

Basic Non Fail-Safe multifunction technology actuator for controlling dampers in typical commercial HVAC applications.

- Torque motor 180 in-lb [20 Nm]
- Nominal voltage AC/DC 24 V
- Control MFT/programmable
- Position feedback 2...10 V



Picture may differ from product



5-year warranty



**MFT**

## 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
	Transformer sizing	6 VA
	Electrical Connection	18 AWG plenum cable, 1 m, with 1/2" NPT conduit connector, degree of protection NEMA 2 / IP54
	Overload Protection	electronic throughout 0...95° rotation
Functional data	Torque motor	180 in-lb [20 Nm]
	Operating range Y	2...10 V
	Operating range Y note	4...20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor)
	Input impedance	100 kΩ for 2...10 V (0.1 mA), 500 Ω for 4...20 mA, 1500 Ω for PWM, On/Off and Floating point
	Operating range Y variable	Start point 0.5...30 V End point 2.5...32 V
	Operating modes optional	variable (VDC, PWM, on/off, floating point)
	Position feedback U	2...10 V
	Position feedback U note	Max. 0.5 mA
	Position feedback U variable	VDC variable
	Direction of motion motor	selectable with switch 0/1
	Manual override	external push button
	Angle of rotation	Max. 95°
	Angle of rotation note	adjustable with mechanical stop
	Running Time (Motor)	150 s / 90°
	Running time motor variable	90...350 s
	Sound power level, motor	45 dB(A)
	Position indication	Mechanical, 30...65 mm stroke
Safety data	Power source UL	Class 2 Supply
	Degree of protection NEMA/UL	NEMA 2
	Housing	UL Enclosure Type 2

## Technical data

<b>Safety data</b>	Agency Listing	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02 CE acc. to 2014/30/EU and 2014/35/EU
<b>Quality Standard</b>	ISO 9001	
UL 2043 Compliant	Suitable for use in air plenums per Section 300.22(C) of the NEC and Section 602 of the IMC	
Ambient humidity	Max. 95% RH, non-condensing	
Ambient temperature	-22...122°F [-30...50°C]	
Storage temperature	-40...176°F [-40...80°C]	
Servicing	maintenance-free	
<b>Weight</b>	Weight	2.6 lb [1.2 kg]
<b>Materials</b>	Housing material	UL94-5VA

**Footnotes** †Rated Impulse Voltage 800V, Type action 1, Control Pollution Degree 3.

## Product features

<b>Application</b>	For proportional modulation of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications.  The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.  The default parameters for 2...10 V applications of the ..MFT actuator are assigned during manufacturing. If necessary, custom versions of the actuators can be ordered. The parameters can be changed by two means: pre-set and custom configurations from Belimo or on-site configurations using the Belimo PC-Tool software.
<b>Operation</b>	The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.  The actuator provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.  The actuators use a brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.  Add-on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.  For low ambient temperatures, the optional supplemental (-H) Heater add-on is available.

<b>Typical specification</b>	Modulating control damper actuators shall be electronic direct-coupled type, which require no crank arm and linkage and be capable of direct mounting to a shaft up to 3/4" diameter. Actuators must provide proportional damper control in response to a 2 to 10 VDC or, with the addition of a 500 Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. Actuators shall have brushless DC motor technology and be protected from overload at all angles of rotation. Run time shall be constant and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position indication. Actuators shall be cULus listed, NEMA 4X, have a 5-year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.
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## Accessories

Tools	Description	Type
	Signal simulator, Power supply AC 120 V	PS-100

## Accessories

	Description	Type
	Connecting cable 16 ft [5 m], A: RJ11 6/4 LINK.10, B: 6-pin for connection to service socket	ZK1-GEN
	Connecting cable 10 ft [3 m], A: RJ11 6/4 LINK.10, B: 3-pin Weidmüller and supply connection	ZK4-GEN
	Service tool, with ZIP-USB function, for configurable and communicative Belimo actuators, VAV controller and HVAC performance devices	ZTH US
Electrical accessories	Description	Type
	Auxiliary switch 1x SPDT add-on	S1A
	Auxiliary switch 2x SPDT add-on	S2A
	Auxiliary switch, mercury-free	P475
	Auxiliary switch, mercury-free	P475-1
	Feedback potentiometer 140 Ω add-on, grey	P140A GR
	Feedback potentiometer 500 Ω add-on, grey	P500A GR
	Feedback potentiometer 1 kΩ add-on, grey	P1000A GR
	Feedback potentiometer 2.8 kΩ add-on, grey	P2800A GR
	Feedback potentiometer 5 kΩ add-on, grey	P5000A GR
	Feedback potentiometer 10 kΩ add-on, grey	P10000A GR
	Feedback potentiometer 15 kΩ gray	P15000A-F GR
	Transformer, AC 120 V to AC 24 V, 40 VA	ZG-X40
	Cable conduit connector 1/2"	TF-CC US
	Cable Gland (NEMA 4 models)	43442-00001
	Positioner for wall mounting	SGA24
	Positioner for front-panel mounting	SGF24
	Resistor, 500 Ω, 1/4" wire resistor with 6" pigtail wires	IRM-100
		ZG-R01
		ZS-T
Gateways	Description	Type
	Gateway MP to BACnet MS/TP	UK24BAC
	Gateway MP to Modbus RTU	UK24MOD
	Gateway MP to LonWorks	UK24LON
Mechanical accessories	Description	Type
	Damper crank arm Slot width 6.2 mm, clamping range ø10...18 mm	KH6
	Damper crank arm Slot width 8.2 mm, clamping range ø10...18 mm	KH8
	Damper crank arm Slot width 8.2 mm, clamping range ø14...25 mm	KH10
	Damper crank arm Slot width 8.2 mm, for ø1.05"	KH12
	Ball joint suitable for damper crank arm KH8	KG6
	Ball joint suitable for damper crank arm KH8	KG8
	Ball joint suitable for damper crank arm KH8 / KH10	KG10A
		SH8
	Push rod for KG10A ball joint L 36", 3/8" diameter	SH10
		ZG-DC1
		ZG-DC2
	Weather shield 13x8x6" [330x203x152 mm] (LxWxH)	ZS-100
	Baseplate, for ZS-100	ZS-101
	Weather shield 406x213x102 mm [16x8-3/8x4"] (LxWxH)	ZS-150
	Shaft extension 240 mm ø20 mm for damper shaft ø8...22.7 mm	AV8-25
		TF-P
	Mounting bracket for AF..	ZG-100
	Mounting bracket for AF / NF	ZG-101
	Wrench 0.32 in and 0.39 in [8 mm and 10 mm]	TOOL-06
	Adapter for auxiliary switch and feedback potentiometer, Multipack 20 pcs.	Z-SPA
	Actuator arm for standard shaft clamp (one-sided)	AH-25
		K-AM25
	Shaft clamp reversible, clamping range ø10...20 mm	K-SA
	Mounting bracket	ZG-109
	Linkage kit	ZG-110

## Accessories

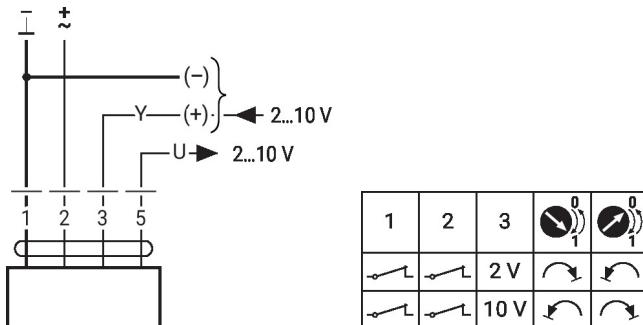
Description	Type
Mounting bracket for LF..	ZG-112
	ZG-JSA-1
	ZG-JSA-2
	ZG-JSA-3
Mounting kit for linkage operation for flat installation Linkage kit	ZG-NMA
Jackshaft RetroFIT+ Linkage with Belimo Rotary Actuators Explosion proof housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations	ZS-260
Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets	ZS-300
Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets	ZS-300-5
Shaft extension 1/2"	ZS-300-C1
Shaft extension 3/4"	ZS-300-C2
Shaft extension 1"	ZS-300-C3
Baseplate extension for SM..A to SM../AM../SMD24R	Z-SMA
	Z-SGF

## Electrical installation

## Wire colors:

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

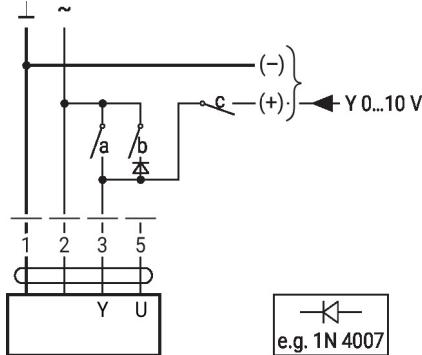
AC/DC 24 V, modulating



## Further electrical installations

## Functions with basic values (conventional mode)

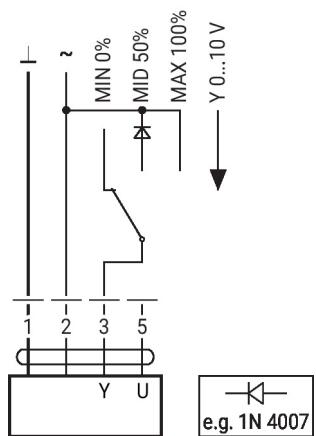
Override control with AC 24 V with relay contacts



e.g. 1N 4007

1	2	a	b	c	
—	—	—	—	—	0 %
—	—	—	—	—	ZS 50%
—	—	—	—	—	100%
—	—	—	—	—	Y

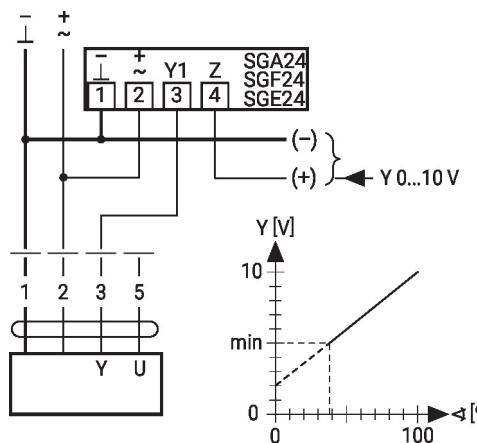
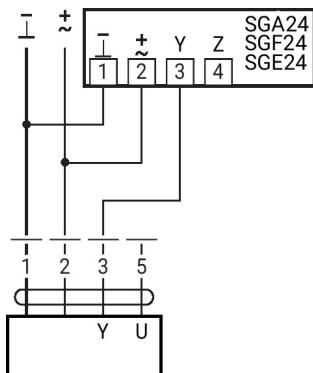
Override control with AC 24 V with rotary switch



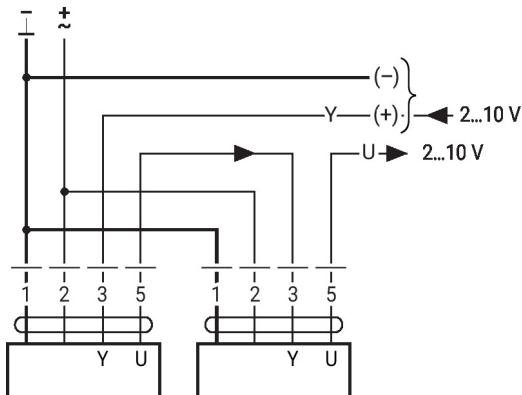
e.g. 1N 4007

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

Minimum limit with positioner SG..

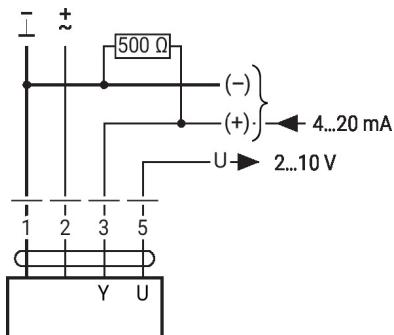


Primary/secondary operation (position-dependent)



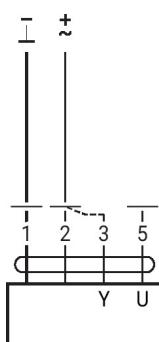
**Further electrical installations****Functions with basic values (conventional mode)**

Control with 4...20 mA via external resistor

**Caution:**

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

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

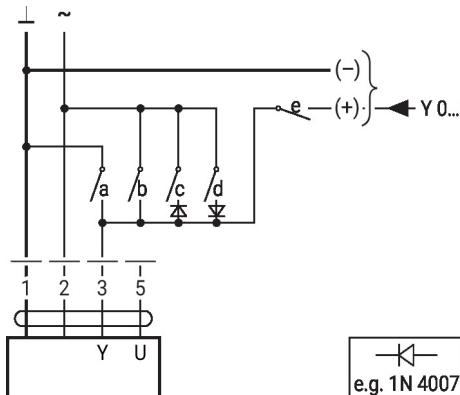
**Functional check****Procedure**

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 (configuration necessary)**

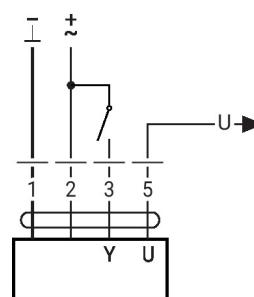
Override control and limiting with AC 24 V with relay contacts

Control on/off



e.g. 1N 4007

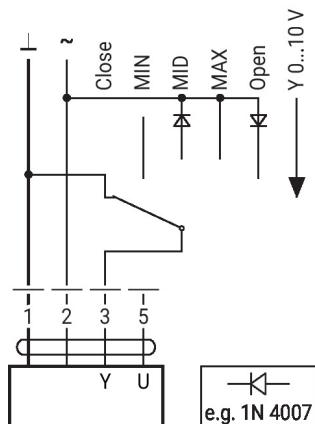
1	2	a	b	c	d	e	
○/L	Close						
○/L	MIN						
○/L	ZS						
○/L	MAX						
○/L	Open						
○/L	Y						



## Further electrical installations

## Functions with specific parameters (configuration necessary)

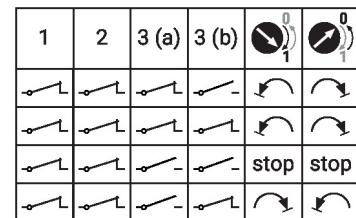
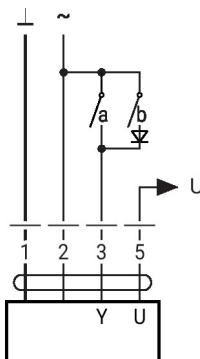
Override control and limiting with AC 24 V with rotary switch



## Caution:

The "Close" function is only guaranteed if the start point of the operating range is defined as min. 0.5 V.

Control 3-point with AC 24 V



## Dimensions

PC

1/2" to 1.05" [12.7 to 26.67]

2 5/8" to 1.05" [10 to 26.67]

