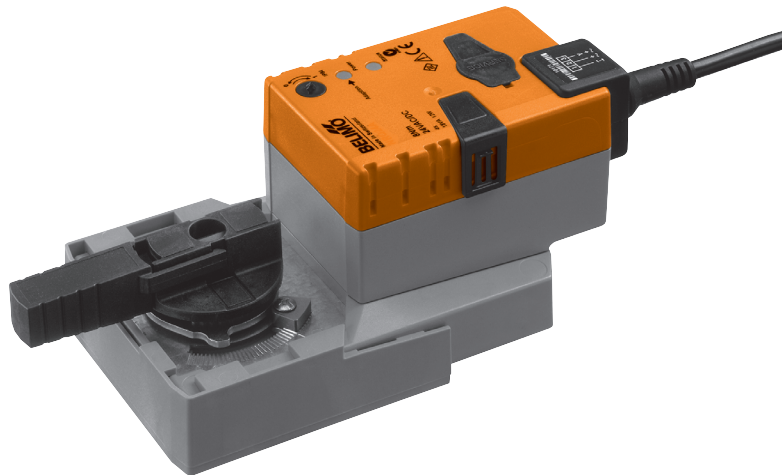


**Modulating rotary actuator  
for 2- and 3-way control ball valves**

- Torque 8 Nm
- Nominal voltage AC/DC 24 V
- Control: modulating DC 0 ... 10 V  
(Operating range DC 0.5 ... 10 V)
- Position feedback DC 0.5 ... 10 V
- Running time 9 s


**Technical data**

<b>Electrical data</b>	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	12 W @ nominal torque
		At rest	1.5 W
		For wire sizing	18 VA (I max. 20 A @ 5 ms)
Connection	Cable 1 m, 4 x 0.75 mm <sup>2</sup>		
Parallel operation	Possible, note the performance data		
<b>Functional data</b>	Torque (nominal torque)	Min. 8 Nm @ nominal voltage	
	Control	Control signal Y	DC 0 ... 10 V, typical input impedance 100 kΩ
		Operating range	DC 0.5 ... 10 V
	Position feedback (measuring voltage U)	DC 0.5 ... 10 V, max. 0.5 mA	
	Position accuracy	±5%	
	Manual override	Gearing latch disengaged with pushbutton, can be locked	
	Running time	9 s / 90°↔	
	Automatic adjustment of 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%	
Sound power level	52 dB (A)		
Position indication	Mechanical, pluggable		
<b>Safety</b>	Protection class	III Safety extra-low vtag	
	Degree of protection	IP54 in any mounting position, UL/NEMA 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	-30 ... +40 °C (no restrictions)	
⚠ +40 ... +50 °C (Caution: can only be used with restrictions. Please contact your Belimo representative.)			
Non-operating temperature	-40 ... +80 °C		
Ambient humidity	95% r.h., non-condensating		
Maintenance	Maintenance-free		
<b>Dimensions / Weight</b>	Dimensions	See «Dimensions» on page 3	
	Weight	Approx. 1.8 kg	



## 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 switch for changing the direction of rotation may only be operated by authorised personnel. The direction of rotation must not be reversed in a frost protection circuit.
- 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.
- Self adaptation is necessary when the system is commissioned and after each adjustment of the angle (press the adaptation push-button).
- 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

<b>Mode of operation</b>	The actuator is controlled by means of a standard control signal DC 0 ... 10 V. It opens to the position dictated by this signal. The measuring voltage U allows the ball position (0 ... 100%) to be electrically indicated and serves as a follow-up control signal for other actuators.
<b>Simple direct mounting</b>	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.
<b>Manual override</b>	Manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked).
<b>Adjustable angle of rotation</b>	Adjustable angle of rotation with mechanical end stops.
<b>High functional reliability</b>	The actuator is overload-proof, requires no limit switches and automatically stops when the end stop is reached.
<b>Position feedback U5</b>	Operation of the ball valve is optimised by a limiting ring. This ring reduces the angle of rotation from 95° to 90°, i.e. U5 will deviate from Y by approximately 0.3 V when the valve is closed.
<b>Home position</b>	When the supply voltage is switched on for the first time, i.e. at commissioning or after pressing the «gear disengagement» switch, the actuator travels to the home position. Factory default: Y2 (counter-clockwise rotation)

Actuator	Valve
	A - AB = 0%
	A - AB = 100%

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

## Accessories

	Description	Data sheet
<b>Electrical accessories</b>	Auxiliary switch S..A..	T2 - S..A..
	Feedback potentiometer P..A..	T2 - P..A..

Electrical installation

Wiring diagram

Notes

- Connect via safety isolation transformer.
- Parallel connection of other actuators possible. Note performance data.
- Direction of rotation switch is covered. Factory setting: Direction of rotation Y2.

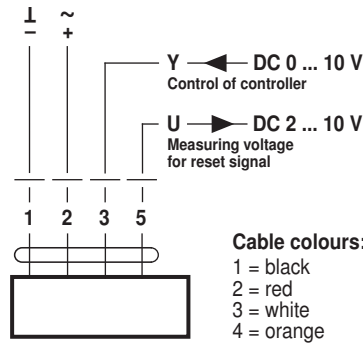


Direction of rotation

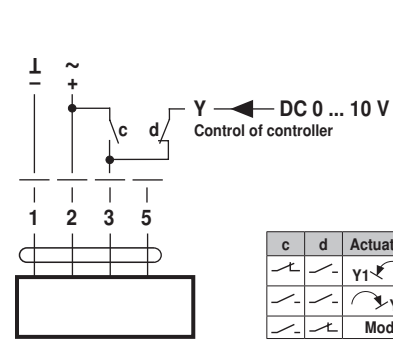


Cable lengths

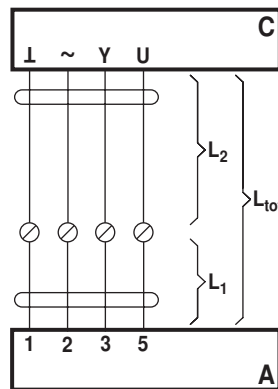
Standard connection



Override control (frost protection circuit)



c	d	Actuator	Rotary valve
↖	↗	Y1	A - AB = 100%
↖	↖	Y2	A - AB = 0%
↖	↖	Modulating operation	



- A = Actuator
- C = Control unit
- L<sub>1</sub> = Belimo connecting cable, 1 m (4 x 0.75 mm<sup>2</sup>)
- L<sub>2</sub> = Customer cable
- L<sub>tot</sub> = Maximum cable length

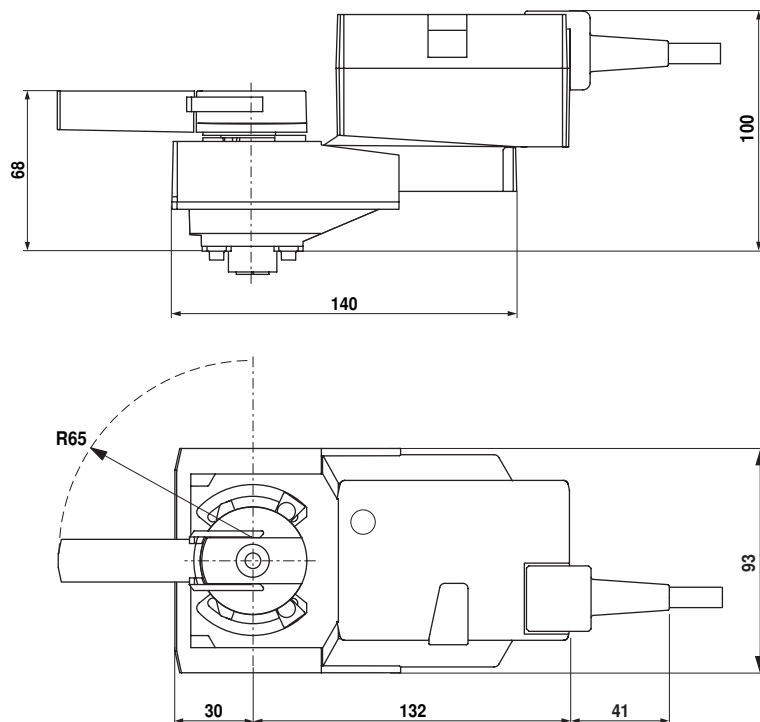
Cross section L <sub>2</sub> ↓ / ~	Max. cable length L <sub>tot</sub> = L <sub>1</sub> + L <sub>2</sub>		Example for DC
	AC	DC	
0.75 mm <sup>2</sup>	≤30 m	≤5 m	1 m (L <sub>1</sub> ) + 4 m (L <sub>2</sub> )
1.00 mm <sup>2</sup>	≤40 m	≤8 m	1 m (L <sub>1</sub> ) + 7 m (L <sub>2</sub> )
1.50 mm <sup>2</sup>	≤70 m	≤12 m	1 m (L <sub>1</sub> ) + 11 m (L <sub>2</sub> )
2.50 mm <sup>2</sup>	≤100 m	≤20 m	1 m (L <sub>1</sub> ) + 19 m (L <sub>2</sub> )

Note

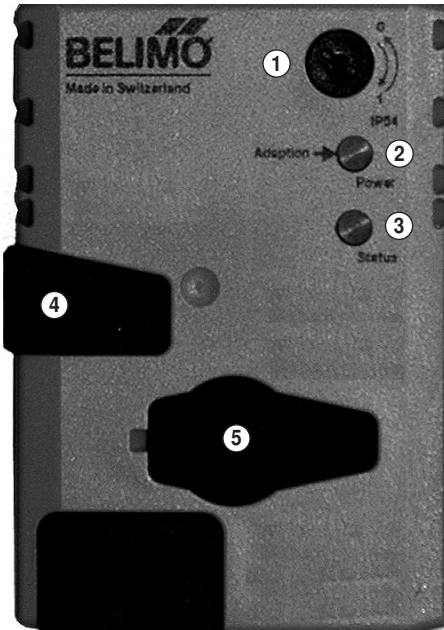
When several actuators are connected in parallel, the maximum cable length must be divided by the number of actuators.

Dimensions [mm]

Dimensional drawings



## 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: Standard operation  
On: Adaptation or synchronising process active  
Press button: No function
- 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

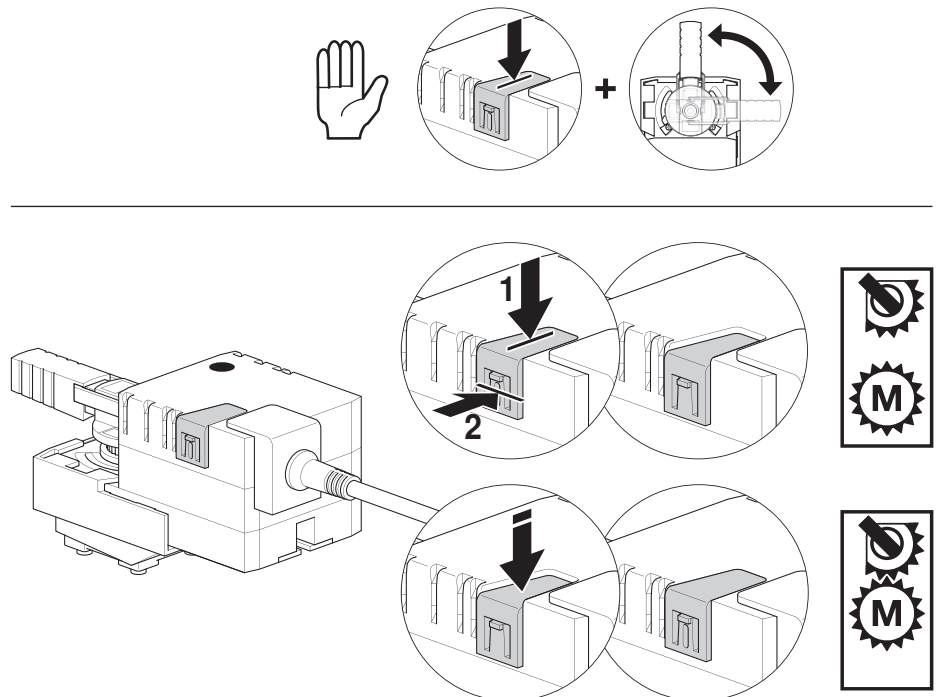
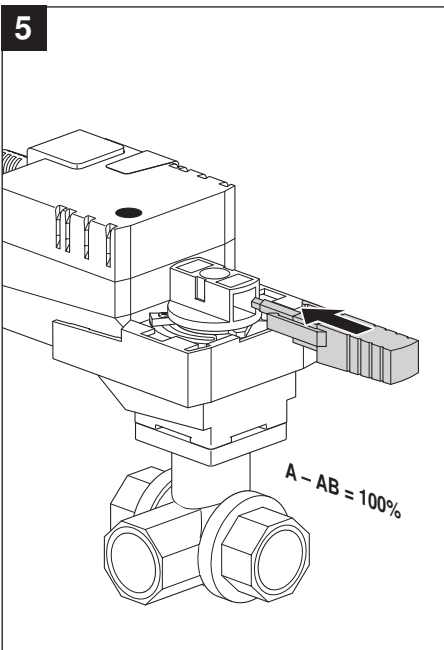
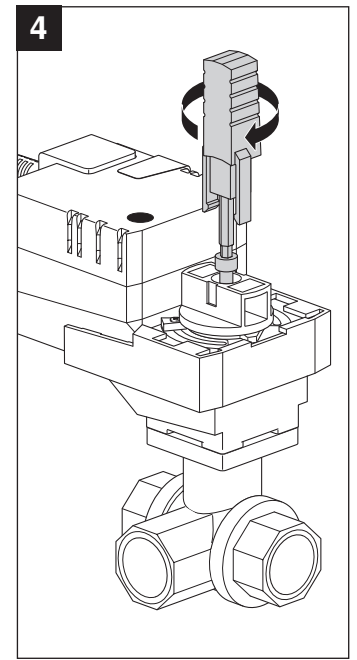
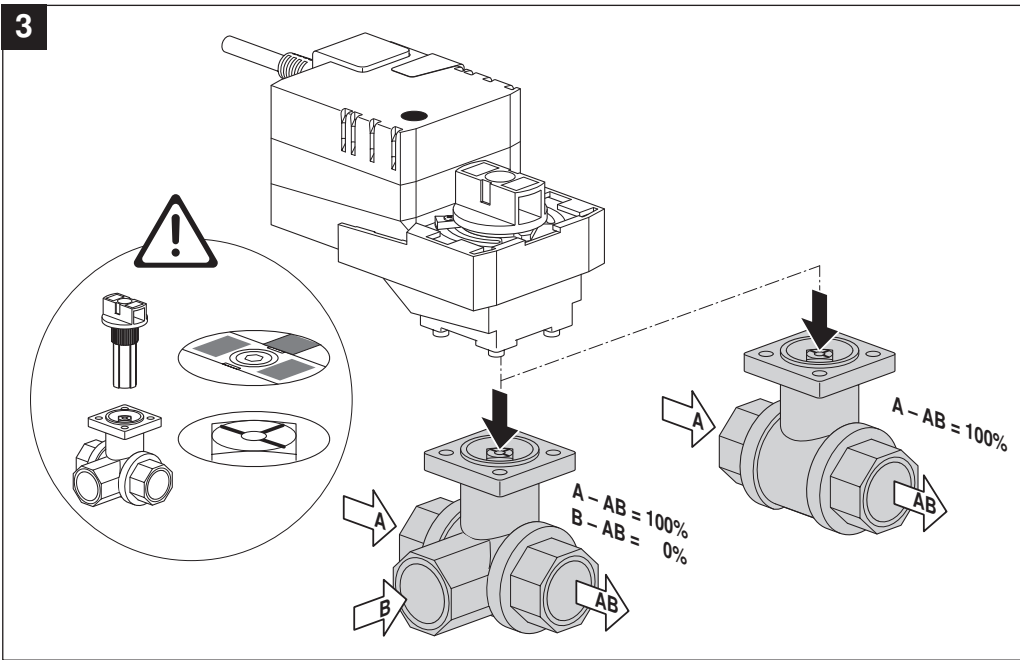
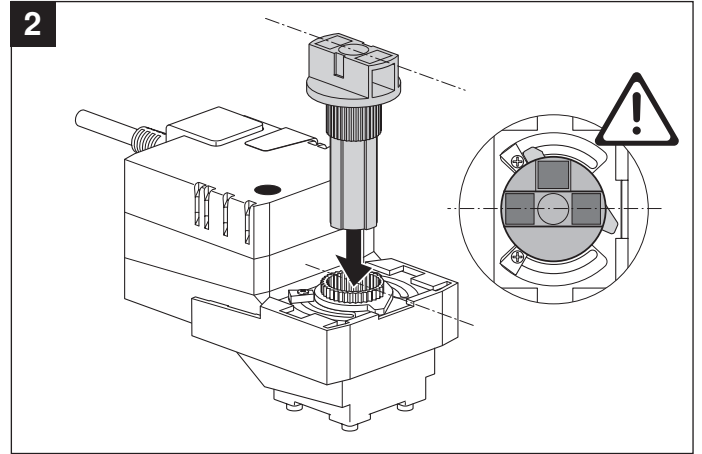
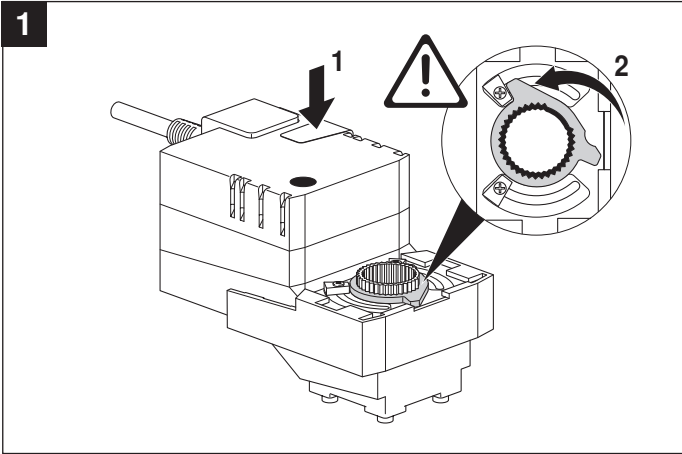
**Check voltage supply connection**

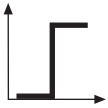
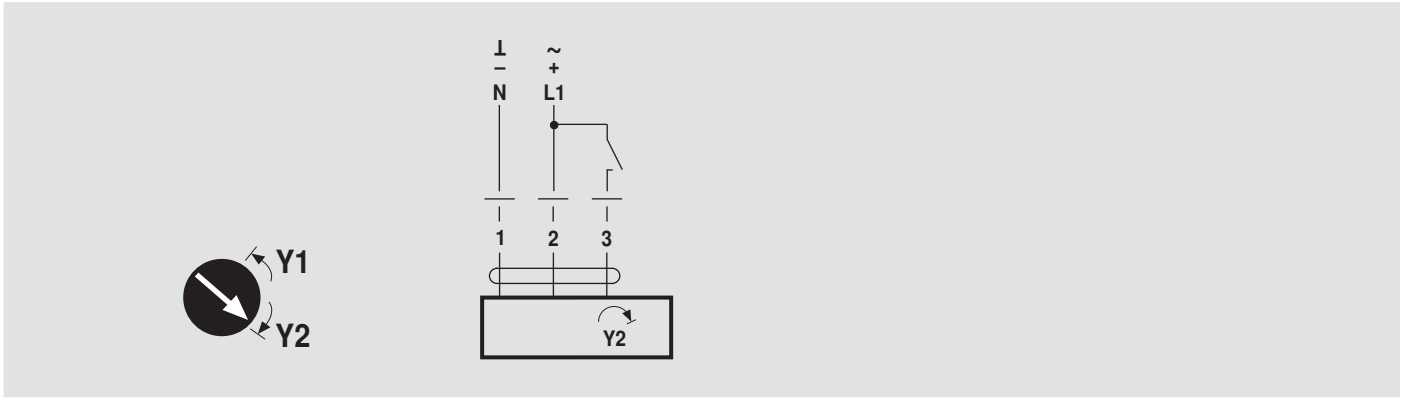
- a) ② Off and ③ On } Check the supply connections.  
b) ② Blinking and ③ Blinking } Possibly  $\perp$  and  $\sim$  are swapped over.

**Further documentations**

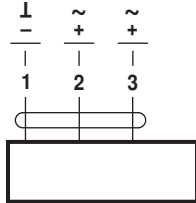
- Complete overview «The complete range of water solutions»
- Data sheets for control ball valves
- Installation instructions for actuators and/or control ball valves
- Notes for project planning (hydraulic characteristic curves and circuits, installation regulations, commissioning, maintenance etc.)

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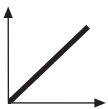




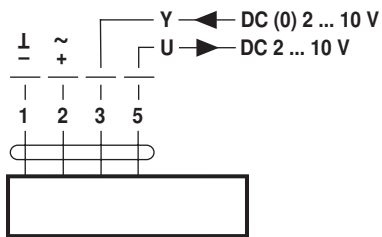
AC 24 V / DC 24 V



LRQ..  
NRQ..



AC 24 V / DC 24 V



LRQ..-SR    LRQ..-SZ  
NRQ..-SR    NRQ..-SZ