**Parameterisable damper actuator for adjusting dampers in technical building installations**

- **Air damper size up to approx. 1.5 m²**
- **Nominal torque 8 Nm**
- **Nominal voltage AC/DC 24 V**
- **Control Modulating DC (0)2...10 V Variable**
- **Position feedback DC 2...10 V Variable**
- **Running time motor 4 s Variable**

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	13 W
	Power consumption in rest position	2 W
	Power consumption for wire sizing	23 VA
	Power consumption for wire sizing note	Imax 20 A @ 5 ms
	Connection supply / control	Cable 1 m, 4 x 0.75 mm²
	Parallel operation	Yes (note the performance data)
Functional data	Torque motor	Min. 8 Nm
	Torque variable	25%, 50%, 75% reduced
	Positioning signal Y	DC 0...10 V
	Positioning signal Y note	Input impedance 100 kΩ
	Control signal Y variable	Open-close Modulating (DC 0...32 V)
	Operating range Y	DC 2...10 V
	Operating range Y variable	Start point DC 0.5...30 V End point DC 2.5...32 V
	Position feedback U	DC 2...10 V
	Position feedback U note	Max. 0.5 mA
	Position feedback U variable	Start point DC 0.5...8 V End point DC 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	Gear disengagement 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
	Minimum angle of rotation	Min. 30°
	Running time motor	4 s / 90°
	Motor running time variable	4...20 s
	Adaption setting range	manual (automatic on first power-up)
	Adaption setting range variable	No action Adaption when switched on Adaption 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	56 dB(A)
	Spindle driver	Universal spindle clamp reversible 8...26.7 mm
	Position indication	Mechanically, pluggable

Technical data

|		
Safety	Protection class IEC/EN	III Safety extra-low voltage
	Protection class UL	UL Class 2 Supply
	Degree of protection IEC/EN	IP54
	Degree of protection NEMA/UL	NEMA 2, UL Enclosure Type 2
	EMC	CE according to 2004/108/EC
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Certification UL	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1:02
	Mode of operation	Type 1
	Rated impulse voltage supply / control	0.8 kV
	Control pollution degree	3
	Ambient temperature	-30...40°C
	Ambient temperature note	Caution: +40...+50°C utilisation possible only under certain restrictions. Please contact your supplier.
	Non-operating temperature	-40...80°C
	Ambient humidity	95% r.h., non-condensing
	Maintenance	Maintenance-free
Weight	Weight	1.1 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.
- Outdoor application: only possible in case that no (sea)water, snow, ice, insolation or aggressive gases interfere directly with the actuator and that is ensured that the ambient conditions remain at any time within the thresholds according to the data sheet.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied 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.
- 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.

Product features

Mode of operation
The actuator is connected with a standard modulating signal of DC 0...10V and drives to the position defined by the positioning signal. Measuring voltage U serves for the electrical display of the damper position 0...100% and as slave control signal for other actuators.

Parameterisable 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 spindle with an universal spindle clamp, supplied with an anti-rotation device to prevent the actuator from rotating.

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

High functional reliability
The actuator is overload protected, requires no limit switches in intermediate positions and automatically stops when the end stop is reached (at rest).

Adjustable angle of rotation
Adjustable angle of rotation with mechanical end stops. A minimum permissible angle of rotation of 30° must be allowed for.

Product features

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.
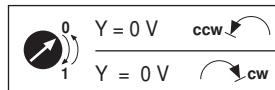
Adaption and synchronisation	An adaption can be triggered manually by pressing the "Adaption" button or with the PC-Tool. Both mechanical end stops are detected during the adaption (entire setting range). Automatic synchronisation after pressing the gearbox disengagement button is configured. The synchronisation 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

	Description	Type
Electrical accessories	Auxiliary switch, add-on, 1 x SPDT	S1A
	Auxiliary switch, add-on, 2 x SPDT	S2A
	Auxiliary switch, add-on, 2 x SPDT, grey	S2A GR
	Auxiliary switch and feedback pot. Adapter	Z-SPA
	Feedback potentiometer 140 Ohm, add-on	P140A
	Feedback potentiometer 140 Ohm, add-on, grey	P140A GR
	Feedback potentiometer 200 Ohm, add-on	P200A
	Feedback potentiometer 500 Ohm, add-on	P500A
	Feedback potentiometer 500 Ohm, add-on, grey	P500A GR
	Feedback potentiometer 1 kOhm, add-on	P1000A
	Feedback potentiometer 2.8 kOhm, add-on	P2800A
	Feedback potentiometer 2.8 kOhm, add-on, grey	P2800A GR
	Feedback potentiometer 1 kOhm, add-on, grey	P1000A GR
	Feedback potentiometer 5 kOhm, add-on	P5000A
	Feedback potentiometer 5 kOhm, add-on, grey	P5000A GR
	Feedback potentiometer 10 kOhm, add-on	P10000A
	Feedback potentiometer 10 kOhm, add-on, grey	P10000A GR
	Signal converter voltage/current, supply AC/DC 24V	Z-UIC
	Digital position indicator for front-panel mounting, 0...99%, front mass 72 x 72 mm	ZAD24
	Range controller for wall mounting, adjustable electron. Min./max. angle of rotation limitation	SBG24
	Positioner for wall mounting, range 0...100%	SGA24
	Positioner in a conduit box, range 0...100%	SGE24
	Positioner for front-panel mounting, range 0...100%	SGF24
	Positioner for wall mounting, range 0...100%	CRP24-B1
	Connecting cable 5 m, A+B: RJ12 6/6, To ZTH/ZIP-USB-MP	ZK1-GEN
	Connection cable 5 m, A: RJ11 6/4, B: Free wire end, To ZTH/ZIP-USB-MP	ZK2-GEN

	Description	Type
Mechanical accessories	Actuator arm, for one-sided spindle clamp K-ENSA	AH-25
	Shaft extension 250 mm, for damper spindles Ø 8...25 mm	AV8-25
	Spindle clamp, one side for NM..A, SM..A	K-ENSA
	Straight ball joint with M8, suitable for damper crank arms KH8	KG10A
	Angled ball joint with M8, suitable for damper crank arms KH8	KG8
	Damper crank arm, for damper spindles	KH8
	Spindle clamp, reversible for SM..A and NMQ..	K-SA

Accessories

Description	Type
Universal mounting bracket 180 mm	Z-ARS180
Angle of rotation limiter, for K-NA	20334-00001
Form fit insert 10x10 mm, for NM..A / SM..A	ZF10-NSA
Form fit insert 12x12 mm, for NM..A / SM..A	ZF12-NSA
Form fit insert 15x15 mm	ZF15-NSA
Form fit insert 16x16 mm, for NM..A / SM..A	ZF16-NSA
Mounting kit for linkage operation, NM..A for flat installation	ZG-NMA
Position indication for LM..A, NM..A, SM..A, GM..A	Z-PI

	Description	Type
Service Tools	Service Tool, for MF/MP/Modbus/LonWorks actuators and VAV-Controller	ZTH EU
	Belimo PC-Tool, software for adjustments and diagnostics	MFT-P
	Adapter to Service-Tool ZTH	MFT-C

Electrical installation

Notes
- Connection via safety isolating transformer.
- Parallel connection of other actuators possible. Observe the performance data.

Wiring diagrams

AC/DC 24 V, modulating

Y ← DC (0)2...10 V
U → DC 2...10 V
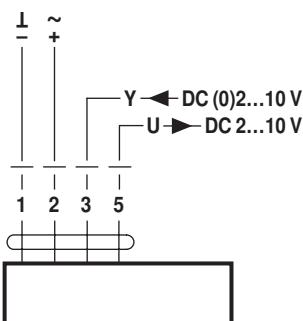
Cable colours:
1 = black
2 = red
3 = white
5 = orange

Signal cable lengths

L_2	$L_{tot} = L_1 + L_2$	
⊥ / ~	AC	DC
0.75 mm^2	≤30 m	≤5 m
1.00 mm^2	≤40 m	≤8 m
1.50 mm^2	≤70 m	≤12 m
2.50 mm^2	≤100 m	≤20 m
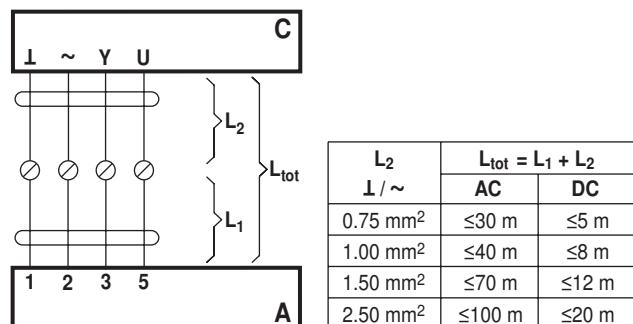
A = actuator
C = control unit
L1 = actuator connecting cable
L2 = customer cable
Ltot = maximum signal cable length

Note:
In the event of several actuators switched in parallel, the maximum signal cable length is to be divided by the number of actuators.

Electrical installation
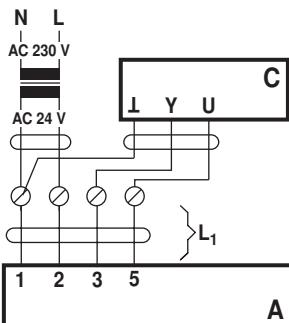
A = actuator
C = control unit
L1 = actuator connecting cable

Note:
If supply and data line are handled separately, then no special limitations apply for the installation.

Functions

Functions with basic values (conventional mode)

Override control with AC 24 V with relay contacts

e.g. 1N 4007

|	a	b	c
0%			
ZS 50%			
100%			
Y			
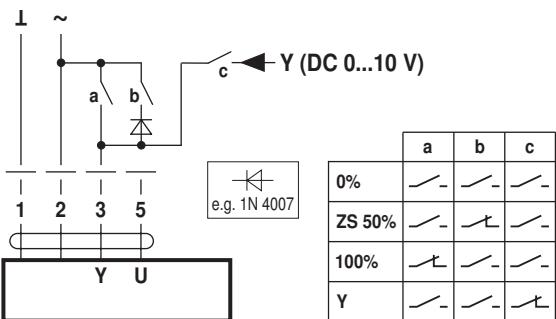
Override control with AC 24 V with rotary switch

e.g. 1N 4007
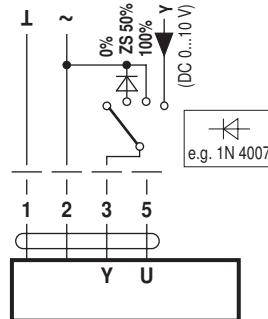
Remote control 0...100% with positioner SG..
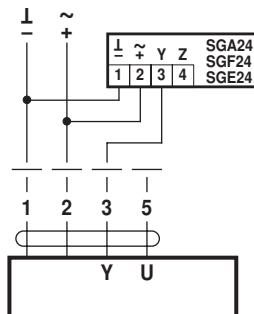
Minimum limit with positioner SG..

Y (DC 0...10 V)
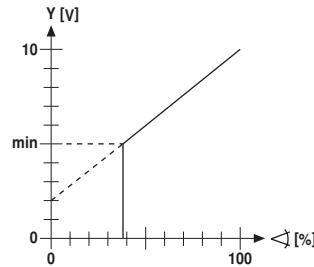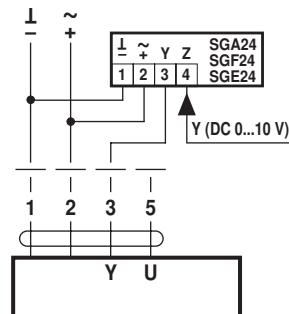
Follow-up control (position-dependent)

Y ◄ DC (0)2...10 V
U ► DC 2...10 V
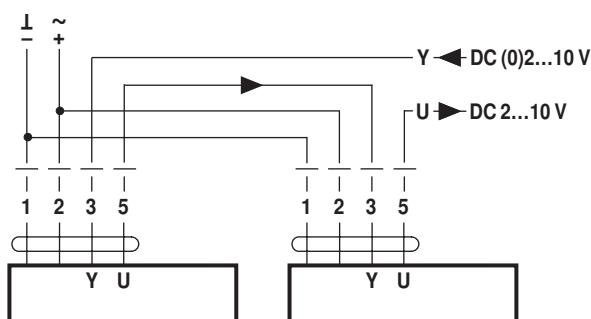
Position indication
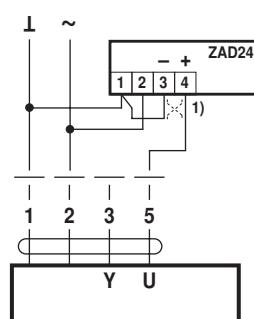
(1) Adapting the direction of rotation

Functions

Control with 4...20 mA via external resistor

Functional check

500 Ω

(–) ◄ **4...20 mA**
(+)

U ► **DC 2...10 V**

1 2 3 5

Y U

1 2 3 5

Y U
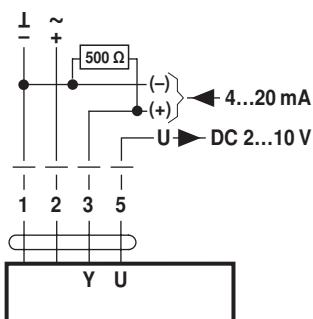
Caution:
The operating range must be set to DC 2...10 V.
The 500 Ω resistor converts the 4...20 mA current signal to a voltage signal DC 2...10 V
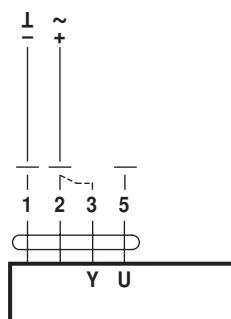
Procedure
1. Connect 24V to connections 1 and 2
2. Disconnect connection 3:
– with direction of rotation 0:
Actuator rotates to the left
– with direction of rotation 1:
Actuator rotates to the right
3. Short-circuit connections 2 and 3:
– Actuator runs in opposite direction

Functions for actuators with specific parameters (Parametrisation with PC-Tool necessary)

Override control and limiting with AC 24 V with relay contacts

a b c d   e ◄ **Y (DC 0...10 V)**

1 2 3 5

e.g. 1N 4007

Y U
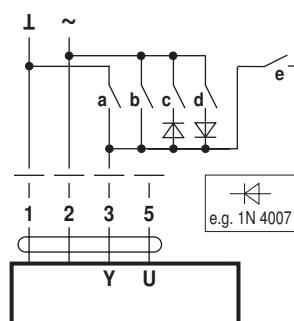
	a	b	c	d	e
Close [1]					
MIN					
ZS					
MAX					
Open					
Y					

Override control and limiting with AC 24 V with rotary switch

Close [1] MIN ZS MAX Open   Y (DC 0...10 V)

1 2 3 5

e.g. 1N 4007

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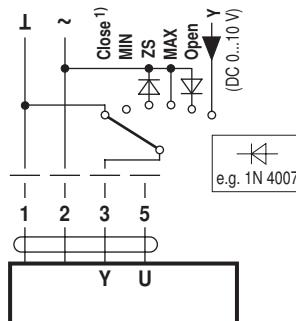
1) **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

Control open-close

► **U**

1 2 3 5

Y U
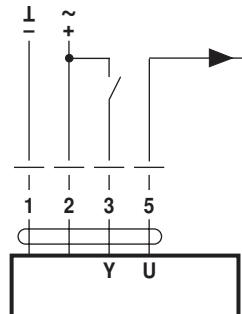
Operating controls and indicators
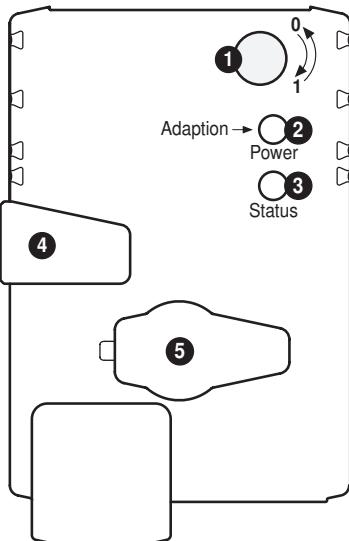
❶ Direction of rotation switch

Switch over:	Direction of rotation changes

❷ 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

❸ Push-button and LED display yellow

Off:	Standard mode
On:	Adaptation or synchronising process active
Press button:	No function

❹ Gear disengagement button

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

❺ Service plug

For connecting parameterisation and service tools

Check power supply connection

❷ Off and ❸ On   Possible wiring error in power supply

Installation notes

Application with transverse forces   max. 50% of the torque (Caution: Application possible only with restrictions. Please contact your supplier.)

## Service

⚠	**Notes**	• The actuator can be parameterised by PC-Tool and ZTH EU via the service socket.

ZTH EU connection
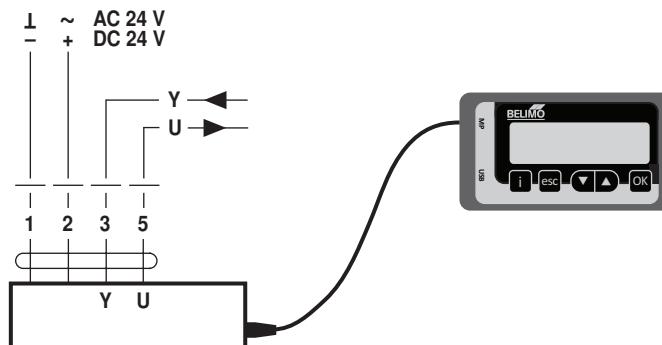
PC-Tool connection
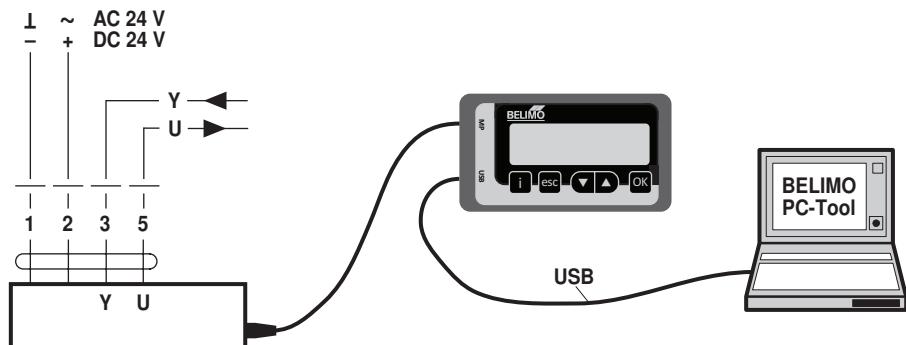
Dimensions [mm]

Spindle length

		Min. 42
		Min. 20

Clamping range

	⬤ ↕	◼ ↕	◆ ↕
	8...26.7	≥8	≤26.7
*	8...20	≥8	≤20
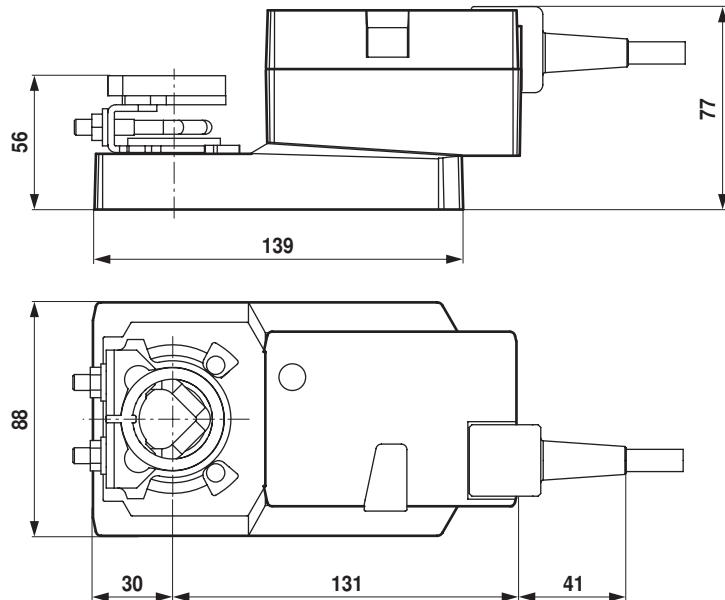
*Option: Spindle clamp mounted below (accessories K-SA needed)
*Option: Spindle clamp mounted below: When an auxiliary switch or a feedback potentiometer is used the adapter Z-SPA is required.

Dimensional drawings