LF24-MFT-20 US - Damper Actuator

Modulating, Spring Return, 24 V, for 6 to 9 VDC control and 20 VDC Output Power for Controllers











	REG. EQUIP.	
Technical Data		
Power Supply	24 VAC ± 20%, 50/60 Hz, 24 VDC ± 10%	
Power Consumption Running	3 W	
Power Consumption Holding	1.5 W	
Transformer Sizing	6 VA (class 2 power source)	
Shaft Diameter	3/8" to 1/2" round, centers on 1/2"	
Electrical Connection	3 ft [1 m], 18 GA appliance cable with 1/2"	
	conduit connector	
Overload Protection	electronic throughout 0° to 95° rotation	
Electrical Protection actuators are double insulated		
Operating Range Y	6 to 9 VDC (Default), P-10005 (A05)	
Input Impedance 100 k Ω		
Feedback Output U 2 to 10 VDC, 0.5 mA max, VDC variable		
Angle of Rotation	max. 95°, adjustable with mechanical stop	
Torque 35 in-lbs [4 Nm] minimum		
Direction of Rotation (Motor)	reversible with built-in switch	
Direction of Rotation (Fail-Safe)	•	
Position Indication	visual indicator, 0° to 95° (0° is full spring	
	return position)	
Running Time (Motor)	150 sec (default), variable (75 to 300 sec)	
Running Time (Fail-Safe)	<pre>(Fail-Safe)</pre>	
Angle of Rotation Adaptation	Off (default)	
Override Control	min. position = 0%, mid. Position = 50%, max. position = 100% (Default)	
Humidity	max. 95% RH non-condensing	
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	
Housing Material	zinc coated steel	
Agency Listings†	cULus acc. To UL 873 and CAN/CSA C22.2	
	No. 24-93	
Noise Level (Motor)	<30 dB (A)	
Noise Level (Fail-Safe)	<62 dB (A)	
Servicing	maintenance free	
Quality Standard	ISO 9001	
Weight	3.5 lb [1.6 kg]	

^{*}Variable when configured with MFT options.

Torque min. 35 in-lb, Control 6 to 9 VDC (DEFAULT), Feedback 2 to 10 VDC (DEFAULT)

Application

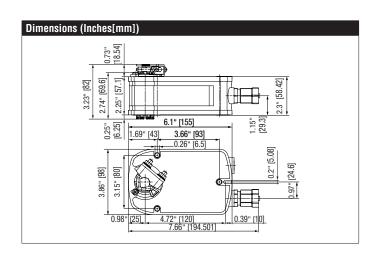
For fail-safe, modulating control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. A feedback signal is provided for position indication.

Default/Configuration

Default parameters for 6 to 9 VDC applications of the LF24-MFT-20 US actuator are assigned during manufacturing. The parameters are variable and can be changed by two means: Set by the customer using PC-Tool software or the handheld ZTH US.

Operation

The LF24-MFT-20 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-20 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-20 US actuator is shipped in the zero position, compression against seats or gaskets for tight shut-off is accomplished manually.



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

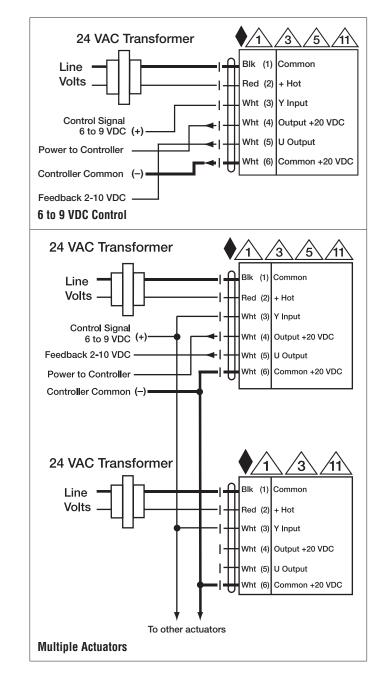




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Modulating, Spring Return, 24 V, for 6 to 9 VDC control and 20 VDC Output Power for Controllers

AMG-20 6.7" shaft extension for 1/4" to 3/4" diameter shafts. IND-LF LF position indicator. K6 US Standard LF clamp (3/8" to 1/2"). K6-1 LF clamp (1/2" to 3/4"). K6-1 LF clamp (1/2" to 3/4"). K6-1 LF clamp (1/2" to 3/4"). K6-1 Ball joint for 5/16" diameter rod, zinc plated. K6-1 Ball joint for 5/16" diameter rod, zinc plated. K6-2 Ball joint for 5/16" diameter rod, 20°, galvanized steel. K6-3 Ball joint for 5/16" diameter rod, 20°, galvanized steel. K1-2 Univ. crankarm, slot 21/64" w, for 3/4" to 1" dia. shafts. K1-1 Univ. crankarm, slot 1/4"-w, for 3/8" to 11/16" dia. shafts. K1-1 LF Crankarm (with 1/2" diameter shaft pass through). K1-1 LF Crankarm (with 1/2" diameter shaft pass through). K1-1 LF V- V-bolt Kit for K1-LF. LF-P Anti-rotation bracket LF. SH10 Push rod for K66 & K68 ball joints (36" L, 3/8" diameter). SH8 Push rod for K66 & K68 ball joints (36" L, 5/16" diameter). TOOL-06 8 mm and 10 mm wrench. TOOL-06 8 mm and 10 mm wrench. ZDB-LF Angle of rotation Limiter for LF. ZF8-LF 8x8 mm form fit adaptor for LF. ZG-109 Right angle bracket for ZS-260. ZG-110 Stand-off bracket for ZS-260. ZG-1110 Stand-off bracket for ZS-260. ZG-112 LF right angle bracket (4-1/2" H x 5-1/2" W x 2-1/2" D). ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-LF2 LF crankarm adaptor kit (Totacket included). ZG-LMSA-1 Shaft extension for 3/8" diameter shafts (4" L). ZG-LMSA-1 Shaft extension for 1/2" diameter shafts (4" L). ZS-100 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, 316L stainless steel enclosure. ZS-300-C1 1/2" shaft adaptor, standard with ZS-300(-5). ZS-300-C3 1" shaft adaptor for ZS-300(-5). ZS-300-C3 1" shaft adaptor for ZS-300(-5). ADS-100 Analog to digital switch for modulating actuators. MFT-P Belimo MFT configuration software (hardware not included). PTA-250 Pulse width modulation interface for modulating actuators. MFT-P Delimo MFT configuration software (hardware not included). PS-100 Analog to digital switc		
IND-LF K6 US Standard LF clamp (3/8" to 1/2"). K6-1 LF clamp (1/2" to 3/4"). K6-1 LF clamp (1/2" to 3/4"). K6-1 LF clamp (1/2" to 3/4"). K6-1 R6-1 LF clamp (1/2" to 3/4"). K6-1 R6-1 Ball joint for 5/16" diameter rod, zinc plated. K6-8 Ball joint for 5/16" diameter rod, zinc plated. K6-8 Ball joint for 5/16" diameter rod, 2inc plated. K6-8 Ball joint for 5/16" diameter rod, 90°, galvanized steel. KH12 Univ. crankarm, slot 21/64" w, for 3/8" to 11/16" dia. shafts. KH6 Univ. crankarm, slot 1/4" w, for 3/8" to 11/16" dia. shafts. KH8 Univ. crankarm, slot 21/64" w, for 3/8" to 11/16" dia. shafts. KH-LF LF crankarm (with 1/2" diameter shaft pass through). KH-LFV V-bolt Kit for KH-LF. LF-P Anti-rotation bracket LF. SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). SH8 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). SH8 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). ZB-LF Angle of rotation Limiter for LF. ZF8-LF S8 mm form fit adaptor for LF. ZG-109 Right angle bracket for ZS-260. ZG-110 Stand-off bracket for ZS-260. ZG-111 LF right angle bracket for ZS-260. ZG-112 LF right angle bracket for 2S-260. ZG-112 LF right angle bracket (4-1/2" H x 5-1/2" W x 2-1/2" D). ZG-DC2 Damper clip for damper blade, 5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-LF112 LF crankarm adaptor kit (Includes ZG-112). ZG-LF2 LF LF crankarm adaptor kit (T bracket included). Shaft extension for 3/8" diameter shafts (4" L). ZG-LMSA-1 Shaft extension for 3/8" diameter shafts (5" L). ZS-100 Weather shield - galvaneal (13" L x 8" W x 6" D). ZS-150 Weather shield - galvaneal (13" L x 8" W x 6" D). ZS-260 Explosion proof housing. ZS-300-C3 Alf shaft adaptor, standard with ZS-300(-5). ADS-100 Analog to digital switch for modulating actuators. NEMA 4X, 304 stainless steel enclosure. ZS-300-C1 1/2" shaft adaptor for ZS-300(-5). ADS-100 Actuator power supply and control simulator. PIA-250 Pulse width modulation interface for modulating actuators. UK24MOD Actuator power supply and control simulator. PIA-250 Pu	Accessories AV6-20	6.7" shaft extension for 1/4" to 3/4" diameter shafts
K6 US K6-1 LF clamp (1/2" to 3/4"). K6-1 LF clamp (1/2" to 3/4"). K610A Ball joint for 3/8" diameter rod, zinc plated. K66 Ball joint for 5/16" diameter rod, zinc plated. K68 Ball joint for 5/16" diameter rod, zinc plated. K68 Ball joint for 5/16" diameter rod, zinc plated. K68 Ball joint for 5/16" diameter rod, 90°, galvanized steel. KH12 Univ. crankarm, slot 21/64" w, for 3/4" to 1" dia. shafts. KH6 Univ. crankarm, slot 1/4" w, for 3/8" to 11/16" dia. shafts. KH8 Univ. crankarm (with 1/2" diameter shaft pass through). KH-LF LF crankarm (with 1/2" diameter shaft pass through). KH-LFV V-bolt Kit for KH-LF. LF-P Anti-rotation bracket LF. SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). SH8 Push rod for KG10A ball joint (36" L, 5/16" diameter). SH8 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). T00L-06 8 mm and 10 mm wrench. ZDB-LF Angle of rotation Limiter for LF. ZF8-LF 8x8 mm form fit adaptor for LF. ZF8-LF Bx8 mm form fit adaptor for LF. ZF8-LG-109 Right angle bracket for ZS-260. ZG-110 Stand-off bracket for ZS-260. ZG-112 LF right angle bracket (4-1/2" H x 5-1/2" W x 2-1/2" D). ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-LDC2 Damper clip for damper blade, 6" width. CG-LF112 LF crankarm adaptor kit (T bracket included). ZG-LMSA-1 Shaft extension for 3/8" diameter shafts (4" L). ZG-LMSA-1/2-5 Shaft extension for 1/2" diameter shafts (4" L). ZS-100 Weather shield - galvaneal (13" L x 8" W x 6" D). ZS-101 Base plate for ZS-100. ZS-105 Weather shield - PC w/ foam seal (16" L x 8-3/8" W x 4" D). ZS-260 Explosion proof housing. ZS-300 Shaft adaptor, standard wtih ZS-300(-5). ZS-300-C3 3/4" shaft adaptor for ZS-300(-5). ZS-300-C3 3/4" shaft adaptor for ZS-300(-5). ZS-300-C4 Positioner control for modulating actuators. IRM-100 Input rescaling module for up to 8 MFT actuators. UK24MOD MODbus gateway module for up to 8 MFT actuators. UK24MOD MODbus gateway module for up to 8 MFT actuators. UK24MOD MODbus gateway module for up to 8 MFT actuators. ZG-KGF Mounting plate for SGF. ZG-K40 120		
K6-1 LF clamp (1/2" to 3/4"). KG10A Ball joint for 3/8" diameter rod, zinc plated. KG6 Ball joint for 5/16" diameter rod, zinc plated. KG8 Ball joint for 5/16" diameter rod, 20°, galvanized steel. KH12 Univ. crankarm, slot 21/64" w, for 3/4" to 1" dia. shafts. KH6 Univ. crankarm, slot 11/4" w, for 3/8" to 11/16" dia. shafts. KH8 Univ. crankarm, slot 11/4" w, for 3/8" to 11/16" dia. shafts. KH8 Univ. crankarm (with 1/2" diameter shaft pass through). KH-LF LF crankarm (with 1/2" diameter shaft pass through). KH-LFU V-bolt Kit for KH-LF. LF-P Anti-rotation bracket LF. SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). SH8 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). SH8 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). ZBB-LF Angle of rotation Limiter for LF. ZF8-LF 8x8 mm form fit adaptor for LF. ZG-109 Right angle bracket for ZS-260. ZG-110 Stand-off bracket for ZS-260. ZG-112 LF right angle bracket (4-1/2" H x 5-1/2" W x 2-1/2" D). ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-LF12 LF crankarm adaptor kit (includes ZG-112). ZG-LF2 LF crankarm adaptor kit (includes ZG-112). ZG-LRS-112 LF crankarm adaptor kit (includes ZG-112). ZG-LS-100 Weather shield - galvaneal (13" L x 8" W x 6" D). ZS-100 Weather shield - galvaneal (13" L x 8" W x 6" D). 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-S NEMA 4X, 304 stainless steel enclosure. ZS-300-C1 1/2" shaft adaptor, standard with ZS-300(-5). ZS-300-C2 3/4" shaft adaptor for ZS-300(-5). ZS-300-C3 1" shaft adaptor for ZS-300(-5). ZS-300-C4 Positioner control for modulating actuators. MFT-P Belimo MFT configuration software (hardware not included). RFT-P Belimo MFT configuration software (hardware not included). RFT-P Belimo MFT configuration software (hardware not included). RG-24 Positioner control for modulating actuators. MFT-P Belimo FT control for modulating actuators. MFT-P Be		· ·
KG10A Ball joint for 3/8" diameter rod, zinc plated. KG6 Ball joint for 5/16" diameter rod, zinc plated. KG8 Ball joint for 5/16" diameter rod, 90°, galvanized steel. KH12 Univ. crankarm, slot 1/4" w, for 3/8" to 1" dia. shafts. KH6 Univ. crankarm, slot 1/4" w, for 3/8" to 11/16" dia. shafts. KH8 Univ. crankarm, slot 1/4" w, for 3/8" to 11/16" dia. shafts. KH8 Univ. crankarm, slot 21/64" w, for 3/8" to 11/16" dia. shafts. KH-LF LF crankarm (with 1/2" diameter shaft pass through). KH-LFV V-bolt Kit for KH-LF. KH-LFP Anti-rotation bracket LF. SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). SH8 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). TOOL-06 8 mm and 10 mm wrench. ZBB-LF Angle of rotation Limiter for LF. ZF8-LF 8-8 mm form fit adaptor for LF. ZG-109 Right angle bracket for ZS-260. ZG-110 Stand-off bracket for ZS-260. ZG-1112 LF right angle bracket for ZS-260. ZG-112 LF right angle bracket for ZS-260. ZG-112 LF right angle bracket for Wx x 2-1/2" D). ZG-DC2 Damper clip for damper blade, 3.5" width. ZG-LF112 LF crankarm adaptor kit (includes ZG-112). ZG-LF2 LF crankarm adaptor kit (includes ZG-112). ZG-LMSA-1 ZG-LMSA-1 ZG-LMSA-1/2-5 Shaft extension for 3/8" diameter shafts (4" L). ZG-LMSA-1/2-5 Shaft extension for 1/2" diameter shafts (4" L). ZS-100 Weather shield - galvaneal (13" L x 8" W x 6" D). ZS-150 Weather shield - PC w/ foam seal (16" L x 8-3/8" W x 4" D). ZS-300-5 NEMA 4X, 304 stainless steel enclosure. ZS-300-5 NEMA 4X, 304 stainless steel enclosure. ZS-300-1 1/2" shaft adaptor, standard with ZS-300(-5). ZS-300-C3 3/4" shaft adaptor for ZS-300(-5). ADS-100 Analog to digital switch for modulating actuators. RM-100 Input rescaling module for modulating actuators. RM-100 Input rescaling module for up to 8 MFT actuators. RM-100 Analog to digital switch for modulating actuators. GA24 Positioner control for modulating actuators (flush mount). RX-400 ADS-100 ACutuator power supply and control simulator. PS		
KG6Ball joint for 5/16" diameter rod, 20°, galvanized steel.KG8Ball joint for 5/16" diameter rod, 90°, galvanized steel.KH12Univ. crankarm, slot 21/64" w, for 3/8" to 11/16" dia. shafts.KH6Univ. crankarm, slot 11/4" w, for 3/8" to 11/16" dia. shafts.KH8Univ. crankarm, slot 21/64" w, for 3/8" to 11/16" dia. shafts.KH9LF crankarm (with 1/2" diameter shaft pass through).KH-LFLF crankarm (with 1/2" diameter shaft pass through).KH-LFUV-bolt Kit for KH-LELF-PAnti-rotation bracket LF.SH10Push rod for KG10A ball joint (36" L, 3/8" diameter).SH8Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).TOU-068 mm and 10 mm wrench.ZB-LFAngle of rotation Limiter for LF.ZF8-LF8x8 mm form fit adaptor for LF.ZG-109Right angle bracket for ZS-260.ZG-112LF right angle bracket for ZS-260.ZG-112LF right angle bracket (4-1/2" H x 5-1/2" W x 2-1/2" D).ZG-DC1Damper clip for damper blade, 3.5" width.ZG-DC2Damper clip for damper blade, 6" width.ZG-LF12LF crankarm adaptor kit (includes ZG-112).ZG-LF2LF crankarm adaptor kit (includes ZG-112).ZG-LMSA-1Shaft extension for 1/2" diameter shafts (4" L).ZS-100Weather shield - galvaneal (13" L x 8" W x 6" D).ZS-101Base plate for ZS-100.ZS-103Weather shield - PC w/ foam seal (16" L x 8-3/8" W x 4" D).ZS-260Explosion proof housing.ZS-300-C31" shaft adaptor for ZS-300(-5).		
KG8 Ball joint for 5/16" diameter rod, 90°, galvanized steel. KH12 Univ. crankarm, slot 21/64" w, for 3/4" to 1" dia. shafts. KH6 Univ. crankarm, slot 121/64" w, for 3/8" to 11/16" dia. shafts. KH8 Univ. crankarm, slot 121/64" w, for 3/8" to 11/16" dia. shafts. KH-LF LF crankarm (with 1/2" diameter shaft pass through). KH-LFV V-bolt Kit for KH-LF. LF-P Anti-rotation bracket LF. SH10 Push rod for KG6 & KG8 ball joint (36" L, 3/8" diameter). SH8 Push rod for KG10A ball joint (36" L, 3/8" diameter). T00L-06 8 mm and 10 mm wrench. ZDB-LF Angle of rotation Limiter for LF. ZF6-LF 8x8 mm form fit adaptor for LF. ZG-109 Right angle bracket for ZS-260. ZG-110 Stand-off bracket for ZS-260. ZG-1110 Stand-off bracket for ZS-260. ZG-112 LF right angle bracket (4-1/2" H x 5-1/2" W x 2-1/2" D). ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-LMSA-1 Shaft extension for 3/8" diameter shafts (4" L). ZG-LMSA-1 Shaft extension for 3/8" diameter shafts (
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 KH6 Univ. crankarm, slot 1/4" w, for 3/8" to 11/16" dia. shafts. KH8 Univ. crankarm, slot 21/64" w, for 3/8" to 11/16" dia. shafts. KH-LF LF crankarm (with 1/2" diameter shaft pass through). KH-LFV V-botk Kit for KH-LF. LF-P Anti-rotation bracket LF. SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). SH8 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). TOOL-06 8 mm and 10 mm wrench. ZDB-LF Angle of rotation Limiter for LF. ZF8-LF Bx8 mm form fit adaptor for LF. ZG-109 Right angle bracket for ZS-260. ZG-110 Stand-off bracket for ZS-260. ZG-112 LF right angle bracket (4-1/2" H x 5-1/2" W x 2-1/2" D). ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 3.5" width. ZG-LF112 LF crankarm adaptor kit (includes ZG-112). ZG-LF2 LF crankarm adaptor kit (includes ZG-112). ZG-LMSA-1 Shaft extension for 3/8" diameter shafts (4" L). ZG-LMSA-1/2-5 Shaft extension for 1/2" diameter shafts (5" L). 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-300-5 NEMA 4X, 304 stainless steel enclosure. ZS-300-1 1/2" shaft adaptor, standard with ZS-300(-5). ZS-300-1 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. IRM-100 Input rescaling module for modulating actuators. PF-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface f		
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Date created, 09/02/2016 - Subject to change. © Belimo Aircontrols (USA), Inc.

LF24-MFT-20 US - Damper Actuator

Modulating, Spring Return, 24 V, for 6 to 9 VDC control and 20 VDC Output Power for Controllers



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 6 to 9 VDC 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.

Wiring Diagrams



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.



Provide overload protection and disconnect as required.



Actuators may also be powered by 24 VDC.



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



Actuators may be connected in parallel if not mechanically linked. Power consumption and input impedance must be observed.