Belimo
Quality Oriented Safety in Buildings

- Compact for space constrained locations
- Four torque ranges: 18 in-lbs, 30 in-lbs, 70 in-lbs, and 180 in-lbs
- 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

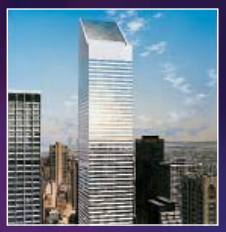
The Empire State Building
New York, New York

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.

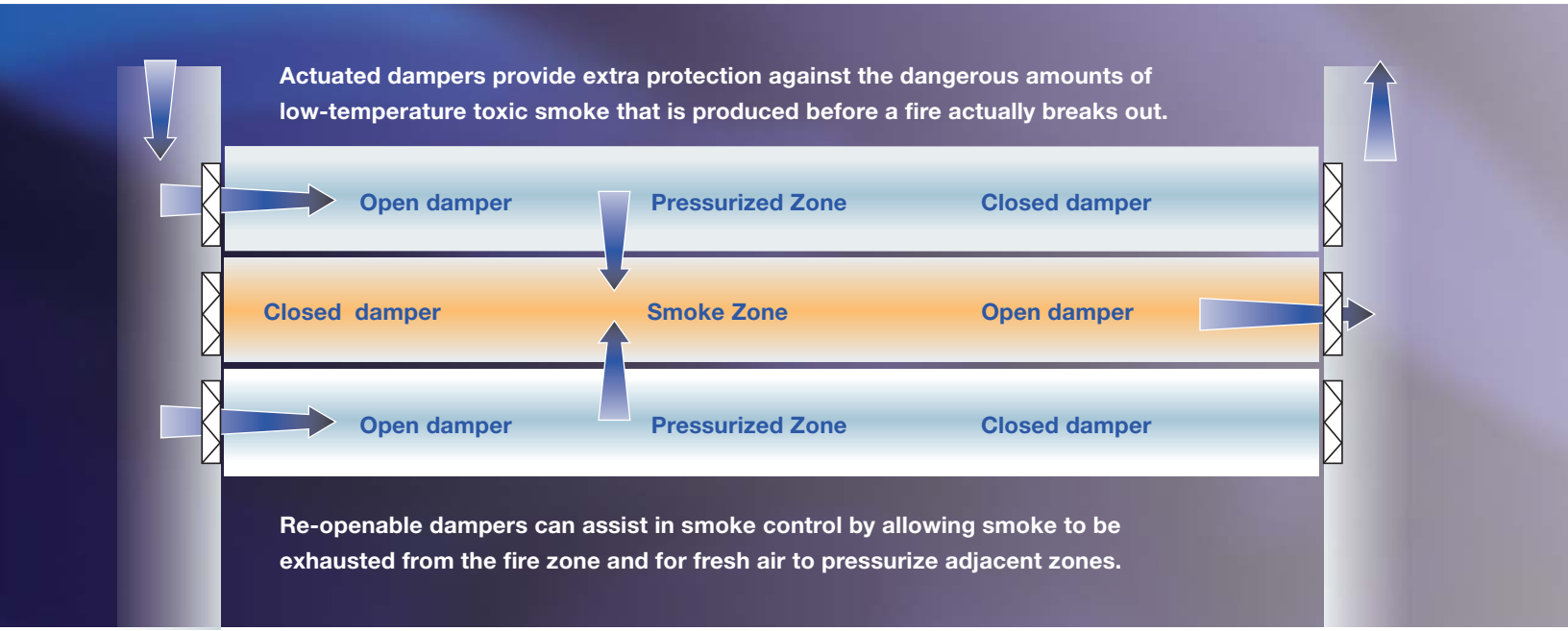
State-of-the-art technology

Belimo first produced actuators for the European fire and smoke damper market in 1978. Since then Belimo has consistently offered new technology and its market share has grown to 80% in Europe and over 60% in the US.

The FSTF, FSLF, FSNF, FSAF*A, and FSAFB series cover the needs of the United States and regions of the world requiring UL 555 and UL 555S listings.

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
Pretensioned, heat resistant steel spring assembly closes damper without loss of torque at elevated temperatures.

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

Linkage capable
Linkage capable if needed for pneumatic retrofit projects

1/2" threaded conduit connector.

Steel-toothed, cold-weld clamp
The low thermal expansion coefficient steel clamp is the safest way to hold damper shafts without slipping.

UL 2043 for air plenums
All Belimo actuators are tested to UL 2043 and qualified for use in air plenums per International Mechanical Code 602.2 and NEC 300.22 (c).

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.

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 -22°F to +122°F.
- All tests performed over an input voltage ranging from 108 VAC to 132 VAC.
- A variety of functional tests to ensure fail-safe operation.
- Extended life cycle tests at high torque loading.
- Extended time stall tests per AMCA 520. Long-term holding tests performed per UL 555 (-S) requirements.

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 millions actuators with the 100% steel clamp. Its high quality has gained customer satisfaction.

Balanced Fire and Smoke Protection

There are various layers of fire and smoke protection engineered into a building in order to protect occupants. Among them are:

- Smoke detection
- Sprinklers
- Alarms - audio, visual, and remote
- Egress passages to aid in escape
- Structural integrity to prevent collapse
- Fire walls, barriers, and partitions
- Smoke barriers and partitions

Dampers are part of the barriers which prevent fire and smoke from passing out of the zone of origin.
In engineered smoke control systems it is the actuator which opens and closes upon command to pressurize areas, extract smoke, or isolate zones as needed.

***Codes do require periodic testing.**

The Belimo Product Range:

FIRE & SMOKE
DAMPER ACTUATORS

5 YEAR WARRANTY

LISTED 94 D5 TEMP. IND. & REG. EQUIP. c UL us

		Power Supply			Power Consumption	Running Time(s)		Control Input	Auxiliary Switches	
		24 VAC (FSAF, FSTF - 24 VAC/DC)	120 VAC	230 VAC	VA Rating	Motor Drive	Spring Return	On/Off	2 SPST	2 SPDT
FSAF*A Series 180 in-lbs [20 Nm] Approx. 18 sq. ft. @ 350°F	FSAF24A	●			32‡	<25	<15	●		
	FSAF24A-S	●			32‡	<25	<15	●	●	
	FSAF120A		●		38‡	<25	<15	●		
	FSAF120A-S		●		38‡	<25	<15	●	●	
	FSAF230A			●	37‡	<25	<15	●		
	FSAF230A-S			●	37‡	<25	<15	●	●	
FSAFB Series 180 in-lbs [20 Nm] Approx. 16 sq. ft. @ 250°F	FSAFB24-SR	●			9	<75	<20	2-10 VDC		
	FSAFB24-SR-S	●			9	<75	<20	2-10 VDC		●
FSNF Series 70 in-lbs [8 Nm] Approx. 12 sq. ft. @ 350°F	FSNF24 US	●			24‡	<15	<15	●		
	FSNF24-S US	●			24‡	<15	<15	●		●
	FSNF120 US		●		23‡	<15	<15	●		
	FSNF120-S US		●		23‡	<15	<15	●		●
	FSNF230 US			●	23‡	<15	<15	●		
	FSNF230-S US			●	23‡	<15	<15	●		●
FSLF Series 30 in-lbs [3.5 Nm] Approx. 4 sq. ft. @ 350°F	FSLF24 US	●			15‡	<15	<15	●		
	FSLF24-S US	●			15‡	<15	<15	●	●	
	FSLF120 US		●		18‡	<15	<15	●		
	FSLF120-S US		●		18‡	<15	<15	●	●	
	FSLF230 US			●	17‡	<15	<15	●		
	FSLF230-S US			●	17‡	<15	<15	●	●	
FSTF Series* 18 in-lbs [2 Nm] Approx. 1.5 sq. ft. @ 250°F	FSTF24 US	●			3	<75	<25	●		
	FSTF24-S US	●			3	<75	<25	●	●	
	FSTF120 US		●		5.5	<75	<25	●		
	FSTF120-S US		●		5.5	<75	<25	●	●	
	FSTF230 US			●	5.5	<75	<25	●		
	FSTF230-S US			●	5.5	<75	<25	●	●	

‡VA Rating Note:
The FSAF*A, FSNF, and FSLF series actuators draw more current when driving against any stops. Neither UL nor Belimo require any local fusing or breakers. If used, see individual data sheets for End Stop current draws and current limit values.

***The FSTF series should be used in retrofit applications for dampers less than 1.5 sq.ft. or to replace existing FSTF actuators. The FSLF is recommended for dampers less than 4 sq.ft. in area. Contact Belimo Technical Support for applications involving small dampers.**

Fire and Smoke Actuator Specifications

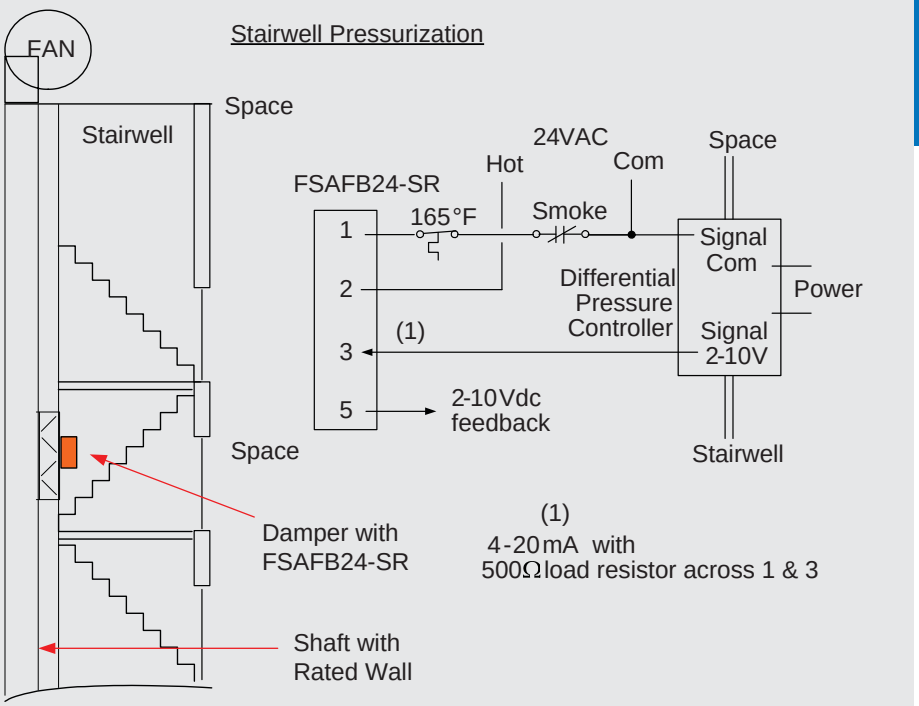
MasterFormat 2004
Section 23 33 13.28 - SMOKE CONTROL DAMPERS
Section 23 33 33.29 - COMBINATION FIRE AND SMOKE DAMPERS

Smoke and Combination Fire and Smoke Actuators In Section 233300, or equivalent

1. All smoke and combination fire and smoke dampers shall be provided with Belimo Aircontrols FS series actuators. Equals shall be approved before submission of bid. Acceptable actuators are FSTF, FSLF, FSNF, FSAF (A or B).
2. Actuators shall be UL 873 or UL 60730 listed.
3. Actuator and damper shall have UL 555 & UL 555S Listing by the manufacturer for 250°F <350°F>.
4. Actuators shall be UL2043 Listed for low smoke generation in environmental air spaces and air moving plenums as required by NFPA 70 Section 300.22 (C) and the International Mechanical Code Section 602. Housing shall be steel or plastic; aluminum is not acceptable.
5. Actuator shall carry a manufacturer's 5-year warranty and be manufactured under ISO 9001 quality control. For replacement of existing competitive motors, NYC OTCR or CSFM listing shall have been obtained.
6. Actuator shall have electronic or microcontroller based motor control 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. Overload protection so that actuator shall be incapable of burning out if stalled before reaching full rotation.
7. The actuators shall be direct coupled and employ a steel-toothed cold-weld V-bolt clamp for connecting to damper shafts. Aluminum clamps or set-screw attachment are not acceptable.
8. Where direct coupling is impossible due to space constraints or geometry of damper installation, linkages designed specifically for the actuator shall be employed.
9. Dampers shall be installed straight and true, level in all planes, and square in all dimensions. Dampers shall move freely without undue stress due to twisting, racking, bowing, or other installation error. Do not install in area where moisture can penetrate damper or actuator nor where actuator temperature continuously exceeds 120°F.
10. Modulating or balancing damper actuators shall be FSAFB24-SR, 2-10V or 4-20mA control with appropriate potentiometer or analog output from building automation system.

FSAFB24-SR Modulating & Balancing Fire and Smoke Actuator

This modulating actuator is used in a number of applications. Economizer function, where the dampers are also used in smoke control, is the most common. Others are multistory stairwell pressure control, shown in the drawing below, and underfloor air-conditioning where pressure must be controlled and space constraints can be severe. In the extreme, three dampers are replaced by one — fire, smoke, and control.



Balancing Damper Actuator

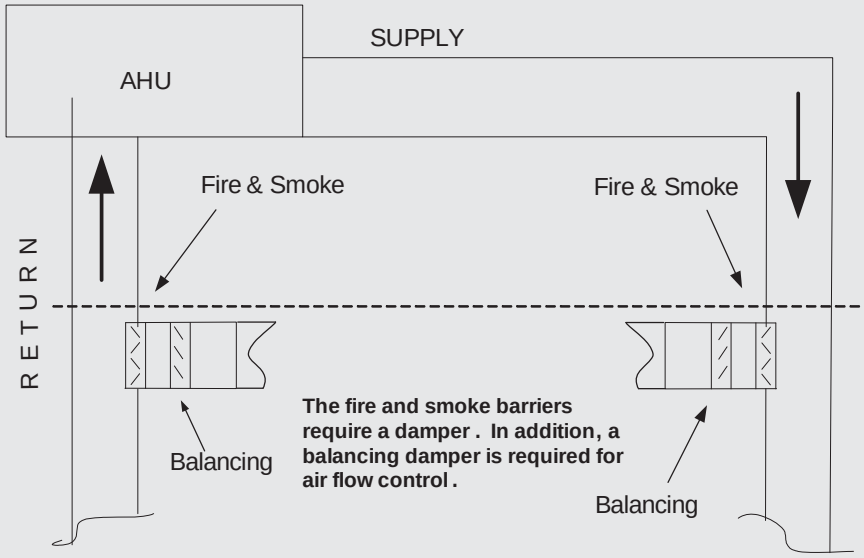
Another application where the modulating actuator can save money is use as a balancing damper actuator located in the barrier wall (see drawings on next page). At one time three dampers would have been required – fire, smoke, and balancing. With supply VAV boxes, it is more typical to have only one balancing damper located in the return duct.

Using a SGA24 potentiometer to position the actuator, the damper can be balanced either locally or remotely. Options include use of the wire 5 FBK for precise position location or two auxiliary switches for open/closed indication.

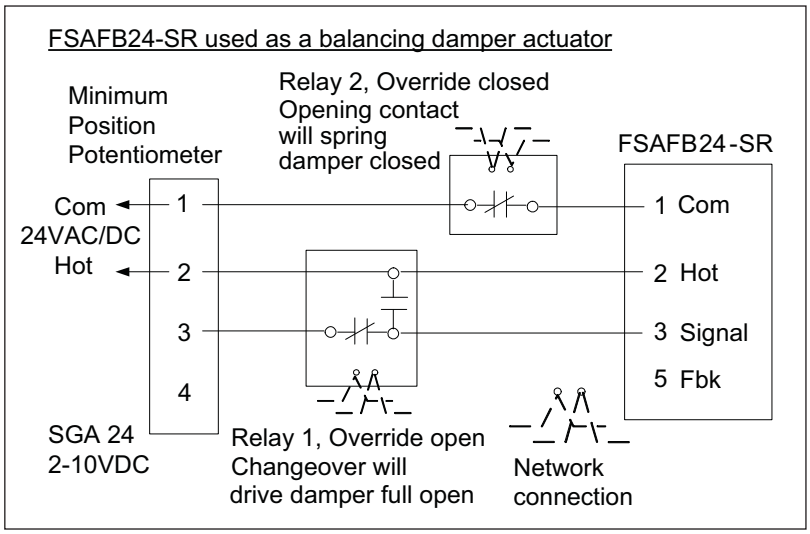
Ruskin FSD60FA-BAL combination fire and smoke balancing damper for use in corridor ventilation and exhaust.

SGA24

Combination Fire and Smoke Balancing Damper Actuator Wiring



The SGA is set from 0 to 100% and provides a 2 to 10 VDC signal to position the actuator. If Relay 2 opens, the actuator springs the damper closed. If Relay 1 changes over, the actuator drives full open. Reverse action is possible by reversing the spring direction when mounted.



5 YEAR WARRANTY · GLOBAL SUPPORT · TESTED QUALITY · ON TIME DELIVERY · EXTENSIVE SERVICE

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