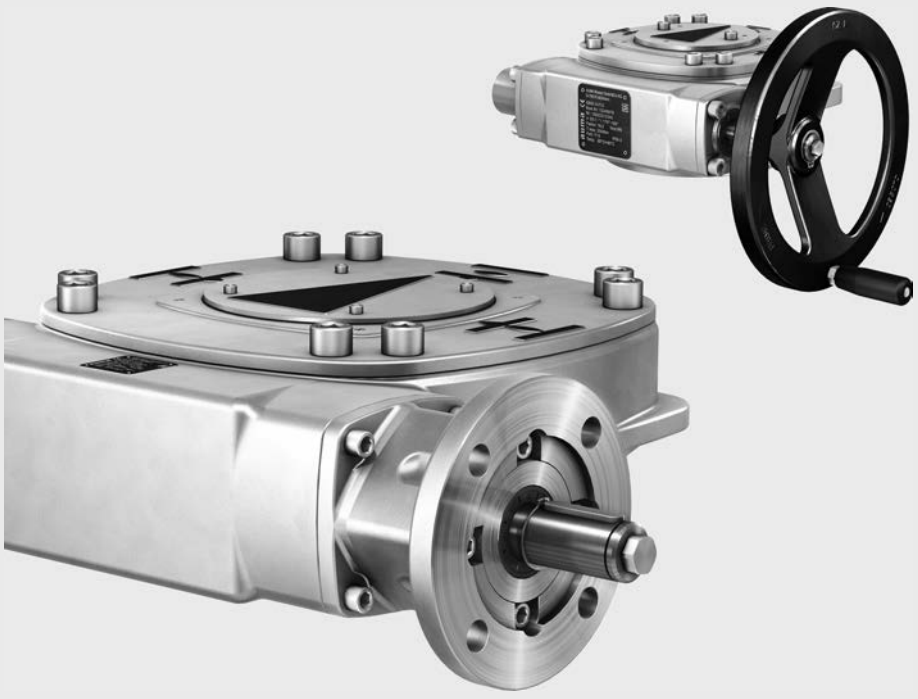
auma®
Solutions for a world in motion

Part-turn gearboxes

GS 50.3 – GS 250.3



Operation instructions

Assembly, commissioning

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.

Table of contents

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.

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.

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, ball valves and 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
- Potentially explosive atmospheres in combination with F21 lubricant type (refer to name plate)
- 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).

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

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

CAUTION — **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.**

NOTICE — **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

DANGER

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.

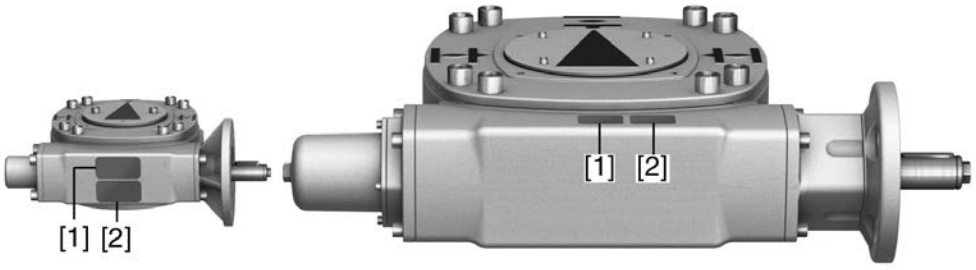
< > **Reference to other sections**

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

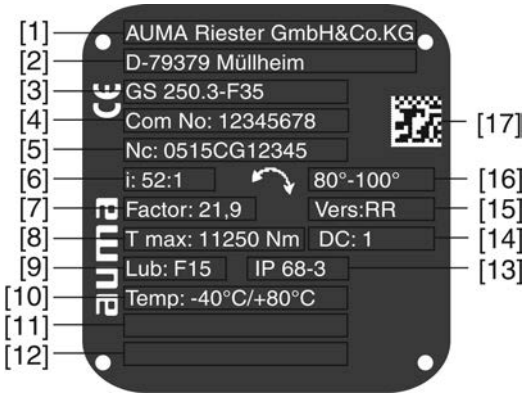
Figure 1: Arrangement of name plates



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

Description of gearbox name plate

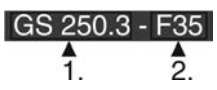
Figure 2: Gearbox name plate (example GS 250.3)



[1] Name of manufacturer
[2] Address of manufacturer
[3] **Type designation** - valve attachment (flange)
[4] **Order number**
[5] **Serial number**
[6] **Reduction ratio**
[7] **Factor**
[8] Max. valve torque (output torque)
[9] **Type of lubricant**
[10] Permissible ambient temperature
[11] Explosion-proof version (option)
[12] Can be assigned as an option upon customer request
[13] Enclosure protection
[14] **Duty class**
[15] **Version**
[16] Swing angle
[17] **Data Matrix code**

Type designation

Figure 3: Type designation (example)



1. Type and size of gearbox

2. Flange size for valve attachment

Type and size

These instructions apply to the following device types and sizes:

Part-turn gearboxes of type **GS**, sizes **50.3 – 250.3**

Order number

The product can be identified using this number and the technical data as well as order-related data pertaining to the device can be requested.

Please always state this number for any product inquiries.

On the Internet at **http://www.auma.com**, we offer a service allowing authorised users to download order-related documents such as wiring diagrams and technical data (both in German and English), inspection certificates and the operation instructions when entering the order number.

Serial number

Description of the serial number (with the example of 0512CG12345)			
05	15	CG12345	
05			Positions 1 + 2 : Assembly in week = week 05
	15		Positions 3 + 4 : Year of manufacture = 2015
		CG12345	Internal 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 conversion factor for actuator size determination:

Input torque = required valve torque (output torque)/factor

Type of lubricant

AUMA abbreviation for type of lubricant used in the gear housing.

DANGER

Danger of explosion when using inappropriate lubricant in potentially explosive atmospheres!

→ **Do not** use gearboxes with F21 lubricant in potentially explosive atmospheres.

→ Do not mix different lubricants.

Duty class

The duty class specifies the application range of a gearbox relating to the lifetime requirements. The duty class is only specified for gearboxes in operation mode class A (OPEN-CLOSE duty).

- **Duty class 1:** suitable for motor operation, meets the lifetime requirements of EN 15714-2
- **Duty class 2:** suitable for motor operation of rarely or infrequently operated valves which do not exceed 1,000 operations across their total lifetime.
- **Duty class 3:** suitable (exclusively) for manual operation with approximately 250 operations, in compliance with the specified lifetime requirements in EN 1074-2.

Please refer to separate Technical data for further information on duty classes.

Version

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** at the output drive (view on housing cover) for clockwise rotation at the input shaft.

Versions: Worm shaft position and direction of rotation of output drive GS 50.3 – GS 250.3

RR

LL

RL

LR

Description of the four different versions (view on housing cover):

Initials	Direction of rotation at input shaft	Position of worm shaft	Direction of rotation at output drive
RR	Clockwise	Right	Clockwise
LL	Clockwise	Left	Counterclockwise
RL	Clockwise	Right	Counterclockwise
LR	Clockwise	Left	Clockwise

Data Matrix code

When registered as authorised user, you may use the **AUMA Support App** to scan the Data Matrix code and directly access the order-related product documents without having to enter order number or serial number.

Figure 4: Link to the App store:

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.

WARNING

The coupling is not secured within the gearbox. Risk of falling out!

Injury hazard.

→ Remove coupling from gearbox housing prior to transport.

Figure 5: Coupling

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 eyebolts for tight seat in housing (verify reach of the screws).

→ Observe manufacturer specifications for fixing lifting straps and round slings.

→ Respect total weight of combination (gearbox, primary reduction gearing, actuator).

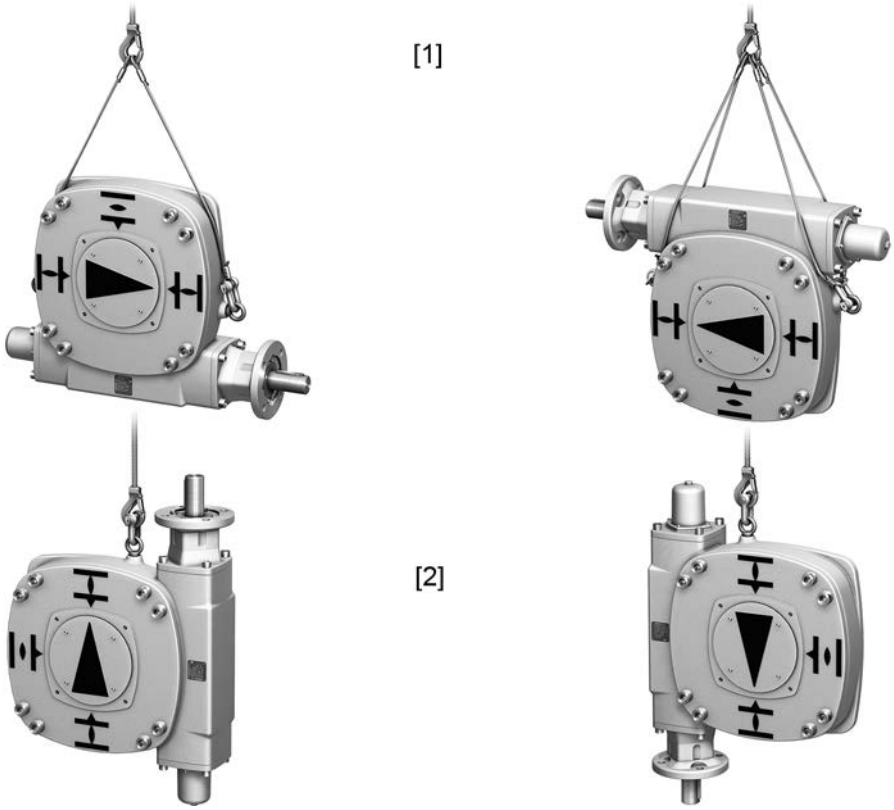
Information

Up to size 125.3, gearboxes are not equipped with special transport threads. Suspension is possible using lifting straps/round slings.
From size 160.3, transport threads are provided for fixing with eyebolts. Eyebolts are not included in the scope of delivery.

Examples of transport without actuator

Figure 6: Example of GS 50.3 – GS 125.3

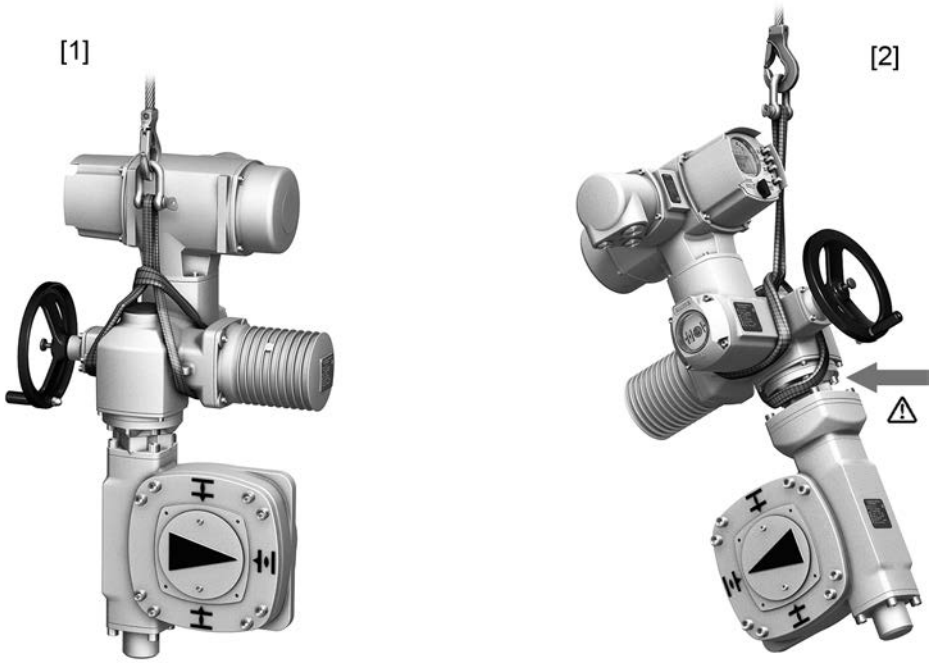
Figure 7: Examples of GS 160.3 – GS 250.3



[1] Worm shaft placed horizontally, with 2 eyebolts
[2] Worm shaft placed vertically, with one eyebolt

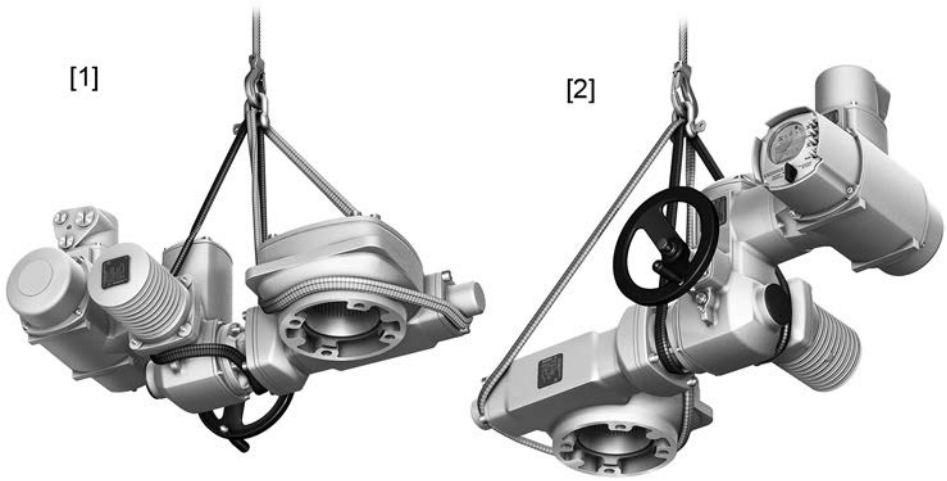
Examples of transport with mounted actuator/actuator controls

Figure 8: Examples of GS 50.3 – GS 125.3, vertical suspension



[1] Sizes 50.3 – 80.3, as well as 100.3/125.3 with i = 52:1/107:1
[2] Sizes 100.3/125.3 with i = 126:1/160:1/208:1
⚠ Place lifting straps/slings around the flange!

Figure 9: Example of GS 50.3 – GS 250.3, horizontal suspension



Strap/sling arrangement
[1] View on front
[2] View on rear

Table 1:

Weights including grease filling in gear housing		
Type	Standard version	Version with base and lever
	[kg][1)]	[kg]
GS 50.3	7	10
GS 63.3	12	23
GS 80.3	16	29
GS 100.3 (52:1/107:1)	33	58
GS 100.3 (126:1/160:1/208:1)	39	64
GS 125.3 (52:1)	40	89
GS 125.3 (126:1/160:1/208:1)	46	95
GS 160.3 (54:1)	80	139
GS 160.3 (218:1/442:1/880:1)	91	150
GS 200.3 (53:1)	140	258
GS 200.3 (214:1/434:1)	160	278
GS 200.3 (864:1/1 752:1)	170	288
GS 250.3 (52:1)	273	467
GS 250.3 (210:1/411:1)	296	490
GS 250.3 (848:1/1 718:1)	308	502
Additional weights when mounting extension flanges		
F30 for GS 125.3	18	
F35 for GS 160.3	33	
F40 for GS 200.3	48	
F48 for GS 250.3	75	

1) Specified weight includes unmachined coupling

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 For long-term storage (more than 6 months), observe the following points:

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

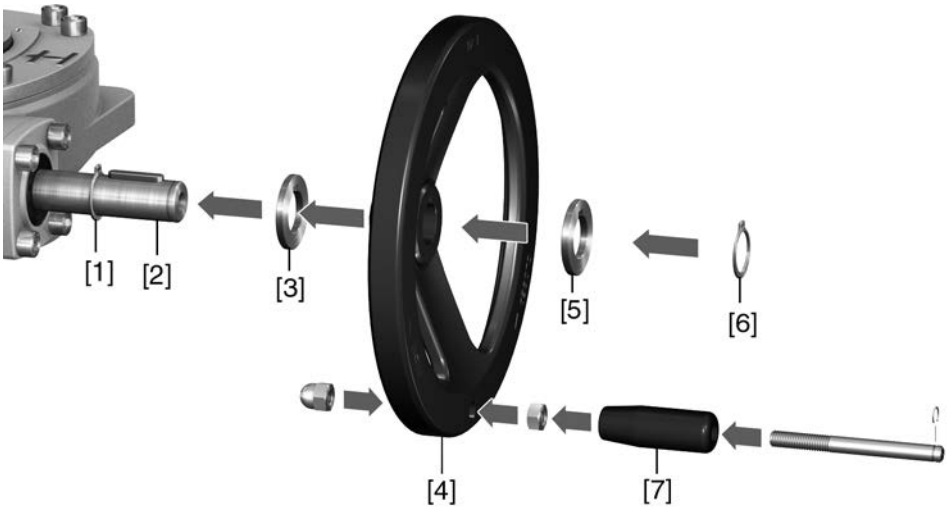
4.1. Mounting position

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 10: Handwheel



[1] Retaining ring for input shaft (partly required)
[2] Gear input shaft
[3] Spacer (partly required)
[4] Handwheel
[5] Spacer (partly required)
[6] Retaining ring
[7] Ball handle

1. For input shafts with keyway: Place retaining ring [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 retaining ring [6] supplied.
6. Fit ball handle [7] to handwheel.

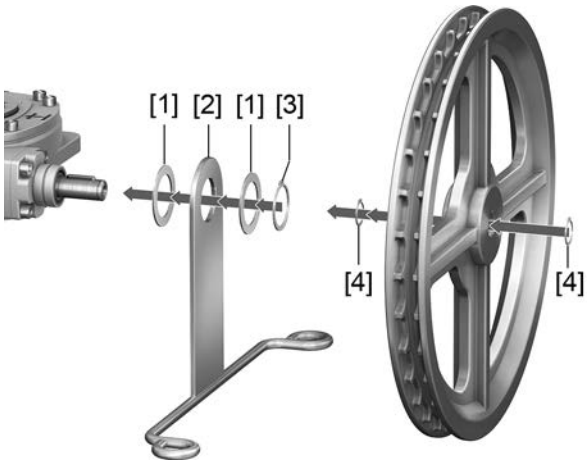
4.3. Chainwheel: mount

For gearboxes to be operated via chainwheel, the chainwheel is supplied separately. Fitting is performed on site according to the description below.

Information Use in explosion-proof atmospheres is not permitted!
Gearboxes supplied without chainwheel can be retrofitted with a chainwheel. For sizes 50.3 – 80.3, a special bearing cover is to be mounted for retrofitting.

4.3.1. Chainwheel for gearboxes GS 50.3 – GS 80.3: mount

Figure 11: Mount chain guide and chainwheel



[1] Thrust washers
[2] Chain guide
[3] Retaining ring for chain guide
[4] Retaining rings for chainwheel

Chain guide

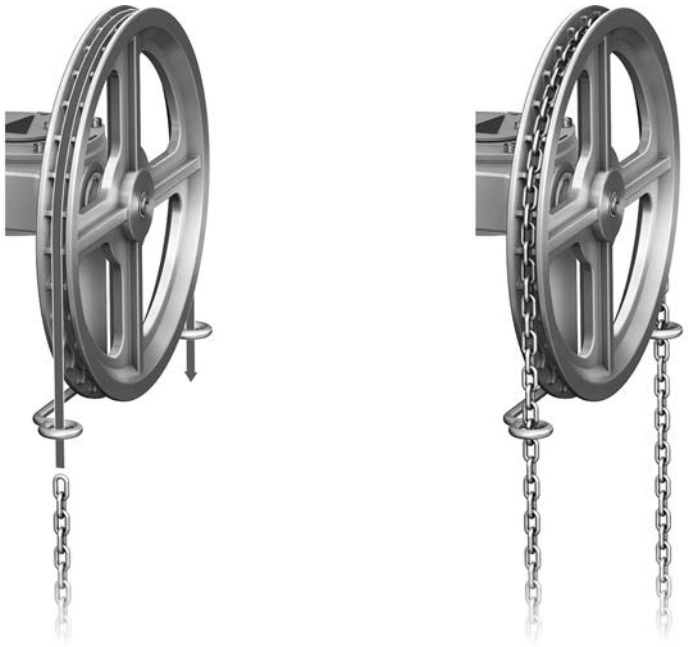
1. Fit thrust washer [1] on input shaft.
2. Fit chain guide [2].
3. Fit second thrust washer [2].
4. Secure chain guide with retaining ring [3].

Chainwheel

5. Fit retaining ring [4] on input shaft.
6. Place chainwheel onto input shaft.
7. Secure chainwheel with second retaining ring [4].

Chain

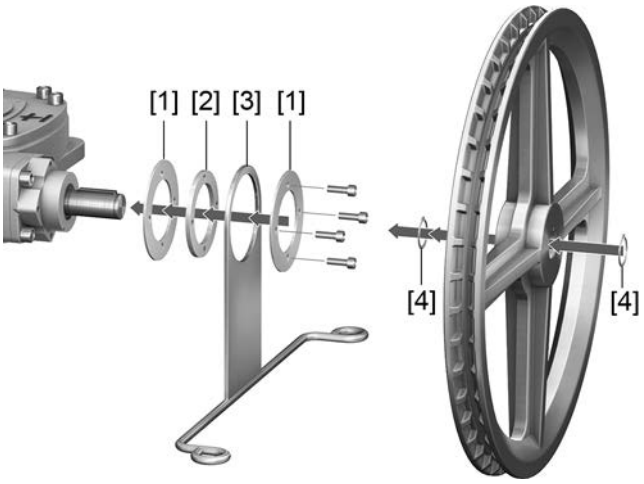
Figure 12: Mount chain



8. Pull chain through chain guide and place across chainwheel.
9. Connect chain ends with spare chain link.
   Information: Do not twist chain!

4.3.2. Chainwheel for gearboxes GS 100.3 – GS 250.3: mount

Figure 13: Mount chain guide and chainwheel



[1] Thrust washers
[2] Washer
[3] Chain guide
[4] Retaining rings for chainwheel

Chain guide

1. Fit thrust washer [1] on input shaft.
2. Also place washer [2].
3. Fit chain guide [3].
4. Fit second thrust washer [2].
5. Fasten chain guide with 4 screws.

Chainwheel

6. Fit retaining ring [4] on input shaft.
7. Place chainwheel onto input shaft.
8. Secure chainwheel with second retaining ring [4].

Chain

Figure 14: Mount chain

9. Pull chain through chain guide and place across chainwheel.
10. Connect chain ends with spare chain link.
    Information: Do not twist chain!

4.4. Multi-turn actuators for motor operation

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.

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).

⚠ WARNING

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.

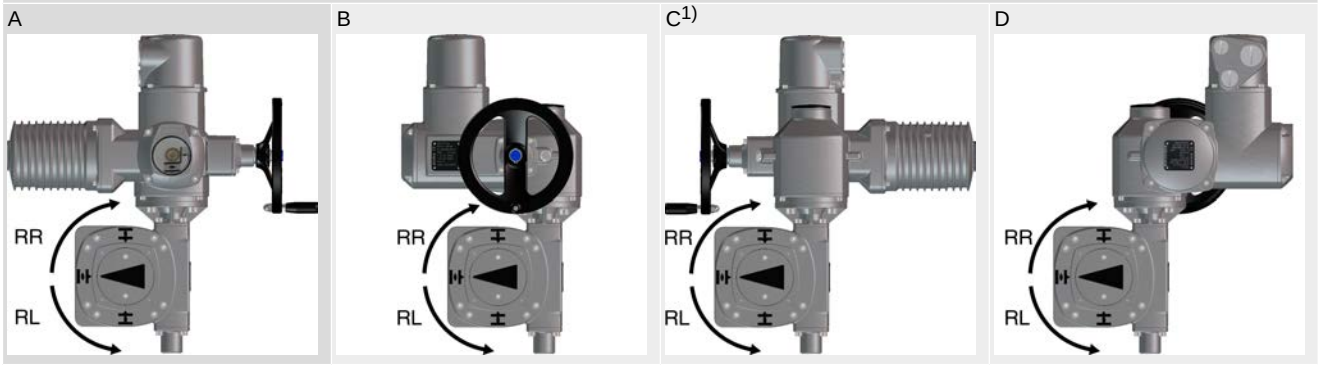
The reach of screws must be sufficient for the internal threads to ensure the supporting strength of the device and to accept the lateral forces due to the applied torque.

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

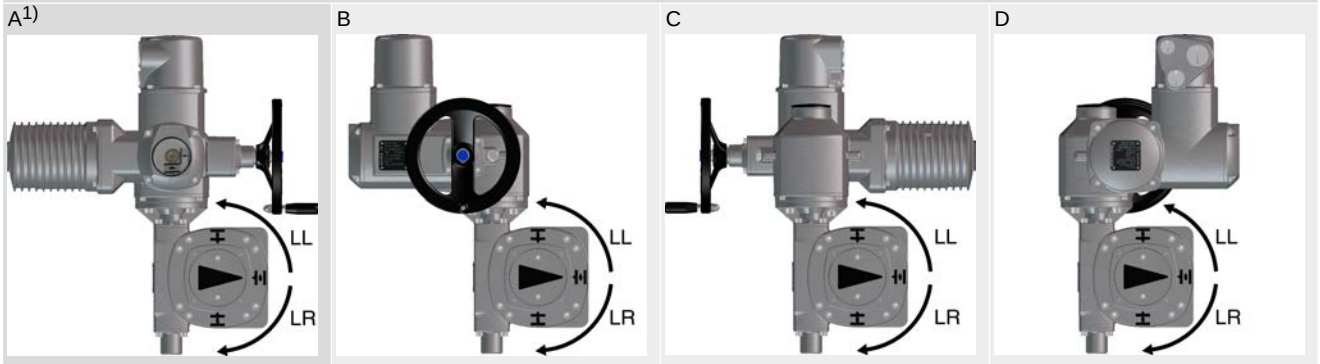
4.4.1. Mounting positions Multi-turn actuators with part-turn gearboxes

Mounting positions A – D for multi-turn actuators with part-turn gearboxes

GS versions RR and LL



GS versions LL and LR



1) Caution: For multi-turn actuators SA/SAR 14.2 and 14.6 with GS 125.3, mounting position C is not possible for RR and RL versions; mounting position A is not possible for LL and LR versions.

Please consider possible space constraints on site when selecting the mounting position.

Mounting positions may easily be changed at a later date.

Up to size GS 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 GS 160.3.

4.4.2. Input mounting flange: mount

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.

Table 2:

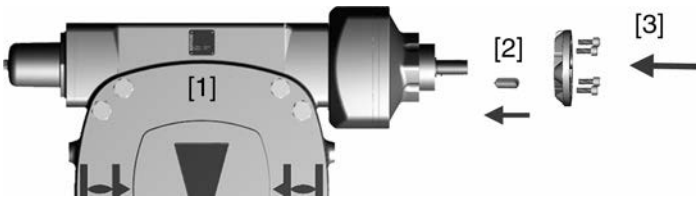
Suitable input mounting flanges				
Gearboxes	Reduction ratio	Input shaft	Input mounting flange for mounting multi-turn actuators	
		[mm]	EN ISO 5210	DIN 3210
GS 50.3	51:1	16	F07, F10	G0
GS 63.3	51:1	20	F07, F10	G0
	82:1	20		
GS 80.3	53:1	20	F07, F10	G0
	82:1	20		
GS 100.3	52:1	30/(20)	F14 (F10)	G1/2 (G0)
	107:1[1)]	30	F14 (F10)	G1/2 (G0)
	126:1[1)]	30	F10	G0
	260:1[1)]	30	F10	G0
	208:1[1)]	30	F10	G0
GS 125.3	52:1	30	F14	G1/2
	126:1[1)]	30/(20)	F14 (F10)	(G0)
	160:1[1)]	30/(20)	F14 (F10)	(G0)
	208:1[1)]	20	F10, F14	G0
GS 160.3	54:1	30	F16 (F14)	G3 (G1/2)
	218:1[1)]	30/(20)	F14 (F10)	G1/2 (G0)
	442:1[1)]	20	F10	G0
	880:1[1)]	20	F10	G0
GS 200.3	53:1	40	F25 (F16)	(G3)
	[1)]	30	F14	G1/2
	434:1[1)]	30/(20)	F14 (F10)	G1/2 (G0)
	864:1[1)]	20	F14	G0
	1,752:1[1)]	20	F10	G0
GS 250.3	52:1	50	F30 (F25)	–
	210:1[1)]	40/(30)	F16 (F14)	G3 (G1/2)
	411:1[1)]	30	F14	G1/2
	848:1[1)]	30/(20)	F14 (F10)	G1/2 (G0)
	1 718:1[1)]	20	F10	G0

1) Equipped with primary reduction gearing or planetary gearing to reduce input torques.

Assembly steps

1. Clean mounting faces, thoroughly degrease uncoated mounting surfaces.

Figure 15: Mounting example, input mounting flange fitted to gearbox with primary reduction gearing



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

2. Mount parallel pin [2].

3. Place input mounting flange [3] and fasten with screws.
4. Fasten screws crosswise to a torque according to table.

Table 3:

Tightening torques for screws (for mounting multi-turn actuator and input mounting flange)	
Threads	Tightening torque Nm]
	Strength class A2-80
M8	24
M10	48
M12	82
M16	200
M20	392

5. Mount AUMA actuator in compliance with the operation instructions pertaining to the multi-turn actuator.

4.5. Gearbox to valve: mount

The gearbox is mounted to the valve using a coupling (standard) or via lever. Separate instructions are available for actuator mounting to the valve when equipped with base and lever.

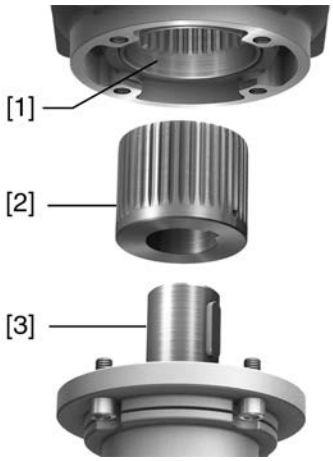
4.5.1. Output drive for coupling

Application

- For valve attachments according to EN ISO 5211
- For rotating, non-rising valve stem

Design

Figure 16: Valve attachment via coupling



[1] Gearbox worm wheel with internal splines
[2] Splined plug-in coupling
[3] Valve shaft (example with key)

4.5.1.1. Gearbox with coupling: mount to valve

Unbored couplings or couplings with pilot bore must be machined to match the valve shaft prior to mounting the gearbox to the valve (e.g. with bore and keyway, two-flat or square bore).

Information

Assemble 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.

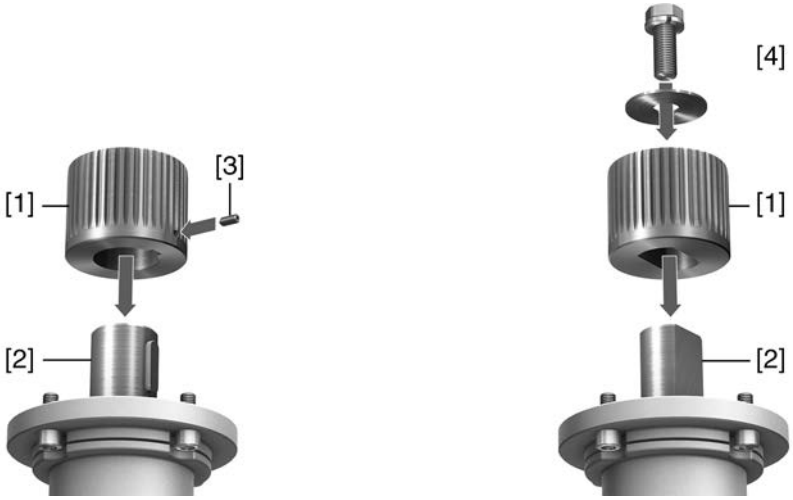
Assembly steps

1. If required, move gearbox in same end position as valve using the handwheel.
2. Clean mounting faces, thoroughly degrease uncoated mounting surfaces.

   Information: To avoid contact corrosion, we recommend applying a surface sealing agent on the uncoated contact surfaces for gearboxes without powder coating.

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 clamping washer and a screw with curved spring lock washer [4]. Thereby, ensure that dimensions X, Y or L are observed (refer to figure and table <Mounting positions for coupling>).

Figure 17: Examples: Fit coupling



[1] Coupling
[2] Valve shaft
[3] Grub screw
[4] Clamping washer and screw with curved spring lock washer

Figure 18: Mounting positions for coupling

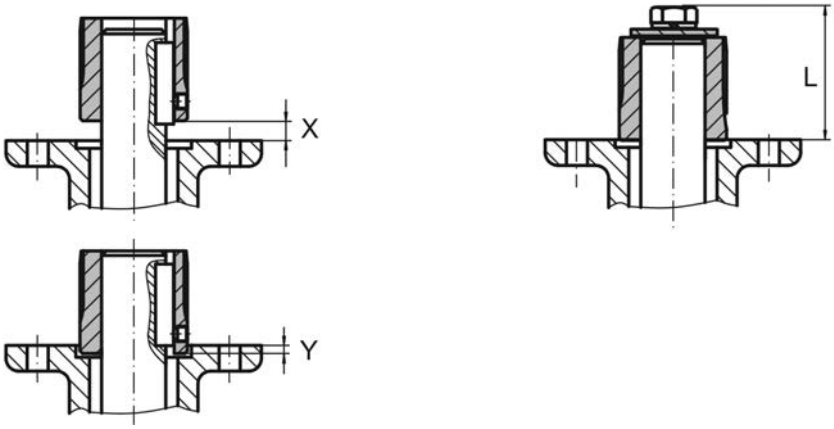


Table 4:

Dimensions [mm]	GS 50.3		GS 63.3		GS 80.3		GS 100.3		GS 125.3		
EN ISO 5211	F05	F10	F10	F12	F12	F14	F14	F16	F16	F25	F30[1)]
X max.	6	14	7	10	13	23	22	22	17	17	35
Y max.	5	5	18	13	18	5	13	8	35	27	0
L max.	61	61	61	73	76	78	88	123	123	126	126

1) Extension flange, extended coupling required

Table 5:

Dimensions [mm]	GS 160.3			GS 200.3			GS 250.3		
EN ISO 5211	F25	F30[1)]	F35	F30	F35	F40[1)]	F35	F40	F48[1)]
X max.	15	30	30	19	44	44	8	13	20
Y max.	11	0	0	19	0	0	8	0	5
L max.	130	140	130	160	190	160	220	230	220

1) Extension flange, extended coupling required

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 size M30 or larger at defined torques. There is a risk that the worm gearbox might shift radially with regard to the valve mounting flange. To improve adhesion between valve and gearbox, we recommend applying Loctite 243 (or similar adhesive products) to the mounting faces of screws and nuts from size M30.
7. Fit gearbox. If required, slightly turn gearbox until splines of coupling engage.

   Figure 19:

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.

   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 6:

Tightening torques for screws		
Threads	Tightening torque Nm]	
	Strength class	
	A2-70/A4-70	A2-80/A4-80
M6	8	10
M8	18	24
M10	36	48
M12	61	82
M16	150	200
M20	294	392
M30	564	1,422
M36	2,098	2,481

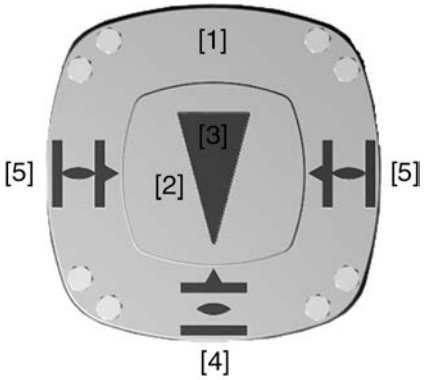
5. Indications

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 20: 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.

⚠ CAUTION

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:

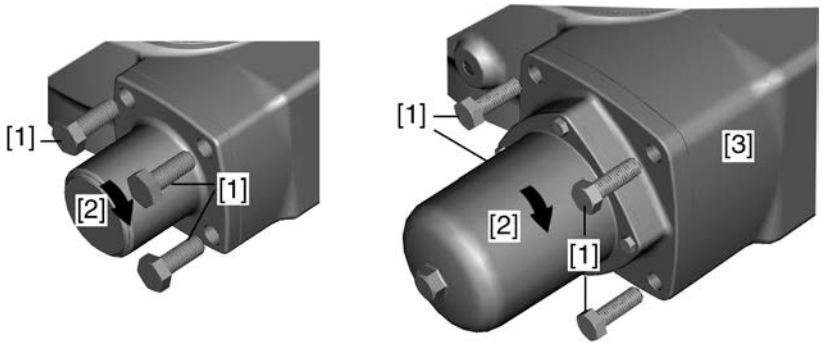
- Recommendation for **butterfly valves**: Set end stop CLOSED first.
- Recommendation for **ball valves**: Set end stop OPEN first.

Information

- 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 21: 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 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 7:

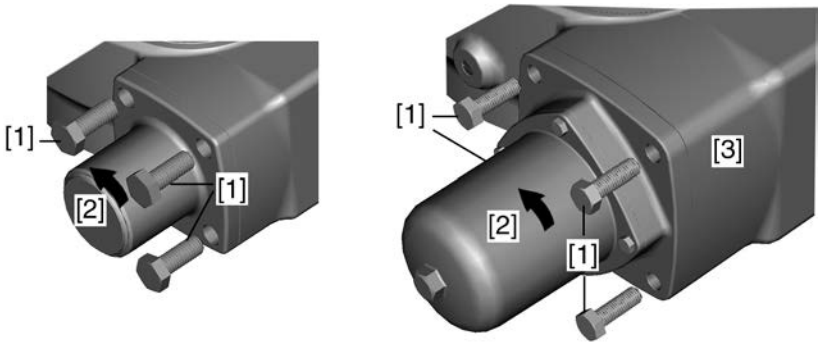
Tightening torques for screws at end stop		
Gearbox	Screws [1]	Tightening torque T_A [Nm]
GS 50.3	M6	10
GS 50.3 – GS 80.3	M8	24
GS 100.3 – GS 125.3	M12	82
GS 160.3	M10	48
GS 200.3	M12	82
GS 250.3	M16	200

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: <Seating in end positions via multi-turn actuator>.

6.1.2. End stop OPEN: set

Figure 22: 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 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: <Seating in end positions via multi-turn actuator>.

6.2. Seating in end positions via 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.
- End position seating must be set in compliance with the operating instructions pertaining to the multi-turn actuator.
- When setting the torque switching within the multi-turn actuator, make sure that the tripping torque for both directions does not exceed the max. gearbox input torque (refer to technical data or name plate).
- Set the torque switching within the multi-turn actuator to the following value to prevent damage to the valve:
  Tripping torque = valve torque/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 Gearbox without primary reduction gearing: Turn handwheel in the opposite direction of the valve end position by approx. 4 – 6 turns.
   3.2 Gearbox with primary reduction gearing: Turn handwheel in the opposite direction of the valve end position by approx. 10 – 15 turns.
   3.3 Check torque switching for end position CLOSED according to operation instructions for multi-turn actuator and, if necessary, set to required value.
   3.4 Set limit switching for signalling end position CLOSED according to operation instructions for multi-turn actuator.

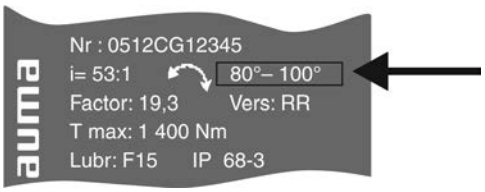
6.2.2. Seating in end position OPEN: set

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 Gearbox without primary reduction gearing: Turn handwheel in the opposite direction of the valve end position by approx. 4 – 6 turns.
   3.2 Gearbox with primary reduction gearing: Turn handwheel in the opposite direction of the valve end position by approx. 10 – 15 turns.
   3.3 Check torque switching for end position OPEN according to operation instructions for multi-turn actuator and, if necessary, set to required value.
   3.4 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 23: Name plate indicating the swing angle



Versions Sizes GS 50.3 – GS 125.3 = adjustable swing angle - option

Sizes GS 160.3 – GS 250.3 = adjustable swing angle - standard

Accuracy Sizes GS 50.3 – GS 125.3 = 0.6°

Sizes GS 160.3 – GS 250.3 = 0.11° up to 0.14°

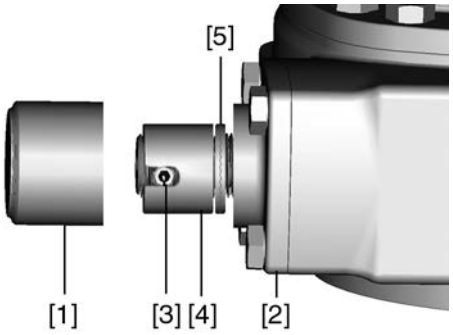
6.3.1. Swing angle: modify at gearboxes up to size 125.3

The adjustment is made in end position OPEN.

Special tools: Pin driver for spring-type straight pin

- for GS 50.3 (AUMA art. no. V001.367-Pos.003)
- for GS 63.3 – GS 80.3 (AUMA art. no. V001.367-Pos.002)
- for GS 100.3 – GS 125.3 (AUMA art. no. V001.367-Pos.001)

Figure 24: End stop (figure shows size 80.3)



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

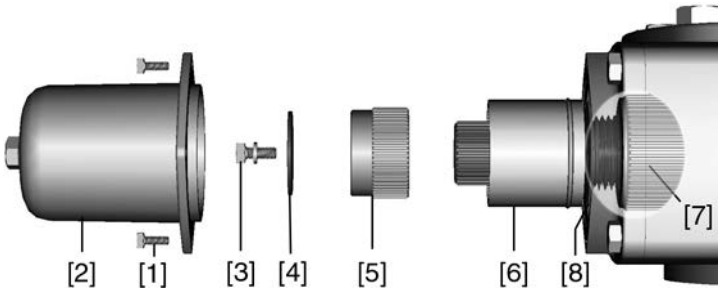
1. Unscrew protective cap [1] at end stop [2].
2. Remove spring-type straight pin [3] with suitable pin driver (special tool).
3. **Swing angle increase:**
   - 3.1 Turn end stop nut [4] **counterclockwise**.
     Information: When turning counterclockwise the end stop nut [4] make sure that the spring-type straight 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: Spring-type straight pin [3] must remain completely covered by end nut [4].
5. Drive in the spring-type straight 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] slighty 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!

6.3.2. Swing angle: modify at gearboxes from size 160.3

Adjustments are generally made in end position OPEN.

Figure 25: End stop (figure shows size 200.3)



[1] Screws
[2] Protective cap
[3] Screw with curved spring lock washer
[4] Clamping washer
[5] Setting ring
[6] End stop nut
[7] Travelling nut
[8] Pairs 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 curved spring 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], as well as screw and curved spring lock washer [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>.

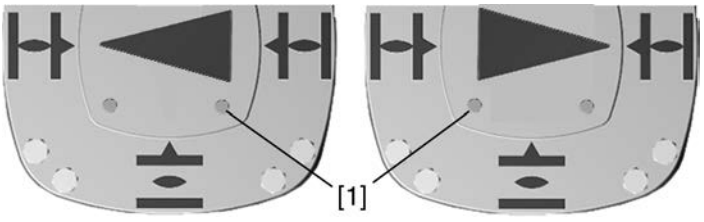
Information If the gearbox is mounted to a multi-turn actuator, the limit switching for the end position OPEN must be set first in compliance with the operation instructions of the multi-turn actuator.

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

CAUTION

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 offers 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

- Before commissioning, perform visual inspection for grease leakage and paint damage (corrosion).
- Thoroughly touch up any possible damage to paint. Original paint in small quantities can be supplied by AUMA.

7.2. Maintenance intervals

Recommendation for plants subject to strong vibration

- For plants subject to strong vibration, 6 months after commissioning and then once a year: Check fastening screws between actuator and gearbox/valve for tightness. If required, fasten screws while applying the tightening torques as indicated in chapter <Assembly>. For screws sealed and secured with e.g. thread sealing material, this action is not required.

Recommendation for grease change and seal replacement:

- If rarely operated (typically in buried service), the gearboxes are maintenance-free. Grease change or re-lubrication is not necessary.
- If operated frequently (typically in modulating duty), we recommend changing both grease and seals after 4 – 6 years.

NOTICE

Gearing damage due to using inappropriate grease!

→ Only use original lubricants supplied by AUMA.

→ Do not mix lubricants.

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

- Imperatively heed 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, in particular where combustible dust is present, perform visual inspection for deposit of dirt or dust on a regular basis. Clean devices if required.
- The pointer cover with indicator glass 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. 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 tables include standard and optional features. For detailed information on the customer-specific version, refer to the order-related data sheet. The technical data sheet can be downloaded from the Internet in both German and English at **http://www.auma.com** (please state the order number).

8.1. Technical data Part-turn gearboxes

General information
For motor or manual operation of valves (e.g. butterfly valves, ball and plug valves). For special applications, e.g. dampers, gas diverters, flue gas dampers, toggle arm driven diverters and guillotine isolators, specific sizing is required. Separate technical data apply for these applications.

Features and functions		
Worm wheel material	For open-close duty: Spheroidal cast iron For modulating duty: Bronze	
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, sensitive adjustment	
Strength of end stop	Guaranteed strength of end stop (in Nm) for input side operation	

Type	GS 50.3	GS 63.3	GS 80.3	GS 100.3			
Reduction ratio	51:1	51:1	53:1	52:1	126:1	160:1	208:1
[Nm]	250	450	450	1,350	625	500	250

Type	GS 125.3				GS 160.3			
Reduction ratio	52:1	126:1	160:1	208:1	54:1	218:1	442:1	880:1
[Nm]	1,350	625	500	250	3,200	900	450	250

Type	GS 200.3					
Reduction ratio	53:1	67:1	214:1	434:1	864:1	1752:1
[Nm]	8,000	250	2,000	1,000	500	250

Type	GS 250.3				
Reduction ratio	52:1	210:1	411:1	848:1	1718:1
[Nm]	8,000	2,000	1,000	500	250

Swing angle GS 50.3 – GS 125.3	Standard:	Fixed swing angle between 10° and max. 100°; set in the factory to 92° unless ordered otherwise.
	Options:	Adjustable in steps of: 10° – 35°, 35° – 60°, 60° – 80°, 80° – 100°, 100° – 125°, 125° – 150°, 150° – 170°,170° – 190° Swing angles > 190° are only possible with a worm wheel made of bronze and without end stops. For swing angles > 100°, we recommend a worm wheel made of bronze. Worm wheel made of bronze; Multi-turn version without end stop, up to max. 10 turns of worm wheel permissible Heed special sizing!
Swing angle GS 160.3 – GS 250.3	Standard:	Adjustable 80° – 100°; set in the factory to 92° unless ordered otherwise.
	Options:	Adjustable in steps of: 0° – 20°, 20° – 40°, 40° – 60°, 60° – 80°, 90° – 110°, 110° – 130°, 130° – 150°, 150° – 170°, 170° – 190° Swing angles > 190° are only possible with a worm wheel made of bronze and without end stops. For swing angles > 100°, we recommend a worm wheel made of bronze. Worm wheel made of bronze; Multi-turn version without end stop, up to max. 10 turns of worm wheel permissible. Heed special sizing!
Swing angle for special reduction ratio (worm wheel made of bronze only)	Standard:	Adjustable 80° – 100°; set in the factory to 92° unless ordered otherwise.
	Options:	Swing angle range different from standard range available on request Multi-turn version without end stop, up to max. 10 turns of worm wheel permissible. Heed special sizing!

Features and functions		
Mechanical position indicator	Standard:	Pointer cover for continuous position indication
	Options:	• Sealed pointer cover for horizontal outdoor installation (not available for GS 50.3) • Protection cover for buried services instead of pointer cover (without mechanical position indicator) • Sealed pointer cover with air vent valve, not available for GS 50.3 Observe notes on Information sheet Enclosure protection IP68 for part-turn gearboxes
Input shaft	Cylindrical with parallel key according to DIN 6885-1	

Operation	
Motor operation	• Via electric multi-turn actuator • Input mounting flanges for multi-turn actuator
Type of duty Open-close duty	Short-time duty S2 - 15 min Class A according to EN 15714-2: OPEN-CLOSE Class B according to EN 15714-2: Inching/positioning or positioning duty
Type of duty Modulating duty	Intermittent duty S4 - 25 % Class C according to EN 15714-2: Modulating duty
Maximum permissible input speeds and operating times	In modulating duty: 215 rpm In open-close duty:

Type	GS 50.3	GS 63.3		GS 80.3		GS 100.3				
Reduction ratio	51:1	51:1	82:1	53:1	82:1	52:1	107:1	126:1	160:1	208:1
Max. permissible input speed [rpm]	108	108		108		108		216		
Fastest operating time for 90° [s]	7	7	11	7	11	7	15	9	11	19

Type	GS 125.3				GS 160.3			
Reduction ratio	52:1	126:1	160:1	208:1	54:1	218:1	442:1	880:1
Max. permissible input speed [rpm]	108	216			108	216		
Fastest operating time for 90° [s]	7	9	11	19	8	15	31	61

Type	GS 200.3					GS 250.3				
Reduction ratio	53:1	214:1	434:1	864:1	1752:1	52:1	210:1	411:1	848:1	1718:1
Max. permissible input speed [rpm]	108	216				108	216			
Fastest operating time for 90° [s]	7	15	30	60	122	7	15	29	59	119

Shorter operating times can be achieved with worm wheels made of bronze, refer to Technical data GS 50.3 – GS 250.3 for modulating duty and shorter operating times.
Due to gear tooth geometry and the material characteristics of bronze, worm gearboxes with a worm wheel made of bronze can transmit lower torques.
Calculation of operating time for a 90° swivel movement

$$\text{Oper. time for } 90° \text{ [s]} = \frac{\text{Reduction ratio [i]}}{\text{n [input speed in rpm]}} \cdot 15$$

Calculation of the operating time for a swivel movement [°]:

$$\text{Oper. time for } \theta° \text{ [s]} = \frac{\text{Swing angle } \theta \text{ [°]} \cdot \text{Reduction ratio [i]}}{6 \cdot \text{n [input speed in rpm]}}$$

Operation

Manual operation

Standard:
- Handwheel made of aluminium with electrophoretic coating
- Handwheel with ball handle

Option:
- Handwheel made of GJL-200 with electrophoretic coating and painting
- Handwheel lockable
- WSH for signalling position and end positions
- Chainwheel (only available for torques according to duty class 1)

Available handwheel diameters according to EN 12570, selection according to output torque:

Type	GS 50.3	GS 63.3	GS 80.3	GS 100.3				GS 125.3			
Reduction ratio	51:1	51:1	53:1	52:1	126:1	160:1	208:1	52:1	126:1	160:1	208:1
Handwheel Ø [mm]	160 200 250	250 315	315 400	400 500	315 400		250 315	500 630 800	400 500		315 400

Type	GS 160.3				GS 200.3					
Reduction ratio	54:1	218:1	442:1	880:1	53:1	67:1	214:1	434:1	864:1	1752:1
Handwheel Ø [mm]	630 800	400	315	250	–	800	500 630	400	315	250

Type	GS 250.3				
Reduction ratio	52:1	210:1	411:1	848:1	1718:1
Handwheel Ø [mm]	–	800	500 630	400	315

Deflection of the input shaft

90° deflection of the input shaft
Combination with GK bevel gearbox directly mounted on GS or on planetary stage possible, refer to Mounting positions Part-turn gearboxes with multi-turn actuators

Base and lever

Not suitable for load class 3.

Base	Made of spheroidal cast iron; for mounting to base, 4 holes for fastening screws are available.	
Lever	Made of spheroidal cast iron; with 2 or 3 bores for fixing lever arrangement. Considering the environmental conditions, the lever may be mounted to the output shaft in any desired position.	
Ball joints	Two ball joints matching the lever, as an option including lock nuts and 2 welding nuts; suitable for pipe according to dimension sheet.	
Mechanical position indicator	Standard:	No position indicator (protection cover)
	Option:	Pointer cover instead of protection cover for continuous position indication

Valve attachment		
Valve attachment	Dimensions according to EN ISO 5211: The maximum torques of mounting flanges according to EN ISO 5211 are to be met.	
Spigot	Flanges with spigot. Up to GS 125.3, spigots are implemented by means of spigot rings (option). From GS 160.3 to GS 250.3, spigots are directly integrated into the housing.	
Plane flanges	Up to GS 125.3, plane flanges are implemented by means of recesses. From GS 160.3 to GS 250.3, the housing is plane machined (option).	
Bore for parallel pins (option)	Two bores for parallel pins shifted by 180°. The parallel pins are not included in the scope of delivery.	

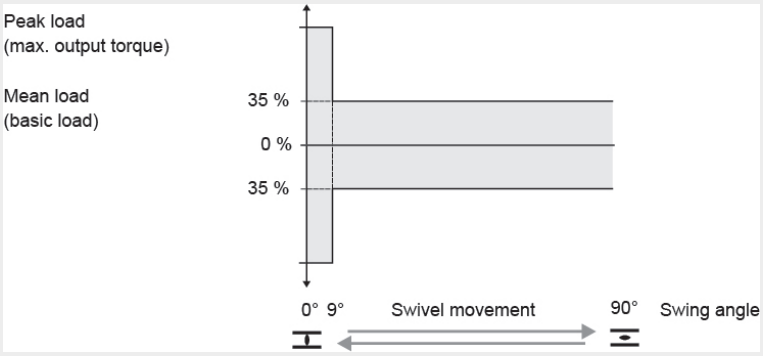
Type	GS 80.3		GS 100.3		GS 125.3			GS 160.3		
Flange according to EN ISO 5211	F12	F14	F14	F16	F16	F25	F30	F25	F30	F35
Housing material	GJS	GJS	GJS	GJS	GJL	GJL	GJL	GJL	GJL	GJL

Type	GS 200.3			GS 250.3		
Flange according to EN ISO 5211	F30	F35	F40	F35	F40	F48
Housing material	GJL	GJL	GJL	GJL	GJL	GJL

Refer to Dimensions Output mounting flange GS 50.3 – GS 125.3 (Y000.854) and Dimensions Output mounting flange GS 160.3 – GS 250.3 (Y005.001). Further pitch circle diameters for locating pins on request.

Splined coupling for connection to the valve shaft	Standard:	• Without bore or pilot bore from GS 160.3 • Worm gearbox can be mounted on coupling
	Options:	Finish machining with bore and keyway, square bore or two-flat with grub screw for secure fixing to valve shaft.

Service conditions		
Mounting position	Any position	
Ambient temperature	Standard:	–40 °C to +80 °C
	Options:	–60 °C to +60 °C 0 °C to +120 °C
Enclosure protection according to EN 60529	Standard:	IP68, dust-tight and water-tight up to max. 8 m head of water
	Options:	IP68-20, dust-tight and water-tight up to max. 20 m head of water
Corrosion protection	Standard:	GS 50.3 – GS 80.3: KS GS 100.3 – GS 250.3: KN
	Options:	GS 50.3 – GS 80.3: KX GS 100.3 – GS 250.3: KS/KX
	KN	Suitable for installation in industrial units, in water or power plants with a low pollutant concentration
	KS	Suitable for use in areas with high salinity, almost permanent condensation, and high pollution.
	KX	Suitable for use in areas with extremely high salinity, permanent condensation, and high pollution.
Coating	GS 50.3 – GS 80.3: Double layer powder coating	
	GS 100.3 – GS 250.3: Two-component iron-mica combination	
Colour		AUMA silver-grey (similar to RAL 7037)
	Option:	Available colours on request

<table>
<tr><th colspan="2">Service conditions</th></tr>
<tr><td>AUMA load spectrum</td><td>For open-close duty with worm wheel made of spheroidal cast iron:
 

For modulating duty with worm wheel made of bronze:
A start consists of one movement of minimum 1 % in both directions at a load of 35 % of the maximum valve torque (modulating torque).
AUMA worm gearboxes meet or exceed the lifetime requirements of EN 15714-2.</td></tr>
<tr><td>Lifetime for motor operation in accordance with AUMA load spectrum</td><td>For open-close duty with worm wheel made of spheroidal cast iron:
Duty class 1: Lifetime for 90° swivel movement. Meets the lifetime requirement of EN 15714-2
<table>
<tr><th>Gearbox size</th><th>GS 50.3/GS 63.3</th><th>GS 80.3/GS100.3</th><th>GS 125.3 – GS 200.3</th><th>GS 250.3</th></tr>
<tr><td>Number of cycles for max. torque</td><td>10,000</td><td>5,000</td><td>2,500</td><td>1,200</td></tr>
</table>
Duty class 2: Lifetime for 90° swivel movement for valves which are infrquently operated.
<table>
<tr><th>Gearbox size</th><th>GS 50.3/GS 63.3</th><th>GS 80.3/GS100.3</th><th>GS 125.3 – GS 200.3</th><th>GS 250.3</th></tr>
<tr><td>Number of cycles for max. torque</td><td colspan="4">1,000</td></tr>
</table>
Lifetime for larger swing angle on request
For modulating duty with worm wheel made of bronze:
1.2 million modulating steps</td></tr>
<tr><td>Lifetime for manual operation</td><td>Duty class 3: Meets the lifetime requirement of EN 1074-2</td></tr>
</table>

Special features for use in potentially explosive atmospheres in accordance with ATEX 2014/34 EU

Explosion protection in accordance with ATEX 2014/34 EU

Standard:	II2G c IIC T4 II2D c T130 °C
Option	II2G c IIC T3 II2D c T190 °C IM2 c

Type of duty (open-close duty, with worm wheel made of spheroidal cast iron)

Maximum 3 cycles (OPEN - CLOSE - OPEN) in accordance with AUMA load spectrum (90° swivel movement) and maximum permissible input speeds, or with mean constant output torques according to table:

Type	GS 50.3	GS 63.3		GS 80.3		GS 100.3		GS 125.3
Reduction ratio	–	51:1	82:1	53:1	82:1	–	107:1	–
Average output torque [Nm]	250	500	375	1,000	750	2,000	1,400	4,000

Type	GS 160.3	GS 200.3	GS 250.3
Average output torque [Nm]	8,000	16,000	32,000

Type of duty (modulating duty with worm wheel made of bronze)

Standard: Intermittent duty S4 – 25 % with modulating torque and max. input speed

Type	GS 50.3	GS 63.3	GS 80.3	GS 100.3			
Reduction ratio	51:1	51:1	53:1	52:1	126:1	160:1	208:1
Max. speed at GS input with SA [rpm]	45	45	45	45	90	125	180

Type	GS 125.3				GS 160.3			
Reduction ratio	52:1	126:1	160:1	209:1	54:1	218:1	442:1	880:1
Max. speed at GS input with SA [rpm]	45	90	125	180	45	180	180	180

Type	GS 200.3					
Reduction ratio	53:1	67:1	214:1	434:1	864:1	1,752:1
Max. speed at GS input with SA [rpm]	11	11	45	90	180	180

Type	GS 250.3				
Reduction ratio	52:1	210:1	441:1	848:1	1,718:1
Max. speed at GS input with SA [rpm]	11	45	90	180	180

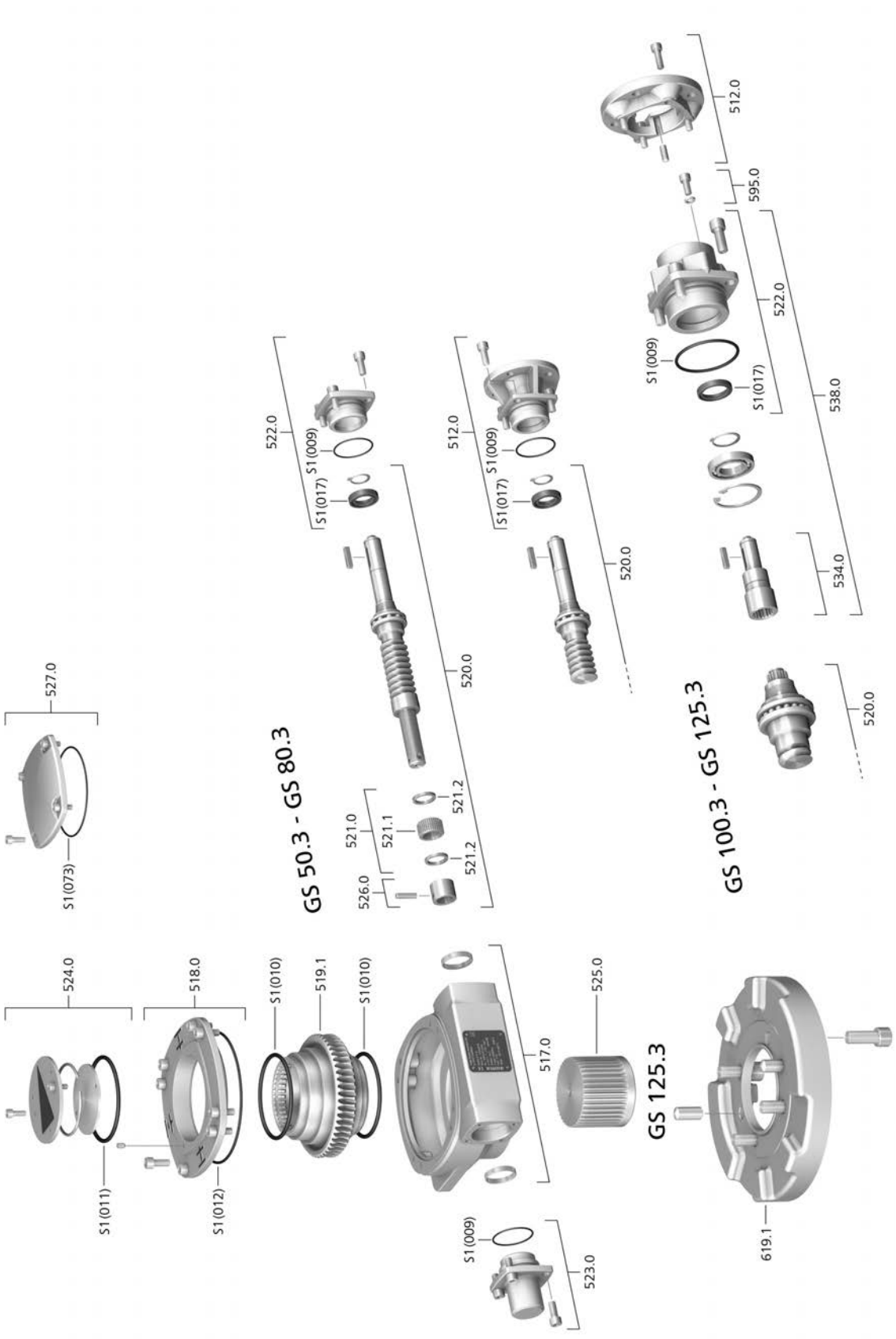
Exception:	GS 200.3 with modulating torque up to 4,800 Nm
Option:	GSD multi-turn version, specific sizing required; please contact AUMA.

Special features for use in potentially explosive atmospheres in accordance with ATEX 2014/34 EU		
Ambient temperature (open-close duty, with worm wheel made of spheroidal cast iron)	Duty classes 1 and 3	
	Standard:	–40 °C to +60 °C (II2G c IIC T4; II2D c T130 °C)
	Option	–60 °C to +60 °C (II2G c IIC T4; II2D c T130 °C) –40 °C to +40 °C (II2G c IIC T4; II2D c T130 °C) –40 °C to +80 °C (II2G c IIC T3; II2D c T190 °C) 0 °C to +120 °C (II2G c IIC T3; II2D c T190 °C) –20 °C to +40 °C (IM2 c)
	Duty class 2	
	Standard:	–40 °C to +60 °C (II2G c IIC T3; II2D c T190 °C); T4 on request with individual test
	Option	–60 °C to +40 °C (II2G c IIC T4; II2D c T130 °C) –60 °C to +60 °C (II2G c IIC T3; II2D c T190 °C); T4 on request with individual test –40 °C to +40 °C (II2G c IIC T4; II2D c T130 °C) –40 °C to +80 °C (II2G c IIC T3; II2D c T190 °C) –20 °C to +40 °C (IM2 c)
	Further temperature classes or loads exceeding the average torque of the AUMA load spectrum on request.	
Ambient temperature (modulating duty with worm wheel made of bronze)	Standard:	–40 °C to +40 °C (II2G c IIC T4; II2D c T130 °C) –40 °C to +60 °C (II2G c IIC T4; II2D c T130 °C) –50 °C to +60 °C (II2G c IIC T4; II2D c T130 °C) –60 °C to +60 °C (II2G c IIC T4; II2D c T130 °C)
	Options:	–40 °C to +80 °C (II2G c IIC T3; II2D c T190 °C) 0 °C to +120 °C (II2G c IIC T3; II2D c T190 °C) –20 °C to +40 °C (IM2 c)

Further information	
EU Directives	ATEX Directive: (2014/34/EU) Machinery Directive: (2006/42/EC)

9. Spare parts

9.1. Part-turn gearboxes GS 50.3 – GS 125.3

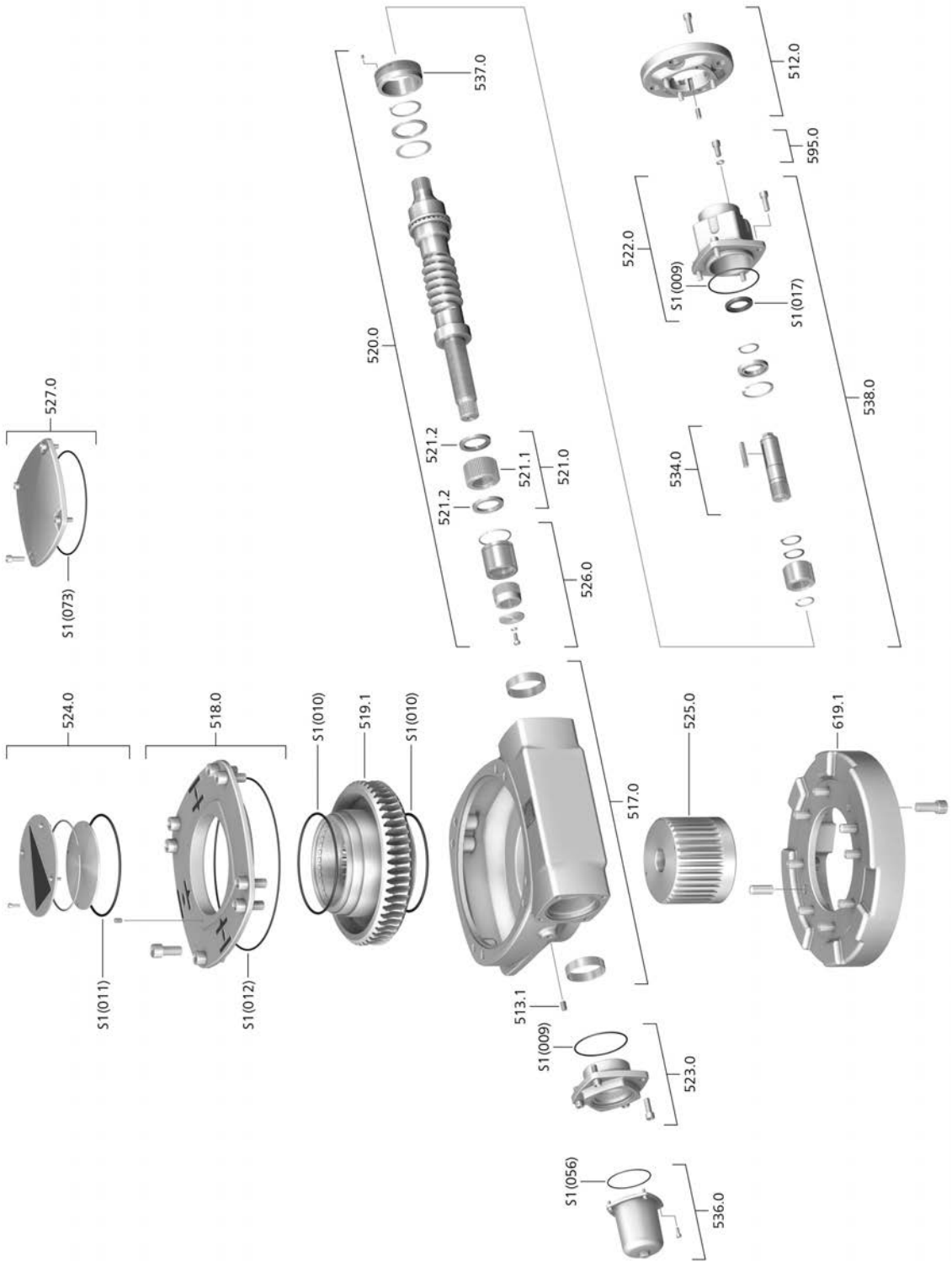


Spare parts

Please state device type and our order number (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.

Ref. no.	Designation	Type
512.0	Input mounting flange	Sub-assembly
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 two pairs 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
524.0	Pointer cover	Sub-assembly
525.0	Coupling	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
595.0	Screw kit for manual gearbox	Sub-assembly
619.1	Extension flange	Sub-assembly
S1	Seal kit	Set

9.2. Part-turn gearboxes GS 160.3 – GS 250.3



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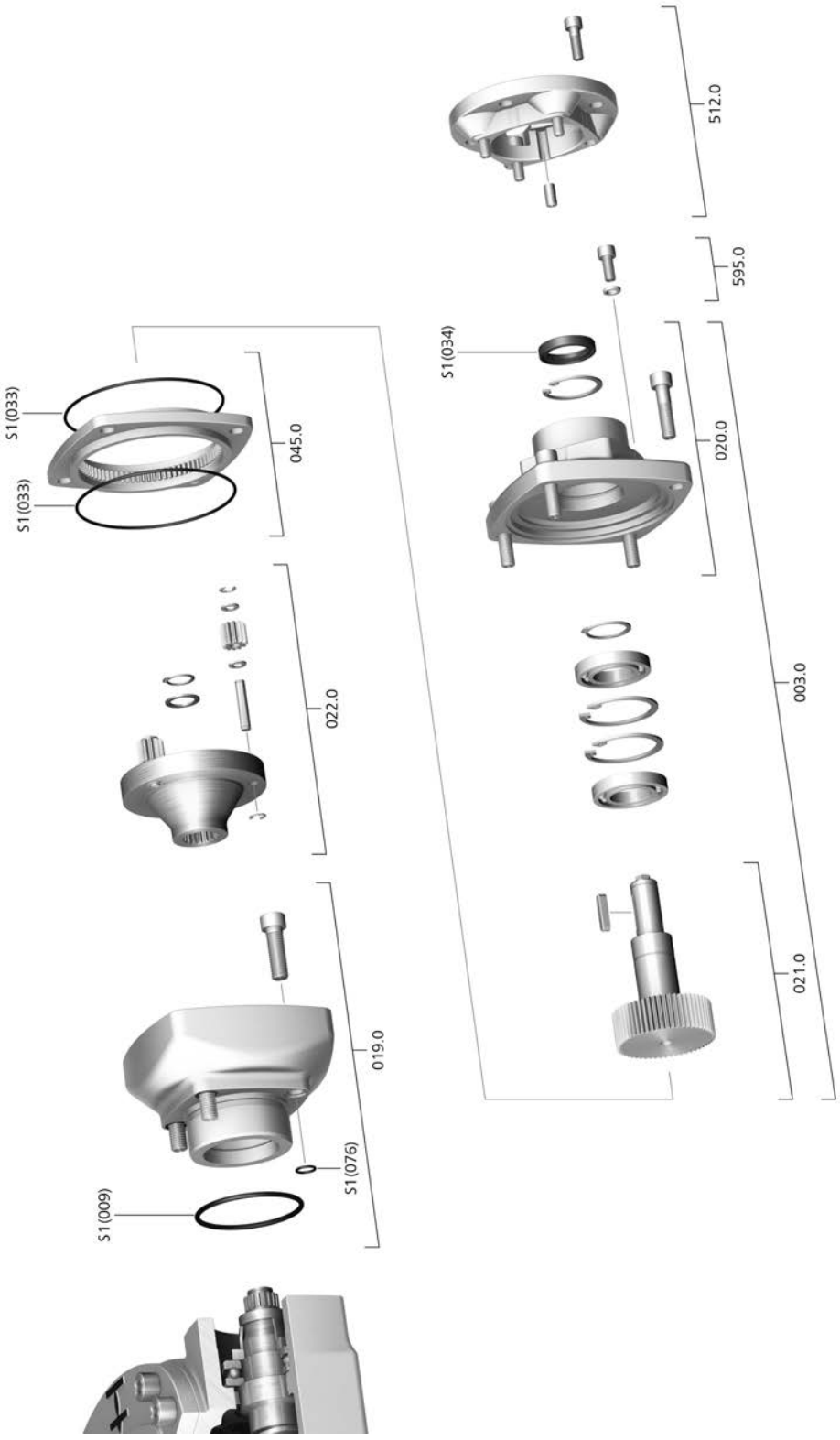
Ref. no.	Designation	Type
512.0	Input mounting flange	Sub-assembly
513.1	Grub screw	
517.0	Housing	Sub-assembly
518.0	Housing cover	Sub-assembly
519.1	Worm wheel	
520.0	Worm shaft	Sub-assembly
521.0	Travelling nut with two pairs of safety wedge discs	
521.1	Travelling nut	
521.2	Pair of safety wedge discs	Sub-assembly
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
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
595.0	Screw kit for manual gearbox	Sub-assembly
619.1	Extension flange	Sub-assembly
S1	Seal kit	Set

9.3. Primary reduction gearings for GS 100.3 – GS 125.3 (126:1/160:1/208:1)



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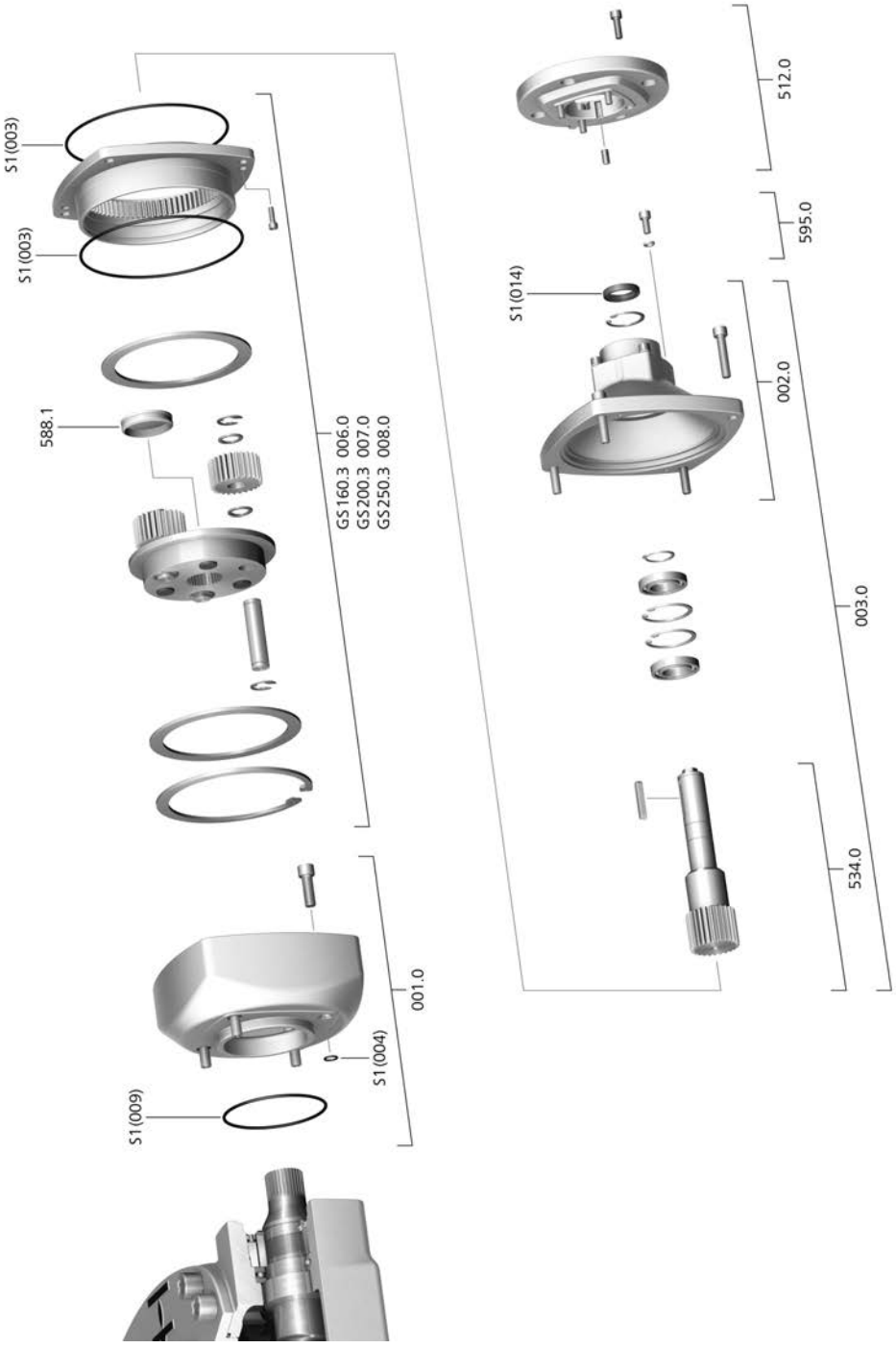
Ref. no.	Designation	Type
003.0	Housing cover with drive shaft	Sub-assembly
019.0	Housing	Sub-assembly
020.0	Housing cover	Sub-assembly
021.0	Drive shaft	Sub-assembly
022.0	Planet carrier	Sub-assembly
045.0	Internal geared wheel	Sub-assembly
512.0	Input mounting flange	Sub-assembly
595.0	Screw kit for manual gearbox	Sub-assembly
S1	Seal kit	Set

9.4. Primary reduction gearings for GS 160.3 (218:1/442:1) GS 200.3 (214:1/434:1) GS 250.3 (210:1/411:1)



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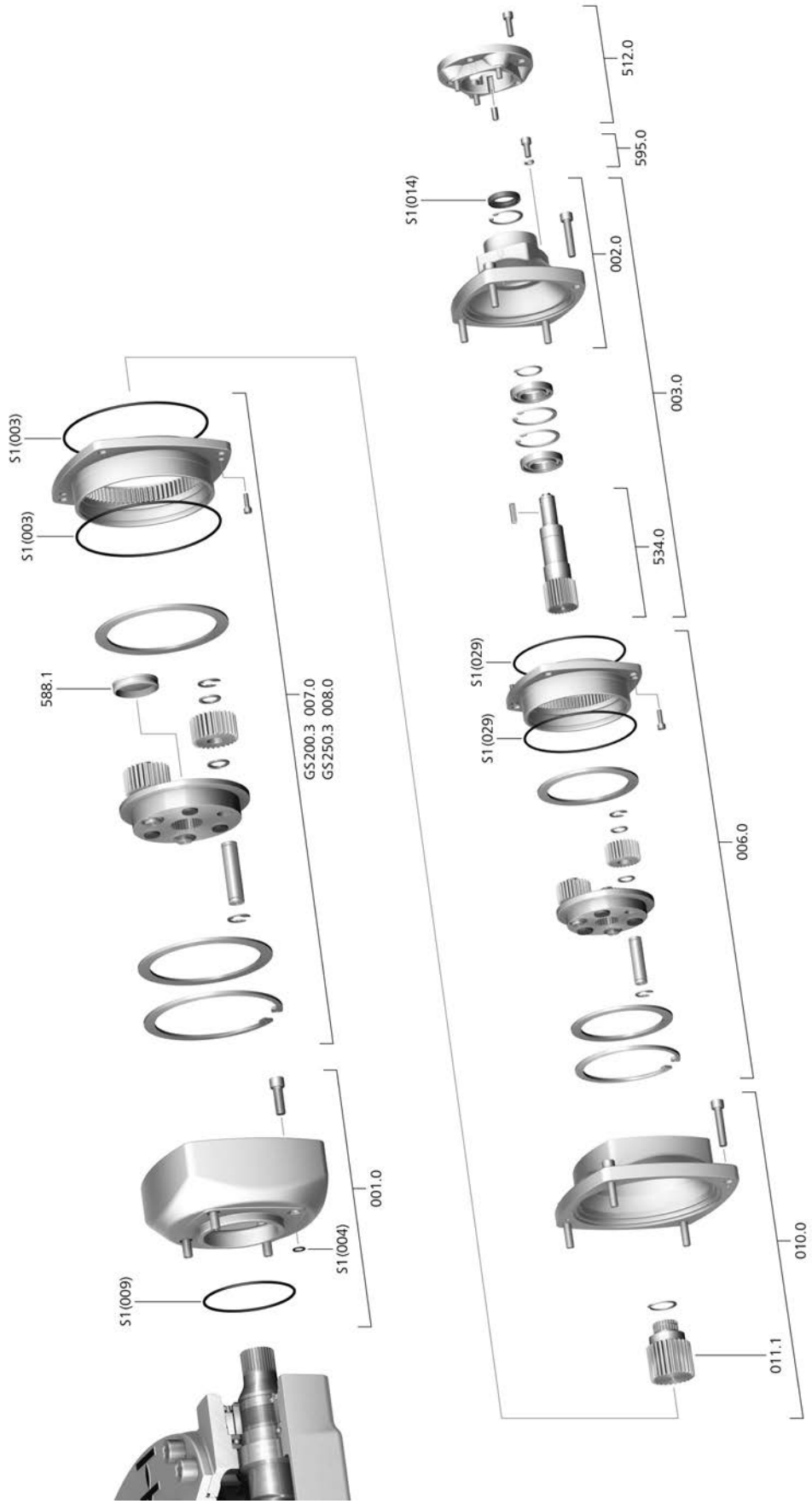
Ref. no.	Designation	Type
001.0	Housing	Sub-assembly
002.0	Housing cover	Sub-assembly
003.0	Housing cover with drive shaft	Sub-assembly
006.0	Planetary gearing first stage (GS 160.3)	Sub-assembly
007.0	Planetary gearing first stage (GS 200.3)	Sub-assembly
008.0	Planetary gearing first stage (GS 250.3)	Sub-assembly
512.0	Input mounting flange	Sub-assembly
534.0	Drive shaft	Sub-assembly
588.1	Blanking plug	
595.0	Screw kit for manual gearbox	Sub-assembly
S1	Seal kit	Set

9.5. Primary reduction gearings for GS 200.3 (864:1) GS 250.3 (848:1)



Spare parts

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Ref. 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 gear second stage (GS 200.3)	Sub-assembly
008.0	Planetary gear second stage (GS 250.3)	Sub-assembly
010.0	Intermediate housing	Sub-assembly
011.1	Pinion	
512.0	Input mounting flange	Sub-assembly
534.0	Drive shaft	Sub-assembly
588.1	Blanking plug	
595.0	Screw kit for manual gearbox	Sub-assembly
S1	Seal kit	Set

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AUMA Riester GmbH & Co. KG

P.O. Box 1362
DE 79373 Muellheim
Tel +49 7631 809 - 0
Fax +49 7631 809 - 1250
info@auma.com
www.auma.com

Certificate Registration No. 12 100/104 4269

Y003.822/003/en/1.24