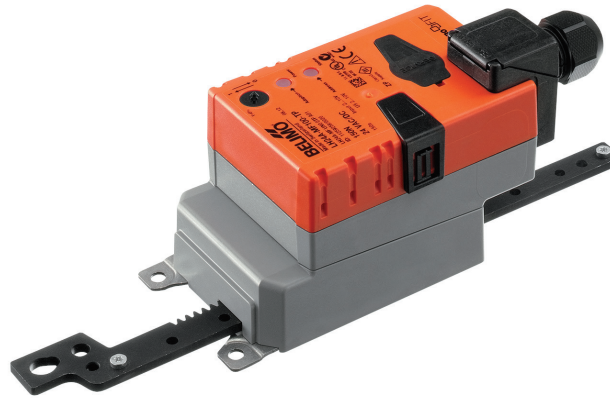


Communicative linear actuator adjusting dampers and slide valves in technical building installations

- Air damper size up to approx. 1 m²
- Actuating force 150 N
- Nominal voltage AC/DC 24 V
- Control Modulating DC (0)2...10 V Variable
- Position feedback DC 2...10 V Variable
- Length of Stroke Max. 100 mm, adjustable in 20 mm increments
- Conversion of sensor signals
- Communication via Belimo MP-Bus


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 | 2.5 W |
| | Power consumption in rest position | 1.2 W |
| | Power consumption for wire sizing | 5 VA |
| | Connection supply / control | Terminals 4 mm ² (cable Ø 4...10 mm, 4-wire) |
| | Parallel operation | Yes (note the performance data) |
| | Functional data | Actuating force motor |
| Modifiable actuating force | | 25%, 50%, 75% reduziert |
| 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 |
| Direction of motion note | | Y = 0 V: with switch 0 (retracted) / 1 (extended) |
| Direction of motion variable | | Electronically reversible |
| Manual override | | Gear disengagement with push-button, can be locked |
| Length of Stroke | | Max. 100 mm, adjustable in 20 mm increments |
| Stroke limitation | | can be limited on both sides with mechanical end stops |
| Running time motor | | 150 s / 100 mm |
| Motor running time variable | | 70...270 s / 100 mm |
| 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) | |
| Safety | Protection class IEC/EN | III Safety extra-low voltage |
| | Protection class UL | UL Class 2 Supply |
| | Degree of protection IEC/EN | IP54 |
| | Degree of protection NEMA/UL | NEMA 2, UL Enclosure Type 2 |

Technical data

| | | |
|---------------|--|---|
| Safety | 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 | 3 |
| | Ambient temperature | -30...50 °C |
| | Non-operating temperature | -40...80 °C |
| | Ambient humidity | 95% r.h., non-condensing |
| | Maintenance | Maintenance-free |
| Weight | Weight | 0.47 kg |

Safety notes



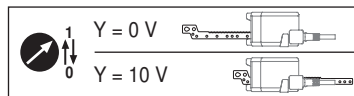
- The device must not be used outside the specified field of application, especially not in aircraft or in any other airborne means of transport.
- Outdoor application: only possible in case that no (sea)water, snow, ice, insolation or aggressive gases interfere directly with the actuator and that is ensured that the ambient conditions remain at any time within the thresholds according to the data sheet.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- 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 rotary supports and coupling pieces available as accessories must always be used if transverse forces are likely. In addition, the actuator must not be tightly bolted to the application. It must remain movable via the rotary support (refer to «Assembly notes»).
- If the actuator is exposed to severely contaminated ambient air, appropriate precautions must be taken on the system side. Excessive deposits of dust, soot etc. can prevent the gear rod from being extended and retracted correctly.
- If not installed horizontally, the gear disengagement pushbutton may only be actuated when there is no pressure on the gear rod.
- To calculate the actuating force required for air dampers and slide valves, the specifications supplied by the damper manufacturers concerning the cross section, the design, the installation site and the ventilation conditions must be observed.
- If a rotary support and/or coupling piece is used, actuation force losses are to be expected.
- 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

| | |
|----------------------------------|--|
| Mode of operation | <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> |
| 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. |
| Parameterisable 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 | The actuator can be directly connected with the application using the enclosed screws. The head of the gear rod is connected to the moving part of the ventilating application individually on the mounting side or with the Z-KS2 coupling piece provided. |
| Manual override | Manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked). |
| Adjustable stroke | If a stroke limitation will be adjusted, the mechanical operating range on this side of the gear rod can be used starting with an extension length of 20 mm and then can be limited respectively in increments of 20 mm by means of mechanical end stops Z-AS2. |
| High functional reliability | The actuator is overload protected, requires no limit switches in intermediate positions and automatically stops when the end stop is reached (at rest). |
| 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 positioning signal. |



| | |
|-------------------------------------|---|
| Adaption and synchronisation | 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). Automatic synchronisation after pressing the gearbox disengagement button is configured. The synchronisation is in the home position (0%). The actuator then moves into the position defined by the positioning signal. A range of settings can be adapted using the PC-Tool (see MFT-P documentation) |
|-------------------------------------|---|

Accessories

| | Description | Type |
|---|---|-------------|
| Gateways | 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 |
| Electrical accessories | Description | Type |
| | 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 | |
| Mechanical accessories | Description | Type |
| | End stop set for LH | Z-AS2 |
| | Rotary support for compensation of transverse forces | Z-DS1 |
| | Coupling piece M6 for LH, galvanised steel | Z-KS2 |
| | Terminal protection IP54 | Z-TP |
| | Cable sleeve for Ø 4-6 mm, suitable for strain relief NG | 43235-00001 |
| | Strain relief bushing (cable sleeve) for Ø 6-8 mm, suitable for strain relief NG | 43235-00002 |
| | Cable sleeve for Ø 8-10 mm, suitable for strain relief NG | 43235-00003 |

Accessories

| Service Tools | Description | Type |
|---------------|--|--------|
| | 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 |

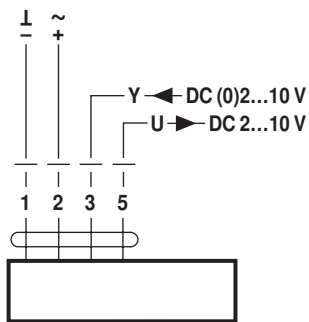
Electrical installation

Notes

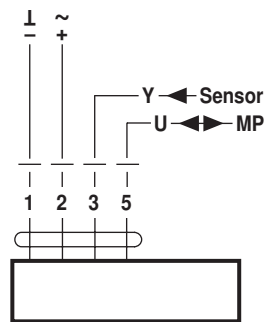
- Connection via safety isolating transformer.
- Parallel connection of other actuators possible. Observe the performance data.

Wiring diagrams

AC/DC 24 V, modulating



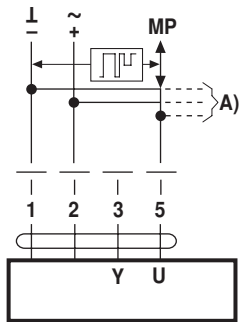
Operation on the MP-Bus



Functions

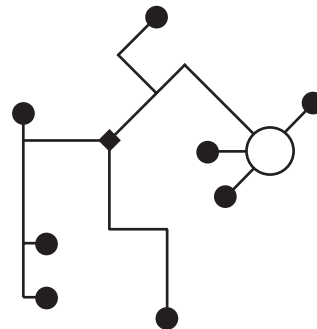
Functions when operated on MP-Bus

Connection on the MP-Bus



A) more actuators and sensors (max.8)

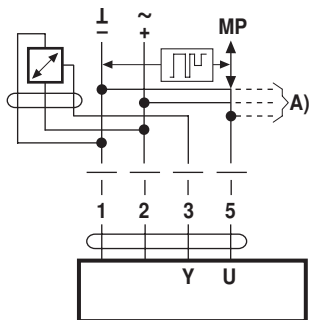
Network topology



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

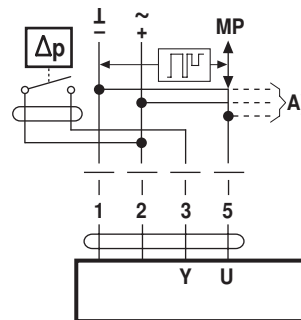
Connection of active sensors



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

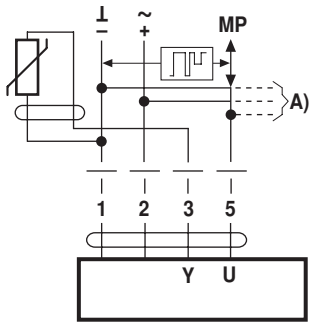


A) more actuators and sensors (max.8)

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

Functions

Connection of passive sensors

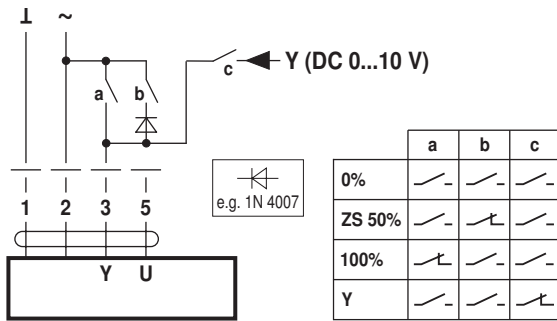


| | | |
|--------|----------------------------|-----------------------------|
| Ni1000 | -28...+98°C | 850...1600 Ω ²⁾ |
| PT1000 | -35...+155°C | 850...1600 Ω ²⁾ |
| NTC | -10...+160°C ¹⁾ | 200 Ω...60 kΩ ²⁾ |

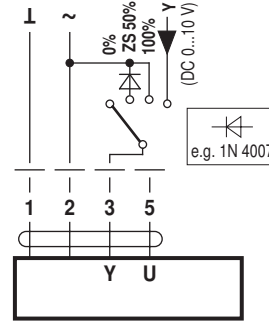
A) more actuators and sensors (max.8)
 1) Depending on the type
 2) Resolution 1 Ohm

Functions with basic values (conventional mode)

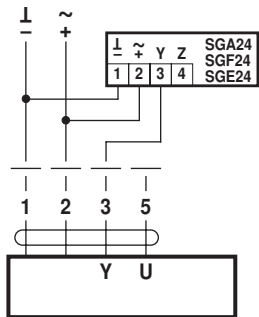
Override control with AC 24 V with relay contacts



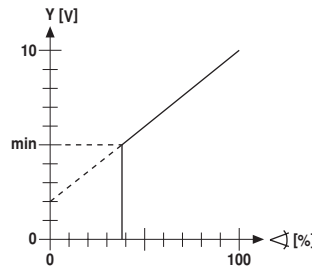
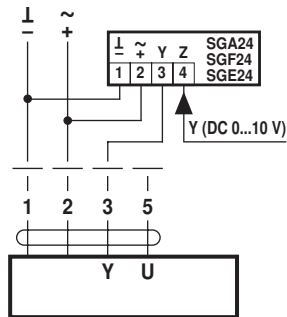
Override control with AC 24 V with rotary switch



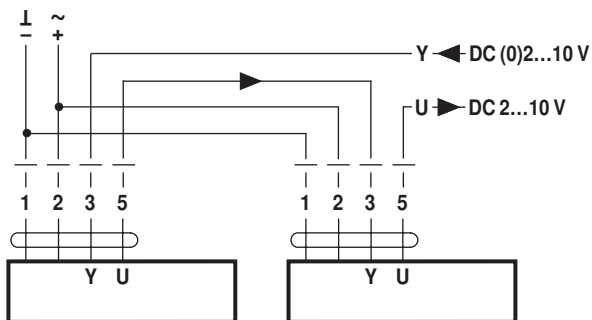
Remote control 0...100% with positioner SG..



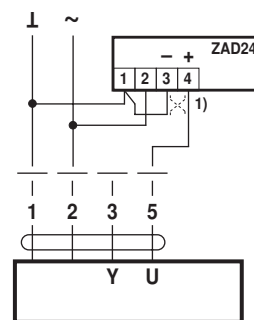
Minimum limit with positioner SG..



Follow-up control (position-dependent)



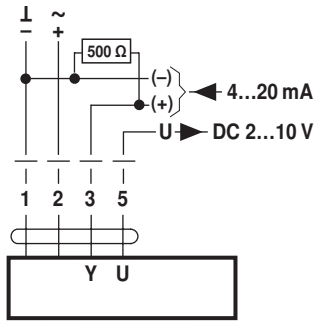
Position indication



1) Adapting the direction of stroke

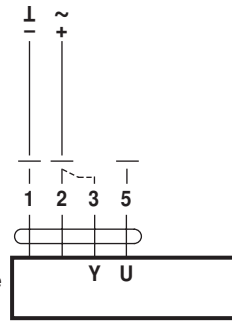
Functions

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

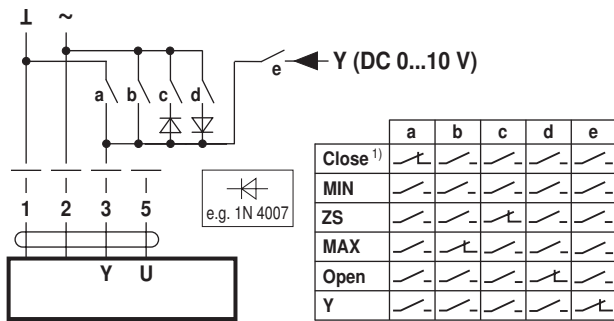


Procedure

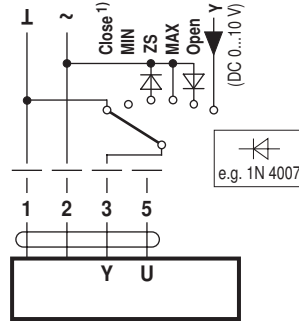
1. Apply 24 V to connection 1 and 2
2. Disconnect connection 3:
 - for direction of stroke 0: Actuator travels in the direction "retracted"
 - for direction of stroke 0: Actuator travels in the direction "extended"
3. Short circuit connections 2 and 3:
 - Actuator runs in the opposite direction

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

Override control and limiting with AC 24 V with relay contacts

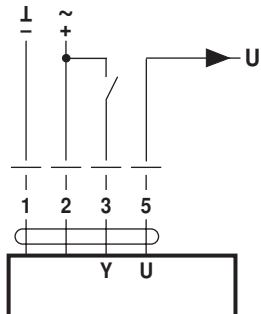


Override control and limiting with AC 24 V with rotary switch

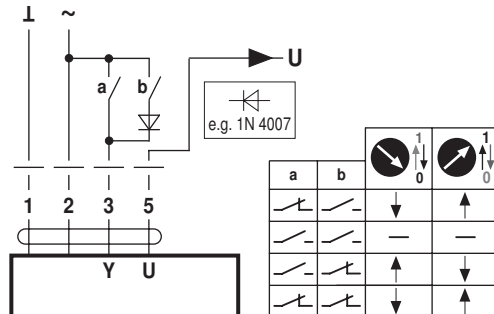


1) **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

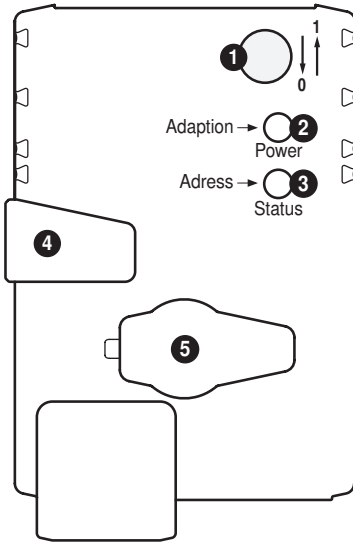
Control open-close



Control 3-point



Operating controls and indicators



1 Direction of stroke switch

Switch over: Direction of stroke changes

2 Push-button and LED display green

Off: No power supply or malfunction

On: In operation

Press button: Triggers stroke 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

Installation notes



Notes

- If a rotary support and/or coupling piece is used, losses in the actuation force losses are to be expected.

Applications without transverse force

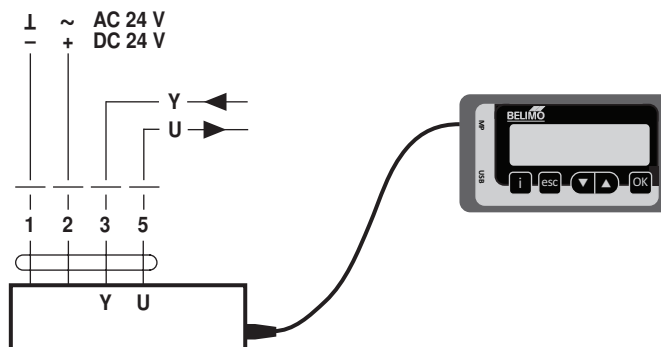
The linear actuator is screwed directly to the housing at three points. Afterwards, the head of the gear rod is fastened to the moving part of the ventilation application (e.g. damper or slide valve).

Applications with transverse forces

Connect the coupling piece with the internal thread (Z-KS2) to the head of the gear rod. Screw the rotary support (Z-DS1) to the ventilation application. Afterwards, the linear actuator is screwed to the previously mounted rotary support with the enclosed screw. Afterwards, the coupling piece, which is mounted to the head of the gear rod, is attached to the moving part of the ventilating application (e.g. damper or slide valve). The transverse forces can be compensated for to a certain limit with the rotary support and/or coupling piece. The maximum permissible swivel angle of the rotary support and coupling piece is 10°, laterally and upwards.

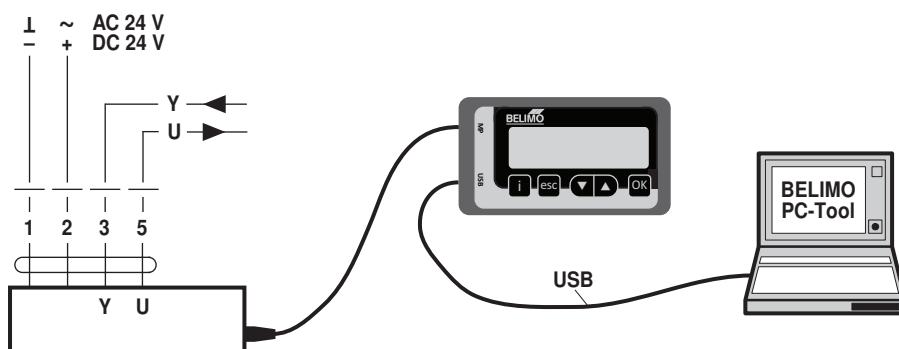
Service

Service Tools connection ZTH EU connection



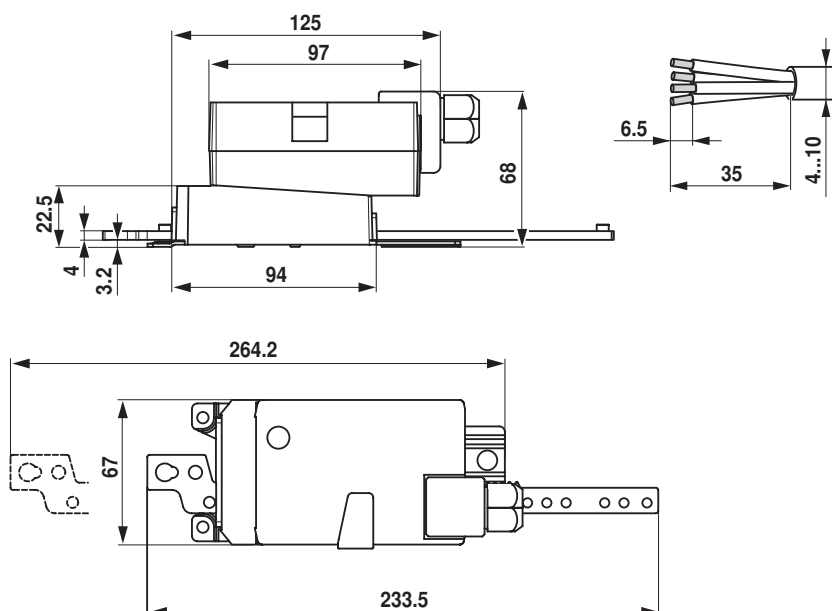
Service

PC-Tool connection



Dimensions [mm]

Dimensional drawings



Further documentation

- Overview MP Cooperation Partners
- Tool connections