

Basic 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
- 2 x SPDT



AFB24-MFT-S







Technical data

Electrical data	Nominal voltage	AC/DC 24 V
	Nominal voltage frequency	50/60 Hz
	Nominal voltage range	AC 19.228.8 V / DC 21.628.8 V
	Power consumption in operation	7.5 W
	Power consumption in rest position	3 W
	Transformer sizing	10 VA
	Auxiliary switch	2 x SPDT, 1 mA3 A (0.5 A inductive), DC 5 VAC 250 V, one set at 10°, one adjustable 1090°
	Switching capacity auxiliary switch	1 mA3 A (0.5 A inductive), DC 5 VAC 250 V
	Electrical Connection	(2) 18 GA appliance cables, 1 m, with 1/2" conduit connectors
	Overload Protection	electronic throughout 095° rotation
	Electrical Protection	actuators are double insulated
Functional data	Torque motor	180 in-lb [20 Nm]
	Operating range Y	210 V
	Operating range Y note	420 mA w/ ZG-R01 (500 Ω, 1/4 W resistor)
	Input impedance	100 k Ω for 210 V (0.1 mA), 500 Ω for 420 mA, 1500 Ω for PWM, On/Off and Floating point
	Operating range Y variable	Start point 0.530 V End point 2.532 V
	Operating modes optional	variable (VDC, PWM, on/off, floating point)
	Position feedback U	210 V
	Position feedback U note	Max. 0.5 mA
	Position feedback U variable	VDC variable
	Direction of motion motor	selectable with switch 0/1
	Direction of motion fail-safe	reversible with cw/ccw mounting
	Manual override	5 mm hex crank (3/16" Allen), supplied
	Angle of rotation	95°
	Angle of rotation note	adjustable with mechanical end stop, 3595°
	Running Time (Motor)	150 s / 90°
	Running time motor variable	70220 s
	Running time fail-safe	<20 s @ -4122°F [-2050°C], <60 s @ -22°F [-30°C]
	Adaptation Setting Range	off (default)
	Override control	MIN (minimum position) = 0% MID (intermediate position) = 50% MAX (maximum position) = 100%
	Noise level, motor	40 dB(A)
	Noise level, fail-safe	62 dB(A)



Functional data	Position indication	Mechanical	
Safety data	Power source UL	Class 2 Supply	
	Degree of protection IEC/EN	IP54	
	Degree of protection NEMA/UL	NEMA 2	
	Enclosure	UL Enclosure Type 2	
	Agency Listing	cULus listed to UL60730-1A:02; UL 60730-2-14:02 and CAN/CSA-E60730-1:02	
	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	-22122°F [-3050°C]	
	Storage temperature	-40176°F [-4080°C]	
	Servicing	maintenance-free	
Weight	Weight	4.2 lb [1.9 kg]	
Materials	Housing material	Galvanized steel and plastic housing	
Footnotes	*Variable when configured with MFT options. †Rated Impulse Voltage 800V, Type of Action 1	I.AA.B, Control Pollution Degree 3.	
Product features			
Default/Configuration	Default parameters for 2 to 10 VDC applications of the AFMFT actuator are assigned during manufacturing. If required, custom versions of the actuator can be ordered. The parameters are variable and can be changed by three means: Factory pre-set or custom configuration, set by the customer using PC-Tool software or the handheld ZTH US.		
Application	For fail-safe, modulating control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. A feedback signal is provided for position indication for primary and secondary applications. Two AF's can be piggybacked for torque loads to max. 360 in-lb. Minimum 3/4" diameter shaft. OR Maximum of three AF's can be piggybacked for torque loads to max. 432 in-lb. Minimum 3/4" diameter shaft. Primary and secondary wiring for either configuration. Actuators must be mechanically linked. When not mechanically linked, actuators must be wired in parallel.		
Operation	indicator showing 0° to 95°. The actuator will a damper or valve mechanical stop and use this operations. A unique manual override allows to of rotation with no power applied. This mechan crank supplied with the actuator. When power the actuator drives toward the fail-safe position is controlled by an Application Specific Integra microprocessor provides the intelligence to the know the actuators's exact position. The ASIC rotation and provides a Digital Rotation Sensin actuator in a stall condition. The position feed mechanical feedback potentiometers using DF normal rotation without the need of mechanic directly to control shafts up to 1.05" diameter bracket. A crank arm and several mounting br where the actuator cannot be direct coupled to provides minimum specified torque to the app	A-MFT actuator provides 95° of rotation and is provided with a graduated position showing 0° to 95°. The actuator will synchronize the 0° mechanical stop or the physical r valve mechanical stop and use this point for its zero position during normal control s. A unique manual override allows the setting of any actuator position within its 95° n with no power applied. This mechanism can be released physically by the use of a plied with the actuator. When power is applied the manual override is released and cor drives toward the fail-safe position. The actuator uses a brushless DC motor which ed by an Application Specific Integrated Circuit (ASIC) and a microprocessor. The ressor provides the intelligence to the ASIC to provide a constant rotation rate and to actuators's exact position. The ASIC monitors and controls the brushless DC motor's nd provides a Digital Rotation Sensing (DRS) function to prevent damage to the n a stall condition. The position feedback signal is generated without the need for al feedback potentiometers using DRS. The actuator may be stalled anywhere in its tation without the need of mechanical end switches. The AF24-MFT is mounted control shafts up to 1.05" diameter by means of its universal clamp and anti-rotation a crank arm and several mounting brackets are available for damper applications e actuator cannot be direct coupled to the damper shaft. The spring return system minimum specified torque to the application during a power interruption. The AF24- ator is shipped at 5° (5° from full fail-safe) to provide automatic compression against askets for tight shut-off.	



Typical specification	Spring return control damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuator must provide modulating damper control in 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. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor 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 feedback or primary and secondary applications. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.
Factory settings	Default parameters for 2 to 10 VDC applications of the AFMFT actuator are assigned during manufacturing. If required, custom versions of the actuator can be ordered. The parameters are variable and can be changed by three means: Factory pre-set or custom configuration, set by the customer using PC-Tool software or the handheld ZTH US.

Accessories

Electrical accessories	Description	Туре
	DC Voltage Input Rescaling Module	IRM-100
	Auxiliary switch, mercury-free	P475
	Auxiliary switch, mercury-free	P475-1
	Convert Pulse Width Modulated Signal to a 210 V Signal for Belimo Proportional Actuators	PTA-250
	Positioner for wall mounting	SGA24
	Positioner for front-panel mounting	SGF24
	Cable conduit connector 1/2"	TF-CC US
	Gateway MP to BACnet MS/TP	UK24BAC
	Gateway MP to LonWorks	UK24LON
	Gateway MP to Modbus RTU	UK24MOD
	Resistor, 500 Ω , 1/4" wire resistor with 6" pigtail wires	ZG-R01
	Resistor kit, 50% voltage divider	ZG-R02
	Transformer, AC 120 V to AC 24 V, 40 VA	ZG-X40



Mechanical accessories	Description	Туре
	Anti-rotation bracket, for AF / NF	AF-P
	Shaft extension 240 mm ø20 mm for damper shaft ø822.7 mm	AV8-25
	End stop indicator	IND-AFB
	Shaft clamp reversible, for central mounting, for damper shafts ø12.7 / 19.0 / 25.4 mm	K7-2
	Ball joint suitable for damper crank arm KH8 / KH10, Multipack 10 pcs.	KG10A
	Ball joint suitable for damper crank arm KH8, Multipack 10 pcs.	KG8
	Damper crank arm Slot width 8.2 mm, clamping range ø1425 mm	KH10
	Damper crank arm Slot width 8.2 mm, for ø1.05"	KH12
	Damper crank arm Slot width 8.2 mm, clamping range ø1018 mm	KH8
	Actuator arm, for 3/4" shafts, clamping range ø1022 mm, Slot width 8.2 mm	KH-AFB
	Push rod for KG10A ball joint 36" L, 3/8" diameter	SH10
	Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).	SH10 SH8
	Wrench 0.32 in and 0.39 in [8 mm and 10 mm]	TOOL-06
	RetroFIT clip	Z-AF
	Mounting bracket for AF	ZG-100
	Mounting bracket	ZG-101
	Dual actuator mounting bracket.	ZG-102
	Mounting bracket	ZG-102 ZG-109
	Linkage kit	ZG-110
	Mounting bracket	ZG-118
	for AF / NF	
	Jackshaft mounting bracket.	ZG-120
	Mounting kit for linkage operation for flat and side installation	ZG-AFB
	Mounting kit for foot mount installation	ZG-AFB118
	Damper clip for damper blade, 3.5" width.	ZG-DC1
	Damper clip for damper blade, 6" width.	ZG-DC2
	1" diameter jackshaft adaptor (11" L).	ZG-JSA-1
	1-5/16" diameter jackshaft adaptor (12" L).	ZG-JSA-2
	1.05" diameter jackshaft adaptor (12" L).	ZG-JSA-3
	Weather shield 13x8x6" [330x203x152 mm] (LxWxH)	ZS-100
	Base plate, for ZS-100	ZS-101
	Weather shield 406x213x102 mm [16x8-3/8x4"] (LxWxH)	ZS-150
	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	ZS-260
	(classified) Locations	76 200
	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	ZS-300-5
	4X, with mounting brackets	75 200 61
	Shaft extension 1/2" Shaft extension 3/4"	ZS-300-C1
	Shaft extension 3/4" Shaft extension 1"	ZS-300-C2 ZS-300-C3
	Base plate extension	ZS-300-C3 Z-SF
	Linkage kit	Z-SF ZG-JSL
	Jackshaft Retrofit Linkage with Belimo Rotary Actuators	
Tools	Description	Туре
	Connecting cable 16 ft [5 m], A: RJ11 6/4 ZTH EU, B: free wire end for connection to MP/PP terminal	ZK2-GEN
	Service Tool, with ZIP-USB function, for programmable and communicative Belimo actuators, VAV controller and HVAC performance devices	ZTH US
	Belimo PC-Tool, Software for adjustments and diagnostics	MFT-P
	Signal simulator, Power supply AC 120 V	PS-100
ion		

Electrical installation

Warning! Live electrical components!

[•] During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks.



Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

Meets cULus requirements without the need of an electrical ground connection.

Apply only AC line voltage or only UL-Class 2 voltage to the terminals of auxiliary switches. Mixed or combined operation of line voltage/safety extra low voltage is not allowed.

A Actuators with appliance cables are numbered.

 Λ Provide overload protection and disconnect as required.

Actuators may also be powered by DC 24 V.

Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.

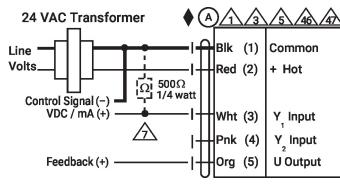
\Lambda Only connect common to negative (-) leg of control circuits.

- \triangle A 500 Ω resistor (ZG-R01) converts the 4...20 mA control signal to 2...10 V.
- 🛕 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 V line.
- A 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.

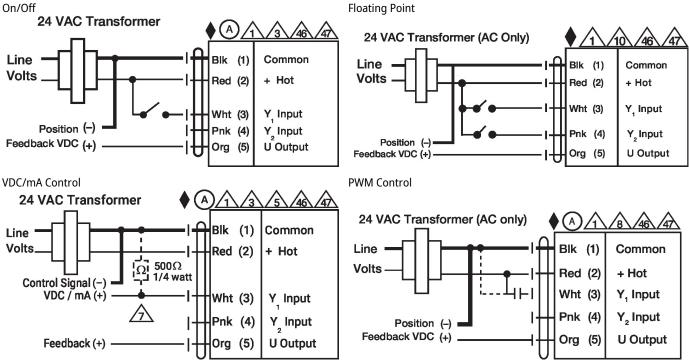
- \Lambda IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).
- Actuators may be controlled in parallel when not mechanically linked. Current draw and input impedance must be observed.

Master-Slave wiring required for piggy-back applications when mechanically linked. Feedback from Master to control input(s) of Slave(s).

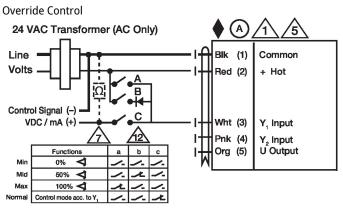


VDC/mA Control

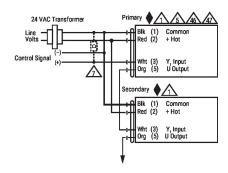
Wiring diagrams



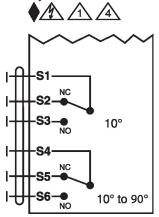




Primary - Secondary



Auxiliary Switches



Dimensions

