MULTI – TURN GEAR BOXES

Bevel Gearbox ABG10.2- ABG35.2

OPERATING INSTRUCTIONS

Scope of these instructions: These instructions apply to multi-turn Bevel Gearbox of type range: ABG10.2-ABG35.2

1. Safety instructions

1.1Range of application

AUMA bevel gearboxes ABG10.2- ABG35.2 are used for the operation of valves (e.g. gate valves and globe valves). They are designed for manual operation as well as motor operation in conjunction with electric actuators. For other applications, please consult AUMA. The manufacturer is not liable for any possible damage resulting from use in other than the designated applications. Such risk lies entirely with the user. Observance of these operation instructions is considered as part of the designated use.
Having the same mounting dimensions and reduction ratios, Bevel gearboxes are interchangeable.

1.2 Warnings and notes

Failure to observe the warnings and notes may lead to serious injuries or damage. Qualified personnel must be thoroughly familiar with all warnings and notes in these operation instructions. Correct transport, proper storage, mounting and installation, as well as careful commissioning are essential to ensure a trouble-free and safe operation.

The following references draw special attention to safety-relevant procedures in these operation instructions. Each is marked by the appropriate pictograph.

This pictograph means: Note!

“Note” marks activities or procedures which have major influence on the correct operation. Non-observance of these notes may lead to consequential damage.

This pictograph means: Warning!

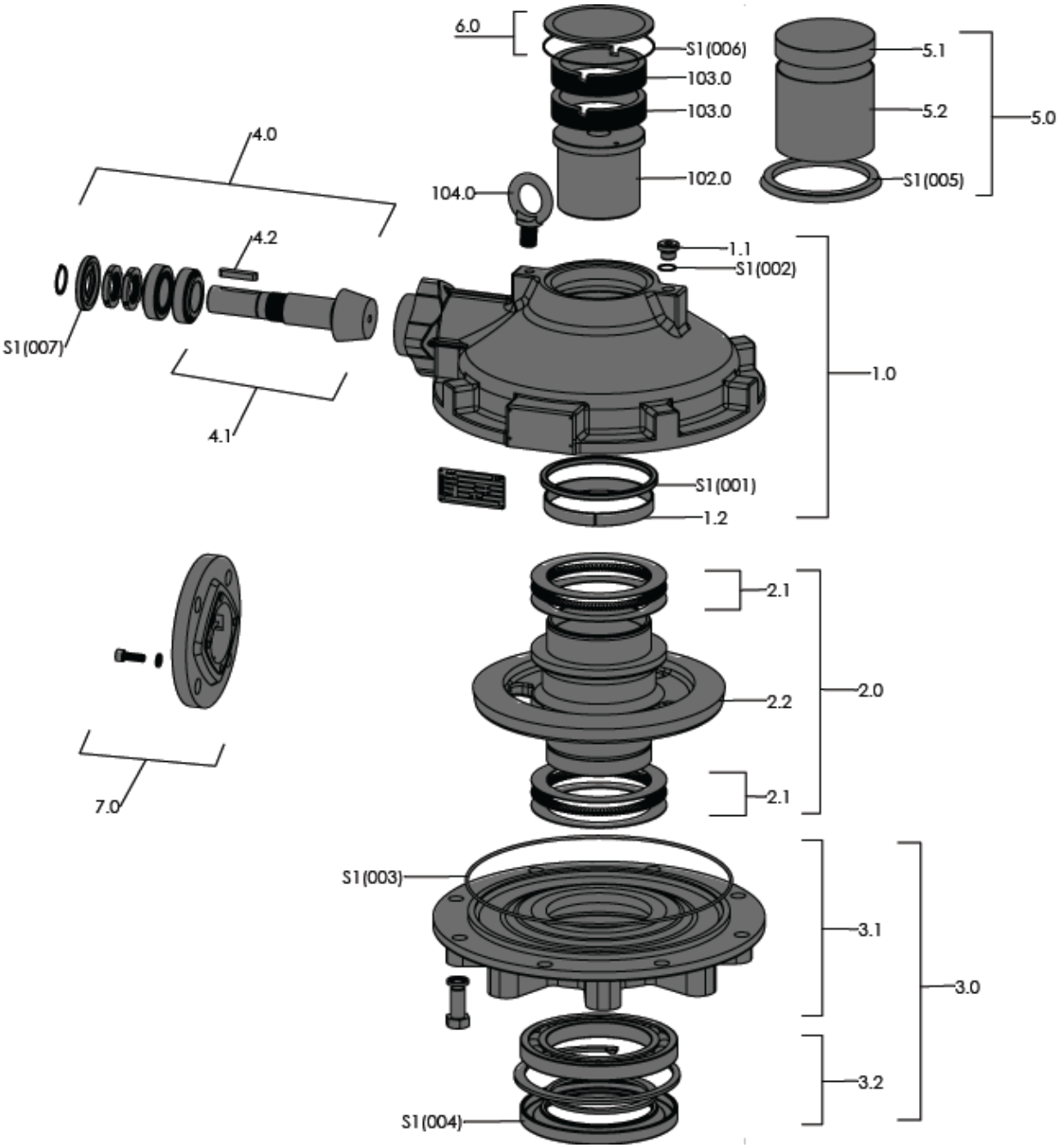
“Warning” marks activities or procedures which, if not carried out correctly can affect the safety of persons or material.

2. Technical Data

BEVEL GEARBOX		**ABG10.2 – ABG35.2**					
Features and functions							
Type of duty	Short time duty S2-15 min Note: In case of electric. 1) OPEN- CLOSE duty in couple with SA actuator. 2) Intermediate positions can be achieved in couple with SAR actuator.						
Direction of rotation	Clockwise rotation at input shaft results in clockwise rotation at output drives						
Input shaft	Cylindrical with parallel key according to IS 2048						
Operation							
Motor operation	With electric multi-turn actuator						
	Flanges for mounting of multi-turn actuator as per standard ENISO5210/DIN3210						
Manual operation	Via hand wheel						
	Available hand wheel diameters, selection according to the max. output torque						
	Type	**ABG10.2**	**ABG14.2**	**ABG16.2**	**ABG25.2**	**ABG30.2**	**ABG35.2**
	Hand wheel dia mm	250/350	350/400	400/640	500/640	640/800	800
Valve attachment							
Valve attachment	Dimensions according to EN ISO 5210						
Service conditions							
Mounting position	Any position						
Enclosure protection according to IS/IEC 60529	Standard	IP67 - Dust proof & water tight					
	Option	IP68 - Enclosure can be provided on request					
Corrosion protection	Standard	Suitable for installation in industrial units, in water or power plants with a low pollutant concentration					
	Option	Others on request					
Paint	Standard	Powder coating as primer + Epoxy finish paint					
	Option	Other paints on request					
Color	Standard	Smoke grey Code 692 as per IS:5					
	Option	Other colours on request					
Ambient Temperature	Standard	–20 ºC to +80 ºC					
	Option	Other temperature requirements on request.					

Note: We reserve the right to alter data according to improvements made. Previous data sheets become invalid with issue of this data sheet.

3. Spare parts list bevel gearboxes ABG10.2 – ABG35.2



Spare parts list bevel gearboxes ABG10.2 – ABG35.2		
Ref no	Designation	Type
1.0	Housing	Sub-assembly
2.0	Bevel Assembly	Sub-assembly
2.1	Axial Needle Roller Bearing	Sub-assembly
2.2	Bevel sleeve	Sub-assembly
3.0	Output Drive	Sub-assembly
3.1	Mounting Flange	Sub-assembly
3.2	Bearing with Circlip	Sub-assembly
4.0	Input Shaft	Sub-assembly
4.1	Pinion Shaft	Sub-assembly
5.0	Stem Protection Tube	Sub-assembly
5.1	Cap for Stem Protection Tube	Part
5.2	Stem Protection Tube	Part
6.0	Plastic Lid with O ring (ABG10,14,16)	Sub-assembly
6.0	Metal Lid without O ring (ABG 25,30,35)	Part
7.0	Actuator Mounting Flange	Sub-assembly
102.0	Stem nut	Part
103.0	Ring Nut	Part
104.0	Eye Bolt (Except ABG10.2)	Part
S1	Seal Kit	Set

4. Transport, storage and packaging

4.1 Transport

Transport to place of installation in sturdy packing. If mounted together with actuator, Attach ropes or hooks for the purpose of lifting by hoist only to the gearbox and not to the actuator and use eye bolt as per table 1.

- ✓ Transport to the place of installation (till last destination).
- ✓ Avoid packages from exposing to open atmosphere during transit.
- ✓ Protect against rains.

Table 1:Permissible loads when using eye bolts according to DIN 580:IS:4190

Sl. Num	Model	eye bolts Size	eye bolts Quantity
1.0	ABG 14.2	M 8	1Num
2.0	ABG 16.2	M 12	1Num
3.0	ABG 25.2	M 16	1Num
4.0	ABG 30.2	M 16	1Num
5.0	ABG 30.2	M 20	1Num

4.2 Storage

- ✓ Store in well-ventilated, dry room.
- ✓ Protect against floor dampness by storage on a shelf or on a wooden pallet.
- ✓ Cover to protect against dust and dirt. Apply suitable corrosion protection agent to bare surfaces.
- ✓ In case gearboxes are to be stored for a long period (more than 6 months).
- ✓ Protect bare surfaces, in particular the output drive parts and mounting surface, with long-term corrosion protection agent.
- ✓ Check for corrosion approximately every 6 months. If first signs of corrosion show, apply new corrosion protection.

Type of enclosure is mentioned on the name plates.

4.3 Packaging

- ✓ Our products are protected by special packaging for the transport ex works.
- ✓ The packaging consists of environmentally friendly materials which can easily be separated and recycled.
- ✓ For the disposal of the packaging material, we recommend approved disposal agency .
- ✓ We use the following packaging materials:

  Wooden material boards (OSB)/cardboard/paper, PE sheet.

5. Fitting the hand wheel

For gearboxes designed for manual operation, the handwheel is supplied separately. Fitting is done on site according to figure 1.

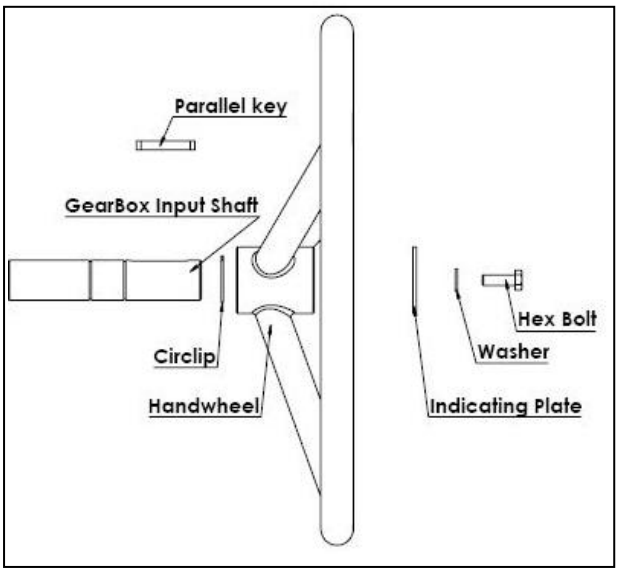


Fig1: Fitting of handwheel

6. Mounting multi-turn actuators SA/SAR

When bevel gearboxes and multi-turn actuators are supplied together, the mounting can be done in the factory up to gearbox size ABG 16.2, if desired. For sizes ABG 25.2 and larger, the mounting of gearboxes is performed as follows.

In case actuator mounting flange is not attached to gearbox:

- ✓ Thoroughly degrease the mounting faces of the gearbox and actuator mounting flange.
- ✓ Fit actuator mounting flange and fasten with bolts and lock washers.
- ✓ Fasten bolts crosswise to the appropriate torque according to table 2.

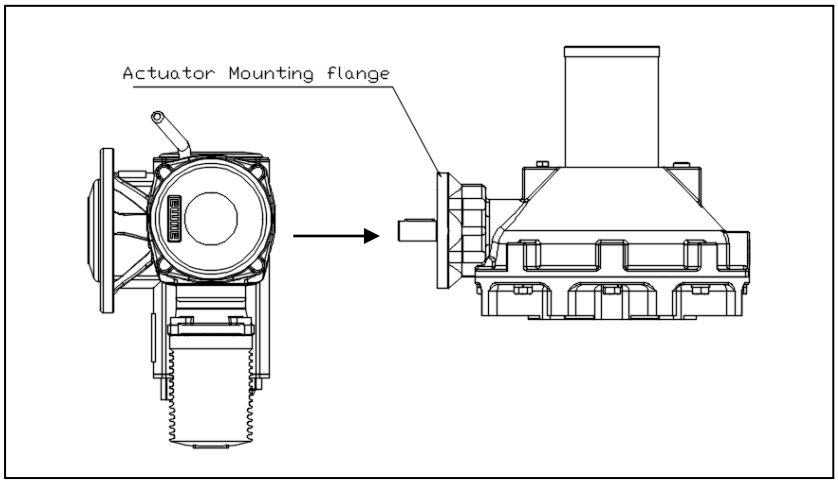


Fig2: Mounting multi-turn actuators SA/SAR

Mounting the multi-turn actuator:

- ✓ Thoroughly degrease the faces of the output mounting flange at actuator and of the input flange at bevel gearbox..
- ✓ Place the multi-turn actuator on bevel gearbox.
- ✓ The multi-turn actuator can be positioned on the valve at every 90°.
- ✓ Ensure that the spigot mates uniformly in the recess and that the mounting faces are in complete contact.
- ✓ Fasten actuator with bolts and lock washers (see table 2) at the flange of the bevel gearbox. Fasten bolts crosswise with a torque according to table3.

 **Do not attach ropes or hooks for the purpose of lifting the actuator by hoist to the handwheel. If multi-turn actuator is mounted on gearbox, attach ropes or hooks for the purpose of lifting by hoist to gearbox and not to multi-turn actuator.**

 **The option Changeover of ABG.2 bevel gear from Manual/hand wheel operated to Electric/ motor operated is applicable only for ABG25.2- ABG35.2 gearboxes only.**

7. Mounting Primary reduction gearboxes GZ with ABG25.2 to ABG35.2 bevel gearboxes

ABG25.2 to ABG35.2 bevel gearboxes will be supplied with suitable GZ14 & GZ 16 primary reduction gearboxes at input as per the requirement of reduction ratio.

In case flange for actuator is not attached to gearbox:

- ✓ Thoroughly degrease the mounting faces of the gearbox and flange for GZ primary reduction gearbox .
- ✓ Fit flange for GZ gear box and fasten with bolts and lock washers.
- ✓ Fasten bolts crosswise to the appropriate torque according to table 3.

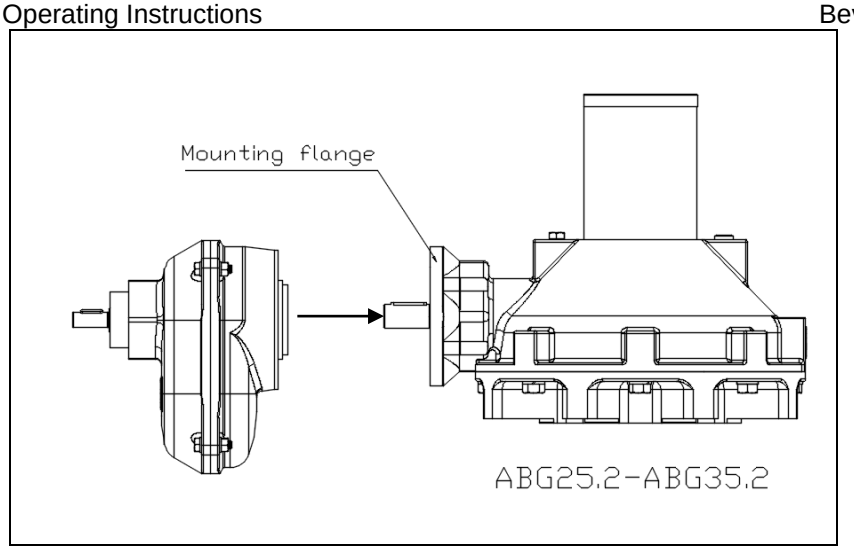


Fig3: Secondary Gearbox GZ series

Table 2: Bolts for mounting AUMA multi-turn actuators on bevel gearboxes									
Gearbox	SA50 / SA60 & G1/2			SA60 & G1/2			SA100 & G3		
	Bolt	Lock washer	Pcs	Bolt	Lock washer	Pcs	Bolt	Lock washer	Pcs
ABG 25.2	M16	B16	4	M16	B16	4	-	-	-
ABG 30.2	-	-	-	M16	B16	4	M20	B20	4
ABG 35.2	-	-	-	-	-	-	M20	B20	4
Gearbox	GZ14 & G1/2			GZ16 & G1/2			GZ16 & G3		
	Bolt	Lock washer	Pcs	Bolt	Lock washer	Pcs	Bolt	Lock washer	Pcs
ABG 25.2	M16	B16	4	M16	B16	4	-	-	-
ABG 30.2	-	-	-	M16	B16	4	M20	B20	4
ABG 35.2	-	-	-	-	-	-	M20	B20	4

Table 3: Tightening torque for bolts				
	Strength class 8.8		**Strength class 10.9**	
Standard metric thread	**Assembly preload [kN]**	**Tightening torque [Nm]**	**Assembly preload [kN]**	**Tightening torque[Nm]**
M 1.6	0.538	0.18	0.79	0.27
M 2	0.895	0.38	1.32	0.56
M 2.5	1.49	0.78	2.19	1.1
M 3	2.24	1.4	3.3	2
M 4	3.88	3.1	5.7	4.5
M 5	6.36	6.1	9.34	9
M 6	8.97	11	13.2	15
M 8	16.5	25	24.2	37

M 10	26.2	51	38.5	75
M 12	38.3	87	56.2	128
M 16	72.4	214	106	314
M 20	117	431	166	615
M 24	168	742	239	1057
M 30	269	1489	383	2121
M 36	393	2594	560	3695

Notice

The gearbox can be mounted in any position. The gearboxes are suitable for short- time duty

The Maximum rated torque and thrust should not be applied over full range of travel, except for valve with short stroke. The maximum rated torque(Nm) and thrust(kN) can be applied to 10% of travel and remaining 90% of travel can be applied with 30% of rated torque(Nm) and thrust(kN).

Bore in coupling flange must have sliding fit on the input shaft. Excessive seating may damage the gearbox during fitting.

Positioning of Gearbox on the valve is made easy by spigot on mounting flange (Fig 4). The corresponding seating should be made to grade H8. Check the proper seating.

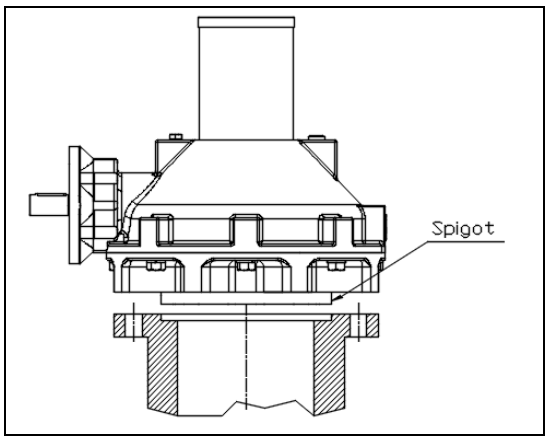


Fig4: Positioning of gearbox on the valve

Fix the gearbox on valve with bolts of min. Quality 8.8(8G) and spring washers.

Check tightness of bolts after about 200 operating hours and if necessary tighten them.

The Gearbox should not move tangentially when being reversed. Locktite No. 307(or similar) may be applied to the flange face prior to mounting, in order to get better adherence.

Prior to mounting, the gearbox must be checked for damage. Damaged parts must be replaced by original spare parts. After mounting to valve, touch up any possible damage to paint finish.

8. Machining and assembly instructions of stem nut

ABG.2 Bevel gearboxes are being supplied with integrated type A output which contains stem nut with pilot bore, whereas stemnut to be removed from the gearbox and machining to be done for suitable internal threads for valve stem.

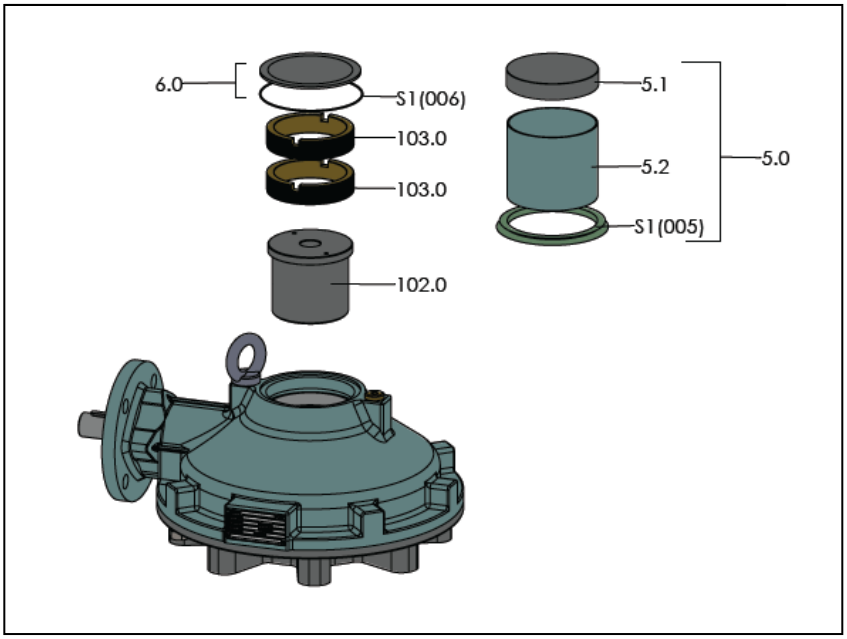


Fig5: Stemnut Removal and machining

- ✓ Remove plug/ stem protection tube fixed at top of the gearbox, refer part num: 5.0/6.0 of above figure 5.
- ✓ Remove 2 ring nuts fixed on the stem nut using suitable fixtures in anticlockwise direction refer part num:103.0 of above figure 5 .
- ✓ Remove the stem nut from splines by simple push towards gearbox's top opening.
- ✓ Drill and bore stem nut and cut thread. When fixing in the chuck, make sure stem nut runs true!
- ✓ Clean the machined stem nut. Apply Lithium soap EP multi-purpose grease to stem nut.

Stem nuts are being supplied with pilot bore and external spline cut, always use soft jaws in chuck to hold the stemnut for thread cutting to avoid damage of splines on stemnut.

9. Protection tube for rising valve stem

- ✓ Seal thread of protection tube with hemp, Teflon tape, or thread sealing material.
- ✓ Screw protection tube (1) into thread (figure 5) and tighten it firmly.
- ✓ Push down the sealing (2) to the housing.

- ✓ Check whether cap (3) is available and without damage

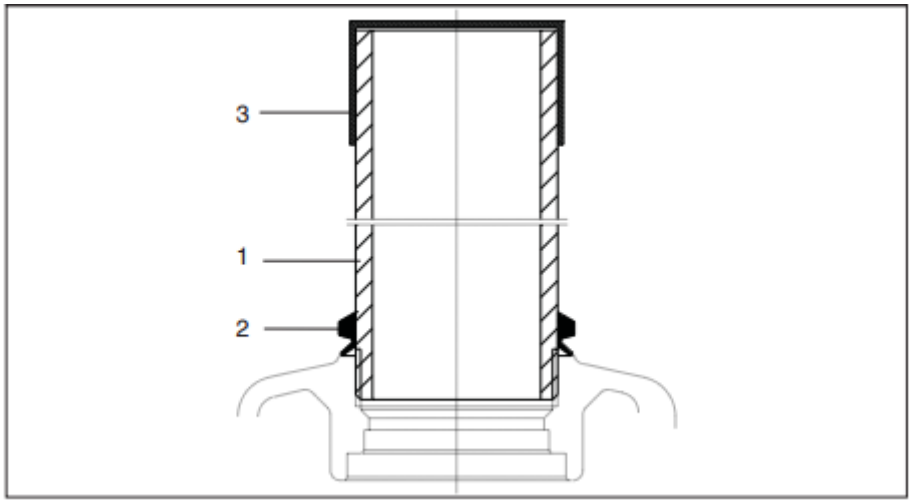


Fig6: Fixing Protection tube for rising valve stem

10. Maintenance

10.1 General references

After commissioning, check gearbox for damage to paint finish. Do a thorough touch-up to prevent corrosion. Original paint in small quantities can be supplied by AUMA.

AUMA gearboxes require only very little maintenance. To ensure that the gearbox is always ready to operate, we recommend –provided that on an average not more than 10 operations are performed per year – the following measures:

- ✓ Approximately six months after commissioning and then every year check bolts between multi-turn actuator, gearbox, and valve for tightness. If required, tighten applying the torques given in table 3, (page 10).
- ✓ Perform a test run as well as a visual inspection for grease leakage every six months.
- ✓ Carry out a detailed functional test for each gearbox every 5 years. Record the results for future reference.
- ✓ For gearboxes permanently exposed to ambient temperatures above 40 °C, maintenance must be performed at shorter intervals.

10.2 Seals:

The seals must be changed when changing the grease. Seal kits may be obtained from AUMA.

10.3 Grease:

A grease and seal change is recommended after the following operation times:

- if operated seldom, after 10 – 12 years.
- if operated frequently, after 6 – 8 years.

Only original AUMA grease must be used. For the grease type, refer to name plate. Lubricants should not be mixed.

Table4:Grease quantity for bevel gearbox						
ABG	**10.2**	**14.2**	**16.2**	**25.2**	**30.2**	**35.2**
Qty- Ltr	0.22	0.56	1.1	2.5	3.1	3.6
Qty- Kg	0.2	0.5	1	2.2	2.8	3.2
Note:1 liter= approximately 0.88 Kg						

The removed lubricant and the cleaning agent used must be disposed of according to the relevant regulations.

For safe operation of explosion-proof products, the gear housing has to be lubricated in compliance with the manufacturer specifications. In the event of lubricant loss, repair measures have to be initiated without delay.

10.4 Change of Grease:

For gearboxes with multi-turn actuator. Remove multi-turn actuator..Remove gearbox from valve

During this time, the valve/pipeline must not be under pressure!

Mark position of the gearbox on the valve, loosen connecting bolts to the valve and remove the gearbox

Remove old grease:

Grease type, see name plate; grease quantities see table 4.

The numbers used in the following text refer to the spare parts list(s) of these operation instructions.

- ✓ Remove bolts at Mounting flange (3.1).
- ✓ Remove mounting flange with hollow shaft (2.0) from housing.
- ✓ Remove old grease completely from the housing and the individual parts and clean gear housing. For this purpose, kerosene or a similar cleaning agent may be used.
- ✓ Replace seals S1 by new ones.
- ✓ Clean mounting faces at housing and mounting flange and apply a small quantity of grease.

- ✓ Mount the mounting flange (3.0) with hollow shaft (2.0) into housing, while paying attention to the O-ring S1(003 & 004) at mounting flange and O-ring S1(001 & 002) in the housing.
- ✓ Screw in bolts with lock washers and fasten them evenly crosswise to the appropriate torque according to table 3.

Fill with new grease :

- ✓ Remove screw plug (1.1) at housing.
- ✓ Fill with new grease.
- ✓ Clean mounting faces at housing and insert screw plug (1.1) with new sealing S1(002) and fasten them to the appropriate torque according to table 3.

After maintenance:

- ✓ Fasten gearbox to valve again.
- ✓ If applicable, mount multi-turn actuator.
- ✓ For gearboxes with multi-turn actuator, check the setting of the limit switching according to the operation instructions for multi-turn actuators; if required, re-set.
- ✓ Perform test run to ensure proper function.
- ✓ Check the gearbox for damage to paint finish. Do a thorough touch-up to
- ✓ prevent corrosion. Original paint in small quantities can be supplied by AUMA.

10.5 Paint:

The housing and mounting flange receive a primary coat of Zinc based paint and the unit is sprayed with epoxy paint after assembly.

11. Disposal and recycling

AUMA gearboxes have an extremely long lifetime. However, they have to be replaced at one point in time.
Our gearboxes have a modular design and may therefore easily be disassembled, separated and sorted according to materials, i.e.:

- Various metals
- Plastics
- Greases and oils

The following generally applies:

- ✓ Collect greases and oils during disassembly. As a rule, these substances are hazardous to water and must not be released into the environment.

- ✓ Arrange for controlled waste disposal of the disassembled material or for separate recycling according to materials.
- ✓ Observe the national regulations for waste disposal.

12.Service

AUMA offers extensive services such as maintenance and inspection for gearboxes. Addresses can be found below and on the Internet (www.auma.co.in).

Regd. Office & Works:
AUMA India Private Limited
(CIN No: U74999KA1983PTC005412)
(GSTIN 29AABCA1342F1Z4)
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