



## Multi-turn actuators

SA 07.2 – SA 16.2

SAR 07.2 – SAR 16.2

AUMA NORM (without controls)



**Read operation instructions first.**

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

**Purpose of the document:**

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

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## 1. Safety instructions

### 1.1. Basic information on safety

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

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

**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 by suitably qualified personnel 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.

**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 national regulations.
- During operation, the housing warms up and surface temperatures > 60 °C 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 written consent of the manufacturer.

### 1.2. Range of application

AUMA multi-turn actuators are designed for the operation of industrial valves, e.g. globe valves, gate valves, butterfly valves, and ball valves.

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
- Buried service
- Continuous submersion (observe enclosure protection)
- Potentially explosive areas, with the exception of zone 22
- 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.

**Information** These operation instructions are only valid for the "clockwise closing" standard version, i.e. driven shaft turns clockwise to close the valve.

### 1.3. Applications in Ex zone 22 (option)

Actuators of the indicated series basically meet the requirements for applications in dust hazardous locations of ZONE 22 in compliance with the ATEX directive 2014/34/EU.

To comply with all requirements of the ATEX directive, observe the following points:

- Actuators are marked with the explosion protection designation II3D... for use in ZONE 22.
- Maximum surface temperature of actuators
  - T150 °C for ambient temperatures up to +60 °C or
  - T190 °C for ambient temperatures up to +80 °C.

Increased dust deposit on the equipment was not considered for the determination of the maximum surface temperature.

- The following conditions must be fulfilled to respect the maximum permissible surface temperatures at the actuator:
  - Respecting types of duty and technical manufacturer data
  - Correct connection of thermal motor protection (thermoswitches or PTC thermistor)

Ambient temperature	Tripping temperature Thermal motor protection	Maximum surface temperature
up to +60 °C	140 °C	T150 °C
up to +80 °C	155 °C	T190 °C

- The connector may only be connected or disconnected when not live.
- The cable glands and cable entries used have to meet the requirements of category II3D and must at least comply with enclosure protection IP67.
- The actuators must be connected by means of an external earth connection (accessory part) to the equipotential earth bonding or integrated into an earthed piping system.
- To ensure combustible dust hazard protection, seal hollow shaft against ingress of dust:
  - Using threaded plug (ref. no. 511.0) and appropriate seal
  - Using metallic stem protection tube, protective cap and V-seal (ref. no. 568.1, 568.2, 568.3) for rising valve stem
- As a general rule, the requirements of IEC 60079 Parts 14 and 17 must be respected in dust hazardous locations. During commissioning, service, and maintenance, special care as well as qualified and trained personnel are required for safe actuator operation.

### 1.4. 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.

## 1.5. 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.

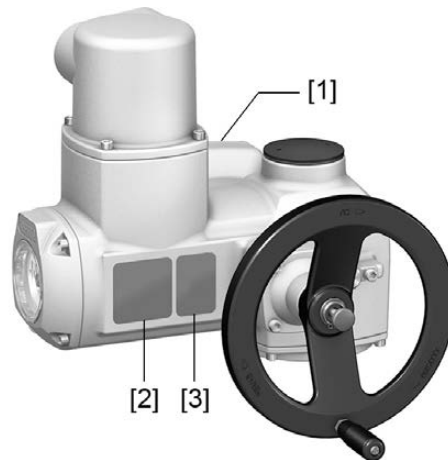
#### < > Reference to other sections

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] Motor name plate
- [2] Actuator name plate
- [3] Additional plate, e.g. KKS plate (Power Plant Classification System)

#### Actuator name plate

Figure 2: Actuator name plate (example)



**auma** (= manufacturer logo); **CE** (= CE mark)

- [1] Name of manufacturer
- [2] Address of manufacturer
- [3] **Type designation**
- [4] **Order number**
- [5] **Serial number**
- [6] Output speed
- [7] Torque range in direction CLOSE
- [8] Torque range in direction OPEN
- [9] Type of lubricant
- [10] Permissible ambient temperature
- [11] Can be assigned as an option upon customer request
- [12] Enclosure protection
- [13] **Data Matrix code**

### Motor name plate

Figure 3: Motor name plate (example)



**auma** (= manufacturer logo); **CE** (= CE mark)

- [1] Motor type
- [2] Motor article number
- [3] Serial number
- [4] Current type, mains voltage
- [5] Rated power
- [6] Rated current
- [7] Type of duty
- [8] Enclosure protection
- [9] Motor protection (temperature protection)
- [10] Insulation class
- [11] Output speed
- [12] Power factor cos phi
- [13] Mains frequency
- [14] Data Matrix code

### Descriptions referring to name plate indications

**Type designation** Figure 4: Type designation (example)

**SA 07.2 - F07**

↑            ↑

1.          2.

1. Type and size of actuator
2. Flange size

#### Type and size

These instructions apply to the following devices types and sizes:

- Type SA = Multi-turn actuators for open-close duty  
Sizes: 07.2, 07.6, 10.2, 14.2, 14.6, 16.2
- Type SAR= Multi-turn actuators for modulating duty  
Sizes: 07.2, 07.6, 10.2, 14.2, 14.6, 16.2

**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> > Service & Support > myAUMA, 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 certificate and the operation instructions when entering the order number.



**Actuator serial number**

Table 1:

Description of serial number (with example 0516MD12345)			
05	16	MD12345	
05	Positions 1+2: Assembly in week = week 05		
	16	Positions 3+4: Year of manufacture = 2016	
		MD12345	Internal number for unambiguous product identification

**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 5: Link to the App store:

**2.2. Short description****Multi-turn actuator**

Definition in compliance with EN 15714-2/EN ISO 5210:

A multi-turn actuator is an actuator which transmits torque to a valve for at least one full revolution. It is capable of withstanding thrust.

AUMA multi-turn actuators SA 07.2 – SA 16.2/SAR 07.2 – SAR 16.2 are driven by an electric motor and are capable of withstanding thrust in combination with output drive type A. For manual operation, a handwheel is provided. Switching off in end positions may be either by limit or torque seating. Actuator controls are required to operate or process the actuator signals.

Actuators without controls can be equipped with AUMA actuator controls at a later date. For more information, please state our order number (refer to actuator name plate).

### 3. Transport, storage and packaging

#### 3.1. Transport

For transport to place of installation, use sturdy packaging.



#### 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.
- Actuators mounted on valves: Attach ropes or hooks for the purpose of lifting by hoist to valve and NOT to actuator.
- Actuators mounted to gearboxes: Attach ropes or hooks for the purpose of lifting by hoist only to the gearbox using eyebolts and NOT to the actuator.
- Respect total weight of combination (actuator, gearbox, valve)
- Secure load against falling down, sliding or tilting.
- Perform lift trial at low height and eliminate any potential danger e.g. by tilting.

Figure 6: Example: Lifting the actuator



Table 2:

**Weights for multi-turn actuators SA 07.2 – SA 16.2 / SAR 07.2 – SAR 16.2 with 3-phase AC motors**

Type designation Actuator	Motor type <sup>1)</sup>	Weight <sup>2)</sup>
		approx. [kg]
SA 07.2/ SAR 07.2	VD...	19
	AD...	20
SA 07.6/ SAR 07.6	VD...	20
	AD...	21
SA 10.2/ SAR 10.2	VD...	22
	AD...	25
SA 14.2/ SAR 14.2	VD...	44
	AD...	48
SA 14.6/ SAR 14.6	VD...	46
	AD...	53
SA 16.2/ SAR 16.2	VD...	67
	AD...	83

1) Refer to motor name plate

2) Indicated weight includes AUMA NORM multi-turn actuator with 3-phase AC motor, electrical connection in standard version, output drive type B1 and handwheel. For other output drive types, heed additional weights.

Table 3:

<b>Weights for multi-turn actuators SA 07.2 – SA 16.2 / SAR 07.2 – SAR 16.2 With 1-phase AC motors</b>		
Type designation Actuator	Motor type <sup>1)</sup>	Weight <sup>2)</sup>
		approx. [kg]
SA 07.2/ SAR 07.2	VE...	25
	AE...	28
SA 07.6/ SAR 07.6	VE...	25
	AE...	28
	AC...	37
SA 10.2/ SAR 10.2	VE...48-4...	28
	VE...48-2...	31
	AC... 56-4...	40
	AC... 56-2...	43
SA 14.2/ SAR 14.2	VE...	59
	VC...	61
	AC...	63
SA 14.6/ SAR 14.6	VE...	63
	VC...	66

- 1) Refer to motor name plate
- 2) Indicated weight includes AUMA NORM multi-turn actuator with 1-phase AC motor, electrical connection in standard version, output drive type B1 and handwheel. For other output drive types, heed additional weights.

Table 4:

<b>Weights for multi-turn actuators SA 07.2 – SA 16.2 / SAR 07.2 – SAR 16.2 With DC motors</b>		
Type designation Actuator	Motor type <sup>1)</sup>	Weight <sup>2)</sup>
		approx. [kg]
SA 07.2/ SAR 07.2	FN... 63-...	29
	FN... 71-...	32
SA 07.6/ SAR 07.6	FN... 63-...	30
	FN... 80-...	44
SA 10.2/ SAR 10.2	FN... 63-...	33
	FN... 71-...	36
	FN... 90-...	56
SA 14.2/ SAR 14.2	FN... 71-... / FN... 80-...	68
	FN... 90-...	100
SA 14.6/ SAR 14.6	FN... 80-... / FN... 90-...	76
	FN... 112-...	122
SA 16.2/ SAR 16.2	FN... 100-...	123

- 1) Refer to motor name plate
- 2) Indicated weight includes AUMA NORM multi-turn actuator with DC motor, electrical connection in standard version, output drive type B1 and handwheel. For other output drive types, heed additional weights.

Table 5:

<b>Weights for output drive type A 07.2 – A 16.2</b>		
Type designation	Flange size	[kg]
A 07.2	F07	1.1
	F10	1.3
A 10.2	F10	2.8
A 14.2	F14	6.8
A 16.2	F16	11.7

Table 6:

Weights for output drive type AF 07.2 – AF 16.2		
Type designation	Flange size	[kg]
AF 07.2	F10	5.2
AF 07.6	F10	5.2
AF 10.2	F10	5.5
AF 14.2	F14	13.7
AF 16.2	F16	23

### 3.2. Storage

#### NOTICE

#### Danger of corrosion due to inappropriate storage!

- Store in a well-ventilated, dry room.
- Protect against floor dampness by storage on a shelf or on a wooden pallet.
- Cover to protect against dust and dirt.
- Apply suitable corrosion protection agent to 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

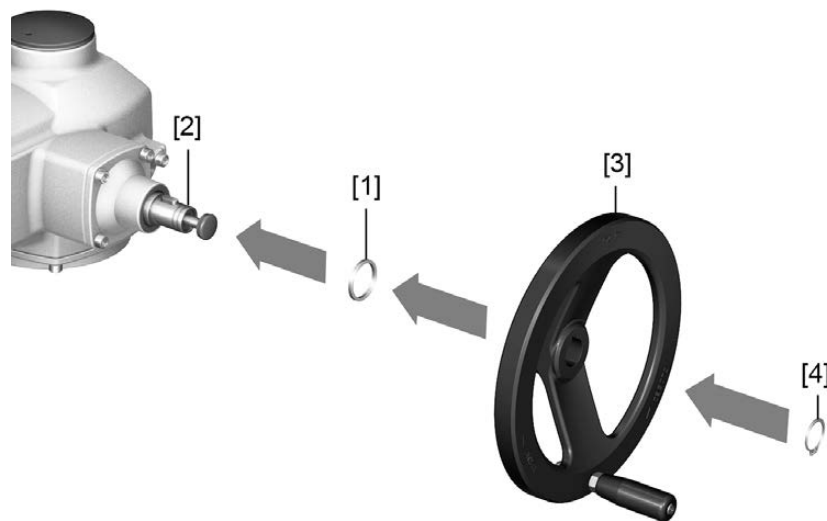
### 4.1. Mounting position

The product described in this document can be operated without restriction in any mounting position.

### 4.2. Handwheel fitting

**Information** For transport reason, handwheels with a diameter of 400 mm and larger are supplied separately within the scope of delivery.

Figure 7: Handwheel



- [1] Spacer
- [2] Input shaft
- [3] Handwheel
- [4] Retaining ring

1. If required, fit spacer [1] on input shaft [2].
2. Slip handwheel [3] onto input shaft.
3. Secure handwheel [3] using the retaining ring [4] supplied.

**Information** The retaining ring [4] (together with these operation instructions) is stored in a weatherproof bag, which is attached to the device prior to delivery.

### 4.3. Multi-turn actuator: mount to valve/gearbox

#### NOTICE

#### Danger of corrosion due to damage to paint finish and condensation!

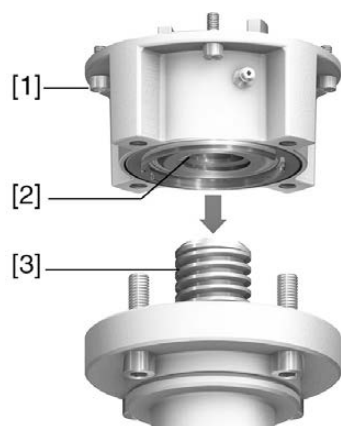
- Touch up damage to paint finish after work on the device.
- After mounting, connect the device immediately to electrical mains to ensure that heater minimises condensation.

#### 4.3.1. Output drive type A

- Application**
- Output drive for rising, non-rotating valve stem
  - Capable of withstanding thrust

**Design** Output mounting flange [1] with axial bearing stem nut [2] form one unit. Torque is transmitted to valve stem [3] via stem nut [2].

Figure 8: Design of output drive type A



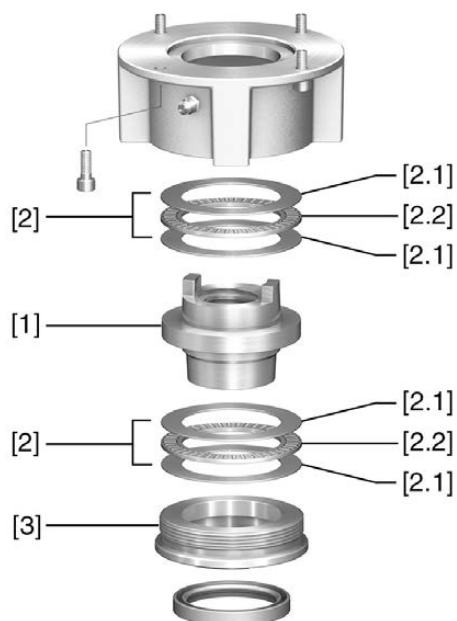
- [1] Output mounting flange
- [2] Stem nut with dog coupling
- [3] Valve stem

**Information** To adapt the actuators to available output drive types A with flanges F10 and F14 (year of manufacture: 2009 and earlier), an adapter is required. The adapter can be ordered from AUMA.

#### 4.3.1.1. Stem nut: finish machining

- ✓ This working step is only required if stem nut is supplied unbored or with pilot bore.

Figure 9: Output drive type A



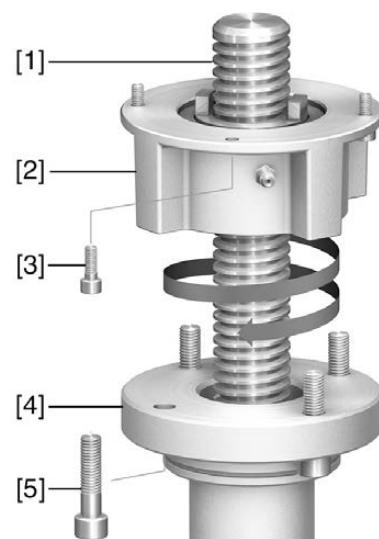
- [1] Stem nut
- [2] Axial needle roller bearing
- [2.1] Axial bearing washer
- [2.2] Axial needle roller and cage assembly
- [3] Spigot ring

1. Remove spigot ring [3] from output drive.
2. Remove stem nut [1] together with axial needle roller bearings [2].
3. Remove axial bearing washers [2.1] and axial needle roller and cage assemblies [2.2] from stem nut [1].

4. Drill and bore stem nut [1] and cut thread.  
**Information:** When fixing in the chuck, make sure stem nut runs true!
5. Clean the machined stem nut [1].
6. Apply sufficient Lithium soap EP multi-purpose grease to axial needle roller and cage assemblies [2.2] and axial bearing washers [2.1], ensuring that all hollow spaces are filled with grease.
7. Place greased axial needle roller and cage assemblies [2.2] and axial bearing washers [2.1] onto stem nut [1].
8. Re-insert stem nut [1] with bearings [2] into output drive.  
**Information:** Ensure that dogs or splines are placed correctly in the keyway of the hollow shaft.
9. Screw in spigot ring [3] until it is firm against the shoulder.

#### 4.3.1.2. Multi-turn actuator (with output drive type A): mount to valve

Figure 10: Assembly of output drive type A



- [1] Valve stem
- [2] Output drive type A
- [3] Screws to actuator
- [4] Valve flange
- [5] Screws to output drive

1. If the output drive type A is already mounted to the multi-turn actuator: Loosen screws [3] and remove output drive type A [2].
2. Check if the flange of output drive type A matches the valve flange [4].
3. Apply a small quantity of grease to the valve stem [1].
4. Place output drive type A on valve stem and turn until it is flush on the valve flange.
5. Turn output drive type A until alignment of the fixing holes.
6. Screw in fastening screws [5], however do not completely tighten.
7. Fit multi-turn actuator on the valve stem so that the stem nut dogs engage into the output drive sleeve.  
➔ The flanges are flush with each other if properly engaged.
8. Adjust multi-turn actuator until alignment of the fixing holes.
9. Fasten multi-turn actuator with screws [3].

10. Fasten screws [3] crosswise with a torque according to table.

Table 7:

Tightening torques for screws	
Threads	Tightening torque [Nm]
	Strength class A2-80/A4-80
M6	10
M8	24
M10	48
M12	82
M16	200
M20	392

11. Turn multi-turn actuator with handwheel in direction OPEN until valve flange and output drive A are firmly placed together.

12. Tighten fastening screws [5] between valve and output drive type A crosswise applying a torque according to table.

#### 4.3.2. Output drive types B

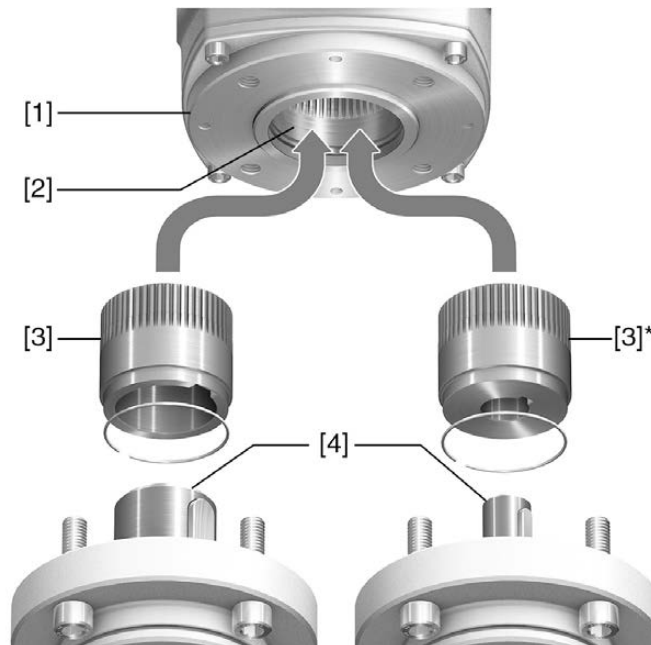
- Application**
- For rotating, non-rising valve stem
  - Not capable of withstanding thrust

**Design** Connection between hollow shaft and valve or gearbox via output drive sleeve fixed to the hollow shaft of the multi-turn actuator via retaining ring.

When exchanging the output drive sleeve, later retrofitting to a different output drive type is possible

- Output drive type B: Output drive sleeve with bore according to DIN 3210
- Output drive types B1 – B4: Output drive sleeve with bore according to EN ISO 5210

Figure 11: Output drive type B



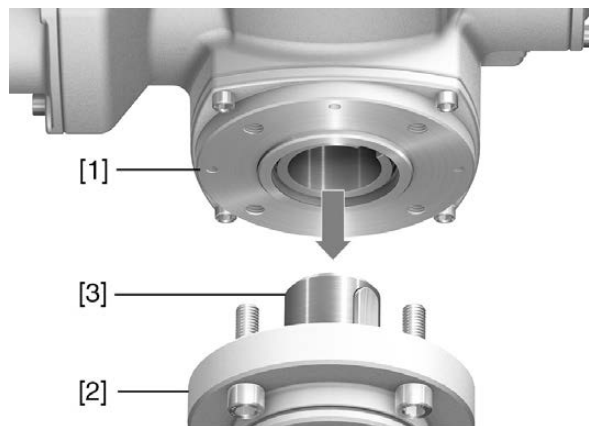
- [1] Flange multi-turn actuator (e.g. F07)  
 [2] Hollow shaft  
 [3] Output drive sleeve (illustration examples)  
 [3] B/B1/B2 and [3]\* B3/B4, respectively with bore and keyway  
 [4] Gearbox/valve shaft with parallel key

**Information** Spigot at valve flanges should be loose fit.



**4.3.2.1. Multi-turn actuator with output drive types B: mount to valve/gearbox**

Figure 12: Mounting output drive types B



- [1] Multi-turn actuator
- [2] Valve/gearbox
- [3] Valve/gearbox shaft

1. Check if mounting flanges fit together.
2. Check if output drive of multi-turn actuator [1] matches the output drive of valve/gearbox or valve/gearbox valve shaft [2/3].
3. Apply a small quantity of grease to the valve or gearbox shaft [3].
4. Fit multi-turn actuator [1].

**Information:** Ensure that the spigot fits uniformly in the recess and that the mounting faces are in complete contact.

5. Fasten multi-turn actuator with screws according to table.  
**Information:** We recommend applying liquid thread sealing material to the screws to avoid contact corrosion.
6. Fasten screws crosswise to a torque according to table.

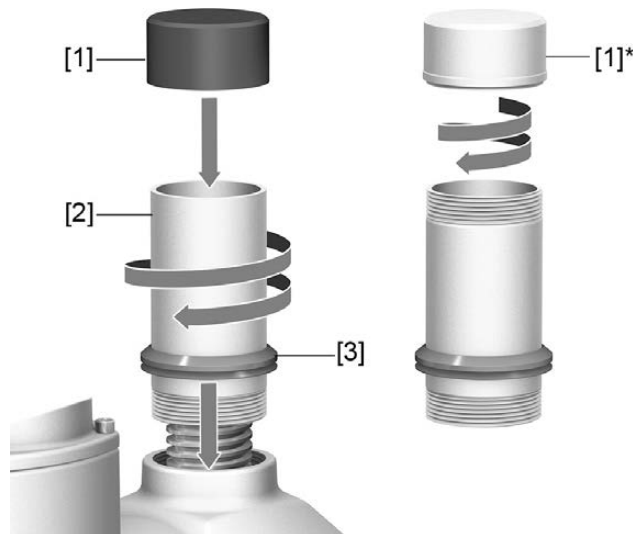
Table 8:

Tightening torques for screws	
Threads	Tightening torque [Nm]
	Strength class A2-80/A4-80
M6	10
M8	24
M10	48
M12	82
M16	200
M20	392

#### 4.4. Accessories for assembly

##### 4.4.1. Stem protection tube for rising valve stem

Figure 13: Assembly of the stem protection tube

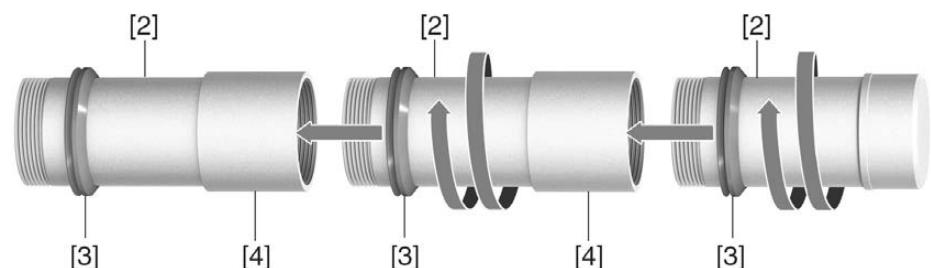


- [1] Protective cap for stem protection tube (fitted)
- [1]\* Option: Protective cap made of steel (screwed)
- [2] Stem protection tube
- [3] V-seal

1. Seal all threads with hemp, Teflon tape, or thread sealing material.
2. Screw stem protection tube [2] into thread and tighten it firmly.

**Information:** For stem protection tubes made of two or more segments, all parts have to be thoroughly screwed together.

Figure 14: Protection tube made of segments with threaded sleeves (>900 mm)



- [2] Segment of stem protection tube
- [3] V-seal
- [4] Threaded sleeve

3. Push down the sealing ring [3] onto the housing.
- Information:** For mounting segments, push down seals of segments down to the sleeve (connecting piece).
4. Check whether protective cap [1] for stem protection tube is available, in perfect condition and tightly placed on or screwed to the tube.

#### NOTICE

**Risk of bending or oscillation of protection tubes exceeding a length of 2 m!**

*Risk of damage at stem and/or protection tube.*

→ Secure protection tubes exceeding 2 m by an appropriate support.

## 5. Electrical connection

### 5.1. Basic information

#### WARNING

#### Danger due to incorrect electrical connection

*Failure to observe this warning can result in death, serious injury, or property damage.*

- The electrical connection must be carried out exclusively by suitably qualified personnel.
- Prior to connection, observe basic information contained in this chapter.
- After connection but prior to applying the voltage, observe the <Commissioning> and <Test run> chapters.

#### Wiring diagram/terminal plan

The pertaining wiring diagram/terminal plan (in German or English) is attached to the device in a weather-proof bag, together with these operation instructions. It can also be requested from AUMA (state order number, refer to name plate) or downloaded directly from the Internet (<http://www.auma.com>).

#### NOTICE

#### Valve damage for connection without controls!

- NORM actuators require controls: Connect motor via controls only (reversing contactor circuit).
- Observe the type of seating specified by the valve manufacturer.
- Observe wiring diagram.

#### Delay time

The delay time is the time from the tripping of the limit or torque switches to the motor power being switched off. To protect the valve and the actuator, we recommend a delay time < 50 ms. Longer delay times are possible provided the operating time, output drive type, valve type, and the type of installation are considered. We recommend switching off the corresponding contactor directly by limit or torque switch.

#### Limit and torque switches

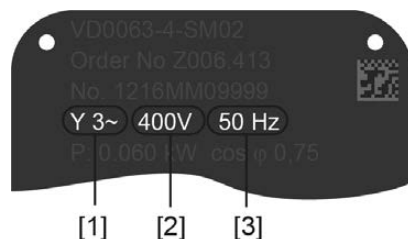
Limit and torque switches can be provided as single, tandem, or triple switches. Only the same potential can be switched on the two circuits (NC/NO contact) of each single switch. If different potentials are to be switched simultaneously, tandem switches or triple switches are required. When using tandem/triple switches:

- For signalling use the leading contacts TSC1, TSO1, LSC1, LSO1.
- For switching off use the lagging contacts TSC, TSO, LSC, LSO.

#### Current type, mains voltage, mains frequency

Type of current, mains voltage and mains frequency must match the data on the motor name plate. Also refer to chapter <Identification>/<Name plate>.

Figure 15: Motor name plate (example)



- [1] Type of current
- [2] Mains voltage
- [3] Mains frequency (for 3-phase and 1-phase AC motors)

#### Protection and sizing on site

For short-circuit protection and for disconnecting the actuator from the mains, fuses and disconnect switches have to be provided by the customer.

The current value for sizing the protection is derived from the current consumption of the motor (refer to motor name plate).

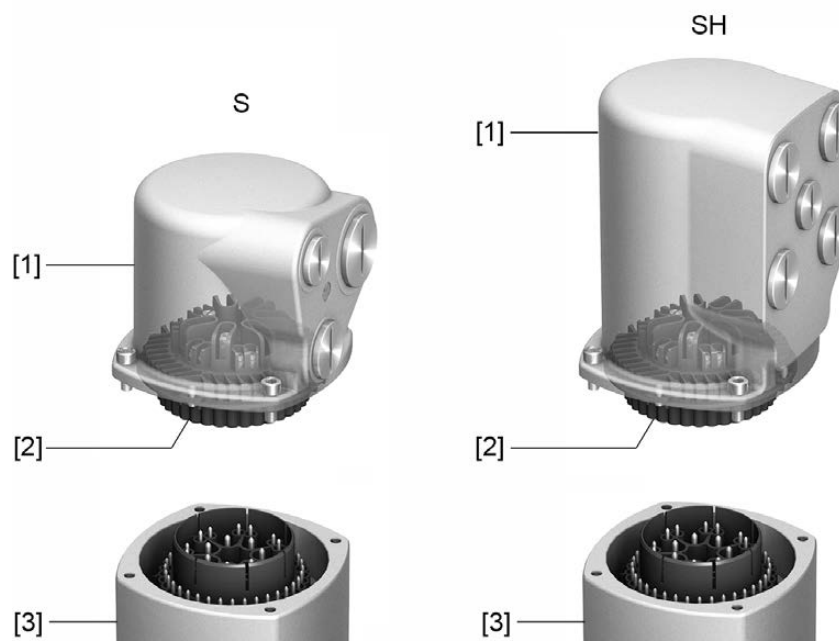
We recommend adapting the switchgear sizing to the max. current ( $I_{max}$ ) and selecting and setting the overcurrent protection device in compliance with the indications in the electrical data sheet.

**Safety standards** Safety measures and safety equipment must comply with the respectively valid national on site specifications. All externally connected devices shall comply with the relevant safety standards for the place of installation.

- Connecting cables**
- We recommend using connecting cables and connecting terminals according to rated current ( $I_N$ ) (refer to motor name plate or electrical data sheet).
  - For device insulation, appropriate (voltage-proof) cables must be used. Specify cables for the highest occurring rated voltage.
  - Use connecting cable with appropriate minimum rated temperature.
  - For connecting cables exposed to UV radiation (outdoor installation), use UV resistant cables.
  - For the connection of position transmitters, screened cables must be used.

## 5.2. S/SH electrical connection (AUMA plug/socket connector)

Figure 16: S and SH electrical connection



- [1] Cover  
 [2] Socket carrier with screw-type terminals  
 With crimp-type connection as an option  
 [3] Actuator housing with pin carrier

**Short description** Plug-in electrical connection with screw-type terminals for power and control contacts. Control contacts also available as crimp-type connection as an option.

S version (standard) with three cable entries. SH version (enlarged) with additional cable entries. For cable connection, remove the AUMA plug/socket connector and the socket carrier from cover.

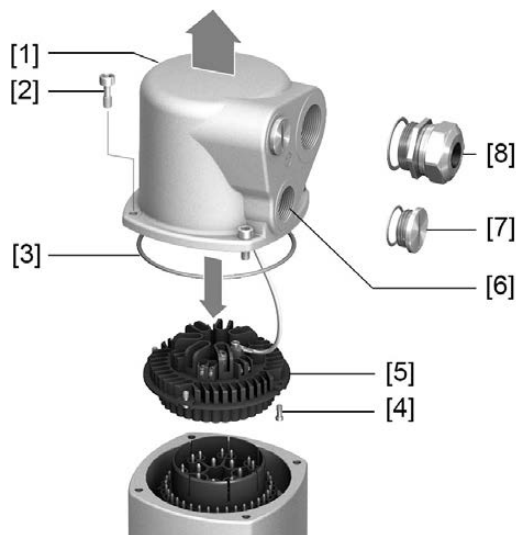
### Technical data

Table 9:

Electrical connection via AUMA plug/socket connector		
	Power contacts	Control contacts
No. of contacts max.	6 (3 equipped) + protective earth conductor (PE)	50 pins/sockets
Designation	U1, V1, W1, U2, V2, W2, PE	1 to 50
Connection voltage max.	750 V	250 V
Rated current max.	25 A	16 A
Type of customer connection	Screw connection	Screw connection, crimp-type (option)
Connection diameter max.	6 mm <sup>2</sup> (flexible) 10 mm <sup>2</sup> (solid)	2.5 mm <sup>2</sup> (flexible or solid)

#### 5.2.1. Terminal compartment : open

Figure 17: Open terminal compartment



- [1] Cover (figure shows S version )
- [2] Screws for cover
- [3] O-ring
- [4] Screws for socket carrier
- [5] Socket carrier
- [6] Cable entry
- [7] Blanking plugs
- [8] Cable gland (not included in delivery)

**DANGER**

#### Hazardous voltage!

*Risk of electric shock.*

→ Disconnect device from the mains before opening.

1. Loosen screws [2] and remove cover [1].
2. Loosen screws [4] and remove socket carrier [5] from cover [1].

3. Insert cable glands [8] suitable for connecting cables.
- ➔ The enclosure protection IP... stated on the name plate is only ensured if suitable cable glands are used.

Figure 18: Example: Name plate for enclosure protection IP68



4. Seal unused cable entries [6] with suitable blanking plugs [7].

### 5.2.2. Cable connection

Table 10:

Terminal cross sections and terminal tightening torques		
Designation	Terminal cross sections	Tightening torques
Power contacts (U1, V1, W1, U2, V2, W2)	1.0 – 6 mm <sup>2</sup> (flexible) 1.5 – 10 mm <sup>2</sup> (solid)	1.2 – 1.5 Nm
Protective earth connection ⊕ (PE)	1.0 – 6 mm <sup>2</sup> (flexible) with ring lugs 1.5 – 10 mm <sup>2</sup> (solid) with loops	1.2 – 2.2 Nm
Control contacts (1 to 50)	0.25 – 2.5 mm <sup>2</sup> (flexible) 0.34 – 2.5 mm <sup>2</sup> (solid)	0.5 – 0.7 Nm

#### NOTICE

**Danger of motor damage if PTC thermistors or thermostats are not connected!**

*Our warranty for the motor will lapse if the motor protection is not connected.*

→ Connect PTC thermistors or thermostats to external controls.

1. Remove cable sheathing.
2. Insert the wires into the cable glands.
3. Fasten cable glands with the specified torque to ensure required enclosure protection.
4. Strip wires.
  - Controls approx. 6 mm, motor approx. 10 mm
5. For flexible cables: Use wire end sleeves according to DIN 46228.
6. Connect cables according to order-related wiring diagram.



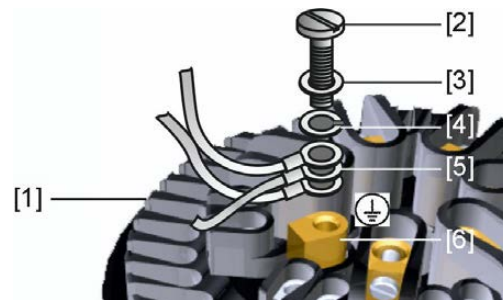
**In case of a fault: Hazardous voltage while protective earth conductor is **NOT** connected!**

*Risk of electric shock.*

- Connect all protective earth conductors.
- Connect PE connection to external protective earth conductor of connecting cables.
- Start running the device only after having connected the protective earth conductor.

7. Tighten PE conductors firmly to PE connection using ring lugs (flexible cables) or loops (solid cables).

Figure 19: Protective earthing

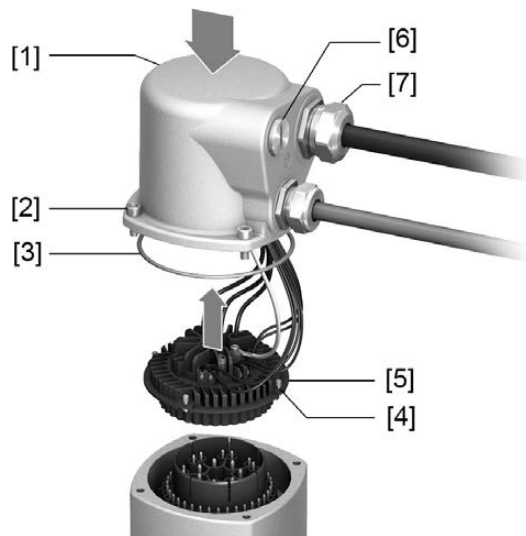


- [1] Socket carrier
- [2] Screw
- [3] Washer
- [4] Lock washer
- [5] Protective earth with ring lugs/loops
- [6] Protective earthing, symbol: ⊕

8. For shielded cables: Link the cable shield end via the cable gland to the housing (earthing).

### 5.2.3. Terminal compartment : close

Figure 20: Close terminal compartment



- [1] Cover (figure shows S version)
- [2] Screws for cover
- [3] O-ring
- [4] Screws for socket carrier
- [5] Socket carrier
- [6] Blanking plug
- [7] Cable gland (not included in delivery)



#### **Short-circuit due to pinching of cables!**

*Risk of electric shock and functional failures.*

→ Carefully fit socket carrier to avoid pinching the cables.

1. Insert the socket carrier [5] into the cover [1] and fasten with screws [4].
2. Clean sealing faces of cover [1] and housing.
3. Check whether O-ring [3] is in good condition, replace if damaged.
4. Apply a thin film of non-acidic grease (e.g. petroleum jelly) to the O-ring and insert it correctly.
5. Fit cover [1] and fasten screws [2] evenly crosswise.
6. Fasten cable glands and blanking plugs applying the specified torque to ensure the required enclosure protection.



### 5.3. Accessories for electrical connection

#### 5.3.1. Parking frame

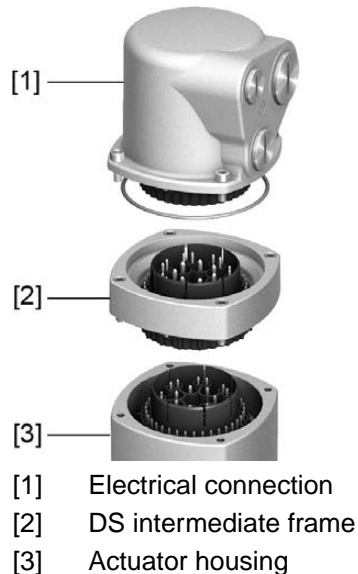
Figure 21: Parking frame, example with S plug/socket connector and cover



**Application** Parking frame for safe storage of a disconnected plug or cover.  
For protection against touching the bare contacts and against environmental influences.

#### 5.3.2. DS intermediate frame for double sealing

Figure 22: Electrical connection with DS intermediate frame



**Application** When removing the electrical connection or due to leaky cable glands, there is a potential risk of ingress of dust and water into the housing. This is prevented effectively by inserting the double sealed intermediate frame [2] between the plug/socket connector [1] and the housing of the device. The enclosure protection of the device (IP68) will not be affected, even if the electrical connection [1] is removed.

### 5.3.3. External earth connection

Figure 23: Earth connection for multi-turn actuator



**Application** External earth connection (U-bracket) for connection to equipotential compensation.

Table 11:

Terminal cross sections and earth connection tightening torques		
Conductor type	Terminal cross sections	Tightening torques
Solid wire and stranded	2.5 mm <sup>2</sup> to 6 mm <sup>2</sup>	3 – 4 Nm
Fine stranded	1.5 mm <sup>2</sup> to 4 mm <sup>2</sup>	3 – 4 Nm

For fine stranded (flexible) wires, connection is made via cable lugs/ring terminals. When connecting two individual wires with a U-bracket, cross sections have to be identical.

## 6. Operation

### 6.1. Manual operation

For purposes of setting and commissioning, in case of motor or power failure, the actuator may be operated manually. Manual operation is engaged by an internal change-over mechanism.

#### 6.1.1. Engage manual operation

##### NOTICE

##### Damage at the motor coupling due to faulty operation!

→ Engage manual operation only during motor standstill.

1. Press push button.

Figure 24: Engage manual operation



2. Turn handwheel in desired direction.

→ To close the valve, turn handwheel clockwise:

➔ Drive shaft (valve) turns clockwise in direction CLOSE.

##### Information

To protect the valve, an overload protection is available as option for manual operation. If the torque applied at the handwheel exceeds a certain value (refer to order-related technical data sheet), the shear pins will rupture and thus protect the valve from damage. The handwheel can no longer transmit the torque (= handwheel is spinning). Motor operation is still possible.

In case of shear pin rupture due to overload, we recommend replacing the safety hub.

Figure 25: Handwheel without/with overload protection



[1] Handwheel without overload protection (standard)

[2] Handwheel with overload protection/safety hub (option)

#### 6.1.2. Manual operation: disengage

Manual operation is automatically disengaged when motor is started again. The handwheel does not rotate during motor operation.

---

## 6.2. Motor operation

---

**NOTICE****Valve damage due to incorrect setting!**

→ Perform all commissioning settings and the test run prior to motor operation.

---

Actuator controls are required to operate an actuator during motor operation. If the actuator is to be operated locally, additional local controls are required.

1. Switch on power supply.
2. To close the valve, switch on motor operation in direction CLOSE.  
➔ Valve shaft turns clockwise in direction CLOSE.

## 7. Indications (optional)

### 7.1. Mechanical position indication/running indication via indicator mark on cover

Figure 26: Mechanical position indication via indicator mark on cover



- [1] End position OPEN reached
- [2] End position CLOSED reached
- [3] Indicator mark on cover

#### Characteristics

- Independent of power supply
- Used as running indication (indicator disc rotates during actuator operation) and continuously indicates the valve position
- Indicates that end positions (OPEN/CLOSED) have been reached (symbols  $\overline{\text{—}}$  (OPEN)/  $\overline{\text{I}}$  (CLOSED) refer to indicator mark  $\blacktriangle$  in cover)

## 8. Signals (output signals)

### 8.1. Feedback signals from actuator

**Information** The switches can be provided as single switches (1 NC and 1 NO), as tandem switches (2 NC and 2 NO) or as triple switches (3 NC and 3 NO). The precise version is indicated in the terminal plan or on the order-related technical data sheet.

Table 12:

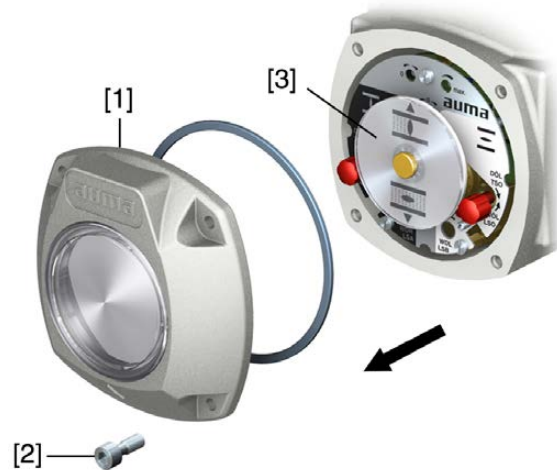
Feedback signal	Type and designation in wiring diagram
<b>End position OPEN/CLOSED reached</b>	Setting via limit switching Switches: 1 NC and 1 NO (standard)
	LSC                      Limit switch, closing, clockwise rotation
	LSO                      Limit switch, opening, counterclockwise rotation
<b>Intermediate position reached (option)</b>	Setting via DUO limit switching Switches: 1 NC and 1 NO (standard)
	LSA                      DUO limit switch, clockwise rotation
	LSB                      DUO limit switch, counterclockwise rotation
<b>Torque OPEN/CLOSED reached</b>	Setting via torque switching Switches: 1 NC and 1 NO (standard)
	TSC                      Torque switch, closing, clockwise rotation
	TSO                      Torque switch, opening, counterclockwise rotation
<b>Motor protection tripped</b>	Thermoswitches or PTC thermistors, depending on the version
	F1, Th                    Thermoswitches
	R3                        PTC thermistors
<b>Running indication (option)</b>	Switches: 1 NC (standard)
	S5, BL                    Blinker transmitter
<b>Position feedback signal, (option)</b>	Depending on version either with potentiometer or electronic position transmitter EWG/RWG
	R2                        Potentiometer
	R2/2                      Potentiometer in tandem arrangement (option)
	B1/B2, EWG/RWG      3-wire or 4-wire system (0/4– 20 mA)
	B3/B4, EWG/RWG      2-wire system (4 – 20 mA)
<b>Manual operation active (option)</b>	Switches

## 9. Commissioning (basic settings)

### 9.1. Switch compartment: open

The switch compartment must be opened to perform the following settings.

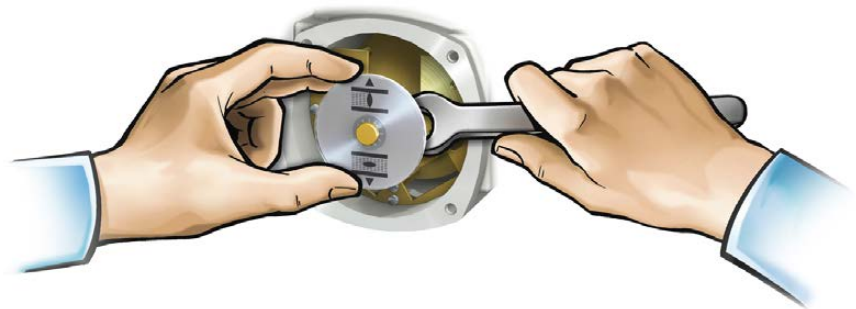
1. Loosen screws [2] and remove cover [1] from the switch compartment.



2. If indicator disc [3] is available:

Remove indicator disc [3] using a spanner (as lever).

**Information:** To avoid damage to paint finish, use spanner in combination with soft object, e.g. fabric.



### 9.2. Torque switching: set

Once the set torque is reached, the torque switches will be tripped (overload protection of the valve).

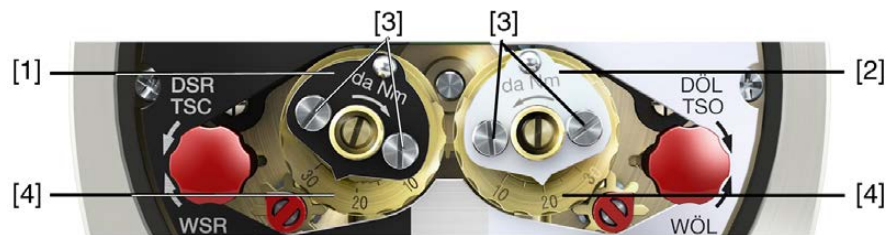
**Information** The torque switches may also trip during manual operation.

#### NOTICE

#### Valve damage due to excessive tripping torque limit setting!

- The tripping torque must suit the valve.
- Only change the setting with the consent of the valve manufacturer.

Figure 27: Torque measuring heads



[1] Torque switching head black in direction CLOSE

[2] Torque switching head white in direction OPEN

[3] Lock screws

[4] Torque dials

1. Loosen both lock screws [3] at the indicator disc.
2. Turn torque dial [4] to set the required torque (1 da Nm = 10 Nm). Example:
  - Black torque switching head set to approx. 25 da Nm  $\hat{=}$  250 Nm for direction CLOSE
  - White torque switching head set to approx. 20 da Nm  $\hat{=}$  200 Nm for direction OPEN
3. Fasten lock screws [3] again.

**Information:** Maximum tightening torque: 0.3 – 0.4 Nm

➔ The torque switch setting is complete.

### 9.3. Limit switching: set

The limit switching records the travel. When reaching the preset position, switches are operated.

Figure 28: Setting elements for limit switching



#### Black section:

[1] Setting spindle: End position CLOSED

[2] Pointer: End position CLOSED

[3] Mark: End position CLOSED is set

#### White section:

[4] Setting spindle: End position OPEN

[5] Pointer: End position OPEN

[6] Mark: End position OPEN is set

#### 9.3.1. End position CLOSED (black section): set

1. Engage manual operation.
2. Turn handwheel clockwise until valve is closed.



3. Turn handwheel by approximately half a turn (overrun) in the opposite direction.
  4. **Press down** and turn setting spindle [1] with screw driver in direction of the arrow and observe the pointer [2]: While a ratchet click is felt and heard, the pointer [2] moves 90° every time.
  5. As soon as the pointer [2] is 90° from mark [3]: Continue turning slowly.
  6. As soon as the pointer [2] moves to mark [3]: Stop turning and release setting spindle.
- ➔ The end position CLOSED setting is complete.
7. If you override the tripping point inadvertently (ratchet click is heard after the pointer has snapped): Continue turning the setting spindle in the same direction and repeat setting process.

### 9.3.2. End position OPEN (white section): set

1. Engage manual operation.
  2. Turn handwheel counterclockwise until valve is open.
  3. Turn handwheel by approximately half a turn (overrun) in the opposite direction.
  4. **Press down** and turn setting spindle [4] with screw driver in direction of the arrow and observe the pointer [5]: While a ratchet click is felt and heard, the pointer [5] moves 90° every time.
  5. As soon as the pointer [5] is 90° from mark [6]: Continue turning slowly.
  6. As soon as the pointer [5] moves to mark [6]: Stop turning and release setting spindle.
- ➔ The end position OPEN setting is complete.
7. If you override the tripping point inadvertently (ratchet click is heard after the pointer has snapped): Continue turning the setting spindle in the same direction and repeat setting process.

### 9.4. Test run

Perform test run only once all settings previously described have been performed.

#### 9.4.1. Direction of rotation: check

#### NOTICE

#### Valve damage due to incorrect direction of rotation!

- If the direction of rotation is wrong, switch off immediately.
- Correct phase sequence.
- Repeat test run.

1. Move actuator manually to intermediate position or to sufficient distance from end position.
2. Switch on actuator in direction CLOSE and observe the direction of rotation:  
With mechanical position indication: Step 3  
Without mechanical position indication: Step 4 (hollow shaft)  
→ Switch off before reaching the end position.

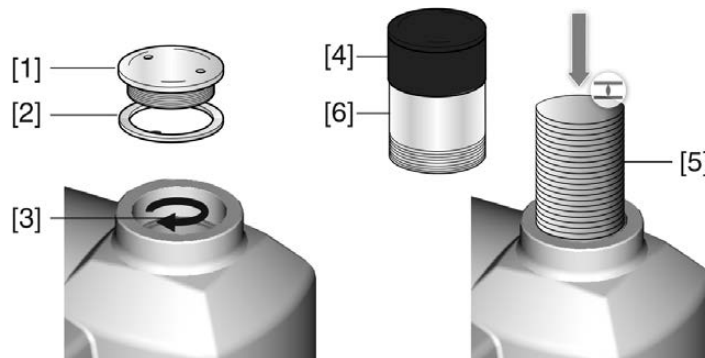
3. With mechanical position indication:
  - Observe direction of rotation.
  - ➔ The direction of rotation is correct if the **actuator moves in direction CLOSE** and:
    - For position indication with symbols OPEN/CLOSED = indicator disc turns **counterclockwise**.

Figure 29: Position indication with symbols OPEN/CLOSED



4. Without mechanical position indication:
  - 4.1 Unscrew threaded plug [1] and seal [2] or protective cap for stem protection tube [4] and observe direction of rotation at hollow shaft [3] or stem [5].
    - ➔ The direction of rotation is correct if the **actuator moves in direction CLOSE** in **clockwise** direction, or the stem moves downward.

Figure 30: Hollow shaft/stem movement for clockwise closing



- [1] Threaded plug
- [2] Seal
- [3] Hollow shaft
- [4] Protective cap for stem protection tube
- [5] Stem
- [6] Stem protection tube

- 4.2 Correctly fit/screw on threaded plug [1] and seal [2] or protective cap for stem protection tube [4], fasten thread.

#### 9.4.2. Limit switching: check

1. Manually operate actuator into both valve end positions.
  - ➔ The limit switching is set correctly if:
    - LSC switch trips in end position CLOSED
    - LSO switch trips in end position OPEN
    - the switches release the contacts after turning back the handwheel
2. If the end position setting is incorrect: Reset limit switching.

**9.5. Switch compartment: close**

- ✓ If options (e.g. potentiometer, position transmitter) are available: Only close switch compartment once all optional equipment has been successfully set.

**NOTICE****Danger of corrosion due to damage to paint finish!**

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

1. Clean sealing faces of housing and cover.
2. Check whether O-ring [3] is in good condition, replace if damaged.
3. Apply a thin film of non-acidic grease (e.g. petroleum jelly) to the O-ring and insert it correctly.

Figure 31:



4. Place cover [1] on switch compartment.
5. Fasten screws [2] evenly crosswise.

## 10. Commissioning (optional equipment settings)

### 10.1. Potentiometer

#### Setting elements

The potentiometer is used as travel sensor and records the valve position.

The potentiometer is housed in the actuator switch compartment. The switch compartment must be opened to perform any settings. Refer to <Switch compartment: open>.

Setting is made via potentiometer [1].

Figure 32: View on control unit



[1] Potentiometer

#### 10.1.1. Potentiometer: set

#### Information

Due to the ratio of the reduction gearing, the complete resistance range/stroke is not always covered. Therefore, external adjustment (setting potentiometer) must be provided.

1. Move valve to end position CLOSED.
2. Turn potentiometer [1] clockwise to the stop.
  - ➔ End position CLOSED corresponds to 0 %
  - ➔ End position OPEN corresponds to 100 %
3. Turn potentiometer [1] slightly in opposite direction.
4. Perform fine-tuning of the zero point at external setting potentiometer (for remote indication).

### 10.2. RWG electronic position transmitter

The RWG electronic position transmitter records the valve position. On the basis of the actual position value measured by the potentiometer (travel sensor), it generates a current signal between 0 – 20 mA or 4 – 20 mA.

#### Technical data

Table 13: RWG 4020

Data	3-wire and 4-wire systems	2-wire system
Output current $I_a$	0 – 20 mA, 4 – 20 mA	4 – 20 mA
Power supply $U_V$ <sup>1)</sup>	24 V DC (18 – 32 V)	14 V DC + (I x R <sub>B</sub> ), max. 30 V
Max. current consumption	24 mA at 20 mA output current	20 mA
Max. load R <sub>B</sub>	600 Ω	(U <sub>V</sub> – 14 V)/20 mA
Impact of power supply	0.1 %/V	0.1 %/V
Load influence	0.1 %/(0 – 600 Ω)	0.1 %/100 Ω
Temperature impact		< 0.3 ‰/K
Ambient temperature <sup>2)</sup>		–60 °C to +80 °C
Transmitter potentiometer		5 kΩ

1) Power supply possible via: AC, AM actuator controls or external power supply

2) Depending on temperature range of the actuator: Refer to name plate

#### Setting elements

The RWG is housed in the actuator switch compartment. The switch compartment must be opened to perform any settings. Refer to <Switch compartment: open>.

Setting is made via three potentiometers [1], [2] and [3].

Figure 33: View on control unit when switch compartment is open



- [1] Potentiometer (travel sensor)
- [2] Potentiometer min. (0/4 mA)
- [3] Potentiometer max. (20 mA)
- [4] Measuring point (+) 0/4 – 20 mA
- [5] Measuring point (–) 0/4 – 20 mA

The output current (measuring range 0 – 20 mA) can be checked at measuring points [4] and [5].

### 10.2.1. Measuring range: set

For measuring range setting, voltage must be applied at the position transmitter.

1. Move valve to end position CLOSED.
2. Connect measuring equipment for 0 – 20 mA to measuring points [4] and [5].  
If no value can be measured:
  - Check whether external load is connected to customer connection XK (for standard wiring: terminals 23/24). Consider maximum load  $R_B$ .
  - Or connect link across customer connection XK (for standard wiring: terminals 23/24).
3. Turn potentiometer [1] clockwise to the stop.
4. Turn potentiometer [1] slightly in opposite direction.
5. Turn potentiometer [2] clockwise until output current starts to increase.
6. Turn potentiometer [2] in opposite direction until the following value is reached:
  - for 0 – 20 mA approx. 0.1 mA
  - for 4 – 20 mA approx. 4.1 mA
- ➔ This ensures that the signal remains above the dead and live zero point.
7. Move valve to end position OPEN.
8. Set potentiometer [3] to end value 20 mA.
9. Approach end position CLOSED again and check minimum value (0.1 mA or 4.1 mA). If necessary, correct the setting.

**Information** If the maximum value cannot be reached, the selection of the reduction gearing must be checked.

### 10.3. EWG 01.1 electronic position transmitter

EWG 01.1 electronic position transmitter signals the remote position or the valve position. On the basis of the actual valve position sensed by hall sensor, a current signal between 0 – 20 mA or 4 – 20 mA is generated.

**Technical data**

Table 14: EWG 01.1

Data	3-wire and 4-wire systems	2-wire system
Output current $I_a$	0 – 20 mA, 4 – 20 mA	4 – 20 mA
Power supply $U_V^{1)}$	24 V DC (18 – 32 V)	24 V DC (18 – 32 V)
Max. current consumption	LED off = 26 mA, LED on = 27 mA	20 mA
Max. load $R_B$	600 $\Omega$	$(U_V - 12 V)/20 \text{ mA}$
Impact of power supply		0.1 %
Load influence		0.1 %
Temperature impact		< 0.1 %/K
Ambient temperature <sup>2)</sup>		-60 °C to +80 °C

1) Power supply possible via: AC, AM actuator controls or external power supply

2) Depending on temperature range of the actuator: Refer to name plate

**Setting elements**

The EWG is housed in the actuator switch compartment. The switch compartment must be opened to perform any settings. Refer to <Switch compartment: open>.

All settings are made via the two push buttons [S1] and [S2].

Figure 34: View on control unit when switch compartment is open



[S1] Push button: Set 0/4 mA

[S2] Push button: Set 20 mA

LED Optical aid for setting

[1] Measuring point (+) 0/4 – 20 mA

[2] Measuring point (-) 0/4 – 20 mA

The output current (measuring range 0 – 20 mA) can be checked at measuring points [1] and [2].

Table 15:

**Short overview on push button functions**

Push buttons	Function
[S1] + [S2]	→ press simultaneously for 5 s: Activate setting mode
[S1]	→ press in setting mode for 3 s: Set 4 mA → press in setting mode for 6 s: Set 0 mA → press in operation for 3 s: Switch on/off LED end position signalling. → touch in end position: Reduce current value by 0.02 mA
[S2]	→ press in setting mode for 3 s: Set 20 mA → press in operation for 3 s: Switch on/off LED end position signalling. → touch in end position: Increase current value by 0.02 mA

**10.3.1. Measuring range: set**

For measuring range setting, voltage must be applied at the position transmitter.

For output current verification, connect a test device for 0 – 20 mA to measurement points (+/-) (for 2-wire systems, connecting a test device is imperatively required).

- Information**
- Both measuring ranges 0/4 – 20 mA and 20 – 0/4 mA (inverse operation) can be set. During setting process, the measuring range (normal or inverse operation) is assigned to the end positions by push button S1/S2 assignment.
  - For 2-wire systems, switch off <LED end position signalling> prior to setting the measuring range.
  - Setting mode activation clears the settings in both end positions and sets the output current to a value of 3.5 mA. After activation, both end values (0/4 mA and 20 mA) need to be reset.
  - In case of inadvertent incorrect adjustment, the settings can always be reset by renewed activation of the setting mode (simultaneous pressing of [S1] and [S2]).

- Activate setting mode**
1. Press both push buttons [S1] and [S2] and hold down for 5 seconds:



- ➔ By pulsing double flashes, the LED indicates that the setting mode is correctly activated:



- ➔ For any other LED flash sequence (single/triple flashing): Refer to <Faults during commissioning>.

- Set measuring range**
2. Operate valve in one of the end positions (OPEN/CLOSED).

3. Set desired output current (0/4 mA or 20 mA):

- for **4 mA**: Hold down push button [S1] for approx. 3 seconds, until **LED is blinking slowly**
- for **0 mA**: Hold down push button [S1] for approx. 6 seconds, until **LED is blinking fast**
- for **20 mA**: Hold down push button [S2] for approx. 3 seconds, until **LED is illuminated**

**Information:** For 2-wire systems read current values at test device.

4. Operate valve into opposite end position.

- ➔ The value set in end position (0/4 mA or 20 mA) does not change during travel in setting mode.

5. Perform setting in the second end position following the same steps.

6. Approach both end positions again to check the setting.

- If the measuring range cannot be set:  
Refer to <Faults during commissioning>.
- If the current values (0/4/20 mA) are incorrect:  
Refer to <Current values: adjust>.
- If the current value fluctuates (e.g. Between 4.0 – 4.2 mA):  
Switch off LED end position signalling.  
Refer to <LED end position signalling: switch on/off>.

### 10.3.2. Current values : adjust

The current values (0/4/20 mA) set in end positions can be adjusted at any time. Common values are e.g. 0.1 mA (instead of 0 mA) or 4.1 mA (instead 4 mA).

- Information** If the current value fluctuates (e.g. between 4.0 – 4.2mA), the <LED end position signalling> must be switched off for current adjustment.

- Operate valve in desired end position (OPEN/CLOSED).
  - Reduce current value: Press push button [S1] (the current is reduced by 0.02 mA every time the push button is pressed)
  - Increase current value: Press push button [S2] (the current is increased by 0.02 mA every time the push button is pressed)




### 10.3.3. LED end position signalling: switch on/off

The LED behaviour for end position reached can be set as follows: blinking/continuous illumination or no illumination. During setting mode, end position signalling is switched on.

#### Switching on and off

1. Operate valve in one of the end positions (OPEN/CLOSED).
  2. Hold down push buttons [S1] or [S2] for approx. 3 seconds.
- ➔ End position signalling is switched on or off.

Table 16:

LED behaviour when end position signalling is switched on	
Set output current	LED behaviour in end position
4 mA	 LED is blinking slowly
0 mA	 LED is blinking fast
20 mA	 LED is illuminated

### 10.4. Intermediate positions: set

Actuators equipped with DUO limit switching contain two intermediate position switches. One intermediate position may be set for each running direction.

Figure 35: Setting elements for limit switching



#### Black section:

- [1] Setting spindle: Running direction CLOSE
- [2] Pointer: Running direction CLOSE
- [3] Mark: Intermediate position CLOSED is set

#### White section:

- [4] Setting spindle: Running direction OPEN
- [5] Pointer: Running direction OPEN
- [6] Mark: Intermediate position OPEN is set

**Information** After 177 turns (control unit for 2 – 500 turns/stroke) or 1,769 turns (control unit for 2 – 5,000 turns/stroke), the intermediate switches release the contact.




**10.4.1. Running direction CLOSE (black section): set**

1. Move valve in direction CLOSE to desired intermediate position.
  2. If you override the tripping point inadvertently: Turn valve into the opposite direction and approach intermediate position again in direction CLOSE.  
**Information:** Always approach the intermediate position in the same direction as in later electrical operation.
  3. **Press down** and turn setting spindle [1] with screw driver in direction of the arrow and observe the pointer [2]: While a ratchet click is felt and heard, the pointer [2] moves 90° every time.
  4. As soon as the pointer [2] is 90° from mark [3]: Continue turning slowly.
  5. As soon as the pointer [2] moves to mark [3]: Stop turning and release setting spindle.
- ➔ The intermediate position setting in running direction CLOSE is complete.
6. If you override the tripping point inadvertently (ratchet click is heard after the pointer has snapped): Continue turning the setting spindle in the same direction and repeat setting process.


**10.4.2. Running direction OPEN (white section): set**

1. Move valve in direction OPEN to desired intermediate position.
  2. If you override the tripping point inadvertently: Move valve in opposite direction and approach intermediate position again in direction OPEN (always approach the intermediate position in the same direction as in later electrical operation).
  3. **Press down** and turn setting spindle [4] with screw driver in direction of the arrow and observe the pointer [5]: While a ratchet click is felt and heard, the pointer [5] moves 90° every time.
  4. As soon as the pointer [5] is 90° from mark [6]: Continue turning slowly.
  5. As soon as the pointer [5] moves to mark [6]: Stop turning and release setting spindle.
- ➔ The intermediate position setting in running direction OPEN is complete.
6. If you override the tripping point inadvertently (ratchet click is heard after the pointer has snapped): Continue turning the setting spindle in the same direction and repeat setting process.


**10.5. Mechanical position indicator: set**

1. Fit indicator disc onto shaft.
2. Move valve to end position CLOSED.
3. Turn lower indicator disc until symbol  (CLOSED) is in alignment with the ▲ mark on the cover.



4. Move actuator to end position OPEN.
5. Hold lower indicator disc in position and turn upper disc with symbol  (OPEN) until it is in alignment with the ▲ mark on the cover.



6. Move valve to end position CLOSED again.
7. Check settings:  
If the symbol  (CLOSED) is no longer in alignment with ▲ mark on the cover:
  - 7.1 Repeat setting procedure.
  - 7.2 Check whether the appropriate reduction gearing has been selected, if required.

## 11. Corrective action

### 11.1. Faults during operation/commissioning

Table 17:

Faults during operation/commissioning		
Fault	Description/cause	Remedy
Mechanical position indicator cannot be set.	Reduction gearing is not suitable for turns/stroke of the actuator.	Exchange reduction gearing.
In spite of correct setting of limit switching, actuator operated into the valve end position.	The overrun was not considered when setting the limit switching. The overrun is generated by the inertia of both the actuator and the valve and the delay time of the actuator controls.	<ul style="list-style-type: none"> <li>Determine overrun: Overrun = travel covered from switching off until complete standstill.</li> <li>Set limit switching again considering the overrun. (Turn handwheel back by the amount of the overrun)</li> </ul>
No value can be measured at measuring points of the RWG.	Current loop across RWG is open. (Position feedback 0/4 – 20 mA is only possible if the current loop is closed across the RWG.)	<ul style="list-style-type: none"> <li>Connect link across RWG to XK (terminals 23/24)</li> <li>Connect external load to XK, e.g. remote indication.</li> <li>Observe maximum load <math>R_B</math>.</li> </ul>
Measuring range 0/4 – 20 mA or maximum value 20 mA at position transmitter cannot be set or supplies an incorrect value.	Reduction gearing is not suitable for turns/stroke of the actuator.	Exchange reduction gearing.
The measuring range 0/4 – 20 mA at EWG position transmitter cannot be set.	The LED on the EWG either flashes in setting mode a) single flash or b) triple flash:  a) EWG is not calibrated. b) Magnet positions of EWG are not aligned.	Call service.
Limit and/or torque switches do not trip.	Switch is defective or switch setting is incorrect.	Check setting, if required, reset end positions. Refer to <Check switches> and replace the switches if required.
Handwheel rotates on the shaft without transmitting torque.	Actuator in version with overload protection for manual operation: Shear pin rupture due to excessive torque at handwheel.	Dismount handwheel. Replace overload protection and remount handwheel.

#### Switch check

The red test buttons [1] and [2] are used for manual operation of the switches:



- Turn test button [1] in direction of the TSC arrow: Torque switch CLOSED trips.
  - Turn test button [2] in direction of the TSO arrow: Torque switch OPEN trips.
- If the actuator is equipped with a DUO limit switching (option), the intermediate position switches (LSA and LSB) will be operated at the same time as the torque switches.
- Turn test button [1] in direction of the LSC arrow: Limit switch CLOSED trips.
  - Turn test button [2] in direction of the LSO arrow: Limit switch OPEN trips.

### 11.2. Motor protection (thermal monitoring)

In order to protect against overheating and impermissibly high temperatures at the actuator, PTC thermistors or thermostiches are embedded in the motor winding. They trip as soon as the max. permissible winding temperature has been reached.

#### Behaviour during failure

If the signals are correctly wired within the controls, the actuator is stopped and can only resume its operation once the motor has cooled down.

#### Possible causes

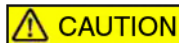
Overload, running time exceeded, max. number of starts exceeded, ambient temperature is too high.

Corrective action

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**Remedy** Check cause, eliminate if possible.

## 12. 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 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](http://www.auma.com))

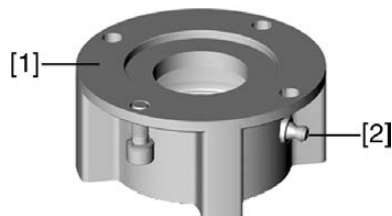
### 12.1. Preventive measures for servicing and safe operation

The following actions are required to ensure safe device operation:

#### 6 months after commissioning and then once a year

- Carry out visual inspection:  
Check threaded plugs, cable entries, cable glands, blanking plugs, etc. for correct tightness and sealing.  
Consider torques according to manufacturer's details.
- 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.
- For devices with output drive type A: Press in Lithium soap EP multi-purpose grease on mineral oil base at the grease nipple with a grease gun.
- Lubrication of the valve stem must be done separately.

Figure 36: Output drive type A



- [1] Output drive type A  
[2] Grease nipple

Table 18:

Grease quantities for bearing of output drive type A				
Output drive type	A 07.2	A 10.2	A 14.2	A 16.2
Quantity [g] <sup>1)</sup>	1.5	3	5	10

1) For grease with density  $\rho = 0.9 \text{ kg/dm}^3$

#### For enclosure protection IP68

After submersion:

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

### 12.2. Maintenance

- Lubrication**
- In the factory, the gear housing is filled with grease.

- Grease change is performed during maintenance
  - Generally after 4 to 6 years for modulating duty.
  - Generally after 6 to 8 years if operated frequently (open-close duty).
  - Generally after 10 to 12 years if operated infrequently (open-close duty).
- We recommend replacing the seals when changing the grease.
- Additional lubrication of the gear housing is not required during operation.

### 12.3. 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.

## 13. 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).

### 13.1. Technical data Multi-turn actuators

Features and functions	
Type of duty (Multi-turn actuators for open-close duty)	Standard: Short-time duty S2 - 15 min, classes A and B according to EN 15714-2 Option: with 3-phase AC motor: Short-time duty S2 - 30 min, classes A and B according to EN 15714-2 For nominal voltage and 40 °C ambient temperature and at load with 35 % of the max. torque.
Type of duty (Multi-turn actuators for modulating duty)	Standard: Intermittent duty S4 - 25 %, class C according to EN 15714-2 Option: with 3-phase AC motor: Intermittent duty S4 - 50 %, class C according to EN 15714-2 Intermittent duty S4 - 25 % (insulation class H required), class C according to EN 15714-2 For nominal voltage and 40 °C ambient temperature and at modulating torque load.
Motors	Standard: 3-phase AC asynchronous motor, type IM B9 according to IEC 60034-7, IC410 cooling procedure according to IEC 60034-6 Option: 1-phase AC motor with permanent split capacitor (PSC), type IM B9 according to IEC 60034-7, IC410 cooling procedure according to IEC 60034-6 1-phase AC motor with integral starting capacitor and solid state switch (CSIR), type IM B9 according to IEC 60034-7, IC410 cooling procedure according to IEC 60034-6 DC shunt motor, type IM B14 according to IEC 60034-7, cooling procedure IC410 according to IEC 60034-6 DC compound motor, type IM B14 according to IEC 60034-7, cooling procedure IC410 according to IEC 60034-6
Mains voltage, mains frequency	Refer to motor name plate Permissible variation of mains voltage: $\pm 10\%$ Permissible variation of mains frequency: $\pm 5\%$ (for 3-phase AC and 1-phase AC current)
Overvoltage category	Category III according to IEC 60364-4-443
Insulation class	Standard: F, tropicalized Option: H, tropicalized (with 3-phase AC motor)
Motor protection	Standard: 3-phase and 1-phase AC motors: Thermoswitches (NC) DC motors: Without Option: PTC thermistors (according to DIN 44082) PTC thermistors additionally require a suitable tripping device in the actuator controls.
Self-locking	Self-locking: Output speeds up to 90 rpm (50 Hz), 108 rpm (60 Hz) NOT self-locking: Output speeds from 125 rpm (50 Hz), 150 rpm (60 Hz) Multi-turn actuators are self-locking, if the valve position cannot be changed from standstill while torque acts upon the output drive.
Motor heater (option)	Voltages: 110 – 120 V AC, 220 – 240 V AC (3-phase and 1-phase AC motors) 380– 480 V AC (3-phase AC motors) DC motors: Without motor heater Power depending on the size 12.5 – 25 W
Manual operation	Manual drive for setting and emergency operation, handwheel does not rotate during electrical operation. Option: Handwheel lockable Handwheel stem extension Power tool for emergency operation with square 30 mm or 50 mm
Indication for manual operation (option)	Indication whether manual operation is active/not active via single switch (1 change-over contact)
Electrical connection	Standard: AUMA plug/socket connector with screw-type connection Motor connection for some DC motors via separate motor terminal board Option: Terminals or crimp connection Gold-plated control plug (sockets and plugs)
Threads for cable entries	Standard: Metric threads Option: Pg-threads, NPT-threads, G-threads
Terminal plan	Terminal plan according to order number as part of the scope of delivery

## Technical data

Features and functions	
Valve attachment	Standard: B1 according to EN ISO 5210 Option: A, B2, B3, B4 according to EN ISO 5210 A, B, D, E according to DIN 3210 C according to DIN 3338 Special valve attachments: AF, AK, AG, B3D, ED, DD, IB1, IB3 A prepared for permanent lubrication of stem
Electromechanical control unit	
Limit switching	Counter gear mechanism for end positions OPEN and CLOSED Turns per stroke: 2 to 500 (standard) or 2 to 5,000 (option) Standard: Single switch (1 NC and 1 NO) silver contact (Ag) for each end position, not galvanically isolated Options: Tandem switch (2 NC and 2 NO) for each end position, switches galvanically isolated Triple switch (3 NC and 3 NO) for each end position, switches galvanically isolated Intermediate position switches (DUO limit switching), adjustable for each direction of operation Gold plated contacts (Au), recommended for low voltage actuator controls
Torque switching	Torque switching adjustable for directions OPEN and CLOSE Standard: Single switch (1 NC and 1 NO) silver contact (Ag) for each direction, not galvanically isolated Options: Tandem switch (2 NC and 2 NO) for each direction, switches galvanically isolated Gold plated contacts (Au), recommended for low voltage actuator controls
Position feedback signal, analogue (option)	Potentiometer or 0/4 – 20 mA (electronic position transmitter)
Mechanical position indicator (option)	Continuous indication, adjustable indicator disc with symbols OPEN and CLOSED
Running indication	Blinker transmitter (option for modulating actuators)
Heater in switch compartment	Standard: Self-regulating PTC heater, 5 – 20 W, 110 – 250 V AC/DC Options: 24 – 48 V AC/DC (for actuators with 3-phase AC/1-phase AC/DC motors) or 380 – 400 V AC/DC (for actuators with 3-phase AC motors) A resistance type heater of 5 W, 24 V AC is installed in the actuator in combination with AM or AC actuator controls.

Technical data for limit and torque switches	
Mechanical lifetime	$2 \times 10^6$ starts
Silver plated contacts:	
U min.	24 V AC/DC
U max.	250 V AC/DC
I min.	20 mA
I max. AC current	5 A at 250 V (resistive load) 3 A at 250 V (inductive load, $\cos \phi = 0.6$ )
I max. DC current	0.4 A at 250 V (resistive load) 0.03 A at 250 V (inductive load, $L/R = 3 \mu s$ ) 7 A at 30 V (resistive load) 5 A at 30 V (inductive load, $L/R = 3 \mu s$ )
Gold plated contacts	
U min.	5 V
U max.	50 V
I min.	4 mA
I max.	400 mA

Technical data for blinker transmitter	
Mechanical lifetime	$10^7$ starts
Silver plated contacts:	
U min.	10 V AC/DC
U max.	250 V AC/DC
I max. AC current	3 A at 250 V (resistive load) 2 A at 250 V (inductive load, $\cos \phi \approx 0.8$ )
I max. DC current	0.25 A at 250 V (resistive load)



<b>Technical data for handwheel activation switches</b>	
Mechanical lifetime	10 <sup>6</sup> starts
<b>Silver plated contacts:</b>	
U min.	12 V DC
U max.	250 V AC
I max. AC current	3 A at 250 V (inductive load, cos phi = 0.8)
I max. DC current	3 A at 12 V (resistive load)
<b>Service conditions</b>	
Use	Indoor and outdoor use permissible
Mounting position	Any position
Installation altitude	≤ 2 000 m above sea level > 2,000 m above sea level, on request
Ambient temperature	Standard: –30 °C to +70 °C Options: –40 °C to +70 °C –40 °C to +80 °C (multi-turn actuators for open-close duty with 3-phase/1-phase AC motors) –60 °C to +60 °C (with 3-phase/1-phase AC motors) 0 °C to +120 °C (multi-turn actuators for open-close duty with 3-phase AC motor) 0 °C to +100 °C (multi-turn actuators for modulating duty with 3-phase AC motor) For exact version, refer to actuator name plate.
Humidity	Up to 100 % relative humidity across the entire permissible temperature range
Enclosure protection according to EN 60529	Standard: IP68 (with AUMA 3-phase/1-phase AC or DC motor) For special motors differing enclosure protection available (refer to motor name plate) Option: DS Terminal compartment additionally sealed against interior (double sealed) According to AUMA definition, enclosure protection IP68 meets the following requirements: <ul style="list-style-type: none"> <li>• Depth of water: Maximum 8 m head of water</li> <li>• Duration of continuous immersion in water: Maximum 96 hours</li> <li>• Up to 10 operations during flooding.</li> <li>• Modulating duty is not possible during continuous immersion.</li> </ul> For exact version, refer to actuator name plate.
Pollution degree according to IEC 60664-1	Pollution degree 4 (when closed), pollution degree 2 (internal)
Vibration resistance according to IEC 60068-2-6	2 g, from 10 to 200 Hz (for actuators in AUMA NORM version) 1 g, from 10 to 200 Hz (for actuators with mounted AUMA actuator controls) Resistant to vibration during start-up or for failures of the plant. However, a fatigue strength may not be derived from this. Indications apply to actuators with AUMA 3-phase AC motor and AUMA plug/socket connector. They are not valid in combination with gearboxes.
Corrosion protection	Standard: KS: Suitable for use in areas with high salinity, almost permanent condensation, and high pollution. Option: KX: Suitable for use in areas with extremely high salinity, permanent condensation, and high pollution. KX-G : same as KX, however aluminium-free version (outer parts)
Coating	Double layer powder coating Two-component iron-mica combination
Colour	Standard: AUMA silver-grey (similar to RAL 7037) Option: Other colours are possible on request.
Lifetime	AUMA multi-turn actuators meet or exceed the lifetime requirements of EN 15714-2. For further details, please contact AUMA
Noise level	< 72 dB (A)
<b>Further information</b>	
EU Directives	Electromagnetic Compatibility (EMC): (2014/30/EU) Low Voltage Directive: (2014/35/EU) Machinery Directive: (2006/42/EC)



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. Representation of spare parts may slightly vary from actual delivery.

Ref. no.	Designation	Type	Ref. no.	Designation	Type
001.0	Housing	Sub-assembly	542.0	Handwheel with ball handle	Sub-assembly
002.0	Bearing flange	Sub-assembly	549.0	Output drive types B/B1/B2/B3/B4/C/E	Sub-assembly
003.0	Hollow shaft	Sub-assembly	549.1	Output drive sleeve B/B1/B2/B3/B4/C/E	Sub-assembly
005.0	Drive shaft	Sub-assembly	551.1	Parallel key	
005.1	Motor coupling		553.0	Mechanical position indicator	Sub-assembly
005.3	Manual drive coupling		554.0	Socket carrier for motor plug/socket connector with cable harness	Sub-assembly
006.0	Worm wheel		556.0	Potentiometer as position transmitter	Sub-assembly
009.0	Manual gearing	Sub-assembly	556.1	Potentiometer without slip clutch	Sub-assembly
017.0	Torque lever	Sub-assembly	557.0	Heater	
018.0	Gear segment		558.0	Blinker transmitter including pins at wires (without impulse disc and insulation plate)	Sub-assembly
019.0	Crown wheel		559.0-1	Electromechanical control unit with switches, including torque switching heads	Sub-assembly
022.0	Drive pinion II for torque switching	Sub-assembly	559.0-2	Electronic control unit with magnetic limit and torque transmitter (MWG)	Sub-assembly
023.0	Output drive wheel for limit switching	Sub-assembly	560.0-1	Switch stack for direction OPEN	Sub-assembly
024.0	Drive wheel for limit switching	Sub-assembly	560.0-2	Switch stack for direction CLOSE	Sub-assembly
025.0	Locking plate	Sub-assembly	560.1	Switch for limit/torque	Sub-assembly
058.0	Cable for protective earth	Sub-assembly	560.2	Switch case	
070.0	Motor (only for V... motors incl. ref. no. 079.0)	Sub-assembly	566.0	RWG position transmitter	Sub-assembly
079.0	Planetary gearing for motor drive (only for V... motors)	Sub-assembly	566.1	Potentiometer for RWG without slip clutch	Sub-assembly
155.0	Reduction gearing	Sub-assembly	566.2	Position transmitter board for RWG	Sub-assembly
500.0	Cover	Sub-assembly	566.3	Cable set for RWG	Sub-assembly
501.0	Socket carrier (complete with sockets)	Sub-assembly	567.1	Slip clutch for potentiometer	Sub-assembly
502.0	Pin carrier without pins	Sub-assembly	568.1	Stem protection tube (without cap)	
503.0	Socket for controls	Sub-assembly	568.2	Protective cap for stem protection tube	
504.0	Socket for motor	Sub-assembly	568.3	V-seal	
505.0	Pin for controls	Sub-assembly	568.4	Threaded sleeve	
506.0	Pin for motor	Sub-assembly	575.1	Stem nut A (without thread)	
507.0	Cover for electrical connection	Sub-assembly	583.0	Motor coupling on motor shaft	Sub-assembly
511.0	Threaded plug	Sub-assembly	583.1	Pin for motor coupling	
514.0	Output drive type A (without stem nut)	Sub-assembly	584.0	Retaining spring for motor coupling	Sub-assembly
514.1	Axial needle roller bearing	Sub-assembly	614.0	EWG position transmitter	Sub-assembly
516.0	Output drive type D	Sub-assembly	627.0	MWG 05.03 cover	
516.1	Output drive shaft D		S1	Seal kit, small	Set
535.1	Snap ring		S2	Seal kit, large	Set
539.0	Screw plug	Sub-assembly			

## 15. Certificates

**Information** Certificates are valid as from the indicated date of issue. Subject to changes without notice. The latest versions are attached to the device upon delivery and also available for download at <http://www.auma.com>.

### 15.1. Declaration of Incorporation and EC Declaration of Conformity

AUMA Riester GmbH & Co. KG  
Aumastr. 1  
79379 Müllheim, Germany  
[www.auma.com](http://www.auma.com)

Tel +49 7631 809-0  
Fax +49 7631 809-1250  
[info@uma.com](mailto:info@uma.com)



#### EU Declaration of Conformity / Declaration of Incorporation in compliance with Machinery Directive

for electric actuators of the following type designations:

**SA 07.2, SA 07.6, SA 10.2, SA 14.2, SA 14.6, SA 16.2,  
SAR 07.2, SAR 07.6, SAR 10.2, SAR 14.2, SAR 14.6, SAR 16.2  
SQ 05.2, SQ 07.2, SQ 10.2, SQ 12.2, SQ 14.2  
SQR 05.2, SQR 07.2, SQR 10.2, SQR 12.2, SQR 14.2**

in versions:

**AUMA NORM  
AUMA SEMIPACT SEM 01.1, SEM 02.1  
AUMA MATIC AM 01.1, AM 02.1  
AUMATIC AC 01.2**

AUMA Riester GmbH & Co. KG as manufacturer declare herewith, that the above mentioned actuators meet the basic requirements of the following Directives:

**2014/30/EU (EMC Directive)  
2006/42/EC (Machinery Directive)**

The following harmonised standards in terms of the specified directives have been applied:

**Directive 2014/30/EU**

EN 61000-6-4:2007 / A1:2011  
EN 61000-6-2:2005 / AC:2005

**Directive 2006/42/EC**

EN ISO 12100:2010  
EN ISO 5210:1996

AUMA actuators are designed for the operation of industrial valves. Putting into service is prohibited until the final machinery has been declared in conformity with the provisions of Directive 2006/42/EC.

The following basic requirements in compliance with Annex I of the Directive are respected:

Appendix I, articles 1.1.2, 1.1.3, 1.1.5, 1.2.1, 1.2.6, 1.3.1, 1.3.7, 1.5.1, 1.6.3, 1.7.1, 1.7.3, 1.7.4

The manufacturer shall be obligated to electronically submit the documents for the partly completed machinery to national authorities on request. The relevant technical documentation pertaining to the machinery described in Annex VII, part B has been prepared.

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

Furthermore, the essential health and safety requirements in compliance with Directive 2014/35/EU (Low Voltage Directive) are fulfilled by applying the following harmonised standards, as far as applicable for the products:

EN 60204-1:2006 / A1:2009 / AC:2010  
EN 60034-1:2010 / AC:2010  
EN 50178:1997

Müllheim, 2016-04-01

  
H. Newerla, Managing Director

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.

Y006.332/003/en/1.16





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## Europe

**AUMA Riester GmbH & Co. KG**

Location Muellheim  
**DE 79373 Muellheim**  
 Tel +49 7631 809 - 0  
 info@auma.com  
 www.auma.com

Location Ostfildern-Nellingen  
**DE 73747 Ostfildern**  
 Tel +49 711 34803 - 0  
 riester@wof.auma.com

Service-Center Bayern  
**DE 85386 Eching**  
 Tel +49 81 65 9017- 0  
 Riester@scb.auma.com

Service-Center Köln  
**DE 50858 Köln**  
 Tel +49 2234 2037 - 900  
 Service@sck.auma.com

Service Center Magdeburg  
**DE 39167 Niederndodeleben**  
 Tel +49 39204 759 - 0  
 Service@scm.auma.com

AUMA-Armaturen- und Antriebstechnik Ges.m.b.H.  
**AT 2512 Tribuswinkel**  
 Tel +43 2252 82540  
 office@auma.at  
 www.auma.at

AUMA BENELUX B.V. B. A.  
**BE 8800 Roeselare**  
 Tel +32 51 24 24 80  
 office@auma.be  
 www.auma.nl

ProStream Group Ltd.  
**BG 1632 Sofia**  
 Tel +359 2 9179-337  
 valtchev@prostream.bg  
 www.prostream.bg

OOO "Dunkan-Privod"  
**BY 220004 Minsk**  
 Tel +375 29 6945574  
 belarus@auma.ru  
 www.zatvor.by

AUMA (Schweiz) AG  
**CH 8965 Berikon**  
 Tel +41 566 400945  
 RettichP.ch@auma.com

AUMA Servopohony spol. s.r.o.  
**CZ 250 01 Brandýs n.L.-St.Boleslav**  
 Tel +420 326 396 993  
 auma-s@auma.cz  
 www.auma.cz

GRØNBECH & SØNNER A/S  
**DK 2450 København SV**  
 Tel +45 33 26 63 00  
 GS@g-s.dk  
 www.g-s.dk

IBEROPLAN S.A.  
**ES 28027 Madrid**  
 Tel +34 91 3717130  
 iberoplan@iberoplan.com

AUMA Finland Oy  
**FI 02230 Espoo**  
 Tel +358 9 5840 22  
 auma@auma.fi  
 www.auma.fi

AUMA France S.A.R.L.  
**FR 95157 Taverny Cedex**  
 Tel +33 1 39327272  
 info@auma.fr  
 www.auma.fr

AUMA ACTUATORS Ltd.  
**GB Clevedon, North Somerset BS21 6TH**  
 Tel +44 1275 871141  
 mail@auma.co.uk  
 www.auma.co.uk

D. G. Bellos & Co. O.E.  
**GR 13673 Acharnai, Athens**  
 Tel +30 210 2409485  
 info@dgbellos.gr

APIS CENTAR d. o. o.  
**HR 10437 Bestovje**  
 Tel +385 1 6531 485  
 auma@apis-centar.com  
 www.apis-centar.com

Fabo Kereskedelmi és Szolgáltató Kft.  
**HU 8800 Nagykanizsa**  
 Tel +36 93/324-666  
 auma@fabo.hu  
 www.fabo.hu

Falkinn HF  
**IS 108 Reykjavik**  
 Tel +00354 540 7000  
 os@falkinn.is  
 www.falkinn.is

AUMA ITALIANA S.r.l. a socio unico  
**IT 20023 Cerro Maggiore (MI)**  
 Tel +39 0331 51351  
 info@auma.it  
 www.auma.it

AUMA BENELUX B.V.  
**LU Leiden (NL)**  
 Tel +31 71 581 40 40  
 office@auma.nl

NB Engineering Services  
**MT ZBR 08 Zabbar**  
 Tel + 356 2169 2647  
 nikibel@onvol.net

AUMA BENELUX B.V.  
**NL 2314 XT Leiden**  
 Tel +31 71 581 40 40  
 office@auma.nl  
 www.auma.nl

SIGUM A. S.  
**NO 1338 Sandvika**  
 Tel +47 67572600  
 post@sifag.no

AUMA Polska Sp. z o.o.  
**PL 41-219 Sosnowiec**  
 Tel +48 32 783 52 00  
 biuro@auma.com.pl  
 www.auma.com.pl

AUMA-LUSA Representative Office, Lda.  
**PT 2730-033 Barcarena**  
 Tel +351 211 307 100  
 geral@aumalusa.pt

SAUTECH  
**RO 011783 Bucuresti**  
 Tel +40 372 303982  
 office@sautech.ro

OOO PRIWODY AUMA  
**RU 141402 Khimki, Moscow region**  
 Tel +7 495 221 64 28  
 aumarussia@auma.ru  
 www.auma.ru

OOO PRIWODY AUMA  
**RU 125362 Moscow**  
 Tel +7 495 787 78 21  
 aumarussia@auma.ru  
 www.auma.ru

ERICH'S ARMATUR AB  
**SE 20039 Malmö**  
 Tel +46 40 311550  
 info@erichsarmatur.se  
 www.erichsarmatur.se

ELSO-b, s.r.o.  
**SK 94901 Nitra**  
 Tel +421 905/336-926  
 elsob@stonline.sk  
 www.elsob.sk

Auma Endüstri Kontrol Sistemleri Limited  
 Sirketi  
**TR 06810 Ankara**  
 Tel +90 312 217 32 88  
 info@auma.com.tr

AUMA Technology Automations Ltd  
**UA 02099 Kiev**  
 Tel +38 044 586-53-03  
 auma-tech@aumatech.com.ua

## Africa

Solution Technique Contrôle Commande  
**DZ Bir Mourad Rais, Algiers**  
 Tel +213 21 56 42 09/18  
 stcco@wissal.dz

A.T.E.C.  
**EG Cairo**  
 Tel +20 2 23599680 - 23590861  
 contactus@atec-eg.com

SAMIREG  
**MA 203000 Casablanca**  
 Tel +212 5 22 40 09 65  
 samireg@menara.ma

MANZ INCORPORATED LTD.  
**NG Port Harcourt**  
 Tel +234-84-462741  
 mail@manzincorporated.com  
 www.manzincorporated.com

AUMA South Africa (Pty) Ltd.  
**ZA 1560 Springs**  
 Tel +27 11 3632880  
 aumasa@mweb.co.za

## America

AUMA Argentina Rep. Office  
**AR Buenos Aires**  
 Tel +54 11 4737 9026  
 contacto@aumaargentina.com.ar

AUMA Automação do Brazil Ltda.  
**BR Sao Paulo**  
 Tel +55 11 4612-3477  
 contato@auma-br.com

TROY-ONTOR Inc.  
**CA L4N 8X1 Barrie, Ontario**  
 Tel +1 705 721-8246  
 troy-ontor@troy-ontor.ca

AUMA Chile Representative Office  
**CL 7870163 Santiago**  
 Tel +56 2 2821 4108  
 claudio.bizama@auma.com

B & C Biosciences Ltda.  
**CO Bogotá D.C.**  
 Tel +57 1 349 0475  
 proyectos@bycenlinea.com  
 www.bycenlinea.com

AUMA Región Andina & Centroamérica  
**EC Quito**  
 Tel +593 2 245 4614  
 auma@auma-ac.com  
 www.auma.com

Corsusa International S.A.C.  
**PE Miraflores - Lima**  
 Tel +51 1444-1200 / 0044 / 2321  
 corsusa@corsusa.com  
 www.corsusa.com

Control Technologies Limited  
**TT Marabella, Trinidad, W.I.**  
 Tel + 1 868 658 1744/5011  
 www.cntltech.com

AUMA ACTUATORS INC.  
**US PA 15317 Canonsburg**  
 Tel +1 724-743-AUMA (2862)  
 mailbox@auma-usa.com  
 www.auma-usa.com

Suplibarca  
**VE Maracaibo, Estado, Zulia**  
 Tel +58 261 7 555 667  
 suplibarca@intercable.net.ve

## Asia

AUMA Actuators UAE Support Office  
**AE 287 Abu Dhabi**  
 Tel +971 26338688  
 Nagaraj.Shetty@auma.com

AUMA Actuators Middle East  
**BH 152 68 Salmabad**  
 Tel +97 3 17896585  
 salesme@auma.com

Mikuni (B) Sdn. Bhd.  
**BN KA1189 Kuala Belait**  
 Tel + 673 3331269 / 3331272  
 mikuni@brunet.bn

AUMA Actuators (China) Co., Ltd.  
**CN 215499 Taicang**  
 Tel +86 512 3302 6900  
 mailbox@auma-china.com  
 www.auma-china.com

PERFECT CONTROLS Ltd.  
**HK Tsuen Wan, Kowloon**  
 Tel +852 2493 7726  
 joeip@perfectcontrols.com.hk

PT. Carakamas Inti Alam  
**ID 11460 Jakarta**  
 Tel +62 215607952-55  
 auma-jkt@indo.net.id

AUMA INDIA PRIVATE LIMITED.  
**IN 560 058 Bangalore**  
 Tel +91 80 2839 4656  
 info@auma.co.in  
 www.auma.co.in

ITG - Iranians Torque Generator  
**IR 13998-34411 Teheran**  
 +982144545654  
 info@itg-co.ir

Trans-Jordan Electro Mechanical Supplies  
**JO 11133 Amman**  
 Tel +962 - 6 - 5332020  
 Info@transjordan.net

AUMA JAPAN Co., Ltd.  
**JP 211-0016 Kawasaki-shi, Kanagawa**  
 Tel +81-(0)44-863-8371  
 mailbox@auma.co.jp  
 www.auma.co.jp

DW Controls Co., Ltd.  
**KR 153-702 Gasan-dong, GeumChun-Gu,, Seoul**  
 Tel +82 2 2624 3400  
 import@actuatorbank.com  
 www.actuatorbank.com

Al-Arfaj Engineering Co WLL  
**KW 22004 Salmiyah**  
 Tel +965-24817448  
 info@arfajengg.com  
 www.arfajengg.com

TOO "Armaturny Center"  
**KZ 060005 Atyrau**  
 Tel +7 7122 454 602  
 armacentre@bk.ru

Network Engineering  
**LB 4501 7401 JBEIL, Beirut**  
 Tel +961 9 944080  
 nabil.ibrahim@networkenglb.com  
 www.networkenglb.com

AUMA Malaysia Office  
**MY 70300 Seremban, Negeri Sembilan**  
 Tel +606 633 1988  
 sales@auma.com.my

Mustafa Sultan Science & Industry Co LLC  
**OM Ruwi**  
 Tel +968 24 636036  
 r-negi@mustafasultan.com

FLOWTORK TECHNOLOGIES CORPORATION  
**PH 1550 Mandaluyong City**  
 Tel +63 2 532 4058  
 flowtork@pltdsl.net

M & C Group of Companies  
**PK 54000 Cavalry Ground, Lahore Cantt**  
 Tel +92 42 3665 0542, +92 42 3668 0118  
 sales@mcss.com.pk  
 www.mcss.com.pk

Petrogulf W.L.L.  
**QA Doha**  
 Tel +974 44350151  
 pgulf@qatar.net.qa

AUMA Saudi Arabia Support Office  
**SA 31952 Al Khobar**  
 Tel + 966 5 5359 6025  
 Vinod.Fernandes@auma.com

AUMA ACTUATORS (Singapore) Pte Ltd.  
**SG 569551 Singapore**  
 Tel +65 6 4818750  
 sales@auma.com.sg  
 www.auma.com.sg

NETWORK ENGINEERING  
**SY Homs**  
 +963 31 231 571  
 eyad3@scs-net.org

Sunny Valves and Intertrade Corp. Ltd.  
**TH 10120 Yannawa, Bangkok**  
 Tel +66 2 2400656  
 mainbox@sunnyvalves.co.th  
 www.sunnyvalves.co.th

Top Advance Enterprises Ltd.  
**TW Zhonghe City, Taipei Hsien (235)**  
 Tel +886 2 2225 1718  
 support@auma-taiwan.com.tw  
 www.auma-taiwan.com.tw

AUMA Vietnam Hanoi RO  
**VN Hanoi**  
 +84 4 37822115  
 chienguyen@auma.com.vn

## Australia

BARRON GJM Pty. Ltd.  
**AU NSW 1570 Artarmon**  
 Tel +61 2 8437 4300  
 info@barron.com.au  
 www.barron.com.au



# auma®

*Solutions for a world in motion*

## **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



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