

# FSAF24(-S) US, FSAF120(-S) US

On/Off, Spring Return, Meets 250°F [121°C] for Half Hour, 75 Seconds



| Technical Data        |                | FSAF24(-S) US, FSAF120(-S) US  |
|-----------------------|----------------|--|
| Power supply          |                |  |
|                       | FSAF24(-S) US  | 24 VAC ± 20%, 24 VDC -10% +20%   |
|                       | FSAF120(-S) US | 120 VAC ± 10%, 50/60 Hz  |
| Power consumption     |                |  |
|                       | FSAF24(-S) US  | running 7.5 W, 10 VA, .4 A   |
|                       |                | holding 2 W, 4 VA, .15 A   |
|                       | FSAF120(-S) US | running 50/60Hz: 9.5 W, 11 VA, .1 A                                      |
|                       |                | holding 3.5 W, 6 VA, .05 A   |
| Transformer sizing    |                | 10 VA (Class 2 power source 24V only)                                    |
| Electrical connection | motor          | 3 ft, 18 ga, 2 color coded leads<br>1/2" conduit connectors              |
|                       | -S models      | 3 ft, 18 ga, 4 leads appliance cable<br>1/2" conduit connectors          |
| Overload protection   |                | electronic throughout 0 to 95° rotation                                  |
| Angle of rotation     |                | mechanically limited to 95°  |
| Torque                |                | 133 in-lb [15 Nm] constant   |
| Direction of rotation | spring         | reversible with cw/ccw mounting  |
| Position indication   |                | visual indicator, 0° to 95°<br>(0° is spring return position)            |
| Manual override       |                | 3mm hex crank (shipped w/actuator)                                       |
| Running time          |                | <75 sec. constant, independent of load                                   |
|                       | spring         | <20 seconds nominal  |
| 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  |
| Gears                 |                | permanently lubricated   |
| Agency listings       |                | cULus listed to UL873 and<br>CAN/CSA C22.2 No.24                         |
| Noise level (max)     |                | 45 dB (A)  |
|                       | spring return  | 62 dB  |
| Servicing             |                | Maintenance free   |
| Quality standard      |                | ISO 9001, 5 year Belimo warranty   |
| Weight                |                | (standard / -S model)  |
|                       | FSAF24(-S) US  | 5.7 / 6.2 lbs (2.6 / 2.8 kg)   |
|                       | FSAF120(-S) US | 6.1 / 6.6 lbs (2.8 / 3 kg)   |

## FSAF24-S US, FSAF120-S US

|                  |   |
|------------------|---|
| Auxiliary Switch | 2xSPST 7A resistive, 2.5A inductive at 120V or 250V, UL Approved, double-insulated, one switch at 10°, one adjustable from 30° to 90° |
|------------------|---|

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

## Application

For two position control 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 3/8" to 1.05" in diameter by means of its universal clamp. A crank arm and mounting brackets are available if the actuator cannot be direct coupled to the jackshaft or damper shaft.

Square footage of damper operated will depend on make and model of damper. Typically 12 sq.ft. minimum up to 24 sq.ft maximum will be operated for UL555S 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 manual positioning mechanism which allows the setting of any damper position within its 95° of rotation.

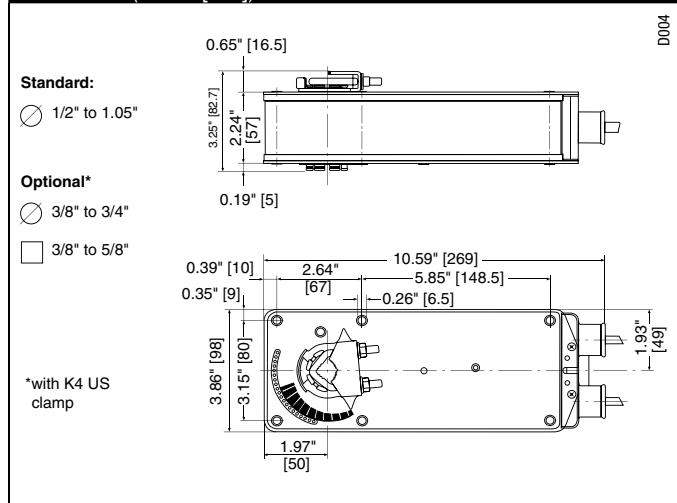
The actuator is shipped in the zero fail-safe position to provide automatic compression against damper gaskets for tight shut-off. When power is applied, the manual mechanism is released and the actuator drives toward the open position where it stops rotating.

The manual override can also be released physically by the use of a crank supplied with the actuator.

## 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.

## Dimensions (Inches [mm])



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### 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       | Crank arm for up to 3/4" round shaft (Series 2)   |
| KH-AF-1     | Crank arm 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  |
| ZDB-AF2 US  | 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 crank arm type installations  |
| ZG-107      | Mounting bracket for Honeywell® Mod III or Johnson® Series 100 replacement or new crank arm type installations                                |
| ZG-108      | Mounting bracket for Barber Colman® MA 3./4., Honeywell® Mod III or IV or Johnson® Series 100 replacement or new crank arm type installations |
| ZG-AF       | Crank arm adaptor kit for AF/NF   |
| ZG-AF108    | Crank arm adaptor kit for AF/NF   |
| ZS-100      | Weather shield (metal)  |
| ZS-150      | Weather shield (polycarbonate)  |
| ZS-300      | NEMA 4X housing   |
| 22965-00001 | 12mm form fit square shaft adaptor  |

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

**NOTE:** When using FSAFxx (-S) US actuators, only use accessories listed on this page.

### Typical Specification

Large combination fire and smoke dampers are to be operated by Belimo FSAF series actuators. Manufacturer shall provide 5 year warranty.

Actuators shall draw no more than 11VA at 120V or 24V.

Where auxiliary switches are required for signaling, starting fans, or position indication, -S model actuators, damper blade, or proximity switches shall be provided.

Smaller dampers shall employ Belimo FSLF or FSNF actuators per damper manufacturer recommendations.

### Wiring Diagrams

#### INSTALLATION NOTES

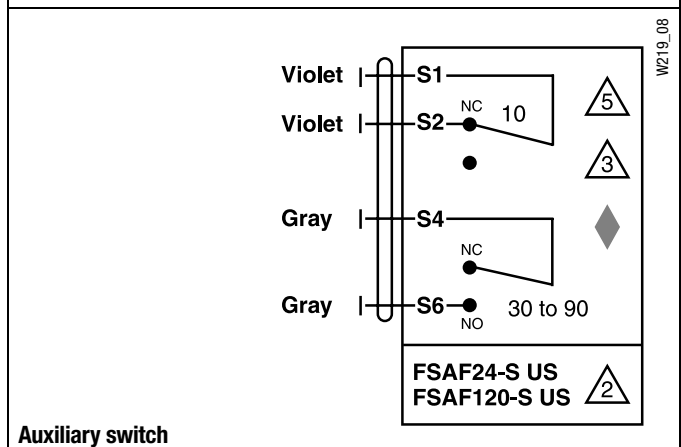
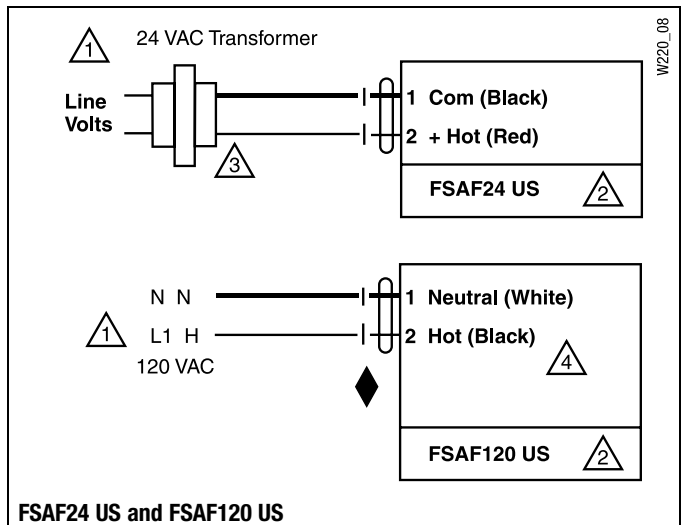
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**  
Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- 3 Actuator may also be powered by 24 VDC.
- 4 No ground connection required. Double insulated.
- 5 For end position indication, interlock control, fan startup, etc., the FSAF24-S US and FSAF120-S US incorporates two built-in auxiliary switches: 2 x SPST, 7A resistive, 2.5 inductive @120/250 VAC, UL Approved, one switch is fixed at 10, one is adjustable from 30 to 90.

#### APPLICATION NOTES

- ◆ Meets UL requirements without the need of an electrical ground connection.
- ◆ Meets cULus or UL and CSA Standard requirements without the need of an electrical ground connection.

#### 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.



# FSAF230(-S) US

On/Off, Spring Return, 250°F [121°C] for Half Hour, 75 Seconds



| Technical Data        |               | FSAF230(-S) US   |
|-----------------------|---------------|--|
| Power supply          |               | 230 VAC ± 14%, 50/60 Hz  |
| Power consumption     | running       | 50/60Hz: 11 W, 12 VA, .07 A  |
|                       | holding       | 3.5 W, 6 VA, .03 A   |
| Transformer sizing    |               | 10 VA (Class 2 power source 24V only)                                    |
| Electrical connection | motor         | 3 ft, 18 ga, 2 color coded leads<br>1/2" conduit connectors              |
|                       | -S models     | 3 ft, 18 ga, 4 leads appliance cable<br>1/2" conduit connectors          |
| Overload protection   |               | electronic throughout 0 to 95° rotation                                  |
| Angle of rotation     |               | mechanically limited to 95°  |
| Torque                |               | 133 in-lb [15 Nm] constant   |
| Direction of rotation | spring        | reversible with cw/ccw mounting  |
| Position indication   |               | visual indicator, 0° to 95°<br>(0° is spring return position)            |
| Manual override       |               | 3mm hex crank (shipped w/actuator)                                       |
| Running time          |               | <75 sec. constant, independent of load                                   |
|                       | spring        | <20 seconds nominal  |
| 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 flexible conduit                                 |
| Housing material      |               | zinc coated metal  |
| Gears                 |               | permanently lubricated   |
| Agency listings       |               | cULus listed to UL873 and CAN/CSA C22.2 No.24                            |
| Noise level (max)     |               | 45 dB (A)  |
|                       | spring return | 62 dB  |
| Servicing             |               | Maintenance free   |
| Quality standard      |               | ISO 9001, 5 year Belimo warranty   |
| Weight                |               | 6.9 lbs (3.1 kg)   |

| FSAF230-S US     |   |
|------------------|---|
| Auxiliary Switch | 2xSPST 7A resistive, 2.5A inductive at 120V or 250V, UL Approved, double-insulated, one switch at <10°, one adjustable from >30° to 90° |

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

## Application

For two position control 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 3/8" to 1.05" in diameter by means of its universal clamp. A crank arm and mounting brackets are available if the actuator cannot be direct coupled to the jackshaft or damper shaft.

Square footage of damper operated will depend on make and model of damper. Typically 12 sq.ft. minimum up to 24 sq.ft maximum will be operated for UL555S 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 manual positioning mechanism which allows the setting of any damper position within its 95° of rotation.

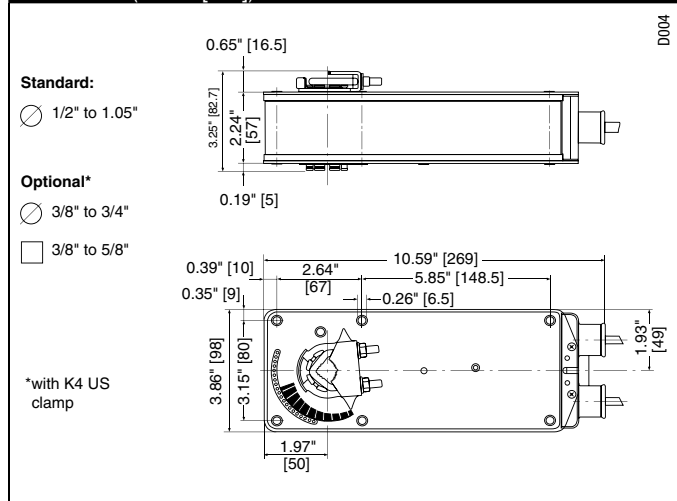
The actuator is shipped in the zero fail-safe position to provide automatic compression against damper gaskets for tight shut-off. When power is applied, the manual mechanism is released and the actuator drives toward the open position where it stops rotating.

The manual override can also be released physically by the use of a crank supplied with the actuator.

### 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.

### Dimensions (Inches [mm])



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### 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       | Crank arm for up to 3/4" round shaft (Series 2)   |
| KH-AF-1     | Crank arm 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  |
| ZDB-AF2 US  | 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 crank arm type installations  |
| ZG-107      | Mounting bracket for Honeywell® Mod III or Johnson® Series 100 replacement or new crank arm type installations                                |
| ZG-108      | Mounting bracket for Barber Colman® MA 3./4., Honeywell® Mod III or IV or Johnson® Series 100 replacement or new crank arm type installations |
| ZG-AF       | Crank arm adaptor kit for AF/NF   |
| ZG-AF108    | Crank arm adaptor kit for AF/NF   |
| ZS-100      | Weather shield (metal)  |
| ZS-150      | Weather shield (polycarbonate)  |
| ZS-300      | NEMA 4X housing   |
| 22965-00001 | 12mm form fit square shaft adaptor  |

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

**NOTE:** When using FSAFxx (-S) US actuators, only use accessories listed on this page.

### Typical Specification

Large combination fire and smoke dampers are to be operated by Belimo FSAF series actuators. Manufacturer shall provide 5 year warranty.

Actuators shall draw no more than 12VA at 230V or 10 VA at 24V.

Where auxiliary switches are required for signaling, starting fans, or position indication, -S model actuators, damper blade, or proximity switches shall be provided.

Smaller dampers shall employ Belimo FSLF or FSNF actuators per damper manufacturer recommendations.

### Wiring Diagrams

#### INSTALLATION NOTES

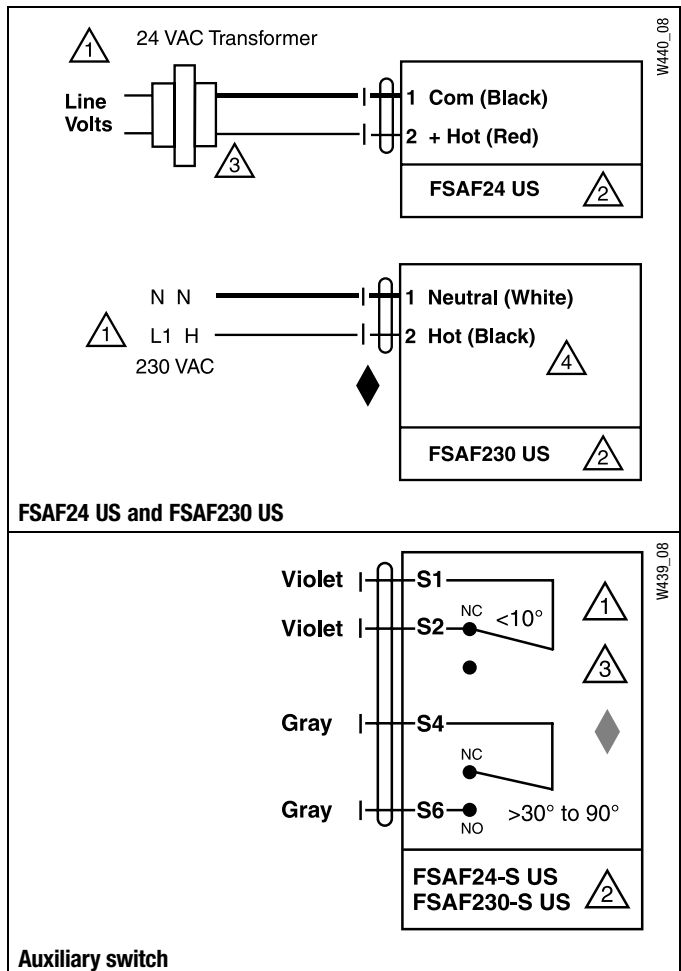
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**  
Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- 3 Actuator may also be powered by 24 VDC.
- 4 No ground connection required. Double insulated.
- 5 For end position indication, interlock control, fan startup, etc., the FSAF230-S US incorporates two built-in auxiliary switches: 2 x SPST, 7A resistive, 2.5 inductive @120/250 VAC, UL Approved, one switch is fixed at 10°, one is adjustable from 30° to 90°.

#### APPLICATION NOTES

- ◆ Meets UL requirements without the need of an electrical ground connection.
- ◆ Meets cULus or UL and CSA Standard requirements without the need of an electrical ground connection.

#### 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.



# FSAF24-SR(-S) US

Proportional, Spring Return, 24 V, 2 to 10 VDC or 4 to 20 mA control signal  
Operation at 250°F for limited time per UL555S testing



| Technical Data        |             | FSAF24-SR(-S) US  |
|-----------------------|-------------|---|
| Power supply          |             | 24 VAC ± 20% 50/60 Hz<br>24 VDC ± 10%   |
| Power consumption     | running     | 7 W, 11 VA  |
|                       | holding     | 3 W, 5 VA   |
| Transformer sizing    |             | 15 VA (class 2 power source)  |
| Electrical connection | FSAF24-SR   | 3 ft, 18 GA, 4 color coded leads (24V)<br>1/2" conduit connector  |
|                       | FSAF24-SR-S | 3 ft, 18 GA appliance cable<br>1/2" conduit connector   |
| Overload protection   |             | electronic throughout 0 to 95° rotation   |
| Operating range       |             | 2 to 10 VDC, 4 to 20mA  |
| Input impedance       |             | 100 kΩ (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] constant  |
| Direction of rotation | spring      | reversible with cw/ccw mounting<br>The control direction switch is not present. Direct acting only. 2 VDC=Fail-safe position.   |
| Position indication   |             | visual indicator, 0° to 95°<br>(0° spring return position)  |
| Manual override       |             | 3mm hex crank (shipped w/actuator)  |
| Running time          | motor       | <75 sec. constant, independent of load  |
|                       | spring      | < 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 2 / IP40  |
| Housing material      |             | zinc coated metal   |
| Agency listings†      |             | cULus to UL873 and CSA C22.2 No. 24-93  |
| Noise level (max)     | running     | 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</b> |             |   |
| Auxiliary switch      |             | 2 x SPDT 7A resistive, 2.5A inductive at 120/250VAC. UL Approved, double-insulated, one set at =+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 jackshaft up to 1.05" in diameter by means of its universal clamp. A crank arm 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 degree position.

The actuator may not be mechanically paralleled or "piggybacked." Each damper section should be controlled by a separate actuator.

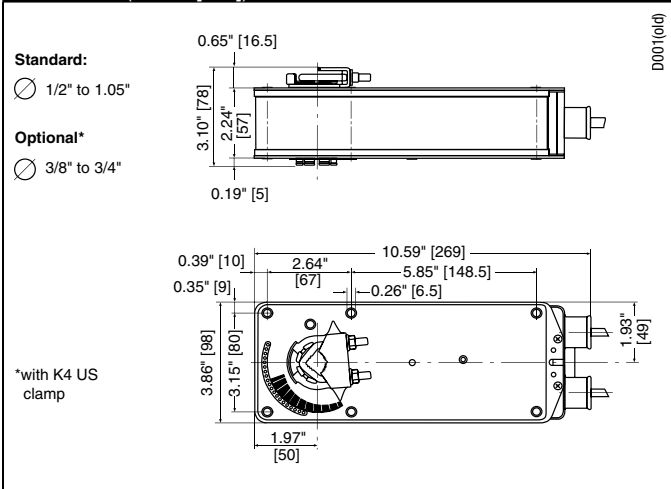
The wire 5 feedback can be used to parallel up to five additional actuators. If less than 2.1 V or greater than 9.9V is given wire 3, actuator drives all the way to the respective end stop.

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.

### 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.

### Dimensions (Inches [mm])



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### 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      | Crank arm for up to 3/4" round shaft (Series 2)   |
| KH-AF-1    | Crank arm 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 US | 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 crank arm type installations  |
| ZG-107     | Mounting bracket for Honeywell® Mod III or Johnson® Series 100 replacement or new crank arm type installations                                |
| ZG-108     | Mounting bracket for Barber Colman® MA 3./4., Honeywell® Mod III or IV or Johnson® Series 100 replacement or new crank arm type installations |
| ZG-AF      | Crank arm adaptor kit for AF/NF   |
| ZG-AF108   | Crank arm 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.

### 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 fail-safe operation. Actuator shall open damper in <75 seconds per UL555S and shall spring closed in under 20 seconds. Actuators shall be UL Approved, 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.

### Replacement Application

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.

### 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.
- 3 Actuator may also be powered by 24 VDC.

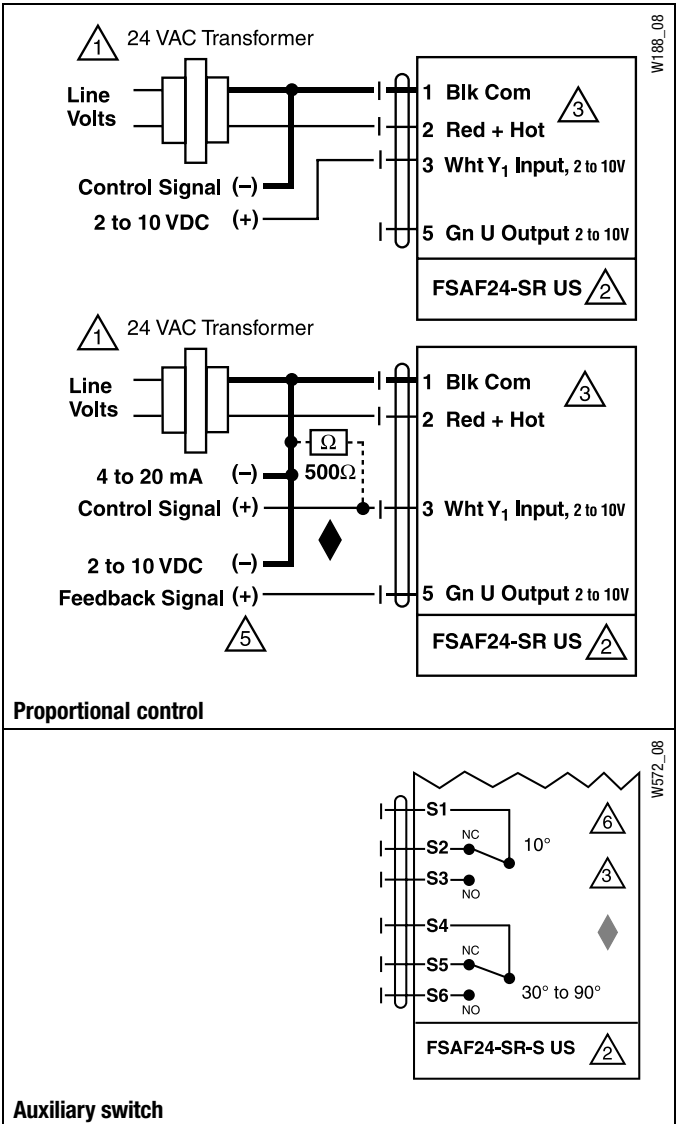
- 4 No ground connection required. Double insulated.
- 5 Only connect common to neg. (-) leg of control circuits.
- 6 For end position indication, interlock control, fan startup, etc., FSAF24-SR-S US incorporates two built-in auxiliary switches:  
2 x SPDT, 7A resistive, 2.5A inductive 120/250 VAC, UL Approved, 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.
- The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC.

#### 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.



# FSAF24-BAL(-S) US

Spring Return, 24 V, 3-Position, 100% Open Override  
Operation at 250°F for limited time per UL555S testing



| Technical Data        |         | FSAF24-BAL(-S) US  |
|-----------------------|---------|--|
| Power supply          |         | 24 VAC ± 20% 50/60 Hz<br>24 VDC ± 10%                      |
| Power consumption     | running | AC 9.5 VA 6.5W<br>DC 6W                                    |
|                       | holding | AC 5 VA 3W<br>DC 3W  |
| Transformer sizing    |         | 10 VA (class 2 power source 24V only)                      |
| Electrical connection |         | 3 ft, 18 GA, 1/2" conduit connector                        |
| Overload protection   |         | electronic throughout 0 to 95° rotation                    |
| Control signal        |         | 24 VAC/DC 3-position                                       |
| Angle of rotation     |         | 20° to 95°, pot adjustable                                 |
| Torque                |         | 133 in-lb [15 Nm]  |
| Direction of rotation | spring  | reversible with cw/ccw mounting                            |
| Position indication   |         | visual indicator, 0° to 95°<br>(0° spring return position) |
| Manual override       |         | 3mm hex crank (shipped w/actuator)                         |
| Running time          | motor   | <75 seconds @ 250°F [121°C]                                |
|                       | spring  | < 20 seconds   |
| Humidity              |         | 5 to 95% RH non-condensing                                 |
| Ambient temperature   |         | -22°F to 122°F [-30°C to 50°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 metal  |
| Agency listings†      |         | cULus to UL873 and CSA C22.2 No. 24-93                     |
| Noise level (max)     | running | <45 dB(A)  |
|                       | spring  | <62dB(A)   |
| Servicing             |         | maintenance free   |
| Quality standard      |         | ISO 9001, 5 year Belimo warranty                           |
| Weight                |         | 5.3 lbs (2.4 kg)   |
|                       |         | 5.7 lbs (2.6 kg) for -S model                              |

| FSAF24-BAL-S US  |  |
|------------------|--|
| Auxiliary switch | 2 x SPDT 7A resistive, 2.5A inductive at 120/250VAC. UL listed, double-insulated, one switch is set at 10°, one is adjustable 30° to 90° |

## Application

For 3-position control of UL555S rated dampers in HVAC. Actuator sizing should be done in accordance with the damper manufacturer's tests. In the absence of other information, use 10 in-lb of torque per square foot of area for opposed blade and 14 in-lb for parallel blade fire and smoke dampers at 1000 fpm air velocity.

The FSAF24-BAL is specifically designed to balance the air flow in ducts and simultaneously provide control of fire and smoke dampers. 0V = spring closed. 24V on wire 2, not 3 = drive to the potentiometer position (balanced flow). 24V on wire 3, regardless of the status of wire 2 = drive full open (smoke control extraction or pressurization). See Application Bulletin for details.

## Operation

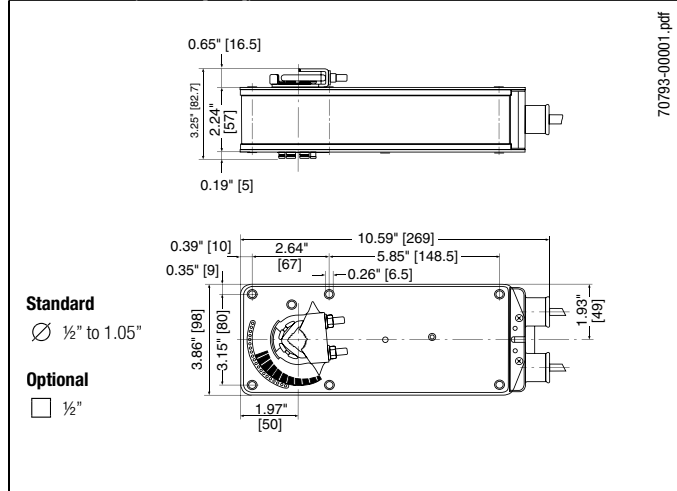
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## SAFETY NOTE

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

## Dimensions (Inches [mm])



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**Accessories (AF series accessories may be employed)**

|             |  |
|-------------|--|
| IND-AF2     | Damper position indicator  |
| K4-1 US     | Universal clamp for up to 1.05" dia. jackshafts  |
| KH-AF       | Crank arm for up to 3/4" round shaft (Series 2)  |
| KH-AF-1     | Crank arm 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   |
| 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 crank arm type installations   |
| ZG-107      | Mounting bracket for Honeywell® Mod III or Johnson® Series 100 replacement or new crank arm type installations                                   |
| ZG-108      | Mounting bracket for Barber Colman® MA 3../4..., Honeywell® Mod III or IV or Johnson® Series 100 replacement or new crank arm type installations |
| ZG-AF       | Crank arm adaptor kit for AF/NF  |
| ZG-AF108    | Crank arm adaptor kit for AF/NF  |
| ZS-100      | Weather shield (metal)   |
| ZS-150      | Weather shield (polycarbonate)   |
| ZS-300      | NEMA 4X housing  |
| 22965-00001 | 12 mm form fit square shaft adaptor  |

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-BAL(-S) US actuators, only use accessories listed on this page.

**Typical Specification**

Where indicated on drawings, combination fire and smoke and balancing dampers shall be controlled by Belimo FSAF24-BAL or equal actuators. 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 have a 5-year warranty and be manufactured under ISO9001 International Quality Control Standards.

Actuator shall have an adjustable Maximum Opening Potentiometer which shall be used by the TAB contractor to adjust flow to that portion of the system fed by the damper.

The actuator shall spring closed if either the smoke detector or alarm system removes power from it. Actuator shall spring closed if the primary temperature thermdisc opens due to high ambient of >165°F or as otherwise indicated on drawings.

The actuator shall drive full open if either the smoke control system 100% open override or Fire Fighters Smoke Control Station override is activated. Damper shall spring closed again if the thermdisc of a combination fire and smoke damper opens due to high temperature (typically 250°F).

**Wiring Diagrams**

**INSTALLATION NOTES**

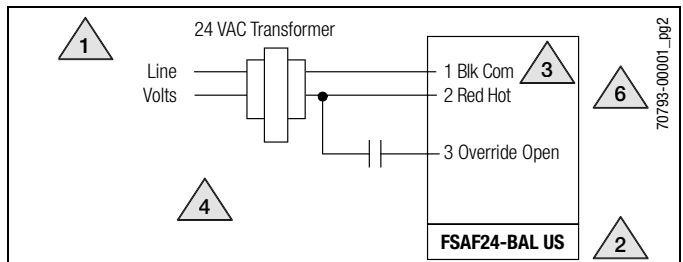
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**  
Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- 3 Actuator may also be powered by 24 VDC.
- 4 Only connect Hot, Wire 2 to Wire 3 override control
- 5 For end position, interlock control, fan start-up, etc., FSAF24-BAL-S 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 adjustable 30° to 90°
- 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 Approved, one switch is fixed at 10°, one is adjustable 30° to 90°.

**APPLICATION NOTES**

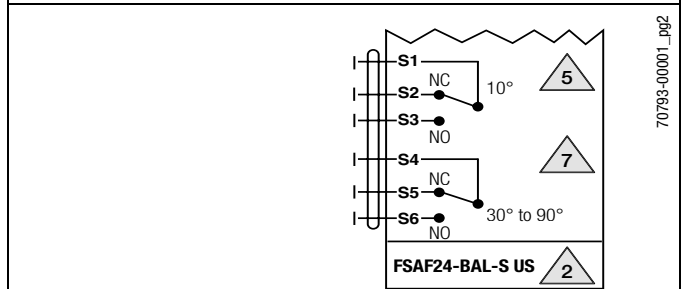
- 6 Meets UL requirements without the need of an electrical ground connection.
- 7 Double insulated

**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.



**Override control**



**Auxiliary switch**

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