



# OPERATING INSTRUCTIONS FOR ELECTRIC ACTUATORS

J4C actuator for butterfly valves, ball valves



## Table of contents

|                                                                |           |
|----------------------------------------------------------------|-----------|
| <b>1 Product description .....</b>                             | <b>4</b>  |
| 1.1 Functional description .....                               | 4         |
| 1.2 Connection.....                                            | 4         |
| 1.3 Connection.....                                            | 4         |
| 1.4 Maintenance.....                                           | 4         |
| <b>2 Important notes .....</b>                                 | <b>4</b>  |
| 2.1 Notes on project planning.....                             | 5         |
| 2.2 Environment and installation system .....                  | 5         |
| <b>3 Commissioning / Electrical connection .....</b>           | <b>5</b>  |
| 3.1 Commissioning / Electrical connection .....                | 5         |
| 3.2 Commissioning / Electrical connection .....                | 5         |
| <b>4 Connection plugs .....</b>                                | <b>6</b>  |
| <b>5 Mounting and adjustment.....</b>                          | <b>7</b>  |
| <b>6 OPEN/CLOSED Standard .....</b>                            | <b>7</b>  |
| <b>7 DPS positioner (additional flash sequences) .....</b>     | <b>8</b>  |
| <b>8 Overview .....</b>                                        | <b>9</b>  |
| 8.1 Data applicable to all models.....                         | 9         |
| 8.2 Model-specific data.....                                   | 9         |
| 8.3 Manual override.....                                       | 10        |
| <b>9 Overview .....</b>                                        | <b>10</b> |
| <b>10 Mounting instructions for GEA AWP service valve.....</b> | <b>11</b> |
| 10.1 Direct mounting with reducing sleeve.....                 | 11        |
| 10.2 Direct mounting ball valve.....                           | 12        |
| 10.3 Mounting the valve under the actuator .....               | 12        |
| 10.4 Perform self-adjustment on the actuator .....             | 12        |
| <b>11 Mounting instructions for GEA AWP service valve.....</b> | <b>13</b> |
| 11.1 Important notes.....                                      | 13        |
| 11.2 Mounting instructions for GEA AWP service valve .....     | 13        |
| 11.3 Mounting instructions for GEA AWP service valve .....     | 13        |
| 11.4 Mounting instructions for GEA AWP service valve .....     | 13        |
| <b>12 Mounting instructions for GEA AWP service valve.....</b> | <b>13</b> |

## 1 Product description

### 1.1 Functional description

The actuator automatically detects the connected operating voltage. Depending on the control, it moves clockwise or anti-clockwise into its specified end position. While the brushless motor drives the main shaft via the gearbox, the DOME position indicator continuously shows the position of the valve. In addition, the operating status is shown via the multi-colour status LED. To avoid condensation in the body during fluctuations in the outside temperature, the part-turn actuator has an automatic integrated switch compartment heater, which protects the interior when there is a continuous power supply. If the valve is blocked or stiff, the electronic torque limitation protects against damage to the gearbox and motor. In the event of a power failure or emergency intervention, the manual override can be switched on via the selector switch and the rotary actuator can then be adjusted manually via the handwheel.

### 1.2 Connection

The mechanical connection is made via a standard interface according to DIN 3337 / ISO 5211. For this purpose, the actuator has a multi-flange plate and is available with various stem inserts. The electrical connection is made via industrial connectors (see connection plugs).

### 1.3 Connection

The mechanical connection is made via a standard interface according to DIN 3337 / ISO 5211. For this purpose, the actuator has a multi-flange plate and is available with various stem inserts. The electrical connection is made via industrial connectors (see connection plugs).

### 1.4 Maintenance

Maintenance work is not required on J+J electric part-turn actuators. Regular functional testing is advisable in accordance with the safety requirements of the system, especially for rarely used actuators.

## 2 Important notes

### DANGER

#### **Danger from electrical voltage!**

During the operation of electrical devices, certain parts of these devices are inevitably under dangerous voltage. Non-observance of the general electrical safety rules can therefore lead to serious physical injury or property damage. .

- ▶ Only appropriately qualified personnel may work on or near these devices.
- ▶ The personnel must be familiar with all safety instructions and maintenance measures in accordance with these operating instructions.

### NOTICE

Observe the operating manual!

The operating manual must be read carefully and completely before installation. For special models, the supplied supplementary manual always applies in addition

## NOTICE

Trouble-free and safe operation of the devices requires proper transport, professional storage, setup and assembly as well as careful operation and maintenance.

### 2.1 Notes on project planning

Before using the electric part-turn actuator, all circumstances regarding the connection, valve and environment must be clarified. Otherwise, long-term damage or functional failure may occur.

### 2.2 Environment and installation system

J+J actuators must not be installed inverted (flange facing upwards). Accessibility of the manual override and visibility of the position indicator and status LED must always be ensured. For applications with vibrations in the pipeline, expansion joints must be provided. If actuators are used outdoors, sufficient protection (canopy) against climatic influences must be provided. Strong sunlight can damage the actuator due to heat build-up and UV radiation. Icing of the actuator can lead to the manual override becoming unusable. To avoid condensation, the switch compartment heater must always be active (see electrical connection).

## 3 Commissioning / Electrical connection

The connection must only be carried out by trained electrical specialist personnel. The general electrical safety rules and VDE regulations apply.

The connection is made using the supplied industrial connectors. When wiring, particular attention must be paid to the correct cable diameter and the plug seals, otherwise the IP67 protection class is not guaranteed. Each plug is fastened to the part-turn actuator with a screw; this must not be overtightened. J+J part-turn actuators are to be connected single-phase and must be controlled via relays or switches. Three different circuit methods are available for control as required, without reconfiguration. An external fuse with the corresponding triggering characteristic for increased starting currents (e.g. circuit breaker type D) must be provided. Switching contacts should be suitable for capacitive loads. **NOTICE! No external consumers may be connected in parallel to the actuator!**

### 3.1 Commissioning / Electrical connection

The connection must only be carried out by trained electrical specialist personnel. The general electrical safety rules and VDE regulations apply.

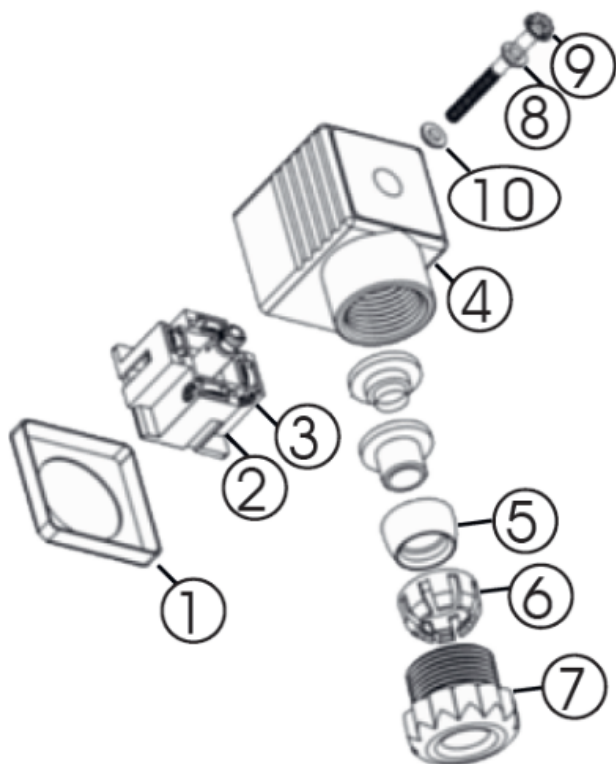
The connection is made using the supplied industrial connectors. When wiring, particular attention must be paid to the correct cable diameter and the plug seals, otherwise the IP67 protection class is not guaranteed. Each plug is fastened to the part-turn actuator with a screw; this must not be overtightened. J+J part-turn actuators are to be connected single-phase and must be controlled via relays or switches. Three different circuit methods are available for control as required, without reconfiguration. An external fuse with the corresponding triggering characteristic for increased starting currents (e.g. circuit breaker type D) must be provided. Switching contacts should be suitable for capacitive loads. **NOTICE! No external consumers may be connected in parallel to the actuator!**

### 3.2 Commissioning / Electrical connection

The connection must only be carried out by trained electrical specialist personnel. The general electrical safety rules and VDE regulations apply.

The connection is made using the supplied industrial connectors. When wiring, particular attention must be paid to the correct cable diameter and the plug seals, otherwise the IP67 protection class is not guaranteed. Each plug is fastened to the part-turn actuator with a screw; this must not be overtightened. J+J part-turn actuators are to be connected single-phase and must be controlled via relays or switches. Three different circuit methods are available for control as required, without reconfiguration. An external fuse with the corresponding triggering characteristic for increased starting currents (e.g. circuit breaker type D) must be provided. Switching contacts should be suitable for capacitive loads. **NOTICE! No external consumers may be connected in parallel to the actuator!**

## 4 Connection plugs



|                            | Large plug              | Small plug                  |
|----------------------------|-------------------------|-----------------------------|
| Permissible cable diameter | 8 mm - 10.5 mm          | 5 mm - 6 mm                 |
| Type                       | DIN EN175301-803 form A | Industrial connector form C |

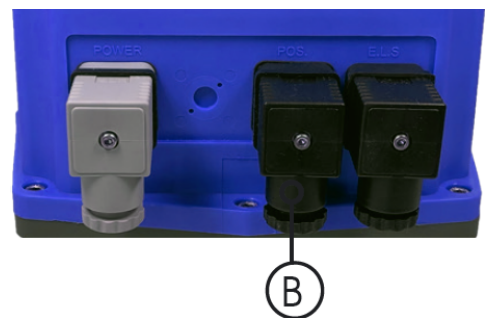
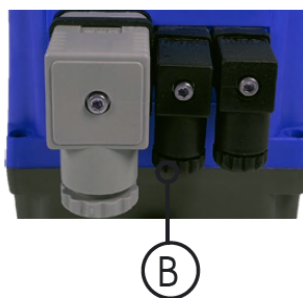
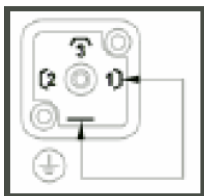
| A | Supply plug     |
|---|-----------------|
| B | Option DPS      |
| C | End positions   |
| I | Optional        |
| 1 | Seal            |
| 2 | Terminal block  |
| 3 | Terminal        |
| 4 | Body            |
| 5 | Sealing ring    |
| 6 | Clamping ring   |
| 7 | Threaded sleeve |
| 8 | Washer          |

| A  | Supply plug  |
|----|--------------|
| 9  | Fixing screw |
| 10 | Sealing ring |

## 5 Mounting and adjustment

To set the actuator to the mounted valve, a self-adjustment must be carried out. In this process, the actuator starts in the open position and moves in the closed direction until the set cut-off torque of the valve is reached. The cut-off torque is stored in the actuator via software or app.

- ✓ Ensure that the actuator is fully open (if necessary, move it electrically to the open position).
  - ✓ Ensure that the valve is open (if necessary, open manually and turn back slightly).
1. Mount the valve under the actuator. If necessary, turn the valve stem slightly in the closed direction to insert the stem insert.
  2. Perform self-adjustment as follows.



3. Bridge Pin 1 + Earth (Plug B).
4. Switch on voltage and remove bracket.
5. Actuator performs self-adjustment.

## 6 OPEN/CLOSED Standard

| Betriebszustand | Blinktakt der LED |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------|-------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| A               |                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| B               |                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| C               |                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| D               |                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| E               |                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| F               |                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| G               |                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| H               |                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| I               |                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| Operating state |                                                          |
|-----------------|----------------------------------------------------------|
| A               | Without power supply                                     |
| B               | Actuator is in the open position                         |
| C               | Actuator is in the closed position                       |
| D               | Actuator is in the stop position                         |
| E               | Actuator moves in the Open direction                     |
| F               | Actuator moves in the Closed direction                   |
| G               | Torque protection circuit active in the Open direction   |
| H               | Torque protection circuit active in the Closed direction |
| I               | Manual override switched on, motor has been stopped      |

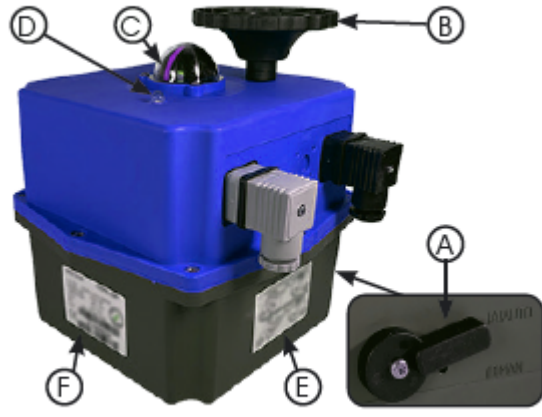
| Operating state        |                                                                                                             |                   |                                                                   |
|------------------------|-------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------|
| Supply (A) Open/Closed | Supply (A) Open/Closed/Stop                                                                                 | End positions (C) | Internal end positions                                            |
|                        | <p>Schaltbild zeigt Ansteuerung in offene Richtung<br/>Wiring diagram shows control to opened direction</p> |                   | <p>Ansicht in geöffneter Position<br/>View of opened position</p> |

## 7 DPS positioner (additional flash sequences)

| Betriebszustand | Blinktakt der LED |       |       |       |      |       |       |       |      |       |       |       |      |       |       |       |
|-----------------|-------------------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|------|-------|-------|-------|
| A               | Blue              | Blue  | Blue  | Blue  | Blue | Blue  | Blue  | Blue  | Blue | Blue  | Blue  | Blue  | Blue | Blue  | Blue  | Blue  |
| B               | Blue              | Green | Green | Green | Blue | Green | Green | Green | Blue | Green | Green | Green | Blue | Green | Green | Green |
| C               | Blue              | Red   | Red   | Red   | Blue | Red   | Red   | Red   | Blue | Red   | Red   | Red   | Blue | Red   | Red   | Red   |
| D               | Blue              | Blue  | Blue  | Blue  | Grey | Blue  | Blue  | Blue  | Blue | Blue  | Blue  | Blue  | Grey | Blue  | Blue  | Blue  |
| E               | Blue              | Blue  | Blue  | Blue  | Blue | Blue  | Blue  | Blue  | Blue | Blue  | Blue  | Blue  | Blue | Blue  | Blue  | Blue  |
| F               | Red               | Red   | Red   | Red   | Blue | Green | Green | Green | Blue | Red   | Red   | Red   | Blue | Green | Green | Green |

| Operating state |                                                                                                  |                   |                                                                   |
|-----------------|--------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------|
| A               | Actuator is at the setpoint position                                                             |                   |                                                                   |
| B               | Actuator moves in the Open direction                                                             |                   |                                                                   |
| C               | Actuator moves in the Closed direction                                                           |                   |                                                                   |
| D               | Actuator moves without input signal (4-20mA or 1-10V)                                            |                   |                                                                   |
| E               | Input signal above signal range (>20mA or >10V)                                                  |                   |                                                                   |
| F               | Self-adjustment                                                                                  |                   |                                                                   |
| Supply (A)      | DPS (B)                                                                                          | End positions (C) | Internal end positions                                            |
|                 | <p>Eingang input    Ausgang output    Masse ground</p> <p>Nicht anschließen! Do not connect!</p> |                   | <p>Ansicht in geöffneter Position<br/>View of opened position</p> |

## 8 Overview

| J4M S2 / S6 / S10                                                                 | J4M S25 / S40                                                                      |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|  |  |
| A                                                                                 | Manual override selector switch                                                    |
| B                                                                                 | Handwheel                                                                          |
| C                                                                                 | DOME position indicator                                                            |
| D                                                                                 | Status LED                                                                         |
| E                                                                                 | Wiring diagram                                                                     |
| F                                                                                 | Nameplate                                                                          |

### 8.1 Data applicable to all models

| Duty cycle | Temp. range     | Heater power | Protection class<br>IEC60529 | Max. rotations |
|------------|-----------------|--------------|------------------------------|----------------|
| ED = 75%   | -20 °C – +70 °C | 3.5 W        | IP 67                        | 13.5           |

### 8.2 Model-specific data

| Model | Minimum torque<br>[ in Nm] | Maximum torque<br>[ in Nm] | Running time without load [in seconds]<br>s/360° ± 10% | Current consumption at max. torque<br>Voltage range: 24-240V DC/AC(50/60 Hz)<br>(-0%/+5%) |                |                |                | Weight |
|-------|----------------------------|----------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------------|----------------|----------------|----------------|--------|
|       |                            |                            |                                                        | 24V AC                                                                                    | 24V AC         | 110V AC        | 230V AC        |        |
| S2    | 2                          | 5.5                        | 4                                                      | 1.8A<br>43.1W                                                                             | 1.28A<br>30.7W | 0.35A<br>38.5W | 0.23A<br>56.0W | 1.9    |
| S6    | 5                          | 9                          | 3                                                      | 2.25A<br>54.1W                                                                            | 1.66A<br>39.3W | 0.45A<br>49.6W | 0.28A<br>68.1W | 1.9    |
| S10   | 7                          | 15                         | 12.8                                                   | 2.41A<br>57.9W                                                                            | 1.70A<br>40.8W | 0.44A<br>47.9W | 0.28A<br>68.1W | 1.9    |

| Model | Minimum torque<br>[ in Nm] | Maximum torque<br>[ in Nm] | Running time without load [in seconds]<br>s/360° ± 10% | Current consumption at max. torque<br>Voltage range: 24-240V DC/AC(50/60 Hz)<br>(-0%/+5%) |                |                 |                 | Weight |
|-------|----------------------------|----------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------------|----------------|-----------------|-----------------|--------|
|       |                            |                            |                                                        |                                                                                           |                |                 |                 |        |
| S25   | 10                         | 30                         | 9.3                                                    | 4.58A<br>110.0W                                                                           | 3.53A<br>84.7W | 1.03A<br>113.5W | 0.77A<br>185.3W | 3.8    |
| S40   | 16                         | 50                         | 12                                                     | 5.43A<br>130.4W                                                                           | 3.87A<br>92.8W | 1.19A<br>130.9W | 0.84A<br>202.8W | 3.8    |

### 8.3 Manual override

All J4M models have a manual override gearbox for manual operation in the event of a power failure. To activate the manual override, the "AUTO-MAN" selector switch (A) is set to "MAN". This decouples the motor from the gearbox. The actuator can now be rotated using the handwheel (B). After approximately four times the running time, the motor is automatically stopped by the electronics. If the actuator is to be put back into operation after manual operation, the selector switch (A) must first be switched to the "AUTO" position. The motor is now coupled again. If the motor has switched off automatically, it can be reactivated either by controlling the other direction or by a brief power interruption (unplugging the supply plug). **CAUTION! The selector switch must not be rotated beyond its specified switching positions. If switching is stiff, the gearbox can be synchronised using the handwheel. The screw of the selector switch must never be loosened!**

## 9 Overview

| J4M S2 / S6 / S10 | J4M S25 / S40                   |
|-------------------|---------------------------------|
|                   |                                 |
| A                 | Manual override selector switch |
| B                 | Handwheel                       |
| C                 | DOME position indicator         |
| D                 | Status LED                      |
| E                 | Wiring diagram                  |
| F                 | Nameplate                       |

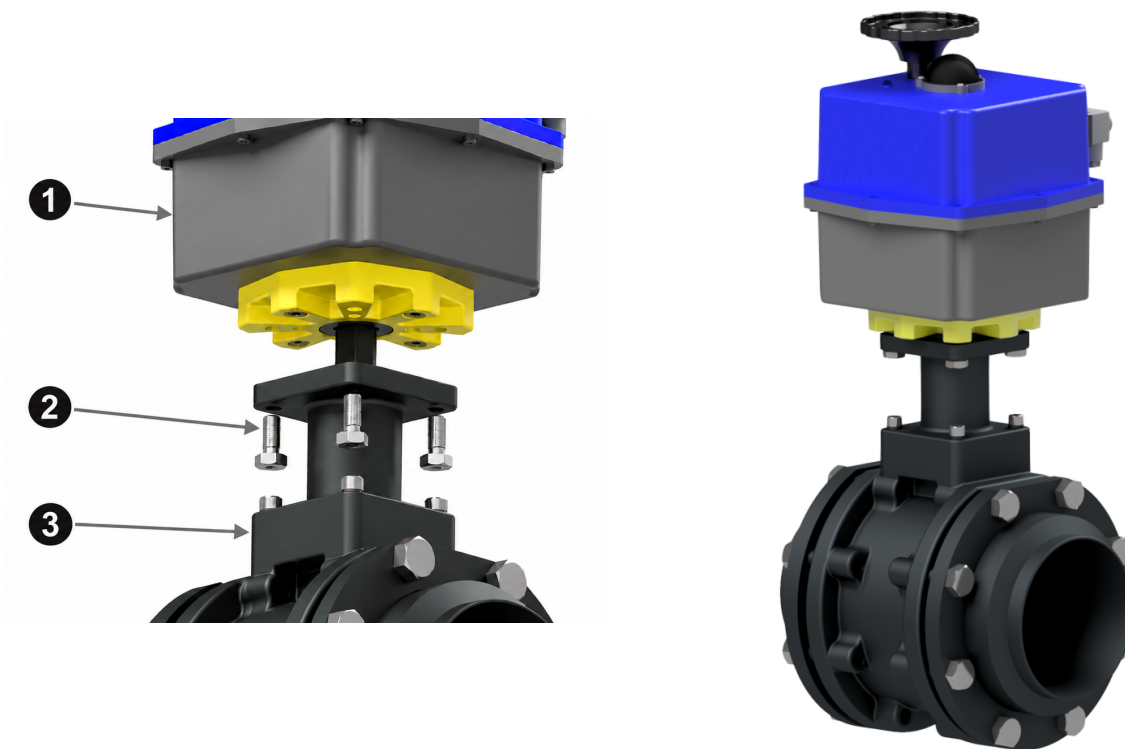
## 10 Mounting instructions for GEA AWP service valve

### 10.1 Direct mounting with reducing sleeve



|                      |                             |
|----------------------|-----------------------------|
| 1 1x actuator unit   | 2 4x socket head cap screws |
| 3 1x butterfly valve |                             |

## 10.2 Direct mounting ball valve



|                    |                             |
|--------------------|-----------------------------|
| 1 1x actuator unit | 2 4x socket head cap screws |
| 3 1x ball valve    |                             |

## 10.3 Mounting the valve under the actuator

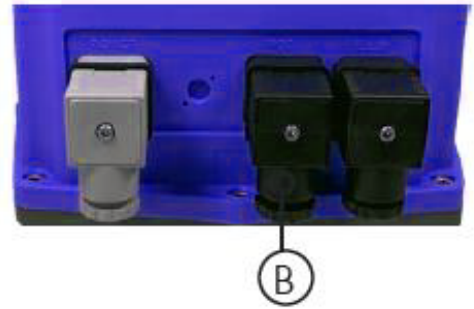
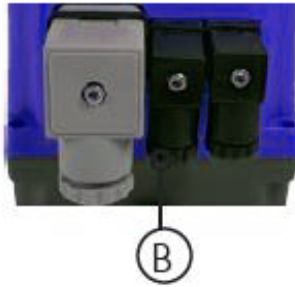
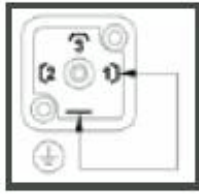
The actuator is delivered in the open position. Before mounting the actuator, the valve must be completely opened. During mounting, the valve stem is turned slightly in the closed direction until it can be inserted into the double square of the actuator.

## 10.4 Perform self-adjustment on the actuator

To set the actuator to the mounted valve, a self-adjustment must be carried out. In this process, the actuator starts in the open position and moves in the closed direction until the set cut-off torque of the valve is reached.

### External self-adjustment

1. Bridge Pin 1 + Earth (plug B)
  2. Switch on supply voltage.
  3. Remove bracket.
- ⇒ Actuator performs self-adjustment



## 11 Mounting instructions for GEA AWP service valve

### 11.1 Important notes

#### DANGER

##### **Danger from electrical voltage!**

During the operation of electrical devices, certain parts of these devices are inevitably under dangerous voltage. Non-observance of the general electrical safety rules can therefore lead to serious physical injury or property damage. .

- ▶ Only appropriately qualified personnel may work on or near these devices.
- ▶ The personnel must be familiar with all safety instructions and maintenance measures in accordance with these operating instructions.

#### NOTICE

Observe the operating manual!

The operating manual must be read carefully and completely before installation. For special models, the supplied supplementary manual always applies in addition

#### NOTICE

Trouble-free and safe operation of the devices requires proper transport, professional storage, setup and assembly as well as careful operation and maintenance.

### 11.2 Mounting instructions for GEA AWP service valve

### 11.3 Mounting instructions for GEA AWP service valve

### 11.4 Mounting instructions for GEA AWP service valve

## 12 Mounting instructions for GEA AWP service valve

**GEA AWP GmbH**  
Armaturenstr. 2  
17291 Prenzlau  
Germany  
phone: +49 3984 8559-0  
fax: +49 3984 8559-18  
e-mail: [info@awpvalves.com](mailto:info@awpvalves.com)

