

# FSAF24-SR (-S) US Proportional Fire and Smoke Actuator

Proportional damper actuator, spring return, 24 V power. 2 to 10 VDC, and 4 to 20 mA control signal.  
Output signal of 2 to 10 VDC for position indication. Operation at 250F for limited time per UL555S testing.



Technical Data	FSAF24-SR (-S) US
Power supply	24 VAC $\pm$ 20% 50/60 Hz 24 VDC $\pm$ 10%
Power consumption	running: 7W 11 VA ; holding: 3W 5 VA
Transformer sizing	15 VA (class 2 power source)
Electrical connection	
Motor	3 ft, 18 ga, 4 color coded leads (24V)
Auxiliary switches	3 ft, 18 ga, appliance cable 1/2" conduit connectors
Overload protection	electronic throughout 0° to 95° rotation
Operating range	2 to 10 VDC, 4 to 20 mA
Input impedance	100k $\Omega$ (0.1 mA), 500 $\Omega$
Feedback output "U"	2 to 10 VDC (max. 0.5 mA) for 95°
Angle of rotation	mechanically limited to 95°
Torque	133 in-lb [15 Nm] constant
Direction of rotation	spring return reversible with CW/CCW mounting. The control direction switch is not present. Direct acting only. 2 VDC=Fail-safe position.
Position indication	visual indicator, 0° to 95° (0° is spring return position)
Manual override	3mm hex crank (shipped w/actuator)
Running time	<75 sec. constant, independent of load, spring return < 20 seconds
Humidity	5 to 95% RH non-condensing
Ambient temperature	
- Normal duty	-22°F to +122°F [-30°C to +50°C]
- Safety duty	3 on/off cycles after 30 minutes at ambient temperature of 250°F [121°C]
Storage temperature	-40°F to +176°F [-40°C to +80°C]
Housing	NEMA type 1 / IP40
Housing material	zinc coated metal
Agency listings	cULus to UL873 and CSA C22.2 No. 24-93
Noise level	max. 45 dB (A)
Servicing	maintenance free
Quality standard	ISO 9001, 5 year Belimo warranty
Weight	6.0 lbs (2.7 kg.)
	<b>FSAF24-SR-S US (same as above)</b>
Auxiliary Switch	2 x SPST 7A resistive, 2.5A inductive at 120/250VAC. UL listed, double-insulated, one set at $\pm$ 10°, one adjustable 30° to 90°

**Torque min. 133 in-lb, for control of air dampers**

## Application

For proportional modulation of UL555S rated dampers in HVAC. Actuator sizing should be done in accordance with the damper manufacturer's specifications.

The actuator is mounted directly to a damper shaft or jack-shaft up to 1.05" in diameter by means of its universal clamp. A crankarm and mounting brackets are available if the actuator cannot be direct coupled to the jackshaft or damper shaft.

The actuator operates in response to a 2 to 10 VDC, or with the addition of a 500 $\Omega$  resistor, a 4 to 20 mA control input from an electronic controller or positioner. A 2 to 10 VDC feedback signal is provided for position indication or master-slave applications.

## Operation

The FSAF series actuators provide true spring return operation for reliable fail-safe application and positive close-off on UL555S dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator.

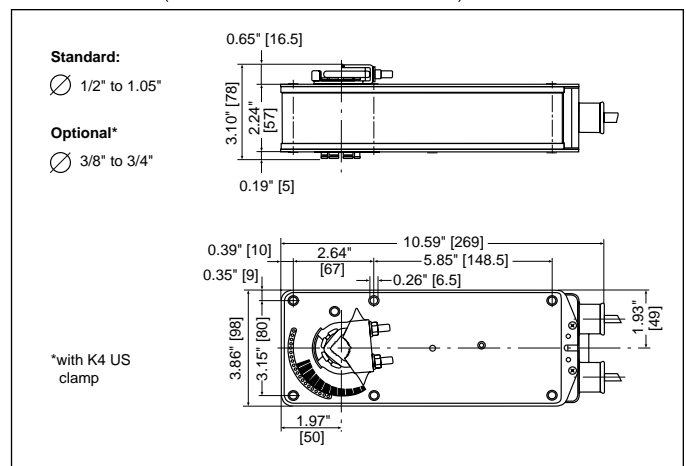
The FSAF series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The FSAF has a unique manual positioning mechanism which allows the setting of any damper position within its 95° of rotation.

The actuator is shipped in the zero position to provide automatic compression against damper gaskets for tight shut-off. When power is applied, the manual mechanism is released and the actuator drives toward the full fail-safe position. The actuator will memorize the angle where it stops rotating and use this point as its zero position for its normal control operations. The manual override can also be released physically by the use of a crank supplied with the actuator.

The FSAF uses a brushless DC motor which is controlled by a microprocessor. The actuator may be stalled anywhere during its rotation without damage.

This is a direct acting actuator. At a 2V signal the actuator will be in the spring return safety direction. With an increase in signal, the actuator drives the damper open. If power is removed, the damper will spring closed. Interlocks must be provided as necessary for life safety functions and to shut down fan if required.

## Dimensions (All numbers in brackets are metric.)



UL555S modulating damper actuator, spring return safety, 24 V for 2 to 10 VDC, and 4 to 20 mA control signal. Output signal of 2 to 10 VDC for position indication.

## Accessories

AF series accessories may be employed:

IND-AF2	Damper position indicator
K4 US	Universal clamp for 3/8" to 3/4" shafts
K4-1 US	Universal clamp for up to 1.05" dia. jackshafts
K4-H	Universal clamp for hexshafts 3/8" to 5/8"
KH-AF	Crankarm for up to 3/4" round shaft (Series 2)
KH-AF-1	Crankarm for up to 1.05" jackshaft (Series 2)
KH-AFV	V-bolt kit for KH-AF and KH-AF-1
Tool-01	10 mm wrench
SGA24	Min. and/or max. positioner in NEMA 4 housing
SGF24	Min. and/or max. positioner for flush panel mounting
ZG-R01	500Ω resistor for 0 to 20 mA control signal
ZDB-AF2	Angle of rotation limiter
ZG-100	Universal mounting bracket
ZG-101	Universal mounting bracket
ZG-102	Multiple actuator mounting bracket
ZG-103	Universal mounting bracket
ZG-104	Universal mounting bracket
ZG-106	Mounting bracket for Honeywell® Mod IV replacement or new crankarm type installations
ZG-107	Mounting bracket for Honeywell® Mod III or Johnson® Series 100 replacement or new crankarm type installations
ZG-108	Mounting bracket for Barber Colman® MA 3.../4..., Honeywell® Mod III or IV or Johnson® Series 100 replacement or new crankarm type installations
ZG-AF	Crankarm adaptor kit for AF/NF
ZG-AF108	Crankarm adaptor kit for AF/NF

ZS-100	Weather shield (metal)
ZS-150	Weather shield (polycarbonate)
ZS-260	Explosion-proof housing
ZS-300	NEMA 4X housing

For an overview of how to apply the accessories, see Belimo Mechanical Accessories and refer to the Belimo Mounting Methods Guide.

**Note: When using FSAF24-SR (-S) US actuators, only use accessories listed on this page.**

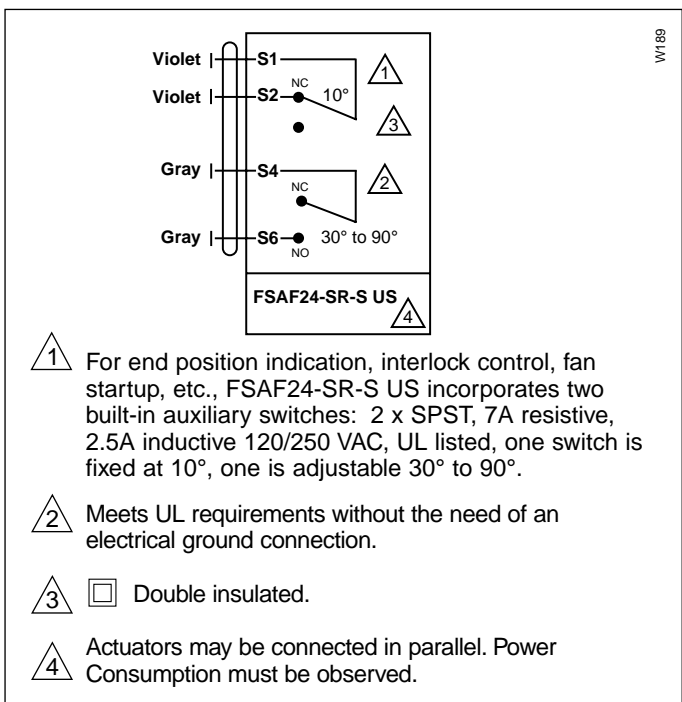
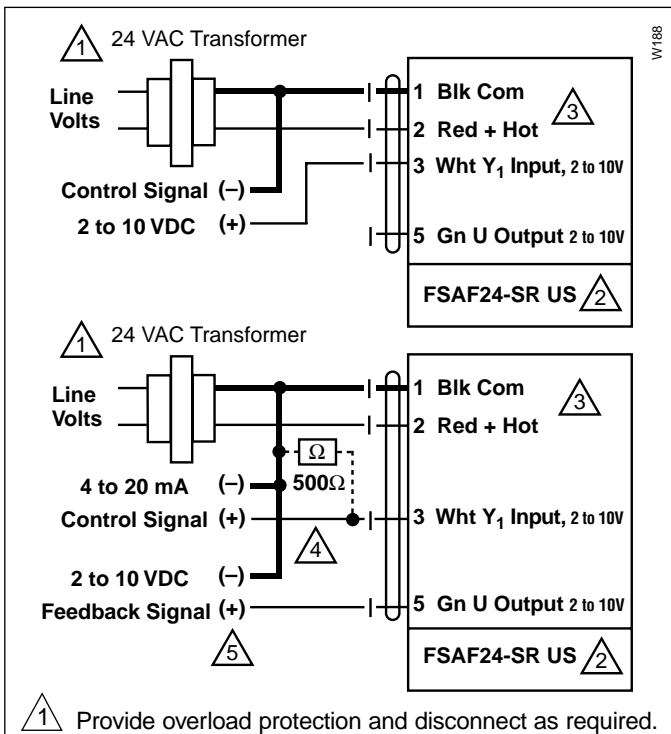
## FSAF24-SR (-S) US Typical Specification

Proportional smoke, and combination fire and smoke dampers, shall be controlled by Belimo FSAF24-SR actuators. The control signal shall provide proportional 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 or positioner. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuator shall open damper in <75 seconds per UL555S and shall spring closed in under 20 seconds. Actuators shall be UL listed, have a 5-year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo. Actuators with auxiliary switches must be constructed to meet the requirement for double insulation so an electrical ground connection is not required to meet agency listings.

## Safety Note

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

## Wiring diagrams



- 1 Provide overload protection and disconnect as required.
- 2 Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- 3 Actuator may also be powered by 24 VDC.
- 4 The ZG-R01 500Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC.
- 5 Only connect common to neg. (—) leg of control circuits

- 1 For end position indication, interlock control, fan startup, etc., FSAF24-SR-S US incorporates two built-in auxiliary switches: 2 x SPST, 7A resistive, 2.5A inductive 120/250 VAC, UL listed, one switch is fixed at 10°, one is adjustable 30° to 90°.
- 2 Meets UL requirements without the need of an electrical ground connection.
- 3 □ Double insulated.
- 4 Actuators may be connected in parallel. Power Consumption must be observed.

## 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 since UL has stated that they do not regulate replacements.

As of this writing, Belimo is the only manufacturer of UL555S listed proportional actuators.