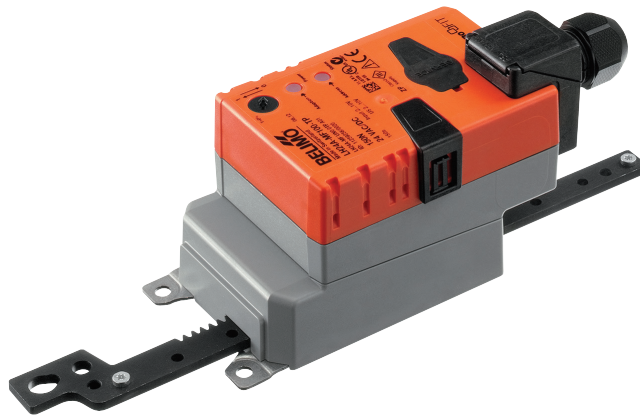


Parmeterisable linear actuator for adjusting dampers and slide valves in technical building installations

- Air damper size up to approx. 1 m<sup>2</sup>
- Actuating force 150 N
- Nominal voltage AC/DC 24 V
- Control modulating DC (0)2...10 V Variable
- Position feedback DC 2...10 V Variable
- Length of Stroke Max. 60 mm, adjustable in 20 mm increments



**Technical data**

<b>Electrical data</b>	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	1.2 W	
	Power consumption for wire sizing	5 VA	
	Connection supply / control	Terminals 4 mm <sup>2</sup> (cable Ø 4...10 mm, 4-wire)	
	Parallel operation	Yes (note the performance data)	
	<b>Functional data</b>	Actuating force motor	Min. 150 N
Modifiable actuating force		25%, 50%, 75% reduziert	
Positioning signal Y		DC 0...10 V	
Positioning signal Y note		Input impedance 100 kΩ	
Control signal Y variable		Open-close 3-point (AC only) Modulating (DC 0...32 V)	
Operating range Y		DC 2...10 V	
Operating range Y variable		Start point DC 0.5...30 V End point DC 2.5...32 V	
Position feedback U		DC 2...10 V	
Position feedback U note		Max. 0.5 mA	
Position feedback U variable		Start point DC 0.5...8 V End point DC 2.5...10 V	
Position accuracy		±5%	
Direction of motion motor		Selectable with switch	
Direction of motion note		Y = 0 V: with switch 0 (retracted) / 1 (extended)	
Direction of motion variable		Electronically reversible	
Manual override		With push-button, can be locked	
Length of Stroke		Max. 60 mm, adjustable in 20 mm increments	
Stroke limitation		can be limited on both sides with mechanical end stops	
Running time motor		150 s / 100 mm	
Running time motor note		corresponds to 90 s / 60 mm	
Motor running time variable		70...270 s / 100 mm	
Adaption setting range		manual	
Adaption setting range variable		No action Adaption when switched on Adaption after pushing the gear disengagement button	
Override control		MAX (maximum position) = 100% MIN (minimum position) = 0% ZS (intermediate position, AC only) = 50%	
Override control variable		MAX = (MIN + 32%)...100% MIN = 0%...(MAX - 32%) ZS = MIN...MAX	
Sound power level motor		45 dB(A)	
<b>Safety</b>		Protection class IEC/EN	III Safety extra-low voltage
		Protection class UL	UL Class 2 Supply
	Degree of protection IEC/EN	IP54	
	Degree of protection NEMA/UL	NEMA 2, UL Enclosure Type 2	

## Technical data

<b>Safety</b>	EMC	CE according to 2014/30/EU
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Certification UL	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1:02
	Mode of operation	Type 1
	Rated impulse voltage supply / control	0.8 kV
	Control pollution degree	3
	Ambient temperature	-30...50 °C
	Non-operating temperature	-40...80 °C
	Ambient humidity	95% r.h., non-condensing
	Maintenance	Maintenance-free
<b>Weight</b>	Weight	0.45 kg

## Safety notes



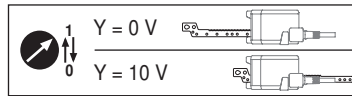
- The device must not be used outside the specified field of application, especially not in aircraft or in any other airborne means of transport.
- Outdoor application: only possible in case that no (sea)water, snow, ice, insolation or aggressive gases interfere directly with the actuator and that is ensured that the ambient conditions remain at any time within the thresholds according to the data sheet.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied 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 rotary supports and coupling pieces available as accessories must always be used if transverse forces are likely. In addition, the actuator must not be tightly bolted to the application. It must remain movable via the rotary support (refer to «Assembly notes»).
- If the actuator is exposed to severely contaminated ambient air, appropriate precautions must be taken on the system side. Excessive deposits of dust, soot etc. can prevent the gear rod from being extended and retracted correctly.
- If not installed horizontally, the gear disengagement pushbutton may only be actuated when there is no pressure on the gear rod.
- To calculate the actuating force required for air dampers and slide valves, the specifications supplied by the damper manufacturers concerning the cross section, the design, the installation site and the ventilation conditions must be observed.
- If a rotary support and/or coupling piece is used, actuation force losses are to be expected.
- 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.

## Product features

<b>Mode of operation</b>	The actuator is connected with a standard modulating signal of DC 0...10V and drives to the position defined by the positioning signal. Measuring voltage U serves for the electrical display of the damper position 0...100% and as slave control signal for other actuators.
<b>Parameterisable 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>	The actuator can be directly connected with the application using the enclosed screws. The head of the gear rod is connected to the moving part of the ventilating application individually on the mounting side or with the Z-KS2 coupling piece provided.
<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 stroke</b>	If a stroke limitation will be adjusted, the mechanical operating range on this side of the gear rod can be used starting with an extension length of 20 mm and then can be limited respectively in increments of 20 mm by means of mechanical end stops Z-AS2.
<b>High functional reliability</b>	The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.

## Product features

**Home position** 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 positioning signal.



**Adaption and synchronisation** An adaption can be triggered manually by pressing the “Adaption” button or with the PC-Tool. Both mechanical end stops are detected during the adaption (entire setting range).  
Automatic synchronisation after pressing the gearbox disengagement button is configured. The synchronisation is in the home position (0%).  
The actuator then moves into the position defined by the positioning signal.  
A range of settings can be adapted using the PC-Tool (see MFT-P documentation)

## Accessories

	Description	Type
<b>Electrical accessories</b>	Digital position indicator for front-panel mounting, 0...99%, front mass 72 x 72 mm	ZAD24
	Range controller for wall mounting, adjustable electron. Min./max. angle of rotation limitation	SBG24
	Positioner for wall mounting, range 0...100%	SGA24
	Positioner in a conduit box, range 0...100%	SGE24
	Positioner for front-panel mounting, range 0...100%	SGF24
	Positioner for wall mounting, range 0...100%	CRP24-B1
	Connecting cable 5 m, A+B: RJ12 6/6, To ZTH/ZIP-USB-MP	ZK1-GEN
	Connection cable 5 m, A: RJ11 6/4, B: Free wire end, To ZTH/ZIP-USB-MP	ZK2-GEN
<b>Mechanical accessories</b>	<b>Description</b>	<b>Type</b>
	End stop set for LH	Z-AS2
	Rotary support for compensation of transverse forces	Z-DS1
	Coupling piece M6 for LH, galvanised steel	Z-KS2
	Cable sleeve for Ø 4-6 mm, suitable for strain relief NG	43235-00001
	Strain relief bushing (cable sleeve) for Ø 6-8 mm, suitable for strain relief NG	43235-00002
	Cable sleeve for Ø 8-10 mm, suitable for strain relief NG	43235-00003
<b>Service Tools</b>	<b>Description</b>	<b>Type</b>
	Service Tool, for MF/MP/Modbus/LonWorks actuators and VAV-Controller	ZTH EU
	Belimo PC-Tool, software for adjustments and diagnostics	MFT-P
	Adapter to Service Tool ZTH	MFT-C

Electrical installation

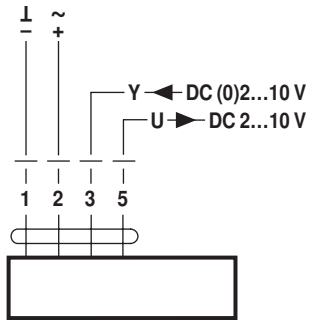


Notes

- Connection via safety isolating transformer.
- Parallel connection of other actuators possible. Observe the performance data.

Wiring diagrams

AC/DC 24 V, modulating



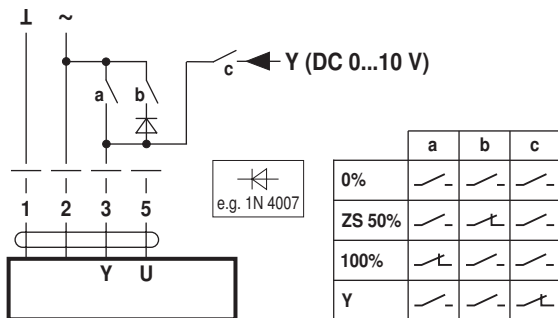
Cable colours:

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

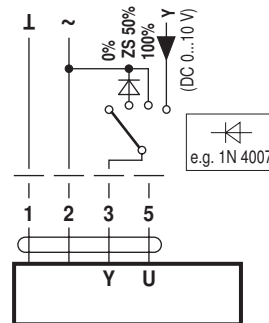
Functions

Functions with basic values (conventional mode)

Override control with AC 24 V with relay contacts

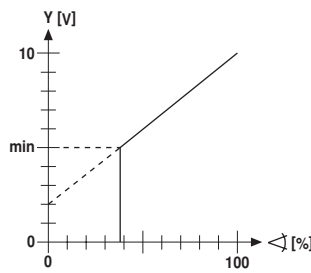
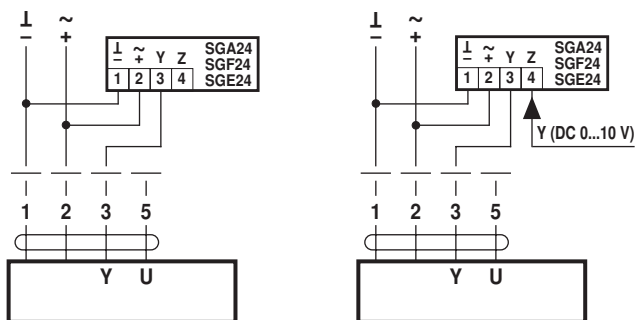


Override control with AC 24 V with rotary switch

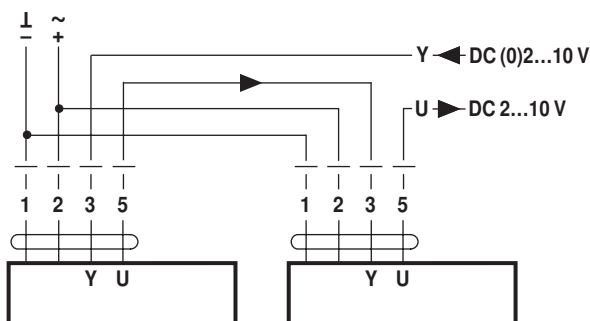


Remote control 0...100% with positioner SG..

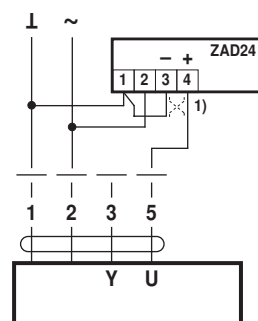
Minimum limit with positioner SG..



Follow-up control (position-dependent)



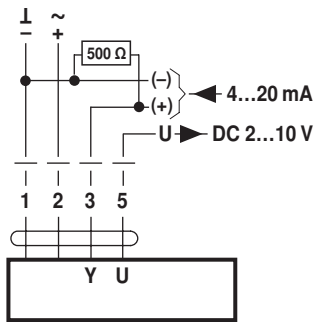
Position indication



1) Adapting the direction of stroke

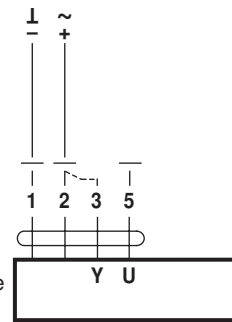
**Functions**

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

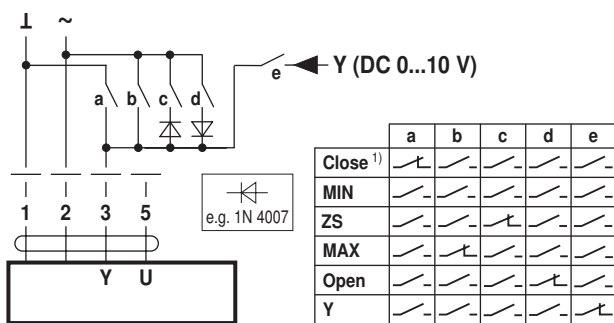


**Procedure**

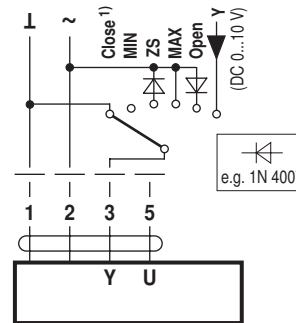
1. Apply 24 V to connection 1 and 2
2. Disconnect connection 3:
  - for direction of stroke 0: Actuator travels in the direction "retracted"
  - for direction of stroke 1: Actuator travels in the direction "extended"
3. Short circuit connections 2 and 3:
  - Actuator runs in the opposite direction

**Functions for actuators with specific parameters (Parametrisation with PC-Tool necessary)**

Override control and limiting with AC 24 V with relay contacts

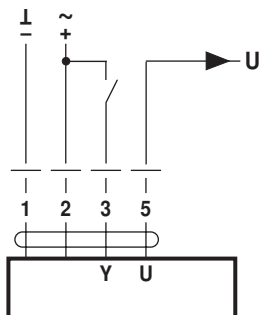


Override control and limiting with AC 24 V with rotary switch

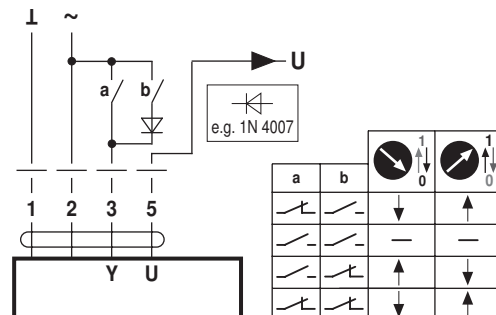


1) **Caution:** This function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

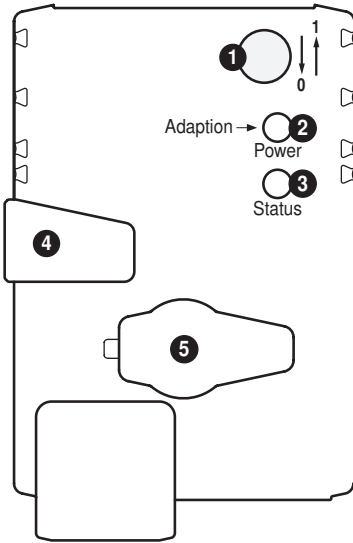
Control open-close



Control 3-point



## Operating controls and indicators



### 1 Direction of stroke switch

Switch over: Direction of stroke changes

### 2 Push-button and LED display green

Off: No power supply or malfunction

On: In operation

Press button: Triggers stroke adaptation, followed by standard mode

### 3 Push-button and LED display yellow

Off: Standard mode

On: Adaptation or synchronising process active

Press button: No function

### 4 Gear disengagement button

Press button: Gear disengages, motor stops, manual override possible

Release button: Gear engages, synchronisation starts, followed by standard mode

### 5 Service plug

For connecting parameterisation and service tools

### Check power supply connection

2 Off and 3 On Possible wiring error in power supply

## Installation notes



### Notes

- If a rotary support and/or coupling piece is used, losses in the actuation force losses are to be expected.

### Applications without transverse force

The linear actuator is screwed directly to the housing at three points. Afterwards, the head of the gear rod is fastened to the moving part of the ventilation application (e.g. damper or slide valve).

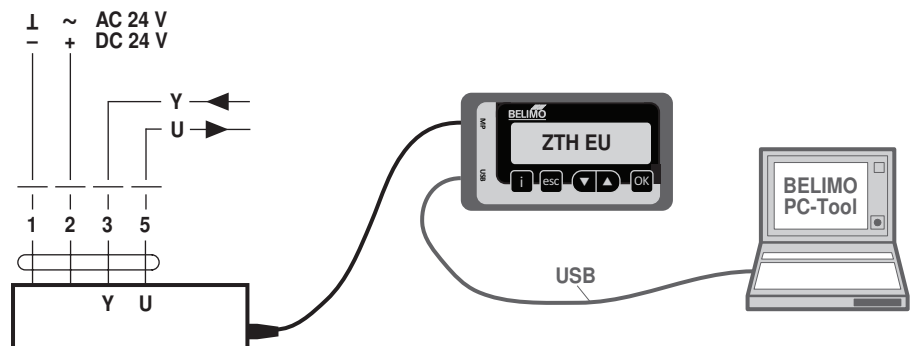
### Applications with transverse forces

Connect the coupling piece with the internal thread (Z-KS2) to the head of the gear rod. Screw the rotary support (Z-DS1) to the ventilation application. Afterwards, the linear actuator is screwed to the previously mounted rotary support with the enclosed screw. Afterwards, the coupling piece, which is mounted to the head of the gear rod, is attached to the moving part of the ventilating application (e.g. damper or slide valve). The transverse forces can be compensated for to a certain limit with the rotary support and/or coupling piece. The maximum permissible swivel angle of the rotary support and coupling piece is 10°, laterally and upwards.

## Service

### Service Tools connection

The actuator can be parameterised by ZTH EU via the service socket. For an extended parameterisation the PC tool can be connected.



Dimensions [mm]

Dimensional drawings

