



5-year warranty



## Technical data

<b>Electrical data</b>	Nominal voltage	AC/DC 24 V
	Nominal voltage frequency	50/60 Hz
	Power consumption in operation	2.5 W
	Power consumption in rest position	1 W
	Transformer sizing	5 VA (class 2 power source)
	Electrical Connection	18 GA plenum cable, 3 ft [1 m], with 1/2" conduit connector
	Overload Protection	electronic throughout 0...95° rotation
<b>Functional data</b>	Electrical Protection	actuators are double insulated
	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
	Position feedback U	2...10 V
	Position Feedback	2...10 V, Max. 0.7 mA
	Position feedback U note	Max. 0.7 mA
	Direction of motion motor	selectable with switch 0/1
	Direction of motion fail-safe	reversible with cw/ccw mounting
	Angle of rotation	Max. 95°, adjustable with mechanical stop
	Angle of rotation note	adjustable with mechanical stop
	Running Time (Motor)	150 s constant, independent of load
	Running time motor note	constant, independent of load
	Running time fail-safe	<25 s @ -4...122°F [-20...50°C], <60 s @ -22°F [-30°C]
	Running time fail-safe note	@ -4...122°F [-20...50°C], <60 s @ -22°F [-30°C]
	Override control	Minimum, Open, Closed via spring Min-position adjusts on actuator cover between 0 and 100% (scaled 0 to 1)
	Noise level, motor	30 dB(A)
	Noise level, fail-safe	62 dB(A)
<b>Safety data</b>	Shaft Diameter	3/8...1/2" round, centers on 1/2"
	Position indication	Mechanical
	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
	Ambient temperature	-22...122°F [-30...50°C]
	Storage temperature	-40...176°F [-40...80°C]
	Ambient humidity	max. 95% r.H., non-condensing

	Servicing	maintenance-free
Weight	Weight	3.3 lb [1.5 kg]
Materials	Housing material	galvanized steel

## Product features

<b>Application</b>	For fail-safe, modulating control with minimum position setpoint, or three position control 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 from 3/8" up to 1/2" in diameter by means of its universal clamp, 1/2" shaft centered at delivery. For shafts up to 3/4" use K6-1 accessory. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. The actuator operates in response to 24 VAC on wire 2 or 3, which allows the LF24- SR-E US to retrofit or replace Honeywell® M8405A actuators. A 2 to 10 VDC feedback signal is provided for position indication.
<b>Operation</b>	The LF series actuators provide true spring return operation for reliable fail-safe application and positive close-off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The LF series provides 95° of rotation and is provided with a graduated position indicator showing 0 to 95°. The LF24-SR-E US 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 function to prevent damage to the actuator in a stall condition. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. Power consumption is reduced in holding mode. See wiring diagrams for LF24-SR-E US for more details on 3-position control.
<b>Typical specification</b>	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 a 1/2" shaft. 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. Actuator must have a built-in minimum position potentiometer. During 3-position control, the actuator shall drive to a minimum position with 24 VAC on wire 2 and drive full open with 24 VAC on wire 3. 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 feedback signal shall be provided for position feedback. The actuator must be designed so that they may be used for either clockwise or counter clockwise failsafe operation. 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.

## Accessories

Electrical accessories	Description	Type
	Auxiliary switch, mercury-free	IRM-100
	Auxiliary switch, mercury-free	P475
	Signal Simulator, Power supply AC 230 V	P475-1
		PS-100
		PTA-250
	Positioner for wall mounting	SGA24
	Positioner for front-panel mounting	SGF24
	Resistor, 500 Ω, 1/4" wire resistor with 6" pigtail wires	ZG-R01
	Resistor Kit, 50% voltage divider	ZG-R02
	Mounting plate for SGF.	ZG-SGF
	Transformer, AC 120 V to AC 24 V, 40 VA	ZG-X40
Mechanical accessories	Description	Type
	Module Bracket for Honeywell Economizer	20477-00001
	Shaft extension 170 mm Ø10 mm for damper shaft Ø 6...16 mm	AV6-20
	End stop indicator	IND-LF
	Standard LF clamp (3/8" to 1/2").	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
Actuator arm, clamping range Ø8...16 mm, Slot width 8.2 mm	KH-LF
V-bolt Kit for KH-LF.	KH-LFV
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
Anti-rotation bracket LF.	LF-P
Push rod for KG10A ball joint (36" L, 3/8" diameter).	SH10
Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).	SH8
TOOL-06 8mm-10mm Wrench	TOOL-06
Angle of rotation limiter, with end stop	ZDB-LF
Form fit adapter 8x8 mm	ZF8-LF
Right angle bracket for ZS-260.	ZG-109
Stand-off bracket for ZS-260.	ZG-110
LF right angle bracket 4-1/2x5-1/2x2-1/2" (HxWxD).	ZG-112
Damper clip for damper blade, 3.5" width.	ZG-DC1
Damper clip for damper blade, 6" width.	ZG-DC2
Honeywell ECON retrofit kit with module bracket.	ZG-ECON1
Honeywell ECON retrofit kit without module bracket.	ZG-ECON2
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
Base Plate, for ZS-100	ZS-101
Weather shield 16x8-3/8x4" [406x213x102 mm] (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)	ZS-260
Locations, outdoor application NEMA 4	
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

## 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.

Provide overload protection and disconnect as required.

Actuators may also be powered by 24 VDC.

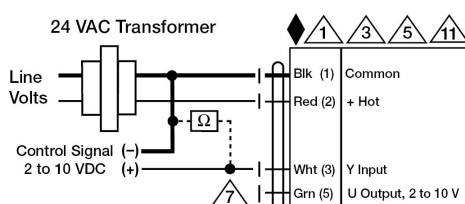
Only connect common to negative (-) leg of control circuits.

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

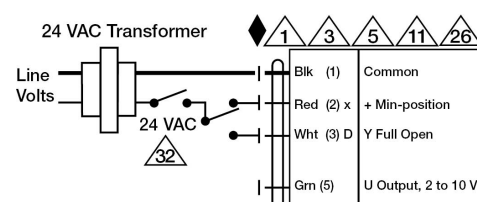
Actuators may be connected in parallel if not mechanically linked. Power consumption and input impedance must be observed.

Min-position is adjustable from 0...100% with a potentiometer on the actuator cover.

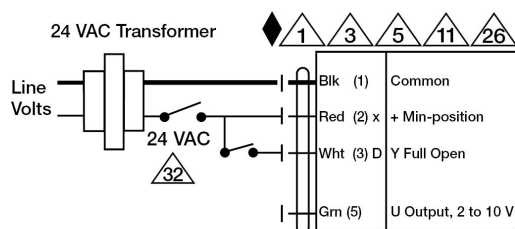
Actuator spring returns when switch is open, for fan interlock, etc.



2...10 V / 4...20 mA Control



Three Position Control



Minimum Position with Override Control

## Dimensions

### Dimensional drawings

