

Communicative rotary actuator with emergency control function for ball valves

- 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
- Deenergised closed (NC)


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 mm ²
	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 rotation motor	Y=0 (0V = A - AB = 0%)
	Direction of rotation spring-return	Deenergised NC, valve closed (A - AB = 0%)
	Manual override	By means of hand crank and locking switch
	Angle of rotation	90°
	Running time motor	90 s / 90°
	Motor running time variable	40...220 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 using the hand crank
	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	45 dB(A)	
Position indication	Mechanical	
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

Technical data

Safety	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



- This device has been designed for use in stationary heating, ventilation and air conditioning systems and is not allowed to be used outside the specified field of application, especially 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.
- Cables must not be removed from the device.
- 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.

Product features

Mode of operation	Conventional operation: The actuator is connected with a standard modulating signal DC 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 emergency position by spring force when the supply voltage is interrupted. 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 ball valve with only one screw. The mounting orientation in relation to the ball valve can be selected in 90° steps.
Manual override	Manual actuation of the valve 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 stop.
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. Factory setting: Y2 (counter-clockwise rotation).
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%). A range of settings can be adapted using the PC-Tool (see MFT-P documentation)

Accessories

	Description	Type
Gateways	Gateway MP for BACnet MS/TP, AC/DC 24 V	UK24BAC
	Gateway MP to Modbus RTU, AC/DC 24 V	UK24MOD
	Gateway MP for LonWorks®, AC/DC 24 V, LonMark-certified	UK24LON
	Gateway MP to KNX/EIB, AC/DC 24 V, EIBA certified	UK24EIB
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
	MP-Bus power supply for MP actuators, AC 230/24V for local power supply	ZN230-24MP
	Connecting board MP bus suitable for wiring boxes EXT-WR-FP..-MP	ZFP2-MP
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

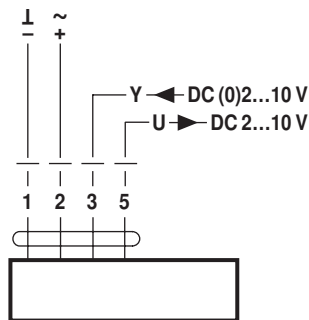


Notes

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

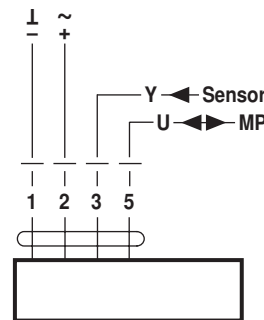
Wiring diagrams

AC/DC 24 V, modulating



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

Operation on the MP-Bus

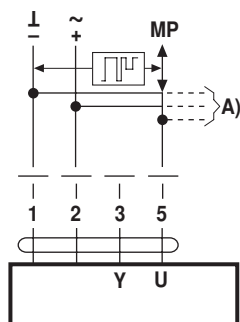


Cable colours:
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Functions

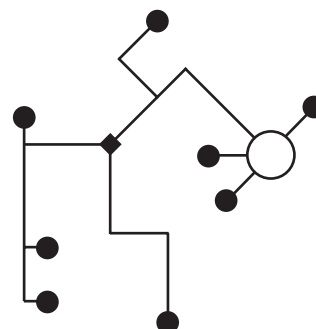
Functions when operated on MP-Bus

Connection on the MP-Bus



A) more actuators and sensors (max.8)

Power topology

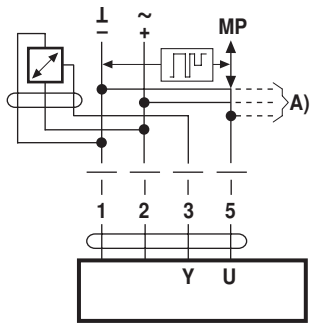


There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted). Supply and communication in one and the same 3-wire cable

- no shielding or twisting necessary
- no terminating resistors required

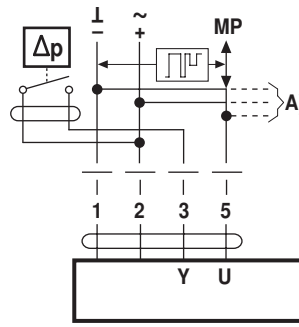
Functions

Connection of active sensors



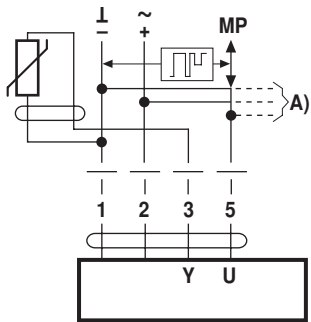
A) more actuators and sensors (max.8)
 • Supply AC/DC 24 V
 • Output signal DC 0...10 V (max. DC 0...32 V)
 • Resolution 30 mV

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 ≥ 0.5 V

Connection of passive sensors

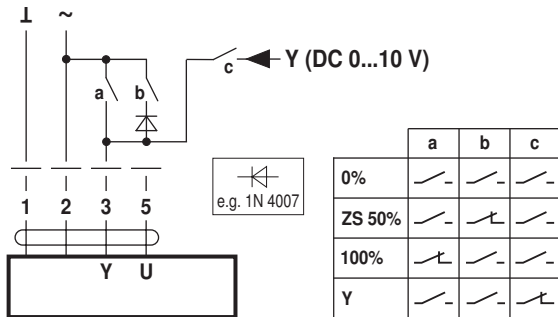


Ni1000	-28...+98°C	850...1600 Ω^2)
PT1000	-35...+155°C	850...1600 Ω^2)
NTC	-10...+160°C ¹⁾	200 Ω ...60 k Ω^2)

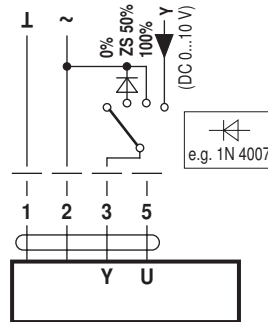
A) more actuators and sensors (max.8)
 1) Depending on the type
 2) Resolution 1 Ohm

Functions with basic values (conventional mode)

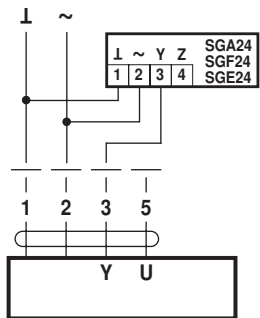
Override control with AC 24 V with relay contacts



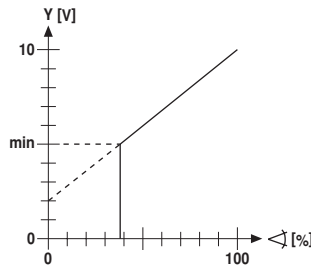
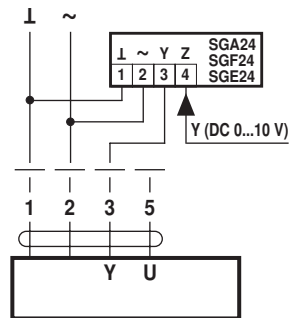
Override control with AC 24 V with rotary switch



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

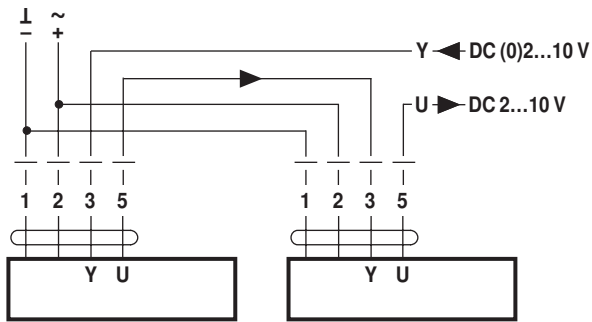


Minimum limit with positioner SG..

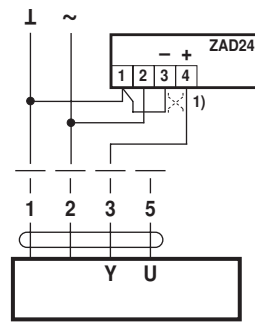


Functions

Follow-up control (position-dependent)

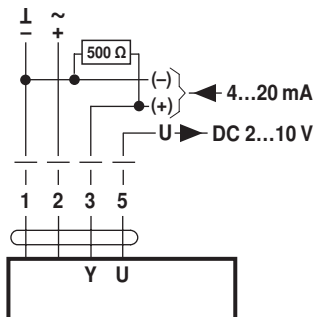


Position indication



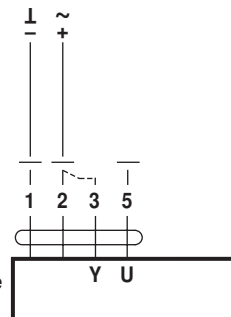
(1) Adapting the direction of rotation

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

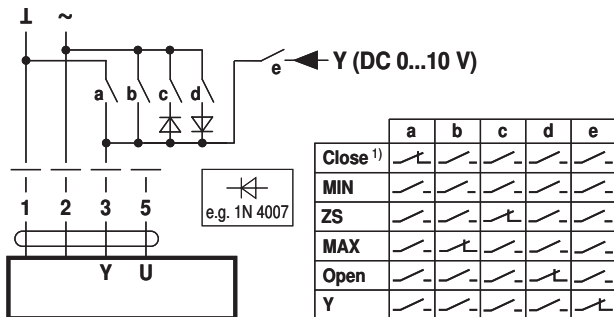
Functional check



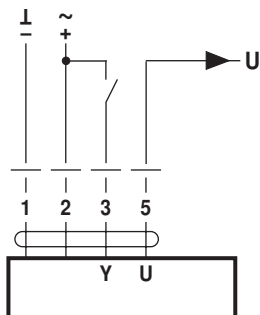
- Procedure**
1. Connect 24 V to connections 1 and 2
 2. Disconnect connection 3:
– Actuator rotates clockwise
 3. Short-circuit connections 2 and 3:
– Actuator runs in opposite direction

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

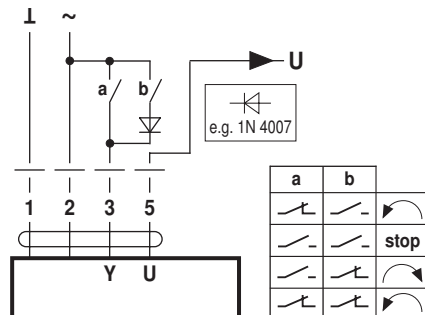
Override control and limiting with AC 24 V with relay contacts



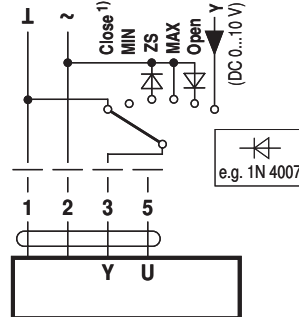
Control open-close



Control 3-point

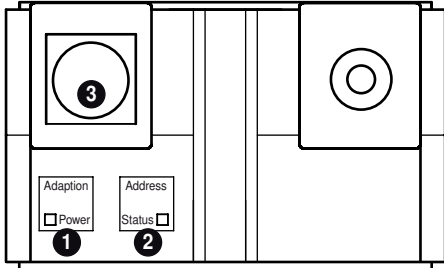


Override control and limiting with AC 24 V with rotary switch



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 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

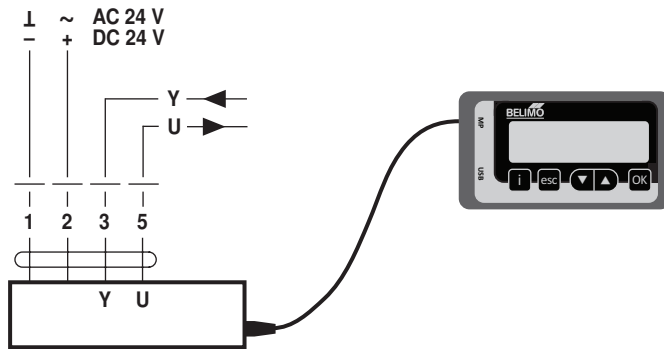
The manual override, locking switch and direction of rotation switch elements are available on both sides

Service

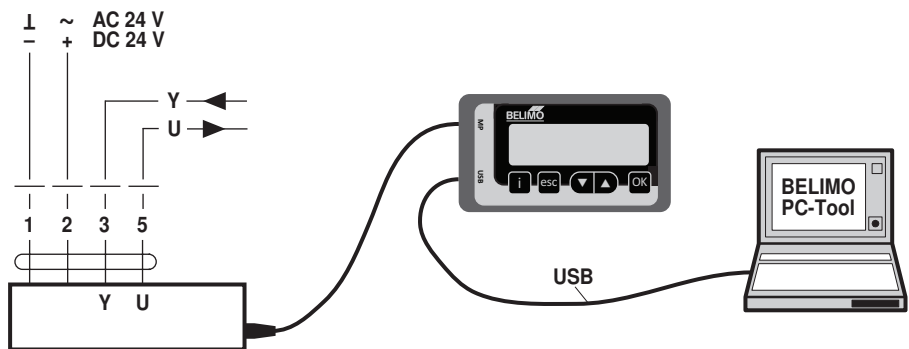


- Notes**
- The actuator can be parameterised by PC-Tool and ZTH EU via the service socket.

ZTH EU connection

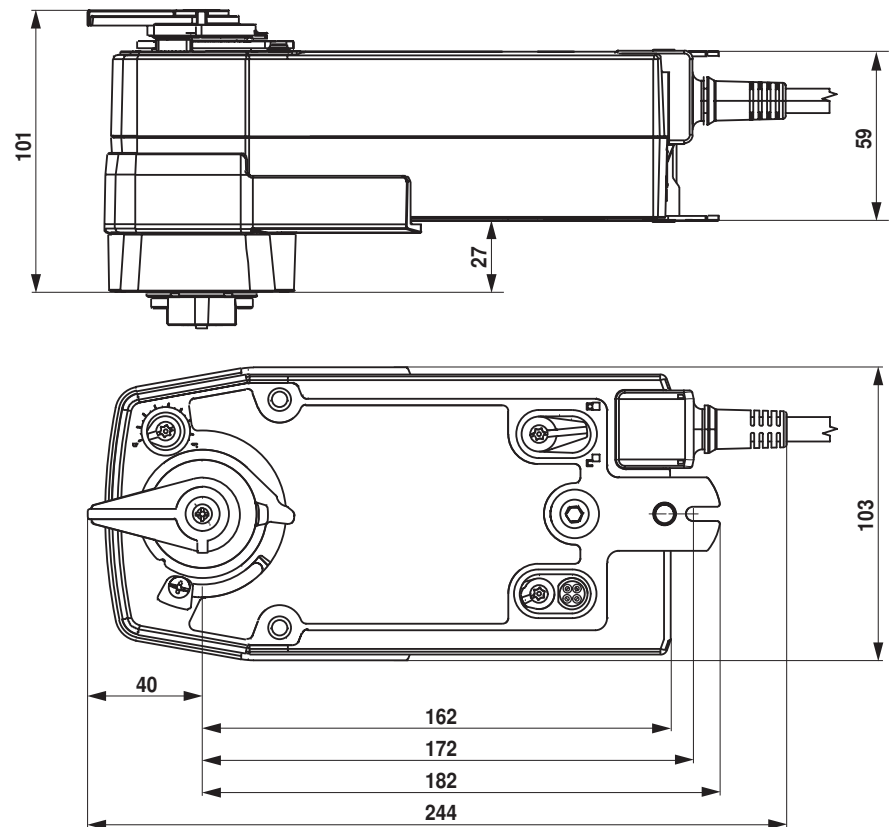


PC-Tool connection



Dimensions [mm]

Dimensional drawings



Further documentation

- Overview Valve-actuator combinations
- Data sheets for ball valves
- Installation instructions for actuators and/or ball valves
- General notes for project planning