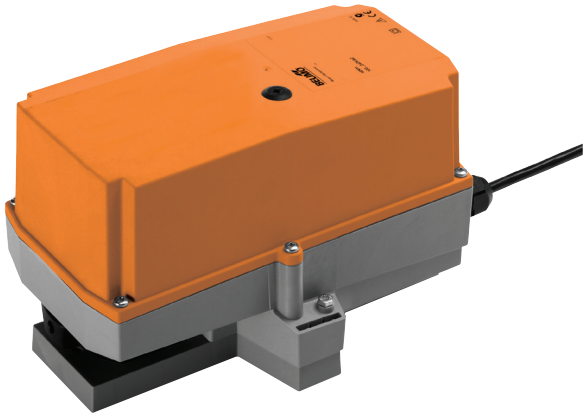
BELIMO

Technical data sheet SR24P-MP-R

RobustLine rotary actuator for rotary valves and butterfly valves in Retrofit applications

- **Nominal torque 20 Nm**
- **Nominal voltage AC/DC 24 V**
- **Control Modulating DC (0)2...10 V Variable**
- **Position feedback DC 2...10 V Variable**
- **Communication via BELIMO MP-Bus**
- **Conversion of sensor signals**
- **Optimum protection against corrosion and chemical influences, UV radiation, damp and condensation**



MP-BUS

RETROFIT

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	3.5 W
	Power consumption in rest position	1.25 W
	Power consumption for wire sizing	6 VA
	Connection supply / control	Cable 1 m, 4 x 0.75 mm² (halogen-free)
	Parallel operation	Yes (note the performance data)
Functional data	Torque motor	Min. 20 Nm
	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%
	Manual override	Gear disengagement with push-button, can be locked
	Running time motor	90 s / 90°
	Motor running time variable	90...350 s
	Adaption setting range	manual (automatic on first power-up)
	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 + 33%)...100% MIN = 0%...(MAX – 33%) ZS = MIN...MAX
	Sound power level motor	45 dB(A)
	Position indication	Mechanically, pluggable
Safety	Protection class IEC/EN	III Safety extra-low voltage
	Protection class UL	UL Class 2 Supply
	Degree of protection IEC/EN	IP66 + IP67
	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

Technical data

Safety	Control pollution degree	4
	Ambient temperature	0...50°C
	Non-operating temperature	-40...80°C
	Ambient humidity	100% r.h.
	Maintenance	Maintenance-free
Mechanical data	Connection flange	F03/F04/F05
Weight	Weight approx.	2.1 kg

Safety notes

- This device has been designed for use in stationary heating, ventilation and air conditioning systems and is not allowed to 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 during installation.
- Junction boxes must at least correspond with enclosure IP degree of protection!
- The switch for changing the direction of rotation may only be operated by authorised specialists. The direction of rotation must not in particular be reversed in a frost protection circuit.
- The surface temperature between actuator and fitting may not exceed 50°C.
- 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 on the inside 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.
- The device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.
- The information on chemical resistance refers to laboratory tests with raw materials and finished products and to trials in the field in the areas of application indicated.
- The materials used may be subjected to external influences (temperature, pressure, constructional fixture, effect of chemical substances, etc.), which cannot be simulated in laboratory tests or field trials.
- The information regarding areas of application and resistance can therefore only serve as a guideline. 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. The chemical or mechanical resistance of the materials used is not alone sufficient for judging the suitability of a product. Regulations pertaining to combustible liquids such as solvents etc. must be taken into account with special reference to explosion protection.

Product features

Fields of application

The actuator is particularly suited for use in difficult conditions, e.g. in the field of:
- Wood drying
- Animal breeding
- Food processing
- Agricultural
- Swimming baths / bathrooms
- Rooftop ventilation plant rooms
- General outdoor applications

Resistances

Noxious gas test EN 60068-2-60 (Fraunhofer Institut ICT / DE)
Salt fog spray test EN 60068-2-52 (Fraunhofer Institut ICT / DE)
Ammoniac test DIN 50916-2 (Fraunhofer Institut ICT / DE)
Climate test IEC60068-2-30 (Trikon Solutions AG / CH)
Disinfectant (animals) (Trikon Solutions AG / CH)
UV Test (Solar radiation at ground level) EN 60068-2-5, EN 60068-2-63 (Quinel / Zug CH)

Product features

Used materials

Actuator housing polypropylene (PP)
Cable glands / hollow shaft polyamide (PA)
Connecting cable FRNC
Clamp / screws in general Steel 1.4404
Seals EPDM
Form fit insert aluminium anodised

Mode of operation

Conventional operation:
The actuator is connected with a standard modulating signal of DC 0 ... 10V and travels to the position defined by the positioning signal. The measuring voltage U serves for the electrical display of the actuator position 0 ... 100% and as slave control signal for other actuators.
Operation on the MP-Bus:
The actuator receives its digital positioning signal from the higher level controller via the MP-Bus and travels 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.

Parameterisable actuators

The factory settings cover the most common applications. Input and output signals and other parameters can be altered with the PC-Tool MFT-P or with the Service tool ZTH EU.

Application

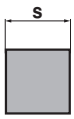
For rotary valves and butterfly valves with the following mechanical specifications:
– ISO 5211: F03, F04, F05 (hole circle diameter on the flange for mounting the fitting)
– ISO 5211: quadratic, flat head or wedge-shaped stem head geometry

Tappet shaft

The form fit adapter is not included in the scope of delivery (see «Accessories»).

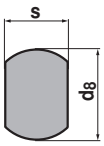
further form fit adapters

ZPV-..



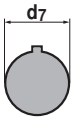
Typ	s [mm]
ZPV-08	8
ZPV-09	9
ZPV-10	10
ZPV-11	11
ZPV-12	12
ZPV-14	14

ZPF-..



Typ	s [mm]	d_8 [mm]
ZPF-08	8	10
ZPF-09	9	12
ZPF-10	10	17
ZPF-11	11	14
ZPF-14	14	18

ZSK-..



Typ	d_7 [mm]
ZPK-12	12
ZPK-14	14

Direct mounting

Simple direct mounting on the rotary valve or butterfly valve with mounting flange. The mounting orientation in relation to the fitting can be selected in 90° steps.

Manual override

Manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked).
The housing cover must be removed for manual override.

High functional reliability

The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.

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.

Home position

The first time the supply voltage is switched on, i.e. at the time of commissioning, the actuator carries out an adaption, which is when the operating range and position feedback adjust themselves to the mechanical setting range.
The actuator then moves into the position defined by the positioning signal.
Factory setting: Y2 (counter-clockwise rotation).

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 for BACnet MS/TP, AC/DC 24 V	UK24BAC
	Gateway MP to Modbus RTU, AC/DC 24 V	UK24MOD
	Gateway MP for LonWorks®, AC/DC 24 V, LonMark-certified	UK24LON
	Gateway MP to KNX/EIB, AC/DC 24 V, EIBA certified	UK24EIB

	Description	Type
Electrical accessories	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
	Connecting board MP bus suitable for wiring boxes EXT-WR-FP..-MP	ZFP2-MP
	MP-Bus power supply for MP actuators, AC 230/24V for local power supply	ZN230-24MP
	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

	Description	Type
Mechanical accessories	Form fit adapter SR..P, 8x8x57 mm	ZPV-08
	Form fit adapter SR..P, 9x9x57 mm	ZPV-09
	Form fit adapter SR..P, 10x10x57 mm	ZPV-10
	Form fit adapter SR..P, 11x11x57 mm	ZPV-11
	Form fit adapter SR..P, 12x12x57 mm	ZPV-12
	Form fit adapter SR..P, 14x14x57 mm	ZPV-14
	Form fit adapter SR..P, 8xØ17x57 mm	ZPF-08
	Form fit adapter SR..P, 9xØ12x57 mm	ZPF-09
	Form fit adapter SR..P, 10xØ17x57 mm	ZPF-10
	Form fit adapter SR..P, 11xØ14x57 mm	ZPF-11
	Form fit adapter SR..P, 14xØ18x57 mm	ZPF-14
	Form fit adapter SR..P, Ø12x4x57 mm	ZPK-12
	Form fit adapter SR..P, Ø14x5x57 mm	ZPK-14

	Description	Type
Service Tools	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

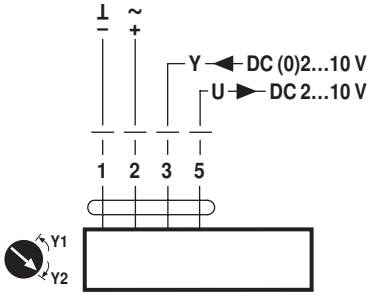
Notes

- Connection via safety isolating transformer.
- Parallel connection of other actuators possible. Observe the performance data.
- Direction of rotation switch is covered. Factory setting: Direction of rotation Y2.

Electrical installation

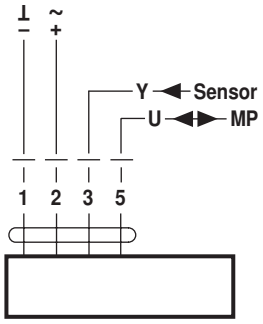
Wiring diagrams

AC/DC 24 V, modulating



Cable colours:
1 = black
2 = red
3 = white
5 = orange

Operation on the MP-Bus

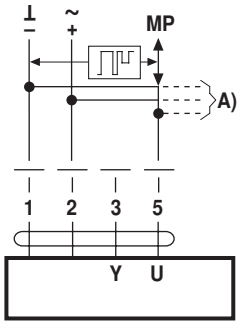


Cable colours:
1 = black
2 = red
3 = white
5 = orange

Functions

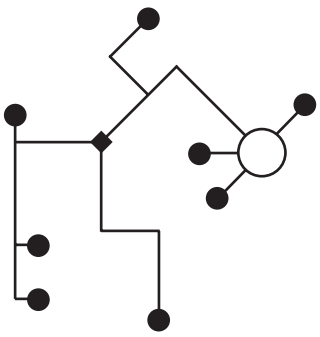
Functions when operated on MP-Bus

Connection on the MP-Bus



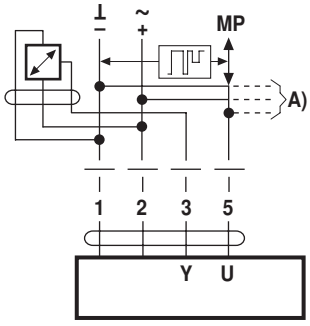
A) more actuators and sensors (max.8)

Power topology



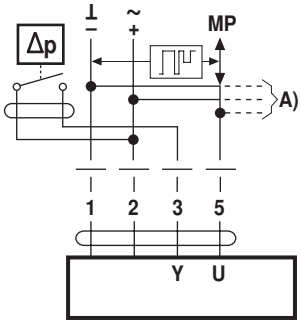
There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted).
Supply and communication in one and the same 3-wire cable
• no shielding or twisting necessary
• no terminating resistors required

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

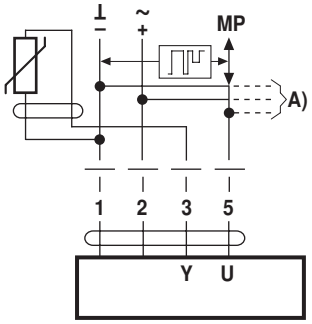
Connection of external switching contact



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 ≥ 0.5 V

Functions

Connection of passive sensors

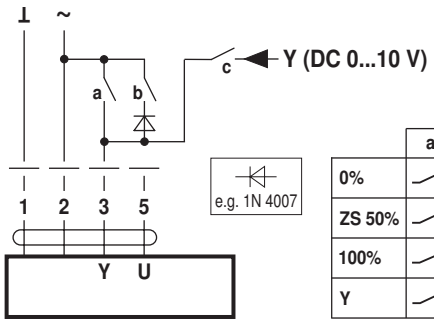


Ni1000	–28...+98°C	850...1600 Ω 2)
PT1000	–35...+155°C	850...1600 Ω 2)
NTC	–10...+160°C 1)	200 Ω...60 kΩ 2)

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

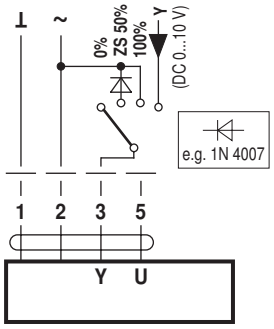
Functions with basic values (conventional mode)

Override control with AC 24 V with relay contacts

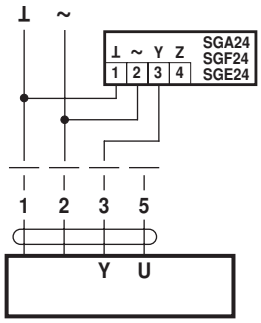


	a	b	c
0%	_/_	_/_	_/_
ZS 50%	_/_	_|_	_/_
100%	_|_	_/_	_/_
Y	_/_	_/_	_|_

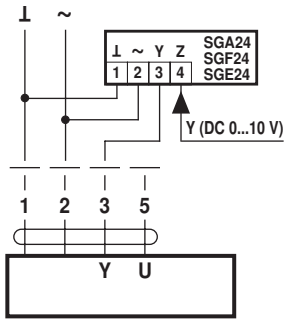
Override control with AC 24 V with rotary switch

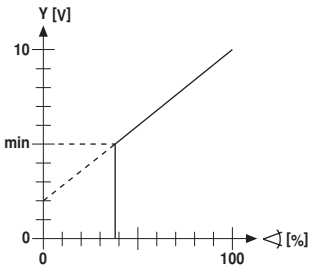


Remote control 0...100% with positioner SG..

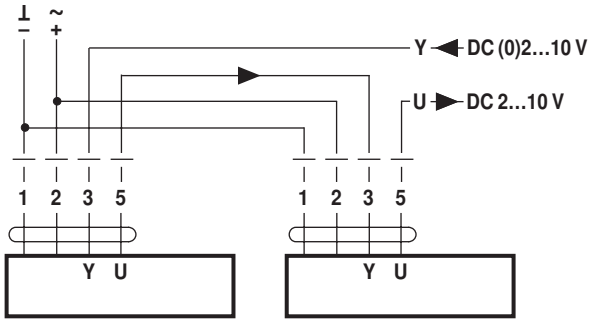


Minimum limit with positioner SG..

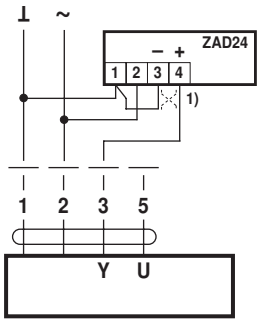




Follow-up control (position-dependent)



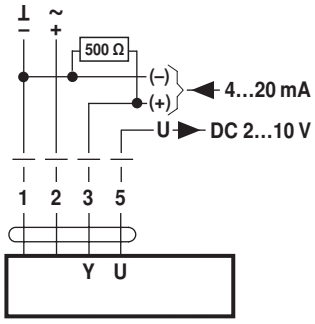
Position indication



(1) Adapting the direction of rotation

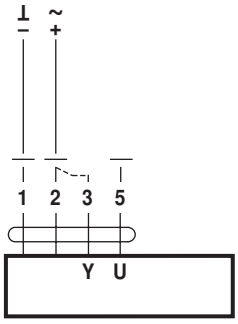
Functions

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

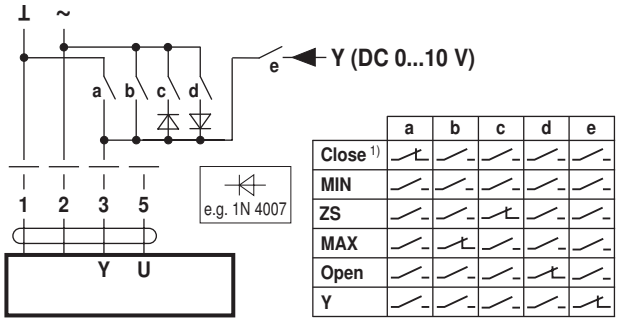
Functional check



Procedure
1. Connect 24V to connections 1 and 2
2. Disconnect connection 3:
– with direction of rotation Y1: Actuator rotates to the left
– with direction of rotation Y2 Actuator rotates to the right
3. Short-circuit connections 2 and 3:
– Actuator runs in opposite direction

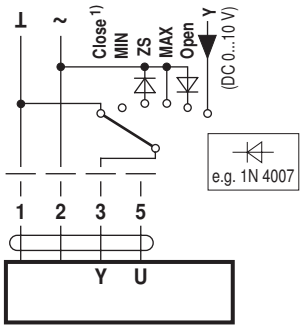
Functions for actuators with specific parameters (Parametrisation with PC-Tool necessary)

Override control and limiting with AC 24 V with relay contacts



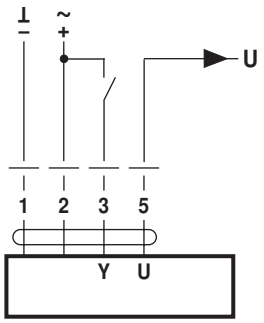
	a	b	c	d	e
Close 1)	⌐	_	_	_	_
MIN	_	_	_	_	_
ZS	_	_	⌐	_	_
MAX	_	⌐	_	_	_
Open	_	_	_	⌐	_
Y	_	_	_	_	⌐

Override control and limiting with AC 24 V with rotary switch

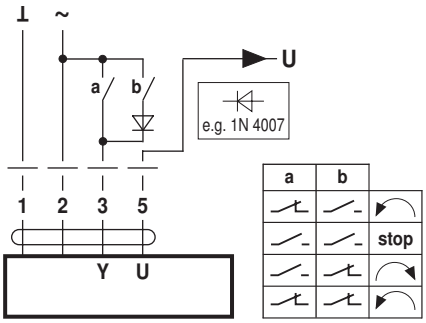


1) **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

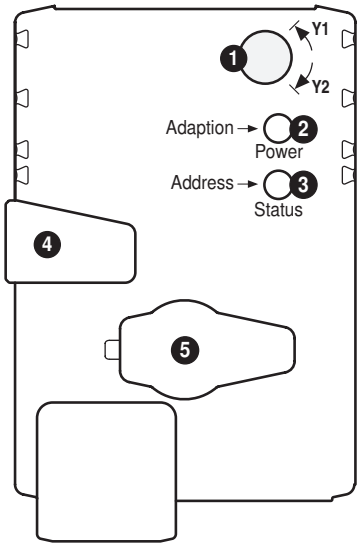
Control open-close



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

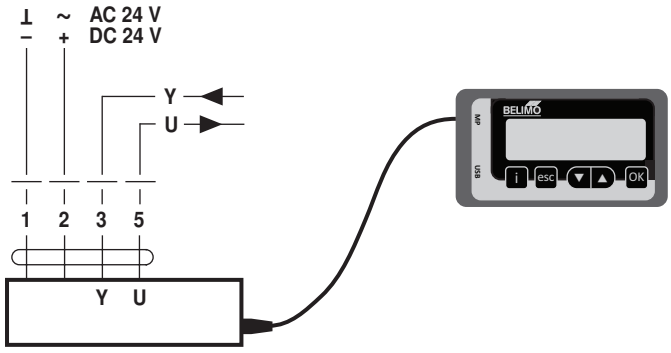
2 Off and 3 On Possible wiring error in power supply

Service

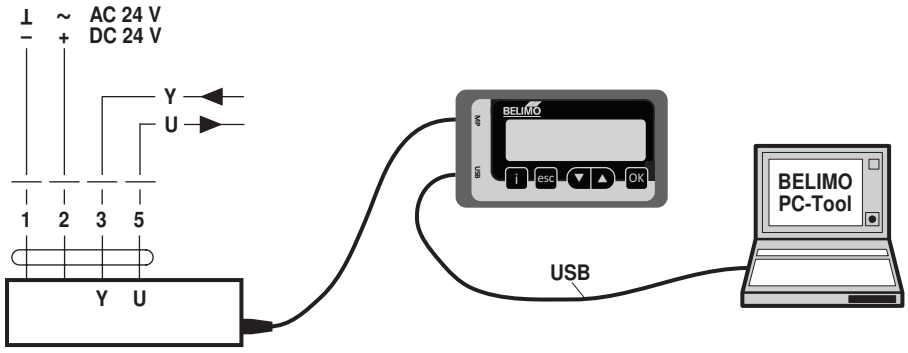
Notes

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

ZTH EU connection

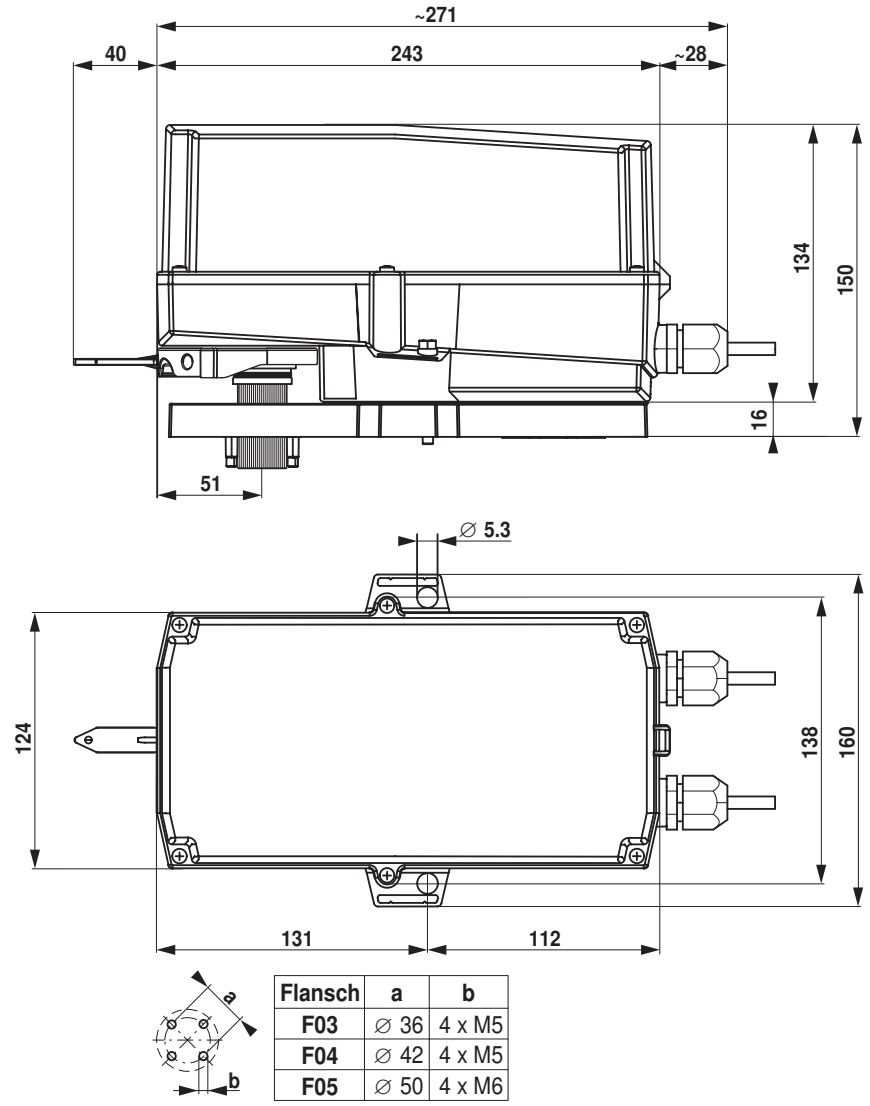


PC-Tool connection



Dimensions [mm]

Dimensional drawings



Flansch	a	b
F03	∅ 36	4 x M5
F04	∅ 42	4 x M5
F05	∅ 50	4 x M6

Further documentation

- General notes for project planning