

auma[®]

Electric multi-turn actuators

SAExC 07.1 – SAExC 16.1
with actuator controls
AMBExC 01.1



Certificate Registration No.
12 100 4269
12 104 4269

Operation instructions

Scope of these instructions: These operation instructions are only valid for multi-turn actuators of the type range SAExC 07.1 – SAExC 16.1 with controls AMBExC 01.1. These operation instructions are only valid for "clockwise closing", i.e. driven shaft turns clockwise to close the valve.

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1. Safety instructions

1.1 Range of application

AUMA actuators are designed for the operation of industrial valves, e.g. globe valves, gate valves, butterfly valves and ball valves.
For other applications, please consult us. The manufacturer is not liable for any possible damage resulting from use in other than the designated applications. Such risk lies entirely with the user.
Observance of these operation instructions is considered as part of the controls'/actuator's designated use.

1.2 Commissioning (electrical connection)

For work carried out in hazardous areas, special regulations (Standard EN 60079-17) must be observed.
Work at the open actuator under voltage must only be performed if it is assured that for the duration of the work there is no danger of explosion. Pay attention to additional national regulations.
During electrical operation certain parts inevitably carry lethal voltages. Work on the electrical system or equipment must only be carried out by a skilled electrician himself or by specially instructed personnel under the control and supervision of such an electrician and in accordance with the applicable electrical engineering rules.

1.3 Maintenance

The maintenance instructions (refer to page 28) must be observed, otherwise a safe operation of the actuator is no longer guaranteed.

1.4 Warnings and notes

Non-observance of the warnings and notes may lead to serious injuries or damage. Qualified personnel must be thoroughly familiar with all warnings and notes in these operation instructions.
Correct transport, proper storage, mounting and installation, as well as careful commissioning are essential to ensure a trouble-free and safe operation.
The following references draw special attention to safety-relevant procedures in these operation instructions. Each is marked by the appropriate pictograph.



This pictograph means: Note!

“Note” marks activities or procedures which have major influence on the correct operation. Non-observance of these notes may lead to consequential damage.



This pictograph means: Electrostatically endangered parts!

If this pictograph is attached to a printed circuit board, it contains parts which may be damaged or destroyed by electrostatic discharges. If the boards need to be touched during setting, measurement or for exchange, it must be assured that immediately before a discharge through contact with an earthed metallic surface (e.g. the housing) has taken place.



This pictograph means: Warning!

“Warning” marks activities or procedures, which, if not carried out correctly, can affect the safety of persons or material.

2. Short description

AUMA multi-turn actuators type SAExC 07.1 – SAExC 16.1 have a modular design. The actuators are driven by an electric motor and controlled with the electro-mechanical version of the controls AMBExC 01.1, which are included in the scope of supply.

The limitation of travel is realised via limit switches in both end positions. In end position CLOSED, tripping may be performed by torque switch. The type of seating is determined by the valve manufacturer.

3. Technical data

Table 1: Technical data SAExC 07.1 – SAExC 16.1

Features and functions	
Explosion protection	Standard: II2G EEx de IIC T4 II2G c IIC T4 Options: II2G EEx d IIC T4 II2G c IIC T4
Protection types	Motor compartment: d flameproof enclosure EEx d Switch compartment: d flameproof enclosure EEx d Controls housing: d flameproof enclosure EEx d Terminal compartment: e increased safety EEx e d (Option) flameproof enclosure EEx d Gear housing: c constructional safety
EC type examination certificate	PTB 01 ATEX 1087
Type of duty ¹⁾	Standard: Short-time duty S2 - 15 min. Option: Short-time duty S2 - 30 min.
Motors	3-ph AC asynchronous motor, type IM B9 according to IEC 34
Insulation class	F, tropicalized
Motor protection	Thermoswitches (NC) and thermal overload relay
Self-locking	yes (for output speeds from 4 to 90 rpm)
Limit switching	Counter gear mechanism for end positions CLOSED and OPEN for 1 to 500 turns per stroke (optional for 1 to 5,000 turns per stroke) Standard: Single switch (1 NC and 1 NO) for each end position: Options: Tandem switch (2 NC and 2 NO) for each end position, switches galvanically isolated Triple switch (3 NC and 3 NO) for each end position, switches galvanically isolated Intermediate position switch (DUO limit switching), available for any intermediate position
Torque switching	Adjustable torque switching for directions OPEN and CLOSE Standard: Single switch (1 NC and 1 NO) for each direction Options: Tandem switch (2 NC and 2 NO) for each direction, switches galvanically isolated
Position feedback signal, analogue (options)	Potentiometer or 0/4 – 20 mA For further details see separate data sheet
Mechanical position indicator (option)	Continuous indication, adjustable indicator disc with symbols OPEN and CLOSED
Running indication	Blinker transmitter
Heater in switch compartment	Standard: Resistance type heater, 5 W, 24 V DC Option: Self-regulating PTC heater, 5 – 20 W 110 – 250 V DC/AC or 24 – 48 V DC/AC
Manual operation	Manual drive for setting and emergency operation, handwheel does not rotate during electric operation Option: Handwheel lockable
Electrical connection to the controls	AUMA plug/ socket connector
Threads for cable glands	Standard: Metric thread Options: Pg thread, NPT thread, G thread
Terminal plan	KMS TP 210/001 (basic version)
Output drive types	A, B1, B2, B3, B4 according to EN ISO 5210 A, B, D, E according to DIN 3210 C according to DIN 3338 Special output drives: AF, AK, AG, IB1, IB3
Service conditions	
Enclosure protection according to EN 60 529	Standard: IP 67 Options: IP 68 For both enclosure protections (IP 67 und IP 68) the terminal compartment ist additionally sealed against the interior - double sealed
Corrosion protection	Standard: KN Suitable for installation in industrial units, in water- or power plants with a low pollutant concentration ²⁾ Options: KS Suitable for installation in occasionally or permanently aggressive atmosphere with a moderate pollutant concentration (e.g. in waste-water treatment plants, chemical industry) KX Suitable for installation in extremely aggressive atmosphere with high humidity and high pollutant concentration KX-G same as KX, however aluminium-free version (outer parts)
Finish coating	Standard: two-component iron-mica combination

1) Based on 20 °C ambient temperature and at an average load with running torque according to Technical data SAExC. The type of duty must not be exceeded

2) If occasionally or permanently exposed to aggressive substances, we recommend a higher corrosion protection KS or KX

Standard colour	Standard: silver-grey (DB 701, similar to RAL 9007) Option: Other colours are possible on request						
Ambient temperature ³⁾	Standard: – 20 °C to + 40 °C Options: – 40 °C to + 40 °C (low temperature) – 50 °C to + 40 °C (extreme low temperature)						
Vibration resistance ⁴⁾ according to EN 60068-2-6	1 g, from 10 Hz to 200 Hz						
Lifetime	<table> <tr> <th>Type</th><th>Operating cycles (OPEN-CLOSED-OPEN) with 30 turns per stroke</th></tr> <tr> <td>SAExC 07.1 – SAExC 10.1</td><td>20,000</td></tr> <tr> <td>SAExC 14.1 – SAExC 16.1</td><td>15,000</td></tr> </table>	Type	Operating cycles (OPEN-CLOSED-OPEN) with 30 turns per stroke	SAExC 07.1 – SAExC 10.1	20,000	SAExC 14.1 – SAExC 16.1	15,000
Type	Operating cycles (OPEN-CLOSED-OPEN) with 30 turns per stroke						
SAExC 07.1 – SAExC 10.1	20,000						
SAExC 14.1 – SAExC 16.1	15,000						
Other information							
EC directives	ATEX directive: (94/9/EC) Electromagnetic Compatibility (EMC): (89/336/EEC) Low Voltage Directive: (73/23/EEC) Machinery Directive: (98/37/EC)						
Reference documents	Product description "Electric multi-turn actuators" Information "Electric actuators and valve gearboxes according to ATEX" Dimension sheets SAExC Electrical data sheets SAExC Technical data SAExC						
³⁾ Under certain conditions (special sizing) up to + 60 °C possible ⁴⁾ For standard version with Ex-plug/socket connector with terminal board							

Table 2: Technical data actuator controls AMBExC 01.1

Explosion protection	Same as actuator
EC type examination certificate	Same as actuator
Supply voltage	Refer to name plate
Motor controls reversing contactors:	mechanical, electrically interlocked, max. 690 V AC, max. 7.5 kW
Control voltage	Standard: 230 V AC from internal power supply unit, also available for input signals OPEN-STOP-CLOSE/ OPEN-CLOSE and for external indication lights (P max = 2.5 W) Option: 115 V AC from internal power supply unit
Binary inputs (input signals) Nominal voltage:	Standard: OPEN-STOP-CLOSE, EMERGENCY-STOP Option: OPEN-CLOSE, EMERGENCY-STOP Standard: 230 – 240 V AC from internal power supply unit (non potential-free) Option: 24 V DC externally supplied (potential-free via relay)
Binary outputs	Standard: End position OPEN/ end position CLOSED (non potential-free) Option: End position OPEN / end position CLOSED (potential-free) in combination with tandem limit switches in multi-turn actuator. Selector switch LOCAL/ selector switch REMOTE (potential-free)
Relay outputs (potential-free)	Version BX01: without relay board (see binary outputs) Version BX02: Thermoswitch or overload relay tripped (NO contact) Signal: Torque switch tripped in mid-travel (change-over contact). Version BX03: see binary outputs Version BX04: Thermoswitch or overload relay tripped (NO contact) Signal: Torque switch tripped in mid-travel (change-over contact).
Local controls	Standard: Selector switch LOCAL-OFF-REMOTE, lockable OPEN-STOP-CLOSE Option: Push-buttons OPEN-CLOSE, EMERGENCY-STOP Indication lights end position OPEN, FAULT ¹⁾ , end position CLOSED
Enclosure protection	Same as actuator
Temperature range	Same as actuator
Electrical connection	Standard: Ex-plug/socket connector with terminal board (screw type connection) Options: Ex-plug-in terminal connection
¹⁾ Only in combination with version BX02 and BX04	

4. Additional information to the wiring diagram legend

- Information A:** Change-over switch S9 for changing the type of seating (see subclause 19.2, page 24).
- Information B:** Self-retaining in local operation can be cancelled by cutting the link B3 (see subclause 19.3, page 25).
- Information C:** Plug-in link for operation mode REMOTE (see subclause 19.4, page 25).
- Information E:** The control voltage is 115 V or 230 V AC (according to order) and must only be switched via potential-free contacts.
End position signal: 115 V or 230 V AC, max. 2.5 W.
- Information F:** Instead of a link, an EMERGENCY switch with NC contact can be used.
-  **Connections XK 49 and XK 50 carry control voltage (115 or 230 V AC) and must only be opened via the potential-free contact.**
- Information G:** (Only for version BX02 and BX04)
Plug-in link for potential-free feedback (see subclause 19.6, page 26).

5. Transport and storage

- Transport to place of installation in sturdy packing.
- Do not attach ropes or hooks to the handwheel for the purpose of lifting by hoist.
- If multi-turn actuator is mounted on valve, attach ropes or hooks for the purpose of lifting by hoist to valve and not to multi-turn actuator.
- Store in 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 bright surfaces.

If multi-turn actuators are to be stored for a long time (more than 6 months), the following points must be observed additionally:

- Prior to storage: Protect bright surfaces, in particular the output drive parts and mounting surface, with long-term corrosion protection agent.
- Check for corrosion approximately every 6 months. If first signs of corrosion show, apply new corrosion protection.

After mounting, connect actuator immediately to electrical system, so that condensation is prevented by the heater.

6. Packaging

Our products are protected by special packaging for the transport ex works. The packaging consists of environmentally friendly materials which can easily be separated and recycled. For the disposal of the packaging material we recommend recycling and collection centres. We use the following packaging materials: wood, cardboard, paper and PE foil.

7. Mounting to valve/gearbox



- **Prior to mounting the actuator must be checked for damage. Damaged parts must be replaced by original spare parts.**
- **After mounting to valve/ gearbox, touch up any possible damage to paint finish.**
- **Increased temperatures at the valve flange or valve stem:**
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.

Mounting is most easily done with the valve shaft/gearbox shaft pointing vertically upward. But mounting can be done in any other position as well. The multi-turn actuator leaves the factory in position CLOSED (limit switch CLOSED tripped).

- Check if mounting flange fits the valve/ gearbox.

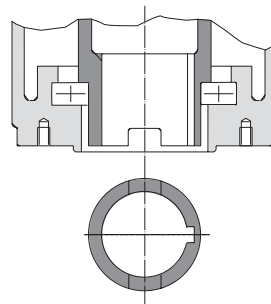


Spigot at flanges should be loose fit!

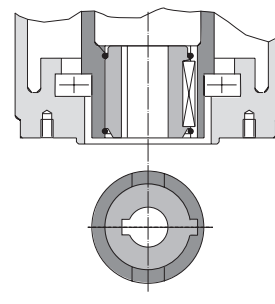
The output drive types B1, B2, B3 or B4 (figure A) are delivered with bore and keyway (usually according to ISO 5210).

Figure A

Output drive type B1/B2
Plug sleeve



Output drive type B3/B4
Bore with keyway

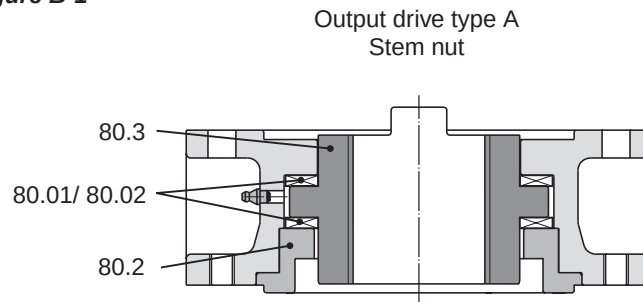


For output drive type A (figure B), the internal thread of the stem nut must match the thread of the valve stem. If not ordered explicitly with thread, the stem nut is unbored or with pilot bore when delivered. For finish machining of stem nut refer to next page.

- Check whether bore and keyway match the input shaft of valve/gearbox.
- Thoroughly degrease mounting faces at multi-turn actuator and valve/gearbox.
- Apply a small quantity of grease to input shaft of valve/gearbox.
- Place actuator on valve/ gearbox and fasten. Fasten bolts (at least quality 8.8, refer to table 3) evenly crosswise.

Table 3: Fastening torque for bolts

Strength class 8.8	T _A (Nm)
M 8	25
M 10	50
M 12	87
M 16	220
M 20	420

Finish machining of stem nut (output drive type A):**Figure B-1**

The output drive flange does not have to be removed from the actuator.

- Remove spigot ring (80.2, figure B-1) from mounting flange.
- Take off stem nut (80.3) together with thrust bearing (80.01) and thrust bearing races (80.02).
- Remove thrust bearing and thrust bearing races from stem nut.
- Drill and bore stem nut and cut thread.
When fixing in the chuck, make sure stem nut runs true!
- Clean the machined stem nut.
- Apply ball bearing grease to thrust bearing and races, then place them on stem nut.
- Re-insert stem nut with thrust bearings into the mounting flange. Ensure that dogs are placed correctly in the slots of the hollow shaft.
- Screw in spigot ring until it is firm against the shoulder.
- Press Lithium soap EP multi-purpose grease on mineral oil base, quantities see table, into the grease nipple with a grease gun:

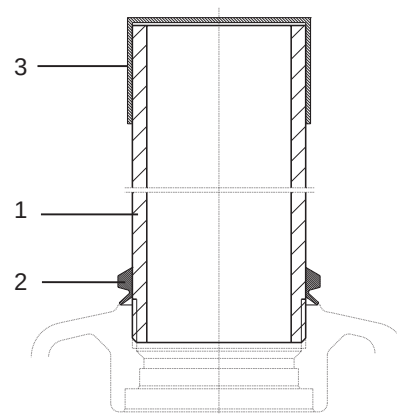
Table 4: Grease quantities for output drive A

Output drive	A 07.2	A 10.2	A 14.2	A 16.2	A 25.2	A 30.2	A 35.2	A 40.2	A 48.2
Qty. ¹⁾	1.5 g	2 g	3 g	5 g	10 g	14 g	20 g	25 g	30 g

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

Protection tube for rising valve stem

- Protection tubes may be supplied loose. Seal thread with hemp, Teflon tape or thread sealing material.
- Screw protection tube (1) into thread (figure B-2) and tighten it firmly.
- For corrosion protection KS/ KX, push down the seal (2) to the housing.
- Check, whether cap (3) is available and without damage.

Figure B-2: Protection tube for rising valve stem

8. Manual operation

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

Engaging manual operation:

- Lift change-over lever in the centre of the handwheel up to max. 85°, while slightly turning the handwheel back and forth until manual drive engages (figure C).

Figure C

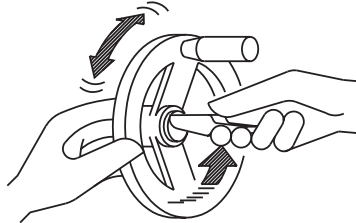
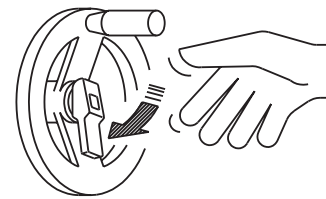


Figure D



Manual force is sufficient for operating the change-over lever. It is not necessary to use an extension. Excessive force may damage the change-over mechanism.

- Release change-over lever (should snap back into initial position by spring action, figure D), if necessary push it back manually.



Operating the change-over lever while the motor is running (figure E) can lead to increased wear at the change-over mechanism.

Figure E

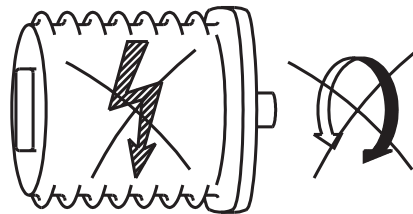
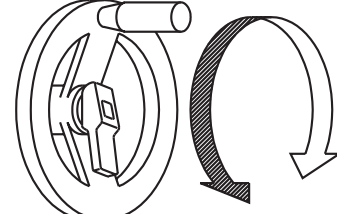


Figure F



- Turn handwheel into desired direction (figure F).

Disengaging manual operation:

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

9. Electrical connection

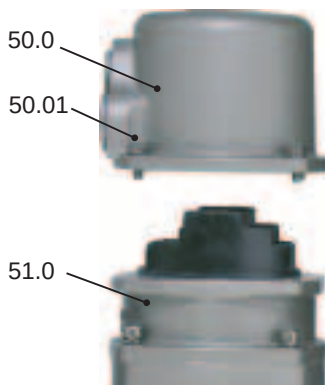


When working in potentially explosive areas, observe the European Standards EN 60079-14 “Electrical Installations in Hazardous Areas” and EN 60079-17 “Inspection and Maintenance of Electrical Installations in Hazardous Areas”.

Work on the electrical system or equipment must only be carried out by a skilled electrician himself or by specially instructed personnel under the control and supervision of such an electrician and in accordance with the applicable electrical engineering rules.

9.1 Ex-plug/socket connector with terminal board

Figure G-1: Connection



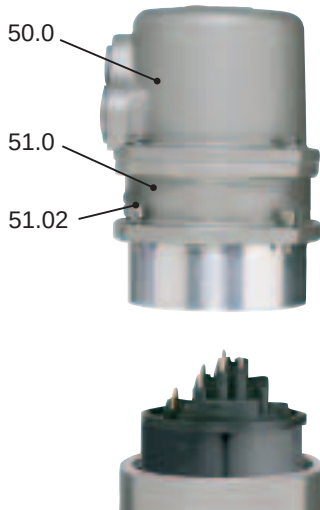
For the Ex-plug/socket connector (figure G-1), the electrical mains connection is made after removing the plug cover (50.0) at the EEx e terminals of the terminal board (51.0). The flameproof compartment (type of protection EEx d) remains hereby closed.

- Check whether type of current, supply voltage and frequency correspond to motor data (refer to name plate at motor).
- Loosen bolts (50.01) (figure G-1) and remove plug cover.



- Insert cable glands with “EEx e” approval and of size suitable for connecting cables.
- Enclosure protection IP 67 or IP 68 is only ensured if suitable cable glands are used.
- Seal cable entries which are not used with suitable plugs.

Figure G-2: Disconnection from the mains



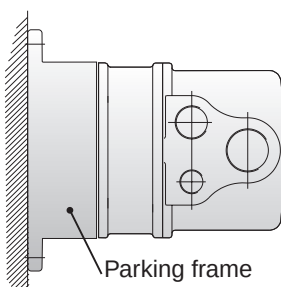
- Remove cable sheathing in a length of 120 –140 mm. Strip wires: Controls max. 8 mm, motor max. 12 mm. For stranded wires use end-sleeves according to DIN 46228.
- 2 wires for each connection permitted.
- Connect cables according to order related terminal plan KMS TP The terminal plan applicable to the actuator KMS TP . . . is attached to the handwheel in a weather-proof bag, together with the operation instructions. In case the terminal plan is not available, it can be obtained from AUMA (state commission no., refer to name plate) or downloaded directly from the Internet (www.auma.com).

If the actuator must be taken from the valve, e.g. for service purposes, it can be separated from the mains without having to remove the wiring (figure G-2). For that the screws (51.02) are removed and the plug/ socket connector is pulled off. Plug cover (50.0) and terminal board (51.0) remain together.



Flameproof enclosure! Before opening, ensure that there is no explosive gas and no voltage.

Figure G-3: Parking frame (accessory)



A special parking frame (figure G-3) for protection against touching the bare contacts and against environmental influences is available.

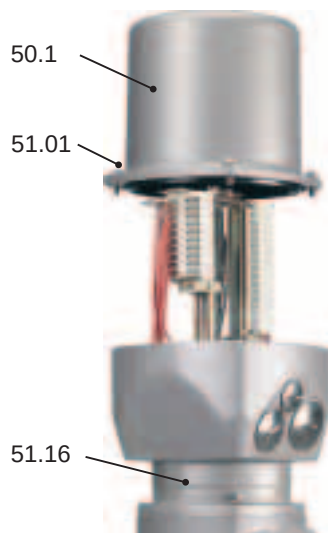
Table 5: Technical data Ex-plug/ socket connector with terminal board for explosion-proof actuators

Technical data	Motor power connections ¹⁾	Protective earth	Control pins
No. of contacts max.	3	1 (leading contact)	38 pins / sockets
Marking	U1, V1, W1	according to VDE	1 to 24, 31 to 40, 47 to 50
Voltage max.	550 V	–	250 V
Current max.	25 A	–	10 A
Type of customer connection	Screws	Screws	Screws
Cross section max.	6 mm ²	6 mm ²	1.5 mm ²
Material: Pin/socket carrier	Araldite/Polyamide	Araldite/Polyamide	Araldite/Polyamide
Contacts	Brass (Ms)	Brass (Ms)	Brass (Ms) tin-plated

1) Suitable for copper wires. For aluminium wires contact AUMA.

9.2 Ex-plug-in terminal connection

Figure G-4: Connection



The electrical connection to the mains is on terminals (figure G-4). The terminal compartment is designed for explosion protection “EEx e” (increased safety). The separation between the terminal compartment (increased safety) and the controls MATIC BASIC ExC (flameproof enclosure) is realised via a flameproof line bushing with integral plug/ socket connector.

- Check whether type of current, supply voltage and frequency correspond to motor data (refer to name plate at motor).
- Loosen bolts (51.01) (figure G-4) and remove terminal cover (50.1).



- Insert cable glands with “EEx e” approval and of size suitable for connecting cables.
- Enclosure protection IP 67 or IP 68 is only ensured if suitable cable glands are used.
- Seal cable entries which are not used with suitable plugs.

- Connect cables according to order related terminal plan KMS TP
- The terminal plan applicable to the actuator KMS TP . . . is attached to the handwheel in a weather-proof bag, together with the operation instructions. In case the terminal plan is not available, it can be obtained from AUMA (state commission no., refer to name plate) or downloaded directly from the Internet (www.auma.com).

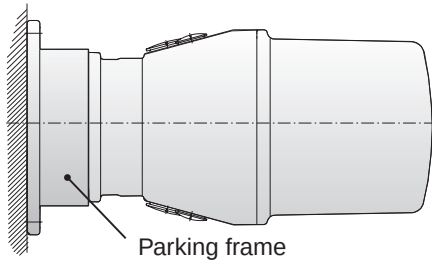
Figure G-5: Disconnection from the mains



If the actuator must be taken from the valve, e.g. for service purposes, it can be separated from the mains without removing the wiring (figure G-5). For that the screws (51.02) are removed and the frame assly. with the integral plug/ socket connector (50.16) is pulled off. Terminal cover (50.1) and frame assly. (51.16) remain together.



Flameproof enclosure! Before opening, ensure that there is no explosive gas and no voltage.

Figure G-6: Parking frame (accessory)

A special parking frame (figure G-6) for protection against touching the bare contacts and against environmental influences is available.

Table 6: Technical data Ex-plug-in terminal connection for explosion proof actuators

Technical data	Motor power connections ¹⁾	Protective earth	Control terminals
Terminals max.	3	1	48
Marking	U1, V1, W1	according to VDE	1 to 48
Voltage max.	750 V	–	250 V
Current max.	25 A		16 A
Type of connection	Screws	Screws	Cage clamp ²⁾
Cross section max.	10 mm ² to SA 16.1	10 mm ²	2,5 mm ² flexible, 4 mm ² massive

1) Suitable for copper wires. For aluminium wires contact AUMA.

2) Optional with screw connections

9.3 Heater

AUMA multi-turn actuators have a heater installed as standard. To prevent condensation, the heater must be connected.

9.4 Motor protection

In order to protect against overheating and impermissibly high temperatures at the actuator, thermostiches are embedded in the motor winding. The thermostat is tripped as soon as the max. permissible winding temperature has been reached.

9.5 Remote position transmitter

For the connection of position transmitters (potentiometer, RWG) screened cables must be used.

9.6 Fitting of the cover

After connection:

- Clean sealing faces at the plug cover or terminal cover and the housing.
- Check whether O-ring is in good condition.
- Apply a thin film of non-acidic grease (e.g. Vaseline) to the sealing faces.
- Preserve joint surfaces with an acid-free corrosion protection agent.



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

- Replace cover (50.0 figure G-1 or 50.1 figure G-4) and fasten 4 bolts evenly crosswise.
- Fasten cable glands with the specified torque to ensure the required enclosure protection.

10. Opening the switch compartment

To be able to make the following settings (clause 11. to 17.) the switch compartment must be opened and, if installed, the indicator disc must be removed.

These settings are only valid for “clockwise closing”, i.e. driven shaft turns clockwise to close the valve.



When working in potentially explosive areas, observe the European Standards EN 60079-14 “Electrical Installations in Hazardous Areas” and EN 60079-17 “Inspection and Maintenance of Electrical Installations in Hazardous Areas”. Work on the electrical system or equipment must only be carried out by a skilled electrician himself or by specially instructed personnel under the control and supervision of such an electrician and in accordance with the applicable electrical engineering rules.

10.1 Removal of the switch compartment cover

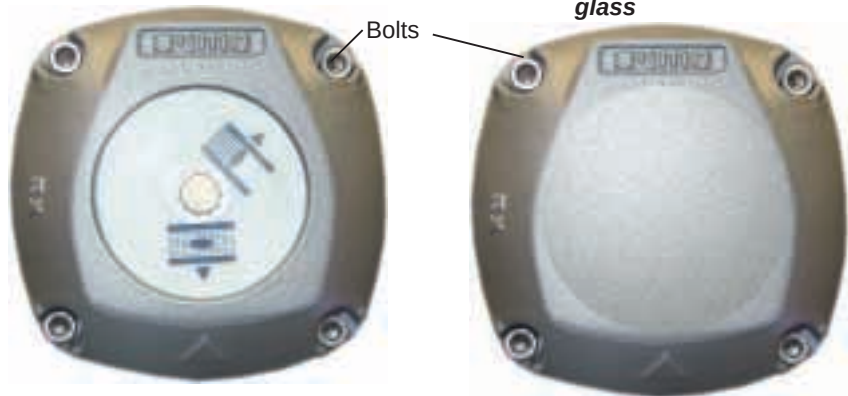


Flameproof enclosure! Before opening, ensure that there is no explosive gas and no voltage.

- Remove 4 bolts and take off the cover at the switch compartment (figure H) .

Figure H-1: Cover with indicator glass

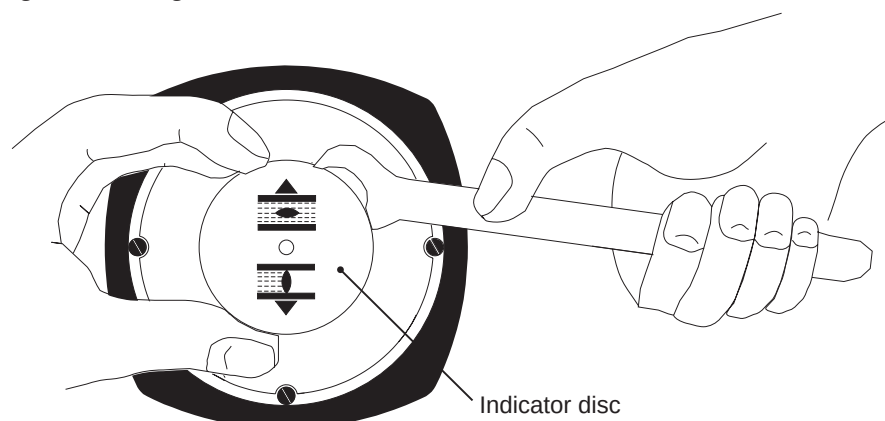
Figure H-2: Cover without indicator glass



10.2 Pulling off the indicator disc (option)

- If installed, pull off indicator disc (figure J). Open end spanner (approx. 14 mm) may be used as lever.

Figure J: Pulling off the indicator disc

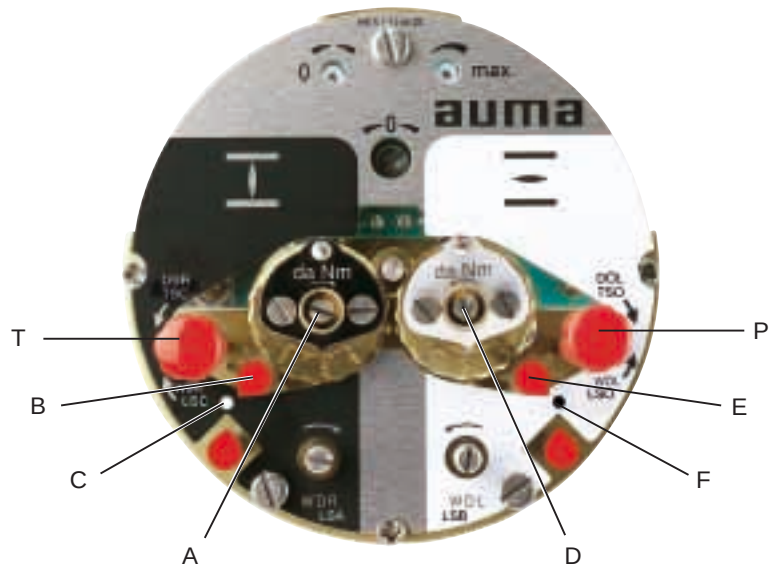


11. Setting of the limit switching

11.1 Setting for end position CLOSED (black section)

- Turn handwheel clockwise until valve is closed.
- After having reached the end position, turn back handwheel approximately 1/2 a turn (overrun). During test run (page 17) check overrun and, if necessary, correct setting of the limit switching.
- **Press down** and turn setting spindle A (figure K-1) with screw driver (5 mm) in direction of arrow, thereby observe pointer B. While a ratchet is felt and heard, the pointer B moves 90° every time. When pointer B is 90° from mark C, continue turning slowly. When pointer B has reached the mark C, stop turning and release setting spindle. If you override the tripping point inadvertently (ratchet is heard after the pointer has snapped), continue turning the setting spindle in the same direction and repeat setting process.

Figure K-1: Control unit



11.2 Setting for end position OPEN (white section)

- Turn handwheel counterclockwise until valve is open, then turn back approximately 1/2 a turn.
- **Press down** and turn setting spindle D (figure K-1) with screw driver (5 mm) in direction of arrow, thereby observe pointer E. While a ratchet is felt and heard, the pointer E moves 90° every time. When pointer E is 90° from mark F, continue turning slowly. When pointer E has reached the mark F, stop turning and release setting spindle. If you override the tripping point inadvertently (ratchet is heard after the pointer has snapped), continue turning the setting spindle in the same direction and repeat setting process.

11.3 Checking the switches

The red test buttons T and P (figure K-1) serve for operating the limit switches manually.

- Turning T in direction of the arrow LSC (WSR) triggers limit switch CLOSED.
- Turning P in direction of the arrow LSO (WÖL) triggers limit switch OPEN.

12. Setting of the DUO limit switching (option)

Any application can be switched on or off via the two intermediate position switches.

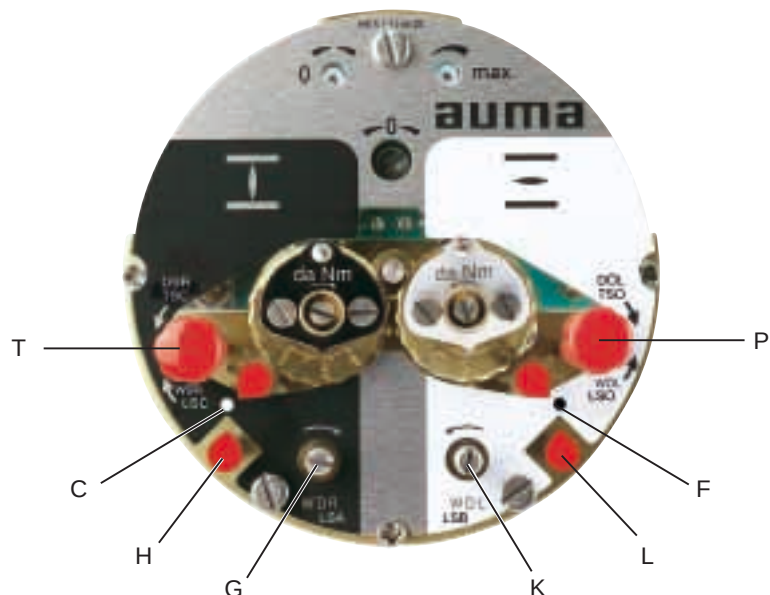


For setting, the switching point (intermediate position) must be approached from the same direction as afterwards in electrical operation.

12.1 Setting for direction CLOSE (black section)

- Move valve to desired intermediate position.
- **Press down** and turn setting spindle G (figure K-2) with screw driver (5 mm) in direction of arrow, thereby observe pointer H. While a ratchet is felt and heard, the pointer H moves 90° every time. When pointer H is 90° from mark C, continue turning slowly. When pointer H has reached the mark C, stop turning and release setting spindle. If you override the tripping point inadvertently (ratchet is heard after the pointer has snapped), continue turning the setting spindle in the same direction and repeat setting process.

Figure K-2: Control unit



12.2 Setting for direction OPEN (white section)

- Move valve to desired intermediate position.
- **Press down** and turn setting spindle K (figure K-2) with screw driver (5 mm) in direction of arrow, thereby observe pointer L. While a ratchet is felt and heard, the pointer L moves 90° every time. When pointer L is 90° from mark F, continue turning slowly. When pointer L has reached the mark F, stop turning and release setting spindle. If you override the tripping point inadvertently (ratchet is heard after the pointer has snapped), continue turning the setting spindle in the same direction and repeat setting process.

13. Setting of the torque switching

13.1 Setting



- The set torque must suit the valve!
- This setting should only be changed with the consent of the valve manufacturer!

Figure L: Torque switching heads

Setting CLOSED

Setting OPEN



- Loosen both lock screws O at the torque dial (figure L).
 - Turn torque dial P to set it to the required torque (1 da Nm = 10 Nm).
- Example:
Figure J shows the following setting:
3.5 da Nm = 35 Nm for direction CLOSE
4.5 da Nm = 45 Nm for direction OPEN
- Tighten lock screws O again



- The torque switches can also be operated in manual operation.
- The torque switching acts as overload protection over full travel, also when stopping in the end positions by limit switching.

13.2 Checking the switches for torque and DUO limit switching

The red test buttons T and P (figure K-2) serve for operating the torque switches manually:

- Turning T in direction of the arrow TSC (DSR) triggers torque switch CLOSED.
- Turning P in direction of the arrow TSO (DÖL) triggers torque switch OPEN.
- If a DUO limit switching (optional) is installed in the actuator, the intermediate position switches will be operated at the same time.

14. Test run



Work at the open actuator under voltage must only be performed if it is assured that for the duration of the work there is no danger of explosion.

14.1 Check direction of rotation: This check is only required for multi-turn actuators with 3-ph AC motor.

- If provided, place indicator disc on shaft.
The direction of rotation of the indicator disc (figure M-1) indicates the direction of rotation of the output drive.
- If there is no indicator disc, the direction of rotation can also be observed on the hollow shaft. To this end, remove screw plug (no. 27) (figure M-2).

Figure M-1: Indicator disc

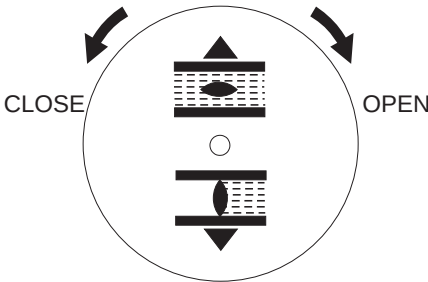
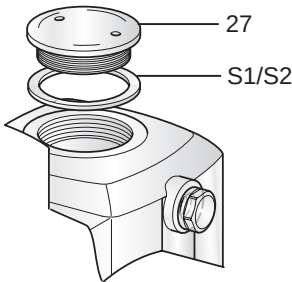


Figure M-2: Opening the hollow shaft



- Move actuator manually to intermediate position or to sufficient distance from end position.
- Set selector switch to local control (I)(figure M-3).

Figure M-3: Selector switch on local controls



- Switch on the voltage supply.
- Operate push-button CLOSE (figure M-4) and observe the direction of rotation:

Figure M-4 Push-button CLOSE



Figure M-5: Push-button STOP





If the direction of rotation is wrong switch off immediately with push-button “Stop” (figure M-5) or by turning **both** test buttons T and P (figure K-2) simultaneously in any direction. Correct phase sequence at motor connection. Repeat test run.

Table 7:	
Direction of rotation of the indicator disc:	
counterclockwise	correct
Direction of rotation of the hollow shaft:	
clockwise	correct

14.2 Check the setting of the limit switching

- Move actuator manually into both end positions of the valve.
- Check whether limit switching is set correctly. Hereby observe that the appropriate switch is tripped in each end position and released again after the direction of rotation is changed. If this is not the case, the limit switching must first be set, as described from page 15.

14.3 Check whether type of seating is set correctly

The valve manufacturer states whether switching off in the end position CLOSED should be by limit seating or torque seating.

- Checking the setting: see page 24, clause 19.

If no other options (clauses 15. to 17.) require setting:

- Close switch compartment (see page 23, clause 18.).

15. Setting of the potentiometer (option)

– For remote indication –

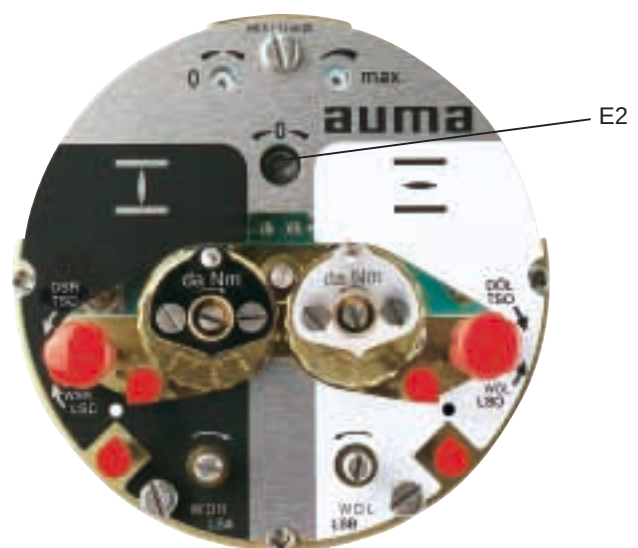
- Move valve to end position CLOSED.
- If installed, pull off indicator disc.
- Turn potentiometer (E2) clockwise until stop is felt.
End position CLOSED corresponds to 0 %, end position OPEN to 100 %.
- Turn potentiometer (E2) slightly back from the stop.



Due to the ratio of the reduction gears for the position transmitter the complete resistance range is not always utilized for the whole travel. Therefore an external possibility for adjustment (setting potentiometer) must be provided.

- Perform fine-tuning of the zero point at external setting potentiometer (for remote indication).

Figure N: Control unit



16. Setting of electronic position transmitter RWG (option)

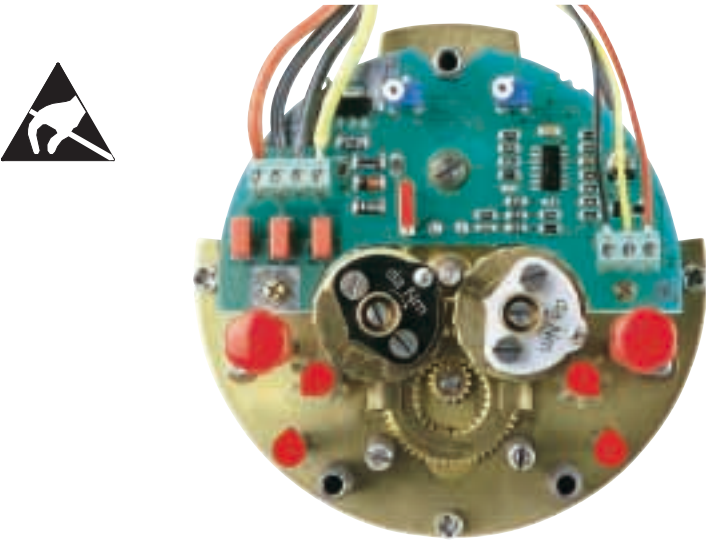
– For remote indication or external control –

After mounting the multi-turn actuator to the valve, check setting by measuring the output current (see subclause 16.1 or 16.2) and re-adjust, if necessary.

Table 8: Technical data RWG 4020			
Terminal plans		KMS TP__ 4 / _ _ _	KMS TP _ 4 _ / _ _ _ KMS TP _ 5 _ / _ _ _
		3-/ 4-wire system	2-wire system
Output current	I _a	0 – 20 mA, 4 – 20 mA	4 – 20 mA
Power supply	U _v	24 V DC, ± 15 % smoothed	14 V DC + (I x R _B), max. 30 V
Max. current input	I	24 mA at 20 mA output current	20 mA
Max. load	R _B	600 Ω	(U _v - 14 V) / 20 mA

The position transmitter board (figure P-1) is located under the cover plate (figure P-2).

Figure P-1: Position transmitter board



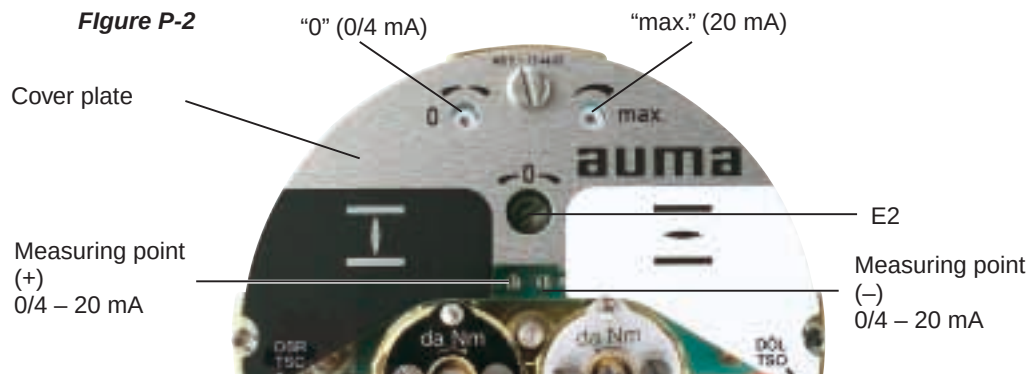
16.1 Setting for 2-wire system 4 – 20 mA and 3- /4-wire system 0 – 20 mA

- Connect voltage for electronic position transmitter.
- Move valve to **end position CLOSED**.
- If installed, pull off indicator disc.
- Connect ammeter for 0 – 20 mA to measuring points (figure P-2).



The circuit (external load) must be connected (max. load R_B), or the appropriate poles at the terminals (refer to terminal plan) must be linked, otherwise no value can be measured.

- Turn potentiometer (E2) clockwise until stop is felt.
- Turn potentiometer (E2) slightly back from the stop.



- Turn potentiometer "0" clockwise until output current starts to increase.
- Turn potentiometer "0" back until the following value is reached:
for 3- or 4-wire system approx. 0.1 mA
for 2-wire system: approx. 4.1 mA.
This ensures that the signal remains above the dead and live zero point.
- Move valve to end position OPEN.
- Set potentiometer "max." to end value 20 mA.
- Approach end position CLOSED anew and check minimum value (0.1 mA or 4.1 mA). If necessary, correct the setting.



If the maximum value can not be reached, the selection of the reduction gearing must be checked.

16.2 Setting for 3- / 4- wire system 4 – 20 mA

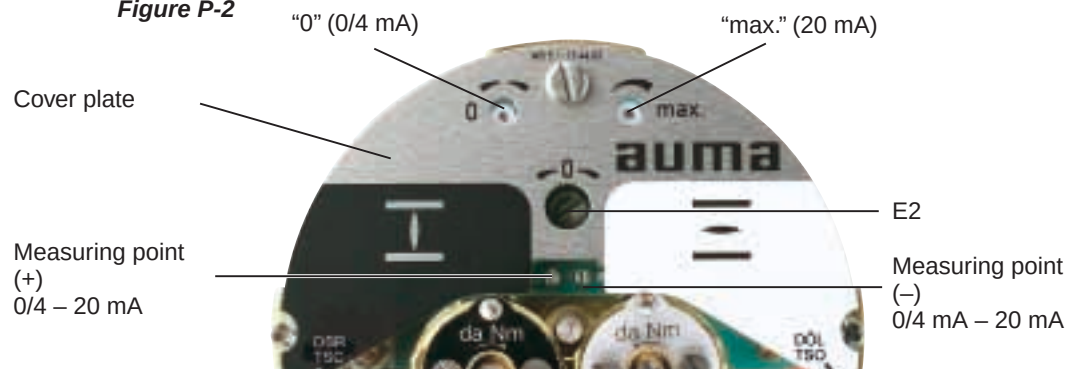
- Connect voltage for electronic position transmitter.
- Move valve to end position CLOSED.
- If installed, pull off indicator disc.
- Connect ammeter for 0 – 20 mA to measuring points (figure P-2).



The circuit (external load) must be connected (max. load R_B), or the appropriate poles at the terminals (refer to terminal plan) must be linked, otherwise no value can be measured.

- Turn potentiometer (E2) clockwise until stop is felt.
- Turn potentiometer (E2) slightly back from the stop.

Figure P-2



- Turn potentiometer "0" clockwise until output current starts to increase.
- Turn back potentiometer "0" until a residual current of approx. 0.1 mA is reached.
- Move valve to end position OPEN.
- Set potentiometer "max." to end value 16 mA.
- Move valve to end position CLOSED.
- Set potentiometer "0" from 0.1 mA to initial value 4 mA.
This results in a simultaneous shift of the end value by 4 mA, so that the range is now 4 – 20 mA.
- Approach both end positions anew and check setting. If necessary, correct the setting.



If the maximum value can not be reached, the selection of the reduction gearing must be checked.

17. Setting of the mechanical position indicator (option)

A suitable reduction gearing was installed in our works. If the turns per stroke are changed at a later date, the reduction gearing may have to be exchanged, too.

- Place indicator disc on shaft.
- Move valve to end position CLOSED.
- Turn lower indicator disc (figure Q-1) until symbol  CLOSED is in alignment with the mark on the cover (figure Q-2).
- Move actuator to end position OPEN.
- Hold lower indicator disc CLOSED in position and turn upper disc with symbol  OPEN until it is in alignment with the mark on the cover.

Figure Q-1:

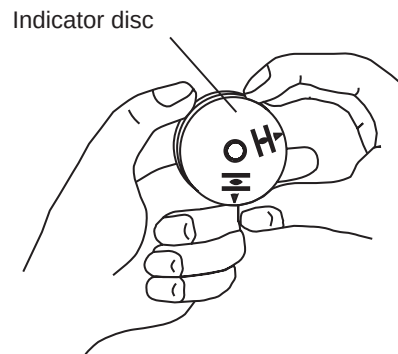


Figure Q-2:



Indicator disc rotates approximately 180° at full travel from OPEN to CLOSED or vice versa.

18. Closing the switch compartment

- Clean sealing faces of housing and cover
- Check whether O-ring is in good condition.
- Apply a thin film of non-acidic grease to the sealing faces.
- Preserve joint surfaces with an acid-free corrosion protection agent.



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

- Replace cover on switch compartment and fasten bolts evenly crosswise.



Touch up possible defects to paint finish after commissioning.

19. Controls AUMA MATIC BASIC ExC

During all work at the AUMA MATIC BASIC ExC observe:



Work at the open actuator under voltage must only be performed if it is assured that for the duration of the work there is no danger of explosion.

19.1 Removal of the local controls

The local controls need only be removed when settings at the controls have to be performed (subclause 19.2 to 19.4).

- Remove local controls (figure R-1). The signal and control board is located under the local controls (figure R-2).

Figure R-1: Local controls

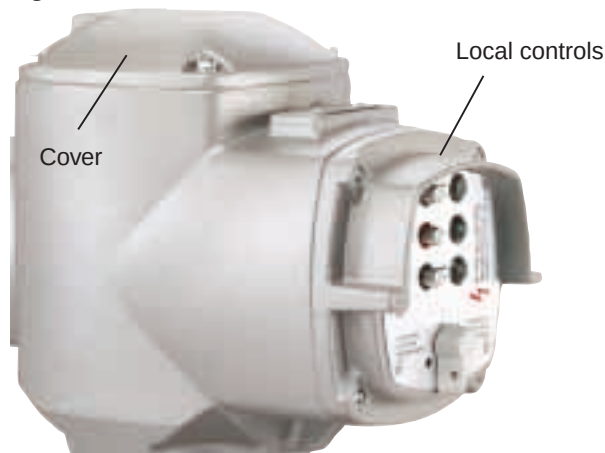
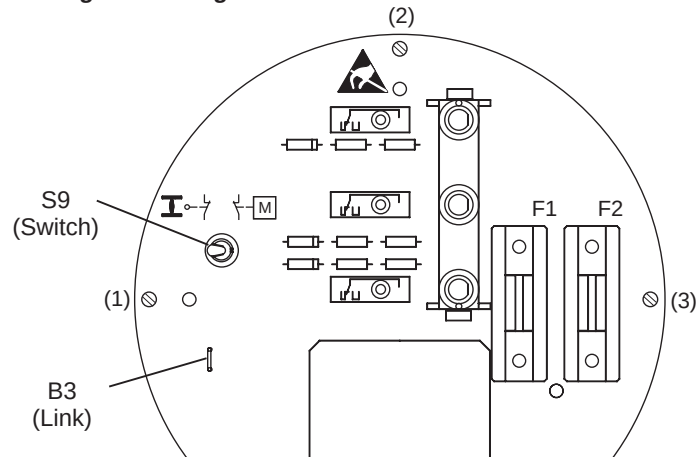


Figure R-2: Signal and control board



19.2 Setting the type of seating in the end position CLOSED

The valve manufacturer states whether switching off in the end position CLOSED should be by limit seating or torque seating.



This setting should only be changed with the consent of the valve manufacturer.

In case the type of seating must be changed at a later date:

Limit seating:

- Set change-over switch S9 (figure R-2) to position **I** .

Actuator switches off in end position CLOSED via limit switch WSR (LSC) (S3, see wiring diagram). The tripping of the torque switch S1 in mid-travel or in the end position switches off the actuator and causes a fault signal.

Torque seating:

- Set change-over switch S9 (figure R-2) to position .

Actuator switches off in the end position CLOSED by torque switch DSR (TSC) (S1, see wiring diagram). The limit switch WSR (LSC) (S3) is used for signalling. It needs to be set in such a way that it is tripped shortly before reaching the end position CLOSED.

If the torque switch trips before the limit switch, the actuator is switched off and a fault signal is given.

19.3 Push-to-run operation or self-retaining in selector switch position LOCAL

Push-to-run operation or self-retaining is set in the factory.
A change at a later date is only possible by cutting the link B3 (see figure R-2).

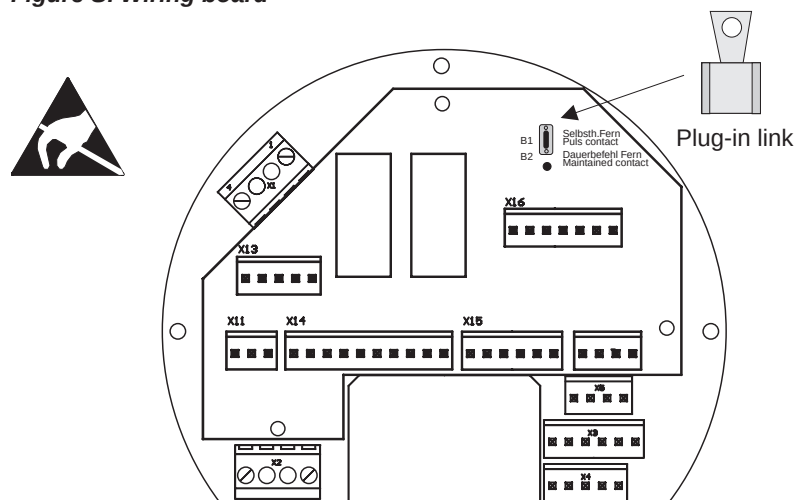
- Remove local controls (figure R-1). The signal and control board is located under the local controls (figure R-2).
Link cut: Push-to-run operation LOCAL.
Link closed: Self-retaining LOCAL.

19.4 Push-to-run operation or self-retaining in selector switch position REMOTE

Push-to-run operation or self-retaining is set in the factory.
If the operation mode must be changed at a later date:

- Loosen the three screws (1–3) and remove signal and control board (figure R-2), but do not interrupt plug-in connections.
- Move red plug-in link (figure S) on wiring board.

Plug-in link on	B1		Self-retaining REMOTE
	B2		
	B1		
Plug-in link on	B2		Push-to-run operation REMOTE (Maintained contact REMOTE)

Figure S: Wiring board

- Fit signal and control board (figure R-2) again.

19.5 Fitting the local controls

- Clean sealing faces of housing and cover
- Check whether O-ring is in good condition.
- Apply a thin film of non-acidic grease to the sealing faces.
- Preserve joint surfaces with an acid-free corrosion protection agent.



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

19.6 Settings on relay board for potential-free feedback (option)

Only valid for versions (BX02 and BX04) with relays K6, K7, K8 on relay board.

Figure T1: Relay board version BX02

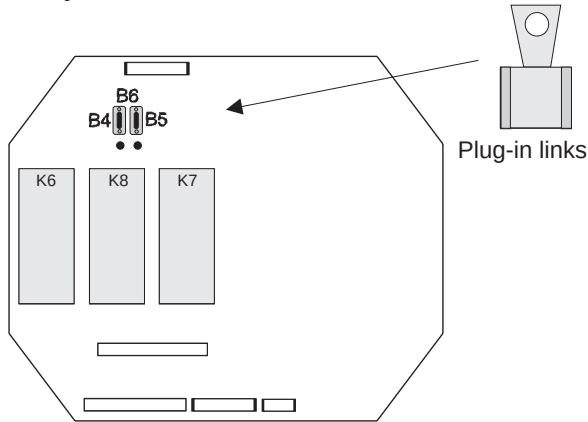
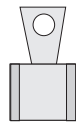
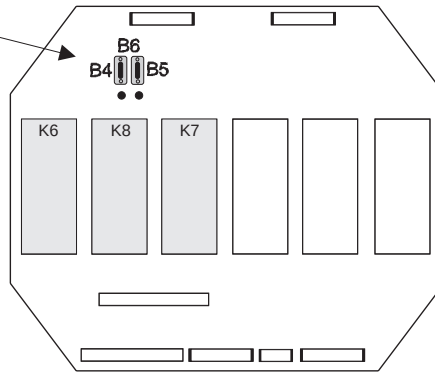


Figure T2: Relay board version BX04

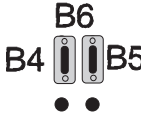
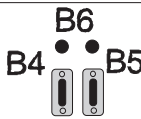
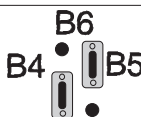
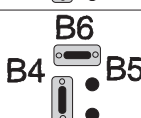
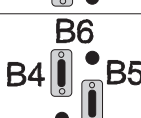


- Remove cover (figure R-1, page 24) of AUMA MATIC BASIC ExC.
- Assign the required functions to the terminals XK ... of the customer connection (see wiring diagram) with the red plug-in links according to table 9.
- Clean sealing faces of housing and cover
- Check whether O-ring is in good condition.
- Apply a thin film of non-acidic grease to the sealing faces.
- Preserve joint surfaces with an acid-free corrosion protection agent.



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

Table 9

Function (Signal on terminal XK ... ¹⁾ active, if the function is correct)	Signal available on terminal ¹⁾	Link
Torque switch tripped in mid-travel and/ or thermoswitch or thermal overload relay tripped	XK 16	
No torque switch tripped in mid-travel	XK 15	
No thermoswitch or no thermal overload relay tripped	XK 13	
No torque switch tripped in mid-travel	XK 15	
Torque switch tripped in mid-travel	XK 16	
no function	XK 13	
No torque switch tripped in mid-travel	XK 15	
Torque switch tripped in mid-travel	XK 16	
No thermoswitch or no thermal overload relay tripped	XK 13	
No torque switch tripped in mid-travel	XK 15	
Torque switch tripped in mid-travel	XK 16	
Thermoswitch or thermal overload relay tripped	XK 13	
Torque switch tripped in mid-travel	XK 16	
No torque switch tripped in mid-travel	XK 15	
no function	XK 13	
Common link to XK 14		
1) refer to order-related wiring diagram BSP ... KMS TP ...		

20. Fuses



- **Flameproof enclosure! Before opening, ensure that there is no explosive gas and no voltage.**
- Fuses (figures U1 and U2) are accessible after removal of the local controls (refer to page 24, figure R-2).
- When exchanging the fuses, only fuses with the same values must be used.

Figure U1: Fuses on signal and control board



Figure U2: Fuses on power supply board

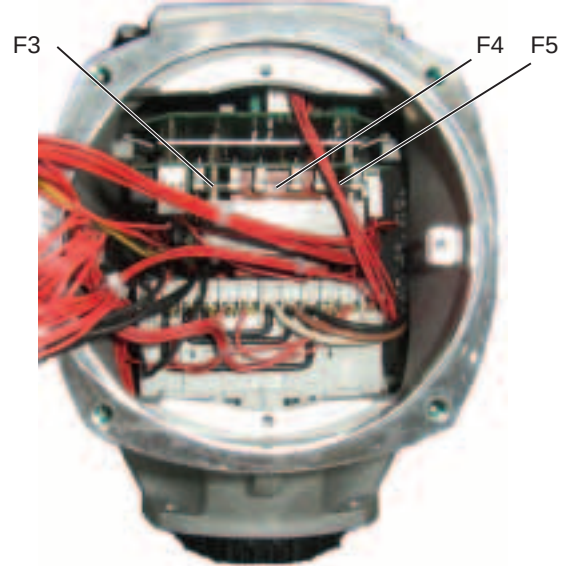


Table 10

G-fuses: (Figure U1 and U2)	1F 1/1F 2 (Board A1, refer to wiring diagram)	F 3/F4 (Board A2, refer to wiring diagram)	F 5 (Board A2, refer to wiring diagram)
Size	6.3 x 32 mm	5 x 20 mm	5 x 20 mm
Control voltage Power supply unit 115 V	1 A T; 500 V	315 mA T	250 mA T
Control voltage Power supply unit 230 V	1 A T; 500 V	160 mA T	160 mA T

1F1/ 1F2: Primary fuses power supply unit

F3: Internal 24 V DC supply

F4: Internal 24 V AC supply (optional: 115 V AC);
Heater, tripping device for PTC thermistors, control reversing contactors

F5: Automatic reset fuse as short-circuit protection (see wiring diagram) for external 24 V DC supply for customer

- After exchanging the fuses screw local controls back on again (refer also to subclause 19.5).



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

21. Maintenance

For any maintenance work, the following should be observed:



- **Regular inspection and maintenance (in 3 year intervals) performed by qualified and trained personnel according to the European standard EN 60079-17 “Inspection and Maintenance of Electrical Installations in Hazardous Areas” is required.**
 - **When working in potentially explosive areas, observe the standard EN 60079-17 “Inspection and Maintenance of Electrical Installations in Hazardous Areas”.**
 - **Work at the open actuator under voltage must only be performed if it is assured that for the duration of the work there is no danger of explosion.**
 - **Pay attention to national regulations.**
- Check actuator visually. Ensure that no outside damage or changes are visible.
The electric connecting cables must be without damage and wired correctly. Do a thorough touch-up of possible damage to paint finish 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. Observe torques according to manufacturer's details. If required, replace the components. Only use components which have a test 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, take care especially of 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).
 - Before fitting, the joint surfaces have to be preserved 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 which affect 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.



- **Flameproof enclosure! Before opening, ensure that there is no explosive gas and no voltage.**
- **Flameproof enclosure! Handle cover and housing parts with care. Joint surfaces must not be damaged or soiled in any way. Housing parts and joint surfaces in particular must not be processed mechanically. Do not jam cover during fitting.**

We recommend additionally:

- If operated seldom, perform a test run about every 6 months. This ensures that the actuator is always ready to operate.
- Approximately six months after commissioning and then every year check bolts between actuator and valve/gearbox for tightness. If required, tighten applying the torques given in table 3, page 8.
- For multi-turn actuators with output drive type A: at intervals of approx. 6 months from commissioning press in Lithium soap EP multi-purpose grease on mineral oil base at the grease nipple with grease gun (quantity see table 4, page 9).

22. Lubrication

- The gear housing is filled with lubricant in the factory.
- A grease change is recommended after the following operation time:
 - If operated seldom after 10 – 12 years
 - If operated frequently after 6 – 8 years



Lubrication of the valve stem must be done separately.

23. Disposal and recycling

AUMA actuators have an extremely long lifetime. However, there will come a time when you have to replace them.

Our actuators have a modular design and may therefore easily be disassembled, separated and sorted according to materials, i.e.:

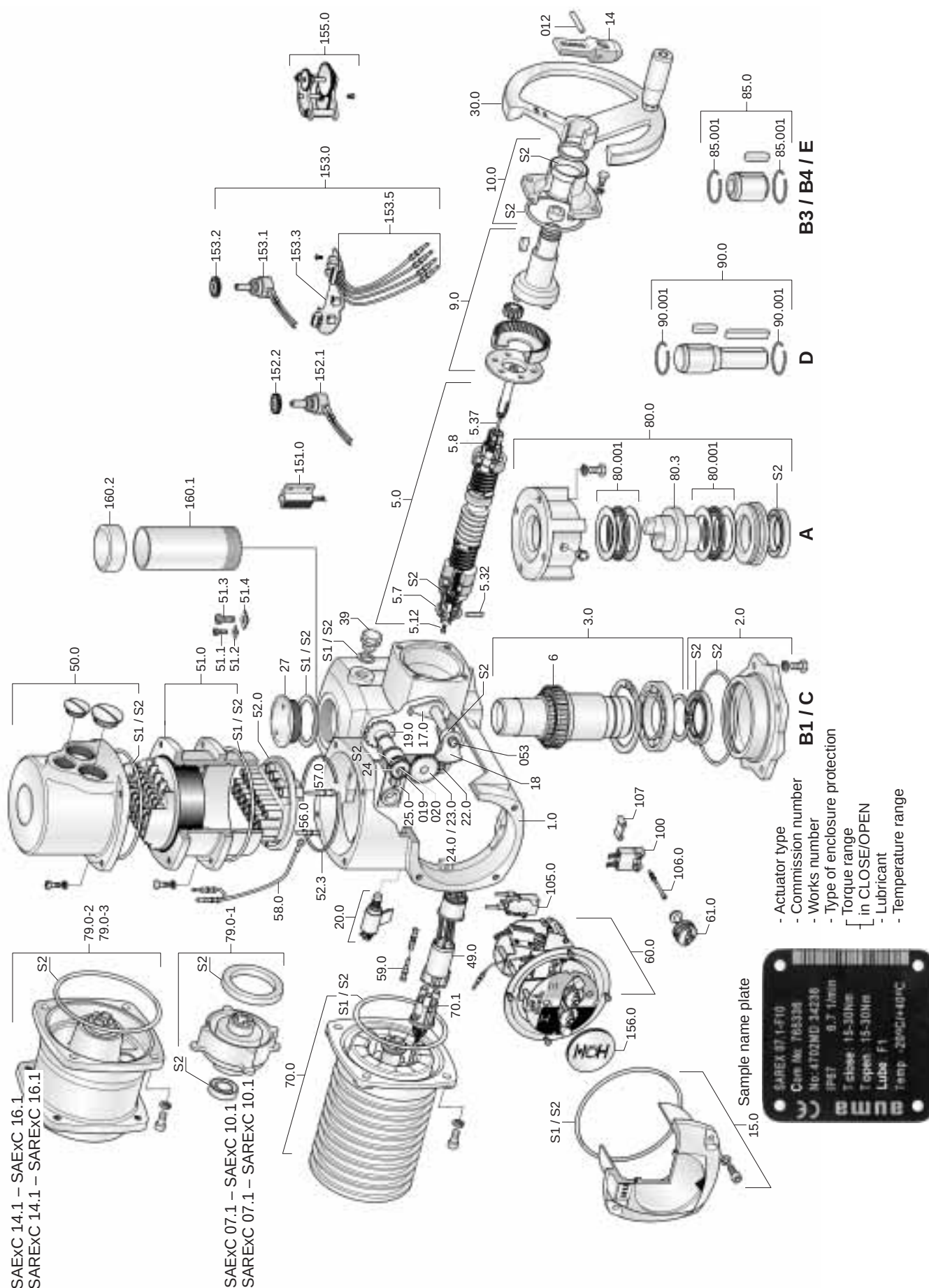
- electronic scrap
- various metals
- plastics
- greases and oils

The following generally applies:

- Collect greases and oils during disassembly. As a rule, these substances are hazardous to water and must not be released into the environment.
- See disassembled material to a sound disposal or to separate recycling according to materials.
- Observe the national regulations for waste disposal.

24. Service

AUMA offers extensive services such as maintenance and inspection for actuators. Addresses of AUMA offices and representatives can be found on page 40 and on the Internet (www.auma.com).



Note:

When placing orders for spare parts, please mention type of actuator and our commission number (refer to name plate).

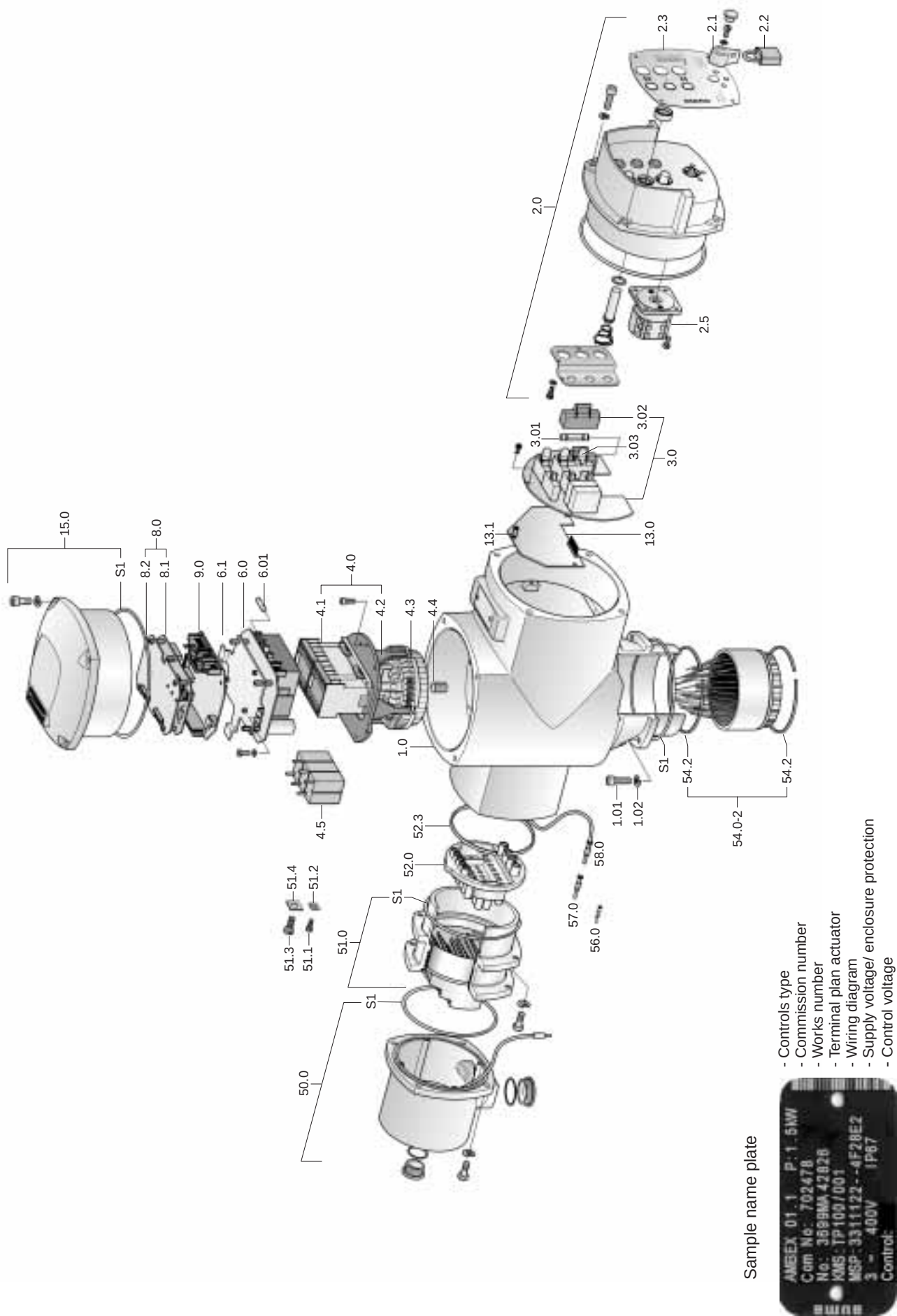
No .	Type	Designation	No.	Type	Designation
012	E	Notched pin	58.0	B	Wire for protective earth
019	E	Cheese head screw	59.0 ¹⁾	B	Pin for motor and thermoswitch in motor plug
020	E	Clamping washer			
053	E	Countersunk screw	60.0	B	Control unit assly. (but without torque head, without switches)
1.0	B	Housing assly.			
2.0	B	Flange, bottom assly.	61.0	B	Torque switching head
3.0	B	Hollow shaft assly. (without worm wheel)	70.0	B	Motor
5.0	B	Worm shaft assly.	70.1 ¹⁾	B	Motor pin carrier without pins)
5.12	E	Grub screw			
5.32	E	Coupling pin	79.0-1 ²⁾	B	Planetary gearing for motor drive assly.
5.37	B	Pull rod assly.	79.0-2 ²⁾	B	Planetary gearing for motor drive assly.
5.7	E	Motor coupling	79.0-3 ²⁾	B	Ex-motor mounting flange
5.8	B	Manual drive coupling assly.	80.0 ³⁾	B	Output drive Form A assly. (without thread in stem nut)
6	E	Worm wheel			
9.0	B	Planetary gear for manual drive assly.	80.001 ³⁾	E	Thrust bearing set
10.0	B	Retaining flange assly.	80.3 ³⁾	E	Stem nut Form A (without thread)
14	E	Change-over lever	85.0 ³⁾	B	Output drive B3
15.0	B	Cover for switch compartment assly.	85.001 ³⁾	E	Snap ring
17.0	B	Torque lever assly.	90.0 ³⁾	B	Output drive D
18	E	Gear segment	90.001 ³⁾	E	Snap ring
19.0	B	Crown wheel assly.	100	B	Switch for limit / torque switching (including pins at wires)
20.0	B	Swing lever assly.			
22.0	B	Drive pinion II for torque switching assly.	105.0	B	Blinker transmitter including pins at wires (without impulse disc and insulation plate)
23.0	B	Drive wheel for limit switching assly.			
24	E	Drive wheel for limit switching	106.0	B	Stud bolt for switches
24.0	B	Intermediate wheel for limit switching assly.	107	E	Spacer
25.0	E	Locking plate	151.0	B	Space heater
27	E	Screw plug	152.1 ³⁾	B	Potentiometer (without slip clutch)
30.0	B	Handwheel with ball handle assly.	152.2 ³⁾	B	Slip clutch for potentiometer
39	E	Screw plug	153.0 ³⁾	B	RWG assly.
49.0 ¹⁾	B	Motor plug, socket assly.	153.1 ³⁾	B	Potentiometer for RWG (without slip clutch)
50.0	B	Cover assly.			
51.0	B	Terminal board assly.	153.2 ³⁾	B	Slip clutch for RWG
51.1	E	Screw - Control terminal	153.3 ³⁾	B	Electronic board RWG
51.2	E	Washer - Control terminal	153.5 ³⁾	B	Wires for RWG
51.3	E	Screw - Power terminal	155.0 ³⁾	B	Reduction gearing
51.4	E	Washer - Power terminal	156.0 ³⁾	B	Mechanical position indicator
52.0	B	Pin carrier (without pins)	160.1 ³⁾	E	Protection tube (without cap)
52.3	E	Circlip	160.2 ³⁾	E	Cap for stem protection tube
56.0	B	Pin for control	S1	S	Seal-kit, small
57.0	B	Pin for motor	S2	S	Seal-kit, large

1) SAExC 16.1 with output speeds 32 to 180 rpm without motor plug/socket assly.; motor directly wired to pin carrier (no. 52.0)

2) Only required for some output speeds

3) Not included in basic equipment

26. Spare parts list controls AMBExC with plug/socket connector

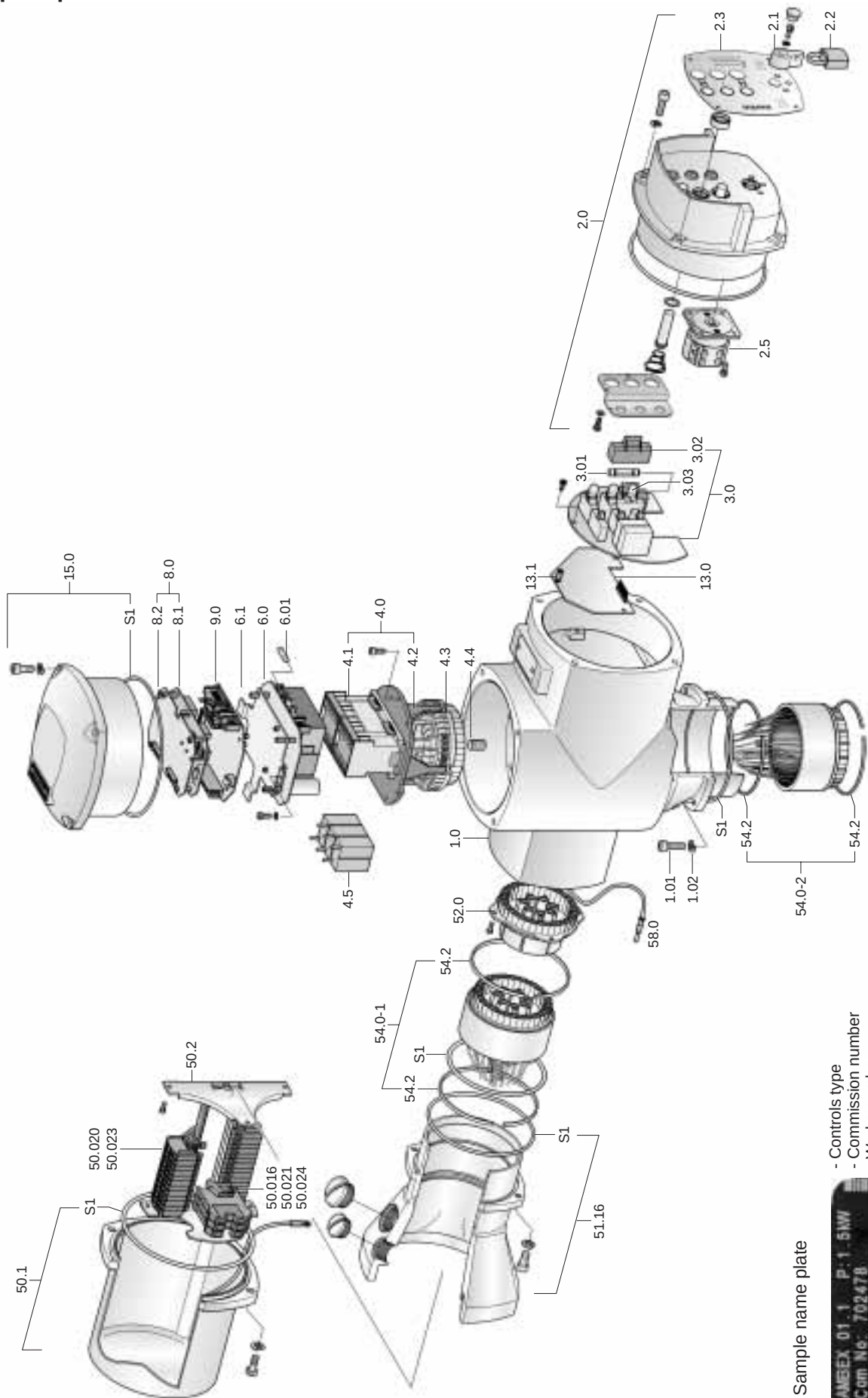


Note:

When placing your order for spare parts, please mention type of the controls and our commission number (refer to name plate)

No.	Type	Designation	No.	Type	Designation
1.0	E	Housing	13.0	B	Wiring board
1.01	E	Hexagon socket head cap screw	13.1	E	Stud
1.02	E	Lock washer	15.0	B	Cover assly.
2.0	B	Cover local controls	50.0	B	Plug cover assly.
2.1	B	Switch knob	51.0	B	Terminal board assly.
2.2	E	Pad lock	51.1	E	Screw - Control terminal
2.3	E	Face-plate for local controls	51.2	E	Washer - Control terminal
2.5	E	Selector switch	51.3	E	Screw - Power terminal
3.0	B	Signal and control board	51.4	E	Washer - Power terminal
3.01	E	Primary fuse	52.0	B	Pin carrier (without pins)
3.02	E	Fuse cover	52.3	E	Circlip
3.03	E	Bulb for indication light	54.0-2	B	Cable conduit assly. (actuator connection)
4.0	B	Contactors assly.	54.2	E	Circlip
4.1	E	Reversing contactors	56.0	B	Pin for controls
4.2	E	Carrier for contactors	57.0	B	Pin for motor
4.3	E	Socket carrier (with sockets)	58.0	B	Protective earth
4.4	E	Grub screw	S1	S	Seal-kit
4.5	E	RC unit			
6.0	B	Power supply			
6.1	B	Mounting plate for power supply			
6.01	S	Secondary fuse			
8.0	B	Relay board assly.			
8.1	B	Relay board			
8.2	E				
9.0	B				

27. Spare parts list controls AMBExC with terminal connection



- Controls type
- Commission number
- Works number
- Terminal plan actuator
- Wiring diagram
- Supply voltage/ enclosure protection
- Control voltage

Sample name plate



Note:

When placing your order for spare parts, please mention type of the controls and our commission number (refer to name plate)

No.	Type	Designation	No.	Type	Designation
1.0	E	Housing	13.0	B	Wiring board
1.01	E	Hexagon socket head cap screw	13.1	E	Stud
1.02	E	Lock washer	15.0	B	Cover assly.
2.0	B	Cover local controls	50.016	E	End piece
2.1	B	Switch knob	50.020	E	Terminal for controls
2.2	E	Pad lock	50.021	E	Terminal for power
2.3	E	Face-plate for local controls	50.023	E	Terminal cover for controls
2.5	E	Selector switch	50.024	E	Terminal cover for power
3.0	B	Signal and control board	50.1	B	Cover assly.
3.01	E	Primary fuse	50.2	B	Terminal frame assly. (without terminals)
3.02	E	Fuse cover	51.16	B	Frame assly.
3.03	E	Bulb for indication light	52.0	B	Pin carrier (without pins)
4.0	B	Contactors assly.	54.0-1	B	Cable conduit assly.(customer connection)
4.1	E	Reversing contactors	54.0-2	B	Cable conduit assly.(actuator connection)
4.2	E	Carrier for contactors	54.2	E	Circlip
4.3	E	Socket carrier (with sockets)	58.0	B	Protective earth
4.4	E	Grub screw	S	S1	Seal-kit
4.5	E	RC unit			
6.0	B	Power supply			
6.1	B	Mounting plate for power supply			
6.01	S	Secondary fuse			
8.0	B	Relay board assly.			
8.1	B	Relay board			
8.2	E				
9.0	B				

28. PTB certificate

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin



(1) EC-TYPE-EXAMINATION CERTIFICATE (Translation)

(2) Equipment and Protective Systems Intended for Use in
Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 01 ATEX 1087



(4) Equipment: multi-turn actuator type SA . ExC.07.1 - SA . ExC.16.1
design Auma Norm and Auma Matic

(5) Manufacturer: Werner Riester GmbH & Co. KG

(6) Address: Renkenrungsstr. 20, 79379 Müllheim, Germany

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

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 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 the confidential report PTB Ex 00-10228.

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

EN 50014:1997+A1+A2

EN 50018:1994

EN 50019:1994

(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 in accordance 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 EEx de IIC T4

Zertifizierungsstelle Explosionsschutz

Braunschweig, September 17, 2001

By order:

Dr.-Ing. U. Klausmeyer
Regierungsdirektor



sheet 1/3

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 106P

(16) Test report: PTB Ex 00-10028

(17) Special conditions for safe use:

none

Special notes for the safe operation:

The mode of operation has to be guaranteed with suitable measures by the operator.

The actuators may only be operated in the mode of operation and under the environmental conditions for which they have been submitted to the type test. When using a PTC and a suitable electronic device for switching-off, the thermal overload relay can be omitted. The actuators are suitable for service at ambient temperatures down to -60 °C if case the routine test is performed with over pressure. The corresponding data can be seen on the name plate.

Components which may be installed or added are only permitted if their technology corresponds at least the standard mentioned on the cover sheet.

Monitoring equipment has to fulfil the requirements of directive DVGWG, appendix II, sub-clause 1.5.5 and EN 1127-1.

Note:

An evaluation of the gaseous compartment is not issued together with this test.

(18) Essential health and safety instructions:

Conform to the above mentioned standards.

Zertifizierungsstelle Explosionsschutz:

Dr. rer. nat.

Dr.-Ing. O. Krausemeyer
Regelungsabteilung

Braunschweig, September 17, 2001

sheet 3/3

EC-Type-examination Certificate without signature and official stamp shall not be valid. This certificate is no substitute for other documents. Errors in translation are subject to approval by the Physikalisch-Technische Bundesanstalt.
No claim of liability for incorrect translations.

Physikalisch-Technische Bundesanstalt • Bundesallee 110 • D 38110 Braunschweig

Physikalisch-Technische Bundesanstalt Braunschweig und Berlin 1st SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 91 ATEX 100T <i>This supplementary certificate shall be included in the document in such a way that the original and complete documents that are required according to EN 50003 contain immediately valid and non-revocable information on this examination.</i> <i>A separate installation and manual must be provided for the portable instruments for connection to accessories with EN 50003, which must meet the quality standard defined below, so that its use at the factory will be proportionally safe as specified in EN 50003:</i> <i>Should these requirements not be met, additional work must be performed only if it represents no further problems for safety and during all of its time, these correcting measures shall also obviously take place, for rules and regulations for incorporation and may be exempted.</i> The assignment of the protection symbol will be based on the types of production of components actually used. Text ref.: PTB Ex-10-1030 Notes for conformity assessment The multi-line actuators may also be controlled by means of suitable cable entries or control systems that meet the requirements of EN 50015, sections 14.1 and 14.2, and for which a separate assessment certificate has been issued. Coverage not used shall be shown as required in DIN EN 10, section 11. This supplement and the EC-type-examination certificate on which it is based, as well as any future supplements thereto shall at the same time be regarded as approvals for Certificates of Conformity PTB No. Ex-ALC 1038, Ex-ALC 1039, Ex-ELC 1037 and Ex-SR E 1019. Performance assessment The tests and the favorable results from three products proved that the multi-line actuators meet the requirements of directive 94/EC as well as those of the standards quoted on the cover sheet.	Braunschweig, October 11, 2012 <i>Sigbert Willebrandt</i> <i>Dr. rer. nat.</i> Director Physikalisch-Technische Bundesanstalt 
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All examinations/certifications which comply with official state law can be used. The certificate has no validity only without reference to the body to which approval is granted by the Physikalisch-Technische Bundesanstalt. In other countries, the Government should be consulted.

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29. Declaration of Conformity and Declaration of Incorporation

auma

EC Declaration of Conformity according to the Directive of the Council for the approximation of law of the Member States relating to the ATEX Directive (94/9/EC) the EMC Directive (89/336/EEC) and the Low Voltage Equipment Directive (73/23/EEC)

AUMA-multi-turn actuators of the type range

SA ExC 07.1 – SA ExC 16.1
SAR ExC 07.1 – SAR ExC 16.1
in versions AUMA NORM,
AUMA SEMIPACT, AUMA MATIC, AUMATIC

are designed and produced to be installed on industrial valves.

Messrs. WERNER RIESTER GmbH & Co. KG as the manufacturer declares herewith, that the above mentioned electric AUMA multi-turn actuators are in compliance with the following directives:

- Equipment and protective systems intended for use in potentially explosive atmospheres (94/9/EC)
- Directive on Electromagnetic Compatibility (EMC) (89/336/EEC)
- Low-Voltage Equipment Directive (73/23/EEC)

The compliance testing of the devices was based on the following standards:

- a) concerning the ATEX Directive
EN 50014: 02/2000 EN 13463-1: 04/2002
EN 50018: 03/1995
EN 50019: 03/1996
EN 50020: 04/1996
EN 1127-1: 10/1997
- b) concerning the Directive on Electromagnetic Compatibility
EN 61000-6-4: 08/2002
EN 61000-6-2: 08/2002
- c) concerning the Low-Voltage Equipment Directive
EN 60204-1
EN 60034-1
VDE 0100-410

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Armaturen- und Maschinenantriebe
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Tel 07631 / 809-0 • Fax 07631 / 809-250

Mühlheim, April 11, 2003

H. Newkötter
H. Newkötter, Managing Director

This declaration does not include any guarantee for certain characteristics.
The safety instructions in the product documentation supplied with the actuators must be observed.

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Declaration of Incorporation according to EC - Machinery Directive 98/37/EC article 4 paragraph 2 (Annex II B)

AUMA multi-turn actuators of the type ranges

SA 07.1 - SA 48.1
SAR 07.1 - SAR 30.1
SA Ex 07.1 - SA Ex 40.1
SAR Ex 07.1 - SAR Ex 16.1
SA ExC 07.1 - SA ExC 16.1
SAR ExC 07.1 - SAR ExC 16.1
in versions AUMA NORM,
AUMA SEMIPACT, AUMA MATIC
or AUMATIC

are designed and produced, as electrical actuating devices, to be installed on industrial valves.

Messrs. WERNER RIESTER GmbH & Co. KG (manufacturer) declares herewith, that when designing the above mentioned electric AUMA multi-turn actuators the following standards were applied:

EN 292 -1
EN 292 -2
EN 60 204 -1
DIN VDE 0100-410
EN 60034-1
EN ISO 5210

AUMA multi-turn actuators covered by this Declaration must not be put into service until the entire machine, into which they are incorporated, has been declared in conformity with the provisions of the Directive.

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Armaturen- und Maschinenantriebe
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Mühlheim, April 11, 2003

H. Newkötter
H. Newkötter, Managing Director

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**Information also available
on the Internet:**

Terminal plan, inspection records and further actuator information can be downloaded directly from the internet by entering the order no. or comm no. (refer to name plate).
Our homepage: <http://www.auma.com>

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