

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

- Torque motor 70 in-lb [8 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	13 W	
Power consumption in rest position	1.5 W	
Transformer sizing	23 VA	
Inrush current	20.0 A @ 5 ms	
Electrical Connection	18 AWG plenum cable with 1/2" NPT conduit connector, degree of protection NEMA 2 / IP54, 1 m, 3 m, and 5 m	
Overload Protection	electronic throughout 0...95° rotation	
Functional data	Torque motor	70 in-lb [8 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 (0.1 mA), 500 Ω, 1000 Ω (on/off)	
Operating range Y variable	Start point 0.5...30 V End point 2.5...32 V	
Operating modes optional	variable (VDC, on/off)	
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 note	adjustable with mechanical end stop, 30...95°	
Running Time (Motor)	4 s / 90°	
Running time motor note	constant, independent of load	
Running time motor variable	4...20 s	
Noise 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

Safety data	Agency Listing	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02 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	
Weight	Weight	2.6 lb [1.2 kg]
Materials	Housing material	UL94-5VA

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

Product features

Application	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, 1/2" self centered default. 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 to 10 VDC 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 (version 3.3 or later).
Operation	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 NMQB(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. The NMQB(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. Add-on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.
Typical specification	Proportional 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 from 1/4" to 1/2" diameter. Actuators must provide proportional damper control response to a 2 to 10 VDC or, with the addition of a 500Ω 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 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.

Peripheral devices

Description	Type
Mounting bracket for AF..	ZG-100
Mounting bracket for AF / NF	ZG-101

Peripheral devices

Description	Type
Mounting bracket	ZG-103
Mounting bracket	ZG-104
Shaft extension for 1/2" diameter shafts (3.8" L).	ZG-NMSA-1
Weather shield 13x8x6" [330x203x152 mm] (LxWxH)	ZS-100
Weather shield 406x213x102 mm [16x8-3/8x4"] (LxWxH)	ZS-150
Wrench 0.32 in and 0.39 in [8 mm and 10 mm]	TOOL-06
	P370
	ADS-100
Resistor, 500 Ω, 1/4" wire resistor with 6" pigtail wires	ZG-R01
Battery backup system, for non-spring return models	NSV24 US
Transformer, AC 120 V to AC 24 V, 40 VA	ZG-X40

Accessories

Electrical accessories	Description	Type
Auxiliary switch 1x SPDT add-on	S1A	
Auxiliary switch 2x SPDT add-on	S2A	
Feedback potentiometer 140 Ω add-on, grey	P140A GR	
Feedback potentiometer 1 kΩ add-on, grey	P1000A GR	
Feedback potentiometer 10 kΩ add-on, grey	P10000A GR	
Feedback potentiometer 2.8 kΩ add-on, grey	P2800A GR	
Feedback potentiometer 500 Ω add-on, grey	P500A GR	
Feedback potentiometer 5 kΩ add-on, grey	P5000A GR	
Mechanical accessories	Description	Type
Shaft clamp reversible, clamping range ø8...20 mm	K-NA	
Mounting bracket for AF..	ZG-100	
Mounting bracket for AF / NF	ZG-101	
Mounting bracket	ZG-103	
Mounting bracket	ZG-104	
Mounting kit for linkage operation for flat installation	ZG-NMA	
Shaft extension 240 mm ø20 mm for damper shaft ø8...22.7 mm	AV8-25	
Shaft extension for 1/2" diameter shafts (3.8" L).	ZG-NMSA-1	
Weather shield 13x8x6" [330x203x152 mm] (LxWxH)	ZS-100	
Weather shield 406x213x102 mm [16x8-3/8x4"] (LxWxH)	ZS-150	
Wrench 0.32 in and 0.39 in [8 mm and 10 mm]	TOOL-06	
Linkage kit	ZG-JSL	
Jackshaft RetroFIT+ Linkage with Belimo Rotary Actuators		

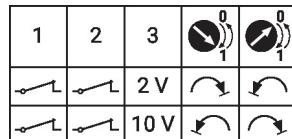
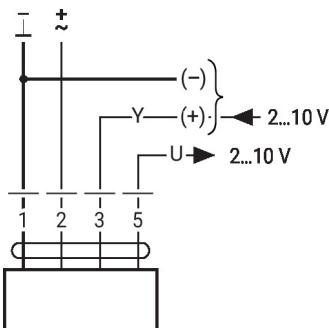
Electrical installation

Wire colors:

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

Electrical installation

AC/DC 24 V, modulating



Signal cable lengths

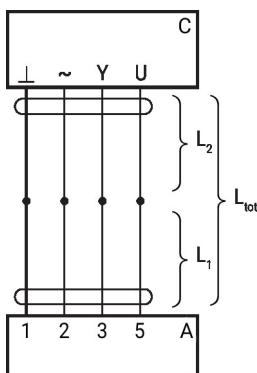
A = Actuator

C = Control unit (controlling unit)

L1 = Connecting cable of the actuator

L2 = Customer cable

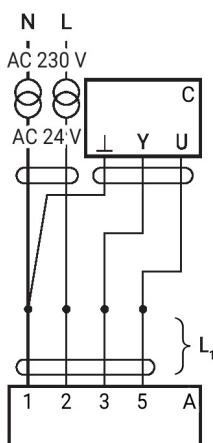
Ltot = Maximum signal cable length



L ₂ L / ~	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

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

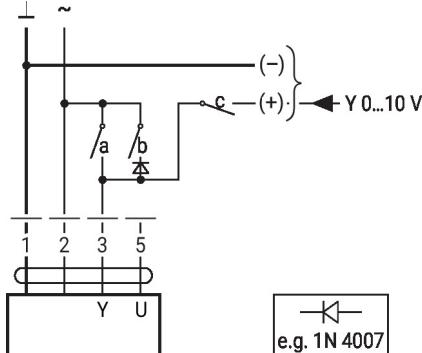
Note:

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

Further electrical installations

Functions with basic values (conventional mode)

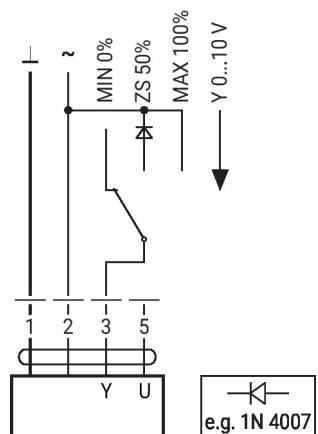
Override control with AC 24 V with relay contacts



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

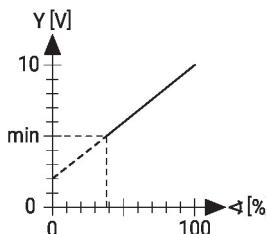
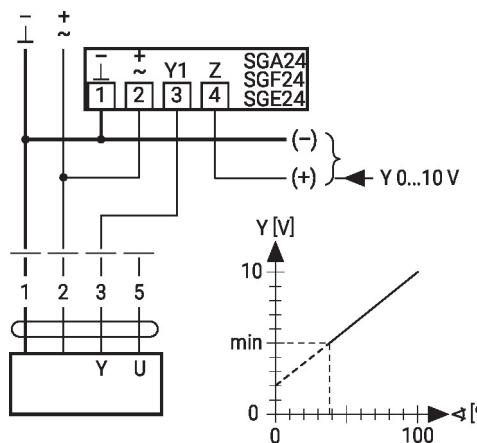
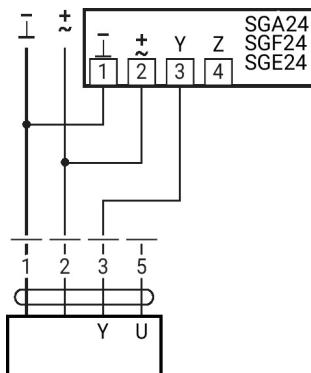
e.g. 1N 4007

Override control with AC 24 V with rotary switch

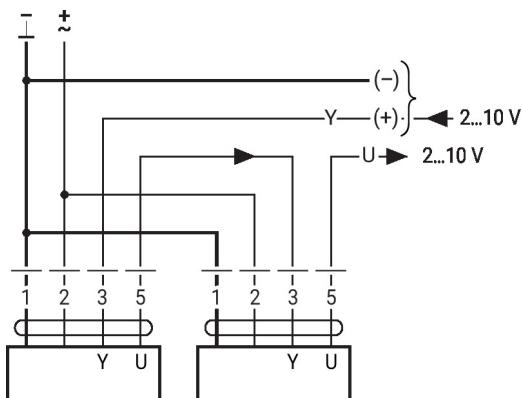


Control remotely 0...100% with positioner SG..

Minimum limit with positioner SG..

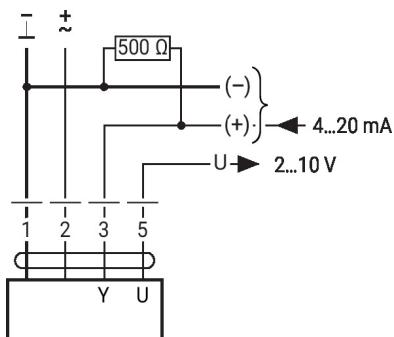


Primary/secondary operation (position-dependent)

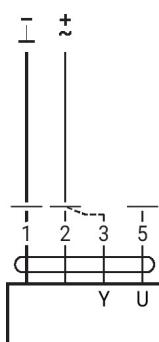


Further electrical installations**Functions with basic values (conventional mode)**

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.

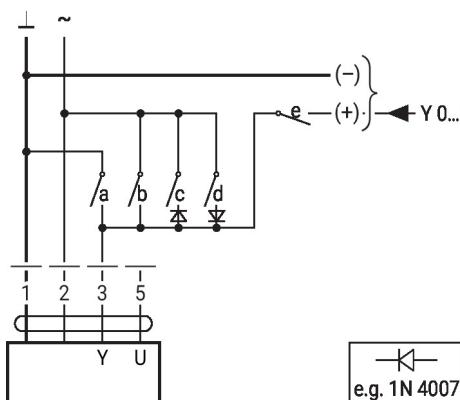
Functional check**Procedure**

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)

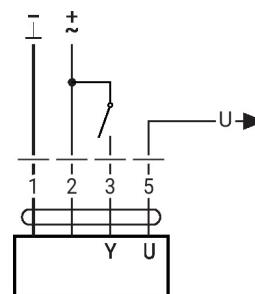
Override control and limiting with AC 24 V with relay contacts

Control on/off



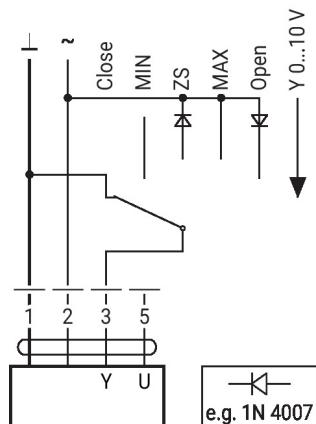
1	2	a	b	c	d	e	
○/L	Close						
○/L	MIN						
○/L	ZS						
○/L	MAX						
○/L	Open						
○/L	Y						

e.g. 1N 4007



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.

Dimensions

PC

