



Technical Data		FSNF24(-S)(-FC) US, FSNF120(-S)(-FC) US	
Power supply	FSNF24(-S)(-FC) US	24 VAC ± 20%, 50/60 Hz	
	FSNF120(-S)(-FC) US	120 VAC ± 10%, 50/60 Hz	
Power consumption	running	17 W, 24 VA	
		24 VAC holding	4 W, 6.5 VA
	120 VAC	running	19 W, 23 VA, 0.19 A
		holding	6 W, 8.5 VA, 0.07 A
Fusing*	FSNF24	2.5 amp slow blow	
	FSNF120	0.5 amp slow blow	
Transformer sizing		40 VA per 24 VAC actuator	
Electrical connection	FSNF24 US	3 ft, 18 ga, 2 color coded leads	
	FSNF120 US	3 ft, 18 ga, 3 color coded leads	
	FSNF...-S US	3 ft, 18 ga, appliance cable	
Overload protection		electronic throughout 0 to 95° rotation grounded enclosure, 120V	
Control		microprocessor	
Angle of rotation		95°	
Torque		70 in-lb [7.9 Nm] minimum from 32°F to 350°F [0°C to 177°C]	
Direction of rotation	spring	can be selected by CCW/CW mounting	
Position indication		visual indicator, 0° to 95°	
Running time		between 32°F and 350°F [0°C to 177°C] <15 seconds at rated voltage and torque	
Humidity		5 to 95% RH non-condensing	
Ambient temperature		32°F to 122°F [0°C to 50°C]	
Storage temperature		-40°F to 176°F [-40°C to 80°C]	
Housing		NEMA type 1	
Housing material		zinc coated steel	
Gears		steel, permanently lubricated	
Agency listings		cULus listed to UL873 and CAN/CSA C22.2 No. 24 NYC Department of Buildings Materials and Equipment Acceptance Division MEA 197-07-M California State Fire Marshal Listing 3210-1593:101	
Servicing		maintenance free	
Quality standard		ISO 9001	
Weight	FSNF24(-S) US	6.0 lbs [2.75 kg], (+ 0.5 lbs [+ .23 kg])	
	FSNF120(-S) US	6.7 lbs [3.0 kg], (+ 0.5 lbs [+ .23 kg])	

FSNF24-S US, FSNF120-S US, FSNF24-S-FC, FSNF120-S-FC	
Auxiliary switch	2xSPST 7A resistive, 2.5A inductive at 120V or 250V, UL Approved, double-insulated, one switch at 10°, one at 85°

**Application**

The type FSNF spring-return actuator is intended for the operation of smoke and combination fire and smoke dampers in ventilation and air-conditioning systems. The actuator will meet requirements of UL555 and UL555S when tested as an assembly with the damper and will open and close in 15 seconds at 350°F. Square footage of damper operated will depend on make and model of damper and the temperature 250°F or 350°F.

**Operation**

Mounting of the actuator to the damper axle shaft or jackshaft (3/8" to 1.05") is via a cold-weld clamp. Teeth in the clamp and V-bolt dig into the metal of both solid and hollow shafts maintaining a perfect connection. The specially designed clamp will not crush hollow shafts. The bottom end of the actuator is held by an anti-rotation strap or by a stud provided by the damper manufacturer.

The actuator is mounted in its fail safe position with the damper blade(s) closed. Upon applying power, the actuator drives the damper to the open position. The internal spring is tensioned at the same time. If the power supply is interrupted, the spring moves the damper back to its fail-safe position.

**-FC Models** have the same electrical and mechanical characteristics except instead of a 1/2" conduit connector a 3/8" screw flex connector is supplied.

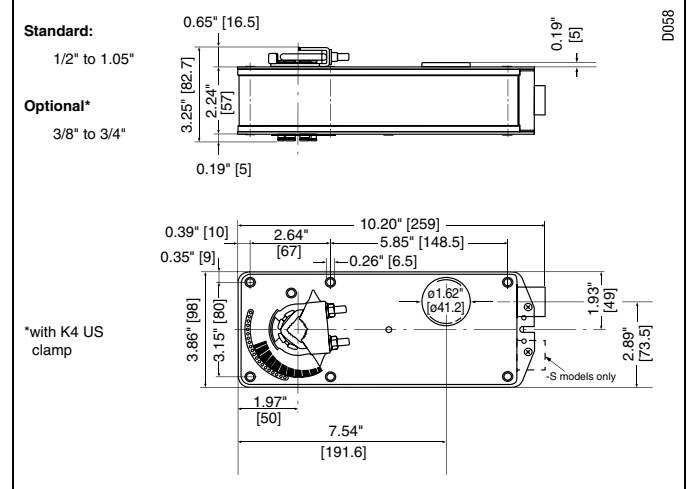
**SAFETY NOTES**

The actuator contains no components which the user can replace or repair.

**1/2" Threaded Connector** – Screw a conduit fitting into the actuator's metal bushing. Jacket the actuator's input wiring with suitable flexible conduit. Properly terminate the conduit in a suitable junction box.

**3/8" Flexible Connector Models (-FC Screw Connector)** – Mount the flexible conduit into the actuator's metal bushing by means of the provided screw with a torque of 0.9 ft-lb. Jacket the actuator's input wiring with suitable flexible conduit. Properly terminate the conduit in a suitable junction box.

**Dimensions (Inches [mm])**



**Accessories**

All AF/NF linkages and parts except ZG-102 may be employed.

**\* Individual Fusing or Breakers are not required by Belimo.**

The FSNF24 draws higher peak current when driving against any type of stop. Given the technology of fuses & breakers, this requires the value of fuse or breaker to be increased to avoid nuisance opening or tripping. A 2.5 amp slow blow should be used for 24VAC. A 0.5 amp slow blow should be used for 120VAC.

**Transformers**

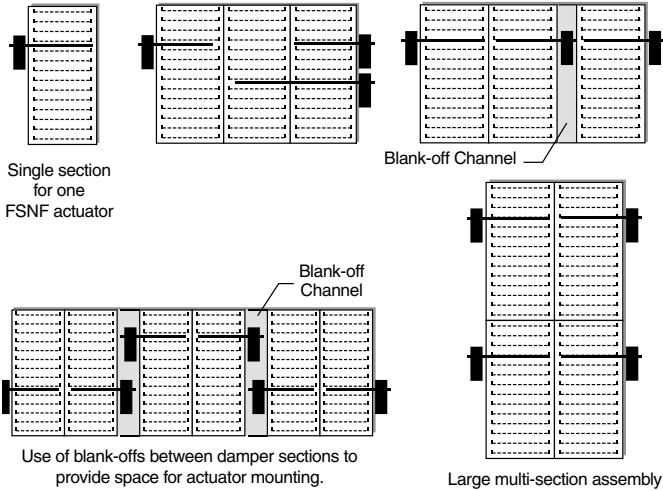
Note that while a 100VA transformer would handle 2 actuators, a 4A breaker is insufficient.

**Typical Applications**

**Multi-section Damper Assemblies**

The typical fire and smoke damper requires from 5-15 in-lb of torque per square foot at 250°F – 350°F under dynamic load (2400 fpm velocity). The FSNF will operate multi-section dampers using multiple actuators for multiple sections. Some of the methods used are shown below.

This is a direct coupled actuator. If linkages are needed use those for the FSAF series. Do not use the ZG-102 as close coupled actuators have a shortened life due to the high speed of the FSNF. Mounting at opposite ends of a jackshaft is OK.

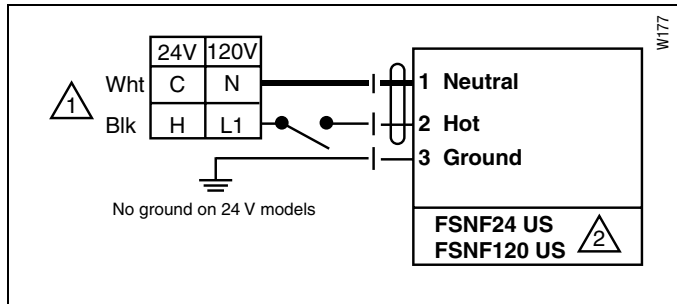


**Wiring Diagrams**

**INSTALLATION NOTES**

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**  
Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- 4 For end position indication, interlock control, fan startup, etc., FSNF24-S US and FSNF120-S US incorporate two built-in auxiliary switches:  
2 x SPDT, 7A (2.5A inductive)@125/250 VAC, UL Approved, 10° and 85°.  
Switch rating is for 250°F 1/2 hour only.

**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.



**Typical Specification**

**Smoke Control and Combination Fire and Smoke Control Damper Actuators**

All smoke and combination fire and smoke dampers shall be provided with Belimo FSTF, FSLF, FSNF, or FSAF actuators. No substitutions allowed.

Damper and actuator shall have UL555S Listing for 250°F (350°F) and shall comply with UBC if required by local codes.

Where proof of closure switches are required, blade switches, actuator auxiliary switches, or proximity switches are allowed if permitted by local codes.

**Replacement Applications**

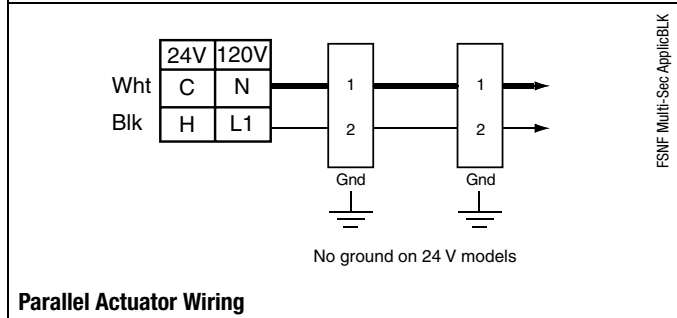
The number one "equal or better" requirement for use as a replacement for obsolete defective motors is the UL555S listing of the Belimo actuator with the damper for the application. The local authority having jurisdiction sets the requirements. In some cases a permit and inspection may be required.

Go to [www.belimo.us/firesmoke](http://www.belimo.us/firesmoke) for a Cross Reference from old damper actuators to Belimo. Extensive retrofit installation instructions are available, along with technical training information.

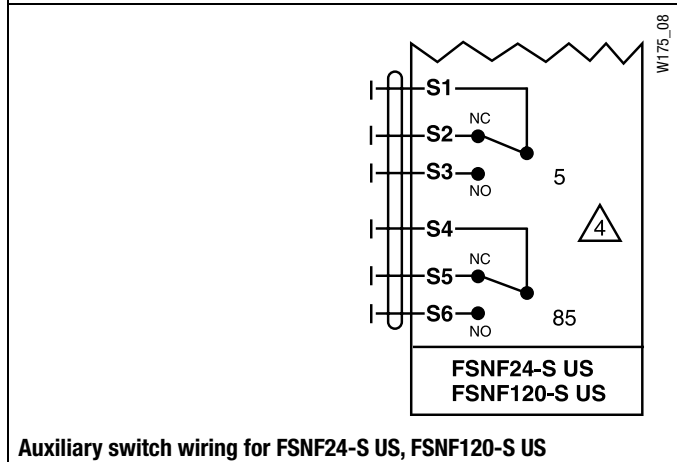
**CAUTION**

Caution must be used when replacing failed motors with new Belimo actuators. Many old motors did not have internal springs and depended on external springs on the side of the damper or wrapped around the damper shaft to close the damper. Old motor springs must be removed or disabled. Do not remove fusible link springs if they had only fire and no smoke functions

In some cases, a BAE 165 or equal thermal sensor must be installed.



**Parallel Actuator Wiring**



**Auxiliary switch wiring for FSNF24-S US, FSNF120-S US**

Subject to change. © Belimo Aircontrols (USA), Inc.