

Rotary actuator for butterfly valves

- Torque motor 160 Nm
- Nominal voltage AC 24...240 V / DC 24...125 V
- Control modulating, communicative, hybrid mode
- 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 230 V 52 VA	
	Auxiliary switch	2 x SPDT, 1 x 10° / 1 x 0...90° (ex works 85°)	
	Switching capacity auxiliary switch	1 mA...3 (0.5 inductive) A, AC 250 V	
	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)	
	Functional data	Nominal torque	160 Nm (parameterized for D6250W/WL)
		Communicative control	BACnet MS/TP (ex works) Modbus RTU MP-Bus
Operating range Y		DC 2...10 V	
Input Impedance		100 kΩ	
Operating range Y variable		DC 0.5...10 V 4...20 mA	
Position feedback U		DC 2...10 V	
Position feedback U note		Max. 0.5 mA	
Position feedback U variable		DC 0.5...10 V	
Position accuracy		±5%	
Manual override		with hand crank, can be fixed in any position	
Running time motor		35 s / 90°	
Running time motor variable		30...120 s	
Sound power level Motor		68 dB(A)	
Position indication		Mechanically (integrated)	
Safety	Protection class IEC/EN	II reinforced insulation	
	Protection class UL	II reinforced insulation	
	Protection class auxiliary switch IEC/EN	II reinforced insulation	
	Degree of protection IEC/EN	IP66/67	
	Degree of protection NEMA/UL	NEMA 4X, 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	
	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		
Non-operating temperature	-40...80 °C		
Ambient humidity	Max. 95% r.h., non-condensing		
Maintenance	Maintenance-free		

Technical data

Mechanical data	Connection flange	F07 (F05 only with accessory)
Weight	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!
- 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.

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 - Humidity
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.
Parameterisable actuators	The factory settings cover the most common applications. The Belimo Assistant App is required for parameterisation 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 butterfly valve. The mounting orientation in relation to the butterfly valve can be selected in 90° (angle) increments.
Manual override	The valve 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 and 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 for BACnet MS/TP, AC/DC 24 V	UK24BAC
	Gateway MP to Modbus RTU, AC/DC 24 V	UK24MOD
	Gateway MP to LonWorks, AC/DC 24 V, LonMark certified	UK24LON
	Gateway MP to KNX, AC/DC 24 V, EIBA certified	UK24EIB
Electrical accessories	Description	Type
	Connecting cable 5 m, A+B: RJ12 6/6, To ZTH EU	ZK1-GEN
Mechanical accessories	Description	Type
	Position indicator and tappet shaft, F07, square, SW 17	ZPR01
	Tappet shaft, F07, square, SW 17	ZPR02
	Position indicator and tappet shaft, F05, square, SW 14	ZPR03
	Retrofit adapter kit, F05/F07, flat head/ square, SW 17	ZPR05
	Retrofit adapter kit, F05/F07, square 45° turned, SW 14	ZPR06
	Retrofit adapter kit with ring, F07, square 45° turned, SW 17	ZPR08
	Retrofit adapter kit with ring, F07, flat head/ square, SW 14	ZPR09
	Retrofit adapter kit, F05/F07, flat head/ square, SW 14	ZPR10
	Retrofit adapter kit, F05/F07, square 45° turned, SW 18	ZPR11
	Retrofit adapter kit, F05/F07, flat head/ square, SW 16	ZPR12
	Hand crank for PR-actuator	ZPR20
	Service Tools	Description
Smartphone app for easy commissioning, parameterising and maintenance		Belimo Assistant App
Service tool 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 50 mm x 6 mm Ni1000	01DT-1CH
	Duct/Immersion Temperature Sensor 100 mm x 6 mm PT1000	01DT-1BL
	Duct/Immersion Temperature Sensor 100 mm x 6 mm Ni1000	01DT-1CL
	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

Electrical installation

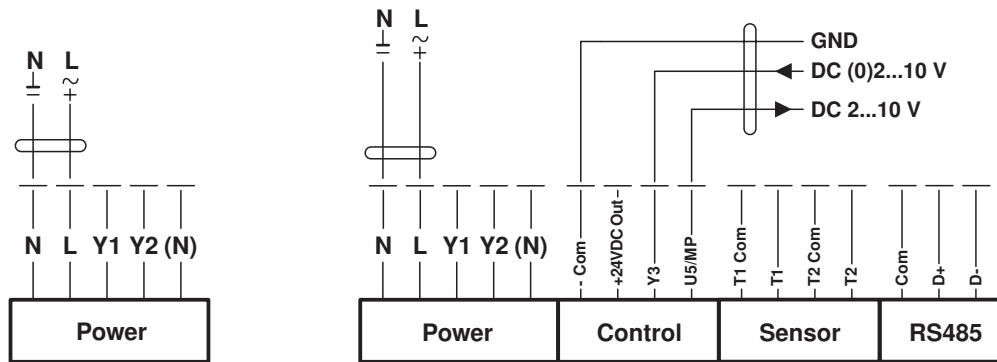
**Notes**

- Caution: Power supply voltage!
- Parallel connection of other actuators possible. Observe the performance data.
- The main power supply for the actuator and for the auxiliary switches shall be from the same phase.
- The wiring of the line for BACnet MS/TP / Modbus RTU is to be carried out in accordance with applicable RS485 regulations.

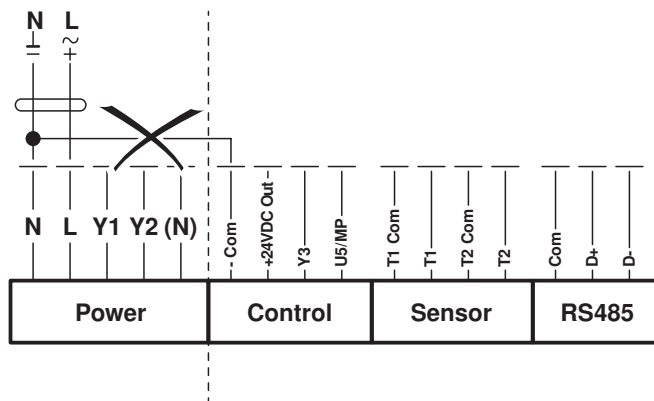
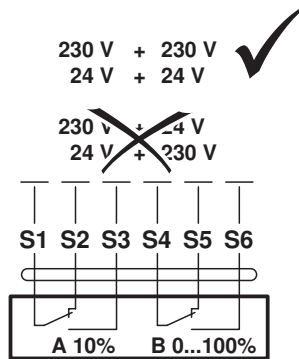
Electrical installation

Wiring diagrams

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



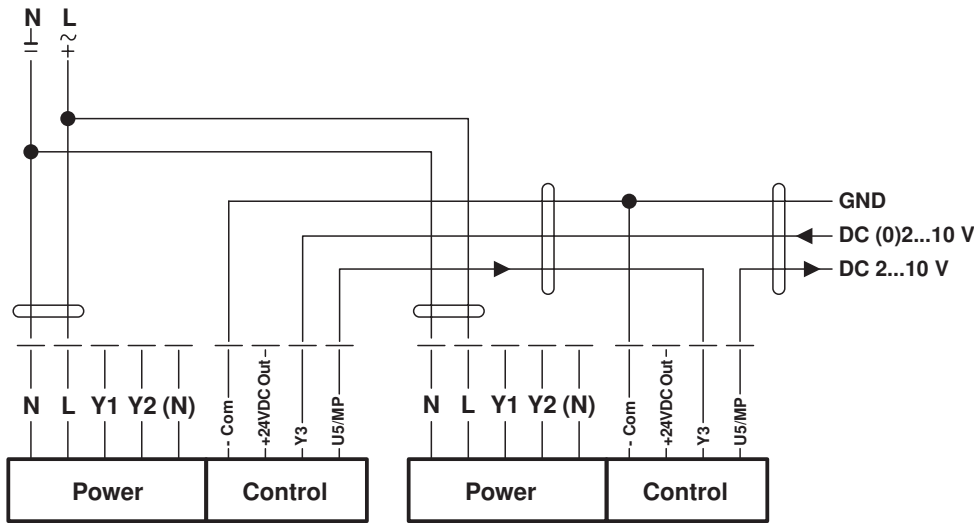
Connection auxiliary switch



Power supply must not be connected to the signal terminals!

Electrical installation

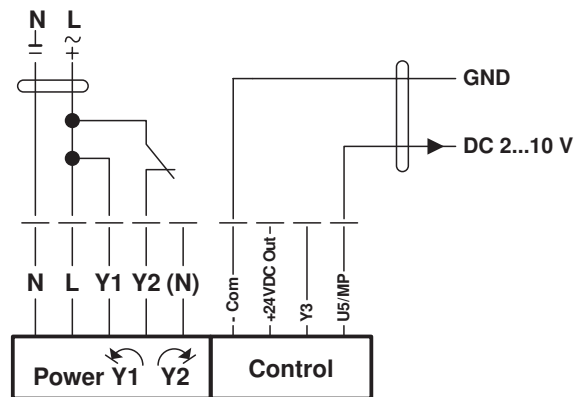
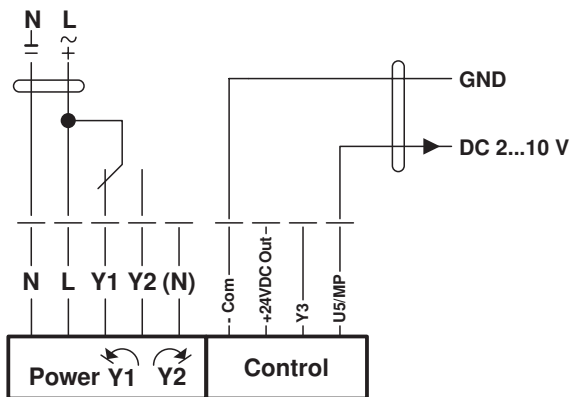
Follow-up control (position-dependent)



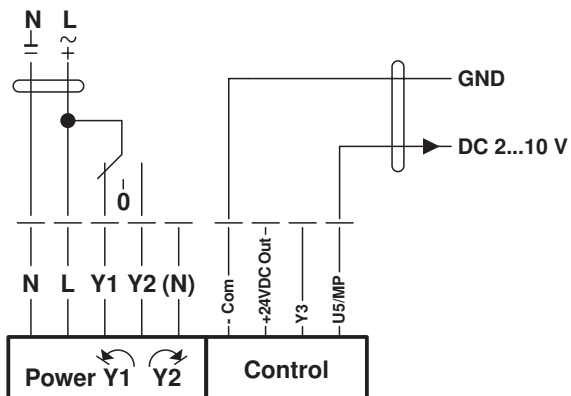
Functions

Functions for actuators with specific parameters (Parametrisation with NFC app necessary)

Control open-close

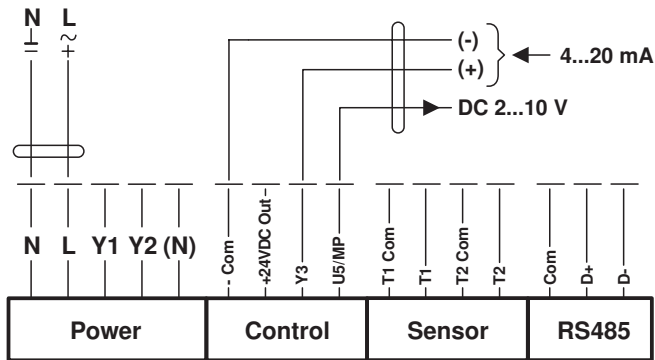


Control 3-point

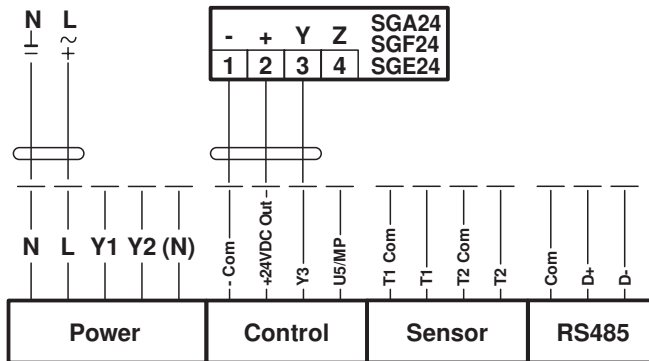


Functions

Control 4...20 mA



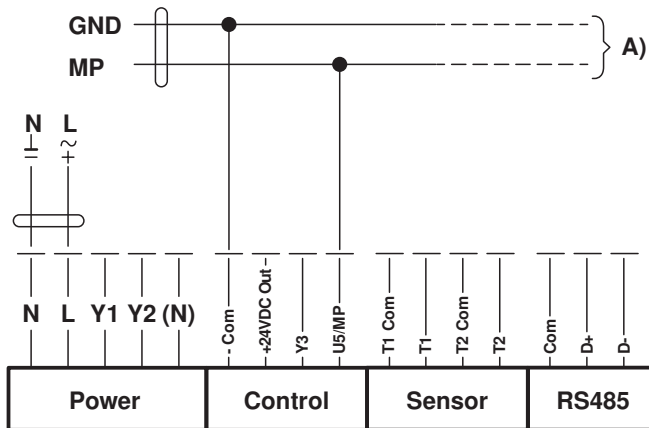
Positioner SG..



Note

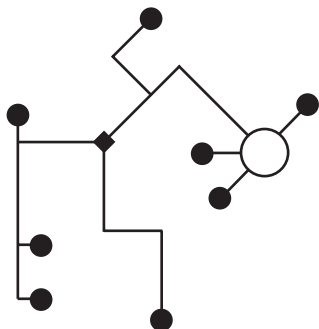
Maximum output power «+ 24VDC out» 1.2 W @ 50 mA!
A separate safety transformer must be used for higher performance!

Connection on the MP-Bus



A) Additional actuators (max. 8)

Network topology

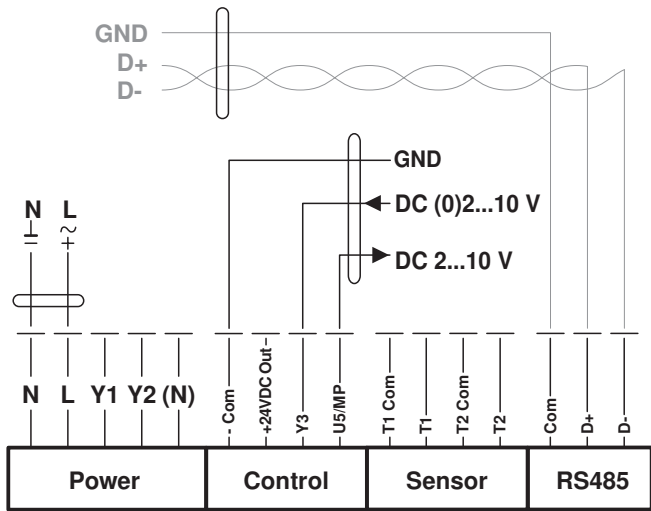


There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted).
Supply and communication in one and the same 3-wire cable

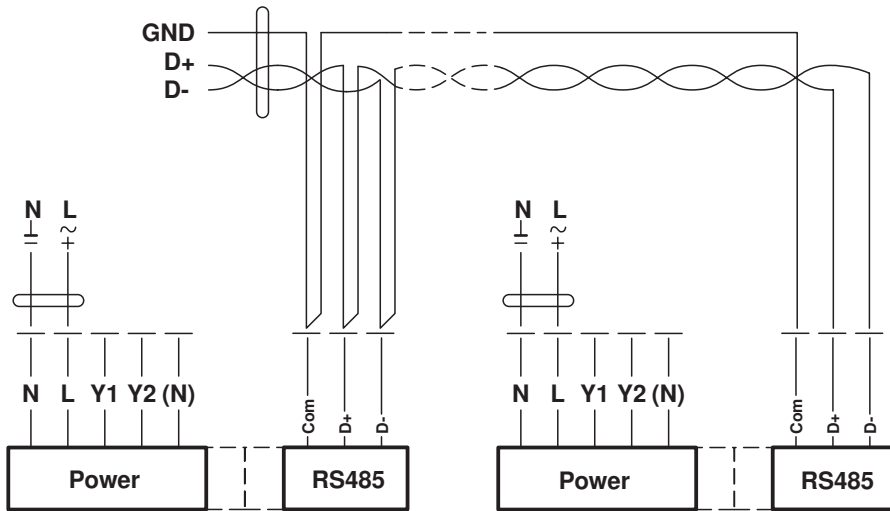
- no shielding or twisting necessary
- no terminating resistors required

Functions

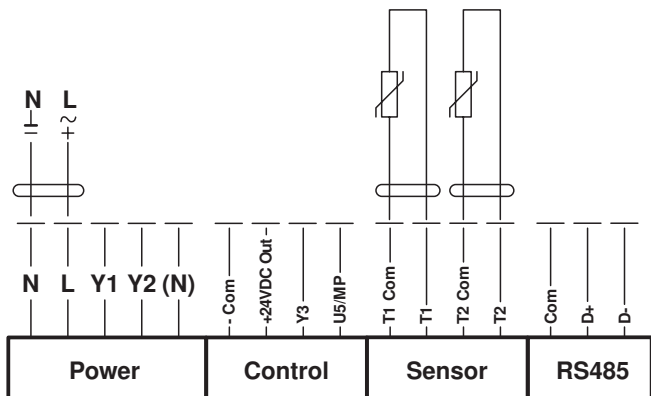
Connection BACnet MS/TP / Modbus RTU with analog setpoint (hybrid mode)



Connection BACnet MS/TP / Modbus RTU



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

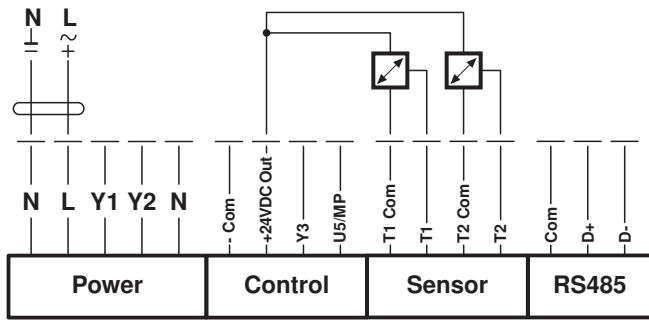


1)	2)
200 Ω...2 kΩ	0.1 Ω
2 kΩ...10 kΩ	1 Ω
10 kΩ...55 kΩ	10 Ω

- 1) Resistance range
- 2) Resolution
- Suitable for Ni1000 and PT1000
- Suitable Belimo types 01DT-...

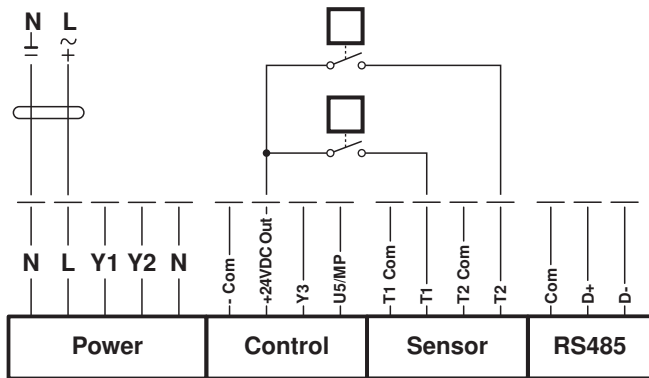
Functions

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



Possible voltage range:
 DC 0...10 V (resolution 5 mV)
 For example, for the detection of:
 - Active temperature sensors
 - Flow sensors
 - Pressure- / differential pressure sensors

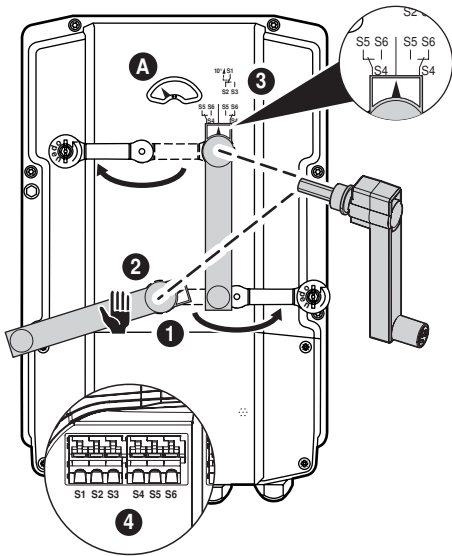
Switching contact connection (BACnet MS/TP / Modbus RTU)



Requirements for switching contact:
 The switching contact must be able to accurately switch a current of 10 mA @ 24 V.
 For example, for the detection of:
 - Flow monitors
 - Operating- / fault messages from chillers

Operating controls and indicators

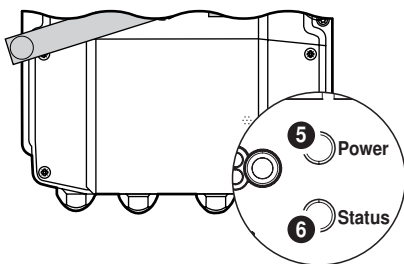
Auxiliary switch settings



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

- 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**
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-buttons 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

Service

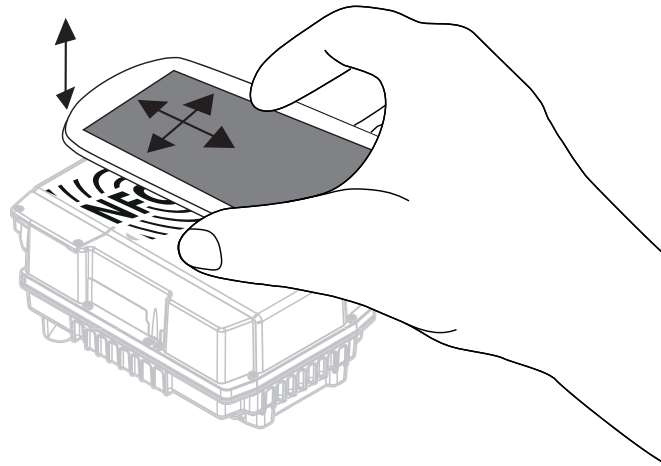
NFC connection Belimo equipment marked with the NFC logo can be operated with the “Belimo Assistant App”.

Requirement:

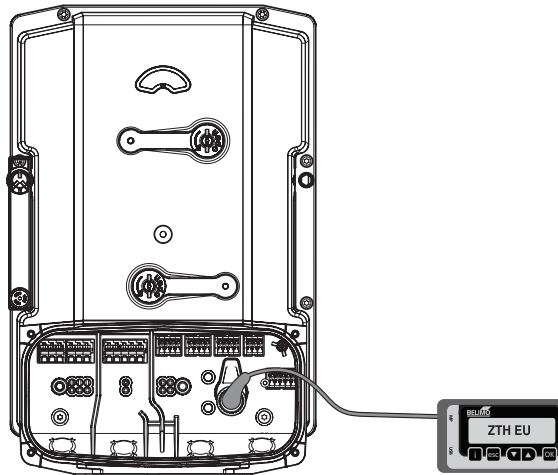
- NFC- or Bluetooth-capable smartphone
- Belimo Assistant App (Google Play & App Store)

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.

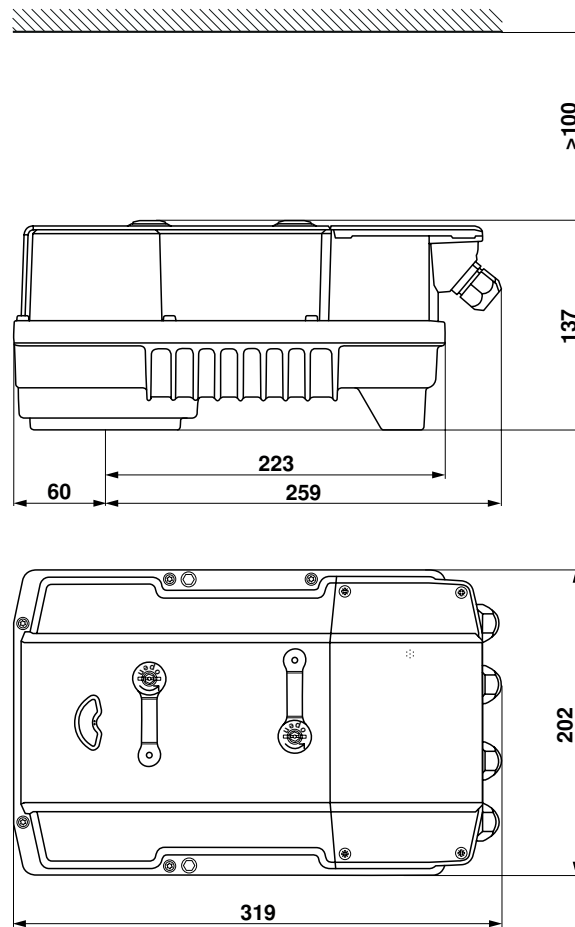


Service Tools connection The actuator can be parameterised by the ZTH EU via the service socket.



Dimensions [mm]

Dimensional drawings



Further documentation

- Tool connections
- Description Protocol Implementing Conformance Statement PICS
- Description Modbus register
- Overview MP Cooperation Partners
- Introduction to MP-Bus Technology
- MP Glossary
- Overview Valve-actuator combinations
- Data sheets for butterfly valves
- Installation instructions for actuators and/or butterfly valves
- General notes for project planning