

Intelligent Drivesystems, Worldwide Services



EN

B 1000

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 1000
 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 units
Bevel gear units
Helical worm gear units
MINIBLOC worm gear units
UNIVERSAL worm gear units

Version list

Title, Date	Order number	Comments
B 1000, February 2013	6052802 / 0713	-
B 1000, September 2014	6052802 / 3814	General corrections
B 1000, April 2015	6052802 / 1915	New gear unit types SK 10382.1 + SK 11382.1
B 1000, March 2016	6052802 / 0916	General corrections New gear unit types SK 920072.1 + SK 930072.1

Table 1: Version list B 1000

Copyright notice

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Any editing or amendment or other utilisation of the document is prohibited.

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

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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 labels used

 DANGER	Indicates an immediate danger, which may result in death or serious injury.
 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.
 Note	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. The gear unit must only be used according to the information in the technical documentation from Getriebebau NORD.

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.



DANGER!

Explosion hazard

Serious injury and material damage due to explosion are possible.

Use in explosion hazard areas is prohibited.



WARNING

Injury 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

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!

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!

Injury to persons

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

- 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

Injury to persons

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

Injury to persons

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 11E, SK 21E, SK 31E, SK 41E, SK 51E (1-stage) SK 02, SK 12, SK 22, SK 32, SK 42, SK 52, SK 62N (2-stage) SK 03, SK 13, SK 23, SK 33N, SK 43, SK 53 (3-stage) SK 62, SK 72, SK 82, SK 92, SK 102 (2-stage) SK 63, SK 73, SK 83, SK 93, SK 103 (3-stage)
NORDBLOC helical gear units SK 320, SK 172, SK 272, SK 372, SK 472, SK 572, SK 672, SK 772, SK 872, SK 972 (2-stage) SK 273, SK 373, SK 473, SK 573, SK 673, SK 773, SK 873, SK 973 (3-stage) SK 071.1, SK 371.1, SK 571.1, SK 771.1 (1-stage) SK 072.1, SK 172.1, SK 372.1, SK 572.1, SK 672.1, SK 772.1, SK 872.1, SK 972.1 (2-stage) SK 373.1, SK 573.1, SK 673.1, SK 773.1, SK 873.1, SK 973.1 (3-stage)
Standard helical gear units SK 0, SK 01, SK 20, SK 25, SK 30, SK 33 (2-stage) SK 10, SK 200, SK 250, SK 300, SK 330 (3-stage)
Parallel shaft gear unit SK 0182NB, SK 0282NB, SK 1282, SK 2282, SK 3282, SK 4282, SK 5282, SK 6282, SK 7282, SK 8282, SK 9282, SK 10282, SK 11282 (2-stage) SK 1382NB, SK 2382, SK 3382, SK 4382, SK 5382, SK 6382, SK 7382, SK 8382, SK 9382, SK 10382, SK 10382.1, SK 11382, SK 11382.1, SK 12382 (3-stage)
Bevel gear units SK 92072, SK 92172, SK 92372, SK 92672, SK 92772; SK 920072.1, SK 92072.1, SK 92172.1, SK 92372.1, SK 92672.1, SK 92772.1, SK 93072.1, SK 93172.1, SK 930072.1, SK 93372.1, SK 93672.1, SK 93772.1 (2-stage) SK 9012.1, SK 9016.1, SK 9022.1, SK 9032.1, SK 9042.1, SK 9052.1, SK 9062.1, SK 9072.1, SK 9082.1, SK 9086.1, SK 9092.1, SK 9096.1 (3-stage) SK 9013.1, SK 9017.1, SK 9023.1, SK 9033.1, SK 9043.1, SK 9053.1 (4-stage)
Helical worm gear units SK 02040, SK 02050, SK 12063, SK 12080, SK 32100, SK 42125 (2-stage) SK 13050, SK 13063, SK 13080, SK 33100, SK 43125 (3-stage)
MINIBLOC worm gear units SK1 S32, SK1 S40, SK 1S50, SK 1S63, SK 1SU..., SK 1SM31, SK 1SM40, SK 1SM50, SK 1SM63 (1-stage) SK 2S32NB, SK 2S40NB, SK 2S50NB, SK 2S63NB, SK 2SU..., SK 2SM40, SK 2SM50, SK 2SM63 (2-stage)

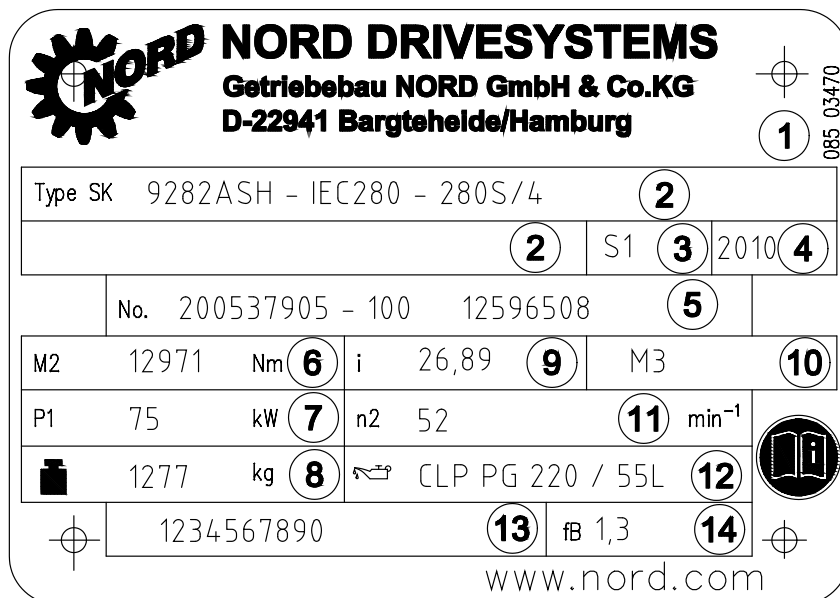
Gear unit types / Type designations					
UNIVERSAL worm gear units					
SK 1SI31, SK 1SI40, SK 1SI50, SK 1SI63, SK 1SI75, SK 1SIS31, ..., SK 1SIS75, SK 1SID31, ..., SK 1SID63, SK 1SMI31, ..., SK 1SMI75, SK 1SMID31, ..., SK 1SMID63, SK 1SIS-D31, ..., SK 1SIS-D63 (1-stage), SK 2SMID40, SK 2SMID50, SK 2SMID63, SK 2SID40, ..., SK 2SID63 (2-stage)					
Versions / Options					
-	Foot mounting with solid shaft	D	Torque support	IEC	Standard IEC motor mounting
A	Hollow shaft version	K	Torque bracket	NEMA	Standard NEMA motor attachment
V	Solid shaft version	S	Shrink disc	W	With free drive shaft
L	Solid shaft both sides	VS	Reinforced shrink disc	VI	Viton radial seals
Z	Output flange B14	EA	Hollow shaft with internal spline	OA	Oil expansion tank
F	Output flange B5	G	Rubber buffer	OT	Oil level tank
X	Foot mounting	VG	Reinforced rubber buffer	SO1	Synthetic oil ISO VG 220
XZ	Base and output flange B14	R	Back stop	CC	Casing cover with cooling spiral
XF	Base and output flange B5	B	Fastening element	DR	Pressure venting
AL	Reinforced axial output bearings	H	Covering cap as contact guard	H10	Modular contrate pre-stage
5	Reinforced output shaft (Standard helical gear units)	H66	Covering cap IP66	/31	Worm pre-stage
V	Reinforced drive shaft (Standard helical gear units)	VL	Reinforced bearings	/40	Worm pre-stage
		VL2	Agitator version		
		VL3	Drywell agitator version		

Table 3: Type designations and gear unit types

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

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

2.2 Type plate



Explanation

- 1 Matrix or bar code
- 2 NORD gear unit type
- 3 Operating mode
- 4 Year of manufacture
- 5 Serial number
- 6 Rated torque of gear unit output shaft
- 7 Drive power
- 8 Weight according to ordered version
- 9 Overall gear unit ratio
- 10 Installation orientation
- 11 Rated speed of gear unit output shaft
- 12 Lubricant type, viscosity and quantity
- 13 Customer's part number
- 14 Operating factor

Fig. 1: Type plate (example) with explanation of the type plate fields

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")bestimmungsgemäße Verwendung.

3.1 Transporting the gear unit



WARNING

Hazard due to heavy loads

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

- Standing under the gear unit during transport is **extremely dangerous**.
- To prevent injury, **the danger area must be generously cordoned off**.
- Only transport using the eyebolts attached to the gear unit.
- No additional loads may be attached.
- If geared motors have an additional eyebolt attached to the motor, this must also be used.
- The thread of the eyebolt must be fully screwed in.
- Avoid pulling the eyebolts at an angle.

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.
- 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.

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 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.

In applications where an incorrect rotational direction may result in damage or potential risk, the correct rotational direction of the output 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 drive/driven sides. The arrows point in the rotation direction of the gear unit. When connecting the motor and during motor control, it must be ensured that the gear unit can only operate in the direction of rotation. (For further explanations see catalogue G1000 and WN 0-000 40)

NOTICE

Gear unit damage

For gear units with an integrated back stop, switching the drive motor to the blocked direction of rotation, i.e. incorrect direction of rotation, may result in damage to the gear unit.

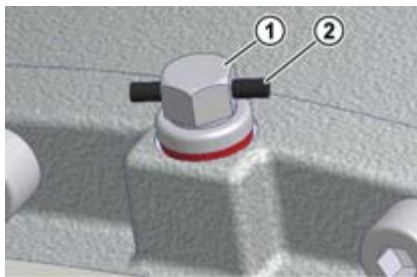
Take care that the direction of rotation is correct.

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.

Oil expansion tanks (Option OA) must be fitted in accordance with works standard WN 0-530 04. For gear units with an M10x1 vent plug, works standard WN 0-52135 must be also be observed during installation.

Oil level tanks (Option OT) must be fitted in accordance with works standard WN 0-521 30.

If venting of the gear unit is provided, the vent or the pressure vent must be activated before commissioning. To activate, remove the transport securing device (sealing cord). Position of the vent plug (please see chapter 6.1 "Configurations and maintenance").



Explanation

- 1 Standard vent plug
- 2 Transport securing device

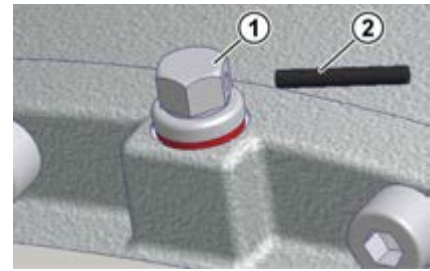
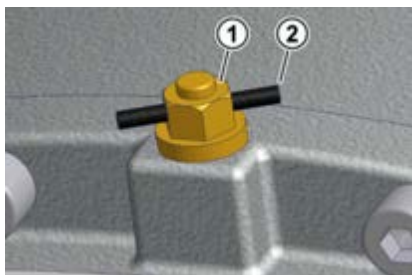


Figure 2: Activating the vent plug



Explanation

- 1 Vent screw
- 2 Transport securing device

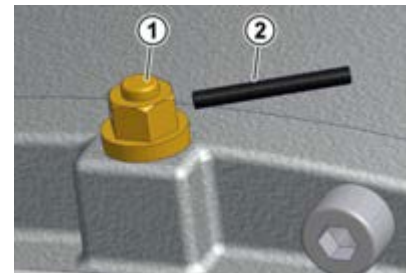
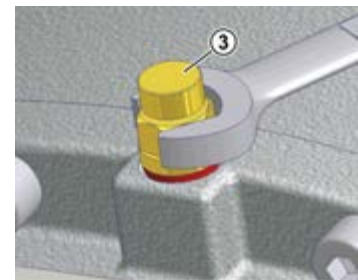
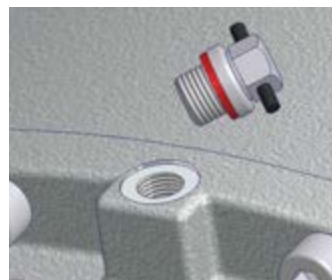
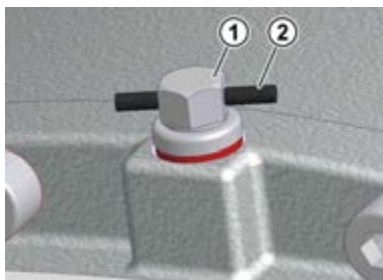


Figure 3: Activating the vent plug

Before commissioning, the vent plug must be replaced with the special pressure vent which is supplied as a loose part.

This is done by unscrewing the vent fitting and replacing it with the special pressure vent and seal (refer to Section 6.1 "Configurations and maintenance"). Double gear units consist of two single units and are equipped with 2 oil chambers and 2 pressure vents.



Explanation

- 1 Standard vent plug
- 2 Transport securing device
- 3 Special pressure vent screw

Figure 4: Removing the vent plug and fitting the special pressure vent

(please see chapter 6.4 "Torque values")

3.5 Installing the gear unit



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.



WARNING

Danger to persons

If the foundation or the fastening of the gear unit is not adequately dimensioned, the gear unit may detach, fall down or rotate in an uncontrolled manner.

The foundation and the gear unit fastening must be appropriately designed for the weight and the torque. All bolts must be used to fasten the gear unit

NOTICE

Damage to the gear unit due to overheating

The gear unit may be damaged by overheating.

When installing, check that the cooling air from the motor fan can circulate around the geared motor and the gear unit without obstruction.

The eyebolts screwed into the gear units must be used during installation. No additional load may be attached to the gear unit.

If geared motors have an additional eyebolt attached to the motor, this must also be used. Avoid pulling the eyebolts at an angle. Observe the safety information (please see chapter 1.4 "Safety information").

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

The gear unit must be precisely aligned with the drive shaft of the machine in order to prevent additional forces from being imposed on the gear unit due to distortion.

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

The gear unit must be installed in the correct orientation(please see chapter 6.1 "Configurations and maintenance"). (UNIVERSAL SI and SM gear unit types do not depend on the configuration). Changes to the installation position after delivery require adjustment of the quantity of oil, and often other measures such as e.g. the installation of encapsulated roller bearings. **Damage may result if the stated installation position is not observed.**

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 to 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.

The oil inspection screws, oil drain screws and the vent valves must be accessible.

3.6 Fitting hubs on the gear shafts

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.

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.

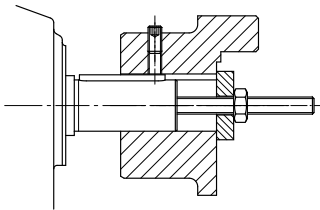


Figure 5: Example of a simple pulling device

DANGER!

Severe personal injury

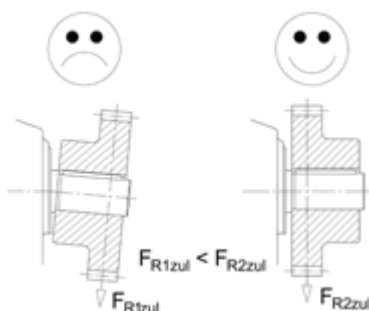
There is a danger of injury due to rapidly rotating drive and driven elements.

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

Drive and driven elements may only subject the drive unit to the maximum radial forces F_R and axial forces F_A which are specified in the catalogue. Observe the correct tension, particularly on belts and chains.

Additional loads due to unbalanced hubs are not permitted.

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



3.7 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 output shaft after a running-in time of approx. 24 hours. This escape of grease is not due to a leak in the gear unit.

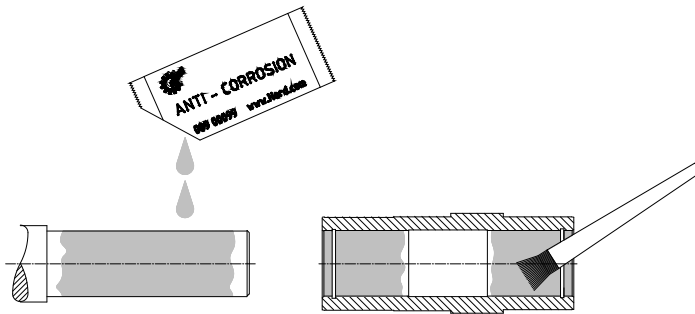


Figure 6: Applying lubricant to the shaft and the hub



Information

Fastening 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"). For gear units with option H66, the factory-fitted closing cap must be removed before assembly.

For push-on gear units with option H66 and fastening element (Option B) the pressed-in closing cap must be pushed out before fitting the gear unit. The pressed-in closing cap may be destroyed during dismantling. As standard a second closing cap is supplied as a loose spare part. After fitting the gear unit, fit the new / new condition closing cap as described in Section 3.9 "Fitting the covers".

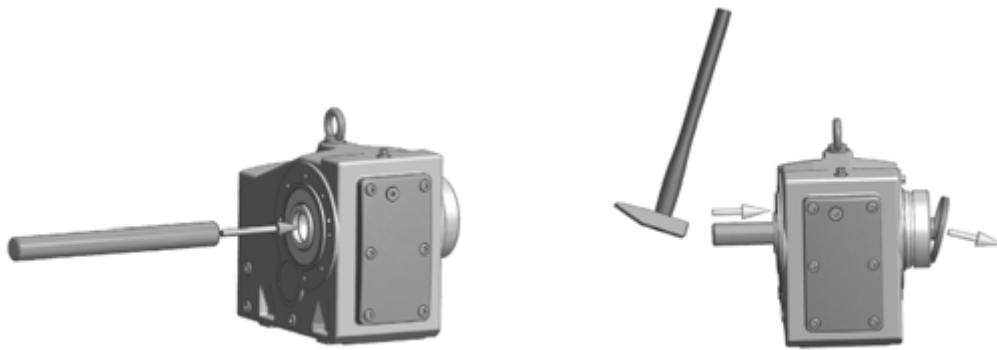


Figure 7: Removing the factory-fitted closing cap

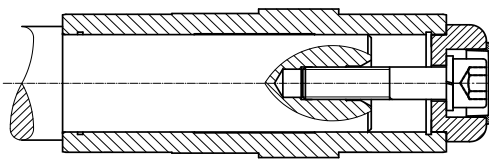


Figure 8: Gear unit mounted to shaft with a shoulder using the fastening element

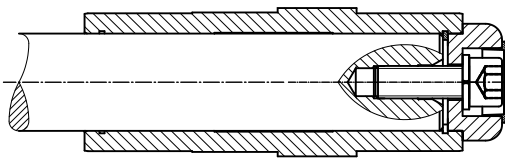


Figure 9: Gear unit mounted to shaft without a shoulder using the fastening element

A gear unit can be dismantled from a shaft with a shoulder using the following device, for example.

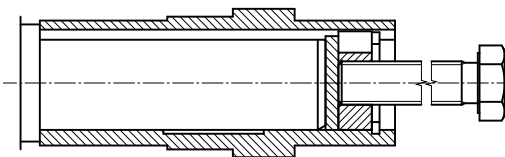


Figure 10: Dismantling using dismantling device

When assembling push-on gears with torque supports, the support must not be distorted. Tension-free mounting is aided by the rubber buffer (Option G or VG).

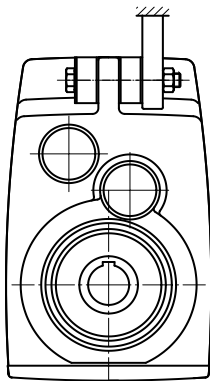


Figure 11: Mounting the rubber buffer (Option G or VG) on parallel shaft gear units

To fit the rubber buffer, tighten the screw fastening until there is no play between the contact surfaces when there is no load.

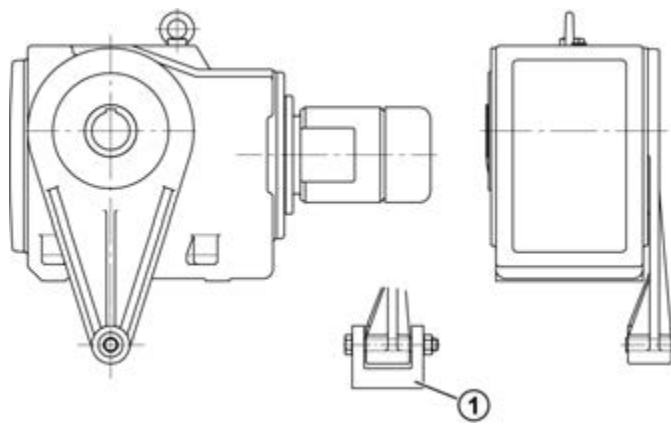
Then turn the fastening nut half a turn in order to pre-tension the rubber buffer (only applies for screw fastenings with adjusting threads). Greater pre-tension is not permissible

WARNING

Risk of injury

The gear unit may suddenly rotate around the shaft if the bolts are loosened.

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



Explanation

- 1 Always support torque support on both sides

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

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

3.8 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!

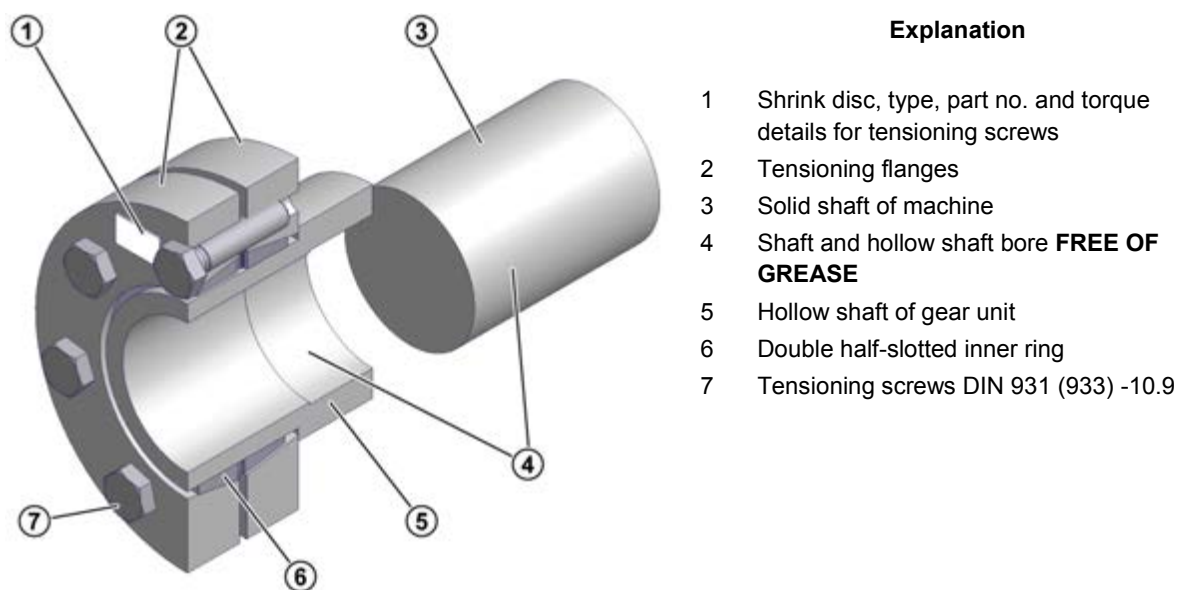


Figure 13: Hollow shaft with shrink disc

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

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

Assembly sequence

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

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. Loosen the clamping flanges from the cone of the inner ring.
3. Remove the gear unit from the solid shaft of the machine.

If a shrink disk has been in use for a long period or is dirty, it must be dismantled, cleaned and the conical surfaces coated with Molykote G Rapid Plus or a similar lubricant before it is refitted. The threads and head surfaces of the screws must be treated with grease without Molykote. Any damaged or corroded elements must be replaced.

3.9 Fitting the covers



WARNING

Risk of injury

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

- Use a cover (Option H and Option H66) 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 tightened to the correct torque (please see chapter 6.4 "Torque values"). For covers with Option H66, press in the new / new condition closing cap by tapping it lightly with a hammer.



Figure 14: Fitting the covers, Option SH, Option H, and Option H66

3.10 Fitting the covers



WARNING

Risk of injury

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

- Use a cover cap 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.

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

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



Fig. 15: Removal and fitting of the cover cap

3.11 Fitting a standard motor

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	160	180	200	225	250	280	315
NEMA motor size		56C	143T	145T	182T	184T	210T	250T	280T	324T	326T	365T		
Max. motor weight [kg]	25	30	40	50	60	80	100	200	250	350	500	700	1000	1500



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.

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

1. Clean the motor shaft and flange surfaces of the motor and the IEC/NEMA 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. Tighten the coupling sleeve on the motor shaft in accordance with the motor manufacturer's instructions until it touches the collar. With motor sizes 90, 160, 180 and 225, any spacer bushes must be positioned between the coupling sleeve and the collar. With standard helical gear units, dimension B between the coupling sleeve and the collar must be observed (see Figure 16). Certain NEMA adapters require adjustment of the coupling in accordance with the specifications indicated on the adhesive plate.
4. If the coupling half contains a threaded pin, the coupling must be secured axially on the shaft. The threaded pin must be coated 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").
5. Sealing of the flange surfaces of the motor and the IEC/NEMA 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 on the IEC/NEMA adapter. Do not forget to fit the gear rim or the splined sleeve provided (see illustration below).
7. Tighten the bolts of the IEC/NEMA adapter with the correct torque (please see chapter 6.4 "Torque values").

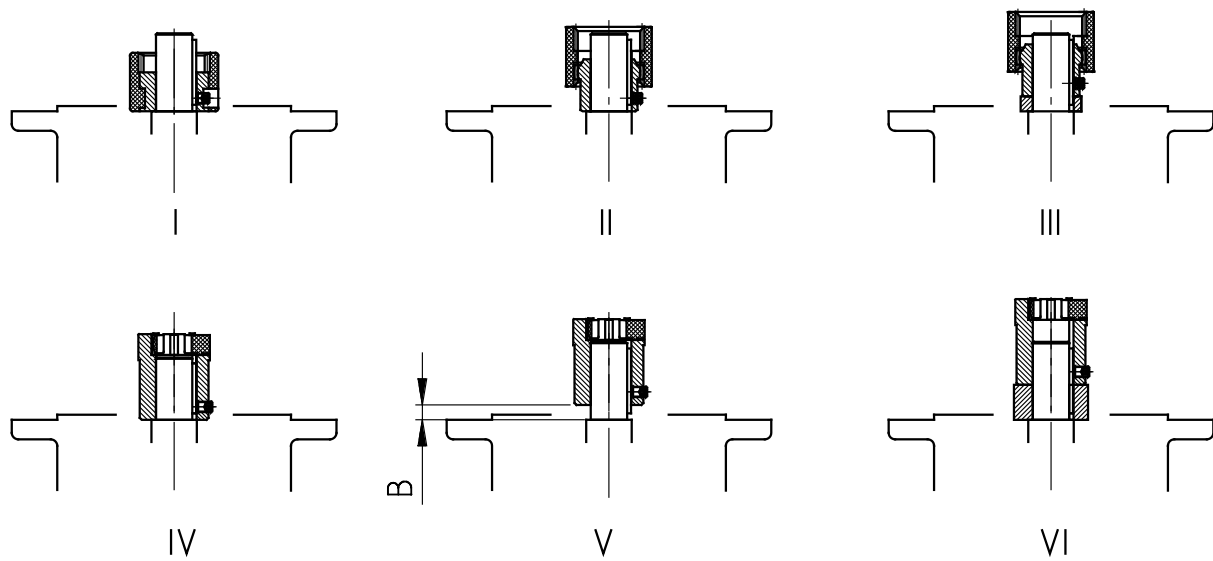


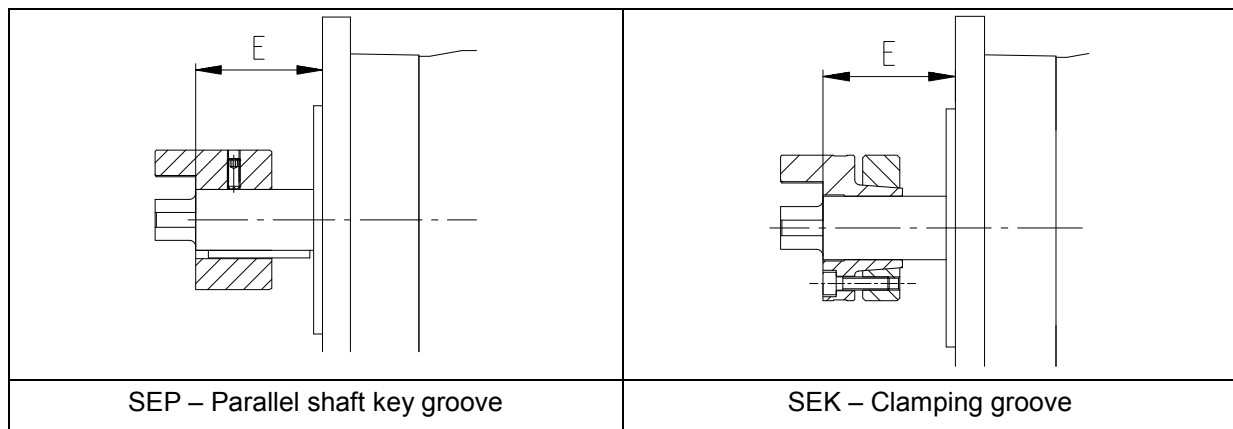
Figure 16: Fitting the coupling onto the motor shaft - various types of coupling

- I Curved tooth coupling
- II Curved tooth coupling, two-part
- III Curved tooth coupling, two-part with spacer bush
- IV Claw coupling, two-part
- V Claw coupling, two-part, observe dimension B:

Standard helical gear unit:		
SK 0, SK 01, SK 20, SK 25, SK 30, SK 33 (2-stage)		
SK 010, SK 200, SK 250, SK 300, SK 330 (3-stage)		
	IEC size 63	IEC size 71
Dimension B (Fig. V)	B = 4.5 mm	B = 11.5 mm

- VI Claw coupling two-part with spacer bush

3.12 Installation of a servo motor (Option SEP / SEK)



E = Coupling installation size of flange system

Cylinder type	Coupling size*	Installation size E [mm]
SE. 100	GS 19	40
SE. 130	GS 24	50
SE. 165	GS 28	58
SE. 215	GS 28	80
	GS 48	80
SE. 300	GS 48	82
*) All coupling sizes are available as SEP or SEK versions, the ring gear has a hardness of (Shore) 98 Sh-A-GS, colour red		

Table 4: Allocation of cylinder types to coupling sizes

To prevent damage to the coupling, the dimension E which is stated in Table 12 must be complied with!

Assembly sequence for the connection of a servo motor to the servo adapter (Option SEP / SEK)

Please refer to the coupling manufacturer's operating/installation instructions for the assembly of the two halves of the coupling.

3.13 Fitting the cooling coil to the cooling system



WARNING

Risk of injury

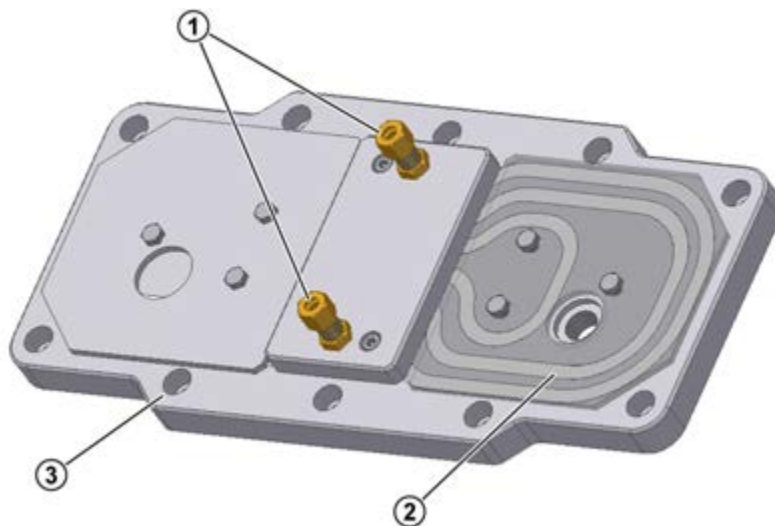
Possibility of injury due to pressure discharge.

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

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

Remove the closing cap from the screw neck prior to assembly to avoid any contamination of the cooling system. The screw necks should be connected with the coolant circuit, which must be provided by the operator. The flow direction of the coolant is irrelevant.

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



Explanation

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

Figure 17: Cooling cover

3.14 Installation of an oil expansion tank, Option OA

The expansion tank must be installed vertically with the hose connection facing downwards and the vent plug upwards. Please note the attached factory standard 0-530-04 for the installation.

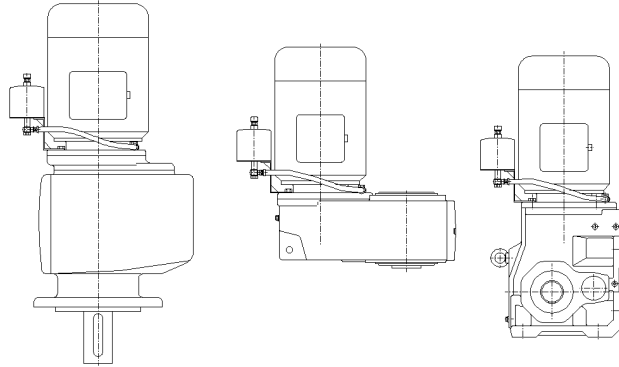


Figure 18: Installing the expansion tank

3.15 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.

4 Commissioning

4.1 Check the oil level

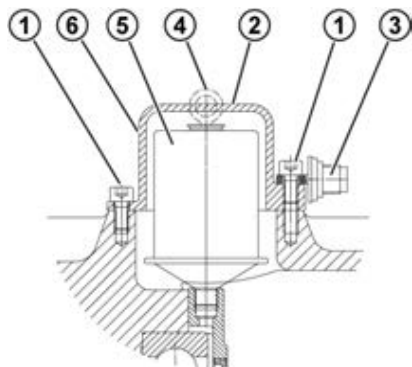
The oil level must be checked prior to commissioning (please see chapter 5.2 "Service and Maintenance Work").

4.2 Activating the automatic lubricant dispenser

Some gear unit types with standard motor (Option IEC/NEMA) have an automatic lubricant dispenser for the roller bearings. This dispenser must be activated prior to commissioning. The cartridge case cover of the adapter for attaching an IEC/NEMA standard motor has a red information sign for the activation of the lubricant dispenser.

Activating the automatic lubricant dispenser:

1. Loosen and remove the cylindrical screws.
2. Remove the cartridge cover.
3. Screw the activation screw into the lubricant dispenser until the lug breaks off at the defined fracture point
4. Re-fit the cartridge cover and fasten it with the cylindrical screw (please see chapter 6.4 "Torque values").
5. Mark activation date on the adhesive label indicating the month/year



Explanation

- | | |
|---|----------------------------|
| 1 | Cylindrical screw M8 x 16 |
| 2 | Cartridge cover |
| 3 | Activation screw |
| 4 | Lug |
| 5 | Lubricant sensor |
| 6 | Position of adhesive label |

Figure 19: Activating the automatic lubricant dispenser with standard motor mounting

Adhesive label:

Notice!																					
Screw in the activation screw until the lug breaks off before commissioning the gear unit.																					
Dispensing time: 12 Months																					
Month					Activation date					Year											
1	2	3	4	5	6	7	8	9	10	11	12						06	07	08	09	10
												11	12	13	14	15					

Figure 20: Adhesive label

4.3 Operation with lubricant cooling

Water cooling

NOTICE

Gear unit damage

The gear unit may be damaged by overheating.

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

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

The **coolant pressure** must not exceed **8 bar**. The required **quantity of coolant** is **10 litres/minute**, and the **coolant inlet temperature** must not exceed 40°C; we recommend **10°C**.

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

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

The **temperature of the cooling water** and the **cooling water flow rate** must be supervised and ensured by the operator.

Air/Oil cooler

The version and all important data for the air/oil cooler can be obtained from Catalogue G1000, or contact the manufacturer of the cooling unit.

4.4 Running-in time for the worm gear unit



Information

Running-in time

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

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

4.5 Checklist

Checklist		
Subject of check	Date checked:	Information see Section
Is the vent plug activated or the pressure vent screwed in?		3.4
Does the required configuration conform with the actual installation?		6.1
Are the external gear shaft forces within permitted limits (chain tension)?		3.6
Is the torque support correctly fitted?		3.7
Are contact guards fitted to rotating components?		3.9
Is the automatic lubricant dispenser activated?		4.2
Is the cooling cover connected to the cooling circuit?		3.13 4.3

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
At least every six months	<ul style="list-style-type: none"> • Visual inspection • Check for running noises • Check the oil level • Re-grease / remove excess grease (only applicable for free drive shaft / Option W and for agitator bearings / Option VL2 / VL3) • Replace the automatic lubricator / remove excess grease (for operating times < 8 h/day: a replacement interval for the lubricant dispenser of 1 year is permissible) (only with IEC/NEMA standard motors) 	5.2
For operating temperatures up to 80°C, every 10000 operating hours, at least every 2 years	<ul style="list-style-type: none"> • Change the oil (The interval is doubled if filled with synthetic products) • Cleaning or replacing the vent plug • 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
At least every 10 years	<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

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 when cleaning with compressed air or a pressure washer.

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.

NOTICE

Leaks

Take care that no dirt or water enters the shaft sealing rings or the vents when cleaning

Dirt or water in the shaft sealing rings may cause leaks.

Visual inspection

The gear unit must be checked for leaks. In addition, the gear unit must be inspected for external damage and cracks in the hoses, hose connections and rubber buffers. Have the gear unit repaired in case of leaks, e.g. dripping gear oil or cooling water, damage or cracks. Please contact the NORD service department.

i 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")

Check for running noises

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

Check the oil level

Section 6.1 "Configurations and maintenance" describes the versions and the corresponding oil level screws. With double gear units, the oil level must be checked on both units. The pressure vent must be at the position marked in Section 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.

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

1. The oil level may only be checked when the gear unit is at a standstill and has cooled down. The gear unit must be secured to prevent accidental switch-on.
2. The oil level screw corresponding to the version must be screwed out (please see chapter 6.1 "Configurations and maintenance").

i Information

Checking the oil level

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

3. **Gear units with oil level screw:** The correct oil level is at the lower edge of the oil level hole. If the oil level is too low, this must be corrected using the correct type of oil. An oil level glass is available instead of the oil level screw
4. **Gear units with an oil level tank:** The oil level must be checked in the oil level tank with the aid of the dipstick plug (thread G1 1/4). The oil level must be between the upper and lower marking when the dipstick is fully screwed in (see Fig. 21). Top up the oil level with the relevant type of oil as necessary. These gearboxes may only be operated in the configuration stated in Section 6.1 "Configurations and maintenance".

5. The oil level screw or the cap screw with dipstick and all other loosened screws must be correctly re-tightened.

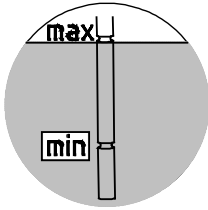


Fig. 21: Checking the oil level with a dipstick

Re-greasing

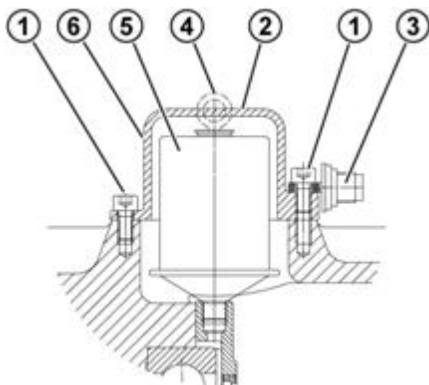
Some gear unit designs (free drive shaft, Option W, agitator designs VL2 and VL3) are equipped with a re-greasing device.

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

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

Recommended grease: Petamo GHY 133N (please see chapter 6.2 "Lubricants") (Klüber Lubrication).

Replacing the automatic lubricant dispenser



Explanation

- | | |
|---|----------------------------|
| 1 | Cylindrical screws M8 x 16 |
| 2 | Cartridge cover |
| 3 | Activation screw |
| 4 | Lug |
| 5 | Lubricant sensor |
| 6 | Position of adhesive label |

Figure 22: Replacing the automatic lubricant dispenser with standard motor mounting

The cartridge cover must be unscrewed. The lubrication dispenser is screwed out and replaced with a new component (Part No. 283 0100). Remove any excess grease from the adapter. Then activate (please see chapter 4.2 "Activating the automatic lubricant dispenser").

Change the oil

The figures in Section 6.1 "Configurations and maintenance" show the oil drain screw, the oil level screw and the pressure vent screw for various designs.

Procedure:

1. Place a catchment vessel under the oil drain screw or the oil drain cock.
2. Completely remove the oil level screw or screwed sealing plug with dipstick if an oil level tank is being used and unscrew oil drain screw.



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 in the thread, a new oil level screw must be used or the thread must be cleaned and coated with securing lubricant, 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 (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). If an oil level tank is used, fill the oil through the upper inlet (thread G1¼) until the oil level is set as described in Section 5.2 "Service and Maintenance Work".
7. Wait at least 15 minutes, or at least 30 minutes if an oil level tank is used, and then check the oil level. Proceed as described in Section 5.2 "Service and Maintenance Work".



Information

Oil level

The oil does not need to be changed on gear units without oil level screw (please see chapter 6.1 "Configurations and maintenance"). These gear units are lubricated for life.

Standard helical gear units have no oil level screw. Here, the oil is topped up through the pressure vent bolt using the quantities listed in the table in Section 6.3 "Lubricant quantities".

Cleaning or replacing the vent plug

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

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

For this, 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

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 recommend that the general overhaul is carried out by the NORD Service department.

6 Appendix

6.1 Configurations and maintenance

Explanation of symbols for the following version illustrations:



Venting



Oil level



Oil drain



Information

Gear unit - Lubrication

SK 320, SK 172, SK 272, SK 372 as well as SK 273 and SK 373, SK 01282 NB, SK 0282 NB, SK 1382 NB and UNIVERSAL / MINIBLOC gear units are lubricated for life. These gear units do not have an oil filler screw.

UNIVERSAL / MINIBLOC worm gear units

NORD UNIVERSAL / MINIBLOC worm gear units are suitable for all installation positions. They have an oil filler which is independent of the configuration.

As an option, types SI and SMI can be equipped with a vent screw. Gear units with vents must be installed in the stated position.

Types SI, SMI, S, SM and SU as 2-stage gear unit types and types SI, SMI as worm gear units for direct motor mounting have an oil filler which depends on the configuration and must be installed in the stated position.

Parallel shaft gear units with oil level tank

The following applies for SK 9282, SK 9382, SK 10282, SK 10382, SK 11282, SK 11382 parallel gear units and SK 12382 in the M4 configuration with oil level tank:

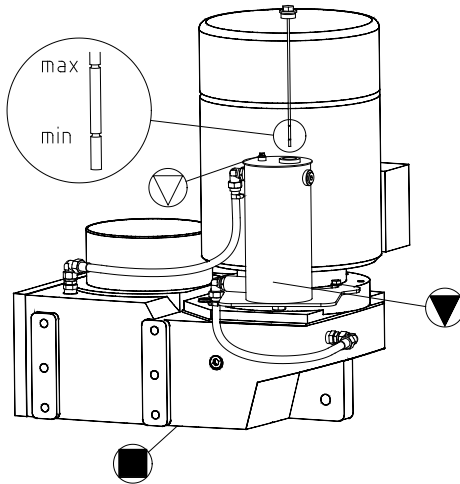
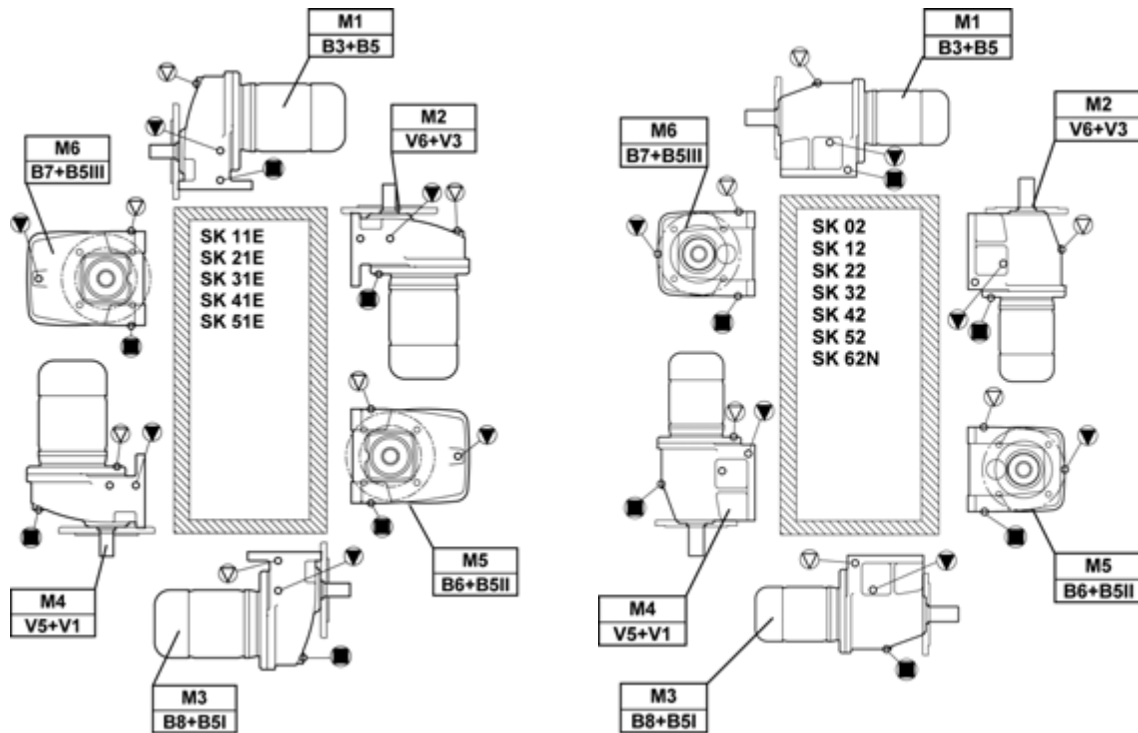
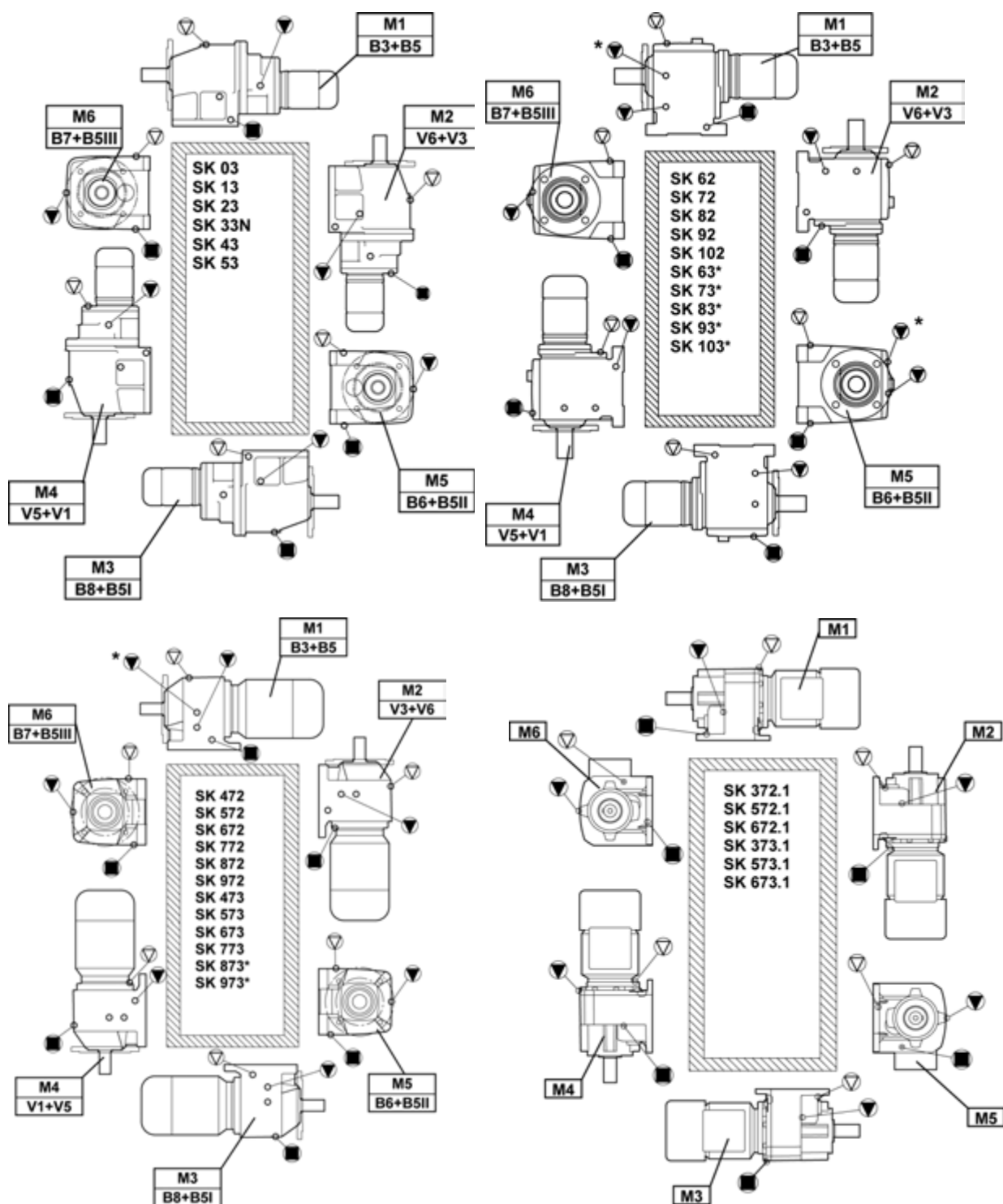
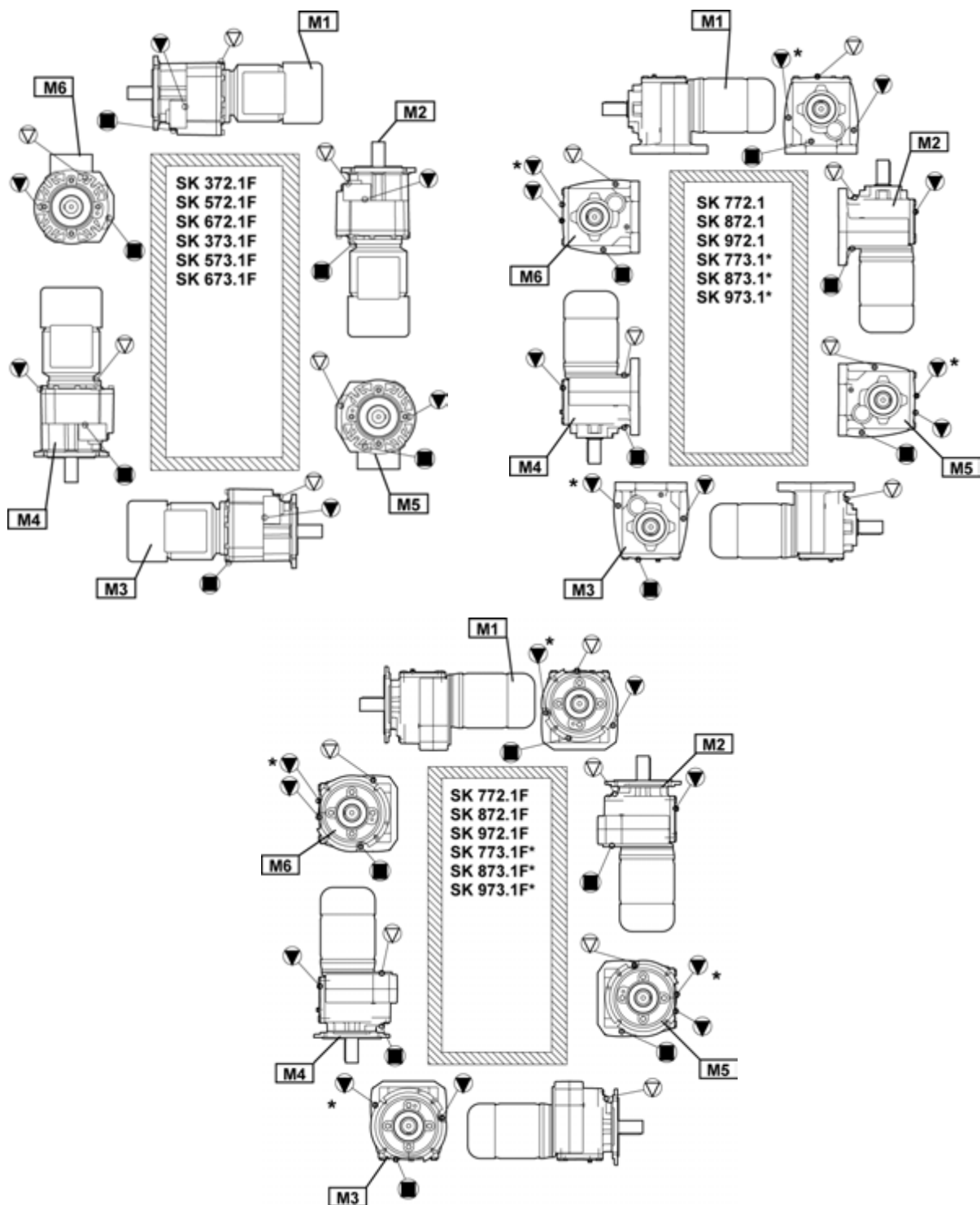
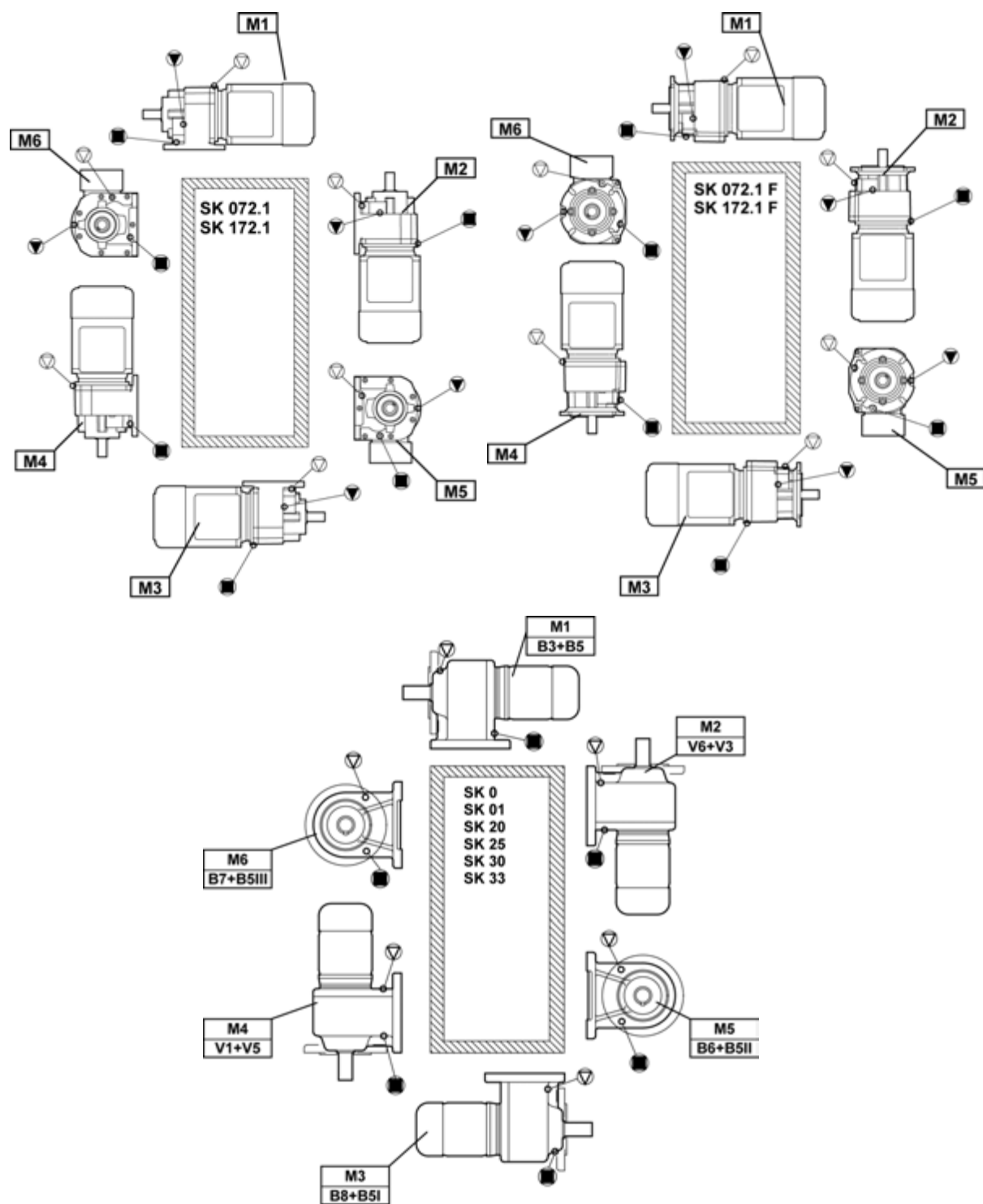


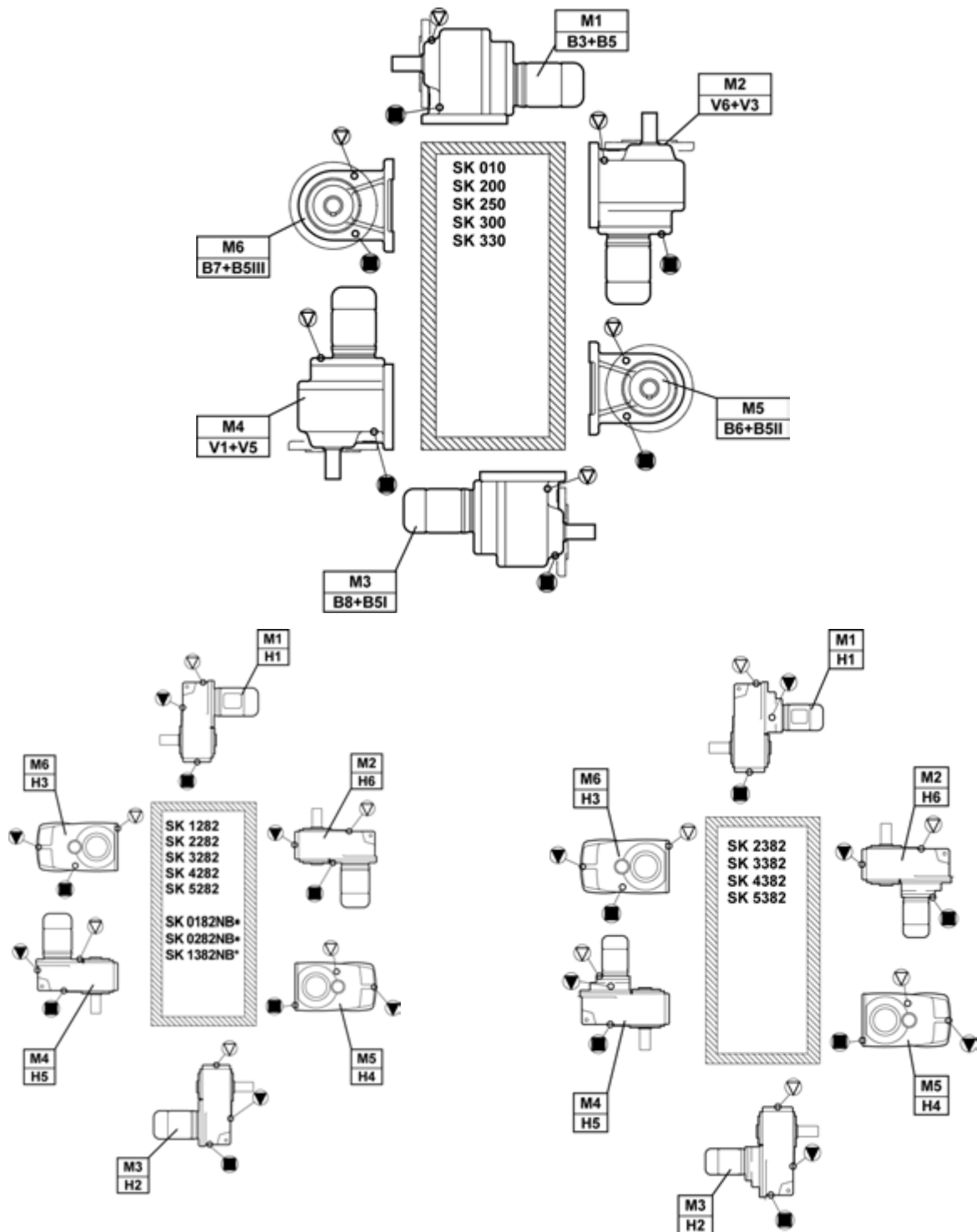
Figure 23: Oil level check with oil level tank

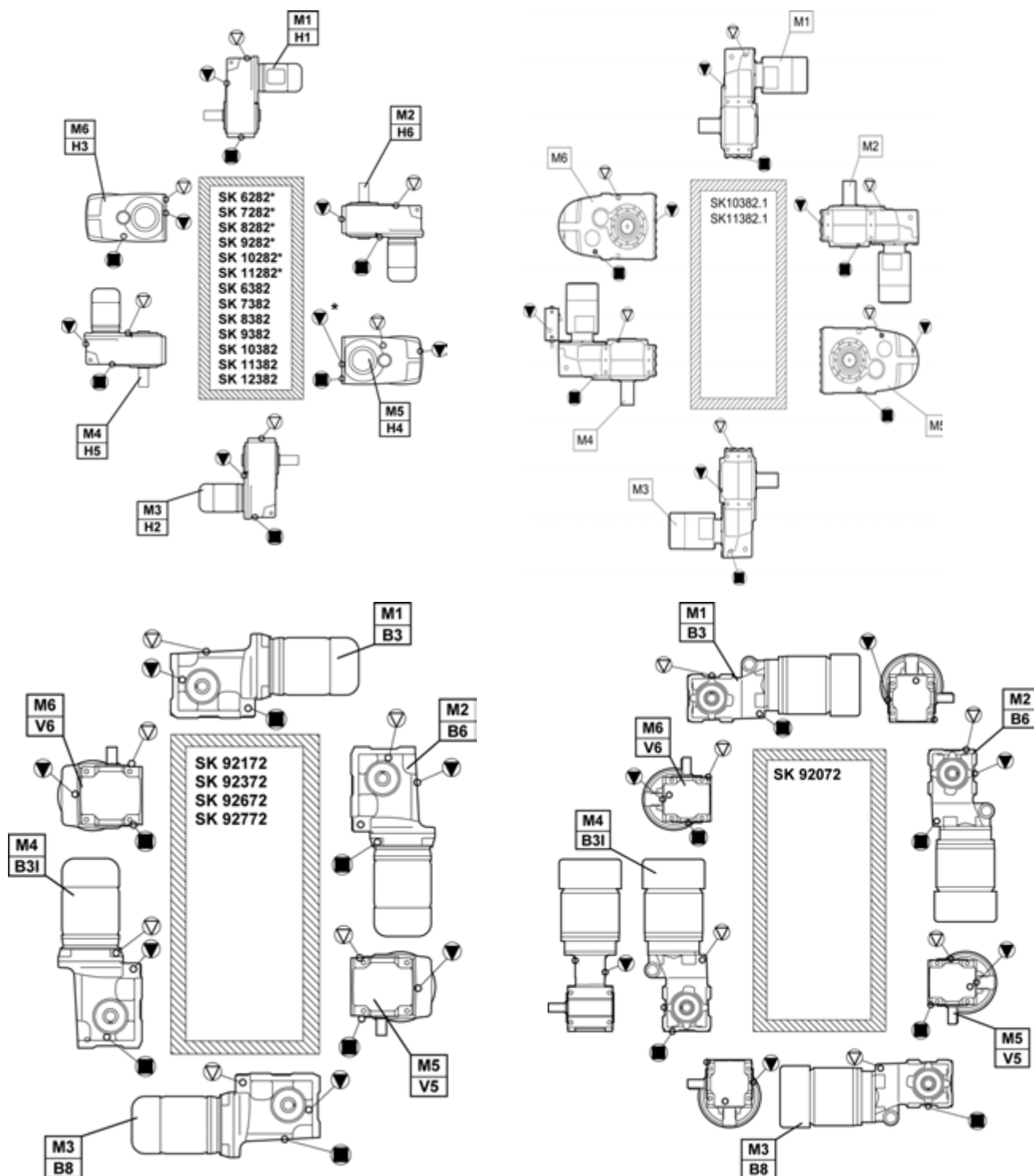


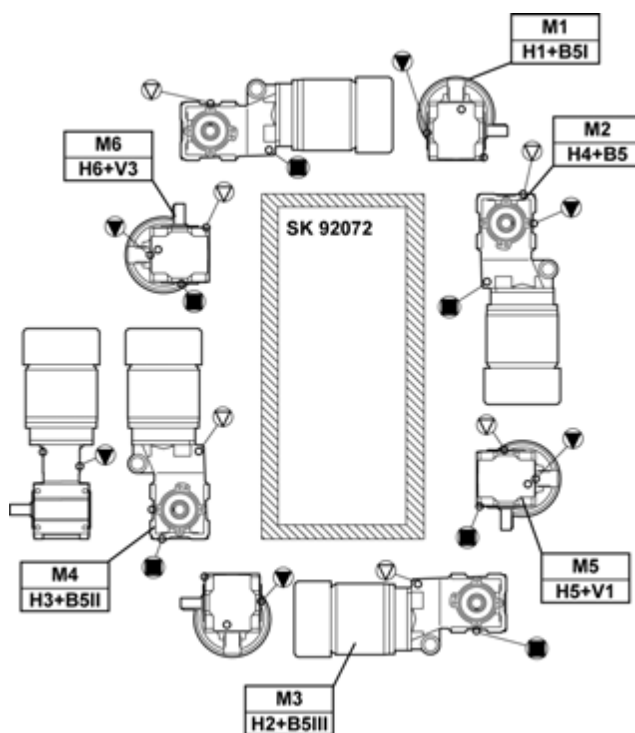
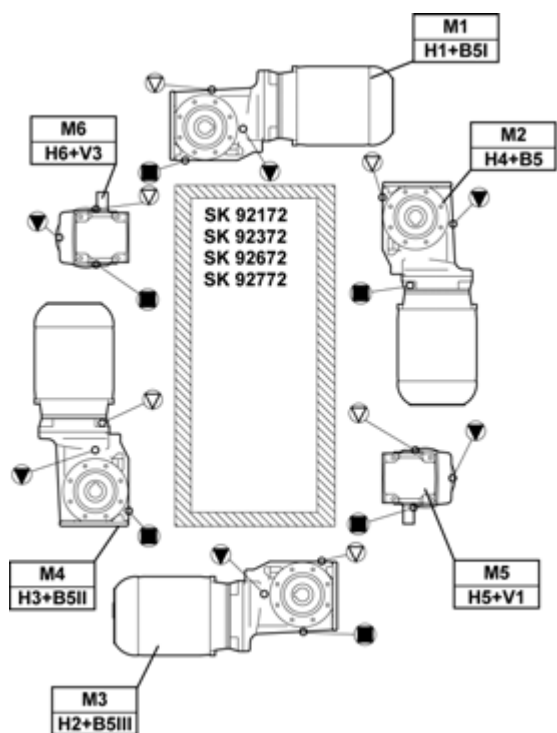
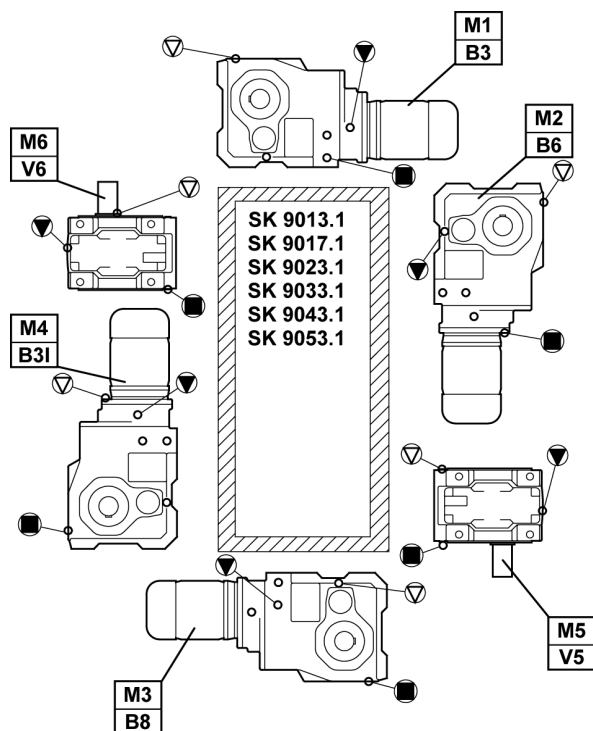
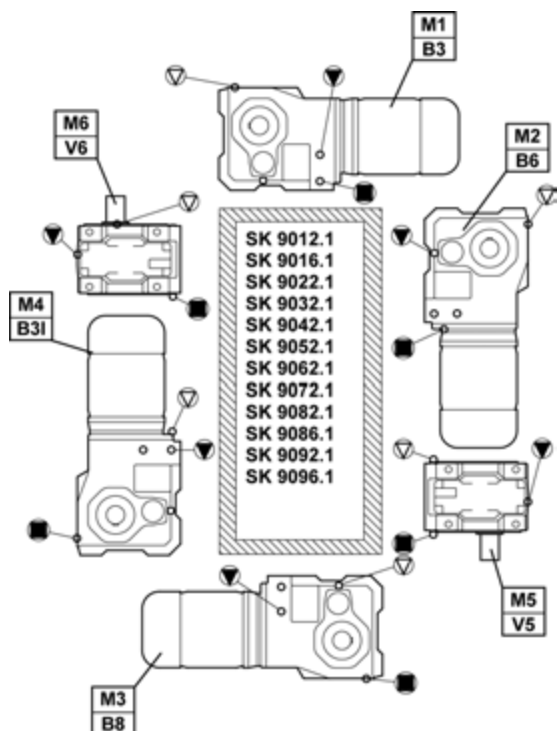


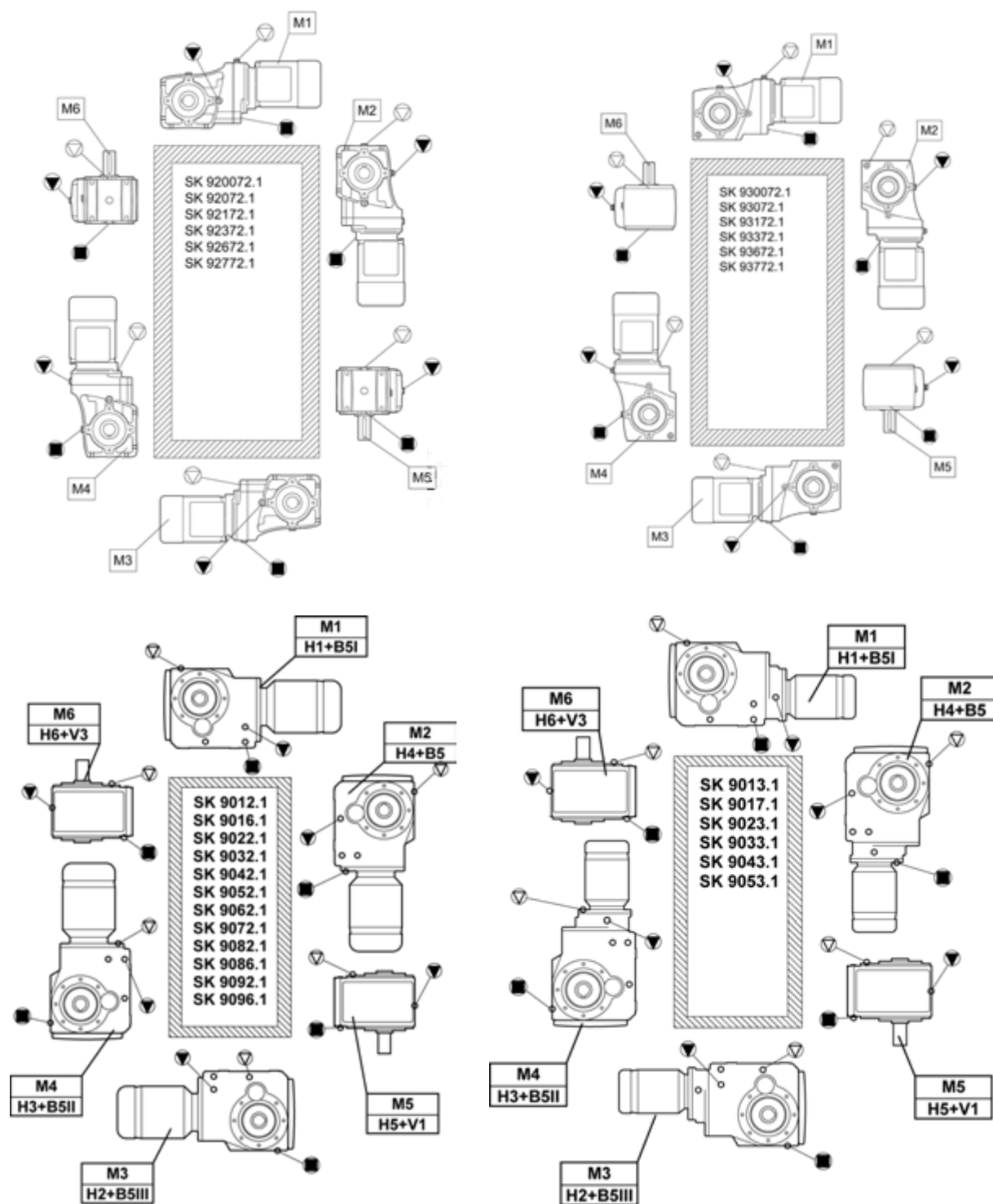


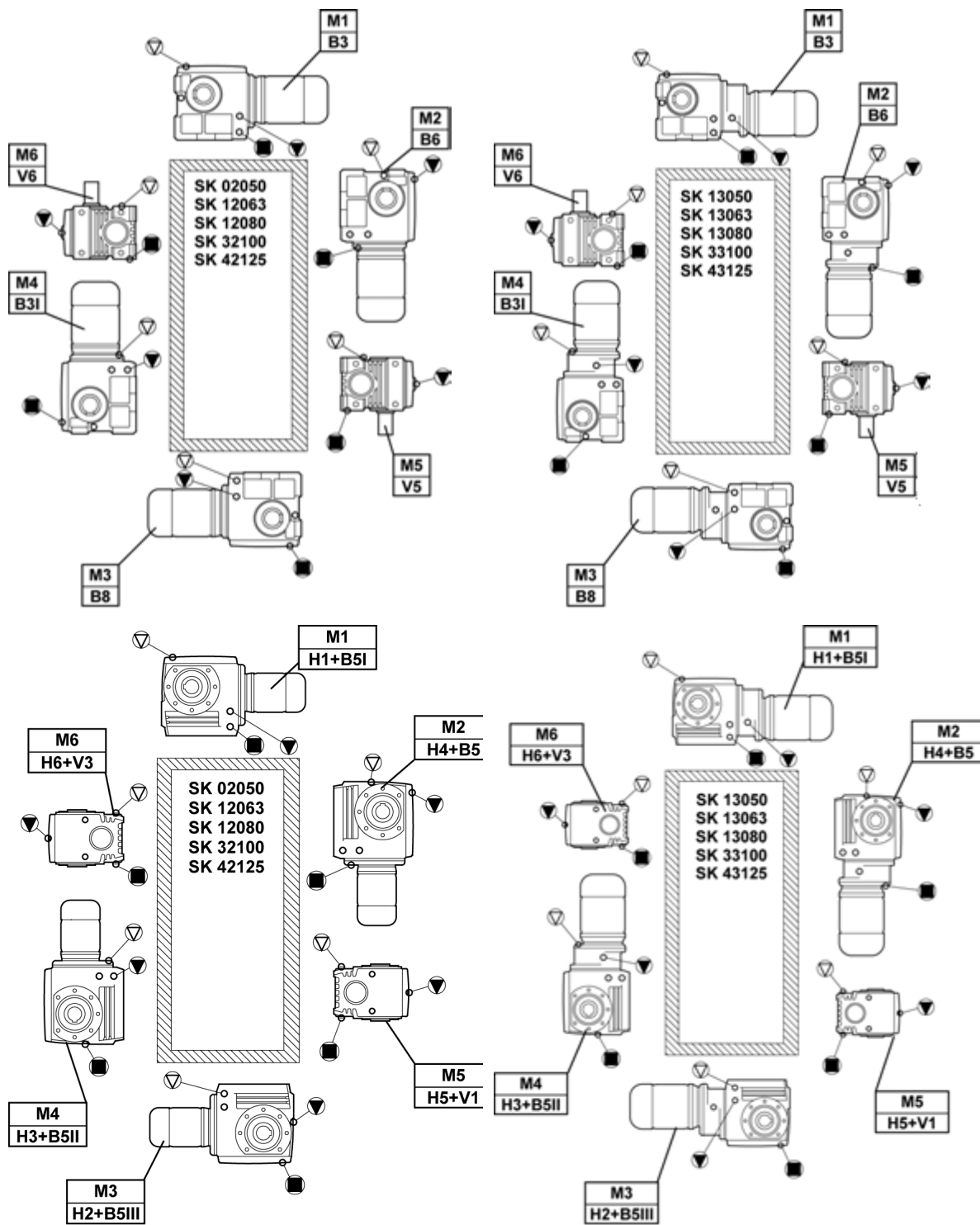


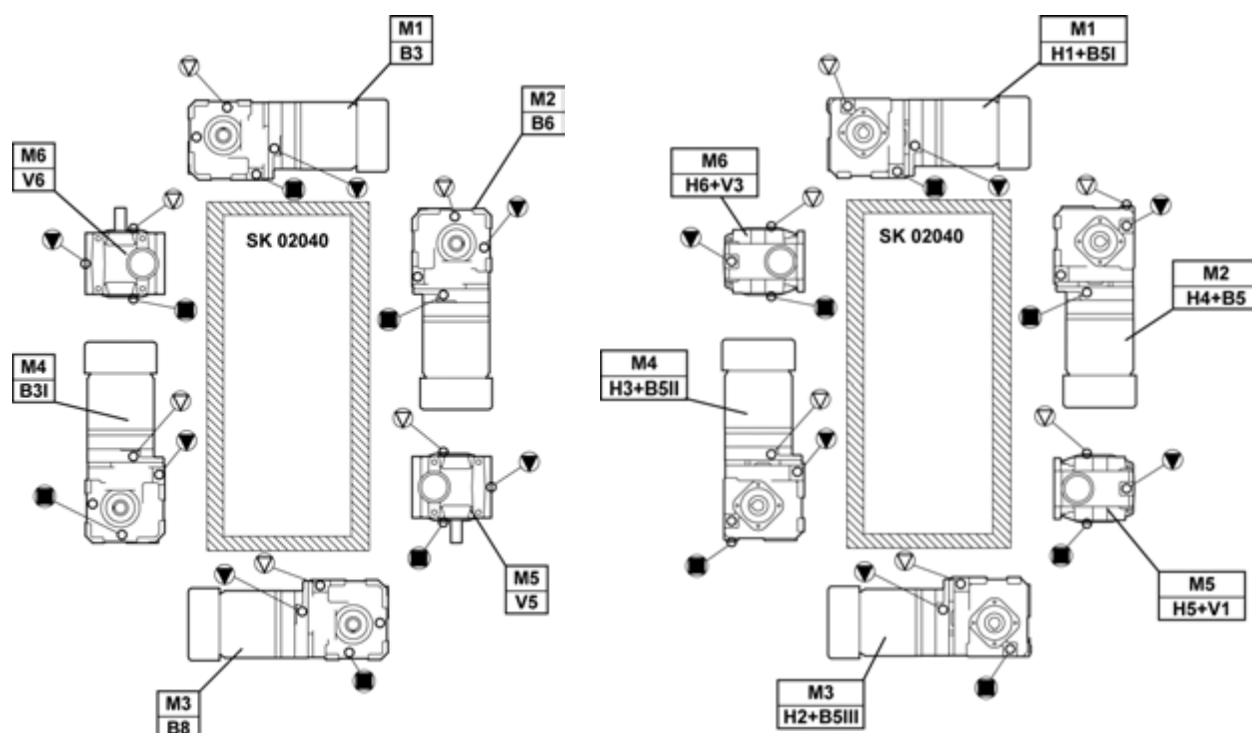




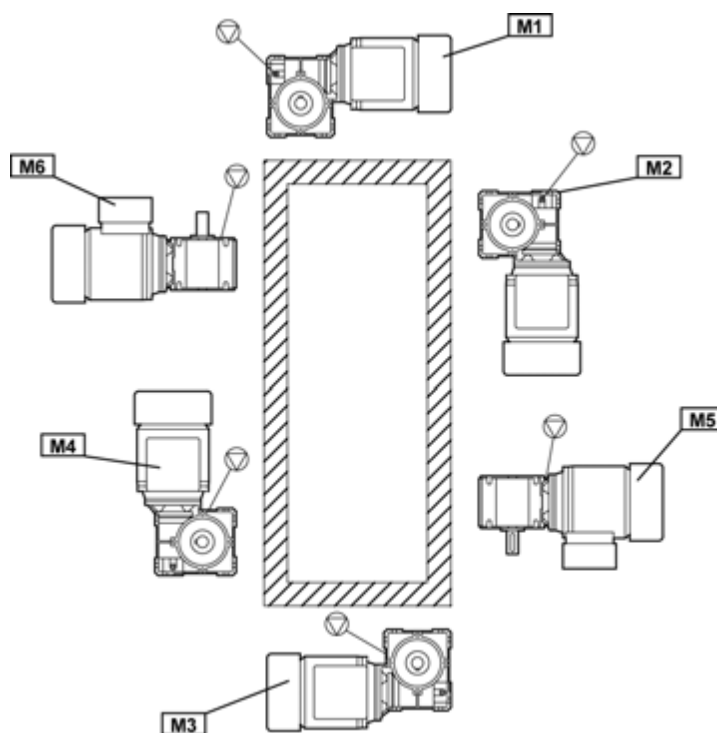








SK 1S32 – SK 1S63
 SK 1SU32 – SK 1SU63
 SK 1SM31 – SK 1SM63
 SK 1SI31 – SK 1SI75
 SK 1SIS31 – SK 1SIS75
 SK 1SMI31 – SK 1SMI75
 SK 1SID31 – SK 1SID75
 SK 1SIS-D31 – SK 1SIS-D63
 SK 1SMID31 – SK 1SMID75
 SK 2S32NB – SK 2S63NB
 SK 2SU32NB- SK 2SU63NB
 SK 2SM40 – SK 2SM63
 SK 2SIS-D40 – SK 2SIS-D63
 SK 2SID40 – SK 2SID63
 SK 2SMID40 – SK 2SMID63



6.2 Lubricants

With the exception of type SK 11282, SK 11382, SK 12382 and SK 9096.1 gear units, all gear units are filled with lubricant ready for operation in the required installation position when delivered. This initial filling corresponds to a lubricant from the column for the ambient temperatures (normal version) in the lubricant table.

Roller bearing greases

This table shows comparable roller bearing greases from various manufacturers. The manufacturer can be changed for a given grease type. Getriebebau NORD must be contacted in case of change of grease type or ambient temperature range, as otherwise no warranty for the functionality of our gear units can be accepted.












Lubricant type	Ambient temperature					
Mineral oil-based grease	-30 ... 60°C	Tribol GR 100-2 PD	Renolit GP 2 Renolit LZR 2 H	-	Mobilux EP 2	Gadus S2 V100 2
	-50 ... 40°C	Optitemp LG 2	Renolit WTF 2	-	-	-
Synthetic grease	-25 ... 80°C	Tribol GR 4747/220-2 HAT	Renolit HLT 2 Renolit LST 2	PETAMO GHY 133 N Klüberplex BEM 41-132	Mobiltemp SHC 32	
Biodegradable grease	-25 ... 40°C	-	Plantogel 2 S	Klüberbio M 72-82	Mobil SHC Grease 102 EAL	Naturelle Grease EP2
Foodstuff compatible grease	-25 ... 40°C	Obeen GR UF 2	Renolit G 7 FG 1 Cassida Grease EPS 2	Klübersynth UH1 14-151	Mobilgrease FM 222	

Table 5: Roller bearing greases

Lubricant table

This table shows comparable lubricants from various manufacturers. The manufacturer can be changed within a particular viscosity or lubricant type. Getriebebau NORD must be contacted in case of change of viscosity or lubricant type, as otherwise no warranty for the functionality of our gearboxes can be accepted.

Lubricant type	Details on type plate	DIN (ISO) / Ambient temperature						
Mineral oil	CLP 680	ISO VG 680 0...40°C	Alpha EP 680 Alpha SP 680 Optigear BM 680 Optigear Synthetic 1100/680	Renolin CLP 680 Renolin CLP 680 Plus	Klüberoil GEM 1-680 N	Mobilgear 600 XP 680	Omala S2 G 680	Carter EP 680 Carter XEP 680
	CLP 220	ISO VG 220 -10...40°C	Alpha EP 220 Alpha SP 220 Optigear BM 220 Optigear Synthetic 1100/220	Renolin CLP 220 Renolin CLP 220 Plus Renolin Gear 220 VCI	Klüberoil GEM 1-220 N	Mobilgear 600 XP 220	Omala S2 G 220	Carter EP 220 Carter XEP 220
	CLP 100	ISO VG 100 -15...25°C	Alpha EP 100 Alpha SP 100 Optigear BM 100 Optigear Synthetic 1100/100	Renolin CLP 100 Renolin CLP 100 Plus	Klüberoil GEM 1-100 N	Mobilgear 600 XP 100	Omala S2 G 100	Carter EP 100
Synthetic oil (Polyglycol)	CLP PG 680	ISO VG 680 -20...40°C	Alphasyn GS 680 Optigear Synthetic 800/680	Renolin PG 680	Klübersynth GH 6-680	Mobil Glygoyle 680	Omala S4 WE 680	Carter SY 680 Carter SG 680
	CLP PG 220	ISO VG 220 -25...80°C	Alphasyn GS 220 Alphasyn PG 220 Optigear Synthetic 800/220	Renolin PG 220	Klübersynth GH 6-220	Mobil Glygoyle 220	Omala S4 WE 220	-
Synthetic oil (hydrocarbons)	CLP HC 460	ISO VG 460 -30...80°C	Alphasyn EP 460 Optigear Synthetic PD 460	Renolin Unisyn CLP 460	Klübersynth GEM 4-460 N	Mobil SHC 634	Omala S4 GX 460	Carter SH 460
	CLP HC 220	ISO VG 220 -40...80°C	Alphasyn EP 220 Optigear Synthetic PD 220	Renolin Unisyn CLP 220 Renolin Unisyn Gear VCI	Klübersynth GEM 4-220 N	Mobil SHC 630	Omala S4 GX 220	Carter SH 220
Bio-degradable oil	CLP E 680	ISO VG 680 -5...40°C	-	Plantogear 680 S	-	-	-	-
	CLP E 220	ISO VG 220 -5...40°C	Performance Bio GE 220 ESS Performance Bio GE 220 ESU	Plantogear 220 S	Klübersynth GEM 2-220	-	Naturelle Gear Fluid EP 220	-







Lubricant type	Details on type plate	DIN (ISO) / Ambient temperature						
Foodstuff-compatible oil	CLP PG H1 680	ISO VG 680 -5...40°C	Optileb GT 1800/680	Cassida Fluid WG 680	Klübersynth UH1 6-680	Mobil Glygoyle 680		-
	CLP PG H1 220	ISO VG 220 -25...40°C	Optileb GT 1800/200	Cassida Fluid WG 220	Klübersynth UH1 6-220	Mobil Glygoyle 220		Nevastane SY 220
	CLP PG H1 680	ISO VG 680 -5...40°C	Optileb GT 680	Cassida Fluid GL 680	Klüberoil 4 UH1-680 N	-		-
	CLP PG H1 220	ISO VG 220 -25...40°C	Optileb GT 220	Cassida Fluid GL 220	Klüberoil 4 UH1-220 N	Mobil SHC Cibus 220		Nevastane XSH 220
Gear unit fluid grease		-25 ... 60°C	Tribol GR 100-00 PD Tribol GR 3020/1000-00 PD Spheerol EPL 00	Renolit Duraplex EP 00 Renolit LST 00	MICROLUBE GB 00 Klübersynth GE 46-1200	Mobil Chassis Grease LBZ Mobil Glygoyle Grease 00	Alvania EP(LF)2 -	Multis EP 00 Marson SY 00

Table 6: Lubricant table

6.3 Lubricant quantities



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 oil level is still within the permissible tolerance.

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.

The filling quantities stated in the following tables are for guidance only. The precise quantities vary depending on the exact gear ratio. When filling, always observe the oil level screw hole as an indicator of the precise quantity of oil.

* Gear unit types SK 11282, SK 11382, SK 11382.1, SK 12382 and SK 9096.1 are normally supplied without oil.

Helical gear units





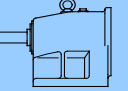
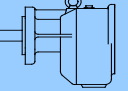

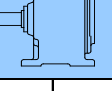
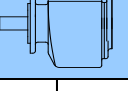


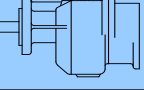

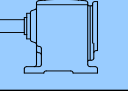
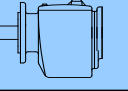
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SK11E	0,25	0,50	0,65	0,50	0,40	0,40	0,30	0,50	0,50	0,45	0,40	0,40
SK21E	0,60	1,20	1,30	1,00	1,00	1,00	0,50	1,20	1,30	0,60	0,90	0,90
SK31E	1,10	2,00	2,20	1,70	1,50	1,50	0,90	1,80	1,65	1,30	1,25	1,25
SK41E	1,60	2,60	3,30	2,80	2,30	2,30	1,20	2,30	2,70	2,00	1,90	1,90
SK51E	1,80	3,50	4,10	4,00	3,80	3,80	1,80	3,50	4,10	3,00	3,80	3,80
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SK02	0,20	0,75	0,75	0,65	0,60	0,60	0,25	0,70	0,70	0,70	0,50	0,50
SK12	0,25	0,80	0,85	0,75	0,55	0,55	0,35	0,85	0,90	0,90	0,70	0,70
SK22	0,50	1,90	2,10	1,80	1,40	1,40	0,70	1,80	1,80	1,80	1,40	1,40
SK32	0,90	2,50	3,10	3,10	2,00	2,00	1,20	2,80	3,10	3,10	2,20	2,20
SK42	1,40	4,50	4,50	4,30	3,20	3,20	1,80	4,40	4,50	4,00	3,70	3,70
SK52	2,50	7,00	6,80	6,80	5,10	5,10	3,00	6,80	6,20	7,40	5,60	5,60
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SK62	6,50	15,00	13,00	16,00	15,00	15,00	7,00	15,00	14,00	18,50	16,00	16,00
SK72	10,00	23,00	18,00	26,00	23,00	23,00	10,00	23,00	18,50	28,00	23,00	23,00
SK82	14,00	35,00	27,00	44,00	32,00	32,00	15,00	37,00	29,00	45,00	34,50	34,50
SK92	25,00	73,00	47,00	76,00	52,00	52,00	26,00	73,00	47,00	78,00	52,00	52,00
SK102	36,00	79,00	66,00	102,00	71,00	71,00	40,00	81,00	66,00	104,00	72,00	72,00
 [L]												
SK03	0,35	1,20	0,80	1,00	0,70	0,70	0,55	0,95	0,90	1,20	0,90	0,90
SK13	0,75	1,30	1,30	1,20	0,75	0,75	1,00	1,30	1,30	1,20	1,00	1,00
SK23	1,20	2,00	1,90	2,40	1,60	1,60	1,40	2,60	2,30	2,80	2,80	2,80
SK33N	1,75	3,00	3,40	4,00	2,30	2,30	2,20	3,00	3,40	4,20	2,30	2,30
SK43	3,00	5,60	5,20	6,60	3,60	3,60	3,50	5,70	5,00	6,10	4,10	4,10
SK53	4,50	8,70	7,70	8,70	6,00	6,00	5,20	8,40	7,00	8,90	6,70	6,70
 [L]												
SK63	13,00	14,50	14,50	16,00	13,00	13,00	13,50	14,00	15,50	18,00	14,00	14,00
SK73	20,50	20,00	22,50	27,00	20,00	20,00	22,00	22,50	23,00	27,50	20,00	20,00
SK83	30,00	31,00	34,00	37,00	33,00	33,00	31,00	34,00	35,00	40,00	34,00	34,00
SK93	53,00	70,00	59,00	72,00	49,00	49,00	53,00	70,00	59,00	74,00	49,00	49,00
SK103	74,00	71,00	74,00	97,00	67,00	67,00	69,00	78,00	78,00	99,00	67,00	67,00

Table 7: Lubricant quantities for helical gear units

NORDBLOC


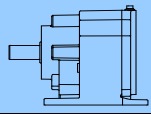

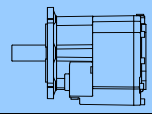



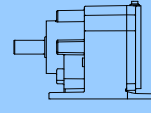

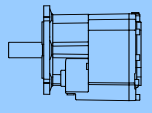


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SK172.1	0,27	0,59	0,42	0,45	0,32	0,39	SK172.1 F	0,27	0,59	0,42	0,45	0,32	0,39
SK372.1	0,45	1,05	0,75	1,00	0,60	0,65	SK372.1 F	0,45	1,05	0,75	1,00	0,60	0,65
SK572.1	0,75	1,90	1,50	2,00	1,10	1,15	SK572.1 F	0,75	1,90	1,50	2,00	1,10	1,15
SK672.1	1,10	2,60	2,15	2,70	1,55	1,65	SK672.1 F	1,10	2,60	2,15	2,70	1,55	1,65
SK772.1	1,30	3,80	2,40	3,20	1,60	2,50	SK772.1 F	1,30	3,80	2,40	3,30	1,70	2,40
SK872.1	2,90	7,80	4,60	6,40	2,50	4,00	SK872.1 F	3,20	7,50	5,10	6,70	2,60	4,30
SK972.1	4,50	12,00	7,50	11,50	4,20	7,50	SK972.1 F	4,50	12,50	8,00	12,50	4,50	7,70
SK772.1VL	2,00	3,80	2,40	3,20	1,60	2,50	SK772.1VL F	2,00	3,80	2,40	3,30	1,70	2,40
SK872.1VL	5,00	7,80	4,60	6,40	2,50	4,00	SK872.1VL F	5,00	7,50	5,10	6,70	2,60	4,30
SK972.1VL	8,50	12,00	7,50	11,50	4,20	7,50	SK972.1VL F	8,50	12,50	8,00	12,50	4,50	7,70
 [L]							 [L]						
⇒  6.1	M1	M2	M3	M4	M5	M6	⇒  6.1	M1	M2	M3	M4	M5	M6
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SK573.1	0,75	1,90	1,50	2,00	1,10	1,15	SK573.1 F	0,75	1,90	1,50	2,00	1,10	1,15
SK673.1	1,10	2,60	2,15	2,70	1,55	1,65	SK673.1 F	1,10	2,60	2,15	2,70	1,55	1,65
SK773.1	2,30	3,80	3,30	3,20	2,40	3,10	SK773.1 F	2,00	3,50	3,20	2,90	2,30	3,00
SK873.1	4,20	7,80	5,90	6,40	4,10	5,90	SK873.1 F	4,10	7,60	6,90	6,60	5,00	6,60
SK973.1	7,50	12,00	10,50	11,50	7,50	10,50	SK973.1 F	7,40	12,20	11,10	11,60	8,00	10,90
SK773.1VL	2,30	3,80	3,30	3,20	2,40	3,10	SK773.1VL F	2,00	3,50	3,20	2,90	2,30	3,00
SK873.1VL	4,20	7,80	5,90	6,40	4,10	5,90	SK873.1VL F	4,10	7,60	6,90	6,60	5,00	6,60
SK973.1VL	7,50	12,00	10,50	11,50	7,50	10,50	SK973.1VL F	7,40	12,20	11,10	11,60	8,00	10,90

Table 8: Lubricant quantities for NORDBLOC

NORDBLOC helical gear units


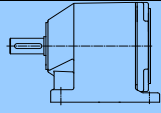
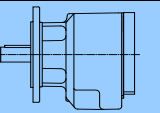

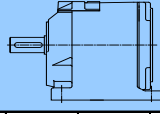
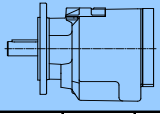
 [L]												
	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6
⇒ 6.1	B3	V6	B8	V5	B6	B7	B5	V3	B5I	V1	B5II	B5III
SK172	0,35	0,50	0,50	0,50	0,50	0,50	0,35	0,50	0,50	0,50	0,50	0,50
SK272	0,60	1,00	1,00	1,00	1,00	1,00	0,60	1,00	1,00	1,00	1,00	1,00
SK372	0,60	1,00	1,00	1,00	1,00	1,00	0,60	1,00	1,00	1,00	1,00	1,00
SK472	1,00	1,90	1,90	2,00	1,80	1,80	1,00	1,90	1,90	1,90	1,90	1,50
SK572	1,00	1,90	1,90	2,00	1,80	1,80	1,00	1,90	1,90	1,90	1,90	1,50
SK672	1,40	3,40	3,10	3,15	1,45	3,15	1,15	3,40	2,70	2,80	1,25	2,70
SK772	2,00	3,30	3,50	4,20	2,70	3,30	1,60	3,30	3,50	3,30	3,10	3,10
SK872	3,70	9,60	9,10	7,30	4,70	8,00	3,50	9,00	7,90	7,70	3,90	7,20
SK972	6,50	16,00	15,70	14,70	8,50	14,00	6,50	15,00	13,00	13,50	6,50	12,00
 [L]												
	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6
SK273	0,62	1,10	1,10	1,10	1,10	1,10	0,62	1,10	1,10	1,10	1,10	1,10
SK373	0,55	1,10	1,10	1,10	1,10	1,10	0,55	1,10	1,10	1,10	1,10	1,10
SK473	1,30	2,50	2,10	2,40	2,10	2,10	1,25	2,40	2,10	2,50	2,10	2,10
SK573	1,30	2,50	2,10	2,40	2,10	2,10	1,25	2,40	2,10	2,50	2,10	2,10
SK673	1,80	3,80	3,20	3,40	2,90	3,00	1,70	3,80	3,00	3,20	3,00	3,00
SK773	2,50	4,50	3,70	4,60	3,30	3,30	2,30	5,00	3,60	4,50	3,90	3,90
SK873	6,20	8,40	7,50	9,10	7,50	7,50	5,00	8,80	7,60	8,00	8,00	8,00
SK973	11,00	15,80	13,00	16,00	13,30	13,00	10,30	16,50	13,00	16,00	14,00	14,00

Table 9: Lubricant quantities: NORDBLOC helical gear units

Standard helical gear units


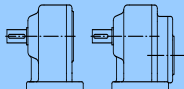

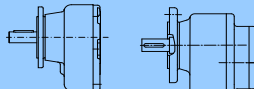


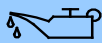
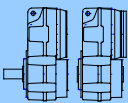

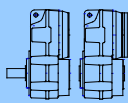




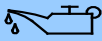
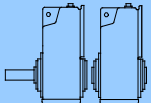

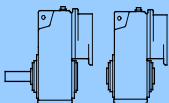
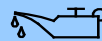
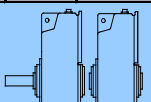

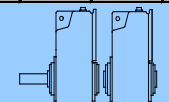
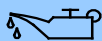
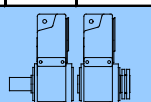

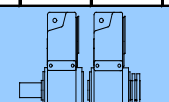
 [L]							 [L]						
⇒  6.1	M1	M2	M3	M4	M5	M6	⇒  6.1	M1	M2	M3	M4	M5	M6
SK20	0,55	1,00	0,55	1,00	0,55	0,55	SK20 F	0,35	0,60	0,35	0,60	0,35	0,35
SK0	0,13	0,22	0,13	0,22	0,13	0,13	SK0 F	0,13	0,22	0,13	0,22	0,13	0,13
SK01	0,22	0,38	0,22	0,38	0,22	0,22	SK01 F	0,22	0,38	0,22	0,38	0,22	0,22
SK25	0,50	1,00	0,50	1,00	0,50	0,50	SK25 F	0,50	1,00	0,50	1,00	0,50	0,50
SK33	1,00	1,60	1,00	1,60	1,00	1,00	SK33 F	1,00	1,50	1,00	1,50	1,00	1,00
SK30	0,90	1,30	0,90	1,30	0,90	0,90	SK30 F	0,70	1,10	0,70	1,10	0,70	0,70
SK300	1,20	2,00	1,20	2,00	1,20	1,20	SK300 F	1,25	1,50	1,20	1,80	1,30	0,95
SK330	1,80	2,80	1,80	2,80	1,80	1,80	SK330 F	1,60	2,50	1,60	2,90	1,90	1,40
SK200	0,80	1,30	0,80	1,30	0,80	0,80	SK200 F	0,65	0,95	0,70	1,10	0,80	0,50
SK010	0,38	0,60	0,38	0,60	0,38	0,38	SK010 F	0,35	0,65	0,40	0,74	0,50	0,30
SK250	1,20	1,50	1,20	1,50	1,20	1,20	SK250 F	0,90	1,40	1,00	1,60	1,30	0,80
SK000	0,24	0,40	0,24	0,41	0,24	0,24	SK000 F	0,24	0,41	0,24	0,41	0,24	0,24

Table 10: Lubricant quantities for standard helical gear units


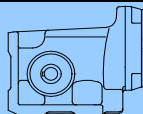
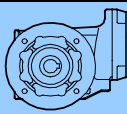
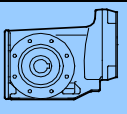

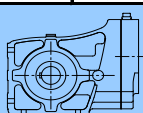
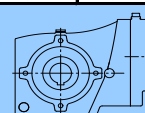

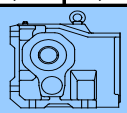
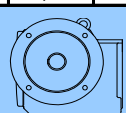
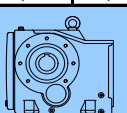

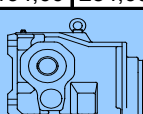
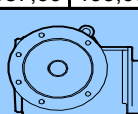
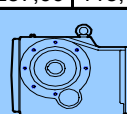
Parallel shaft gear units

 [L]							 [L]						
⇒  6.1	M1	M2	M3	M4	M5	M6	⇒  6.1	M1	M2	M3	M4	M5	M6
⇒  6.1	H1	H6	H2	H5	H4	H3	⇒  6.1	H1	H6	H2	H5	H4	H3
SK0182NB A	0,40	0,55	0,55	0,40	0,40	0,40							
SK0282NB A	0,70	1,10	0,80	1,10	0,90	0,90							
							SK1382NB A	1,40	2,30	2,20	2,20	2,00	2,00
 [L]							 [L]						
SK1282 A	0,95	1,30	0,90	1,30	1,00	1,00	SK2382 A	2,30	2,70	2,10	3,20	2,00	2,00
SK2282 A	1,70	2,30	1,70	2,20	1,90	1,90	SK3382 A	3,80	4,30	3,00	5,50	3,00	3,00
SK3282 A	2,80	4,00	3,30	3,80	3,00	3,00	SK4382 A	6,10	6,90	4,90	8,40	5,00	5,00
SK4282 A	4,20	5,40	4,40	5,00	4,20	4,20	SK5382 A	12,50	12,00	6,70	14,00	8,30	8,30
SK5282 A	7,50	8,80	7,50	8,80	7,20	7,20	SK1382 A	1,45	1,60	1,15	1,70	1,10	1,10
 [L]							 [L]						
SK6282 A	17,00	15,50	12,50	17,50	11,00	14,00	SK6382 A	16,00	13,00	10,00	18,00	14,00	12,50
SK7282 A	25,50	21,00	20,50	27,00	16,00	21,00	SK7382 A	22,00	21,00	16,00	25,00	23,00	22,00
SK8282 A	37,50	33,00	30,50	44,00	31,00	31,00	SK8382 A	34,50	32,50	25,00	38,00	35,00	30,00
SK9282 A	74,50	70,00	56,00	80,00	65,00	59,00	SK9382 A	73,50	70,00	43,00	74,50	65,00	60,00
 [L]							 [L]						
SK10282 A	90	90	40	90	60	82	SK10382 A	85	90	73	100	80	80
SK11282 A	165	160	145	195	100	140	SK11382 A	160	155	140	210	155	135
							SK12382 A	160	155	140	210	155	135
							SK10382.1 A	76,0	80,0	71,0	92,5	71,5	66,5
							SK11382.1 A	127	133	118	194	124	112

* For further information see page 56

Table 11: Lubricant quantities for parallel shaft gear units

Bevel gear units

 [L]							 					
⇒ 6.1	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6
⇒ 6.1	B3	B6	B8	B3I	V5	V6	B5I	B5	B5III	B5II	V1	V3
							H1	H4	H2	H3	H5	H6
SK92072	0,40	0,60	0,50	0,55	0,40	0,40	0,40	0,60	0,55	0,55	0,40	0,40
SK92172	0,60	0,90	1,00	1,10	1,10	0,80	0,50	1,00	0,90	1,05	0,90	0,60
SK92372	0,90	1,60	1,50	1,90	1,50	0,90	1,20	1,60	1,50	1,90	1,30	1,30
SK92672	1,80	3,50	3,60	3,40	2,60	2,60	1,60	2,80	2,50	3,30	2,40	2,40
SK92772	2,30	4,50	4,60	5,30	4,10	4,10	2,80	4,40	4,50	5,50	3,50	3,50
 [L]												
SK9x072.1	0,26	0,49	0,42	0,54	0,29	0,31	0,39	0,93	0,79	1,02	0,49	0,62
SK9x172.1	0,34	0,61	0,52	0,67	0,42	0,48	0,60	1,17	0,94	1,22	0,65	0,85
SK9x372.1	0,43	0,92	0,73	0,83	0,55	0,61	1,00	1,97	1,65	2,14	1,12	1,34
SK9x672.1	0,85	1,60	1,20	1,50	1,02	1,02	1,80	3,23	2,71	3,80	2,02	2,45
SK9x772.1	1,30	2,65	1,86	2,45	1,60	1,60	2,72	4,63	3,70	5,40	2,93	3,25
SK9x0072.1	0,21	0,47	0,36	0,34	0,28	0,28	0,28	0,65	0,56	0,54	0,39	0,39
 [L]							 					
SK9012.1	0,70	1,70	1,90	2,10	1,10	1,50	1,00	1,90	1,90	2,20	1,20	1,70
SK9016.1	0,70	1,70	1,90	2,10	1,10	1,50	1,00	1,90	1,90	2,20	1,20	1,70
SK9022.1	1,30	2,90	3,30	3,80	1,70	2,80	1,60	3,50	3,50	4,20	2,30	2,80
SK9032.1	1,80	5,40	6,10	6,80	3,00	4,60	2,10	4,80	6,40	7,10	3,30	5,10
SK9042.1	4,40	9,00	10,00	10,70	5,20	7,70	4,50	10,00	10,00	11,50	6,50	8,20
SK9052.1	6,50	16,00	19,00	21,50	11,00	15,50	7,50	16,50	20,00	23,50	11,50	18,00
SK9062.1	10,00	27,50	32,00	36,00	18,00	24,00	12,00	27,50	33,00	38,50	19,00	26,00
SK9072.1	10,00	27,50	32,00	36,00	18,00	24,00	12,00	27,50	33,00	38,50	19,00	26,00
SK9082.1	17,00	51,50	62,50	71,50	33,00	46,50	21,00	54,00	66,00	80,00	38,00	52,00
SK9086.1	29,00	73,00	85,00	102,00	48,00	62,00	36,00	78,00	91,00	107,00	53,00	76,00
SK9092.1	41,00	157,00	170,00	172,00	80,00	90,00	40,00	130,00	154,00	175,00	82,00	91,00
SK9096.1	70,00	187,00	194,00	254,00	109,00	152,00	80,00	187,00	193,00	257,00	113,00	156,00
 [L]							 					
SK9013.1	1,35	2,10	2,15	2,75	1,00	1,80	1,45	2,30	2,10	2,80	1,05	1,80
SK9017.1	1,30	2,00	2,10	2,70	1,00	1,70	1,45	2,30	2,10	2,80	1,05	1,80
SK9023.1	2,20	3,20	3,60	4,70	2,20	2,90	2,30	3,50	3,80	5,30	2,20	3,40
SK9033.1	3,10	5,70	6,30	8,00	3,40	4,80	3,70	5,70	6,70	8,60	3,60	5,30
SK9043.1	5,00	10,10	11,00	13,30	5,70	8,10	6,50	10,50	11,90	14,70	6,70	9,30
SK9053.1	10,00	17,00	20,00	24,50	11,50	16,50	13,00	18,00	21,50	26,50	13,00	17,00

* For further information see page 56

Table 12: Lubricant quantities for bevel gear units

Helical worm gear units

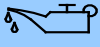
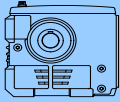

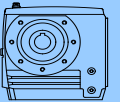
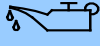
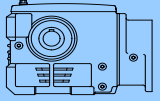

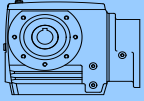
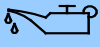
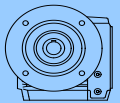

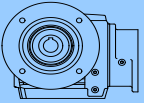
 [L]							 [L]						
⇒ 6.1	M1	M2	M3	M4	M5	M6		M1	M2	M3	M4	M5	M6
⇒ 6.1	B3	B6	B8	B3I	V5	V6		B5I	B5	B5III	B5II	V1	V3
⇒ 6.1								H1	H4	H2	H3	H5	H6
SK02040	0,40	0,80	0,75	0,65	0,50	0,50	SK02040 A	0,40	0,70	0,65	0,65	0,55	0,55
SK02050	0,40	1,40	1,10	1,30	0,70	0,70	SK02050 A	0,45	1,40	1,15	1,10	0,75	0,75
SK12063	0,60	1,80	1,20	1,60	1,00	1,00	SK12063 A	0,55	1,45	1,60	1,60	1,10	1,10
SK12080	0,90	3,10	2,40	3,00	1,80	1,80	SK12080 A	0,80	3,10	3,20	2,80	1,80	1,80
SK32100	1,50	6,30	5,60	5,50	3,60	3,60	SK32100 A	1,50	5,60	5,60	5,30	4,00	4,00
SK42125	2,80	11,80	10,20	10,00	6,20	6,20	SK42125 A	3,00	12,50	10,80	10,80	6,50	6,50
 [L]							 [L]						
SK13050	0,75	1,75	1,30	1,75	0,75	0,75	SK13050 A	0,90	1,80	1,30	1,65	1,30	1,30
SK13063	1,00	2,30	1,50	2,20	1,10	1,10	SK13063 A	1,05	2,10	1,80	2,10	1,40	1,40
SK13080	1,70	3,50	3,50	3,50	2,00	2,00	SK13080 A	1,60	3,60	2,90	3,75	2,00	2,00
SK33100	2,40	6,40	5,40	6,50	3,40	3,40	SK33100 A	2,60	6,00	5,80	6,00	3,50	3,50
SK43125	4,25	13,00	10,50	13,50	7,20	7,20	SK43125 A	4,60	13,60	11,40	14,30	7,60	7,60
 [L]							 [L]						
SK02040 F	0,40	0,70	0,65	0,65	0,55	0,55							
SK02050 F	0,40	1,50	1,25	1,20	0,90	0,75	SK13050 F	0,75	1,80	1,50	1,70	1,05	0,90
SK12063 F	0,50	1,95	1,70	1,75	1,20	0,95	SK13063 F	1,00	2,30	1,90	2,20	1,35	1,10
SK12080 F	0,90	3,70	3,20	3,40	2,50	2,30	SK13080 F	1,60	3,80	3,50	3,90	2,70	2,50
SK32100 F	1,40	6,30	6,10	6,10	4,00	3,60	SK33100 F	2,65	7,20	6,40	7,60	4,30	3,80
SK42125 F	3,00	11,50	11,50	11,00	8,40	7,30	SK43125 F	4,70	15,00	13,00	16,00	9,00	7,70

Table 13: Lubricant quantities for helical worm gear units

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 14: 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
<p>There is a slipping hazard in case of leaks.</p> <p>Clean the soiled floor and machine components before starting troubleshooting.</p>	

 WARNING	Injury to persons
<p>Risk of injury due to rapidly rotating and hot machine components.</p> <p>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.</p>	

NOTICE	Gear unit damage
<p>Damage to the gear unit is possible in case of faults.</p> <p>Shut down the drive unit immediately in case of any faults in the gear unit.</p>	

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
Output shaft does not rotate although motor is running	Fracture in gear unit or defective motor coupling or shrink disc slippage	Consult NORD Service

Table 15: 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	Location of leak			
		Shaft sealing ring	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 16: 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 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.

6.7.1 Repairs

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

Getriebebau NORD GmbH & Co. KG


Service Department

Getriebebau-Nord-Straße 1

22941 Bargteheide

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

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

 Information	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.	

6.7.2 Internet information

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

6.8 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		

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Headquarters:

Getriebebau NORD GmbH & Co. KG
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

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