

Parametrisable RobustLine damper actuator for adjusting dampers in HVAC plants, comparable industrial plants and technical building installations

- Air damper size up to approx. 2 m<sup>2</sup>
- Torque motor 10 Nm
- Nominal voltage AC/DC 24 V
- Control modulating 2...10 V variable
- Position feedback 2...10 V variable
- Optimum protection against corrosion and chemical influences, UV radiation, damp and condensation



## 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	3.5 W
	Power consumption in rest position	1.3 W
	Power consumption for wire sizing	6 VA
	Connection supply / control	Cable 1 m, 4 x 0.75 mm <sup>2</sup> (halogen-free)
	Parallel operation	Yes (note the performance data)
Functional data	Torque motor	10 Nm
	Torque variable	25%, 50%, 75% reduced
	Operating range Y	2...10 V
	Input Impedance	100 kΩ
	Operating range Y variable	Start point 0.5...30 V End point 2.5...32 V
	Operating modes optional	Open/close 3-point (AC only) Modulating (DC 0...32 V)
	Position feedback U	2...10 V
	Position feedback U note	Max. 0.5 mA
	Position feedback U variable	Start point 0.5...8 V End point 2.5...10 V
	Position accuracy	±5%
	Direction of motion motor	selectable with switch 0/1
	Direction of motion note	Y = 0 V: At switch position 0 (ccw rotation) / 1 (cw rotation)
	Direction of motion variable	electronically reversible
	Manual override	with push-button, can be locked
	Angle of rotation	Max. 95°
	Angle of rotation note	can be limited on both sides with adjustable mechanical end stops
	Running time motor	150 s / 90°
	Running time motor variable	43...173 s
	Adaptation setting range	manual
	Adaptation setting range variable	No action Adaptation when switched on Adaptation after pushing the manual override button
	Override control	MAX (maximum position) = 100% MIN (minimum position) = 0% ZS (intermediate position, AC only) = 50%

<b>Functional data</b>	Override control variable	MAX = (MIN + 32%)...100% MIN = 0%...(MAX – 32%) ZS = MIN...MAX
	Sound power level, motor	35 dB(A)
	Mechanical interface	Universal shaft clamp 10...20 mm
	Position indication	Mechanically, pluggable
<b>Safety data</b>	Protection class IEC/EN	III, Safety Extra-Low Voltage (SELV)
	Power source UL	Class 2 Supply
	Degree of protection IEC/EN	IP66/67
	Degree of protection NEMA/UL	NEMA 4X
	Enclosure	UL Enclosure Type 4X
	EMC	CE according to 2014/30/EU
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	UL Approval	cULus according to UL60730-1A, UL60730-2-14 and CAN/CSA E60730-1 The UL marking on the actuator depends on the production site, the device is UL-compliant in any case
	Mode of operation	Type 1
	Rated impulse voltage supply / control	0.8 kV
	Pollution degree	4
	Ambient humidity	Max. 100% RH
	Ambient temperature	-30...50°C [-22...122°F]
	Storage temperature	-40...80°C [-40...176°F]
	Servicing	maintenance-free
<b>Weight</b>	Weight	1.7 kg

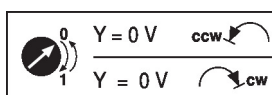
**Safety notes**


- This device has been designed for use in stationary heating, ventilation and air-conditioning systems and must not 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 during installation.
- Junction boxes must at least correspond with enclosure IP degree of protection!
- The cover of the protective housing may be opened for adjustment and servicing. When it is closed afterwards, the housing must seal tight (see installation instructions).
- 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 cables must not be removed from the device installed in the interior.
- To calculate the torque required, the specifications supplied by the damper manufacturers concerning the cross-section, the design, the installation situation and the ventilation conditions must be observed.
- The device contains electrical and electronic components and must not be disposed of as household refuse. All locally valid regulations and requirements must be observed.
- The information on chemical resistance refers to laboratory tests with raw materials and finished products and to trials in the field in the areas of application indicated.
- The materials used may be subjected to external influences (temperature, pressure, constructional fixture, effect of chemical substances, etc.), which cannot be simulated in laboratory tests or field trials.
- The information regarding areas of application and resistance can therefore only serve as a guideline. In case of doubt, we definitely recommend that you carry out a test. This information does not imply any legal entitlement. Belimo will not be held liable and will provide no warranty. The chemical or mechanical resistance of the materials used is not alone sufficient for judging the suitability of a product. Regulations pertaining to combustible liquids such as solvents etc. must be taken into account with special reference to explosion protection.
- Flexible metallic cable conduits or threaded cable conduits of equal value are to be used for UL (NEMA) Type 4X applications.
- When used under high UV loads, e.g. extreme sunlight, the use of flexible metallic or equivalent cable conduits is recommended.

**Product features**

<b>Fields of application</b>	<p>The actuator is particularly suitable for utilisation in outdoor applications and is protected against the following weather conditions:</p> <ul style="list-style-type: none"> <li>- Wood drying</li> <li>- Animal breeding</li> <li>- Food processing</li> <li>- Agriculture</li> <li>- Indoor swimming pools / bathhouses</li> <li>- Rooftop ventilation plant rooms</li> <li>- General outdoor applications</li> <li>- Alternating climate</li> <li>- Laboratories</li> </ul>
<b>Resistances</b>	<p>Noxious gas test EN 60068-2-60 (Fraunhofer Institut ICT / DE)  Salt fog spray test EN 60068-2-52 (Fraunhofer Institut ICT / DE)  Ammoniac test DIN 50916-2 (Fraunhofer Institut ICT / DE)  Climate test IEC60068-2-30 (Trikon Solutions AG / CH)  Disinfectant (animals) (Trikon Solutions AG / CH)  UV Test (Solar radiation at ground level) EN 60068-2-5, EN 60068-2-63 (Quinel / Zug CH)</p>
<b>Used materials</b>	<p>Actuator housing polypropylene (PP)  Cable glands / hollow shaft polyamide (PA)  Connecting cable FRNC  Clamp / screws in general Steel 1.4404  Seals EPDM  Form fit insert aluminium anodised</p>

<b>Mode of operation</b>	The actuator is connected with a standard control signal of 0...10 V and drives to the position defined by the control signal. Measuring voltage U serves for the electrical display of the damper position 0...100% and as control signal for other actuators.
<b>Parametrisable actuators</b>	The factory settings cover the most common applications. Single parameters can be modified with the Belimo Service Tools MFT-P or ZTH EU.
<b>Simple direct mounting</b>	Simple direct mounting on the damper shaft with a universal shaft clamp, supplied with an anti-rotation device to prevent the actuator from rotating.
<b>Manual override</b>	Manual override with push-button possible (the gear train 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. Standard setting 0...90°. The housing cover must be removed to set the angle of rotation.
<b>High functional reliability</b>	The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.
<b>Home position</b>	The first time the supply voltage is switched on, i.e. at the time of commissioning, the actuator carries out a synchronisation. The synchronisation is in the home position (0%). The actuator then moves into the position defined by the control signal.



<b>Adaptation and synchronisation</b>	An adaptation can be triggered manually by pressing the "Adaptation" button or with the PC-Tool. Both mechanical end stops are detected during the adaptation (entire setting range). Automatic synchronisation after pressing the manual override button is configured. The synchronisation is in the home position (0%). The actuator then moves into the position defined by the control signal. A range of settings can be adapted using the PC-Tool (see MFT-P documentation)
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## Accessories

Electrical accessories	Description	Type
	Auxiliary switch 2 x SPDT add-on, grey	S2A GR
	Feedback potentiometer 140 Ω add-on	P140A
	Feedback potentiometer 200 Ω add-on	P200A
	Feedback potentiometer 500 Ω add-on	P500A
	Feedback potentiometer 1 kΩ add-on	P1000A
	Feedback potentiometer 2.8 kΩ add-on	P2800A
	Feedback potentiometer 5 kΩ add-on	P5000A
	Feedback potentiometer 10 kΩ add-on	P10000A
Tools	Description	Type
	Service Tool, with ZIP-USB function, for parametrisable and communicative Belimo actuators, VAV controller and HVAC performance devices	ZTH EU
	Belimo PC-Tool, Software for adjustments and diagnostics	MFT-P
	Adapter for Service-Tool ZTH	MFT-C

## Electrical installation

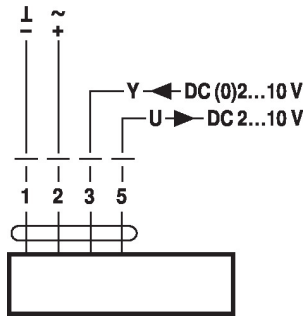


**Supply from isolating transformer.**

**Parallel connection of other actuators possible. Observe the performance data.**

### Wiring diagrams

AC/DC 24 V, modulating



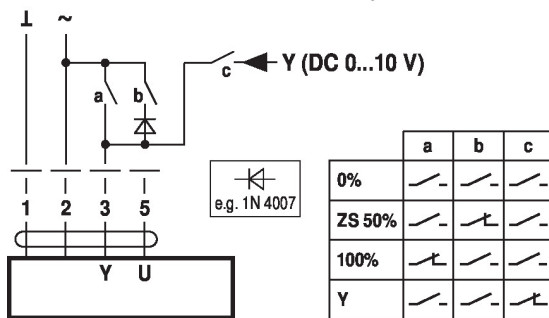
#### Cable colours:

- 1 = black
- 2 = red
- 3 = white
- 5 = orange

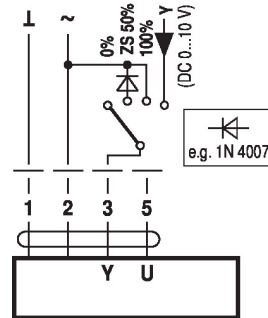
### Functions

#### Functions with basic values (conventional mode)

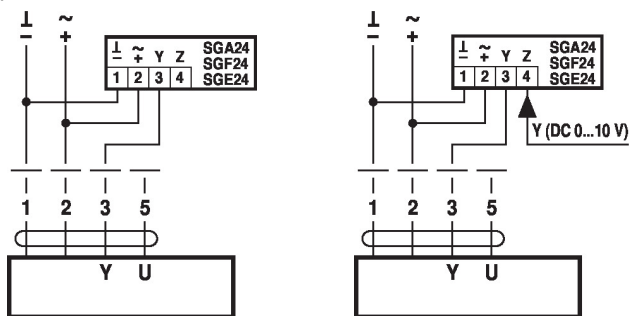
Override control with AC 24 V with relay contacts



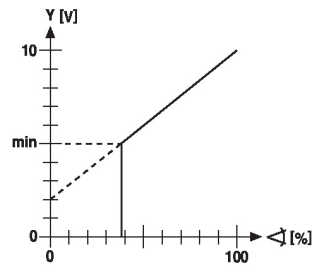
Override control with AC 24 V with rotary switch



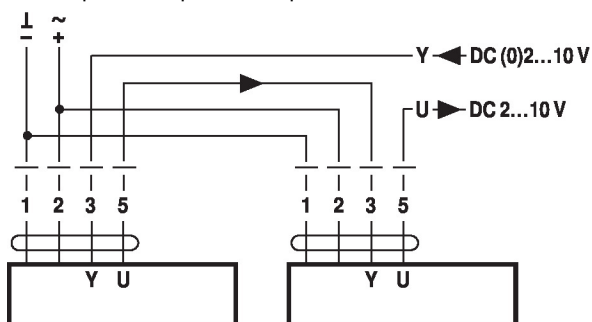
Control remotely 0...100% with positioner SG..



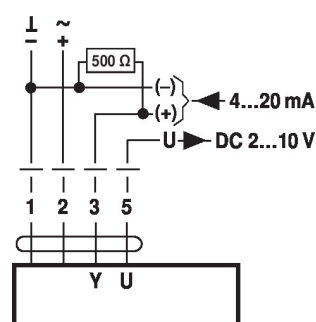
Minimum limit with positioner SG..



Follow-up control (position-dependent)



Control with 4...20 mA via external resistor

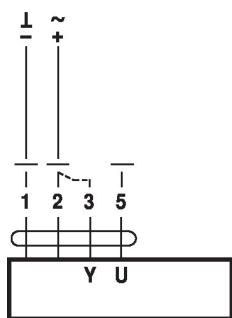


#### Caution:

The operating range must be set to DC 2...10 V.

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

## Functional check

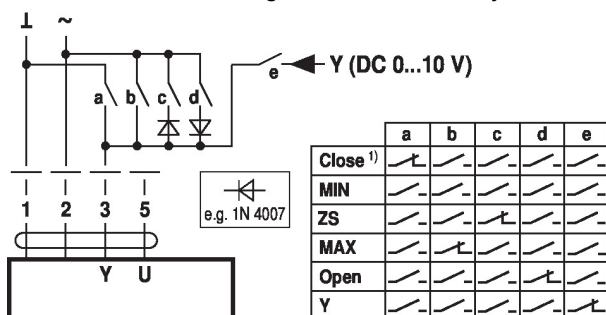


## Procedure

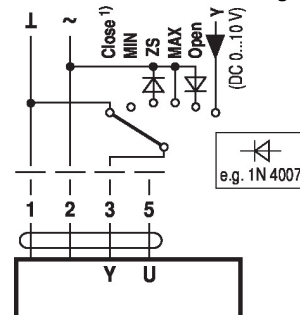
1. Connect 24 V to connections 1 and 2
2. Disconnect connection 3:
  - with direction of rotation 0: Actuator rotates to the left
  - with direction of rotation 1: Actuator rotates to the right
3. Short-circuit connections 2 and 3:
  - Actuator runs in opposite direction

## Functions with specific parameters (parametrisation necessary)

Override control and limiting with AC 24 V with relay contacts

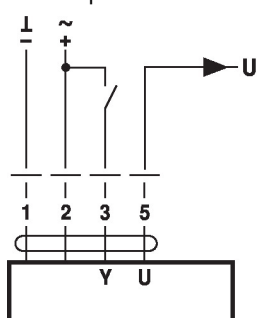


Override control and limiting with AC 24 V with rotary switch

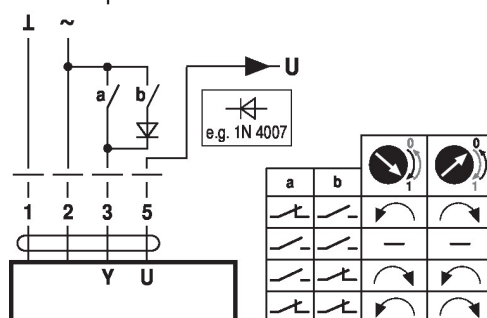


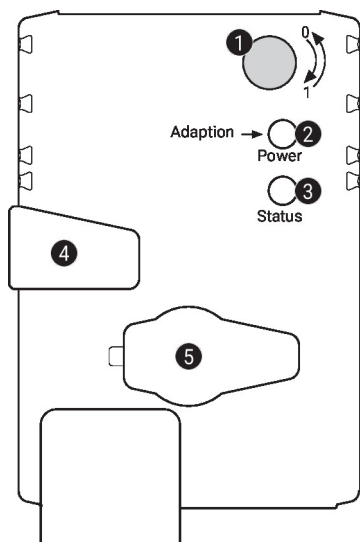
1) **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

Control open/close



Control 3-point



**Operating controls and indicators**

**1 Direction of rotation switch**

Switch over: Direction of rotation changes

**2 Push-button and LED display green**

Off: No power supply or malfunction  
 On: In operation  
 Press button: Triggers angle of rotation adaptation, followed by standard mode

**3 Push-button and LED display yellow**

Off: Standard mode  
 On: Adaptation or synchronisation process active  
 Press button: No function

**4 Manual override button**

Press button: Gear train disengages, motor stops, manual override possible  
 Release button: Gear train engages, synchronisation starts, followed by standard mode

**5 Service plug**

For connecting parametrisation and service tools

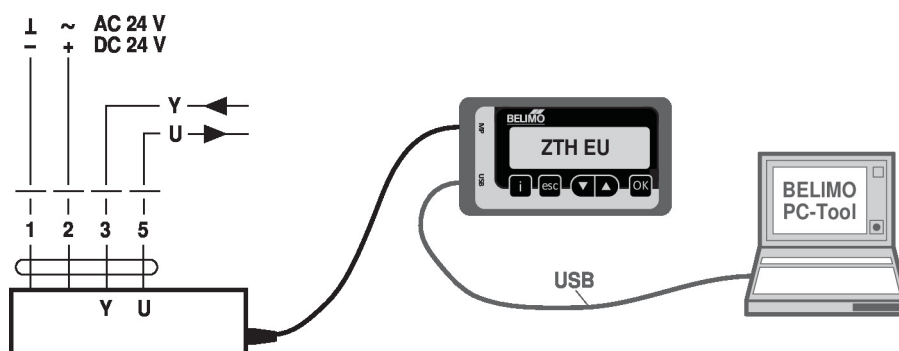
**Check power supply connection**

**2** Off and **3** On Possible wiring error in power supply

**Service**

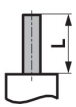
**Tools connection** The actuator can be parametrised by ZTH EU via the service socket.  
 For an extended parametrisation the PC tool can be connected.

Connection ZTH EU / PC-Tool






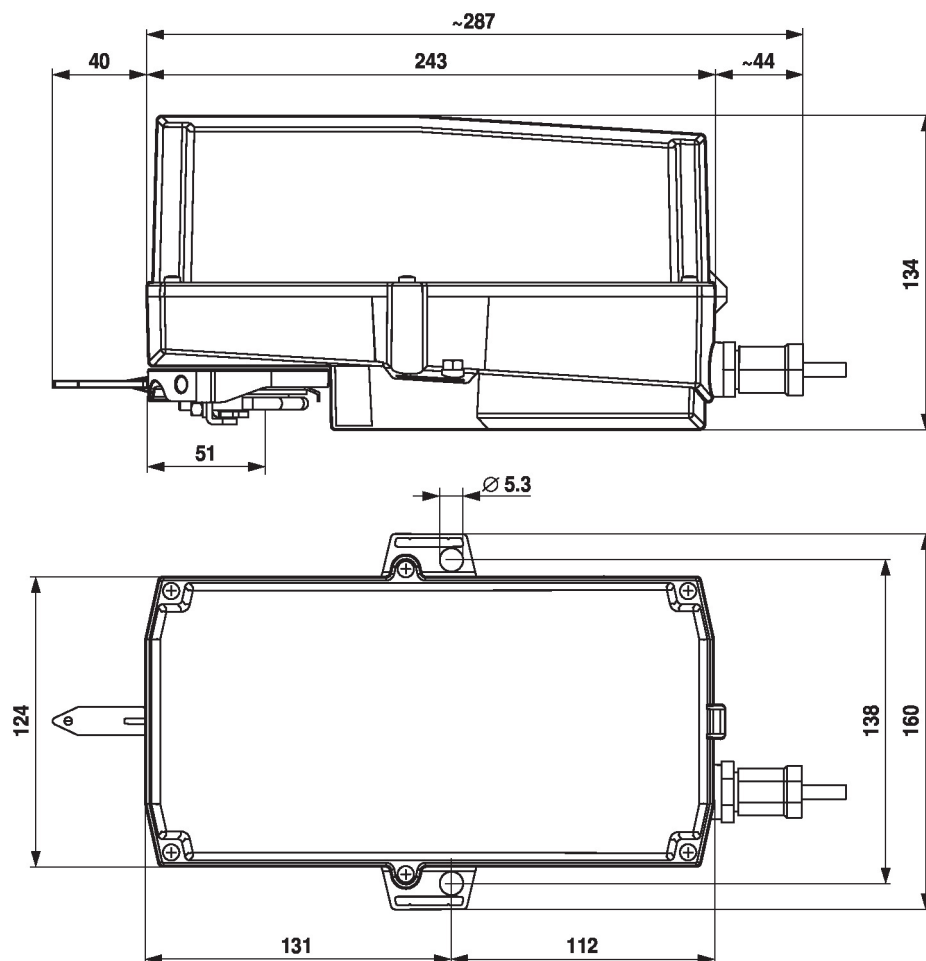
## Dimensions

## Spindle length

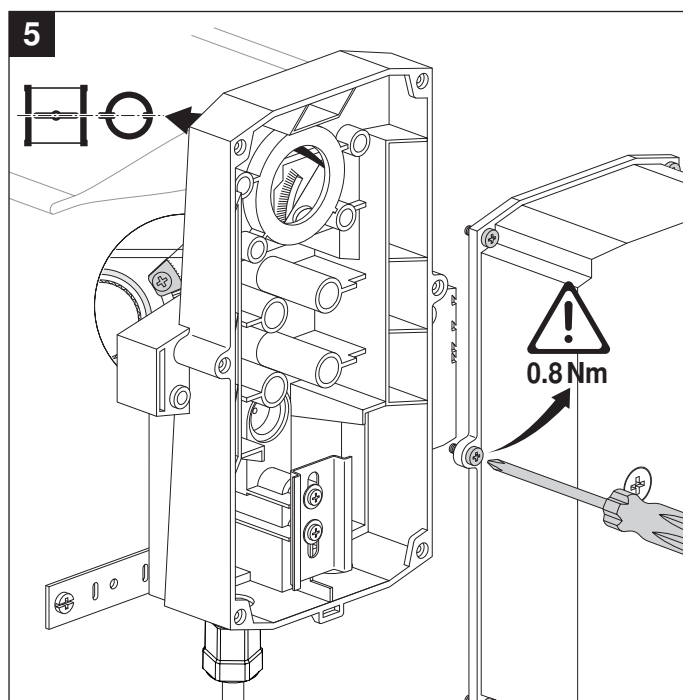
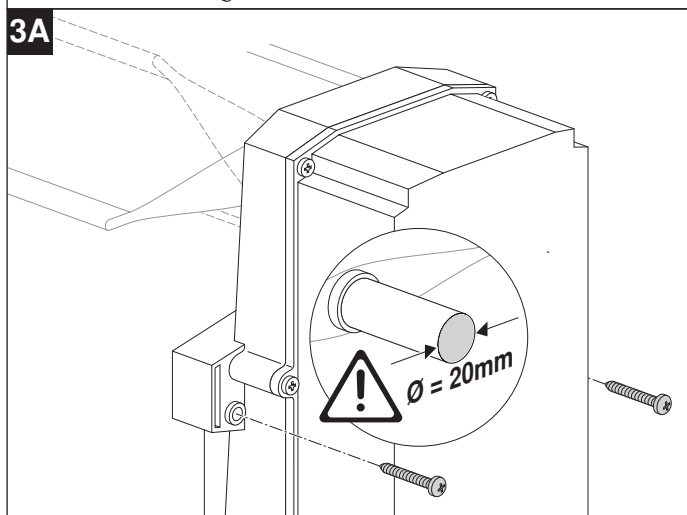
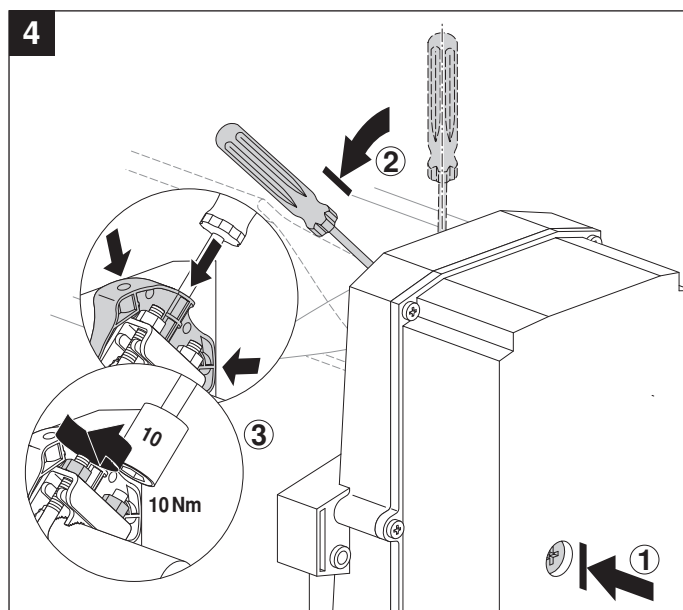
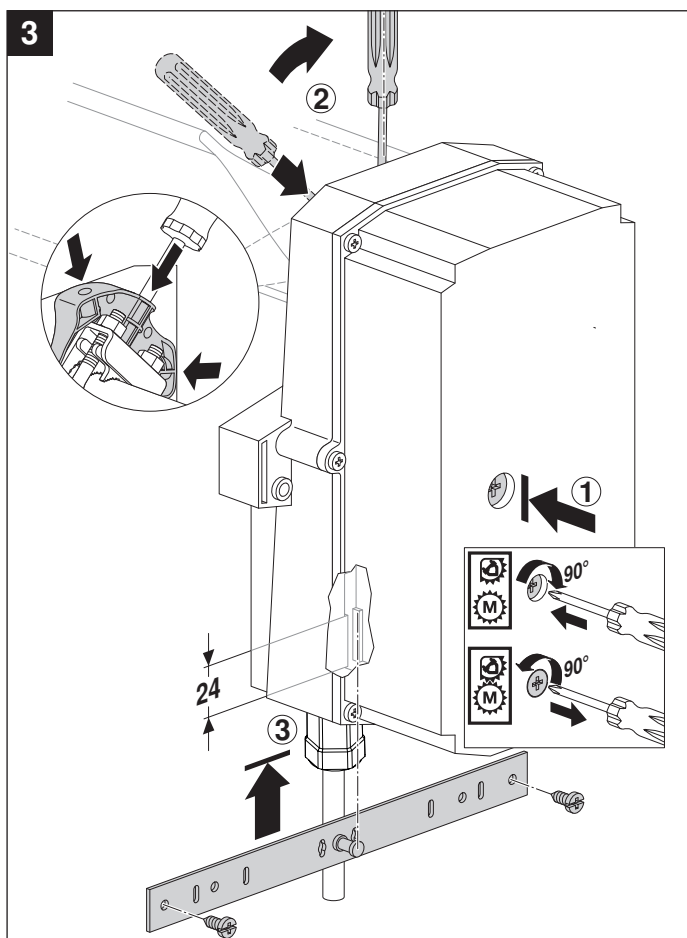
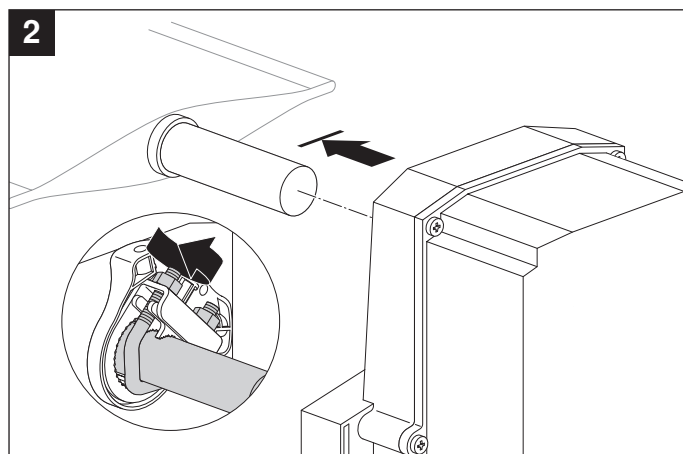
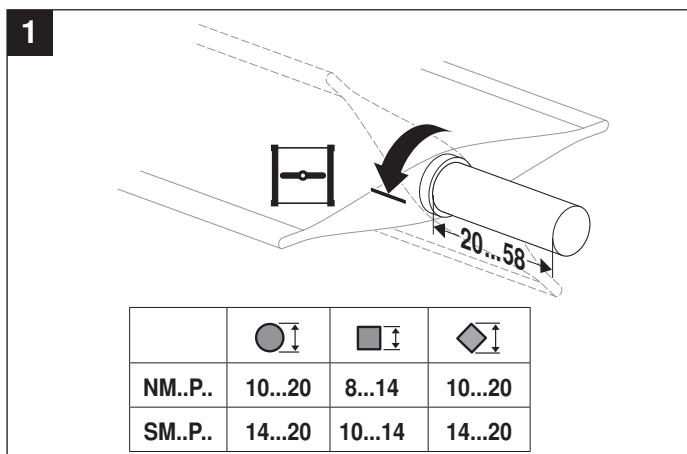
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	20...58

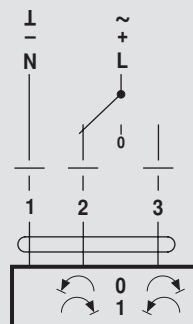
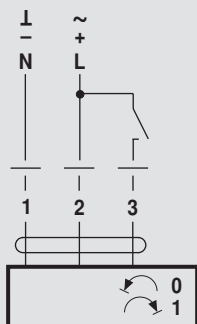
## Clamping range

		
10...20	8...14	10...20

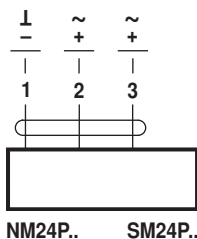




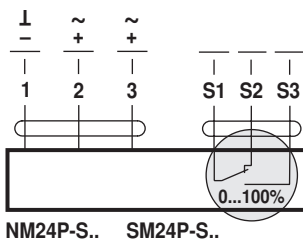




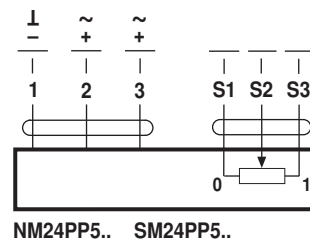
AC 24 V / DC 24 V



NM24P.. SM24P..

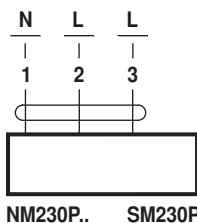


NM24P-S.. SM24P-S..

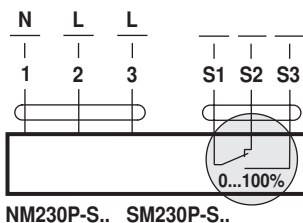


NM24PP5.. SM24PP5..

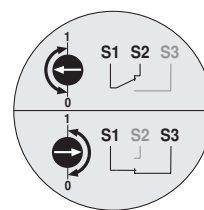
AC 100 ... 240 V ⚠



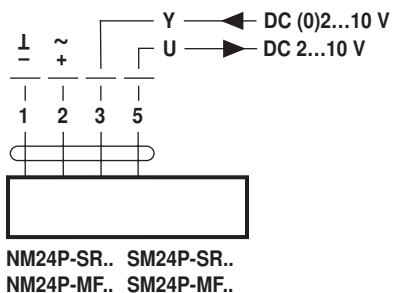
NM230P.. SM230P..



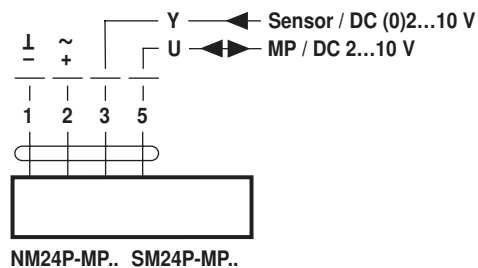
NM230P-S.. SM230P-S..



AC 24 V / DC 24 V

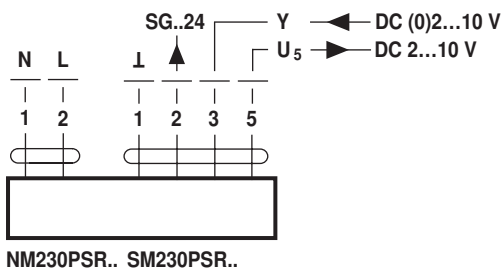


NM24P-SR.. SM24P-SR..  
NM24P-MF.. SM24P-MF..



NM24P-MP.. SM24P-MP..

AC 100 ... 240 V ⚠



NM230PSR.. SM230PSR..

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