

Intelligent Drivesystems, Worldwide Services



ATEX

EN

B 2050

Explosion-protected industrial gear units

Operating and Assembly Instructions





General safety and operating instructions

1. General

Depending on its protection class, the device may have live, bare, moving or rotating parts or hot surfaces during operation.

Unauthorised removal of covers, improper use, incorrect installation or operation causes a risk of serious personal injury or material damage.

All transport, installation, commissioning and maintenance work must be carried out by qualified specialist personnel (national accident prevention regulations must be observed).

Within the meaning of this basic safety information, qualified specialist personnel are persons who are familiar with the installation, assembly, commissioning and operation of the product and who have the training and experience to recognise and avoid any hazards and risks.

2. Correct use

NORD products may only be used according to the information in the catalogue and the associated technical documentation.

Compliance with the operating and installation instructions is a **prerequisite for fault-free operation** and for the fulfilment of any warranty claims. **These operating and installation instructions must be read** before working with the device!

These operating and installation instructions contain important information about **servicing**. They must therefore be kept **close to the device**.

All details regarding technical data and permissible conditions at the installation site must be complied with.

3. Transport, storage

Information regarding transport, storage and correct handling must be complied with.

4. Installation

The device must be protected against impermissible loads. In particular, during transport and handling, components must not be deformed or changed. Touching of electronic components and contacts must be avoided.

5. Electrical Connection

When working on live three-phase motors, the applicable national accident prevention regulations must be complied with (e.g. BGV A3, formerly VBG 4).

The electrical installation must be implemented according to the applicable regulations (e.g. cable cross-section, fuses, earth lead connections).

Information regarding EMC-compliant installation – such as shielding, earthing and installation of cables – can be found in the three-phase motor documentation. Compliance with the limiting values specified in the EMC regulations is the responsibility of the manufacturer of the system or machine.

6. Operation

Appropriate safety measures must be taken for applications where failure of the device may result in injury.

Where necessary, systems in which NORD devices are installed must be equipped with additional monitoring and protective equipment according to the applicable safety requirements, e.g. legislation concerning technical equipment, accident prevention regulations, etc.

All covers and guards must be kept closed during operation.

7. Maintenance and repairs

After the device has been disconnected from the power supply, live equipment components and power connections should not be touched immediately, because of possible charged capacitors.

Further information can be found in this documentation.

These safety instructions must be kept in a safe place!

Documentation

Name: B 2050
 Part No.: 6052802
 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 unit
Bevel gear unit
Helical worm gear units
MINIBLOC worm gear units
UNIVERSAL worm gear units

Version list

Title, Date	Order number	Comments
B 2050, February 2013	6052802 / 0613	-
B 2050, September 2014	6052802 / 3814	General corrections
B 2050, April 2015	6052802 / 1915	General corrections

Table 1: Version list B 2050

Copyright notice

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Publisher

Getriebebau NORD GmbH & Co. KG
 Getriebebau-Nord-Straße 1 • 22941 Bargteheide, Germany • <http://www.nord.com/>
 Fon +49 (0) 45 32 / 289-0 • Fax +49 (0) 45 32 / 289-2253

Table of Contents

1	Notes	9
1.1	General information.....	9
1.2	Safety and information symbols.....	10
1.2.1	Explanation of designations used.....	10
1.3	Correct use.....	10
1.4	Safety information.....	11
1.5	Other documents.....	13
1.6	Disposal.....	13
2	Description of gear unit	14
2.1	Type designations and gear unit types.....	14
3	Assembly instructions, storage, preparation, installation	16
3.1	Transporting the gear unit.....	16
3.2	Storage.....	19
3.3	Long-term storage.....	19
3.4	Inspecting the drive unit.....	21
3.5	Checking the type plate data.....	21
3.6	Checking the configuration.....	23
3.7	Preparing for installation.....	24
3.8	Installing the gear unit.....	25
3.9	Fitting hubs on the gear shafts.....	28
3.10	Fitting push-on gear units.....	30
3.11	Torque support.....	32
3.12	Fitting shrink discs.....	33
3.13	Fitting the covers.....	35
3.14	Fitting a standard motor.....	36
3.15	Fitting the external oil / air cooler (cooling unit).....	38
3.16	Temperature sticker.....	39
3.17	Subsequent paintwork.....	40
4	Commissioning	41
4.1	Check the oil level.....	41
4.2	Temperature measurement.....	43
4.3	Checking the gear unit.....	45
4.4	Lubricant cooling with external oil / water cooler (cooling unit).....	46
4.5	Operation with pressure circulation lubrication.....	47
4.6	Pressure safeguard.....	48
4.7	Operation with back stop.....	49
4.8	Checklist.....	51
4.9	Operation of the gear unit in explosive areas.....	52
5	Service and maintenance	53
5.1	Service and Maintenance Intervals.....	53
5.2	Service and Maintenance Work.....	54
6	Appendix	61
6.1	Configurations and maintenance.....	61
6.2	Lubricants.....	64
6.3	Lubricant quantities.....	65
6.4	Torque values.....	67
6.5	Troubleshooting.....	68
6.6	Leaks and seals.....	69
6.7	Declaration of Conformity.....	70
6.7.1	Explosion protected industrial gear units, Category 2G and 2D.....	70
6.7.2	Explosion protected industrial gear units, Category 3G and 3D.....	71
6.8	Repair information.....	72

6.8.1	Repairs	72
6.8.2	Internet information.....	72
6.9	Abbreviations	72

List of illustrations

Fig. 1: Gear unit lifting points	17
Fig. 2: Transport of gear unit with motor	17
Fig. 3: Transport of gear unit with motor swing base or base frame	18
Fig. 4: Type plate (example)	21
Fig. 5: Activation of the pressure vent	25
Fig. 6: Example of a simple pulling device	28
Fig. 7: Permissible application of force to drive and driven shafts	29
Fig. 8: Applying lubricant to the shaft and the hub	30
Fig. 9: Assembly	31
Fig. 10: Securing	31
Fig. 11: Dismantling	31
Fig. 12: Permissible installation deviations of the torque support	32
Fig. 13: Mounting the solid shaft with a shrink disc	33
Fig. 14: Fitting the coupling to the motor shaft	37
Fig. 15: Industrial gear unit with CS1 and CS2 cooling systems	38
Fig. 16: Hydraulic diagram of the industrial gear unit with CS1 and CS2 cooling systems	39
Fig. 17: Position of the temperature label for helical and helical bevel gear units	40
Fig. 18: Checking the oil level with a dipstick	42
Fig. 19: ATEX labelling	44
Fig. 20: Temperature sticker	44
Fig. 21: Industrial gear unit with back stop	49
Fig. 22: Position of the oil screws in the gear unit	62
Fig. 23: Installation orientations for helical gear units	63
Fig. 24: Installation orientations for bevel helical gear units	63
Fig. 25: Declaration of Conformity for Category 2G / 2D	70
Fig. 26: Declaration of Conformity for Category 3G / 3D	71

List of tables

Table 1: Version list B 2050.....	3
Table 2: Disposal of materials	13
Table 3: Helical gear units - Type designation and gear unit types	14
Table 4: Bevel helical gear units - Type designation and gear unit types	15
Table 5: Motor weights	36
Table 6: Lift-off speeds for back stops.....	50
Table 7: Lubricant table	64
Table 8: Lubricant quantities for helical gear units.....	66
Table 9: Lubricant quantities for bevel helical gear units.....	66
Table 10: Torque values.....	67
Table 11: Overview of malfunctions.....	68
Table 12: Definition of leaks according to DIN 3761.....	69

1 Notes

1.1 General information

Read the Operating Manual carefully prior to performing any work on or putting the gear unit into operation. Strict compliance with the instructions in this Operating Manual is essential. This Operating Manual and all associated special documentation must be kept in the immediate vicinity of the gear unit.

Getriebebau NORD accepts no liability for damage to persons, materials or assets as a result of the non-observance of this Operating Manual, operating errors or incorrect use. General wearing parts, e.g. radial seals are excluded from the warranty.







If additional components are attached to or installed on or in the gear unit (e.g. motor, cooling system, pressure sensor etc.) or components (e.g. cooling system) are supplied with the order, the operating instructions for these components must be observed.

If geared motors are used, compliance with the Motor Operating Manual is also necessary.

If you do not understand the contents of this Operating Manual or additional operating instructions, please consult Getriebebau NORD!

1.2 Safety and information symbols


1.2.1 Explanation of designations used

 DANGER!	Indicates an immediate danger, which may result in death or serious injury.
 DANGER! 	Indicates an immediate danger, which may result in death or serious injury. Contains important information regarding explosion protection.
 WARNING	Indicates a possibly dangerous situation, which may result in death or serious injury.
 CAUTION	Indicates a possibly dangerous situation, which may result in slight or minor injuries.
NOTICE	Indicates a possibly harmful situation, which may cause damage to the product or the environment.
 Information	Indicates hints for use and useful information.

1.3 Correct use

These gear units generate a rotational movement and are intended for use in commercial systems. They satisfy the explosion-protection requirements of Directive 94/9EC (ATEX100a) for the product category indicated on the type plate.

Commissioning (start of proper operation) is prohibited until it has been established that the machine complies with the local laws and directives. The EMC Directive 2004/108/EC and the Machinery Directive 2006/42/EC in their currently valid scope of application must be complied with in particular.

 WARNING	Danger to persons
Appropriate safety measures must be taken for applications where failure of a gear unit or geared motor may result in injury.	
Safeguard a wide area around the hazard zone.	

WARNING

Explosion hazard



Only components which comply with the applicable regulations of Directive 94/9/EU may be fitted and operated.

Observe the Declaration of Conformity and all safety information for the components.

WARNING

Material damage and personal injury

If the gear unit is not used as designed, this may cause damage to the gear unit or the premature failure of components. Personal injury as a result of this cannot be ruled out.

Strict compliance with the technical data on the type plate is essential. The documentation must be observed.

1.4 Safety information

Observe all safety information, including that provided in the individual sections of this Operating Manual. All national and other regulations on safety and accident prevention must also be observed.

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

All work, e.g. transportation, storage, installation, electrical connection, commissioning, servicing and maintenance must be performed in a non-explosive atmosphere.

DANGER!

Severe personal injury

Serious physical and property damage may result from inappropriate installation, non-designated use, incorrect operation, non-compliance with safety information, unauthorised removal of housing components or safety covers and structural modifications to the gear unit.

- All work, e.g. transportation, storage, installation, electrical connection, commissioning, servicing, maintenance and repair must only be performed by qualified specialist personnel.
- Observe the Operating Manual
- Observe the safety information
- Observe the safety and accident prevention regulations.
- Tighten the drive elements or secure the parallel key before switching on.
- Do not make any structural modifications.
- Do not remove any safety devices.
- If necessary, wear hearing protection when working in the immediate vicinity of the gear unit.
- All rotating components must be provided with guards. In standard cases, covers are fitted by NORD . The covers must always be used if contact protection is not provided by other methods.

 **DANGER!**

Severe personal injury

The surfaces of gear units or geared motors may become hot during or shortly after operation.

- Installation and maintenance work must only be performed when gear unit is at a standstill and has cooled down. The drive must be isolated and secured to prevent accidental start-up.
- Wear protective gloves.
- Shield hot surfaces with contact guards.
- Do not store inflammable objects or substances in the immediate vicinity of the gear unit.

 **WARNING**

Serious personal injury and material damage

Serious injury and material damage due to improper transport are possible.

- No additional loads may be attached.
- Transportation aids and lifting gear must have an adequate load-bearing capacity.
- Pipes and hoses must be protected from damage.

 **CAUTION**

Cutting hazard

Danger of cuts from exterior edges of attachment adapters, flanges and covers.

Contact freezing with metallic components in case of low temperatures.

In addition to personal protective equipment, wear suitable protective gloves and suitable goggles during assembly, commissioning, inspection and maintenance, in order to prevent injuries.

It is recommended that repairs to NORD Products are carried out by the NORD Service department.

1.5 Other documents

Further information may be obtained from the following documents:

- Gear unit catalogues (G1000, G1012, G1014, G1035, G1050, G2000),
- Operating and maintenance instructions for the electric motor,
- if applicable, the Operating Manuals for attached or supplied options

1.6 Disposal

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

Gear unit components	Material
Gear wheels, shafts, rolling bearings, parallel keys, locking rings, ...	Steel
Gear unit housing, housing components, ...	Grey cast iron
Light alloy gear unit housing, light alloy gear unit housing components, ...	Aluminium
Worm gears, bushes, ...	Bronze
Radial seals, sealing caps, rubber components,...	Elastomers with steel
Coupling components	Plastic with steel
Flat seals	Asbestos-free sealing material
Gear oil	Additive mineral oil
Synthetic gear oil (type plate code: CLP PG)	Polyglycol-based lubricants
Cooling spiral, embedding material of the cooling spiral, screw fittings	Copper, epoxy, yellow brass

Table 2: Disposal of materials

2 Description of gear unit

2.1 Type designations and gear unit types

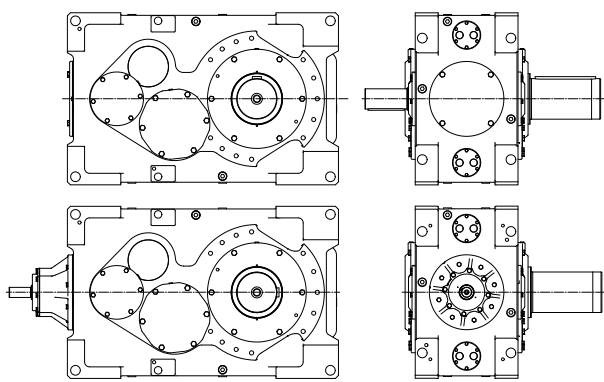
Gear unit types / Type designations					
Helical gear units					
SK 7207, SK 8207, SK 9207, SK 10207, SK 11207, SK 12207, SK 13207, SK 15207 (2-stage)					
SK 7307, SK 8307, SK 9307, SK 10307, SK 11307, SK 12307, SK 13307, SK 15307 (3-stage)					
Versions / Options					
-	Foot mounting with solid shaft	F1	Drive flange	NEMA	Standard NEMA motor attachment
A	Hollow shaft version	H	Covering cap as contact guard	S	Shrink disc
B	Fixing element	IEC	Standard IEC motor mounting	V	Solid shaft
CS2	Cooling system oil/air	L	Solid shaft both sides	VL	Reinforced bearings
D	Torque support	MF...	Motor base frame	VL2	Agitator version
EA	Hollow shaft with internal spline	...B	with brake	VL3	Drywell agitator version
ED	Elastic torque support	...K	with elastic coupling	W	Free input shaft
EV	Solid shaft with internal spline	...T	with hydrodynamic coupling	W2	Two drive shaft journals
EW	Drive shaft with internal spline	MS...	Motor swing base	W3	Three drive shaft journals
F	Block flange	...B	with brake		
FAN	Fans	...K	with elastic coupling		
FK	Collar flange	...T	with hydrodynamic coupling		

Table 3: Helical gear units - Type designation and gear unit types

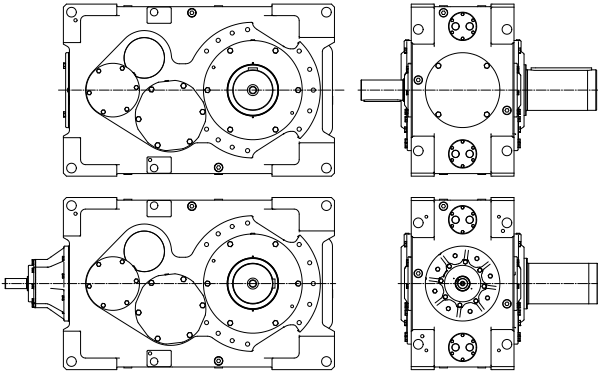
Gear unit types / Type designations					
Bevel helical gear unit SK 7407, SK 8407, SK 9407, SK 10407, SK 11407, SK 12407, SK 13407, SK 15407 (3-stage) SK 7507, SK 8507, SK 9507, SK 10507, SK 11507, SK 12507, SK 13507, SK 15507 (4-stage)					
					
Versions / Options					
-	Foot mounting with solid shaft	F1	Drive flange	NEMA	Standard NEMA motor attachment
A	Hollow shaft version	H	Covering cap as contact guard	S	Shrink disc
B	Fixing element	IEC	Standard IEC motor mounting	V	Solid shaft
CS2	Cooling system oil/air	L	Solid shaft both sides	VL	Reinforced bearings
D	Torque support	MF...	Motor base frame	VL2	Agitator version
EA	Hollow shaft with internal spline	...B	with brake	VL3	Drywell agitator version
ED	Elastic torque support	...K	with elastic coupling	W	Free input shaft
EV	Solid shaft with internal spline	...T	with hydrodynamic coupling	W2	Two drive shaft journals
EW	Drive shaft with internal spline	MS...	Motor swing base	W3	Three drive shaft journals
F	Block flange	...B	with brake		
FAN	Fans	...K	with elastic coupling		
FK	Collar flange	...T	with hydrodynamic coupling		

Table 4: Bevel helical gear units - Type designation and gear unit types

Double gear units consist of two single gear units.

Gear units SK 7207 – SK 15507 are to be treated according to these instructions and attached gear units are to be treated according to the operation and maintenance instructions B2000, each as two individual gear units.

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

3 Assembly instructions, storage, preparation, installation

Please observe all general safety instructions (please see chapter 1.4 "Safety information"), the safety information in the individual sections and the proper use (please see chapter 1.3 "Correct use").

3.1 Transporting the gear unit



WARNING

Hazard due to heavy loads

Severe injuries and material damage due to falling, swinging or tipping heavy loads are possible.

- To prevent injury, the danger area must be generously cordoned off.
- Standing under the gear unit during transport is **extremely dangerous**.
- Use adequately dimensioned and **suitable means of transportation**. Lifting tackle must be designed for the weight of the gear unit. The weight of the gear unit can be obtained from the dispatch documents.
- If geared motors have an additional eyebolt attached to the motor, this must **not** be used.
- Only the **four ring bolts** provided may be used for transporting the gear unit.



CAUTION

Slipping hazard

Transport damage to the gear unit or gear unit components may result from the leakage of lubricants. There is a slipping hazard due to leaked lubricants.

The drive unit must be inspected and may only be installed if no transportation damage or leaks are visible. In particular the radial seals and the sealing caps must be inspected for damage.

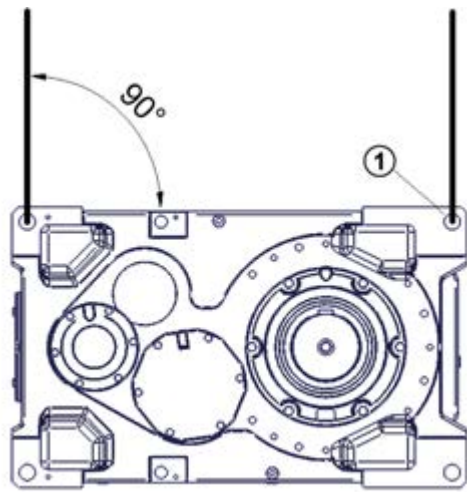
NOTICE

Gear unit damage

Damage to the gear unit due to improper use is possible.

- Prevent damage to the gear unit. Impacts to the free ends of the shafts may cause internal damage to the gear unit.
- The ends of the shafts must **not** be used for transportation, as this may seriously damage the gear unit.

For additional drive units and components, an additional lifting point may be necessary.



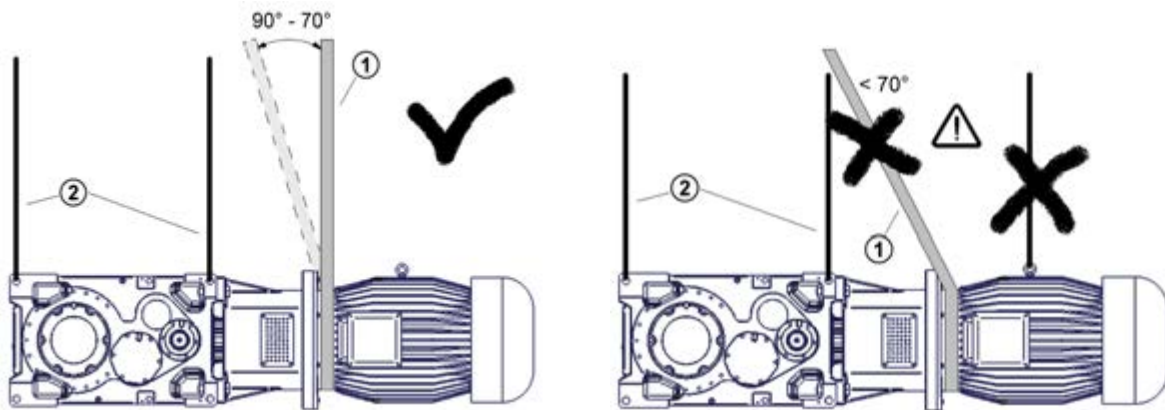
1 Transport eyebolts

Fig. 1: Gear unit lifting points

Gear units with motor adapter

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

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



Explanation

- 1 Lifting strap
- 2 Lifting rope

Fig. 2: Transport of gear unit with motor

Gear units on motor swing base or base frame

Gear units on a motor swing base or base frame must only be transported with **vertically** tensioned lifting ropes or chains. Only use the attachment points on the motor swing base or base frame.

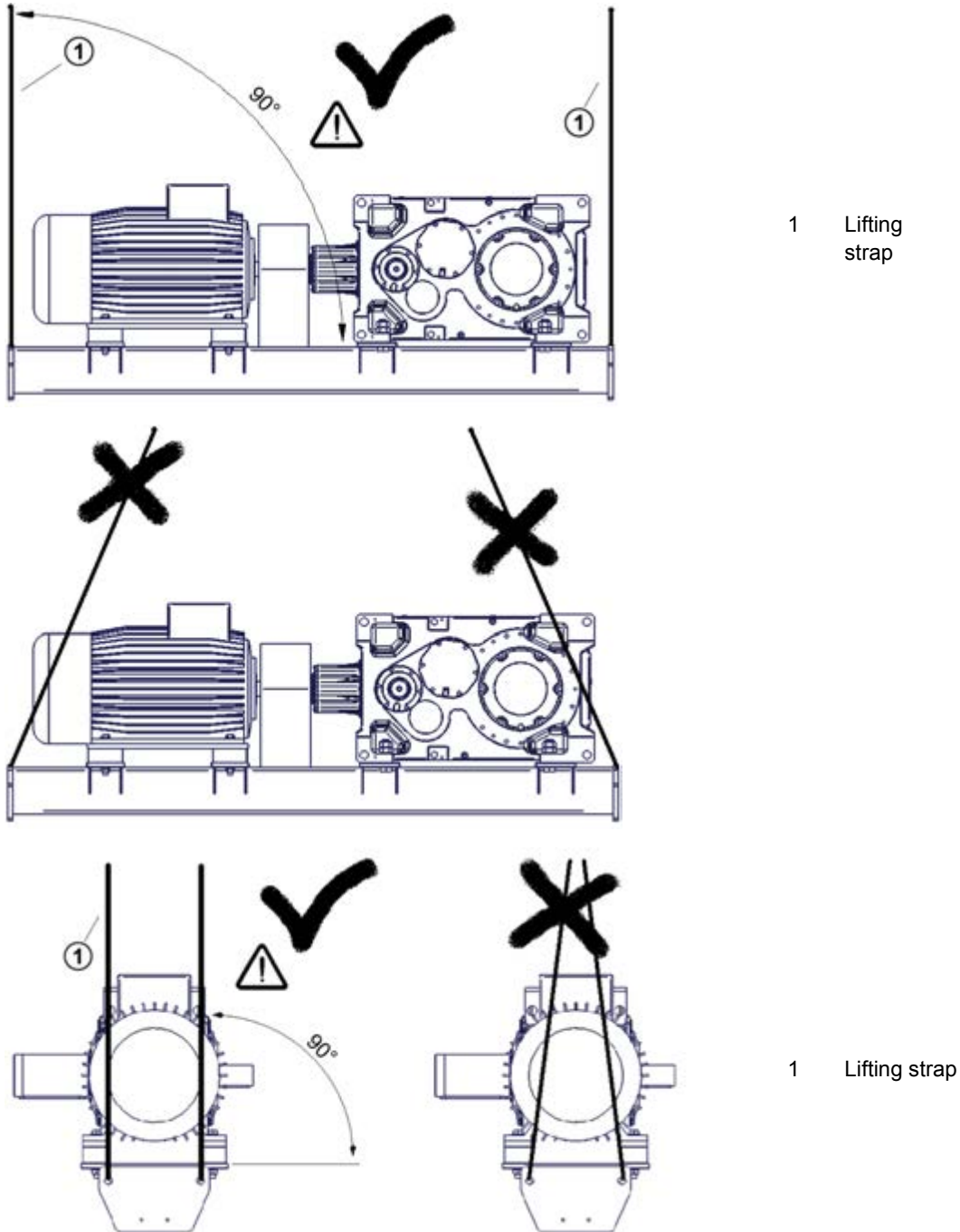


Fig. 3: Transport of gear unit with motor swing base or base frame

3.2 Storage

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

Store in the installation position (please see chapter 6.1 "Configurations and maintenance") and secure the gear unit 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



CAUTION

Injury to persons

Incorrect, or excessively long storage may result in malfunctions of the gear unit.

Perform an inspection of the gear unit prior to commissioning if the permissible storage time has been exceeded.



Information

Long-term storage

For storage or standstill periods in excess of 9 months, Getriebebau NORD recommends the long-term storage option.

With the long-term storage option and 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 installation position (please see chapter 6.1 "Configurations and maintenance") and secure the gear unit 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 gear 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

- 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 Inspecting the drive unit

⚠ DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

All work, e.g. transportation, storage, installation, electrical connection, commissioning, servicing and maintenance must be performed in a non-explosive atmosphere.

The drive unit must be inspected and may only be installed if:

- No damage, e.g. due to storage or transport is apparent. In particular the radial seals, the sealing caps and the covers must be inspected for damage.
- No leakage or no oil loss is visible.
- No corrosion or other indications of incorrect or damp storage is apparent.
- The packaging material has been completely removed.

3.5 Checking the type plate data

⚠ DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

It must be checked and ensured that the gear unit type, all technical data and the ATEX labelling conform to the planning of the plant or the machine.

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

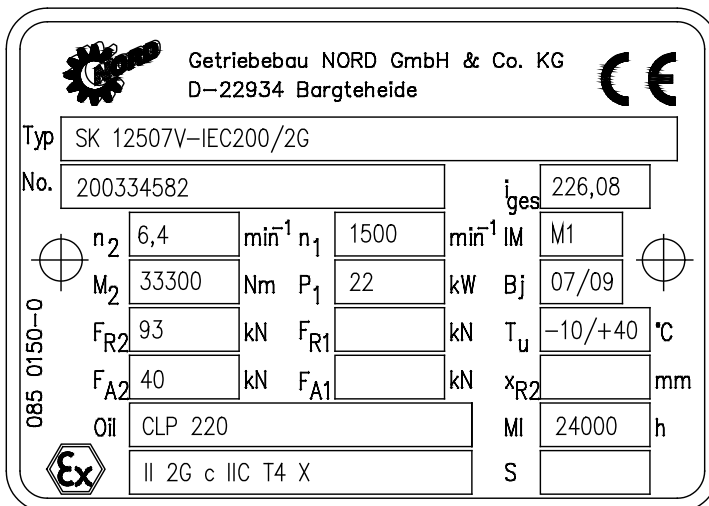



Fig. 4: Type plate (example)

Explanation of the name plate			
Abbreviations	Unit	Designation	See Section
Type	-	NORD gear unit type	
No.	-	Serial number	
i_{ges}	-	Overall gear unit ratio	
n_2	rpm	Rated speed of gear unit drive shaft*	
n_1	rpm	Rated speed of the gear unit drive shaft or the drive motor*	
IM	-	Configuration (installation orientation)	6.1
M_2	Nm	Max. permissible gear unit drive shaft torque	
P_1	kW	Max. permissible drive power or motor power	
Bj	-	Year of manufacture:	
F_{R2}	kN	Max. permissible transverse force on the gear unit driven shaft	3.9
F_{R1}	kN	Max. permissible transverse force on the gear unit drive shaft for option W	3.9
T_u	°C	Permissible ambient temperature for the gear unit	
F_{A2}	kN	Max. permissible axial force on the gear unit driven shaft	3.9
F_{A1}	kN	Max. permissible axial force on the gear unit drive shaft for option W	3.9
MI	h	Interval for general overhaul of the gear unit in operating hours or according to the specification of the dimensionless maintenance class CM	5.2
x_{R2}	mm	Max. dimension for the point of application of the transverse force F_{R2}	3.9
Oil	-	Gear unit oil type (standard designation)	6.2
Last line 	-	Labelling as per ATEX (DIN EN 13463-1): 1. Group (always II, not for mines) 2. Category (2G, 3G for gas or 2D, 3D for dust) 3. Ignition protection type if fitted (c) 4. Explosion group if applicable (IIC, IIB) 5. Temperature class (T1-T3 or T4 for gas) or max. surface temperature (e.g. 125°C for dust) or special max. surface temperature see special documentation (TX) 6. Temperature measurement on commissioning (X)	4.2
S	-	Number of the special documentation, consisting of serial no. / year	
* 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 drive shaft journal (please see chapter 3.9 "Fitting hubs on the gear shafts").			

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.

3.6 Checking the configuration

 **DANGER!**

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- The gear unit may only be operated in the stated configuration.
 - The permissible configuration is stated on the name plate (IM...). If an X is present in the field IM, the special documentation, whose number is in field S, must be observed. Section 6.1 "Configurations and maintenance" or the special documentation shows the configurations of the individual gear unit types.
 - It must be checked and ensured that the configuration as stated on the type plate complies with the installation orientation and that the installation orientation does not change during operation.
-

3.7 Preparing for installation



CAUTION

Injury to persons

Transport damage may cause malfunctions of the gear unit, which may cause material damage or personal injury.

Please inspect the delivery for transport and packaging damage immediately on receipt. Report any damage to the carrier immediately. Gear units with transport damage must not be commissioned.

The drive unit must be inspected and may only be installed if no damage is apparent. In particular the radial seals and the sealing caps must be inspected for damage.

Pay attention to leaked lubricants, they may cause slips.

All bare metal surfaces and shafts of the gear unit 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.



DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

Care must be taken that drive elements attached to the gear unit, such as clutches, pulleys etc. and drive motors are also ATEX-compliant.



Information

Oil filling

Gear units and geared motors are filled with oil as standard when delivered from the factory. For filling, the lubricant stated on the type plate must be used. Please refer to Section 6.2 "Lubricants" for the amount of lubricant.

As an option, the gear unit can be filled with lubricant. In all cases, the oil level must be checked as per Section 4.1 "Check the oil level" prior to commissioning.

In applications where an incorrect rotational direction may result in damage or potential risk, the correct rotational direction of the drive shaft is to be established by test running the drive when uncoupled and guaranteeing such for subsequent operation.

Gears with integrated return stops are marked with arrows on the driven/driving sides. The arrows point in the rotation direction of the gear unit. When connecting the motor and during motor control, it must be ensured, e.g. by testing the rotating field, that the gear unit can only operate in the direction of rotation (for further explanations see Catalogue G1000 and WN 0-000 40).

NOTICE

Gear unit damage

With 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.

Take care that the direction of rotation of the gear unit is correct when connecting the motor and the motor control unit.

NOTICE

Gear unit damage

Damage to the gear unit due to aggressive or corrosive environments.

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

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

Double gear units consist of two single units and are equipped with 2 oil chambers and 2 pressure vents.

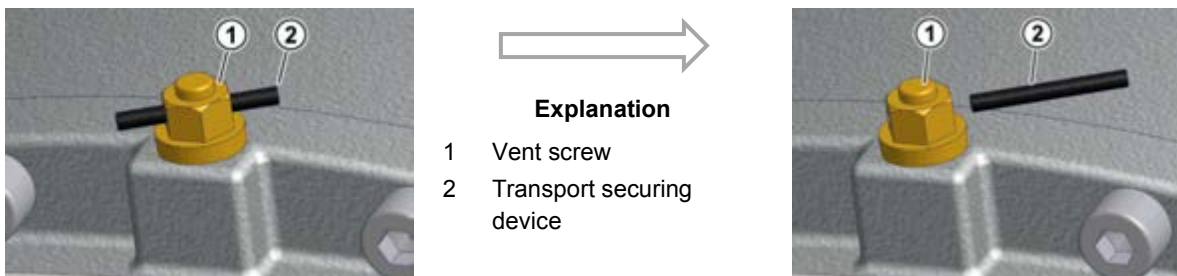


Fig. 5: Activation of the pressure vent

3.8 Installing the gear unit

⚠ DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- No explosive atmosphere must be present when installing the gear unit.
- The cooling air supplied to the gear unit/geared motor must be within the permissible temperature range stated on the type plate.
- In case of direct sunlight falling onto the gear unit, the cooling air supplied to the gear unit/geared motor must be at least 10 °C below the highest permissible temperature of the ambient temperature range T_u , which is stated on the type plate.

**WARNING****Hazard due to heavy loads**

Danger of injury and damage to the device may be caused by incorrect attachment.

- The eyebolts screwed into the gear unit must be used during installation.
- Do not attach additional loads to the gear unit.
- Use the additional eyebolts attached to the geared motor if fitted.
- Avoid pulling the eyebolts at an angle.

**WARNING****Danger of burns**

The surfaces of gear units or geared motors may become hot during or shortly after operation.

Hot surfaces which can be touched directly must be protected with a contact guard.

NOTICE**Damage to the gear unit due to overheating**

The gear unit may be damaged by overheating.

During installation::

- Ensure a free flow of air to all sides of the gear unit.
- Ensure adequate space around the gear unit.
- With geared motors, the cooling air of the motor fan must be able to flow unobstructed onto the gear unit.
- Do not enclose or encase the gear unit/geared motor.
- Do not subject the gear unit to highly energetic radiation.
- Do not direct warm exhaust air from other units onto the gear unit/geared motor.
- The base or flange to which the gear unit is attached must not input any heat into the gear unit during operation.
- Do not allow dust to accumulate in the area of the gear unit

The base and/or flange to which the gear unit is fitted should be vibration-free, torsionally strong and flat. The smoothness of the mating surface on the base or flange must be according to tolerance class K according to DIN ISO 2768-2. All contamination to the bolting surfaces of gear unit and base and/or flange must be thoroughly removed.

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

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

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.

Information

Orientation

The service life of shafts, bearings and couplings depends on the precision of alignment of the shaft. Therefore, zero deviation should always be aimed for in alignment. For this, e.g. the requirements for the coupling should be obtained from the special Operating Manuals.

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

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

The gear unit must be installed in the correct configuration (please see chapter 6.1 "Configurations and maintenance"). All gear unit feet and/or all flange bolts on each side must be used. Bolts must have a minimum quality of 8.8. The bolts must be tightened with the correct torques (please see chapter 6.4 "Torque values"). Tension-free bolting must be ensured, particularly for gear units with a foot and flange.

Oil checking and oil drain screws must be accessible.

3.9 Fitting hubs on the gear shafts

⚠ DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

Care must be taken that drive and driven elements attached to the gear unit must also be ATEX-compliant.

⚠ DANGER!

Risk of injury

There is a danger of injury due to drive and driven elements.

- Drive and driven elements, such as belt drives, chain drives and couplings must be fitted with contact protection.

NOTICE

Gear unit damage

The gear unit may be damaged by axial forces.

- Do not subject the gear unit to harmful axial forces when fitting the hubs. In particular, do not hit the hubs 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 onto the gear unit. In particular, do not hit the hubs with a hammer.

i Information

Assembly

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

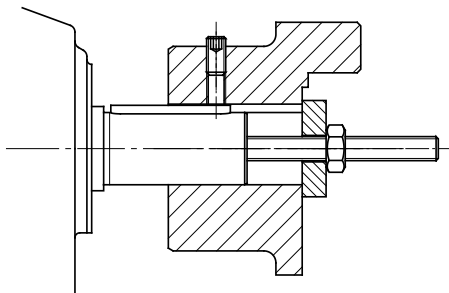


Fig. 6: Example of a simple pulling device

Drive and driven elements must only introduce the maximum radial transverse forces F_{R1} and F_{R2} as stated in the catalogue and the axial forces F_{A1} and F_{A2} into the gear unit (please see chapter 3.5 "Checking the type plate data"). Observe the correct tension, particularly on belts and chains.

Additional loads due to unbalanced hubs are not permitted.

⚠ DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- The transverse force must be applied to the gear unit as closely as possible.
- 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 driven shafts, the application of the transverse force F_{R2} must not exceed the dimension X_{R2} .
- If the transverse force F_{R2} for the driven shaft is stated on the type plate, but no dimension X_{R2} is stated, the application of the force is assumed to be to the centre of the shaft journal.

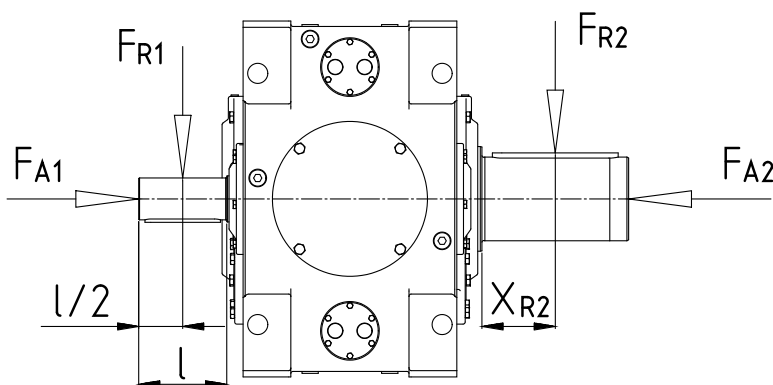


Fig. 7: Permissible application of force to drive and driven shafts

3.10 Fitting push-on gear units

NOTICE

Gear unit damage

The bearings, gear wheels, shafts and housing may be damaged by incorrect fitting.

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

Assembly and subsequent dismantling is aided 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. Clean these points on the driven shaft after a running-in time of approx. 24 hours. This escape of grease is not due to a leak in the gear unit.

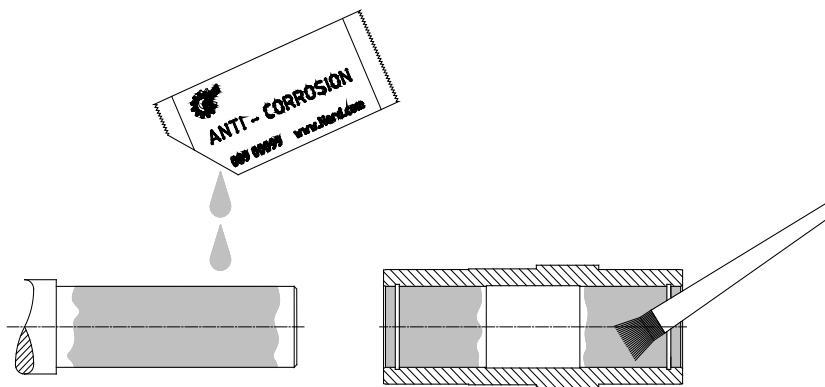


Fig. 8: Applying lubricant to the shaft and the hub

i Information

Fixing element

The gear unit can be fitted to shafts with and without a shoulder using the fastening element (Option B). Tighten the bolt of the fastening element to the correct torque (please see chapter 6.4 "Torque values").

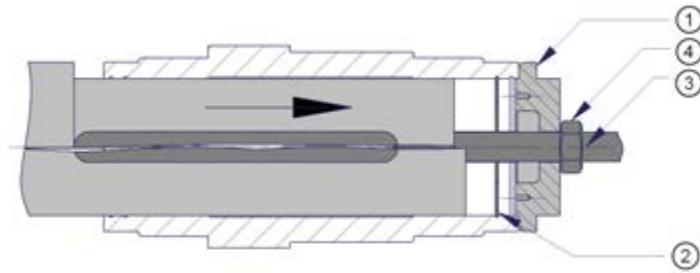


Fig. 9: Assembly

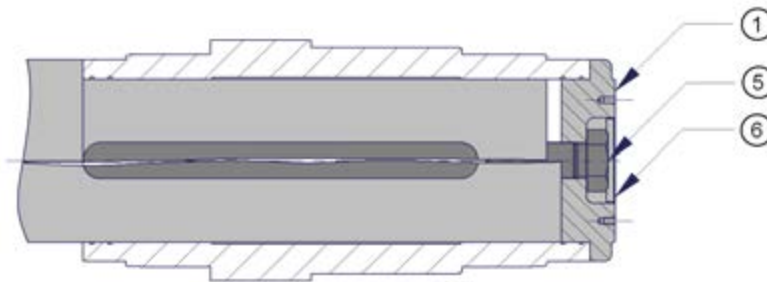


Fig. 10: Securing

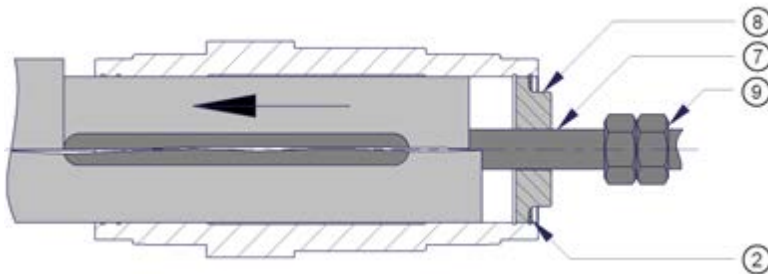


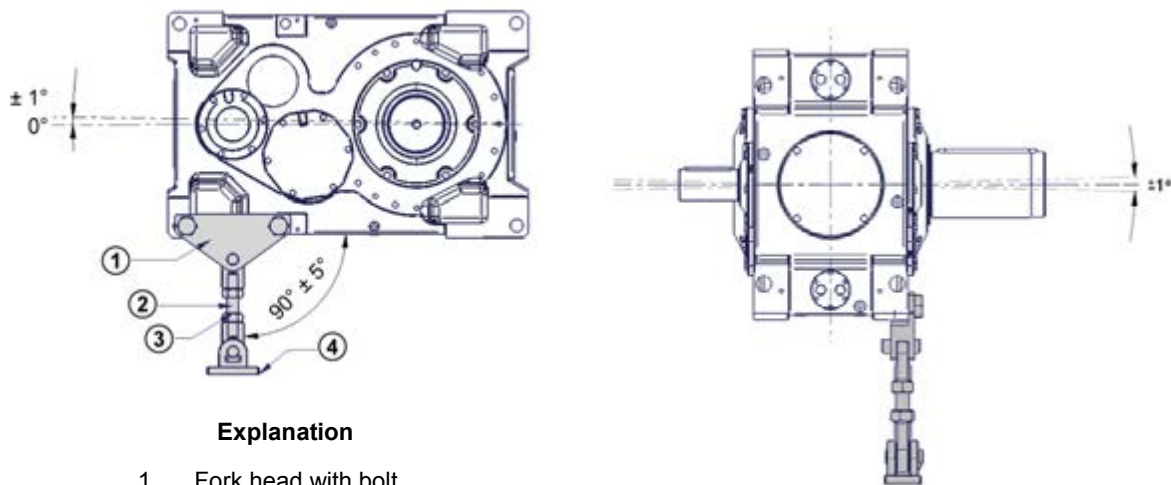
Fig. 11: Dismantling

Explanation

- 1 Fixing element
- 2 Circlip
- 3 Assembly – threaded rod
- 4 Assembly – threaded nut
- 5 Securing screw
- 6 Protective cover
- 7 Disassembly of threaded rod
- 8 Disassembly element
- 9 Disassembly – threaded nut

When assembling push-on gears with torque supports, the support must not be distorted. Distortion-free assembly is made easier if an elastic element (Option DG) is used.

3.11 Torque support



Explanation

- 1 Fork head with bolt
- 2 Threaded bolt
- 3 Maintenance-free joint head
- 4 Fork plate with bolt

Fig. 12: Permissible installation deviations of the torque support

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

Assembly should be carried out from the side of the machine, in order to reduce the bending moment on the machine shaft. Tension and pressure and installation upwards or downwards are not permissible.

Distortion of the torque support during assembly or operation must be avoided, as otherwise the service life of the output shaft bearings may be reduced. Torque supports are not suitable for the transmission of radial forces, therefore they may only be used in combination with motor adapters or couplings which cannot transmit radial forces.

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

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

Tighten the fastenings of the torque support with the correct tightening torques (please see chapter 6.4 "Torque values") and secure against loosening (e.g. Loctite 242, Loxeal 54-03).

3.12 Fitting shrink discs



CAUTION

Risk of injury

Risk of injury from incorrect mounting and dismantling of the shrink disc.

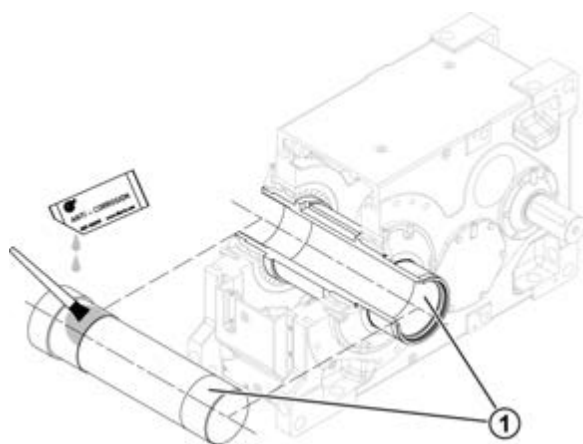
Observe the instructions.

NOTICE

Gear unit damage

If the tensioning bolts are tightened without the solid shaft inserted, the hollow shaft may be permanently deformed.

Do not tighten bolts if the solid shaft is not inserted!



1 No grease here

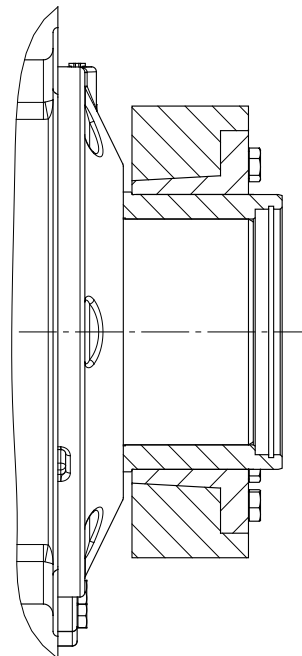


Fig. 13: Mounting the solid shaft with a shrink disc

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 up to the collar onto the hollow shaft (see illustration).
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 de-greased 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. Tighten the tensioning bolts successively in a clockwise direction by several turns – not crosswise – with approx. $\frac{1}{4}$ rotation per turn.
9. After tightening the tensioning bolts the face of the inner ring on the screw side must be flush with the face of the outer ring. The distortion of the shrink disc must be checked visually.
10. 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. $\frac{1}{4}$ rotation per turn. Do not remove the bolts from their thread.
2. If the external ring does not detach from the inner ring after approx. one turn of all screws, the external ring can be released with the aid of the push-off thread. For this, the required number of tensioning bolts are uniformly screwed into the push-off thread until the external ring separates from the internal 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.

3.13 Fitting the covers

 **DANGER!**

Explosion hazard



Explosion hazard due to damaged and rubbing covers. Failure to comply may cause severe, or even fatal injuries.

- Damaged covers must not be used, as they may cause rubbing.
- Covers must be inspected for transportation damage e.g. dents and warping before they are fitted.

 **WARNING**

Risk of injury

There is a danger of injury due to shrink discs and freely rotating shaft journals.

- Use a cover (Option H) as a guard.
- If this does not achieve sufficient protection against contact according to the required protection type, the machinery and plant constructor must ensure this by means of special attached components.

All fixing screws must be used and coated prior to use with a securing lubricant e.g. Loctite 242, Loxeal 54-03 and tightened to the correct torque (please see chapter 6.4 "Torque values").

3.14 Fitting a standard motor

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- Only standard motors with an adequate ATEX Zone category according to the type plate may be used.
- In addition, for ATEX category 2D gear units (see the ATEX labelling on the last line of the gear unit type plate), the motor must have at least protection class IP6x.
- Only couplings which are approved and labelled for use in explosion hazard areas may be used. The ATEX labelling must conform to the details of the system and/or machine design.

The maximum permitted motor weights indicated in the table below must not be exceeded when attaching the motor to an IEC- / NEMA adapter:

Maximum permitted motor weights							
IEC motor size	63	71	80	90	100	112	132
NEMA motor size		56C	143T	145T	182T	184T	210T
Maximum motor weight [kg]	25	30	40	50	60	80	100
IEC motor size	160	180	200	225	250	280	315
NEMA motor size	250T	280T	324T	326T	365T		
Maximum motor weight [kg]	200	250	350	500	700	1000	1500
Transnorm	315	355	400	450			
Maximum motor weight [kg]	1500	2200	3200	4400			

Table 5: Motor weights



WARNING

Risk of injury

Severe injuries may be caused by rapidly rotating parts when installing and servicing couplings.

- Secure the drive unit against accidental switch-on.
- The operating and assembly instructions for the coupling must be observed.

Gear units with IEC adapters must be operated with self-cooling motors compliant with IC411 (TEFC) or externally cooled IC416 (TEBC) motors compliant with EN60034-6 which generate a continuous flow of air in the direction of the gear unit. Please consult NORD if IC410 (TENV) motors without fans are to be used.

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

1. Clean motor shaft and flange surfaces of 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 motor parallel key engages into the groove in the sleeve on tightening.
3. Pull the coupling sleeve onto the motor shaft according to the instructions of the motor manufacturer. The shaft end of the motor must be adjusted so that it is parallel with the face of the coupling (see Fig. 14).
4. Secure the coupling half with the threaded pin. Prior to use, the threaded pin must be coated with a securing adhesive e.g. Loctite 242, Loxeal 54-03 and tightened to the correct torque (please see chapter 6.4 "Torque values").
5. Sealing of the flange surfaces of the motor and the adapter is recommended if the motor is installed outdoors or in a humid environment. Before the motor is installed, the flange surfaces must be completely coated with surface sealant Loctite 574 or Loxeal 58-14 so that the flange seals after mounting.
6. Mount the motor to the adapter. Do not forget to fit the gear rim or the sleeve.
7. Tighten the bolts of the adapter with the correct torque (please see chapter 6.4 "Torque values").

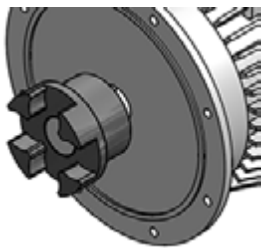


Fig. 14: Fitting the coupling to the motor shaft



Information

Coupling

The operating instructions for the coupling must be observed.

3.15 Fitting the external oil / air cooler (cooling unit)

! DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- For operation in explosion hazard atmospheres, only approved and labelled cooling systems may be used.
- The ATEX labelling must conform to the details of the system and/or machine design.

NOTICE

External cooling system

- The separate manufacturer's documentation must be observed for assembly.
- With circulation lubrication (LC) use the connection diagram included by NORD.

Connect the cooling system as shown in the illustration. Other connection plans can be agreed upon during consultation with NORD.

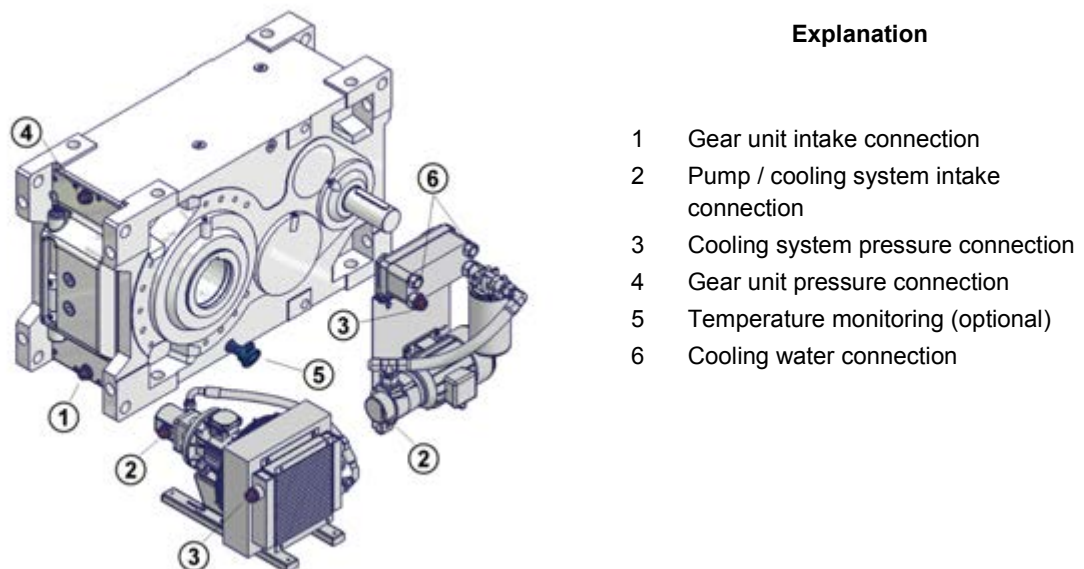


Fig. 15: Industrial gear unit with CS1 and CS2 cooling systems

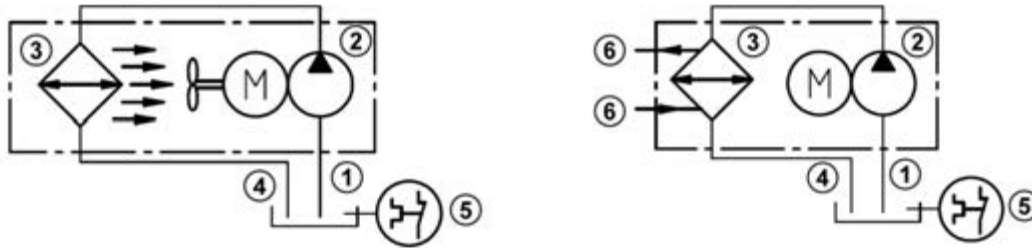


Fig. 16: Hydraulic diagram of the industrial gear unit with CS1 and CS2 cooling systems

3.16 Temperature sticker

⚠ DANGER!

Explosion hazard



Explosion hazard due to lack of labelling. Failure to observe this may cause severe, or even fatal injuries.

With temperature class T4 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.: 8510400).

The temperature class or the maximum surface temperature can be seen from the ATEX labelling in the last line of the type plate.

Examples: II 2G c IIC **T4 X** or II 3D **125°C X**

The temperature label must be attached in the area of the drive mount. For gear units with an IEC / NEMA adapter, the temperature label must be attached as for a helical gear unit.

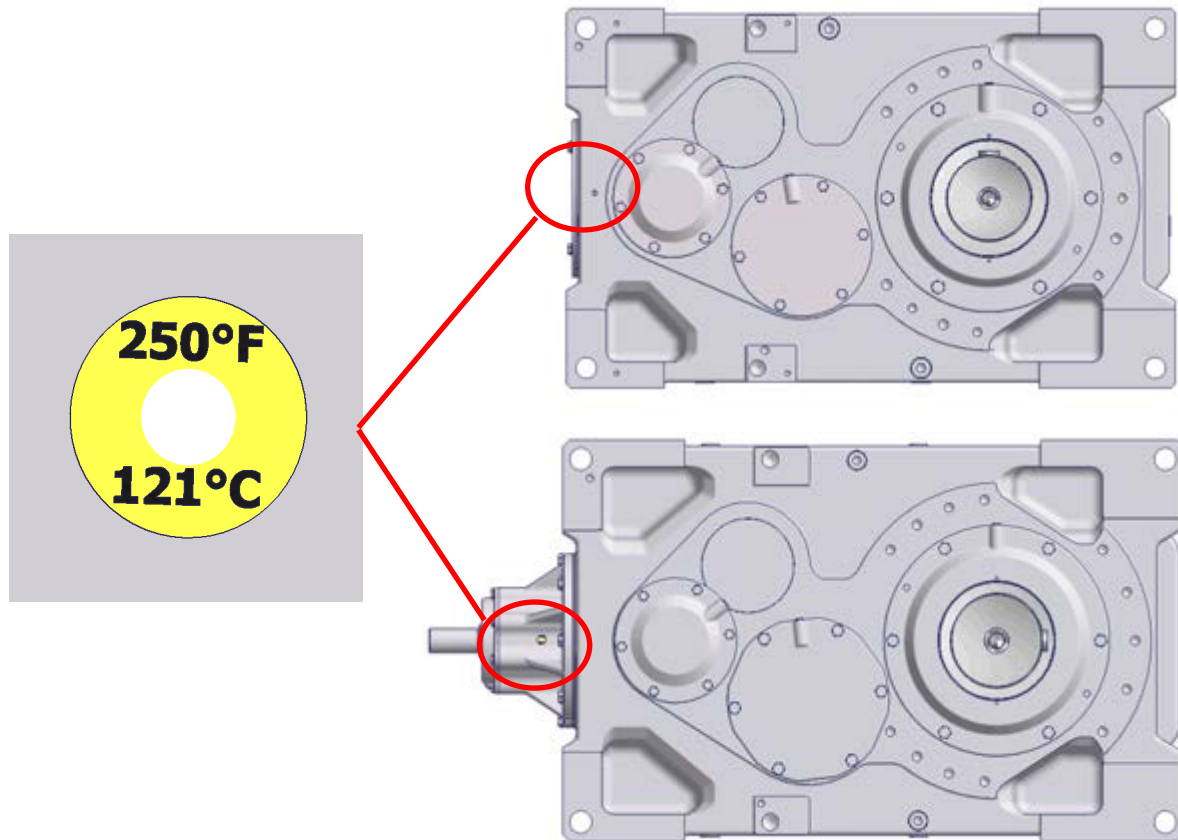


Fig. 17: Position of the temperature label for helical and helical bevel gear units

3.17 Subsequent paintwork

NOTICE

Damage to the device

For retrospective painting of the gear unit, the radial seals, rubber elements, pressure venting valves, hoses, type plates, adhesive labels and motor coupling components must not come into contact with paints, lacquers or solvents, as otherwise components may be damaged or made illegible.

For subsequent painting, note that for use in Category II2G Group IIC the paint thickness must not exceed 0.2 mm.

4 Commissioning

4.1 Check the oil level

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.
Before commissioning, the oil level must be checked with the supplied dipstick.

WARNING

Danger of burns

Danger of burns due to hot oil.

- Allow the gear unit to cool down before carrying out maintenance or repair work.
- Wear protective gloves.

The installation must comply with the configuration on the type plate. Section 6.1 "Configurations and maintenance" describes the configurations and the corresponding oil level screws. With double gear units, the oil level must be checked on both units. The vent must be in the position indicated in Section 6.1 "Configurations and maintenance".

The oil level does not need to be checked on gear units without oil level screw (please see chapter 6.1 "Configurations and maintenance").

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

Check 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 switch-on.
2. Gear units with oil level screw:
 - Unscrew the oil level screw for the particular configuration (please see chapter 6.1 "Configurations and maintenance").
 - Check the oil level in the gear unit with the dipstick supplied (Part No.: 283 0050), as shown in Fig. 18. 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 screw lock coating in the thread of the oil drain screw or 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.
- Check the sealing ring for damage. Replace with a new sealing ring in case of damage.
- Fit the oil level screw together with the sealing ring and tighten to the correct torque (please see chapter 6.4 "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 6.4 "Torque values").

3. 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.

4. Final check:

- All previously removed screws must be screwed back in correctly.

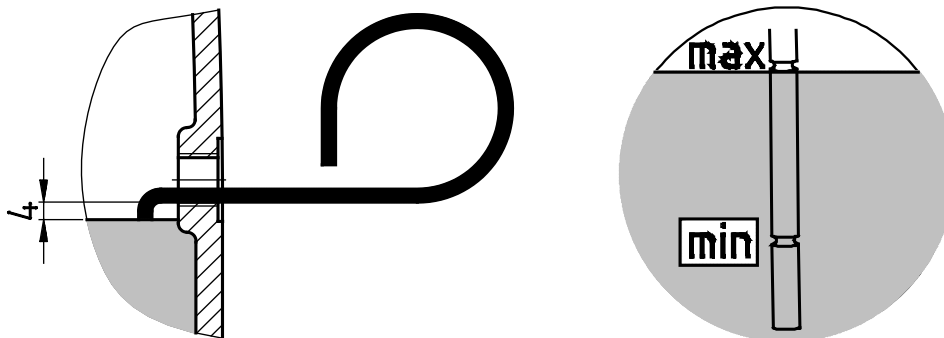


Fig. 18: Checking the oil level with a dipstick

4.2 Temperature measurement

The details of the ATEX temperature class or the maximum surface temperature are based on normal installation conditions (please see chapter 3.7 "Preparing for installation"). Even small changes to the installation conditions can have a significant effect on the temperature of the gear unit.

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

On 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 type plate.)

For the temperature measurement, a normal temperature measuring device is required, with 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} must be measured close to the temperature sticker (please see chapter 3.16 "Temperature sticker").

3. Measure the temperature of the air T_{um} in the immediate vicinity of the gear unit.

! DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

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

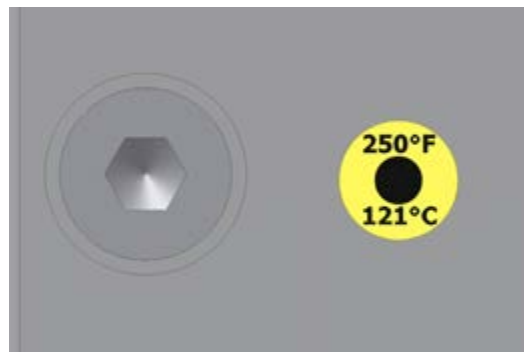
- The measured air temperature T_{um} is within the permissible range stated on the type plate.
- The measured temperature of the surface of the gear unit housing T_{gm} is below 121 °C and the temperature sticker has not turned black (see Fig. 20).
- The measured temperature of the surface of the gear 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.:

ATEX labelling: II 2G c T4 / II 3G T4 :	$T_{gm} + T_u - T_{um} < 135 \text{ °C} - 15 \text{ °C}$
ATEX labelling: II 2D c Tmax / II 3D Tmax:	$T_{gm} + T_u - T_{um} < T_{max} - 15 \text{ °C}$
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 according to the type plate in °C

Fig. 19: ATEX labelling



Centre dot is **white**: OK



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

Fig. 20: Temperature sticker

4.3 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. For this, the cover must be removed and a check carried out whether the marking described in Section 3.12 "Fitting shrink discs" shows a relative movement of the hollow shaft of the gear unit and the machine shaft. After this, the cover must be fitted as described in Section 3.13 "Fitting the covers".

Information

Lubrication of the shaft sealing rings

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.

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

The drive must be shut down and Getriebebau NORD consulted if any irregularities are observed during the checks described above.

4.4 Lubricant cooling with external oil / water cooler (cooling unit)

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

When commissioning the cooling system, the operating instructions of the oil / air cooler or oil / water cooler must be observed.

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- The drive unit may only be commissioned after the cooling system has been connected and commissioned.
- For operation in explosion hazard atmospheres, only approved and labelled cooling systems may be used. The ATEX labelling must conform to the details of the system or machine design.

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- The temperature of the cooling water and the cooling water flow rate must be supervised and ensured by the operator.
- The ATEX approval is void if these instructions are not observed!

NOTICE

Gear unit damage

The gear unit may be damaged by overheating.

With oil / air coolers an adequate air intake must be ensured. The air inlet grille and the fan blades must be kept clean.

Information

Frost damage

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

Temperature regulation can optionally be provided by using a temperature switch or a resistance thermometer, which is installed in the oil sump of the gear unit.

4.5 Operation with pressure circulation lubrication

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- The drive unit may only be commissioned after the pump for the pressure circulation lubrication has been connected and commissioned.
- Observe the operating instructions for the pump.
- For operation in explosion hazard atmospheres, only approved and labelled circulation pumps may be used. The ATEX labelling must conform to the details of the system and/or machine design.
- During operation, the function of the lubricant circulation must be monitored and ensured.
- The gear unit must be shut down immediately in case of failure of the lubrication circulation.

Information

Lubricant circulation

If pressure circulation lubrication is used, the operational viscosity of the gear oil on start-up must not exceed 1800 cSt. For ISO-VG220 this corresponds to a maximum temperature of 10 °C for mineral oil, and a temperature of at least 0 °C for synthetic oil.

All gear units equipped with lubricant circulation are provided with a pressure switch to monitor the pump function. The connection of the pressure switch and the evaluation of the signal must be carried out by the operator. The pressure switch must be connected so that operation is only possible if the oil pump has built up pressure. During commissioning, a lower pressure is permissible for a short time.

4.6 Pressure safeguard

The pressure monitor is an electric switch, which monitors the lubrication pressure of gear units with circulation lubrication or targeted lubrication. If the pre-set pressure is undershot, the applied electric signal is interrupted by the pressure monitor. Evaluate the signal accordingly.

NOTICE

Gear unit damage

Insufficient lubrication pressure may cause damage to the gear unit

- Connect the pressure monitor so as to be fully functional before starting operation for the first time.
- The pressure monitor can only be used in combination with a monitoring system.

Information

Commissioning

Evaluate the pressure monitor after initially operating the pump, as pressure must be built up.

4.7 Operation with back stop

Optional backstops, which allow rotation in only one direction and block the other direction of rotation are available for attachment to the gear unit. The lubrication of the backstop is by means of the gear oil. The backstops lift off due to centrifugal force above a certain lifting speed (see Table 6) and are then free of wear.

 **DANGER!**

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.
In continuous operation, back stops may only be operated at above the lift-off speed.

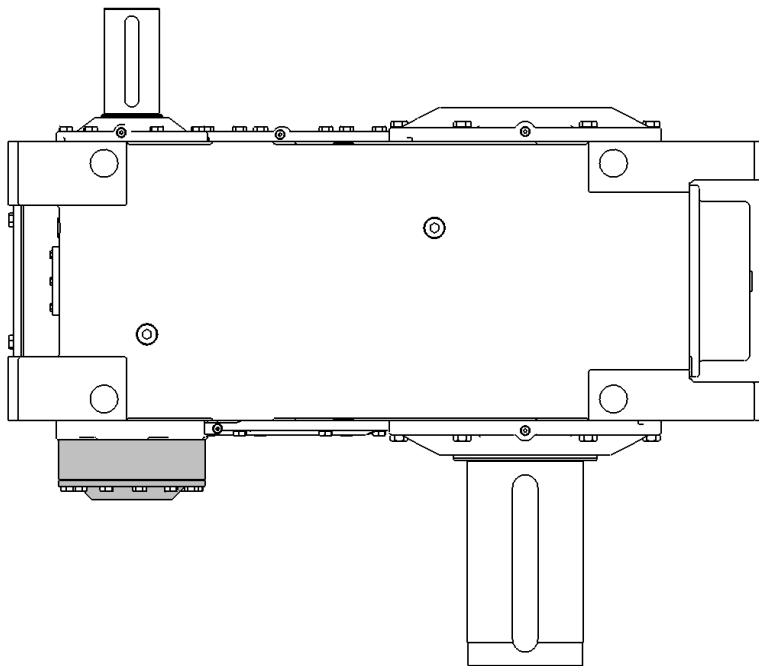


Fig. 21: Industrial gear unit with back stop

Gear units	Stages	Nominal gear ratio i_N	Lift-off speed n_1 [rpm]
SK 112 07	2	5.6 - 20	320
SK 113 07	3	31.5 - 112	400
		22.4 - 28	320
SK 114 07	3	12.6 - 71	1136
SK 115 07	4	112 - 400	1420
		80 - 100	1136
SK 122 07	2	5.6 - 20	250
SK 123 07	3	22.4 - 112	320
SK 124 07	3	12.6 - 71	888
SK 125 07	4	80 - 400	1136
SK 132 07	2	5.6 - 20	250
SK 133 07	3	22.4 - 112	320
SK 134 07	3	12.6 - 71	888
SK 135 07	4	80 - 400	1136
SK 152 07	2	5.6 - 20	220
SK 153 07	3	22.4 - 112	250
SK 154 07	3	12.6 - 71	781
SK 155 07	4	80 - 400	888

Table 6: Lift-off speeds for back stops

4.8 Checklist

Checklist		
Subject of check	Date checked:	Information see Section
Is any transportation damage or damage apparent?		3.4
Does the labelling on the type plate conform to the specifications?		6.1 3.5
Does the required configuration conform with the actual installation?		3.6
Is the pressure vent screwed in?		3.7
Do all drive and driven elements have ATEX approval?		3.7
Are the external gear shaft forces within permitted limits (chain tension)?		3.9
Is the torque support correctly fitted?		3.11
Are contact guards fitted to rotating components?		3.13
Does the motor also have a relevant ATEX approval?		3.14
Is the temperature sticker affixed?		3.16
Has the correct oil level for the configuration been checked?		4.1
Is the cooling system connected?		4.4
Has the pressure safeguard been functionally connected?		4.6
Has the temperature measurement been carried out?		4.2
Has the centre of the temperature sticker turned black?		4.3
Has the gear unit been checked with a test run?		4.3
Has the shrink disk connection been checked for slippage?		4.3

4.9 Operation of the gear unit in explosive areas

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- When operating the gear unit, the instructions in this operating manual must be complied with.
- The prescribed inspection and servicing intervals must be complied with.
- It must be ensured that the power ratings stated on the type plate are not exceeded. If, e.g. for variable speed drive units, there are several operating points, the maximum permissible drive power P1 or the maximum permissible torque on the driven shaft M2 or the maximum permissible speed must not be exceeded at any operating point. Overload of the gear unit must be ruled out.
- If the gear unit is equipped with a cooling coil, it may only be put into operation if the cooling coil has been connected to the cooling circuit and the cooling circuit is in operation. The temperature of the cooling fluid and the cooling fluid flow rate must be monitored and ensured by the operator.
- Gear units with an integrated back stop on the drive shaft may only be operated at more than the minimum speed of the gear unit drive shaft, $n_{1min} = 900$ rpm.
- The painting of the gear unit is only designed for Category 2G Group IIB. **For use in Category 2G Group IIC (Zone 1 Group IIC)** the gear unit must not be used or installed in areas in which processes which cause electrostatic charging are to be expected. This also includes occasional manual rubbing of the gear unit housing; cleaning may only be carried out with a cloth which is moistened with water.
- During operation, if any of the irregularities described in Section 4.3 "Checking the gear unit" are detected, or the temperature sticker has turned black, the gear unit must be shut down and Getriebebau NORD must be consulted.

5 Service and maintenance



WARNING

Danger of burns

The surfaces of gear units or geared motors may become hot during or shortly after operation.

- Installation and maintenance work must only be performed when gear unit is at a standstill and has cooled down. The drive must be isolated and secured to prevent accidental start-up.
- Wear protective gloves.
- Shield hot surfaces with contact guards.

5.1 Service and Maintenance Intervals

Service and Maintenance Intervals	Service and Maintenance Work	Information see Section
Weekly or every 100 operating hours	<ul style="list-style-type: none"> • Check the gear unit for unusual running noises and/or vibrations • Visual inspection for leaks 	5.2
At least once per month	<ul style="list-style-type: none"> • Check the cover and the attachment adapter for dirt 	5.2
Every 2500 operating hours, at least every six months	<ul style="list-style-type: none"> • Visual inspection of the rubber buffer • Visual inspection of hose • Visual inspection of shaft sealing ring • Visual inspection of the temperature sticker • Remove dust (only for category 2D) • Check the oil level • Re-grease (for agitator bearings Option VL2 / VL3) • Checking the oil filter • Clean or replace the pressure venting screw 	5.2
At least every year	<ul style="list-style-type: none"> • Check the oil / air cooler for dirt 	5.2

Service and Maintenance Intervals	Service and Maintenance Work	Information see Section
For operating temperatures up to 80 °C. every 10000 operating hours, at least every 2 years Higher temperatures reduce the oil change intervals	<ul style="list-style-type: none"> • Change oil (if filled with synthetic oil, this period is doubled) Reduction of lubricant replacement interval under extreme operating conditions (high humidity, aggressive environment and high temperature fluctuations) • Replace the oil filter • Replace shaft sealing rings if worn 	5.2
Every 20000 operating hours, at least every 4 years	<ul style="list-style-type: none"> • Re-lubrication of the bearings in the gear unit 	5.2
According to the interval specified on the type plate MI = Operating hours at least every 10 years (Only for Category 2G and 2D)	<ul style="list-style-type: none"> • General overhaul 	5.2

Information

Oil change intervals

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



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- No explosive atmosphere must be present during servicing and repair work. Servicing and maintenance work must only be performed by qualified specialist personnel.
- When cleaning the surface of the gear unit, do not use and procedures or materials, which could cause electrostatic charging of the surface of the gear unit.

WARNING

Severe personal injury

Severe injury and material damage may be caused by incorrect servicing and maintenance work.

Servicing and maintenance work must only be performed by qualified specialist personnel. Wear the necessary protective clothing for servicing and maintenance work (e.g. industrial footwear, protective gloves, goggles, etc.)



WARNING

Severe personal injury

Risk of injury due to rapidly rotating and hot machine components.

Installation and maintenance work must only be performed when gear units are at a standstill and have cooled down. The drive must be isolated and secured to prevent accidental start-up.



WARNING

Severe personal injury

Particles or liquids thrown up during servicing and maintenance can cause injuries.

- Observe the safety information
- Pressure washers and compressed air must not be used for cleaning



WARNING

Danger of burns

Danger of burns due to hot oil.

- Allow the gear unit to cool down before carrying out maintenance or repair work.
- Wear protective gloves.

Visual inspection for leaks



DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- 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 radial seals, cover caps, screw plugs, hoses and housing joints should be checked.

If leaks are suspected, the gear unit should be cleaned, the oil level checked (please see chapter 4.1 "Check the oil level") and checked again for leaks after approx. 24 hours. If a leak is confirmed (dripped oil), the gear unit must be repaired immediately. Please contact the NORD service department.

Check for running noises



DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- 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 cover and the attachment adapter for dirt

(Only necessary for Category 2D)

For gear units fitted with a cover (Option H), remove the cover in case of severe soiling. Dust deposits in the covering cap, on the driven shaft and on the shrink disk must be removed. Then fit the cover cap (please see chapter 3.13 "Fitting the covers").

If the interior of the IEC / NEMA adapter is severely soiled, the motor must be removed and the dust deposits removed from the interior and the coupling.

Then install the motor as described in Section 3.14 "Fitting a standard motor".

Visual inspection of the rubber buffer

Gear units with an elastic torque support (Option DG) have 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 reservoir (Option OT) and external cooling units have rubber hoses. If damage to the external surface of the hoses as far as where they are inserted occurs, e.g. due to abrasions, cuts or tears, they must be replaced. Please contact the NORD service department.

Visual inspection of shaft sealing ring

Information

Shaft sealing rings

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 (please see chapter 6.6 "Leaks and seals").

Visual inspection of the temperature sticker

(Only necessary for temperature class T4 or max. surface temperature < 135 °C)

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- Check whether the temperature sticker has turned black (please see chapter 3.16 "Temperature sticker"). If the temperature sticker has turned black, the gear unit has become too hot. In this case operation of the gear unit must be discontinued immediately.
-

The cause of overheating must be established. 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 recommissioning, a new temperature sticker must be affixed to the gear unit (please see chapter 3.16 "Temperature sticker").

Remove dust

(Only necessary for Category 2D)

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- Dust deposits on the gear unit housing must be removed if they are more than 5 mm thick.
-

Check the oil level

(please see chapter 4.1 "Check the oil level").

Re-greasing

Some gear unit designs (agitator designs VL2 and VL3) are equipped with a re-greasing device.

For agitator versions VLII and VLIII, 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.

Remove and dispose of escaping grease. Recommended grease: Petamo GHY 133N (Klüber Lubrication).

Checking the oil filter

The oil filters are equipped with a visual or electro-mechanical contamination indicator. If contamination is indicated, the oil filter must be replaced according to the operating instructions for the particular cooling system or circulation pump.

Cleaning or replacing the vent screw

Unscrew the pressure vent, thoroughly clean the vent screw (e.g. with compressed air) carry out a function test and fit the vent screw in the same place. If necessary, use a new vent screw.

Check the oil / air cooler

The oil / air cooler must be checked for dirt and leaks. All fan inlets and outlets must be cleaned. For further information, please refer to the operating instructions for the cooling unit.

Change the oil

The illustrations in Section (please see chapter 6.1 "Configurations and maintenance") show the oil drain screw, the oil level screw and the pressure vent screw (if fitted) for various designs.

Procedure:

1. Place a catchment vessel under the oil drain screw or the oil drain cock.
2. Completely unscrew the oil level screw and the oil drain screw, or open the oil drain cock.

WARNING

Danger of burns

Danger of burns due to hot oil.

- Allow the gear unit to cool down before carrying out maintenance or repair work.
- Wear protective gloves.

-
3. Drain all the oil from the gear unit.
 4. If the sealing ring of the oil drain screw or 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.

5. Screw the oil drain screw into the hole and tighten to the correct torque or close the oil drain cock (please see chapter 6.4 "Torque values").
6. Using a suitable filling device, refill with oil of the same type through the oil level hole until oil emerges from the oil level hole. (The oil can also be filled through the pressure vent screw or a sealing plug located higher than the oil level).
7. Wait at least 15 minutes and then check the oil level. Proceed as described in Section 4.1 "Check the oil level".

Replacing the oil filter

The oil filter must be changed according to the operating instructions from the supplier.

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

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

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





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
- All damaged components must be replaced
- All roller bearings must be replaced
- Replace back stops if fitted
- Replace all seals, radial seals and Nilos rings
- Replace plastic and elastomer components of the motor coupling

6 Appendix

6.1 Configurations and maintenance

Explanation of symbols for the following version illustrations:

	E	Venting	¹⁾	Special oil level
	S	Oil level	²⁾	According to cover assembly
	A	Oil drain	³⁾	Installation position M1 to M6  Page 63, 63

 **DANGER!**

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

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

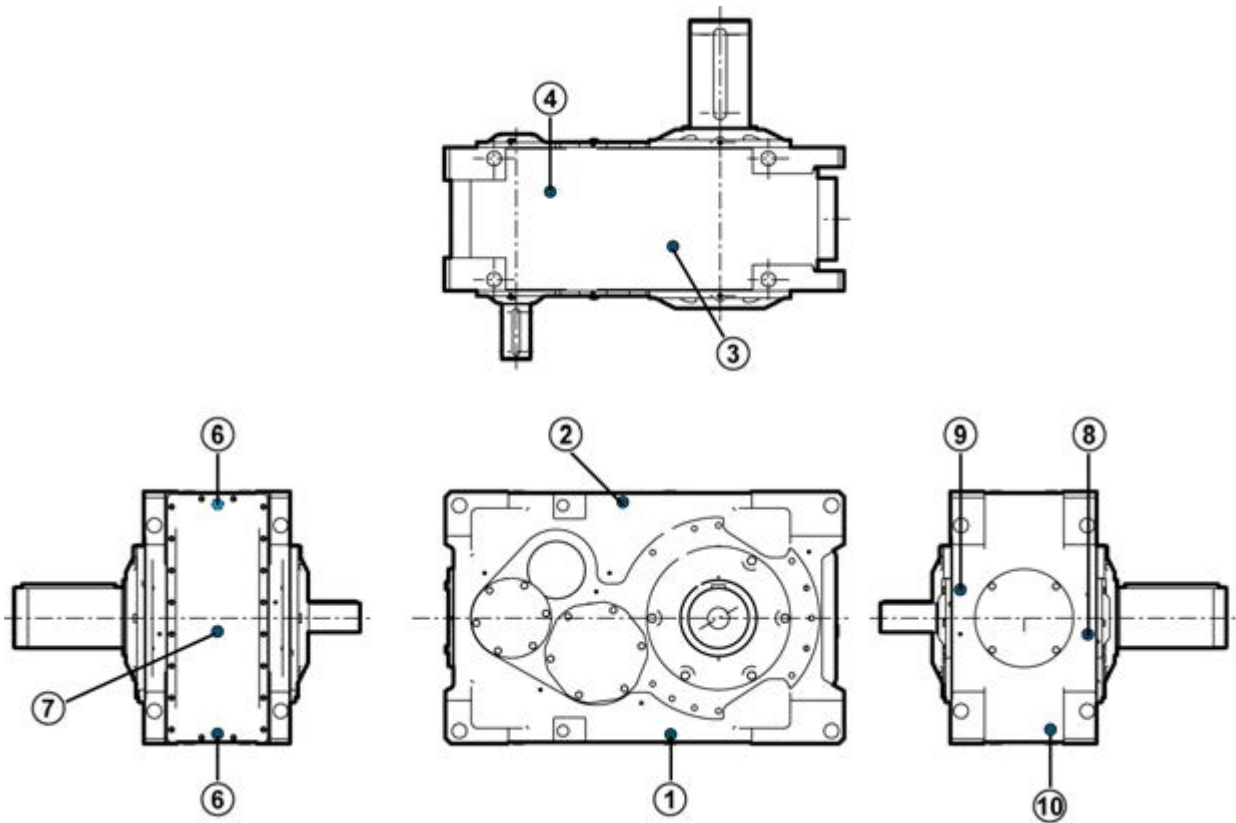


Fig. 22: Position of the oil screws in the gear unit

Explanation			Installation position ³⁾					
No.		Thread	M1	M2	M3	M4	M5	M6
1	Both sides	G1 “	A	S ¹⁾	E	S ¹⁾	A / E	A / E
2	Both sides	G1 “	E	S ¹⁾	A	S ¹⁾	A / E	A / E
3	Both sides	G1 “	E	S	E	S ¹⁾	S	S ¹⁾
4	Both sides	G1 “	E	---	E	S	S ¹⁾	S
6	Up or down according to installation – the cover can be rotated	G1 “	A / E ²⁾		A / E ²⁾	A	S ¹⁾	S ¹⁾
7		G1 “	S ¹⁾	E	S ¹⁾	A	S ¹⁾	S ¹⁾
8		G1 “	S	A	S	E	A	E
9		G1 “	S ¹⁾	A	S ¹⁾	E	E	A
10		G1 “	A	E	E	A	S ¹⁾	S ¹⁾

Installation orientations for helical gear units

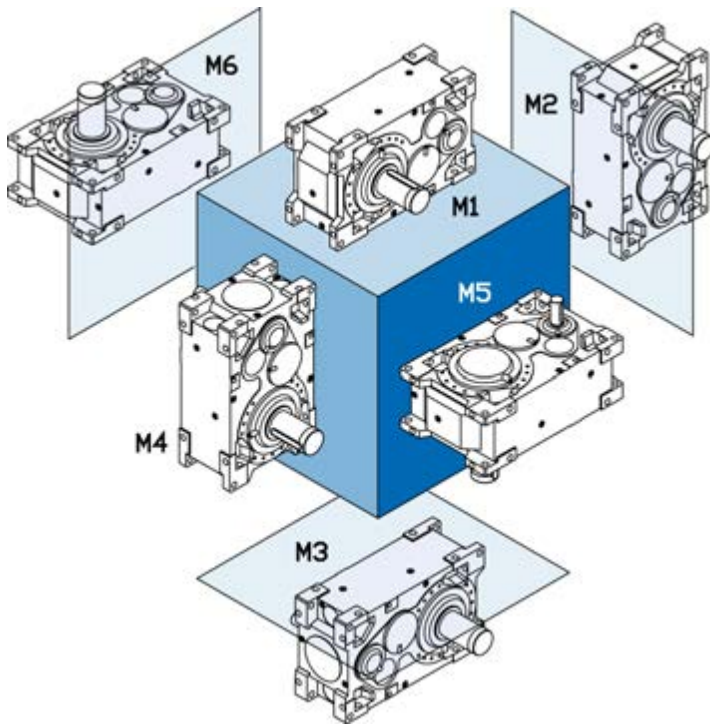


Fig. 23: Installation orientations for helical gear units

Installation orientations for bevel helical gear units

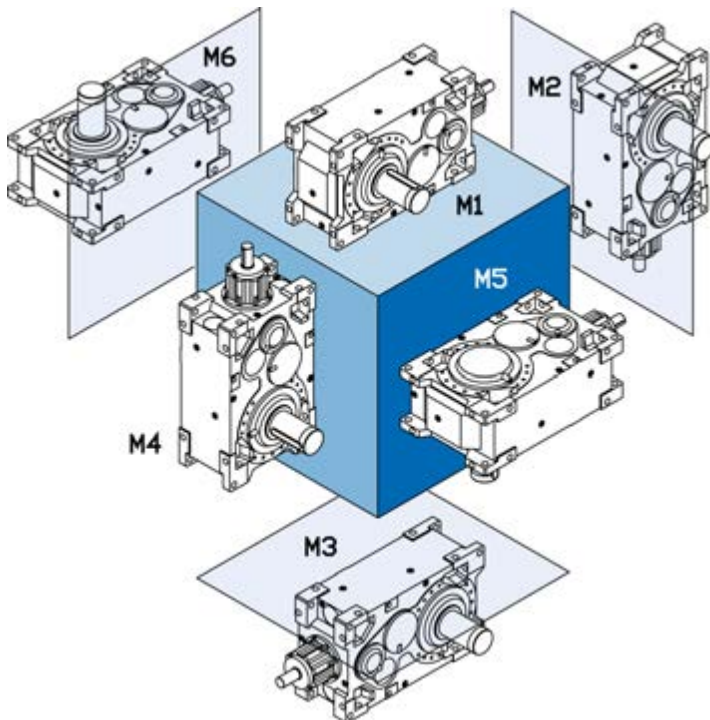


Fig. 24: Installation orientations for bevel helical gear units

6.2 Lubricants

⚠ DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

When changing the oil or filling for the first time, the type of lubricant stated on the type plate must be used.

The following table shows the approved proprietary brands or product names according to the gear oil types stated on the type plate (please see chapter 3.5 "Checking the type plate data"). This means that a product corresponding to the type of oil shown on the type plate must be used.







Lubricant type	Type of oil stated on type plate						
Mineral oil	CLP 220	Energol GR-XP 220	Alpha EP 220 Alpha SP 220 Alpha MAX 220 Optigear BM 220 Tribol 1100 / 220	Renolin CLP 220 Renolin CLP 220 Plus Gearmaster CLP 220	Klüberoil GEM 1-220 N	Mobilgear 600 XP 220 Mobilgear XMP 220	Shell Omala S2 G 220
	CLP 320	Energol GR-XP 320	Alpha EP 320 Alpha SP 320 Alpha MAX 320 Optigear BM320 Tribol 1100 / 320	Renolin CLP 320 Renolin CLP 320 Plus Gearmaster CLP 320	Klüberoil GEM 1-320 N	Mobilgear 600 XP 320 Mobilgear XMP 320	Shell Omala S2 G 320
Synthetic oil	CLP PG 680	Energol SG-XP 680	Tribol 1300 / 680 Tribol 800 / 680 Alphasyn GS 680	Renolin PG 680 Gearmaster PGP 680	Klübersynth GH-6-680		Shell Omala S4 WE 680
	CLP PG 220	Energol SG-XP 220	Tribol 1300 / 220 Tribol 800 / 220 Alphasyn GS 220	Renolin PG 220 Gearmaster PGP 220	Klübersynth GH-6-220		Shell Omala S4 WE 220
Bio-degradable oil	E 680			Plantogear 680 S Gearmaster ECO 680			
	E 220		Tribol Bio Top 1418 / 220	Plantogear 220 S Gearmaster ECO 220	Klübersynth GEM 2-220		Shell Naturelle Gear Fluid EP 220
Food grade oil H1 as per FDA 178.3570	CLP PG H1 680				Klübersynth UH1 6-680		Shell Cassida WG 680
	CLP PG H1 220				Klübersynth UH1 6-220		Shell Cassida WG 220

Table 7: Lubricant table

6.3 Lubricant quantities

 **DANGER!**

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

When filling, always use the oil level screw as an indicator of the precise quantity of oil. After filling, the oil level must be checked as described in Section 4.1 "Check the oil level".

 **Information**

Lubricants

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

The stated filling quantities are for guidance only. The precise quantities vary depending on the exact gear ratio.

If at the express request of the customer, an oil inspection glass is installed at an additional charge, we recommend that the customer corrects the oil level after an operating period of approx. 2 hours, so that when the gear unit is at a standstill and has cooled down, the oil level is visible in the inspection glass. Only then, is it possible to check the oil level by means of the inspection glass.

Helical gear units



							
	[L]	M1	M2	M3	M4	M5 ²⁾	M6 ²⁾
SK 11207	105	130 (50)	105	140 (40)	135 (45)	135 (45)	180
SK 11307	105	130 (50)	105	140 (40)	135 (45)	135 (45)	180
SK 12207	116	185 (83)	116	203 (65)	199 (69)	199 (69)	268
SK 12307	116	185 (83)	116	203 (65)	199 (69)	199 (69)	268
SK 13207	154	256 (107)	154	290 (73)	268 (95)	268 (95)	363
SK 13307	154	256 (107)	154	290 (73)	268 (95)	268 (95)	363
SK 15207	358	415 (160)	335	450 (125)	405 (170)	412 (163)	575
SK 15307	358	415 (160)	335	450 (125)	405 (170)	412 (163)	575

Table 8: Lubricant quantities for helical gear units

Bevel helical gear units



							
	[L]	M1	M2	M3	M4 ¹⁾	M5 ²⁾	M6 ²⁾
SK 11407	112	137 (57)	112	147 (47)	142 (52)	147 (47)	187
SK 11507	112	137 (57)	112	147 (47)	142 (52)	147 (47)	187
SK 12407	126	195 (93)	126	213 (75)	209 (79)	209 (79)	278
SK 12507	126	195 (93)	126	213 (75)	209 (79)	209 (79)	278
SK 13407	168	270 (121)	168	304 (87)	282 (109)	282 (109)	377
SK 13507	168	270 (121)	168	304 (87)	282 (109)	282 (109)	377
SK 15407	382	439 (184)	359	474 (149)	429 (194)	436 (187)	599
SK 15507	382	439 (184)	359	474 (149)	429 (194)	436 (187)	599

Table 9: Lubricant quantities for bevel helical gear units

Explanation of the oil fill quantity tables

The details stated in the table are in litres.

- 1) Circulation lubrication necessary for bevel gear stages
- 2) Oil filling quantity for circulation lubrication
- 3) Poor efficiency, observe heat balance

6.4 Torque values

Dimensions	Bolt Torques [Nm]					
	Screw connections in the strength classes			Cover screws	Threaded pin on coupling	Screw connections on protective covers
	8.8	10.9	12.9			
M4	3.2	5	6	-	-	-
M5	6.4	9	11	-	2	-
M6	11	16	19	-	-	6.4
M8	27	39	46	11	10	11
M10	53	78	91	11	17	27
M12	92	135	155	27	40	53
M16	230	335	390	35	-	92
M20	460	660	770	-	-	230
M24	790	1150	1300	80	-	460
M30	1600	2250	2650	170	-	-
M36	2780	3910	4710	-	-	1600
M42	4470	6290	7540	-	-	-
M48	6140	8640	16610	-	-	-
M56	9840	13850	24130	-	-	-
G½	-	-	-	75	-	-
G¾	-	-	-	110	-	-
G1	-	-	-	190	-	-
G1¼	-	-	-	240	-	-
G1½				300		-

Table 10: 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

6.5 Troubleshooting



WARNING

Injury to persons

There is a slipping hazard in case of leaks.

Clean the soiled floor and machine components before starting troubleshooting.



WARNING

Injury to persons

Risk of injury due to rapidly rotating and hot machine components.

Troubleshooting must only be performed when gear units are at a standstill and have cooled down. The drive must be isolated and secured to prevent accidental start-up.

NOTICE

Gear unit damage

Damage to the gear unit is possible in case of faults.

Shut down the drive unit immediately in case of any faults in the gear unit.

Gear unit malfunctions		
Fault	Possible cause	Remedy
Unusual running noises, vibrations	Oil too low or bearing damage or gear wheel damage	Consult NORD Service
Oil escaping from the gear unit or motor	Defective seal	Consult NORD Service
Oil escaping from pressure vent	Incorrect oil level or incorrect, contaminated oil or unfavourable operating conditions	Oil change: Use oil expansion tank (Option OA)
Gear unit becomes too hot	Unfavourable installation conditions or gear unit damage	Consult NORD Service
Shock when switching on, vibrations	Defective motor coupling or loose gear unit mounting or defective rubber element	Replace elastomer gear rim, tighten motor and gear unit fastening bolts, replace rubber element
Drive shaft does not rotate although motor is running	Fracture in gear unit or defective motor coupling or shrink disc slippage	Consult NORD Service
Fault or failure of the oil / air cooling system		See the separate operating instructions for the oil / air cooling system
Pressure at the pressure safeguard is too low	Pump is not delivering any oil or leakage in the piping	Check the pump and the pipes

Table 11: Overview of malfunctions

6.6 Leaks and seals

Gear units are filled with oil or grease to lubricate the moving parts. Seals prevent the escape of lubricants. A complete seal is not technically 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.

Definition of leakage according to DIN 3761 and its appropriate use					
Term	Explanation	Shaft sealing ring	Location of leak		
			in IEC adapter	Housing joint	Venting
Sealed	No moisture apparent	No reason for complaint	No reason for complaint	No reason for complaint	No reason for complaint
Damp	Moisture film locally restricted (not an area)	No reason for complaint	No reason for complaint	No reason for complaint	No reason for complaint
Wet	Moisture film beyond the extent of the component	No reason for complaint	No reason for complaint	Repair if necessary	No reason for complaint
Measurable leakage	Recognisable stream, dripping	Repair recommended	Repair recommended	Repair recommended	Repair recommended
Temporary leakage	Temporary malfunction of the sealing system or oil leak due to transport *)	No reason for complaint	No reason for complaint	Repair if necessary	No reason for complaint
Apparent leakage	Apparent leakage, e.g. due to soiling, sealing systems which can be re-lubricated	No reason for complaint	No reason for complaint	No reason for complaint	No reason for complaint

Table 12: 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.

6.7 Declaration of Conformity

6.7.1 Explosion protected industrial gear units, Category 2G and 2D


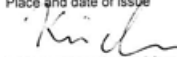
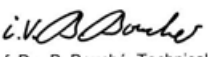
<p>Declaration of Conformity (In the sense of Directive 94/9/ EU Annex VII)</p> <p>Getriebebau NORD GmbH&Co.KG Rudolf-Diesel Str. 1 D-22941 Bargteheide Tel.: +49 (0) 4532 / 401 - 0 Fax: +49 (0) 4532 / 401 – 253 http://www.nord.com info@nord-de.com</p>	
<p>Getriebebau NORD</p>	<p>Declares in its sole responsibility, that the industrial gear unit types SK 11207, SK 12207, SK 13207, SK 15207, SK 11307, SK 12307, SK 13307, SK 15307, SK 11407, SK 12407, SK 13407, SK 15407, SK 11507, SK 12507, SK 13507, SK 15507 of Categories 2G and 2D, to which this declaration refers, comply with Directive 94/9/EU</p>
<p>Applied standards</p>	<p>EN 1127-1: 1997, EN 13463-1: 2009, EN 13463-5: 2003</p>
<p>Getriebebau NORD</p>	<p>has submitted the documents required as per 94/9/EU Annex VII to the stipulated office No. 0158: Certification Office of the DEKRA EXAM GmbH</p>
<p>Getriebebau NORD GmbH&Co.KG</p> <p><u>Bargteheide, 16.09.09</u> Place and date of issue</p> <p> <u>U. Küchenmeister, Manager</u></p>	<p> for and on behalf of <u>Dr. B. Bouché, Technical Manager</u></p>

Fig. 25: Declaration of Conformity for Category 2G / 2D

6.7.2 Explosion protected industrial gear units, Category 3G and 3D


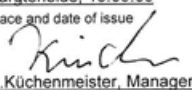
<p>Declaration of Conformity (In the sense of Directive 94/9/ EU Annex VII)</p> <p>Getriebebau NORD GmbH&Co.KG Rudolf-Diesel Str. 1 D-22941 Bargteheide Tel.: +49 (0) 4532 / 401 - 0 Fax: +49 (0) 4532 / 401 - 253 http://www.nord.com info@nord-de.com</p>	
<p>Getriebebau NORD</p>	<p>Declares in its sole responsibility, that the industrial gear unit types SK 11207, SK 12207, SK 13207, SK 15207, SK 11307, SK 12307, SK 13307, SK 15307, SK 11407, SK 12407, SK 13407, SK 15407, SK 11507, SK 12507, SK 13507, SK 15507 of Categories 3G and 3D, to which this declaration refers, comply with Directive 94/9/EU</p>
<p>Applied standards</p>	<p>EN 1127-1: 1997, EN 13463-1: 2009</p>
<p>Getriebebau NORD</p>	<p>hold the following technical documentation ready for inspection: - Operating instructions as per regulations - Technical documents</p>
<p>Getriebebau NORD GmbH&Co.KG</p> <p><u>Bargteheide, 16.09.09</u> Place and date of issue</p> <p> <u>U. Küchenmeister, Manager</u></p>	<p> <u>for and on behalf of Dr. B. Bouché, Technical Manager</u></p>

Fig. 26: Declaration of Conformity for Category 3G / 3D

6.8 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.

6.8.1 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	Reason for return
If possible, the reason for returning the component or device should be stated. If necessary, at least one contact should be stated in case of queries.	
This is important in order to keep repair times as short and efficient as possible.	

6.8.2 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


6.9 Abbreviations

2D	Dust explosion protected gear units zone 21	FA	Axial force
2G	Explosion protected gear units with ignition protection class "c"	IE1	Motors with standard efficiency
3D	Dust explosion protected gear units zone 22	IE2	Motors with high efficiency
ATEX	AT mospheres EX plosibles	IEC	International Electrotechnical Commission
B5	Flange fastening with through holes	NEMA	National Electrical Manufacturers Association
B14	Flange fastening with threaded holes	IP55	International Protection
CW	Clockwise, right-hand direction of rotation	ISO	International Standardisation Organisation
CCW	Counter-clockwise, left-hand direction of rotation	pH	pH value
°dH	Water hardness in German hardness degrees: 1°dH = 0.1783 mmol/l	PPE	Personal Protective Equipment
DIN	German standards institute	RL	Directive
EC	European Community	VCI	Volatile Corrosion Inhibitor
EN	European standard	WN	Getriebebau NORD factory standard
FR	Radial transverse force		

Key word index

A		Long-term storage.....	19
Activating the vent	25	Lubricant circulation	47
Address.....	72	Lubricants	64
Assembly	24	M	
B		Maintenance	72
Back stop	49	Check oil level	57
lift-off speed	50	Cover cap	56
C		Hose	56
Check the oil level	41	Leaks	55
Correct use	10	Oil / air cooler	58
Covers	35	Oil change	58
D		oil filter	57
Danger labels	10	Oil filter	59
Data on the type plate	21	Rubber buffers.....	56
Disposal of materials	13	Running noises.....	55
E		Temperature sticker	56
External cooling system.....	38	Vent plug	57
F		Maintenance intervals.....	53
Faults	68	Motor weights for IEC adapters	36
G		O	
Gear unit types	14	Oil fill quantity	
bevel helical gear units	15	bevel helical gear units.....	66
double gear units	15	Oil fill quantity for helical gear units	66
helical gear units	14	P	
General overhaul	60	Painting the gear unit.....	40
General safety information	11	Position of torque support.....	32
H		Pressure safeguard.....	48
Hose fitting.....	67	Pulling devices	28
I		Push-on gear unit.....	30
Inspection intervals.....	53	R	
Installing the gear unit	25	Repairs.....	72
Internet.....	72	S	
Introduction of forces	29	Safety information	2
L		Service	72
Leakage	69	Shrink disc	33
		Standard motor	36

Storage	19	Transport.....	16
T		motor adapter	17
Temperature sticker.....	39	motor swing base	18
Test run.....	45	V	
Tightening torques.....	67	Version testing	23



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Getriebebau-Nord-Straße 1
22941 Bargteheide, Germany
Fon +49 (0) 4532 / 289-0
Fax +49 (0) 4532 / 289-2253
info@nord.com, www.nord.com

Member of the NORD DRIVESYSTEMS Group

