

Communicative damper actuator in IP66/67 protective housing for adjusting dampers in industrial plants and technical building installations

- 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

| | | |
|------------------------|---|---|
| Electrical data | 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 | 19 W |
| | Power consumption in rest position | 6 W |
| | Power consumption for wire sizing | with 24 V 19 VA / with 240 V 49 VA |
| | Auxiliary switch | 2 x SPDT, 1 x 10° / 1 x 0...90° |
| | Switching capacity auxiliary switch | 1 mA...3 A (0.5 A inductive), AC 250 V |
| | Connection supply | Terminals 2.5 mm ² |
| | Connection protective earth | earth terminal |
| | Connection control | Terminals 1.5 mm ² |
| | Connection auxiliary switch | Terminals 2.5 mm ² |
| | Parallel operation | Yes (note the performance data) |
| Functional data | Torque motor | 160 Nm |
| | Inhibiting torque static (voltage-free) | 50 Nm |
| | Communicative control | BACnet MS/TP Modbus RTU MP-Bus |
| | Operating range Y | 2...10 V |
| | Input Impedance | 100 kΩ |
| | Operating range Y variable | 0.5...10 V 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% |
| | Direction of motion motor | electronically reversible |
| | Manual override | hand lever |
| | Angle of rotation | Max. 95° |
| | Angle of rotation note | can be limited on both sides with adjustable electrical end stops |
| | Running time motor | 35 s / 90° |
| | Running time motor variable | 30...120 s |
| | Sound power level, motor | 68 dB(A) |
| | Mechanical interface | Form fit 17x17 mm |
| | Position indication | Scale plate 0...90 |
| Safety | 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 |

Technical data

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|------------------------|--|-------------------------------|
| Safety | 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. |
| Mechanical data | Servicing | maintenance-free |
| Weight | Connection flange | F07 (F05 only with accessory) |
| | Weight | 6.1 kg |

Safety notes



- The device must not be used outside the specified field of application, especially not 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.
- Caution: Power supply voltage!
- The device has a protective earthing. Incorrect connection of the protective earth can lead to hazards due to electrical shock.
- 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.
- To calculate the torque required, the specifications supplied by the damper manufacturers concerning the cross-section, the design, the installation site and the ventilation conditions must be observed.
- The materials used may be subjected to external influences (temperature, pressure, construction fastening, effect of chemical substances, etc.), which cannot be simulated in laboratory tests or field trials. In case of doubt, we definitely recommend that you carry out a test. This information does not imply any legal entitlement. Belimo will not be held liable and will provide no warranty.
- If cables which are not authorised for UL (NEMA) Type 4X applications are used, then flexible metallic cable conduits or suitable threaded cable conduits of equal value are to be used.
- 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

- Fields of application** The actuator is particularly suitable for utilisation in outdoor applications and is protected against the following weather conditions:
- UV radiation
 - Dirt / Dust
 - Rain / Snow
 - Air humidity

Product features

| | |
|---|--|
| Mode of operation | The actuator is equipped with a universal voltage feed module that can utilise supply voltages of AC 24...240 V and DC 24...125V. Conventional operation: The actuator is connected with a standard modulating signal of 0...10 V and drives to the position defined by the positioning signal. Measuring voltage U serves for the electrical display of the damper position 0.5...100% and as a slave control signal for other actuators. Operation on Bus: The actuator is fitted with an integrated interface for BACnet MS/TP, Modbus RTU and MP-Bus. It receives the digital positioning signal from the control system and returns the current status. |
| Converter for sensors | 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. |
| Parametrisable actuators | The factory settings cover the most common applications. The Belimo Assistant App is required for parametrisation via Near Field Communication (NFC) and simplifies commissioning. Moreover, it provides a variety of diagnostic options. The ZTH EU service tool provides a selection of both diagnostic and setting options. |
| Combination analogue - communicative (hybrid mode) | With conventional control by means of an analogue positioning signal, BACnet or Modbus can be used for the communicative position feedback |
| Simple direct mounting | Simple direct mounting on the damper shaft with form fit insert. |
| Manual override | The damper can be manually operated using a hand crank. Unlocking is carried out manually by removing the hand crank. |
| Internal heating | 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 signalization | The actuator has one auxiliary switch with a fixed setting (10°) and one adjustable auxiliary switch (0...90°). |

Accessories

| | Description | Type |
|--|---|-------------|
| Gateways | Gateway MP zu BACnet MS/TP | UK24BAC |
| | Gateway MP to Modbus RTU | UK24MOD |
| | Gateway MP to LonWorks | UK24LON |
| | Gateway MP to KNX | UK24EIB |
| Electrical accessories | Description | Type |
| | Connection cable 5 m, A: RJ11 6/4 ZTH EU, B: 6-pin service socket for Belimo device | ZK1-GEN |
| Service Tools | Description | Type |
| | Converter Bluetooth / NFC | ZIP-BT-NFC |
| Sensors | Description | Type |
| | Duct/Immersion Temperature Sensor 150 mm x 6 mm Pt1000 | 01DT-1BN |
| | Duct/Immersion Temperature Sensor 150 mm x 6 mm Ni1000 | 01DT-1CN |
| | Duct/Immersion Temperature Sensor 200 mm x 6 mm Pt1000 | 01DT-1BP |
| | Duct/Immersion Temperature Sensor 200 mm x 6 mm Ni1000 | 01DT-1CP |
| | Duct/Immersion Temperature Sensor 300 mm x 6 mm Pt1000 | 01DT-1BR |
| | Duct/Immersion Temperature Sensor 300 mm x 6 mm Ni1000 | 01DT-1CR |
| | Duct/Immersion Temperature Sensor 450 mm x 6 mm Pt1000 | 01DT-1BT |
| | Duct/Immersion Temperature Sensor 450 mm x 6 mm Ni1000 | 01DT-1CT |
| | Duct Sensor Humidity / Temperature active 140 mm x 19.5 mm | 22DTH-11M |
| | Outdoor Sensor Humidity, Temperature active with weather shield | 22UTH-11 |
| Differential Pressure Sensor Air 0...250 Pa, LCD | 22ADP-18QB | |

Electrical installation

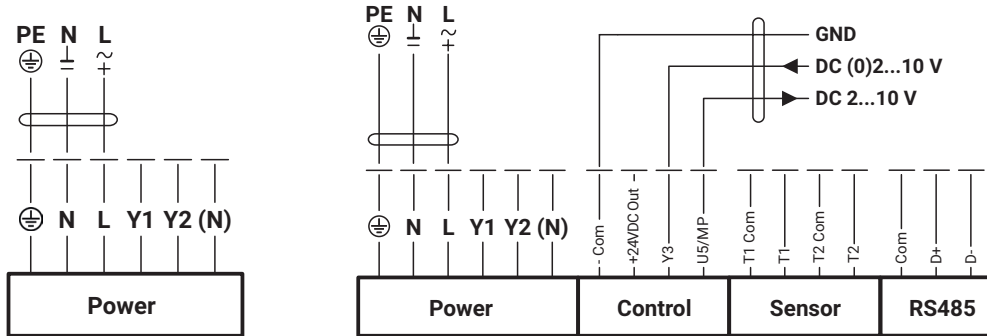


Notes

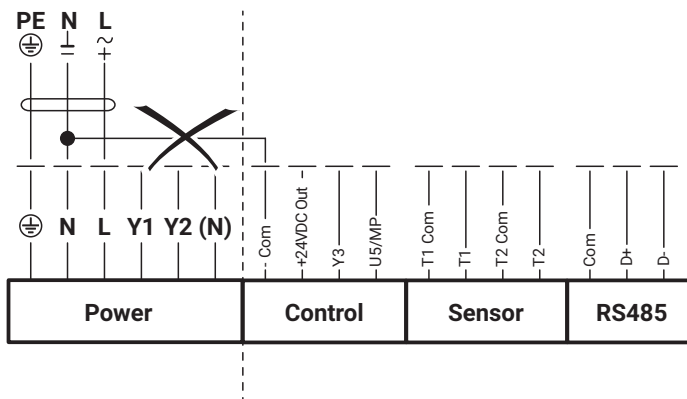
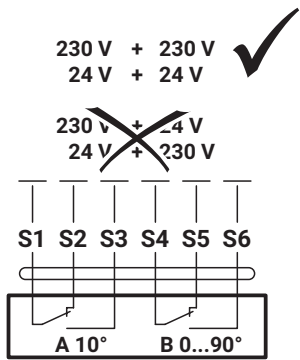
- Caution: Power supply voltage!
- Parallel connection of other actuators possible. Observe the performance data.
- The wiring of the line for BACnet MS/TP / Modbus RTU is to be carried out in accordance with applicable RS485 regulations.

Wiring diagrams

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



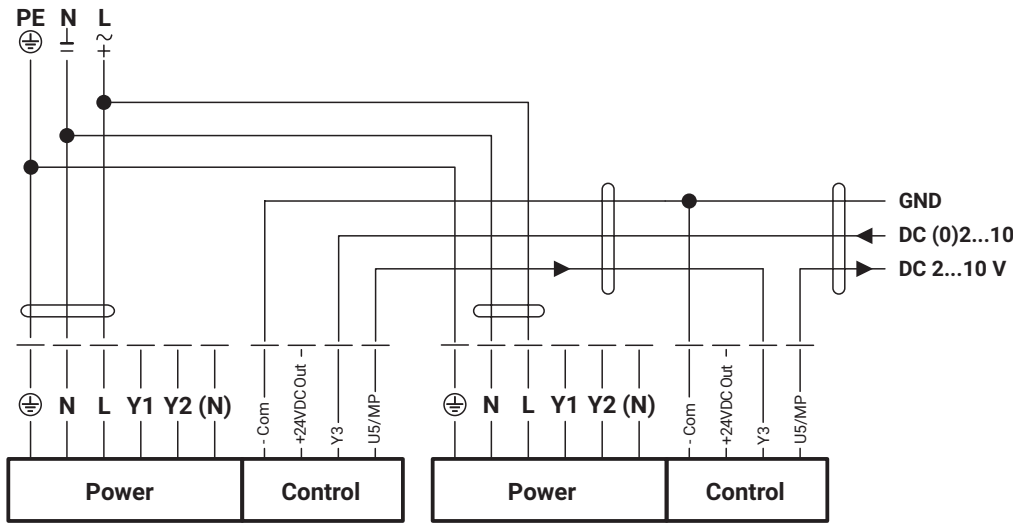
Connection auxiliary switch



Power supply must not be connected to the signal terminals!

Electrical installation

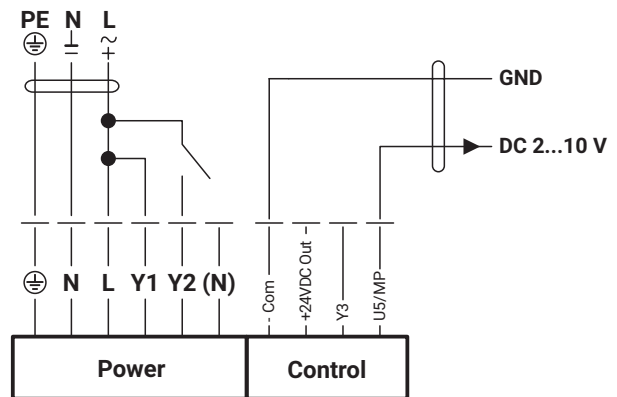
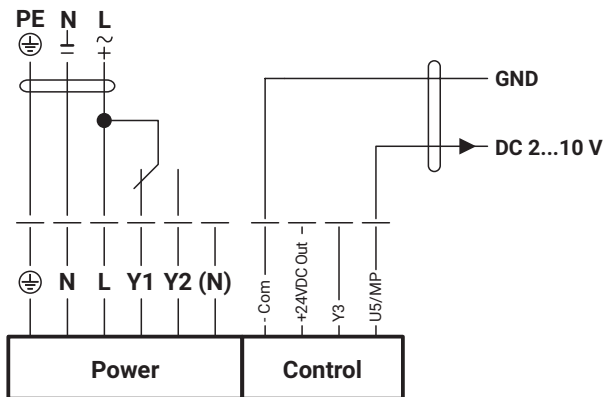
Follow-up control (position-dependent)



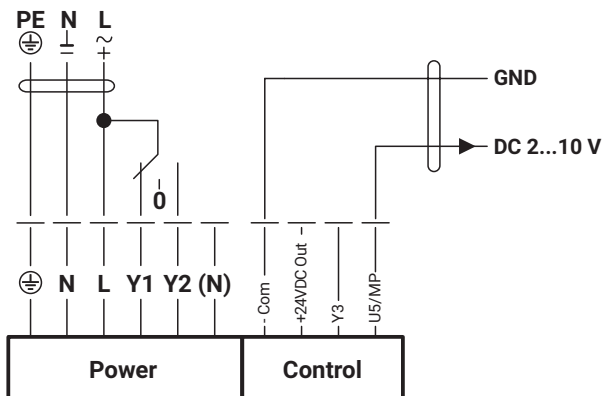
Functions

Functions for devices with specific parameters (Parametrisation necessary)

Control open/close

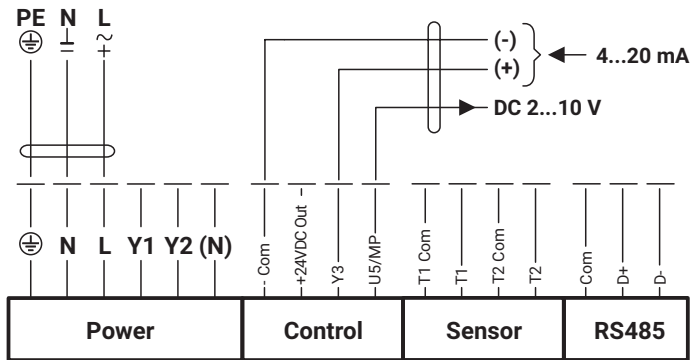


Control 3-point

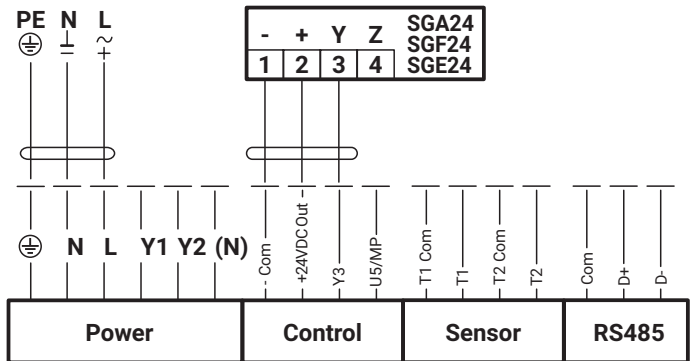


Functions

Control 4...20 mA



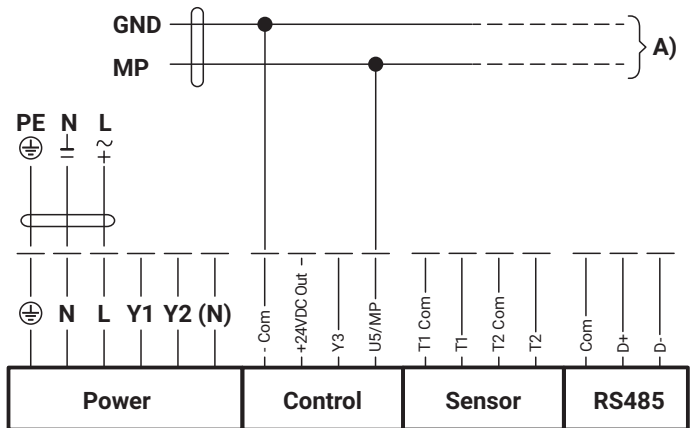
Positioner SG..



Note

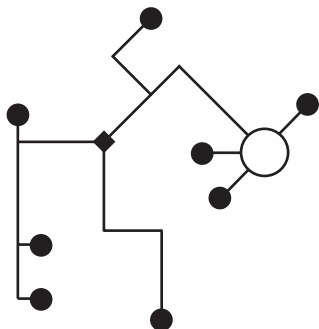
Maximum output power «+ 24VDC out» 1.2 W @ 50 mA!
A separate safety transformer must be used for higher performance!

Connection on the MP-Bus



A) Additional actuators (max. 8)

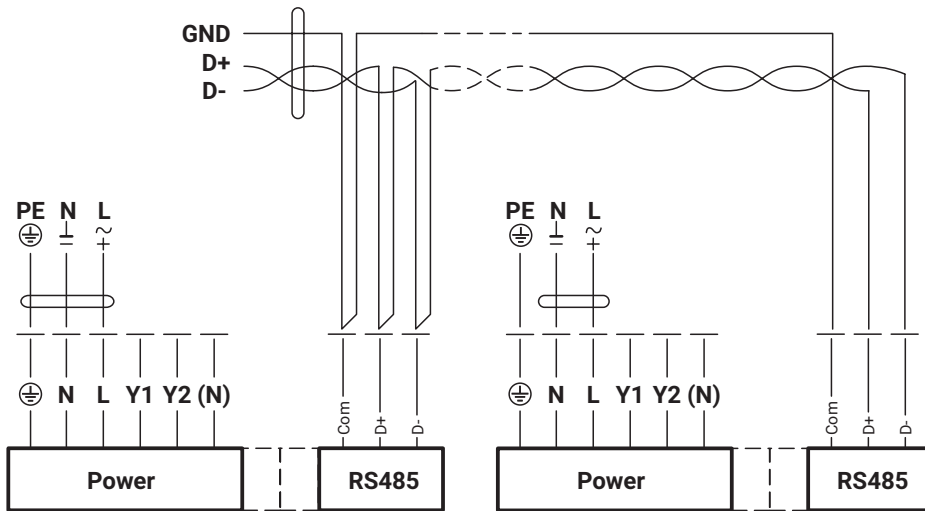
MP-Bus Network topology



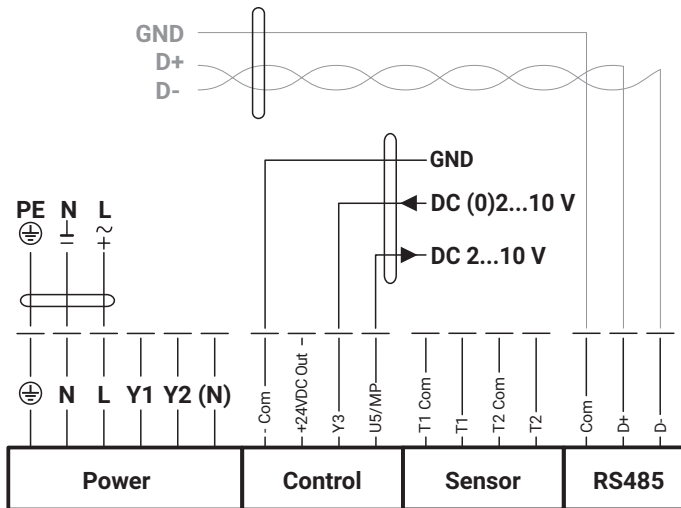
There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted).
Supply and communication in one and the same 3-wire cable
• no shielding or twisting necessary
• no terminating resistors required

Functions

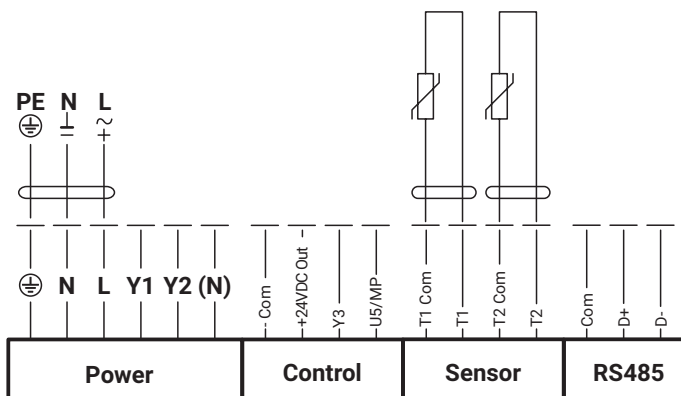
Connection BACnet MS/TP / Modbus RTU



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



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

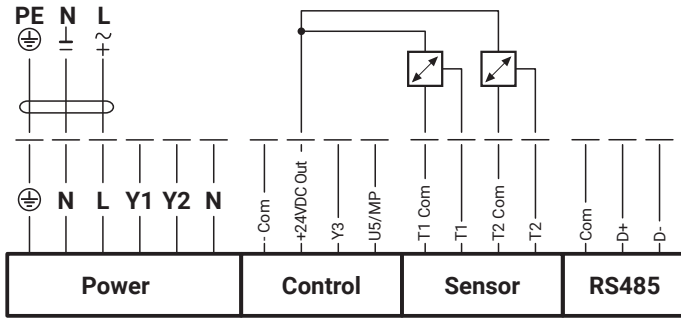


| 1) | 2) |
|---------------|-------|
| 200 Ω...2 kΩ | 0.1 Ω |
| 2 kΩ...10 kΩ | 1 Ω |
| 10 kΩ...55 kΩ | 10 Ω |

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

Functions

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

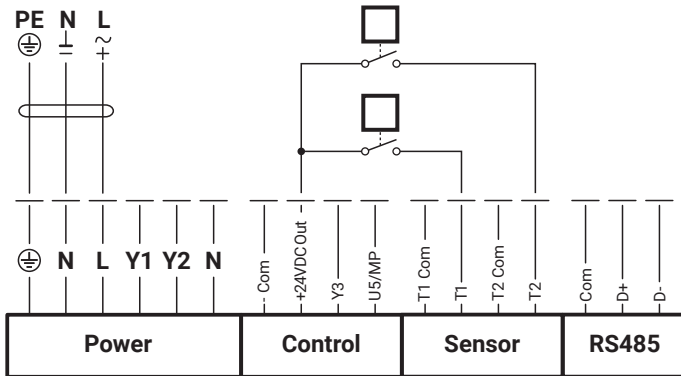


Possible input voltage range:
DC 0...10 V (resolution 5 mV)

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:

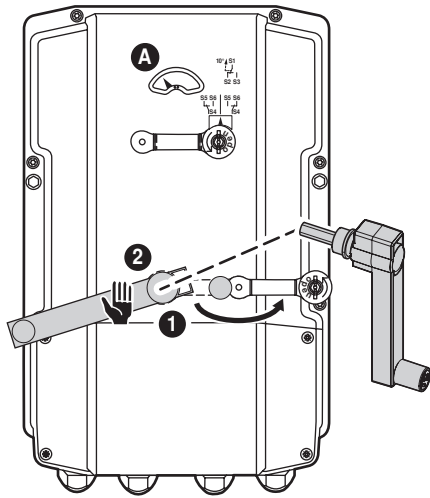
The switching contact must be able to accurately switch a current of 10 mA @ 24 V.

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.

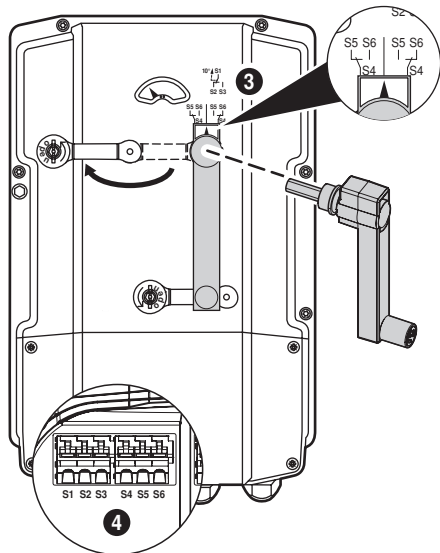
For the auxiliary switch position settings, carry out points 1 to 4 successively.

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.



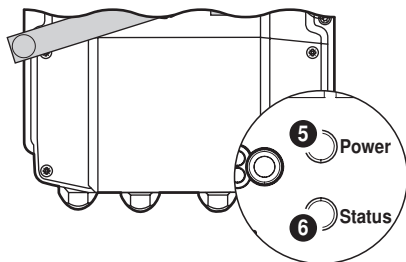
3 Auxiliary switch

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

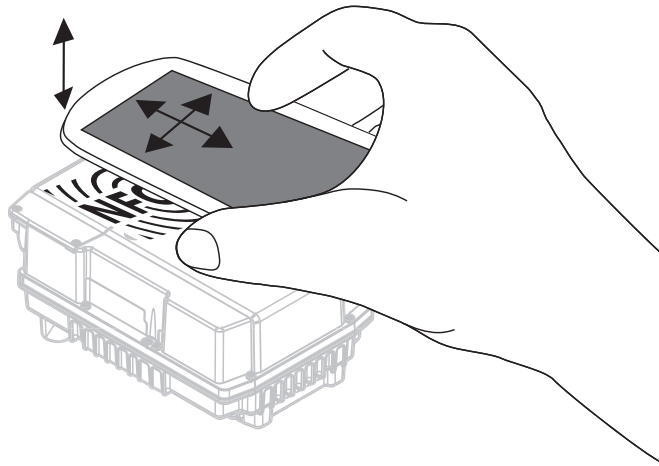
NFC connection Belimo equipment marked with the NFC logo can be operated with the Belimo Assistant App.

Requirement:

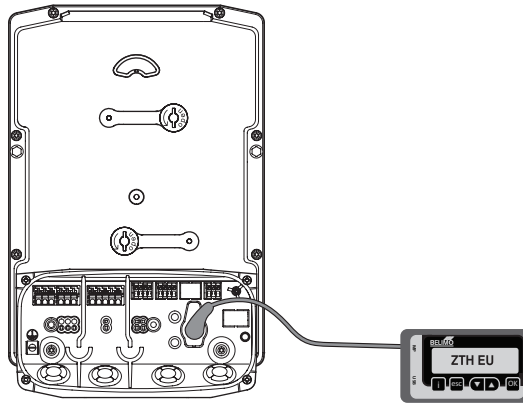
- NFC- or Bluetooth-capable smartphone
- Belimo Assistant App (Google Play & Apple AppStore)

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

Connect Bluetooth-enabled smartphone via the Bluetooth-to-NFC Converter ZIP-BT-NFC to the actuator. 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.



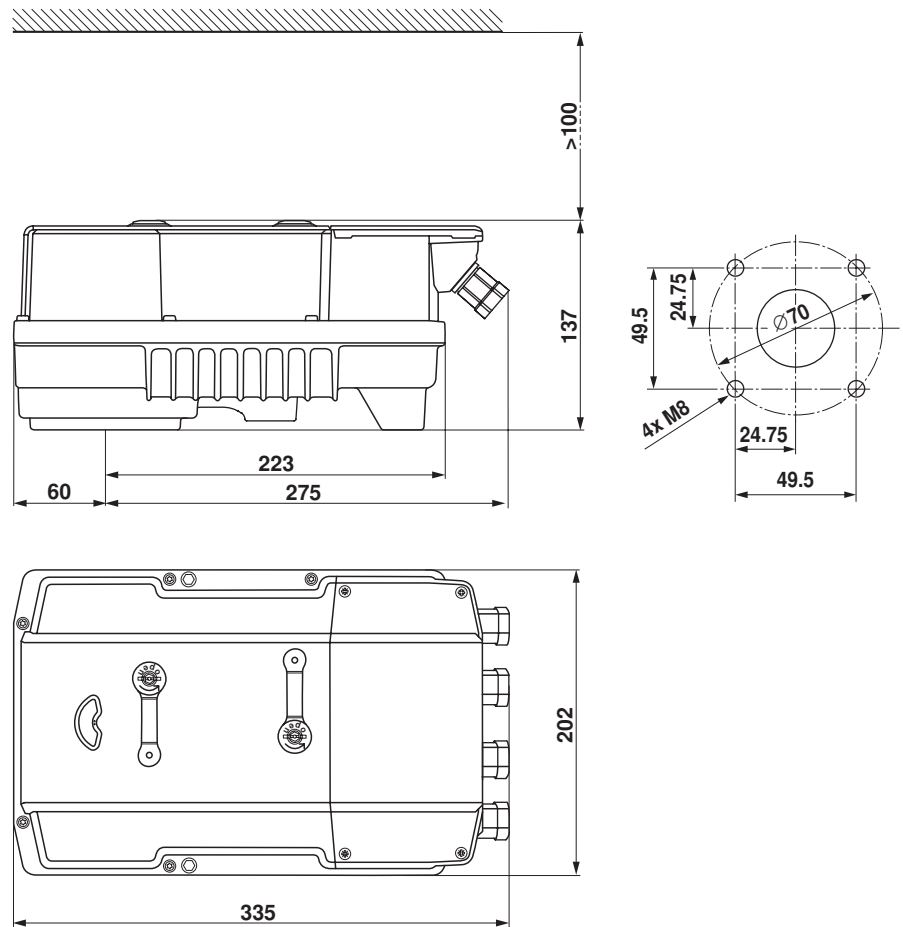
Dimensions [mm]

Spindle length

| | |
|--|-----------|
| | - |
| | 22.5...33 |

| |
|---------|
| |
| 17 x 17 |

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
- Installation instructions for actuators