Techical Data

**Power Supply**
- 24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / +20%

**Power consumption in operation**
- 6 W, 9.5 VA

**Power consumption in rest position**
- 3 W, 5 VA

**Transformer sizing**
- 10 VA (class 2 power source 24 VAC only)

**Shaft Diameter**
- 1/2" to 1.05" round, centers on 1/2" and 3/4" with insert, 1.05" without insert

**Electrical Connection**
- 3 ft [1 m], 18 GA appliance cable with 1/2" conduit connector

**Overload Protection**
- electronic throughout 0° to 95° rotation

**Electrical Protection**
- actuators are double insulated

**Operating Range**
- DC 2...10 V, 4...20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor)

**Input Impedance**
- 100 kΩ for 2...10 VDC (0.1 mA), 500 Ω for 4...20 mA

**Position Feedback**
- DC 2...10 V, Max. 0.5 mA

**Angle of rotation**
- 95°, adjustable with mechanical end stop, 35° to 95°

**Torque motor**
- [20 Nm]

**Direction of rotation motor**
- reversible with CW/CCW mounting

**Direction of rotation spring-return**
- reversible with CW/CCW mounting

**Position indication**
- visual indicator, 0° to 95° (0° is full spring return position)

**Manual override**
- 5 mm hex crank (3/16" Allen), supplied

**Running time**
- <75 sec @ 250°F [121°C]

**Running time emergency control position**
- <20 sec @ -4...122°F [-20...50°C], <60 sec @ -22°F [-30°C]

**Ambient humidity**
- 5 to 95% RH non-condensing

**Ambient temperature**
- -22...122°F [-30...50°C]

**Non-operating temperature**
- -40...176°F [-40...80°C]

**Degree of Protection**
- IP54, NEMA 2, UL Enclosure Type 2

**Housing material**
- zinc coated metal and plastic casing

**Agency Listing**
- cULus listed to UL60730-1A:02; UL 60730-2-14:02 and CAN/CSA-E60730-1:02; Listed to UL 2043 - suitable for use in air plenums per Section 300.22(c) of the NEC and Section 602.2 of the IMC

**Noise level, motor**
- inaudible holding, running <40 dB (A) spring <62 dB (A)

**Maintenance**
- maintenance free

**Quality Standard**
- ISO 9001

**Weight**
- 4.6 lb [2.1 kg]

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**Application**

For proportional control of fire and smoke combination and smoke dampers in UL555S applications. In new installations, UL 555S requires that actuators be mounted by the damper manufacturer.

**Operation**

The FSAFB24-SR & FSAFB24-SR-S actuators provide 95° of rotation and are provided with a graduated position indicator showing 0° to 95°. A unique manual override allows the setting of any actuator position within its 95° of rotation with no power applied. This mechanism can be released physically by the use of a crank supplied with the actuator. When power is applied the manual override is released and the actuator drives toward the fail-safe position to synchronize before going to the position commanded by the signal.

The actuator uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the brushless DC motor’s rotation and provides a Digital Rotation Sensing (DRS) function to prevent damage to the actuator in a stall condition. The position feedback signal is generated by a feedback potentiometer. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The actuator cannot burn out from being stalled before full rotation is achieved.

The FSAFB24-SR, FSAFB24-SR-S, is mounted directly to control shafts up to 1.05” diameter by means of its universal clamp and anti-rotation bracket. A crank arm and several mounting brackets are available for damper applications where the actuator cannot be direct coupled to the damper shaft. The spring return system provides the specified torque to the application during a power interruption. The FSAFB24-SR, FSAFB24-SR-S, actuator is shipped at +5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

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**Dimensions (Inches[mm])**

<table>
<thead>
<tr>
<th>K72 (supplied)</th>
<th>1/2&quot; Centered (Default)</th>
<th>3/4&quot; Centered (Field Selectable)</th>
<th>1.05&quot; Centered (Field Selectable)</th>
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<tbody>
<tr>
<td>[2.12 [56.48]</td>
<td>[2.37 [60.22]</td>
<td>[3.12 [79.2]</td>
<td>[6.69 [169.2]</td>
</tr>
<tr>
<td>[0.26 [6.5]</td>
<td>[0.32 [8.12]</td>
<td>[0.40 [10.2]</td>
<td>[0.90 [22.9]</td>
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† UL File XAPX.E108966
### Accessories

--- **AF-P**
Anti-rotation bracket AF/NF.

--- **SH8**
Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).

--- **100L-06**
8 mm and 10 mm wrench.

--- **ZG-100**
 Univ. right angle bracket 17”x11-1/8”x6” (HxWxbase).

--- **ZG-101**
 Univ. right angle bracket (13” H x 11” W x 7-7/16” base).

--- **ZG-118**
AFB(X)/NFB(X) U bracket (5-7/8” H x 5-1/2” W x 2-19/32” D).

--- **ZG-AFB118**
AFB(X)/NFB(X) crankarm adaptor kit.

--- **ZG-DC1**
Damper clip for damper blade, 3.5” width.

--- **ZG-DC2**
Damper clip for damper blade, 6” width.

--- **ZS-100**
Weather shield - galvaneal (13” L x 8” W x 6” D).

--- **ZS-150**
Weather shield - PC w/ foam seal (16” L x 8-3/8” W x 4” D).

--- **ZS-260**
Explosion proof housing.

--- **ZS-300**
NEMA 4X, 304 stainless steel enclosure.

--- **BAE165 US**
165° F electric thermal sensor, SPST, normally closed.

--- **SGA24**

--- **S2A-F US**
Auxiliary switch, 2x SPDT, 3A (0.5A inductive) @250 VAC max.

### Wiring Diagrams

#### APPLICATION NOTES

- Meets cULus requirements without the need of an electrical ground connection.
- Provide overload protection and disconnect as required.
- Actuators may also be powered by 24 VDC.
- Actuators may be powered in parallel. Power consumption must be observed.
- 500 ohm load resistor for 4-20 mA. Only one resistor for multiple actuators.
- Master-slave control/wiring of mechanically paralleled (“piggyback”) Fire and Smoke actuators will not function.
- Actuators may be electrically paralleled on different damper sections that are not mechanically connected to one another.
- Smoke relay and primary heat responsive sensor may be located in hot wire.
- Only one smoke signal and/or thermal sensor may be employed for all paralleled actuators.
- Any wire 5 feedback could be used to indicate position or to drive actuators that are not mechanically paralleled. That is, they are on other dampers.

#### 24 VAC/DC

- **Manual Reset**
- **Smoke Relay**
- **165°F**

#### Parallel wiring

- **Relay 2, Override closed**
- **Opening contact will spring damper closed**

#### Minimum Position Potentiometer

- **Com**
- **24 VAC/DC**
- **Hot**

#### FSAFB24-SR used as a balancing actuator, FSAF24-BAL
FSAFB24-SR-S
Fire & Smoke, Fail-Safe, Spring Return, Modulating 2-10 VDC Actuators

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<td>Running time (Motor)</td>
<td>&lt;7 sec</td>
</tr>
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<td>&lt;20 sec @ -4...122°F [-20...50°C], &lt;60 sec @ -22°F [-30°C]</td>
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<td>5...95% RH H. non-condensing</td>
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</tr>
<tr>
<td>Storage temperature</td>
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</tr>
<tr>
<td>Degree of Protection</td>
<td>IP54, NEMA 2, UL Enclosure Type 2</td>
</tr>
<tr>
<td>Housing material</td>
<td>zinc coated metal and plastic casing</td>
</tr>
<tr>
<td>Gears</td>
<td>steel, permanently lubricated</td>
</tr>
<tr>
<td>Agency Listing</td>
<td>CE, UL 60730-1, CSA C22.2 No. 139 certified</td>
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Noise level, motor
inaudible holding, running <40 dB (A)  
spring <62 dB (A)

Maintenance
maintenance free

Quality Standard
ISO 9001

Weight
5 lb [4.9 kg]

Auxiliary switch
2 x SPDT, 3 A resistive (0.5 A inductive) @ AC 250 V, one set at 10°, one adjustable 10°...90°

Safety Notes

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800-543-9038 USA
866-805-7089 CANADA
203-791-8396 LATIN AMERICA / CARIBBEAN
**FSAFB24-SR-S**  
Fire & Smoke, Fail-Safe, Spring Return, Modulating 2-10 VDC Actuators

### Accessories
- **AF-P**: Anti-rotation bracket AF/NF.
- **SH8**: Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).
- **TOOL-06**: 8 mm and 10 mm wrench.
- **ZG-100**: Univ. right angle bracket 17"x11-1/8"x6" (HxWxbase).
- **ZG-101**: Univ. right angle bracket 13x11x7-7/16" (HxWxbase).
- **ZG-118**: AFb(X)/NFB(X) U bracket 5-7/8x5-1/2x2-19/32" (HxWxD).
- **ZG-AFB118**: AFb(X)/NFB(X) crankarm adaptor kit.
- **ZG-DC1**: Damper clip for damper blade, 3.5" width.
- **ZG-DC2**: Damper clip for damper blade, 6" width.
- **ZS-100**: Weather shield - galvaneal 13x8x6" (LxWxD).
- **ZS-150**: Weather shield - PC w/ foam seal 16x8-3/8x4" (LxWxD).
- **ZS-260**: Explosion proof housing.
- **ZS-300**: NEMA 4X, 304 stainless steel enclosure.
- **BAE165 US**: 165° F electric thermal sensor, SPST, normally closed.
- **S2A-F US**: Auxiliary switch, 2x SPDT, 3A (0.5A inductive) @250 VAC max.

### Wiring Diagrams

#### APPLICATION NOTES
- Meets cULus requirements without the need of an electrical ground connection.
- Provide overload protection and disconnect as required.
- Actuators may also be powered by 24 VDC.
- Actuators may be powered in parallel. Power consumption must be observed.
- S4 makes to S6 when actuator is powered open.
- Auxiliary switches are for end position indication or interlock control.
- Double insulated.
- 500 ohm load resistor for 4-20 mA. Only one resistor for multiple actuators.
- Master-slave control/wiring of mechanically paralleled (“piggyback”) Fire and Smoke actuators will not function.
- Actuators may be electrically paralleled on different damper sections that are not mechanically connected to one another.
- Smoke relay and primary heat responsive sensor may be located in hot wire.
- Only one smoke signal and/or thermal sensor may be employed for all paralleled actuators.
- Any wire 5 feedback could be used to indicate position or to drive actuators that are not mechanically paralleled. That is, they are on other dampers.

#### 24 VAC/DC

![Wiring Diagram]

- **Manual Reset** 165°F
  - Smoke Relay
  - 2 – 10 V Signal
  - Signal Common

#### Parallel wiring

- **FSAFB24-SR-S** used as a balancing actuator, FSAF24-BAL

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