

Communicative rotary actuator with fail-safe for ball valves

- Torque motor 2.5 Nm
- Nominal voltage AC/DC 24 V
- Control modulating, communicative 2...10 V variable
- Position feedback 2...10 V variable
- Conversion of sensor signals
- Deenergised closed (NC)
- Communication via Belimo MP-Bus


**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	2.5 W
	Power consumption in rest position	1 W
	Power consumption for wire sizing	4 VA
	Connection supply / control	Cable 1 m, 4 x 0.75 mm <sup>2</sup>
	Parallel operation	Yes (note the performance data)
	<b>Functional data</b>	Torque motor
Torque fail-safe		2.5 Nm
Communicative control		MP-Bus
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
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		Y = 0 (0 V = A – AB = 0%)
Direction of motion fail-safe		Deenergised NC, valve closed (A – AB = 0%)
Running time motor		90 s / 90°
Running time fail-safe		<25 s / 90°
Adaptation setting range		manual
Adaptation setting range variable		No action Adaptation when switched on Adaptation after using the rotation switch
Override control		MAX (maximum position) = 100% MIN (minimum position) = 0% ZS (intermediate position, AC only) = 50%
Override control variable		MAX = (MIN + 33%)...100% MIN = 0%...(MAX – 33%) ZS = MIN...MAX
Sound power level, motor		35 dB(A)
Position indication		Mechanical
Service life		Min. 60'000 fail-safe positions
<b>Safety</b>	Protection class IEC/EN	III Safety Extra-Low Voltage (SELV)
	Degree of protection IEC/EN	IP42
	EMC	CE according to 2014/30/EU
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	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
	<b>Weight</b>	Weight

## 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 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.
- 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

<b>Mode of operation</b>	Conventional operation: The actuator is connected with a standard modulating signal 0...10 V. The actuator moves the valve to the operating position at the same time as tensioning the return spring. The valve is turned back to the fail-safe position by spring force when the supply voltage is interrupted. 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.
<b>Converter for sensors</b>	Connection option for a sensor (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.
<b>Parametrisable actuators</b>	The factory settings cover the most common applications. Input and output signals and other parameters can be altered with the Belimo Service Tool MFT-P.
<b>Simple direct mounting</b>	Simple direct mounting on the ball valve with only one screw. The mounting orientation in relation to the ball valve can be selected in 90° steps.
<b>High functional reliability</b>	The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.
<b>Home position</b>	Factory setting: Arrow cw (clockwise).
<b>Adaption and synchronisation</b>	An adaption can be triggered manually by switching the direction of rotation switch from the left to the right twice within 5s or with the PC-Tool. Both mechanical end stops are detected during the adaption (entire setting range). Automatic synchronisation after actuating the direction of rotation switch once is programmed. The synchronisation is in the home position (0%). A range of settings can be adapted using the PC-Tool (see MFT-P documentation)

## Accessories

	Description	Type
<b>Gateways</b>	Gateway MP zu BACnet MS/TP	UK24BAC
	Gateway MP to Modbus RTU	UK24MOD
	Gateway MP to LonWorks	UK24LON
	Gateway MP to KNX	UK24EIB
	Description	Type
<b>Electrical accessories</b>	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
	Connecting board MP-Bus for wiring boxes EXT-WR-FP...MP	ZFP2-MP
	MP-Bus power supply for MP actuators	ZN230-24MP

Accessories

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

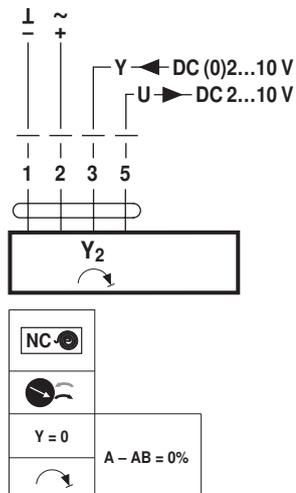
Electrical installation



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

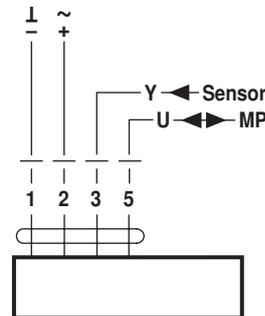
Wiring diagrams

AC/DC 24 V, modulating



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

Operation on the MP-Bus

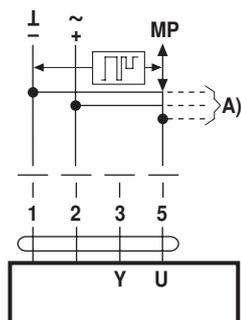


**Cable colours:**  
 1 = black  
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Functions

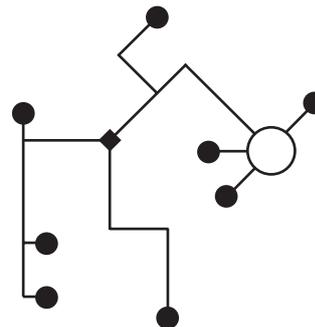
Functions when operated on MP-Bus

Connection on the MP-Bus



A) more actuators and sensors (max.8)

MP-Bus Network topology

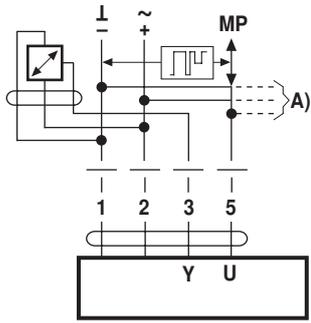


There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted). Supply and communication in one and the same 3-wire cable

- no shielding or twisting necessary
- no terminating resistors required

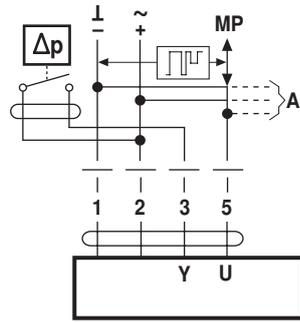
**Functions**

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

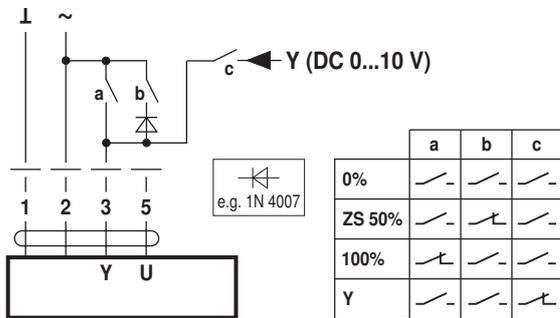
Connection of external switching contact



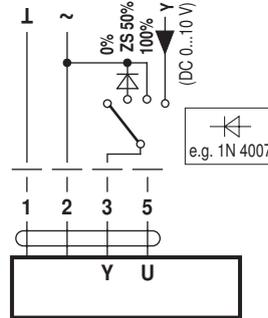
A) more actuators and sensors (max.8)  
 • Switching current 16 mA @ 24 V  
 • Start point of the operating range must be parameterised on the MP actuator as  $\geq 0.5$  V

**Functions with basic values (conventional mode)**

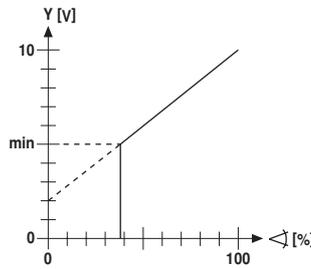
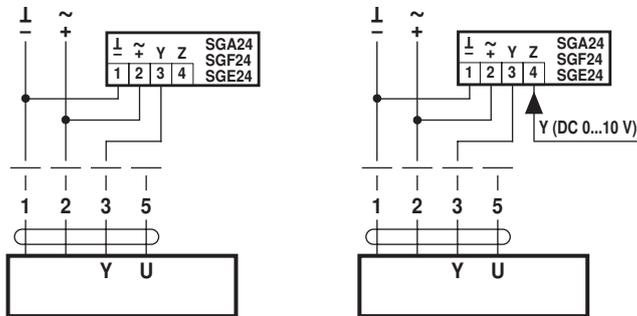
Override control with AC 24 V with relay contacts



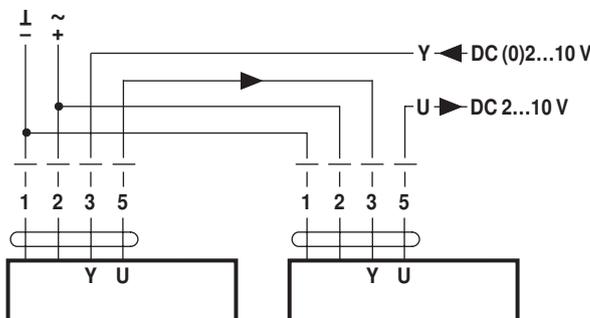
Override control with AC 24 V with rotary switch



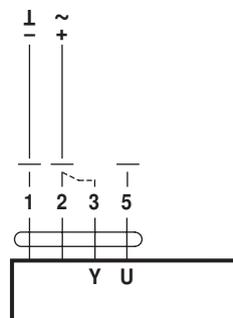
Control remotely 0...100% with positioner SG.. Minimum limit with positioner SG..



Follow-up control (position-dependent)



Functional check



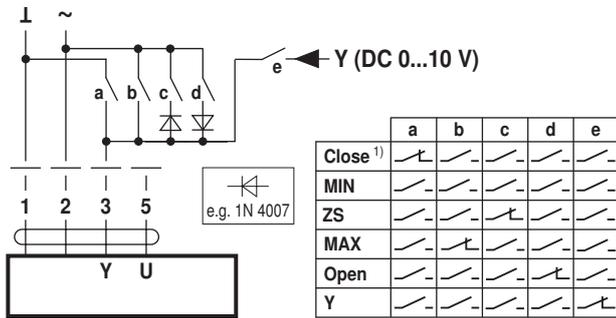
**Procedure**

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

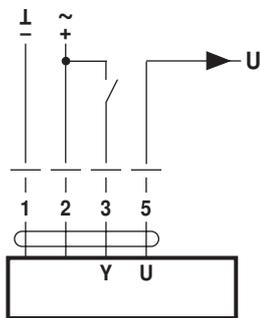
Functions

Functions for devices with specific parameters (Parametrisation necessary)

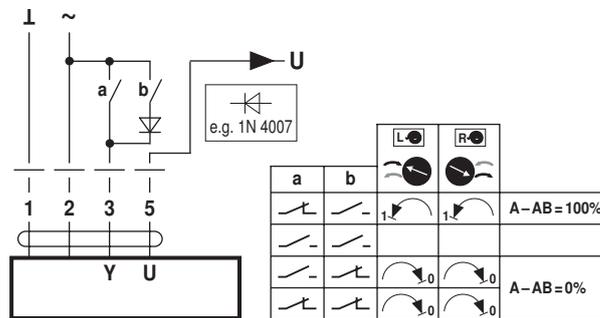
Override control and limiting with AC 24 V with relay contacts



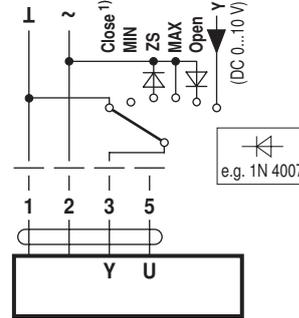
Control open/close



Control 3-point

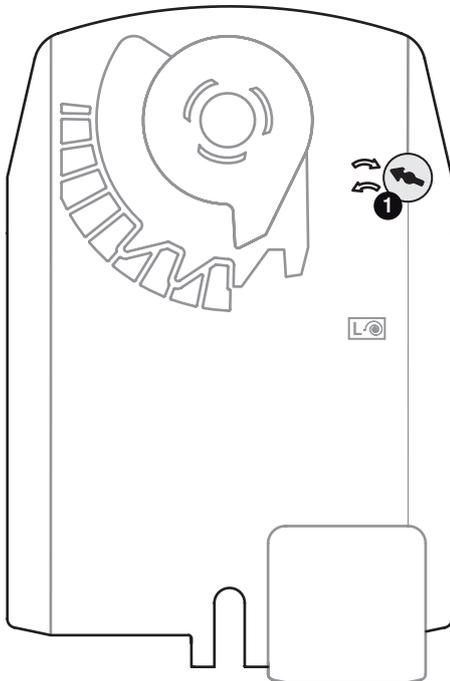


Override control and limiting with AC 24 V with rotary switch



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

Operating controls and indicators



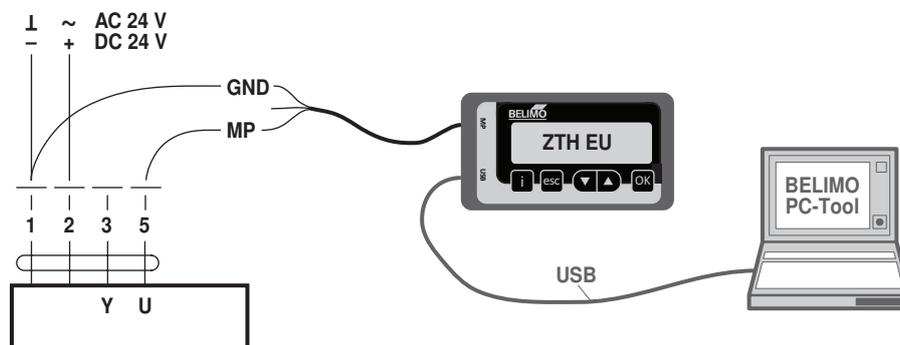
1 MP addressing

Move direction of rotation switch in opposite position and backwards (within 4 seconds)

## Service

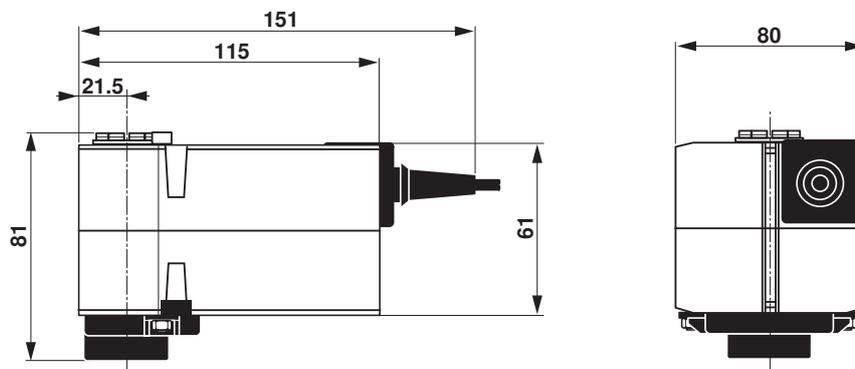
**Service Tools connection** The actuator can be parametrised by ZTH EU via terminal connection. For extended parametrisation the PC tool can be connected.

Connection ZTH EU / PC-Tool



## Dimensions [mm]

### Dimensional drawings



## Further documentation

- Overview MP Cooperation Partners
- Tool connections
- Introduction to MP-Bus Technology
- The complete product range for water applications
- Data sheets for ball valves
- Installation instructions for actuators and/or ball valves
- General notes for project planning