

- Torque motor 160 Nm
- Nominal voltage AC 24...240 V / DC 24...125 V
- Control modulating, communicative, hybrid
- with 2 integrated auxiliary switches
- Conversion of sensor signals
- Communication via BACnet MS/TP, Modbus RTU, Belimo-MP-Bus or conventional control



Technical data

|                        |                                     |   |
|------------------------|-------------------------------------|---|
| <b>Electrical data</b> | Nominal voltage                     | AC 24...240 V / DC 24...125 V                                       |
|                        | Nominal voltage frequency           | 50/60 Hz  |
|                        | Nominal voltage range               | AC 19.2...264 V / DC 19.2...137.5 V                                 |
|                        | Power consumption in operation      | 20 W  |
|                        | Power consumption in rest position  | 6 W   |
|                        | Power consumption for wire sizing   | with 24 V 20 VA / with 230 V 52 VA                                  |
|                        | Auxiliary switch                    | 2 x SPDT, 1 x 10° / 1 x 0...90° (default setting 85°)               |
|                        | Switching capacity auxiliary switch | 1 mA...3 A (0.5 A inductive), AC 250 V                              |
|                        | Connection supply                   | Terminals 2.5 mm <sup>2</sup>                                       |
|                        | Connection protective earth         | earth terminal  |
|                        | Connection control                  | Terminals 1.5 mm <sup>2</sup>                                       |
|                        | Connection auxiliary switch         | Terminals 2.5 mm <sup>2</sup>                                       |
| Parallel operation     | Yes (note the performance data)     |   |
| <b>Functional data</b> | Torque motor                        | 160 Nm  |
|                        | Communicative control               | BACnet MS/TP<br>Modbus RTU<br>MP-Bus                                |
|                        | Operating range Y                   | 2...10 V  |
|                        | Input Impedance                     | 100 kΩ  |
|                        | Operating range Y variable          | 0.5...10 V<br>4...20 mA   |
|                        | Position feedback U                 | 2...10 V  |
|                        | Position feedback U note            | Max. 0.5 mA   |
|                        | Position feedback U variable        | 0.5...10 V  |
|                        | Position accuracy                   | ±5%   |
|                        | Manual override                     | hand lever  |
|                        | Running time motor                  | 35 s / 90°  |
|                        | Running time motor variable         | 30...120 s  |
|                        | Sound power level, motor            | 68 dB(A)  |
|                        | Position indication                 | Mechanically (integrated)   |
| <b>Safety data</b>     | Protection class IEC/EN             | I protective earth (PE)   |
|                        | Protection class UL                 | I protective earth (PE)   |
|                        | Degree of protection IEC/EN         | IP66/67   |
|                        | Degree of protection NEMA/UL        | NEMA 4X   |
|                        | Enclosure                           | UL Enclosure Type 4X  |
|                        | EMC                                 | CE according to 2014/30/EU  |
|                        | Low voltage directive               | CE according to 2014/35/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           | 4 kV  |
|                        | Rated impulse voltage control          | 0.8 kV  |
|                        | Rated impulse voltage auxiliary switch | 2.5 kV  |
|                        | Control pollution degree               | 3   |
|                        | Ambient temperature                    | -30...50°C  |
|                        | Storage temperature                    | -40...80°C  |
|                        | Ambient humidity                       | Max. 100% r.H.  |
|                        | Servicing                              | maintenance-free  |
| <b>Mechanical data</b> | Connection flange                      | F07 (F05 only with accessory)   |
| <b>Weight</b>          | Weight                                 | 5.8 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.
- Caution: Power supply voltage!
- The device has a protective earthing. Incorrect connection of the protective earth can lead to hazards due to electrical shock.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- Apart from the connection box, 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.
- The two switches integrated in the actuator are to be operated either on power supply voltage or at safety extra-low voltage. The combination power supply voltage/safety extra-low voltage is not permitted.

**Product features**

|   |  |
|---|--|
| <b>Fields of application</b>                              | The actuator is particularly suitable for utilisation in outdoor applications and is protected against the following weather conditions:<br>- UV radiation<br>- Dirt / Dust<br>- Rain / Snow<br>- Air humidity   |
| <b>Converter for sensors</b>                              | Connection option for two sensors (passive, active or switching contacts). In this way, the analogue sensor signal can be easily digitised and transferred to the bus systems BACnet or Modbus.  |
| <b>Configurable actuators</b>                             | The factory settings cover the most common applications.<br>The Belimo Assistant App is required for parametrisation via Near Field Communication (NFC) and simplifies commissioning. Moreover, it provides a variety of diagnostic options.<br>The ZTH EU service tool provides a selection of both diagnostic and setting options. |
| <b>Combination analogue - communicative (hybrid mode)</b> | With conventional control by means of an analogue positioning signal, BACnet or Modbus can be used for the communicative position feedback   |
| <b>Simple direct mounting</b>                             | Simple direct mounting on the butterfly valve. The mounting orientation in relation to the butterfly valve can be selected in 90° (angle) increments.  |
| <b>Manual override</b>                                    | The valve can be manually operated using a hand crank. Unlocking is carried out manually by removing the hand crank.   |
| <b>Internal heating</b>                                   | An internal heater prevents condensation buildup.  |

Thanks to the integrated temperature and humidity sensor, the built-in heater automatically switches on/off.

- High functional reliability** The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.
- Flexible signalling** The actuator has one auxiliary switch with a fixed setting (10°) and one adjustable auxiliary switch (0...90°).

**Accessories**

| Gateways               | Description   | Type                 |
|------------------------|---|----------------------|
|                        | Gateway MP zu BACnet MS/TP  | UK24BAC              |
|                        | Gateway MP to KNX   | UK24EIB              |
|                        | Gateway MP to Modbus RTU  | UK24MOD              |
| Electrical accessories | Description   | Type                 |
|                        | Connection cable 5 m, A: RJ11 6/4 ZTH EU, B: 6-pin for connection to service socket   | ZK1-GEN              |
| Mechanical accessories | Description   | Type                 |
|                        | Position indicator and tappet shaft, F07 square, SW 17, DN 125...300  | ZPR01                |
|                        | Tappet shaft, F07 square, SW 17   | ZPR02                |
|                        | Position indicator and tappet shaft, F05, square, SW 14, DN 80...100  | ZPR03                |
|                        | Retrofit adapter kit, F05/F07/F10, flat head/square, SW 17  | ZPR05                |
|                        | Retrofit adapter kit, F05/F07/F10, square 45° turned, SW 14   | ZPR06                |
|                        | Retrofit adapter kit with ring, F07, square 45° turned, SW 17   | ZPR08                |
|                        | Retrofit adapter kit, F07/F10, flat head/square, SW 14  | ZPR09                |
|                        | Retrofit adapter kit, F05, flat head/square, SW 14  | ZPR10                |
|                        | Retrofit adapter kit, F05/F07/F10, square 45° turned, SW 18   | ZPR11                |
|                        | Retrofit adapter kit, F05/F07/F10, flat head/square, SW 16  | ZPR12                |
|                        | Retrofit adapter kit, F05/F07/F10, flat head/square, SW 11  | ZPR13                |
|                        | Retrofit adapter kit, F05/F07/F10, flat head/square, SW 12.7  | ZPR14                |
|                        | Hand crank for PR/PM actuator   | ZPR20                |
| Service tools          | Description   | Type                 |
|                        | Belimo Assistant App, Smartphone app for easy commissioning, parametrising and maintenance  | Belimo Assistant App |
|                        | Converter Bluetooth / NFC   | ZIP-BT-NFC           |
|                        | Service Tool, with ZIP-USB function, for parametrisable and communicative Belimo actuators, VAV controller and HVAC performance devices | ZTH EU               |
| Sensors                | Description   | Type                 |
|                        | Duct/Immersion Temperature Sensor 50 mm x 6 mm Pt1000   | 01DT-1BH             |
|                        | Duct/Immersion Temperature Sensor 100 mm x 6 mm Pt1000  | 01DT-1BL             |
|                        | Duct/Immersion Temperature Sensor 150 mm x 6 mm Pt1000  | 01DT-1BN             |
|                        | Duct/Immersion Temperature Sensor 200 mm x 6 mm Pt1000  | 01DT-1BP             |
|                        | Duct/Immersion Temperature Sensor 300 mm x 6 mm Pt1000  | 01DT-1BR             |
|                        | Duct/Immersion Temperature Sensor 450 mm x 6 mm Pt1000  | 01DT-1BT             |
|                        | Duct/Immersion Temperature Sensor 50 mm x 6 mm Ni1000   | 01DT-1CH             |
|                        | Duct/Immersion Temperature Sensor 100 mm x 6 mm Ni1000  | 01DT-1CL             |
|                        | Duct/Immersion Temperature Sensor 150 mm x 6 mm Ni1000  | 01DT-1CN             |
|                        | Duct/Immersion Temperature Sensor 200 mm x 6 mm Ni1000  | 01DT-1CP             |
|                        | Duct/Immersion Temperature Sensor 300 mm x 6 mm Ni1000  | 01DT-1CR             |
|                        | Duct/Immersion Temperature Sensor 450 mm x 6 mm Ni1000  | 01DT-1CT             |

**Electrical installation**

**Caution: Power supply voltage!**

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

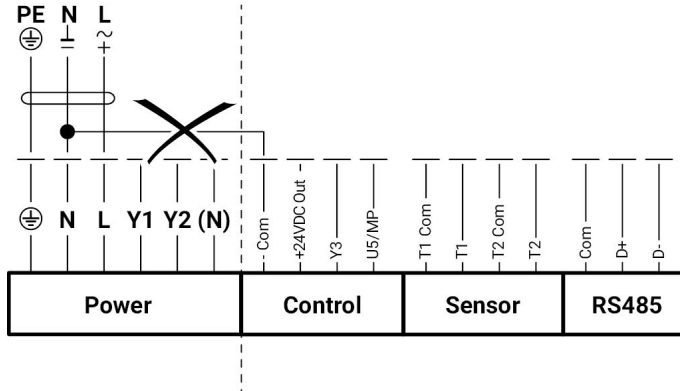
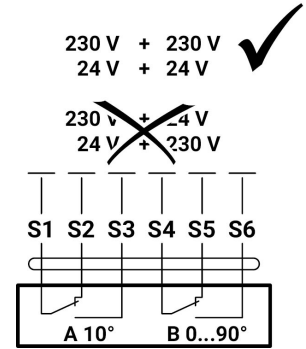
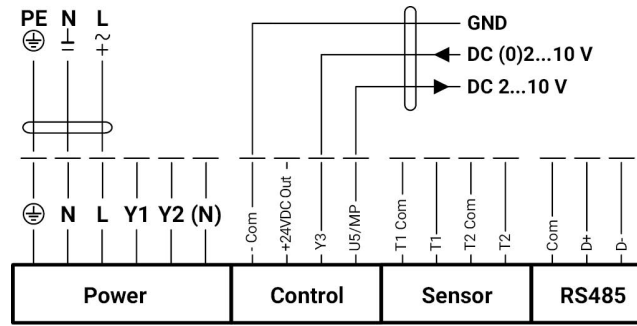
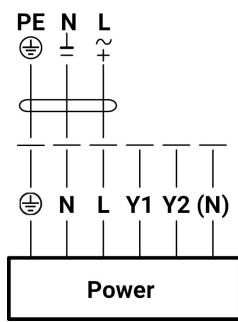
The wiring of the line for BACnet MS/TP / Modbus RTU is to be carried out in accordance with applicable RS485 regulations.

### Wiring diagrams

AC 24...240 V / DC 24...125 V

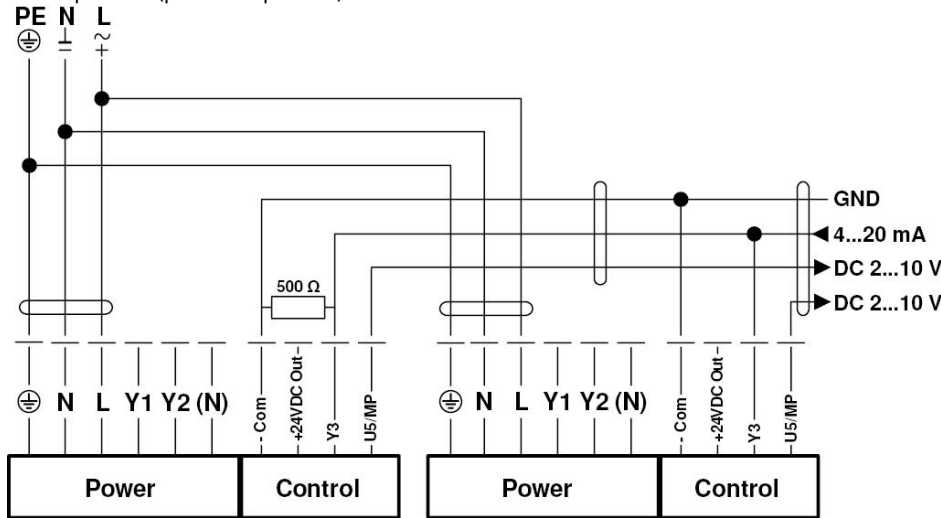
### Modulating control

### Connection auxiliary switch



Power supply must not be connected to the signal terminals!

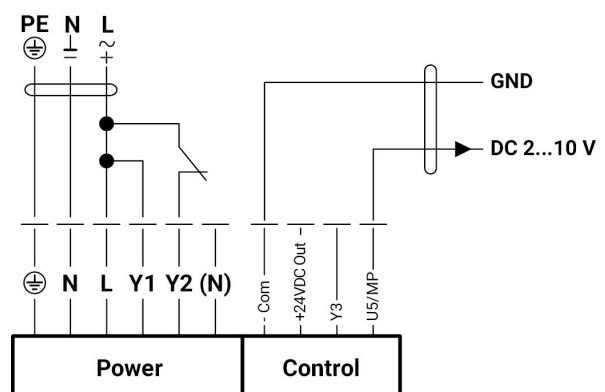
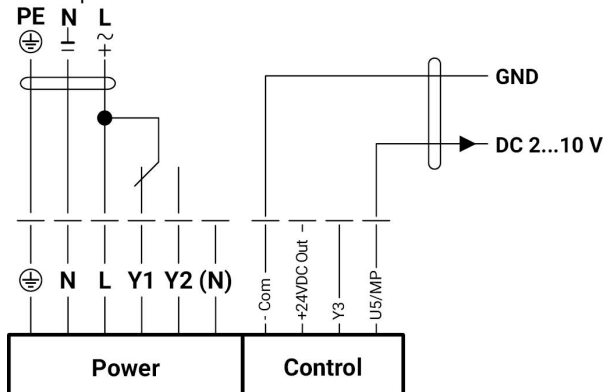
### Follow-up control (position-dependent)



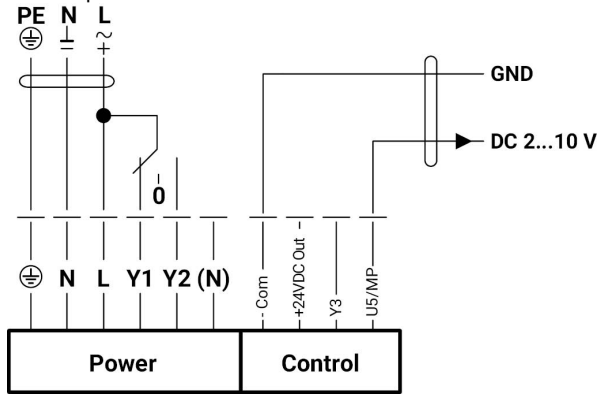
## Functions

### Functions for actuators with specific parameters (NFC)

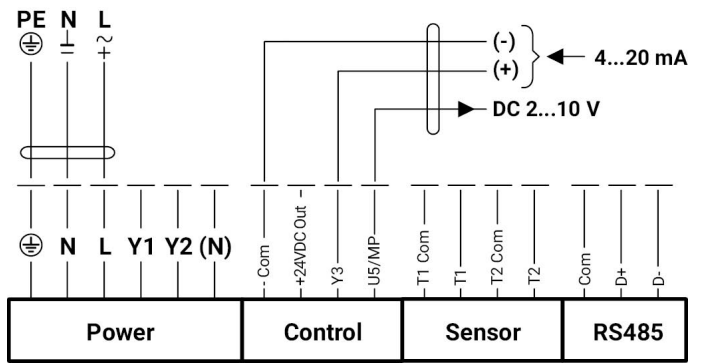
#### Control open/close



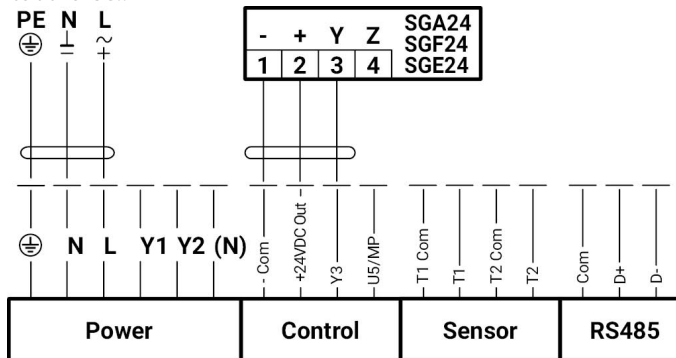
### Control 3-point



### Control 4...20 mA



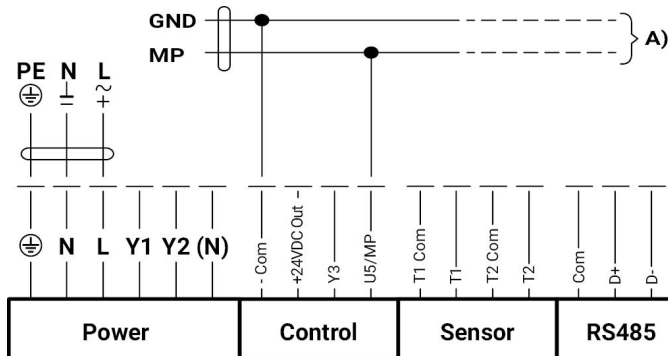
### Positioner SG..



### Note

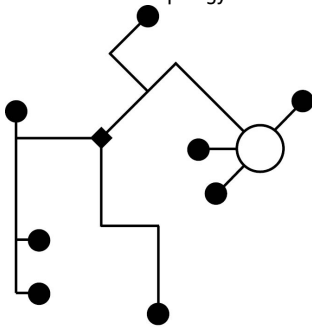
Maximum output power «DC 24 V out» 1.2 W @ 50 mA!  
A separate safety transformer must be used for higher performance!

### Connection on the MP-Bus



A) Additional actuators (max. 8)

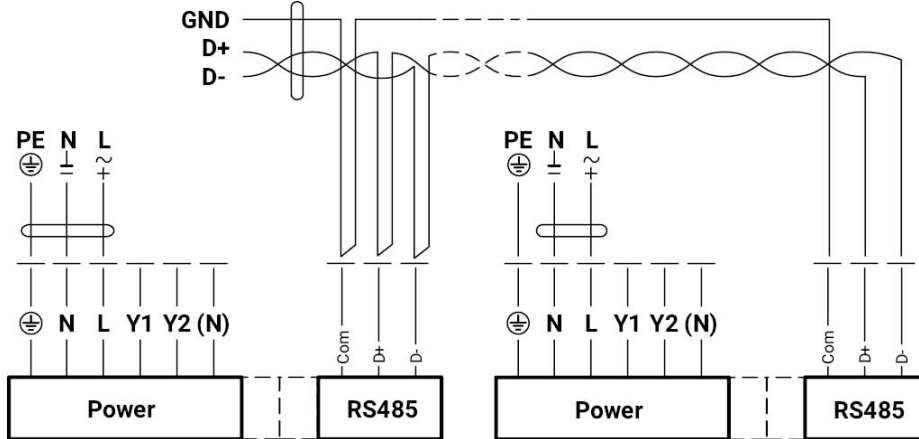
### MP-Bus Network topology



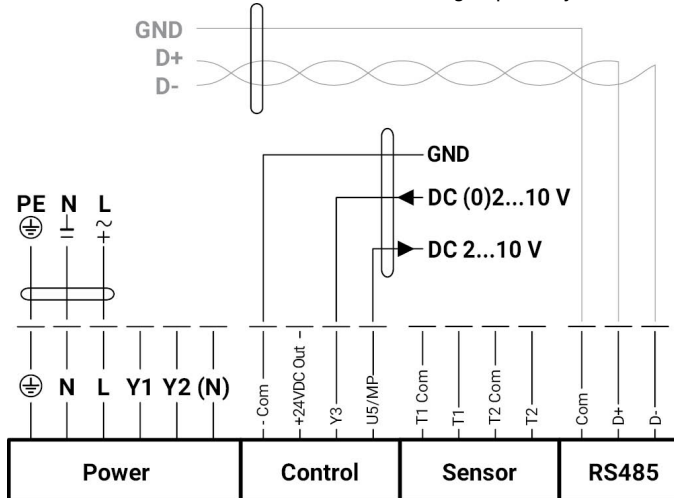
There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted).  
Supply and communication in one and the same 3-wire cable

- no shielding or twisting necessary
- no terminating resistors required

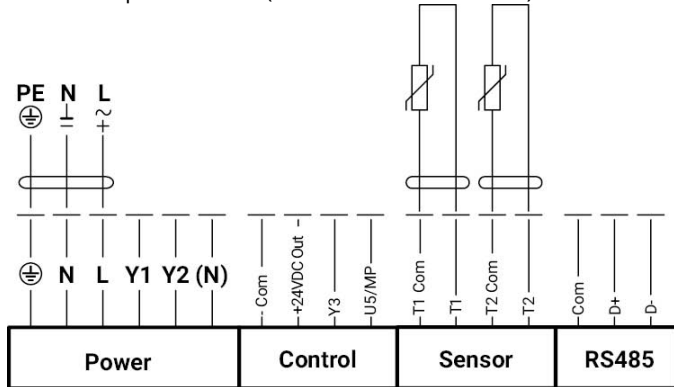
Connection BACnet MS/TP / Modbus RTU



Connection BACnet MS/TP / Modbus RTU with analog setpoint (hybrid mode)



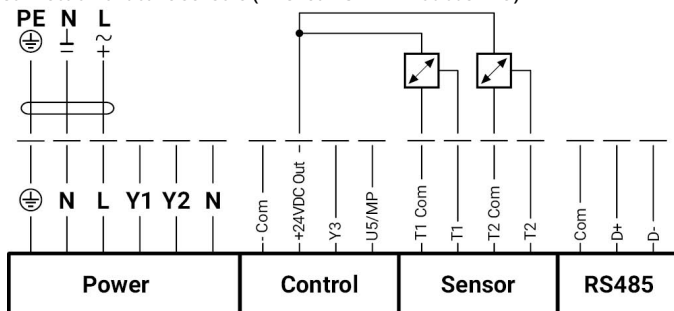
Connection of passive sensors (BACnet MS/TP / Modbus RTU)



| 1)            | 2)    |
|---------------|-------|
| 200 Ω...2 kΩ  | 0.1 Ω |
| 2 kΩ...10 kΩ  | 1 Ω   |
| 10 kΩ...55 kΩ | 10 Ω  |

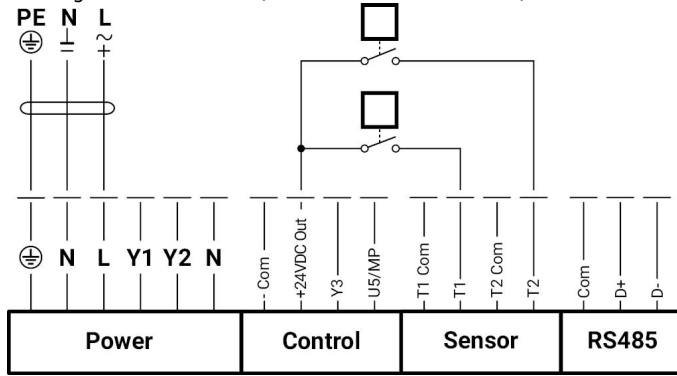
- 1) Resistance range
- 2) Resolution
- Suitable for Ni1000 and Pt1000
- Suitable Belimo types 01DT-...

Connection of active sensors (BACnet MS/TP / Modbus RTU)



Possible input voltage range:  
 DC 0...10 V (resolution 5 mV)  
 For example, to capture:  
 - Active temperature sensors  
 - Flow sensors  
 - Pressure / differential pressure sensors

Switching contact connection (BACnet MS/TP / Modbus RTU)



Requirements for switching contact:

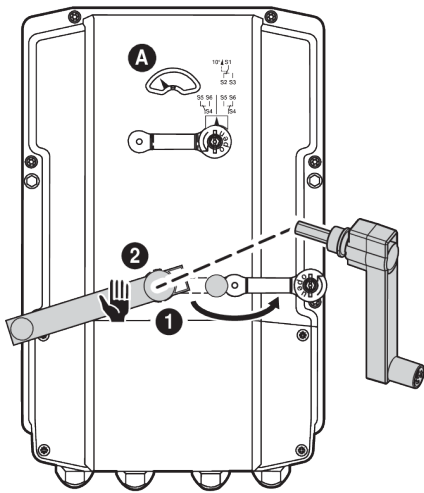
The switching contact must be able to accurately switch a current of 10 mA @ 24 V.

For example, to capture:

- Flow monitors
- Operation / malfunction messages of chillers

### Operating controls and indicators

#### Auxiliary switch settings



**Note:** Perform settings on the actuator only in deenergised state.

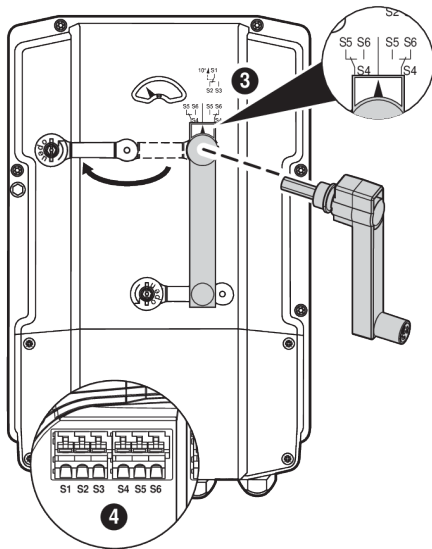
For the auxiliary switch position settings, carry out points 1 to 4 successively.

#### 1 Gear disengagement

Opening the manual override cover and adjusting the hand crank. Manual override is possible.

#### 2 Manual override control

Turn the hand crank until the desired switching position **A** is indicated and then remove the crank.



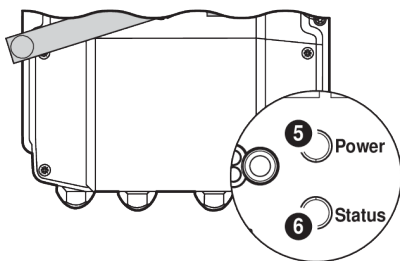
#### 3 Auxiliary switch

For the auxiliary switch position settings, carry out points 1 to 4 successively. Opening the auxiliary switch adjustment cover and adjusting the hand crank. Turn the crank until the arrow points to the vertical line

#### 4 Terminals

Connect continuity tester to S4 + S5 or to S4 + S6. If the auxiliary switch should switch in the opposite direction, rotate the hand crank by 180°.

#### Push-button and display



#### 5 Push-button and LED display green

Off: No power supply or malfunction  
On: In operation  
Press button: Triggers test run, followed by standard mode

#### 6 Push-button and LED display yellow

Off: Standard mode  
On: Test run active  
Flickering: BACnet / Modbus communication active  
Flashing: Request for addressing from MP master  
Press button: Confirmation of the MP addressing

### Service

**NFC connection** Belimo devices marked with the NFC logo can be operated with the Belimo Assistant App.

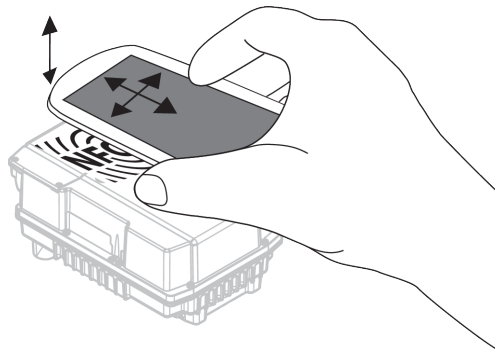
Requirement:

- NFC- or Bluetooth-capable smartphone
- Belimo Assistant App (Google Play & Apple AppStore)

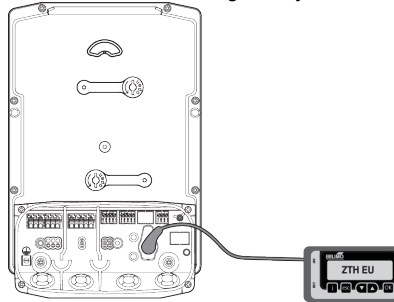
Align NFC-capable smartphone on the device so that both NFC antennas are superposed.

Connect Bluetooth-enabled smartphone via the Bluetooth-to-NFC Converter ZIP-BT-NFC to the device. Technical data and operation instructions are shown in the ZIP-BT-NFC data sheet.



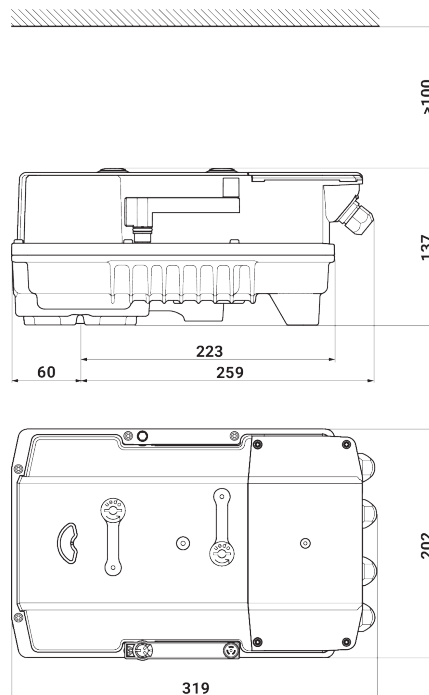


**Service Tools connection** The actuator can be configured by the ZTH EU via the service socket.



## Dimensions

### Dimensional drawings



## Further documentation

- Tool connections
- Description Protocol Implementation Conformance Statement PICS
- Description Modbus register
- Overview MP Cooperation Partners
- Introduction to MP-Bus Technology
- MP Glossary
- The complete product range for water applications
- Data sheets for butterfly valves
- Installation instructions for actuators and/or butterfly valves
- General notes for project planning