BELIMO

Technical data sheet LF24-ECON-R03 US

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

- **Torque motor 35 in-lb [4 Nm]**
- **Nominal voltage AC/DC 24 V**
- **Control Modulating**

5-year warranty

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 plenum cable, 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	3 kΩ NTC
	Operating range Y note	3 kΩ @ 77°F (25°C) MA setpoint = 55°F
	Input impedance	100 kΩ
	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°
	Angle of rotation note	adjustable with mechanical stop
	Running Time (Motor)	95 s / 90°
	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]
	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 †Rated Impulse Voltage 800V, Type of action 1.AA, Control Pollution Degree 3

Product features

Application

For fail-safe, modulating control of mixed air setpoint on economizer 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 3 kΩ thermistor, which allows the LF24-ECON.. to retrofit or replace Honeywell® M7415 actuators. A 2...10 V feedback signal is provided for position indication.

Operation

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 90°. The LF24-ECON-R03 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-ECON-R03 US for more details on 3-position control.

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 3 kΩ NTC thermistor, 55°F setpoint. Actuator must have a built-in minimum position potentiometer. Actuator must have a minimum position override via 0 to 10 VDC on wire 4. 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 independent of torque load. A 2 to 10 VDC 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 fail safe 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
DC Voltage Input Rescaling Module	IRM-100
Auxiliary switch, mercury-free	P475
Auxiliary switch, mercury-free	P475-1
Signal simulator, Power supply AC 120 V	PS-100
Positioner for wall mounting	SGA24
Positioner for front-panel mounting	SGF24
Transformer, AC 120 V to AC 24 V, 40 VA	ZG-X40

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 36" L, 3/8" diameter	SH10
Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).	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
Damper clip for damper blade, 3.5" width.	ZG-DC1
Damper clip for damper blade, 6" width.	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	

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.

1 Provide overload protection and disconnect as required.

3 Actuators may also be powered by DC 24 V.

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

27 A relay or switch can spring return the actuator when the RTU fan de-energizes, or if low ambient temperature is sensed.

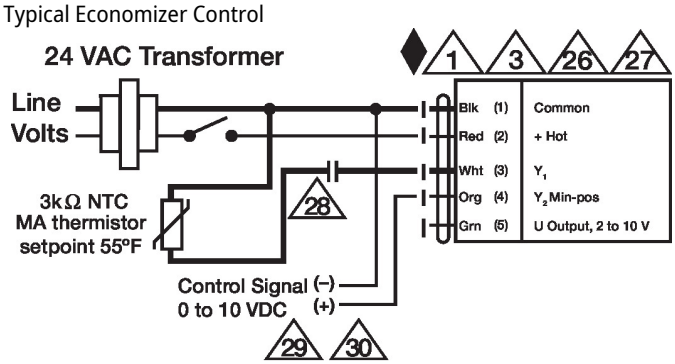
28 A standard relay can be used to close the sensor circuit to engage economizer mode, e.g. outside air changeover device like a dry bulb or enthalpy limit switch. Honeywell® logic module W7459A and enthalpy sensor C7400 also provide terminals for this switching.

29 A remote CO2 sensor or DDC controller can change the standard relay opening or closing the sensor circuit. This device can be a relay or a dry bulb/enthalpy limit switch.

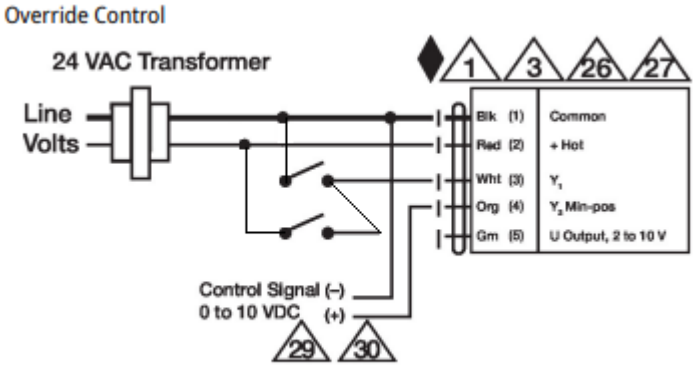
30 Override control for Y2 only accepts 0.5...10 V override control.

Wiring diagrams

Typical Economizer Control



Override Control



Dimensions