

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

- Air damper size up to approx. 8 m²
- Torque motor 40 Nm
- Nominal voltage AC/DC 24 V
- Control modulating, communicative 2...10 V variable
- Position feedback 2...10 V variable
- Communication via Belimo MP-Bus
- Conversion of sensor signals
- Optimum weather protection for use outdoors (for use in ambient temperatures up to -40°C, there is a separate actuator available with built-in heater)




Technical data

Electrical data	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	4.5 W
	Power consumption in rest position	1.6 W
	Power consumption for wire sizing	7 VA
	Power consumption for wire sizing note	I _{max} 20 A @ 5 ms
	Connection supply / control	Terminals 4 mm ² (cable ø4...10 mm, 4-wire)
Data bus communication	Communicative control	MP-Bus
	Number of nodes	MP-Bus max. 8
Functional data	Torque motor	40 Nm
	Torque variable	25%, 50%, 75% reduced
	Operating range Y	2...10 V
	Input impedance	100 kΩ
	Operating range Y variable	Start point 0.5...30 V End point 2.5...32 V
	Operating modes optional	Open/close 3-point (AC only) Modulating (DC 0...32 V)
	Position feedback U	2...10 V
	Position feedback U note	Max. 0.5 mA
	Position feedback U variable	Start point 0.5...8 V End point 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	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°	

Technical data

Functional data	Running time motor variable	90...150 s	
	Adaptation setting range	manual	
	Adaptation setting range variable	No action Adaptation when switched on Adaptation after pushing the manual override 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)	
	Mechanical interface	Universal shaft clamp 14...26.7 mm	
	Position indication	Mechanical, pluggable	
	Safety data	Protection class IEC/EN	III, Safety Extra-Low Voltage (SELV)
		Power source UL	Class 2 Supply
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 2006/95/EC	
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 / control		0.8 kV	
Pollution degree		4	
Ambient humidity		Max. 100% RH	
Ambient temperature		-30...50°C [-22...122°F]	
Ambient temperature note		-40...50°C for actuator with integrated heating	
Storage temperature		-40...80°C [-40...176°F]	
Servicing		maintenance-free	
Weight	Weight	3.5 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.
- 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 at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.
- 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 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 device 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 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.
- When used under high UV loads, e.g. extreme sunlight, the use of flexible metallic or equivalent cable conduits is recommended.

Product features

Fields of application	The actuator is particularly suitable for utilisation in outdoor applications and is protected against the following weather conditions: <ul style="list-style-type: none"> - UV radiation - Rain / Snow - Dirt / Dust - Air humidity - Alternating climate / frequent and severe temperature fluctuations (Recommendation: use the actuator with integrated factory-installed heating which can be ordered separately to prevent internal condensation)
Operating mode	Conventional operation: The actuator is connected with a standard control signal of 0...10 V and drives to the position defined by the control signal. 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 receives its digital control 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.
Converter for sensors	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.
Parametrisable actuators	The factory settings cover the most common applications. Single parameters can be modified with the Belimo service tools MFT-P or ZTH EU.

Product features

Simple direct mounting	Simple direct mounting on the damper shaft with a universal shaft clamp, supplied with an anti-rotation device to prevent the actuator from rotating.
Manual override	Manual override with push-button possible (the gear train is disengaged for as long as the button is pressed or remains locked). The housing cover must be removed for manual override.
Adjustable angle of rotation	Adjustable angle of rotation with mechanical end stops. Standard setting 0...90°. The housing cover must be removed to set the angle of rotation.
High functional reliability	The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.
Home position	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%). The actuator then moves into the position defined by the control signal.
Adaptation and synchronisation	<div style="text-align: center; border: 1px solid black; padding: 5px; margin-bottom: 10px;"> </div> An adaptation can be triggered manually by pressing the "Adaptation" button or with the PC-Tool. Both mechanical end stops are detected during the adaptation (entire setting range). Automatic synchronisation after pressing the manual override button is configured. The synchronisation is in the home position (0%). The actuator then moves into the position defined by the control signal. A range of settings can be adapted using the PC-Tool (see MFT-P documentation)

Accessories

Gateways	<table border="0"> <tr> <th style="text-align: left;">Description</th> <th style="text-align: left;">Type</th> </tr> <tr> <td>Gateway MP to BACnet MS/TP</td> <td>UK24BAC</td> </tr> <tr> <td>Gateway MP to Modbus RTU</td> <td>UK24MOD</td> </tr> </table>	Description	Type	Gateway MP to BACnet MS/TP	UK24BAC	Gateway MP to Modbus RTU	UK24MOD								
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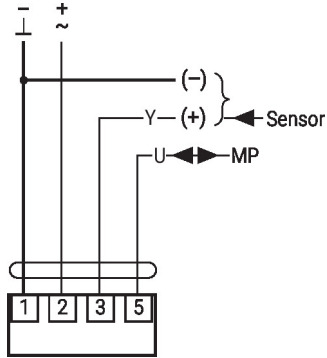
Electrical installation



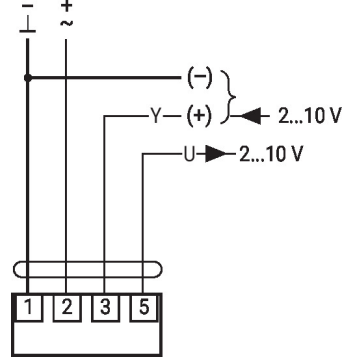
Supply from isolating transformer.
Parallel connection of other actuators possible. Observe the performance data.

Wiring diagrams

MP-Bus



AC/DC 24 V, modulating

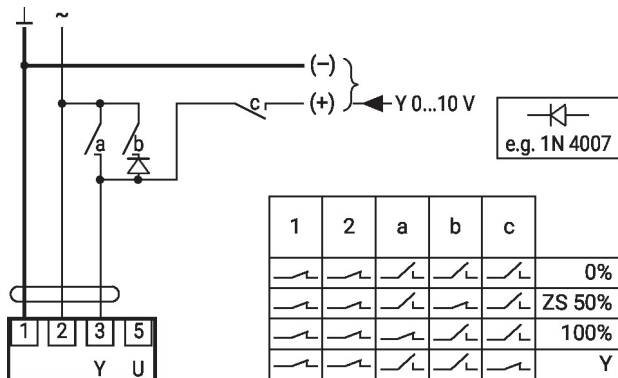


1	2	3		
		2 V		
		10 V		

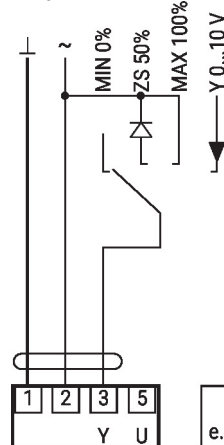
Functions

Functions with basic values (conventional mode)

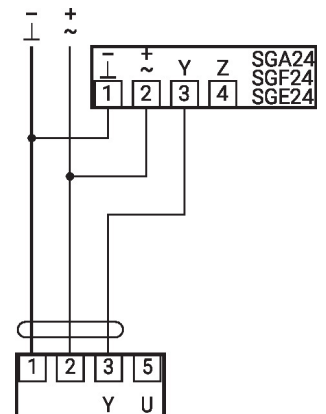
Override control with AC 24 V with relay contacts



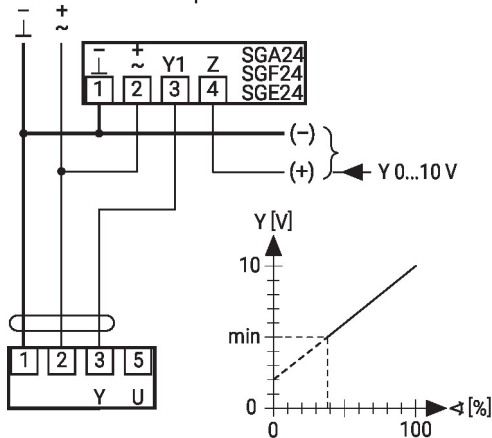
Override control with AC 24 V with rotary switch



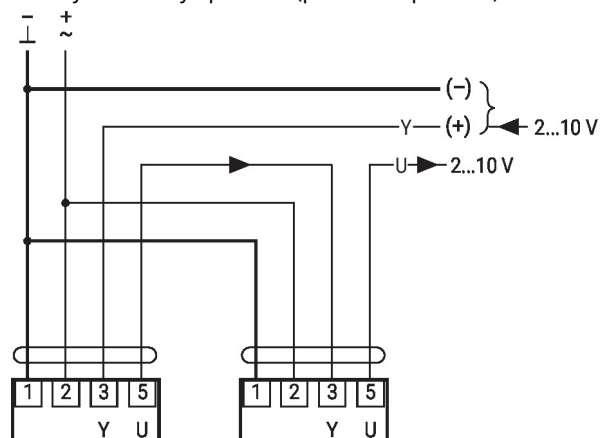
Control remotely 0...100% with positioner SG..



Minimum limit with positioner SG..

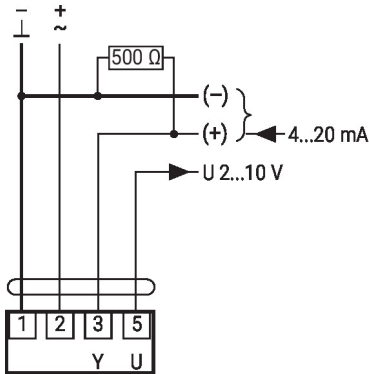


Primary/secondary operation (position-dependent)



Functions with basic values (conventional mode)

Control with 4...20 mA via external resistor

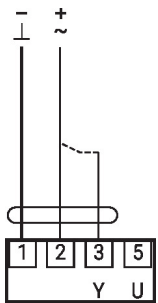


Caution:

The operating range must be set to DC 2...10 V.

The 500 Ohm resistor converts the 4...20 mA current signal to a voltage signal DC 2...10 V.

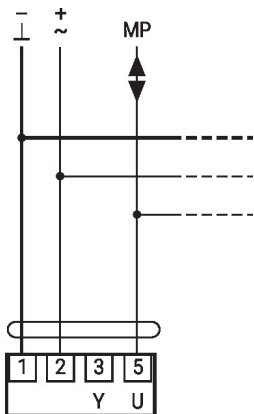
Functional check



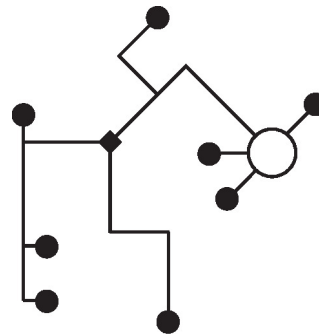
Procedure

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

Functions with specific parameters (Parametrisation necessary)



MP-Bus Network topology



There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted).

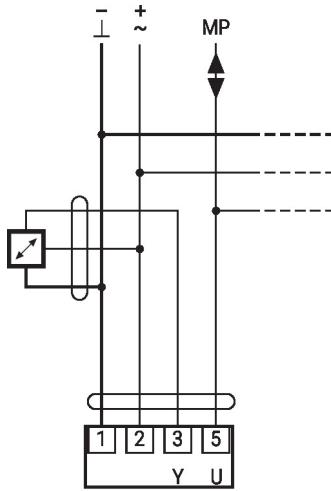
Supply and communication in one and the same 3-wire cable

- no shielding or twisting necessary
- no terminating resistors required

Max. 8 additional MP-Bus nodes

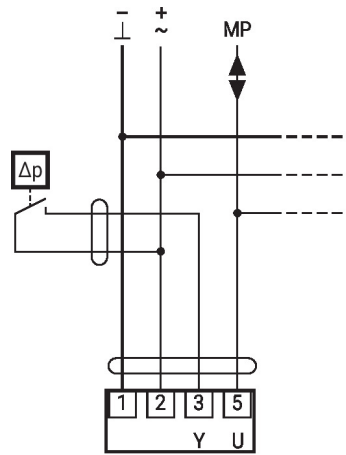
Functions with specific parameters (Parametrisation necessary)

Connection of active sensors



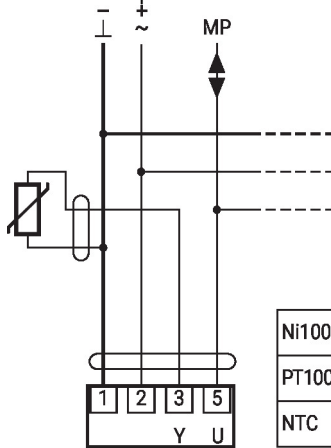
- Max. 8 additional MP-Bus nodes
- Supply AC/DC 24 V
 - Output signal 0...10 V (max. 0...32 V)
 - Resolution 30 mV

Connection of external switching contact



- Max. 8 additional MP-Bus nodes
- Switching current 16 mA @ 24 V
 - Start point of the operating range must be parametrised on the MP actuator as ≥ 0.5 V

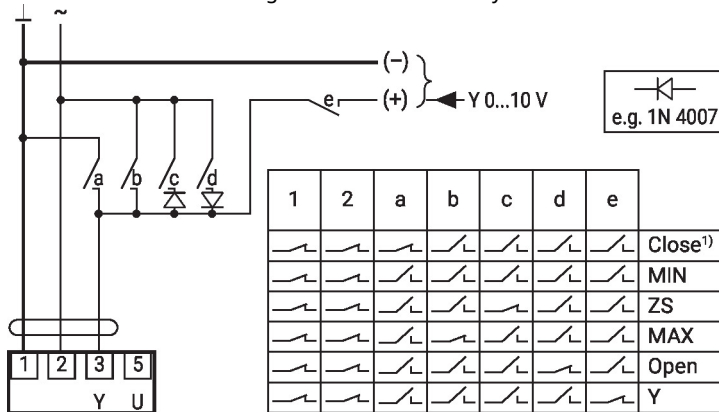
Connection of passive sensors



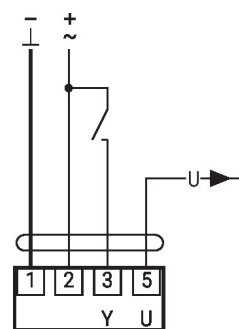
Ni1000	-28...+98°C	850...1600 Ω ²⁾
PT1000	-35...+155°C	850...1600 Ω ²⁾
NTC	-10...+160°C ¹⁾	200 Ω...60 kΩ ²⁾

- 1) Depending on the type
2) Resolution 1 Ohm
Compensation of the measured value is recommended

Override control and limiting with AC 24 V with relay contacts



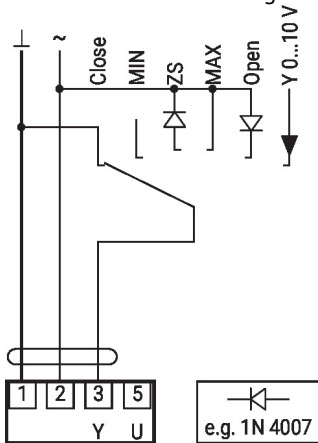
Control open/close



Functions

Functions with specific parameters (Parametrisation necessary)

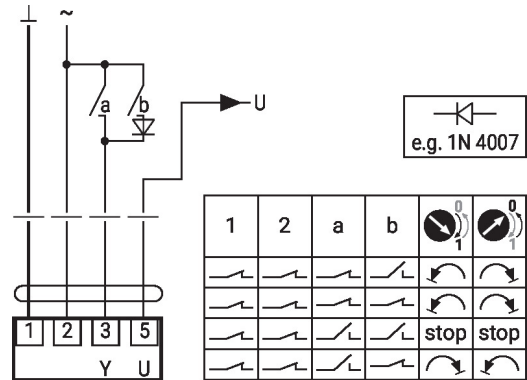
Override control and limiting with AC 24 V with rotary switch



e.g. 1N 4007

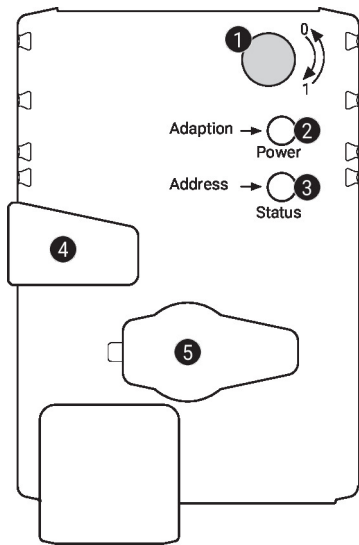
Caution:
The "Close" function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

Control 3-point with AC 24 V



e.g. 1N 4007

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

On: Adaptation or synchronisation process active

Flickering: MP-Bus communication active

Flashing: Request for addressing from MP client

Press button: Confirmation of the addressing

4 Manual override button

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

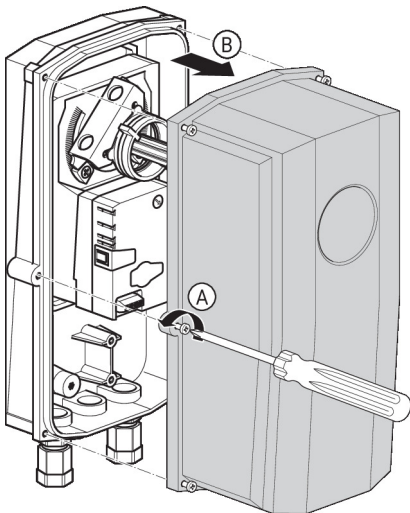
Release button: Gear train engages, synchronisation starts, followed by standard mode

5 Service plug

For connecting parametrisation and service tools

Check power supply connection

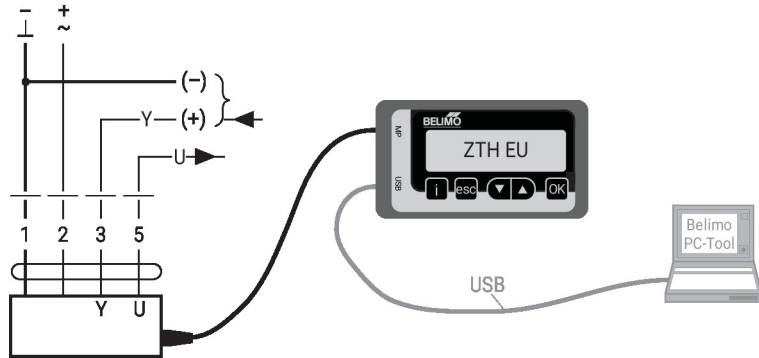
2 Off and **3** On Possible wiring error in power supply



Service

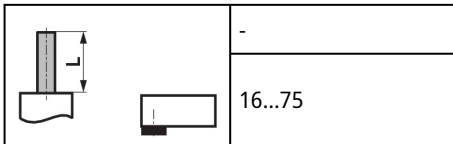
Tool connection The actuator can be parametrised by ZTH EU via the service socket.
For an extended parametrisation the PC tool can be connected.

Connection ZTH EU / PC-Tool

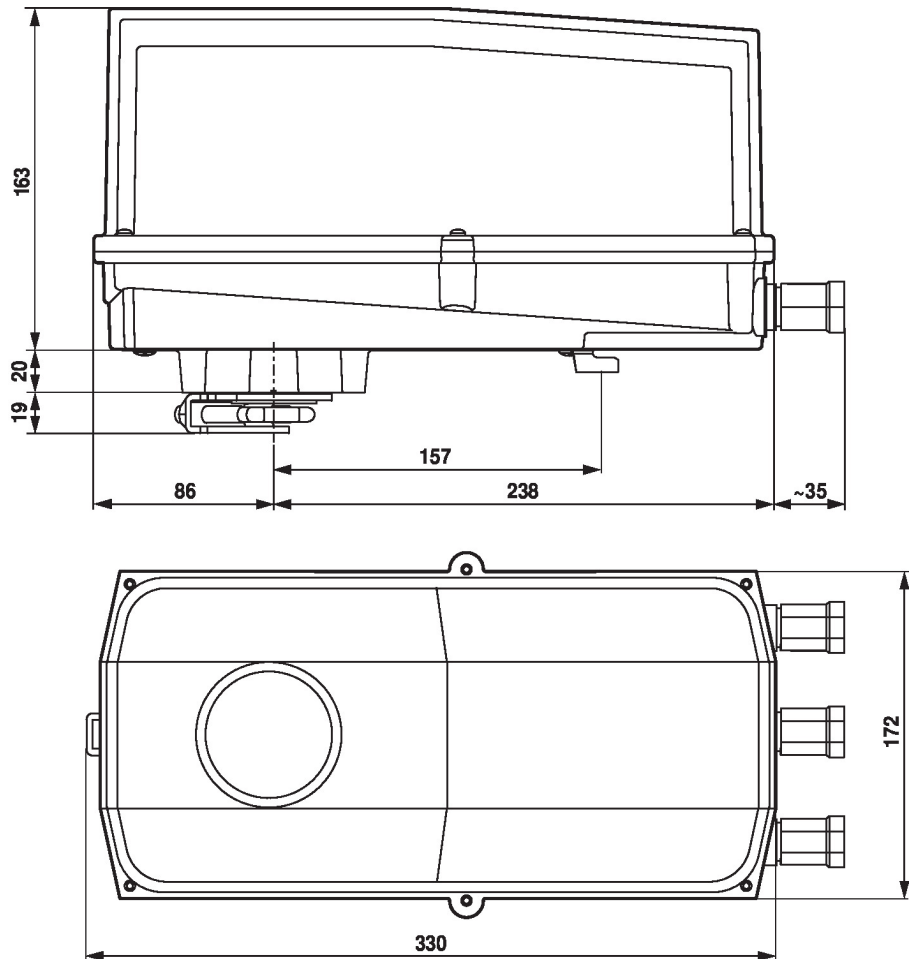
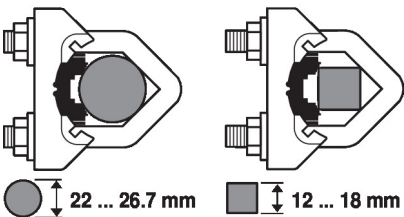
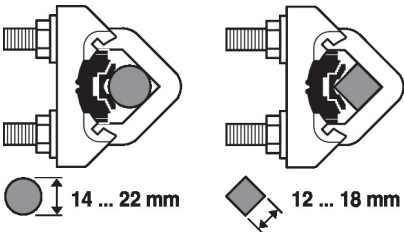


Dimensions

Spindle length



Clamping range damper shaft



Further documentation

- Overview MP Cooperation Partners
- Tool connections
- Introduction to MP-Bus Technology