

Communicative damper actuator in IP66/67 protective housing for adjusting dampers in HVAC plants, comparable 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



Picture may differ from product

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 | 20 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 | 2x SPDT, 1x 10° / 1x 0...90° |
| Switching capacity auxiliary switch | 1 mA...3 A (0.5 A inductive), DC 5 V...AC 250 V |
| Connection protective earth | earth terminal |
| Connection supply | Terminals 2.5 mm ² |
| Connection control | Terminals 1.5 mm ² |
| Connection auxiliary switch | Terminals 2.5 mm ² |
| Parallel operation | Yes (note the performance data) |

Data bus communication

| | |
|-----------------------|--|
| Communicative control | BACnet MS/TP Modbus RTU MP-Bus |
| Number of nodes | BACnet / Modbus see interface description MP-Bus max. 8 |

Functional data

| | |
|---|---|
| Torque motor | 160 Nm |
| Inhibiting torque static (voltage-free) | 50 Nm |
| 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 electronically limited on both sides with Belimo Assistant 2 |
| 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 |

Technical data

| | | |
|--------------------|--|---|
| Safety data | 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 |
| | Housing | 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 |
| | 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 | 4 kV |
| | Rated impulse voltage control | 0.8 kV |
| | Rated impulse voltage auxiliary switch | 2.5 kV |
| | Pollution degree | 3 |
| Weight | Ambient humidity | Max. 100% RH |
| | Ambient temperature | -30...50°C [-22...122°F] |
| | Storage temperature | -40...80°C [-40...176°F] |
| | Servicing | maintenance-free |
| | Weight | 6.1 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.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied with during installation.
- Caution: Mains voltage!
- The device has a protective earthing. Incorrect connection of the protective earth can lead to hazards due to electrical shock.
- Apart from the wiring compartment, 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 and the design, as well as the installation situation and the ventilation conditions must be observed.
- The materials used may be subject 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 mains voltage or on safety extra-low voltage. The combination mains 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 |
| Operating mode | The actuator is equipped with a universal power supply module that can utilise supply voltages of AC 24...240 V and DC 24...125V. Conventional operation: The actuator is connected with an analogue control signal Y (note the operating range) and drives to the position defined. The measuring voltage U serves for the electrical display of the damper position 0...100% and as 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 control 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. |
| Configurable device | The factory settings cover the most common applications. Belimo Assistant 2 is required for configuration via Near Field Communication (NFC) and simplifies commissioning. Moreover, Belimo Assistant 2 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 control 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. |
| 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

| Tools | Description | Type |
|------------------------|--|--------------------|
| | | Belimo Assistant 2 |
| | Service tool for wired and wireless setup, on-site operation and troubleshooting. | |
| | Belimo Assistant Link Bluetooth and USB to NFC and MP-Bus converter for configurable and communicative devices | LINK.10 |
| | Connecting cable 5 m, A: RJ11 6/4 LINK.10, B: 6-pin for connection to service socket | ZK1-GEN |
| | Connecting cable 5 m, A: RJ11 6/4 LINK.10, B: free wire end for connection to MP/PP terminal | ZK2-GEN |
| Electrical accessories | Description | Type |
| | Signal converter voltage/current 100 kΩ 4...20 mA, Supply AC/DC 24 V | Z-UIC |
| Gateways | Description | Type |
| | Gateway MP to BACnet MS/TP | UK24BAC |
| | Gateway MP to Modbus RTU | UK24MOD |

Accessories

| Mechanical accessories | Description | Type |
|--|-------------|------------|
| RetroFIT+ adapter kit, F07/F10 (incl. screws F07), flat head/square, SW 17 | | ZPR05 |
| RetroFIT+ adapter kit, F07/F10 (incl. screws F07), square 45° offset, SW 14 | | ZPR06 |
| Adapter kit with spacer ring, F07, square 45° offset, SW 17 | | ZPR08 |
| RetroFIT+ adapter kit, F07/F05/F10 (incl. screws F07), flat head/square, SW 14 | | ZPR09 |
| RetroFIT+ adapter kit, F05/F07/F10 (incl. screws F05), flat head/square, SW 14 | | ZPR10 |
| RetroFIT+ adapter kit, F07/F10 (incl. screws F07), square 45° offset, SW 18 | | ZPR11 |
| RetroFIT+ adapter kit, F07/F10 (incl. screws F07), flat head/square, SW 16 | | ZPR12 |
| Hand crank for PR/PM actuator | | ZPR20 |
| Sensors | Description | Type |
| Duct/Immersion sensor Temperature 150 mm x 6 mm Pt1000 | | 01DT-1BN |
| Duct/Immersion sensor Temperature 150 mm x 6 mm Ni1000 | | 01DT-1CN |
| Duct/Immersion sensor Temperature 200 mm x 6 mm Pt1000 | | 01DT-1BP |
| Duct/Immersion sensor Temperature 200 mm x 6 mm Ni1000 | | 01DT-1CP |
| Duct/Immersion sensor Temperature 300 mm x 6 mm Pt1000 | | 01DT-1BR |
| Duct/Immersion sensor Temperature 300 mm x 6 mm Ni1000 | | 01DT-1CR |
| Duct/Immersion sensor Temperature 450 mm x 6 mm Pt1000 | | 01DT-1BT |
| Duct/Immersion sensor Temperature 450 mm x 6 mm Ni1000 | | 01DT-1CT |
| Duct sensor Humidity / Temperature active 140 mm x 19.5 mm | | 22DTH-11M |
| Outdoor sensor with weather shield Humidity / Temperature | | 22UTH-11 |
| Air differential pressure sensor -150...250 Pa, LCD | | 22ADP-18QB |

Electrical installation

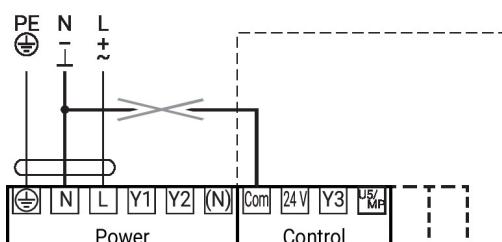
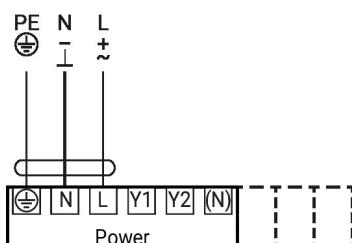


Caution: Mains voltage!

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 RS-485 regulations.

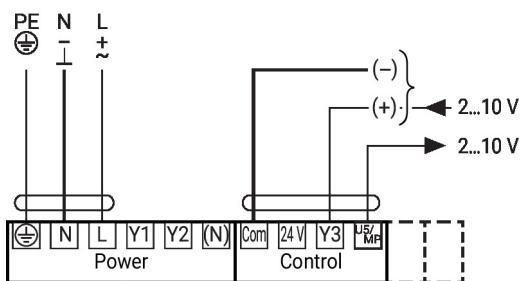
AC 24...240 V / DC 24...125 V



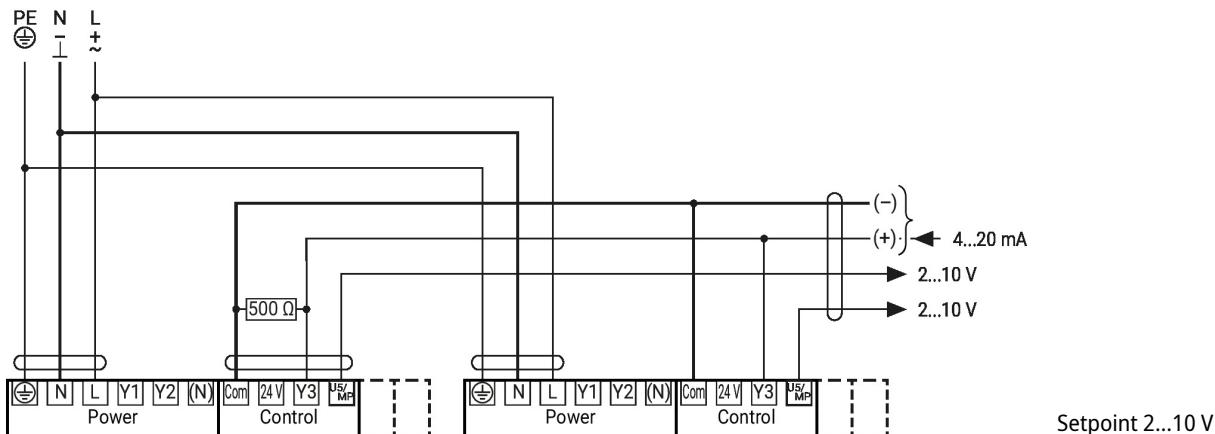
Power supply must not be connected to the signal terminals!

Electrical installation

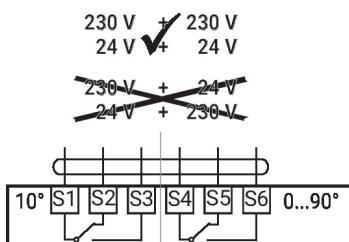
Modulating control



Parallel circuit 4...20 mA

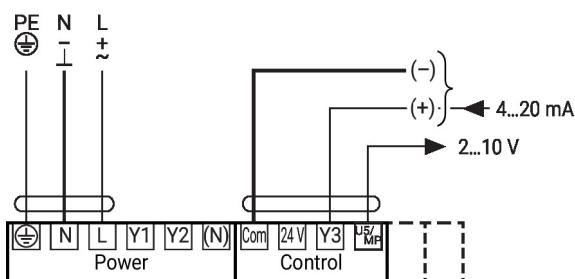


Auxiliary switch

**Further electrical installations**

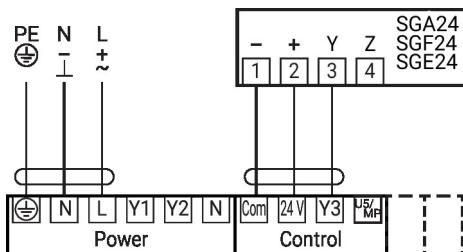
Functions with specific parameters (configuration necessary)

Control 4...20 mA



Further electrical installations**Functions with specific parameters (configuration necessary)**

Positioner SG..

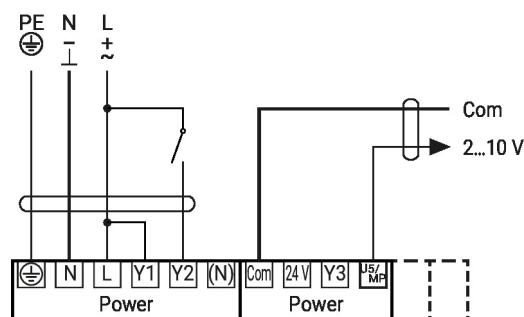
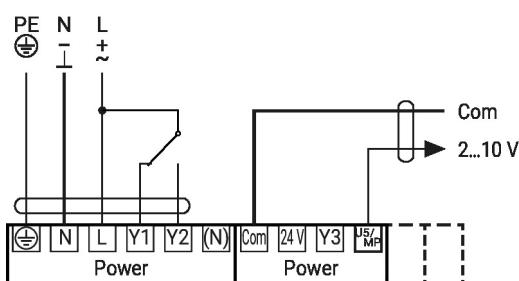
**Note**

Maximum output power «DC 24

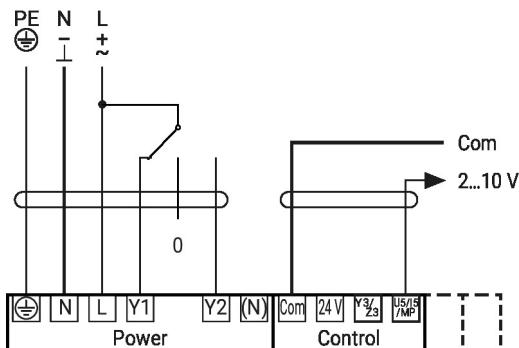
V out» 1.2 W @ 50 mA!

A separate isolating transformer
must be used for higher
performance!**Functions with specific parameters (NFC)**

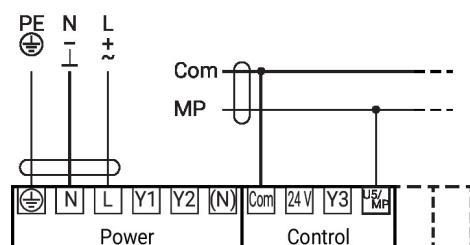
Control open/close



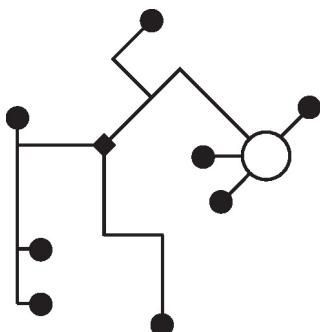
Control 3-point



Connection on the MP-Bus



MP-Bus Network topology



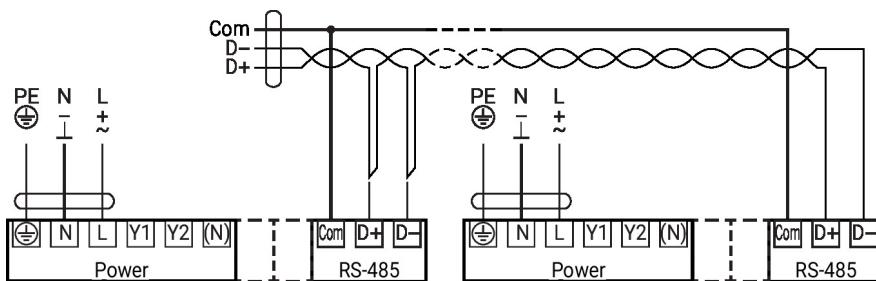
There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted). Supply and communication in one and the same 3-wire cable

- no shielding or twisting necessary
- no terminating resistors required

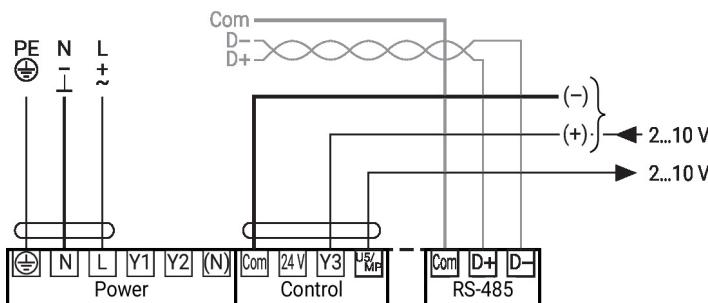
Further electrical installations

Functions with specific parameters (NFC)

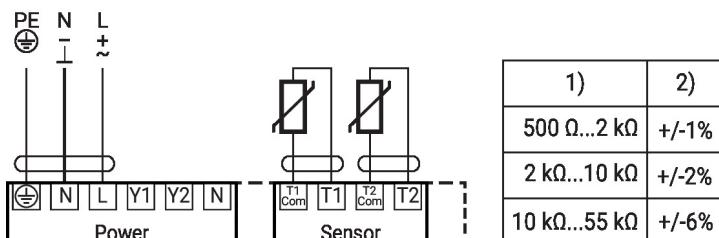
Connection BACnet MS/TP / Modbus RTU



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

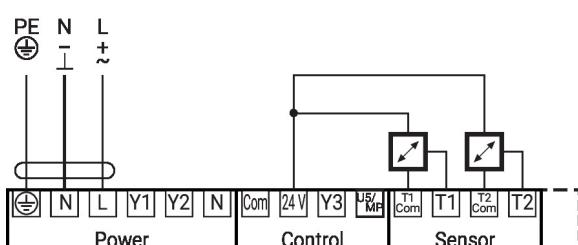


Connection of passive sensors (BACnet MS/TP / Modbus RTU)



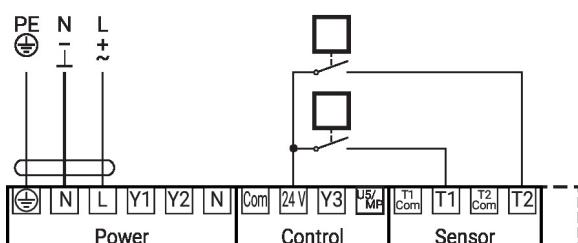
1) Resistance range
 2) Tolerance measured value
 Compensation of the measured value is recommended
 - Suitable for Ni1000 and Pt1000
 - Suitable Belimo types 01DT-..

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



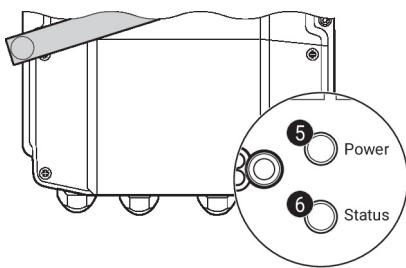
Possible input voltage range:
 0...10 V
 Resolution 5 mV
 To capture for example:
 - Active temperature sensors
 - Flow sensors
 - Pressure / differential pressure sensors

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



Switching contact requirements:
 The switching contact must be able to switch a current of 16 mA at 24 V accurately.
 To capture for example:
 - Flow monitors
 - Operation / malfunction messages of chillers

Operating controls and indicators

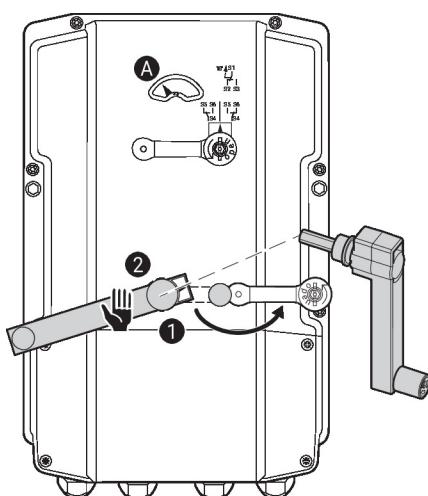


⑤ Push-button and LED display green

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 client
 Press button: Confirmation of the MP addressing



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 train disengagement

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

② Manual override

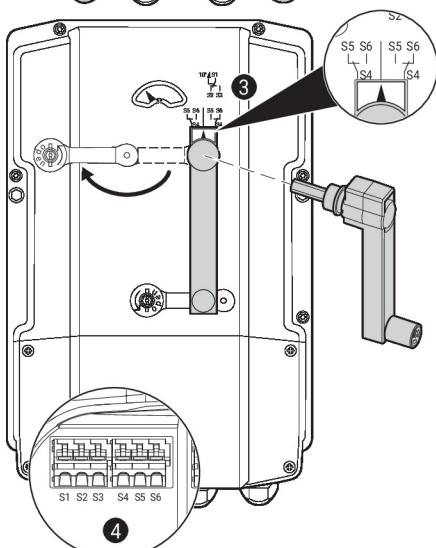
Turn the hand crank until the desired switching position **A** is indicated and then remove the hand crank.

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 hand 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°.



Service

Using Belimo Assistant 2, device parameters can be modified. Belimo Assistant 2 can operate on a smartphone, tablet or PC. The available connection options vary depending on the hardware on which Belimo Assistant 2 is installed.

For more information about Belimo Assistant 2, refer to the Quick Guide – Belimo Assistant 2.

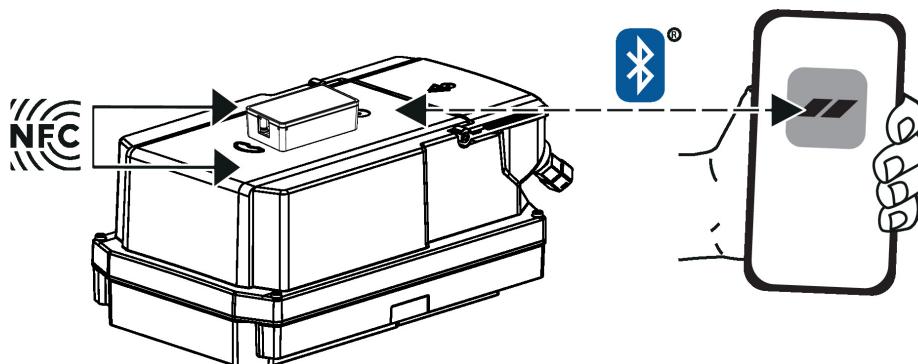
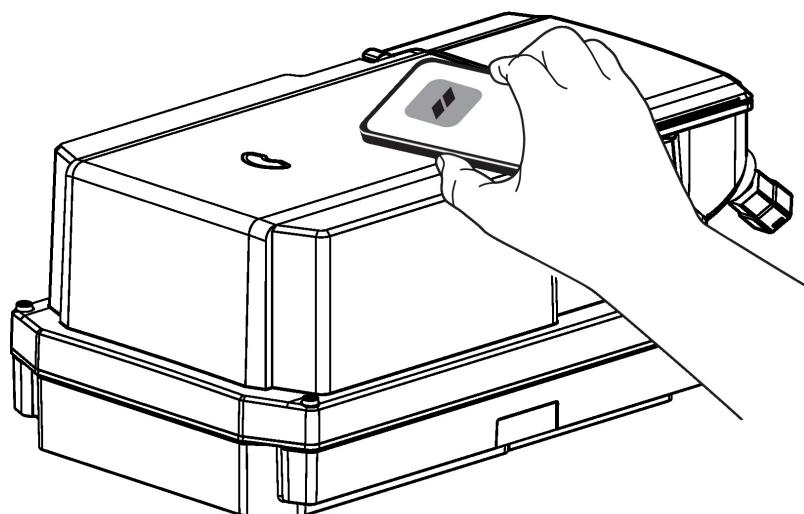
**Wireless connection**

Belimo devices marked with the NFC logo can be accessed either directly with an NFC-capable smartphone or with a Bluetooth-capable smartphone connected to Belimo Assistant Link.

Requirement:

- NFC- or Bluetooth-capable smartphone or tablet
- Belimo Assistant 2 (Google Play and Apple App Store)

Align the NFC-capable smartphone or Belimo Assistant Link with the device's NFC logo so that both NFC antennas are superposed.

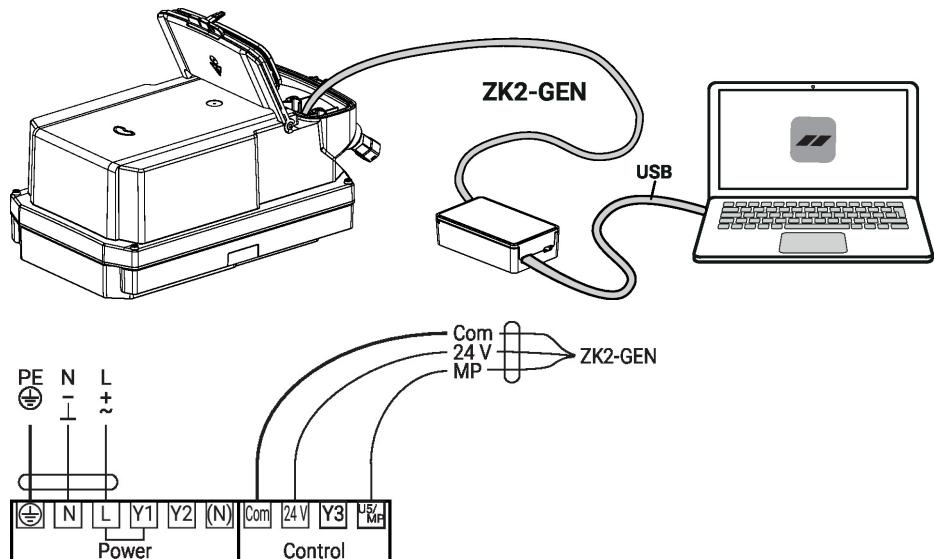


Service

Wired connection

Belimo devices can be accessed by connecting Belimo Assistant Link to the USB port on a PC or laptop and to the service socket or MP-Bus wire on the device.

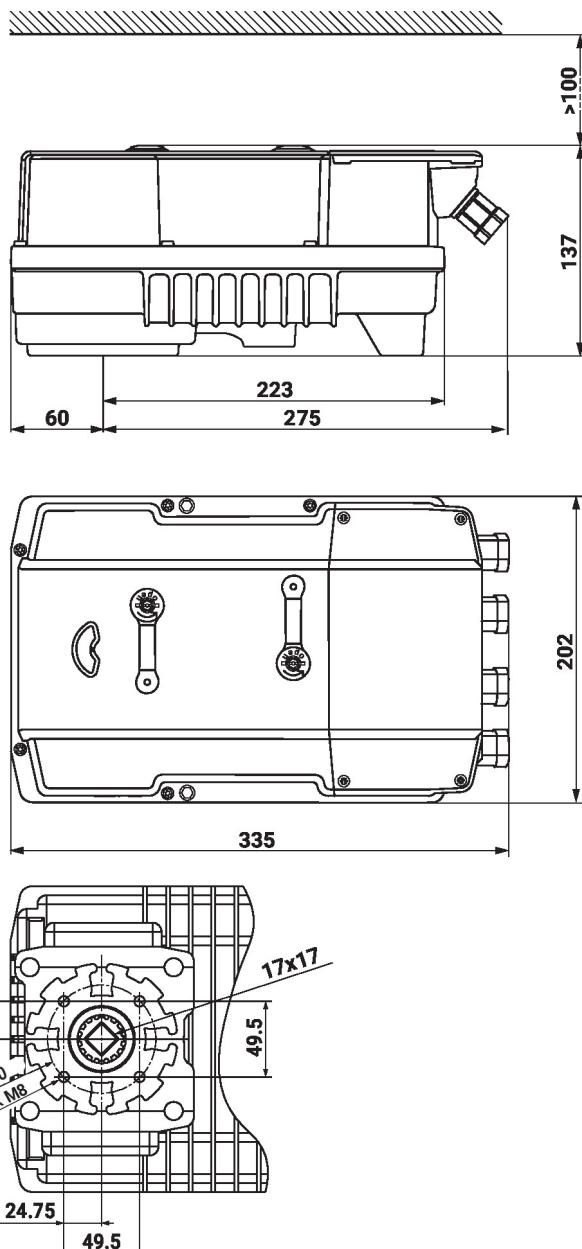
Belimo Assistant 2 acts as MP client. Therefore, no other MP client shall be connected to the device.



Dimensions

Shaft length

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



Further documentation

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