

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
- Communication via Belimo MP-Bus
- Conversion of sensor signals



Picture may differ from product

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, 4x 0.75 mm ²
	Parallel operation	Yes (note the performance data)
Data bus communication	Communicative control	MP-Bus
	Number of nodes	MP-Bus max. 8
Functional data	Torque motor	5 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
	Operating modes optional	Open/close 3-point (AC only) 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 variable	electronically reversible
	Direction of motion note	Y = 0 V: At switch position 0 (ccw rotation) / 1 (cw rotation)
	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	
Sound power level, motor	35 dB(A)	

Functional data	Adaptation setting range	manual	
	Adaptation setting range variable	No action Adaptation when switched on Adaptation after pushing the manual override 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	
	Mechanical interface	Universal shaft clamp 6...20 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	
Housing		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 The UL marking on the actuator depends on the production site, the device is UL-compliant in any case	
Hygiene test		According to VDI 6022 Part 1 / SWKI VA 104-01, cleanable and disinfected, low emission	
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	0.50 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 Conventional operation:

The actuator is controlled with a standard control signal of DC 0...10 V (note the operating range) and drives to the position defined by the control signal. The measuring voltage U serves for the electrical display of the actuator position 0.5...100% and as control signal for other actuators.

Operation on Bus:

The actuator receives its digital control 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.

Configurable device The factory settings cover the most common applications. Single parameters can be modified with Belimo Assistant 2 or ZTH EU.

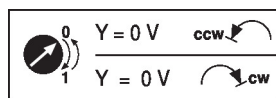
Simple direct mounting Simple direct mounting on the damper shaft with a universal shaft clamp, supplied with an anti-rotation mechanism to prevent the actuator from rotating.

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.



Product features

Adaptation and synchronisation An adaptation can be triggered manually by pressing the "Adaptation" button or with Belimo Assistant 2. 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 made using Belimo Assistant 2.

Accessories

Tools	Description	Type
	Service tool, with ZIP-USB function, for configurable and communicative Belimo actuators, VAV controller and HVAC performance devices	ZTH EU
	Service tool for wired and wireless setup, on-site operation and troubleshooting.	Belimo Assistant 2
	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 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
	MP-Bus power supply for MP actuators	ZN230-24MP
Gateways	Description	Type
	Gateway MP to BACnet MS/TP	UK24BAC
	Gateway MP to Modbus RTU	UK24MOD
Mechanical accessories	Description	Type
	Shaft extension 170 mm ø10 mm for damper shaft ø6...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 indicator, Multipack 20 pcs.	ZFRL8-LMA
	Form fit insert 10x10 mm, with angle of rotation limiter and position indicator, Multipack 20 pcs.	ZFRL10-LMA
	Form fit insert 12x12 mm, with angle of rotation limiter and position indicator, Multipack 20 pcs.	ZFRL12-LMA
	Position indicator, Multipack 20 pcs.	Z-PI

Electrical installation



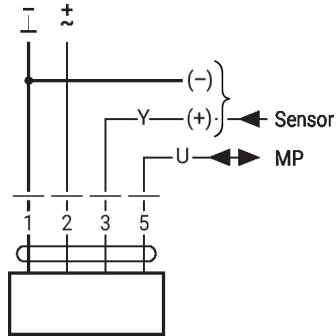
Supply from isolating transformer.

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

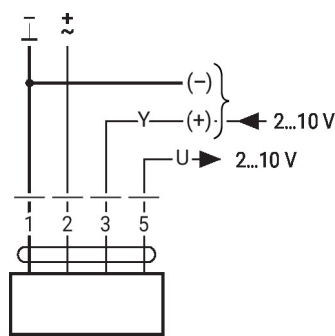
Wire colours:

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

MP-Bus



AC/DC 24 V, modulating

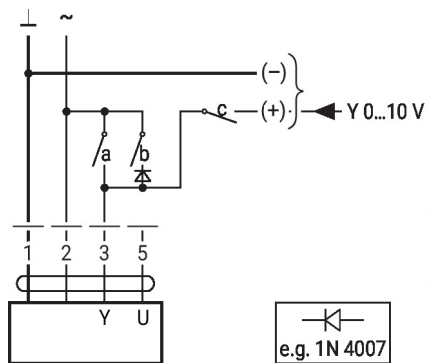


1	2	3		
		2 V		
		10 V		

Further electrical installations

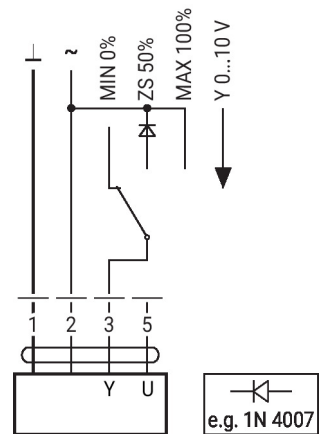
Functions with basic values (conventional mode)

Override control with AC 24 V with relay contacts



1	2	a	b	c	
					0 %
					ZS 50%
					100%
					Y

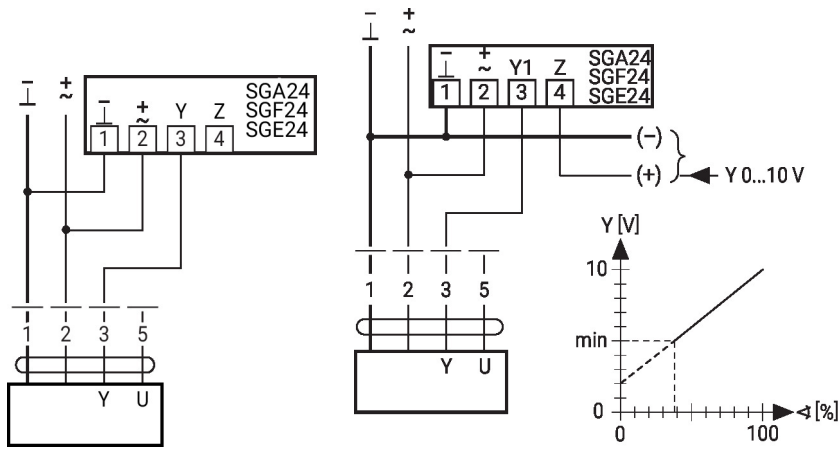
Override control with AC 24 V with rotary switch



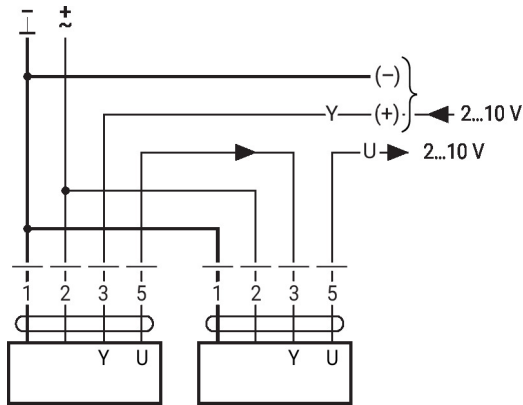
Functions with basic values (conventional mode)

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

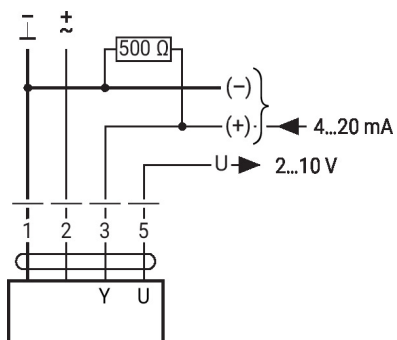
Minimum limit with positioner SG..



Primary/secondary operation (position-dependent)



Control with 4...20 mA via external resistor



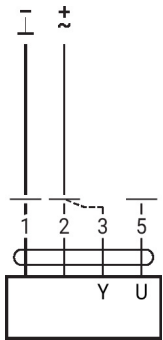
Caution:

The operating range must be set to DC 2...10 V.

The 500 Ohm resistor converts the 4...20 mA current signal to a voltage signal DC 2...10 V.

Functions with basic values (conventional mode)

Functional check

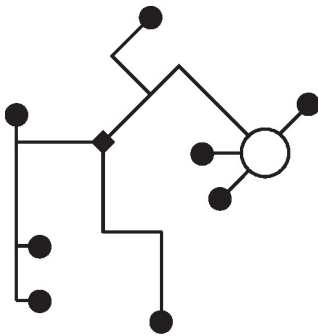


Procedure

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

MP-Bus

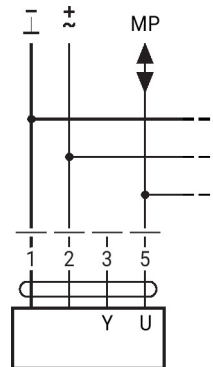
MP-Bus Network topology



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

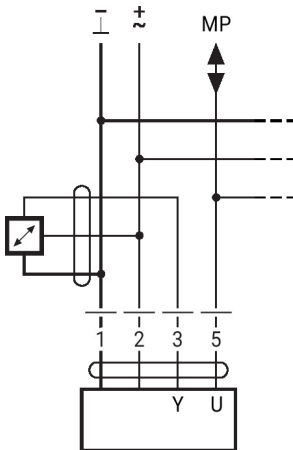
- no shielding or twisting necessary
- no terminating resistors required

Connection on the MP-Bus



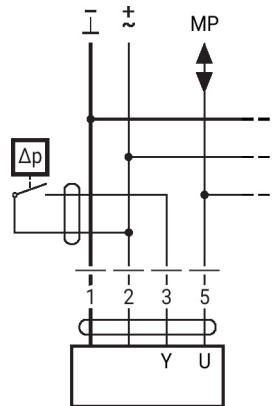
Max. 8 MP-Bus nodes

Connection of active sensors



- Supply AC/DC 24 V
- Output signal 0...10 V (max. 0...32 V)
- Resolution 30 mV

Connection of external switching contact

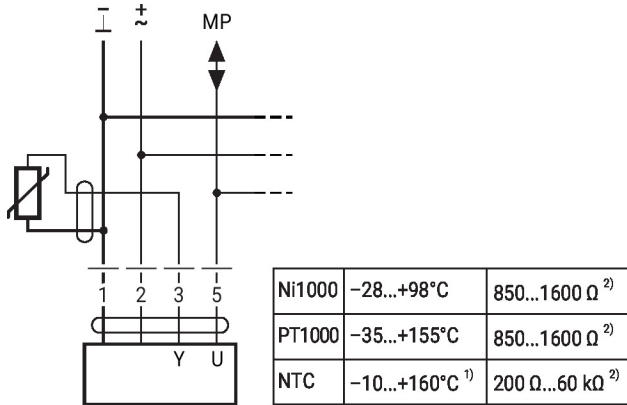


- Switching current 16 mA @ 24 V
- Start point of the operating range must be configured on the MP actuator as ≥ 0.5 V

Further electrical installations

MP-Bus

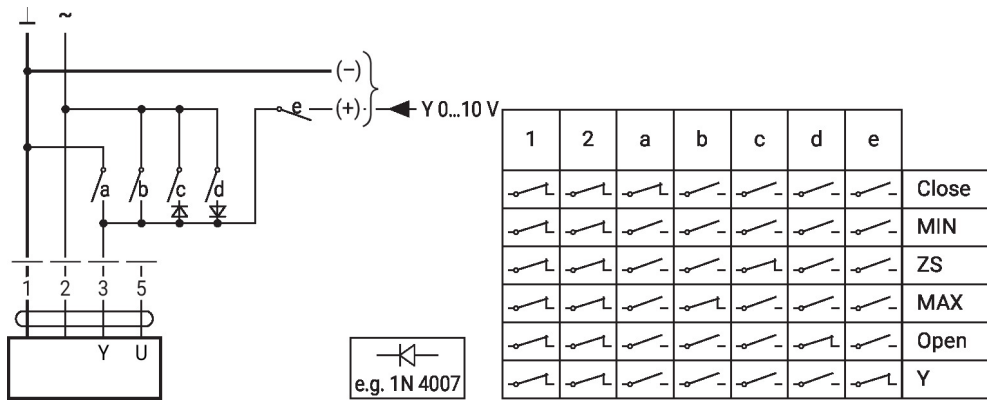
Connection of passive sensors



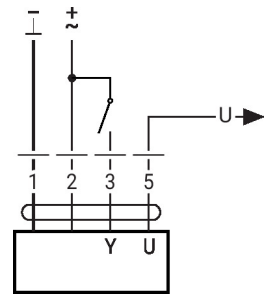
1) Depending on the type
 2) Resolution 1 Ohm
 Compensation of the measured value is recommended

Functions with specific parameters (configuration necessary)

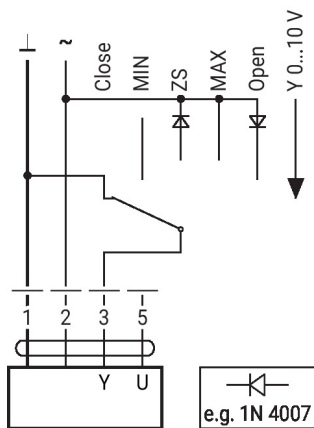
Override control and limiting with AC 24 V with relay contacts



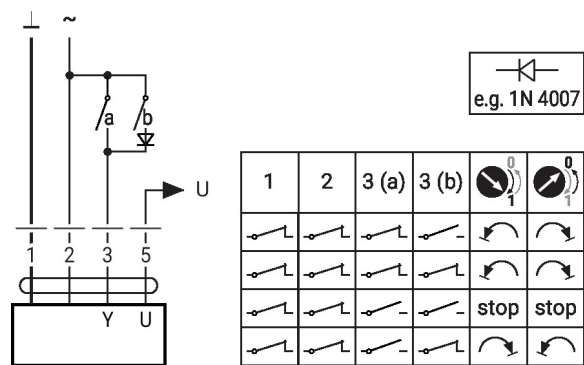
Control open/close



Override control and limiting with AC 24 V with rotary switch

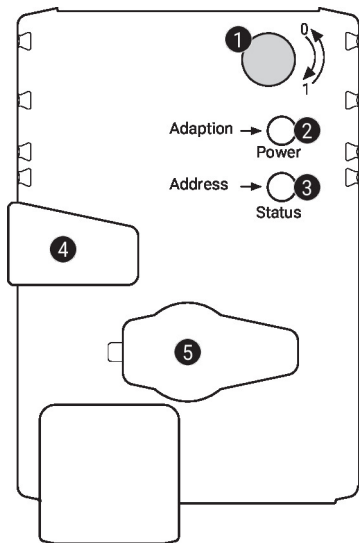


Control 3-point with AC 24 V



Caution:
 The "Close" function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

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

Flickering: MP-Bus communication active

Flashing: Request for addressing from MP client

Press button: Confirmation of the addressing

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 configuration and service tools

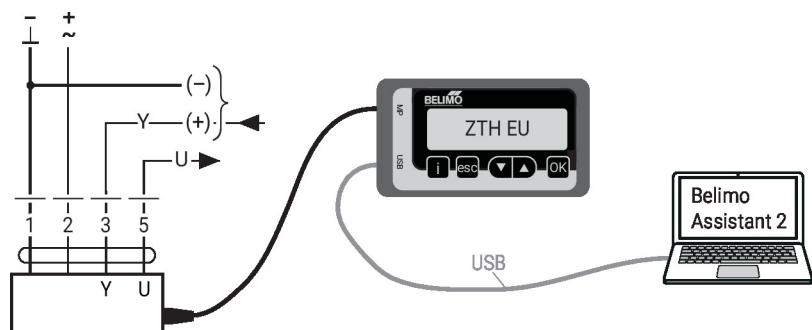
Check power supply connection

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

Service

Wired connection The device can be configured by ZTH EU via the service socket. For an extended configuration, Belimo Assistant 2 can be connected.

Connection ZTH EU / Belimo Assistant 2



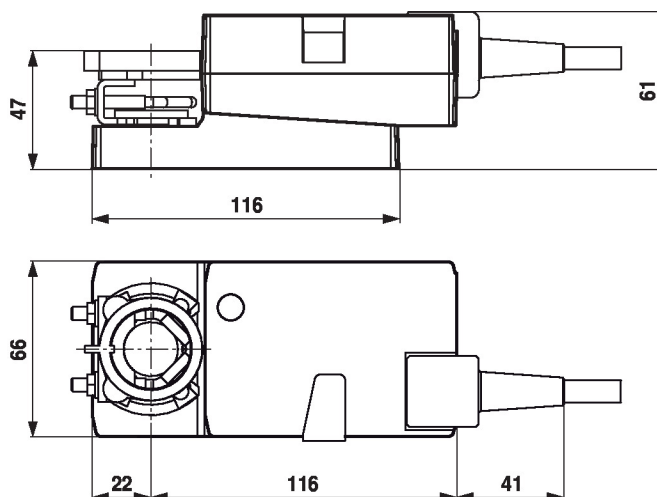
Dimensions

Spindle length

	Min. 37
	-

Clamping range

6...20	≥ 6	≤ 20



Further documentation

- Overview MP Cooperation Partners
- Tool connections
- Introduction to MP-Bus Technology
- Quick Guide – Belimo Assistant 2

Application notes

- For digital control of actuators in VAV applications patent EP 3163399 must be considered.