

Multifunctional spring-return actuator for adjusting air dampers and slide valves in ventilation and air conditioning systems in buildings

- For air dampers up to approx. 0.4 m²
- Torque 2 Nm
- Nominal voltage AC/DC 24 V
- Control: modulating DC 0 ... 10 V or variable
- Position feedback DC 2 ... 10 V or variable
- Communication via BELIMO MP-Bus
- Conversion of sensor signals


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 | 2.5 W @ nominal torque |
| In operation | 1 W |
| At rest | 4 VA |
| For wire sizing | |
| Connection | Cable 1 m, 4 x 0.75 mm ² |
| Parallel operation | Yes |

| Functional data | Factory settings | Variable | Settings |
|-----------------|------------------|----------|----------|
|-----------------|------------------|----------|----------|

| | | | |
|--|------------------------|---|---|
| Torque (nominal torque) | Motor Spring-return | Min. 2 Nm @ nominal voltage Min. 2 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 2 ... 10 V | Starting point DC 0.5 ... 30 V End point DC 2.5 ... 32 V |
| Position feedback (measuring voltage U) | | DC 2 ... 10 V, max. 0.5 mA | Starting point DC 0.5 ... 8 V End point DC 2.5 ... 10 V |
| Position accuracy | | ±5% | |
| Direction of rotation | | Reversible with switch ↺ / ↻ | |
| Direction of motion at Y = 0 V | | At switch position 1 ↺ resp. 0 ↻ | Electronically reversible |
| Manual override | | No | |
| Angle of rotation | | Max. 95°↔ | |
| Running time | Motor Spring-return | 150 s / 90°↔ <25 s @ -20 ... 50°C / max. 60s @ -30°C | 75 ... 300 s |
| Automatic adjustment of running time, operating range and measuring signal U to match the mechanical angle of rotation | | Manual triggering of the adaption by switching from ↺ - ↻ twice within 5 s or with PC-Tool. | 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 | Motor Spring-return | Max. 35 dB (A) ~62 dB (A) | |
| Service life | | Min. 60'000 emergency settings | |
| Position indication | | Mechanical | |

Safety

| | |
|---------------------------|--|
| Protection class | III Safety extra-low voltage |
| Degree of protection | IP42 in any mounting position |
| EMC | CE according to 2004/108/EC |
| Mode of operation | Type 1 (to EN 60730-1) |
| Rated impulse voltage | 0.8 kV (to EN 60730-1) |
| Control pollution degree | 3 (to EN 60730-1) |
| Ambient temperature | -30 ... +50°C |
| Non-operating temperature | -40 ... +80°C |
| Ambient humidity | 95% RH, non-condensating (to EN 60730-1) |
| Maintenance | Maintenance-free |

Dimensions / Weight

| | |
|------------|----------------------------|
| Dimensions | See «Dimensions» on page 5 |
| Weight | Approx. 600 g |

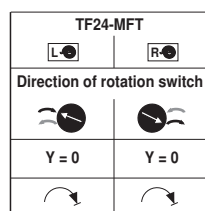
Safety notes



- 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 assembly.
- 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 | <p>The actuator moves the damper actuator to the operating position at the same time as tensioning the return spring. If the power supply is interrupted, the energy stored in the spring moves the damper back to its safe position.</p> <p><i>Conventional Mode:</i> The actuator is controlled with a standard modulating signal of DC 0 ... 10 V and moves to the position defined by the control signal. The measuring voltage U serves for the electrical display of the damper position 0 ... 100% and as slave control signal for other actuators.</p> <p><i>Operation on the MP-Bus:</i> 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.</p> |
| Converter for sensors | <p>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.</p> |
| Parameterisable actuators | <p>The factory settings cover the most common applications. Input and output signals and other parameters can be altered with the MFT-H parameterising device or the BELIMO Service Tool, MFT-P.</p> |
| Simple direct mounting | <p>Simple direct mounting on the damper spindle with a universal spindle clamp, supplied with an anti-rotation strap to prevent the actuator from rotating.</p> |
| High functional reliability | <p>The actuator is overload-proof, requires no limit switches and automatically stops when the end stop is reached.</p> |
| Home position | <p>When the supply voltage is switched on, the actuator automatically detects its safety position (zero initialisation). This process, which takes place with the actuator stationary, lasts approximately 15 s.</p> |



Accessories

| | Description | Data sheet |
|-------------------------------|---|--------------|
| Electrical accessories | Parameterizing device MFT-H | T2 - MFT-H |
| | PC-Tool MFT-P | T2 - MFT-P |
| | Positioner SGA24, SGF24, SGE24 (only in conventional mode) | T2 - SG..24 |
| | Digital position indication ZAD24 (only in conventional mode) | T2 - ZAD24 |
| | Room temperature controller CR24.. | S4 - CR24-.. |

Electrical installation

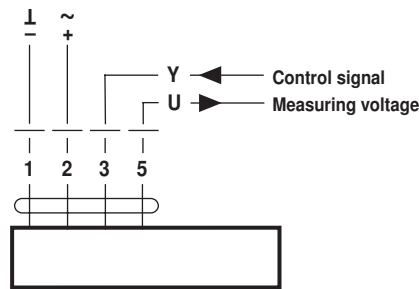
Wiring diagram

Notes

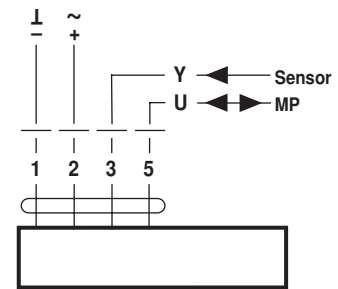
- Connect via safety isolation transformer.
- Parallel connection of other actuators possible. Note the performance data.



Conventional operation:

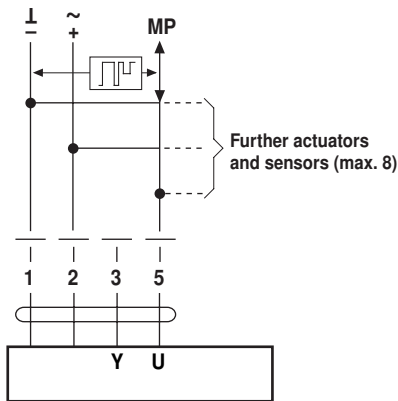


Operation on the MP-Bus



Functions when operated on MP-Bus

Connection on the MP-Bus

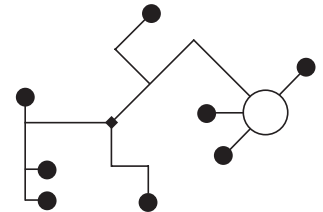


Communication and supply

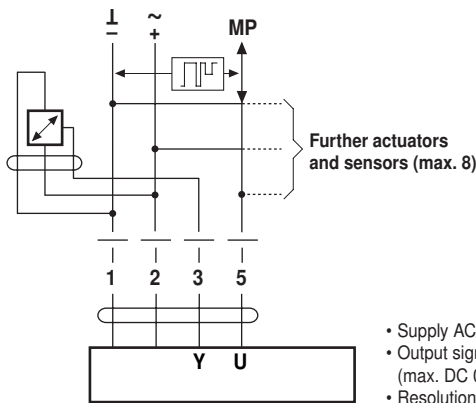
- in the same 3-wire cable
- no shielding or twisting necessary
 - no terminating resistors required

Power topology

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

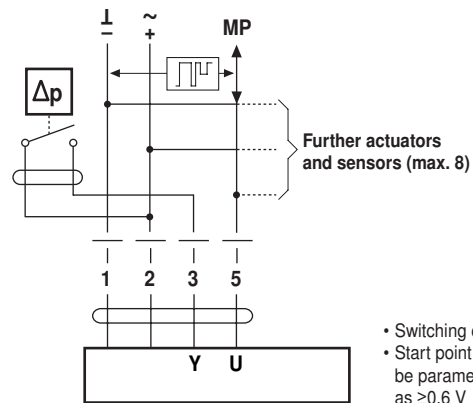


Connection of active sensors



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

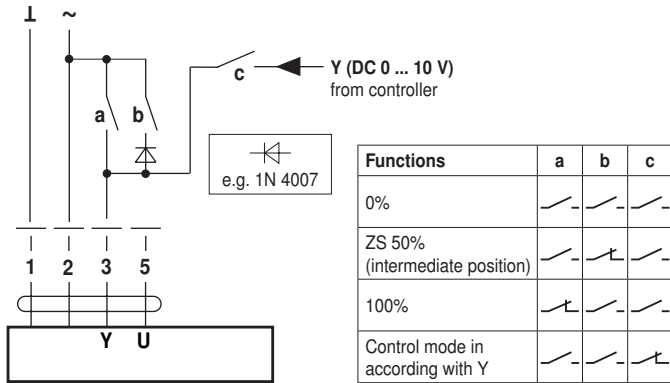
Connection of external switching contact



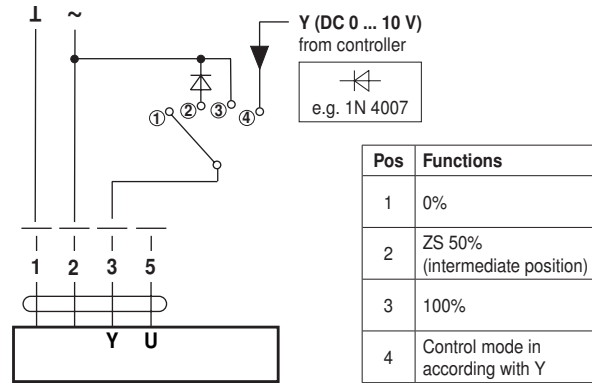
- Switching current 16 mA @ 24 V
- Start point of the operating range must be parameterised on the MP actuator as ≥ 0.6 V

Functions with basic values (only in conventional mode)

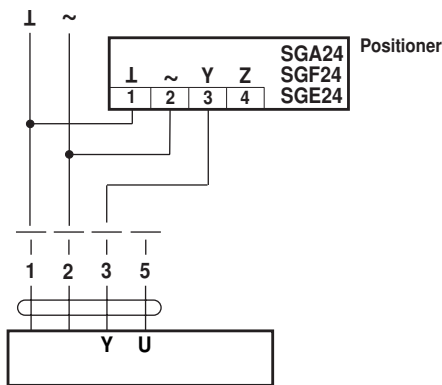
Override control with AC 24 V with relay contacts



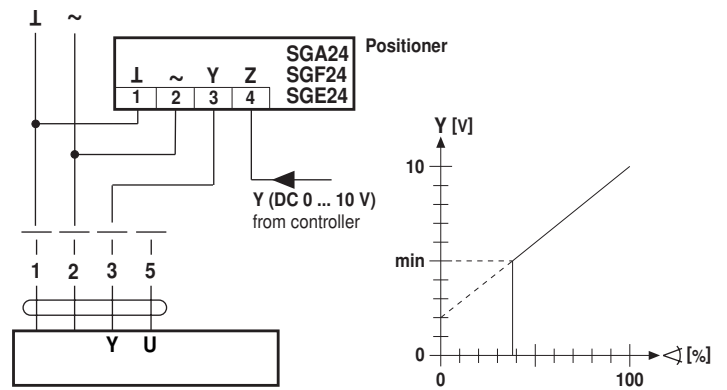
Override control with AC 24 V with rotary control switch



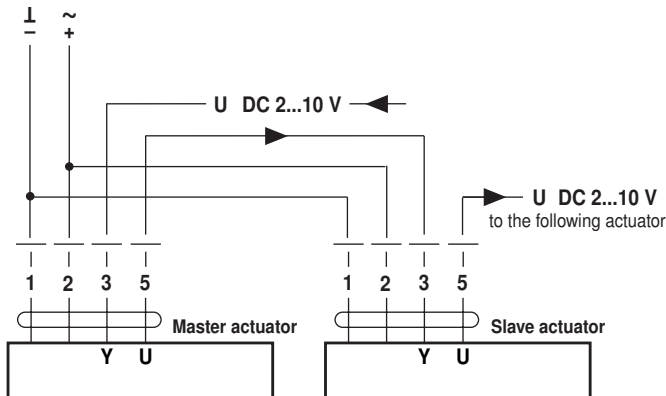
Remote control 0 ... 100 %



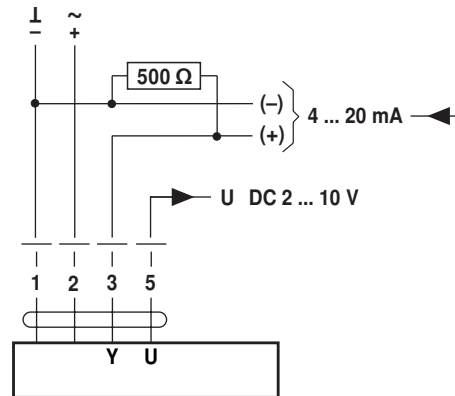
Minimum limit



Master/Slave control (position-dependent)

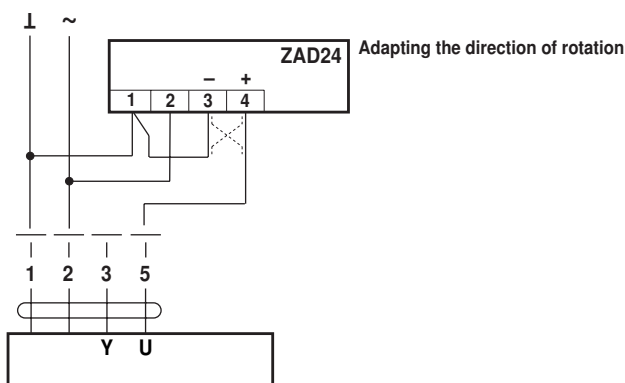


Control with 4 ... 20 mA via external resistance

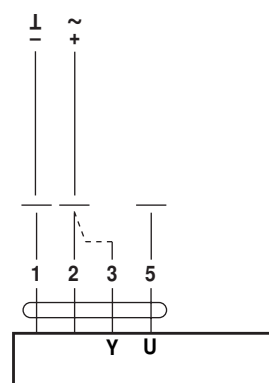


The 500 Ω resistor converts the 4 ... 20 mA current signal into a voltage signal DC 2 ... 10 V

Position indication



Functional check

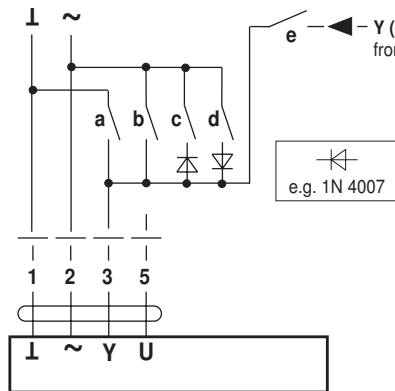


Procedure

- 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

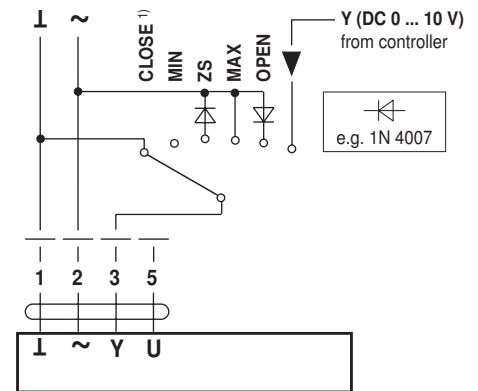
Functions for actuators with specific parameters

Override control and limiting with AC 24 V with relay contacts



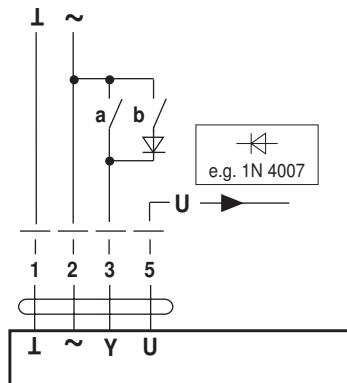
| Functions | a | b | c | d | e |
|----------------------------------|---|---|---|---|---|
| CLOSE ¹⁾ | | | | | |
| MIN | | | | | |
| ZS (intermediate position) | | | | | |
| MAX | | | | | |
| OPEN | | | | | |
| Control mode in according with Y | | | | | |

Override control and limiting with AC 24 V with rotary switch



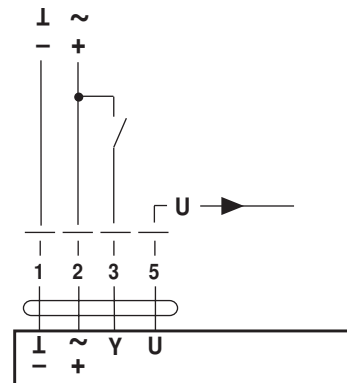
¹⁾ **Caution!** This function is only guaranteed if the start point of the operating range is defined as min. 0.6 V.

3-point control



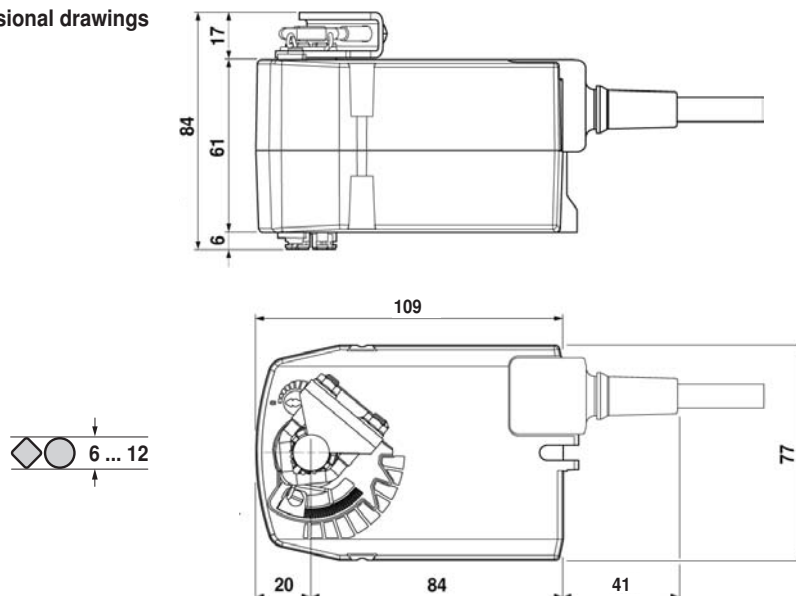
| | | TF24-MFT | |
|---|---|------------------------------|---|
| | | L | R |
| | | Direction of rotation switch | |
| a | b | | |
| | | | |
| | | | |
| | | | |
| | | | |

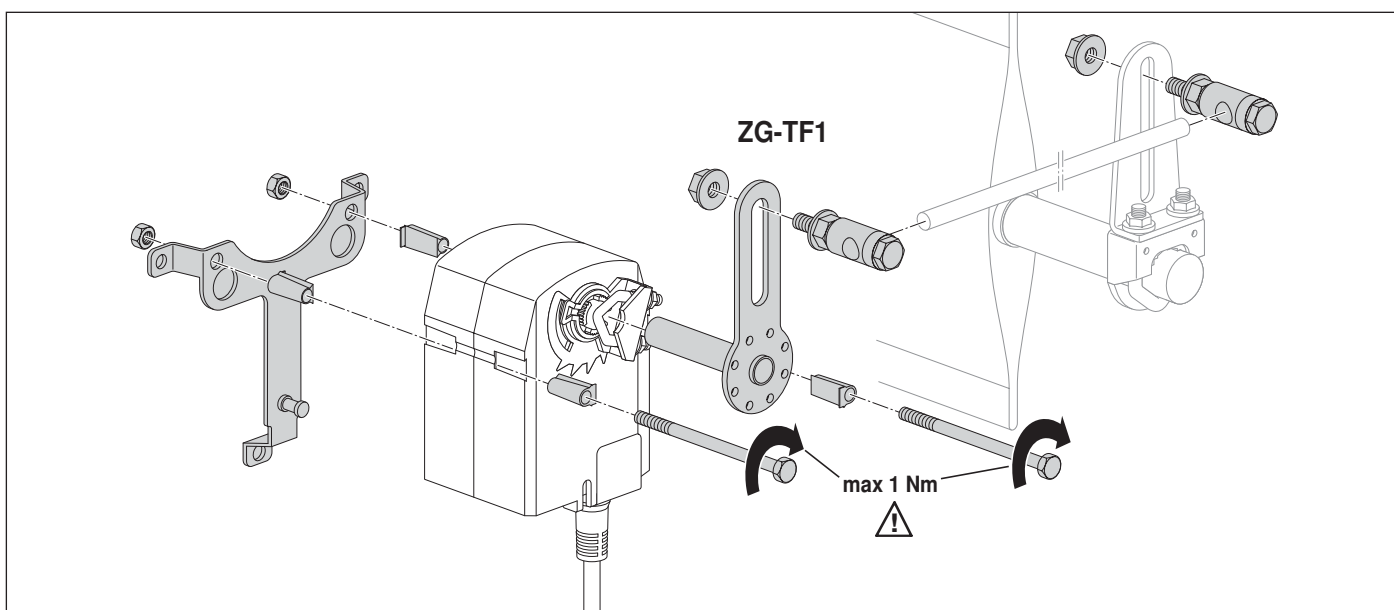
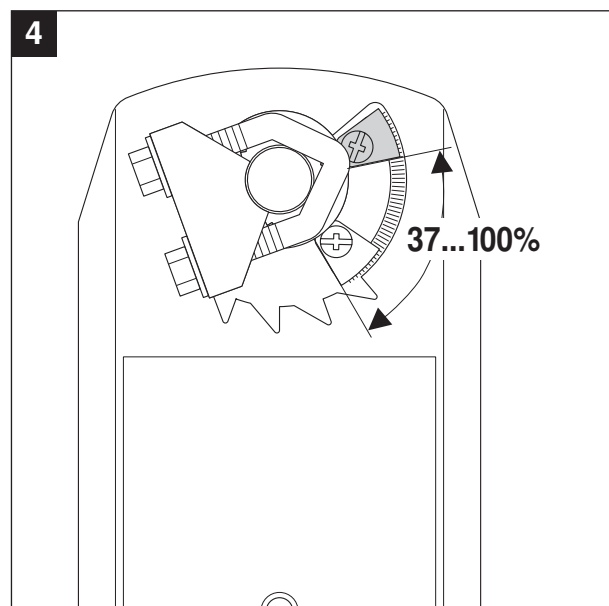
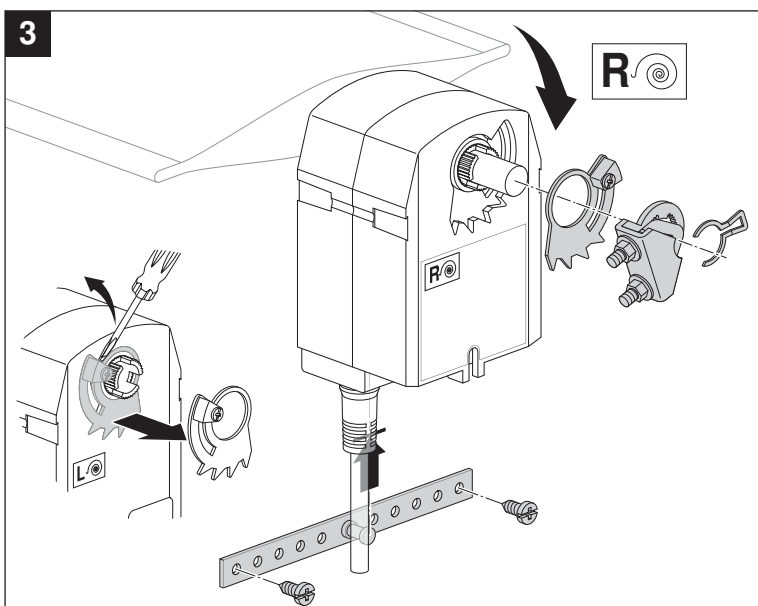
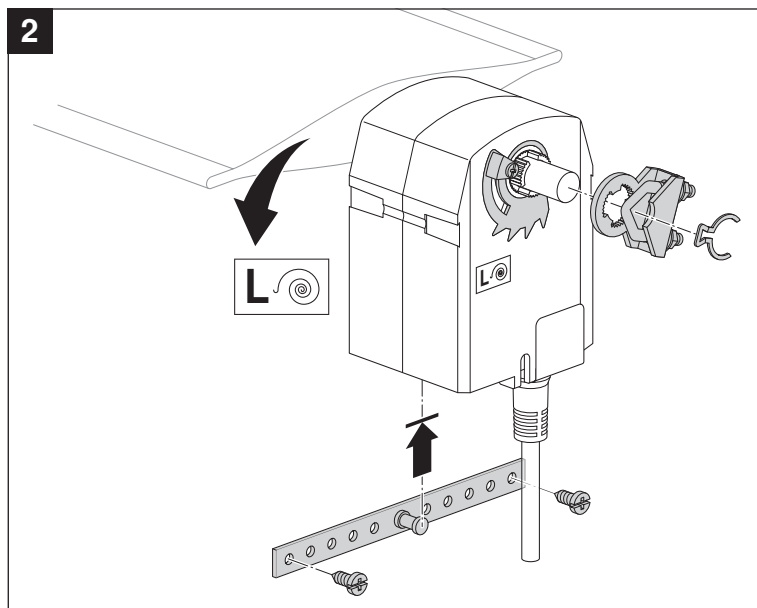
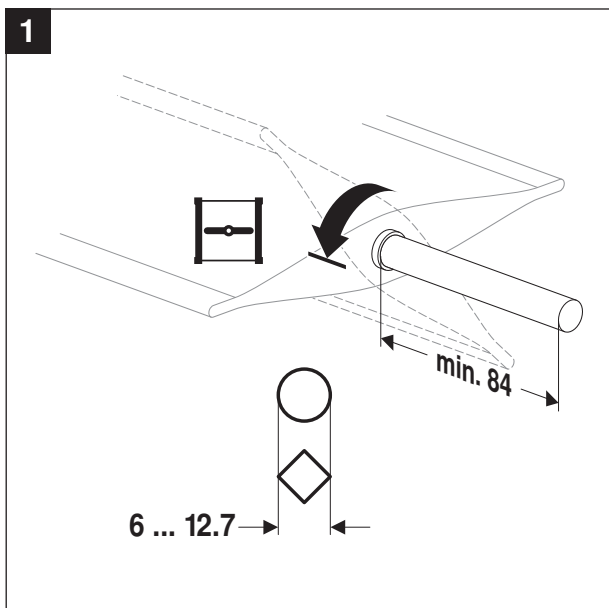
Open-close control

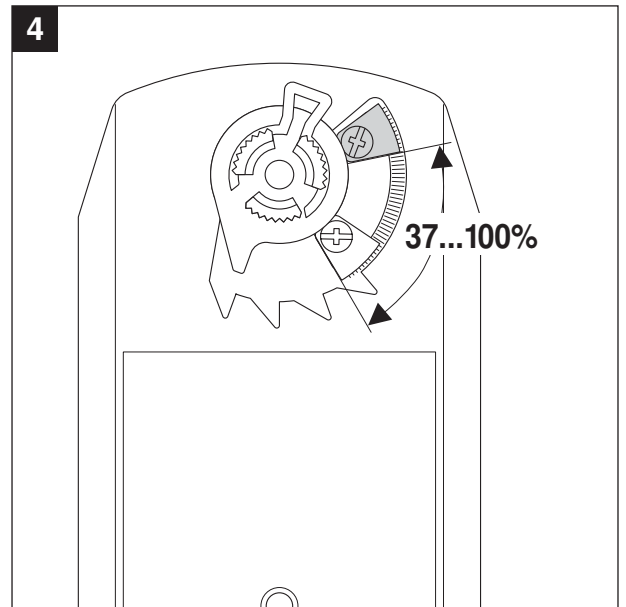
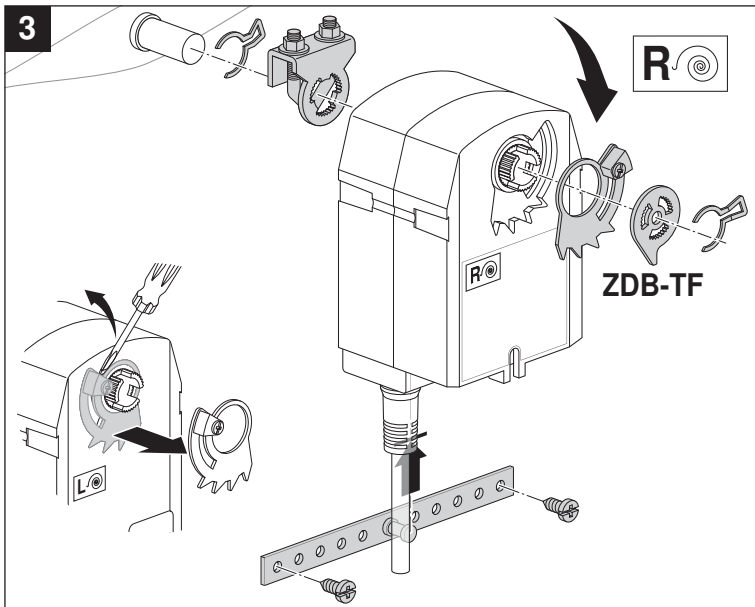
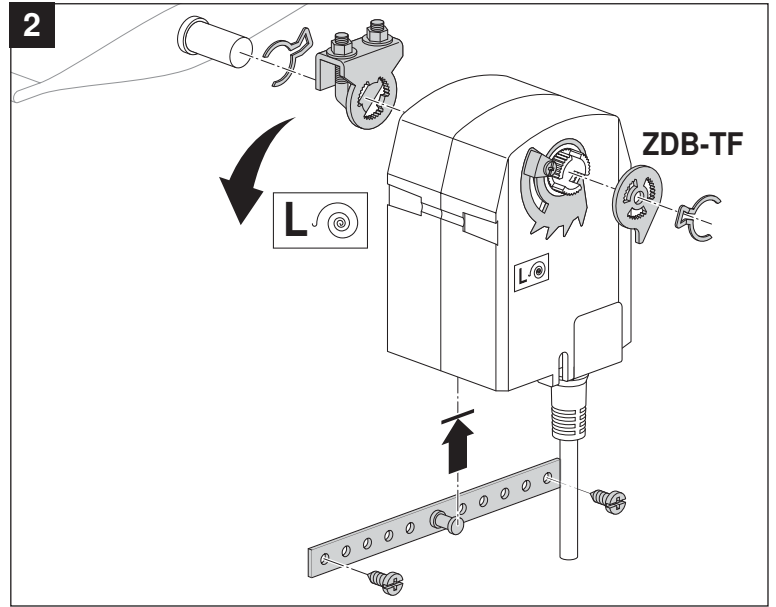
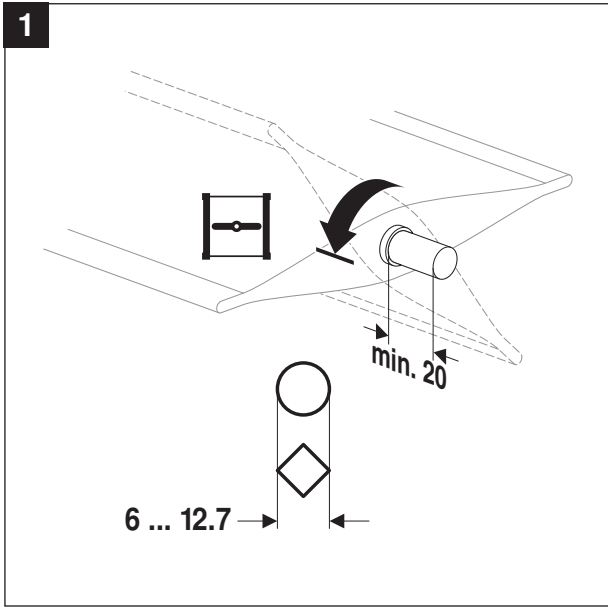


Dimensions [mm]

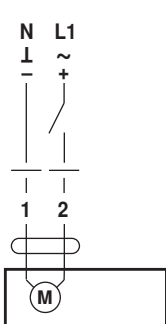
Dimensional drawings



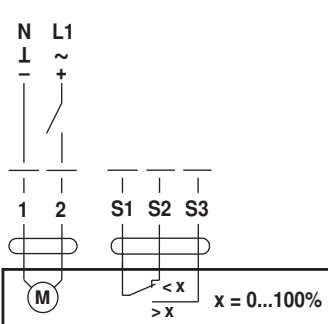




AC 230 V
AC 24 V / DC 24 V

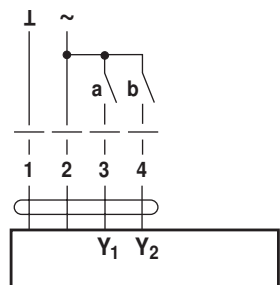


TF230 / TF24

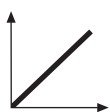


TF230-S / TF24-S

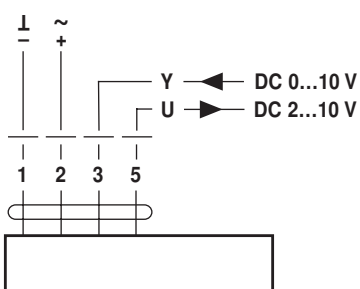
AC 24 V



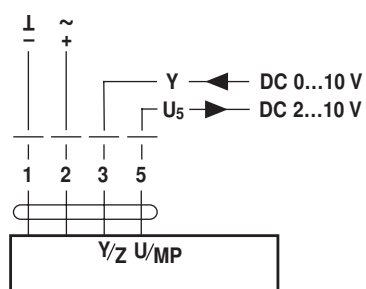
TF24-3



AC 24 V / DC 24 V



TF24-SR



TF24-MFT