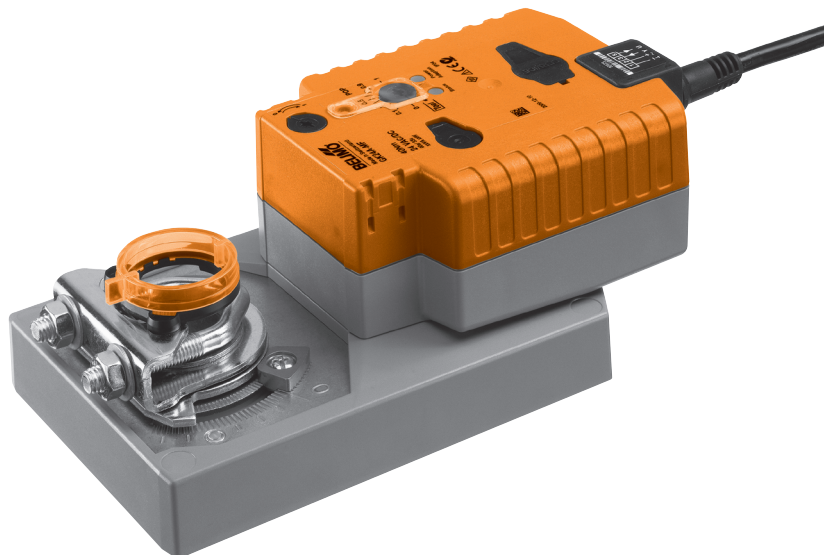


Communicative SuperCap rotary actuator with emergency setting function and extended functionalities for adjusting air dampers in ventilation and air-conditioning systems for building services installations and in laboratories

- For air dampers up to approx. 8 m²
- Torque 40 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
- Design life SuperCaps 15 years


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 11 W @ nominal torque At rest 3 W For wire sizing 21 VA (I _{max} 20 A @ 5 ms)
Connection	Cable 1 m, 4 x 0.75 mm ²

Functional data	Factory settings	Variable	Setting
Torque	≥40 Nm		
Inhibiting torque	≥40 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
Setting emergency position (POP)	0% (POP rotary button end stop, left)	0 ... 100%
Bridging time (PF)	2 s	1 ... 10 s
Position accuracy	±5%		
Direction of rotation Motor	As an option with ↻/↻		
Emergency setting position	Reversible with switch 0 ... 100%		
Direction of rotation Y = 0 V	At switch position 1 ↻ and 0 ↻, respectively	Electronically reversible
Manual override	Gearing latch disengaged with push button		
Angle of rotation	Max. 95°↔, can be limited at both ends with adjustable mechanical end stops		
Running time Standard operation	150 s / 90°↔	90 ... 150 s	
Emergency setting position	35 s @ 0 ... 50°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	Automatic adaption whenever the supply voltage is switched on, or manual triggering
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 Standard operation	≤53 dB (A) @ 90 s running time		
Emergency setting position	≤52 dB (A) @ 150 s running time ≤61 dB (A)		
Position indication	Mechanical, pluggable		

Terms and abbreviations POP = Power off position / emergency setting position
PF = Power fail delay time / bridging time

Technical data

(continued)

Safety

Protection class	III Safety extra-low voltage UL Class 2 Supply
Degree of protection	IP54 NEMA 2, UL Enclosure Type 2
EMC	CE according to 2004/108/EC
Certification	Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14 cULus according to UL 60730-1A and UL 60730-2-14 and CAN/CSA E60730-1:02
Mode of operation	Type 1.AA
Rated impulse voltage	0.8 kV
Control pollution degree	3
Ambient temperature	-30 ... +50 °C
Non-operating temperature	-40 ... +80 °C
Ambient humidity	95% r.h., non-condensating
Maintenance	Maintenance-free
Dimensions / Weight	
Dimensions	See «Dimensions» on page 8
Weight	Approx. 1.8 kg

Safety notes


- The actuator 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 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 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** The actuator moves the air damper to the **desired operating position at the same time as the integrated capacitors are loaded**. Interrupting the supply voltage causes the air damper to be rotated back into the emergency setting position by means of stored electrical energy.
- 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. The measuring voltage U serves for the electrical display of the damper position 0 ... 100%.
- 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.

Product features

(continued)

Pre-charging time (start up)

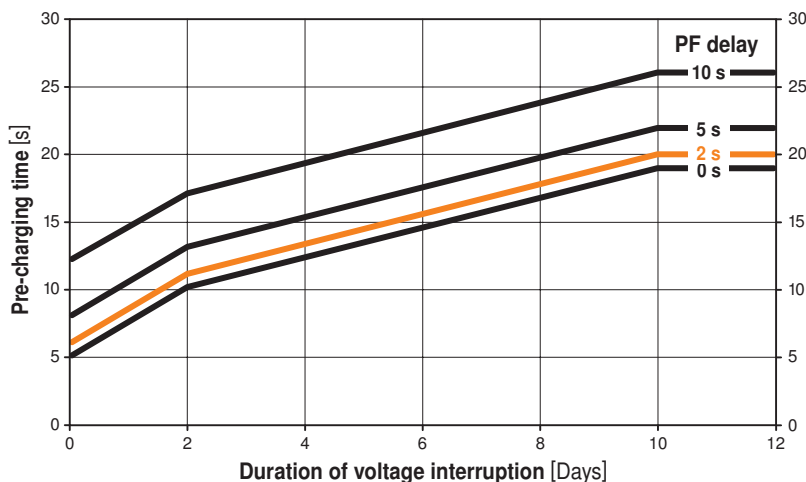
The capacitor actuators require a pre-charging time. This time is used for charging the capacitors up to a usable voltage level. This ensures that, in the event of a voltage interruption, the actuator can be moved at any time from its current position into the preset emergency setting position (POP).

The duration of the pre-charging time depends mainly on the following factors:

- Duration of the voltage interruption
- PF delay time (bridging time)

Typical pre-charging times

PF delay [s]	Duration of voltage interruption [Days]				
	0	1	2	7	≥10
0	5	8	10	15	19
2	6	9	11	16	20
5	8	11	13	18	22
10	12	15	17	22	26
Pre-charging time [s]					



Calculation example:

In the event of a voltage interruption of 3 days and a set bridging time (PF) of 5 s, the actuator requires a pre-charging time of 14 s (see graphic on page 2) after the voltage has been reconnected.

Delivery condition (capacitors)

The actuator is completely discharged after delivery from the factory, which is why the actuator requires approximately 20 s pre-charging time before initial commissioning in order to bring the capacitors up to the required voltage level.

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 with the ZTH-GEN adjustment and diagnostic tool.

Simple direct mounting

Simple direct mounting on the damper spindle with a universal spindle clamp, supplied with an anti-rotation strap to prevent the actuator from rotating.

Manual override

Manual override with push button possible (the gear is disengaged for as long as the button remains pressed down).

High operational reliability

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

Home position / Start

The clamp of the actuator is set ex-works to 0° ↺. After the supply voltage has been applied, the actuator moves into the position defined by the control signal.

Direction of rotation switch

When actuated, the direction of rotation switch changes the running direction in normal operation. The direction of rotation switch has no influence on the emergency setting position (POP) which has been set.

Product features		(continued)
Emergency setting position (POP) rotary button		The «Emergency setting position» rotary button can be used to adjust the desired emergency setting position (POP) between 0 and 100% in 10% increments. The rotary button applies only to the adapted angle of rotation range of between 30 and 95°↔. No minimum or maximum set values are taken into account. In the event of a voltage interruption, the actuator will move into the selected emergency setting position, taking into account the bridging time.
	Settings	The rotary button must be set to the «Tool» position for retroactive settings of the emergency setting position with the BELIMO service tool MFT-P. Once the rotary button is set back to the range 0 ... 100%, the manually set value will have positioning authority
Bridging time (PF)		Voltage interruptions can be bridged up to a maximum of 10 s. In the event of a voltage interruption, the actuator will remain stationary in accordance with the set bridging time. If the voltage interruption is greater than the set bridging time, then the actuator will move into the selected emergency setting position (POP). The bridging time set ex-works is 2 s. This can be modified at the site of operations with the use of the BELIMO service tool MFT-P.
	Settings	The rotary button must not be set to the «Tool» position! Only the values need to be entered for retroactive adjustments of the bridging time with the BELIMO service tool MFT-P.

Accessories		
	Description	Data sheet
Electrical accessories	BELIMO service tool MFT-P	
	ZTH-GEN adjustment and diagnostic tool	
	Position sensor SGA24, SGE24 and SGF24	T2 - SG..24
	Digital position indication ZAD24	T2 - ZAD24
Mechanical accessories	Various accessories	T2 - Z-GM..A../GK..A..

Electrical installation

Notes

- Connect via safety isolation transformer.
- Local power supply recommended.
- Other actuators can be connected in parallel. Please note the performance data!

Wiring diagrams

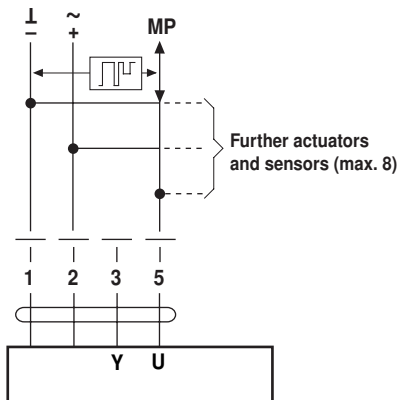
Conventional operation

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



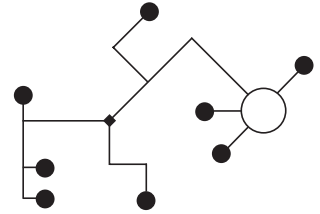
Supply and communication

in one and the same 3-wire cable

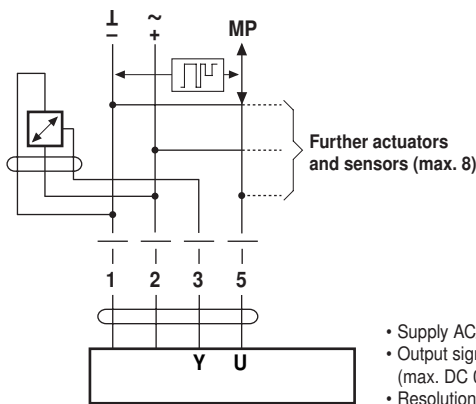
- no shielding or twisting necessary
- no terminating resistors required

Power topology

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

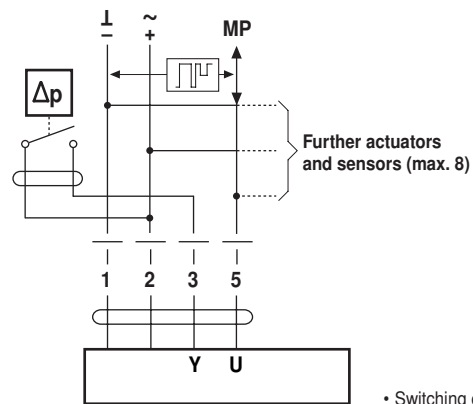


Connection of active sensors



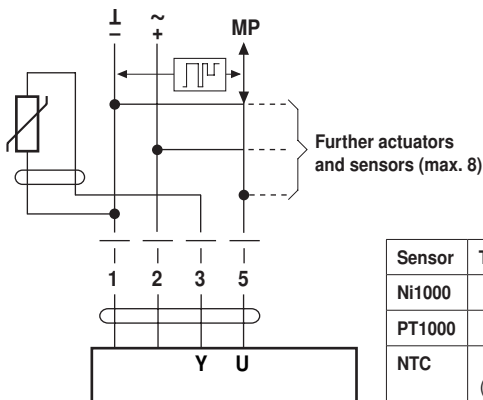
- Supply AC/DC 24 V
- Output signal DC 0 ... 10 V (max. DC 0 ... 32 V)
- Resolution 30 mV

Connection of external switching contact



- Switching current 16 mA @ 24 V

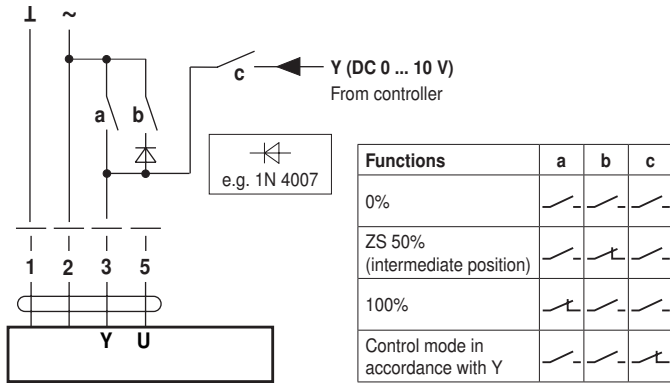
Connection of passive sensors



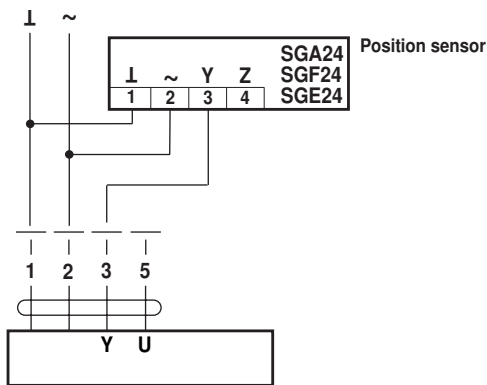
Sensor	Temperature range	Resistance range	Resolution
Ni1000	-28 ... +98°C	850 ... 1600 Ω	1 Ω
PT1000	-35 ... +155°C	850 ... 1600 Ω	1 Ω
NTC	-10 ... +160°C (depending on type)	200 Ω ... 60 kΩ	1 Ω

Functions with basic values (only in conventional mode)

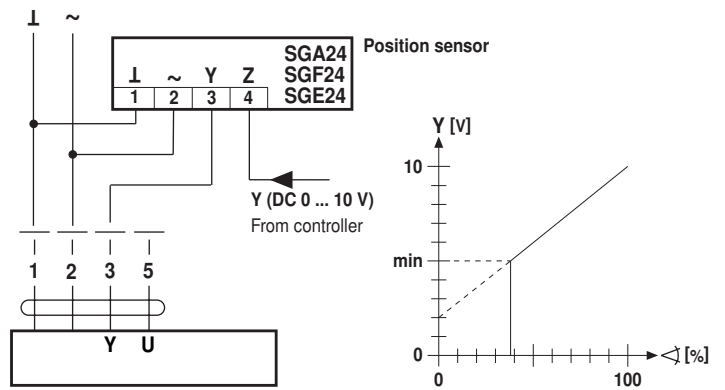
Override control with AC 24 V with relay contacts



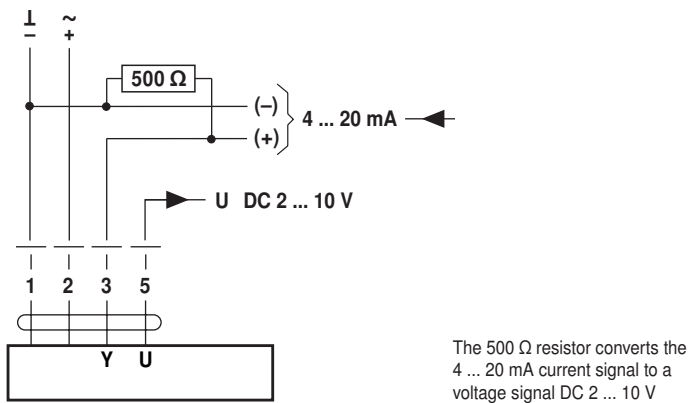
Remote control 0 ... 100%



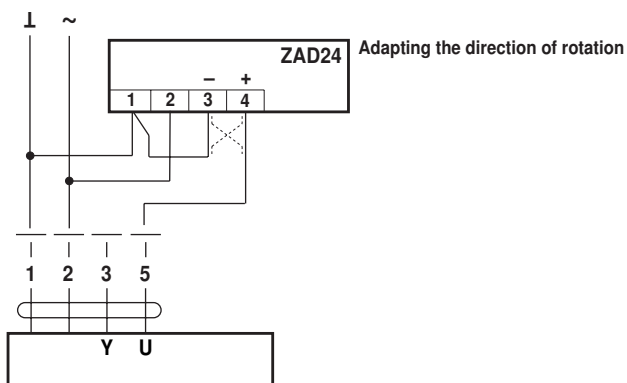
Minimum limit



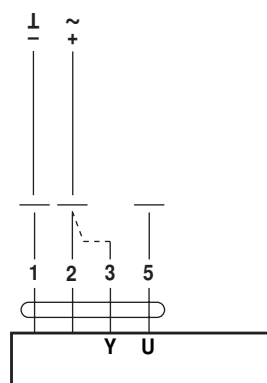
Control with 4 ... 20 mA via external resistance



Position indication



Functional check

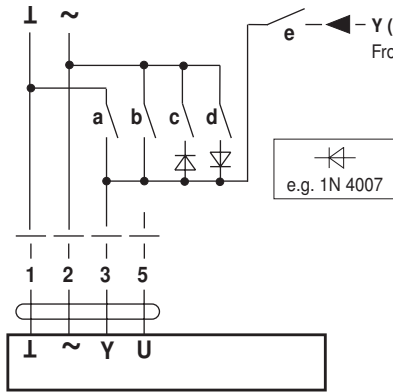


Procedure

- 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 travels in the opposite direction

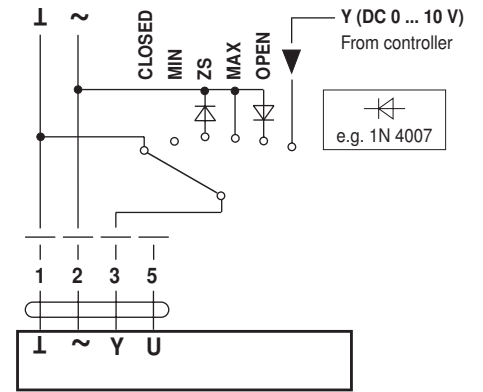
Functions for actuators with specific parameters

Override control and limiting with AC 24 V with relay contacts

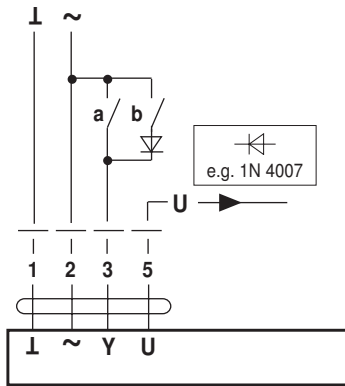


Functions	a	b	c	d	e
CLOSED					
MIN					
ZS (intermediate position)					
MAX					
OPEN					
Control mode in accordance with Y					

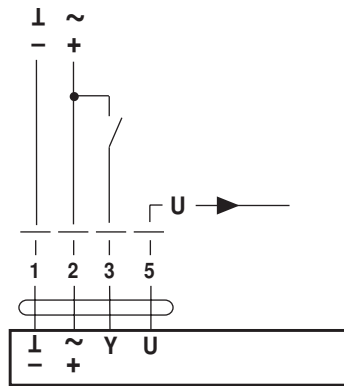
Override control and limiting with AC 24 V with rotary switch



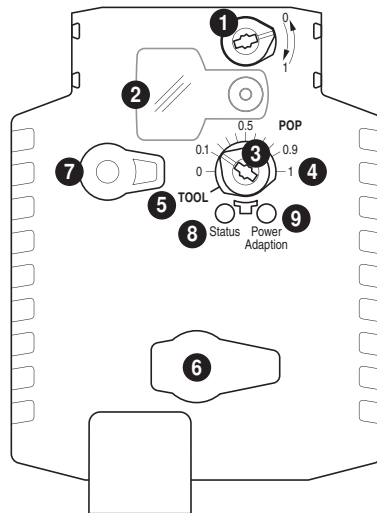
3-point control



Open-close control



Operating controls and indicators



- 1 Direction of rotation switch
- 2 Cover, POP button
- 3 POP button
- 4 Scale for manual adjustment
- 5 Position for adjustment with tool
- 6 Tool socket
- 7 Disengagement button

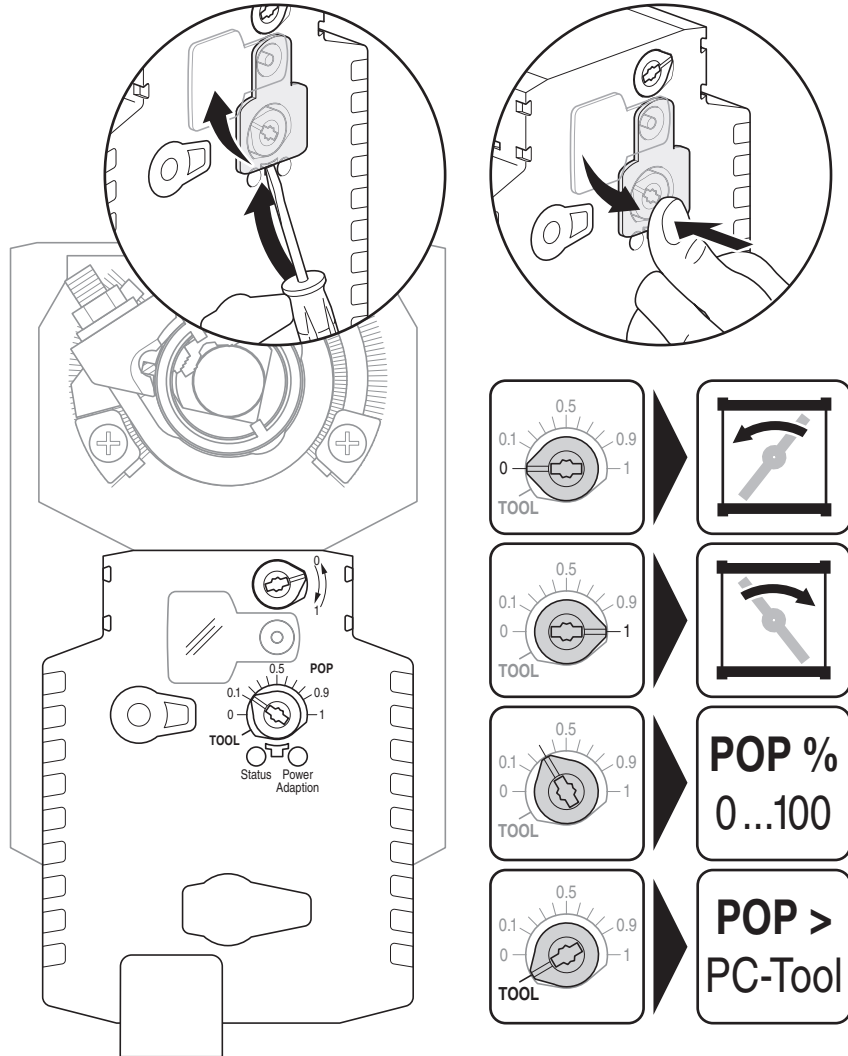
LED displays		Meaning / function
8 yellow	9 green	
Off	Illuminated	Operation OK / without fault
Off	Blinking	POP function active
Illuminated	Off	Fault
Off	Off	Not in operation
Illuminated	Illuminated	Adaptation procedure running
Blinking	Illuminated	Communication

- 9 Press button: Triggers angle of rotation adaption, followed by standard operation

Operating controls and indicators

(continued)

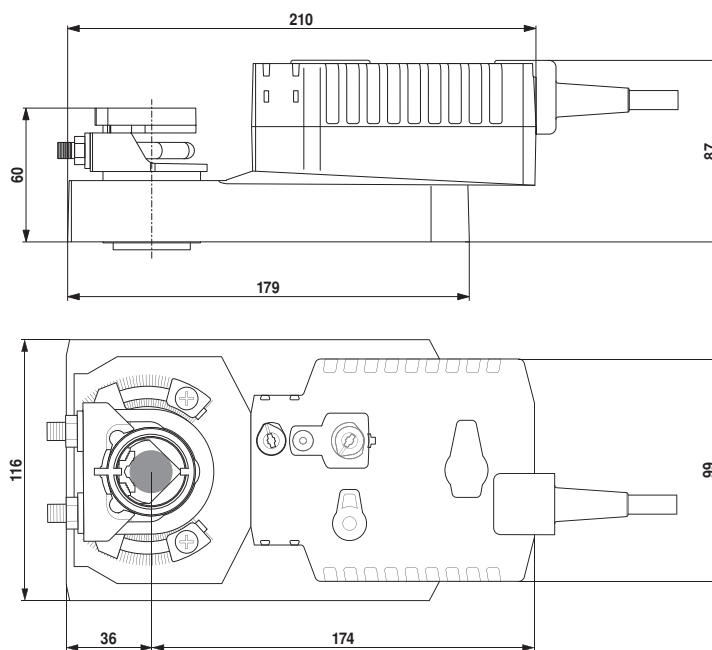
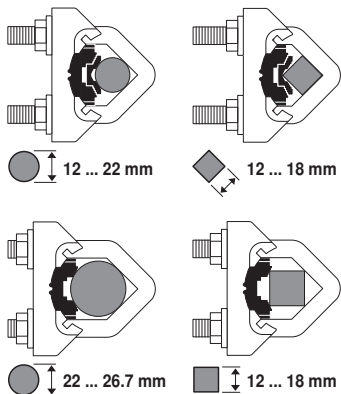
Setting the POP Power off position



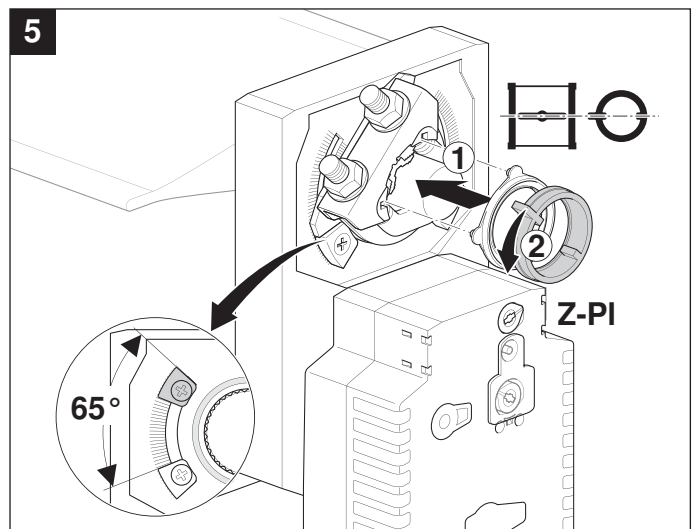
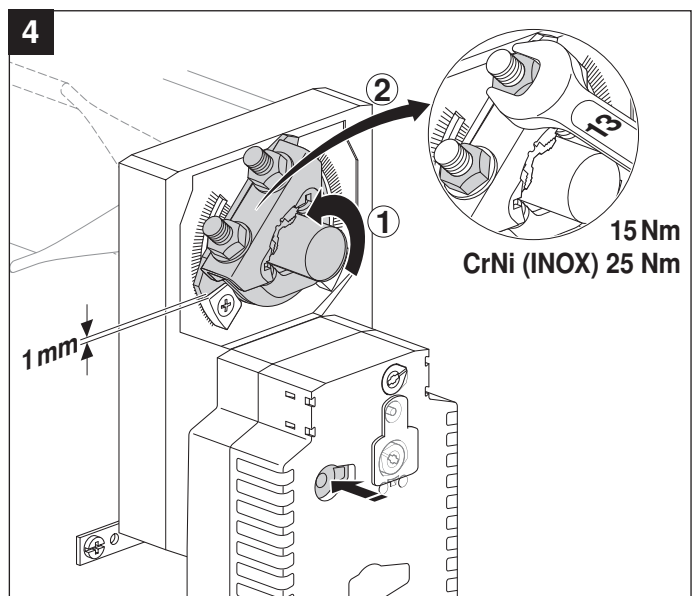
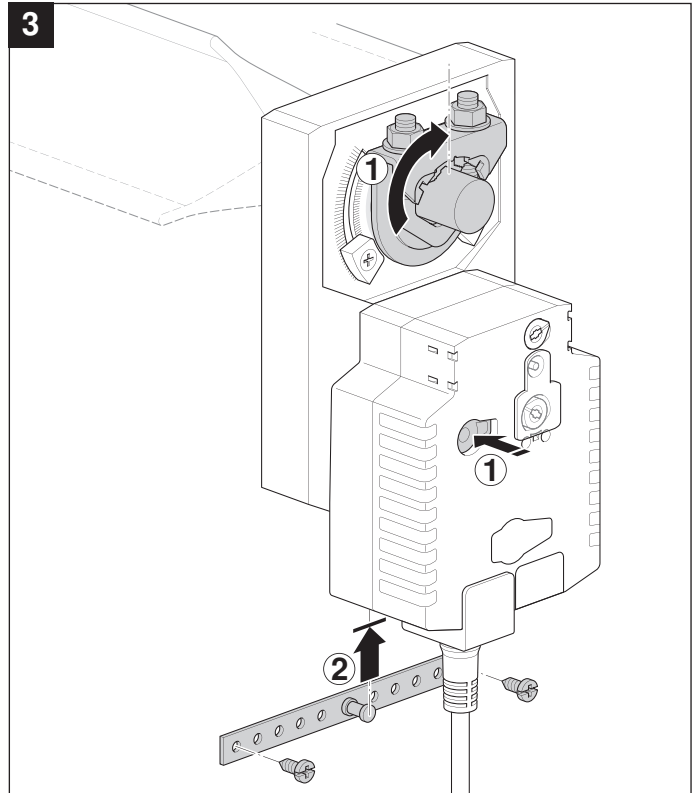
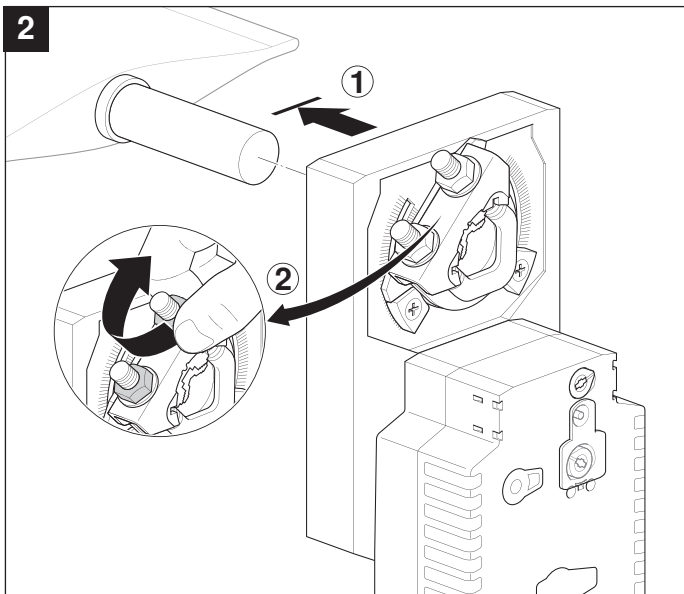
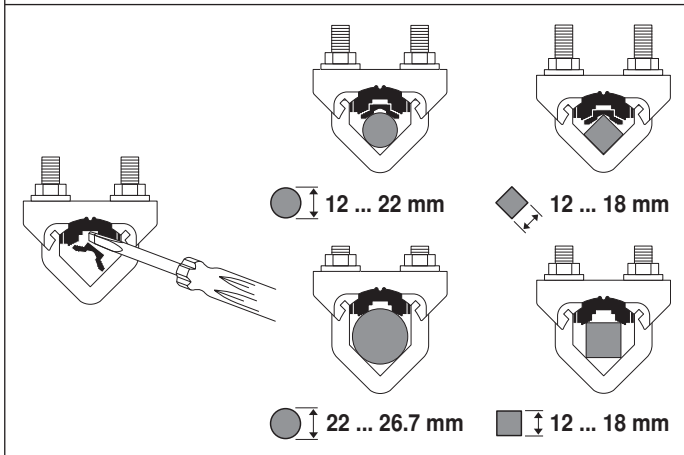
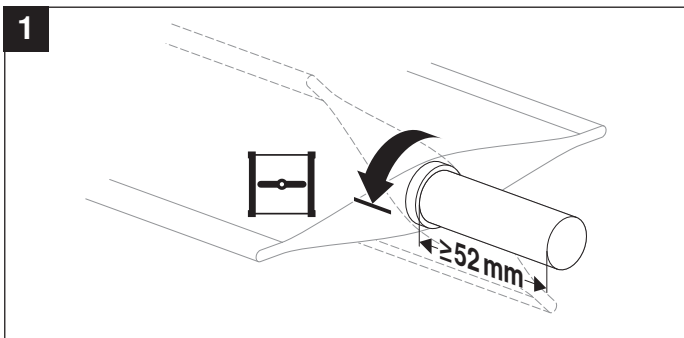
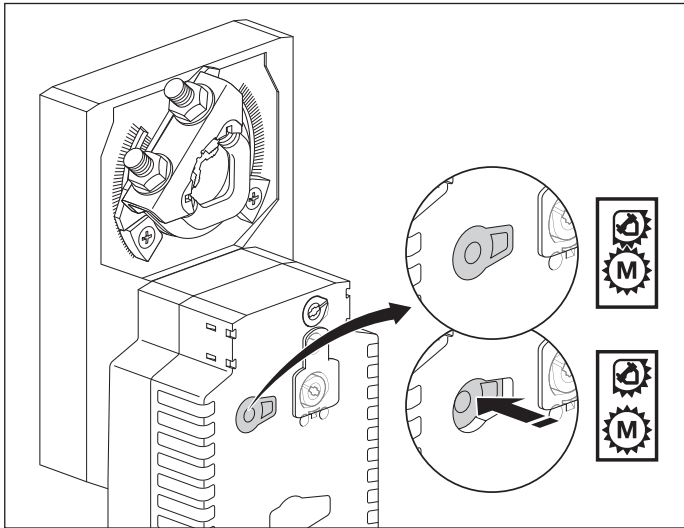
Dimensions [mm]

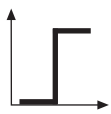
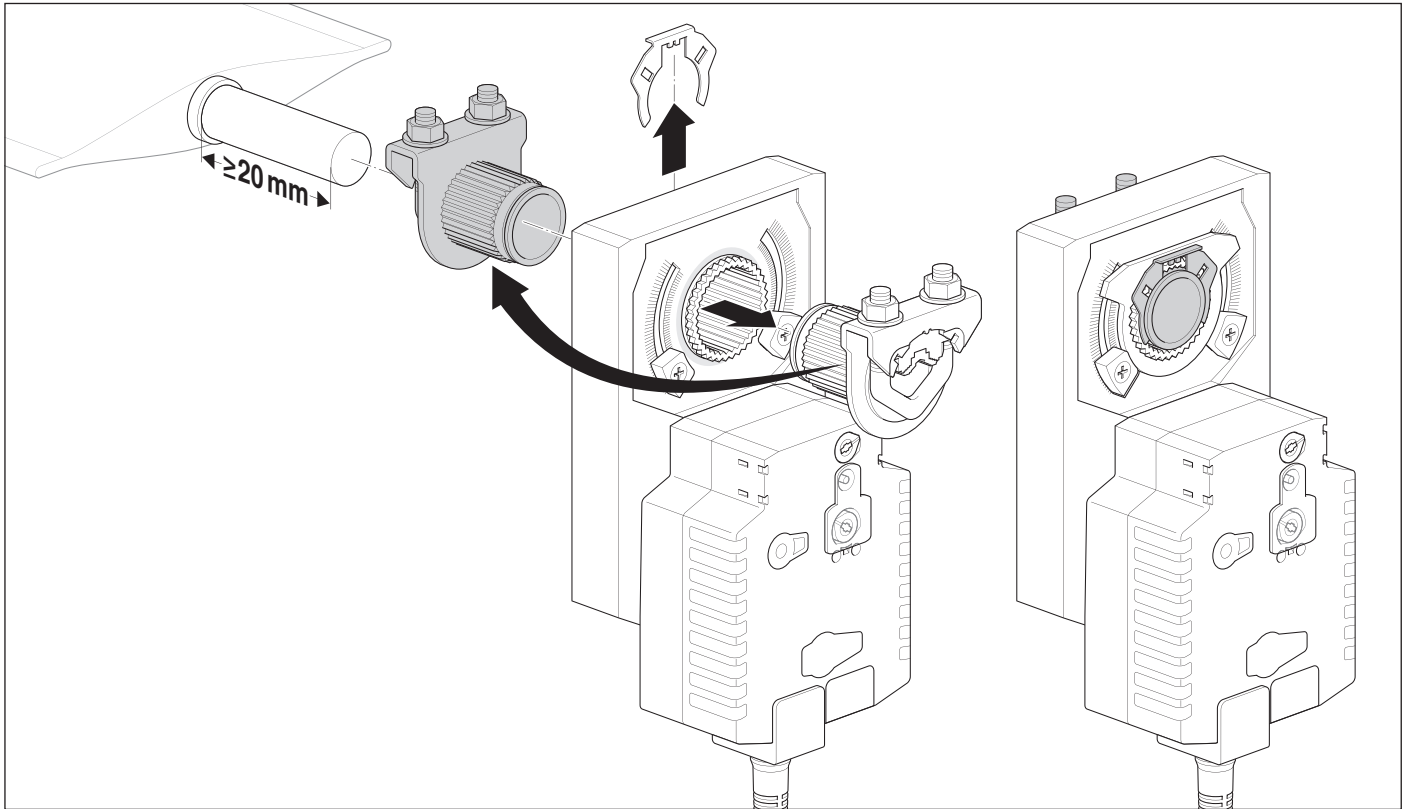
Dimensional drawings

Damper spindle	Length			
	≥52	12 ... 26.7	≥12	≤25.5
	≥20	12 ... 26.7	≥12	≤25.5

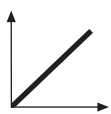
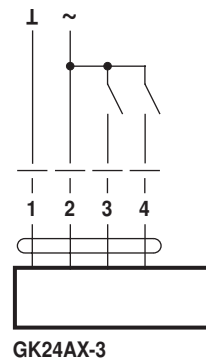
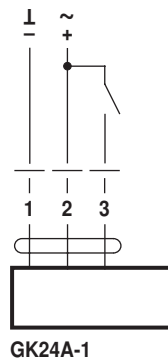
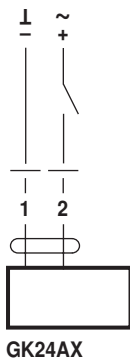


* When an auxiliary switch or a feedback potentiometer is used, see «Accessories»





AC 24 V / DC 24 V



AC 24 V / DC 24 V

