auma®
Solutions for a world in motion

Part-turn actuators
SQEx 05.2 – SQEx 14.2
SQREx 05.2 – SQREx 14.2
with actuator controls
AUMA MATIC AMExC 01.1

Operation instructions Assembly, operation, commissioning

Read operation instructions first.

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

Purpose of the document:

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

Reference documents:

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

Table of contents Page

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 standards and directives such as IEC/EN 60079 “Electrical apparatus for explosive atmospheres" –

- Part 14: Electrical installations in hazardous areas (other than mines).
- Part 17: Inspection and maintenance of electrical installations in hazardous areas (other than mines).

Safety instructions/warnings

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

Qualification of staff

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

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

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

Commissioning

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

Operation

Prerequisites for safe and smooth operation:

- Correct transport, proper storage, mounting and installation, as well as careful commissioning.
- Only operate the device if it is in perfect condition while observing these instructions.
- Immediately report any faults and damage and allow for corrective measures.
- Observe recognised rules for occupational health and safety.
- Observe the national regulations.
- During operation, the 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 part-turn actuators are designed for the operation of industrial valves, e.g. butterfly valves and ball valves.

The devices described below are approved for use in the potentially explosive atmospheres of zones 1, 2, 21, and 22.

If temperatures >40 °C are to be expected at the valve mounting flange or the valve stem (e.g. due to hot media), please consult AUMA. Temperatures > 40 °C are not considered with regards to the non-electrical explosion protection.

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 of zones 0 and 20
- Potentially explosive areas of group I (mining)
- 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. Warnings and notes

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

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

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

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

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

Arrangement and typographic structure of the warnings

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

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

→ Measures to avoid the danger

→ Further measure(s)

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

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

1.4. References and symbols

The following references and symbols are used in these instructions:

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

Symbol for CLOSED (valve closed)

Symbol for OPEN (valve open)

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

< > **Reference to other sections**

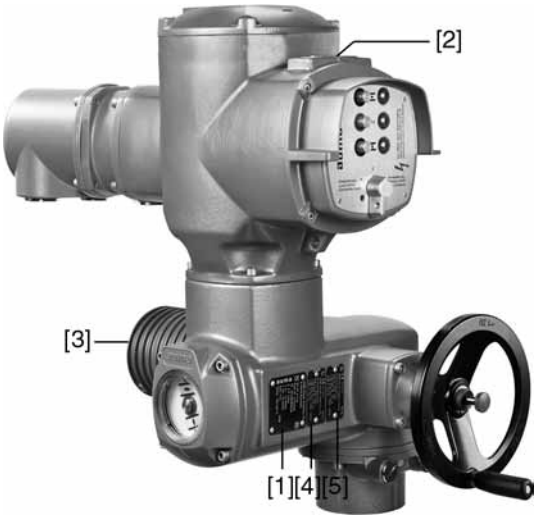
Terms in brackets shown above refer to other sections of the document which provide further information on this topic. These terms are either listed in the index, a heading or in the table of contents and may quickly be found.

2. Identification

2.1. Name plate

Each device component (actuator, controls, motor) is equipped with a name plate.

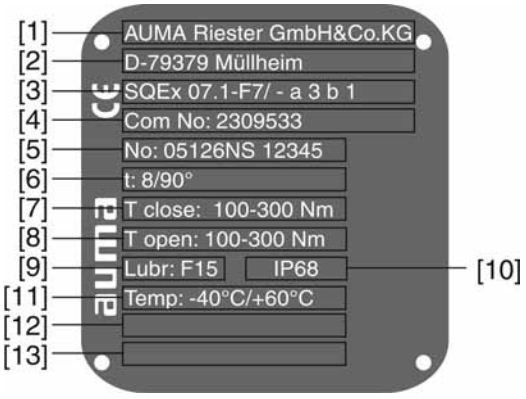
Figure 1: Arrangement of name plates



[1] Actuator name plate
[2] Controls name plate
[3] Motor name plate
[4] Additional plate, e.g. KKS plate (Power Plant Classification System)
[5] Explosion protection approval plate

Description of actuator name plate

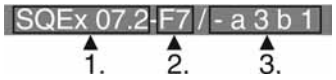
Figure 2: Actuator name plate (example)



[1] Name of manufacturer
[2] Address of manufacturer
[3] **Type designation** (see explanation below)
[4] **Commission number** (see explanation below)
[5] **Actuator serial number** (see explanation below)
[6] Operating time in [s] for a part-turn movement of 90°
[7] Torque range in direction CLOSE
[8] Torque range in direction OPEN
[9] Lubricant type – [10] enclosure protection
[11] Permissible ambient temperature
[12] Can be assigned as an option upon customer request
[13] Can be assigned as an option upon customer request

Type designation

Figure 3: Type designation (example)



1. Type and size of actuator
2. Flange size
3. Ex marking

Type and size

These instructions apply to the following devices types and sizes:

Part-turn actuators for open-close duty: SQEx 05.2, 07.2, 10.2, 12.2, 14.2

Part-turn actuators for modulating duty: SQ**R**Ex 05.2, 07.2, 10.2, 12.2, 14.2

Ex marking

Table 1: Marking for explosion protection (with example)

/	-	a	3	b	1	
1st position: Not used						
	–					
2nd position: Motor type						
		a	SDX or VDX:: 3-phase AC motor			
3rd position: Protection type of electrical connection						
			3	Terminal compartment Ex **e** increased safety: Types: KP, KPH or KES		
			4	Terminal compartment Ex **d** flameproof enclosure: Type: KES-Exd		
4th position: Protection type of position transmitter						
				a	Without intrinsically safe electric circuit	
				b	Electric circuit Ex **i** Intrinsic safety: Type: RWG 5020.2Ex	
5th position: Protection type Ex fieldbus						
					1	No Ex fieldbus
					2	Ex **nL** non sparking Type: FNICO
					3	Ex **ic** non sparking Type: FISCO

Commission number

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

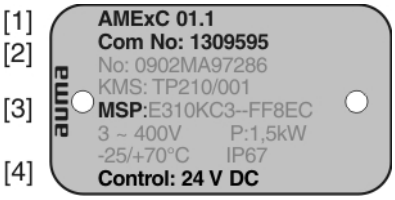
Actuator serial number

Table 2: Description of serial number (with example)

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

Description of controls name plate

Figure 4: Controls name plate



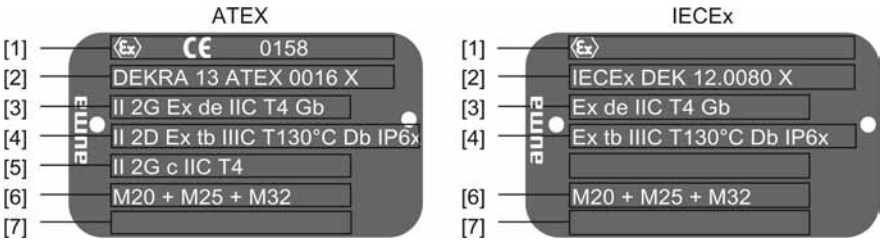
[1] **Type designation**
[2] Commission number
[3] **Wiring diagram**
[4] **Control**

Type designation
AMExC 01.1 = actuator controls AUMA MATIC

Control
24 V DC = Control via parallel interface at 24 V DC control voltage.
115 V AC = Control via parallel interface at 115 V AC control voltage.
0/4 – 20 mA = Control via parallel interface via analogue input 0/4 – 20 mA.

Description of approval plate in explosion-proof version

Figure 5: Approval plates in explosion-proof version (examples)



[1] Ex symbol. CE mark, number of test authority
[2] Ex certificate (number)
Classification:
[3] Electrical gas explosion protection
[4] Electrical dust explosion protection
[5] Non-electrical explosion protection
[6] Threads for line bushings at electrical connection
[7] Not used

2.2. Short description

Part-turn actuator
Definition in compliance with EN ISO 5211:

A part-turn actuator is an actuator which transmits a torque to the valve for less than one full revolution. It need not be capable of withstanding thrust.

AUMA part-turn actuators are driven by an electric motor. A handwheel is provided for manual operation. Switching off in end positions may be either by limit or torque seating. Controls are required to operate or process the actuator signals.

Actuator controls
The AUMA MATIC actuator controls are used to operate AUMA actuators and are supplied ready for use. The controls can be mounted directly to the actuator but also separately on a wall bracket. The functions of the AUMA MATIC controls include standard valve control in OPEN - CLOSE duty, position indications and different signals right through to position control.

Local controls
Operation (via push buttons), setting and indication can be performed directly at the controls (contents of these instructions).

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.

→ 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.

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

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.

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

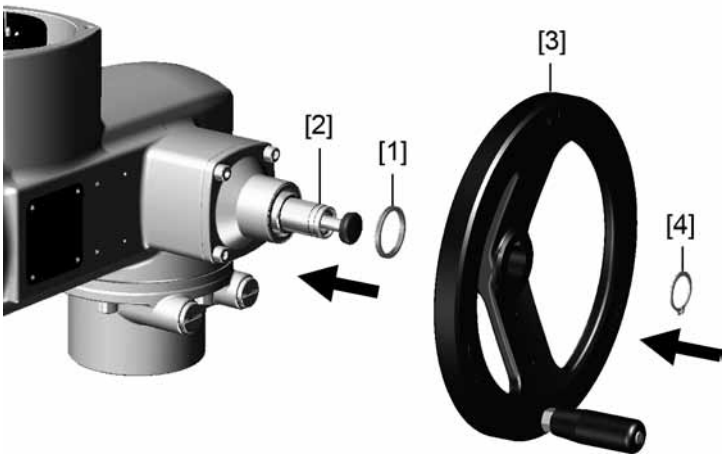
4.1. Mounting position

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

4.2. Handwheel fitting

Information For transport purposes, handwheels from a diameter of 400 mm are supplied separately.

Figure 6: Handwheel



[1] Spacer
[2] Input shaft
[3] Handwheel
[4] Circlip

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

4.3. Actuator: mount to valve

NOTICE

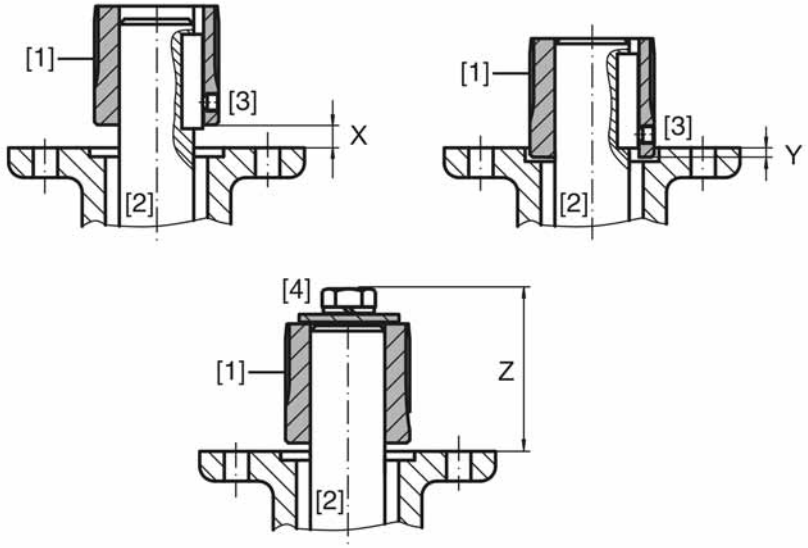
Danger of corrosion due to damage to paint finish and condensation!

→ 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.

The actuator is mounted to the valve using a coupling.

Figure 7: Coupling fitting dimensions



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

Table 3: Coupling fitting dimensions

Type, size - output mounting flange	X max [mm]	Y max [mm]	Z max [mm]
SQEx/SQREx 05.2-F05	3	2	40
SQEx/SQREx 05.2-F07	3	2	40
SQEx/SQREx 07.2-F07	3	2	40
SQEx/SQREx 07.2-F10	3	2	66
SQEx/SQREx 10.2-F10	4	5	50
SQEx/SQREx 10.2-F12	4	5	82
SQEx/SQREx 12.2-F12	5	10	62
SQEx/SQREx 12.2-F14	5	10	102
SQEx/SQREx 14.2-F14	8	10	77
SQEx/SQREx 14.2-F16	8	10	127

1. Use handwheel to run actuator to mechanical end stop.

   Information: Assemble valve and actuator in the same end position.
   - For butterfly valves: Recommended mounting position is end position CLOSED.
   - For ball valves: Recommended mounting position is end position OPEN.
2. Thoroughly degrease mounting faces of the output mounting flanges.
3. Apply a small quantity of grease to the valve shaft [2].
4. Place coupling [1] onto valve shaft [2] and secure against axial slipping by using a grub screw, a circlip or a screw. Thereby, ensure that dimensions X, Y or Z are observed (refer to figure and table <Coupling fitting dimensions>).
5. Apply non-acidic grease at splines of coupling.
6. Fit actuator.

   Information: Ensure that the spigot (if provided) fits uniformly in the recess and that the flanges are in complete contact.
7. If flange bores do not match thread:

   7.1 Slightly rotate handwheel until bores line up.

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

8. 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 4: Tightening torques for screws

Screws Threads	Tightening torque T_A [Nm]
	Strength class 8.8
M6	11
M8	25
M10	51
M12	87
M16	211

4.4. Mounting positions of local controls

The mounting position of the local controls is selected according to the order. If, after mounting the actuator to the valve or the gearbox on site, the local controls are in an unfavourable position, the mounting position can be changed at a later date. Four mounting positions are possible.

Figure 8: Mounting positions A and B

Figure 9: Mounting positions C and D

4.4.1. Mounting positions: modify

⚠ WARNING

Flameproof enclosure, danger of explosion!

Risk of death or serious injury.

→ Before opening, ensure that there is no explosive gas and no voltage.
→ Handle cover and housing parts with care.
→ Joint surfaces must not be damaged or soiled in any way.
→ Do not jam cover during fitting.

1. Loosen screws and remove the local controls.
2. Loosen 3 screws of the board, turn board to the new position and fasten the screws.
3. Check whether O-ring is in good condition, correctly insert O-ring.
4. Turn local controls into new position and re-place.

NOTICE

Cable damage due to twisting or pinching!

Risk of functional failures.

→ Turn local controls by a maximum of 180°.
→ Carefully assemble local controls to avoid pinching the cables.

5. Fasten screws evenly crosswise.

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 and English language) is attached to the device in a weather-proof bag, together with these operation instructions. It can also be obtained from AUMA (state commission no., refer to name plate) or downloaded directly from the Internet (www.auma.com).

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 values for respective sizing is derived from the current consumption of the motor (refer to electrical data sheet) plus the current consumption of the controls.

Table 5: Current consumption controls

Mains voltage	Max. current consumption
100 to 120 V AC (±10 %)	575 mA
208 to 240 V AC (±10 %)	275 mA
380 to 500 V AC (±10 %)	160 mA
24 V DC (+20 %/–15 %) and AC motor	500 mA

Table 6: Maximum permissible protection

Switchgear	Rated power	Max. protection
Reversing contactor A1	up to 1.5 kW	16 A (gL/gG)
Thyristor B1	up to 1.5 kW	16 A (g/R) I^2t<1,500A^2s

If controls are mounted separately from actuator (controls on wall bracket): Consider length and cross section of connecting cable when defining the protection required.

Power supply for the controls (electronics)

If the controls (electronics) are supplied externally with 24 V DC, the power supply is smoothed via an internal 1,000 µF capacitor). When selecting a power supply, care must be taken to consider the capacitor inrush current upon powering the unit up.

Safety standards

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

Cable installation in accordance with EMC

Signal and bus cables are susceptible to interference.

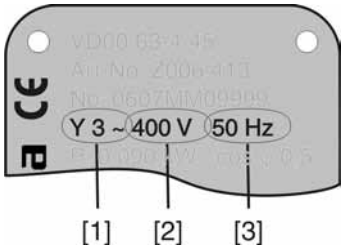
Motor cables are interference sources.

- 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 10: Motor name plate (example)



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

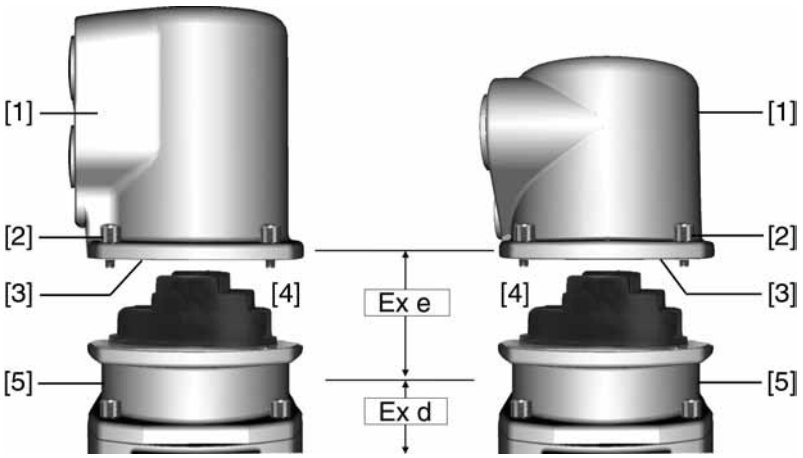
Connecting cables

- For device insulation, appropriate (voltage-proof) cables must be used. Specify cables for the highest occurring rated voltage.
- Use connecting cables with a minimum temperature range of +80 °C.
- For connecting cables exposed to UV radiation (outdoor installation), use UV resistant cables.

5.2. Connecting via Ex plug/socket connector with screw-type terminals (KP, KPH)

5.2.1. Terminal compartment: open

Figure 11: Ex plug/socket connector KPH, KP



[1] Cover
[2] Screws for cover
[3] O-ring
[4] Terminal compartment
[5] Terminal board

DANGER

Hazardous voltage!

Risk of electric shock.

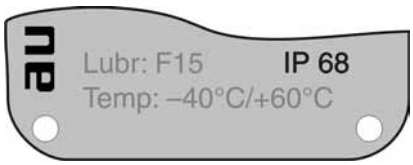
→ Disconnect device from the mains before opening.

1. Loosen screws [2] and remove cover [1].

➥ Terminal compartment [4] is designed for explosion protection Ex e (increased safety). The flameproof compartment (type of protection Ex d) remains hereby closed.

2. Insert cable glands with Ex e approval and of size suitable for connection cables.

➥ The enclosure protection IP… stated on the name plate is only ensured if suitable cable glands are used. Example: Name plate shows enclosure protection IP68.



3. Seal cable entries which are not used with approved plugs suitable for the required protection type.
4. Insert the wires into the cable glands.

5.2.2. Cable connection

Table 7: Cross sections and tightening torques

Type	Cross sections	Tightening torques
Power terminals (U1, V1, W1) PE connection	(1.5)[1)] 2.5 – 6 mm² (flexible or solid)	2 Nm
Control contacts (1 to 50)	0.75 – 1.5 mm² (flexible or solid)	1 Nm

1) with small clamp washers

NOTICE

Danger of corrosion: Damage due to condensation!

→ After mounting, commission the device immediately to ensure that heater minimises condensation.

1. Remove cable sheathing in a length of 120 – 140 mm.
2. Strip wires.
   → Controls max. 8 mm, motor 12 mm
3. For flexible cables: Use end sleeves according to DIN 46228.
4. Connect cables according to order-related wiring diagram.
   Information: Two wires for each connection permitted.
   → When using motor cables with a cross section of 1.5 mm²: Use small clamp washers for connection to terminals U1, V1, W1 and PE (the small clamp washers are provided in the electrical connection cover).

⚠ WARNING

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

Risk of electric shock.

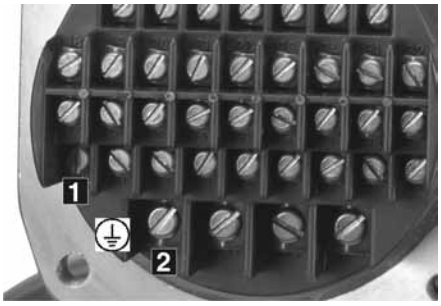
→ Connect all protective earth conductors.

→ Connect PE connection to external protective earth conductor of connecting cables.

→ Start running the device only after having connected the protective earth conductor.

5. Tighten protective earth firmly to PE connection

Figure 12: PE connection

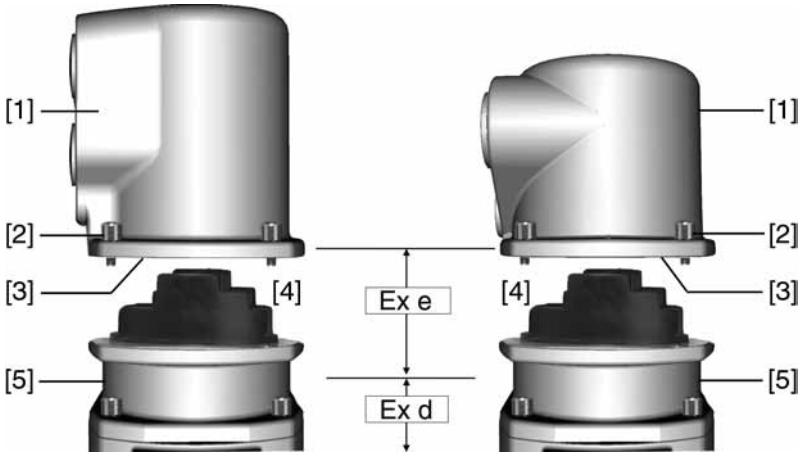


[1] PE connection, control cable
[2] PE connection, motor cable

Information Some actuators are equipped with an additional motor heater. The motor heater minimises condensation in the motor.

5.2.3. Terminal compartment: close

Figure 13: Ex plug/socket connector KPH, KP



[1] Cover
[2] Screws for cover
[3] O-ring
[4] Terminal compartment
[5] Terminal board

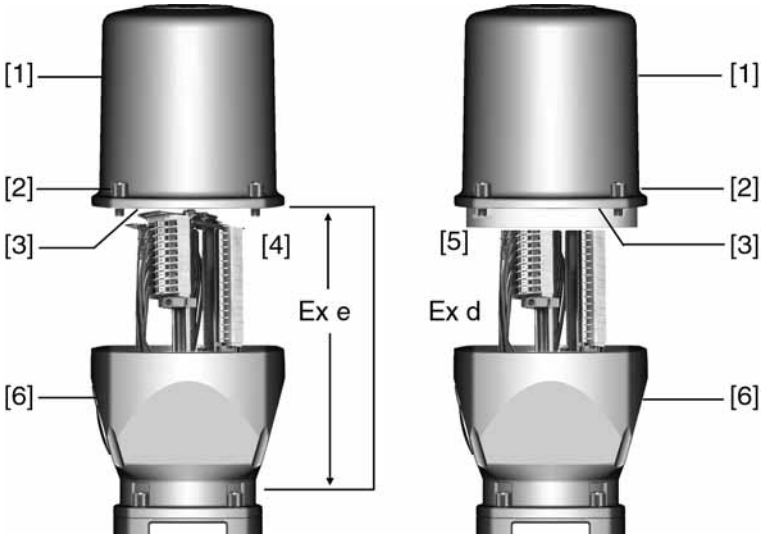
1. Clean sealing faces of cover [1] and housing.
2. Check whether O-ring [3] is in good condition, replace if damaged.
3. Apply a thin film of non-acidic grease (e.g. petroleum jelly) to the O-ring and insert it correctly.
4. Fit cover [1] and fasten screws [2] evenly crosswise.

5. Fasten cable glands with the specified torque to ensure the required enclosure protection.

5.3. Connecting via Ex plug/socket connector with terminal blocks (KES)

5.3.1. Terminal compartment: open

Figure 14: Ex plug/socket connector: left KES, right KES flameproof



[1] Cover
[2] Screws for cover
[3] O-ring
[4] Terminal compartment: Type of protection Ex e
[5] Terminal compartment: Type of protection Ex d
[6] Frame

DANGER

Hazardous voltage!

Risk of electric shock.

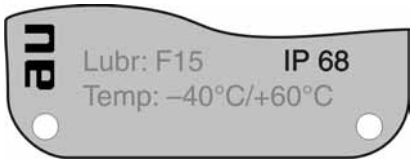
→ Disconnect device from the mains before opening.

1. Loosen screws [2] and remove cover [1].

➥ Terminal compartments [4] and [5] are designed either in type of protection Ex e (increased safety) or in type of protection Ex d (flameproof enclosure). Hereby, the flameproof interior compartment of the actuator (Ex d) remains closed.

2. Insert cable glands with Ex e approval and suitable for connection cables.

➥ The enclosure protection IP… stated on the name plate is only ensured if suitable cable glands are used. Example: Name plate shows enclosure protection IP68.



3. Seal cable entries unused cable entries with approved plugs suitable for the required protection type.
4. Remove cable sheathing and insert the wires into the cable glands.
5. Fasten cable glands with the specified torque to ensure required enclosure protection.

5.3.2. Cable connection

Table 8: Cross sections and tightening torques

Type	Cross sections	Tightening torques
Power terminals (U, V, W)	max. 10 mm² (flexible or solid)	1.5 – 1.8 Nm
PE connection	max. 10 mm² (flexible or solid)	3.0 – 4.0 Nm
Control contacts (1 to 50)	max.2.5 mm² (flexible or solid)	0.6 – 0.8 Nm

NOTICE

Danger of corrosion: Damage due to condensation!

→ After mounting, commission the device immediately to ensure that heater minimises condensation.

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

⚠ WARNING

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

Risk of electric shock.

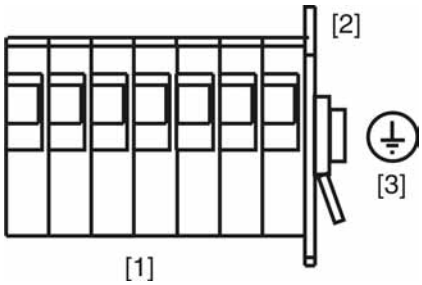
→ Connect all protective earth conductors.

→ Connect PE connection to external protective earth conductor of connecting cables.

→ Start running the device only after having connected the protective earth conductor.

4. Tighten protective earth firmly to PE connection

Figure 15: PE connection

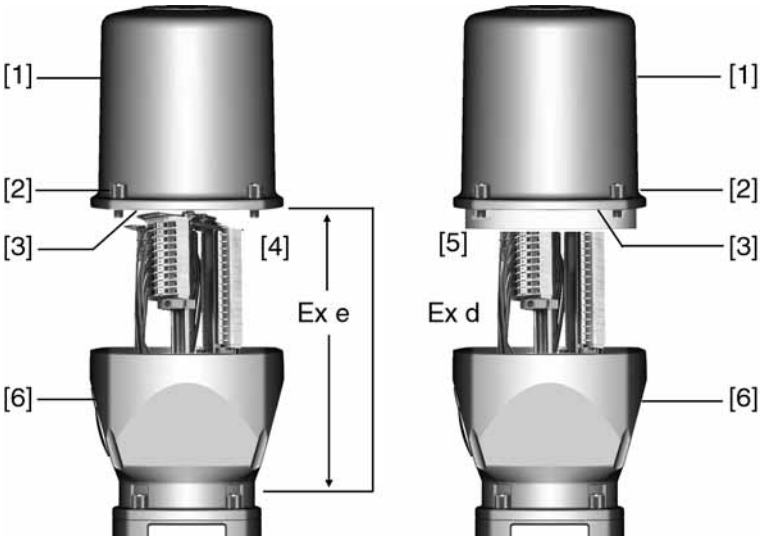


[1] Terminal blocks
[2] Terminal housing
[3] PE connection, symbol: ⏚

Information Some actuators are equipped with an additional motor heater. The motor heater minimises condensation in the motor.

5.3.3. Terminal compartment: close

Figure 16: Ex plug/socket connector: left KES, right KES flameproof



[1] Cover
[2] Screws for cover
[3] O-ring
[4] Terminal compartment: Type of protection Ex e
[5] Terminal compartment: Type of protection Ex d
[6] Frame

1. Clean sealing faces of cover [1] and housing.
2. Ex plug/socket connector designed as KES flameproof: Preserve joint surfaces with an acid-free corrosion protection agent.
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.

⚠ WARNING

Flameproof enclosure, danger of explosion!

Risk of death or serious injury.

→ Handle cover and housing parts with care.
→ Joint surfaces must not be damaged or soiled in any way.
→ Do not jam cover during fitting.

5. Fit cover [1] and fasten screws [2] evenly crosswise.

5.4. Accessories for electrical connection

— Option —

5.4.1. Controls mounted to wall bracket

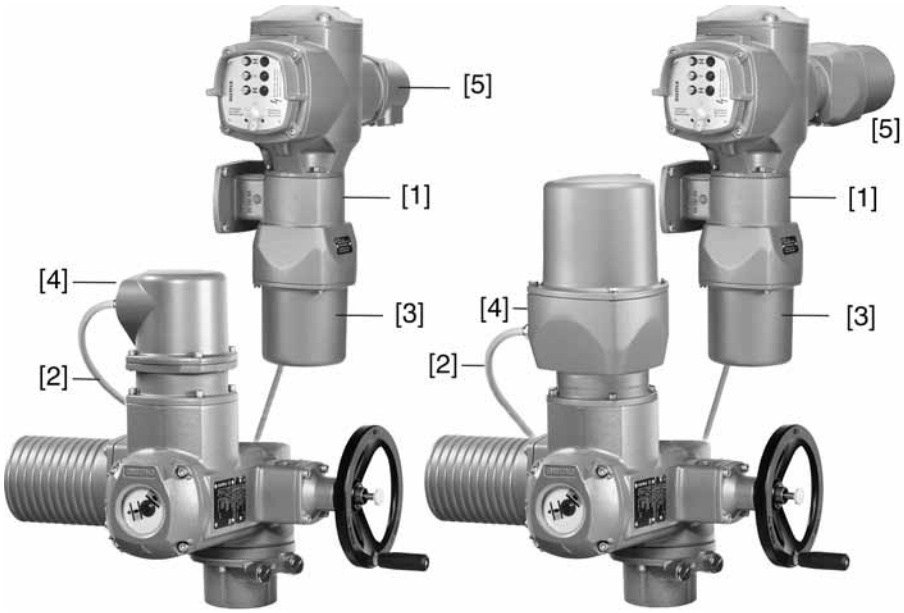
The wall bracket allows separate mounting of controls and actuator.

Application

- When mounted in confined spaces.
- If the actuator is subjected to high temperatures.
- In case of heavy vibration of the valve.

Design

Figure 17: Design principle with wall bracket (KP on the left, KES on the right)



[1] Wall bracket
[2] Connecting cables
[3] Electrical connection of wall bracket (XM)
[4] Electrical connection of actuator (XA)
[5] Electrical connection of controls (XK) - customer plug

Observe prior to connection

- Permissible length of connecting cables: max. 100 m.
- If the actuator is equipped with a position transmitter (EWG/RWG): Connecting cables must be available as shielded version.
- Versions with potentiometer in the actuator are not suitable.
- We recommend using an AUMA cable set "LSW".
- If the AUMA cable set is not used: Use suitable flexible and screened connecting cables.
- When using connecting cables, e.g. of the heater or switch, requiring direct wiring from the actuator to the XK customer plug (XA-XM-XK, refer to wiring diagram), these connecting cables must be subject to an insulation test in compliance with EN 50178. Connecting cables of position transmitters (EWG, RWG, IWG, potentiometer) do not belong to this group. They may **not** be subject to an insulation test.

5.4.2. Parking frame

Application

Parking frame for safe storage of a disconnected plug.

For protection against touching the bare contacts and against environmental influences.

Figure 18: Parking frame and Ex plug/socket connector with screw-type terminals (KP/KPH)

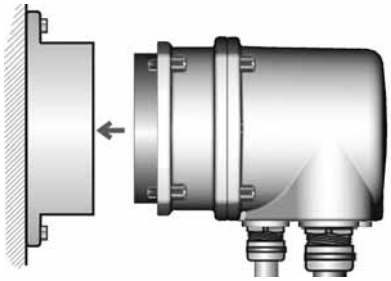
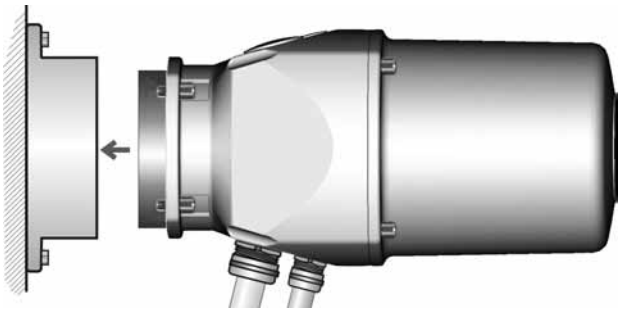


Figure 19: Parking frame and Ex plug/socket connector with terminal blocks (KES)



5.4.3. Protection cover

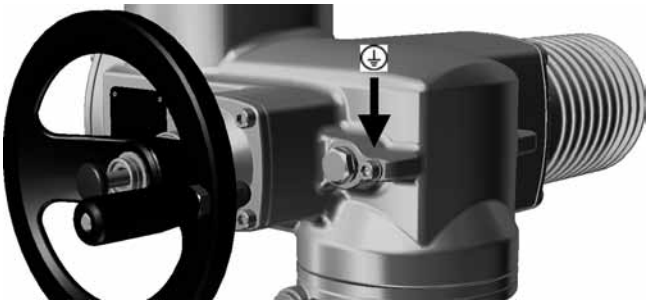
Protection cover for plug compartment when plug is removed.

The open terminal compartment can be closed using a protective cover (not illustrated).

5.4.4. Earth connection, external

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

Figure 20: Earth connection



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.

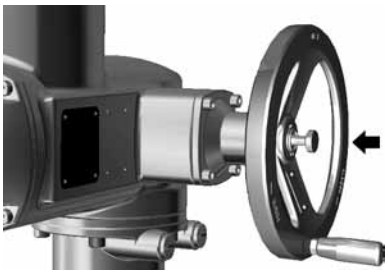
6.1.1. Manual operation: engage

NOTICE

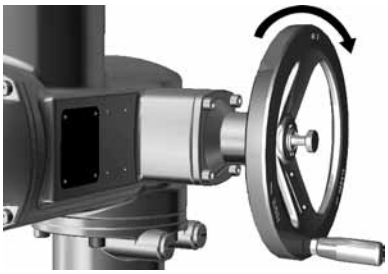
Damage at the motor coupling due to faulty operation!

→ Engage manual operation only during motor standstill.

1. Press push button.



2. Turn handwheel in desired direction.
   → To close the valve, turn handwheel clockwise:
   ➥ Drive shaft (valve) turns clockwise in direction CLOSE.



6.1.2. Manual operation: disengage

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

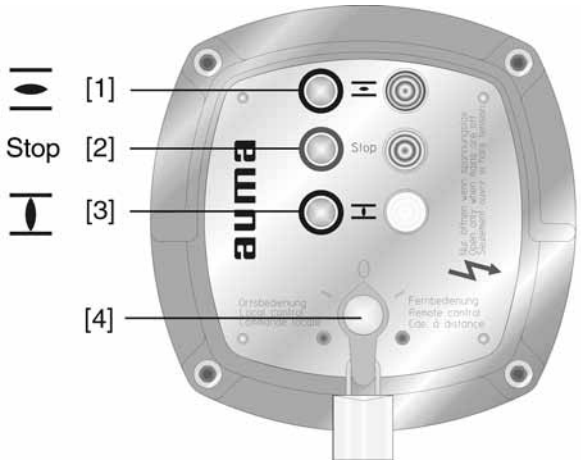
6.2. Motor operation

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

6.2.1. Local operation

The local operation of the actuator is performed using the push buttons of the local controls.

Figure 21: Local controls



[1] Push button for operation command in direction OPEN
[2] Push button Stop
[3] Push button for operation command in direction CLOSE
[4] Selector switch

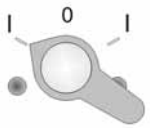
⚠ CAUTION

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.

→ Set selector switch [4] to position **Local control** (LOCAL).



➥ The actuator can now be operated using the push buttons [1 – 3]:

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

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

6.2.2. Actuator operation from remote

→ Set selector switch to **Remote control** (REMOTE).

➥ Now, it is possible to operate the actuator via remote control, via operation commands (OPEN, STOP, CLOSE) or analogue setpoints (e.g. 0 – 20 mA).

Information For actuators equipped with positioner, it is possible to optionally **select** between **open-close duty** (REMOTE OPEN-CLOSE) and **modulating duty** (REMOTE SETPOINT). Selection is made via REMOTE MANUAL input, e.g. based on a 24 V DC signal (refer to wiring diagram).

Behaviour in modulating duty for version with positioner:

In case of signal loss of setpoint E1 or actual value E2, the actuator moves to a preset position. The following reactions are possible:

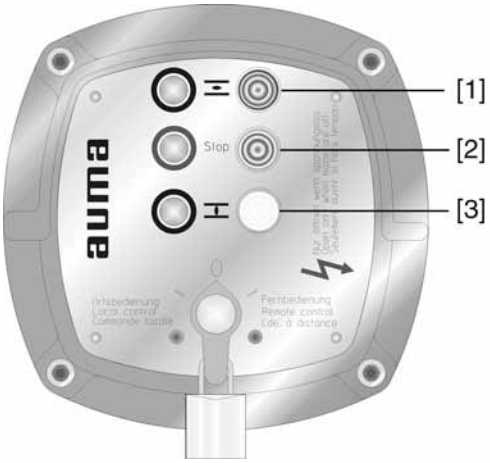
- **Fail as is:** Actuator stops immediately and remains in this position.
- **Fail close:** Actuator moves the valve to end position CLOSED.
- **Fail open:** Actuator moves the valve to end position OPEN.

The behaviour on loss of signal can be set via a switch in the controls.

7. Indications

7.1. Indication lights

Figure 22: Local controls with indication lights



[1] illuminated (default: green): End position OPEN reached

[2] illuminated (default: red): Collective fault signal

[3] illuminated (default: yellow): End position CLOSED reached

Information The three indication lights can be provided in different colours (deviating from the standard).

Collective fault signal The collective fault signal [2] appears if one of the following events occurs (default configuration):

- Torque fault: The set torque was exceeded before reaching an end position. (This signal can be activated/deactivated via a switch in the controls.)
- Thermal fault: Motor protection has tripped, i.e. the motor is overheated.
- Phase failure: One phase is missing (3-ph AC motors only).
- PTC tripping device: Test complete

Running indication If the actuator is equipped with a blinker transmitter (wiring diagram designation: S5), indication lights [1] and [3] can be used as running indication. The running indication can be activated/deactivated via a switch in the controls. If the running indication is active, the respective indication light blinks during operation.

7.2. Mechanical position indicator/running indication

Mechanical position indicator:

- Continuously indicates the valve position
  (For a swing angle of 90°, the indicator disc [2] rotates by approximately 180°.)
- 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

8. Signals

8.1. Feedback signals via output contacts (binary)

The output contacts can be used to indicate operation modes of the actuator or the controls as binary signals.

The signals are assigned according to the order. Example:

Output contact open = end position CLOSED not reached

Output contact closed = end position CLOSED reached

Collective fault signal

Switches: 1 NC and 1 NO (standard)

Designation in the wiring diagram: K9

The collective fault signal appears if one of the following events occurs (default configuration):

- Torque fault: The set torque was exceeded before reaching an end position. (This signal can be activated/deactivated via a switch in the controls.)
- Thermal fault: Motor protection has tripped, i.e. the motor is overheated.
- Phase failure: One phase is missing (3-ph AC motors only).
- PTC tripping device: Test complete

4 output contacts:

Switches: 1 NC (standard)

Designation in the wiring diagram: K5, K6, K7, K8

Default configuration:

- K5: Selector switch is in position **Remote control** (REMOTE).
- K6: Selector switch is in position **Local control** (LOCAL).
- K7: End position OPEN reached
- K8: End position CLOSED reached

8.2. Feedback signals (analogue)

— (Option) —

If the actuator is equipped with a position transmitter (EWG, RWG or potentiometer), an analogue position feedback signal is available.

Valve position

Signal: E2 = 0/4 – 20 mA (galvanically isolated)

Designation in the wiring diagram: E2 (actual value)

9. Commissioning (basic settings)

1. Set selector switch to position **0** (OFF).

Information: The selector switch is not a mains switch. When positioned to **0** (OFF), the actuator cannot be operated. The controls' power supply is maintained.

2. Switch on the power supply.

   Information: Please consider the heat-up time for ambient temperatures below –20 °C.

3. Perform basic settings.

9.1. Heat-up time for low temperature version

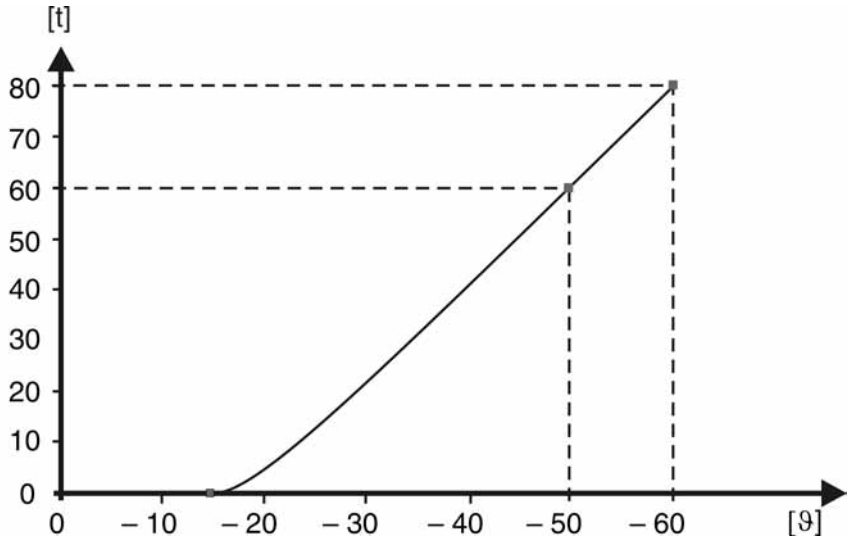
Please note that for low temperature versions, the controls require a heat-up time.

This heat-up time is applicable in case the actuator and the controls are not live and have cooled down to ambient temperature. Under these conditions and after connection to the voltage supply, the following heat-up times must be complied with prior to commissioning:

For –50 °C = 60 min.

For –60 °C = 80 min.

Figure 24: Sketch illustrating the heat-up time



[t] Heat-up time in minutes

[ϑ] Ambient temperature in °C

9.2. End stops in part-turn actuator

The internal end stops limit the swing angle. They protect the valve in the event of limit switching failure.

End stop setting is generally performed by the valve manufacturer **prior** to installing the valve into the pipework.

⚠ CAUTION

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

Pinching and damage by valve or actuator.

→ End stops should be set by suitably qualified personnel only.

→ Never completely remove the setting screws [2] and [4] to avoid grease leakage.

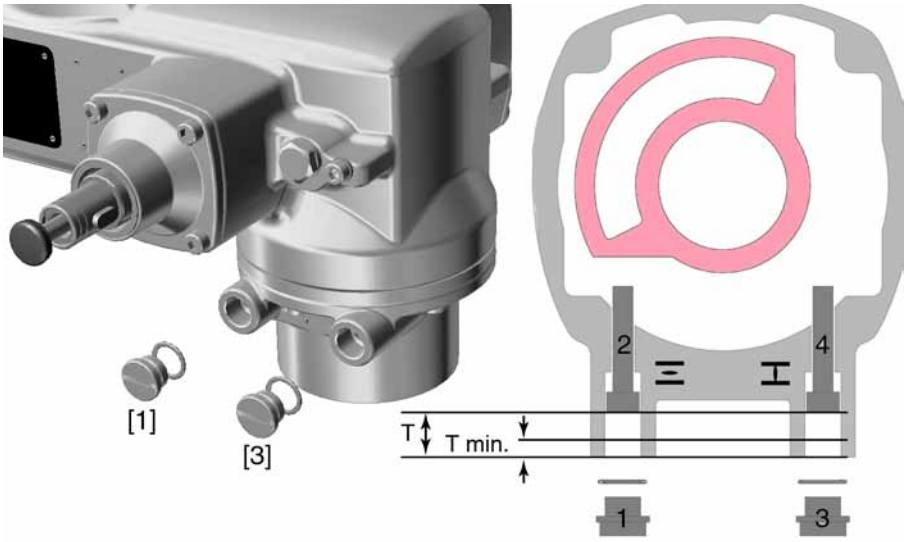
→ Observe dimension $T_{min.}$

Information

- The swing angle set in the factory is indicated on the name plate:

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

Figure 25: End stop



[1] Screw plug for end stop OPEN
[2] Setting screw for end stop OPEN
[3] Screw plug for end stop CLOSED
[4] Setting screw for end stop CLOSED

Dimensions/sizes	05.2	07.2	10.2	12.2	14.2
T (for 90°)	17	17	20	23	23
$T_{min.}$	11	11	12	13	12

9.2.1. End stop CLOSED: set

1. Remove screw plug [3].
2. Move valve to end position CLOSED with handwheel.

3. If the valve end position is not reached:
   → Slightly turn setting screw [4] counterclockwise until valve end position CLOSED can be safely set.
   ➥ Turning the setting screw [4] clockwise results in a smaller swing angle.
   ➥ Turning the setting screw [4] counterclockwise results in a larger swing angle.

4. Turn setting screw [4] clockwise to the stop.

➥ This completes the setting of end stop CLOSED.

5. Check O-ring in screw plug and replace if damaged.
6. Fasten and tighten screw plug [3].

Having completed this procedure, the end position detection CLOSED can be set immediately.

9.2.2. End stop OPEN: set

Information In general, the end stop OPEN does not have to be set.

1. Remove screw plug [1].
2. Move valve to end position OPEN with handwheel.
3. If the valve end position is not reached:
   → Slightly turn setting screw [2] counterclockwise until valve end position OPEN can be safely set.
   ➥ Turning the setting screw [2] clockwise results in a smaller swing angle.
   ➥ Turning the setting screw [2] counterclockwise results in a larger swing angle.

4. Turn setting screw [2] clockwise to the stop.

➥ This completes the setting of end stop OPEN.

5. Check O-ring in screw plug and replace if damaged.
6. Fasten and tighten screw plug [1].

Having completed this procedure, the end position detection OPEN can be set immediately.

9.3. Switch compartment: open

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

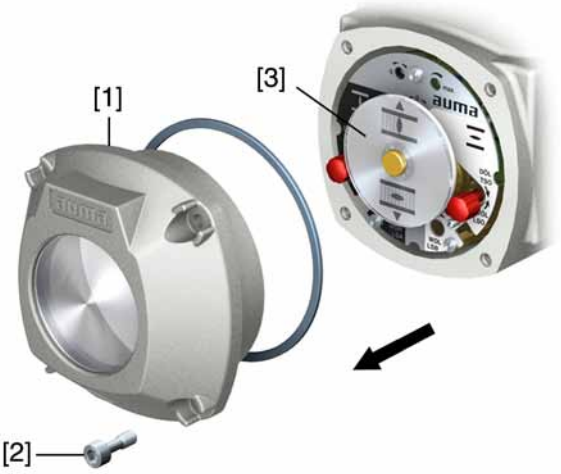
⚠ WARNING

Flameproof enclosure, danger of explosion!

Risk of death or serious injury.

→ Before opening, ensure that there is no explosive gas and no voltage.
→ Handle cover and housing parts with care.
→ Joint surfaces must not be damaged or soiled in any way.
→ Do not jam cover during fitting.

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.

9.4. Torque switching: set

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

Information The torque switches may also trip during manual operation.

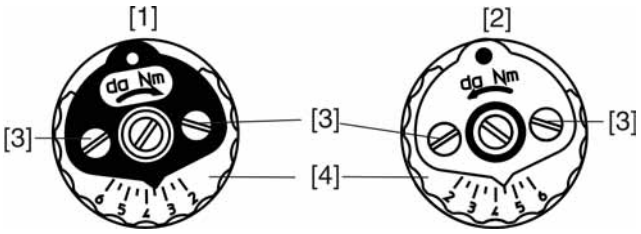
NOTICE

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 26: Torque switching 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).
3. Fasten lock screws [3] again.
   Information: Maximum tightening torque: 0.3 – 0.4 Nm

➥ The torque switch setting is complete.

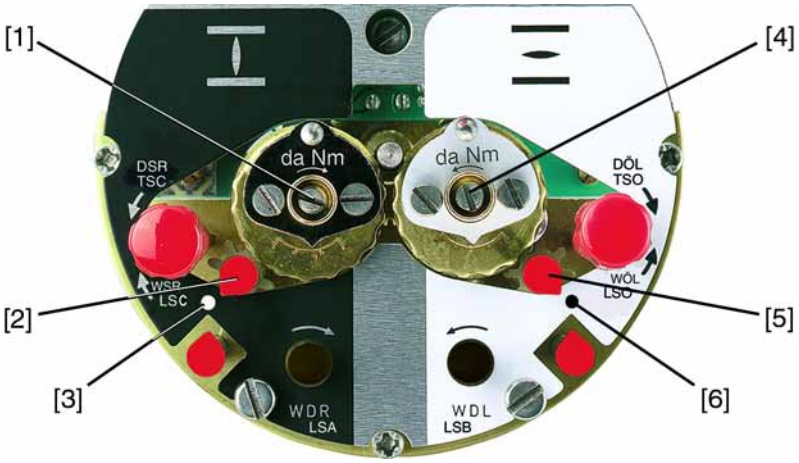
Example: The figure above shows the following settings:

- 3.5 da Nm = 35 Nm for direction CLOSE
- 4.5 da Nm = 45 Nm for direction OPEN

9.5. Limit switching: set

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

Figure 27: 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

9.5.1. 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. If the pointer [2] is 90° from mark [3]: Continue turning slowly.
6. If 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.

9.5.2. 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. If the pointer [5] is 90° from mark [6]: Continue turning slowly.
6. If the pointer [5] moves to mark [6]: Stop turning and release setting spindle.

➥ The end position OPEN setting is complete.

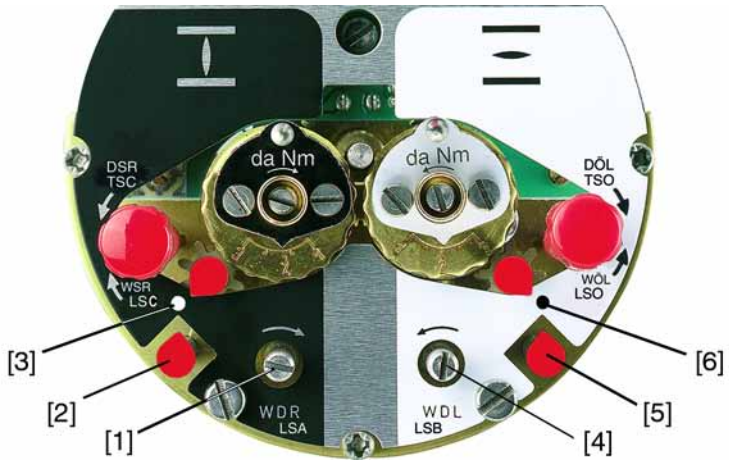
7. If you override the tripping point inadvertently (ratchet click is heard after the pointer has snapped): Continue turning the setting spindle in the same direction and repeat setting process.

9.6. Intermediate positions: set

— Option —

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

Figure 28: 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

9.6.1. 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 in 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. If the pointer [2] is 90° from mark [3]: Continue turning slowly.
5. If 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.

9.6.2. 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. If the pointer [5] is 90° from mark [6]: Continue turning slowly.
5. If 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.

9.7. Test run

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

9.7.1. Direction of rotation: check

NOTICE

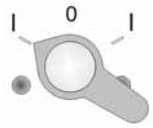
Valve damage due to incorrect direction of rotation!

→ If the direction of rotation is wrong, switch off immediately (press STOP).

→ Eliminate cause, i.e. correct phase sequence for cable set wall bracket.

→ Repeat test run.

1. Move actuator manually to intermediate position or to sufficient distance from end position.
2. Set selector switch to position **Local control** (LOCAL).

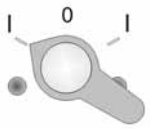


3. Switch on actuator in direction CLOSE and observe the direction of rotation on the indicator disc.
   → Switch off before reaching the end position.

➥ The direction of rotation is correct if **actuator runs in direction CLOSE** and **indicator disc turns counterclockwise**.

9.7.2. Limit switching: check

1. Set selector switch to position **Local control** (LOCAL).



2. Operate actuator using push buttons OPEN - STOP - CLOSE.

➥ The limit switching is set correctly if (default indication):

- the yellow indication light is illuminated in end position CLOSED
- the green indication light is illuminated in end position OPEN
- the indication lights go out after travelling into the opposite direction.

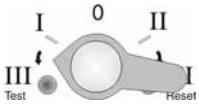
➥ The limit switching is set incorrectly if:

- the actuator comes to a standstill before reaching the end position
- the red indication light is illuminated (torque fault).

3. If the end position setting is incorrect: Reset limit switching.
4. If the end position setting is correct and no options (e.g. potentiometer, position transmitter) are available: Close switch compartment.

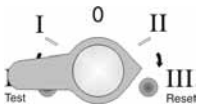
9.7.3. PTC tripping device (option): test

1. Turn selector switch to position **Test** (spring return).



➥ If the PTC tripping device is working properly, the tripping of the motor protection is signalled via the red indication light "collective fault signal" on the local controls.

2. Turn selector switch to position **Reset**.



➥ The fault signal is reset if the device is working properly.

3. If no fault signal is initiated: Request AUMA service to check both wiring and selector switch.

9.8. Potentiometer setting

— Option —

The potentiometer as travel sensor records the valve position.

Information This setting is only required if the potentiometer is directly wired to the customer connection XK (refer to wiring diagram).

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

Figure 29: View of control unit

[1] Potentiometer

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).

9.9. Electronic position transmitter RWG: set

— Option —

The electronic position transmitter RWG 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.

Table 9: Technical data RWG 4020

Wiring		**3-wire or 4-wire system**
Terminal plan	TPA	9th position = E or H
Output current	I_A	0 – 20 mA, 4 – 20 mA
Power supply	U_V	24 V DC, ±15 % smoothed
Max. current consumption	I	24 mA at 20 mA output current
Max. load	R_B	600 Ω

Figure 30: View of control unit

[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

1. Connect voltage to electronic position transmitter.

2. Move valve to end position CLOSED.
3. Connect ammeter for 0 – 20 mA to measuring points [4 and 5].
4. Turn potentiometer [1] clockwise to the stop.
5. Turn potentiometer [1] slightly in opposite direction.
6. Turn potentiometer [2] clockwise until output current starts to increase.
7. 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.

8. Move valve to end position OPEN.
9. Set potentiometer [3] to end value 20 mA.
10. Approach end position CLOSED again and check minimum value (0.1 mA or 4.1 mA). If necessary, correct the setting.

9.10. Mechanical position indicator: set

1. Place indicator disc on 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:
   → Repeat setting procedure.

9.11. Switch compartment: close

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. Preserve joint surfaces with an acid-free corrosion protection agent.
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.

WARNING

Flameproof enclosure, danger of explosion!

Risk of death or serious injury.

→ Handle cover and housing parts with care.

→ Joint surfaces must not be damaged or soiled in any way.

→ Do not jam cover during fitting.

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

10. Commissioning – controls settings

The controls are set in the factory according to the order. The settings only have to be changed if the device is used for applications other than those specified in the order. In case the device is equipped with a positioner (option), subsequent setting may be required.

The following settings are described in these operation instructions:

- Type of seating (limit or torque seating): set
- Push-to-run operation or self-retaining: set
- Running indication (blinker transmitter) (option): activate/deactivate
- Torque fault in collective fault signal: activate/deactivate
- Positioner setting (option)

10.1. Controls: open

WARNING

Flameproof enclosure, danger of explosion!

Risk of death or serious injury.

→ Before opening, ensure that there is no explosive gas and no voltage.
→ Handle cover and housing parts with care.
→ Joint surfaces must not be damaged or soiled in any way.
→ Do not jam cover during fitting.

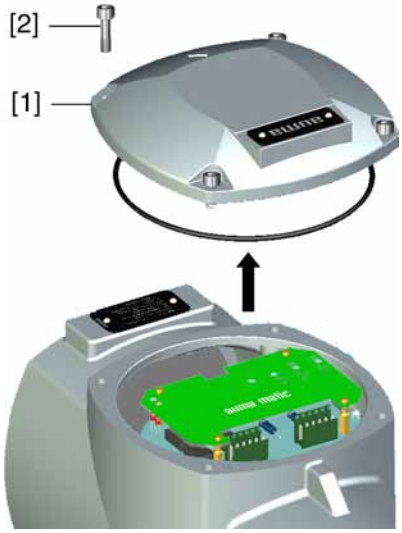
NOTICE

Electrostatic discharge ESD!

Risk of damage to electronic components.

→ Earth both operators and devices.

→ Loosen screws [2] and remove cover [1].



10.2. 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.

The type of seating can be set via two DIP switches on the logic board.

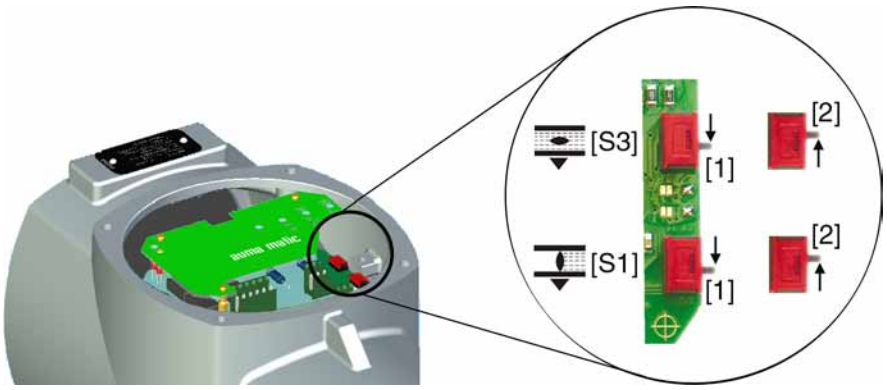
Limit seating The limit switching is set in such a way that the actuator switches off at the desired switching points. The torque switching acts as overload protection for the valve.

Torque seating The torque switching is set to the desired tripping torque. After reaching the tripping torque, the actuator is turned off.

The limit seating is used to signal that the limit switching will trip shortly **before** reaching the set tripping torque. If this is not the case, either the indication light on the local controls or the alarm contact K9 (collective fault signal) will signal a fault.

→ Set type of seating for end positions via DIP switches [S1] and [S3].

Figure 31: DIP switches on logic board



[S1] DIP switch for end position CLOSED
[S3] DIP switch for end position OPEN
[1] Position [1] = limit seating
[2] Position [2] = torque seating

10.3. Push-to-run operation or self-retaining: set

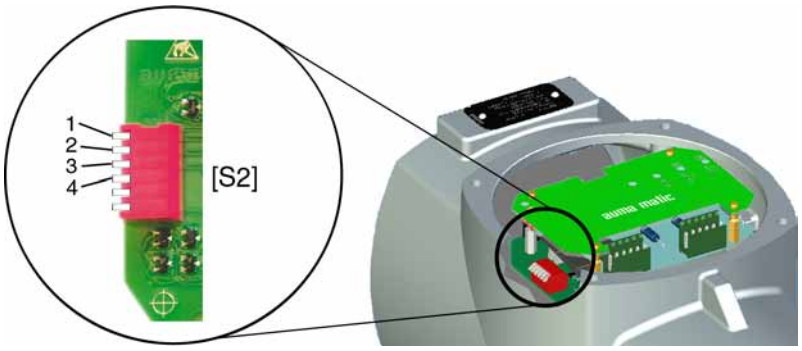
Push-to-run operation or self-retaining is set via a DIP switch on the logic board.

Push-to-run operation Actuator only runs in direction OPEN or CLOSE while an operation command is being received. The actuator stops if the operation command is cancelled.

Self-retaining After receiving an operation command, the actuator continues to run in direction OPEN or CLOSE, even if the operation command is cancelled (self-retaining). The actuator is either stopped by the STOP command or if an end position or intermediate position has been reached.

→ Set push-to-run operation or self-retaining via DIP switch [S2].

Figure 32: DIP switch on logic board



[S2] 6-way DIP, switches [1 – 4]:
1 for operation commands CLOSE from remote
2 for operation commands OPEN from remote
3 for operation commands CLOSE via push button at local controls
4 for operation commands OPEN via push button at local controls

➥ Switch in lower position (position ON): Self-retaining

➥ Switch in upper position (position OFF): Push-to-run operation

Information If the controls are equipped with a positioner, switches 1 and 2 (operation commands from remote) must be in position OFF (push-to-run operation).

10.4. Running indication (blinker transmitter): activate/deactivate

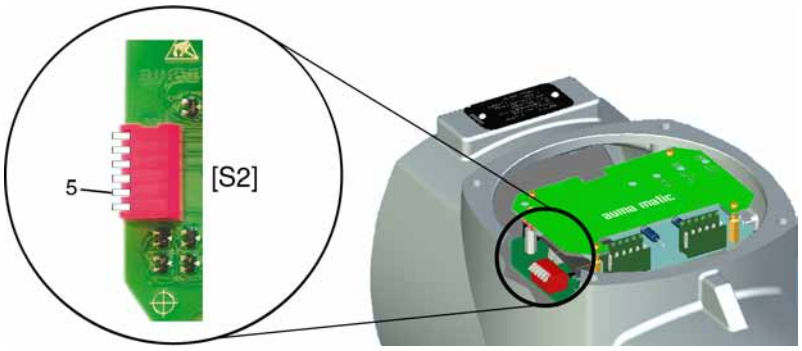
— (Option) —

If the actuator is equipped with a blinker transmitter (wiring diagram designation: S5), indication lights (OPEN/CLOSE) on the local controls can be used as running indication. If the running indication is active, the respective indication light blinks during actuator operation.

The running indication is activated/deactivated via a DIP switch on the logic board.

→ Set running indication (blinker) via DIP switch [S2].

Figure 33: DIP switch on logic board



[S2] 6-way DIP, switch 5

➥ Switch 5 in lower position (position ON): Running indication is deactivated.

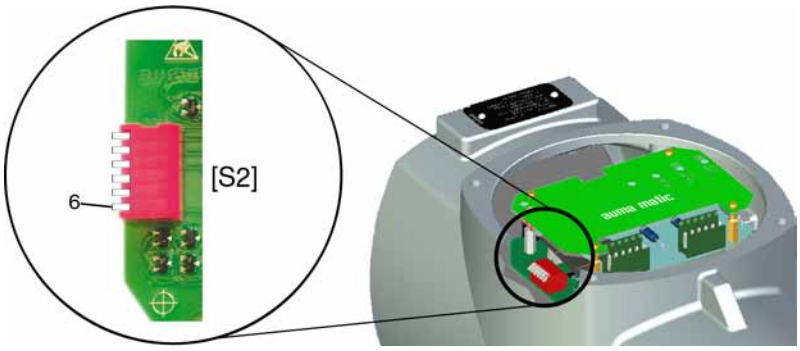
➥ Switch 5 in upper position (position OFF): Running indication is activated.

10.5. Torque fault in collective fault signal: activate/deactivate

The torque fault signal is activated/deactivated via a DIP switch on the logic board.

→ Activate/deactivate signal via DIP switch [S2].

Figure 34: DIP switch on logic board



[S2] 6-way DIP, switch 6

➥ Switch 6 in lower position (position ON): The signal "Torque fault in collective fault signal" is activated.

➥ Switch 6 in upper position (position OFF): The signal "Torque fault in collective fault signal" is deactivated.

10.6. Positioner

— (Option) —

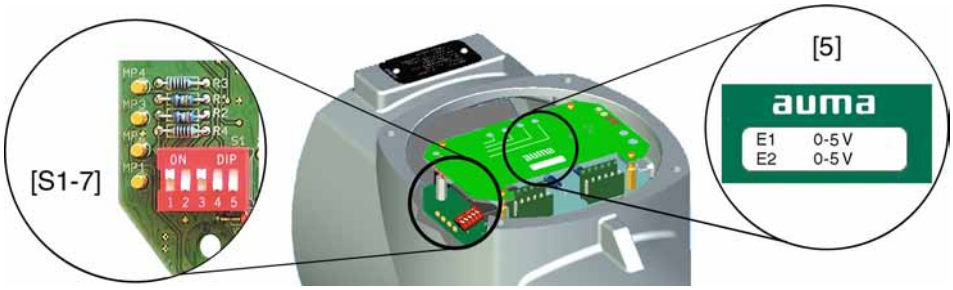
→ Prior to positioner setting, set limit and torque switching as well as potentiometer or electronic position transmitter.

10.6.1. Input ranges (signal type) for setpoint and actual value

The input range (signal type) for setpoint E1 and actual value E2 is set in the factory and marked with a label on the cover plate of the positioner.

The type of signal can be modified at a later date exclusively for versions with setpoint E1 ≠ 0/4 – 20 mA and split-range version. For these versions, the positioner board is equipped with an additional contact.

Figure 35: Version with additional switch on the positioner board



[5] Label indicating the set input ranges

[S1-7] 5-contact DIP switch for setting

DIP1 Actual value E2 (current or voltage signal)

DIP3 Setpoint E1 (current or voltage signal)

DIP5 Setpoint E1 (double signal range e.g. for split range)

Table 10: Input range setting for setpoint E1

Setpoint E1	**[S1–7]**
	DIP 3 and 5
0/4 – 20 mA	ON 1 2 3 4 5

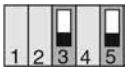
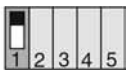
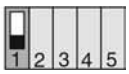
Setpoint E1	[S1–7]
	DIP 3 and 5
0 – 5 V	ON 
0 – 10 V	ON 

Table 11: Input range setting for actual value E2

Actual value E2	[S1–7]
	DIP 1
0/4 – 20 mA[1)]	ON 
0 – 5 V[2)]	ON 

1) for internal feedback of electronic position transmitter RWG
2) for internal feedback of precision potentiometer 5 kΩ

Information When changing the setting, a new label [5] indicating the set signal type must be provided. Furthermore, the wiring diagram indicated on the name plate of the actuator controls also changes.

10.6.2. Behaviour on loss of signal (actuator reaction)

In case of a loss of signal of setpoint E1 or actual value E2, the reaction of the actuator can be programmed via switch [S2-7]. The complete selection range, however, is only available for signals 4 – 20 mA.

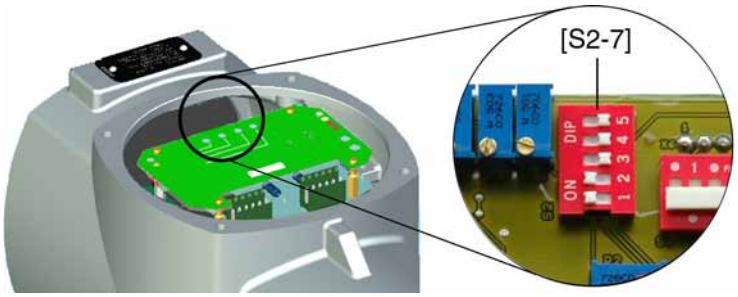
The following reactions are possible:

Fail as is: Actuator stops immediately and remains in this position.

Fail close: Actuator moves the valve to end position CLOSED.

Fail open: Actuator moves the valve to end position OPEN.

Figure 36: DIP switch [S2-7] on positioner board

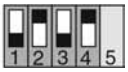


DIP1 = ON, actual value E2 is monitored
DIP2 = ON, setpoint E1 is monitored

Table 12: Recommended settings

Behaviour on loss of signal of	Signal type		[S2–7]
E1 and/or E2	Setpoint E1	Actual value E2	DIP 1 2 3 4
Fail as is	4 – 20 mA	4 – 20 mA	ON 
Fail close			ON 
Fail open			ON 

Table 13: Further possible settings

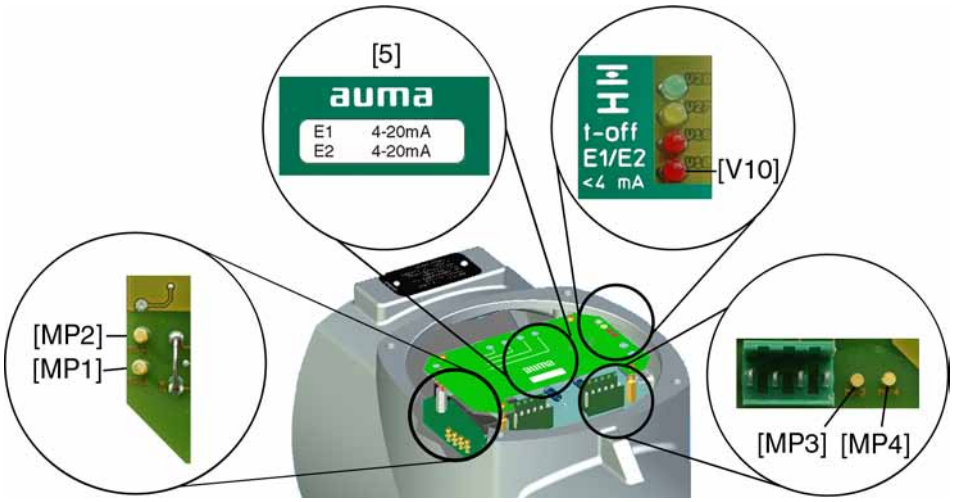
Behaviour on loss of signal of		Signal type[1)]		[S2–7]
E1	**E2**	**Setpoint E1**	**Actual value E2**	**DIP 1 2 3 4**
Fail as is	Fail open	4 – 20 mA	0 – 5 V	ON 
Fail close	Fail open	4 – 20 mA	0 – 5 V	ON 
		0 – 20 mA	4 – 20 mA	ON 
		0 – 20 mA 0 – 5 V 0 – 10 V	0 – 20 mA 0 – 5 V	ON 
	Fail close	0 – 20 mA 0 – 5 V	4 – 20 mA	ON 
	Fail as is	0 – 20 mA 0 – 10 V	4 – 20 mA	ON 
Fail open		4 – 20 mA	0 – 20 mA 0 – 5 V	ON 

1) in case of a signal loss, a misinterpretation might be made for **0** – 20 mA, **0** – 5 V or **0** – 10 V, due to the fact that E1 or E2 could take the value 0 mA even without loss of signal (end position CLOSED = 0 mA or 0 V).

10.6.3. Adjustment in end positions

The setting described below applies to the standard positioner version, i.e. maximum setpoint E1 (20 mA) triggers a travel to end position OPEN, minimum setpoint (0/4 mA) triggers a travel to end position CLOSED.

Figure 37: Electronic positioner board



[MP1] Measuring point (–) for actual value E2
[MP2] Measuring point (+) for actual value E2
[MP3] Measuring point (+) for setpoint E1
[MP4] Measuring point (–) for setpoint E1
[5] Label with signal indication
[V10] Red LED: E1/E2 <4 mA

End position CLOSED

1. Set selector switch to position **Local control** (LOCAL).
2. Move valve to end position CLOSED.

3. Connect lower setpoint to customer connection XK (terminals 2/3). The lower setpoint (0 V, 0 mA or 4 mA) is indicated on the label [5].
4. If the red LED [V10] **E1/E2 <4 mA** is illuminated:
   4.1 Verify polarity of setpoint E1.
   4.2 Check whether external load is connected to customer connection XK (terminals 23/24) (observe max. load R_B), or
   4.3 Connect terminals 23/24 across customer connection XK (terminals 23/24).
5. Measure setpoint E1: Connect measuring device for 0 – 5 V to measuring points **[MP3/MP4]**.

➥ For a setpoint E1 of 0 V or 0 mA, the voltmeter shows 0 V.

➥ For a setpoint E1 of 4 mA, the voltmeter shows 1 V.

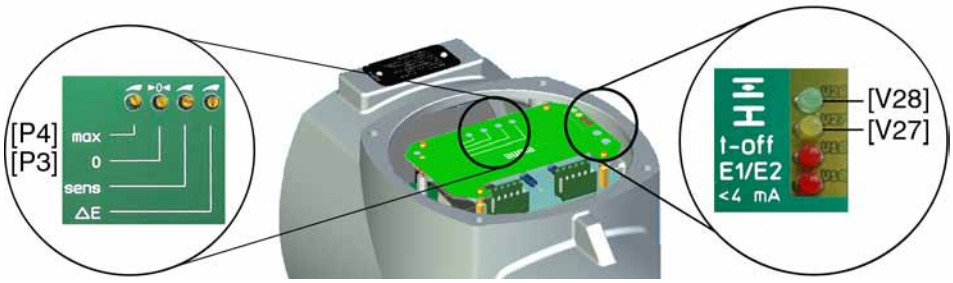
6. If measured value is not correct: Correct setpoint E1.
7. Measure actual value E2: Connect measuring device for 0 – 5 V to measuring points **[MP1/MP2]**.

➥ For an actual value E2 of 0 mA, the voltmeter shows 0 V.

➥ For an actual value E2 of 4 mA, the voltmeter shows 1 V.

8. If measured value is not correct: Re-set potentiometer or electronic position transmitter and perform adjustment once again, starting from step 1.
9. Adjust positioner using potentiometer **0** [P3].
   9.1 If both LEDs are OFF or the green LED [V28] is illuminated: Turn potentiometer **0** [P3] slightly clockwise until the yellow LED [V27] is illuminated.
   9.2 If the yellow LED [V27] is illuminated: Turn potentiometer **0** [P3] counterclockwise until the yellow LED [V27] goes out. Then turn potentiometer **0** [P3] slightly clockwise until the yellow LED [V27] is illuminated again.

Figure 38: Electronic positioner board



[P3] Potentiometer 0
[P4] Potentiometer max
[V27] Yellow LED: End position CLOSED reached
[V28] Green LED: End position OPEN reached

➥ The setting is correct if the yellow LED [V27] is switched on when reaching end position CLOSED.

End position OPEN

10. Move valve to end position OPEN.
11. Measure actual value E2 (measuring points **[MP1/MP2]**):

➥ For an actual value E2 of 20 mA, the voltmeter shows 5 V.

12. If measured value is not correct: Re-set potentiometer or electronic position transmitter and perform adjustment once again, starting from step 1.
13. Set maximum setpoint E1 (5 V or 20 mA, refer to label [5]).
14. Measure setpoint E1 (measuring points **[MP3/MP4]**):

➥ For a setpoint E1 of 5 V or 20 mA, the voltmeter shows 5 V.

15. If measured value is not correct: Verify setpoint E1.

16. Adjust positioner using potentiometer **max** [P4].
    16.1 If both LEDs are OFF or the yellow LED [V27] is illuminated: Turn potentiometer **max** [P4] slightly counterclockwise until the green LED [V28] is illuminated.
    16.2 If the green LED [V28] is illuminated: Turn potentiometer **max** [P4] clockwise until the green LED [V28] goes out. Then turn potentiometer **0** [P3] slightly counterclockwise until the green LED [V28] is illuminated again.
    ➥ The setting is correct if the green LED [V28] is switched on when reaching end position OPEN.

10.6.4. Sensitivity setting

NOTICE

Unnecessary wear at valve and actuator caused by an excessive number of starts (sensitivity)!

→ Set maximum dead band acceptable for the process.
→ Observe maximum number of actuator starts (refer to technical data sheet for modulating actuators).

Dead band

The dead band determines the sensitivity between switch-on point and switch-off point. The smaller the dead band, the higher the sensitivity of the positioner.

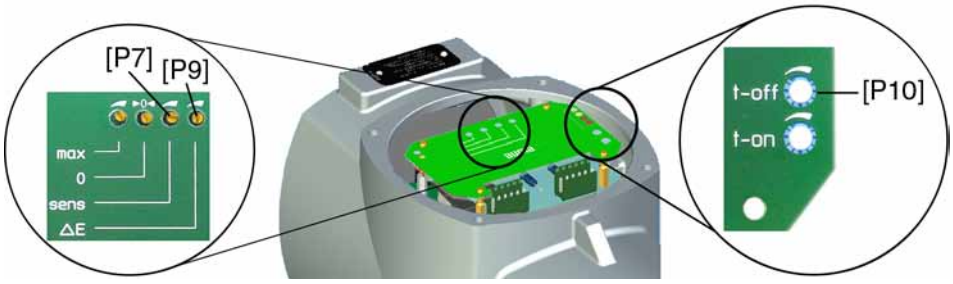
Default value: 2.5 %

Setting range: 0.5 % to 2.5 % (of the maximum setpoint E1)

Dead time

The dead time prevents the operation to a new setpoint within a pre-determined time (0.5 to 10 seconds). The number of starts can be reduced by setting the dead time to a sufficiently high value.

Figure 39: Sensitivity setting



[P7] Potentiometer **sens** (fine tuning)
[P9] Potentiometer Δ **E** (dead band)
[P10] Potentiometer **t-off** (dead time)

Dead band setting

1. Set selector switch to position **Remote control** (REMOTE).
2. Connect setpoint E1 to customer connection XK (terminals 2/3).
3. Set dead band using potentiometer Δ **E** [P9]:
   → Reduce dead band (increase sensitivity): Turn potentiometer counterclockwise.
   → Increase dead band (reduce sensitivity): Turn potentiometer clockwise.

Fine tuning

Information: Fine tuning is only useful for output speeds <16 rpm. For 1-phase AC motors, fine tuning is not possible.

4. Reduce dead band further by up to 0.25 % (increase sensitivity): Turn potentiometer **sens** [P7] counterclockwise.

Dead time setting

5. Set dead time using potentiometer **t-off** [P10]:
   → Reduce dead time: Turn potentiometer **t-off** [P10] counterclockwise.
   → Increase dead time: Turn potentiometer **t-off** [P10] clockwise.

10.7. EMERGENCY command (EMERGENCY - OPEN/EMERGENCY - CLOSE)

— (Option) —

The EMERGENCY input (refer to wiring diagram) has to be connected to the control voltage using an NC contact (closed circuit principle). In the event of an EMERGENCY command (removal of the signal = NC contact is operated), the actuator runs to the preset end position:

- EMERGENCY - CLOSE input: Actuator runs to end position CLOSED.
- EMERGENCY - OPEN input: Actuator runs to end position OPEN.

The EMERGENCY command is effective in all three selector switch positions (LOCAL, OFF, REMOTE).

⚠ CAUTION

The actuator can immediately start when switched on!

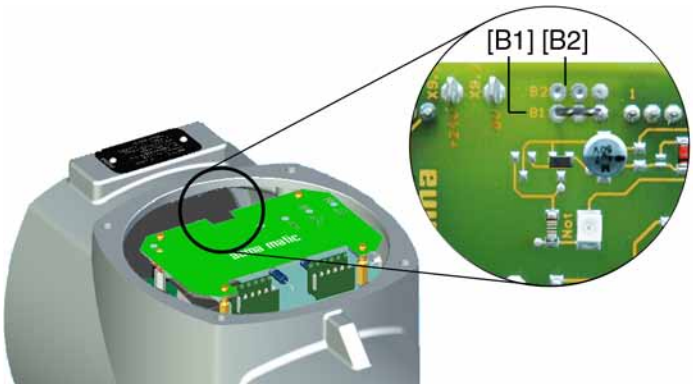
Risk of personal injuries or damage to the valve.

→ Ensure that EMERGENCY signal is present when switching on.

→ If the actuator starts to run unexpectedly: Immediately press push button **Stop**.

Disable EMERGENCY command

Figure 40: Interface board for available option EMERGENCY - OPEN/EMERGENCY - CLOSE



[B1] Link available: EMERGENCY - CLOSE
[B2] Link available: EMERGENCY - OPEN

1. Remove face plate.
2. Disconnect links [B1] or [B2].

10.8. Controls: close

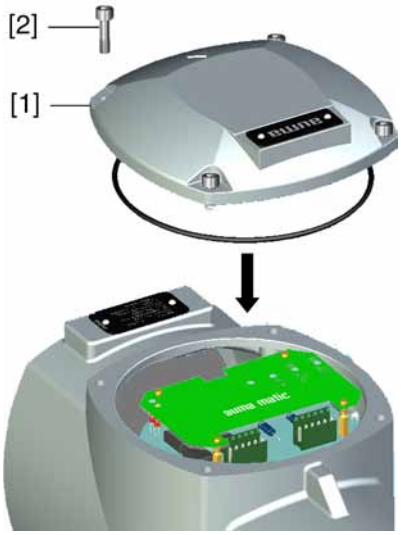
NOTICE

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. Preserve joint surfaces with an acid-free corrosion protection agent.
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.



WARNING

Flameproof enclosure, danger of explosion!

Risk of death or serious injury.

→ Handle cover and housing parts with care.

→ Joint surfaces must not be damaged or soiled in any way.

→ Do not jam cover during fitting.

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

11. Corrective action

11.1. Faults during commissioning

Table 14: Faults during commissioning

Fault description	Possible causes	Remedy
Mechanical position indicator cannot be set.	Reduction gearing is not suitable for turns/stroke of the actuator.	Exchange reduction gearing.
Fault in end position Actuator runs to end stop although the limit switches work properly.	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 controls.	Determine overrun: Overrun = travel covered from switching off until complete standstill. Set limit switching again considering the overrun (turn handwheel back by the amount of the overrun).
Limit and/or torque switches do not trip.	Switch is defective or switch setting is incorrect.	Check setting, if required, reset end positions. → **Check switches** and replace them, if required.

Switch check

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

1. Turn test button [1] in direction of the TSC arrow: Torque switch CLOSED trips. The red indication light (fault) on the local controls is illuminated.
2. Press push button OPEN to reset the fault (indication light) by operating the device in the opposite direction.
3. Turn test button [2] in direction of the TSO arrow: Torque switch OPEN trips.
4. Press push button CLOSE to reset the fault (indication light) by operating the device in the opposite direction.

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.

1. Turn test button [1] in direction of the LSC arrow: Limit switch CLOSED trips.
2. Turn test button [2] in direction of the LSO arrow: Limit switch OPEN trips.

11.2. Fuses

11.2.1. Fuses within the actuator controls

After removal of local controls, the fuses can be accessed.

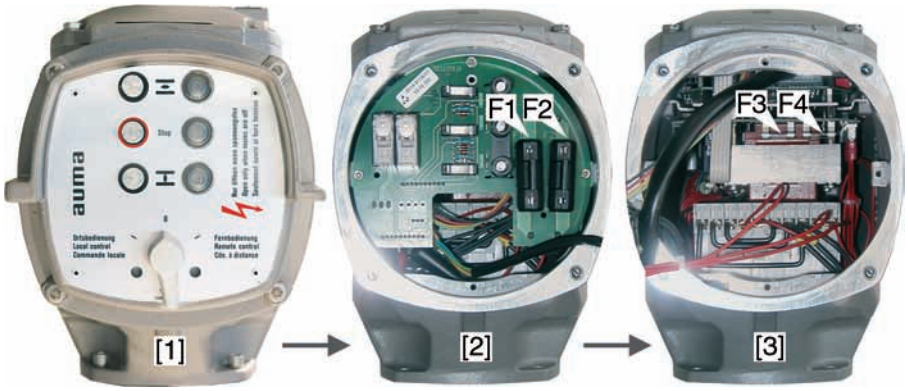
DANGER

Hazardous voltage!

Risk of electric shock.

→ Disconnect device from the mains before opening.

Figure 41: Access to fuses



[1] Local controls
[2] Signal and control board
[3] Power supply unit

F1/F2 Primary fuses on power supply unit

G fuses	F1/F2	AUMA Art. no.:
Size	6.3 x 32 mm	
Reversing contactors Power supply≤ 500 V	1 A T; 500 V	K002.277
Reversing contactors Power supply > 500 V	2 A FF; 690 V	K002.665

F3 Internal 24 V DC supply

G fuse according to IEC 60127-2/III	F3	AUMA Art.no.:
Size	5 x 20 mm	
Voltage output (power supply unit) = 24 V	500 mA T; 250 V	K001.183
Voltage output (power supply unit) = 115 V	500 mA T; 250 V	K001.183

F4 Internal 24 V AC supply (115 V AC) for:

- Heater, switch compartment, reversing contactors control
- PTC tripping device
- for 115 V AC also control inputs OPEN - STOP - CLOSE

G fuse according to IEC 60127-2/III	F4	AUMA Art.no.:
Size	5 x 20 mm	
Voltage output (power supply unit) = 24 V	1.0 A T; 250 V 1.6 A T; 250 V	K004.831 K003.131
Voltage output (power supply unit) = 115 V	0.4 A T; 250 V	K003.021

Information Only replace fuses with fuses of the same type and value.

→ After replacing the fuses, screw local controls back on again.

NOTICE

Cable damage due to twisting or pinching!

Risk of functional failures.

→ Turn local controls by a maximum of 180°.
→ Carefully assemble local controls to avoid pinching the cables.

11.2.2. Motor protection (thermal monitoring)

In order to protect against overheating and impermissibly high surface temperatures at the actuator, PTC thermistors or thermoswitches are embedded in the motor

winding. The thermoswitch is tripped as soon as the max. permissible winding temperature has been reached.

The actuator is stopped and the red indication light on the local controls is illuminated.

The motor has to cool down before the operation can be resumed.

Version with thermoswitch (standard)

The actuator can be controlled again once the motor has cooled down (red indication light goes out).

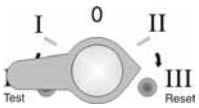
Version with thermoswitch and additional thermal overload relay within the controls (option)

The operation may only be resumed once the fault signal (red indication light) has been reset. The fault signal is reset via the overload relay integrated in the actuator controls. Therefore the controls have to be opened at the cover and the relay held down. The relay is located on the contactors.

Version with PTC thermistor (option)

The operation may only be resumed once the fault signal (red indication light) has been reset. The fault signal is reset via selector switch position **Reset** of the local controls.

Figure 42: Selector switch on local controls



12. 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).

12.1. 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

- Carry out visual inspection:
  Cable entries, cable glands, blanking plugs, etc. have to be checked for correct tightness and sealing.
  Respect 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 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.

12.2. Disconnection from the mains

If the device must be dismantled, e.g. for service purposes, it can be separated from the mains without having to remove the wiring.

WARNING

Flameproof enclosure, danger of explosion!

Risk of death or serious injury.

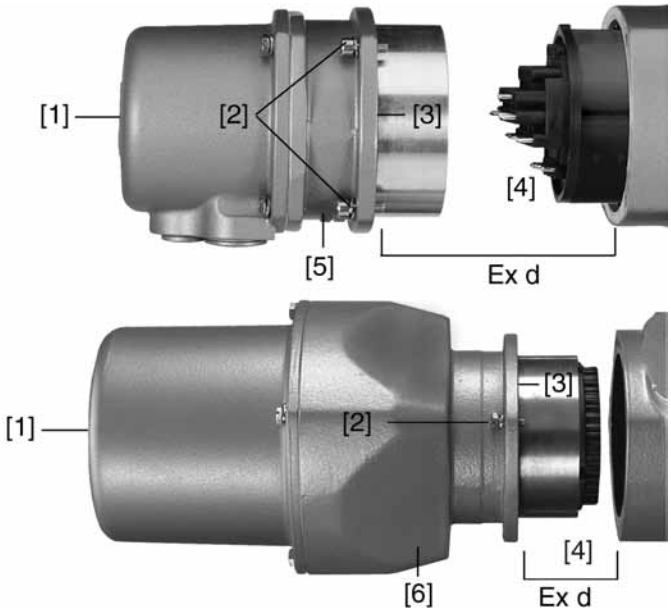
→ Before opening, ensure that there is no explosive gas and no voltage.

→ Handle cover and housing parts with care.

→ Joint surfaces must not be damaged or soiled in any way.

→ Do not jam cover during fitting.

Figure 43: top: KP/KPH, bottom: KES



[1] Cover
[2] Screws for housing
[3] O-ring
[4] Terminal compartment
[5] Terminal board (KP, KPH)
[6] Frame (KES)

Removing the plug:

1. Loosen the screws [2].
2. Remove plug/socket connector.

➥ Hereby, cover [1] and terminal board [5] or frame [6] remain together.

3. Seal open plug/socket connection, e.g. using AUMA protection cover and parking frame.

Fitting the plug:

4. Clean sealing faces at the cover and the housing.
5. Preserve joint surfaces with an acid-free corrosion protection agent.
6. Check whether O-ring [3] is in good condition, replace if damaged.
7. Apply a thin film of non-acidic grease (e.g. petroleum jelly) to the O-ring and insert it correctly.
8. Replace plug/socket connector and fasten screws evenly crosswise.

12.3. Maintenance

Maintenance intervals

After 3 years at the latest for Ex certified products.

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 rarely (open-close duty).
- We recommend exchanging the seals when changing the grease.
- No additional lubrication of the gear housing is required during operation.

Notes regarding the maintenance

- Perform visual inspection of actuator. Ensure that no outside damage or changes are visible.
- Electrical connection cables must be placed properly and in perfect condition.
- Thoroughly touch up any possible damage to painting to prevent corrosion. Original paint in small quantities can be supplied by AUMA.

- Cable entries, cable glands, plugs etc. have to be checked for correct tightness and sealing. Consider torques according to manufacturer's details. If required, replace the components. Only use components which have an own EC type examination certificate.
- Check whether Ex connections are fastened correctly.
- Take care of possible discolouration of the terminals and wires. This would indicate an increased temperature.
- For Ex housings, pay special attention to a possible collection of water. This may originate from “breathing” due to severe temperature variations (e. g. change of night and day), from damaged seals etc. Remove any water immediately.
- Check the flame path gaps of flameproof enclosures for dirt and corrosion.
- Since the dimensions of all flameproof joints are strictly defined and inspected, no mechanical work (such as grinding) shall be performed on them. The joint surfaces have to be cleaned chemically (e. g. with Esso-Varsol).
- Prior to fitting, preserve joint surfaces with an acid-free corrosion protection agent (e. g. Esso Rust-BAN 397).
- Ensure that all housing covers are handled carefully and that the seals are checked.
- All cable and motor protection components have to be checked.
- If defects impairing the safety are detected during maintenance, repair measures have to be initiated without delay.
- Any kind of surface coating for the joint surfaces is not permitted.
- When exchanging parts, seals etc. only original spare parts shall be used.

12.4. Disposal and recycling

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

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

The following generally applies:

- Greases and oils are hazardous to water and must not be released into the environment.
- Arrange for controlled waste disposal of the disassembled material or for separate recycling according to materials.
- Observe the national regulations for waste disposal.

13. Technical data

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

13.1. Features and functions of actuator

Explosion protection	Standard version (ATEX): • II2G Ex de IIC T4 (T3) Gb • II2G c IIC T4 (T3) • II2D Ex tb IIIC T130 °C (T190 °C) Db IP6x Standard version (IECEx): • Ex de IIC T4 (T3) Gb • Ex tb IIIC T130°C (T190 °C) Db IP6x For actual version, refer to actuator name plate.
Ex certificates	DEKRA 13 ATEX 0016 X IECEx DEK 12.0080X
Type of protection	• Ex **d** flameproof enclosure: - Motor compartment - Switch compartment - Controls housing - Terminal compartment (for electrical connection: KES-Exd) • Ex **e** increased safety: - Terminal compartment (for electrical connection: KP, KPH or KES) • **c** constructional safety: - Gear housing
Type of duty[1)]	• SQEx: Short-time duty S2 - 15 min • SQREx: Intermittent duty S4 - 25 %
Torque range	Refer to actuator name plate
Operating time for 90°	Refer to actuator name plate
Motor	Standard: 3-ph AC asynchronous motor, type IM B9 according to IEC/EN 60034 Part 1
Motor voltage and frequency	Refer to motor name plate Permissible variation of mains voltage: ±10 % Permissible variation of mains frequency: ±5 %
Insulation class	Standard: F, tropicalized Option: H, tropicalized
Motor protection	Standard: PTC thermistors (according to DIN 44082) Option: Thermoswitches (NC) in the actuator and in the thermal overload relay of controls
Motor heater (option)	Voltages: 110 – 120 V AC, 220 – 240 V AC or 400 V AC (externally supplied) Power depending on the size 12.5 – 25 W
Swing angle	Standard: Adjustable between 75° and < 105° Options: 15° to < 45°, 45° to < 75°, 105° to < 135°
Self-locking	Self-locking Part-turn actuators are self-locking, if the valve position cannot be changed from standstill while torque acts upon the output drive.
Manual operation	Manual drive for setting and emergency operation, handwheel does not rotate during electrical operation. Option: Handwheel lockable
Indication for manual operation (option)	Indication whether manual operation is active/not active via switch (1 change-over contact)
Connection to controls	AUMA plug/socket connector with screw-type connection
Coupling	Standard: Coupling without bore Options: Machined coupling with bore and keyway, square bore or bore with two-flats according to EN ISO 5211
Valve attachment	Dimensions according to EN ISO 5211

Electromechanical control unit	
Limit switching	Counter gear mechanism for end positions CLOSED and OPEN Standard: Single switches (1 NC and 1 NO; not galvanically isolated) for each end position Options: • Tandem switches (2 NC and 2 NO) for each end position, switches galvanically isolated • Triple switches (3 NC and 3 NO) for each end position, switches galvanically isolated • Intermediate position switch (DUO limit switching), adjustable for any position
Torque switching	Torque switching adjustable for directions OPEN and CLOSE Standard: Single switch (1 NC and 1 NO) for each direction, switches not galvanically isolated Options: Tandem switches (2 NC and 2 NO) for each direction, switches galvanically isolated
Position feedback signal, analogue (option)	Potentiometer or 0/4 – 20 mA (RWG)
Mechanical position indicator	Continuous indication, adjustable indicator disc with symbols OPEN and CLOSED
Running indication	Blinker transmitter (standard for SQEx, option for SQREx)
Heater in switch compartment	Standard: Resistance type heater, 5 W, 24 V AC, (internal supply)

1) For nominal voltage and 40 °C ambient temperature and an average load with running torque or modulating torque according to separate technical data. The type of duty must not be exceeded.

Technical data for limit and torque switches	
Mechanical lifetime	2 x 10^6 starts
Silver plated contacts:	
U min.	30 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 µs) 7 A at 30 V (resistive load) 5 A at 30 V (inductive load, L/R = 3 µs)
Gold plated contacts:	
U min.	5 V
U max.	30 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 ≈ 0.8)
I max. DC current	0.25 A at 250 V (resistive load)

Technical data for handwheel activation switches	
Mechanical lifetime	10^6 starts
Silver plated contacts:	
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)

13.2. Features and functions of actuator controls

Power supply, mains frequency	For mains voltage and mains frequency, refer to name plates at the controls and the motor Permissible variation of the mains voltage: ±10 % Permissible variation of the mains frequency: ±5 % Option: Permissible variation of the mains voltage: –10 %
Current consumption	Motor current consumption: Refer to motor name plate Current consumption of the controls depending on the mains voltage: 100 to 120 V AC = max. 575 mA 208 to 240 V AC = max. 275 mA 380 to 500 V AC = max. 160 mA
External supply of the electronics (option)	24 V DC +20 % / –15 % Current consumption: Basic version approx. 200 mA, with options up to 500 mA
Rated power	The controls are conceived for the rated motor power, refer to motor name plate
Overvoltage category	Category III according to IEC 60364-4–443
Switchgear[1) 2)]	Standard: Reversing contactors (mechanically and electrically interlocked) for motor power up to power class A1 Options: • Thyristor unit for mains voltage up to 500 V AC (recommended for modulating actuators) for AUMA power class B1
Auxiliary voltage output	Standard: 24 V DC ±5 %, max. 50 mA for supply of the control inputs, galvanically isolated from internal voltage supply Option: 115 V AC ±10 %, max. 30 mA for supply of the control inputs[3)], galvanically isolated from internal voltage supply
Control	Standard: Control inputs 24 V DC, OPEN - STOP - CLOSE (via opto-isolator, one common), current consumption: approx. 10 mA per input, observe minimum pulse duration for modulating actuators Option: Control inputs 115 V AC, OPEN - STOP - CLOSE - EMERGENCY (via opto-isolator, one common), current consumption: approx. 15 mA input Additional enable inputs for directions OPEN and CLOSE
Status signals	Standard: 5 output contacts with gold-plated contacts: • 4 potential-free NO contacts with one common, max. 250 V AC, 0.5 A (resistive load) - Default configuration: End position OPEN, end position CLOSED, selector switch REMOTE, selector switch LOCAL • 1 potential-free change-over contacts, max. 250 V AC, 0.5 A (resistive load) - Default configuration: Collective fault signal (torque fault, phase failure, motor protection tripped) Options: • Signals in combination with positioner: - End position OPEN, end position CLOSED (requires tandem switch within actuator), selector switch REMOTE, selector switch REMOTE, selector switch LOCAL via 2nd level selector switch • 1 potential-free change-over contact, max. 250 V AC, 0.5 A (resistive load) - Default configuration: Collective fault signal (torque fault, phase failure, motor protection tripped)
Position feedback signal (option)	Galvanically isolated analogue output E2 = 0/4 – 20 mA (load max. 300 Ω)
Local controls	Standard: • Selector switch LOCAL - OFF - REMOTE (lockable in all three positions) • Push buttons OPEN, STOP, CLOSE • 3 indication lights: - End position CLOSED (yellow), collective fault signal (red), end position OPEN (green) Options: • Special colours for the 3 indication lights • Protection cover, lockable • Protection cover with indicator glass, lockable

Functions	Standard: • Switch-off mode adjustable - Limit or torque seating for end position OPEN and end position CLOSED • Overload protection against excessive torques over the whole travel • Excessive torque (torque fault) can be excluded from collective fault signal. • Phase failure monitoring with automatic phase correction • Push-to-run operation or self-retaining in REMOTE • Push-to-run operation or self-retaining in LOCAL • Running indication via blinker transmitter signal of actuator (option) can be activated or deactivated Options: • Positioner - Position setpoint via analogue input E1 = 0/4 – 20 mA - Galvanic isolation for position setpoint (0/4 – 20 mA) and position feedback (0/4 – 20 mA) - Adjustable behaviour on loss of signal - Adjustable sensitivity (dead band) and pause time • Positioner for Split Range operation
Motor protection evaluation	Standard: Monitoring of the motor temperature with PTC tripping device in combination with PTC thermistors in the actuator motor Options: Thermal overload relay in combination with thermoswitches in the actuator motor
Electrical connection	Standard: Plug/socket connector with screw type terminals (KP, KPH) Ex e (increased safety) and M-threads Options: • Plug/socket connector with terminal blocks (KES) Ex e (increased safety) • Plug/socket connector with terminal blocks (KES) Ex d (flameproof enclosure) • Pg-threads, NPT-threads, G-threads, special threads • Parking frame for wall mounting of the disconnected plug • Protection cover for plug compartment (when plug is removed)
Wiring diagram	Refer to name plate

1) The reversing contactors are designed for a lifetime of 2 million starts.
2) For the assignment of AUMA power classes, please refer to electrical data on actuator.
3) Not possible in combination with PTC tripping device

13.3. Service conditions

Use	Indoor and outdoor use permissible
Mounting position	Any position
Installation altitude	≤ 2,000 m above sea level for > 2,000 m above sea level, please contact AUMA
Ambient temperature	Standard: • –40 °C to +60 °C For actual version, refer to actuator/controls name plate.
Enclosure protection according to EN 60529	Standard: IP68 with AUMA 3-phase AC motor/1-phase AC motor 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. For enclosure protection IP68, the terminal compartment is additionally sealed against the interior – double sealed. For actual version, refer to actuator/controls name plate.
Pollution degree	Pollution degree 4 (when closed) according to EN 50178

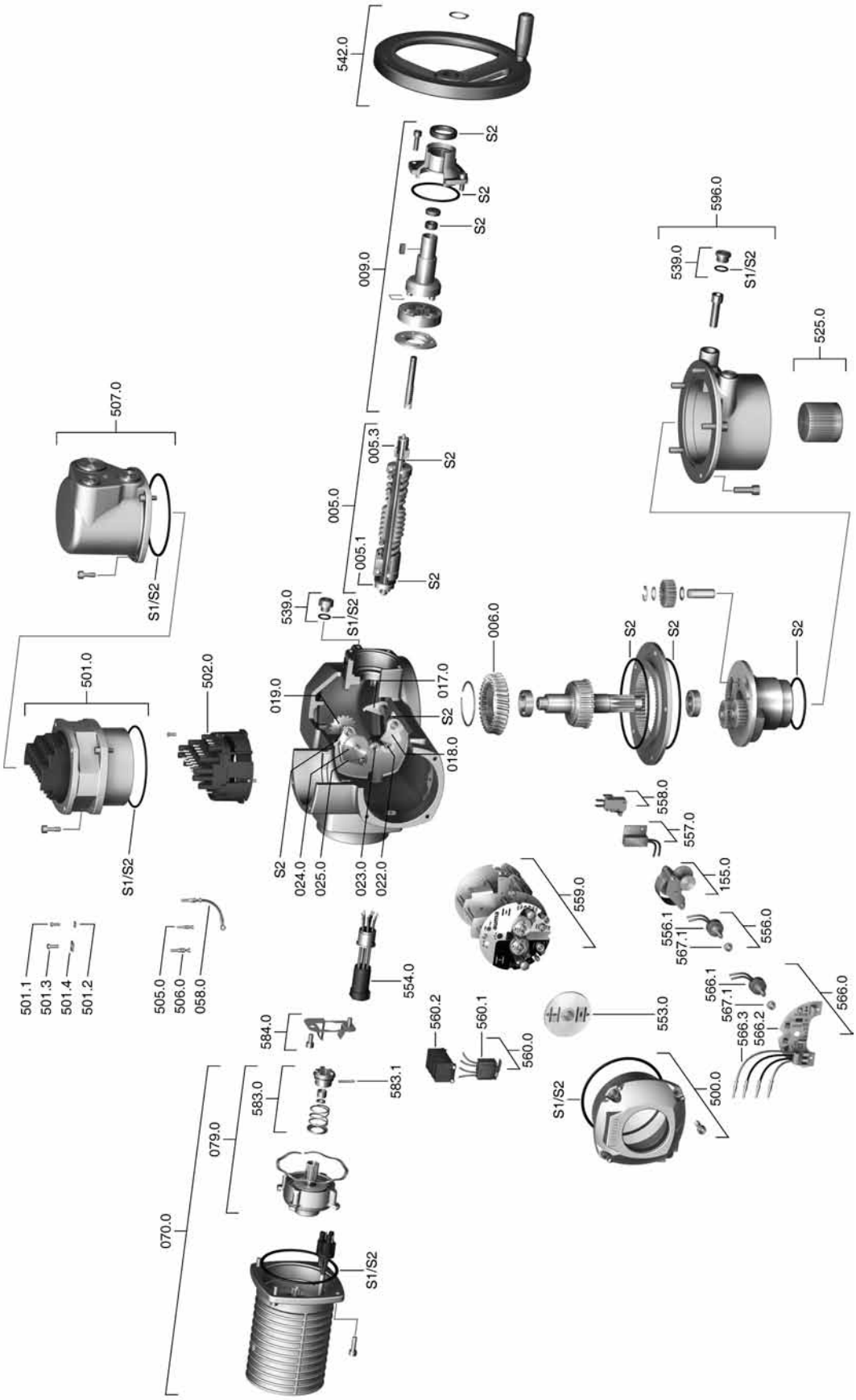
Vibration resistance according to IEC 60068–2–6	1 g, from 10 to 200 Hz Resistant to vibration during start-up or for failures of the plant. However, a fatigue strength may not be derived from this.
Corrosion protection	Standard: • KS: Suitable for installation in industrial units, in water or power plants with a low pollutant concentration as well as for installation in occasionally or permanently aggressive atmosphere with a moderate pollutant concentration (e.g. wastewater treatments plants, chemical industry) Options: • KX: Suitable for installation in extremely aggressive atmospheres with high humidity and high pollutant concentration • KX-G : same as KX, however aluminium-free version (outer parts)
Finish coating	Powder coating
Colour	Standard: AUMA silver-grey (similar to RAL 7037)
Lifetime	AUMA part-turn actuators meet or even exceed the lifetime requirements of EN 15714-2. Detailed information can be provided on request.
Weight	Refer to separate technical data

13.4. Further information

EU Directives	• ATEX Directive: (94/9/EC) • Electromagnetic Compatibility (EMC): (2004/108/EC) • Low Voltage Directive: (2006/95/EC) • Machinery Directive: (2006/42/EC)

14. Spare parts

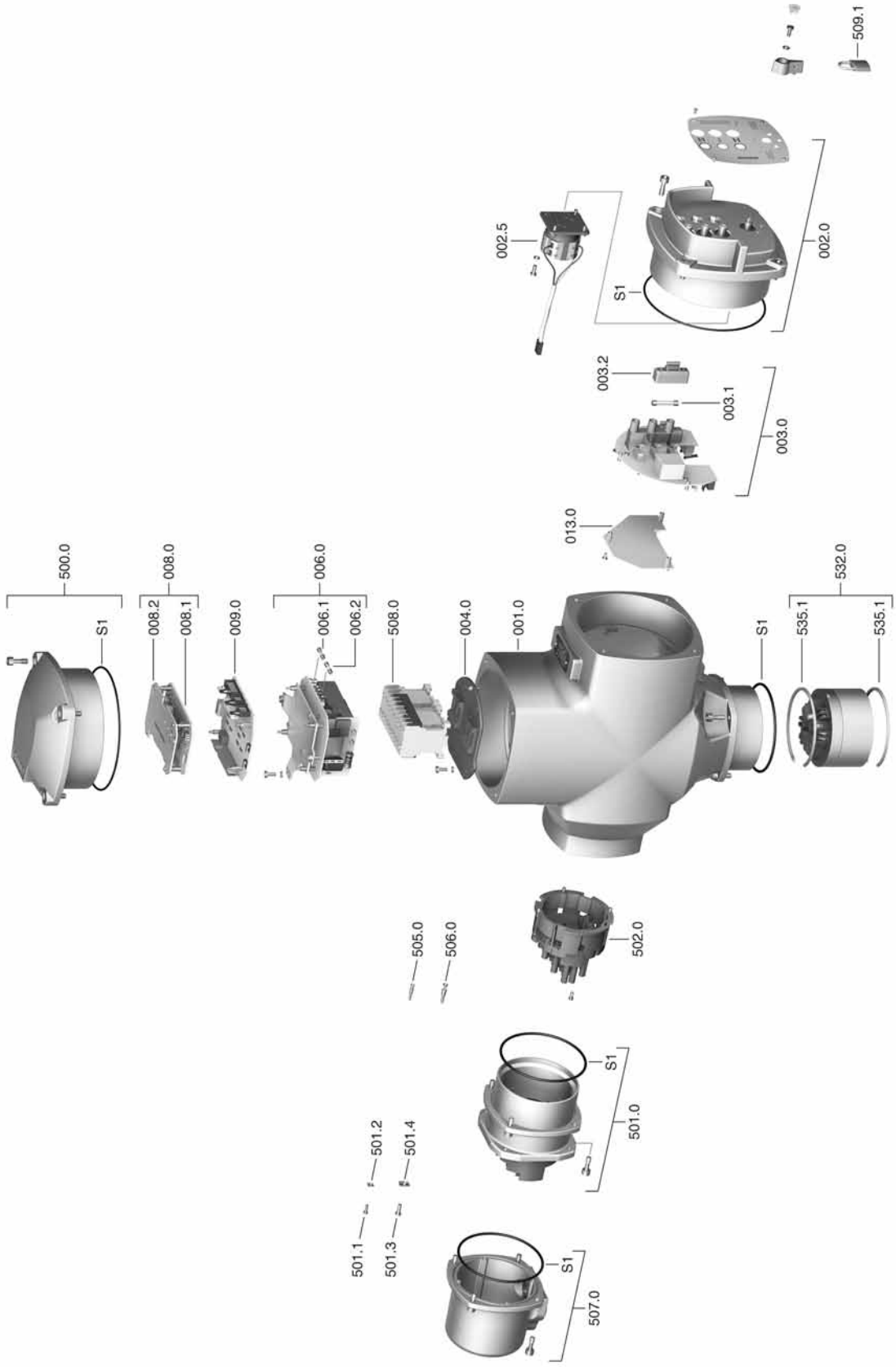
14.1. Part-turn actuator SQEx 05.2 – SQEx 14.2/SQREx 05.2 – SQREx 14.2 with Ex plug/socket connector and screw-type terminals (KP, KPH)



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

No.	Designation	Type	No.	Designation	Type
005.0	Drive shaft	Sub-assembly	525.0	Coupling	Sub-assembly
005.1	Motor coupling	Sub-assembly	539.0	Screw plug	
005.3	Manual drive coupling	Sub-assembly	542.0	Handwheel with ball handle	Sub-assembly
006.0	Worm wheel		553.0	Mechanical position indicator	Sub-assembly
009.0	Planetary gearing for manual drive	Sub-assembly	554.0	Socket carrier for motor plug/ socket connector with cable harness	Sub-assembly
017.0	Torque lever	Sub-assembly	556.0	Potentiometer for position transmitter	Sub-assembly
018.0	Gear segment		556.1	Potentiometer without slip clutch	Sub-assembly
019.0	Crown wheel	Sub-assembly	557.0	Heater	Sub-assembly
022.0	Drive pinion II for torque switching		558.0	Blinker transmitter including pins at wires (without impulse disc and insulation plate)	Sub-assembly
023.0	Output drive wheel for limit switching	Sub-assembly	559.0	Control unit with torque switching heads and switches	Sub-assembly
024.0	Drive wheel for limit switching	Sub-assembly	559.0	Control unit with magnetic limit and torque transmitter (MWG) for Non-intrusive version in combination with AUMATIC integral controls	Sub-assembly
025.0	Locking plate	Sub-assembly	560.0	Switch stack for direction OPEN	Sub-assembly
058.0	Wire for protective earth	Sub-assembly	560.0	Switch stack for direction CLOSE	Sub-assembly
070.0	Motor (VD motor incl. ref. no. 079.0)	Sub-assembly	560.1	Switch for limit/torque	Sub-assembly
079.0	Planetary gearing for motor drive (SQ 05.2 – 14.2 for VD motor)	Sub-assembly	560.2	Switch case	
155.0	Reduction gearing	Sub-assembly	566.0	Position transmitter RWG	Sub-assembly
500.0	Cover	Sub-assembly	566.1	Potentiometer for RWG without slip clutch	Sub-assembly
501.0	Ex Ex plug/socket connector with screw-type terminals (KP, KPH)	Sub-assembly	566.2	Position transmitter board for RWG	Sub-assembly
501.1	Screw for control terminal	Sub-assembly	566.3	Wire harness for RWG	Sub-assembly
501.2	Washer for control terminal	Sub-assembly	567.1	Slip clutch for potentiometer	Sub-assembly
501.3	Screw for power terminal	Sub-assembly	583.0	Motor coupling on motor shaft	Sub-assembly
501.4	Washer for power terminal		583.1	Pin for motor coupling	Sub-assembly
502.0	Pin carrier without pins	Sub-assembly	584.0	Retaining spring for motor coupling	
505.0	Pin for controls	Sub-assembly	596.0	Output drive flange with end stop	Sub-assembly
506.0	Pin for motor	Sub-assembly	S1	Seal kit, small	Set
507.0	Cover for electrical connection	Sub-assembly	S2	Seal kit, large	Set

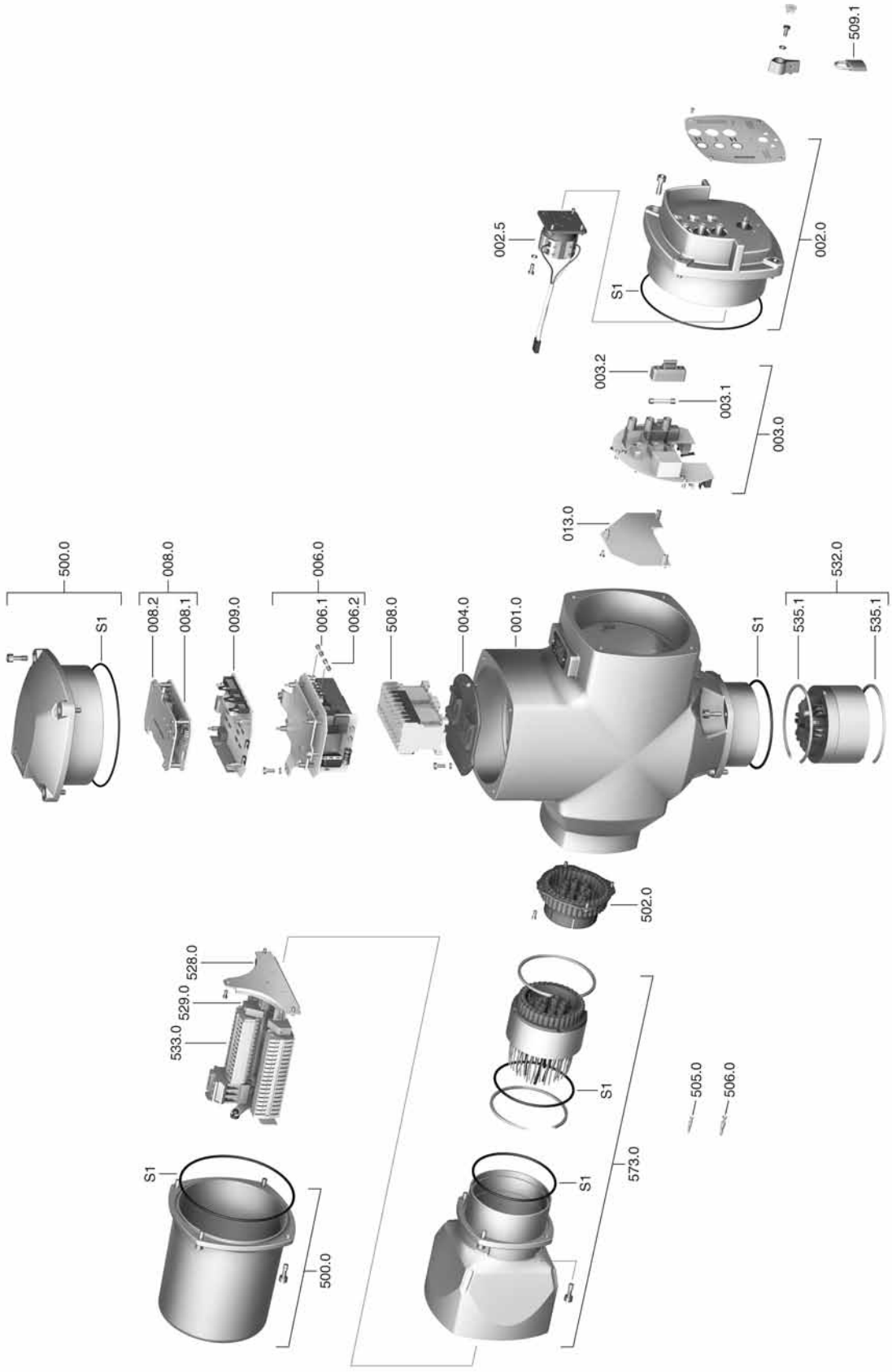
14.2. Actuator controls AUMA MATIC AMExC 01.1 via Ex plug/socket connector with screw-type terminals (KP, KPH)



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

No.	Designation	Type
001.0	Housing	Sub-assembly
002.0	Local controls	Sub-assembly
002.5	Selector switch	Sub-assembly
003.0	Local controls board	Sub-assembly
003.1	Primary fuse	
003.2	Fuse cover	
004.0	Carrier for contactors	
006.0	Power supply	Sub-assembly
006.1	Secondary fuse F3	
006.2	Secondary fuse F4	
008.0	Interface board	Sub-assembly
008.1	Interface board	
008.2	Cover plate for interface board	
009.0	Logic board	Sub-assembly
013.0	Adapter board	
500.0	Cover	Sub-assembly
501.0	Terminal board	Sub-assembly
501.1	Screw for control terminal	
501.2	Washer for control terminal	
501.3	Screw for power terminal	
501.4	Washer for power terminal	
502.0	Pin carrier without pins	Sub-assembly
505.0	Pin for controls	Sub-assembly
506.0	Pin for motor	Sub-assembly
507.0	Plug cover	Sub-assembly
508.0	Switchgear	Sub-assembly
509.1	Padlock	
532.0	Line bushing (actuator connection)	Sub-assembly
535.1	Circlip	
S	Seal kit	Set

14.3. Actuator controls AUMA MATIC AMExC 01.1 via Ex plug/socket connector with terminal blocks (KES)



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

No.	Designation	Type
001.0	Housing	Sub-assembly
002.0	Local controls	Sub-assembly
002.5	Selector switch	Sub-assembly
003.0	Local controls board	Sub-assembly
003.1	Primary fuse	
003.2	Fuse cover	
004.0	Carrier for contactors	
006.0	Power supply	Sub-assembly
006.1	Secondary fuse F3	
006.2	Secondary fuse F4	
008.0	Interface board	Sub-assembly
008.1	Interface board	
008.2	Cover plate for interface board	
009.0	Logic board	Sub-assembly
013.0	Adapter board	
500.0	Cover	Sub-assembly
502.0	Pin carrier without pins	Sub-assembly
505.0	Pin for controls	Sub-assembly
506.0	Pin for motor	Sub-assembly
508.0	Switchgear	Sub-assembly
509.1	Padlock	
528.0	Terminal frame (without terminals)	Sub-assembly
529.0	End piece	
532.0	Line bushing (actuator connection)	Sub-assembly
533.0	Terminals for motor/controls	
535.1	Circlip	
573.0	Plug-in electrical connection	
S	Seal kit	Set

15. Certificates

15.1. Declaration of Incorporation and EC Declaration of Conformity

AUMA Riester GmbH & Co. KG
Aumastr. 1
79379 Müllheim, Germany
www.auma.com

Tel +49 7631 809-0
Fax +49 7631 809-1250
Riester@auma.com

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 Actuators of the type ranges

Multi-turn actuators	**SAEx 07.2 – SAEx 16.2 and SAREx 07.2 – SAREx 16.2**
Part-turn actuators	**SQEx 05.2 – SQEx 14.2 and SQREx 05.2 – SQREx 14.2**

in versions **AUMA NORM**, **AUMA SEMIPACT**, **AUMA MATIC** or **AUMATIC**.

AUMA Riester GmbH & Co. KG as manufacturer declares herewith, that the above mentioned multi-turn and part-turn 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 ISO 12100: 2010 EN ISO 5211: 2001
EN ISO 5210: 1996

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 multi-turn and part-turn actuators are designed to be installed on industrial valves. AUMA multi-turn and part-turn actuators must not be put into 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 multi-turn and part-turn 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: 2012	EN 60079-11: 2012	EN 13463-1: 2009
EN 60079-1: 2007	EN 60079-31: 2009	EN 1127-1: 2011
EN 60079-7: 2007	EN 13463-5: 2011	

The EC type examination certificate DEKRA 11ATEX0008 X issued by the DEKRA Certification B.V. is available for the multi-turn actuators mentioned above.

The EC type examination certificate DEKRA 13ATEX0016 X issued by the DEKRA Certification B.V. is available for the part-turn actuators mentioned above.

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

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

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

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

Muellheim, 2014-01-01

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.

Y006.331/003/en

15.2. ATEX certificate

CERTIFICATE

EC-Type Examination

(1) EC-Type Examination

(2) **Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC**

(3) EC-Type Examination Certificate Number: **DEKRA 13ATEX0016 X** Issue Number: **2**

(4) Equipment: **Part-Turn actuator, Types SQ.Ex 05.2 to SQ.Ex 14.2 in version AUMA NORM, AUMA SEMIPACT, AUMA MATIC or AUMATIC and wall bracket WH01.1**

(5) Manufacturer: **Auma Riester GmbH & Co. KG**

(6) Address: **Aumastraße 1, 79379 Müllheim, Germany**

(7) This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) DEKRA Certification B.V., notified body number 0344 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the directive.

The examination and test results are recorded in confidential test report number NL/DEK/ExTR13.0014/**.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0 : 2009 **EN 60079-1 : 2007** **EN 60079-7 : 2007** **EN 60079-11 : 2007**
EN 60079-15 : 2005 **EN 60079-27 : 2006/2008** **EN 60079-31 : 2009**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment according to the Directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 2 G **Ex d ...IIC T4 or T3 Gb**
II 2 (3) G **Ex d ... [... Gc] IIC T4 or T3 Gb**
II 2 D **Ex tb IIIC T130°C or T190°C Db IP6x**

This certificate is issued on 27 November 2013 and, as far as applicable, shall be revised before the date of cessation of presumption of conformity of (one of) the standards mentioned above as communicated in the Official Journal of the European Union.

DEKRA Certification B.V.

T. Pijpker
Certification Manager

Page 1/6

DEKRA Certification B.V. Meander 1051, 6825 MJ Arnhem P.O. Box 5185, 6802 ED Arnhem The Netherlands
T +31 88 96 83000 F +31 88 96 83100 www.dekra-certification.com Registered Arnhem 09085396

DEKRA

(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate DEKRA 13ATEX0016 X** Issue No. **2**

(15) **Description**

The Part-turn actuators, types SQ.Ex 05.2 to SQ.Ex 14.2 in version AUMA NORM comprise a motor, a switch mechanism compartment and a terminal compartment. Version AUMA SEMIPACT, AUMA MATIC and AUMATIC comprise a motor, a switch mechanism compartment, integral controls and a terminal compartment. The integral controls can be mounted on an explosion proof wall bracket type WH01.1.

The motor is in the type of protection Ex d. In order to guarantee the temperature class, the motor is equipped either with thermo switches and a thermal overload relay or with three PTC's integrated in each winding and a suitable electronic device for switching off in case of over temperature. The Part-turn actuators are classified for explosion group IIC and temperature class T4.

The switch mechanism compartment is in type of protection Ex d and may optionally also be provided with the position indicator type RWG5020.2Ex in the type of protection Ex ib.

The terminal compartment type KES-Exd is in type of protection Ex d. The alternative terminal compartments types KP, KPH and KES are in type of protection Ex e.

The integral controls are in type of protection Ex d.
The integral control type AUMATIC ACExC 01.1 may optionally be provided with a FNICO Fieldbus interface in type of protection Ex nL and/or a FISCO Fieldbus interface in the type of protection Ex ic.
The integral control type AUMATIC ACExC 01.2 may optionally be provided with a FISCO Fieldbus interface in the type of protection Ex ic.

The integral controls may optionally be installed on a wall-bracket type WH01.1. The electrical connection of the wall-bracket is in type of protection Ex e or in type of protection Ex d.

All Part-turn actuators are in type of protection Ex t Db for environments containing combustible dust substances.

DEKRA

(13) SCHEDULE

(14) to EC-Type Examination Certificate DEKRA 13ATEX0016 X Issue No. 2

Type designation

Part-turn actuator:

SQ . Ex 05 . 2 - F05 / - a 3 a 1
I II III IV V VI VII VIII IX X XI

Designation	Explanation	Value	Explanation
I	General	SQ	Part-turn actuator
II	Duty	none R	short-time duty S2 xx min or Class A or Class B intermittent duty S4 xx % or Class C
III	Area classification	Ex	For use in environments containing flammable gas / vapour combustible dust substances
IV	Actuator size	05 07 10 12 14	Indicator for standardized actuator sizes
V	Design generation	2	Indicator for generation series
VI	Flange size	F***	Indicator for standardized flange sizes
VII	Blank	-	not used yet
VIII	Motor	a	Type 3ph VDX or SDX
IX	Terminal connection	3 4	Type KP or KPH or KES (Ex e) Type KES-Exd (Ex d)
X	Position transmitter	A b	without RWG5020.2Ex with RWG5020.2Ex (Ex i)
XI	Ex-Fieldbus	1 2 3	without Ex-Fieldbus with FNICO (Ex nL) with FISCO (Ex ic)

Optional integral controls:

AM ExC 01 . 1
I II III IV

Designation	Explanation	Value	Explanation
I	Controls indicator	AM AMB SEM AC	AUMA MATIC AUMA MATIC Basic AUMA SEMIPACT AUMATIC
II	Area classification	Ex	For use in environments containing flammable gas / vapour combustible dust substances.
III	Size	01	Indicator for standardized actuator sizes
IV	Design generation	1 2	Design series 1 Design series 2, ACExC controls only

Versions without optional controls are called AUMA NORM.

DEKRA

(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate DEKRA 13ATEX0016 X** Issue No. **2**

Thermal data

Ambient temperature range: -60 °C to +60 °C or
-20 °C to +60 °C in combination with ACExC 01.1
with cylindrical joint and special fasteners M6

The Part-turn actuators are classified for the temperature class T4/T130 °C and may be classified for the temperature class T3/T190 °C if required, for instance prolonged running times.

Marking

The marking of the Part-turn actuators types SQ.Ex 05.2 to SQ.Ex 14.2 for use in explosive gas atmospheres includes the following:

Fieldbus interface	Terminal compartment	Position transmitter	Marking	
--	KES-Exd	--	II 2 G	Ex d IIC T4 or T3 Gb
		RWG5020.2Ex	II 2 G	Ex d ib IIC T4 or T3 Gb
	KP, KPH and KES	--	II 2 G	Ex d e IIC T4 or T3 Gb
		RWG5020.2Ex	II 2 G	Ex d e ib IIC T4 or T3 Gb
FISCO	KES-Exd	--	II 2(3) G	Ex d [ic Gc] IIC T4 or T3 Gb
		RWG5020.2Ex	II 2(3) G	Ex d ib [ic Gc] IIC T4 or T3 Gb
	KP, KPH and KES	--	II 2(3) G	Ex d e [ic Gc] IIC T4 or T3 Gb
		RWG5020.2Ex	II 2(3) G	Ex d e ib [ic Gc] IIC T4 or T3 Gb
FNICO	KES-Exd	--	II 2(3) G	Ex d [nL Gc] IIC T4 or T3 Gb
		RWG5020.2Ex	II 2(3) G	Ex d ib [nL Gc] IIC T4 or T3 Gb
	KP, KPH and KES	--	II 2(3) G	Ex d e [nL Gc] IIC T4 or T3 Gb
		RWG5020.2Ex	II 2(3) G	Ex d e ib [nL Gc] IIC T4 or T3 Gb

For use in explosive dust atmospheres, the marking of the Part-turn actuators additionally or alternately includes the following: II 2 D Ex tb IIIC T130 °C or T190 °C Db

DEKRA

(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate DEKRA 13ATEX0016 X** Issue No. **2**

Electrical data

3-phase AC motor:

Actuator size	Motor size	Power (1)
SQ.Ex 05.2	VDX 63 SDX 63	0.02 – 0.06 kW 0.01 kW
SQ.Ex 07.2 (2)	VDX 63 SDX 63	0.03 – 0.12 kW 0.01 kW
SQ.Ex 10.2	VDX 63 SDX 63	0.10 – 0.19 kW 0.02 – 0.06 kW
SQ.Ex 12.2	VDX 63 SDX 63	0.10 – 0.19 kW 0.04 – 0.06 kW
SQ.Ex 14.2 (2)	VDX 63 SDX 63	0.10 – 0.19 kW 0.06 kW

1) Nominal power at operating torque (corresponds to approx. 35% of maximum torque).
2) Size SQ.Ex 05.2 and SQ.Ex 07.2 uses the same actuators housing, the difference is only in the size of the flange

Motor type:	3-phase AC squirrel cage motor
Motor voltage:	690 V max.
Motor current:	25 A max.
Control voltage:	250 V max.
Control current:	5 A max.
Frequency:	50/60 Hz
Isolation class:	F or H
Type of connection	Star or triangle connection
Operation type:	S2 - ... min or Class A, Class B S4 - ... % or Class C

Position Transmitter 4..20 mA type RWG5020.2Ex according PTB 03 ATEX 2176:
Only for connection to certified intrinsically safe circuit.
Maximum values of RWG5020.2EX:
Ui = 28,5 V; Ii = 200 mA; Pi = 0,9 W; Ci and Li are negligible small.
The electronic position transmitter is considered as being earthed in terms of safety.

Fieldbus interface FNICO and FISCO:
In type of protection energy limitation Ex nL IIC in accordance with FNICO (ACExC 01.1) and/or intrinsic safety Ex ic IIC in accordance with FISCO (ACExC 01.1 and ACExC 01.2).

Installation instructions

The instructions provided with the equipment shall be followed in detail to assure safe operation.

(16) **Test Report**

No. NL/DEK/ExTR13.0014/**.

DEKRA

(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate DEKRA 13ATEX0016 X** Issue No. **2**

(17) **Special conditions for safe use**

For information regarding the dimensions of the flameproof joints the manufacturer shall be contacted.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at (9).

(19) **Test documentation**

As listed in Test Report No. NL/DEK/ExTR13.0014/**.

Index

Europe

AUMA Riester GmbH & Co. KG

Plant Müllheim
DE 79373 Müllheim
Tel +49 7631 809 - 0
riester@auma.com
www.auma.com

Plant 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-Armaturenantriebe 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@sigum.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

ERICHS 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 9500414 Buin
Tel +56 2 821 4108
aumachile@auma-chile.cl

Ferrostaal de Colombia Ltda.
CO Bogotá D.C.
Tel +57 1 401 1300
dorian.hernandez@ferrostaal.com
www.ferrostaal.com

Transcontinental Trading Overseas SA.
CU Ciudad Habana
Tel +53 7 208 9603 / 208 7729
tto@ttoweb.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 +511444-1200 / 0044 / 2321
corsusa@corsusa.com
www.corsusa.com

Control Technologies Limited
TT Marabella, Trinidad, W.I.
Tel + 1 868 658 1744/5011
www.ctltech.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@pldtdsl.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 Jhonghe 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
chiennguyen@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 Riester GmbH & Co. KG

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

Certificate Registration No.
12 100/104 4269