

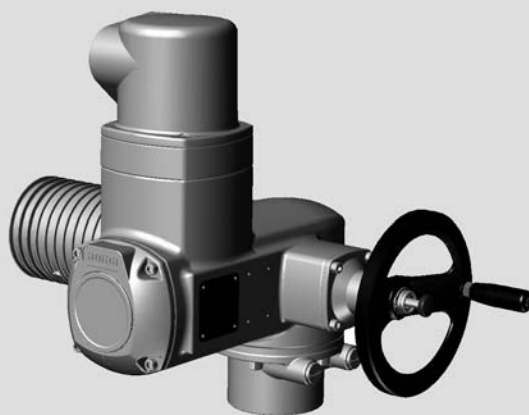


Part-turn actuators

SQEx 05.2 – SQEx 14.2

SQREx 05.2 – SQREx 14.2

AUMA NORM actuator (without controls)



Read operation instructions first.

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

Purpose of the document:

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

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1. Safety instructions

1.1. Basic information on safety

- Standards/directives** 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).



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



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



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



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


Arrangement and typographic structure of the warnings



Type of hazard and respective source!

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

- Measures to avoid the danger
- Further measure(s)

Safety alert symbol  warns of a potential personal injury hazard.
The signal word (here: DANGER) indicates the level of hazard.


1.4. References and symbols

The following references and symbols are used in these instructions:

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

 Symbol for CLOSED (valve closed)

 Symbol for OPEN (valve open)

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

< > **Reference to other sections**

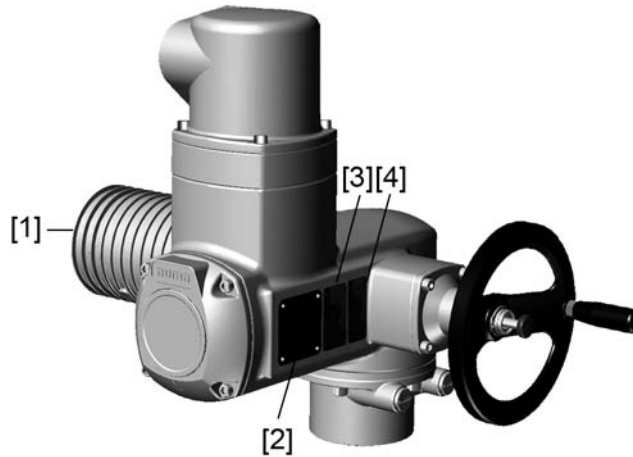
Terms in brackets shown above refer to other sections of the document which provide further information on this topic. These terms are either listed in the index, a heading or in the table of contents and may quickly be found.

2. Identification

2.1. Name plate

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

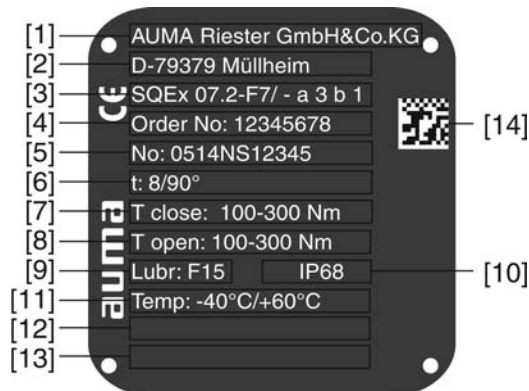
Figure 1: Arrangement of name plates



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

Description of actuator name plate

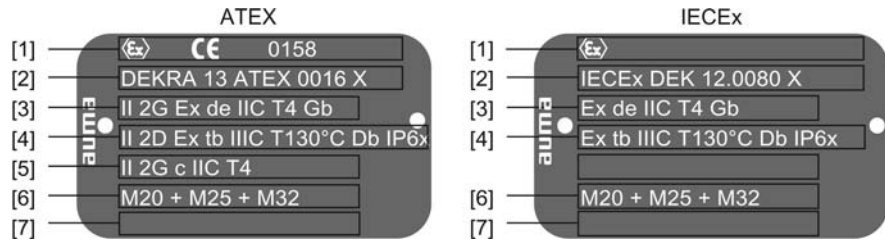
Figure 2: Actuator name plate (example)



- [1] Name of manufacturer
- [2] Address of manufacturer
- [3] **Type designation**
- [4] **Order number**
- [5] **Actuator serial number**
- [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] Type of lubricant
- [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
- [14] **Data Matrix code**

Description of approval plate in explosion-proof version

Figure 3: Approval plates in explosion-proof version (examples)

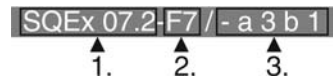


- [1] Ex symbol, CE mark, number of test authority
- [2] Ex certificate (number)
- Classification:**
- [3] Electrical gas explosion protection
- [4] Electrical dust explosion protection
- [5] Non-electrical explosion protection
- [6] Threads for line bushings at electrical connection
- [7] Not used

Descriptions

Type designation

Figure 4: 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: SQREx 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 Stelle: Motor type						
		a	ADX or VDX: 3-phase AC motor			
		b	AEX, ACX, VEX and VCX: 1-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 Stelle: 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 Fieldbus						
				1	Standard fieldbus connection	
				2	Ex nL non incendive fieldbus connection	
				3	Ex ic intrinsically safe fieldbus connection	

Identification

Order number The product can be identified using this number and the technical data as well as order-related data pertaining to the device can be compiled.
 Please always state this number for any product inquiries.
 On the Internet at <http://www.auma.com>, we offer a service allowing authorised users to download order-related documents such as wiring diagrams and technical data (both in German and English), inspection certificates and the operation instructions when entering the order number.

Actuator serial number

Table 2: Description of serial number (with example)

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

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

Figure 5: Link to the App store:



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

3. Transport, storage and packaging

3.1. Transport

For transport to place of installation, use sturdy packaging.



Hovering load!

Risk of death or serious injury.

- Do NOT stand below hovering load.
- Attach ropes or hooks for the purpose of lifting by hoist only to housing and NOT to handwheel.
- Actuators mounted on valves: Attach ropes or hooks for the purpose of lifting by hoist to valve and NOT to actuator.
- Actuators mounted to gearboxes: Attach ropes or hooks for the purpose of lifting by hoist only to the gearbox using eyebolts and NOT to the actuator.
- 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



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.

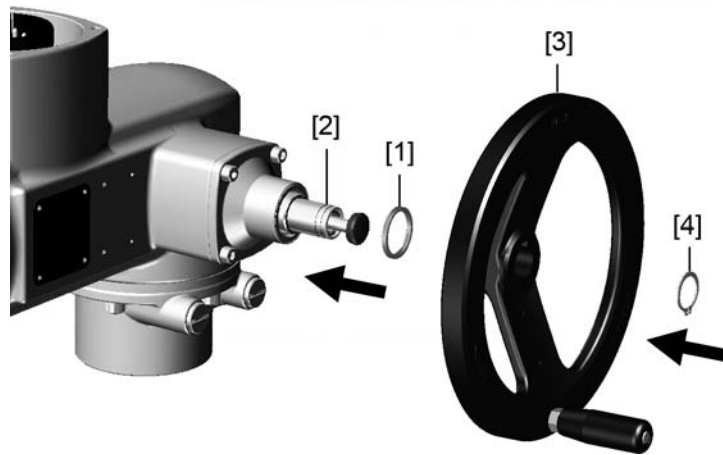
4. Assembly

4.1. Mounting position

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

4.2. Handwheel fitting

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

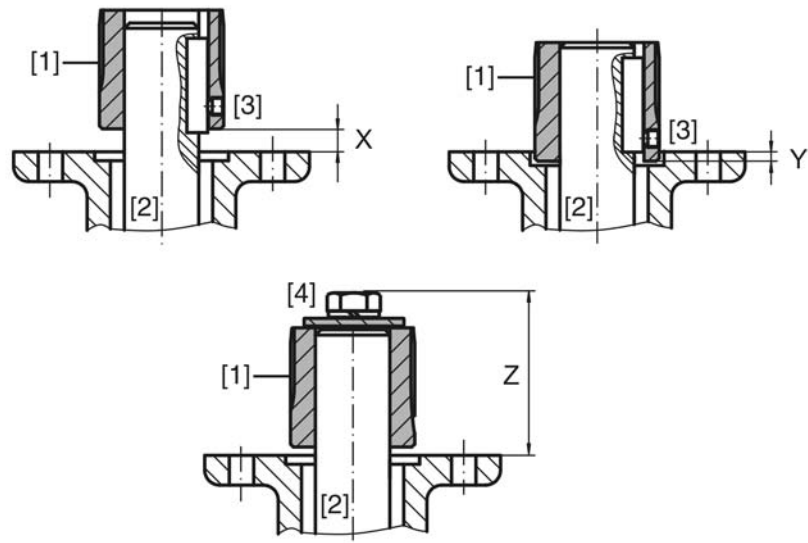
Danger of corrosion due to damage to paint finish and condensation!

- 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 (standard) or via lever. Separate instructions are available for actuator mounting to the valve when equipped with base and lever.

4.3.1. Valve attachment via coupling

Dimensions 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/F07	3	2	40
SQEx/SQREx 07.2-F05/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	61
SQEx/SQREx 12.2-F14	5	10	101
SQEx/SQREx 14.2-F14	8	10	75
SQEx/SQREx 14.2-F16	8	10	125

Assembly

Information: Mount 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.

1. Thoroughly degrease mounting faces of output mounting flanges.
2. Apply a small quantity of grease to the valve shaft [2].
3. Use handwheel to run actuator to mechanical end stop.
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	214

5. Electrical connection

5.1. Basic information



Danger due to incorrect electrical connection

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

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

Wiring diagram/terminal plan

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

NOTICE

Valve damage for connection without controls!

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

Delay time

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

Protection on site

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

The current value for respective sizing is derived from the current consumption of the motor (refer to electrical data sheet).

Protection via thermal motor protection

- Version with thermostiches as motor protection:
According to EN 60079-14, a thermal overload protection device (e.g. motor protection switch) must be installed for explosion-proof actuators in addition to the thermostiches.
- Version with PTC thermistor:
PTC thermistors additionally require a suitable tripping device in the controls.

Limit and torque switches

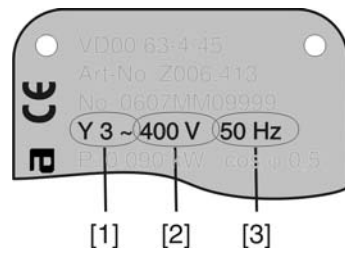
Limit and torque switches can be provided as single, tandem, or triple switches. Only the same potential can be switched on the two circuits (NC/NO contact) of each single switch. If different potentials are to be switched simultaneously, tandem switches or triple switches are required. When using tandem/triple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

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

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 8: Motor name plate (example)



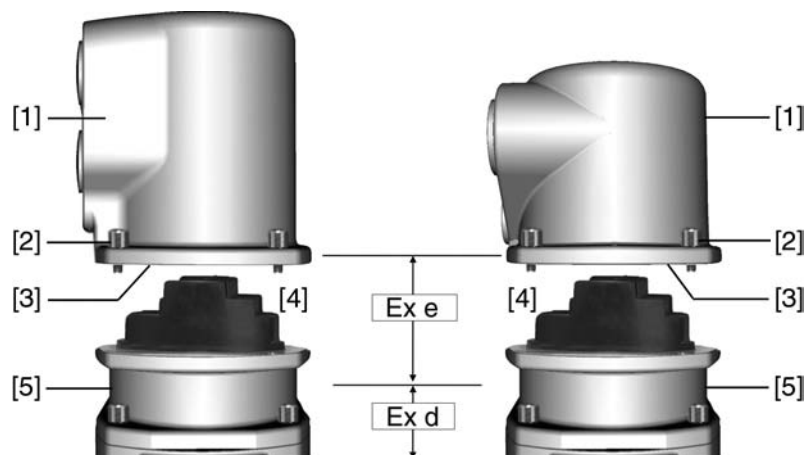
- [1] Type of current
 [2] Mains voltage
 [3] Mains frequency (for 3-ph and 1-ph AC motors)

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 9: Ex plug/socket connector KPH, KP



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

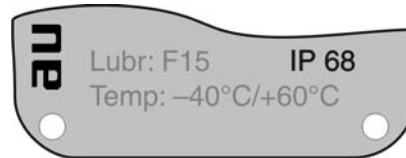
⚠ DANGER**Hazardous voltage!**

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 5: Cross sections and tightening torques

Type	Cross sections	Tightening torques
Power terminals (U1, V1, W1) PE connection	(1.5) ¹⁾ 2.5 – 6 mm ² (flexible or solid)	2 Nm
Control contacts (1 to 38)	0.75 – 1.5 mm ² (flexible or solid)	1 Nm

1) with small clamp washers

CAUTION

Without motor protection, impermissibly high temperatures at the actuator may occur: Ignition hazard, risk of explosion!

Risk of death, serious injury or motor damage. Our warranty for the motor will lapse if the motor protection is not connected.

→ Connect PTC thermistors or thermostats to external controls.

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**

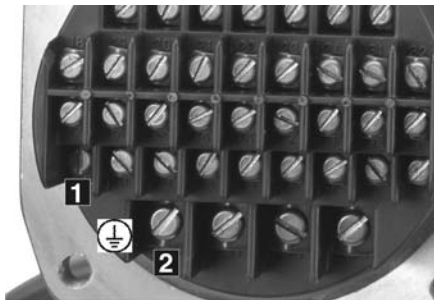
In case of a fault: Hazardous voltage while protective earth conductor is NOT connected!

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 10: PE connection

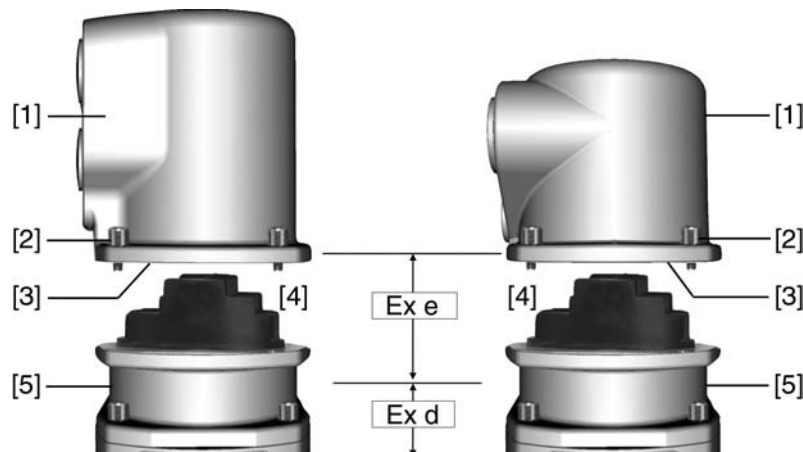


- [1] PE connection, control cable
- [2] PE connection, motor cable

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 11: Ex plug/socket connector KPH, KP



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

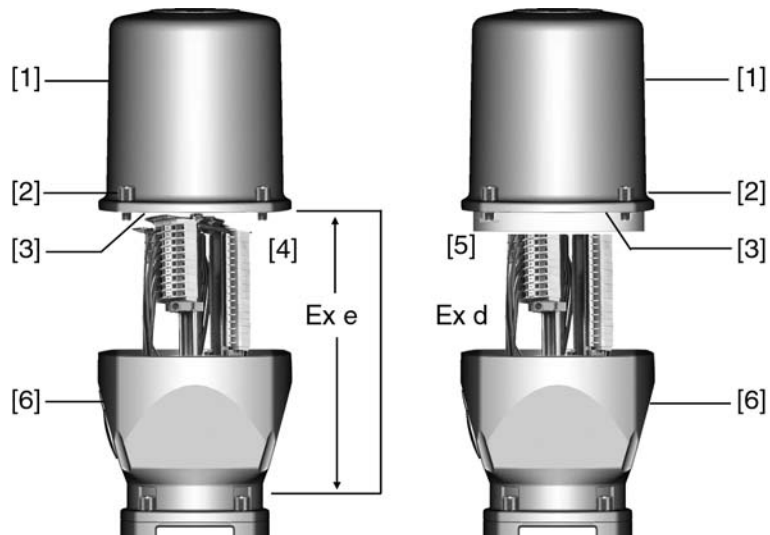
1. Clean sealing faces of cover [1] and housing.
2. Check whether O-ring [3] is in good condition, replace if damaged.
3. Apply a thin film of non-acidic grease (e.g. petroleum jelly) to the O-ring and insert it correctly.
4. Fit cover [1] and fasten screws [2] evenly crosswise.

- 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 12: 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

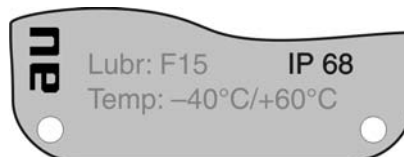
⚠ DANGER

Hazardous voltage!

Risk of electric shock.

→ Disconnect device from the mains before opening.

- 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.
- 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.



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

5.3.2. Cable connection

Table 6: Cross sections and tightening torques

Type	Cross sections	Tightening torques
Power terminals (U, V, W)	max. 10 mm ² (flexible or solid)	1.5 – 1.8 Nm
PE connection	max. 10 mm ² (flexible or solid)	3.0 – 4.0 Nm
Control contacts (1 to 50)	max. 2.5 mm ² (flexible), or max. 4 mm ² (solid)	0.6 – 0.8 Nm



Without motor protection, impermissibly high temperatures at the actuator may occur: Ignition hazard, risk of explosion!

Risk of death, serious injury or motor damage. Our warranty for the motor will lapse if the motor protection is not connected.

→ Connect PTC thermistors or thermostats to external controls.

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.



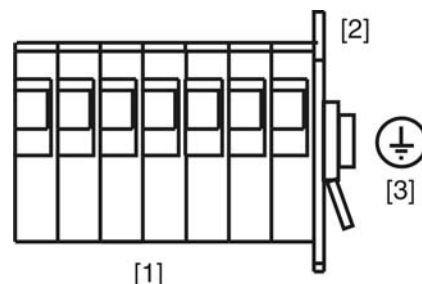
In case of a fault: Hazardous voltage while protective earth conductor is NOT connected!

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 13: PE connection

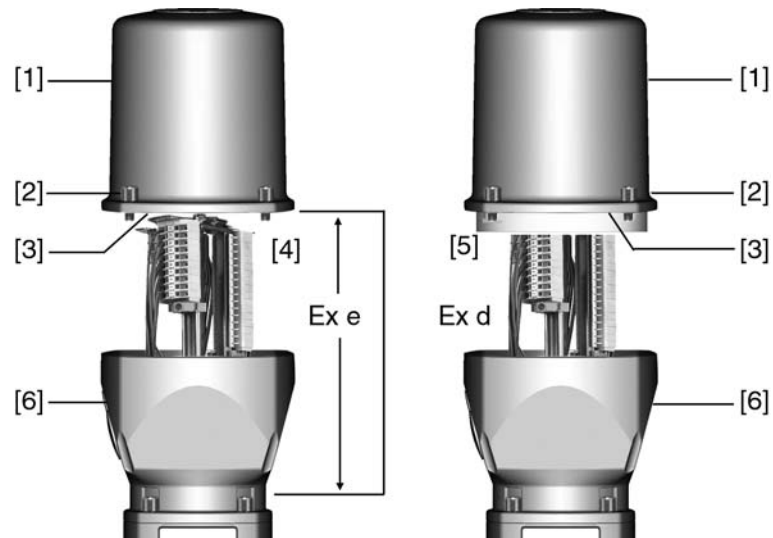


- [1] Terminal blocks
- [2] Terminal housing
- [3] PE connection, symbol: ⊕

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 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

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. Parking frame

Application Parking frame for safe storage of a disconnected plug.

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

Figure 15: Parking frame and Ex plug/socket connector with screw-type terminals (KP/KPH)

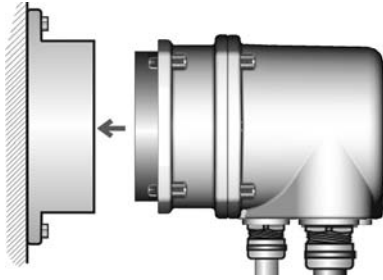
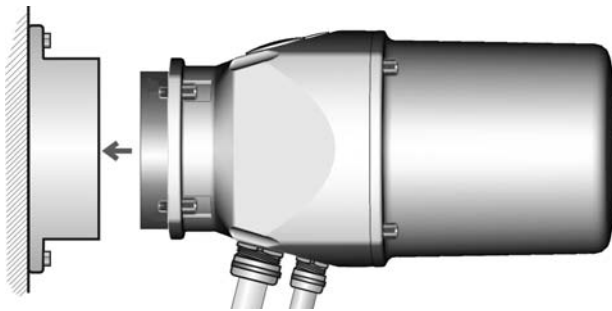


Figure 16: Parking frame and Ex plug/socket connector with terminal blocks (KES)



5.4.2. Protection cover

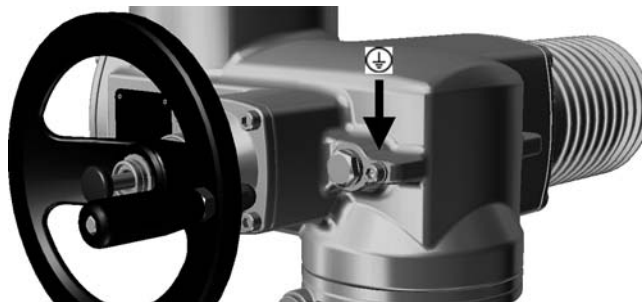
Protection cover for plug compartment when plug is removed.

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

5.4.3. Earth connection, external

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

Figure 17: 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

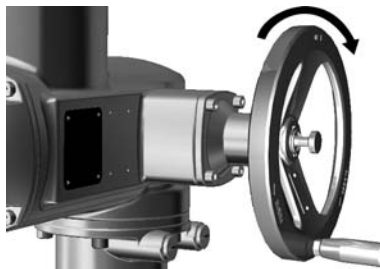
Damage at the motor coupling due to faulty operation!

→ 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

NOTICE

Valve damage due to incorrect setting!

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

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

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

7. Indications

7.1. 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 18: 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 from actuator

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

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

9. Commissioning

9.1. 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.



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} .

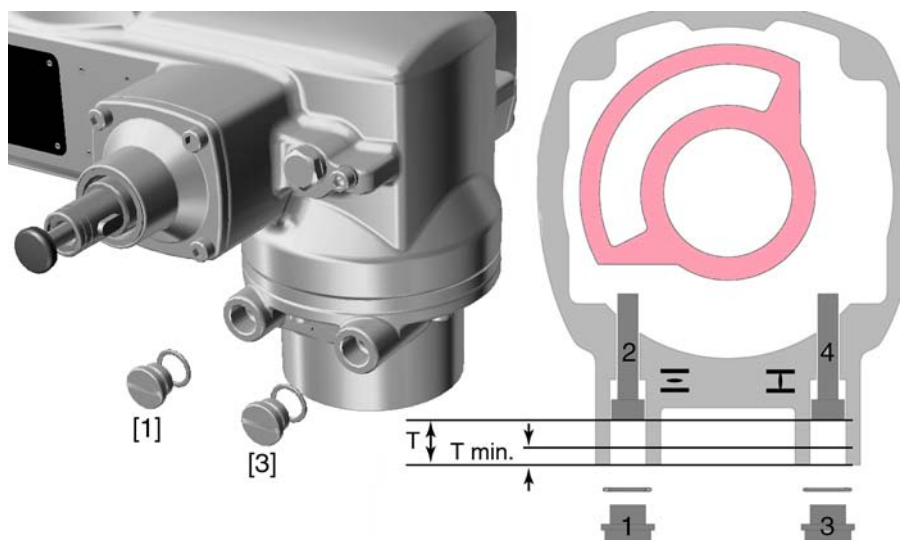
Information

- 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 19: 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

9.1.1. 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.

9.1.2. 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.

9.2. Switch compartment: open

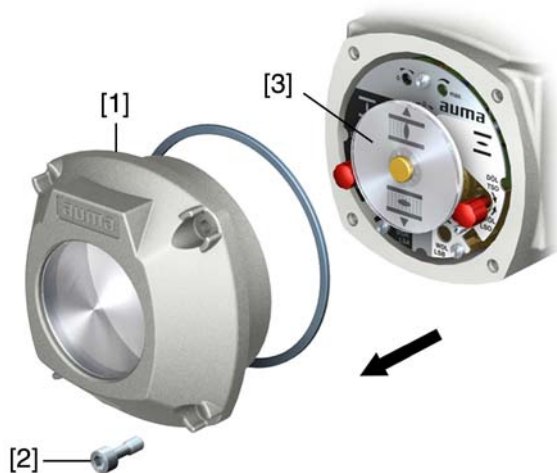
The switch compartment must be opened to perform the following settings (options).

**Flameproof enclosure, danger of explosion!**

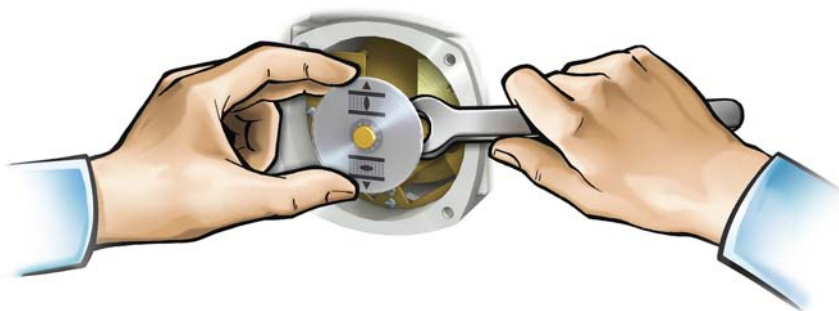
Risk of death or serious injury.

- 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.



9.3. Torque switching: set

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

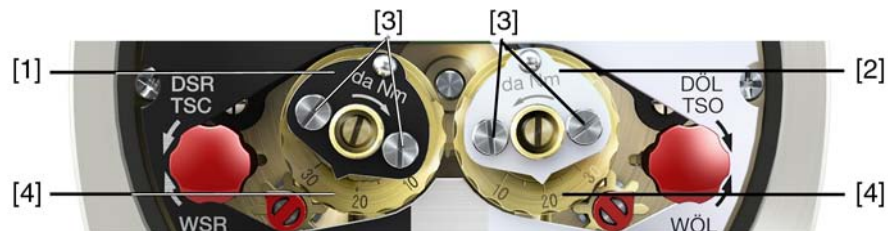
Information The torque switches may also trip during manual operation.

NOTICE

Valve damage due to excessive tripping torque limit setting!

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

Figure 20: Torque measuring heads



- [1] Torque switching head black in direction CLOSE
- [2] Torque switching head white in direction OPEN
- [3] Lock screws
- [4] Torque dials

1. Loosen both lock screws [3] at the indicator disc.

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

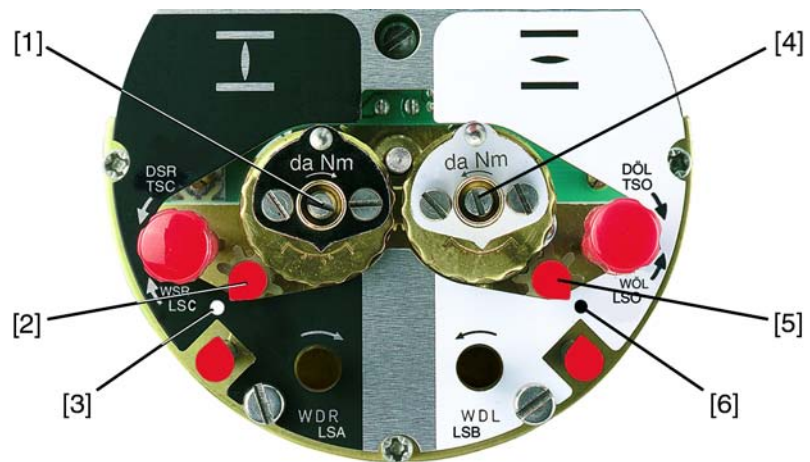
Information: Maximum tightening torque: 0.3 – 0.4 Nm

➔ The torque switch setting is complete.

9.4. Limit switching: set

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

Figure 21: 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

9.4.1. End position CLOSED (black section): set

1. Engage manual operation.
2. Turn handwheel clockwise until valve is closed.
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 end position CLOSED setting 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.

9.4.2. End position OPEN (white section): set

1. Engage manual operation.
2. Turn handwheel counterclockwise until valve is open.

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 end position OPEN setting 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.

9.5. 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 22: 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

9.5.1. 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.

9.5.2. 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.

9.6. Test run

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

9.6.1. Direction of rotation: check

NOTICE

Valve damage due to incorrect direction of rotation!

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

1. Move actuator manually to intermediate position or to sufficient distance from end position.
2. Switch on actuator in direction CLOSE and observe the direction of rotation 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**.



9.6.2. Limit switching: check

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

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

9.7. Electronic position transmitter EWG 01.1

— Option —

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

Technical data

Table 7: EWG 01.1

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

- 1) Power supply possible via: AC, AM controls or external power supply
 2) Depending on temperature range of the actuator: Refer to name plate

Setting elements

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

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

Figure 23: View on control unit when switch compartment is open



- [S1] Push button: Set 0/4 mA
 [S2] Push button: Set 20 mA
 LED Optical aid for setting
 [1] Measuring point (+) 0/4 – 20 mA
 [2] Measuring point (-) 0/4 – 20 mA

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

Table 8: Short overview on push button functions

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

9.7.1. Measuring range: set

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

Information

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

Activate setting mode

1. Press both push buttons [S1] and [S2] and hold down for 5 seconds:






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



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

Set measuring range

2. Operate valve in one of the end positions (OPEN/CLOSED).
 3. Set desired output current (0/4 mA or 20 mA):
 - for **4 mA**: Hold down push button [S1] for approx. 3 seconds, until **LED is slowly blinking** .
 - for **0 mA**: Hold down push button [S1] for approx. 6 seconds, until **LED is blinking fast** .
 - for **20 mA**: Hold down push button [S2] for approx. 3 seconds, until **LED is illuminated** .
 4. Operate valve into opposite end position.
- ➔ The value set in end position (0/4 mA or 20 mA) does not change during travel in setting mode.
5. Perform setting in the second end position following the same steps.

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

9.7.2. Current values: adjust

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

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




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

9.7.3. LED end position signalling: switch on/off

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

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

Table 9: LED behaviour when end position signalling is switched on

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

9.8. Potentiometer

— Option —

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

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

Setting is made via potentiometer [1].

Figure 24: View on control unit



9.8.1. Potentiometer setting

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

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

9.9. Electronic position transmitter RWG

— 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.

Technical data

Table 10: RWG 4020

Data	3-wire or 4-wire system	2-wire system
Output current I_a	0 – 20 mA, 4 – 20 mA	4 – 20 mA
Power supply U_V ¹⁾	24 V DC (18 – 32 V)	14 V DC + $(I \times R_B)$, max. 30 V
Max. current consumption	24 mA at 20 mA output current	20 mA
Max. load R_B	600 Ω	$(U_V - 14 \text{ V})/20 \text{ mA}$
Impact of power supply	0.1 %/V	0.1 %/V
Load influence	0.1 %/(0 – 600 Ω)	0.1 %/100 Ω
Temperature impact	< 0.3 %/K	
Ambient temperature ²⁾	–60 °C to +80 °C	
Transmitter potentiometer	5 k Ω	

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

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

Setting elements

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

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

Figure 25: View on control unit when switch compartment is open



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



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

9.9.1. Measuring range: set


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

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


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.

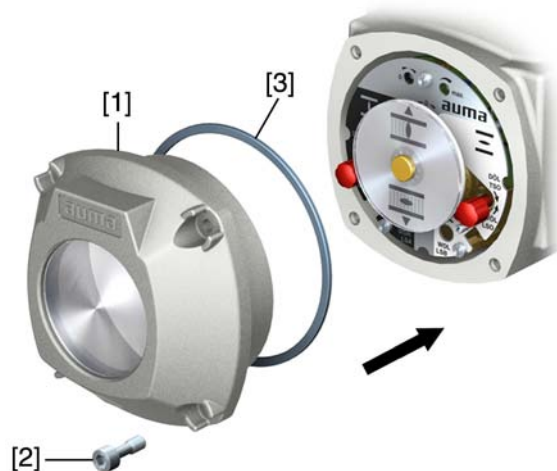
9.11. Switch compartment: close

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. Corrective action

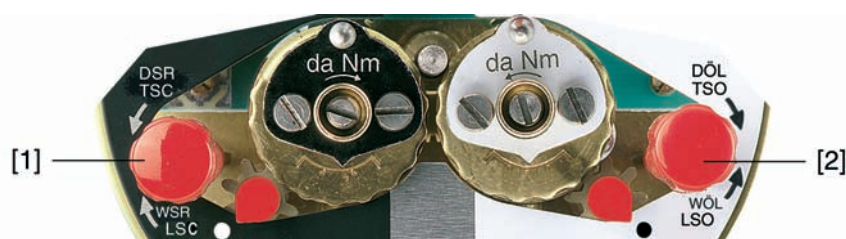
10.1. Faults during commissioning

Table 11: Faults during commissioning

Fault	Description/cause	Remedy
Mechanical position indicator cannot be set.	Reduction gearing is not suitable for turns/stroke of the actuator.	Set gear stage of the reduction gearing.
In spite of correct setting of limit switching, actuator operated into the valve end position.	The overrun was not considered when setting the limit switching. The overrun is generated by the inertia of both the actuator and the valve and the delay time of the controls.	<ul style="list-style-type: none"> 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).
No value can be measured at measuring points of the RWG.	Current loop across RWG is open. (Position feedback 0/4 – 20 mA is only possible if the current loop is closed across the RWG.)	<ul style="list-style-type: none"> Connect link across RWG to XK (terminals 23/24) Connect external load to XK, e.g. remote indication. Observe maximum load R_B.
Measuring range 0/4 – 20 mA or maximum value 20 mA at position transmitter cannot be set or supplies an incorrect value.	Reduction gearing is not suitable for turns/stroke of the actuator.	Set gear stage of the reduction gearing.
The measuring range 0/4 – 20 mA at EWG position transmitter cannot be set.	The LED on the EWG either flashes in setting mode a) single flash or b) triple flash:  a) EWG is not calibrated. b) Magnet positions of EWG are not aligned.	Call AUMA service.
Limit and/or torque switches do not trip.	Switch is defective or switch setting is incorrect.	<ul style="list-style-type: none"> Check setting, if required, reset end positions. Refer to <Check switches> and replace the switches 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.
3. Turn test button [2] in direction of the TSO arrow: Torque switch OPEN trips.

If the actuator is equipped with a DUO limit switching (option), the intermediate position switches (LSA and LSB) will be operated at the same time as the torque switches.

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.

10.2. Motor protection (thermal monitoring)

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

Behaviour during failure	If the signals are correctly wired within the controls, the actuator is stopped and can only resume its operation once the motor has cooled down.
Possible causes	Overload, running time exceeded, max. number of starts exceeded, ambient temperature is too high.
Remedy	Check cause, eliminate if possible.

11. Servicing and maintenance



Damage caused by inappropriate maintenance!

- Servicing and maintenance must be carried out exclusively by suitably qualified personnel having been authorised by the end user or the contractor of the plant. Therefore, we recommend contacting our service.
- Only perform servicing and maintenance tasks when the device is switched off.

AUMA Service & Support

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

11.1. 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.

11.2. 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.

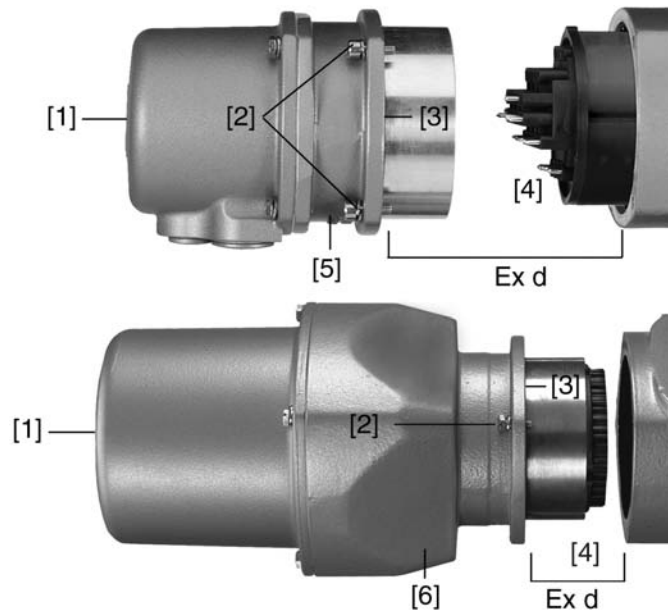


Flameproof enclosure, danger of explosion!

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 26: 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.

11.3. 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).

Notes regarding the maintenance

- We recommend exchanging the seals when changing the grease.
- No additional lubrication of the gear housing is required during operation.
- 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.

11.4. 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.

12. Technical data

Information The following technical data includes standard and optional features. For detailed information on the customer-specific version, refer to the order-related data sheet. The technical data sheet can be downloaded from the Internet at www.auma.com in both German and English (please state the order number).

12.1. Technical data Part-turn actuator

Features and functions	
Explosion protection	Standard: Standard version (ATEX): II2G Ex de IIC T4 or T3 Gb II2G c IIC T4 or T3 II2D Ex tb IIIC T130 °C or T190 °C Db IP6x Standard version (IECEX): Ex de IIC T4 or T3 Gb Ex tb IIIC T130 °C or T190 °C Db IP6x
	For actual version, refer to actuator name plate
EC type examination certificate	DEKRA 13 ATEX 0016 X IECEX DEK 12.0080X
Type of duty	Short-time duty S2 - 15 min (part-turn actuators for open-close duty with 3-phase AC motors) Intermittent duty S4 - 25 % (part-turn actuators for modulating duty with 3-phase AC motors)
	For nominal voltage and 40 °C ambient temperature and at average load with 35 % of the max. torque
Motors	Standard: 3-ph AC asynchronous motor, type IM B9 according to IEC 60034
Mains voltage, mains frequency	Refer to motor name plate Permissible variation of mains voltage: ±10 % Permissible variation of mains frequency: ±5 %
Overvoltage category	Category III according to IEC 60364-4-443
Insulation class	Standard: F, tropicalized
	Option: H, tropicalized
Motor protection	Standard: PTC thermistors (according to DIN 44082) PTC thermistors additionally require a suitable tripping device within the controls
	Option: Thermostats (NC) According to EN 60079-14, a thermal overcurrent protection device (e.g. motor protection switch) must be installed for explosion-proof actuators in addition to the thermostats.
Motor heater (option)	Voltages: 110 – 120 V AC, 220 – 240 V AC or 400 V AC (externally supplied)
	Power: 12.5 W
Swing angle	Standard: 75° to < 105° adjustable
	Option: 15° to < 45°, 45° to < 75°, 105° to < 135°
Self-locking	Yes (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 Handwheel stem extension
Indication for manual operation (option)	Indication whether manual operation is active/not active via switch (1 change-over contact)
Electrical connection	Standard: Ex plug/socket connector with screw-type terminals (KP)
	Option: Ex plug/socket connector with terminal blocks (KES)
Threads for cable entries	Standard: Metric threads
	Option: Pg-threads, NPT-threads, G-threads
Terminal plan	Terminal plan according to order number enclosed with delivery
Splined coupling for connection to the valve shaft	Standard: Coupling without bore
	Option: 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 without spigot

Technical data

With base and lever (option)	
Swing lever	Made of spheroidal cast iron with two or three bores for fixing a lever arrangement. Considering the installation conditions, the lever may be mounted to the output shaft in any desired position.
Ball joints (option)	Two ball joints matching the lever, including lock nuts and two welding nuts, suitable for pipe according to dimension sheet
Fixing	Base with four holes for fastening screws

Electromechanical control unit	
Limit switching	Counter gear mechanism for end positions OPEN and CLOSED
	Standard: Single switches (1 NC and 1 NO) for each end position, not galvanically isolated
	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 switches (1 NC and 1 NO) for each direction, 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 (EWG/RWG)
Mechanical position indicator (option)	Continuous indication, adjustable indicator disc with symbols OPEN and CLOSED
Running indication	Blinker transmitter (option for modulating actuators)
Heater in switch compartment	Standard: Self-regulating PTC heater, 5 – 20 W, 110 – 250 V AC/DC
	Options: 24 – 48 V AC/DC or 380 – 400 V AC
	A resistance type heater of 5 W, 24 V AC is installed in the actuator in combination with AM or AC actuator controls.

Technical data for limit and torque switches	
Mechanical lifetime	2×10^6 starts
Silver plated contacts:	
U min.	24 V AC/DC
U max.	250 V AC/DC
I min.	20 mA
I max. AC current	5 A at 250 V (resistive load) 3 A at 250 V (inductive load, $\cos \phi = 0.6$)
I max. DC current	0.4 A at 250 V (resistive load) 0.03 A at 250 V (inductive load, $L/R = 3 \mu s$) 7 A at 30 V (resistive load) 5 A at 30 V (inductive load, $L/R = 3 \mu s$)
Gold plated contacts	
U min.	5 V
U max.	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, $\cos \phi \approx 0.8$)
I max. DC current	0.25 A at 250 V (resistive load)

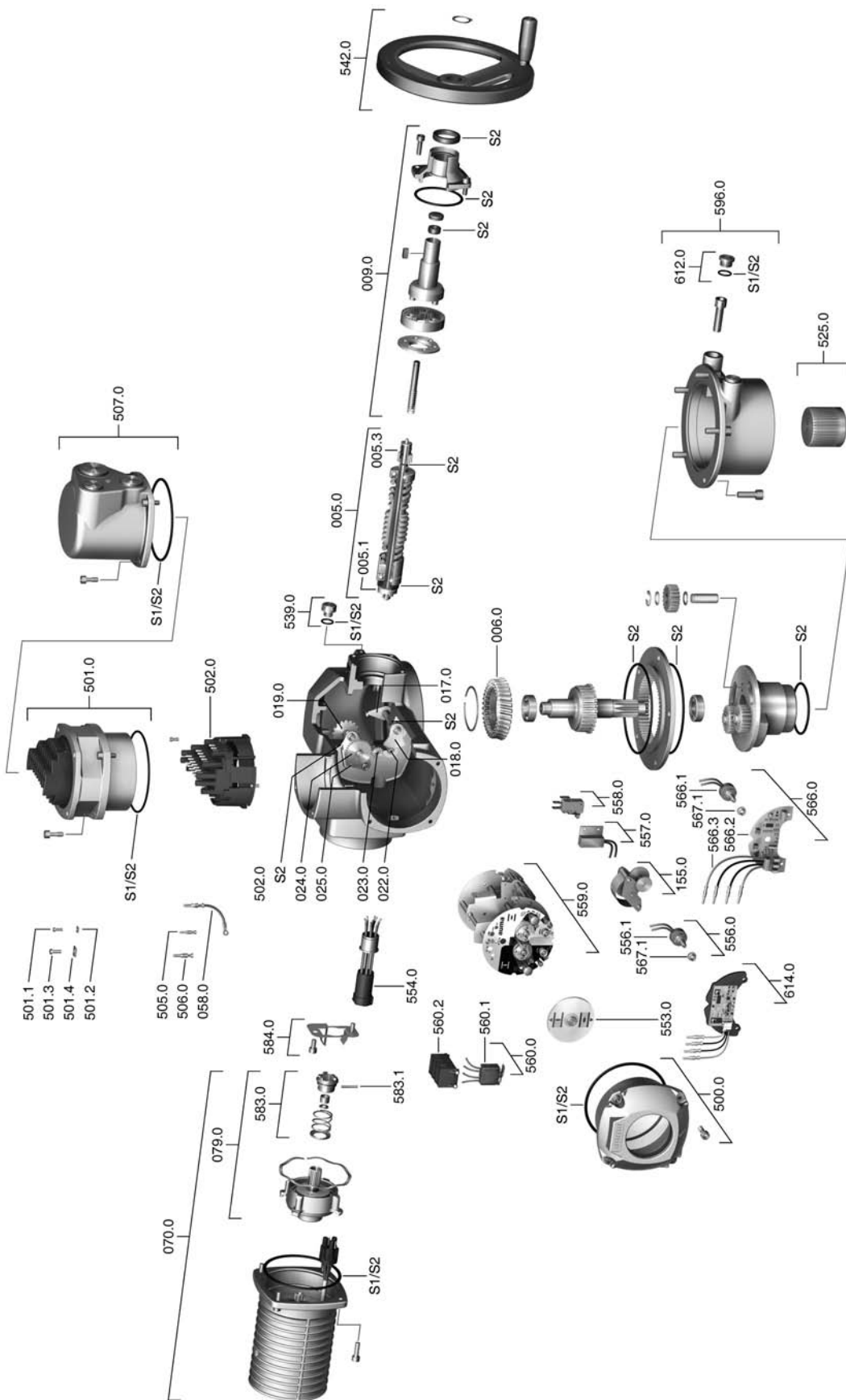
Technical data for handwheel activation switches	
Mechanical lifetime	10 ⁶ starts
Silver plated contacts:	
U min.	12 V DC
U max.	250 V AC
I max. AC current	3 A at 250 V (inductive load, cos phi = 0.8)
I max. DC current	3 A at 12 V (resistive load)

Service conditions	
Use	Indoor and outdoor use permissible
Mounting position	Any position
Installation altitude	≤ 2 000 m above sea level > 2 000 m above sea level on request
Ambient temperature	Standard: -40 °C to +60 °C (3-phase AC motors)
	Options: -60 °C to +60 °C
	For actual version, refer to actuator name plate.
Enclosure protection according to EN 60529	Standard: IP68 with AUMA 3-phase AC motor For special motors differing enclosure protection: refer to name plate.
	According to AUMA definition, enclosure protection IP68 meets the following requirements: <ul style="list-style-type: none"> • 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 actual version, refer to actuator name plate.
Pollution degree	Pollution degree 4 (when closed) according to EN 50178
Vibration resistance according to IEC 60068-2-6	2 g, from 10 to 200 Hz Resistant to vibration during start-up or for failures of the plant. However, a fatigue strength may not be derived from this. Valid for part-turn actuators in version AUMA NORM (with AUMA plug/socket connector, without actuator controls). Not valid in combination with gearboxes.
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. waste water treatments plants, chemical industry)
	Option: KX: Suitable for installation in extremely aggressive atmospheres with high humidity and high pollutant concentration
Finish coating	Powder coating
Colour	Standard: AUMA silver-grey (similar to RAL 7037)
	Option: Available colours on request.
Lifetime	AUMA part-turn actuators meet or even exceed the lifetime requirements of EN 15714-2. Detailed information can be provided on request.

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)

13. Spare parts

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

Ref. No.	Designation	Type	Ref. No.	Designation	Type
005.0	Drive shaft	Sub-assembly	539.0	Screw plug	
005.1	Motor coupling	Sub-assembly	542.0	Handwheel with ball handle Handwheel with ball handle	Sub-assembly
005.3	Manual drive coupling	Sub-assembly	553.0	Mechanical position indicator	Sub-assembly
006.0	Worm wheel		554.0	Socket carrier for motor plug/socket connector with cable harness	Sub-assembly
009.0	Planetary gear for manual drive	Sub-assembly	556.0	Potentiometer for position transmitter	Sub-assembly
017.0	Torque lever	Sub-assembly	556.1	Potentiometer without slip clutch	Sub-assembly
018.0	Gear segment		557.0	Heater	Sub-assembly
019.0	Crown wheel	Sub-assembly	558.0	Blinker transmitter including pins at wires (without impulse disc and insulation plate)	Sub-assembly
022.0	Drive pinion II for torque switching		559.0	Control unit with torque switching heads and switches	Sub-assembly
023.0	Output 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
024.0	Drive wheel for limit switching	Sub-assembly	560.0	Switch stack for direction OPEN	Sub-assembly
025.0	Locking plate	Sub-assembly	560.0	Switch stack for direction CLOSE	Sub-assembly
058.0	Wire for protective earth	Sub-assembly	560.1	Switch for limit/torque switching	Sub-assembly
070.0	Motor (VD motor incl. ref.no. 079.0)	Sub-assembly	560.2	Switch case	
079.0	Planetary gear for motor drive (SQ 05.2 - 14.2 for VD motor)	Sub-assembly	566.0	Position transmitter RWG	Sub-assembly
155.0	Reduction gearing	Sub-assembly	566.1	Potentiometer for RWG without slip clutch	Sub-assembly
500.0	Cover	Sub-assembly	566.2	Position transmitter board for RWG	Sub-assembly
501.0	Ex plug/socket connector with screw-type terminals (KP, KPH)	Sub-assembly	566.3	Wire harness for RWG	Sub-assembly
501.1	Screw for control terminal	Sub-assembly	567.1	Slip clutch for potentiometer	Sub-assembly
501.2	Washer for control terminal	Sub-assembly	583.0	Motor coupling on motor shaft	Sub-assembly
501.3	Screw for power terminal	Sub-assembly	583.1	Pin for motor coupling	Sub-assembly
501.4	Washer for power terminal		584.0	Retaining spring for motor coupling	
502.0	Pin carrier without pins	Sub-assembly	596.0	Output drive flange with end stop	Sub-assembly
505.0	Pin for controls	Sub-assembly	612.0	Screw plug for end stop	Sub-assembly
506.0	Pin for motor	Sub-assembly	614.0	Position transmitter EWG	Sub-assembly
507.0	Cover for electrical connection	Sub-assembly	S1	Seal kit, small	Set
525.0	Coupling	Sub-assembly	S2	Seal kit, large	Set

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

Ref. No.	Designation	Type	Ref. Nor.	Designation	Type
005.0	Drive shaft	Sub-assembly	554.0	Socket carrier for motor plug/socket connector with cable harness	
005.1	Motor coupling	Sub-assembly	556.0	Potentiometer as position transmitter	Sub-assembly
005.3	Manual drive coupling	Sub-assembly	556.1	Potentiometer without slip clutch	Sub-assembly
006.0	Worm wheel		557.0	Heater	Sub-assembly
009.0	Planetary gear for manual drive	Sub-assembly	558.0	Blinker transmitter including pins at wires (without impulse disc and insulation plate)	Sub-assembly
017.0	Torque lever	Sub-assembly	559.0	Control unit with torque switching heads and switches	Sub-assembly
018.0	Gear segment		559.0	Control unit with magnetic limit and torque transmitter (MWG) for Non-intrusive version in combination with AUMATIC integral controls	Sub-assembly
019.0	Crown wheel	Sub-assembly	560.0	Switch stack for direction OPEN	Sub-assembly
022.0	Drive pinion II for torque switching		560.0	Switch stack for direction CLOSE	Sub-assembly
023.0	Output drive wheel for limit switching	Sub-assembly	560.1	Switch for limit/torque switching	Sub-assembly
024.0	Drive wheel for limit switching	Sub-assembly	560.2	Switch case	
025.0	Locking plate	Sub-assembly	566.0	Position transmitter RWG	Sub-assembly
058.0	Wire for protective earth	Sub-assembly	566.1	Potentiometer for RWG without slip clutch	Sub-assembly
070.0	Motor (VD motor incl. ref.no. 079.0)	Sub-assembly	566.2	Position transmitter board for RWG	Sub-assembly
079.0	Planetary gear for motor drive (SQ 05.2 –SQ 14.2 for VD motor)	Sub-assembly	566.3	Wire harness for RWG	Sub-assembly
155.0	Reduction gearing	Sub-assembly	567.1	Slip clutch for potentiometer	Sub-assembly
500.0	Cover	Sub-assembly	573.0	Ex plug/socket connector with terminal blocks (KES)	Sub-assembly
502.0	Pin carrier without pins	Sub-assembly	583.0	Motor coupling on motor shaft	Sub-assembly
505.0	Pin for controls	Sub-assembly	583.1	Pin for motor coupling	
506.0	Pin for motor	Sub-assembly	584.0	Retaining spring for motor coupling	Sub-assembly
525.0	Coupling	Sub-assembly	596.0	Output drive fl ange with end stop	Sub-assembly
528.0	Terminal frame (without terminals)		607.0	Cover	Sub-assembly
529.0	End clamp	Sub-assembly	612.0	Screw plug for end stop	Sub-assembly
533.0	Terminals for motor/controls	Sub-assembly	614.0	Position transmitter EWG	Sub-assembly
539.0	Screw plug	Sub-assembly	S1	Seal kit, small	Set
542.0	Handwheel with ball handle	Sub-assembly	S2	Seal kit, large	Set
553.0	Mechanical position indicator	Sub-assembly			

14. Certificates**14.1. Declaration of Incorporation and EC Declaration of Conformity**

AUMA Riester GmbH & Co. KG Tel +49 7631 809-0
 Aumastr. 1 Fax +49 7631 809-1250
 79379 Müllheim, Germany Riester@auma.com
 www.auma.com



**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.

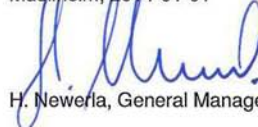
(2) Directive relating to Electromagnetic Compatibility (EMC) (2004/108/EC)

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

14.2. ATEX certificate



CERTIFICATE

- (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

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(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 AJUMATIC 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.1b.

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 AJUMATIC, 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 AJUMATIC, 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.

(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	SO	Part-turn actuator
II	Duty	none	short-time duty S2 xx min or Class A or Class B
III	Area classification	Ex	intermittent duty S4 xx % or Class C 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 AJUMATIC
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.



(13) **SCHEDULE**
 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	0.02 – 0.06 kW
	SDX 63	0.01 kW
SQ.Ex 07.2 ⁽²⁾	VDX 63	0.03 – 0.12 kW
	SDX 63	0.01 kW
SQ.Ex 10.2	VDX 63	0.10 – 0.19 kW
	SDX 63	0.02 – 0.06 kW
SQ.Ex 12.2	VDX 63	0.10 – 0.19 kW
	SDX 63	0.04 – 0.06 kW
SQ.Ex 14.2 ⁽²⁾	VDX 63	0.10 – 0.19 kW
	SDX 63	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 - ... % or 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; I_I = 200 mA, P_I = 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.

Test Report

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



(13) **SCHEDULE**
 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	RWG5020.2Ex	II 2 G Ex d IIC T4 or T3 Gb
	KP, KPH and KES	RWG5020.2Ex	II 2 G Ex d e IIC T4 or T3 Gb
	KES-Exd	RWG5020.2Ex	II 2 G Ex d e IIC T4 or T3 Gb
FISCO	KES-Exd	RWG5020.2Ex	II 2(3) G Ex d IIC Gc] IIC T4 or T3 Gb
	KP, KPH and KES	RWG5020.2Ex	II 2(3) G Ex d e IIC Gc] IIC T4 or T3 Gb
	KES-Exd	RWG5020.2Ex	II 2(3) G Ex d e IIC Gc] IIC T4 or T3 Gb
FNICO	KP, KPH and KES	RWG5020.2Ex	II 2(3) G Ex d e [nL Gc] IIC T4 or T3 Gb
	KES-Exd	RWG5020.2Ex	II 2(3) G Ex d e [nL Gc] IIC T4 or T3 Gb
	KP, KPH and KES	RWG5020.2Ex	II 2(3) G Ex d e [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 IIC T130 °C or T190 °C Db



- (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. NUDEKEXTR13.0014/”.

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