Multi-turn actuators
SA 07.2 – SA 16.2/SAR 07.2 – SAR 16.2
with local control unit
AUMA SEMIPACT SEM 01.1/SEM 02.1
Read operation instructions first.

- Observe safety instructions.
- These operation instructions are part of the product.
- Preserve 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:
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
AUMA products are designed and manufactured in compliance with recognised standards and directives. This is certified in a Declaration of Incorporation and an EC Declaration of Conformity.

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

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

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

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

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

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

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

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

Any device modification requires prior consent of the manufacturer.

1.2 Range of application

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

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

The following applications are not permitted, e.g.:
- Industrial trucks according to EN ISO 3691
- Lifting appliances according to EN 14502
- Passenger lifts according to DIN 15306 and 15309
- Service lifts according to EN 81-1/A1
Escalators
Continuous duty
Buried service
Permanent submersion (observe enclosure protection)
Potentially explosive areas, with the exception of zone 22
Radiation exposed areas in nuclear power plants

No liability can be assumed for inappropriate or unintended use.

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

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

1.3 Applications in Ex zone 22 (option)

Actuators of the indicated series basically meet the requirements for applications in dust hazardous locations of ZONE 22 in compliance with the ATEX directive 94/9/EC.

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

To comply with all requirements of EN 50281-1-1:1998, it is imperative that the following points are observed:

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

1.4 Warnings and notes

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

⚠️ DANGER

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

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

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

Arrangement and typographic structure of the warnings

Type of hazard and respective source!

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

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

Safety alert symbol ⚠️ warns of a potential personal injury hazard.

The signal word (here: DANGER) indicates the level of hazard.

1.5 References and symbols

The following references and symbols are used in these instructions:

**Information**

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

- Symbol for CLOSED (valve closed)
- Symbol for OPEN (valve open)
- ✔️ Important information before the next step. This symbol indicates what is required for the next step or what has to be prepared or observed.

**Reference to other sections**

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

2.1 Name plate

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

Figure 1: Arrangement of name plates

[1] Actuator name plate
[2] Local control unit name plate
[3] Motor name plate
[4] Additional plate, e.g. KKS plate (Power Plant Classification System)

Data for identification

Figure 2: Actuator name plate

[1] Type and size of actuator
[2] Commission number

Figure 3: Local control unit name plate

[1] Type and size of the local control unit
[2] Commission number

Type and size

These instructions apply to the following devices:

Multi-turn actuators for open-close duty: SA 07.2, 07.6, 10.2, 14.2, 14.6, 16.2
Multi-turn actuators for modulating duty: SAR 07.2, 07.6, 10.2, 14.2, 14.6, 16.2
SEM 01.1/02.1 = local control unit SEMIPACT
### Commission number
An order-specific commission number is assigned to each device. This commission number can be used to directly download the wiring diagram, inspection records and further information regarding the device from the Internet: [http://www.auma.com](http://www.auma.com).

### 2.2 Short description

| **Multi-turn actuator** | Definition in compliance with EN ISO 5210:
|-------------------------|-----------------------------------------------
|                         | A multi-turn actuator is an actuator which transmits to the valve a torque for at least one full revolution. It is capable of withstanding thrust.  
|                         | AUMA multi-turn actuators are driven by an electric motor and are capable of withstanding thrust in combination with output drive type A. For manual operation, a handwheel is provided. Switching off in end positions may be either by limit or torque seating. Controls are required to operate or process the actuator signals. |
| **Local control unit**   | The AUMA SEMIPACT local control unit is used to operate the actuator from LOCAL. The SEMIPACT is **not** considered as actuator controls. The switching elements (push buttons, selector switch) and indication lights must be wired to external controls (e.g. reversing contactors). |
3. Transport, storage and packaging

3.1 Transport

For transport to place of installation, use sturdy packaging.

**Hovering load!**
*Risk of death or serious injury.*

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

3.2 Storage

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

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

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

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

3.3 Packaging

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

4.1 Mounting position

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

4.2 Handwheel fitting

Information

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

Figure 4: Handwheel

![Handwheel Diagram]

[1] Spacer
[2] Input shaft
[3] Handwheel
[4] Circlip

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

4.3 Multi-turn actuator: mount to valve/gearbox

**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.

4.3.1 Output drive types B, B1 – B4 and E

Application

- For rotating, non-rising valve stem
- Not capable of withstanding thrust

Design

Output drive bore with keyway:

- Types B1 – B4 with bore according to ISO 5210
- Types B and E with bore according to DIN 3210
- Later change from B1 to B3, B4, or E is possible.
4.3.1.1 Multi-turn actuator (with output drive types B1 – B4 or E): mount to valve/gearbox

1. Check if mounting flanges fit together.
2. Check whether bore and keyway match the input shaft.
3. Apply a small quantity of grease to the input shaft.
4. Place multi-turn actuator.  
   **Information:** Ensure that the spigot fits uniformly in the recess and that the mounting faces are in complete contact.
5. Fasten multi-turn actuator with screws according to table.  
   **Information:** We recommend applying liquid thread sealing material to the screws to avoid contact corrosion.
6. Fasten screws crosswise to a torque according to table.

<table>
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<tr>
<th>Screws Threads</th>
<th>Tightening torque $T_A$ [Nm]</th>
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<td>M8</td>
<td>25</td>
</tr>
<tr>
<td>M10</td>
<td>51</td>
</tr>
<tr>
<td>M12</td>
<td>87</td>
</tr>
<tr>
<td>M16</td>
<td>214</td>
</tr>
<tr>
<td>M20</td>
<td>431</td>
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</table>

4.3.2 Output drive type A

**Application**

- Output drive for rising, non-rotating valve stem
- Capable of withstanding thrust

**Information**

To adapt the actuators to output drive types A available on site with flanges F10 and F14 (year of manufacture: 2009 and earlier), an adapter is required. The adapter can be ordered from AUMA.
4.3.2.1 Stem nut: finish machining

✔ This working step is only required if stem nut is supplied unbored or with pilot bore.

Figure 6: Design of output drive type A

3. Remove bearing races [2.1] and bearing rims [2.2] from stem nut [1].
4. Drill and bore stem nut [1] and cut thread.
   **Information:** When fixing in the chuck, make sure stem nut runs true!
5. Clean the machined stem nut [1].
6. Apply sufficient Lithium soap EP multi-purpose grease to bearing rims [2.2] and bearing races [2.1], ensuring that all hollow spaces are filled with grease.
7. Place greased bearing rims [2.2] and bearing races [2.1] onto stem nut [1].
   **Information:** Ensure that dogs or splines are placed correctly in the keyway of the hollow shaft.
9. Screw in spigot ring [3] until it is firm against the shoulder.
4.3.2.2 Multi-turn actuator (with output drive type A): mount to valve

Figure 7: Assembly with output drive type A

1. If the output drive type A is already mounted to the multi-turn actuator: Loosen screws [3] and remove output drive type A [2].
2. Check if the flange of output drive type A matches the valve flange [4].
3. Apply a small quantity of grease to the valve stem [1].
4. Place output drive type A on valve stem and turn until it is flush on the valve flange.
5. Turn output drive type A until alignment of the fixing holes.
6. Screw in fastening screws [5], however do not completely tighten.
7. Fit multi-turn actuator on the valve stem so that the stem nut dogs engage into the output drive sleeve.
   - The flanges are flush with each other if properly engaged.
8. Adjust multi-turn actuator until alignment of the fixing holes.
9. Fasten multi-turn actuator with screws [3].

Table 2: Tightening torques for screws

<table>
<thead>
<tr>
<th>Screws</th>
<th>Tightening torque $T_A$ [Nm]</th>
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<td>Threads</td>
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<td>M6</td>
<td>11</td>
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<td>M8</td>
<td>25</td>
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<td>M10</td>
<td>51</td>
</tr>
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<td>M12</td>
<td>87</td>
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<tr>
<td>M16</td>
<td>214</td>
</tr>
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</table>

11. Turn multi-turn actuator with handwheel in direction OPEN until valve flange and output drive A are firmly placed together.
12. Tighten fastening screws [5] between valve and output drive type A crosswise applying a torque according to table.
4.4 Accessories for assembly

4.4.1 Stem protection tube for rising valve stem

— Option —

Figure 8: Assembly of the stem protection tube

1. Seal thread with hemp, Teflon tape, or thread sealing material.
4. Check whether cap for stem protection tube [1] is available and in perfect condition.
## 5. Electrical connection

### 5.1 Basic information

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<th><strong>WARNING</strong> Danger due to incorrect electrical connection</th>
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<tr>
<td><em>Failure to observe this warning can result in death, serious injury, or property damage.</em></td>
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<tr>
<td>→ The electrical connection must be carried out exclusively by suitably qualified personnel.</td>
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<tr>
<td>→ Prior to connection, observe basic information contained in this chapter.</td>
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<tr>
<td>→ After connection but prior to applying the voltage, observe the &lt;Commissioning&gt; and &lt;Test run&gt; chapters.</td>
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#### Wiring diagram/terminal plan

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

#### Valve damage for connection without controls!

- Actuators with local control unit SEMIPACT require controls: Connect motor via controls only (reversing contactor circuit).
- Observe the type of seating specified by the valve manufacturer.
- Observe wiring diagram.

#### Delay time

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

#### Protection on site

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

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

#### Limit and torque switches

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

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

#### Type of current, mains voltage and mains frequency

Type of current, mains voltage and mains frequency must match the data on the motor name plate.
Connecting cables

- For device insulation, appropriate (voltage-proof) cables must be used. Specify cables for the highest occurring rated voltage.
- Use connecting cable with appropriate minimum rated temperature.
- For connecting cables exposed to UV radiation (outdoor installation), use UV resistant cables.

5.2 Connection with AUMA plug/socket connector

Cross sections AUMA plug/socket connector:

- Power terminals (U1, V1, W1, U2, V2, W2): max. 6 mm² flexible/10 mm² solid
- PE connection: max. 6 mm² flexible/10 mm² solid
- Control contacts (1 to 50): max. 2.5 mm²

5.2.1 Terminal compartment: open
Hazardous voltage!

Risk of electric shock.

→ Disconnect device from the mains before opening.

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

 ➤ The enclosure protection IP... stated on the name plate is only ensured if suitable cable glands are used. Example: Name plate shows enclosure protection IP 68.

4. Seal unused cable entries [6] with suitable blanking plugs [7].
5. Insert the cables into the cable glands [8].

5.2.2 Cable connection

✔ Observe permissible cross sections.
1. Remove cable sheathing.
2. Strip wires.
3. For flexible cables: Use end sleeves according to DIN 46228.
4. Connect cables according to order-related wiring diagram.
In case of a fault: Hazardous voltage while protective earth conductor is NOT connected!

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

5. Tighten PE conductors firmly to PE connection using ring lugs (flexible cables) or loops (rigid cables).

Figure 12: PE connection

[1] Socket carrier
[2] Screw
[4] Lock washer
[5] Protective earth with ring lugs/loops
[6] PE connection, symbol: ⚡

Danger of motor damage if PTC thermistors or thermoswitches are not connected!

Our warranty for the motor will lapse if the motor protection is not connected.
→ Connect PTC thermistors or thermoswitches to external controls.

Danger of corrosion: Damage due to condensation!

→ After mounting, commission the device immediately to ensure that heater minimises condensation.

Information
Some actuators are equipped with an additional motor heater. The motor heater minimises condensation within the motor and improves the start-up behaviour for extremely low temperatures.
5.2.3 Terminal compartment: close

Figure 13: Example: Version S

[1] Cover
[2] Screws for cover
[3] O-ring
[4] Screws for socket carrier
[5] Socket carrier
[6] Cable entry
[7] Blanking plug
[8] Cable gland (not included in delivery)

⚠️ WARNING

Short-circuit due to pinching of cables!
Risk of electric shock and functional failures.

→ Carefully fit socket carrier to avoid pinching the cables.

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

5.3 Accessories for electrical connection

— Option —

5.3.1 Parking frame

Application

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

Protection cover for plug compartment when plug is removed.

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

5.3.3 Double sealed intermediate frame

When removing the electrical connection or due to leaky cable glands, ingress of dust and water into the housing may occur. This is prevented effectively by inserting the double sealed intermediate frame [2] between the plug/socket connector [1] and the housing of the device. The enclosure protection of the device (IP 68) will not be affected, even if the electrical connection [1] is removed.

Figure 15: Electrical connection with double sealed intermediate frame

[1] Electrical connection
[2] Double sealed intermediate frame

5.3.4 Earth connection, external

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

Figure 16: Earth connection
6. Operation

6.1 Manual operation

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

### 6.1.1 Manual operation: engage

**NOTICE**

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

→ Engage manual operation only during motor standstill.

1. Press push button.

2. Turn handwheel in desired direction.
   
   → To close the valve, turn handwheel clockwise:
   
   ➡ Drive shaft (valve) turns clockwise in direction CLOSE.

### 6.1.2 Manual operation: disengage

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

6.2 Motor operation

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

6.2.1 Local operation

The local operation of the actuator is performed using the push buttons of the local controls.
Figure 19: 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] Selector switch

⚠️ CAUTION

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

Danger of burns

→ Check surface temperature and wear protective gloves, if required.


The actuator can now be operated using the push buttons [1 – 3]:

- Run actuator in direction OPEN: Press push button [1] ⬇️
- Run actuator in direction CLOSE: Press push button [3] ⬆️

6.2.2 Actuator operation from remote

→ Set selector switch to Remote control (REMOTE).

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

7.1 Indication lights

— Option —

The colours of the 3 indication lights on the local controls are specified in the order. The signal assignment depends on the external wiring.

Figure 22: Local controls with indication lights (default signalling)

[1] illuminated (green): End position OPEN reached
[3] illuminated (yellow): End position CLOSED reached

7.2 Mechanical position indicator/running indication

— Option —

Mechanical position indicator:

- Continuously indicates the valve position
  (For complete travel from OPEN to CLOSED or vice versa, the indicator disc [2] rotates by approximately 180° to 230°.)
- Indicates whether the actuator is running (running indication)
- Indicates that the end positions are reached (via indicator mark [3])

Figure 23: Mechanical position indicator

[1] Cover
[2] Indicator disc
[4] Symbol for position OPEN
[5] Symbol for position CLOSED
8. Signals

8.1 Feedback signals from actuator

Information

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

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

8.2 Signals from local controls

Information

The signals must be wired to external controls.

<table>
<thead>
<tr>
<th>Signal</th>
<th>Type and designation in wiring diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selector switch position</td>
<td>Standard Selector switch LOCAL - OFF - REMOTE (S11) NO contact for selector switch in position Local control (LOCAL) NO contact for selector switch in position Remote control (REMOTE)</td>
</tr>
<tr>
<td>Operation commands</td>
<td>Standard Push button with NO contact for operation command in direction OPEN (S12.1) Push button with NC contact for STOP command (S12.2) Push button with NC contact for operation command in direction CLOSE (S12.3)</td>
</tr>
</tbody>
</table>
9. Commissioning (basic settings)

9.1 Switch compartment: open

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


   Figure 24:

2. If indicator disc [3] is available:
   Remove indicator disc [3] using a spanner (as lever).
   **Information:** To avoid damage to paint finish, use spanner in combination with soft object, e.g. fabric.

   Figure 25:

9.2 Torque switching: set

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

**Information**
The torque switches may also trip during manual operation.

**NOTICE**

Valve damage due to excessive tripping torque limit setting!

→ The tripping torque must suit the valve.

→ Only change the setting with the consent of the valve manufacturer.
1. Loosen both lock screws [3] at the indicator disc.
2. Turn torque dial [4] to set the required torque (1 da Nm = 10 Nm).

**Information:** Maximum tightening torque: 0.3 – 0.4 Nm

* The torque switch setting is complete.

Example: The figure above shows the following settings:
- 3.5 da Nm = 35 Nm for direction CLOSE
- 4.5 da Nm = 45 Nm for direction OPEN

### Limit switching: set

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

**Black section:**
[1] Setting spindle: End position CLOSED
[2] Pointer: End position CLOSED
[3] Mark: End position CLOSED is set

**White section:**
[4] Setting spindle: End position OPEN

#### 9.3.1 End position CLOSED (black section): set

1. Engage manual operation.
2. Turn handwheel clockwise until valve is closed.
3. Turn handwheel by approximately half a turn (overrun) in the opposite direction.

4. Press down and turn setting spindle [1] with screw driver in direction of the arrow and observe the pointer [2]: While a ratchet click is felt and heard, the pointer [2] moves 90° every time.

5. If the pointer [2] is 90° from mark [3]: Continue turning slowly.


    ➤ The end position CLOSED setting is complete.

7. If you override the tripping point inadvertently (ratchet click is heard after the pointer has snapped): Continue turning the setting spindle in the same direction and repeat setting process.

### 9.3.2 End position OPEN (white section): set

1. Engage manual operation.
2. Turn handwheel counterclockwise until valve is open.
3. Turn handwheel by approximately half a turn (overrun) in the opposite direction.

4. Press down and turn setting spindle [4] with screw driver in direction of the arrow and observe the pointer [5]: While a ratchet click is felt and heard, the pointer [5] moves 90° every time.

5. If the pointer [5] is 90° from mark [6]: Continue turning slowly.

6. If the pointer [5] moves to mark [6]: Stop turning and release setting spindle.

    ➤ The end position OPEN setting is complete.

7. If you override the tripping point inadvertently (ratchet click is heard after the pointer has snapped): Continue turning the setting spindle in the same direction and repeat setting process.

### 9.4 Intermediate positions: set

— Option —

Actuators equipped with DUO limit switching contain two intermediate position switches. One intermediate position may be set for each running direction.

Figure 28: Setting elements for limit switching

Black section:

- [1] Setting spindle: Running direction CLOSE
- [2] Pointer: Running direction CLOSED

White section:

- [4] Setting spindle: Running direction OPEN
After 177 turns (control unit for 1 – 500 turns/stroke) or 1,769 turns (control unit for 1 – 5,000 turns/stroke), the intermediate switches release the contact.

### 9.4.1 Running direction CLOSE (black section): set

1. Move valve in direction CLOSE to desired intermediate position.
2. If you override the tripping point inadvertently: Turn valve in opposite direction and approach intermediate position again in direction CLOSE.
   **Information:** Always approach the intermediate position in the same direction as in later electrical operation.
3. **Press down** and turn setting spindle [1] with screw driver in direction of the arrow and observe the pointer [2]: While a ratchet click is felt and heard, the pointer [2] moves 90° every time.
4. If the pointer [2] is 90° from mark [3]: Continue turning slowly.
5. If the pointer [2] moves to mark [3]: Stop turning and release setting spindle.
   ➡️ The intermediate position setting in running direction CLOSE is complete.
6. If you override the tripping point inadvertently (ratchet click is heard after the pointer has snapped): Continue turning the setting spindle in the same direction and repeat setting process.

### 9.4.2 Running direction OPEN (white section): set

1. Move valve in direction OPEN to desired intermediate position.
2. If you override the tripping point inadvertently: Move valve in opposite direction and approach intermediate position again in direction OPEN (always approach the intermediate position in the same direction as in later electrical operation).
3. **Press down** and turn setting spindle [4] with screw driver in direction of the arrow and observe the pointer [5]: While a ratchet click is felt and heard, the pointer [5] moves 90° every time.
4. If the pointer [5] is 90° from mark [6]: Continue turning slowly.
5. If the pointer [5] moves to mark [6]: Stop turning and release setting spindle.
   ➡️ The intermediate position setting in running direction OPEN is complete.
6. If you override the tripping point inadvertently (ratchet click is heard after the pointer has snapped): Continue turning the setting spindle in the same direction and repeat setting process.

### 9.5 Test run

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

#### 9.5.1 Direction of rotation: check

**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.

1. Move actuator manually to intermediate position or to sufficient distance from end position.
2. Set selector switch to position Local control (LOCAL).
3. Switch on actuator in running direction CLOSE and observe the direction of rotation:
   with indicator disc: step 4
   without indicator disc: step 5 (hollow shaft)
   → Switch off before reaching the end position.

4. With indicator disc:
   → Observe direction of rotation.
      ➤ The direction of rotation is correct, if **actuator runs in direction CLOSE** and **indicator disc turns counterclockwise**.

5. Without the indicator disc:
      ➤ The direction of rotation is correct, if **actuator runs in direction CLOSE** and hollow shaft or stem **turn clockwise**.

Figure 31: Hollow shaft/stem

[1] Threaded plug
[2] Seal
[3] Hollow shaft
[5] Stem
[6] Stem protection tube

9.5.2 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 is illuminated in end position CLOSED
  - the green indication light is illuminated in end position OPEN
  - the indication lights go out after travelling into the opposite direction.

- The limit switching is set incorrectly if:
  - the actuator comes to a standstill before reaching the end position
  - the red indication light is illuminated (torque fault).

3. If the end position setting is incorrect: Reset limit switching.

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

### 9.6 Potentiometer setting

— Option —

The potentiometer as travel sensor records the valve position.

**Information**

This setting is only required if the potentiometer is directly wired to the customer connection XK (refer to wiring diagram).

**Information**

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

Figure 33: View of control unit

![Potentiometer](image)

1. Move valve to end position CLOSED.
   - End position CLOSED corresponds to 0 %
   - End position OPEN corresponds to 100 %
4. Perform fine-tuning of the zero point at external setting potentiometer (for remote indication).

### 9.7 Electronic position transmitter RWG: set

— Option —

The electronic position transmitter RWG records the valve position. On the basis of the actual position value measured by the potentiometer (travel sensor), it generates a current signal between 0 – 20 mA or 4 – 20 mA.
Table 3: Technical data RWG 4020

<table>
<thead>
<tr>
<th>Wiring</th>
<th>3- or 4-wire system</th>
<th>2-wire system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal plan</td>
<td>TPA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9th position = E or H</td>
<td>9th position = C, D or G</td>
</tr>
<tr>
<td>Output current</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 – 20 mA, 4 – 20 mA</td>
<td>4 – 20 mA</td>
</tr>
<tr>
<td>Power supply</td>
<td>U_V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 V DC, ±15 % smoothed</td>
<td>14 V DC + (I x R_B), max. 30 V</td>
</tr>
<tr>
<td>Max. current consumption</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 mA at 20 mA output current</td>
<td>20 mA</td>
</tr>
<tr>
<td>Max. load</td>
<td>R_B</td>
<td></td>
</tr>
<tr>
<td></td>
<td>600 Ω</td>
<td>(U_V – 14 V) /20 mA</td>
</tr>
</tbody>
</table>

Figure 34: View of control unit

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

1. Connect voltage to electronic position transmitter.
2. Move valve to end position CLOSED.
3. Connect ammeter for 0 – 20 mA to measuring points [4 and 5]. If no value can be measured:
   3.1 Check, whether external load is connected to customer connection XK (terminals 23/24) (observe max. load R_B), or
   3.2 Connect terminals 23/24 across customer connection XK (terminals 23/24).
7. Turn potentiometer [2] in opposite direction until the following value is reached:
   - for 0 – 20 mA approx. 0.1 mA
   - for 4 – 20 mA approx. 4.1 mA
   ➤ This ensures that the signal remains above the dead and live zero point.
8. Move valve to end position OPEN.
9. Set potentiometer [3] to end value 20 mA.
10. Approach end position CLOSED again and check minimum value (0.1 mA or 4.1 mA). If necessary, correct the setting.

Information

If the maximum value cannot be reached, the selection of the reduction gearing must be checked. (The max. possible turns/stroke are indicated on the order-related technical data sheet for the actuator.)

9.8 Mechanical position indicator: set

— Option —

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

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

6. Move valve to end position CLOSED again.
7. Check settings:
   - If the symbol \( \square \) (CLOSED) is no longer in alignment with mark \( \triangle \) on the cover:
     7.1 Repeat setting procedure.
     7.2 Check whether the appropriate reduction gearing has been selected, if required.

9.9 Switch compartment: close

---

**NOTICE**

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

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

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

10. Corrective action

10.1 Faults during commissioning

Table 4: Faults during commissioning

<table>
<thead>
<tr>
<th>Fault description</th>
<th>Possible causes</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical position indicator cannot be set.</td>
<td>Reduction gearing is not suitable for turns/stroke of the actuator.</td>
<td>Exchange reduction gearing.</td>
</tr>
<tr>
<td>Actuator runs to end stop although the limit switches work properly.</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 controls.</td>
<td>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>
<tr>
<td>Position transmitter RWG No value can be measured at measuring points.</td>
<td>Current loop via RWG is open. (Position feedback 0/4 – 20 mA only functions if the current loop is closed across the RWG.)</td>
<td>Connect terminals 23/24 to XK across RWG. Connect external load to XK, e.g. remote indication. Consider maximum load $R_B$.</td>
</tr>
<tr>
<td>Position transmitter RWG Measurement range 4 – 20 mA or maximum value 20 mA cannot be set.</td>
<td>Reduction gearing is not suitable for turns/stroke of the actuator.</td>
<td>Exchange reduction gearing.</td>
</tr>
<tr>
<td>Limit and/or torque switches do not trip.</td>
<td>Switch is defective or switch setting is incorrect.</td>
<td>Check setting, if required, reset end positions. → Check switches and replace them, if required.</td>
</tr>
</tbody>
</table>

Switch check

The red test buttons [1] and [2] are used for manual operation of the switches:


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


10.2 Motor protection (thermal monitoring)

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

Behaviour during failure
If the signals are correctly wired within the controls, the actuator is stopped and can only resume its operation once the motor has cooled down.

Possible causes Overload, running time exceeded, max. number of starts exceeded, ambient temperature is too high.

Remedy Check cause, eliminate if possible.
11. Servicing and maintenance

Damage caused by inappropriate maintenance!

→ Servicing and maintenance must be carried out exclusively by suitably qualified personnel having been authorised by the end user or the contractor of the plant. Therefore, we recommend contacting our service.

→ Only perform servicing and maintenance tasks when the device is switched off.

AUMA Service & Support

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

11.1 Preventive measures for servicing and safe operation

The following measures are required to ensure safe device operation:

6 months after commissioning and then every year

- Carry out visual inspection:
  Cable entries, cable glands, blanking plugs, etc. have to be checked for correct tightness and sealing.
  Respect torques according to manufacturer's details.
- Check fastening screws between actuator and gearbox/valve for tightness. If required, fasten screws while applying the tightening torques as indicated in chapter <Assembly>.
- When rarely operated: Perform test run.
- For devices with output drive A: Press in Lithium soap EP multi-purpose grease on mineral oil base at the grease nipple with a grease gun.
- Lubrication of the valve stem must be done separately.

Figure 39: Output drive type A

Table 5: Grease quantities for bearing of output drive type A

<table>
<thead>
<tr>
<th>Output drive</th>
<th>A 07.2</th>
<th>A 10.2</th>
<th>A 14.2</th>
<th>A 16.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity [g] 1)</td>
<td>1.5</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

1) For grease at density $r = 0.9 \text{ kg/dm}^3$

For enclosure protection IP 68

After continuous immersion:

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

11.2 Maintenance

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.

11.3 Disposal and recycling

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

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

The following generally applies:

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

Information

The following technical data includes standard and optional features. For detailed information on the customer-specific version, refer to the order-relevant data sheet. This data sheet can be downloaded from the Internet at [http://www.auma.com](http://www.auma.com) in German and English (indication of commission number required).

12.1 Features and functions of actuator

<table>
<thead>
<tr>
<th>Type of duty¹</th>
<th>Standard:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• SA: Short-time duty S2 - 15 min</td>
</tr>
<tr>
<td></td>
<td>• SAR: Intermittent duty S4 - 25 %</td>
</tr>
<tr>
<td>Options:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SA: Short-time duty S2 - 30 min</td>
</tr>
<tr>
<td></td>
<td>• SAR: Intermittent duty S4 - 50 %</td>
</tr>
<tr>
<td></td>
<td>• SAR: Intermittent duty S5 – 25 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Torque range</th>
<th>Refer to actuator name plate</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Output speed</th>
<th>Refer to actuator name plate</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Motor</th>
<th>Standard: 3-ph AC asynchronous motor, type IM B9 according to IEC 60034</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Motor voltage and frequency</th>
<th>Refer to motor name plate</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Insulation class</th>
<th>Standard: F, tropicalized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Option: H, tropicalized</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motor protection</th>
<th>Standard: Thermoswitches (NC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Option: PTC thermistors (according to DIN 44082)²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Self-locking</th>
<th>Self-locking: Output speeds up to 90 rpm (50 Hz), 108 rpm (60 Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NOT self-locking: Output speeds up to 125 rpm (50 Hz), 150 rpm (60 Hz)</td>
</tr>
<tr>
<td></td>
<td>Multi-turn actuators are self-locking, if the valve position cannot be changed from standstill while torque acts upon the output drive.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Limit switching</th>
<th>Counter gear mechanism for end positions CLOSED and OPEN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Turns per stroke: 2 to 500 (standard) or 2 to 5,000 (option)</td>
</tr>
<tr>
<td></td>
<td>Standard: Single switches (1 NC and 1 NO, not galvanically isolated) for each end position</td>
</tr>
<tr>
<td></td>
<td>Options: Tandem switches (2 NC and 2 NO) for each end position, switches galvanically isolated</td>
</tr>
<tr>
<td></td>
<td>• Triple switches (3 NC and 3 NO) for each end position, switches galvanically isolated</td>
</tr>
<tr>
<td></td>
<td>• Intermediate position switch (DUO limit switching), adjustable for any position</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Torque switching</th>
<th>Torque switching adjustable for directions OPEN and CLOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard: Single switch (1 NC and 1 NO; not galvanically isolated) for each direction</td>
</tr>
<tr>
<td></td>
<td>Option: Tandem switches (2 NC and 2 NO) for each direction, switches galvanically isolated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Position feedback signal, analogue (option)</th>
<th>Potentiometer or 0/4 – 20 mA (RWG)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Mechanical position indicator (option)</th>
<th>Continuous indication, adjustable indicator disc with symbols OPEN and CLOSED</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Running indication</th>
<th>Blinker transmitter (standard for SA, option for SAR)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Heater in switch compartment</th>
<th>Self-regulating PTC heater, 5 – 20 W, 110 – 250 V AC/DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option:</td>
<td>24 – 48 V AC/DC or 380 – 400 V AC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motor heater (option)</th>
<th>Voltages: 110 – 120 V AC, 220 – 240 V AC or 400 V AC (externally supplied)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power depending on the size: 12.5 – 25 W</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manual operation</th>
<th>Manual drive for setting and emergency operation, handwheel does not rotate during electrical operation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option:</td>
<td>Handwheel lockable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>Standard: AUMA plug/socket connector with screw-type connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Options:</td>
<td>Terminals or crimp connection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terminal plan</th>
<th>Terminal plan according to commission number attached with delivery</th>
</tr>
</thead>
</table>
Valve attachment
Standard: B1 according to EN ISO 5210
Options:
A, B2, B3, B4 according to EN ISO 5210
A, B, D, E according to DIN 3210
C according to DIN 3338
Special output drive types: AF, B3D, ED, DD, IB1, IB3
A prepared for stem lubrication

Sensor system
Indication for manual operation (option)
Indication whether manual operation is active/not active via switch (1 change-over contact)

1) For nominal voltage and 40 °C ambient temperature and an average load with running torque or modulating torque according to separate technical data. The type of duty must not be exceeded.
2) PTC thermistors additionally require a suitable tripping device within the controls

### Technical data for limit and torque switches

<table>
<thead>
<tr>
<th>Mechanical lifetime</th>
<th>2 x 10⁶ starts</th>
</tr>
</thead>
</table>

#### Silver plated contacts:

<table>
<thead>
<tr>
<th>U min.</th>
<th>30 V AC/DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>U max.</td>
<td>250 V AC/DC</td>
</tr>
<tr>
<td>I min.</td>
<td>20 mA</td>
</tr>
<tr>
<td>I max. AC current</td>
<td>5 A at 250 V (resistive load)</td>
</tr>
<tr>
<td>I max. DC current</td>
<td>0.4 A at 250 V (resistive load)</td>
</tr>
</tbody>
</table>

#### Gold plated contacts:

<table>
<thead>
<tr>
<th>U min.</th>
<th>5 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>U max.</td>
<td>30 V</td>
</tr>
<tr>
<td>I min.</td>
<td>4 mA</td>
</tr>
<tr>
<td>I max.</td>
<td>400 mA</td>
</tr>
</tbody>
</table>

### Technical data for blinker transmitter

<table>
<thead>
<tr>
<th>Mechanical lifetime</th>
<th>10⁷ starts</th>
</tr>
</thead>
</table>

#### Silver plated contacts:

<table>
<thead>
<tr>
<th>U min.</th>
<th>10 V AC/DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>U max.</td>
<td>250 V AC/DC</td>
</tr>
<tr>
<td>I max. AC current</td>
<td>3 A at 250 V (resistive load)</td>
</tr>
<tr>
<td>I max. DC current</td>
<td>0.25 A at 250 V (resistive load)</td>
</tr>
</tbody>
</table>

### Technical data for handwheel activation switches

<table>
<thead>
<tr>
<th>Mechanical lifetime</th>
<th>10⁶ starts</th>
</tr>
</thead>
</table>

#### Silver plated contacts:

<table>
<thead>
<tr>
<th>U min.</th>
<th>12 V DC</th>
</tr>
</thead>
<tbody>
<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>
### 12.2 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>Enclosure protection according to EN 60529</td>
<td>Standard: IP 68 with AUMA 3-ph AC motor/1-ph AC motor According to AUMA definition, enclosure protection IP 68 meets the following requirements: ● Depth of water: maximum 8 m head of water ● Duration of continuous immersion in water: max. 96 hours ● Up to 10 operations during flooding. ● Modulating duty is not possible during continuous immersion. For actual version, refer to actuator/local controls name plate.</td>
</tr>
<tr>
<td>Corrosion protection</td>
<td>Standard: KS: Suitable for installation in industrial units, in water or power plants with a low pollutant concentration as well as for installation in occasionally or permanently aggressive atmosphere with a moderate pollutant concentration (e.g. in wastewater treatment plants, chemical industry) Options: ● KX: Suitable for installation in extremely aggressive atmospheres with high humidity and high pollutant concentration ● KX-G: same as KX, however aluminium-free version (outer parts)</td>
</tr>
<tr>
<td>Installation altitude</td>
<td>Standard: ≤ 2,000 m above sea level Option: &gt; 2,000 m above sea level, please contact AUMA</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>Pollution degree 4 (when closed) according to 50178</td>
</tr>
<tr>
<td>Finish coating</td>
<td>Standard: Paint based on polyurethane (powder coating)</td>
</tr>
<tr>
<td>Colour</td>
<td>Standard: AUMA silver-grey (similar to RAL 7037)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Standard: ● Open-close duty: -40 °C to +80 °C ● Modulating duty: -40 °C to +60 °C For actual version, refer to actuator/local controls name plate.</td>
</tr>
<tr>
<td>Vibration resistance according to IEC 60068-2-6</td>
<td>1 g, from 10 to 200 Hz Resistant to vibration during start-up or for failures of the plant. However, a fatigue strength may not be derived from this. Not valid in combination with gearboxes.</td>
</tr>
<tr>
<td>Lifetime</td>
<td>AUMA part-turn actuators meet or exceed the lifetime requirements of EN 15714-2. For further details, please contact AUMA</td>
</tr>
<tr>
<td>Weight</td>
<td>Refer to separate technical data</td>
</tr>
</tbody>
</table>

### 12.3 Further information

13. **Spare parts**

13.1 **Multi-turn actuators SA 07.2 – SA 16.2/SAR 07.2 – SAR 16.2**
Information: Please state type and commission no. of the device (see name plate) when ordering spare parts. Only original AUMA spare parts should be used. Failure to use original spare parts voids the warranty and exempts AUMA from any liability. Delivered spare parts may slightly vary from the representation.

<table>
<thead>
<tr>
<th>No.</th>
<th>Designation</th>
<th>Type</th>
<th>No.</th>
<th>Designation</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>001.0</td>
<td>Housing</td>
<td>Sub-assembly</td>
<td>553.0</td>
<td>Mechanical position indicator</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>002.0</td>
<td>Bearing flange</td>
<td>Sub-assembly</td>
<td>554.0</td>
<td>Socket carrier with motor cable harness</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>003.0</td>
<td>Hollow shaft with worm wheel</td>
<td>Sub-assembly</td>
<td>556.0</td>
<td>Potentiometer for position transmitter</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>005.0</td>
<td>Drive shaft</td>
<td>Sub-assembly</td>
<td>556.1</td>
<td>Potentiometer without slip clutch</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>005.1</td>
<td>Motor coupling on output drive shaft</td>
<td></td>
<td>557.0</td>
<td>Heater</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>005.5</td>
<td>Manual drive coupling</td>
<td></td>
<td>558.0</td>
<td>Blinker transmitter including pins at wires</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>009.0</td>
<td>Planetary gear for manual drive</td>
<td>Sub-assembly</td>
<td>559.0-1</td>
<td>Control unit with torque switching heads and switches</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>017.0</td>
<td>Torque lever</td>
<td>Sub-assembly</td>
<td>559.0-2</td>
<td>Control unit with magnetic limit and</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>torque transmitter for Non-intrusive version</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>in combination with AUMATIC integral controls</td>
<td></td>
</tr>
<tr>
<td>018.0</td>
<td>Gear segment</td>
<td></td>
<td>560.0-1</td>
<td>Switch stack for direction OPEN</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>019.0</td>
<td>Crown wheel</td>
<td></td>
<td>560.0-2</td>
<td>Switch stack for direction CLOSE</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>022.0</td>
<td>Drive pinion II for torque switching</td>
<td>Sub-assembly</td>
<td>560.1</td>
<td>Switch for limit/torque switching</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>023.0</td>
<td>Output drive wheel for limit switching</td>
<td>Sub-assembly</td>
<td>560.2</td>
<td>Switch case</td>
<td></td>
</tr>
<tr>
<td>024.0</td>
<td>Drive wheel for limit switching</td>
<td>Sub-assembly</td>
<td>566.0</td>
<td>Position transmitter RWG</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>025.0</td>
<td>Locking plate</td>
<td>Sub-assembly</td>
<td>566.1</td>
<td>Potentiometer for RWG without slip clutch</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>058.0</td>
<td>Wire for protective earth (pin)</td>
<td>Sub-assembly</td>
<td>566.2</td>
<td>Electronic board RWG</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>070.0</td>
<td>Motor (VD motor incl. no. 079.0)</td>
<td>Sub-assembly</td>
<td>566.3</td>
<td>Wire harness for RWG</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>079.0</td>
<td>Planetary gear for motor drive</td>
<td>Sub-assembly</td>
<td>567.1</td>
<td>Slip clutch for potentiometer/RWG</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>155.0</td>
<td>Reduction gearing</td>
<td>Sub-assembly</td>
<td>568.1</td>
<td>Stem protection tube (without cap)</td>
<td></td>
</tr>
<tr>
<td>500.0</td>
<td>Cover for switch compartment</td>
<td>Sub-assembly</td>
<td>568.2</td>
<td>Cap for stem protection tube</td>
<td></td>
</tr>
<tr>
<td>501.0</td>
<td>Socket carrier (complete with sockets)</td>
<td>Sub-assembly</td>
<td>568.3</td>
<td>V-seal</td>
<td></td>
</tr>
<tr>
<td>502.0</td>
<td>Pin carrier without pins</td>
<td>Sub-assembly</td>
<td>574.1</td>
<td>Radial seal output drive A for ISO flange</td>
<td></td>
</tr>
<tr>
<td>503.0</td>
<td>Socket for controls</td>
<td>Sub-assembly</td>
<td>575.1</td>
<td>Stem nut type A</td>
<td></td>
</tr>
<tr>
<td>504.0</td>
<td>Socket for motor</td>
<td>Sub-assembly</td>
<td>583.0</td>
<td>Motor coupling on motor shaft</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>505.0</td>
<td>Pin for controls</td>
<td>Sub-assembly</td>
<td>583.1</td>
<td>Pin for motor coupling</td>
<td></td>
</tr>
<tr>
<td>506.0</td>
<td>Pin for motor</td>
<td>Sub-assembly</td>
<td>584.0</td>
<td>Retaining spring for motor coupling</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>507.0</td>
<td>Plug cover</td>
<td>Sub-assembly</td>
<td>S1</td>
<td>Seal kit, small</td>
<td>Set</td>
</tr>
<tr>
<td>511.0</td>
<td>Threaded plug</td>
<td>Sub-assembly</td>
<td>S2</td>
<td>Seal kit, large</td>
<td></td>
</tr>
<tr>
<td>514.0</td>
<td>Output drive form A (without stem nut)</td>
<td>Sub-assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>514.1</td>
<td>Axial needle roller bearing</td>
<td>Sub-assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>516.0</td>
<td>Output drive D</td>
<td>Sub-assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>535.1</td>
<td>Snap ring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>539.0</td>
<td>Screw plug</td>
<td>Sub-assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>542.0</td>
<td>Handwheel with ball handle</td>
<td>Sub-assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>549.0</td>
<td>Output drive B1/B3/B4/C</td>
<td>Sub-assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>549.1</td>
<td>Output drive sleeve B1/B3/B4/C</td>
<td>Sub-assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
13.2 Local control unit AUMA SEMIPACT SEM 01.1/SEM 02.1
Information: Please state type and commission no. of the device (see name plate) when ordering spare parts. Only original AUMA spare parts should be used. Failure to use original spare parts voids the warranty and exempts AUMA from any liability. Delivered spare parts may slightly vary from the representation.

<table>
<thead>
<tr>
<th>No.</th>
<th>Designation</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>001.0</td>
<td>Housing</td>
<td></td>
</tr>
<tr>
<td>002.0</td>
<td>Local controls</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>002.5</td>
<td>Selector switch</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>003.0</td>
<td>Local controls board</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>003.1</td>
<td>Primary fuse</td>
<td></td>
</tr>
<tr>
<td>003.2</td>
<td>Fuse cover</td>
<td></td>
</tr>
<tr>
<td>013.0</td>
<td>Adapter board</td>
<td></td>
</tr>
<tr>
<td>500.0</td>
<td>Cover</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>501.0</td>
<td>Socket carrier (complete with sockets)</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>502.0</td>
<td>Pin carrier without pins</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>503.0</td>
<td>Socket for controls</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>504.0</td>
<td>Socket for motor</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>505.0</td>
<td>Pin for controls</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>506.0</td>
<td>Pin for motor</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>507.0</td>
<td>Plug cover</td>
<td>Sub-assembly</td>
</tr>
<tr>
<td>509.1</td>
<td>Padlock</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Seal kit</td>
<td>Set</td>
</tr>
</tbody>
</table>
14. Certificates

14.1 Declaration of Incorporation and EC Declaration of Conformity

Original Declaration of Incorporation of Partly Completed Machinery
(EC Directive 2006/42/EC) and EC Declaration of Conformity in compliance with the Directives on EMC and Low Voltage

for electric AUMA multi-turn actuators of the type ranges SA 07.2 – SA 16.2 and SAR 07.2 – SAR 16.2 in versions AUMA NORM, AUMA SEMIPACT, AUMA MATIC or AUMATIC.

AUMA Riester GmbH & Co. KG as manufacturer declares herewith, that the above mentioned multi-turn actuators meet the following basic requirements of the EC Machinery Directive 2006/42/EC: Annex I, articles 1.1.2, 1.1.3, 1.1.5, 1.2.1; 1.2.6, 1.3.1, 1.3.7, 1.5.1, 1.6.3, 1.7.1, 1.7.3, 1.7.4

The following harmonised standards within the meaning of the Machinery Directive have been applied:

EN 12100-1: 2003
EN 12100-2: 2003
EN 60204-1: 2006
ISO 5210: 1996

With regard to the partly completed machinery, the manufacturer commits to submitting the documents to the competent national authority via electronic transmission upon request. The relevant technical documentation pertaining to the machinery described in Annex VII, part B has been prepared.

AUMA multi-turn actuators are designed to be installed on industrial valves. AUMA multi-turn actuators must not be put into service until the final machinery into which they are to be incorporated has been declared in conformity with the provisions of the EC Directive 2006/42/EC.

Authorised person for documentation: Peter Malus, Aumastrasse 1, D-70379 Muelheim

As partly completed machinery, the multi-turn actuators further comply with the requirements of the following directives and the respective approximation of national laws as well as the respective harmonised standards as listed below:

EN 61000-6-4: 2007
EN 61000-6-2: 2005

2) Low Voltage Directive (2006/95/EC)
EN 60204-1: 2006
EN 60034-1: 2004
EN 50178: 1997
EN 61010-1: 2001

Year of affixing of the CE marking: 2010

Muelheim/2009-12-29
H. Newerla, General Management

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