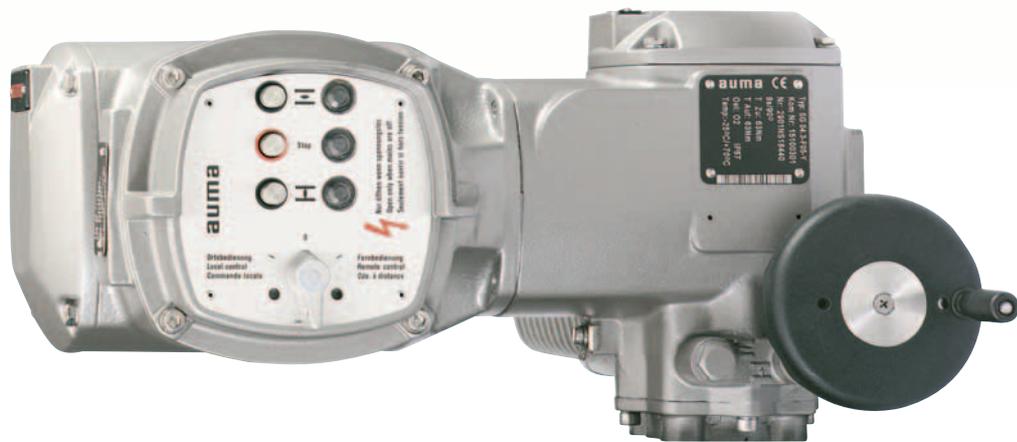


auma®

Electric part-turn actuators

SG 03.3 – SG 04.3
with AUMA MATIC



Certificate Registration No.
12 100/104 4269

Operation instructions

Scope of these instructions: These instructions apply to part-turn actuators of the type range SG 03.3 – SG 04.3 with controls AUMA MATIC. These operation instructions are only valid for "clockwise closing", i.e. driven shaft turns clockwise to the valve.

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1. Safety instructions

1.1 Range of application

AUMA part-turn actuators are designed for the operation of industrial valves, e.g. 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 actuator's designated use.

1.2 Commissioning (electrical connection)

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 24) 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!

The printed circuit boards are equipped with 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.

1.5 Further notes



This pictograph means: Procedure may have been performed by valve manufacturer!

If actuators are delivered mounted to a valve, this step has been done in the valve manufacturer's plant.

Setting must be checked during commissioning!

2. Short description

AUMA part-turn actuators type SG 03.3 - SG 04.3. have a modular design. The actuators are driven by an electric motor and operated with the controls AUMA MATIC, which are included in the scope of supply. Manual operation is possible without change-over.
The limitation of travel is realised via limit switches in both end positions.

3. Technical data

Table 1: Part-turn actuator SG 03.3 – SG 04.3	
Application	
Part-turn actuator	Electrical operation of valves (e.g. butterfly valves and ball valves).
Features and functions	
Type of duty (acc. to IEC 34-1)	Short-time S2 - 15 min ³⁾
Motors	Standard: 1-phase AC motor Option: 3-phase AC motor
Insulation class	F, tropicalized
Motor protection	Standard: Thermoswitch Option: PTC thermistor
Self-locking	yes
Operating times	see table
Swing angle	90° (adjustable from 82° to 98°)
Type of seating	by limit switching
Limit switching	Counter gear mechanism for end positions OPEN and CLOSED Standard: Single switch (1 NC and 1 NO) for each end position Option: Tandem switch (2 NC and 2 NO) for each end position, switches galvanically isolated
Limit switching	Not available
Intermediate positions (option)	Electronic intermediate position switches, max. 2 switching points, adjustable (only in combination with electronic position transmitter RWG 6020)
Position feedback signal (options)	Precision potentiometer Electronic position transmitter RWG 6020, 0/4 – 20 mA, voltage supply 24 V DC
Mechanical position indicator	adjustable indicator disc with symbols OPEN and CLOSED, continuous indication
Running indication (option)	in combination with blinker transmitter possible
Heater in switch compartment	Standard: Resistance type heater, 5 W, 24 V DC, internal supply
Manual operation	Manual drive for setting and emergency operation, handwheel does not rotate during electric operation
Handwheel lockable (option)	yes
Electrical connection	
Electrical connection	Standard: AUMA plug/socket connector with screw type connection Option: Double sealed (double sealed plug/socket connector)
Threads for cable glands	Standard: 1 x M20x1.5, 2 x M25x1.5 Options: Pg-threads NPT-threads
Terminal plan	1-phase AC motor: KMS B10101100 (basic version) 3-phase AC motor: KMS A10101100 (basic version)
Valve attachment	
Valve attachment	Dimensions according to EN ISO 5211
Coupling	splined coupling for connection to the valve shaft, part-turn actuator can be repositioned 4 x 90° on coupling Standard: Coupling without bore Options: Machined coupling with bore and keyway, square bore or bore with two-flats
Service conditions	
Enclosure protection according to EN 60 529	Standard: IP 67 Option: IP 68
Corrosion protection	Standard: KN Suitable for installation in industrial units, in water- or power plants with a low pollutant concentration ⁴⁾ Options: KS Suitable for installation in occasionally or permanently aggressive atmosphere with a moderate pollutant concentration (e.g. in wastewater treatment plants, chemical industry) KX Suitable for installation in extremely aggressive atmosphere with high humidity and high pollutant concentration
Ambient temperature	Standard: -25 °C to + 70 °C
Finish coating	Standard: two-component iron-mica combination
Standard colour	AUMA silver-grey (similar to RAL 7037)
Further information	
Reference documents	Product description SG 03.3 - SG 04.3 Dimension sheet SG 03.3 - SG 05.3 Electrical data sheets SG 03.3 - SG 04.3, SGR 03.3 - SG 04.3

Table 2: Actuator controls AUMA MATIC Type AM 01.1

Integral controls AUMA MATIC Type AM 01.1, for direct mounting to:
Part-turn actuator AUMA NORM SG 03.3 – SG 04.3

Electrical connection	Refer to page 11
Supply voltage	Refer to name plate
Motor controls	Standard: Reversing contactors: mechanically and electrically interlocked
Digital inputs (input signals)	Standard: OPEN-STOP-CLOSE Nominal voltage: Standard: 24 V DC, current consumption: 10 – 15 mA per input from internal power supply (max. 50 mA load) or from external source Galvanic isolation: Opto-isolators
Digital outputs	– 4 Output relays: End position OPEN / End position CLOSED/ selector switch LOCAL / selector switch REMOTE – Collective fault signal: Phase failure or power failure/motor protection tripped
Monitor relay (diagnosis LEDs)	– Phase failure or power failure, motor protection tripped
Analogue output (option)	Actual position value (galvanically isolated) E2 = 0/4 - 20 mA
EMERGENCY operation (option)	effective in selector switch positions LOCAL, OFF and REMOTE (see page 22): – End position OPEN – End position CLOSED
Timer (option)	Running time/ pause time independently adjustable (1-30 seconds)
Local controls	– Selector switch LOCAL-OFF-REMOTE, lockable – Push-buttons OPEN-STOP-CLOSE – Indication lights: End position OPEN (green) End position CLOSED (yellow) Fault (red)
Ambient temperature	–25 °C to + 70 °C
Enclosure protection (according to EN 60529)	Standard: IP 67 Option: IP 68

4. Additional information to the legend for wiring diagrams

Information A: A running indication is possible if blinker transmitter (S5) is installed (open-
ing and closing of contacts)
Direction CLOSE: Connections X_K 6 - X_K 7
Direction OPEN: Connections X_K 6 - X_K 8
The contacts remain closed in the end positions.
When connected to an external PLC the blinking signal can be switched off
via the DIP-switches (page 21).

Information B: The type of seating in the end positions is determined by the valve manufac-
turer. Setting is possible at the programming switches S1-2 and S3-2 (see
subclause 17.2, page 21). In actuators of the type range SG 03.3 to SG
04.3, the switches must be switched off via limit seating.

For further programming possibilities, e.g. self-retaining in operation mode
REMOTE, see page 21.

Information D: The following faults are registered and can be transmitted to the control
room as a potential-free collective fault signal:
- Power failure
- Phase failure
- Motor protection tripped

Information E: Input signals according to DIN 19 240.
The nominal current of the inputs X_K 2; X_K 3 and X_K 4 is 10- 15 mA. If internal
voltage (X_K 11 / + 24 V or X_K 5 / - 24V) is used for remote control (OPEN,
STOP, CLOSE), it must only be connected via potential-free contacts.

Information F: For part-turn actuators with 3-phase AC motor, the rotating field is corrected through automatic phase inversion in case of incorrect phase sequence. In case of a phase failure the actuator stops. This fault is indicated at LED V14 on the interface board. For collective fault signal see information D.

Information G: Potential-free contacts are available for signals. The internal control voltage (X_K 11 / + 24 V and X_K 5 / - 24V) must not be used for external lamps, relays etc.

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 part-turn actuator is mounted on valve, attach ropes or hooks for the purpose of lifting by hoist to valve and not to part-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 part-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 part-turn actuator immediately to electrical mains, 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:

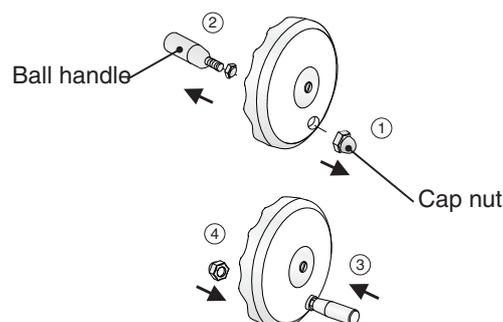
Wooden material boards (OSB)/cardboard/paper/PE film

7. Fitting the ball handle/ manual operation

To avoid damage during transport, the ball handles are fitted to the inside of the handwheel. Prior to commissioning, the ball handle has to be fitted in the correct position.

7.1 Fitting the ball handle

Figure A1



- Remove cap nut.
- Pull out ball handle and re-insert in correct position.
- Fasten with cap nut.
- Remove label from the hand wheel before fitting the ball handle.

7.2 Manual operation

Manual operation is activated by turning the handwheel. A change-over is not required. The handwheel does not rotate during motor operation.

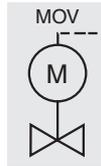


Turning the handwheel during motor operation results in an extension or reduction of the operating time, depending on the direction of rotation.

8. Mounting to valve



- Prior to mounting the part-turn actuator must be checked for any damage. Damaged parts must be replaced by original spare parts.
- After mounting to valve, touch up any possible damages to paint finish.



- For **butterfly valves** the recommended mounting position is end position CLOSED. (Prior to mounting, bring the part-turn actuator to the mechanical end stop CLOSED by turning the handwheel clockwise).
- For **ball valves** the recommended mounting position is end position OPEN. (Prior to mounting, bring the part-turn actuator to the mechanical end stop OPEN by turning the handwheel counter-clockwise).
- Thoroughly degrease mounting faces of part-turn actuator and valve.
- Place coupling sleeve on to valve shaft and secure (refer to figure A2, detail A or B), ensure that dimensions X, Y and Z are observed (refer to table 3).
- Apply non-acidic grease at splines of coupling.
- Fit actuator so that fixing holes in actuator and valve mounting flange are in alignment.
If necessary, move actuator up or down one tooth on the coupling.
If required, turn handwheel a little in direction OPEN or CLOSE until holes align to the threads.
- Ensure that the spigot (if provided) mates uniformly in the recess and that the mounting faces are in complete contact.
- Fasten the actuator with bolts of minimum quality 8.8 using lock washers. Fasten bolts crosswise to the appropriate torque according to table 3.

Figure A2

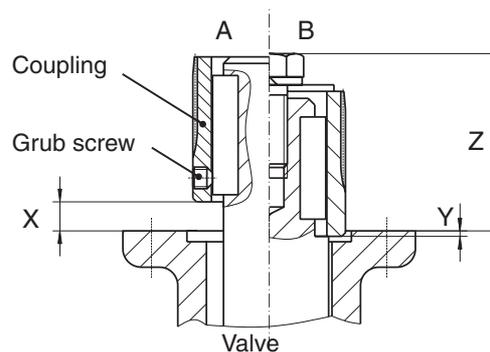


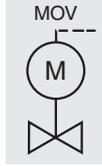
Table 3

Type	X max	Y max	Z max	8.8	T _A [Nm]
SG 03.3/04.3-F04	10	0	37	4 x M 5	6
SG 03.3/04.3-F05	8	2	35	4 x M 6	11
SG 03.3/04.3-F07	8	2	35	4 x M 8	25

9. Checking the end stops

This check can only be performed on valves which are not yet mounted into a pipeline.

9.1 Setting of end stop CLOSED



- Check whether mechanical end position of the valve corresponds to the mechanical end stop of actuator by turning at handwheel (clockwise for end position CLOSED)
- If necessary, remove screw plug (22.1, figure B1) and adjust mechanical end stop at hex. socket head cap screw (21.1, figure B3). Turning clockwise results in smaller, turning counter-clockwise results in larger swing angles.



- **Never remove the screws (21.2, figure B2 and 21.1, figure B3) completely, because this will cause oil leakage.**
- **Observe dimension T_{min} .** (subclause 9.3).

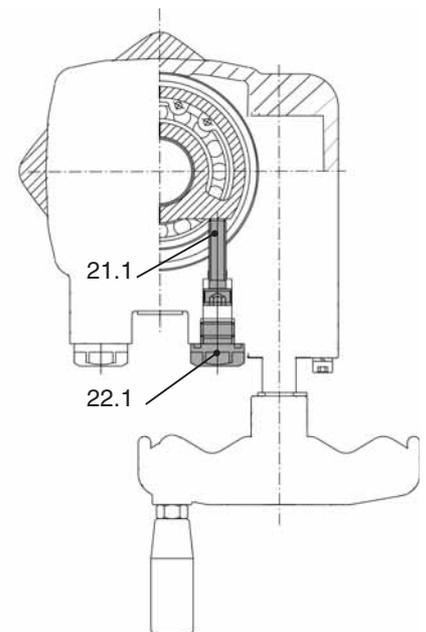
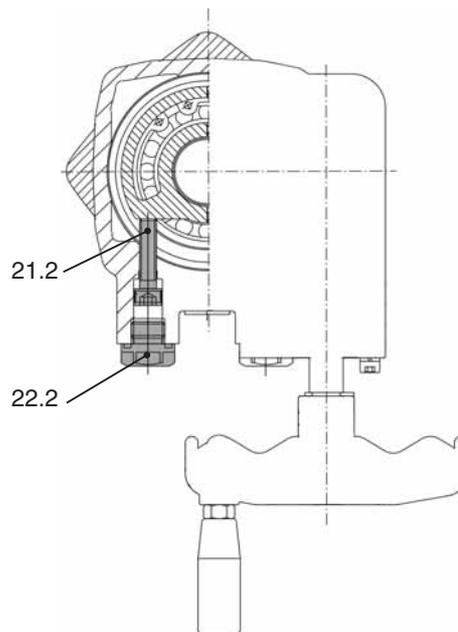
- Check O-ring in screw plug and replace if damaged.
- Replace and fasten screw plug (22.1, figure B1).

Figure B1

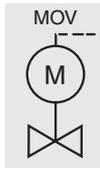


Figure B2: Setting end position OPEN (top view)

Figure B3: Setting end position CLOSED (top view)



9.2 Setting of end stop OPEN



The swing angle has been set in the factory to approx. 90° or to the swing angle stated in the order. An adjustment might be necessary if the end stop CLOSED has been re-adjusted.

- Check whether mechanical end position of the valve corresponds to the mechanical end stop of actuator by turning at handwheel (counter-clockwise for end position OPEN)
- If necessary, remove screw plug (22.2, figure B2) and adjust mechanical end stop at hex. socket head cap screw (21.2, figure B2).
- Check O-ring in screw plug and replace if damaged.
- Replace and fasten screw plug (22.2).

9.3 Setting values for mechanical end stops

Figure B4: (top view)

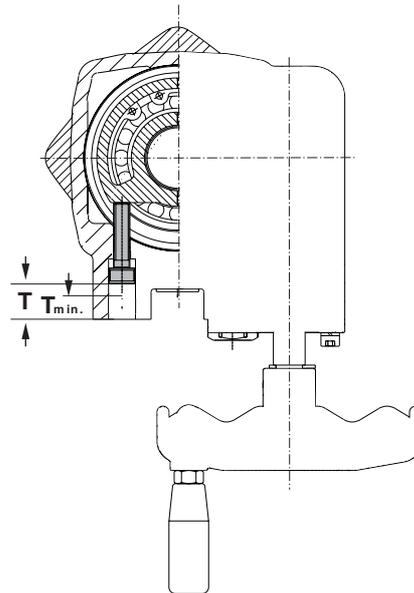
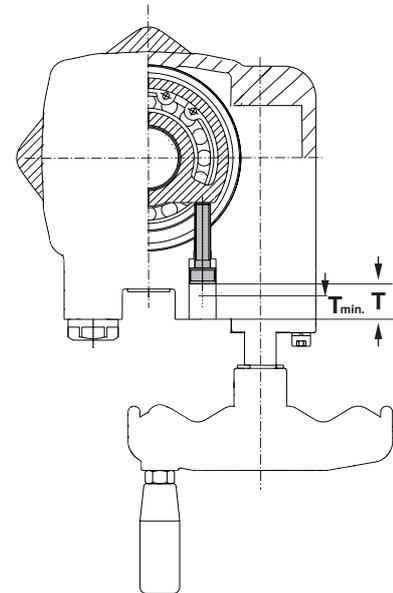


Figure B5: (top view)



Basic factory setting for 90° swing angle:

Swing angle ¹⁾		SG 03.3/ SG 04.3
Dimension T (factory setting)	mm	13.5
Dimension T _{min.} ²⁾	mm	9

1) By turning at the hex. socket head cap screw for end stop CLOSED or OPEN the end position changes accordingly.
The swing angle can be checked and set by using the dimension T.

2) If T_{min.} is not reached, the gearing might be damaged.

For each turn of the hex. socket head cap screw, the setting of the end position changes by:

for clockwise turn approx.:	3.3°
for counter-clockwise turn approx.:	2.4°



The limitation of travel is realised via limit switches (page 13) in both end positions. For this reason the end stops of the actuator have to be set to a slightly larger swing angle (approx. by 2° larger) than the swing angle actually required by the valve.

10. Electrical connection



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.

Figure C1: Wall bracket (accessory)



Connecting cable to the actuator

AUMA part-turn actuators SG are operated via the controls AUMA MATIC. The controls may either be mounted directly to the actuator or to a separate wall bracket.

When installing the MATIC on a wall bracket, observe the following points:

- For the connection of actuator and MATIC on wall bracket, use suitable flexible and screened connecting cables. (Connecting cables are available on request, see address list page 32).
- The max. permissible cable length between actuator and the controls AUMA MATIC is 100 m.
- For position feedback an electronic position transmitter in 4-wire system must be used.
- Connect cables according to wiring diagram MSP
- Check the direction of rotation before switching on (see page 15).

10.1 Connection with AUMA plug/ socket connector

Figure C2: Connection



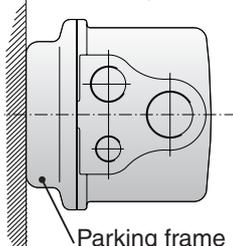
- Check whether type of current, supply voltage and frequency correspond to motor data (refer to name plate at motor / AUMA MATIC).
- Loosen bolts (26.01) (figure C2) and remove plug cover (26.0).
- Loosen screws (26.2.5) and remove socket carrier (26.2) from plug cover (26.0).
- Insert cable glands 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 wiring diagram MSP. . . Connect KMS B . . . The wiring diagram applicable to the actuator is attached to the handwheel in a weather-proof bag, together with the operation instructions. In case the wiring diagram is not available, it can be obtained from AUMA (state commission no., refer to name plate) or downloaded directly from the Internet (see page 31).

Figure C3: Parking frame (accessory)



A special parking frame for protection against touching the bare contacts and against environmental influences is available (see address list, page 32).

Table 4: Technical data AUMA plug/ socket connector

Technical data	Motor power connections ¹⁾	Protective earth	Control pins
No. of contacts max.	6 (3 are used)	1 (leading contact)	50 pins / sockets
Marking	U1, V1, W1, U2, V2, W2	according to VDE	1 to 50
Voltage max.	750 V	–	250 V
Current max.	25 A	–	16 A
Type of customer connection	Screws	Screw for ring lug	Screws
Cross section max.	6 mm ²	6 mm ²	2.5 mm ²
Material: Pin / socket carrier	Polyamide	Polyamide	Polyamide
Contacts	Brass (Ms)	Brass (Ms)	Brass, tin plated or gold plated (option)

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

10.2 Heater

AUMA part-turn actuators have a heater installed as standard. Unless ordered otherwise, the heater is internally supplied.

10.3 Motor protection

In order to protect the motor against overheating a thermoswitch is embedded in the motor windings. The controls AUMA MATIC switch off the motor as soon as the max. permissible windings temperature is reached. After the motor has cooled down to a temperature of approx. 90 °C, the actuator can be switched on again.

10.4 Remote position transmitter

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

10.5 Type of seating

The limitation of travel is realised via limit switches in both end positions. A torque sensor is not available.

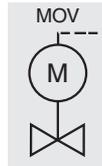


A torque seating is not permissible. The switches S1-2 and S3-2 on the logic board (page 21) must be set to limit seating.

10.6 Fitting of the cover

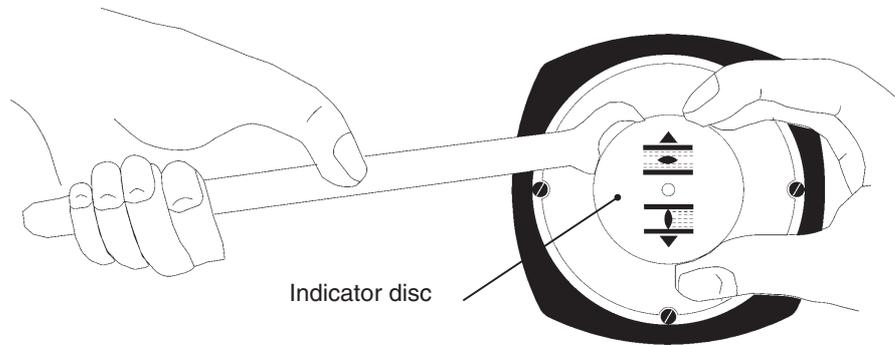
- After completion of the power supply connection, insert the socket carrier (26.2), see figure C2, page 11, into the plug cover (26.0) and fasten it with screws (26.2.5).
- Clean sealing faces at plug cover (26.0) and check whether O-ring is in good condition. Apply a thin film of non-acidic grease (e.g. Vaseline) to the sealing faces.
- Replace plug cover (26.0) and fasten 4 bolts (26.01) evenly crosswise.
- Fasten cable glands firmly to ensure required enclosure protection.

11. Setting the limit switching



- Take off cover at switch compartment.
- Pull off indicator disc (figure D). Open end spanner (approx. 14 mm) may be used as lever.

Figure D



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

11.1 Setting for end position CLOSED (black section)

- Turn handwheel clockwise until valve is closed.
- Turn handwheel approx. 1 turn in direction OPEN and then half a turn in direction CLOSED.
- **Press down** and turn setting spindle A (figure E) with screw driver (5 mm) in direction of arrow, thereby observe switch cam B. While a ratchet is felt and heard, the switch cam B moves 90° every time. When switch cam B is 90° from the switch, continue turning slowly. When the switch cam B snaps and trips the switch, stop turning and release setting spindle. If you override the tripping point inadvertently (ratchet is heard after the switch cam has snapped), continue turning the setting spindle in the same direction and repeat the setting process.

Figure E



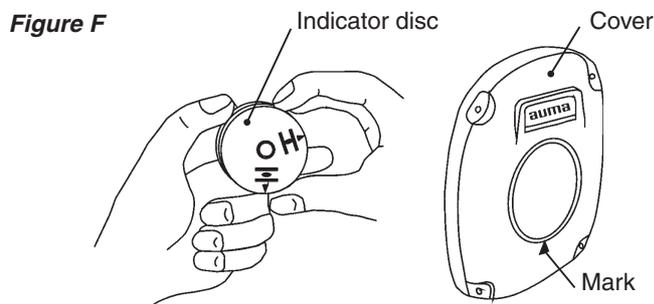
11.2 Setting for end position OPEN (white section)

- Turn handwheel counter-clockwise until valve is open.
- Turn handwheel approx. 1 turn in direction CLOSE and then half a turn in direction OPEN.
- **Press down** and turn setting spindle D (figure E) with screw driver (5 mm) in direction of arrow, thereby observe switch cam E. While a ratchet is felt and heard, the switch cam E moves 90° every time. When switch cam E is 90° from the switch, continue turning slowly. When the switch cam E snaps and trips the switch, stop turning and release setting spindle.
If you override the tripping point inadvertently (ratchet is heard after the switch cam has snapped), continue turning the setting spindle in the same direction and repeat the setting process.

12. Setting of mechanical position indicator

Indicator disc rotates approximately 90° at full travel from OPEN to CLOSED or vice versa.

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

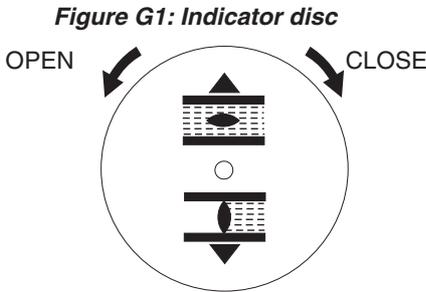


13. Test run

Check direction of rotation :

This test is only required when mounting the controls AUMA MATIC on the wall bracket and part-turn actuator with 3-phase AC motor (see page 11). When the MATIC controls are mounted directly to the actuator, the automatic phase correction ensures the correct direction of rotation, even if the phases are crossed over during electrical installation.

- The direction of rotation of the indicator disc (figure G1) indicates the direction of rotation of the output drive.
- Engage manual operation as described under clause 7 on page 7.
- Move actuator manually to intermediate position.
- Set selector switch to local control (I)(figure G2).
- Switch on the mains voltage.
- Operate push-button CLOSE and observe the direction of rotation:



Direction of rotation of the indicator disc:	
clockwise	correct

- **If the direction of rotation is wrong switch off immediately:**
Afterwards correct phase sequence in the connecting cable from the wall bracket to the actuator and repeat test run.

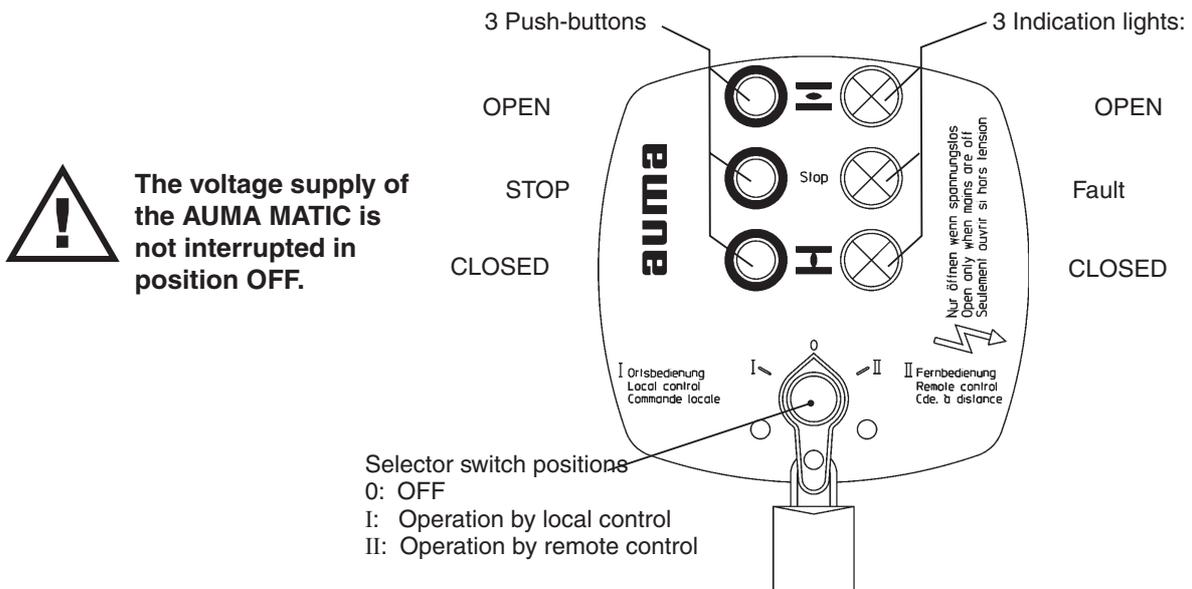
Checking the limit switching:

- Set selector switch to position OFF (0) (figure G2).
- Switch on the mains voltage.
- Engage manual operation as described under clause 7 on page 7.
- Move actuator manually into both end positions of the valve.
- Check if limit switching is set correctly for both end positions. 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 under clause 11 on page 13.

When limit switching is set correctly:

- Perform test run at local controls with selector switch in position LOCAL (I) via push-buttons (figure G2).

Figure G2: Local controls



If no optional components (clauses 14 to 16.) require setting:

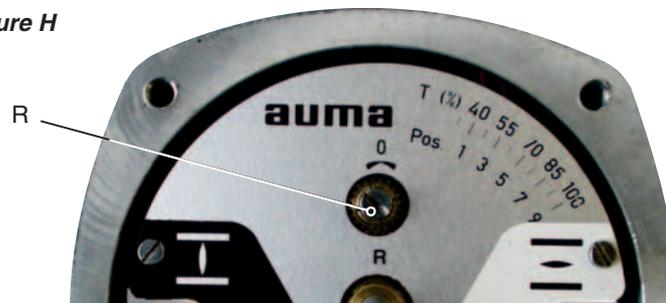
- Clean sealing faces at cover and housing; check whether O-ring is in good condition. Apply a thin film of non-acidic grease to the sealing faces.
- Replace cover on switch compartment and fasten bolts evenly crosswise.

14. Setting of the potentiometer (option)

— For remote indication —

- Move valve to end position CLOSED.
- Take off cover at switch compartment.
- Take off indicator disc.
- Turn potentiometer (R) counter-clockwise until stop is felt. End position CLOSED corresponds to 0 %, end position OPEN to 100 %.
- Turn potentiometer (R) slightly back from the stop.
- Perform fine-tuning of the zero point at external setting potentiometer (for remote indication).
- Press indicator disc on shaft and perform setting as described on page 14, clause 12.
- Clean sealing faces at cover and housing; check whether O-ring is in good condition. Apply a thin film of non-acidic grease to the sealing faces.
- Fit and fasten switch compartment cover.

Figure H



15. Setting of electronic position transmitter RWG (option)

- For remote indication or external control -

After mounting the part-turn actuator to the valve, check setting by measuring the output current (see subclause 15.1 or 15.2) and re-adjust, if necessary.

Table 5: Technical data RWG 6020

Wiring diagrams		KMS B_ _ _ _ R _ / _ _ (requires 2 external wires) 4-wire system	KMS B_ _ _ _ Z _ / _ _ KMS B_ _ _ _ Z _ / _ _ (requires 2 external wires) 2-wire system
Output current	I_a	0 - 20 mA, 4 - 20 mA	4 - 20 mA
Supply voltage	U_v	internal supply 24 V DC	external supply 12 V DC + ($I \times R_B$), max. 30 V
Max. input current	I	25 mA at 20 mA output current	20 mA
Max. load	R_B	600 Ω	$(U_v - 12 \text{ V}) / 20 \text{ mA}$

15.1 Setting of 2-wire system 4 – 20 mA and 4-wire system 0 – 20 mA

The 2-wire system cannot be used in combination with the intermediate position detection (page 19).



- Connect voltage for electronic position transmitter.
- Move valve to end position CLOSED.
- Take off cover at switch compartment.
- Take off indicator disc.
- Connect ammeter for 0 -20 mA to measuring points (MP1/ MP2) (figure J).
In end position CLOSED with 4-wire system the value after setting must be 0 mA, for 2-wire system it must be 4 mA.



The circuit (external load) must be connected (observe max. ext. load R_B), or the appropriate poles at the AUMA plug/ socket connector must be linked (refer to terminal plan), otherwise no value can be measured.

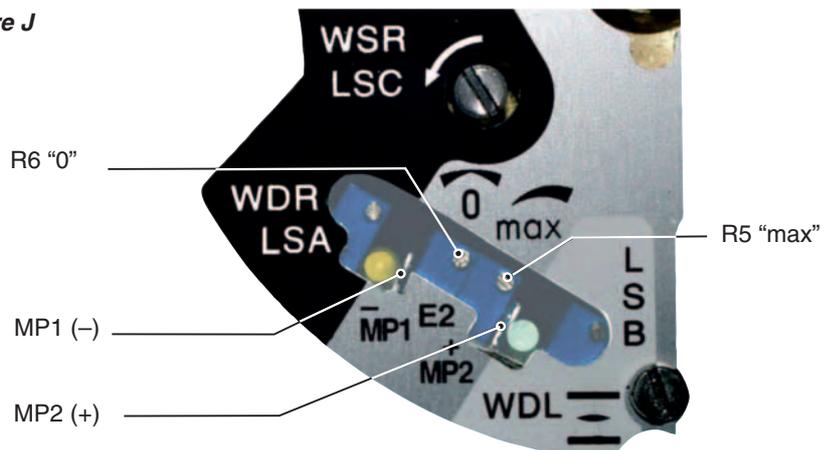
- Turn potentiometer (R) counter-clockwise until stop is felt.
- Turn potentiometer (R) slightly back from the stop.

Figure H



- Turn trimmer potentiometer (R6 - "0") clockwise until output current starts to increase.
- Turn back trimmer potentiometer (R6 - "0") until a residual current of approx. 0.1 mA (or 4.1 mA in case of 2-wire system) is reached. This ensures that the signal remains above the dead and live zero point.
- Move valve to end position OPEN.
- Set to end value 20 mA with trimmer potentiometer (R5 - "max").
- Approach end position CLOSED anew and check minimum value (0 mA or 4 mA). If necessary, correct the setting.
- Press indicator disc on shaft and perform setting as described on page 14, clause 12.
- Clean sealing faces at cover and housing; check whether O-ring is in good condition. Apply a thin film of non-acidic grease to the sealing faces.
- Replace cover on switch compartment and fasten bolts evenly crosswise.

Figure J



15.2 Setting of 4-wire system 4 – 20 mA



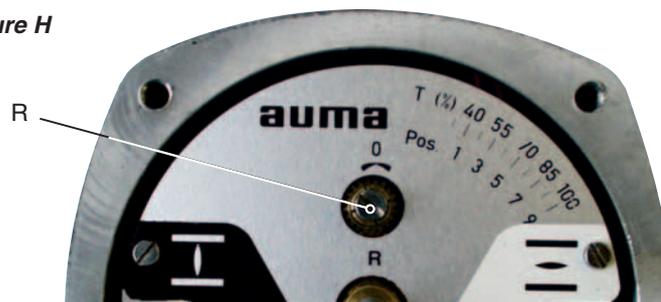
- Connect voltage for electronic position transmitter.
- Move valve to end position CLOSED.
- Take off cover at switch compartment.
- Take off indicator disc.
- Connect ammeter for 0 -20 mA to measuring points (MP1/ MP2) (figure J).



The circuit (external load) must be connected (observe max. ext. load R_B), or the appropriate poles at the AUMA plug/ socket connector must be linked (refer to terminal plan), otherwise no value can be measured.

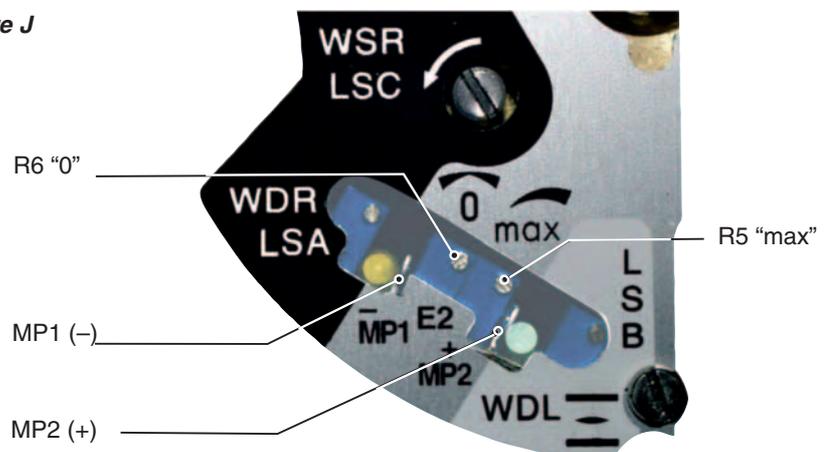
- Turn potentiometer (R) counter-clockwise until stop is felt.
- Turn potentiometer (R) slightly back from the stop.
-

Figure H

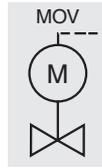


- Turn trimmer potentiometer (R6 - "0") clockwise until output current starts to increase.
- Turn back potentiometer (R6 - "0") until a residual current of approx. 0.1 mA is reached.
- Move valve to end position OPEN.
- Set trimmer potentiometer (R5 - "max.") to end value 16 mA.
- Move valve to end position CLOSED.
- Set potentiometer (R5 - "max.") 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.
- Press indicator disc on shaft and perform setting as described on page 14, clause 12.
- Clean sealing faces at cover and housing; check whether O-ring is in good condition. Apply a thin film of non-acidic grease to the sealing faces.
- Replace cover on switch compartment and fasten bolts evenly crosswise.

Figure J



16. Setting of the electronic intermediate position detection (option)



Any application can be switched **on or off** via the two intermediate position switches WDR/LSA and WDL/LSB.

The intermediate position detection is set in the factory according to order details. If the customer requirements have not been mentioned in the order, the intermediate positions have been set to 5 mA (WDR/LSA) and 15 mA (WDL/LSB)

In case other intermediate positions are required they have to be set as follows:

- Connect voltage for electronic position transmitter.
- Take off cover at switch compartment.

Figure K

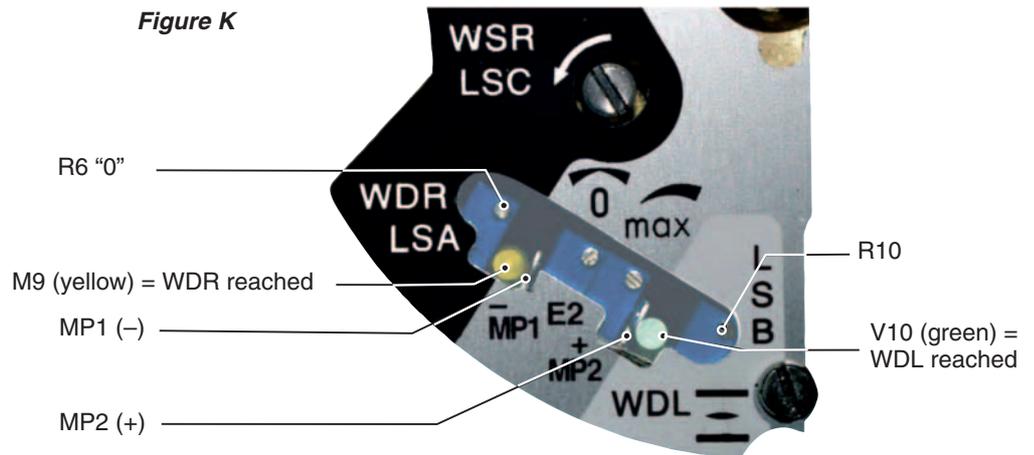


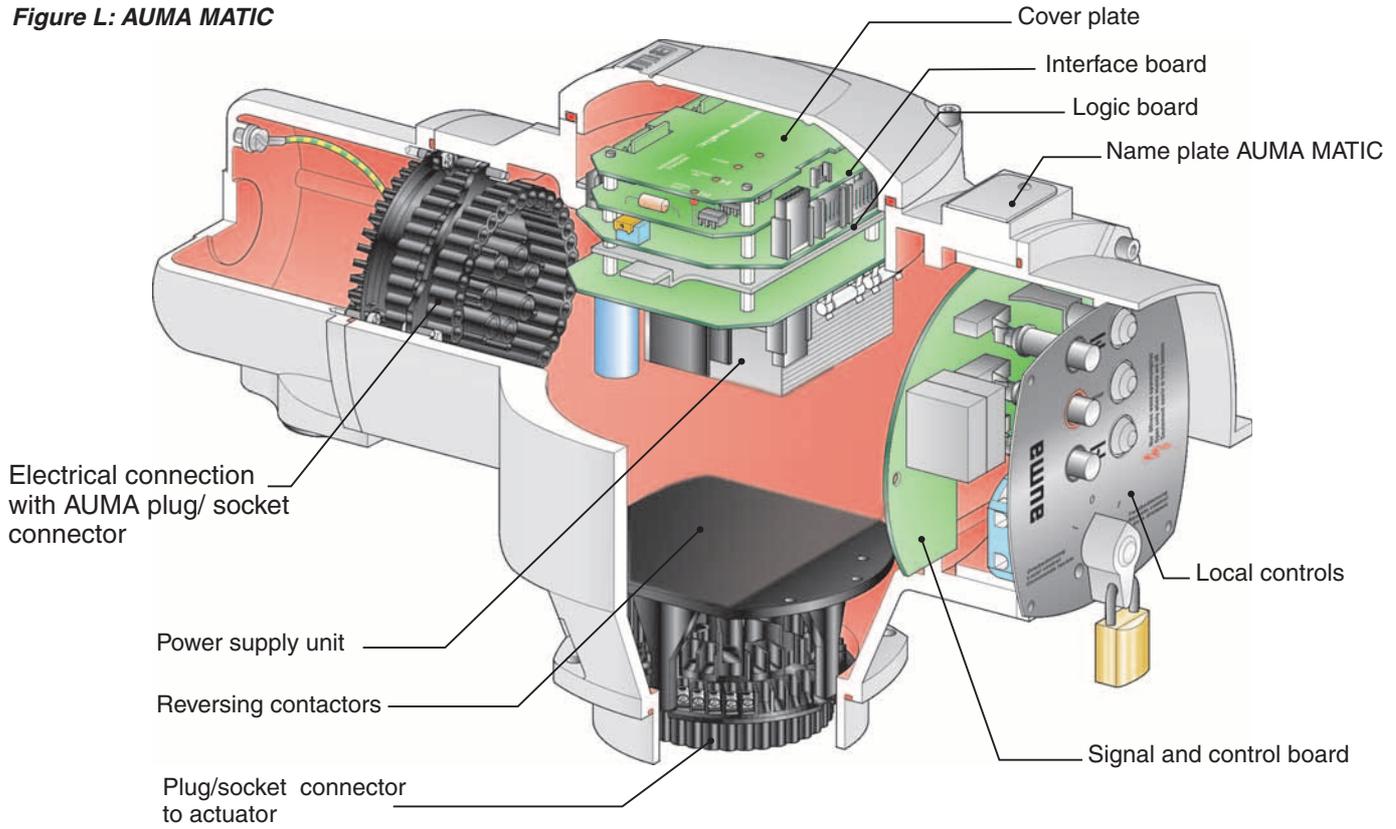
Table 6

No	Colour	Function	Description
V9	yellow	is illuminated:	The current, and consequently, the position have reached the set value
		is not illuminated: no WDR/LSA	the intermediate position WDR has not yet been reached
V10	green	is illuminated: WDL/LSB	The current, and consequently, the position have reached the set value
		is not illuminated: no WDR/LSB	the intermediate position WDL has not yet been reached

- Move valve to end position CLOSED.
- Connect ammeter for 0 - 20 mA to measuring points (MP1/ MP2). (Measured value for normal operation = 0 mA or 4 mA, for inverse operation = 20 mA)
- Turn trimmer potentiometer (R9) clockwise, until the yellow LED V9 is no longer illuminated.
- Move valve in direction OPEN. Stop the actuator when reaching the desired intermediate position (WDR/LSA).
- Turn trimmer potentiometer (R9) counter-clockwise, until the yellow LED V9 is illuminated. The intermediate position WDR/LSA is now set.
- Move valve to end position OPEN. (Measured value for normal operation = 20 mA, for inverse operation = 0 mA or 4 mA)
- Turn trimmer potentiometer (R10) counter-clockwise, until the green LED V10 is no longer illuminated.
- Move valve in direction CLOSE. Stop the actuator after reaching the desired intermediate position (WDL/LSB).
- Turn trimmer potentiometer (R10) clockwise, until the green LED V10 is illuminated. The intermediate position WDL/LSB is now set.
- Clean sealing faces at cover and housing; check whether O-ring is in good condition. Apply a thin film of non-acidic grease to the sealing faces.
- Replace cover on switch compartment and fasten bolts evenly crosswise.

17. Programming AUMA MATIC

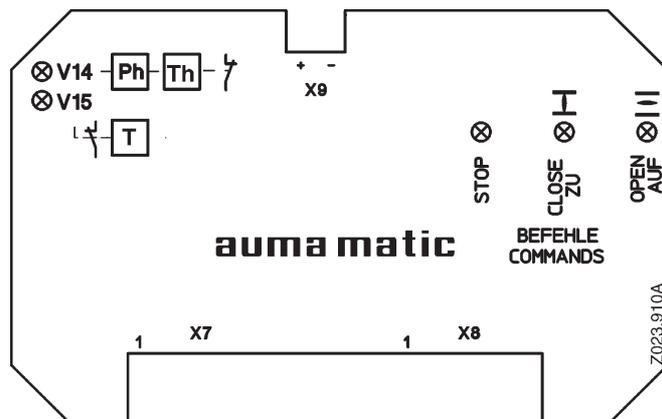
Figure L: AUMA MATIC



17.1 Functions of the diagnosis LEDs on the interface board (standard version)

V14 is illuminated: Phase failure and/ or motor protection tripped;
V15: no function

Figure Q1: Cover plate above interface board



LEDs STOP, CLOSE, OPEN
indicate available remote control commands.

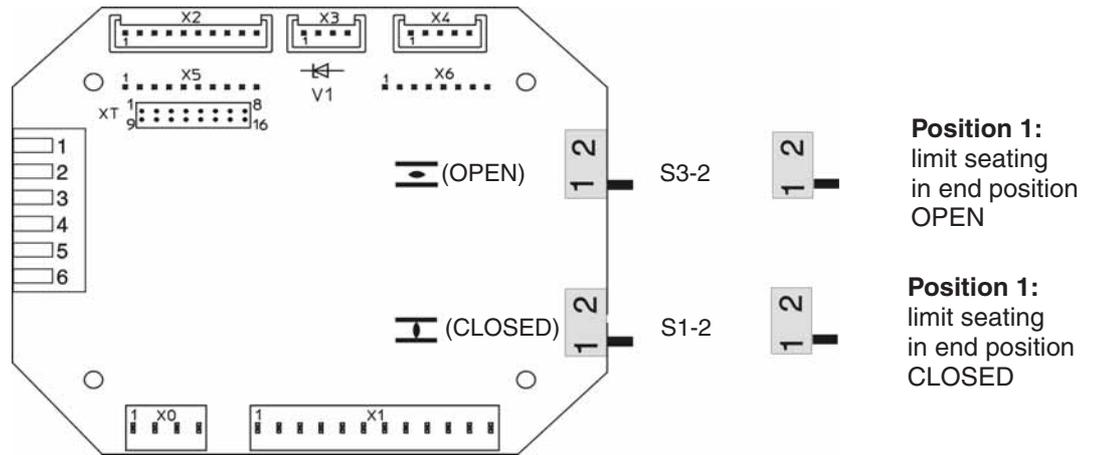
17.2 Programming of the logic board

The limitation of travel is realised via limit switches in both end positions.



A torque seating is not permissible. The switches S1-2 and S3-2 must be set to limit seating (position 1) .

Figure Q2: Logic board A2



- Set desired programming according to table 7 at the switch S2-2.

Table 7

DIP switch S2-2	Programming (ON = pressed)	
	Direction CLOSE	Direction OPEN
Self-retaining REMOTE	OFF ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	OFF ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6
Push-to-run operation REMOTE	OFF ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	OFF ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6
Self-retaining LOCAL	OFF ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	OFF ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6
Push-to-run operation LOCAL	OFF ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	OFF ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6
	activated	deactivated
Blinker transmitter (option)	OFF ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	OFF ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6
no function	OFF ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	

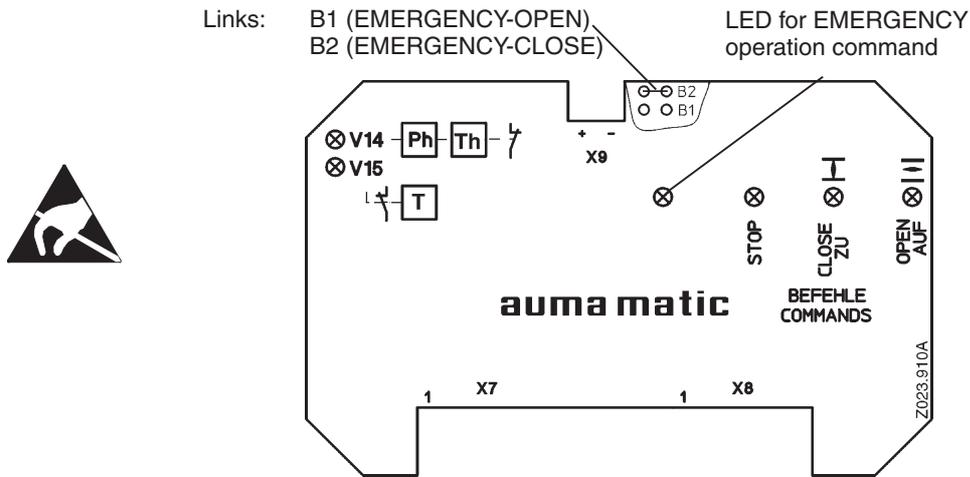
17.3 EMERGENCY-OPEN and EMERGENCY-CLOSE signal (option)

(5th digit in wiring diagram MSP ... C, D or P)

When an EMERGENCY run command is given the actuator operates the valve to the predetermined end position (effective in all three selector switch positions: LOCAL, OFF, REMOTE).

- The input at terminal X_k 1 (refer to wiring diagram) must be connected to a NC-contact (closed circuit principle) at + 24 V DC.
- If EMERGENCY-OPEN or EMERGENCY-CLOSE signal is generally not desired:
Disconnect links B1 (for EMERGENCY-CLOSE) and B2 (for EMERGENCY-OPEN).

Figure M: Cover plate for option EMERGENCY-OPEN or EMERGENCY-CLOSE



18. Timer (option)

With the timer board the operating time can be increased for the entire or any portion of the valve travel.

Example:

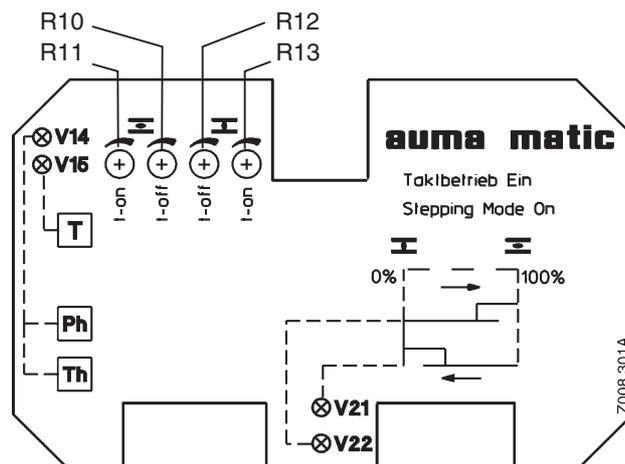
In order to avoid water hammer in long pipelines, stepping mode can be chosen for any part of the travel.

- The timer is installed in the AUMA MATIC instead of the interface board (figure L, page 20).

18.1 Function of the diagnosis LEDs (timer)

- V14 is illuminated: Phase failure and/ or motor protection tripped
- V15: no indication
- V21 is illuminated: Stepping mode in direction CLOSE switched on
- V22 is illuminated: Stepping mode in direction OPEN switched on

Figure N: Cover plate timer A1.6



18.2 Setting of the timer

Start and end of stepping mode can be set via:

- Electronic intermediate position detection (clause 15, page 19)
- external switches (use potential-free contacts)

ON and OFF times can be set independently of each other between 1 - 30 seconds at the 4 potentiometers R10 to R13.

Clockwise rotation:

Time extension

Counter-clockwise rotation:

Time reduction

R10 (t-off)  :

OFF time in direction OPEN

R11 (t-on)  :

Running time in direction OPEN

R12 (t-off)  :

OFF time in direction CLOSE

R13 (t-on)  :

Running time in direction CLOSE

19. Fuses



- Fuses (figure P) are accessible after removal of the local controls.
- When exchanging the fuses, only fuses with the same values must be used.

Figure P: AUMA MATIC

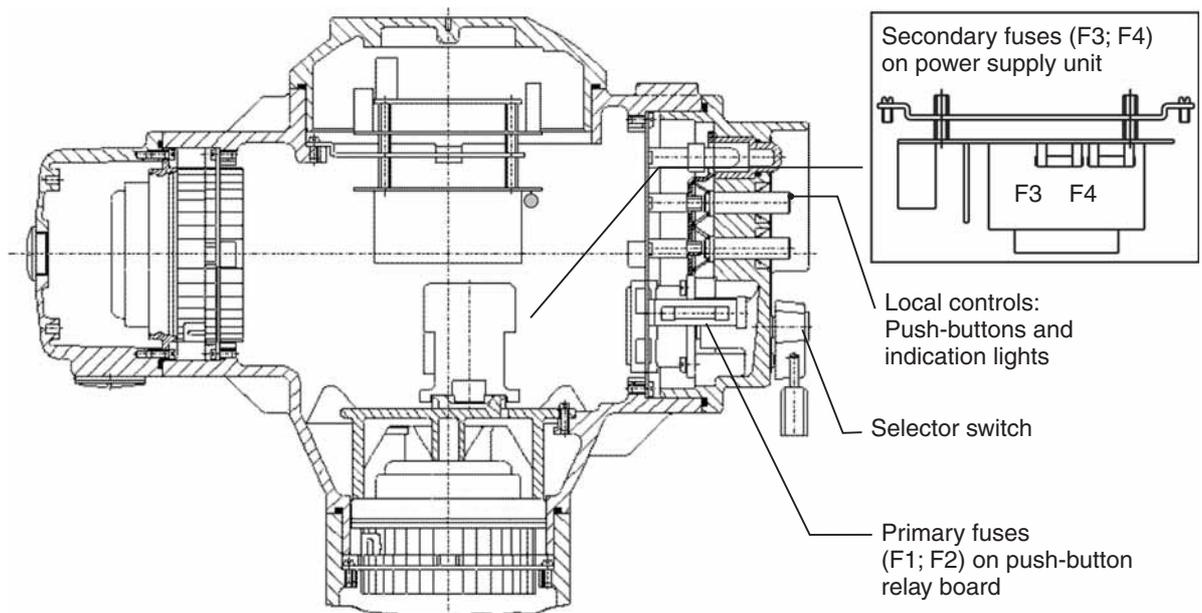


Table 8

G fuses: (Figure P)	F 1 / F 2 (Primary fuses for power supply unit)	F 3 (Boards A1.0 to A22, refer to wiring diagram)	F 4 (Reversing contactors K1 + K2, heater, auxiliary voltage)
Size	6.3 x 32 mm	5 x 20 mm	5 x 20 mm
with reversing contactors	1 A T; 500 V AC	500 mA T; 250 V AC	1.6 A T; 250 V AC

20. Maintenance

After commissioning, check part-turn actuator for damage to paint finish. Do a thorough touch-up to prevent corrosion. Original paint in small quantities can be supplied by AUMA.

AUMA part-turn actuators require very little maintenance.
Precondition for reliable service is correct commissioning.

Seals made of elastomers are subject to aging and must therefore regularly be checked and, if necessary, exchanged.

It is also very important that the O-rings at the covers are placed correctly and cable glands fastened firmly to prevent ingress of dirt or water.

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 part-turn actuator and valve for tightness. If required, tighten applying the torques given in table 3, page 8.

21. Lubrication

The gear housing is filled with lubricant in the factory. This filling lasts for several years of service.

22. 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.

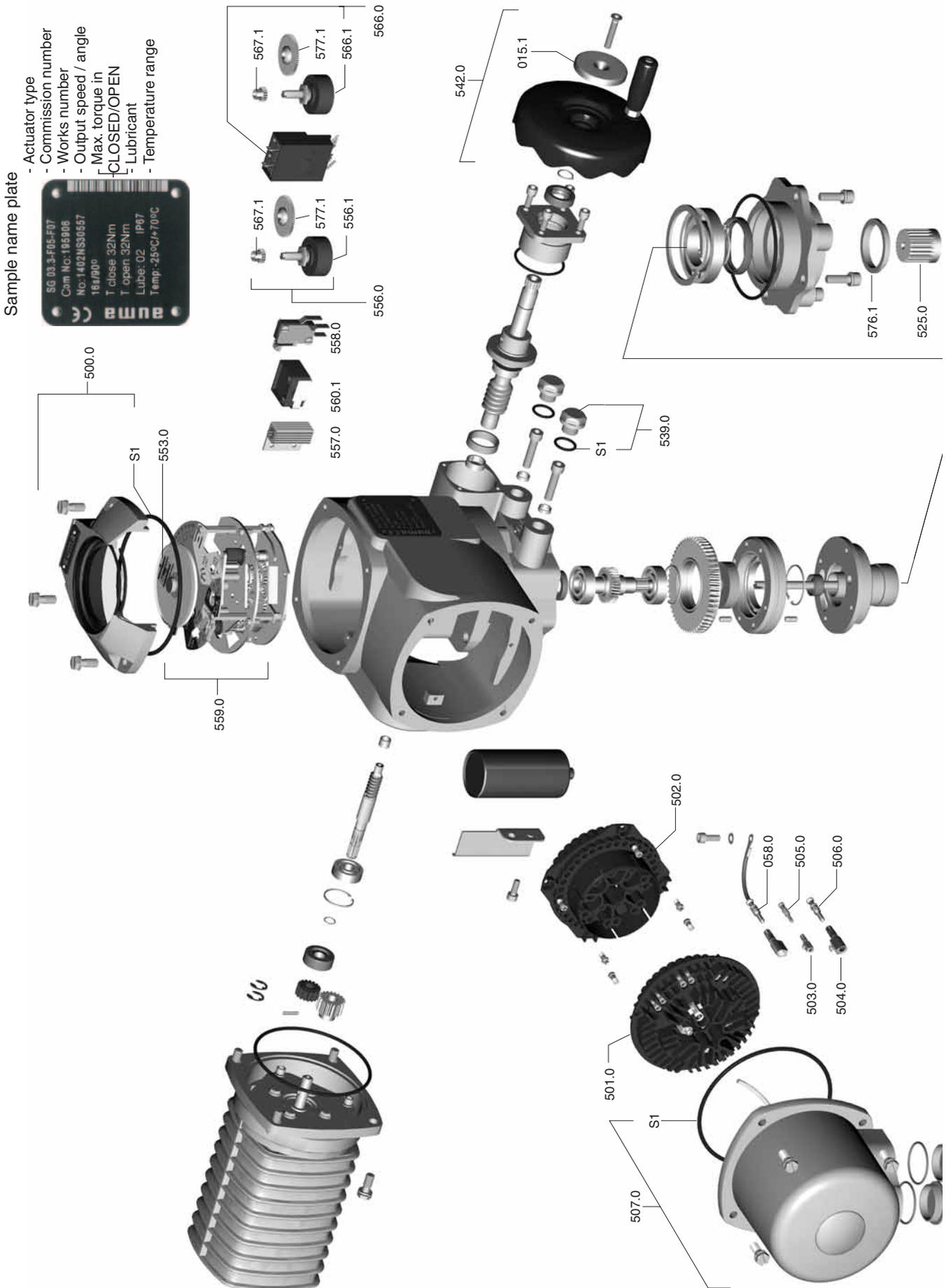
Observe the national regulations for waste disposal.

23. Service

AUMA offers extensive services such as maintenance and inspection for actuators. Addresses, AUMA offices and representatives can be found on page 32 and on the Internet (www.auma.com).

Notes

24. Spare parts list Part-turn actuators SG 03.3 – SG 04.3

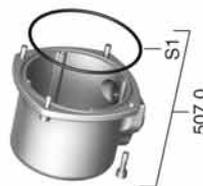
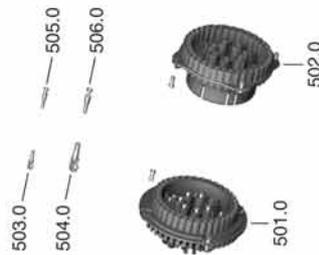
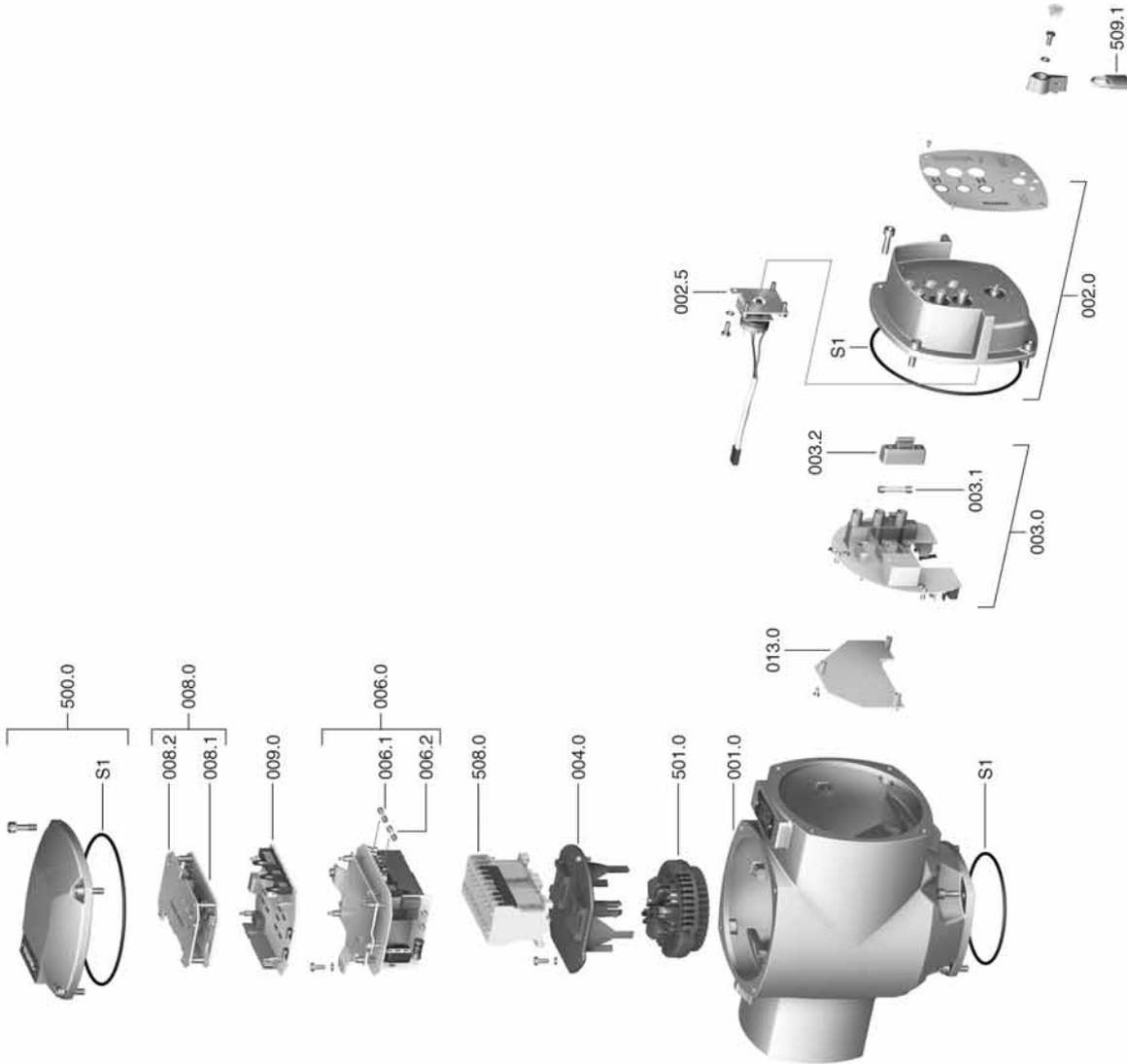


Note:

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

No.	Designation	Type
015.1	Cover disc	
058.0	Wire for protective earth	Sub-assembly
500.0	Cover	Sub-assembly
501.0	Socket carrier (complete with sockets)	Sub-assembly
502.0	Pin carrier without pins	Sub-assembly
503.0	Socket for controls	Sub-assembly
504.0	Socket for motor	Sub-assembly
505.0	Pin for controls	Sub-assembly
506.0	Pin for motor	Sub-assembly
507.0	Plug cover	Sub-assembly
525.0	Coupling	Sub-assembly
539.0	Screw plug	Sub-assembly
542.0	Handwheel	Sub-assembly
553.0	Mechanical position indicator	Sub-assembly
556.0	Potentiometer for position transmitter	Sub-assembly
556.1	Potentiometer without slip clutch	Sub-assembly
557.0	Heater	Sub-assembly
558.0	Blinker transmitter including pins at wires (without impulse disc and insulation plate)	Sub-assembly
559.0	Control unit without switches	Sub-assembly
560.1	Limit switches	Sub-assembly
566.0	Electronic position transmitter RWG 6020	Sub-assembly
566.1	Potentiometer for RWG without slip clutch	Sub-assembly
567.1	Slip clutch for potentiometer/RWG	Sub-assembly
576.1	Spigot ring	
577.1	Pinion for potentiometer	
S1	Seal kit, small	Set

25. Spare parts list Controls AUMA MATIC



Sample name plate



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

Note:

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

No.	Designation	Type
001.0	Housing	
002.0	Local controls	Sub-assembly
002.5	Selector switch	Sub-assembly
003.0	Local controls board	Sub-assembly
003.1	Primary fuse	
003.2	Fuse cover	
004.0	Carrier for contactors	
006.0	Power supply including mounting plate	Sub-assembly
006.1	Secondary fuse F3	
006.2	Secondary fuse F4	
008.0	Interface board	Sub-assembly
008.1	Interface board	
008.2	Cover plate for interface board	
009.0	Logic board	Sub-assembly
013.0	Adapter board	Sub-assembly
500.0	Cover	Sub-assembly
501.0	Socket carrier (complete with sockets)	Sub-assembly
502.0	Pin carrier without pins	Sub-assembly
503.0	Socket for controls	Sub-assembly
504.0	Socket for motor	Sub-assembly
505.0	Pin for controls	Sub-assembly
506.0	Pin for motor	Sub-assembly
507.0	Plug cover	Sub-assembly
508.0	Switchgear	Sub-assembly
509.1	Padlock	
S1	Seal kit	Set

26. Declaration of Conformity and Declaration of Incorporation

auma[®]

EC - Declaration of Conformity
according to the directive of the Council for
the approximation of the laws of the Member States
relating to the EMC Directive (89/336/EEC) and
the Low Voltage Equipment Directive (73/23/EEC)

AUMA part-turn actuators of the type ranges

SG 03.3 - SG 05.3
in versions AUMA NORM, AUMA SEMIPACT,
AUMA MATIC, AUMATIC and SIMPACT

are designed and produced to be installed on industrial valves.

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

- 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 Directive on Electromagnetic Compatibility
EN 61000-6-4: 08/2002
EN 61000-6-2: 08/2002
EN 61800-3: 02/2001

b) concerning the Low-Voltage Equipment Directive
EN 60204-1
EN 60034-1
EN 50178

Müllheim, May 13th, 2005

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H. Newerla, 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.

Y003.885/002/en

auma

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

AUMA part-turn actuators of the type ranges

SG 03.3 – SG 05.3
in versions AUMA NORM, AUMA SEMIPACT,
AUMA MATIC, AUMATIC and SIMPACT

are designed to be installed on valves.

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

- EN ISO 12100-1
- EN ISO 12100-2
- EN 60 204-1
- EN 60034-1
- EN ISO 5211

AUMA part-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.

Müllheim, 15. January 2007

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**Information also available
on the Internet:**

Wiring diagram, 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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