

# Rotary actuator for butterfly valves

- 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	20 W
	Power consumption in rest position	6 W
	Power consumption for wire sizing	with 24 V 20 VA / with 240 V 52 VA
	Auxiliary switch	2x SPDT, 1x 10° / 1x 0...90° (default setting 85°)
	Switching capacity auxiliary switch	1 mA...3 A (0.5 A inductive), DC 5 V...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)
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
	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%
	Manual override	hand crank
	Running time motor	35 s / 90°
	Running time motor variable	30...120 s
	Sound power level, motor	68 dB(A)
	Position indication	Mechanical, integrated
Safety data	Protection class IEC/EN	I, protective earth (PE)
	Protection class UL	I, protective earth (PE)
	Degree of protection IEC/EN	IP66/67

## Technical data

<b>Safety data</b>	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
	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
	Ambient humidity	Max. 100% RH
	Ambient temperature	-30...50°C [-22...122°F]
	Storage temperature	-40...80°C [-40...176°F]
	Servicing	maintenance-free
<b>Mechanical data</b>	Connection flange	F07 (F05/F10 only with accessory)
	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 with 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: - UV radiation - Dirt / Dust - Rain / Snow - 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.

## Product features

<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.
<b>Parametrisable actuators</b>	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.
<b>Combination analogue - communicative (hybrid mode)</b>	With conventional control by means of an analogue control 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>High functional reliability</b>	The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.
<b>Flexible signalling</b>	The actuator has one auxiliary switch with a fixed setting (10°) and one adjustable auxiliary switch (0...90°).

## Accessories

<b>Electrical accessories</b>	<b>Description</b>	<b>Type</b>
	Signal converter voltage/current 100 kΩ 4...20 mA, Supply AC/DC 24 V	Z-UIC
<b>Mechanical accessories</b>	<b>Description</b>	<b>Type</b>
	Position indicator and tappet shaft, F07, square 45° offset, SW 17, DN 125...300	ZPR01
	Tappet shaft, F07, square 45° offset, SW 17	ZPR02
	Position indicator and tappet shaft, F05, square 45° offset, SW 14, DN 80...100	ZPR03
	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
	RetroFIT+ adapter kit, F07/F05/F10 (incl. screws F07), flat head/square, SW 11	ZPR13
	RetroFIT+ adapter kit, F07/F05/F10 (incl. screws F07), flat head/square, SW 12.7	ZPR14
	RetroFIT+ adapter kit, F07/F10 (incl. screws F07), square 45° offset, SW 11	ZPR15
	Hand crank for PR/PM/JR actuator	ZPR20
	Spacer ring, F04/F05, Height 22 mm	ZRI-001
	Spacer ring, F05/F07, Height 23.5 mm	ZRI-002

**Accessories**

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
	Connecting cable 5 m, A: RJ11 6/4 ZTH EU, B: 6-pin for connection to service socket	ZK1-GEN
Sensors	Description	Type
	Duct/Immersion sensor Temperature 500 mm x 6 mm Pt1000	01DT-1BH
	Duct/Immersion sensor Temperature 500 mm x 6 mm Ni1000	01DT-1CH
	Duct/Immersion sensor Temperature 100 mm x 6 mm Pt1000	01DT-1BL
	Duct/Immersion sensor Temperature 100 mm x 6 mm Ni1000	01DT-1CL
	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

**Electrical installation**

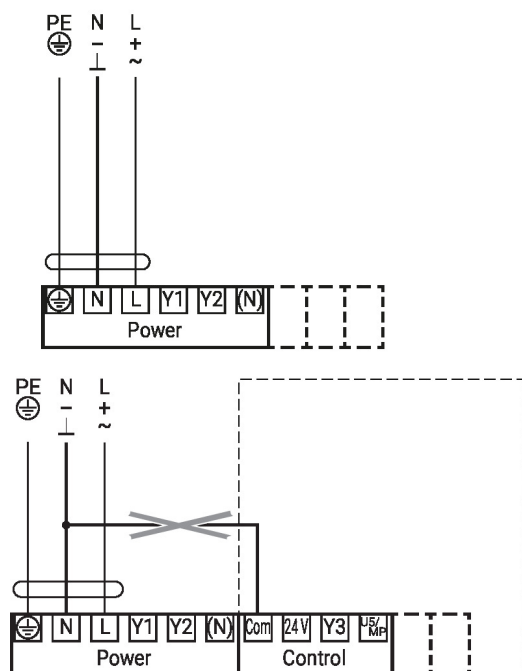

**Caution: Power supply voltage!**

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 RS-485 regulations.

**Wiring diagrams**

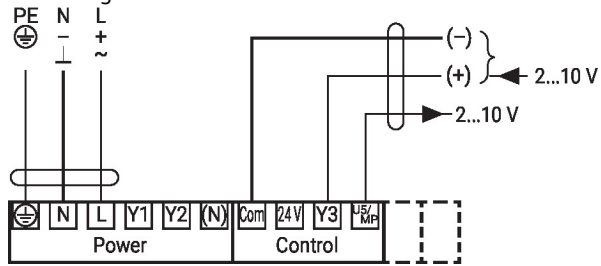
AC 24...240 V / DC 24...125 V



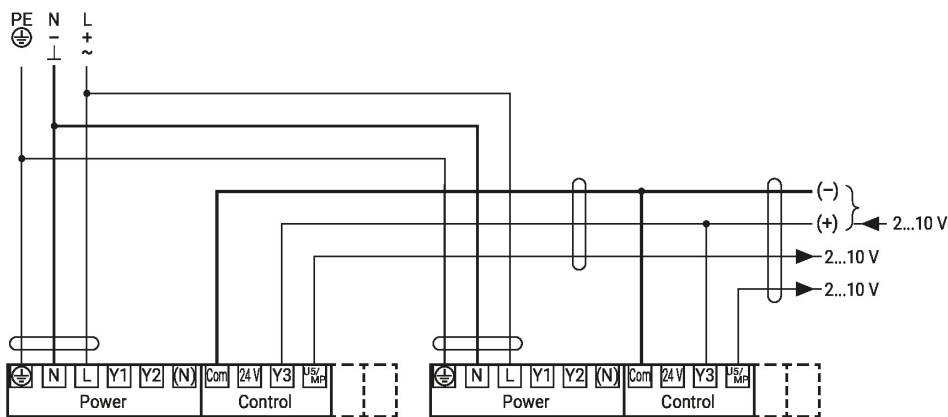
Power supply must not be connected to the signal terminals!

# Wiring diagrams

## Modulating control

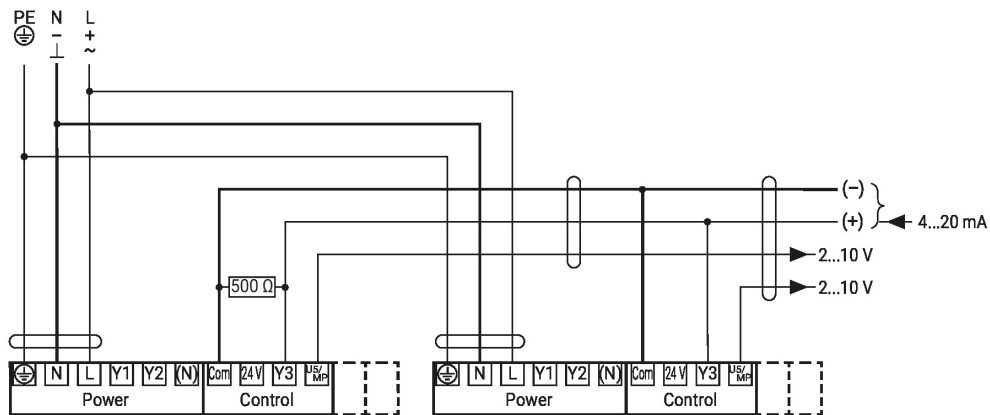


Parallel circuit 2...10 V



Setpoint 2...10 V

Parallel circuit 4...20 mA

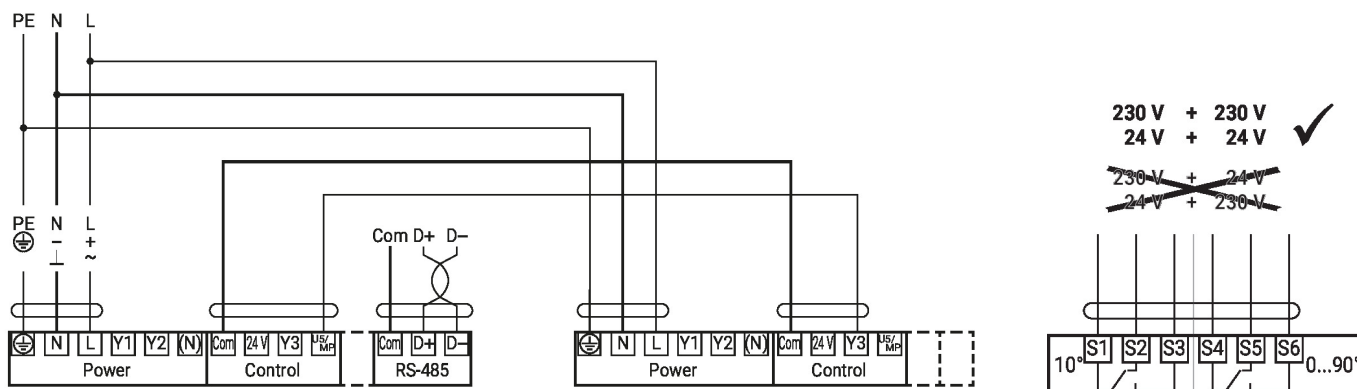


Setpoint 2...10 V

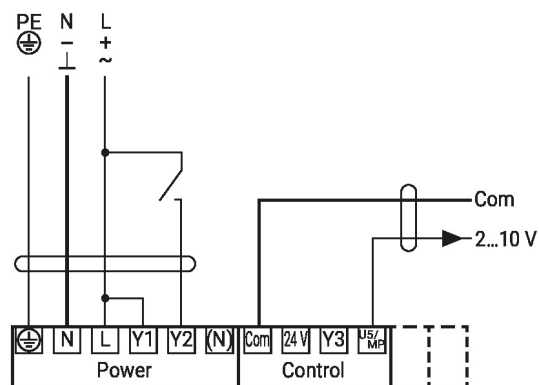
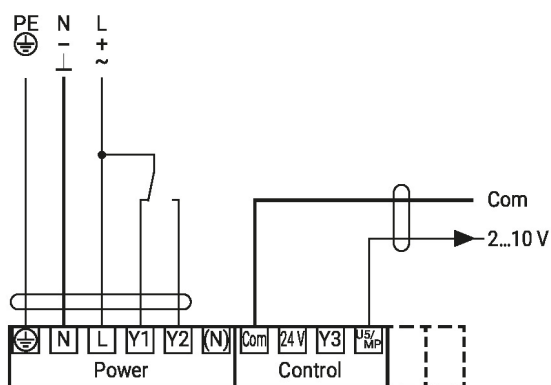
**Electrical installation**
**Wiring diagrams**

Connection BACnet MS/TP / Modbus RTU with analogue primary/secondary operation

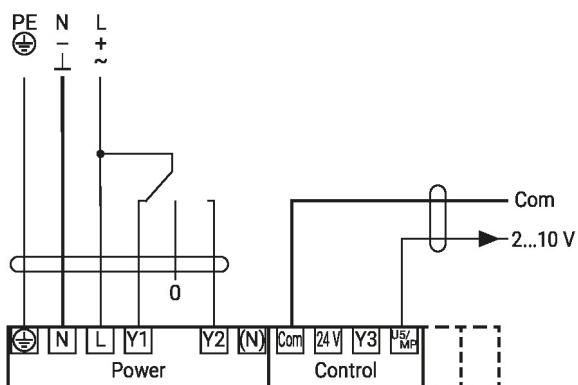
Auxiliary switch


**Functions**
**Functions with specific parameters (NFC)**

Control open/close

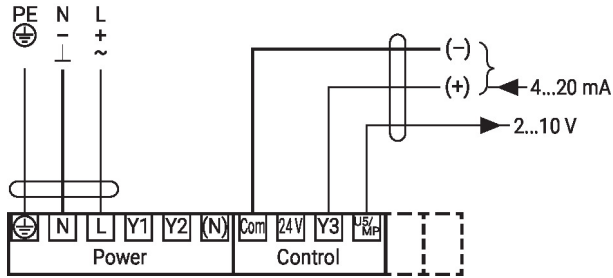


Control 3-point

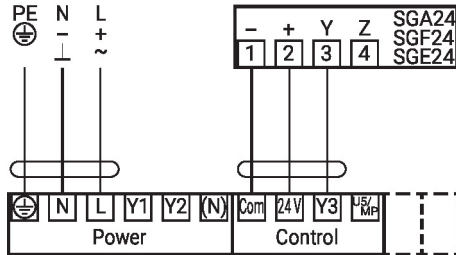


### Functions with specific parameters (NFC)

Control 4...20 mA



Positioner SG..

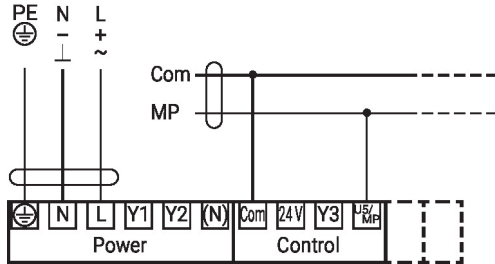


#### Note

Maximum output power «DC 24 V out» 1.2 W @ 50 mA!

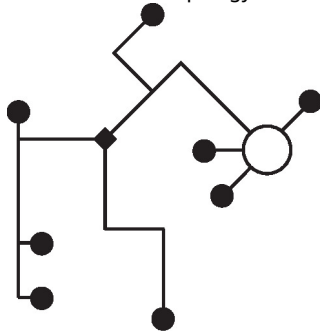
A separate isolating transformer must be used for higher performance!

Connection on the MP-Bus



Max. 8 additional actuators

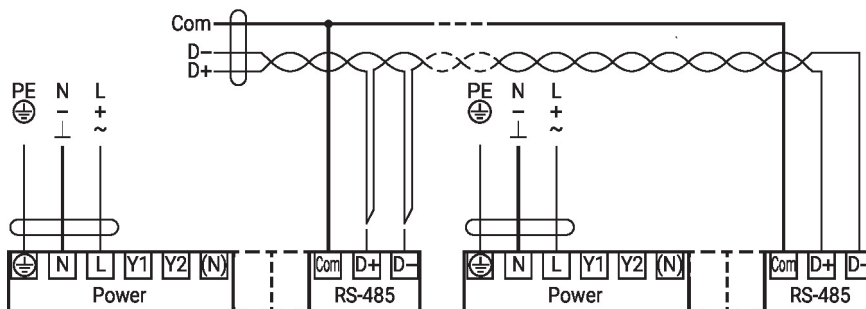
MP-Bus Network topology



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

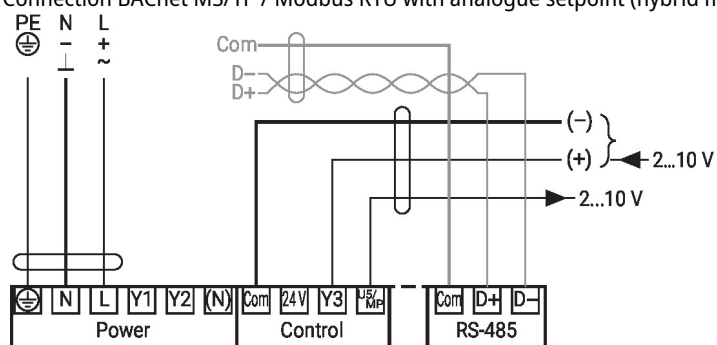
- no shielding or twisting necessary
- no terminating resistors required

Connection BACnet MS/TP / Modbus RTU



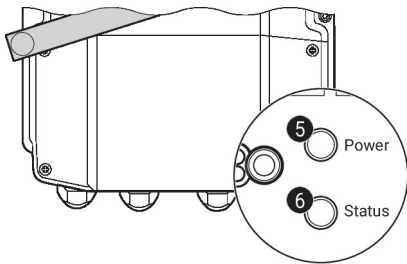
**Functions**
**Functions with specific parameters (NFC)**

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





## 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

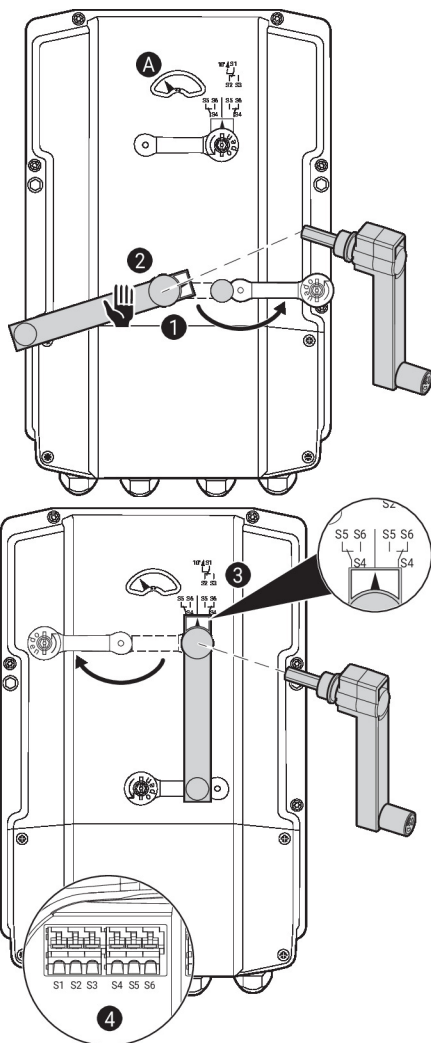
- Off: Standard mode
- On: Test run active
- Flickering: BACnet / Modbus communication active
- Flashing: Request for addressing from MP client
- Press button: Confirmation of the MP addressing

## 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**

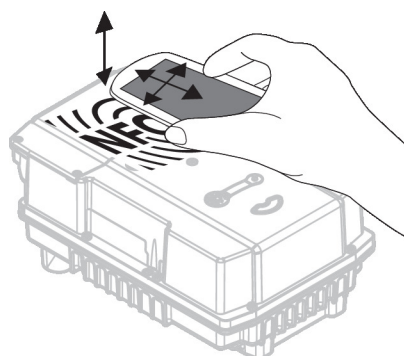
**NFC connection** Belimo devices marked with the NFC logo can be operated with the Belimo Assistant App.

Requirement:

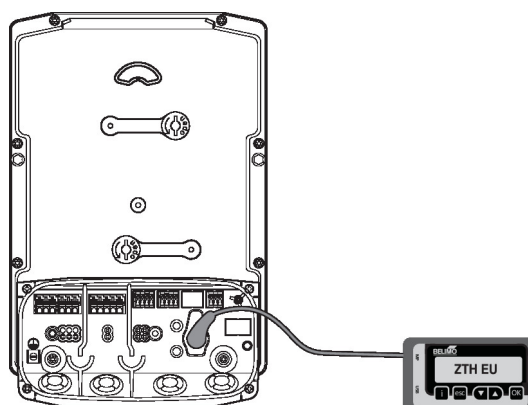
- NFC- or Bluetooth-capable smartphone
- Belimo Assistant App (Google Play & Apple AppStore)

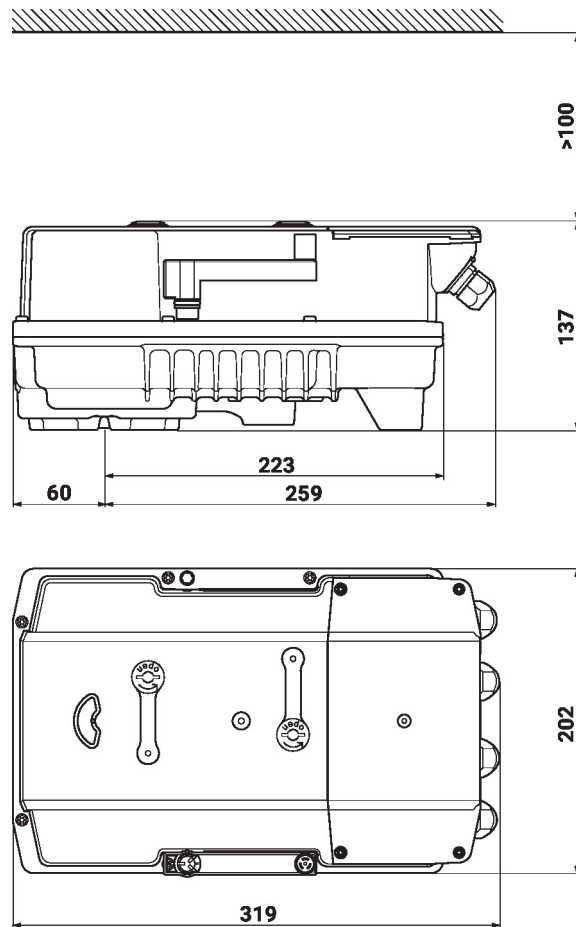
Align NFC-capable smartphone on the device so that both NFC antennas are superposed.

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.



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



**Dimensions**

**Further documentation**

- Tool connections
- BACnet Interface description
- Modbus Interface description
- 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