dependencies MC2RS../MC2RH.. keyway with backstop

The following figures show the shaft positions and directions of rotation for 2-stage gear units with backstop of the types MC.RS.. and MC.RH.. with keyway.



INFORMATION

Only one direction of rotation is possible, which has to be specified in the order. The permitted direction of rotation is indicated on the housing.

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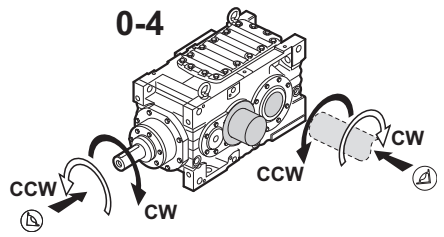
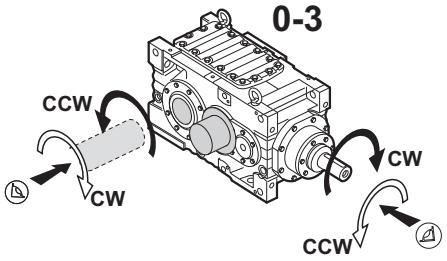
3.10.6 Shaft positions and direction of rotation dependencies MC2RH../SD gear units with shrink disk and backstop

The following figures show the shaft positions and direction of rotation dependencies for 2-stage gear units with backstop of type MC.RS.. and shrink disk.

2-stage



INFORMATION

Only one direction of rotation is possible, which has to be specified in the order. The permitted direction of rotation is indicated on the housing.

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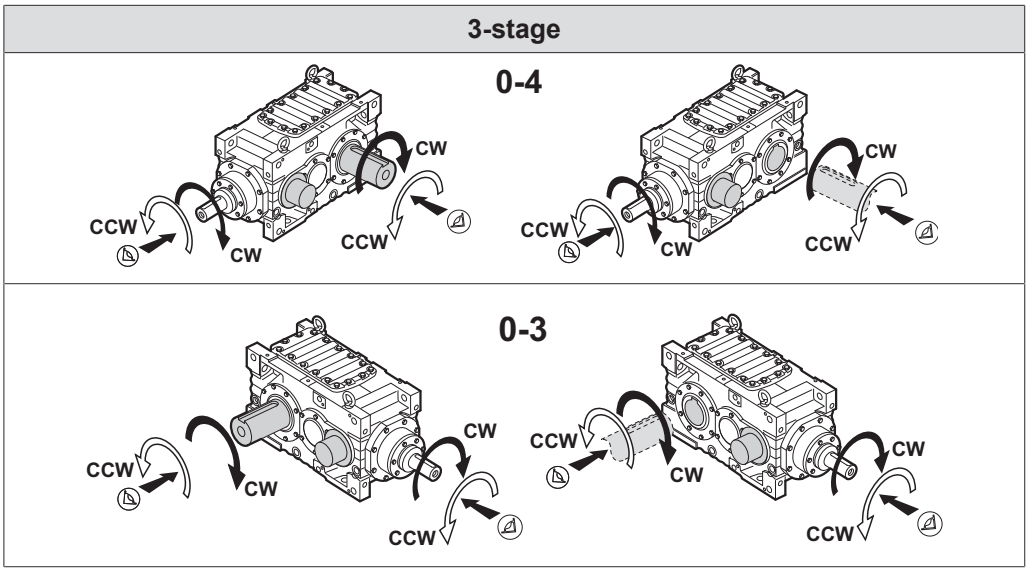
3.10.7 Shaft positions and direction of rotation dependencies of MC3R.. with backstop on the driven machine end

The following figures show the shaft positions and direction of rotation dependencies for 3-stage gear units with backstop of type MC.3R..



INFORMATION

Only one direction of rotation is possible, which has to be specified in the order. The permitted direction of rotation is indicated on the housing.

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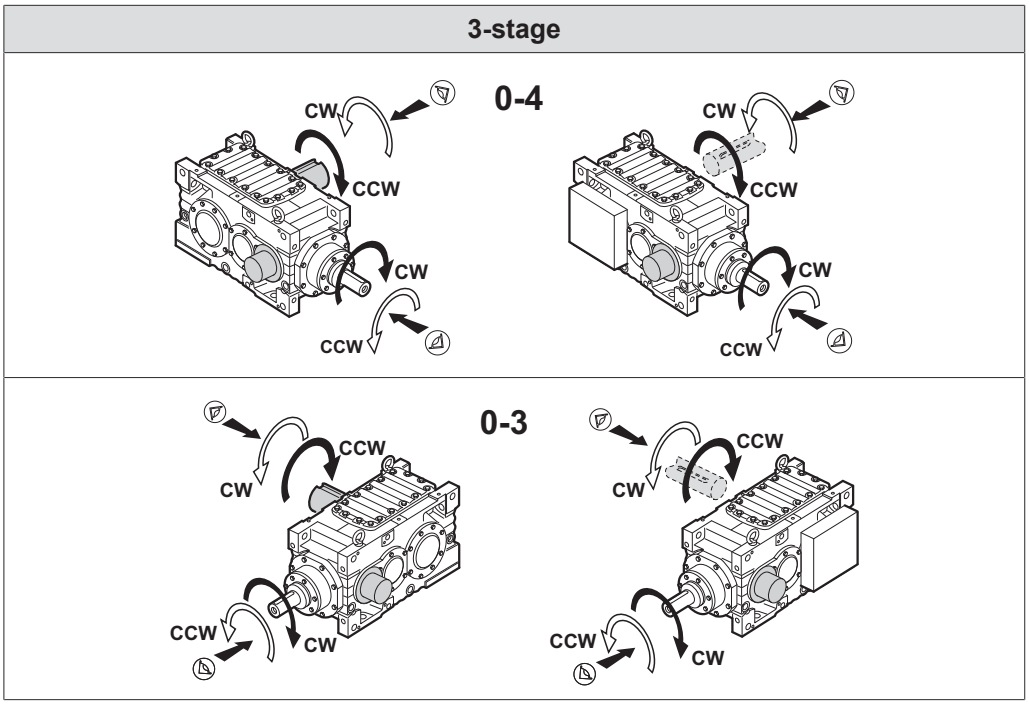
3.10.8 Shaft positions and direction of rotation dependencies of MC3P.. Backstop opposite driven machine

The following figures show the shaft positions and directions of rotation for gear units with backstop of type MC3R.



INFORMATION

Only one direction of rotation is possible, which has to be specified in the order. The permitted direction of rotation is indicated on the housing.

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3.11 Lubrication of industrial gear units

Depending on the mounting position, **"splash lubrication" or "bath lubrication" lubrication types are used** for MC.. series industrial gear units.

3.11.1 Splash lubrication

Splash lubrication is used for industrial gear units of the MC.. series in horizontal mounting position (type designation MC..**L**..). With splash lubrication, the oil level is low. With this lubrication method, oil is splashed onto the bearings and gearing components.

3.11.2 Bath lubrication

For industrial gear units of the MC.. series, bath lubrication is used in vertical (type designation MC..**V**..) and in upright mounting position (type designation MC..**E**..). With oil bath lubrication, the oil level is so high that the bearings and gearing components are completely immersed in the lubricant.

For industrial gear units of the M.PV.. and M.RV.. and MC.RE.. series **with bath lubrication**, **oil expansion tanks are always** used. Oil expansion tanks allow the lubricant to expand when the gear unit heats up during operation.

Regardless of the mounting position, an oil expansion tank made of steel is used for installation outdoors and at very humid ambient temperatures. The oil expansion tank can be used both for the version with solid shaft and hollow shaft. A membrane in the oil expansion tank separates the oil in the gear unit from the humid ambient air and thus ensures that no humidity can build up in the gear unit.

3.11.3 Symbols used

The following table contains the symbols used in the following illustrations and explains their meaning.

Symbol	Meaning
	Breather plug
	Inspection opening
	Oil dipstick
	Oil drain plug
	Oil filling plug
	Oil sight glass
	Air outlet screw

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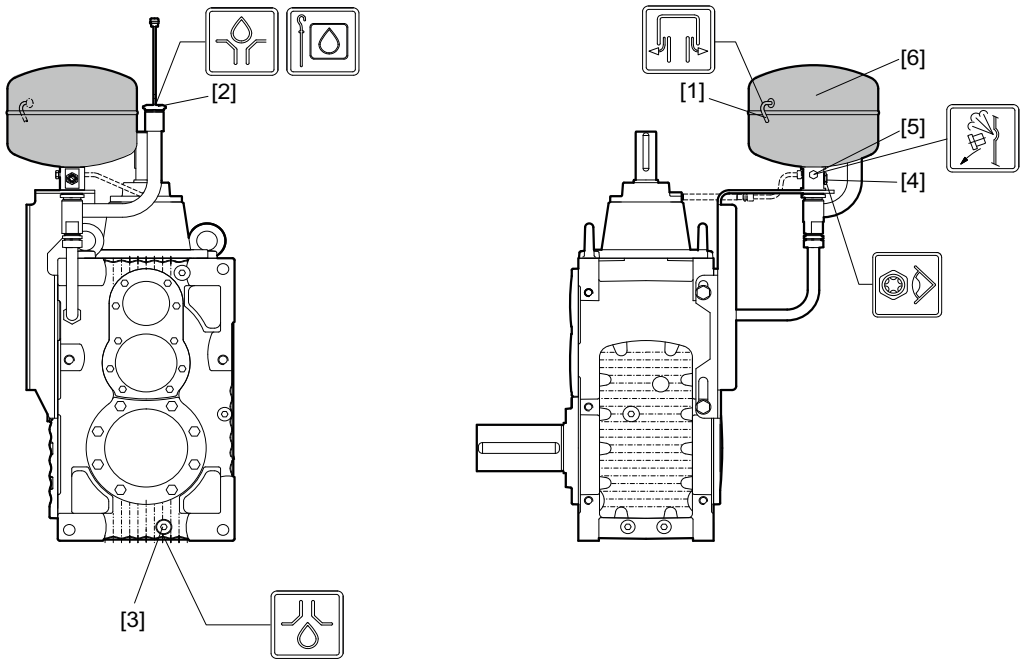
3.11.4 Oil bath lubrication upright mounting position

The oil expansion tank made of steel [6] is used for **MC.. series** industrial gear units in **upright mounting position** (type designation **MC.PE..** or **MC..RE..**).



25428525707

[1] Breather
[2] Oil dipstick
[3] Oil drain plug
[4] Oil sight glass
[5] Air outlet screw
[6] Steel oil expansion tank

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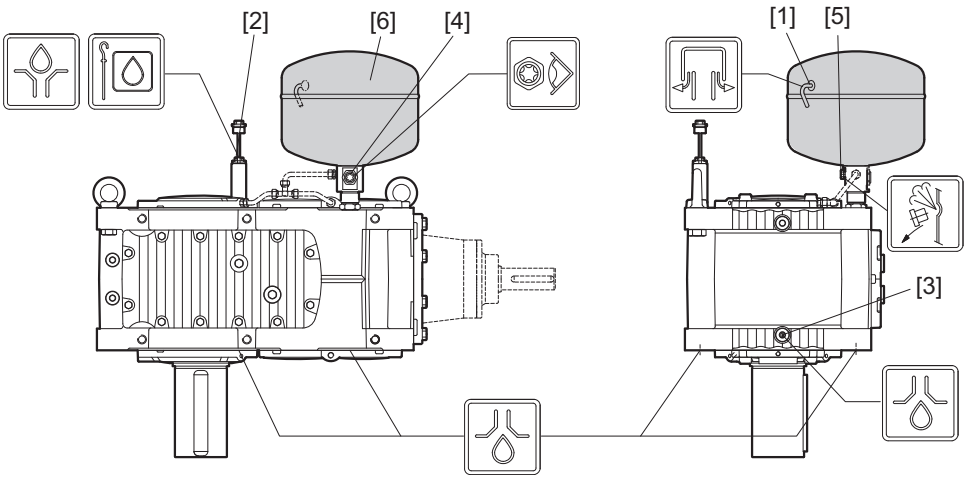
3.11.5 Oil bath lubrication vertical mounting position

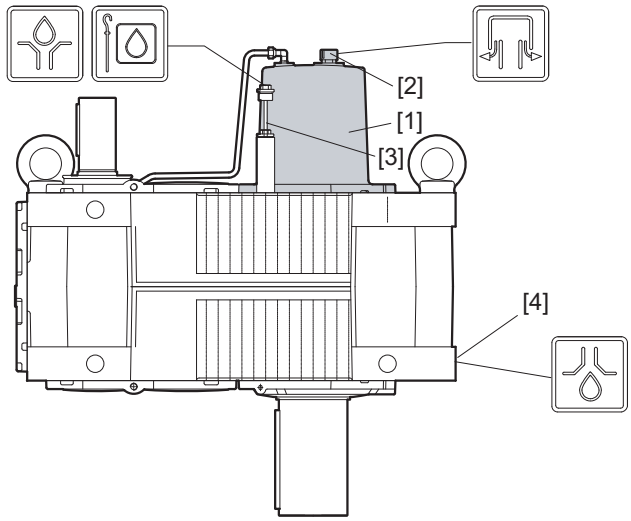
The oil expansion tank made of steel [6] for industrial gear units of the MC.. series in vertical mounting position (type designation MC.PV../MC.RV..) is located on the side of the cover plate.



25428534027

[1] Breather
[2] Oil dipstick
[3] Oil drain plug
[4] Oil sight glass
[5] Air outlet screw
[6] Steel oil expansion tank

With **dry ambient conditions**, an **oil expansion tank made of gray cast iron** [1] is used. This oil expansion tank is only used for the vertical mounting position **with the solid output shaft pointing downwards** (type designation MC.P**VS**F.. or MC.R**VSF**..).



25428742411

[1] Cast iron oil expansion tank
[2] Breather plug
[3] Oil dipstick
[4] Oil drain plug

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3.11.6 Pressure lubrication

Regardless of the mounting position, pressure lubrication can be provided as a lubrication type according to the order.

With pressure lubrication, the oil level is low. For sizes 04 to 09, the gearing and bearings not immersed in the oil bath are lubricated using a shaft end pump (→ chapter "Shaft end pump"). A motor pump is used for sizes 02 to 09 (→ chapter "Motor pump").

"Pressure lubrication" is used if:

- Oil bath lubrication is not required for horizontal or vertical mounting positions
- Speeds are very high
- The gear unit must be cooled by an external oil-water (→ chapter "Oil-water cooling system") or oil-air cooling system (→ chapter "Oil-air cooling system").

INFORMATION

For more details on oil expansion tanks, refer to chapter "Mounting positions".

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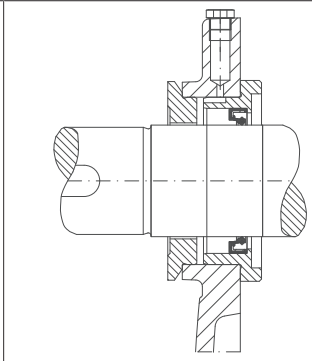
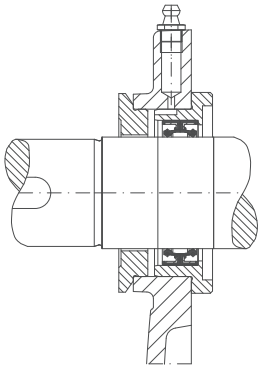
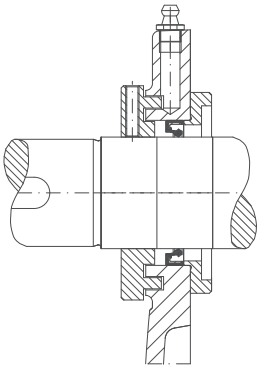
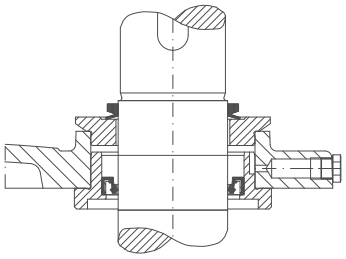
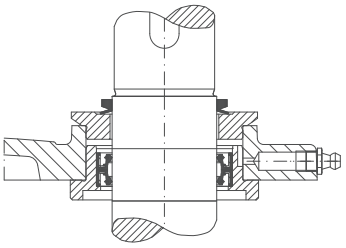
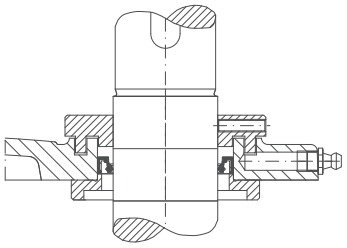
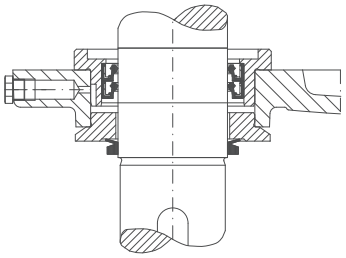
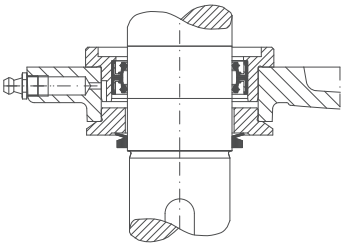
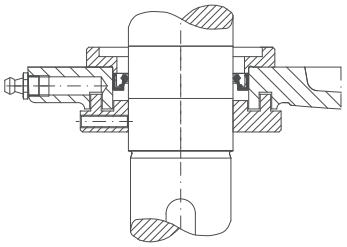
3.12 Sealing systems

3.12.1 MC.P.. helical gear units, sealing systems for input shaft

	Oil seal (standard) **Single oil seal with dust protection cover** • Clean environment	**Double lip oil seal with grease nipple** **Double lip oil seal with re-greasable dust protection cover** • Dusty environment with abrasive particles	**Radial labyrinth seal with grease nipple** **Single oil seal with radial labyrinth seal** • Dusty environment with abrasive particles
Horizontal input shaft			
Vertical input shaft, pointing upwards			
Vertical input shaft, pointing downwards			

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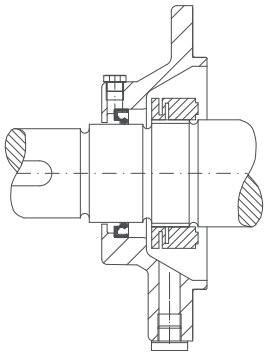
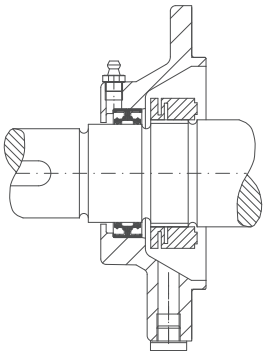
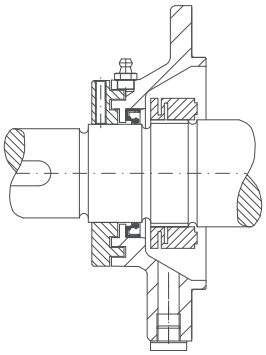
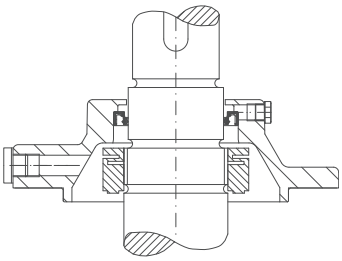
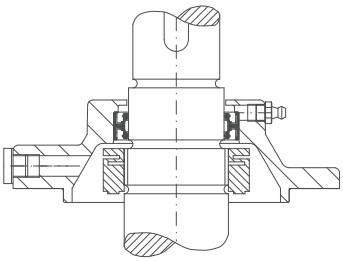
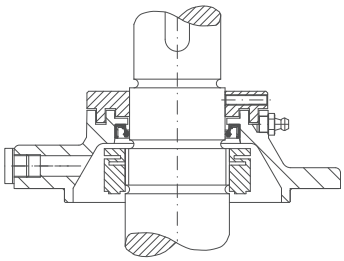
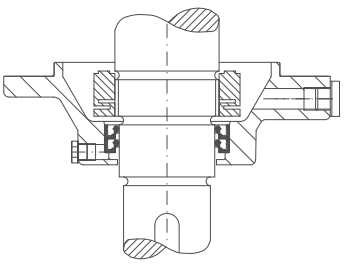
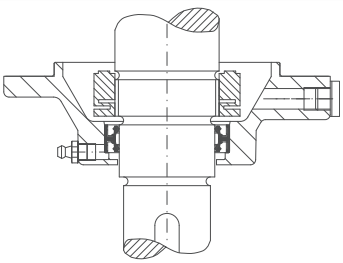
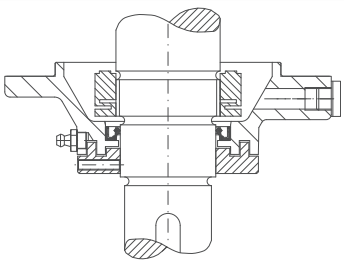
3.12.2 MC.R.. helical-bevel gear units, sealing systems for input shaft

	Oil seal (standard) **Single oil seal with dust protection cover** • Clean environment	**Double lip oil seal with grease nipple** **Double lip oil seal with re-greasable dust protection cover** • Dusty environment with abrasive particles	**Radial labyrinth seal with grease nipple** **Single oil seal with radial labyrinth seal** • Dusty environment with abrasive particles
Horizontal input shaft			
Vertical input shaft, pointing upwards			
Vertical input shaft, pointing downwards			

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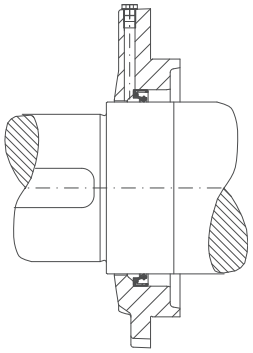
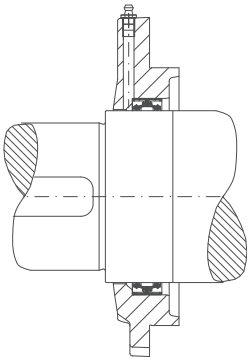
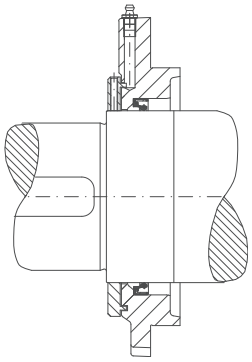
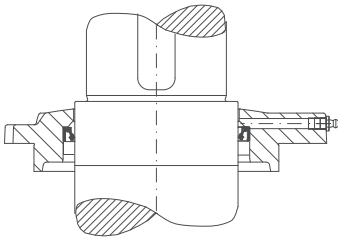
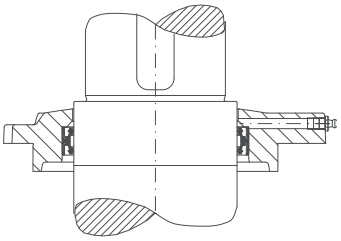
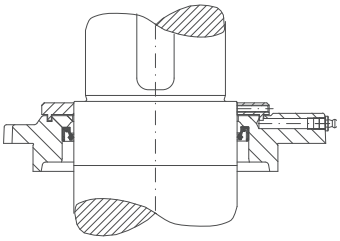
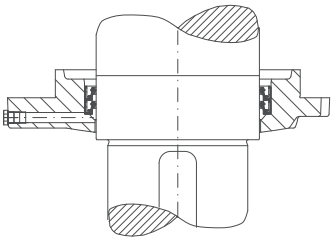
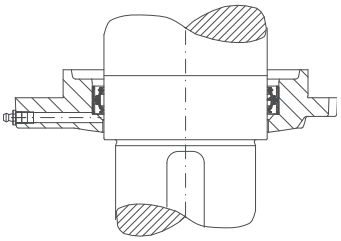
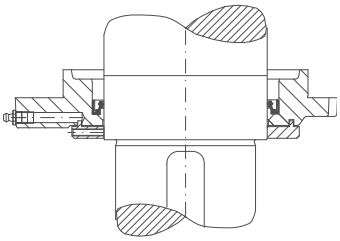
3.12.3 MC.P.., MC.R.. , sealing systems for solid input shaft

	Oil seal (standard) **Single oil seal with dust protection cover** • Clean environment	**Double lip oil seal with grease nipple** **Double lip oil seal with re-greasable dust protection cover** • Dusty environment with abrasive particles	**Radial labyrinth seal with grease nipple** **Single oil seal with radial labyrinth seal** • Dusty environment with abrasive particles
Horizontal input shaft			
Vertical input shaft, pointing upwards			
Vertical input shaft, pointing downwards			

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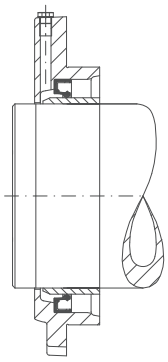
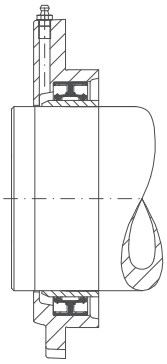
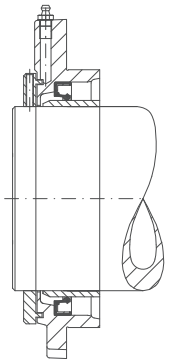
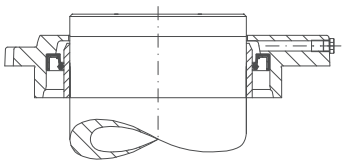
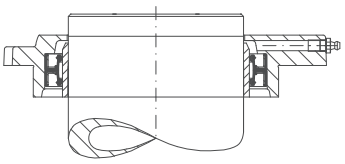
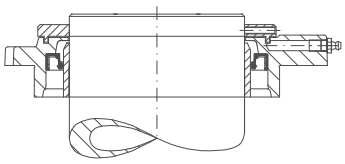
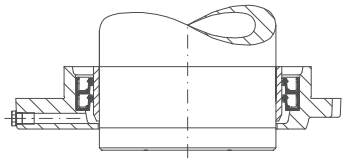
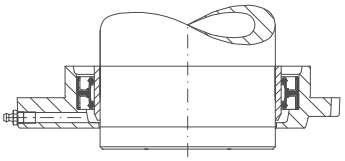
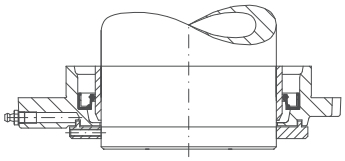
3.12.4 MC.P.., MC.R.. , sealing systems for hollow input shaft

	Oil seal (standard) **Single oil seal with dust protection cover** • Clean environment	**Double lip oil seal with grease nipple** **Double lip oil seal with re-greasable dust protection cover** • Dusty environment with abrasive particles	**Radial labyrinth seal with grease nipple** **Single oil seal with radial labyrinth seal** • Dusty environment with abrasive particles
Horizontal input shaft			
Vertical input shaft, pointing upwards			
Vertical input shaft, pointing downwards			

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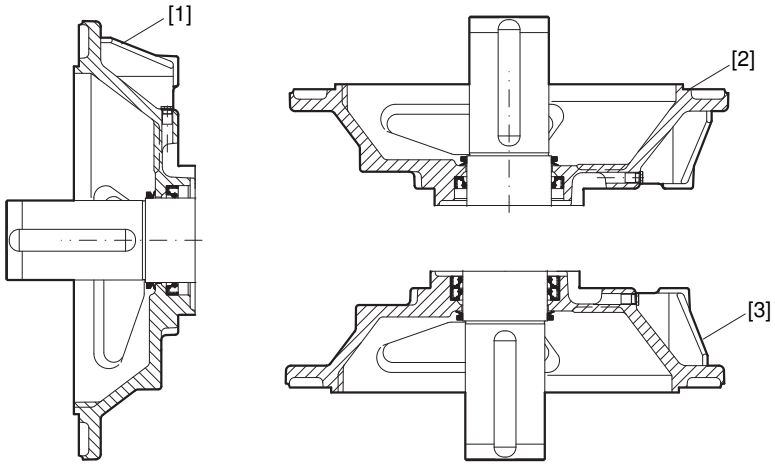
3.12.5 MC.P.., MC.R.. with mounting flange ("MF"), solid output shaft



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Sealing solution	Gear unit design	Shaft positions	Drawing number
Single oil seal (NBR) with dust protection cover and V-ring (NBR)	Horizontal LSS	All	1
	Upright mounting position	All	1
	Vertical LSS	14, 24, 04	2
Double oil seal (NBR) with dust protection cover and V-ring (NBR)	Vertical LSS	13, 23, 03	2

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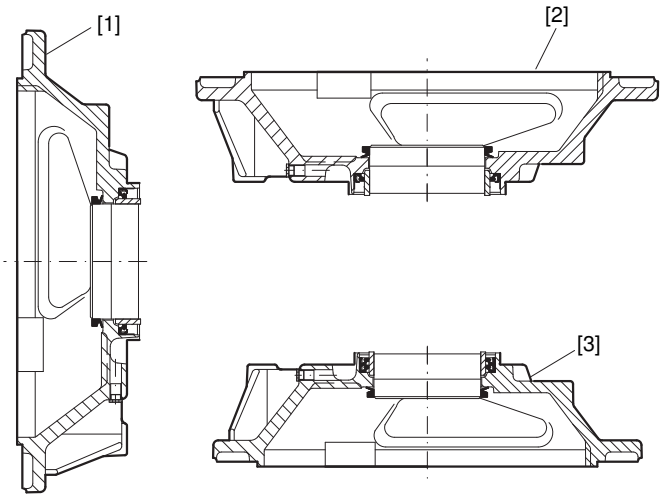
3.12.6 MC.P.., MC.R.. with mounting flange MC.P.., MC.R.. with mounting flange ("/MF"), hollow output shaft



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Sealing solution	Gear unit design	Shaft positions	Drawing number
Single oil seal (NBR) with dust protection cover and V-ring (NBR)	Horizontal LSS	All	1
	Upright mounting position	All	1
	Vertical LSS	14, 24, 04	2
Double oil seal (NBR) with dust protection cover and V-ring (NBR)	Vertical LSS	13, 23, 03	2

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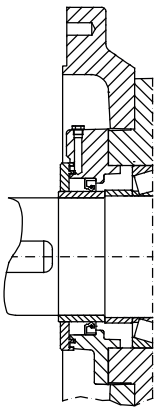
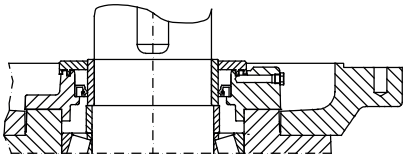
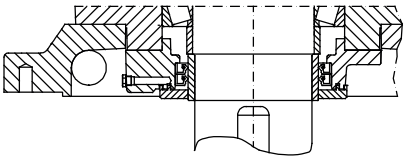
3.12.7 EBD EF..., solid and hollow shaft

Gear unit design	Oil seal (standard) **Single oil seal with dust protection cover** • Clean environment
Horizontal shaft	
Upright shaft	
Shaft end pointing downwards	

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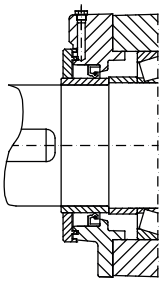
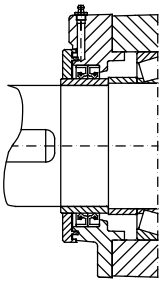
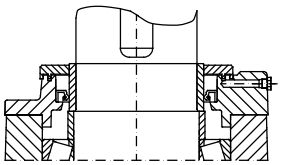
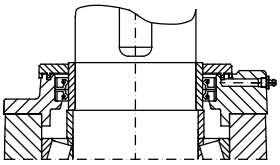
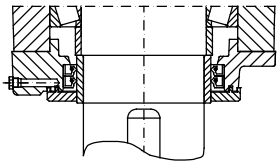
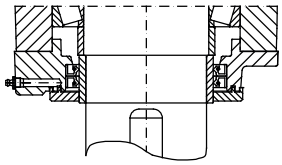
3.12.8 EBD EN..., solid and hollow shaft

Gear unit design	Oil seal (standard) **Single oil seal with dust protection cover** • Clean environment	Radial labyrinth seal with grease nipple **Single oil seal with radial labyrinth seal** • Dusty environment with abrasive particles
Horizontal shaft		
Upright shaft		
Shaft end pointing downwards		

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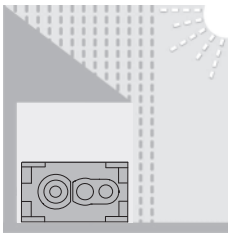
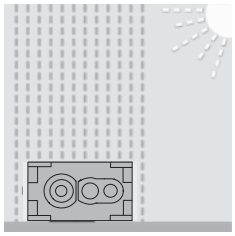
3.13 Coating and surface protection systems

Used as surface protection under typical ambient conditions, corrosivity category DIN EN ISO 12944-2. The following tables give an overview of coating and surface protection systems.

The gear unit is equipped with the following surface protection.

OS 1 low environmental pollution	
	For environments prone to condensation and atmospheres with low humidity or contamination, such as outdoor applications under roof or with protection, unheated buildings where condensation can build up. According to corrosivity category: C2 (low)
Sample applications	• Systems in saw mills • Agitators and mixers
Condensation test ISO 6270	120 h
Salt spray test ISO 7253	–

OS 2 medium environmental pollution	
	For environments with high humidity or moderate atmospheric contamination, such as applications outdoors subject to direct weathering. According to corrosivity category: C3 (moderate)
Sample applications	• Applications in gravel plants • Cableways
Condensation test ISO 6270	120 h
Salt spray test ISO 7253	240 h

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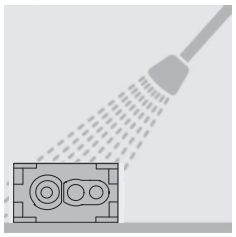
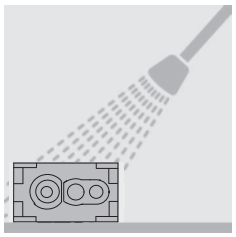
OS 3 high environmental pollution	
	Suitable for environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasionally acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt exposure. Based on corrosivity category: C4 (high)
Application examples	• Port cranes • Sewage treatment plants • Mining applications
Condensation test ISO 6270	240 h
Salt spray test ISO 7253	480 h

OS 4 very high environmental pollution	
	Suitable for environments with permanent humidity or severe atmospheric or chemical contamination. Regular acidic and caustic wet cleaning also with chemical cleaning agents. Based on corrosivity category: C5 (very high)
Sample applications	• 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.
- Color according to RAL
- 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.

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4 Structure of options and additional features

4.1 Oil expansion tank

The oil expansion tank is designed to compensate for oil volume variations in the system caused by temperature fluctuations. When the gear unit temperature increases, the oil expansion tank absorbs some of the increasing oil volume and feeds it back to the gear unit as the temperature goes down, which means the gear unit is always completely filled with oil. Based on the oil level specified by SEW-EURODRIVE, the oil expansion tank is designed to compensate the oil volume change within the permitted operating temperature range.

A temperature decrease below the permitted temperature range causes the oil expansion tank to be completely emptied and air being sucked into the gear unit. This might result in insufficient lubrication and a malfunction of the gear unit. An increase above the permitted temperature range causes an overfilling of the expansion tank and oil might leak from the gear unit.

Any oil level below or above the level specified by SEW-EURODRIVE is permitted during operation as long as there is oil in the oil expansion tank and the oil expansion tank does not overflow.

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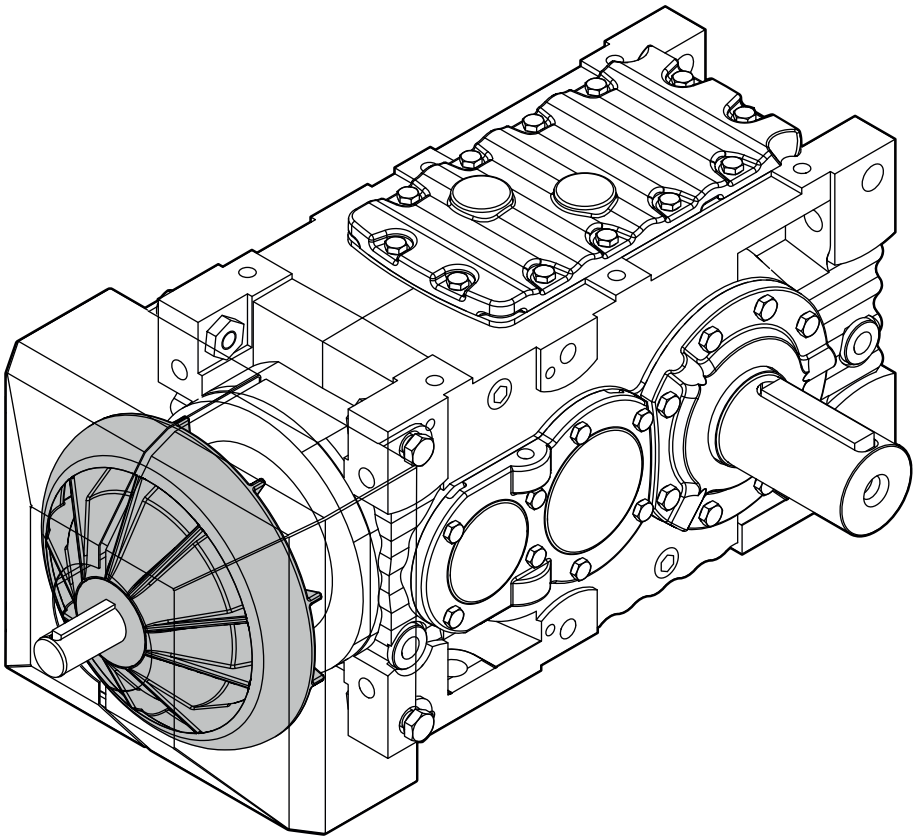
4.2 Fan

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

4.2.1 Advanced

When the type MC3R.. Advanced is used, the connection element (e.g. hydraulic start-up coupling) can be mounted flush to the fan guard.

The air intake clearance is integrated into the fan guard.



38791763339

INFORMATION

The MC3R.. fan design Advanced cannot be used together with a torque arm because the fan guard is mounted to the attachment point of the torque arm.

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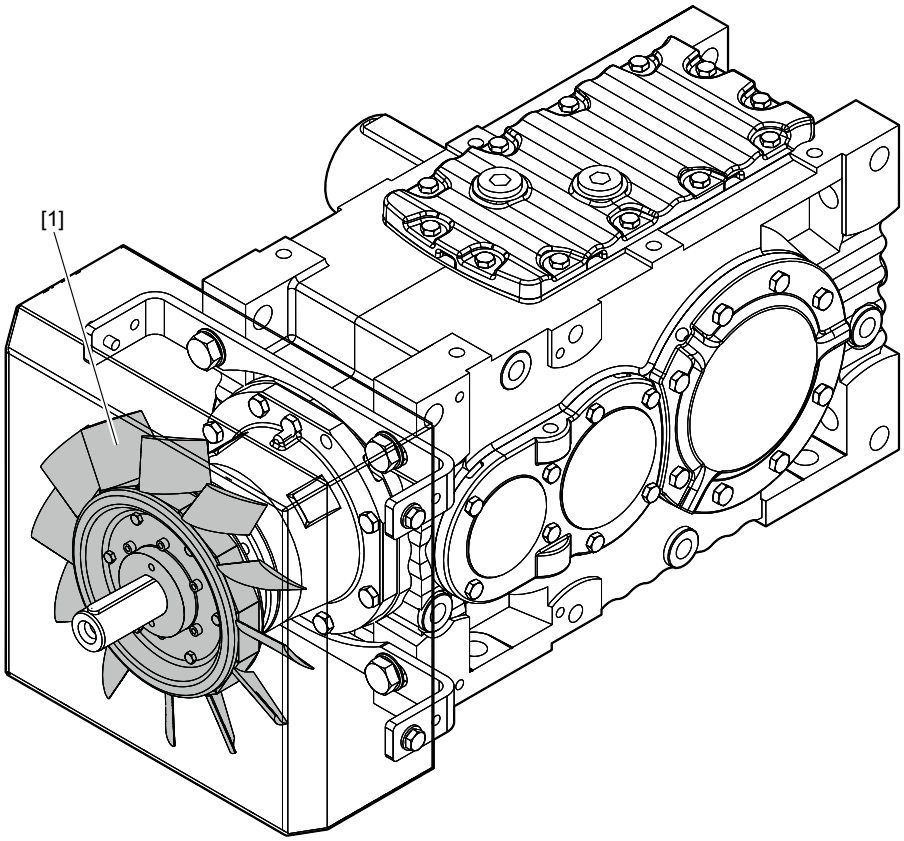
4.2.2 Axial fan

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

Refer to the information on the order documents.

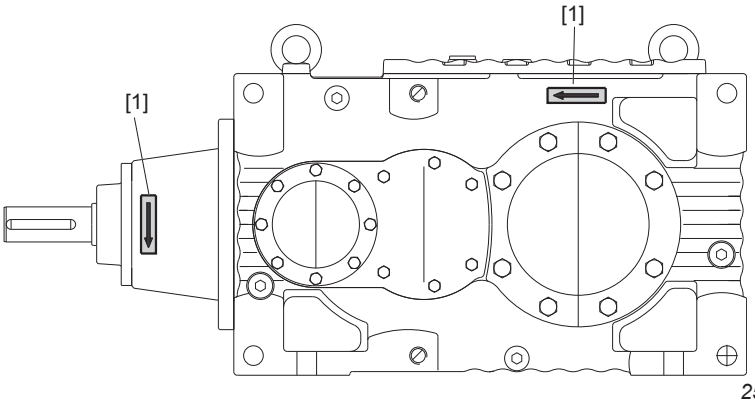


38793176843

4.3 Backstop

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.

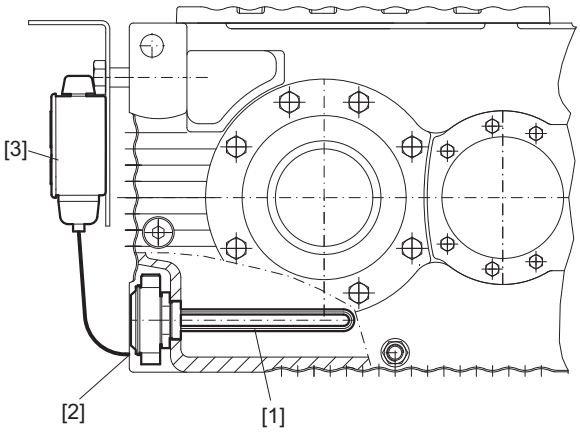


25524744459

4.4 Oil heater

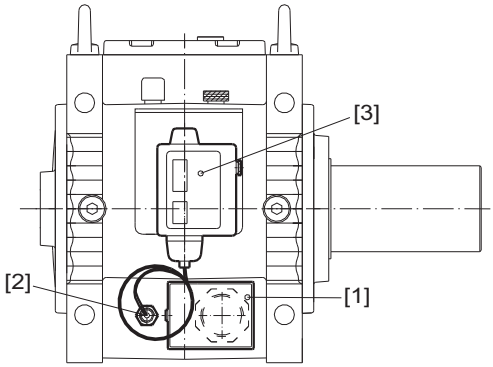
The oil heater consists of three basic parts:

1. Resistor in the oil bath ("oil heater") with terminal box
2. Temperature sensor
3. Thermostat



25540099339

[1] Oil heater
[2] Temperature sensor
[3] Thermostat



25540102923

Position of the temperature sensor for gear unit sizes 04 – 06

[1]Oil heater
[2]Temperature sensor
[3]Thermostat

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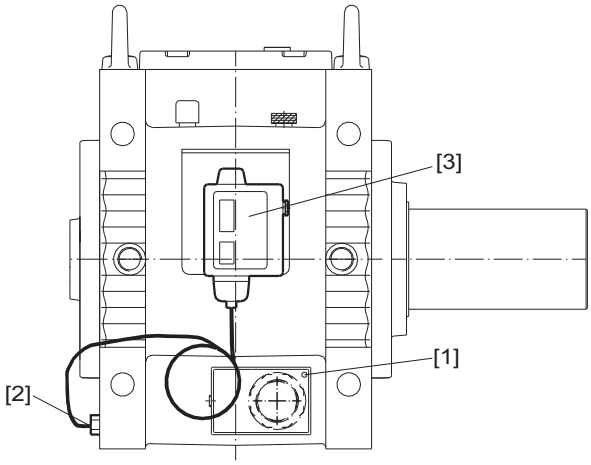

Position of the temperature sensor for gear unit sizes 07 – 09

25540106507

[1] Oil heater
[2] Temperature sensor
[3] Thermostat

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4.5 Installation with steel frame

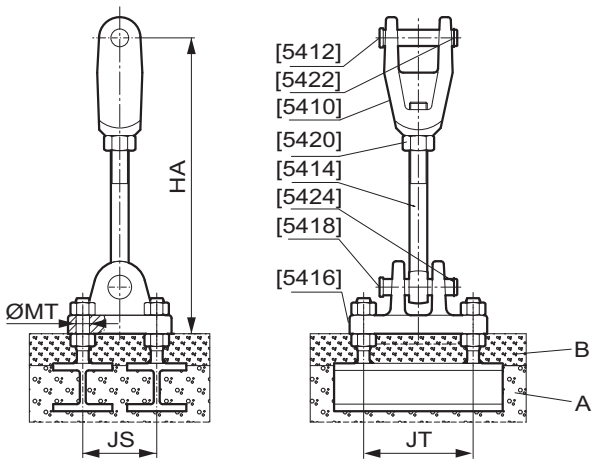
For MC.. series industrial gear units in the horizontal mounting position (MC2PL.., MC3PL.., MC2RL.., and MC3RL..), SEW-EURODRIVE supplies pre-assembled drive packages on a steel frame (swing base or base frame).

4.5.1 Swing base

A swing base is a steel frame [1] that accommodates gear unit, (hydro) coupling and motor (and brake, if required). As a rule, these are

- Hollow shaft gear units or
- Solid shaft gear units with flange coupling on the output shaft

The steel construction [1] is supported by a torque arm [2] (→ chapter "Torque arm").



25537235211

[1] Swing base
[2] Torque arm

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).

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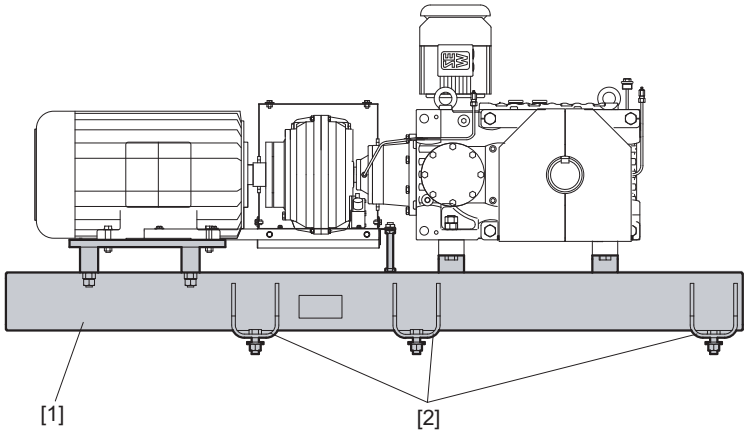
4.5.2 Base frame

A base frame is a steel frame [1] that accommodates gear unit, (hydro) coupling and motor (and brake, if required). 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.



25537290891

[1] Base frame
[2] Foot mounting

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.

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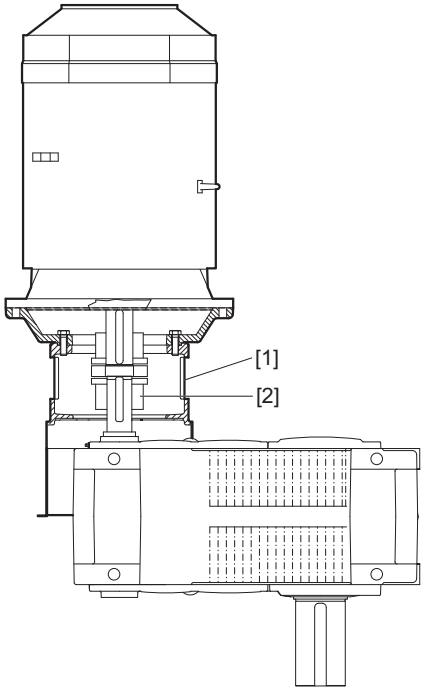
4.6 V-belt drives /VBD

V-belt drives are usually employed where an equalization of the overall gear ratios is necessary or where physical peripheral conditions require a specific motor arrangement.

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

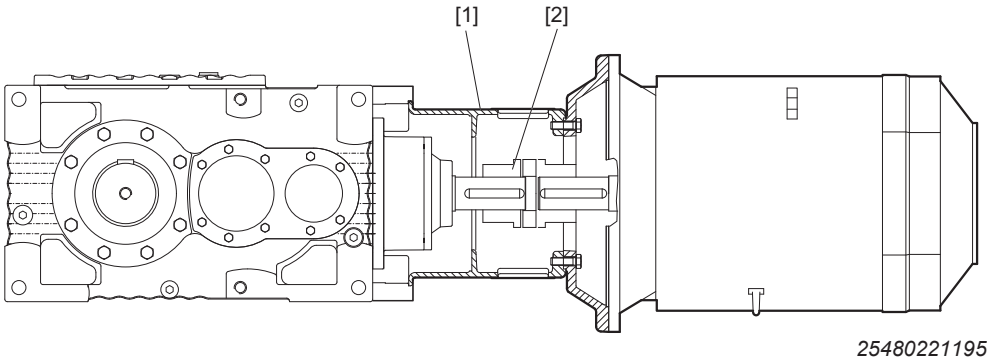
4.7 Motor adapter

Motor adapters [1] are available for connecting IEC motors of sizes 132 to 315 to industrial gear units of the MC series.



25480217611

[1] Motor adapter
[2] Coupling



25480221195

[1] Motor adapter
[2] Coupling

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4.8 Water cooling cover

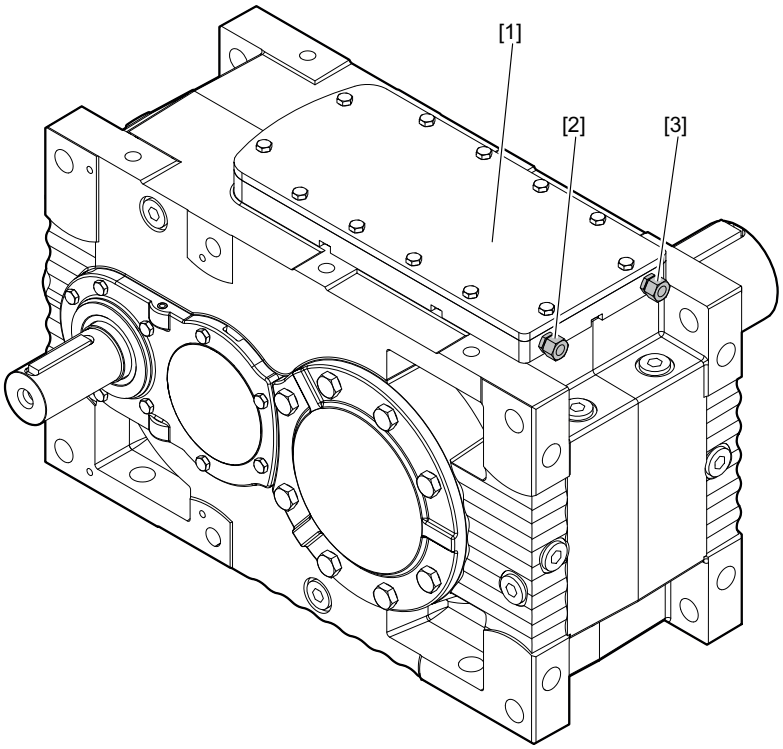
The water cooling cover is located on the gear unit's assembly opening and is provided with cooling water through a water connection. The customer is responsible for providing the water connection.

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. Observe the data given in the technical specifications.

INFORMATION

Contact SEW-EURODRIVE if you use cooling media such as brackish water or process water. Observe the information in chapter "Permitted cooling media".

4.8.1 Structure



38793187851

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

The water cooling cover [1] is made of a corrosion-resistant aluminum alloy. Two bores with G1/2” pipe threads are available to connect to the cooling circuit.

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

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

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4.8.2 Technical data

Adhere to the following values in the table. Do not exceed these values. Lower values are permitted. Also observe the information in the order-specific documents.

Size	Max. cooling water volume flow l/min	Max. water pressure bar
MC02-03	13	6
MC04-05	15	6
MC06-07	15	6
MC08-09	17	6

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4.9 Oil supply system

INFORMATION

For information about the structure, function, startup, maintenance, etc. of the oil supply system for pressure lubrication, refer to the separate operating instructions.

You will find the separate operating instructions together with the dimension sheet and additional documents in the overall documentation for the gear unit.

4.10 Oil cooling system

INFORMATION

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

You will find the separate operating instructions together with the dimension sheet and additional documents in the overall documentation for the gear unit.

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4.11 Shaft end pump

A shaft end pump (direction-independent) supplies all bearing points and gearing above the oil sump with oil via a tube system.

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

The shaft end pump is monitored via the connected pressure switch. A minimum input speed is required for the shaft end pump to operate properly. It is therefore important that you contact SEW-EURODRIVE if you use variable input speeds (e.g. with inverter-controlled drives) or if you intend to change the input speed of an already delivered gear unit with shaft end pump.

4.11.1 Pump position

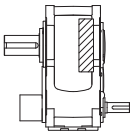
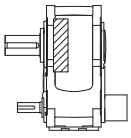
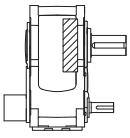
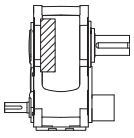
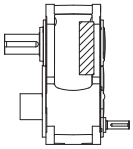
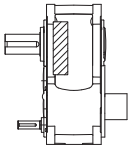
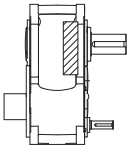
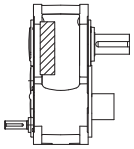
The pump is mounted externally to the gear unit and is directly driven by the input shaft or intermediate shaft of the gear unit. A high reliability of the pump function is ensured in this way. The pump position depends on the following factors:

- Number of gear unit stages
- Gear unit type (helical or bevel-helical)
- Shaft position of the gear unit
- Output shaft type

INFORMATION

Check for interference of the shaft end pump with other surrounding structures.

The following tables display the positions of the pumps:

Shaft positions				
	23	**13**[1)]	**24**[1)]	**14**
MC2P • Solid shaft • Hollow shaft with keyway • Hollow shaft with shrink disk				
MC3P • Solid shaft • Hollow shaft with keyway • Hollow shaft with shrink disk				

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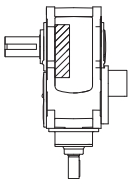
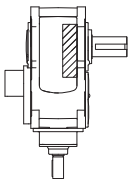
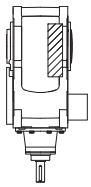
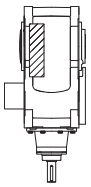
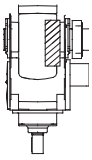
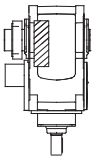
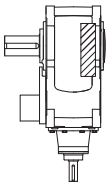
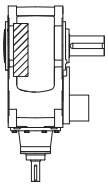
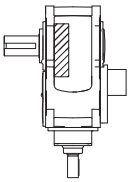
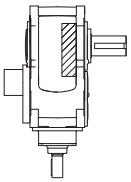
1) The maximum permitted external loads on the output shaft are lower

Shaft positions				
	03	04	03[1)]	04[1)]
MC2R • Solid shaft				
MC2R • Hollow shaft with keyway				
MC2R • Hollow shaft with shrink disk				
MC3R • Solid shaft • Hollow shaft with keyway • Hollow shaft with shrink disk				

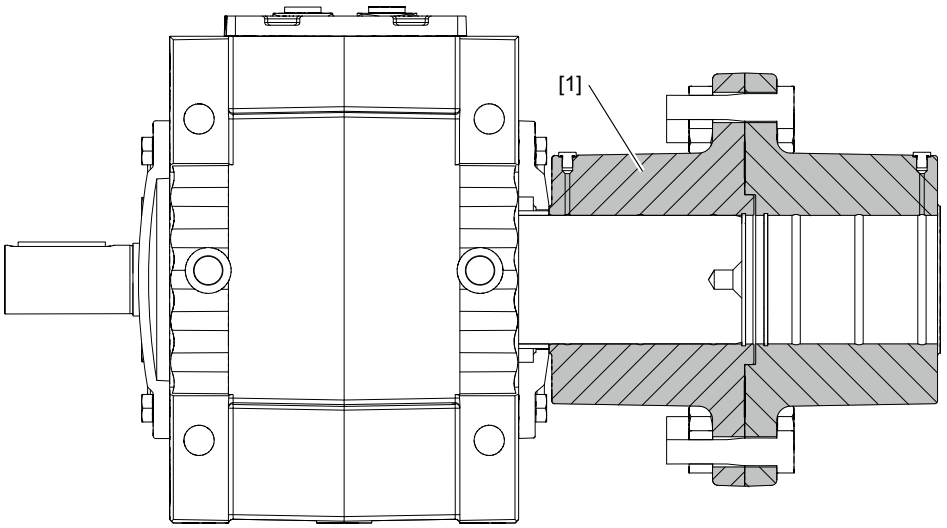
1) The maximum permitted external loads on the output shaft are lower.

4.12 Flange coupling with cylindrical interference fit

Flange coupling [1] is a rigid coupling for connecting 2 shafts.

It is 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.

The dimensions and dimensioning of the machine shaft are available upon request from SEW-EURODRIVE.



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4.13 Breather /BPG

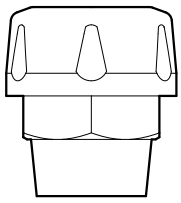
The breather serves to prevent non-permitted pressure generated by heating or cooling during operation.

INFORMATION

Refer to the dimension sheet and the order documents for further information on the breather.

The following breathers can be used.

4.13.1 Breather made of steel



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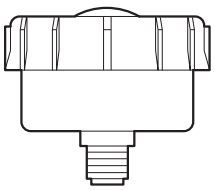
Structure

Characteristics	
Housing material	Steel
Filter inserts	Wire mesh
Threads	3/4" or 1"

4.13.2 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 an air intake opening at the top. The cover with protection lip keeps splashing water off.

Features	
Housing material	Polyamide
Filter inserts	Wire mesh, galvanized
Filter size	10 µm

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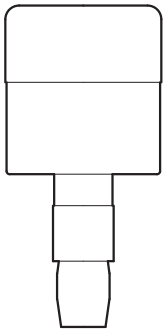
Features	
Threads	3/4" or 1"

4.13.3 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	• 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"

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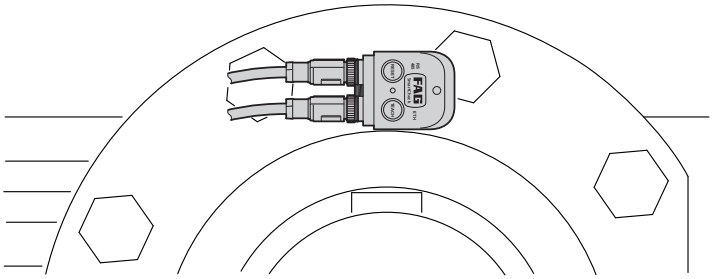
4.14 DUV40A (Diagnostic Unit Vibration)

The DUV40A vibration monitoring system is used for early detection of damage to gear units and gearmotors (e.g. bearing damage or imbalance). Permanent frequency-selective monitoring of the gearmotor is used for this purpose. Apart from the vibration analysis, additional measured values of up to 3 signal encoders can be detected, recorded and analyzed. The additional signals can be used as reference values for signal analysis e.g. to trigger time or event-controlled measuring tasks. After the analysis and depending on user-defined alarm limits, the system can switch outputs and display the state using LEDs.

DUV40A is configured using the SmartWeb software. If you use several Vibration SmartCheck systems, you can control them centrally from one PC using the SmartUtility Light software.



INFORMATION

For more information about DUV40A, refer to the "Diagnostic Unit Vibration" manual, part number: 26871971/DE.

4.14.1 Scope of delivery

- Vibration SmartCheck unit with integrated SmartWeb software
- Vibration SmartCheck and SmartWeb documentation on CD-ROM
- SmartUtility Light software with user documentation on CD-ROM

4.14.2 Technical data

DUV40A (Diagnostic Unit Vibration)	
Housing	Glass fiber reinforced plastic
Mounting	Hexagon socket head screw M6 × 45 Contact surface on the machine: 25 mm Ø
Current consumption	< 200 mA at 24 V
Ambient temperature	-20 to +70 °C
Internal operating temperature	-20 to +85 °C
Voltage supply	DC 11 – 32 V or Power over Ethernet (PoE) based on 802.3af Mode A
Size	44 mm × 57 mm × 55 mm
Weight	Approx. 210 g
Degree of protection	IP 67

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DUV40A (Diagnostic Unit Vibration)	
Operating system	Embedded Linux
Software	SmartWeb (Mozilla Firefox ESR 38 (recommended), Internet Explorer 11, Internet Explorer 9 not recommended due to performance reasons) Vibration SmartUtility Light or optionally Vibration SmartUtility Languages: German, English, Chinese, Spanish, and French

Internal sensor technology	
Vibration	Acceleration sensor (piezoelectric sensor) Frequency range 0.8 Hz to 10 kHz Measuring range ±50 g
Temperature	Measuring range -20 to +70 °C

Measurement	
Measurement functions	Acceleration Speed and distance by integration System temperature Process parameters (e.g. speed, load, pressure)
Diagnostic procedure	Time signal, envelope, spectrum and trend analysis, rotational speed and frequency tracking

Characteristic values (time and frequency range)	
Defined characteristic values	DIN/ISO 10816
Calculated characteristic values	RMS, frequency selected RMS, direct component, peak, peak to peak, crest factor, Wellhausen count, carpet level, condition monitoring Other user-defined characteristic values are available.

Signal processor	
Frequency resolution	1600, 3200, 6400, or 12 800 lines
Measurement resolution	24 bit (A/D converter)
Frequency range	0.8 Hz – 10 kHz
Low passes	50 Hz – 10 kHz (50 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz, 5 kHz, 10 kHz)
High passes (only envelope)	750 Hz, 1 kHz, 2 kHz (other filters on request)

Storage	
Program and data	64 MB RAM, 128 MB flash

Inputs and outputs	
Inputs	**2 analog inputs** (0 – 10 V / 0 – 24 V / 0 – 20 mA / 4 – 20 mA), frequency range 0 – 500 Hz, 12 bit **1 digital input** (0 – 30 V, 0.1 Hz – 1 kHz)
Outputs	**1 analog output** (0 – 10 V / -20 mA / 4 – 20 mA), 12 bit **1 switching output** (open collector, max. 1 A, 28 V)

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Interfaces	
Control elements	2 capacitive pushbuttons (learning mode, alarm reset, restart, factory settings)
Display elements	1 LED to display status and alarm 1 LED to acknowledge the pushbuttons 2 LEDs to display communication
Communication	Ethernet 100 Mb/s OPC UA (server) available with additional license
Electrical connections	3 polarity reversal-protected M12 plug connectors for supply, input/outputs and Ethernet

4.14.3 Part numbers

	Description	Part number
Sensor	DUV40A (Diagnostic Unit Vibration)	19175892
Cable	Voltage supply cable 8-pin for SmartCheck 5 m; M12(B) <-> open end	19179596
Cable	Ethernet cable for SmartCheck 5 m; M12 <-> RJ45	19179618
Cable	I/O cable 8-pin for SmartCheck 5 m; M12(St) <-> open end	19179626
Cable	Power/Ethernet/I-O signals in 10 m and 20 m	

	Description	Part number
Base for mounting on standard gear units (R, F, K, and S gear units)	Mounting base with sealing ring M10 × 1	20593422
	Mounting base with sealing ring M12 × 1.5	20593430
	Mounting base with sealing ring M22 × 1.5	20593449
	Mounting base with sealing ring M33 × 2	20593457
	Mounting base with sealing ring M42 × 2	20593465

	Description	Part number
Base for mounting on industrial gear units	Mounting base with sealing ring G3/4"	20593384
	Mounting base with sealing ring G1"	20593392
	Mounting base with sealing ring G1 1/4"	20593406
	Mounting base with sealing ring G1 1/2"	20593414

	Description	Part number
Base for mounting on standard motors	Mounting base M5	21014175
	Mounting base M6	21014167
	Mounting base M8	20593503
	Mounting base M10	21014248
	Mounting base M12	20593473
	Mounting base M16	20593481
	Mounting base M20	20593511

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4.15 DUO10A diagnostic unit (oil aging)

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

The diagnostic unit consists of a PT100 temperature sensor and an evaluation unit. The temperature sensor installed in the gear unit measures the present gear unit oil temperature. The diagnostic unit 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 can find more information on the evaluation unit in the "DUO10A Diagnostic Unit" manual, part number 11473428.

4.16 Flow switch

The flow switch is an electrical switch used for controlling the correct functioning of a pressure lubrication system (→ shaft end pump; → motor pump) by checking the oil flow.

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4.17 Temperature switch /NTB

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

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

- as an "early warning"

  or

- as a "main alarm" for switching off the main motor.

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

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

4.18 Temperature switch /TSK2

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

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

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

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

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

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

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

4.19 Temperature sensor /Pt100

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

Observe the gear unit oil temperature in chapter "Permitted lubricants" (→ 🗎 174) and the information in the order-specific documents.

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

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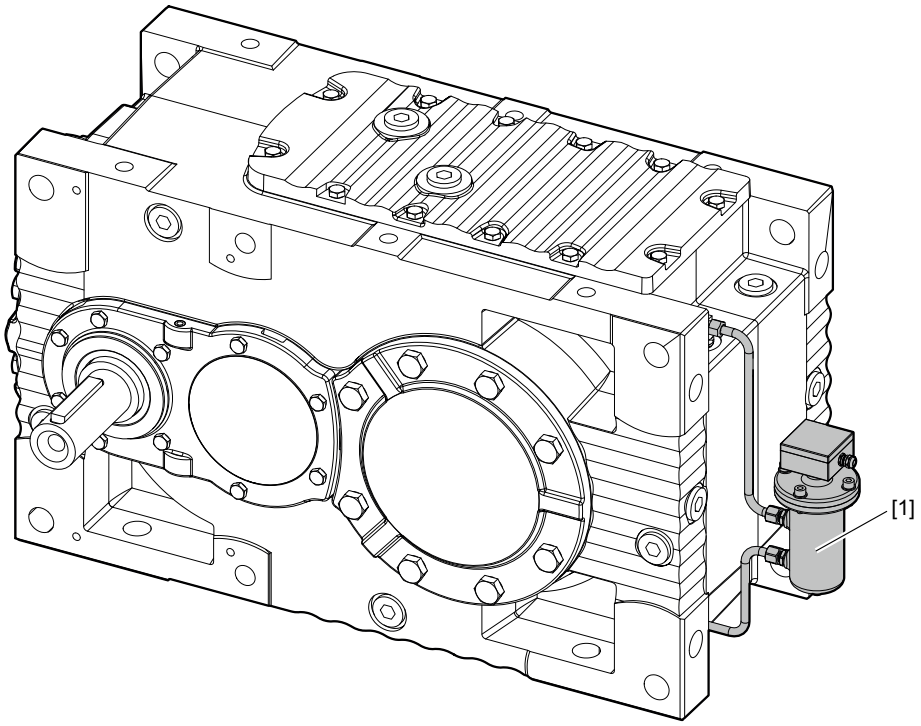
4.20 Float switch

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

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



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5 Installation/assembly

5.1 Required tools/resources

Not included in the delivery:

- Set of wrenches
- Torque wrench (for shrink disks)
- Motor mount on motor adapter
- Mounting device
- Compensation elements (shims, spacing rings)
- Fasteners for input and output elements
- Lubricant (e.g. NOCO® fluid from SEW-EURODRIVE).
- For hollow-shaft gear units (→ chapter "Assembly/disassembly of hollow-shaft gear units with keyed connection): Threaded rod, nut (DIN 934), retaining screw, and ejector screw
- Mount the parts according to the gear unit illustrations shown in chapter "Gear unit foundation".

5.1.1 Installation tolerances

Shaft end	Flanges
Diameter tolerance in accordance with DIN 748 • ISO k6 for solid shafts with Ø ≤ 50 mm • ISO m6 for solid shafts with Ø > 50 mm • ISO H7 with hollow shafts for shrink disk • ISO H8 for hollow shafts with keyway. • Center hole according to DIN 332, shape DS..	Centering shoulder tolerance: • ISO js7/H8

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5.2 Important notes

Read the following information prior to installation/mounting.

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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

⚠ WARNING

Danger due to mounting in impermissible mounting position.

Severe or fatal injuries.

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

⚠ WARNING

Danger due to freely accessible, rotating parts.

Severe or fatal injuries.

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

⚠ WARNING

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

Severe or fatal injuries.

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

⚠ WARNING

Danger due to installing impermissible components.

Severe or fatal injuries.

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

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⚠ WARNING

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

Severe injury.

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

⚠ CAUTION

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

Possible injuries.

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

⚠ CAUTION

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

Minor injuries.

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

⚠ CAUTION

Risk of injury due to protruding parts.

Minor injuries.

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

NOTICE

Improper installation and assembly can damage the gear unit.

Possible damage to property.

- Observe the following information.

- Make sure that the customer components are designed for the load.
- The gear units are delivered without oil fill as standard.
- Do not change the mounting position without prior consultation with SEW-EURODRIVE. The warranty will become void without prior consultation.
- The most important technical data is provided on the nameplate.

  You find more information on operation together with the dimension sheet and further documents in the overall documentation for the gear unit.
- Do not modify the gear unit or the mount-on components without prior consultation with SEW-EURODRIVE.

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- Install/mount the gear unit only in the specified mounting position on a level, vibration-damping, and torsionally rigid support structure. Do not twist housing legs and mounting flanges against each other.
- Make sure that the oil level plugs and oil drain plugs, as well as the breather are freely accessible.
- When installing a filter in the OAP and OWP cooling units, make sure there is sufficient height for removing the filter element and the filter hood.
- Use plastic inserts if there is a risk of electrochemical corrosion between the gear unit and the driven machine (connection between different metals such as cast iron and stainless steel). Install the bolts also with plastic washers. Always ground the gear unit housing.
- Only mechanical specialists may assemble gear head units with motors and adapters.
- Do not weld anywhere on the drive. Do not use the drive as a ground point for welding work. Welding may destroy gearing components and bearings.
- Units installed outdoors must be protected from the sun. Suitable protection devices are required, such as covers or roofs. Avoid heat from building up. The user must ensure that no foreign objects impair the function of the gear unit (e.g. due to falling objects or spillage).
- Protect the gear unit from direct cold air currents. Condensation may cause water to accumulate in the oil.
- Repair any damage to the paint work (e.g. on the breather).
- Do not modify the existing piping.

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5.3 Prerequisites for installation

NOTICE

Danger due to insufficiently cleaned flange surfaces.

Possible damage to property.

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

Check that the following conditions have been met:

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

5.3.1 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.

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5.4 Gear unit foundation

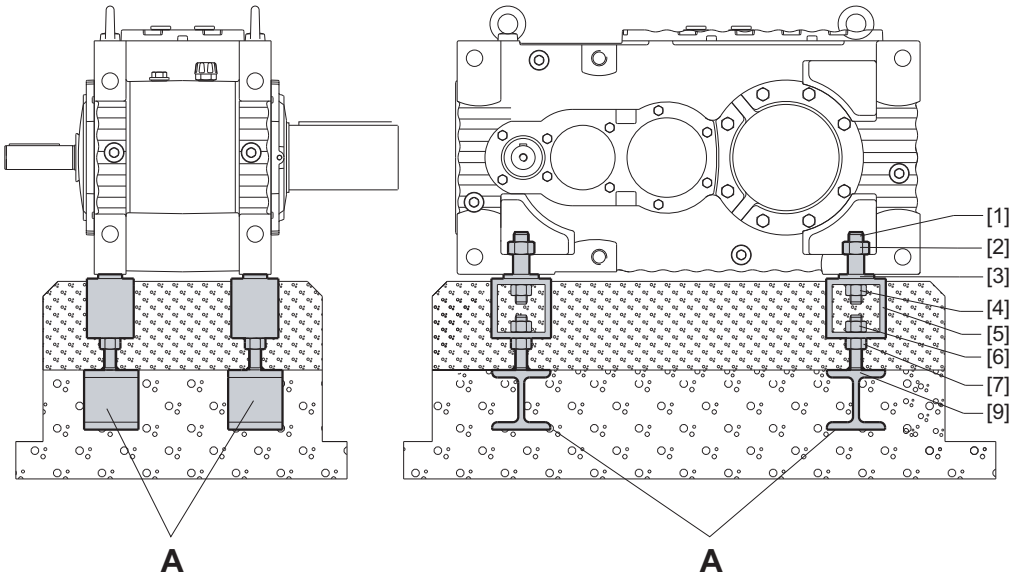
5.4.1 Foundation for foot-mounted gear units

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

SEW-EURODRIVE recommends the types of foundations shown in the following figures. If you design your own foundation, it must at least be equivalent to the shown foundation types regarding design and quality.

When mounting the gear unit on a steel construction, ensure adequate stiffness to avoid harmful vibrations and oscillations. The foundation must be dimensioned according to the weight and torque of the gear unit, taking into account the forces acting on the gear unit.

Example 1



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Pos. "A" → "Concrete base" section

[1] Hex head screw or stud
[2] Hex nut if [1] is a stud or an upside-down screw
[3] Shims (about 3 mm space for shims)
[4] Hex nut
[5] Foundation block
[6] Hex nut
[7] Hex nut and foundation screw
[9] Supporting girder

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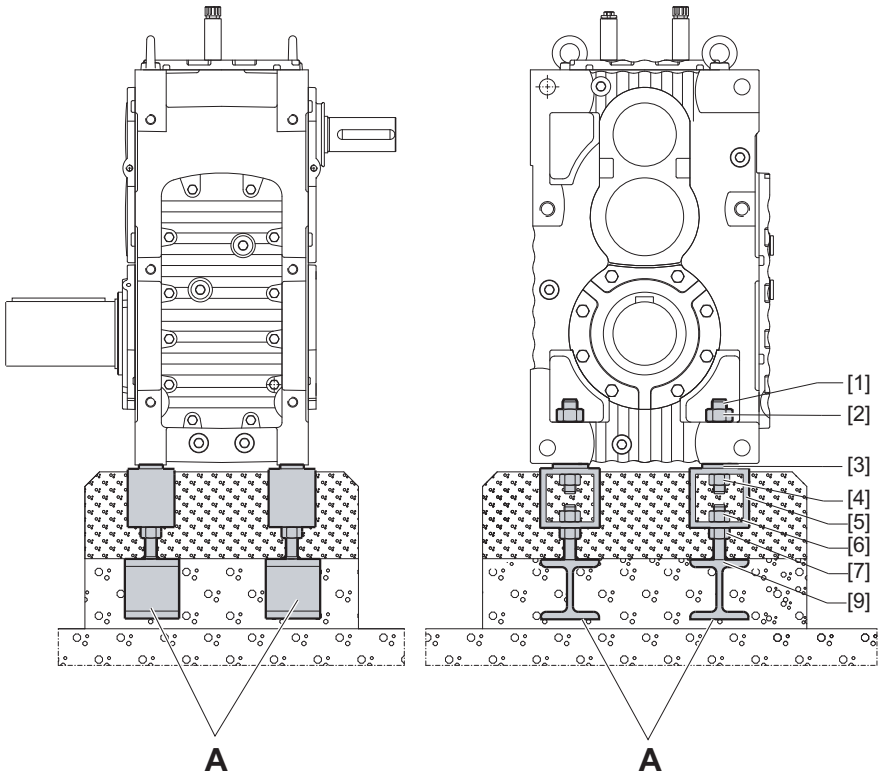
Example 2



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Pos. "A" → "Concrete base" section

[1] Hex head screw or stud
[2] Hex nut if [1] is a stud or an upside-down screw
[3] Shims (about 3 mm space for shims)
[4] Hex nut
[5] Foundation block
[6] Hex nut
[7] Hex nut and foundation screw
[9] Supporting girder

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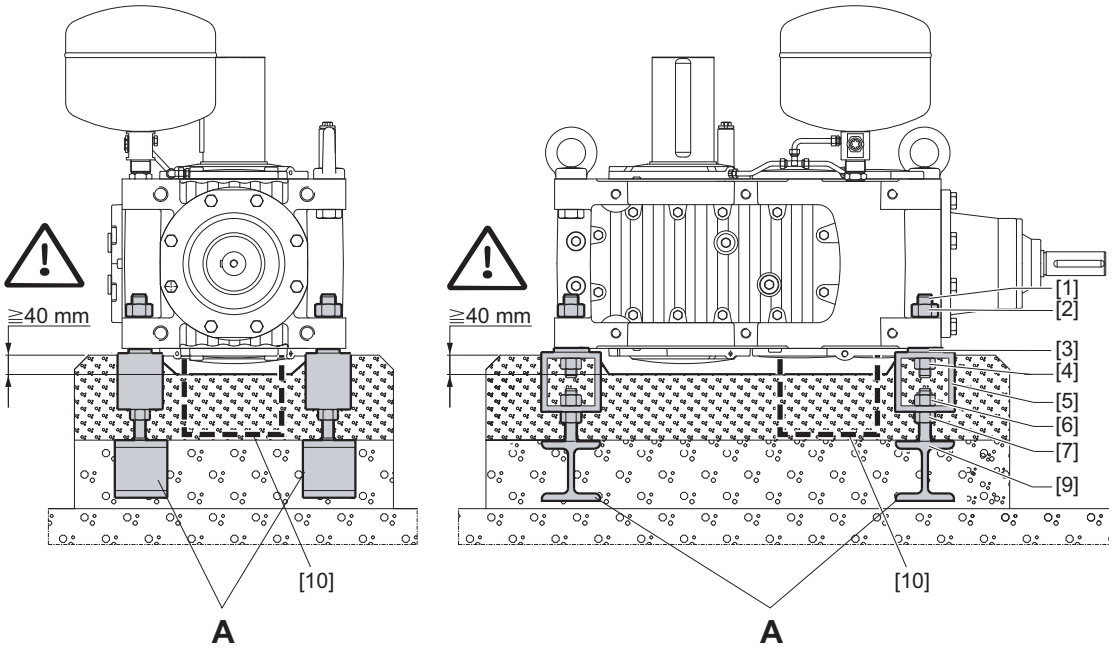
Example 3

Observe the following points:

- The mounting clearance between bearing cover and gear unit foundation must be at least 40 mm.
- The mounting clearance must be dimensioned adequately if the gear unit is equipped with a shaft end pump [10] (→ chapter "Shaft end pump").



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Pos. "A" → "Concrete base" section

[1] Hex head screw or stud
[2] Hex nut if [1] is a stud or an upside-down screw
[3] Shims (about 3 mm space for shims)
[4] Hex nut
[5] Foundation block
[6] Hex nut
[7] Hex nut and foundation screw
[9] Supporting girder
[10] Shaft end pump (optional)

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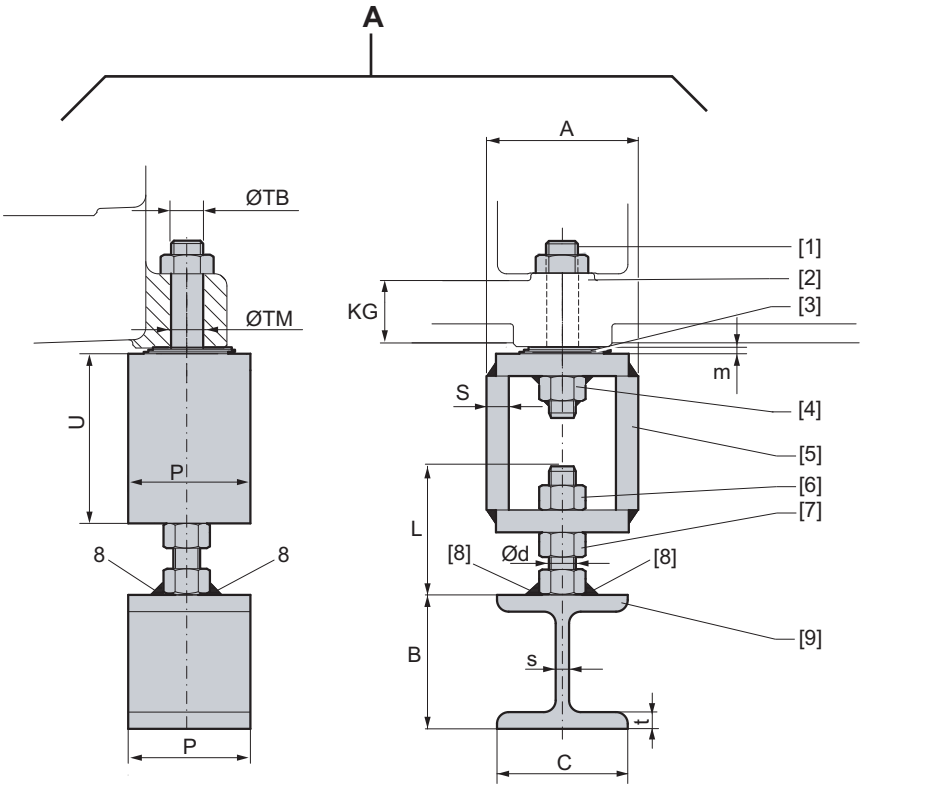
5.4.2 Concrete base

The concrete base for the gear unit must be reinforced and connected with the second concrete layer using steel clamps, steel rods, or steel elements. Only the supporting girders are embedded in the concrete (Pos. "A" → following figure).



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[1] Hex head screw or stud
[2] Hex nut if [1] is a stud or an upside-down screw
[3] Shims (about 3 mm space for shims)
[4] Hex nut
[5] Foundation block
[6] Hex nut
[7] Hex nut and foundation bolt
[8] Welded joint
[9] Supporting girder

5.4.3 Dimensions

Gear unit size	Stud			Base frame					Foundation screws		Supporting girder			
	ØTB	ØTM	KG	m	P	U	A	S	Ød	L	P	B	C	s
	mm													
02	M20	24	28	3	120	120	120	20	M24	120	120	100		10
03														
04	M24	28	34											
05														
06	M30	33	40			150		30	M30	150		140		12
07														
08	M36	39	52											
09														

INFORMATION

The minimum tensile strength of the supporting girders and foundation screws must be at least 350 N/mm^2.

5.4.4 Second concrete layer

The tightness of the second concrete layer must correspond to that of the concrete base. The second concrete layer is connected to the concrete base using concrete steels.

The weld seams [9] must only be welded if

- The concrete base around the supporting girder has dried
- The gear unit and all its mount-on components are aligned in their final position

5.4.5 Tightening torques

Screw/nut	Tightening torque screw/nut Nm
M8	19
M10	38
M12	67
M16	160
M20	315
M24	540
M30	1090
M36	1900

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5.4.6 Counterflange for gear units in flange-mounted version

Gear units can be supplied with a mounting flange on the LSS. These two types of flanges are named according to their bearing assembly:

- "Mounting flange"
- "EBD mounting flange"

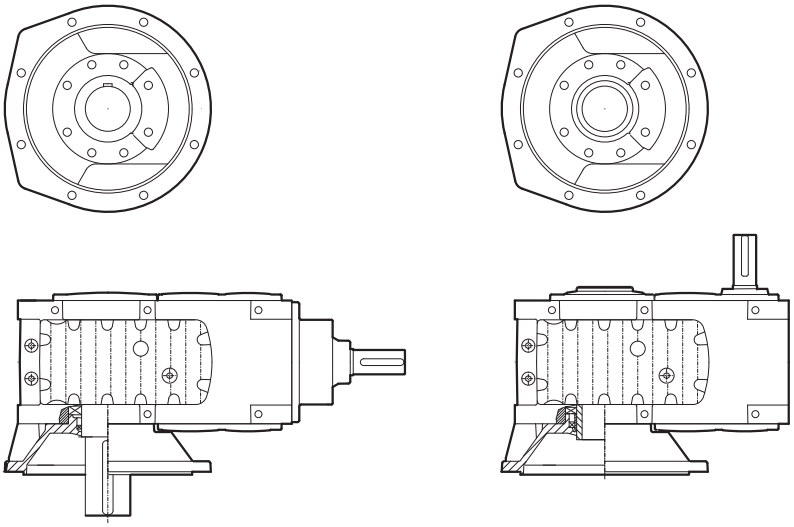
Both types of flanges are suitable for all gear units and mounting positions:

- MC.L..
- MC.V..
- MC.E..

5.4.7 Mounting flange

Solid shaft LSS

Hollow shaft LSS



Mounting flange

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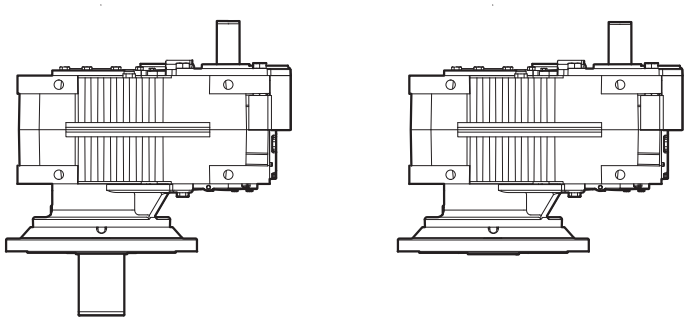
5.4.8 EBD mounting flange

Solid shaft LSS

Hollow shaft LSS



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The counterflange must have the following characteristics:

- Stiff and torsionally rigid taking into account
  - Gear unit weight
  - motor weight

  - Torque to be transmitted
  - Additional forces from the customer machine acting on the gear unit (such as axial forces from and towards the gear unit resulting from a mixing process)
- Horizontal
- Smooth
- Vibration damping, i.e. no vibrations are to be transmitted from adjacent machines and components.
- Resonance vibrations must not occur.
- A bore with an H7 fit, corresponding to the dimension drawing for the centering shoulder of the gear unit flange.

The mounting surfaces of the mounting flange and counterflange must be absolutely free of grease, oil, or other contamination (such as small textile particles, dust, etc.).

The gear unit output shaft must be aligned as accurately as possible in relation to the counterflange. Alignment affects the lifetime of bearings, shafts, and the coupling.

The incorrect positions permitted for the coupling of the output shaft can be seen either in chapter 5.2 or a separate manual on couplings.

Use screws of strength class 8.8 (tensile strength. 640 N/mm^2)

Gear unit size	Mounting flange	EBD mounting flange
02	8 × M16	16 × M16
03	8 × M16	16 × M16
04	8 × M16	16 × M16
05	8 × M20	16 × M16
06	8 × M20	16 × M20
07	8 × M20	16 × M20
08	8 × M24	16 × M24
09	8 × M24	16 × M24

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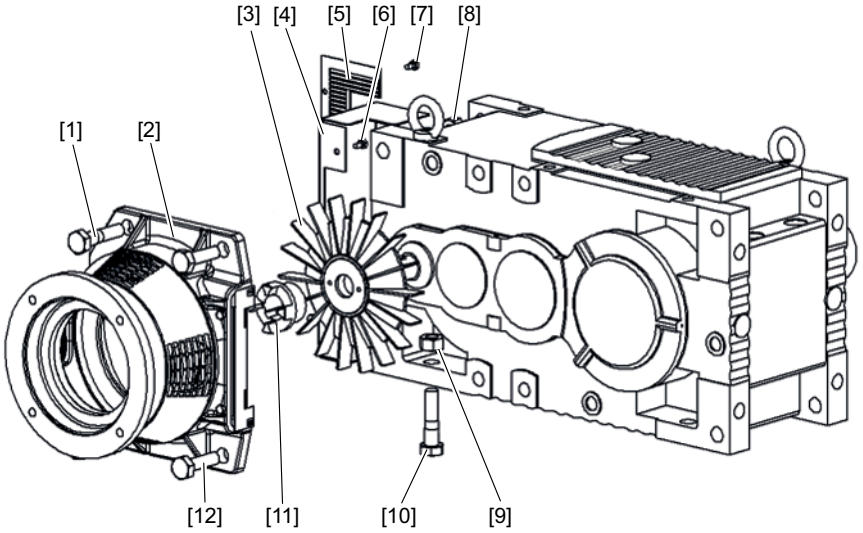
5.5 Gear unit mounting with foot-mounted design: Motor adapter



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1. Loosen the screws [7] and remove the guard [5].
2. Loosen the screws [6] and remove the guard [4] (optional accessory).
3. Loosen the screws [1] and [12], and remove the motor adapter [2].
4. Remove the coupling [11].
5. Remove the fan [3].
6. Mount the gear unit onto the foundation using screws [10] and nuts [9].
7. Mount the components mentioned in the steps before in reverse order.

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5.6 Mounting of solid shaft gear units

INFORMATION

Before mounting the gear unit, check the foundation dimensions with those in the corresponding gear unit drawings in chapter "Gear unit foundation".

Assemble the gear unit in the following order:

1. Mount the parts according to the gear unit illustrations shown in chapter "Gear unit foundation". The shims [3] allow for readjusting after assembly and, if required, gear unit replacement at a later time.
2. Secure the gear unit at the selected positions on the supporting girders using three foundation screws. Position the foundation screws at the maximum distance possible (two screws on one side of the gear unit and one on the other side). Align the gear unit as follows:
   - vertically by lifting, lowering or tilting the unit using the nuts of the foundation screws
   - in horizontal direction by tapping the foundation screws slightly into the required direction
3. After having aligned the gear unit, tighten the 3 nuts of the foundation bolts used for alignment. Carefully insert the fourth foundation bolt into the supporting girder and tighten it securely. When doing so, make sure that the position of the gear unit does not change. If necessary, align the gear unit again.
4. Tack-weld the ends of the foundation bolts to the supporting girder (at least 3 welding spots per foundation bolt). Tack-weld the foundation bolts alternately in both directions (starting from the center) and symmetrically to the gear unit's center line. This way, misalignment caused by the welding process is avoided. After having tack-welded all screws, they must be welded all the way round in the above mentioned order. Adjust the nuts on the foundation bolts to ensure that the welded foundation bolts do not twist the gear unit housing.
5. After the nuts of the retaining screws of the gear unit have been tack-welded, check the assembly again and then cast the foundation of the customer.
6. When the second layer of concrete has hardened, check the assembly a last time and adjust, if necessary.

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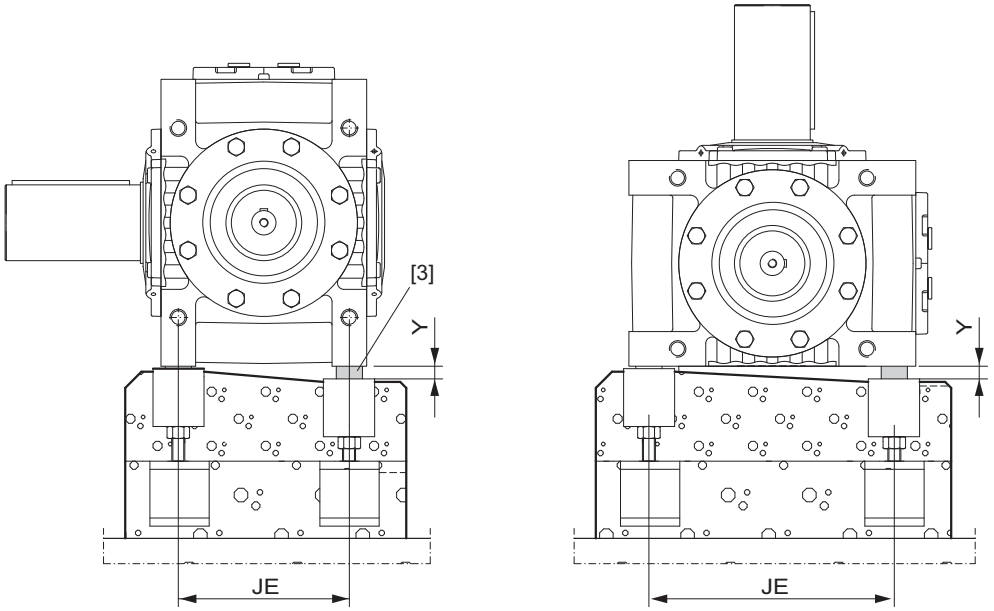
5.6.1 Mounting accuracy when aligning



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When aligning the gear unit, make sure that the mounting tolerances for the flatness of the foundation are not exceeded (y_{max} values in the following table). If necessary, use shims [3] to align the gear unit on the base plate.

JE mm	Y_{max} mm
< 400	0.035
400 – 799	0.060
800 – 1200	0.090
1200 – 1600	0.125

5.6.2 Flange-mounted gear units

INFORMATION

Before mounting the gear unit, make sure that the requirements described in chapter 4.4 "Gear unit foundation – Counterflange for gear units in flange-mounted design" have been fulfilled.

Assemble the gear unit in the following order:

1. The gear unit must be lowered onto the counterflange with suitable hoisting equipment. Follow the instructions in chapter 2.
2. Fasten the gear unit to the counterflange in the correct position using flange bolts. Tighten them diagonally with full tightening torque (→ chapter 4.4).

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5.7 Filling the gear unit with oil

The gear unit is delivered without being filled with oil at the factory as standard. Observe the following notes while filling in oil.

5.7.1 General information

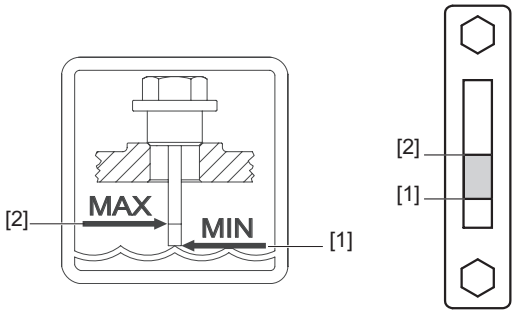
Observe the notes in chapter "Important information" (→ 🗎 86).

Information

- Use an oil from the current lubricant table:

  www.sew-eurodrive.de/lubricants
- Fill in the oil when the gear unit is in the intended mounting position.
- Make sure the oil is fluid when filling it into the gear unit. The flowability can be improved by prior heating, e.g. by using an oil heater. SEW-EURODRIVE recommends an oil temperature of 20 °C to 40 °C for filling in oil.
- Fill the gear unit with the oil grade specified on the nameplate. The oil quantity specified on the nameplate is an approximate quantity. The markings [1] and [2] on the oil dipstick or oil level glass are the decisive indicators of the correct oil quantity to be filled in.
- Check the oil level only when the gear unit is cool and in idle state. SEW-EURODRIVE recommends checking the oil level at an oil temperature of 20 °C to 40 °C. The oil level must be between the markings [1] and [2] and should ideally be in the middle. Observe chapter "Checking the oil level" (→ 🗎 163).
- The required oil fill quantity is higher when additional attachments are mounted to the gear unit, such as an oil supply system. In this case, observe the respective "Oil Cooling System" operating instructions from SEW-EURODRIVE.
- For gear units with external supply pipes, e.g. oil cooling systems, establish the connections before filling the oil.
- Use a clean filling aid (plastic funnel or similar) for filling the oil. Avoid using galvanized filling aids.

Procedure



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

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5.8 Shaft end pump SHP

5.8.1 Pump suction

NOTICE

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

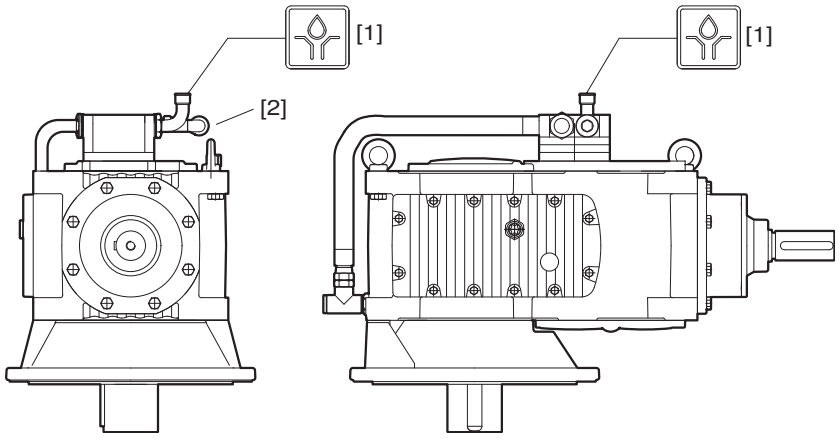
Possible damage to property.

- Observe the following information.

- Fill the gear unit with the oil type and oil quantity corresponding to the nameplate data, see chapter "Changing the oil" (→ 🗎 166).
- Check the oil level using the oil dipstick or the oil level glass. For more information, refer to chapter "Checking the oil level" (→ 🗎 163).
- Do not change the diameter of the tube / pipe connection!
- Do not open the pressure line [PRE].
- If the shaft end pump does not build up pressure within 10 seconds after the gear unit has been started, contact SEW-EURODRIVE.

It is essential that the oil pump begins to pump oil as soon as the main motor begins to rotate. If the pump does not begin to pump oil immediately, open the separate oil filling plug [1] and fill in oil (1 to 4 liters). Close the separate oil filling plug as soon as the oil starts to circulate (check with flow switch or optical flow indicator [2]).

This procedure is particularly important if the gear unit has been standing for a long period of time and there is air in the suction pipe and oil pump.



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[1] Separate oil filling plug on the intake pipe
[2] Oil flow monitor or optical oil flow indicator (not visible in the figure)

5.9 Oil supply and oil cooling systems

5.9.1 Startup of the pressure lubrication system

The motor pump of the pressure lubrication unit can be started if the oil sump temperature is above the required temperature, which results in an oil viscosity of max. 2000 cSt.

5.9.2 Starting the main drive motor for operating the gear unit

Before starting up the main motor, make sure that the pressure lubrication system is working properly and that the gear unit is lubricated correctly.

If the oil pressure is displayed above 0.7 bar at the pressure switch, the main motor can be started.

The pressure switch issues a warning signal when the pressure falls below 0.5 bar.

An oil pressure gauge is located in the oil pressure pipe. The normal oil pressure should be between 1 and 2 bar in the normal operating state. The oil pressure can reach up to 8 bar for a short time in the starting situation with high oil viscosity.

5.9.3 The oil temperature can be monitored by a temperature switch in the oil pressure pipe of the lubrication unit

- If the separate temperature switch indicates that the oil exceeds the oil temperature of 70 °C, an alarm must be issued for the operator.
- If the separate temperature switch indicates that the oil exceeds the oil temperature of 80 °C, stop the gear unit as soon as possible (recommended in less than 2 minutes).
- As an option, the temperature switches can be replaced by a Pt100 temperature sensor that is installed in the oil pressure pipe of the lubrication unit. The stop and alarm signals must correspond to the values specified for the temperature switches.
  - The normal operating temperature for the oil pan of the gear unit is approximately 70 °C when the oil cooler is in operation. Of course, the oil can be cooler than 70 °C.
  - The alarm must be triggered when the oil sump temperature of the gear unit reaches 80 °C.
  - Switch off the gear unit as soon as possible when the oil sump temperature of the gear unit reaches 90 °C (recommended in less than 2 minutes).

5.9.4 Oil filter

As an option, a duplex oil filter (two oil filters in one frame) can be provided to allow a clogged filter cartridge to be replaced during operation and without any interruption of business.

5.9.5 Contamination indicator visual and/or electrical in the oil filter

The oil filter cartridge must be replaced if either the optical or electrical contamination indicator signals a warning signal.

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5.9.6 Volume flow monitoring device

As an option, a volume flow monitor can be installed in the oil pressure pipe of the lubrication unit.

- The volume flow monitor is triggered when the oil flow has increased above 70% of the specified oil flow. If the oil flow is above 70% of the intended oil flow and is indicated by the flow switch, the main motor can be started.
- If the oil flow drops below 70% of the nominal oil flow indicated by the flow switch shutting down, stop the gear unit as quickly as possible (recommended in less than 2 minutes).

5.9.7 General assessment basis

The oil temperature that enters the gear unit from the cooler must be set in the range from 45 – 55 °C. An oil thermometer is located in the pressure oil pipe.

The oil temperature with water/oil cooler is controlled by a thermostatic water valve. The thermostat sensor measures the oil temperature directly after the cooler in the pressure oil pipe that leads from the cooler to the gear unit.

The oil temperature with air/oil cooler is controlled by a thermostat sensor that measures the oil temperature coming from the gear unit directly in front of the cooler. The fan of the air cooler should start working/cooling when the oil temperature coming out of the gear unit exceeds 60 °C. The thermostat of the fan at the air cooler should have a hysteresis of about 15 °C. The fan of the cooler should stop when the oil temperature coming out of the gear unit drops below 45 °C.

The bypass valve in the air/oil cooler should be selected so that it forces the entire oil flow through the cooler if the oil temperature coming out of the gear unit rises above 60 °C. Typically, the bypass valve also has a hysteresis of about 15 °C, which means that the entire oil flow should bypass the cooler if the oil temperature from the gear unit drops below 45 °C.

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5.10 Mounting/removing hollow-shaft gear units with keyed connection

INFORMATION

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

The selection of the thread and length of the threaded rod and the retaining screw depends on the surrounding structure of the customer.

5.10.1 Thread sizes

SEW-EURODRIVE recommends the following thread sizes:

Gear unit size	Thread size for • **Threaded rod [2]** • **Nut (DIN 934) [5]** • **Retaining screw [6]**
02 – 06	M24
07 – 09	M30

The thread size of the ejector screw depends on the end plate [4]:

Gear unit size	Thread size of the ejector screw [8]
02 – 06	M30
07 – 09	M36

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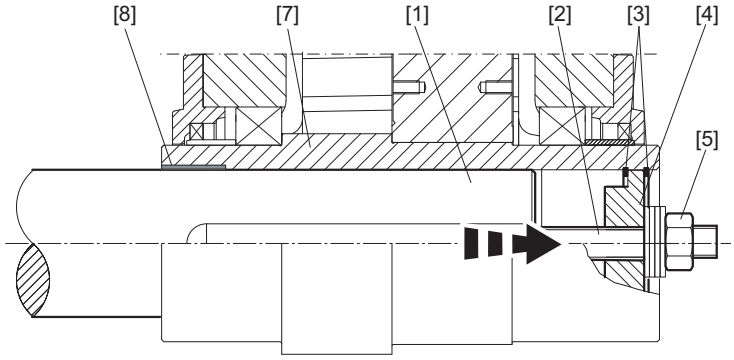
5.10.2 Mounting the hollow-shaft gear unit onto the customer shaft

1. To mount and secure the gear unit, attach the retaining rings [3] and the end plate [4] on the hollow shaft bore.
2. Apply NOCO® fluid to the hollow shaft [7] and the shaft end of the customer shaft [1].
3. Push the gear unit onto the customer shaft [1]. Thread the threaded rod [2] into the customer shaft [1]. Tighten the customer shaft [1] with the nut [5] until the shaft end of the customer shaft [1] and the end plate [4] meet.



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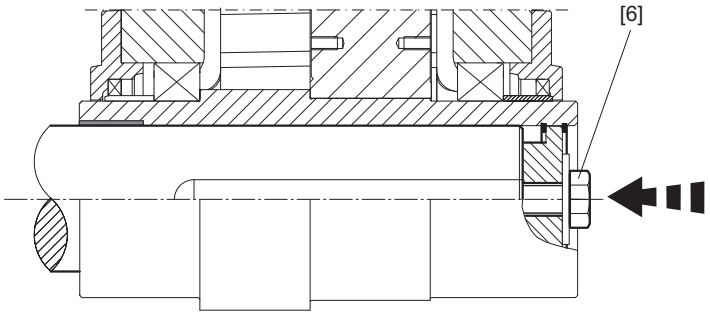
[1] Customer shaft
[2] Threaded rod
[3] Retaining rings
[4] End plate
[5] Nut
[7] Hollow shaft
[8] Bushing

4. Loosen the nut [5] and unscrew the threaded rod [2]. After having mounted the gear unit, secure the customer shaft [1] using the retaining screw [6].



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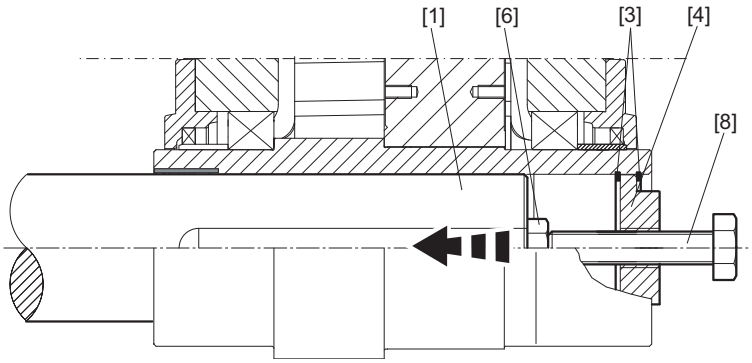
5.10.3 Removing the hollow-shaft gear unit from the customer shaft

1. Loosen the retaining screw [6].
2. Remove the outer retaining ring [3] and the end plate [4].
3. Thread the retaining screw [6] into the customer shaft [1].
4. Turn the end plate [4] and mount the end plate and the outer retaining ring [3] again.
5. Thread the ejector screw [8] into the end plate [4] to remove the gear unit from the customer shaft [1].



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[1] Customer shaft
[3] Retaining rings
[4] End plate
[6] Retaining screw
[8] Ejector screw

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5.11 Mounting/removing hollow-shaft gear units with shrink disk

Shrink disks serve as a connecting element between the hollow shaft of the gear unit and the customer shaft. For the shrink disk type used (type designation: RLK608), refer to chapter "Determining the shrink disk type".

INFORMATION

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

The selection of the thread and length of the threaded rod and the retaining screw depends on the surrounding structure of the customer.

5.11.1 Thread sizes

SEW-EURODRIVE recommends the following thread sizes:

Gear unit size	Thread size for • Threaded rod [2] • Nut (DIN 934) [5] • Retaining screw [6]	→ Illustration on the following pages
02 – 06	M24	
07 – 09	M30	

The thread size of the ejector screw depends on the end plate [4]:

Gear unit size	Thread size of the ejector screw [8]
02 – 06	M30
07 – 09	M36

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5.11.2 Determining the type of shrink disk

The shrink disk is usually type RLK608. It is metal colored. The letters "RLK 608-..." are engraved:

Shrink disk type RLK608 *25474390283*

[10] Locking screw
[11] Push-off bores

INFORMATION

Depending on the order, other types of shrink disk can be used. Read the separate operating instructions for the corresponding shrink disk.

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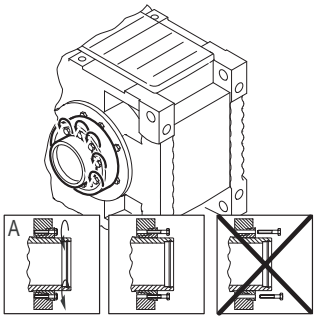
5.11.3 Mounting the shrink disk

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



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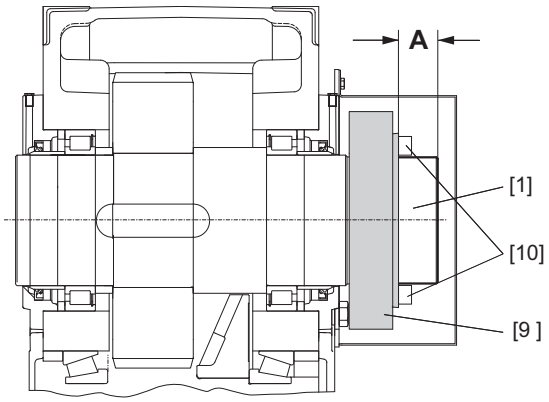
2. Slide the shrink disk [9] with untightened screws onto the hub of the hollow shaft bore. Position the customer shaft [1] in the hollow shaft bore. Then move the shrink disk [9] by dimension A (→ following figure, "Dimension A" section) from the shaft end of the hollow shaft:

3. ⚠ **CAUTION!** The loose shrink disk could slip. Potential risk of crushing due to falling parts.
   Secure the shrink disk against slipping.



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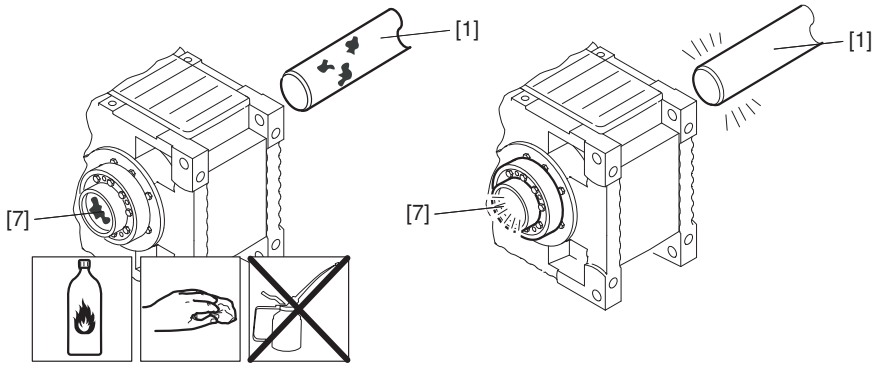
[1] Customer shaft
[9] Shrink disk
[10] Locking screws

Dimension A

Gear unit size	Dimension A in mm
02	39
03	45
04	44
05	42
06	44
07	50
08	51
09	49

5.11.4 Mounting the hollow-shaft gear unit onto the customer shaft

1. Before mounting the gear unit, degrease the hollow shaft bore and the customer shaft [1].



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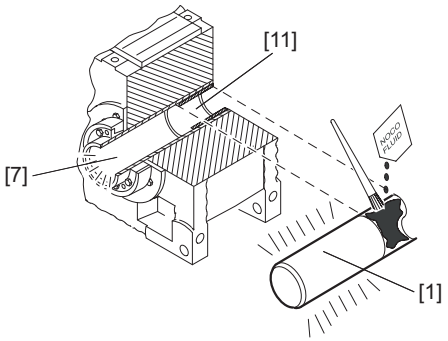
2. Apply some NOCO® fluid to the customer shaft in the area of the bushing [11].
3. **NOTICE!** Never apply assembly paste directly to the bushing [11] since the compound may get into the clamping area of the shrink disk when the input shaft is connected. Possible damage to property.
   It is essential that the clamping area of the shrink disk between the machine shaft and hollow shaft remains free of grease.



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4. To mount and secure the gear unit, attach the retaining rings [3] and the end plate [4] on the hollow shaft bore.
5. Push the gear unit onto the customer shaft [1]. Thread the threaded rod [2] into the customer shaft [1]. Tighten the customer shaft [1] with the nut [5] until the shaft end of the customer shaft [1] and the end plate [4] meet.
6. Loosen the nut [5] and unscrew the threaded rod [2].

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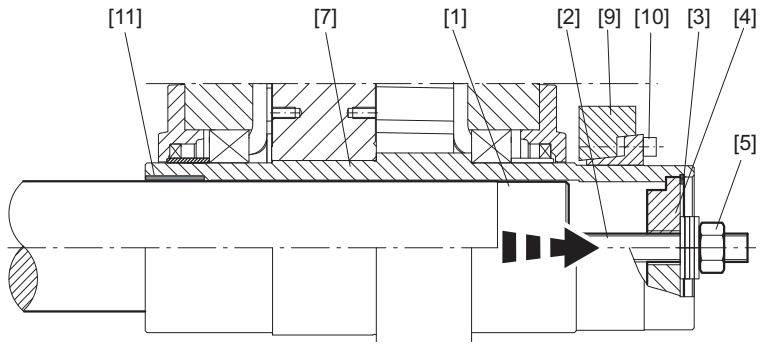

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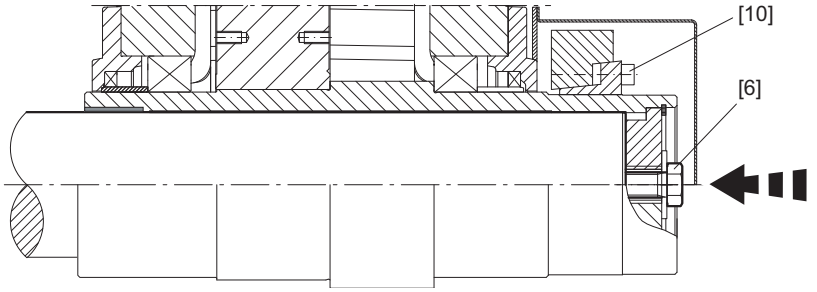
[1]	Customer shaft	[7]	Hollow shaft
[2]	Threaded rod	[9]	Shrink disk
[3]	Retaining rings	[10]	Locking screws
[4]	End plate	[11]	Bushing
[5]	Nut		

7. After having mounted the gear unit, secure the customer shaft [1] using the retaining screw [6].



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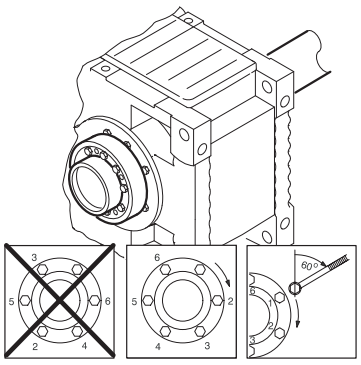
5.11.5 Tightening the shrink disk of type RLK608

Tighten the retaining screws by hand while the shrink disk is being aligned. Tighten the retaining screws one after the other in clockwise direction (not crosswise) by 1/4 turn each.



Sequence in which the retaining screws are tightened *25475390347*

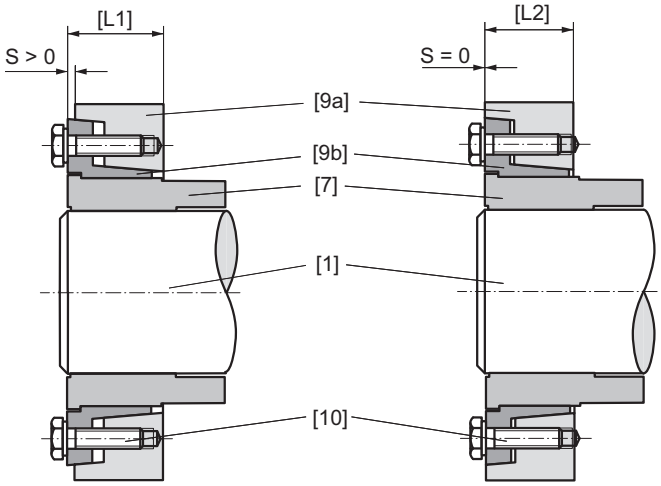
INFORMATION

Tighten the screws of shrink disks with slotted taper bushing so that you start with the screw on one side of the slot and continue with the screw on the other side of the slot.

Tighten the screws by a quarter turn in several steps until the screwing surfaces of the outer and inner rings are aligned.

INFORMATION

Mounting is determined by the axial movement of the taper bushings and can be done without a torque wrench.



Tightening the shrink disk of type RLK608 *25475543691*

[L1] Condition at the time of shipment (pre-assembled)
[L2] Ready for operation (final assembly)
[9a] Body size
[9b] Taper bushing
[7] Hollow shaft
[1] Customer shaft
[10] Locking screws

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5.11.6 Removing the shrink disk

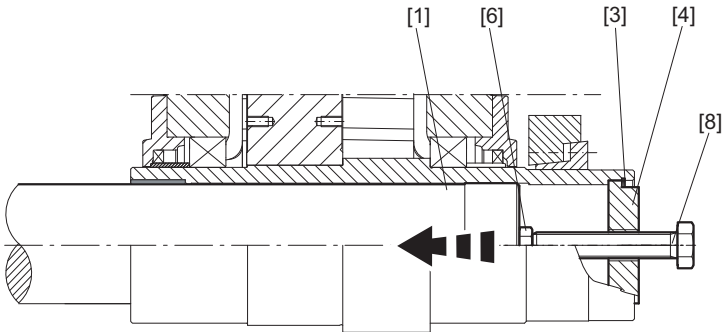
NOTICE

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

Possible damage to property.

- You may only support yourself on the hollow shaft during 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 retaining screw [6].
2. Remove the outer retaining ring [3] and the end plate [4].
3. Thread the retaining screw [6] into the customer shaft [1].
4. Turn the end plate [4] and mount the end plate and the outer retaining ring [3] again.
5. Thread the ejector screw [8] into the end plate [4] to remove the gear unit from the customer shaft [1].



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[1] Customer shaft
[3] Retaining ring
[4] End plate
[6] Retaining screw
[8] Ejector screw

5.11.7 Cleaning and lubrication

Clean the shrink disk after removal and

- Lubricate the locking screws [10] on the thread and under the head with an MoS_2 compound, such as "gleitmo 100" from FUCHS LUBRITECH (www.fuchs.-lubritech.de).
- Lubricate the tapered surfaces and the screwing surfaces of the taper bushing with a thin layer (0.01 ... 0.02 mm) of "gleitmo 900" lubricant from FUCHS LUBRITECH (www.fuchs.-lubritech.de) or a comparable product from another manufacturer.

INFORMATION

Spray the lubricant until the layer is thick enough to cover the surface (in this case, the thickness is approx. 0.01 ... 0.02 mm).

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5.12 Mounting a motor with motor adapter

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

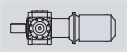
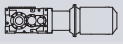
The motor weight may not exceed either one of these criteria.

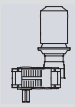
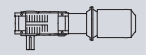
The following applies to all tables:

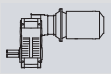
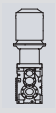
G_M = Motor weight G_G = Gear unit weight

INFORMATION

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

Fastening type	Gear unit series	
	 MC.PL..	 MC.RL..
Foot mounting	$G_M \leq G_G$	$G_M \leq G_G$
Shaft-mounted design	$G_M \leq 0.5G_G$	$G_M \leq G_G$
Flange mounting	$G_M \leq 0.5G_G$	$G_M \leq G_G$

Fastening type	Gear unit series	
	 MC.PV..	 MC.RV..
Foot mounting	$G_M \leq 1.5G_G$	$G_M \leq G_G$
Shaft-mounted design	$G_M \leq G_G$	$G_M \leq G_G$
Flange mounting	$G_M \leq G_G$	$G_M \leq 0.75G_G$

Fastening type	Gear unit series	
	 MC.PE..	 MC.RE..
Foot mounting	$G_M \leq G_G$	$G_M \leq 1.5G_G$
Shaft-mounted design	$G_M \leq G_G$	$G_M \leq G_G$
Flange mounting	$G_M \leq G_G$	$G_M \leq G_G$

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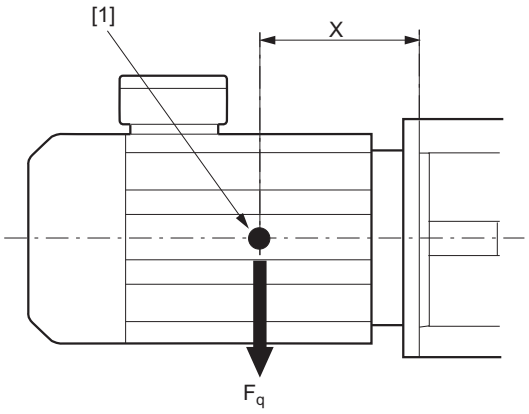
These tables apply only to the following assignment of motor size/weight Fq and dimension "x."



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[1] Center of gravity of the motor

Motor size		F_q	x
IEC	**NEMA**	**N**	**mm**
132S	**213/215**	579	189
132M	**213/215**	677	208
160M	**254/286**	1059	235
160L	**254/286**	1275	281
180M	**254/286**	1619	305
180L	**254/286**	1766	305
200L	**324**	2354	333
225S	**365**	2943	348
225M	**365**	3237	348
250M	**405**	4267	395
280S	**444**	5984	433
280M	**445**	6475	433
315S	**505**	8142	485
315M	**505**	8927	485
315L		11772	555

The maximum approved weight of the attached motor F_q has to be reduced in a linear manner if the center of gravity distance x is increased. $F_{q\ max}$ cannot be increased if the center of gravity distance is reduced.

INFORMATION

Contact SEW-EURODRIVE in the following cases.

- When retrofitting motor adapters with a cooling air fan (not for motors of sizes 132S and 132M).
- If a motor adapter is removed, re-alignment is necessary.

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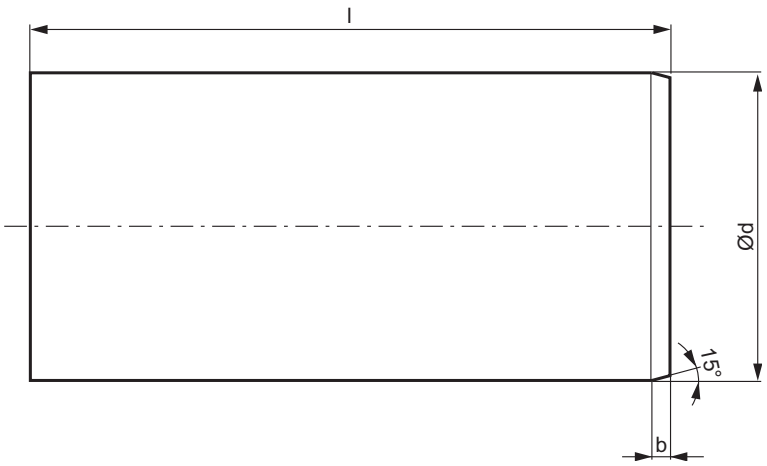
5.13 Flange coupling with cylindrical interference fit

5.13.1 Dimensions of the machine shaft

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



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Size	ø d	ø l	B x 15°
MC 02	85_{h6}	130	5 x 15°
MC 03	100_{h6}	140	5 x 15°
MC 04	105_{h6}	150	5 x 15°
MC 05	120_{x6}	180	7 x 15°
MC 06	130_{h6}	180	7 x 15°
MC 07	140_{h6}	210	7 x 15°
MC 08	160_{x6}	210	8 x 15°
MC 09	170_{x6}	220	8 x 15°

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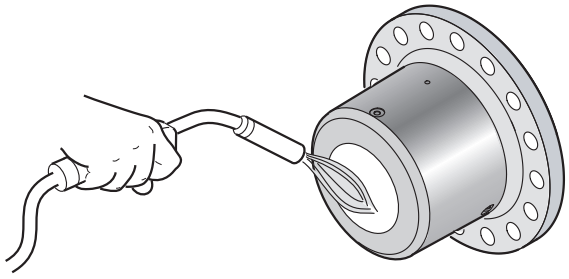
5.13.2 Mounting the coupling onto the machine shaft

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



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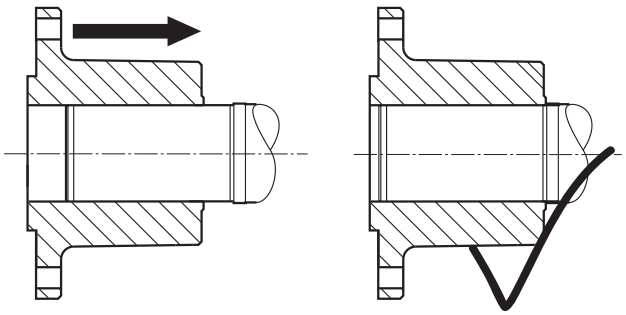
6. Mount the flange coupling quickly onto the shaft up against the shaft shoulder.

INFORMATION

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

INFORMATION

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



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5.13.3 Mounting the flange connection

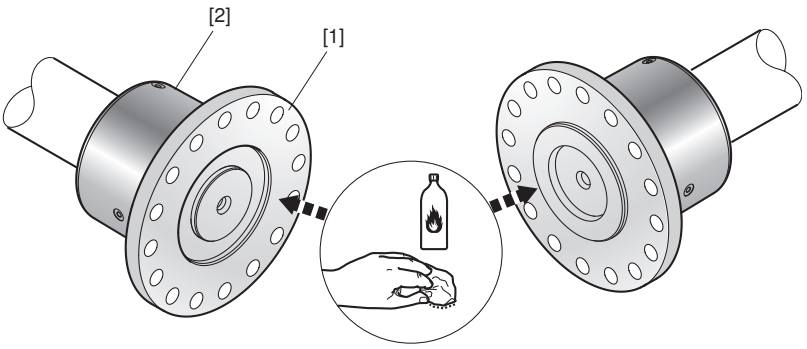
NOTICE

Improper assembly can damage the coupling.

Possible damage to property.

- Note that the flange coupling cannot compensate any shaft misalignments during mounting.

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



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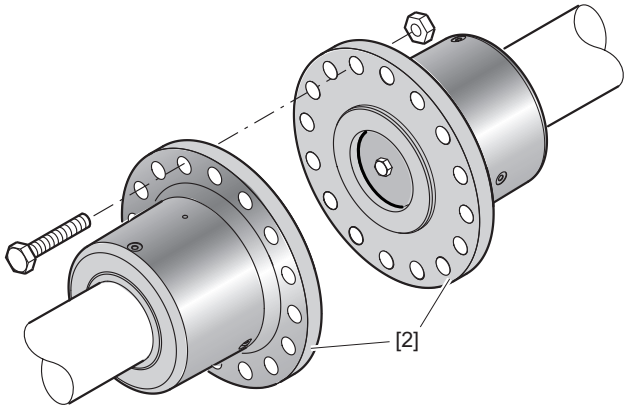
2. Align the bore patterns of the two coupling halves [2] and join the flange coupling.



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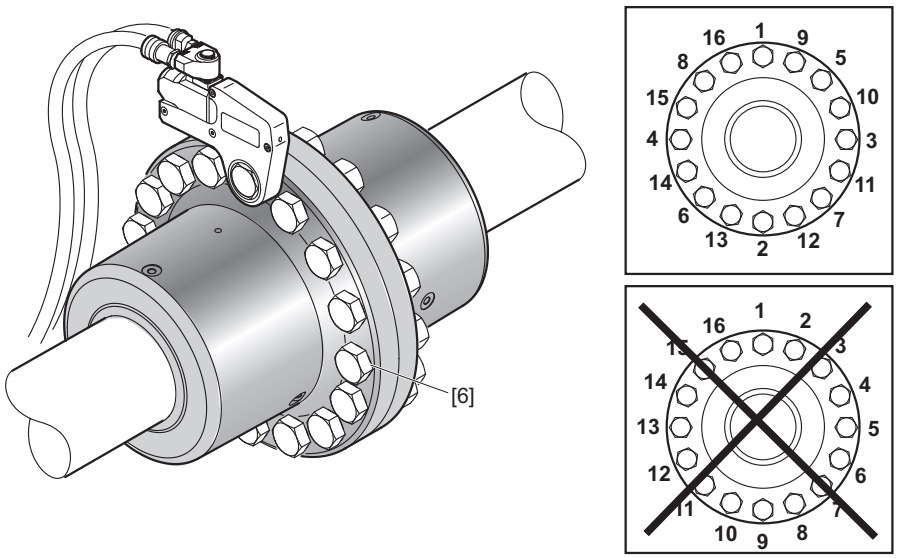
3. Mount the screws [3] and tighten them in diametrically opposite sequence to the tightening torques given in the following table.



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INFORMATION

The tightening torques listed in the table are based on the friction coefficient for thread and bearing surface of μ = 0.14 for screws of strength class 8.8, and of μ = 0.11 for screws of strength class 10.9.

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

Use only the following tools for installation:

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

For disassembling the coupling, one oil pump is required per disassembly bore.The data required for dimensioning the extractor is listed in the following table:

Screw size	Tightening torque in Nm Strength class	
	8.8	10.9
M16	235	285
M20	460	555
M24	795	960
M30	1590	1910
M36	2760	3320
M42	4410	5310

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5.13.4 Removing the coupling from the shaft

Notes

⚠ CAUTION

Risk of jamming and crushing due to improper removal of heavy components.

Risk of injury.

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

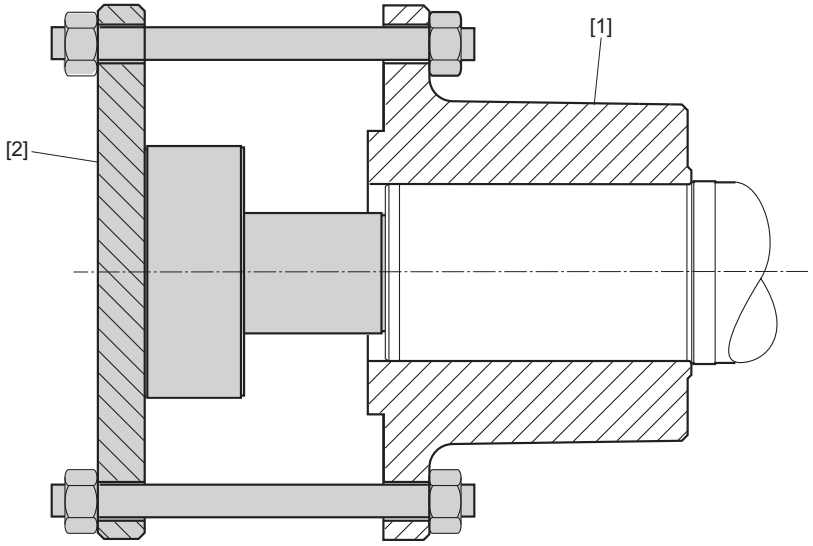
NOTICE

Improper disassembly may damage the output shaft bearing.

Possible damage to property

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

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



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

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

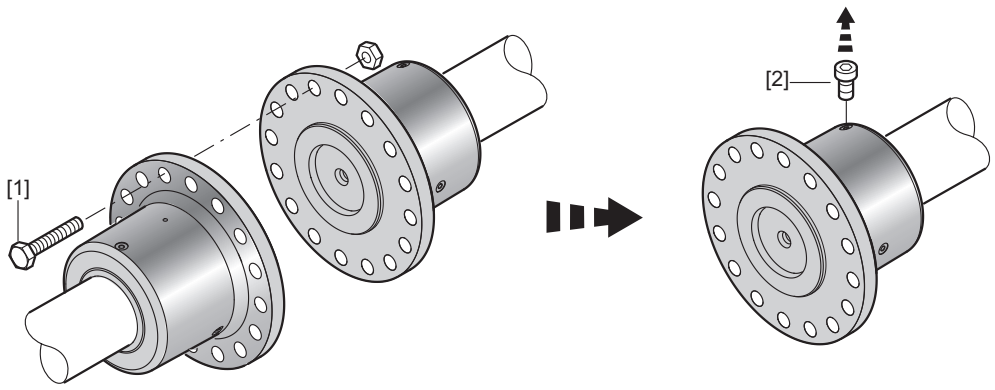
Size	Required axial force of extractor kN	Required oil pressure for disassembly bar
MC02	60	1600
MC03	65	
MC04	72	
MC05	100	
MC06	115	
MC07	121	
MC08	175	
MC09	200	

Procedure

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

INFORMATION

Carefully prepare the disassembly tools and the process so that the coupling can be removed quickly from the shaft.



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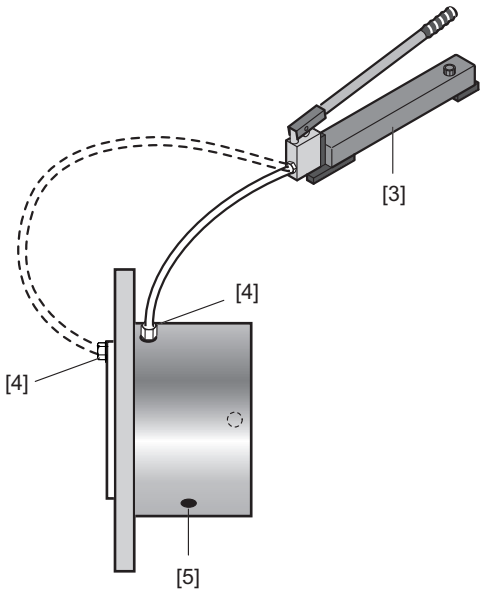
2. Connect the first oil pump [3] to the disassembly bore closest to the flange [4] and apply pressure until oil comes out of the second disassembly bore [5]. Depending on the size, this bore can also be located on the flange surface of the coupling.

INFORMATION

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



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

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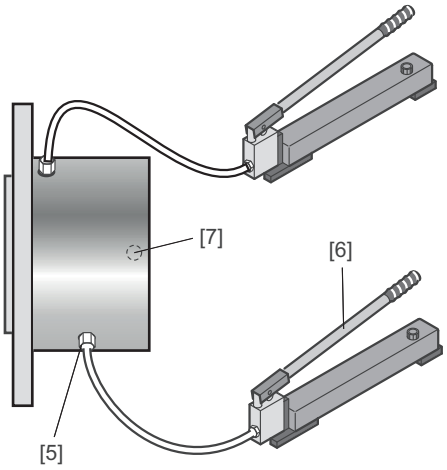

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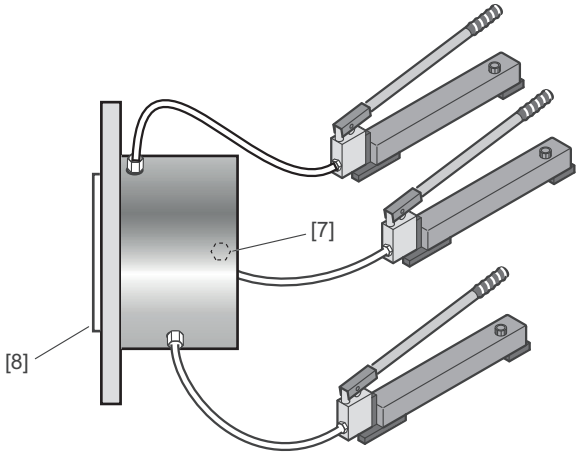
4. Repeat this process until all disassembly bores are connected to an oil pump and pressure is applied. At the last disassembly bore [7], increase the pressure until oil comes out in the shape of a ring at both front faces of the coupling [8].



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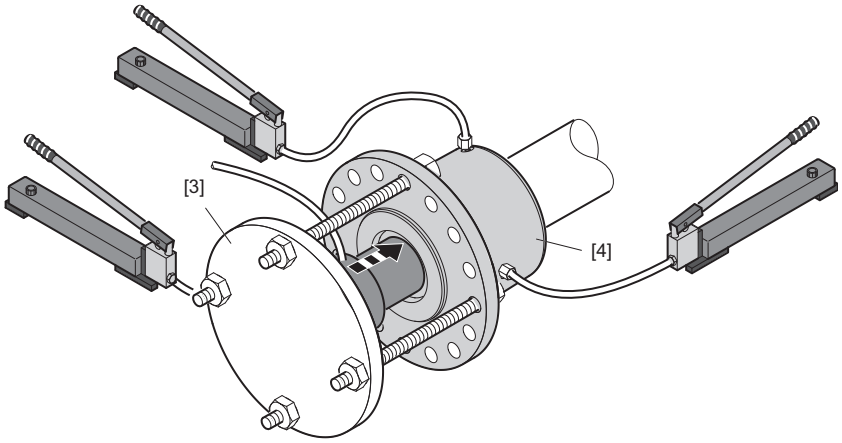
INFORMATION

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

INFORMATION

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

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



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6. Check the condition of the shaft and the coupling bore after the disassembly process. Replace damaged parts.

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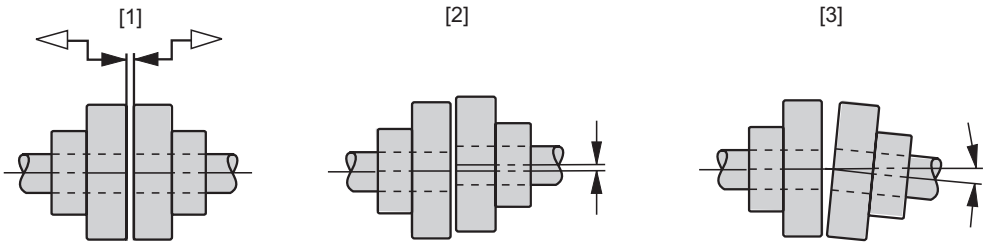
5.14 Align couplings/assembly tolerances

5.14.1 Mounting tolerances

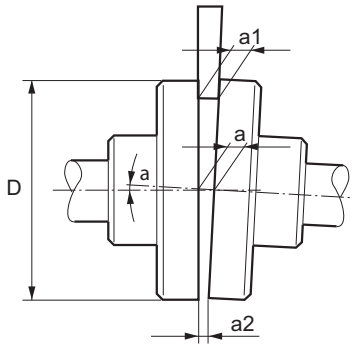
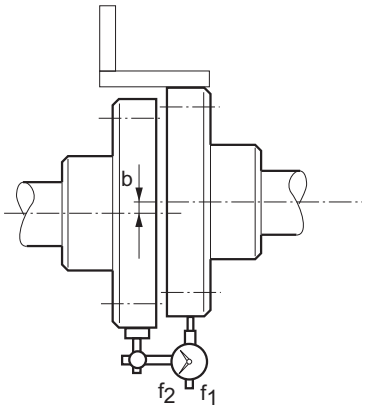
a) Axial misalignment

b) Radial misalignment

c) Angular offset



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

Measuring instruments	Angular offset	Axis offset
Laser		
	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 average value from the difference (a1 – a2).	The following illustration shows the measurement of axial misalignment using a straight-edge. Permissible values for eccentricity 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 micrometer dial indicates the misalignment (dimension "b") that includes the axial misalignment of the other coupling half.

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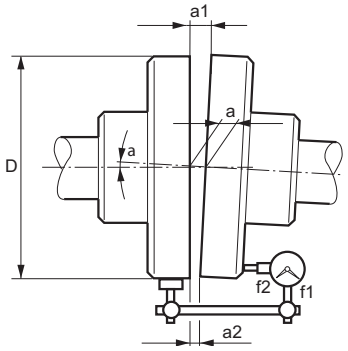
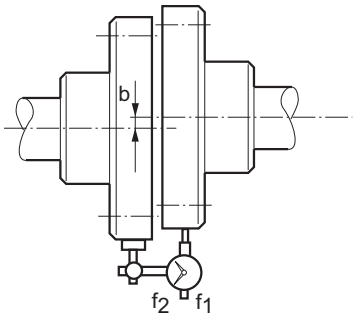
Measuring instruments	Angular offset	Axis offset
Micrometer dial		
	A prerequisite for this measuring method is that there is no axial play in the shaft bearings when the shafts rotate. If this condition is not fulfilled, the axial play between the faces of the coupling halves must be eliminated. As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

5.14.2 SEW-EURODRIVE standard coupling from KTR-Rotex

INFORMATION

Observe the operating instructions of the applicable coupling manufacturer.

5.14.3 Mounting tolerances

Observe the following points.

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

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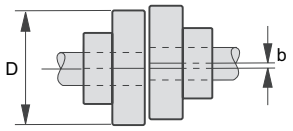
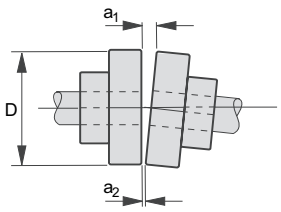
Observe the following information.

Radial misalignment



b = Max. radial misalignment
D = Outer diameter

Angular misalignment



$a_1 - a_2$ = Max. angular misalignment

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

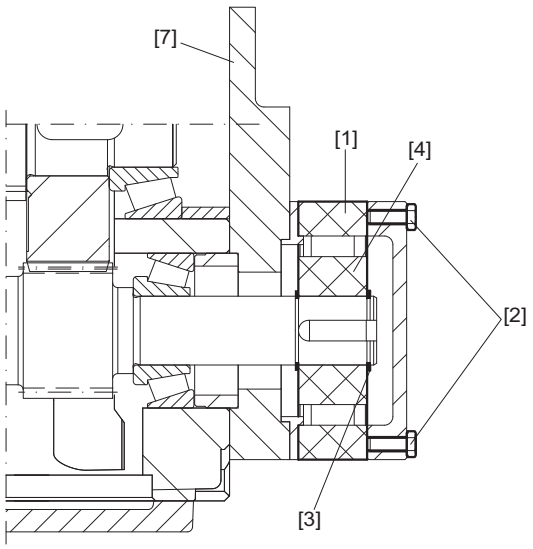
Outer diameter D in mm	Mounting tolerances in mm					
	n < 500 min^{-1}		n: 500 – 1500 min^{-1}		n > 1500 min^{-1}	
	$a_1 - a_2$	b	$a_1 - a_2$	b	$a_1 - a_2$	b
0 – 200	0.2	0.2	0.2	0.2	0.2	0.2
200 – 400	0.3	0.3	0.3	0.3	0.3	0.3
> 400	0.3	0.3	0.3	0.3	–	–

5.15 Backstop FXM

5.15.1 Changing the direction of rotation

To change the direction of rotation, turn the inner ring with the sprags by 180°. To do so, the inner ring with the sprags must be pulled out using a pull-off device (not included in the delivery) and re-installed rotated by 180°.

...for a backstop mounted outside the gear unit



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[1] Outer ring
[2] Retaining screws
[3] Retaining ring
[4] Inner ring with cage and sprags

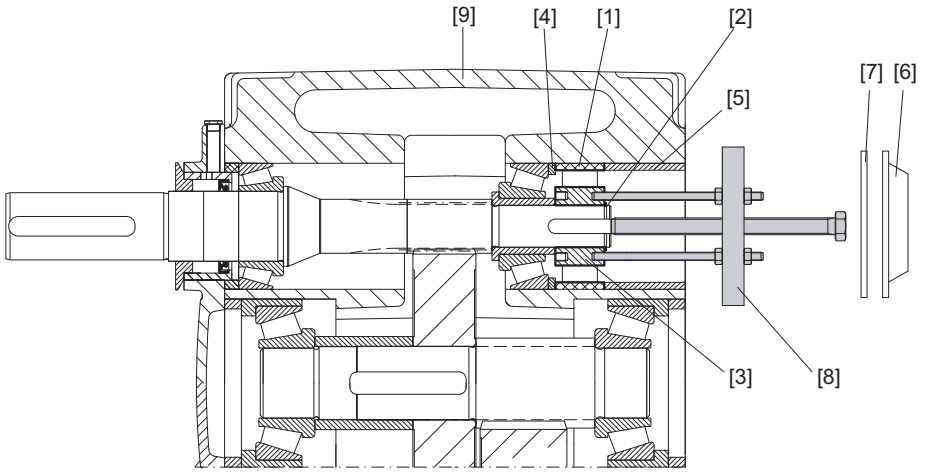
1. Drain the oil from the gear unit, see chapter "Changing the oil" (→ 🗎 166).
2. Loosen the retaining screws [2] of the backstop.

3. Remove the outer ring [1]. To facilitate dismounting, slightly turn the outer ring [2] in freewheeling direction.
4. Remove the retaining ring [3] and inner ring with cage and sprags [4].
5. Turn the inner ring [4] with the sprags by 180° and replace the parts in reverse order. When mounting the backstop, do not apply pressure to the cage with the sprags but to the inner ring [4] only. Use the threaded holes on the inner ring [4] for mounting.
6. Fix the inner ring [4] with the retaining ring [3] in axial direction. Mount the outer ring [1] using the retaining screws [2]. Observe the tightening torques specified in the following table:

Screw size	Tightening torque in Nm
M5	6
M6	10
M8	25
M10	48
M12	84
M16	206
M20	402
M24	696
M30	1420

7. Alter the direction arrow on the gear unit housing.
8. Fill the gear unit with oil again, see chapter "Checking the oil level" (→ 🗎 163).
9. After assembly, check that the backstop runs smoothly.

... with the backstop installed in the gear unit



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Changing the direction of rotation when the backstop is installed in the gear unit

[1] Outer ring
[2] Retaining ring
[3] Inner ring with cage and sprags
[4] Supporting ring
[5] Sleeve
[6] Bearing cover
[7] Shims
[8] Pull-off device

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1. Drain the oil from the gear unit, see chapter "Changing the oil" (→ 🗎 166).
2. Remove bearing cover [6], shims [7] and sleeve [5]. It is important that shims [7] and sleeve [5] between bearing cover [6] and outer ring [1] are not mixed up because they must be assembled in the correct order.
3. Remove the retaining ring [2] from the input shaft.
4. Remove the inner ring with the cage and wedge elements [3] using a suitable pulling device [8]. Use the threaded holes on the inner ring [3] for mounting.
5. Turn the inner ring [3] with the sprags by 180° and replace the parts in reverse order. When mounting the backstop, do not apply pressure to the cage with the sprags but to the inner ring [3] only.
6. When mounting the backstop, turn it in freewheeling direction so that the sprags move into the outer ring.
7. Fix the inner ring [3] with the retaining ring [2] in axial direction.
8. Mount the sleeve [5], shims [7] and bearing cover [6] in reverse order.
9. Alter the direction arrow on the gear unit housing.
10. Fill the gear unit with oil again (→ chapter "Lubricants"). Check the oil level.
11. After assembly, check that the backstop runs smoothly.

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5.16 Torque arm

INFORMATION

If the gear unit moves to the side during operation or there is a noticeably large number of peak torques, you should not use the fixed torque arm. Use a torque arm with flexible bearing sleeve instead. Contact SEW-EURODRIVE.

5.16.1 Directly mounted to the gear unit

Always mount the torque arm on the side of the driven machine.

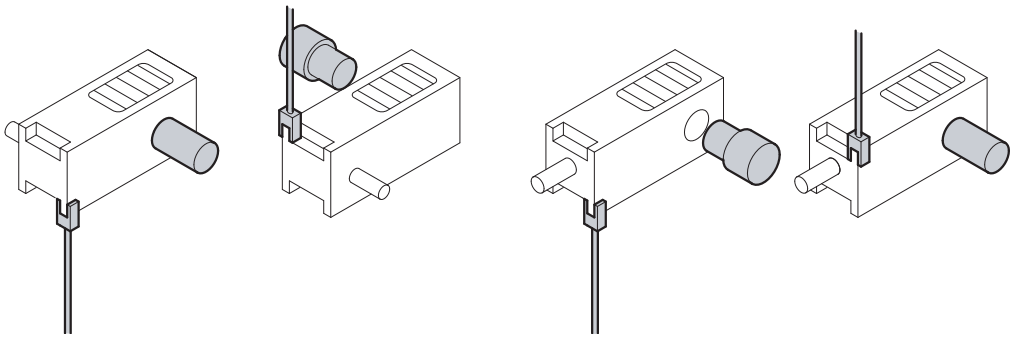
Observe the notes in chapter "Important information" (→ 🗎 86).

⚠ WARNING

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

Severe or fatal injuries.

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



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The torque arm can be directly mounted to the gear unit both in the case of tensile strain and compressive stress. Additional strain or stress to the gear unit may be caused by

- eccentricity during operation
- expansion of the driven machine due to heat

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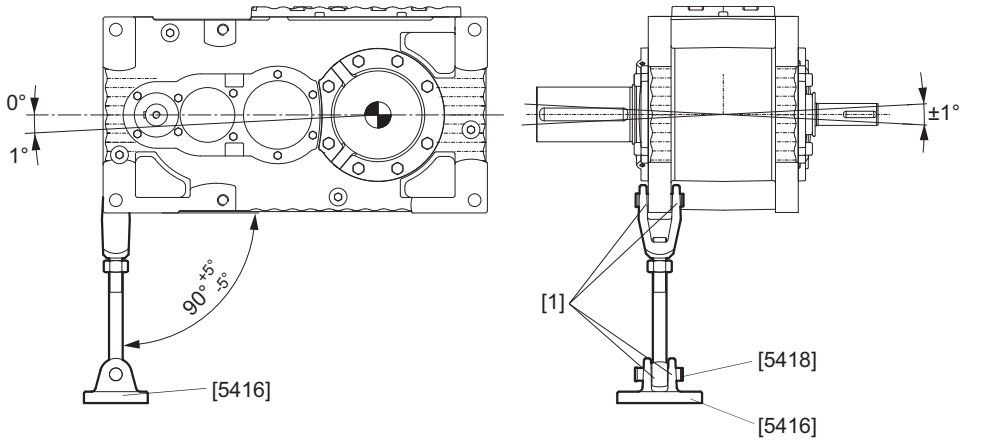
To avoid such strain, the anchor bolt [5418] is equipped with double connection elements that allow sufficient lateral and radial clearance [1].



25539056139

NOTICE

Danger due to overhung loads acting on the torque arm.

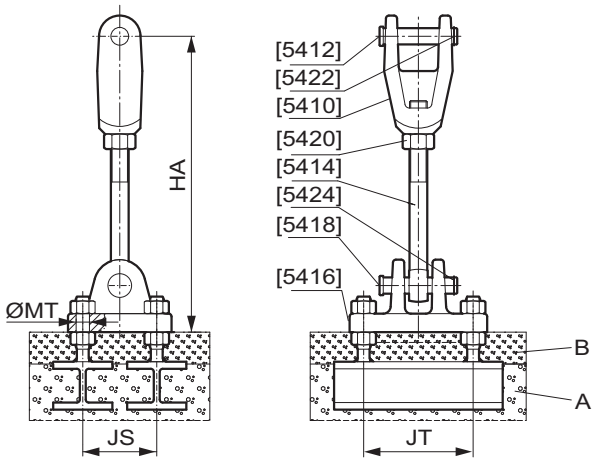
Possible damage to the gear unit.

- It is essential that there is sufficient clearance [1] between the torque arm and the anchor plate [5416] as well as between the torque arm and the gear unit. This way, no bending force can act on the torque arm and the bearings of the output shaft are not subjected to additional stress.

5.16.2 Foundation for torque arm

To build the foundation for the torque arm directly mounted to the gear unit or mounted to the swing base of the motor, do the following:

- Place the supporting girders horizontally in their fixed locations. Anchor the supporting girders in the concrete base [A].
- Reinforce the concrete base [A] and connect it to the base using steel rods. The concrete base [A] must withstand at least the same load as the weld joints of the foundation screws.
- After having mounted the torque arm, position the grouting [B] and bond it to the concrete base [A] with steel rods.



25539117835

[A]	Concrete base	[5416]	Anchor plate
[B]	Second concrete layer	[5418]	Anchoring bolt
[5410]	Anchoring	[5420]	Hex nut
[5412]	Anchoring bolt	[5422]	Retaining ring
[5414]	Eye bolt	[5424]	Retaining ring

INFORMATION

All parts except positions A and B are included in the scope of delivery.

The length HA of the torque arm (→ following table) can be freely selected in the range between HA_{min} and HA_{max}. The torque arm is supplied as a special design if HA is to be greater than HA_{max}.

Gear unit size	HA mm min. ... max.	JT mm	JS mm	ØMT mm
02, 03	360 ... 410	148	100	18
04,05	405 ... 455			
06, 07	417 ... 467			
08, 09	432 ... 482	188	130	22

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5.17 V-belt

⚠ WARNING

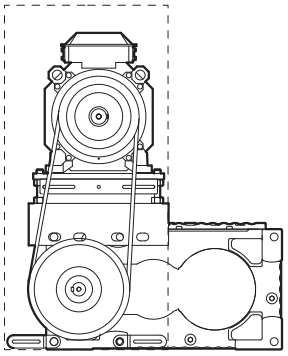
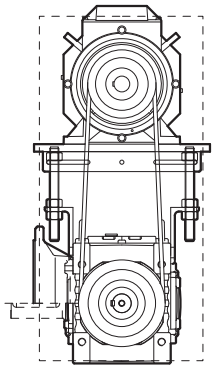
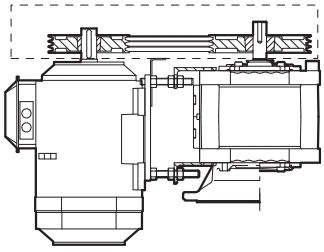
Observe the maximum circumferential speed according to the respective manufacturer specifications.

Severe or fatal injuries.

- Overspeed can damage the belt pulley.

When selecting a motor, observe the permitted motor weight, the gear unit design and the type of gear unit mounting according to the following table.

G_M = Motor weight G_G = Gear unit weight

	MC2P/MC3P	MC2R/MC3R
Upright mounting: **Foot-mounted design** $G_M \leq 0.4 \times G_G$ **Shaft-mounted design** $G_M \leq 0.4 \times G_G$ **Flange-mounted design** $G_M \leq 0.4 \times G_G$	Contact SEW-EURODRIVE	Contact SEW-EURODRIVE
Horizontal LSS: **Foot-mounted design** $G_M \leq 1.0 \times G_G$ **Shaft-mounted design** $G_M \leq 1.0 \times G_G$ **Flange-mounted design** $G_M \leq G_G$		
Vertical LSS: **Foot-mounted design** $G_M \leq 0.4 \times G_G$ **Shaft-mounted design** $G_M \leq 0.4 \times G_G$ **Flange-mounted design** $G_M \leq 0.4 \times G_G$		Contact SEW-EURODRIVE

INFORMATION

Heavier motor weights are only permitted if they have been specified in the purchase order.

G_M = Motor weight G_G = Gear unit weight

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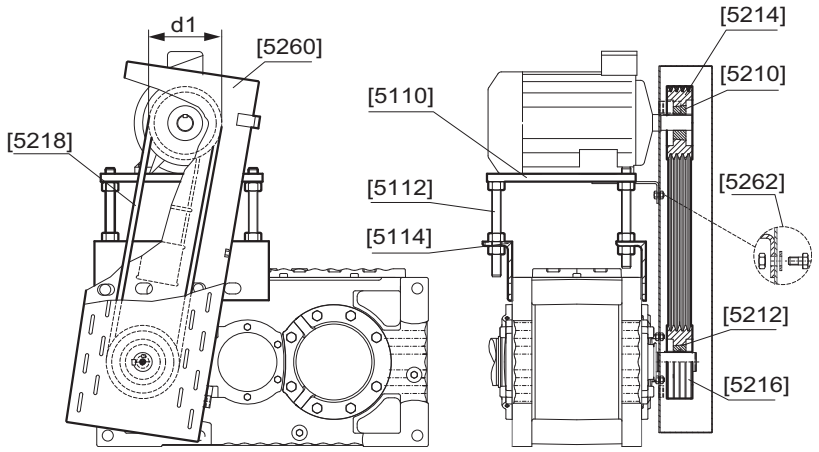

V-belt drive

25539447307

[5110, 5112]	Motor scoop	[5214, 5216]	Belt pulleys
[5114]	Angle bracket	[5218]	V-belt
[5210, 5212]	Taper bushing	[5260]	Belt cover

5.17.1 Mounting

- Mount the motor on the motor bracket (retaining screws not included in the scope of delivery).
- Attach the back plate of the belt guard cover [5260] to the motor bracket [5112, 5114] of the gear unit using screws. Take into account the desired direction of the opening of the belt guard cover [5260]. To adjust the tension of the V-belt, loosen the upper screw [5262] of the backplate of the belt guard cover.
- **Installing the taper bushings [5210, 5212]:**
  - Mount the belt pulleys [5214, 5216] onto motor and gear shaft as closely as possible to the shaft shoulder.
  - Degrease taper bushings [5210, 5212] and belt pulleys [5214, 5216]. Insert the taper bushings [5210, 5212] into the belt pulleys [5214, 5216]. Make sure that the bores are aligned accurately.
  - Grease the retaining screws and screw them into the threading of the belt pulley hub.
  - Clean motor and gear shaft and insert the complete belt pulleys [5214, 5216].
  - Tighten the screws. Tap slightly against the sleeve and re-tighten the screws. Repeat this procedure several times.
  - Make sure that the belt pulleys [5214, 5216] are aligned accurately. Check the alignment with a steel beam that is in contact at four points (→ following figure).

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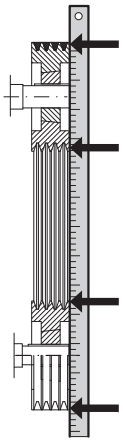

25539456395

– Fill the holes with grease to exclude dirt.

- Draw V-belts [5218] over the belt pulleys [5214, 5216] and tighten the belts using the adjustment screws in the motor bracket (→ chapter belt tightening).
- The maximum permissible error is 1 mm per 1000 mm span of the V-belt. This way, maximum power transmission is ensured and excessive load on the gear and motor shafts can be prevented.
- **Check belt tension using a V-belt tension meter:**
  – Measure the length of the belt span (= free belt length)
  – Measure the perpendicular force causing a 16 mm sag per 1000 mm of the belt. Compare the measured values with those listed in section "Belt tightening".
- Tighten the lock screws for the motor rack and the belt guard rear plate.
- Mount the belt guard cover using the hinge pins. Secure the hinge pins.

5.17.2 V-belt tightening

V-belt profile	Ø d1 mm	Force required to offset the belt by 16 mm per 1000 mm span in N
SPC	56 – 95	13 – 20
	100 – 140	20 – 25
SPA	80 – 132	25 – 35
	140 – 200	35 – 45
SPB	112 – 224	45 – 65
	236 – 315	65 – 85
SPC	224 – 355	85 – 115
	375 – 560	115 – 150

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5.18 Oil heater

⚠ WARNING

Danger of electric shock.

Severe or fatal injuries.

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

NOTICE

Improper operation of the oil heater may damage the gear unit.

Possible damage to property.

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

NOTICE

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

Possible damage to property.

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

INFORMATION

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

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

INFORMATION

Refer to the dimension sheet and the order documents for further information on the oil heater.

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5.18.1 Activation / deactivation behavior

- The oil heater is activated when the factory set temperature is reached. This temperature setpoint depends on the following factors:
  - With splash lubrication/bath lubrication: The pour point of the used oil
  - With pressure lubricated gear units: from the temperature at which the oil viscosity reaches a maximum of 2000 cSt
- The oil heater is deactivated when the set temperature is exceeded by 8 to 10 °C.

Observe the information in chapter "Lubricant tables".

Thermostat and oil heater are usually installed on the gear unit and are ready for operation but without electrical connections. Therefore, do the following before startup:

1. Connect the resistor element ("Oil heating") to the power supply
2. Connect the thermostat to the power supply

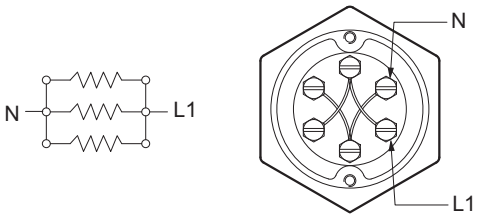
5.18.2 Technical data

Gear unit size	Current consumption oil heater	Voltage supply V_{AC}
04 - 06	600 W	See separate data sheet[1)]
07 - 09	1200 W	

1) Only use voltage specified in separate data sheet.

5.18.3 Electrical connection resistor element

Connection examples with 230/400 V line voltage



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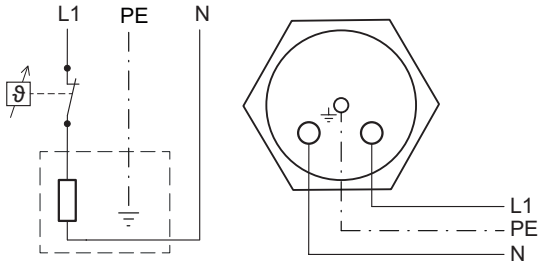
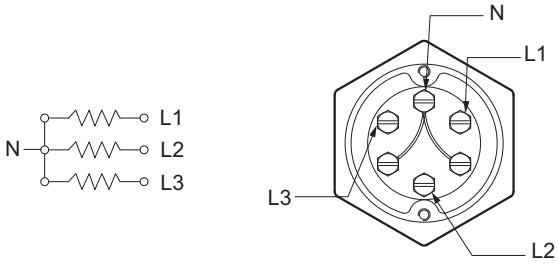
1-phase	
Voltage	230 V
Phase voltage	230 V
Line voltage	400 V
Voltage resistor element	230 V



48316201227

1-phase	
Voltage	230 V
Phase voltage	230 V
Line voltage	230 V
Voltage resistor element	230 V



25540691083

3-phase / star connection	
Voltage	230/400 V
Phase voltage	230 V
Line voltage	400 V
Voltage resistor element	230 V

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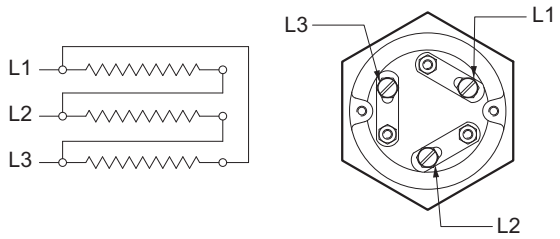
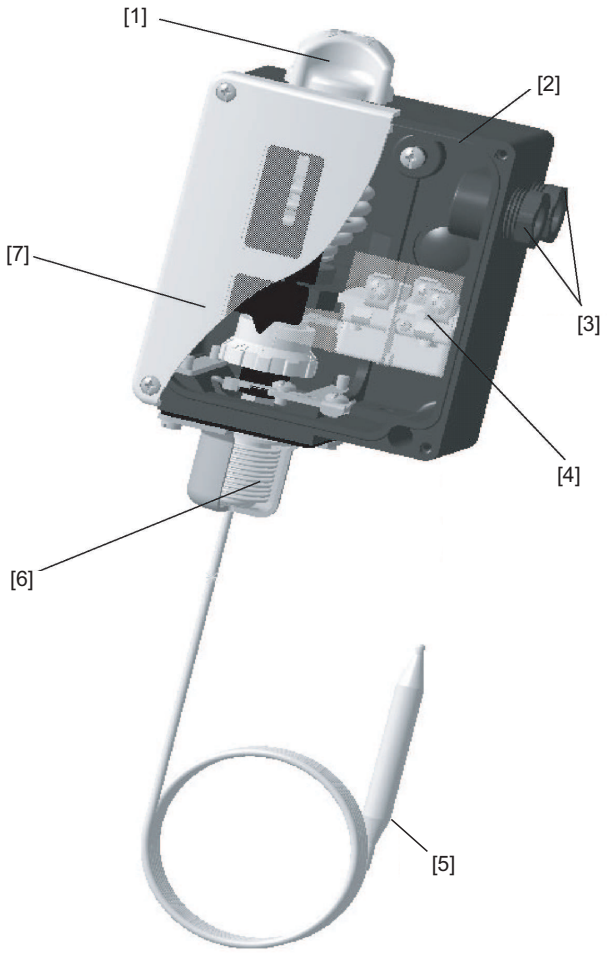


25540694667

3-phase / delta connection	
Voltage	400 V
Line voltage	400 V
Voltage resistor element	400 V

5.18.4 Basic structure of thermostat



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

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

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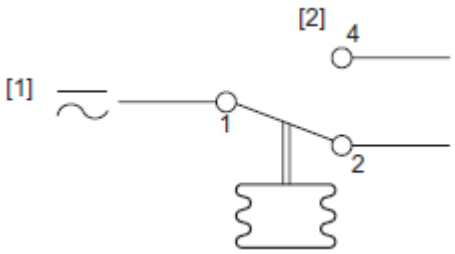
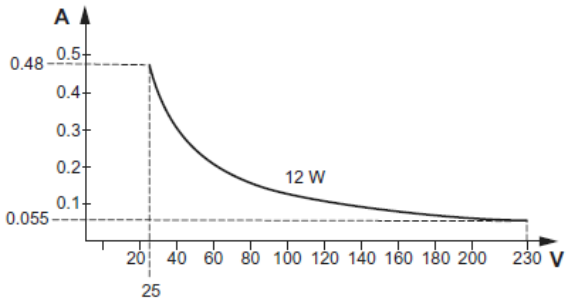
<table>
<tr><th></th><th colspan="2">Thermostat RT</th></tr>
<tr><td>Connection diagram</td><td colspan="2"> 

[1] Line
[2] SPDT</td></tr>
<tr><td rowspan="2">Connection data</td><td>Alternating current:
AC-1: 10 A, 400 V
AC-3: 4 A, 400V
AC-15: 3 A, 400 V</td><td rowspan="2"> 
</td></tr>
<tr><td>Contact material:
AgCdO</td><td>Direct current:
DC-13: 12 W, 230 V</td></tr>
<tr><td>Cable entry</td><td colspan="2">2 PG 13.5 for cable diameter of 6 – 14 mm</td></tr>
<tr><td>Degree of protection</td><td colspan="2">IP66 according to IEC 529 and EN 60529, IP54 for devices with external reset. The thermostat housing is made of bakelite according to DIN 53470, the cover is made of polyamide.</td></tr>
</table>

A contactor must be used in the following cases:

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

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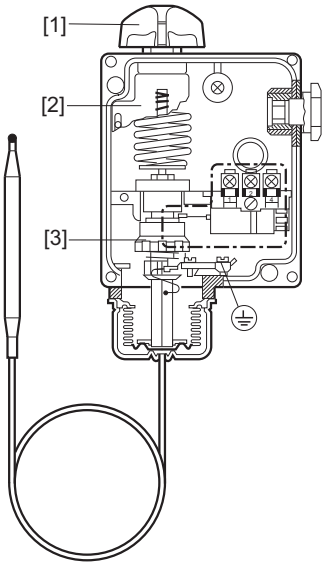
5.18.5 Adjusting the setpoint

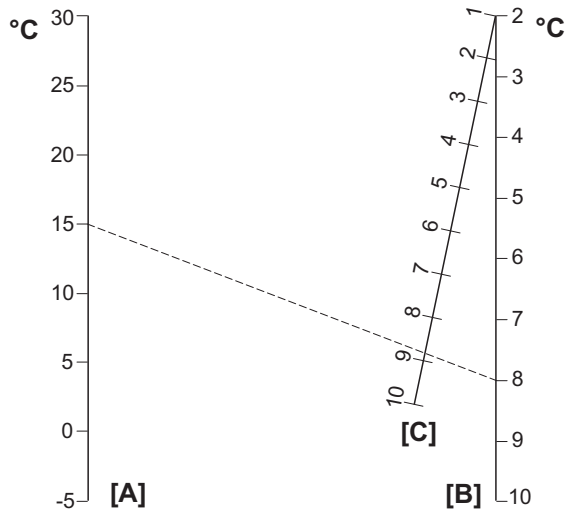
The setpoint is usually set at the factory. Proceed as follows for changing the value: The range is set using the adjustment knob [1] while reading the main scale [2]. Use a tool if the thermostat is equipped with a cap. The differential is set using the differential disk [3].

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



25544694923

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



25544698507

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

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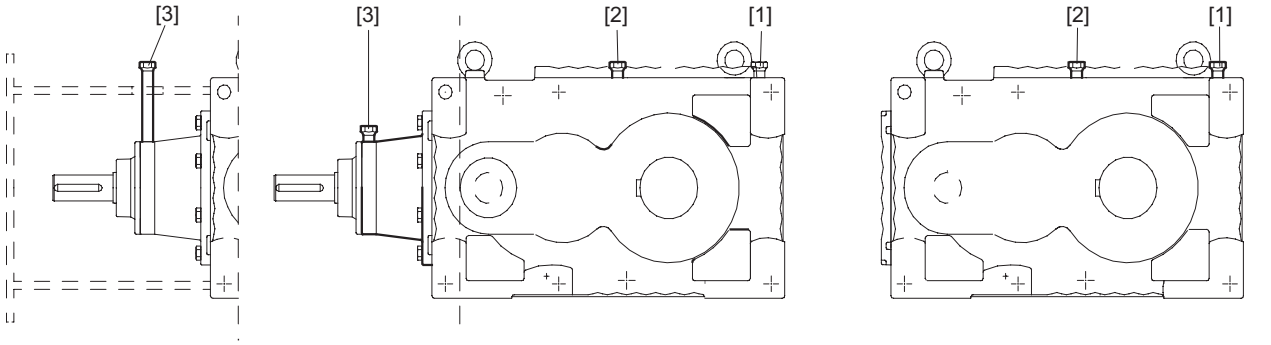
5.19 SPM adapter

SPM adapters are available for measuring the shock pulses of the gear unit bearings. The shock pulses are measured using shock pulse sensors attached to the SPM adapter.

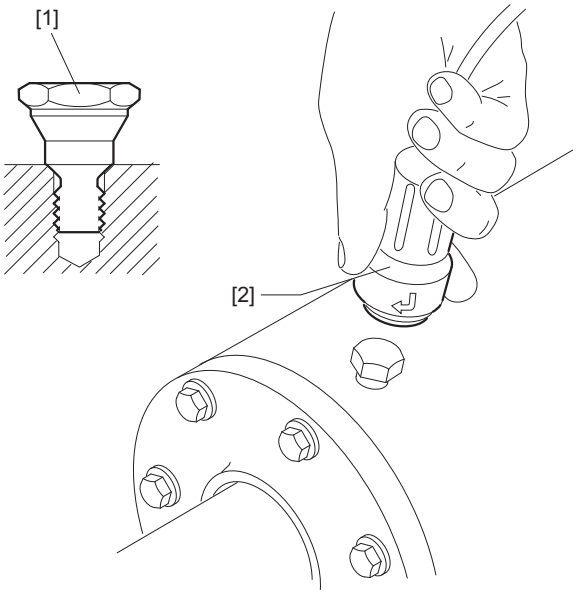
5.19.1 Mounting position

MC.R..: An extended SPM adapter [3] is required if a motor flange or fan is used.	MC.R..: SPM adapters [1] and [2] are attached on the side of the gear unit, SPM adapter [3] is attached on the pinion housing.	MC.P..: SPM adapters [1] and [2] are attached to the side of the gear unit.



Mounting positions of SPM adapters

25545682571



Mounting the shock pulse sensor onto the SPM adapter

25545686155

5.19.2 Mounting the shock pulse sensor

- Remove the protection cap of the SPM adapter [1]. Ensure that the SPM adapter [1] is tightened correctly and securely.
- Mount the shock pulse sensor [2] on the SPM adapter [1].

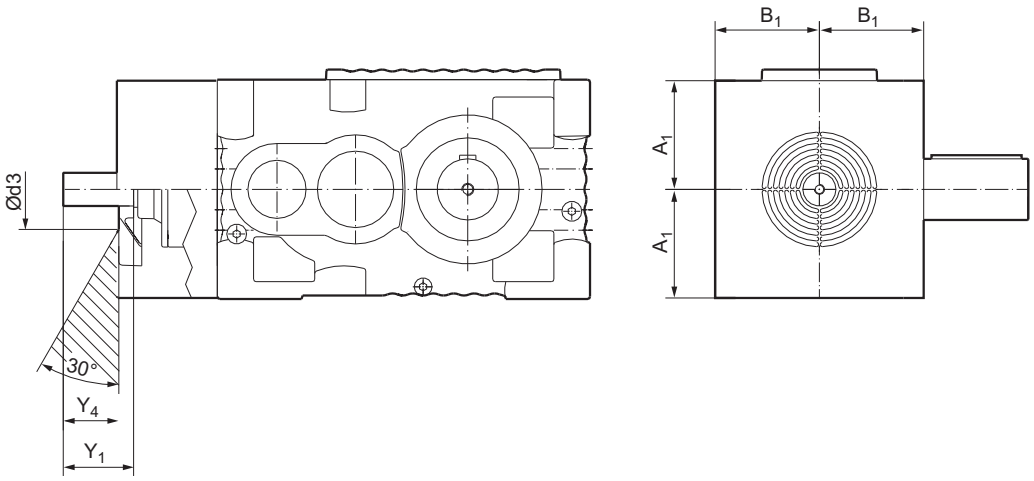
5.20 Fan

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 the intake of cooling air.

  Refer to 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 when installing the fan guard:



Mounting dimension of the fan

25545916683

Size	A_1	B_1	Y_4	Y_1	Air intake	
	mm				Ø d_3 in mm	Angle
MC3RL..02	158	160	70	100	109	30°
MC3RL..03	178	165	82	112	131	
MC3RL..04	198	185	90	120	131	
MC3RL..05	213	195	95	125	156	
MC3RL..06	232	220	100	130	156	
MC3RL..07	262	230	105	135	156	
MC3RL..08	297	255	105	135	198	
MC3RL..09	332	265	110	140	226	

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5.21 Flow switch

5.21.1 Selection

SEW-EURODRIVE selects the flow switch. As standard, a flow switch of the type DW-R-20 is used. All the following technical data refer to this type.

5.21.2 Function

The oil flow pushes against a circular plate attached to a pendulum. The pendulum, which is regulated by a spring, moves on its pivot. A magnet attached to the end of the pendulum operates a movable reed contact. The switch unit itself is separated from the oil.

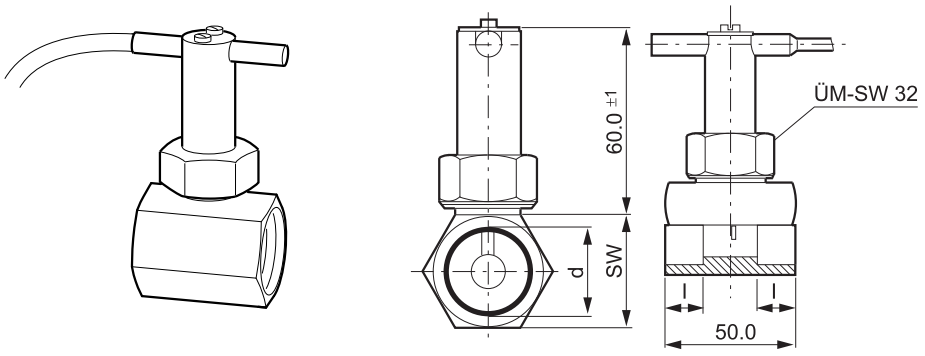
The flow switch has two switching points:

1. Switching point HIGH (lower limit of flow rate) → contact closed - ON
2. Switching point LOW (upper limit of flow rate) → contact closed - OFF

5.21.3 Dimensions

INFORMATION

For determining the exact position of the flow switch, refer to the order-specific dimension drawing.



Dimensions

25546715659

	d female thread	NW (rated width)	l	SW	Z	Z	L	H	Z
			mm						
Material				A+B+C	A+B	C	D	D	D
Dimension	R ¾	20	11	30	50	50	19	109	66

Material abbreviations:

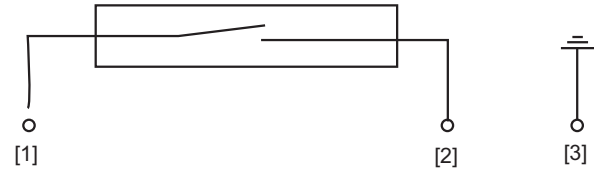
A = Brass

B = Nickel-plated brass

C = Stainless steel

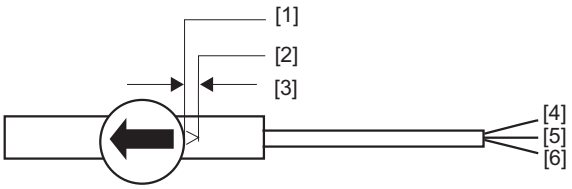
C = Stainless steel / PVC

5.21.4 Electrical connection



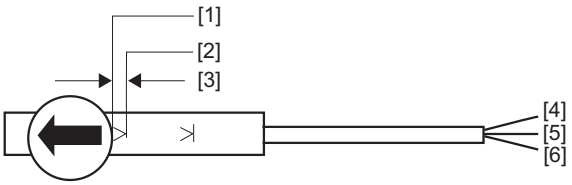
Electrical connection 25547905547

[1] Brown
[2] Blue
[3] Yellow/green



Electrical connection 25547909131

[1] Switching point HIGH
[2] Switching point LOW
[3] Setting range
[4] Blue
[5] Brown
[6] Yellow/green



Electrical connection 25547912715

[1] Switching point HIGH
[2] Switching point LOW
[3] Setting range
[4] Blue
[5] Brown
[6] Yellow/green

Connection data:	230 V; 1,5 A; 80 W, 90 $V_{A\ max}$
Degree of protection:	IP65
Maximum temperature of medium:	110 °C
Maximum ambient temperature:	70 °C
Maximum working pressure:	25 bar
Length of connecting cable:	1.5 m
Switch:	Switch can be used as NC or NO contact; SPDT switch available on request
Switch hysteresis:	approx. 5%

Type	Switching point range ON	Switching point range OFF	Maximum flow rate
	l/min		
DW-R-20	8.5 – 12.0	6.6 – 11.0	80

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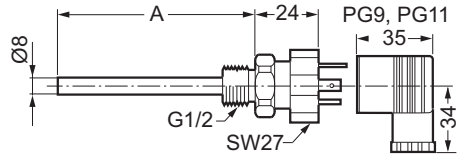
5.22 Temperature sensor /Pt100

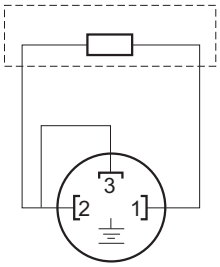
5.22.1 Dimensions



27021598123377419

A in mm
50
150

5.22.2 Electrical connection



9007199613899531

[1] [2] Resistor element connection

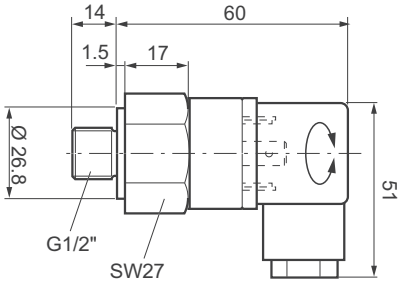
5.22.3 Technical data

- Design with thermowell and changeable measuring insert
- Sensor tolerance K ± (0.3 + 0.005 × 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.

5.23 Temperature switch /NTB

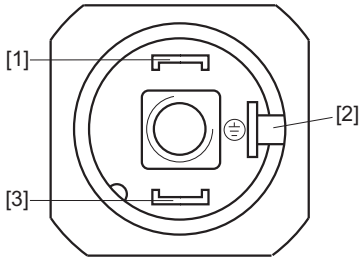
5.23.1 Dimensions



36028797385488907

5.23.2 Electrical connection

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



366532491

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

5.23.3 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.

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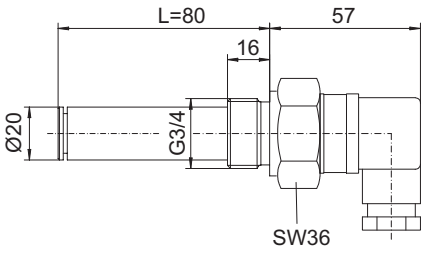
5.24 Temperature switch /TSK

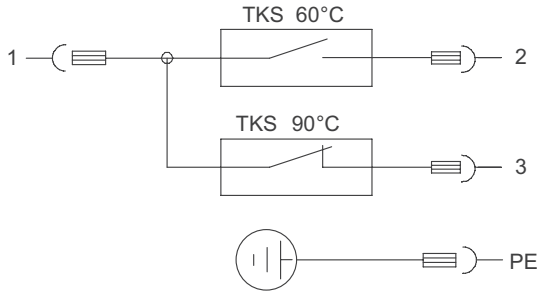
5.24.1 Dimensions



9007200148613771

5.24.2 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.



45035997167583115

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

5.24.3 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.

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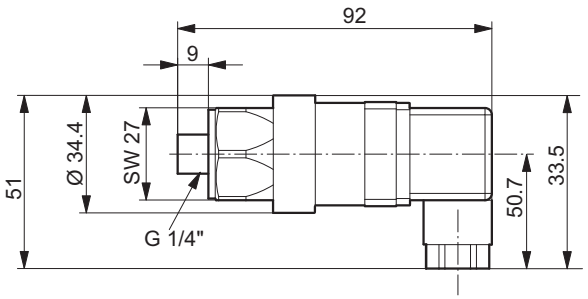
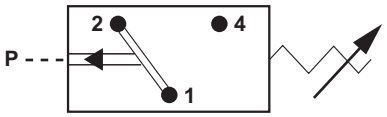
5.25 Pressure switch /PS

5.25.1 Dimensions



721994635

5.25.2 Electrical connection



722003723

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

5.25.3 Technical data

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

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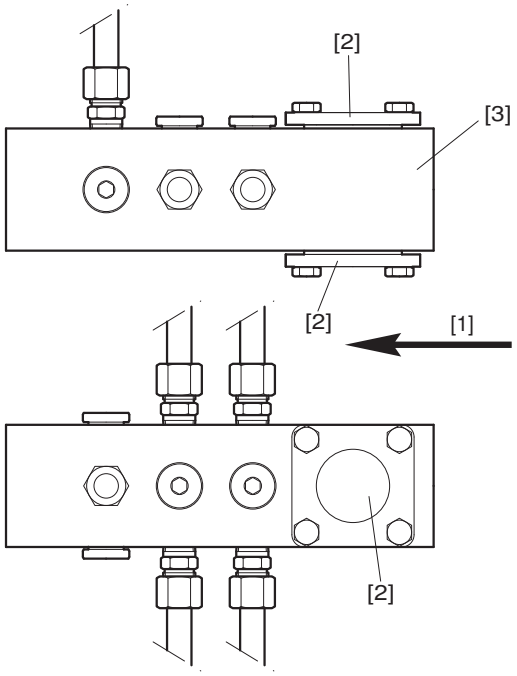
5.26 Visual flow indicator



25548730763

[1] Oil flow direction
[2] Sight glass
[3] Oil distributor block

5.26.1 Use

The visual flow indicator is a simple method of checking the functioning of a pressure lubrication system by visually checking the oil flow.

5.26.2 Function

The oil flow can be seen behind the glass [2]. If no oil flows and/or air bubbles are in the oil, check the function of the pump and the suction pipe with the connections.

INFORMATION

It is easier to see the oil flow when the glasses [2] are clean and bright light is used on the other side of the oil distribution block.

6 Startup

6.1 Gear unit startup

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 notes.

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- 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 chapters "Checking the oil level" (→ 🗎 163) and "Changing the oil" (→ 🗎 166).

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

  Check the oil level again after the first few operating hours, see chapter "Checking the oil level" (→ 🗎 163).
- The most important technical data is provided on the nameplate. Additional data relevant for operation is available in drawings, on the order confirmation, or any order-specific documentation.
- After installing the gear unit, check to see that all retaining screws are tight.
- Make sure that the alignment has not changed after tightening the mounting elements.
- If there are any oil drain valves, ensure that they cannot be opened unintentionally.
- Prior to startup, make sure the monitoring devices (pressure switch, temperature switch, etc.) are fully operational.
- If an oil level glass is used for checking the oil level, ensure that it is protected against damage.
- If the gear unit is equipped with a fan on the input shaft, check for free air intake within the specified angle.
- Gear units with pressure lubrication may only be taken into operation when the pressure switch is connected.
- Make sure that the external coolant supply is guaranteed for gear units with water cooling cover.
- 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 motor, frequency inverter, etc., must be grounded separately.
- Protect the gear unit from falling objects.
- Remove any available transport protection prior to startup.
- Observe the safety notes in the individual chapters.

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6.1.1 Before startup

- **Remove dust and dirt from the gear unit surface.**
- **When using gear units with long-term protection:** Remove the gear unit from the sea-worthy protection box.
- Remove the corrosion protection agent from the gear unit parts. Make sure gaskets, sealing surfaces and sealing lips are not damaged by mechanical abrasion, etc.
- Before filling the gear unit with the correct oil grade and volume, drain the remaining amount of protection oil. To do so, unscrew the oil drain plug and drain the remaining protection oil. Thread the oil drain plug back in place.
- Ensure that rotating shafts as well as couplings are equipped with suitable protective covers.
- If the gear unit has a motor pump, check for proper functioning of the pressure lubricating system. Make sure that monitoring devices are connected properly.
- After an extended period of storage (max. 2 years), have the gear unit operate without load with the correct oil fill (see chapter "Nameplate"). This way, the correct functioning of the lubricating system and particularly the oil pump is ensured.
- If the gear unit is equipped with a fan on the input shaft, check for free air intake within the specified angle (see chapter "Fan").

6.1.2 Run-in period

SEW-EURODRIVE recommends running-in the gear unit as the first phase of startup. Increase load and revolutions up to maximum level in 2 to 3 steps. The run-in phase takes approx. 10 hours.

Note the following during the running-in phase:

- Verify the power values specified on the nameplate because their frequency may be a decisive factor for the service life of the gear unit.
- Does the gear unit run smoothly?
- Are there vibrations or unusual running noises?
- Are there signs of leakage (lubricants) on the gear unit?

INFORMATION

For further information and troubleshooting measures, refer to chapter "Malfunctions".

6.2 Startup of MC gear units with backstop

INFORMATION

Ensure that the direction of rotation of the motor is correct for gear units with backstop.

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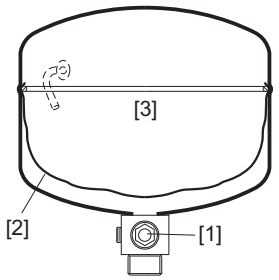
6.3 Startup of MC gear units with steel oil expansion tank

This chapter describes the procedure for filling MC.PV, MC.RV, and MC.RE gear units supplied with steel oil expansion tanks. Fill with oil very carefully. No more air may be in the gear unit. Before filling the gear unit, the membrane in the steel oil expansion tank must be at the bottom. The membrane moves up and down with the thermal expansion of the oil when the gear unit is in operation.

Position of the membrane before startup:

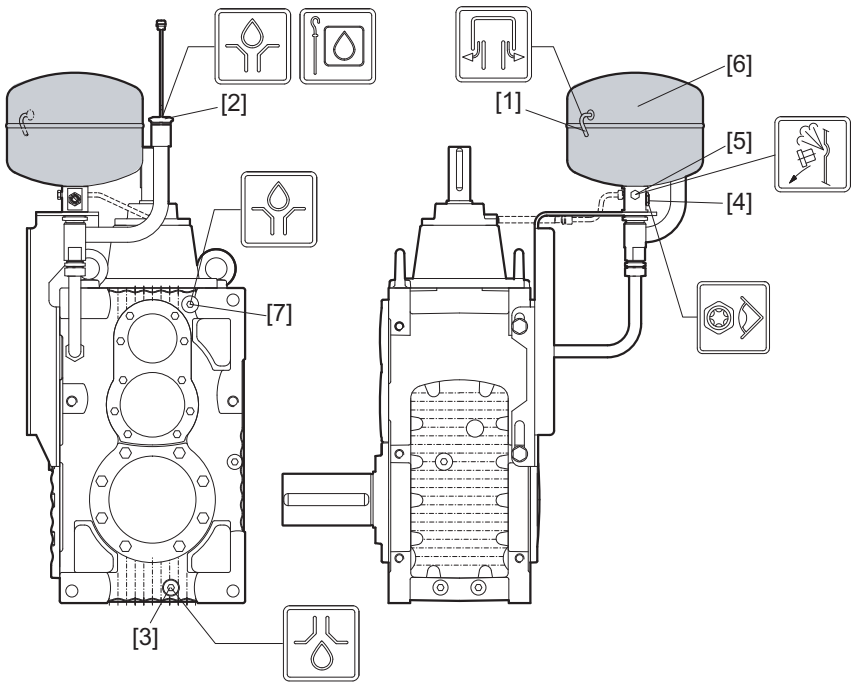


25551750923

[1] Oil level
[2] Membrane in down position
[3] Air

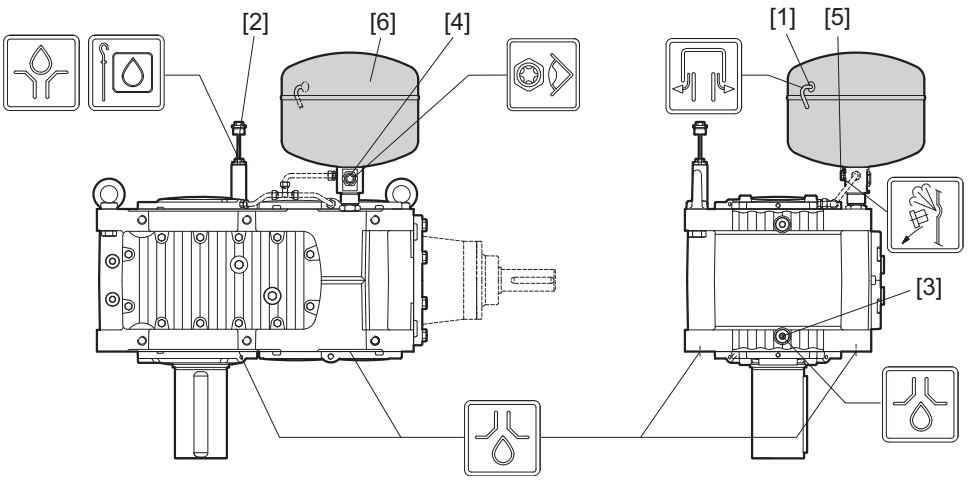
If air penetrates below the membrane in the oil expansion tank, it can push the membrane upward. This causes pressure to build up in the gear unit, and leakage may result.

When being filled, the oil temperature must be the same as the ambient temperature, and the gear unit must be mounted in its final mounting position. If the gear unit is filled before it is mounted, it may not be tilted when being installed since the oil would then move the membrane upward.



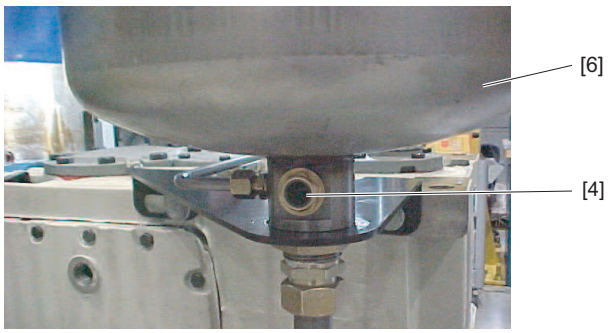
25551754507

[1] Breather plug
[2] Dipstick and oil filling hole no. 2
[3] Oil drain plug
[4] Oil sight glass
[5] Air outlet screw
[6] Steel oil expansion tank
[7] Oil filling hole no. 1

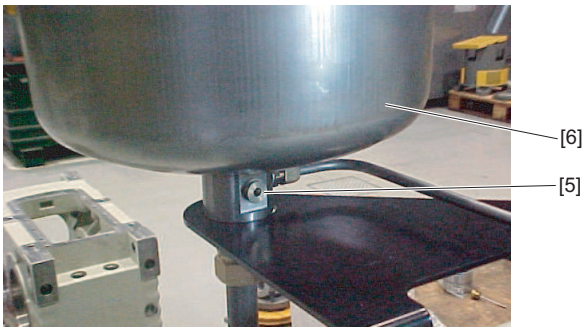


25551758091

[1] Breather plug
[2] Oil dipstick
[3] Oil drain plug
[4] Oil sight glass
[5] Air outlet screw
[6] Steel oil expansion tank



25551761675



25551765259

1. Open the air outlet screw [5].
2. Open ALL of the screw plugs on the top of the gear unit (normally two to three screw plugs, such as the breather plug, oil filling plug, and dipstick).
3. Let compressed air into the oil expansion tank using the breather plug [1]. The membrane goes down (sometimes you will hear a popping noise).
4. Fill the oil through the oil filling holes ([2][7] refer to the previous page).
5. When the oil has reached the holes of the screw plugs (unless you are using a dipstick), screw the screw plugs back on to the housing. Start with the screw plug hole where the oil first begins to leak. Then close the second screw plug, etc. This procedure prevents air from entering the gear unit.

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6. Fill the gear unit with oil until oil comes out of the air outlet screw [5]. Close the air outlet screw.
7. Fill the oil up to the oil sight glass [4].
8. Monitor the oil level using the oil sight glass and the dipstick. The correct oil level has been reached when half of the oil sight glass is covered with oil. The oil level in the oil sight glass is decisive.
9. Screw in the dipstick again [2].
10. Execute a trial run to ensure that the oil level does not sink below the oil sight glass.
11. Check the oil level only after the gear unit has cooled down to the ambient temperature.

INFORMATION

Before the gear unit is filled with oil, the membrane in the oil expansion tank must be in the down position to prevent pressure from building up in the gear unit. Strict adherence to the described procedure is the prerequisite for any and every liability claim.

6.4 Gear unit shutdown/corrosion protection

⚠ 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. For oil supply systems, contact SEW-EURODRIVE.

Additional preservation measures are required if the gear unit is to be shut-down for a longer period. Note the installation site, ambient conditions and lubricant condition of the gear unit, depending on which preservation may be necessary after only a few weeks of downtime.

6.4.1 Internal conservation

- **New or hardly used gear units:**
  - SEW-EURODRIVE recommends the VCI conservation method for internal conservation of the gear unit.
  - Apply the required amount of VCI anti-corrosion agent to the inside of the gear unit (e.g. FUCHS Anticorit VCI UNI O-40, www.fuchs.com). The amount depends on the free space inside the gear unit. Any existing oil may usually remain in the drive.

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

– Replace the breather with a screw plug and close the gear unit so that it is air tight. Mount a new breather prior to startup.

- **After longer gear unit operation:**
  – The oil might be contaminated (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" (→ 🗎 166) in the corresponding operating instructions. The inside of the gear unit can then be conserved as described above.

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

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

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

Before startup, mount a new breather. Observe the information on the nameplate regarding the oil grade and oil quantity.

6.4.2 External corrosion protection

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

INFORMATION

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

Also observe the information in the operating instructions in chapter "Storage and transport conditions" (→ 🗎 23). This chapter provides information on the possible storage periods in conjunction with adequate packaging – depending on the storage location.

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7 Inspection/maintenance

7.1 Preliminary work for inspection and maintenance

Observe the following notes before starting inspection/maintenance work.

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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

⚠ WARNING

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

Severe or fatal injuries.

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

⚠ WARNING

Danger due to using impermissible gear unit oil.

Severe or fatal injuries.

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

⚠ WARNING

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

Severe injuries.

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

⚠ CAUTION

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

Minor injuries.

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

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⚠ CAUTION

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.

NOTICE

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

Possible damage to property.

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

NOTICE

Improper maintenance may result in damage to the gear unit.

Possible damage to property.

- Observe the following notes.

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

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7.2 Inspection and maintenance intervals

Time interval	What to do?
Daily	• Check the housing temperature: – with mineral oil: max. 90 °C – with synthetic oil: max. 100 °C • Check gear unit noise • Check the gear unit for signs of leakage
After 500 operating hours[1)]	• First oil change after initial startup
Every 3000 operating hours, at least every 6 months	• Check the oil: If the gear unit is operated outdoors or in humid conditions, check the water content of the oil. The water content must not exceed 0.05% (500 ppm). • Fill labyrinth seals with grease. Use about 30 g grease per grease nipple. • Clean the breather plug.
Every 4000 operating hours	• For gear units with Drywell: Re-lubricate the lower bearings of the LSS.
Depending on the operating conditions, at least every 12 months	• Change the mineral oil (→ chapter "Inspection and maintenance of the gear unit) • Check retaining screws for tight fit • Check contamination and condition of the oil-air cooling system • Check the condition of the oil-water cooler • Clean the oil filter, replace filter element if necessary
Every 8000 operating hours, every 2 years at the latest	
Depending on the operating conditions, every 3 years at the latest	• Change synthetic oil (→ chapter "Inspection and maintenance of the gear unit")
Varying (depending on external factors)	• Repair or renew the surface/anti-corrosion coating • Clean the gear unit housing surface and the fan • Check the oil heater: – Are all connection cables and terminals tightened securely and free from corrosion? – Clean encrusted elements (such as the heating element) and replace, if required (→ chapter "Inspection and maintenance of the gear unit").

1) Note that the first oil change after 500 operating hours may not be necessary under certain circumstances. For detailed information, refer to the order documents. If you have any questions, contact SEW-EURODRIVE.

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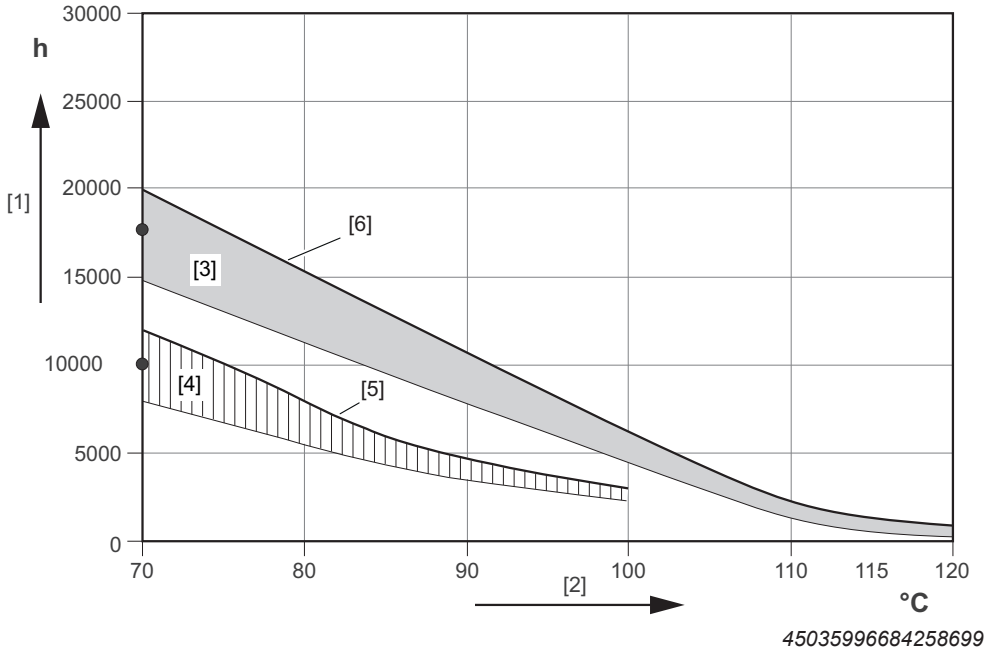
7.3 Lubricant change intervals

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

INFORMATION

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



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

INFORMATION

SEW-EURODRIVE recommends that the gear unit oil is analyzed regularly (see chapter "Checking the oil consistency" (→ 🗎 165)) to optimize the lubricant change intervals.

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7.4 Checking the oil level

7.4.1 General information

Note the following when checking the oil level:

NOTICE

Improper check 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 has cooled down in idle state. SEW-EURODRIVE recommends checking the oil level at an oil temperature of 20 °C to 40 °C. The oil level must be between the markings [1] and [2] at the oil dipstick or oil level glass and should ideally be in the middle.
- 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, the oil level on the oil dipstick is decisive. The oil level on the oil sight glass is only an approximate value.
- Elements for checking the oil level, oil drain, and oil fill openings are indicated on the gear unit by symbols.
- Check the oil level again after the first few operating hours when the gear unit is at standstill.

INFORMATION

Refer to the dimension sheet and the order documents for further information on checking the oil level.

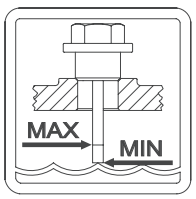
7.4.2 Standard procedure

Video instructions

Deutsch	English

Oil dipstick

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 159).



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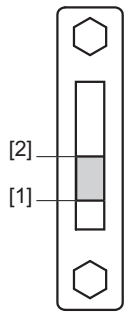
1. Unscrew the oil dipstick and remove it.
2. Clean the oil dipstick and re-insert it into the gear unit (do not screw in tightly).
3. Remove oil dipstick again and check oil level. Correct, if necessary. The oil level is correct when it is between the oil level mark (= maximum oil level) and the end of the oil dipstick (= minimum oil level)

INFORMATION

Refer to the dimension sheet and the order documents for further information on checking the oil level.

Oil level glass

Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 159).



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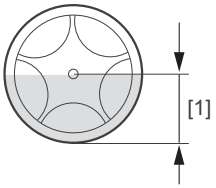
1. The oil level must be in the middle between marking [1] and marking [2].
2. Proceed as follows if the oil level is too low:
   - Open the oil fill plug.
   - Fill in oil of the same oil grade until the oil level is in the middle between marking [1] and marking [2].
3. If you filled in too much oil,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

Oil sight glass

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



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7.5 Checking the oil consistency

INFORMATION

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

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

Proceed as follows to check the oil consistency:

1. ⚠ **WARNING!** Risk of burns due to hot gear unit and hot gear unit oil. Severe injuries.
   Allow the gear unit to cool down below 50 °C before you start working on it.
2. Start the gear unit for a short time for the oil to mix with suspended particles.
3. Determine the oil drain and place a clean and dry container underneath.
4. Slowly open the oil drain and drain some oil.
5. Close the oil drain valve.
6. Check the oil consistency:

- Check the drained oil for appearance, color, and contamination.
- If the oil sample is severely contaminated, e.g. water, cloudiness, change in color, dirt, consult a specialist to find out the cause.

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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.

Severe injury.

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

NOTICE

Improper oil change can damage the gear unit.

Possible damage to property.

- Observe the following information.

- Perform the oil change quickly after you have switched off the gear unit to prevent solids from settling. If possible, drain the oil while it is still warm. Avoid oil temperatures above 50 °C.
- Oil grade and oil viscosity are listed on the nameplate of the gear unit.

  The required oil fill quantity is higher when additional attachments are mounted to the gear unit, such as an oil supply system. Observe the operating instructions of the oil supply system.
- Always fill the gear unit with the same oil grade as before. Mixing oils of different grades and/or manufacturers is not permitted. Synthetic oils in particular must not be mixed with mineral oils or other synthetic oils. When switching from mineral oil and/or when switching from synthetic oil of one basis to synthetic oil of another basis, thoroughly flush the gear unit with the new oil grade.

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

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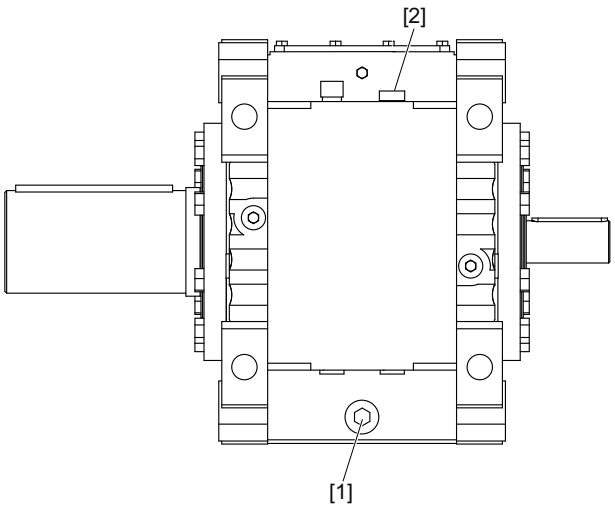
7.6.2 Basic gear unit



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Observe the notes in chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 159).

1. Place a suitably large container under the oil drain [1].
2. Remove the oil fill plug(s)/breather [2].
3. Open the oil drain valve [1] and drain all the oil into the container.
4. Close the oil drain valve [1].
5. Fill in new oil of the same grade through the oil fill opening [2].

- 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" (→ 🗎 163).
- Use a clean filling aid (plastic funnel or similar). Avoid using galvanized filling aids.

6. If present, screw the oil fill plug(s)/breather [2] and the oil dipstick back into place.

⚠ CAUTION

Danger due to leakage of lubricant.

Injuries.

- Remove any dripping oil immediately with oil binding agent.

7.6.3 Gear units with shaft end pump /SEP

INFORMATION

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

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7.7 Cleaning the oil heater /OH

⚠ WARNING

Danger of electric shock.

Severe or fatal injuries.

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

1. Remove the cabling of the heating element.
2. Before disassembling the heating element, drain the oil (→ 🗎 166).
3. **NOTICE!** Improper cleaning may damage the heating elements. Possible damage to property.
   Do not destroy the heating elements by scratching or scraping them! Clean the tubular heating elements with solvent. Replace the defective heating elements.
4. Screw the heating element out of the gear unit housing.
5. Apply LOCTITE® 577 to the 2 threads of the heating element.
6. Fasten the heating element by applying torque only to the head of the hex screw.
7. Close the oil drain valve.
8. Fill new oil of the same type as the old oil through the oil filling hole (if you want to change the oil type, contact SEW-EURODRIVE Service).

- Fill in the oil quantity according to the information on the nameplate. The oil quantity specified on the nameplate is a guide value.
- Use a clean filling aid (plastic funnel or similar). Avoid using galvanized filling aids.
- Check to see that the oil level is correct, refer to chapter "Checking the oil level".

9. Connect the heating element.

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7.8 Breather /BPG

7.8.1 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" (→ 🗎 159).

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

7.8.2 Replacing the desiccant breather filter

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

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

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

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

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

Disposal

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

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7.9 Regreasable sealing systems (except for Drywell)

Standard procedure, not valid for gear units with drywell design.

⚠ 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" (→ 🗎 159).

Regreasable sealing systems may be filled with "grease" (→ 🗎 191). Use moderate pressure to force grease into each lubrication point until new grease leaks out of the sealing gap.

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

INFORMATION

Immediately remove the old grease that leaked out.

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7.10 Vertical gear units with Drywell sealing system on the output shaft

⚠ WARNING

Risk of crushing due to rotating parts.

Severe or fatal injuries.

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

NOTICE

Excessive press-in pressure can cause grease to leak between the sealing lip of the oil seal and the shaft. The sealing lip can be damaged or slip.

Possible damage to property.

- Make sure that the grease drain is open and the excess used grease can escape.

In the Drywell version, the lower bearings of the output shaft are lubricated with grease.

The sticker with the lubrication intervals on the gear unit contains information on the quantity of grease needed for the bearings. Use the appropriate grease for each relubrication nipple as indicated on the label, see lubricant table → chapter 10.2

Use only for lubricating bearings.

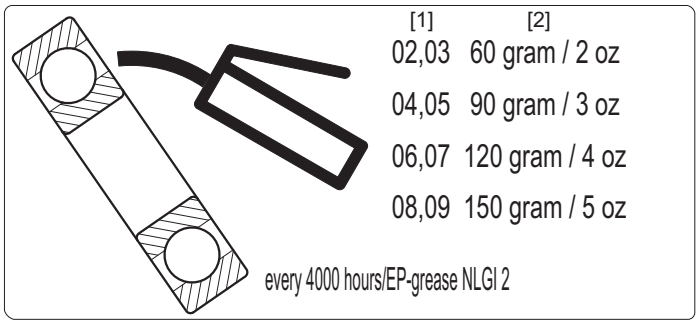
If the gear unit has been stored for a longer time, you must change the bearing lubrication before starting up the gear unit.

The bearings must be lubricated regularly. Information on the quantity of grease and lubrication intervals can be found on the sticker on the gear unit.

There are two gear unit types with Drywell:

- Types E to G, with extended bearing distance (EBD)
- With standard bearing design

With EBD /E...G and Drywell



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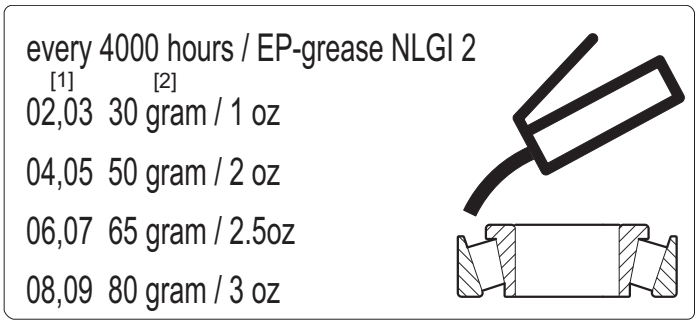
[1] Gear unit size (see nameplate)
[2] Lubrication quantity

Gear unit size MC.V../E....G	Grease quantity g	Lubrication Interval
02	60	Every 4,000 operating hours or at least every 10 months
03	60	
04	90	
05	90	
06	120	
07	120	
08	150	
09	150	

With standard bearing design and Drywell



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[1] Gear unit size (see nameplate)
[2] Lubrication quantity

Gear unit size MC.V../E....G	Grease quantity g	Lubrication Interval
02	30	Every 4,000 operating hours or at least every 10 months
03	30	
04	50	
05	50	
06	65	
07	65	
08	80	
09	80	

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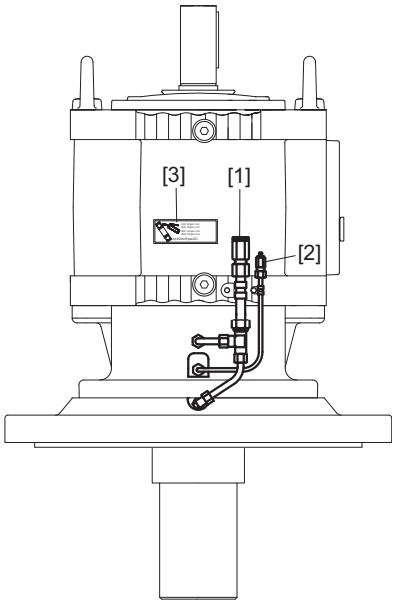
Proceed as follows to lubricate the bearings:



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[1] Grease drain pipe
[2] Grease nipple
[3] Label with predefined lubrication quantity

INFORMATION

- Fill the grease while the gear unit is in operation.
- Refer to the sticker [3] for the quantity of grease required.

1. Open the grease drain pipe [1]. The old grease oozes out.
2. Fill the grease using the greasing nipple [2].
3. Close the grease drain pipe [1].

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8 Permitted lubricants

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

8.1 Lubricant selection

Note the following when selecting the lubricants.

NOTICE

Improper lubricant selection can damage the gear unit.

Possible damage to property.

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

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

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

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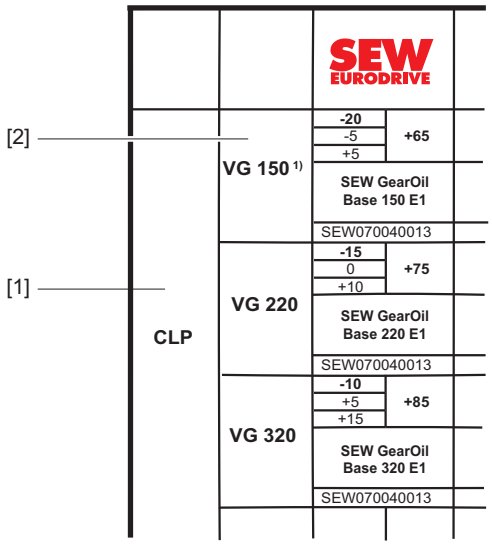
8.2 Structure of the tables and abbreviations



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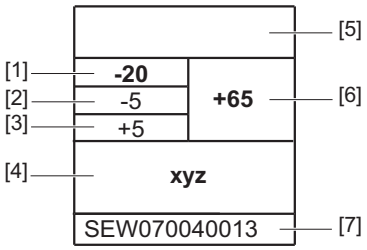
[1] Lubricant type
[2] Viscosity class

Abbreviations

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

8.3 Explanation of the various lubricants



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

1) In case of lower temperatures, the oil must be heated to the specified minimum temperature, for example, by using an oil heater. For the maximum permitted oil viscosity per pump type, refer to chapter "Explanations on the oil supply system / oil cooling systems and oil viscosity".
2) Service life is significantly reduced when exceeded. Observe chapter "Lubricant change intervals".

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8.4 Lubricant compatibility with oil seal

Approval	Explanation
SEW07004_ _13:	A lubricant especially recommended with regard to compatibility with the approved oil seals. The lubricant exceeds the state-of-the-art requirements regarding elastomer compatibility.

Permitted application temperature range of the oil seals

In the low temperature range, oil seals can withstand shaft deflections (e.g. through overhung load) only to a limited extent. Especially avoid or limit pulsating or changing radial displacements of the shaft. Contact SEW-EURODRIVE, if required.

Oil seal material class	Permitted oil sump temperature
NBR	-40 °C to +80 °C
FKM	-25 °C to +115 °C
FKM-PSS	-25 °C to +115 °C

Limitations of use of oil seals with the specific lubricant are described in the following table:

Material class			Manufacturer		Material	
S	1	NBR	1	Freudenberg		72 NBR 902
			2	Trelleborg		4NV11
	2	FKM	1	Freudenberg	1	75 FKM 585
					2	75 FKM 170055
			2	Trelleborg	1	VCBVR

Examples:

S11: Only the elastomer 72NBR902 from Freudenberg meets the requirements of the approval in conjunction with the specific lubricant.

S2: Only the elastomer FKM meets the requirements of the approval in conjunction with the specific lubricant.

8.5 Explanation of the oil supply systems and the oil viscosity

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

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

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8.6 Lubricant tables

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

[1]	[2]	SEW EURODRIVE			Castrol			FUCHS			Mobil			KLÜBER LUBRICATION			SINOPEC			TOTAL		
CLP	VG 150	-20 -5 +5	+65	SEW GearOil Base 150 E1 / US1 / CN1 / BR1	-20 -5 +5	+65	Optigear BM 150	-20 -5 +5	+65	Renolin CLP 150 Plus	-20 -5 +5	+65	Renolin HighGear 150	-20 -5 +5	+65	Mobilgear 600 XP 150	-20 -5 +5	+65	Klüberoil GEM 1-150 N	-20 -5 +5	+65	AP-SGO 150
		SEW070040013						SEW070030013														
	VG 220	-15 0 +10	+75	SEW GearOil Base 220 E1 / US1 / CN1 / BR1	-15 0 +10	+75	Optigear BM 220	-15 0 +10	+75	Renolin CLP 220 Plus	-15 0 +10	+75	Renolin HighGear 220	-15 0 +10	+75	Mobilgear 600 XP 220	-15 0 +10	+75	Klüberoil GEM 1-220 N	-15 0 +10	+75	AP-SGO 220
		SEW070040013						SEW070030013														
	VG 320	-10 +5 +15	+85	SEW GearOil Base 320 E1 / US1 / CN1 / BR1	-10 +5 +15	+80	Optigear BM 320	-10 +5 +15	+80	Renolin CLP 320 Plus	-10 +5 +15	+80	Renolin HighGear 320	-10 +5 +15	+80	Mobilgear 600 XP 320	-10 +5 +15	+80	Klüberoil GEM 1-320 N	-10 +5 +15	+80	AP-SGO 320
		SEW070040013						SEW070030013														
	VG 460	-5 +10 +20	+90	SEW GearOil Base 320 E1 / US1 / CN1 / BR1	-5 +10 +20	+90	Optigear BM 460	-5 +10 +20	+90	Renolin CLP 460 Plus	-5 +10 +20	+90	Renolin HighGear 460	-5 +10 +20	+90	Mobilgear 600 XP 460	-5 +10 +20	+90	Klüberoil GEM 1-460 N	-5 +10 +20	+90	AP-SGO 460
		SEW070040013						SEW070030013														
	VG 680	0 +15 +25	+90	SEW GearOil Base 320 E1 / US1 / CN1 / BR1	0 +15 +25	+90	Optigear BM 680	0 +15 +25	+90	Renolin CLP 680 Plus	0 +15 +25	+90	Renolin HighGear 680	0 +15 +25	+90	Mobilgear 600 XP 680	0 +15 +25	+90	Klüberoil GEM 1-680 N	0 +15 +25	+90	AP-SGO 460
		SEW070040013						SEW070030013														
	VG 1000	+5 +20 +30	+90	Optigear BM 1000																		

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[1]	[2]	SEW EURODRIVE	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	TOTAL
CLP HC	VG 32 [1]				-40 / -30 / -25 +30 SHC 624		
	VG 68 [1]			-35 / -20 / -10 +50 Renolin Unisyn CLP 68	-40 / -25 / -15 +50 SHC 626	-35 / -20 / -10 +50 Klübersynth GEM 4-68 N	
	VG 150 [1]	-35 / -15 / -5 +75 GearOil Synth 150 E1 SEW 07004031 3	-25 / -10 / 0 +70 Alphasyn EP 150	-30 / -10 / +0 +70 Renolin Unisyn CLP 150	-30 / -10 / 0 +75 SHC 629	-25 / -10 / 0 70 Klübersynth GEM 4-150 N	-35 / -15 / -5 +75 Carter SH 150
	VG 220	-30 / -10 / 0 +85 GearOil Synth 220 E1 SEW 07004031 3	-25 / -5 / +5 +80 Alphasyn EP 220	-25 / -5 / +5 +80 Renolin Unisyn CLP 220	-25 / -5 / 0 +85 SHC 630	-25 / -5 / +5 +80 Klübersynth GEM 4-220 N	-25 / -5 / +5 +80 Carter SH 220
	VG 320	-25 / -5 / +5 +100 GearOil Synth 320 E1 SEW 07004031 3	-20 / 0 / +10 +90 Alphasyn EP 320	-20 / 0 / +10 +90 Renolin Unisyn CLP 320	-20 / 0 / +10 +95 SHC 632	-20 / 0 / +10 +95 Klübersynth GEM 4-320 N	-20 / 0 / +10 +90 Carter SH 320
	VG 460	-20 / 0 / +15 +110 GearOil Synth 460 E1 SEW 07004031 3	-15 / +5 / +15 +100 Alphasyn EP 460	-15 / +5 / +15 +100 Renolin Unisyn CLP 460	-15 / +5 / +15 +105 SHC 634	-15 / +5 / +20 +105 Klübersynth GEM 4-460 N	-15 / +5 / +15 +100 Carter SH 460
	VG 680	-15 / +5 / +20 +110 GearOil Synth 680 E1 SEW 07004031 3	-10 / +10 / +25 +110 Optigear Synthetic X 680	-10 / +10 / +25 +110 Renolin Unisyn CLP 680	-10 / +10 / +25 +110 SHC 636	-10 / +10 / +25 +110 Klübersynth GEM 4-680 N	-10 / +10 / +25 +110 Carter SH 680
	VG 1000				-10 / +15 / +30 +110 SHC 639	-10 / +15 / +30 +110 SHC Gear 1000	0 / +20 / +30 +110 Klübersynth EG4-1000

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

[1]	[2]	[3]	SEW EURODRIVE	bremer & leguil	Castrol	FUCHS	KLÜBER LUBRICATION
	CLP HC 2) NSF H1	VG 68 1)		-35 -20 -10 Cassida Fluid HF 68 +45	-40 -25 -15 Optileb HY 68 +45	-35 -20 -10 Cassida Fluid HF 68 +45	-35 -20 -10 Klüberoil 4UH1-68 N +45
		VG 220 1)	-30 -5 0 SEW GearOil Synth 220 H1 E1 +80	-20 -5 +5 Cassida Fluid GL 220 +75	-25 -5 +5 Optileb GT 220 +75	-20 -5 +5 Cassida Fluid GL 220 +75	-25 -5 +5 Klüberoil 4UH1-220 N +75
			SEW 070040313		SEW 070040313		
		VG 460 1)	-20 0 +15 SEW GearOil Synth 460 H1 E1 +100	-15 +5 +20 Cassida Fluid GL 460 +90	-15 +5 +20 Optileb GT 460 +95	-15 +5 +20 Cassida Fluid GL 460 +90	-15 +5 +15 Klüberoil 4UH1-460 N +95
			SEW 070040313		SEW 070040313		
		VG 680 1)		-10 +10 +25 Cassida Fluid GL 680 +105		-10 +10 +25 Cassida Fluid GL 680 +105	-10 +10 +25 Klüberoil 4UH1-680 N +105
	E	VG 320				-20 0 +10 Plantogear 320 S +8a5 S2	-20 0 +10 Klüberbio EG2-320 +85 S2
		VG 460				-15 +5 +15 Plantogear 460 S +95 S2	

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1) Lubricants may only be used if the service factor F_s and peak load factor $F_F \geq 1.6$.
The peak output torque M_{K2per} is limited as follows: $F_F \geq 1.6 \rightarrow M_{K2per} \leq 1.25 \times M_{N2}$ (nominal torque) $\rightarrow M_{K2per} \leq 2 \times M_{N2}/F_F = 2/1.6 \times M_{N2}$.
In case of deviations, contact SEW-EURODRIVE.

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

NOTICE:
The thermal operating limits of the oil seal materials must also be taken into account, see chapter "Lubricant compatibility with oil seal" (→ 177).

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8.7 Lubricant fill quantities

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

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

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

8.7.1 MC2P.

Type	Stage	Mounting position	Lubrication	Oil fill quantity in l
MC2P	**02**	M1	Splash	8
		M2	Splash	14
		M3	Splash	9
		M4	Splash	15
		M5	Bath	16
		M6	Bath	16
MC2P	**03**	M1	Splash	10
		M2	Splash	17
		M3	Splash	11
		M4	Splash	22
		M5	Bath	23
		M6	Bath	23
MC2P	**04**	M1	Splash	15
		M2	Splash	24
		M3	Splash	17
		M4	Splash	31
		M5	Bath	36
		M5	Pressure	25
		M5	Drywell	13
		M6	Bath	36
		M6	Pressure	25
		M6	Drywell	13

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Type	Stage	Mounting position	Lubrication	Oil fill quantity in l
MC2P	**05**	M1	Splash	19
		M2	Splash	30
		M3	Splash	20
		M4	Splash	39
		M5	Bath	44
		M5	Pressure	29,04
		M5	Drywell	15
		M6	Bath	44
		M6	Pressure	29,04
		M6	Drywell	15
MC2P	**06**	M1	Splash	22
		M2	Splash	39
		M3	Splash	27
		M4	Splash	46
		M5	Bath	58
		M5	Pressure	39
		M5	Drywell	20
		M6	Bath	58
		M6	Pressure	39
		M6	Drywell	20
MC2P	**07**	M1	Splash	33
		M2	Splash	57
		M3	Splash	41
		M4	Splash	69
		M5	Bath	80
		M5	Pressure	48
		M5	Drywell	26
		M6	Bath	80
		M6	Pressure	48
		M5	Drywell	26

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Type	Stage	Mounting position	Lubrication	Oil fill quantity in l
MC2P	**08**	M1	Splash	45
		M2	Splash	79
		M3	Splash	57
		M4	Splash	95
		M5	Bath	112
		M5	Pressure	75
		M5	Drywell	33
		M6	Bath	112
		M6	Pressure	75
		M5	Drywell	33
MC2P	**09**	M1	Splash	62
		M2	Splash	111
		M3	Splash	80
		M4	Splash	130
		M5	Bath	150
		M5	Pressure	97
		M5	Drywell	37
		M6	Bath	150
		M6	Pressure	97
		M5	Drywell	37

8.7.2 MC3P.

Type	Stage	Mounting position	Lubrication	Oil fill quantity in l
MC3P	**02**	M1	Splash	10
		M2	Splash	17
		M3	Splash	11
		M4	Splash	18
		M5	Bath	21
		M6	Bath	21
MC3P	**03**	M1	Splash	13
		M2	Splash	22
		M3	Splash	14
		M4	Splash	28
		M5	Bath	29
		M6	Bath	29

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Type	Stage	Mounting position	Lubrication	Oil fill quantity in l
MC3P	**04**	M1	Splash	19
		M2	Splash	33
		M3	Splash	21
		M4	Splash	36
		M5	Bath	41
		M5	Pressure	30
		M5	Drywell	15
		M6	Bath	41
		M6	Pressure	30
		M6	Drywell	15
MC3P	**05**	M1	Splash	23
		M2	Splash	40
		M3	Splash	27
		M4	Splash	44
		M5	Bath	48
		M5	Pressure	31,68
		M5	Drywell	18
		M6	Bath	48
		M6	Pressure	31,68
		M6	Drywell	18
MC3P	**06**	M1	Splash	29
		M2	Splash	50
		M3	Splash	32
		M4	Splash	56
		M5	Bath	62
		M5	Pressure	41
		M5	Drywell	24
		M6	Bath	62
		M6	Pressure	41
		M6	Drywell	24

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Type	Stage	Mounting position	Lubrication	Oil fill quantity in l
MC3P	**07**	M1	Splash	40
		M2	Splash	62
		M3	Splash	47
		M4	Splash	76
		M5	Bath	86
		M5	Pressure	51
		M5	Drywell	34
		M6	Bath	86
		M6	Pressure	51
		M5	Drywell	34
MC3P	**08**	M1	Splash	55
		M2	Splash	90
		M3	Splash	68
		M4	Splash	115
		M5	Bath	123
		M5	Pressure	81
		M5	Drywell	44
		M6	Bath	123
		M6	Pressure	81
		M5	Drywell	44
MC3P	**09**	M1	Splash	77
		M2	Splash	127
		M3	Splash	91
		M4	Splash	147
		M5	Bath	161
		M5	Pressure	107
		M5	Drywell	58
		M6	Bath	161
		M6	Pressure	107
		M5	Drywell	58

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8.7.3 MC2R.

Type	Stage	Mounting position	Lubrication	Oil fill quantity in l
MC2R	**02**	M1	Splash	7
		M2	Splash	13
		M3	Splash	8
		M4	Splash	14
		M5	Bath	17
		M6	Bath	17
MC2R	**03**	M1	Splash	10
		M2	Splash	18
		M3	Splash	10
		M4	Splash	23
		M5	Bath	24
		M6	Bath	24
MC2R	**04**	M1	Splash	14
		M2	Splash	30
		M3	Splash	18
		M4	Splash	34
		M5	Bath	35
		M5	Pressure	22
		M5	Drywell	10
		M6	Bath	35
		M6	Pressure	22
		M6	Drywell	10
MC2R	**05**	M1	Splash	17
		M2	Splash	32
		M3	Splash	21
		M4	Splash	40
		M5	Bath	45
		M5	Pressure	30
		M5	Drywell	17
		M6	Bath	45
		M6	Pressure	30
		M6	Drywell	17

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Type	Stage	Mounting position	Lubrication	Oil fill quantity in l
MC2R	**06**	M1	Splash	23
		M2	Splash	52
		M3	Splash	31
		M4	Splash	52
		M5	Bath	54
		M5	Pressure	39
		M5	Drywell	18
		M6	Bath	54
		M6	Pressure	39
		M6	Drywell	18
MC2R	**07**	M1	Splash	31
		M2	Splash	60
		M3	Splash	40
		M4	Splash	69
		M5	Bath	72
		M5	Pressure	49
		M5	Drywell	30
		M6	Bath	72
		M6	Pressure	49
		M5	Drywell	30
MC2R	**08**	M1	Splash	47
		M2	Splash	82
		M3	Splash	60
		M4	Splash	97
		M5	Bath	98
		M5	Pressure	72
		M5	Drywell	41
		M6	Bath	98
		M6	Pressure	72
		M5	Drywell	41

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Type	Stage	Mounting position	Lubrication	Oil fill quantity in l
MC2R	**09**	M1	Splash	61
		M2	Splash	115
		M3	Splash	82
		M4	Splash	135
		M5	Bath	152
		M5	Pressure	110
		M5	Drywell	55
		M6	Bath	152
		M6	Pressure	110
		M5	Drywell	55

8.7.4 MC3R.

Type	Stage	Mounting position	Lubrication	Oil fill quantity in l
MC3R	**02**	M1	Splash	8
		M2	Splash	15
		M3	Splash	9
		M4	Splash	15
		M5	Bath	18
		M6	Bath	18
MC3R	**03**	M1	Splash	12
		M2	Splash	20
		M3	Splash	13
		M4	Splash	25
		M5	Bath	26
		M6	Bath	26
MC3R	**04**	M1	Splash	16
		M2	Splash	31
		M3	Splash	19
		M4	Splash	35
		M5	Bath	36
		M5	Pressure	25
		M5	Drywell	11
		M6	Bath	36
		M6	Pressure	25
		M6	Drywell	11

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Type	Stage	Mounting position	Lubrication	Oil fill quantity in l
MC3R	**05**	M1	Splash	18
		M2	Splash	36
		M3	Splash	22
		M4	Splash	41
		M5	Bath	46
		M5	Pressure	29
		M5	Drywell	18
		M6	Bath	46
		M6	Pressure	29
		M6	Drywell	18
MC3R	**06**	M1	Splash	24
		M2	Splash	51
		M3	Splash	30
		M4	Splash	50
		M5	Bath	55
		M5	Pressure	40
		M5	Drywell	19
		M6	Bath	55
		M6	Pressure	40
		M6	Drywell	19
MC3R	**07**	M1	Splash	32
		M2	Splash	61
		M3	Splash	43
		M4	Splash	70
		M5	Bath	73
		M5	Pressure	50
		M5	Drywell	31
		M6	Bath	73
		M6	Pressure	50
		M5	Drywell	31

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Type	Stage	Mounting position	Lubrication	Oil fill quantity in l
MC3R	**08**	M1	Splash	48
		M2	Splash	83
		M3	Splash	62
		M4	Splash	99
		M5	Bath	100
		M5	Pressure	73
		M5	Drywell	42
		M6	Bath	100
		M6	Pressure	73
		M5	Drywell	42
MC3R	**09**	M1	Splash	60
		M2	Splash	116
		M3	Splash	84
		M4	Splash	136
		M5	Bath	154
		M5	Pressure	112
		M5	Drywell	56
		M6	Bath	154
		M6	Pressure	112
		M5	Drywell	56

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8.8 Sealing greases/rolling bearing greases

INFORMATION

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

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

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

Area of application	Manufacturer	Grease	Lower service temperature
Standard	SEW-EURODRIVE	**SEW Grease HL 2 E1**[1)]	-40 °C
	Fuchs	Renolit CX TOM 15 OEM	-40 °C
	BP	Energrease LS EP-2	-30 °C
	Castrol	Longtime PD 2/ Tribol GR 100-1 PD	-35 °C
		Spheerol EPL 2	-20 °C
	Klüber	Centoplex EP 2	-20 °C
		Petamo GHY 133 N	-40 °C
	Mobil	Mobilux EP 2	-20 °C
	Shell	Gadus S2 V220 2	-20 °C
	Total	Multis EP 2	-20 °C
	SEW	**SEW Grease HL 2 H1 E1**[1)]	-40 °C
	Bremer & Leguil	Cassida Grease GTS2	-40 °C
	Fuchs	**Plantogel 2 S**[1)]	-40 °C

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

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9 Malfunctions/remedy

9.1 Troubleshooting information

Read the following information before you proceed with troubleshooting:

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

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

⚠ WARNING

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

Severe injury.

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

NOTICE

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

Possible damage to property.

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

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9.2 Possible malfunctions/remedy

Fault	Possible cause	Measure
Unusual, regular running noise	• Meshing/grinding noise: Bearing damage	• Check the oil consistency; change bearings
	• Knocking noise: Irregularity in the gearing	• Contact SEW-EURODRIVE. For a better assessment of the failure, send an audio recording of the noise
	• Deformation of the housing upon tightening	• Check the gear unit mounting for possible deformation and correct if necessary
	• Noise generation caused by insufficient rigidity of the gear unit foundation	• Reinforce the gear unit foundation
Unusual, irregular running noises	• Foreign objects in the oil	• Check the oil consistency • Stop the drive, contact SEW-EURODRIVE
Unusual noise in the area where the gear unit is mounted	• Gear unit mounting has loosened	• Tighten retaining screws and nuts to the specified torque • Replace the damaged/defective retaining screws or nuts
Operating temperature too high	• Too much oil	• Check the oil level; correct if necessary
	• Oil too old	• Check when the oil was last changed; change the oil, if necessary
	• Oil is heavily contaminated	• Analyze the oil to determine the cause; take measures, if necessary; change the oil
	• Ambient temperature too high	• Protect the gear unit from external heat sources (e.g. provide shade)
	• Gear units with fan: Air intake opening/gear unit housing contaminated	• Check air intake openings, clean them if necessary; clean the gear unit housing
	• Malfunction of the oil-air or oil-water cooling system	• Observe the separate operating instructions for the oil-water or oil-air cooling system.
	• For gear units with built-in cooling: Cooling liquid flow rate too low; cooling liquid temperature too high; deposits in cooling system	• Check the cooling liquid flow rate; check the entry temperature of the cooling liquid; clean the cooling system.
Temperature at bearing points too high	• Not enough oil	• Check oil level; correct if necessary
	• Oil too old	• Check when the oil was last changed; change the oil if necessary
	• Bearing damaged	• Check the bearing and replace it if necessary. Contact SEW-EURODRIVE

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Fault	Possible cause	Measure
Oil leaking • From cover plate • From inspection cover • From bearing cover • From mounting flange	• Seal not tight at: – Cover plate – Inspection cover – Bearing cover – Mounting flange	• Tighten the bolts on the respective cover. Observe the gear unit. Contact SEW-EURODRIVE if oil is still leaking
Oil leaking[1)] • From oil seal	• Too much oil • Breather blocked • Oil seal damaged/worn	• Check the oil level; correct if necessary • Check the breather and replace if necessary • Check oil seals; replace if necessary
Oil leaking • At the gear unit breather	• Too much oil • Drive not installed in proper mounting position • Frequent cold starts (oil foaming) and/or high oil level	• Check oil level, correct if necessary • Install gear unit breather correctly and adjust the oil level • Install oil expansion tank
Oil leaking • from the screw plug • from the oil drain valve	• Gasket not tight • Fittings loosened	• Retighten screw • Retighten the fitting and screw. Secure screw fitting with Loctite®.
Severe V-belt wear	• Inadequately aligned belt pulleys • Harmful ambient conditions (e.g. abrasive particles, chemical substances) • V-belt overloaded	• Check V-belt pulley alignment and pretension of the belts • Protect V-belt drive from environmental influences; sufficient ventilation must be ensured • Replace V-belt if necessary; contact SEW-EURODRIVE
No oil pump suction	• Air in the suction line of the oil pump • Oil pump defective	• Fill oil into the suction line and the oil pump, vent the pump at the pressure side • Consult SEW-EURODRIVE
Pressure switch not switching	• Air in the suction line of the oil pump • Pressure switch connected incorrectly • Pressure switch defective • Oil pump defective	• Fill suction pipe and oil pump with oil • Vent the pump at the pressure side • Check the connection • Replace pressure switch • Contact SEW-EURODRIVE
Malfunction in the oil-water or oil-air cooling system	• Malfunction of the oil-water or oil-air cooling system	• Observe the separate operating instructions for the oil-water or oil-air cooling system.

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Fault	Possible cause	Measure
Gear unit does not reach cold start temperature	• Thermostat set incorrectly	• Check the setting of the thermostat
	• Oil heating defective or connected incorrectly	• Check the oil heater for proper connection and function; replace if necessary
	• Heat dissipation too great due to unfavorable climatic conditions	• Protect the gear unit from cooling off during the warm-up phase
Operating temperature at backstop too high, no blocking function	• Damaged/defective backstop	• Check the backstop, replace it if necessary • Contact SEW-EURODRIVE

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

9.3 Service

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

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

9.4 Waste disposal

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

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

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

- Oil and grease

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

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10 Address list

Argentina			
Assembly Sales	Buenos Aires	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 http://www.sew-eurodrive.com.ar sewar@sew-eurodrive.com.ar
Australia			
Assembly Sales Service	Melbourne	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
Service	Tomago	SEW-EURODRIVE PTY. LTD. 8 Epson Drive Tomago, New South Wales, 2322	Tel. +61 2 49505585 mail@sew-eurodrive.com.au
Austria			
Assembly Sales Service	Vienna	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Straße 24 1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at
Bangladesh			
Sales	Bangladesh	SEW-EURODRIVE INDIA PRIVATE LIMITED 345 DIT Road East Rampura Dhaka-1219, Bangladesh	Tel. +88 01729 097309 salesdhaka@seweurodrivebangladesh.com
Belarus			
Sales	Minsk	Foreign unitary production enterprise SEW-EURODRIVE Novodvorskij village council 145 223016, Minsk region	Tel. +375 17 319 47 56 / +375 17 378 47 58 Fax +375 17 378 47 54 http://www.sew-eurodrive.by sew@sew-eurodrive.by
Belgium			
Assembly Sales Service	Brussels	SEW-EURODRIVE n.v./s.a. Researchpark Haasrode 1060 Evenementenlaan 7 3001 Haasrode	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Center	Industrial Gears	SEW-EURODRIVE n.v./s.a. Rue du Parc Industriel, 31 6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be info@sew.be
Brazil			
Production Sales Service	São Paulo	SEW-EURODRIVE Brasil Ltda. Estrada Municipal José Rubim, 205 – Rodovia Santos Dumont Km 49 Indaiatuba – 13347-510 – SP	Tel. +55 19 3835-8000 sew@sew.com.br
Assembly Sales Service	Rio Claro	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. Jvl / Ind Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
Bulgaria			
Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg

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Canada			
Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2001 Ch. de l'Aviation Dorval Quebec H9P 2X6	Tel. +1 514 367-1124 Fax +1 514 367-3677 n.paradis@sew-eurodrive.ca
Chile			
Assembly Sales Service	Santiago de Chile	SEW-EURODRIVE CHILE LTDA Las Encinas 1295 Parque Industrial Valle Grande LAMPA Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 2757 7000 Fax +56 2 2757 7001 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl
China			
Production Assembly Sales Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 78, 13th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 http://www.sew-eurodrive.cn info@sew-eurodrive.cn
Assembly Sales Service	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Taiyuan	SEW-EURODRIVE (Taiyuan) Co,. Ltd. No.3, HuaZhang Street, TaiYuan Economic & Technical Development Zone ShanXi, 030032	Tel. +86-351-7117520 Fax +86-351-7117522 taiyuan@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
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Sales Service	Hong Kong	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk
Colombia			
Assembly Sales Service	Bogota	SEW-EURODRIVE COLOMBIA LTDA. Calle 17 No. 132-18 Interior 2 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sew@sew-eurodrive.com.co
Croatia			
Sales Service	Zagreb	KOMPEKS d. o. o. Zeleni dol 10 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr
Czech Republic			
Assembly Sales Service	Hostivice	SEW-EURODRIVE CZ s.r.o. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
Denmark			
Assembly Sales Service	Copenhagen	SEW-EURODRIVEA/S Geminivej 28-30 2670 Greve	Tel. +45 43 95 8500 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Service	Vejle	SEW-EURODRIVE A/S Bødkervej 2 7100 Vejle	Tel. +45 43 9585 00 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Egypt			
Technical Office	Cairo	SEW-EURODRIVE Representative Office in Egypt REGUS Paramount Business Complex, Block 1258M, Unit 1, Ground Floor, Sheraton Heliopolis Cairo	Tel. +20 2 2503 2807 Fax +20 2 2503 2801 info@sew-eurodrive.eg
Estonia			
Sales	Tallin	ALAS-KUUL AS Loomäe tee 1, Lehmja küla 75306 Rae vald Harjumaa	Tel. +372 6593230 Fax +372 6593231 http://www.alas-kuul.ee info@alas-kuul.ee
Finland			
Assembly Sales Service	Hollola	SEW-EURODRIVE OY Vesimäentie 4 15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Service	Hollola	SEW-EURODRIVE OY Keskikankaantie 21 15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
	Tornio	SEW-EURODRIVE Oy Lossirannankatu 5 95420 Tornio	Tel. +358 201 589 300 Fax +358 3 780 6211 http://www.sew-eurodrive.fi sew@sew.fi
Production Assembly	Karkkila	SEW Industrial Gears Oy Santasalonkatu 6, PL 8 03620 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 http://www.sew-eurodrive.fi sew@sew.fi
France			
Production Sales	Haguenau	SEW USOCOME 48-54 route de Soufflenheim B. P. 20185 67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 http://www.usocome.com sew@usocome.com

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France			
Production	Forbach	SEW USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 57604 Forbach Cedex	Tel. +33 3 87 29 38 00
	Brumath	SEW USOCOME 1 Rue de Bruxelles 67670 Mommenheim Cedex	Tel. +33 3 88 37 48 00
Assembly Sales Service	Bordeaux	SEW USOCOME Parc d'activités de Magellan 62 avenue de Magellan – B. P. 182 33607 Pessac Cedex	Tel. +33 5 57 26 39 00 dtcbordeaux@usocome.com
	Haguenau	SEW USOCOME 48-54 route de Soufflenheim B. P. 20185 67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 dtchaguenau@usocome.com
	Lyon	SEW USOCOME 75 rue Antoine Condorcet 38090 Vaulx-Milieu	Tel. +33 4 74 99 60 00 dtclyon@usocome.com
	Nantes	SEW USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon	Tel. +33 2 40 78 42 00 dtcnantes@usocome.com
	Paris	SEW USOCOME Zone industrielle 2 rue Denis Papin 77390 Verneuil l'Étang	Tel. +33 1 64 42 40 80 dtcparis@usocome.com
Gabon			
Representation: Cameroon			
Germany			
Headquarters Production Sales	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Production / Industrial Gears	Bruchsal	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str. 10 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Production / Precision Gear Units	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 sew@sew-eurodrive.de
Production	Graben	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-0 Fax +49 7251-2970
Service Competence Center	Mechanics / Mechatronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 scc-mechanik@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Straße 12 76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 scc-elektronik@sew-eurodrive.de
	MAXOLUTION® Factory Automation	SEW-EURODRIVE GmbH & Co KG Eisenbahnstraße 11 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 sew@sew-eurodrive.de
Drive Technology Center	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 43 30823 Garbsen (Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 dtc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 08393 Meerane (Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-20 dtc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 85551 Kirchheim (München)	Tel. +49 89 909551-21 Fax +49 89 909551-50 dtc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 40764 Langenfeld (Düsseldorf)	Tel. +49 2173 8507-10 Fax +49 2173 8507-50 dtc-west@sew-eurodrive.de

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Germany			
Drive Center	Berlin	SEW-EURODRIVE GmbH & Co KG Melitta-Schiller-Straße 8 12526 Berlin	Tel. +49 306331131-30 Fax +49 306331131-36 dc-berlin@sew-eurodrive.de
	Bremen	SEW-EURODRIVE GmbH & Co KG Allerkai 4 28309 Bremen	Tel. +49 421 33918-10 Fax +49 421 33918-22 dc-bremen@sew-eurodrive.de
	Hamburg	SEW-EURODRIVE GmbH & Co KG Hasselbinnen 11 22869 Schenefeld	Tel. +49 40298109-60 Fax +49 40298109-70 dc-hamburg@sew-eurodrive.de
	Saarland	SEW-EURODRIVE GmbH & Co KG Gottlieb-Daimler-Straße 4 66773 Schwalbach Saar – Hülzweiler	Tel. +49 6831 48946 10 Fax +49 6831 48946 13 dc-saarland@sew-eurodrive.de
	Ulm	SEW-EURODRIVE GmbH & Co KG Dieselstraße 18 89160 Dornstadt	Tel. +49 7348 9885-0 Fax +49 7348 9885-90 dc-ulm@sew-eurodrive.de
	Würzburg	SEW-EURODRIVE GmbH & Co KG Nürnbergerstraße 118 97076 Würzburg-Lengfeld	Tel. +49 931 27886-60 Fax +49 931 27886-66 dc-wuerzburg@sew-eurodrive.de
Drive Service Hotline / 24 Hour Service			0 800 SEWHELP 0 800 7394357
Great Britain			
Assembly Sales Service	Normanton	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
Greece			
Sales	Athens	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr
Hungary			
Sales Service	Budapest	SEW-EURODRIVE Kft. Csillaghegyí út 13. 1037 Budapest	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu
Iceland			
Sales	Reykjavik	Varma & Vélaverk ehf. Knarrarvogi 4 104 Reykjavík	Tel. +354 585 1070 Fax +354 585)1071 https://vov.is/ vov@vov.is
India			
Registered Office Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited 302, NOTUS IT PARK, Sarabhai Campus, Beside Notus Pride, Genda Circle, Vadodara 390023 Gujarat	Tel. +91 265 3045200 Fax +91 265 3045300 https://www.seweurodriveindia.com salesvadodara@seweurodriveindia.com
Assembly Sales Service	Chennai	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com
	Pune	SEW-EURODRIVE India Private Limited Plant: Plot No. D236/1, Chakan Industrial Area Phase- II, Warale, Tal- Khed, Pune-410501, Maharashtra	Tel. +91 21 35 628700 Fax +91 21 35 628715 salespune@seweurodriveindia.com
	Tapukara	SEW-EURODRIVE India Private Limited Plot No SP-6-46, Tapukara, Karoli Industrial Area, No. 1, district : Alwar , Rajasthan - 301707	Tel. +91 265 3045200 Fax +91 265 3045300 tapukara.plant@seweurodriveindia.com

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India			
Sales	Gurgaon	SEW-EURODRIVE India Private Limited Global Business Park, Sector -26, M.G. Road, Sikanderpur Unit No. 205, 2nd Floor, Tower – D Gurugram 122002, Haryana	Tel. +91 9958376669 salesgurgaon@seweurodriveindia.com
Drive Center	Raipur	SEW-EURODRIVE India Private Limited Plot unit no. 129/17 P.O. GSI-Mandhar District: Raipur, State: Chhattisgarh	Tel. +91 8294630772 salesraipur@seweurodriveindia.com
Indonesia			
Registered Office Sales Service	Jakarta	PT SEW EURODRIVE INDONESIA Palma Tower, 16th Floor, Unit H & I, Jl R.A. Kartini II-S Kav 06 Pondok Pinang, Kebayoran Lama Jakarta Selatan 12310	Tel. +62 21 7593 0272 Fax +62 21 7593 0273 sales.indonesia@sew-eurodrive.com https://www.sew-eurodrive.com.sg
Sales	Medan	PT. Serumpun Indah Lestari Jl.Pulau Solor no. 8, Kawasan Industri Medan II Medan 20252	Tel. +62 61 687 1221 Fax +62 61 6871429 / +62 61 6871458 / +62 61 30008041 sil@serumpunindah.com serumpunindah@yahoo.com http://www.serumpunindah.com
	Jakarta	PT. Cahaya Sukses Abadi Komplek Rukan Puri Mutiara Blok A no 99, Sunter Jakarta 14350	Tel. +62 21 65310599 Fax +62 21 65310600 csajkt@cbn.net.id
	Jakarta	PT. Agrindo Putra Lestari JL.Pantai Indah Selatan, Komplek Sentra Industri Terpadu, Pantai indah Kapuk Tahap III, Blok E No. 27 Jakarta 14470	Tel. +62 21 2921-8899 Fax +62 21 2921-8988 aplindo@indosat.net.id http://www.aplindo.com
	Surabaya	PT. TRIAGRI JAYA ABADI Jl. Sukosemolo No. 63, Galaxi Bumi Permai G6 No. 11 Surabaya 60111	Tel. +62 31 5990128 Fax +62 31 5962666 sales@triagri.co.id http://www.triagri.co.id
	Surabaya	CV. Multi Mas Jl. Raden Saleh 43A Kav. 18 Surabaya 60174	Tel. +62 31 5458589 Fax +62 31 5317220 sianhwa@sby.centrin.net.id http://www.cvmultimas.com
Ireland			
Sales Service	Dublin	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 http://www.alperton.ie info@alperton.ie
Israel			
Sales	Tel Aviv	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il
Italy			
Assembly Sales Service	Milan	SEW-EURODRIVE S.a.s. di SEW S.r.l. & Co. Via Bernini,12 20033 Solaro (Milano)	Tel. +39 02 96 980229 Fax +39 02 96 980 999 http://www.sew-eurodrive.it milano@sew-eurodrive.it
Ivory Coast			
Sales	Abidjan	SEW-EURODRIVE SARL Ivory Coast Rue des Pêcheurs, Zone 3 26 BP 916 Abidjan 26	Tel. +225 27 21 21 81 05 Fax +225 27 21 25 30 47 info@sew-eurodrive.ci http://www.sew-eurodrive.ci
Japan			
Assembly Sales Service	Iwata	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

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Kazakhstan			
Sales Service	Almaty	SEW-EURODRIVE LLP 291-291A, Tole bi street 050031, Almaty	Tel. +7 (727) 350 5156 Fax +7 (727) 350 5156 http://www.sew-eurodrive.com kazakhstan@sew-eurodrive.com
	Tashkent	Representative Office SEW-EURODRIVE Representative office in Uzbekistan 95A Amir Temur ave, office 401/3 100084 Tashkent	Tel. +998 97 134 01 99 http://www.sew-eurodrive.uz sew@sew-eurodrive.uz
	Ulaanbaatar	IM Trading LLC Olympic street 28B/3 Sukhbaatar district, Ulaanbaatar 14230, MN	Tel. +976-77109997 Fax +976-77109997 imt@imt.mn
Latvia			
Sales	Riga	SIA Alas-Kuul Katlakalna 11C 1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.lv info@alas-kuul.com
Lebanon			
Sales (Lebanon)	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
Sales (Jordan, Kuwait , Saudi Arabia, Syria)	Beirut	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 http://www.medrives.com info@medrives.com
Lithuania			
Sales	Alytus	UAB Irseva Statybininku 106C 63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 http://www.irseva.lt irmantas@irseva.lt
Luxembourg			
Representation: Belgium			
Macedonia			
Sales	Skopje	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 http://www.boznos.mk
Malaysia			
Assembly Sales Service	Johor	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Mexico			
Assembly Sales Service	Quéretaro	SEW-EURODRIVE MEXICO S.A. de C.V. SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Querétaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Sales Service	Puebla	SEW-EURODRIVE MEXICO S.A. de C.V. Calzada Zavaleta No. 3922 Piso 2 Local 6 Col. Santa Cruz Buenavista C.P. 72154 Puebla, México	Tel. +52 (222) 221 248 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Mongolia			
Technical Office	Ulaanbaatar	IM Trading LLC Olympic street 28B/3 Sukhbaatar district, Ulaanbaatar 14230, MN	Tel. +976-77109997 Tel. +976-99070395 Fax +976-77109997 http://imt.mn/ imt@imt.mn

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Morocco			
Sales Service Assembly	Bouskoura	SEW-EURODRIVE Morocco SARL Parc Industriel CFCIM, Lot. 55/59 27182 Bouskoura Grand Casablanca	Tel. +212 522 88 85 00 Fax +212 522 88 84 50 http://www.sew-eurodrive.ma sew@sew-eurodrive.ma
Namibia			
Sales	Swakopmund	DB MINING & INDUSTRIAL SUPPLIES CC Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 anton@dbminingnam.com
Netherlands			
Assembly Sales Service	Rotterdam	SEW-EURODRIVE B.V. Industrieweg 175 3044 AS Rotterdam Postbus 10085 3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl
New Zealand			
Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 30 Lodestar Avenue, Wigram Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Nigeria			
Sales	Lagos	Greenpeg Nig. Ltd 64C Toyin Street Opebi-Allen Ikeja Lagos-Nigeria	Tel. +234-701-821-9200-1 http://www.greenpegltd.com sales@greenpegltd.com
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Hornebergvegen 11 B 7038 Trondheim	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no
Pakistan			
Sales	Karachi	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk
Paraguay			
Sales	Fernando de la Mora	SEW-EURODRIVE PARAGUAY S.R.L Nu Guazu No. 642 casi Campo Esperanza Santisima Trinidad Asuncion	Tel. +595 991 519695 Fax +595 21 3285539 sewpy@sew-eurodrive.com.py
Peru			
Assembly Sales Service	Lima	SEW EURODRIVE DEL PERU S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe
Philippines			
Sales	Makati	P.T. Cerna Corporation 4137 Ponte St., Brgy. Sta. Cruz Makati City 1205	Tel. +63 2 519 6214 Fax +63 2 890 2802 mech_drive_sys@ptcerna.com http://www.ptcerna.com
Poland			
Assembly Sales Service	Łódź	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 92-518 Łódź	Tel. +48 42 293 00 00 Fax +48 42 293 00 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl

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Poland			
	Service	Tel. +48 42 293 0030 Fax +48 42 293 0043	24 Hour Service Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl
Portugal			
Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Av. da Fonte Nova, n.º 86 3050-379 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
Romania			
Sales Service	Bucharest	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 http://www.sialco.ro sialco@sialco.ro
Senegal			
Sales	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 http://www.senemeca.com senemeca@senemeca.sn
Serbia			
Sales	Belgrade	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor 11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs
Singapore			
Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. 9, Tuas Drive 2 Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Slovakia			
Drive Technology Center	Bernolákovo	SEW-Eurodrive SK s.r.o. Priemyselná ulica 6267/7 900 27 Bernolákovo	Tel.+421 2 48 212 800 http://www.sew-eurodrive.sk sew@sew-eurodrive.sk
Slovenia			
Representation: Austria			
South Africa			
Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED 32 O'Connor Place Eurodrive House Aeroton Johannesburg 2190 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 248-7289 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 bgriffiths@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospecton Road Isipingo Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 902 3815 Fax +27 31 902 3826 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PROPRIETARY) LIMITED 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za

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South Korea			
Assembly Sales Service	Ansan	SEW-EURODRIVE Korea Co., Ltd. 7, Dangjaengi-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-eurodrive.kr master.korea@sew-eurodrive.com
	Busan	SEW-EURODRIVE Korea Co., Ltd. 28, Noksansandan 262-ro 50beon-gil, Gangseo-gu, Busan, Zip 618-820	Tel. +82 51 832-0204 Fax +82 51 832-0230
Assembly Service	Siheung	SEW-EURODRIVE Korea Co., Ltd. 35, Emtibeui 26-ro 58beon-gil, Siheung-si, Gyeonggi-do	http://www.sew-eurodrive.kr
Spain			
Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es
Sri Lanka			
Sales	Colombo	SM International (Pte) Ltd 254, Galle Raod Colombo 4, Sri Lanka	Tel. +94 1 2584887 Fax +94 1 2582981
Swaziland			
Sales	Manzini	C G Trading Co. (Pty) Ltd Simunye street Matsapha, Manzini	Tel. +268 7602 0790 Fax +268 2 518 5033 charles@cgtrading.co.sz www.cgtradingswaziland.com
Sweden			
Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 553 03 Jönköping Box 3100 S-550 03 Jönköping	Tel. +46 36 34 42 00 Fax +46 36 34 42 80 http://www.sew-eurodrive.se jonkoping@sew.se
Switzerland			
Assembly Sales Service	Basel	Alfred Imhof AG Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 17 17 http://www.imhof-sew.ch info@imhof-sew.ch
Taiwan			
Sales	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Huw S. Road Taipei	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 sewtwn@ms63.hinet.net http://www.tingshou.com.tw
	Nan Tou	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878 sewtwn@ms63.hinet.net http://www.tingshou.com.tw
Tanzania			
Sales	Daressalam	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam	Tel. +255 0 22 277 5780 Fax +255 0 22 277 5788 http://www.sew-eurodrive.co.tz info@sew.co.tz
Thailand			
Assembly Sales Service	Chonburi	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com https://www.sew-eurodrive.co.th
Tunisia			
Sales	Tunis	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 http://www.tms.com.tn tms@tms.com.tn

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Turkey			
Assembly Sales Service	Kocaeli-Gebze	SEW-EURODRIVE Ana Merkez Gebze Organize Sanayi Böl. 400 Sok No. 401 41480 Gebze Kocaeli	Tel. +90 262 9991000 04 Fax +90 262 9991009 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr
Ukraine			
Assembly Sales Service	Dnipropetrovsk	SEW-EURODRIVE, LLC Robochya str., bld. 23-B, office 409 49008 Dnipro	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
United Arab Emirates			
Drive Technology Center	Dubai	SEW-EURODRIVE FZE PO Box 263835 Jebel Ali Free Zone – South, P.O. Box Dubai, United Arab Emirates	Tel. +971 (0)4 8806461 Fax +971 (0)4 8806464 info@sew-eurodrive.ae
Uruguay			
Assembly Sales	Montevideo	SEW-EURODRIVE Uruguay, S. A. Jose Serrato 3569 Esqina Corumbe CP 12000 Montevideo	Tel. +598 2 21181-89 Fax +598 2 21181-90 sewuy@sew-eurodrive.com.uy
USA			
Production Sales Service	Southeast Region	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Production +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly Sales Service	Northeast Region	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 202 W. Danieldale Rd. DeSoto, TX 75115	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Wellford	SEW-EURODRIVE INC. 148/150 Finch Rd. Wellford, S.C. 29385	Tel. +1 864 439-7537 Fax +1 864 661 1167 IGOrders@seweurodrive.com
		SEW-EURODRIVE INC. 220 Finch Rd. Wellford, S.C. 29385-9630	
	Additional addresses for service provided on request!		
Vietnam			
Sales	Ho Chi Minh City	SEW-EURODRIVE PTE. LTD. RO at Hochiminh City Floor 8, KV I, Loyal building, 151-151 Bis Vo Thi Sau street, ward 6, District 3, Ho Chi Minh City, Vietnam	Tel. +84 937 299 700 huytam.phan@sew-eurodrive.com
	Hanoi	MICO LTD Quảng Trị - North Vietnam / All sectors except Construction Materials 8th Floor, Ocean Park Building, 01 Dao Duy Anh St, Ha Noi, Viet Nam	Tel. +84 4 39386666 Fax +84 4 3938 6888 nam_ph@micogroup.com.vn http://www.micogroup.com.vn
Zambia			
Representation: South Africa			

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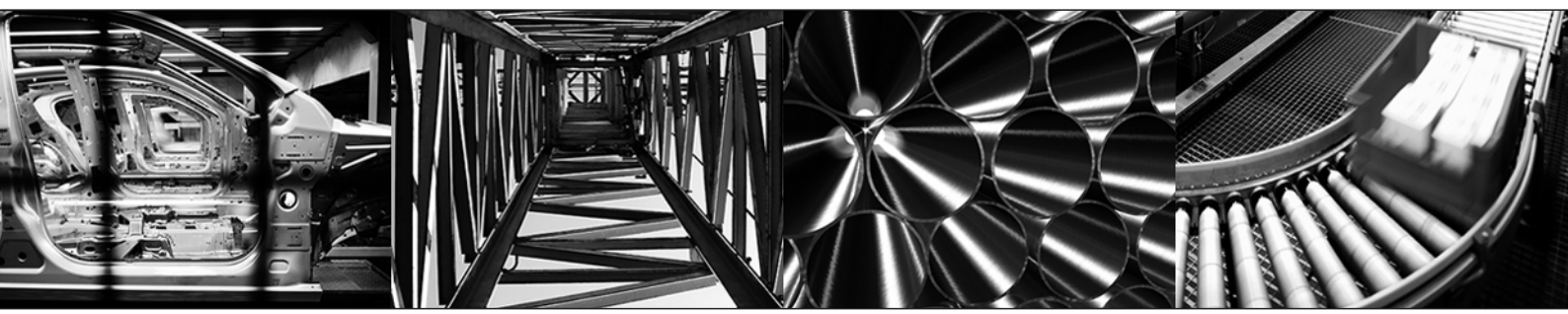

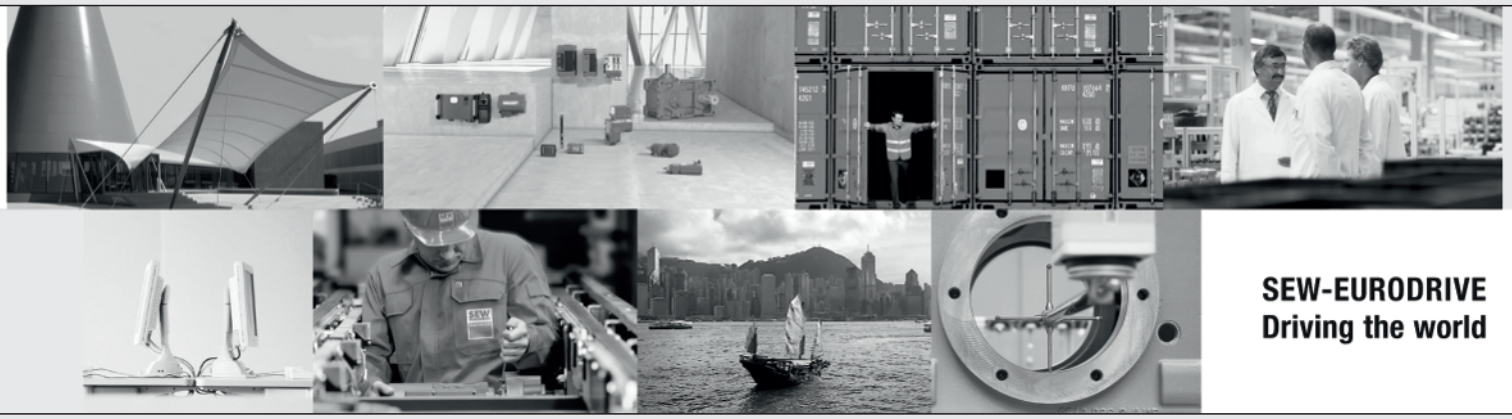

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