Technical data sheet TFX24-3

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

- **Torque motor 22 in-lb [2.5 Nm]**
- **Nominal voltage AC/DC 24 V**
- **Control Floating point**

Picture may differ from product

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	4 VA
	Electrical Connection	18 AWG appliance or plenum cables, 1 m, 3 m or 5 m, with or without 1/2" NPT conduit connector
	Overload Protection	electronic throughout 0...95° rotation
	Electrical Protection	actuators are double insulated
Functional data	Torque motor	22 in-lb [2.5 Nm]
	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 /
	Running time motor note	constant, independent of load
	Running time fail-safe	<25 s @ -20...50°C, <60 s @ -30°C
	Sound power level, motor	35 dB(A)
	Sound power level, fail-safe	62 dB(A)
	Position indication	Mechanical
Safety data	Power source UL	Class 2 Supply
	Degree of protection NEMA/UL	NEMA 2
	Housing	UL Enclosure Type 2
	Agency Listing	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2014/30/EU
	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

Technical data

Weight	Weight	1.4 lb [0.63 kg]
Materials	Housing material	UL94-5VA

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

Product features

Application

For modulation or On/Off, fail-safe 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 1/4" up to 1/2" in diameter by means of its universal clamp, 1/2" shaft centered at delivery. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. Control is floating point from a triac or relay, or On/Off from an auxiliary contact on a fan motor contactor, controller or manual switch.

Operation

The TF 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 consistent torque to the damper with, and without, power applied to the actuator. The TF series provides 95° of rotation and is provided with a graduated position indicator showing 0 to 95°. The TF 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 fail-safe 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.

Safety Note: Screw a conduit fitting into the actuator's bushing. Jacket the actuator's input and output wiring with suitable flexible conduit. Properly terminate the conduit in a suitable junction box.

Typical specification

Floating point, On/Off spring return 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 1/2" diameter and center a 1/2" shaft. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall have an external direction of rotation switch to reverse control logic. Actuators shall use a brushless DC motor and be protected from overload at all angles of rotation. If required, one SPDT auxiliary switch shall be provided having the capability of being adjustable. Actuators with auxiliary switch must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Run time shall be constant and independent of torque. 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	P475
Auxiliary switch, mercury-free	P475-1
Signal simulator, Power supply AC 120 V	PS-100
Cable conduit connector 1/2"	TF-CC US
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
Position indicator for TFB(X)	IND-TF
Shaft clamp for TFB(X)	K8 US
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

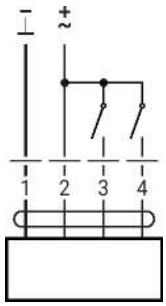
Accessories

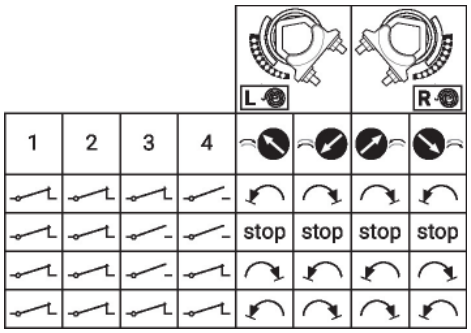
Description	Type
Damper crank arm Slot width 8.2 mm, for ø1.05"	KH12
Damper crank arm Slot width 6.2 mm, clamping range ø3/8...3/4" [10...18 mm]	KH6
Damper crank arm Slot width 8.2 mm, clamping range ø3/8...3/4" [10...18 mm]	KH8
	KH-TF US
	KH-TF-1 US
Screw fastening kit	SB-TF
Push rod for KG10A ball joint L 36", 3/8" diameter	SH10
	SH8
	TF-P
Wrench 0.32 in and 0.39 in [8 mm and 10 mm]	TOOL-06
Angle of rotation limiter, with end stop	ZDB-TF
Mounting bracket for TFB(X)	ZG-113
	ZG-DC1
	ZG-DC2
	ZG-LMSA-1
	ZG-LMSA-1/2-5
	ZG-TF112
	ZG-TF2
Mounting kit for TFB(X)	ZG-TF3
Weather shield 13x8x6" [330x203x152 mm] (LxWxH)	ZS-100
Baseplate, for ZS-100	ZS-101
Weather shield 406x213x102 mm [16x8-3/8x4"] (LxWxH)	ZS-150

Electrical installation

Wire colors:
1 = black
2 = red
3 = white
4 = white

AC/DC 24 V, 3-point





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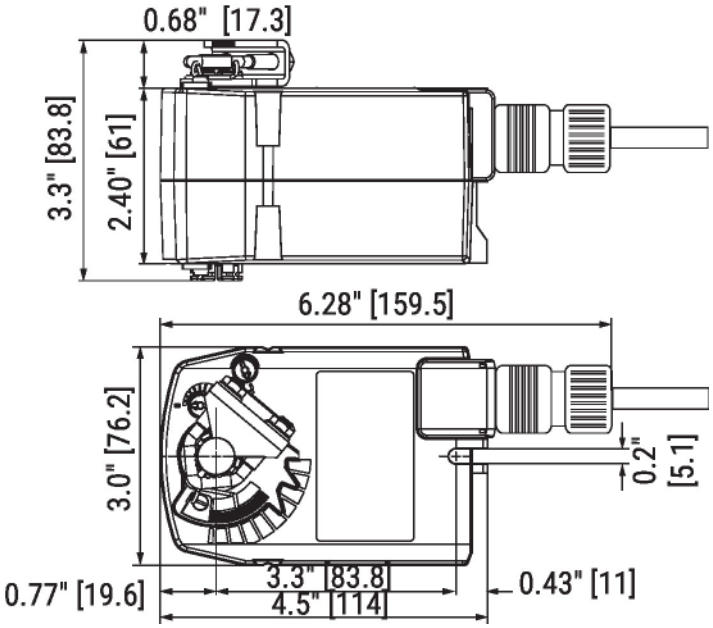
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