Part-turn actuators
SQEx 05.2 – SQEx 14.2
SQREx 05.2 – SQREx 14.2
Control unit: electronic (MWG)
with actuator controls
ACExC 01.2 Non-Intrusive

Control
Parallel
Profibus DP
Profinet
Modbus RTU
→ Modbus TCP/IP
Foundation Fieldbus
HART
Read operation instructions first.

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

Purpose of the document:

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

Reference documents:

- Manual (Operation and setting) of actuator controls ACExC 01.2 Modbus TCP/IP
- Manual (Fieldbus device integration) of actuator controls ACExC 01.2 Modbus TCP/IP

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

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1. Safety instructions

1.1. Basic information on safety

Standards/directives

Our products are designed and manufactured in compliance with recognised standards and directives. This is certified in a Declaration of Incorporation and an EU Declaration of Conformity.

The end user or the contractor must ensure that all legal requirements, directives, guidelines, national regulations and recommendations with respect to assembly, electrical connection, commissioning and operation are met at the place of installation.

They include among others:

- Standards and directives such as IEC 60079 “Explosive atmospheres”.
  - Part 14: Electrical installations design, selection and erection.
  - Part 17: Electrical installations inspection and maintenance.
- Applicable configuration guidelines for network applications.

Safety instructions/warnings

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

Qualification of staff

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

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

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

Commissioning

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

Operation

Prerequisites for safe and smooth operation:

- Correct transport, proper storage, mounting and installation, as well as careful commissioning.
- Only operate the device if it is in perfect condition while observing these instructions.
- Immediately report any faults and damage and allow for corrective measures.
- Observe recognised rules for occupational health and safety.
- Observe national regulations.
- During operation, the housing warms up and surface temperatures > 60 °C may occur. To prevent possible burns, we recommend checking the surface temperature using an appropriate thermometer and wearing protective gloves, if required, prior to working on the device.

Protective measures

The end user or the contractor are responsible for implementing required protective measures on site, such as enclosures, barriers, or personal protective equipment for the staff.

Maintenance

To ensure safe device operation, the maintenance instructions included in this manual must be observed.

Any device modification requires prior written consent of the manufacturer.
1.2. Range of application

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

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

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

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

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

- Industrial trucks according to EN ISO 3691
- Lifting appliances according to EN 14502
- Passenger lifts according to DIN 15306 and 15309
- Service lifts according to EN 81-1/A1
- Escalators
- Continuous duty
- Buried service
- Continuous submersion (observe enclosure protection)
- Potentially explosive areas of zones 0 and 20
- Potentially explosive areas of group I (mining)
- Radiation exposed areas in nuclear power plants

No liability can be assumed for inappropriate or unintended use.

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

Information

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

1.3. Warnings and notes

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

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

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

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

NOTICE
Potentially hazardous situation. Failure to observe this warning could result in property damage. Is not used for personal injury.
Arrangement and typographic structure of the warnings

⚠️ DANGER ⚠️

Type of hazard and respective source!

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

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

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

1.4. References and symbols

The following references and symbols are used in these instructions:

Information

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

Symbol for CLOSED (valve closed)
Symbol for OPEN (valve open)

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

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.

Reference to other sections

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

2.1. **Name plate**

Figure 1: Arrangement of name plates

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

**Actuator name plate**

Figure 2: Actuator name plate (example)

1. Name of manufacturer
2. Address of manufacturer
3. Type designation
4. Order number
5. Serial number
6. Operating time in [s] for a part-turn movement of 90°
7. Torque range in direction CLOSE
8. Torque range in direction OPEN
9. Type of lubricant
10. Permissible ambient temperature
11. Can be assigned as an option upon customer request
12. Enclosure protection
13. Data Matrix code

SQEx 05.2 – SQEx 14.2 / SQREx 05.2 – SQREx 14.2 Control unit: electronic (MWG)
ACExC 01.2 Non-Intrusive Modbus TCP/IP
### Actuator controls name plate

Figure 3: Actuator controls name plate

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type designation</td>
</tr>
<tr>
<td>2</td>
<td>Order number</td>
</tr>
<tr>
<td>3</td>
<td>Serial number</td>
</tr>
<tr>
<td>4</td>
<td>Actuator terminal plan</td>
</tr>
<tr>
<td>5</td>
<td>Actuator controls terminal plan</td>
</tr>
<tr>
<td>6</td>
<td>Mains voltage</td>
</tr>
<tr>
<td>7</td>
<td><strong>AUMA power class for switchgear</strong></td>
</tr>
<tr>
<td>8</td>
<td>Permissible ambient temperature</td>
</tr>
<tr>
<td>9</td>
<td>Enclosure protection</td>
</tr>
<tr>
<td>10</td>
<td>Control</td>
</tr>
<tr>
<td>11</td>
<td>Data Matrix code</td>
</tr>
</tbody>
</table>

- **auma** (= manufacturer logo)

### Motor name plate

Figure 4: Motor name plate (example)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motor type</td>
</tr>
<tr>
<td>2</td>
<td>Motor article number</td>
</tr>
<tr>
<td>3</td>
<td>Serial number</td>
</tr>
<tr>
<td>4</td>
<td>Current type, mains voltage</td>
</tr>
<tr>
<td>5</td>
<td>Rated power</td>
</tr>
<tr>
<td>6</td>
<td>Rated current</td>
</tr>
<tr>
<td>7</td>
<td>Type of duty</td>
</tr>
<tr>
<td>8</td>
<td>Enclosure protection</td>
</tr>
<tr>
<td>9</td>
<td>Motor protection (temperature protection)</td>
</tr>
<tr>
<td>10</td>
<td>Insulation class</td>
</tr>
<tr>
<td>11</td>
<td>Speed</td>
</tr>
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<td>12</td>
<td>Power factor cos phi</td>
</tr>
<tr>
<td>13</td>
<td>Mains frequency</td>
</tr>
<tr>
<td>14</td>
<td>Data Matrix code</td>
</tr>
</tbody>
</table>

- **auma** (= manufacturer logo); **CE** (= CE mark)
Approval plate in explosion-proof version

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

<table>
<thead>
<tr>
<th>ATEX</th>
<th>IECEx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex symbol, CE mark, number of test authority</td>
<td>Ex symbol, CE mark, number of test authority</td>
</tr>
<tr>
<td>Il 2G Ex db eb IIC T4 Gb</td>
<td>Il 2G Ex db eb IIC T4 Gb</td>
</tr>
<tr>
<td>Il 2D Ex tb IIIC T130°C Dib IP6x</td>
<td>Il 2D Ex tb IIIC T130°C Dib IP6x</td>
</tr>
<tr>
<td>M20 + M25 + M32</td>
<td>M20 + M25 + M32</td>
</tr>
</tbody>
</table>

Classifications:

1. Electrical gas explosion protection
2. Electrical dust explosion protection
3. Non-electrical explosion protection
4. Threads for line bushings at electrical connection
5. Not used

Descriptions referring to name plate indications

<table>
<thead>
<tr>
<th>Type designation</th>
<th>SQEx 07.2 - F07 / - a 3 b 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Type and size of actuator</td>
<td></td>
</tr>
<tr>
<td>2. Flange size</td>
<td></td>
</tr>
<tr>
<td>3. Ex marking</td>
<td></td>
</tr>
</tbody>
</table>

Type and size

These instructions apply to the following devices types and sizes:

- **Type SQEx** = Part-turn actuators for open-close duty
  Sizes: 05.2, 07.2, 10.2, 12.2, 14.2
- **Type SQREx** = Part-turn actuators for modulating duty
  Sizes: 05.2, 07.2, 10.2, 12.2, 14.2
- **Type ACExC** = AUMATIC actuator controls
  Size: 01.2
Table 1: Marking for explosion protection (example of /-a3b1)

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>–</td>
<td>3</td>
<td>1</td>
<td>Not used</td>
</tr>
</tbody>
</table>

- **Motor type**
  - a = VDX or SDX: 3-phase AC motor
  - b = VWX or SWX: 1-phase AC motor

- **Protection type of electrical connection**
  - 3 = Terminal compartment Ex e increased safety
  - 4 = Terminal compartment Ex d flameproof enclosure

- **Protection type of position transmitter**
  - a = Without intrinsically safe electric circuit
  - b = Electric circuit Ex I Intrinsic safety (RWG 5020.2Ex)

- **Protection type of fieldbus**
  - 1 = Without Ex fieldbus connection
  - 2 = Ex nL non-incendive fieldbus connection
  - 3 = Ex ic intrinsically safe fieldbus connection

Order number

The product can be identified using this number and the technical data as well as order-related data pertaining to the device can be requested.

Please always state this number for any product inquiries.

On the Internet at [http://www.auma.com > Service & Support > myAUMA](http://www.auma.com), we offer a service allowing authorised users to download order-related documents such as wiring diagrams and technical data (both in German and English), inspection certificate and the operation instructions when entering the order number.

Table 2: Description of the serial number (with example of 0516NS12345)

<table>
<thead>
<tr>
<th>Positions 1+2: Assembly in week = week 05</th>
<th>05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positions 3+4: Year of manufacture = 2016</td>
<td>16</td>
</tr>
</tbody>
</table>

| 05 16 NS12345 |

| Positions 3+4: Year of manufacture = 2016 | 16 |

| Positions 3+4: Year of manufacture = 2016 | 16 |

Actuator terminal plan

Position 9 after TPA: Position transmitter version

I, Q = MWG (Magnetic limit and torque transmitter)

AUMA power class for switchgear

The switchgear used in the actuator controls (reversing contactors/thyristors) are classified according to AUMA power classes (e.g. A1, B1, ....). The power class defines the max. permissible rated power (of the motor) the switchgear has been designed for. The rated power (nominal power) of the actuator motor is indicated in kW on the motor name plate. For the assignment of the AUMA power classes to the nominal power of the motor types, refer to the separate electrical data sheets.

For switchgear without assignment to any power classes, the actuator controls name plate does not indicate the power class but the max. rated power in kW.

Control

Table 3: Control examples (indications on actuator controls name plate)

<table>
<thead>
<tr>
<th>Input signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modbus TCP/IP</td>
<td>Control via Modbus TCP/IP interface</td>
</tr>
<tr>
<td>Modbus TCP/IP/24 V DC</td>
<td>Control via Modbus TCP/IP interface and control voltage for OPEN-CLOSE control via digital inputs (OPEN, STOP, CLOSE)</td>
</tr>
</tbody>
</table>

Data Matrix code

When registered as authorised user, you may use our [AUMA Assistant App](http://www.auma.com) to scan the Data Matrix code and directly access the order-related product documents without having to enter order number or serial number.
2.2. Short description

Part-turn actuator
Definition in compliance with EN 15714-2/EN ISO 5211:
A part-turn actuator is an actuator which transmits a torque to the valve for less than one full revolution. It need not be capable of withstanding thrust.
AUMA part-turn actuators SQEx 05.2 – SQEx 14.2 / SQREx 05.2 – SQREx 14.2 are driven by an electric motor. For manual operation, a handwheel is provided. Switching off in end positions may be either by limit or torque seating. Actuator controls are required to operate or process the actuator signals.

Actuator controls
ACExC 01.2 actuator controls are used to operate AUMA actuators and are supplied ready for use. The actuator controls may be mounted directly to the actuator or separately on a wall bracket.
The functions of the ACExC 01.2 actuator controls include standard valve control in OPEN-CLOSE duty, positioning, process control, logging of operating data, diagnostic functions right through control via various interfaces (e.g. Fieldbus, Ethernet and HART).

Local controls/ AUMA software
Operation, setting, and display can be either performed directly at actuator controls or alternatively from Remote via binary input signals, or using another interface.
The following options are available at the actuator controls in local operation:

- The actuator can be operated via the push buttons of the local controls or settings can be made in the actuator controls menu. The display shows information on the actuator as well as menu settings (contents of these instructions).
- Using the AUMA CDT software for Windows-based notebooks or the AUMA Assistant App for Android-based devices, data can be uploaded and read whereas settings can be modified and stored. The connection between computer and actuator controls is wireless via Bluetooth interface (not included in these instructions). AUMA CDT software can be downloaded free of charge from our website www.auma.com.

Intrusive - Non-Intrusive

- Intrusive version (control unit: electromechanical):
  Limit and torque setting is performed via switches in the actuator.
- Non-Intrusive version (control unit: electronic):
  Limit and torque setting is performed via the controls, without removal of actuator or actuator controls covers. For this purpose, the actuator is equipped with an MWG (magnetic limit and torque transmitter), also capable to supply analogue torque feedback signals/torque indication and analogue position feedback signals/position indication at the actuator controls output.
3. Transport, storage and packaging

3.1. Transport

For transport to place of installation, use sturdy packaging.

**Hovering load!**

*Risk of death or serious injury.*

→ Do NOT stand below hovering load.
→ Attach ropes or hooks for the purpose of lifting by hoist only to housing and NOT to handwheel.
→ Actuators mounted on valves: Attach ropes or hooks for the purpose of lifting by hoist to valve and NOT to actuator.
→ Actuators mounted to gearboxes: Attach ropes or hooks for the purpose of lifting by hoist only to the gearbox using eyebolts and NOT to the actuator.
→ Actuators mounted to controls: Attach ropes or hooks for the purpose of lifting by hoist only to the actuator and NOT to the controls.
→ Respect total weight of combination (actuator, actuator controls, gearbox, valve)
→ Secure load against falling down, sliding or tilting.
→ Perform lift trial at low height to eliminate any potential danger e.g. by tilting.

Figure 8: Example: Lifting the actuator

<table>
<thead>
<tr>
<th>Table 4: Weight for ACExC 01.2 actuator controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>with electrical connection type:</td>
</tr>
<tr>
<td>AUMA Ex plug/socket connector with screw-type terminals (KT)¹</td>
</tr>
<tr>
<td>AUMA Ex plug/socket connector with screw-type terminals (KP)</td>
</tr>
<tr>
<td>AUMA Ex plug/socket connector with terminal blocks (KES), increased safety Ex e</td>
</tr>
<tr>
<td>AUMA Ex plug/socket connector with terminal blocks (KES), increased safety Ex d</td>
</tr>
</tbody>
</table>

¹) Standard
### Table 5: Weights for part-turn actuators SQEx 05.2 – SQEx 14.2 / SQREx 05.2 – SQREx 14.2 with 3-phase AC motors

<table>
<thead>
<tr>
<th>Type designation</th>
<th>Weight 1) [kg]</th>
<th>Weight with base and lever 2) [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQEx 05.2/ SQREx 05.2</td>
<td>29</td>
<td>34</td>
</tr>
<tr>
<td>SQEx 07.2/ SQREx 07.2</td>
<td>29</td>
<td>34</td>
</tr>
<tr>
<td>SQEx 10.2/ SQREx 10.2</td>
<td>34</td>
<td>38</td>
</tr>
<tr>
<td>SQEx 12.2/ SQREx 12.2</td>
<td>42</td>
<td>50</td>
</tr>
<tr>
<td>SQEx 14.2/ SQREx 14.2</td>
<td>51</td>
<td>62</td>
</tr>
</tbody>
</table>

1) Indicated weight includes AUMA NORM part-turn actuator with 3-phase AC motor, electrical connection in standard version, unbored coupling and handwheel. For other output drive types, heed additional weights.

2) Indicated weight includes AUMA NORM part-turn actuator with 3-phase AC motor, electrical connection in standard version, and handwheel, including base and lever. For other output drive types, heed additional weights.

### Table 6: Weights for part-turn actuators SQEx 05.2 – SQEx 14.2 / SQREx 05.2 – SQREx 14.2 with 1-phase AC motors

<table>
<thead>
<tr>
<th>Type designation</th>
<th>Weight 1) [kg]</th>
<th>Weight with base and lever 2) [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQEx 05.2/ SQREx 05.2</td>
<td>33</td>
<td>39</td>
</tr>
<tr>
<td>SQEx 07.2/ SQREx 07.2</td>
<td>33</td>
<td>39</td>
</tr>
<tr>
<td>SQEx 10.2/ SQREx 10.2</td>
<td>39</td>
<td>43</td>
</tr>
<tr>
<td>SQEx 12.2/ SQREx 12.2</td>
<td>47</td>
<td>55</td>
</tr>
<tr>
<td>SQEx 14.2/ SQREx 14.2</td>
<td>56</td>
<td>67</td>
</tr>
</tbody>
</table>

1) Indicated weight includes AUMA NORM part-turn actuator with 1-phase AC motor, electrical connection in standard version, unbored coupling and handwheel. For other output drive types, heed additional weights.

2) Indicated weight includes AUMA NORM part-turn actuator with 1-phase AC motor, electrical connection in standard version, and handwheel, including base and lever. For other output drive types, heed additional weights.

### 3.2. Storage

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

#### Damage on display caused by temperatures below permissible level!
- AC actuator controls MUST NOT be stored below –30 °C.

#### Long-term storage
For long-term storage (more than 6 months), observe the following points:
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 protec-
   tion.

3.3. Packaging

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

4.1. Mounting position

The product described in this document can be operated in any mounting position.
Restriction: When using oil instead of grease within the actuator gear housing, the hollow shaft mounting position must be perpendicular, with the flange pointing downward. The type of lubricant used is indicated on the actuator name plate (short designation \( F\ldots = \text{grease}; \ O\ldots = \text{oil} \)).

4.2. Handwheel fitting

Figure 9: Handwheel

1. If required, fit spacer [1] onto input shaft [2].

Information

The retaining ring [4] (together with these operation instructions) is stored in a weatherproof bag, which is attached to the device prior to delivery.

4.3. Part-turn actuator to valve: mount

**NOTICE**

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

→ Touch up damage to paint finish after work on the device.
→ After mounting, connect the device immediately to electrical mains to ensure that heater minimises condensation.

The part-turn actuator is mounted to the valve using a coupling (standard) or via lever. Separate instructions are available for actuator mounting to the valve when equipped with base and lever.
4.3.1. Output drive for coupling

**Design**

Figure 10: Valve attachment via coupling

- [1] Actuator worm wheel with internal splines
- [2] Splined plug-in coupling
- [3] Valve shaft (example with key)

**Application**

- For valve attachments according to EN ISO 5211
- For rotating, non-rising valve stem

### 4.3.1.1. Part-turn actuator (with coupling): mount to valve

Unbored couplings or couplings with pilot bore must be machined to match the valve shaft prior to mounting the part-turn actuator to the valve (e.g. with bore and keyway, two-flat or square bore).

**Information**

Assemble valve and part-turn actuator in the same end position. As standard, the part-turn actuator is supplied in end position CLOSED.

- Recommended mounting position for **butterfly valves**: End position CLOSED.
- Recommended mounting position for **ball valves**: End position OPEN.

**Assembly steps**

1. If required, move part-turn actuator in same end position as valve using the handwheel.
2. Clean mounting faces, thoroughly degrease uncoated mounting surfaces.
3. Apply a small quantity of grease to the valve shaft [2].
4. Place coupling [1] onto valve shaft [2] and secure against axial slipping by using a grub screw [3] or a clamping washer and a screw with curved spring lock washer [4]. Thereby, ensure that dimensions X, Y or L are observed (refer to figure and table <Mounting positions for coupling>).

Figure 11: Examples: Fit coupling

Figure 12: Mounting positions for coupling

Table 7:

<table>
<thead>
<tr>
<th>Dimensions [mm]</th>
<th>SQEx 05.2</th>
<th>SQEx 07.2</th>
<th>SQEx 10.2</th>
<th>SQEx 12.2</th>
<th>SQEx 14.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN ISO 5211</td>
<td>F05</td>
<td>F07</td>
<td>F05</td>
<td>F07</td>
<td>F10</td>
</tr>
<tr>
<td>X max.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Y max.</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>L max.</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>66</td>
</tr>
</tbody>
</table>

5. Apply non-acidic grease at splines of coupling (e.g. Gleitmo by Fuchs).
6. Fit part-turn actuator. If required, slightly turn part-turn actuator until splines of coupling engage.

Figure 13:

**Information**
Ensure that the spigot (if provided) fits uniformly in the recess and that the flanges are in complete contact.

7. If flange bores do not match thread:
   7.1 Slightly rotate handwheel until bores line up.
   7.2 If required, shift part-turn actuator by one tooth on the coupling.

8. Fasten part-turn actuator with screws.
   **Information:** We recommend applying liquid thread sealing material to the screws to avoid contact corrosion.

9. Fasten screws crosswise to a torque according to table.

**Table 8:**

<table>
<thead>
<tr>
<th>Threads</th>
<th>Tightening torque [Nm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6</td>
<td>10</td>
</tr>
<tr>
<td>M8</td>
<td>24</td>
</tr>
<tr>
<td>M10</td>
<td>48</td>
</tr>
<tr>
<td>M12</td>
<td>82</td>
</tr>
<tr>
<td>M16</td>
<td>200</td>
</tr>
<tr>
<td>M20</td>
<td>392</td>
</tr>
</tbody>
</table>
4.4. Mounting positions of local controls

Figure 14: Mounting positions

The mounting position of the local controls is implemented according to the order. If, after mounting the actuator to the valve or the gearbox on site, the local controls are in an unfavourable position, the mounting position can be changed at a later date. Four mounting positions shifted by respectively 90° are possible (by maximum 180° into one direction).

4.4.1. Mounting positions: modify

**WARNING**

**Flameproof enclosure, danger of explosion!**

*Risk of death or serious injury.*

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

**NOTICE**

**Electrostatic discharge ESD!**

*Risk of damage to electronic components.*

→ Earth both operators and devices.

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

**NOTICE**

**Cable damage due to twisting or pinching!**

*Risk of functional failures.*

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

4. Fasten screws evenly crosswise.
## 5. Electrical connection

### 5.1. Basic information

**Danger due to incorrect electrical connection**

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

→ The electrical connection must be carried out exclusively by suitably qualified personnel.

→ Prior to connection, observe basic information contained in this chapter.

→ After connection but prior to applying the voltage, observe the <Commissioning> and <Test run> chapters.

### Wiring diagram/terminal plan

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

### Permissible networks (supply networks)

Actuator controls (actuators) are suitable for use in TN and TT networks with directly earthed star point for mains voltage up to maximum 690 V AC. Use in IT networks for nominal voltages up to maximum 600 V AC are permissible. For IT network, a suitable, approved insulation monitor measuring the pulse code is required.

### Current type, mains voltage, mains frequency

Type of current, mains voltage and mains frequency must match the data on the actuator controls and motor name plates. Also refer to chapter <Identification>/<Name plate>.

Figure 15: Motor name plate (example)

![Motor name plate](image)

1. Type of current
2. Mains voltage
3. Mains frequency (for 3-phase and 1-phase AC motors)

### External supply of the electronics

For external electronics supply with 24 V DC and simultaneous use of DC motors (24 V DC, 48 V DC, 60 V DC, 110 V DC, 220 V DC), the 24 V DC controls’ voltage supply should be ensured via the XK25/26 terminals, separately 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 permissible 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 actuator controls briefly signal a fault condition.

### Protection and sizing 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 sizing the protection can be derived from the current consumption of the motor (refer to motor name plate) plus the current consumption of actuator controls.

We recommend adapting the switchgear sizing to the max. current ($I_{\text{max}}$) and selecting and setting the overcurrent protection device in compliance with the indications in the electrical data sheet.
Table 9:
Current consumption of actuator controls

<table>
<thead>
<tr>
<th>Permissible variation of the mains voltage</th>
<th>Max. current consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>±10 %</td>
<td>±30 %</td>
</tr>
<tr>
<td>100 to 120 V AC</td>
<td>750 mA</td>
</tr>
<tr>
<td>208 to 240 V AC</td>
<td>400 mA</td>
</tr>
<tr>
<td>380 to 500 V AC</td>
<td>250 mA</td>
</tr>
<tr>
<td>515 to 690 V AC</td>
<td>200 mA</td>
</tr>
</tbody>
</table>

Table 10:
Maximum permissible protection

<table>
<thead>
<tr>
<th>Switchgear (switchgear with power class)¹</th>
<th>Rated power</th>
<th>max. protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reversing contactor A1</td>
<td>up to 1.5 kW</td>
<td>16 A (gL/gG)</td>
</tr>
<tr>
<td>Thyristor B1</td>
<td>up to 1.5 kW</td>
<td>16 A (g/R) I²t&lt;1,500A²s</td>
</tr>
</tbody>
</table>

¹) The AUMA power class (A1, B1, ...) is indicated on the actuator controls name plate.

Consider the motor starting current (Iₐ) (refer to electrical data sheet) when selecting the circuit breaker. We recommend tripping characteristics D or K for circuit breakers in accordance with IEC 60947-2. For controls with thyristors, we recommend safety fuses instead of circuit breakers.

We recommend refraining from using residual current devices (RCD). However, if an RCD is used within the mains, the residual current device must be of type B.

For actuator controls equipped with a heating system and external electronics power supply, the fuses for the heating system have to be provided by the customer (refer to wiring diagram F4 ext.)

Table 11:
Fuse for heating system

<table>
<thead>
<tr>
<th>Designation in wiring diagram = F4 ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>External power supply</td>
</tr>
<tr>
<td>115 V AC</td>
</tr>
<tr>
<td>230 V AC</td>
</tr>
<tr>
<td>Fuse</td>
</tr>
<tr>
<td>2 A T</td>
</tr>
<tr>
<td>1 A T</td>
</tr>
</tbody>
</table>

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

Potential of customer connections
All input signals (control inputs) must be supplied with the same potential. All output signals (status signals) must be supplied with the same potential.

Safety standards
Safety measures and safety equipment must comply with the respectively valid national on site specifications. All externally connected devices shall comply with the relevant safety standards for the place of installation.

Connecting cables
- We recommend using connecting cables and connecting terminals according to rated current (Iₐ) (refer to motor name plate or electrical data sheet).
- For device insulation, appropriate (voltage-proof) cables must be used. Specify cables for the highest occurring rated voltage.
- Use connecting cables with a minimum temperature range of +80 °C.
- For connecting cables exposed to UV radiation (outdoor installation), use UV resistant cables.
- For the connection of position transmitters, screened cables must be used.

Cable installation in accordance with EMC
Signal and fieldbus 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 fieldbus cables increases if the cables are laid close to the earth potential.

If possible, avoid laying long cables and make sure that they are installed in areas being subject to low interference.

Avoid parallel paths with little cable distance of cables being either susceptible to interference or interference sources.

Fieldbus cable

Table 12: Cable recommendation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impedance</td>
<td>135 to 165 Ohm, at a measurement frequency between 3 and 20 MHz</td>
</tr>
<tr>
<td>Cable capacity</td>
<td>&lt; 30 pF per metre</td>
</tr>
<tr>
<td>Wire diameter</td>
<td>&gt; 0.64 mm</td>
</tr>
<tr>
<td>Cross section</td>
<td>&gt; 0.34 mm², corresponds to AWG 22</td>
</tr>
<tr>
<td>Loop resistance</td>
<td>&lt; 110 Ohm per km</td>
</tr>
<tr>
<td>Screening</td>
<td>CU shielding braid or shielding braid and shielding foil</td>
</tr>
</tbody>
</table>

Prior to installation, please note:

- Connect maximum 32 devices to one segment.
- If more devices are to be connected:
  - Connect several segments using repeaters.
- Install fieldbus cables at a distance of minimum 20 cm to other cables.
- If possible, fieldbus cables should be laid in a separate, conductive, and earthed cable tray.
- Ensure absence of equipotential earth bonding differences between the individual devices at fieldbus (perform an equipotential earth bonding).

Table 13: Transmission rate/cable length for line topology

<table>
<thead>
<tr>
<th>Baud rate (kbit/s)</th>
<th>Max. cable length (segment length) without repeater</th>
<th>Possible cable length with repeater (total network cable length)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6 – 115.2</td>
<td>1,200 m</td>
<td>Approx. 10 km</td>
</tr>
</tbody>
</table>

Table 14: Transmission rate/cable length for loop topology

<table>
<thead>
<tr>
<th>Baud rate (kbit/s)</th>
<th>Max. cable length between actuators (without repeater)</th>
<th>Max. possible cable length of redundant loop</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6 – 115.2</td>
<td>1,200 m</td>
<td>Approx. 290 km</td>
</tr>
</tbody>
</table>
5.2. **KES electrical connection**

Figure 16: KES electrical connection

**Short description**
KES plug-in electrical connection with terminal blocks for power and control contacts.

Cable entry via the connection frame. Cover in KES-e version for terminal compartment in type of protection Ex e (increased safety). Cover in KES-Ex d version for terminal compartment in type of protection Ex d (flameproof enclosure).

Plug-in connection is made via the connection frame. For cable connection, simply remove the cover. The connection frame remains within the device. The flameproof interior of the connected devices remains sealed.

**Technical data**

<table>
<thead>
<tr>
<th>KES electrical connection</th>
<th>Power contacts</th>
<th>Control contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of contacts max.</td>
<td>3 + protective earth connection at frame</td>
<td>50</td>
</tr>
<tr>
<td>Designation</td>
<td>U, V, W, (PE)</td>
<td>1 to 50</td>
</tr>
<tr>
<td>Connection voltage max.</td>
<td>750 V</td>
<td>250 V</td>
</tr>
<tr>
<td>Rated current max.</td>
<td>25 A</td>
<td>10 A</td>
</tr>
<tr>
<td>Type of customer connection</td>
<td>Screw connection PE = Ring lug/U-bracket</td>
<td>Cage clamp, screw-type connection as an option</td>
</tr>
<tr>
<td>Connection diameter max.</td>
<td>6 mm²/10 mm²</td>
<td>2.5 mm² flexible, 4 mm² solid</td>
</tr>
</tbody>
</table>
5.2.1. Terminal compartment: open

Figure 17: Open terminal compartment

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cover (illustration shows type of protection Ex e)</td>
</tr>
<tr>
<td>2</td>
<td>Screws for cover</td>
</tr>
<tr>
<td>3</td>
<td>O-ring</td>
</tr>
<tr>
<td>4</td>
<td>Blanking plugs</td>
</tr>
<tr>
<td>5</td>
<td>Cable gland (example)</td>
</tr>
<tr>
<td>6</td>
<td>Connection frame</td>
</tr>
</tbody>
</table>

**Hazardous voltage!**

*Risk of electric shock.*

→ Disconnect device from the mains before opening.

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

   **Information:** Terminal compartment is designed either in type of protection Ex e (increased safety) or in type of protection Ex d (flameproof enclosure) (refer to Ex marking on name plate). The flameproof interior of the connected device remains closed when removing the cover [1].

2. Insert cable glands suitable for connecting cables.

   **Information:** When selecting cable glands observe type of protection (with Ex e or Ex d approval) and enclosure protection IP (refer to name plate). The type of protection stated on the name plate IP is only ensured if suitable cable glands are used.

   Figure 18: Name plate, example with enclosure protection IP68

   **Information:** For shielded cables: Use EMC cable glands.

3. Seal unused cable entries with approved plugs suitable for the required protection type.
### 5.2.2. Cable connection

#### Table 16: Terminal cross sections and terminal tightening torques

<table>
<thead>
<tr>
<th>Designation</th>
<th>Terminal cross sections</th>
<th>Tightening torques</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power contacts (U, V, W)</td>
<td>max. 10 mm² (flexible or solid)</td>
<td>1.5 – 1.8 Nm</td>
</tr>
<tr>
<td>PE connection</td>
<td>max. 10 mm² (flexible or solid)</td>
<td>3.0 – 4.0 Nm</td>
</tr>
<tr>
<td>Control contacts (1 to 50)</td>
<td>max. 2.5 mm² flexible, or max. 4 mm² solid</td>
<td>0.6 – 0.8 Nm</td>
</tr>
</tbody>
</table>

1. Remove cable sheathing and insert the wires into the cable glands.
2. Fasten cable glands with the specified torque to ensure required enclosure protection.
   
   **Information:** For shielded cables: Link the cable shield end via the cable gland to the housing (earthing).
3. Strip wires.
4. For flexible cables: Use end sleeves according to DIN 46228.
5. Connect cables according to order-related wiring diagram.

**WARNING**

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

*Risk of electric shock.*

→ Connect all protective earth conductors.
→ Connect PE connection to external protective earth conductor of connecting cables.
→ Start running the device only after having connected the protective earth conductor.

6. Firmly tighten protective earth to PE connection (symbol: 🌿).

Figure 19: Protective earth (PE)

![U-bracket for PE connection](image)

### 5.2.3. Industrial Ethernet cable: connect

**Information** This description applies to the connection via CAT 6A Ethernet cables.
Figure 20: TCP/IP-RTU gateway

[1] RJ45 plug-in socket for connecting the Industrial Ethernet cable
[2] Power supply

**Cable connection**

1. For connecting cables to RJ45 connectors, proceed in compliance with the connector manufacturer specifications.
   - When using the RJ45 connector supplied by AUMA, please heed the assembly instructions provided.
2. Connect RJ45 connector to port for Ethernet cable [1].

---

**5.2.4. Terminal compartment: close**

Figure 21: Close terminal compartment

[1] Cover (illustration shows type of protection Ex e)
[2] Screws for cover
[3] O-ring
[4] Blanking plugs
[5] Cable gland (example)
[6] Connection frame

1. Clean sealing faces of cover [1] and connection frame [6].
2. For Ex plug/socket connector designed as KES flameproof: Preserve joint surfaces with an acid-free corrosion protection agent.
3. Check whether O-ring [3] is in good condition, replace if damaged.
4. Apply a thin film of non-acidic grease to the O-ring and insert it correctly.
Flameproof enclosure, danger of explosion!

Risk of death or serious injury.

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


5.3. External earth connection

Figure 22: Earth connection for part-turn actuator

Figure 23: Earth connection for wall bracket

Application

External earth connection (U-bracket) for connection to equipotential compensation.

Table 17:

<table>
<thead>
<tr>
<th>Terminal cross sections and earth connection tightening torques</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor type</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>Solid wire and stranded</td>
</tr>
<tr>
<td>Fine stranded</td>
</tr>
</tbody>
</table>

For fine stranded (flexible) wires, connection is made via cable lugs/ring terminals. When connecting two individual wires with a U-bracket, cross sections have to be identical.
5.4. Accessories for electrical connection

5.4.1. Actuator controls on wall bracket

Design
Figure 24: Design principle with wall bracket (example)

Application
The wall bracket allows separate mounting of actuator controls and actuator.

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

Information on installation with wall bracket

- The permissible cable length between actuator controls on wall bracket and the actuator amounts to 100 m maximum.
- We recommend using an AUMA “LSW” cable set.
- If the AUMA cable set is not used:
  - Use suitable flexible and screened connecting cables.
  - Use separate CAN bus cable of 120 Ohm character impedance for MWG (e.g. UNITRONIC BUS-FD P CAN UL/CSA - 2 x 2 x 0.5 mm², manufacturer: Lapp).
  - Data cable connection: XM2-XA2 = CAN L, XM3-XA3 = CAN H.
  - Voltage supply MWG: XM6-XA6 = GND, XM7-XA7 = + 24 V DC (refer to wiring diagram).

- When using connecting cables, e.g. of the heater or switch, requiring direct wiring from the actuator to the XK customer plug (XA-XM-XK, refer to wiring diagram), these connecting cables must be subject to an insulation test in compliance with EN 50178. Connecting cables of position transmitters (EWG, RWG, IWG, potentiometer) do not belong to this group. They may not be subjected to an insulation test.
5.4.2. Parking frame

*Figure 25: Parking frame, example with Ex plug/socket connector and cover*

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

**WARNING**

*Explosion hazard!*
*Risk of death or serious injury.*

→ Prior to opening the device (removing the plug) ensure that the device is free of gas and voltage!
→ Do NOT switch on voltage in potentially explosive atmospheres.
6. **Operation**

6.1. **Manual operation**

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

6.1.1. **Manual operation: engage**

*NOTICE*

**Damage at the motor coupling due to faulty operation!**

→ Engage manual operation only during motor standstill.

1. Press push button.

![Manual operation](image1.png)

2. Turn handwheel in desired direction.

→ To close the valve, turn handwheel clockwise:

[Drive shaft (valve) turns clockwise in direction CLOSE.](image2.png)

6.1.2. **Manual operation: disengage**

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

6.2. **Motor operation**

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

*NOTICE*

**Valve damage due to incorrect basic setting!**

→ Prior to electrical operation of the actuator, the basic settings i.e. type of seating, torque and limit switching have to be completed.

6.2.1. **Local actuator operation**

Local actuator operation is performed using the local controls push buttons of actuator controls.
Figure 26: Local controls

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

**CAUTION**

Hot surfaces, e.g. possibly caused by high ambient temperatures or strong direct sunlight!

Danger of burns

→ Verify surface temperature and wear protective gloves.


The actuator can now be operated using the push buttons [1 – 3]:
- Run actuator in direction OPEN: Press push button [1].
- Stop actuator: Press push button STOP [2].
- Run actuator in direction CLOSE: Press push button [3].

Information

OPEN and CLOSE operation commands can be given either in push-to-run or in self-retaining operation mode. In self-retaining mode, the actuator runs to the defined end position after pressing the button, unless another command has been received beforehand. For further information, please refer to Manual (Operation and setting).

### 6.2.2. Actuator operation from remote

**CAUTION**

Risk of immediate actuator operation when switching on!

risk of personal injuries or damage to the valve

→ If the actuator starts unexpectedly: Immediately turn selector switch to position 0 (OFF).
→ Check input signals and functions.
Set selector switch to position **Remote control** (REMOTE).

Now, the actuator can be remote-controlled via fieldbus.

Information

For actuators equipped with a positioner, it is possible to change over between **OPEN-CLOSE control** (Remote OPEN-CLOSE) and **setpoint control** (Remote SET-POINT). For further information, please refer to the Manual (Operation and setting).

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

Menu navigation for display and setting is made via the push buttons [1 – 4] of the local controls.

Set the selector switch [5] to position **0 (OFF)** when navigating through the menu.

The bottom row of the display [6] serves as navigation support and explains which push buttons [1 – 4] are used for menu navigation.

Figure 27:

Table 18: Important push button functions for menu navigation

<table>
<thead>
<tr>
<th>Push buttons</th>
<th>Navigation support on display</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>[1] ▲</td>
<td>Up</td>
<td>Change screen/selection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change values</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enter figures from 0 to 9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change values</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enter figures from 0 to 9</td>
</tr>
<tr>
<td>[3] ◀</td>
<td>Ok</td>
<td>Confirm selection</td>
</tr>
<tr>
<td></td>
<td>Save</td>
<td>Save</td>
</tr>
<tr>
<td></td>
<td>Edit</td>
<td>Enter &lt;Edit&gt; menu</td>
</tr>
<tr>
<td></td>
<td>Details</td>
<td>Display more details</td>
</tr>
</tbody>
</table>
6.3.1. Menu layout and navigation

Backlight
- The display is illuminated in white during normal operation. It is illuminated in red in case of a fault.
- The screen illumination is brighter when operating a push button. If no push button is operated for 60 seconds, the display will become dim again.

Groups
The indications on the display are divided into 3 groups:

![Groups Diagram]

1. Startup menu
2. Status menu
3. Main menu

ID
Status menu and main menu are marked with an ID.

![ID Marking Diagram]

S: ID starts with S = status menu
M: ID starts with M = main menu

Group selection
It is possible to select between status menu S and main menu M:

For this, set selector switch to 0 (OFF), hold down push button C for approx. 2 seconds until a screen containing the ID M appears.

![Group Selection Diagram]

You return to the status menu if:
- the push buttons on the local controls have not been operated within 10 minutes
- or by briefly pressing C

Direct display via ID
When entering the ID within the main menu, screens can be displayed directly (without clicking through).
6.4. User level, password

User level  
The user level defines which menu items or parameters can be displayed or modified by the active user.

There are 6 different user levels. The user level is indicated in the top row:

Figure 32: User level display (example)

Password  
A password must be entered to allow parameter modification. The display indicates: 
Password 0***

A specific password is assigned to each user level and permits different actions.

Table 19:  
User levels and authorisations

<table>
<thead>
<tr>
<th>Designation (user level)</th>
<th>Authorisation/password</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observer (1)</td>
<td>Verify settings</td>
</tr>
<tr>
<td></td>
<td>No password required</td>
</tr>
<tr>
<td>Operator (2)</td>
<td>Change settings</td>
</tr>
<tr>
<td></td>
<td>Default factory password: 0000</td>
</tr>
<tr>
<td>Maintenance (3)</td>
<td>Reserved for future extensions</td>
</tr>
<tr>
<td>Specialist (4)</td>
<td>Change device configuration</td>
</tr>
<tr>
<td></td>
<td>e.g. type of seating, assignment of output contacts</td>
</tr>
<tr>
<td></td>
<td>Default factory password: 0000</td>
</tr>
<tr>
<td>Service (5)</td>
<td>Service staff</td>
</tr>
<tr>
<td></td>
<td>Change configuration settings</td>
</tr>
<tr>
<td>AUMA (6)</td>
<td>AUMA administrator</td>
</tr>
</tbody>
</table>

6.4.1. Password entry

1. Select desired menu and hold down push button \(<\) for approx. 3 seconds.

Display indicates the set user level, e.g Observer (1)

2. Select higher user level via \(<\up\) \(<\down\) and confirm with \(<\Ok\).

Display indicates: Password 0***

3. Use push buttons \(<\up\) \(<\down\) to select figures 0 to 9.

4. Confirm first digit of password via push button \(<\Ok\).
5. Repeat steps 1 and 2 for all further digits.
   ➤ Having confirmed the last digit with ▼Ok, access to all parameters within one user level is possible if the password entry is correct.

### 6.4.2. Password change

Only the passwords of same or lower access level may be changed.

Example: If the user is signed in as Specialist (4), he/she can change passwords as for password levels (1) through (4).

<table>
<thead>
<tr>
<th>Device configuration</th>
<th>M0053</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service functions</td>
<td>M0222</td>
</tr>
<tr>
<td>Change passwords</td>
<td>M0229</td>
</tr>
</tbody>
</table>

Menu item Service functions M0222 is only visible, if user level Specialist (4) or higher is selected.

#### Select main menu
1. Set selector switch to position 0 (OFF).

2. Press push button C Setup and hold it down for approx. 3 seconds.
   ➤ Display goes to main menu and indicates: ▶ Display...

#### Change passwords
3. Select parameter Change passwords either:
   ➤ click via the menu M ▶ to parameter, or
   ➤ via direct display: press ▲ and enter ID M0229

   - Display indicates: ▶ Change passwords
   - The user level is indicated in the top row (1 – 6), e.g.:

     ![User level 4](image)

   - For user level 1 (view only), passwords cannot be changed. To change passwords, you must change to a higher user level. For this, enter a password via a parameter.

4. For a user level between 2 and 6: Press push button ▼Ok.
   ➤ The display indicates the highest user level, e.g.: For user 4

5. Select user level via push buttons ▲ Up ▼ Down ▼ and confirm with ▼Ok.
   ➤ Display indicates: ▶ Change passwords Password 0***

6. Enter current password (→ enter password).
   ➤ Display indicates: ▶ Change passwords Password (new) 0***

7. Enter new password (→ enter password).
   ➤ Display indicates: ▶ Change passwords For user 4 (example)

8. Select next user level via push buttons ▲ Up ▼ Down ▼ or cancel the process via Esc.

### 6.5. Language in the display

The AUMATIC actuator controls display is multilingual.

#### 6.5.1. Language change

<table>
<thead>
<tr>
<th>Display...</th>
<th>M0009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>M0049</td>
</tr>
</tbody>
</table>
Select main menu
1. Set selector switch to position 0 (OFF).

2. Press push button C Setup and hold it down for approx. 3 seconds.
   ➤ Display goes to main menu and indicates: ▶ Display...

Change language
3. Press ← Ok.
   ➤ Display indicates: ▶ Language
4. Press ← Ok.
   ➤ Display indicates the selected language, e.g.: ▶ Deutsch
5. The bottom row of the display indicates:
   → Save → continue with step 10
   → Edit → continue with step 6
   ➤ Display indicates: ▶ Observer (1)
7. Select user level via ▲▼ Up ▲ Down ▼ resulting in the following significations:
   → black triangle: ▶ = current setting
   → white triangle: ▷ = selection (not saved yet)
8. Press ← Ok.
   ➤ Display indicates: Password 0***
9. Enter password (→ enter password).
   ➤ Display indicates: ▶ Language and Save (bottom row)

Language selection
10. Select new language via ▲▼ Up ▲ Down ▼ resulting in the following significations:
    → black triangle: ▶ = current setting
    → white triangle: ▷ = selection (not saved yet)
11. Confirm selection via ← Save.
    ➤ The display changes to the new language. The new language selection is saved.
7. Indications

7.1. Indications during commissioning

**LED test**
When switching on the power supply, all LEDs on the local controls illuminate for approx. 1 second. This optical feedback indicates that the voltage supply is connected to the controls and all LEDs are operable.

Figure 33: LED test

**Language selection**
During the self-test, the language selection can be activated so that the selected language is immediately indicated in the display. For this, set selector switch to position 0 (OFF).

*Activate language selection:*
1. Display indicates in the bottom row: *Language selection menu? 'Reset'*
2. Press push button *RESET* and hold it down until the following text is displayed in the bottom line: *Language menu loading, please wait.*

Figure 34: Self-test

**Startup menu**
The current firmware version is displayed during the startup procedure:

Figure 35: Startup menu with firmware version: 04.00.00–xxxx

If the language selection feature has been activated during the self-test, the menu for selecting the display language will now be indicated. For further information on language setting, please refer to chapter *Language in the display*.

Figure 36: Language selection

If no entry is made over a longer period of time (approx. 1 minute), the display automatically returns to the first status indication.

7.2. Indications in the display

**Status bar**
The status bar (first row in the display) indicates the operation mode [1], the presence of an error [2] and the ID number [3] of the current display indication.
Figure 37: Information in the status bar (top)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[1]</td>
<td>[2]</td>
<td>[3]</td>
</tr>
<tr>
<td>Off</td>
<td>△</td>
<td>S₀₀₁</td>
</tr>
</tbody>
</table>

- **[1]** Operation mode
- **[2]** Error symbol (only for faults and warnings)
- **[3]** ID number: S = Status page

**Navigation support**

If further details or information are available with reference to the display, the following indications appear in the navigation support (bottom display row). Then, further information can be displayed via the push button.

**Figure 38: Navigation support (bottom)**

- **[1]** shows list with detailed indications
- **[2]** shows further available information

The navigation support (bottom row) is faded out after approx. 3 seconds. Press any push button (selector switch in position 0 (OFF)) to fade in the navigation support.

### 7.2.1 Feedback indications from actuator and valve

Display indications depend on the actuator version.

**Valve position (S₀₀₀₁)**

- **S₀₀₀₁** on the display indicates the valve position in % of the travel.
- The bar graph display appears after approx. 3 seconds.
- When issuing an operation command, an arrow indicates the direction (OPEN/CLOSE).

**Figure 39: Valve position and direction of operation**

Reaching the preset end positions is additionally indicated via (CLOSED) and (OPEN) symbols.

**Figure 40: End position CLOSED/OPEN reached**

- **0%** Actuator is in end position CLOSED
- **100%** Actuator is in end position OPEN

**Torque (S₀₀₀₂)**

- **S₀₀₀₂** on the display indicates the torque applied at the actuator output.
- The bar graph display appears after approx. 3 seconds.
The push button allows to select the unit displayed (percent %, Newton metre Nm or “foot-pound” ft-lb).

Figure 42: Units of torque

Display in percent

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

Example: SA 07.6 with 20 – 60 Nm.

- 100 % corresponds to 60 Nm of nominal torque.
- 50 % corresponds to 30 Nm of nominal torque.

Operation commands (S0003)

The display S0003 indicates:

- active operation commands, like e.g.: Operation in direction CLOSE or in direction OPEN
- the actual value E2 as bar graph indication and as value between 0 and 100 %.
- for setpoint control (positioner): setpoint E1
- for stepping mode or for intermediate positions with operation profile: pivot points and operation behaviour of pivot points

The navigation support (bottom row) is faded out after approx. 3 seconds and the axis/axes for pivot point display are shown.

OPEN - CLOSE control

Active operation commands (OPEN, CLOSE, ... ) are shown above the bar graph display. The figure below shows the operation command in direction CLOSE.

Figure 43: Display for OPEN - CLOSE control

Setpoint control

If the positioner is enabled and activated, the bar graph indication for E1 (position setpoint) is displayed.

The direction of the operation command is displayed by an arrow above the bar graph indication. The figure below shows the operation command in direction CLOSE.
Figure 44: Indication for setpoint control (positioner)

### Pivot point axis

The pivot points and their operation behaviour (operation profile) are shown on the pivot point axis by means of symbols.

The symbols are only displayed if at least one of the following functions is activated:

- **Operation profile M0294**
- **Timer CLOSE M0156**
- **Timer OPEN M0206**

Figure 45: Examples: on the left pivot points (intermediate positions); on the right stepping mode

Table 20: Symbols along the pivot point axis

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Pivot point (intermediate position) with operation profile</th>
<th>Stepping mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>↓</td>
<td>Stop during operation in direction CLOSE</td>
<td>Start of stepping mode in direction CLOSE</td>
</tr>
<tr>
<td>↑</td>
<td>Stop during operation in direction OPEN</td>
<td>Start of stepping mode in direction OPEN</td>
</tr>
<tr>
<td>◆</td>
<td>Stop during operation in directions OPEN and CLOSE</td>
<td>—</td>
</tr>
<tr>
<td>◁</td>
<td>Pause for operation in direction OPEN</td>
<td>—</td>
</tr>
<tr>
<td>◂</td>
<td>Pause for operation in direction OPEN</td>
<td>—</td>
</tr>
<tr>
<td>◇</td>
<td>Pause for operation in directions OPEN and CLOSE</td>
<td>—</td>
</tr>
</tbody>
</table>

#### 7.2.2. Status indications according to AUMA classification

These indications are available if the parameter Diagnostic classific. M0539 is set to AUMA.

**Warnings (S0005)**

If a warning has occurred, the display shows S0005:

- the number of warnings occurred
- a blinking question mark after approx. 3 seconds

Figure 46: Warnings

For further information, please also refer to <Corrective action>.
Not ready REMOTE (S0006)
The **S0006** display shows indications of the Not ready REMOTE group. If such an indication has occurred, the display shows **S0006**:  
- the number of indications occurred  
- a blinking crossbar after approx. 3 seconds  

Figure 47: Not ready REMOTE indications

---

Fault (S0007)
If a fault has occurred, the display shows **S0007**:  
- the number of faults occurred  
- a blinking exclamation mark after approx. 3 seconds  

Figure 48: Fault

---

7.2.3. Status indications according to NAMUR recommendation

These indications are available, if the parameter **Diagnostic classific. M0539** is set to NAMUR.

Out of Specification (S0008)
The **S0008** indication shows out of specification indications according to NAMUR recommendation NE 107. If such an indication has occurred, the display shows **S0008**:  
- the number of indications occurred  
- a blinking triangle with question mark after approx. 3 seconds  

Figure 49: Out of specification

---

Function check (S0009)
The **S0009** indication shows function check indications according to NAMUR recommendation NE 107. If an indication has occurred via the function check, the display shows **S0009**:  
- the number of indications occurred  
- a blinking triangle with a spanner after approx. 3 seconds
Maintenance required (S0010)

The S0010 indication shows maintenance indications according to NAMUR recommendation NE 107.

If such an indication has occurred, the display shows S0010:
- the number of indications occurred
- a blinking square with an oilcan after approx. 3 seconds

For further information, please also refer to <Corrective action>.

Failure (S0011)

The S0011 indication shows the causes of the failure indication according to NAMUR recommendation NE 107.

If such an indication has occurred, the display shows S0011:
- the number of indications occurred
- a blinking circle with a cross after approx. 3 seconds

For further information, please also refer to <Corrective action>.
7.3. Indication lights of local controls

Figure 53: Arrangement and signification of indication lights

- [1] Marking with symbols (standard)
- [2] Marking with figures 1 – 6 (option)

1. End position CLOSED reached (blinking: operation in direction CLOSE)
2. Torque fault CLOSE
3. Motor protection tripped
4. Torque fault OPEN
5. End position OPEN reached (blinking: operation in direction OPEN)
6. Bluetooth connection

Modify indication light assignment (indications)

Different indications can be assigned to LEDs 1 – 5.

**Device configuration M0053**

- Local controls M0159
- Indication light 1 (left) M0093
- Indication light 2 M0094
- Indication light 3 M0095
- Indication light 4 M0096
- Indication light 5 (right) M0097
- Signal interm. pos. M0167

**Default values (Europe):**

- Indication light 1 (left) = End p. CLOSED, blink
- Indication light 2 = Torque fault CLOSE
- Indication light 3 = Thermal fault
- Indication light 4 = Torque fault OPEN
- Indication light 5 (right) = End p. OPEN, blink
- Signal interm. pos. = OPEN/CLOSED = Off

**Further setting values:**

Refer to Manual (Operation and setting).

7.4. Mechanical position indication (self-adjusting)

Figure 54: Mechanical position indicator

- [1] End position OPEN reached
- [2] End position CLOSED reached
Characteristics

- Independent of power supply
- Used as running indication: Indicator disc (with arrow \(\triangleleft \rightarrow\)) rotates during actuator operation and continuously indicates the valve position. (For “clockwise closing version”, the arrow rotates in clockwise direction for operation in direction CLOSE)
- Indicates that end positions (OPEN/CLOSED) have been reached. Arrow \(\triangleleft \rightarrow\) points to symbol \(\uparrow\) (OPEN) or \(\downarrow\) (CLOSED)
- Self-adjusting when increasing the swing angle

7.5. Mechanical position indication via indicator mark

Figure 55: Mechanical position indicator

- [1] End position OPEN reached
- [2] End position CLOSED reached
- [3] Indicator mark at cover

Characteristics

- Independent of power supply
- Used as running indication: Indicator disc rotates during actuator operation and continuously indicates the valve position. (For “clockwise closing version”, the symbols \(\uparrow\)/\(\downarrow\) rotate in counterclockwise direction for operation in direction CLOSE)
- Indicates that end positions (OPEN/CLOSED) have been reached. (Symbols \(\uparrow\) (OPEN)/\(\downarrow\) (CLOSED) point to the indicator mark \(\uparrow\) at cover)
8. Signals (output signals)

8.1. Status signals via output contacts (digital outputs)

**Conditions**
Output contacts are only available if a parallel interface is provided in addition to the communication interface.

**Characteristics**
Output contacts are used to send status signals (e.g. reaching the end positions, selector switch position, faults...) as binary signals to the control room.

Status signals only have two states: active or inactive. Active means that the conditions for the signal are fulfilled.

8.1.1. Assignment of outputs

The output contacts (outputs DOUT 1 – 6) can be assigned to various signals.

Required user level: Specialist (4) or higher.

M ▶ Device configuration M0053
I/O interface M0139
Digital outputs M0110
Signal DOUT 1 M0109

Default values:
- Signal DOUT 1 = Fault
- Signal DOUT 2 = End position CLOSED
- Signal DOUT 3 = End position OPEN
- Signal DOUT 4 = Selector sw. REMOTE
- Signal DOUT 5 = Torque fault CLOSE
- Signal DOUT 6 = Torque fault OPEN

8.1.2. Coding the outputs

The output signals Coding DOUT 1 – Coding DOUT 6 can be set either to high active or low active.

- High active = output contact closed = signal active
- Low active = output contact open = signal active

Signal active means that the conditions for the signal are fulfilled.

Required user level: Specialist (4) or higher.

M ▶ Device configuration M0053
I/O interface M0139
Digital outputs M0110
Coding DOUT 1 M0102

Default values:
- Coding DOUT 1 = Low active
- Coding DOUT 2 & Coding DOUT 6 = High active

8.2. Analogue signals (analogue outputs)

**Requirements**
Analogue signals are only available if additional input signals are provided.

**Valve position**
Signal: E2 = 0/4 – 20 mA (galvanically isolated)
Designation in the wiring diagram: AOUT1 (position)

**Torque feedback**
Signal: E6 = 0/4 – 20 mA (galvanically isolated)
Designation in the wiring diagram: AOUT2 (torque)

For further information on this topic, please refer to Manual (Operation and setting).
9. Commissioning (basic settings)

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

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

2. Switch on the power supply.

   Information: Observe heat-up time for ambient temperatures below –30 °C.

3. Perform basic settings.

9.1. End stops in part-turn actuator

The internal end stops limit the swing angle. They protect the valve in case of limit switching failure during motor operation and serve the purpose as limitation for manual operation via handwheel. They may not be used for torque tripping in end positions during standard operation.

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

---

**CAUTION**

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

*Pinching and damage by valve or actuator.*

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

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

→ Observe dimension $T_{min}$.

---

**Information**

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

  Figure 56: Example: Swing angle on name plate

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

1. Remove screw plug [3].
2. Move valve to end position CLOSED with handwheel.
3. If the valve end position is not reached:
   → Slightly turn setting screw [4] counterclockwise until valve end position CLOSED can be safely set.
   ← Turning the setting screw [4] clockwise results in a smaller swing angle.
   ← Turning the setting screw [4] counterclockwise results in a larger swing angle.
   ← This completes the setting of end stop CLOSED.
5. Check O-ring in screw plug and replace if damaged.
6. Fasten and tighten screw plug [3].

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

9.1.2. End stop OPEN: set

**Information**

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

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

   - This completes the setting of end stop OPEN.

5. Check O-ring in screw plug and replace if damaged.
6. Fasten and tighten screw plug [1].
   Having completed this procedure, the end position detection OPEN can be set
   immediately.

9.2. Type of seating: set

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.

<table>
<thead>
<tr>
<th>M ▶ Customer settings M0041</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of seating M0012</td>
</tr>
<tr>
<td>End position CLOSED M0086</td>
</tr>
<tr>
<td>End position OPEN M0087</td>
</tr>
</tbody>
</table>

Default value: Limit

Setting values:
- Limit: Seating in end positions via limit switching.
- Torque: Seating in end positions via torque switching.

Select main menu
1. Set selector switch to position 0 (OFF).

2. Press push button C Setup and hold it down for approx. 3 seconds.
   - Display goes to main menu and indicates: ▶ Display...

Select parameter
3. Select parameter either:
   - click via the menu M ▶ to parameter, or
   - via direct display: Press ▲ and enter ID M0086 or M0087
   - Display indicates: End position CLOSED

CLOSE or OPEN
4. Use ▲▼ Up ▼ Down ▼ to select:
   - ▶ End position CLOSED
   - ▶ End position OPEN
   - The black triangle ▶ indicates the current selection.
5. Press \( \text{Ok} \).
   ➤ Display indicates the current setting: Limit or Torque
   ➤ The bottom row of the display indicates either:
     - Edit → continue with step 6
     - Save → continue with step 10
6. Press \( \text{Edit} \).
   ➤ Display indicates: ▶ Specialist (4)
7. Use ▲ ▼ Up ▼ Down ▼ to select user:
   Information: Required user level: Specialist (4) or higher
   ➤ The symbols have the following meaning:
     - black triangle: ▶ = current setting
     - white triangle: ▼ = selection (not saved yet)
8. Press \( \text{Ok} \).
   ➤ Display indicates: Password 0***
9. Enter password (→ enter password).
   ➤ The screen indicates the pre-set type of seating (▶ Limit or ▶ Torque) by means of a black triangle ▶.
10. Use ▲ ▼ Up ▼ Down ▼ to select new setting.
    ➤ The symbols have the following meaning:
      - black triangle: ▶ = current setting
      - white triangle: ▼ = selection (not saved yet)
11. Confirm selection via \( \text{Save} \).
    ➤ The setting for the type of seating is complete.
12. Back to step 4 (CLOSED or OPEN): Press \( \text{Esc} \).

9.3. Torque switching: set

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

Information
The torque switches may also trip during manual operation.

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

M ▷ Customer settings  M0041
Torque switching  M0013
Trip torque CLOSE  M0088
Trip torque OPEN  M0089

Default value: According to order data
Setting range: Torque range according to actuator name plate
Select parameter

3. Select parameter either:
   → click via the menu M ▶ to parameter, or
   → via direct display: press ▲ and enter ID M0088.

   ➤ Display indicates: Trip torque CLOSE

CLOSE or OPEN

4. Use ▲▼ Up ▲ Down ▼ to select:
   → ▶ Trip torque CLOSE
   → ▶ Trip torque OPEN

   ➤ The black triangle ▶ indicates the current selection.

5. Press ← Ok.
   ➤ Display shows the set value.
   ➤ The bottom row indicates: Edit Esc

   ➤ Display indicates:
     - Specialist (4) → continue with step 7
     - in bottom row Up ▲ Down ▼ Esc → continue with step 11

User login

7. Use ▲▼ Up ▲ Down ▼ to select user:
   Information: Required user level: Specialist (4) or higher.

   ➤ The symbols have the following meanings:
     - black triangle: ▶ = current setting
     - white triangle: ▷ = selection (not saved yet)

8. Press ← Ok.
   ➤ Display indicates: Password 0***

9. Enter password (→ enter password).
   ➤ Display shows the set value.
   ➤ The bottom row indicates: Edit Esc


Change value

11. Enter new value for tripping torque via ▲▼ Up ▲ Down ▼.
    Information: The adjustable torque range is shown in round brackets.

12. Save new value via ← Save.
    ➤ The tripping torque is set.


Information

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

- In the display of the local controls: Status indication S0007 Fault = Torque fault OPEN or Torque fault CLOSE

The fault has to be acknowledged before the operation can be resumed. The acknowledgement is made:

1. either by an operation command in the opposite direction.
   - For Torque fault OPEN: Operation command in direction CLOSE
   - For Torque fault CLOSE: Operation command in direction OPEN

2. or, in case the torque applied is lower than the preset tripping torque:
   - in selector switch position Local control (LOCAL) via push button RESET.
   - in selector switch position Remote control (REMOTE):
     - via the fieldbus, command reset., if the fieldbus is the active command source.
     - via a digital input (I/O interface) with RESET command if a digital input is configured for signal RESET and the I/O interface is the active command source.
9.4. Limit switching: set

**NOTICE**
Valve damage at valve/gearbox due to incorrect setting!
→ When setting with motor operation: Stop actuator **prior** reaching end of travel (press STOP push button).
→ Allow for overrun when selecting limit seating.

<table>
<thead>
<tr>
<th>M ▶</th>
<th>Customer settings M0041</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Limit switching M0010</td>
</tr>
<tr>
<td></td>
<td>Set end pos. CLOSED? M0084</td>
</tr>
<tr>
<td></td>
<td>Set end pos. OPEN? M0085</td>
</tr>
</tbody>
</table>

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

2. Press push button C and hold it down for approx. 3 seconds.
   ➥ Display goes to main menu and indicates: ▶ Display...

**Select parameter**
3. Select parameter either:
   → click via the menu M ▶ to parameter, or
   → via direct display: press ▲ and enter ID M0084.

   ➥ Display indicates: Set end pos. CLOSED?

**CLOSED or OPEN**
4. Select via ▲▼ Up ▲ Down ▼:
   → ▶ Set end pos. CLOSED? M0084
   → ▶ Set end pos. OPEN? M0085

   ➥ The black triangle ▶ indicates the current selection.

5. Press Ok.
   ➥ The display indicates either:
   - Set end pos. CLOSED? CMD0009 → continue with step 9
   - Set end pos. OPEN? CMD0010 → continue with step 12
   - Specialist (4) → continue with step 6

**User login**
6. Use ▲▼ Up ▲ Down ▼ to select user:
   **Information:** Required user level: Specialist (4) or higher

   ➥ The symbols have the following meaning:
   - black triangle: ▶ = current setting
   - white triangle: ▼ = selection (not saved yet)

7. Press Ok to confirm selected user.
   ➥ Display indicates: Password 0***

8. Enter password (→ enter password).
   ➥ The display indicates either:
   - Set end pos. CLOSED? CMD0009 → continue with step 9
   - Set end pos. OPEN? CMD0010 → continue with step 12
Set end position 
CLOSED CMD0009

9. Set end position CLOSED again:
9.1 For large strokes: Set selector switch in position Local control (LOCAL) and operate actuator in motor operation via push button \(\square\) (CLOSE) in direction of the end position.

**Information:** Stop actuator before reaching end of travel (press STOP push button to avoid damage).

9.2 Engage manual operation.
9.3 Turn handwheel until valve is closed.
9.4 Set selector switch to position 0 (OFF).

➡️ Display indicates: Set end pos.CLOSED? Yes No

Confirm new end position

10. Press ✈️ Yes to confirm new end position.

➡️ Display indicates: End pos. CLOSED set!
➡️ The left LED is illuminated (standard version) and thus indicates that the end position CLOSED setting is complete.

11. Make selection:
→ Edit → back to step 9: Set end position CLOSED "once again"
→ Esc → back to step 4; either set end position OPEN or exit the menu.

Set end position OPEN CMD0010

12. Re-set end position OPEN:
12.1 For large strokes: Set selector switch in position Local control (LOCAL) and operate actuator in motor operation via push button \(\square\) (OPEN) in direction of the end position.

**Information:** Stop actuator before reaching end of travel (press STOP push button to avoid damage).

12.2 Engage manual operation.
12.3 Turn handwheel until valve is open.
12.4 Set selector switch to position 0 (OFF).

➡️ Display indicates: Set end pos. OPEN? Yes No

Confirm new end position

13. Press ✈️ Yes to confirm new end position.

➡️ Display indicates: End pos. OPEN set!
➡️ The right LED is illuminated (standard version) and thus indicates that the end position OPEN setting is complete.

14. Make selection:
→ Edit → back to step 12: Set end position OPEN "once again"
→ Esc → back to step 4; either set end position CLOSED or exit the menu.

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

9.5. Fieldbus address (slave address), baud rate, parity and monitoring time: set

M ➔ Customer settings M0041
Modbus M0341
MD1 slave address M0247
MD2 slave address: M0409
Baud rate: M0343
Parity/stop bit: M0782
Monitoring time: M0781

Default values:
MD1 slave address = 247
MD2 slave address = 247
Baud rate = Auto
Parity/stop bit = Even, 1 stop bit
Monitoring time = 15 seconds

Information
Parameter MD2 slave address is only available if AUMA redundancy I (option) is available.

For further settings and information e.g. on redundancy, refer to Manual (Device integration).

9.5.1. Modbus TCP/IP gateway: set

Modbus TCP/IP gateway settings can be adapted by means of a web server.
Login password (default setting in the factory): admin

Table 21: Default setting of the IP interface:

<table>
<thead>
<tr>
<th>Address Type</th>
<th>Static IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static IP Address</td>
<td>192.168.255.1</td>
</tr>
<tr>
<td>Subnet Mask</td>
<td>255.255.0.0</td>
</tr>
<tr>
<td>Default Gateway</td>
<td>192.168.0.1</td>
</tr>
</tbody>
</table>

If required, only the IP interface must be adapted to the requirements of the Modbus TCP/IP network. All further settings of the Modbus TCP/IP gateway (particularly the port settings) are set as default in the factory.

9.6. Test run

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

9.6.1. Direction of rotation at mechanical position indicator: check

**NOTICE**
Valve damage due to incorrect direction of rotation!
→ If the direction of rotation is wrong, switch off immediately (press STOP).
→ Eliminate cause, i.e. correct phase sequence for cable set wall bracket.
→ Repeat test run.

Information
Switch off before reaching the end position.

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

→ For self-adjusting mechanical position indication:
  ➤ The direction of rotation is correct if the actuator operates in direction CLOSE and arrow \( \rightarrow \) turns clockwise in direction CLOSE (symbol \( \mathbb{1} \)).

Figure 58: Direction of rotation \( \rightarrow \) (for “clockwise closing version”)

→ For mechanical position indication via indicator mark: (not self-adjusting)
  ➤ The direction of rotation is correct if the actuator operation in direction CLOSE and the symbols \( \Leftrightarrow \) turn counterclockwise:

Figure 59: Direction of rotation \( \Leftrightarrow \) (for “clockwise closing version”)

### 9.6.2. Limit switching: check

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

2. Operate actuator using push buttons OPEN, STOP, CLOSE.
  ➤ The limit switching is set correctly if (default indication):
    - the yellow indication light/LED1 is illuminated in end position CLOSED
    - the green indication light/LED5 is illuminated in end position OPEN
    - the indication lights go out after travelling into opposite direction.
  ➤ 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)
    - the status indication S0007 in the display signals a fault.

3. If the end position setting is incorrect: Reset limit switching.
10. Commissioning (settings in the actuator)

The actuator is supplied with the swing angle set in the factory in compliance with the order. The mechanical position indication is set to this swing angle.

If the factory swing angle is changed at a later date, the position indicator must be adapted to the new swing angle:

- Increasing the swing angle: The mechanical position indication automatically adjusts with the subsequent operation.
- Decreasing the swing angle: The mechanical position indication must be newly set (refer to the subsequent chapters).

In case the mechanical position indication integrated within the actuator is NOT self-adjusting, the switch compartment must be opened for mechanical position indication adjustment when commissioning.
10.1. **Switch compartment: open/close**

Figure 62: Open/close switch compartment

![Diagram of switch compartment]

**[A]** Mechanical position indication (self-adjusting)

**[B]** Mechanical position indication via indicator mark

**WARNING**

Flameproof enclosure, danger of explosion!

*Risk of death or serious injury.*

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

→ Handle cover and housing parts with care.

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

→ Do not jam cover during fitting.

<table>
<thead>
<tr>
<th>Open</th>
<th>Close</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Clean sealing faces of housing and cover.</td>
</tr>
<tr>
<td>3.</td>
<td>Preserve joint surfaces with an acid-free corrosion protection agent.</td>
</tr>
<tr>
<td>5.</td>
<td>Apply a thin film of non-acidic grease (e.g. petroleum jelly) to the O-ring and insert it correctly.</td>
</tr>
</tbody>
</table>

10.2. **Mechanical position indicator (self-adjusting)**

Figure 63: Mechanical position indicator (self-adjusting)

The self-adjusting mechanical position indicator shows the valve position by means of an arrow. When correctly set, the arrow points to symbol (OPEN) or (CLOSED) in the end positions.
The position indications is housed in the actuator switch compartment. Opening the switch compartment for manual setting is only necessary if the gear stage setting must be modified or if the factory settings of predefined end position CLOSED (or OPEN) must be adapted when commissioning.

### 10.2.1. Mechanical position indicator: set

1. Move valve to end position CLOSED.
2. Push both lower discs with the symbols (OPEN) and (CLOSED) towards each other. The disc with the arrow is thereby driven:

   ![Figure 64: Setting position in CLOSED](image)

3. Move actuator to end position OPEN.

   - The arrow rotates in direction OPEN driving the indicator disc with symbol (OPEN) until the actuator stops in position OPEN.

   ![Figure 65: Operation in direction OPEN (left) and position OPEN (right)](image)

4. Check settings:

   - The setting of the mechanical position indicator is correct if the angle between the symbols (OPEN) and (CLOSED) ranges between approx. 120° and 280°.

   - If all three discs are turned at the same time, the indicator can be shifted in steps of 15°. Individual shifts of 5° are possible.

   - If the indicator is rotated too far (more than 280°) or if the angle is too small (below 120°), adapt the gear stage setting to the actuator swing angle. Refer to <Gear stage of the reduction gearing: test/set>.

### 10.2.2. Gear stage of the reduction gearing: test/set

The test/setting is only required if the mechanical position indicator cannot be correctly set or if another swing angle range is ordered subsequently, for example, 120° ±15° instead of 90° ±15° (replacement by the AUMA Service only).
1. Refer to table and check if swing angle corresponds to the setting of the reduction gearing (stages 1–9).

<table>
<thead>
<tr>
<th>Actuator swing angle and suitable reduction gearing setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQ 05.2 / SQ 07.2</td>
</tr>
<tr>
<td>30° +/-15°</td>
</tr>
<tr>
<td>60° +/-15°</td>
</tr>
<tr>
<td>90° +/-15°</td>
</tr>
<tr>
<td>120° +/-15°</td>
</tr>
<tr>
<td>150° +/-15°</td>
</tr>
<tr>
<td>180° +/-15°</td>
</tr>
<tr>
<td>210° +/-15°</td>
</tr>
<tr>
<td>290° +/-70°</td>
</tr>
</tbody>
</table>

2. To modify settings, lift the lever at the reduction gearing and engage at the selected stage.

Figure 66: Set reduction gearing

10.3. Mechanical position indication via indicator mark (not self-adjusting)

Figure 67: Mechanical position indication via indicator mark

The mechanical position indicator shows the valve position via two indicator discs with symbols (OPEN) and (CLOSED). When correctly set, the symbols OPEN/CLOSED point to the indicator mark ▲ at the cover in the end positions.

**Setting elements**

The position indications is housed in the actuator switch compartment. The switch compartment must be opened to perform any settings. Refer to <Switch compartment: open/close>.
10.3.1. Mechanical position indicator: set

- ✔ If options (e.g. potentiometer, position transmitter) are available: Only set mechanical position indication once all optional equipment have been successfully set.

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 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 ▲ mark on the cover:
   → Repeat setting procedure.

10.3.2. Gear stage of the reduction gearing: test/set

This test/setting is only required if a different swing angle is subsequently required:

- **Information**
  The adjustable swing angle range is available in the order-related technical data sheet (e.g. “90° +/-15°”).

1. Pull off indicator disc using a spanner as lever if required.
2. Refer to table and check if swing angle of the actuator corresponds to the setting of the reduction gearing (stages 1–9).
   If the setting is not correct: continue with step 4.
   If the setting is correct: continue with step 7.

Table 23:

<table>
<thead>
<tr>
<th>Actuator swing angle and suitable reduction gearing setting</th>
<th>SQ 05.2 / SQ 07.2</th>
<th>SQ 10.2</th>
<th>SQ 12.2</th>
<th>SQ 14.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° +/-15°</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>60° +/-15°</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>90° +/-15°</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>120° +/-15°</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>150° +/-15°</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>180° +/-15°</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>210° +/-15°</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>290° +/-70°</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

3. Loosen screw [1].
4. Set crown wheel [2] to desired level according to table.
5. Tighten screw [1].
6. Place indicator disc on shaft.
7. Set mechanical position indicator.

Figure 68: Control unit with reduction gearing

[1] Screw
11. Corrective action

11.1. Faults during commissioning

Table 24:

<table>
<thead>
<tr>
<th>Fault</th>
<th>Description/cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faults</td>
<td>Mechanical position indicator cannot be set.</td>
<td>Reduction gearing is not suitable for actuator swing angle. Set gear stage of the reduction gearing. The control unit might have to be exchanged.</td>
</tr>
<tr>
<td></td>
<td>In spite of correct setting of mechanical limit switching, actuator operates into the valve or actuator end position.</td>
<td>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 actuator controls. • Determine overrun: Overrun = travel covered from switching off until complete standstill. • Set limit switching again considering the overrun. (Turn handwheel back by the amount of the overrun)</td>
</tr>
</tbody>
</table>

11.2. Fault indications and warning indications

**Faults** interrupt or prevent the electrical actuator operation. In the event of a fault, the display backlight is red.

**Warnings** have no influence on the electrical actuator operation. They only serve for information purposes. The display remains white.

**Collective signals** include further indications. They can be displayed via the Details push button. The display remains white.

Table 25:

<table>
<thead>
<tr>
<th>Indication on display</th>
<th>Description/cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>S0001</td>
<td>Instead of the valve position, a status text is displayed.</td>
<td>For a description of the status texts, refer to Manual (Operation and setting).</td>
</tr>
<tr>
<td>S0005 Warnings</td>
<td>Collective signal 02: Indicates the number of active warnings.</td>
<td>For indicated value &gt; 0: Press push button Details. For details, refer to &lt;Warnings and Out of specification&gt; table.</td>
</tr>
<tr>
<td>S0006 Not ready REMOTE</td>
<td>Collective signal 04: Indicates the number of active signals.</td>
<td>For indicated value &gt; 0: Press push button Details. For details, refer to &lt;Not ready REMOTE and Function check&gt; table.</td>
</tr>
<tr>
<td>S0007 Fault</td>
<td>Collective signal 03: Indicates the number of active faults. The actuator cannot be operated.</td>
<td>For indicated value &gt; 0: Press push button Details to display a list of detailed indications. For details, refer to &lt;Faults and Failure&gt; table.</td>
</tr>
<tr>
<td>S0008 Out of specification</td>
<td>Collective signal 07: Indication according to NAMUR recommendation NE 107 Actuator is operated outside the normal operation conditions.</td>
<td>For indicated value &gt; 0: Press push button Details. For details, refer to &lt;Warnings and Out of specification&gt; table.</td>
</tr>
<tr>
<td>S0009 Function check</td>
<td>Collective signal 08: Indication according to NAMUR recommendation NE 107 The actuator is being worked on; output signals are temporarily invalid.</td>
<td>For indicated value &gt; 0: Press push button Details. For details, refer to &lt;Not ready REMOTE and Function check&gt; table.</td>
</tr>
<tr>
<td>S0010 Maintenance required</td>
<td>Collective signal 09: Indication according to NAMUR recommendation NE 107 Recommendation to perform maintenance.</td>
<td>For indicated value &gt; 0: Press push button Details to display a list of detailed indications.</td>
</tr>
<tr>
<td>S0011 Failure</td>
<td>Collective signal 10: Indication according to NAMUR recommendation NE 107 Actuator function failure, output signals are invalid</td>
<td>For indicated value &gt; 0: Press push button Details to display a list of detailed indications. For details, refer to &lt;Faults and Failure&gt; table.</td>
</tr>
<tr>
<td>Indication on display</td>
<td>Description/cause</td>
<td>Remedy</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Config. warning</td>
<td>Collective signal 06: Configuration setting is incorrect. The device can still be operated with restrictions.</td>
<td>Press push button to display a list of individual indications. For a description of the individual signals, refer to Manual (Operation and setting).</td>
</tr>
<tr>
<td>Internal warning</td>
<td>Collective signal 15: Device warnings The device can still be operated with restrictions.</td>
<td>Press push button to display a list of individual indications. For a description of the individual signals, refer to Manual (Operation and setting).</td>
</tr>
<tr>
<td>24 V DC external</td>
<td>The external 24 V DC voltage supply of the controls has exceeded the power supply limits.</td>
<td>Check 24 V DC voltage supply.</td>
</tr>
<tr>
<td>Wrn op.mode run time</td>
<td>Warning on time max. running time/h exceeded</td>
<td>- Check modulating behaviour of actuator. - Check parameter Perm. run time M0356, re-set if required.</td>
</tr>
<tr>
<td>Wrn op.mode starts</td>
<td>Warning on time max. number of motor starts (starts) exceeded</td>
<td>- Check modulating behaviour of actuator. - Check parameter Permissible starts M0357, re-set if required.</td>
</tr>
<tr>
<td>Failure behav. active</td>
<td>The failure behaviour is active since all required setpoints and actual values are incorrect.</td>
<td>Verify signals: - Setpoint E1 - Actual value E2 - Actual process value E4 - Check connection to master.</td>
</tr>
<tr>
<td>Wrn input Ain 1</td>
<td>Warning: Loss of signal analogue input 1</td>
<td>Check wiring.</td>
</tr>
<tr>
<td>Wrn input Ain 2</td>
<td>Warning: Loss of signal analogue input 2</td>
<td>Check wiring.</td>
</tr>
<tr>
<td>Wrn setpoint position</td>
<td>Warning: Loss of signal setpoint position Possible causes: For an adjusted setpoint range of e.g. 4 – 20 mA, the input signal is 0 (signal loss). For a setpoint range of 0 – 20 mA, monitoring is not possible.</td>
<td>Check setpoint signal.</td>
</tr>
<tr>
<td>Op. time warning</td>
<td>The set time (parameter Perm. op. time, manual M0570) has been exceeded. The preset operating time is exceeded for a complete travel from end position OPEN to end position CLOSED.</td>
<td>The warning indications are automatically cleared once a new operation command is executed. - Check valve. - Check parameter Perm. op. time, manual M0570.</td>
</tr>
<tr>
<td>Wrn controls temp.</td>
<td>Temperature within controls housing too high.</td>
<td>Measure/reduce ambient temperature.</td>
</tr>
<tr>
<td>Time not set</td>
<td>Real time clock has not yet been set.</td>
<td>Set time.</td>
</tr>
<tr>
<td>RTC voltage</td>
<td>Voltage of the RTC button cell is too low.</td>
<td>Replace button cell.</td>
</tr>
<tr>
<td>PVST fault</td>
<td>Partial Valve Stroke Test (PVST) could not be successfully completed.</td>
<td>Check actuator (PVST settings).</td>
</tr>
<tr>
<td>PVST abort</td>
<td>Partial Valve Stroke Test (PVST) was aborted or could not be started.</td>
<td>Perform RESET or restart PVST.</td>
</tr>
<tr>
<td>Wrn no reaction</td>
<td>No actuator reaction to operation commands within the set reaction time.</td>
<td>- Check movement at actuator. - Check parameter Reaction time M0634.</td>
</tr>
<tr>
<td>Torque wrn OPEN</td>
<td>Limit value for torque warning in direction OPEN exceeded.</td>
<td>Check parameter Wrn torque OPEN M0768, re-set if required.</td>
</tr>
<tr>
<td>Torque wrn CLOSE</td>
<td>Limit value for torque warning in direction CLOSE exceeded.</td>
<td>Check parameter Wrn torque CLOSE M0769, re-set if required.</td>
</tr>
<tr>
<td>SIL fault1)</td>
<td>SIL sub-assembly fault has occurred.</td>
<td>Refer to separate Manual Functional Safety.</td>
</tr>
<tr>
<td>PVST required</td>
<td>Execution of PVST (Partial Valve Stroke Tests) is required.</td>
<td></td>
</tr>
<tr>
<td>Maintenance required</td>
<td>Maintenance is required.</td>
<td></td>
</tr>
<tr>
<td>FQM fail safe fault2)</td>
<td>FQM fault</td>
<td>Checking and fault remedy are required. Refer to FQM operation instructions.</td>
</tr>
</tbody>
</table>

1) For actuators controls in SIL version

2) For actuators controls in SIL version
For actuators with fail safe unit

<table>
<thead>
<tr>
<th>Table 27: Faults and Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indication on display</strong></td>
</tr>
</tbody>
</table>
| Configuration error | Collective signal 11: Configuration error has occurred. | Press push button  
  ❯ Details to display a list of individual indications.  
  For a description of the individual signals, refer to Manual (Operation and setting). |
| Config. error REMOTE | Collective signal 22: Configuration error has occurred. | Press push button  
  ❯ Details to display a list of individual indications.  
  For a description of the individual signals, refer to Manual (Operation and setting). |
| Internal error | Collective signal 14: Internal error has occurred. | AUMA service  
  Press push button  
  ❯ Details to display a list of individual indications.  
  For a description of the individual signals, refer to Manual (Operation and setting). |
| Torque fault CLOSE | Torque fault in direction CLOSE | Perform one of the following measures:  
  ● Issue operation command in direction OPEN.  
  ● Set selector switch to position Local control (LOCAL) and reset fault indication via push button  
    RESET.  
  ● Execute reset command via fieldbus. |
| Torque fault OPEN | Torque fault in direction OPEN | Perform one of the following measures:  
  ● Issue operation command in direction CLOSE.  
  ● Set selector switch to position Local control (LOCAL) and reset fault indication via push button  
    RESET.  
  ● Execute reset command via fieldbus. |
| Phase fault |  
  ● When connecting to a 3-ph AC system and with internal 24 V DC supply of the electronics: Phase 2 is missing.  
  ● When connecting to a 3-ph or 1-ph AC system and with external 24 V DC supply of the electronics: One of the phases L1, L2 or L3 is missing. | Test/connect phases. |
| Incorrect phase seq | The phase conductors L1, L2 and L3 are connected in the wrong sequence.  
  Only applicable if connected to a 3-ph AC system. | Correct the sequence of the phase conductors L1, L2 and L3 by exchanging two phases. |
| Mains quality | Due to insufficient mains quality, the controls cannot detect the phase sequence (sequence of phase conductors L1, L2 and L3) within the pre-set time frame provided for monitoring. |  
  ● Check mains voltage.  
  For 3-phase/1-phase AC current, the permissible variation of the mains voltage is ±10 % (option ±30 %). The permissible variation of the mains voltage is ±5 %  
  ● Check parameter Tripping time M0172, extend time frame if required. |
| Thermal fault | Motor protection tripped |  
  ● Cool down, wait.  
  ● If the fault indication display persists after cooling down:  
    - Set selector switch to position Local control (LOCAL) and reset fault indication via push button  
      RESET.  
    - Execute reset command via fieldbus.  
  ● Check fuses. |
| Fault no reaction | No actuator reaction to operation commands within the set reaction time. | Check movement at actuator. |
| Poti Out of Range | Potentiometer is outside the permissible range. | Check device configuration:  
  Parameter Low limit Uspan M0832 must be less than parameter Volt.level diff. potent. M0833. |
| LPV not ready | LPV: Lift Plug Valve function  
  The master actuator signals a fault |  |
### Faults and Failure

<table>
<thead>
<tr>
<th>Indication on display</th>
<th>Description/cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrm input AIN 1</td>
<td>Loss of signal analogue input 1</td>
<td>Check wiring.</td>
</tr>
<tr>
<td>Wrm input AIN 2</td>
<td>Loss of signal analogue input 2</td>
<td>Check wiring.</td>
</tr>
<tr>
<td>Incorrect rotary direct.</td>
<td>Contrary to the configured direction of rotation and the active operation command, the motor turns into the wrong direction.</td>
<td>Check operation command control. For 3-phase AC current mains, activate phase monitoring (parameter <strong>Adapt rotary dir M0171</strong>). Check device configuration setting (parameter <strong>Closing rotation M0176</strong>). To delete the fault indication: Disconnect actuator controls from the mains and perform reboot.</td>
</tr>
</tbody>
</table>

**FQM collective fault**

<table>
<thead>
<tr>
<th>Collective signal 25:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Press push button <strong>Details</strong> to display a list of individual indications. For a description of the individual signals, refer to Manual (Operation and setting).</td>
<td></td>
</tr>
</tbody>
</table>

1) For lift plug valve product variant
2) For actuators equipped with fail safe unit

### Table 28: Not ready REMOTE and Function check (collective signal 04)

<table>
<thead>
<tr>
<th>Indication on display</th>
<th>Description/cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wrong oper. cmd</strong></td>
<td>Collective signal 13: Possible causes: • Several operation commands (e.g. OPEN and CLOSE simultaneously, or OPEN and SET-POINT operation simultaneously) • A setpoint is present and the positioner is not active</td>
<td>• Check operation commands (reset/clear all operation commands and send one operation command only). • Set parameter <strong>Positioner</strong> to <strong>Function active</strong>. • Check setpoint. Press push button <strong>Details</strong> to display a list of individual indications. For a description of the individual signals, refer to Manual (Operation and setting).</td>
</tr>
<tr>
<td>Sel. sw. not REMOTE</td>
<td>Selector switch is not in position REMOTE.</td>
<td>Set selector switch to position REMOTE.</td>
</tr>
<tr>
<td>Service active</td>
<td>Operation via service interface (Bluetooth) and AUMA CDT service software.</td>
<td>Exit service software.</td>
</tr>
<tr>
<td>Disabled</td>
<td>Actuator is in operation mode Disabled.</td>
<td>Check setting and status of function &lt;Local controls enable&gt;.</td>
</tr>
<tr>
<td>EMCY stop active</td>
<td>The EMERGENCY stop switch has been operated. The motor control power supply (contactors or thyristors) is disconnected.</td>
<td>• Enable EMERGENCY stop switch. • Reset EMERGENCY stop state by means of Reset command.</td>
</tr>
<tr>
<td>EMCY behav. active</td>
<td>Operation mode EMERGENCY is active (EMERGENCY signal was sent). 0 V are applied at the EMERGENCY input.</td>
<td>• Detect cause for EMERGENCY signal. • Verify failure source. • Apply +24 V DC at EMERGENCY input.</td>
</tr>
<tr>
<td>I/O interface</td>
<td>The actuator is controlled via the I/O interface (parallel).</td>
<td>Check I/O interface.</td>
</tr>
<tr>
<td>Handwheel active</td>
<td>Manual operation is activated.</td>
<td>Start motor operation.</td>
</tr>
<tr>
<td>FailState fieldbus</td>
<td>Fieldbus connection available, however no process data transmission by the master.</td>
<td>Verify master configuration</td>
</tr>
<tr>
<td>Local STOP</td>
<td>A local STOP is active. Push button STOP of local controls is operated.</td>
<td>Release push button STOP.</td>
</tr>
<tr>
<td>Interlock</td>
<td>An interlock is active.</td>
<td>Check interlock signal.</td>
</tr>
<tr>
<td>Interlock by-pass</td>
<td>By-pass function is interlocked.</td>
<td>Check states of main and by-pass valve.</td>
</tr>
<tr>
<td>PVST active</td>
<td>Partial Valve Stroke Test (PVST) is active.</td>
<td>Wait until PVST function is complete.</td>
</tr>
<tr>
<td><strong>SIL function active</strong></td>
<td>SIL function is active</td>
<td></td>
</tr>
</tbody>
</table>

1) For actuators controls in SIL version
11.3. Fuses

11.3.1. Fuses within the actuator controls

**F1/F2**

Table 29: Primary fuses F1/F2 (for power supply unit)

<table>
<thead>
<tr>
<th>G fuse</th>
<th>F1/F2</th>
<th>AUMA art. no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>6.3 x 32 mm</td>
<td></td>
</tr>
<tr>
<td>Reversing contactors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply ≤ 500 V</td>
<td>1 A T; 500 V</td>
<td>K002.277</td>
</tr>
<tr>
<td>Reversing contactors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply &gt; 500 V</td>
<td>2 A FF; 690 V</td>
<td>K002.665</td>
</tr>
<tr>
<td>Thyristor units for motor power up to 1.5 kW</td>
<td>1 A T; 500 V</td>
<td>K002.277</td>
</tr>
<tr>
<td>Thyristor units for motor power up to 3.0 kW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thyristor units for motor power up to 5.5 kW</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**F3** Internal 24 V DC supply

Table 30: Secondary fuses F3 (internal 24 V DC supply)

<table>
<thead>
<tr>
<th>G fuse according to IEC 60127-2/III</th>
<th>F3</th>
<th>AUMA art. no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>5 x 20 mm</td>
<td></td>
</tr>
<tr>
<td>Voltage output (power supply unit) = 24 V</td>
<td>2.0 A T; 250 V</td>
<td>K006.106</td>
</tr>
<tr>
<td>Voltage output (power supply unit) = 115 V</td>
<td>2.0 A T; 250 V</td>
<td>K006.106</td>
</tr>
</tbody>
</table>

**F4**

Table 31: Secondary fuse F4 (internal AC supply)\(^1\)

<table>
<thead>
<tr>
<th>G-fuse according to IEC 60127-2/III</th>
<th>F4</th>
<th>AUMA art. no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>5 x 20 mm</td>
<td></td>
</tr>
<tr>
<td>Voltage output (power supply unit) = 24 V</td>
<td>1.25 A T; 250 V</td>
<td>K001.184</td>
</tr>
<tr>
<td>Voltage output (power supply unit) = 115 V</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

\(^1\) Fuse for: Switch compartment heater, reversing contactor control, PTC tripping device (at 24 V AC only), at 115 V AC also control inputs OPEN, STOP, CLOSE

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

11.3.2. Fuse replacement

11.3.2.1. Replace fuses F1/F2

⚠️ **DANGER**

**Hazardous voltage!**

*Risk of electric shock.*

→ Disconnect device from the mains before opening.

1. Remove electrical connection from actuator controls.
2. Pull fuse holder out of pin carrier, open fuse cover and replace old fuses by new ones.

### 11.3.2.2. Test/replace fuses F3/F4


   ![Figure 70:](image)

   **Check fuses.**

   2. The power supply unit has measurement points (solder pins) allowing to perform a resistance (continuity) measurement:

<table>
<thead>
<tr>
<th>Checking</th>
<th>Measuring points</th>
</tr>
</thead>
<tbody>
<tr>
<td>F3</td>
<td>MTP5 – MTP6</td>
</tr>
<tr>
<td>F4</td>
<td>MTP7 – MTP8</td>
</tr>
</tbody>
</table>

3. To replace defective fuses: Carefully loosen power supply unit [3] and pull out.

   *(The fuses are on the equipped part of the power supply board.)*

---

### Cable damage due to pinching!

*Risk of functional failures.*

→ Carefully assemble power supply unit to avoid pinching the cables.

---

### 11.3.3. Motor protection (thermal monitoring)

In order to protect against overheating and impermissibly high surface temperatures at the actuator, PTC thermistors or thermostwitches are embedded in the motor winding. Motor protection trips as soon as the max. permissible winding temperature has been reached.

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

- LED 3 (motor protection tripped) on the local controls is illuminated.
- The status indication **S0007** or **S0011 Failed** displays a fault.
  - The fault **Details** is displayed when selecting **Thermal fault**.
The motor has to cool down before operation can be resumed.

Depending on the parameter setting (motor protection behaviour), the fault signal is either automatically reset or the fault signal has to be acknowledged.

The acknowledgement is made:

- in selector switch position **Local control** (LOCAL) via push button **RESET**.
- In selector switch position **Remote control** (REMOTE) with Reset command via fieldbus.

**Proof-test motor protection**

Test correct functioning of the motor protection as described hereafter. Perform the functional test at the latest within the framework of maintenance (refer to chapter <Servicing and maintenance>).

The test is performed by simulating the motor protection signal via actuator controls local controls:

Required user level: **Specialist (4)** or higher.

**Test procedure:**

1. Set selector switch to position **0** (OFF).
2. Return to the main menu and select the simulation value: **Thermal test** in parameter **TMS proof test M1950**.
3. Activate motor protection simulation: Press **Ok** push button.
   - The safety function is correct if no fault signal is displayed.
4. Reset simulation: Press **Ok** push button or exit the simulation menu and reset the selector switch to its initial position.
12. Servicing and maintenance

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

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

12.1. Preventive measures for servicing and safe operation

The following actions are required to ensure safe device operation:

6 months after commissioning and then once a year

- Carry out visual inspection:
  Check cable entries, cable glands, blanking plugs, etc. for correct tightness and sealing.
  Consider torques according to manufacturer's details.
- Check fastening screws between actuator and gearbox/valve for tightness. If required, fasten screws while applying the tightening torques as indicated in chapter <Assembly>.
- When rarely operated: Perform test run.

For enclosure protection IP68

After submersion:
- Check actuator.
- In case of ingress of water, locate leaks and repair. Dry device correctly and check for proper function.

12.2. Disconnection from the mains

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

12.2.1. Disconnection from the mains with KP/KPH and KES electrical connection

Flameproof enclosure, danger of explosion!
Risk of death or serious injury.
→ Before opening, ensure that there is no explosive gas and no voltage.
→ Handle cover and housing parts with care.
→ Joint surfaces must not be damaged or soiled in any way.
→ Do not jam cover during fitting.
12.3. Maintenance

Maintenance intervals After 3 years at the latest for Ex certified products.

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

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

### 12.4. Disposal and recycling

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

The following generally applies:
- Greases and oils are hazardous to water and must not be released into the environment.
- Arrange for controlled waste disposal of the disassembled material or for separate recycling according to materials.
- Observe the national regulations for waste disposal.
### 13. Technical data

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

#### 13.1. Technical data Part-turn actuator

<table>
<thead>
<tr>
<th>Features and functions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explosion protection</strong></td>
<td>Refer to name plate</td>
</tr>
<tr>
<td><strong>Certificates and standards</strong></td>
<td>Certificates are attached to the device. All standards applied and their respective issues are indicated on these certificates.</td>
</tr>
<tr>
<td><strong>Particular conditions of use</strong></td>
<td>The particular conditions of use are listed on the certificates supplied.</td>
</tr>
<tr>
<td><strong>Type of duty (Part-turn actuators for open-close duty)</strong></td>
<td>Standard: With 3-phase AC motor:</td>
</tr>
<tr>
<td></td>
<td>Short-time duty S2 - 15 min, classes A and B according to EN 15714-2</td>
</tr>
<tr>
<td></td>
<td>With 1-phase AC motor:</td>
</tr>
<tr>
<td></td>
<td>Short-time duty S2 - 10 min, classes A and B according to EN 15714-2</td>
</tr>
<tr>
<td></td>
<td>For nominal voltage and +40 °C ambient temperature and at run torque load.</td>
</tr>
<tr>
<td><strong>Type of duty (Part-turn actuators for modulating duty)</strong></td>
<td>Standard: With 3-phase AC motor:</td>
</tr>
<tr>
<td></td>
<td>Intermittent duty S4 - 25 %, class C according to EN 15714-2</td>
</tr>
<tr>
<td></td>
<td>With 1-phase AC motor:</td>
</tr>
<tr>
<td></td>
<td>Intermittent duty S4 - 20 %, class C according to EN 15714-2</td>
</tr>
<tr>
<td></td>
<td>Option: With 3-phase AC motor:</td>
</tr>
<tr>
<td></td>
<td>Intermittent duty S4 - 50 %, class C according to EN 15714-2</td>
</tr>
<tr>
<td></td>
<td>For nominal voltage and +40 °C ambient temperature and at modulating torque load.</td>
</tr>
<tr>
<td><strong>Motors</strong></td>
<td>Standard: 3-phase AC asynchronous motor, type IM B9 according to IEC 60034-7, IC410 cooling procedure according to IEC 60034-6</td>
</tr>
<tr>
<td></td>
<td>Option: 1-phase AC motor with integral permanent split capacitor (PSC), type IM B9 according to IEC 60034-7, IC410 cooling procedure according to IEC 60034-6</td>
</tr>
<tr>
<td><strong>Mains voltage, mains frequency</strong></td>
<td>Refer to motor name plate</td>
</tr>
<tr>
<td></td>
<td>Permissible variation of mains voltage: ±10 %</td>
</tr>
<tr>
<td></td>
<td>Permissible variation of mains frequency: ±5 % (for 3-phase and 1-phase AC current)</td>
</tr>
<tr>
<td><strong>Overvoltage category</strong></td>
<td>Category III according to IEC 60364-4-443</td>
</tr>
<tr>
<td><strong>Insulation class</strong></td>
<td>Standard: F, tropicalized</td>
</tr>
<tr>
<td></td>
<td>Option: H, tropicalized</td>
</tr>
<tr>
<td><strong>Motor protection</strong></td>
<td>Standard: PTC thermistors (according to DIN 44082)</td>
</tr>
<tr>
<td></td>
<td>Option: Options apply for open-close duty only</td>
</tr>
<tr>
<td></td>
<td>Thermoswitches (NC) in the actuator and thermal overload relay in controls</td>
</tr>
<tr>
<td><strong>Motor heater (option)</strong></td>
<td>Voltages:</td>
</tr>
<tr>
<td></td>
<td>110 – 120 V AC, 220 – 240 V AC or 380 – 480 V AC</td>
</tr>
<tr>
<td></td>
<td>110 – 120 V AC, 220 – 240 V AC</td>
</tr>
<tr>
<td></td>
<td>Power: 12.5 W</td>
</tr>
<tr>
<td><strong>Swing angle</strong></td>
<td>Standard: 75° to &lt; 105° adjustable</td>
</tr>
<tr>
<td></td>
<td>Options:</td>
</tr>
<tr>
<td></td>
<td>15° to &lt; 45°, 45° to &lt; 75°, 105° to &lt; 135°, 135° to &lt; 165°, 165° to &lt; 195°, 195° to &lt; 225°</td>
</tr>
<tr>
<td><strong>Self-locking</strong></td>
<td>Yes (Part-turn actuators are self-locking if the valve position cannot be changed from standstill while torque acts upon the output drive.)</td>
</tr>
<tr>
<td><strong>Manual operation</strong></td>
<td>Manual drive for setting and emergency operation, handwheel does not rotate during electrical operation.</td>
</tr>
<tr>
<td></td>
<td>Options:</td>
</tr>
<tr>
<td></td>
<td>Handwheel lockable</td>
</tr>
<tr>
<td></td>
<td>Handwheel stem extension</td>
</tr>
<tr>
<td></td>
<td>Power tool for emergency operation with square 30 mm or 50 mm</td>
</tr>
<tr>
<td><strong>Indication for manual operation (option)</strong></td>
<td>Indication whether manual operation is active/not active via single switch (1 change-over contact)</td>
</tr>
<tr>
<td><strong>Splined coupling for connection to the valve shaft</strong></td>
<td>Standard: Coupling without bore</td>
</tr>
<tr>
<td></td>
<td>Options:</td>
</tr>
<tr>
<td></td>
<td>Machined coupling with bore and keyway, square bore or bore with two-flats according to EN ISO 5211</td>
</tr>
<tr>
<td><strong>Valve attachment</strong></td>
<td>Dimensions according to EN ISO 5211 without spigot</td>
</tr>
</tbody>
</table>
With base and lever (option)

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

Electronic control unit (option)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Intrusive setting</td>
<td>Magnetic limit and torque transmitter (MWG)</td>
</tr>
<tr>
<td>Position feedback signal</td>
<td>Via actuator controls</td>
</tr>
<tr>
<td>Torque feedback signal</td>
<td>Via actuator controls</td>
</tr>
<tr>
<td>Mechanical position indicator</td>
<td>Continuous self-adjusting indication with symbols OPEN and CLOSED</td>
</tr>
<tr>
<td>Running indication</td>
<td>Blinking signal via actuator controls</td>
</tr>
<tr>
<td>Heater in switch compartment</td>
<td>Resistance type heater with 5 W, 24 V AC</td>
</tr>
</tbody>
</table>

Service conditions

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use</td>
<td>Indoor and outdoor use permissible</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Any position</td>
</tr>
<tr>
<td>Installation altitude</td>
<td>≤ 2 000 m above sea level</td>
</tr>
<tr>
<td></td>
<td>&gt; 2,000 m above sea level on request</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Refer to actuator name plate</td>
</tr>
<tr>
<td>Humidity</td>
<td>Up to 100 % relative humidity across the entire permissible temperature range</td>
</tr>
<tr>
<td>Enclosure protection according to EN 60529</td>
<td>IP68 Terminal compartment additionally sealed against interior of actuator (double sealed)</td>
</tr>
<tr>
<td></td>
<td>For special motors differing enclosure protection: refer to name plate.</td>
</tr>
<tr>
<td></td>
<td>According to AUMA definition, enclosure protection IP68 meets the following requirements:</td>
</tr>
<tr>
<td></td>
<td>● Depth of water: maximum 8 m head of water</td>
</tr>
<tr>
<td></td>
<td>● Duration of continuous immersion in water: Max. 96 hours</td>
</tr>
<tr>
<td></td>
<td>● Up to 10 operations during continuous immersion</td>
</tr>
<tr>
<td></td>
<td>● Modulating duty is not possible during continuous immersion.</td>
</tr>
<tr>
<td></td>
<td>For exact version, refer to actuator controls name plate.</td>
</tr>
<tr>
<td>Pollution degree according to IEC 60664-1</td>
<td>Pollution degree 4 (when closed), pollution degree 2 (internal)</td>
</tr>
<tr>
<td>Vibration resistance according to IEC 60068-2-6</td>
<td>2 g, 10 to 200 Hz (AUMA NORM), 1g, 10 to 200 Hz (for actuators with AMExC or ACExC integral actuator controls)</td>
</tr>
<tr>
<td></td>
<td>Resistant to vibration during start-up or for failures of the plant. However, a fatigue strength may not be derived from this. Valid for part-turn actuators in version AUMA NORM and in version with integral actuator controls, each with AUMA plug/socket connector. Not valid in combination with gearboxes.</td>
</tr>
<tr>
<td>Corrosion protection</td>
<td>Standard: KS: Suitable for use in areas with high salinity, almost permanent condensation, and high pollution.</td>
</tr>
<tr>
<td></td>
<td>Option: KX: Suitable for use in areas with extremely high salinity, permanent condensation, and high pollution.</td>
</tr>
<tr>
<td></td>
<td>KX-G: Same as KX, however aluminium-free version (outer parts)</td>
</tr>
<tr>
<td>Coating</td>
<td>Double layer powder coating</td>
</tr>
<tr>
<td></td>
<td>Two-component iron-mica combination</td>
</tr>
<tr>
<td>Colour</td>
<td>Standard: AUMA silver-grey (similar to RAL 7037)</td>
</tr>
<tr>
<td></td>
<td>Option: Available colours on request.</td>
</tr>
<tr>
<td>Lifetime</td>
<td>AUMA part-turn actuators meet or even exceed the lifetime requirements of EN 15714-2. Detailed information can be provided on request.</td>
</tr>
</tbody>
</table>

Further information

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Directives</td>
<td>ATEX Directive: (2014/34/EU)</td>
</tr>
<tr>
<td></td>
<td>Electromagnetic Compatibility (EMC): (2014/30/EU)</td>
</tr>
<tr>
<td></td>
<td>Low Voltage Directive: (2014/35/EU)</td>
</tr>
<tr>
<td></td>
<td>Machinery Directive: (2006/42/EC)</td>
</tr>
</tbody>
</table>
### Technical data for handwheel activation switches

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical lifetime</td>
<td>$10^6$ starts</td>
</tr>
<tr>
<td>Silver plated contacts:</td>
<td></td>
</tr>
<tr>
<td>U min.</td>
<td>12 V DC</td>
</tr>
<tr>
<td>U max.</td>
<td>250 V AC</td>
</tr>
<tr>
<td>I max. AC current</td>
<td>3 A at 250 V (inductive load, cos $\phi = 0.8$)</td>
</tr>
<tr>
<td>I max. DC current</td>
<td>3 A at 12 V (resistive load)</td>
</tr>
</tbody>
</table>

### 3.2. Technical data Actuator controls

<table>
<thead>
<tr>
<th>Feature and functions</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features and functions</td>
<td>Refer to name plate</td>
</tr>
<tr>
<td>Power supply</td>
<td>Refer to nameplates at actuator controls and motor</td>
</tr>
<tr>
<td>Permissible variation of mains voltage: ±10 %</td>
<td></td>
</tr>
<tr>
<td>Permissible variation of mains voltage: ±30 % (option)</td>
<td></td>
</tr>
<tr>
<td>Permissible variation of mains frequency: ±5 %</td>
<td></td>
</tr>
<tr>
<td>External supply of the electronics (option)</td>
<td>24 V DC: +20 % / -15 %,</td>
</tr>
<tr>
<td>Current consumption</td>
<td>Refer to name plates at actuator controls and motor</td>
</tr>
<tr>
<td>Permissible variation of mains voltage: ±10 %</td>
<td></td>
</tr>
<tr>
<td>For permissible variation of mains voltage of ±30 %:</td>
<td></td>
</tr>
<tr>
<td>100 to 120 V AC = max. 740 mA</td>
<td></td>
</tr>
<tr>
<td>208 to 240 V AC = max. 400 mA</td>
<td></td>
</tr>
<tr>
<td>380 to 500 V AC = max. 250 mA</td>
<td></td>
</tr>
<tr>
<td>515 to 690 V AC = max. 200 mA</td>
<td></td>
</tr>
<tr>
<td>Permissible variation of mains voltage: ±30 %</td>
<td></td>
</tr>
<tr>
<td>100 to 120 V AC = max. 1,200 mA</td>
<td></td>
</tr>
<tr>
<td>208 to 240 V AC = max. 750 mA</td>
<td></td>
</tr>
<tr>
<td>380 to 500 V AC = max. 400 mA</td>
<td></td>
</tr>
<tr>
<td>515 to 690 V AC = max. 400 mA</td>
<td></td>
</tr>
<tr>
<td>Overvoltage category</td>
<td>Category III according to IEC 60364-4-443</td>
</tr>
<tr>
<td>Rated power</td>
<td>The actuator controls are designed for the nominal motor power, refer to motor name plate</td>
</tr>
<tr>
<td>Switchgear</td>
<td>Standard: Reversing contactors (mechanically and electrically interlocked) for AUMA power classes A1/A2</td>
</tr>
<tr>
<td>Options</td>
<td>Reversing contactors (mechanically and electrically interlocked) for AUMA power class A3</td>
</tr>
<tr>
<td></td>
<td>Thyristor unit for mains voltage up to 500 V AC (recommended for modulating actuators) for AUMA power classes B1, B2 and B3</td>
</tr>
<tr>
<td>Control and feedback signals</td>
<td>Via Modbus TCP/IP interface</td>
</tr>
</tbody>
</table>
## Features and functions

<table>
<thead>
<tr>
<th>Modbus TCP/IP interface with additional input signals (option)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• 2 free analogue inputs (0/4 – 20 mA), 4 free digital inputs</td>
<td></td>
</tr>
<tr>
<td>- Signal transmission is made via fieldbus interface</td>
<td></td>
</tr>
<tr>
<td>• Inputs OPEN, STOP, CLOSE, EMERGENCY, I/O interface, MODE (via opto-isolator thereof OPEN, STOP, CLOSE, MODE with one common and EMERGENCY, I/O interface respectively without common)</td>
<td></td>
</tr>
<tr>
<td>- OPEN, STOP, CLOSE, EMERGENCY control inputs</td>
<td></td>
</tr>
<tr>
<td>- I/O interface: Selection of control type (fieldbus interface or additional input signals)</td>
<td></td>
</tr>
<tr>
<td>- MODE: Selection between open-close duty (OPEN, STOP, CLOSE) or modulating duty (0/4 – 20 mA position setpoint)</td>
<td></td>
</tr>
<tr>
<td>- Additionally 1 analogue input (0/4 – 20 mA) for position setpoint</td>
<td></td>
</tr>
<tr>
<td>• Inputs OPEN, STOP, CLOSE, EMERGENCY, I/O interface, MODE (via opto-isolator thereof OPEN, STOP, CLOSE, MODE with one common and EMERGENCY, I/O interface respectively without common)</td>
<td></td>
</tr>
<tr>
<td>- OPEN, STOP, CLOSE, EMERGENCY control inputs</td>
<td></td>
</tr>
<tr>
<td>- I/O interface: Selection of control type (fieldbus interface or additional input signals)</td>
<td></td>
</tr>
<tr>
<td>- MODE: Selection between open-close duty (OPEN, STOP, CLOSE) or modulating duty (0/4 – 20 mA position setpoint)</td>
<td></td>
</tr>
<tr>
<td>- Additionally 1 analogue input (0/4 – 20 mA) for position setpoint</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control voltage/current consumption for control inputs</th>
<th>Standard: 24 V DC, current consumption: approx. 10 mA per input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Options: 48 V DC, current consumption: approx. 7 mA per input</td>
<td></td>
</tr>
<tr>
<td>60 V DC, current consumption: approx. 9 mA per input</td>
<td></td>
</tr>
<tr>
<td>100 – 125 V DC, current consumption: approx. 15 mA per input</td>
<td></td>
</tr>
<tr>
<td>100 – 120 V AC, current consumption: approx. 15 mA per input</td>
<td></td>
</tr>
</tbody>
</table>

All input signals must be supplied with the same potential.

| Status signals | Via Modbus TCP/IP interface |

<table>
<thead>
<tr>
<th>Modbus TCP/IP interface with additional output signals (option)</th>
<th>Additional, binary output signals (only available in combination with additional input signals (option))</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 6 programmable output contacts:</td>
<td></td>
</tr>
<tr>
<td>- 5 potential-free NO contacts with one common, max. 250 V AC, 1 A (resistive load)</td>
<td></td>
</tr>
<tr>
<td>Standard assignment: End position CLOSED, end position OPEN, selector switch REMOTE, torque fault CLOSE, torque fault OPEN</td>
<td></td>
</tr>
<tr>
<td>- 1 potential-free change-over contact, max. 250 V AC, 5 A (resistive load)</td>
<td></td>
</tr>
<tr>
<td>Standard assignment: Collective fault signal (torque fault, phase failure, motor protection tripped)</td>
<td></td>
</tr>
<tr>
<td>• 6 programmable output contacts:</td>
<td></td>
</tr>
<tr>
<td>- 5 potential-free change-over contacts with one common, max. 250 V AC, 1 A (resistive load)</td>
<td></td>
</tr>
<tr>
<td>- 1 potential-free change-over contact, max. 250 V AC, 5 A (resistive load)</td>
<td></td>
</tr>
<tr>
<td>• 6 programmable output contacts:</td>
<td></td>
</tr>
<tr>
<td>- 6 potential-free change-over contacts without one common, max. 250 V AC, 5 A (resistive load)</td>
<td></td>
</tr>
<tr>
<td>• 6 programmable output contacts:</td>
<td></td>
</tr>
<tr>
<td>- 4 mains failure proof potential-free NO contacts with one common, max. 250 V AC, 1 A (resistive load), 1 potential-free NO contact, max. 250 V AC, 1 A (resistive load), 1 potential-free change-over contact, max. 250 V AC, 5 A (resistive load)</td>
<td></td>
</tr>
<tr>
<td>• 6 programmable output contacts:</td>
<td></td>
</tr>
<tr>
<td>- 4 mains failure proof potential-free NO contacts, max. 250 V AC, 5 A (resistive load), 2 potential-free change-over contacts, max. 250 V AC, 5 A (resistive load),</td>
<td></td>
</tr>
</tbody>
</table>

All binary output signals must be supplied with the same potential.

| • Analogue output signal for position feedback |  |
| - Galvanically isolated position feedback 0/4 – 20 mA (load max. 500 Ω) |  |
## Features and functions

### Local controls

**Standard:**
- Selector switch LOCAL - OFF - REMOTE (lockable in all three positions)
- Push buttons OPEN, STOP, CLOSE, RESET
  - Local STOP: The actuator can be stopped via push button STOP of local controls if the selector switch is in position REMOTE. (Not activated when leaving the factory.)
- 6 indication lights:
  - End position and running indication CLOSED (yellow), torque fault CLOSE (red), motor protection tripped (red), torque fault OPEN (red), end position and running indication OPEN (green), Bluetooth (blue)
- Graphic LC display: illuminated

**Options:**
- Special colours for the indication lights:
  - End position CLOSED (green), torque fault CLOSE (blue), torque fault OPEN (yellow), motor protection tripped (violet), end position OPEN (red)

### Bluetooth Communication interface

**Bluetooth class II chip, version 2.1:** With a range up to 10 m in industrial environments, supports the SPP Bluetooth profile (Serial Port Profile).

**Required accessories:**
- AUMA CDT (Commissioning and Diagnostic Tool for Windows-based PC)
- AUMA Assistant App (Commissioning and Diagnostic Tool for Android devices)

### Application functions

**Standard:**
- Selectable type of seating, limit or torque seating for end position OPEN and end position CLOSED
- Torque by-pass: Adjustable duration (with adjustable peak torque during start-up time)
- Start and end of stepping mode as well as ON and OFF times can be set individually for directions OPEN and CLOSE, 1 to 1,800 seconds
- Any 8 intermediate positions between 0 and 100 %, reaction and signal behaviour programmable
- Running indication blinking: can be set
- Positioner:
  - Position setpoint via Modbus TCP/IP interface
  - Automatic adaptation of dead band (adaptive behaviour selectable)
  - Change-over between OPEN-CLOSE control and setpoint control via fieldbus interface

**Option:**
- PID process controller: with adaptive positioner, via 0/4 – 20 mA analogue inputs and Modbus TCP/IP for process setpoint and actual process value
- Multiport valve: Up to 16 positions, signals (pulse or edge), accuracy < 0.2 %
- Automatic deblocking: Up to 5 operation trials, travel time in opposite direction can be set

### Safety functions

**Standard:**
- EMERGENCY operation (programmable behaviour)
  - Via additional input (option, low active) or via fieldbus interface
  - Reaction can be selected: STOP, run to end position CLOSED, run to end position OPEN, run to intermediate position
  - Torque monitoring can be by-passed during EMERGENCY operation.
  - Thermal protection can be by-passed during EMERGENCY operation (only in combination with thermoswitch within actuator, not with PTC thermistor).

**Options:**
- Release of local controls via fieldbus interface: Thus, actuator operation can be enabled or disabled via push buttons on local controls.
- Local STOP: The actuator can be stopped via push button STOP of local controls if the selector switch is in position REMOTE. (Not activated when leaving the factory.)
- Interlock for main/by-pass valve: Enabling the operation commands OPEN or CLOSE via fieldbus interface
- PVST (Partial Valve Stroke Test): programmable to check the function of both actuator and actuator controls: Direction, stroke, operation time, reversing time

### Monitoring functions

- Valve overload protection: adjustable, results in switching off and generates fault signal
- Motor temperature monitoring (thermal monitoring): results in switching off and generates fault indication
- Monitoring the heater within actuator: generates warning signal
- Monitoring of permissible on-time and number of starts: adjustable, generates warning signal
- Operation time monitoring: adjustable, generates warning signal
- Phase failure monitoring: results in switching off and generates fault signal
- Automatic correction of rotation direction upon wrong phase sequence (3-ph AC current)
Features and functions

Diagnostic functions
- Electronic device ID with order and product data
- Operating data logging: A resettable counter and a lifetime counter each 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
- Time-stamped event report with history for setting, operation and faults
- Status signals according to NAMUR recommendation NE 107: "Failure", "Function check", "Out of specification", "Maintenance required"
- Torque characteristics (for version with MWG in actuator):
  - 3 torque characteristics (torque-travel characteristic) for opening and closing directions can be saved separately.
  - Torque characteristics stored can be shown on the display.

Motor protection evaluation
- Standard: PTC tripping device in combination with PTC thermistors within actuator motor
- Option: Thermal overload relay in controls combined with thermoswitches within actuator

Electrical connection
- Standard: AUMA Ex plug/socket connector with terminal blocks (KES), flameproof enclosure Ex d
- Options: AUMA Ex plug/socket connector (KT); screw-type motor terminals; push-in type control terminals

Threads for cable entries
- Standard: Metric threads
- Options: Pg-threads, NPT-threads, G-threads

Wiring diagram
- Refer to name plate

Further options for version with MWG in actuator

Setting of limit and torque switching via local controls

Torque feedback signal
- Via Modbus TCP/IP interface
- Galvanically isolated analogue output 0/4 – 20 mA (load max. 500 Ω). Option, only possible in combination with output contacts.

Wiring diagram
- Refer to name plate

Settings/programming the Modbus TCP/IP interface

Setting the fieldbus address
- Baud rate, parity and Modbus address are set via the display of actuator controls

Setting the Modbus gateway
- Settings are made via web server
- Default settings of the IP interface:

<table>
<thead>
<tr>
<th>IP Address Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address Type</td>
</tr>
<tr>
<td>Static IP Address</td>
</tr>
<tr>
<td>Subnet Mask</td>
</tr>
<tr>
<td>Default Gateway</td>
</tr>
</tbody>
</table>
### General Modbus TCP/IP data

<table>
<thead>
<tr>
<th>Communication protocol</th>
<th>Modbus TCP/IP according to IEC 61158 and IEC 61784</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network topology</td>
<td>Star topology/ point-to-point topology</td>
</tr>
<tr>
<td>Transmission medium</td>
<td>IEC IEEE 802.3, cable recommendation: Cat. 6A</td>
</tr>
<tr>
<td>Transmission rate/cable length</td>
<td>• Baud rate of 10/100 Mbits/s</td>
</tr>
<tr>
<td></td>
<td>• Maximum cable length: 100 m</td>
</tr>
</tbody>
</table>

#### Supported Modbus functions (services)

- 01 Read Coil Status
- 02 Read Input Status
- 03 Read Holding Registers
- 04 Read Input Registers
- 05 Force Single Coil
- 15 (0FHex) Force Multiple Coils
- 06 Preset Single Register
- 16 (10Hex) Preset MultipleRegisters
- 17 (11Hex) Report Slave ID
- 08 Diagnostics:
  - 00 00 Loopback
  - 00 10 (0AHex) Clear Counters and Diagnostic Register
  - 00 11 (0BHex) Return Bus Message Count
  - 00 12 (0CHex) Return Bus Communication Error Count
  - 00 13 (0DHex) Return Bus Exception Error Count
  - 00 14 (0EHex) Return Slave Message Count
  - 00 15 (0FHex) Return Slave No Response Count
  - 00 16 (10Hex) Return Slave NAK Count
  - 00 17 (11Hex) Return Slave Busy Count
  - 00 18 (12Hex) Return Character Overrun Count

### Commands and signals of the Modbus TCP/IP interface

#### Process representation output (command signals)

- OPEN, STOP, CLOSE, position setpoint, RESET, EMERGENCY operation command, enable LOCAL, Interlock OPEN/CLOSE

#### Process representation input (feedback signals)

- End positions OPEN, CLOSED
- Actual position value
- Actual torque value, requires magnetic limit and torque transmitter (MWG) in actuator
- Selector switch in position LOCAL/REMOTE
- Running indication (directional)
- Torque switches OPEN, CLOSED
- Limit switches OPEN, CLOSED
- Manual operation by handwheel or via local controls
- Analogue (2) and digital (4) customer inputs

#### Process representation input (fault signals)

- Motor protection tripped
- Torque switch tripped in mid-travel
- One phase missing
- Failure of analogue customer inputs

#### Behaviour on loss of communication

- The behaviour of the actuator is programmable:
  - Stop in current position
  - Travel to end position OPEN or CLOSED
  - Travel to any intermediate position
  - Execute last received operation command

### Service conditions

<table>
<thead>
<tr>
<th>Use</th>
<th>Indoor and outdoor use permissible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting position</td>
<td>Any position</td>
</tr>
<tr>
<td>Installation altitude</td>
<td>≤ 2,000 m above sea level</td>
</tr>
<tr>
<td></td>
<td>&gt; 2,000 m above sea level, on request</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Refer to name plate of actuator controls</td>
</tr>
<tr>
<td>Humidity</td>
<td>Up to 100 % relative humidity across the entire permissible temperature range</td>
</tr>
</tbody>
</table>
### Service conditions

<table>
<thead>
<tr>
<th>Enclosure protection according to EN 60529</th>
<th>IP68 Terminal compartment additionally sealed against interior of actuator controls (double sealed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>According to AUMA definition, enclosure protection IP68 meets the following requirements:</td>
<td>- Depth of water: Maximum 8 m head of water</td>
</tr>
<tr>
<td></td>
<td>- Duration of continuous immersion in water: Maximum 96 hours</td>
</tr>
<tr>
<td></td>
<td>- Up to 10 operations during continuous immersion</td>
</tr>
<tr>
<td></td>
<td>- Modulating duty is not possible during continuous immersion.</td>
</tr>
<tr>
<td>For exact version, refer to actuator controls name plate.</td>
<td></td>
</tr>
<tr>
<td>Pollution degree according to IEC 60664-1</td>
<td>Pollution degree 4 (when closed), pollution degree 2 (internal)</td>
</tr>
<tr>
<td>Vibration resistance according to IEC 60068-2-6</td>
<td>Resistance against vibration can be given on request</td>
</tr>
<tr>
<td>Corrosion protection</td>
<td>Standard: KS Suitable for use in areas with high salinity, almost permanent condensation, and high pollution.</td>
</tr>
<tr>
<td></td>
<td>Option: KX Suitable for use in areas with extremely high salinity, permanent condensation, and high pollution.</td>
</tr>
<tr>
<td>Coating</td>
<td>Double layer powder coating Two-component iron-mica combination</td>
</tr>
<tr>
<td>Colour</td>
<td>Standard: AUMA silver-grey (similar to RAL 7037)</td>
</tr>
<tr>
<td></td>
<td>Option: Available colours on request</td>
</tr>
</tbody>
</table>

### Accessories

| Wall bracket | For actuator controls mounted separately from the actuator, including plug/socket connector. Connecting cable on request. Recommended for high ambient temperatures, difficult access, or in case of heavy vibration during service. Cable length between actuator and actuator controls is max. 100 m (not suitable for version with potentiometer in the actuator). Instead of the potentiometer, an MWG has to be used. (MWG requires separate data cable.) |
| Programming software | AUMA CDT (Commissioning and Diagnostic Tool for Windows-based PC) AUMA Assistant App (Commissioning and Diagnostic Tool for Android devices) |

### Further information

| Weight | Approx. 12 kg (including Ex-plug/socket connector with screw-type terminals) |
14. **Spare parts**

14.1. **Part-turn actuators SQEx 05.2 – SQEx 14.2/SQREx 05.2 – SQREx 14.2 KES**

SQEx 05.2 – SQEx 14.2 / SQREx 05.2 – SQREx 14.2 Control unit: electronic (MWG)

ACExC 01.2 Non-Intrusive Modbus TCP/IP
Please state device type and our order number (see name plate) when ordering spare parts. Only original AUMA spare parts should be used. Failure to use original spare parts voids the warranty and exempts AUMA from any liability. Representation of spare parts may slightly vary from actual delivery.

<table>
<thead>
<tr>
<th>Ref. no.</th>
<th>Designation</th>
<th>Type</th>
<th>Ref. no.</th>
<th>Designation</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>005.0</td>
<td>Drive shaft</td>
<td>Sub-assembly</td>
<td>556.0</td>
<td>Potentiometer as position transmitter</td>
<td>Sub-assembly</td>
</tr>
<tr>
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Spare parts
14.2. Actuator controls ACE\text{\textp{X}}C 01.2 KES Modbus TCP/IP
Please state device type and our order number (see name plate) when ordering spare parts. Only original AUMA spare parts should be used. Failure to use original spare parts voids the warranty and exempts AUMA from any liability. Representation of spare parts may slightly vary from actual delivery.

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Spare parts
15. Certificates

Information
Certificates are valid as from the indicated date of issue. Subject to changes without notice. The latest versions are attached to the device upon delivery and also available for download at http://www.auma.com.

15.1. Declaration of Incorporation and EU Declaration of Conformity

EU Declaration of Conformity / Declaration of Incorporation in compliance with Machinery Directive

for electric actuators of the following types:

SAEx 07.2, SAEx 07.6, SAEx 10.2, SAEx 14.2, SAEx 14.6, SAEx 16.2,
SAEx 07.2, SAEx 07.6, SAEx 10.2, SAEx 14.2, SAEx 14.6, SAEx 16.2
SQEx 05.2, SQEx 07.2, SQEx 10.2, SQEx 12.2, SQEx 14.2
SQEx 05.2, SQEx 07.2, SQEx 10.2, SQEx 12.2, SQEx 14.2

in versions:
AUMA NORM
AUMA MATIC AMExC 01.1
AUMA ACExC 01.1
AUMA Riepler GmbH & Co. KG as manufacturer declare herewith, that the above mentioned actuators meet the basic requirements of the following Directives:
2014/34/EU (ATEX Directive)
2014/30/EU (EMC Directive)

The following harmonised standards in terms of the specified directives have been applied:

Directive 2014/30/EU
EN 60079-0:2012 / A11:2013
EN 60079-1:2014
EN 60079-7:2007

EC type test certificate:
DEKRA 11ATEX0008 X
DEKRA 13ATEX0016 X
DEKRA Certification B.V., 6825 MJ Amhlem, Netherlands
EU identification number 0344

The standards stipulated in the EC type test certificate were partially replaced by new issues. AUMA Riepler GmbH declare the compliance with the requirements of the new issues of standards, since the modified requirements of the new issues of standards are irrelevant for the products stipulated above.

Notification relating to quality assurance within production:
DEKRA 12ATEX0127
DEKRA Certification B.V., 6825 MJ Amhlem, Netherlands
EU identification number 0344

Directive 2006/42/EC
EN 60079-0:2012 / A11:2013
EN 60079-1:2014
EN 60079-7:2007

Directive 2006/42/EC
EN ISO 12100:2010
EN ISO 8210:1995
EN ISO 8211:2001

AUMA actuators are designed for the operation of industrial valves. Putting into service is prohibited until the final machinery has been declared in conformity with the provisions of Directive 2000/13/EC.

The following basic requirements in compliance with Annex I of the Directive are respected:
Appendix I, articles 1.1.2, 1.1.3, 1.1.5, 1.2.1, 1.2.6, 1.3.1, 1.3.7, 1.5.1, 1.6.3, 1.7.1, 1.7.3, 1.7.4

The manufacturer shall be obligated to electronically submit the documents for the partly completed machinery to national authorities on request. The relevant technical documentation pertaining to the machinery described in Annex VII, part B has been prepared.

Authorised person for documentation: Peter Malus, Aumastrasse 1, 79370 Muelheim, Germany

Furthermore, the essential health and safety requirements in compliance with Directive 2014/35/EU (Low Voltage Directive) are fulfilled by applying the following harmonised standards, as far as applicable for the products:
EN 60034-1:2010 / AC:2010
EN 50178:1997

This declaration does not contain any guarantees. The safety instructions in product documentation supplied with the devices must be observed. Non-consented modification of the devices voids this declaration.

Dr. J. Hoffmann, Managing Director
Muelheim, 2016-09-01
SQEx 05.2 – SQEx 14.2 / SQREx 05.2 – SQREx 14.2 Control unit: electronic (MWG)
ACExC 01.2 Non-Intrusive Modbus TCP/IP
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ACExC 01.2 Non-Intrusive Modbus TCP/IP

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