Explosion-protected gear units

Operating and Assembly Instructions
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 2000
Material No.: 6051402
Series: Gear units and geared motors
Type series:
Gear unit types: Helical gear units
NORDBLOC helical gear units
Standard helical gear units
Parallel shaft gear units
Bevel gear units
Helical worm gear units
MINIBLOC worm gear units
UNIVERSAL worm gear units

Version list

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<th>Title, Date</th>
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<td>6051402 / 0413</td>
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<td>6051402 / 3814</td>
<td>• General corrections</td>
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<td>• General corrections • Adaptation of new ATEX Directives as of 20/04/2016</td>
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Table 1: Version list B 2000
Copyright notice

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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. The plant or machinery must comply with the local laws and regulations and all applicable health and safety requirements must be fulfilled. 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 are suitable for use in explosion hazard areas according to the category stated on the type plate. They satisfy the explosion protection requirements of Directive 2014/34/EU and TR CU 012/2011 for the category indicated on the type plate. The gear units may only be operated with components which are intended for use in explosion hazard areas. No mixture of atmospheres with gases, vapours and aerosols (CE: Zone 1 or 2, labelling G; EAC: Category IIG) and dusts (CE: Zone 21 or 22, labelling D; EAC: Category IIID) may be present during operation. The approval of the gear unit is void in case of a hybrid mixture.

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 foundation or the gear unit fastening 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 Safety information for explosion protection

The gear units are suitable for use in explosion hazard areas. The following information must be observed in order to ensure adequate explosion protection.

- Explosion protection only extends to areas which correspond to the device category and the type of explosive atmosphere according to the labelling on the type plate. The type of gear unit and all technical data must comply with the planning details for the plant or machinery. If there are several operating points, the maximum drive power, torque or speed must not be exceeded in any operating point. The gear unit may only be operated in the installation position which complies with the version. Carefully check all details on the type plate before installing the gear unit.
- Drive elements such as couplings, pulleys etc., as well as drive motors must also be suitable for use in the zone with an explosive atmosphere. For use with gear units with device category 2D the motor must have at least protection class IP6x.
- All work, e.g. transportation, storage, installation, electrical connection, commissioning, servicing and maintenance must be performed in a non-explosive atmosphere.
- Gear units must be properly designed. Overloads may result in breakage of components. This may cause sparks. Carefully fill in the enquiry form. Getriebebau NORD GmbH & Co KG designs gear units according to the details in the enquiry form. Please note the information for gear unit selection in the enquiry form and in the catalogue.
- If the gear unit is equipped with a back stop, note the minimum speed for releasing the back stop as well as the maximum speed. Speeds which are too low cause increased wear and temperature increases. Excess speeds will damage the back stop.
• If the gear unit is exposed to direct sunlight or comparable radiation, the ambient temperature or the temperature of the cooling air must always be at least 10 K below the maximum permissible ambient temperature range "Tu" as stated on the type plate.

• Incorrect installation results in stresses and impermissibly high loads. This causes increased surface temperatures. Note the installation and assembly instructions in these operating and installation instructions.

• Even small changes to the installation conditions can have a significant effect on the temperature of the gear unit. Gear units with temperature class T4 or with a maximum surface temperature of 135 °C or less must be provided with a temperature label. The dot in the middle of the temperature label turns black if the surface temperature is too high. Take the gear unit out of service immediately if the dot has turned black.

• Before commissioning, carry out all of the checks which are prescribed in these operating and maintenance instructions in order to detect faults which could increase the risk of explosion in good time. Do not commission the gear unit if abnormalities are found during the checks. Contact Getriebebau NORD.

• For gear units with temperature class T4 or with a maximum surface temperature of less than 200 °C, carry out a measurement of the surface temperature of the gear unit before commissioning. Take the gear unit out of service if the measured surface temperature is too high.

• The gear unit housing must be earthed in order to prevent electrostatic charging.

• Defective lubrication causes temperature increases and sparks. Check the oil level before commissioning. Check the oil level at regular intervals according to the details in these operating and installation instructions.

• Oil mist may ignite inside the gear unit if unsuitable oils are used. The function of the back stop may be impaired, resulting in increased temperatures and sparks. Therefore only use oils which correspond with the details on the type plate. Recommended lubricants can be found in the appendix to these operating and installation instructions.

• Getriebebau NORD GmbH & Co KG can calculate the required cooling power if lubricant cooling is necessary. Gear units with a cooling coil must not be commissioned without lubricant cooling. The function of the lubricant cooling must be monitored with a resistance thermometer. The drive must be shut down if the permissible temperature is exceeded. Check for leaks at regular intervals.

• Perform all of the inspections specified in these operating and installation instructions with great care in order not to increase the risk of explosion due to functional faults and damage. The drive must be shut down if any abnormalities are detected. Contact Getriebebau NORD.

• Dust and dirt deposits cause temperature increases. Dust may also be deposited inside covers which are not dust-proof. Remove deposits at regular intervals according to the details in these operating and installation instructions.

• Non-conducting coatings, low pressure hoses or oil expansion tanks may become electrostatically charged. Sparks may be produced on discharge. Gear units with a coating thickness in excess of 0.2 mm may only be used in areas in which processes that cause charging are not to be expected. Oil expansion tanks may only be located in areas with maximum gas group IIB. Only clean surfaces with a cloth which is moistened with water. Gear units must not be painted.

• Observe the special documentation stated in field "S" of the type plate as well as instructions for equipment such couplings.
1.3 ATEX ignition hazards according to DIN EN ISO 80079-36

The following ignition protection types are used:

- **Measures to ensure constructional safety "c"**
  - Strength and thermal calculations for all applications,
  - Selection of suitable materials and components,
  - Calculation of a recommended interval for general overhaul,
  - Inspection interval for lubricant level, therefore ensuring lubrication of bearings, seals and gears,
  - Requirement for thermal check during commissioning.

- **Measures to ensure encapsulation with liquid "k"**
  - The gears are lubricated with a suitable lubricant,
  - Statement of approved lubricants on the type plate,
  - Statement of lubricant fill levels.

- **Measures to ensure monitoring of sources of ignition "b"**
  - Use of temperature monitoring as ignition protection system b1.

1.4 Do not make any modifications.

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

1.5 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.

1.6 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.
1.7 Safety for particular activities

1.7.1 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.

1.7.2 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.

1.8 Hazards

1.8.1 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. Pay attention to adequate space for avoiding swinging loads.
- Never stand under suspended loads.
- Select lifting gear and transport equipment according to the weight of the gear unit. The weight of the gear unit can be obtained from the type plate.
- Only lift the gear units by the eyebolts which are provided. The eyebolts must be fully screwed in. Only pull on the eyebolts vertically, never cross-wise or at an angle. Only use the eyebolts to lift the gear unit without other components. The eyebolts are not designed for lifting the gear unit with attachments. Use the eyebolts on both the gear unit and the motor to lift a geared motor.

1.8.2 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.

1.8.3 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.
1.8.4 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.

1.8.5 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.

1.8.6 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.
1.9 Explanation of markings

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<thead>
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<th>Symbol</th>
<th>Description</th>
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<td>Indicates an immediate danger, which may result in death or very serious injury if it is not avoided.</td>
</tr>
<tr>
<td><img src="image" alt="DANGER" /></td>
<td>Indicates an immediate danger, which may result in death or very serious injury if it is not avoided. Contains important information regarding explosion protection.</td>
</tr>
<tr>
<td><img src="image" alt="WARNING" /></td>
<td>Indicates a dangerous situation, which may result in death or serious injury if it is not avoided.</td>
</tr>
<tr>
<td><img src="image" alt="CAUTION" /></td>
<td>Indicates a dangerous situation, which may result in minor injuries if it is not avoided.</td>
</tr>
<tr>
<td><img src="image" alt="NOTICE!" /></td>
<td>Indicates a situation, which may result in damage to the product or its environment if it is not avoided.</td>
</tr>
<tr>
<td><img src="image" alt="Information" /></td>
<td>Indicates hints for use and especially important information to ensure reliability of operation.</td>
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2 Description of gear units

2.1 Type designation and type of gear unit

### Gear unit types / Type designations

#### Helical gear units

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<td>SK 03, SK 13, SK 23, SK 33N, SK 43, SK 53</td>
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#### Versions / Options

- **Foot-mounted version**
- **Output flange B5**
- **Base and output flange B14**
- **Base and output flange B5**
- **Reinforced bearings**
- **Solid shaft, reinforced axial bearings**
- **IEC Standard IEC motor mounting**
- **NEMA Standard NEMA motor attachment**
- **W Free input shaft**
- **Viton radial seals**
- **Oil expansion tank**
- **Synthetic oil ISO VG 220**

| Table 2: Helical gear units - Type designation and gear unit types |

#### Gear unit types / Type designations

#### Helical gear units

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<td>SK 62, SK 72, SK 82, SK 92, SK 102</td>
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<tr>
<td>SK 63, SK 73, SK 83, SK 93, SK 103</td>
<td>3-stage</td>
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#### Versions / Options

- **Foot-mounted version**
- **Output flange B5**
- **Base and output flange B14**
- **Base and output flange B5**
- **Reinforced bearings**
- **IEC Standard IEC motor mounting**
- **NEMA Standard NEMA motor attachment**
- **W Free input shaft**
- **Viton radial seals**
- **Oil expansion tank**
- **Synthetic oil ISO VG 220**

| Table 3: Large helical gear units - Type designation and gear unit types |
## 2 Description of gear units

### Gear unit types / Type designations

#### NORDBLOC helical gear units

<table>
<thead>
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<th>Type</th>
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<td>SK 320</td>
<td>SK 172, SK 272</td>
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<td>SK 273</td>
<td>SK 373</td>
<td>SK 973 (3-stage)</td>
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<td>SK 071.1</td>
<td>SK 171.1, SK 371.1, SK 571.1</td>
<td>SK 771.1 (single stage)</td>
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<tr>
<td>SK 072.1</td>
<td>SK 172.1</td>
<td>SK 872.1, SK 972.1 (2-stage)</td>
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<td>SK 373.1</td>
<td>SK 373.1</td>
<td>SK 773.1, SK 873.1, SK 973.1 (3-stage)</td>
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#### Versions / Options

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<tr>
<td>W</td>
<td>Free input shaft</td>
</tr>
<tr>
<td>VI</td>
<td>Viton radial seals</td>
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<tr>
<td>OA</td>
<td>Oil expansion tank</td>
</tr>
<tr>
<td>SO1</td>
<td>Synthetic oil ISO VG 220</td>
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Table 4: NORDBLOC helical gear units - Type designation and gear unit types

### Gear unit types / Type designations

#### Standard helical gear units

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<td>SK 0, SK 01</td>
<td>SK 20, SK 25, SK 30, SK 33</td>
<td>2-stage</td>
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<td>SK 000, SK 010</td>
<td>SK 200, SK 250, SK 300, SK 330</td>
<td>3-stage</td>
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</table>

#### Versions / Options

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<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>AL</td>
<td>Solid shaft, reinforced axial bearings</td>
</tr>
<tr>
<td>IEC</td>
<td>Standard IEC motor mounting</td>
</tr>
<tr>
<td>NEMA</td>
<td>Standard NEMA motor attachment</td>
</tr>
<tr>
<td>W</td>
<td>Free input shaft</td>
</tr>
<tr>
<td>VI</td>
<td>Viton radial seals</td>
</tr>
<tr>
<td>SO1</td>
<td>Synthetic oil ISO VG 220</td>
</tr>
</tbody>
</table>

Table 5: NORDBLOC helical gear units - Type designation and gear unit types
### Gear unit types / Type designations

**Parallel shaft gear units**

SK 0182NB, SK 0182.1, SK 0282NB, SK 0282.1, SK 1282, SK 1282.1, ..., SK 9282, SK 10282, SK 11282 (2-stage)

SK 0182.1, SK 0282.1, SK 1382NB, SK 1382.1, SK 2382, ..., SK 9382, SK 10382, SK 11382, SK 12382, SK 10382.1, SK 11382.1 (3-stage)

---

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK</td>
<td>Parallel shaft gear units</td>
</tr>
<tr>
<td>A</td>
<td>Hollow shaft version</td>
</tr>
<tr>
<td>V</td>
<td>Solid shaft version</td>
</tr>
<tr>
<td>Z</td>
<td>Output flange B14</td>
</tr>
<tr>
<td>F</td>
<td>Output flange B5</td>
</tr>
<tr>
<td>X</td>
<td>Foot mounting</td>
</tr>
<tr>
<td>S</td>
<td>Shrink disc</td>
</tr>
<tr>
<td>VS</td>
<td>Reinforced shrink disc</td>
</tr>
<tr>
<td>EA</td>
<td>Hollow shaft with internal spline</td>
</tr>
<tr>
<td>G</td>
<td>Rubber buffer</td>
</tr>
<tr>
<td>VG</td>
<td>Reinforced rubber buffer</td>
</tr>
<tr>
<td>B</td>
<td>Fastening element</td>
</tr>
<tr>
<td>H</td>
<td>Covering cap as contact guard</td>
</tr>
<tr>
<td>H66</td>
<td>Covering cap IP66</td>
</tr>
<tr>
<td>VL</td>
<td>Reinforced bearings</td>
</tr>
<tr>
<td>VLI</td>
<td>Agitator version</td>
</tr>
<tr>
<td>VLII</td>
<td>Drywell agitator version</td>
</tr>
<tr>
<td>VLL</td>
<td>Screw Conveyor Flange</td>
</tr>
<tr>
<td>IEC</td>
<td>Standard IEC motor mounting</td>
</tr>
<tr>
<td>NEMA</td>
<td>Standard NEMA motor attachment</td>
</tr>
<tr>
<td>W</td>
<td>Free input shaft</td>
</tr>
<tr>
<td>VI</td>
<td>Viton radial seals</td>
</tr>
<tr>
<td>OA</td>
<td>Oil expansion tank</td>
</tr>
<tr>
<td>SO1</td>
<td>Synthetic oil ISO VG 220</td>
</tr>
<tr>
<td>CC</td>
<td>Casing cover with cooling spiral</td>
</tr>
<tr>
<td>OT</td>
<td>Oil level tank</td>
</tr>
</tbody>
</table>

*Table 6: Parallel shaft gear units - Type designation and gear unit types*

Double gear units consist of two single gear units. They are to be treated as per the instructions in this Manual, i.e. as two individual gear units.

Type designation for double gear units: e.g. SK 73 /22 (consisting of single gear units SK 73 and SK 22).
## Description of gear units

<table>
<thead>
<tr>
<th>Gear unit types / Type designations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bevel gear units</strong></td>
</tr>
<tr>
<td>SK 92072, SK 92172, SK 92372, SK 92672, SK 92772, SK 920072.1, SK 92072.1, SK 92172.1, SK 92372.1, SK 92672.1, SK 92772.1, SK 930072.1, SK 93072.1, SK 93172.1, SK 93372.1, SK 93672.1, SK 93772.1 (2-stage) SK 9012.1, SK 9016.1, SK 9022.1, SK 9032.1, SK 9042.1, SK 9052.1, SK 9062.1, SK 9072.1, SK 9082.1, SK 9086.1, SK 9092.1, SK 9096.1 (3-stage) SK 9013.1, SK 9017.1, SK 9023.1, SK 9033.1, SK 9043.1, SK 9053.1 (4-stage)</td>
</tr>
</tbody>
</table>

| Foot-mounted version | Covering cap as contact guard |
| Hollow shaft version | Covering cap IP66 |
| Solid shaft version | Reinforced bearings |
| Solid shaft both sides | Agitator version |
| Output flange B14 | Drywell agitator version |
| Output flange B5 | Screw Conveyor Flange |
| Foot mounting | Standard IEC motor mounting |
| Torque arm | Standard NEMA motor attachment |
| Torque bracket | Free input shaft |
| Shrink disc | Viton radial seals |
| Reinforced shrink disc | Oil expansion tank |
| Hollow shaft with internal spline | Synthetic oil ISO VG 220 |
| Back stop | Casing cover with cooling spiral |

Table 7: Bevel gear units - Type designation and gear unit types
## Gear unit types / Type designations

### Helical worm gear units

<table>
<thead>
<tr>
<th>Gear unit types / Type designations</th>
<th>SK 02040, SK 02040.1, SK 02050, SK 12063, SK 12080, SK 32100, SK 42125 (2-stage)</th>
<th>SK 13050, SK 13063, SK 13080, SK 33100, SK 43125 (3-stage)</th>
</tr>
</thead>
</table>

### Versions / Options

<table>
<thead>
<tr>
<th>A</th>
<th>Foot mounting with solid shaft</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Hollow shaft version</td>
</tr>
<tr>
<td>V</td>
<td>Solid shaft version</td>
</tr>
<tr>
<td>L</td>
<td>Solid shaft both sides</td>
</tr>
<tr>
<td>X</td>
<td>Foot mounting</td>
</tr>
<tr>
<td>Z</td>
<td>Output flange B14</td>
</tr>
<tr>
<td>F</td>
<td>Output flange B5</td>
</tr>
<tr>
<td>D</td>
<td>Torque support</td>
</tr>
<tr>
<td>S</td>
<td>Shrink disc</td>
</tr>
</tbody>
</table>

B Fastening element  
H Covering cap as contact guard  
H66 Covering cap IP66  
VL Reinforced bearings  
IEC Standard IEC motor mounting  
NEMA Standard NEMA motor attachment  
W With free drive shaft  
VI Viton radial seals  
OA Oil expansion tank

Table 8: Helical worm gear units - Type designation and gear unit types

### MINIBLOC worm gear units

<table>
<thead>
<tr>
<th>Gear unit types / Type designations</th>
<th>SK 1S 32, SK 1S 40, SK 1S 50, SK 1S 63, SK 1S...</th>
<th>SK 1SM 31, SK 1SM 40, SK 1SM 50, SK 1SM 63, (single stage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK 2S32NB, SK 2S40NB, SK 2S50NB, SK 2S63NB, SK 2SU..., SK 2SM40, SK 2SM50, SK 2SM63 (2-stage)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Versions / Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Foot mounting with solid shaft</td>
</tr>
<tr>
<td>A Hollow shaft version</td>
</tr>
<tr>
<td>V Solid shaft version</td>
</tr>
<tr>
<td>L Solid shaft both sides</td>
</tr>
<tr>
<td>Z Output flange B14</td>
</tr>
<tr>
<td>F Output flange B5</td>
</tr>
<tr>
<td>D Torque support</td>
</tr>
<tr>
<td>X Foot mounting</td>
</tr>
</tbody>
</table>

B Fastening element  
IEC Standard IEC motor mounting  
NEMA Standard NEMA motor attachment  
W With free drive shaft  
VI Viton radial seals

Table 9: MINIBLOC - Type designation and gear unit types
## Gear unit types / Type designations

### UNIVERSAL worm gear units

<table>
<thead>
<tr>
<th>Type Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK 1SI31, SK 1SI40, SK 1SI50, SK 1SI63, SK 1SI75</td>
<td>Modular contrate pre-stage</td>
</tr>
<tr>
<td>SK 1SID31, SK 1SID40, SK 1SID50, SK 1SID63, SK 1SID75</td>
<td>Worm pre-stage</td>
</tr>
<tr>
<td>SK 1SIS-D31, SK 1SIS-D63</td>
<td>Worm pre-stage</td>
</tr>
<tr>
<td>SK 1SMI31, SK 1SMI40, SK 1SMI50, SK 1SMI63, SK 1SMI75</td>
<td>Standard IEC motor mounting</td>
</tr>
<tr>
<td>SK 1SMID31, SK 1SMID40, SK 1SMID50, SK 1SMID63 (1-stage)</td>
<td>Standard NEMA motor attachment</td>
</tr>
<tr>
<td>SK 2SD40, SK 2SD50, SK 2SD63, SK 1SI.../31, SK 1SI.../H10, SK 2SID40, SK 2SID63, SK 2SID-D40, SK 2SID-D63</td>
<td>With free drive shaft</td>
</tr>
<tr>
<td>SK 2SMI40, SK 2SMI50, SK 2SMI63</td>
<td>Viton radial seals</td>
</tr>
<tr>
<td>SK 2SMID40, SK 2SMID50, SK 2SMID 63 (2-stage)</td>
<td>B14, B5, B50</td>
</tr>
</tbody>
</table>

### Versions / Options

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>Solid shaft or plug-in shaft</td>
</tr>
<tr>
<td>A</td>
<td>Hollow shaft version</td>
</tr>
<tr>
<td>L</td>
<td>Solid shaft both sides</td>
</tr>
<tr>
<td>X</td>
<td>Feet on three sides</td>
</tr>
<tr>
<td>Z</td>
<td>Output flange B14</td>
</tr>
<tr>
<td>F</td>
<td>Output flange B5</td>
</tr>
<tr>
<td>D</td>
<td>Torque support</td>
</tr>
<tr>
<td>H</td>
<td>Covering cap</td>
</tr>
<tr>
<td>H10</td>
<td>Modular contrate pre-stage</td>
</tr>
<tr>
<td>/31</td>
<td>Worm pre-stage</td>
</tr>
<tr>
<td>/40</td>
<td>Worm pre-stage</td>
</tr>
<tr>
<td>IEC</td>
<td>Standard IEC motor mounting</td>
</tr>
<tr>
<td>NEMA</td>
<td>Standard NEMA motor attachment</td>
</tr>
<tr>
<td>W</td>
<td>With free drive shaft</td>
</tr>
<tr>
<td>VI</td>
<td>Viton radial seals</td>
</tr>
</tbody>
</table>

*Table 10: UNIVERSAL worm gear units - Type designation and gear unit types*
### 2.2 Type plate

The type plate must be permanently attached to the gear unit and must not be exposed to permanent dirtying. Please contact the NORD service department if the type plate is illegible or damaged.

![Type plate example](image)

#### Explanation of the type plate

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Unit</th>
<th>Designation</th>
<th>See Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>-</td>
<td>NORD gear unit type</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>-</td>
<td>Serial number</td>
<td></td>
</tr>
<tr>
<td>( i_{\text{tot}} )</td>
<td>rpm</td>
<td>Total gear unit ratio</td>
<td></td>
</tr>
<tr>
<td>( n_2 )</td>
<td>rpm</td>
<td>Rated speed of gear unit output shaft*</td>
<td></td>
</tr>
<tr>
<td>( n_1 )</td>
<td>rpm</td>
<td>Rated speed of the gear unit drive shaft or drive motor*</td>
<td></td>
</tr>
<tr>
<td>IM</td>
<td>-</td>
<td>Version (installation orientation)</td>
<td>7.1</td>
</tr>
<tr>
<td>( M_2 )</td>
<td>Nm</td>
<td>Max. permissible torque at the gear unit output shaft</td>
<td></td>
</tr>
<tr>
<td>( P_1 )</td>
<td>kW</td>
<td>Max. permissible drive power or motor power</td>
<td></td>
</tr>
<tr>
<td>Bj</td>
<td>-</td>
<td>Year of manufacture</td>
<td></td>
</tr>
<tr>
<td>( F_{R2} )</td>
<td>kN</td>
<td>Max. permissible transverse force on the gear unit output shaft</td>
<td>3.8</td>
</tr>
<tr>
<td>( F_{R1} )</td>
<td>kN</td>
<td>Max. permissible transverse force on the gear unit drive shaft for option ( W )</td>
<td>3.8</td>
</tr>
<tr>
<td>( T_u )</td>
<td>°C</td>
<td>Permissible ambient temperature range for the gear unit</td>
<td></td>
</tr>
<tr>
<td>( F_{A2} )</td>
<td>kN</td>
<td>Max. permissible axial force on the gear unit output shaft</td>
<td>3.8</td>
</tr>
<tr>
<td>( m )</td>
<td>kg</td>
<td>Total weight</td>
<td>3.8</td>
</tr>
<tr>
<td>MI</td>
<td>h</td>
<td>Interval between general overhauls of the gear unit in operating hours or details of the dimensionless maintenance class CM</td>
<td>5.2</td>
</tr>
<tr>
<td>( x_{R2} )</td>
<td>mm</td>
<td>Max. dimension for the point of application of the transverse force ( F_{R2} )</td>
<td>3.8</td>
</tr>
<tr>
<td>Oil</td>
<td>-/l</td>
<td>type of gear oil (standard designation) and gear oil volume</td>
<td>7.2</td>
</tr>
</tbody>
</table>
### 2 Description of gear units

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Unit</th>
<th>Designation</th>
<th>See Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last line</td>
<td>-</td>
<td>Labelling according to ATEX DIN EN ISO 80079-36 or DIN EN 13463-1:</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>-</td>
<td>Number of the special documentation, consisting of serial no. / year</td>
<td></td>
</tr>
</tbody>
</table>

* The maximum permissible speeds are 10% above the rated speed if the maximum permissible drive power $P_1$ is not exceeded.

If the fields $F_{R1}$, $F_{R2}$, $F_{A1}$ and $F_{A2}$ are empty, the forces are zero. If the field $x_{R2}$ is empty, the point of application of force $F_{R2}$ is central on the driven shaft journal (See Section 3.8*).

Please note that for geared motors (gear units with attached electric motors) the electric motor has its own type plate and separate ATEX designation. The motor labelling must also comply with data for the planning of the plant or the machine.

**The lowest explosion protection level on the gear unit and the motor labelling applies for the geared motor unit.**

If the electric motor is driven with a frequency inverter, the motor requires ATEX approval for inverter operation. If the motor is operated with an inverter, significant differences between the nominal speeds on the type plates of the motor and the gearbox are normal and permissible. For operation of the motor with the mains supply, differences of the nominal speeds on the motor and the gear unit of up to ± 60 rpm are permissible.
2.3 Additional type plate for EAWU

<table>
<thead>
<tr>
<th>Directive</th>
<th>EAC Ex Labelling</th>
<th>CE Ex Labelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR CU 012/2011</td>
<td>II Gb c T4 X</td>
<td>II2G Ex h IIC T4 Gb</td>
</tr>
<tr>
<td></td>
<td>II Gb c T3 X</td>
<td>II2G Ex h IIC T3 Gb</td>
</tr>
<tr>
<td></td>
<td>II Gb c IIIB T4 X</td>
<td>II2G Ex h IIB T4 Gb</td>
</tr>
<tr>
<td></td>
<td>II Gb c IIIB T3 X</td>
<td>II2G Ex h IIB T3 Gb</td>
</tr>
<tr>
<td></td>
<td>III Db c T125°C X</td>
<td>II2D Ex h IIIC T125°C Db</td>
</tr>
<tr>
<td></td>
<td>III Db c T140°C X</td>
<td>II2D Ex h IIIC T140°C Db</td>
</tr>
<tr>
<td></td>
<td>II Gc T4 X</td>
<td>II3G Ex h IIIC T4 Gc</td>
</tr>
<tr>
<td></td>
<td>II Gc T3 X</td>
<td>II3G Ex h IIIC T3 Gc</td>
</tr>
<tr>
<td></td>
<td>III Dc T125°C X</td>
<td>II3D Ex h IIIC T125°C Dc</td>
</tr>
<tr>
<td></td>
<td>III Dc T140°C X</td>
<td>II3D Ex h IIIC T140°C Dc</td>
</tr>
</tbody>
</table>

Table 11: EAC Ex / CE Ex labelling

Explosion-protected gear units which are intended for use in the region of the Eurasian Economic Union have an additional type plate which indicates use in explosion hazard areas with EAC labelling according to EAC Ex.

In the further course of these operating and installation instructions, the EAC Ex logo will not be indicated together with the CE Ex logo. The EAC Ex logo is equivalent to the CE Ex logo. If "ATEX" is stated in these operating and installation instructions, this also applies accordingly for EAC Ex gear units.

With servicing as specified, gear units may have a service life of 30 years. The gear unit should be taken out of service at the latest 30 years after delivery by Getriebebau NORD. The year of delivery corresponds to the year of manufacture which is stated on the ATEX type plate.

EAC Ex gear units have two type plates. One type plate complies with ATEX Directive 2014/34 EU and the relevant standards; the second type plate contains the additional specifications according to Directive TP TC 012/2011.
Figure 2: Additional type plates for EAC Ex
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

- The thread of the eyebolt must be fully screwed in.
- Do not pull on the eyebolt at an angle.

Only use the eyebolts attached to the gear unit for transport. If geared motors have an additional eyebolt attached to the motor, this must also be used.

Transport the gear unit with care. Impacts to the free ends of the shafts may cause internal damage to the gear unit.

3.2 Storage

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

- Store gear units in the fitting position (please see chapter 7.1 "Versions and maintenance") 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 7.1 "Versions and maintenance") 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.

3.4 Checking the version

The gear unit may only be operated in the stated version. The permissible version is stated in the field IM on the type plate. Gear units with the abbreviation UN in field IM of the type plate are version-independent. Section (please see chapter 7.1 "Versions and maintenance") shows the versions of the individual gear unit types. If an X is present in the field IM, the special documentation, whose number is stated in field S, must be observed.

It must be checked and ensured that the version as stated on the type plate complies with the installation orientation and that the installation orientation does not change during operation.

Please heed the Operating Instructions for the motor, in particular with regard to the chosen version.
3.5 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 damage is 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 gear units 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 drive when uncoupled and guaranteeing such for subsequent operation.

For gear units with an integrated back stop, switching the drive motor to the blocked direction of rotation, i.e. incorrect direction of rotation, may result in damage to the gear unit. 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. (For further explanations refer to Catalogue G1000 and WN 0-000 40)

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 expansion tanks (Option OA) must be fitted in accordance with works standard WN 0-530 04. For M10 x 1 screw fittings, the enclosed factory standard WN 0-521 35 must also be observed.

Oil level tanks (Option OT) must be fitted in accordance with works standard WN 0-521 30. Screw the enclosed M12x1.5 pressure relief screw into the tank.

The pressure vent must be activated prior to commissioning. To activate, remove the transport securing devices.

Double gear units consist of two separate gear units (please see chapter 7.1 "Versions and maintenance").
3.6 Installing the gear unit

**DANGER**

Explosion hazard

- No explosive atmosphere must be present when installing the gear unit
- For geared motors, check that the cooling air from the motor fan can circulate around the gear unit without obstruction.

The base or flange to which the gear unit is fitted should be vibration-free, torsionally rigid and flat (flatness error <0.2 mm).

All contamination of the bolting surfaces of gear unit and base or flange must be thoroughly removed.

The gear housing must always be earthed. With geared motors, earthing via the motor connection must be ensured.

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.

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.

The **correct version of the gear unit must be installed** (please see chapter 3.4 "Checking the version") and (please see chapter 7.1 "Versions and maintenance").

All gear unit feet or all flange bolts on each side must be used. Bolts must have a minimum quality of 10.9. The bolts must be tightened to the correct torques (please see chapter 7.3 "Torque values"). Tension-free bolting must be ensured, especially with foot and flange-mounted gear units.

Oil checking and oil drain screws must be accessible.
3.7 Fitting hubs on the gear shafts

**DANGER**

**Danger of explosion due to increased temperature**

The gear unit may heat up to an impermissible extent if transverse forces are applied unfavourably.

- The transverse force must be applied as closely as possible to the gear unit.

**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.

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.

![Figure 4: Example of a simple pulling device](image)

Driven elements must only introduce the maximum radial transverse forces $F_{R1}$ and $F_{R2}$ and axial forces $F_{A1}$ and $F_{A2}$ into the gear unit (please see chapter 2.2 "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.
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 transverse force $F_{R1}$ applies for the application of the transverse force to the centre of the free shaft journal. For output shafts, the application of the transverse force $F_{R2}$ must not exceed the dimension $x_{R2}$. If the transverse force $F_{R2}$ for the output shaft is stated on the rating plate, but no dimension $x_{R2}$ is stated, the application of the force is assumed to be to the centre of the shaft journal.

Figure 5: Permissible application of force to drive and driven shafts
3.8 Fitting push-on gear units

**WARNING**

When the screw fastenings of the torque arm are removed, the gear unit will rotate around the output shaft

- Secure the screw fastening against loosening, e.g. with Loctite 242 or a second nut.

**NOTICE!**

The gear unit may be damaged by axial forces.

Bearings, gear wheels, shafts and housings may be damaged by incorrect assembly.

- Use suitable pulling devices.
- Do not strike the gear unit with a hammer.

Assembly and subsequent dismantling is facilitated by applying an anti-corrosive lubricant to the shaft 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. Thoroughly clean these points on the output shaft after a running-in time of approx. 24 hours. This escape of grease is not due to a leak in the gear unit.

![Figure 6: Applying lubricant to the shaft and the hub](image)

**Information**

The gear unit can be fitted to shafts with and without a shoulder using the fastening element (Option B). Tighten the screw of the fastening element with the appropriate torque (please see chapter 7.3 "Torque values"). For gear units with option H66, the closing cap fitted at the factory must be removed before assembly.

For push-on gear units with option H66 and fastening element (Option B) the pressed-in closing cap must be pushed out before installing the gear unit. The pressed-in closing cap may be destroyed during dismantling. As standard, a 2nd closing cap is supplied as a loose spare part. After installing the gear unit, fit the new closing cap as described in Section 3.10 "Fitting the covers".
A gear unit can be removed from a shaft with a shoulder e.g. using the following device.

When assembling push-on gears with torque supports, the support must not be distorted. Tension-free mounting is aided by the rubber buffer (Option G or VG).
To fit the rubber buffer, tighten the screw fastening until there is no play between the contact surfaces when there is no load.

Then turn the fastening nut half a turn in order to pre-tension the rubber buffer (only applies for screw fastenings with adjusting threads). Greater pre-tension is not permissible.

Figure 12: Attaching the torque support on bevel gear and worm gear units

Tighten the fastenings of the torque support with the correct tightening torques (please see chapter 7.3 "Torque values") and secure against loosening (e.g. Loctite 242, Loxeal 54-03).
3.9 Fitting shrink discs

**NOTICE!**

Damage to the hollow shaft

- Do not tighten the clamping bolts if the solid shaft is not inserted.

---

**Explanation**

1. Shrink disc, type, part no. and torque details for tensioning screws
2. Tensioning flanges
3. Solid shaft of machine
4. Shaft and hollow shaft bore

**FREE OF GREASE**

5. Hollow shaft of gear unit
6. Double half-slotted inner ring
7. Tensioning screws DIN 931 (933) - 10.9

---

Figure 13: Hollow shaft with shrink disc

The shrink discs are supplied by the manufacturer ready for fitting. They must not be dismantled prior to fitting.

The solid shaft of the machine runs **free of grease** in the hollow shaft of the gear unit.

---

Assembly sequence

1. Remove any transport securing devices.
2. Loosen but do not remove tightening bolt and tighten gently by hand until there is no play between the flanges and the inner ring.
3. Push the shrink disc onto the hollow shaft until the outer clamping flange is flush with the hollow shaft. The shrink disc is easier to slide on if the bore of the inner ring is lightly greased.
4. Prior to mounting, grease the solid shaft only in the area which will later come into contact with the bronze bush in the hollow shaft of the gear unit. Do not grease the bronze bush, in order to prevent grease penetrating the area around the shrink connection.
5. The hollow shaft of the gear unit must be completely de-greased and **completely free of grease**.
6. In the area of the shrink connection the solid shaft of the machine must be degreased and **completely free** of grease.
7. Insert the solid shaft of the machine into the hollow shaft so as to completely fill the area around the shrink connection.
8. Position the clamping flange by gently tightening the bolts.
9. Tighten the tensioning bolts successively in a clockwise direction by several turns – not crosswise – with approx. ¼ rotation per turn. Tighten the bolts with a torque wrench to the torque indicated on the shrink disc.
10. When the tensioning bolts have been tightened, there must be an even gap between the clamping flanges. If this is not the case, the gear unit must be dismantled and the shrink disc connection checked for correct fit.

11. The hollow shaft of the gear unit and the solid shaft of the machine should be marked with a line (felt-tip pen) in order to detect any slippage under load.

**Dismantling sequence:**

1. Loosen the tensioning bolts successively in a clockwise direction by several turns with approx. ¼ rotation per turn. Do not remove the tensioning bolts from their thread.
2. Loosen the clamping flanges from the cone of the inner ring.
3. Remove the gear unit from the solid shaft of the machine.

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.

**3.10 Fitting the covers**

---

**DANGER**

Explosion hazard due to damaged and rubbing covers

- Inspect covers for transportation damage, e.g. dents and warping before fitting.
- Do not use damaged covers.

---

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 7.3 "Torque values"). For covers with Option H66, press in the new condition closing cap by tapping it lightly with a hammer.

![Figure 14: Fitting the covers, Option SH, Option H, and Option H66](image-url)
3.11 Fitting the covers

Many versions of the universal worm gear unit are supplied with plastic cover caps as standard. These cover caps protect the shaft sealing ring against the entry of dust and other possible contamination. The cover caps can be removed by hand without the use of tools and pushed onto the A or B side.

The cover cap must be removed before installing the universal worm gear unit. After installation is complete, the cover cap must be pushed into the threaded holes on the output flange on the corresponding side. Care must be taken that the cover cap is removed and pushed on vertically, in order not to damage the expansion elements of the cover cap.

Figure 15: Removal and fitting of the cover cap

3.12 Fitting a standard motor

The maximum permitted motor weights indicated in the table below must not be exceeded:

<table>
<thead>
<tr>
<th>IEC motor size</th>
<th>63</th>
<th>71</th>
<th>80</th>
<th>90</th>
<th>100</th>
<th>112</th>
<th>132</th>
<th>160</th>
<th>180</th>
<th>200</th>
<th>225</th>
<th>250</th>
<th>280</th>
<th>315</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEMA motor size</td>
<td>56C</td>
<td>140TC</td>
<td>180TC</td>
<td>210TC</td>
<td>250TC</td>
<td>280TC</td>
<td>320TC</td>
<td>360TC</td>
<td>400TC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. motor weight [kg]</td>
<td>25</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>200</td>
<td>250</td>
<td>350</td>
<td>500</td>
<td>700</td>
<td>1000</td>
<td>1500</td>
</tr>
</tbody>
</table>

Gear units with IEC / NEMA adapters must be operated with self-ventilated motors which comply with IC411 (TEFC) or IC416 (TEBC) externally ventilated motors compliant with EN60034-6, which generate a continuous airflow towards the gear unit. Please contact NORD if the use of IC410 (TENV) motors without fans is intended.

Assembly procedure to attach a standard motor to the IEC adapter (Option IEC/NEMA adapter)

1. Clean the motor shaft and flange surfaces of the motor and adapter and check for damage. The mounting dimensions and tolerances of the motor must conform to DIN EN 50347 / NEMA MG1 Part 4.
2. Push the coupling sleeve onto the motor shaft so that the parallel key of the motor engages into the groove in the sleeve on tightening.
3. Tighten the coupling sleeve on the motor shaft in accordance with the motor manufacturer’s instructions until it touches the collar. With motor sizes 90, 160, 180 and 225, any spacer bushes must be positioned between the coupling sleeve and the collar. With standard helical gear units, dimension B between the coupling sleeve and the collar must be observed (see Figure 16). Certain NEMA adapters require adjustment of the coupling in accordance with the specifications indicated on the adhesive plate.
4. If the coupling half contains a threaded pin, the coupling must be secured axially on the shaft. The threaded pin must be coated with a securing lubricant, e.g. Loctite 242, Loxeal 54-03 prior to use and tightened to the correct torque (please see chapter 7.3 "Torque values").
5. **The flange surfaces** of the motor and adapter must be completely coated with **surface sealant**, e. g. Loctite 574 or Loxeal 58-14 prior to mounting the motor, so that the flange seals after mounting. (only necessary for category 2D gear units – see ATEX labelling on the last line of the gear unit type plate) Sealing of the flange surfaces is also recommended for installation outdoors or in damp environments.

6. Mount the motor on the adapter. Do not forget to fit the ring gear or the gear sleeve (see Figure 16).

7. Tighten the adapter bolts to the correct torque (please see chapter 7.3 "Torque values").

![Figure 16: Fitting the coupling onto the motor shaft - various types of coupling](image)

- **I** Curved tooth coupling (BoWex®) one-piece
- **II** Curved tooth coupling (BoWex®), two-piece
- **III** Curved tooth coupling (BoWex®), two-part with spacer bush
- **IV** Claw coupling (ROTEX®), two-piece
- **V** Claw coupling (ROTEX®), two-piece, observe dimension B:

<table>
<thead>
<tr>
<th>Standard helical gear units:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK 0, SK 01, SK 20, SK 25, SK 30, SK 33 (2-stage)</td>
</tr>
<tr>
<td>SK 010, SK 200, SK 250, SK 300, SK 330 (3-stage)</td>
</tr>
<tr>
<td>IEC size 63</td>
</tr>
<tr>
<td>Dimension B (Fig. V)</td>
</tr>
</tbody>
</table>
- **VI** Claw coupling (ROTEX®), two-piece with spacer bush
3.13 Fitting the cooling coil to the cooling system

The cooling coil is installed in the housing cover. Cutting ring screw threads according to DIN 2353 are located at the casing cover for the connection of a pipe with an external diameter of 10 mm.

Remove the closing cap from the screw neck prior to assembly to avoid 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.

Make sure not to twist the screw necks during or after assembly as the cooling coil may be damaged. It must be ensured that no external forces act on the cooling coil.

**Explanation**

1. Cutting ring screw threads
2. Cooling coil
3. Housing cover

*Figure 17: Cooling cover*
3.14 Temperature sticker

For temperature class T4 gear units or gear units with a maximum surface temperature of less than 135 °C, the supplied self-adhesive temperature sticker (printed with value 121 °C) must be affixed to the gear unit housing. (Part No. 2839050) The temperature class or the maximum surface temperature can be seen from the ATEX labelling in the last line of the gear unit type plate.

Examples:

II 2G Ex h IIC T4 Gb or. II 3D Ex h IIC T125°C Dc
II 2G c IIC T4 X or. II 3D 125°C X

The temperature sticker must be affixed next to the oil level screw (please see chapter 7.1 “Versions and maintenance”) towards the motor. For gear units with an oil level tank, the temperature sticker must be affixed in the same position as for gear units without an oil level tank. For gear units which are lubricated for life without oil maintenance, the temperature sticker should be affixed next to the type plate.

Figure 18: Position of the temperature sticker
3.15 Installation example for an SCX flange

Note that the maximum gap (dimension a) between the push-in shaft and the rear wall of the conveyor channel or the fastening plate must not exceed \( a = 8 \text{ mm} \).

Check the position of the protective bracket. The protective bracket must always cover the vertical open hole in the flange. The SCX flange may only be used in installation positions M1, M2, M3 and M4. A temperature sensor can be fitted as an option. The sensor must trigger at a temperature of 120°C and shut down the drive unit. Visual inspection is not required if a temperature sensor is used (please see chapter 5.1 "Service and Maintenance Intervals").
3.16 Installation of an oil expansion tank, Option OA

The expansion tank must be installed vertically with the hose connection facing downwards and the vent plug upwards. If the tank is not fitted, observe the following steps for fitting:

- After installing the gear unit (motor), remove the vent screw on the gear unit.
- For modules 0.7 l, 2.7 l and 5.4 l the reduction / extension is screwed in with the existing sealing ring.
- Now fit the expansion tank (see below for suggested position).
  Note: If the necessary screw insertion depth of 1.5d can no longer be achieved, use a 5 mm longer screw. If a longer screw cannot be fitted, use a stud and a nut with appropriate dimensions.
  If the fastening screw is screwed into a through hole, seal the thread with a medium strength screw securing material such as LOXEAL 54-03 or Loctite 242.
- The tank should be fitted as high as possible. - Note the length of the hoses!! -
- After this, fit the vent hose with the enclosed hollow screws and seals.

Finally, screw the enclosed M12x1.5 vent screw and sealing ring into the tank. **Notice:** For ATEX gear units, screw the enclosed M12x1.5 vent screw into the tank.

![Figure 20: Installing the expansion tank](image)

3.17 Subsequent paintwork

**DANGER**

Explosion hazard due to electrostatic charge

- Subsequent painting must have the same characteristics as the original 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 Check the oil level

The installation position must comply with the version on the type plate. Section 7.1 "Versions and maintenance" describes the versions and the corresponding oil level screws. With double gear units, the oil level must be checked on both units. The pressure vent must be at the position marked in Section 7.1 "Versions and maintenance".

The oil level does not need to be checked on gear units without oil level screw (please see chapter 7.1 "Versions and maintenance").

Gear unit types that are not supplied with an oil filling must be filled before the oil level is checked. (please see chapter 5.2 "Service and Maintenance Work").

Checking the oil level with an oil temperature of between 20 °C to 40 °C.

Checking the oil level:

1. The oil level may only be checked when the gear unit is at a standstill and has cooled down. The gear unit must be secured to prevent accidental activation.
2. Gear units with oil level screw:
   • Standard version M4 (V1 and V5) helical gear units have an angled pipe for checking the oil level as shown in Figure 21 (right-hand illustration). This must point vertically upwards. Before checking the oil level, the pressure vent must be unscrewed.
   • The oil level screw corresponding to the version must be screwed out (please see chapter 7.1 "Versions and maintenance").
   • Check the oil level in the gear unit with the dipstick supplied (Part No.: 283 0050), as shown in Figure 21 (left and right illustration). 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.
   • If the oil level is not correct, it must be adjusted by draining off oil or topping up with the type of oil stated on the type plate.
   • 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.
   • Fit the oil level screw together with the sealing ring and tighten to the correct torque (please see chapter 7.3 "Torque values").
   • If the pressure vent has been unscrewed, reinsert it together with the sealing ring and tighten to the correct torque (please see chapter 7.3 "Torque values").
   • Mount all removed attachments again.
3. Gear units with an oil level tank:
   • The oil level in the oil level tank must be checked with the aid of the dipstick plug (thread G1¼). The oil level must be between the upper and lower marking when the dipstick is fully screwed in; see Figure 21 (centre illustration). These gear units may only be operated in the mounting position stated in Section 7.1 "Versions and maintenance".
4. Gear units with oil inspection glass:
   • The oil level can be seen directly in the window
   • The correct oil level is: the middle of the oil inspection glass.
   • If the oil level is not correct, it must be adjusted by draining off oil or topping up with the type of oil stated on the type plate.

5. Final check:
   • All previously removed screws must be screwed back in correctly.

4.2 Activating the automatic lubricant dispenser

Some gear unit types with standard motor (Option IEC / NEMA) have an automatic lubricant dispenser for the roller bearings. This must be activated prior to commissioning. The cartridge case cover of the adapter for attaching an IEC/NEMA standard motor has a red information sign for activation of the lubricant dispenser. Opposite to the lubricant dispenser there is a grease escape hole which is closed with a G1/4 cap screw. After activation of the lubricant dispenser, the cap screw can be removed and replaced with the grease collection container (Part No. 28301210) which is supplied separately with the delivery.
Activating the lubricant dispenser:
1. Loosen and remove the cylindrical screws.
2. Remove the cartridge cover.
3. Screw the activation screw into the lubricant dispenser until the lug breaks off at the defined fracture point.
4. The flange surfaces of the cartridge cover must be completely coated with surface sealant, e.g. Loctite 574 or Loxeal 58-14 prior to assembly, so that the cover seals after it has been fitted. (Only necessary for category 2D gear units – see ATEX labelling, last line of the type plate.)
5. Re-fit the cartridge cover and fasten it with the cylindrical screw (please see chapter 7.3 "Torque values").
6. Mark activation date on the adhesive label indicating the month/year.

![Diagram](Image)

Figure 23: Activating the automatic lubricant dispenser with standard motor mounting

**Adhesive label**

**Notice!**
Screw in the activation screw until the lug breaks off before commissioning the gear unit.

<table>
<thead>
<tr>
<th>Dispensing time: 12 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Month</td>
</tr>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
</tr>
</tbody>
</table>

Figure 24: Adhesive label

### 4.3 Temperature measurement

The details of the ATEX temperature class or the maximum surface temperature are based on normal installation conditions. Even small changes to the installation conditions can have a significant effect on the temperature of the gear unit.

During commissioning, a surface temperature measurement of the gear unit must be made under maximum load. This does not apply to gear units which are labelled as temperature class T1 – T3 or a maximum surface temperature of 200 °C in the last line of the rating plate.

For the temperature measurement, a normal temperature measuring device is required, which covers a measurement range from 0 °C to 130 °C and a precision of at least ± 4 °C and which enables the measurement of the surface temperature and the temperature of the air. Temperature measurement procedure:
1. Allow the gear unit to run at maximum speed under maximum load for approx. 4 hours.
2. Following warm-up, the temperature of the gear unit housing surface $T_{gm}$ is to be measured close to the temperature sticker (please see chapter 3.14 “Temperature sticker”).
3. Measure the temperature of the air $T_{um}$ in the immediate vicinity of the gear unit.

The drive must be shut down and Getriebebau NORD must be consulted if any of the following criteria do not apply:

- The measured air temperature $T_{um}$ is within the permissible range stated on the type plate.
- The measured temperature of the surface of the gear unit housing $T_{gm}$ is below 121 °C and the temperature indication label has not turned black (see Figure 26).
- The measured temperature of the surface of the gear unit housing plus the difference between the highest permissible air temperature $T_u$ stated on the type plate and the measured air temperature must be at least 15 °C lower than the maximum permissible surface temperature, i.e.:

<table>
<thead>
<tr>
<th>ATEX labelling:</th>
<th>II 2G Ex h IIIC T4 Gb/ II 3G Ex h IIICT4 Gc or II 2G c T4 / II 3G T4:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_{gm}$ + $T_u$ – $T_{um}$</td>
<td>$&lt; 135$ °C – $15$ °C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ATEX labelling:</th>
<th>II 2D Ex h IIIC $T_{max}$ Db / II 3D Ex h IIIC $T_{max}$:Dc or II 2D $T_{max}$ / II 3D $T_{max}$:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_{gm}$ + $T_u$ – $T_{um}$</td>
<td>$&lt; T_{max}$ – $15$ °C</td>
</tr>
</tbody>
</table>

$T_{gm}$: Measured temperature of the surface of the gear unit housing in °C
$T_{um}$: Measured air temperature in °C
$T_{max}$: Maximum surface temperature according to gear unit type plate (ATEX labelling) in °C
$T_u$: Upper value of the permissible ambient temperature range in °C according to the type plate

**Figure 25: ATEX labelling**

![ATEX labelling](image)

Centre dot is **white**: OK

Centre dot is **black**: Temperature was too high.

**Figure 26: Temperature sticker**

![Temperature sticker](image)
4.4 Operation with lubricant cooling

The coolant must have a similar thermal capacity to water (specific thermal capacity at 20 °C \(c=4.18\text{ kJ/kgK}\)). 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 quantity of coolant is 10 litres/minute, and the coolant inlet temperature must not exceed 40 °C; we recommend 10 °C.

The temperature of the cooling water and the cooling water flow rate must be supervised and ensured by the operator. The drive must be shut down if the permissible temperature is exceeded.

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

4.5 Checking the gear unit

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 3.9 "Fitting shrink discs" indicates a movement of the gear unit hollow shaft relative to the machine shaft. Then remount the cover as described in Section 3.10 "Fitting the covers".

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.
4.6 Running-in time for the worm gear unit

In order to achieve maximum efficiency of the worm gear unit, the gear unit must be subjected to a running-in period of approx. 25 h – 48 h under maximum load.

There may be a reduction in efficiency before the running-in period is complete.

4.7 Checklist

<table>
<thead>
<tr>
<th>Subject of check</th>
<th>Date checked:</th>
<th>Information see Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is any transportation damage or damage apparent?</td>
<td></td>
<td>3.5</td>
</tr>
<tr>
<td>Does the labelling on the type plate conform to the</td>
<td></td>
<td>2.2</td>
</tr>
<tr>
<td>specifications?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the configuration on the type plate conform to the</td>
<td></td>
<td>3.4</td>
</tr>
<tr>
<td>actual installation?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the pressure vent screwed in?</td>
<td></td>
<td>3.5</td>
</tr>
<tr>
<td>Do all drive and driven elements have ATEX approval?</td>
<td></td>
<td>3.8</td>
</tr>
<tr>
<td>Are the external gear shaft forces within permitted limits</td>
<td></td>
<td>3.8</td>
</tr>
<tr>
<td>(chain tension)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are contact guards fitted to rotating components?</td>
<td></td>
<td>3.12</td>
</tr>
<tr>
<td>Does the motor also have a relevant ATEX approval?</td>
<td></td>
<td>3.14</td>
</tr>
<tr>
<td>Is the temperature sticker affixed?</td>
<td></td>
<td>4.1</td>
</tr>
<tr>
<td>Has the correct oil level for the configuration been</td>
<td></td>
<td>4.2</td>
</tr>
<tr>
<td>checked?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the automatic lubricant dispenser activated?</td>
<td></td>
<td>4.2</td>
</tr>
<tr>
<td>Has the temperature measurement been carried out?</td>
<td></td>
<td>4.3</td>
</tr>
<tr>
<td>Has the centre of the temperature sticker turned black?</td>
<td></td>
<td>4.3</td>
</tr>
<tr>
<td>Is the cooling cover connected to the cooling circuit?</td>
<td></td>
<td>3.14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.4</td>
</tr>
<tr>
<td>Has the gear unit been checked with a test run?</td>
<td></td>
<td>4.5</td>
</tr>
<tr>
<td>Has the shrink disk connection been checked for slippage?</td>
<td></td>
<td>4.5</td>
</tr>
</tbody>
</table>
## 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>
| Weekly or every 100 operating hours | • Visual inspection for leaks  
• Check the gear unit for unusual running noises and/or vibrations  
• Only for **gear units with cooling cover**: Visual inspection of the temperature sticker | 5.2 |
| Every 2500 operating hours, at least every six months | • Check the oil level  
• Visual inspection of the rubber buffer  
• Visual inspection of hose  
• Visual inspection of shaft sealing ring  
• Visual inspection of Option SCX  
• Visual inspection of the temperature sticker  
• Remove dust  (only for category 2D)  
• Check the coupling  (only for category 2G and standard IEC / NEMA motor attachment)  
• Re-grease / remove excess grease  (only applicable for free drive shaft / Option W and for agitator bearings / Option VLII / VLIII)  
• Clean or replace the pressure vent screw | 4.1, 5.2 |
Explosion-protected gear units – Operating and Assembly Instructions

## 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>
<tbody>
<tr>
<td>Every 5000 operating hours, at least every year (only for standard IEC / NEMA motor attachment)</td>
<td>• Replace the automatic lubricant dispenser / remove excess grease, empty or replace the grease collection container at each second replacement of the lubricant dispenser</td>
<td>5.2 4.2</td>
</tr>
<tr>
<td>For operating temperatures up to 80 °C, every 10000 operating hours, at least every 2 years</td>
<td>• Change the oil (if filled with synthetic products, the interval is doubled, with the use of SmartOilChange the interval is specified by SmartOilChange) • Check the cooling coil for deposits (fouling) • Replace the shaft sealing rings at every oil change • Clean or replace the vent screw as necessary</td>
<td>5.2</td>
</tr>
<tr>
<td>Every 20000 operating hours, at least every 4 years</td>
<td>• Re-lubricate the bearings in the gear unit • Replace the hoses • Check the function of the resistance thermometer (only II2GD)</td>
<td>5.2</td>
</tr>
<tr>
<td>Interval as stated in field MI of the type plate (only for Category 2G and 2D) or at least every 10 years</td>
<td>• General overhaul</td>
<td>5.2</td>
</tr>
</tbody>
</table>

---

### Information

The oil change intervals apply for normal operating conditions and operating temperatures up to 80 °C. The oil change intervals are reduced in the case of extreme conditions (operating temperatures higher than 80 °C, high humidity, aggressive environment and frequent fluctuations in the operating temperature).

---

### 5.2 Service and Maintenance Work

#### DANGER

**Explosion hazard**

- No explosive atmosphere must be present during repair work.
- When cleaning the gear unit, do not use procedures or materials which may cause electrostatic charging of the gear unit or adjacent non-conducting components.

#### 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.

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.

If the gear unit is equipped with a cooling coil in the housing cover, the connections and the cooling coil must be checked for leaks. If there are any leaks, these must be repaired immediately. Please contact the NORD service department.
Check for running noises

If the gear unit produces unusual running noises and/or vibrations, this could indicate damage to the gear unit. In this case the gear should be shut down and a general overhaul carried out.

Check the oil level

Section 7.1 "Versions and maintenance" describes the mounting positions and the corresponding oil level screws. With double gear units, the oil level must be checked on both units. The pressure vent must be at the position marked in Section 7.1 "Versions and maintenance".

The oil level does not need to be checked on gear units without oil level screw (please see chapter 7.1 "Versions and maintenance").

Gear unit types that are not supplied full of oil must be filled before the oil level is checked.

Check the oil level with an oil temperature of between 20 °C to 40 °C.

1. The oil level may only be checked when the gear unit is at a standstill and has cooled down. The gear unit must be secured to prevent accidental activation.
2. The oil level screw corresponding to the actual mounting position must be screwed out (please see chapter 7.1 "Versions and maintenance").

Information

At the first oil level check a small amount of oil may escape, as the oil level may be above the lower edge of the oil level hole.

3. **Gear units with oil level screw:** The correct oil level is at the bottom edge of the oil level hole. If the oil level is too low, this must be corrected with the appropriate type of oil. Optionally, an oil level glass is also possible instead of the oil level screw.
4. **Gear units with oil tank:** The oil level must be checked with the aid of the cap screw with dipstick (G1¼ thread) in the oil tank. The oil level must be between the top and bottom marking when the dipstick is fully screwed in (see Figure 27). Top up the oil level with the relevant type of oil as necessary. These gearboxes may only be operated in the mounting position stated in Section 7.1 "Versions and maintenance").
5. The oil level screw or the cap screw with dipstick and all other loosened screws must be correctly re-tightened.

![Figure 27: Checking the oil level with a dipstick](image)

Visual inspection of the rubber buffers

Gear units with rubber buffers (Option G or VG) and gear units with torque supports are equipped with rubber elements. If these show damage such as tears to the rubber surface, the elements must be replaced. Please contact the NORD service department.
Visual inspection of hose

Gear units with an oil tank (Option OT) and external cooling units have rubber hoses. Check the connections for leaks. After assembling the oil lines, fill the gear unit housing with the gear oil type and quantity that is printed on the type plate. Please contact the NORD service department.

Visual inspection of shaft sealing ring

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.

Visual inspection of Option SCX

Check the dirt outlet holes on the flange for dirt. The gap between the shaft and the fastening plate must be free from dirt. If severe soiling is apparent, pull the gear unit off the push-in shaft and clean the push-in shaft and the inside of the flange. Check the shaft sealing ring on the gear unit for damage. Damage shaft sealing rings must be replaced with new rings. Mount the gear unit on the cleaned flange.

Visual inspection of the temperature sticker

(only necessary for temperature class T4 or max. surface temperature < 135 °C).
Check the temperature sticker for black colouration. If the temperature sticker has turned black, the gear unit has become too hot. The cause of overheating must be determined. Please contact the NORD service department immediately. The drive unit must not resume operation before the cause of overheating has been remedied and renewed overheating can be ruled out.

Before putting into operation again, a new temperature-sensitive adhesive label must be attached to the gear unit.

Remove dust

(only necessary for category 2D)
Dust deposits on the gear unit housing must be removed if they are more than 5 mm thick. With gear units fitted with a cover (Option H) the cover must be removed. Dust deposits in the cover, on the driven shaft and on the shrink disk must be removed. Then the covering cap must be fitted.

Information

Some covers can be completely sealed with liquid sealing agent. In such cases, there is no need for regular cleaning of the cover if it is completely sealed with a liquid sealing agent such as Loctite 574 or Loxeal 58-14.

Checking the coupling

(only necessary for category 2G and IEC / NEMA standard motor attachments)
The motor must be removed. Plastic or elastomer coupling components must be examined for traces of wear. If the limiting values listed below for the particular coupling versions and sizes are exceeded, the plastic or elastomer coupling components must be replaced.
Only use replacement parts with the same colour.
With claw couplings (ROTEx®), the tooth thickness of the elastomer gear rim must be measured as shown in the illustration. \( B_{\text{min}} \) is the minimum permitted tooth thickness.

![Illustration of gear rim wear measurement](image)

**Figure 28: Measurement of gear rim wear on the ROTEx claw coupling®**

<table>
<thead>
<tr>
<th>Type</th>
<th>R14</th>
<th>R24</th>
<th>R38</th>
<th>R42</th>
<th>R48</th>
<th>R65</th>
<th>R90</th>
</tr>
</thead>
<tbody>
<tr>
<td>( B ) [mm]</td>
<td>9.7</td>
<td>8.6</td>
<td>13.3</td>
<td>15.7</td>
<td>17.7</td>
<td>22.2</td>
<td>32.3</td>
</tr>
<tr>
<td>( B_{\text{min}} ) [mm]</td>
<td>7.7</td>
<td>5.6</td>
<td>10.3</td>
<td>11.7</td>
<td>13.7</td>
<td>17.2</td>
<td>24.3</td>
</tr>
</tbody>
</table>

**Table 12: Limiting wear values for coupling gear rims**

For gear couplings, the limiting wear value is \( X = 0.8 \text{ mm} \), as shown in the following illustration.

![Illustration of gear sleeve wear measurement](image)

**Figure 29: Measurement of gear sleeve wear for curved tooth BoWex® couplings**

**Information**

If the examination only shows slight wear (25 % of the limiting value), it is permissible to extend the interval for examination of the coupling to twice the normal period, i.e. 5000 operating hours and at least every year.

**Re-greasing**

Some gear unit designs (free drive shaft, Option W, agitator designs VL2 and VL3) are equipped with a re-greasing device.

For agitator versions VL2 and VL3, the vent screw located opposite to the grease nipple must be unscrewed before re-greasing. Grease should be injected until a quantity of 20 - 25 g escapes from the vent hole. After this, the vent plug must be reinserted and tightened.

For Option W and some IEC adapters, the outer roller bearing must be re-greased with approx. 20 - 25 g of grease via the grease nipple provided. Remove any excess grease from the adapter.

Recommended grease: Petamo GHY 133N (please see chapter 7.2 "Lubricants") (Klüber Lubrication), a food compatible grease is possible as an option.
Cleaning or replacing the vent plug

Unscrew the vent screw and thoroughly clean it (e.g. with compressed air) and fit the vent screw in the same place. If necessary, use a new vent screw with a new sealing ring.

Replacing the automatic lubricant dispenser

The cartridge cover must be unscrewed. The lubrication dispenser is screwed out and replaced with a new component (Part No. 28301000 or for food-compatible grease Part No.: 28301010). Remove any excess grease from the adapter. Then activate (please see chapter 4.2 "Activating the automatic lubricant dispenser").

Empty or replace the grease collection container (Part No. 28301210) with every second replacement of the lubricant container. To empty the container, unscrew it from the screw fitting. The container has an internal piston, which can be pressed back with a rod with a maximum diameter of 10 mm. Collect the grease which is pressed out and dispose of it correctly. Due to the shape of the container, a residual quantity of grease remains in the container. After emptying and cleaning the container, it can be screwed back into the drain hole in the IEC adapter. Replace the container with a new one if it is damaged.

Checking the cooling coil for deposits

The inner surface of the cooling coil must be checked for deposits, as in case of severe deposits (fouling) dissipation of heat is no longer guaranteed. In this case, the cooling coil must be cleaned. 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 yellow brass fittings).

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.

Re-lubricating bearings

For bearings which are not oil-lubricated and whose holes are completely above the oil level, replace the roller bearing grease (recommended grease: PETAMO GHY 133N). Please contact the NORD service department.
General overhaul

Explosion hazard

- The general overhaul must be carried out by qualified personnel in a specialist workshop with appropriate equipment.
- We urgently recommend that the general overhaul is carried out by the NORD Service Department.

With category 2G and 2D gear units, a general overhaul is necessary after a specified longer period of operation. The specification of the operating period in terms of operating hours, after which a general overhaul must be carried out, can be seen from the type plate data in field MI.

Alternatively, the maintenance class $C_M$ can be used to determine the operating period after which a general overhaul must be carried out. The data in field MI of the type plate is then e.g.: MI $C_M = 5$.

The time for general overhaul with the stated maintenance class $C_M$ is calculated as follows:

$$N_A = C_M \cdot f_L \cdot k_A$$

$N_A$: Number of years since commissioning. With calculated values of $N_A$ which exceed 10 years, a general overhaul is due 10 years after commissioning.

$C_M$: Maintenance class according to field MI of the type plate

$f_L$: Running time factor
- $f_L = 10$ Running time maximum 2 hours per day
- $f_L = 6$ Running time 2 to 4 hours per day
- $f_L = 3$ Running time 4 to 8 hours per day
- $f_L = 1.5$ Running time 8 to 16 hours per day
- $f_L = 1$ Running time 16 to 24 hours per day

$k_A$: Utilisation factor
- If the utilisation factor is not known, $k_A = 1$.

Longer maintenance intervals often result if the actual power required by the application is known. The utilisation factor may be calculated as follows:

$$k_{\alpha} = \left( \frac{P_{t_{\text{att}}}}{P_{t_{\text{att}}}} \right)^3$$

$P_t$: Max. permissible drive power or motor power in kW according to the type plate

$P_{t_{\text{att}}}$: Actual drive power or motor power in kW which is required by the application at the nominal speed. This is determined, e.g. by measurements. For variable loads with differing actual drive powers with nominal speeds $P_{t_{\text{att}1}}, P_{t_{\text{att}2}}, P_{t_{\text{att}3}}, \ldots$ with known percentage times $q_1, q_2, q_3, \ldots$, the following equivalent average drive power applies:

$$P_{t_{\text{att}}} = \sqrt{P_{t_{\text{att}1}}^3 \cdot \frac{q_1}{100} + P_{t_{\text{att}2}}^3 \cdot \frac{q_2}{100} + P_{t_{\text{att}3}}^3 \cdot \frac{q_3}{100} + \ldots}$$
If a general overhaul is due, the gear unit must be completely dismantled. The following work must be carried out:

- clean all gear unit components,
- examine all gear unit components for damage and wear,
- all components which are damaged or show signs of wear must be replaced,
- all roller bearings must be replaced,
- replace back stops if fitted,
- replace all seals, radial seals and Nilos rings,
- all plastic and elastomer components must be replaced,
- illegible or damaged type plates must be replaced.
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 13: Disposal of materials
7 Appendix

7.1 Versions and maintenance

For versions which are not listed, please refer to the special documentation drawing (please see chapter 2.2 "Type plate").

Explanation of symbols for the following mounting position illustrations:

- Vent
- Oil level
- Oil drain

Standard helical gear units

Standard ATEX category 3G and 3D helical gear units do not have oil filling screws (please see chapter 2.2 "Type plate").

NORDBLOC helical gear units SK 072.1 and SK 172.1

1. Bring the gear unit from the M4 orientation into the M2 installation orientation and remove the oil level screw for the M2 orientation.

Figure 31: Oil level measurement SK 072.1 – SK 172.1
2. Determine the measurement $X$ between the upper edge of the gear unit housing and the oil level. If necessary, modify the dipstick (see Figure 32 below).

![Diagram of measuring oil level]

**Explanation**
1. Upper edge of housing
2. Oil level

**Figure 32: Measuring the oil level**

3. Compare the determined measurement $X$ with the corresponding measurement in the following table. If necessary, adjust the oil level with the type of oil shown on the type plate.

<table>
<thead>
<tr>
<th>Gear unit type</th>
<th>Thread size</th>
<th>Measurement $X$ [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK 072.1</td>
<td>M8 x 1</td>
<td>22 ± 1</td>
</tr>
<tr>
<td>SK 172.1</td>
<td>M8 x 1</td>
<td>20 ± 1</td>
</tr>
</tbody>
</table>

4. Screw in and tighten the oil level screw in the installation orientation M2 as per Section (please see chapter 2.2 "Type plate").
5. Bring the gear unit back into the installation orientation M4.
NORDBLOC helical gear units SK 071.1, SK 171.1, SK 371.1, SK 571.1, SK 771.1

The gear units do not have oil level screws in the installation position M2. The oil level must be measured in installation position M4. The following steps must be observed.

SK 071.1, SK 171.1, SK 371.1, SK 571.1

1. Bring the gear unit into the installation orientation M4.

![M2 M4 diagram](image)

Figure 33: Oil level measurement SK 071.1 – SK 371.1

2. Unscrew the oil level screw for installation position M4 and check the oil level as described in Section 4.1 "Check the oil level". If necessary, adjust the oil level with the type of oil shown on the type plate.

3. Screw in the M4 oil level screw and tighten with the correct torque (see Section 7.3 "Torque values").

4. Bring the gear unit back into the installation orientation M2 and install it.
SK 771.1

1. Bring the gear unit into the installation orientation M4 (see above)
2. Determine the dimension X between the top edge of the gear unit cover and the oil level.

![Image of SK 771.1 gear unit]

**Explanation**
1. Upper edge of housing
2. Oil level

**Figure 34: Oil level SK 771.1**

3. Compare the determined measurement X with the dimension in the following table. If necessary, adjust the oil level with the type of oil shown on the type plate.

<table>
<thead>
<tr>
<th>Gear unit type</th>
<th>Thread size</th>
<th>Measurement X [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK 771.1</td>
<td>M12 x 1.5</td>
<td>28 ± 1</td>
</tr>
</tbody>
</table>

4. Screw in the M4 oil level screw and tighten with the correct torque (see Section 7.3 “Torque values”).
5. Bring the gear unit back into the installation orientation M2 and install it.
UNIVERSAL worm gear units
SK 1SI 31 – SK 1SI 75
SK 1SIS 31 – SK 1SIS 75

Figure 35: Orientation for oil level check

For the oil level check, the gear unit or the geared motor must be brought into the orientation shown above. To do this, it may be necessary to remove the gear unit or the geared motor.

Information
An adequate settling time of the warm gear unit or geared motor in the position shown in Figure 35 must be observed, in order to allow the oil to settle evenly.

The oil level can then be checked as described in Section 2.2 "Type plate".
In category 2G and 2D the gear units only have one oil level screw. These gear unit types have a checkable life-long lubrication.
The oil level screws are not used in ATEX categories 3G and 3D (please see chapter 4.1 "Check the oil level"). These gear unit types are lubricated for life.
The gear unit types SK 1S xx, SK 2S xx, SK 1SU xx, SK 2SU xx, SK 1SM xx, SK 2SM xx, SK 1SMI xx, SK 2SMI xx may only be used in category 3G and 3D. These gear units are lubricated for life and do not have an oil level screw.
As an option, types SI and SMI can be equipped with a vent screw.
Parallel shaft gear units

The following illustration applies for the M4 / H5 configuration of gear unit types SK 9282, SK 9382, SK 10282, SK 10382, SK 11282, SK 11382, SK 12382, SK 10382.1, SK 11382.1 with oil level tank.

![Parallel shaft gear units with oil level tank](image)

Figure 36: Parallel shaft gear units with oil level tank

Oil level screws are not fitted to gear unit types SK 0182 NB, SK 0282 NB and SK 1382 NB in the ATEX categories 3G and 3D (please see chapter 4.1 "Check the oil level").

In category 2G and 2D, types SK 0182 NB, SK 0282 NB and SK 1382 NB only have one oil level screw. These gear unit types have checkable life-long lubrication.

**NORDBLOC helical gear units**

Gear unit types SK 320, SK 172, SK 272, SK 372 and SK 273 and SK 373 are not fitted with oil level screws for ATEX categories 3G and 3D (please see chapter 2.2 "Type plate").

In category 2G and 2D, types SK 320, SK 172, SK 272, SK 372 and SK 273 and SK 373 only have one oil level screw. These gear unit types have checkable life-long lubrication.
7.2 Lubricants

**DANGER**

Explosion hazard due to unsuitable oil

Use of the gear oil type which is stated on the type plate is essential.

The following table shows the proprietary brands or product names according to the gear oil types stated on the gear unit type plate (please see chapter 2.2 "Type plate"). This means that a product corresponding to the type of oil shown on the type plate must be used. In special cases, the designation of the specified product is stated on the type plate of the gear unit.

<table>
<thead>
<tr>
<th>Lubricant type</th>
<th>Details on type plate</th>
<th>Castrol</th>
<th>Fuchs</th>
<th>Klüberoil</th>
<th>Mobilgear</th>
<th>Omega S2 G 220</th>
<th>Carter EP 220 Carter XEP 220</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CLP 100</td>
<td>Alpha EP 100</td>
<td></td>
<td>Renolin CLP 100 Plus</td>
<td>Mobilgear 600 XP 100</td>
<td>Omega S2 G 100</td>
<td>Carter EP 100</td>
</tr>
<tr>
<td><strong>Synthetic oil (Polyglycol)</strong></td>
<td>CLP PG 680</td>
<td>Alphasyn GS 680</td>
<td>Optigear Synthetic 680</td>
<td>Renolin PG 680</td>
<td>Klüberoil GEM 6-680</td>
<td>Mobilgear</td>
<td>Omega S4 WE 680</td>
</tr>
<tr>
<td></td>
<td>CLP PG 220</td>
<td>Alphasyn GS 220</td>
<td>Optigear Synthetic 800/220</td>
<td>Renolin PG 220</td>
<td>Klüberoil GEM 6-220</td>
<td>Mobilgear</td>
<td>Omega S4 WE 220</td>
</tr>
<tr>
<td><strong>Synthetic oil (hydrocarbon)</strong></td>
<td>CLP HC 220</td>
<td>Alphasyn EP 220</td>
<td>Optigear Unisyn CLP 220</td>
<td>Renolin Unisyn CLP 220</td>
<td>Klüberoil GEM 4-220</td>
<td>Mobil SHC 630</td>
<td>Omega S4 GX 220</td>
</tr>
<tr>
<td><strong>Bio-degradable oil</strong></td>
<td>CLP E 680</td>
<td>-</td>
<td>Plantogear 680 S</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>CLP E 220</td>
<td>Performance Bio GE 220 S</td>
<td>Plantogear 220 S</td>
<td>Klüberoil GEM 2-220</td>
<td>-</td>
<td>Naturelle Gear Fluid EP 220</td>
<td>-</td>
</tr>
<tr>
<td><strong>Food grade oil as per FDA 178.3570</strong></td>
<td>CLP PG H1 680</td>
<td>Optileb GT 1800/680</td>
<td>Cassida Fluid WG H1 680</td>
<td>Klüberoil UH1 6-680</td>
<td>Mobilgear</td>
<td>Glygoyle 680</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>CLP PG H1 220</td>
<td>Optileb GT 1900/220</td>
<td>Cassida Fluid WG 220</td>
<td>Klüberoil UH1 6-220</td>
<td>Mobilgear</td>
<td>Glygoyle 220</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>CLP HC H1 680</td>
<td>Optileb GT 680</td>
<td>Cassida Fluid GL 680</td>
<td>Klüberoil 4 UH1-680 N</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>CLP PG H1 220</td>
<td>Optileb GT 220</td>
<td>Cassida Fluid GL 220</td>
<td>Klüberoil 4 UH1-220 N</td>
<td>Mobil</td>
<td>SHC Cibus 220</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 14: Lubricant table
## 7.3 Torque values

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Screw connections in the strength classes</th>
<th>Cover screws</th>
<th>Threaded pin on coupling</th>
<th>Screw connections on protective covers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.8</td>
<td>10.9</td>
<td>12.9</td>
<td></td>
</tr>
<tr>
<td>M4</td>
<td>3.2</td>
<td>5</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>M5</td>
<td>6.4</td>
<td>9</td>
<td>11</td>
<td>-</td>
</tr>
<tr>
<td>M6</td>
<td>11</td>
<td>16</td>
<td>19</td>
<td>-</td>
</tr>
<tr>
<td>M8</td>
<td>27</td>
<td>39</td>
<td>46</td>
<td>11</td>
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<tr>
<td>M10</td>
<td>53</td>
<td>78</td>
<td>91</td>
<td>11</td>
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<tr>
<td>M12</td>
<td>92</td>
<td>135</td>
<td>155</td>
<td>27</td>
</tr>
<tr>
<td>M16</td>
<td>230</td>
<td>335</td>
<td>390</td>
<td>35</td>
</tr>
<tr>
<td>M20</td>
<td>460</td>
<td>660</td>
<td>770</td>
<td>-</td>
</tr>
<tr>
<td>M24</td>
<td>790</td>
<td>1150</td>
<td>1300</td>
<td>80</td>
</tr>
<tr>
<td>M30</td>
<td>1600</td>
<td>2250</td>
<td>2650</td>
<td>170</td>
</tr>
<tr>
<td>M36</td>
<td>2780</td>
<td>3910</td>
<td>4710</td>
<td>-</td>
</tr>
<tr>
<td>M42</td>
<td>4470</td>
<td>6290</td>
<td>7540</td>
<td>-</td>
</tr>
<tr>
<td>M48</td>
<td>6140</td>
<td>8640</td>
<td>16610</td>
<td>-</td>
</tr>
<tr>
<td>M56</td>
<td>9840</td>
<td>13850</td>
<td>24130</td>
<td>-</td>
</tr>
<tr>
<td>G½</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>75</td>
</tr>
<tr>
<td>G¾</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>110</td>
</tr>
<tr>
<td>G1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>190</td>
</tr>
<tr>
<td>G1¼</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>240</td>
</tr>
<tr>
<td>G1½</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>300</td>
</tr>
</tbody>
</table>

Table 15: Torque values

### Assembling the hose fittings

Oil the thread of the union nut, the cutting ring and the screw neck. Tighten the union nut with the wrench until the point where the union nut can only be turned with considerably more force. Turn the union nut of the screw fitting approx. 30° to 60° further but not more than 90°. For this the screw neck must be held with a wrench. Remove excess oil from the screw fitting.
### 7.4 Troubleshooting

**WARNING**

Danger of slipping in case of leaks
- Clean the soiled floor before starting troubleshooting.

**NOTICE!**

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

<table>
<thead>
<tr>
<th>Fault</th>
<th>Gear unit malfunctions</th>
<th>Possible cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unusual running noises, vibrations</td>
<td>Oil too low or bearing damage or gear wheel damage</td>
<td>Consult NORD Service</td>
<td></td>
</tr>
<tr>
<td>Oil escaping from gear unit or motor</td>
<td>Defective seal</td>
<td>Consult NORD Service</td>
<td></td>
</tr>
<tr>
<td>Oil escaping from pressure vent</td>
<td>Incorrect oil level or incorrect, contaminated oil or unfavourable operating conditions</td>
<td>Oil change, use oil expansion tank (Option OA)</td>
<td></td>
</tr>
<tr>
<td>Gear unit becomes too hot</td>
<td>Unfavourable installation conditions or gear unit damage</td>
<td>Consult NORD Service</td>
<td></td>
</tr>
<tr>
<td>Shock when switching on, vibrations</td>
<td>Defective motor coupling or loose gear unit mounting or defective rubber element</td>
<td>Replace elastomer gear rim, tighten motor and gear unit fastening bolts, replace rubber element</td>
<td></td>
</tr>
<tr>
<td>Output shaft does not rotate although motor is running</td>
<td>Fracture in gear unit or defective motor coupling or shrink disc slippage</td>
<td>Consult NORD Service</td>
<td></td>
</tr>
</tbody>
</table>

*Table 16: Overview of malfunctions*
7.5 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>Location of leak</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>
</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>
</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>
</tr>
<tr>
<td>Measurable leakage</td>
<td>Recognisable stream, dripping</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>
</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>
</tr>
</tbody>
</table>

Table 17: 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.
7.6 Declaration of Conformity

7.6.1 Explosion protected gear units and geared motors, Category 2G and 2D

Declaration of Conformity for Category 2G / 2D, valid for labelling on the type plate according to DIN EN 13463-1.

---

Figure 37: Declaration of Conformity for Category 2G / 2D, labelling according to EN ISO 13463-1
Declaration of Conformity for Category 2G / 2D, valid for labelling on the type plate according to DIN EN ISO 80079-36

<table>
<thead>
<tr>
<th>EU Declaration of Conformity</th>
<th>According to EU directive 2014/34/EU Annex VIII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Getriebebau NORD GmbH &amp; Co. KG hereby declares, that the gear units and geared motors from the following product series are compliant with the following directive: ATEX directive for products: 2014/34/EU</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>• Helical gear units Type SK ...</td>
<td>• Worm gear units Type SK 02,..., SK 15L,..., SK 12,..., SK 3,..., SK 4,...</td>
</tr>
<tr>
<td>• Parallel shaft gear units Type SK ...R2, SK ...R2.1, SK ...R2NB</td>
<td>• Bevel gear units Type SK 9,...</td>
</tr>
<tr>
<td>with ATEX labelling Ex II 2D / 2G</td>
<td></td>
</tr>
<tr>
<td>Applied standards:</td>
<td>2011</td>
</tr>
<tr>
<td>EN 1127-1:</td>
<td></td>
</tr>
<tr>
<td>DIN EN 6079-0:</td>
<td>2014</td>
</tr>
</tbody>
</table>

Getriebebau NORD has submitted the documents required as per 2014/34/EU Annex VIII to the notified body:

DEKRA EXAM GmbH
Dinnendahlstraße 9
44809 Bochum
ID number: 0158
Certificate: BVS 04 ATEX H/B 196

Bargteheide, 28/02/2019

[Signature]
U. Küchenmeister Manager

[Signature]
Dr. O. Sadi Technical Manager

Figure 38: Declaration of Conformity for Category 2G / 2D, labelling according to DIN EN ISO 80079-36
7.6.2 Explosion protected gear units and geared motors, Category 3G and 3D

Declaration of Conformity for Category 3G / 3D, valid for labelling on the type plate according to EN ISO 13463-1

---

Figure 39: Declaration of Conformity for Category 3G / 3D, labelling according to EN ISO 13463-1
Declaration of Conformity for Category 3G / 3D, valid for labelling on the type plate according to DIN EN ISO 80079-36

Figure 40: Declaration of Conformity for Category 3G / 3D, labelling according to DIN EN ISO 80079-36
7.7 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.

7.7.1 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.

7.7.2 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
7.8 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.

7.9 Abbreviations

| 2D | Dust explosion protected gear units zone 21 |
| 2G | Explosion protected gear units with ignition protection class "c" |
| 3D | Dust explosion protected gear units zone 22 |
| AT | Atmospheres EXplosibles |
| BS | Flange fastening with through holes |
| B14 | Flange fastening with threaded holes |
| CW | Clockwise, right-hand direction of rotation |
| CCW | Counter-clockwise, left-hand direction of rotation |
| °dH | Water hardness in German hardness degrees: 1°dH = 0.1783 mmol/l |
| DIN | German standards institute |
| EC | European Community |
| EN | European standard |
| FR | Radial transverse force |
| FA | Axial force |
| IE1 | Motors with standard efficiency |
| IE2 | Motors with high efficiency |
| IEC | International Electrotechnical Commission |
| NEMA | National Electrical Manufacturers Association |
| IP55 | International Protection |
| ISO | International Standardisation Organisation |
| pH | pH value |
| PPE | Personal Protective Equipment |
| RL | Directive |
| VCI | Volatile Corrosion Inhibitor |
| WN | Getriebebau NORD factory standard |
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