

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

- Torque motor 360 in-lb [40 Nm]
- Nominal voltage AC/DC 24 V
- Control MFT/programmable
- Position feedback 2...10 V



5-year warranty



Picture may differ from product

## 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     | 4.5 W   |
|                        | Power consumption in rest position | 1.5 W   |
|                        | Transformer sizing                 | 7 VA  |
|                        | Electrical Connection              | Screw terminal (for 26...14 AWG wire)   |
|                        | Overload Protection                | electronic throughout 0...95° rotation  |
| <b>Functional data</b> | Torque motor                       | 360 in-lb [40 Nm]   |
|                        | Input impedance                    | 100 kΩ for 2...10 V (0.1 mA), 500 Ω for 4...20 mA   |
|                        | 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 note            | constant, independent of load   |
|                        | Running time motor variable        | 75...300 s  |
|                        | Noise level, motor                 | 45 dB(A)  |
|                        | Position indication                | reflective visual indicator (snap on)   |
| <b>Safety data</b>     | Power source UL                    | Class 2 Supply  |
|                        | Degree of protection NEMA/UL       | NEMA 1  |
|                        | Housing                            | UL Enclosure Type 1   |
|                        | Agency Listing                     | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02<br>CE acc. to 2014/30/EU and 2014/35/EU |
|                        | Quality Standard                   | 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                             | 3.3 lb [1.5 kg]   |

## Technical data

|                  |                  |          |
|------------------|------------------|----------|
| <b>Materials</b> | Housing material | UL94-5VA |
|------------------|------------------|----------|

|                  |   |
|------------------|---|
| <b>Footnotes</b> | †Rated Impulse Voltage 800V, Type action 1, Control Pollution Degree 3. |
|------------------|---|

## Product features

|                              |  |
|------------------------------|--|
| <b>Application</b>           | For 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. 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>             | <p>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.</p> <p>The GMB(X) series 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.</p> <p>The GMB(X)24-MFT 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.</p> <p>Add-on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.</p> |
| <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 1.05" diameter. Actuators must provide modulating 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. Actuators shall have reversing switch and manual override on the cover. Run time shall be constant and independent of torque. Actuators shall be cULus listed, have a 5-year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.  |

## Accessories

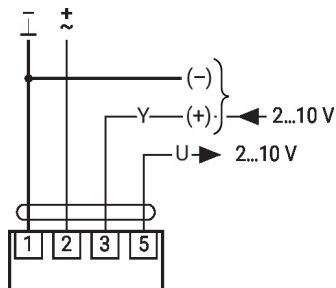
| <b>Tools</b>                  | <b>Description</b>  | <b>Type</b> |
|-------------------------------|---|-------------|
|                               | Connecting cable 16 ft [5 m], A: RJ11 6/4 LINK.10, B: 6-pin for connection to service socket  | ZK1-GEN     |
|                               | Connecting cable 16 ft [5 m], A: RJ11 6/4 LINK.10, B: free wire end for connection to MP/PP terminal                                  | ZK2-GEN     |
|                               | Connecting cable 16 ft [5 m], A+B: RJ12 6/6   | ZK6-GEN     |
|                               | Service tool, with ZIP-USB function, for configurable and communicative Belimo actuators, VAV controller and HVAC performance devices | ZTH US      |
| <b>Electrical accessories</b> | <b>Description</b>  | <b>Type</b> |
|                               | DC Voltage Input Rescaling Module   | IRM-100     |
|                               | Feedback potentiometer 10 kΩ add-on, grey   | P10000A GR  |
|                               | Feedback potentiometer 140 Ω add-on, grey   | P140A GR    |
|                               | Feedback potentiometer 2.8 kΩ add-on, grey  | P2800A GR   |
|                               | Feedback potentiometer 5 kΩ add-on, grey  | P5000A GR   |
|                               | Feedback potentiometer 500 Ω add-on, grey   | P500A GR    |
|                               | Signal simulator, Power supply AC 120 V   | PS-100      |
|                               | Convert Pulse Width Modulated Signal to a 2...10 V Signal for Belimo Proportional Actuators   | PTA-250     |
|                               | Auxiliary switch 1x SPDT add-on   | S1A         |
|                               | Auxiliary switch 2x SPDT add-on   | S2A         |











## Accessories

|                        | Description   | Type      |
|------------------------|---|-----------|
|                        | Positioner for wall mounting  | SGA24     |
|                        | Cable conduit connector 1/2"  | TF-CC US  |
|                        | Gateway MP to LonWorks  | UK24LON   |
|                        | Resistor, 500 $\Omega$ , 1/4" wire resistor with 6" pigtail wires   | ZG-R01    |
|                        | Resistor kit, 50% voltage divider   | ZG-R02    |
|                        | Resistor kit, for -MFT95 actuator in 0...135 $\Omega$ control application   | ZG-R03    |
|                        | Transformer, AC 120 V to AC 24 V, 40 VA   | ZG-X40    |
|                        | Feedback potentiometer 1 k $\Omega$ add-on, grey  | P1000A GR |
|                        | Terminal-strip cover for NEMA 2 rating (-T models).   | ZS-T      |
| Mechanical accessories | Description   | Type      |
|                        | Actuator arm for standard shaft clamp   | AH-GMA    |
|                        | Shaft extension 240 mm $\varnothing$ 20 mm for damper shaft $\varnothing$ 8...22.7 mm   | AV8-25    |
|                        | Ball joint suitable for damper crank arm KH8  | KG8       |
|                        | Standard GK/GM clamp (1/2" to 1.05").   | K-GM20    |
|                        | Push rod for KG10A ball joint L 36", 3/8" diameter  | SH10      |
|                        |   | SH8       |
|                        | Wrench 0.512 in. [13 mm]  | TOOL-07   |
|                        | Mounting bracket for AF..   | ZG-100    |
|                        | Mounting bracket<br>for AF / NF   | ZG-101    |
|                        | Dual actuator mounting bracket.   | ZG-102    |
|                        | Mounting bracket  | ZG-103    |
|                        | Mounting bracket  | ZG-104    |
|                        | Mounting bracket  | ZG-109    |
|                        | Linkage kit   | ZG-110    |
|                        |   | ZG-DC1    |
|                        |   | ZG-DC2    |
|                        | Mounting kit for linkage operation for flat installation  | ZG-GMA    |
|                        | Baseplate extension for GM..A to GM..   | Z-GMA     |
|                        | Weather shield 13x8x6" [330x203x152 mm] (LxWxH)   | ZS-100    |
|                        | Baseplate, for ZS-100   | ZS-101    |
|                        | Weather shield 406x213x102 mm [16x8-3/8x4"] (LxWxH)   | ZS-150    |
|                        | Explosion proof housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL<br>and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III,<br>Hazardous (classified) Locations | ZS-260    |
|                        | Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA<br>4X, with mounting brackets   | ZS-300    |
|                        | Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA<br>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 |

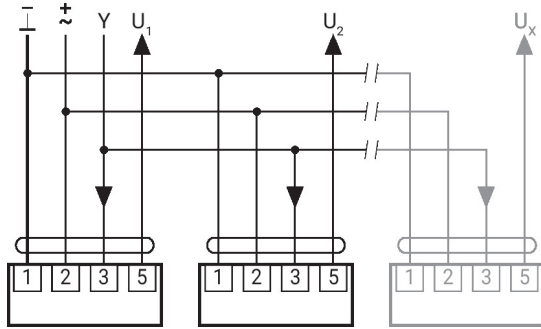
## Electrical installation

AC/DC 24 V, modulating



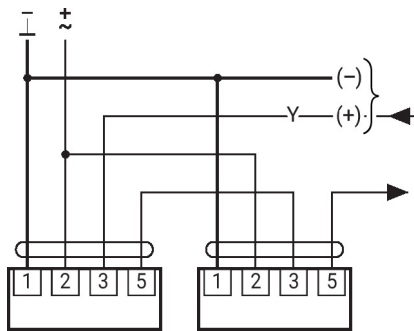
|   |   |      |   |   |
|---|---|------|---|---|
| 1   | 2   | 3    |  |  |
|  |  | 2 V  |  |  |
|  |  | 10 V |  |  |

## Electrical installation



Max. 8 actuators in parallel  
Parallel operation is permitted  
only on non-connected axes  
Do not fail to observe  
performance data with parallel  
operation

Wiring diagram piggy-back operation (mechanically coupled actuators)

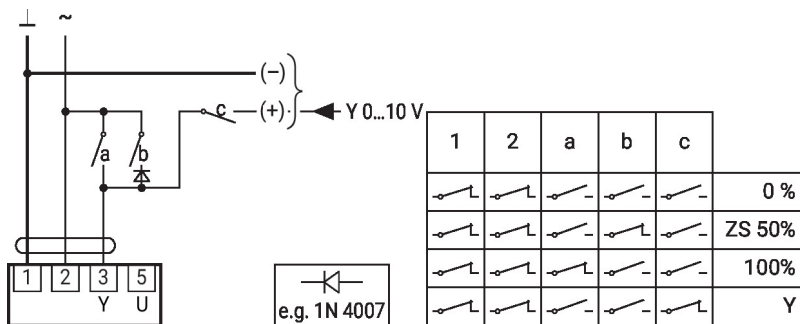


Max. 2 actuators in primary/  
secondary operation  
Primary/secondary operation is  
permitted only on one fixed  
shaft or on two mechanically  
coupled shafts  
The programming of the  
primary actuator is adopted by  
the secondary actuator

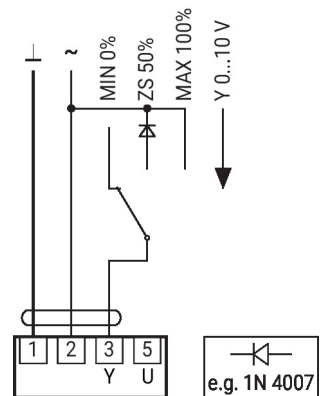
## Further electrical installations

### Functions with basic values (conventional mode)

Override control with AC 24 V with relay contacts



Override control with AC 24 V with  
rotary switch

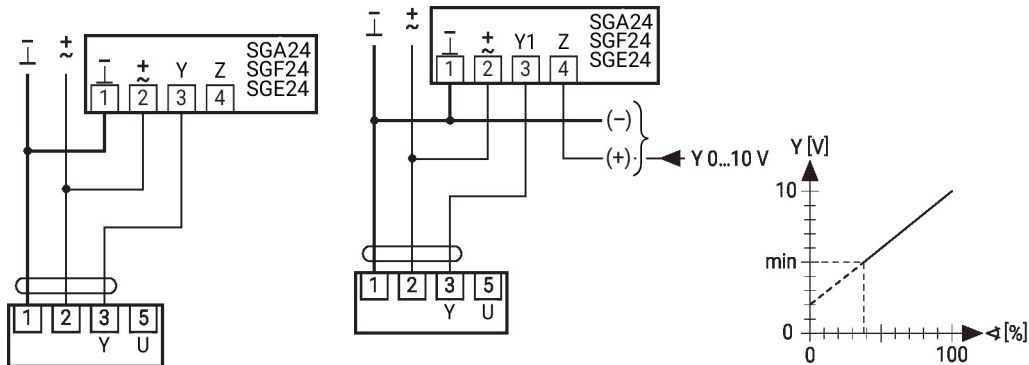


### Further electrical installations

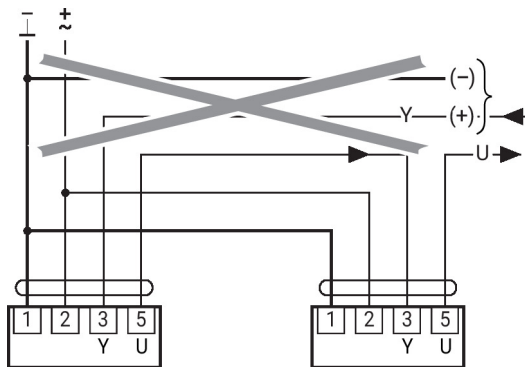
#### Functions with basic values (conventional mode)

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

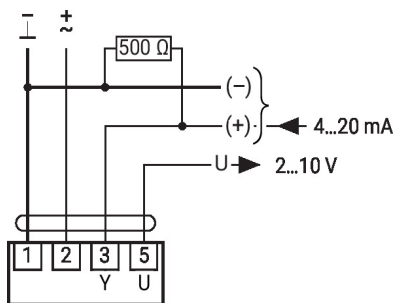
Minimum limit with positioner SG..



#### Primary/secondary operation (position-dependent)



#### Control with 4...20 mA via external resistor

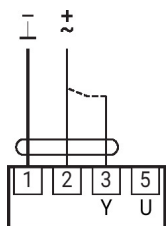


#### Caution:

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

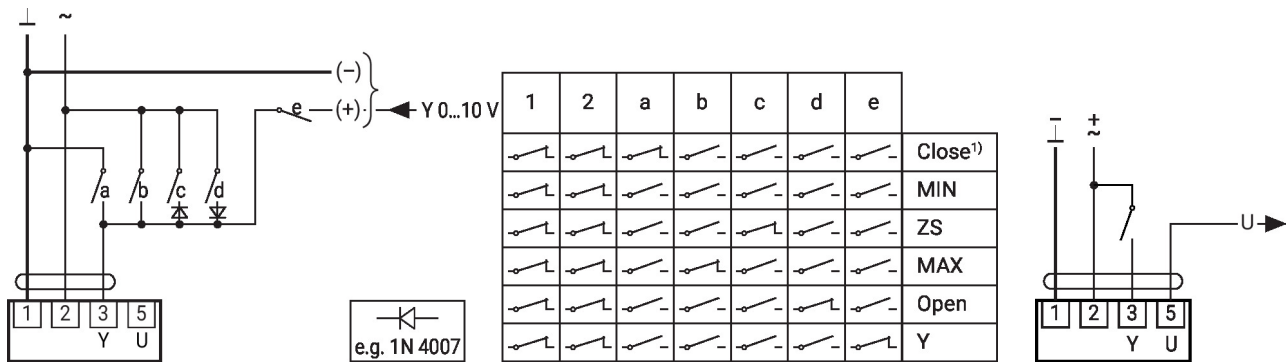
1. Connect 24 V to connections 1 and 2
2. Disconnect connection 3:
  - with direction of rotation L: Actuator rotates to the left
  - with direction of rotation R: Actuator rotates to the right
3. Short-circuit connections 2 and 3:
  - Actuator runs in opposite direction

### Further electrical installations

#### Functions with specific parameters (configuration necessary)

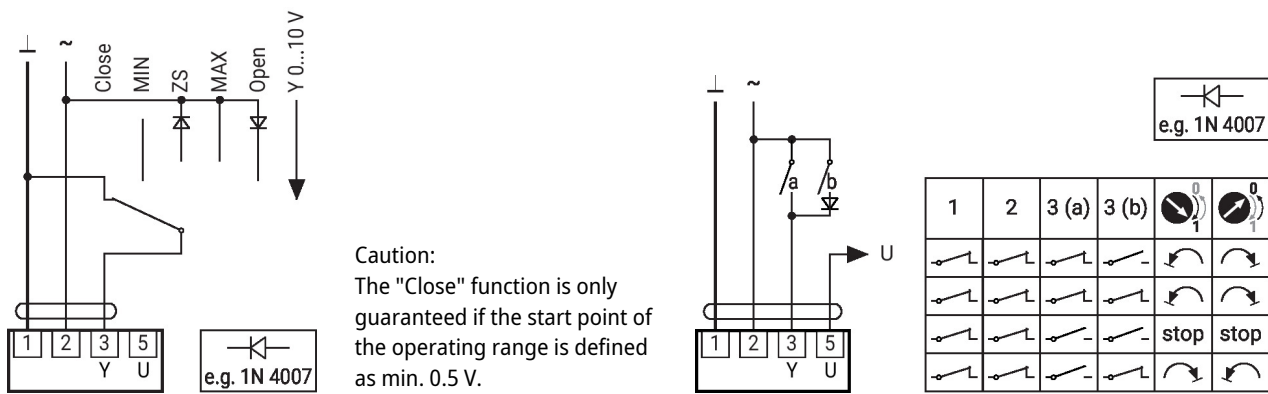
Override control and limiting with AC 24 V with relay contacts

Control on/off



Override control and limiting with AC 24 V with rotary switch

Control 3-point with AC 24 V



### Dimensions

PC

Ø 1/2" to 1.05" [12.7 to 26.67]

□ 2/5" to 1.05" [10 to 26.67]

