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Valves, controls + systems

EN

# Electromotive actuator "Aktor M ST L ", 24 V, 0 - 10 V

**Operating instructions**

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# 1. General information

The original operating instructions were drafted in German.

The operating instructions in other languages were translated from German.

## 1.1 Validity of the operating instructions

These operating instructions are valid for the electromotive actuator "Aktor M ST L", 24 V, modulating proportional actuator, 0-10 V, with electric emergency control function and automatic recognition of neutral point.

## 1.2 Type plate

The type plate is located on the bottom of the product.

## 1.3 Extent of supply

Items included in the delivery:

- "Aktor M ST L", 24 V, modulating proportional actuator, 0-10 V
- Operating instructions

## 1.4 Contact

OVENTROP GmbH & Co. KG

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GERMANY

www.oventrop.com

**Technical service**

Phone: +49 (0) 29 62 82-234

## 1.5 EU Declaration of conformity

Oventrop GmbH & Co. KG hereby declares that this product complies with the basic requirements and other relevant provisions of the EC Directives concerned.

The declaration of conformity can be obtained from the manufacturer.

## 1.6 Used symbols

| | |
|---|---|
| | Important information and further explanations. |
| ▶ | Action required |
| • | Enumeration |
| 1.<br>2. | Fixed order. Steps 1 to X. |
| ▷ | Result of action |

# 2. Safety-related information

## 2.1 Correct use

Safety in operation is only guaranteed if the product is used correctly.

The Aktor may be used as actuator with electric emergency control function and automatic recognition of neutral point in indoor heating, ventilation and air conditioning systems.

Any other use of the product will be considered incorrect use.

Claims of any kind against the manufacturer and/or his authorised representatives, due to damages caused by incorrect use cannot be accepted.

The observance of the operating instructions is part of the compliance terms.

## 2.2 Warnings

Each warning contains the following elements:

| Warning symbol SIGNAL WORD |
|---|
| **Type and source of danger**<br>Possible consequences if the danger occurs or the warning is ignored.<br>▶ Possibilities of avoiding the danger. |

The signal words identify the severity of the danger arising from a situation.

| ⚠ DANGER |
|---|
| Indicates an imminent danger with high risk. The situation will lead to death or serious injury if not avoided. |

| ⚠ WARNING |
|---|
| Indicates a possible danger with moderate risk. The situation may lead to death or serious injury if not avoided. |

| ⚠ CAUTION |
|---|
| Indicates a possible danger with low risk. It may lead to minor and reversible injury if the situation is not avoided. |

| *NOTICE* |
|---|
| Indicates a situation which may lead to damage to property if not avoided. |

## 2.3 Safety notes

We have developed this product in accordance with current safety requirements.

Please observe the following notes concerning safe use.

### 2.3.1 Danger in case of inadequate personnel qualification

Any work on this product must only be carried out by qualified tradespeople.

As a result of their professional training and experience as well as their knowledge of the relevant legal regulations, qualified tradespeople are able to carry out any work on the described product professionally.

**User**

The user must be informed how to operate the product by qualified tradespeople.

### 2.3.2 Risk of burns due to hot components and surfaces

▶ Wear suitable protective clothing to avoid unprotected contact with hot system components and fittings.

### 2.3.3 Availability of the operating instructions

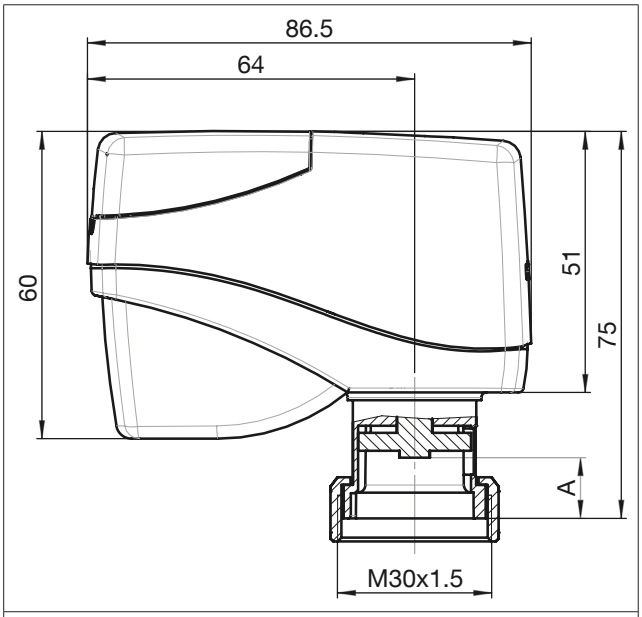
Any person working on the product has to read and apply these operating instructions and all other valid documents.

The operating instructions must be available at the installation location of the product.

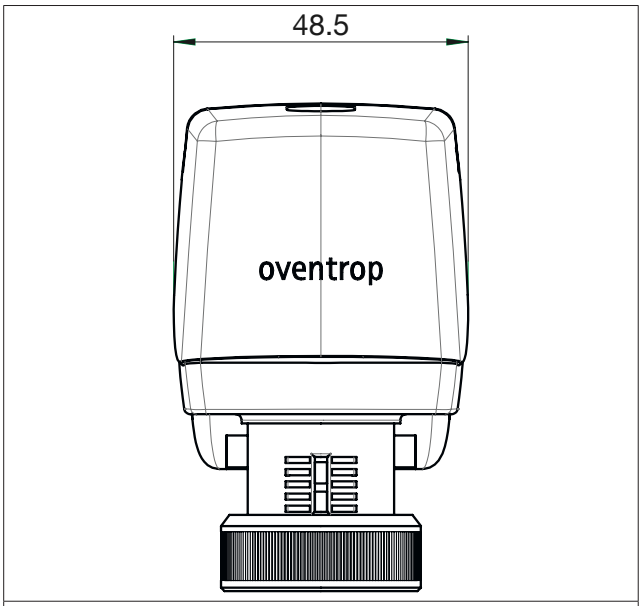
▶ Hand these operating instructions and all other valid documents over to the user.

# 3. Technical description

## 3.1 Construction




*Illust. 1: Side view*




*Illust. 2: Front view*

## 3.2 Functional description

### 3.2.1 Normal operation

The actuator opens or closes the valve depending on the applied control voltage.

The actuator can be adapted to the specific parameters of the valve used with the help of DIP switches.

### 3.2.2 Emergency end position

The actuator features an energy store.

If the operating voltage fails, the stem of the actuator will move to the emergency end position (see section 6.3 on page 10).

## 3.3 Technical data

| | |
|---|---|
| **Operating voltage** | 24 V AC ±10 %; 50/60 Hz;<br>24 V DC ±10 % |
| **Power consumption** | Dimensioning: 6.8 VA (24 V AC);<br>3.3 W (24 V DC)<br>nominal: 5.3 VA (24 V AC);<br>2.7 W (24 V DC) |
| **Start up load** | For short periods max. 12 A |
| **Drive** | Steady control 0 - 10 V DC;<br>< 0.5 mA |
| **Connection** | Fixed pre-assembled cable<br>1.5 m; 5 x 0.5 mm² |
| **Display** | LED display for operating voltage and status |
| **Motor deactivation** | Drive stem:<br>- extending = load-dependent<br>- retracting = travel-dependent |
| **Piston stroke** | Max. 4 mm |
| **Floating time** | 22 s/mm |
| **Emergency floating time** | about 5 s/mm |
| **Operating power** | Nominal 150 N |
| **Position indicator** | Stroke scale |
| **Position feedback** | 2 - 10 V; DC, 5 mA<br>for 0 -100 % travel |
| **Emergency control function** | Emergency end position adjustable |
| **Valve anti-blocking function** | Active |
| **Permissible fluid temperature in the valve** | 0 °C - 120 °C |
| **Ambient temperature** | 0 °C - 50 °C |
| **Ambient humidity** | 0 - 85% r.h., not condensing |
| **Protection class** | IP54 |
| **Protective system** | Degree of protection |
| **Installation position** | 360° |
| **Maintenance** | maintenance-free |
| **Weight** | 250 g |

# 4. Transport and storage

| | |
|---|---|
| **Temperature range** | 0 °C - 50 °C |
| **Relative air humidity** | 0 - 85% r.h., not condensing |
| **Particles** | Store dry and free from dust |
| **Mechanical influences** | Protected from mechanical agitation |
| **Weather influences** | Do not store outdoors |
| | Protect from direct sunlight |
| **Chemical influences** | Do not store together with aggressive fluids |

# 5. Installation

## 5.1 Initial installation

Make sure that there is enough space for the installation of the actuator when installing the valve.

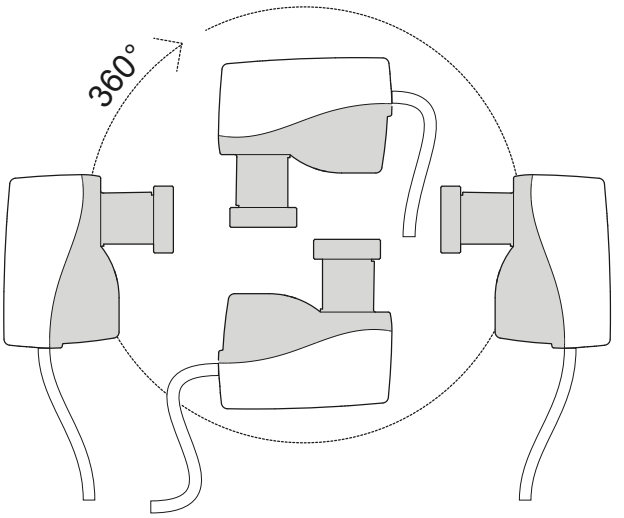
The actuator must only be connected to the power supply after installation!

**CAUTION**

**Risk of burns due to hot components**

An unprotected contact with hot components may lead to burns.

- ▶ Allow the installation to cool down before working on it.
- ▶ Wear safety gloves.




*Illust. 3: Installation position*

1. Fit the actuator to the connection thread of the valve.
2. Hand tighten the collar nut.

Avoid cross threading.

***NOTICE***

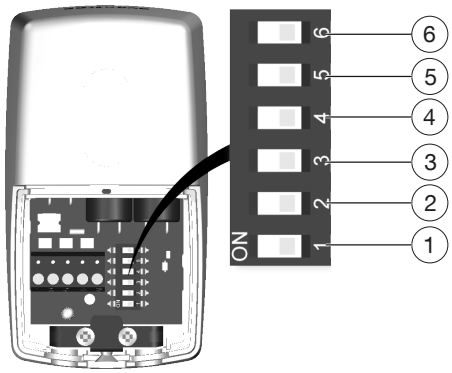
**Damage to the actuator when tightening the collar nut with excessive torque**

The actuator can be damaged and its be function impaired if the collar nut is over-tightened.

- ▶ Hand tighten the collar nut.

## 5.2 Configuration of the DIP switches

- ▶ Remove the casing cover.
- ▶ Configure the DIP switches according to the valve used (see section 10 on page 12).



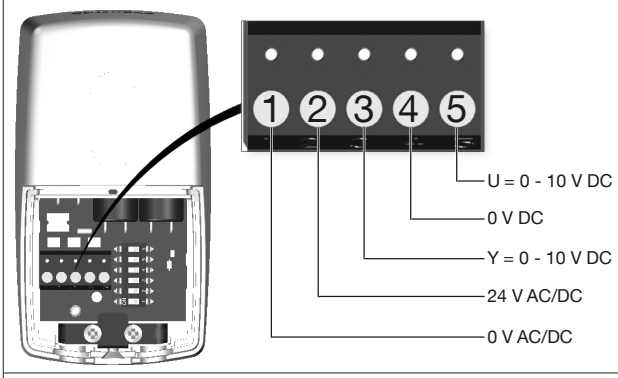

*Illust. 4: DIP switches*

| | | |
|---|---|---|
| **(1)** | S1 ON/ OFF | **Setting of the required stroke behaviour in accordance with the characteristic lines of the valve used.** |
| **(2)** | S2 ON/ OFF | |
| **(3)** | S3 ON/ OFF | |
| **(4)** | S4 ON/ OFF | |
| **(5)** | S5 ON/ OFF | |
| **(6)** | Setting of the emergency end position | |
| | ON = Stem in retracted position | OFF = Stem in extended position |

## 5.3 Connection of the power supply

| ***NOTICE*** | |
|---|---|
| | **Damage to the stem in unmounted state**<br>If you operate the actuator electrically without valve, the stem may be damaged by exceeding the defined range of extension.<br>▶ Only operate the product in mounted state |

| | |
|---|---|
| | After having connected the power supply, the internal energy store will be charged first before the actuator reacts.<br>Charging of the energy store generally has priority over the actuator functions. |




*Illust. 5: Connection assignment*

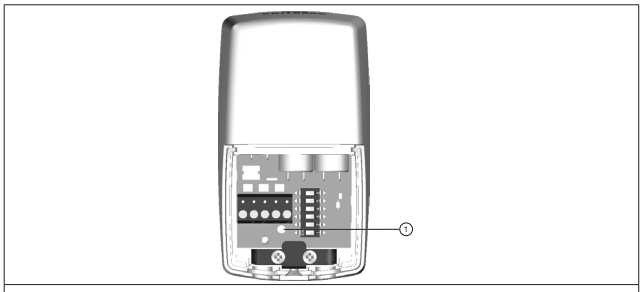
| | |
|---|---|
| **(1)** | 0 V AC/DC - blue (BU) |
| **(2)** | 24 V AC/DC - brown (BN) |
| **(3)** | Control 0 - 10 V DC - grey (GY) |
| **(4)** | Position feedback 0 V DC - yellow (YE) |
| **(5)** | Position feedback 0 -10 V DC - green (GN) |

- ▶ Connect the power supply according to the desired assignment in Illust. 5 on page 9.
- ▷ The energy store will be charged.
- ▷ After about 2.5 minutes, the actuator will carry out an initialisation run and is ready for operation.

| | |
|---|---|
| | The supply voltage must not be interrupted during the initialisation run. |

# 6. Operation

## 6.1 Status LED




*Illust. 6: Status LED*

| | |
|---|---|
| **(1)** | Status LED |

The status LED is located under the casing cover and displays the operating status of the actuator.

| Status-LED | Bedeutung |
|---|---|
| Flashing red | Charging of the capacitors after switching on |
| Flashing green | Initialisation run, recognition of neutral point active |
| Lit green | Operating voltage applied, normal operation |
| Off | Emergency control mode triggered, no operating voltage |

## 6.2 Normal operation

The actuator is automatically controlled via the control technology.

## 6.3 Emergency control function

▷ If the operating voltage fails, the actuator will move to the set emergency end position.

▷ Once the operating voltage has been restored, the energy store will be charged first.

▷ After that, the actuator will follow the signals of the control technology.

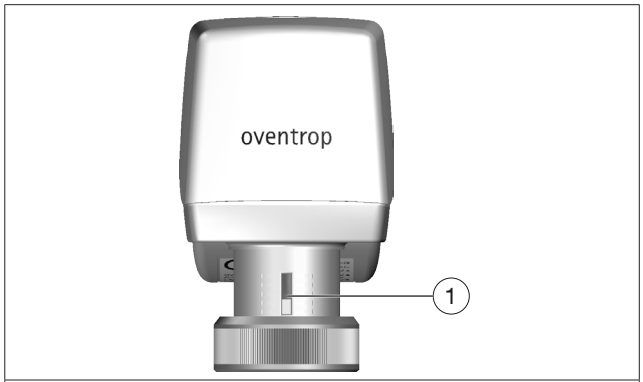
| | |
|---|---|
| | The emergency control function will only be available after successful completion of the initialisation run (displayed by a constantly lit green LED ). |

# 7. Maintenance

The actuator is maintenance-free.

# 8. Removal and reinstallation

## 8.1 Removal




*Illust. 7: Stroke position indicator*

| | |
|---|---|
| **(1)** | Stroke position indicator of the actuator |

**CAUTION**

**Risk of burns due to hot components**

An unprotected contact with hot components may lead to burns.

▶ Allow the valve to cool down before working on it.

***NOTICE***

**It may not be possible to unscrew the collar nut by hand**

Without operating voltage, the actuator may close the valve with the maximum actuating power of 200 N. In this case, the collar nut can no longer be unscrewed by hand.

▶ Do not use pliers or similar to loosen the collar nut!

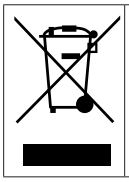
1. Set the DIP switch 6 to "ON" (see section 5.2 on page 9).
2. Disconnect the actuator from the power supply.

▷ The actuator will move to the upper stroke position.

3. Disconnect all electrical connections.
4. Loosen the collar nut.
5. Remove the actuator from the valve.

# 9. Disposal

## Guideline 2012/19/EU WEEE:



Waste electrical and electronic equipment (WEEE) must not be disposed of with domestic waste, but must be dropped off at a collection point for the recycling of electrical and electronic appliances.

***NOTICE***

**Risk of environmental pollution**

Incorrect disposal (for instance with the domestic waste) may lead to environmental damage.

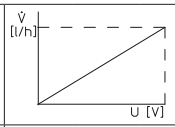
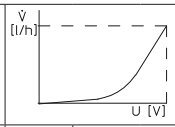
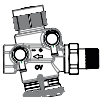
- ▶ Packaging material is to be disposed of in an environmentally friendly manner.
- ▶ Components are to be disposed of professionally.

If no return or disposal agreement has been made, the product has to be disposed of.

- ▶ If possible, the components are to be recycled.
- ▶ Components, which cannot be recycled, are to be disposed of according to the local regulations. Disposal with the domestic waste is inadmissible.

# 10. Appendix

## Settings of the DIP switches

| Valve + actuator = | | |  | | | | | |  | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Valve type** | Model | Control range | DIP switches | | | | | | DIP switches | | | | | |
| | | | **S1** | **S2** | **S3** | **S4** | **S5** | | **S1** | **S2** | **S3** | **S4** | **S5** |
|  Cocon QTZ **PN 25** | DN 10/15 30 - 210 l/h | 30 - 90 l/h | ON | OFF | ON | OFF | OFF | | | | | | | |
| | | 91 - 150 l/h | OFF | ON | ON | OFF | OFF | | OFF | ON | ON | OFF | ON |
| | | 151 - 210 l/h | ON | ON | ON | OFF | OFF | | ON | ON | ON | OFF | ON |
| | DN 10/15 150 - 700 l/h | 150 - 250 l/h | OFF | OFF | OFF | ON | OFF | | | | | | |
| | | 251 - 500 l/h | ON | OFF | OFF | ON | OFF | | OFF | OFF | OFF | ON | ON |
| | | 501 - 700 l/h | OFF | ON | OFF | ON | OFF | | ON | OFF | OFF | ON | ON |
| | DN 15 200 - 1300 l/h | 200 - 300 l/h | ON | ON | OFF | ON | OFF | | | | | | |
| | | 301 - 500 l/h | ON | ON | ON | OFF | OFF | | ON | ON | ON | OFF | ON |
| | | 501 - 900 l/h | OFF | OFF | ON | ON | OFF | | OFF | ON | OFF | ON | ON |
| | | 901 - 1300 l/h | ON | OFF | ON | ON | OFF | | ON | ON | OFF | ON | ON |
| | DN 20 250 - 1800 l/h | 250 - 400 l/h | ON | ON | OFF | ON | OFF | | | | | | |
| | | 401 - 800 l/h | OFF | ON | ON | OFF | OFF | | OFF | ON | ON | OFF | ON |
| | | 801 - 1100 l/h | OFF | OFF | ON | OFF | ON | | OFF | ON | ON | ON | ON |
| | | 1101 - 1500 l/h | OFF | ON | ON | ON | OFF | | OFF | OFF | ON | ON | ON |
| | | 1501 - 1800 l/h | ON | ON | ON | ON | OFF | | ON | ON | OFF | ON | ON |
| | DN 25 400 - 2500 l/h | 400 - 700 l/h | OFF | OFF | OFF | OFF | ON | | | | | | |
| | | 701 - 1100 l/h | OFF | ON | ON | OFF | OFF | | OFF | ON | ON | OFF | ON |
| | | 1101 - 2100 l/h | ON | OFF | OFF | OFF | ON | | ON | OFF | ON | ON | ON |
| | | 2101 - 2500 l/h | OFF | ON | OFF | OFF | ON | | ON | ON | OFF | ON | ON |
| | DN 32 600 - 4800 l/h | 600 - 800 l/h | ON | ON | OFF | OFF | ON | | | | | | |
| | | 801 - 2800 l/h | OFF | OFF | ON | OFF | ON | | OFF | ON | ON | ON | ON |
| | | 2801 - 4800 l/h | ON | OFF | ON | OFF | ON | | ON | ON | ON | ON | ON |
| Cocon 2TZ | kvs = 0.45 | 0.25 U. | OFF | ON | OFF | OFF | OFF | | | | | | |
| | | 0.26 - 4 U. | ON | OFF | OFF | OFF | OFF | | | | | | |
| | kvs = 1.0 | 0.5 - 1U. | OFF | ON | OFF | OFF | OFF | | | | | | |
| | | 1.1 - 4.5 U | OFF | OFF | ON | OFF | ON | | | | | | |
| | kvs = 1.8 | 0.5 - 7 U. | OFF | ON | OFF | OFF | OFF | | | | | | |
| | kvs = 4.5 | 0.75 - 1 U. | OFF | OFF | ON | OFF | ON | | | | | | |
| | | 1.1 - 7 U. | ON | OFF | ON | OFF | ON | | | | | | |
| Hycocon HTZ | DN 15 kvs = 1.7 | 0.5 - 0.75 U. | ON | ON | OFF | OFF | OFF | | | | | | |
| | | 0.76 - 3 U. | OFF | ON | OFF | OFF | OFF | | | | | | |
| | DN 20 kvs = 2.7 | 0.5 - 0.75 U. | ON | ON | OFF | OFF | OFF | | | | | | |
| | | 0.76 - 1.5 U. | OFF | OFF | ON | OFF | ON | | | | | | |
| | | 1.6 - 3 U. | ON | OFF | ON | OFF | ON | | | | | | |
| | DN 25 kvs = 3.6 | 0.5 - 0.75 U. | OFF | OFF | ON | OFF | OFF | | | | | | |
| | | 0.76 - 1.0 U. | ON | ON | OFF | OFF | OFF | | | | | | |
| | | 1.1 - 1.5 U. | OFF | ON | OFF | OFF | OFF | | | | | | |
| | | 1.6 - 3.0 U. | OFF | OFF | ON | OFF | ON | | | | | | |
| | | 3.1 - 3.5 U. | OFF | OFF | OFF | OFF | OFF | | | | | | |
| | DN 32 kvs = 6.8 | 0.5 U. | OFF | OFF | ON | OFF | OFF | | | | | | |
| | | 0.6 - 1.0 U. | ON | ON | OFF | OFF | OFF | | | | | | |
| | | 1.1 - 2.0 U. | OFF | ON | OFF | OFF | OFF | | | | | | |
| | | 2.1 - 3.0 U. | ON | OFF | OFF | OFF | OFF | | | | | | |
| | | 3.1 - 4.0 U. | OFF | OFF | OFF | OFF | OFF | | | | | | |
| | DN 40 kvs = 10 | 0.5 - 0.75 U. | ON | ON | OFF | OFF | OFF | | | | | | |
| | | 0.76 - 1.5 U. | OFF | ON | OFF | OFF | OFF | | | | | | |
| | | 1.6 - 2.5 U. | ON | OFF | OFF | OFF | OFF | | | | | | |
| | | 2.6 - 4.0 U. | OFF | OFF | OFF | OFF | OFF | | | | | | |
| Products of other manufacturers (M30x1.5, s=11.8mm) | Valve stroke h | h = 0.5 mm | OFF | OFF | ON | OFF | OFF | | | | | | |
| | | h = 1.0 mm | ON | ON | OFF | OFF | OFF | | | | | | |
| | | h = 2.0 mm | OFF | ON | OFF | OFF | OFF | | | | | | |
| | | h = 3.0 mm | ON | OFF | OFF | OFF | OFF | | | | | | |
| | | h = 4.0 mm | OFF | OFF | OFF | OFF | OFF | | | | | | |

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