BELIMO

Technical data sheet NVK24A-MP-RE

Communication-capable globe valve actuator with emergency control function for 2-way and 3-way globe valves

- **Actuating force 1000 N**
- **Nominal voltage AC/DC 24 V**
- **Control modulating DC (0) 0.5 V...10 V, variable**
- **Nominal stroke 20 mm**
- **Design life SuperCaps 15 years**

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	2.5 W
	Power consumption in rest position	1.5 W
	Power consumption for wire sizing	6 VA
	Connection supply / control	Terminals 4 mm²
	Parallel operation	Yes
Functional data	Actuating force	1000 N
	Positioning signal Y	DC 0...10 V
	Positioning signal Y note	Input impedance 100 kΩ
	Operating range Y	DC 0.5...10 V
	Operating range Y variable	Start point DC 0.5 ... 30V End point DC 2.5 ... 32V
	Position feedback U	DC 0.5...10 V
	Position feedback U note	max. 0.5 mA
	Position feedback U variable	Start point DC 0.5 ... 8V End point DC 2.5 ... 10V
	Setting emergency setting position	Actuator spindle 0...100%, adjustable (POP rotary knob)
	Bridging time (PF) variable	1 ... 10 s
	Position accuracy	5% absolute
	Manual override	Gear disengagement with push-button
	Nominal stroke	20 mm
	Actuating time	150 s / 20 mm
	Actuating time emergency control function	35 s / 20 mm
	Override control MAX (maximum position)	100 %
	Override control MIN (minimum position)	0 %
	Override control ZS (intermediate position, only AC)	50 %
	Override control ZS variable	ZS = MIN ... MAX
	Sound power level motor max.	60 dB (A)
	Sound power level motor note	60 dB (A) @ 90 s running time
	Sound power level emergency setting position max.	60 dB (A)
	Position indication	Mechanical 5 … 20 mm stroke
Safety	Protection class IEC/EN	III Safety extra-low voltage
	Degree of protection IEC/EN	IP54
	EMC	CE in accordance with 2004/108/EC
	Certification IEC/EN	Certified to: IEC/EN 60730-1 and IEC/EN 60730-2-14
	Mode of operation	Type 1.AA
	Rated impulse voltage supply / control	0.8 kV
	Control pollution degree	3
	Ambient temperature	0°C ... 50°C
	Non-operating temperature	-40°C ... 80°C
	Ambient humidity	95% r.h., non-condensing
	Maintenance	Maintenance-free
Weight	Weight approx.	2.800 kg

Safety notes

- This actuator has been designed for application 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 with during installation.
- The switch for changing the direction of motion/the closing point may be adjusted only by authorised personnel. The direction of stroke is critical, particularly in connection with frost protection circuits.
- 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 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

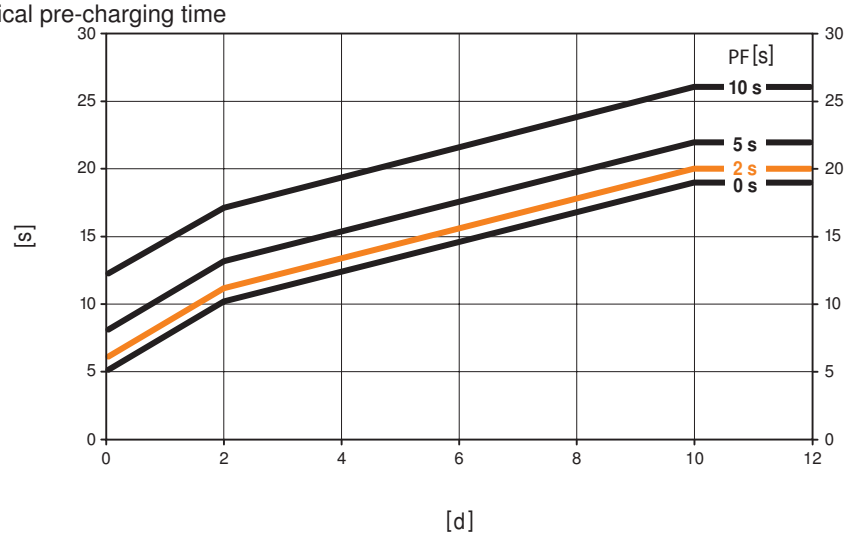
Principle of operation

The actuator is connected with a standard modulating signal of DC 0 ... 10V and travels to the position defined by the positioning signal at the same time the integrated capacitors are being charged..
Interrupting the supply voltage causes the valve to be moved to the selected emergency setting position (POP) by means of stored electrical energy.

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 an electricity interruption, the actuator can move 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 time



PF [s]	[d]				
	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
	[s]				

[d] = Electricity interruption in days
[s] = Pre-charging time in seconds
PF[s] = Bridging time
Calculation example: In the event of an electricity 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) 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.

Adjustable-parameter 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-GEN.

Product features

Installation on third-party valves
The retrofit actuators for installation on a wide range of valves from various manufacturers are comprised of an actuator, bracket, universal valve neck adapter and universal valve stem adapter. Adapt the valve neck and valve stem to begin with, then attach the retrofit bracket to the valve neck adapter. Now fit the retrofit actuator into the bracket and connect it to the valve. Whilst taking the position of the valve closing point into account, secure the actuator to the bracket and then conduct the commissioning process. The valve neck adapter/actuator can be rotated through 360° on the valve neck, provided it is permitted by the size of the installed valve.

Installation on Belimo valves
Please use standard actuators from Belimo for installation on Belimo globe valves. The installation of retrofit actuators on Belimo globe valves is technically possible.

Manual override
Manual override with push-button possible - temporary. The gear is disengaged and the actuator decoupled for as long as the button is pressed.
The stroke can be adjusted by using a hexagon socket screw key (4 mm), which is inserted into the top of the actuator. The stroke spindle extends when the key is rotated clockwise.

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

Position indication
The stroke is indicated mechanically on the bracket with tabs. The stroke range adjusts itself automatically during operation.

Home position
Setting ex-works: Actuator spindle is retracted.

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

Adaption of stroke range
The first time the supply voltage is switched on, i.e. at the time of commissioning, the actuator carries out a stroke adaption, which is when the operating range and position feedback adjust themselves to the mechanical stroke.
Manual triggering of the adaption can be carried out by pressing the "Adaption" button or with the PC-Tool.
The actuator then moves into the position defined by the positioning signal.

Rotary knob emergency setting position
The "Emergency setting position" rotary knob can be used to adjust the desired emergency setting position (POP) from 0% to 100% in 10% increments.
The rotary knob is in reference to the adapted or programmed height of stroke.
In the event of an electricity interruption, the actuator will move into the selected emergency setting position, taking into account the bridging time (PF) of 2 s which was set ex-works.
Settings: The rotary knob 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 knob is set back to the range 0 … 100%, the manually set value will have positioning authority

Bridging time (PF)
Electricity interruptions can be bridged up to a maximum of 10 s.
In the event of an electricity interruption, the actuator will remain stationary in accordance with the set bridging time. If the electricity 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 knob 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	Type
Electrical accessories	Auxiliary switch add-on, 2 x SPDT	S2A-H
Service tools	Manual parameterizing device, for MF/MP/Modbus/LonWorks actuators and VAV-Control	ZTH-GEN
	Belimo PC-Tool, software for adjustments and diagnostics	MFT-P

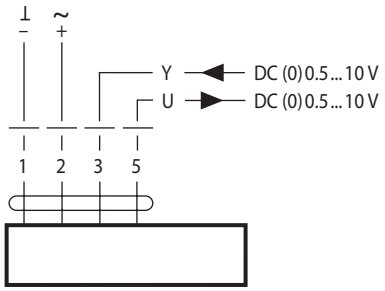
Electrical installation

Notes

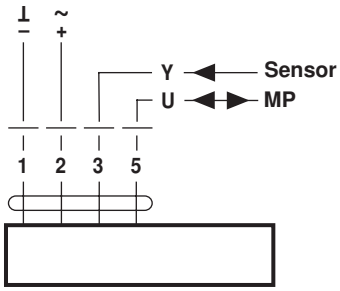
- Connection via safety isolating transformer.
- Parallel connection of other actuators possible.
- Direction of stroke switch factory setting: Actuator spindle retracted.

Wiring diagrams

AC/DC 24V, modulating



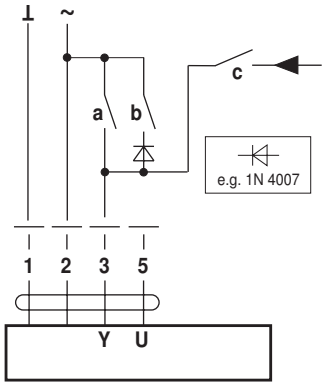
Operation on the MP bus



Functions

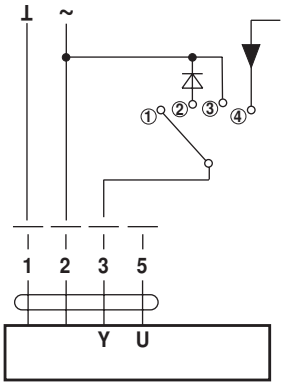
Functions with basic values

Override control with AC 24V with relay contacts



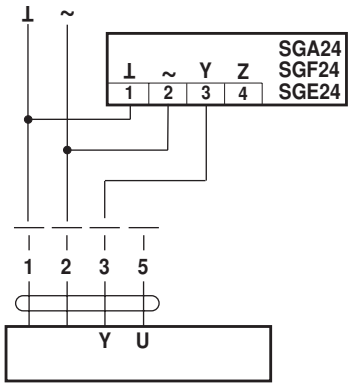
	a	b	c
0%			
ZS 50%			
100%			
Y			

Override control with AC 24V with rotary switch

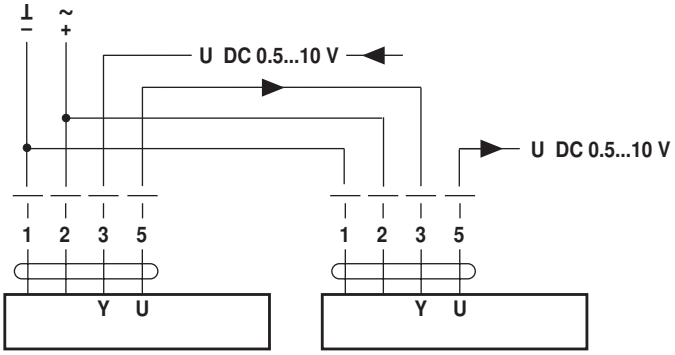


Pos	
1	0%
2	ZS 50%
3	100%
4	Y

Remote control 0 ... 100%

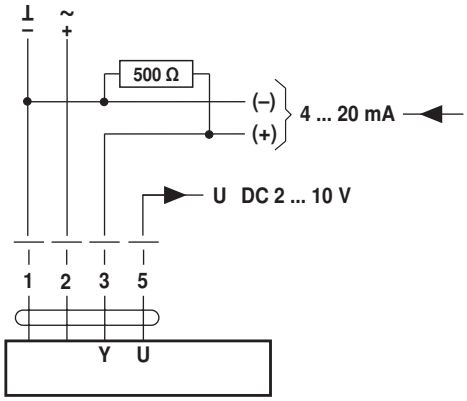


Follow-up control (position-dependent)



Functions

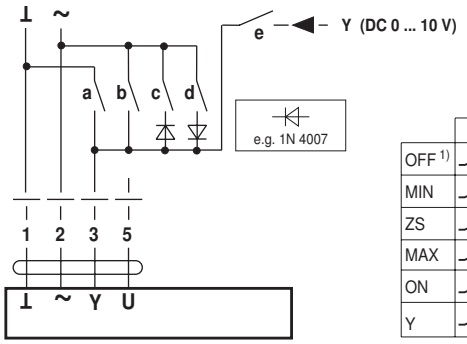
Control with 4 ... 20 mA via external resistor



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

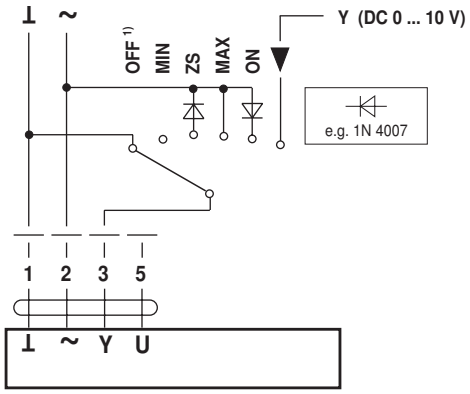
Functions for actuators with specific parameters

Override control and limiting with AC 24V with relay contacts



	a	b	c	d	e
OFF [1]	⌐	_	_	_	_
MIN	_	_	_	_	_
ZS	_	_	⌐	_	_
MAX	_	⌐	_	_	_
ON	_	_	_	⌐	_
Y	_	_	_	_	⌐

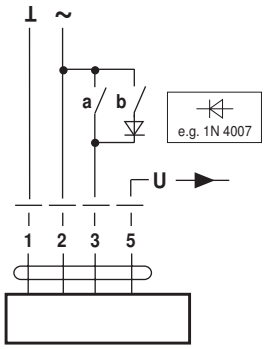
Override control and limiting with AC 24V with rotary switch

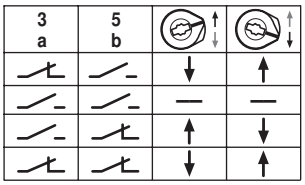


1) Caution: This function is guaranteed only if the start point of the operating range is defined as min. 0.6V.

Functions

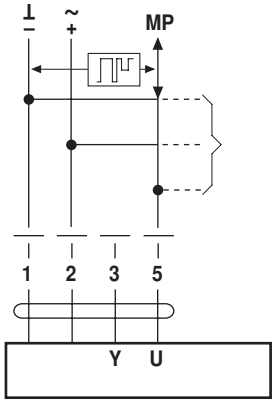
AC 24V; 3-point





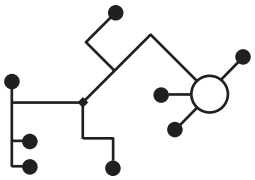
Functions when operated on MP bus

Connection on the MP bus



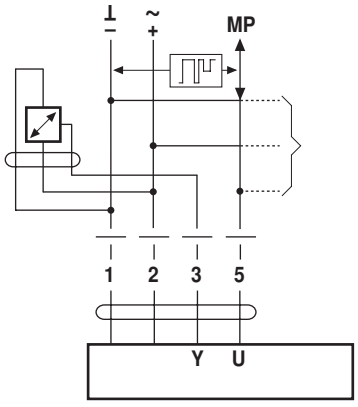
Supply and communication in one and the same 3-wire cable
• no shielding or twisting required
• no terminating resister required

Power topology



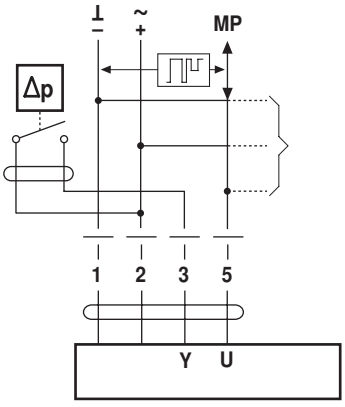
There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted).

Connection of active sensors



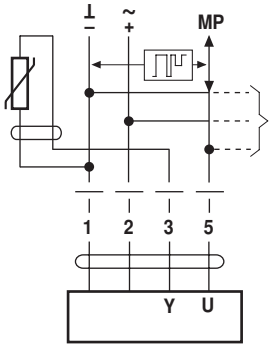
• Supply AC/DC 24 A
• Output signal DC 0 ... 10V (max. DC 0 ... 32V)
• Resolution 30 mV

Connection of external switching contact



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

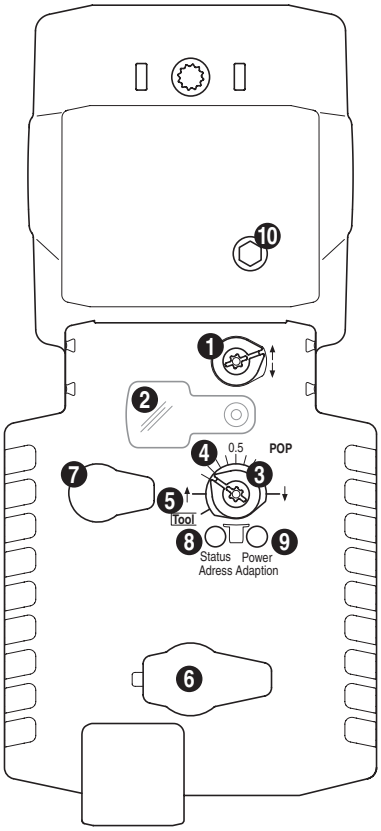
Connection of passive sensors



Ni1000	–28 ... +98°C	850 ... 1600 Ω [2]
PT1000	–35 ... +155°C	850 ... 1600 Ω [2]
NTC	–10 ... +160°C [1]	200 Ω ... 50 kΩ [2]

1) Depending on the type
2) Resolution 1 Ohm

Indicators and operating elements



(1) Direction of stroke switch
Switching: Direction of stroke changes

(2) Cover, POP button

(3) POP button

(4) Scale for manual adjustment

(5) Position for adjustment with tool

(6) Service plug
For connecting the parameterisation and service tools

(7) Gear disengagement button, temporary
Press button: Gear disengages, motor stops, manual override possible
Release button: Gear engages, standard mode

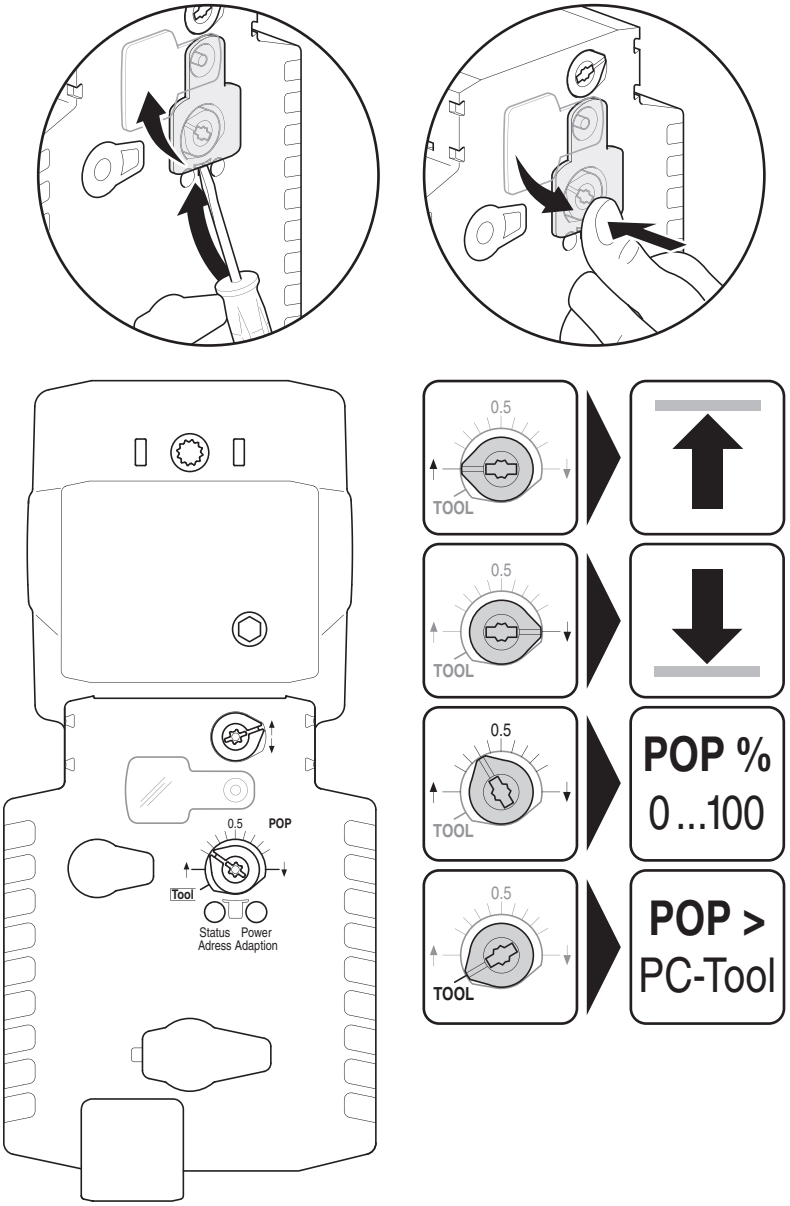
(8) Push-button and LED display yellow
Press button: Confirmation of addressing

(9) Push-button and LED display green
Press button: Triggers stroke adaption, followed by standard mode

(10) Manual override
Clockwise: Actuator spindle extends
Counterclockwise: Actuator spindle retracts

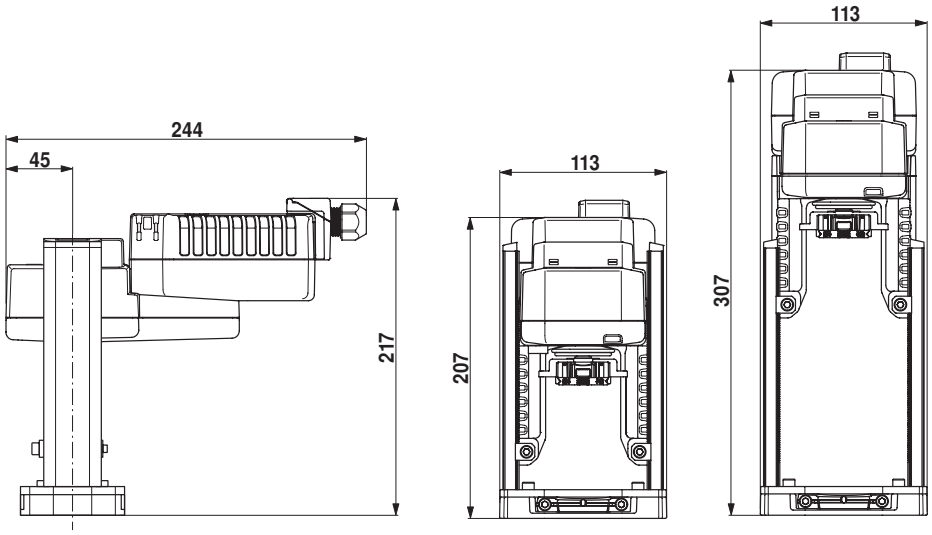
LED displays (8, yellow) and (9, green)
yellow: Off; green: Illuminated; In operation OK
yellow: Off; green: Blinking; POP function active
yellow: Illuminated;green: Off; Pre-charging time SuperCap / Fault SuperCap / Wiring error in supply
yellow: Off; green: Off; Not in operation
yellow: Illuminated; green: Illuminated; Adaption procedure active active
yellow: Flickering; green: Illuminated; Communication active

Indicators and operating elements



Dimensions [mm]

Dimensional drawings



Further documentation

- Installation instructions for actuators

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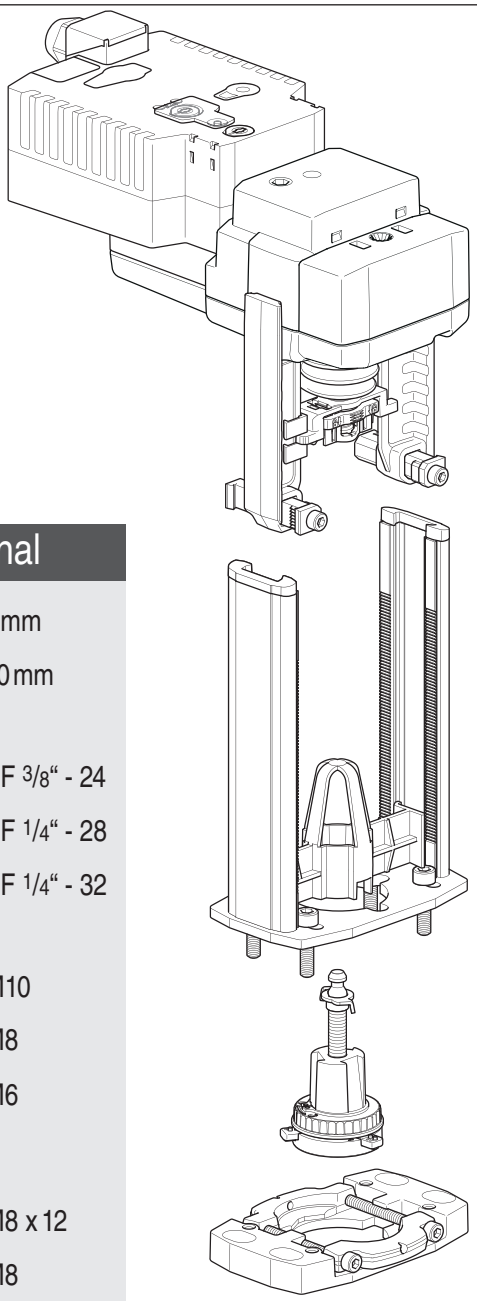
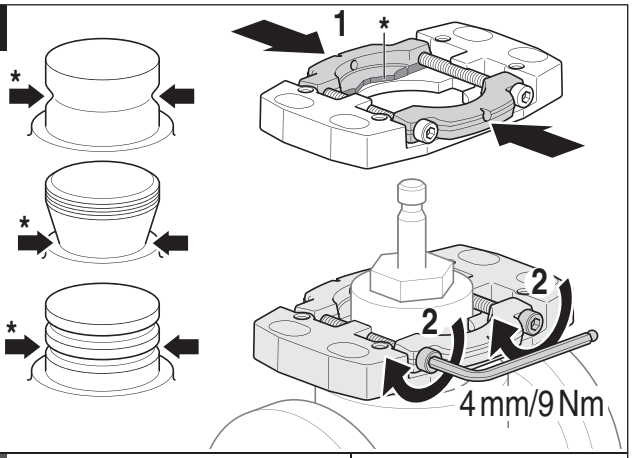
1



optional

- 1 x 4-6 mm
- 1 x 8-10 mm
- 1 x UNF 3/8“ - 24
- 1 x UNF 1/4“ - 28
- 1 x UNF 1/4“ - 32
- 1 x M10
- 1 x M8
- 1 x M6
- 2 x
- 2 x M8 x 12
- 2 x M8

2



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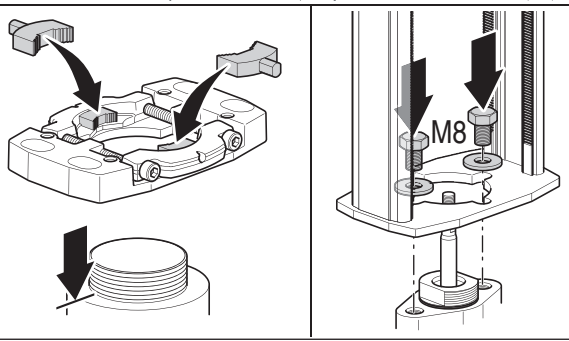

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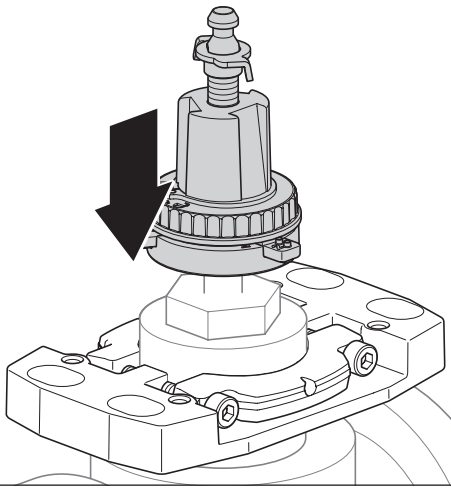

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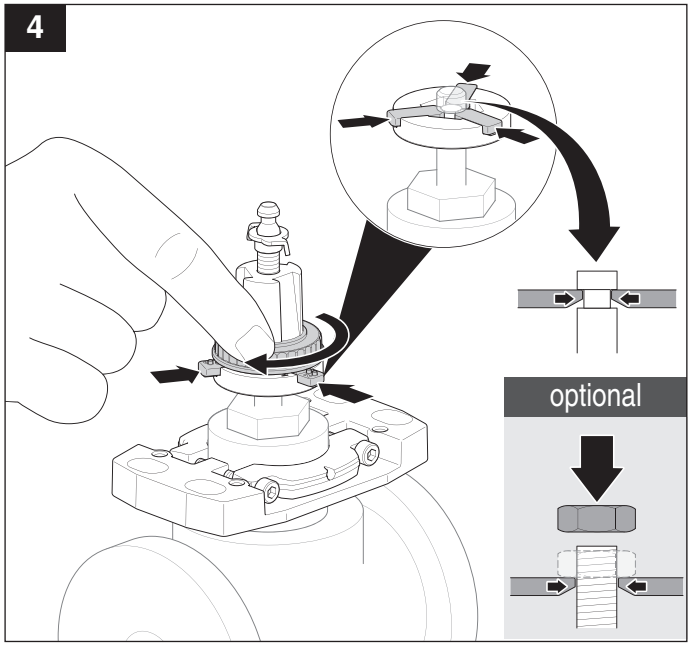

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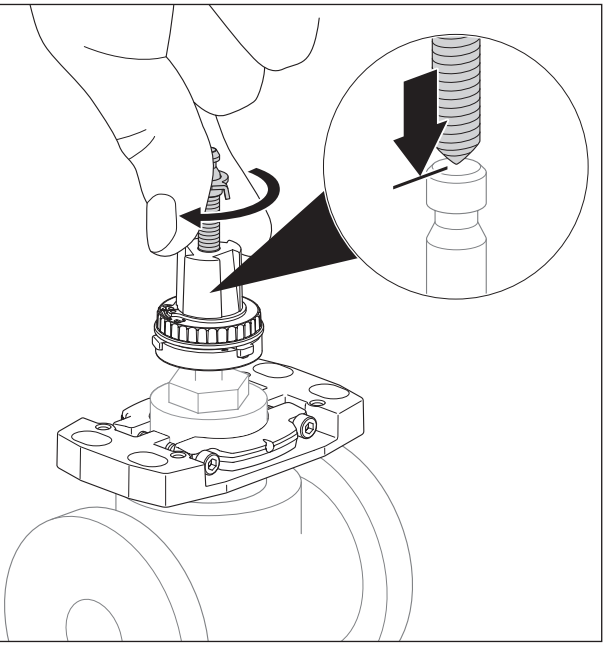

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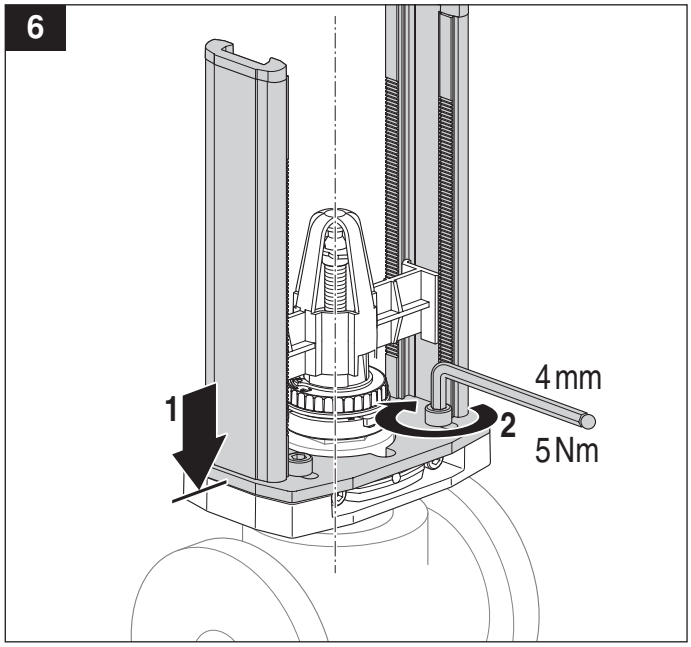

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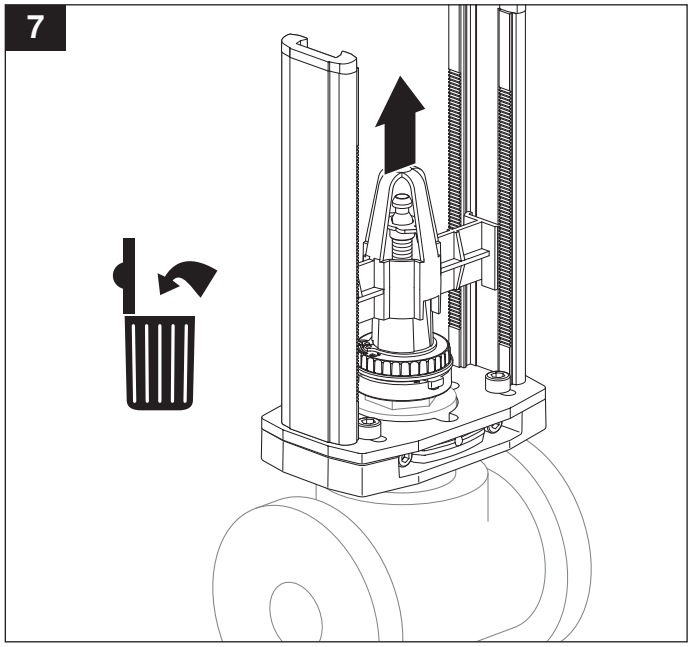

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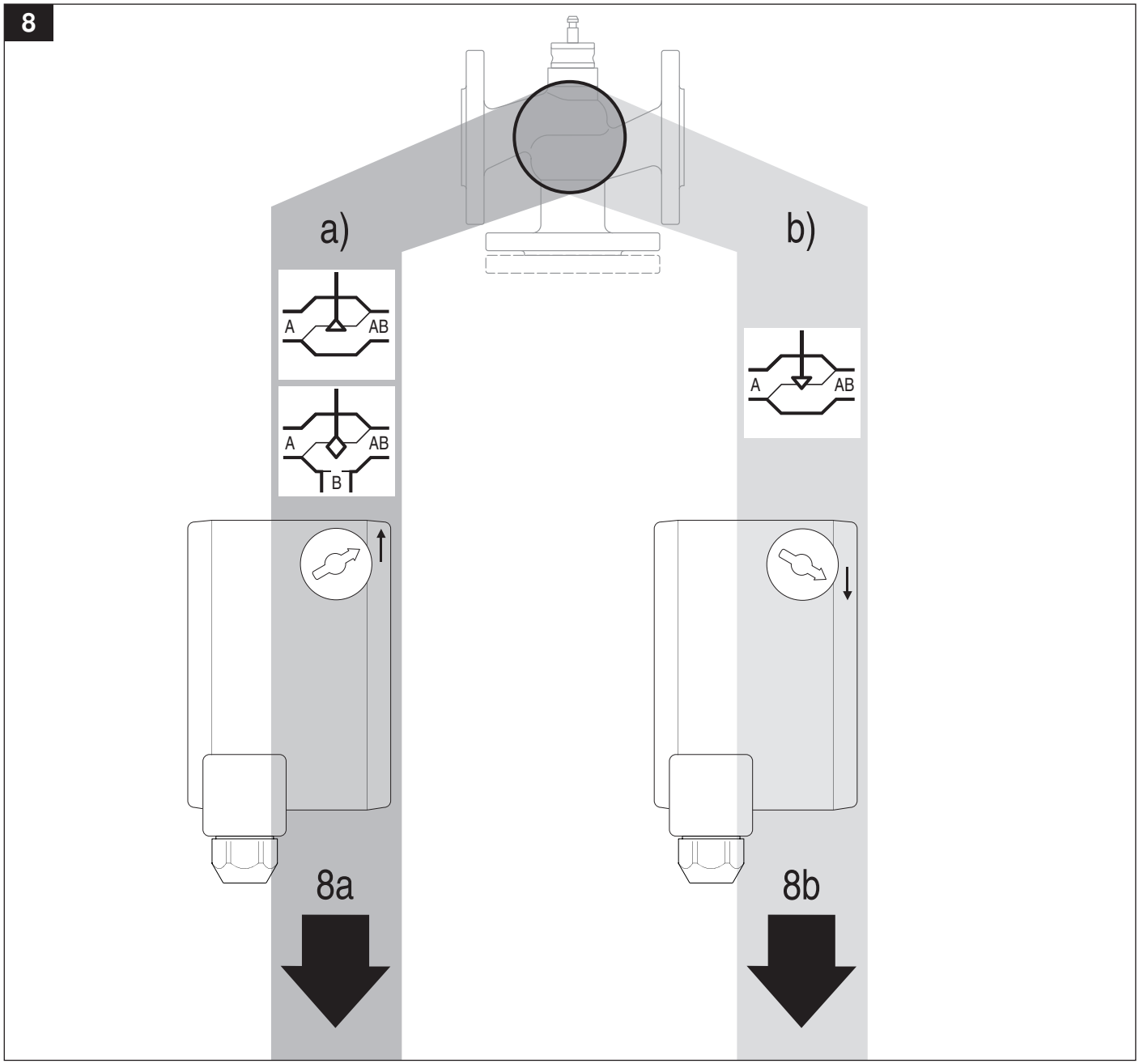

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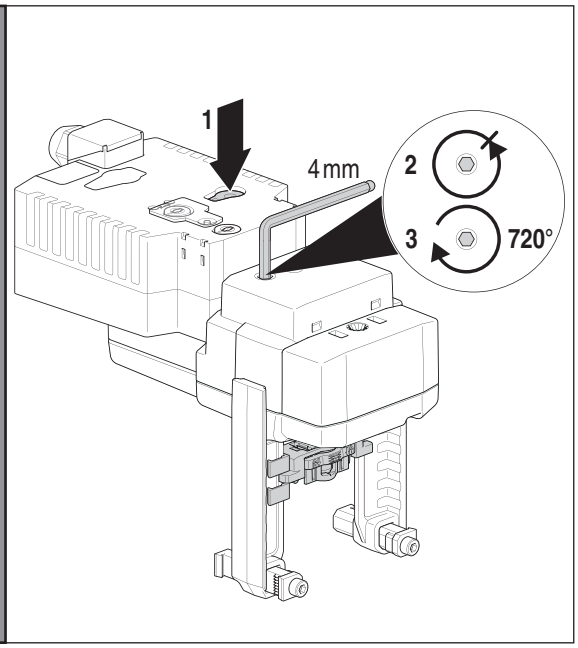

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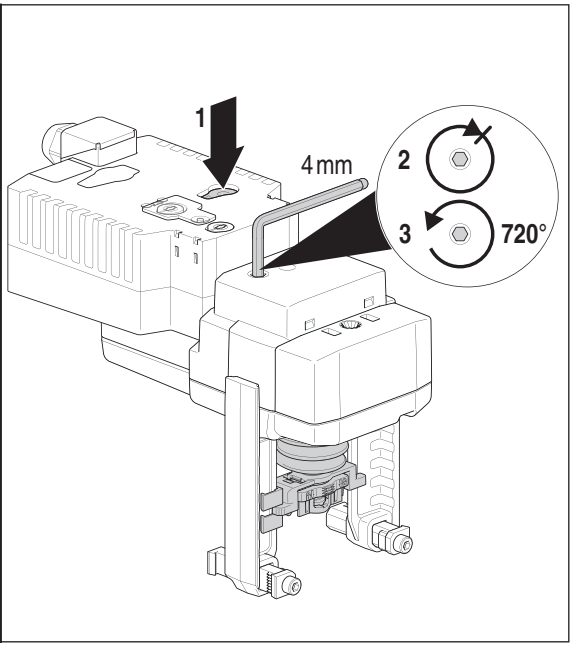
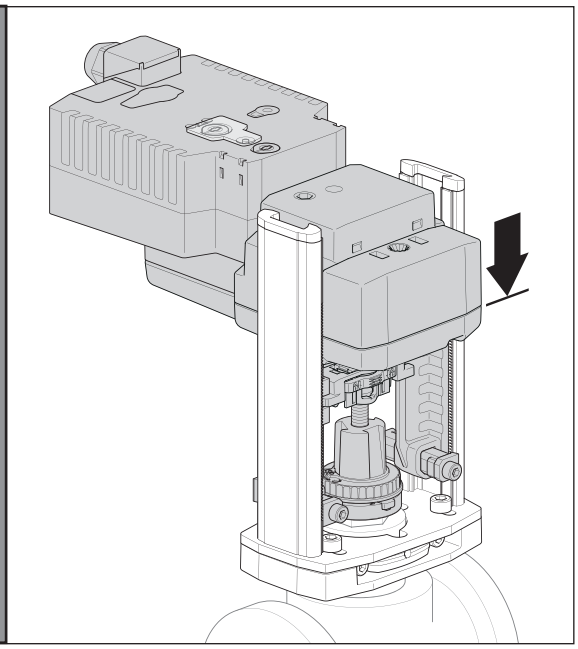
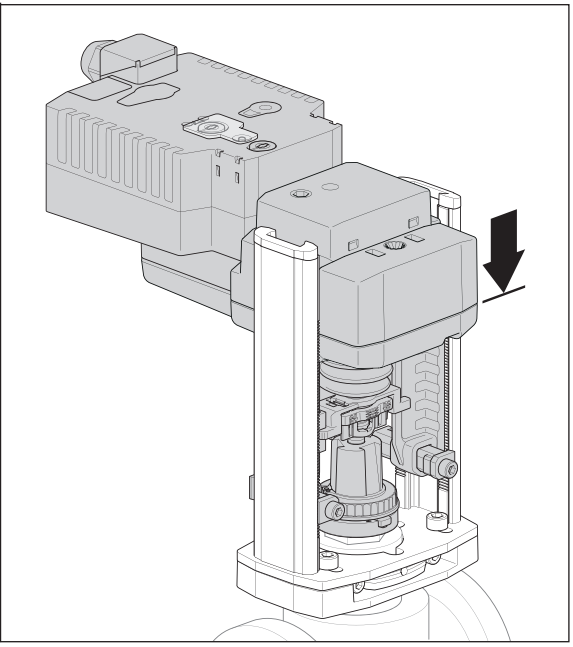


9a



9b



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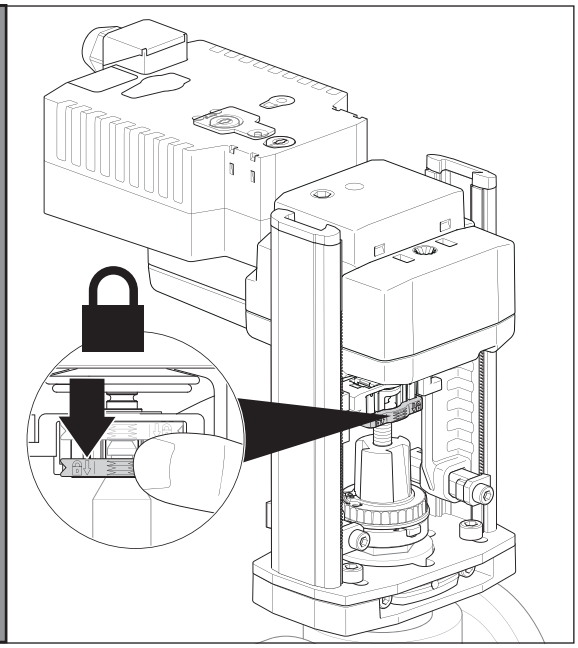
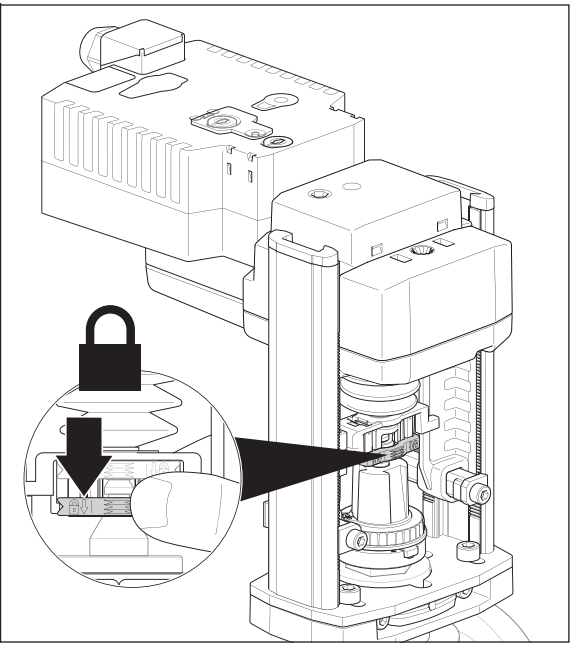
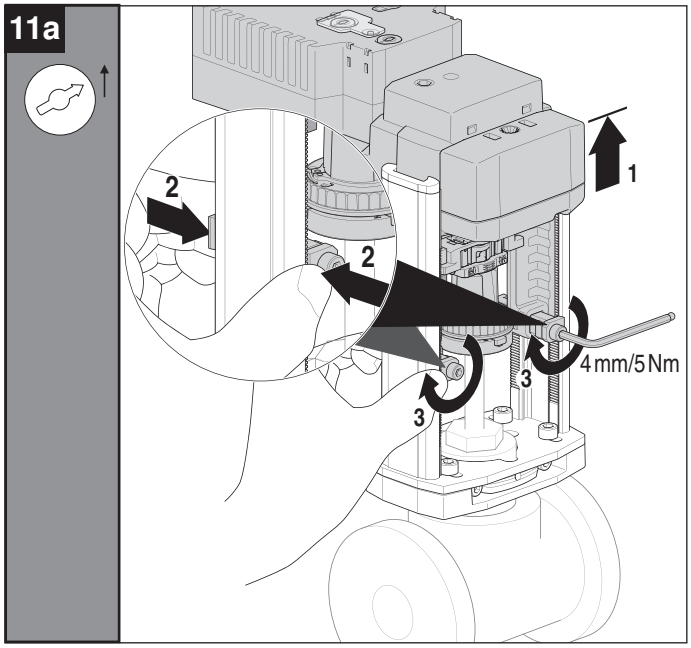
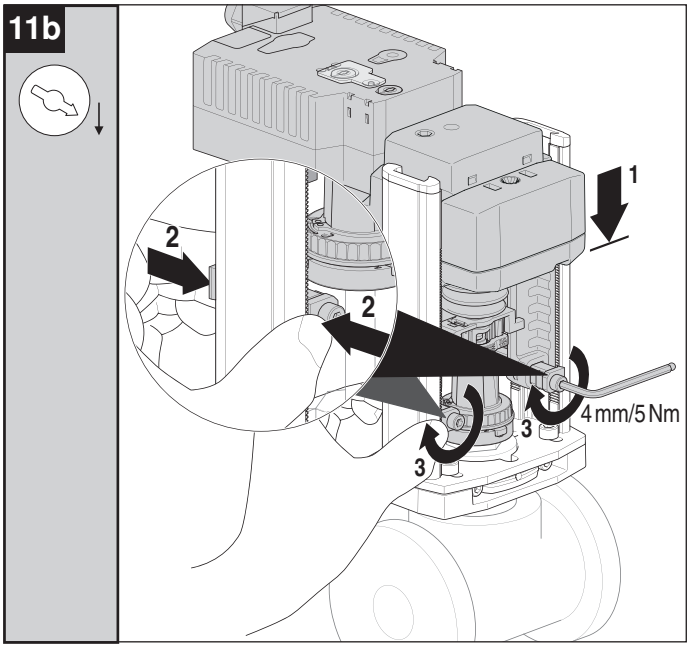
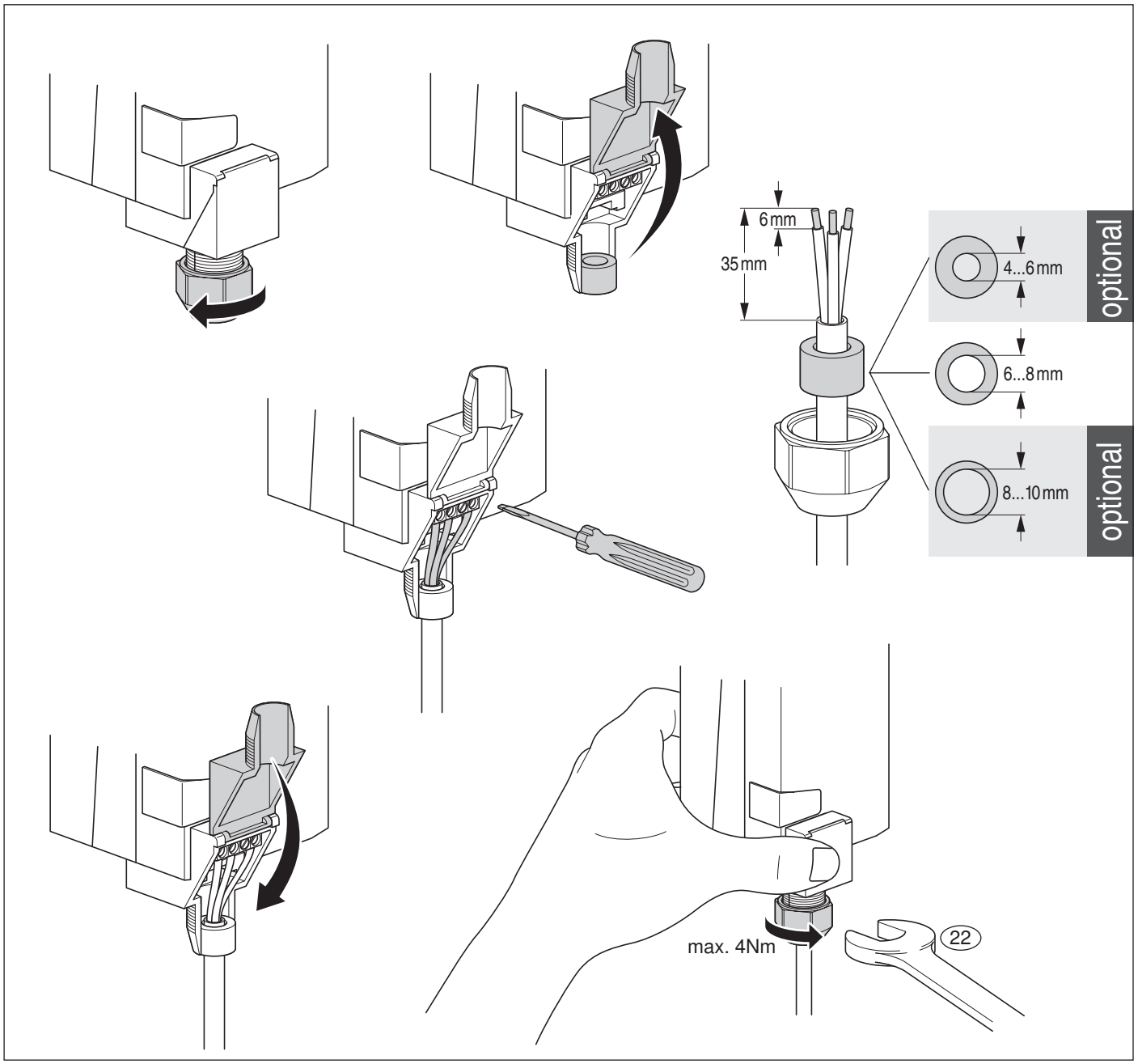


10b

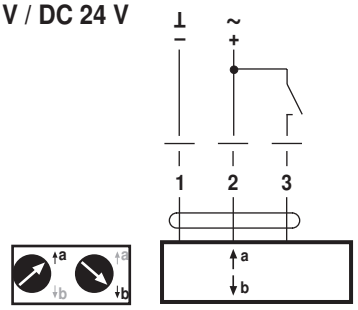



11a
1
2
2
3
3
4 mm/5 Nm


11b
1
2
2
3
3
4 mm/5 Nm

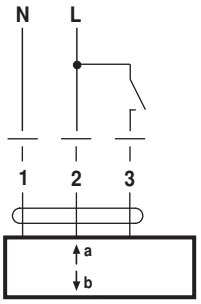

6 mm
35 mm
4...6 mm
optional
6...8 mm
8...10 mm
optional
max. 4Nm
22

AC 24 V / DC 24 V

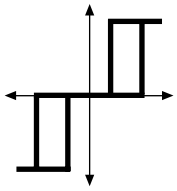


NVK(C)24A-3-RE

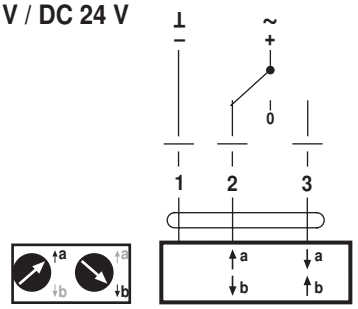
AC 230 V



NVK(C)230-3-RE

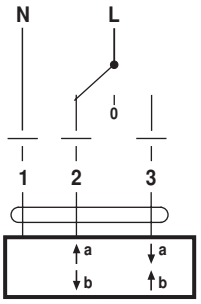


AC 24 V / DC 24 V



NVK(C)24A-3-RE

AC 230 V



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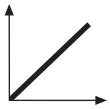
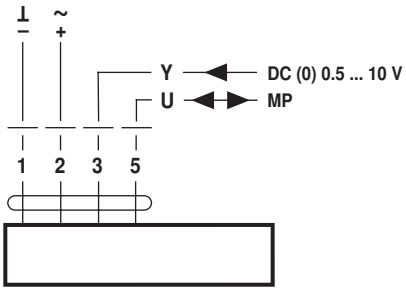


AC 24 V / DC 24 V



NVK(C)24A-MP-RE