

Application

The FSD-141-SP combination fire smoke damper employs triple-V blades for point-of-origin control of fire and smoke in static and dynamic smoke management systems. These specialty dampers are approved for installation with the closed plane of the blades up to 14½" (368) outside the fire rated partition and come standard with the actuator externally mounted in a side panel allowing for direct service access from the face of the damper through the HVAC grille. The FSD-141-SP is qualified to 2,000 ft/min (10.2 m/s) and 4 in.wg. (1.0 kPa) and may be installed in vertical walls or partitions, or horizontally in floors or assemblies with fire resistance ratings up to 2 hours.

Standard Construction

Frame: 5" x 1" (127 x 25) galvanized steel hat channel with interlocking corner gusset. Equivalent to 13 gauge (2.4) channel frame. Low profile head and sill are used on sizes less than 13" (330) high.

Blades: 6" x 16 gauge (152 x 1.6) galvanized steel.

Sleeve: 20 gauge (1.0) galvanized steel with 1" (25) flange and factory installed thermal insulation on four sides.

Axles: ½" (13) diameter plated steel hex.

Linkage: Concealed in frame.

Bearings: Stainless steel oilite, sleeve-type.

Seals: Silicone blade edge seals and flexible metal jamb seals.

Actuator: 120 VAC, power open, spring-close, external mount.

Fire Closure Device: PFV (pneumatic actuators)

Fire Closure Temperature: 165°F (75°C).

Minimum Size: 14" x 8" (356 x 203)

Maximum Size: 44" x 48" (1118 x 1219)

Options

- Alternate actuator:
 - 24 VAC
 - 230 VAC
 - Pneumatic
- DRS-30 — Two temperature fire closure device. (Includes PI-50 switch package) ← **ON ACTUATOR**
- PI-50 — Dual position indicator switch package.
- Alternate factory installed sleeve:
 - Gauge: 18 (1.3) 16 (1.6) 14 (2.0) 10 (3.5)
 - 3¾" (95) clearance for grill. (sleeve length = 4¾" (121) + X).
 - Net O.D. (sleeve I.D. will be approximately ¾" (9) under nominal duct size opening).
- Transitions: Round Oval
 - Duct connections: 1" (25) S-clip 1½" (38) S-clip
- Alternate fire closure temperature:
 - 212°F (100°C) 250°F (121°C)
 - 286°F (141°C) 350°F (177°C).
- Duct smoke detector factory mounted and wired:
 - 2151 (0-3,000 fpm [0-15.2 m/s])
- Remote control stations:
 - RCP-1 (single) RCP-1K (single, key controlled)

Ratings

UL 555 Fire Resistance Rating: 1-1/2 hour (vertical and horizontal)

UL 555S Leakage Class: 1 [8 cfm/sq.ft. @ 4 in.wg.]
[(0.04 m³/s/m² @ 1.0 kPa)]

Maximum Dynamic Closure Velocity: 2,000 fpm (10.2 m/s)

Maximum UL555S Rated Pressure: 4 in.wg. (1.0 kPa)

Maximum Temperature: 350°F (177°C)

Listings

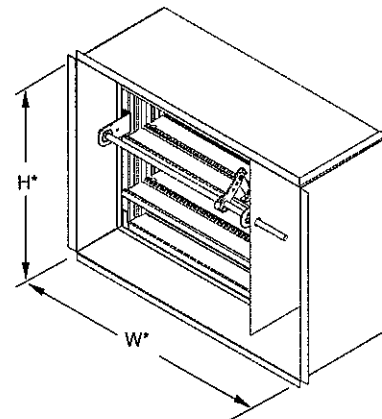
UL 555 and 555S listing: R11767

CSFM listing: 3225-0368:110 and 3230-0368:111

New York City MEA listing: 295-98-E

Meets NFPA Standards: 90A, 92A, 92B and 101

Meets Building Code Standards: IBC, NBC, NFPA, SBC and UBC



Model FSD-141-SP
(standard)

*Standard sleeve O.D. including thermal blanket wrap, is approximately 3/8" (9) over nominal duct size. Standard sleeve I.D. is approximately nominal duct size.

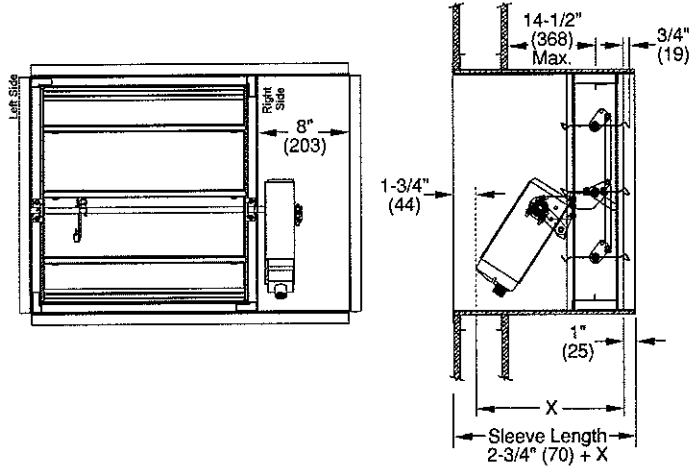
NOTE: The opening for the damper assembly in the fire wall must be sized appropriately. If not, serious damage to the thermal blanket wrap could occur and this will nullify the U.L. rating. Contact the factory if necessary for additional information.

Actuator and Sleeve Dimensional Data

The drawings and corresponding table show the position of the damper when mounted in a factory sleeve and the relative space required for a given actuator. The standard mounting locations provide enough space for installation of retaining angles and duct connections.

Actuator Model	X Dimension		Minimum Damper Size (w x h)
	(H < 10")	(H ≥ 10")	
FSLF120/24	13-1/4" (337)	11-1/4" (286)	14" x 8" (356 x 203)
FSNF120/24	15-1/4" (387)	11-1/4" (286)	14" x 8" (356 x 203)
ML4115/8115 ML4209/8209	N/A	9-1/4" (235)	14" x 8" (356 x 203)
331-4826	N/A	9-1/4" (235)	14" x 20" (356 x 508)

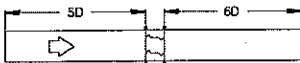
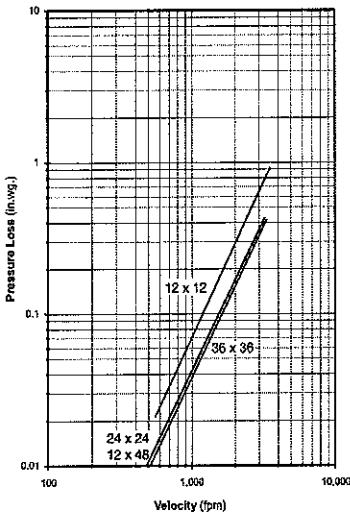
NOTE: 1. Damper may be rotated 180° to position actuator on left side.
2. For dimensions on actuators not shown above, contact factory.



Airflow Performance Data

Pressure Loss vs. Velocity

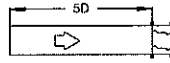
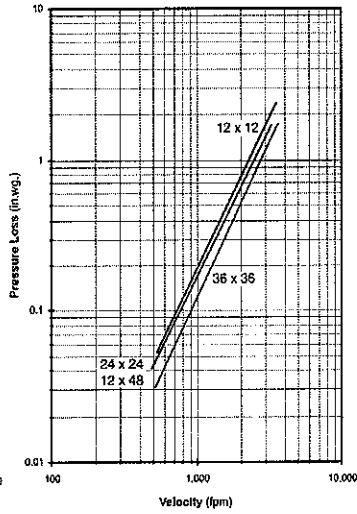
Figure 5.3 — Ducted Inlet and Outlet



Ducted Inlet and Outlet

AMCA Figure 5.3 illustrates a fully ducted damper. This configuration represents the lowest pressure drop of the three test configurations because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

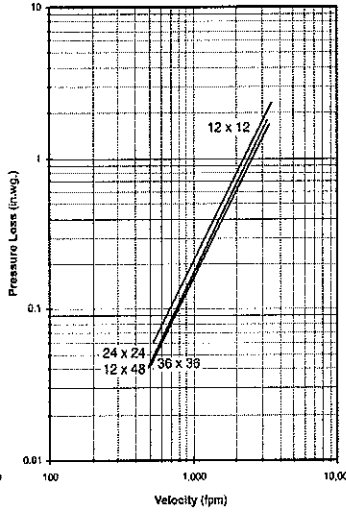
Figure 5.2 — Ducted Inlet



Ducted Inlet

AMCA Figure 5.2 illustrates a ducted damper exhausting air into an open area. This configuration has a lower pressure drop than Figure 5.5 because entrance losses are minimized by a straight duct run upstream of the damper.

Figure 5.5 Plenum Mount



Plenum Mount

AMCA Figure 5.5 illustrates a plenum mounted damper. This configuration has the highest pressure drop because of extremely high entrance and exit losses due to the sudden changes of area in the system.

Pressure drop testing was performed in accordance with AMCA Standard 500-D using the three configurations shown. All data has been corrected to represent air density of 0.075 lb/ft. Actual pressure drop in any ducted HVAC system is a combination of many elements. This information, along with analysis of other system influences, should be used to estimate actual pressure losses for a damper installed in a given HVAC system.

Information is subject to change without notice or obligation.

NOTE: Dimensions in parentheses () are millimeters.

Application

The FSD-141-OP combination fire smoke damper employs triple-V blades for point-of-origin control of fire and smoke in static and dynamic smoke management systems. These specialty dampers are approved for installation with the closed plane of the blades up to 14½" (368) outside the fire rated partition and come standard with the actuator in the airstream allowing for direct service access from the face of the damper through the HVAC grille. The FSD-141-OP is qualified to 2,000 fpm (10.2 m/s) and 4 in.wg. (1.0 kPa) and may be installed in vertical walls and partitions, or horizontally in floors or assemblies with fire resistance ratings up to 2 hours.

Standard Construction

Frame: 5" x 1" (127 x 25) galvanized steel hat channel with interlocking corner gusset. Equivalent to 13 gauge (2.4) channel frame. Low profile head and sill are used on sizes less than 13" (330) high.

Blades: 6" x 16 gauge (152 x 1.6) galvanized steel — triple-V.

Sleeve: 20 gauge (1.0) galvanized steel with 1" (25) flange and factory installed thermal insulation on four sides.

Axles: ½" (13) diameter plated steel hex.

Linkage: Concealed in frame.

Bearings: Stainless steel oilite, sleeve-type.

Seals: Silicone blade edge seals and flexible metal jamb seals.

Actuator: 120 VAC, power-open, spring-close, internal mount.

Fire Closure Device:
PFV (pneumatic actuators)

Fire Closure Temperature: 165°F (75°C).

Minimum Size: 10" x 8" (254 x 152)

Maximum Size: 36" x 48" (914 x 1219)

Options

- Alternate actuator:
 - External Mount
 - 24 VAC
 - 230 VAC
 - Pneumatic
- DRS-30 — Two temperature fire closure device.
(Includes PI-50 switch package) ← *ON Actuator*
- PI-50 — Dual position indicator switch package.
- Alternate factory installed sleeve:
 - Gauge: 18 (1.3) 16 (1.6) 14 (2.0) 10 (3.5)
 - Net O.D. (sleeve I.D. will be approximately ⅜" (9) under nominal duct size opening).
- Transitions: Round Oval
 - Duct connections: 1" (25) S-clip 1½" (38) S-clip
- Alternate fire closure temperature:
 - 212°F (100°C) 250°F (121°C)
 - 286°F (141°C) 350°F (177°C).
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 - 2151 (0-3,000 fpm [0-15.2 m/s])
- Remote control stations:
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Ratings

UL 555 Fire Resistance Rating: 1½ hour (vertical and horizontal)

UL 555S Leakage Class: 1 [8 cfm/sq.ft. @ 4 in.wg.]
[(0.04 m³/s/m² @ 1.0 kPa)]

Maximum Dynamic Closure Velocity: 2,000 fpm (10.2 m/s)

Maximum UL555S Rated Pressure: 4 in.wg. (1.0 kPa)

Maximum Temperature: 350°F (177°C)

Listings

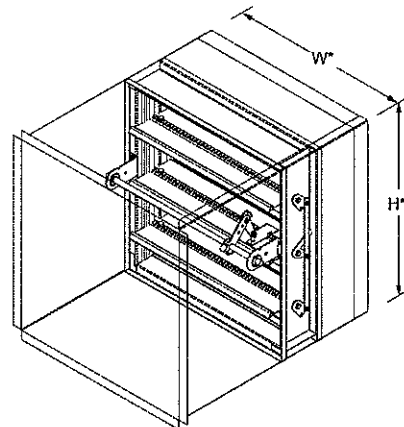
UL 555 and 555S listing: R11767

CSFM listing: 3225-0368:110 and 3230-0368:111

New York City MEA listing: 295-98-E

Meets NFPA Standards: 90A, 92A, 92B and 101

Meets Building Code Standards: IBC, NBC, NFPA, SBC and UBC



Model FSD-141-OP (standard)

*Standard sleeve O.D. including thermal blanket wrap, is approximately ⅜" (9) over nominal duct size. Standard sleeve I.D. is approximately nominal duct size.

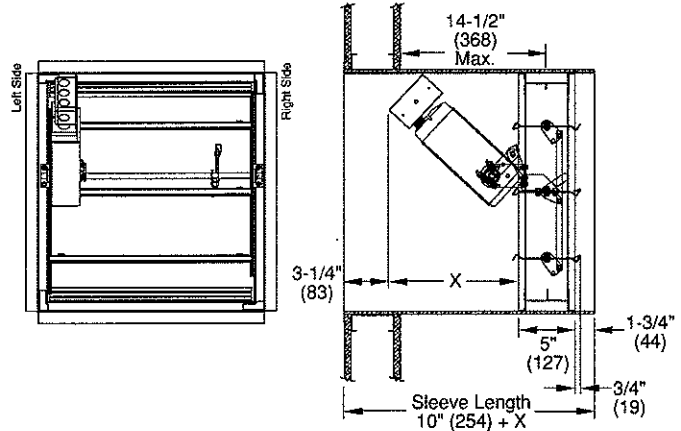
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Actuator and Sleeve Dimensional Data

The drawings and corresponding table show the position of the damper when mounted in a factory sleeve and the relative space required for a given actuator. The standard mounting locations provide enough space for installation of retaining angles and duct connections.

Actuator Model	X-Dimension		Minimum Damper Size (w x h)
	(H < 15")	(H ≥ 15")	
FSLF120/24	11" (279)	6" (152)	10" x 6" (254 x 152)
FSNF120/24	14" (356)	11" (279)	10" x 10" (254 x 254)
ML4115/8115	9" (229)	6" (152)	10" x 8" (254 x 203)
ML4209/8209	(H < 13")	(H ≥ 13")	(254 x 203)
331-4826	N/A	8" (203)	10" x 20" (254 x 508)

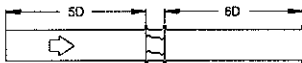
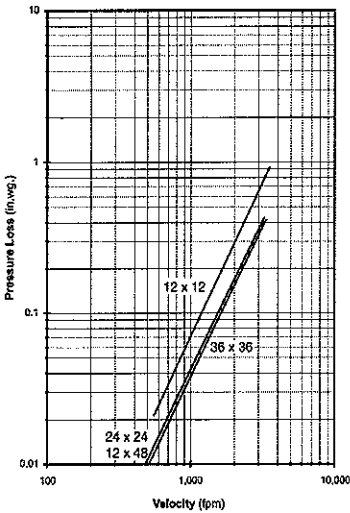
- NOTE:**
1. Damper may be rotated 180° to position actuator on right side.
 2. For dimensions on actuators not shown above, contact factory.
 3. If actuator is ordered with optional external mount, sleeve flange should be ordered loose, for field assembly.



Airflow Performance Data

Pressure Loss vs. Velocity

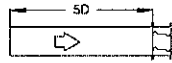
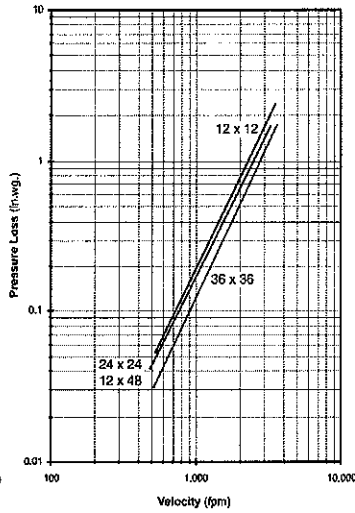
Figure 5.3 — Ducted Inlet and Outlet



Ducted Inlet and Outlet

AMCA Figure 5.3 illustrates a fully ducted damper. This configuration represents the lowest pressure drop of the three test configurations because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

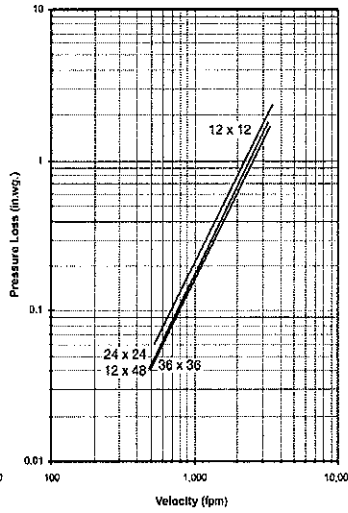
Figure 5.2 — Ducted Inlet



Ducted Inlet

AMCA Figure 5.2 illustrates a ducted damper exhausting air into an open area. This configuration has a lower pressure drop than Figure 5.5 because entrance losses are minimized by a straight duct run upstream of the damper.

Figure 5.5 Plenum Mount



Plenum Mount

AMCA Figure 5.5 illustrates a plenum mounted damper. This configuration has the highest pressure drop because of extremely high entrance and exit losses due to the sudden changes of area in the system.

Pressure drop testing was performed in accordance with AMCA Standard 500-D using the three configurations shown. All data has been corrected to represent air density of 0.075 lb/ft. Actual pressure drop in any ducted HVAC system is a combination of many elements. This information, along with analysis of other system influences, should be used to estimate actual pressure losses for a damper installed in a given HVAC system.

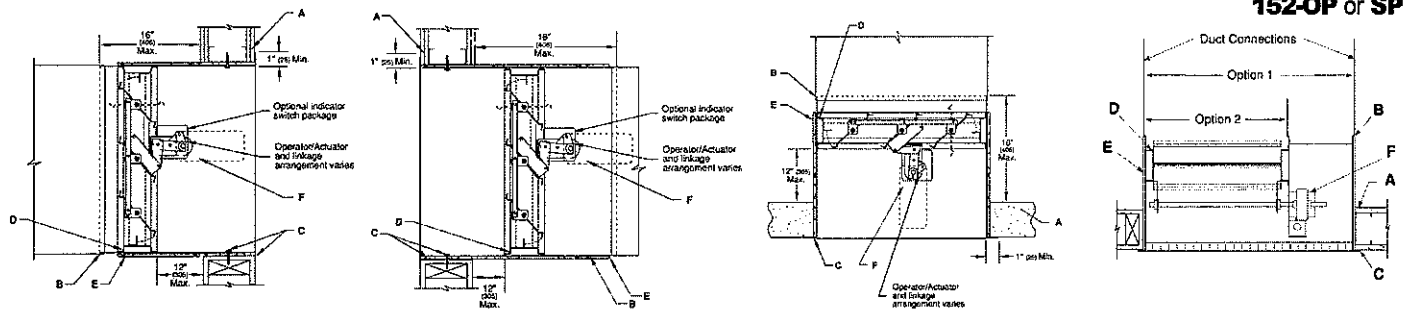
Information is subject to change without notice or obligation.

NOTE: Dimensions in parentheses () are millimeters.

POTTORFF®

out-of-partition and side panel 1 1/2 hour — combination fire smoke dampers installation instructions

The following installation details apply to models **FSD-141-OP or SP, FSD-142-OP or SP, FSD-143-OP, FSD-151-OP or SP and FSD-152-OP or SP**



Vertical Mount (Side View)

- Notes:**
- All dimensions shown in () are in millimeters.
 - Vertical illustration depicts damper installed vertical right side up. Damper may also be installed upside down.
 - Above detail applicable for concrete partitions also.

Illustrations show triple-V bladed (140/170 type), steel airfoil blade (150 type) similar.

Horizontal Mount (Side View)

- Horizontal illustration depicts damper installed from the top down with the actuator above the floor line. Damper may also be installed from the bottom up with the actuator below the floor line.

Vertical Mount SP (Top View)

- Illustration shows side panel with motor on right side. The unit can also be installed with the motor/side panel on the left side.
- Above detail applicable for concrete partitions also.

- A.** Typical 2 hour steel stud vertical and concrete horizontal fire partition shown. See steel Stud Framing for Fire Dampers in Drywall and/or Cavity Shaftwall Partitions Supplemental Installation Instructions for further details. The opening shall be a minimum of 1/4" (6) larger than the overall damper and sleeve assembly size. Damper must be installed with leading edge of the damper frame no more than 12" (305) outside the partition.
- B.** For rigid type duct connections, the sleeve shall be a minimum of 16 gauge (1.5) for dampers up to 36" wide by 24" high (914 x 610) and 14 gauge (1.9) for larger units. When lighter gauge sleeves are used, one or more of commonly used breakaway style connections are required. Refer to Sleeve Termination Supplemental Installation Instructions for further details. In no case will the sleeve gauge be less than the duct gauge to which it is connected. Damper sleeve shall not extend more than 16" (406) beyond the rated partition on the actuator side.
- C.** Mounting flange shall be a minimum of 1" x 20 gauge. The flange shall be attached to the sleeve with 3/16" (4.8) diameter steel rivets. Quick-Lock joint, welds, No.10 (M5) bolts or sheet metal screws at 8" (203) o.c. maximum. The damper sleeve shall be fastened directly to the partition with 3/16" (4.8) diameter steel rivets, or No.10 (M5) sheet metal screws at 8" (203) o.c. maximum. A minimum of two connections per side, top and bottom. A minimum 1-1/2" x 3/4" x 20 gauge (38 x 19 x 1) mounting angle may be used on the opposite side of the partition from the mounting flange in lieu of fastening the sleeve directly to the partition. When using mounting angles they shall be attached to the sleeve under the same guideline as the mounting flange.
- D.** When fastening the damper to the sleeve, the damper shall be fastened with 3/16" (4.8) diameter steel rivets, Quick-Lock Joints, welds, No. 10 (M5) bolts or sheet metal screws at 12" (305) o.c. maximum. A minimum of two connections per side, top and bottom.
- E.** A factory installed minimum of one layer of thermal blanket wrap shall encase the exterior of the damper sleeve and shall span the entire length of the sleeve from the outer most edge of the damper frame to the mounting flange. Care should be taken during handling & installation to prevent tearing or bending of the material. To aid in this the thermal blanket may be fastened to the sleeve with adhesive.
- F.** Fire/Leakage rated dampers and qualified operators are tested together by Underwriters Laboratories and are factory installed to qualify for standard damper/operator warranties. Damper operator/actuator must be tested prior to system start-up to ensure proper operation. Before applying power to the operator/actuator, the power must be verified.

Special Notes for Dampers Installed in Wood Stud Construction:

1. The opening must be made larger to permit the attachment of gypsum wallboard to the sides and top of the outside of the damper sleeve. The wallboard must be a minimum of 1/2" thick and must be UL rated for use in fire protective construction. The bottom of the damper requires no wallboard. Therefore, if 1/2" thick wallboard is used, the opening will have to be 1" wider and 1/2" higher than normal.
2. The wallboard must be attached to outside of the damper sleeve with a minimum of 2 drywall screws on each of the sides and on the top. The screws on the sides should be located approx. 1-1/2" from the back edge of the sleeve and approx. 1-1/2" down from the top and 1-1/2" up from the bottom of the sleeve. The screws on the top should be located approx. 1-1/2" from the back edge of the sleeve and approx. 1-1/2" in from each side of the sleeve. The screws should be a #6 or larger and must be 1/8" longer than the thickness of the drywall attached to the sleeve.
3. In lieu of the sleeve to partition attachment details above, the damper/sleeve must be attached to the opening with min. #10 screws (drywall, wood or equivalent), 3" long. The screws must be at a max. of 8" o.c. and must be located such that they penetrate the wood framing members around the opening.
4. A steel grille must be installed on the flange of the damper sleeve. The grille must be a min. of 24 ga. thick and have a min. 1" (25) tall flange that overlaps the damper flange.
For use in Dynamic or Static Systems 1-1/2 Hour Rated for Vertical or Horizontal Installation
Galvanized or Stainless Steel.

Notes:

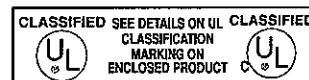
1. The annular space between damper sleeve and wall opening must not be filled with firestop materials such as fill, void, or cavity materials. However, if optional sealing between the retaining angle (or flange) leg and the surface of the partition, wall, or floor and/or between the retaining angle leg and the surface of the damper sleeve is required, any of the following sealants may be used:

Dow-Coming 700 or 732

GE RTV 108 or SCS 1201 RTV

These sealants must be applied such that they do not intrude into the annular space between the outside surface of the damper sleeve and the opening of the partition, wall or floor into which the damper/sleeve is being installed.

2. In order to run the necessary electrical wiring or pneumatic piping/tubing to facilitate supplying power to the actuator it will be necessary to cut a hole in the damper sleeve. Care should be taken such that the hole is as small as possible but will still permit the necessary electrical wiring or pneumatic piping/tubing to connect through and/or attach to the sleeve. As is always the case, all electrical and pneumatic connections should be done in accordance with the local code requirements.



Underwriter's Laboratories file #R11767. City of New York listing # MEA 295-98-E

The product is also listed by CSFM file # 3225-0368:110 and 3230-0368:111 and conforms to NFPA 90-A and NFPA 92-A.

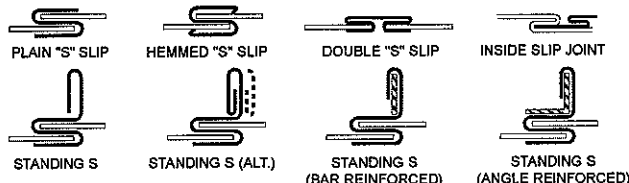
Information is subject to change without notice or obligation.

NOTE: Dimensions in parentheses () are millimeters.

Application - UL Approved Breakaway Connections

All of these connections may be used to terminate the damper sleeve in place of slip joints, for Pottorff multiple blade or single blade fire dampers, curtain type fire dampers, and combination fire-smoke dampers.

- 1) Duct-sleeve connections listed in UL 555, Fifth Edition, "Standard For Fire Dampers".



- 2) Additional duct-sleeve connections which were tested and witnessed by UL. The connections performed within the requirements of the UL test criteria.

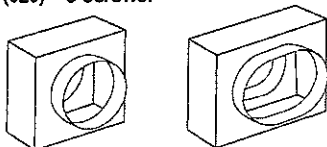
(a) Rectangular Duct - Breakaway Connections

Joints using connections shown in 1) above with a maximum of two No.10 (M5) sheet metal screws on each side and on the bottom located in the center of the slip pocket and penetrating both sides of the slip pocket. Note: UL tested duct sealant may be used.

(b) Round Duct - Breakaway Connections

Joints where round or oval spiral ducts attach to round or oval collars which are part of the damper sleeve as shown below. No.10 (M5) sheet metal screws are spaced equally around the circumference of the duct per the following:

- Duct diameters 22" (560) and smaller—3 screws.
- Duct diameters over 22" (560) to and including 36" (920)—5 screws.



DAMPER/SLEEVE ASSEMBLIES WITH COLLARS FOR ROUND AND FLAT OVAL DUCTS

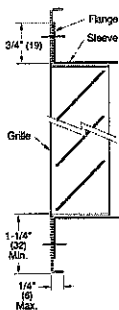
Notes:

- (1) For flat oval ducts, the diameter shall be considered the largest (major) dimension of the duct.
- (2) UL tested duct sealant may be used.

(c) Flat Drive Slips - Breakaway Connections



Joints using connectors of the types shown in 1) above on the top and the bottom and using flat drive slips not exceeding 20" (508) duct height on the sides (see sketch above). Note: If optional sealing of these joints is required, the following sealants may be applied in accordance with the instructions supplied by the manufacturer of the sealant: Design Polymeric - DP 1010 or Precision - PA2084T.



FLANGE TERMINATION AT A GRILLE

Grille (by others).

Grille is to be screwed to minimum 3/4" x 20 gauge (19 x 1) flange.

Grille flange must be minimum 1-1/4" (32) and overlap the opening a minimum of 1/2" (13).

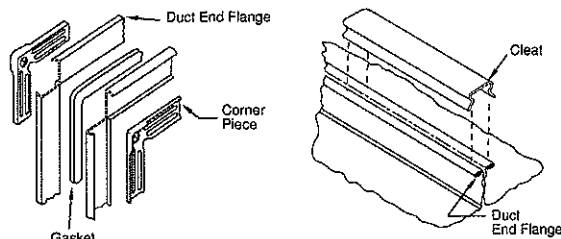
Select the damper with sleeve of sufficient length to permit attachment, with perimeter mouting angles, to duct work on one side of the wall, floor or ceiling opening. Detail shown is for vertical application.

General Installation for Flanged Duct Breakaway Connections

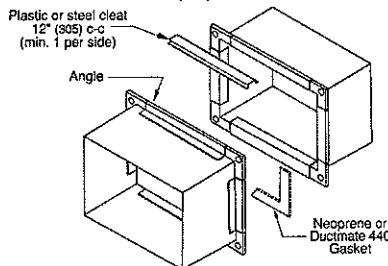
Flange corner pieces insert into the hollow web of the angles and slip over the duct and sleeve. Closed cell neoprene gasket or Ductmate 440 gasket tape is then applied to one face of the flange. To complete installation, butt the flange faces together, aligning edges, and install cleats over the flange. Cleats shall be 6" (153) long, plastic or steel. Install minimum one per side, spaced 12" (305) center to center.

Note: Cleats may be replaced by #10 x 3/4" (19) Tek Screws.
• See Table below.

FLANGED DUCT CONNECTIONS



- (d) TDC and TDF roll-formed 4-bolt flanged connections assembled per the manufacturer's instructions using gaskets and metal or plastic cleats. **Flanges may be joined with or without four 3/8" (10) steel bolts and nuts.**



- (e) Ductmate, Ward and Nexus slip on 4-bolt flanged connections assembled per the manufacturer's instructions using gaskets and metal or plastic cleats as shown above. As an option, a 3/8" (9) bolt may be used in the corners to help with the alignment. [Min. 20 ga (1.0) thick sleeve].

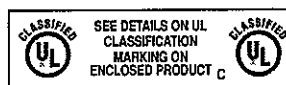
Note: Cleats may be replaced by #10 x 3/4" (19) Tek Screws.
• See Table below.

Tek Screw Table

Sleeve Width (w) or Height (h)	No. of Tek Screws
w or h < 24"	1 per side
24" ≤ w or h < 36"	2 per side
36" ≤ w or h < 54"	3 per side
54" ≤ w or h < 72"	4 per side
w or h ≥ 72"	5 per side

Note:

It is not necessary to have the same connections on the damper sleeve and on the duct being connected/attached to the damper sleeve. The TDC, TDF, Ductmate, Ward and Nexus can be installed and mixed on the sleeve/duct. i.e. the damper sleeve can have a Ductmate connection and can be attached to duct with a TDC, TDF, etc. type connection, or vice versa. Any of the previously mentioned connections can be mixed/matched on the damper sleeve and duct.



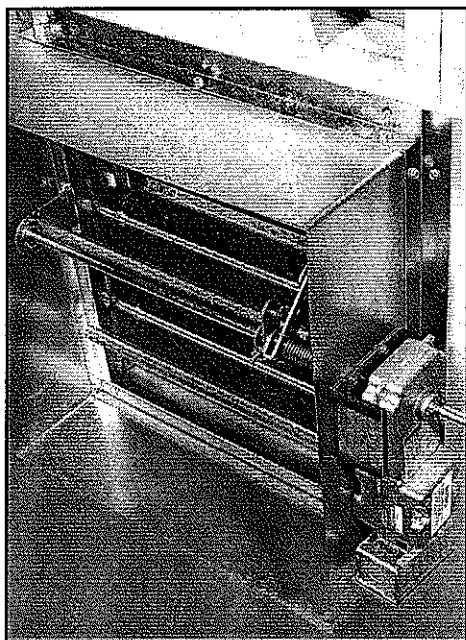


Figure 1: Single Mounting Angle
Over Drywall with Wood Stud
(Cutaway shown for illustration purposes only)



Application

All Pottorff 1-½ hour vertical mounted fire and fire-smoke dampers may use single-side mounting angles in lieu of conventional 2-sided mounting angles. Single-side mounting angles may be field fabricated or factory supplied and may be installed in metal stud, wood stud, concrete or masonry partitions.

Maximum Size

80" wide (2032), 96" high (2438), and not exceeding 26.67 square feet in area.

General Notes

- A.** Install dampers in accordance with the appropriate damper installation instructions sheet. Replace conventional 2-side mounting angles with single-side mounting angles as appropriate.
- B.** Single-side mounting angles shall be a minimum of ¾" x 1-½" tall x 20 gauge (19 x 38 x 1.0) steel. For metal stud partitions only, the single-side mounting angle may be directly attached to the metal stud prior to the installation of the drywall. See Figure 3.
- C.** Attach single-side mounting angles to the damper sleeve and the partition with No. 10 (m5) steel screws or bolts, ⅜" (4.8) diameter steel rivets, quick-lock joints or welds at 12" o.c. maximum. A minimum of two connections per side, top and bottom.

Note:

The annular space between damper sleeve and wall opening must not be filled with firestop materials such as fill, void, or cavity materials. However, if optional sealing between the retaining angle (or flange) leg and the surface of the partition, wall, or floor and/or between the retaining angle leg and the surface of the damper sleeve is required, any of the following sealants may be used:

Dow-Corning 700 or 732 GE RTV 108 or SCS 1201 RTV

These sealants must be applied such that they do not intrude into the annular space between the outside surface of the damper sleeve and the opening of the partition, wall or floor into which the damper/sleeve is being installed.

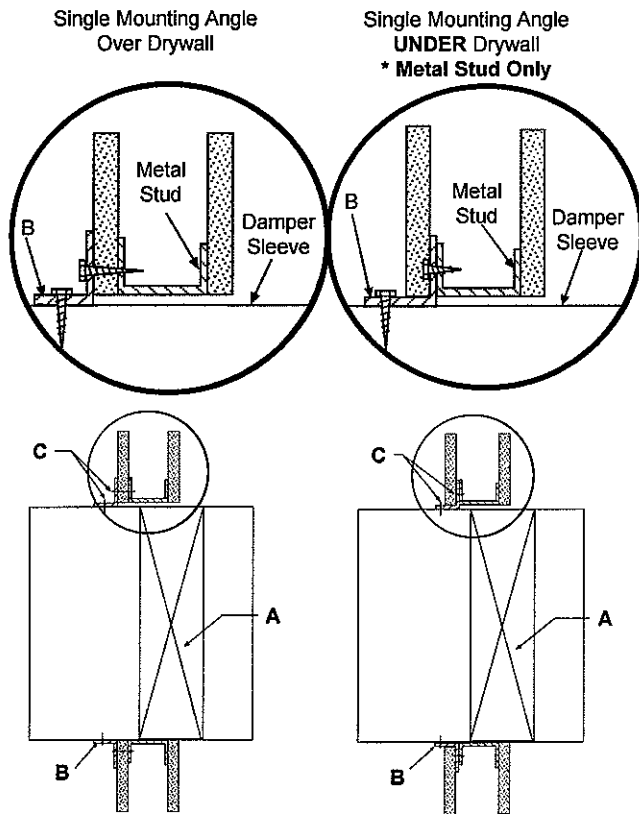


Figure 2: Metal Stud

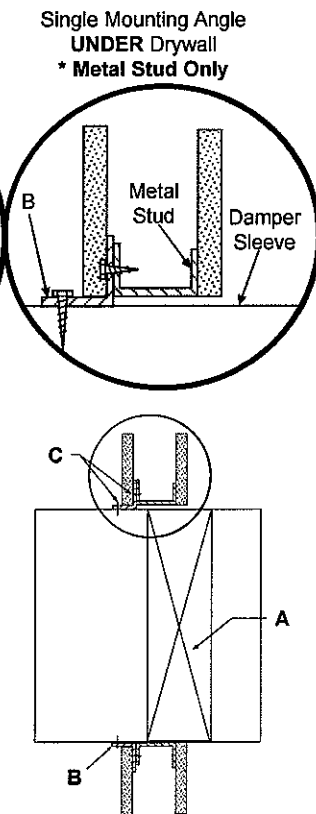


Figure 3: Under Drywall Installation
(Metal Stud Only)

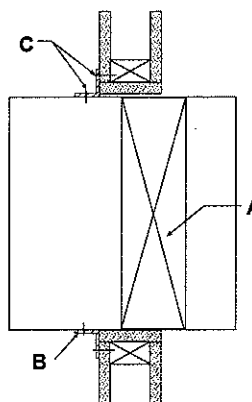


Figure 4: Wood Stud

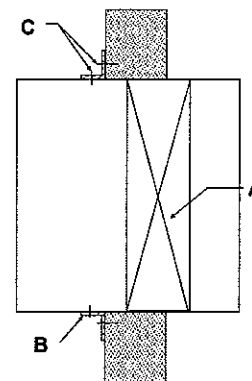


Figure 5: Concrete or Masonry

Underwriter's Laboratories file #R11767 and R15401
The product is also listed by CSFM fire #3225-0368:101,
#3225-0368:110 and conforms to NFPA 90A and NFPA 92A.
Information is subject to change without notice or obligation.

NOTE: Dimensions in parentheses () are millimeters.

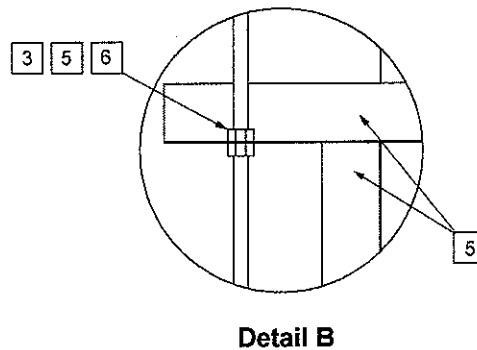
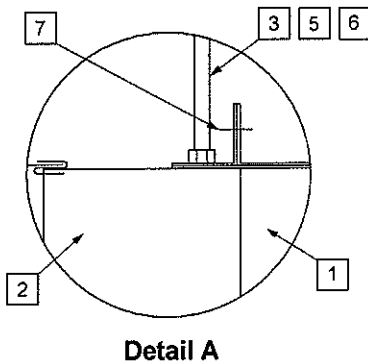
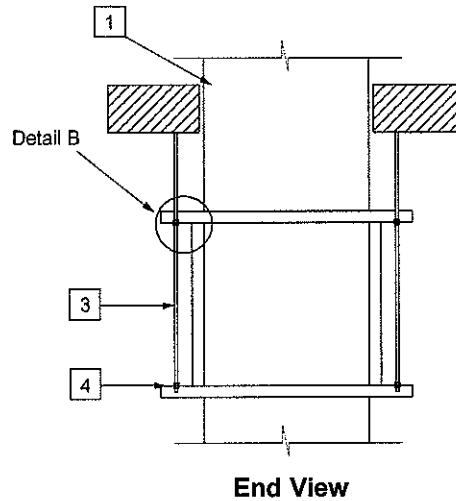
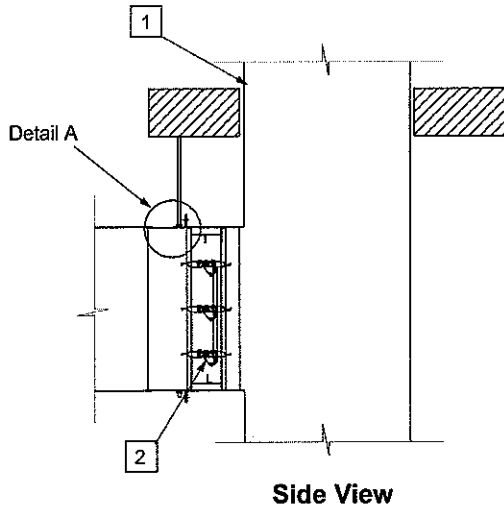
The following installation details apply to models **FD-140, FD-150, FD-340, FSD-141, FSD-142, FSD-143, FSD-151, FSD-152, FSD-341, FSD-342, FSD-343, VFD-10, VFD-30, VFD-10D and VFD-30D**

These installation instructions outline the required details to properly install vertical dampers in fire resistant ventilation ducts. These installation instructions apply to UL Ventilation Duct Assembly No. V-5.

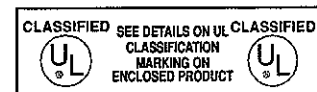
- A. The damper sleeve must slip inside the fire resistant duct spool. Damper sleeve assembly will be ¼" (6) min., ½" (13) max., smaller than duct spool size.
- B. Damper to be supplied with factory mounted sleeve. Sleeve gauge shall be minimum of 16 (1.6) gauge for dampers up to 36" w x 24" h (914 x 610) and 14 (2) gauge for dampers exceeding 36" w x 24" h (914 x 610).
- C. Mounting Angles: 1½" x 1½" x ¼" (38 x 38 x 6) up to and including 24" (610) long.
2" x 2" x ¼" (51 x 51 x 6) over 24" (610) up to and including 32" (813) long.
2½" x 2½" x ¼" (64 x 64 x 6) over 32" (813) up to and including 40" (1016) long.
3" x 3" x ¼" (76 x 76 x 6) up to and including 40" (1016) long.
- D. Mounting Angle Fasteners shall be: #10 (4) bolts or screws or ⅜" (4) steel rivets or ½" (13) long welds.
- E. Mounting Angle Fasteners Spacing: Mounting angles to damper sleeve, space fasteners 6" (152) on center.
Mounting angle to spool flange, space fasteners 12" (305) on center.

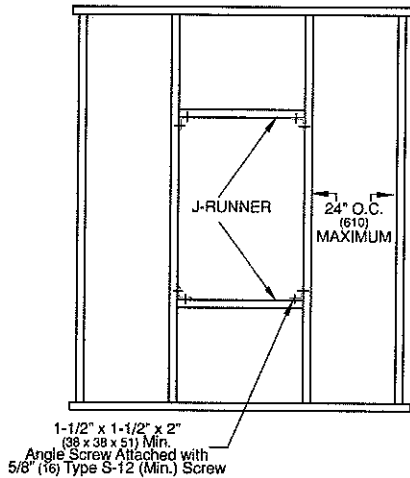
Note: Minimum of 2 fasteners per side.

- F. Hanger Rods: ⅜" (10) threaded rod anchored to the floor above and attached to the mounting angles through hole in the angles and secured with hex nut and washer (Items #5 and 6 below). Anchor to masonry per UL assembly No. V-5.
- F. Duct to Damper Sleeve Connection: Refer to fire damper or combination fire/smoke damper installation instructions as well as sleeve termination installation instructions.

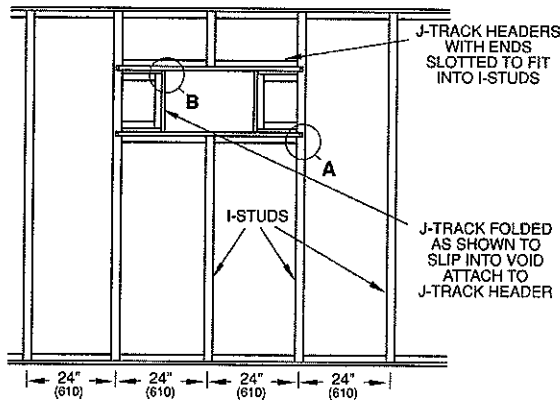


ITEM	DESCRIPTION
1.	Fire Resistant Ventilation Duct (UL Category Control No. HNLJ, Assembly No. V-5).
2.	Fire Damper or Combination Fire/Smoke Damper.
3.	Hanger Rods in Accordance with Assembly No. V-5.
4.	Mounting Angles (See Note #C).
5.	⅜" (10) Hex Nuts.
6.	⅜" (10) Flat Washer.
7.	Mounting Angle Fasteners (See Note #D).

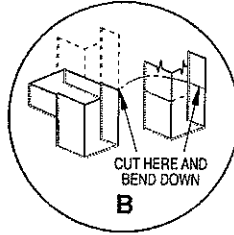
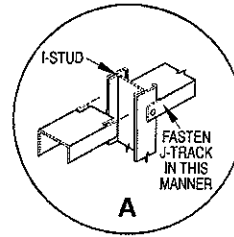




Opening Preparation Detail



Optional Opening Preparation Detail for I-Stud Assembly



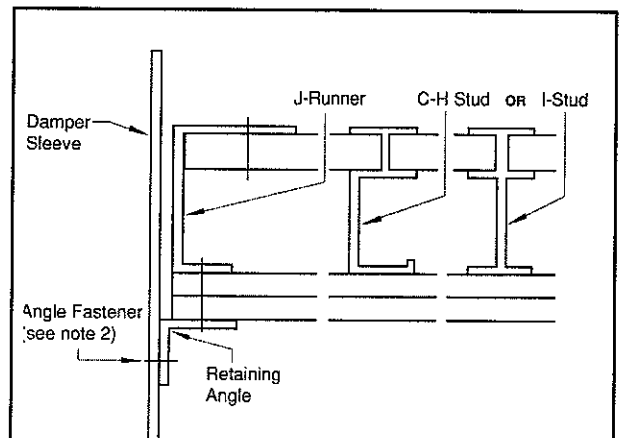
CLASSIFIED SEE DETAILS ON UL CLASSIFIED CLASSIFICATION MARKING ON ENCLOSED PRODUCT

TESTED PER U.L. 555

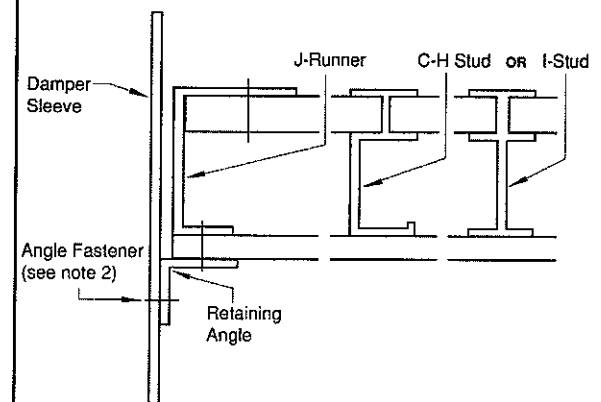


NOTES

- Gypsum panels must be screwed 12" (305) O.C. maximum to all stud and runner flanges surrounding opening.
- Mounting angles shall be a minimum of 3/4" x 1-1/2" tall x 20 gauge (19 x 38 x 1.0). For opening sizes ≤ 80" wide (2032), 96" high (2438), and not exceeding 26.67 square feet in area retaining angles are only required on one side of the partition and must be attached to the sleeve and the partition. For larger openings (or optional on smaller openings), 1-1/2" x 1-1/2" x 16 gauge (38 x 38 x 1.5), retaining angles are required on both sides of the partition and must be attached to the sleeve. Attachment to the sleeve shall be with No. 10 (M5) screws or bolts, 3/16" (4.8) diameter steel rivets, Quick-Lock joints or welds, at 12" (305) o.c. maximum. Attachment to partition/opening shall be with min. #10 fasteners with a minimum length as follows: For metal stud and the angles under the drywall, the fasteners must be a min. 1/2" long. For metal stud and the angles over the drywall the fastener must be a min. 1/2" longer than the thickness of the drywall. i.e. if the partition has one layer of 5/8" drywall on the attachment side, the screws must be 1/2" + 5/8" = 1-1/8" long. The fasteners in the partition should be located such that they are 1/2" below the top of the 1-1/2" flange of the retaining angles. Fasteners in the partition should be spaced 12" o.c. max. A minimum of two connections per side, top and bottom. A minimum 3/4" x 20 gauge (19 x 1) flange termination may be used in lieu of mounting angles. Refer to Sleeve Termination Supplemental Installation Instructions and Framing for Fire Dampers for further details. Ensure that attachment device does not interfere with the operation of the damper and the free movement of the damper blades.
- See standard damper installation instruction sheets for additional details.



Wall with Two Layers of Drywall



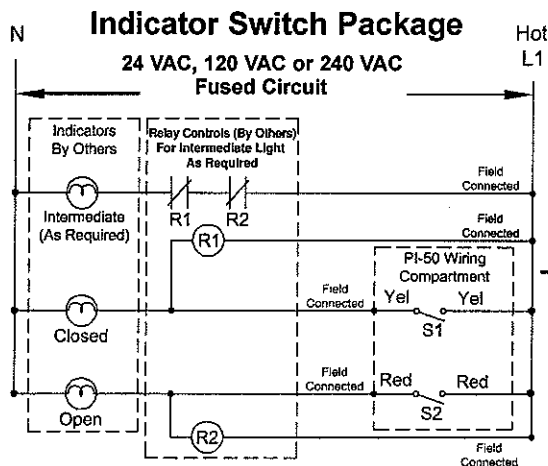
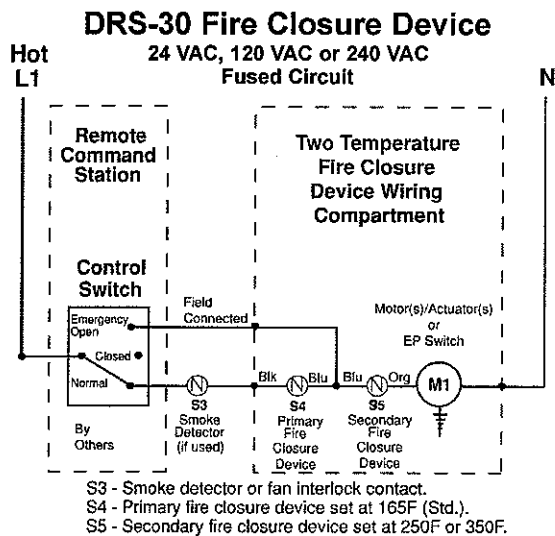
Wall with Single Layer of Drywall

Fire and Fire Smoke Dampers **IMSCS** July 2008

Application

The DRS-30 fire closure device employs a two-temperature, manually resettable, electric thermostat sensor to interrupt the electrical power to actuators used on fire/smoke dampers. The DRS-30 permits testing of the damper closure by applying direct heat to the one or both of the sensor's discs or by physically depressing one of the discs from the inside of the damper sleeve. The damper can be reopened by manually resetting the sensor from the exterior side of the damper sleeve, once the disc has cooled down below its set temperature. In addition to the fire closure device, the DRS-30 is factory equipped with an indicator switch package that employs an in-jamb assembly plate consisting of two single pole, double throw micro switches to provide full open and full closed blade indication from a remote location. The indicator switch package is factory installed directly to a damper blade.

Wiring Diagrams



Verify continuity before final wiring.

- S1 & S2** - Damper position indicator switches.
S1 - Closes when damper is closed.
S2 - Closes when damper is open.
R1 - Relay control for intermediate position indication.
R2 - Relay control for intermediate position indication.

Ratings

125/250 VAC, 12A
250 VAC, 1/3HP; 125 VAC, 1/6HP
250 VDC, 1/4A; 125 VDC, 1/2A
Max. ambient temp. 257°F (125°C)

Listings

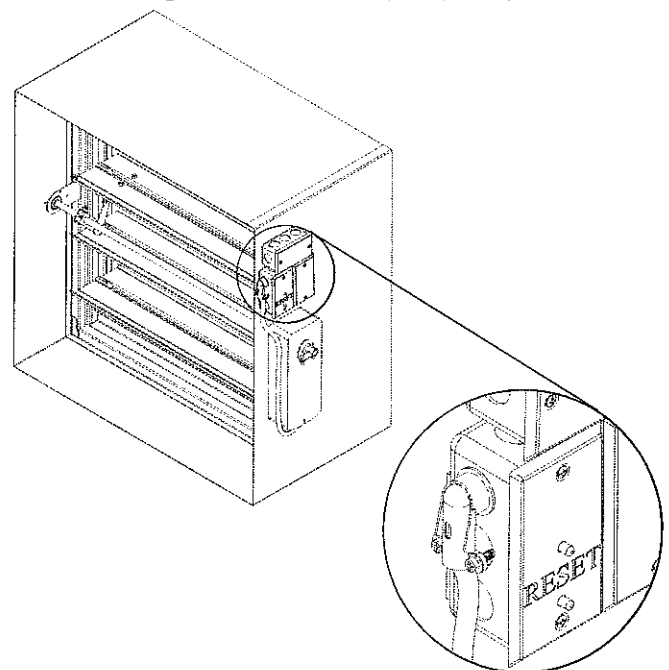
UL 555 listing: R11767

CSFM listing: 3225-0368:110, 3225-0368:111,
3225-0368:112, 3225-0368:113,
3225-0368:115, and 3225-0368:116.

New York City MEA listing: 295-98-E

Meets NFPA Standards: 90A, 92A, 92B and 101

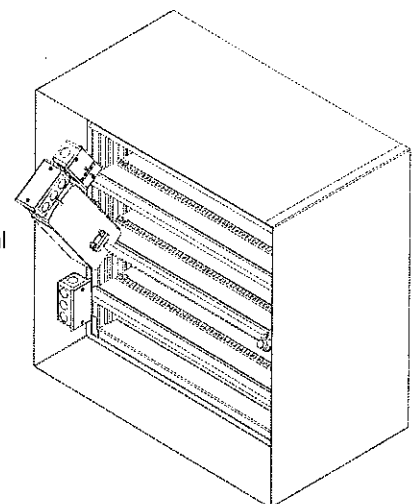
Meets Building Code Standards: IBC, NBC, NFPA, SBC and UBC



Model **DRS-30** external

On
Actuator

Model **DRS-30** internal



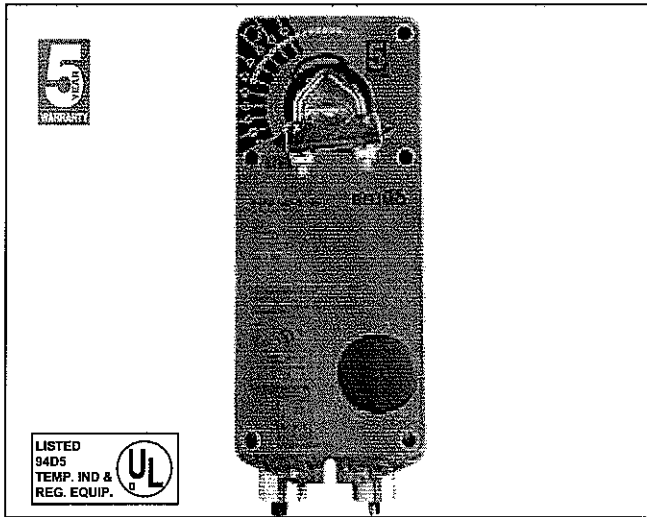
Information is subject to change without notice or obligation.

NOTE: Dimensions in parentheses () are millimeters.

FSNF120 (-S), FSNF24 (-S)



Fire and smoke actuator, 70 in-lb, spring return, 350°F for half hour, 15 sec. cycle time



Technical Data	FSNF120(-S)	FSNF24(-S)
Power supply	120 VAC ± 10% 50/60 Hz	24 VAC ± 20% 50/60 Hz
Power consumption 120 VAC	running: 18 W, .23A holding: 6 W, .09A	
Transformer sizing 24 VAC	27 VA Class 2 power supply	
Electrical connection	3 ft, 18 ga, 3 color coded leads (120V) 3 ft, 18 ga, 2 color coded leads (24V) 3 ft, 18 ga, appliance cable (Aux switches)	
Overload protection	Electronic throughout 0 to 95° rotation Auto-restart after temporary overload	
Electrical protection	Grounded enclosure 120 V Double insulated aux switches	
Angle of rotation	95°	
Torque	70 in-lb [7.9 Nm] minimum from 32°F to 350°F	
Direction of rotation	spring return can be selected by CCW/CW mounting	
Position indication	visual indicator, 0° to 95°	
Running time	between 32°F and 350°F motor: < 15 sec at rated voltage and torque spring: < 15 sec	
Auxiliary switches (FSNF24-S/120-S)	2 x SPDT 7A (2.5A inductive)@ 125/250VAC, UL listed, 5° and 85°	
Humidity	5 to 95% RH noncondensing	
Ambient temperature	32°F to +122°F [0°C to +50°C]	
Storage temperature	-40°F to +176°F [-40°C to +80°C]	
Housing	NEMA type 1, zinc coated steel	
Gears	Steel, permanently lubricated	
Agency listings	UL listed to UL873 and CAN/CSA C22.2 No. 24, New York BEC, CSFM	
Servicing	maintenance free	
Quality standard	ISO 9001	
Weight	6 lbs (2.75 kg.)	

Application:

The type FSNF spring-return actuator is intended for the operation of smoke and combination fire and smoke dampers in ventilation and air-conditioning systems. The actuator will meet requirements of UL555 and UL555S when tested as an assembly with the damper and will meet requirements of UBC for 15 second opening and closing at 350°F.

Square footage of damper operated will depend on make and model and the temperature required.

Operation

Mounting of the actuator to the damper axle shaft (smoke) or jackshaft (combination) is via a cold-weld clamp. Teeth in the clamp and V-bolt dig into the metal of both solid and hollow shafts maintaining a perfect connection. The specially designed clamp will not crush hollow shafts. The bottom end of the actuator is held by an anti-rotation strap or by a stud provided by the damper manufacturer.

The actuator is mounted in its fail safe position with the damper blade(s) closed. Upon applying power, the actuator drives the damper to the open position. The internal spring is tensioned at the same time. If the power supply is interrupted, the spring moves the damper back to its fail-safe position.

Accessories

All AF/NF linkages may be applied.

Replacement applications

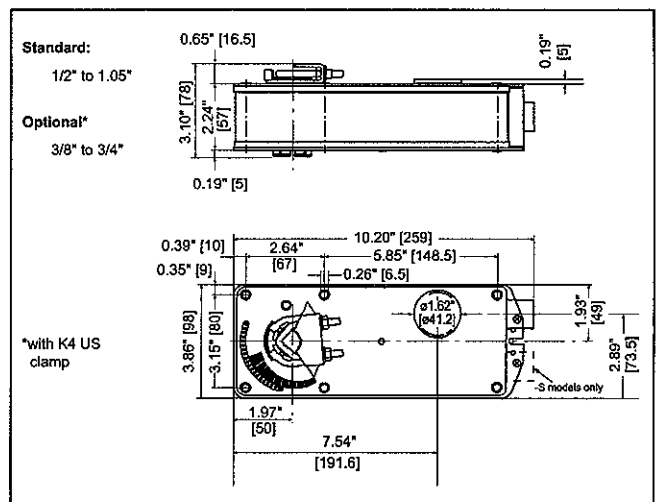
When actuators fail on existing dampers, the local authority having jurisdiction sets the code requirements for replacement actuators. The local inspector or fire marshal should be consulted. In some jurisdictions, a product meeting current codes may be required. The FSNF will meet or exceed requirements.

Caution must be used when replacing failed motors with new Belimo actuators. Many old motors did not have internal springs and depended on external springs on the side of the damper or wrapped around the damper shaft to close the damper.

In some cases, the damper must be replaced because the damper would have to undergo major modifications to replace an actuator.

In all cases, replacing the actuator voids the UL555 listing of the damper and actuator.

Dimensions [All numbers in brackets are in millimeters.]



Fire and smoke actuator, 70 in-lb, spring return, 350°F for half hour, 15 sec. cycle time

Accessories

AF series accessories may be employed:

- IND-AF2 Damper position indicator
- K4 US Universal clamp for 3/8" to 3/4" shafts
- K4-1 US Universal clamp for up to 1.05" dia. jackshafts
- K4-H Universal clamp for hexshafts 3/8" to 5/8"
- KH-AF Crankarm for up to 3/4" round shaft (Series 2)
- KH-AF-1 Crankarm for up to 1.05" jackshaft (Series 2)
- KH-AFV V-bolt kit for KH-AF and KH-AF-1
- Tool-06 8mm and 10 mm wrench
- ZDB-AF2 Angle of rotation limiter
- ZG-100 Universal mounting bracket
- ZG-101 Universal mounting bracket
- ZG-102 Multiple actuator mounting bracket
- ZG-103 Universal mounting bracket
- ZG-104 Universal mounting bracket
- ZG-106 Mounting bracket for Honeywell® Mod IV replacement or new crankarm type installations
- ZG-107 Mounting bracket for Honeywell® Mod III or Johnson® Series 100 replacement or new crankarm type installations
- ZG-108 Mounting bracket for Barber Colman® MA 3..4... Honeywell® Mod III or IV or Johnson® Series 100 replacement or new crankarm type installations
- ZG-AF Crankarm adaptor kit for AF/NF
- ZG-AF108 Crankarm adaptor kit for AF/NF
- ZS-100 Weather shield (metal)

- ZS-150 Weather shield (polycarbonate)
- ZS-300 NEMA 4X housing
- 22965-00001 12mm form fit square shaft adaptor

For an overview of how to apply the accessories, see Belimo Mechanical Accessories and refer to the Belimo Mounting Methods Guide.

Note: When using FSNF (-S) US actuators, only use accessories listed on this page.

FSNF Typical specification

All smoke and combination fire and smoke dampers shall be provided with Belimo FSNF US actuators. No substitutions allowed.

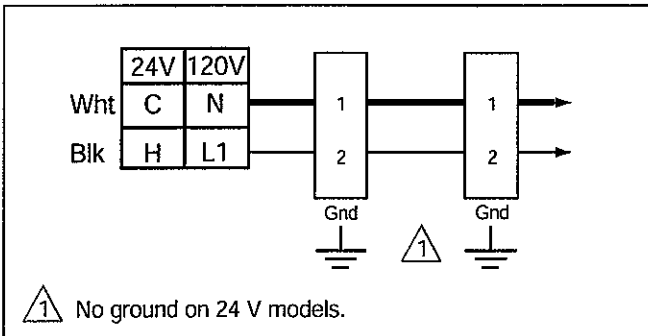
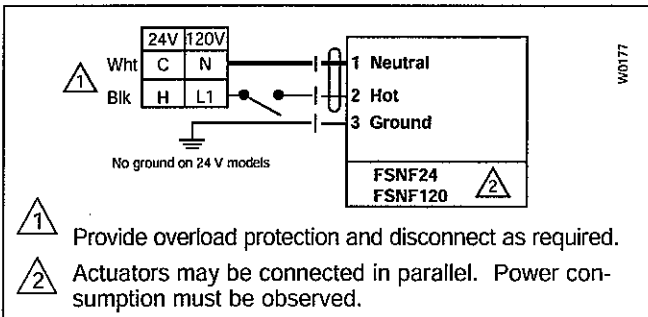
Damper and actuator shall have UL555S Listing for 350°F (250°F) and shall drive open in 15 seconds and spring closed in 15 seconds at elevated temperature.

Where auxiliary switches are required for signaling, starting fans, or position indication, -S model actuators, damper blade, or proximity switches shall be provided.

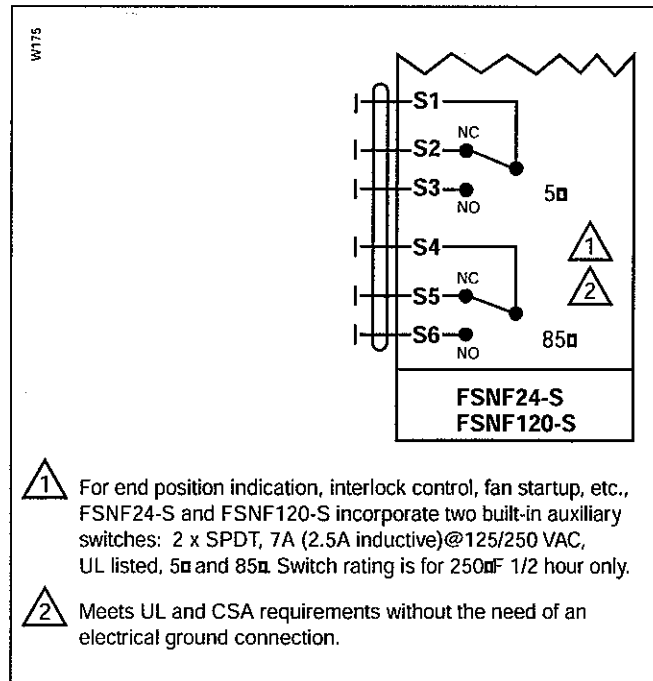
Indication switch



Wiring



Parallel actuator wiring

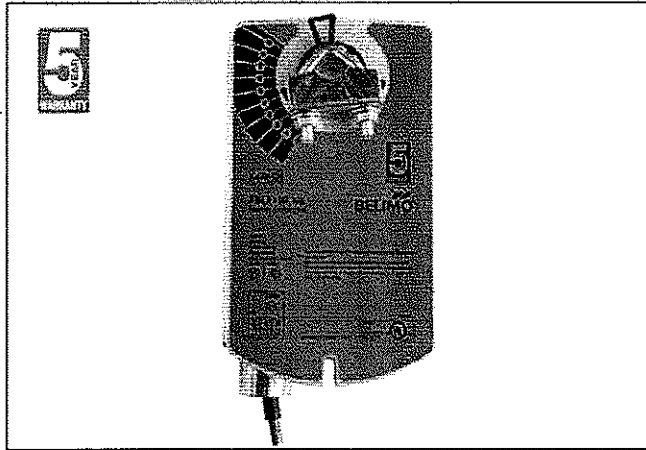


Auxiliary switch wiring for FSNF24-S, FSNF120-S

FSLF120 (-S) US, FSLF24 (-S) US



Fire and smoke actuator, 30 in-lb, [3.5 Nm], spring return, 350°F [177°C] for half hour, 15 sec. operation.



Technical Data	FSLF120(-S) US	FSLF24(-S) US
Nominal voltage	120 VAC 50/60 Hz	24 VAC 50/60 Hz
Nominal voltage range	108 - 132 VAC	21.6 - 26.4 VAC
Power consumption	Running: 24 VAC, 50/60 Hz: 5.0 VA 120 VAC, 60 Hz: 18 VA (120 VAC, 50 Hz: 20 VA) Holding: 24 VAC, 50/60 Hz: 3.5 VA 120 VAC, 60 Hz: 6.5 VA (120 VAC, 50 Hz: 12 VA)	
Transformer sizing	Safety note: Connect via safety isolating transformer, Class 2 supply.	
24 VAC		
Electrical connection	2 ft, 18 ga, 3 color coded leads (120 V) 2 ft, 18 ga, 2 color coded leads (24 V) 2 ft, 18 ga, appliance cable (Aux switches)	
Overload protection	Electronic throughout 0 to 95° rotation Auto-restart after temporary overload	
Electrical protection motor	FSLF120 US grounded enclosure	
Electrical protection	Double insulated <input type="checkbox"/>	
Auxiliary switches		
Angle of rotation	95°	
Torque	30 in-lb [3.5 Nm] minimum from 32°F to 350°F [0°C to 177°C]	
Direction of rotation	Spring return can be selected by CCW/CW mounting	
Position indication	Visual indicator, 0° to 95°	
Running time	Motor: < 15 sec at rated voltage and torque, 32°F to +122°F [0°C to +50°C] Spring: < 15 sec	
Auxiliary switches	2 x SPST 0.5 A inductive @ 120/250 V, 1 mA @ 5 VDC, 3 A resistive @ 120/250 V, UL listed, 10° and 85°	
FSLF120-S US/24-S US		
Humidity	5 to 95% RH noncondensing	
Ambient temperature		
- Normal operation	32°F to +122°F [0°C to +50°C]	
- Safety operation	3 On/Off cycles after 30 minutes at ambient temperature of 350°F [177°C]	
Storage temperature	-40°F to +176°F [-40°C to +80°C]	
Housing	NEMA type 1, zinc coated steel	
Type of action	Type 1.B	
Software class	A	
Gears	Permanently lubricated	
Agency listings	cULus listed acc. to UL 60730-1	
Servicing	Maintenance free	
Quality standard	ISO 9001	
Weight	3.7 lbs [1.7 kg]	

Application:

The type FSLF spring-return actuator is intended for the operation of smoke and combination fire and smoke dampers in ventilation and air-conditioning systems. The actuator will meet requirements of UL555 and UL555S when tested as an assembly with the damper and will meet requirements of UBC for 15 second opening and closing.

Square footage of damper operated will depend on make and model and the temperature required.

Operation

Mounting of the actuator to the damper axle shaft or jackshaft is via a cold-weld clamp. Teeth in the clamp and V-bolt dig into the metal of both solid and hollow shafts maintaining a perfect connection. The specially designed clamp will not crush hollow shafts. The bottom end of the actuator is held by an anti-rotation strap or by a stud provided by the damper manufacturer.

The actuator is mounted in its fail safe position with the damper blade(s) closed. Upon applying power, the actuator drives the damper to the open position. The internal spring is tensioned at the same time. If the power supply is interrupted, the spring moves the damper back to its fail-safe position.

Replacement applications

When actuators fail on existing dampers, the local authority having jurisdiction sets the code requirements for replacement actuators. The local inspector or fire marshal should be consulted. In some jurisdictions, a product meeting current codes may be required.

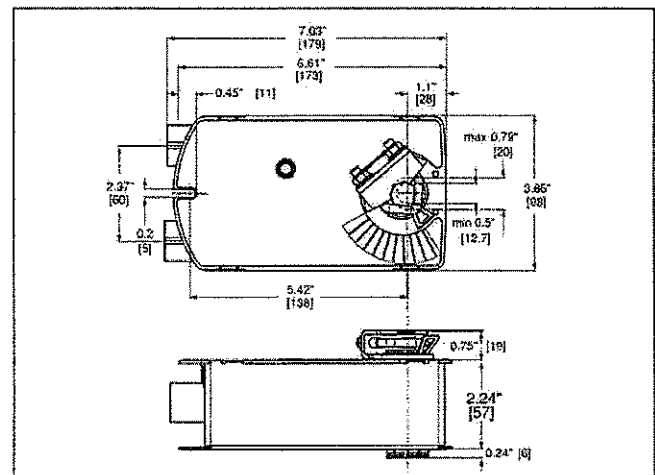
The FSLF will meet or exceed requirements.

Caution must be used when replacing failed motors with new Belimo actuators. Many old motors did not have internal springs and depended on external springs on the side of the damper or wrapped around the damper shaft to close the damper.

In some cases, the damper must be replaced because the damper would have to undergo major modifications to replace an actuator.

Most codes require that "equal or better" actuators be used to replace defectives.

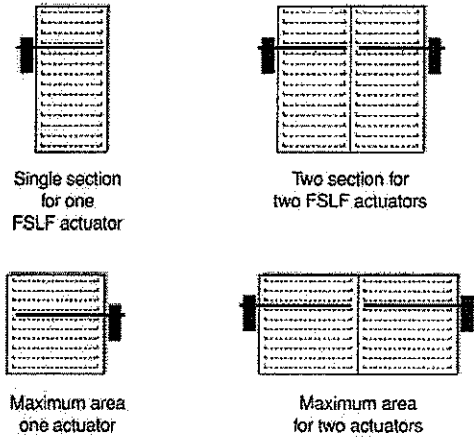
Dimensions [All numbers in brackets are in millimeters.]



Fire and smoke actuator, 30 in-lb, [3.5 Nm], spring return, 350°F [177°C] for half hour, 15 sec. operation.

Multi-section damper assemblies – typical applications

The typical fire and smoke damper requires from 5-15 in-lb of torque per square foot at 250°F - 350°F under dynamic load (2400 fpm velocity). The FSLF is a single section damper actuator. For the multi section dampers, use the FSNF series.



This is a direct coupled actuator. If linkages are needed use the FSNF series. Square shaft adaptors are available: 22153-00002, 22153-00003, 22153-00004 for the 8mm, 10mm, and 12mm. form fit respectively.

Safety note:
The actuator contains no components which the user can replace or repair.

FSLF120 or FSLF24(-S) Typical specification

All smoke and combination fire and smoke dampers shall be provided with Belimo FSLF US or FSNF US actuators. No substitutions allowed.

Damper and actuator shall have UL555S Listing for 250°F (350°F) and shall drive open in 15 seconds and spring closed in 15 seconds as required by UBC.

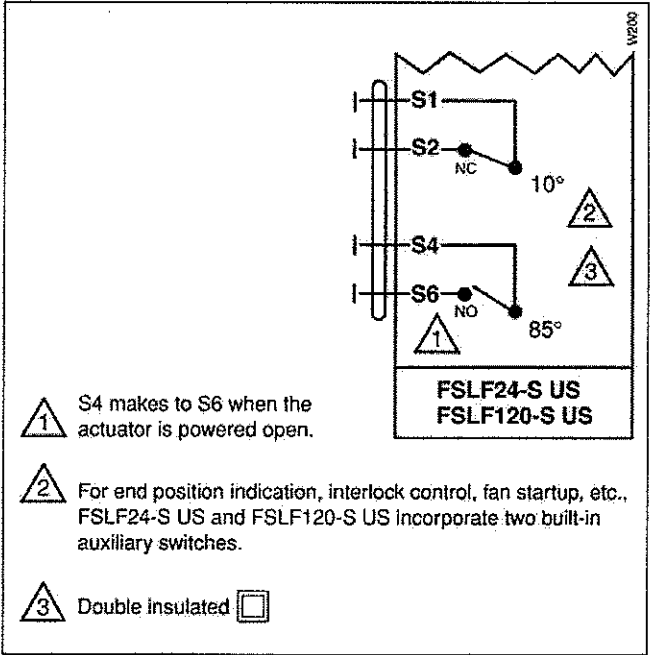
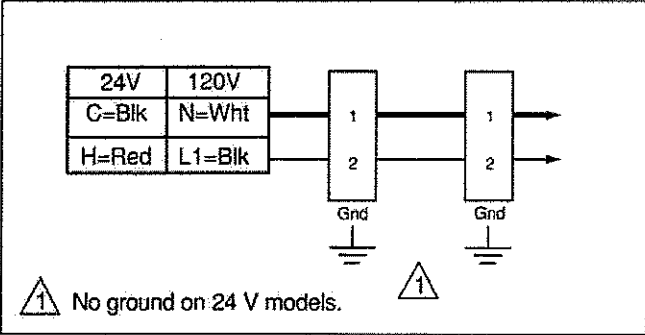
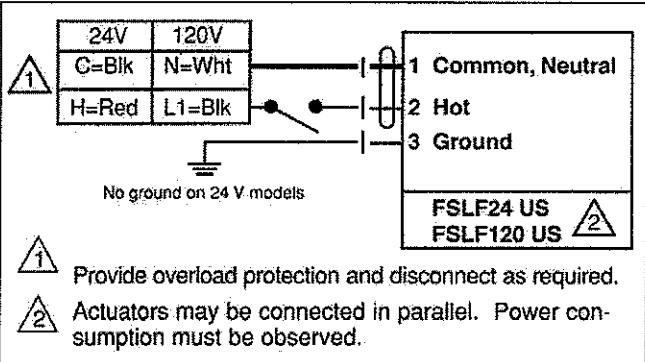
Where auxiliary switches are required for signaling, starting fans, or position indication, -S model actuators, damper blade, or proximity switches shall be provided.

Safety note:
Screw a conduit fitting into the actuator's metal bushing. Jacket the actuators input and output wiring with suitable flexible conduit. Properly terminate the conduit in a suitable junction box.

Indication switch



Wiring



Auxiliary switch wiring for FSLF24-S US, FSLF120-S US

Parallel actuator wiring