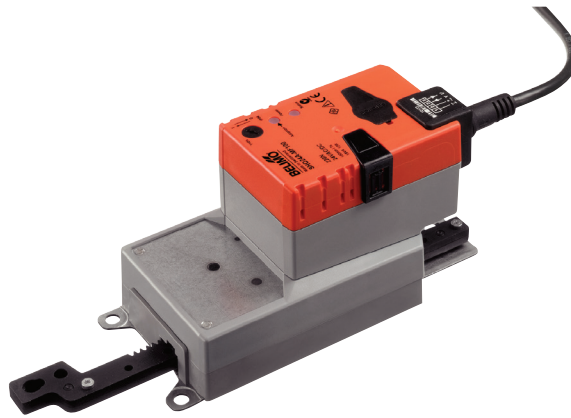


Configurable linear actuator for adjusting dampers and slide valves in technical building installations

- Air damper size up to approx. 1.3 m²
- Actuating force 200 N
- Nominal voltage AC/DC 24 V
- Control modulating 2...10 V variable
- Position feedback 2...10 V variable
- Length of Stroke Max. 100 mm, adjustable in 20 mm increments
- Running time motor 7 s variable


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	13 W
	Power consumption in rest position	2 W
	Power consumption for wire sizing	23 VA
	Power consumption for wire sizing note	I _{max} 20 A @ 5 ms
	Connection supply / control	Cable 1 m, 4 x 0.75 mm ²
	Parallel operation	Yes (note the performance data)
	Functional data	Torque variable
Actuating force motor		200 N
Actuating force variable		25%, 50%, 75% reduziert
Operating range Y		2...10 V
Input Impedance		100 kΩ
Options positioning signal		Open/close Modulating (DC 0...32 V)
Operating range Y variable		Start point 0.5...30 V End point 2.5...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
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
Stroke		100 mm
Length of Stroke		Max. 100 mm, adjustable in 20 mm increments
Minimum stroke		40 mm
Stroke limitation		can be limited on both sides with mechanical end stops
Running time motor		7 s / 100 mm
Running time motor variable		7...30 s / 100mm
Adaptation setting range		manual (automatic on first power-up)
Adaptation setting range variable		No action Adaptation when switched on Adaptation 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	56 dB(A)	
Safety	Protection class IEC/EN	III Safety Extra-Low Voltage (SELV)
	Protection class UL	UL Class 2 Supply
	Degree of protection IEC/EN	IP54

Technical data

Safety	Degree of protection NEMA/UL	NEMA 2
	Enclosure	UL Enclosure Type 2
	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 UL60730-1A, UL60730-2-14 and CAN/CSA E60730-1:02
	Certification UL note	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
	Control pollution degree	3
	Ambient temperature	-30...40 °C
	Ambient temperature note	Caution: +40...+50 °C utilisation possible only under certain restrictions. Please contact your supplier.
	Storage temperature	-40...80 °C
	Ambient humidity	Max. 95% r.H., non-condensing
	Servicing	maintenance-free
Weight	Weight	1.4 kg

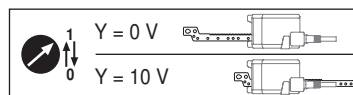
Safety notes



- 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.
- Cables must not be removed from the device.
- The rotary supports and coupling pieces available as accessories and 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 push-button 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.
- Self-adaptation is necessary when the system is commissioned or whenever the stroke limiting is adjusted (press the adaptation push-button).
- 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

Mode of operation	The actuator is connected with a standard modulating signal of 0...10 V and drives to the position defined by the positioning signal. Measuring voltage U serves for the electrical display of the damper position 0.5...100% and as slave control signal for other actuators.
Parametrisable actuators	The factory settings cover the most common applications. Single parameters can be modified with the Belimo Service Tools MFT-P or ZTH EU.
Simple direct mounting	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-KS1 coupling piece provided for this purpose.
Manual override	Manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked).
Adjustable stroke	If a stroke limitation will be adjusted, the 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 the mechanical end stops Z-AS1. A minimum permissible stroke of 40 mm must be allowed for.
High functional reliability	The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.
Home position	The first time the supply voltage is switched on, i.e. at the time of commissioning, the actuator carries out an adaption, which is when the operating range and position feedback adjust themselves to the mechanical setting range. The detection of the mechanical end stops enables a gentle approach to the end positions, thus protecting the actuator mechanics. The actuator then moves into the position defined by the positioning signal.



Adaption and synchronisation	<p>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).</p> <p>Automatic synchronisation after pressing the gearbox disengagement button is configured. The synchronisation is in the home position (0%).</p> <p>The actuator then moves into the position defined by the positioning signal.</p> <p>A range of settings can be adapted using the PC-Tool (see MFT-P documentation)</p>
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Accessories

	Description	Type
Electrical accessories	Signal converter voltage/current 100 kΩ Supply AC/DC 24 V	Z-UIC
	Range controller for wall mounting	SBG24
	Positioner for wall mounting	SGA24
	Positioner for built-in mounting	SGE24
	Positioner for front-panel mounting	SGF24
	Positioner for wall mounting	CRP24-B1
	Connection cable 5 m, A: RJ11 6/4 ZTH EU, B: 6-pin service socket for Belimo device	ZK1-GEN
	Connection cable 5 m, A: RJ11 6/4 ZTH EU, B: free wire end for connection to MP/PP terminal	ZK2-GEN
Mechanical accessories	Description	Type
	End stop kit, Multipack 20 pcs.	Z-AS1
	Rotary support, for linear actuator	Z-DS1
	Coupling piece M8	Z-KS1
Service Tools	Description	Type
	Service Tool, with ZIP-USB function	ZTH EU
	Belimo PC-Tool, Software for adjustments and diagnostics	MFT-P
	Adapter for Service-Tool ZTH	MFT-C

Electrical installation

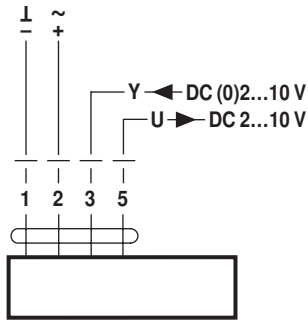


Notes

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

Wiring diagrams

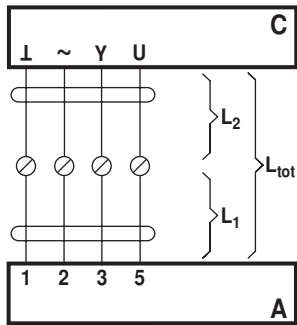
AC/DC 24 V, modulating



Cable colours:

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

Signal cable lengths

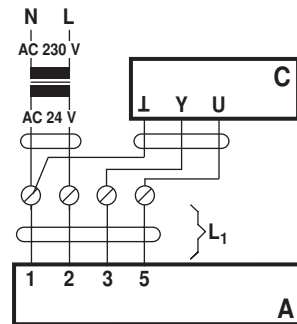


L ₂ ┴ / ~	L _{tot} = L ₁ + L ₂	
	AC	DC
0.75 mm ²	≤30 m	≤5 m
1.00 mm ²	≤40 m	≤8 m
1.50 mm ²	≤70 m	≤12 m
2.50 mm ²	≤100 m	≤20 m

- A = Actuator
- C = Control unit (controlling unit)
- L₁ = Connecting cable of the actuator
- L₂ = Customer cable
- L_{tot} = Maximum signal cable length

Note:

When several actuators are connected in parallel, the maximum signal cable length must be divided by the number of actuators.



- A = Actuator
- C = Control unit (controlling unit)
- L₁ = Connecting cable of the actuator

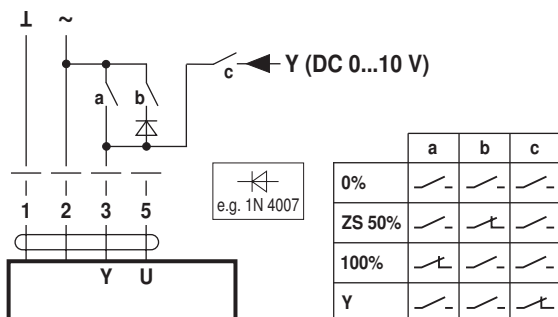
Note:

There are no special restrictions on installation if the supply and the data cable are routed separately.

Functions

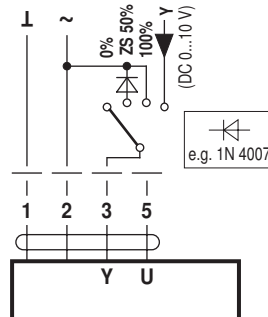
Functions with basic values (conventional mode)

Override control with AC 24 V with relay contacts



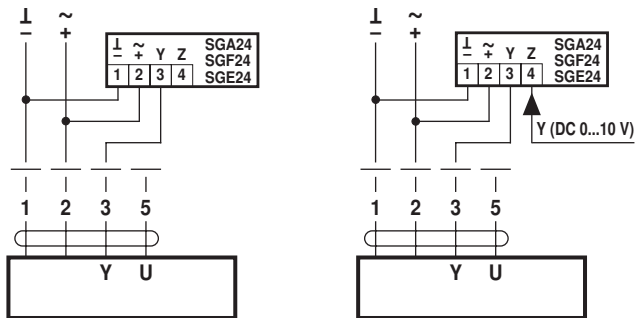
	a	b	c
0%	┌──	┌──	┌──
ZS 50%	┌──	┌──	┌──
100%	┌──	┌──	┌──
Y	┌──	┌──	┌──

Override control with AC 24 V with rotary switch

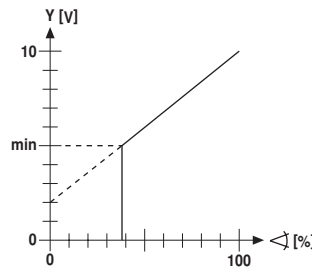


Functions

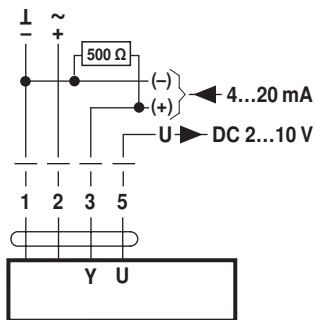
Control remotely 0...100% with positioner SG.. Minimum limit with positioner SG.. positioner SG..



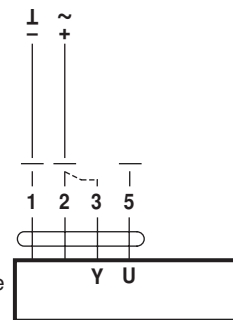
Control with 4...20 mA via external resistor



Functional check



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

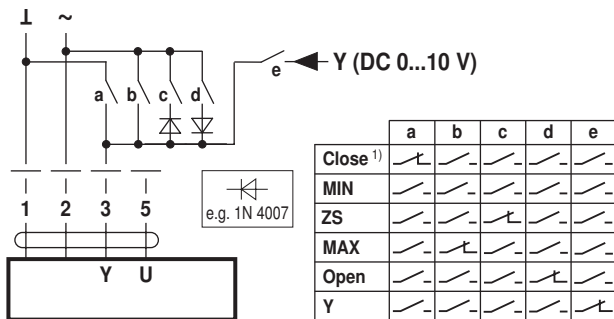


Procedure

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

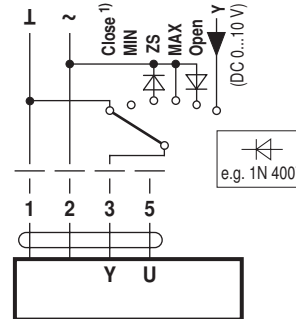
Functions for devices with specific parameters (Parametrisation necessary)

Override control and limiting with AC 24 V with relay contacts

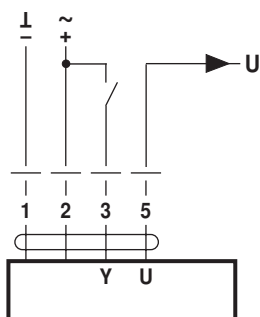


Control open/close

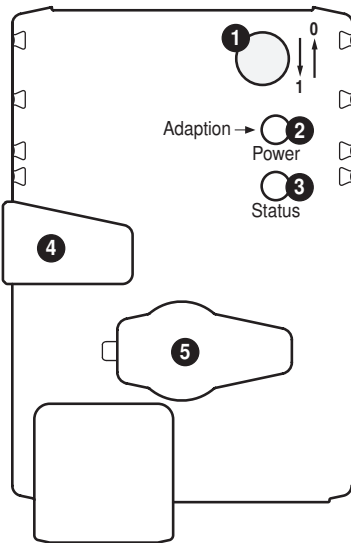
Override control and limiting with AC 24 V with rotary switch



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



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

The coupling piece with the internal thread (Z-KS1) is connected to the head of the gear rod. The rotary support (Z-DS1) is screwed 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° (angle), laterally and upwards.

Negative torque

Max. 50% of the actuating force (Caution: Application possible only under certain restrictions. Please contact your supplier.)

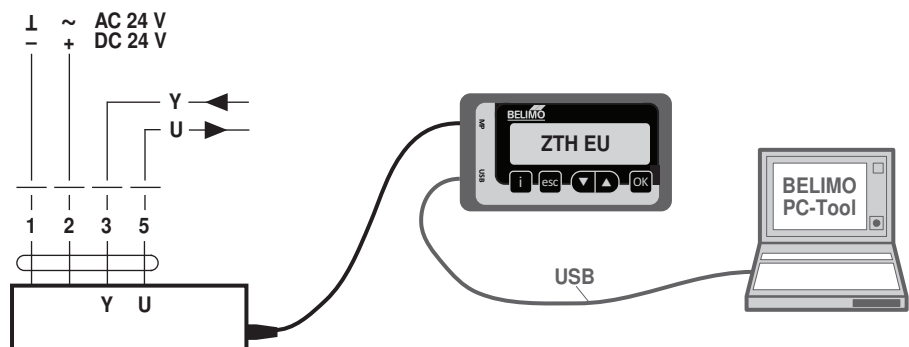
Service

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 [mm]

Dimensional drawings

