Read the operating and installation instructions

Read this operating and installation manual carefully prior to performing any work on or putting the gear unit into operation. Always observe the instructions in this operating and assembly manual.

Keep this operating and installation manual in the vicinity of the gear unit so that it is available if required.

Please also note the following documents:

• Gear unit catalogues (G1000, G1012, G1014, G1035, G1050, G2000),
• Operating and maintenance instructions for the electric motor,
• Operating instructions for equipment which is attached or provided.

Please contact Getriebebau NORD GmbH & Co. KG if you require further information.
Documentation

Designation: B 1050
Material No.: 6052902
Series: Gear units and geared motors
Type series: SK 5207 – SK 15507, SK 5217 – SK 11217, SK 5217 – SK 11217 and SK xx319
Gear unit types: Industrial gear units

Version list

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<td>• SK 5217 to 11217 added</td>
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<td>• SK xx319 added</td>
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<td></td>
<td>• Sound Emission chapter added</td>
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<td>• Supplements to Service and Maintenance Intervals chapter</td>
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<td>• Supplements to Brake chapter</td>
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<td>• General corrections</td>
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</table>

Table 1: Version list B 1050
Copyright notice

As an integral component of the device described here, this document must be provided to all users in a suitable form.
Any editing or amendment or other utilisation of the document is prohibited.

Publisher

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Member of the NORD DRIVESYSTEMS Group
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1 Safety information

1.1 Intended use

These gear units are used to transmit and transform rotary movements. They are intended for use as part of a drive system in commercially used plant and machinery. The gear units must not be operated until it has been established that the plant or machinery can be safely operated with the gear unit. Suitable protective measures must be provided if failure of a gear unit or a geared motor could result in a risk to persons. The machine or system must comply with local legislation and directives. All applicable health and safety requirements must be met. In particular, the Machinery Directive 2006/42/EC, TR CU 010/2011 and the TR CU 020/2011 must be especially observed in the relevant areas of application.

The gear units may not be used in environments in which an explosive atmosphere can occur.

The gear units may only be used according to the information in the technical documentation from Getriebebau NORD GmbH & Co. KG. Damage to the gear unit may result if the gear unit is not used as intended and according to the information in the operating and assembly manual. This may also result in personal injury.

The base or the gear unit mount must be appropriately designed for the weight and torque. All of the fastenings provided must be used.

Some gear units are equipped with a cooling coil. These gear units may only be operated if the cooling circuit is connected and in operation.

1.2 Do not make any modifications.

Do not make any modifications to the gear unit. Do not remove any protective devices.

1.3 Performing inspection and maintenance work

Due to lack of maintenance and damage, malfunctions may occur which can result in personal injury.

- Carry out all servicing and maintenance work at the specified intervals.
- Also note that servicing is necessary after long storage periods prior to commissioning.
- Do not operate damaged gear units. The gear unit must not have any leaks.

1.4 Personnel qualification

All transport, storage, installation, commissioning and maintenance work must be carried out by qualified specialist personnel.

Qualified specialist personnel are persons who have the training and experience to recognise and avoid any possible risks.
1.5  Safety for particular activities

1.5.1  Check for transport damage
Transport damage may cause malfunctions of the gear unit, which may cause personal injury. Oil which escapes due to leaks may cause a slipping hazard.

• Check the packaging and the gear unit for transport damage.
• Do not operate damaged gear units.

1.5.2  Safety information for installation and maintenance
Before starting work on the gear unit disconnect the drive from the power supply and secure it against accidental switch-on. Allow the gear unit to cool down. Depressurise the cooling circuit lines. Damaged or defective components, attachment adapters, flanges and covers may have sharp edges. Wear work gloves and work clothing.

1.6  Hazards

1.6.1  Hazards when lifting
Persons may be injured by falling or swinging gear units. Therefore also observe the following information:

• Cordon off a wide area around the hazard area. Take care that there is adequate space to avoid swinging loads.
• Never stand under suspended loads.
• Use adequately dimensioned means of transport which are suitable for the purpose. The weight of the gear unit can be obtained from the type plate.

• Gear units may only be transported with shackles and lifting straps/chains at an angle of 90° to 70° to the horizontal. Do not use the eye bolts on the motor for lifting if a motor is fitted to the gear unit. The eye bolts are not designed for lifting the motor with heavy attachments. Pay attention to the section 3.1 “Transporting the gear unit”.

1.6.2  Hazards due to rotating parts
Rotating parts cause a risk of entanglement. Therefore provide a contact guard. In addition to shafts, this also applies to fans as well as drives and drive elements such as belt drives, chain drives, shrink discs and couplings.

For test operation do not switch on the drive without an installed drive element or secure the parallel key.

Take possible run-on of the machine into consideration for the design of protective guards.
1.6.3 Hazards due to high or low temperatures

The gear unit may heat up to 90 °C during operation. Touching hot surfaces or contact with hot oil may result in burns. At very low ambient temperatures freezing may occur on contact.

- Only touch the gear unit when wearing gloves after operation or at very low ambient temperatures.
- Before starting maintenance work, allow the gear unit to cool down sufficiently after operation.
- Provide a contact guard if there is a risk that persons may touch the gear unit when it is in operation.
- Bursts of hot oil mist may be emitted from the pressure vent screw during operation. Provide a suitable guard so that persons cannot be injured by this.
- Do not place any flammable materials on the gear unit.

1.6.4 Hazards due to lubricants and other substances

Chemical substances which are used with the gear unit may be toxic. Eye injuries may result if these substances enter the eyes. Lubricants and adhesives may cause skin irritation.

Oil mist may escape when vent screws are opened.

Due to lubricants and conservation materials, gear units may be slippery and slip out of the hands. There is a slipping hazard from spilled lubricants.

- When working with chemical substances wear chemical-resistant gloves and work clothing. Wash your hands after working.
- Wear protective goggles if there is a possibility of splashed chemicals, for example when filling oil or during cleaning work.
- If chemicals enter the eyes, rinse with large amounts of cold water immediately. Consult a physician in case of symptoms.
- Observe the safety data sheets for the chemicals. Keep the safety data sheets in the vicinity of the gear unit.
- Collect spilled lubricants immediately with a binding agent.

1.6.5 Hazards due to noise

Some gear units or attached components may cause hazardous noise levels during operation. Wear hearing protection if work has to be carried out close to such gear units.

1.6.6 Hazards due to pressurised coolants

The cooling system is under high pressure. Damage or opening a cooling line which is under pressure may result in injury. Depressurise the cooling circuit before working on the gear unit.
1.7 Explanation of markings

<table>
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<th><strong>DANGER</strong></th>
<th>Indicates an immediate danger, which may result in death or very serious injury if it is not avoided.</th>
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<td><strong>WARNING</strong></td>
<td>Indicates a dangerous situation, which may result in death or very serious injury if it is not avoided.</td>
</tr>
<tr>
<td><strong>CAUTION</strong></td>
<td>Indicates a dangerous situation, which may result in minor injuries if it is not avoided.</td>
</tr>
<tr>
<td><strong>NOTICE!</strong></td>
<td>Indicates a situation, which may result in damage to the product or its environment if it is not avoided.</td>
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| **Information** | Indicates hints for use and especially important information to ensure reliability of operation. |
2 Description of gear units

2.1 Type designations and gear unit types

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Table 2: Type designations and gear unit types

Double gear units consist of two single gear units.

SK 5207 - SK 15507 and SK 5217 – SK 11217 gear units should be treated according to these instructions. The operating and assembly manual B 1000 should be used for attached gear units.

Type designation for double gear units: e.g. SK 13307 /7282 (consisting of single gear units SK 13307 and SK 7282).

The gear unit type SK xx319 is a 3-stage helical gear unit with extended axle spacing.
### Table 3: Versions and options

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<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>A</td>
<td>Hollow shaft version</td>
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<td>B</td>
<td>Fastening element</td>
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<td>CC</td>
<td>Cooling coil</td>
<td>x x</td>
<td></td>
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<tr>
<td>CS1-X</td>
<td>Cooling system oil / water</td>
<td>x x</td>
<td></td>
</tr>
<tr>
<td>CS2-X</td>
<td>Cooling system oil / air</td>
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</tr>
<tr>
<td>D</td>
<td>Torque support</td>
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<td>EA</td>
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<td>ED2)</td>
<td>Elastic torque support</td>
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<tr>
<td>EV</td>
<td>Splined solid output shaft</td>
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<td>EW</td>
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<td>Solid output shaft on both sides</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>LC(X)1</td>
<td>Lubricant circulation</td>
<td>x x x</td>
<td></td>
</tr>
<tr>
<td>MC</td>
<td>Motor bracket</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>MF...</td>
<td>Motor base frame</td>
<td>x x</td>
<td></td>
</tr>
<tr>
<td>...B</td>
<td>with brake</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>EV</td>
<td>Oil heater</td>
<td>x x</td>
<td></td>
</tr>
<tr>
<td>EW</td>
<td>Oil level tank</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Temperature sensor</td>
<td>x x</td>
<td></td>
</tr>
<tr>
<td>FAN</td>
<td>Backstop</td>
<td>x x</td>
<td></td>
</tr>
<tr>
<td>FK</td>
<td>Shrink disc</td>
<td>x x</td>
<td></td>
</tr>
<tr>
<td>F1</td>
<td>Solid output shaft</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>IEC</td>
<td>Standard IEC motor mounting</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>KL2</td>
<td>Agitator version</td>
<td>x x</td>
<td></td>
</tr>
<tr>
<td>KL3</td>
<td>Agitator version</td>
<td>x x</td>
<td></td>
</tr>
<tr>
<td>KL4</td>
<td>Agitator version</td>
<td>x x</td>
<td></td>
</tr>
<tr>
<td>KL6</td>
<td>Agitator version</td>
<td>x x x</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>One free drive shaft journal</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>LC(X)1</td>
<td>Two free drive shaft journals</td>
<td>w2</td>
<td></td>
</tr>
<tr>
<td>MC</td>
<td>Three free drive shaft journals</td>
<td>w3</td>
<td></td>
</tr>
<tr>
<td>MF...</td>
<td>Auxiliary drive unit</td>
<td>WX</td>
<td></td>
</tr>
<tr>
<td>...B</td>
<td>with brake</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

1) with pressure switch
2) Also only stated with D on the type plate
Certain versions / options can only be used for particular gear unit sizes or configurations.

Figure 1: MAXXDRIVE® XT 2-stage helical bevel gear unit
### 2.2 Name plate

#### Figure 2: Name plate (example)

![Name plate image](image)

#### Table 4: Explanation of the name plate

<table>
<thead>
<tr>
<th>No.</th>
<th>Abbreviation</th>
<th>Unit</th>
<th>Designation</th>
<th>See section</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>-</td>
<td>DataMatrix code</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Type SK</td>
<td>-</td>
<td>NORD gear unit type</td>
<td>2.1 &quot;Type designations and gear unit types&quot;</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>-</td>
<td>Operating mode</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>-</td>
<td>Year of manufacture</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>No.</td>
<td>-</td>
<td>Serial number</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>M2</td>
<td>Nm</td>
<td>Rated torque of gear unit output shaft</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>P1</td>
<td>kW</td>
<td>Drive power</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>-</td>
<td>kg</td>
<td>Weight according to ordered version</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>i</td>
<td>-</td>
<td>Overall gear unit ratio</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>-</td>
<td>Installation orientation</td>
<td>7.2 &quot;Installation orientation&quot;</td>
</tr>
<tr>
<td>11</td>
<td>n2</td>
<td>rpm</td>
<td>Rated speed of gear unit output shaft</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>-</td>
<td>Lubricant type, viscosity and quantity</td>
<td>7.3 &quot;Lubricants&quot;</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>-</td>
<td>Customer's part number</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>fB</td>
<td>-</td>
<td>Operating factor</td>
<td></td>
</tr>
</tbody>
</table>
3 Assembly instructions, storage, preparation, installation

Please note all safety information (please see chapter 1 "Safety information") and warning information in the relevant sections.

3.1 Transporting the gear unit

**WARNING**

Hazard due to falling loads

- Do not use the eye bolts on a mounted motor to lift the unit.
- Note the centre of gravity of the gear unit.

Transport the gear unit with care. Use suitable aids such as cross-beams or similar to facilitate transportation of the gear unit. Impacts to the free ends of shafts may cause internal damage to the gear unit.
3.1.1 Standard gear units

Gear units may only be transported with lifting ropes and chains or lifting straps at an angle of 90° to 70° to the horizontal.

Legend

1: Lifting strap
2: Shackle
\(\times\): Not permissible
\(\checkmark\): Permissible

Figure 3: Transport of standard gear unit
3.1.2 with motor adapter

Gear units with motor adapters may only be transported with lifting ropes and chains or lifting straps at an angle of 90° to 70° to the horizontal.

The ring bolts on the motor must **not** be used for transportation.

---

**Legend**

1: Lifting strap  
2: Shackle  
×: Not permissible  
✓: Permissible

**Figure 4: Transport of gear unit with motor adapter**
3.1.3 with V-belt drives

Gear units with V-belt drives may only be transported with lifting ropes and chains or lifting straps at an angle of **90° to 70°** to the horizontal.

The ring bolts on the motor and the motor bracket must **not** be used for transportation.

---

**Legend**

1: Lifting strap
2: Shackle
×: Not permissible
✓: Permissible

**Figure 5:** Transport of agitator version gear unit
3.1.4 with V-belt drive

Agitator version gear units may only be transported with lifting ropes and chains or lifting straps at an angle of 90° to 70° to the horizontal.

The ring bolts on the motor must not be used for transportation.

Legend

1: Lifting strap
2: Shackle
✗: Not permissible
✓: Permissible

Figure 6: Transport of agitator version gear units
3.1.5 on motor swing base or base frame

Gear units on a motor swing base or base frame may only be transported with lifting ropes and chains or lifting straps at an angle of 90° to 70° to the horizontal. Only use the attachment points on the motor swing base or base frame.

Legend

1: Lifting strap
2: Shackle
X: Not permissible
✓: Permissible

Figure 7: Transport of gear unit with motor swing base or base frame
3.2 Storage

For short-term storage before commissioning, please observe the following:

- Store gear units in the fitting position (please see chapter 7.2 "Installation orientation") and secure them against falling,
- Lightly oil bare metal housing surfaces and shafts
- Store in a dry place,
- Temperature in the range from – 5 °C to + 50 °C without large fluctuations,
- Relative humidity less than 60 %,
- No direct exposure to sunlight or UV light,
- No aggressive, corrosive substances (contaminated air, ozone, gases, solvents, acids, alkalis, salts, radioactivity etc.) in the immediate vicinity,
- No vibration or oscillation

3.3 Long-term storage

For storage or standstill periods in excess of 9 months, Getriebebau NORD recommends the long-term storage option. With the use of the measures listed below, storage for up to 2 years is possible. As the actual influences on the unit greatly depend on the local conditions, these times should only be regarded as guide values.

Conditions of the gear unit and storage area for long-term storage prior to commissioning:

- Store in the fitting position (please see chapter 7.2 "Installation orientation") and secure them against falling.
- Transportation damage to the external paint must be repaired. Check that a suitable rust inhibitor is applied to the flange bearing surfaces. If necessary apply a suitable rust inhibitor to the surfaces.
- Gear units with the long-term storage option are completely filled with lubricant or have VCI corrosion protection agent mixed with the gear oil (see adhesive label on the gear unit, or are not filled with oil, but rather with small quantities of VCI concentrate.
- The sealing band in the vent plug must not be removed during storage. The gear unit must remain sealed tight.
- Store in a dry place.
- In tropical regions the drive unit must be protected against damage by insects.
- Temperature in the range from – 5 °C to + 40 °C without large fluctuations.
- Relative humidity less than 60 %.
- No direct exposure to sunlight or UV light.
- No aggressive, corrosive substances (contaminated air, ozone, gases, solvents, acids, alkalis, salts, radioactivity etc.) in the immediate vicinity.
- No vibration or oscillation

Measures during storage or standstill periods

- If the relative humidity is < 50 % the gear unit can be stored for up to 3 years.

Measures before commissioning

- Inspect the gear unit before commissioning.
- If the storage or standstill period exceeds 2 years or the temperature during short-term storage has greatly deviated from the standard range, the lubricant in the gear unit must be replaced before commissioning.
- If the gear unit is completely filled, the oil level must be reduced before commissioning.
- For gear units without oil filling, the oil level for the version must be filled before commissioning. The VCI concentrate may remain in the gear unit. Lubricant quantities and types must be filled according to the details on the type plate.
3 Assembly instructions, storage, preparation, installation

3.4 Preparing for installation

Inspect the delivery for transport and packaging damage immediately on receipt. The drive unit must be examined and may only be installed if no leaks are apparent. In particular the shaft sealing rings and sealing caps must be inspected for damage. Report any damage to the carrier immediately. Gear units with transport damage must not be commissioned.

All bare metal surfaces and shafts of the geared motor are protected against corrosion with oil, grease or corrosion protection agents before shipping.

Thoroughly remove all oil / grease or corrosion protection agents and any dirt from the shafts and flange surfaces before assembly.

In applications where an incorrect rotational direction may result in damage or potential risk, the correct rotational direction of the output shaft must be established by test running the uncoupled drive and ensured for subsequent operation.

Gears with integrated back stops are marked with arrows on the drive/driven sides. The arrows point in the rotation direction of the gear unit. When connecting the motor and during motor control, it must be ensured that the gear unit can only operate in the direction of rotation.

It must be ensured that no aggressive or corrosive substances which attack metal, lubricants or elastomers are present in the area surrounding the installation site or are subsequently expected during operation. In case of doubt, please contact Getriebebau NORD and take the recommended action.

Oil level tanks (Option: OT) are fitted as standard prior to delivery of the gear unit. If this is not the case, the intended position can be obtained from the order-related dimension sheet.

Gear units filled with VCI concentrate for long-term storage are fully closed. Take care that the vent is fitted and released as necessary prior to commissioning. The installation position can be obtained from the specific dimension sheet for the order.

If possible, the shaft sealing rings or the gear unit should be protected from exposure to direct sunlight.

3.5 Installing the gear unit

No additional loads must be attached to the gear unit. If a motor is mounted, an existing eye bolt must not be used for lifting (please see chapter 1 "Safety information").

All bolts must be used to fasten the gear unit.

Pay attention to the following items in order to prevent overheating:

- Ensure a free flow of air to all sides of the gear unit.
- Ensure that there is a free space of 30° around fan intakes.
- With geared motors, the cooling air of the motor fan must be able to flow against the gear unit without obstruction.
- Do not enclose or encase the gear unit.
- Do not subject the gear unit to highly energetic radiation.
- Do not direct warm exhaust air from other units onto the gear unit.
- The base or flange to which the gear unit is attached must not input any heat into the gear unit during operation.
- Do not allow dust to accumulate in the area of the gear unit

Please contact NORD if the conditions stated above cannot be met.

The gear unit must be precisely aligned with the drive shaft of the machine in order to prevent additional forces from being imposed on the gear unit due to distortion.
The service life of shafts, bearings and couplings depends on the precision of alignment of the shaft. Therefore, zero deviation should always be aimed for in alignment. In this context, refer to the special Operating Manuals regarding the requirements for the coupling, for example.

The base on which the gear unit is fitted must be vibration-free, torsionally rigid and flat.

The flatness of the bolting surface on the base must be of the appropriate precision (please see chapter 7.5 "Tolerances for bolting surfaces”).

Any contamination to the bolting surfaces of gear unit and base must be thoroughly removed.

The base must be designed according to the weight and torque, taking into account the forces acting on the gear unit. Bases which are insufficiently rigid may lead to radial and axial displacement during operation, which is not measurable when the unit is stopped.

When attaching the gear unit to a concrete base using masonry bolts or base blocks, appropriate recesses must be provided in the base. Tensioning bars must be cast into the concrete base in their aligned state.

Bolts with a minimum quality of 8.8 must be used to fasten the gear unit. The bolts must be tightened to the correct torques (please see chapter 7.4 "Screw tightening torques”).

The tolerances of the shaft ends and the flange connections should be obtained from the specific dimension sheet for the order.

The gear housing must always be earthed.

Welding of the gear unit is prohibited. The gear unit must not be used as the earth connection for welding work, as this may cause damage to the bearings and gear wheels.
3.6 Fitting hubs on the gear shafts

**NOTICE!**
The gear unit may be damaged by axial forces.
- Do not allow any harmful axial forces to act on the gear unit. Do not strike the hub with a hammer.

During assembly, take care that the shaft axes are precisely aligned with each other and comply with the manufacturer’s tolerance specifications. Drive and driven elements, e.g. coupling and chain-wheel hubs must be mounted onto the drive and driven shaft of the gear unit using suitable pullers that will not apply damaging axial forces to the gear unit. In particular, do not hit the hubs with a hammer.

**Information**
Use the end thread of the shafts for pulling. Fitting can be facilitated by coating the hub with lubricant or heating it up to approx. 100 °C beforehand.

The coupling must be positioned according to the installation instructions (specific drawing for the order). If no details are stated, the coupling must be aligned flush with the end of the motor shaft.

![Figure 8: Example of a simple pulling device](image)

Drive and driven elements may only introduce the maximum permissible radial forces $F_{R1}$ and $F_{R2}$ and axial forces $F_{A1}$ and $F_{A2}$ into the gear unit as stated in the catalogue (see type plate). Observe the correct tension, particularly on belts and chains.

Additional loads due to unbalanced hubs are not permitted.
The transverse force must be applied as closely as possible to the gear unit. For drive shafts with free shaft ends – Option W – the maximum permissible radial force $F_{R1}$ applies for the application of the radial force to the centre of the free shaft journal. For output shafts, the application of the radial force $F_{R2}$ must not exceed the dimension $xR2$. If the radial force $F_{R2}$ for the output shaft is stated on the rating plate, but no dimension $xR2$ is stated, the application of the force is assumed to be to the centre of the shaft journal.

Figure 9: Permissible application of force to drive and driven shafts
3.7 Gear unit with hollow shaft (Option: A, EA)

**NOTICE!**

Risk of damage to bearings, gear wheels, shafts or housing

- The gear unit must be fitted onto the hollow shaft of the machine using a suitable puller which will not exert damaging axial forces on the gear unit. In particular, do not hit the gear unit with a hammer.

Assembly and subsequent dismantling is facilitated by applying an anti-corrosive lubricant to the points described before fitting (e.g. NORD Anti-Corrosion Part No. 089 00099). Excess grease or anti-corrosion agent may escape after assembly and may drip off. Clean these points on the driven shaft after a running-in time of approx. 24 hours. This escape of grease is not due to a leak in the gear unit.

**NB:**

Not for gear units with shrink discs (please see chapter 3.7.2 "Hollow shaft with shrink disc element (option: S)"

![Figure 10: Applying lubricant to the shaft and the hub](image)

The required length of the parallel key of the solid shaft of the machine must be appropriately designed by the customer in order to ensure the safe transmission of forces.

If splines are used (option: EA) to transmit the forces, it must be ensured that the splines on the solid shaft of the machine are of the correct size and tolerances.
3.7.1 Hollow shaft with fastening element (Option: B)

**Information**

The gear unit can be fitted to solid shafts with and without a shoulder using the fastening element. The screw of the fastening element must be tightened with the appropriate torque (please see chapter 7.4 "Screw tightening torques").

**Assembly**

- 1: Fastening element
- 2: Circlip
- 3: Threaded rod
- 4: Threaded nut
- 5: Securing screw
- 6: Sealing cap
- 7: Threaded rod
- 8: Disassembly element
- 9: Threaded nut

**Securing**

**Dismantling**

Figure 11: Assembly and disassembly of the fastening element (schematic diagram)
3.7.2 Hollow shaft with shrink disc element (option: S)

**NOTICE!**

Risk of damage to the gear unit if the shrink disk is installed incorrectly

- To avoid tension or rubbing between the hollow shaft and the shoulder, hollow shafts with shrink discs must not be mounted on solid machine shafts with shoulders.
- If the tensioning bolts of the shrink disc are tightened without the solid shaft inserted, the hollow shaft may be permanently deformed. Do not tighten the bolts if the solid shaft is not inserted!
- When re-assembling the shrink disc, the thread and head surfaces of the tensioning bolts must be treated with grease which does not contain Molycote.
- The separate manufacturer's documentation for the shrink disc must be observed for installation.

Unless otherwise stated in the specific dimension sheet for the order, the external diameter of the customer's shaft must have a fit of h6 if the diameter is up to and including 160 mm or g6 for larger diameters. The fit must be according to DIN EN ISO 286.

The material of the customer's shaft must have a minimum yield strength of 360 N/mm². This ensures that no permanent deformation occurs due to the clamping force.
Standard fitting procedure for 2-part shrink discs:

1. Remove the cover if present

2. Loosen the tensioning bolts of the shrink disc but do not remove them. Tighten them gently by hand until there is no play between the flanges and the inner ring.

3. Push on the shrink disc up to the specified position (refer to the specific dimension sheet for the order).

4. The solid shaft of the machine must be completely de-greased prior to assembly.
   
   a. Do not apply grease to standard hollow machine shafts.

   b. In the case of special hollow shafts with a bronze bushing, the solid shaft of the machine must be greased in the area which will later come into contact with the bushing in the hollow shaft of the gear unit (Figure 12). It is essential that the tensioning seat of the hollow shaft is free of grease.

   ![Legend](image)

   **Legend**

   - Free of grease in this area
   - 1: Bronze bushing
   - 2: Shrink connection area
   - 3: Solid shaft of machine

5. The hollow shaft of the gear unit and its bushing must be completely de-greased in order to avoid accidental greasing in the area of the shrink connection.

6. Insert the solid shaft of the machine into the hollow shaft so that the area around the shrink connection is completely filled.

7. Evenly tighten the tensioning bolts of the shrink disc **in sequence** in the clockwise direction in several stages.

Figure 12: Machine shaft assembly for special hollow shafts with shrink discs
8. After tightening the tensioning bolts the face of the inner ring on the screw side must be flush with the face of the outer ring. The shrink disc must be checked visually for distortion (Figure 13).

![Figure 13: Fitted shrink disc](image)

9. The hollow shaft of the gear unit and the solid shaft of the machine should be marked in order to detect any slippage under load.

**Standard disassembly procedure:**

1. Evenly loosen the tensioning bolts of the shrink disc in **sequence** in the clockwise direction in several stages. Do not remove the tensioning bolts from their thread.

2. If the external ring does not detach from the inner ring after approx. one turn of all screws, the external ring can be released with the aid of the push-off thread. For this, screw as many tensioning bolts as are necessary into the push-off threads evenly until the external ring separates from the internal ring.

3. The gear unit is removed from the solid shaft of the machine by pushing against the hollow shaft.

If a shrink disk has been in use for a long period or is dirty, it must be dismantled, cleaned and the conical surfaces coated with Molykote G Rapid Plus or a similar lubricant before it is refitted. The threads and head surfaces of the screws must be treated with grease without Molykote. Any damaged or corroded elements must be replaced.
3.8  Flange version gear units (option: F, FK, VL2/3/4/5, KL2/3/4)

**NOTICE!**

Risk of gear unit damage from distortion

- Flange version gear units must only be bolted to the flange of the driven machine.
- The bolting surface of the driven machine must comply with the tolerances in section 7.5 "Tolerances for bolting surfaces".
- The flange of the driven machine must be free of vibration and torsionally rigid
- The bolting surfaces of both flanges must be clean.

The diameter of the hole circle and the size of the threaded holes on the flange of the gear unit must be obtained from the specific dimension sheet for the order.

3.9  Motor base frame (option MF)

A motor base frame is a steel structure for pre-assembled drive packages in a horizontal position. It serves for jointly mounting the gear unit, (hydro) coupling, motor, and, where applicable, also a mechanical brake, and it includes the necessary protective devices (e.g. hood). The steel structure is supported by several fastening feet.

**Legend**

1: Gear unit
2: Motor
3: Foundation frame
Installation and assembly

**WARNING**

**Hazards from rotating parts**

There are moving parts (e.g. shafts) on the individual components of the drive package. These can rotate quickly and lead to injuries (e.g. crushing, strangling, etc.).

- Do not operate the drive without covers or hoods.
- Secure the drive against inadvertent switching on during installation work.
- Pay attention to the additional information contained in the operating and assembly instructions for third-party components.
- Pay attention to the job-specific information on brake and coupling components contained in the dimension sheet or the order confirmation.

**NOTICE!**

**Risk of gear unit damage from faulty installation**

Impermissible tension, distortion and poor stability can damage the gear unit and attached components.

- Use the right lashing points.
- Install the drive package on a horizontal and level surface.
- Ensure that foundation and torque arm are dimensioned adequately.
- Do not exceed the maximum permissible distortion of 0.1 mm at a distance of 1 m.
- Check and correct the alignment of mounted components (Pay attention to the manufacturers’ documentation).
- Ensure a non-distorted alignment to the shaft of the connected machine.

Impermissible distortion and poor stability of the gear unit significantly affect the wear pattern of gear wheels, the load on the bearings, and consequently the service life of the gear unit.

Components between the motor and the gear unit, e.g. turbo couplings or brakes are pre-adjusted prior to delivery: The alignment and adjustment of these components must be checked and corrected according to the corresponding manufacturer’s documentation prior to commissioning the gear unit. Incorrect alignment will result in premature failure of the attached components and the gear unit.

Pay attention to all the notes on installation and assembly contained in the present manual and also the separate operating and assembly instructions of all installed components (e.g. couplings or brakes).

*Additional notes on the installation of the motor base frame*

- Solid shaft with elastic output coupling, see section 3.6 "Fitting hubs on the gear shafts"
3.10 Motor swing base (option: MS)

A motor swing base is a steel structure for pre-assembled drive packages in a horizontal position. It serves for jointly mounting gear unit, (hydro) coupling, motor, and, where applicable, also a mechanical brake, and it comes with the necessary protective devices (e.g. hood). The steel structure is supported by the drive shaft and a torque arm.

![Legend]

Legend
1: Gear unit
2: Motor
3: Gear unit swing base
4: Elastic element (retainer bush)

Installation and assembly

**WARNING**

**Hazards from rotating parts**

There are moving parts (e.g. shafts) on the individual components of the drive package. These can rotate quickly and lead to injuries (e.g. crushing, strangling, etc.).

- Do not operate the drive without covers or hoods.
- Secure the drive against inadvertent switching on during installation work.
- Pay attention to the additional information contained in the operating and assembly instructions for third-party components.
- Pay attention to the job-specific information on brake and coupling components contained in the dimension sheet or the order confirmation.

**NOTICE!**

**Risk of gear unit damage from faulty installation**

Impermissible tension, distortion and poor stability can damage the gear unit and attached components.

- Use the right lashing points.
- Install the drive package on a horizontal and level surface.
- Ensure that foundation and torque arm are dimensioned adequately.
- Do not exceed the maximum permissible distortion of 0.1 mm at a distance of 1 m.
- Check and correct the alignment of mounted components (Pay attention to the manufacturers’ documentation).
- Ensure a non-distorted alignment to the shaft of the connected machine.

Impermissible distortion and poor stability of the gear unit significantly affect the wear pattern of gear wheels, the load on the bearings, and consequently the service life of the gear unit.
Components between the motor and the gear unit, e.g. turbo couplings or brakes are pre-adjusted prior to delivery. The alignment and adjustment of these components must be checked and corrected according to the corresponding manufacturer's documentation prior to commissioning the gear unit. Incorrect alignment will result in premature failure of the attached components and the gear unit.

Pay attention to all the notes on installation and assembly contained in the present manual and also the separate operating and assembly instructions of all installed components (e.g. couplings or brakes).

Additional notes on the installation of the motor swing base

- Push-on gear unit via hollow shaft (option A, EA), see section 3.7 "Gear unit with hollow shaft (Option: A, EA)"
- Solid shaft with flange coupling, see section 3.6 "Fitting hubs on the gear shafts"
- Hollow shaft with fastening element (option B), see section 3.7.1 "Hollow shaft with fastening element (Option: B)"
- Hollow shaft with shrink disc (option S), see section 3.7.2 "Hollow shaft with shrink disc element (option: S)"

NORD recommends a g6 fit for the bolt supporting the elastic element.

To facilitate installation and to protect against corrosion, a suitable lubricant may be applied to the inner diameter of the elastic element.

The elastic element is made of an elastomer that can be used up to a temperature of +40°C. Depending on the component, the elastic element is capable of compensating for a small assembly-related offset. For specifications, refer to the manufacturer's documentation.

3.11 Motor mount (Option: MT)

Gear units with motor mounts and belt drives are pre-adjusted prior to delivery. Check the alignment of the motor and the belt tension prior to commissioning the gear unit.

3.12 Belt drives

WARNING

Risk of belt damage from incorrect installation

A damaged belt may break during operation. This can result in severe injuries.

- Before installation the axle spacing must be reduced so that the belt can be inserted into the grooves without the use of force.
- Forcible mounting belts by means of tyre levers, screwdrivers etc. is completely impermissible, as this often causes invisible damage to the stretch-resistant tension cord or the surrounding fabric.

Information

In the standard version, V-belt drives cannot be combined with a mounting flange or fan, as these options would conflict with each other.
A check/adjustment of the belt tension (tension check) of the belt drive must be carried out in order to ensure correct functioning.

A suitable contact pressure must be ensured. Excessive, or too little contact pressure increases losses due to friction and may result in an interruption of torque transfer.

The belt tension can be checked with the aid of various measuring devices. NORD recommends that the check is made with the aid of a non-contact frequency measuring device, which enables quick, simple and reliable testing in inaccessible areas.

Initial installation or the general inspection procedure with a frequency measuring device is described below (deviations which are specific to the manufacturer are possible):

1. Alignment of the shaft or the V-belt pulley parallel to the axis and horizontally must be ensured (max. angular deviation and displacement values can be provided on request).
2. Clean and de-grease all bare metal surfaces such as holes and the surface of the tapered bushing of the pulley.
3. Insert the tapered bushing in the hub and bring all connecting holes into alignment. Half-threaded holes must be opposite half-smooth holes.
4. Lightly oil studs or cylindrical screws and screw them in. Do not tighten the screws yet.
5. Clean and de-grease the shaft.
6. Push the pulley with the taper bushing to the required position on the shaft (see V-belt pulley alignment).
7. If a parallel key is used, this must first be placed in the groove on the shaft. There must be play between the parallel key and the groove in the hole.
8. Evenly tighten the studs or cylindrical screws to the specified torques (available on request) with a DIN 911 Allen key.
9. Place on the belts in sequence and roughly pre-adjust the tension by increasing the gap between the axles.
10. After this, the pre-tensioned belt is set into vibration (plucking or hitting with a finger is sufficient).
11. Point the sensor of the measuring device at the vibrating power drum and read the measurement.
12. If necessary, increase the axle spacing or the belt pre-tension and measure again.
13. To prevent the entry of foreign bodies, fill empty connection holes with grease.
14. From experience, after a running time of 0.5 to 4 hours, check the belt tension again and correct as necessary.
3 Assembly instructions, storage, preparation, installation

Figure 14: V-belt pulley (disassembled/assembled)

Legend
1: Studs or cylindrical screws
2: Tapered bushing
3: V-belt pulley

Legend
1: Axle (shaft)
2: Belt
3: Belt pulley
I: Aligned pulleys on axially parallel shafts
II: Axial displacement of the pulleys
III: Horizontal angular displacement of axles
\[\times\]: Not permissible
\[\checkmark\]: Permissible

Figure 15: Axle alignment (belt drives)
3.13 Covering cap (Option: H, H66, FAN, MF., MS…)
All fixing screws must be used and coated with a securing lubricant e.g. Loctite 242, Loxeal 54-03 prior to use and tightened to the correct torque (please see chapter 7.4 "Screw tightening torques").

3.14 Motor (Option: IEC, NEMA)

⚠️ WARNING
Risk of severe injuries from rapidly rotating parts
- Secure the drive against accidental start-up.

The maximum permitted motor weights and the dimension "X max" stated in the table below must not be exceeded when attaching the motor to an IEC or NEMA adapter:

<table>
<thead>
<tr>
<th>Maximum permitted IEC and NEMA motor weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC</td>
</tr>
<tr>
<td>NEMA</td>
</tr>
<tr>
<td>Centre of gravity X max [mm]</td>
</tr>
<tr>
<td>Weight [kg]</td>
</tr>
</tbody>
</table>

1) see Figure 16 for maximum permitted X dimension

Table 5: IEC and NEMA motor weights
### Maximum permitted Transnorm motor weights

<table>
<thead>
<tr>
<th>Transnorm</th>
<th>315</th>
<th>355</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Centre of gravity X max [mm]</td>
<td>615</td>
<td>615</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight [kg]</td>
<td>1500</td>
<td>1500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) see Figure 16 for maximum permitted X dimension

Table 6: Transnorm motor weights

NORD must be consulted if the values stated in the table are exceeded.

**Legend**

1: Centre of gravity of motor

**Figure 16: Centre of gravity of motor**
Installation of motors with standard dog couplings (Rotex®)

**NOTICE!**

Risk of damage to gear unit and motor from poor coupling alignment

- Also pay attention to the separate documentation for the coupling.
- The coupling must be positioned according to the installation instructions (specific drawing for the order). If no details are stated, the coupling must be aligned flush with the end of the motor shaft.

1. Clean the motor shaft and flange surfaces of the motor and adapter and check for damage. Check the attachment dimensions and tolerances of the motor and the adapter.

2. Push the coupling half onto the motor shaft so that the parallel key of the motor engages into the groove in the coupling half on mounting.

3. Pull the coupling halves onto the motor shaft according to the instructions of the motor manufacturer. The shaft end of the motor must be adjusted so that it is flush with the face of the coupling.

4. Secure the coupling half with the setscrew. The setscrew must be coated with a threadlocker (e.g. Loctite 242, Loxeal 54-03) and tightened to the correct torque (please see chapter 7.4 “Screw tightening torques”).

5. Sealing of the flange surfaces of the motor and the adapter is recommended if the motor is installed outdoors or in a humid environment. Before the motor is installed, the flange surfaces must be completely coated with surface sealant (e.g. Loctite 574 or Loxeal 58-14) so that the flange seals after mounting.

6. Mount the motor on the adapter. Do not forget the ring gear.

7. Tighten the adapter bolts to the correct torque (please see chapter 7.4 “Screw tightening torques”).

If a different type of coupling is used, observe the documentation from the manufacturer for the assembly sequence.
3.15 Drive coupling

**NOTICE!**

Risk of damage to gear unit and motor from poor coupling alignment

- Check the alignment of the coupling prior to commissioning. The coupling must be positioned according to the installation instructions (specific drawing for the order). If no details are stated, the coupling must be aligned flush with the end of the motor shaft.

The coupling specifications must always be verified if the operating conditions (power, speed, changes to the drive or the driven machine) change.

### 3.15.1 Dog coupling

Normally, the gear unit is connected to the motor with a dog coupling. For gear units without an IEC/NEMA adapter, the alignment between the gear unit and the motor must be ensured by the operator and the coupling installed according to the manufacturer's instructions.

For gear units with IEC/NEMA adapters, see section 3.14 "Motor (Option: IEC, NEMA)".

### 3.15.2 Turbo coupling

**WARNING**

Risk of oil being expelled in case of an overload

The oil being expelled from the coupling is hot. Danger of burns.

- The coupling must be encased as a protection against oil being expelled.

The coupling must be positioned according to the installation instructions (specific drawing for the order). If no details are stated, the coupling must be aligned flush with the end of the motor shaft.

Turbo couplings are usually supplied with a fusible plug. In case of overload the oil temperature in the coupling increases. As soon as the temperature limit (usually 140°C) is reached, the fusible plug melts and the oil flows out of the coupling in order to separate the motor and the gear unit before both components are damaged.

It is recommended that an oil tray is provided for the turbo coupling in order to catch escaping oil. The quantity of oil in the coupling can be obtained from the manufacturer's documentation.

Such an oil tray is installed as standard for gear units on a motor swing base or base frame which are combined with a turbo coupling.

Optionally, turbo couplings can be equipped with a fusible plug and a separate mechanical switch.
Figure 18: Fusible plug with separate mechanical switch

The triggering temperature of the fusible plug is usually 120°C. This ensures that the system is shut down before the temperature for the fusible plug is reached.

The alignment of the mechanical switch must be checked with the aid of the manufacturer's documentation prior to commissioning.

The switch must be connected to the evaluation electronics by the operator.

As standard, turbo couplings are usually supplied filled with oil.

3.15.3 Dog coupling

Dog couplings require lubrication with grease to ensure wear-free function: Dog couplings must be re-greased according to the manufacturer's documentation prior to commissioning.
3.16 Output coupling

**NOTICE!**

Risk of damage to gear unit and motor from poor coupling alignment

- Check the alignment of the coupling prior to commissioning. The coupling must be positioned according to the installation instructions (specific drawing for the order). If no details are stated, the coupling must be aligned flush with the end of the motor shaft.

The coupling specifications must always be verified if the operating conditions (power, speed, changes to the drive or the driven machine) change.

Output couplings which are supplied separately must be fitted and aligned according to the manufacturer's documentation.

3.17 Internal cooling system (Option: CC)

**WARNING**

Risk of injury due to pressure discharge

- Ensure that the pressure is released from the cooling circuit before carrying out any work on the gear unit.

**NOTICE!**

Risk of damage to the cooling coil

- The cooling coil must not be subjected to external forces.
- Do not twist the connections after assembly.
- Prevent vibrations from reaching the cooling coil during operation.

**Information**

Using two cooling coils

Make sure when using two cooling coils to connect them in parallel and not in series. This is the only way to ensure that sufficient cooling power is available.

For the inlet and outlet of cooling fluid, connections with pipe threads are provided on the gear unit or the casing cover for fitting pipes or hoses. The exact size of the pipe threads can be obtained from the specific dimension sheet for the order.

Remove the drain plug from the screw neck prior to assembly and flush the cooling coil to prevent any contamination of the cooling system. The screw necks should be connected with the coolant circuit, which must be provided by the operator. The flow direction of the coolant is irrelevant.

If a volume regulator is fitted upstream of the cooling coil, the connection is extended accordingly. The cooling water must be fed in via the volume regulator. Observe the operating instructions of the volume regulator.
3.18 External cooling system (Option: CS1-X, CS2-X)

Connect the cooling system as shown in Figure 20. In consultation with NORD, other connection points may be agreed. These must be obtained from the specific dimension sheet for the order. Do not modify any of the pre-assembled hoses without having consulted NORD beforehand. The permissible maximum ambient temperature for operating the cooling systems is 40 °C. A test by NORD is required before commissioning if higher ambient temperatures prevail.
3.19 Lubricant circulation (Option: LC, LCX)

Flanged or motor pumps are used as standard for gear units with lubricant circulation. These are already installed on the gear unit on delivery and all lines are correctly connected.

The flange pump is driven via the gear unit drive shaft. The motor pump has a separate drive.

Lubricant circulation systems are normally equipped with pressure switches. The connection and evaluation of these sensors must be ensured by the operator.

Information
In the case of combination of lubricant circulation with external cooling units the pressure and intake lines between the lubricant circulation and the cooling unit must be connected during the installation of the gear unit. The connection points should be obtained from the specific dimension sheet for the order.

3.20 Gear unit monitoring sensors (option: MO)

The position of the sensors must be obtained from the specific dimension sheet for the order.

Pay attention to the manufacturer's documentation.
3.21 Torque supports (Option: D, ED, MS)

**NOTICE!**

Risk of gear unit damage if the torque arm is installed incorrectly

- Distortion of the torque support during assembly or operation must be avoided, as otherwise the service life of the output shaft bearings may be reduced.
- The torque arm is not suitable for transferring transverse forces.

Assembly should be carried out from the side of the machine in order to reduce the bending moment on the machine shaft. Tension and pressure and installation upwards or downwards are permissible.

For helical gear units with motor adapters, the torque support is located opposite to the motor adapter.

The length of the torque support (Option: D) can be adjusted within a certain range.

The gear unit is aligned horizontally by means of the threaded bolt and the nuts of the torque arm and secured with lock-nuts.

Tighten the fastenings of the torque arm with the correct tightening torques (please see chapter 7.4 "Screw tightening torques") and secure against loosening (e.g. Loctite 242, Loxeal 54-03).

The Option ED torque support has an integrated elastic element and cannot be adjusted in length.
3.22 Oil heater (option: OH)

The oil heater is already installed prior to delivery. Consult the manufacturer's documentation for connecting the oil heater.

---

**Information**

**Prevent excessive heat dissipation**

The gear unit heat loss is particularly high in installation locations where extremely low ambient temperatures or strong air movements prevail. In such cases, it may be necessary to implement protective devices against excessive gear unit heat losses if the oil heater cannot sufficiently compensate the heat loss.

---

3.23 Brake

---

**WARNING**

**Risk of brake malfunction from faulty adjustment**

A brake malfunction may cause serious injury.

The brake is delivered in a pre-adjusted state only. The customer is obliged to check the settings and correct them if necessary.

- Adjust the brake correctly as described in the operating instructions before commissioning.

---

**WARNING**

**Risk of brake malfunction from excessive wear**

Faulty or incorrectly adjusted brake linings can lead to a reduction in braking torque and braking effect up to a complete failure of the brake. This can result in a longer brake response time and braking distance. A complete loss of the braking effect is possible in case of a total brake failure.

- Check the condition of the brake linings at regular intervals.
- Use additional monitoring functions (e.g. option SLW).
- Pay attention to the operating instructions of the brake.

---

Read and observe the manufacturer’s documentation prior to assembly, commissioning and adjusting work. For details on the options described below, please refer to the dimension sheet or order confirmation.

The commissioner is responsible for proper electrical connection and processing of electrical contacts and sensor signals.

The brake is delivered in an applied state.

The brake specifications must always be verified if the operating conditions (power, speed, changes to the drive or the driven machine) change.
3.23.1 Automatic lining wear correction (option: LWC)

While being operated, the brake lining of a mechanical brake is subject to wear. The option LWC compensates for this wear by automatically adjusting the brake lining. But the adjusting range is limited. To maintain an even braking effect, you must check and if necessary correct the adjustment (residual stroke) in line with the manufacturer's specifications and during or briefly after commissioning in particular.

**Information**

Decreasing braking effect

The braking effect will decrease if the mechanical wear of the brake lining exceeds the adjusting range of the LWC option. This has a negative effect on the brake response time and the braking distance.

3.23.2 Limit switch to indicate the brake lining wear (option SLW)

While being operated, the brake lining of a mechanical brake is subject to wear. The option SLW indicates when the wear limit is reached and the brake lining must be replaced.

3.23.3 NC/NO contacts (option: SO/SC)

The option SO/SC comprises limit switches that make it possible to report the switching state of the mechanical brake (open/closed).

A higher level control unit is responsible for the evaluation. With proper evaluation, the option SO/SC represents a safety element that, for example, prevents the drive from starting while the brake is applied.

The correct function of the limit switches must be checked during commissioning.


**WARNING**

Unexpected movement

Operating the manual release will disengage the brake. This can result in unexpected drive movements even if the drive is switched off electrically.

- Safeguard the hazard zone.
- Secure the drive against impermissible movement before actuating the manual release.
- Disengage the machine.
- Do not lock the manual release.
Options MR and MRS comprise a manual release of the brake. With these options, the contact pressure and thus the brake torque can be reduced or cancelled entirely.

The option MRS features an additional limit switch. This limit switch reports the switching state of the manual release and can be accordingly evaluated by a higher level control unit.

**Information**

You must check and if necessary correct the function of the limit switch after the brake linings are replaced.

### 3.24 Subsequent painting

For retrospective painting of the gear unit, the shaft sealing rings, rubber elements, pressure vent screws, hoses, type plates, adhesive labels and motor coupling components must not come into contact with paints, lacquers or solvents, as otherwise the components may be damaged or made illegible.
4 Commissioning

4.1 Oil level and venting

The oil level must be checked prior to commissioning (please see chapter 5.2 "Service and Maintenance Work").

If the gear unit has already been filled with an initial filling prior to delivery, the vents must be fitted after installation.

The following table shows the usual oil filling state of oil spaces on delivery:

<table>
<thead>
<tr>
<th>Oil space</th>
<th>Oil filling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>with</td>
</tr>
<tr>
<td>Industrial gear units</td>
<td>X</td>
</tr>
<tr>
<td>Primary gear unit (Option: WG)</td>
<td>X</td>
</tr>
<tr>
<td>Auxiliary gear unit (Option: WX)</td>
<td>X</td>
</tr>
<tr>
<td>Connecting flange (Option: WX)</td>
<td>X</td>
</tr>
<tr>
<td>Turbo coupling</td>
<td>X</td>
</tr>
<tr>
<td>Oil tank (Option: OT)</td>
<td>X</td>
</tr>
</tbody>
</table>

Table 7: Oil spaces as delivered

The position of the vents can be obtained from the specific dimension sheet for the order or from section 7.1 "Standard positions of the oil drain, vent and oil level". For more detailed information about the vent option used (e.g. FV, EF, DB), refer to section 5.2.10 "Venting".

The sealing plug which is used for transport must first be removed and the vent installed in the same position. The sealing plug of gear units that are filled with oil is marked with red paint.

Information

Auxiliary gear units (option WX) and first stage gear units (option WG) can be fitted with a pressure vent (option DR). The pressure vent must be unlocked prior to commissioning. Refer to the operating and installation instructions B 1000.

The sealing plug which is used to close the vent hole for transport is marked with red paint.

The connecting flange between the industrial gear unit and the auxiliary gear unit is always equipped with a pressure venting device. This device, as well as the pressure venting device on the industrial gear unit (only for ATEX-certified gear units) must be unlocked as shown in Figure 23.
4 Commissioning

Legend
1: Vent screw
2: Transport securing device

Figure 23: Activation of the pressure vent

4.2 Taconite seal

If Taconite seals are installed, check whether there is a gap between the bearing cover plates and that this is filled with grease. Re-greasing is carried out via the conical grease nipple.

Legend
1: Bearing cover 1
2: Grease-filled gap
3: Conical grease nipple
4: Bearing cover 2

Figure 24: Checking a Taconite seal

As standard, the grease nipple is located directly on the bearing cover.

In the case of covers or IEC cylinders, lubrication lines are installed on the gear unit to enable easy re-lubrication. The lubrication points should be obtained from the specific dimension sheet for the order.
4.3 Lubricant circulation (Option: LC, LCX)

**NOTICE!**

**Gear unit damage due to overheating**

- The drive unit may only be commissioned after the pump and the pressure monitor for the lubricant circulation lubrication have been connected and commissioned.
- During operation, the function of the lubricant circulation must be ensured by means of a monitoring system.
- The gear unit must be shut down immediately in case of failure of the lubrication circulation.

Gear units equipped with lubricant circulation are usually equipped with a pressure monitor to monitor the pump function. The pressure monitor must be connected so that operation is only possible if the oil pump has built up pressure. If the pre-set pressure is undershot, the applied electric signal is interrupted by the pressure switch.

During start-up, the viscosity of the gear oil must not be higher than 1800 cSt. For ISO-VG220 this corresponds to a temperature of at least 10 °C for mineral oil, and a temperature of at least 0 °C for synthetic oil. The pressure monitor can only be evaluated after the pump has been put into operation, as a pressure must first be built up. During commissioning, a lower pressure is permissible for a short period. The pressure monitor is usually set to 0.5 bar.

4.4 Gear unit cooling with fan (Option: FAN)

**WARNING**

**Risk of eye injury from suspended particles**

- Use goggles when switching on the fan.

**NOTICE!**

**Risk of gear unit overheating from insufficient air flow**

- Check the contact guard for warping and damage. Repair any damage prior to commissioning.
- An adequate supply of air must be ensured by means of a minimum free space of 30° ahead of the air intakes. The air inlet grille and the fan blades must be kept clean.

Fan operation increases the probability of dirt and dust deposits in the spaces between the cooling webs of a ribbed gear unit housing. This will reduce the thermal dissipation performance of the housing. As a consequence, the gear unit is no longer cooled sufficiently.

The main direction of rotation was specified in the planning phase and can be obtained from the specific dimension sheet for the order.

The opposite direction of rotation is also permissible. However, in this case the fan does not provide cooling so that the calculated thermal limit power of the gear unit cannot be complied with.
4.5 Internal cooling system (Option: CC)

**NOTICE!**

Gear unit damage due to overheating

- The drive may only be commissioned after the cooling spiral has been connected to the cooling circuit, and the cooling circuit has been put into operation.

The coolant must have a thermal capacity similar to water (specific thermal capacity at 20 °C $c=4.18$ kJ/kgK). Industrial water without any air bubbles or sediments is recommended as a coolant. The hardness of the water must be between 1°dH and 15°dH; the pH value must be between pH°7.4 and pH°9.5. No aggressive liquids may be added to the coolant!

The coolant pressure must not exceed 8 bar. The required coolant flow rate is 10 l/min. The maximum permissible coolant inlet temperature must not exceed 20 °C.

We also recommend fitting a pressure reducer at the coolant inlet to avoid damage due to excessive pressure.

If there is a danger of frost, the operator should add a suitable anti-freeze solution to the cooling water.

The temperature of the cooling fluid and the cooling fluid flow rate must be monitored and ensured by the operator.

**Information**

With a thermostat in the cooling water inlet, the volume of cooling water can be adjusted to the actual requirements.
4.6  External cooling system (option: CS1-X, CS2-X)

**NOTICE!**

**Gear unit overheating**
- The drive unit may only be commissioned after the cooling system has been connected and commissioned.

The system consists of at least a motor pump, a filter and a heat exchanger. In addition, a pressure switch is usual in order to monitor the pump and therefore the cooling.

For oil / water coolers (option: CS1) the temperature of the cooling fluid and the cooling fluid flow rate must be monitored and ensured by the operator. The maximum permissible cooling water inlet temperature is defined during the planning phase and can be found in the order data.

If there is a danger of frost, the operator should add a suitable anti-freeze solution to the cooling water.

For oil / water coolers (option: CS2) an adequate air intake must be ensured. A free space of at least 30° must be provided for the air intake. The air inlet grille and the fan blades must be kept clean.

The permissible maximum ambient temperature for operating the cooling systems is 40 °C. A test by NORD is required before commissioning if higher ambient temperatures prevail.

**Information**

Temperature regulation is provided by means of a resistance thermometer (PT100), which is installed in the oil sump of the gear unit.

It is recommended that the cooling unit is only switched on above an oil temperature of 60°C and switched off below an oil temperature of 45°C.
4.7 Oil heater (Option: OH)

**NOTICE!**

**Gear unit damage**

- The oil heater must be completely submerged in the oil bath.
- The oil heater must be switched off when gear units with option VL/KL 4-6 are operated.

The oil heater is equipped with a temperature sensor and a thermostat. The heater is pre-set to a switch-off temperature of 20°C. This means that the heater is in operation as long as an oil temperature of 20°C has not been reached. Please contact Getriebebau NORD for other switch-off temperatures.

The oil heater must remain functional when the gear unit is shut down in order to ensure that the oil temperature does not drop too much.

**Information**

If an oil heater is used, it is recommended that the gear unit is also equipped with a PT 100 to monitor the oil temperature.

4.8 Temperature monitoring (Option: PT100)

**NOTICE!**

**Gear unit damage through overheating**

- The customer must connect the resistance thermometer to an evaluation device. The operator is responsible for implementing this interlock.

The PT100 is an electrical resistor with which the oil temperature can be monitored. The electrical resistance depends on the oil temperature. The PT100 must be connected to a suitable evaluation device and the signal must be evaluated. The gear unit must be shut down if the permissible oil temperature is exceeded.

The triggering device must be set so that the drive unit is shut down when the maximum permissible oil temperature is reached.

For mineral oil, the maximum permissible oil temperature is 85 °C.

For synthetic oil, the maximum permissible oil temperature is 105 °C.
4.9 Backstop / freewheeling coupling (Option: R, WX)

**NOTICE!**

**Gear unit damage through overheating**

- The auxiliary drive must be secured or monitored to prevent it from idling.
- Operation below the lift-off speed according to the following tables results in a considerable reduction of the service life of the back stop bearing.

Optional back stops, which only allow rotation in one direction and block the other direction of rotation are available for attachment to the gear unit. For auxiliary gear units (option: WX) the back stop is used for freewheeling in order to allow the gear unit to run at low speeds, e.g. for maintenance work.

The back stop or freewheeling coupling is lubricated with the gear oil. The back stops or the freewheeling coupling lift off due to centrifugal force above a certain lift-off speed $n_1$ (see Table 8 and Table 9). For the freewheeling coupling the auxiliary drive must be at a standstill. Monitoring of the freewheeling coupling can be carried out with a speed sensor.

In continuous operation, back stops and freewheeling couplings should only be operated above the lift-off speed in order to minimise wear and generation of heat.

Adhesive labels on the gear unit indicate the direction of rotation of the back stop and the freewheeling coupling. The main direction of rotation was specified in the planning phase for the gear unit and can also be obtained from the specific dimension sheet for the order.

![Figure 25: Industrial gear unit with back stop (schematic diagram)](image)
### Table 8: Back stop lift-off speeds SK 5..07 – SK 10..07

<table>
<thead>
<tr>
<th>Gear units</th>
<th>Stages</th>
<th>Nominal gear ratio $i_N$</th>
<th>Lift-off speed $n_{\text{l}}$ [rpm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK 5207</td>
<td>2</td>
<td>7.1</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>430</td>
</tr>
<tr>
<td>SK 5307</td>
<td>3</td>
<td>28</td>
<td>315</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>670</td>
</tr>
<tr>
<td>SK 5407</td>
<td>3</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>671</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>1088</td>
</tr>
<tr>
<td></td>
<td></td>
<td>56</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>1759</td>
</tr>
<tr>
<td>SK 5507</td>
<td>4</td>
<td>112</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>2740</td>
</tr>
<tr>
<td>SK 6207</td>
<td>2</td>
<td>8.0</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>430</td>
</tr>
<tr>
<td>SK 6307</td>
<td>3</td>
<td>31.5</td>
<td>355</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>670</td>
</tr>
<tr>
<td>SK 6407</td>
<td>3</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>671</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>1088</td>
</tr>
<tr>
<td></td>
<td></td>
<td>56</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>1759</td>
</tr>
<tr>
<td>SK 6507</td>
<td>4</td>
<td>125</td>
<td>445</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to</td>
<td>2740</td>
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Table 9: Back stop lift-off speeds SK 11..07 – SK 15..07
4 Commissioning

<table>
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<tr>
<th>Gear units</th>
<th>Stages</th>
<th>Nominal gear ratio in</th>
<th>Lift-off speed n₁ [rpm]</th>
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<td>809</td>
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<td>SK 5217 / SK 6217</td>
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<td>16 to 22</td>
<td>1308</td>
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<tr>
<td>SK 7217 / SK 8217</td>
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<td>6 to 8</td>
<td>451</td>
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<td>SK 7217 / SK 8217</td>
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<td>9 to 13</td>
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<td>16 to 20</td>
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<tr>
<td>SK 9217 / SK 11217</td>
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<td>9 to 13</td>
<td>545</td>
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<td>16 to 21</td>
<td>887</td>
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</table>

Table 10: Back stop lift-off speeds SK 5..17 – SK 11..17

There is increased wear if the necessary lift-off speed is not reached. The service life of the back stop bearing decreases. Contact NORD for further information.

4.10 Checking the gear unit

During commissioning of the gear unit a test run should be carried out in order to detect any problems prior to continuous operation.

During a test run under full load, the gear unit should be checked for:

- Unusual noises, such as grinding, knocking or rubbing noises
- Unusual vibrations, oscillations or other movements
- Production of steam or smoke

After the test run, the gear unit should be checked for:

- Leaks
- Slippage of the shrink disks. To do this, remove the cover and check whether the marking specified in Section 3.7.2 “Hollow shaft with shrink disc element (option: S)” indicates a movement of the gear unit hollow shaft relative to the machine shaft. Then remount the cover as described in Section 3.13 “Covering cap (Option: H, H66, FAN, MF.., MS…)”.

**Information**

Shaft sealing rings are rubbing seals and have sealing lips made from an elastomer material. These sealing lips are lubricated with a special grease at the factory. This reduces the wear due to their function and ensures a long service life. An oil film in the region of the rubbing sealing lip is therefore normal and is not due to leakage.

**Information**

Taconite seals have a grease filling to seal the gear unit against dirt and other contaminants. During continuous operation of the gear unit and the associated heating, grease may drip from the area of the Taconite seal. This is normal and is not due to a leak.
4.11 Checklist

4.11.1 Obligatory

<table>
<thead>
<tr>
<th>Item to be checked</th>
<th>Date of check</th>
<th>Information see Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can transport damage or other damages be found?</td>
<td></td>
<td>3.1</td>
</tr>
<tr>
<td>Does the version on the name plate comply with the specifications?</td>
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<td>2.2</td>
</tr>
<tr>
<td>Does the required orientation comply with the actual installation position?</td>
<td></td>
<td>7.2</td>
</tr>
<tr>
<td>Has the correct oil level for the version been checked?</td>
<td></td>
<td>5.2.3</td>
</tr>
<tr>
<td>Has the vent been fitted and activated?</td>
<td></td>
<td>4.1</td>
</tr>
<tr>
<td>Has the gear unit been earthed?</td>
<td></td>
<td>3.5</td>
</tr>
<tr>
<td>Has the gear unit been aligned properly?</td>
<td></td>
<td>3.5</td>
</tr>
<tr>
<td>Has the gear unit been installed free of tension?</td>
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<td>3.21</td>
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<tr>
<td>Are the external gear shaft forces within the permitted limits?</td>
<td></td>
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</tr>
<tr>
<td>Is the coupling between the gear unit and the motor correctly installed?</td>
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<tr>
<td>Was the gear unit checked in a test run?</td>
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Table 11: Obligatory checklist for commissioning
## 4.11.2 Optional

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<th>Checklist</th>
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<th>Information see Section</th>
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<td>Option R, WX, FAN: Is the direction of rotation specified and checked?</td>
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<td>4.4, 4.9</td>
</tr>
<tr>
<td>Option D and ED: Is the torque arm installed correctly?</td>
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<td>3.21</td>
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<tr>
<td>Option AS, FAN: Are rotating parts covered with a contact guard?</td>
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<tr>
<td>Option FAN, CS2: Is an adequate supply of air ensured?</td>
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<td>4.4, 4.6</td>
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<tr>
<td>Option CS1, CC: Is the cooling water connected to the cooling unit or the cooling coil and open?</td>
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<td>3.17, 3.18</td>
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<tr>
<td>Option CS1, CS2: Is the cooling unit connected to the gear unit?</td>
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<td></td>
<td>3.18</td>
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<tr>
<td>Option: LC, LCX: Is the pressure monitor connected and functioning?</td>
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<tr>
<td>Option PT100: Is the temperature monitor connected and functioning?</td>
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<tr>
<td>Option AS: Was the shrink disk connection tested for slippage?</td>
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<tr>
<td>Brake option: Is the brake correctly adjusted?</td>
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<tr>
<td>Option MT: Is the belt correctly tensioned?</td>
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<tr>
<td>Option WX: Has the speed monitor been functionally connected?</td>
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Table 12: Optional checklist for commissioning
## 5 Service and maintenance

### 5.1 Service and Maintenance Intervals

<table>
<thead>
<tr>
<th>Service and Maintenance Intervals</th>
<th>Service and maintenance work</th>
<th>Information see section</th>
</tr>
</thead>
</table>
| According to manufacturer's details | • Option PT100: Check the function and measurement accuracy; recalibrate as necessary  
• Option LC/LCX: Check the function and measurement accuracy of the pressure monitor, recalibrate as necessary  
• Option CS1: Service the oil / water cooler  
• Option CS2: Service the oil / air cooler  
• Brakes: check for wear  
• Couplings: Service the drive and output couplings | Manufacturer's documentation |
| Standstill/storage > 6 months | • Regularly check the protective coating on unpainted and painted surfaces  
• Check the condition of the oil  
• Check the seals | 3.3 |
| Daily | • Visual inspection of the contamination indicator  
• Check oil temperature  
• Check oil pressure  
• Check if the operating noise has changed | 5.2, 4.8 |
| Every 100 operating hours, but at least weekly | • Visual inspection for leaks  
• Check the gear unit for unusual running noises and vibrations | 5.2 |
| After 500 operating hours | • First oil change after commissioning  
• Check the brake  
  – Inspect the wear pattern of the brake  
  – Check the lining wear correction  
• Check the coupling  
  – Check the wear of dog couplings | 5.2.8, 3.23, 3.15, 3.16 |
| At least once per month | • Option FAN: Check the air cooler / gear unit for dirt and dirt deposits  
• Option CS2: Check the heat exchanger for dirt  
• Check the covers and the attachment adapters for dirt and dirt deposits | 5.2.7 |
<p>| At least once within 3 months | • Belt drive option: Inspect the pulleys and belts for wear and condition. (Profile gauges) | 5.2.15 |</p>
<table>
<thead>
<tr>
<th>Service and Maintenance Intervals</th>
<th>Service and maintenance work</th>
<th>Information see section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every 2500 operating hours, at least every six months</td>
<td>• Visual inspection of shaft sealing ring</td>
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<td>• Check the oil level and oil condition</td>
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<td>• Clean or replace the vent</td>
<td>5.2.10</td>
</tr>
<tr>
<td></td>
<td>• Option D, ED: Visual inspection of the rubber buffers</td>
<td>5.2.4</td>
</tr>
<tr>
<td></td>
<td>• Option LC, LCX, CS1, CS2, OT: Visual inspection of hoses and pipes</td>
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<tr>
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<td>• Option CS1, CS2, LC, LCX: Check the oil filter</td>
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<tr>
<td></td>
<td>• Option VL2/3/4/6 KL2/3/4/6: Re-lubricate the bearings in the output flange and remove excess grease</td>
<td>5.2.13</td>
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<tr>
<td></td>
<td>• Taconite option: Re-grease</td>
<td>5.2.14</td>
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<td>• Check the brake</td>
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</tr>
<tr>
<td></td>
<td>– Inspect the wear pattern of the brake</td>
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</tr>
<tr>
<td></td>
<td>– Check the lining wear correction</td>
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</tr>
<tr>
<td></td>
<td>• Check the coupling</td>
<td>3.15, 3.16</td>
</tr>
<tr>
<td></td>
<td>– Check the wear of dog couplings</td>
<td></td>
</tr>
<tr>
<td>For operating temperatures up to 80 °C: Every 10000 operating hours, but at least every 2 years</td>
<td>• Replace shaft sealing rings if worn</td>
<td>5.2.11</td>
</tr>
<tr>
<td>Higher temperatures reduce the oil change intervals</td>
<td>• Change the oil (if filled with synthetic oil, this period is doubled) Reduction of lubricant replacement intervals under extreme operating conditions (high humidity, aggressive environment, high temperatures and large temperature fluctuations)</td>
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<tr>
<td></td>
<td>• Option CC: Check the cooling coil for deposits (fouling)</td>
<td>5.2.9</td>
</tr>
<tr>
<td>Every 20,000 operating hours, but at least every 4 years</td>
<td>• Re-grease the bearings in the gear unit (only for SK5..07-SK6..07 and installation position M5/M6)</td>
<td>5.2.12</td>
</tr>
<tr>
<td></td>
<td>• Option LC, LCX, CS1, CS2, OT: Replace hose lines</td>
<td>5.2.5</td>
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<tr>
<td>At least every 10 years</td>
<td>• General overhaul</td>
<td>5.2.16</td>
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</tbody>
</table>

Table 13: Service and Maintenance Intervals
5.2 Service and Maintenance Work

Visual inspection for leaks

The gear unit must be checked for leaks. Attention should be paid to escaping gear oil and traces of oil on the exterior or underneath the gear unit. In particular, the shaft sealing rings, cover caps, screw fittings, hoses and housing joints should be checked.

Information

Shaft sealing rings are components with a limited life and are subject to wear and ageing. The service life of shaft sealing rings depends on various ambient conditions. Temperature, light (especially UV light), ozone and other gases and liquids affect the ageing process of shaft sealing rings. Some of these influences may change the physical or chemical properties of the shaft sealing rings and result in a significant reduction of their service life. Foreign substances (e.g. dust, sludge, sand, metallic particles) and excess temperature (excessive speed or external heating) accelerate the wear of the sealing lip. These sealing lips are made of an elastomer material and are lubricated with a special grease at the factory. This reduces the wear due to their function and ensures a long service life. An oil film in the region of the rubbing sealing lip is therefore normal and is not due to leakage (please see chapter 7.7 "Leakage and leak-tightness").

If leaks are suspected, the gear unit should be cleaned, the oil level checked and checked again for leaks after approx. 24 hours. If a leak is confirmed (dripped oil), the gear unit must be repaired immediately. Please contact the NORD service department.

Check for running noises

If the gear unit produces unusual running noises or vibrations, this could indicate damage to the gear unit. In this case the gear unit must be repaired immediately. Please contact the NORD Service department.

5.2.1 Gear unit cooling with fan (Option: FAN)

The inlet and outlet openings on the fan cover and the fan wheel must be kept clean. Before re-commissioning, observe the information in Section 4.4 "Gear unit cooling with fan( Option: FAN)".

5.2.2 Heat exchanger (option: CS2)

The heat exchanger of the oil/air cooling unit (option CS2) must be cleaned regularly according to the documentation of the product manufacturer in order to maintain the efficiency of the unit.
5.2.3 Oil level

The installation position must comply with the version on the type plate.

**WARNING**

Risk of burns and injuries

- Switch off the drive before checking the oil level.
- Secure the drive against inadvertent switching on, for example with a padlock.
- Allow the gear unit to cool down. The oil temperature should be between 20 °C and 40 °C.

**Checking the oil level**

1. Shut down the drive.
2. Make sure to wait for 5 to 10 minutes.
3. Check the oil level only if the gear unit is at a standstill and if the oil is free from foaming.
   - An oil level above the “Max” marking is impermissible and may indicate the ingress of foreign liquids (e.g. water). Check the water content of the oil.
   - An oil level below the “Min” marking is impermissible and may indicate a leak.

*An impermissible oil level may damage the gear unit.*

- Find and correct the reason for the incorrect oil level.
- If applicable, correct the oil level or change the oil (see section 5.2.8 "Oil change").
  
  Use the gear oil type stated on the name plate.
- If possible, filling should be carried out via the vent position.

For the positions of the oil level measuring device, the vent and the oil drain, please refer to the specific dimension sheet for the order.

With double gear units (option WG) and gears with auxiliary drive (option WX), the oil level must be checked on both gear units. For auxiliary drives with freewheeling couplings the oil level in the attachment cylinder must also be checked.

Oil level checks and top-ups may be necessary for attached couplings. In this case, the manufacturer’s documentation must be observed.
5.2.3.1 Oil level screw

1. The corresponding oil level screw must be screwed out.
2. Check the oil level in the gear unit with the dipstick supplied (Part No.: 2830050), as shown in Figure 26. To do this, the part of the dipstick which is submerged in the oil must be held vertically. The maximum oil level is the lower edge of the oil level hole. The minimum oil level is approx. 4 mm below the lower edge of the oil level hole. The dipstick then just dips into the oil.
3. If the integrated seal of the oil level screw is damaged, a new oil level screw must be used or the thread cleaned and coated with securing adhesive, (e.g. Loctite 242, Loxeal 54-03) prior to insertion.
4. Fit the oil level screw together with the sealing ring and tighten to the correct torque (please see chapter 7.4 “Screw tightening torques”).

![Figure 26: Checking the oil level with a dipstick](image)

5.2.3.2 Oil inspection glass/oil level glass (Option: OSG), Oil level indicator (Option: OST)

The oil level can be seen directly in the window. The correct oil level is the middle of the inspection glass. For the oil level indicator version, the oil level must be in the middle.

5.2.3.3 Oil dipstick (Option: PS)

1. Unscrew the dipstick from the gear unit and wipe it with a clean cloth.
2. Fully insert the dipstick into the gear unit and unscrew it again.
3. The oil level must be between the upper and lower marking.

![Figure 27: Checking the oil level with an oil dip-stick](image)
5.2.3.4 Oil level tanks (Option: OT)

**NOTICE!**

Damage to the gear unit due to low oil level

An oil level below the Min marking may indicate a leak. This may result in damage to the gear unit.

- Find and correct the reason for the low oil level

Check the oil level prior to commissioning. A gear unit which is in operation must be shut down at least 20 to 30 minutes before checking the oil level.

The oil level must be checked with the gear unit at a standstill and with foam-free oil in the installation position stated on the name plate.

If the oil level is below the minimum level (lower edge of the inspection window), the oil level must be corrected by topping up with lubricant.

a. Oil level tank and dipstick (standard configuration) (characteristic: cylindrical container): The oil level must be checked with the aid of the dipstick plug (thread G1¼) in the oil tank. The sequence is as described in the previous section.

b. Oil level tank and oil level indicator (standard configuration) (characteristic: rectangular container): The oil level can be seen directly in the window. The correct oil level is the middle of the oil level indicator.

After correction of the oil level, oil level screws, dipsticks, vents and oil drain screws which have been unscrewed must be screwed in again and tightened with the appropriate torques (see section 7.4 "Screw tightening torques").
5.2.3.5  No-seal adapter for mixers (option SAFOMI)

---

**NOTICE!**

**Damage to the gear unit due to insufficient lubricant**

Oil foam formation may indicate contamination of the oil, e.g. due to the entry of foreign liquids. Contamination impairs the lubricating properties of the gear oil and may result in damage to the gear unit.

- Check the gear oil for water and other contaminants
- Change the oil
- Clarify and remedy the cause of oil contamination

---

This option is equipped with a 3D oil inspection glass in the gear unit housing and an oil inspection glass in the SAFOMI-IEC adapter. The 3D oil inspection glass cannot be used if the SAFOMI-IEC adapter has been retrofitted. In this case the oil level must be checked with a dipstick.

- The 3D oil inspection glass in the gear unit housing is used to check the oil level and must always be completely filled with oil.
- The oil inspection glass in the SAFOMI-IEC adapter is an inspection window. It is used to check the gear oil with regard to foam formation. No oil foam must be visible, neither at a standstill nor during operation.

---

**Information**

**Incorrect oil level indication due to trapped air**

During commissioning and after changing the oil, air (air pockets) may become trapped in the gear unit oil bath. These disappear during operation. The resulting space fills with lubricant. Because of this the oil level may deviate in comparison with the initial filling. Trapped air can escape via the gear unit venting. This process may take several days. During this period an incorrect display of the oil level in the 3D inspection glass cannot be ruled out.

- Check the oil level at regular intervals, especially after changing the oil or commissioning.
5.2.4 Rubber buffer (Option: ED)

Gear units with an elastic torque support (Option ED) have rubber elements. If these show damage such as tears to the rubber surface, the elements must be replaced. In this case, please contact NORD Service.

5.2.5 Piping

5.2.5.1 Piping (Option: LC, LCX, OT)

The piping of lubrication circulation systems or vent lines for full oil level in combination with oil level tanks must be checked for leaks.

The affected pipes must be replaced in case of leaks. In this case, please contact NORD Service.

5.2.5.2 Hose lines (Option: LC, LCX, CS1, CS2, OT)

Hose lines are used as intake and pressure lines for lubricant circulation and for cooling units. In addition, if an oil tank is present, this is connected to the gear unit with hose lines.

Hose lines are subjected to a natural ageing process due to external influences (e.g. UV radiation) to a greater extent than pipes.

When checking hose lines, look out for leaks, cuts, cracks, porous areas and chafing. In such cases, the affected hose lines must be replaced. Please contact the NORD Service department.

5.2.6 Oil filter (Option: CS1-X, CS2-X, LC/LCX)

As standard, the oil filter is equipped with a visual contamination indicator. It is recommended that the filter element is replaced at the latest after an operating period of one year.

The filter element must be replaced immediately if the contamination indicator triggers. Refer to the relevant manufacturer's documentation for further information.

5.2.7 Remove dust

Dust layers on the gear unit housing and on the fan blades degrade the cooling performance and lead to overheating. Remove dust deposits. For ribbed gear unit housings, special care must be taken that the spaces between the ribs are cleaned at regular intervals.
5.2.8 Oil change

**WARNING**

**Risk of burns and injuries**

- Allow the gear unit to cool down.
- Wear protective gloves and goggles when changing the oil.

The position of the oil drain screw (optionally the drain tap), vents and devices for checking the oil level can be obtained from the specific dimension sheet for the order.

Procedure:

1. Select a collection vessel according to the stated quantity of oil (please see chapter 7.3.3 "Lubricant quantities") and place it under the oil drain screw or the oil drain tap.
2. Unscrew the vent from the gear unit.
3. Unscrew the oil drain screw or the sealing plug from the oil drain tap and open it.
4. Completely drain the oil from the gear unit.
5. Clean the interior of the gear unit by flushing with oil so that oil sludge particles, due to wear and old residues, are removed. The same type of oil as is used for operation must be used for this.
6. Clean the thread of the oil drain screw or the sealing cap of the oil drain tap and coat with a threadlocker (e.g. Loctite 242 or Loxeal 54-03) before screwing in again. In both cases, tighten the screws with the correct torque (please see chapter 7.4 "Screw tightening torques").
7. Fill the gear unit with the specified quantity of fresh oil according to the name plate through the vent hole. If the gear unit is equipped with a dipstick, the oil may be filled through this hole.
8. After approx. 15 minutes (for oil level tanks 30 minutes), check the oil level as described in section 5.2.3 "Oil level" and correct as necessary.
9. Other attached components such as filters and piping should also be drained if necessary.
10. For gear units with oil circulation lubrication and oil supply systems, the oil bearing system must be drained according to the manufacturer's specifications (maintenance instructions).

5.2.9 Internal cooling system (Option: CC)

To check the cooling coil, the coolant feed must be shut off and the pipes disconnected from the cooling coil. If deposits are apparent on the inner wall of the cooling coil, the deposits and the coolant must be analysed.

If a chemical cleaner is used, it must be ensured that the cleaning agent does not attack the material of the cooling coil (copper pipe and brass fittings).

Check the cooling coil and the cover for leaks if strong corrosion is found on the connections.

Please contact the NORD Service department.
5.2.10 Venting

5.2.10.1 Vent filter (Option: FV)

The ventilation filter uses a wire mesh as the filter material and is intended to ensure that any excessive pressure can escape from the gear unit housing. It must be inspected for soiling. A soiled filter is no longer capable of fulfilling its function and must be replaced.

1. Unscrew the old ventilation filter
2. Screw in the new ventilation filter with a new sealing ring (please see chapter 7.4 "Screw tightening torques")

![Vent filter (option FV)](image)

5.2.10.2 Cellulose filter (Option: EF)

This filter uses cellulose as the filter material. The filter insert is replaceable.

1. Unscrew the cap of the filter insert
2. Remove and check the filter element
3. Optional: Replace the filter element in case of contamination
4. Insert the filter insert
5. Put on the cover and tighten finger-tight

![Cellulose filter (Option EF)](image)
5.2.10.3 Drying agent filter (Option: DB)

The drying agent filter uses silica gel as the filter material. The condition of the filter is visible from the outside. With increasing contamination the colour of the filter material changes from blue to pink. The colour change starts in the lower area and spreads to the upper area. The filter should be replaced when three quarters of the filter have changed colour.

1. Check the degree of contamination.
2. Optional: Unscrew the old ventilation filter.
3. Optional: Screw in the new ventilation filter with a new sealing ring (please see chapter 7.4 "Screw tightening torques").

5.2.11 Replacing the shaft sealing ring

Replace the shaft sealing ring

Once the shaft sealing ring has reached the end of its service life, the oil film in the region of the sealing lip increases and a measurable leakage with dripping oil occurs. The **shaft sealing ring must then be replaced**. The space between the sealing lip and the protective lip must be filled approximately 50% with grease on fitting (recommended grease: PETAMO GHY 133N). Take care that after fitting, the new shaft sealing ring does not run in the old wear track.

---

**Information**

Special installation rules must be observed when replacing **MSS7 seals** in order to achieve a normal operating life. MSS7 seals are two-part seals which consist of a liner with an axial dust lip and a radial shaft sealing ring with a radial dust lip (Figure 30: MSS7 seal). Please contact the NORD Service department in case of any queries.

---

**Legend**

1: Bushing
2: MSS7 seal
3: Shaft

---

**Figure 30: MSS7 seal**
5.2.12 Bearings in the gear unit

As standard, all bearings in the gear units are lubricated with an oil bath. For installation positions where this is not possible, or in case of reduced oil levels, lubricant circulation is used. Exceptions to this are gear units SK 5..07 bis SK 6..07 in installation position M5/M6. In this installation position, the upper bearings are lubricated with grease.

Please contact the NORD Service department for replacement of the grease in the roller bearings.

Recommended grease: Petamo GHY 133N - Klüber Lubrication ((please see chapter 7.3.1 "Roller bearing greases").

5.2.13 Bearings in the output flange (Option: VL2/3/4/6, KL2/3/4/6)

For agitator version gear units, re-lubrication of the bearing in the output flange is necessary. Before re-lubrication, the grease nipple opposite to the sealing plug must be unscrewed. Grease should be injected until a quantity of 25 g escapes from the sealing plug. After this, the sealing plug must be reinserted and tightened. Remove excess grease.

Recommended grease: Petamo GHY 133N - Klüber Lubrication ((please see chapter 7.3.1 "Roller bearing greases").
5.2.14 Taconite seal

Input and/or output shafts may be equipped with Taconite seals, depending on the version. The associated grease nipples are located either directly on the bearing cover or re-lubrication must be carried out via a lubrication line.

![Diagram of Taconite seal components]

**Legend**

1: Bearing cover 1  
2: Grease-filled gap  
3: Conical grease nipple  
4: Bearing cover 2

**Figure 31: Re-greasing Taconite seals**

The precise position of the grease nipples can be obtained from the specific dimension sheet for the order. The seal must be filled with grease until clean grease emerges from the grease gap. Remove excess grease.

Recommended grease: Petamo GHY 133N - Klüber Lubrication (please see chapter 7.3.1 "Roller bearing greases")

**Information**

Optimal re-lubrication is achieved by rotating the gear unit shaft in 45° steps when lubricating and pressing in grease until clean grease emerges from the shaft.
5.2.15 V-belts (belt drives)

**WARNING**

Entanglement hazard

- The protective cover must be correctly installed before re-commissioning.

V-belt pulleys should be visually inspected at regular intervals. In case of severe signs of wear, a V-groove and profile gauge should be used as an aid to determine the degree of wear. Dirt on the belt pulley or the belt causes friction losses. Therefore, always keep these components clean and dry.

Check the condition of the V-belts. Replace cracked or brittle V-belts. If one or more V-belts fail in a multiple groove drive, a new set of V-belts must be fitted. V-belts from different manufacturers must not be combined to form a set of belts. Before installing new V-belts, it is essential to check the condition of the V-belt pulleys.

After a running time of approx. 4-5 hours with the drive under full load, the tension of the V-belts must be checked with a frequency measuring device and corrected as necessary.

5.2.16 General overhaul

The general overhaul must be carried out by a specialist workshop with suitable equipment and be qualified personnel with appropriate equipment in observance of national regulations and laws. We recommend that the general overhaul is carried out by the NORD Service Department.

For this, the gear unit must be fully disassembled and the following work must be carried out:

1. Clean all components of the gear unit
2. Examine all gear unit components for damage
3. All damaged components must be replaced
4. Replace all roller bearings
5. Replace all seals, shaft sealing rings and Nilos rings
6. Optional: Replace the backstop
7. Optional: Replace the elastomers in the coupling
6 Disposal

Observe the current local regulations. In particular, lubricants must be collected and disposed of correctly.

<table>
<thead>
<tr>
<th>Gear unit components</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gear wheels, shafts, rolling bearings, parallel keys, locking rings, …</td>
<td>Steel</td>
</tr>
<tr>
<td>Gear unit housing, housing components, …</td>
<td>Grey cast iron</td>
</tr>
<tr>
<td>Light alloy gear unit housing, light alloy gear unit housing components, …</td>
<td>Aluminium</td>
</tr>
<tr>
<td>Worm gears, bushes, …</td>
<td>Bronze</td>
</tr>
<tr>
<td>Shaft sealing rings, sealing caps, rubber components, …</td>
<td>Elastomers with steel</td>
</tr>
<tr>
<td>Coupling components</td>
<td>Plastic and steel</td>
</tr>
<tr>
<td>Flat seals</td>
<td>Asbestos-free sealing material</td>
</tr>
<tr>
<td>Gear oil</td>
<td>Additive mineral oil</td>
</tr>
<tr>
<td>Synthetic gear oil (adhesive label: CLP PG)</td>
<td>Polyglycol-based lubricants</td>
</tr>
<tr>
<td>Synthetic gear oil (adhesive label CLP PG)</td>
<td>Poly-alpha-olefin based lubricants</td>
</tr>
<tr>
<td>Cooling spiral, embedding material of the cooling spiral, screw fittings</td>
<td>Copper, epoxy, yellow brass</td>
</tr>
</tbody>
</table>

Table 14: Disposal of materials
### 7.1 Standard positions of the oil drain, vent and oil level

The configuration and the position of the oil drain, vent and oil level should be primarily obtained from the dimension sheet for the order. If this does not contain any details, the following details can be used.

<table>
<thead>
<tr>
<th>Option</th>
<th>Installation orientation</th>
<th>5x07, 6x07</th>
<th>7x07-10x07</th>
<th>11x07-15x07</th>
<th>5x17 – 11x17</th>
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### Table 15: Position of housing options on oil screw holes (standard installation positions)

<table>
<thead>
<tr>
<th>Option</th>
<th>Installation orientation</th>
<th>5x07, 6x07</th>
<th>7x07-10x07</th>
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</tbody>
</table>

**Key:**

- **Housing**: Standard position in housing
- **Lid**: Standard position in lid
- **Oil tank**: Standard only possible in oil tank
- **---**: Special, not possible in standard
- **/OT**: If option OT, then always in the oil tank
- **(D)**: Optionally in the lid
- **(G)**: Optionally in the housing
Gear units SK 5207 – SK 10507

M1 oil screw holes
M2 oil screw holes
### Gear units SK 5207 – SK 10507

<p>| | |</p>
<table>
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M3 oil screw holes
Gear units SK 5207 – SK 10507

M4 / oil screw holes
### Gear units SK 5207 – SK 10507

<table>
<thead>
<tr>
<th></th>
<th>Diagram 1</th>
<th>Diagram 2</th>
</tr>
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<tr>
<td>1</td>
<td><a href="#">Diagram 1</a></td>
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</tr>
<tr>
<td>16</td>
<td>M5 oil screw holes</td>
<td></td>
</tr>
<tr>
<td>17</td>
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</tbody>
</table>

M5 oil screw holes
Gear units SK 5207 – SK 10507

M6 oil screw holes

Figure 32: Numbering of oil screw holes on SK 5207 – SK 10507
Gear units SK 11207 – SK 15507

M1 oil screw holes
<table>
<thead>
<tr>
<th>Gear units SK 11207 – SK 15507</th>
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</thead>
</table>

M2 oil screw holes
## Appendix

<table>
<thead>
<tr>
<th>Gear units SK 11207 – SK 15507</th>
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</table>

M3 oil screw holes
Gear units SK 11207 – SK 15507

M4 oil screw holes
### Gear units SK 11207 – SK 15507

M5 oil screw holes
Gear units SK 11207 – SK 15507

Figure 33: Numbering of oil screw holes on SK 11207 – SK 15507
### Gear units SK 5217 – SK 11217

M1 oil screw holes
Gear units SK 5217 – SK 11217

M4 oil screw holes
### Gear units SK 5217 – SK 11217

<table>
<thead>
<tr>
<th>Diagram 1</th>
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</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Diagram 1" /></td>
<td><img src="image2.png" alt="Diagram 2" /></td>
</tr>
</tbody>
</table>

**M5 oil screw holes**
Figure 34: Numbering of oil screw holes on SK 5217 – SK 11217
7.2 Installation orientation

7.2.1 Helical gear unit

Figure 35: Helical gear unit installation positions with standard mounting surface

7.2.2 Bevel helical gear unit

Figure 36: Bevel gear unit installation positions with standard mounting surface
### 7.3 Lubricants

#### 7.3.1 Roller bearing greases

This table shows comparable roller bearing greases from various manufacturers.

<table>
<thead>
<tr>
<th>Roller bearing greases</th>
<th>Ambient temperature [°C]</th>
<th>bp</th>
<th>Castrol</th>
<th>Fuchs</th>
<th>KLOBER</th>
<th>Mobil</th>
<th>Mineral oil based</th>
<th>Synthetic</th>
<th>Bio-degradable</th>
<th>Food compatible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>From to</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mineral oil based</td>
<td>-30 to 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Energrease LS 2</td>
<td>Energrease LS-EP 2</td>
<td>Energrease SY 2202</td>
<td>Biogrease EP 2</td>
</tr>
<tr>
<td></td>
<td>-50 to 40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Longtime PD 2</td>
<td>RENOLIT LZR 2 H</td>
<td>Tribol 4747</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RENOLIT GP 2</td>
<td>RENOLIT LZR 2 H</td>
<td>RENOLIT HLT 2</td>
<td>PLANTOGEL 2 S</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RENOLIT LZR 2 H</td>
<td>RENOLIT LST 2</td>
<td>RENOLIT LST 2</td>
<td>Klüberplex M 72-62</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>Klüberplex M 72-62</td>
<td>Klübersynth UH1 14-151</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MobilUX EP 2</td>
<td>-</td>
<td>Mobiltemp SHC 32</td>
<td>Mobil grease 102 EAL</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gadus S2 V100 2</td>
<td>-</td>
<td>Cassida EPS2</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Naturelle Grease EP2</td>
</tr>
</tbody>
</table>

Table 16: Roller bearing greases

The manufacturer can be changed for a given grease type. NORD must be consulted if the type of grease or the range of ambient temperatures is changed. Otherwise no guarantee can be accepted for the function of the gear unit.
7.3.2 Types of lubricant oil

**NOTICE!**

Gear unit damage

Consequences if the notice is not observed.

- Additives, third-party lubricants or corrosion inhibitors must not be added to the specified lubricant without testing or approval by Getriebebau NORD.

The following table assigns the type of gear oil stated on the name plate (please see chapter 2.2 "Name plate") to the particular approved product and the manufacturer.

If different oil types are mixed, damage to the gear unit is possible due to inadequate lubrication through oil incompatibility.

Fill the gear unit with the previously used oil type. Mixing of oils of various types or from different manufacturers is not permissible. In particular, polyglycol oils must not be mixed with mineral oils or other synthetic oils. If the oil type is changed, thoroughly flush the gear unit with the new oil type before filling.

Getriebebau NORD must be consulted in case of change of viscosity or lubricant type, as otherwise no warranty for the functionality of our gearboxes can otherwise be accepted.
<table>
<thead>
<tr>
<th>Lubricant oil</th>
<th>Viscosity [mm²/s]</th>
<th>Ambient temperature [°C]</th>
<th>Alpha SP</th>
<th>Renolin CLP</th>
<th>Klüberoil GEM 1 - N</th>
<th>Mobilgear 600 XP</th>
<th>Mobilgear XMP</th>
<th>Shell Omala F</th>
<th>Shell Omala S4 WE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLP (Mineral)</td>
<td>220</td>
<td>-10 to 40</td>
<td>Enerol GR-XP</td>
<td>Renolin CLP Plus</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>320</td>
<td>-25 to 40</td>
<td>Alpha MAX</td>
<td>Renolin CLP</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>680</td>
<td>0 to 40</td>
<td>Alpha SP</td>
<td>Renolin CLP</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CLP PG (Synthetic - polyglycol)</td>
<td>220</td>
<td>-25 to 40</td>
<td>Energol SG-XP</td>
<td>Renolin PG</td>
<td>Klüberoil GEM 1 - N</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Shell Omala S4 WE</td>
</tr>
<tr>
<td></td>
<td>320</td>
<td>-25 to 40</td>
<td>Enerogear BM</td>
<td>Renolin CLP</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>680</td>
<td>-20 to 40</td>
<td>Enerogear BM</td>
<td>Renolin CLP</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CLP HC (Synthetic - hydrocarbon)</td>
<td>220</td>
<td>-40 to 40</td>
<td>Enersyn EP-XF</td>
<td></td>
<td>Klüberoil GEM 1 - N</td>
<td>-</td>
<td>-</td>
<td>Shell Omala S4 GX</td>
<td></td>
</tr>
<tr>
<td></td>
<td>320</td>
<td>-25 to 40</td>
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<td>-</td>
</tr>
<tr>
<td></td>
<td>680</td>
<td>-10 to 40</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CLP E (Bio-degradable)</td>
<td>220</td>
<td>-5 to 40</td>
<td></td>
<td></td>
<td>Klüberoil GEM 1 - N</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>320</td>
<td>-5 to 40</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>680</td>
<td>-5 to 40</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CLP PG H1 (food compatible)</td>
<td>220</td>
<td>-25 to 40</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>320</td>
<td>-20 to 40</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>680</td>
<td>-5 to 40</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 17: Lubricant oil table
### 7.3.3 Lubricant quantities

The filling quantities listed in the tables below and the specifications on the name plate are guide values. The precise quantities vary depending on the exact gear ratio and options that may be present (e.g. OSG, OST, OT). Make sure by visual inspection (see section 4.1 "Oil level and venting") that the oil level is correct. Correct the oil level if necessary (see section 5.2.3 "Oil level").

### Information

After changing the lubricant, and in particular after the initial filling, the oil level may change during the first few hours of operation, as the oil galleries and hollow spaces only fill gradually during operation. Check and, if necessary, correct the oil level after 2 hours of operation.

#### 7.3.3.1 Helical gear units

<table>
<thead>
<tr>
<th>[L]</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>OT</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK 5207 / 5307</td>
<td>21</td>
<td>31</td>
<td>26</td>
<td>39</td>
<td>37</td>
<td>37</td>
<td>54(^1)</td>
</tr>
<tr>
<td>SK 6207 / 6307</td>
<td>26</td>
<td>37</td>
<td>32</td>
<td>45</td>
<td>42</td>
<td>42</td>
<td>63(^3)</td>
</tr>
<tr>
<td>SK 7207 / 7307</td>
<td>36</td>
<td>45</td>
<td>36</td>
<td>58</td>
<td>46</td>
<td>46</td>
<td>98(^3)</td>
</tr>
<tr>
<td>SK 8207 / 8307</td>
<td>44</td>
<td>55</td>
<td>48</td>
<td>75</td>
<td>57</td>
<td>57</td>
<td>106(^3)</td>
</tr>
<tr>
<td>SK 9207 / 9307</td>
<td>57</td>
<td>71</td>
<td>73</td>
<td>76</td>
<td>74</td>
<td>74</td>
<td>150(^3)</td>
</tr>
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<td>SK 10207 / 10307</td>
<td>72</td>
<td>89</td>
<td>90</td>
<td>96</td>
<td>92</td>
<td>92</td>
<td>180(^3)</td>
</tr>
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<td>105</td>
<td>130</td>
<td>50(^2)</td>
<td>105</td>
<td>140</td>
<td>40(^2)</td>
<td>135(^1)</td>
</tr>
<tr>
<td>SK 12207 / 12307</td>
<td>116</td>
<td>165</td>
<td>83(^2)</td>
<td>149</td>
<td>203</td>
<td>65(^2)</td>
<td>199(^1)</td>
</tr>
<tr>
<td>SK 13207 / 13307</td>
<td>154</td>
<td>256</td>
<td>107(^2)</td>
<td>201</td>
<td>290</td>
<td>73(^2)</td>
<td>268(^1)</td>
</tr>
<tr>
<td>SK 14207 / 14307</td>
<td>225</td>
<td>374</td>
<td>156(^2)</td>
<td>291</td>
<td>424</td>
<td>107(^2)</td>
<td>392(^1)</td>
</tr>
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<td>SK 15207 / 15307</td>
<td>358</td>
<td>415</td>
<td>160(^2)</td>
<td>314</td>
<td>450</td>
<td>125(^2)</td>
<td>405(^1)</td>
</tr>
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</table>

Table 18: Lubricant quantities for helical gear units
7.3.3.2 Helical bevel gear units

<table>
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<tr>
<th>[L]</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>OT</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK 5407 / 5507</td>
<td>24</td>
<td>34</td>
<td>26</td>
<td>42</td>
<td>40</td>
<td>40</td>
<td>53</td>
</tr>
<tr>
<td>SK 6407 / 6507</td>
<td>29</td>
<td>40</td>
<td>32</td>
<td>48</td>
<td>44</td>
<td>44</td>
<td>66</td>
</tr>
<tr>
<td>SK 7407 / 7507</td>
<td>40</td>
<td>47</td>
<td>38</td>
<td>50</td>
<td>49</td>
<td>50</td>
<td>90</td>
</tr>
<tr>
<td>SK 8407 / 8507</td>
<td>42</td>
<td>58</td>
<td>47</td>
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<td>62</td>
<td>106</td>
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<td>141</td>
</tr>
<tr>
<td>SK 10407 / 10507</td>
<td>88</td>
<td>103</td>
<td>77</td>
<td>101</td>
<td>97</td>
<td>101</td>
<td>161</td>
</tr>
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<td>SK 11407 /11507</td>
<td>117</td>
<td>137</td>
<td>57</td>
<td>102</td>
<td>147</td>
<td>40</td>
<td>197</td>
</tr>
<tr>
<td>SK 12407 / 12507</td>
<td>159</td>
<td>195</td>
<td>93</td>
<td>149</td>
<td>213</td>
<td>65</td>
<td>290</td>
</tr>
<tr>
<td>SK 13407 /13507</td>
<td>159</td>
<td>270</td>
<td>121</td>
<td>198</td>
<td>304</td>
<td>73</td>
<td>377</td>
</tr>
<tr>
<td>SK 14407 /14507</td>
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<td>395</td>
<td>177</td>
<td>281</td>
<td>444</td>
<td>107</td>
<td>526</td>
</tr>
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<td>241</td>
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<td>188</td>
<td>320</td>
<td>474</td>
<td>125</td>
<td>550</td>
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</table>

Table 19: Lubricant quantities for bevel helical gear units

7.3.3.3 MAXXDRIVE® XT industrial helical bevel gear unit

<table>
<thead>
<tr>
<th>[L]</th>
<th>M1/M3</th>
</tr>
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<tbody>
<tr>
<td>SK 5217</td>
<td>25</td>
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<td>SK 6217</td>
<td>31</td>
</tr>
<tr>
<td>SK 7217</td>
<td>43</td>
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<td>SK 8217</td>
<td>53</td>
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</tr>
<tr>
<td>SK 10217</td>
<td>100</td>
</tr>
<tr>
<td>SK 11217</td>
<td>126</td>
</tr>
</tbody>
</table>

Table 20: Lubricant quantities MAXXDRIVE® XT bevel gear unit
7.4 Screw tightening torques

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Screw fastenings in strength classes</th>
<th>Screw fastenings on protective covers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.8</td>
<td>10.9</td>
</tr>
<tr>
<td>M4</td>
<td>3.2</td>
<td>5</td>
</tr>
<tr>
<td>M5</td>
<td>6.4</td>
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<td>16</td>
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<td>27</td>
<td>39</td>
</tr>
<tr>
<td>M10</td>
<td>53</td>
<td>78</td>
</tr>
<tr>
<td>M12</td>
<td>92</td>
<td>135</td>
</tr>
<tr>
<td>M16</td>
<td>230</td>
<td>335</td>
</tr>
<tr>
<td>M20</td>
<td>460</td>
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<td>M24</td>
<td>790</td>
<td>1150</td>
</tr>
<tr>
<td>M30</td>
<td>1600</td>
<td>2250</td>
</tr>
<tr>
<td>M36</td>
<td>2780</td>
<td>3910</td>
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<td>M42</td>
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<tr>
<td>M48</td>
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<td>8640</td>
</tr>
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<td>M56</td>
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<td>G1</td>
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</tr>
<tr>
<td>G1¼</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>G1½</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 21: Screw tightening torques

7.5 Tolerances for bolting surfaces

For mounting on the motor swing base or motor base frame (option MF or MS), a maximum permissible distortion of 0.1 mm at a distance of 1 m must not be exceeded.
7.6 Troubleshooting

**NOTICE!**

*Gear unit damage*

- Shut down the gear unit immediately in case of malfunction.

**WARNING**

*Danger of slipping in case of leaks*

- Clean the soiled floor before starting troubleshooting.

<table>
<thead>
<tr>
<th>Gear unit malfunctions</th>
<th>Fault</th>
<th>Possible cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unusual running noises, vibrations</strong></td>
<td>Oil level too low</td>
<td>Correct oil level, Consult NORD Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bearing damage</td>
<td>Consult NORD Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gear wheel damage</td>
<td>Consult NORD Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>System defective</td>
<td>Check and correct the alignment of drive components, check operating values of the system</td>
<td></td>
</tr>
<tr>
<td><strong>Oil leaks from the gear unit</strong></td>
<td>Defective seal</td>
<td>Consult NORD Service</td>
<td></td>
</tr>
<tr>
<td><strong>Oil escaping from pressure vent</strong></td>
<td>Oil level too high</td>
<td>Correct oil level</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unfavourable operating conditions</td>
<td>Consult NORD Service</td>
<td></td>
</tr>
<tr>
<td><strong>Gear unit becomes too hot</strong></td>
<td>Incorrect oil in the gear unit</td>
<td>Change oil, Thoroughly flush the gear unit inside with fresh oil before filling new oil, Consult NORD Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incorrect oil level</td>
<td>Correct oil level</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dirty oil</td>
<td>Replace oil and filter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cooling system dirty</td>
<td>Clean cooling system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gear unit dirty</td>
<td>Clean gear unit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cooling defective</td>
<td>Consult NORD Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gear unit overloaded</td>
<td>Consult NORD Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impermissible axial or radial forces</td>
<td>Consult NORD Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unfavourable installation situation</td>
<td>Consult NORD Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gear unit damage</td>
<td>Consult NORD Service</td>
<td></td>
</tr>
</tbody>
</table>
### Gear unit malfunctions

<table>
<thead>
<tr>
<th>Fault</th>
<th>Possible cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shock when switching on</td>
<td>Motor coupling defective</td>
<td>Replace coupling</td>
</tr>
<tr>
<td></td>
<td>Motor coupling worn</td>
<td>Replace elastomer ring</td>
</tr>
<tr>
<td></td>
<td>Gear unit fastening loose</td>
<td>Check gear unit and motor fastening</td>
</tr>
<tr>
<td></td>
<td>Rubber element worn</td>
<td>Replace rubber element</td>
</tr>
<tr>
<td>Output shaft does not rotate although motor is running</td>
<td>Motor coupling defective</td>
<td>Replace coupling</td>
</tr>
<tr>
<td></td>
<td>Shrink disc slip</td>
<td>Check shrink disc</td>
</tr>
<tr>
<td></td>
<td>Breakage in gear unit</td>
<td>Consult NORD Service</td>
</tr>
<tr>
<td>Cooling system failure</td>
<td>Cooling system defective</td>
<td>Observe the separate operating manual</td>
</tr>
<tr>
<td>Pressure at the pressure safeguard is too low</td>
<td>Pump does not deliver oil</td>
<td>Check pump and replace as necessary</td>
</tr>
<tr>
<td></td>
<td>Leakage</td>
<td>Check piping and replace as necessary</td>
</tr>
</tbody>
</table>

Table 22: Overview of malfunctions
7.7 Leakage and leak-tightness

Gear units are filled with oil or grease to lubricate the moving parts. Seals prevent the escape of lubricants. A complete seal is technically not possible, as a certain film of moisture, for example on the radial shaft sealing rings is normal and advantageous for a long-term seal. In the region of vents, moisture due to oil may be visible due to the escape of oil mist because of the function. In the case of grease-lubricated labyrinth seals, e.g. Taconite sealing systems, used grease emerges from the sealing gap due to the principle of operation. This apparent leak is not a fault.

According to the test conditions as per DIN 3761, the leak is determined by the medium which is to be sealed, which in test bench tests exceeds the function-related moisture in a defined test period and which results in dripping of the medium which is to be sealed. The measured quantity which is then collected is designated as leakage.

<table>
<thead>
<tr>
<th>Term</th>
<th>Explanation</th>
<th>Radial shaft seal</th>
<th>In IEC adapter</th>
<th>Housing joint</th>
<th>Venting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealed</td>
<td>No moisture apparent</td>
<td>No reason for complaint</td>
<td>No reason for complaint</td>
<td>No reason for complaint</td>
<td>No reason for complaint</td>
</tr>
<tr>
<td>Damp</td>
<td>Moisture film locally restricted (not an area)</td>
<td>No reason for complaint</td>
<td>No reason for complaint</td>
<td>No reason for complaint</td>
<td>No reason for complaint</td>
</tr>
<tr>
<td>Wet</td>
<td>Moisture film beyond the extent of the component</td>
<td>No reason for complaint</td>
<td>No reason for complaint</td>
<td>Repair if necessary</td>
<td>No reason for complaint</td>
</tr>
<tr>
<td>Measurable leakage</td>
<td>Recognisable stream, dripping</td>
<td>Repair recommended</td>
<td>Repair recommended</td>
<td>Repair recommended</td>
<td>Repair recommended</td>
</tr>
<tr>
<td>Temporary leakage</td>
<td>Temporary malfunction of the sealing system or oil leak due to transport *)</td>
<td>No reason for complaint</td>
<td>No reason for complaint</td>
<td>Repair if necessary</td>
<td>No reason for complaint</td>
</tr>
<tr>
<td>Apparent leakage</td>
<td>Apparent leakage, e.g. due to soiling, sealing systems which can be re-lubricated</td>
<td>No reason for complaint</td>
<td>No reason for complaint</td>
<td>No reason for complaint</td>
<td>No reason for complaint</td>
</tr>
</tbody>
</table>

Table 23: Definition of leaks according to DIN 3761

*) Previous experience has shown that moist or wet radial shaft sealing rings stop leaking later. Therefore, under no circumstances can replacement be recommended at this stage. The reason for momentary moisture may be e.g. small particles under the sealing lip.

7.8 Noise emissions

The *measuring surface sound level* to be expected for the gear units according to ISO 8579-1 is below the 50% line stated in the standard.
7.9 Repair information

For enquiries to our technical and mechanical service departments, please have the precise gear unit type (type plate) and if necessary the order number (type plate) to hand.

7.9.1 Repairs

The device must be sent to the following address if it needs repairing:

Getriebebau NORD GmbH & Co. KG
Service Department
Getriebebau-Nord-Straße 1
22941 Bargteheide

No guarantee can be given for any attachments, such as encoders or external fans, if a gear unit or geared motor is sent for repair.

Please remove all non-original parts from the gear unit or geared motor.

Information

If possible, the reason for returning the component/device should be stated. If necessary, at least one contact for queries should be stated.

This is important in order to keep repair times as short and efficient as possible.

7.9.2 Internet information

In addition, the country-specific operating and installation instructions in the available languages can be found on our Internet site: www.nord.com

7.10 Warranty

NORD GmbH & Co. KG accepts no liability for damage to persons, materials or assets as a result of failure to observe this operating manual, operating errors or incorrect use. General wearing parts, e.g. radial seals are excluded from the warranty.

7.11 Abbreviations

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D</td>
<td>Dust explosion protected gear units, Zone 21</td>
</tr>
<tr>
<td>2G</td>
<td>Gas explosion protected gear units, Zone 1</td>
</tr>
<tr>
<td>3D</td>
<td>Dust explosion protected gear units, Zone 2</td>
</tr>
<tr>
<td>ATEX</td>
<td>ATEX Atmosphères Explosible</td>
</tr>
<tr>
<td>B5</td>
<td>Flange fastening with through holes</td>
</tr>
<tr>
<td>B14</td>
<td>Flange fastening with threaded holes</td>
</tr>
<tr>
<td>CW</td>
<td>Clockwise, right rotation</td>
</tr>
<tr>
<td>CCW</td>
<td>Counter-clockwise, left rotation</td>
</tr>
<tr>
<td>&quot;dh&quot;</td>
<td>Water hardness in German hardness degrees 1</td>
</tr>
<tr>
<td>dh1</td>
<td>Water hardness in German hardness degrees 1</td>
</tr>
<tr>
<td>DIN</td>
<td>Deutsches Institut für Normung [German Standards Institute]</td>
</tr>
<tr>
<td>EC</td>
<td>European Community</td>
</tr>
<tr>
<td>EN</td>
<td>European standard</td>
</tr>
<tr>
<td>FA</td>
<td>Axial force</td>
</tr>
<tr>
<td>IE1</td>
<td>Standard efficiency motors</td>
</tr>
<tr>
<td>IE2</td>
<td>High efficiency motors</td>
</tr>
<tr>
<td>IEC</td>
<td>International Electrotechnical Commission</td>
</tr>
<tr>
<td>NEMA</td>
<td>National Electrical Manufacturers Association</td>
</tr>
<tr>
<td>IP55</td>
<td>International Protection</td>
</tr>
<tr>
<td>ISO</td>
<td>International standardisation organisation</td>
</tr>
<tr>
<td>pH</td>
<td>pH value</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>DIR</td>
<td>Directive</td>
</tr>
<tr>
<td>VCI</td>
<td>Volatile Corrosion Inhibitor</td>
</tr>
<tr>
<td>WN</td>
<td>Document from Getriebebau NORD</td>
</tr>
</tbody>
</table>
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