

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

- Torque motor 35 in-lb [4 Nm]
- Nominal voltage AC/DC 24 V
- Control MFT/programmable
- Position feedback 2...10 V



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	2.5 W
	Power consumption in rest position	1 W
	Transformer sizing	5 VA
	Electrical Connection	18 GA appliance cable, 3 ft [1 m], with 1/2" NPT conduit connector
	Overload Protection	electronic throughout 0...95° rotation
	Electrical Protection	actuators are double insulated
Functional data	Torque motor	35 in-lb [4 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
	Direction of motion fail-safe	reversible with cw/ccw mounting
	Angle of rotation	Max. 95°
	Angle of rotation note	adjustable with mechanical stop
	Running Time (Motor)	150 s / 90°
	Running time motor variable	75...300 s
	Running time fail-safe	<25 s @ -4...122°F [-20...50°C], <60 s @ -22°F [-30°C]
	Adaptation Setting Range	off (default)

Technical data

Functional data	Override control	MIN (minimum position) = 0% MID (intermediate position) = 50% MAX (maximum position) = 100%
	Noise level, motor	30 dB(A)
	Noise level, fail-safe	62 dB(A)
	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 acc. To UL 873 and CAN/CSA C22.2 No. 24-93
	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	3.4 lb [1.6 kg]
Materials	Housing material	galvanized steel

Footnotes *Variable when configured with MFT options.

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

Product features

Default/Configuration	Default parameters for 2 to 10 VDC applications of the LF..-MFT 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.

Product features

Operation	The LF24-MFT US actuator provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator will synchronize the 0° mechanical stop or the damper or valves mechanical stop and use this point for its zero position during normal control operations. The actuator uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC) and a microprocessor. The microprocessor provides the intelligence to the ASIC to provide a constant rotation rate and to know the actuator's exact position. The ASIC monitors and controls the brushless DC motor's rotation and provides a Digital Rotation Sensing (DRS) function to prevent damage to the actuator in a stall condition. The position feedback signal is generated without the need for mechanical feedback potentiometers using DRS. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The LF24-MFT US is mounted directly to control shafts up to 3/4" diameter (K6-1 clamp) and anti-rotation bracket. A crank arm and several mounting brackets are available for damper applications where the actuator cannot be direct coupled to the damper shaft. The spring return system provides minimum specified torque to the application during a power interruption. The LF24-MFT US actuator is shipped in the zero position, compression against seats or gaskets for tight shut-off is accomplished manually.
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 shaft up to a 3/4" diameter and center on a 1/2" shaft (default). Actuator shall deliver a minimum output torque of 35 in-lbs. 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. 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 LF..-MFT 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

	Gateways	Description	Type
	Gateway MP to BACnet MS/TP		UK24BAC
	Gateway MP to Modbus RTU		UK24MOD
	Gateway MP to LonWorks		UK24LON
	Electrical accessories	Description	Type
	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 2...10 V Signal for Belimo		PTA-250
	Proportional Actuators		
	Positioner for wall mounting		SGA24
	Positioner for front-panel mounting		SGF24
	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

Accessories

Mechanical accessories	Description	Type
Shaft extension 170 mm ø10 mm for damper shaft ø6...16 mm	AV6-20	
End stop indicator	IND-LF	
Shaft clamp for LF..	K6 US	
Shaft clamp reversible, clamping range ø16...20 mm	K6-1	
Ball joint suitable for damper crank arm KH8 / KH10	KG10A	
Ball joint suitable for damper crank arm KH8	KG6	
Ball joint suitable for damper crank arm KH8	KG8	
Damper crank arm Slot width 8.2 mm, for ø1.05"	KH12	
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	
Actuator arm, clamping range ø8...16 mm, Slot width 8.2 mm	KH-LF	
V-bolt Kit for KH-LF.	KH-LFV	
Anti-rotation bracket LF.	LF-P	
Push rod for KG10A ball joint L 36", 3/8" diameter	SH10	
	SH8	
Wrench 0.32 in and 0.39 in [8 mm and 10 mm]	TOOL-06	
Angle of rotation limiter, with end stop	ZDB-LF	
Form fit adapter 8x8 mm	ZF8-LF	
Mounting bracket	ZG-109	
Linkage kit	ZG-110	
Mounting bracket for LF..	ZG-112	
	ZG-DC1	
	ZG-DC2	
LF crankarm adaptor kit (includes ZG-112).	ZG-LF112	
LF crankarm adaptor kit (T bracket included).	ZG-LF2	
Shaft extension for 3/8" diameter shafts (4" L).	ZG-LMSA-1	
Shaft extension for 1/2" diameter shafts (5" L).	ZG-LMSA-1/2-5	
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 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	
Linkage kit	ZG-JSL	
Jackshaft RetroFIT+ Linkage with Belimo Rotary Actuators		
Tools	Description	Type
Connecting cable 16 ft [5 m], A: RJ11 6/4 ZTH EU, B: free wire end for connection to MP/PP terminal	ZK2-GEN	
Connecting cable 10 ft [3 m], A: RJ11 6/4 ZTH EU, B: 3-pin Weidmüller and supply connection	ZK4-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 Signal simulator, Power supply AC 120 V	MFT-P PS-100	

Electrical installation

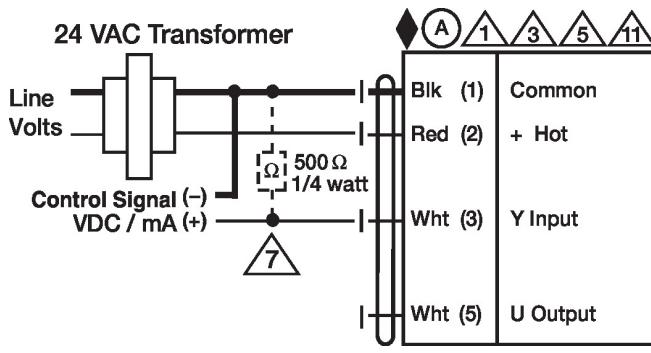


Warning! Live electrical components!

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.

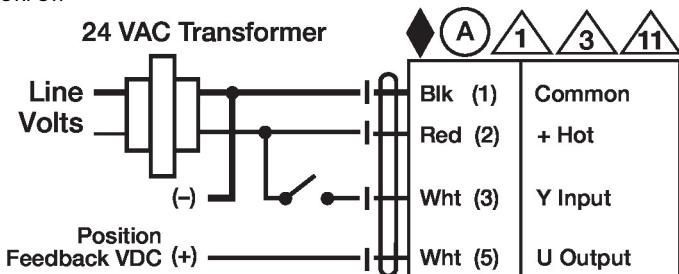
- ◆ Meets cULus requirements without the need of an electrical ground connection.
- ◆ Actuators with appliance cables are numbered.
- ◆ Provide overload protection and disconnect as required.
- ◆ Actuators may also be powered by DC 24 V.
- ◆ Only connect common to negative (-) leg of control circuits.
- ◆ 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.
- ◆ 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.
- ◆ Actuators may be connected in parallel if not mechanically linked. Power consumption and input impedance must be observed.
- ◆ IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).



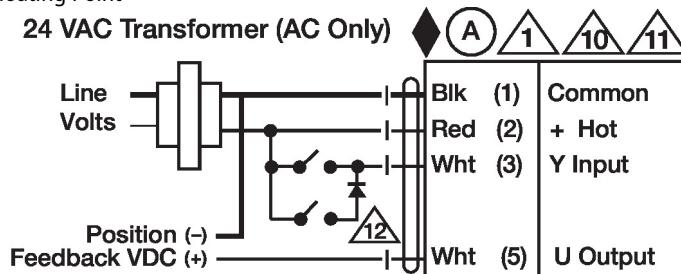
VDC/mA Control

Wiring diagrams

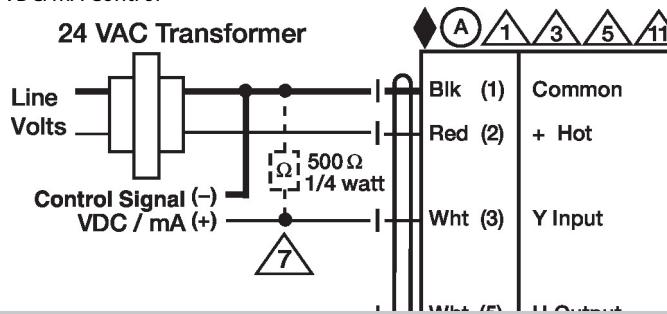
On/Off



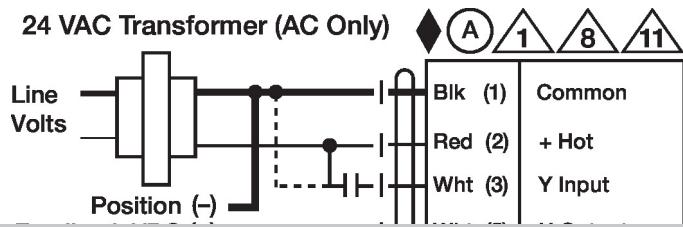
Floating Point



VDC/mA Control



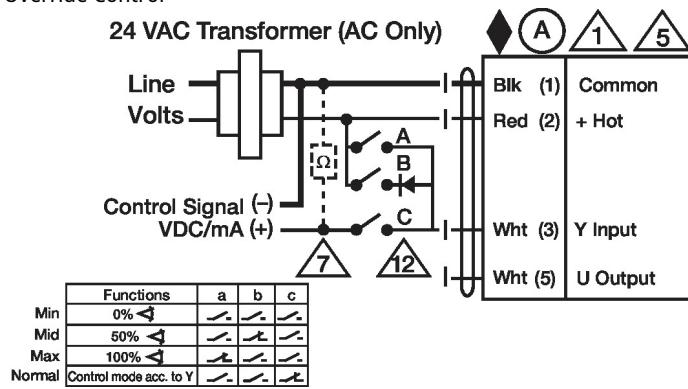
PWM Control



Electrical installation

Wiring diagrams

Override Control



Dimensions

