auma®

Solutions for a world in motion

Globe valve actuators

SVC 05.1 – SVC 07.5

SVCR 05.1 – SVCR 07.5

with integral actuator controls

Control

Parallel

Profibus DP

→ Modbus RTU

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.

Reference documents:

- Manual (Device integration Fieldbus) SGC(R)/SVC(R)/SGM(R)/SVM(R) Modbus

Reference documents can be downloaded from the Internet (www.auma.com) or ordered directly from AUMA (refer to <Addresses>).

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1. Safety instructions

1.1. Basic information on safety

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

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

They include among others applicable configuration guidelines for fieldbus applications.

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

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

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

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

Operation Prerequisites for safe and smooth operation:

- Correct transport, proper storage, mounting and installation, as well as careful commissioning.
- Only operate the device if it is in perfect condition while observing these instructions.
- Immediately report any faults and damage and allow for corrective measures.
- Observe recognised rules for occupational health and safety.
- Observe the national regulations.
- During operation, the 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 consent of the manufacturer.

1.2. Range of application

AUMA globe valve actuators are designed for the operation of 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
- Buried service
- Continuous submersion (observe enclosure protection)
- Potentially explosive atmospheres
- 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 category Ex II3D basically meet the requirements for applications in dust hazardous locations of ZONE 22 in compliance with the ATEX directive 94/9/EC.

Actuators for zone 22 are at least designed in enclosure protection IP65 and comply with the provisions of IEC 60079-0 - Explosive atmospheres - Part 0: Equipment - General requirements.

To comply with all requirements of IEC 60079-0, it is imperative that the following points are observed:

- In compliance with the ATEX directive 94/9/EC, the actuators must be equipped with an additional identification – II3D IP6X T150 °C.
- The maximum surface temperature of the actuators, based on an ambient temperature of +70 °C in accordance with IEC 60079-0 section 5.3, is +150 °C. In accordance with section 5.3.2, an increased dust deposit on the equipment was not considered for the determination of the maximum surface temperature.
- Fulfilling the requirements of the duty type and the technical data are prerequisites for compliance with the maximum surface temperature of devices.
- The connectors may only be connected or disconnected when not live.
- The cable glands used also have to meet the requirements of category II3 D and must at least comply with enclosure protection IP67.
- The actuators must be connected by means of an external earth connection to the equipotential earth bonding or integrated into an earthed piping system.
- As a general rule, the requirements of IEC 60079-0 and EN 13463-1 must be respected in dust hazardous locations. During commissioning, service, and maintenance, special care as well as qualified and trained personnel are required for the safe operation of actuators.
- Connectors and components remaining live when not connected to a socket are not permissible.

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).

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

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

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

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

Arrangement and typographic structure of the warnings

⚠ DANGER	**Type of hazard and respective source!**

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

→ Measures to avoid the danger

→ Further measure(s)

Safety alert symbol ⚠ warns of a potential personal injury hazard.

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

1.5. 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 quickly be found.

2. Identification

2.1. Name plate

Figure 1: Arrangement of name plates

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

Description of actuator name plate

Figure 2: Actuator name plate (example)

[1] Name of manufacturer
[2] Address of manufacturer
[3] **Type designation**
[4] **Order number**
[5] **Actuator serial number**
[6] Speed
[7] Torque range
[8] Current type, mains voltage, mains frequency
[9] Electric power (motor)
[10] Wiring diagram number
[11] **Control**
[12] Can be assigned as an option upon customer request
[13] Enclosure protection
[14] Type of lubricant
[15] Turns per stroke
[16] Permissible ambient temperature
[17] Rated current
[18] Type of duty
[19] **Data Matrix code**

| Type designation | Figure 3: Type designation (example) |

1. Type and size of actuator
2. Flange size

Type and size

These instructions apply to the following devices types and sizes:

Globe valve actuators for open-close duty: SVC 05.1, 07.1, 07.5

Globe valve actuators for modulating duty: SVC**R** 05.1, 07.1, 07.5

| 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 compiled. |

Please always state this number for any product inquiries.

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

| Actuator serial number | Table 1: Description of serial number (with example) |

05	14	NS12345	
1st + 2nd **position: Assembly in week**			
05	Week 05		
3rd + 4th **position: Year of manufacture**			
	14	Year of manufacture: 2014	
All other positions			
		NS12345	Internal number for unambiguous product identification

| Control | **Modbus RTU** = Control via Modbus RTU interface. |

| 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 of serial number. |

Figure 4: Link to the App store:

2.2. Short description

| Globe valve actuator | AUMA globe valve actuators are multi-turn actuators for the automation of globe valves and are driven by an electric motor. For control in motor operation and for processing the actuator signals, controls are integrated within the housing. The actuator can be operated easily on site via the local controls. A handwheel or crank is provided for manual operation. Manual operation is possible without change-over. |

Switching off in end positions may be either by limit or torque seating.

As for part-turn actuators, the connection dimensions of AUMA globe valve actuators are designed according to EN ISO 5211.

| AUMA CDT | The AUMA CDT software (accessories) can be used to establish a connection to a computer (PC, laptop or PDA). Among others, the software can be used to read in and out data and to save and modify settings. |

The connection between computer and the integral actuator controls is made using a service cable.

3. Transport, storage and packaging

3.1. Transport

For transport to place of installation, use sturdy packaging.

⚠ DANGER

Hovering load!

Risk of death or serious injury.

→ Do NOT stand below hovering load.

→ Attach ropes or hooks for the purpose of lifting by hoist only to housing and NOT to handwheel.

→ Actuators mounted on valves: Attach ropes or hooks for the purpose of lifting by hoist to valve and NOT to actuator.

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

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

1. Prior to storage:
   Protect uncoated surfaces, in particular the output drive parts and mounting surface, with long-term corrosion protection agent.

2. At an interval of approx. 6 months:
   Check for corrosion. If first signs of corrosion show, apply new corrosion protection.

Plastic protective caps supplied when leaving the factory are for transport protection only. They have to be replaced for long-term storage. (Heed protection type indicated on name plate.)

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.
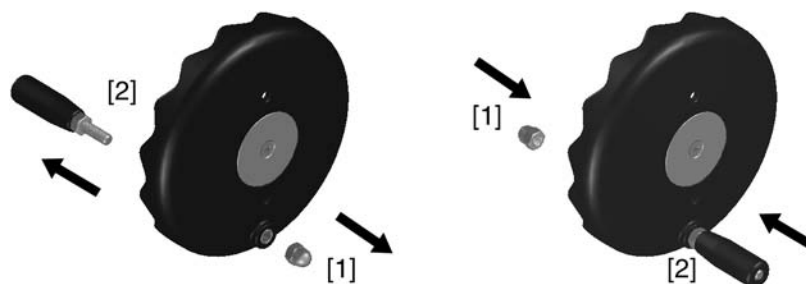
4.   Assembly

4.1.   Mounting position

AUMA actuators can be operated without restriction in any mounting position.

4.2.   Ball handle to handwheel: fit

To avoid damage during transport, the ball handle is fitted at the rear of the handwheel.

Prior to commissioning, mount the ball handle into correct position:

1.   Remove cap nut [1] and pull out ball handle [2].
2.   Insert ball handle [2] in correct position and fasten with cap nut [1].

Information   The end position detection can be modified by turning the handwheel while actuator is not mounted to a valve. Therefore, we recommend not to turn the handwheel prior to mounting to the actuator to the valve.

4.3.   Actuator: mount to valve

4.3.1.   Actuator for assembly: prepare

Prior to mounting, both valve and actuator must be in the same end position!

*   For butterfly valves, the recommended mounting position is end position CLOSED.
*   For ball valves, the recommended mounting position is end position OPEN.

In compliance with the order, the actuator is supplied either in position CLOSED or position OPEN. The mechanical position indicator supplies information on the set position.

If the actuator position was not modified and agrees with the valve position, the actuator can be mounted in the supplied position.

In case the actuator is in an incorrect position:

1.   Operate the actuator into the same position as the valve via push buttons OPEN, STOP, CLOSE while in motor operation. For motor operation, please refer to <Actuator operation at the local controls> chapter.
2.   Should the electrical connection not be available at the time of assembly, the actuator can be operated into the required end position using the handwheel.

    2.1   Turn the handwheel or the crank handle until the respective symbol (OPEN/CLOSED) of mechanical position indication corresponds to the mark (same end position OPEN or CLOSED as valve).
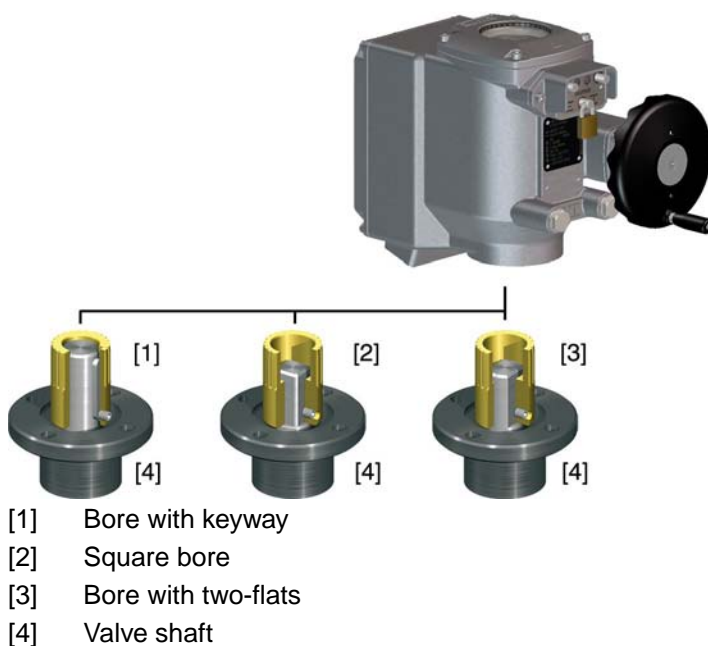   **Information:** Since the actuator is not equipped with internal end stops (mechanical limits), the symbol should not be turned ahead of the mark.

    2.2   Turn handwheel by approximately two turns (overrun) in the opposite direction.

After this procedure, the actuator can be mounted to the valve.

4.3.2. Output drive for coupling

Application
- For valves with output drive types according to EN ISO 5211
- Capable of withstanding thrust

Assembly
- The actuator is mounted to the valve using a coupling placed onto the valve shaft.
- Unbored couplings must be adapted and machined to match the valve shaft prior to mounting (e.g. with bore and keyway, two-flat or square bore)

Figure 5: Coupling variants

[1]   Bore with keyway
[2]   Square bore
[3]   Bore with two-flats
[4]   Valve shaft

4.3.2.1. Mounting with coupling

Condition: Valve and actuator are in the same end position.

Figure 6: Coupling fitting dimensions

[1]   Coupling
[2]   Valve shaft
[3]   Grub screw
[4]   Screw
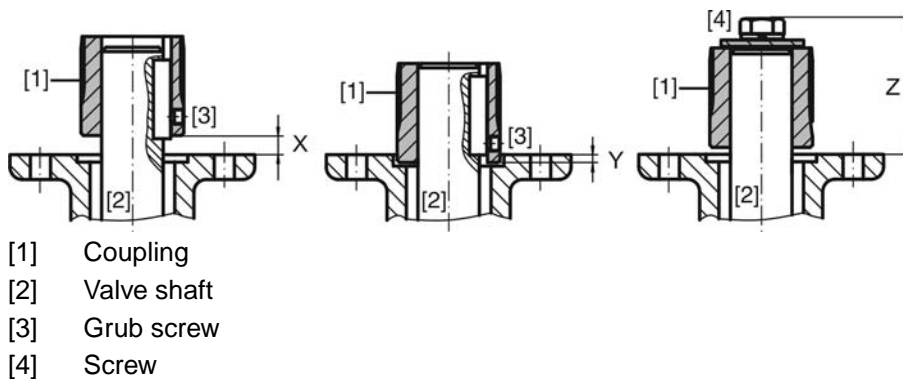
Table 2: Coupling fitting dimensions

Type, size - output mounting flange	X max [mm]	Y max [mm]	Z max [mm]
SVC/SVCR 05.1-F07	2.5	6	40
SVC/SVCR 07.1-F07	2.5	6	50
SVC/SVCR 07.5-F07	2.5	6	50

1. Thoroughly degrease mounting faces of output mounting flanges.
2. Apply a small quantity of grease to the valve shaft [2].

3. Place coupling [1] onto valve shaft [2] and secure against axial slipping by using a grub screw [3], a circlip or a screw [4]. Thereby, ensure that dimensions X, Y or Z are observed (refer to figure and table <Coupling fitting dimensions>).

4. Apply non-acidic grease at splines of coupling.

5. Fit actuator.

   Information: Ensure that the spigot (if provided) fits uniformly in the recess and that the flanges are in complete contact.

6. If flange bores do not match thread:

   6.1 Slightly rotate handwheel until bores line up.

   6.2 If required, shift actuator position by one tooth on the coupling.

7. Fasten actuator with screws [4].

   Information: We recommend applying liquid thread sealing material to the screws to avoid contact corrosion.

   → Fasten screws [4] crosswise with a torque according to table.

Table 3: Tightening torques for screws

Screws Threads	Tightening torque T_A [Nm]
	Strength class A4-80
M8	24

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 (both in German and 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).

Permissible networks (supply networks)

The actuators are suitable for use in TN and TT networks with directly earthed star point. Use in IT networks is permitted while observing the respective <Protection on site>.

Protection 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 respective sizing is derived from the current consumption of the actuator (refer to electrical data sheet).

The actuators are suitable for use in current circuits with a maximum short-circuit 1-phase AC current value of 5,000 A root-mean-square (R.M.S). The output data of the fuses to be provided on site must not exceed the following values: 15 A/250 V at a maximum mains current of 5,000 A AC.

Use appropriate insulation monitors when working in power installations, for example an insulation monitor measuring the pulse code.

We recommend refraining from using residual current devices (RCD). However, if an RCD is used within the mains, the residual current device must be of type B.

Power supply for the controls (electronics)

In case of external supply of the controls (electronics): The external power supply must have a reinforced insulation against the mains voltage in accordance with IEC 61800-5-1 and may only be supplied by a circuit limited to 150 VA in accordance with IEC 61800-5-1.

Safety standards

All externally connected devices shall comply with the relevant safety standards.

All connected electric circuits shall comply with the requirements for protective separation.

Cable installation in accordance with EMC

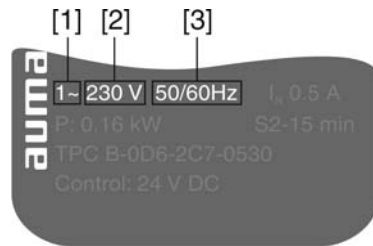Signal and bus cables are susceptible to interference.

Motor cables are interference sources.

- Lay cables being susceptible to interference or sources of interference at the highest possible distance from each other.
- The interference immunity of signal and bus cables increases if the cables are laid close to the earth potential.
- If possible, avoid laying long cables and make sure that they are installed in areas being subject to low interference.
- Avoid long parallel paths with cables being either susceptible to interference or interference sources.
- For the connection of remote position transmitters, screened cables must be used.

Type of current, mains voltage and mains frequency

Type of current, mains voltage and mains frequency must match the data on the motor name plate.

Figure 7: Name plate (example)

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

Connecting cables

- 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.
- The cross-sectional area of every protective earthing conductor which does not form not part of the supply cable or the cable enclosure, shall, in any case, not be less than:
  - With mechanical protection: minimum 2.5 mm²
  - Without mechanical protection: minimum 4 mm²

Bus cables

Only cables complying with the recommendations of EIA 485 specifications should be used for Modbus wiring.
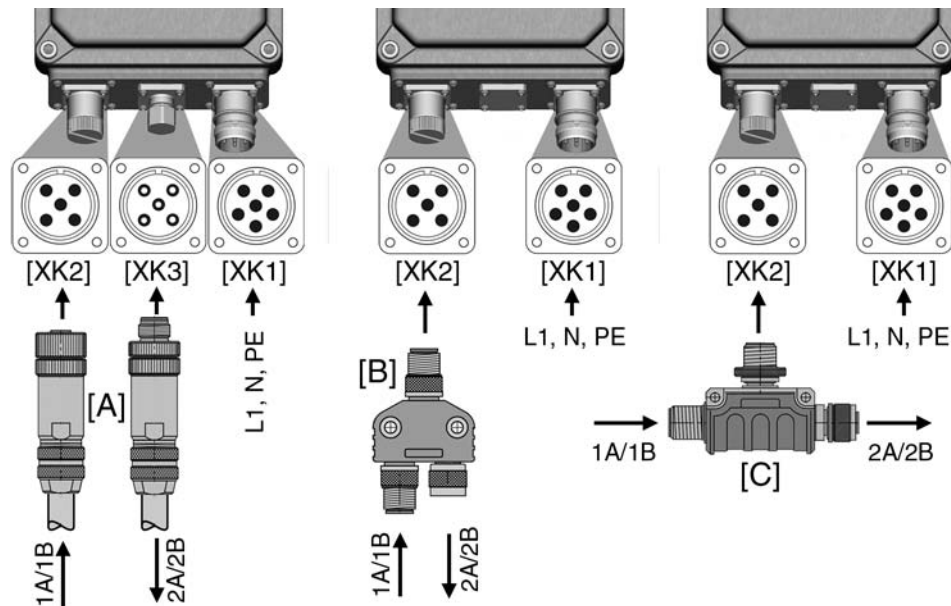
Cable recommendation:

Impedance:	135 to 165 Ohm, at a measurement frequency between 3 and 20 MHz
Cable capacity:	< 30 pF per metre
Wire diameter	> 0.64 mm
Wire cross section:	0.34 mm², corresponds to AWG 22
Loop resistance:	< 110 Ohm per km
Screening:	CU shielding braid or shielding braid and shielding foil

Prior to installation, please note:

- Connect maximum 32 devices to one segment.
- If more devices are to be connected:
  - Connect several segments using repeaters.
- Respect a distance of minimum 20 cm between the bus cable and other cables.
- If possible, bus cables should be laid in a separate, conductive, and earthed cable tray.
- Make sure to avoid potential differences between the individual devices on the bus (perform an equipotential earth bonding).

5.2. Connection via screw-type connector

Figure 8: Arrangement of connections (connection variants)

[XK1] Power terminals (mains cables)

[XK2] Control contacts/bus cables ↑ from previous device

[XK3] Control contacts/bus cables ↓ to next device

[A] Single connector

[B] Y-connector

[C] T-connector

Connection of mains cable [XK1] is performed via a 6-pin single connector.

Bus connection [XK2 or XK3] can be made via two single connectors [A], via a Y-connector [B] or via a T-connector [C].

The single connectors [A] are available either as straight (standard) or angled (90°) version.

Cross sections:

- Power terminals: 1.0 – 1.5 mm² flexible
- Control contacts: 0.75 – 1.0 mm² flexible

⚠ WARNING | **Hazardous voltage at open connector (capacitor discharge)!**

Risk of electric shock.

→ After disconnecting the power supply (removing connector for power terminals), wait at least 5 seconds before touching the pins/sockets.

5.2.1. Mains and bus cables: connect

Observe prior to connection

- Observe permissible cross sections of connectors used.
- Use suitable crimping tools to connect wires:
  - For screw-type connectors:
    e.g. Phoenix 4-arbor crimping pliers
- Observe operation instructions of the connector manufacturer.
- Upon request, AUMA provide suitable connection sets.
- For further information refer to separate "Technical data Connector".

- Use in Ex zone 22 is only possible with straight single connectors and protective sleeves.
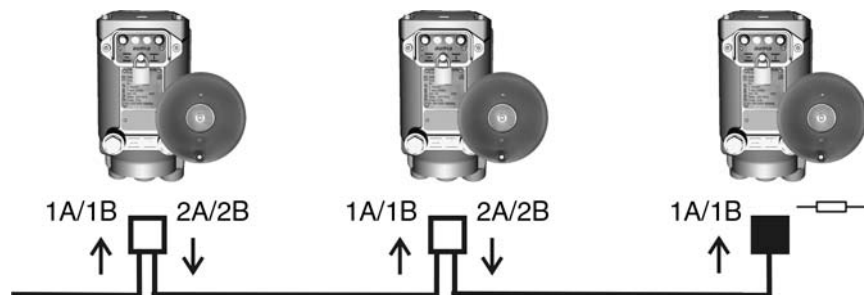Figure 9: Fitting the protective sleeve (option)

⚠ **WARNING**

Explosion hazard when used in Ex zone 22!

→ For use in Ex zone 22: Only mount connector with protection sleeves. The protection sleeves are enclosed with the delivery.

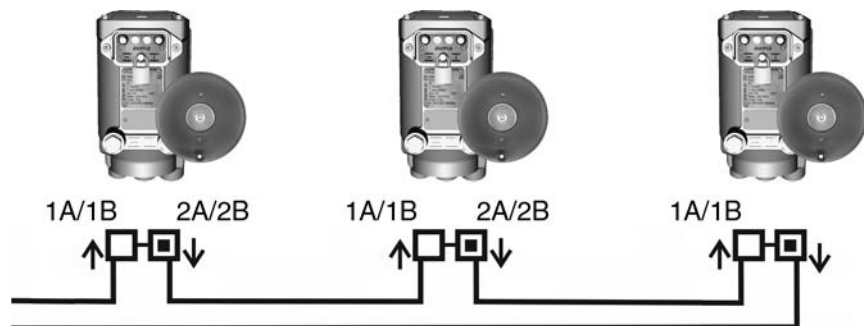→ The outer diameters of the connecting cables have to meet the requirements of the connectors used.

- Observe characteristics of network topology used.

Figure 10: Structure for line topology

□	further bus devices will follow
■	last bus device, termination must be activated
↑	from the previous device
↓	to the next device

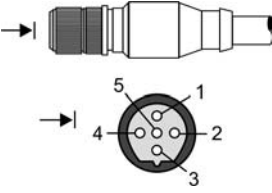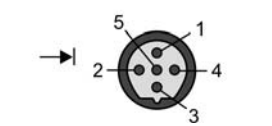Figure 11: Structure for redundant loop topology

□	Input
▣	Output
↑	from the previous device
↓	to the next device

Information
- For loop topology, automatic termination is performed as soon as the actuator is connected to the power supply.
- In case of a power failure, the two RS-485 loop segments will be automatically connected so that the actuators following these segments remain available.
- Redundant loop topology may only be established when using a SIMA Master Station.

Steps   1.   Connect mains and bus cables according to the order related wiring diagram.

Table 4: Assignment of bus cables

Plug/socket connector	Pin	Assignment	Colour
XK2 (socket)	1	Not used	
	2	1A	Green
	3	Not used	
	4	1B	Red
	5 ⏚ 1)		
	Screw connection	Shield	
XK3 (plug)	1	Not used	
	2	2A	Green
	3	Not used	
	4	2B	Red
	5 ⏚ 1)		
	Screw connection	Shield	

1)   As an option, pin 5 can be connected to the shielding. This is, however, not recommended.

⚠ WARNING

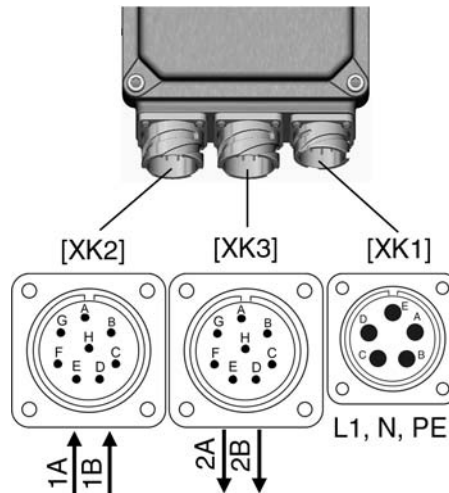**In case of a fault: Hazardous voltage while protective earth conductor is NOT connected!**

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.

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2.   Connect protective earth conductor according to wiring diagram, symbol: ⏚ anschließen.

3.   If the actuator is the last bus device, seal open connector [XK3] with protective cap. Heed protection type indicated on name plate. Plastic protective caps supplied when leaving the factory are for transport protection only. They are not appropriate for permanent use.

5.3. Connection via bayonet connector

Figure 12: Arrangement of connections

[XK1] Power terminals (mains cables)

[XK2] Control contacts/bus cables ↑ from previous device

[XK3] Control contacts/bus cables ↓ to next device

Cross sections:

- Power terminals: max. 1.5 mm² flexible
- Control contacts: max. 1.5 mm² flexible

⚠ WARNING

Hazardous voltage at open connector (capacitor discharge)!
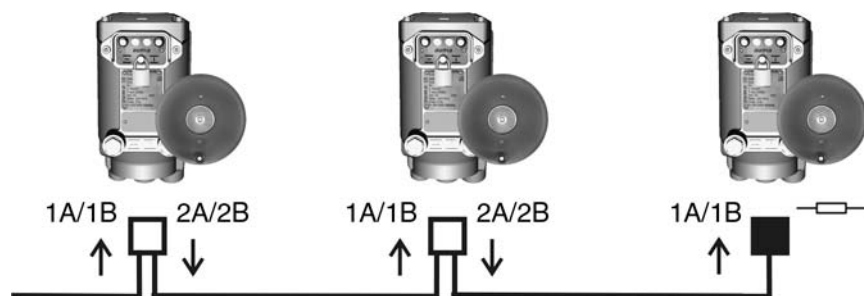
Risk of electric shock.

→ After disconnecting the power supply (removing connector for power terminals), wait at least 5 seconds before touching the pins/sockets.

5.3.1. Mains and bus cables: connect

Observe prior to connection

- Observe permissible cross sections of connectors used.
- Use suitable crimping tools to connect wires:
  - For bayonet connectors:
    e.g. Cannon four indent crimping tool
- Observe operation instructions of the connector manufacturer.
- Upon request, AUMA provide suitable connection sets.
- For further information refer to separate "Technical data Connector".
- Observe characteristics of network topology used.

Figure 13: Structure for line topology

□	further bus devices will follow
■	last bus device, termination must be activated
↑	from the previous device
↓	to the next device

Figure 14: Structure for redundant loop topology

□	Input
⊡	Output
↑	from the previous device
↓	to the next device

Information
- For loop topology, automatic termination is performed as soon as the actuator is connected to the power supply.
- In case of a power failure, the two RS-485 loop segments will be automatically connected so that the actuators following these segments remain available.
- Redundant loop topology may only be established when using a SIMA Master Station.

Steps
1. Connect mains and bus cables according to the order related wiring diagram.

Table 5: Assignment of bus cables

Plug/socket connector	Pin	Assignment	Colour
XK2 (socket)	A	1A	Green
	B	1B	Red
	E ⏚ 1)		
	Screw connection	Shield	
XK3 (socket)	A	2A	Green
	B	2B	Red
	E ⏚ 1)		
	Screw connection	Shield	

1) As an option, pin E can be connected to the shielding. This is, however, not recommended.

⚠ WARNING

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.

2. Connect protective earth conductor according to wiring diagram, symbol: ⊕ .

3. If the actuator is the last bus device, seal open connector [XK3] with protective cap. Heed protection type indicated on name plate. Plastic protective caps supplied when leaving the factory are for transport protection only. They are not appropriate for permanent use.

5.4. Connection with AUMA plug/socket connector

Figure 15: Connection with AUMA plug/socket connector
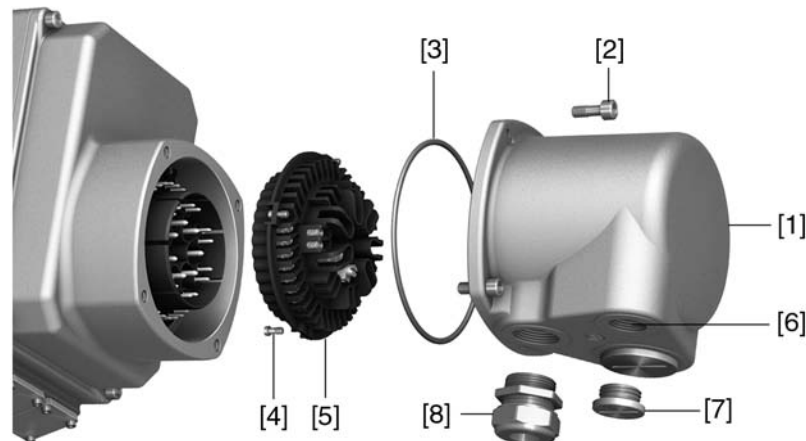

Cross sections AUMA plug/socket connector:

- Power terminals (U1, V1, W1, U2, V2, W2): max. 6 mm² flexible/10 mm² solid
- PE connection ⊕: max. 6 mm² flexible/10 mm² solid
- Control contacts (1 to 50): max. 2.5 mm²

5.4.1.   Terminal compartment: open

Figure 16: Connection AUMA plug/socket connector, version S

[1]   Cover
[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)

Information   Bus operation is **not** interrupted when removing the connection housing [1].

⚠ **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.
4.   Seal unused cable entries [6] with suitable blanking plugs [7].
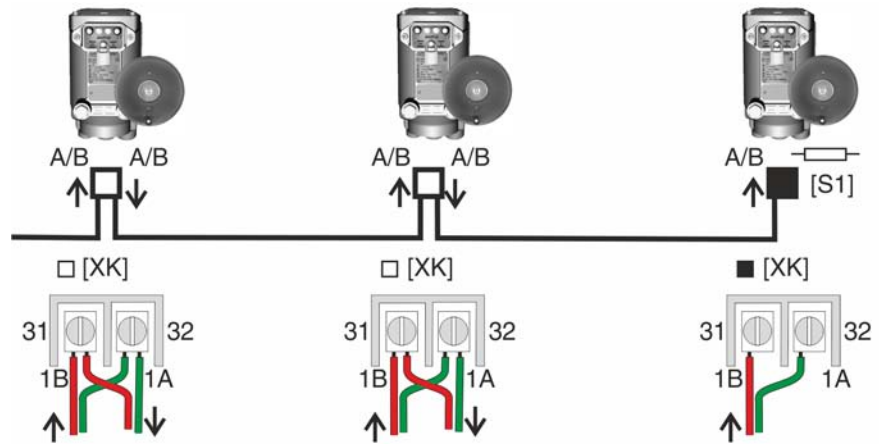5.   Insert the cables into the cable glands [8].

5.4.2.   Mains and bus cables: connect

✓ Observe permissible cross sections.

1.   Remove cable sheathing.
2.   Strip wires.
3.   For flexible cables: Use end sleeves according to DIN 46228.
4.   Connect cables according to order-related wiring diagram.

5. Observe characteristics of network topology used. (When connecting several field devices (actuators) in a network, the structure is called network topology.)
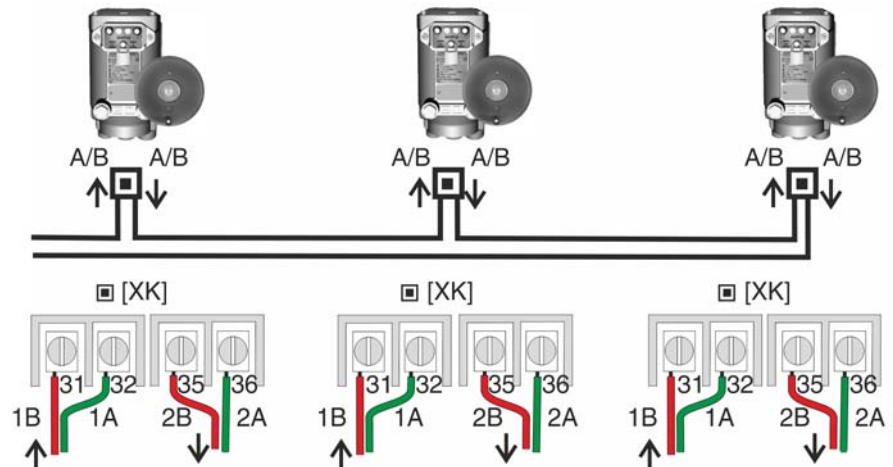
Figure 17: Structure and terminal assignment for line topology

□	further bus devices will follow
■	last bus device
↑	from the previous device
↓	to the next device
[XK]	Terminal assignment according to wiring diagram (customer connection)
[S1]	Switch for terminal resistor (setting within controls)

➥

Figure 18: Structure and terminal assignment for ring topology

▣	Input/output
↑	from previous device (input via channel 1)
↓	to next device (input via channel 2)
[XK]	Terminal assignment according to wiring diagram (customer connection)

Information
- For loop topology, automatic termination is performed as soon as the actuator is connected to the power supply.
- In case of a power failure, the two RS-485 loop segments will be automatically connected so that the actuators following these segments remain available.
- When using a SIMA master station, a redundant loop topology may be established.
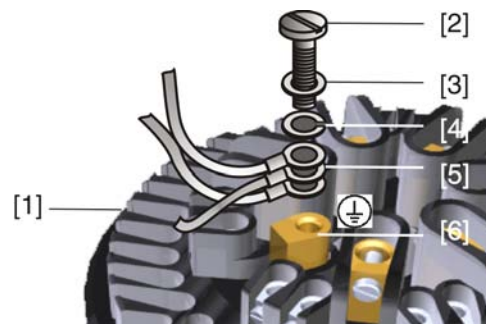
⚠ WARNING

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.

6. Tighten PE conductors firmly to PE connection using ring lugs (flexible cables) or loops (rigid cables).
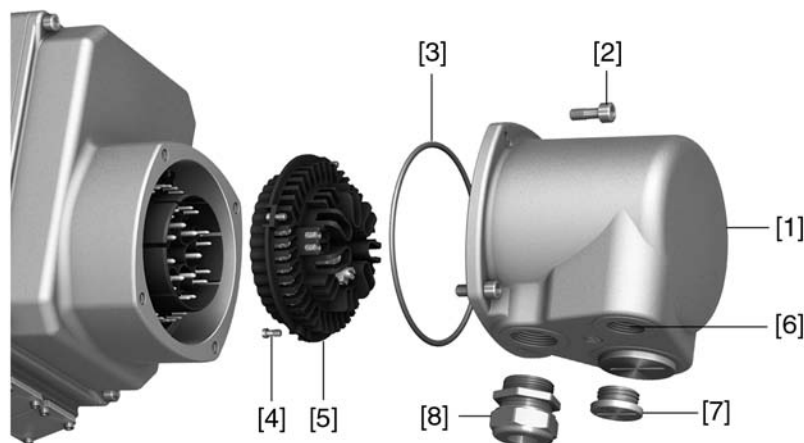
Figure 19: Protective earthing

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

5.4.3. Terminal compartment: close

Figure 20: Example: Version S

[1] Cover
[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)

> ⚠ **WARNING**
>
> **Short-circuit due to pinching of cables!**
>
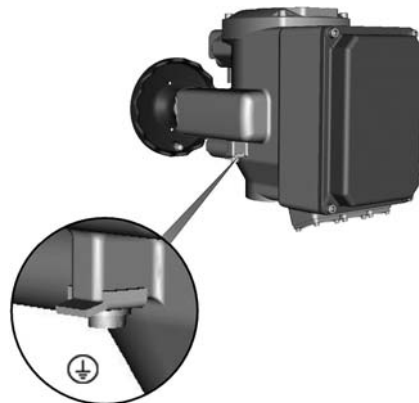> *Risk of electric shock and functional failures.*
>
> → Carefully fit socket carrier to avoid pinching the cables.

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 [8] applying the specified torque to ensure the required enclosure protection.

5.5. Earth connection, external

The housing is equipped with an external earth connection (U-bracket) to integrate the device in equipotential earth bonding.

Figure 21: Ground connection

⏚   Earth connection (U-bracket), external

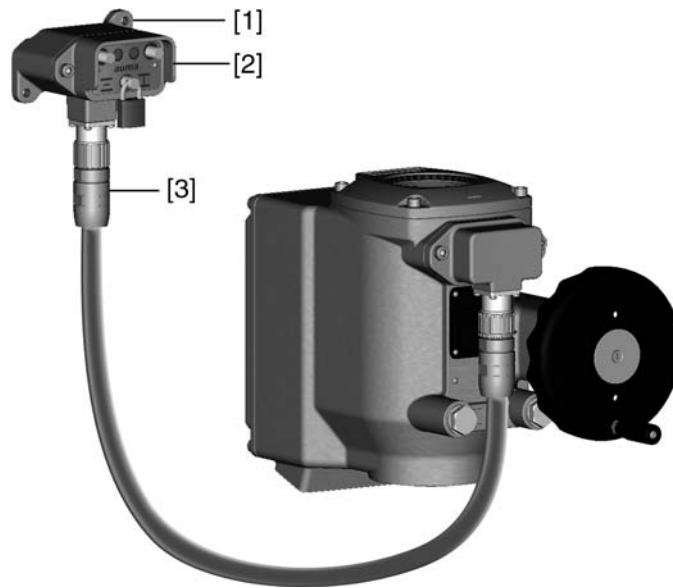## 5.6. Accessories for electrical connection

5.6.1. Local controls mounted on wall bracket

— Option —

The wall bracket allows separate mounting of local controls and actuator.

Application   If the actuator cannot be accessed safely.

Figure 22: Actuator with local controls on wall bracket

[1]   Wall bracket
[2]   Local controls
[3]   Phoenix connector with connecting cable

Observe prior to connec-
tion

- Permissible length of connecting cables: max. 30 m.
- We recommend: AUMA cable set K008.218 (5 m).
- A retrofit kit is available for actuators without wall bracket.
- Local controls on wall bracket are not approved for use in Ex zone 22.
- Establish cable connection via plug/socket connector as illustrated.

6. Indications

6.1. Mechanical position indicator/running indication

Mechanical position indicator:

- Continuously indicates the valve position
- Indicates whether the actuator is running (running indication)
- Indicates that the end positions are reached (via indicator mark [3])

Figure 23: Mechanical position indicator

[1] Cover
[2] Indicator disc
[3] Mark
[4] Symbol for position OPEN
[5] Symbol for position CLOSED

6.2. Indication lights

Figure 24: Indication lights on local controls

[1] Indication light OPEN/warning/fault (green/yellow/red)
[2] Indication light CLOSE/LOCAL/set end position (yellow/blue)

Table 6: Indication light [1] (default setting)

Colour/state	Signification	Description
illuminated in green	OPEN	Actuator is in end position OPEN.
blinking in yellow	Warning	Stroke between selected end positions (OPEN/CLOSED) is below the preset minimum stroke (factory setting 60 % of maximum rotation). Refer to <Corrective action> chapter.
blinking in red	Fault	The number of blinking signals indicates the number of fault signal. Refer to <Corrective action> chapter.

Table 7: Indication light [2] (default setting)

Colour/state	Signification	Description
illuminated in yellow	CLOSE	Actuator is in end position CLOSED.
blinking in blue (1 Hz)	LOCAL	Operation mode LOCAL is active. The actuator can be operated via push buttons.

Colour/state	Signification	Description
blinking in blue (5 Hz)	Set end position	Setting mode for end position setting is active.

7. Signals

7.1. Signals via fieldbus

The feedback signals via Modbus RTU can be read using the appropriate Modbus function codes.

For further information, please refer to the Manual (Device integration fieldbus) Modbus.

8. Operation

8.1. Manual operation

For purposes of setting and commissioning, in case of motor failure or power failure, the actuator may be operated manually.

The handwheel does not rotate during motor operation. Change-over from motor operation to manual operation is not required.

1. Close valve: Turn crank handle/handwheel clockwise.

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

2. Open valve: Turn crank handle/handwheel counterclockwise.

➥ Drive shaft (valve) turns counterclockwise in direction OPEN.

Information Turning the handwheel during motor operation extends or reduces the operating time, depending on the direction of rotation.
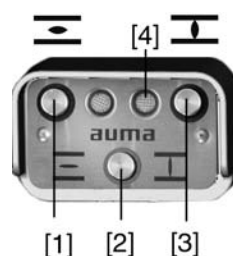
8.2. Motor operation

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

8.2.1. Local actuator operation

The actuator can be locally operated by means of push buttons.

Figure 25: Local controls

[1] Push button OPEN
[2] Push button STOP - operation mode LOCAL/REMOTE
[3] Push button CLOSE
[4] Indication light for operation mode LOCAL (blue)

⚠ CAUTION	**Hot surfaces, e.g. possibly caused by high ambient temperatures or strong direct sunlight!**

Danger of burns

→ Check surface temperature and wear protective gloves, if required.

Activate operation mode LOCAL:

→ Hold down push button [2] for approx. 3 seconds until the indication light [4] is blinking in blue.

➥ If the right indication light is blinking in blue, the actuator can be operated via push buttons [1 – 3]:

- Run actuator in direction OPEN: Press push button OPEN [1].
- Stop actuator: Press push button STOP [2].
- Run actuator in direction CLOSE: Press push button CLOSE [3].

Information OPEN - CLOSE operation commands can be given either in **push-to-run** or in **self-retaining** operation mode. In self-retaining mode, the actuator runs to the defined end position after pressing the button, unless another command has been received beforehand.

Push-to-run operation or self-retaining is set via the controls software. Refer to <AUMA CDT software (accessories)> chapter. It is possible to temporarily (for one operation command) activate self-retaining by means of the push buttons:

→ Press and hold down push buttons OPEN [1] or CLOSE [3] for more than 3 seconds.

During this procedure, self-retaining is not saved. The setting programmed within the software is taken over for the subsequent operation command.

8.2.2. Actuator operation from remote

Operation mode Remote can be activated via local controls.

Figure 26: Local controls

[2] Operation mode LOCAL/REMOTE
[4] Indication light for operation mode LOCAL (blue)

Activate operation mode Remote by means of local controls:

→ If indication light [4] is blinking in blue: Hold down push button [2] for approx. 3 seconds until the blue indication light goes out.

➥ Now, the actuator can be remote-controlled via fieldbus.

Change-over between OPEN - CLOSE control and setpoint control:

For actuators equipped with a positioner, it is possible to select between **OPEN CLOSE control** (Fieldbus REMOTE/Fieldbus CLOSE) and **setpoint control** (Fieldbus SETPOINT).

EMERGENCY operation:

- An EMERGENCY operation is initiated by the Fieldbus EMERGENCY command bit.
- The actuator moves to a predefined EMERGENCY position (i.e. end position OPEN or end position CLOSED).
- During EMERGENCY operation, the actuator does not react on other operation commands such as Fieldbus/OPEN/Fieldbus/CLOSE or Fieldbus SETPOINT.

9. Commissioning (basic settings of controls)

To prevent valve damage and disturbances during commissioning, the basic settings of controls must be verified prior to electrical actuator operation (motor operation) and adapted in compliance with the requirements of both valve and application.

Basic settings of controls comprise:

- Setting the type of seating
- Setting the torque switches
- Setting the bus address (slave address)
- Setting the termination resistor
- Setting the output speed

To perform basic settings, proceed as follows:

1. via **switches** (directly at the device);
    For switch setting, open controls cover.

2. via **AUMA CDT software** (accessories);
    By connecting a PC, laptop or PDA.
    Also refer to <AUMA CDT software (accessories)> chapter.

3. by means of commands via **fieldbus**;
    (Except the termination resistor – this item can only be selected via a switch within the device.)
    For fieldbus configuration, please also refer to the Manual (Device integration Fieldbus).

Please also refer to <AUMA CDT software (accessories)> chapter for further settings.

9.1. Cover to controls: open

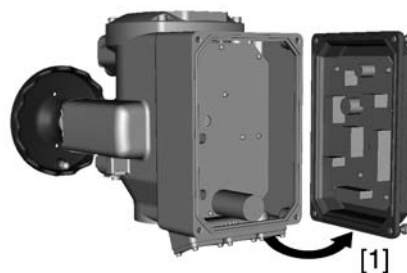The cover to the integral controls must be opened to perform the following settings (options).

⚠ DANGER | **Hazardous voltage!**

Risk of electric shock.

→ Disconnect device from the mains before opening.

→ Loosen 4 screws and remove cover [1] to controls.

9.2. Setting via hardware (switches) or via software

The switch [S5] position determines whether the hardware settings (switches) or the software settings (via AUMA CDT software) are currently active.

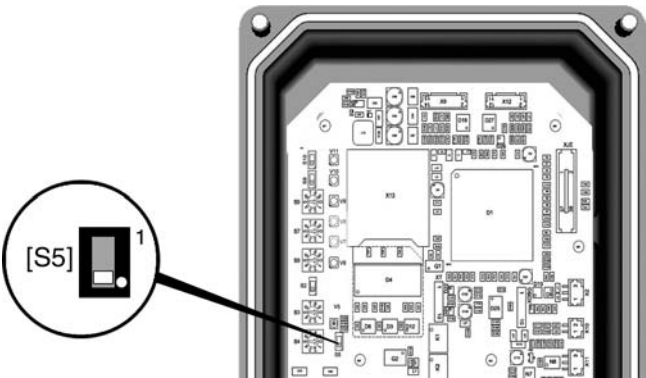Figure 27: Switch [S5] = Hardware/software mode

Table 8: Switch [S5] functions

OFF		**Hardware mode** (Factory setting on delivery for line topology) Settings of switches [S2] through [S4] and [S6] through [S10] are valid. The values cannot be changed via AUMA CDT software.
ON		**Software mode** (sliding switch at white dot) (Factory setting on delivery for loop topology) Settings of switches [S2] through [S4] and [S6] through [S10] are NOT relevant. Settings are defined via software parameters.

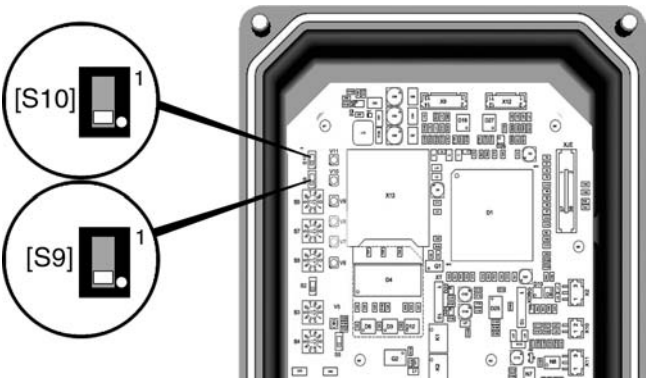## 9.3. Type of seating: set

NOTICE

Valve damage due to incorrect setting!

→ The type of seating must suit the valve.

→ Only change the setting with the consent of the valve manufacturer.

Setting via switches

Condition: Switch [S5] in position OFF (hardware mode).

Figure 28: Switches for type of seating

[S9]   End position OPEN
[S10] End position CLOSED

Table 9: Function of switches [S9], [S10]

ON		Limit seating, sliding switch at white dot
OFF		Torque seating

Setting via software parameters (AUMA CDT)

Condition: Switch [S5] is in position ON (software mode).

Setting parameters

M ▷ Customer settings
   Type of seating
     End position CLOSED
     End position OPEN

Default value: Limit

Setting values:

Limit   Limit seating in end positions.

Torque   Torque seating in end positions.

9.4. Torque switching: set

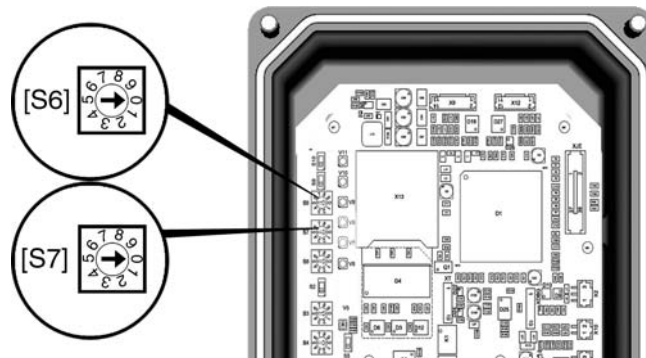| NOTICE	**Valve damage due to excessive tripping torque limit setting!**

   →   The tripping torque must suit the valve.

   →   Only change the setting with the consent of the valve manufacturer.

Once the set tripping torque is reached, the controls automatically switch off the actuator (overload protection of the valve).

Setting via switches

Condition: Switch [S5] is in position OFF (hardware mode).

Figure 29: Switches for tripping torque

[S6]   Tripping torque in direction OPEN
[S7]   Tripping torque in direction CLOSE

Default value: depending on the order

Setting range: in 8 steps (refer to tables), linear from 40 – 100 % of the maximum tripping torque.

Table 10:

Switch steps	Tripping torques [Nm]		
	SVC/SVCR 05.1	SVC/SVCR 07.1	SVC/SVCR 07.5
0 - 1	10	20	40
2 - 3	>	>	>
4	15	30	60
5	>	>	>
6	20	40	80
7	>	>	>
8 - 9	25	50	100

Switch steps	Tripping torques [Nm]		
	SVC/SVCR 05.1	**SVC/SVCR 07.1**	**SVC/SVCR 07.5**
> intermediate value			

Setting via software parameters (AUMA CDT)

Condition: Switch [S5] is in position ON (software mode).

Setting parameters

M ▷ Customer settings
   Torque switching
     Tripping torque CLOSE (S7)
     Tripping torque OPEN (S6)

Default value: depending on the order

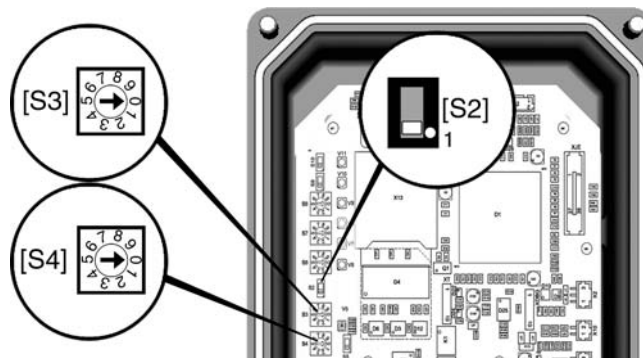**Setting ranges:** adjustable between 40 – 100 % of the maximum tripping torque

9.5. Bus address (slave address), baud rate, parity and monitoring time: set

Setting the bus address via switches

Condition: Switch [S5] is in position OFF (hardware mode).

Information   Baud rate, parity and Modbus connection monitoring time can only be set via software parameters (AUMA CDT).

Figure 30: Switch for bus address

[S2]   3rd position before decimal point
[S3]   2nd position before decimal point
[S4]   1st position before decimal point

Default value: 200[1)]

Setting range: 1 – 200

Table 11: Examples

Address	Setting value		
	[S2]	**[S3]**	**[S4]**
1	OFF	0	1
2	OFF	0	2
10	OFF	1	0
12	OFF	1	2
100	ON	0	0
110	ON	1	0
111	ON	1	1
200	OFF	0	0

1)   For Modbus loop topology, sliding switches [S2 – S4] are deactivated in the factory. In this case,
     the default value is 247, set via software parameters (AUMA CDT).

Switch position [S2]: ON = sliding switch at white dot (pin 1)

Information

> **Setting via software parameters (AUMA CDT)**

Condition for setting the bus address via software parameters: Switch [S5] is in position ON (software mode).

Setting parameters

M ▷ Customer settings
  Modbus
    MD1 slave address
    Baud rate
    Parity/stop bit
    Monitoring time

Default values:
MD1 slave address = 247
Baud rate = Auto
Parity/stop bit = Even, 1 stop bit
Monitoring time = 15.0 seconds

Setting ranges: The setting ranges are indicated in the AUMA CDT software.

9.6. Termination resistor: connect

✔ Switch [S1] is only available for line topology. For loop topology, termination is done automatically; therefore a switch for the termination resistor is not required.

✔ This setting is only required if the actuator is the last bus device.

✔ The termination resistor can only be set via switch [S1] and not via the software.

→ Switch on the termination resistor for channel 1 using switch [S1] (standard).

    Information: As soon as the termination resistors are switched on, the connection to the next fieldbus device (via bus cable XK3) is automatically interrupted to avoid multiple terminations.
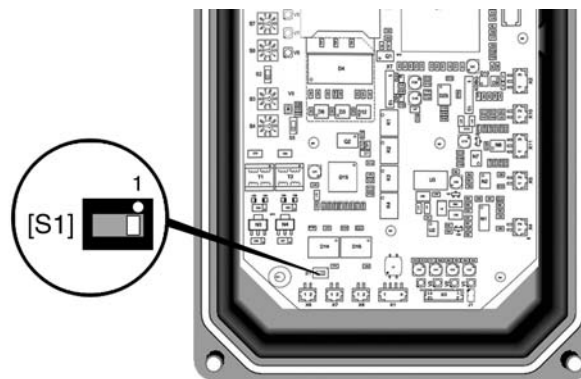

Table 12: Switch [S1] functions

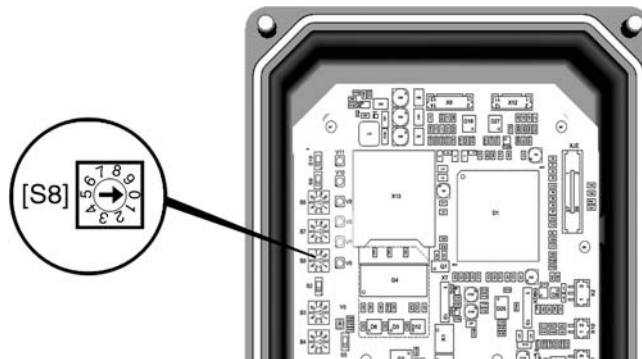| OFF		Bus termination OFF; sliding switch at white dot (pin 1) (delivery state)
ON		Bus termination ON

9.7. Output speed: set

Output speed at output drive is defined by the motor speed.

Setting via switches

Condition: Switch [S5] is in position OFF (hardware mode)

Figure 31: Speed switch

[S8]   Output speed

Default value: depending on the order

Setting range: 9 steps (refer to table)

Table 13:

Switch [S8] Step	SVC/SVCR 05.1/07.1	SVC/SVCR 07.5
	Output drive speed [rpm]	
1	1.6	0.6
2	2.2	0.8
3	3.2	1.1
4	4	1.6
5	5.6	2.2
6	8	3.2
7	11	4
8	16	5.6
9	22	8
0	impermissible switch position	

Setting via software parameters (AUMA CDT)

The motor speed can be modified via the software parameters described hereafter:
Contrary to output speed setting using switch [S8], setting via software parameters
offers the following additional possibilities:

- different motor speeds for operation modes Local and Remote
- adjustable motor speed setting
- motor speed setting (target speed) for operation mode Remote by an external
  signal (fieldbus command)

Setting parameters

Condition: Switch [S5] is in position ON (software mode).

M ▷   Device configuration
   Motor speed
     Speed LOCAL
     Speed REMOTE
     Speed fieldbus

Description of parameters:

Speed LOCAL   Output speed for operation via local controls (operation mode Local); Setting range:
linear between 0 – 100 % (0 % = min. motor speed, 100 % = max. motor speed);
Default value = 50.0 %

Speed REMOTE — Output speed in operation mode Remote for setting the Speed fieldbus = Internal parameter; Setting range: linear between 0 – 100 % (0 % = min. motor speed, 100 % = max. motor speed); Default value = 50.0 %

Speed fieldbus — = External

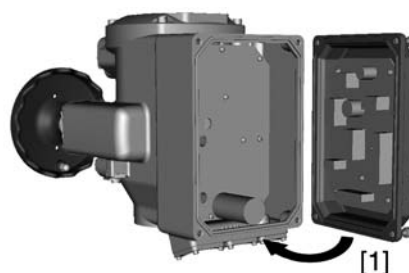In operation mode Remote, the output speed is defined via fieldbus.

= Internal

In operation mode Remote, the output speed is not defined via fieldbus but by means of the Speed REMOTE software parameter.

Table 14: Examples of possible settings

SVC/SVCR 05.1/07.1			SVC/SVCR 07.5		
Output speed via parameter: Speed LOCAL Speed REMOTE or via fieldbus: (Speed fieldbus = External)	Output speed Motor [rpm]	Output speed Output drive [rpm]	**Output speed** via parameter: Speed LOCAL Speed REMOTE or via fieldbus: (Speed fieldbus = External)	Output speed Motor [rpm]	Output speed Output drive [rpm]
0.0 %	133	1.6	0.0 %	133	0.6
2.0 %	176	2.2	2.0 %	186	0.8
6.0 %	256	3.2	6.0 %	255	1.1
9.0 %	320	4	11.0 %	371	1.6
15.0 %	448	5.6	18.0 %	510	2.2
24.0 %	640	8	29.0 %	742	3.2
35.0 %	880	11	38.0 %	928	4.0
54.0 %	1,280	16	55.0 %	1,299	5.6
77.0 %	1,760	22	81.0 %	1,856	8.0
100.0 %	2,250	28.1	100.0 %	2,250	9.7

9.8. Cover to controls: close

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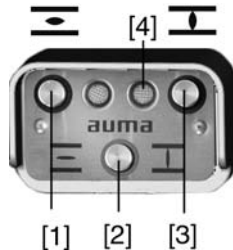

5. Place cover [1].
6. Fasten screws evenly crosswise.

10. Commissioning (basic settings at actuator)

10.1. End position detection: verify setting

1. Activate operation mode LOCAL:
   - → If indication light [4] is blinking in blue: Operation mode LOCAL is already active.
   - → Indication light [4] is NOT blinking in blue: → Hold down push button [2] for approx. 3 seconds until the indication light is blinking in blue.
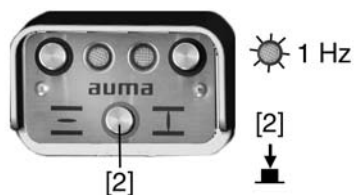   - ➥ The actuator can be operated using the push buttons [1 – 3]:

2. Operate actuator using push buttons OPEN, STOP, CLOSE.
   - ➥ The end position detection is set correctly if (default indication):
   - - the right indication light [3] is illuminated in yellow in end position CLOSED
   - - the left indication light [1] is illuminated in green in end position OPEN
   - - the indication lights go out after travelling into opposite direction.
   - ➥ The end position detection is set incorrectly, if:
   - - the actuator comes to a standstill before reaching the end position
   - - the left indication light is blinking in red
3. If the end position setting is incorrect or not precise: <End position detection: set again via local controls>.

10.2. End position detection: set again via local controls

Operation mode LOCAL must be activated for end position setting.
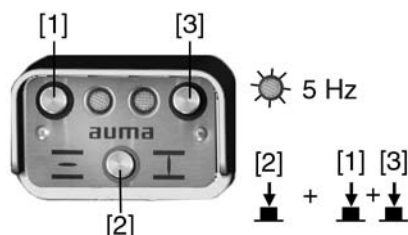
Activate operation mode LOCAL:

→ Hold down push button [2] for approx. 3 seconds until right indication light is blinking in blue.

Information If the local controls are not provided on site, it is possible to connect an external control module. The setting is then performed in the same way as described below.

10.2.1. End position CLOSED: set again

Activate setting mode "end position setting":

1. Press push button [2] – hold down and press push buttons [1] and [3] at the same time.

➥ Now, the right indication light is blinking faster (5 Hz).
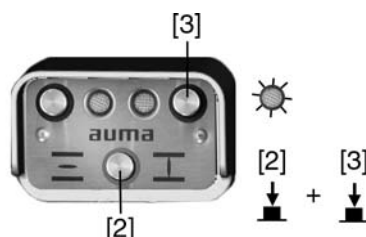
Set end position CLOSED:

2. Use crank handle/handwheel or push button [3] for running the actuator to end position CLOSED. (Actuator runs at reduced output speed in setting mode.)
Information: If the red indication light is blinking (6 blinks), the actuator is outside the permissible setting range (0 – 100 %).

During electrical operation via push buttons, the actuator stops and cannot resume operation (up to valve end position). Since end position setting is not permissible while the indication light is blinking in red, potentiometer setting must be performed in a first step (also refer to <Potentiometer setting> chapter). Once this procedure is complete, setting can be resumed and the end position can be set again as described .
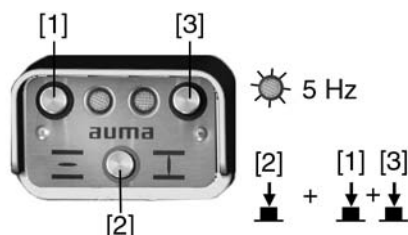
3. Press push button [2] – hold it down and press push button [3]. Hold both push buttons down until the right indication light is blinking alternately in yellow and blue (default).

➥ If the right indication light is blinking in yellow/blue, end position CLOSED setting is complete.

10.2.2. End position OPEN: set again

Activate setting mode "end position setting":

1. Press push button [2] – hold down and press push buttons [1] and [3] at the same time.
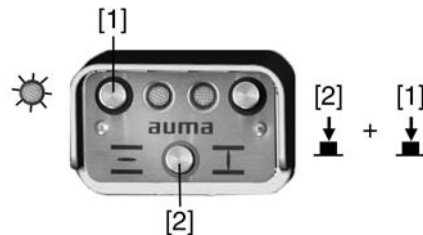

➥ Now, the right indication light is blinking faster (5 Hz).

Set end position OPEN:

2.   Use crank handle/handwheel or push button [1] for running actuator to end position OPEN. (Actuator runs at reduced output speed in setting mode.)
     Information: One of the reasons that end positions OPEN cannot be set (left indication light is blinking in red) could be that the stroke between both end positions (OPEN/CLOSED) is too large. In this instance, the primary reduction gearing must be replaced (by the AUMA service).

3.   Press push button [2] – hold it down and press push button [1]. Hold both push buttons down until the left indication light is blinking in green (default).

➥   Once the left indication light is illuminated in green (default), end position OPEN setting is complete.

4.   Once both end positions are set, perform a reference operation, i.e. both end positions must be approached again – either via push buttons [1]/[3] (in operation mode Local) or from Remote (deactivate operation mode Local).

Deactivate operation mode Local:

5.   Hold down push button [2] for approx. 3 seconds until blue indication light goes out.

➥   Now, the actuator can be controlled from Remote:

-    via operation commands (OPEN - STOP - CLOSE) in positions OPEN or CLOSED.

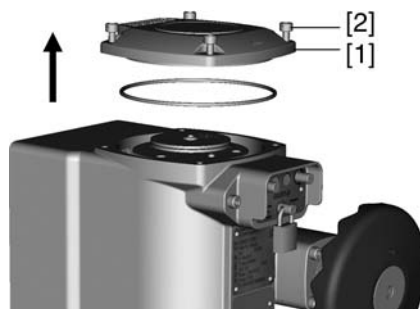-   via setpoint indication in defined positions between 0 % and 100 % of setting range.

Information   •   If the left indication light is blinking in yellow once the setting of both end positions is performed, the stroke between both end positions (OPEN/CLOSED) is too small.

10.3.   Switch compartment: open

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

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

Figure 32:

10.4.   Potentiometer setting

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

Information   The valve position (position at output drive) is transmitted to the potentiometer via a reduction gearing. The highest resolution and thus best positioning accuracy is achieved if the selected stroke between end positions OPEN and CLOSED is as close as possible to the maximum actuator stroke (max. turn range).

The actuators are available with different maximum turn ranges (= max. number of turns). The maximum actuator turn range is defined by the respective reduction gearing. Exchanging the reduction gearing and consequently changing the max. turn range can only be performed by the AUMA service.

The potentiometer is set in the factory. Turning the potentiometer by means of the setting screw [1] results in modification of the end position detection!
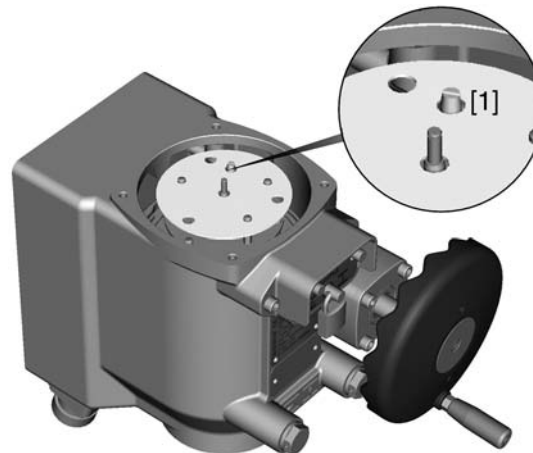
→ Only set potentiometer if the end position detection cannot be set: Fault signal "Actuator is outside the permissible position" or the indication light blinks in red 6 times.

If the stroke to be set is larger than the maximum actuator stroke, replace the reduction gearing selecting a unit with a higher maximum stroke value (max. turn range).

1.   Remove retaining washer [4] and take off indicator disc [3].

2.   Move valve to end position CLOSED.
3.   Turn potentiometer [1] counterclockwise until stop is felt.

➥   End position CLOSED corresponds to 0 %

➥   End position OPEN corresponds to 100 %

4.   Turn potentiometer [1] slightly in opposite direction (for actuators with local controls: until the red indication light goes out).

5. Place indicator disc [3] and secure with retaining washer [4].

Information   Once the potentiometer setting has been modified, repeat end position detection setting. Refer to <End position detection: set again via local controls> chapter.

10.5. Mechanical position indicator: set

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

3. Move actuator to end position OPEN.
4. Hold lower indicator disc in position and turn upper disc with symbol ⊇ (OPEN) until it is in alignment with the ▲ mark on the cover.
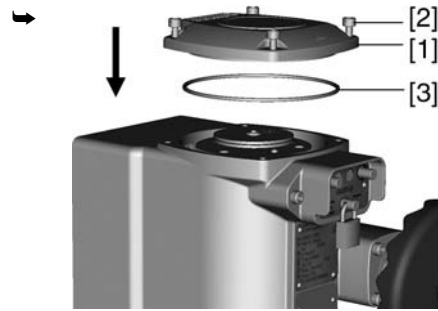
5. Move valve to end position CLOSED again.
6. Check settings:

   If the symbol ⊥ (CLOSED) s no longer in alignment with ▲ mark on the cover:
   6.1   Repeat setting procedure.
   6.2   Check potentiometer setting.

10.6. Switch compartment: close

1. Clean sealing faces of housing and cover.
2. Apply a thin film of non-acidic grease (e.g. petroleum jelly) to the sealing faces.
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.
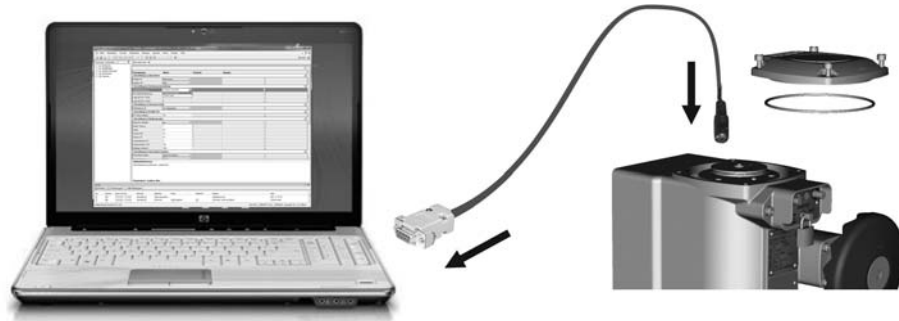
➡

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

11.   AUMA CDT software (accessories)

The AUMA CDT software (accessories) can be used to establish a connection to a computer (PC, laptop or PDA).

It can be downloaded free of charge from our web site www.auma.com.

Figure 33: Connection with service cable

For connecting the computer to the integral actuator controls, a service cable (AUMA article no.: Z100.999) is required.

Read/perform basic settings via AUMA CDT

Basic settings at the device (in controls) made via switches are read only via AUMA CDT on delivery and cannot be modified. To be able to change these parameters via software, position switch [S5] in controls to "Software mode". Refer to <Settings via hardware (switches) or via software> chapter.

Switches and software parameters are set to the same values upon delivery (factory settings).

Further settings via AUMA CDT

Apart from basic settings, the following functions may additionally be set via AUMA CDT software:

- Torque by-pass
  Allows suspending torque monitoring at actuator start-up. Duration for torque by-pass is adjustable.
- Electronic positioner (option)
- Failure behaviour (on loss of signal)
- EMERGENCY behaviour (option)
- Timer function (option)
- Motion detector
- Type of duty monitoring (motor starts and running time)
- Operating time monitoring
- Self-retaining local

For detailed information on these functions, refer to the online help of the AUMA CDT software.

12.   Corrective action

12.1.   Fault indications and warning indications

Faults interrupt or prevent the electrical actuator operation.

Faults and warnings can be signalled via the fieldbus and/or via the local controls.

Should local controls be available, the fault and warning signals are indicated by the left indication light [1].

Figure 34: Fault indications and RESET

[1]   Red indication light: Fault, yellow: Warning
[2]   Push button RESET

In operation mode LOCAL (right indication light is blinking in blue), stored faults (cause does no longer exist), may be reset using the push button RESET [2] (hold it down for more than 1 second).

Warnings have no influence on the electrical actuator operation. They only serve for information purposes.

The tables below show the fault signalling via the indication lights of the local controls.

Table 15: Fault signalling via the red indication light

Indication	Signal	Signification (default)
1 blink	Fault indication 1	Torque fault → Press push buttons OPEN or CLOSE to reset the fault (indication light) by operating the device in the opposite direction.
2 blinks	Fault indication 2	Thermal fault (motor protection tripped) → Cool down, wait.
3 blinks	Fault indication 3	Signal loss of analogue input (4 – 20 mA)
4 blinks	Fault indication 4	Operation mode DISABLED: Operation via the local controls is disabled (Enable local controls function).
5 blinks	Fault indication 5	Fault E2 (actual value of positioner) → Check wiring (for possible loss of signal) of E2. → Read detailed fault indication via AUMA CDT software (accessories).
6 blinks	Fault indication 6	Actuator is outside the permissible position (potentiometer signal). → Set potentiometer again.
7 blinks	Fault indication 7	Fault of controls temperature
8 blinks	Fault indication 8	Collective signal: Internal error has occurred. → Read detailed fault indication via AUMA CDT software (accessories) and contact AUMA service.
9 blinks	Fault indication 9	Collective signal for all other faults

In case several faults have occurred, only the fault with the highest priority will be signalled. Fault indication 1 has the highest, fault indication 9 the lowest priority.

Table 16: Warning signalling via yellow indication light

Indication	Signal	Signification (default)
Blinking	Warning	For reasons of accuracy, we recommend selection of the stroke higher than 60 % of the maximum turn range. → Abort warning: Set again Low limit Uspan parameter via AUMA CDT software within the Position transmitter potentiometer sub-menu. → Remedy warning: Reduce maximum turn range by replacing the reduction gearing through the AUMA service.

12.2. Fuses

12.2.1. Fuses within the actuator controls

The primary fuse F1 is located on the power board (device protection fuse). It becomes visible when removing the cover to the controls. The fuse cannot be replaced. Only by replacing the entire power board can the fuse be exchanged.
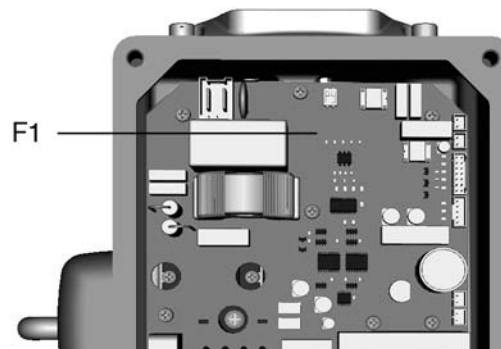
⚠ DANGER

Hazardous voltage!

Risk of electric shock.

→ Disconnect device from the mains before opening.

Figure 35: Primary fuse on power board

12.2.2. Motor protection (thermal monitoring)

In order to protect against overheating and impermissible high surface temperatures at the actuator, a PTC thermistor is embedded in the motor winding. Motor protection trips as soon as the max. permissible winding temperature has been reached.

The actuator is stopped and controls signals a fault. The left indication light of the local controls is blinking in red.

The motor has to cool down before operation can be resumed. Depending on the parameter setting, the fault signal is either automatically reset or the fault signal has to be acknowledged.

The acknowledgement is made:

- via push button [2] in operation mode LOCAL (press and hold down push button more than 1 second)

[2]

- or with the reset command via fieldbus.

13. Servicing and maintenance

⚠ CAUTION	**Damage caused by inappropriate maintenance!**

→ Servicing and maintenance must be carried out exclusively by suitably qualified personnel having been authorised by the end user or the contractor of the plant. Therefore, we recommend contacting our service.

→ Only perform servicing and maintenance tasks when the device is switched off.

AUMA Service & Support

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

13.1. Preventive measures for servicing and safe operation

The following measures are required to ensure safe device operation:

6 months after commissioning and then every year

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

For enclosure protection IP68

After continuous immersion:

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

13.2. Maintenance

Maintenance intervals

The maintenance intervals depend on load and application conditions having a major influence on the lubricating characteristics of the oil. Maintenance (incl. oil change/seal replacement) may only be carried out by the AUMA service.

Recommendations for 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 rarely (open-close duty).

No additional lubrication of the gear housing is required during operation.

13.3. 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.

14. Technical data Globe valve actuator

Type	Speed rpm	Torque range	Run torque[1]/ Modulating torque[2]	Valve attachment	Valve shaft Max.			Handwheel		Weight[3]
SVC/ SVCR	(adjustable in 9 steps) 50 Hz/60 Hz	Max. [Nm]	Max. [Nm]	Standard EN ISO 5211	Cyl. [mm]	Square [mm]	Two-flat [mm]	∅ [mm]	Reduction ratio	approx. [kg]
05.1	1.6 – 22	10 – 25	13	F05/F07	20	17	17	100	13:1	7.0
07.1	1.6 – 22	20 – 50	25	F07	25.4	22	22	125	13:1	10
07.5	0.6 – 8.0	40 – 100	50	F07	25.4	22	22	125	13:1	10

1) Permissible average torque for the whole travel or in modulating duty
2) Torque in modulating duty S4 - 40 %
3) Indicated weight includes globe valve actuator with controls, electrical connection in standard version, unbored coupling and handwheel

Features and functions of actuator		
Type of duty	Open-close duty SVC:	Short-time duty S2 - 15 min, classes A and B according to EN 15714-2
	Modulating duty SVCR:	Intermittent duty S4 - 40 %, class C according to EN 15714-2 with maximum number of starts of 1,800 cycles per hour
	For nominal voltage and 40 °C ambient temperature and at average running or modulating torque load The type of duty must not be exceeded.	
Motor	Variable speed, brushless motor	
Insulation class	F, tropicalized	
Motor protection	PTC thermistors (according to DIN 44081)	
Self-locking	Yes	
Limit switching (end postion detection)	• Via position transmitter potentiometer status signals for directions OPEN and CLOSE • Turns per stroke: Subranges between 1– 99 (observe max. stem stroke) • Signalling via fieldbus interface	
Torque switching	Via electronic current measurement status signals for directions OPEN and CLOSE, adjustable in 8 steps Signalling via fieldbus interface	
Mechanical position indicator	Continuous indication, adjustable indicator disc with symbols OPEN and CLOSED	
Manual operation	Manual drive for setting and emergency operation, handwheel does not rotate during electrical operation	
Coupling	Standard:	Coupling unbored
	Options:	• Coupling unbored extended • Finish machining of coupling (standard or extended) - Bore according to EN ISO 5211 with 1 keyway according to DIN 6885-1 - Square bore according to EN ISO 5211 - Two-flat according to EN ISO 5211
Valve attachment	Standard:	With coupling, dimensions according to EN ISO 5211
	Options:	With output drive type A With LE linear thrust unit With GS worm gearbox

Features and functions of actuator controls			
Power supply	Standard voltages:		
	1-phase AC current (voltages/frequencies)		
	Volt	115	230
	Hz	50/60	50/60
	Permissible variation of mains voltage: ±10 % Permissible variation of mains frequency: ±5 % For current consumption, current type, mains voltage and frequency, refer to the name plate		
External supply of the electronics (option)	24 V DC +20 %/–15 % Current consumption: With options up to 200 mA The external power supply must have a reinforced insulation against mains voltage in accordance with IEC 61800-5-1 and may only be supplied by a circuit limited to 150 VA in accordance with IEC 61800-5-1.		
Overvoltage category	Category III according to IEC 60364-4-443		
Power electronics	Power electronics with integral motor controller		
Rated power	The controls are designed for the rated motor power, refer to name plate		
Control (input signals)	Operation commands and setpoint via Modbus RTU interface		
Status signals (output signals)	Via Modbus RTU interface		
Local controls	Standard:	• Push buttons OPEN, STOP (LOCAL - REMOTE), CLOSE • 2 multi-colour programmable indication lights: - End position CLOSED (yellow), fault/failure (red), end position OPEN (green), operation mode LOCAL (blue)	
	Option:	Local controls mounted separately on wall bracket	
Functions	• Switch-off mode adjustable: - Limit or torque seating for end position OPEN and end position CLOSED • Torque monitoring across the whole travel • Torque by-pass • Programmable EMERGENCY behaviour - via Modbus RTU interface - Reaction can be selected: Stop, run to end position CLOSED, run to end position OPEN • Positioner: - Position setpoint via Modbus RTU interface - Programmable behaviour on loss of signal - Automatic adaptation of the dead band (adaptive behaviour selectable) - Switch-over between OPEN - CLOSE control (REMOTE OPEN-CLOSE) and setpoint control (REMOTE SETPOINT) via Modbus RTU interface		
Electrical connection	Standard:	Plug/socket connector with crimp connection	
	Option:	AUMA plug/socket connector with screw-type connection	
Wiring diagram	Refer to name plate		

Settings/programming the Modbus RTU interface	
Setting the Modbus RTU interface	The Modbus address is set via switches (DIP switches in the actuator), alternatively also via parameters (using AUMA Software CDT and AUMA service cable Z100.999). Parity and baud rate are set via parameters.

Commands and signals of the Modbus RTU interface	
Process representation output (command signals)	OPEN, STOP, CLOSE, position setpoint, RESET, EMERGENCY operation command
Process representation input (feedback signals)	- End position OPEN, CLOSED - Actual position value - Selector switch in position LOCAL/REMOTE - Torque switch OPEN, CLOSED - Limit switch OPEN, CLOSED
Process representation input (fault signals)	- Motor protection tripped - Torque switch tripped in mid-travel
Behaviour on loss of communication	The behaviour of the actuator is programmable: - Stop in current position - Travel to end position OPEN or CLOSED - Travel to any intermediate position - Execute last received operation command

General data of the Modbus RTU interface	
Communication protocol	Modbus RTU according to IEC 61158 and IEC 61784
Network topology	Line (bus) structure. When using repeaters, tree structures can also be implemented. Coupling and uncoupling of devices during operation without affecting other devices is possible.
Transmission medium	Twisted, screened copper cable according to IEC 61158
Fieldbus interface	EIA-485 (RS485)
Transmission rate/cable length	Line topology: Redundant loop topology:

Line topology:

Baud rate (kbit/s)	Max. cable length (segment length) without repeater	Possible cable length with repeater (total network cable length):
9.6 – 38.4	1,200 m	approx. 10 km

Redundant loop topology:

Baud rate (kbit/s)	Max. cable length between actuators (without repeater)	Max. possible cable length of redundant loop
9.6 – 38.4	1,200 m	approx. 290 km

Device types	Modbus slave, e.g. devices with digital and/or analogue inputs/outputs such as actuators, sensors
Number of devices	32 devices without repeater, with repeater expandable to 247
Fieldbus access	Polling between master and slaves (query response)

General data of the Modbus RTU interface		
Supported fieldbus functions	01	Read Coil Status
	02	Read Input Status
	03	Read Holding Registers
	04	Read Input Registers
	05	Force Single Coil
	15 (0FHex)	Force Multiple Coils
	06	Preset Single Register
	16 (10Hex)	Preset Multiple Registers
	17 (11Hex)	Report Slave ID
	08	Diagnostics: • 00 00 Loopback • 00 10 (0AHex) Clear Counters and Diagnostic Register • 00 11 (0BHex) Return Bus Message Count • 00 12 (0CHex) Return Bus Communication Error Count • 00 13 (0DHex) Return Bus Exception Error Count • 00 14 (0EHex) Return Slave Message Count • 00 15 (0FHex) Return Slave No Response Count • 00 16 (10Hex) Return Slave NAK Count • 00 17 (11Hex) Return Slave Busy Count • 00 18 (12Hex) Return Character Overrun Count

Service conditions		
Mounting position	Any position	
Installation altitude	≤ 2 000 m above sea level > 2,000 m above sea level on request	
Ambient temperature	Refer to name plate Standard: –25 °C to +70 °C	
Humidity	Up to 100 % relative humidity across the entire permissible temperature range	
Enclosure protection according to EN 60529	Refer to name plate IP68 According to AUMA definition, enclosure protection IP68 meets the following requirements: • Depth of water: maximum 8 m head of water • Duration of continuous immersion in water: Max. 96 hours • Up to 10 operations during continuous immersion • Modulating duty is not possible during continuous immersion	
Pollution degree	Pollution degree 4 (when closed) according to IEC 61800-5-1	
Vibration resistance according to IEC 60068-2-6	2 g, from 10 to 200 Hz Resistant to vibration during start-up or for failures of the plant. However, a fatigue strength may not be derived from this.	
GL approval	Environmental categories D, G, EMC2	
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.
Finish coating	Standard: Two-component iron-mica combination	
Colour	Standard:	AUMA silver-grey (similar to RAL 7037)
	Option:	Available colours on request
Lifetime	Open-close duty:	20,000 operating cycles OPEN - CLOSE - OPEN An operating cycle is based on an operation from CLOSED to OPEN and back to CLOSED
	Modulating duty:	5 million modulating steps The lifetime depends on the load and the number of starts. A high starting frequency will rarely improve the modulating accuracy. To reach the longest possible maintenance and fault-free operating time, the number of starts per hour chosen should be as low as permissible for the process.

Further information	
EU Directives	Electromagnetic Compatibility (EMC): (2004/108/EC) Low Voltage Directive: (2006/95/EC) Machinery Directive: (2006/42/EC)

15. Spare parts

15.1. Globe valve actuator SVC 05.1 – SVC 07.5 / SVCR 05.1 – SVCR 07.5

Information: Please state device type and our order number (see name plate) when ordering spare parts. Only original AUMA spare parts should be used. Failure to use original spare parts voids the warranty and exempts AUMA from any liability. Delivered spare parts may slightly vary from the representation in these instructions.

Ref. no.	Designation	Type
002.0-1	Local controls	Sub-assembly
002.0-2	Cover (for version without local controls)	Sub-assembly
002.0-3	Cover with socket for separately mounted local controls	Sub-assembly
002.3-1	Board for local controls 002.0-1	Sub-assembly
002.3-2	Board in connecting cover 002.0-3	Sub-assembly
006.0	Power supply unit/switchgear	Sub-assembly
009.0	Logic board	
058.0	Wire for protective earth	Sub-assembly
500.0	Cover	Sub-assembly
501.0	Socket carrier (complete with sockets)	Sub-assembly
502.0	Pin carrier without pins	Sub-assembly
503.0	Socket for control	Sub-assembly
504.0	Socket for motor	Sub-assembly
505.0	Pin for controls	Sub-assembly
506.0	Pin for motor	Sub-assembly
507.0	Cover for electrical connection	Sub-assembly
525.0	Coupling	Sub-assembly
544.0	Screw plug	
541.0	Protective earth connection	Sub-assembly
542.1	Handwheel	Sub-assembly
542.2	Ball handle	Sub-assembly
545.0-1	Protective cap with cord	Sub-assembly
545.0-2	Protective cap without cord	Sub-assembly
545.0-3	Mating plug	Sub-assembly
587.0	Wall bracket	
611.0	Cover	Sub-assembly
S1	Seal kit, small	Set

16.   Certificates

16.1.   Declaration of Incorporation and EC Declaration of Conformity

AUMA Riester GmbH & Co. KG   Tel +49 7631 809-0
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auma®
Solutions for a world in motion

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

for electric AUMA globe valve actuators of type ranges **SVC 05.1 – SVC 07.5** and **SVCR 05.1 – SVCR 07.5** with **integral actuator controls**.

AUMA Riester GmbH & Co. KG as manufacturer declares herewith, that the above mentioned globe valve actuators meet the following basic requirements of the EC Machinery Directive 2006/42/EC: Annex I, articles 1.1.2, 1.1.3, 1.1.5, 1.2.1; 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 following harmonised standards within the meaning of the Machinery Directive have been applied:

EN 12100-1: 2003   ISO 5211: 2001
EN 12100-2: 2003   EN 60204-1: 2006

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

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

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

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

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

EN 60079-0: 2009   EN 13463-5: 2003
EN 61241-1: 2004   EN 1127-1: 2007
EN 13463-1: 2009   EN 60529: 2000

(2) Directive relating to Electromagnetic Compability (EMC) (2004/108/EC)

EN 61800-3: 2004

(3) Low Voltage Directive (2006/95/EC)

EN 61800-5-1: 2007

Year of affixing of the CE marking: 2010

The above mentioned globe valve actuators are available as an option in a special version for applications in Zone 22 category II3D and are marked with the designation II3D IP6X T150°C.

These globe valve actuators are available in enclosure protection IP 65, IP 67 or IP 68 and fulfil the requirements of EN 61241-1:2004 – Electrical apparatus for use in presence of combustible dust.
To fulfil all requirements in compliance with EN 61241-1 – Electrical apparatus for use in presence of combustible dust according to procedure A, the indications contained in the operation instructions must imperatively be observed.

Muellheim, 2011-03-01

H. Newerla, General Management

This declaration does not contain any guarantees. The safety instructions in product documentation supplied with the devices must be observed. Non-concerted modification of the devices voids this declaration.   Y005.090/002/en

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Y005.710/003/en/1.15

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