Communicative damper actuator for adjusting dampers in technical building installations

- Air damper size up to approx. 1 m²
- Torque motor 5 Nm
- Nominal voltage AC/DC 24 V
- Control modulating, communicative 2...10 V variable
- Position feedback 2...10 V variable
- Conversion of sensor signals
- Communication via Belimo MP-Bus

MP⁄BUS

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	2.5 W
	Power consumption in rest position	1.3 W
	Power consumption for wire sizing	5 VA
	Connection supply / control	Cable 1 m, 4 x 0.75 mm²
	Parallel operation	Yes (note the performance data)
Functional data	Torque motor	5 Nm
	Torque variable	25%, 50%, 75% reduced
	Communicative control	MP-Bus
	Operating range Y	2...10 V
	Input Impedance	100 kΩ
	Options positioning signal	Open/close 3-point (AC only) Modulating (DC 0...32 V)
	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%
	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	35...150 s
	Adaptation setting range	manual
	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	35 dB(A)
	Mechanical interface	Universal shaft clamp 6...20 mm
	Position indication	Mechanically, pluggable
Safety	Protection class IEC/EN	III Safety Extra-Low Voltage (SELV)
	Protection class UL	UL Class 2 Supply

Technical data

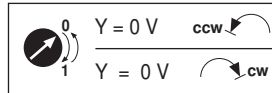|		
Safety	Degree of protection IEC/EN	IP54
	Degree of protection NEMA/UL	NEMA 2
	Enclosure	UL Enclosure Type 2
	EMC	CE according to 2014/30/EU
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Certification UL	cULus according to UL60730-1A, UL60730-2-14 and CAN/CSA E60730-1:02
	Certification UL note	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	3
	Ambient temperature	-30...50°C
	Storage temperature	-40...80°C
	Ambient humidity	Max. 95% r.H., non-condensing
	Servicing	maintenance-free
Weight	Weight	0.50 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.
- 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	Conventional operation: The actuator is connected with a standard modulating signal of 0...10 V and drives to the position defined by the positioning signal. The measuring voltage U serves for the electrical display of the actuator position 0.5...100% and as slave control signal for other actuators. Operation on Bus: The actuator receives its digital positioning signal from the higher level controller via the MP-Bus and drives 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.
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 is disengaged for as long as the button is pressed or remains locked).

Product features

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 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
Gateways	Gateway MP to Modbus RTU	UK24MOD
	Gateway MP zu BACnet MS/TP	UK24BAC
	Gateway MP to LonWorks	UK24LON
	Gateway MP to KNX	UK24EIB

	Description	Type
Electrical accessories	Auxiliary switch 1 x SPDT add-on	S1A
	Auxiliary switch 2 x SPDT add-on	S2A
	Auxiliary switch 2 x SPDT add-on, grau	S2A/300 GR
	Auxiliary switch 2 x SPDT add-on, grau	S2A/500 GR
	Feedback potentiometer 140 Ω add-on, grau	P140A GR
	Feedback potentiometer 200 Ω add-on	P200A
	Feedback potentiometer 500 Ω add-on	P500A
	Feedback potentiometer 500 Ω add-on, grau	P500A GR
	Feedback potentiometer 1 kΩ add-on	P1000A
	Feedback potentiometer 1 kΩ add-on, grau	P1000A GR
	Feedback potentiometer 2.8 kΩ add-on	P2800A
	Feedback potentiometer 2.8 kΩ add-on, grau	P2800A GR
	Feedback potentiometer 5 kΩ add-on	P5000A
	Feedback potentiometer 5 kΩ add-on, grau	P5000A GR
	Feedback potentiometer 10 kΩ add-on	P10000A
	Feedback potentiometer 10 kΩ add-on, grau	P10000A GR
	Signal converter voltage/current 100 kΩ Supply AC/DC 24 V	Z-UIC
	Range controller for wall mounting	SBG24
	Positioner for wall mounting	SGA24
	Positioner for built-in mounting	SGE24
	Positioner for front-panel mounting	SGF24
	Positioner for wall mounting	CRP24-B1
	Connection cable 5 m, A: RJ11 6/4 ZTH EU, B: 6-pin service socket for Belimo device	ZK1-GEN
	Connection cable 5 m, A: RJ11 6/4 ZTH EU, B: free wire end for connection to MP/PP terminal	ZK2-GEN
	MP-Bus power supply for MP actuators	ZN230-24MP
	Connecting board MP-Bus for wiring boxes EXT-WR-FP..-MP	ZFP2-MP

Accessories

	Description	Type
Mechanical accessories	Shaft extension 170 mm Ø10 mm for damper shaft Ø 6...16 mm	AV6-20
	Shaft clamp one-sided, clamping range Ø6...20 mm, Multipack 20 pcs.	K-ELA
	Shaft clamp one-sided, clamping range Ø6...10 mm, Multipack 20 pcs.	K-ELA10
	Shaft clamp one-sided, clamping range Ø6...13 mm, Multipack 20 pcs.	K-ELA13
	Shaft clamp one-sided, clamping range Ø6...16 mm, Multipack 20 pcs.	K-ELA16
	Anti-rotation mechanism 180 mm, Multipack 20 pcs.	Z-ARS180
	Form fit insert 8x8 mm, Multipack 20 pcs.	ZF8-LMA
	Form fit insert 10x10 mm, Multipack 20 pcs.	ZF10-LMA
	Form fit insert 12x12 mm, Multipack 20 pcs.	ZF12-LMA
	Form fit insert 8x8 mm, with angle of rotation limiter and position indication, Multipack 20 pcs.	ZFRL8-LMA
	Form fit insert 10x10 mm, with angle of rotation limiter and position indication, Multipack 20 pcs.	ZFRL10-LMA
	Form fit insert 12x12 mm, with angle of rotation limiter and position indication, Multipack 20 pcs.	ZFRL12-LMA
	Position indicator, Multipack 20 pcs.	Z-PI

	Description	Type
Service Tools	Service Tool, with ZIP-USB function	ZTH EU
	Belimo PC-Tool, Software for adjustments and diagnostics	MFT-P
	Adapter for 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

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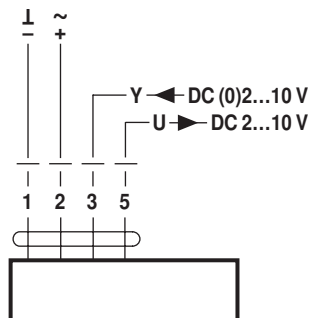
Cable colours:
1 = black
2 = red
3 = white
5 = orange

Operation on the MP-Bus

```
⊥ ~
─ +
          Y ◄── Sensor
          U ◄─► MP

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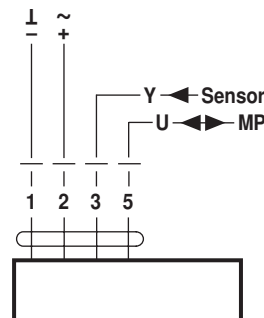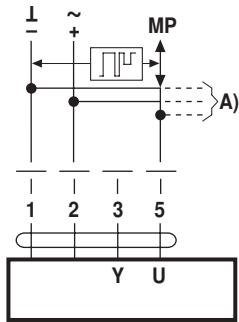
Cable colours:
1 = black
2 = red
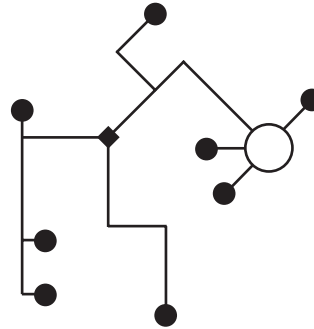3 = white
5 = orange

Functions

Functions

Functions when operated on MP-Bus

Connection on the MP-Bus

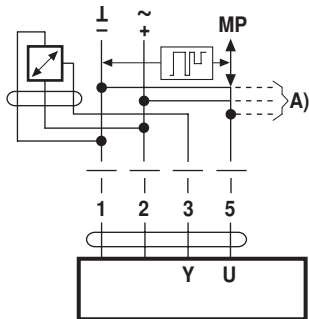A) more actuators and sensors
(max.8)

MP-Bus 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
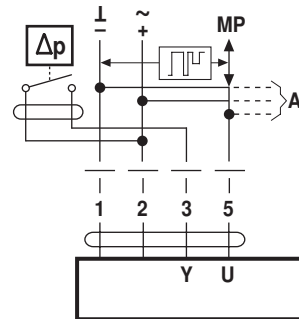• no terminating resistors required

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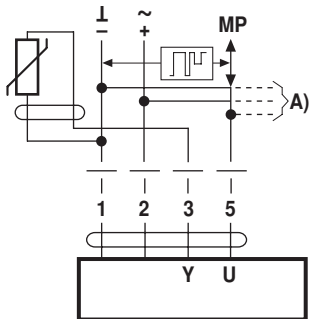
Ni1000	−28...+98 °C	850...1600 Ω [2]
PT1000	−35...+155 °C	850...1600 Ω [2]
NTC	−10...+160 °C [1]	200 Ω...60 kΩ [2]

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

Functions with basic values (conventional mode)

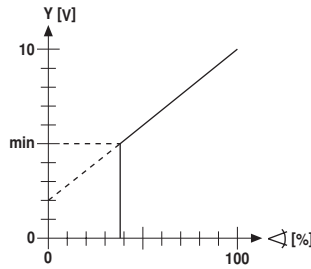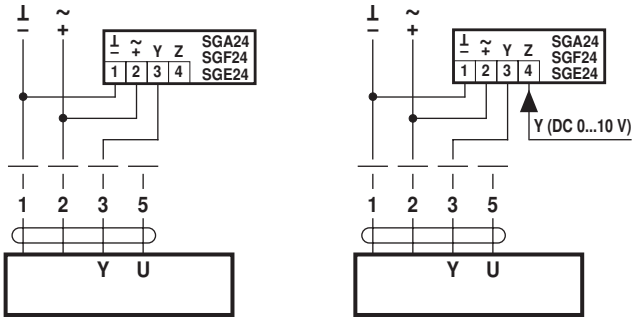Override control with AC 24 V with relay contacts

e.g. 1N 4007

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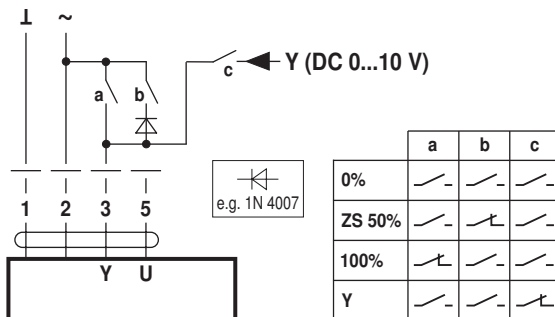
Override control with AC 24 V with rotary switch
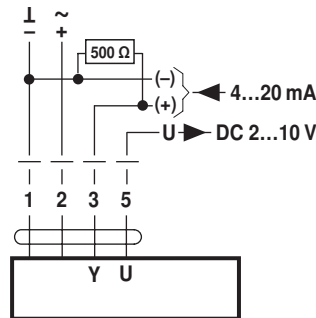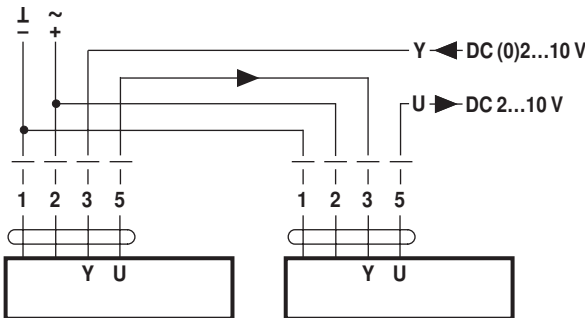

e.g. 1N 4007
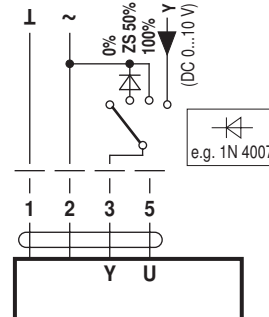
Functions

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

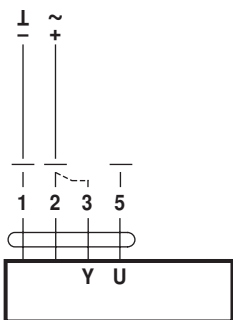Minimum limit with positioner SG..

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 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 devices with specific parameters (Parametrisation necessary)

Override control and limiting with AC 24 V with relay contacts

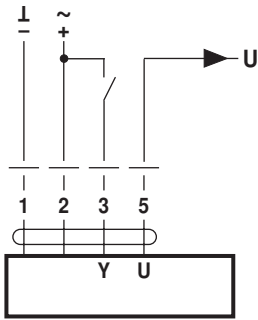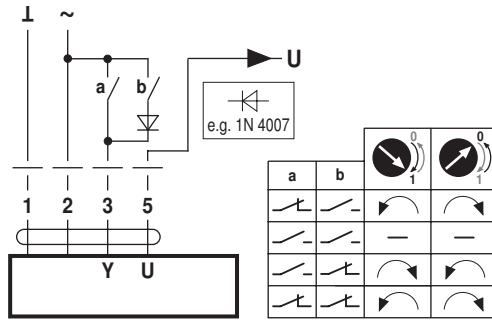|	a	b	c	d	e
Close [1]					
MIN					
ZS					
MAX					
Open					
Y					

Override control and limiting with AC 24 V with rotary switch
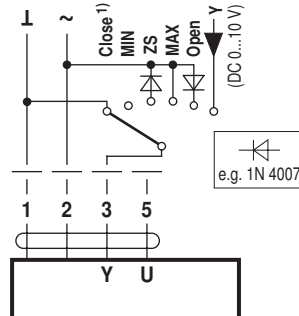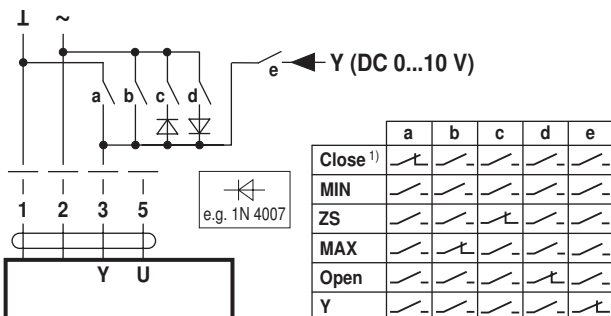
[1] **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.
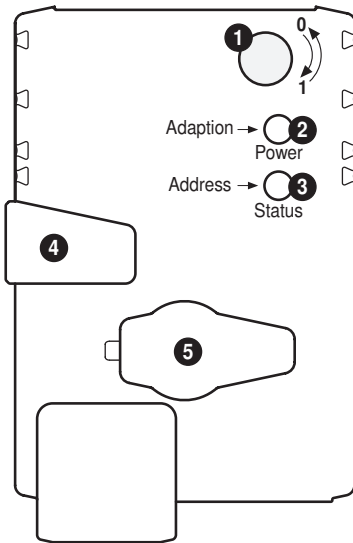
Rotary actuator, modulating, communicative, AC/ DC 24 V, 5 Nm, Communication via Belimo MP-Bus

BELIMO®

Functions

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 malfuntion
On:	In operation
Press button:	Triggers angle of rotation adaptation, followed by standard mode

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

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

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

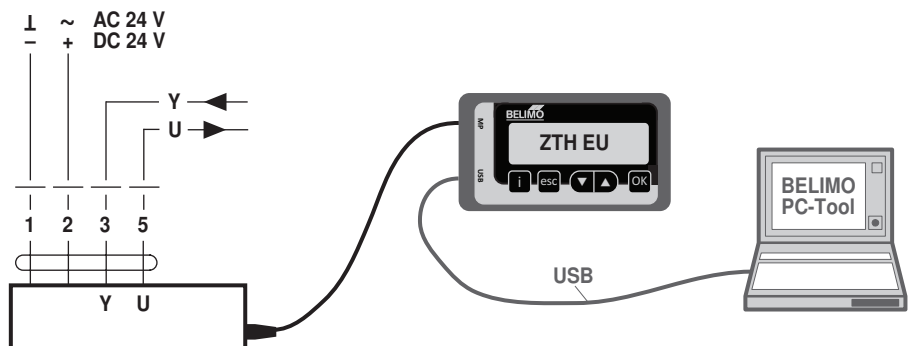**Check power supply connection**

2 Off and **3** On   Possible wiring error in power supply

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.

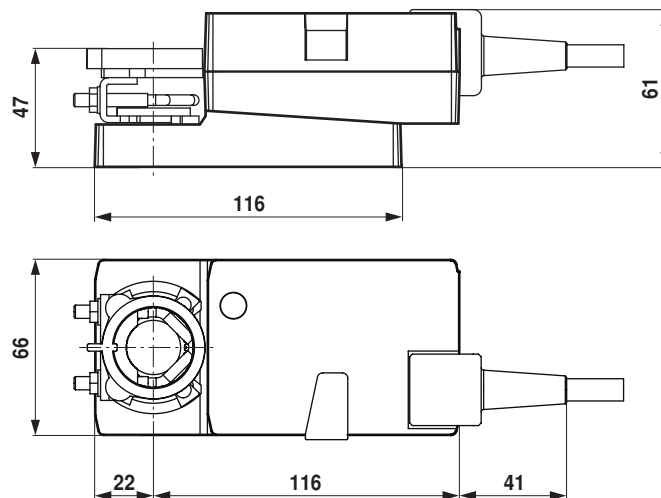Connection ZTH EU / PC-Tool

Dimensions [mm]

Spindle length

		Min. 37
		-

Clamping range

6...20	≥6	≤20

Dimensional drawings

Further documentation

- Overview MP Cooperation Partners
- Tool connections
- Introduction to MP-Bus Technology