

FSAF24-SR (-S) US

Proportional Fire and Smoke Actuator, Spring Return, 24V. 2 to 10 VDC and 4 to 20 mA Control Signal. Output Signal of 2 to 10 VDC for Position Indication. Operation at 250°F for Limited Time per UL555S Testing.

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 jackshaft 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 Ω 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. See Application Bulletin for details.

Operation

The FSAF series actuators provide spring return operation. There is no reversing switch on the FSAF24-SR. It is direct acting only. A reverse acting signal is required if it must spring open while 2V signal drives it closed. The torque is asymmetrical giving 180 in-lb drive and 133 in-lb spring.

The FSAF resets after being driven or springing closed to the 0° position. There is a possible hysteresis of 1° every 1000 changes in signal. This can cause a position shift. It is recommended that power or signal be reset once a week.

A manual override winder and locking mechanism is provided. If the manual winder is used when the actuator is powered, the actuator will release and drive closed to reset the 0° position.

The actuator may be mechanically paralleled or "piggybacked." Up to 4 actuators may be mechanically paralleled on the same shaft. Wiring must be 3-3-3-3 from the control signal. The signal must change at least .25V when changing directions and .1V when moving in the same direction.

The wire 5 feedback can be used to parallel up to five additional actuators on different dampers. If less than 2.1V or greater than 9.9V is given wire 3, actuator drives all the way to the respective end stop.

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



Technical Data

FSAF24-SR (-S) US

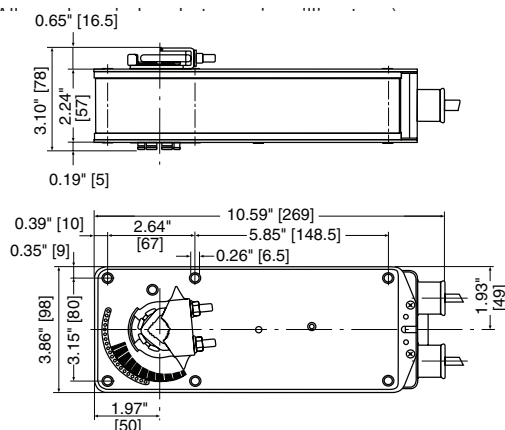
Power supply	24 VAC $\pm 20\%$ 50/60 Hz 24 VDC $\pm 10\%$	
Power consumption	running	7W 11 VA
	holding	3W 5 VA
Transformer sizing	15 VA (class 2 power source)	
Electrical connection	motor	3 ft, 18 ga, 4 color coded leads (24V) 1/2" conduit connectors
	auxiliary switches	3 ft, 18 ga, appliance cable 1/2" conduit connectors
Overload protection	electronic throughout 0° to 95° rotation	
Operating range	2 to 10 VDC, 4 to 20 mA	
Input impedance	100 k Ω (0.1 mA), 500 Ω	
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]	
Direction of rotation	spring return reversible with CW/CCW mounting. A 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	3 mm hex crank (shipped w/ actuator)	
Running time	<75 seconds 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 (with flex conduit)	
Housing material	zinc coated steel	
Agency listings	cULus to UL873 and CSAC22.2 No 24-93	
Noise level	<45 dB(A)	
Servicing	maintenance free	
Quality	ISO 9001, 5-year Belimo warranty	
Weight	6.0 lbs (2.7 kg.), [-S] 6.5 lbs (3 kg)	
Auxiliary switch	2 x SPDT 7A resistive, 2.5A inductive at 120/250VAC. UL listed, double-insulated, one set at +10°, one adjustable 30° to 90°	

K4-2 (Standard):

○ 1/2" to 1.05"

Optional:

◻ 1/2"



Accessories (AF series accessories may be employed)

IND-AF2	Damper position indicator
K4-1 US	Universal clamp for up to 1.05" dia. jackshafts
K4-H	Universal clamp for hexshafts $\frac{3}{8}$ " to $\frac{5}{8}$ "
KH-AF	Crankarm for up to $\frac{3}{4}$ " 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	500 Ω 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-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.

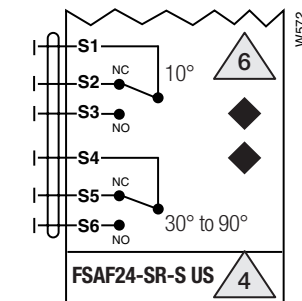
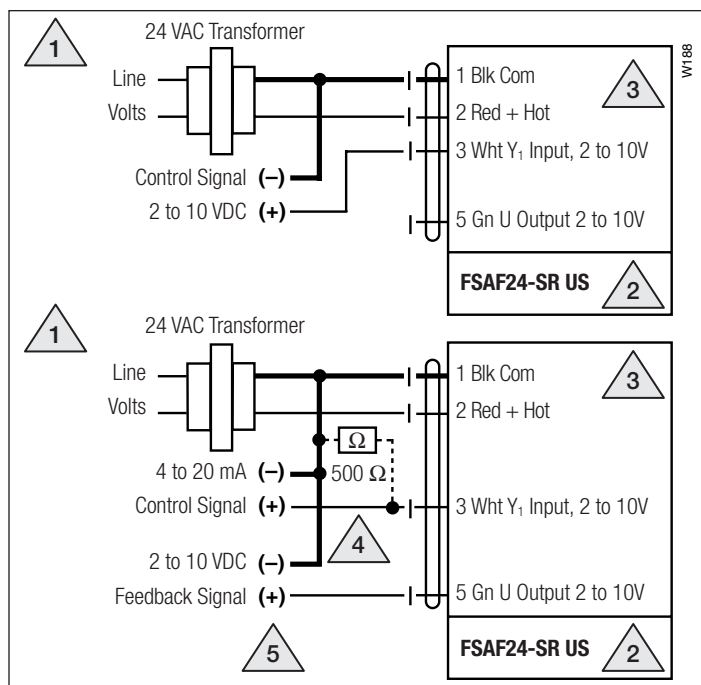
Safety Note

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.

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 500 Ω 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 failsafe 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.

Wiring Diagrams



CAUTION



1 Provide overload protection and disconnect as required.



2 Actuators may be connected in parallel. Power consumption must be observed.



INSTALLATION NOTES



3 Actuators may also be powered by 24 VDC.



4 The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC.



5 Only connect common to neg. (—) leg of control circuits.



6 For end position indication, interlock control, fan startup, etc., FSAF24-SR-S US incorporates two built-in auxiliary switches: 2 x SPDT, 7A resistive, 2.5A inductive 120/250 VAC, UL listed, one switch is fixed at 10°, one is adjustable 30° to 90°.



APPLICATION NOTES



Meets UL requirements without the need of an electrical ground connection. Actuator may also be powered by 24 VDC.



Double insulated.



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.

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.