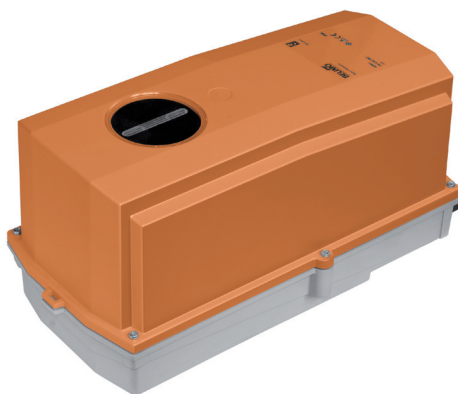


Communicative damper actuator in IP66 protective housing for adjusting dampers in industrial plants and technical building installations

- Air damper size up to approx. 8 m<sup>2</sup>
- Nominal torque 40 Nm
- Nominal voltage AC/DC 24 V
- Control Modulating DC (0)2...10 V Variable
- Position feedback DC 2...10 V Variable
- Conversion of sensor signals
- Communication via Belimo MP-Bus



## Technical data

<b>Electrical data</b>	Nominal voltage	AC/DC 24 V
	Nominal voltage frequency	50/60 Hz
	Nominal voltage range	AC 19.2...28.8 V / DC 21.6...28.8 V
	Power consumption in operation	4 W
	Power consumption in rest position	1.6 W
	Power consumption for wire sizing	7 VA
	Power consumption for wire sizing note	I <sub>max</sub> 20 A @ 5 ms
	Connection supply / control	Terminals 4 mm <sup>2</sup> (cable Ø 4...10 mm, 4-wire)
<b>Functional data</b>	Torque motor	Min. 40 Nm
	Torque variable	25%, 50%, 75% reduced
	Positioning signal Y	DC 0...10 V
	Positioning signal Y note	Input impedance 100 kΩ
	Control signal Y variable	Open-close 3-point (AC only) Modulating (DC 0...32 V)
	Operating range Y	DC 2...10 V
	Operating range Y variable	Start point DC 0.5...30 V End point DC 2.5...32 V
	Position feedback U	DC 2...10 V
	Position feedback U note	Max. 0.5 mA
	Position feedback U variable	Start point DC 0.5...8 V End point DC 2.5...10 V
	Position accuracy	±5%
	Direction of motion motor	Selectable with switch 0 / 1
	Direction of motion note	Y = 0 V: At switch position 0 (ccw rotation) / 1 (cw rotation)
	Direction of motion variable	Electronically reversible
	Manual override	Gear disengagement with push-button, can be locked (under protective housing)
	Angle of rotation	Max. 95°
	Angle of rotation note	can be limited on both sides with adjustable mechanical end stops
	Running time motor	150 s / 90°
	Motor running time variable	90...150 s
	Adaption setting range	manual
	Adaption setting range variable	No action Adaption when switched on Adaption after pushing the gear disengagement button
	Override control	MAX (maximum position) = 100% MIN (minimum position) = 0% ZS (intermediate position, AC only) = 50%
	Override control variable	MAX = (MIN + 32%)...100% MIN = 0%...(MAX - 32%) ZS = MIN...MAX
	Sound power level motor	45 dB(A)
	Spindle driver	Universal spindle clamp 14...26.7 mm
	Position indication	Mechanically, pluggable
<b>Safety</b>	Protection class IEC/EN	III Safety extra-low voltage

## Technical data

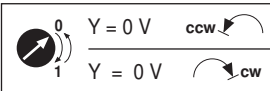
<b>Safety</b>	Protection class UL	UL Class 2 Supply
	Degree of protection IEC/EN	IP66
	Degree of protection NEMA/UL	NEMA 4, UL Enclosure Type 4
	EMC	CE according to 2004/108/EC
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Certification UL	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1:02
	Mode of operation	Type 1
	Rated impulse voltage supply / control	0.8 kV
	Control pollution degree	4
	Ambient temperature	-30...50 °C
	Ambient temperature note	-40...50 °C for actuator with integrated heating
	Non-operating temperature	-40...80 °C
	Ambient humidity	100% r.h.
	Maintenance	Maintenance-free
<b>Weight</b>	Weight approx.	4.2 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.
- Junction boxes must at least correspond with enclosure IP degree of protection!
- The cover of the protective housing may be opened for adjustment and servicing. When it is closed afterwards, the housing must seal tight (see installation instructions).
- The device may only be opened in the manufacturer's factory. It does not contain any parts that can be replaced or repaired by the user.
- The cables must not be removed from the device installed in the interior.
- 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 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 actuator is not designed for applications where chemical influences (gases, fluids) are present or for utilisation in corrosive environments in general.
- The actuator may not be used in plenary applications (e.g. suspended ceilings or raised floors).
- 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 4 applications are guided out of the unit, then flexible metallic cable conduits or suitable threaded cable conduits of equal value are to be used.

## Product features

<b>Fields of application</b>	<p>The actuator is particularly suitable for utilisation in outdoor applications and is protected against the following weather conditions:</p> <ul style="list-style-type: none"> <li>- UV radiation</li> <li>- rain / snow</li> <li>- dirt / dust</li> <li>- Humidity</li> <li>- Changing atmosphere / frequent and severe temperature fluctuations</li> </ul> <p>(recommendation: use the actuator with integrated factory-installed heating which can be ordered separately to prevent internal condensation)</p>
<b>Mode of operation</b>	<p>Conventional operation: The actuator is connected with a standard modulating signal of DC 0...10V and drives to the position defined by the positioning signal. Measuring voltage U serves for the electrical display of the damper position 0...100% and as slave control signal for other actuators.</p> <p>Operation on the MP-Bus: The actuator receives its digital positioning signal from the higher level controller via the MP-Bus and drives to the position defined. Connection U serves as communication interface and does not supply an analogue measuring voltage.</p>
<b>Converter for sensors</b>	Connection option for a sensor (passive or active sensor or switching contact). The MP actuator serves as an analogue/digital converter for the transmission of the sensor signal via MP-Bus to the higher level system.
<b>Parameterisable actuators</b>	The factory settings cover the most common applications. Single parameters can be modified with the Belimo Service Tools MFT-P or ZTH EU.
<b>Simple direct mounting</b>	Simple direct mounting on the damper spindle with an universal spindle clamp, supplied with an anti-rotation device to prevent the actuator from rotating.
<b>Manual override</b>	<p>Manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked).</p> <p>The housing cover must be removed for manual override.</p>
<b>High functional reliability</b>	The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.
<b>Adjustable angle of rotation</b>	Adjustable angle of rotation with mechanical end stops. Standard setting 0 ... 90°. The housing cover must be removed to set the angle of rotation.
<b>Home position</b>	<p>The first time the supply voltage is switched on, i.e. at the time of commissioning, the actuator carries out a synchronisation. The synchronisation is in the home position (0%).</p> <p>The actuator then moves into the position defined by the positioning signal.</p>
	
<b>Adaption and synchronisation</b>	<p>An adaption can be triggered manually by pressing the "Adaption" button or with the PC-Tool. Both mechanical end stops are detected during the adaption (entire setting range).</p> <p>Automatic synchronisation after pressing the gearbox disengagement button is configured. The synchronisation is in the home position (0%).</p> <p>The actuator then moves into the position defined by the positioning signal.</p> <p>A range of settings can be adapted using the PC-Tool (see MFT-P documentation)</p>

## Accessories

	Description	Type
<b>Gateways</b>	Gateway MP to Modbus RTU, AC/DC 24 V	UK24MOD
	Gateway MP for BACnet MS/TP, AC/DC 24 V	UK24BAC
	Gateway MP to LonWorks, AC/DC 24 V, LonMark certified	UK24LON
	Gateway MP to KNX, AC/DC 24 V, EIBA certified	UK24EIB
	Description	Type
<b>Electrical accessories</b>	Auxiliary switch, add-on, 1 x SPDT	S1A
	Auxiliary switch, add-on, 2 x SPDT	S2A
	Feedback potentiometer 140 Ohm, add-on	P140A
	Feedback potentiometer 200 Ohm, add-on	P200A
	Feedback potentiometer 500 Ohm, add-on	P500A
	Feedback potentiometer 1 kOhm, add-on	P1000A
	Feedback potentiometer 2.8 kOhm, add-on	P2800A
	Feedback potentiometer 5 kOhm, add-on	P5000A
	Feedback potentiometer 10 kOhm, add-on	P10000A
	Signal converter voltage/current, supply AC/DC 24V	Z-UIC
	Digital position indicator for front-panel mounting, 0...99%, front mass 72 x 72 mm	ZAD24
	Range controller for wall mounting, adjustable electron. Min./max. angle of rotation limitation	SBG24
	Positioner for wall mounting, range 0...100%	SGA24
	Positioner in a conduit box, range 0...100%	SGE24
	Positioner for front-panel mounting, range 0...100%	SGF24
	Positioner for wall mounting, range 0...100%	CRP24-B1
	Connecting cable 5 m, A+B: RJ12 6/6, To ZTH/ZIP-USB-MP	ZK1-GEN
	Connection cable 5 m, A: RJ11 6/4, B: Free wire end, To ZTH/ZIP-USB-MP	ZK2-GEN
	MP-Bus power supply for MP actuators, AC 230/24V for local power supply	ZN230-24MP
	Connecting board MP bus suitable for wiring boxes EXT-WR-FP...MP	ZFP2-MP
	Description	Type
<b>Mechanical accessories</b>	Cable gland, for cable diameter 4-10	Z-KB-PG11
	Description	Type
<b>Service Tools</b>	Service Tool, for MF/MP/Modbus/LonWorks actuators and VAV-Controller	ZTH EU
	Belimo PC-Tool, software for adjustments and diagnostics	MFT-P
	Adapter to Service-Tool ZTH	MFT-C

## Electrical installation

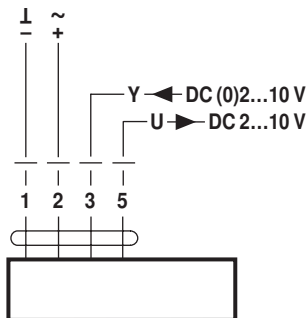


## Notes

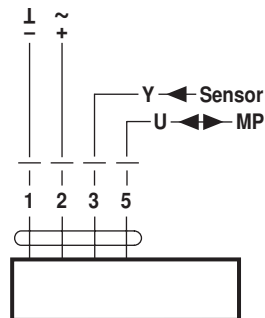
- Connection via safety isolating transformer.
- Parallel connection of other actuators possible. Observe the performance data.

## Wiring diagrams

AC/DC 24 V, modulating



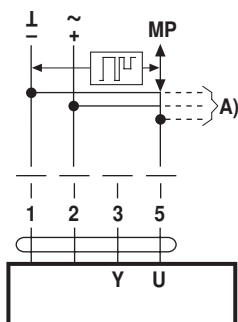
Operation on the MP-Bus



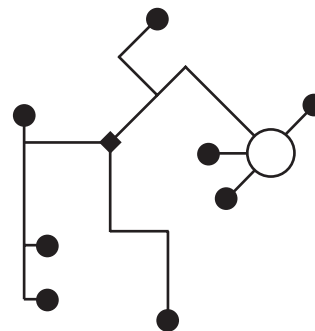
## Functions

## Functions when operated on MP-Bus

Connection on the MP-Bus

A) more actuators and sensors  
(max.8)

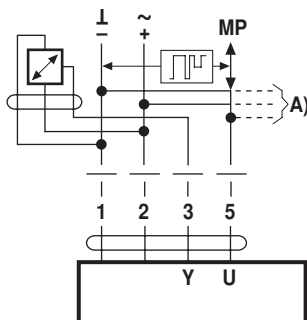
Network topology



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

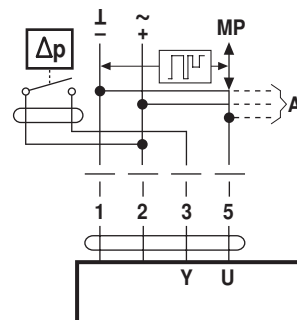
Connection of active sensors



A) more actuators and sensors (max.8)

- Supply AC/DC 24 V
- Output signal DC 0...10 V (max. DC 0...32 V)
- Resolution 30 mV

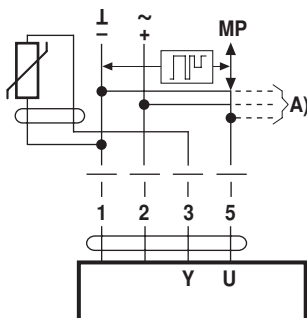
Connection of external switching contact



A) more actuators and sensors (max.8)

- Switching current 16 mA @ 24 V
- Start point of the operating range must be parameterised on the MP actuator as  $\geq 0.5$  V

Connection of passive sensors



Ni1000	-28...+98 °C	850...1600 $\Omega$ <sup>2)</sup>
PT1000	-35...+155 °C	850...1600 $\Omega$ <sup>2)</sup>
NTC	-10...+160 °C <sup>1)</sup>	200 $\Omega$ ...60 k $\Omega$ <sup>2)</sup>

A) more actuators and sensors (max.8)

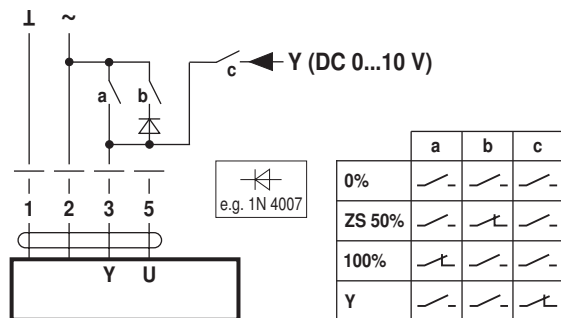
1) Depending on the type

2) Resolution 1 Ohm

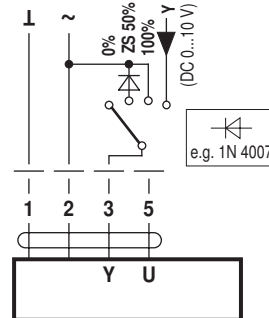
## Functions

### Functions with basic values (conventional mode)

Override control with AC 24 V with relay contacts

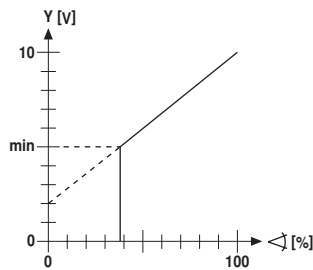
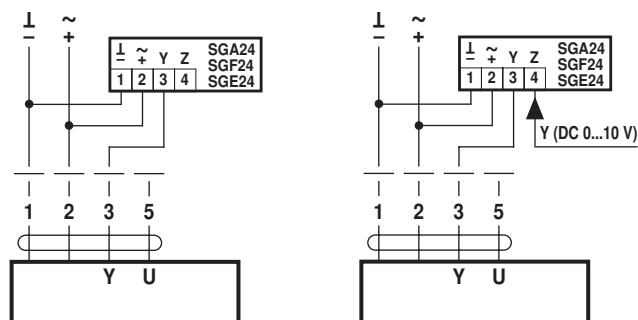


Override control with AC 24 V with rotary switch

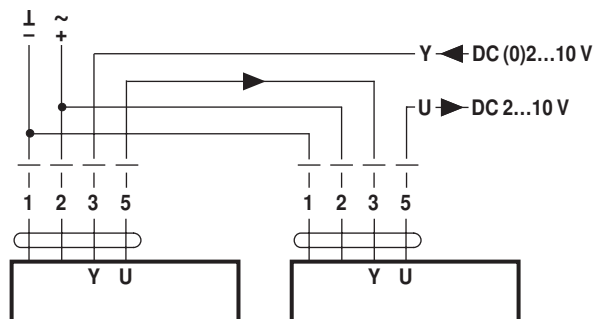


Remote control 0...100% with positioner SG..

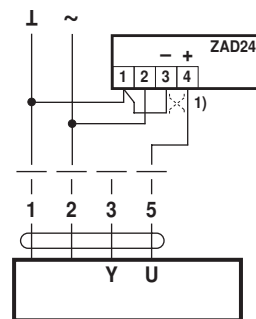
Minimum limit with positioner SG..



Follow-up control (position-dependent)

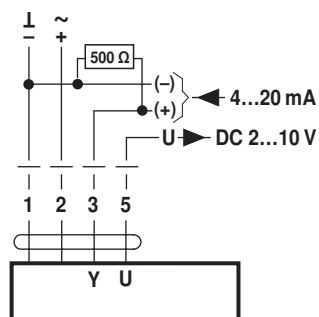


Position indication



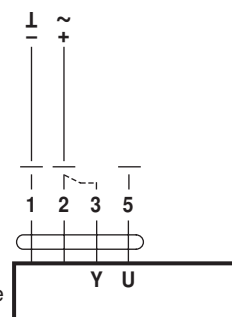
(1) Adapting the direction of rotation

Control with 4...20 mA via external resistor



**Caution:**  
The operating range must be set to DC 2...10 V.  
The 500 Ω resistor converts the 4...20 mA current signal to a voltage signal DC 2...10 V

Functional check



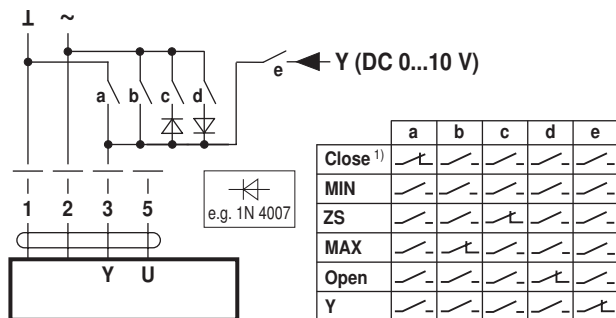
### Procedure

1. Connect 24V to connections 1 and 2
2. Disconnect connection 3:
  - with direction of rotation 0: Actuator rotates to the left
  - with direction of rotation 1: Actuator rotates to the right
3. Short-circuit connections 2 and 3:
  - Actuator runs in opposite direction

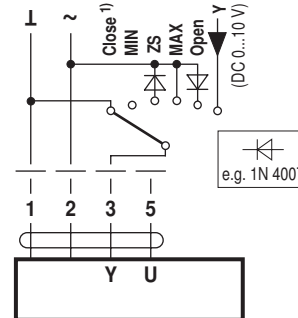
## Functions

### Functions for actuators with specific parameters (Parametrisation with PC-Tool necessary)

Override control and limiting with AC 24 V with relay contacts

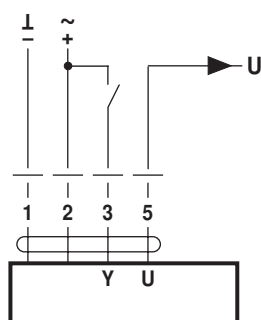


Override control and limiting with AC 24 V with rotary switch

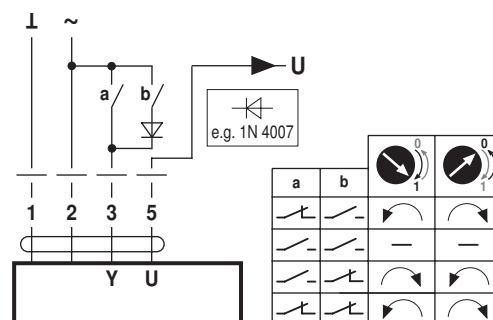


1) **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

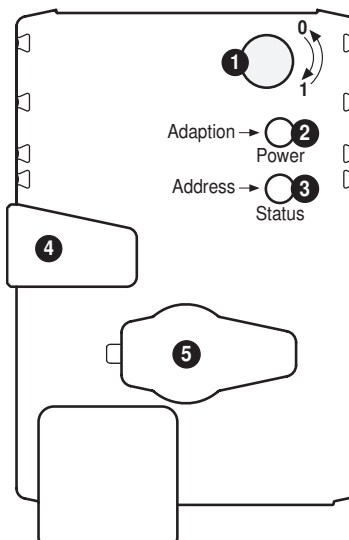
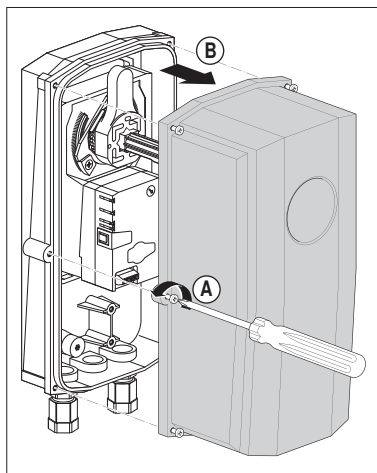
Control open-close



Control 3-point



## Operating controls and indicators



### 1 Direction of rotation switch

Switch over: Direction of rotation changes

### 2 Push-button and LED display green

Off: No power supply or malfunction

On: In operation

Press button: Triggers angle of rotation adaptation, followed by standard mode

### 3 Push-button and LED display yellow

Off: Standard mode

Flickering: MP communication active

On: Adaptation or synchronising process active

Flashing: Request for addressing from MP master

Press button: Confirmation of the addressing

### 4 Gear disengagement button

Press button: Gear disengages, motor stops, manual override possible

Release button: Gear engages, synchronisation starts, followed by standard mode

### 5 Service plug

For connecting parameterisation and service tools

### Check power supply connection

2 Off and 3 On Possible wiring error in power supply

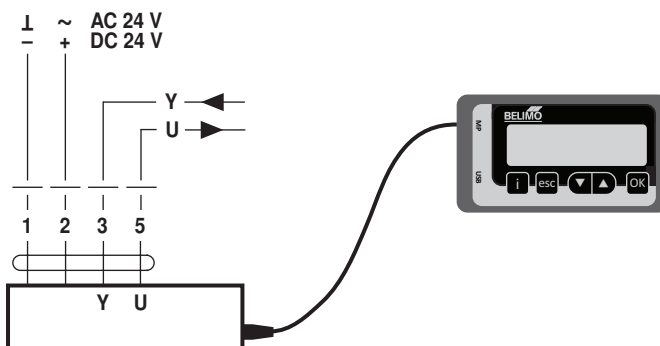
## Service



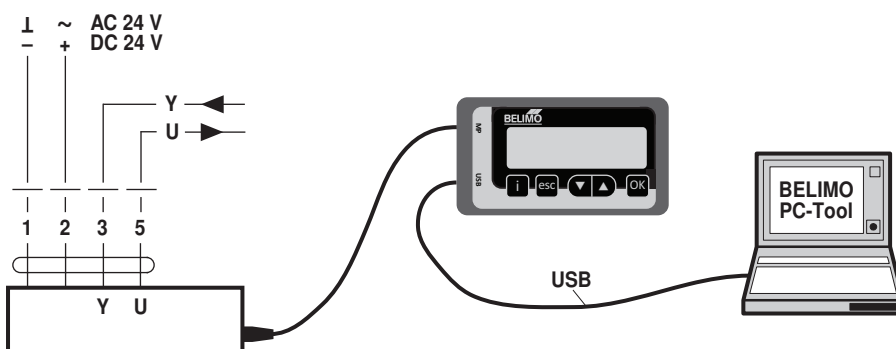
## Notes

- The actuator can be parameterised by PC-Tool and ZTH EU via the service socket.



## Service Tools connection ZTH EU connection

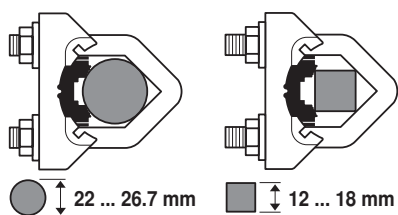
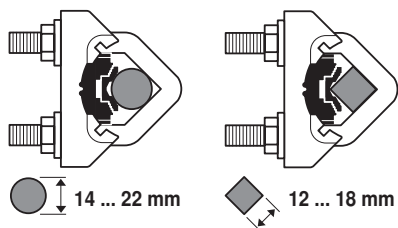
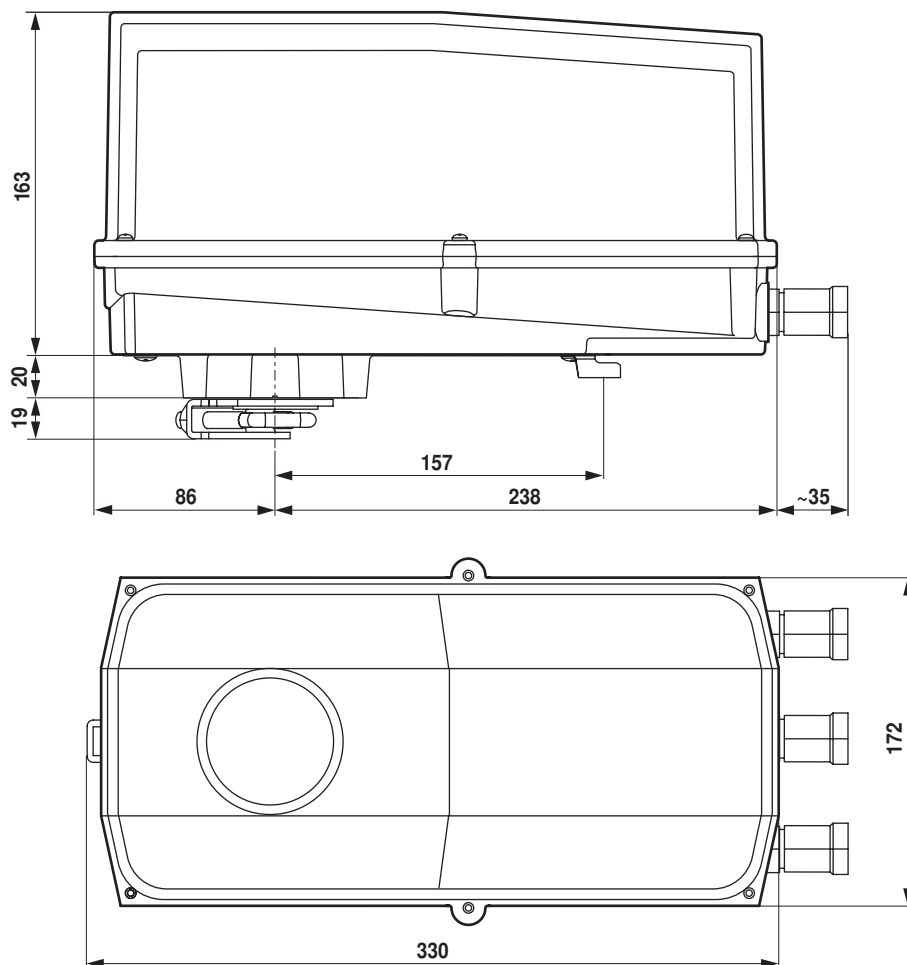


## PC-Tool connection



**Dimensions [mm]**
**Spindle length**

	-
	16...75


**Dimensional drawings**

**Further documentation**

- Overview MP Cooperation Partners
- Tool connections