

Configurable damper actuator in the IP66/67 protective housing for adjustment of dampers in industrial plants and building installations

- Air damper size up to approx. 3.2 m<sup>2</sup>
- Torque motor 16 Nm
- Nominal voltage AC/DC 24 V
- Control modulating 2...10 V variable
- Position feedback 2...10 V variable
- Running time motor 7 s variable
- Optimum weather protection for use outdoors (for use in ambient temperatures up to -40°C, there is a separate actuator available with built-in heater)


**Technical data**

<b>Electrical data</b>	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	15 W
	Power consumption in rest position	2 W
	Power consumption for wire sizing	26 VA
	Power consumption for wire sizing note	Imax 20 A @ 5 ms
	Connection supply / control	Cable 1 m, 4 x 0.75 mm <sup>2</sup> (halogen-free)
	Parallel operation	Yes (note the performance data)
<b>Functional data</b>	Torque motor	16 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 End point 2.5...32 V
	Options positioning signal	Open/close 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 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 (under protective housing)
	Angle of rotation	Max. 95°
	Angle of rotation note	can be limited on both sides with adjustable mechanical end stops
	Minimum angle of rotation	Min. 30°
	Running time motor	7 s / 90°
	Running time motor variable	7...35 s
	Adaptation setting range	manual (automatic on first power-up)
Adaptation setting range variable	No action Adaptation when switched on Adaptation after pushing the gear disengagement button	

	Override control	MAX (maximum position) = 100% MIN (minimum position) = 0% ZS (intermediate position, AC only) = 50%
	Override control variable	MAX = (MIN + 32%)...100% MIN = 0%...(MAX - 32%) ZS = MIN...MAX
	Sound power level, motor	63 dB(A)
	Mechanical interface	Universal shaft clamp 12...26.7 mm
	Position indication	Mechanically, pluggable
<b>Safety data</b>	Protection class IEC/EN	III Safety Extra-Low Voltage (SELV)
	Protection class UL	UL Class 2 Supply
	Degree of protection IEC/EN	IP66/67
	Degree of protection NEMA/UL	NEMA 4X UL Enclosure Type 4X
	EMC	CE according to 2014/30/EU
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Certification UL	cULus according to UL60730-1A, UL60730-2-14 and CAN/CSA E60730-1:02 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
	Control pollution degree	4
	Ambient temperature	-30...40°C
	Ambient temperature note	Caution: +40...+50°C utilisation possible only under certain restrictions. Please contact your supplier.
	Storage temperature	-40...80°C
Ambient humidity	Max. 100% r.H.	
Servicing	maintenance-free	
<b>Weight</b>	Weight	3.6 kg

**Safety notes**



- The device must not be used outside the specified field of application, especially not in aircraft or in any other airborne means of transport.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- Junction boxes must at least correspond with enclosure IP degree of protection!
- The cover of the protective housing may be opened for adjustment and servicing. When it is closed afterwards, the housing must seal tight (see installation instructions).
- 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.
- The cables must not be removed from the device installed in the interior.
- Self adaption is necessary when the system is commissioned and after each adjustment of the angle of rotation (press the adaption push-button once).
- To calculate the torque required, the specifications supplied by the damper manufacturers concerning the cross-section, the design, the installation site 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.
- The actuator is not designed for applications where chemical influences (gases, fluids) are present or for utilisation in corrosive environments in general.
- The actuator may not be used in plenary applications (e.g. suspended ceilings or raised floors).
- The materials used may be subject to external influences (temperature, pressure, construction fastening, effect of chemical substances, etc.), which cannot be simulated in laboratory tests or field trials. In case of doubt, we definitely recommend that you carry out a test. This information does not imply any legal entitlement. Belimo will not be held liable and will provide no guarantee.
- Flexible metallic cable conduits or threaded cable conduits of equal value are to be used for UL (NEMA) Type 4X applications.
- When used under high UV loads, e.g. extreme sunlight, the use of flexible metallic or equivalent cable conduits is recommended.

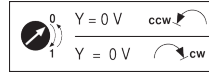
**Product features**

<b>Fields of application</b>	The actuator is particularly suitable for utilisation in outdoor applications and is protected against the following weather conditions: <ul style="list-style-type: none"> <li>- UV radiation</li> <li>- Rain / Snow</li> <li>- Dirt / Dust</li> <li>- Air humidity</li> <li>- 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)</li> </ul>
<b>Mode of operation</b>	The actuator is connected with a standard modulating signal of 0...10 V and drives to the position defined by the positioning signal. Measuring voltage U serves for the electrical display of the damper position 0.5...100% and as slave control signal for other actuators.
<b>Parametrisable actuators</b>	The factory settings cover the most common applications. Single parameters can be modified with the Belimo Service Tools MFT-P or ZTH EU.
<b>Simple direct mounting</b>	Simple direct mounting on the damper shaft with a universal shaft clamp, supplied with an anti-rotation device to prevent the actuator from rotating.
<b>Manual override</b>	Manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked). The housing cover must be removed for manual override.
<b>Adjustable angle of rotation</b>	Adjustable angle of rotation with mechanical end stops. A minimum permissible angle of rotation of 30° must be allowed for. The housing cover must be removed to set the angle of rotation.
<b>High functional reliability</b>	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 adaption, which is when the operating range and position feedback adjust themselves to the mechanical setting range.

The detection of the mechanical end stops enables a gentle approach to the end positions, thus protecting the actuator mechanics.

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



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

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

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

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

## Accessories

Electrical accessories	Description	Type
	Positioner for wall mounting	CRP24-B1
	Feedback potentiometer 10 kΩ add-on	P10000A
	Feedback potentiometer 1 kΩ add-on	P1000A
	Feedback potentiometer 140 Ω add-on	P140A
	Feedback potentiometer 200 Ω add-on	P200A
	Feedback potentiometer 2.8 kΩ add-on	P2800A
	Feedback potentiometer 5 kΩ add-on	P5000A
	Feedback potentiometer 500 Ω add-on	P500A
	Auxiliary switch 1 x SPDT add-on	S1A
	Auxiliary switch 2 x SPDT add-on	S2A
	Positioner for wall mounting	SGA24
	Positioner for built-in mounting	SGE24
	Positioner for front-panel mounting	SGF24
	Adapter for auxiliary switch and feedback potentiometer	Z-SPA
	Signal converter voltage/current 100 kΩ Supply AC/DC 24 V	Z-UIC
Mechanical accessories	Description	Type
	Cable gland for cable diameter Ø 4...10 mm	Z-KB-PG11
Service tools	Description	Type
	Adapter for Service-Tool ZTH	MFT-C
	Belimo PC-Tool, Software for adjustments and diagnostics	MFT-P
	Service Tool, with ZIP-USB function, for parametrisable and communicative Belimo actuators, VAV controller and HVAC performance devices	ZTH EU
Options ex works only	Description	Type
	Heating, with mechanical humidistat	HH24-MG
	Heating, with adjustable thermostat	HT24-MG

## Electrical installation

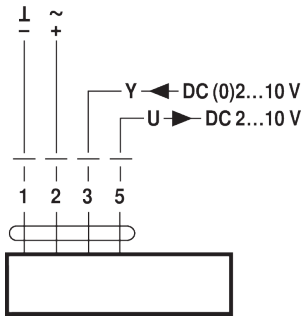


**Supply from isolating transformer.**

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

### Wiring diagrams

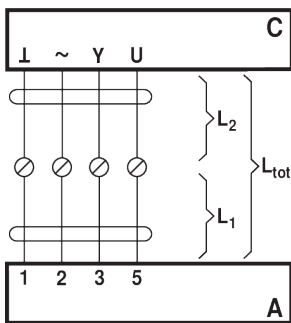
AC/DC 24 V, modulating



#### Cable colours:

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

Signal cable lengths



L <sub>2</sub> ┴ / ~	L <sub>tot</sub> = L <sub>1</sub> + L <sub>2</sub>	
	AC	DC
0.75 mm <sup>2</sup>	≤30 m	≤5 m
1.00 mm <sup>2</sup>	≤40 m	≤8 m
1.50 mm <sup>2</sup>	≤70 m	≤12 m
2.50 mm <sup>2</sup>	≤100 m	≤20 m

A = Actuator

C = Control unit (controlling unit)

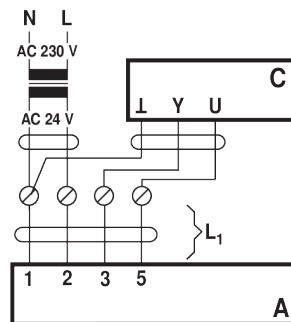
L1 = Connecting cable of the actuator

L2 = Customer cable

L<sub>tot</sub> = Maximum signal cable length

#### Note:

When several actuators are connected in parallel, the maximum signal cable length must be divided by the number of actuators.



A = Actuator

C = Control unit (controlling unit)

L1 = Connecting cable of the actuator

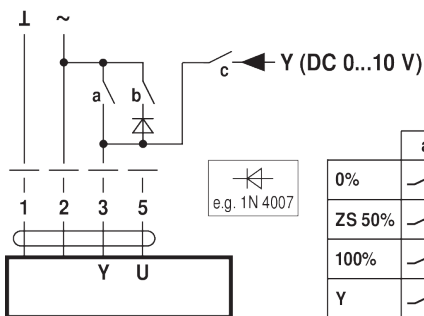
#### Note:

There are no special restrictions on installation if the supply and the data cable are routed separately.

## Functions

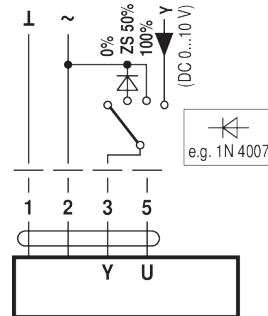
### Functions with basic values (conventional mode)

Override control with AC 24 V with relay contacts

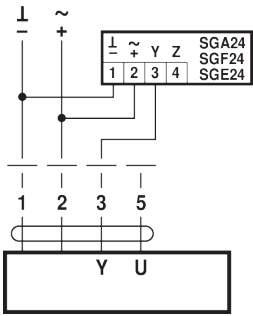


	a	b	c
0%	—	—	—
ZS 50%	—	—	—
100%	—	—	—
Y	—	—	—

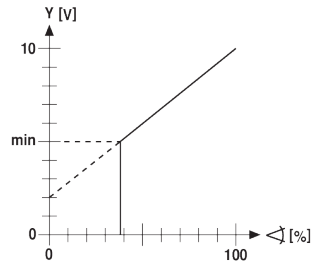
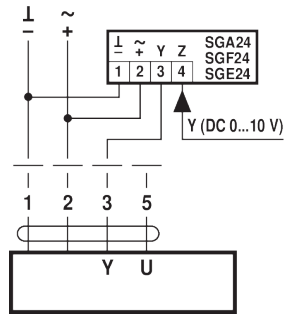
Override control with AC 24 V with rotary switch



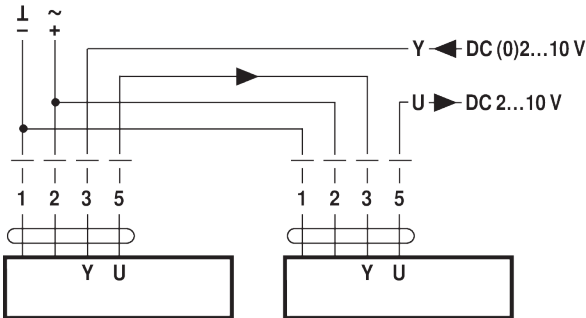
Control remotely 0...100% with positioner SG..



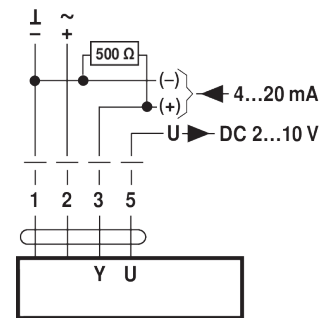
Minimum limit with positioner SG..



Follow-up control (position-dependent)



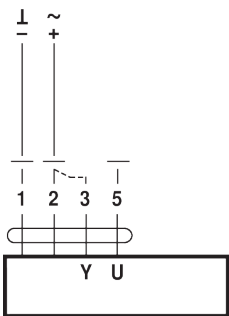
Control with 4...20 mA via external resistor



**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

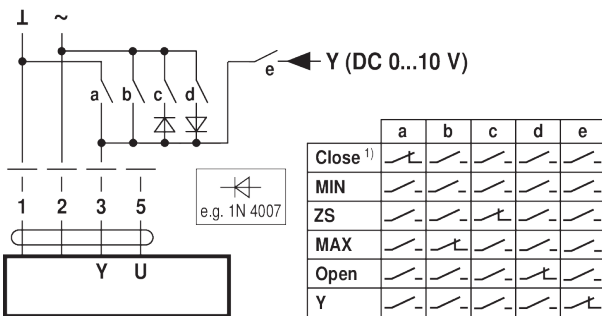


**Procedure**

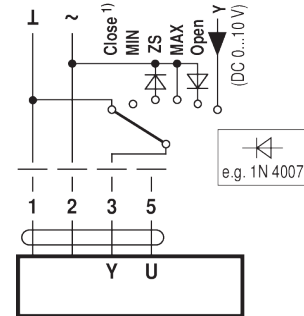
1. Connect 24 V to connections 1 and 2
2. Disconnect connection 3:
  - with direction of rotation 0: Actuator rotates to the left
  - with direction of rotation 1: Actuator rotates to the right
3. Short-circuit connections 2 and 3:
  - Actuator runs in opposite direction

**Functions for actuators with specific parameters (Parametrisation necessary)**

Override control and limiting with AC 24 V with relay contacts

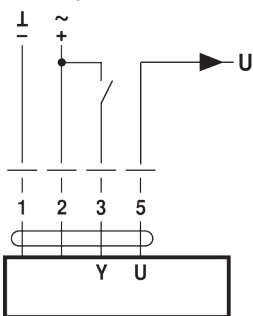


Override control and limiting with AC 24 V with rotary switch

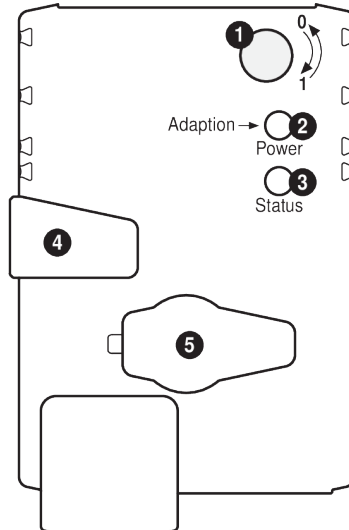
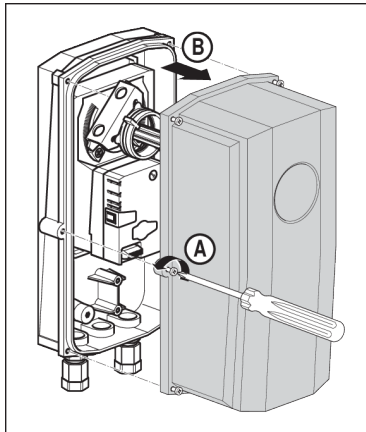


1) **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

Control open/close



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 synchronising process active  
Press button: No function
  - 4 Gear disengagement button**  
Press button: Gear disengages, motor stops, manual override possible  
Release button: Gear engages, synchronisation starts, followed by standard mode
  - 5 Service plug**  
For connecting parameterisation and service tools
- Check power supply connection**  
**2** Off and **3** On Possible wiring error in power supply

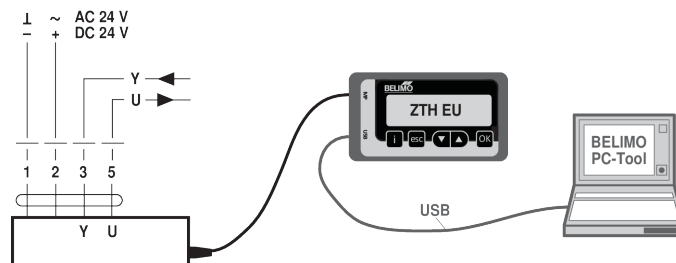
Installation notes

**Negative torque** Max. 50% of the torque (Caution: Application possible only with restrictions. Please contact your supplier.)

Service

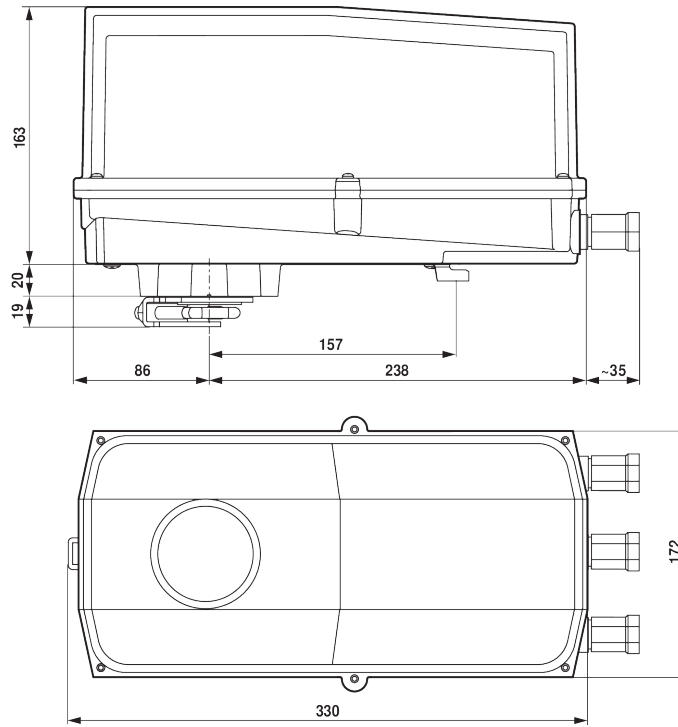
**Service Tools connection** The actuator can be parametrised by ZTH EU via the service socket.  
For an extended parametrisation the PC tool can be connected.

Connection ZTH EU / PC-Tool



Dimensions

Dimensional drawings



Clamping range

	12...22	12...18
	22...26.7	12...18

Shaft length

