



Damper & Actuator Identifier

ACTUATOR REPLACEMENT STARTS WITH THE DAMPER, NOT THE ACTUATOR.

Most modern actuators can be replaced like-for-like since they function identically and have equal UL555S listings.

These have a replacement shown below.

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.

Replacement is required; however, it must be done correctly.

Note that while replacement of actuators by electrical and torque characteristics may be straightforward, mounting may require special methods.

A primary requirement for torque is that the actuator has been tested for the damper area and temperature.

Use the UL555S tested area results given in damper OEM sections below.

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



WARNING!

UL expects using instructions to ensure correct replacement is accomplished. For that reason, the make and model of damper are needed.

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.

INSTRUCTIONS ARE AVAILABLE AND SHOULD BE USED.

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

TTT-VAT

Technical actuator characteristics can be found using the TTT-VAT questions:

Temperature, Time, Torque, & Voltage should be equal or better.

Amperage draw should be equal or lower to ensure a breaker is not overloaded.

Damper and actuator should be Tested after installation. See Fire Marshal/Building Official form on last page of each Belimo replacement installation instruction.

in each instruction or at www.belimo.us/firesmoke

Codes

UL does not regulate replacement and repair.

The local Fire Marshal or Building Official is the Authority Having Jurisdiction.

NFPA 80 (fire) and NFPA 105 (smoke) require damper repair as soon as possible.

Consult local AHJ for any permit requirements.

Belimo has MEA for New York City and California State Fire Marshal Listing.

MEA Tag rules are at https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/1_MEA_Tag_Regulations.pdf

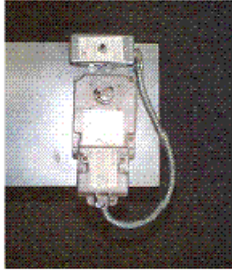
TTT-VAT
TEMPERATURE
TIME
TORQUE
VOLTAGE
AMPERAGE
TEST

It is recommended, not required by most codes, that replacement instructions be submitted to AHJ.

For Belimo assistance -
Aaron Nobel at 203 749-3119 on East Coast
Larry Felker at 775-857-4243 or 800 987-9042 x 5205 on West Coast

Barber Colman-Siebe--Invensys

MA2xx



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

Air Balance, Greenheck, Nailoi NCA (Arlan), Ruskin (ALD), Safe-Air (Imperial)

Remove external spring along with actuator. Dual spring or thermal sensor methods were used. Pottorff (Accurate)

Single spring was typical. It must be disconnected and a new thermal sensor must be installed. Use HS10 or BAE165

Prefco (Complete Spiral, Hugh Richards)

OLD dampers are often special. Some internal mounts -- no replacement possible.

Where McCabe Link was employed, derate actuator. See Prefco instructions below.

In general, MA22x was for <3 sq.ft. and MA23x was for 3 to max 6 sq.ft.

Model	Power	Volts	Replacement Options		Notes
MA220	23VA	120	FSLF120	Use FSNF if linkages are required.	In all cases, disconnect external motor spring.
MA221	23VA	240	FSLF230		See specific damper manufacturer. The FSLF series replaces the MA220 series where direct coupled. The FSNF 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.
MA223	23VA	24	FSLF24		
MA230	36VA	120	FSNF120		Match voltages. Use FSLF for 4 sq.ft. and less. Use FSNF for 4 sq.ft. to 8 sq.ft. on Ruskin, 12 sq.ft. on others.
MA231	36VA	240	FSNF230		
MA233	36VA	24	FSLF24		
MA240	No replacement.		Investigation may allow retrofit.		
MA250	Same as MA220/230 series		FSLF	FSNF	

Contact Belimo for mechanical and electrical parallel applications. Dual actuators can be applied with certain provisos.

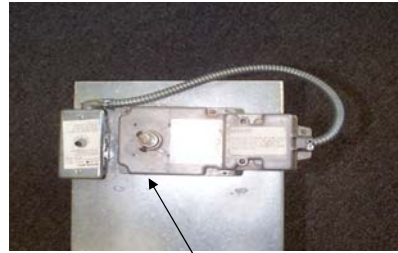
MA220/230/250

Greenheck



Spiral spring type MA220/230

Ruskin

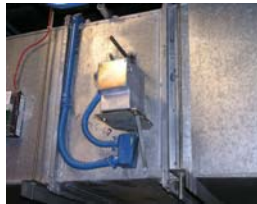


Spring is in housing under motor

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

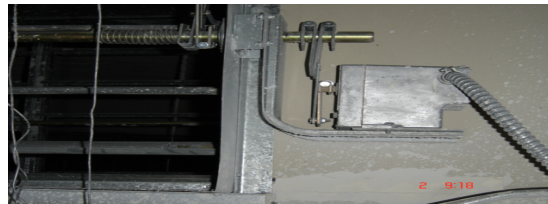
MA318 & MA418

Ruskin



View from outside.

Greenheck



View from inside.

ECM Out of business.

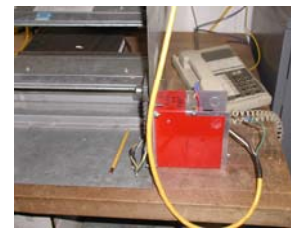
First time replacement on any project is likely to require Belimo Product Management involvement. **FSLF if direct coupled possible. FSNF if linkages needed.**



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	CCW	Torque	Model	Notes
ML4105A1000	120	CCW	50	FSLF120	FSNF120 should be used for dampers over 4 sq.ft. Where linkages are needed, use FSNF. This includes internal mount. Due to torque rating differences, the Belimo FSLF 30 in-lb achieves the same UL damper sq.ft. as the 50 in-lb ML4105.
ML4105B1009	120	CW	50	"	
ML4105C1008	230	CCW	50	"	
ML4105D1007	230	CW	50	"	
ML4115A1009	120	CCW	30	"	
ML4115B1008	120	CW	30	"	
ML4115C	230	CCW	30	FSLF230	
ML4115D	230	CW	30	"	
ML4115H	120	CW	30	FSLF120	
ML4115J	120	CCW	30	"	
ML4202	120	CW	20	"	
ML4302	120	CCW	20	"	
ML4702	230	CW	20	FSLF230	
ML4802	230	CCW	20	"	



ML4105, ML4114
MS4209 series

Four models look identical. Part number needed. See cross reference.



Internal mount.

32003532-002 Aux Switch Package				Use -S Belimo model.
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Model	Power	CCW	Torque	Model	Notes
ML8105A1006	24	CCW	50	FSLF24	FSNF120 should be used for dampers over 4 sq.ft. Where linkages are needed, use FSNF. This includes internal mount. Due to torque rating differences, the Belimo FSLF 30 in-lb achieves the same UL damper sq.ft. as the 50 in-lb ML8105.
ML8105B1005	24	CW	50	"	
ML8115A1005	24	CCW	30	"	
ML8115B1004	24	CW	30	"	
ML8115H	24	CW	30	"	
ML8115J	24	CCW	30	"	
ML8202	24	CW	20	FSLF24	
ML8302	24	CCW	20	"	

Honeywell Continued

Honeywell	Power	CCW	Torque	Belimo	Notes
MS4120F1006	No aux	120	.35A 175 in-#	FSAF120	If fast speed needed, use FSNF. UL555S listing of FSNF is 8 sq.ft. per actuator for Ruskin, 12 sq.ft. for others at 350F.
MS4120F1204	2 SPST	120	" 175 in-#	FSAF120-S	
MS4209F	.13A	120	CW 80in-#	FSNF120	
MS4309F	"	120	CCW 80in-#	"	
MS4620F1005	No aux	230	175 in-#	FSAF230	At 250F, FSNF is UL555S listed up to 16 sq.ft. for some. Use 12 sq.ft. max to be conservative.
MS4620F1203	2 SPST	230	175 in-#	FSAF230-S	
MS4709F	.09A	230	CW 80in-#	FSNF230	
MS4809F	"	230	CCW 80in-#	"	
MS8120F1002	No aux	24	175 in-#	FSAF24	FSAF Power: .09A @120V 11VA FSNF Power: .23A @120V 27VA
MS8120F1200	2 SPST	24	175 in-#	FSAF24-S	
MS8209F	7VA	24	CW 80in-#	FSNF24	



MS8309F	"	24	CCW 80in-#	FSNF24	
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	CCW	Torque	Belimo	Notes
H2000A/x	.18A	120	CCW .15A	FSLF120	< 4 sq.ft. FSNF120 .23A
H2000B/x	"	120	CW	"	"
H2024A/x	16VA	24	CCW 5VA	FSLF24	FSNF24
H2024B/x	"	24	CW	"	"
H2230A/x	.13A	230	CCW 0.075A	FSLF230	FSNF230 .12A
H2230B/x	"	230	CW	"	"
32003532-002 Aux Switch Package					Use -S model of proper voltage.
SPH2 Aux Switch					



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 under all conditions.



Siemens

Make & Model	in-lb	Power	Belimo Replacement		Notes
GGD121	140 in-lb	24	FSAF24	FSNF24	Belimo FSNF limited to 12 sq.ft.
GGD221		120	FSAF120	FSNF120	
GGD321		230	FSAF230	FSNF230	

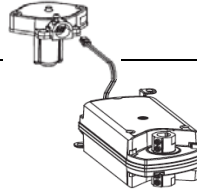
Siemens spring is 108 in-lb with <10% reduction at elevated temperature.

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



GGD

GND



GND

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 Product Management involvement.

MultiProducts motors were used in many different ways and investigation is necessary to ensure correct replacement. Damper manufacturer identification and digital photograph are necessary.

As more models and methods of use are identified, this cross reference will be expanded in detail.

The same model number may have had different shaft styles and flats. Typically Belimo is direct coupled and the exact MP shaft was linkaged to the damper shaft.

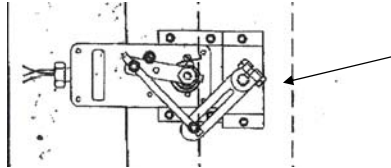
2920 + spring, etc.

MP2781-SQ	For direct coupled use FSLF.	Use FSNF where linkages needed.
MP2781-A-SQ	115 .24A run/.27A hold	Original was 1/4" shaft; replacement was 3/16" shaft.
MP2814-SQ	10 in-lb "A" model was CW rotation; plain was CCW	FSLF120 replaces both.
MP2814A-SQ	24 1.15A run/1.3A hold	(yes, true!)

Inside clamp mounting or a shaft extension required.

TB2001	Typically FSLF series. Use FSNF where linkages required due to space constraints.
MP2585, 2986	FSLF120 See Greenheck Installation Instructions

MP2659	FSLF120 for direct coupled. FSNF120 if ZG-AF linkage required.
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Note that the motor shaft is inconsequential. The damper shaft is a standard 1/2".



MP2781
See Ruskin use below.



2430

Arrow. 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. Replace damper.

MP3158,9 TYPE

Inside view

AB = long coiled external shaft spring type



Greenheck 3159 used short spring



Pottorff



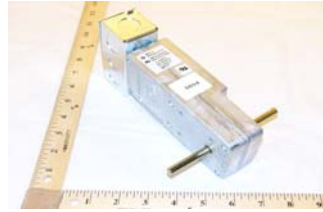
Multiproducts cont

Model 2724

Air Balance



2985E



Call for information

2553A



These are very old and were applied using what are strange 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. Call for information.

TSB2000



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.



From the outside of the duct, the actuator is visible. However, replacement sometimes involves rebuilding the linkage to the damper blade. ECM shown below. Out of business.

Phillips P150

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



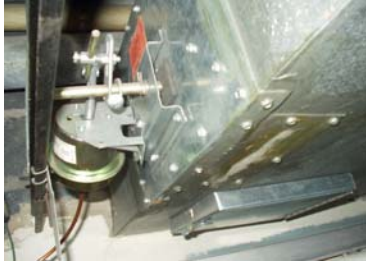
PNEUMATIC



Pneumatic to electric conversions are allowed by AHJ's in some cases. Full replacement instructions must be used that are custom to the application. A general conception is available at the Belimo website. Contact us for custom installation instructions. Damper manufacturers are sent copies of the instructions for approval.

New thermal sensor and rewiring will be required.

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.



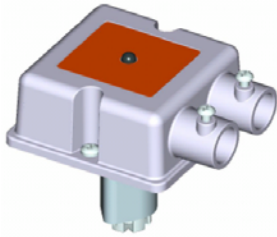
Belimo FSLF direct coupled to shaft.

Fire and smoke damper retrofit will entail installing a thermal sensor. Damper manufacturer rep can supply current products.

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.

Thermoelectric Tripping Device 165 °F (with manual reset)

BAE165 US



Application

The BAE165 US thermoelectric resettable tripping device operates in conjunction with a UL listed Belimo safety actuator for use in fire & smoke applications. The BAE drives a motorised fire damper to its safe position when the temperature at the damper (tripping temperature) exceeds the set value. The device is connected in series with the power supply of the fire & smoke control actuator.

See Wiring diagrams on las page of this document.



Damper Manufacturers

See Belimo Instruction Sheets for actual installation details.

If none at www.belimo.us/firesmoke, call and we will provide.

New York City - Belimo has MEA listing. See www.belimo.us/firesmoke

or https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/1_MEA_Tag_Regulations.pdf

Accurate Specialty Metal (Pottorff, PCI) in New York.

Company <http://asm-mech.com/>

Damper products <http://www.pottorff-hvac.com/>

MA418	Two methods possible.	1) Fusible link with shaft spring.
		2) Thermal sensor.

Regardless of sensor and spring method, remove MA418 and install FSNF or FSAF.

See Mounting Methods Guide if necessary. https://www.belimo.us/bellib/Application_Guides/Mounting_Methods.pdf

Direct coupled is typically possible. Use linkages if necessary for space constraints or very short shafts.

Use either FSNF or FSAF. One actuator per 12 sq.ft. section is recommended.

FSNF is 350F. FSAF is 250F.

MA220, MA230, MA250	350°F	FSLF < 4 sq.ft.
		Use FSNF for dampers over 4 sq.ft. or if linkages are required.



WARNING!

The existing shaft spring must be disconnected and the fusible link replaced with a bolt.

An HS10 Pottorff thermal sensor or a Belimo BAE165 sensor must be installed.

See instructions:

https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/Pottorff_MA220_Field_Replacement.pdf

Air Louver & Dampers (Ruskin in NYC) Maspeth

http://www.nyccmacna.org/members/profile_air.html

See Ruskin.

Air Balance

<http://www.airbalance.com/>

(Mestek - American Warming, Arrow, Cesco, Louvers and Dampers)

Most Air Balance before 2002 need careful examination before replacement.

ECM & MultiProducts	FSLF 3 sq. ft. and smaller. FSNF where linkages needed.
	FSNF up to 12 sq.ft. 350°F

On older dampers there are major modifications required to replace actuators.

Special instructions needed for most. Call Belimo for details.

MA418	FSNF up to 12 sq.ft. 350°F. Thermal sensors not fusible links were used.
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A number of variations exist which are no longer manufactured:

- 1) Negator spring contacts the damper blade. Several sensor methods were used.
 - 2) Crankarm-pully has a spring built in. Also referred to as a "wrap spring clutch break."
Both 1) and 2) were without jackshaft. See photo's below.
 - 3) MultiProducts with thermal sensors and jackshaft.
- The high temperature limit may be a fusible link or a fusible rod.

1) Negator spring contacts the damper blade.

From the outside of the duct, the actuator is visible. However, replacement sometimes involves rebuilding the linkage to the damper blade.

ECM shown below.



External Motor.

Call for information.

Fusible rod method. Replacement will require Belimo actuator and a parts kit from AB.

Instructions should be submitted to AHJ before rebuilding damper.



Negator spring

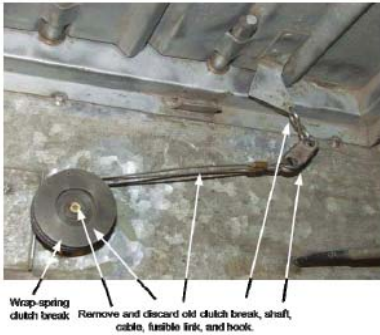
Fusible Rod



Air Balance

2) Crankarm-pully has a spring built in.

ECM and MultiProduct both used. No repair parts available.
 Variety of linkage methods were used. Call with model number for assistance.



Wrap-spring clutch break
 Remove and discard old clutch break, shaft, cable, fusible link, and hook.



Negator spring holder.
 (Spring missing.)
 Replace it or damper.

Completed Mounting



Above needs parts available from Air Balance. Call for information.
 Installation instructions are available

Modern Air Balance has a mounting plate for anti-rotation strap. Some older dampers have actuator hanging in air and a 4x4 box cover plate may be needed for anti-rotation.

3) MultiProducts with thermal sensors and jackshaft.

https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/AB_MP_JackshaftedtoBelimoReplacementInstructions.pdf

Inside



Motor with external springs



Full replacement instructions are available from Belimo.



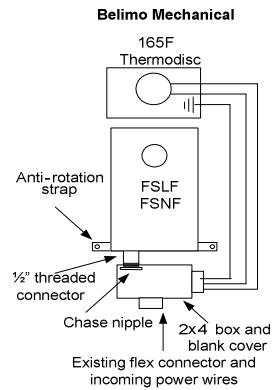
The thermal sensor and lower bracket do not need to be removed. Only the actuator should have been disconnected.
 Air Balance.

HW ML4115, ML4202	FSLF
HW MS4209	FSNF

Direct coupled. Straightforward replacement.

https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/AB_ML-MS_Type_to_Belimo.pdf

https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/ReplacementHoneywellML4115andSimilarMotors.pdf



Arlan (NCA) NYC

See NCA.

<http://www.smacna-li.org/a>

Complete Spiral Metals.

See Prefco.

<http://www.nyccsmacna.org>



MA220, MA230, MA250 FSLF120

Used 2 springs. Red arrows point at external one used for actuator. Internal one is preloaded and releases if fusible link melts.

Remove old motor, bracket and spring. Belimo can then be direct coupled easily.

Remove the motor, spring, and bracket.

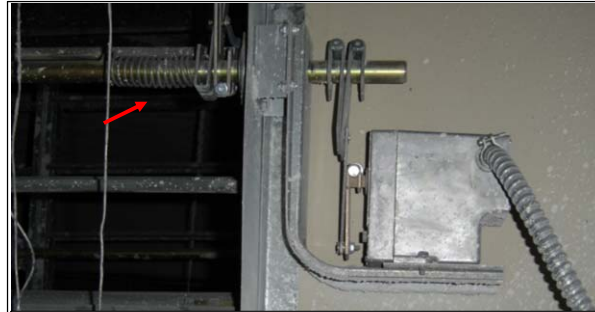
Mount the Belimo using the anti-rotation strap. Greenheck bracket can be mounted on small dampers where the motor hangs out in the air.



MA418, MA318 FSNF or FSAF

Application shown to right allows direct coupling. Linkages needed in some cases where space constraints dictate.

Disconnect electrical. Remove motor, linkage and bracket. Leave outboard bearing bracket. Mount Belimo and rewire.



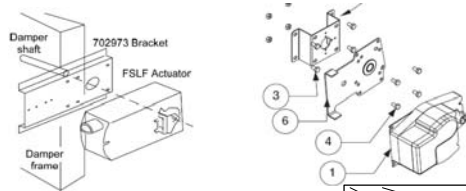
In general, oil-filled spring return motors like the MA418 are straightforward replacements. In this case, the Belimo FSNF or FSAF may be direct coupled. The shaft spring should be examined and exercised to prove it is still operational. The fusible link cannot be seen, however it should release the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

ML4115, MS4202 FSLF up to 24" x 24" for retrofit. (UL555S at 30" x 30" for new applications.) Wiring is straightforward.

https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/ReplacementHoneywellML4115andSimilarMotors.pdf

MS4120, GGD FSNF or FSAF up to 12 sq.ft. Optional bracket available from Greenheck rep.

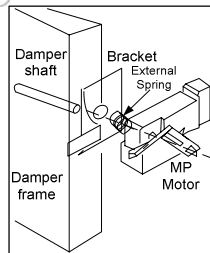
remove the HW bracket and mount the Belimo direct coupled using the anti-rotation strap. On dampers where the motor has been hung out in the air, the anti-rotation strap can be screwed to it. It is along the same axis as the length of the actuator. See HW to Belimo:



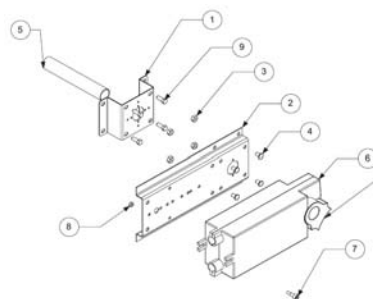
MultiProducts FSLF
FSNF if linkages needed

Belimo ZG-LMSA-1/2-5 is a 1/2" shaft extension 5" long.

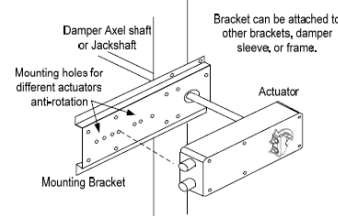
Optional bracket available.



A variety of MultiProducts motors have been used. Remove motor, brackets, and external spring.



651815 Bracket may be used. Belimo fits on same bracket.



Greenheck cont

MP2985, 2986

FSLF120 for direct coupled and FSNF120 if linkages needed.
https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/Greenheck_MP2985_6_to_Belimo_Retrofit.pdf



Spring

Fusible link and shaft spring.
DO NOT REMOVE.



Replacement is straightforward. Remove old motor and linkage parts. Place Belimo FSLF120 over shaft, mount antirotation, wire and test.

Hugh Richards NYC (Prefco)

Now Complete Spiral Metals. See Prefco.

Imperial NYC

See Safe-Air <http://www.imperialdamper.com/products.html>

Leader

All FSNF

<http://www.leaderindustries.com/>
 Leader has always used the 2 spring approach. Remove old motor, linkage, and spring. Install Belimo. Only FSNF UL Listed as of this file date. Examine damper and send digital photographs if more direction needed. Use various drawings in this document as references.

Lloyd Industries

All FSNF

<http://www.firedamper.com/>
 Present damper using the dual spring approach so replacement straightforward. Only FSNF Listed.

Nailor

<http://www.nailor.com/OnlineCatalogs/CAC/CACCINTRO.pdf>

MultiProducts FSLF or FSNF + linkage parts

https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/Nailor_MP_to_Belimo_FS_actuators.pdf

MA220, 230, 250 FSNF listed up to 36" x 48"

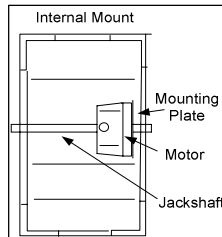
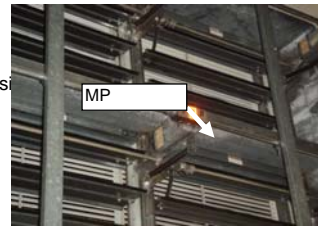
Modern dampers use the thermal sensor method for fire sensing. Actuator replacement is straightforward direct coupling.

ML4115 FSLF UL555S listed only 18" x 6".

More to come.

ML4209 FSNF listed up to 36" x 48"

MS4120 FSNF listed up to 36" x 48"



Internal moun



External mount

For short shaft mounting of FSLFs, use the ZG-LMSA-1/2-5. 1/2" diameter, 5" long. It fits thru the FSLF and allows mounting. Or mount clamp internally.

https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/ReplacementHoneywellML4115andSimilarMotors.pdf



Nailor cont



Nailor. Fusible link, arm, knee-lock and shaft spring.

Detail



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.



If the whole building looks like the picture on the left, replace the building.



More taken apart than necessary. Jackshaft and bearings are exposed.

<http://ncamfg.com/>

NCA

MA220, MA230, 250 FSLF

MA418 FSNF

ML4115	FSLF	350F	24" x 24"
MS4209	FSNF	250F	48" X 36"

https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/ReplacementHoneywellML4115andSimilarMotors.pdf

MultiProducts FSLF120 for <4 sq.ft. FSNF120 for >4 sq.ft.

Modern dampers use the thermal sensor method for fire sensing. Actuator replacement is straightforward direct coupling. All older dampers used dual springs. The actuator spring must be removed or bypassed before installing a Belimo. The fusible link spring should be left as is.

NCA was purchased by Metal Industries who also owns Prefco. United Enertech has a franchise as does Complete Spiral Metals in NYC.

Pottorff, PCI (Accurate in New York)

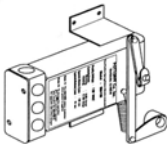
<http://www.pottorff-hvac.com/>

MA318 FSNF24 up to 12 sq.ft. 350°F and up to 16 sq.ft. 250°F.
MA418 FSNF120 up to 12 sq.ft. 350°F and up to 16 sq.ft. 250°F.
 FSAF may be used for the same sizes if special features are needed.

MA220 MA220 was used up to 4 sq.ft. FSLF replaces it. See Siebe for voltages of part numbers.
MA230 MA230 was used up to 6 sq.ft. FSNF replaces it. See Siebe for voltages of part numbers.
 Use FSNF if linkages needed where space constraints exist.
 Actual damper size varied among manufacturers.

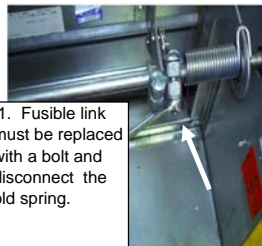
See motor section for various models of MA2xx for voltages.

The existing shaft spring must be disconnected and the fusible link replaced with a bolt
 A thermal sensor must be installed. Link to instructions on Fire & Smoke Dashboard:
https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/Pottorff_MA220_Field_Replacement.pdf



Model EM-120
(EM-24 is optional)

Call for information.



1. Fusible link must be replaced with a bolt and disconnect the old spring.



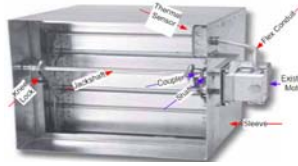
2. Then a new primary thermal sensor must be installed to control the actuator electrically.



<http://www.prefco-hvac.com/PRF-Main.html>
<http://www.metalaire.com/>

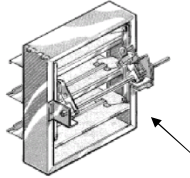
MA2xx Siebe	FSNF	5800MB2A	As of this file date, Prefco had not tested FSLF.
ML4115, ML4202	FSNF		Metal Industries owns both Prefco and NCA.
MultiProducts	FSNF	5800MB2X	

https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/Prefco_Mod_5000_Actuator_Replacement.pdf



Replacement of the Honeywell actuator shown at left is straightforward. Remove old motor and install Belimo on shaft. Wire per Diagram 1 below.

Modern Prefco 5050/5150



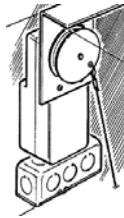
On McCabe® Link dampers, the first time the actuator rotates open, it must tighten the shaft spring. Derate the actuator for that one time use. A single FSNF can be installed on 36" x 45" maximum section. If an FSLF is used, install on maximum 18" x 18" damper.

McCabe® Link

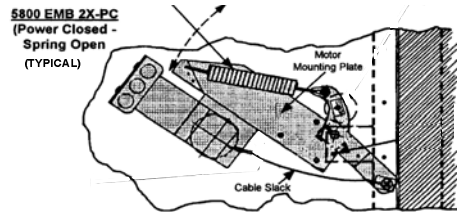
Prefco had a wide variety of mounting methods. Where a shaft existed, Belimo FSNF may be used. Where no shaft was present, refer to Prefco.

https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/PrefcoMcCabeOldmotorReplacementBelimoFS_Series.pdf

5800 EMB
 Belimo cannot replace many cable types.



Belimo cannot be used for this internal mount replacement. Only use Belimo on external shaft mount applications.



Internal mount

Belimo replacements are available only for the PHL 5800 MB2 or MB3 actuator – most other 5800 series actuators must be replaced

External mount



In MultiProducts application to left an FSLF will drop right over the shaft after removing motor, spring, cable, and crank-arm. Fusible link and spring should be checked for operation. Internal mounted motors can not usually be replaced unless an external shaft is available and the fusible link is not compromised.

Replace motor by disconnecting all existing parts. Then mount Belimo on shaft. Ensure fire function, if any, is intact.



Prefco continued

MULTIPRODUCTS Motors

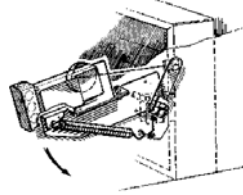
5800EMB2XPO/C



Prefco numbers. MP numbers unknown.

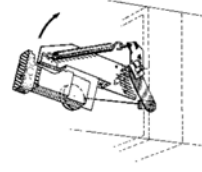
5800EMB2XPO

Power open



5800EMB2XPC

Power closed



Left. Difficult replacement problem as a crank-arm goes directly to the blade. A jackshaft adaptor may work. A cable drops to the lower section. Replacement of the damper is a good solution.

Below. McCabe Link.



Ruskin

<http://www.ruskin.com/>

Ruskin models are mostly thermal sens. Older negator spring models are an exception.

MA318 FSNF24 up to 8 sq.ft. 350°F.

MA418 FSNF120 up to 8 sq.ft. 350°F

FSAF may be used for the same sizes if special features are needed.

Note that more testing is underway in 2011 for 250°F applications.

https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/MA220_Replacement_on_Ruskin.pdf

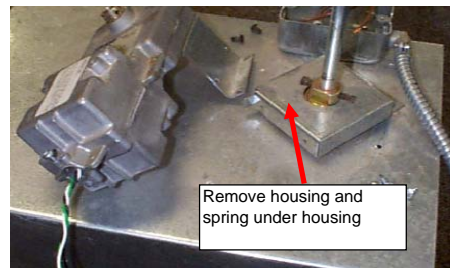
MA220 MA220 was used up to 3 sq.ft. FSLF

MA230 MA230 was used up to 6 sq.ft. FSNF

Use FSNF if linkages needed where space constraints exist.

See Siebe section for various voltages and models.

Remove defective actuator & external spring.
Straightforward replacement. CAUTION!
SPRING UNDER TENSION. WEAR EYE AND HAND PROTECTION.



Siebe



Before

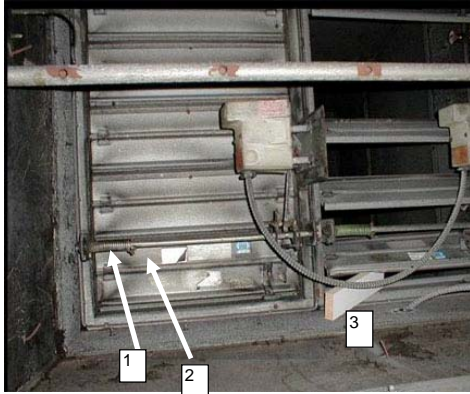
After




Ruskin cont

ML4115	FSLF	4 sq.ft. 350F
MS4209	FSNF	4 sq.ft. to 8 sq.ft. at 350F
MS4120	FSNF	Max UL555S 8 sq.ft. at 350F
	FSAF	12 sq.ft. at 250F

GGD	FSNF or FSAF at damper sizes above.	
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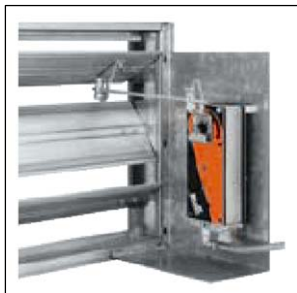
Old spring [1] must be disabled. Loosen arms, let spring unwind on shaft. Disconnect. DANGER - wear hand and eye protection. After releasing tension, drive shaft pin out to release spring. Slide spring down shaft and hold with pin.
Then install FSxx on old plate or use ZG-100 or equal to mount new actuator.
[3] Illegal 4 hour fusible link. Pencils, which at least burn faster, are also illegal. Remove.

Phillips T150 FSNF or FSAF at damper sizes above.
https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/Ruskin_P150_to_FSNF_or_FSAF.pdf
 Check jackshaft spring [1] and fusible link [2]. Field modifications may have been made on these old dampers changing factory function.
 Motor has no spring. When power is removed, damper is driven closed by spring.
 Thermal sensors were used to cut electrical power to the motor and allow spring to close damper.
 Smoke function was by smoke detector.

Use of instructions is required by UL when changing old actuators.



This photograph exemplifies a not uncommon error. Obsolete Phillips P150 motor was used originally. Barber Colman MA418's were installed to replace the defective P150's which did not have internal springs like more modern motors. However, the old shaft spring was left functioning. The MA418's have to do double duty by holding against their own internal spring as well as the old spring. The replacement motors fail prematurely.



The Belimo FSNF or FSAF can be mouted a number of ways. Use of a ZG-100 is shrn here.

For various Belimo mounting concepts see:

- http://www.belimo.us/bellib/Accessories/Mechanical_Accessories.pdf
- http://www.belimo.us/bellib/Application_Guides/Mounting_Methods.pdf

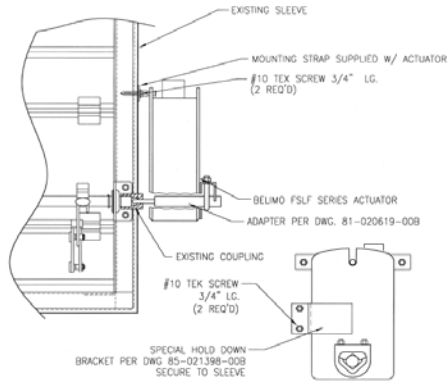


MP2781 MultiProducts FSLF120/MP kit. Available from Ruskin only.



Old negator springs must be present and working. If not, replace the damper.

In order to adapt the old MP motor with its .2" square male shaft end, a female socket was welded onto the damper shaft. The welded piece must stay on the shaft. A shaft adapter insert and actuator with hold down bracket is available from Ruskin.



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.

ACTUATOR HOLD DOWN DETAIL
 CUSTOMER MUST VERIFY JACKSHAFT ROTATION See Wiring Diagrams on p19

https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/RuskinDamperwithObsoleteMP2781_MultiProductsMotortoBelimoFSLF120.pdf



Above. Negator spring is attached to the blade and a post coming from the damper frame. The one above is broken.



Above. Fusible link and attachment arm detail.



Fusible rod melts at 165°F.



Side view of 2781.



View after removal.



Honeywell. Like for like replacement.

This is not a motor. It is the auxiliary switch package.



https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/Ruskin_FSxx_Mounting_&_Wiring_Instructions.pdf
https://www.belimo.us/bellib/Fire_and_Smoke_Actuators/ReplacementHoneywellML4115andSimilarMotors.pdf



FSNF use limited due to no UL testing. Remove old motor and spring, install Belimo.
 Knee-locks were sometimes very tight and may need adjustment.

Safe Air always used the dual spring approach on older dampers.

MultiProducts used extensively.	FSNF120	FSNF120 where linkages needed due to space constraints
MA220, MA230, 250	FSNF120	A variety of Multiproducts motors were used also.
MA418	FSNF120	Send digital photographs if mounting assistance needed.
MA318	FSNF24	for use in determining instructions required.
ML4105, ML4115, MS4202	FSNF120	



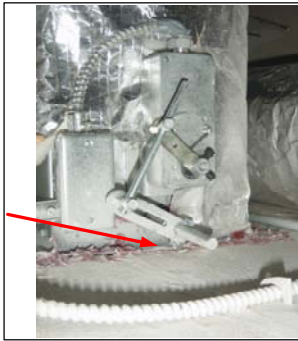
Honeywell. Straightforward direct couple replacement. Add 2x4 box and chase nipple to Belimo if J-box needed for wire connections.



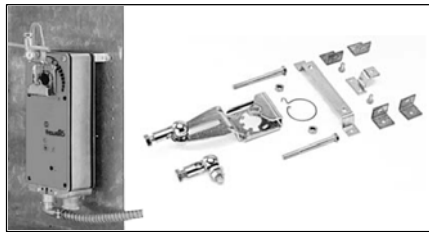
FSLF not UL555S listed as of this file date.
 The FSLF is quite sufficient for torque on 3 sq.ft. and smaller.
 However, Safe-Air has not tested it as of this publication.



Fusible link and spring mechanism on Safe-Air. This is not to be removed or changed when replacing external actuator and actuator spring with a Belimo. Testing by removing fusible link, ensuring spring closes damper, and replacing is necessary. **CAUTION!** Wear protective gloves and keep hands out of danger.



MultiProducts. Damper shaft is too close to the wall for direct coupling an FSLF. An FSNF with ZG-AF linkage kit can be mounted. A flat 14 ga metal plate may be necessary to get the anti-rotation strap mounted. A 4-5/16" or 4" cover plate may be sufficient. The FSLF has sufficient torque. However, there is not enough space for an FSLF120 actuator.



Crankarmed FSNF will fit well in several geometric arrangements.

United Enertech

<http://www.unitedenertech.com/news/>
 NCA Type dampers.

Vent Products

No longer making smoke or combination dampers. Call for information. Older models still exist.

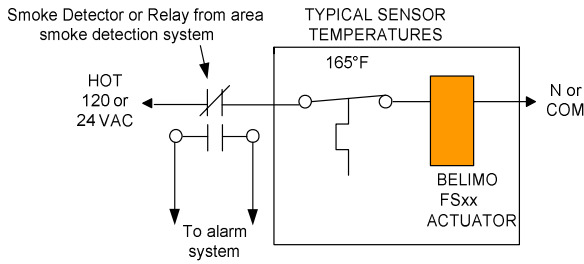


Wiring Diagram 1

Wiring for primary sensor applications.

TYPICAL FIRE - SMOKE COMBINATION DAMPER WIRING

Electric thermal disc

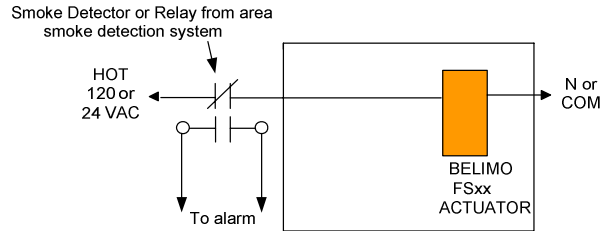


Wiring Diagram 2

Wiring when fusible link is retained and old spring used.

Actuator has only a smoke function in this variation.

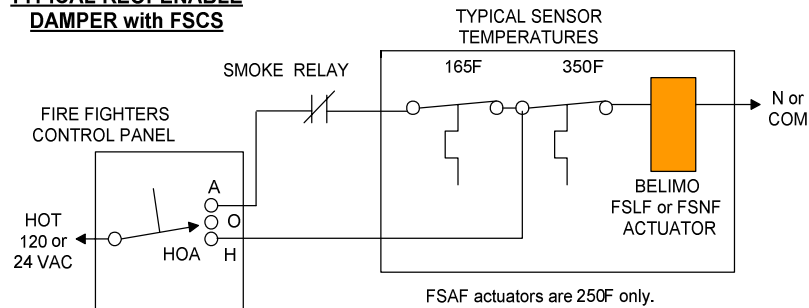
Example - Prefco with McCabe® Link



Wiring Diagram 3

TYPICAL REOPENABLE DAMPER with FSCS

Hard wiring shown here. Most modern systems are networked.



FSAF actuators are 250F only.



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.

For more information go to:

www.belimo.us/firesmoke

For Belimo assistance -
 Aaron Nobel at 203 749-3119 on East Coast
 Larry Felker at 775-857-4243 or 800 987-9042 x 5205 on West Coast