

- Actuating force 500 N
- Nominal voltage AC/DC 24 V
- Control modulating, communicative 2...10 V variable
- Stroke 20 mm
- Conversion of sensor signals
- 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	1.5 W
	Power consumption in rest position	0.5 W
	Power consumption for wire sizing	3 VA
	Connection supply / control	Terminals 4 mm <sup>2</sup> (cable Ø4...10 mm)
	Parallel operation	Yes (note the performance data)
<b>Functional data</b>	Actuating force motor	500 N
	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
	Options positioning signal	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%
	Manual override	with push-button, can be locked
	Stroke	20 mm
	Running time motor	150 s / 15 mm (200 s / 20 mm)
	Running time motor variable	90...150 s
	Adaptation setting range	manual (automatic on first power-up)
	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 + 33%)...100% MIN = 0%...(MAX - 33%) ZS = MIN...MAX
	Sound power level, motor	45 dB(A)
	Position indication	Mechanically, 5...20 mm stroke
<b>Safety data</b>	Protection class IEC/EN	III Safety Extra-Low Voltage (SELV)
	Protection class UL	UL Class 2 Supply

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	0...50°C
Storage temperature	-40...80°C
Ambient humidity	Max. 95% r.H., non-condensing
Servicing	maintenance-free
<b>Weight</b>	<b>Weight</b> 1.9 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 during installation.
- The switch for changing the direction of motion and so the closing point may be adjusted only by authorised specialists. The direction of motion is critical, particularly in connection with frost protection circuits.
- 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 must not be disposed of as household refuse. All locally valid regulations and requirements must be observed.

**Product features**

<b>Mode of operation</b>	<p>Conventional operation:</p> <p>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.</p> <p>Operation on Bus:</p> <p>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.</p>
<b>Converter for sensors</b>	<p>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.</p>
<b>Configurable actuators</b>	<p>The factory settings cover the most common applications. Single parameters can be modified with the Belimo Service Tools MFT-P or ZTH EU.</p>
<b>Mounting on third-party valves</b>	<p>The retrofit actuators for installation on a wide range of valves from various manufacturers are comprised of an actuator, bracket, universal valve neck adapter and universal valve stem adapter. Adapt the valve neck and valve stem to begin with, then attach the retrofit bracket to the valve neck adapter. Now fit the retrofit actuator into the bracket and connect it to the valve. Whilst taking the position of the valve closing</p>

point into account, secure the actuator to the bracket and then conduct the commissioning process. The valve neck adapter/actuator can be rotated through 360° on the valve neck, provided it is permitted by the size of the installed valve.

<b>Mounting on Belimo valves</b>	Use standard actuators from Belimo for mounting on Belimo globe valves. The installation of retrofit actuators on Belimo globe valves is technically possible.
<b>Manual override</b>	<p>Manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked).</p> <p>The stroke can be adjusted by using a hexagon socket screw key (4 mm), which is inserted into the top of the actuator. The stroke shaft extends when the key is rotated clockwise.</p>
<b>High functional reliability</b>	The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.
<b>Position indication</b>	The stroke is indicated mechanically on the bracket with tabs. The stroke range adjusts itself automatically during operation.
<b>Home position</b>	<p>Factory setting: Actuator spindle is retracted.</p> <p>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.</p> <p>The actuator then moves into the position defined by the positioning signal.</p>
<b>Adaptation and synchronisation</b>	<p>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).</p> <p>Automatic synchronisation after pressing the gearbox disengagement button is configured. The synchronisation is in the home position (0%).</p> <p>The actuator then moves into the position defined by the positioning signal.</p> <p>A range of settings can be adapted using the PC-Tool (see MFT-P documentation)</p>
<b>Setting direction of stroke</b>	When actuated, the stroke direction switch changes the running direction in normal operation.

**Accessories**

<b>Gateways</b>	<b>Description</b>	<b>Type</b>
	Gateway MP zu BACnet MS/TP	UK24BAC
	Gateway MP to KNX	UK24EIB
	Gateway MP to Modbus RTU	UK24MOD
<b>Electrical accessories</b>	<b>Description</b>	<b>Type</b>
	Auxiliary switch 2 x SPDT add-on	EXT-WR-FP20-MP S2A-H
	Connection cable 5 m, A: RJ11 6/4 ZTH EU, B: 6-pin for connection to service socket	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
<b>Mechanical accessories</b>	<b>Description</b>	<b>Type</b>
	Spacer ring for LDM, stroke 20 mm	ZNV-203
	Spacer ring for Sauter, stroke 20 mm	ZNV-204
	Adapter kit Danfoss	ZNV-205
<b>Service tools</b>	<b>Description</b>	<b>Type</b>
	Adapter for Service-Tool ZTH	MFT-C
	Belimo PC-Tool, Software for adjustments and diagnostics	MFT-P
	Service Tool, with ZIP-USB function, for configurable and communicative Belimo actuators, VAV controller and HVAC performance devices	ZTH EU

**Electrical installation**

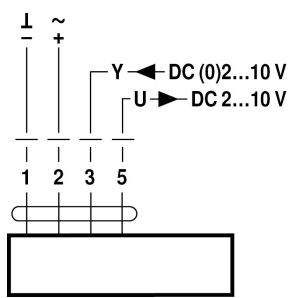

**Supply from isolating transformer.**

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

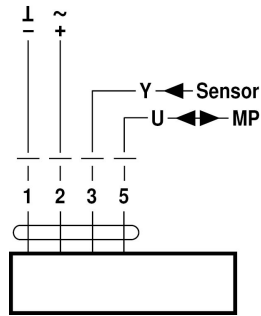
**Direction of stroke switch factory setting: Actuator spindle retracted (▲).**

### Wiring diagrams

AC/DC 24 V, modulating



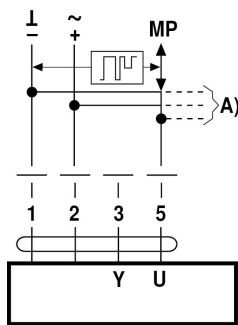
Operation on the MP-Bus



### Functions

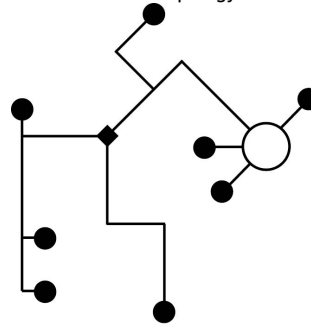
#### Functions when operated on MP-Bus

Connection on the MP-Bus



A) additional MP-Bus nodes (max. 8)

MP-Bus Network topology

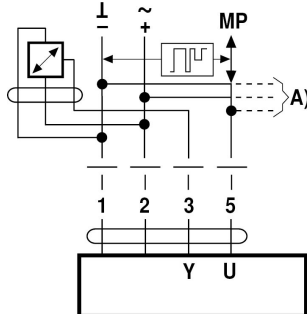


There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted).

Supply and communication in one and the same 3-wire cable

- no shielding or twisting necessary
- no terminating resistors required

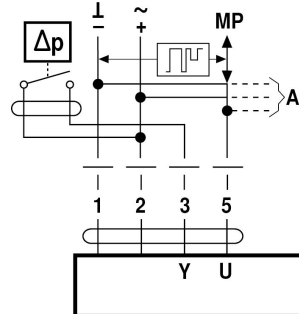
Connection of active sensors



A) additional MP-Bus nodes (max. 8)

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

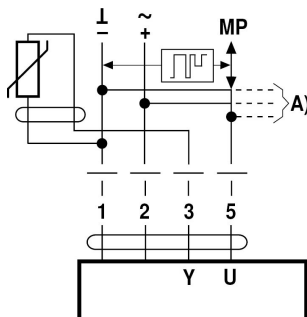
Connection of external switching contact



A) additional MP-Bus nodes (max. 8)

- Switching current 16 mA @ 24 V
- Start point of the operating range must be parametrised on the MP actuator as  $\geq 0.5$  V

Connection of passive sensors



Ni1000	-28...+98 °C	850...1600 $\Omega^2$ )
PT1000	-35...+155 °C	850...1600 $\Omega^2$ )
NTC	-10...+160 °C <sup>1)</sup>	200 $\Omega$ ...60 k $\Omega^2$ )

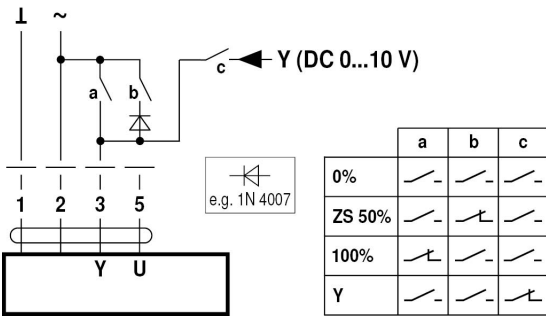
A) additional MP-Bus nodes (max. 8)

1) Depending on the type

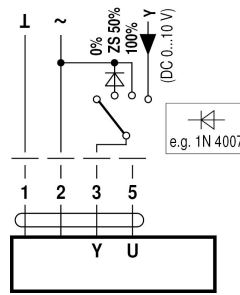
2) Resolution 1 Ohm

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

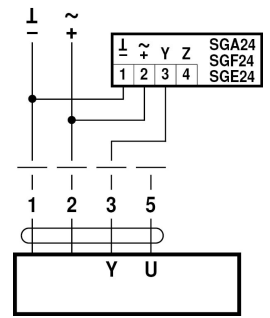
Override control with AC 24 V with relay contacts



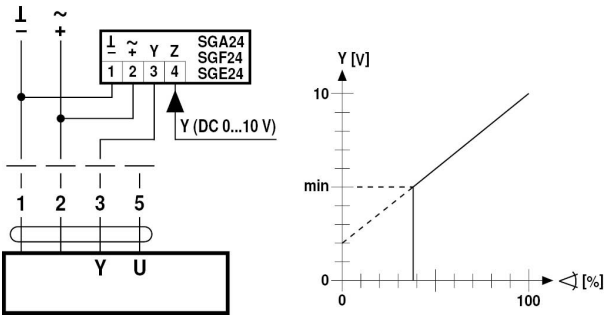
Override control with AC 24 V with rotary switch



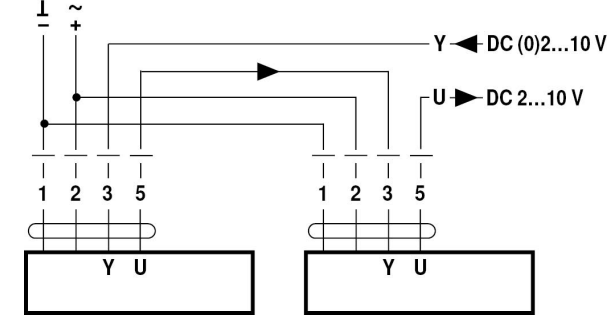
Control remotely 0...100% with positioner SG..



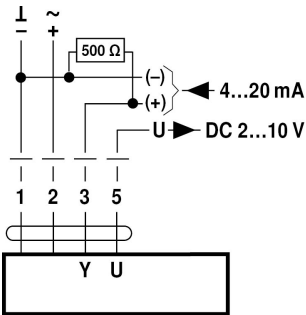
Minimum limit with positioner SG..



Follow-up control (position-dependent)

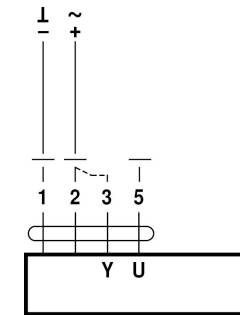


Control with 4...20 mA via external resistor



**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

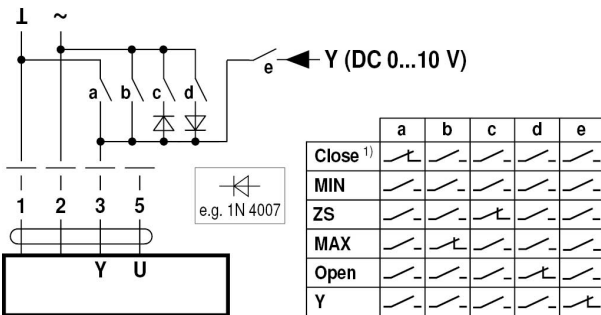


**Procedure**

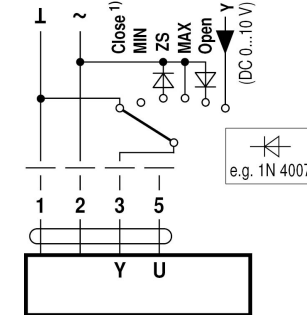
1. Apply 24 V to connection 1 and 2
2. Disconnect connection 3:  
- with upwards direction of motion: closing point at top  
- with downwards direction of motion: closing point at bottom
3. Short circuit connections 2 and 3:  
- Actuator runs in the opposite direction

**Functions for actuators with specific parameters (Parametrisation necessary)**

Override control and limiting with AC 24 V with relay contacts

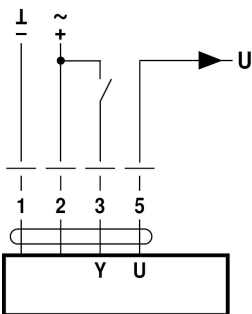


Override control and limiting with AC 24 V with rotary switch

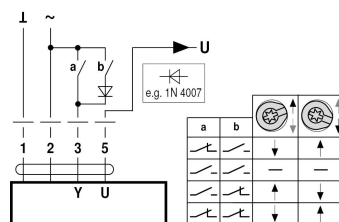


1) **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

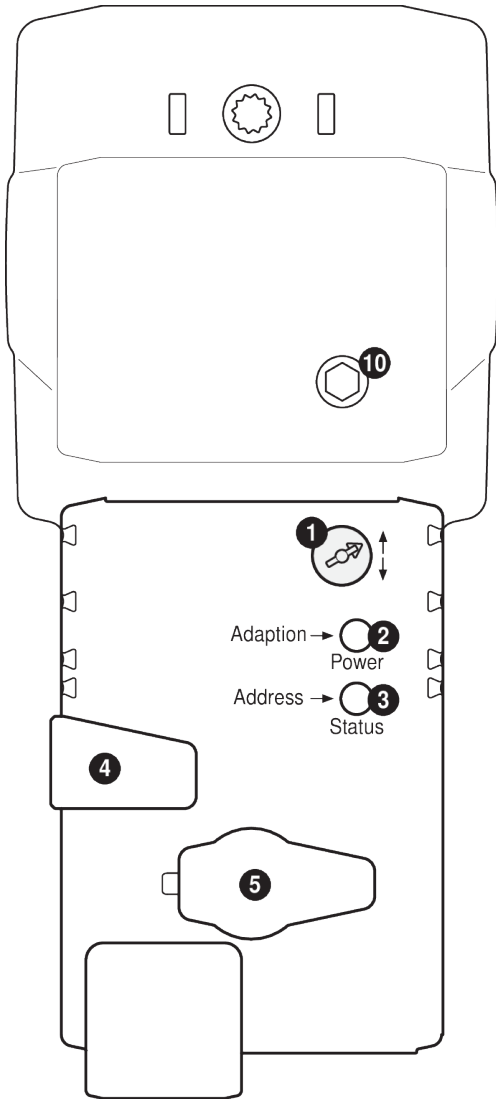
Control open/close



Control 3-point



Operating controls and indicators



- 1 Direction of stroke switch**  
Switch over: Direction of stroke changes
- 2 Push-button and LED display green**  
Off: No power supply or malfunction  
On: In operation  
Press button: Triggers stroke adaptation, followed by standard mode
- 3 Push-button and LED display yellow**  
Off: Standard mode  
Flickering: MP communication active  
On: Adaptation 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, standard mode
- 5 Service plug**  
For connecting parameterisation and service tools
- 10 Manual override**  
Clockwise: Actuator spindle extends  
Counterclockwise: Actuator spindle retracts

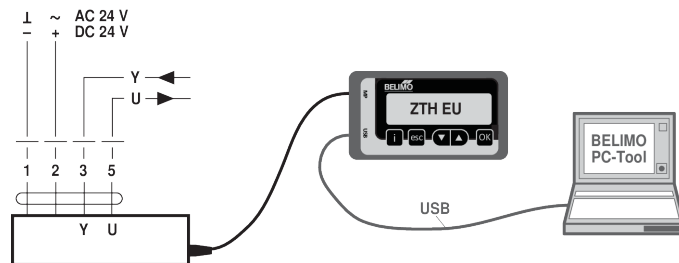
**Check power supply connection**

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

Service

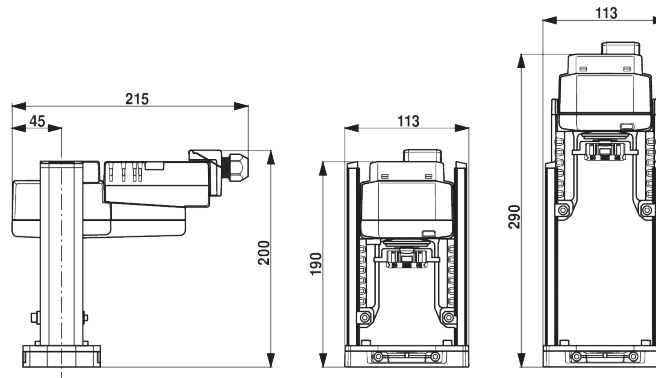
**Service Tools connection** The actuator can be parametrised by ZTH EU via the service socket. For an extended parametrisation the PC tool can be connected.

**Connection ZTH EU / PC-Tool**



## Dimensions

## Dimensional drawings



## Further documentation

- Tool connections
- Introduction to MP-Bus Technology
- Overview MP Cooperation Partners
- Data sheets for globe valves
- Installation instructions for actuators