GMB24-MFT
Modulating, Non-Spring Return, 24 V, Multi-Function Technology®

BELIMO®

5 YEAR WARRANTY

BRUSHLESS dc motor®

CE LISTED 94 D5 TEMP. IND. & REG. EQUIP. c(UL)us

Technical Data

Power Supply	24 VAC, ±20%, 50/60 Hz, 24 VDC, ±10%
Power Consumption Running	4.5 W
Power Consumption Holding	1.5 W
Transformer Sizing	7 VA (class 2 power source)
Shaft Diameter	1/2" to 1.05" round, centers on 1/2" and 3/4" with insert, 1.05" without insert
Electrical Connection	695
Overload Protection	electronic throughout 0° to 95° rotation
Operating Range Y	2 to 10 VDC, 4 to 20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor), variable (VDC, floating point, on/off)
Input Impedance	100 kΩ for 2 to 10 VDC (0.1 mA), 500 Ω for 4 to 20 mA, 1500 Ω for PWM, floating point and On/Off
Feedback Output U	2 to 10 VDC, 0.5 mA max, VDC variable
Angle of Rotation	Max. 95°, adjustable with mechanical stop
Nominal Torque	Min. 360 in-lbs [40 Nm]
Direction of Rotation (Motor)	reversible with built-in switch
Position Indication	reflective visual indicator (snap on)
Manual Override	external push button
Running Time (Motor)	default 150 sec, variable 75...300 sec
Ambient Humidity	5 to 95% RH non condensing (EN 60730-1)
Ambient Temperature Range	-22°F to 122°F [-30°C to 50°C]
Storage Temperature Range	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2, IP54, UL Enclosure Type 2
Housing Material	UL94-5VA
Agency Listings†	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC and 2006/95/EC
Noise Level (Motor)	<45 dB (A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	3.5 lb [1.6 kg]
Degree of Protection IEC/EN	IP54

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

Torque min. 360 in-lb, for control of damper surfaces up to 90 sq. ft.

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. 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.

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 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.
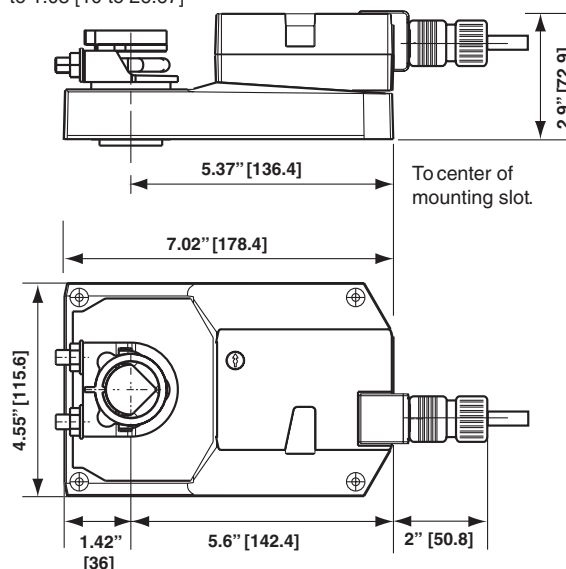
The GMB(X)24-MFT actuators use a brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add-on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.

Dimensions (Inches[mm])
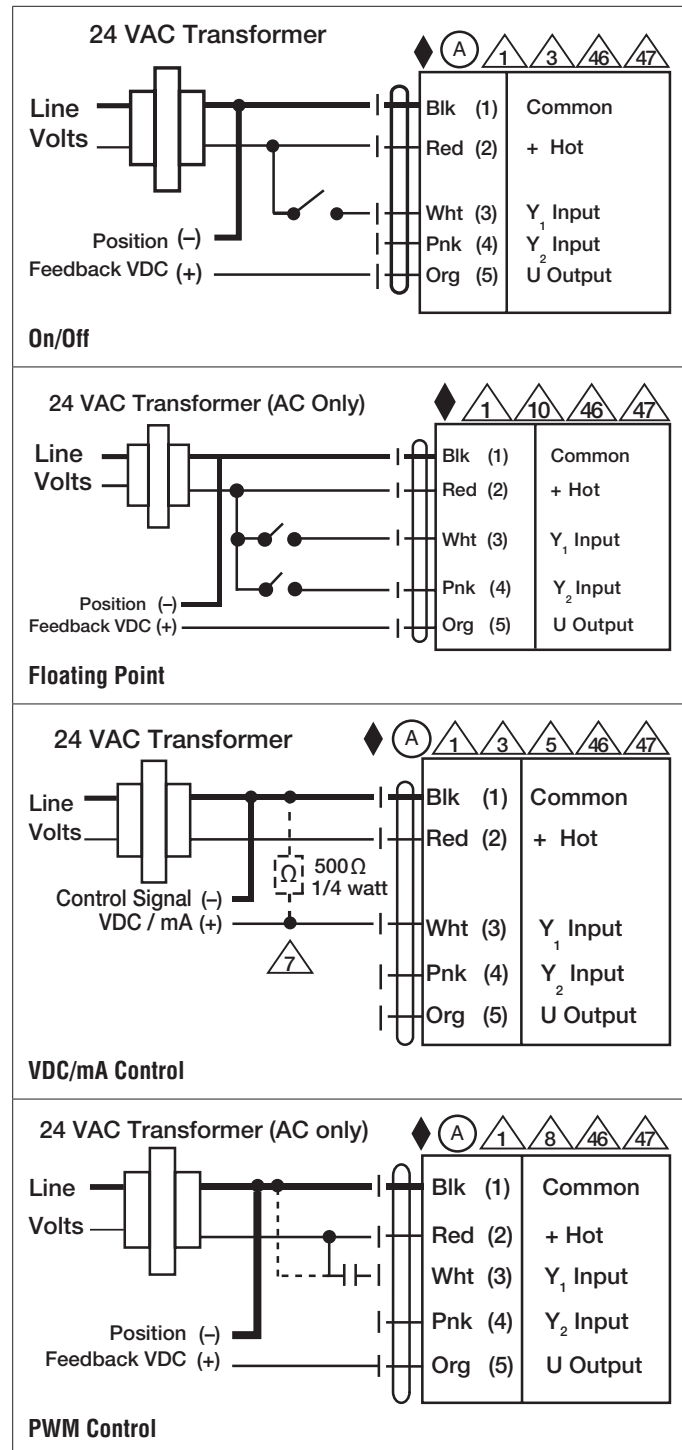
⌀ 1/2" to 1.05"[12.7 to 26.67]

□ 2/5" to 1.05"[10 to 26.67]

2.9" [72.9]

5.37" [136.4]

To center of mounting slot.

7.02" [178.4]

4.55" [115.6]

1.42" [36]

5.6" [142.4]

2" [50.8]

ZG-104	Univ. right angle bracket (13-5/8" H x 7-1/2" W x 4" base).
ZG-109	Right angle bracket for ZS-260.
ZG-111	Stand-off bracket for ZS-260.
ZG-DC1	Damper clip for damper blade, 3.5" width.
ZG-DC2	Damper clip for damper blade, 6" width.
ZG-GMA	GKB(X), GMB(X) crankarm adaptor kit.
Z-GMA	Classic GM to GMB(X) retrofit bracket.

Accessories

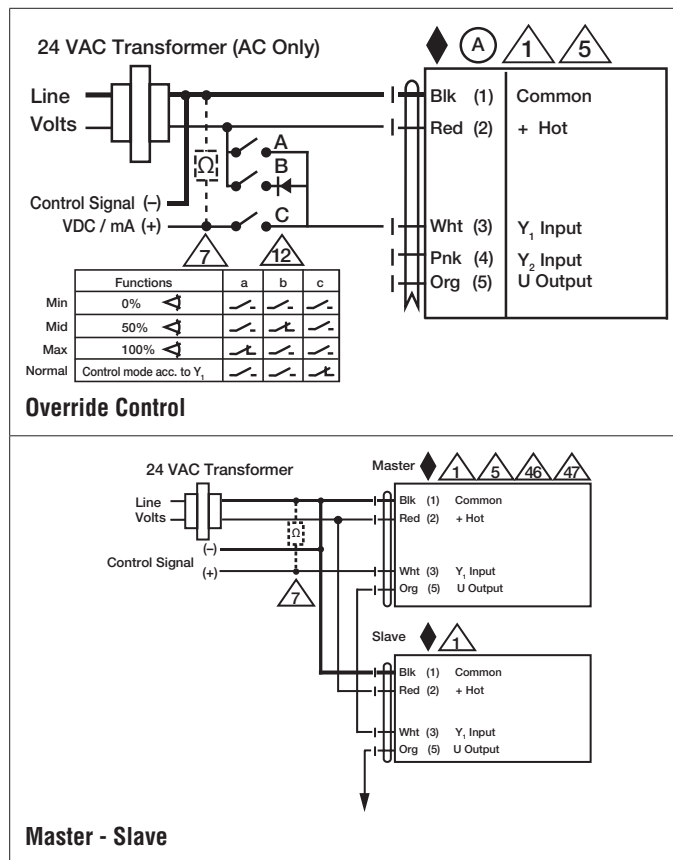| ZK1-GEN	Cable for ZTH US to diagnostic/programming socket.
ZK2-GEN	Cable for ZTH US to actuators w/o diagnostics socket.
ZK3-GEN	Cable to ZIP-RS232 US to diagnostic/programming socket.
ZKS-MP	Cable for ZIP-RS232 US and ZIP-USB-MP US to Belimo gateways.
ZS-100	Weather shield - galvaneal (13" L x 8" W x 6" D).
ZS-101	Base plate for ZS-100.
ZS-150	Weather shield - PC w/ foam seal (16" L x 8-3/8" W x 4" D).
ZS-260	Explosion proof housing.
ZS-300	NEMA 4X, 304 stainless steel enclosure.
ZS-300-1	ZS-300 without brackets.
ZS-300-5	NEMA 4X, 316L stainless steel enclosure.
ZS-300-BK	ZS-300 Mounting Bracket Set
ZS-300-C1	1/2" shaft adaptor, standard wtih ZS-300(-5).
ZS-300-C2	3/4" shaft adaptor for ZS-300(-5).
ZS-300-C3	1" shaft adaptor for ZS-300(-5).
MFT-P	Belimo MFT configuration software (hardware not included).
ZK6-GEN	Cable for ZTH US to connect to SY actuators via RJ11 port.
ZTH-GEN US	Hand held programming tool with ZK1-GEN.
ZTH-GEN US PLUS	Hand held programming tool with ZK1-GEN, ZK2-GEN & ZK6-GEN.
ADS-100	Analog to digital switch for modulating actuators.
IRM-100	Input rescaling module for modulating actuators.
MFT-P US	Belimo MFT configuration software (hardware not included).
MFT-XFMR	24 V transformer (120V to 24V) for PS-100.
NSV24 US	Battery back-up module for non-spring return actuators.
NSV-BAT	12V 1.2AH battery (two required for NSV24 US).
P10000A GR	Feedback potentiometer 10000Ω.
P1000A GR	Feedback potentiometer 1000Ω.
P140A GR	Feedback potentiometer 140Ω.
P2800A GR	Feedback potentiometer 2800Ω.
P370	Shaft mount auxiliary switch, 1/2" shaft.
P5000A GR	Feedback potentiometer 5000Ω.
P500A GR	Feedback potentiometer 500Ω.
PS-100	Actuator power supply and control simulator.
PTA-250	Pulse width modulation interface for modulating actuators.
S1A	Auxiliary switch, 1x SPDT, 3A (0.5A inductive) @250 VAC max.
S2A	Auxiliary switch, 2x SPDT, 3A (0.5A inductive) @250 VAC max.
SGA24	Positioner control for modualting actuators (surface mount).
UK24LON	LON gateway module for up to 8 MFT actuators.
ZAD24	Digital position indicator for modualting actuators.
ZG-R01	4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires.
ZG-R02	50% voltage divider kit (resistors with wires).
ZG-R03	MFT95 resistor kit for 0 to 135Ω control applications.
ZG-R05	MFT95 resistor kit for 4 to 20 mA control applications.
ZG-R06	MFT95 resistor kit for Series 90 control applications.
ZG-SGF	Mounting plate for SGF.
ZG-X40	120 to 24 VAC, 40 VA transformer.
ZIP-RS232 US	PC Tool computer programming interface, serial port.
ZIP-USB-MP US	PC Tool computer programming interface, USB port.
NSV-BAT US	12VDC 1.2 AH battery (2 required).

24 VAC Transformer

Blk	(1)	Common
Red	(2)	+ Hot
Wht	(3)	Y_1 Input
Pnk	(4)	Y_2 Input
Org	(5)	U Output

Line Volts
Position (−)
Feedback VDC (+)

On/Off

24 VAC Transformer (AC Only)

Blk	(1)	Common
Red	(2)	+ Hot
Wht	(3)	Y_1 Input
Pnk	(4)	Y_2 Input
Org	(5)	U Output

Line Volts
Position (−)
Feedback VDC (+)

Floating Point

24 VAC Transformer

Blk	(1)	Common
Red	(2)	+ Hot
Wht	(3)	Y_1 Input
Pnk	(4)	Y_2 Input
Org	(5)	U Output

Line Volts
Control Signal (−)
VDC / mA (+)
500Ω 1/4 watt

VDC/mA Control

24 VAC Transformer (AC only)

Blk	(1)	Common
Red	(2)	+ Hot
Wht	(3)	Y_1 Input
Pnk	(4)	Y_2 Input
Org	(5)	U Output

Line Volts
Position (−)
Feedback VDC (+)

PWM Control

Override Control

	Functions	a	b	c
Min	0%			
Mid	50%			
Max	100%			
Normal	Control mode acc. to Y₁			

Master - Slave

Typical Specification

Floating point, on/off 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 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.

Wiring Diagrams

Ⓐ Actuators with appliance cables are numbered.

△1 Provide overload protection and disconnect as required.

△3 Actuators may also be powered by 24 VDC.

△5 Only connect common to negative (-) leg of control circuits.

△7 A 500 Ω resistor (ZG-R01) converts the 4 to 20 mA control signal to 2 to 10 VDC.

△8 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.

△10 For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a triac sink controller; the actuator internal common reference is not compatible.

△12 IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).

△46 Actuators may be controlled in parallel. Current draw and input impedance must be observed.

△47 Master-Slave wiring required for piggy-back applications. Feedback from Master to control input(s) of Slave(s).