



## *Multi-turn actuator*

SA 07.1 – 16.1/SAR 07.1 – SAR 16.1

Non-Intrusive

*with actuator controls*

AUMATIC AC 01.1

Control:

→ Parallel

Profibus DP

Profibus DP with FO

Modbus

Modbus with FO

DeviceNet

Foundation Fieldbus



**Read the operation instructions first**

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

**Reference documents:**

- Manual(Operation and setting) AUMATIC AC 01.1.  
Can be downloaded from the Internet ([www.auma.com](http://www.auma.com)) or ordered directly from AUMA (addresses from page 70).

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## 1. Safety instructions

### 1.1. General notes on safety

<b>Standards/directives</b>	<p>AUMA products are designed and manufactured in compliance with recognised standards and directives. This is certified in a declaration of incorporation and a declaration of conformity.</p> <p>The end user or the contractor must ensure that all requirements with respect to assembly, electrical connection, and commissioning at the place of installation are met. They include among others:</p> <ul style="list-style-type: none"><li>• National regulations, laws, and prescriptio</li></ul>
<b>Safety instructions/warnings</b>	<p>All personnel working with this device must be familiar with the safety and warning instructions in this manual and observe the instructions given. Safety instructions and warning signs on the device must be observed to avoid personal injury or property damage.</p>
<b>Qualification of staff</b>	<p>Assembly, electrical connection, commissioning, operation, and maintenance must be carried out exclusively by suitably qualified personnel having been authorised by the end user or contractor of the plant.</p> <p>Prior to working on this product, the staff must have thoroughly read and understood these instructions and, furthermore, know and observe officially recognised rules regarding occupational health and safety.</p>
<b>Commissioning</b>	<p>Prior to commissioning, it is important to check that all settings are in compliance with the requirements of the application. Incorrect settings might present a danger to the application, e.g. cause damage to the valve or the installation.</p> <p>The manufacturer will not be held liable for any consequential damage. Such risk lies entirely with the user.</p>
<b>Operation</b>	<p>Prerequisites for safe and smooth operation:</p> <ul style="list-style-type: none"><li>• Correct transport, proper storage, mounting and installation, as well as careful commissioning.</li><li>• Only operate the device if it is in perfect condition while observing these instructions.</li><li>• Immediately notify any faults and damage and allow for corrective measures.</li><li>• Observe recognised rules for occupational health and safety.</li><li>• Observe the national regulations.</li><li>• During operation, the housing warms up and surface temperatures &gt; 60 °C may occur. To prevent possible burns, we recommend to the check surface temperature with an appropriate thermometer prior to working with the device.</li></ul>
<b>Protective measures</b>	<p>The end user or the contractor are responsible for implementing required protective measures on site, such as enclosures, barriers, or personal safety equipment for the staff.</p>
<b>Maintenance</b>	<p>To ensure safe device operation, the maintenance instructions included in this manual must be observed.</p> <p>Any device modification requires the consent of the manufacturer.</p>

## 1.2. Range of application

AUMA multi-turn actuators are designed for the operation of industrial valves, e.g. globe valves, gate valves, butterfly valves, and ball valves.

Other applications require explicit (written) confirmation by the manufacturer.

The following applications are not permitted, e.g.:

- Industrial trucks according to EN ISO 3691
- Lifting appliances according to EN 14502
- Passenger lifts according to DIN 15306 and 15309
- Service lifts according to EN 81-1/A1
- Roller conveyors according to Standard EN 14673 (draft)
- Permanent operation
- Buried service
- Permanent submersion (observe enclosure protection)
- Potentially explosive areas, with the exception of zone 22
- Radiation exposed areas in nuclear power plants

No liability can be assumed for inappropriate or unintended use.

Observance of these operation instructions is considered as part of the device's designated use.

### Information

These operation instructions are only valid for the “clockwise closing” standard version, i.e. driven shaft turns clockwise to close the valve. Separate instructions are available for the “counterclockwise closing” special version.

### 1.3. Applications in Ex zone 22 (option)

SA 07.1 – 16.1/SAR 07.1 – SAR 16.1 actuators basically meet the requirements for applications in dust hazardous locations of ZONE 22, in compliance with the ATEX directive 94/9/EC.

The actuators are designed to meet enclosure protection IP 67 or IP 68 and fulfil the requirements of EN 50281-1-1:1998 section 6 – Electrical apparatus for use in presence of combustible dust hazards, requirements for category 3 electrical equipment – protected by enclosures.

To comply with all requirements of EN 50281-1-1: 1998, the following points must imperatively be observed:

- In compliance with the ATEX directive 94/9/EC, the actuators must be equipped with an additional identification – II3D IP6X T150 °C.
- The maximum surface temperature of the actuators, based on an ambient temperature of +40 °C in accordance with EN 50281-1-1 section 10.4, is +150 °C. In accordance with section 10.4, an increased dust deposit on the equipment was not considered for the determination of the max. surface temperature.
- The correct connection of the thermostats or the PTC thermistors as well as fulfilling the requirements of the duty type and the technical data are prerequisites for compliance with the maximum surface temperature of devices.
- The connection plug may only be plugged in or pulled out when device is disconnected from the mains.
- The cable glands used also have to meet the requirements of category II3 D and must at least comply with enclosure protection IP 67.
- The actuators must be connected by means of an external ground connection (accessory part) to the potential equaliser or integrated into a grounded piping system.
- The screw plug (part no. 511.0) or the stem protection tube with protection cap (part nos. 568.1 and 568.2) for sealing the hollow shaft must imperatively be mounted to guarantee the combustible dust hazard protection.
- As a general rule, the requirements of EN 50281-1-1 must be respected in dust hazardous locations. During commissioning, service, and maintenance, special care as well as qualified and trained personnel are required for the safe operation of actuators.

## 1.4. Warnings and notes

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



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



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



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



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

### Arrangement and typographic structure of the warnings



**Safety alert symbol** (warns of a potential personal injury hazard).

**Signal word** (DANGER, WARNING, CAUTION, NOTE)

#### Type of hazard and respective source!

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

→ Measures to avoid the danger

→ Further measure(s)

## 1.5. Further references and symbols

The following references and symbols are used in these instructions:

### Information

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



Symbol for CLOSED.



Symbol for OPEN.



### Via the menu to parameter

Describes the path within the menu to the parameter. By using the push buttons of the local controls you may quickly find the desired parameter in the display.



### Description of the parameter settings/indications

Describes the setting/viewing possibilities of a parameter.



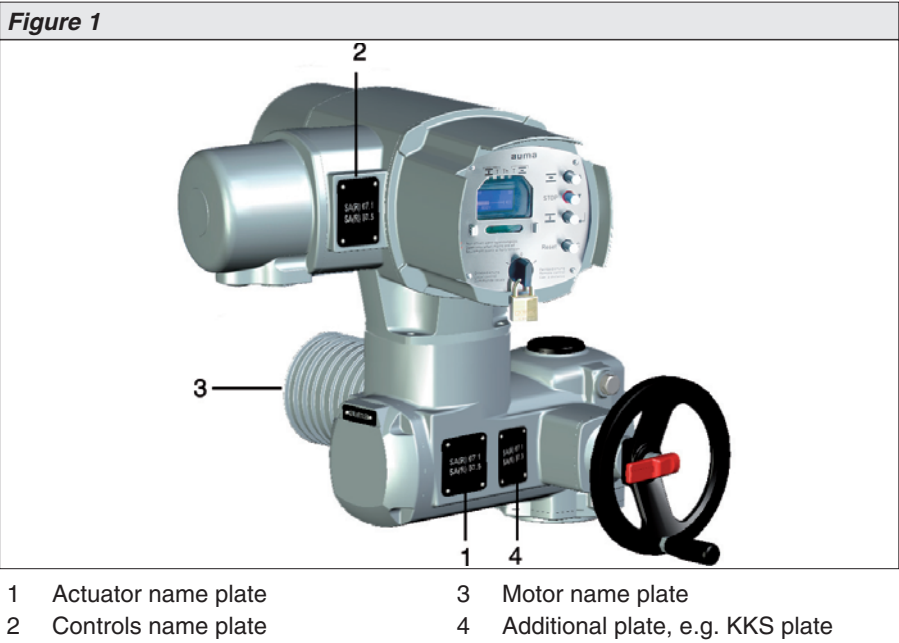
### Step by step

Provides a detailed description of each step for setting/viewing the parameter.

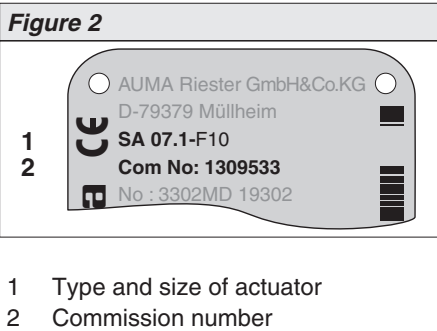
2. Identification

2.1. Name plate

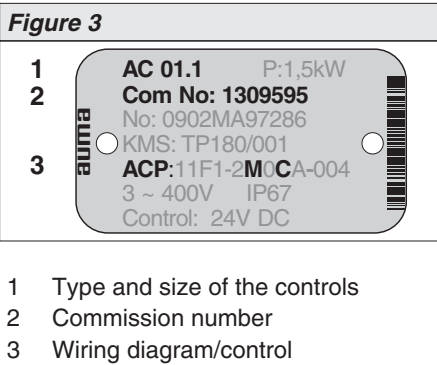
Each device (actuator, controls, motor) is equipped with a name plate. Figure 1 shows the arrangement of name plates on the instrument.



Identification data on the actuator name plate:



Identification data on the controls' name plate





<b>Type and size</b>	<p>These instructions apply to the following actuator controls combinations:</p> <p>Type: SA = multi-turn actuator for open-close duty</p> <p>Type: SAR = multi-turn actuator for modulating duty</p> <p>Size: 07.1 – 16.1</p> <p>Version: Non-Intrusive</p> <p>Type: AC = AUMATIC actuator controls</p> <p>Size: 01.1</p>
<b>Commission number</b>	<p>An order-specific commission number is assigned to each device. You can use this number to download the wiring diagram, inspection records and further information on the device from the Internet (<a href="http://www.auma.com">http://www.auma.com</a>).</p>
<b>Wiring diagram/control</b>	<p>The actuator controls are designed for the <b>Non-Intrusive</b> version (refer also to page 10), if the 7th position in the ACP wiring diagram contains the character M, e.g.: ACP 11F1-2<b>M</b>0CA-004.</p> <p>Controlling the actuator controls is performed via a <b>parallel interface</b>, if the 9th position in the ACP wiring diagram contains the character A, B, C, or 1, e.g.: ACP 11F1-2<b>M0CA</b>-004.</p>

## 2.2. Short description

<b>Multi-turn actuator</b>	<p>Definition in compliance with EN ISO 5210: A multi-turn actuator is an actuator which transmits to the valve a torque for at least one full revolution. It is capable of withstanding thrust. AUMA multi-turn actuators are driven by an electric motor. A handwheel is provided for manual operation. Switching off in end positions may be either by limit or torque seating. Controls are required to operate or process the actuator signals.</p>
<b>Actuator controls</b>	<p>The AUMATIC actuator controls is used to operate AUMA actuators and is supplied ready for use. The controls can be mounted directly to the actuator but also separately on a wall bracket. The functions of the AUMATIC controls include standard valve control in OPEN - CLOSE duty, positioning, process control, logging of operating data right through to diagnosis functions.</p>
<b>Local controls/ COM-AC</b>	<p>Operation, setting, and display can be performed on site directly at the controls On site it is possible to</p> <ul style="list-style-type: none"><li>• operate the actuator via the local controls (push buttons and display) and perform settings (contents of these instructions).</li><li>• read in or out data or modify and save settings via the COM-AC software (option), using a computer (laptop or PC). Depending on the version, the connection between computer and AUMATIC can be made with cable (infra-red interface) or without cable (Bluetooth interface) (not included in these instructions).</li></ul>
<b>Intrusive – Non-Intrusive</b>	<ul style="list-style-type: none"><li>• Intrusive version: Limit and torque setting is performed via switches in the actuator.</li><li>• Non-Intrusive version: Limit and torque setting is performed via the controls, actuator and controls housings do not have to be opened. For this purpose, the actuator is equipped with an MWG (magnetic limit and torque transmitter), also supplying analogue torque feedback signals/torque indication.</li></ul>

### 3. Transport, storage and packaging

#### 3.1. Transport

→ For transport to place of installation, use sturdy packaging.

#### DANGER

##### Hovering load!

Death or serious injury possible.

- Do not place below hovering load.
- Attach ropes or hooks for the purpose of lifting by hoist only to housing and not to handwheel.
- Actuators mounted on valves:  
Attach ropes or hooks for the purpose of lifting by hoist to valve and not to multi-turn actuator.
- Actuators mounted to gearboxes:  
Attach ropes or hooks for the purpose of lifting by hoist only to the gear-box using eyebolts and not to the actuator

#### 3.2. Storage

#### NOTICE

##### Danger of corrosion due to inappropriate storage!

- Store in a well-ventilated, dry room.
- Protect against floor dampness by storage on a shelf or on a wooden pallet.
- Cover to protect against dust and dirt.
- Apply suitable corrosion protection agent to uncoated surfaces.

##### Long-term storage:

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

1. Prior to storage:
  - Protect uncoated surfaces, in particular the output drive parts and mounting surface, with long-term corrosion protection agent.
2. At an interval of approx. 6 months:
  - Check for corrosion. If first signs of corrosion show, apply new corrosion protection.

#### 3.3. 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.

We use the following packaging materials: wood, cardboard, paper, and PE foil. For the disposal of the packaging material, we recommend recycling and collection centres.

## 4. Assembly

### 4.1. Handwheel fitting

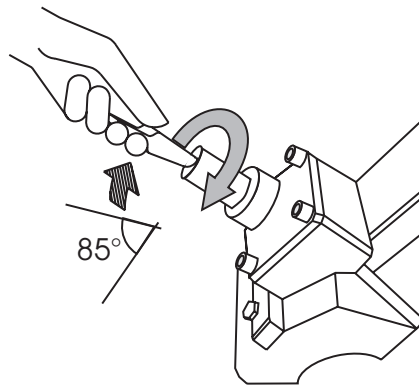
**Information** For transport purposes, handwheels from a diameter of 400 mm are supplied separately.

#### NOTICE

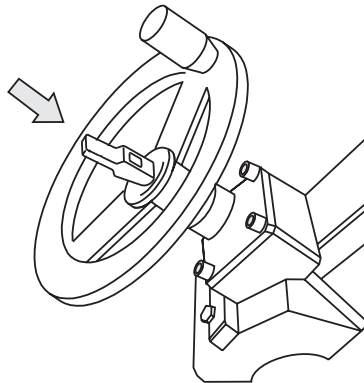
#### Damage at the change-over mechanism due to incorrect assembly!

- Only pivot the change-over lever manually.
- Using extensions as a lever for operation is **not** permitted.
- First engage manual operation correctly, then mount handwheel.

1. Manually lift the red change-over lever while slightly turning the shaft back and forth until manual operation engages.  
The manual operation is correctly engaged if the change-over lever can be lifted by approx. 85°.



2. Attach handwheel over the red change-over lever then on to the shaft.



3. Secure handwheel using the circlip supplied.

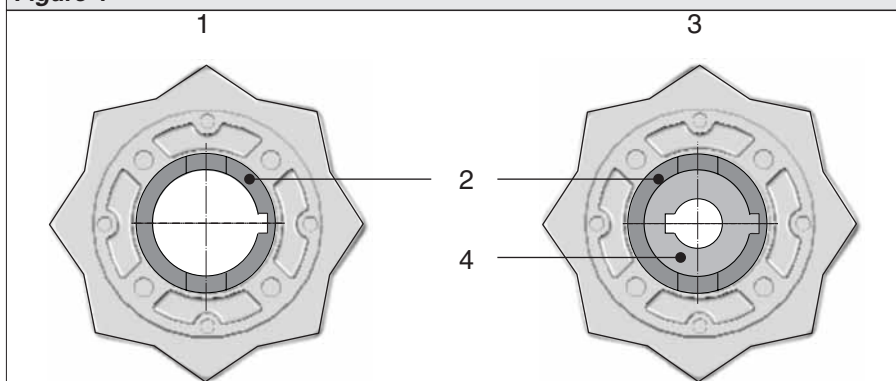
## 4.2. Multi-turn actuator mounting to valve/gearbox

### 4.2.1 Output drive types B1, B2, B3, B4, B, and E

**Application** For rotating, non-rising valve stem.

**Design** Output drive type bore with keyway:  
Type B1 – B4 with bore according to ISO 5210.  
Type B and E with bore according to DIN 3210.  
Later change from B1 to B3, B4, or E is possible.

**Figure 4**



1 Output drive type B1/B2 and B  
2 Hollow shaft with keyway

3 Output drive B3/B4 and E  
4 Plug sleeve with bore and keyway

**Information** Spigot at flanges should be loose fit.

### Mounting the multi-turn actuator

1. Check if mounting flanges fit together.
2. Check whether bore and keyway match the input shaft.
4. Thoroughly degrease mounting faces of the mounting flanges.
5. Apply a small quantity of grease to the input shaft.
6. Mount multi-turn actuator and ensure that the spigot mates uniformly in the recess and that the mounting faces are in complete contact.
7. Fasten multi-turn actuator with screws according to table 1.
8. Fasten screws crosswise with a torque according to table 1.

**Table 1**

Mounting flange	Screws Thread	Fastening torque $T_A$ [Nm]
		Strength class 8.8
F07	M 8	25
F10	M10	51
F14	M12	87
F16	M16	214

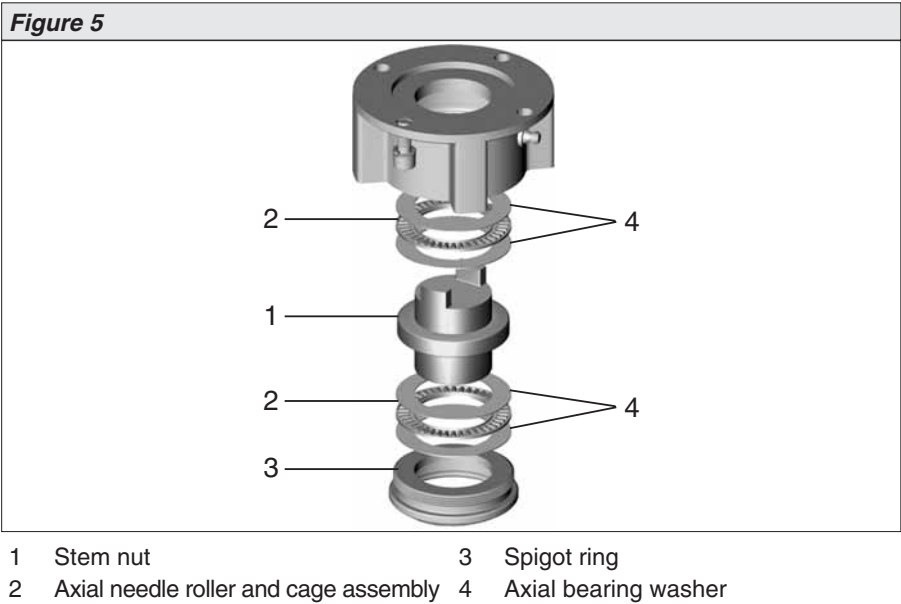
### NOTICE

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

- Touch up damage to paint finish after working on the device.
- After mounting, connect the device immediately to electrical mains to ensure that heater reduces condensation.

4.2.2 Output drive type A

- Application
- For rising, non-rotating valve stem.
  - Capable of withstanding thrust
- Design
- Output drive type A as separate unit (figure 5):



- 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 supplied unbored or with a pilot bore.

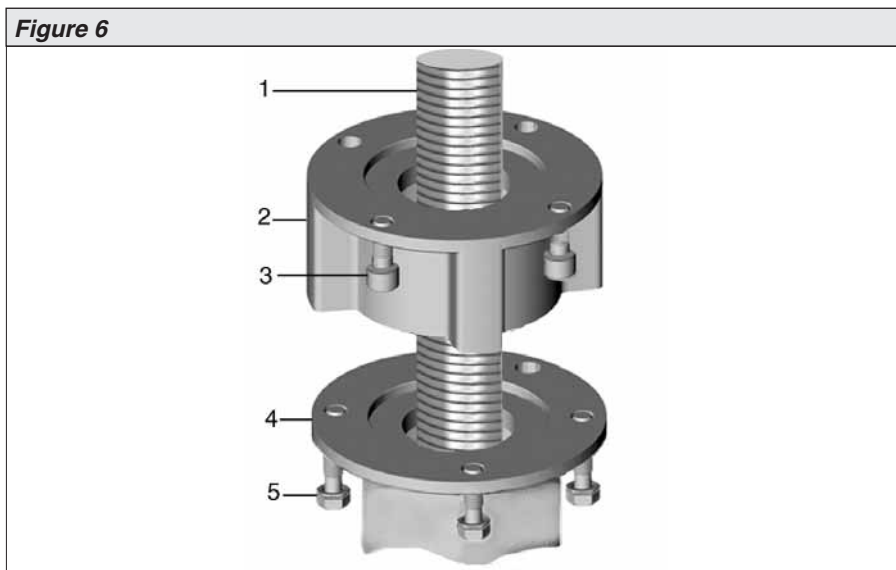
Finish machining the stem nut

Only required for stem nut if supplied unbored or with a pilot bore.

1. Remove spigot ring (3) from output drive type.
2. Take off stem nut (1) together with axial needle roller and cage assembly (2) and axial bearing washers (4).
3. Remove axial needle roller and cage assembly and axial bearing washers from stem nut.
4. Drill and bore stem nut and cut thread.  
When fixing in the chuck, make sure stem nut runs true!
5. Clean the machined stem nut.
6. Apply Lithium soap EP multi-purpose grease to axial needle roller and cage assembly and axial bearing washers, then place them on stem nut.
7. Re-insert stem nut with axial bearings into output drive type. Ensure that dogs or tothing are placed correctly in the slots of the hollow shaft.
8. Screw in spigot ring until it is firm against the shoulder.
9. Press in Lithium soap EP multi-purpose grease on mineral oil base at the grease nipple with a grease gun (for quantities, please refer to table 2).

Grease quantities for bearing of output drive A:

Table 2				
Output drive	A 07.2	A 10.2	A 14.2	A 16.2
Qty <sup>1)</sup>	1.5 g	2 g	3 g	5 g
1) For grease with density $\rho = 0.9 \text{ kg/dm}^3$				

**Mounting the multi-turn actuator (with output drive A) to valve****Figure 6**

- |                       |                          |
|-----------------------|--------------------------|
| 1 Valve stem          | 4 Valve flange           |
| 2 Output drive type A | 5 Screws to output drive |
| 3 Screw to actuator   |                          |

1. Remove screws (3) and take off output drive type A (2) from multi-turn actuator.
2. Check if the flange of output drive type A matches the gearbox or the valve flange (4).
3. Thoroughly degrease mounting faces of the mounting flanges.
4. Apply a small quantity of grease to the valve stem (1).
5. Place output drive type A on valve stem and fasten until it is seated solidly on the gearbox or valve flange.
6. Turn output drive type A until alignment of the fastening holes.
7. Screw in fastening screws (5), however do not completely fasten.
8. Fit multi-turn actuator on the valve stem so that the hollow shaft pinions engage into the stem nut. The flanges are flush with each other if properly engaged.
9. Turn multi-turn actuator until alignment of the fastening holes.
10. Fasten multi-turn actuator with screws (3) according to table 1, page 13.
11. Fasten screws crosswise with a torque according to table 1.
12. Engage manual operation at multi-turn actuator and turn handwheel in direction OPEN until valve flange and output drive type A are firmly placed together.
13. Tighten fastening screws (5) between valve and output drive type A crosswise with a torque according to table 1, page 13.

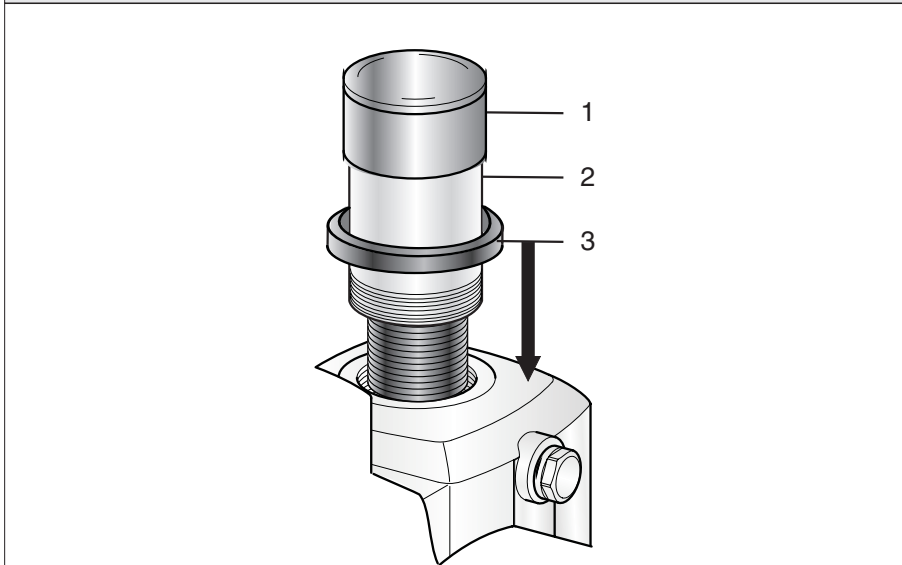
**NOTICE****Danger of corrosion due to damage to paint finish and condensation!**

- Touch up damage to paint finish after working on the device.
- After mounting, connect the device immediately to electrical mains to ensure that heater reduces condensation.

### 4.3. Accessories (option)

#### 4.3.1 Protection tube for rising valve stem

**Figure 7**



- |                                |                |
|--------------------------------|----------------|
| 1 Cap for stem protection tube | 3 Sealing ring |
| 2 Stem protection tube         |                |

1. Seal thread with hemp, Teflon tape, or thread sealing material.
2. Screw protection tube (2) into thread and tighten it firmly.
3. Push down the sealing ring (3) into the housing.
4. Check whether cap (1) is available and in perfect condition.



#### 4.4. Mounting positions of the local controls

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

Figure 8 shows mounting positions A and B:

**Figure 8**



Figure 9 shows mounting positions C and D:

**Figure 9**



#### Changing the mounting position

##### **⚠ DANGER**

##### **Hazardous voltage!**

Electric shock possible.

→ Disconnect device from the mains before opening.

1. Loosen bolts and remove the local controls.
2. Check whether O-ring is in good condition, correctly place O-ring.
3. Turn local controls into new position and re-place.

##### **NOTICE**

##### **Cable damage due to twisting or squeezing!**

Functional failures possible.

→ Turn local controls by a maximum of 180°.

→ Carefully assemble local controls to avoid pinching the cables.

4. Fasten bolts evenly crosswise.

## 5. Electrical connection

### 5.1. General notes



#### **Danger due to incorrect electrical connection!**

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

- The electrical connection must be carried out exclusively by suitably qualified personnel.
- Prior to connection, observe general references contained in this clause.

#### **Wiring diagram/terminal plan**

The wiring diagram/terminal plan is attached to the device in a weather-proof bag, together with these operation instructions. It can also be obtained from AUMA (state commission no., refer to name plate) or downloaded directly from the Internet ([www.auma.com](http://www.auma.com)).

#### **Protection on site**

For short-circuit protection and for disconnecting the actuator from the mains, fuses and disconnect switches have to be provided by the customer. The current values for respective sizing can be derived from the current consumption of the motor plus the current consumption of the controls. Motor current consumption:

Refer to name plate on motor (nominal current).

Current consumption of the controls depending on the mains voltage:

100 to 120 V AC = max. 650 mA

208 to 240 V AC = max. 325 mA

380 to 500 V AC = max. 190 mA

24 V DC (+10 %/–15 %) = max. 500 mA, filter capacitor 2200 µF

Current consumption for actuator with 1-ph DC motor:

24 V DC (+10 %/–10 %) = max. 750 mA, filter capacitor 2200 µF

The maximum permissible fuse for controls with a rated power of 1.5 kW is 16 A (gL/gG); for controls with a rated power of 7.5 kW, the value amounts to 32 A (gL/gG).

#### **Power supply for the controls (electronics)**

If the controls (electronics) are supplied externally with 24 V DC and DC motors (24 V DC, 48 V DC, 60 V DC, 110 V DC, 220 V DC) are used simultaneously, the 24 V DC voltage supply for the controls should be ensured via the XK25/26 terminals, separate from the power supply (U1, V1). In case of common supply using a single cable (links from U1, V1 with XK25/26, for 24 V DC only !!!), short-term excess or falling below the admissible voltage limits can be the consequence during switching (24 V DC +10 %/–10 %). Any possibly incoming operation commands are not executed outside the admissible limit values. The controls briefly signal a fault condition.

#### **Cable installation in accordance with EMC**

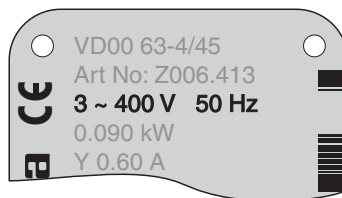
Signal and bus cables are susceptible to interference.

Motor cables are interference sources.

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

**5.2. Connection with AUMA plug/socket connector (S, SH, SE)****Before mains connection**

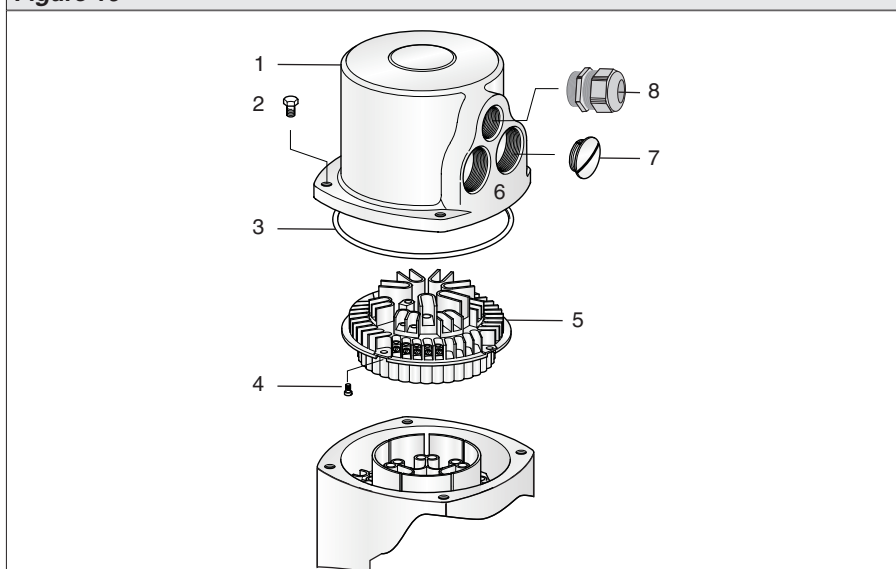
→ Check whether type of current, supply voltage, and frequency comply with motor data (refer to name plate at motor).

**Opening the terminal compartment****Hazardous voltage!**

Electric shock possible.

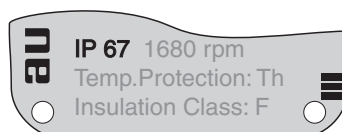
→ Disconnect device from the mains before opening.

Figure 10 shows the connection using the example of version S:

**Figure 10**

- |                             |  |
|-----------------------------|--|
| 1 Cover                     | 5 Socket carrier                         |
| 2 Screws for cover          | 6 Cable entry                            |
| 3 O-ring                    | 7 Screw plugs                            |
| 4 Screws for socket carrier | 8 Cable gland (not included in delivery) |
| 1 Cover                     | 5 Socket carrier                         |

- Loosen screws (2) and remove cover (1).
- Loosen screws (4) and remove socket carrier (5) from cover (1).
- Insert cable glands (8) suitable for connecting cables.  
The enclosure protection IP... stated on the name plate is only ensured if suitable cable glands are used.



- Seal cable entries (6) which are not used with suitable screw plugs (7).
- Insert the wires into the cable glands (8).

### Connecting the cables

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

Cable cross sections:

- Power terminals (U1, V1, W1, U2, V2, W2) and protective earth (symbol:  $\oplus$ ) = max. 6 mm<sup>2</sup> flexible, max. 10 mm<sup>2</sup> rigid
- Control contacts (1 to 50) = max. 2.5 mm<sup>2</sup>

### Information

For some special motors, the connection of the power terminals (U1, V1, W1, U2, V2, W2) is made via a terminal board at the motor.

### WARNING

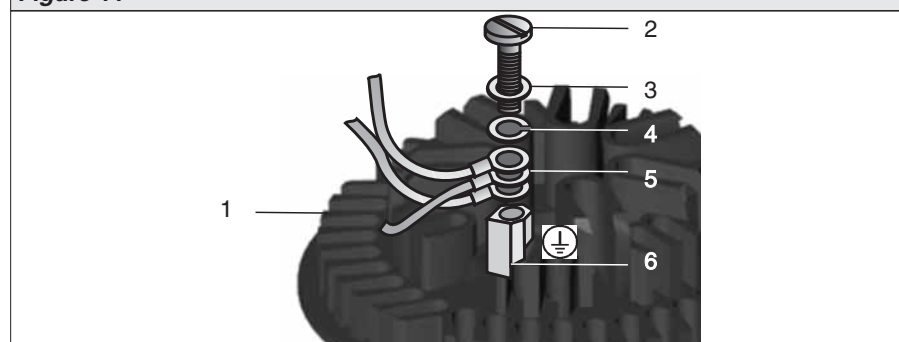
**In case of failure: Hazardous voltage while protective conductor is not connected!**

Electric shock possible.

- Connect all protective conductors.
- Connect PE connection with external protective conductor of connecting cables.

5. Tighten PE conductors firmly to PE connection (symbol:  $\oplus$ ) using ring lugs (flexible cables) or loops (rigid cables).

Figure 11



- 1 Socket carrier
- 2 Screw
- 3 Washer

- 4 Spring lock washer
- 5 Protective earth with ring lugs/loops
- 6 PE connection

### Connecting the heater

The heater prevents condensation in the actuator. Unless ordered otherwise, the heater is internally supplied and does not require separate connection.

### NOTICE

#### Danger of corrosion due to condensation!

- For version with external heater supply (option):  
Connect heater R1 according to terminal plan.
- For all versions: After mounting, immediately put device into operation.

### Connecting the motor heater (option)

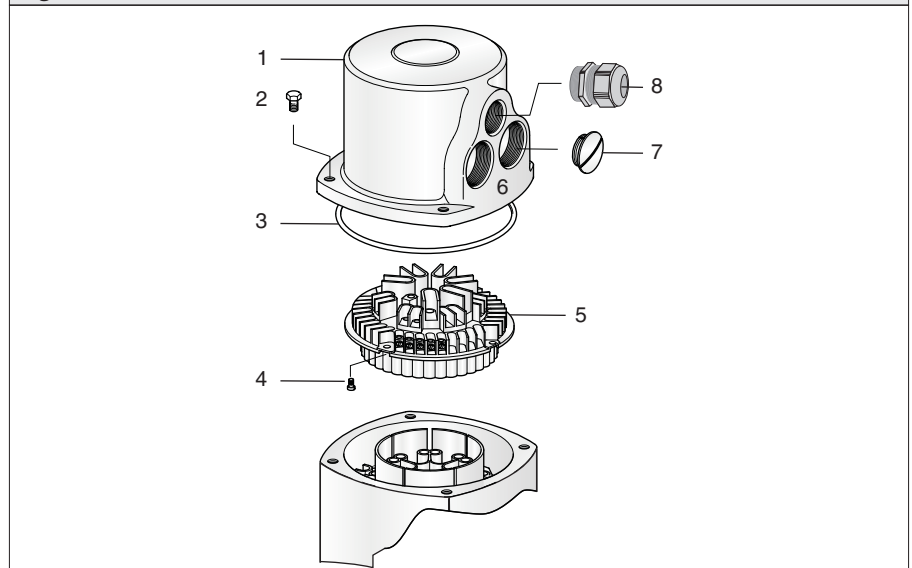
Some actuators are equipped with an additional motor heater. The motor heater improves the start-up behaviour for extremely low temperatures.

- Connect motor heater R4, if available, according to wiring diagram.

**Closing the terminal compartment**

Refer to figure 12.

1. Insert the socket carrier (5) into the plug cover (1) and fasten it with screws (4).
2. Clean sealing faces of housing and cover.
3. Apply a thin film of non-acidic grease (e.g. Vaseline) to the sealing faces.
4. Check whether O-ring (3) is in good condition, correctly place O-ring.
5. Replace cover (1) and fasten screws (2) evenly crosswise.
6. Fasten cable glands (8) applying the specified torque to ensure the required enclosure protection.

**Figure 12**

- |   |                           |   |  |
|---|---------------------------|---|--|
| 1 | Cover                     | 5 | Socket carrier                         |
| 2 | Screws for cover          | 6 | Cable entry                            |
| 3 | O-ring                    | 7 | Screw plugs                            |
| 4 | Screws for socket carrier | 8 | Cable gland (not included in delivery) |

### 5.3. Accessories for electrical connection (option)

#### 5.3.1 Controls mounted to wall bracket

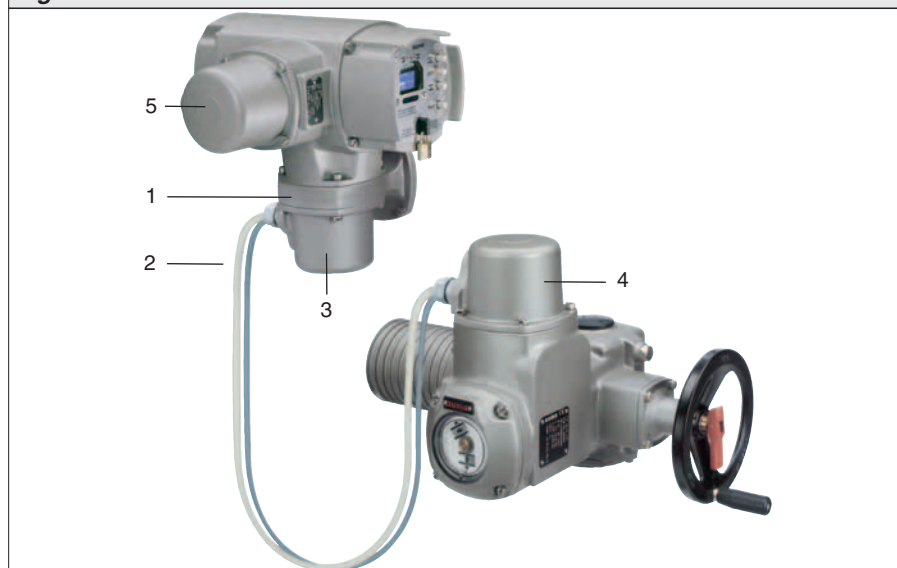
##### Application

The controls can also be mounted separately from the actuator on a wall bracket.

- If the actuator cannot be accessed
- In case of heavy vibration of the valve
- If the actuator is subjected to high temperatures

##### Design

**Figure 13**



- |                     |                               |
|---------------------|-------------------------------|
| 1 Wall bracket      | 3 Wall bracket terminals (XM) |
| 2 Connecting cables | 4 Actuator terminals (XA)     |
|                     | 5 Controls terminals (XK)     |

##### Observe prior to connection

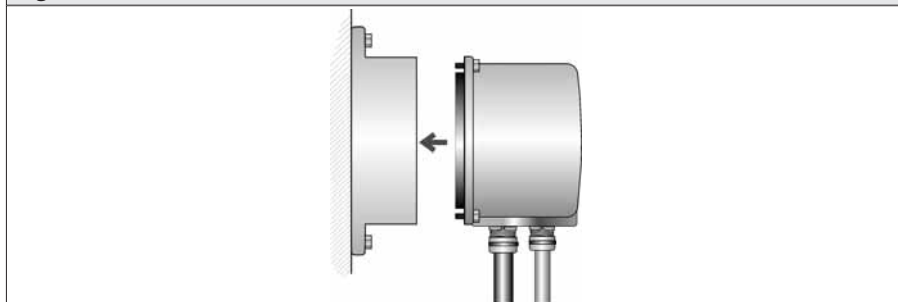
- Permissible length of connecting cables: max. 100 m.
- Permissible length of connecting cables for later separation of actuator and controls: max. 10 m.
- We recommend: AUMA cable set LSW20.
- If not using an AUMA cable set, the following has to be observed as well: Use suitable flexible and screened connecting cables.
  - Use separate, CAN-capable data cable for MWG of 120 Ohm intrinsic impedance (e.g. UNITRONIC BUS-FD P CAN UL/CSA - 2 x 2 x 0.5 mm<sup>2</sup>, manufacturer: Lapp).
  - Connecting the data cable: XM2-XA2 = CAN L, XM3-XA3 = CAN H.
  - MWG voltage supply if the AUMATIC has been ordered and delivered with wall bracket: XM6-XA6 = GND, XM7-XA7 = + 24 V DC (refer to wiring diagram).
  - MWG voltage supply if AUMATIC has been subsequently separated from the actuator: XM6-XA6 = GND, XM11-XA117 = + 5 V DC (refer to wiring diagram).
  - For the connector on the wall bracket, the terminals are made as crimp connections.
  - Use a suitable four indent crimp tool for crimping.
  - Cross sections for flexible wires:
 

Control cables:	max. 0.75 to 1.5 mm <sup>2</sup>
Mains connection:	max. 2.5 ... 4 mm <sup>2</sup>
- If connecting cables, e.g. of the heater, are available requiring direct wiring from the actuator to the XK customer connector (XA-XM-XK, refer to wiring diagram), these connecting cables must be subject to an insulation test in compliance with EN 50178.  
The connecting cables from the MWG may **not** be subject to an insulation test.

### 5.3.2 Parking frame

Parking frame for safe storage of a disconnected plug.  
For protection against touching the bare contacts and against environmental influences.

**Figure 14**



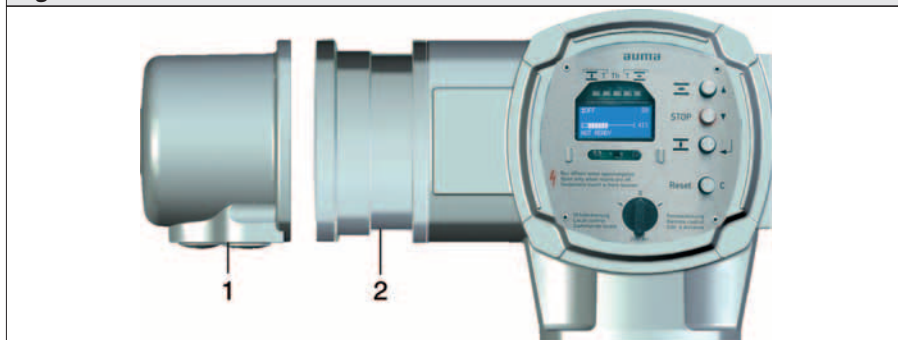
### 5.3.3 Protection cover

Protection cover for plug compartment when plug is removed.  
The open terminal compartment can be closed using a protective cover (not illustrated).

### 5.3.4 Double sealed intermediate frame

When removing the electrical connection or due to leaky cable glands, ingress of dust and water into the housing is possible. This is prevented by inserting the double sealed intermediate frame (2) between the electrical connection (1) and actuator housing. The enclosure protection of the device, IP 67 or IP 68, will not be affected, even if the electrical connection is removed.

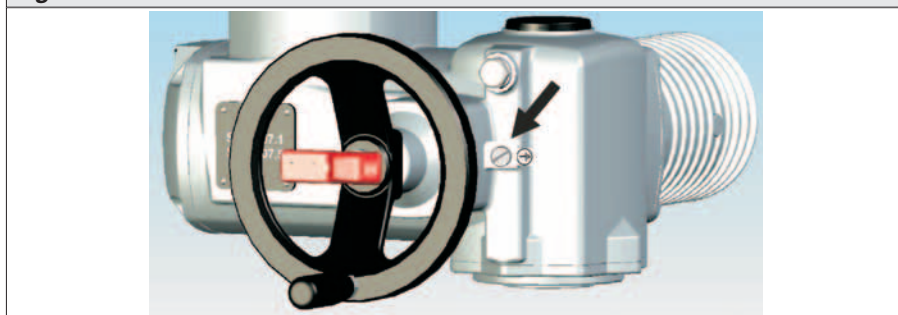
**Figure 15**



### 5.3.5 Ground connection, external

As an option, an external ground connection (U-bracket) at the housing is available.

**Figure 16**





## 6. Operation

### 6.1. Manual operation

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

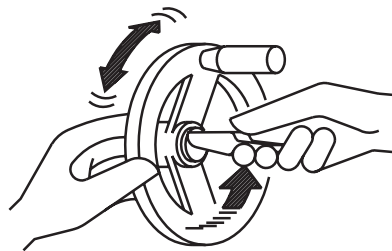
#### Engaging manual operation

##### NOTICE

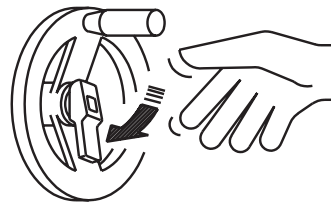
#### Damage at the change-over mechanism due to faulty operation!

- Engage manual operation only during motor standstill.
- Only pivot change-over lever manually.
- Using extensions as a lever for operation is **not** permitted.

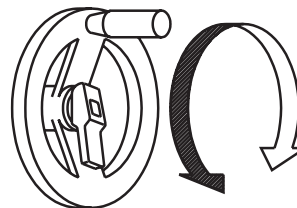
1. Pivot change-over lever manually to approx. 85° while slightly turning the handwheel back and forth until manual operation engages.



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



3. Turn handwheel into desired direction, in doing so the following applies:  
To close the valve, turn handwheel clockwise:  
Drive shaft (valve) turns clockwise in direction CLOSE.



#### Disengaging manual operation

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



## 6.2. Motor operation

Perform all commissioning settings prior to motor operation.

### 6.2.1 Local operation

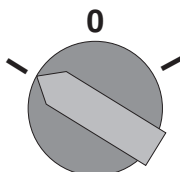
The local operation of the actuator is performed using the push buttons (figure 17).

**Figure 17**



- |                     |                          |
|---------------------|--------------------------|
| 1 Push button OPEN  | 4 Reset push button      |
| 2 Push button STOP  | 5 Selector switch        |
| 3 Push button CLOSE | 6 Indication lights/LEDs |

→ Set selector switch (5) to position **Local control** (LOCAL).



The actuator can now be operated using the push buttons (1 – 3).

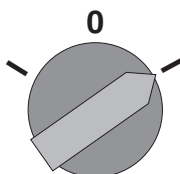
- |                                     |                        |
|-------------------------------------|------------------------|
| 1. Run actuator in direction OPEN:  | Press push button (1). |
| 2. Stop actuator:                   | Press push button (2). |
| 3. Run actuator in direction CLOSE. | Press push button (3). |

#### Information

The OPEN - CLOSE operation commands can be given either in push-to-run operation or in the self-retaining mode. For further information on this topic refer to "Manual (Operation and setting) AUMATIC AC 01.1/ACExC 01.1".

### 6.2.2 Operation from REMOTE

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



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

#### Information

Use the MODE input (refer to wiring diagram) to select between REMOTE MODE (open-close duty) and SETPOINT MODE (modulating duty).

6.3. Menu navigation via push buttons (for settings and indications)

The push buttons of the local controls (figure 18) are used to view, edit, and show various indications on the display.

**Figure 18**

1 Push button ▲

2 Push button ▼

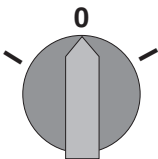
3 Push button ←

4 Push button C

5 Selector switch

6 Display

→ Set selector switch (5) to position **0** (OFF).



Now, settings and indications can be performed via the push buttons (1 – 4).

6.3.1 Short overview: functions of the push buttons

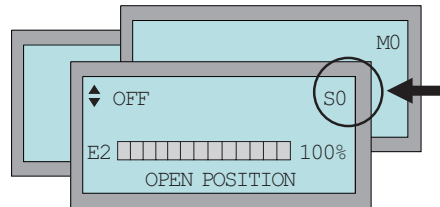
Table 3	
Push buttons	Functions
▲ ▼	Scrolling within a group (The triangles ▲ ▼ in the display show the direction of scrolling.)
	Change values
	Enter figures from 0 to 9
↵	Confirm the selection to go to a new menu/subgroup.
C	Cancel process
	Return to previous display: press briefly
	Change to another group (S, M, D) - press for approx. 3 seconds until group M0 is displayed. - hold down for more than 3 seconds until group D0 is displayed (thereby, group M is skipped).

### 6.3.2 Structural design and navigation

The indications on the display are divided into 3 groups:

- Group S = status indications
- Group M = menu (settings)
- Group D = diagnostic indications

The active group is displayed on the top right corner of the display.



#### Change groups

##### Change from group S to group M:

→ Press **C** push button and hold it down for approx. 3 seconds until group M0 appears.

##### Change from group S to group D:

→ Press **C** push button and hold it down until group D0 appears (group M is hereby skipped).

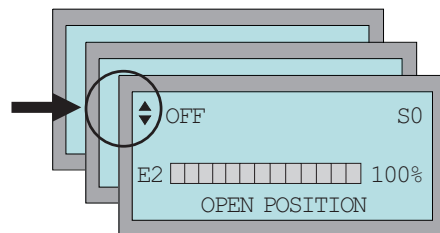
##### Change from any group M or D back to group S:

→ Briefly press **C**.

#### Scrolling

→ Press ▼▲:

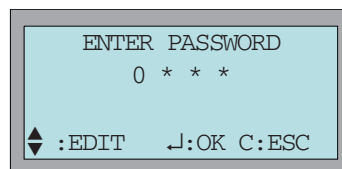
The triangles ▼▲ in the top left corner of the display indicate the possible scrolling direction (within one group) of scrolling.



#### Enter the password

In the menu (group M), the settings are protected by a password. To change the parameters, a password must first be entered. The following default password is set in the factory: 0000.

After selecting **EDIT**, the following is displayed:



1. Select figures 0 to 9: Press ▼▲.
2. Move to the next position: Press ↵.
3. Repeat steps 1 and 2 for all four digits.
4. To cancel a process: Press **C**.

#### Information

If no input is received over a longer period of time (approx. 10 min), the controls automatically returns to the status indication S0.

## 6.4. Language change in the display



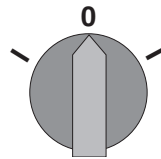
### Via the menu to parameter:

MAIN MENU (M0)  
LANGUAGE/CONTRAS (M00)  
VIEW (M00)  
EDIT (M01)  
LANGUAGE (M010)  
Default value: GERMAN  
Setting range: GERMAN, PORTUGUESE, ITALIAN, SPANISH,  
FRENCH, ENGLISH, TUERKCE, POLSKI, MAGYAR

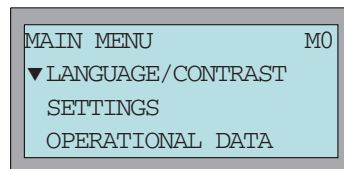


### Step by step:

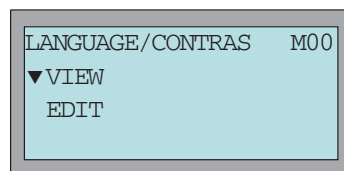
1. Set the selector switch to position **0** (OFF).



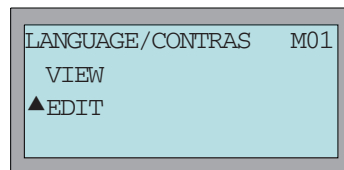
2. Press **C** and hold it down for approx. 3 seconds.  
Display indicates:



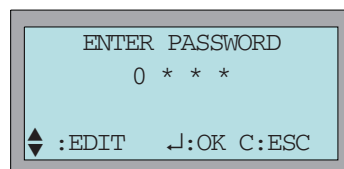
3. Press **↵**  
Display indicates:



4. Press **▼**.  
Display indicates:

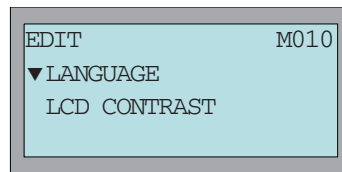


5. Press **↵**  
Display indicates:

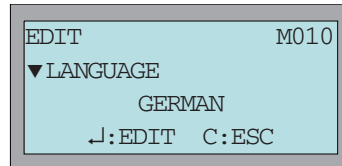


6. Enter password:  
Press **↵** 4 times = 0000 (default factory password).

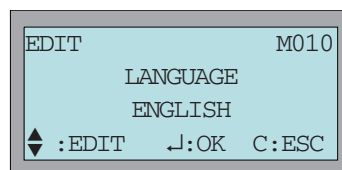
Display indicates:



7. Press  $\leftarrow$   
Display shows the set value.



8. Press  $\leftarrow$  again to enter the edit mode.  
Display indicates:



9. Set new value: Press  $\blacktriangledown$   $\blacktriangle$ .  
10. Accept value: Press  $\leftarrow$  or cancel process without accepting the value:  
Press C.

7. Indications

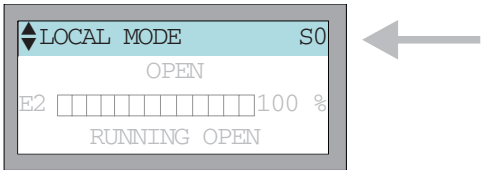
7.1. Status indication in the display

Status indications regarding faults and warnings, refer to pages 51 et seq..

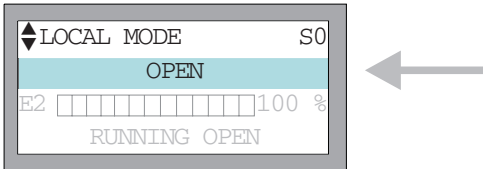
7.1.1 Status indication S0/S6 - operation

**Information** For actuators equipped with process controllers, status indication S6 is displayed instead of status indication S0. The description below applies to both indications (S0 and S6).

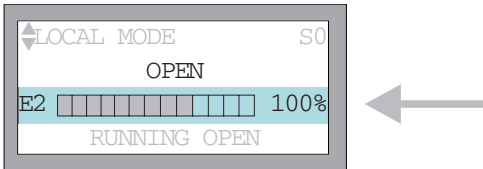
**Operation mode display** Line 1 indicates the current operation mode (LOCAL MODE, OFF, SETPOINT MODE, ...).



**Operation command/ setpoint display/** Line 2 indicates currently incoming operation commands (OPEN, STOP, CLOSE) or the setpoints E1 or E7 (for actuators equipped with positioner/process controller) in % of the total travel.

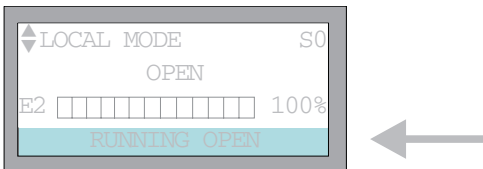


**Valve position display** Line 3 indicates the valve position in % of the travel  
This indication is only available if the actuator is equipped with a position transmitter.



0 % = actuator is in end position CLOSED  
100 % = actuator is in end position OPEN

**End position/running indication** Line 4 indicates the current actuator status.



↓ **Description of indications in line 4:**

**RUNNING OPEN**  
Actuator runs logically OPEN (remains set during operation pauses).

**RUNNING CLOSE**  
Actuator runs logically CLOSE (remains set during operation pauses).

**OPEN POSITION**  
End position OPEN reached.

**CLOSED POSITION**

End position CLOSED reached.

**SETPOINT POSITION**

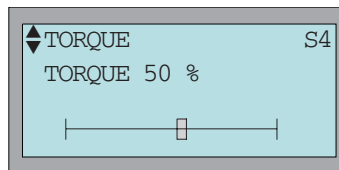
Setpoint (modulating actuators only).

**Description of the fault indications:**

See page 51.

**7.1.2 Status indication S4 - torque**

A deflection to the left side indicates torque in direction CLOSE.  
A deflection to the right side indicates torque in direction OPEN.



Example: SA 07.5 with 20 – 60 Nm.

100 % corresponds to 60 Nm of nominal torque.

50 % corresponds to 30 Nm of nominal torque.

**Information**

The torque value can be displayed in percent, Newtonmeter (Nm) or in Lbs/ft.

7.2. Indication lights/LEDs

The indication lights/LEDs locally display the different operation states as optical signals. The assignment of signals is freely selectable. Figure 19 shows the indication lights/LEDs on the local controls:

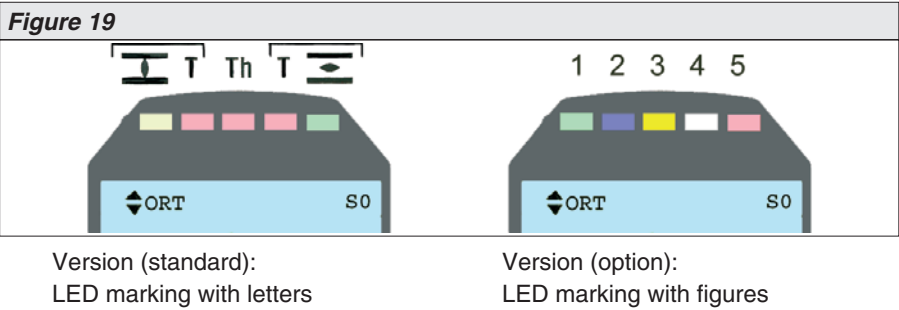




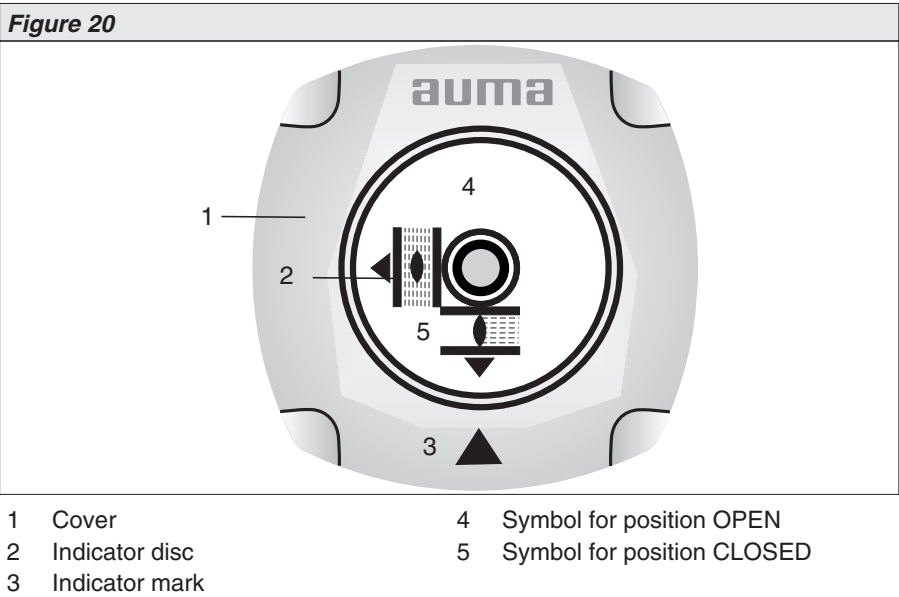
Table 4 describes the standard indication.

Table 4		
LED 1 (left) (  )	illuminated	Actuator is in end position CLOSED
	blinking	Running indication: Actuator runs in direction CLOSE
LED 2 (T)	illuminated	Torque fault CLOSE
LED 3 (Th)	illuminated	Motor protection tripped
LED 4 (T)	illuminated	Torque fault OPEN
LED 5 (right) (  )	illuminated	Actuator is in end position OPEN
	blinking	Running indication: Actuator runs in direction OPEN

**Information** The behaviour (blinking/illuminated) can be changed via the `BLINKER` parameter.

7.3. Mechanical position indicator/running indication (option)

- Mechanical position indicator
- continuously indicates the valve position (Indicator disc rotates approximately 180° to 230° at full travel from OPEN to CLOSED or vice versa.)
  - indicates whether the actuator is running (running indication)
  - indicates that the end positions (via indication mark) have been reached





## 8. Signals

### 8.1. Feedback via output contacts (binary)

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

Output contact open = no thermal fault

Output closes = thermal fault in actuator

Fault signals can be issued via the `ALARM CONTACT` parameter, other signals via the `OUTPUT CONTACTS 1 TO 5` parameters.

Alarm contact default value:

(Designation in the wiring diagram: NC fault/NO ready)

`FAULT GROUP 3` = fault signal (includes: torque fault, thermal fault, phase failure, and internal faults)

Standard values output contacts 1 to 5:

(Designation in the wiring diagram: DOUT1 to DOUT5)

`OUTPUT CONTACT 1` = CLOSED POSITION

`OUTPUT CONTACT 2` = OPEN POSITION

`OUTPUT CONTACT 3` = REMOTE SW. POSITION

`OUTPUT CONTACT 4` = TORQUE FAULT (CLOSE)

`OUTPUT CONTACT 5` = TORQUE FAULT (OPEN)

For further information on this topic refer to "Manual (Operation and setting) AUMATIC AC 01.1/ACExC 01.1".

### 8.2. Feedback signals (analogue)

**Valve position**      Signal: E2 = 0/4 – 20 mA (galvanically isolated)  
Designation in the wiring diagram:  
ANOUT1 (position)

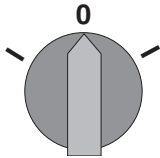
**Torque feedback**      Signal: E6 = 0/4 – 20 mA (galvanically isolated)  
Designation in the wiring diagram:  
ANOUT1 (torque)

For further information on this topic refer to "Manual AUMATIC AC 01.1/ACExC 01.1".

9. Commissioning

Prior to any electrical operation (motor operation), ensure that all commissioning settings described in this clause have been performed.

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



**Information** The selector switch is not a mains switch. The actuator control is disabled in **0** (OFF) position. The controls' power supply is maintained.

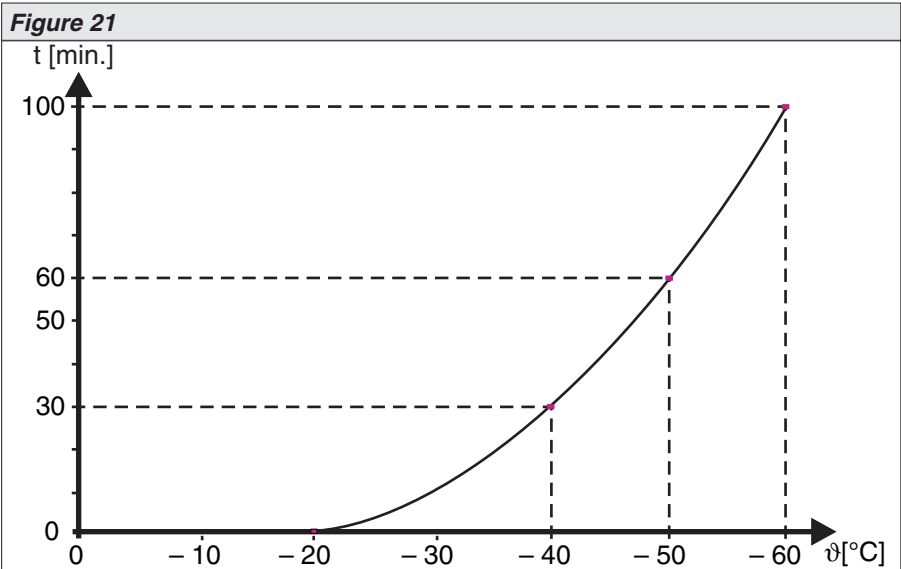
2. Switch on the voltage supply.
3. Perform the settings described in this clause.

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

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

- For  $-40\text{ }^{\circ}\text{C}$  = 30 min.
- For  $-50\text{ }^{\circ}\text{C}$  = 60 min.
- For  $-60\text{ }^{\circ}\text{C}$  = 100 min.

Figure 21: Sketch illustrating the heat-up time



**9.1. Type of seating: check/edit for end positions****NOTICE****Valve damage due to incorrect setting!**

- The type of seating must suit the valve.
- Only change the setting with the consent of the valve manufacturer.

**Limit seating**

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

**Torque seating**

The torque switching is set to the desired tripping torque. After reaching the tripping torque the actuator is turned off.  
The limit seating is used for signalling that the limit switching is tripped shortly before reaching the set tripping torque. If this is not the case, one of the following fault signals is displayed: TSO FAULTS or TSC FAULTS (menu S1).

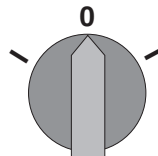
**Via the menu to parameter:**

```

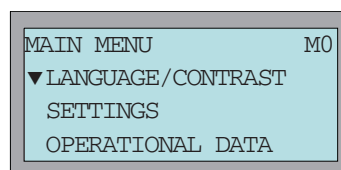
MAIN MENU (M0)
  SETTINGS (M1)
    SEATING MODE (M11)
      VIEW (M110)
      EDIT (M111)
        OPEN POSITION (M11_0)
        CLOSED POSITION (M11_1)
Default value:  LIMIT
  
```

**Step by step:**

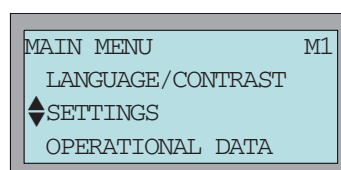
1. Set the selector switch to position **0** (OFF).



2. Press **C** and hold it down for approx. 3 seconds.  
Display indicates:

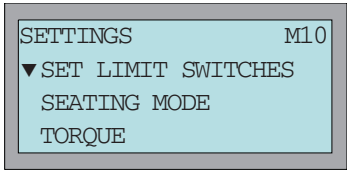


3. Press **▼**.  
Display indicates:

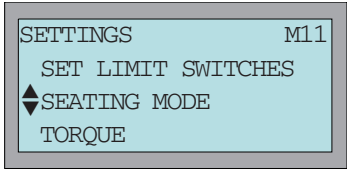


4. Press **←**.

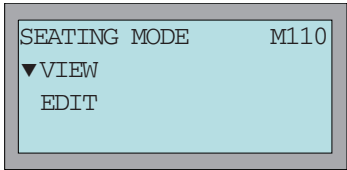
Display indicates:



5. Press ▼.  
Display indicates:



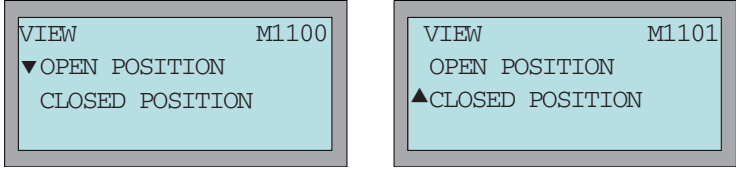
6. Press ↵.  
Display indicates:



7. Check settings (view): continue with 8.  
Change setting: continue with 11.

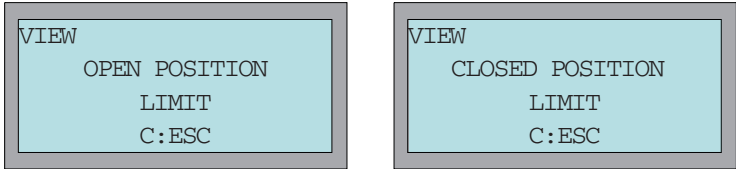
Check settings (view)

8. Press ↵.  
Display indicates:



▲ ▼ are used to change between the OPEN POSITION (left figure) and CLOSED POSITION (right figure) displays.

9. Press ↵.  
Display indicates:

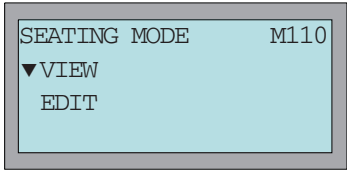


▲ ▼ are also used here to change between the OPEN POSITION (left figure) and CLOSED POSITION (right figure) displays.

10. Back to the VIEW/EDIT menu: Press C twice.

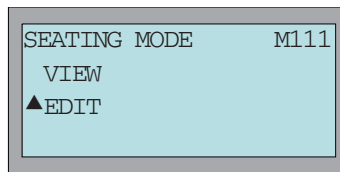
Change setting

Display indicates:



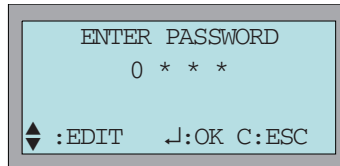
11. Press ▼.

Display indicates:



12. Press  $\leftarrow$ .

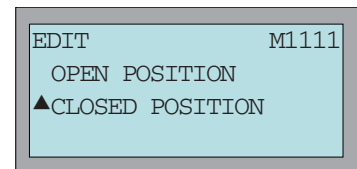
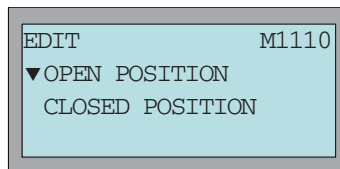
Display indicates:



13. Enter password:

Press  $\leftarrow$  4 times = 0000 (default factory password).

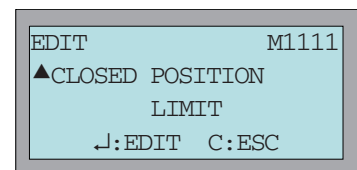
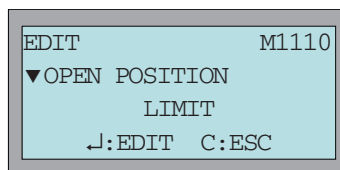
Display indicates:



▲ ▼ are used to change between the OPEN POSITION (left figure) and CLOSED POSITION (right figure) displays.

14. Press  $\leftarrow$ .

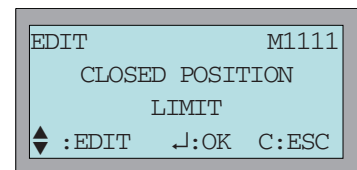
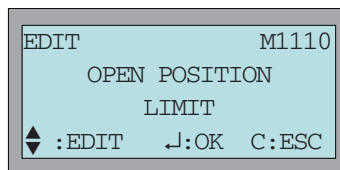
Display shows the set value:



▲ ▼ are also used here to change between the OPEN POSITION (left figure) and CLOSED POSITION (right figure) displays.

15. Press  $\leftarrow$  again to enter the edit mode.

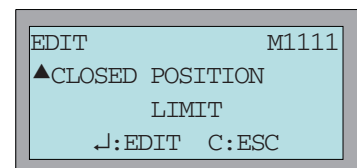
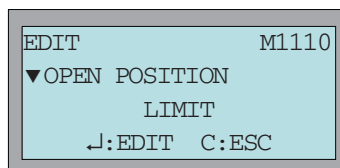
Display indicates:



16. Set new value: Press ▼▲.

17. Accept value: Press  $\leftarrow$  or cancel process without accepting the value: Press C.

Display indicates:



18. Return to status display:

Press C several times until S0 is displayed.

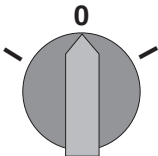
9.2. Torque switching: check/set

NOTICE

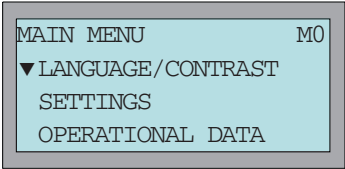
**Valve damage due to incorrect setting!**  
→ The torque must suit the valve.  
→ Only change the setting with the consent of the valve manufacturer.

- ➡ **Via the menu to parameter:**
- MAIN MENU (M0)
    - SETTINGS (M1)
      - TORQUE (M12)
        - VIEW (M120)
          - EDIT (M121)
            - OPENING (M12\_0)
            - CLOSING (M12\_1)
- Default value: according to order data  
Setting range: according to torque setting range  
refer to actuator name plate

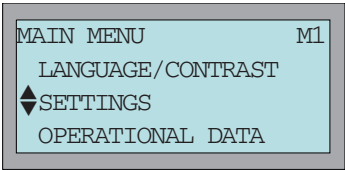
- ⇓ **Step by step:**
1. Set the selector switch to position 0 (OFF).



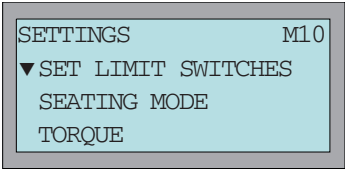
2. Press **C** and hold it down for approx. 3 seconds.  
Display indicates:



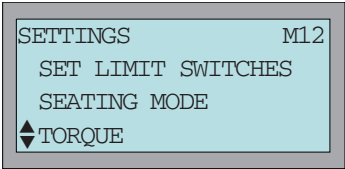
3. Press **▼**.  
Display indicates:



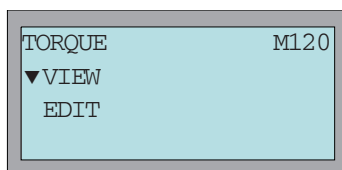
4. Press **↵**.  
Display indicates:



5. Press **▼** twice.  
Display indicates:



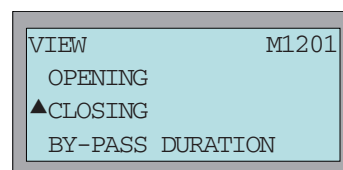
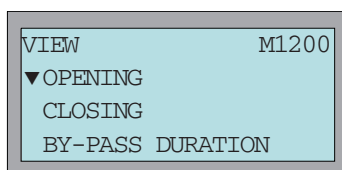
6. Press  $\leftarrow$ .  
Display indicates:



7. Check settings (view): continue with 8.  
Change setting: continue with 11.

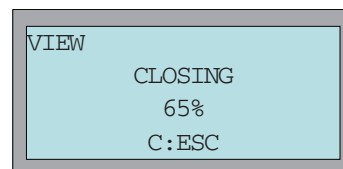
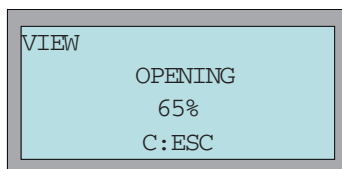
### Check settings (view)

8. Press  $\leftarrow$ .  
Display indicates:



▲ ▼ are used to change between the OPENING (left figure) and CLOSING (right figure) displays.

9. Press  $\leftarrow$ .  
Display indicates:

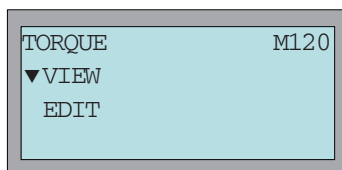


▲ ▼ are also used here to change between the OPENING (left figure) and CLOSING (right figure) displays.

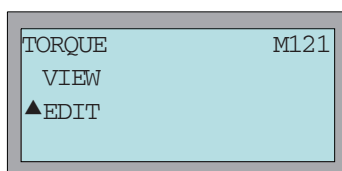
10. Back to the VIEW/EDIT menu:  
Press C twice.

### Change setting

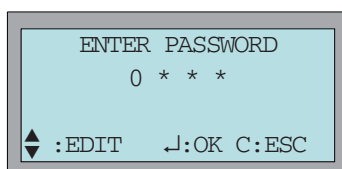
Display indicates:



11. Press ▼.  
Display indicates:



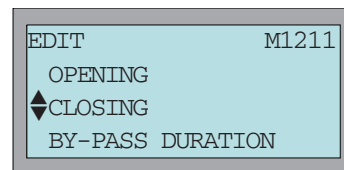
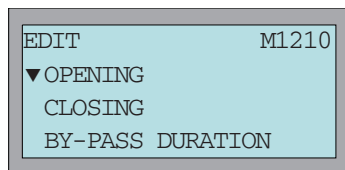
12. Press  $\leftarrow$ .  
Display indicates:



13. Enter password:

Press  $\leftarrow$  4 times = 0000 (default factory password).

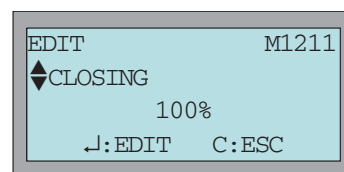
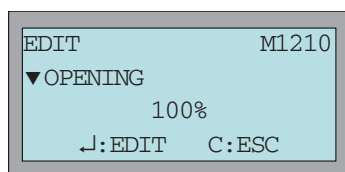
Display indicates:



$\blacktriangle$   $\blacktriangledown$  are used to change between the OPENING (left figure) and CLOSING (right figure) displays.

14. Press  $\leftarrow$ .

Display shows the set value:



$\blacktriangle$   $\blacktriangledown$  are also used here to change between the OPENING (left figure) and CLOSING (right figure) displays.

**Information**

The value can be displayed in percent, Newtonmeter (Nm) or in Lbs/ft.

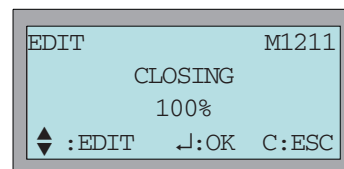
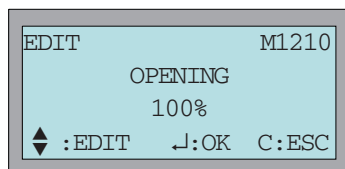
For display in percent:

100 % equals the max. torque indicated on the name plate of the actuator.

Example: SA 07.5 with 20 – 60 Nm: 100 % = 60 Nm  
33 % = 20 Nm

15. Press again  $\leftarrow$  to enter the edit mode.

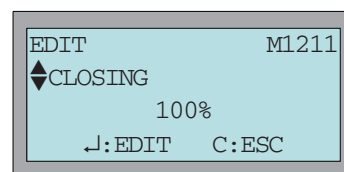
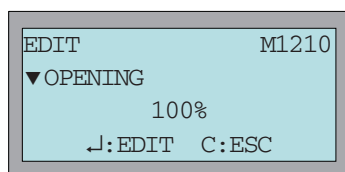
Display indicates:



16. Set new value: Press  $\blacktriangledown$   $\blacktriangle$ .

17. Accept value: Press  $\leftarrow$  or cancel process without accepting the value: Press **C**.

Display indicates:



18. Return to status display:

Press **C** several times until S0 is displayed.

**Information**

The following fault signals are sent if torque setting performed has been reached **in mid-travel**:

Status indication S0: FAULT IND.

Status indication S1: TORQUE FAULT (OPEN) or TORQUE FAULT (CLOSE) (torque fault)

The fault has to be acknowledged before the operation can be resumed.

Either by

- an operation command in the opposite direction.  
For TORQUE FAULT (CLOSE): Operation command in direction OPEN  
For TORQUE FAULT (OPEN): Operation command in direction CLOSE
- or via the **Reset** push button in selector switch position LOCAL.

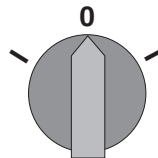


**9.3. Limit switching setting****Via the menu to parameter:**

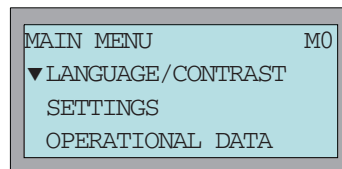
MAIN MENU (M0)  
 SETTINGS (M1)  
 SET LIMIT SWITCHES (M10)  
 CLOSED POSITION (M101)  
 OPEN POSITION (M101)

**Step by step:**

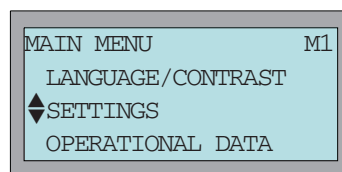
1. Set the selector switch to position **0** (OFF).



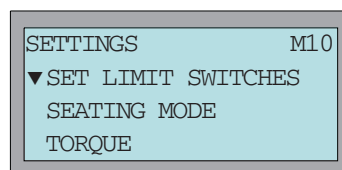
2. Press **C** and hold it down for approx. 3 seconds.  
Display indicates:



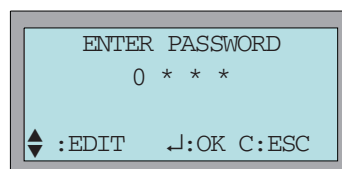
3. Press **▼**.  
Display indicates:



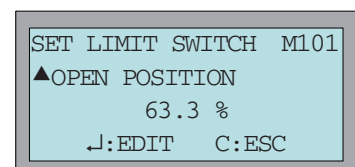
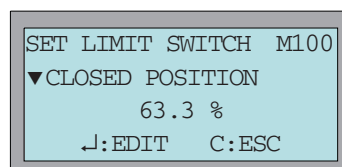
4. Press **↵**.  
Display indicates:



5. Press **↵**.  
Display indicates:



6. Enter password:  
Press **↵** 4 times = 0000 (default factory password).  
The current actuator position is displayed:

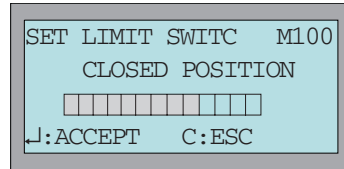


▲ ▼ are used to change between the CLOSED POSITION (left figure) and OPEN POSITION (right figure) displays.

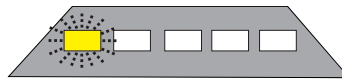
7. Setting end position CLOSED: continue with 8  
Setting end position OPEN: continue with 13

### Setting end position CLOSED

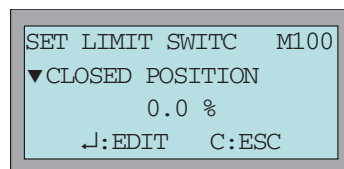
8. Press  $\leftarrow$  to enter the edit mode:  
Display indicates:



9. Engage manual operation.
10. Turn handwheel clockwise until valve is closed.
11. Turn handwheel back by approximately half a turn (overrun).
12. Press  $\leftarrow$  to accept new end position.  
LEDs and display indicate that the new end position has been accepted:
  - The left LED is illuminated (standard setting).
  - Display indicates: 0.0 %.

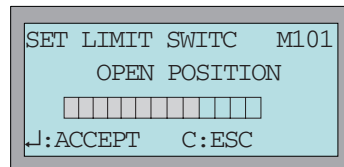


▼ is used to select OPEN POSITION.



### Setting end position OPEN

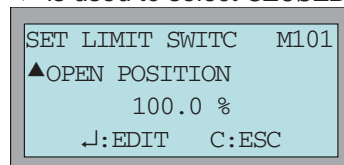
13. Press  $\leftarrow$  to enter the edit mode:  
Display indicates:



14. Engage manual operation.
15. Turn handwheel counterclockwise until valve is open.
16. Turn handwheel back by approximately half a turn (overrun).
17. Press  $\leftarrow$  to accept new end position.  
LEDs and display indicate that the new end position has been accepted:
  - The right LED is illuminated (standard setting).
  - Display indicates: 100.0 %.



▼ is used to select CLOSED POSITION.



18. Press **C** several times until S0 is displayed to return to the status indication.

**Information** If an end position cannot be set:  
→ Check the type of control unit in actuator.

**Information** The end positions can be approached (via push buttons and selector switch in position LOCAL), even during motor operation. For setting, the selector switch must be in position 0 (OFF).

**NOTICE**

**Valve damage due to direct approaching of mechanical end stop during motor operation!**

→ During motor operation, interrupt travel before reaching the mechanical valve/gearbox end stop (press push button STOP ).

## 9.4. Test run

Perform test run only once all settings previously described in the Commissioning clause have been performed.

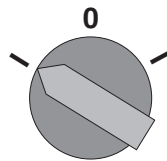
### 9.4.1 Rotational direction check

#### NOTICE

#### Valve damage due to incorrect direction of rotation!

- If the direction of rotation is wrong, switch off immediately (press STOP).
- Eliminate the cause, e.g. correct phase sequence for wall bracket cable set.
- Repeat test run.

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



3. Operate push button CLOSE and observe the direction of rotation.
4. Switch off before reaching the end position.

#### For actuators equipped with indicator disc

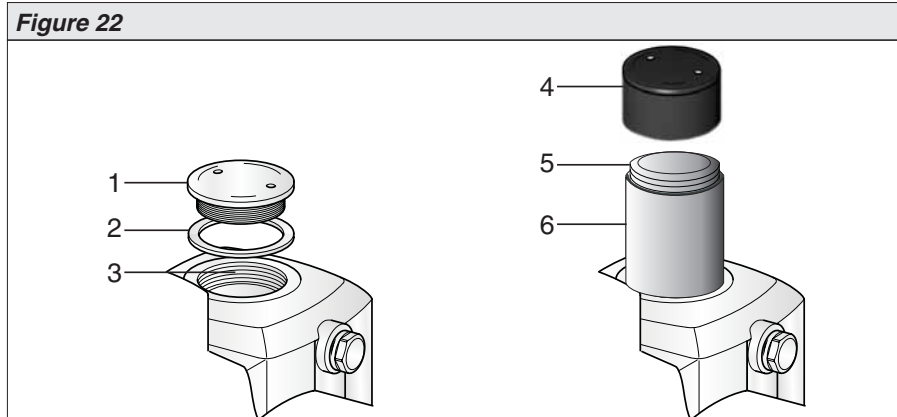
- Observe direction of rotation on the indicator disc.  
The direction of rotation is correct, if: The actuator moves in direction CLOSE while the indicator disc turns counterclockwise.



**For actuators without indicator disc**

→ Unscrew screw plug (1) and seal (2) or tube cap (4) and observe direction of rotation at hollow shaft (3) or the stem (5).

The direction of rotation is correct, if: the actuator moves in direction CLOSE while the hollow shaft or the stem turn clockwise.

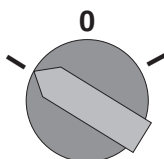
**Figure 22**

- 1 Screw plug
- 2 Seal
- 3 Hollow shaft

- 4 Cap for stem protection tube
- 5 Stem
- 6 Protection tube

**9.4.2 Limit switching check**

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

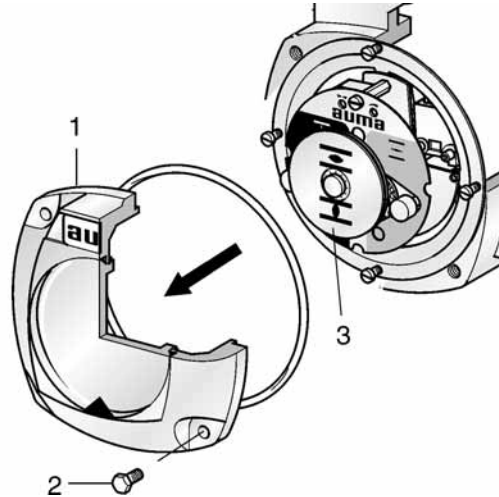


2. Operate actuator using push buttons OPEN - STOP - CLOSE.  
The limit switching is set correctly if (standard indication):
  - The yellow indication light/LED1 is illuminated in end position CLOSED
  - The green indication light/LED5 is illuminated in end position OPEN
 The limit switching is set incorrectly, if:
  - The actuator comes to a standstill before reaching the end position
  - One of the red indication lights/LEDs is illuminated (torque fault), or the following fault signals are displayed:  
Status indication S0: FAULT, IND.  
Status indication S1: TORQUE FAULT (CLOSE) or TORQUE FAULT (OPEN).
3. If the end position setting is incorrect: Set limit switching again (page 41).



## 9.5. Switch compartment: open

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



1. Loosen screws (2) and remove cover (1) from the switch compartment.





## 9.6. Mechanical position indicator (option) setting

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



3. Move actuator to end position OPEN.
4. Hold lower indicator disc CLOSED in position and turn upper disc with  symbol (OPEN) until it is in alignment with the  mark on the cover.



5. Move valve to end position CLOSED again.
6. Check settings: If the  symbol (CLOSED) is no longer in alignment with the  mark on the cover:  
→ Test/set gear stage of the reduction gearing (page 47).
7. If the setting is correct: Close switch compartment (page 49).

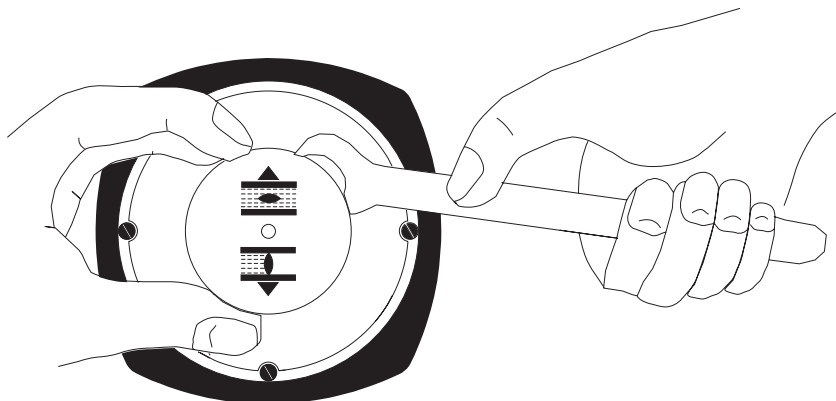
**9.7. Gear stage of the reduction gearing: test/set**

This test/setting is only required if the turns/stroke of the actuator have been changed at a later date.

The control unit may possibly have to be exchanged:

Control unit MS5.2: 1 to 500 turns per stroke  
Control unit MS50.2: 10 to 5,000 turns per stroke

1. Pull off indicator disc. Open end wrench may be used as lever.



2. Check if turns/stroke of the actuator correspond to the setting of the primary reduction gearing (figure 23: stages 1 – 9) using table 5.
3. If the setting is not correct: continue with point 4.  
If the setting is correct: continue with point 7.

**Table 5**

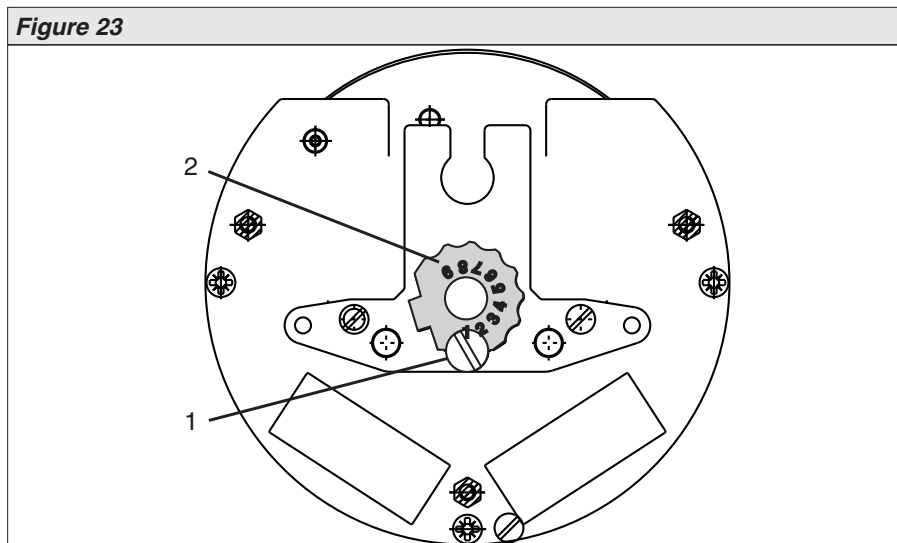
**Control unit MS5.2 (1 to 500 turns per stroke)**

Turns/stroke above – to	Gear stage	Turns/stroke above – to	Gear stage	Turns/stroke above – to	Gear stage
1.0 – 1.9	1	7.8 – 15.6	4	62.5 – 125	7
1.9 – 3.9	2	15.6 – 31.5	5	125 – 250	8
3.9 – 7.8	3	31.5 – 62.5	6	250 – 500	9

**Control unit MS50.2 (10 to 5,000 turns per stroke)**

Turns/stroke above – to	Gear stage	Turns/stroke above – to	Gear stage	Turns/stroke above – to	Gear stage
10.0 – 19.5	1	78 – 156	4	625 – 1,250	7
19.5 – 39.0	2	156 – 315	5	1,250 – 2,500	8
39.0 – 78.0	3	315 – 625	6	2,500 – 5,000	9

**Figure 23**



1 Screw

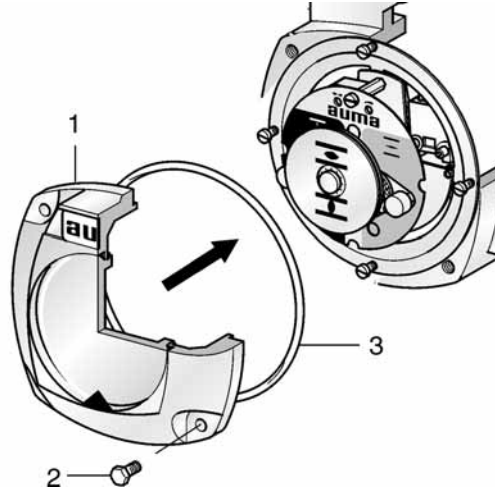
2 Crown wheel

4. Loosen screw (1).
5. Set crown wheel (2) to desired level according to table 5.
6. Fasten screw (1).
7. Place indicator disc on shaft.
8. Set the mechanical position indicator as described on page 46.



**9.8. Switch compartment: close**

1. Clean sealing faces of housing and cover.
2. Apply a thin film of non-acidic grease (e.g. Vaseline) to the sealing faces.
3. Check whether O-ring (3) is in good condition, insert O-ring correctly.



4. Place cover (1) on switch compartment.
5. Fasten screws (2) evenly crosswise.

**NOTICE****Danger of corrosion due to damage to paint finish!**

→ Touch up damage to paint finish after work on the device.

10. Corrective action

10.1. Faults during commissioning

10.1.1 Mechanical position indicator

Fault description	Mechanical position indicator cannot be set.
Possible cause	Actuator turns/stroke have been modified at a later date.
Remedy	Set reduction gearing (page 47), replace control unit if required.

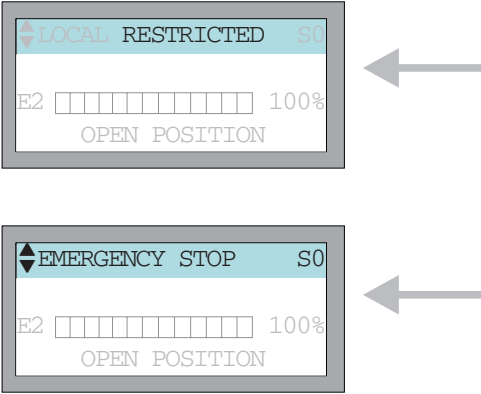
10.1.2 Fault in end position (overrun not considered)

Fault description	Actuator runs to end stop although the limit switches work properly.
Possible cause	The overrun was not considered when setting the limit switching. The overrun is generated by the inertia of both the actuator and the valve and the delay time of the controls.
Remedy	1. Determine overrun: Overrun = travel covered from switching off until complete standstill. 2. Set limit switching again (page 41) considering the overrun (turn handwheel back by the amount of the overrun).

10.1.3 Push buttons do not react

Fault description	Push buttons do not react. The controls may not be operated via the local controls.
-------------------	--

Display indicates:



Possible cause	<ul style="list-style-type: none"><li>• RESTRICTED means that the local controls of the AUMATIC have not been released yet.</li><li>• EMERGENCY STOP signifies that the EMERGENCY STOP operation mode has been activated upon operating an EMERGENCY STOP button (option).</li></ul>
Remedy	For RESTRICTED: → A release must be initiated externally via bus or input signal. See parameter ENABLE LOCAL MODE. For EMERGENCY STOP: → Release EMERGENCY STOP button.

## 10.2. Fault indications and warning indications

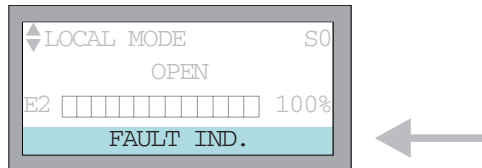
**Faults** interrupt or prevent the electric actuator operation.

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

Fault and warning indications are shown on the display.

### 10.2.1 Status display S0 - faults and warnings

Line 4 of status indication S0 shows faults and warnings.



#### Description of the fault indications:

##### **FAULT IND.**

A fault has occurred

→ For further information, press ▼▲ and go to status indication S1.

##### **WARNING IND.**

A warning has occurred

→ For further information, press ▼▲ and go to status indication S2.

##### **FAULT + WARNING**

Faults as well as warnings have occurred.

→ For further information, press ▼▲ and go to status indications S1 (faults) or S2 (warnings).

##### **NOT READY IND.**

The actuator cannot be operated from REMOTE. The actuator can only be operated via the local controls.

→ For further information, press ▼▲ and go to status indication S3 (cause for fault indications).

##### **FLT + NR**

Faults and the NOT READY IND. signal have occurred.

→ For further information, press ▼▲ and go to status indications S1 or S3.

##### **WRN + NR**

Faults and the NOT READY IND. signal have occurred.

→ For further information, press ▼▲ and go to status indications S2 or S3.

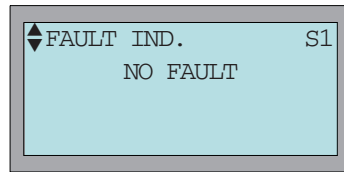
##### **FLT + WRN + NR**

Faults, warnings, and the NOT READY IND. signal have occurred.

→ For further information, press ▼▲ and go to status indications S1 to S3.

### 10.2.2 Status indication S1 - faults

Faults are indicated in this group:



#### Description of the fault indications:

##### **NO FAULT**

No fault has occurred.

##### **INTERNAL FAULT**

Internal fault has occurred.

For further information:

1. Go to group D0: Press **C** and hold it down until diagnostic indication D0 is displayed.
2. Go to diagnostic indication D2: Press **▼** twice.

##### **TORQUE FAULT (CLOSE)**

Torque fault in direction CLOSE.

- Operation command in direction OPEN, or
- Set selector switch to position **Local control** (LOCAL) and reset fault indication via **Reset** push button.

##### **TORQUE FAULT (OPEN)**

Torque fault in direction OPEN

- Operation command in direction CLOSE, or
- Set selector switch to position **Local control** (LOCAL) and reset fault indication via **Reset** push button.

##### **LOSS OF PHASE**

One phase is missing.

- Test/connect phases.

##### **THERMAL FAULT**

Motor protection tripped.

- Wait for cooling off.
- If the fault indication display persists after cooling off:
  - Set selector switch to position **Local control** (LOCAL) and reset fault indication via **Reset** push button
- Check fuse F4.

##### **CONFIGURATION FAULT**

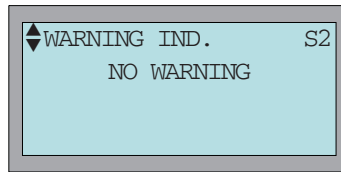
The controls configuration is incorrect.

For further information:

1. Go to group D0: Press **C** and hold it down until diagnostic indication D0 is displayed.
2. Go to diagnostic indication D4: Press **▼** four times.

**10.2.3 Status indication S2 - warnings**

Warnings are indicated in this group:

**Description of the warnings:****NO WARNING**

No warnings have occurred.

**WARNING RUN.TIME**

The preset running time for a travel between end position OPEN and end position CLOSED has been exceeded.

- Set the running time (MONITOR TRIGGERS parameter) in accordance with the actual running time.
- Check tripping behaviour of end position switches.
- Check actuator mechanics.

**WARNING STARTS/RUN**

The preset values for max. starts/h or max. running time/h have been exceeded.

- Check modulating behaviour.
- Increase dead time.
- Reduce number of nominal value changes.

**INTERNAL FEEDBACK**

Position transmitter is not standardised.

- Operate actuator into both end positions (OPEN and CLOSED).

**INTERNAL WARNING**

Internal warnings have occurred.

For further information:

1. Go to group D0: Press **C** and hold it down until diagnostic indication D0 is displayed.
2. Go to diagnostic indication D3: Press **▼** three times.

**FEEDBACK E2 LOSS**

Signal loss of position transmitter.

- Check position transmitter signal.
- 1. Go to group D0: Press **C** and hold it down until diagnostic indication D0 is displayed.
- 2. Go to diagnostic indication D7, D8, or D9: Press **▼** either seven, eight, or nine times.
- Check position transmitter wiring.
- Check POSITION E2. The setting must correspond to the wiring diagram.

**SETPOINT E1 LOSS**

Signal loss of the set point.

- Check wiring.

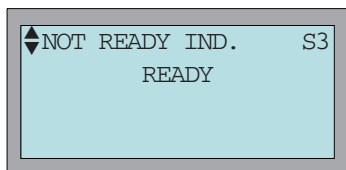
**TORQUE E6 LOSS**

Signal loss of torque source.

- Check wiring.

#### 10.2.4 Status indication S3 - causes for not ready remote

The causes for the NOT READY IND. fault signals (S0 status indication) are indicated within this group.



##### Description of the fault signals:

###### **READY**

Actuator can be operated from REMOTE.

###### **NOT REMOTE**

Actuator **cannot** be operated from REMOTE because the selector switch is either in position LOCAL or OFF.

**10.3. Fuses****Hazardous voltage!**

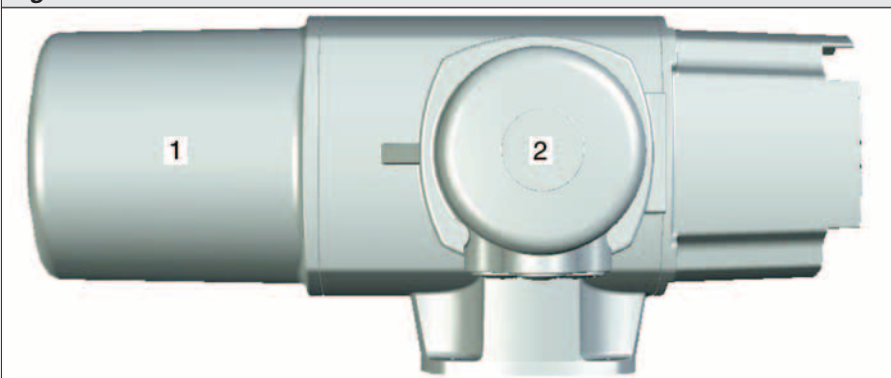
Electric shock possible.

→ Disconnect device from the mains before opening.

**10.3.1 Fuses within the actuator controls**

Fuses F1 and F2 can be accessed after removing the cover (1) on the rear side.

Fuses F3, F4, and F5 are located on the power supply unit and can be accessed after removing the electrical connection (2).

**Figure 24**

1 Rear cover

2 Electrical connection

**F1/F2** Primary fuses on power supply unit**Table 6**

G fuses	F 1/F 2	AUMA Art. no.
Size	6.3 x 32 mm	
Reversing contactors Voltage supply ≤ 500 V	1 A T; 500 V	K002.277
Reversing contactors Voltage supply 500 V	2 A FF; 660 V	K002.665
Thyristor units for motor power up to 1.5 kW	15 A FF; 500 V	K001.189
Thyristor units for motor power up to 3.0 kW	30 A FF; 500 V	K006.965
Thyristor units for motor power up to 5.5 kW	1 A T; 500 V	K002.277

**F3** Internal 24 V DC supply**F4** Internal 24 V AC supply (115 V AC) for:

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

**Table 7**

G fuse according to IEC 60127-2/III	F3	F4
Size	5 x 20 mm	5 x 20 mm
Voltage output (power supply unit) = 24 V	1.0 A T; 250 V	1.25 A T; 250 V
Voltage output (power supply unit) = 115 V	1.0 A T; 250 V	0.315 A T; 250 V

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

→ Screw cover back on again after fuse replacement.

### 10.3.2 Motor protection (thermal monitoring)

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

The actuator is switched off and the following signals are given:

- LED 3 (thermal fault) on the local controls is illuminated.
- Status indication S0: operation mode OFF/LOCAL = FLT + NR
- Status indication S0/S6: operation mode REMOTE = FAULT IND.
- Status indication S1 in the display: THERMAL FAULT.

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

Depending on the parameter setting, the fault signal is either automatically reset or the fault signal has to be reset using the **Reset** push button in selector switch position LOCAL or using the reset command via fieldbus.

For further information on this topic refer to "Manual (Operation and setting) AUMATIC AC 01.1/ACExC 01.1".



## 11. Servicing and maintenance

### CAUTION

#### Damage caused by inappropriate maintenance!

- Servicing and maintenance tasks must be carried out exclusively by suitably qualified personnel authorised by the end user or contractor of the plant only.
- Only perform servicing and maintenance tasks when the device is switched off.

#### Service

AUMA offers extensive service such as maintenance and inspection as well as customer product training. For the relevant contact addresses, please refer to page 70 et seqq. and on the Internet ([www.auma.com](http://www.auma.com)).

### 11.1. Preventive measures for servicing and safe operation

The following measures are required to ensure safe device operation:

#### Every 6 months after commissioning

- Carry out visual inspection:
  - For electrical devices: cable entries, cable glands, screw plugs, etc. have to be checked for correct tightness and sealing. Consider torques according to manufacturer's details.
- If rarely operated: perform test run.
- For devices with output drive A, press in Lithium soap EP multi-purpose grease on mineral oil base at the grease nipple with the grease gun (quantities see 14, table 2). This procedure does not grease the valve stem. Lubrication of the valve stem must be done separately.

Figure 25



1 Output drive type A

2 Grease nipple

#### 6 months after commissioning and then once a year

Check screws between multi-turn actuator and valve for tightness. If required, tighten by applying the torques given in table 1, page 13.

#### For enclosure protection IP 68 (option)

After submersion:

- Check multi-turn actuator.
- In case of ingress of water, dry device correctly and check for proper function.

## 11.2. Maintenance

### Maintenance intervals

- Refer to lubricant change.

### Lubricant change

- In the factory, the gear housing is filled with grease.
- Grease change is performed during maintenance.
  - Generally after 4 to 6 years for modulating duty.
  - Generally after 6 to 8 years if operated frequently (open-close duty).
  - Generally after 10 to 12 years if operated rarely (open-close duty).
- No additional lubrication is required during operation.

## 11.3. Disposal and recycling

AUMA devices have a long lifetime. However, they have to be replaced at one point in time.

The devices have a modular design and may, therefore, easily be separated and sorted according to materials used, i.e.:

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

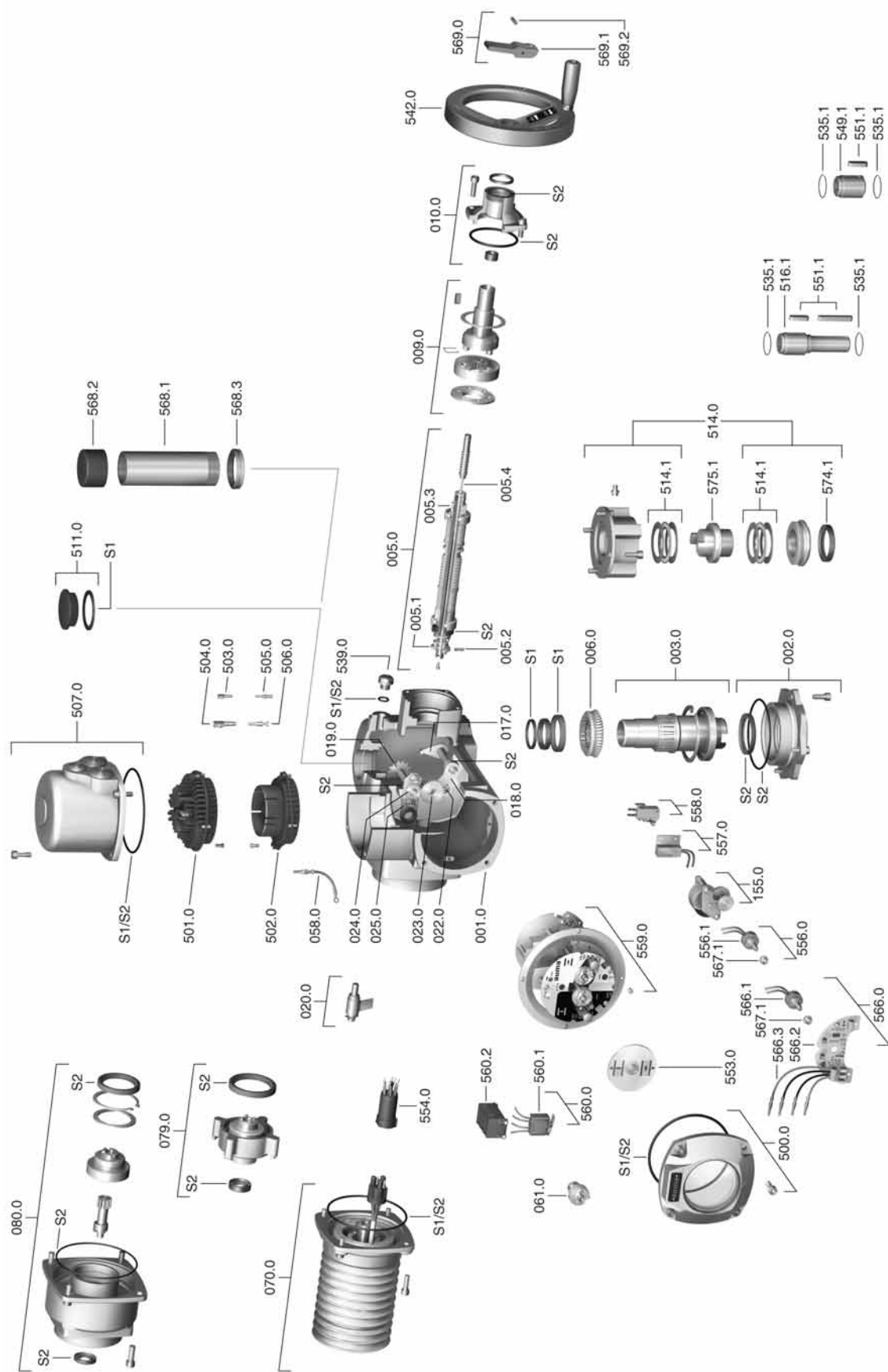
The following generally applies:

- Collect greases and oils during disassembly. Generally, these substances are hazardous to water and must not be released into the environment.
- Arrange for controlled waste disposal of the disassembled material or for separate recycling according to materials.
- Observe the national regulations for waste disposal.

## Notes

12. Spare parts list

12.1. Multi-turn actuator SA 07.1 – SA 16.1/SAR 07.1 – SAR 16.1

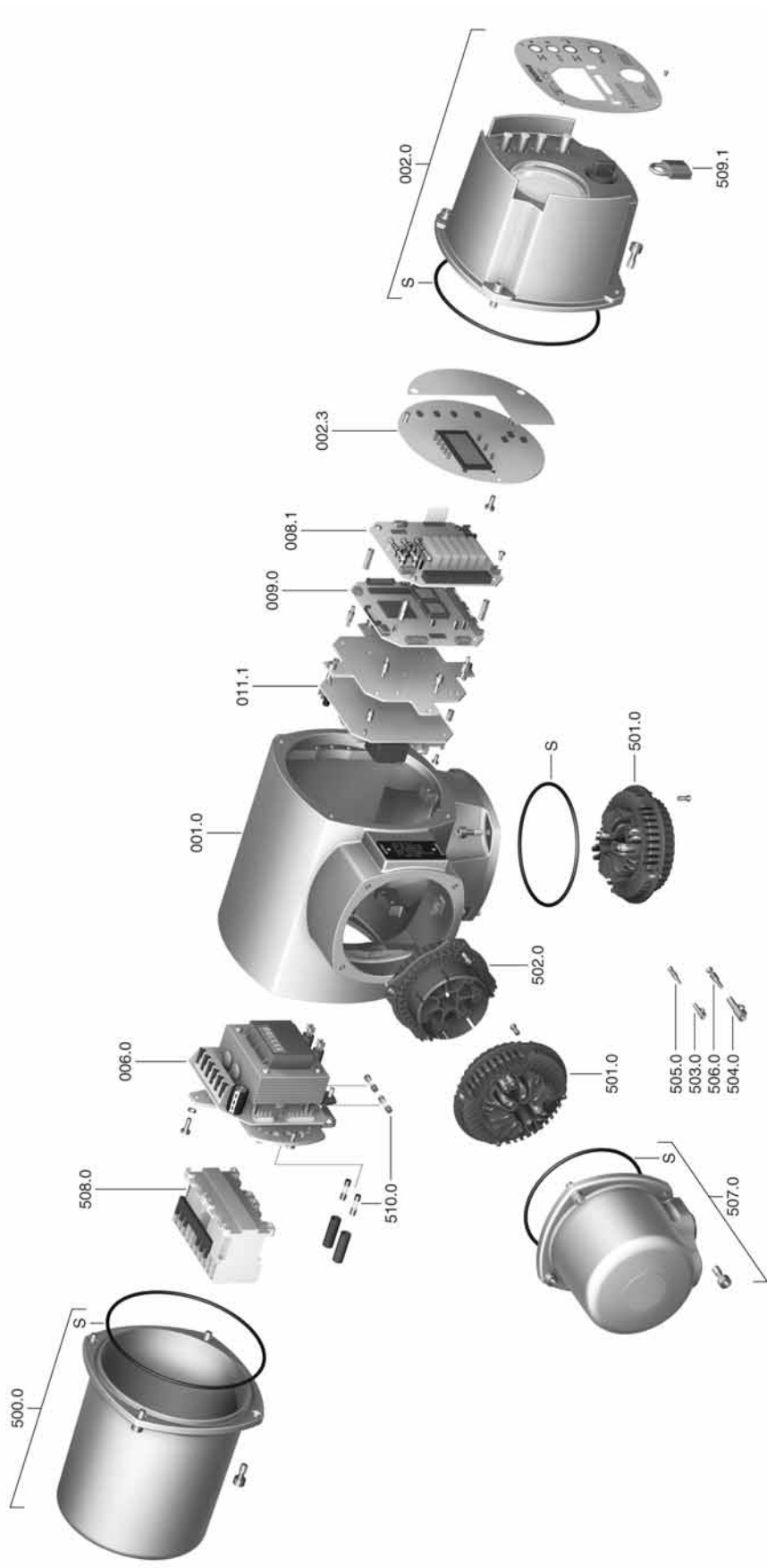


**Note:**

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	No.	Designation	Type
001.0	Housing	Sub-assembly	566.2	Electronic board RWG	Sub-assembly
002.0	Bearing flange	Sub-assembly	566.3	Wire harness for RWG	Sub-assembly
003.0	Hollow shaft without worm wheel	Sub-assembly	567.1	Slip clutch for potentiometer/RWG	Sub-assembly
005.0	Worm shaft	Sub-assembly	568.1	Stem protection tube (without cap)	
005.1	Motor coupling		568.2	Cap for stem protection tube	
005.2	Coupling pin		568.3	V-seal	
005.3	Manual drive coupling		569.0	Change-over lever assly.	
005.4	Pull rod		569.1	Change-over lever	
006.0	Worm wheel		569.2	Notched pin	
009.0	Planetary gear for manual drive	Sub-assembly	574.1	Radial seal output drive A for ISO flange	
010.0	Retaining flange	Sub-assembly	575.1	Stem nut type A	
017.0	Torque lever	Sub-assembly	S1	Seal kit, small	Set
018.0	Gear segment		S2	Seal kit, large	Set
019.0	Crown wheel	Sub-assembly			
020.0	Swing lever	Sub-assembly			
022.0	Drive pinion II for torque switching	Sub-assembly			
023.0	Output drive wheel for limit switching	Sub-assembly			
024.0	Intermediate wheel for limit switching	Sub-assembly			
025.0	Locking plate	Sub-assembly			
058.0	Wire for protective earth (pin)	Sub-assembly			
061.0	Torque switching head	Sub-assembly			
070.0	Motor (VD motor incl. no. 079.0)	Sub-assembly			
079.0	Planetary gear for motor drive (SA/SAR 07.1 – 14.1 for VD motor)	Sub-assembly			
080.0	Planetary gear for motor drive (SA/SAR 16.1 for AD90 motor)	Sub-assembly			
155.0	Reduction gearing	Sub-assembly			
500.0	Cover for switch compartment	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			
511.0	Screw plug	Sub-assembly			
514.0	Output drive form A (without stem nut)	Sub-assembly			
514.1	Axial needle roller bearing	Sub-assembly			
516.1	Output drive shaft D				
535.1	Snap ring				
539.0	Screw plug				
542.0	Handwheel with ball handle	Sub-assembly			
549.1	Output socket B3/B4/E				
551.1	Parallel key				
553.0	Mechanical position indicator	Sub-assembly			
554.0	Socket carrier with motor cable harness	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			
559.0-1	Control unit without torque head, without switches	Sub-assembly			
559.0-2	Control unit with magnetic limit and torque transmitter (MWG) for Non-intrusive version in combination with AUMATIC integral controls	Sub-assembly			
560.0-1	Switch stack for OPEN direction	Sub-assembly			
560.0-2	Switch stack for CLOSE direction	Sub-assembly			
560.1	Switch for limit/torque switching				
560.2	Switch case				
566.0	Position transmitter RWG	Sub-assembly			
566.1	Potentiometer for RWG without slip clutch	Sub-assembly			

12.2. Controls AC 01.1 with AUMA plug/socket connector (S, SH, SE)



**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	Sub-assembly
002.0	Local controls	Sub-assembly
002.3	Local controls board	
006.0	Power supply	Sub-assembly
008.1	Interface board	
009.0	Logic board	Sub-assembly
011.1	Relay board	
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	
510.0	Fuse kit	Set
S	Seal kit	Set

## 13. Technical data

Features and functions for actuator	
Type of duty <sup>1)</sup>	Standard: SA Short time duty S2 - 15 min SAR Intermittent duty S4 - 25 % Option: SA Short time duty S2 - 30 min SAR Intermittent duty S4 - 50 % Intermittent duty S5 - 25 %
Torque range	Refer to actuator name plate
Output speed	Refer to actuator name plate
Motors	Standard: 3-ph AC asynchronous motor, type IM B9 according to IEC 34 Options: 1-ph AC motor, type IM B14 according to IEC 34 DC shunt motor, type IM B14 according to IEC 34 DC compound motor, type IM B14 according to IEC 34 Special motors
Insulation class	Standard: F, tropicalized Option: H, tropicalized
Motor protection	Standard: Thermoswitches (NC) Option: PTC thermistors (PTC according to DIN 44082) <sup>2)</sup>
Self-locking	Yes, for output speeds 4 to 90
Limit switching	Magnetic limit and torque transmitter (MWG) for 1 to 500 turns per stroke or for 10 to 5,000 turns per stroke
Torque switching	Via MWG (like limit switching)
Position feedback, analogue	Via MWG
Torque feedback signal, analogue	Via MWG
Mechanical position indicator (option)	Continuous indication, adjustable indicator disc with OPEN and CLOSED symbols
Running indication	Blinker transmitter
Heater in switch compartment	Resistance type heater with 5 W, 24 V DC (standard: internal supply)
Motor heater (option)	SA/SAR 07.1 – 10.1: 12.5 W SA/SAR 14.1 – 16.1: 25 W
Manual operation	Manual drive for setting and emergency operation, handwheel does not rotate during electrical operation. Option: Handwheel lockable
Connection to controls	AUMA plug/socket connector with screw type connection
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
Features and functions for controls	
Power supply	For mains voltage and mains frequency, refer to name plates at the controls and the motor (for a description of the name plates, refer to page 8) Permissible variation of the nominal voltage: $\pm 10\%$ Permissible variation of the mains frequency: $\pm 5\%$ Motor current consumption: Refer to motor name plate Current consumption of the controls depending on the mains voltage: 100 to 120 V AC = max. 650 mA 208 to 240 V AC = max. 325 mA 380 to 500 V AC = max. 190 mA
External supply of the electronics (option)	24 V DC + 20 %/– 15 %, Current consumption: Basic version approx. 200 mA, with options up to 500 mA
Rated power	Refer to motor name plate The controls is designed for the rated power of the actuator
Overvoltage category	Category III according to IEC 60 644-1
Switchgear	Standard: Reversing contactors <sup>3)</sup> (mechanically and electrically interlocked) for motor power up to 1.5 kW, nominal motor current up to 9 A (OPEN - CLOSE duty) or 5.2 A (modulating duty)
<p>1) For nominal voltage and 20 °C ambient temperature and at an average load with running torque or modulating torque according to Technical data SA or SAR</p> <p>2) PTC thermistors require additionally a suitable tripping device in the controls</p> <p>3) The reversing contactors are designed for a lifetime of 2 million starts. For applications requiring a high number of starts, we recommend the use of thyristor units.</p>	



Switchgear	Options:	Reversing contactors <sup>3)</sup> (mechanically and electrically interlocked) for motor power up to 7,5 kW, nominal motor current up to 20 A (OPEN - CLOSE duty) or 18 A (modulating duty) Reversing contactors <sup>3)</sup> (mechanically and electrically interlocked) for actuators with DC motor 24 V, 48 V, 60 V, 110 V, 220 V (nominal current max. 25 A, starting current max. 70 A) Requires external supply of the electronics with 24 V DC and thermal overload relay Thyristor unit (recommended for modulating actuators) For motor power up to 1.5 kW, 500 V AC with internal fuses For motor power up to 3,0 kW, 500 V AC with internal fuses For motor power up to 5.5 kW, 500 V AC, external fuses required
Control	Standard:	Control inputs 24 V DC, OPEN - STOP - CLOSE - EMERGENCY (via opto-isolator, one common), current consumption: observe approx. 10 mA minimum pulse duration per input for modulating actuators
	Option:	Control inputs 115 V AC, OPEN - STOP - CLOSE - EMERGENCY (via opto-isolator, one common), current consumption: ca. 15 mA per input
Output signals	Standard:	6 output relays with gold-plated contacts: 5 NO contacts with one common, max. 250 V AC, 1 A (resistive load) Standard configuration: End position OPEN, end position CLOSED, selector switch REMOTE, torque fault CLOSE, torque fault OPEN 1 potential-free change-over contact, max. 250 V AC, 5 A (resistive load) for collective fault signal Standard configuration: Torque fault, phase failure, motor protection tripped
	Option:	5 potential-free NO/NC contacts without one common, per relay max. 250 V AC, 5 A (resistive load)
Voltage output	Standard:	Auxiliary voltage 24 V DC, max. 100 mA for supply of the control inputs, galvanically isolated from internal voltage supply
	Option:	Auxiliary voltage 115 V AC, max. 30 mA for supply of the control inputs <sup>4)</sup> , galvanically isolated from internal voltage supply
Local controls	Standard:	Selector switch LOCAL - OFF - REMOTE (lockable in all three positions) Push buttons OPEN - STOP - CLOSE - RESET 5 indication lights: End position CLOSED and running indication CLOSE (yellow), torque fault CLOSE (red), motor protection tripped (red), torque fault OPEN (red), end position and running indication OPEN (green) LC display, illuminated Programming interface (infra-red)
	Options:	Bluetooth programming interface with Bluetooth class II chip with a range up to 10m. Supports the Bluetooth profile SPP (Serial Port Profile). Release of the local controls: RELEASE input for external release of the operation via local controls Special colours for the 5 indication lights: end position CLOSED (green), torque fault CLOSED (blue), torque fault OPEN (yellow), motor protection tripped (white), end position OPEN (red) Protection cover, lockable Protection cover with indicator glass, lockable
Functions	Standard:	Switch-off mode adjustable limit or torque seating for end position OPEN and end position CLOSED Torque monitoring over the whole travel Torque by-pass, adjustable to up to 5 seconds (no torque monitoring during this time) Phase failure monitoring <sup>5)</sup> with automatic phase correction EMERGENCY behaviour programmable Digital input low active Reaction selectable: Stop, operation to end position CLOSED, operation to end position OPEN, operation to intermediate position Torque monitoring and thermal protection <sup>4)</sup> can be by-passed during EMERGENCY operation

3) The reversing contactors are designed for a lifetime of 2 million starts. For applications requiring a high number of starts, we recommend the use of wearless thyristor units.

4) Not possible in combination with PTC tripping device

5) During an adjustable period (factory setting 10 seconds), faults in the supply voltage (e.g. voltage drops) will not lead to an fault signal.

Functions	Options: Positioner <sup>6)</sup> : Nominal position value via analogue input E1 = 0/4 – 20 mA Programmable behaviour on loss of signal Automatic adaptation of the dead band (adaptive behaviour selectable) Split Range operation MODE input for changing from OPEN - CLOSE duty to modulating duty Process controller PID <sup>6)</sup> : Process setpoint via analogue input E1 = 0/4 – 20 mA Actual position value via analogue input E4 = 0/4 – 20 mA Programmable behaviour on loss of signal Limitation of the control range MODE input for changing from OPEN - CLOSE duty to modulating duty
Monitoring functions	Programmable monitoring of the max. number of starts, generates warning signal Reaction monitoring for operation command (programmable from 1 to 15 seconds), generates fault signal – results in switching off Operating time monitoring (programmable from 4 to 1,800 seconds), generates warning signal
Electronic name plate	Order data: AUMATIC commission number, actuator commission number, KKS number (definition system for power plants), valve number, plant number Product data: Product name, actuator works number, AUMATIC works number, logic software version, logic hardware version, date of final test, wiring diagram, terminal plan Project data: Project name, 2 freely definable customer fields with a max. of 19 digits each Service data: Service telephone, Internet address, service text 1, service text 2
Logging of operating data	A resettable counter and a lifetime counter for: Motor running time, number of starts, torque switch trippings in end position CLOSED, limit switch trippings in end position CLOSED, torque switch trippings in end position OPEN, limit switch trippings in end position OPEN, torque faults CLOSE, torque faults OPEN, motor protection trippings
Motor protection evaluation	Standard: Monitoring of the motor temperature in combination with thermostats in the motor Options: Additional thermal overload relay in the controls in combination with thermostats within the motor PTC tripping device in combination with PTC thermistors in the motor
Electrical connection	Standard: AUMA plug/socket connector with screw type connection: Threads for cable glands: M-threads: 1 x M20 x 1.5/2 x M25 x 1.5 Pg-threads: 1 x Pg13.5; 2 x Pg21 NPT-threads: 1 x NPT ½"; 2 x NPT ¾" Options: M-threads: 1 x M20 x 1.5; 2 x M25 x 1.5; 1 x M32 x 1.5 1 x M20 x 1.5; 1 x M25 x 1.5; 1 x M32 x 1.5 Pg-threads: 1 x M20 x 1.5; 2 x M25 x 1.5; 1 x M32 1 x Pg13.5; 2 x Pg21; 1 x Pg29 NPT-threads: 2 x ¾" NPT; 1 x 1¼" NPT G-threads: 2 x G ¾"; 1 x G 1"; 1 x G 1¼" 2 x G ¾"; 1 x G 1¼" Special threads, other than standard mentioned above, possible Gold-plated control plug (pins and sockets) Parking frame for wall mounting of the disconnected plug Protection cover for plug compartment (when plug is removed)
Wiring diagram (basic version)	ACP 11F1-2M0CA-001 KMS TP180/001
<b>Additional features (Non-intrusive version with MWG in the actuator)</b>	
Setting of limit and torque switching via the controls' local controls	
Position feedback	Galvanically isolated analogue output E2 = 0/4 – 20 mA (load max. 500 Ω)
Torque feedback	Galvanically isolated analogue output E6 = 0/4 – 20 mA (load max. 500 Ω)
Electronic timer	Start and end of stepping mode as well as ON and OFF time (1 up to 300 seconds) can be programmed individually for the directions OPEN and CLOSE.
Intermediate positions	Any 8 intermediate positions between 0 and 100 % Reaction and signal behaviour programmable

4) Not possible in combination with PTC tripping device


5) During an adjustable period (factory setting 10 seconds), faults in the supply voltage (e.g. voltage drops) will not lead to a fault signal.

6) Requires position transmitter in the actuator

Service conditions for actuator with controls	
Mounting position	Any position
Enclosure protection according to EN 60 529 <sup>7)</sup>	Standard: IP 67 Options: IP 68 Max. 6 m head of water, duration of the flooding 72 hours max. Up to 10 operations during flooding Modulating duty is not possible during submersion IP 67-DS (Double Sealed) IP 68-DS (Double Sealed) (Double Sealed = Electrical connection compartment additionally sealed against interior)
Corrosion protection	Standard: KN Suitable for installation in industrial units, in water or power plants low pollutant concentration 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 KX-G same as KX, however aluminium-free version (outer parts)
Finish coating	Standard: Two-component iron-mica combination Option: Special primer/special finish coat (customer's choice)
Colour	Standard: AUMA silver-grey (similar to RAL 7037) Other colours than standard colour are possible on request
Ambient temperature	Standard: –25 °C to +70 °C Options: –40 °C to +70 °C, low temperature version incl. heating system –50 °C to +70 °C, extreme low temperature version incl. heating system Low temperature versions incl. heating system for connection to external power supply 230 V AC or 115 V AC.
Vibration resistance according to IEC 60 068	1 g, from 10 Hz to 200 Hz Resistant to vibrations during start-up or for failures of the plant. However, a fatigue strength may not be derived from this. Applies to actuator with actuator controls only, not valid in combination with gearboxes.
Lifetime	Open-close duty: Operating cycles (OPEN - CLOSE - OPEN) SA 07.1 – SA 10.1: 20,000 SA 14.1 – SA 16.1: 15,000 Modulating duty: <sup>8)</sup> SAR 07.1 – SAR 10.1: min. 5.0 million modulating steps SAR 14.1 – SAR 14.5: min. 3.5 million modulating steps SAR 16.1: min. 3.5 million modulating steps
Weight	Refer to separate Technical data SA/SAR/AC
Accessories	
Wall bracket <sup>9)</sup>	AUMATIC mounted separately from the actuator, including plug/socket connector. Connecting cables on request. Recommended for high ambient temperatures, difficult access, or in case of heavy vibrations during service.
EMERGENCY STOP button <sup>10)</sup>	The control voltage of the reversing contactors is interrupted by operating the EMERGENCY STOP button.
Programming software for PC	COM-AC. An interface cable is required for the standard infra-red programming interface.
Further information	
EU Directives	Electromagnetic Compatibility (EMC): (2004/108/EC) Low Voltage Directive: (2006/95/EC) Machinery Directive: (98/37/EC)
<p>7) The enclosure protection according to name plate applies.  Other enclosure protections apply to single phase AC motors, DC motors, or special motors (refer to separate technical data sheets).  Enclosure protection IP 68 refers to the interior of the actuators (motor, gearing, switch compartment, and terminal compartment).  For 3-phase asynchronous motors in enclosure protection IP 68, higher corrosion protection KS or KX is strongly recommended. Additionally, for enclosure protection IP 68, we recommend to use the double sealed terminal compartment DS.</p> <p>8) The lifetime depends on the load and the number of starts. A high starting frequency will rarely improve the modulating accuracy. To reach the longest possible maintenance and fault-free operating time, the number of starts per hour chosen should be as low as possible for the process.</p> <p>9) Cable length between actuator and AUMATIC max. 100 m. Requires separate data cable for MWG. If actuator and AUMATIC are separated at a later date, the max. cable length is 10 m.</p> <p>10) Only in combination with reversing contactors and AUMATIC AC 01.1 in enclosure protection IP 67 or IP 68</p>	

14. Certificates

14.1. Declaration of Conformity and Declaration of Incorporation



EU - 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-multi-turn actuators of the type range

SA 07.1 – SA 48.1  
SAR 07.1 – SAR 30.1

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

are designed and produced to be installed on industrial valves.

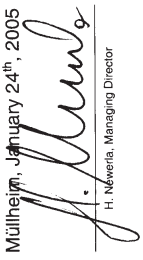
Messrs. AUMA RIESTER GmbH & Co. KG as the manufacturer declares herewith,  
that the above mentioned electric AUMA multi-turn actuators are in compliance with  
the following directives:


- 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


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

  
Müllheim, January 24<sup>th</sup>, 2005  
H. Niewiera, Managing Director

  
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Armaturen- und Maschinenantriebe  
P.O. Box 13 62 • 79373 Müllheim / Baden  
Tel 07631 / 809-0 • Fax 07631 / 809-250

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

Y003.859/002/en



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 25.1 – SA Ex 40.1  
SAR Ex 25.1 – SAR Ex 30.1  
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. AUMA RIESTER GmbH & Co. KG (manufacturer) declares herewith, that when de-  
signing 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

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.

  
Müllheim, November 26<sup>th</sup>, 2004  
H. Niewiera, Managing Director

  
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Y003.811/002/en

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2007-06-29



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