



Replacement Actuators

ACTUATOR REPLACEMENT STARTS WITH THE DAMPER, NOT THE ACTUATOR.

Most modern actuators can be replaced equal or better with Belimo since they function identically and have equal UL555S listings.

Many old motors did not have internal springs and the spring and fusible link method varied depending on damper OEM.

Those require some investigation to be sure the replacement is performed correctly.

See any Belimo Retrofit Installation Instruction for UL and NFPA replacement information.

Note that while replacement of actuators by electrical and torque characteristics may be straightforward, mounting may require a linkage or adaptors.

All Belimo FS actuators have passed UL 555S with multiple damper OEMs.

List of damper OEMs and actuator instructions:

Fire & Smoke Actuators | Belimo www.belimo.com/us/firesmoke

Fire and Smoke Damper Actuator Replacement Checklist

Please enter all information available:
Damper Make.....Appx Dimensions* w.....x h..... or area.....
Actuator Voltage*.....Temperature required (250F, 350F)*.....Aux switches required*.....

Old motor Make & Model.....Amperage.....Drive time.....Spring time.....Torque.....

[Digital photographs](#) allow Belimo to identify most replacement applications. * indicates necessary info

It is required by NFPA 80 (fire) & NFPA 105 (smoke) that a record of testing and repairs be left on premises.

WARNING!

OLD EXTERNAL ACTUATOR SPRINGS MUST BE REMOVED.

FUSIBLE LINK SHAFT SPRINGS ARE NOT TO BE REMOVED UNLESS A NEW THERMAL SENSOR IS INSTALLED.

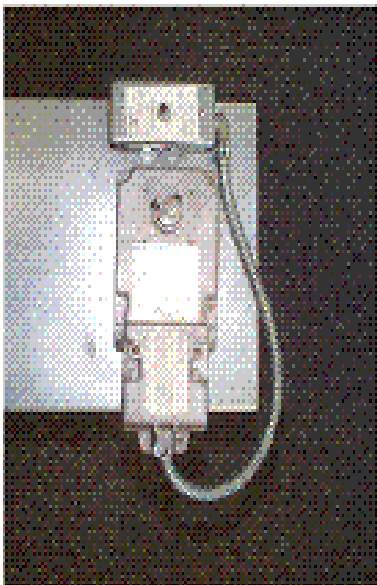
IN SOME CASES THERE WAS A SINGLE SPRING FOR ACTUATOR AND SHAFT SPRING FIRE FUNCTION. IN THOSE CASES, A NEW THERMAL SENSOR MAY NEED TO BE INSTALLED.

BELIMO INSTRUCTIONS ARE AVAILABLE AND SHOULD BE USED. CUSTOM INSTRUCTIONS CAN BE CREATED.

Consult local AHJ - Fire Marshal or Building Official for permit requirements. In particular, where alarm wiring is touched, retesting is typically required.

TTT-VAT	<p>Technical actuator characteristics can be found using the TTT-VAT questions:</p> <p>Temperature, Time, Torque, & Voltage should be equal or better.</p> <p>Amperage draw should be equal or lower to ensure a breaker is not overloaded.</p> <p>Damper and actuator should be <u>Tested</u> after installation. See Fire Marshal/Building Official form on last page of each Belimo replacement installation instruction.</p>	<div>TTT-VAT</div> <div>TEMPERATURE</div> <div>TIME</div> <div>TORQUE</div> <div>VOLTAGE</div> <div>AMPERAGE</div> <div>TEST</div>
Codes	<p>UL does not regulate replacement and repair. The local Fire Marshal or Building Official is usually the Authority Having Jurisdiction. NFPA 80 (fire) and NFPA 105 (smoke) require damper repair as soon as possible.</p> <p>Belimo has MEA for New York City and California State Fire Marshal Listing.</p> <p>MEA is no longer required by the NYC codes. OCTR has replaced it and Belimo is in compliance.</p>	
Contacts:	<p>Tech supprt can be reached at 800 543-9038</p> <p>Product management: Larry Felker 775 355-2461 775 250-4160 Cell</p> <p>Mike Knipple 203 749-3170</p>	

MA2xx



Regardless of manufacturer, investigate method to ensure no variations or field modifications occurred.
Instructions must be used for all replacements.

- Air Balance, Greenheck, Nailor NCA (Arlan in NYC), Ruskin (ALD in NYC), Safe-Air (Imperial in NYC)
Remove external spring along with actuator. Dual spring or thermal sensor methods were used.
- Pottorff (Accurate in NYC)
Single spring was typical. It must be disconnected and a new thermal sensor must be installed. Use HS10 or BAE165
- Prefco
OLD dampers are often special. Some have no replacement possible.
Where McCabe Link was employed, derate actuator. See Prefco instructions below.

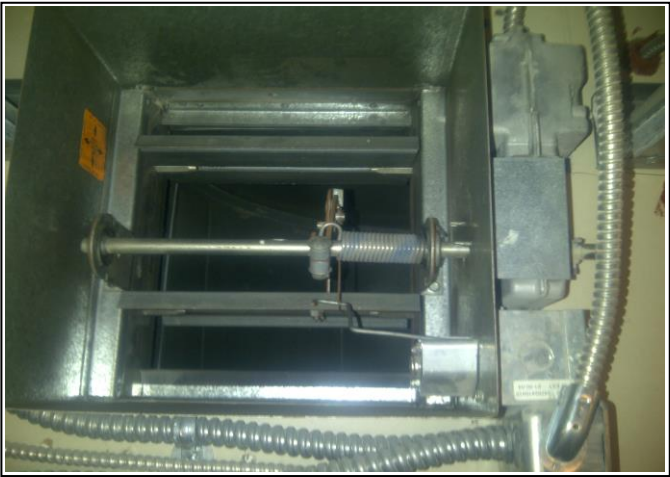
In general, use FSLF for < 4 sq.ft. and FSNF for > 4 sq.ft.

Model	Power	Volts		Replacement Options		Notes
MA220	23VA	120		FSLF120	Use FSNF if linkages are required.	In all cases, disconnect and remove external motor spring. See specific damper manufacturer. The FSLF series replaces the MA220 series where direct coupled. The FSNF & FSTF series replaces the MA230 series and MA220 series where linkages are required. However, the spring and fusible link set-up requires installation of a BAE165 or equal in some cases. FSTF is recommended for 2 sq.ft. and less at 250°F. IN ALL CASES BEWARE PREVIOUS FIELD MODIFICATIONS.
MA221	23VA	240		FSLF230		
MA223	23VA	24		FSLF24		
MA230	36VA	120		FSNF120		
MA231	36VA	240		FSNF230		
MA233	36VA	24		FSLF24		
MA240	No direct replacement.			Call Belimo for assistance.		
	Motor was not 90 degree and pulley and cable were usually used. Some geometric changes are necessary to simplify.					
MA250				FSLF		Match voltages. Use FSLF for 4 sq.ft. and less. Use FSNF for 4 sq.ft. to 12 sq.ft. on Ruskin at350°F.
MA251		230		FSLF230		
MA253		24		FSLF24		

Contact Belimo for mechanical and electrical parallel applications. Dual actuators can be applied with certain provisos.
Provide photos. Motor, linkage, blades, fusible link, McCabe © Link, Typically direct couple to damper shaft if available. Otherwise, investigation necessary.

MA220/230/250

Pottorff



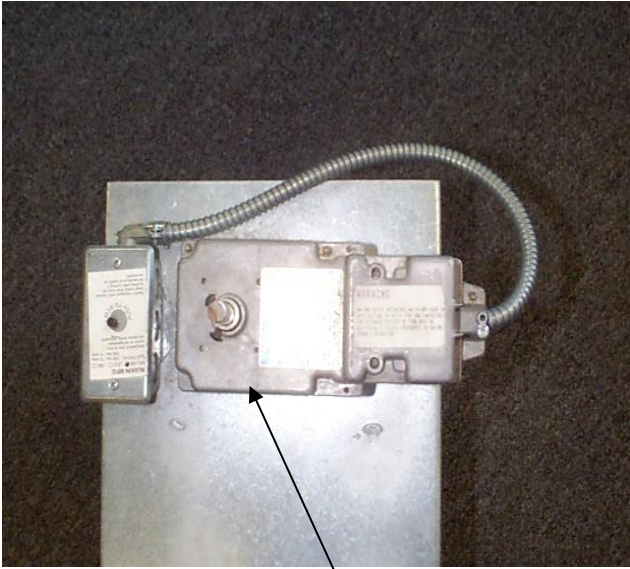
See specific instructions for spring.

Greenheck



Spiral spring type MA220/230

Ruskin



Spring is in housing under motor

For a list of damper OEMs and actuator replacement instructions:
[Fire & Smoke Actuators | Belimo](#) www.belimo.com/us/firesmoke



MA318 & MA418

Model		Power		Torque-Stroke	Belimo Replacement	Note
MA318		24		60-180 stroke	FSNF24	May need linkage.
MA418		120		60-180 stroke	FSNF120	
MAxxx-500	-500 indicates switch				Add -S	Aux switch

For a list of damper OEMs and actuator replacement instructions:

[Fire & Smoke Actuators | Belimo](#)

www.belimo.com/us/firesmoke

Greenheck

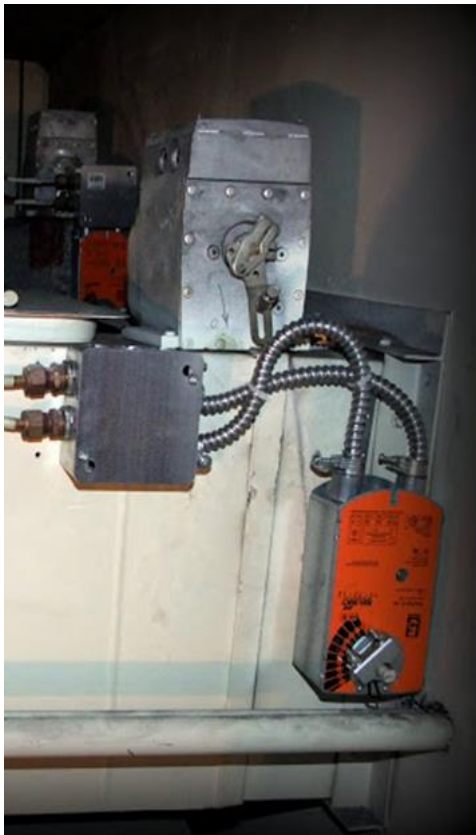


Ruskin



MA418 that was formerly linked, now direct coupled

These are very easy to replace. Simply remove the old motor and linkages. Then mount Belimo FSNF over shaft. Do not remove any bearings.



Ruskin with MA220 and Belimo FSLF replacement

Belimo	Discontinued	Replacement	Voltage	Timing	Control
	FSAF24-SR	FSAFB24-SR	24 VAC/DC	75/20	Modulating 2-10
	FSAF24-SR-S	FSAFB24-SR	24 VAC/DC	75/20	Modulating 2-10 with switch
	FSAF24-BAL	FSAFB24-SR+SGA/F	24 VAC/DC	75/20	3-position
	FSAF24-BAL-S	FSAFB24-SR-S+SGA/F	24 VAC/DC	75/20	3-position
	FSAF24	FSAF24 A	24 VAC/DC	25/15	On/Off
	FSAF24 -S	FSAF24A -S	24 VAC/DC	25/15	On/Off
	FSAF120	FSAF120A	120VAC	25/15	On/Off
	FSAF120-S	FSAF120A-S	120VAC	25/15	On/Off
	FSAF230	FSAF230A	230 VAC	25/15	On/Off
	FSAF230-S	FSAF230A-S	230 VAC	25/15	On/Off

All old models were 133 in-lb. New models are 180 in-lb. -S models have 2 auxiliary switches.



Nailor fusible link and spring

When replacing actuator, only the smoke closing function is replaced. Old external spring and motor are replaced. Leave internal mechanism as it performs the fire function. Check by removing fusible link and ensuring spring closes the damper. **CAUTION!** Wear protective gloves and keep hands out of blades and danger.



ECM

Out of business. First time replacement on any project is likely to require Belimo Product Management involvement.
FSLF if direct coupled possible. FSNF if linkages needed. Spring methods can require rebuild of damper.



View from outside.

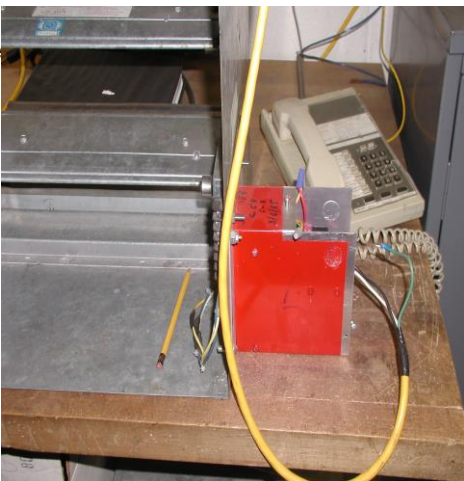


View from inside.

The damper has to be rebuilt to some degree in most cases. The ECM's are not available. They may not be repaired.

Rather than starting with the motor here, go to the damper manufacturer and the instructions are available.

AHJ must be informed and approve before replacement. No UL555S methods possible. However, result will be a better than original application.



Honeywell

These are straightforward like-for-like replacements.

Model		Power		Torque	Model	Notes
ML4105A1000		120		50	FSLF120	FSNF120 should be used for dampers over 4 sq.ft.
ML4105B1009		120		50	"	
M4105C1008		230		50	"	Where linkages are needed, use FSNF. This includes internal mount.
ML4105D1007		230		50	"	
ML4115A1009		120		30	"	Due to torque rating differences, the Belimo FSLF 30 in-lb achieves the same UL damper sq.ft. as the 50 in-lb ML4105.
ML4115B1008		120		30	"	
ML4115C		230		30	FSLF230	
ML4115D		230		30	"	
ML4115H		120		30	FSLF120	
ML4115J		120		30	"	FSTF120 can be used for dampers less than 2 sq.ft.
ML4202F1000		120		20	"	
ML4302F1008		120		20	"	
ML4702F1009		230		20	FSLF230	
ML4802F1007		230		20	"	

32003532-002 Aux Switch Package		Use -S Belimo model.
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ML8105A1006		24		50	FSLF24	FSNF120 should be used for dampers over 4 sq.ft. and where linkages required. Same as Ruskin H2024B/3 Due to torque rating differences, the Belimo FSLF 30 in-lb achieves the same UL damper sq.ft. as the 50 in-lb ML8105.
ML8105B1013		24		50	"	
ML8115A1005		24		30	"	
ML8115A1013		24		30		
ML8115B1004		24		30	"	
ML8115B1012		24		30	"	
ML8115H1008		24		30	"	
ML8115J1005		24		30	"	

ML8202F1006		24		20	FSLF24	FSTF24 can be used for dampers less than 2 sq.ft.
ML8302F1004		24		20	"	



ML4105, ML4114
MS4209 series
Four models look identical. Part number needed. See cross reference.



Internal mount.



External aux switch tends to change position with repeated actuations. Replace with -S model actuator.



Honeywell		Power		Torque	Belimo	Notes
MS4104F1010		120		30 in-lb	FSLF120 US	FSTF if damepr is less than 2 sq.ft.
MS4104F1210	Aux	120		30 in-lb	FSLF120-S	
MS4109F1010		120		80 in-lb	FSNF120	
MS4109F1012	2 SPST	120		80 in-lb	FSNF120-S	If fast speed needed, use FSNF. UL555S listing of FSNF is 12 sq.ft. At 350°F and 16 sq.ft. at 250°F
MS4120F1006		120		175 in-#	FSAF120A	
MS4120F1204	2 SPST	120		175 in-#	FSAF120A-S	
MS4209F1007	.13A	120		80in-#	FSNF120	
MS4309F1005	"	120		80in-#	FSNF120	
MS4604F1010		230		30 in-lb	FSLF230 US	
MS4604F1012	2 SPST	230		30 in-lb	FSLF230-S US	
MS4609F1010		230		80in-#	FSNF120	
MS4609F1012	2 SPST	230		80in-#	FSNF120-S	
MS4620F1005	No aux	230		175 in-#	FSAF230A	
MS4620F1203	2 SPST	230		175 in-#	FSAF230A-S	
ML4702F1009		230			FSLF230 US	
ML4802F1007		230			FSLF230 US	
MS4709F1012	.09A	230		80in-#	FSNF230	
MS4809F1014	"	230		80in-#	FSNF230	



The thermal sensor and lower bracket do not need to be removed. Only the actuator should have been disconnected. Air Balance.

MS7520A2015	2-10V, 4-20mA	24		175 in-#	FSAFB24-SR US	Use -S for switches
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MS8104F1010		24		30 in-lb	FSLF24 US	FSAF Power: .09A @120V 11VA FSNF Power: .23A @120V 27VA
MS8104F1012	2 SPST	24		30 in-lb	FSLF24-S US	
MS8109F1010		230		80in-#	FSNF24	
MS8109F1012	2 SPST	230		80in-#	FSNF24-S	
MS8120F1002	No aux	24		175 in-#	FSAF24A	
MS8120F1200	2 SPST	24		175 in-#	FSAF24A-S	
MS8209F1003	7VA	24		80in-#	FSNF24	
MS8309F1001	"	24		80in-#	FSNF24	

MS4120



S2024-F	No aux	24		175 in-#		S = Halogen and silicone free wires.
S20230-F	No aux	230		175 in-#		S = Double insulated actuators.
S2024-F-SW2	2 SPDT	24		175 in-#		
SO230-F-SW2	2 SPDT	230		175 in-#		

Ruskin Models made by Honeywell			Belimo Replacement		
Model		Power		< 4 sq.ft.	> 4 sq.ft.
H2000A/x	.18A	120		.15A FSLF120	FSNF120 .23A
H2000B/x	"	120		"	"
H2024A/x	16VA	24		5VA FSLF24	FSNF24
H2024B/x	"	24		"	"
H2230A/x	.13A	230		0.075A FSLF230	FSNF230 .12A
H2230B/x	"	230		"	"
32003532-002 Aux Switch Package					Use -S model of proper voltage.
SPH2 Aux Switch					Use -S model of proper voltage.



WARNING!

When replacing actuators, the torque should not be less than that of the old motor unless it is known that a Belimo has passed UL555S under the same conditions. For example, a HW MS4209, 80 in-lb actuator may be on a 4 sq.ft. damper. On the surface, this appears to be overkill. However, it may be that the damper is rated for 4000 fpm instead of 2000 fpm. Examine the damper manufacturer label on the damper blade and check the data sheets. Note also that the torque measurement by one company is not the same as by another. In all cases, Belimo rated torque is the minimum, not the maximum. Derating is not required. The Belimo 70 in-lb FSNF has greater torque than the 80 in-lb rated HW.



Multiproducts

VERY IMPORTANT THAT THE FUSIBLE LINK METHOD BE EXAMINED. NOT ALL MultiProducts CAN BE REPLACED.

First time replacement on any project is likely to require Belimo assistance.

MultiProducts motors were used in many different ways and investigation is necessary to ensure correct replacement.

Damper manufacturer identification and digital photograph help significantly.

The same model number may have had different shaft styles and flats.

Typically Belimo will be direct coupled while the exact MP shaft was linkaged to the damper shaft.

MP proceeds many of the part numbers. Ignored here.

MZRHM

Nailor. Remove linkage parts and mount to damper shaft. FSLF for dampers < 4 sq.ft. and FSNF for dameprs > 4 sq.ft.

TSB2000
TB2001
FSLF Direct coupled



These are simple to replace.
The crank-arm goes to the 1/2" damper shaft. Direct couple where there is space with FSLF. Use linkage where space is constrained and mount an FSNF with a ZG-AF linkage kit.

In all cases disconnect external motor spring without compromising fusible link and internal spring ability to close the blades. These are quite old and changes may have been made over the years. Investigate operation. Confirm voltage. Check fusible links or bimetal. Verify damper functions after replacement by testing damper open and spring closed 3 times to simulate the UL 555S test.

2430
FSLF Direct coupled



Some dampers are pulled part way out of the wall and the shaft is so close to the wall that direct coupling is impossible. In those cases, assuming the AHJ approved the damper slightly out of the wall, use existing crank-arm and FSNF120 with a ZG-AF or other linkage kit.

Note that cutting the drywall is a code violation. See arrow.

The 2430 was applied several ways. Sometimes linkaged using a crank arm on the square motor shaft and the spring was on the round shaft. Remove all linkage parts and direct couple to damper shaft. If Air Balance with cable, call for help.

2553A
FSLF Direct coupled



These are quite old and were applied using sometimes awkward methods to attach the inner shaft to the damper. Inspectors have allowed replacements but instructions and retest are absolutely necessary. The actuator is easy; the damper requires investigation.

Square shaft inserted into damper sleeve with special crankarm. If a smoke damper, replacement may be possible and requires a new shaft and other linkage parts. If a combination fire and smoke damper, Belimo cannot be used. contact Multiproducts or replace damper. Used by Air Balance.

2585
2586
FSLF Direct coupled

See Greenheck Installation Instructions

Typically these were linkaged using a crank arm on the square motor shaft and the spring was on the round shaft. Remove all linkage parts and direct couple to damper shaft (arrow at right).

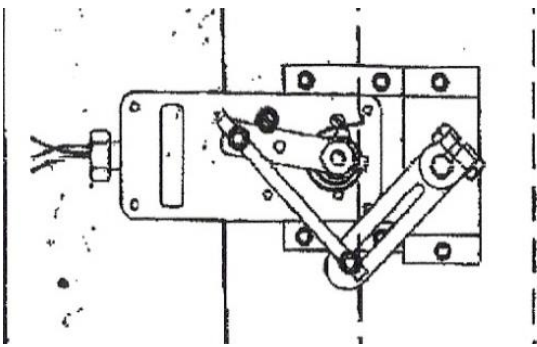


2659 FSLF120 for direct coupled.

Safe-Air / Imperial.
Typically linked.
There was an internal
spring and fusible link
for the fire function.

FSTF120 for dampers less than 2 sq.ft.
FSNF120 if ZG-AF linkage required.
Remove all linkage and direct
couple over the damper shaft.

Note that the motor shaft is incon-
sequential. The damper shaft
is a standard 1/2" (arrow).



The motor shaft dimensions are inconsequential. It is the damper shaft that matters.

2724
Air Balance
FSLF Direct coupled

Except in rare occasions where space constraints exist, simply remove all linkage parts and direct couple on damper shaft. Use old motor as a mounting platform for anti-rotation strap.



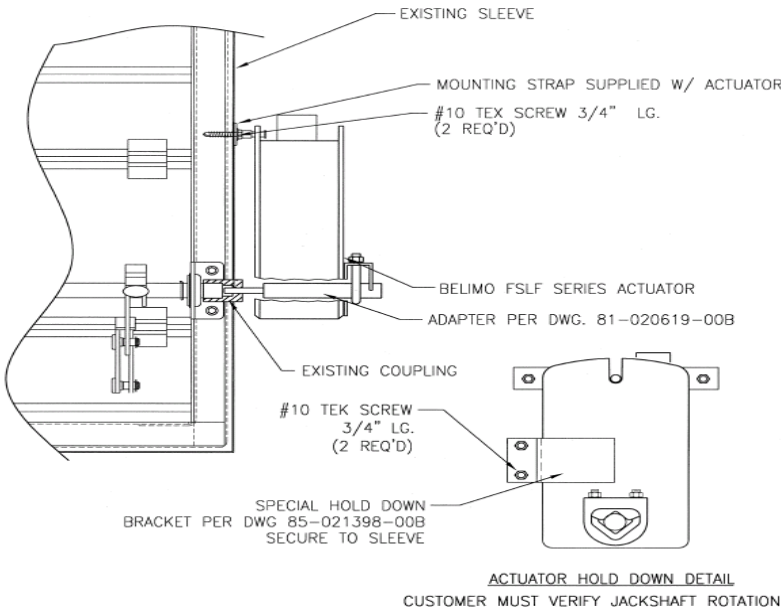
2781		115	.24A run/.27A hold		Both 1/4" & 3/16" shaft.
Obtain kit from Ruskin rep. FSLF120/MP kit is available.			Available from Ruskin reps only.		
Use FSNF where linkages needed.					



Parts are no longer available.
Most negator springs no longer function.

Usually on a Negator Spring damper. For electric, the Ruskin kit FSLF120/MP must be ordered from a Ruskin rep. Check voltage.

For instructions:
https://www.belimo.com/mam/americas/technical_documents/oem_documentation/belimo_ruskin-multiproducts2781-1161B-fsxx_replacement-instructions_AM_en-us.pdf



Ruskin part number FSLF120/MP. This must be ordered from Ruskin or local Ruskin Representative. Go to www.ruskin.com for list.

RETROFIT KIT FOR CONVERTING AN EXISTING MP2781 TO FSLF SERIES ACTUATOR
Kit contains actuator, shaft adaptor, hold down, and instruction sheet.



2814-SQ
2814A-SQ

FSLF120
Direct coupled

10 in-lb "A" model was CW rotation; plain was CCW
Check voltage 1.15A run/1.3A hold
FSLF120 replaces both.



2920

FSLF120
Direct coupled

Inside clamp mounting or a shaft
extension required.

2985
2986

FSLF120
Direct coupled

See Greenheck instructions on
Belimo website.

Typically these were linkaged
using a crank arm on the square
shaft and the spring was on the
round shaft.

Remove all linkage parts and
direct couple Belimo
to the damper shaft.



3158
3159

FSLF120
Direct coupled



Greenheck 3159 used short spring



Air Balance short spring version



Pottorff variation



Side view of Greenheck installation



**Example of all brackets and linkages removed
and Belimo FSLF mounted on damper shaft.**

Some were direct coupled to the damper shaft with an external spring. Some were
linkaged using a crank arm on the square motor shaft and the spring was on the round
shaft. Remove all linkage parts and direct couple to damper shaft.

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Air Balance MultiProducts Jackshafted motor replacement with Belimo FS Series

Greenheck MP2986 Motor Replacement with Belimo FS Series

Multiproducts_Replacement_with_Belimo_Instructions.pdf

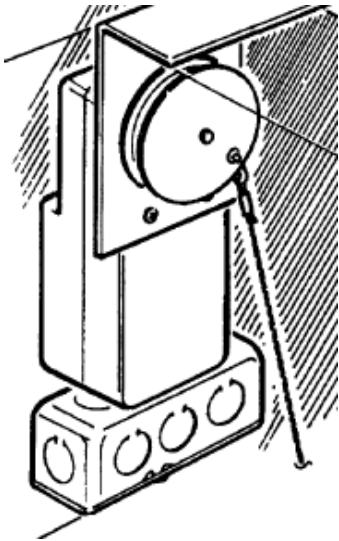
5800 EMB	These are Prefco/PH part numbers. Made by Multiproducts.			
In all cases disconnect external motor spring without compromising fusible link and internal spring ability to close the blades. These are quite old and changes may have been made over the years. Investigate operation. Confirm voltage. Check fusible links or McCabe © Link. Verify damper functions after replacement by testing damper open and spring closed.	All are On/Off	FSTF if less than 2 sq.ft. FSNF if needed for some linkage applications.	Use -S models if auxiliary switches are required.	

While direct couplin is preferable, some applications require linkages. See **Linkages** below for an example of a FSTF linked to a Prefco internally.

5800EMB2XPO	120VAC	FSLF120 direct coupled	FSLF120			
5800EMB2XPC	120VAC	FSLF120 direct coupled	FSLF120			
5800EMB1	120VAC	FSLF120 direct coupled	FSLF120	5800EMB1 - Outside the duct, top mount, power open		
5800EMB7	120VAC	FSLF120 direct coupled	FSLF120	5800EMB7 - Inside the duct, bottom mount, power closed		
5800EMB10	120VAC	FSLF120 direct coupled	FSLF120	5800EMB10 - Outside the duct, bottom mount, power closed		
5800EMB5	120VAC	FSLF120 direct coupled	FSLF120	5800EMB5 - Inside the duct, top mount, power open		
5800EMB8	24VAC	FSLF24 direct coupled	FSLF24			
5800EMB9	120VAC	FSLF120 direct coupled	FSLF120			

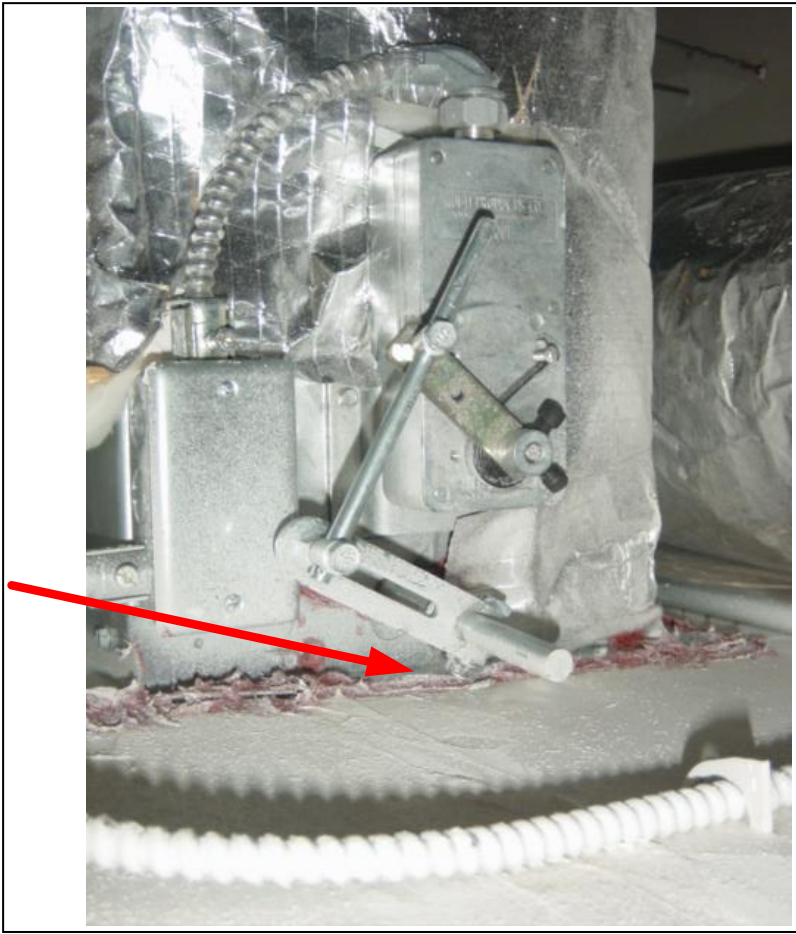
The three examples below are all replaceable with FSLF or FSNF by removing all linkage parts and mounting Belimo over the damper shaft.

Do not remove any bearings.



Cable pulley versions need linkage replacements.

Where damper shaft has been placed too close to a wall for direct coupling, use FSNF or FSTF and linkages. (Incidentally, this one had enough space.)



6247	Nailor
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Remove linkage parts and mount to shaft.
FSLF for dampers < 4 sq.ft.
FSNF for dampers > 4 sq.ft.

Nailor. Remove linkage parts and mount to damper shaft.



Where there is insufficient space direct couple. Where shaft is too close to drywall, linkage.

With no space to direct couple, a crank arm and ball joints from the ZG-AF Kit have been used. Note leg kit connections below actuator.

Phillips - Ruskin

Phillips P150

See Ruskin. Non-spring. Shaft spring must be disabled.



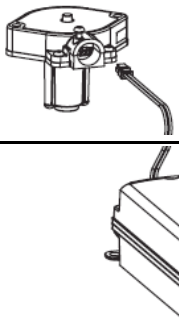
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Siemens

Make & Model	in-lb	Power		Belimo Replacement	Notes
GGD121	140 in-lb drive	24		FSAF24A FSNF24	Belimo FSNF limited to 12 sq.ft.
GGD221	110 in-lb	120		FSAF120A FSNF120	
GGD321	spring	230		FSAF230A FSNF230	
Siemens spring is 108 in-lb with <10% reduction at elevated temperature.					

GND12x.1x	50 in-lb	24V	20VA	FSLF24	Belimo FSLF is UL555S listed at the same sizes as the GND. Limit replacement to <4 sq.ft.
GND22x.1x		120V	.17A, 120V	FSLF120	
GND32x.1x		230V		FSLF230	
.1U is up to 1" clamp. .3U is 1.05"					



Electronic Fuse Link (24 Vac)			
ASK79.165 165°F (74°C)	Thermal sensor. Opens at 165F.		BAE165 US
ASK79.212 212°F (100°F)		None. Call if needed.	
ASK79.250 250°F (121°C)		None. Call if needed.	
ASK79.350 350°F (177°C)		None. Call if needed.	

Optional	Two Auxiliary Switches Fixed 5° and 85°
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GND

Siemens is a direct copy of Belimo. No special investigation needed.
 Replace like for like since Siemens has internal spring.

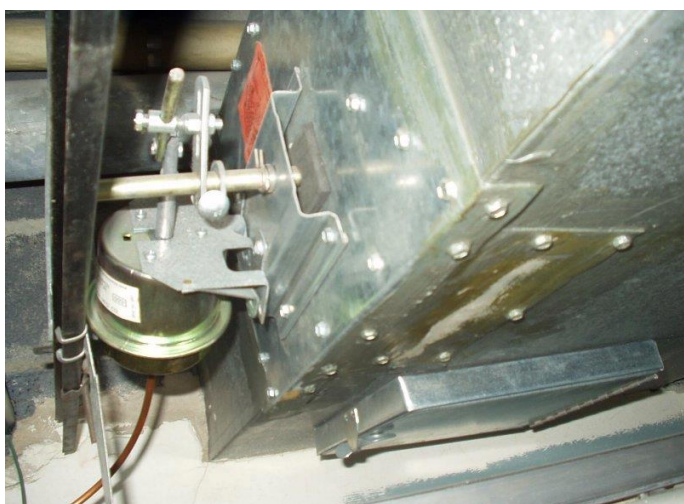
PNEUMATIC



Pneumatic to electric conversions are typically straightforward.
 Where the damper shaft or jackshaft extends out of the duct, mounting is simple.
 Where the old actuator is mounted on the face of the damper use of a linkage kit is needed. See the Belimo Mounting Methods Guide.
belimo_mounting-methods_guide_en-us.pdf
 Control methods need to be investigated. Shaft springs with fusible links, fusible air valves, and bimetals with EP relays were all employed.
 A BAE165 or similar new thermal sensor and rewiring could be required.

Ruskin negator spring damper instructions:
https://www.belimo.com/mam/americas/technical_documents/oem_documentation/belimo_ruskin-negator-spring-pneumatic-fsxx_replacement-instructions_AM_en-us.pdf

Smoke damper retrofit. Note damper blade is outside of plane of wall.



Pneumatic actuator linkaged to shaft.



Actuator removed exposing mounting plate and damper shaft.



Belimo FSLF direct coupled to shaft.

Fire and smoke Alternately, Belimo BAE 165 shown below has passed in a UL555S test.
 It can be used for older dampers where no present UL listed devices are available.

https://www.belimo.com/mam/americas/technical_documents/Support%20material/Fire%20and%20smoke/pneumatic_general_retrofit_instructions.pdf
 Pneumatic FS Damper Actuator Replacement with Belimo FSxx Series (pdf - 1.73 MB)



BAE165 US
 Manual reset 165°F thermal sensor.

See Linkages & Wiring sheet for more details.



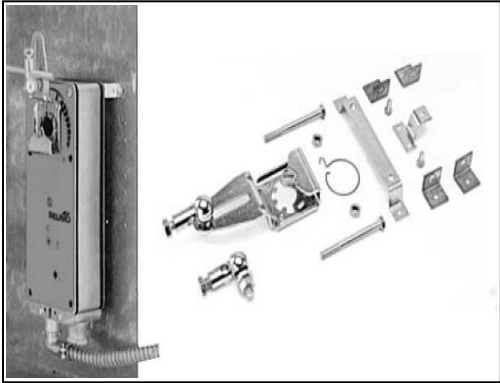
The damper area below is based on air velocity of 2000 fpm and 4.5 in. w.c. static pressure when closed.
For high velocity or static pressure, contact Belimo.

Fire & Smoke Damper sizes



LINKAGES

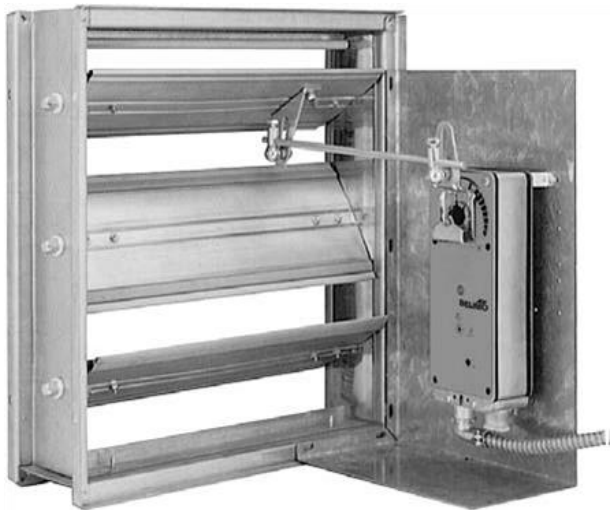
Consult the Belimo Product Guide and Price list or Mechanical accessories for more linkage parts



ZG-AF Kit for use with FSNF

Left: leg kit. Right: FSNF mounted with the leg kit.

For any of these applications Belimo linkages can be used. The ZG-AF is particularly applicable. [ZG-100 shown with ZG-AF & damper clip and rod.]



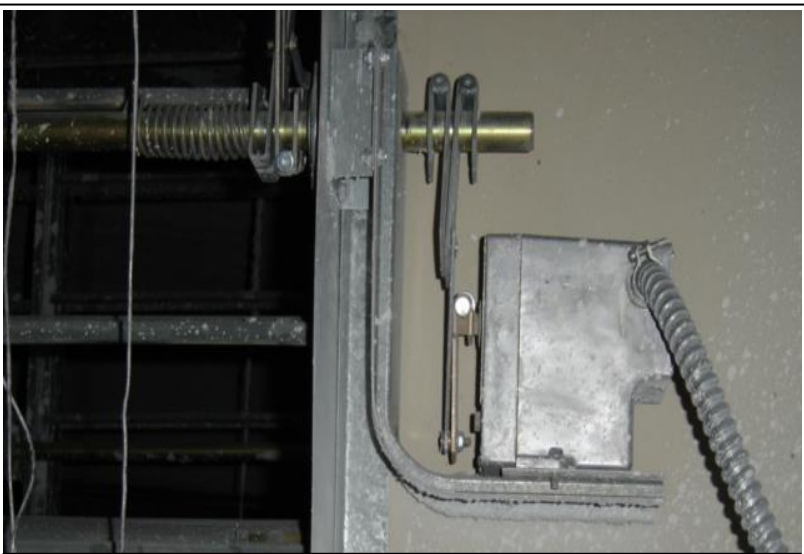
ZG-AFA108
Mounting bracket, crank arm, and hardware for FSAF*A actuators

FSAF*A actuators use custome linkage kits with ZG- brackets.



ZG-AFA
Leg kit, angle brackets, crank arm, and hardware for FSAF*A actuators

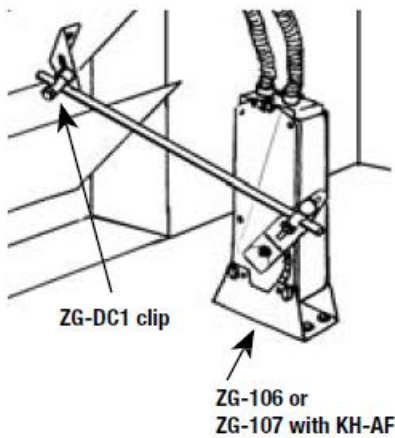
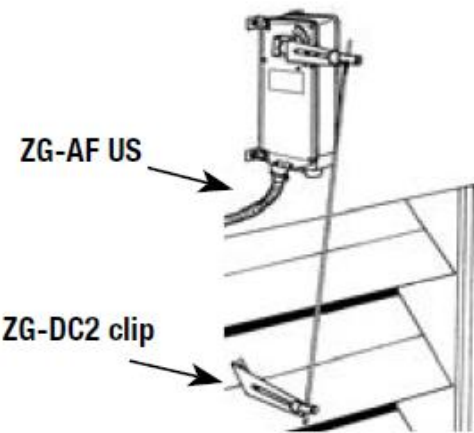
Use of ZG-106 bracket, crank arm and ball joints to connect to two damper arms.



In general, oil-filled spring return motors like the MA418 are straightforward replacements. In this case, the Belimo FSNF or FSAF may be direct coupled. The shaft spring should be examined and exercised to prove it is still operational. The fusible link cannot be seen, however it should release the shaft spring.



Examples. See Mounting Methods Guide and PGPL for all parts.





ZG-JSLA + "Actuator"
Select actuators available preassembled to the ZG-JSL. At the factory, there is a cost savings on the ZG-JSL if assembled with the actuator

The Jackshaft adaptor can be used with the FSNF, FSAF*A, & FSAFB actuators.

A variety of crank-arms are available.



The FSTF actuator has a full set of linkage parts. Particularly helpful with Prefco dampers.

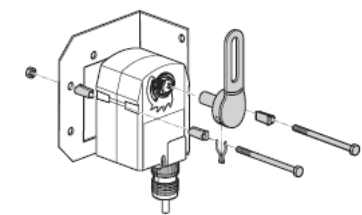
The FSTF is limited in torque and should be used for dampers 2 sq.ft. and smaller only.



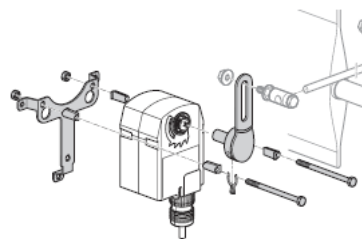
KH-TF US
Crank arm with 5/16" slot
KH-TF-1 US
Crank arm with 1/4" slot



ZDB-TF
Angle of rotation limiter for TF



ZG-TF112
Crank arm adaptor kit (includes ZG-113 and KH-TF-1)



ZG-TF2
Crank arm adaptor kit (includes mounting hardware)

TF-P Anti-rotation strap



The modulating FSAFB actuators use AFB linkages.



ZG-AFB
Crank arm adaptor kit



ZG-AFB118
Crank arm adaptor kit



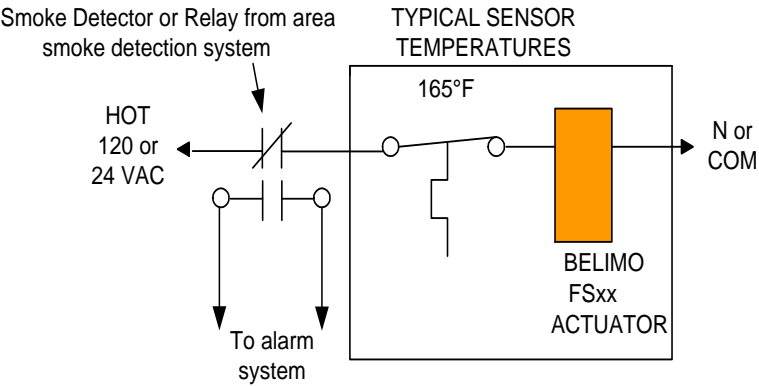
FSLF No linkages available. Ruskin makes one for the negator spring damper electric actuator replacements



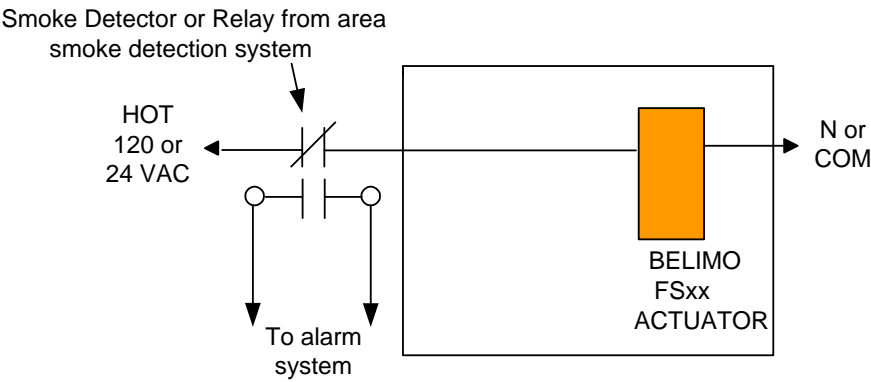
WIRING

TYPICAL FIRE - SMOKE COMBINATION DAMPER WIRING Wiring when fusible link is retained and old spring used.

Electric thermal disc



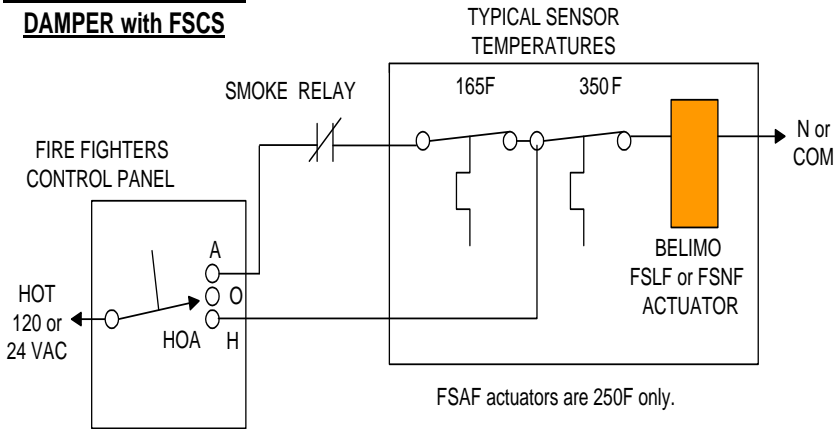
Actuator has only a smoke function in this variation.



If any alarm wiring is touched, contact Fire Marshal to determine if a retesting is required.
If any building structural changes are made, contact Building Official for permit & inspection

In some cases the actuator auxiliary switches are used for connection to status indication or to smoke control system. Consult with AHJ to see if a retest is required when replacing defective motors.

TYPICAL REOPENABLE DAMPER with FSCS



Where a new manual reset high temperature limit is required, the BAE165 is available.



BAE165 US
165°F Electric thermal sensor. SPST, NC

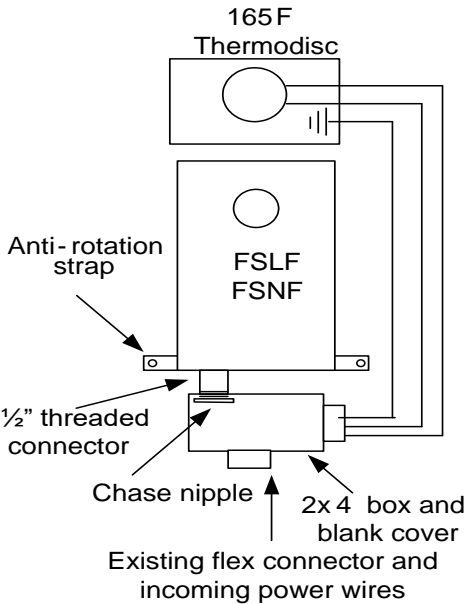
A large number of variations are possible. Call if needed with questions on wiring and testing.

A 4" x 4" box has been mounted to the ½' Kos of the FSLF to provide wiring space.

In addition, the clamp has been mounted on the inside of the actuator because the damper shaft was too short.



Belimo Mechanical



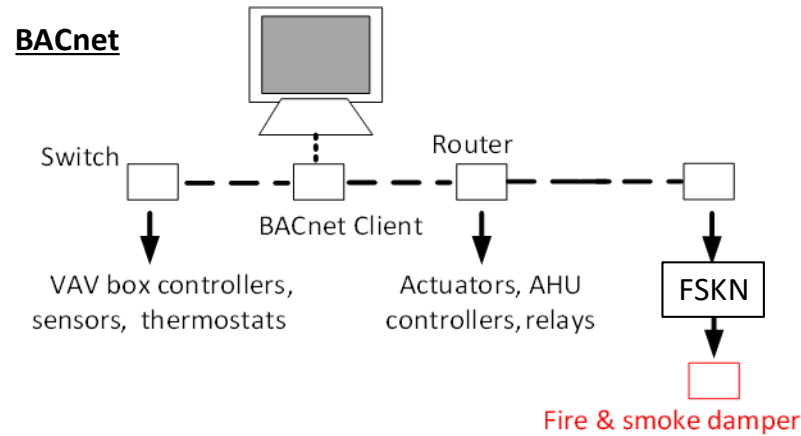
The International Building Code requires remote testing for inaccessible fire and smoke dampers.

IBC SECTION 717 DUCTS AND AIR TRANSFER OPENINGS

717.4 Access and identification. Access and identification of fire and smoke dampers shall comply with Sections 717.4.1 through 717.4.2.

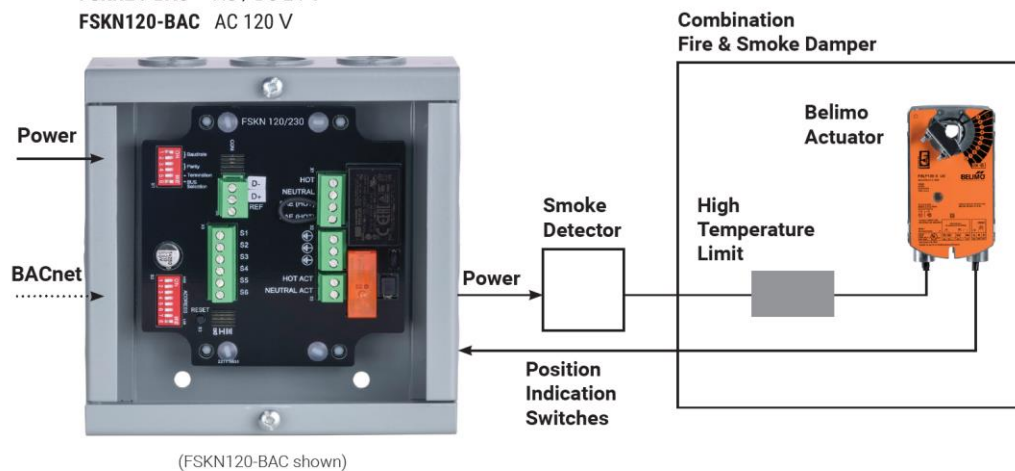
Then...

717.4.1.2 Restricted access. Where space constraints or physical barriers restrict access access to a damper for periodic inspection and testing, the damper shall be a single- or multi-blade type damper and shall comply with the remote inspection requirements of NFPA 80 or NFPA 105.



FSKN BACnet fire & smoke damper remote testing module

FSKN24-BAC AC / DC 24 V
FSKN120-BAC AC 120 V



The FSKN remote inspection module allows code required testing of actuated life safety dampers without difficult costly visual inspections.

- Remote life safety damper testing is approved by NFPA 80 & NFPA 105'
- BACnet Testing Laboratory approved
- UL 60730