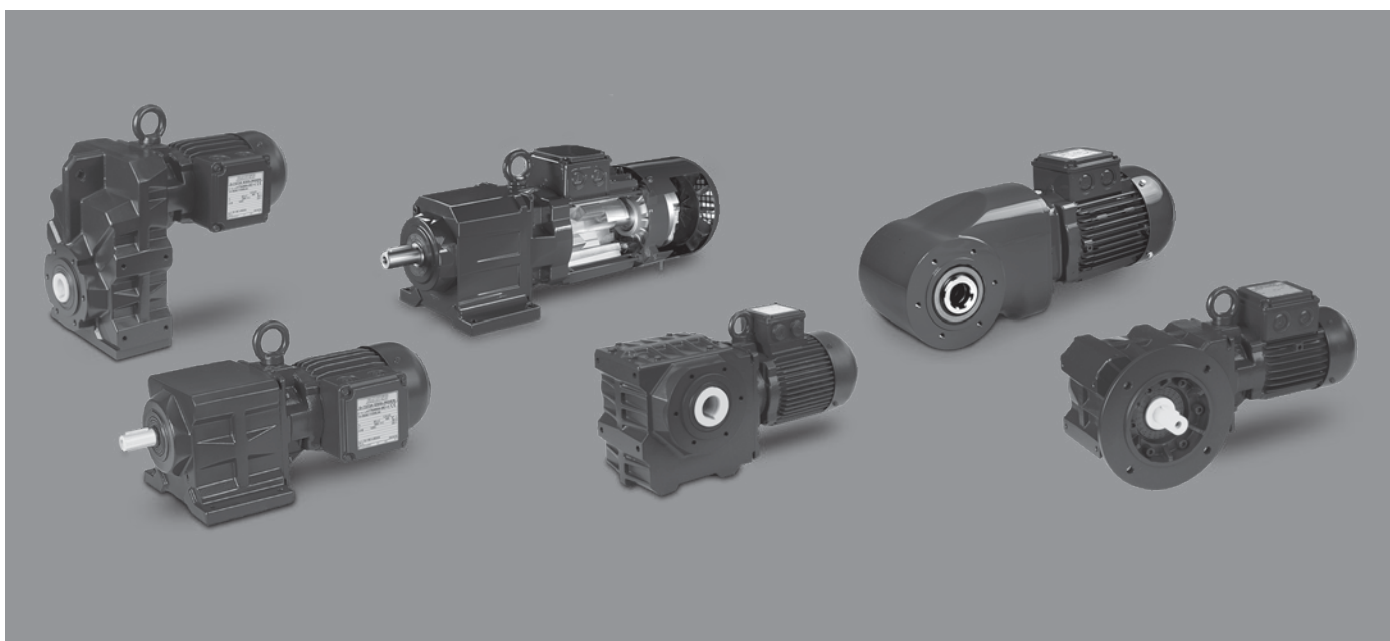


Gears Series **BG.. / BF.. / BK.. / BS.. / BM..**

Input drive units **C/SN, C/IEC, C/NEMA**

English



Digital documentation

Scan the QR code to view and download more languages.



BG Сканирайте QR кода, за да видите и да изтеглите още езици.

CN 扫描二维码以查看和下载更多语言。

CZ Pro zobrazení a stažení dalších jazyků naskenujte QR kód.

DE Scannen Sie den QR-Code, um weitere Sprachen anzusehen und herunterzuladen.

DK Scan QR-koden for at se og downloade flere sprog.

EE Muude keelte nägemiseks ja alla laadimiseks skannige QR-kood.

EN Scan the QR code to view and download more languages.

ES Escanee el código QR para ver y descargar más idiomas.

FI Skannaa QR-koodi nähdäkseen muut kielet ja lataaksesi sisältöä.

FR Scanner le code QR pour afficher et télécharger d'autres langues.

GR Σαρώστε τον γραμμωτό κώδικα QR, για να δείτε και να κατεβάσετε περισσότερες γλώσσες.

HR Skenirajte QR kod za pregled i preuzimanje drugih jezika.

HU További nyelvek megtekintéséhez és letöltéséhez olvassa be a QR-kódot.

IT Scansiona il codice QR per visualizzare e scaricare altre lingue.

LT Nuskaitykite QR kodą, jei norite peržiūrėti ir atsisiųsti daugiau kalbų.

LV Noskenējiet QR kodu, lai skatītu un lejupielādētu citas valodas.

NL Scan de QR-code om meer talen te bekijken en te downloaden.

NO Skann QR-koden for å se og laste ned flere språk.

PL Zeskanować kod QR, aby zobaczyć i pobrać inne języki.

PT Ler o código QR para ver e descarregar mais idiomas.

RO Scanați codul QR, pentru a vizualiza și descărca și alte limbi.

RU Отсканируйте QR-код, чтобы просмотреть и загрузить другие языки.

SE Skanna QR-koden för att se och ladda ned fler språk.

SI Naskenujte QR kód, aby ste si mohli pozrieti a stiahnuť dokumentáciu v ďalších jazykoch.

SK Skenirajte QR kodo, da si ogledate in prenesete dodatne jezike.

TR Daha fazla dil görüntülemek ve indirmek için QR kodunu tarayın.

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1 About this documentation

These Assembly and Operating Instructions (hereinafter referred to as “documentation”) are an integral part of the product. It is intended for persons carrying out work associated with the product and contains important information on safety and safe handling of the device. All safety instructions and work steps specified must be followed in order to work safely with the device.

- Read this document carefully before starting any work.
- Keep these Assembly and Operating Instructions in the immediate vicinity of the device, accessible to personnel at all times, and in legible condition

For purposes of better presentation, the figures in this document are not to scale and may differ from the actual version.

- Should anything be unclear, please contact Bauer Gear Motor.

You can download the complete operating instructions in digital form with larger font here:



You can find further documentation at www.bauergears.com.

1.1 Product name

Product designations mentioned in this document are trademarks of Bauer Gear Motor, some with a registered trademark ®.

1.2 Validity

This document applies to the following series:

- Gear series BG.. / BF.. / BK.. / BS..
- input drive units C/SN, C/IEC, C/NEMA

1.3 Applicable documents

The following documents form part of these Assembly and Operating Instructions:

- Manufacturer documentation of supplier components

1.4 Symbols and means of representation

1.4.1 Warnings

Warnings are used in this document to warn of situations that could cause damage to property and personal injury.

- Read and observe warning notices.
- Follow all steps marked with the warning symbol and warning word.

Safety Alert Symbol	Signal Word	Meaning
	DANGER	indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	WARNING	indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	CAUTION	indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
—	NOTICE	indicates practices not related to physical injury and which, if not avoided, could result in property damages.

Tab. 1: Warning symbols

1.4.2 Symbols and means of representation

Symbol	Meaning
	means "additional information"
	Symbol for an action: You must do something here. ► If there are several steps, follow the order given.

Tab. 2: Symbols

1.5 Abbreviations

Abbreviation	Definition	Description
BG	-	Helical gear
BF	-	Shaft-mounted gear
BK	-	Bevel
BM	-	Monorail gear
BS	-	Worm gear
OK	Okay	-
IP	Ingress protection	Protection rating, indicates protection for active parts against contact, ingress of foreign bodies and water
NN	Normal-null ("standard elevation zero")	-
SSV	Shrink disc connection	-
USIT	Gaskets	USIT rings
UVV	Accident prevention regulations	-
VD	Sealing cover	-
VK	Sealing cap	-

Tab. 3: Abbreviations

1.6 Copyright

Bauer Gear Motor reserves all rights regarding this document. No part of this document may be reproduced, redistributed, modified, or otherwise utilised.

2 Safety

The safety instructions serve to prevent personal injury and material damage. They relate only to the drive unit concerned in this document.

► When using special options/components: Also refer to additional product-specific documents provided.

The product is part of a drive system and may only be put into operation if it has been properly determined that the machine or system can be operated safely.

► Operate the product only in accordance with the information in this document and with the information on the name plate.

► Only operate the entire unit in the mounting position specified on the name plate.



WARNING!

Failure to observe the documentation

Serious or fatal injuries may result.

► Before using the product, carefully read this documentation and all other relevant documents.

The operator must ensure that all persons entrusted to work on the product have read and understood this document and that they follow the safety instructions given.

► Keep this document near the product in a place accessible to the operator.

2.1 Intended use

The products are gearboxes – a unit made up of a mechanical gearbox and input drive unit. The products are intended exclusively for use in industrial and commercial machines and systems.

2.2 Improper use

The following is considered improper or incorrect use:

- Changes to product
- Use in potentially explosive areas

2.3 Personnel qualification

Knowledge of this documentation is a prerequisite for all persons.

► Only qualified personnel are permitted to perform any work with or on the product.

Person group	Required qualifications
Mechanic	• Specific and general training as a mechanic • At least 2 years of relevant professional experience • Knowledge of how drive units work and how to handle them • Experience using common work tools • Routine use of smartphones (e.g. videos), PC/tablet.

Tab. 4: Personnel categories and qualifications

Qualified personnel must be familiar with and observe the IEC 60364/IEC 60664 standards as well as national occupational safety and accident prevention regulations and environmental regulations.

Bauer Gear Motor GmbH offers disassembly and assembly training at regular intervals both at its head-quarters and on site. Training content and dates can be found at www.bauergears.com/sales-and-service/gear-motor-academy/ under "Gear Motor Academy". Register for training courses online at www.bauergears.com/sales-and-service/global-service/ under "Gear Motor Academy Registration". Coordinate individual training sessions with head office.

2.4 Residual risks

Automatic restart

Serious or fatal injuries may result from persons being drawn-in and caught.

- ▷ Before starting maintenance and repair work, make sure that the machine/system cannot be switched on again.
- ▷ During commissioning, ensure that no unauthorised persons are in the hazard zone.
- ▷ Place warning signs.
- ▷ Keep a safe distance from moving parts.

Improper assembly or disassembly

Serious to fatal injuries and property damage can result.

- ▷ Ensure that only authorised personnel are present on site.
- ▷ Only perform assembly and installation work when the machine/system is standing idle.
- ▷ Only perform work on the product when it is at a standstill and safeguarded from being inadvertently switched on, and the connection voltage is safely disconnected.
- ▷ Secure heavy components and attachments from falling.
- ▷ Ensure there is sufficient safety clearance, e.g. by using barriers as necessary.

Rotating parts

Serious or fatal injuries may result from persons being drawn-in and caught.

- ▷ Before starting maintenance and repair work, make sure that the machine/system cannot be switched on again.
- ▷ Do not work on couplings, brakes, or backstops unless they are safeguarded against a unit automatically starting up, a trolley/shuttle rolling, or a load dropping or even falling, etc.

Parts breaking loose

Parts may break loose and cause minor to moderate injury.

- ▷ Wear safety glasses during assembly and disassembly.

Hot surfaces

Serious injury from skin burns may result.

- ▷ Allow hot product surfaces to cool before touching them.
- ▷ Suitable protective gloves must be worn when working on hot product components.

Frozen surfaces

Serious injury from cold burns on skin

- ▷ Allow cold product surfaces to warm before touching them.
- ▷ Suitable protective gloves must be worn when working on frozen product components.

High noise emissions

Hearing damage may result

- ▷ Wear hearing protection.

Forces and torques when separating transmission elements

Serious or fatal injuries may result.

- ▷ Only loosen and disconnect transmission elements such as couplings, chain and belt drives, etc. if no force or torque is acting on the output shaft.
- ▷ With shaft-mounted gears, only remove the torque arms if no force or torque is being applied.
- ▷ Only remove the shaft-mounted gear if no force or torque is being applied.

Non-approved spare parts

Serious to fatal injuries and material damage from drive failure, crashes, blockages, unexpected system downtimes, etc. due to the use of non-approved spare parts

- ▷ Use only approved spare parts.

Falling products

Improper transport of the product can result in serious injury or death.

- ▷ Only use suitable lifting and transport equipment.
- ▷ Make sure that lifting or transport equipment is approved for the specified weight.

Suspended loads

Serious or fatal injuries may result.

- ▷ Do not walk under suspended loads.

Improper transport, storage and installation

Improper transport, storage, and installation can damage corrosion-resistant paint coatings and lead to corrosion. Mechanical damage (scratches, chipping), chemical degradation by acids or alkalis or thermal damage caused by sparks, welding beads and heat lead to corrosion and failure of the external protection.

- ▷ Make sure that paint coatings are protected properly during transport, storage and installation.
- ▷ Have damage to paint coating repaired professionally. Observe permissible paint layer thicknesses.

Exceeding permissible limit values

Heat and centrifugal force can lead to overloading, gear damage, and damage to the system/machine.

- ▷ Use the values for torque limit and limit speed on the rating plate.

Attachment element pressure points

Pressure marks from attachment elements can damage corrosion-resistant paint coatings and lead to corrosion.

- ▷ Have damage to paint coating repaired professionally.

Incorrect installation positions and ambient temperatures

Material damage may occur

- ▶ Ensure compliance with the specified permissible installation orientations and ambient temperature ranges.

2.5 Pictograms on product

Symbol	Meaning
	The gear unit is suitable for use in potentially explosive atmospheres.
	This is not a lifting point.
	Hot surface, can cause burns.
	Products and accessories may be subject to country-specific regulations implementing the WEEE directive (Waste Electrical and Electronic Equipment). Disposal of the product and all accessories must therefore be carried out in accordance with the statutory disposal and return regulations in force in your country.

Tab. 5: Pictograms

2.6 Personal protective equipment

All specialist personnel must wear the necessary work/protective clothing.

- ▶ Wear hearing protection for high noise emissions.
- ▶ Wear suitable protective gloves if coming into contact with hot or frozen components.
- ▶ Wear safety shoes.
- ▶ Wear safety glasses when installing electrical equipment.

2.7 Safety devices

Do not disable local monitoring and protection devices when working on the product.

2.8 Environmental protection and disposal

- ▶ Dispose of gear units in accordance with applicable local regulations.
- ▶ Collect old lubricant (waste oil, grease) and dispose of properly.

3 Product description

3.1 Product identification: gear units

Gear units are used to drive slow-running machines, devices, and systems. Products are identified using the type codes described below.

3.1.1 Rating plate/type plate

All essential data and information is stated on the rating plate in accordance with EN 60034.

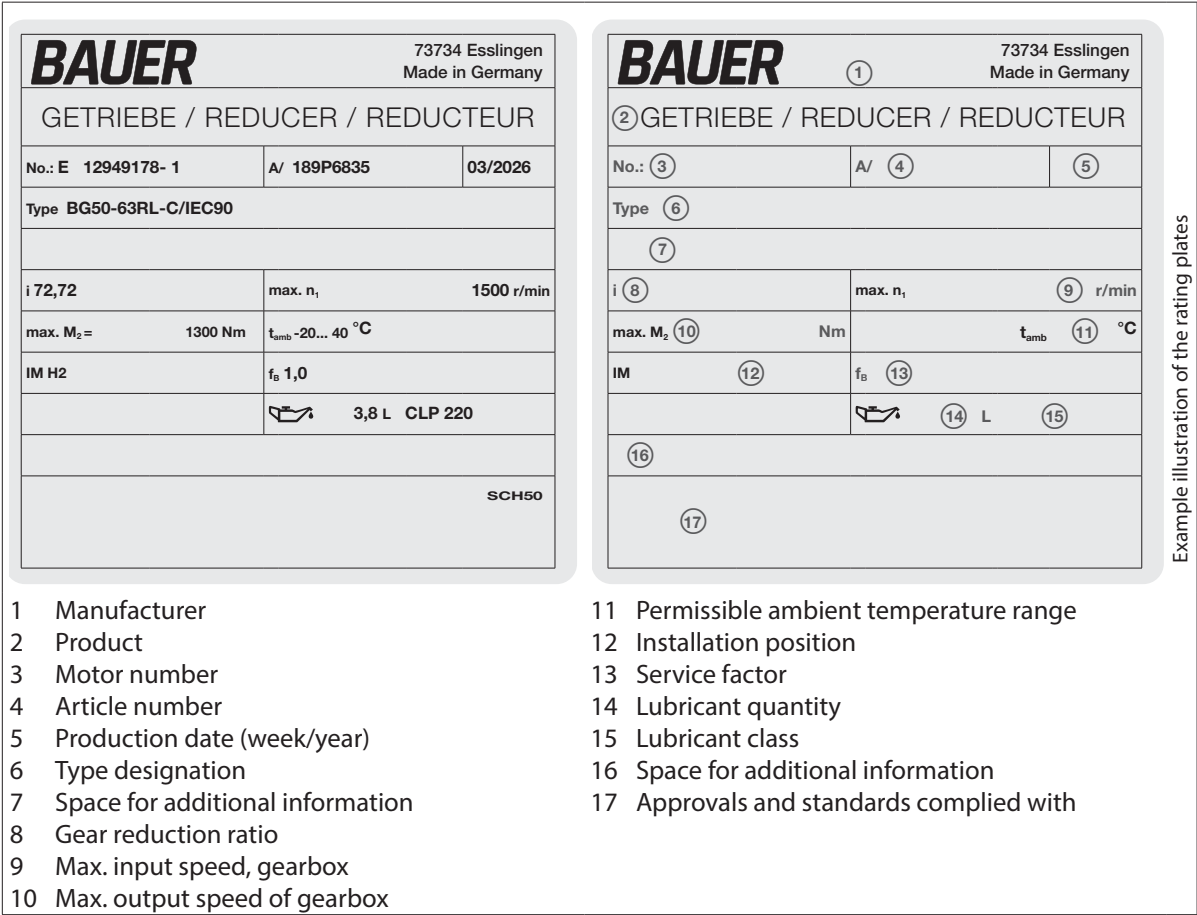


Fig. 1: Type plate

3.1.2 Type code/type designation



- 1 Gear type, size, and design
- 2 Input drive units
- 3 Additional options

A complete breakdown can be found in all of our catalogues in chapter 3, see www.bauergears.com.

3.2 Gear types and designations



- 1 Gearbox type*
- 2 Gearbox size
- 3 Pre-stage
- 4 Reinforced bearing
- 5 Placeholder
- 6 Code number for gearbox version
- 7 Code number for output shaft version
- 8 Position of gearbox version (optional)
- 9 Additional version (optional)

*)
BG Helical gear
BF Shaft-mounted gear
BK Bevel gear
BS Worm gear
BM Monorail

3.3 Input drive units and designations



- 1 Drive unit
 - C/IEC - IEC B5-flange
 - C/NEMA - NEMA TC-flange
 - C/SN - free drive shaft
- 2 Motor size

3.3.1 Installation positions

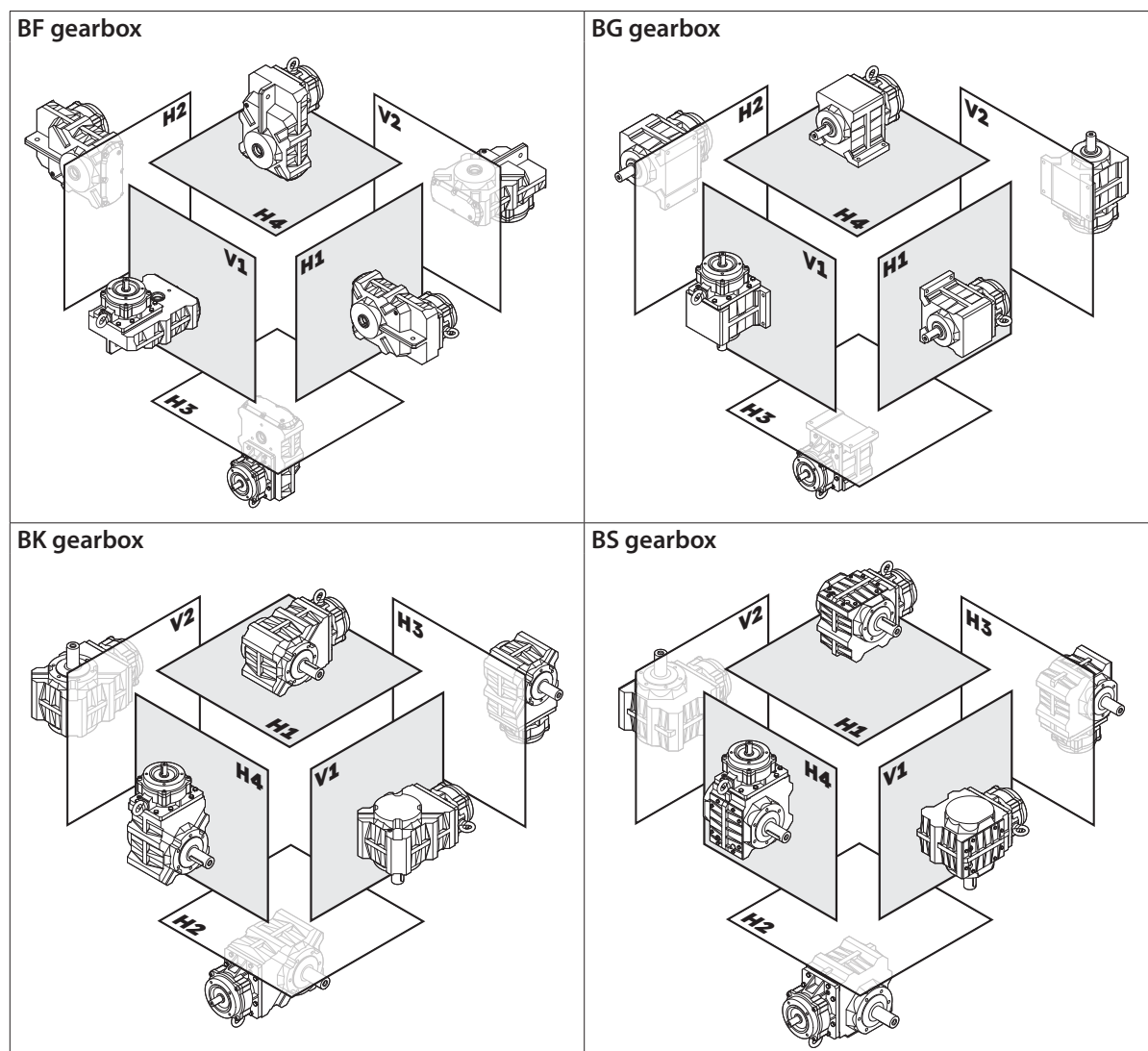


Fig. 2: mounting positions

Inclined installation positions - Explanation of the abbreviations on the type plate

Information on rating plate (example)	Explanation
H4/V1 30° Example for BG	[Installation position 1] / [Installation position 2] [Deviation value] - Installation position 1: Output installation position - Installation position 2: Installation position in which the gearbox is rotated - Deviation value: Twist angle in degrees [°] The actuators are used stationary in installation position H4, but rotated by 30° in direction V1.

Tab. 6: Inclined installation positions

Multiple installation positions - Explanation of the abbreviations on the type plate

Information on rating plate (example)	Explanation
H1-V2 Example for BG	[Installation position 1] - [Installation position 2] The drives may be used in a stationary position in ALL installation positions (H1 to V2).
H1,H2,V2 Example for BG	[Installation position 1] , [Installation position 2] , [Installation position 3] The drives may be used stationary in exactly the specified installation positions H1, H2 and V2.

Tab. 7: Multiple installation positions

Swivelling installation positions - Explanation of the abbreviations on the type plate

Information on rating plate (example)	Explanation
V2/H4/V1 Example for BG	[Installation position] / [End position] / [Intermediate position] - Installation position: Output installation position - End position: Position of the gearbox after swivelling over the intermediate position - Intermediate position: Position that the gearbox assumes when swivelling The drives may be used in variable installation positions within a swivel range between installation position V2 via intermediate position H4 to end position V1.

Tab. 8: Swivelling installation positions

NOTICE

Incorrect service intervals

The lubricant quantity for swivel mounting positions is adapted for use in different positions. Operation with an adapted (= increased) lubricant quantity without gearbox ventilation leads to higher internal gearbox pressure and reduces the service life of the shaft seals.

- ▷ Only operate the product in the installation position, intermediate position and end position specified on the type plate.
- ▷ Adjust the division of the service intervals.

3.4 Functional description

3.4.1 Gearbox ventilation

The gearboxes are dimensioned in such a way that no gearbox ventilation is required in many installation positions.

Install a pressure relief valve as necessary.

3.4.2 Oil expansion tank

The oil expansion tank is used in critical drive configurations to maintain the build-up of pressure in the gearbox resulting from the volumetric expansion of the oil within the permissible range during operation.

4 Included with delivery

The gear unit is delivered as a ready-to-use unit.

Accessories ordered separately, e.g. shrink disc connections or rubber buffers for torque arm, are attached to the product or otherwise enclosed with delivery.

The gearboxes are delivered from the factory with the type and quantity of lubricant specified on the rating plate.

5 Transport and storage

5.1 Goods Receiving

NOTICE**Incomplete and damaged products**

Obstruction and complication of operational processes

▷ Do not install or commission damaged products.

- ▶ Immediately check delivery for completeness upon receipt.
- ▶ Verify that the technical design of the product corresponds to the order.
- ▶ Check rating plate.
- ▶ Inspect products for packaging and shipping damage.
- ▶ Report any damage to the transport company immediately.

The product is delivered assembled.

Any additional equipment is supplied separately and packaged as an “accessory pack”.

5.2 Transportation

NOTICE**Improper transport**

Material damage may result. The ring eyelet attached close to the centre of gravity does not guarantee that the product will remain in a horizontal position.

- ▷ Observe the specifications for proper transport.
 - ▷ Lift the product slowly and ensure that it remains in a horizontal position by attaching the lifting gear (additional loops) appropriately.
 - ▷ Do not install or commission damaged products..
-

With our products, only eye bolts pursuant to DIN 580 are permitted for use as lifting points for lifting equipment. The eye bolts are only designed for the weight force of the gear unit. Additional loads are not permitted.

Only one lifting point is provided per product.

- ▶ When lifting and transporting heavy loads, follow internal factory specifications for handling loads.
- ▶ Only use suitable lifting and transport equipment.
- ▶ See the rating plate for the product weight.
- ▶ Make sure that the lifting or transport equipment is approved for the specified weight.
- ▶ Only use the provided lifting points for lifting and transporting.
- ▶ For gear unit with pre-stages (Z) or intermediate gears (G), use only the eye bolt closest to the main gear-box.
- ▶ Make sure that the eye bolts are completely tightened.
 - The eye bolt(s) should lie flat on the housing surface.

5.3 Storage

NOTICE**Improper storage**

Material damage may result.

- ▷ Observe the specifications for proper storage.
 - ▷ Do not install or commission improperly stored products.
-

5.3.1 Short-term storage

If the product is not installed immediately as intended, it can be stored for up to 9 months without taking any special measures.

- ▶ If possible, store the product in the intended installation position.
- ▶ Store product in a dry place.
- ▶ Avoid temperature fluctuations outside the normal range of -20 to +40 °C.
- ▶ Do not subject product to shocks or vibrations.
- ▶ Have transport damage to paint or corrosion protection repaired professionally.

5.3.2 Long-term storage

- ☑ Storage space requirements
- ☑ Storage space is dry, dust-free, ventilated, and free of vibrations (permissible vibrations $v_{\text{eff}} < 0.2 \text{ mm/s}$).
- ☑ Storage temperature range: -20°C to +40°C with minor fluctuations.
- ☑ Air in the room should be free from aggressive, corrosive, or radioactive elements.
- ☑ Do not expose product to direct sunlight or any other source of UV radiation.

Preparation for storage

NOTICE

Improper storage

Improper storage can damage corrosion-resistant paint layers and thus lead to corrosion. Mechanical damage (scratches, slivers), chemical corrosion from acids or alkali, or thermal damage from flying sparks, welding beads, and heat will cause the external protection to deteriorate and fail.

▷ Observe the specifications for proper storage.

- ▶ Check the exterior paintwork. Repair any damage if necessary. Observe the permissible paint layer thicknesses.
- ▶ Check the corrosion protection on bare metal parts (shafts, hollow shafts, flanges, etc.). Repair any damage if necessary.
- ▶ Replace the vent valve with a suitable screw plug.

During the storage time

Do not stack products on top of each other.

- ▶ Store the product on a hollow base.
- ▶ Cover product when stored.
- ▶ Products that require the oil to be refilled during normal operation must be turned 180° at 6-month intervals to ensure all bearings and gears on the reverse side are covered with lubricant.
 - On special request, the product can be prepared for long-term storage and completely filled with lubricant. In this case, there is no need to turn the product during storage.
- ▶ To prevent the sealing ring/sealing lips from sticking or hardening, we recommend turning the product every six months.

6 Installation

6.1 Requirements for installation site

NOTICE**Incorrect installation positions and ambient temperatures**

Material damage may result.

▷ Observe the information on authorised installation positions and ambient temperatures.

The product may only be operated in the installation position and ambient temperature specified on the rating plate.

▶ Any change to the installation position specified on the nameplate is only permitted after consultation with BAUER GEAR MOTOR!

6.1.1 Substructure

- ☑ The substructure is torsion-resistant and vibration-damping.
- ☑ Mounting surfaces for gearbox feet or gearbox flanges are flat.
- ▶ If the installation position specified on the rating plate and the lubricant quantity is subsequently changed: Install pressure relief valve. In these cases, contact our service team.

6.1.2 Installation outdoors or in damp rooms

All gear units are suitable for use outdoors or in damp rooms. For corrosion reasons, use increased corrosion protection (CORO2).

Direct sunlight, e.g. when installed outdoors, is not permitted.

- ▶ Use suitable covers that do not accumulate heat.
- ▶ Have any damage to paint coating caused during transport, installation, and assembly repaired professionally before commissioning.
- ▶ Check the product at regular intervals with regard to fastening and tightness of cabling.
- ▶ Remove any deposits of dust and dirt.

6.2 Mechanical installation

6.2.1 Required tools and aids

The following tools and aids are required for mechanical installation:

- Disassembly/assembly aids
- Transport devices
- Lifting equipment
- Hand tools such as wrenches, screwdrivers, etc.
- Torque wrench for checking tightening torques
- Mounting tools for shaft-mounted gearboxes as well as couplings, chain/gearwheels etc.
- Cleaner for degreasing shafts for shrink disc connections
- Anti-skid/anti-corrosion agent for mounting hollow shafts with keyway
- Screw locking agent, e.g. Loctite®
- Measuring equipment, e.g. caliper gauge for measuring rubber buffer pre-stress
- Use fixing screws of strength class 8.8 at least.

6.2.2 Consumables

NOTICE**Lack of lubricant or over-lubrication**

Damage and machine/system downtime can result.

▷ Only operate the product in the installation position specified on the rating plate.

The product is delivered ready for operation with lubricant.

The lubricant type and quantity favourable for the intended mounting position are specified on the rating plate, see chapter 3.1.1, p. 12.

For information on lubricant schedules and approved lubricant types, see chapter 11.2.2, p. 37 and chapter 11.2.3, p. 38.

▶ Any change to the installation position specified on the nameplate is only permitted after consultation with BAUER GEAR MOTOR!

6.2.3 Inspections and preparatory work before installation

**CAUTION****Sharp edges on open keyways**

Cutting injuries may result

▷ Insert the key into the keyway

Work can only be carried out if the following requirements are met:

- ☒ Product is not damaged or leaking.
- ☒ The information on the product rating plate matches the requirements with regard to power, speed, installation position, and ambient temperature in particular.
- ☒ Any potential dirt and anti-corrosion agents on flange surfaces, fittings, and output shafts have been removed.

In abrasive, aggressive, or corrosive ambient conditions, only use the product if it is appropriately dimensioned and designed.

If in doubt, consult Bauer Gear Motor.

6.2.4 Drive elements

**DANGER****Ejection of unsecured keys from the keyway**

This can result in serious or even fatal injuries caused by flying debris.

▷ Drive with the customer's drive element fitted or the key suitably secured operate.

**DANGER****Ejection of unsecured keys from the keyway**

This can result in serious or even fatal injuries caused by flying debris.

▷ Operate the drive with the customer's drive element fitted or suitably secured key.

NOTICE**Material damage due to improper installation of drive elements**

This may result in damage to the bearing.

▷ Heat drive elements, such as pinions or couplings, before assembly.

**DANGER****Rotating parts.**

Serious to fatal injuries are the result.

- If no protection is provided on site, install a protective cover in accordance with accident prevention regulations.

6.3 Mounting standard motors with C-coupling (IEC and NEMA)

Standard motors of IEC frame sizes 56 to 280 (version B5) and NEMA 56C to 405TC using mounting variant "C"

► Use the following tightening torques:

IEC motor size	NEMA motor size	Bolt	Tightening torque [Nm]
56	-	M6	10.1
63	-	M6	10.1
71	56	M6	10.1
80	-	M8	24.6
90	145	M8	24.6
112	184	M8	24.6
132	215	M12	84
160	256	M12	84
180	286	M12	84
200	-	M16	206
225	326	M16	206
250	365	M16	206
280	405	M16	206

Tab. 9: Tightening torques for tensioning screws

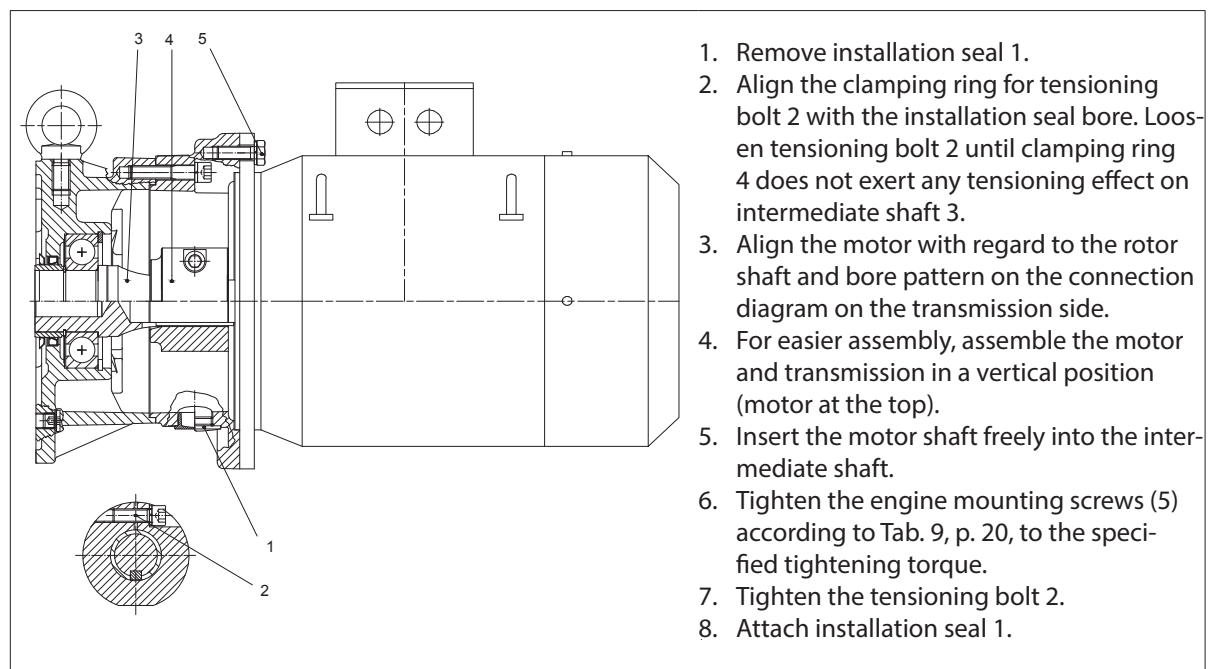


Fig. 3: C-coupling with standard motor

6.4 Installation of hollow shaft, gearbox with hollow shaft with keyway or spline

This also applies to AsepticDrives or CleanDrives.

► Use the following tightening torques:

Screws/nuts with thread	Tightening torque [Nm]
M6	11
M8	25
M10	48
M12	86
M16	210
M20	410
M24	710
M30	1450

Tab. 10: Tightening torques, hollow shaft installation

NOTICE

Unsuitable or improperly used tools

Material damage to drives (bearings, shaft and gearbox housing) and the environment/system may result.

▷ Do not hit transmission elements such as pinions, hubs, couplings, etc. with a hammer.

▷ Pull on transmission elements with a suitable device.

► Use an assembly aid to pull the gearbox onto the machine solid shaft with key or spline and secure it axially, see 6.2.1, p. 18.

► To facilitate assembly: Apply suitable anti-corrosion protection to shaft and bore.

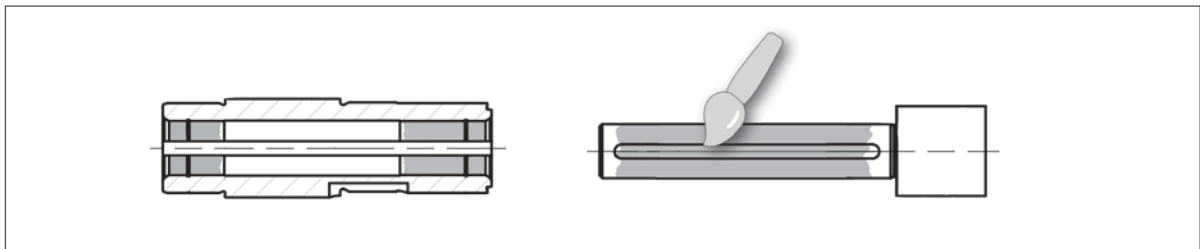


Fig. 4: Corrosion protection for hollow shaft mounting

6.5 Assembly of shaft-mounted gear with hollow shaft with shrink disc connection

NOTICE

Improper handling

Damage to the hollow shaft may occur.

▷ Tighten screws on shrink disc connection only with the solid shaft installed.

1. Clean solid shaft and hollow shaft bore over the entire length. In particular, assembly personnel must clean areas A and B of oil, grease, and any contaminant that reduce the friction coefficient.
2. Before tightening (tensioning the shrink disc), ensure that the contact surface between the outer surface of the hollow shaft and shrink disc (area B) is free of oil, grease, and any contaminant that reduce the friction coefficient. Remove residue.

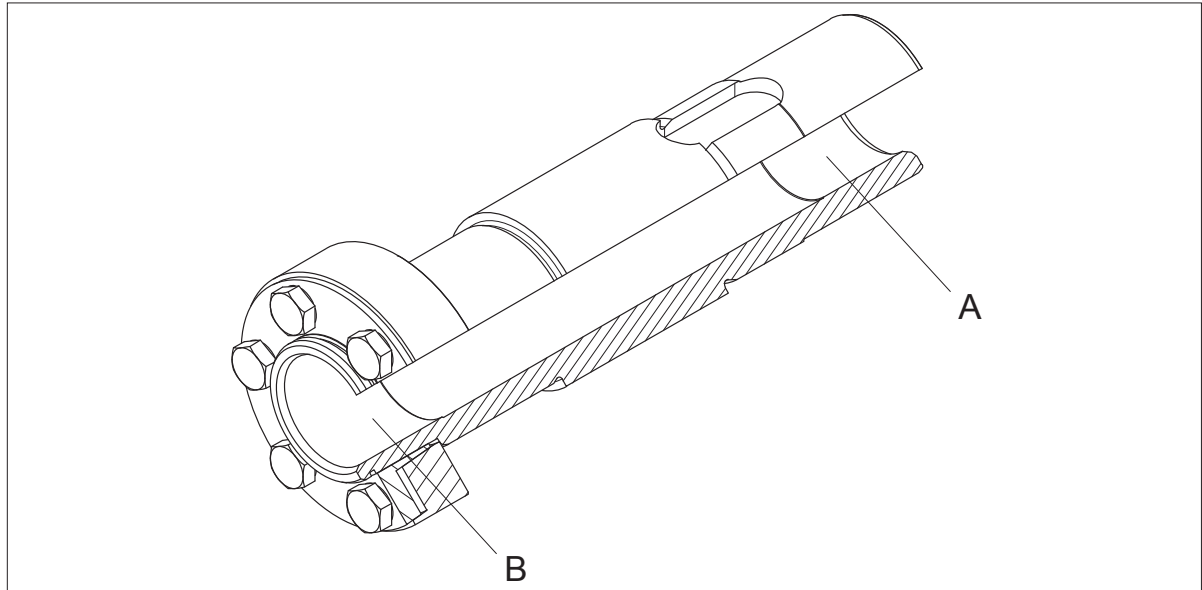


Fig. 5: Hollow shaft with shrink disc (SSV)

3. Slide shrink disc onto the hollow shaft so that the outer clamping flange is flush with the shoulder of the hollow shaft phase. If the shrink disc connection cannot be pushed on, slightly loosen the tensioning screws.

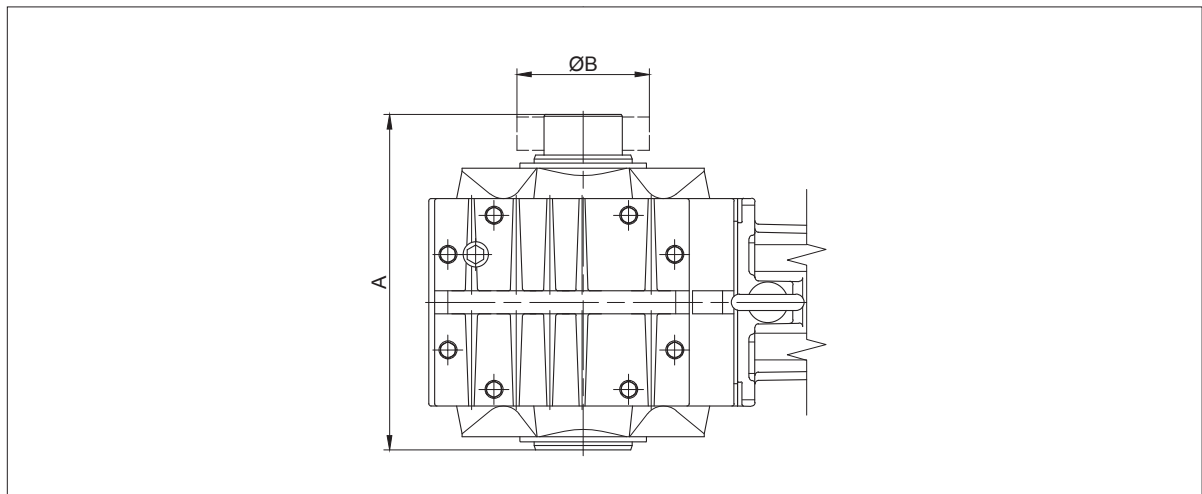


Fig. 6: Gearbox dimensions with shrink disc

4. The solid shaft must be at least long enough to cover the entire area under the shrink disc connection. Slide the gearbox onto the solid shaft of the machine.
5. Tighten the tensioning screws with several clockwise turns using a torque wrench. Make sure that the gap between the flanges is uniform all around. Required tightening torque: see SSV manual.

6.6 Installation of torque arm



WARNING

Improper installation of torque arm

The dimension "L", see following graphics and tables, determines both the pre-stress force of the torque arm and the tightening torque of the fixing screw "G". Play leads to knocking and gearbox overload. Serious or fatal injuries may result.

- ▷ Observe the specified preload values (see tables).
- ▷ Use bolts and nuts with a strength of 8.8 or higher.
- ▷ Make sure that the position of fixing screw "G" is parallel to the bore.

NOTICE

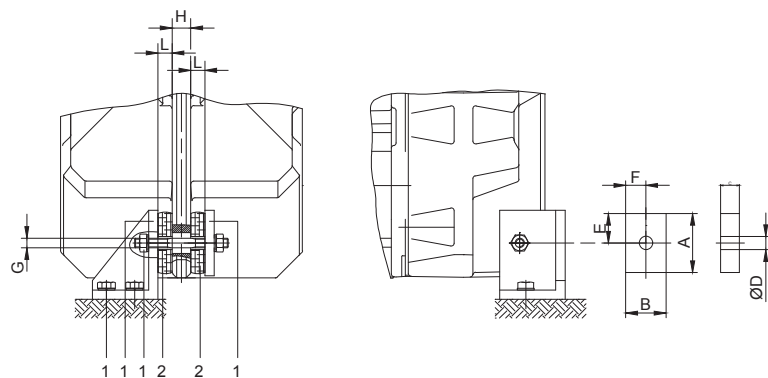
Improper use of rubber buffers

The use of rubber buffers with different pre-stresses allows relative movements that could generate frictional heat. Rubber buffers with specified pre-stresses (see Fig. 7, p. 23, Fig. 8, p. 24, Fig. 9, p. 25) must be used.

- ▷ Avoid metallic contacts by using rubber buffers.
- ▷ Avoid metallic contacts through correct pre-stressing.
- ▷ Avoid play and frictional heat by correct pre-stress.

6.6.1 Rubber buffer for torque arm with shaft-mounted gearboxes

For gear code BF..-0./ (shaft-mounted version): Rubber buffers are included with delivery. Attachments are not included with delivery.



- 1 Not included with delivery
- 2 Rubber buffer pre-stressed

G Maximum bolt diameter

Material:

Natural rubber

Hardness:

50 +/-5 Shore A

Transverse hole dimensions:

See dimension drawing for respective gearbox

Gearbox	Pos.	A	B	C	D	E	F	G	H	L
BF06	0	30	30	12	12	15	15	M10	10	10
BF10	1	48	32	15	14	24	16	M10	16	13.5
BF20	1	48	32	15	14	24	16	M10	18	13
BF30	2	63	43	20	14	31.5	21.5	M10	18	17
BF40	2	63	43	20	14	31.5	21.5	M10	20	16.5
BF50	3	88	60	25	22	44	30	M18	24	21.5
BF60	3	88	60	25	22	44	30	M18	28	21
BF70	4	123	88	30	26	61.5	44	M20	30	25.5
BF80	5	133	103	35	26	66.5	51.5	M20	40	30
BF90	5	133	103	35	26	66.5	51.5	M20	50	29.5

Dimensions [mm]

Fig. 7: Rubber buffer, shaft-mounted gearbox, dimensions

6.6.2 Rubber buffer for torque arm with bevel gearboxes

With supplied torque arm for gearbox code BK...-0: Rubber buffers are included with delivery. Attachments are not included with delivery.

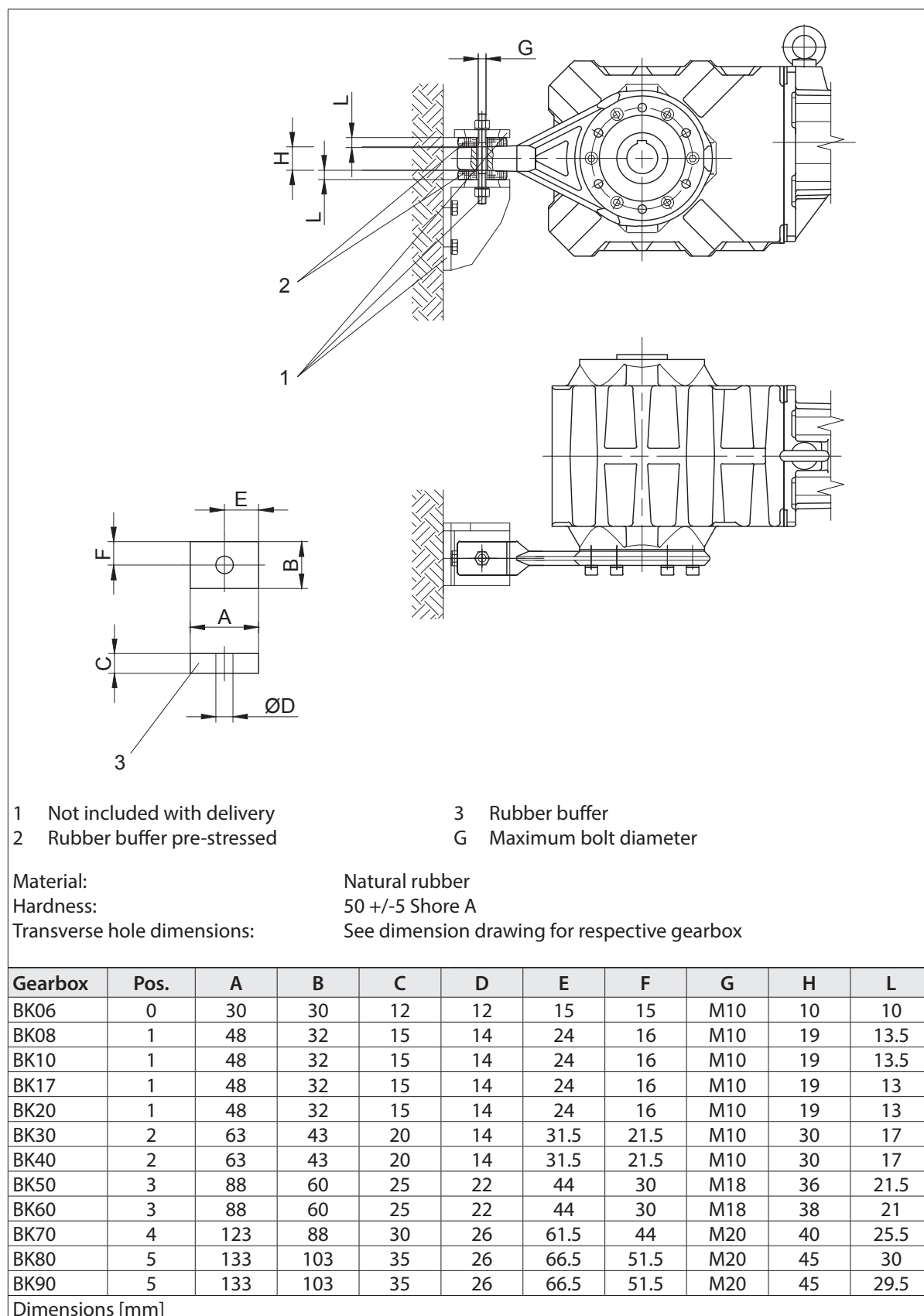


Fig. 8: Rubber buffer, bevel gearbox, dimensions

6.6.3 Rubber buffer for torque arm with worm gearboxes

With supplied torque arm for gearbox code BS..-0: Rubber buffers are included with delivery. Attachments are not included with delivery.

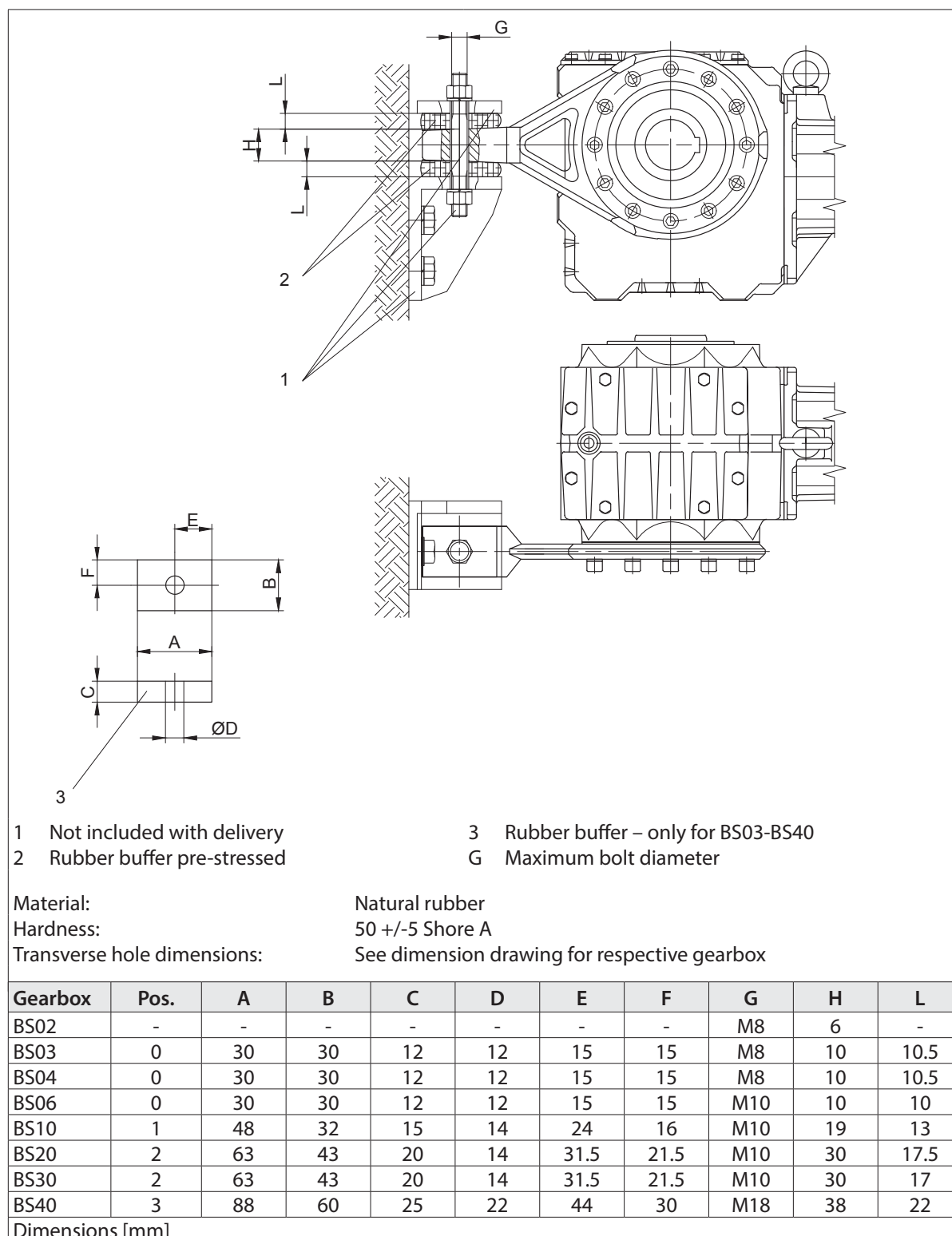


Fig. 9: Rubber buffer, worm gearbox, dimensions

6.6.4 Torque arm for gearboxes BK04, BK08, and BK17

For gearbox code BKH...-0: The torque arm is delivered as a set, consisting of a mounting kit and the torque arm as an accessory with the drive.

The torque arm is not suitable for switching operation.

- For switching operation, please contact Bauer Gear Motor GmbH.
- Attach mounting kit according to illustration below.

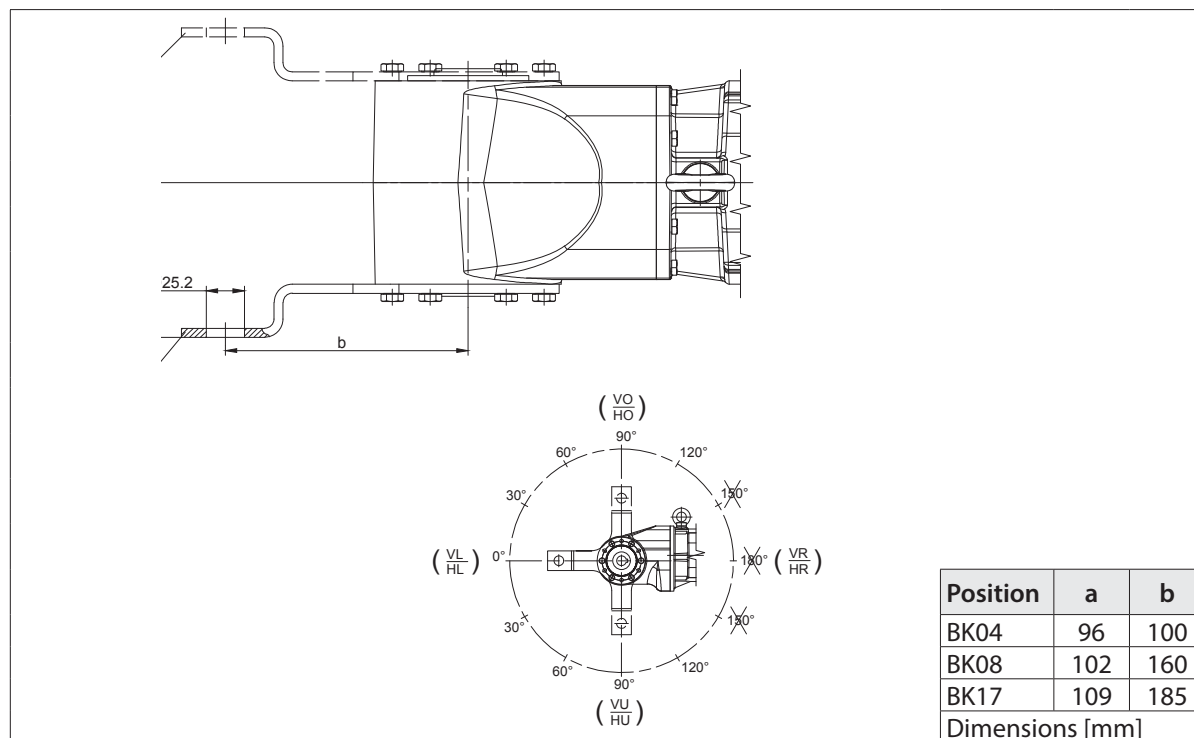


Fig. 10: Torque arm design and position

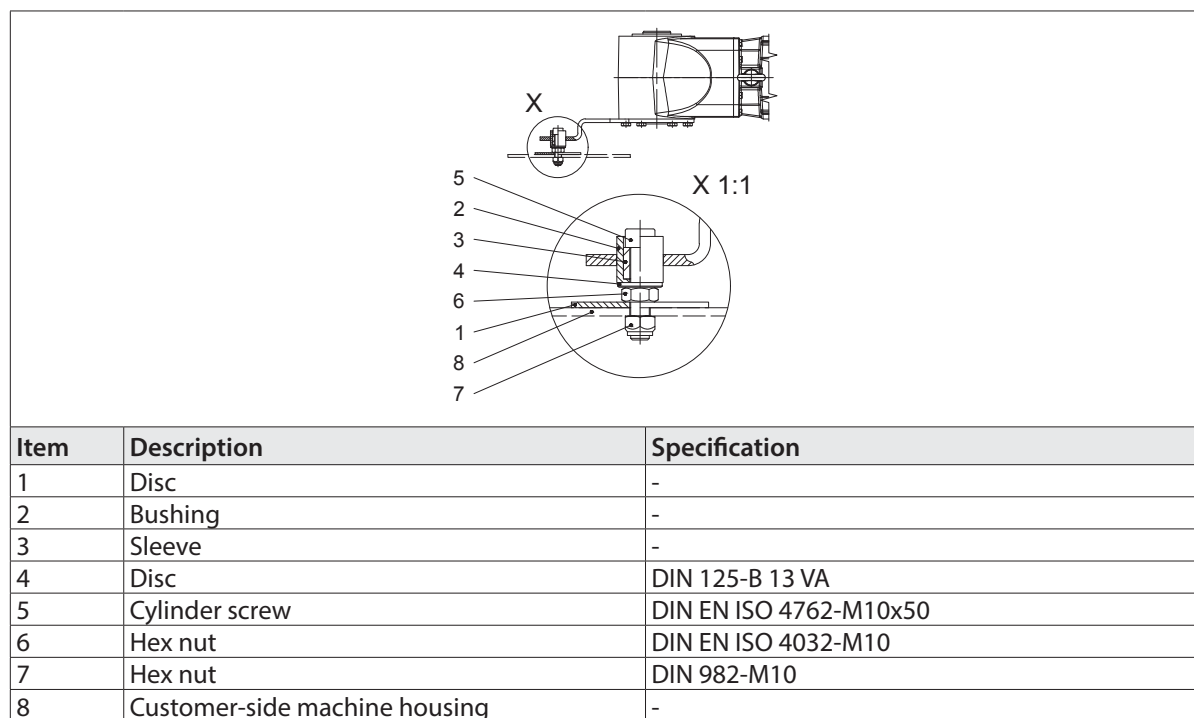


Fig. 11: Mounting kit

To install the torque arm to the gearbox housing, the mounting kit includes 6 stainless steel screws.

► Use the following tightening torques:

Size	Tightening torque [Nm]
M6	8
M8	22
M10	43

Tab. 11: Tightening torques for torque arm installation

6.7 Installation of protective cover



DANGER

Rotating parts

Serious to fatal injuries are the result.

► If no protection is provided on site, install a protective cover for the SSV in accordance with accident prevention regulations (UVV) (available as an option).

6.7.1 Protective cover for shrink disc connection

The following covers are provided as contact protection. They do not protect against water or dirt.

Optionally available

Following versions:

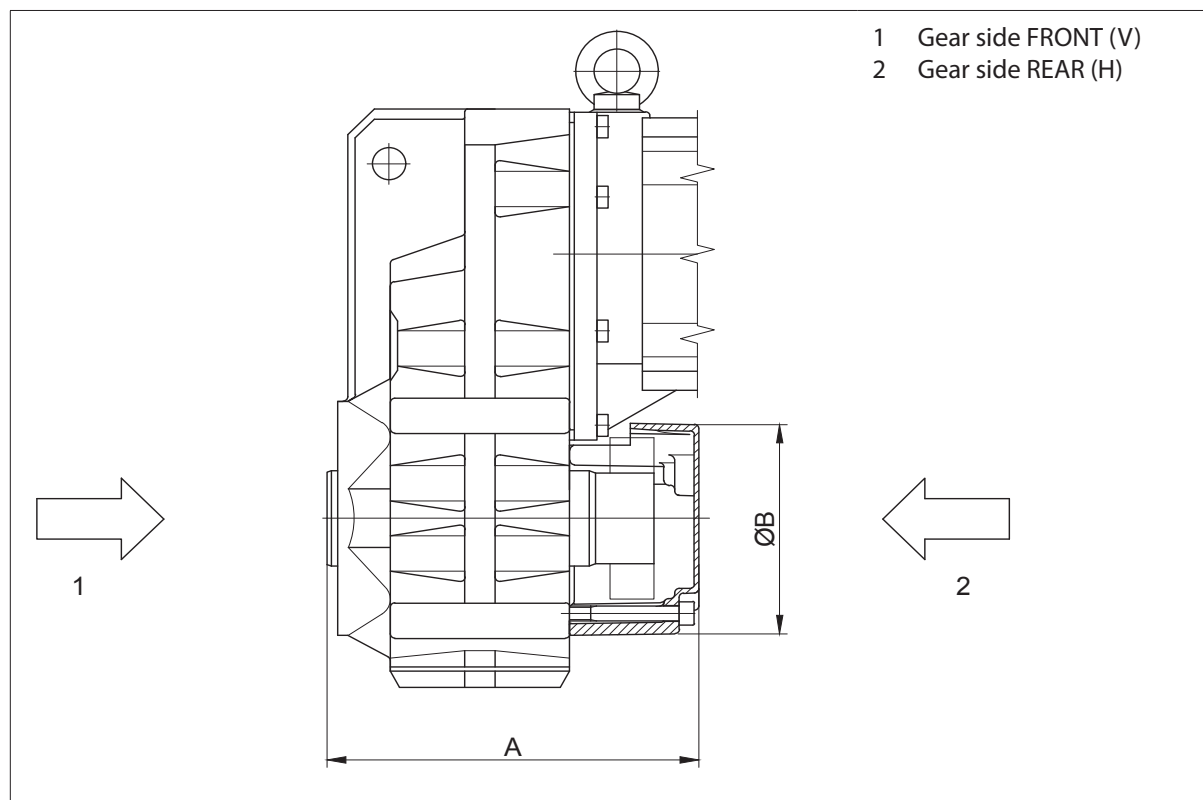


Fig. 12: SSV cover for shaft-mounted gearbox BF10 ... BF90

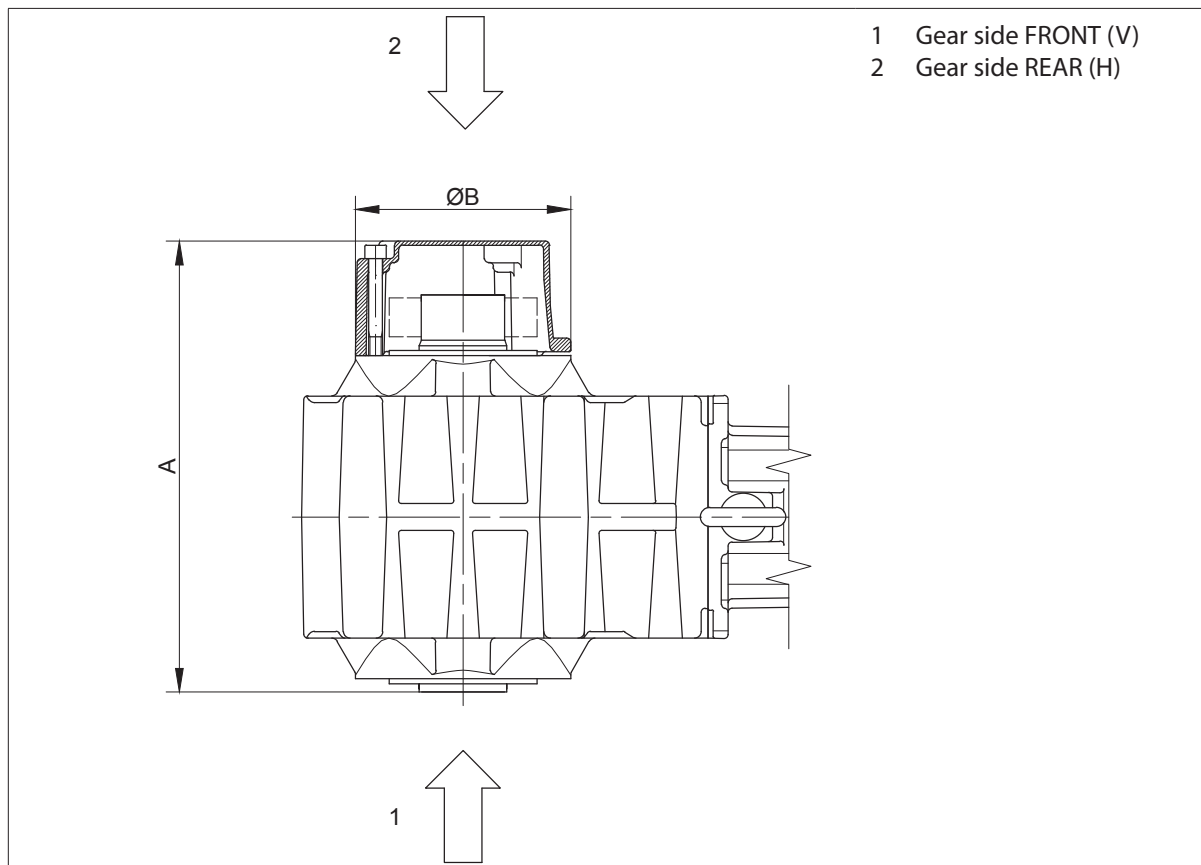


Fig. 13: SSV cover for bevel gearbox BK10 ... BK90

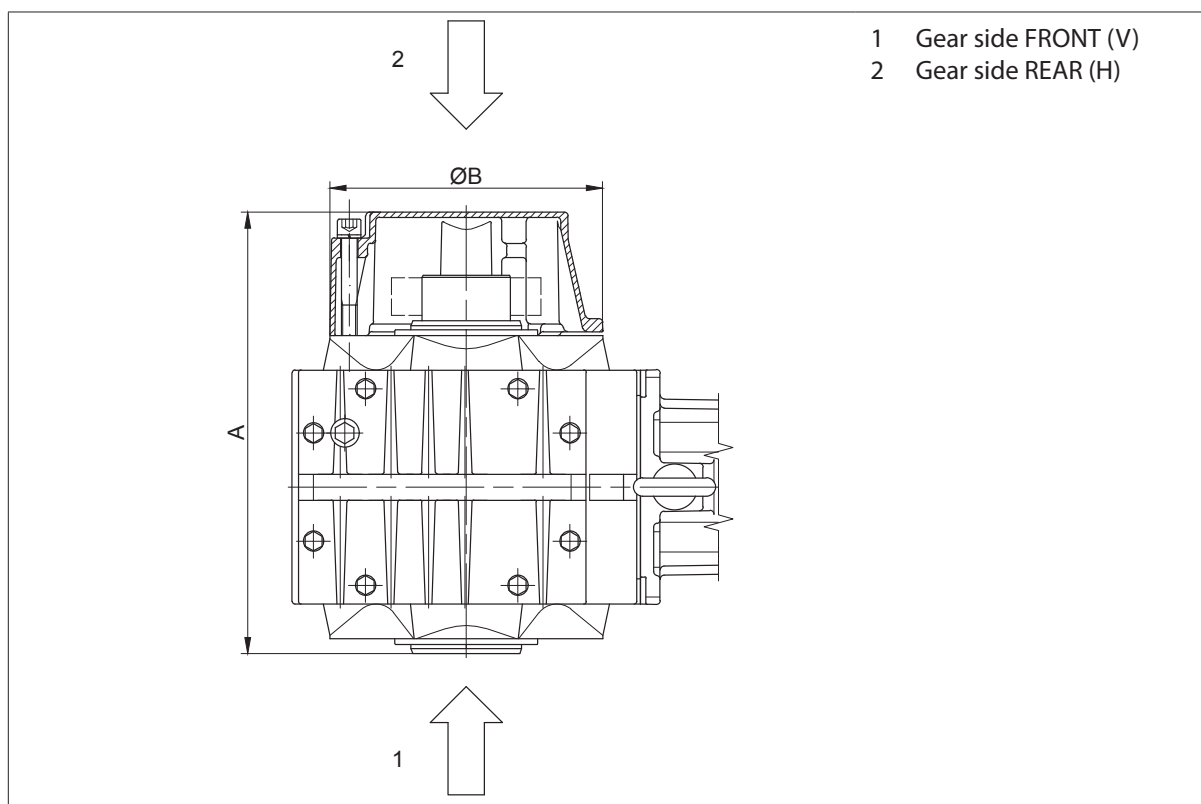


Fig. 14: SSV cover for worm gearbox BS10 ... BS40

► Install covers as contact guard for drives with shrink disc connection.

6.7.2 Protective covers for hollow shafts with keyway or splines

Drives with hollow shafts can be protected against contact and the ingress of occasional splashed water or dirt by installing sealing caps (VK) or sealing covers (VD).

► Before mounting the sealing cover, degrease sealing surfaces and seal with a suitable liquid seal.

Optionally available

Following versions:

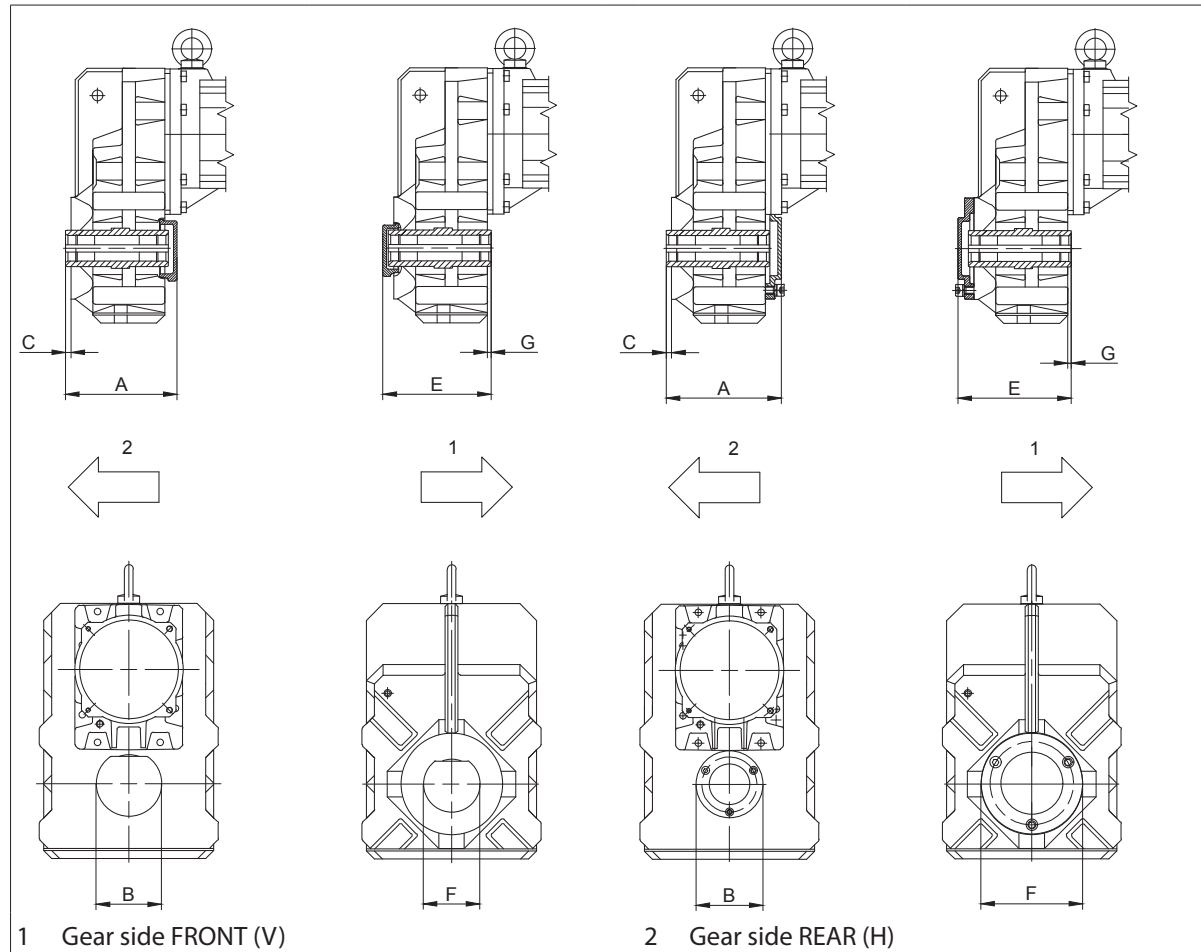


Fig. 15: SSV cover for shaft-mounted gearbox BF10 ... BF90
– sealing caps (left) and sealing covers (right)

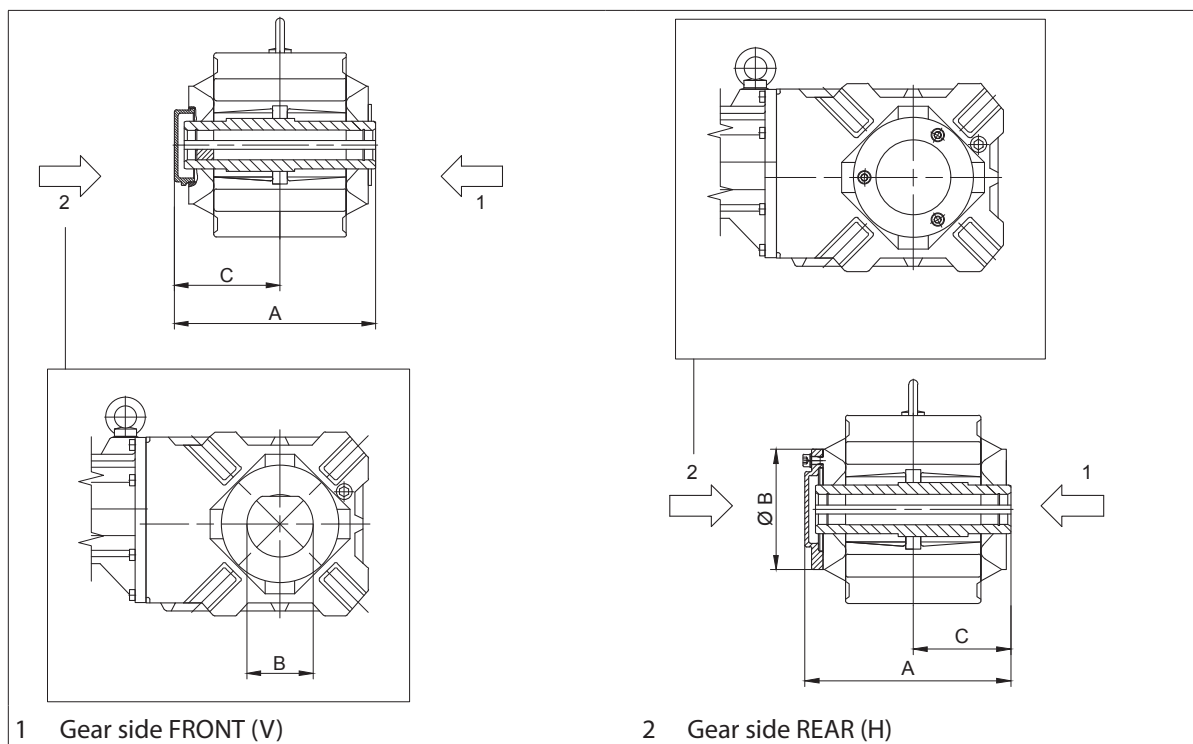


Fig. 16: SSV cover for bevel gearbox BK10 ... BK90
– sealing caps (left), sealing cover (right)

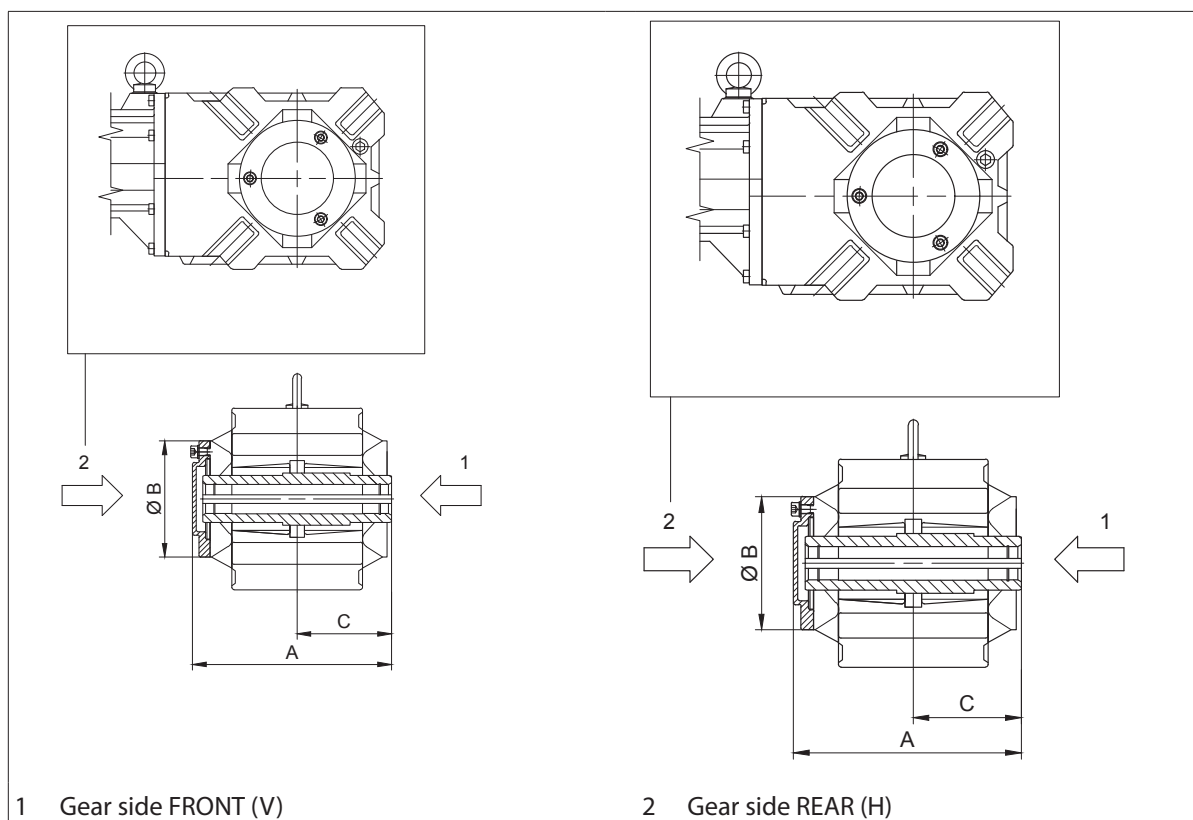


Fig. 17: SSV cover for worm gearbox BS10 ... BS40
– sealing caps (left), sealing cover (right)

6.8 Installation of oil expansion tank

The oil expansion tank and the components required for installation are supplied as a three-piece accessory set delivered with the drive.

- ☑ Drive correctly positioned for installation according to rating plate
- Install oil expansion tank on gearbox in system on site.

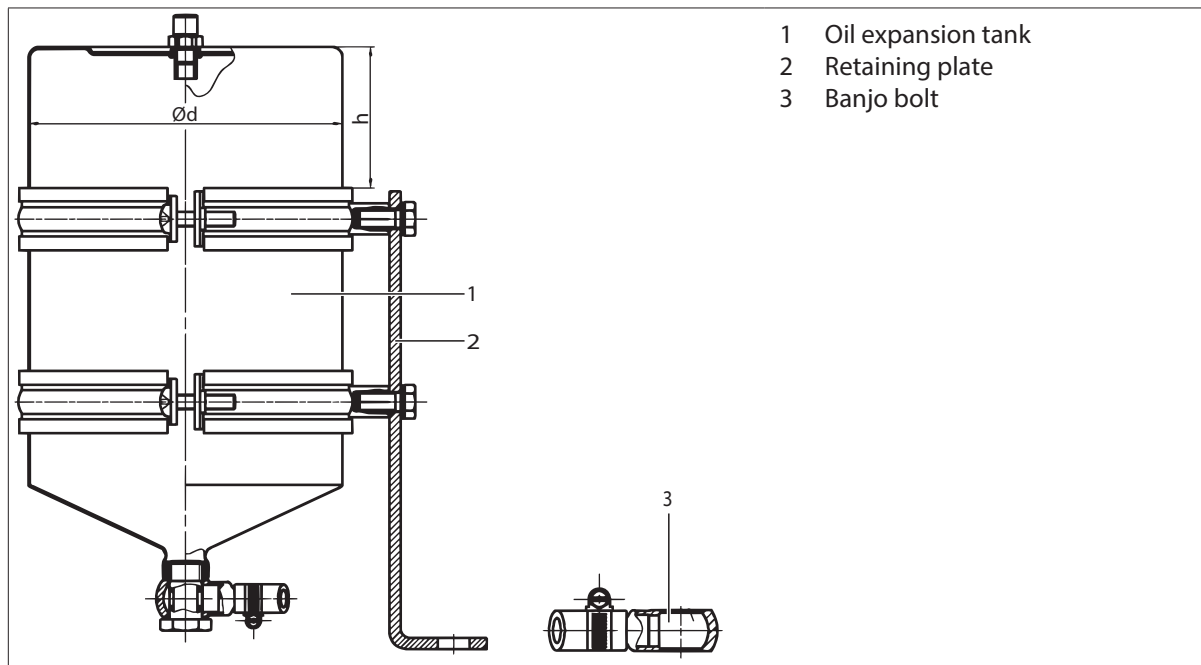


Fig. 18: Accessory set, Part 1: Oil expansion tank unit with retaining plate

Tank diameter d [mm]	Height positioning h [mm]
ca. 100	5
ca. 112	77

Tab. 12: Oil expansion tank height adjustment

6.8.1 Attach oil expansion tank to gearbox housing

The gearbox is delivered with pre-installed threaded bolt, spring washer, and hex nut.

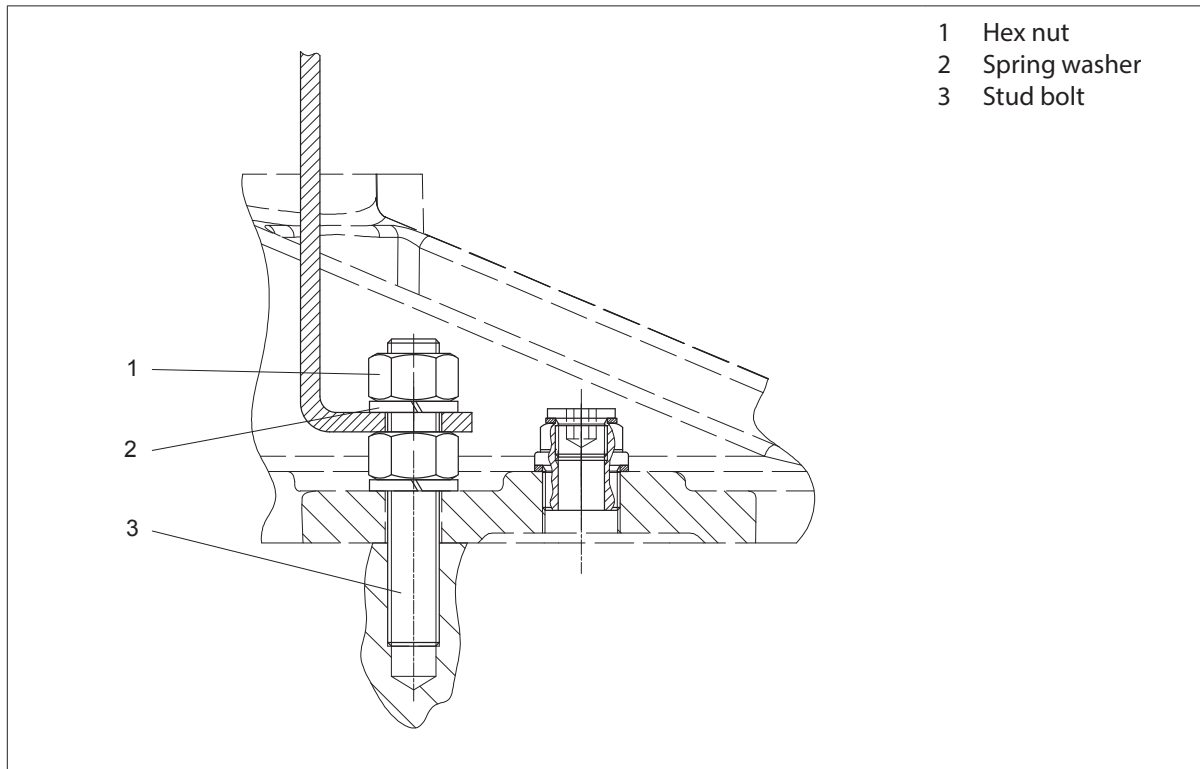


Fig. 19: Accessory set, Part 2: Mounting set with nut and spring washer

- Place oil expansion tank (1, Fig. 18, p. 31) with mounted retaining plate (2, Fig. 18, p. 31) on threaded bolt (3) and fasten with spring washers (2) and hex nut (1).

- Tightening torques for hex nut on threaded bolt:

M12: 86 Nm

M16: 210 Nm

6.8.2 Avoiding noise

- To avoid noise, make sure that the tank unit does not come into contact with the motor housing when mounted.

Aligning the connection hose

- If it is necessary to align the connection hose, turn the entire tank in the pipe clamps as follows:

1. Sufficiently loosen the pipe clamps by opening the tensioning screws; see information label on tank (Fig. 20, p. 32).
2. Align the tank. When doing so, note the correct height position h of the tank, see Fig. 18, p. 31 and Tab. 12, p. 31.
3. Re-tighten tensioning screws of pipe clamps with $5 + 2$ Nm.

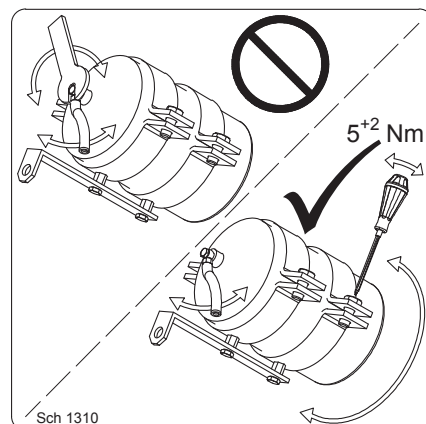


Fig. 20: 'SCH 1310' nameplate

6.8.3 Attach connection hose to gearbox housing

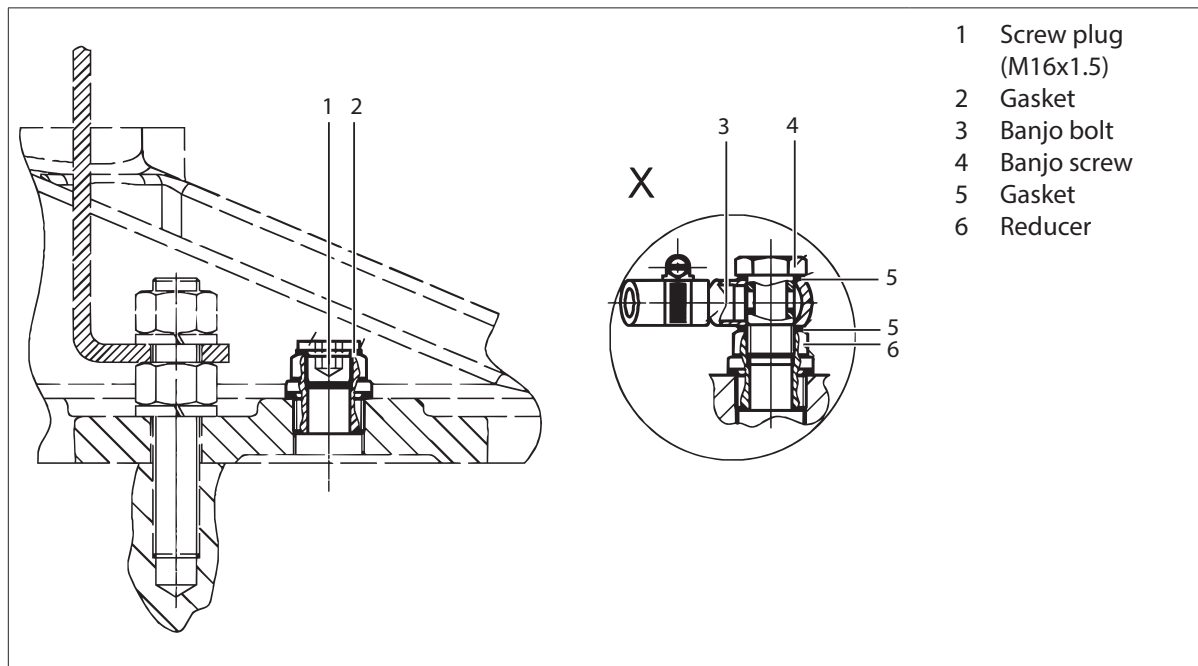


Fig. 21: Accessory set, Part 3: Hollow screw and two gaskets

To ensure that the expansion tank functions correctly, connect the free end of the connection hose to the gearbox using the banjo bolt as follows:

1. Remove the screw plug (1) marked with a red dot and the gasket (2) underneath it. Both are no longer required for operation.
2. Into the open threaded hole of the reducer (6), screw the banjo bolt (3) of the connection hose according to Fig. 21, p. 33, detail X with new gaskets (5) and new hollow screw (4), taking into account the arrangement of the components.
 - Tightening torque for banjo screw: 27 Nm

7 Commissioning

**CAUTION****High noise emissions**

Hearing damage may occur.

▷ Wear hearing protection.

NOTICE**Incorrect installation positions and ambient temperatures**

Material damage may result.

▷ Observe the information on approved installation positions and ambient temperatures.

- ▶ Observe the values on the rating plate.
- ▶ Follow instructions in chapters 2, p. 8, 6.2, p. 18 .
- ▶ Observe input speeds.

7.1 Checks before commissioning

- ▶ Before commissioning the product, check the following:
 - Integrity
 - No leaks
 - Fasten the drive and transmission elements with the necessary screws and torques
 - Transmission elements such as chains or belts are tensioned according to specification.
 - Possible torque arms are placed correctly and rubber buffers are pre-stressed.
 - Safety devices and covers are correctly mounted on both the drive and the system/machine.

7.2 Initial commissioning

- ☑ Installation position according to rating plate.



Worm gearboxes (BS...) are so-called sliding gears whose tooth flanks must be smoothed during a run-in phase in order to achieve optimum efficiency. Depending on the load, this is achieved within 50 ... 100 operating hours.



Small amounts of lubricant will occasionally leak out of the output shaft seals during commissioning and within the first hours of operation. This is not a defect, it is a so-called apparent leak. These can be caused by grease "bleeding" between the dust lip and sealing lip of the shaft seal as well as by an incomplete run-in process between sealing lip and shaft.

- ▷ Wipe off any leaking lubricant with a lint-free cloth.
- ▷ Check the sealing point again after a few operating hours.

7.3 Commissioning after long-term storage

7.3.1 Gearbox measures

Detailed information and instructions on lubricant recommendations can be found in chapter 11.2.3, p. 38. For lubricant quantities, see rating plate or customer service manual.

- ▶ Before commissioning, reduce the lubricant level of the gearbox back to the value specified on the rating plate or in these Operating Instructions.
- ▶ If the vent screws have been replaced with screw plugs: Re-insert vent screws.
- ▶ If the storage period exceeds two years, for shorter storage periods, or if the ambient temperature often exceeds the normal values of -20 °C to +40 °C: Change lubricant.
- ▶ Check shaft seals for damage, inspect shape, colour, hardness, and replace if changed.

8 Normal operation

Normal operation depends on the overall situation after installing the drive in the overall system or machine.



Read and follow documentation for overall system or machine.

9 Malfunctions and troubleshooting

9.1 Gearbox malfunctions

Malfunction	Possible cause	Remedy
Gearbox making unusual grinding noises	- Drive installed unfavourably in system (tensioned) - Potentially (also) bearing damage	▶ Correct alignment and mounting of the drive. ▶ If bearings are damaged, repair at specialist workshop.
Gearbox making unusual knocking noises	Damage in gearing	▶ Repair at a specialist workshop.
Oil leaking at output shaft or at housing separation points	- Sealing ring defective/worn - Surface seals defective	▶ Repair at a specialist workshop.
Minimal lubricant leakage at output shaft, usually during commissioning	Apparent leakage	No damage present. ▶ Wipe off excess lubricant and monitor area. If no further leakage occurs, seal point OK
Oil leak at vent valve	- Incorrect installation position - Too much lubricant in gearbox	▶ Correct lubricant quantity according to installation position. See rating plate for the correct lubricant quantities.

Tab. 13: Gearbox malfunctions

10 Repair

NOTICE

Property damage

This may result in damage to drives and the surrounding area/system.

▷ Avoid damage to paint coating.

Any work on the products must be performed by qualified specialist personnel.

▶ Follow the troubleshooting instructions in chapter 9, p. 35.

Repairs must be made in compliance with chapters 2, p. 8, 6.2, p. 18, 7, p. 34, 8, p. 35 and 15, p. 40 by authorised personnel trained on the product.

▶ Use only original spare parts.

Bauer Gear Motor GmbH assumes no liability or guarantee in the event of non-compliance.

NOTICE

Damage to property

Possible damage to drives and environment/system

▷ Avoid damage to paint coating.

▷ For drives with corrosion class C4, C5, IM2, and aseptic: Have repaired only by Bauer contract partners or at the main plant.

11 Maintenance



WARNING

Inadequate maintenance

Death and serious injuries may result.

▷ Observe maintenance and inspection intervals.

NOTICE

Material damage

Damage to drives and surroundings/system possible

▷ For all maintenance work, observe the installation position according to the type plate (see chapter 3.1.1, p. 12).

▷ Do not change the installation position.

11.1 Maintenance schedule

Assembly	Component	Maintenance interval	Activities
Gearbox	Entire gearbox	After 3,000 operating hours, every 6 months at the latest	See chapter 11.2.1, p. 37
	Only for worm gearboxes	Occasionally, depending on load and operating mode, normally only after running for some time	► Replace worm gear.
	Lubricants	After 15,000 ^{*)} operating hours for mineral gear oil (CLP 220) Every 25,000 operating hours for synthetic gear oil (PGLP220/PGLP460), after 2 ... 3 years at the latest (does not apply to lifetime lubricated gears).	See chapter 11.2.2, p. 37 For approved lubricant types and quantities depending on installation position, see rating plate or chapter 11.2.3, p. 38.
*) Gearboxes without oil filler and oil drain plugs do not require a lubricant change. They are lifetime lubricated under normal operating conditions.			

Tab. 14: Maintenance schedule

11.2 Inspection and maintenance of gearboxes

Check the following components during inspection and maintenance:

- Shaft sealing rings (wear parts)
- Roller bearings (wear parts to a lesser extent)

11.2.1 Gearing

If there is unusual running noise caused by bearing damage and/or leaks, have gearing repaired by trained personnel.

- ▶ Check for bearing damage if noise is heard while running.
- ▶ Visually inspect the seals on the output and, housing for leaks.
- ▶ Check that rubber buffers for any existing torque arms are installed properly and pre-stressed, see chapter 6.2, p. 18.
- ▶ Replace rubber buffers if cracked, damaged, or severely compressed.
- ▶ Check paint/corrosion protection and touch up as necessary.

11.2.2 Lubricants



WARNING

Incorrect disposal of lubricants

Environmental damage can result. Death and serious injury may result.

- ▷ Synthetic gear oils based on polyglycol (e.g. PGLP...) must be disposed of separately from mineral oils as hazardous waste.

We also recommend replacing the roller bearings in order to ensure longterm operating reliability.

- ▶ Allow the lubricant to completely drain into a suitable container and dispose of it properly.
- ▶ Fill with new lubricant of the same type; see rating plate for quantity.
- ▶ Replace the shaft sealing ring for gears with pre-stage or for tandem gearboxes. Fill 50% of the chamber between the dust lip and sealing lip with grease (Shell Gadus S2 V100 3 or similar). Make sure that the new sealing ring does not return to the "old" track.

11.2.3 Approved lubricant types for gear units

Lubricant manufacturer	Lubricant type					
	Mineral oil	Synthetic oil				USDA H1 oil
	ISO VG 220	ISO VG 68		ISO VG 220	ISO VG 460	ISO VG 220
	Standard oil for gearboxes of series	Low-temperature oil for gearboxes of series		Standard oil for gears of series	Standard oil for gears of series	Food industry oil for gearboxes of series
	BF06-BF90 BG04-BG100 BK06-BK90	BF06-BF90 BG04-BG100	BK06-BK90 BM09-BM40 BS02-BS40	BS02-BS10 BK06-BK10 BM09-BM10 High-temperature oil for gearboxes of series BS02-BS10 BK06-BK10 BF06-BF90 BG04-BG100 BK06-BK90 BM09-BM10	BS20-BS40 BK17-BK50 BM20-BM40 High-temperature oil for gearboxes of series BS20-BS40 BK17-BK50 BM20-BM40	BF06-BF90 BG04-BG100 BK06-BK90 BM09-BM40 BS02-BS40
AGIP	BLASIA 220 [13 02 08]	—	—	BLASIA S 220 [13 02 06]	BLASIA S 460 [13 02 06]	—
BECHER RHUS	STAROL G 220 [13 02 08]	—	BERUSYNTH EP 68 [13 02 06]	BERUSYNTH EP 220 [13 02 06]	BERUSYNTH EP 460 [13 02 06]	BERUSYNTH EP 220 H1 [13 02 06]
CASTROL	ALPHA EP 220 [13 02 08] ALPHA SP 220 [13 02 08] OPTIGEAR EP 220 [13 02 08] OPTIGEAR 1100/220 [13 02 08]	Alphasyn T68 [13 02 06]	—	ALPHASYN PG 220 [13 02 06] OPTIGEAR 800/220 [13 02 06] OPTIGEAR 1300/220 [13 02 06] ALPHASYN GS 220 [13 02 06]	ALPHASYN PG 460 [13 02 06] OPTIGEAR Synthetic 800/460 [13 02 06] OPTIGEAR Synthetic 1300/460 [13 02 06] ALPHASYN GS 460 [13 02 06]	OPTILEB GT 220 (CLP-HC) [13 02 06] OPTILEB GT 1800/220 (CLP-PG) [13 02 08]
CHEVRON	Meropa 220 [13 02 08] GEARTEX EP-A SAE 85W-90 [13 02 06]	—	Meropa Synlube WS 68 [13 02 06]	Meropa Synlube WS 220 [13 02 06]	Meropa Synlube WS 460 [13 02 06]	Chevron lubricating oils FM 220 (USA) [13 02 06]
FUCHS	RENOLIN CLP 220 [13 02 08] RENOLIN CLPF 220 SUPER [13 02 08] RENOLIN CLP 220 PLUS [13 02 08]	RENOLIN UNISYN XT 68 [13 02 06]	RENOLIN PG 68 [13 02 06]	RENOLIN PG 220 [13 02 06]	RENOLIN PG 460 [13 02 06]	CASSIDA FLUID GL 220 [13 02 06]
KLÜBER	KLÜBEROIL GEM 1-220 N [13 02 08]	—	KLÜBERSYNTH GH 6-80 [13 02 06]	KLÜBERSYNTH GH 6-220 [13 02 06]	KLÜBERSYNTH GH 6-460 [13 02 06]	KLÜBEROIL 4UH1-220 N [13 02 06] KLÜBERSYNTH UH1 6-220 [13 02 06]
MOBIL	MOBILGEAR 600 XP 220 [13 02 08]	MOBIL SHC 626 [13 02 06]	—	MOBIL SHC Gear 220 [13 02 06] MOBIL SHC 630 [13 02 06]	MOBIL SHC Gear460 [13 02 06] MOBIL SHC 634 [13 02 06]	MOBIL SHC CIBUS 220 [13 02 06]
OEST	Gearol 220 [13 02 06]	—	—	—	—	—
SHELL	OMALA S2 GX220 [13 02 08]	—	—	OMALA S4 WE 220 [13 02 06]	OMALA S4 WE 460 [13 02 06]	—
TOTAL	CARTER EP 220 [13 02 08] CARTER XEP 220 [13 02 06]	—	—	CARTER SY 220 [13 02 06]	CARTER SY 460 [13 02 06]	NEVASTANE SL220 [13 02 06] NEVASTANE EP 220 [13 02 06] NEVASTANE SY 220 [13 02 06]
WINTERSHALL	SRS ERSOLAN 220 [13 02 08]	—	—	—	—	—
Bearing grease						
—	SHELL S2 V100 3 – High temperature –	KLÜBER PETAMO GHY 133 – or similar –	Standard: SHELL S2 V100 3 High temperature: KLÜBER PETAMO GHY 133 – or similar –		MOBIL Polyrex 222 – or similar –	

[...] code from European Waste Catalogue (Decision 2001/118/EC).

Tab. 15: Approved lubricant types

11.3 Cleaning and maintenance

NOTICE**Improper cleaning of the paint layer**

Corrosion protection is impaired. The drive or its surroundings may be damaged.

▷ Only use non-abrasive cleaning tools.

NOTICE

Penetration of liquid into device.

This may result in damage to the drives and the surrounding area/system.

▷ Avoid direct water exposure to the shaft seals

1. Perform cleaning work.
2. At the end of the cleaning cycle, remove any cleaner residue from the drive shaft sealing rings.

12 Decommissioning

Follow the instructions and notes for installation and commissioning in chapters 6.2, p. 18, 7, p. 34 and 8, p. 35 and proceed in reverse order.

13 Disassembly

Follow the instructions and notes for installation and commissioning in chapters 6.2, p. 18, 7, p. 34 and 8, p. 35 and proceed in reverse order.

14 Disposal

14.1 Packaging

Improper disposal of packaging materials can cause environmental damage.

The products are packaged in accordance with the necessary or prescribed requirements for the respective mode of transport.

▶ Dispose of non-reusable packaging materials in accordance with local waste or disposal regulations.

14.2 Lubricants

▶ Dispose of synthetic gear oils based on polyglycol (e. g. PGLP, etc.) separately from mineral oils as hazardous waste.

14.3 Gearbox

▶ Dispose of gear and its components, e.g. as scrap steel:

- Housing and housing parts
- Gearwheels
- Shafts
- Roller bearing
- Worm gears (copper alloy)

15 Spare parts and accessories

Our worldwide service team is always ready to provide advice and support for supplying spare parts. You can find the nearest service partner online at www.bauergears.com/sales-and-service/global-service/ under "Sales Locator".

Necessary spare parts can be requested and ordered from Bauer Gear Motor GmbH or one of our service partners.

Our website www.bauergears.com/sales-and-service/global-service/ allows you to select the necessary spare parts yourself using the "Spare Part Selector".

16 Technical data

16.1 General data and conditions of use

See the rating plate/type plate for the most important technical data on operating the gear units. These technical data and other contractually agreed data and properties form the basis and limit of the intended use.

Unless explicitly stated or agreed, the products can be operated without restriction and without taking special measures under the following environmental conditions:

Parameter	Value
Ambient temperature range	-20°C - +40°C
Installation altitude	1000 m above sea level

Tab. 16: Permissible ambient conditions

The power and torque data given on the rating plate is fully available at the output shaft.

Gearbox efficiencies are taken into account here.

Specific technical data can be requested from Bauer Gear Motor by specifying the serial and/or article number.

16.2 Substructure and system-related vibrations

Gearbox series	Gearbox size	Max. permissible error (mm)
BG	<06	0.2
	10 ... 30	0.4
	40 ... 60	0.5
	70 ... 80	0.7
	90 ... 100	0.8
BF	10 ... 30	0.2
	40 ... 50	0.4
	60 ... 70	0.5
	80 ... 90	0.7
BK	06 ... 30	0.2
	40 ... 50	0.4
	60 ... 80	0.5
	90	0.7
BS	<06	0.2
	10 ... 30	0.4
	40	0.5

Tab. 17: Foot design: permissible flatness error

Gearbox series	Bolt circle Ø (mm), A-flange	Bolt circle Ø (mm), C-flange	Max. permissible error (mm)
BG, BF, BK, BS	<165	<165	0.2
	>165 ... 265	>165 ... 265	0.4
	>265 ... 350	>265	0.5
	>350 ... 500	-	0.7
	>500	-	0.8

Tab. 18: Flange design: permissible flatness error)

16.3 Gearbox

16.3.1 General

Numerous influencing factors are decisive for the overall load on a gearbox.

The most important include:

- Average torque (rated torque) in Nm
- Daily operating time in hours (h)
- Strength of torque peaks (load classification)
- Frequency of torque peaks (switching operation)

These influences can be described in a simplified and practical manner by operating factors.

A distinction is made between operating factor 1 for load classification and operating time and operating factor 2 for load classification and switching frequency.

16.3.2 Torque ranges

Bauer gear units are provided in different gear sizes:

Type of gearbox	Series	Number of sizes	Torque range
Helical gear	BG	13	20 Nm to 16,800 Nm
Shaft-mounted gear	BF	10	90 Nm to 16,800 Nm
Bevel	BK	10	80 Nm to 16,800 Nm
Worm gear	BS	8	25 Nm to 1,000 Nm

Tab. 19: Torque ranges for Bauer gearboxes and geared motors

[illegible]

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