

Belimo. Quality oriented safety in buildings

> We set standards.

www.belimo.com



- Compact for space constrained locations
- Three torque ranges: 30 in-lb, 70 in-lb, and 133 in-lb
- Lowest current draws for the torque
- Auxiliary switch available
- 24 VDC available
- ISO 9001 quality control

FIRE & **SMOKE** DAMPER ACTUATORS

BELIMO[®]

Belimo is the worldwide leader in fire and smoke actuation.



Sonoma State University
Sonoma, California



Shell Point
Fort Meyers, Florida



FIESP Building
São Paulo, Brazil



Pier 1 Imports
Fort Worth, Texas



The Empire State Building
New York, New York



Canary Wharf
London, England



The Louvre
Paris, France



PeopleSoft
Pleasanton, California



BOSE Corporation
Framingham, Massachusetts



Citibank
New York, New York



Mandalay Bay
Las Vegas, Nevada



Reichstag
Berlin, Germany

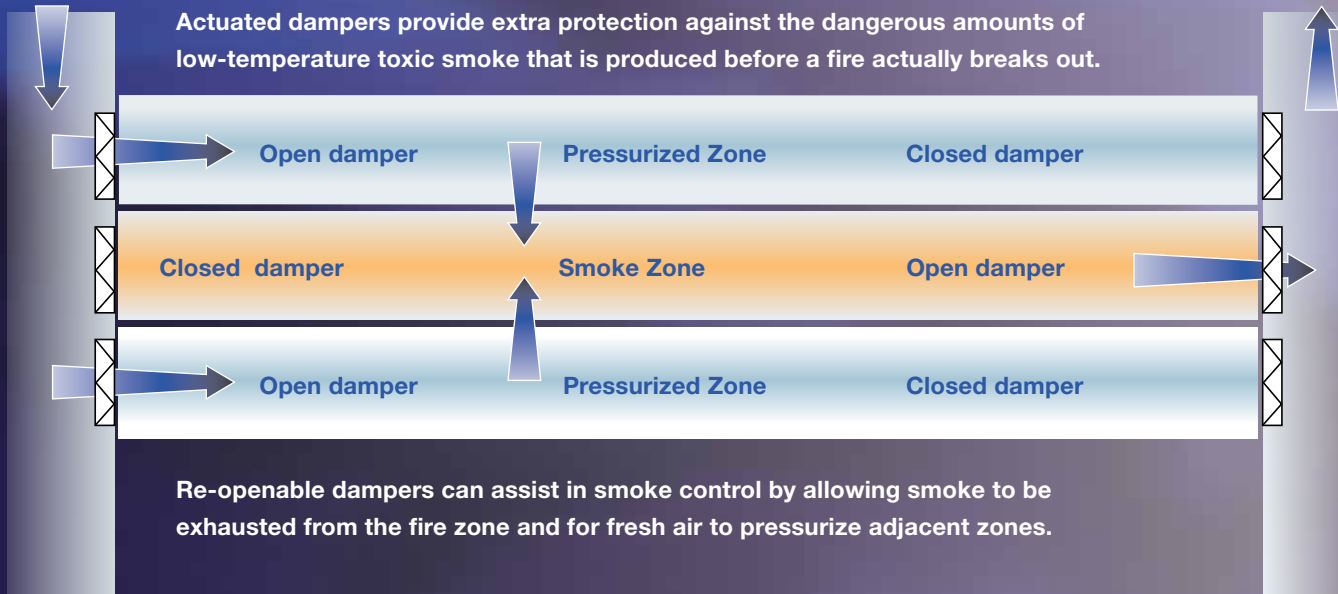
Belimo is the largest
Fire & Smoke Actuator
manufacturer in the world.

State-of-the-art technology

Belimo first produced actuators for the European fire and smoke damper market in 1978. Belimo has consistently offered new technology since entering the market. Since 1978, Belimo's market share has grown as actuator variations were released to meet various worldwide requirements. The FSLF, FSNF, and FSAF cover the needs of the United States and regions of the world requiring UL555 and UL555S listing.

Increased requirements

Legal fire protection regulations normally only prescribe minimum requirements. Catastrophes with terrible consequences for people, tangible assets, and high insurance costs, have caused the market to expect more today than legal minimum from modern fire protection equipment. As a result technical fire protection systems that take into account the increased need for safety, have established themselves in practice.



Active safety with motorized fire and smoke dampers

Ensuring the safety of human life and property in buildings is one of the toughest demands that planners, builders, owners and operators are called upon to face. Smoke related injuries and deaths outnumber fire related injuries and deaths four to one. This is a rising concern for the safety of people and fire fighters who need to travel through building emergency exit routes as quickly as possible.

Tactical methods for smoke control are: fans, smoke vents, and closed doors in combination with dampers. Strategy varies with each situation.

- Warehouses employ smoke vents to release smoke to the outside. NFPA 204M allows fans in the roof with louvers and dampers in the side walls to control the smoke.
- Stairwell pressurization systems combine fans and dampers to prevent smoke from entering the stairwell from a burning floor.
- Building HVAC ducting systems use motorized fire and smoke dampers to seal off individual zones. Dampers which are actuated electrically can be controlled from a central point and be integrated into safety control systems allowing a relatively smoke free exit for occupants and entrance of fire fighters.

Fire and smoke dampers are an integral part of distribution systems and are critical links in the life safety systems associated with most buildings. They offer extra protection against the dangerous amounts of low temperature smoke often produced before a fire actually breaks out. Restricting fires to the area of origin not only helps stop fire spread but has been proven to allow sprinklers to operate efficiently, and helps to ensure safety of human life.

Belimo actuators: Optimized functionality for maximum safety.



Steel spring assembly

- Heat resistant for reliability
- Safety positions
- Pretensioned for:
 - easier installation
 - higher contact pressure
 - assured damper sealing

Steel-toothed, cold-weld clamp

The low thermal expansion coefficient steel clamp is the safest way to hold damper shafts without slipping.

Auxiliary switches available in various configurations

Actuator auxiliary switches signal damper position for testing in smoke control systems and where indicator lights are required.

Sturdy, galvanized steel housing

Manual override available on FSAF
(Not available on FSLF or FSNF)

1/2" threaded conduit connector.

CE

Testing

- Life cycle tests with rated load, followed by 250/350°F cycle test simulating UL555S test conditions.
- Alternating load variation to stress gears.
- Ambient temperature testing from 30°F to 122°F.
- All tests performed over an input voltage ranging from 108VAC to 132VAC.
- A variety of functional tests to insure fail safe operation.
- Extended life cycle tests at high torque loading.
- Extended time stall tests per AMCA 520.

Gearing

Belimo is known for its precise tolerances and high quality gear boxes. Belimo's FS gear boxes are

designed for reliable performance in extreme conditions. There is no need to periodically cycle the actuator.*

Fretting, corrosion and peeling of metal surfaces, has caused some actuator gears to stick together. The damper can then stick open. This cannot occur with Belimo designed actuators.

All steel V-bolt clamp

Belimo clamps are 100% steel. The same saw-toothed cold weld clamp and V-bolt design is used on the fire and smoke actuators as is used in control applications. The V-bolt design will not crush hollow shafts. Belimo has sold over 24 million actuators with the 100% steel clamp. Its high quality has gained customer satisfaction.

Design

The smoke and combination fire and smoke damper actuator market has experienced serious problems in the past. The damper actuator has too often been treated like a commodity item with low first cost being the #1 selection criteria.

As a result, noise, early failure, and operational problems have occurred. In response to many of the difficulties, the UL555 and UL555S standards have been modified to require more stringent construction and testing.

Belimo has designed the FS Series to ensure top quality actuation for smoke and combination dampers.

The Belimo product range:

| Product Range /Technical Data | | | | | | | | | | | | | | | | | | |
|---|----------------------------|--------------|-----------|----------|------------|-----------|-----------|-------------|------------|--------------|-----------|-------------|------------|--------------|--------------|----------------|---------------|--------------|
|  | | Model Number | FSLF24 US | FSLF24-S | FSLF120 US | FSLF120-S | FSNF24 US | FSNF24-S US | FSNF120 US | FSNF120-S US | FSAF24 US | FSAF24-S US | FSAF120 US | FSAF120-S US | FSAF24-SR US | FSAF24-SR-S US | FSAF24-BAL US | FSAF24-BAL-S |
| Torque | 133 in-lb [15 Nm] constant | | | | | | | | | • | • | • | • | • | • | • | • | • |
| | 70 in-lb [7.9 Nm] minimum | | | | | • | • | • | • | | | | | | | | | |
| | 30 in-lb [3.5 Nm] minimum | • | • | • | • | | | | | | | | | | | | | |
| Power Supply* | 24 VAC | • | • | | | • | • | | | • | • | | | • | • | • | • | • |
| | 24 VAC/DC | | | | | | | | | • | • | | | • | • | • | • | • |
| | 120 VAC | | | • | • | | | • | • | | | • | • | | | | | |
| Consumption | 5 VA | • | • | | | | | | | | | | | | | | | |
| | 0.15A | | | • | • | | | | | | | | | | | | | |
| | 27 VA | | | | | • | • | | | | | | | | | | | |
| | 0.23 A | | | | | | | • | • | | | | | | | | | |
| | 10 VA | | | | | | | | | • | • | | | | | | • | • |
| | 11 VA | | | | | | | | | | | | | • | • | | | |
| | .1 A | | | | | | | | | | | | • | • | | | | |
| Auxiliary Switches | | • | | • | | • | • | • | • | | • | | • | | • | | • | • |
| Mechanical Accessories | | | | | | • | • | • | • | • | • | • | • | • | • | • | • | • |

*230 VAC versions are available.

-S models available with a variety of switch configurations. See data sheets available online.

Speed and temperature ratings

FSAF 250°F, <20 second spring <75 second run time.

FSNF 350°F, 15 second spring and run time.

FSLF 350°F, 15 second spring and run time.

Temperatures are for 1/2 hour in UL555S test

Micro controller

- Actuator cannot burn out if stalled before full rotation is reached. Motor runs cool for a long lifespan.

DC motor

- Silent holding. Constant running time. Low current draw for the running torque. Low holding current draw.

Engineered design criteria

- Quality first. While important, cost must be a secondary consideration in life safety products.
- Size and weight are low for the high speed and torque generation.
- Flip-over design to minimize stock requirement.
- Internal spring is protected from damage.
- Use existing proven technology to maintain quality.
- Optimized power consumption over the whole input voltage range. Minimized power consumption in the full open position.
- Steel housing, tamper-proof construction and high temperature integrity. Internal, heat-resistant spring to guarantee safety closure.

Long service life

Belimo actuators considerably exceed the legal minimum requirements. Fire and Smoke damper actuators are designed for 30,000 safety cycles at rated load. This ensures that the service life of the actuators exceeds the average useful life of the building, even if the actuators are subject to frequent cycling. Belimo safety actuators are maintenance free.

Fire and Smoke actuator specifications.

MasterFormat 2004

Section 23 33 13.28 - SMOKE CONTROL DAMPERS

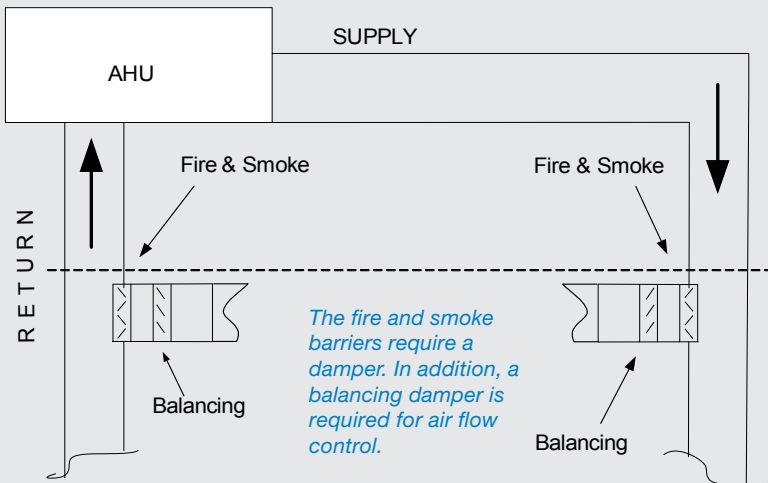
Section 23 33 33.29 - COMBINATION FIRE AND SMOKE DAMPERS



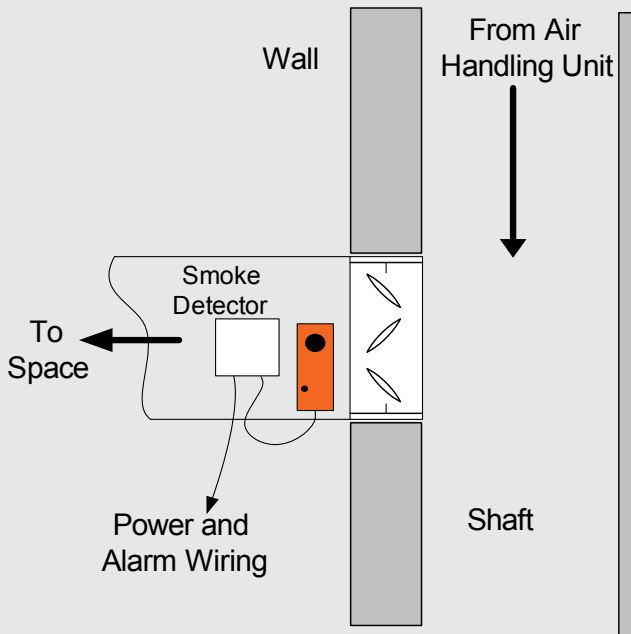
1. All smoke and combination fire and smoke dampers shall be provided with Belimo FSLF (30 in-lb), FSNF (70 in-lb), or FSAF (133 in-lb) actuators.
2. Equals shall be approved before submission of bid.
3. Actuator shall carry a manufacturer's 5-year warranty and be manufactured under ISO 9001 quality control.
4. Actuator shall have microprocessor or electronic-based motor controller providing:
 - a. Electronic cut off at full open so that no noise can be generated while holding open. Holding noise level shall be inaudible.
 - b. Shall be incapable of burning out if stalled before full rotation is reached.
5. Housing shall be steel and gears shall be permanently lubricated.
6. The actuators shall be direct coupled and employ a steel-toothed cold-weld clamp for connecting to damper shafts. Aluminum clamps or set-screw attachment are not acceptable.
7. Actuator shall have UL555S Listing by the damper manufacturer for 350°F (177°C) [250°F (121°C)].
8. FSLF (nominally up to 4 sq. ft.) current draw shall be no more than 0.15 A at 120 V running, or 0.06 A holding at 120 V (5 VA and 3.5 VA respectively for 24 V power).
9. FSNF (nominally 4-16 sq. ft.) current draw shall be no more than 0.23 A at 120 V running, or 0.1 A holding at 120 V (27 VA and 10 VA respectively for 24 V power).
10. FSAF (nominally 8-18 sq. ft.) current draw shall be no more than 0.1 A at 120 V running, or 0.05 A holding at 120 V (10 VA and 3 VA respectively for 24 V power). FSAF shall not be used in UBC regions.
11. Where required, actuators shall have built-in auxiliary switches (-S). Two SPDT (FSNF) or two SPST (FSLF, FSAF) switches shall be provided. One operates at 10° to indicate damper closed. One operates at 85° to indicate damper open. Where auxiliary switches are required for monitoring, proximity switches, actuator or damper blade switches shall be acceptable.
12. Where proportional control is required the FSAF24-SR 250°F actuator shall be employed. Where switches are required, the FSAF24-SR-S shall be used.
13. Where balancing is also required from the fire and smoke damper, the FSAF24-BAL or FSAF24-BAL-S shall be employed.

FSAF24-BAL 3-Position Fire and Smoke Actuator Saves on Installation

Current Installation of Fire and Smoke Damper Actuators



New Installation



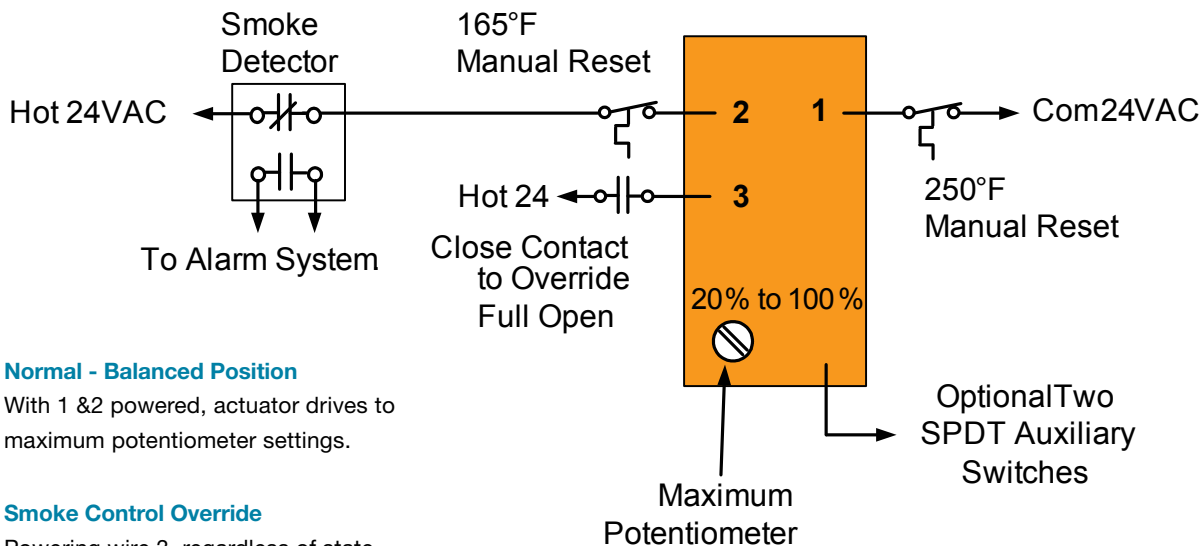
The balancing actuator allows one damper to do the job where two were required in the past. Cost analysis will show a break-even point at about 4 square feet.

FSAF24-BAL is a balancing fire and smoke, three position damper actuator with spring return closed, 24V, for UL555(S) fire and smoke dampers. A maximum position potentiometer is built-in with a 100% open override. The FSAF24-BAL is specifically designed to balance the air flow in ducts and simultaneously provide control of fire and smoke dampers.



www.belimo.com
 (USA, Latin America)
 or www.belimo.ca (Canada) for
 complete technical specifications.

Combination Fire and Smoke Balancing Damper Actuator Wiring



Normal - Balanced Position

With 1 & 2 powered, actuator drives to maximum potentiometer settings.

Smoke Control Override

Powering wire 3, regardless of state of wire 2, drives the actuator to full open.

The balancer sets the correct flow volume using the maximum potentiometer. Normally, the actuator opens to the balancing position. If the 165°F sensor opens, the damper springs closed. If the smoke purge contact powers wire 3, then the damper drives full open. If the 250°F sensor opens, the damper again springs closed. Sensors are manual reset.

A number of different applications can use the FSAF24-BAL actuator. Contact your Belimo Sales Manager or our Fire and Smoke Product Manager at 800-987-9042



Rusking FSD60FA-BAL combination fire and smoke balancing damper with 3-position FSAF24-BAL actuator used for corridor ventilation and exhaust.

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