

Modulating rotary actuator fail-safe for rotary valves and butterfly valves

- Torque motor 40 Nm
- Nominal voltage AC/DC 24 V
- Control modulating 2...10 V
- Position feedback 2...10 V


Technical data

| | | |
|------------------------|--|---|
| Electrical data | Nominal voltage | AC/DC 24 V |
| | Nominal voltage frequency | 50/60 Hz |
| | Nominal voltage range | AC 19.2...28.8 V / DC 21.6...28.8 V |
| | Power consumption in operation | 11 W |
| | Power consumption in rest position | 3 W |
| | Power consumption for wire sizing | 21 VA |
| | Power consumption for wire sizing note | Imax 20 A @ 5 ms |
| | Connection supply / control | Terminals 1 m, 4 x 0.75 mm ² |
| | Parallel operation | Yes (note the performance data) |
| Functional data | Torque motor | 40 Nm |
| | Operating range Y | 2...10 V |
| | Input Impedance | 100 kΩ |
| | Operating range Y variable | Start point 0.5...30 V End point 2.5...32 V |
| | Position feedback U | 2...10 V |
| | Position feedback U note | Max. 0.5 mA |
| | Position feedback U variable | Start point 0.5...8 V End point 2.5...10 V |
| | Position accuracy | ±5% |
| | Manual override | with push-button, can be locked |
| | Running time motor | 150 s / 90° |
| | Running time motor variable | 90...150 s |
| | Adaptation setting range | manual (automatic on first power-up) |
| | Sound power level, motor | 52 dB(A) |
| | Position indication | Mechanical |
| Safety data | Protection class IEC/EN | III, Safety Extra-Low Voltage (SELV) |
| | Power source UL | Class 2 Supply |
| | Degree of protection IEC/EN | IP66/67 |
| | Degree of protection NEMA/UL | NEMA 4X |
| | Enclosure | UL Enclosure Type 4X |
| | EMC | CE according to 2014/30/EU |
| | Certification IEC/EN | IEC/EN 60730-1 and IEC/EN 60730-2-14 |
| | UL Approval | cULus according to UL60730-1A, UL60730-2-14 and CAN/CSA E60730-1 The UL marking on the actuator depends on the production site, the device is UL-compliant in any case |
| | Mode of operation | Type 1 |
| | Rated impulse voltage supply / control | 0.8 kV |
| | Pollution degree | 3 |

| | | |
|------------------------|---------------------|--------------------------|
| Safety data | Ambient humidity | Max. 100% RH |
| | Ambient temperature | -30...50°C [-22...122°F] |
| | Storage temperature | -40...80°C [-40...176°F] |
| | Servicing | maintenance-free |
| Mechanical data | Connection flange | F05 |
| Weight | Weight | 2.9 kg |

Safety notes


- This device has been designed for use in stationary heating, ventilation and air-conditioning systems and must not be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Outdoor application: only possible in case that no (sea) water, snow, ice, insolation or aggressive gases interfere directly with the device and that it is ensured that the ambient conditions remain within the thresholds according to the data sheet at any time.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- The switch for changing the direction of rotation may only be operated by authorised specialists. The direction of rotation must not in particular be reversed in a frost protection circuit.
- The device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.
- Cables must not be removed from the device.
- The device contains electrical and electronic components and must not be disposed of as household refuse. All locally valid regulations and requirements must be observed.

Product features

| | |
|-------------------------------------|--|
| Fields of application | The actuator is particularly suitable for utilisation in outdoor applications and is protected against the following weather conditions: - UV radiation - Rain / Snow - Dirt / Dust - Air humidity - Alternating climate / frequent and severe temperature fluctuations (Recommendation: use the actuator with integrated factory-installed heating which can be ordered separately to prevent internal condensation) |
| Mode of operation | The actuator moves the valve to the desired operating position at the same time as the integrated capacitors are loaded. Interrupting the supply voltage causes the valve to be moved to the selected fail-safe position by means of stored electrical energy. |
| Parametrisable actuators | The factory settings cover the most common applications. Single parameters can be modified with the Belimo Service Tools MFT-P or ZTH EU. |
| Simple direct mounting | Simple direct mounting on the rotary valve or butterfly valve with mounting flange. The mounting orientation in relation to the fitting can be selected in 90° steps. |
| Manual override | Manual control with push-button possible - temporary. The gear train is disengaged and the actuator decoupled for as long as the button is pressed. |
| Adjustable angle of rotation | Adjustable angle of rotation with mechanical end stops. |
| High functional reliability | The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached. |

Home position The first time the supply voltage is switched on, i.e. at the time of commissioning, the actuator carries out an adaptation, which is when the operating range and position feedback adjust themselves to the mechanical setting range.

The actuator then moves into the position defined by the control signal.

Factory setting: Y2 (counter-clockwise rotation).

Adaptation and synchronisation An adaptation can be triggered manually by pressing the "Adaptation" button or with the PC-Tool. Both mechanical end stops are detected during the adaptation (entire setting range).

Automatic synchronisation after pressing the manual override button is configured. The synchronisation is in the home position (0%).

The actuator then moves into the position defined by the control signal.

A range of settings can be adapted using the PC-Tool (see MFT-P documentation)

Accessories

| Electrical accessories | Description | Type |
|------------------------|---|---------|
| | Auxiliary switch 1 x SPDT add-on | S1A |
| | Auxiliary switch 2 x SPDT add-on | S2A |
| | Feedback potentiometer 140 Ω add-on | P140A |
| | Feedback potentiometer 200 Ω add-on | P200A |
| | Feedback potentiometer 500 Ω add-on | P500A |
| | Feedback potentiometer 1 kΩ add-on | P1000A |
| | Feedback potentiometer 2.8 kΩ add-on | P2800A |
| | Feedback potentiometer 5 kΩ add-on | P5000A |
| | Feedback potentiometer 10 kΩ add-on | P10000A |
| Tools | Description | Type |
| | Service Tool, with ZIP-USB function, for parametrisable and communicative Belimo actuators, VAV controller and HVAC performance devices | ZTH EU |
| | Belimo PC-Tool, Software for adjustments and diagnostics | MFT-P |
| | Connection cable 5 m, A: RJ11 6/4 ZTH EU, B: 6-pin for connection to service socket | ZK1-GEN |
| | Connection cable 5 m, A: RJ11 6/4 ZTH EU, B: free wire end for connection to MP/PP terminal | ZK2-GEN |
| Options ex works only | Description | Type |
| | Heater, with adjustable thermostat | HT24-MG |
| | Heater, with mechanical humidistat | HH24-MG |

Electrical installation

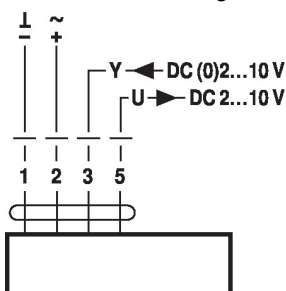

Supply from isolating transformer.

Parallel connection of other actuators possible. Observe the performance data.

Direction of rotation switch Factory setting: Direction of rotation Y2.

Wiring diagrams

AC/DC 24 V, modulating

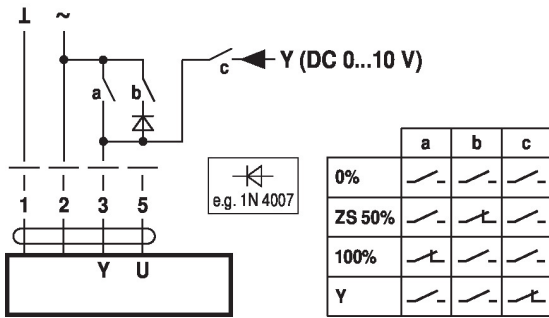

Cable colours:

- 1 = black
- 2 = red
- 3 = white
- 5 = orange

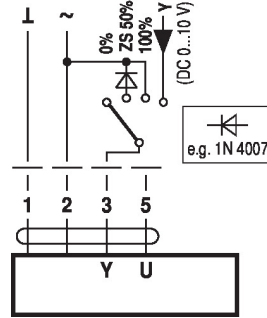
Functions

Functions with basic values (conventional mode)

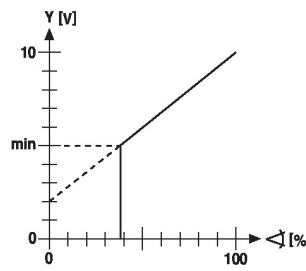
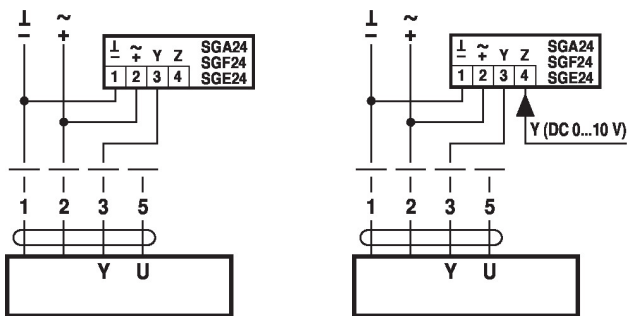
Override control with AC 24 V with relay contacts



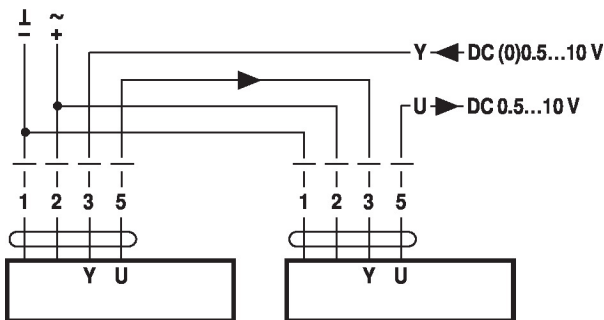
Override control with AC 24 V with rotary switch



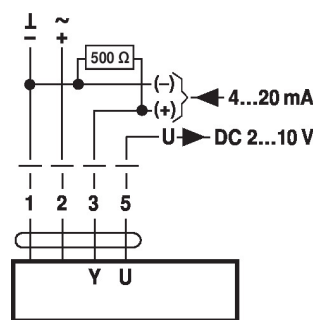
Control remotely 0...100% with positioner SG..



Follow-up control (position-dependent)

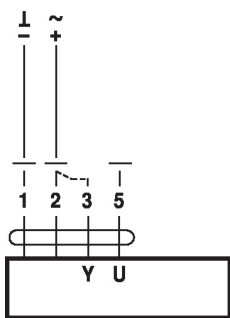


Control with 4...20 mA via external resistor



Caution:
The operating range must be set to DC 2...10 V.
The 500 Ω resistor converts the 4...20 mA current signal to a voltage signal DC 2...10 V

Functional check

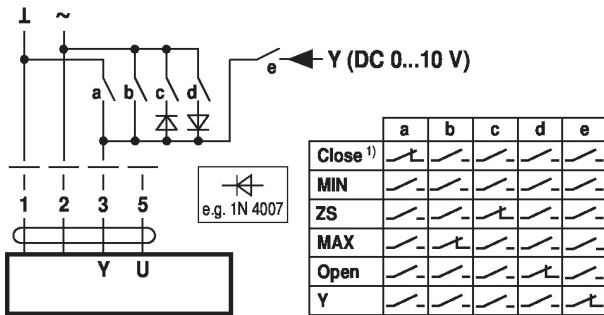


Procedure

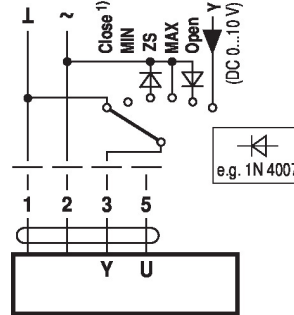
1. Connect 24 V to connections 1 and 2
2. Disconnect connection 3:
 - with direction of rotation Y1: Actuator rotates to the left
 - with direction of rotation Y2: Actuator rotates to the right
3. Short-circuit connections 2 and 3:
 - Actuator runs in opposite direction

Functions with specific parameters (parametrisation necessary)

Override control and limiting with AC 24 V with relay contacts

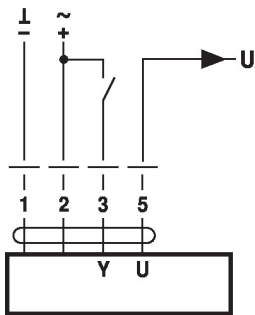


Override control and limiting with AC 24 V with rotary switch

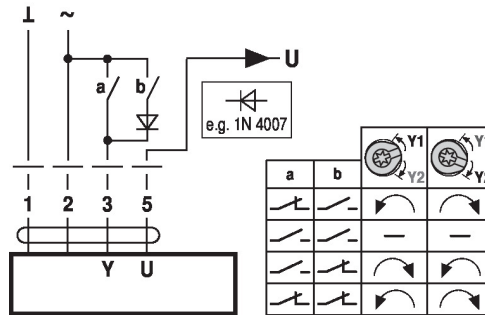


1) **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

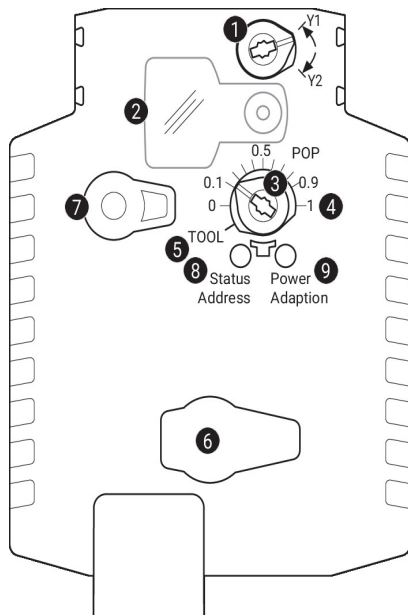
Control open/close



Control 3-point



Operating controls and indicators



1 Direction of rotation switch

Switch over: Direction of rotation changes

2 Cover, POP button

3 POP button

4 Scale for manual adjustment

5 Position for adjustment with tool

6 Service plug

For connecting parametrisation and service tools

7 Manual override button

Press button: Gear train disengages, motor stops, manual override possible

Release button: Gear train engages, standard mode

LED displays

| yellow 8 | green 9 | Meaning / function |
|-----------------|----------------|--|
| Off | On | Operation OK |
| Off | Flashing | POP function active |
| On | Off | Fault |
| Off | Off | Not in operation |
| On | On | Adaptation or synchronisation process active |
| Flickering | On | Communication with programming tool |

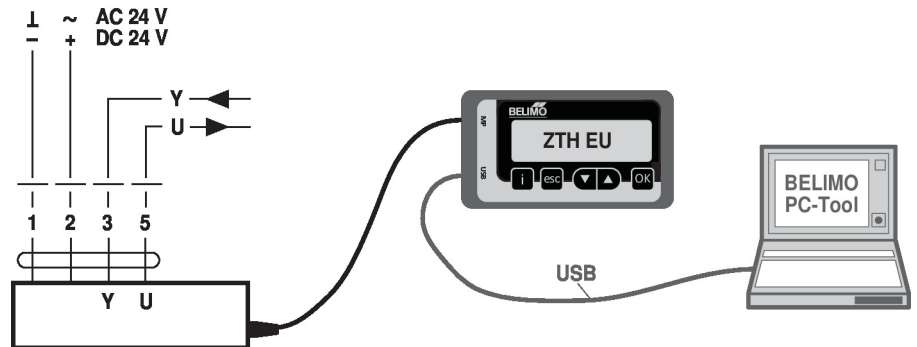
9 Push-button (LED green)

Press button: Triggers angle of rotation adaptation, followed by standard mode

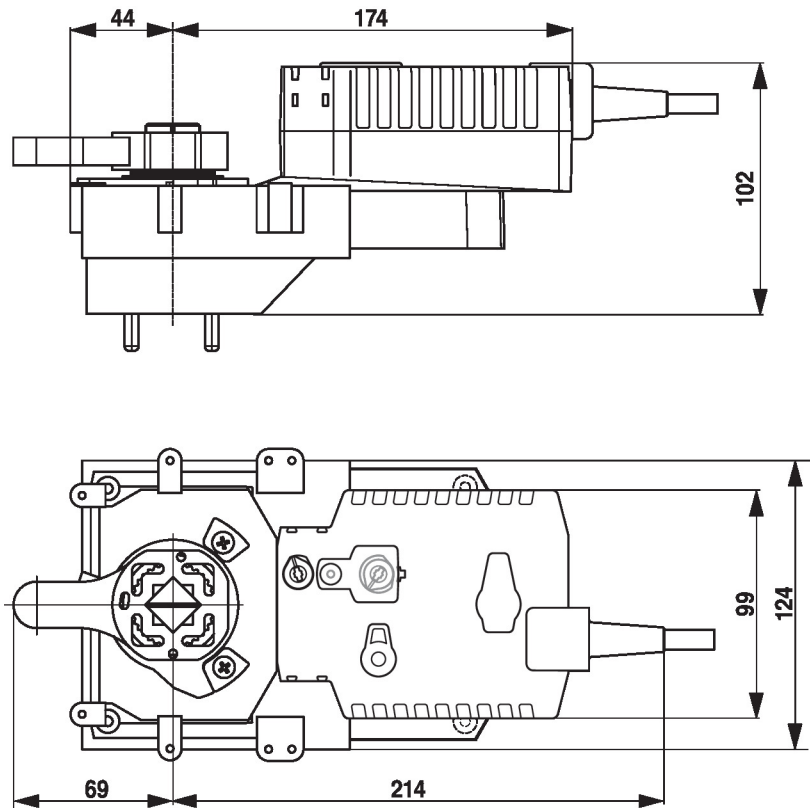
Service

Tools connection The actuator can be parametrised by ZTH EU via the service socket. For an extended parametrisation the PC tool can be connected.

Connection ZTH EU / PC-Tool



Dimensions



Further documentation

- The complete product range for water applications
- Data sheets for rotary valves and butterfly valves
- Installation instructions for actuators and/or rotary valves and butterfly valves
- General notes for project planning