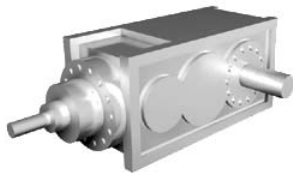
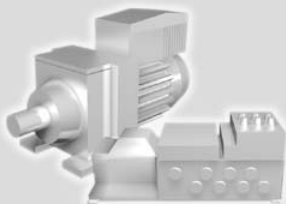
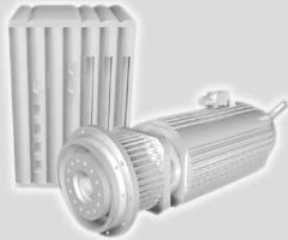
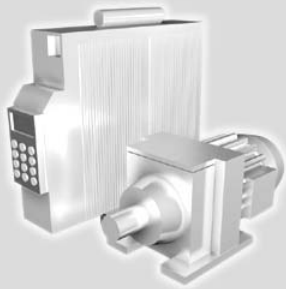




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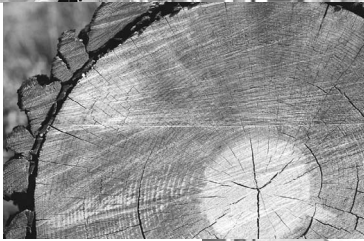
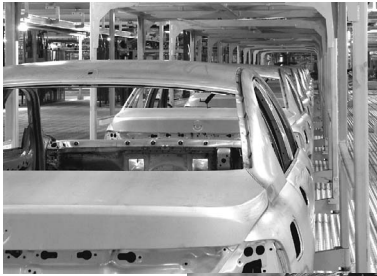
**Planetary Gear Units
P..RF.., P..KF.. Series**

GD140000

Edition 06/2006

11359714 / EN

Operating Instructions





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1 Important Notes on the Operating Instructions

Introduction These operation instructions are an integral part of gear unit delivery. Always keep the operating instructions close to the gear unit. Additional technical documents, delivery contracts, or other agreements must also be observed.

General Planetary gear units are a combination of (→ see section 3.1)

1. Planetary gear unit P.. output stage
2. RF.. or KF.. primary gear unit
3. Mount-on components: Motor, coupling, adapter, and backstop

Part of the product The operating instructions constitute an integral part of the P..RF, P..KF series planetary gear units and contain important information for operation and service. The operating instructions are written for all employees who assemble, install, startup, and service planetary gear units.

Designated use The designated use refers to the procedure specified in the operating instructions. The planetary gear units of the P..RF., P..KF.. series are units run by motors for industrial and commercial systems. Gear unit loads other than those specified, and applications other than industrial and commercial systems can only be used after consultation with SEW-EURODRIVE. For the purpose of EC Machinery Directive 2006/42/EC, the planetary gear units are components for installation in machinery and systems. In the scope of the EC directive, you cannot operate the machinery in the designated fashion until you have established that the end product complies with the Machinery Directive 2006/42/EC.

Qualified personnel Planetary gear units of the P..RF., P..KF.. series represent a potential hazard for persons and property. Consequently, only trained personnel who are aware of the potential hazards may perform assembly, installation, startup, and service work.

Personnel must be appropriately qualified for the task at hand and must know how to carry out the following work:

- Assembly
- Installation
- Startup
- Operation

Personnel must carefully read the operating instructions, in particular the safety notes section, and ensure that they understand and comply with them.



Liability for defects

Incorrect handling or any action performed that is not specified in these operating instructions could adversely affect the properties of the product. If this is the case, you lose any right to claim against SEW-EURODRIVE GmbH & Co KG under limited warranty.

Product names and trademarks

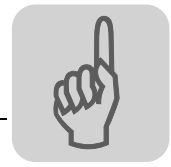
The brands and product names contained within these operating instructions are trademarks or registered trademarks of the titleholders.

Disposal



(Please observe current regulations):

- Housing parts, gears, shafts, and roller bearings of the gear units must be disposed of as steel scrap. This also applies to gray-cast iron parts if there is no separate collection for them.
- Collect used oil and dispose of it in the proper manner.



1.1 Explanation of symbols

	Electrical hazard Possible consequences: Severe or fatal injuries
	Hazard Possible consequences: Severe or fatal injuries
	Hazardous situation Possible consequences: Slight or minor injuries
	Harmful situation Possible consequences: Damage to the drive and the environment
	Tips and useful information

1.2 Notes on operation



- The planetary gear units are delivered without oil fill.
- RF../KF.. primary gear units are normally delivered with oil fill. Please refer to the order documents for discrepancies.
- The nameplate of the gear unit contains the most important technical data.
- RF../KF.. primary gear units have a lubricant fill in accordance with their mounting position.
- The oil chambers of both gear units are separate. Exceptions are specifically identified as such.
- The mounting position may be changed only after prior consultation with SEW-EURODRIVE. The warranty will become void without prior consultation.
Oil expansion tanks and/or an oil riser pipe are required if you change to a vertical mounting position. Adjust the lubricant fill quantities and the position of the breather valve accordingly.
- Please observe the instructions in the "Mechanical Installation / Installing the Gear Unit" section.



2 Safety Notes

2.1 Preface



- The following safety notes primarily refer to the use of planetary gear units of the P..RF../P..KF.. series.
- When using gearmotors, also observe the safety notes for motors and primary gear units in the accompanying operating instructions.
- Also consider the supplementary safety notes in the individual sections of these operating instructions.

2.2 General information



Risk of burns.

Touching the gear unit before it has cooled down will result in burns.

Never touch the gear unit during operation or in the cool down phase once the unit has been switched off.



Never install damaged products or put them into operation.

Please submit a complaint to the shipping company immediately in the event of damage.

During and after operation, industrial gear units, primary gear units, and motors have:

- Live parts
- Moving parts
- Hot surfaces

Only qualified personnel may carry out the following work:

- Installation/assembly
- Connection
- Startup
- Maintenance
- Servicing

Observe the following information and documents:

- Pertinent operating instructions and wiring diagrams
- System-specific regulations and requirements
- National/regional safety and accident prevention regulations



Serious injuries and property damage may result from:

- Improper use
- Incorrect installation or operation
- Improper removal of the required protective cover



General

- Work carefully and keep safety in mind.
- When installing the gear unit in devices or systems, the manufacturers of the device or system are obligated to include the regulations, notes, and descriptions from these operating instructions in their own operating instructions.
- Observe the notes attached to the gear unit such as the nameplate and direction arrow. They must be free of paint or dirt. Replace missing signs.
- Work on the gear unit only when the machine is not in use. Prevent the drive unit from being unintentionally switched on by locking the keyswitch or removing the fuses from the power supply. Attach an information sign near the on-switch to warn that the gear unit is being worked on.

Startup/operation



Check that the direction of rotation is correct in the decoupled state. Pay attention to unusual grinding noises as the shaft rotates.

Secure the keys for test mode without output elements. Do not deactivate monitoring and protection equipment even in test mode.

When in doubt, switch off the main motor whenever changes occur in relation to normal mode (such as increased temperatures, noise, oscillation). Determine the cause of the fault, and consult SEW-EURODRIVE.

Inspection and maintenance

Observe the instructions in the "Inspection and Maintenance" section.

Heating

- Please contact SEW-EURODRIVE if an ambient temperature of 45 °C is exceeded for a sustained period with the planetary and primary gear unit in the horizontal mounting position.
- Please contact SEW-EURODRIVE if an ambient temperature of 45 °C and/or a motor speed of 1800 1/min are exceeded for a sustained period with either the planetary gear unit or the primary gearmotor in the vertical configuration.

Operational environment

The following uses are prohibited unless the units are explicitly designed for such purposes:



- **Use in potentially explosive atmospheres**
- **Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc. In you have questions please contact SEW-EURODRIVE.**












Safety Notes

Symbols on the gear unit

2.3 Symbols on the gear unit

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

Symbol	Meaning
	Breather valve
	Oil filling plug
	Oil drain plug
	Lubrication point
	Oil sight glass
	Direction of rotation
	Delivery status
	Hot surfaces
	Extended storage

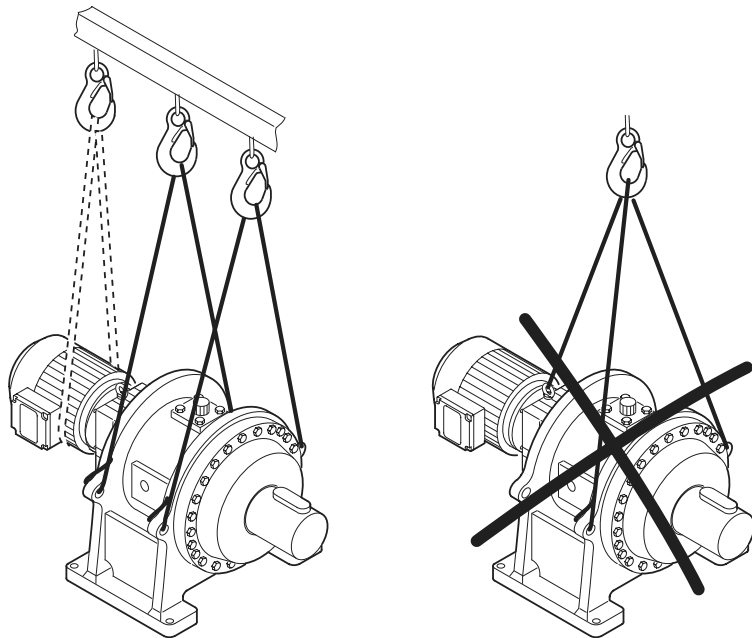


2.4 Transportation

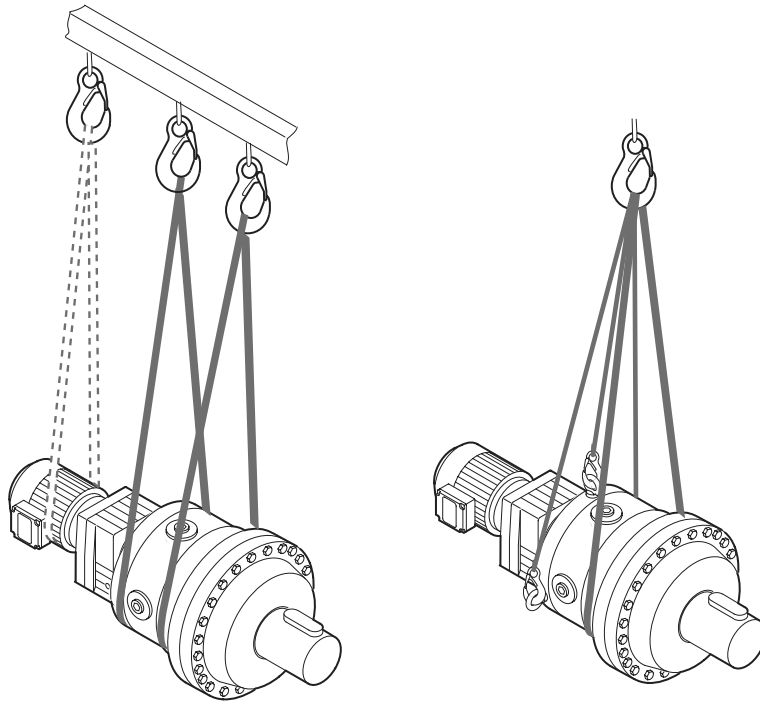


- Inspect the shipment as soon as you receive the delivery and immediately inform the shipping company of any damage that may have occurred in transit. It may be necessary to preclude startup.
- During transport, use only hoists and load-bearing equipment with sufficient load-bearing capacity.
- The weight of the gear unit is indicated on the nameplate or the dimension drawing. Observe the loads and regulations specified on the nameplate.
- The gear unit must be transported in a manner that prevents injuries and damage to the gear unit. For example, impacts against exposed shaft ends can damage the gear unit.
- Do not use the eyebolts or lifting eyebolts on motors or primary gear units (RF../KF..) during transport.
- Planetary gear units and planetary gearmotors are suspended from the transport points marked in the drawings below.
- The drawing below can be applied for the support and balancing of the planetary gear unit (→ see dotted line in the two drawings below).

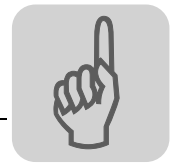
Transporting planetary gear units with foot mounting



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**Transporting
planetary gear
units with flange
mounting**

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2.5 Extended storage

Design

You can also order gear units designed for "extended storage". In this case, a VCI (volatile corrosion inhibitor) is added to the lubricant in these gear units (except for planetary gear units and planetary gearmotors with a shared oil chamber). Unless specified otherwise, the gear unit will be provided with exterior surface protection OS1. You can order OS2 or OS3 instead of OS1.



The planetary gear units are filled with oil if you order extended storage. Please refer to the section "Startup". Please contact SEW-EURODRIVE if you order extended storage.

Surface protection	Suitable for
OS1	Low environmental impact
OS2	Medium environmental impact
OS3	High environmental impact

Oil fill for helical and helical-bevel primary gear units

Observe the following points concerning the oil fill:

- **Mineral oil (CLP) and synthetic oil (CLP HC):** Gear units will be supplied with an oil fill according to the mounting position (M1 ... M6) and are ready for operation.
- **Synthetic oil (CLP PG):** In some cases, gear units are supplied with an increased oil level. Before startup, adjust the oil level to match the required mounting position (M1 ... M4). The oil fill quantities for the gear units are specified in the section Design and operating notes.



The gear units must remain tightly sealed until startup to prevent the VCI anti-corrosion agent from evaporating.

Always check the oil level before you take the gear unit into operation!



Safety Notes

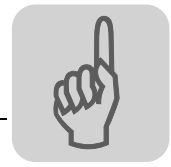
Extended storage

Storage conditions

Observe the storage conditions specified in the following table for extended storage:

Climate zone	Packaging ¹⁾	Storage location	Storage time
Temperate: (Europe, USA, Canada, China and Russia, excluding tropical zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap.	Roofed, protected against rain, snow, and shocks.	Up to three years, regularly checking the packaging and moisture indicator (rel. humidity < 50 %).
	Open	Roofed, enclosed at constant temperature and atmospheric humidity (5°C < ϑ < 60°C, < 50% relative humidity). Protected against sudden temperature fluctuations and for controlled ventilation with filter (free from dirt and dust). Protected against aggressive vapors and shocks.	Two years or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Check corrosion protection.
Tropical: (Asia, Africa, Central and South America, Australia, New Zealand excluding temperate zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap. Protected against insect damage and mildew by chemical treatment.	Roofed, protected against rain and shocks.	Up to three years, regularly checking the packaging and moisture indicator (rel. humidity < 50 %).
	Open	Roofed, enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 60°C, < 50 % relative humidity). Protected against sudden temperature fluctuations and for controlled ventilation with filter (free from dirt and dust). Protected against aggressive vapors and shocks. Protected against insect damage.	Two years or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Inspect corrosion protection.

1) Packaging must be carried out by an experienced company using the packaging materials that have been explicitly specified for the particular application.



2.6 Corrosion and Surface Protection

OS surface protection Instead of standard surface protection, motors and gear units are optionally available with OS1, OS2 or OS3 surface protection.

Surface protection	Layers	Layer thickness [μm]	Suitable for
Standard	1 x dip primer 1 two-pack top coat	Approx. 60	<ul style="list-style-type: none"> • Normal environmental conditions • Relative humidity below 90 % • Surface temperature up to 120 °C • Corrosivity category C1¹⁾
OS1	1 x dip primer 1 two-pack Base coat 1 two-pack Top coat	Approx. 120-150	<ul style="list-style-type: none"> • Low environmental impact • Relative humidity max. 95 % • Surface temperature up to 120 °C • Corrosivity category C2¹⁾
OS2	1 x dip primer 2 two-pack Base coat 1 two-pack Top coat	Approx. 170-210	<ul style="list-style-type: none"> • Medium environmental impact • Relative humidity up to 100 % • Surface temperature up to 120 °C • Corrosivity category C3¹⁾
OS3	1 x dip primer 2 two-pack Base coat 2 two-pack Top coat	Approx. 220-270	<ul style="list-style-type: none"> • High environmental impact • Relative humidity up to 100 % • Surface temperature up to 120 °C • Corrosivity category C4¹⁾

1) in accordance with DIN EN ISO 12 944-2

Output shafts and machined metal surfaces are tectylized corresponding to the storage conditions.



Gear Unit Design

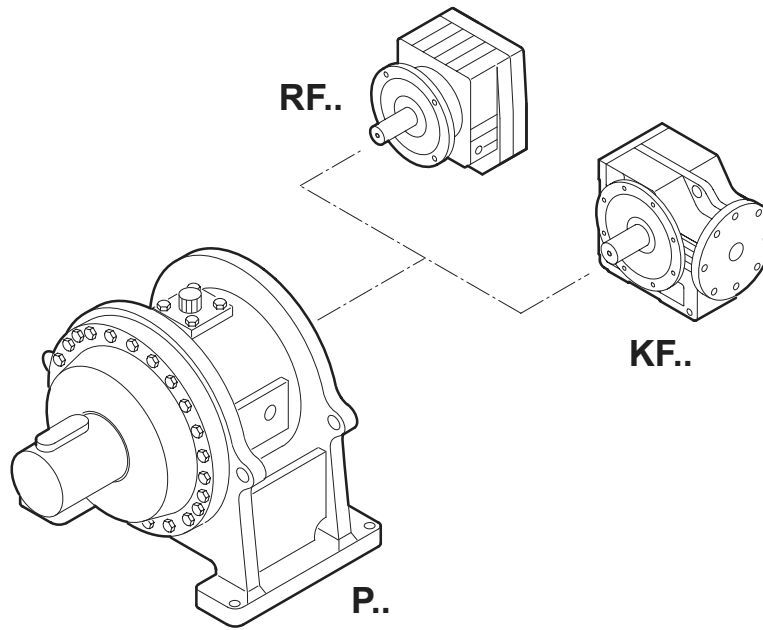
Planetary gear unit with primary gear unit combination

3 Gear Unit Design

3.1 Planetary gear unit with primary gear unit combination

The illustration below shows the design of the planetary gear unit P..RF../P..KF.. Series.

The gear unit design consists of a planetary gear unit and an RF../KF.. primary gear unit.



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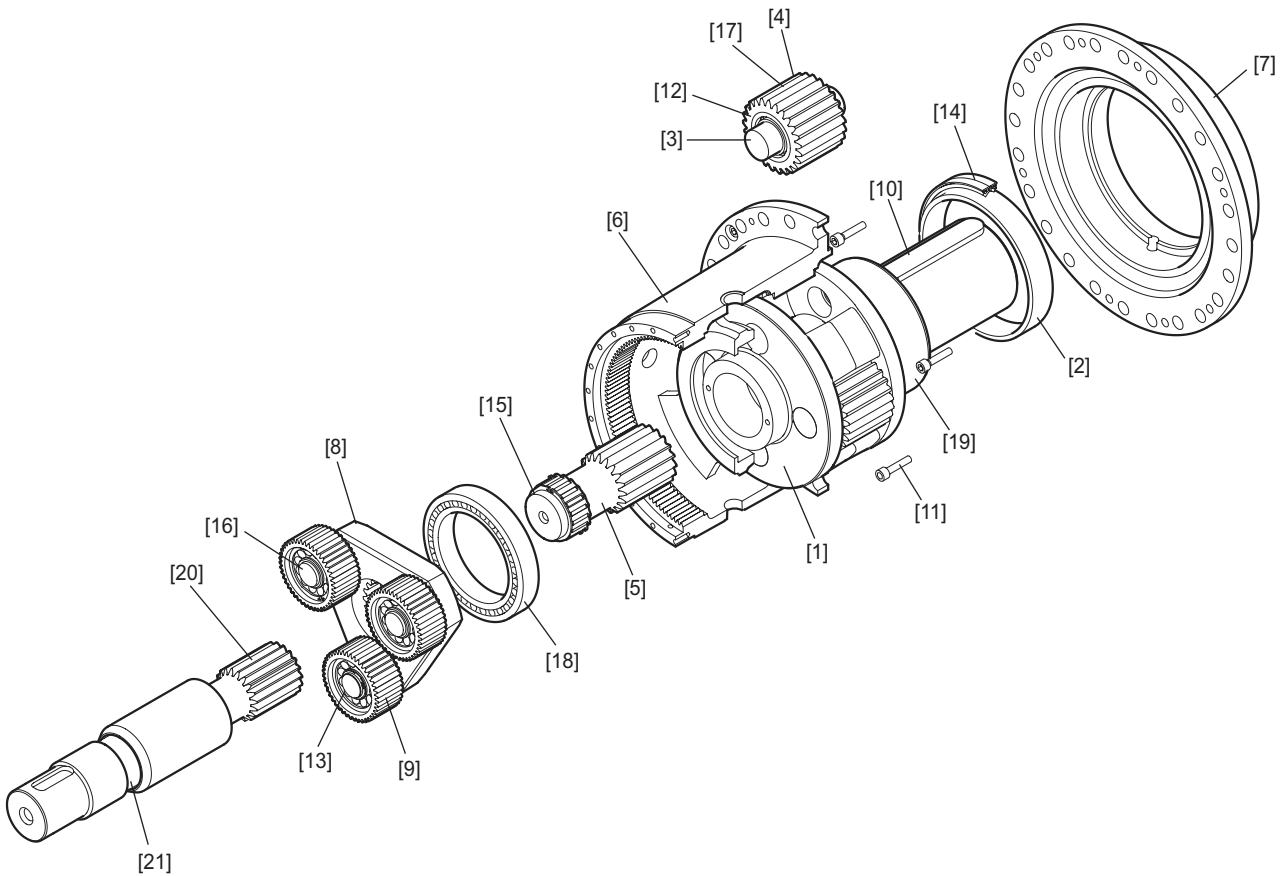
- P.. Planetary gear unit
- RF.. Helical gear unit (flange mounted)
- KF.. Helical-bevel gear unit (flange mounted)



3.2 Design of the planetary gear unit



Basic design of the planetary gear unit taking the example of a solid shaft gear unit.



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- | | | |
|-------------------------|--|----------------------------------|
| [1] Planet carrier | [8] Planet carrier | [15] Circlip |
| [2] Bearing race | [9] Planet wheel | [16] Circlip |
| [3] Planetary gear axle | [10] Key (not installed in hollow shaft) | [17] Circlip |
| [4] Planet wheel | [11] Machine screw | [18] Cylindrical roller bearings |
| [5] Sun pinion | [12] Cylindrical roller bearings | [19] Cylindrical roller bearings |
| [6] Housing gear rim | [13] Self-aligning roller bearing | [20] Sun pinion |
| [7] Output flange | [14] Oil seal | [21] Intermediate shaft |



3.3 Nameplate and unit designation

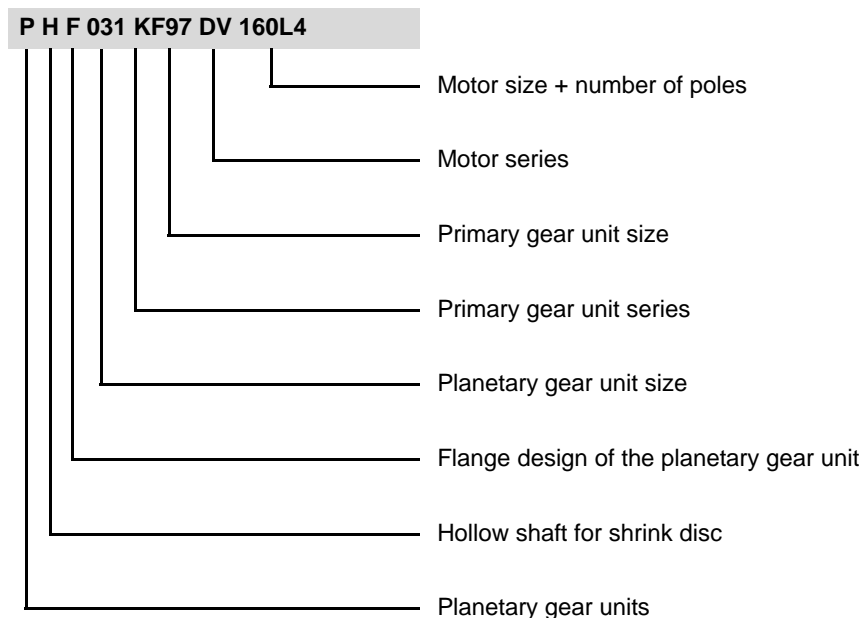
Example nameplate for a planetary gear unit

SEW-EURODRIVE		Bruchsal/Germany	
Typ	PHF031KF97DV160L4 / TF		
Nr. 1	1124908205	Nr. 2	W10789
Pe kW	9.7	MN2 kNm	27.6/69.1
F _S	3.1	kg	890
i 1:	470	Year	2006
n r/min	1460		
Lubricant	Synthetic ISO VG320EP PAO		
Number of greasing points:	0	Made in D	

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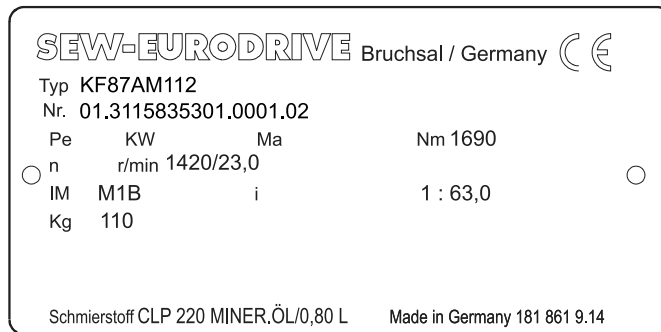
Type		Unit designation
Nr. 1		Serial number 1
Nr. 2		Serial number 2
P _e	[kW]	Operating power produced on the input shaft
F _S		Service factor
n	[rpm]	Input/output speed
kg		Weight
i		Exact gear unit reduction ratio
Lubricant		Oil grade and viscosity class/oil capacity
M _{N2}	[kNm]	Rated torque of gear unit
Year		Year of construction
Number of greasing points		Number of points that require re-greasing

Example of planetary gear unit designations





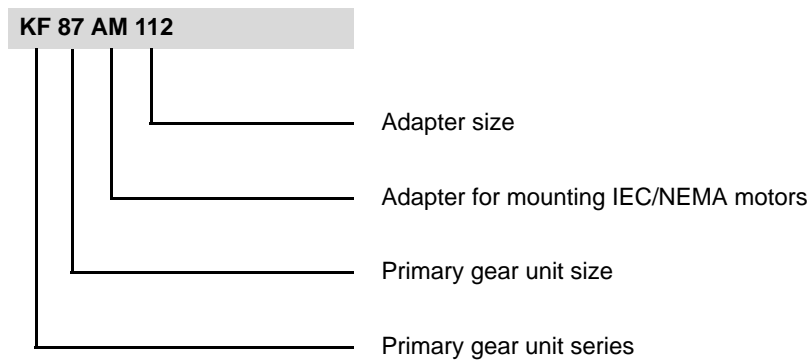
Example nameplate for a primary gear unit KF..



05831ADE

Typ		Unit designation
Nr.		Manufacturer number of the primary gear unit
Pe	[kW]	Input power of the gear unit
Ma	[Nm]	Output torque:
n	[r/min]	Input/output speed
IM		Mounting position
i		Ratio
Kg	[Kg]	Weight

Example of unit designation for a primary gear unit KF..





Gear Unit Design

Nameplate and unit designation

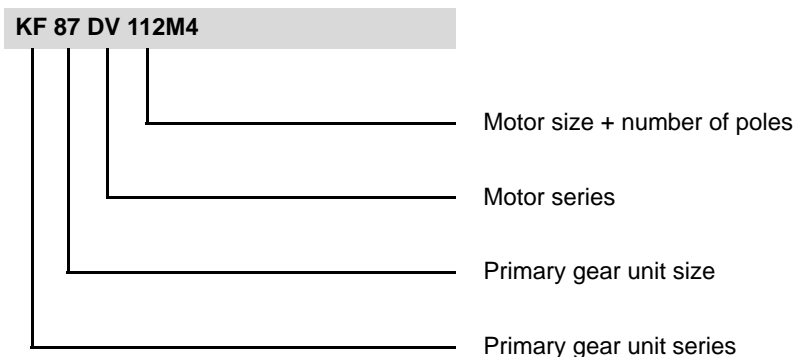
Example nameplate of primary gear unit RF./KF.. as gearmotor

SEW-EURODRIVE		Bruchsal / Germany	CE
Typ	KF87DV112M4	3 ~ IEC 34	
Nr.	01.3998708401.0001.01	i	63,0 :1
	1/min 1420/23	Nm	1690
○ KW	4 S1	cos ϕ	0,84
V	230 Δ /400 Y	A	15/8,7 Hz 50
IM	M1	kg	125 IP 54 Kl.B
Bremse	V	Nm	Gleichrichter
Schmierstoff			181 868 6.13

05832ADE

Typ		Unit designation
Nr.		Manufacturer number of the primary gearmotor
i		Ratio
1/min	[min ⁻¹]	Input/output speed
Nm	[Nm]	Output torque:
KW	[kW]	Input power of the gear unit
S1		Operating mode
cos		Power factor of the motor
V	[V]	Supply voltage in delta/star connection
A	[A]	Rated motor current in delta/star connection
Hz	[Hz]	Supply frequency
IM		Mounting position
Kg	[kg]	Weight of the primary gearmotor
IP		Enclosure of the motor
Kl		Insulating material classification of the motor
Bremse V	[V]	Brake connection voltage
Nm	[Nm]	Braking torque
Gleichrichter		Brake rectifier for complete drive

Example nameplate of primary gear unit RF./KF.. as gearmotor





4 Mechanical Installation

4.1 Required tools/resources

Not included in the scope of delivery:

- Set of wrenches
- Torque wrench (for shrink discs)
- Motor mount on motor adapter
- Mounting device
- Compensation elements (shims and spacing rings)
- Fasteners for input and output elements
- Mount the parts according to the gear unit illustrations shown in the section "Gear Unit Foundation".

4.2 Installation tolerances



Ensure that the tolerance zone of the mount-on components (e.g., couplings, belt pulleys, chain sprockets) correspond to SEW specifications.

Gear unit type	Shaft end	Flange
RF../KF.. primary gear unit	Diameter tolerance > 50 mm -> ISO m6 Center bore in accordance with DIN 332, type D.. d, d1 > 85..130 mm -> M24 > 130..180 mm -> M30 > 180 mm -> -	Centering shoulder tolerance -> ISO m8
Planetary gear unit P..	Shaft end ISO m6	Centering shoulder ISO f8

4.3 Prerequisites for assembly

Check whether the following conditions have been met:

- The entries on the nameplate of the motor match the voltage supply system
- The drive has not been damaged during transportation or storage.



4.4 Preliminary work



Danger of material damages.

Do not let the solvent come into contact with the sealing lips of the oil seals.



Ensure that there is sufficient ventilation when using solvents. This is risk of explosion. No open flames.

- You must remove any anti-corrosion agents, contaminants, or similar substances from output shafts and flange surfaces. Use a commercially available solvent.
- Protect all oil seals against direct contact with abrasive substances (such as sand, dust, or shavings).

Extended storage

Please note: The service life of the lubricant in the bearings is reduced if the unit is stored for ≥ 1 year

Gear units designed for "extended storage" have a higher oil level in some cases. Correct the oil level in primary and planetary gear units before startup (see section 6, "Inspection and Maintenance").

Oil check



Fill planetary gear units with the oil grades and quantities specified on the nameplate (see sections "Startup" and "Inspection and Maintenance"):

- Fill to volume suitable for the mounting position (see nameplate)
- Check oil level through the oil sight glass or with oil stick

→ see sections "Inspection and Maintenance" and "Design and Operating Notes".



4.5 Installing the gear unit



- You must strictly observe the safety notes in the individual sections.
- The most important technical data is included on the nameplate. Additional data relevant for operation is available in drawings, order confirmations or any order-specific documentation.
- Installation must be done with great care by qualified personnel. Damage due to improper handling leads to exclusion of liability.
- You may only install/mount the planetary gear unit in the specified mounting position on a level, vibration-damping, and torsionally rigid support structure. Do not tighten housing legs and mounting flanges against each other.
- Work on the planetary gear unit only when the machine is not in use. Prevent the drive unit from being unintentionally switched on (e.g. by locking the key-switch or removing the fuses from the power supply). Place an information sign next to the ON switch to warn that the gear unit is being worked on.
- The oil level and drain plugs as well as the breather valves must be freely accessible.
- Use plastic inserts (2 to 3 mm thick) if there is a risk of electrochemical corrosion between the planetary gear unit and the driven machine (connection between different metals such as cast iron and high-grade steel). Also fit the plugs with plastic washers. Ground the housing additionally: use the grounding screws on the motor.
- Before startup, check whether the oil fill corresponds to the specified mounting position (→ information on the nameplate).
- The mounting position may only be changed after consultation with SEW-EURODRIVE. Warranty will become void without prior consultation.
- Only authorized personnel may assemble gear head units with motors and adapters. Please contact SEW-EURODRIVE.
- Do not weld anywhere on the drive. Do not use the drive as a mass point for welding work. Welding may destroy gearing parts and bearings.
- Protect rotating drive parts such as the coupling, gears, or belt drive using suitable devices that protect from contact.
- Units installed outdoors must be protected from the sun. Suitable protective devices such as covers and roofs are required. When using these, avoid heat accumulation. The operator must ensure that foreign objects do not impair the function of the gear unit (e.g., by falling objects or coverings).
- Gear units are supplied with suitable coating for use in damp areas or in the open air. Any damage to the coating (e.g. on the breather valve) must be repaired.
- For the standard mounting positions, the breather valve on planetary gear units is mounted at the factory and activated if the gear unit is supplied without an oil fill. Check the functionality of the breather valve and that it is seated correctly.
- Only mount the coupling using a mounting device.



Mechanical Installation

Installing the gear unit

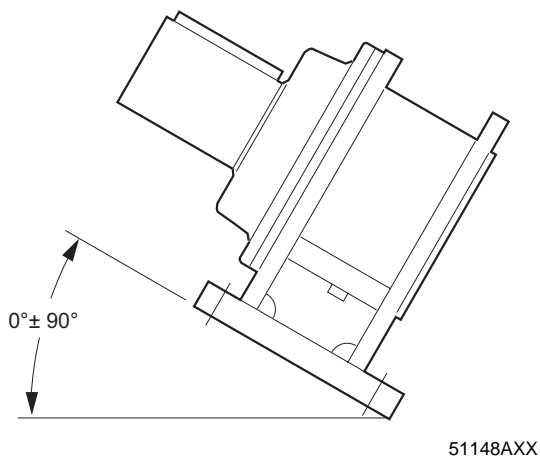
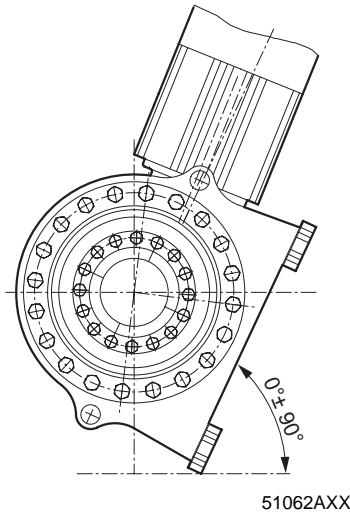
Pivoted mounting positions

Pivoted mounting positions are mounting positions that differ from the standard mounting positions (see section "Mounting positions").

The ventilation filter of the planetary gear unit is supplied for transport with pivoted mounting positions.

In this case, replace the ventilation filter with the corresponding screw plug prior to start-up.

Example

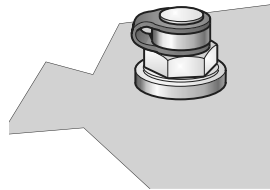




**Breather valve
with RF../KF..
primary gear unit**

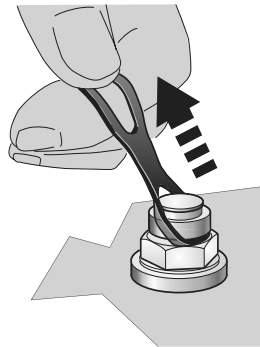
As a rule, the breather valve is already activated at the factory for RF../KF.. primary gear units. If this is not the case, remove the transport fixture from the breather valve before starting up the gear unit.

1. Breather valve with transport fixture



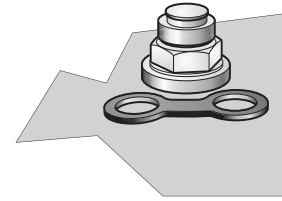
02053BXX

2. Remove transport fixture



02054BXX

3. Activated breather valve



02055BXX

**Painting the gear
unit**

If all or some of the surfaces of the drive are to be painted, ensure that you carefully mask the breather valve and the oil seals. Remove the strips of tape after completing painting.



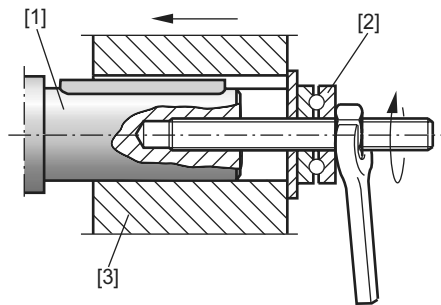
4.6 Gear units with solid shafts



Input and output elements such as belt pulleys, couplings, etc. must have protection against contact.

Installing input and output elements

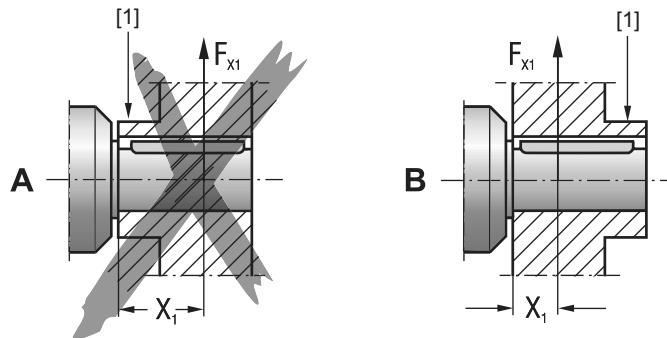
The following figure shows an example of a mounting device for installing couplings or hubs on gear unit or motor shaft ends. It is possible that you do not need the thrust bearing on the mounting device.



58196AXX

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

The following illustration shows the correct mounting arrangement (**B**) of a gear wheel or chain sprocket for avoiding excessively high lateral forces.



05821AXX

- A = Unfavorable
- B = Correct
- [1] Hub



- Only use a mounting device (see previous page) for installing input and output elements. Use the center bore and the thread on the shaft end for positioning.
- **Never drive belt pulleys, couplings, pinions, etc. onto the shaft end by hitting them with a hammer (damage to bearings, housing and the shaft will result).**
- **For belt pulleys, ensure that the belt has the correct tension (in accordance with the manufacturer's instructions).**
- Power transmission elements should be balanced after fitting and must not cause any impermissible radial or axial forces (see the "Planetary Gearmotors" catalog for permitted values).



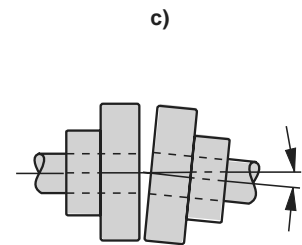
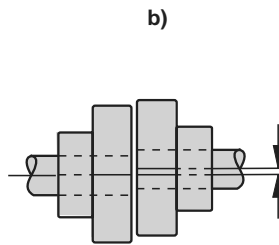
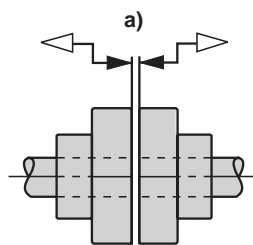
Note:

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

Mounting couplings

Couplings must be mounted and balanced according to the information provided by the coupling manufacturer:

- Maximum and minimum clearance
- Axial misalignment
- Angular misalignment



03356AXX

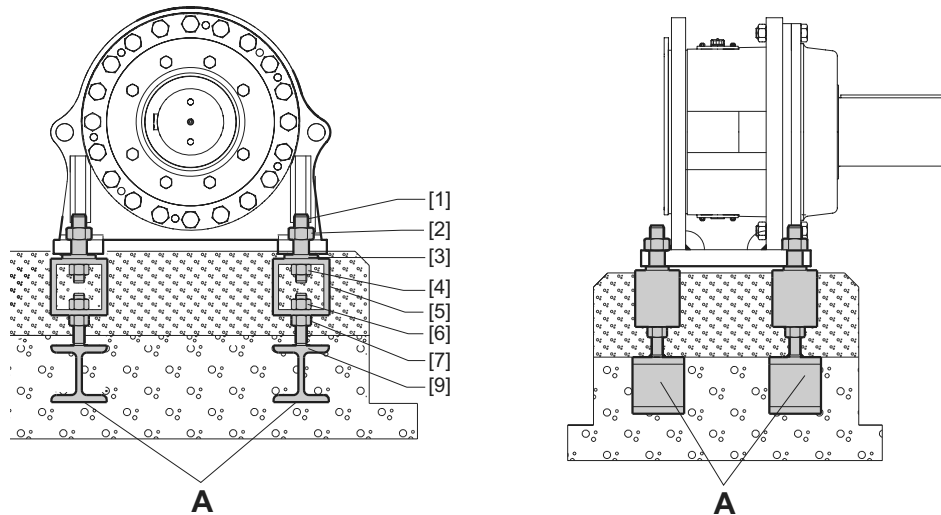


4.7 Gear unit mounting for foot-mounted units

To quickly and reliably install the planetary gear unit, the proper type of foundation must be selected and extensive planning is required, which includes the drafting of foundation drawings with all necessary construction and dimension details.

To avoid harmful vibrations and oscillations when the planetary gear unit is mounted on a steel construction, ensure that the stiffness of the construction is adequate. The foundation must be designed according to the weight and torque of the planetary gear unit while accounting for the forces acting on the gear unit.

Example



58336AXX

Position A Concrete base section

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



- Only use class 8.8 screws in accordance with the table below.
- Tighten screws with the specified tightening torque.

Gear unit type	DIN screws	Thread	Quantity	Strength class	Tightening torque [Nm] ± 20 %
P001	912/931	M20	8	8.8	310
P011	912/931	M20	8	8.8	310
P021	912/931	M20	8	8.8	310
P031	912/931	M24	8	8.8	540
P041	912/931	M30	8	8.8	1100
P051	912/931	M36	8	8.8	1830
P061	912/931	M36	8	8.8	1830
P071	912/931	M42	8	8.8	3200
P081	912/931	M42	8	8.8	3200

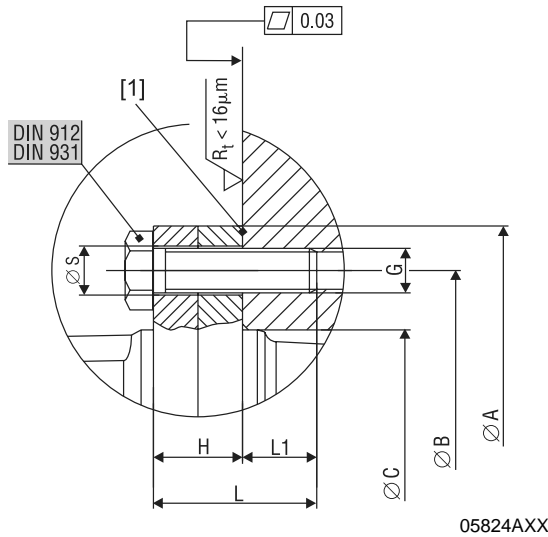


4.8 Gear unit mounting for flange-mounted units

During gear unit mounting on the torque arm and/or machine frame, note the following:



- Only use class 8.8 screws in accordance with the table below.
- Tighten screws with the specified tightening torque.
- In addition, apply Loctite 640 to the screw contact surface [1].



Gear unit type P	Screws DIN	Thread	Quantity	Strength classes	Tightening torque [Nm] $\pm 20\%$	Dimensions in [mm]						
						$\varnothing S$	H	L	L1	$\varnothing A$	$\varnothing B$	$\varnothing C$
P001	912/931	M20	20	8.8	310	22	36	70	34	410	370	330 f8
P011	912/931	M20	20	8.8	310	22	38	70	32	450	410	370 f8
P021	912/931	M20	24	8.8	310	22	44	80	36	500	460	410 f8
P031	912/931	M24	20	8.8	540	26	46	80	34	560	510	460 f8
P041	912/931	M30	20	8.8	1100	33	60	110	50	620	560	480 f8
P051	912/931	M30	24	8.8	1100	33	60	110	50	650	590	530 f8
P061	912/931	M36	24	8.8	1830	39	70	130	60	760	690	610 f8
P071	912/931	M36	24	8.8	1830	39	80	140	60	840	770	690 f8
P081	912/931	M42	24	8.8	3200	45	80	150	70	920	840	750 f8



Mechanical Installation

Installing torque arms for hollow shaft gear units

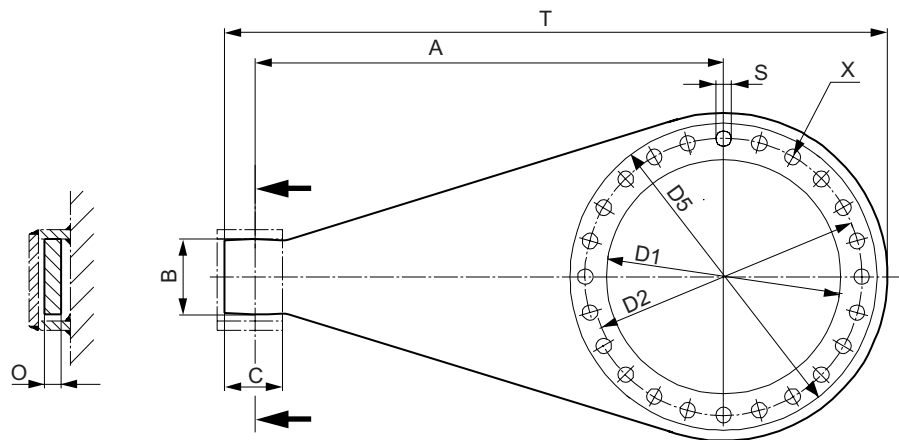
4.9 Installing torque arms for hollow shaft gear units

Single-sided torque arm



Do not place torque arms under strain during installation.

The reactive force due to the gear unit torque is absorbed via the torque arm with lever arm A. The illustration shows an example for absorption in a welded construction with design dimensions. Two supporting plates are welded with the suggested dimensions on the machine design. Once the gear unit has been mounted, a connecting cover plate is welded onto the two supporting plates. The force of the gear unit torque acts on the support, divided by the length of the lever arm A. The reaction force also acts on the gear and machine shafts.



51056AXX

Dimensions

Gear unit type	Dimensions in [mm]									Quantity	Weight [Kg]
	A	B	C	D1	D2	D5	O	S	T		
P001	650	60	50	335	370	410	25	22	880	16	31
P011	700	70	60	375	410	450	30	22	955	20	36
P021	750	90	70	415	460	500	35	22	1035	24	58
P031	800	110	90	465	510	560	35	26	1125	20	70
P041	900	150	120	485	560	620	40	33	1270	20	117
P051	1000	160	130	535	590	650	40	33	1390	24	147
P061	1200	180	150	615	690	760	50	39	1655	24	183
P071	1500	230	200	695	770	840	60	39	2020	24	315
P081	1600	230	200	755	840	920	70	45	2160	24	360



Tightening torques

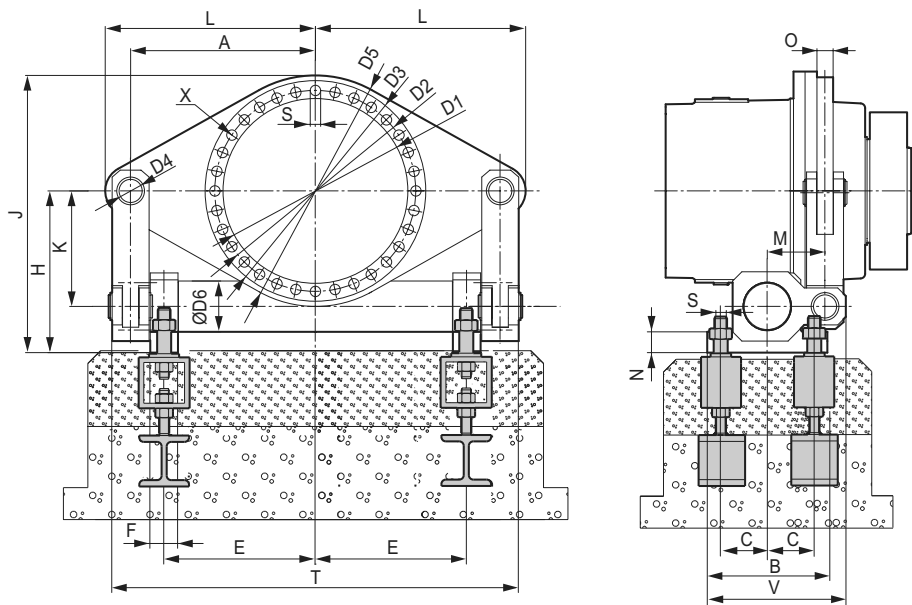
Gear unit type	Screws DIN	Thread	Quantity	Strength classes	Tightening torque [Nm] ± 20 %
P001	912/931	M20	20	8.8	310
P011	912/931	M20	20	8.8	310
P021	912/931	M20	24	8.8	310
P031	912/931	M24	20	8.8	540
P041	912/931	M30	20	8.8	1100
P051	912/931	M30	24	8.8	1100
P061	912/931	M36	24	8.8	1830
P071	912/931	M36	24	8.8	1830
P081	912/931	M42	24	8.8	3200

Double-sided torque arms



Do not place torque arms under strain during installation.

The reaction torque from the gear unit output torque is absorbed via the lever arms A. The resulting reactive force is absorbed in the foundation. No reaction forces act on the gear unit and machine bearings. The torque arm must be screwed onto a structure or foundation provided by the customer using the foot screws.



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Mechanical Installation

Installing torque arms for hollow shaft gear units

Tightening torques

Tighten the foot-mounting screws with the specified tightening torque.

Gear unit type	DIN screws	Thread	Quantity	Strength class	Tightening torque [Nm] 20 %
P061	912/931	M36	8	8.8	1830
P071	912/931	M36	8	8.8	1800
P081	912/931	M42	8	8.8	3200

Dimensions

Gear unit type	Dimensions in [mm]											
	A	B	C	D1	D2	D3	D4	D5	D6	E	F	H
P061	500	500	190	610	690	770	90	810	200	370	110	640
P071	600	500	190	690	770	850	90	890	200	470	110	640
P081	700	520	200	750	840	930	100	970	220	555	120	710

Gear unit type	Dimensions in [mm]									Quantity	Weight
	J	K	L	M	N	O	S	T	V	X	[Kg]
P061	1045	460	595	240	70	60	39	1140	560	24	780
P071	1085	460	695	240	70	60	39	1340	560	24	895
P081	1195	520	810	260	80	70	45	1560	600	24	1292



4.10 Assembly/disassembly of hollow shaft gear units and shrink discs

Assembly instructions

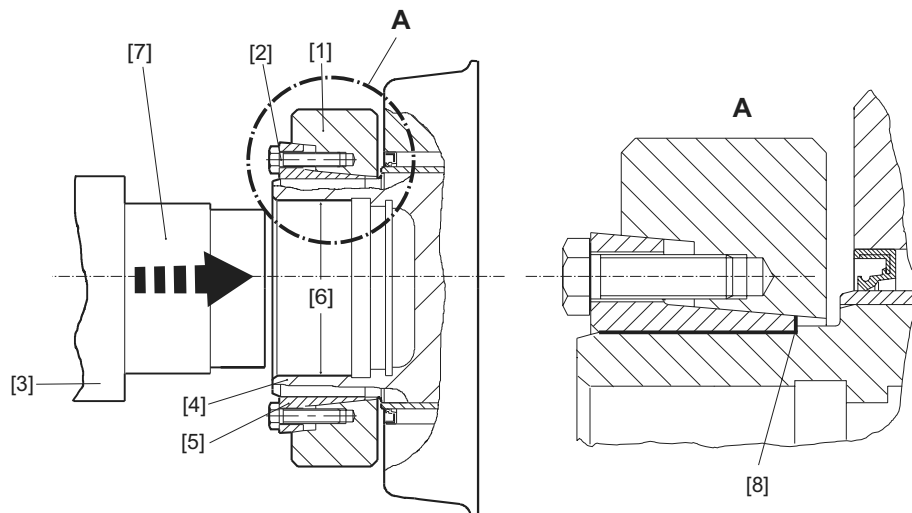


- Do not disassemble the shrink disc before the first installation.
- Never tighten the locking screws until the machine shaft has been installed.
- Do not tighten the locking screws in diametrically opposite sequence.
- On the outside surface of shrink disc, the bore of the hollow shaft and the machine shaft must be absolutely free from any grease. This is an important factor for the reliability of torque transmission. Contaminated solvents and cleaning rags are not suitable for degreasing.



The shrink discs are delivered preassembled and ready for installation.

Assembly



58199AXX

- | | |
|-------------------|---|
| [1] Outer ring | [5] Inner ring |
| [2] Locking screw | [6] Free from grease |
| [3] Machine shaft | [7] Free from grease |
| [4] Hub | [8] Correct position of the shrink disc |

1. Before installing the shrink disc, clean and degrease the hub [4] and the machine shaft [3]. This is very important for the reliability of torque transmission.
2. Ensure that the dimensions of the machine shafts correspond to SEW specifications.
3. Slide the loose shrink disc onto the hub [4].



Mechanical Installation

Assembly/disassembly of hollow shaft gear units and shrink discs

4. Check the correct position of the shrink disc [8]. The shrink disc is positioned correctly when it is in contact with the shaft shoulder.
 - Never tighten the locking screws [2] until the machine shaft [3] has been installed.
5. Install the machine shaft [3] or slide the hub [4] to a stop on the machine shaft [3]. Perform the mounting sequence slowly to allow the compressed air to escape around the outside of the shaft.
6. Tighten the locking screws [2] manually first. Tighten all locking screws working around equally (not diametrically opposite) in 1/4-turn increments.
7. **Observe the tightening torque** → see the table below. Tighten the locking screws [2] by continuing to work around in 1/4-turn increments until you reach the tightening torque. Additionally, you can visually check to see that the front lateral surfaces are aligned to the outer [1] and inner rings [5].



Review the type details on your shrink disc and choose the tightening torque.

Shrink discs type	Gear unit type	Screws	Rated torque [Nm]	Tightening torque [Nm] ± 20 %
3191	P001	M16	41000	250
3181	P011	M16	75500	290
	P021	M16	95500	290
	P031	M20	134000	570
	P041	M20	194000	570
	P051	M20	255000	570
	P061	M24	405000	980
	P071	M24	525000	980
	P081	M24	720000	980
3171	P011	M16	61400	250
	P021	M16	77500	250
	P031	M20	109000	490
	P041	M20	159000	490
	P051	M20	207000	490
	P061	M24	331000	840
	P071	M24	427000	840
	P081	M24	584000	840



Disassembly



Danger of injury if disassembly is not performed correctly.

1. Loosen the locking screws [2], working around in 1/4-turn increments for each screw.
 Do not loosen the rings [1] [5] from each other, unscrew as many screws as there are forcing threads and screw these equally so into the forcing threads until the stage tapered bushing is pushed out of the stage tapered ring.
 Under no circumstances should more locking screws be unscrewed than there are forcing threads present, else there is a possible risk of injury.
2. Remove the machine shaft [3] or pull the hub [4] off the customer shaft. (It is necessary to first remove any rust, which may have formed between the hub and the end of the shaft.)
3. Remove the shrink disc from the hub [4].

Cleaning and lubrication

Do not strip down and re-grease the disassembled shrink disc before installing it again. Only clean the shrink disc if it is contaminated.

Next, only re-grease the inner sliding surfaces of the shrink disc.

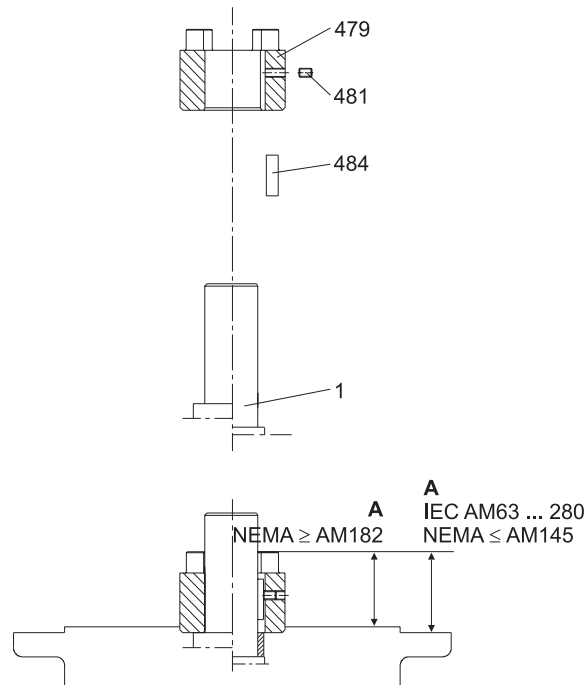
Use a solid lubricant with a friction factor of $\mu = 0.04$.

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



4.11 Coupling of AM adapter

IEC adapters
AM63 - 225/NEMA
adapters AM56 -
365



04469CXX

[1] Motor shaft
[479] Coupling half
[481] Setscrew
[484] Key

1. Clean the motor shaft [1] and flange surface of the motor and the adapter.
2. Remove the key from the motor shaft and replace it with the supplied key [484] (not AM63 or AM250).
3. Heat coupling half [479] to approx. 80 - 100 °C and push coupling half onto the motor shaft.
4. Push coupling half [479] onto the motor shaft until it makes contact with the motor shaft collar [1] (position to point A except for AM250/AM280 and NEMA).
5. Secure key and coupling half using setscrew [481] and tightening torque T_A according to the table on the motor shaft.
6. Check point A.
7. Seal the contact surfaces between the adapter and motor using a suitable sealing compound.
8. Mount the motor on the adapter, and while doing so, ensure that the coupling claw of the adapter shaft is engaged in the plastic cam ring.

IEC AM	63 / 71	80 / 90	100 / 112	132	160 / 180	200	225	250 / 280
A	24.5	31.5	41.5	54	76	78.5	93.5	139
T_A	1.5	1.5	4.8	4.8	10	17	17	17
Thread	M4	M4	M6	M6	M8	M10	M10	M10
NEMA AM	56	143 / 145	182 / 184	213 / 215	254 / 256	284 / 286	324 / 326	364 / 365
A	46	43	55	63.5	78.5	85.5	107	107
T_A	1.5	1.5	4.8	4.8	10	17	17	17
Thread	M4	M4	M6	M6	M8	M10	M10	M10



To avoid contact corrosion, we recommend applying NOCO[®] FLUID to the motor shaft before mounting the coupling half.

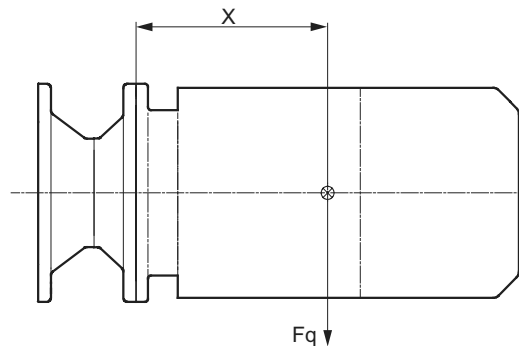


When installing a motor onto an adapter, you must use an anaerobic fluid seal to ensure that no moisture can penetrate the adapter.

Permitted loads



The load data specified in the table below must not be exceeded when a motor is mounted.



51102AXX

Adapter type		x ¹⁾ [mm]	F _q ¹⁾ [N]	
IEC	NEMA		IEC adapter	NEMA adapter
AM63/71	AM56	77	530	410
AM80/90	AM143/145	113	420	380
AM100/112	AM182/184	144	2000	1760
AM132 ²⁾	AM213/215 ²⁾	186	1600	1250
AM132..	AM213/215		4700	3690
AM160/180	AM254/286	251	4600	4340
AM200/225	AM324-AM365	297	5600	5250
AM250/280	-	390	11200	-

- 1) The maximum permitted weight of the attached motor F_{qmax} must be reduced linearly as the center of gravity distance x increases. If this distance is reduced, the maximum permitted weight F_{qmax} cannot be increased.
- 2) Diameter of the adapter output flange: 160 mm



Mechanical Installation

Coupling of AM adapter

Adapter AM with backstop AM../RS

Inspect the direction of the direction of rotation of the drive before assembly or startup. Please inform SEW-EURODRIVE service in the case of incorrect rotation direction.

The backstop is maintenance-free in operation, and does not require any further maintenance work.

Backstops have a minimum lift-off speed depending on the size (→ table below). If the minimum lift-off speeds are not met, the backstops are subject to wear, and the resulting friction causes the temperature to increase.

Type	Maximum locking torque of backstop [Nm]	Minimum lift-off speed [1/min]
AM80/90/RS, AM143/145/RS	90	640
AM100/112/RS, AM182/184/RS	340	600
AM132/RS, AM213/215/RS	700	550
AM160/180/RS, AM254/286/RS	1200	630
AM200/225/RS, AM324-365/RS	1450	430



In rated operation, the lift-off speed must not drop below the minimum values. The lift-off speed is only permitted to drop below the minimum values during startup or braking.

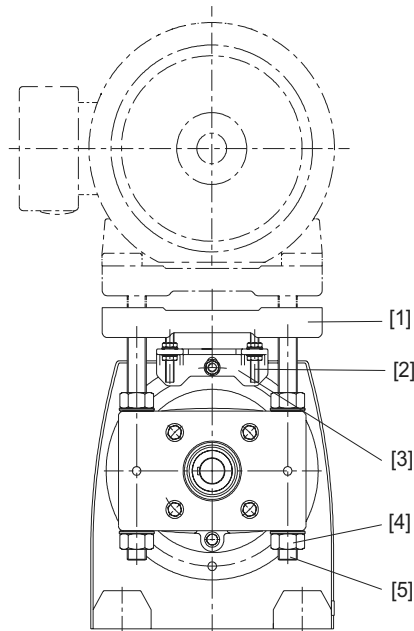


4.12 Input cover AD

Please refer to section "Installing input and output shafts" for information on the mounting of input elements.

Cover with motor mounting platform AD..P

Mounting the motor and adjusting the motor mounting platform.



58205AXX

- | | |
|-------------------------------------|---------------------|
| [1] Motor mounting platform | [4] Nut |
| [2] Stud bolt (only AD6/P or AD7/P) | [5] Threaded column |
| [3] Support (only AD6/P or AD7/P) | |

1. Set the motor mounting platform to the required mounting position by evenly tightening the adjusting nuts. It may be necessary to remove the lifting eyebolt from helical gear units in order to achieve the lowest adjustment position. Touch up any damaged painted surface.
2. Align the motor on the motor mounting platform (shaft ends must be in alignment) and secure it.
3. Mount the input elements on the input shaft end and the motor shaft, line them up with one another, and correct the motor position again if necessary.
4. Put on traction elements (V-belt, chain, etc.) and apply a preload by evenly adjusting the motor mounting platform. When doing so, do not stress the motor mounting platform and the columns against each other.
5. Tighten the threaded columns using the nuts that are not used for adjustment.



Mechanical Installation

Input cover AD

Only AD6/P and AD7/P:

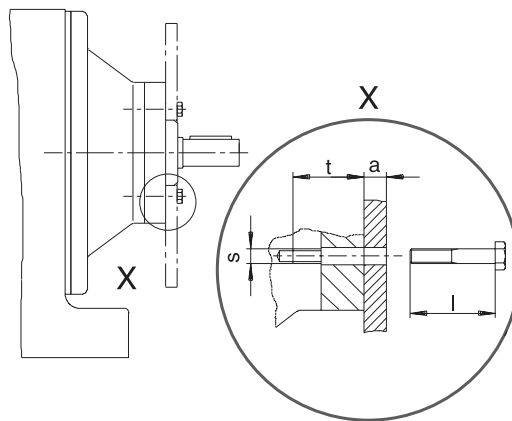
Loosen the nuts on the stud bolts before adjustment to allow the stud bolts to move axially in the support without restriction. Do not tighten the nuts until the final adjustment position has been achieved. Do not adjust the motor mounting platform using the support.

Type with centering shoulder AD../ZR

Mounting applications on the input cover with centering shoulder.

1. Screws of a suitable length must be used to secure the application. The length l of the new screws is shown in the illustration below.

Round down the calculated screw length to the next smaller standard length.



02725CXX

$$l = t + a$$

t = Screw-in depth (see table)

a = Thickness of the application

s = Retaining thread (see table)

2. Remove the retaining screws from the centering shoulder.
3. Clean the contact surface and the centering shoulder.
4. Clean the screw thread of the new screws. Apply a threadlocker compound (such as Loctite 243) to the first few threads.
5. Place the application on the centering shoulder. Tighten the retaining screws with the specified tightening torque T_A (see table).

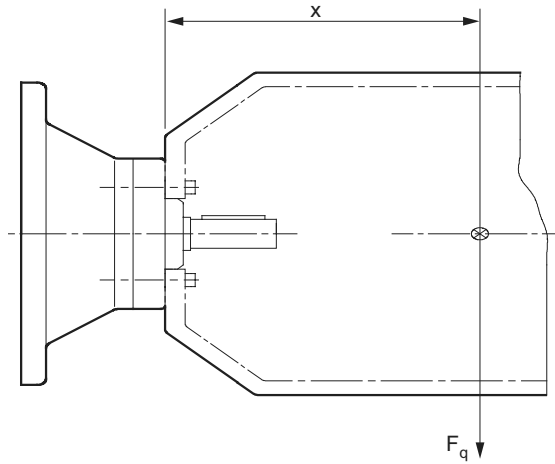
Type	Screw-in depth t [mm]	Retaining thread s	Tightening torque T_A for connection screws of strength class 8.8 [Nm]
AD2/ZR	25.5	M8	25
AD3/ZR	31.5	M10	48
AD4/ZR	36	M12	86
AD5/ZR	44	M12	86
AD6/ZR	48.5	M16	210
AD7/ZR	49	M20	410
AD8/ZR	42	M12	86



Permitted loads



The load values specified in the table below must not be exceeded.



53513AXX

Type	x ¹⁾ [mm]	F _q ¹⁾ [N]
AD2/ZR	193	330
AD3/ZR	274	1400
AD4/ZR ²⁾	361	1120
AD4/ZR		3300
AD5/ZR	487	3200
AD6/ZR	567	3900
AD7/ZR	663	10000
AD8/ZR	516	4300

- 1) Maximum load values for connection screws of strength class 8.8. The maximum permitted weight of the attached motor must be reduced linearly as the center of gravity distance x increases. When this distance is reduced, F_{qmax} cannot be increased.
- 2) Diameter of the adapter output flange: 160 mm



Mechanical Installation

Input cover AD

Cover with backstop AD../RS

Inspect the direction of rotation of the drive before assembly or startup. Please inform SEW-EURODRIVE service in the case of incorrect direction of rotation.

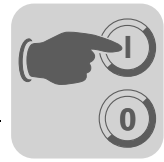
The backstop is maintenance-free in operation, and does not require any further maintenance work.

Backstops have a minimum lift-off speed depending on the size (→ table below). If the minimum lift-off speeds are not met, the backstops are subject to wear, and the resulting friction causes the temperature to increase.

Type	Maximum locking torque of backstop [Nm]	Minimum lift-off speed [1/min]
AD2/RS	90	640
AD3/RS	340	600
AD4/RS	700	550
AD5/RS	1200	630
AD6/RS	1450	430
AD7/RS	1450	430
AD8/RS	2860	430



In rated operation, the lift-off speed must not drop below the minimum values. The lift-off speed is only permitted to drop below the minimum values during startup or braking.



5 Startup

5.1 Notes on startup



- Strictly observe the safety notes in the individual sections.
- The most important technical data is included on the nameplate. Additional data relevant for operation is available in drawings, order confirmations or any order-specific documentation.
- RF../KF.. primary gear units are normally delivered with oil fill. Please refer to the order documents for discrepancies.
- Adhere to the oil information on the nameplate of the primary gear unit.
If no oil information is found on the nameplate of the primary gear unit, the oils specified in the operating instructions can be used.
- Ensure that startup does not take place in an explosive atmosphere.
- Check the surface temperature before you perform maintenance on the gear unit or refill the gear unit oil. Risk of burns (hot oil in the gear unit).
- It is essential that there is no open fire or risk of sparks when working on the gear unit.
- Ensure that the choice of lubricant corresponds to the lubricant table in section 9 concerning environmental conditions.
- Before startup, check that the oil level is correct. For lubricant fill quantities, refer to the respective nameplate.
- For gear units with long-term protection: Replace the screw plug at the location indicated on the gear unit with a breather plug (position see order documents). Refer to the next page for information on long-term protection.
- After the gear unit has been installed, ensure that all retaining screws are tight.
- In addition, after tightening the mounting elements, check to ensure that the alignment did not change.
- If there are any oil drain valves, ensure that they cannot be opened unintentionally.
- If you use an oil sight glass to monitor the oil level, it must be protected from possible damage.
- Protect the gear unit from falling objects.
- Check that the rotating parts on the protective equipment are fitted correctly. Contact with rotating parts is not permitted.
- Ensure that the rotating shafts as well as couplings are equipped with suitable protective covers.
- If the gear unit is equipped with a fan on the input shaft, check for free air intake within the specified angle.



Startup Run-in period

Before startup for gear units with long-term protection:

- Anti-corrosion agent:
Remove anti-corrosion agent from the gear unit parts. Ensure that the gaskets, sealing surfaces and sealing lips are not damaged by mechanical abrasion and so on.
- Oil level:
Since the planetary gear units under "Long-term protection" are delivered complete with oil, the correct oil volume and oil level should be checked before startup.
→ Correct the oil level to the appropriate fill level.
- Breather plug:
Replace the corresponding screw plug by the enclosed ventilation filter.

5.2 Run-in period

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

Check the following points during the run-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 (lubrication) on the gear unit?



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

5.3 Starting up gear units with backstop



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



5.4 Shutting down gear units



- Turn off the drive unit. Prevent the drive unit from unintentionally starting up.
- Put an information sign near the ON switch.

If the gear unit will not be operated for an extended period of time, you must activate it regularly at intervals of approx. 2 - 3 weeks.

If the gear unit will not be operated for a period **longer than nine months**, additional corrosion protection is required:

- **Corrosion protection for the interior of gear units with splash or oil bath lubrication:**
 - Fill the planetary gear unit up to the breather plug with the oil grade specified on the nameplate.
 - Regularly set the planetary gear unit in no-load running operation for a short period of time.
- **Exterior corrosion protection:**
 - Clean the surfaces.
 - Grease the shaft around the sealing lip to separate the sealing lip of oil seal and the corrosion protection.
 - Apply a wax-based protective coating to shaft ends and unpainted surfaces as corrosion protection.



Refer to the "Startup" section before restart of the gear unit.



6 Inspection and Maintenance

6.1 Preface



- Strictly observe the safety notes in the individual sections.
- All maintenance work must be carried out carefully by qualified personnel.
- Shut down gear units and mounted components.
- Prevent the drive unit from starting up unintentionally. Put an information sign near the ON switch.
- When using primary gearmotors, also observe the maintenance notes for motors and primary gear units in the accompanying operating instructions.

6.2 Inspection and maintenance intervals

Time interval for planetary gear units

Time interval	Activity
After 500 operating hours	Change the oil in the planetary gear unit
Every 3000 operating hours, at least every 6 months	<ul style="list-style-type: none"> • Check oil and oil level. • Fill labyrinth seals with grease (see section 6.6).
Depending on the operating hours (see illustration on the following page), every 2 years at the latest.	Change mineral oil.
Depending on the operating hours (see illustration on the following page), every 3 years at the latest.	Change synthetic oil.

Time interval for RF./KF. primary gear units

Time interval	Activity
<ul style="list-style-type: none"> • Every 3000 machine hours, at least every 6 months 	<ul style="list-style-type: none"> • Check oil and oil level. • Visually check the seals for leakage • For gear units with a torque arm: Check the rubber buffer and change it, if necessary.
<ul style="list-style-type: none"> • Depending on the operating conditions (see chart below), every 3 years at the latest. • According to oil temperature. 	<ul style="list-style-type: none"> • Change mineral oil. • Replace anti-friction bearing grease (recommendation). • Replace oil seal (do not install it in the same track).
<ul style="list-style-type: none"> • Depending on the operating conditions (see chart below), every 5 years at the latest. • According to oil temperature. 	<ul style="list-style-type: none"> • Change synthetic oil. • Replace anti-friction bearing grease (recommendation). • Replace oil seal (do not install it in the same track).
<ul style="list-style-type: none"> • Varying (depending on external factors). 	<ul style="list-style-type: none"> • Touch up or renew the surface/anticorrosion coating.

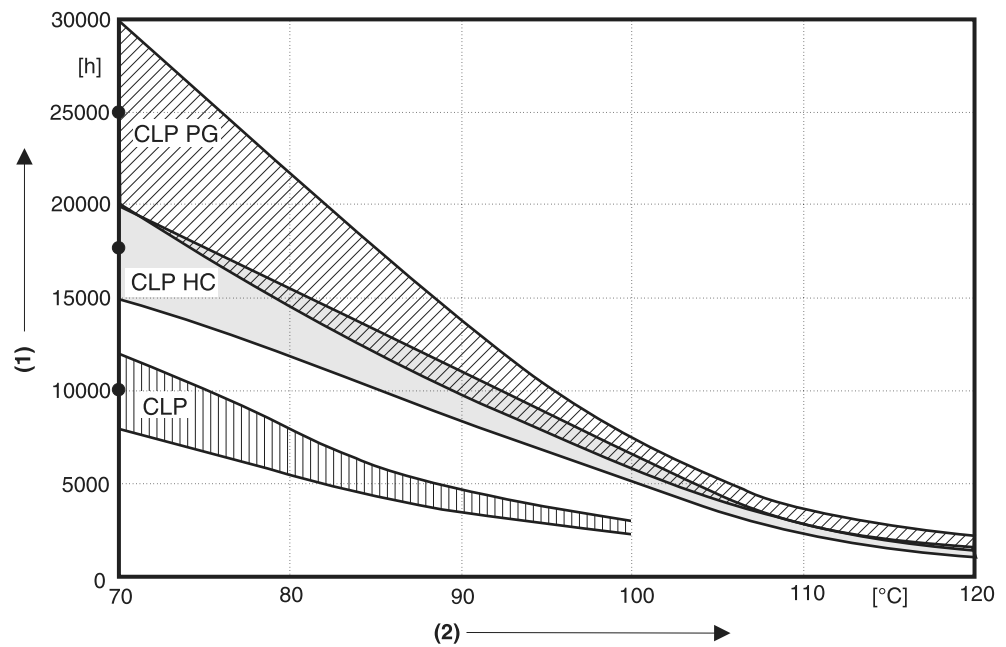


6.3 Lubricant change intervals

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



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 by oil grade at 70 °C



6.4 Checking the oil level



- Do not mix different synthetic lubricants and do not mix synthetic with mineral lubricants.
- The position of the oil level plug, oil drain plug, and breather valve depends on the mounting position. Refer to the diagrams of the mounting positions.



1. De-energize the gearmotor and secure it to prevent it from being switched back on unintentionally.

Wait until the planetary gear unit cools down. Danger of burns.

2. For gear units with an oil level plug: Remove the oil level plug, check the fill level, correct it if necessary, and screw the oil level plug back in.

The oil level should be at the upper marking of the oil stick or oil sight glass when the oil is cooled. The oil level can be slightly above the upper marking when the oil is hot.

6.5 Checking the oil consistency



1. De-energize the gearmotor and secure it to prevent it from being switched back on unintentionally.

Wait until the planetary gear unit cools down. Danger of burns.

2. Remove a little oil from the oil drain plug.
3. Check the oil consistency:
 - You can receive more detailed information on testing the oil for water content and viscosity from the lubrication manufacturer.
 - Contact SEW-EURODRIVE if the oil is heavily contaminated.
4. For gear units with an oil level plug: Remove the oil level plug, check the fill level, correct it if necessary, and screw the oil level plug back in.



6.6 Changing the oil

Notes



- Refer to the accompanying operating instructions when changing the oil in the primary gear unit.
- When changing the oil, always refill the planetary gear unit with the grade of oil that was used before. Mixing oils of different grade or manufacturer is not permitted. Especially synthetic oils may not be mixed with mineral oils or other synthetic oils. Flush the gear unit with the new oil grade thoroughly when switching from mineral oil or when switching from synthetic oil on a certain basis to synthetic oil with a different basis.
- Refer to the lubrication table in section 9 to determine which oils from various lubricant manufacturers can be used.
- Information such as the oil grade, viscosity and required volume of oil is listed on the nameplate of the planetary gear unit.
- The oil volume specified on the nameplate is an approximate quantity. The mark on the oil sight glass or stick is the decisive indicator of the correct oil level.
- Only change the oil when the gear unit is at operating temperature.
- When changing the oil, flush the housing thoroughly with oil to remove oil sludge, oil residue, and abrasion. Use the same grade of oil that is used to operate the gear unit. Viscous oil must be heated up first. Fill with fresh oil only after all residues have been removed.
- The position of the oil level plug, oil drain plug, and the breather valve depends on the mounting position. Refer to the diagrams of the mounting positions.

Procedure



1. De-energize the gearmotor and secure it to prevent it from being switched back on unintentionally!

Wait until the planetary gear unit cools down. Danger of burns.

Note: The planetary gear unit must still be warm otherwise the high viscosity of excessively cold oil will make it more difficult to drain the oil correctly.

2. Place a container underneath the oil drain plug.
3. Remove the breather plug/valve and oil drain plug.
4. Drain all the oil.
5. Screw in the oil drain plug.
6. Fill with new oil (see nameplate) through the vent hole.
 - Pour in the oil in accordance with the mounting position (see section 9.3 "Lubricant fill quantities") or as specified on the nameplate.
 - The oil level must be at the upper marking of the oil stick or above the middle of the oil sight glass when the oil is cooled.
7. Screw in the breather plug/valve.

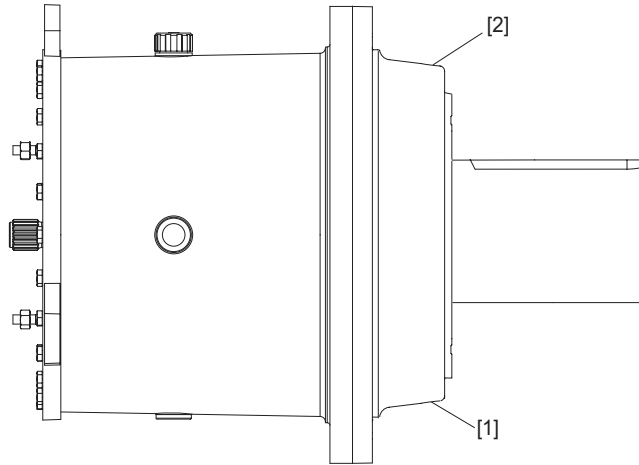


Any dripping oil must be removed immediately with an oil binding agent.



6.7 Labyrinth seal (optional)

Gear units of the P-series can be optionally equipped with an output-side labyrinth seal for use in dusty conditions.



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- [1] Balancing hole
[2] Greasing nipple

The seal is greased and must be re-greased at regular intervals.



This should be done after 3000 hours of operation at the very latest or after 6 months, but much more frequent re-greasing may also be necessary in order to prevent a clogged labyrinth.

1. Open the balancing hole [1].
2. Press the lithium-saponified anti-friction bearing grease (see section 9.2, "Lubricant table") through the grease nipple [2] until fresh grease exits the balance hole (depending on size 100 g - 500 g).
3. Close the pressure relief hole [1].



Used grease that has leaked out must be removed immediately and properly disposed of.



6.8 Checking and cleaning the breather plug

The breather plug must be cleaned if there is a layer of dust and also before the expiration of a minimum period of three months.



Prevent foreign bodies from entering into the gear unit during the following work.

1. Remove the breather plug.
2. Clean the breather plug with benzine or a similar cleaning agent.
3. Dry or blow the breather plug with compressed air.
4. Re-insert the breather plug.



Malfunctions

Checking and cleaning the breather plug

7 Malfunctions



You must observe the safety notes in the previous sections.



Malfunctions that require repairs to the gear unit may only be resolved by SEW-EURODRIVE during the warranty period.

After the warranty period has elapsed, we recommend that our customers take advantage of our customer service if malfunctions occur and the cause is not clear.



7.1 Planetary gear unit malfunctions

Malfunction	Possible cause	Remedy
Unusual, regular running noise	A Meshing/grinding noise: Bearing damage B Knocking noise: Irregularity in the gearing	A Check the oil (→ "Inspection and Maintenance" section), replace bearings B Contact customer service
Unusual, irregular running noise	Foreign bodies in the oil	<ul style="list-style-type: none"> Check the oil (see section "Inspection and Maintenance") Stop the drive, contact customer service
Unusual noises in the area of the gear unit mounting	Gear unit mounting has loosened	<ul style="list-style-type: none"> Tighten retaining screws and nuts with the specified torque Replace damaged or defective retaining screws or nuts
Operating temperature too high	A Too much oil B Oil too old C The oil is heavily contaminated D Gear units with fan: Air intake opening/gear unit housing contaminated E Shaft end pump defective F Malfunctions of oil/air or oil/water cooling system	A Check the oil level, correct if necessary (→ "Inspection and Maintenance" section) B Check when the oil was last changed; change the oil if necessary (→ "Inspection and Maintenance" section) C Change the oil (→ "Inspection and Maintenance" section) D Check the air intake opening and clean if necessary; clean gear unit housing E Check shaft end pump; replace if necessary F Observe the separate operating instructions for the oil/water and oil/air cooling system
Bearing point temperatures too high	A Insufficient oil B Oil too old C Shaft end pump defective D Bearing damaged	A Check the oil level, correct if necessary (→ "Inspection and Maintenance" section) B Check when the oil was last changed; change the oil if necessary (→ "Inspection and Maintenance" section) C Check shaft end pump; replace if necessary D Check bearing and replace if necessary; contact customer service
Oil leaking from ¹⁾ <ul style="list-style-type: none"> Cover plate Gear unit cover plate Bearing cover Mounting flange Output/input end oil seal 	A Gasket on assembly/gear unit/bearing cover/mounting flange leaking B Sealing lip of the oil seal turned up C Oil seal damaged/worn down	A Tighten the screws on the respective cover plate and observe the gear unit. If oil still leaks: Contact customer service B Vent the gear unit (→ "Mounting Positions" section). Observe the gear unit. If oil still leaks: Contact customer service C Contact customer service
Oil leaking from <ul style="list-style-type: none"> Oil drain plug Breather plug 	A Too much oil B Drive operated in incorrect mounting position C Frequent cold starts (oil foams) and/or high oil level	A Correct the oil volume (→ "Inspection and Maintenance" section) B Mount the breather plug correctly (→ order documents) and correct the oil level (see nameplate)
Malfunctions of oil/air or oil/water cooling system		Observe the separate operating instructions for the oil/water and oil/air cooling system
Operating temperature at backstop too high	Damaged/defective backstop	<ul style="list-style-type: none"> Check backstop; replace if necessary Contact customer service

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

Customer service

Please have the following information on hand when you call our customer service:

- Complete nameplate data
- Type and extent of the problem
- Time the problem occurred and any accompanying circumstances
- Presumed cause



7.2 Primary gear unit malfunction

Malfunction	Possible cause	Remedy
Unusual, regular running noise	A Meshing/grinding noise: Bearing damage B Knocking noise: Irregularity in the gearing	A Check the oil (see "Inspection and Maintenance"), change bearings. B Contact customer service
Unusual, irregular running noise	Foreign bodies in the oil	<ul style="list-style-type: none"> Check the oil (see "Inspection and Maintenance"). Stop the drive, contact customer service
Oil leaking from ¹⁾ <ul style="list-style-type: none"> Gear unit cover plate Motor flange Motor oil seal Gear unit flange Output end oil seal 	A Rubber seal on the gear cover plate leaking B Seal defective C Gear unit not vented	A Tighten the screws on the gear cover plate and observe the gear unit. If oil still leaks: Contact customer service B Contact customer service C Vent the gear unit (see "Mounting Positions")
Oil leaking from breather valve	A Too much oil B Drive operated in incorrect mounting position C Frequent cold starts (oil foams) and/or high oil level	A Correct the oil level (see "Inspection and Maintenance") B Mount the breather valve correctly (see "Mounting Positions") and correct the oil level (see "Lubricants")
Output shaft does not rotate although the motor is running or the input shaft is rotated	Connection between shaft and hub in gear unit interrupted	Send in the gear unit/geared motor for repair

1) Short-term oil/grease leakage at the oil seal is possible in the run-in phase (24-hours running time).

7.3 Adapter AM/AL malfunctions

Malfunction	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage	Contact SEW-EURODRIVE customer service
Oil leaking	Seal defective	Contact SEW-EURODRIVE customer service
Output shaft does not rotate although the motor is running or the input shaft is rotated	Connection between shaft and hub in gear unit interrupted	Send the gear unit to SEW-EURODRIVE for repair
Change in running noise and/or vibrations occur	A Annular gear wear, short-term torque transfer through metal contact B Screws to secure hub axially are loose	A Change the annular gear B Tighten the screws
Premature wear in annular gear	A Contact with aggressive fluids/oil; ozone influence; ambient temperatures too high, etc., which can cause a change in the physical properties of the annular gear B Impermissibly high ambient/contact temperature for the annular gear; maximum permitted temperature: -20 °C bis +80 °C C Overload	Contact SEW-EURODRIVE customer service



7.4 Motor malfunctions

Malfunction	Possible cause	Remedy
Motor does not start up	Interruption in supply cable	Check connections, correct if necessary
	Brake does not release	→ see the motor operating instructions
	Fuse has blown	Replace fuse
	Motor protection has triggered	Check motor protection for correct setting, correct error if necessary
	Motor protection does not switch, error in control	Check motor protection control, correct error if necessary
Motor does not start or only with difficulty	Motor designed for delta connection but used in star connection	Correct circuit
	Voltage and frequency deviate markedly from setpoint, at least while being switched on	Provide better power supply system; check cross section of supply cable
Motor does not start in star connection, only in delta connection	Torque not sufficient in star connection	Switch on directly if delta inrush current is not too great; otherwise use a larger motor or a special design (contact SEW)
	Contact fault on star delta switch	Rectify fault
Incorrect direction of rotation	Motor connected incorrectly	Swap over two phases
Motor hums and has high current consumption	Brake does not release	→ see the motor operating instructions
	Winding defective	Send motor to specialist workshop for repair
	Rotor rubbing	
Fuses blow or motor protection trips immediately	Short circuit in line	Rectify short circuit
	Short circuit in motor	Send motor to specialist workshop for repair
	Lines connected incorrectly	Correct circuit
	Ground fault on motor	Send motor to specialist workshop for repair
Severe speed loss under load	Overload	Measure power, use larger motor or reduce load if necessary
	Voltage drops	Increase cross section of incoming cable
Motor heats up excessively (measure temperature)	Overload	Measure power, use larger motor or reduce load if necessary
	Insufficient cooling	Correct cooling air supply or clear cooling air passages, retrofit forced cooling fan if necessary
	Ambient temperature is too high	Comply with permitted temperature range
	Use delta connection for motor rather than star connection as provided for	Correct circuit
	Loose contact in incoming cable (one phase missing)	Rectify loose contact
	Fuse has blown	Look for and rectify cause (see above); replace fuse
	Supply voltage deviates from the rated motor voltage more than 5%. A higher voltage has a particularly unfavorable effect in motors with a low-speed winding since in these, the no-load current is already close to the rated current even when the voltage is normal.	Adapt motor to supply voltage
	Rated operation type (S1 to S10, DIN 57530) exceeded, e.g. through excessive starting frequency	Adjust rated operation type of motor to required operating conditions; if necessary call in a specialist to determine correct drive
Excessively loud	Ball bearing compressed, contaminated or damaged	Realign motor, inspect ball bearing (→ section "Permitted Ball Bearing Types"), grease if necessary (→ section "Lubricant Table for Anti-Friction Bearings of SEW Motors"), replace
	Vibration of rotating parts	Rectify cause, possible imbalance
	Foreign bodies in cooling air passages	Clean cooling air passages



7.5 Brake malfunctions

Malfunction	Possible cause	Remedy
Brake does not release	Incorrect voltage on brake control unit	Apply correct voltage
	Brake control unit failed	Install a new brake control system, check internal resistance and isolation of brake coil, check switchgear
	Max. permitted working air gap exceeded because brake lining worn down	Measure and set working air gap
	Voltage drop on incoming cable > 10 %	Provide correct connection voltage; check cable cross section
	Inadequate cooling, brake overheats	Replace type BG brake rectifier with type BGE
	Brake coil has interturn fault or short circuit to exposed conductive part	Replace complete brake and brake control system (specialist workshop), check switchgear
	Rectifier defective	Replace the rectifier and brake coil
Motor does not brake	Working air gap not correct	Measure and set working air gap
	Brake lining worn down	Replace entire brake disc
	Incorrect braking torque	Change the braking torque (→ motor operating instructions): <ul style="list-style-type: none"> • By the type and number of brake springs • Brake BMG 05: by installing the same brake coil body design as in brake BMG 1 • Brake BMG 2: by installing the same brake coil body design as in brake BMG 4
	BM(G) only: Working air gap so large that setting nuts come into contact	Set the working air gap
	Only BR03, BM(G): Manual brake release device not set correctly	Set the setting nuts correctly
Brake is applied with time lag	Brake is switched on AC voltage side	Switch on DC and AC voltage sides (e.g. BSR); please refer to wiring diagram
Noises in vicinity of brake	Gearing wear caused by jolting startup	Check project planning
		-> see motor operating instructions

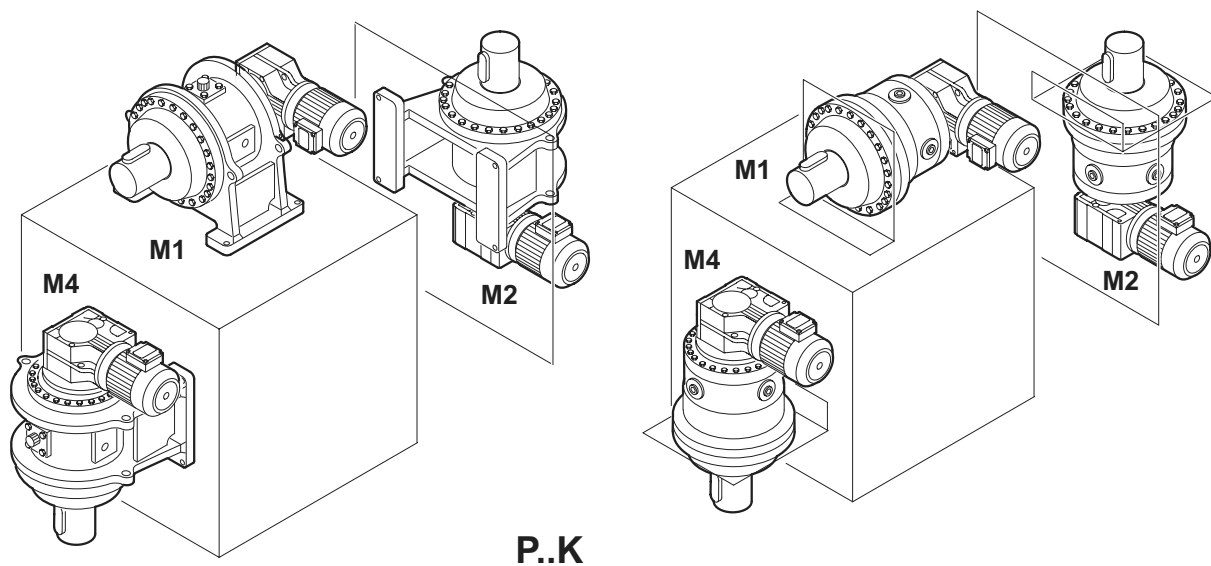
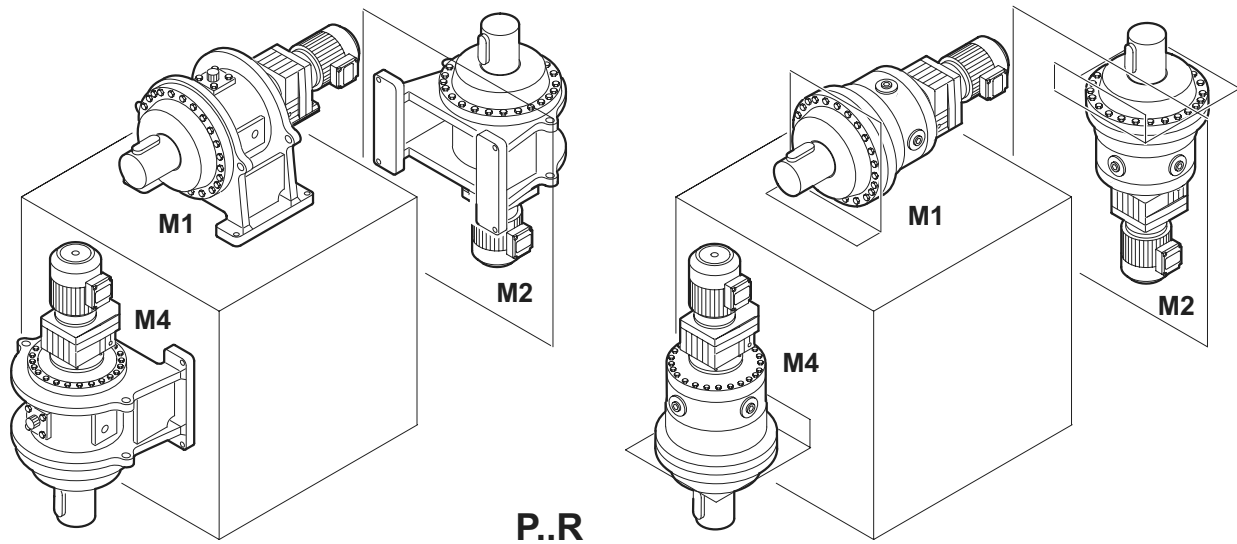
8 Mounting Positions

8.1 General information on mounting positions

Mounting position names

SEW-EURODRIVE distinguishes between the mounting positions M1, M2 and M4 for planetary gearmotors. The following diagram shows the spatial orientation of the gear unit.

The mounting positions apply to planetary gear units with solid shafts and hollow shafts.

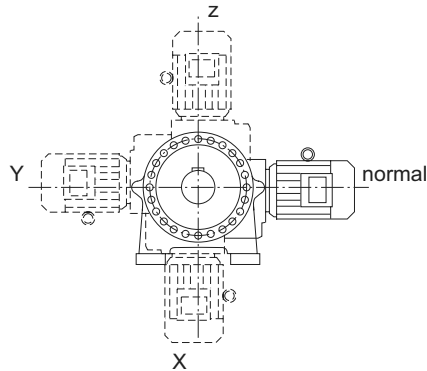


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8.2 Mounting positions of KF primary gear units

The following mounting positions exist for the helical-bevel primary stage:

Normal, X, Y, Z



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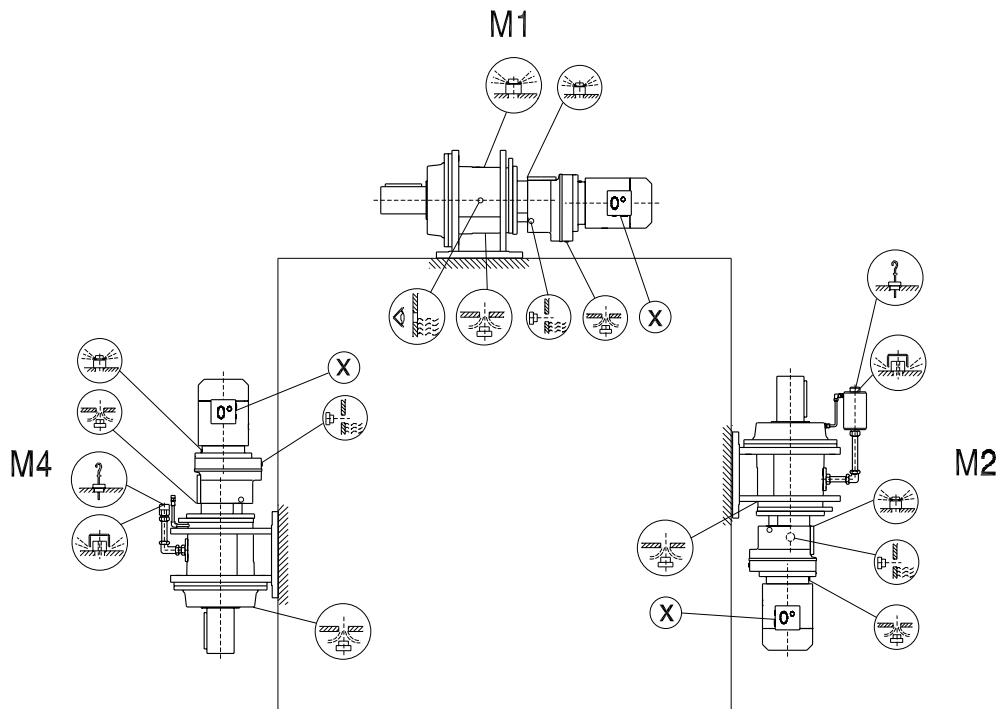
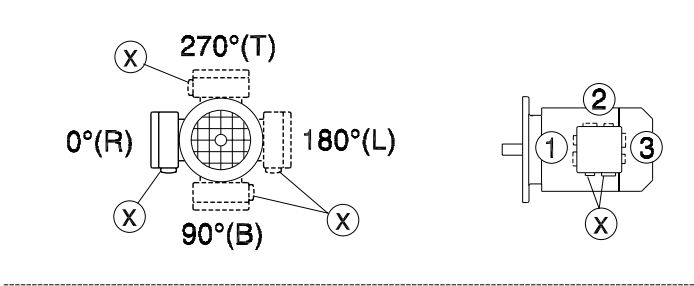
8.3 Legend to the mounting position sheets**Symbols used**

The following table shows the symbols used in the mounting position sheets and what they mean:

Symbol	Meaning
	Breather valve
	Oil level plug
	Oil drain plug
	Breather
	Oil stick
	Oil sight glass

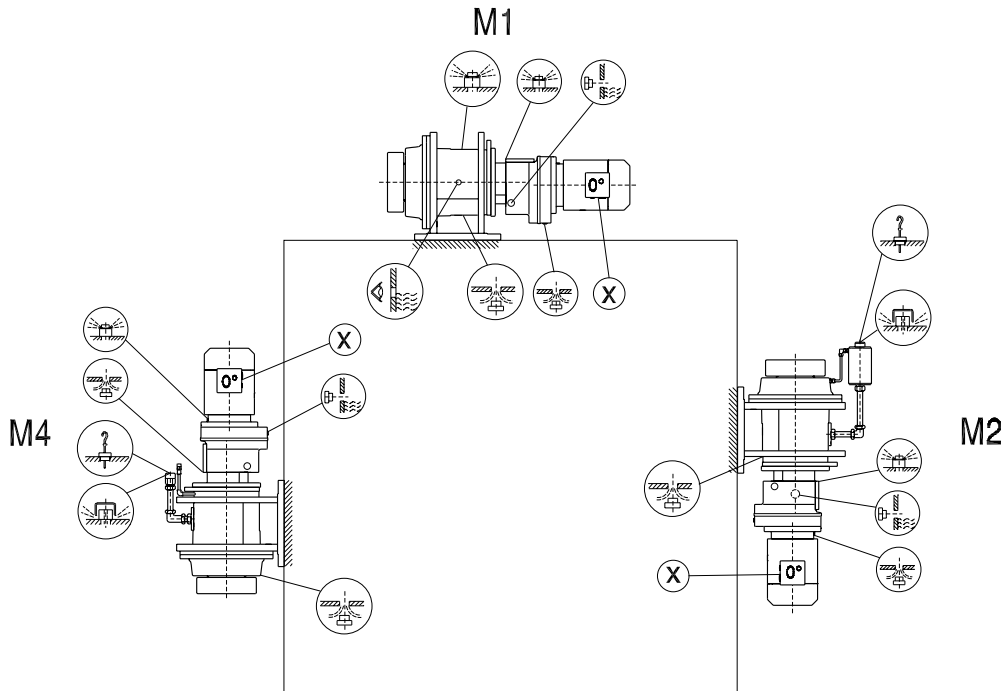
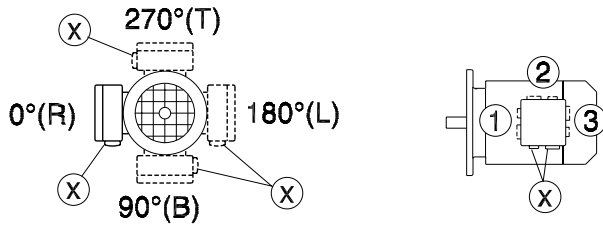
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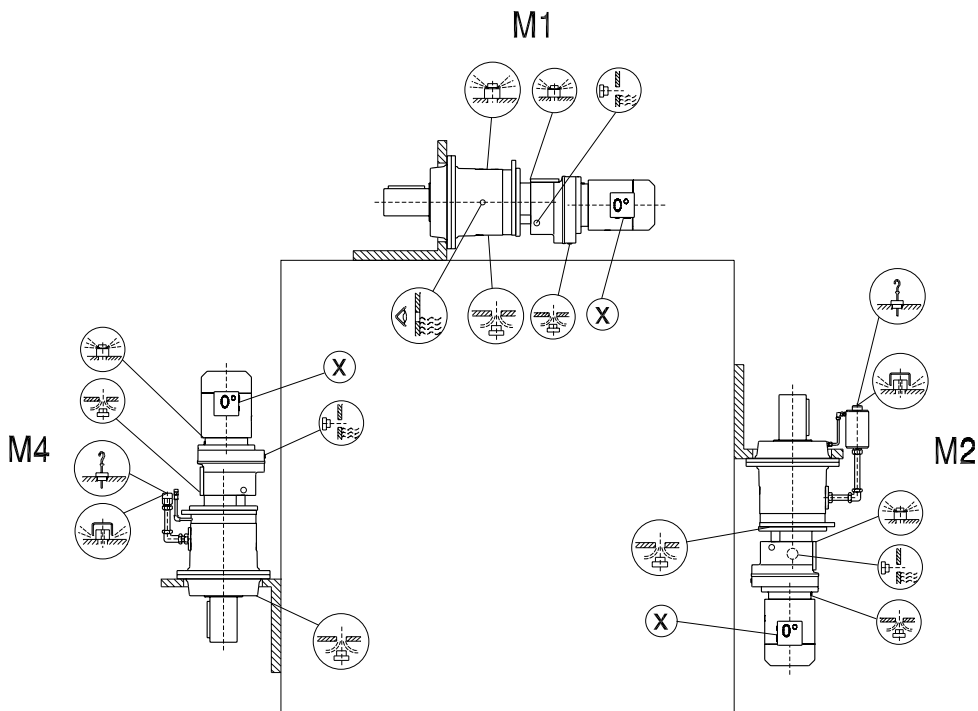
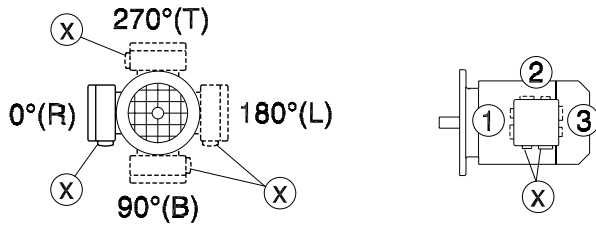
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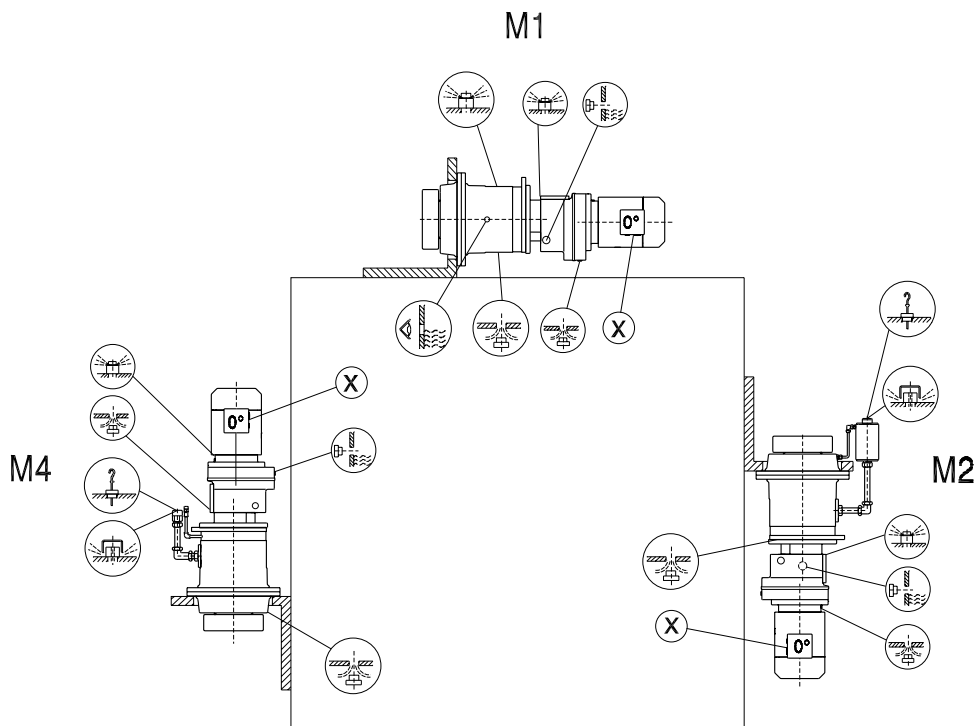
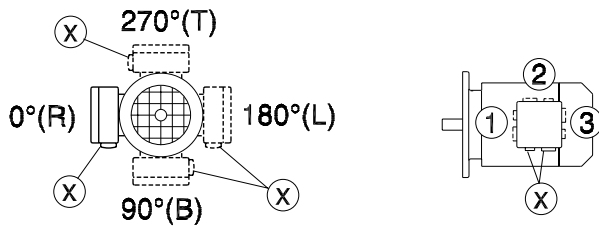
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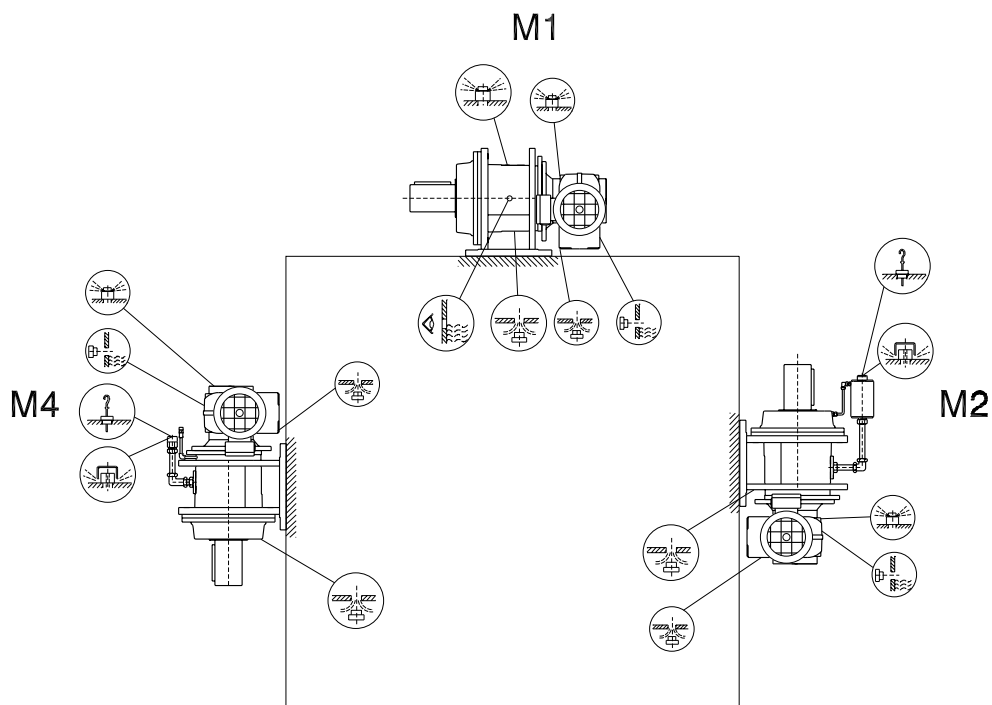
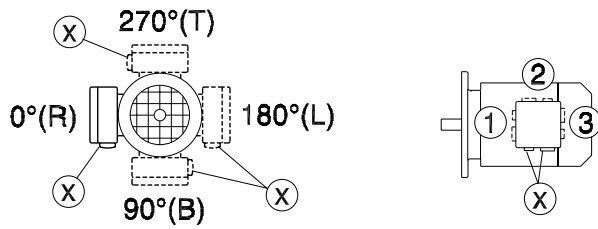
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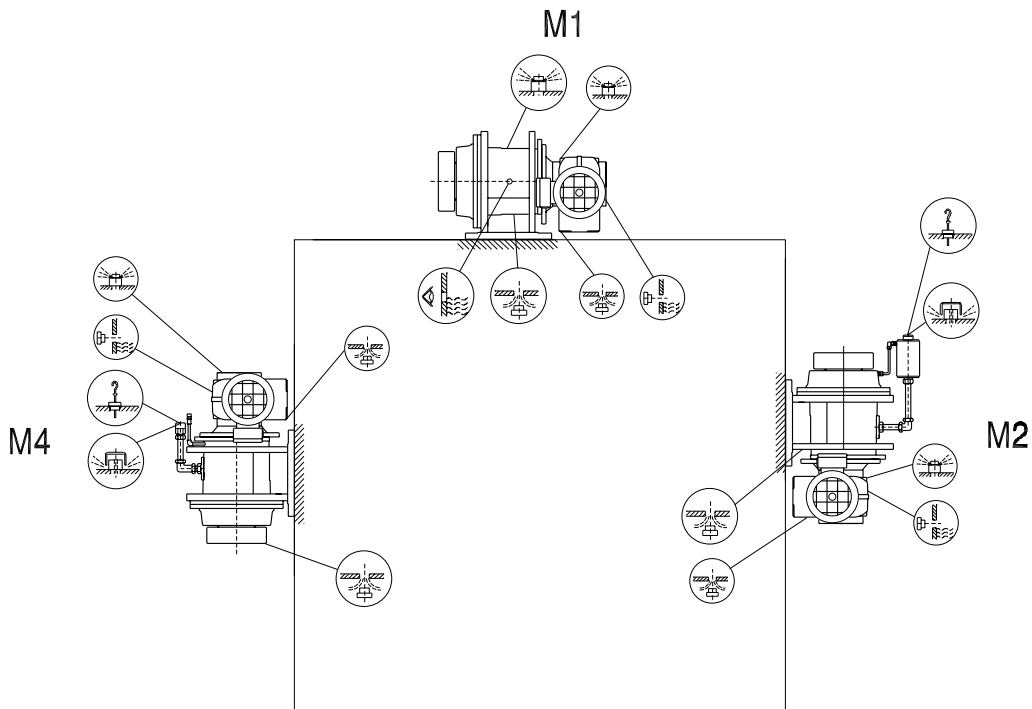
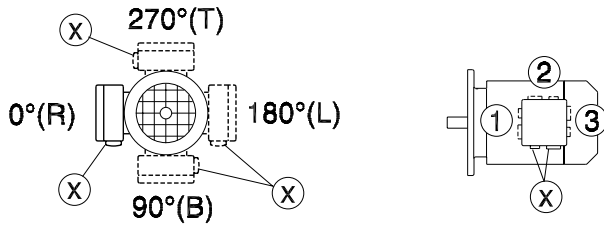
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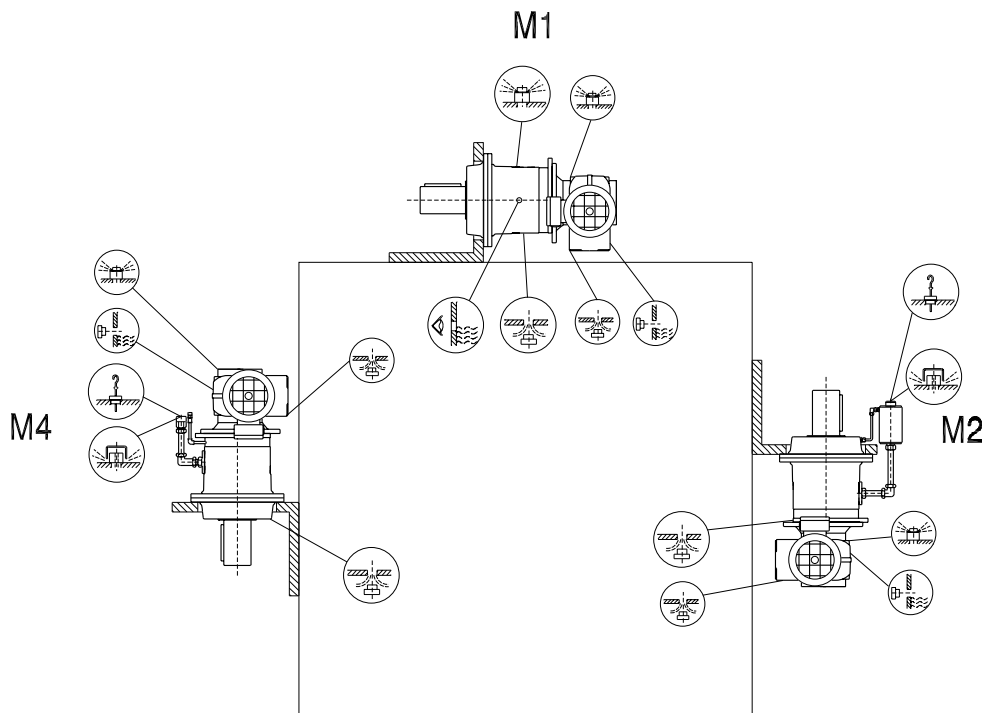
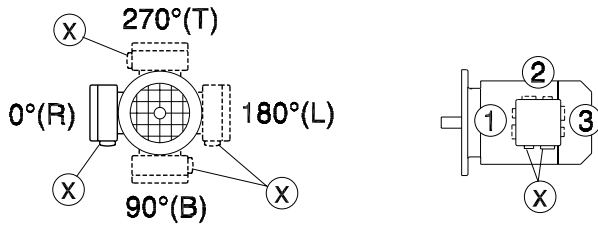
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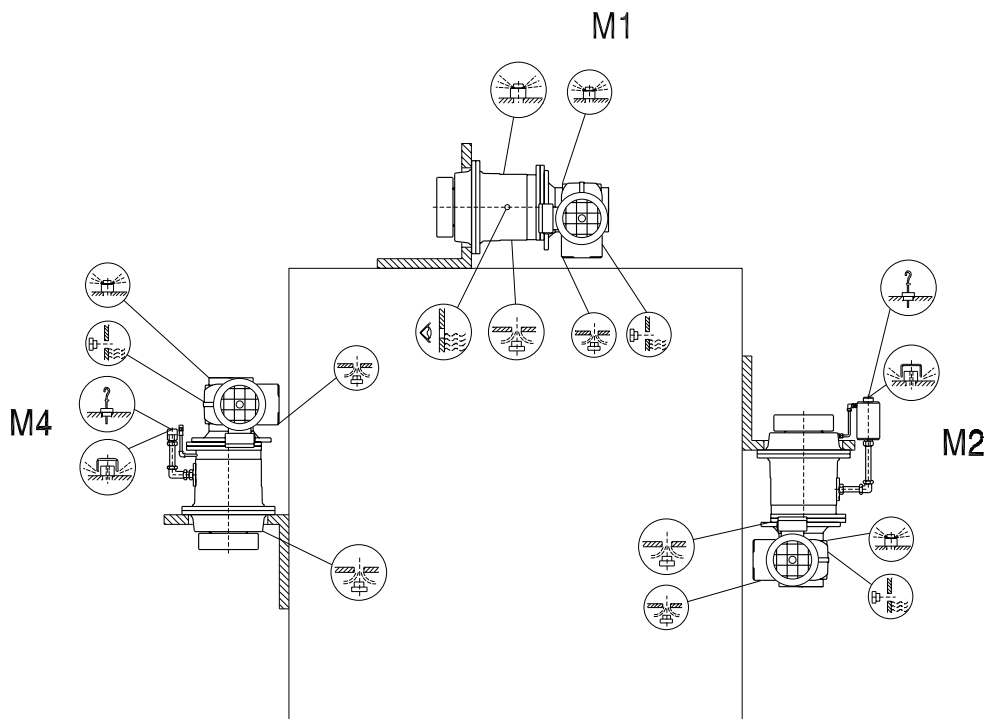
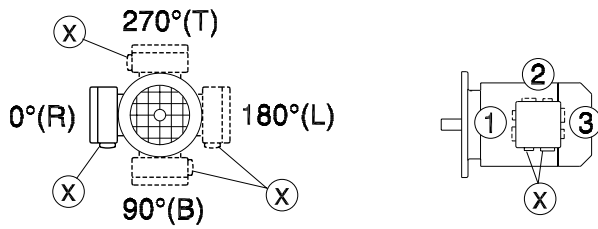
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8.11 PHF.. KF.. DT/DV

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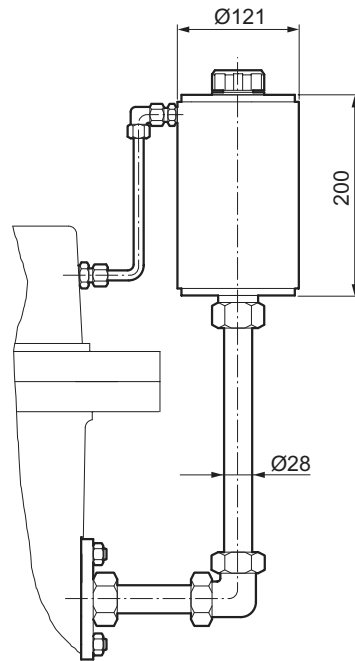


8.12 Oil expansion tank/oil riser pipe for the planetary gear unit



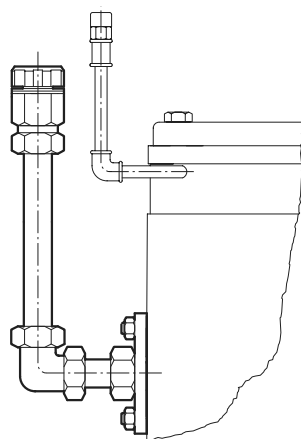
If there is little space available for installing the oil expansion tank (mounting position M2) or the oil riser pipes (mounting position M4), you can request an order-specific dimension drawing from SEW-EURODRIVE.

Oil expansion tank in mounting position M2



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Oil riser pipe in mounting position M4



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9 Lubricants

9.1 Guidelines for lubricant selection

General information

Unless a special arrangement is made, SEW-EURODRIVE delivers the planetary gear unit without oil fill and the primary gear unit with oil fill.



Ensure that the planetary gear units and primary gear units are filled with the correct oil grade and volume before startup. You can obtain the corresponding information from the gear unit nameplate and the lubricant table in the following section.



The most important factors in selecting lubricants are the specified oil grade and viscosity found on the nameplate. The specified viscosity and oil grade are chosen for the operation conditions agreed upon in the contract. Any deviation from these conditions makes consultation with SEW-EURODRIVE essential.



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



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



The lubricant fill quantity and viscosity with planetary gearmotors with shared oil chamber depends only on the information on the nameplate of the planetary gear unit. Planetary gear units and the primary gear units are delivered without oil fill.

If you have selected synthetic oil because of the operating temperature or oil change interval, SEW-EURODRIVE recommends polyalphaolefin-based oil (PAO).



9.2 Lubricant table

General

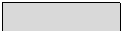
The lubricant table on the following page shows the permitted lubricants for planetary gear units. Please refer to the following legend for the lubricant table.


Legend to the lubricant table


Abbreviations used, meaning of shading, and notes:

CLP = Mineral oil

CLP PAO = Synthetic polyalphaolefin

 = Synthetic lubricant (= synthetic-based anti-friction bearing grease)

 = Mineral lubricant (= mineral-based anti-friction bearing grease)

 = Contact SEW-EURODRIVE

 Ambient temperature

Notes on the lubricant table



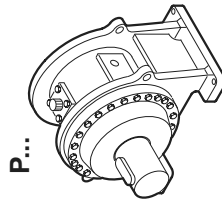
- The temperature ranges are to be considered guide values. The decisive factor is the viscosity information on the nameplate.
- Contact SEW-EURODRIVE if operating the unit under extreme conditions; e.g. cold, heat, or changes to operating conditions since project planning.
- Adhere to the oil information on the nameplate of the primary gear unit.
If there is no oil information on the nameplate of the primary gear unit, you can use the oils specified in the operating instructions.



Lubricants
Lubricant table

Lubricant table

Temperature range	DIN (ISO)	ISO VG class	Mobil®	Shell	KLÜBER	ARAL	bp	TEXACO	FUCHS	Q8	Castrol	TOTAL
 1)	CLP	VG 150			KLÜBER GEM 1-150N	Degol BG Plus 150	BP Energol GX-XF 150		Renolin CLP150Plus	Q8 Goya NT 150		
	CLP PAO	VG 150			Klübersynth GEM4-150N	Degol PAS 150 Degol GS 150	Energyn EP-XF 150 Energyn SG-XP 150		Renolin Unisyn CLP 150	Q8 ELGRECO 150		Carter SH 150
-10 to +25	CLP	VG 220	Mobilgear XMP220	Omala Oil F220	KLÜBER GEM 1-220N	Degol BG Plus 220	BP Energol GX-XF 220	Meropa 220	Renolin CLP220Plus	Q8 Goya NT 220	Alphamax 220 Tribol 1710/ 220 Optigear BM 220	
	CLP PAO	VG 220	Mobilgear SHC XMP220	Omala Oil HD 220	Klübersynth GEM4-220N	Degol PAS 220 Degol GS220	Energyn EP-XF 220 Energyn SG-XP 220	Pinnacle EP 220	Renolin Unisyn CLP 220	Q8 ELGRECO 220	Optigear Synthetic X 220	Carter SH 220
-35 to +40	CLP	VG 320	Mobilgear XMP320	Omala Oil F320	KLÜBER GEM 1-320N	Degol BG Plus 320	BP Energol GX-XF 320	Meropa 320	Renolin CLP320Plus	Q8 Goya NT 320	Alphamax 320 Tribol 1100 / 320 BM 320	
	CLP PAO	VG 320	Mobilgear SHC XMP320 Mobil SHC 632	Omala Oil HD 320	Klübersynth GEM4-320N	Degol PAS 320 Degol GS 320	Energyn EP-XF 320 Energyn SG-XP 320	Pinnacle EP 320	Renolin Unisyn CLP 320	Q8 ELGRECO 320	Tribol 1510/ 320 Tribol 1710/ 320 Optigear Synthetic A320 Optigear Synthetic X 320	Carter SH 320
-5 to +40	CLP	VG 460	Mobilgear XMP460	Omala Oil F460	KLÜBER GEM 1-460N	Degol BG Plus 460	BP Energol GX-XF 460	Meropa 460	Renolin CLP460Plus	Q8 Goya NT 460	Alphamax 460 Tribol 1100 / 460 Optigear BM 460	
	CLP PAO	VG 460	Mobilgear SHC XMP460 Mobil SHC 634	Omala Oil HD 460	Klübersynth GEM4-460N	Degol PAS 460 Degol GS 460	Energyn EP-XF 460 Energyn SG-XP 460	Pinnacle EP 460	Renolin Unisyn CLP 460	Q8 ELGRECO 460	Tribol 1510/ 460 Tribol 1710/ 460 Optigear Synthetic A460 Optigear Synthetic X 460	Carter SH 460
-20 to +50	CLP	VG 680	Mobilgear XMP680		KLÜBER GEM 1-680N	Degol BG Plus 680	BP Energol GX-XF 680	Meropa 680		Q8 Goya NT 680	Tribol 1100 / 680 BM 680	Renolin CLP680
		CLP										





9.3 Lubricant fill quantities

The specified fill quantities are **guide values**. The precise values vary depending on the stages and gear ratios. Check the oil level in a planetary gear unit at the oil sight glass or the oil stick and in a primary gear unit at the oil level plug.



The planetary gear units are supplied without lubricant. RF.. and KF.. gear units are supplied from the factory with a lubricant fill appropriate for their mounting position. The oil chambers of both gear units are separate.



Refer to the oil fill quantity stated on the nameplates in case of a pivoted mounting position.

The tables below show guide values for lubricant fill quantities depending on the mounting position M.

Planetary gear units

Delivery without oil fill

Gear unit type	Fill quantity in liters	
	Mounting position M1	Mounting position M2/M4
P001	4	7
P011	6	11
P021	8	14
P031	11	20
P041	15	29
P051	20	38
P061	25	48
P071	30	58
P081	40	83

Helical gear units (RF-) and primary gear units

Delivery with oil fill

Gear unit type	Fill quantity in liters		
	Mounting position M1	Mounting position M2	Mounting position M4
RF77	1.2	3.8	4.1
RF87	2.4	6.8	7.7
RF97	5.1	11.9	14
RF107	6.3	15.9	19.2
RF137	9.5	27	32.5
RF147	16.4	47	52
RF167	26	82	88



Lubricants

Anti-friction bearing greases for primary gear units

Bevel gear units (RF-) and primary gear units

The lubricant fill quantity depends on the mounting position of the planetary gear unit and the mounting position of the KF primary gearmotor.

Mounting position of the KF primary gearmotor **X, Y, Z, normal**, see section 8.2 "Mounting positions".

Delivery of the KF primary gear unit with oil fill.

Type	Fill quantity in liters											
	Mounting position M1				Mounting position M2				Mounting position M4			
	Normal	X	Y	Z	Normal	X	Y	Z	Normal	X	Y	Z
KF67	1.1	2.4	1.1	3.6	2.4	2.4	2.4	2.4	3.7	3.7	3.7	3.7
KF77	2.1	4.1	2.1	6.0	4.1	4.1	4.1	4.1	5.9	5.9	5.9	5.9
KF87	3.7	8.2	3.7	11.9	8.2	8.2	8.2	8.2	11.9	11.9	11.9	11.9
KF97	7.0	14.7	7.0	21.5	14.7	14.7	14.7	14.7	21.5	21.5	21.5	21.5
KF107	10.0	22.0	10.0	35.0	21.8	21.8	21.8	21.8	35.1	35.1	35.1	35.1
KF127	21.0	41.5	21.0	55.0	41.5	41.5	41.5	41.5	55.0	55.0	55.0	55.0
KF157	31.0	66.0	31.0	92.0	66.0	66.0	66.0	66.0	92.0	92.0	92.0	92.0

9.4 Anti-friction bearing greases for primary gear units

The anti-friction bearings in gear units and motors are given a factory-fill with the greases listed below. SEW-EURODRIVE recommends regreasing anti-friction bearings with a grease fill at the same time as changing the oil.

	Ambient temperature	Manufacturer	Type
Gear unit anti-friction bearings	-20 °C ... +60 °C	Mobil	Mobilux EP 2
	-40 °C ... +80 °C	Mobil	Mobiltemp SHC 100
Motor anti-friction bearings	-20 °C ... +80 °C	Esso	Unirex EQ3
	-20 °C ... +60 °C	Shell	Alvania RL3
	+80 °C ... +100 °C	Klber	Barrierta L55/2
	-45 °C ... -25 °C	Shell	Aero Shell Grease 16 ¹⁾

1) Recommended for continuous operation at ambient temperatures below 0 °C, for example in cold storage.



The following grease quantities are required:

- For fast-running bearings (motor and gear unit input end): Fill the cavities between the rolling elements one-third full with grease.
- For slow-running bearings (in gear units and at gear unit output end): Fill the cavities between the rolling elements two-thirds full with grease.



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Senegal			
Sales	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 849 47-70 Fax +221 849 47-71 senemeca@sentoosn
Serbia and Montenegro			
Sales	Beograd	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 dipar@yubc.net
Singapore			
Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Slovakia			
Sales	Bratislava	SEW-Eurodrive SK s.r.o. Rybnicna 40 SK-83107 Bratislava	Tel. +421 2 49595201 Fax +421 2 49595200 http://www.sew.sk sew@sew-eurodrive.sk
	Zilina	SEW-Eurodrive SK s.r.o. ul. Vojtecha Spanyola 33 SK-010 01 Zilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovska cesta 85 SK-97411 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
Slovenia			
Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. Ul. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
South Africa			
Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za dross@sew.co.za

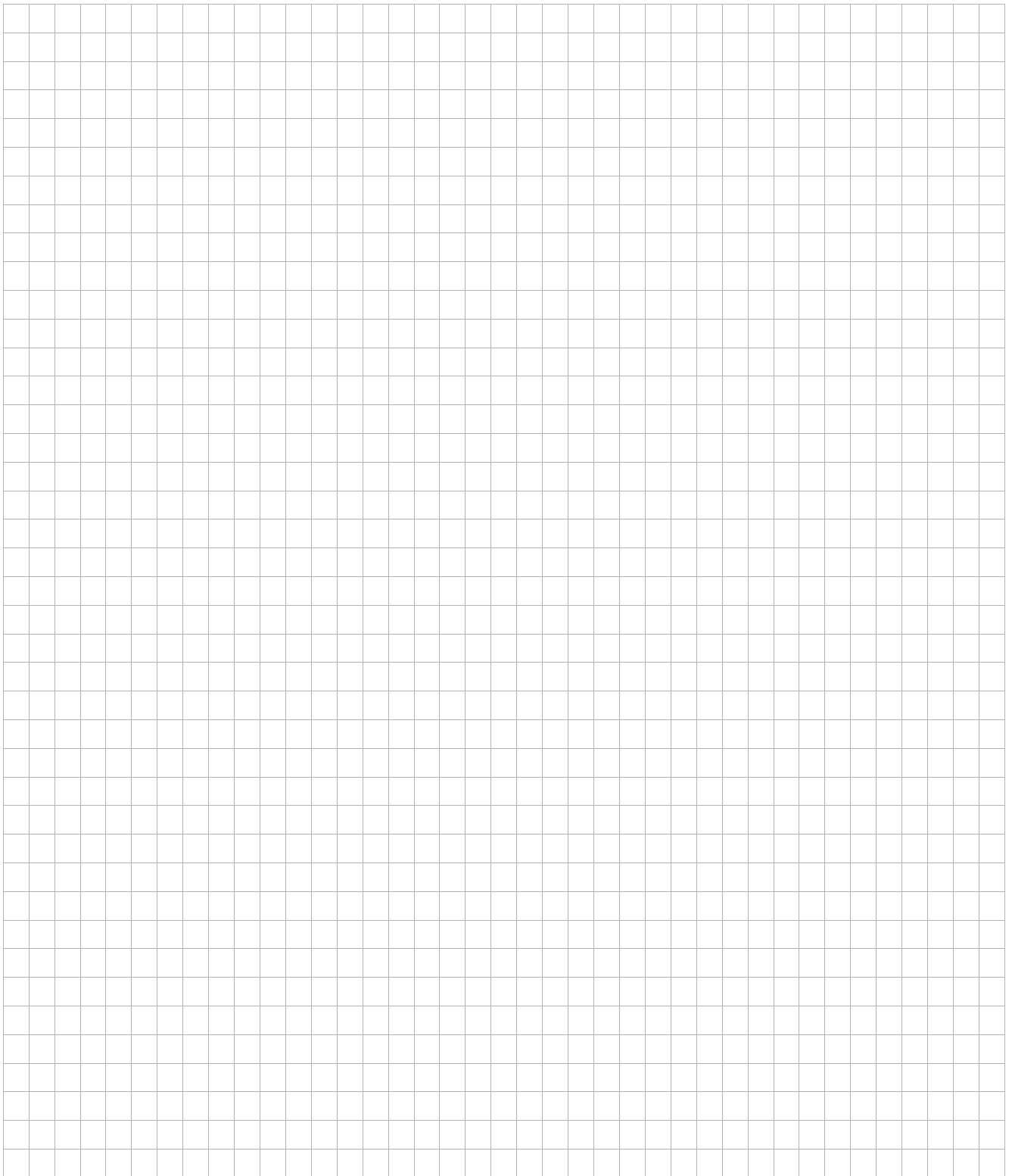


Address List

South Africa			
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za
Spain			
Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 9 4431 84-70 Fax +34 9 4431 84-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es
Sweden			
Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442-00 Fax +46 36 3442-80 http://www.sew-eurodrive.se info@sew-eurodrive.se
Switzerland			
Assembly Sales Service	Basel	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch
Thailand			
Assembly Sales Service	Chon Buri	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, Moo.7, Tambol Donhuaroh Muang District Chon Buri 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Tunisia			
Sales	Tunis	T. M.S. Technic Marketing Service 7, rue Ibn El Heithem Z.I. SMMT 2014 Mégrine Erriadh	Tel. +216 1 4340-64 + 1 4320-29 Fax +216 1 4329-76 tms@tms.com.tn
Turkey			
Assembly Sales Service	Istanbul	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 164 3838014/15 Fax +90 216 3055867 sew@sew-eurodrive.com.tr
Ukraine			
Sales Service	Dnepropetrovsk	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
USA			
Production Assembly Sales Service	Greenville	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 Manuf. +1 864 439-9948 Fax Ass. +1 864 439-0566 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com



USA			
Assembly Sales Service	San Francisco	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6381 cshayward@seweurodrive.com
	Philadelphia/PA	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
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
Additional addresses for service in the USA provided on request!			
Venezuela			
Assembly Sales Service	Valencia	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve sewventas@cantv.net sewfinanzas@cantv.net



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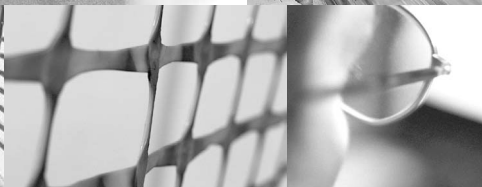
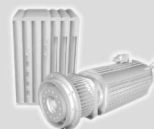
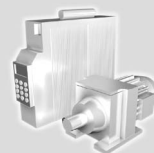
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