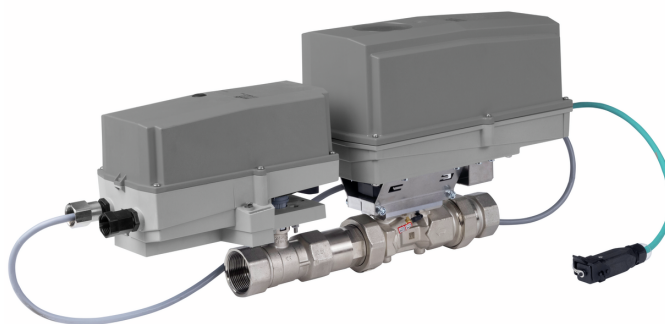


Energy metering pressure independent control valve that optimizes, documents and proves water coil performance in chilled and hot water systems.

- Nominal voltage AC/DC 24 V
- Control Modulating, Communicative, Hybrid, Cloud
- Measures Energy
- Controls Power
- Manages Delta T



5-year warranty



Please note: Due to a supplier issue, certain NEMA 4 actuator covers will be supplied in gray instead of orange until further notice. This change ensures uninterrupted shipping and the same protective properties and product specifications.

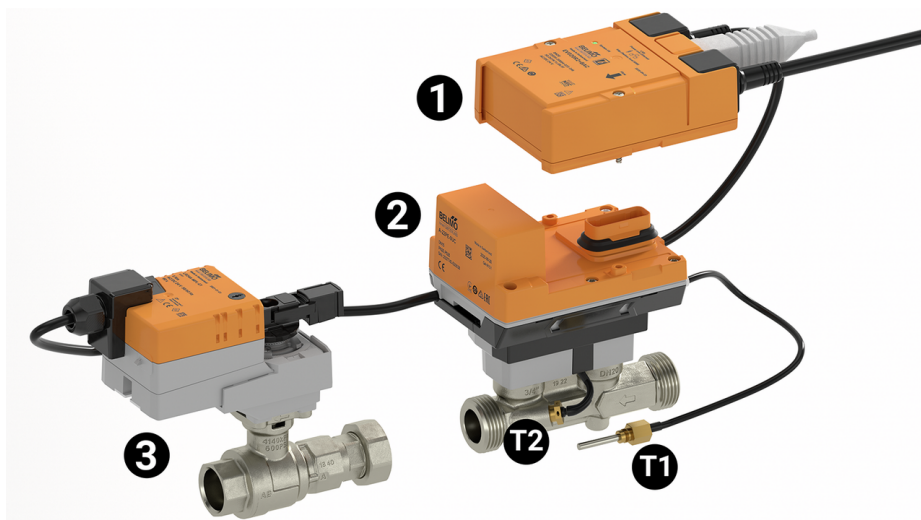
## Type Overview

| Type           | DN      | V <sup>nom</sup><br>[GPM] | Body Pressure Rating |
|----------------|---------|---------------------------|----------------------|
| EV200+ARX-E N4 | 2" [50] | 66                        | 360 psi              |

## Structure

- Components** The Belimo Energy Valve consists of a characterized control valve, an actuator and a thermal energy meter with a logic and a sensor module.
- The logic module provides the power supply, the communication interface and the NFC connection of the energy meter. All relevant data are measured and recorded in the sensor module.
- This modular design of the energy meter means that the logic module can remain in the system if the sensor module is replaced.

- External temperature sensor T1
- Integrated temperature sensor T2
- Logic module 1
- Sensor module 2
- Characterized control valve with actuator 3



## 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 | 5 W                                 |
|                 | Transformer sizing             | 8 VA                                |

## Technical data

|                         |                                                     |                                                                                                                                                                                             |
|-------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electrical data         | Connection Ethernet                                 | RJ45 socket                                                                                                                                                                                 |
|                         | Power over Ethernet PoE                             | DC 37...57 V<br>11 W (PD13W)                                                                                                                                                                |
|                         | Conductors, cables                                  | Power supply AC/DC 24 V: cable length <100 m, no shielding or twisting required<br>Power supply PoE: shielded cables recommended                                                            |
|                         | Electrical Connection                               | 18 AWG plenum cable and RJ45 socket (Ethernet)                                                                                                                                              |
|                         | Overload Protection                                 | electronic throughout 0...90° rotation                                                                                                                                                      |
|                         |                                                     |                                                                                                                                                                                             |
| Data bus communication  | Communicative control                               | BACnet/IP, BACnet MS/TP<br>Modbus TCP, Modbus RTU<br>MP-Bus<br>Cloud                                                                                                                        |
| Functional data         | Valve size [mm]                                     | 2" [50]                                                                                                                                                                                     |
|                         | Operating range Y                                   | 2...10 V                                                                                                                                                                                    |
|                         | Operating range Y note                              | 4...20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor)                                                                                                                                                 |
|                         | Input impedance                                     | 100 kΩ (0.1 mA), 500 Ω                                                                                                                                                                      |
|                         | Operating modes optional                            | VDC variable                                                                                                                                                                                |
|                         | Position feedback U                                 | 2...10 V                                                                                                                                                                                    |
|                         | Position feedback U variable                        | VDC variable                                                                                                                                                                                |
|                         | Running Time (Motor)                                | 90 s                                                                                                                                                                                        |
|                         | Sound power level motor                             | 45 dB(A)                                                                                                                                                                                    |
|                         | Control accuracy                                    | ±5%                                                                                                                                                                                         |
|                         | Min. controllable flow                              | 1% of V <sub>nom</sub>                                                                                                                                                                      |
|                         | Fluid                                               | chilled or hot water, up to 60% glycol max (open loop/steam not allowed)                                                                                                                    |
|                         | Fluid temperature                                   | 14...250°F [-10...120°C]                                                                                                                                                                    |
|                         | Close-off pressure                                  | Δps 200 psi                                                                                                                                                                                 |
|                         | Differential pressure                               | Δp 5...50 psi<br>1...50 psi, see "Flow Reduction Chart"                                                                                                                                     |
|                         | Flow characteristic                                 | equal percentage or linear                                                                                                                                                                  |
|                         | Pipe connection                                     | Internal thread<br>NPT (female)                                                                                                                                                             |
|                         | Servicing                                           | maintenance-free                                                                                                                                                                            |
|                         | Manual override                                     | external push button                                                                                                                                                                        |
|                         | Inlet Length to Meet Specified Measurement Accuracy | 0x nominal pipe size (NPS)                                                                                                                                                                  |
|                         |                                                     |                                                                                                                                                                                             |
| Measuring data          | Measured values                                     | Flow<br>Temperature                                                                                                                                                                         |
|                         | Temperature sensor                                  | Pt1000 - EN 60751, 2-wire technology, inseparably connected<br>Cable length external sensor T1: 3 m [9.8 ft]                                                                                |
| Temperature measurement | Measuring accuracy absolute temperature             | Temperature probe (probe only – individually compensated):<br>±(0.1 + 0.0017  T )°C<br>(corresponds to Pt1000 EN60751 Class AA)<br>Calculator + temperature probe:<br>±(0.15 + 0.002  T )°C |
|                         | Measuring accuracy differential temperature         | ±0.17K @ ΔT = 5K<br>±0.18 K @ ΔT = 10 K<br>±0.23 K @ ΔT = 20 K                                                                                                                              |
| Flow measurement        | Measuring accuracy flow                             | ±2% @ 20°C [68°F]                                                                                                                                                                           |

## Technical data

|                  |                              |                                                                                             |
|------------------|------------------------------|---------------------------------------------------------------------------------------------|
| Flow measurement | Measurement repeatability    | ±0.5% (Flow)                                                                                |
|                  | Sensor technology            | Ultrasonic with glycol and temperature compensation                                         |
| Safety data      | Power source UL              | Class 2 Supply                                                                              |
|                  | Degree of protection NEMA/UL | NEMA 4                                                                                      |
|                  | Housing                      | UL Enclosure Type 4                                                                         |
|                  | Agency Listing               | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02<br>CE acc. to 2014/30/EU and 2014/35/EU |
|                  | Quality Standard             | ISO 9001                                                                                    |
|                  | UL 2043 Compliant            | Suitable for use in air plenums per Section 300.22(C) of the NEC and Section 602 of the IMC |
|                  | Ambient humidity             | Max. 95% RH, non-condensing                                                                 |
|                  | Ambient temperature          | -22...122°F [-30...50°C]                                                                    |
|                  | Storage temperature          | -40...176°F [-40...80°C]                                                                    |
|                  |                              |                                                                                             |
| Materials        | Valve body                   | Nickel-plated brass body                                                                    |
|                  | Flow measuring pipe          | Nickel-plated brass body                                                                    |
|                  | Stem                         | stainless steel                                                                             |
|                  | Stem seal                    | EPDM (lubricated)                                                                           |
|                  | Seat                         | PTFE                                                                                        |
|                  | Characterized disc           | TEFZEL®                                                                                     |
|                  | O-ring                       | EPDM                                                                                        |
|                  | Ball                         | stainless steel                                                                             |

## 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 if no (sea) water, snow, ice, sunlight, or aggressive gases directly act on the device, and if it is ensured that the ambient conditions remain within the limit values specified in the data sheet at all times.
- Only authorized specialists may carry out installation. All applicable legal or institutional installation regulations must be complied with during installation.
- 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

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Application    | Water-side control certified for heating applications only. For AHUs and water coils.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Operation      | The Belimo Energy Valve™ is a pressure-independent control valve with integrated energy metering that measures, documents, and optimizes water coil performance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Operating mode | The HVAC performance device is comprised of four components: characterized control valve (CCV), measuring pipe with flow sensor, temperature sensors and the actuator itself. The adjusted maximum flow (V'max) is assigned to the maximum control signal DDC (typically 10 V / 100%). Alternatively, the control signal DDC can be assigned to the valve opening angle or to the power required on the heat exchanger (see power control). The HVAC performance device can be controlled via communicative or analog signals. The fluid is detected by the sensor in the measuring pipe and is applied as the flow value. The measured value is balanced with the setpoint. The actuator corrects the deviation by changing the valve position. The angle of rotation $\alpha$ varies according to the differential pressure through the control element (see flow curves). |

## Product features

- PoE (Power over Ethernet)** If necessary, the thermal energy meter can be supplied with power via the Ethernet cable. This function can be enabled via the Belimo Assistant App.
- DC 24 V (max. 8 W) is available at wires 1 and 2 for power supply of external devices (e.g. actuator or active sensor).
- Caution: PoE may only be enabled if an external device is connected to wires 1 and 2 or if wires 1 and 2 are insulated!

## Accessories

| Replacement sensor modules | Description                                                             | Type       |
|----------------------------|-------------------------------------------------------------------------|------------|
|                            | T-piece with thermowell DN 15                                           | A-22PE-A09 |
|                            | T-piece with thermowell DN 20                                           | A-22PE-A10 |
|                            | T-piece with thermowell DN 25                                           | A-22PE-A11 |
|                            | T-piece with thermowell DN 32                                           | A-22PE-A12 |
|                            | T-piece with thermowell DN 40                                           | A-22PE-A13 |
|                            | T-piece with thermowell DN 50                                           | A-22PE-A14 |
| Sensors                    | Description                                                             | Type       |
|                            | Liquid differential pressure sensor, 0...1 bar, 0...15 psi, 1/4" NPT    | 22WDP-511  |
|                            | Liquid differential pressure sensor, 0...2.1 bar, 0...30 psi, 1/4" NPT  | 22WDP-512  |
|                            | Liquid differential pressure sensor, 0...3.4 bar, 0...50 psi, 1/4" NPT  | 22WDP-514  |
|                            | Liquid differential pressure sensor, 0...6.9 bar, 0...100 psi, 1/4" NPT | 22WDP-515  |

## Electrical installation



Supply from isolating transformer.

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

The wiring of the line for BACnet MS/TP / Modbus RTU is to be carried out in accordance with applicable RS485 regulations.

Modbus / BACnet: Supply and communication are not a galvanic dry contact. COM and the ground of the devices must be connected.

Sensor connection: An additional sensor can optionally be connected to the thermal energy meter. This can be a passive resistance sensor Pt1000, Ni1000, NTC10k (10k2), an active sensor with output DC 0...10 V or a switching contact. Thus the analogue signal of the sensor can be easily digitised with the thermal energy meter and transferred to the corresponding bus system.

Analog output: An analog output is available on the thermal energy meter. This can be selected as DC 0...10 V, DC 0.5...10 V or DC 2...10 V. For example, the flow rate or the temperature of the temperature sensor T1 / T2 can be output as an analog value.

### Wire colors:

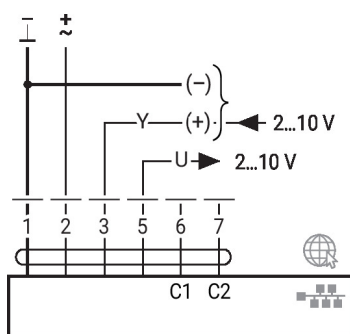
- 1 = black
- 2 = red
- 3 = white
- 5 = orange
- 6 = pink
- 7 = grey

### Functions:

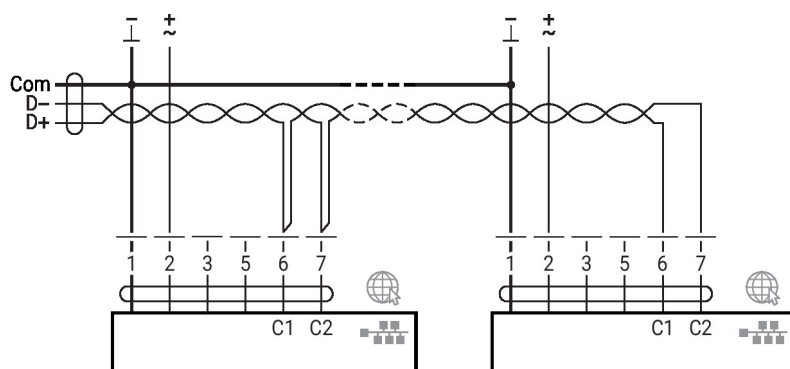
- 1 = Com
- 2 = AC/DC 24 V
- 3 = Sensor (optional)
- 5 = 0...10 V, MP-Bus
- C1 = D- (wire 6)
- C2 = D+ (wire 7)

**Electrical installation**

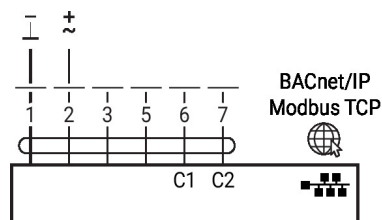
AC/DC 24 V, output signal



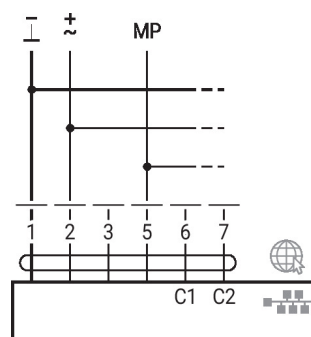
BACnet MS/TP / Modbus RTU



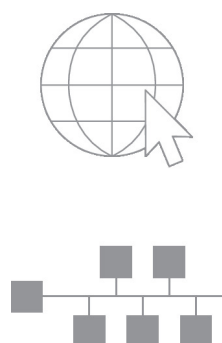
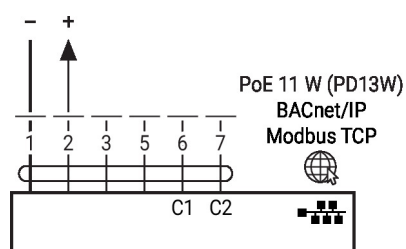
BACnet/IP / Modbus TCP



MP-Bus, supply via 3-wire connection



PoE with BACnet/IP / Modbus TCP

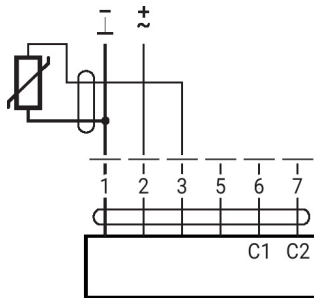


Connection of a notebook for parameterisation manual control via RJ45.  
Optional connection via RJ45 (direct connection to notebook / connection via Intranet or Internet) for access to the integrated web server

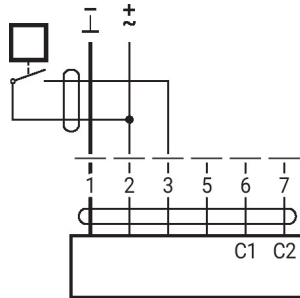
## Electrical installation

### Converter for sensors

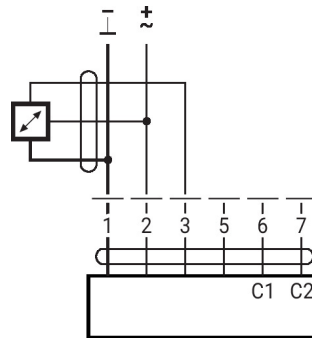
Connection with passive sensor



Connection with switching contact



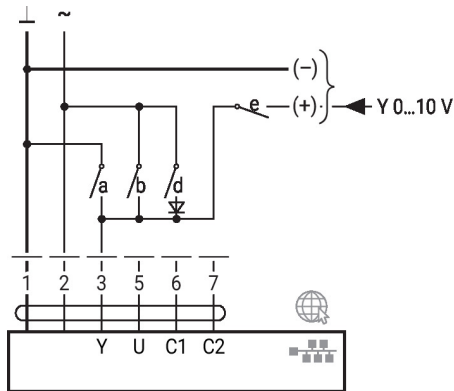
Connection with active sensor



## Further electrical installations

### Functions with specific parameters (configuration necessary)

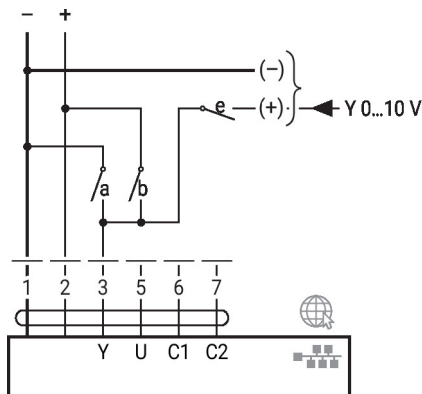
Override control and limiting with AC 24 V with relay contacts (with conventional control or hybrid mode, not for differential pressure control)



| 1 | 2 | a | b | d | e |                                 | Inv.                            |
|---|---|---|---|---|---|---------------------------------|---------------------------------|
|   |   |   |   |   |   | Close <sup>1)</sup>             | Open <sup>1)</sup>              |
|   |   |   |   |   |   | V' <sub>min</sub> <sup>2)</sup> | V' <sub>max</sub> <sup>2)</sup> |
|   |   |   |   |   |   | Q' <sub>min</sub> <sup>3)</sup> | Q' <sub>max</sub> <sup>3)</sup> |
|   |   |   |   |   |   | V' <sub>max</sub>               | V' <sub>max</sub>               |
|   |   |   |   |   |   | Open                            | Open                            |
|   |   |   |   |   |   | Y                               | Y                               |

- 1) Position control  
2) Flow control  
3) Power control  
Inv. = control signal inverted

Override control and limiting with DC 24 V with relay contacts (with conventional control or hybrid mode, not for differential pressure control)



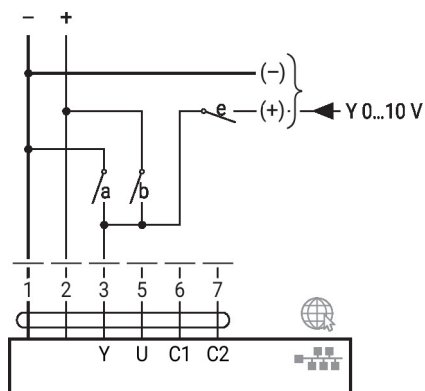
| 1 | 2 | a | b | e |                                 | Inv.                            |
|---|---|---|---|---|---------------------------------|---------------------------------|
|   |   |   |   |   | Close <sup>1)</sup>             | Open <sup>1)</sup>              |
|   |   |   |   |   | V' <sub>min</sub> <sup>2)</sup> | V' <sub>max</sub> <sup>2)</sup> |
|   |   |   |   |   | Q' <sub>min</sub> <sup>3)</sup> | Q' <sub>max</sub> <sup>3)</sup> |
|   |   |   |   |   | Y                               | Y                               |
|   |   |   |   |   | Open <sup>1)</sup>              | Open <sup>1)</sup>              |
|   |   |   |   |   | V' <sub>max</sub> <sup>2)</sup> | V' <sub>max</sub> <sup>2)</sup> |
|   |   |   |   |   | Q' <sub>max</sub> <sup>3)</sup> | Q' <sub>max</sub> <sup>3)</sup> |

- 1) Position control  
2) Flow control  
3) Power control  
Inv. = control signal inverted

## Further electrical installations

### Functions with specific parameters (configuration necessary)

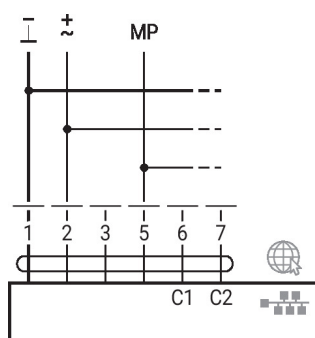
Override control and limiting with DC 24 V with relay contacts (with conventional control or hybrid mode, not for differential pressure control)



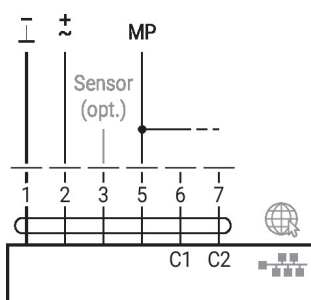
| 1 | 2 | a | b | e |                                 | Inv.                            |
|---|---|---|---|---|---------------------------------|---------------------------------|
|   |   |   |   |   | Close <sup>1)</sup>             | Open <sup>1)</sup>              |
|   |   |   |   |   | V' <sub>min</sub> <sup>2)</sup> | V' <sub>max</sub> <sup>2)</sup> |
|   |   |   |   |   | Q' <sub>min</sub> <sup>3)</sup> | Q' <sub>max</sub> <sup>3)</sup> |
|   |   |   |   |   | Y                               | Y                               |
|   |   |   |   |   | Open <sup>1)</sup>              | Open <sup>1)</sup>              |
|   |   |   |   |   | V' <sub>max</sub> <sup>2)</sup> | V' <sub>max</sub> <sup>2)</sup> |
|   |   |   |   |   | Q' <sub>max</sub> <sup>3)</sup> | Q' <sub>max</sub> <sup>3)</sup> |

- 1) Position control
- 2) Flow control
- 3) Power control
- Inv. = control signal inverted

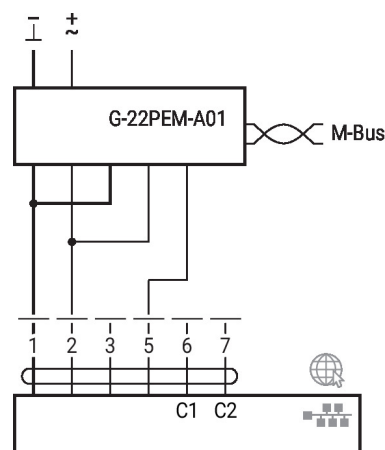
MP-Bus, supply via 3-wire connection



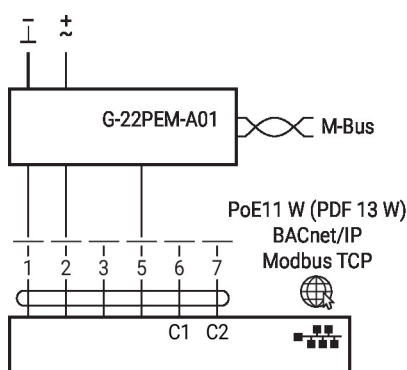
MP-Bus via 2-wire connection, local power supply



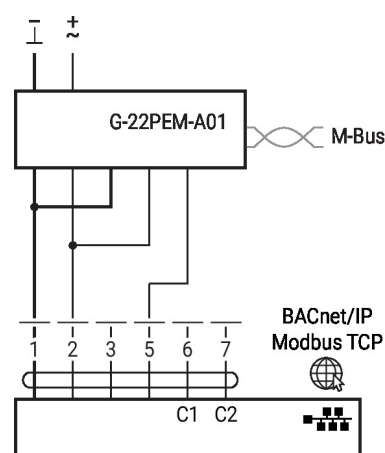
M-Bus with converter



M-Bus with converter in parallel mode with PoE with BACnet/IP / Modbus TCP



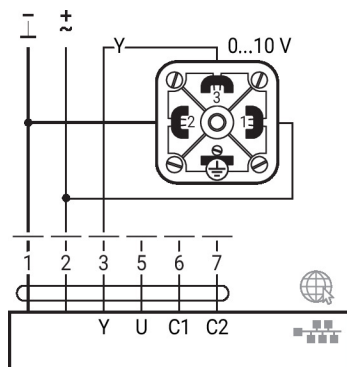
M-Bus with converter in parallel mode with BACnet/IP / Modbus TCP



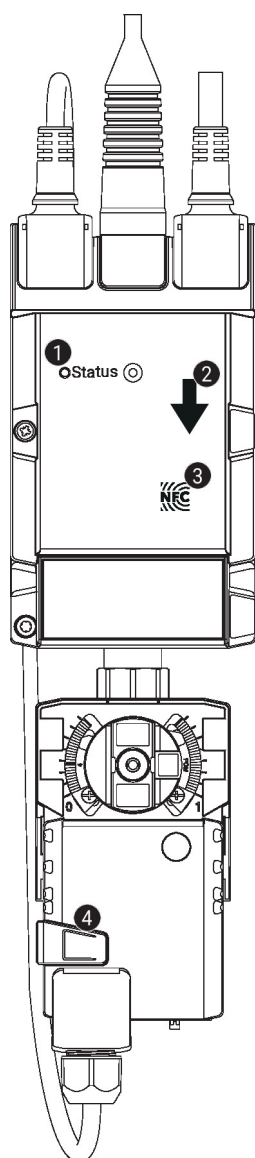
## Further electrical installations

### Differential pressure control operating mode

Connection of differential pressure sensor 22WDP... (sensor not included)



## Operating controls and indicators



### 1 LED display green

|           |                         |
|-----------|-------------------------|
| On:       | Device starting up      |
| Flashing: | In operation (Power ok) |
| Off:      | No power                |

### 2 Flow direction

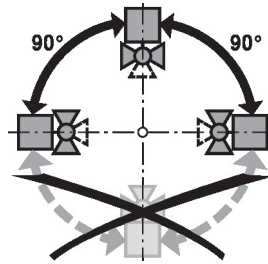
### 3 NFC interface

### 4 Manual override button

|                 |                                                                    |
|-----------------|--------------------------------------------------------------------|
| Press button:   | Gear train disengages, motor stops, manual override possible       |
| Release button: | Gear train engages, standard mode. Device performs synchronisation |

**Installation notes**

**Permissible installation orientation** The ball valve can be installed upright to horizontal. The ball valve may not be installed in a hanging position, i.e. with the stem pointing downwards.



**Installation location in return** Installation in the return is recommended.

**Water quality requirements** The water quality requirements specified in VDI 2035 must be adhered to. Belimo valves are regulating devices. For the valves to function correctly in the long term, they must be kept free from particle debris (e.g. welding beads during installation work). The installation of a suitable strainer is recommended.

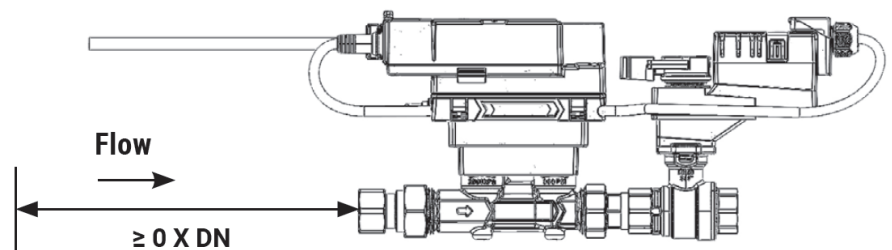
**Servicing** Ball valves, rotary actuators and sensors are maintenance-free. Before any service work on the control element is carried out, it is essential to isolate the rotary actuator from the power supply (by unplugging the electrical cable if necessary). Any pumps in the part of the piping system concerned must also be switched off and the appropriate slide valves closed (allow all components to cool down first if necessary and always reduce the system pressure to ambient pressure level). The system must not be returned to service until the ball valve and the rotary actuator have been correctly reassembled in accordance with the instructions and the pipeline has been refilled by professionally trained personnel.

**Flow direction** The direction of flow, specified by an arrow on the housing, is to be complied with, since otherwise the flow rate will be measured incorrectly.

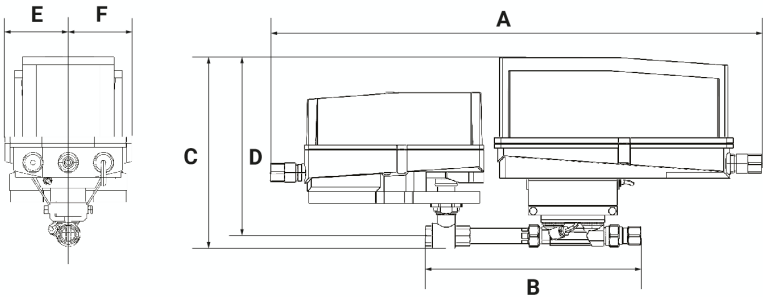
**Cleaning of pipes** Before installing the thermal energy meter, the circuit must be thoroughly rinsed to remove impurities.

**Prevention of stresses** The energy meter must not be subjected to excessive stress caused by pipes or fittings.

**Inlet section** There are no requirements for straight inlet sections prior to the flow sensor. Product has been tested to and fulfills the requirements of EN1434-4:2022



Dimensions



| Type           | DN          |             | Weight         |           |           |
|----------------|-------------|-------------|----------------|-----------|-----------|
| EV200+ARX-E N4 | 2" [50]     |             | 16 lb [7.3 kg] |           |           |
| A              | B           | C           | D              | E         | F         |
| 26.6" [675]    | 13.9" [353] | 12.0" [305] | 10.2" [260]    | 3.4" [86] | 3.4" [86] |