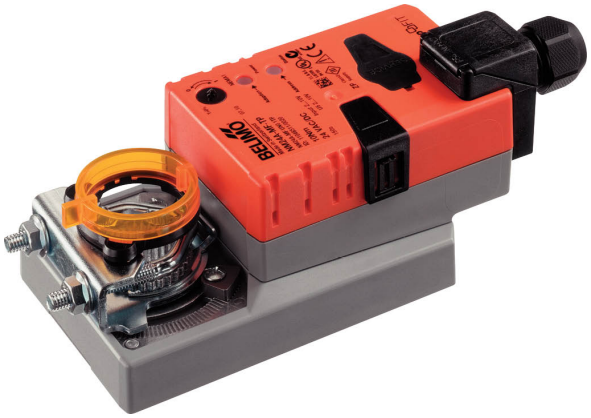
Configurable damper actuator for adjusting dampers in technical building installations

- Air damper size up to approx. 2 m²
- Torque motor 10 Nm
- Nominal voltage AC/DC 24 V
- Control modulating 2...10 V variable
- Position feedback 2...10 V variable
- with connecting terminals



## 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 | 3.5 W |
| | Power consumption in rest position | 1.3 W |
| | Power consumption for wire sizing | 6 VA |
| | Connection supply / control | Terminals 4 mm² (cable ø4...10 mm, 4-wire) |
| | Parallel operation | Yes (note the performance data) |
| **Functional data** | Torque motor | 10 Nm |
| | Torque variable | 25%, 50%, 75% reduced |
| | Operating range Y | 2...10 V |
| | Input impedance | 100 kΩ |
| | Operating range Y variable | Start point 0.5...30 V<br>End point 2.5...32 V |
| | Operating modes optional | Open/close<br>3-point (AC only)<br>Modulating (DC 0...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<br>End point 2.5...10 V |
| | Position accuracy | ±5% |
| | Direction of motion motor | selectable with switch 0/1 |
| | Direction of motion note | Y = 0 V: At switch position 0 (ccw rotation) / 1 (cw rotation) |
| | Direction of motion variable | electronically reversible |
| | Manual override | with push-button, can be locked |
| | Angle of rotation | Max. 95° |
| | Angle of rotation note | can be limited on both sides with adjustable mechanical end stops |
| | Running time motor | 150 s / 90° |
| | Running time motor variable | 43...173 s |
| | Adaptation setting range | manual |
| | Adaptation setting range variable | No action<br>Adaptation when switched on<br>Adaptation after pushing the manual override button |

## Technical data

| | | |
|---|---|---|
| **Functional data** | Override control | MAX (maximum position) = 100%<br>MIN (minimum position) = 0%<br>ZS (intermediate position, AC only) = 50% |
| | Override control variable | MAX = (MIN + 32%)...100%<br>MIN = 0%...(MAX – 32%)<br>ZS = MIN...MAX |
| | Sound power level, motor | 35 dB(A) |
| | Mechanical interface | Universal shaft clamp 8...26.7 mm |
| | Position indication | Mechanical, pluggable |
| **Safety data** | Protection class IEC/EN | III, Safety Extra-Low Voltage (SELV) |
| | Power source UL | Class 2 Supply |
| | Degree of protection IEC/EN | IP54 |
| | Degree of protection NEMA/UL | NEMA 2 |
| | Enclosure | UL Enclosure Type 2 |
| | 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<br>The UL marking on the actuator depends on the production site, the device is UL-compliant in any case |
| | Type of action | Type 1 |
| | Rated impulse voltage supply / control | 0.8 kV |
| | Pollution degree | 3 |
| | Ambient humidity | Max. 95% RH, non-condensing |
| | Ambient temperature | -30...50°C [-22...122°F] |
| | Storage temperature | -40...80°C [-40...176°F] |
| | Servicing | maintenance-free |
| **Weight** | Weight | 0.67 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 with during installation.
- 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.
- To calculate the torque required, the specifications supplied by the damper manufacturers concerning the cross-section and the design, as well as the installation situation and the ventilation conditions must be observed.
- 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

**Operating mode**
The actuator is connected with a standard control signal of 0...10 V and drives to the position defined by the control signal. Measuring voltage U serves for the electrical display of the damper position 0...100% and as control signal for other actuators.

**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 damper shaft with a universal shaft clamp, supplied with an anti-rotation device to prevent the actuator from rotating.

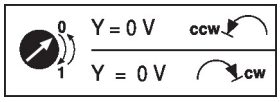
**Manual override**
Manual override with push-button possible (the gear train is disengaged for as long as the button is pressed or remains locked).

**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 a synchronisation. The synchronisation is in the home position (0%).

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




**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 1x SPDT add-on | S1A |
| Auxiliary switch 2x SPDT add-on | S2A |
| Feedback potentiometer 140 Ω add-on | P140A |
| Feedback potentiometer 1 kΩ add-on | P1000A |
| Feedback potentiometer 10 kΩ add-on | P10000A |
| Signal converter voltage/current 100 kΩ 4...20 mA, Supply AC/DC 24 V | Z-UIC |
| Positioner for wall mounting | SGA24 |
| Positioner for built-in mounting | SGE24 |
| Positioner for front-panel mounting | SGF24 |
| Positioner for wall mounting | CRP24-B1 |

**Mechanical accessories**

| Description | Type |
|---|---|
| Actuator arm for standard shaft clamp (one-sided) | AH-25 |
| Shaft extension 240 mm ø20 mm for damper shaft ø8...22.7 mm | AV8-25 |
| Ball joint suitable for damper crank arm KH8 | KG8 |
| Ball joint suitable for damper crank arm KH8 / KH10 | KG10A |
| Damper crank arm Slot width 8.2 mm, clamping range ø10...18 mm | KH8 |
| Shaft clamp one-sided, clamping range ø8...26 mm with insert, Multipack 20 pcs. | K-ENMA |
| Shaft clamp one-sided, clamping range ø8...26 mm, Multipack 20 pcs. | K-ENSA |
| Shaft clamp reversible, clamping range ø8...20 mm | K-NA |
| Form fit insert 8x8 mm, Multipack 20 pcs. | ZF8-NMA |
| Form fit insert 10x10 mm, Multipack 20 pcs. | ZF10-NSA |

## Accessories

| | Description | Type |
|---|---|---|
| | Form fit insert 12x12 mm, Multipack 20 pcs. | ZF12-NSA |
| | Form fit insert 15x15 mm, Multipack 20 pcs. | ZF15-NSA |
| | Form fit insert 16x16 mm, Multipack 20 pcs. | ZF16-NSA |
| | Mounting kit for linkage operation for flat installation | ZG-NMA |
| | Anti-rotation mechanism 180 mm, Multipack 20 pcs. | Z-ARS180 |
| | Baseplate extension for NM..A to NM.. | Z-NMA |
| | Position indicator, Multipack 20 pcs. | Z-PI |
| | Terminal protection IP54, Multipack 20 pcs. | Z-TP |
| **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 |
| | Adapter for Service-Tool ZTH | MFT-C |
| | Connecting cable 5 m, A: RJ11 6/4 ZTH EU, B: 6-pin for connection to service socket | ZK1-GEN |
| | Connecting cable 5 m, A: RJ11 6/4 ZTH EU, B: free wire end for connection to MP/PP terminal | ZK2-GEN |

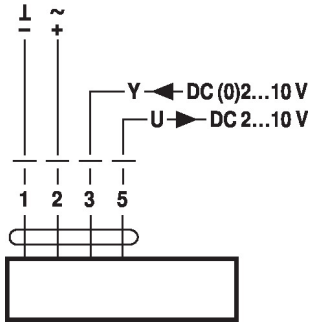
## Electrical installation

**Supply from isolating transformer.**

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

### Wiring diagrams

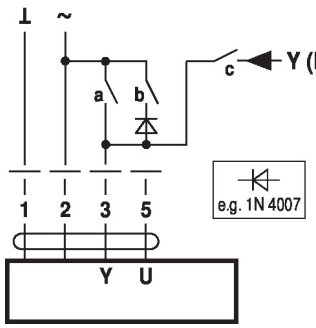
AC/DC 24 V, modulating




## Functions

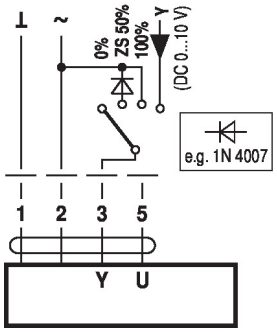
### Functions with basic values (conventional mode)

Override control with AC 24 V with relay contacts



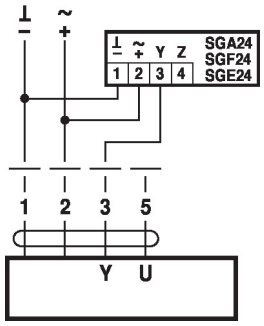

| | a | b | c |
|---|---|---|---|
| 0% | | | |
| ZS 50% | | | |
| 100% | | | |
| Y | | | |

Override control with AC 24 V with rotary switch

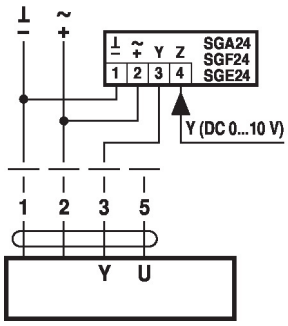


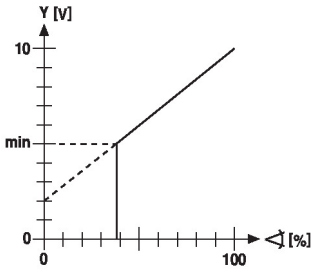
### Functions with basic values (conventional mode)

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

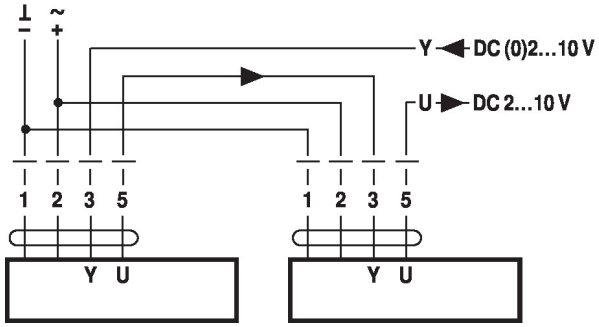



Minimum limit with positioner SG..

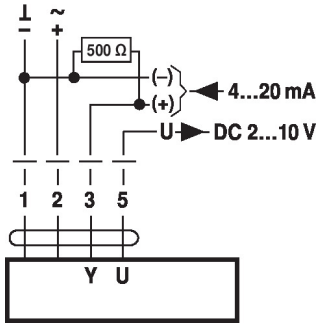



Primary/secondary operation (position-dependent)

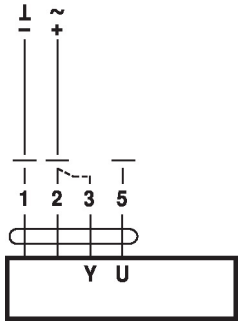



Control with 4...20 mA via external resistor




**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

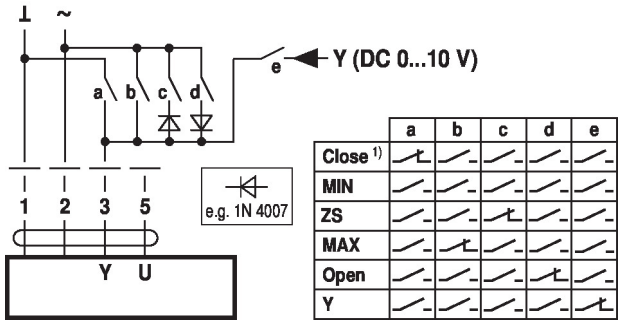
Functional check




**Procedure**
1. Connect 24 V to connections 1 and 2
2. Disconnect connection 3:
– with direction of rotation 0: Actuator rotates to the left
– with direction of rotation 1: Actuator rotates to the right
3. Short-circuit connections 2 and 3:
– Actuator runs in opposite direction

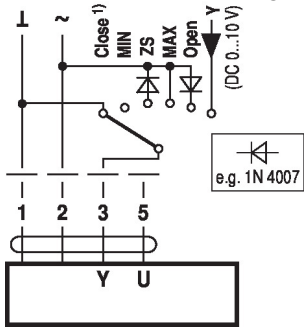
### Functions with specific parameters (parametrisation necessary)

Override control and limiting with AC 24 V with relay contacts




| | a | b | c | d | e |
|---|---|---|---|---|---|
| Close [1] | ⊥ | – | – | – | – |
| MIN | – | ⊥ | – | – | – |
| ZS | – | – | ⊥ | – | – |
| MAX | – | ⊥ | – | – | – |
| Open | – | – | – | ⊥ | – |
| Y | – | – | – | – | ⊥ |

Override control and limiting with AC 24 V with rotary switch

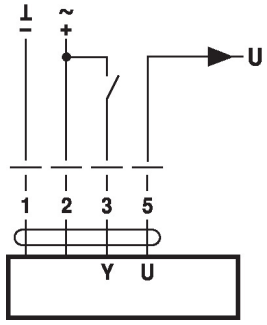



1) **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

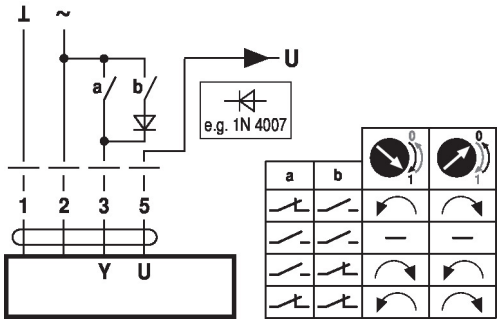
## Functions

**Functions with specific parameters (parametrisation necessary)**

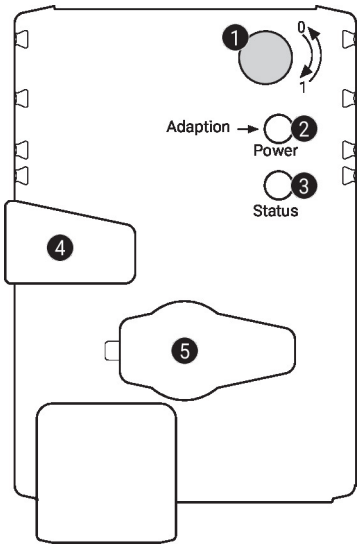
Control open/close




Control 3-point




## Operating controls and indicators




**1 Direction of rotation switch**

| | |
|---|---|
| Switch over: | Direction of rotation changes |

**2 Push-button and LED display green**

| | |
|---|---|
| Off: | No power supply or malfunction |
| On: | In operation |
| Press button: | Triggers angle of rotation adaptation, followed by standard mode |

**3 Push-button and LED display yellow**

| | |
|---|---|
| Off: | Standard mode |
| On: | Adaptation or synchronisation process active |
| Press button: | No function |

**4 Manual override button**

| | |
|---|---|
| Press button: | Gear train disengages, motor stops, manual override possible |
| Release button: | Gear train engages, synchronisation starts, followed by standard mode |

**5 Service plug**

For connecting parametrisation and service tools

**Check power supply connection**

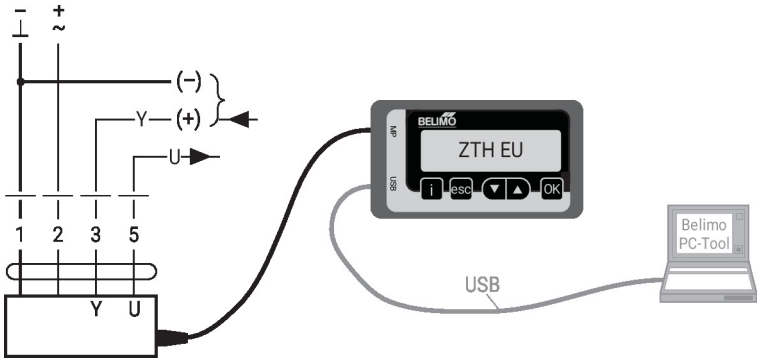
| | |
|---|---|
| 2 Off and 3 On | Possible wiring error in power supply |

## Service

**Tools connection**

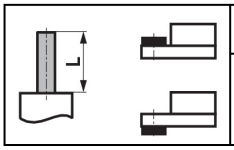
The actuator can be parametrised by ZTH EU via the service socket.
For an extended parametrisation the PC tool can be connected.

Connection ZTH EU / PC-Tool




## Dimensions

**Spindle length**

| | |
|---|---|
|  | Min. 40 |
| | Min. 20 |



**Clamping range**

| | | | |
|---|---|---|---|
| | 8...26.7 | ≥8 | ≤26.7 |
| * | 8...20 | ≥8 | ≤20 |

*Option: Shaft clamp mounted below (accessories K-NA needed)