![BELIMO logo]

Communicative spring-return actuator with emergency control function for adjusting dampers in technical building installations
- Air damper size up to approx. 2 m²
- Nominal torque 10 Nm
- Nominal voltage AC/DC 24 V
- Control Modulating DC (0)2...10 V Variable
- Position feedback DC 2...10 V Variable
- Communication via BELIMO MP-Bus
- Conversion of sensor signals

MP BUS®

PROTECT ASSETS
FAIL-SAFE SOLUTIONS BY BELIMO

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	7 W
	Power consumption in rest position	3.5 W
	Power consumption for wire sizing	9.5 VA
	Connection supply / control	Cable 1 m, 4 x 0.75 mm²
	Parallel operation	Yes (note the performance data)
Functional data	Torque motor	Min. 10 Nm
	Torque spring return	Min. 10 Nm
	Positioning signal Y	DC 0...10 V
	Positioning signal Y note	Input impedance 100 kΩ
	Control signal Y variable	Open-close 3-point (AC only) 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 emergency control function	Selectable by mounting L / R
	Direction of motion note	Y = 0 V: At switch position 0 (ccw rotation) / 1 (cw rotation)
	Direction of motion variable	Electronically reversible
	Manual override	By means of hand crank and locking switch
	Angle of rotation	Max. 95°
	Angle of rotation note	adjustable starting at 33% in 2.5% steps (with mechanical end stop)
	Running time motor	150 s / 90°
	Motor running time variable	40...150 s
	Running time emergency control position	<20 s / 90°
	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	40 dB(A)
	Spindle driver	Universal spindle clamp 10...25.4 mm

Technical data

Functional data	Position indication	370
		373
	Service life	Min. 60,000 emergency positions
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.AA
	Rated impulse voltage supply / control	0.8 kV
	Control pollution degree	3
	Ambient temperature	-30...50 °C
	Non-operating temperature	-40...80 °C
	Ambient humidity	95% r.h., non-condensing
	Maintenance	Maintenance-free
Weight	Weight approx.	2.2 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.
- 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 device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.
- Cables must not be removed from the device.

Product features

Mode of operation	Conventional operation: The actuator is connected with a standard modulating signal of DC 0 ... 10V and travels 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. Operation on the MP-Bus: The actuator receives its digital positioning signal from the higher level controller via the MP-Bus and travels to the position defined. Connection U serves as communication interface and does not supply an analogue measuring voltage.
Converter for sensors	Connection option for a sensor (passive or active sensor or switching contact). The MP actuator serves as an analogue/digital converter for the transmission of the sensor signal via MP-Bus to the higher level system.
Parameterisable actuators	The factory settings cover the most common applications. Input and output signals and other parameters can be altered with the PC-Tool MFT-P or with the Service tool ZTH EU.
Direct mounting	Simple direct mounting on the damper spindle with a universal spindle clamp, supplied with a universal mounting bracket to prevent the actuator from rotating.
Manual override	Manual actuation of the damper with manual elevator crank, engagement with the locking switch at any position. Unlocking is manual or automatic by applying the operating voltage.
High functional reliability	The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.
Adjustable angle of rotation	Adjustable angle of rotation with mechanical end stops.

Spring-return actuator, communicative, Modulating,
AC/DC 24 V, 10 Nm

BELIMO®

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 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 actuating the hand crank is programmed. 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
Gateways	Gateway MP for LonWorks®, AC/DC 24 V, LonMark-certified	UK24LON
	Gateway MP to Modbus RTU, AC/DC 24 V	UK24MOD
	Gateway MP for BACnet MS/TP, AC/DC 24 V	UK24BAC
	Gateway MP to KNX/EIB, AC/DC 24 V, EIBA certified	UK24EIB

	Description	Type
Electrical accessories	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
	Connecting board MP bus suitable for wiring boxes EXT-WR-FP..-MP	ZFP2-MP
	MP-Bus power supply for MP actuators, AC 230/24V for local power supply	ZN230-24MP

|	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

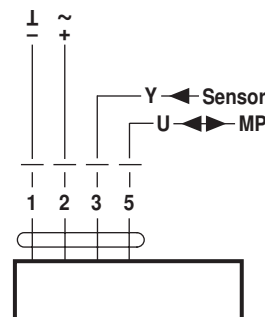| ⚠	**Notes**	• Connection via safety isolating transformer. • Parallel connection of other actuators possible. Observe the performance data.

Wiring diagrams

AC/DC 24 V, modulating
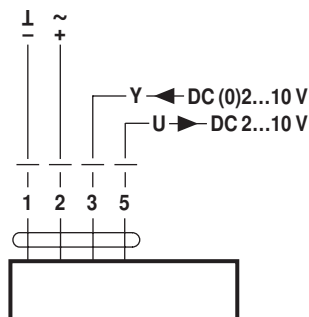
Operation on the MP-Bus

Cable colours:
1 = black
2 = red
3 = white
5 = orange

Cable colours:
1 = black
2 = red
3 = white
5 = orange

Spring-return actuator, communicative, Modulating,
AC/DC 24 V, 10 Nm
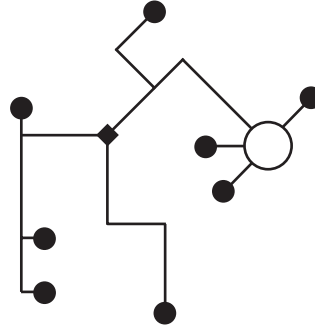
BELIMO

Functions

Functions when operated on MP-Bus
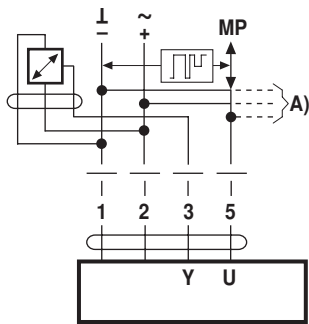
Connection on the MP-Bus

| Y | U |
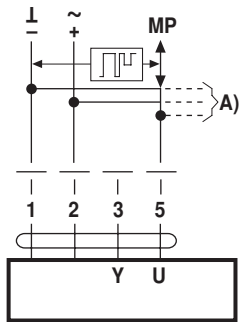
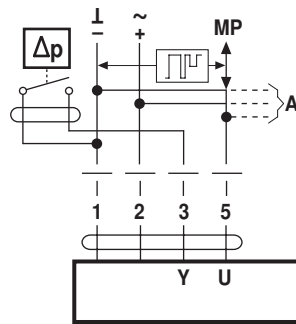A) more actuators and sensors
(max.8)

Network topology

There are no restrictions for the
network topology (star, ring, tree or
mixed forms are permitted).
Supply and communication in one
and the same 3-wire cable
• no shielding or twisting necessary
• no terminating resistors required

Connection of active sensors

A) more actuators and sensors
(max.8)
• Supply AC/DC 24 V
• Output signal DC 0...10 V
  (max. DC 0...32 V)
• Resolution 30 mV

Connection of external switching contact

A) more actuators and sensors
(max.8)
• Switching current 16 mA @ 24 V
• Start point of the operating range
must be parameterised on the MP
actuator as ≥ 0.5 V

Connection of passive sensors
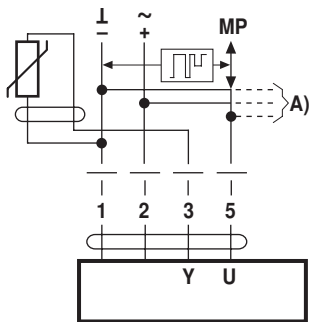
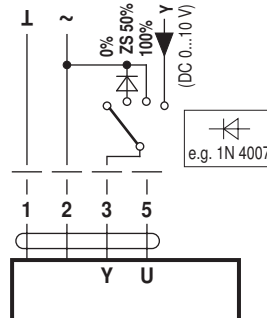|		
Ni1000	−28...+98 °C	850...1600 Ω [2]
PT1000	−35...+155 °C	850...1600 Ω [2]
NTC	−10...+160 °C [1]	200 Ω...60 kΩ [2]

A) more actuators and sensors
(max.8)
1) Depending on the type
2) Resolution 1 Ohm

Functions with basic values (conventional mode)
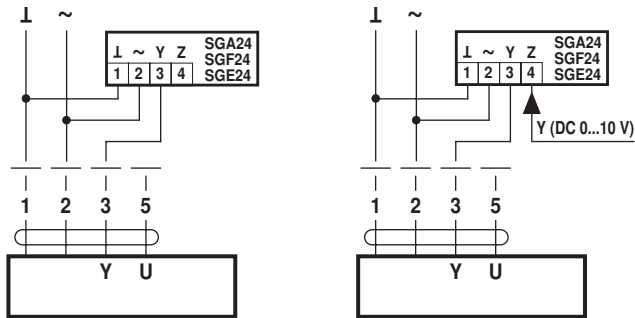
Override control with AC 24 V with relay contacts

→ Y (DC 0...10 V)

e.g. 1N 4007

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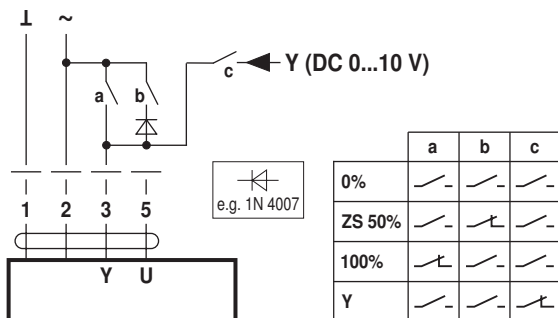
Override control with AC 24 V with rotary switch

e.g. 1N 4007

Functions

Remote control 0...100% with positioner SG..
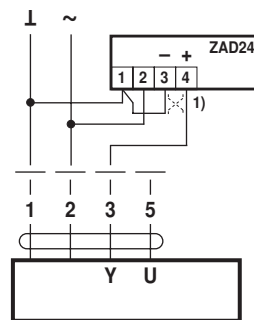
Minimum limit with positioner SG..

SGA24
SGF24
SGE24

⊥ ~ Y Z
1 2 3 4

Y (DC 0...10 V)

Y [V]

10

min

0

0   100

◁ [%]

Follow-up control (position-dependent)

Y ◄ DC (0)2...10 V

U ► DC 2...10 V

Position indication

ZAD24

– +
1 2 3 4

1)
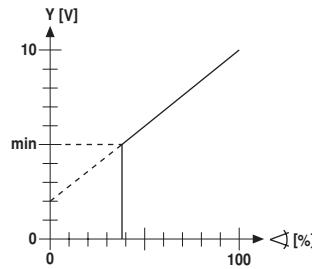
(1) Adapting the direction of rotation
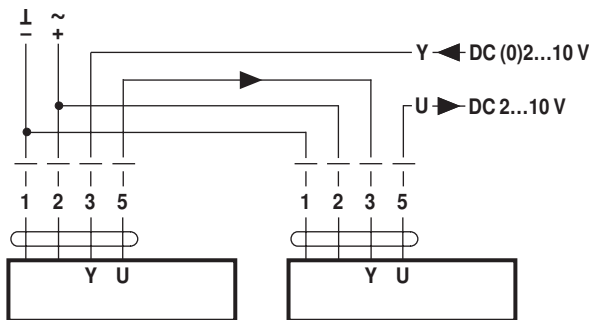
Control with 4...20 mA via external resistor

500 Ω

(–)
(+) ◄ 4...20 mA
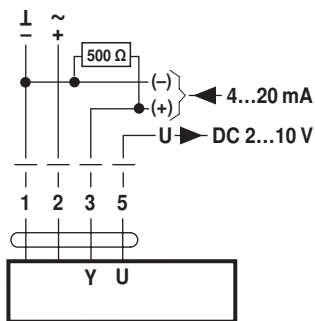
U ► DC 2...10 V

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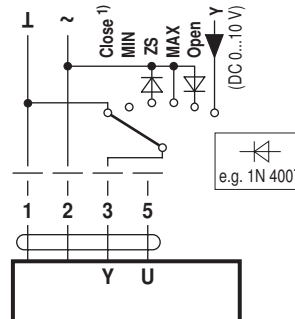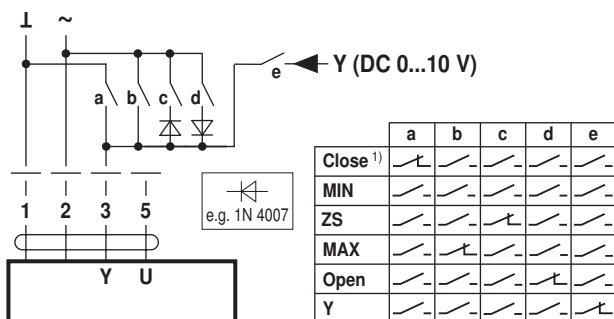
Functional check
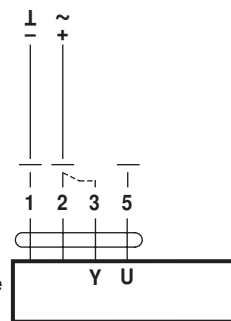
Procedure
1. Connect 24V to connections 1 and 2
2. Disconnect connection 3:
– with direction of rotation 0:
Actuator rotates to the left
– with direction of rotation 1:
Actuator rotates to the right
3. Short-circuit connections 2 and 3:
– Actuator runs in opposite direction

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

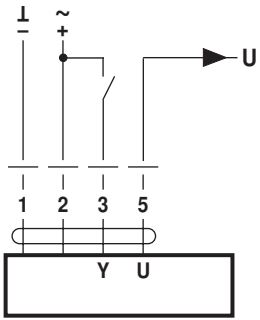Override control and limiting with AC 24 V with relay contacts

a b c d e ◄ Y (DC 0...10 V)

e.g. 1N 4007

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

Override control and limiting with AC 24 V with rotary switch

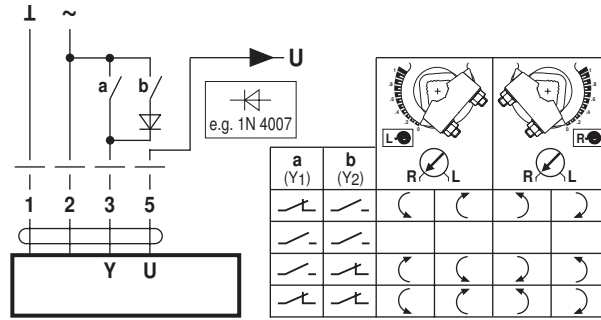Close [1] MIN ZS MAX Open Y (DC 0...10 V)

e.g. 1N 4007

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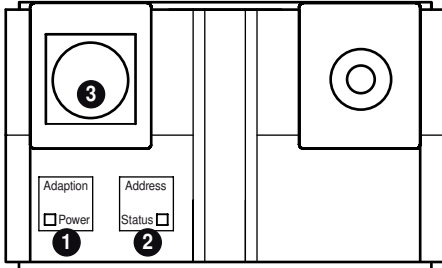
Functions

Control open-close

Control 3-point

Operating controls and indicators

1 **Membrane key and LED display green**

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

2 **Membrane key and LED display gelb**

Off:	Standard mode
Flickering:	MP communication active
On:	Adaptation and synchronising process active
Flashing:	Request for addressing from MP master
Press button:	Confirmation of the addressing

3 **Service plug**

For connecting parameterisation and service tools

Operating elements

The manual override, locking switch and direction of rotation switch elements
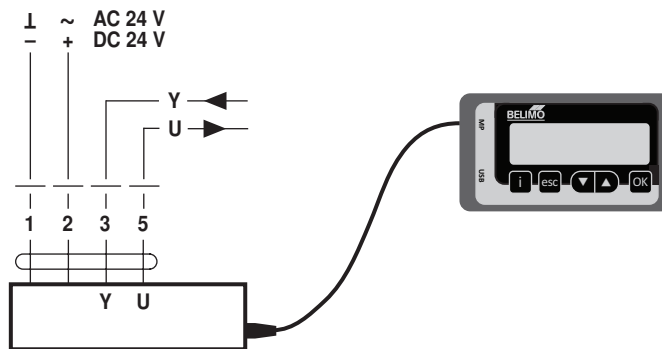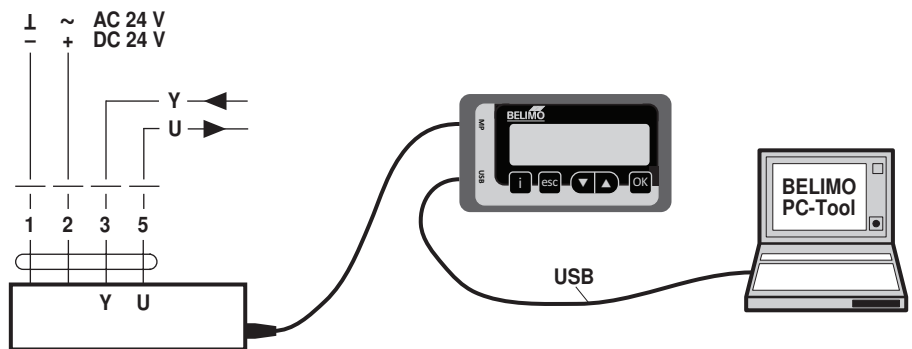are available on both sidesa

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. 85
		Min. 15

Clamping range

	12...22	10	14...25.4
	19...25.5 (26.7)	12...18	

Dimensional drawings