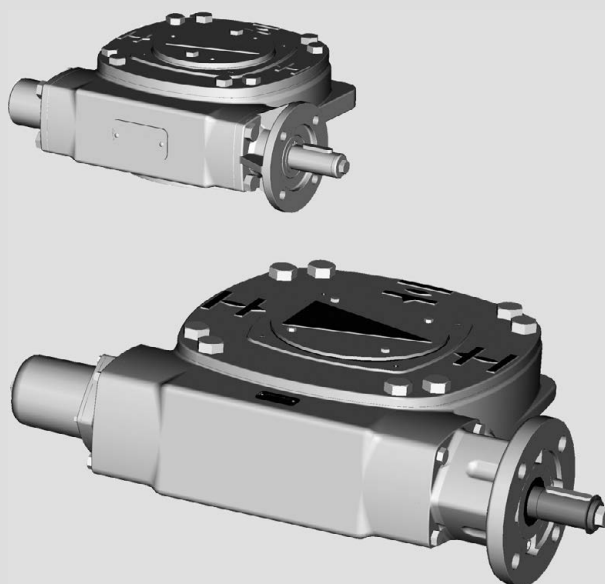




Part-turn gearboxes

GSI 63.3 – GSI 250.3

qualified for use in nuclear power plants
(Inside/Outside Containment)



Read operation instructions first.

- Observe safety instructions.
- These operation instructions are part of the product.
- Retain operation instructions during product life.
- Pass on instructions to any subsequent user or owner of the product.

Purpose of the document:

This document contains information for installation, commissioning, operation and maintenance staff. It is intended to support device installation and commissioning.

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1. Safety instructions

1.1. Basic information on safety

Standards/directives Our products are designed and manufactured in compliance with recognised standards and directives. This is certified in a Declaration of Incorporation and an EU Declaration of Conformity.

The end user or the contractor must ensure that all legal requirements, directives, guidelines, national regulations and recommendations with respect to assembly, electrical connection, commissioning and operation are met at the place of installation.

They include among others standards, directives and regulations on radiation protection in nuclear power plants.

Safety instructions/warnings All personnel working with this device must be familiar with the safety and warning instructions in this manual and observe the instructions given. Safety instructions and warning signs on the device must be observed to avoid personal injury or property damage.

Qualification of staff Assembly, electrical connection, commissioning, operation, and maintenance must be carried out exclusively by suitably qualified personnel having been authorised by the end user or contractor of the plant only.

Prior to working on this product, the staff must have thoroughly read and understood these instructions and, furthermore, know and observe officially recognised rules regarding occupational health and safety.

Work performed in radiation exposed areas is subject to special regulations which have to be observed. The end user or contractor of the plant are responsible for respect and control of these regulations, standards, and laws.

Commissioning Prior to commissioning, it is important to check that all settings meet the requirements of the application. Incorrect settings might present a danger to the application, e.g. cause damage to the valve or the installation. The manufacturer will not be held liable for any consequential damage. Such risk lies entirely with the user.

Operation Prerequisites for safe and smooth operation:

- Correct transport, proper storage, mounting and installation, as well as careful commissioning.
- Only operate the device if it is in perfect condition while observing these instructions.
- Immediately report any faults and damage and allow for corrective measures.
- Observe recognised rules for occupational health and safety.
- Observe the national regulations.
- During operation, the device warms up and increased surface temperature may occur. To prevent possible burns, we recommend checking the surface temperature using an appropriate thermometer and wearing protective gloves, if required, prior to working on the device.

Protective measures The end user or the contractor are responsible for implementing required protective measures on site, such as enclosures, barriers, or personal protective equipment for the staff.

Maintenance To ensure safe device operation, the maintenance instructions included in this manual must be observed.

Any device modification requires prior consent of the manufacturer.

1.2. Range of application

AUMA part-turn gearboxes are designed for the operation of industrial valves, e.g. butterfly valves and ball valves.

They are qualified for use in nuclear power plants inside and outside containment. However, deviations from the qualified versions may exist for these products. These

deviations have been discussed and agreed between customer and manufacturer (AUMA). Deviating versions are stipulated in the order acknowledgement and may be enquired from AUMA stating the commission number (refer to the name plate). Before using the product, check whether the respective service conditions match those of the contractual version stipulated in the order acknowledgement.

Other applications require explicit (written) confirmation by the manufacturer.

The following applications are not permitted, e.g.:

- Industrial trucks according to EN ISO 3691
- Lifting appliances according to EN 14502
- Passenger lifts according to DIN 15306 and 15309
- Service lifts according to EN 81-1/A1
- Escalators
- Continuous duty

No liability can be assumed for inappropriate or unintended use.

Observance of these operation instructions is considered as part of the device's designated use.

1.3. Warnings and notes

The following warnings draw special attention to safety-relevant procedures in these operation instructions, each marked by the appropriate signal word (DANGER, WARNING, CAUTION, NOTICE).



Indicates an imminently hazardous situation with a high level of risk. Failure to observe this warning could result in death or serious injury.



Indicates a potentially hazardous situation with a medium level of risk. Failure to observe this warning could result in death or serious injury.



Indicates a potentially hazardous situation with a low level of risk. Failure to observe this warning could result in minor or moderate injury. May also be used with property damage.



Potentially hazardous situation. Failure to observe this warning could result in property damage. Is not used for personal injury.

Arrangement and typographic structure of the warnings



Type of hazard and respective source!

Potential consequence(s) in case of non-observance (option)

- Measures to avoid the danger
- Further measure(s)

Safety alert symbol  warns of a potential personal injury hazard.

The signal word (here: DANGER) indicates the level of hazard.

1.4. References and symbols

The following references and symbols are used in these instructions:

Information

The term **Information** preceding the text indicates important notes and information.

 Symbol for CLOSED (valve closed)

 Symbol for OPEN (valve open)

✓ Important information before the next step. This symbol indicates what is required for the next step or what has to be prepared or observed.

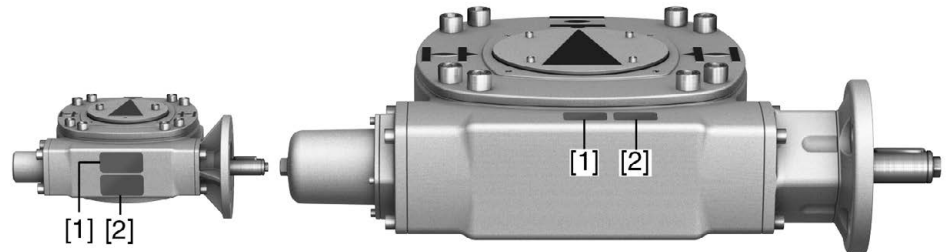
< > **Reference to other sections**

Terms in brackets shown above refer to other sections of the document which provide further information on this topic. These terms are either listed in the index, a heading or in the table of contents and may easily be located.

2. Identification

2.1. Name plate

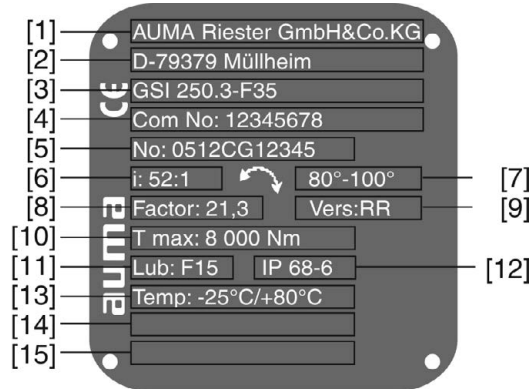
Figure 1: Arrangement of name plates



- [1] Gearbox name plate
- [2] Additional plate, e.g. KKS plate (Power Plant Classification System)

Description of gearbox name plate

Figure 2: Gearbox name plate (example GSI 250.3)



- [1] Name of manufacturer
- [2] Address of manufacturer
- [3] Type and size - valve attachment (flange)
- [4] Commission number
- [5] Gearbox serial number
- [6] Reduction ratio — [7] swing angle
- [8] Factor — [9] version
- [10] Max. output torque (depending on flange size)
- [11] Lubricant type – [12] enclosure protection
- [13] Permissible ambient temperature
- [14] Customer information (option)
- [15] Customer information (option)

Type and size These instructions apply to the following devices types and sizes:

Part-turn gearboxes: GSI 63.3 – GSI 250.3

Primary reduction gearings: VZI 2.3 – VZI 4.3

Primary reduction gearings: GZI 160.3 – GZI 250.3

Commission number An order-relevant commission number (order number) is assigned to each device. This commission number can be used to directly download inspection records and further information regarding the device from the Internet: <http://www.auma.com>. For some details, the customer number might be required.

Gearbox serial number

Table 1: Description of serial number (with example)

05	12	C G 12345	
1 st + 2 nd		position: Assembly in week	
05	In our example: Week 05		
3 rd + 4 th		position: Year of manufacture	
	12	In our example: Year of manufacture: 2012	
All other positions			
		C G 12345	Internal works number for unambiguous product identification

Reduction ratio

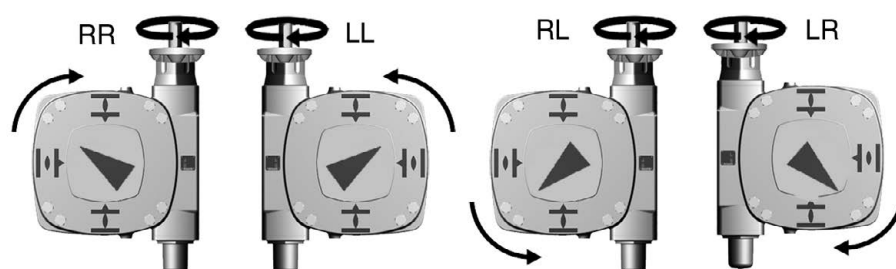
The reduction ratio within the gearing and primary reduction gearing reduces the required input torques and increases the operating time.

Factor

Mechanical gearbox factor to determine the actuator size: Input torque = required output torque/factor

Version

Figure 3: Version (worm shaft position and direction of rotation)



The first letter of the version indicates the **position of the worm shaft** in relation to the worm wheel (view on input shaft).

The second letter indicates the **direction of rotation** of the valve shaft (view on housing cover) for clockwise rotation at the input shaft.

Table 2: Version

Version	Position of worm shaft	Rotation direction of valve shaft
RR	right	clockwise
LL	left	counterclockwise
RL	right	counterclockwise
LR	left	clockwise

2.2. Short description

AUMA worm gearboxes are part-turn gearboxes converting a rotary movement at the input shaft into a part-turn movement at the output drive. The worm gearboxes are driven either via electric motor (by means of a multi-turn actuator) or manually (e.g. via a handwheel). The required input torques are reduced due to high reduction ratios. In standard version, internal end stops limit the swing angle to 100°.

Worm gearboxes are available in different versions to implement various mounting conditions and rotary directions.

3. Transport, storage and packaging

3.1. Transport

For transport to place of installation, use sturdy packaging.

Transport gearbox and actuator separately.

DANGER

Suspended load!

Risk of death or serious injury.

- Do NOT stand below suspended load.
- Attach ropes or hooks for the purpose of lifting by hoist only to housing and NOT to handwheel.
- Check available eyebolt for tight seat in housing (verify reach of the screw).
- Fix ropes or hooks to gearbox using available eyebolts only.
- Respect total weight of combination (gearbox, primary reduction gearing, actuator).

Table 3: Weight with coupling (without bore) and grease filling in the gear housing

Type	Weight [kg]
GSI 63.3	11
GSI 80.3	14
GSI 100.3	34
GSI 100.3 with primary reduction gearing VZI	36
GSI 125.3	44
GSI 125.3 with primary reduction gearing VZI	50
GSI 160.3	80
GSI 160.3 with primary reduction gearing GZI 160.3 (4:1/8:1)	95
GSI 200.3	145
GSI 200.3 with primary reduction gearing GZI 200.3 (4:1/8:1)	171
GSI 250.3	275
GSI 250.3 with primary reduction gearing GZI 250.3 (4:1/8:1)	315

3.2. Storage

NOTICE

Danger of corrosion due to inappropriate storage!

- Store in a well-ventilated, dry room (maximum humidity 70 %).
- 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 uncoated surfaces.

Long-term storage

If the device must be stored for a long period (more than 6 months), the following points must be observed in addition:

1. Prior to storage:
Protect uncoated surfaces, in particular the output drive parts and mounting surface, with long-term corrosion protection agent.
2. At an interval of approx. 6 months:
Check for corrosion. If first signs of corrosion show, apply new corrosion protection.

3.3. Packaging

Our products are protected by special packaging for transport when leaving the factory. The packaging consists of environmentally friendly materials which can easily be separated and recycled. We use the following packaging materials: wood,

cardboard, paper, and PE foil. For the disposal of the packaging material, we recommend recycling and collection centres.

4. Assembly

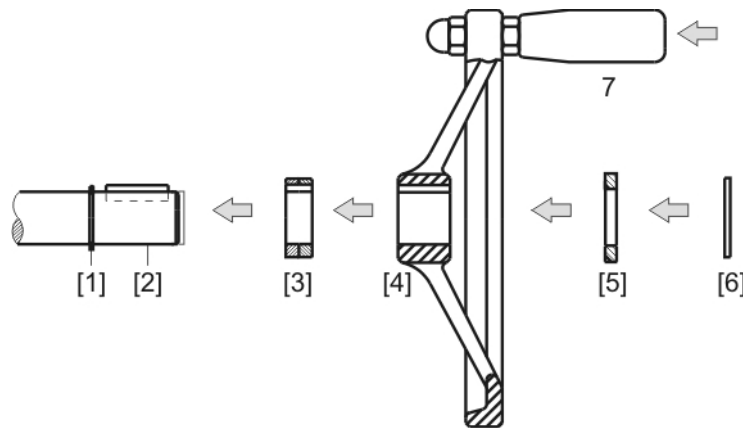
4.1. Mounting position

The gearboxes described here can be operated without restriction in any mounting position.

4.2. Handwheel fitting

Gearboxes designed for manual operation are supplied with a separate handwheel. Fitting is performed on site according to the description below.

Figure 4: Handwheel



- [1] Circlip of gear input shaft
- [2] Gear input shaft
- [3] Spacer (partly required)
- [4] Handwheel
- [5] Spacer (partly required)
- [6] Circlip
- [7] Ball handle (option)

1. Place circlip [1] onto input shaft [2].
2. If required, fit spacer [3].
3. Slip handwheel [4] onto input shaft.
4. If required, fit spacer [5].
5. Secure handwheel [4] using the circlip [6] supplied.
6. Fit ball handle [7] to handwheel.

Information The handwheel (material GJL-200) has not been subjected to any seismic test and is not qualified.

4.3. Multi-turn actuators for motor operation

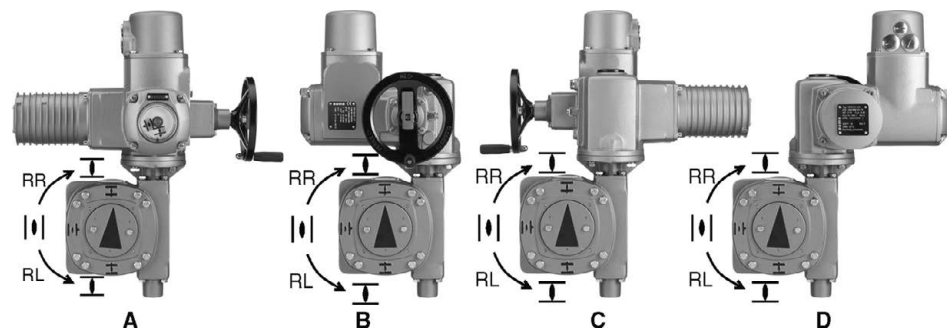
Refer to the operation instructions pertaining to the multi-turn actuator for indications on mounting multi-turn actuators to gearboxes.

This chapter supplies basic information and notes which should be considered in addition to the operation instructions of the multi-turn actuator.

Mounting positions

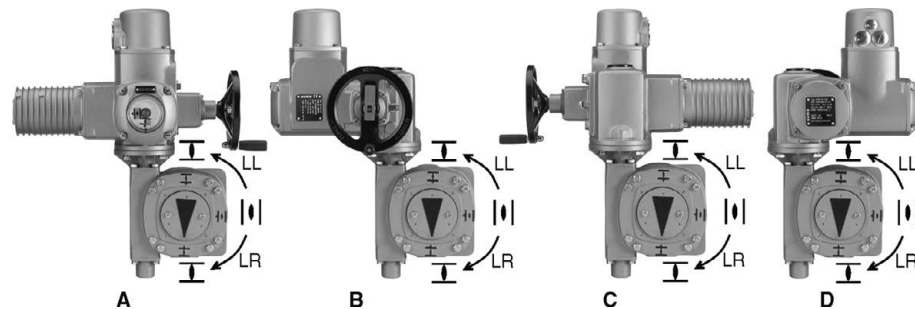
Up to size GSI 125.3, the multi-turn actuator-gearbox combination is delivered in the ordered mounting position. For packing reasons, actuator and gearbox will be delivered separately from size GSI 160.3.

Figure 5: Versions RR and RL



Limitation: For SAN/SARN 14.1/14.5 with GSI 125.3, mounting position “C” in versions RR/RL is only possible for a handwheel diameter up to 315 mm.

Figure 6: Versions LL and LR



Limitation: For SAN/SARN 14.1/14.5 with GSI 125.3, mounting position “A” in versions LL/LR is only possible for a handwheel diameter up to 315 mm.

Flanges

Table 4: Suitable input mounting flanges

Gearing	Primary reduction gearing	Flange for mounting of multi-turn actuator	
		EN ISO 5210	DIN 3210
GSI 63.3	—	F10	G0
GSI 80.3	—	F10	G0
GSI 100.3	—	F10	G0
GSI 100.3	VZI 2.3/3.3/4.3	F10	G0
GSI 125.3	—	F14	G1/2
GSI 125.3	VZI 2.3/3.3/4.3	F10	G0
GSI 160.3	—	F14, F16	G1/2, G3
GSI 160.3	GZI 160.3 (4:1)	F10, F14	G0, G1/2
GSI 160.3	GZI 160.3 (8:1)	F10	G0
GSI 200.3	—	F16, F25	G3
GSI 200.3	GZI 200.3 (4:1)	F14	G1/2
GSI 200.3	GZI 200.3 (8:1)	F10, F14	G0, G1/2
GSI 250.3	—	F25	—
GSI 250.3	GZI 250.3 (4:1/8:1)	F14	G1/2

Screws to actuator

For mounting AUMA multi-turn actuators, screws and lock washers are supplied together with the gearboxes. When mounting other actuators, the screws might be either too long or too short (insufficient reach of screws).



WARNING

Danger of falling actuator due to fracturing when using inappropriate screws!

Risk of death or serious injury.

→ Check length of screws.

The reach of screws must be sufficient for the internal threads to ensure the supporting strength of the device and to accept the lateral forces due to the applied torque.

Screws which are too long could make contact with the housing parts, presenting the risk that the device performs a radial shift with respect to the gearbox. This can lead to shearing off the screws.

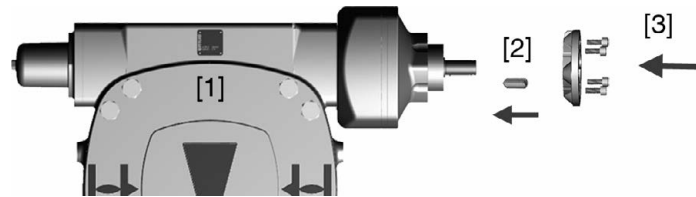
Centre of gravity

Respect the permissible actuator weight and the centre of gravity of the actuator-gearbox combination. Drawings for centre of gravity are available on request. For actuators by other manufacturers, imperatively contact AUMA.

Mount input mounting flange

An input mounting flange is required for mounting a multi-turn actuator. Depending on the version, the flange for mounting the multi-turn actuator is already mounted in the factory.

Figure 7: Mounting input mounting flange to gearbox with primary reduction gearing



- [1] Gearbox with primary reduction gearing
- [2] Parallel pin
- [3] Input mounting flange

1. Clean mounting faces (mounting faces at gearbox bearing flange or at housing cover of primary reduction gearing and at input mounting flange), thoroughly degrease uncoated surfaces.
2. Fit parallel pin [2].
3. Place input mounting flange [3] and fasten with screws/lock washers.
4. Fasten screws crosswise to a torque according to table <Fastening torques for screws>.
5. Mount AUMA actuator in compliance with the operation instructions pertaining to the multi-turn actuator.
6. Fasten screws crosswise to a torque according to table.

Table 5: Fastening torques for screws

(for mounting of multi-turn actuator and input mounting flange)

Screws Threads	Tightening torque T_A [Nm]
	Strength class A2-80
M8	24
M10	48
M12	82
M16	200
M20	392

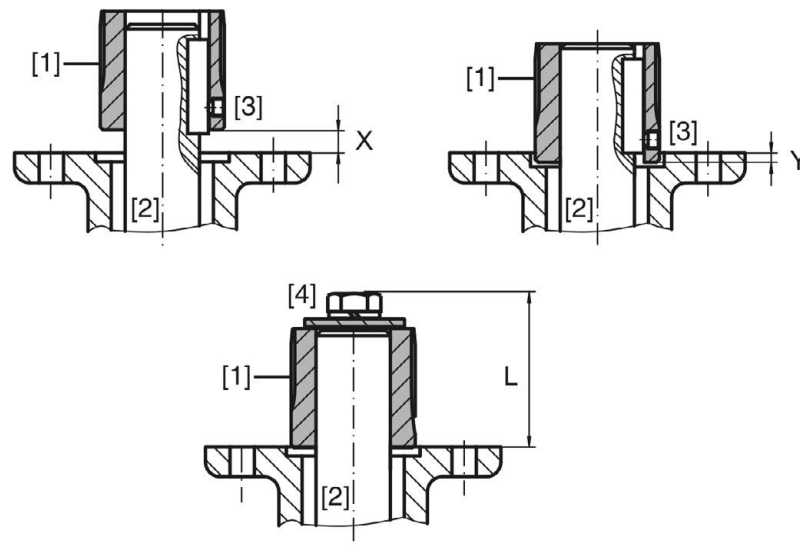
4.4. Mount gearbox to valve

Coupling

For gearbox mounting to the valve, a plug-in coupling is included in the scope of delivery.

When supplied in basic version, the coupling is generally provided with a pilot bore from size 160.3. Prior to mounting the gearbox to the valve, finish machining the coupling to match the valve shaft (e.g. with bore and keyway, two-flats or square bore).

Figure 8: Coupling fitting dimensions



- [1] Coupling
- [2] Valve shaft
- [3] Grub screw
- [4] Screw with washer

Table 6: Coupling fitting dimensions

Type, size - mounting flange	X max [mm]	Y max [mm]	L max [mm]
GSI 63.3-F10	7	18	75
GSI 63.3-F12	10	13	78
GSI 80.3-F12	13	18	80
GSI 80.3-F14	23	5	90
GSI 100.3-F14	22	13	125
GSI 100.3-F16	22	8	125
GSI 125.3-F16	17	35	128
GSI 125.3-F25	17	27	128
GSI 160.3-F25	15	11	133
GSI 160.3-F30	30	0	148
GSI 200.3-F30	19	19	160
GSI 200.3-F35	44	0	190
GSI 250.3-F35	8	8	233
GSI 250.3-F40	13	0	245

⚠ DANGER

Suspended load!

→ For lifting, respect transport instructions.

Information

Mount valve and gearbox in the same end position. As a standard, the gearbox is supplied in end position CLOSED.

- Recommended mounting position for **butterfly valves**: End position CLOSED.
 - Recommended mounting position for **ball valves**: End position OPEN.
1. If required, move gearbox in same end position as valve using the handwheel.
 2. Clean mounting faces, thoroughly degrease uncoated mounting surfaces.
 3. Apply a small quantity of grease to the valve shaft [2].
 4. Place coupling [1] onto valve shaft [2] and secure against axial slipping by using a grub screw [3] or a washer and a screw [4]. Thereby, ensure that dimensions X, Y or L are observed (refer to figure and table <Coupling fitting dimensions>).

5. Apply non-acidic grease at splines of coupling (e.g. Gleitmo by Fuchs).
6. Experience showed that it is very difficult to fasten screws or nuts of M30 or larger with the defined torques. The worm gearbox may be moved radially against the valve flange. To improve adhesion between valve and gearbox, we recommend to apply Loctite 243 (or similar) for screws and nuts from size M30 (or similar adhesive products) to the mounting faces.
7. Fit gearbox. If required, turn gearbox slightly until the toothing of the coupling gets engaged.
Information: Ensure that the spigot (if provided) fits uniformly in the recess and that the flanges are in complete contact.
8. If flange bores do not match thread:
 - 8.1 Slightly rotate handwheel until bores line up.
 - 8.2 If required, shift gearbox position by one tooth on the coupling.
9. Fasten gearbox with screws (strength class min. 8.8).
Information: We recommend applying liquid thread sealing material to the screws to avoid contact corrosion.
10. Fasten screws crosswise to a torque according to table.

Table 7: Tightening torques for screws

Screws Threads	Tightening torque T_A [Nm]		
	Strength class		
	8.8	A2-70/A4-70	A2-80/A4-80
M10	51	36	48
M12	87	61	82
M16	214	150	200
M20	431	294	392
M30	1,489	564	–
M36	2,595	–	–

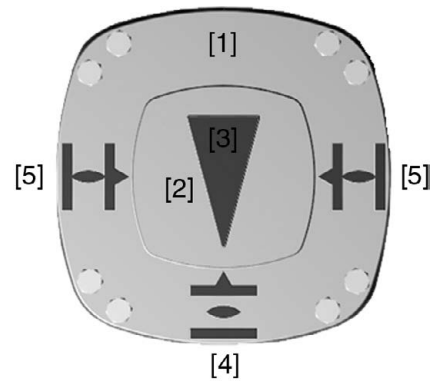
5. Indications

5.1. Mechanical position indicator/running indication

Mechanical position indicator:

- continuously indicates the valve position (pointer cover [2] follows the valve movement)
- indicates whether the actuator is moving (running indication)
- indicates that end positions have been reached (mark on pointer cover [3] points to symbols OPEN [4] or CLOSED [5])

Figure 9: Mechanical position indicator



- [1] Housing cover
- [2] Pointer cover
- [3] Indicator mark
- [4] Symbol for position OPEN
- [5] Symbol for position CLOSED

6. Commissioning

6.1. End stops in gearbox

The internal end stops limit the swing angle and protect the valve against overload. End stop setting is generally performed by the valve manufacturer **prior** to installing the valve into the pipework.



Exposed, rotating parts (discs/balls) at the valve!

Pinching and damage at the valve.

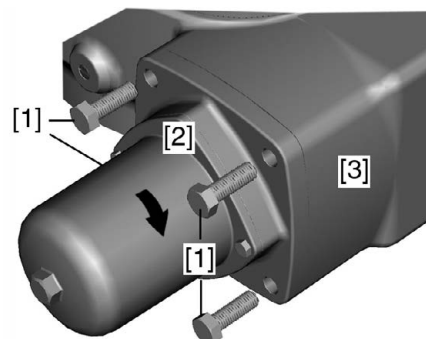
- End stops should be set by suitably qualified personnel only.
- Set end stops as to ensure that they are NOT reached during normal operation.

- Information** The setting sequence depends on the valve:
- Recommendation for **butterfly valves**: Set end stop CLOSED first.
 - Recommendation for **ball valves**: Set end stop OPEN first.

- Information**
- The gearboxes are qualified up to a swing angle of 100°.
 - In general, gearboxes with a swing angle > 190° are multi-turn (without end stops). Consequently, end position setting is not possible. Therefore, no protective function is available for the valve.
 - In general, only one end stop (either OPEN or CLOSED) must be set, due to the fact that the swing angle was already set in the factory.

6.1.1. End stop CLOSED: set

Figure 10: End stop (figure shows size GSI 200.3)



- [1] Screws
- [2] End stop
- [3] Housing

1. Remove the four screws [1] at end stop [2].

NOTICE

No overload protection at valve for unfastened end stop!

- In motor operation: Stop travel before reaching the valve end position (consider overrun).
 - The last part of the travel must be completed in manual operation mode.
2. Turn valve via handwheel to position CLOSED. Check whether end stop [2] rotates simultaneously.
 - Otherwise: Turn end stop [2] **clockwise** to the stop.

3. With mounted multi-turn actuator (not required for manual operation): Turn end stop [2] counterclockwise by 1/4 turn.
 ➔ This ensures that the gearbox end stop cannot be approached during motor operation if a multi-turn actuator is mounted and that the valve can close tightly for torque seating.
4. In case the four holes of the end stop [2] do not match the four threaded bores within the housing [3]: Remove end stop [2] until it disengages from the toothing and replace in correct position.
5. Fasten screws [1] crosswise with a torque according to table <Tightening torques for screws at end stop>.

Table 8: Tightening torques for screws at end stop

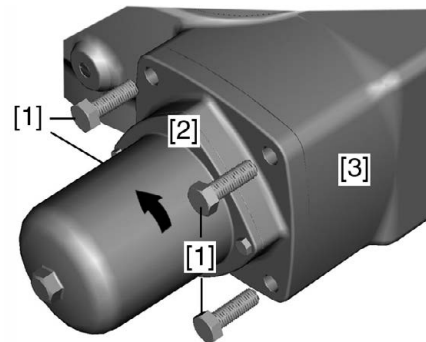
Gearing	Screws [1]	Tightening torque T_A [Nm]
GSI 63.3 – GSI 80.3	M8	24
GSI 100.3 – GSI 125.3	M12	82
GSI 160.3	M10	48
GSI 200.3	M12	82
GSI 250.3	M16	200

Further settings hereafter:

- If the gearbox is equipped with a pointer cover: Check whether the mark aligns with the symbol CLOSED. Refer to <Mechanical position indicator: set>.
- If the gearbox is mounted to a multi-turn actuator, set the seating in end position CLOSED straight after completion of the current setting position: <Seating in end positions via multi-turn actuator>.

6.1.2. End stop OPEN: set

Figure 11: End stop (figure shows size GSI 200.3)



- [1] Screws
 [2] End stop
 [3] Housing

1. Remove the four screws [1] at end stop [2].

NOTICE**No overload protection at valve for unfastened end stop!**

- In motor operation: Stop travel before reaching the valve end position (consider overrun).
- The last part of the travel must be in manual operation mode.

2. Turn valve via handwheel in position OPEN. Check whether end stop [2] rotates simultaneously.
 → Otherwise: Turn end stop [2] **counterclockwise** to the stop.

3. With mounted multi-turn actuator (not required for manual operation): Turn end stop [2] clockwise by 1/4 turn.
➔ This ensures that the gearbox end stop cannot be approached during motor operation if a multi-turn actuator is mounted and that the valve can close tightly for torque seating.
4. In case the four holes of the end stop [2] do not match the four threaded bores within the housing [3]: Remove end stop [2] until it disengages from the toothing and replace in correct position.
5. Fasten screws [1] crosswise with a torque according to table <Tightening torques for screws at end stop>.

Further settings hereafter:

- If the gearbox is equipped with a pointer cover: Check whether the mark aligns with the symbol OPEN. Refer to <Mechanical position indicator: set>.
- If the gearbox is mounted to a multi-turn actuator, set the seating in end position OPEN straight after completion of the current setting position: <Seating in end positions via multi-turn actuator>.

6.2. Seating in end positions via multi-turn actuator

Important information regarding setting:

End position seating must be set in compliance with the operating instructions pertaining to the multi-turn actuator.

This chapter supplies basic information and notes which should be considered in addition to the operation instructions of the multi-turn actuator.

- The valve manufacturer has to determine whether the valve is limit or torque seated.
- For limit seating, determine overrun, i.e. how much does the valve move after the motor has been switched off?
- For torque seating, the maximum permissible input torque of the gearbox must not be exceeded for neither direction. Set the torque switching within the multi-turn actuator to the following value to prevent damage to the valve:
 $T_{\text{torque switch}} = T_{\text{valve}} / \text{factor}$ (refer to name plate)
- If the swing angle set in the factory for opening and closing the valve is not sufficient: refer to <Swing angle>.

6.2.1. Seating in end position CLOSED: set

1. Move valve to end position CLOSED.
Information: The last part of the travel must be in manual operation mode!
2. For **limit** seating in end position CLOSED:
 - 2.1 Turn back the valve from the valve end position by an amount equal to the overrun.
 - 2.2 Set limit switching for the end position CLOSED according to the operation instructions for the multi-turn actuator.

3. For **torque** seating in end position CLOSED:

3.1 Turn handwheel in the opposite direction of the valve end position:

Multi-turn actuator	Gearbox with/without primary reduction gearing	Handwheel turns in the opposite direction
SAN/SARN	without	4 – 6
	with VZI/GZI	10 – 15
SAI/SARI	without	1/4 – 1/2
	with VZI/GZI	1 – 4

3.2 Check torque switching for end position CLOSED according to operation instructions for multi-turn actuator and, if necessary, set to required value.

3.3 Set limit switching for signalling end position CLOSED according to operation instructions for multi-turn actuator.

6.2.2. Seating in end position OPEN: set

1. Move valve to end position OPEN.

Information: The last part of the travel must be in manual operation mode!2. For **limit** seating in end position OPEN:

2.1 Turn back the valve from the valve end position by an amount equal to the overrun.

2.2 Set limit switching for end position OPEN according to the operation instructions for the multi-turn actuator.

3. For **torque** seating in end position OPEN:

3.1 Turn handwheel in the opposite direction of the valve end position:

Multi-turn actuator	Gearbox with/without primary reduction gearing	Handwheel turns in the opposite direction
SAN/SARN	without	4 – 6
	with VZI/GZI	10 – 15
SAI/SARI	without	1/4 – 1/2
	with VZI/GZI	1 – 4

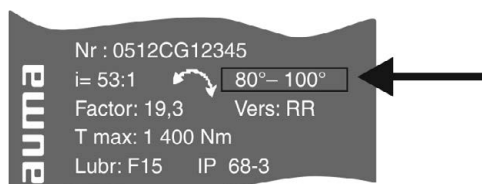
3.2 Check torque switching for end position OPEN according to operation instructions for multi-turn actuator and, if necessary, set to required value.

3.3 Set limit switching for signalling end position OPEN according to operation instructions for multi-turn actuator.

6.3. Swing angle

The swing angle must only be changed if the swivel range for end stop setting is not sufficient.

Figure 12: Name plate indicating the swing angle



In the standard version, the swing angle can be adjusted within the range of 80° to 100°.

Accuracy Sizes GSI 63.3 – GSI 125.3 = 0.6°

Sizes GSI 160.3 – GSI 250.3 = 0.11° to 0.14°

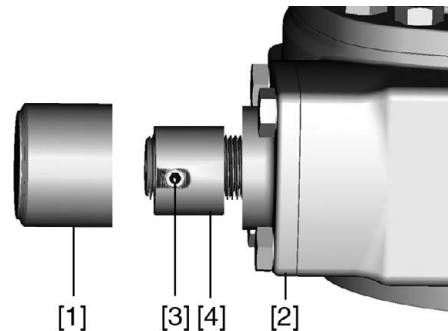
6.3.1. Swing angle: modify at gearboxes up to size 125.3

The adjustment is made in end position OPEN.

Special tools: Pin drive for roll pin

- for GSI 63.3 – GSI 80.3 (AUMA art.-no. V001.367-Pos.002)
- for GSI 100.3 – GSI 125.3 (AUMA art.-no. V001.367-Pos.001)

Figure 13: End stop (figure shows size 80.3)



- [1] Protective cap
- [2] End stop
- [3] Roll pin
- [4] End stop nut

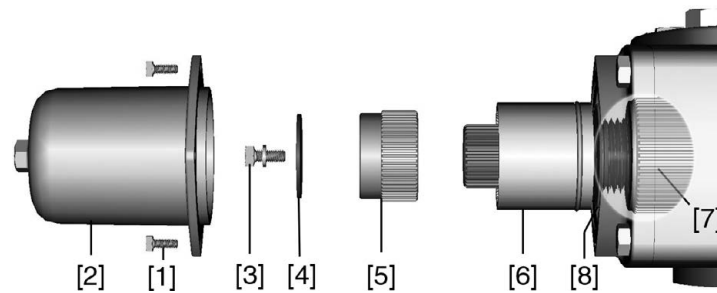
1. Unscrew protective cap [1] at end stop [2].
2. Remove roll pin [3] with suitable pin drive (special tool).
3. **Swing angle increase:**
 - 3.1 Turn end stop nut [4] **counterclockwise**.
Information: When turning back the end stop nut [4] make sure that the roll pin [3] can still be tapped within the oblong hole.
 - 3.2 Move valve manually to the desired end position OPEN.
 - 3.3 Turn end stop nut [4] **clockwise** until it is tight to the travelling nut.
4. **Swing angle reduction:**
 - 4.1 Move valve manually to the desired end position OPEN.
 - 4.2 Turn end stop nut [4] **clockwise** until it is tight to the travelling nut.
Information: Roll pin [3] must remain completely covered by end nut [4].
5. Drive in the roll pin [3] using the appropriate tool.
 - If the slot provided in the end stop nut [4] does not align with the bore of the worm shaft: Turn end stop nut [4] slightly counterclockwise until the hole is aligned; then drive in roll pin [3].
6. Check whether O-ring at protective cap is in good condition, replace if damaged.
7. Fasten protective cap [1].

Information If the gearbox is mounted to a multi-turn actuator, the limit switching for the end position OPEN must be set first in compliance with the operation instructions of the multi-turn actuator. Allow for overrun!

6.3.2. Swing angle: modify at gearboxes from size 160.3

Adjustments are generally made in end position OPEN.

Figure 14: End stop (figure shows size 200.3)

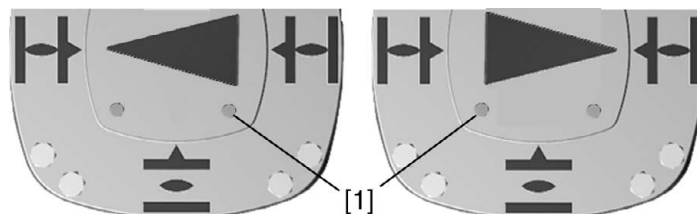


- [1] Screws
 - [2] Protective cap
 - [3] Screw with lock washer
 - [4] Clamping washer
 - [5] Setting ring
 - [6] End stop nut
 - [7] Travelling nut
 - [8] Pair of safety wedge discs (for OPEN and CLOSE)
1. Remove all four screws [1] and pull off protective cap [2].
 2. Remove the screw with the lock washer [3] and clamping washer [4].
 3. Pull off setting ring [5].
 4. **Swing angle increase:**
 - 4.1 Turn end stop nut [6] **counterclockwise**.
 - 4.2 Move valve manually to the desired end position OPEN.
 - 4.3 Turn end stop nut [6] **clockwise** until it is tight to the travelling nut [7].
 5. **Swing angle reduction:**
 - 5.1 Move valve manually to the desired end position OPEN.
 - 5.2 Turn end stop nut [6] **clockwise** until it is tight to the travelling nut [7].
 6. Fit setting ring [5], secure with clamping washer [4], lock washer [5] and screw [3].
 7. Check whether O-ring at protective cap is in good condition, replace if damaged.
 8. Place protective cap [2] and fasten screws [1] crosswise with a torque according to table <Tightening torques for screws at end stop>.

Information If the gearbox is mounted to a multi-turn actuator, the limit switching for the end position OPEN must be set first in compliance with the operation instructions of the multi-turn actuator.

6.4. Mechanical position indicator: set

- End position CLOSED**
1. Move valve to end position CLOSED and check setting.
- ➡ The setting is correct if the mark aligns with the symbol CLOSED.



2. If the mark position is not correct:
 - 2.1 Slightly loosen screws [1] at pointer cover [two screws up to size 125.3, four screws as from size 160.3).
 - 2.2 Turn pointer cover to symbol for position CLOSED [5].
 - 2.3 Fasten screws again.
- End position OPEN** 3. Move valve to end position OPEN and check setting.
 - ➡ The setting is correct if the mark aligns with the symbol OPEN.

7. Servicing and maintenance



Damage caused by inappropriate maintenance!

- Servicing and maintenance must be carried out exclusively by suitably qualified personnel having been authorised by the end user or the contractor of the plant. Therefore, we recommend contacting our service.
- Only perform servicing and maintenance tasks when the device is switched off.

AUMA Service & Support

AUMA offer extensive service such as servicing and maintenance as well as customer product training. For the relevant contact addresses, please refer to <Addresses> in this document or to the Internet (www.auma.com).

7.1. Preventive measures for servicing and safe operation

The following measures are required to ensure safe device operation:

These measures are based on the assumption that the unit is operated on an average less than 10 times per year.

Every 6 months after commissioning and then once a year

- Perform visual inspection for grease leakage and paint damage (corrosion).
- Check fastening screws between actuator and gearbox/valve for tightness. If required, fasten screws while applying the tightening torques as indicated in chapter <Assembly>.
- When rarely operated: Perform test run.

Every 5 years after commissioning

Test gearbox function in detail. Record the results for future reference.

For enclosure protection IP68–D

After continuous immersion:

- Check gearbox.
- In case of ingress of water, locate leaks and repair. Dry device correctly and check for proper function.

7.2. Maintenance intervals

Recommendation for grease change and seal replacement:

- Generally after 6 to 8 years if operated frequently (open-close duty).
- Generally after 10 to 12 years if operated rarely (open-close duty).
- Generally after 4 to 6 years for modulating duty.

NOTICE

Gearing damage due to inappropriate grease!

- Only use original lubricants.
- The lubricant type is marked on the name plate.
- Do not mix lubricants.

Instructions for use in potentially explosive atmospheres of categories M2, 2G, 3G, 2D and 3D

- The technical data as well as the ambient temperatures, type of duty and running times indicated on the name plate must imperatively be observed.
- In hazardous areas where combustible dust is present in particular, perform visual inspection for deposit of dirt or dust on a regular basis. Clean devices if required.
- The pointer cover with indicator glass (option) is only approved for use in potentially explosive atmospheres according to ATEX II2G c IIB T4 or T3.

- When using mechanical microswitches (option), additionally observe the mounting and wiring instructions of the manufacturer.

7.3. Grease change and seal replacement

DANGER

Suspended load!

Risk of death or serious injury.

- Do NOT stand below suspended load.
- Attach ropes or hooks for the purpose of lifting by hoist only to housing and NOT to handwheel.
- Check available eyebolt for tight seat in housing (verify reach of the screw).
- Fix ropes or hooks to gearbox using available eyebolts only.
- Respect total weight of combination (gearbox, primary reduction gearing, actuator).

CAUTION

High pressure, high temperatures, mechanical stress!

Danger of crushing and burns!

- Piping must be free of pressure.
- No mechanical forces must be applied to the valve (discs, levers)

NOTICE

Danger of corrosion due to damage to paint finish!

- Touch up damage to paint finish after work on the device.

Grease change and seal replacement can only be performed if device is dismantled.

Preparations:

1. Detach actuator or handwheel.
2. Mark gearbox position at valve, unfasten screws to valve and dismount the gearbox.

After grease change and seal replacement:

Information: Refer to operation instructions.

3. For manually operated gearboxes: Fit handwheel.
4. For motor-operated gearboxes: Mount multi-turn actuator to gearbox.
5. Mount gearbox to valve.
6. Set end stops in gearbox.
7. Perform test run to ensure the proper function.

7.3.1. Grease change GSI 63.3 – GSI 125.3 (VZI 2.3 – VZI 4.3)

Grease type: Refer to gearbox name plate

Cleaning agent: Petroleum jelly or similar cleaning agent.

Reference documents: Spare parts list Part turn gearboxes GSI 63.3 – GSI 125.3

Spare parts: seal kit S1 (order indicating commission number)

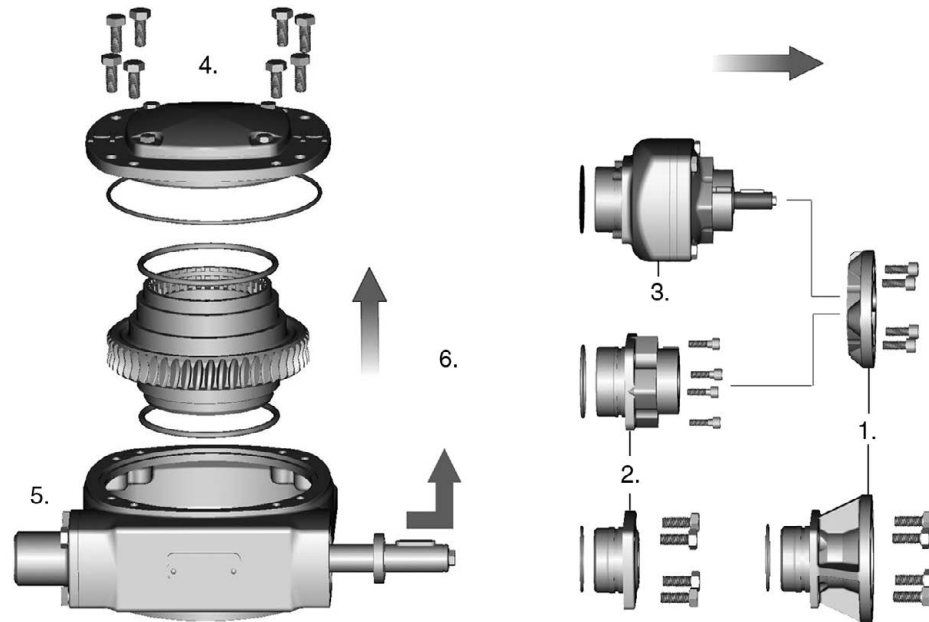
Table 9: Grease quantities for gearboxes (grease with density $r = 0.9 \text{ kg/dm}^3$)

GSI	63.3	80.3	100.3	125.3
Quantity [kg]	0.27	0.36	0.9	1.17

Table 10: Grease quantities for primary reduction gearings VZI (grease with density $r = 0.9 \text{ kg/dm}^3$)

VZI	2.3	3.3	4.3
Quantity [kg]	0.32	0.32	0.32

Figure 15: Working steps for grease change at GSI 63.3 – GSI 125.3



- | | |
|--------------------------------------|---|
| Input mounting flange | 1. If an input mounting flange [512.0] is mounted: Remove screws at input mounting flange [512.0] and remove input mounting flange [512.0]. |
| Bearing cover | 2. If a bearing cover [522.0] is mounted: Remove screws at bearing cover [522.0] and bearing cover [522.0]. (For sizes GSI 100.3 – GSI 125.3, the bearing cover is removed including the drive shaft [538.0].) |
| Primary reduction gearing VZI | 3. If a primary reduction gearing VZI is mounted: <ul style="list-style-type: none"> 3.1 Remove screws at housing cover VZI [020.0] and remove housing cover VZI [020.0] including the drive shaft VZI [021.0]. 3.2 Take off VZI internal geared wheel VZI [045.0] as well as planet carrier [022.0]. 3.3 Completely remove old grease from the housing and the individual parts and clean the primary reduction gearing. 3.4 Remove screws at housing VZI [019.0] and detach housing VZI [019.0]. |
| Housing cover | 4. Remove screws at housing cover [518.0] and detach housing cover [518.0]. |
| End stop | 5. Dismantle end stop: <ul style="list-style-type: none"> 5.1 Unfasten protective cap [536.0]. 5.2 Remove screws at end stop [523.0] and take off end stop [523.0]. |
| Worm shaft/worm wheel | 6. Dismantle and clean both worm shaft [520.0] and worm wheel [519.1]: <ul style="list-style-type: none"> 6.1 Carefully lift worm wheel [519.1] out of housing. For this, pull out worm shaft [520.0] from bearings and slightly incline the wheel within the worm channel. 6.2 Completely remove old grease from housing and gear housing and clean all individual parts. 6.3 Replace used O-rings [S1(010)] at worm wheel [519.1] with new O-rings. 6.4 Carefully fit worm wheel [519.1] and correctly position worm shaft [520.0]. |

- End stop** 7. Fit end stop:
- 7.1 Clean all mounting faces (gearbox housing, end stop and protective cap).
- 7.2 Fit end stop [523.0] with new O-ring and and fasten with screws.
- 7.3 Fasten protective cap [536.0] with new O-ring.
8. Fill gear housing with new grease.
- Housing cover** 9. Mount housing cover [518.0]:
- 9.1 Clean mounting faces at housing and housing cover [518.0].
- 9.2 Replace used O-ring [S1(012)] at housing cover [518.0] with a new O-ring.
- 9.3 Fit housing cover [518.0] and fasten with screws according to table.

Table 11: Tightening torques for screws of housing cover

Type Size	Screws Threads	Tightening torque T_A [Nm]
		Strength class A2-80
GSI 63.3	M6	10
GSI 80.3	M8	25
GSI 100.3	M10	50
GSI 125.3	M12	85

- Primary reduction gear-
ing VZI** 10. For gearboxes with a primary reduction gearing VZI:
- 10.1 Clean all mounting surfaces (gearbox housing, housing VZI [019.0], hollow shaft VZI [045.0] and housing cover VZI [020.0].
- 10.2 Replace all used sealing elements S1 with new seals.
- 10.3 Place housing VZI [019.0] and fasten with screws.
- 10.4 Insert planet carrier [022.0].
- 10.5 Fill with new grease.
- 10.6 Place VZI internal geared wheel [045.0].
- 10.7 Fit housing cover VZI [020.0] with drive shaft [021.1] and fasten with screws.
11. For gearboxes without primary reduction gearings VZI: Fit bearing cover [522.0] and fasten with screws.
12. If a mounting flange is required for actuator installation: Place input mounting flange [512.0] and fasten with screws.

7.3.2. Grease change GSI 160.3 – GSI 250.3 (GZI 160.3 – GZI 250.3)

Grease type: Refer to gearbox name plate

Cleaning agent: Petroleum jelly or similar cleaning agent.

Reference documents:

- Spare parts list Part turn gearboxes GSI 160.3 – GSI 250.3
- Spare parts list Primary reduction gearings GZI 160.3 – GZI 250.3

Spare parts: seal kit S1 (order indicating commission number)

Special tools: Lock nut key

- for GSI 160.3 (AUMA art. no. V001.570-Pos.001)
- for GSI 200.3 (AUMA art. no. V001.570-Pos.002)
- for GSI 250.3 (AUMA art. no. V001.570-Pos.003)

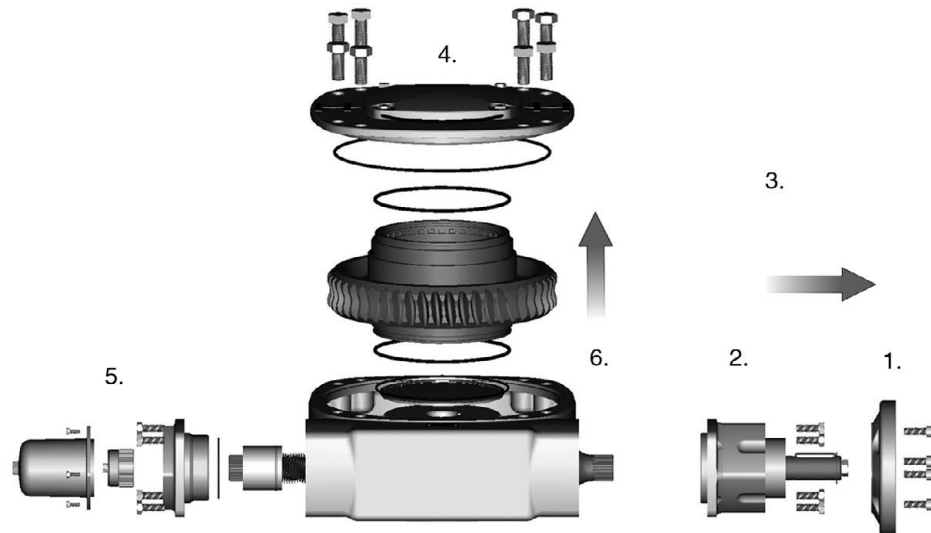
Table 12: Grease quantities for gearboxes (grease with density $r = 0.9 \text{ kg/dm}^3$)

GSI	160.3	200.3	250.3
Quantity [kg]	3.0	6.0	11.0

Table 13: Grease quantities for primary reduction gearings GZI (grease with density $r = 0.9 \text{ kg/dm}^3$)

GZI	160.3	200.3	250.3
Quantity [kg]	0.9	1.4	2.0

Figure 16: Working steps for grease change on GSI 160.3 – GSI 250.3



- | | |
|--------------------------------------|---|
| Input mounting flange | 1. If an input mounting flange [512.0] is mounted: Remove screws at input mounting flange [512.0] and detach input mounting flange [512.0]. |
| Bearing cover | 2. If a bearing cover [522.0] is mounted: Remove screws at bearing cover [522.0] and pull of bearing with drive shaft [534.0]. |
| Primary reduction gearing GZI | 3. If a primary reduction gearing GZI is mounted, remove primary reduction gearing.
3.1 Remove screws at housing cover GZI [002.0] and remove housing cover GZI [002.0] including the drive shaft GZI [534.0].
3.2 Remove planetary gearings [006.0/007.0/008.0].
3.3 Completely remove old grease from the housing and the individual parts and clean the primary reduction gearing.
3.4 Remove screws at housing GZI [001.0] and detach housing GZI [001.0]. |
| Housing cover | 4. Remove screws at housing cover [518.0] and detach housing cover [518.0]. |
| End stop | 5. Dismantle end stop:
5.1 Remove all four screws and lift protective cap [536.0].
5.2 Remove screws at end stop [523.0] and take off end stop [523.0]. |
| Worm shaft/worm wheel | 6. Dismantle and clean both worm shaft [520.0] and worm wheel [519.1]:
6.1 Loosen grub screw and unfasten lock nut [537.0] using the lock nut key.
6.2 Carefully lift worm wheel [519.1] out of housing. For this, pull out worm shaft [520.0] from bearings and slightly incline the wheel within the worm channel.
6.3 Completely remove old grease from housing and gear housing and clean all individual parts.
6.4 Replace used O-rings [S1(010)] at worm wheel [519.1] with new O-rings.
6.5 Carefully fit worm wheel [519.1] and correctly position worm shaft [520.0].
6.6 Screw in lock nut [537.0] using the lock nut key and secure with grub screw. |

- End stop** 7. Fitting end stop:
- 7.1 Clean all mounting faces (gearbox housing, end stop and protective cap).
- 7.2 Fit end stop [523.0] with new O-ring and and fasten with screws.
- 7.3 Place protective cap [536.0] fitted with new O-ring and fasten the screws.
8. Fill gear housing with new grease.
- Housing cover** 9. Mount housing cover [518.0]:
- 9.1 Clean mounting faces at housing and housing cover [518.0].
- 9.2 Replace used O-ring [S1(012)] at housing cover [518.0] with a new O-ring.
- 9.3 Fit housing cover [518.0] and fasten with screws according to table.

Table 14: Tightening torques for screws of housing cover

Type Size	Screws Threads	Tightening torque T_A [Nm]
		Strength class A2-80
GSI 160.3	M16	210
GSI 200.3	M20	425
GSI 250.3	M24	730

- Primary reduction gear-
ing GZI** 10. For gearboxes equipped with primary reduction gearings GZI, mount primary reduction gearing.
- 10.1 Clean all mounting surfaces (gearbox housing, housing GZI [001.0], internal geared wheel of planetary gearing [006.0/007.0/008.0] and housing cover GZI [002.0].
- 10.2 Replace all used sealing elements S1 with new seals.
- 10.3 Place housing GZI [001.0] and fasten with screws.
- 10.4 Fill housing GZI [001.0] with new grease.
- 10.5 Insert planetary gearings [006.0/007.0/008.0] and apply grease.
- 10.6 Fit housing cover GZI [002.0] with drive shaft [534.0] and fasten with screws.
11. For gearboxes without primary reduction gearings GZI: Fit bearing cover [522.0] with drive shaft [534.0] and fasten with screws.
12. If a mounting flange is required for actuator installation: Place input mounting flange [512.0] and fasten with screws.

7.4. Disposal and recycling

Our devices have a long lifetime. However, they have to be replaced at one point in time. The devices have a modular design and may, therefore, easily be separated and sorted according to materials used, i.e.:

- electronic scrap
- various metals
- plastics
- greases and oils

The following generally applies:

- Greases and oils 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.

8. Technical data

Information The following technical data includes standard and optional features. For detailed information on the customer-specific version, refer to the order-relevant data sheet. This data sheet can be downloaded from the Internet at <http://www.auma.com> in German and English (indication of commission number required).

8.1. Features and functions

Version	Standard: clockwise rotation RR, counterclockwise rotation LL Option: RL or LR
Housing material	Standard: GJS-400-15
Self-locking	The gearboxes are self-locking when at standstill under normal service conditions; strong vibration may cancel the self-locking effect. While in motion, safe breaking is not guaranteed. If this is required, a separate brake must be used.
Output torques	Maximum output torques for IEEE ¹⁾ : • GSI 63.3 = 500 Nm • GSI 80.3 = 1,000 Nm • GSI 100.3 = 2,000 Nm • GSI 125.3 = 4,000 Nm • GSI 160.3 = 8,000 Nm • GSI 200.3 = 16,000 Nm • GSI 250.3 = 24,000 Nm Variations according to KTA 3504 • GSI 125.3 with VZI 3.3 = 3,000 Nm • GSI 125.3 with VZI 4.3 = 2,400 Nm • GSI 160.3 (without primary reduction gearing) = 6,345 Nm • GSI 160.3 with GZI 160.3 (4:1) = 6,800 Nm • GSI 160.3 with GZI 160.3 (8:1) = 5,500 Nm • GSI 200.3 (without primary reduction gearing) = 13,105 Nm • GSI 250.3 (without primary reduction gearing) = 23,400 Nm • GSI 250.3 with GZI 250.3 (4:1) = 22,020 Nm • GSI 250.3 with GZI 250.3 (8:1) = 23,300 Nm For more specific details regarding the output torques, refer to separate technical data sheet.
End stops	Positive for both end positions by travelling nut, sensitive adjustment
Strength of end stop	Guaranteed strength of end stop (in Nm) for input side operation • GSI 63.3 = 450 Nm • GSI 80.3 = 450 Nm • GSI 100.3 with VZI 2.3/3.3 = 500 Nm • GSI 100.3 with VZI 4.3 = 250 Nm • GSI 125.3 with VZI 2.3/3.3 = 500 Nm • GSI 125.3 with VZI 4.3 = 250 Nm • GSI 160.3 with GZI 160.3 (4:1) = 500 Nm • GSI 160.3 with GZI 160.3 (8:1) = 450 Nm • GSI 200.3 with GZI 200.3 (4:1/8:1) = 500 Nm • GSI 250.3 with GZI 250.3 (4:1/8:1) = 500 Nm
Swing angle GSI 63.3 – GSI 125.3	Standard: Adjustable in end position OPEN in steps of 80° – 100° Options: Adjustable in end position OPEN in steps of: 10° – 35°, 35° – 60°, 60° – 80°
Swing angle GSI 160.3 – GSI 250.3	Standard: Adjustable in end position OPEN in steps of 80° – 100° Options: Adjustable in end position OPEN in steps of: 0° – 20°, 20° – 40°, 40° – 60°, 60° – 80°
Mechanical position indicator	Standard: Sealed pointer cover for continuous position indication

Input shaft	Cylindrical with parallel key according to DIN 6885.1
-------------	---

1) Maximum output torques according to IEEE are valid for gearboxes with and without primary reduction gearings GZI/VZI

Operation	
Motor operation	With electric multi-turn actuator, directly or through primary reduction gearing
Type of duty	Short-time duty S2 - 15 min (open-close duty) Intermittent duty S4 - 25 % (modulating duty), not in version according to KTA
Manual operation	Via handwheel in material GJL-200 (not qualified), directly or through primary reduction gearing VZI/GZI. Available handwheel diameters, selection according to the max. output torque: - GSI 63.3 = 200 mm - GSI 80.3 = 315 mm - GSI 100.3 = 400 mm - GSI 100.3 with VZI 2.3 = 315 mm - GSI 100.3 with VZI 3.3/4.3 = 200 mm - GSI 125.3 = 500 mm - GSI 125.3 with VZI 2.3/3.3 = 400 mm - GSI 125.3 with VZI 4.3 = 315 mm - GSI 160.3 = 800 mm - GSI 160.3 with GZI 160.3 (4:1) = 500 mm, (8:1) = 315 mm - GSI 200.3 with GZI 200.3 (4:1) = 500 mm, (8:1) = 400 mm - GSI 250.3 with GZI 250.3 (4:1) = 800 mm, (8:1) = 500 mm

Primary reduction gearing	
Primary reduction gearing	Types VZI and GZI as planetary gears with various reduction ratios for reducing input torques

Valve attachment	
Valve attachment	Dimensions according to EN ISO 5211 Standard: - GSI 63.3 – GSI 125.3: without spigot - GSI 160.3 – GSI 250.3: with spigot Options: - GSI 63.3 – GSI 125.3: with spigot - GSI 160.3 – GSI 250.3: without spigot
Coupling	Splined coupling for connection to the valve shaft Standard: Without bore or pilot bore from GSI 160.3 Options: Finish machining with grub screw to secure on valve shaft - with bore and keyway - with square bore - with two-flats

8.2. Service conditions

Mounting position	Any position
Enclosure protection according to EN 60529	Refer to name plate Standard: IP68-6-D, dust-tight, continuous immersion in water up to 6 m head of water and sealed pointer cover. Type-tested with 5.0 bar overpressure (with air)
Corrosion protection	KI, aluminium-free version in combination with multi-turn actuator SA(R)I (inside containment) and in combination with multi-turn actuator SA(R)N (outside containment)
Paint	Decontaminable
Colour	Standard: Silver-grey (RAL 7001) if finish painting is applied Option: Other colours on request

Ambient temperature	Refer to name plate Standard: –25 °C to +80 °C Under DBE conditions up to + 185 °C for a short period
Lifetime according to IEEE 382	Open-close duty: 5,000 operating cycles (OPEN-CLOSE-OPEN) according to IEEE 382 For the entire lifetime, 50% of the nominal torque was operated for 80° and 120% of the nominal torque for the residual angle of 10°. For larger swing angles, the lifetime is reduced accordingly by the factor "set swing angle divided by 90°". Modulating duty: ¹⁾ min. 2.5 million operations For the entire lifetime, modulating steps of approx. 1° were operated within a range of 20° – 60° at the max. modulating torque at the output shaft.
Lifetime according to KTA 3504	Operating cycles (OPEN- CLOSE -OPEN) according to KTA 3504-11/06; strength calculation GSI 63.3 – GSI 125.3: 5,000 GSI 200.3/GZI 200.3: 3,750 GSI 160.3/GZI 160.3: 5,000 GSI 250.3/GZI 250.3: 5,000 For the entire lifetime, 50% of the nominal torque was operated for 80° and 120% of the nominal torque for the residual angle of 10°. For larger swing angles, the lifetime is reduced accordingly by the factor "set swing angle divided by 90°".
Vibration tests in combination with respective multi-turn actuator	Induced vibrations: 5 – 200 – 5 Hz; 0.75 g/2 octaves per minute/21 cycles per axis Earthquake according to OBE (Operating Basis Earthquake): 2 -35 -2 Hz; 3 g/1 octave per minute/2 cycles per axis Earthquake according to SSE (Safe Shutdown Earthquake): 2 – 35 – 2 Hz; 4,5 g/½ octave/5 sine beats with 4 load cycles per test frequency and axis Airplane crash: 5 – 100 Hz; 5 g/½ octave/1 sine beat with 4 load cycles per test frequency and axis

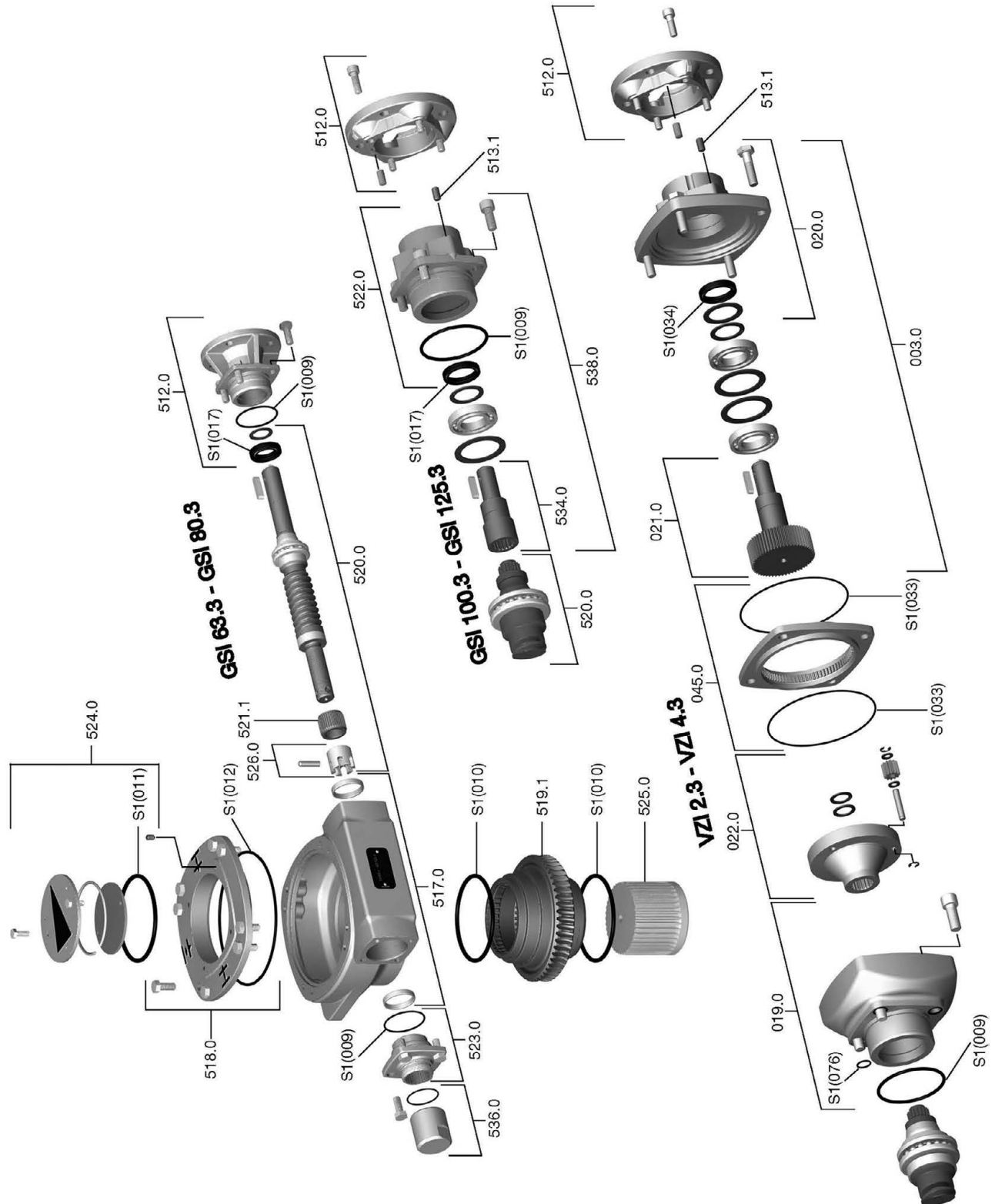
- 1) The lifetime depends on the load and the number of starts. A high starting frequency will rarely improve the modulating accuracy. To reach the longest possible maintenance and fault-free operating time, the number of starts per hour chosen should be as low as permissible for the process.

8.3. Further information

EU Directives	Machinery Directive: (2006/42/EC)
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9. Spare parts

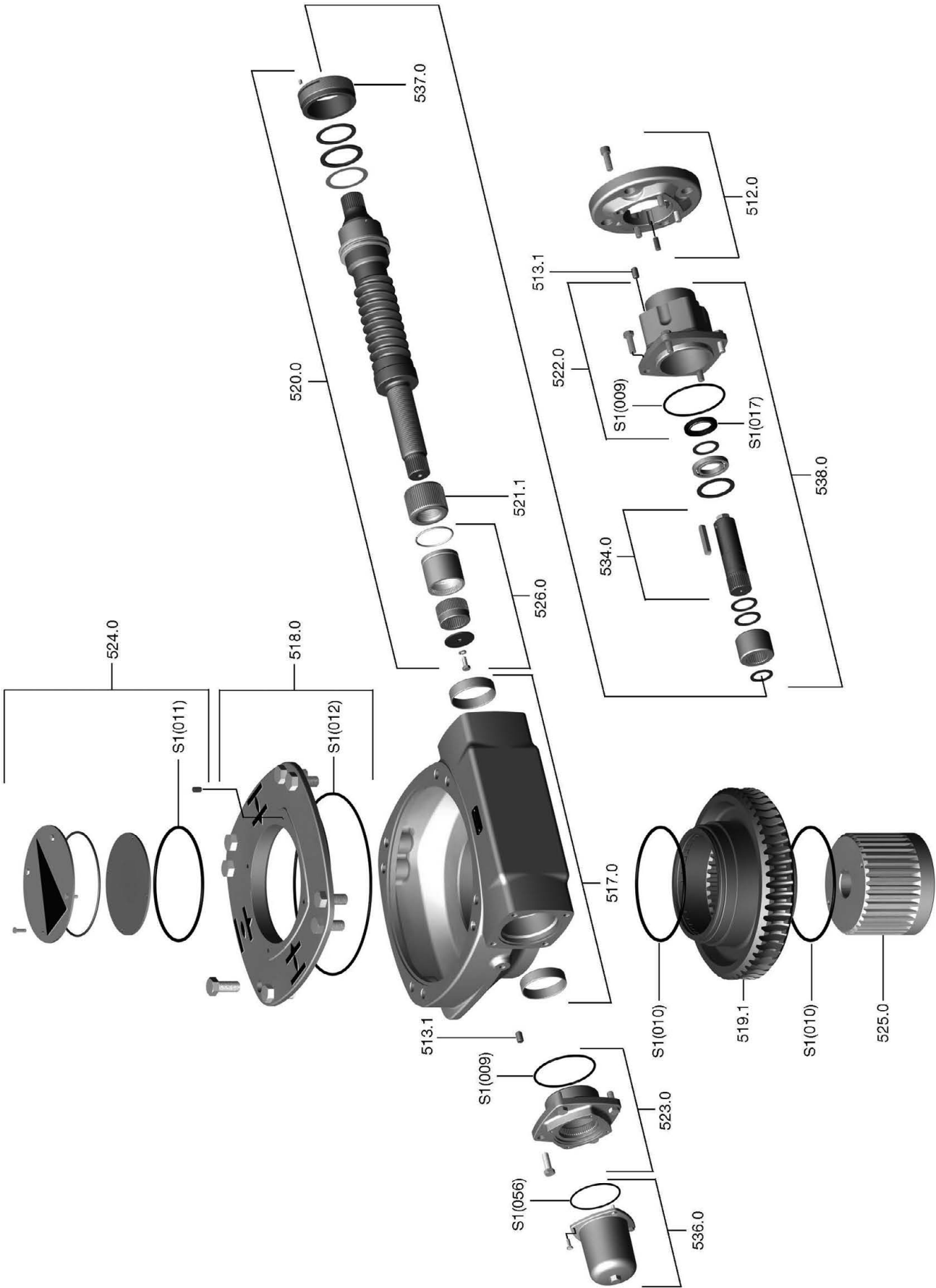
9.1. Part-turn gearboxes GSI 63.3 – GSI 125.3 and primary reduction gearings VZI 2.3 – VZI 4.3



Information: Please state type and commission no. of the device (see name plate) when ordering spare parts. Only original AUMA spare parts should be used. Failure to use original spare parts voids the warranty and exempts AUMA from any liability. Delivered spare parts may slightly vary from the representation in these instructions.

No.	Designation	Type
003.0	Housing cover with drive shaft VZI	Sub-assembly
019.0	Housing VZI	Sub-assembly
020.0	Housing cover VZI	Sub-assembly
021.0	Drive shaft VZI	Sub-assembly
022.0	Planet carrier VZI	Sub-assembly
045.0	Internal geared wheel VZI	Sub-assembly
512.0	Input mounting flange	Sub-assembly
513.1	Grub screw	
517.0	Housing	Sub-assembly
518.0	Housing cover	Sub-assembly
519.1	Worm wheel	
520.0	Worm shaft	Sub-assembly
521.1	Travelling nut	
522.0	Bearing cover	Sub-assembly
523.0	End stop	Sub-assembly
524.0	Pointer cover	Sub-assembly
525.0	Coupling	Sub-assembly
526.0	End stop nut	Sub-assembly
534.0	Drive shaft	Sub-assembly
536.0	Protective cap	
538.0	Bearing cover with drive shaft	Sub-assembly
S1	Seal kit	Set

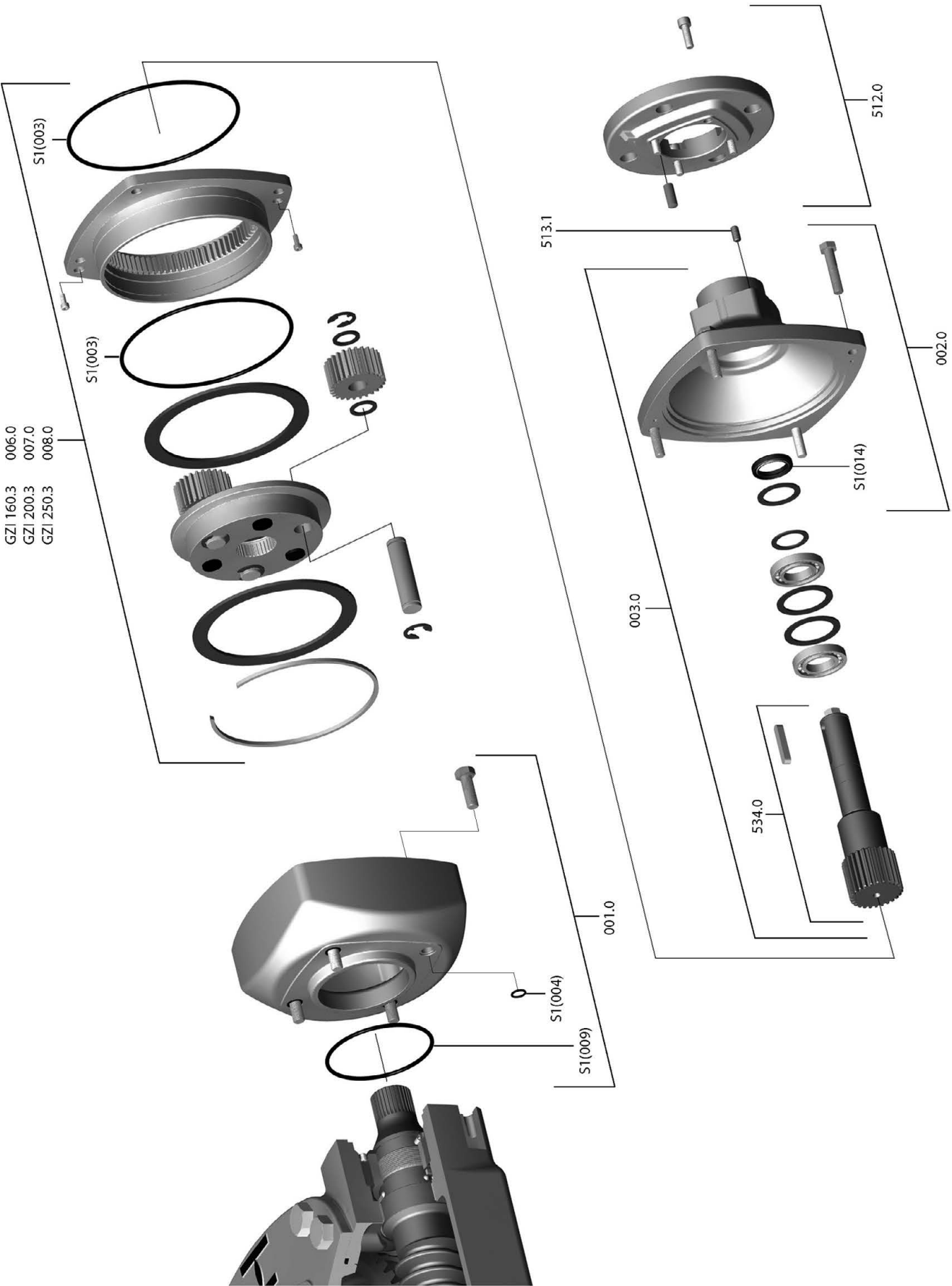
9.2. Part-turn gearboxes GSI 160.3 – GSI 250.3



Information: Please state type and commission no. of the device (see name plate) when ordering spare parts. Only original AUMA spare parts should be used. Failure to use original spare parts voids the warranty and exempts AUMA from any liability. Delivered spare parts may slightly vary from the representation in these instructions.

No.	Designation	Type
512.0	Input mounting flange	Sub-assembly
513.1	Grub screw	
517.0	Housing	Sub-assembly
518.0	Housing cover	Sub-assembly
519.1	Worm wheel	
520.0	Worm shaft	Sub-assembly
521.1	Travelling nut	
522.0	Bearing cover	Sub-assembly
523.0	End stop	Sub-assembly
524.0	Pointer cover	Sub-assembly
525.0	Coupling	Sub-assembly
526.0	End stop nut	Sub-assembly
534.0	Drive shaft	Sub-assembly
536.0	Protective cap	Sub-assembly
537.0	Lock nut	Sub-assembly
538.0	Bearing cover with drive shaft	Sub-assembly
S1	Seal kit	Set

9.3. Primary reduction gearings GZI 160.3 – GZI 250.3



Information: Please state type and commission no. of the device (see name plate) when ordering spare parts. Only original AUMA spare parts should be used. Failure to use original spare parts voids the warranty and exempts AUMA from any liability. Delivered spare parts may slightly vary from the representation in these instructions.

No.	Designation	Type
001.0	Housing	Sub-assembly
002.0	Housing cover	Sub-assembly
003.0	Housing cover with drive shaft	Sub-assembly
006.0	Planetary gearing, first stage (GZI 160.3)	Sub-assembly
007.0	Planetary gearing, first stage (GZI 200.3)	Sub-assembly
008.0	Planetary gearing, first stage (GZI 250.3)	Sub-assembly
512.0	Flange for actuator	Sub-assembly
513.1	Grub screw	
534.0	Drive shaft	Sub-assembly
S1	Seal kit	Set

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