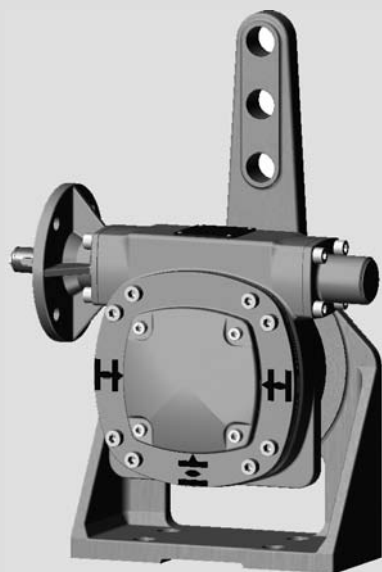




Lever gearboxes
GF 50.3 – GF 250.3



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 EC 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.

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 potentially explosive atmospheres 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.
- During operation, the lever moves by the set angular range. Ensure that neither persons nor objects enter the swivel range of the lever or of connected, movable parts.

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 lever gearboxes are designed for the operation of industrial valves via lever arrangements, e.g. dampers.

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
- Radiation exposed areas in nuclear power plants

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 may result in minor or moderate injury. May also be used with property damage.



Potentially hazardous situation. Failure to observe this warning may 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.

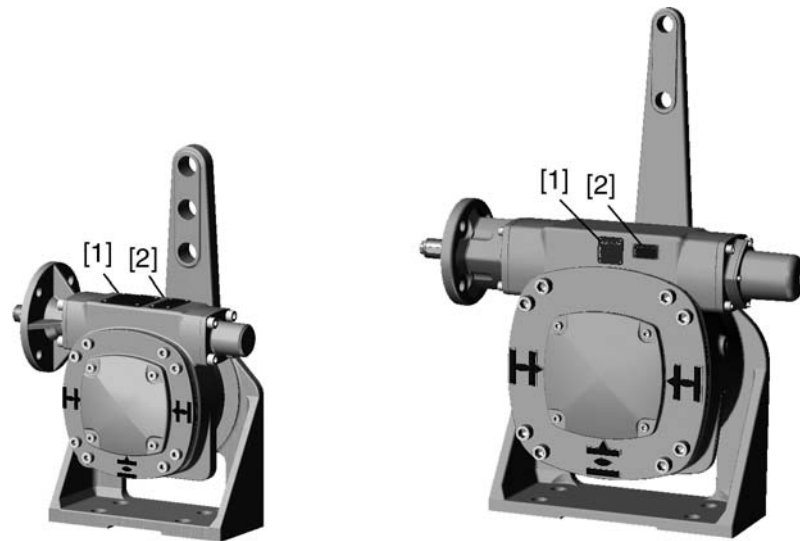
< > Reference to other sections

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 quickly be found.

2. Identification

2.1. Name plate

Figure1: Arrangement of name plates

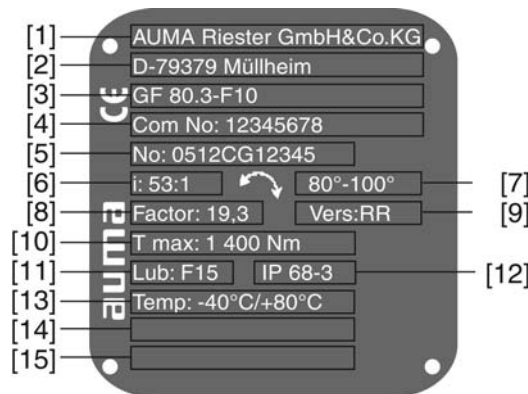


left: for GF 50.3/63.3, right: for GF 80.3 – GF 250.3

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

Description of gearbox name plate

Figure2: Gearbox name plate (example of GF 80.3)



- [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] Explosion-proof version (option)
- [15] Can be assigned as an option upon customer request

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

Lever gearboxes: GF 50.3, 63.3, 80.3, 100.3, 125.3, 160.3, 200.3, 250.3

Primary reduction gears: VZ 2.3, 3.3, 4.3
 Primary reduction gears: GZ 160.3, 200.3, 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.

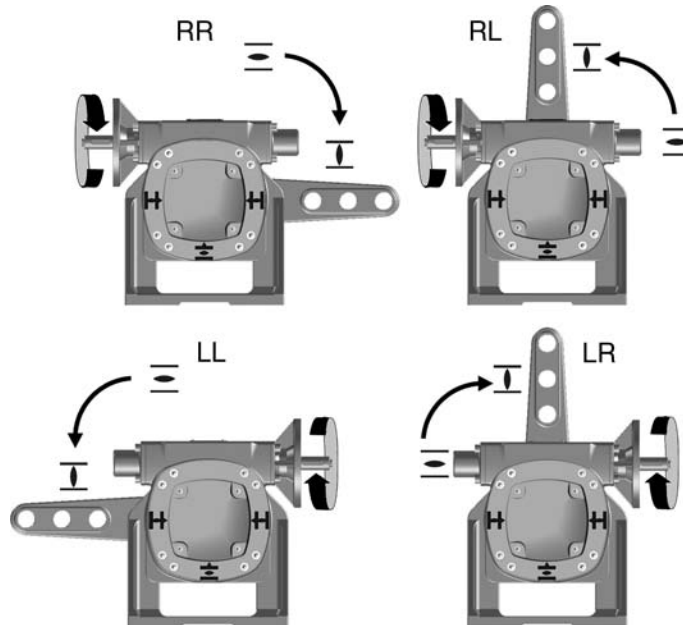
Gearbox series number Table 1: Description of series number (with example)

05	12	C G 12345	
1st + 2nd position: Assembly in week			
05	In our example: Week 05		
3rd + 4th 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 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 Figure3: 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 protective cover) for clockwise rotation at the input shaft.

Table 2: Version (with view on protective cover)

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

Explosion-proof version (option)

For larger sizes (GF 80.3 – GF 250.3), explosion-proof version is directly indicated on the gearbox name plate. For smaller sizes GF 50.3 and GF 63.3, explosion-proof version is indicated on a separate name plate.

Figure4: Separate name plate for explosion-proof version (example)



[1] Ex symbol. CE mark, number of test authority

Classification:

- [2] Gas explosion protection
- [3] Dust explosion protection

2.2. Short description

AUMA lever gearboxes are based on the proven AUMA GS worm gearbox type range. Installation of base and lever converts a worm gearbox into a lever gearbox.

3. Transport, storage and packaging

3.1. Transport

For transport to place of installation, use sturdy packaging.

Transport gearbox and actuator separately.

DANGER

Hovering load!

Risk of death or serious injury.

- Do NOT stand below hovering 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]
GF 50.3	10
GF 63.3	23
GF 80.3	29
GF 100.3	58
GF 100.3 with VZ primary reduction gearing	64
GF 125.3	89
GF 125.3 with VZ primary reduction gearing	95
GF 160.3	139
GF 160.3 with primary reduction gearing GZ 160.3 (4:1)	150
GF 200.3	258
GF 200.3 with primary reduction gearing GZ 200.3 (4:1/8:1)	278
GF 200.3 with primary reduction gearing GZ 200.3 (16:1)	288
GF 250.3	467
GF 250.3 with primary reduction gearing GZ 250.3 (4:1/8:1)	490
GF 250.3 with primary reduction gearing GZ 250.3 (16:1)	502

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

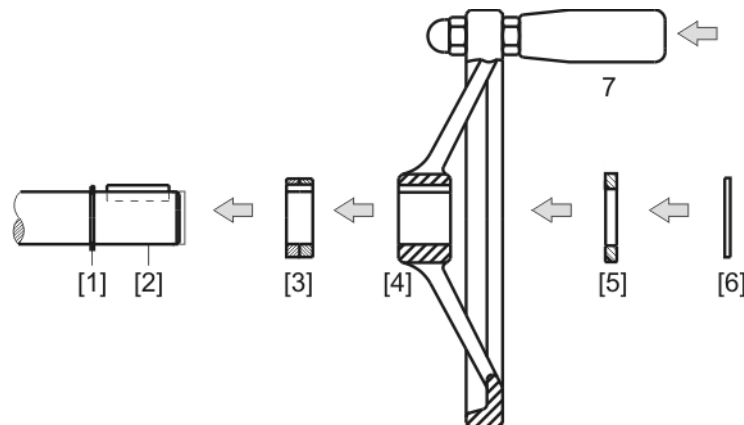
4.1. Mounting position

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.

Figure5: 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.

4.3. Multi-turn actuator: mount

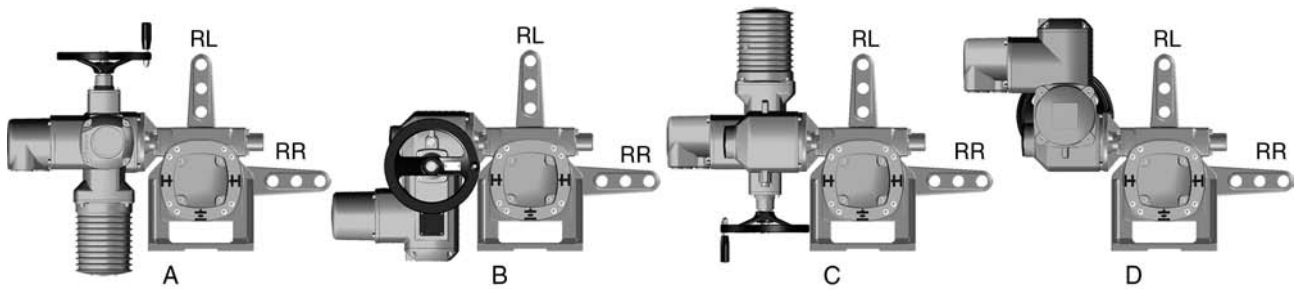
Refer to the operation instructions pertaining to the multi-turn actuator for indications on how to mount multi-turn actuators to gearboxes.

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

Mounting positions

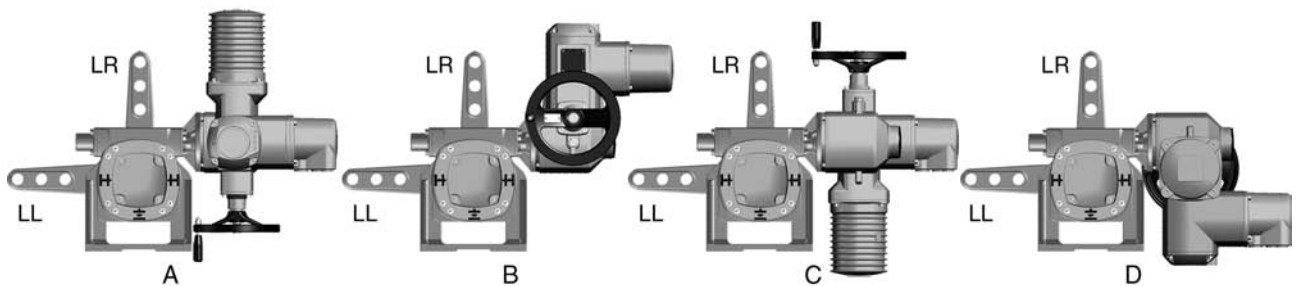
When supplying the gearboxes in combination with AUMA multi-turn actuators up to size GF 125.3, the multi-turn actuator/gearbox combination is delivered in the ordered mounting position. For packing reasons, actuator and gearbox will be delivered separately from size GF 160.3.

Figure6: Versions RR and LL



Restriction: For SA/SAR 14.2/14.6 with GF 125.3, mounting position “C” in versions RR/RL is only possible for handwheel diameters up to 315 mm.

Figure7: Versions LL and LR



Restriction: For SA/SAR 14.2/14.6 with GF 125.3, mounting position “A” in versions LL/LR is only possible for handwheel diameters up to 315 mm.

Flanges

Table 4: Suitable input mounting flanges

Gearboxes	Primary reduction gearing	Mounting flange for multi-turn actuator	
		EN ISO 5210	DIN 3210
GF 50.3	—	F07, F10	G0
GF 63.3	—	F07, F10	G0
GF 80.3	—	F07, F10	G0
GF 100.3	—	F10, F14	G0, G1/2
GF 100.3	VZ 2.3/3.3/4.3	F10	G0
GF 125.3	—	F14	G1/2
GF 125.3	VZ 2.3/3.3	F10, F14	G0, G1/2
GF 125.3	VZ 4.3	F10	G0
GF 160.3	—	F14, F16	G1/2, G3
GF 160.3	GZ 160.3 (4:1)	F10, F14	G0, G1/2
GF 160.3	GZ 160.3 (8:1)	F10	G0
GF 200.3	—	F16, F25	G3
GF 200.3	GZ 200.3 (4:1)	F14	G1/2
GF 200.3	GZ 200.3 (8:1)	F10, F14	G0, G1/2
GF 200.3	GZ 200.3 (16:1)	F10	G0
GF 250.3	—	F25, F30	—
GF 250.3	GZ 250.3 (4:1)	F14, F16	G1/2, G3
GF 250.3	GZ 250.3 (8:1)	F14	G1/2
GF 250.3	GZ 250.3 (16:1)	F10, F14	G0, G1/2

Screws to actuator

Screws are included in the scope of delivery of the gearbox for mounting AUMA multi-turn actuators. When mounting other actuators, the screws might be either too long or too short (insufficient reach of screws).



Risk of actuator falling off in case inappropriate screws used should shear.

Risk of death or serious injury!

- Check length of screws.
- Only use screws with strength class specified herein.

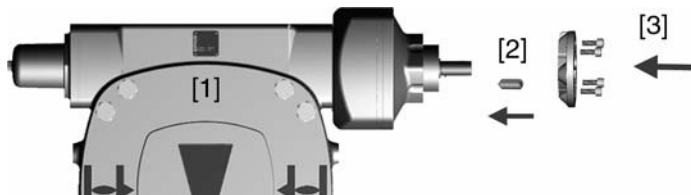
The reach of screws must be sufficient for the internal threads to ensure the supporting strength of the device and to accept the lateral forces due to the applied torque.

Screws which are too long could make contact with the housing parts and may cause the device to shift radially with respect to the gearbox. This can lead to shearing of the screws.

Fit 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 fitted in the factory.

Figure8: Fit 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. Mount parallel pin [2].
3. Place input mounting flange [3] and fasten with screws.
4. Fasten screws crosswise with a torque according to table <Tightening 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: Tightening torques for screws

(for mounting 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. Gearbox: mount and secure



Danger of jamming due to moving parts!

- Prior to mounting, check whether there are no space constraints. The actuator or other parts must be outside of the lever swivel range.
- Provide protective equipment.

NOTICE

Modification of lever range caused by vibration!

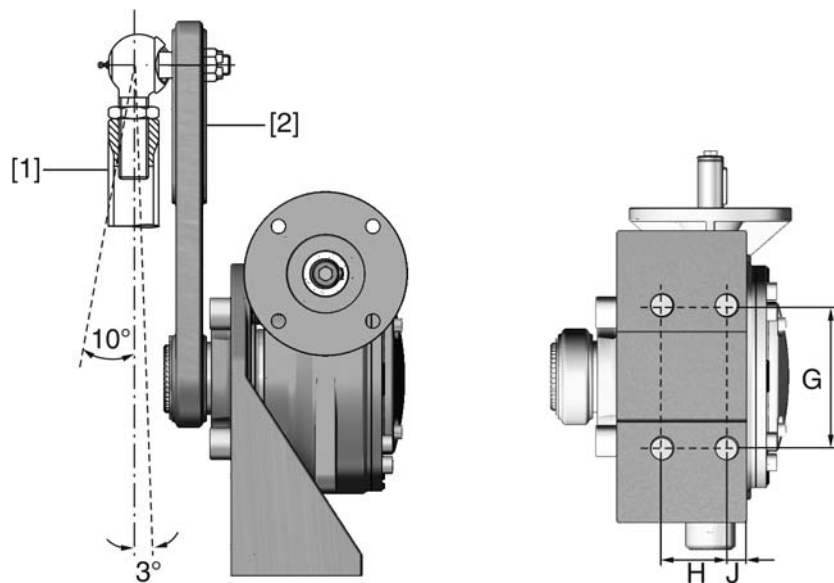
→ Mount the lever gearbox on a firm, rigid, and vibration-free surface in such a way as to prevent any relative movements between the base and the fixing element.

1. Adjust mounting position to ensure that tube to valve [1] as well as swing lever of gearbox [2] are in parallel.

Information: Observe permissible angle deflection between tube and swing lever.

- in the opposite direction as swing lever [2]: max 10°
- in the same direction as swing lever [2]: max 3°

Figure9: Permissible angle deflection and bores in base



- [1] Tube to valve
- [2] Swing lever

2. Thoroughly clean and degrease mounting surfaces.
3. Fasten lever gearbox with 4 screws (quality min. 8.8) and lock washers.

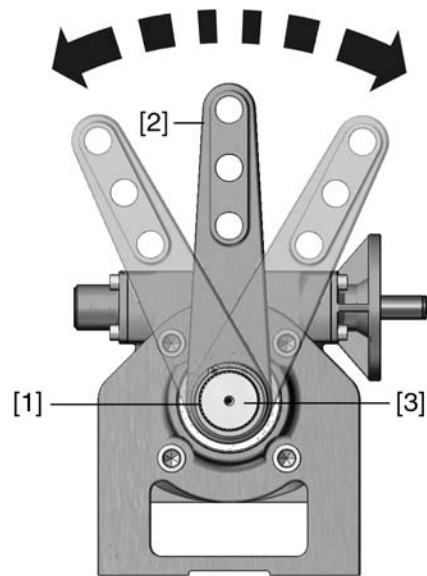
Table 6: Dimensions of base bores

Type	G	H	J
GF 50.3	80	40	15
GF 63.3	110	45	15
GF 80.3	110	50	15
GF 100.3	140	60	25
GF 125.3	200	60	30
GF 160.3	250	80	30
GF 200.3	320	95	35
GF 250.3	400	125	45

4.5. Lever position: adjust

If necessary, the lever position can be adjusted.

Figure10: Lever position adjustment



- [1] Circlip
- [2] Swing lever
- [2] Output shaft

1. Remove circlip [1].
2. Remove swing lever [2] from output shaft [3] and replace again in desired position to output shaft.

Table 7: Lever adjustment by one indent

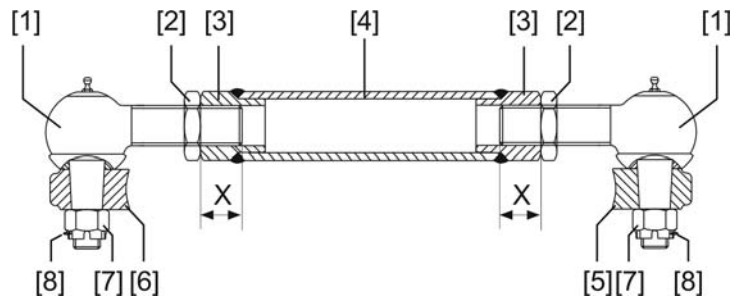
Type	Degrees per indent
GF 50.3	15°
GF 63.3	11.25°
GF 80.3	9°
GF 100.3	11.25°
GF 125.3	9°
GF 160.3	
GF 200.3	
GF 250.3	

3. Secure swing lever with circlip [1].

4.6. Lever arrangement: mount

Ball joints suitable for swing lever including lock nuts and welding nuts are available on special order with AUMA.

Figure11: Lever arrangement with ball joints



- [1] Ball joint
- [2] Lock nut
- [3] Welding nut
- [4] Tube
- [5] Valve lever
- [6] Swing lever
- [7] Crown nut
- [8] Cotter pin

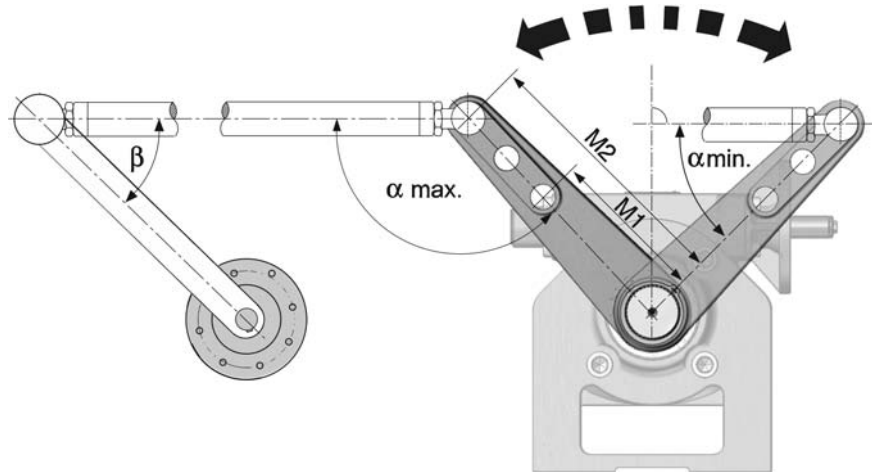
1. Insert ball joint [1] into bore at swing lever [6], fix with crown nut [7] and secure against removal using cotter pin [8].
2. Insert the second ball joint [1] into bore at valve lever [5], fix with crown nut [7] and secure against removal using cotter pin [8].
3. Fasten both welding nuts [3] on ball joints [1] until half the thread length.
Information: Respect minimum thread engagement ($X_{\min} = 1 \times \text{thread diameter}$).
4. Move lever gearbox and valve into the same end position.
5. Ensure that valve lever [5] and swing lever [6] are perpendicular.
6. Measure tube length required and shorten the tube to the length needed.
7. Unscrew welding nut [3] from both ball joints and weld to the tube.
Information: Apply corrosion protection after welding work.
8. Tighten lock nut [2] and tube [4] into ball joint at swing lever.
Information: Respect minimum thread engagement ($X_{\min} = 1 \times \text{thread diameter}$).
9. Remove second ball joint [1] from valve lever [5], tighten lock nut [2] and screw ball joint into tube.
Information: Respect minimum thread engagement ($X_{\min} = 1 \times \text{thread diameter}$).
10. Insert the second ball joint [1] into valve lever [5], fix with crown nut [7] and secure against removal using cotter pin [8].

11. Adjust suitable length by turning the tube.

Information: When using the ball joints supplied, one ball joint has a right-handed thread, the other a left-handed thread.

Information: When adjusting the length, make sure that angle α min. or α max. are neither undercut nor exceeded.

Figure12: Permissible angle deflection



α Angle deflection
 β Angle depending on valve

➔ The limits for angle β must be defined by the valve manufacturer.

Table 8: Permissible angle deflection

Type	α min.	α max.
GF 50.3 – GF 100.3	30°	150°
GF 125.3	37°	143°
GF 160.3 – GF 250.3 (small clearance M1)	45°	135°
GF 160.3 – GF 250.3 (large clearance M2)	33°	147°

12. Tighten both lock nuts [2] at tube [4].

5. Indications

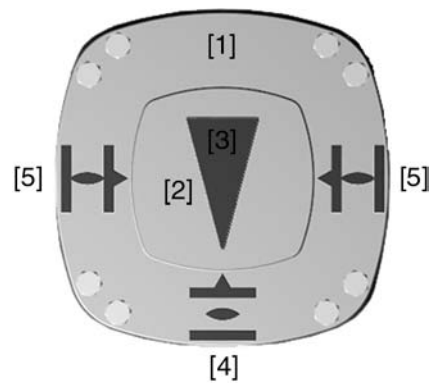
5.1. Mechanical position indicator/running indication

— Option —

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])

Figure13: 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. They protect the valve against overload.



Openly accessible and moving parts!

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:

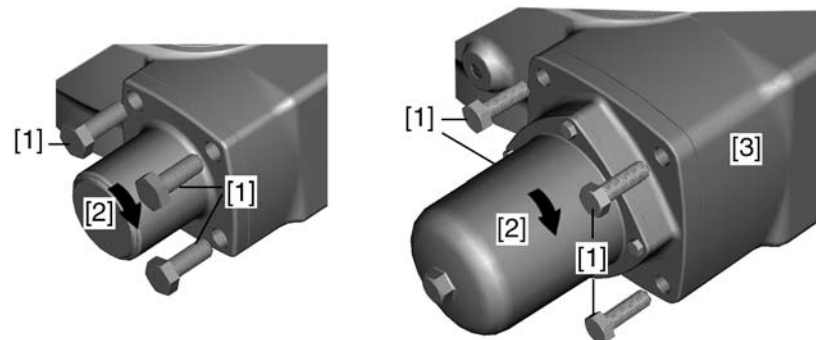
- Recommendation for **butterfly valves**: Set end stop CLOSED first.

Information

- Gearboxes with a swing angle of $> 190^\circ$ are usually multi-turn (without end stops). End position setting is therefore not possible. Thus, no protective function is available for the valve.
- In general, only one end stop (either OPEN or CLOSED) must be set, since the swing angle was already set in the factory.

6.1.1. End stop CLOSED: set

Figure14: End stop (left: up to size 125.3, right: from size 160.3)



- [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 on time 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 reached 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 tothing and replace in correct position.

- Fasten screws [1] crosswise with a torque according to table <Tightening torques for screws at end stop> .

Table 9: Tightening torques for screws at end stop

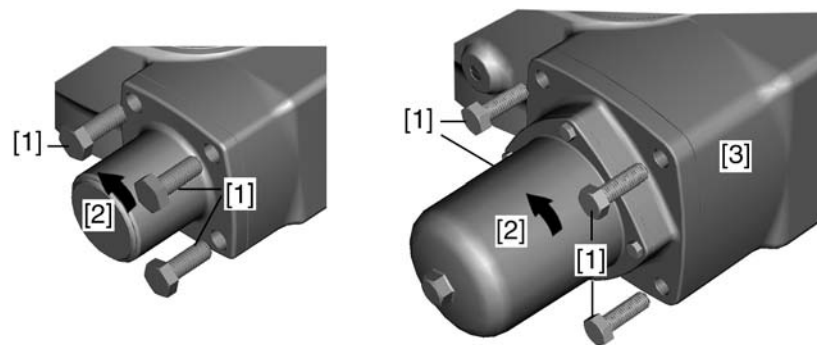
Gearboxes	Screws [1]	Tightening torque T_A [Nm]
GF 50.3	M6	10
GF 50.3 – GF 80.3	M8	24
GF 100.3 – GF 125.3	M12	82
GF 160.3	M10	48
GF 200.3	M12	82
GF 250.3	M16	200

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

Figure15: End stop (left: up to size 125.3, right: from size 160.3)



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

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

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

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

- Turn valve via handwheel to position OPEN. Check whether end stop [2] rotates simultaneously.
 - Otherwise: Turn end stop [2] **counterclockwise** to the stop.
- 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 reached during motor operation if a multi-turn actuator is mounted and that the valve can close tightly for torque seating.
- 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 tothing and replace in correct position.
- Fasten screws [1] crosswise with a torque according to table <Tightening torques for screws at end stop> .

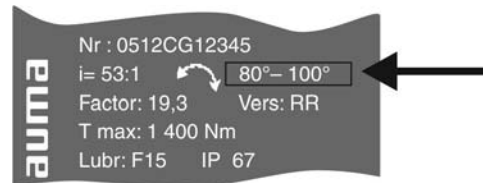
Further settings hereafter:

1. If the gearbox is equipped with a pointer cover: Check whether the mark aligns with symbol OPEN. Refer to <Mechanical position indicator: set>.
2. 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. Swing angle

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

Figure16: Name plate indicating the swing angle



Versions	Sizes GF 50.3 – GF 125.3 = adjustable swing angle - option Sizes GF 160.3 – GF 250.3 = adjustable swing angle - standard
Accuracy	Sizes GF 50.3 – GF 125.3 = 0.6° Sizes GF 160.3 – GF 250.3 = 0.11° up to 0.14°

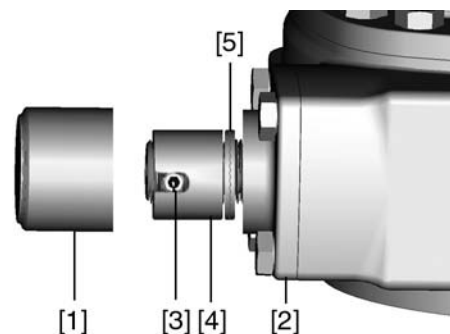
6.2.1. Swing angle: adjust at gearboxes up to size 125.3

Adjustments are made in end position OPEN.

Special tools: Parallel pin punch for spring-type straight pin

- for GF 50.3 (AUMA art. no. V001.367-Pos.003)
- for GF 63.3 – GF 80.3 (AUMA art. no. V001.367-Pos.002)
- for GF 100.3 – GF 125.3 (AUMA art. no. V001.367-Pos.002)

Figure17: End stop (figure shows size 80.3)



- [1] Protective cap
- [2] End stop
- [3] Spring-type straight pin
- [4] End stop nut
- [5] Pair of safety wedge discs (for OPEN and CLOSED)

1. Unscrew protective cap [1] at end stop [2].
2. Strike out spring-type straight pin [3] using matching parallel pin punch (special tool).

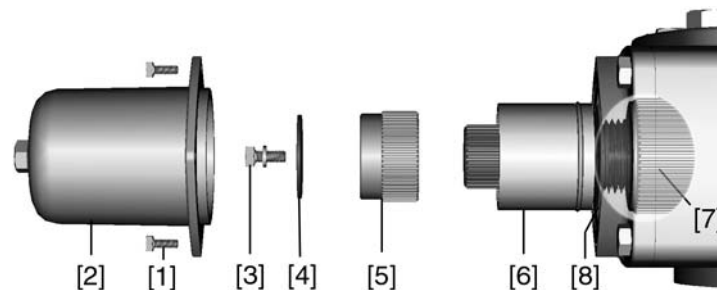
3. **Swing angle increase:**
 - 3.1 Turn end stop nut [4] **counterclockwise**.
Information: When turning back the end stop nut [4] make sure that the spring-type straight pin [3] can still be driven within the oblong hole.
 - 3.2 Move valve manually to the desired end position OPEN.
 - 3.3 Turn end 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: Spring-type straight pin [3] must remain completely covered by end stop nut [4].
5. Drive in spring-type straight pin [3] using the appropriate assembly 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 spring-type straight 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!

6.2.2. Swing angle: adjust at gearboxes from size 160.3

Adjustments are generally made in end position OPEN.

Figure18: 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 CLOSED)

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>.

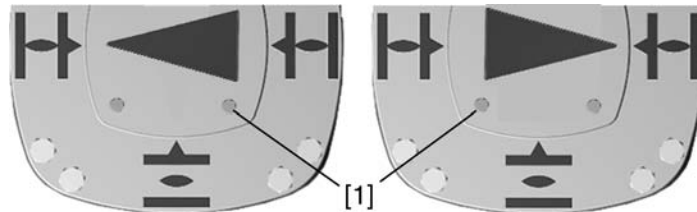
Information If the gearbox is mounted to a multi-turn actuator, the limit switching for the end position OPEN must be set first in compliance with the operation instructions of the multi-turn actuator.

6.3. Mechanical position indicator: set

— Option —

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 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 actions are required to ensure safe device operation:

These measures are based on the assumption that the unit is operated on an average of 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.

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

- It is imperative that the technical data, as well as the ambient temperatures, type of duty and running times indicated on the name plate are observed.
- In potentially explosive atmospheres 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 is only approved for use in potentially explosive atmospheres according to ATEX II2G c IIB T4 or T3.

7.3. Grease change and seal replacement



Hovering load!

Risk of death or serious injury.

- Do NOT stand below hovering 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).



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).
- Protect valve (disc) against inadvertent movement.



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. Remove ball joint at lever.
2. Mark position of the lever gearbox on the base, untighten connecting screws and remove gearbox.
3. Dismantle multi-turn actuator or handwheel from lever gearbox.

After grease change and seal replacement:

4. For manually operated lever gearboxes: Fit handwheel.
5. For motor-operated gearboxes: Mount multi-turn actuator to gearbox (refer to actuator operation instructions).
6. Mount and secure gearbox.
7. Mount lever arrangement (fix ball joint at lever).
8. Set end stops in gearbox.
9. Perform test run to ensure the proper function.

7.3.1. Grease change GF 50.3 – GF 125.3 (VZ 2.3 – VZ 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 GF 50.3 – GF 125.3

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

Table 10: Grease quantities for gearboxes (grease with density $\rho = 0.9 \text{ kg/dm}^3$)

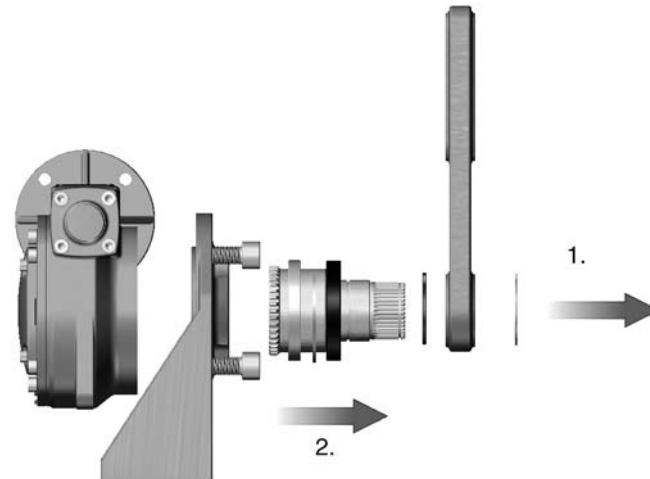
GF	50.3	63.3	80.3	100.3	125.3
Quantity [kg]	0.13	0.3	0.5	1.2	1.5

Table 11: Grease quantities for primary reduction gearings VZ (grease with density $r = 0.9 \text{ kg/dm}^3$)

VZ	2.3	3.3	4.3
Quantity [kg]	0.32	0.32	0.32

7.3.1.1. Swing lever and base: dismantle

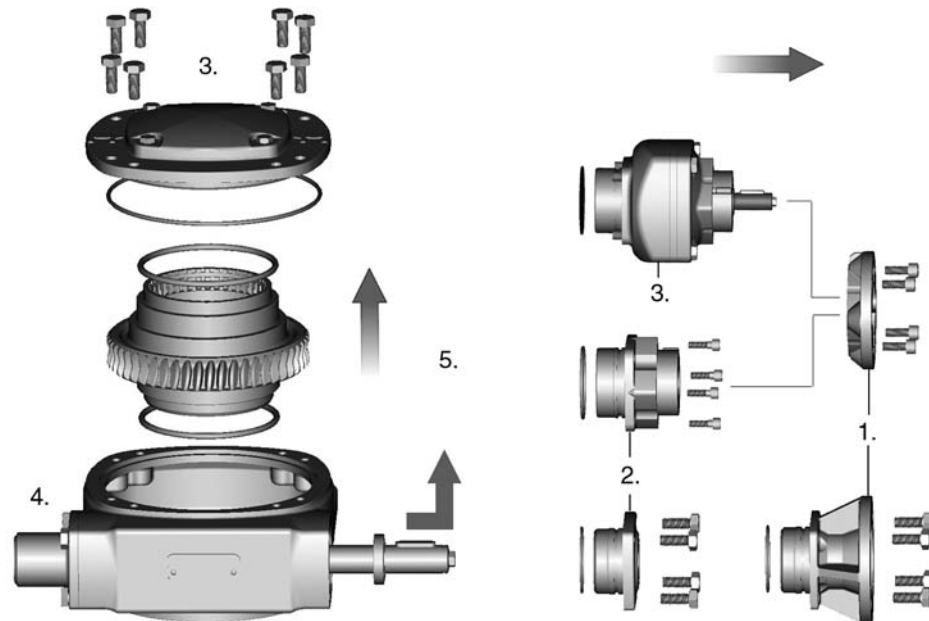
Figure19: Working steps for dismantling lever and base



- Lever** 1. Dismantle swing lever [547.0]:
- 1.1 Remove circlip at swing lever [547.0].
 - 1.2 Remove swing lever [547.0] from drive shaft.
- Base** 2. Disconnect base and gearbox:
- 2.1 Remove circlip from output shaft.
 - 2.2 Pull out radial seal.
 - 2.3 Remove circlip for ball bearing.
 - 2.4 Remove output shaft with ball bearing.
 - 2.5 Untighten screws at base and remove base from housing [517.0].

7.3.1.2. Working steps for grease change

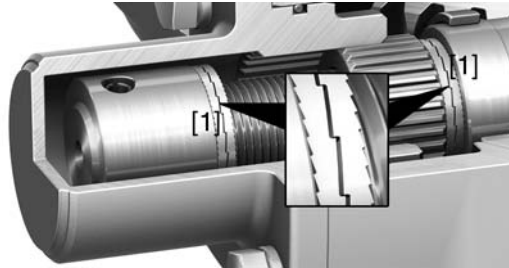
Figure20: Working steps for grease change on GF 50.3 – GF 125.3



- | | |
|-------------------------------------|---|
| 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 provided: Remove screws at bearing cover [522.0] and bearing cover [522.0]. (For sizes GF 100.3 – GF 125.3, bearing covers are completely removed including drive shafts [538.0]) |
| VZ primary reduction gearing | 3. If a VZ primary reduction gearing is mounted: <ul style="list-style-type: none"> 3.1 Remove screws at housing cover VZ [020.0] and remove housing cover VZ [020.0] including the drive shaft VZ [021.0]. 3.2 Take off internal geared wheel VZ [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 VZ [019.0] and detach housing VZ [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 For adjustable end stop: 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:

Information: For devices equipped with safety wedge discs [1] in end stop:



If the safety wedge discs [1] have been dismantled for cleaning, make sure the discs are installed with the wedge surfaces pointing to the inner side (radial teeth) or the radial splines to the outer side (cams).

- 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 For adjustable end stop: Fasten protective cap [536.0] with new O-Ring.

Housing cover

- 8. Fill gear housing with new grease.
- 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 12: Tightening torques for screws of housing cover

Type Size	Screws Threads	Tightening torque T_A [Nm]
		Strength class A2-80
GF 50.3	M5	
GF 63.3	M6	10
GF 80.3	M8	25
GF 100.3	M10	50
GF 125.3	M12	85

VZ primary reduction gearing

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

7.3.1.3. Base and swing lever: mount

Base

- 1. Mount gearbox housing to base:
 - 1.1 Fasten housing [517.0] to base with screws.
 - 1.2 Insert output shaft with ball bearing.
 - 1.3 Insert circlip for ball bearing.
 - 1.4 Insert radial seal.
 - 1.5 Fix circlip (lever) at output shaft

- Lever** 2. Mount swing lever [547.0]:
- 2.1 Fit swing lever [547.0] onto output shaft.
 - 2.2 Secure swing lever with circlip.

7.3.2. Grease change GF 160.3 – GF 250.3 (GZ 160.3 – GZ 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 GF 160.3 – GF 250.3
- Spare parts list Reduction gearings GZ 160.3 – GZ 250.3

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

Special tools: Lock nut tool

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

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

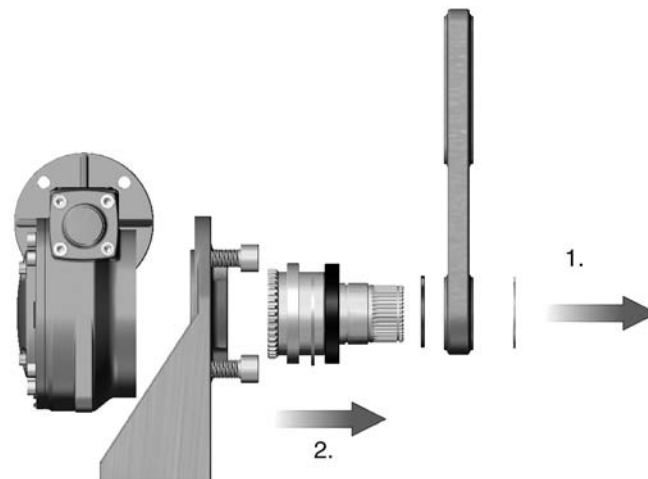
GF	160.3	200.3	250.3
Quantity [kg]	3.85	7.65	14.0

Table 14: Grease quantities for GZ primary reduction gearings (grease with density $r = 0.9 \text{ kg/dm}^3$)

GZ	160.3	200.3 (4:1/8:1)	200.3 (16:1)	250.3 (4:1/8:1)	250.3 (16:1)
Quantity [kg]	0.9	1.4	1.8	2.0	2.25

7.3.2.1. Swing lever and base: dismantle

Figure21: Working steps for dismantling lever and base

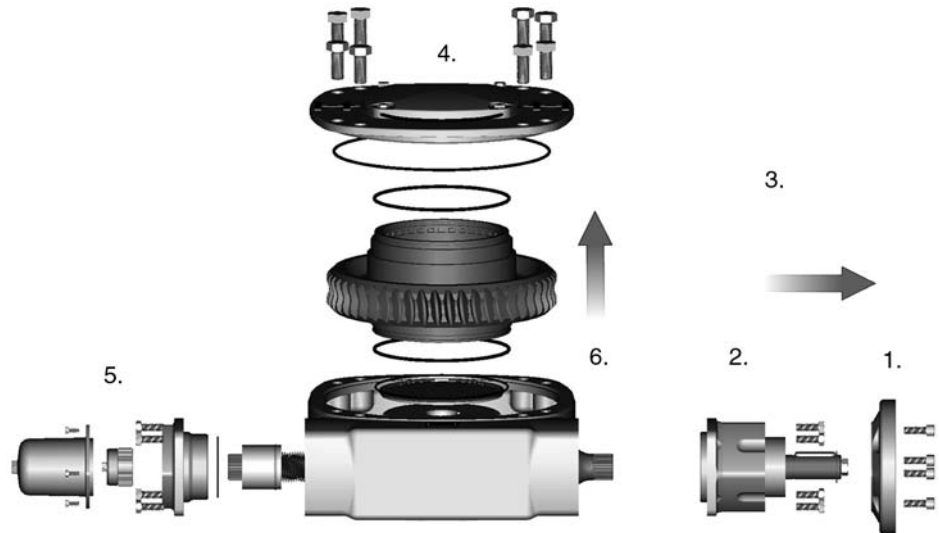


- Lever** 1. Dismantle swing lever [547.0]:
- 1.1 Remove circlip at swing lever [547.0].
 - 1.2 Remove swing lever [547.0] from output shaft.

- Base**
2. Disconnect base and gearbox:
 - 2.1 Remove circlip from output shaft.
 - 2.2 Pull out radial seal.
 - 2.3 Remove circlip for ball bearing.
 - 2.4 Remove output shaft with ball bearing.
 - 2.5 Untighten screws at base and remove base from housing [517.0].

7.3.2.2. Working steps for grease change

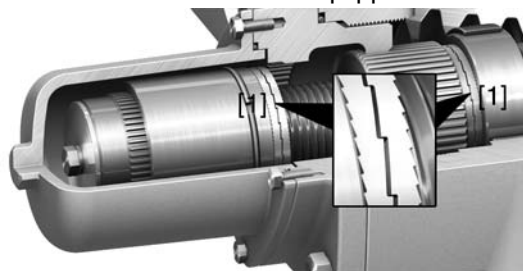
Figure22: Working steps for grease change on GF 160.3 – GF 250.3



- 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 provided: Remove screws at bearing cover [522.0] and pull of bearing with drive shaft [538.0].
- GZ primary reduction gearing**
3. If a primary reduction gearing GZ is mounted, dismantle primary reduction gearing:
 - 3.1 Remove screws at housing cover GZ [002.0] and remove housing cover GZ [002.0] including drive shaft GZ [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 GZ [001.0] and detach housing GZ [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 tool.
 - 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 tool and secure with grub screw.

- End stop**
7. Fit end stop:
Information: For devices equipped with safety wedge discs [1] in end stop:



If the safety wedge discs [1] have been dismantled for cleaning, make sure the discs are installed with the wedge surfaces pointing to the inner side (radial teeth) or the radial splines to the outer side (cams).

- 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 15: Tightening torques for screws of housing cover

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

- Primary reduction gear-ings GZ**
10. For gearboxes equipped with primary reduction gearings GZ, mount primary reduction gearing:
 - 10.1 Clean all mounting surfaces (gearbox housing, housing GZ [001.0], internal geared wheel of planetary gearing [006.0/007.0/008.0] and housing cover GZ [002.0].
 - 10.2 Replace all used sealing elements S1 with new seals.
 - 10.3 Place housing GZ [001.0] and fasten with screws.
 - 10.4 Fill housing GZ [001.0] with new grease.
 - 10.5 Insert planetary gearings [006.0/007.0/008.0] and apply grease.
 - 10.6 Fit housing cover GZ [002.0] with drive shaft [534.0] and fasten with screws.

11. For gearboxes without primary reduction gearings GZ: Fit bearing cover [522.0] with drive shaft [534.0] and fasten with screws.
12. If an input mounting flange is required for actuator installation: Place input mounting flange [512.0] and fasten with screws.

7.3.2.3. Base and swing lever: mount

- | | |
|--------------|---|
| Base | <ol style="list-style-type: none">1. Mount gearbox housing to base:<ol style="list-style-type: none">1.1 Fasten housing [517.0] to base with screws.1.2 Insert output shaft with ball bearing.1.3 Insert circlip for ball bearing.1.4 Insert radial seal.1.5 Fix circlip (lever) at output shaft. |
| Lever | <ol style="list-style-type: none">2. Mount swing lever [547.0]:<ol style="list-style-type: none">2.1 Fit swing lever [547.0] onto output shaft.2.2 Secure swing lever with circlip. |

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: Cast iron (GJL-250) Option: Spheroidal cast iron (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.
End stops	Positive for both end positions by travelling nut and safety wedge discs, sensitive adjustment
Strength of end stop	Guaranteed strength of end stop (in Nm) for input side operation <ul style="list-style-type: none"> • GF 50.3 = 250 Nm • GF 63.3 = 450 Nm • GF 80.3 = 450 Nm • GF 100.3 with VZ 2.3/3.3 = 500 Nm • GF 100.3 with VZ 4.3 = 250 Nm • GF 125.3 with VZ 2.3/3.3 = 500 Nm • GF 125.3 with VZ 4.3 = 250 Nm • GF 160.3 with VZ 160.3 (4:1) = 500 Nm • GF 160.3 with VZ 160.3 (8:1) = 450 Nm • GF 200.3 with VZ 200.3 (4:1/8:1/16:1) = 500 Nm • GF 250.3 with VZ 250.3 (4:1/8:1/16:1) = 500 Nm
Swing angle GF 50.3 – GF 125.3	Standard: Fixed swing angle between 10° and max. 100°; set in the factory to 92° unless ordered otherwise. Options: <ul style="list-style-type: none"> • Adjustable in steps of: 10° – 35°, 35° – 60°, 60° – 80°, 80° – 100°, 100° – 125°, 125° – 150°, 150° – 170°, 170° – 190° • Swing angle > 190°, multi-turn version without end stops, worm wheel made of bronze required, for GFD version special sizing necessary
Swing angle GF 160.3 – GF 250.3	Standard: Adjustable 80° – 100°; set in the factory to 92° unless ordered otherwise. Options: <ul style="list-style-type: none"> • Adjustable in steps of: 0° – 20°, 20° – 40°, 40° – 60°, 60° – 80°, 90° – 110°, 110° – 130°, 130° – 150°, 150° – 170°, 170° – 190° • Swing angle > 100°, multi-turn version without end stops, worm wheel made of bronze required, for GFD version special sizing necessary
Mechanical position indicator	Standard: No position indicator (protection cover) Options: Pointer cover instead of protection cover for continuous position indication
Input shaft	Cylindrical with parallel key according to DIN 6885.1

Operation

Motor operation	With electric multi-turn actuator, directly or through primary reduction gearing Input mounting flange for multi-turn actuator; size according to EN ISO 5210 or DIN 3210
Type of duty	For version with worm wheel made of spheroidal cast iron: <ul style="list-style-type: none"> • Short-time duty S2 - 15 min (open-close duty) • Push-to-run operation permissible, max. 10 steps in one direction and max. 30 starts per hour For version with worm wheel made of bronze: <ul style="list-style-type: none"> • Intermittent duty S4 - 25 % (modulating duty)

Operation	
Manual operation	<p>Via handwheel in aluminium, directly or through VZ/GZ primary reduction gearing Available handwheel diameters, selection according to the output torque:</p> <ul style="list-style-type: none"> • GF 50.3 = 160, 200, 250 mm • GF 63.3 = 250, 315 mm • GF 80.3 = 315, 400 mm • GF 100.3 = 400, 500 mm • GF 100.3 with VZ 2.3/3.3 = 315, 400 mm • GF 100.3 with VZ 4.3 = 250, 315 mm • GF 125.3 = 500, 630, 800 mm • GF 125.3 with VZ 2.3/3.3 = 400, 500 mm • GF 125.3 with VZ 4.3 = 315, 400 mm • GF 160.3 = 630, 800 mm • GF 160.3 with GZ 160.3 (4:1) 400 mm, (8:1) = 315 mm • GF 200.3 with GZ 200.3 (4:1) = 500/630 mm, (8:1) = 400 mm, (16:1) = 315 mm • GF 250.3 with GZ 250.3 (4:1) = 800 mm, (8:1) = 500/630 mm, (16:1) = 400 mm <p>Option: handwheel material GJL-200</p>

Primary reduction gearing	
Primary reduction gearing	<ul style="list-style-type: none"> • VZ and GZ types as planetary gears with various reduction ratios for reducing input torques. • Combination with GK bevel gearbox directly on GF or on GF with VZ/GZ possible

Base and lever	
Base	Spheroidal cast iron For mounting to base, 4 bores for fastening screws are available.
Lever	Spheroidal cast iron With 2 or 3 bores for fixing a lever arrangement. Considering the environmental conditions, the lever may be mounted to the output shaft in any desired position.
Ball joints (option)	2 ball joints suitable for lever, including lock nuts and 2 welding nuts; suitable for tube according to dimension sheet

8.2. Service conditions

Mounting position	Any position
Enclosure protection according to EN 60529	Standard: IP67 For actual version, refer to name plate
Corrosion protection	<p>Standard:</p> <ul style="list-style-type: none"> • KN: Suitable for installation in industrial units, in water or power plants with a low pollutant concentration <p>Options:</p> <ul style="list-style-type: none"> • KS: Suitable for installation in occasionally or permanently aggressive atmosphere with a moderate pollutant concentration (e.g. in wastewater treatment plants, chemical industry) • KX: Suitable for installation in extremely aggressive atmospheres with high humidity and high pollutant concentration <p>For actual version, refer to name plate</p>
Finish coating	<p>Standard:</p> <ul style="list-style-type: none"> • GF 50.3 – GF 125.3: Two-component iron-mica combination • GF 160.3 – GF 250.3: Primer coating <p>Option:</p> <ul style="list-style-type: none"> • GF 160.3 – GF 250.3: Two-component iron-mica combination
Colour	Standard: AUMA silver-grey (similar to RAL 7037) if finish painted Option: Other colours on request

Technical data

Ambient temperature	Standard: -40 °C to +80 °C Options: <ul style="list-style-type: none"> • -60 °C to +60 °C, version EL • 0 °C to + 120 °C, version H For actual version, refer to name plate
Lifetime	Open-close duty (number of cycles according to standard EN 15714-2 for max. torque and 90° swivel movement): GF 50.3/GF 63.3: 10,000 GF 80.3/GF100.3/VZ: 5,000 GF 125.3/VZ, GF 200.3/GZ: 2,500 GF 250.3/GZ: 1,000 Modulating duty: ¹⁾ 2.5 million modulating steps

- 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.

Special features for use in potentially explosive atmospheres	
Explosion protection in compliance with 94/9/EC	Standard: <ul style="list-style-type: none"> • II2G c IIC T4 • II2D c T130°C Options: <ul style="list-style-type: none"> • II2G c IIC T3 • II2D c T190 °C • IM2 c
Type of duty	For version with worm wheel made of spheroidal cast iron: Short-time duty S2 – 15 min., max. 3 cycles (OPEN - CLOSE - OPEN) 90°, with subsequent average output torques (then cool-down to ambient temperature): <ul style="list-style-type: none"> • GF 50.3 = 250 Nm • GF 63.3 = 500 Nm • GF 80.3 = 1,000 Nm • GF 100.3 = 2,000 Nm • GF 125.3 = 4,000 Nm • GF 160.3 = 8,000 Nm • GF 200.3 = 16,000 Nm • GF 250.3 = 32,000 Nm For version with worm wheel made of bronze: Standard: Intermittent duty S4 – 25 % with modulating torque, exception: GF 200.3 with modulating torque up to 4,800 Nm Max. input speed: Standard: 45 rpm, exception: GF 200.3 and GF 250.3 up to 11 rpm The type of duty must not be exceeded. Option: GFD multi-turn version, special sizing required; please contact AUMA.
Ambient temperature	(temperature range depending on application and worm wheel material) Standard: <ul style="list-style-type: none"> • -40 °C to +40 °C (II2G c IIC T4; II2D c T130°C) bronze • -40 °C to +60 °C (II2G c IIC T4; II2D c T130°C) bronze/spheroidal cast iron • -50 °C to +60 °C (II2G c IIC T4; II2D c T130°C) bronze • -60 °C to +60 °C (II2G c IIC T4; II2D c T130°C) bronze Options: <ul style="list-style-type: none"> • -50 °C to +60 °C (II2G c IIC T4; II2D c T130°C) spheroidal cast iron • -60 °C to +60 °C (II2G c IIC T4; II2D c T130°C) spheroidal cast iron • -40 °C to +40 °C (II2G c IIC T4; II2D c T130°C) spheroidal cast iron • -40 °C to +80 °C (II2G c IIC T3; II2D c T190°C) bronze/spheroidal cast iron • 0 °C to +120 °C (II2G c IIC T3; II2D c T190°C) bronze/spheroidal cast iron • -20 °C to +40 °C (IM2 c) bronze/spheroidal cast iron

8.3. Accessories

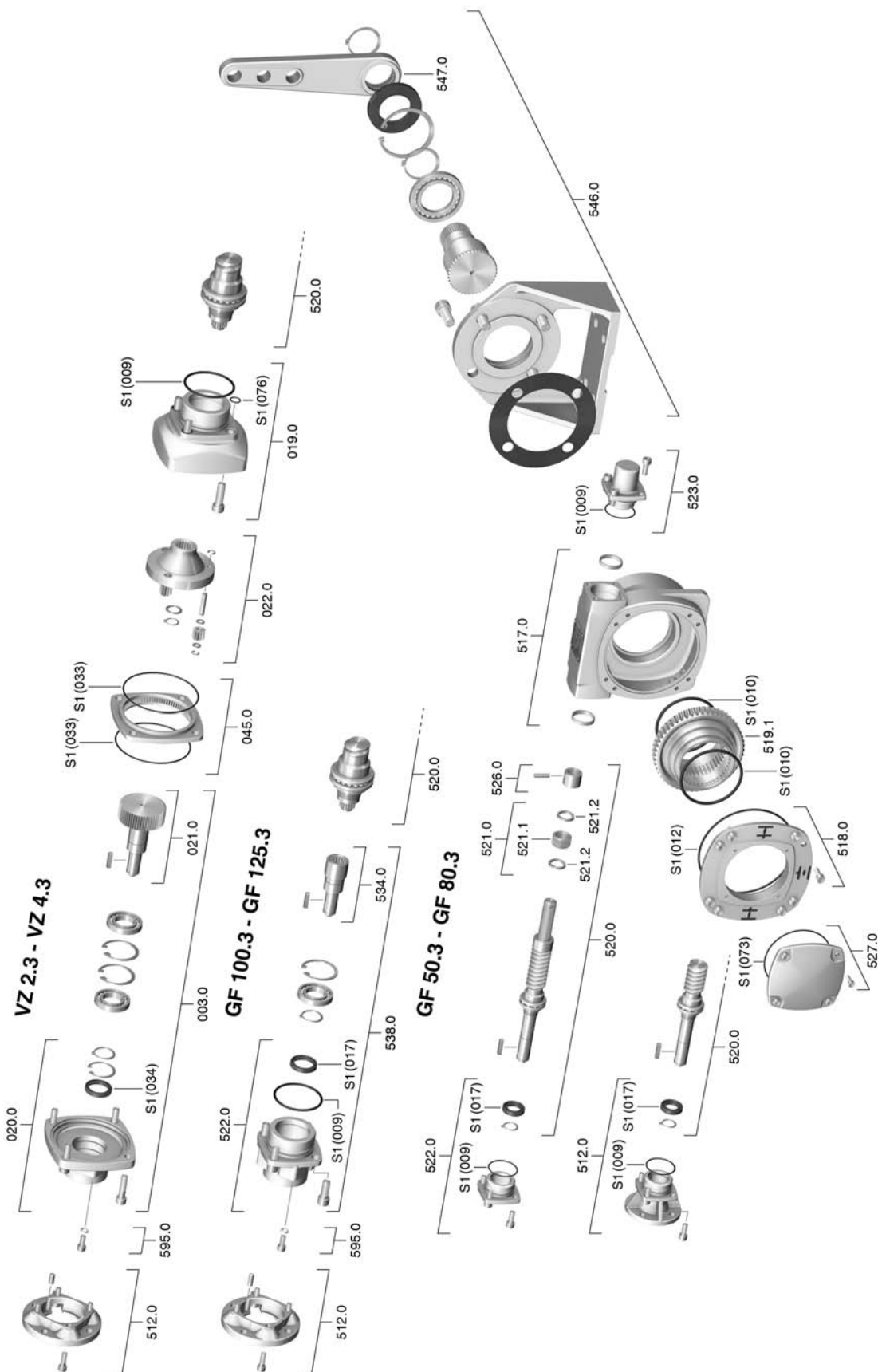
Valve position indicators	WSG valve position indicator for position and end position signalling to ensure precise and low-backlash feedback for swing angles ranging from 82° – 98°.
	WGD valve position indicator for position and end position signalling for swing angles > 180°
Limit switching	WSH limit switching device for manually operated valves. For position and end position signalling.

8.4. Further information

EU Directives	<ul style="list-style-type: none"> • ATEX Directive: (94/9/EC) • Machinery Directive: (2006/42/EC)
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9. Spare parts

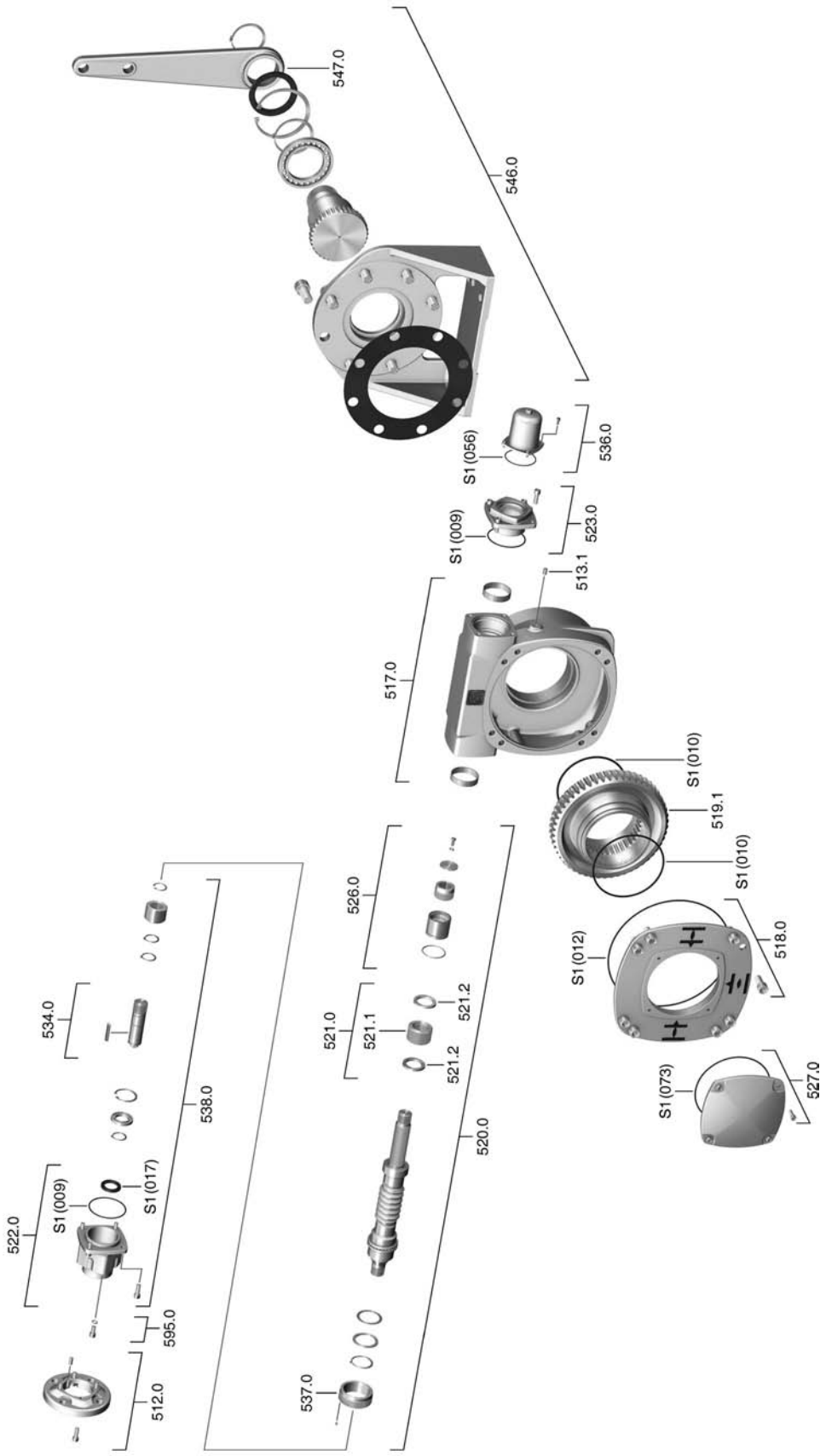
9.1. Lever gearboxes GF 50.3 – GF 125.3 with primary reduction gearings VZ 2.3 – VZ 4.3



Information: Please state type and commission no. of the device (see name plate) when ordering spare parts. You may only use AUMA spare parts. 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 VZ	Sub-assembly
019.0	Housing VZ	Sub-assembly
020.0	Housing cover VZ	Sub-assembly
021.0	Drive shaft VZ	Sub-assembly
022.0	Planet carrier VZ	Sub-assembly
045.0	Internal geared wheel VZ	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
521.0	Travelling nut with pair of safety wedge discs	Sub-assembly
521.1	Travelling nut	
521.2	Pair of safety wedge discs	
522.0	Bearing cover	Sub-assembly
523.0	End stop	Sub-assembly
526.0	End stop nut	Sub-assembly
527.0	Protection cover	Sub-assembly
534.0	Drive shaft	Sub-assembly
538.0	Bearing cover with drive shaft	Sub-assembly
546.0	Base flange	Sub-assembly
547.0	Swing lever	
S1	Seal kit	Set

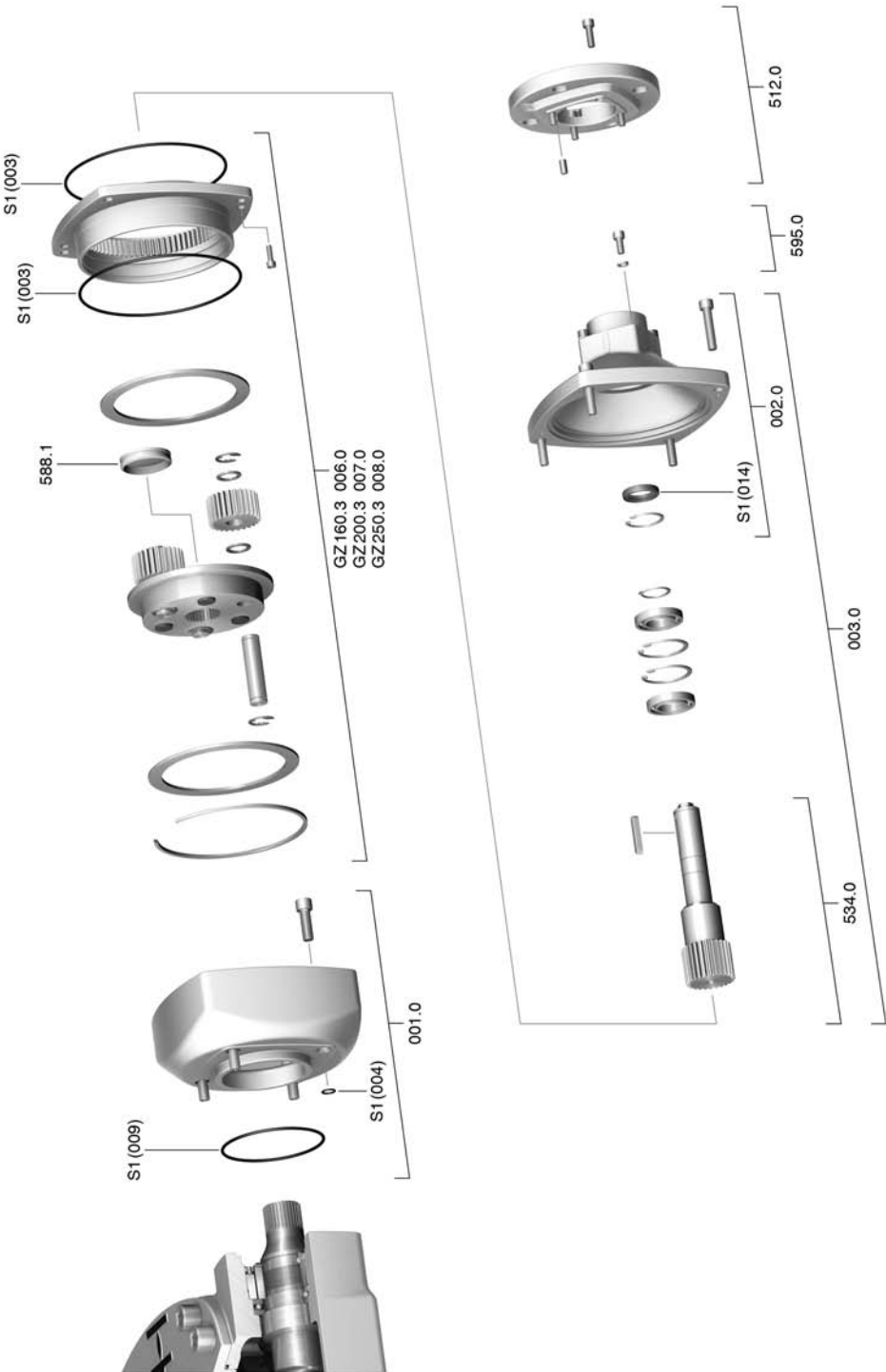
9.2. Lever gearboxes GF 160.3 – GF 250.3



Information: Please state type and commission no. of the device (see name plate) when ordering spare parts. You may only use AUMA spare parts. 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
521.0	Travelling nut with pair of safety wedge discs	Sub-assembly
521.1	Travelling nut	
521.12	Pair of safety wedge discs	
522.0	Bearing cover	Sub-assembly
523.0	End stop	Sub-assembly
526.0	End stop nut	Sub-assembly
527.0	Protection cover	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
546.0	Base flange	Sub-assembly
547.0	Swing lever	
S1	Seal kit	Set

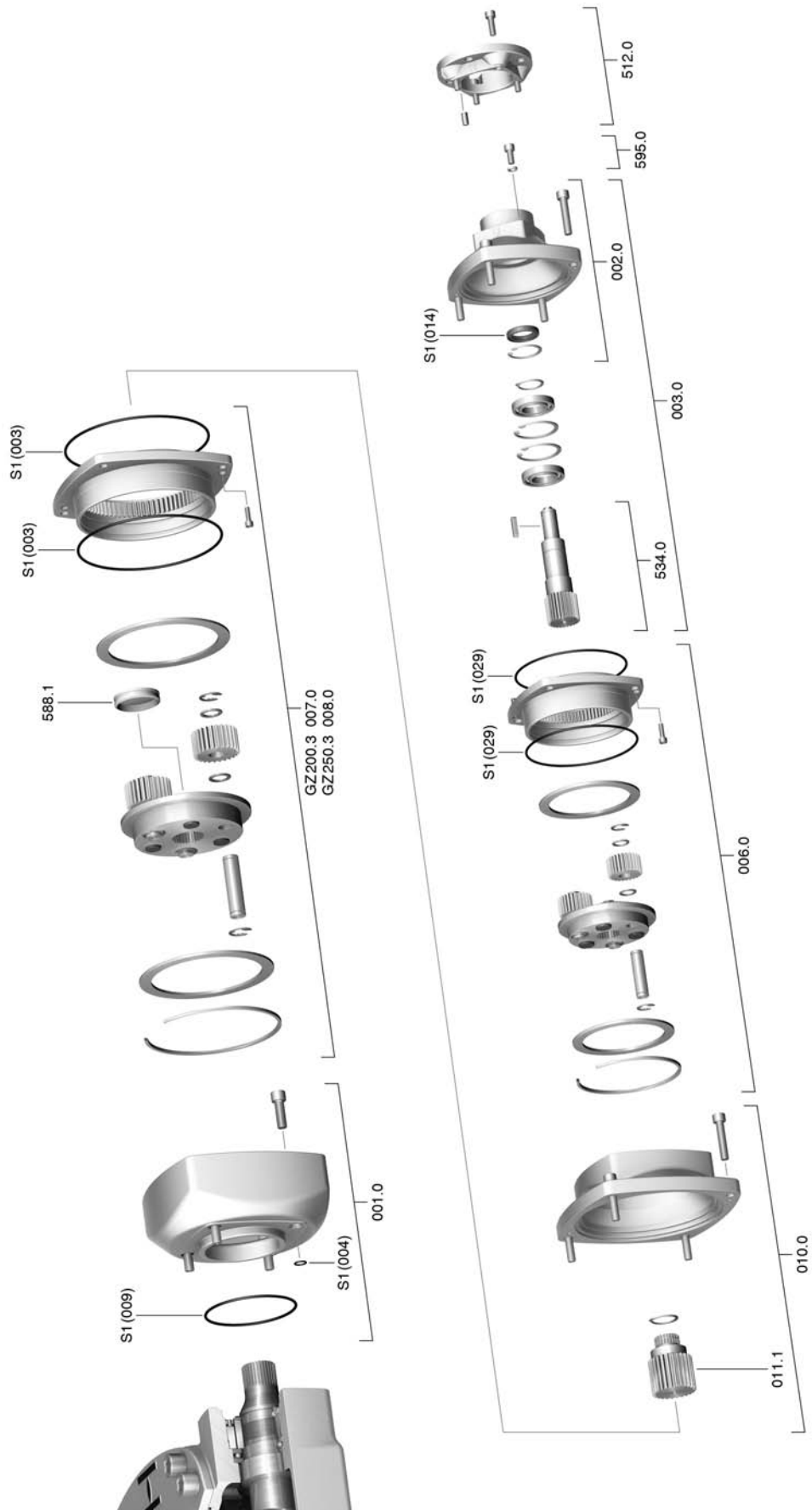
9.3. Primary reduction gearings GZ 160.3 – GZ 250.3 (4:1/8:1)



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 (GZ 160.3)	Sub-assembly
007.0	Planetary gearing, first stage (GZ 200.3)	Sub-assembly
008.0	Planetary gearing, first stage (GZ 250.3)	Sub-assembly
512.0	Input mounting flange	Sub-assembly
513.1	Grub screw	
534.0	Drive shaft	Sub-assembly
588.1	Blanking plug	
595.0	Screw with polyamide washer (PA)	Sub-assembly
S1	Seal kit	Set

9.4. Primary reduction gearings GZ 200.3 – GZ 250.3 (16:1)



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	Sub-assembly
007.0	Planetary gearing, second stage (GZ 200.3)	Sub-assembly
008.0	Planetary gearing, second stage (GZ 250.3)	Sub-assembly
010.0	Housing frame	Sub-assembly
011.1	Pinion	
512.0	Input mounting flange	Sub-assembly
513.1	Grub screw	
534.0	Drive shaft	Sub-assembly
588.1	Blanking plug	
595.0	Screw with polyamide washer (PA)	Sub-assembly
S1	Seal kit	Set

10. Certificates

10.1. Declaration of Incorporation and EC Declaration of Conformity

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Original Declaration of Incorporation of Partly Completed Machinery (EC Directive 2006/42/EC) and EC Declaration of Conformity in compliance with the Directive on Explosion Protection

for AUMA gearboxes of the type ranges

Worm gearboxes	GS 50.3 – GS 125.3 with reduction gearing VZ 2.3 – VZ 4.3 GS 160.3 – GS 250.3 with reduction gearing GZ 160.3 – GZ 250.3 GS 630.3 with reduction gearing GZ 630.3
Lever gearboxes	GS 315 – GS 500 with reduction gearing GZ 16.1 – GZ 40.1 GF 50.3 – GF 125.3 with reduction gearing VZ 2.3 – VZ 4.3 GF 160.3 – GF 250.3 with reduction gearing GZ 160.3 – GZ 250.3
Bevel gearboxes	GK 10.2 – GK 40.2
Spur gearboxes	GST 10.1 – GST 40.1

AUMA Riester GmbH & Co. KG as manufacturer declares herewith, that the above mentioned gearboxes meet the following basic requirements of the EC Machinery Directive 2006/42/EC: Annex I, articles 1.1.2, 1.1.3, 1.1.5, 1.3.1, 1.3.7, 1.7.1, 1.7.3, 1.7.4

The following harmonised standards within the meaning of the Machinery Directive have been applied:

EN 12100-1: 2003	ISO 5210: 1996
EN 12100-2: 2003	ISO 5211: 2001

With regard to the partly completed machinery, the manufacturer commits to submitting the documents to the competent national authority via electronic transmission upon request. The relevant technical documentation pertaining to the machinery described in Annex VII, part B has been prepared.

AUMA gearboxes are designed to be installed on industrial valves. AUMA gearboxes must not be put service until the final machinery into which they are to be incorporated has been declared in conformity with the provisions of the EC Directive 2006/42/EC.

Authorised person for documentation: Peter Malus, Aumastrasse 1, D-79379 Müllheim

As partly completed machinery, the gearboxes further comply with the requirements of the following directives and the respective approximation of national laws as well as the respective harmonised standards as listed below:

(1) Equipment and protective systems intended for use in potentially explosive atmospheres (94/9/EC)

EN 1127-1: 2011
EN 1127-2: 2002 + A1: 2008
EN 13463-1: 2009
EN 13463-5: 2011

The above mentioned AUMA gearboxes in "ATEX" version are marked as follows:

II2G c IIC T4 or T3
II2D IP6X T130°C or T190°C
IM2 c I

In order to meet the requirements for use of AUMA gearboxes in potentially explosive atmospheres, the relevant information in the operation instructions must imperatively be observed.

Müllheim, 2013-05-01

H. Newerla, General Management

This declaration does not contain any guarantees. The safety instructions in product documentation supplied with the devices must be observed. Non-concerted modification of the devices voids this declaration.

Y004.932/002/en

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