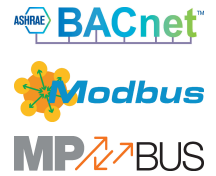**Communicative globe valve actuator for 2-way and 3-way globe valves**

• Actuating force 1000 N
• Nominal voltage AC/DC 24 V
• Control modulating, communicative, hybrid
• Stroke 20 mm
• Communication via BACnet MS/TP, Modbus RTU, Belimo-MP-Bus or conventional control
• Conversion of sensor signals

ASHRAE **BACnet™**

Modbus

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	1.5 W
	Power consumption in rest position	0.5 W
	Power consumption for wire sizing	3 VA
	Connection supply / control	Cable 1 m, 6x 0.75 mm²
Data bus communication	Communicative control	BACnet MS/TP Modbus RTU (factory setting) MP-Bus
	Number of nodes	BACnet / Modbus see interface description MP-Bus max. 8
Functional data	Actuating force motor	1000 N
	Operating range Y	2...10 V
	Operating range Y variable	0.5...10 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...10 V
	Position accuracy	±5%
	Manual override	with push-button, can be locked
	Stroke	20 mm
	Running time motor	150 s / 20 mm
	Running time motor variable	90...150 s
	Sound power level, motor	45 dB(A)
	Adaptation setting range	manual (automatic on first power-up)
	Adaptation setting range variable	No action Adaptation when switched on Adaptation after pushing the manual override button
	Override control, controllable via bus communication	MAX (maximum position) = 100% MIN (minimum position) = 0% ZS (intermediate position) = 50%
	Override control variable	MAX = (MIN + 33%)...100% ZS = MIN...MAX
	Position indication	Mechanical, 5...20 mm stroke

Technical data

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
	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	0...50°C [32...122°F]
	Storage temperature	-40...80°C [-40...176°F]
	Servicing	maintenance-free
Weight	Weight	1.8 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 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.
- 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

Operating mode
The actuator is fitted with an integrated interface for BACnet MS/TP, Modbus RTU and MP-Bus. It receives the digital control signal from the control system and returns the current status.

Converter for sensors
Connection option for a sensor (passive, active or with switching contact). In this way, the analogue sensor signal can be easily digitised and transferred to the bus systems : BACnet, Modbus or MP-Bus.

Product features

Parametrisable actuators	The factory settings cover the most common applications. Single parameters can be modified with Belimo Assistant 2 or ZTH EU.
	The communication parameters of the bus systems (address, baud rate etc.) are set with the ZTH EU. Pressing the "Address" button on the actuator while connecting the supply voltage resets the communication parameters to the factory setting.
	Quick addressing: The BACnet and Modbus address can alternatively be set using the buttons on the actuator and selecting 1...16. The selected value is added to the "basic address" parameter and results in the absolute BACnet and Modbus address.
Combination analogue - communicative (hybrid mode)	With conventional control by means of an analogue control signal, BACnet or Modbus can be used for the communicative position feedback
Mounting on third-party valves	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 point into account, secure the actuator to the bracket and then conduct the commissioning process. The valve neck adapter/actuator can be rotated by 360° on the valve neck, provided the size of the installed valve permits.
Mounting on Belimo valves	Use standard actuators from Belimo for mounting on Belimo globe valves. The installation of RetroFIT+ actuators on Belimo globe valves is technically possible.
Manual override	Manual override with push-button possible (the gear train is disengaged for as long as the button is pressed or remains locked).
	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.
High functional reliability	The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.
Home position	Factory setting: Actuator stem is retracted.
	The first time the supply voltage is switched on, i.e. at the time of commissioning, the actuator carries out an adaptation, 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 control signal.
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 parametrised. 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.
Setting direction of motion	When actuated, the direction-of-stroke switch changes the direction of motion in normal operation.

Accessories

Tools	Description	Type
	Service tool, with ZIP-USB function, for parametrisable 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

Accessories

	Description	Type
	Connecting cable 5 m, A: RJ11 6/4 ZTH EU, B: free wire end for connection to MP/PP terminal	ZK2-GEN
Mechanical accessories	Description	Type
	Spacer ring for LDM, stroke 20 mm	ZNV-203
	Spacer ring for Sauter, stroke 20 mm	ZNV-204
	Adapter kit Danfoss	ZNV-205

Electrical installation

⚠️ **Supply from isolating transformer.**

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

The wiring of the line for BACnet MS/TP / Modbus RTU is to be carried out in accordance with applicable RS-485 regulations.

Modbus / BACnet: Supply and communication are not galvanically isolated. COM and ground of the devices must be connected to each other.

Wire colours:
1 = black
2 = red
3 = white
5 = orange
6 = pink
7 = grey

Functions:
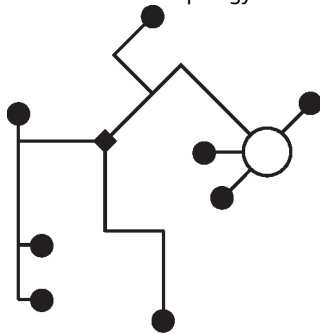C1 = D- = A (wire 6)
C2 = D+ = B (wire 7)

BACnet MS/TP / Modbus RTU
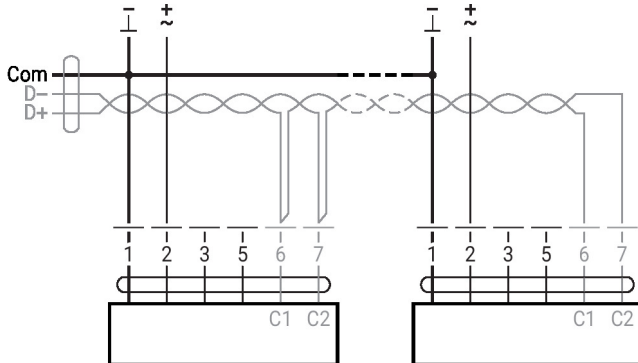
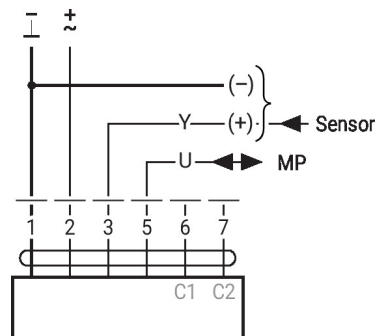## Further electrical installations

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
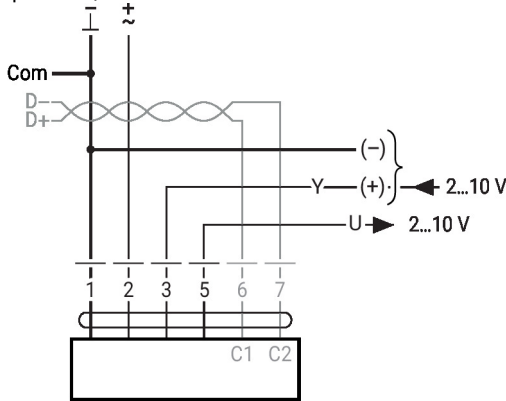• no terminating resistors required

MP-Bus

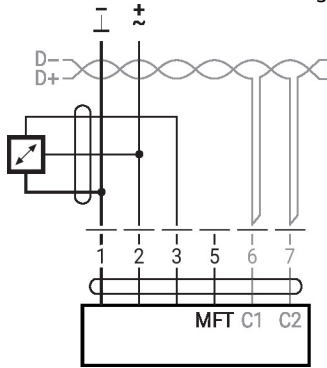## Further electrical installations

Functions with specific parameters (Parametrisation necessary)
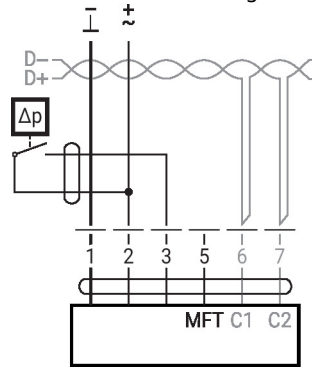Modbus RTU / BACnet MS/TP with analogue setpoint (hybrid operation)

```
Com
D–
D+
              (–)
       Y—(+)  ◄ 2...10 V
              U ► 2...10 V
  1  2  3  5  6  7
           C1  C2
```

Sensor connection

Connection with active sensor, e.g. 0...10 V @ 0...50°C

```
D–
D+
  1  2  3  5  6  7
     MFT C1  C2
```

Possible input voltage range:
0...10 V
Resolution 30 mV

Connection with switching contact, e.g. Δp monitor

```
D–
D+
 Δp
  1  2  3  5  6  7
     MFT C1  C2
```

Switching contact requirements:
The switching contact must be able to switch a current of 16 mA at 24 V accurately.
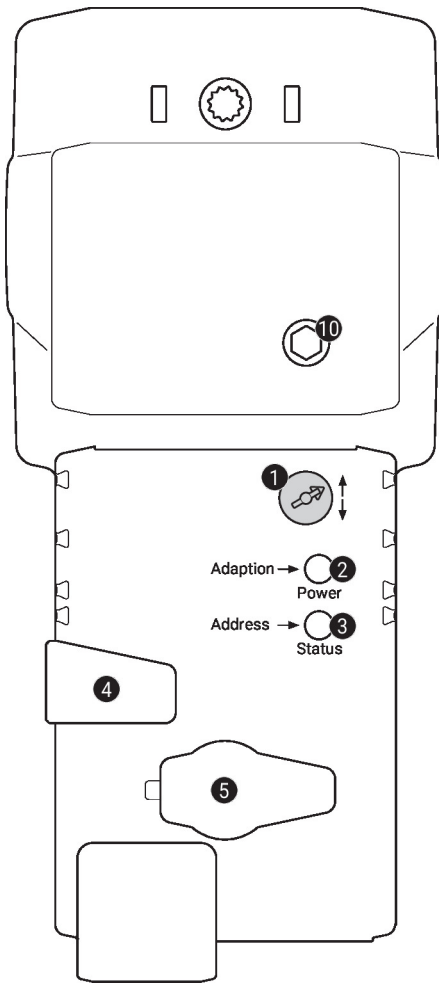Start point of the operating range must be parametrised on the MOD actuator as ≥0.5 V.

Connection with passive sensor, e.g. Pt1000, Ni1000, NTC

```
D–
D+
  1  2  3  5  6  7
     MFT C1  C2
```
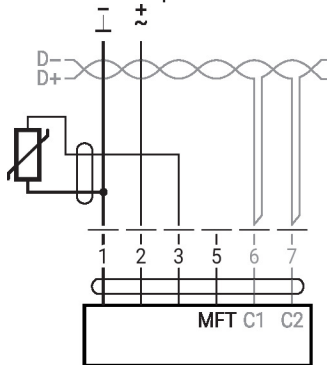
Ni1000	−28...+98°C	850...1600 Ω [2]
PT1000	−35...+155°C	850...1600 Ω [2]
NTC	−10...+160°C [1]	200 Ω...60 kΩ [2]

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

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

Flashing: In address mode: Pulses according to set address (1...16)
When starting: Reset to factory setting (Communication)

Press button: In standard mode: Triggers stroke adaptation
In address mode: Confirmation of set address (1...16)

3 Push-button and LED display yellow

Off: Standard mode

On: Adaptation or synchronisation process active
or actuator in address mode (LED display green flashing)

Flickering: BACnet / Modbus communication active

Press button: In operation (>3 s): Switch address mode on and off
In address mode: Address setting by pressing several times
When starting (>5 s): Reset to factory setting (Communication)

4 Manual override button

Press button: Gear train disengages, motor stops, manual override possible

Release button: Gear train engages, standard mode

5 Service plug

For connecting parametrisation and service tools

10 Manual override

Clockwise: Actuator stem extends

Counterclockwise: Actuator stem retracts

Service

Quick addressing

1. Press the "Address" button until the green "Power" LED is no longer illuminated. The green "Power" LED flashes in accordance with the previously set address.

2. Set the address by pressing the "Address" button the corresponding number of times (1...16).

3. The green LED flashes in accordance with the address that has been entered (1...16). If the address is not correct, it can be reset in accordance with step 2.

4. Confirm the address setting by pressing the green "Adaptation" button.

If the address is not confirmed within 60 seconds, the address procedure will be ended. Any address change that has already been started will be discarded.
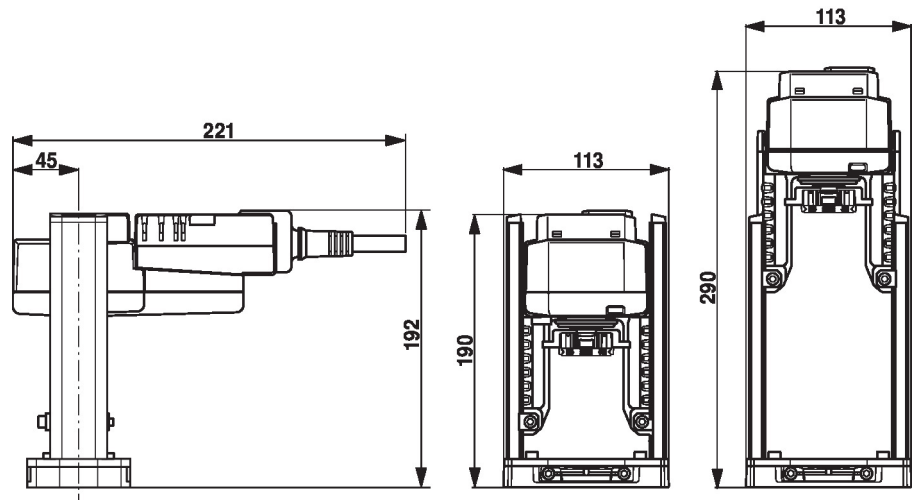
The resulting BACnet MS/TP and Modbus RTU address is made up of the set basic address plus the short address (e.g. 100+7=107).

Service

Wired connection   The device can be parametrised by ZTH EU via the service socket.

For an extended parametrisation, Belimo Assistant 2 can be connected.
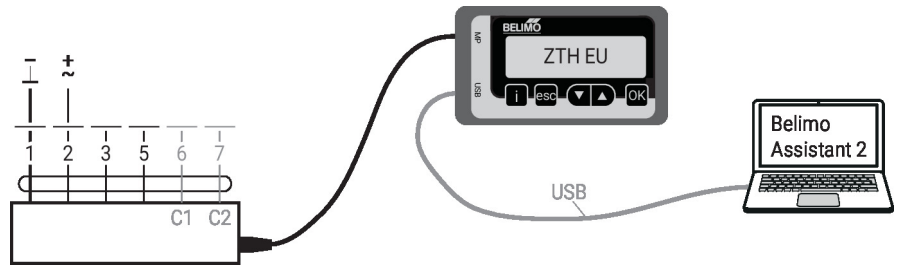
Dimensions

Further documentation

- Tool connections
- BACnet Interface description
- Modbus Interface description
- Overview MP Cooperation Partners
- MP Glossary
- Introduction to MP-Bus Technology
- Data sheets for globe valves
- Installation instructions for actuators
- Quick Guide – Belimo Assistant 2