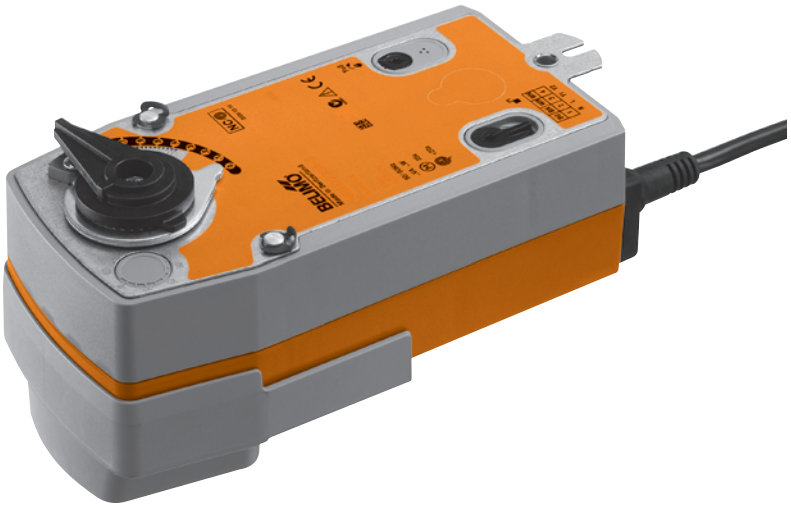
Comunicative rotary actuator with emergency function for 2- and 3-way control ball valves

- **Torque 10 Nm**
- **Nominal voltage AC/DC 24 V**
- **Control: modulating DC 0 ... 10 V or variable**
- **Position feedback DC 0 ... 10 V or variable**
- **Communication via BELIMO MP-Bus**
- **Conversion of sensor signals**
- **NRF24A-MP: Deenergised NC**
  NRF24A-MP-O: Deenergised NO



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	7 W @ nominal torque
At rest	3.5 W
For wire sizing	9.5 VA
Connection	Cable 1 m, 4 x 0.75 mm²

Functional data	Factory settings	Variable	Setting
Torque (nominal torque) Motor	Min. 10 Nm @ nominal voltage		
Spring return	Min. 10 Nm		
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 0.5 ... 10 V	Start point DC 0.5 ... 30 V End point DC 2.5 ... 32 V	.....
Position feedback (measuring voltage U)	DC 0.5 ... 10 V, max. 0.5 mA	Start point DC 0.5 ... 8 V End point DC 2.5 ... 10 V	.....
Position accuracy	±5%		
Direction of rotation Motor	Reversible with switch ↷ / ↶		
Spring return – NRF24A-MP – NRF24A-MP-O	 Deenergised NC, ball valve closed (A – AB = 0%) Deenergised NO, ball valve open (A – AB = 100%)		
Direction of rotation Y = 0 V	At switch position 1 ↷ resp. 0 ↶	Electronically reversible	.....
Manual override	With hand crank and interlocking switch		
Angle of rotation	Max. 90°∢		
Running time Motor	≤90 s / 90°∢	40 ... 220 s	.....
Spring return	≤20 s @ –20 ... 50°C / max. 60 s @ –30°C		
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		
Override control	MAX (maximum position) = 100% MIN (minimum position) = 0% ZS (intermediate position, only AC) = 50%	MAX = (MIN + 32%) ...100% MIN = 0% ... (MAX – 32%) ZS = MIN ... MAX	.....
Sound power level Motor	≤45 dB (A) @ 90 s running time		
Spring return	≤62 dB (A)		
Service life	Min. 60,000 emergency positions		
Position indication	Mechanical		

Safety

Protection class	**III** Extra low voltage
Degree of protection	IP54
EMC	CE according to 2004/108/EC
Certification	Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
Mode of operation	Type 1.AA
Rated impulse voltage	0.8 kV
Control pollution degree	3

Technical data *(continued)*

Safety	
Ambient temperature	–30 ... +50°C
Media temperature	+5 ... +120°C (in ball valve) –10°C with stem heating upon 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. 2 kg (without ball valve)

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.**
  All applicable legal or institutional installation regulations must be complied with.
- **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 signal of DC 0 ... 10 V and moves the ball valve to the operating position at the same time as tensioning the return spring. The ball valve is turned back to the emergency position by spring force if the supply voltage is interrupted.
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. The ball valve is turned back to the emergency position by spring force if the supply voltage is interrupted.

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 or the adjustment and diagnostic tool ZTH-GEN

Simple direct mounting
Straightforward direct mounting on the ball valve with only one screw. The mounting position in relation to the ball valve can be selected in 90°◁ steps.

High operational 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, the actuator automatically detects its emergency position (zero initialisation). This process, which takes place with the actuator stationary, lasts <15 s.

Combination valve actuators
Refer to the valve documentation for suitable valves, their permitted media temperatures and closing pressures.

Accessories

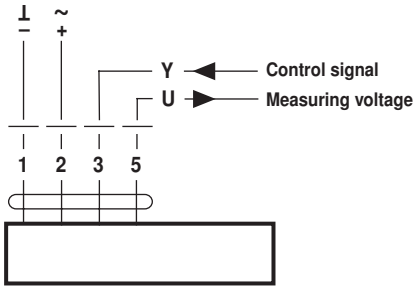
	Description
Electrical accessories	BELIMO Service tool MFT-P
	Adjustment and diagnostic tool ZTH-GEN

Electrical installation

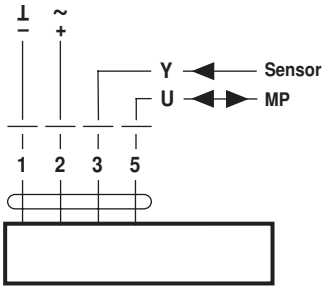
Wiring diagrams

Notes
- Connection via safety isolating transformer!
- Other actuators can be connected in parallel. Please note the performance data!

Conventional operation



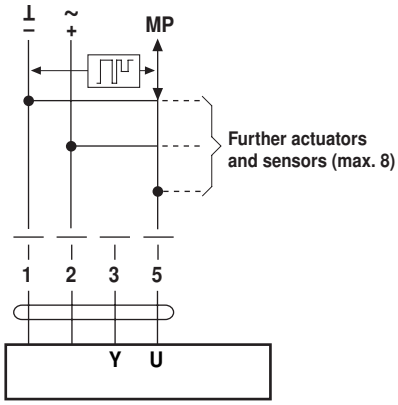
Operation on the MP-Bus



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

Functions when operated on MP-Bus

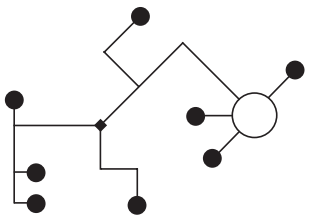
Connection on the MP-Bus



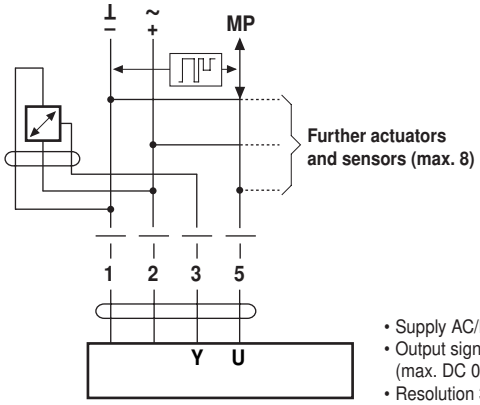
Supply and communication
in one and the same 3-wire cable
- no shielding or twisting necessary
- no terminating resistors required

Power topology

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

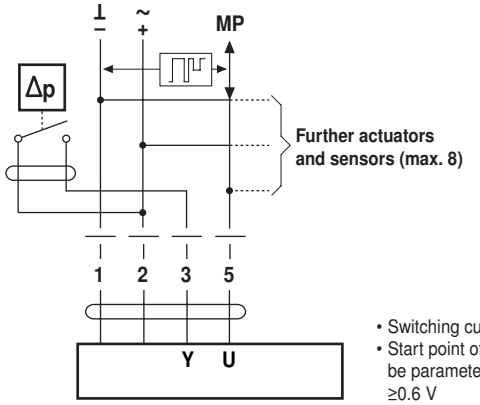


Connection of active sensors



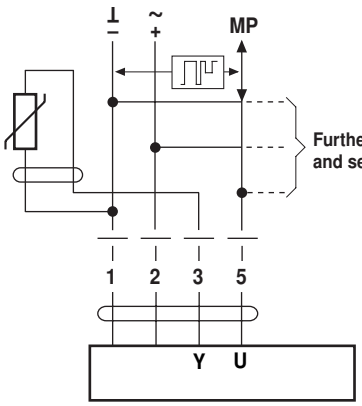
- Supply AC/DC 24 A
- Output signal DC 0 ... 10 V (max. DC 0 ... 32 V)
- Resolution 30 mV

Connection of external switching contact



- Switching current 16 mA @ 24 V
- Start point of the operating range must be parameterised on the MP actuator as ≥0.6 V

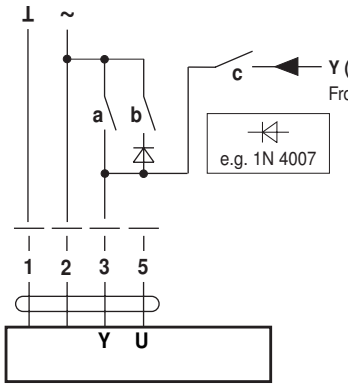
Connection of passive sensors



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

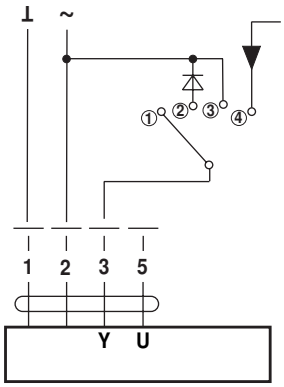
Functions with basic values (only in conventional mode)

Override control with AC 24 V with relay contacts



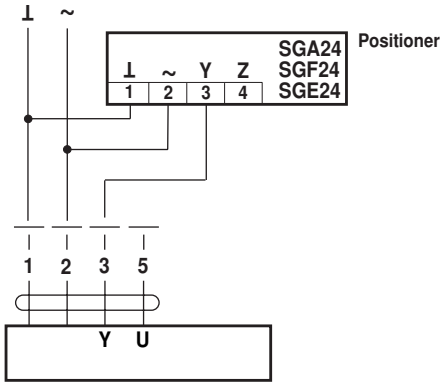
Functions	a	b	c
0%	⟋	⟋	⟋
ZS 50% (intermediate position)	⟋	⌐	⟋
100%	⌐	⟋	⟋
Control mode in accordance with Y	⟋	⟋	⌐

Override control with AC 24 V with rotary control switch

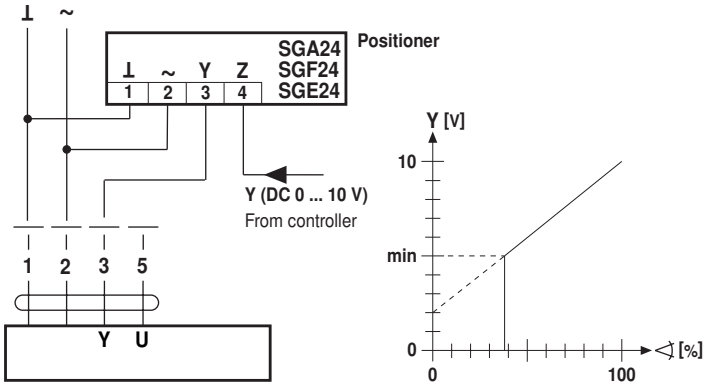


Pos	Functions
1	0%
2	ZS 50% (intermediate position)
3	100%
4	Control mode in accordance with Y

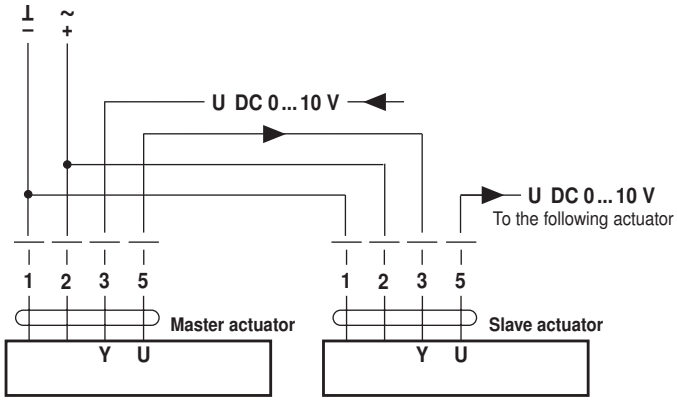
Remote control 0 ... 100 %



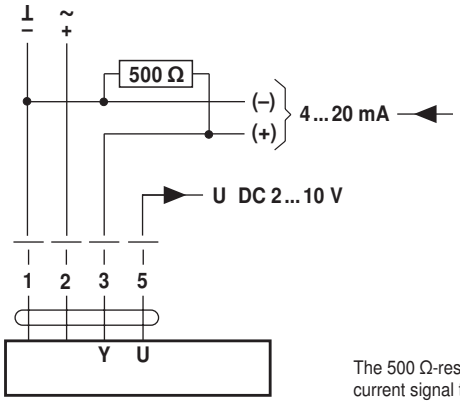
Minimum limit



Master/Slave control (position-dependent)

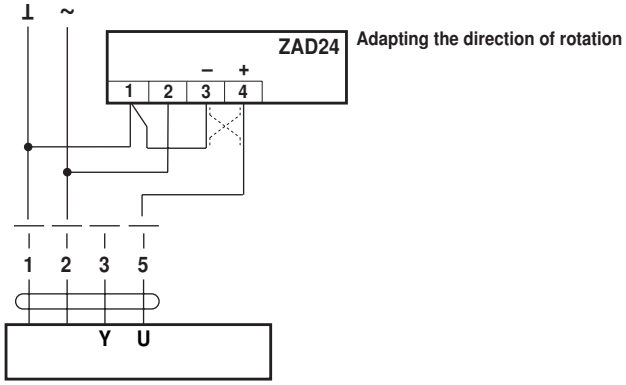


Control with 4 ... 20 mA via external resistance

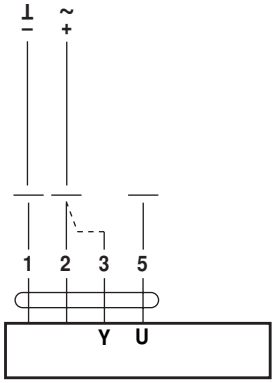


The 500 Ω-resistor converts the 4 ... 20 mA current signal to a voltage signal DC 2 ... 10 V.

Position indication



Functional check

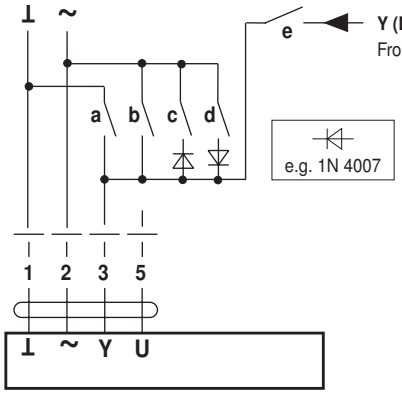


Procedure

- 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

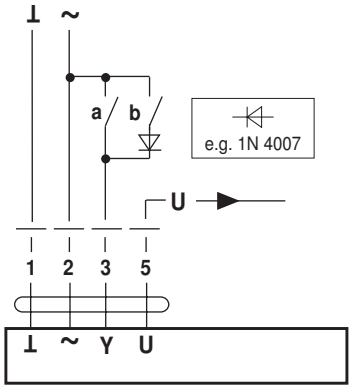
Override control and limiting with AC 24 V with relay contacts

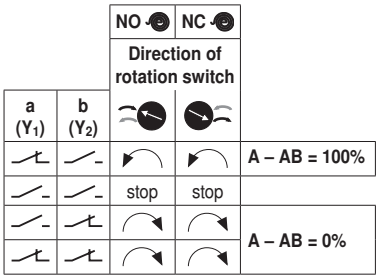


Functions	a	b	c	d	e
CLOSE [1]					
MIN					
ZS (intermediate position)					
MAX					
OPEN					
Control mode in accordance with Y					

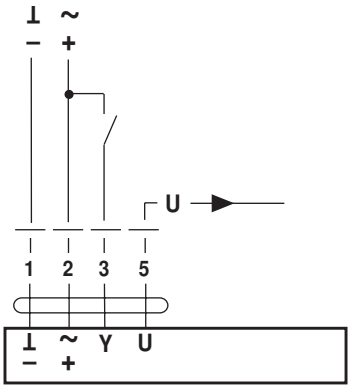
[1] **Caution !** This function is only guaranteed if the start point of the operating range is defined as min. 0.6 V.

3-point control

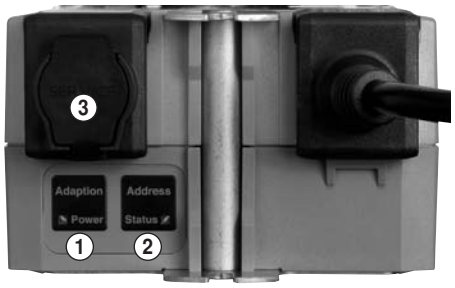




Open-close control



Operating controls and indicators



① **Membrane key and green LED display**

Off:	No voltage supply or malfunction
On:	Operation
Press button:	Switches on angle of rotation adaption followed by standard operation

② **Membrane key and yellow LED display**

Off:	Standard operation without MP bus
On:	Adaption or synchronising process active
Blinking:	Addressing request sent to MP master
Press button:	Acknowledgment of addressing
Flickering:	MP communication active

③ **Service plug**

For connecting parameterising and service tools

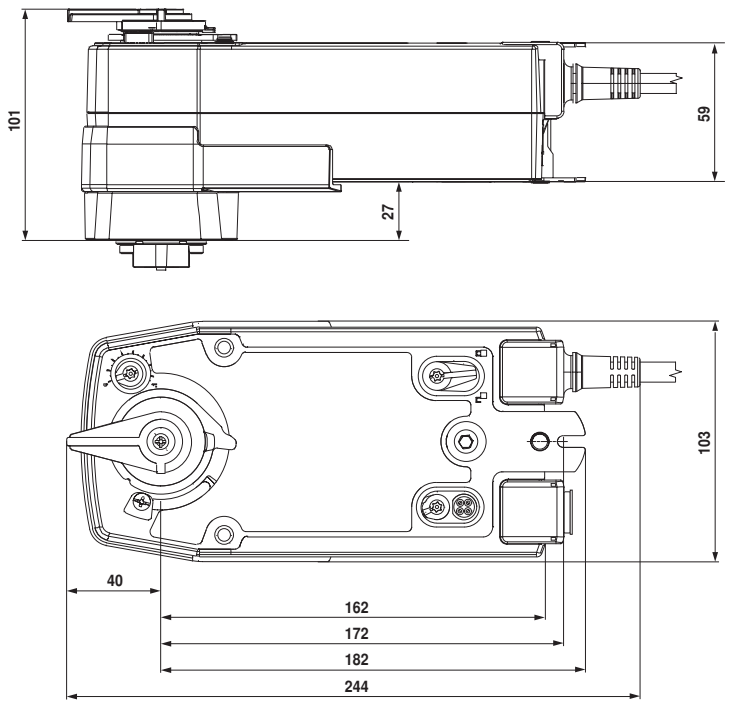
Check voltage supply connection

a)	① Off and ② On	Check the supply connections. Possibly ⊥ and ~ are swapped over.
b)	① Blinking and ② Blinking	

Operating controls The hand crank, interlocking switch and direction of rotation switch are provided on both sides.

Dimensions [mm]

Dimensional drawings



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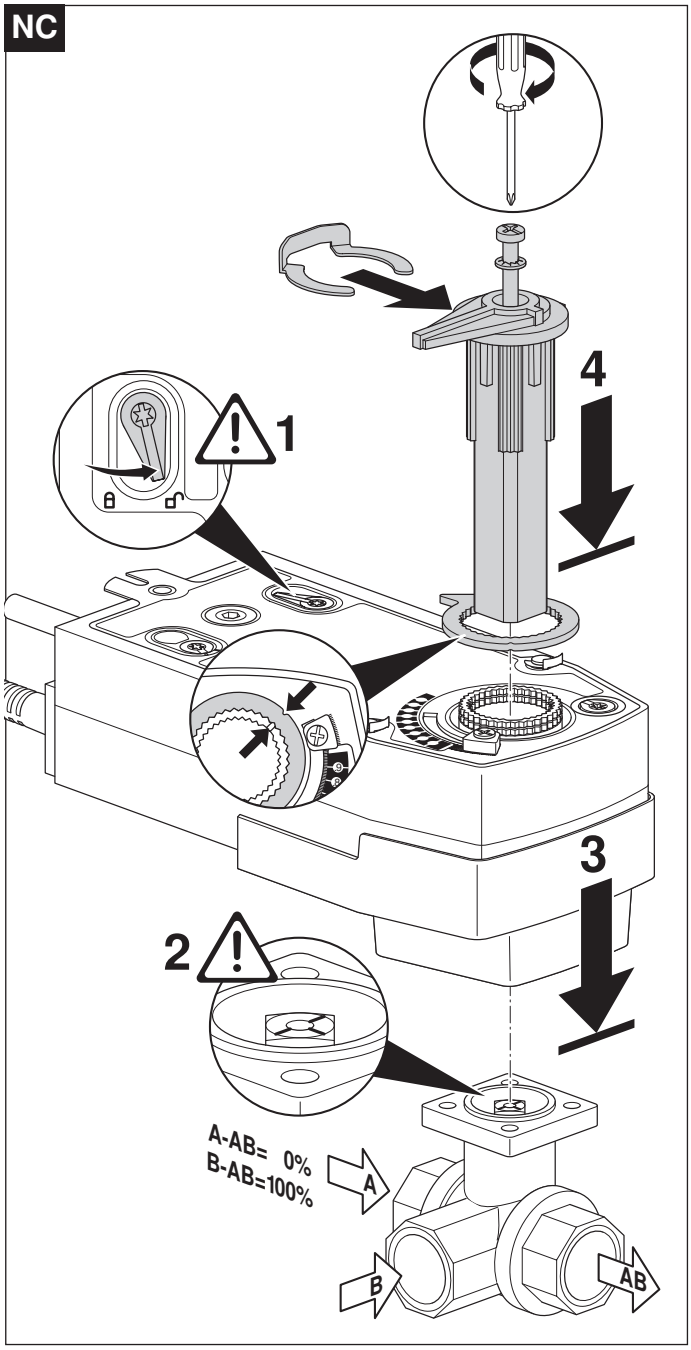
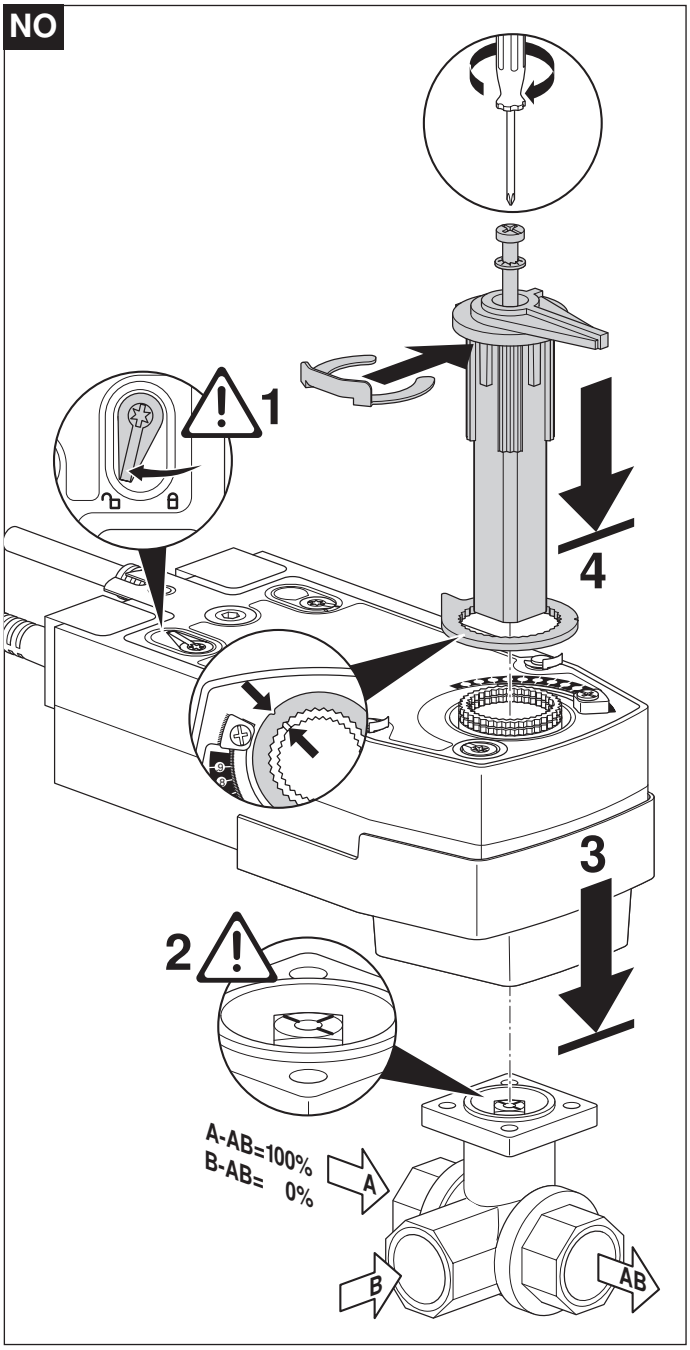
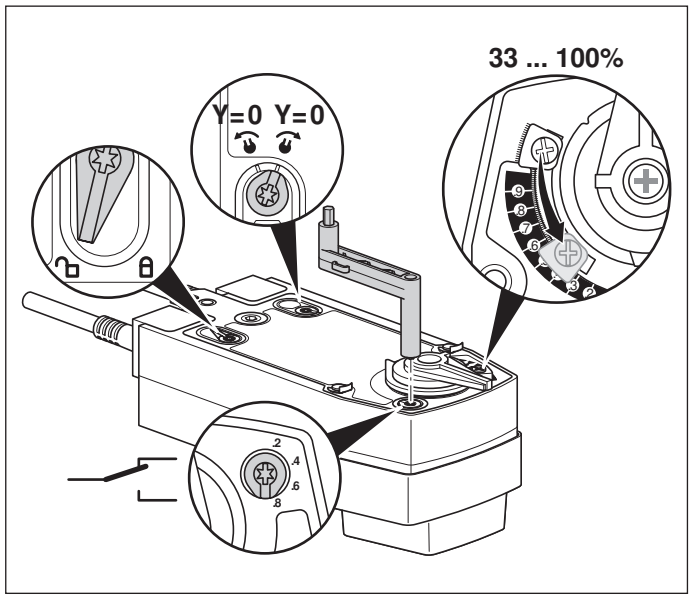
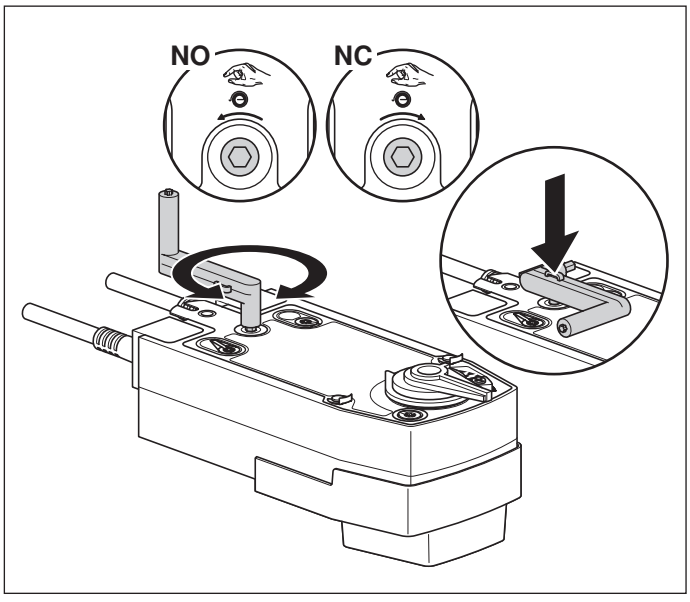
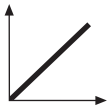


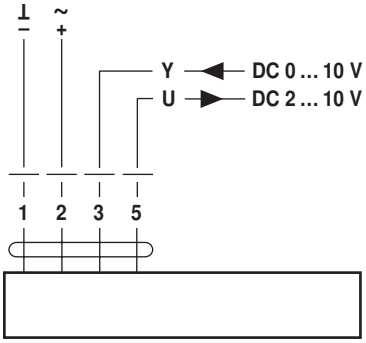




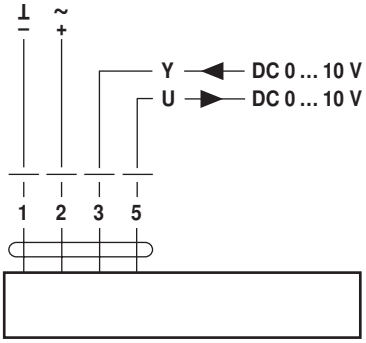


AC 24 V / DC 24 V

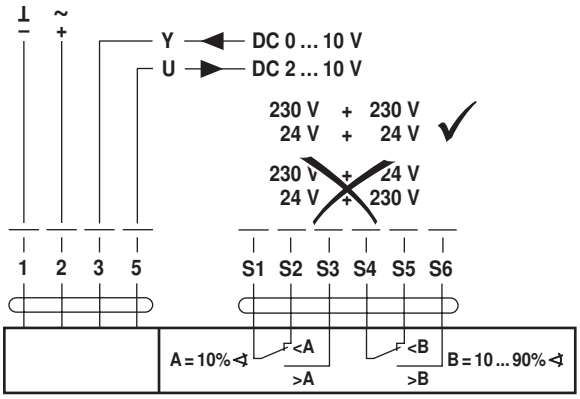




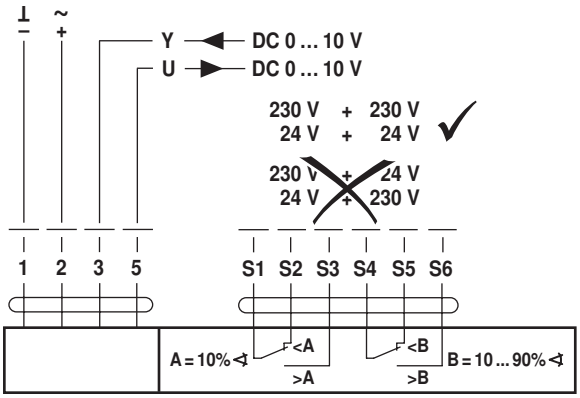
NRF24A-SR(-O)
SRF24A-SR(-O)



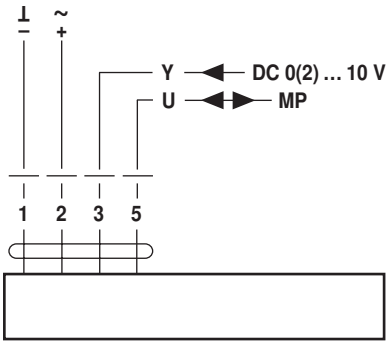
NRF24A-SZ(-O)
SRF24A-SZ(-O)



NRF24A-SR-S2(-O)
SRF24A-SR-S2(-O)



NRF24A-SZ-S2(-O)
SRF24A-SZ-S2(-O)



NRF24A-MP(-O)
SRF24A-MP(-O)