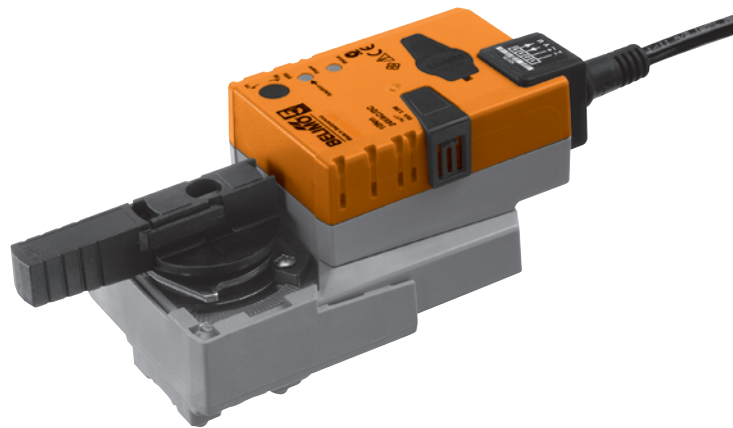**Communicative rotary actuator
for 2 and 3 way control ball valves**

- **Torque 10 Nm**
- **Nominal voltage AC/DC 24 V**
- **Control: modulating DC 0 ... 10 V
  or variable**
- **Position feedback DC 2 ... 10 V
  or variable**
- **Communication via BELIMO MP-Bus**
- **Conversion of sensor signals**

Technical data

Electrical data

Nominal voltage		AC 24 V, 50/60 Hz / DC 24 V
Nominal voltage range		AC 19.2 ... 28.8 V / DC 21.6 ... 28.8 V
Power consumption	In operation	3.5 W @ nominal torque
	At rest	1.25 W
	For wire sizing	5.5 VA
Connection		Cable 1 m, 4 x 0.75 mm²

Functional data

		Factory settings	Variable	Setting
Torque (nominal torque)		Min. 10 Nm @ nominal voltage		
Control	Control signal Y	DC 0 … 10 V, input impedance 100 kΩ	Open-close / 3-point (only AC), modulating (DC 0 ... 32 V)	....
	Operating range	DC 2 ... 10 V	Start point DC 0.5 ... 30 V End point DC 2.5 ... 32 V	....
Position feedback (measuring voltage U)		DC 2 ... 10 V, max. 0.5 mA	Start point DC 0.5 ... 8 V End point DC 2.5 ... 10 V	....
Position accuracy		±5%		
Manual override		Gearing latch disengaged with pushbutton, can be locked		
Running time		90 s / 90°∢	90 ... 346 s	....
Automatic adjustment of running time, operating range and measuring signal U to match the mechanical angle of rotation		Manual triggering of the adaption by pressing the «Adaption» button or with the PC-Tool	Automatic adaption whenever the supply voltage is switched on, or manual triggering	....
Angle of rotation limiting		MAX (maximum position) = 100% MIN (minimum position) = 0% ZS (intermediate position, only AC) = 50%	MAX = (MIN + 30°∢) ... 100% MIN = 0% ... (MAX – 30°∢) ZS = MIN ... MAX	....
Sound power level		Max. 35 dB (A) (without ball valve)	With a 90 s = 45 dB (A) running time of 346 s = 35 dB (A)	
Position indication		Mechanical, pluggable		

Safety

Protection class	**III** Safety extra-low voltage / UL Class 2 Supply
Degree of protection	IP54 in any mounting position NEMA 2, UL Enclosure Type 2
EMC	CE according to 2004/108/EC
Certification	cULus according to UL 60730-1A and UL 60730-2-14 and CAN/CSA E60730-1:02 Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
Mode of operation	Type 1
Rated impulse voltage	0.8 kV
Control pollution degree	3
Ambient temperature	0 ... +50°C
Medium temperature	+5 ... +100°C in the ball valve −10°C with stem heating on request
Non-operating temperature	−40 ... +80°C
Ambient humidity	95% r.h., non-condensating
Maintenance	Maintenance-free

Dimensions / Weight

Dimensions	See «Dimensions» on page 6
Weight	Approx. 850 g

Safety notes

⚠️
- **The actuator 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.**
- **It may only be installed by suitably trained personnel. Any legal regulations or regulations issued by authorities must be observed during assembly.**
- **The switch for changing the direction of rotation may only be operated by authorized personnel.**
  werden. Der Drehsinn ist insbesondere bei Frostschutzschaltungen kritisch.
- **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 cable must not be removed from the device.**
- **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.**

Product features

Mode of operation	*Conventional operation:* The actuator is controlled with a standard modulating signal of DC 0 ... 10 V and travels to the position defined by the control signal. Measuring voltage U serves for the electrical display of the ball 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 BELIMO Service Tool, MFT-P.
Simple direct mounting	Straightforward direct mounting on the ball valve with only one screw. The assembly tool is integrated in the plug-on position indicator. The mounting position in relation to the ball valve 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).
Adjustable angle of rotation	Adjustable angle of rotation with mechanical end stops.
High functional reliability	The actuator is overload-proof, requires no limit switches and automatically stops when the end stop is reached.
Home position	When the supply voltage is switched on for the first time, i.e. at commissioning or after pressing the "gear disengagement" switch, the actuator moves to the home position. Factory default: Y2 (counter-clockwise rotation)

Actuator	Valve
↘ Y2	A – AB = 0%
Y1 ↙	A – AB = 100%

The actuator then moves into the position defined by the control signal.

Accessories

	Description	Data sheet
Electrical accessories	Auxiliary switch S..A..	T2 - S..A..
	Feedback potentiometer P..A..	T2 - P..A..
	PC-Tool MFT-P from version 3.3	T2 - MFT-P
	Position positioner SGA24, SGE24 and SGF24 (only in conventional mode)	T2 - SG..24
	Digital position indication ZAD24 (only in conventional mode)	T2 - ZAD24

Electrical installation
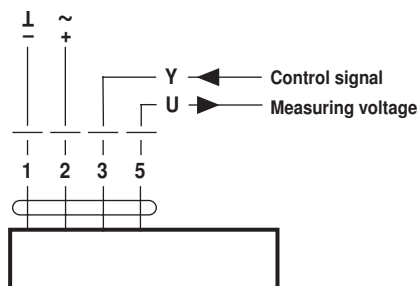
Wiring diagrams

Hinweise

- Connect via safety isolation transformer.
- Other actuators can be connected in parallel.
  Note the performance data.
- Direction of rotation switch is covered.
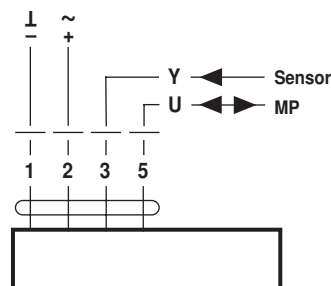 Factory default: Direction of rotation Y2

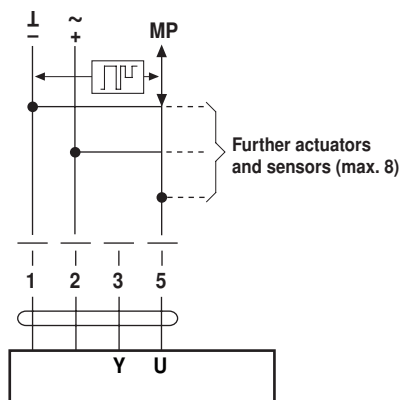**Direction of rotation**

Conventional operation:

Y ◄ Control signal
U ► Measuring voltage

Operation on the MP-Bus

Y ◄ Sensor
U ◄► MP

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

Functions when operated on MP-Bus

Connection on the MP-Bus

Further actuators
and sensors (max. 8)

Communication and supply
in the same 3-wire cable

- no shielding or twisting necessary
- no terminating resistors required

Power topology
There are no restrictions for the network topology (star, ring,
tree or hybrid forms are permitted).
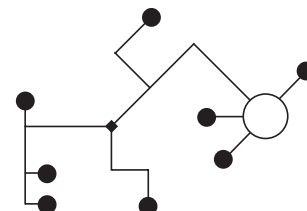
Connection of active sensors

Further actuators
and sensors (max. 8)
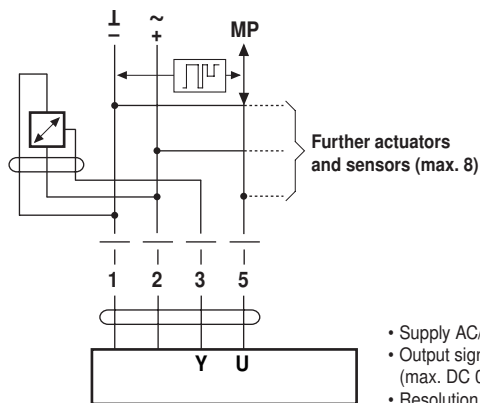
- Supply AC/DC 24 A
- Output signal DC 0 ... 10 V
  (max. DC 0 ... 32 V)
- Resolution 30 mV

Connection of external switching contact

Further actuators
and sensors (max. 8)
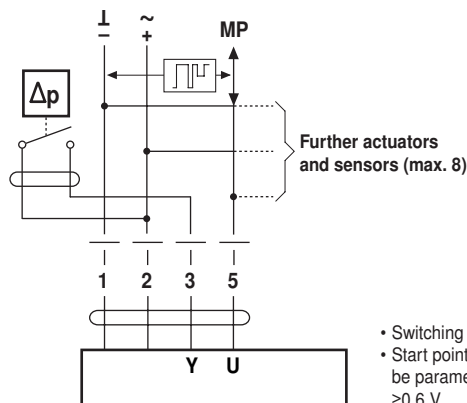
- Switching current 16 mA @ 24 V
- Start point of the operating range must
  be parameterised on the MP actuator as
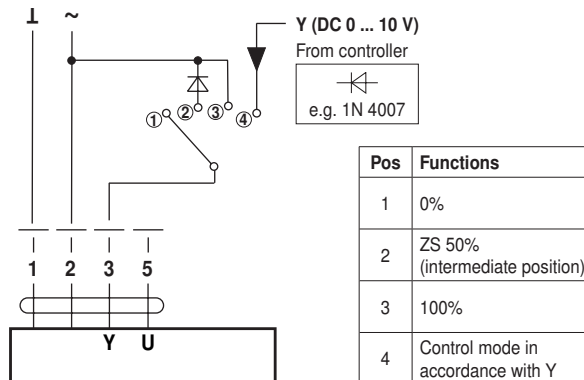 ≥0.6 V

Connection of passive sensors

Further actuators
and sensors (max. 8)
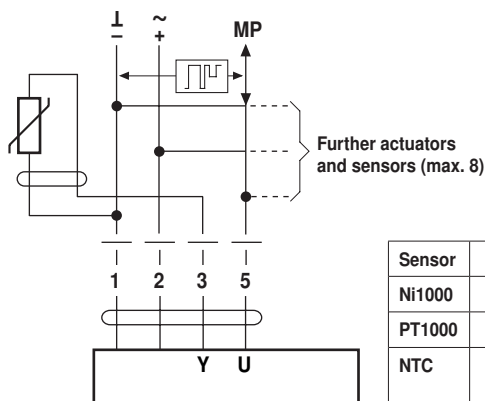
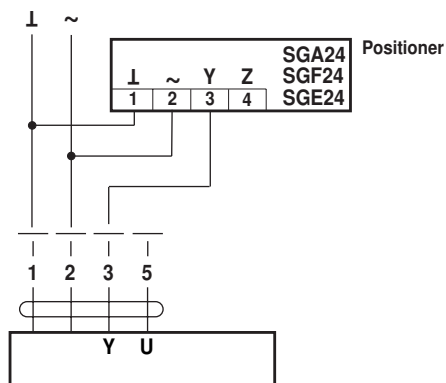| Sensor	Temperature range	Resistance range	Resolution
Ni1000	–28 ... +98 °C	850 ... 1600 Ω	1 Ω
PT1000	–35 ... +155 °C	850 ... 1600 Ω	1 Ω
NTC	–10 ... +160 °C (depending on Type)	200 Ω ... 60 kΩ	1 Ω

Functions with basic values (only in conventional mode)
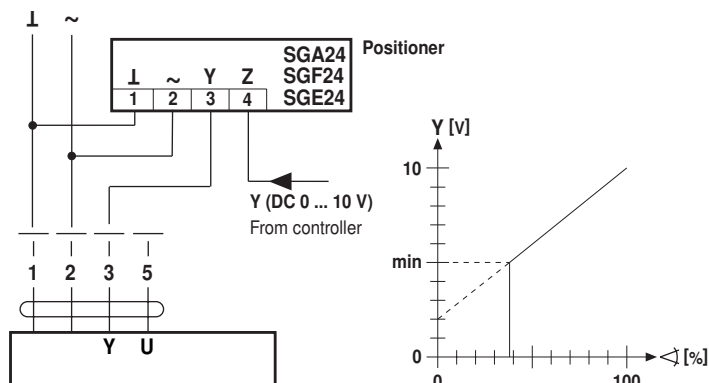
Override control with AC 24 V with relay contacts

Y (DC 0 ... 10 V) From controller

e.g. 1N 4007

Functions	a	b	c
0%			
ZS 50% (intermediate position)			
100%			
Control mode in accordance with Y			
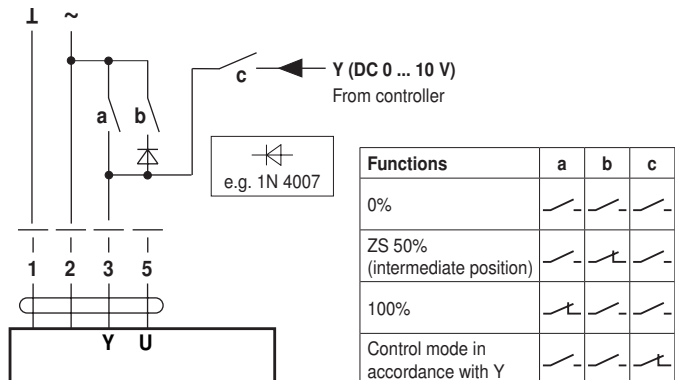
Override control with AC 24 V with rotary control switch

Y (DC 0 ... 10 V) From controller

e.g. 1N 4007

Pos	Functions
1	0%
2	ZS 50% (intermediate position)
3	100%
4	Control mode in accordance with Y

Remote control 0 ... 100 %

SGA24
SGF24
SGE24

Positioner

⊥ ~ Y Z
1 2 3 4

Minimum limit

SGA24
SGF24
SGE24

Positioner

⊥ ~ Y Z
1 2 3 4

Y (DC 0 ... 10 V) From controller

Y [V]

10

min

0

0   100   ◁ [%]

Master/Slave control (position-dependent)

U DC 2...10 V

U DC 2...10 V
To the following actuator

Master actuator

Slave actuator
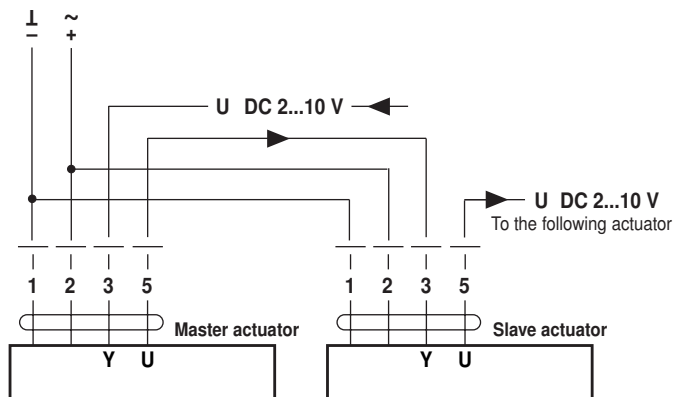
Control with 4 ... 20 mA via external resistance

500 Ω

(−)
(+) } 4 ... 20 mA
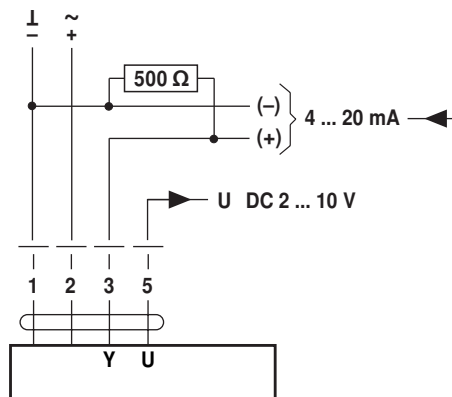
U DC 2 ... 10 V

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

Position indication

ZAD24 **Adapting the direction of rotation**

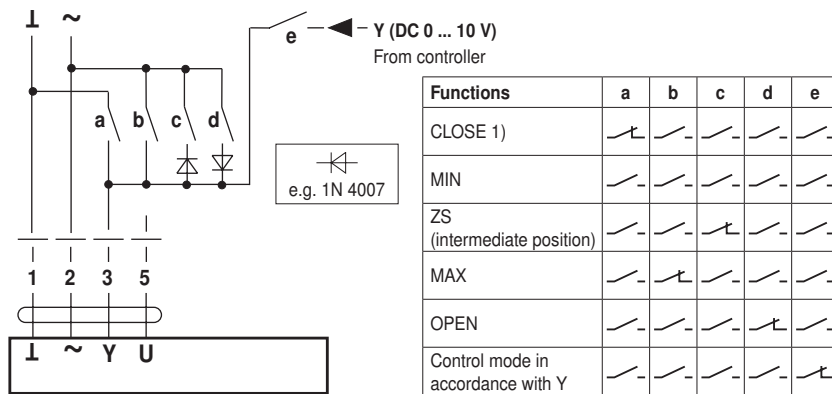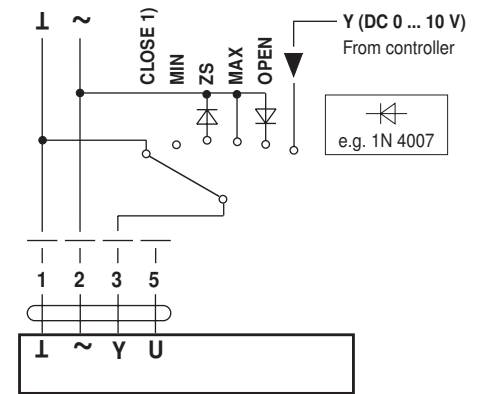− +
1 2 3 4
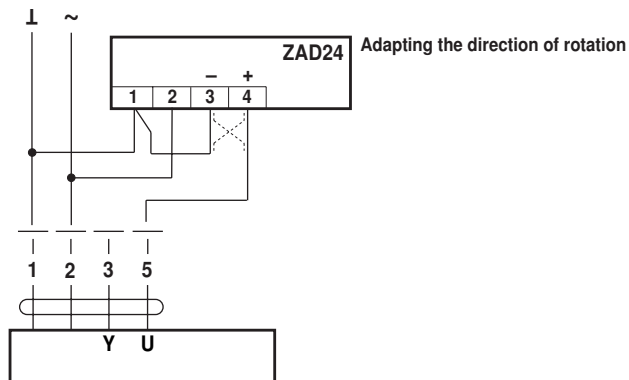
Functional check
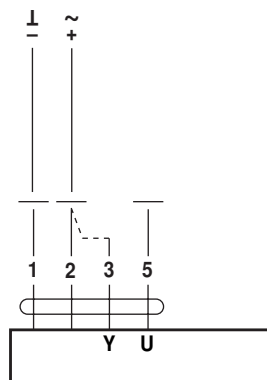
Procedure
- Apply 24 V to connection 1 and 2
- Disconnect connection 3:
  – For direction of rotation 0: Actuator turns in the direction of ↶
  – For direction of rotation 1: Actuator turns in the direction of ↘
- Short circuit connections 2 and 3:
  – Actuator runs in the opposite direction

Functions for actuators with specific parameters

**Override control and limiting
with AC 24 Vwith relay contacts**

e — ◄ — Y (DC 0 ... 10 V)
From controller

e.g. 1N 4007

⊥ ~ Y U

1 2 3 5

Functions	a	b	c	d	e
CLOSE 1)					
MIN					
ZS (intermediate position)					
MAX					
OPEN					
Control mode in accordance with Y					

**Override control and limiting with AC 24 V
with rotary switch**

CLOSE 1) · MIN · ZS · MAX · OPEN

Y (DC 0 ... 10 V)
From controller

e.g. 1N 4007

⊥ ~ Y U

1 2 3 5

1) **Caution!** This function is only guaranteed if the start point of the operating range is defined as min. 0.6 V.

3-point control

e.g. 1N 4007

U ►

⊥ ~ Y U

1 2 3 5

**Direction of
rotation switch**

0 / 1

a	b	1	0
		↶	↷
		Stop	Stop
		↷	↶
		↶	↷
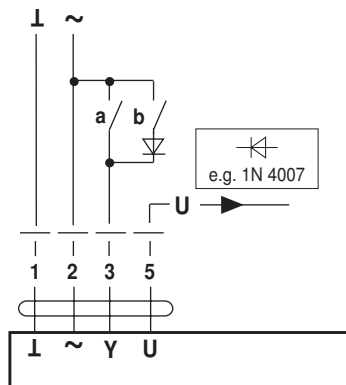
Open-close control

⊥ ~
− +

U ►

⊥ ~ Y U
− +

1 2 3 5
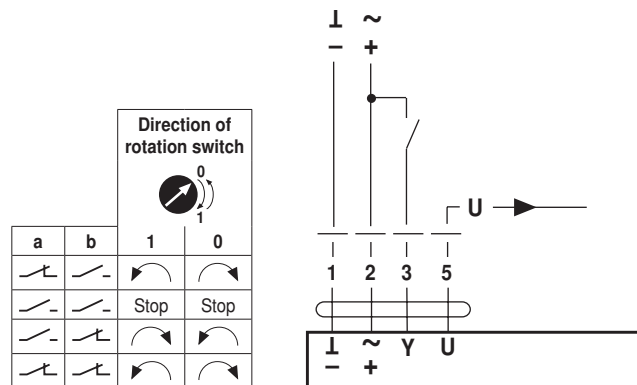
Operating controls and indicators
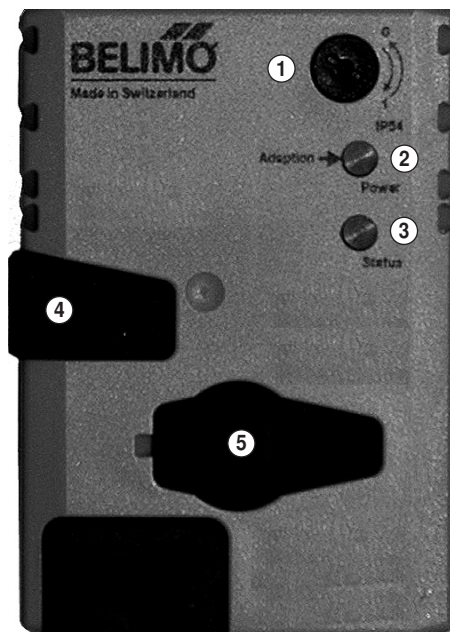
① **Direction of rotation switch**
Switching over: Direction of rotation changes

② **Push-button and green LED display**
Off: No voltage supply or fault
On: In operation
Press button: Switches on angle of rotation adaptation followed by standard operation

③ **Push-button and yellow LED display**
Off: Normalbetrieb ohne MP-Bus
Flickering: MP communication active
On: Adaptation or synchronising process active
Blinking: Addressing request sent to MP master
Press button: Bestätigen der Adressierung

④ **Gear disengagement switch**
Press button: Gear disengaged, motor stops, manual override possible
Release button: Gear engaged, synchronisation starts, followed by standard operation

⑤ **Service plug**
For connecting parameterising and service tools

Check voltage supply connection

a) ② Off and ③ On
b) ② Blinking and ③ Blinking } Check the power supply connections. ⊥ and ~ could be reverse.
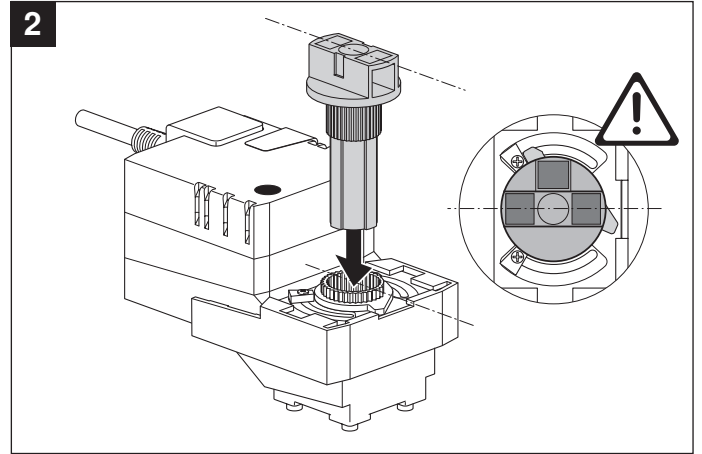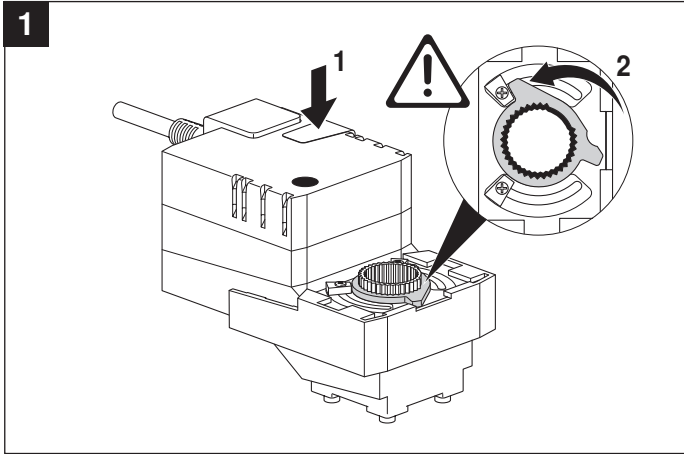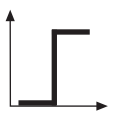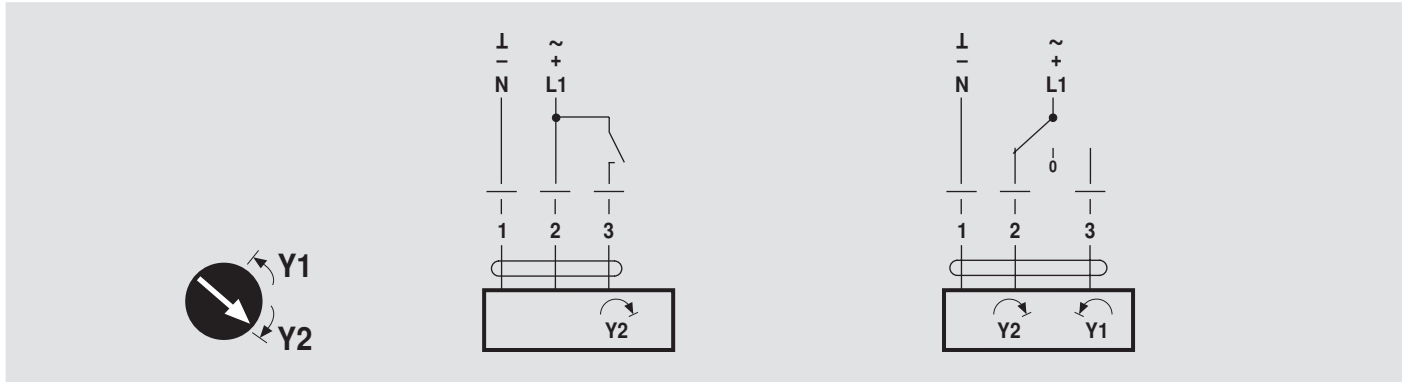
Dimensions [mm]
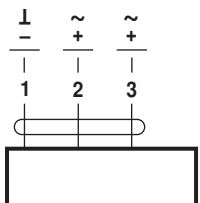
Dimensional drawings
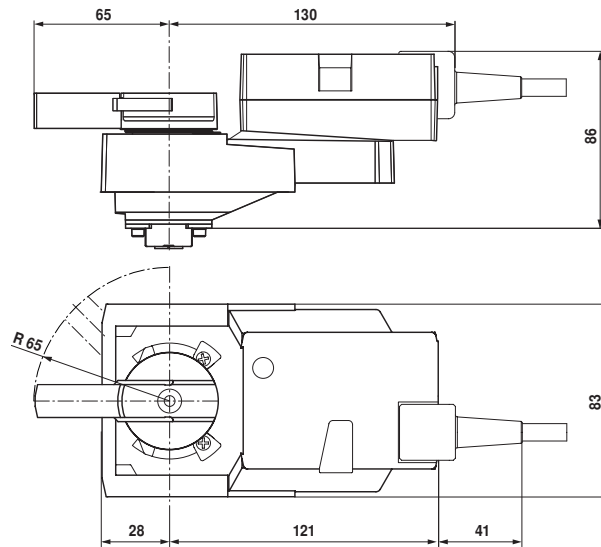
Further documentations
- Complete overview «The complete product range of water solutions»
- Datasheets control ball valves
- Mounting instructions for actuators or control ball valves, respectively
- Notes for project planning (hydraulic characteristic curves and circuits, installation regulations, commissioning, maintenance, etc.)
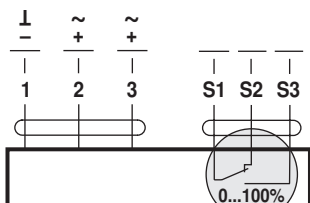
70741-00001.D

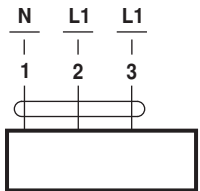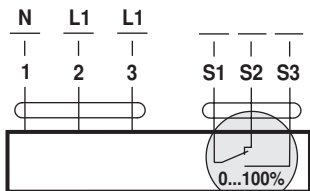**1**

2

3

M5 ⚠ ►► Z

M4

A – AB = 100%
B – AB = 0%

A – AB = 100%

4

5

A – AB = 100%

1

2

Y1
Y2

⊥ ~ ~
– + +
N L1 L1
1 2 3
Y2

⊥ ~ ~
– + +
N L1 L1
1 2 3
Y2 Y1

AC 24 V / DC 24 V

⊥ ~ ~
– + +
1 2 3

LR24A NR24A
SR24A

⊥ ~ ~
– + +
1 2 3   S1 S2 S3

0...100%
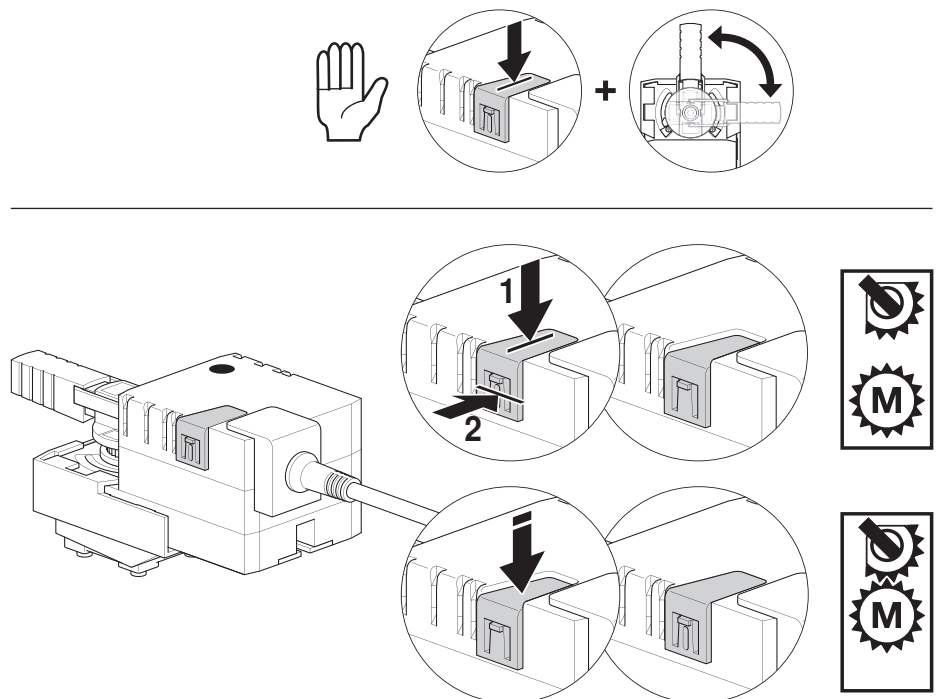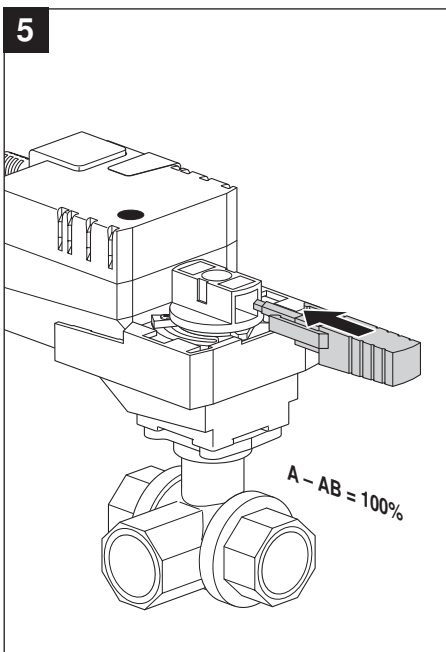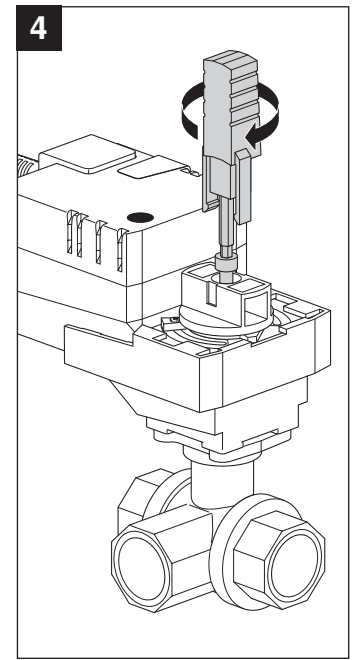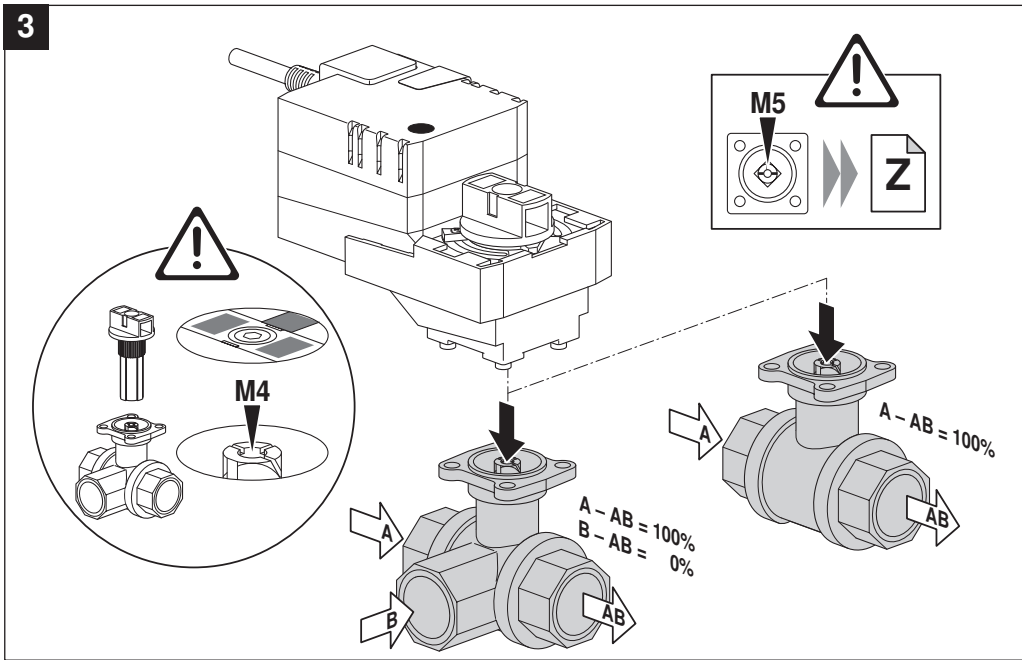
LR24A-S NR24A-S
SR24A-S

AC 100 ... 240 V ⚠

N L1 L1
1 2 3

LR230A NR230A
SR230A

N L1 L1
1 2 3   S1 S2 S3

0...100%

LR230A-S NR230A-S
SR230A-S

S1 S2 S3

S1 S2 S3

AC 24 V / DC 24 V

⊥ ~
– +   Y ◄ DC (0) 2 ... 10 V
       U ► DC 2 ... 10 V
1 2 3 5
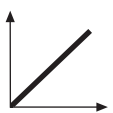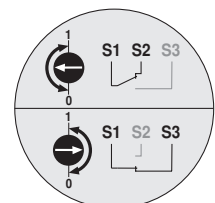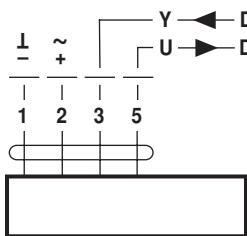
TRC24A-SR LR24A-MF
LR(C)24A-SR NR24A-MF
NR(C)24A-SR SR24A-MF
SR24A-SR

⊥ ~
– +   Y ◄ DC (0) 2 ... 10 V
       U ◄► MP
1 2 3 5
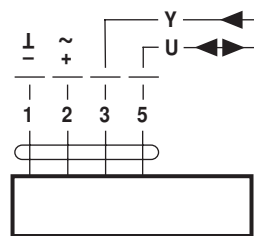
LR24A-MP NR24A-MP
SR24A-MP

LONWORKS® **AC 24 V / DC 24 V**

⊥ ~
V
1 2 3 5 6 7
MFT LON LON

⊥ ~
– +
1 2 3 5 6 7
MFT LON LON

⊥ ~
Δp
1 2 3 5 6 7
MFT LON LON

⊥ ~
– +
1 2 3 5 6 7
MFT LON LON

BELIMO®

71364-00001.A