

# INSTALLATION INSTRUCTION

## Standard Installation

**Combination Fire/Smoke Damper Models:** AS1, FS1, CG1, MS1, AS2, FS2, CG2, MS2, AT1, FT1, CH1, MT1, AT2, FT2, CH2, MT2,

UA1, FA1, CA1, MA1, UA2, FA2, CA2, MA2, VA1, TA1, CT1, LA1, VA2, TA2, CT2, LA2, AS2C2, FS2C2, TG2C2, MS2C2, UA2M, FA2M, CA2M, MA2M, VA2M, TA2M, CT2M, LA2M

**Fire Damper Models:** MD17, MD19, 15MD, 17MD, MS17, MS19, 15MS, 17MS, MD37, MD39, 30MD, 38MD, MA17, MA19, 15MA, 17MA, MA37, MA39, 30MA, 38MA

### APPLICATION

These dynamically rated fire/smoke and static or dynamic rated fire dampers are intended to restrict the passage of flame. The dynamically rated fire/smoke dampers are also intended to restrict the passage of smoke. When the damper is intended to be used as a fire rated damper, the standard installation requires that the damper is positioned so that the closed plane of the blades is within the fire rated masonry/concrete or metal or wood framed gypsum wallboard barrier. When the damper is to be used as a leakage rated damper only, the damper is to be installed within 24" of the smoke barrier and upstream of any duct outlets. When configured as modulating (\*), the damper may be utilized as a volume control damper. This damper may be mounted in the vertical or horizontal position with the damper blades running horizontally. Airflow can be from either direction. When mounted in the vertical position, the damper may be mounted right side up or upside down and can be mounted in a fire barrier constructed of masonry/concrete or metal or wood framed gypsum wallboard materials. When mounted in the horizontal position, the damper must be mounted with the actuator on the top side of the floor and can only be mounted in a fire barrier constructed of masonry/concrete materials. Models AS2C2, FS2C2, TG2C2, and MS2C2 are approved and labeled for use in the following applications. For sizes not exceeding 24"W x 24"H, Models AS2C2, FS2C2, TG2C2, and MS2C2 are approved and labeled for use as vertically mounted or horizontally mounted, 1½ hour rated Fire/Smoke Dampers. When used as Fire/Smoke Dampers, the installation instructions stated in this pamphlet apply. Models AS2C2, FS2C2, TG2C2, and MS2C2 are also approved and labeled for use as horizontally mounted, 1 hour rated Corridor Dampers. When used as a Corridor Damper, the installation instructions stated by II-FS2C shall apply.

### MULTIPLE PANEL SIZE LIMITATIONS

Actuation	Electric					
	Horizontal Mount			Vertical Mount		
Orientation	Max Panel	Max Assy 250°	Max Assy 350°	Max Panel	Max Assy 250°	Max Assy 350°
AS1, FS1, CG1, MS1, AS2, FS2, CG2, MS2	36"Wx48"H	72"Wx48"H	72"Wx48"H	36"Wx48"H 48"Wx36"H	144"Wx70"H	128"Wx62"H
AT1, FT1, CH1, MT1, AT2, FT2, CH2, MT2	30"Wx48"H 36"Wx30"H	60"Wx48"H	60"Wx48"H	36"Wx48"H 42"Wx36"H	126"Wx48"H	126"Wx48"H
UA1, FA1, CA1, MA1, UA2, FA2, CA2, MA2	32"Wx48"H	96"Wx96"H	96"Wx96"H	32"Wx48"H	128"Wx96"H	128"Wx96"H
VA1, TA1, CT1, LA1, VA2, TA2, CT2, LA2	30"Wx48"H	60"Wx48"H	60"Wx48"H	30"Wx48"H	60"Wx48"H	60"Wx48"H
AS2C2, FS2C2, TG2C2, MS2C2	24"Wx24"H	24"Wx24"H	-	24"Wx24"H	24"Wx24"H	-
*UA2M, *FA2M, *CA2M, *MA2M	24"Wx24"H	96"Wx48"H	-	24"Wx24"H	96"Wx48"H	-
*VA2M, *TA2M, *CT2M, *LA2M	24"Wx24"H	60"Wx48"H	-	24"Wx24"H	60"Wx48"H	-
Actuation	Pneumatic					
Orientation	Horizontal Mount			Vertical Mount		
Assembly	Max Panel	Max Assy 250°	Max Assy 350°	Max Panel	Max Assy 250°	Max Assy 350°
AS1, FS1, CG1, MS1, AS2, FS2, CG2, MS2	36"Wx48"H	72"Wx48"H	72"Wx48"H	36"Wx48"H	108"Wx48"H	108"Wx48"H
AT1, FT1, CH1, MT1, AT2, FT2, CH2, MT2	30"Wx48"H 36"Wx30"H	60"Wx48"H	60"Wx48"H	36"Wx48"H 42"Wx36"H	126"Wx48"H	126"Wx48"H
UA1, FA1, CA1, MA1, UA2, FA2, CA2, MA2	32"Wx48"H	96"Wx96"H	96"Wx96"H	32"Wx48"H	128"Wx96"H	128"Wx96"H
VA1, TA1, CT1, LA1, VA2, TA2, CT2, LA2	30"Wx48"H	60"Wx48"H	60"Wx48"H	30"Wx48"H	60"Wx48"H	60"Wx48"H
Actuation	Non-Motorized					
Orientation	Horizontal Mount			Vertical Mount		
Assembly	Max Panel	Max Assy 250°	Max Assy 350°	Max Panel	Max Assy 250°	Max Assy 350°
MD17, MD19, 15MD, 17MD	36"Wx48"H	72"Wx48"H	72"Wx48"H	36"Wx48"H	72"Wx60"H 126"Wx48"H	72"Wx60"H 126"Wx48"H
MS17, MS19, 15MS, 17MS	-	-	-	36"Wx48"H	156"Wx96"H	156"Wx96"H
MD37, MD39, 30MD, 38MD	30"Wx48"H 36"Wx30"H	60"Wx48"H	60"Wx48"H	36"Wx48"H	126"Wx48"H	126"Wx48"H
MA17, MA19, 15MA, 17MA	32"Wx48"H	64"Wx36"H 32"Wx72"H	64"Wx36"H 32"Wx72"H	32"Wx48"H	64"Wx36"H 32"Wx72"H	64"Wx36"H 32"Wx72"H
MA37, MA39, 30MA, 38MA	32"Wx48"H	60"Wx36"H	60"Wx36"H	32"Wx48"H	60"Wx36"H	60"Wx36"H

\* Modulating

### SUPPLEMENTAL INSTALLATION INSTRUCTIONS / SUBMITTAL DATA

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>One-Side Retaining Angles (SI-CDLG-FSOS)</li> <li>Out-of-Wall/Floor (SI-CDLG-OOWFD)</li> <li>Sleeve Extension (SI-CDLG-SLVEXT)</li> <li>Transfer Openings (SI-GFTD)</li> <li>Integral Dual Position Indication (SD-IDPI)</li> <li>Electric or Pneumatic Sensortherm (SD-ESOT or SD-PSOT)</li> </ul> | <ul style="list-style-type: none"> <li>Electric or Pneumatic Heat Response Device (SD-EHRD or SD-PHRD)</li> <li>Flow-Rated Smoke Detector (SM-501)</li> <li>No-Flow Smoke Detector (2151)</li> <li>Transitions (SD-TRFS)</li> <li>Sleeves (SD-SLVFS)</li> </ul> |
|--|---|



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## INSTALLATION INSTRUCTIONS

**1. General:** The installation of the damper and all duct connections to the damper sleeve shall conform to NFPA-90A and the SMACNA Fire, Smoke and Radiation Damper Installation Guide. All duct connections shall also conform to UL555 when the damper is intended to be used as a fire damper.

**2. Actuators:** Dampers must be supplied with factory mounted actuators (except Model MD17, MD19, 15MD, 17MD, MS17, MS19, 15MS, 17MS, MD37, MD39, 30MD, 38MD, MA17, MA19, 15MA, 17MA, MA37, MA39, 30MA, and 38MA) and are intended to close automatically when sensing heat or upon loss of electrical power or release of air pressure. When this damper is used as a leakage rated damper only, it shall be arranged to operate automatically and is to be controlled by a smoke detector. Refer to additional instructions, which detail damper actuator sequence of operations. Multiple actuators in a mechanically linked section that are factory wired/plumbed together have only one heat response device and one supply connection point. The supply connection point must be at the "master" actuator package, which contains the heat response device. The heat response device must be wired/plumbed between the supply connection point and the master actuator and all slave actuators. Refer to SI-ACTLOC for further details.

**3. Multiple Panel / Multiple Section Assembly:** Large damper assembly sizes may require multiple factory assembled modules that ship separately. Refer to page 5 for details.

**4. Sleeves:** *Sleeves are required for the proper installation of fire rated dampers, but need not be factory mounted.* Dampers with factory mounted external actuators can be supplied without sleeves, but require sideplates. Dampers with factory mounted internal actuators can be supplied without sleeves or sideplates. Sleeves shall be the same gauge or heavier as the duct to which it is attached. Gauges shall conform to SMACNA or ASHRAE duct standards. A field supplied sleeve is attached to the damper frame with  $\frac{3}{16}$ " diameter steel rivets,  $\frac{1}{4}$ " diameter steel bolts, #10 steel sheet metal screws, or  $\frac{1}{2}$ " long welds. Fasteners shall be staggered on each side of the damper frame on 6" maximum centers and  $3\frac{1}{2}$ " maximum from each corner. For Class I Fire/Smoke dampers, approved caulking (reference note 7) shall be applied along the perimeter between the sleeve and the damper on both sides. For Class II Fire/Smoke dampers, approved caulking (reference note 7) shall be applied along the perimeter between the sleeve and the damper on only one side.

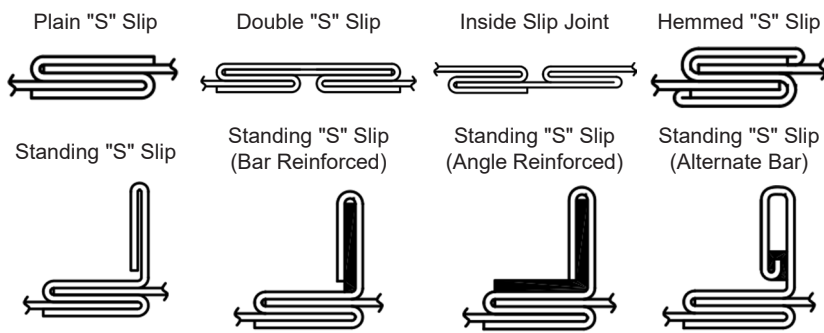
**5a. Expansion Clearance:** The opening in the wall for the fire rated damper shall be sized to provide expansion clearance between the sleeve and the opening. The minimum expansion clearance shall be the greater of  $\frac{1}{4}$ " or  $\frac{1}{8}$ " per foot of overall damper/sleeve width and height. The maximum expansion clearance shall not exceed  $\frac{1}{8}$ " per foot of overall damper/sleeve width and height plus 2". The damper can be located anywhere in the opening and need not be centered. However, in cases of large damper assemblies, the damper must be centered in the opening such that the required expansion clearance gap does not exceed 3" on either side of the damper and the resulting larger retaining angle (see note 6) does not exceed 4". The top retaining angle is permitted to be larger than 4" given it is impractical to provide a clearance gap at the bottom of a large assembly.

**Example:** For a damper with exact outside dimensions of 36"W x 48"H, the gap at the top plus the gap at the bottom must be between 0.5" and 2.5". The gap at the left side plus the gap at the right side must be between 0.375" and 2.375".

**5b. Undercutting:** Width and Height dimensions apply to the frame size and do not include the outside sleeve thickness. If ordering with a heavy gauge sleeve, care must be taken to order the damper with additional undercuts to ensure the minimum required annular space is maintained.

**Example:** For a damper ordered as 36 x 48 with no undercut and 10ga sleeves will have an approximate OD of 36 $\frac{1}{4}$ " x 48 $\frac{1}{4}$ ".

**6. Retaining Angle Attachment:** Perimeter retaining angles shall increase in size, proportionately, so there will be a minimum of 1" overlap on the wall, including at the corners. The angles shall be flush against the barrier. The leg attached to the damper can turn away from or into the opening. In metal frame construction, the angles can be mounted under or over the gypsum board. In wood frame construction, the angles must be mounted over the gypsum board. The perimeter mounting angles shall be fastened on all four sides and on both faces of the damper to the sleeve only, with  $\frac{3}{16}$ " diameter steel or stainless steel nuts and bolts or by tack welding with beads  $\frac{1}{2}$ "  $\pm$   $\frac{1}{4}$ " in length or with #10 steel or stainless steel sheet metal screws or  $\frac{3}{16}$ " steel or stainless steel pop rivets. All connections shall be spaced on 6" maximum centers and 3" maximum from each corner (a minimum of 2 fasteners are required per side). For perimeter angle mounting on one side of the fire barrier only, reference Installation Instruction II-FSOS. Perimeter retaining angles shall be a minimum of  $1\frac{1}{2}$ " x  $\frac{7}{8}$ " x 16 GA. steel. Corners of angles are not welded together for dampers with width or height dimensions exceeding 24". For dampers 24"W x 24"H or smaller, the corners of the perimeter mounting angles can be welded. Some local codes may not allow welded corners. Attachment of these angles must not restrict operation of the damper. Perimeter retaining angles and their mounting fasteners are not typically supplied with the damper.



The factory supplied round/oval transition provides the breakaway connection if the following conditions are satisfied.

1. Round duct diameter is no larger than 36".
2. Oval duct size is no larger than 71"W x 30"H.
3. Duct gauges conform to the SMACNA or ASHRAE standard.
4. An oval duct or round duct less than or equal to 24" is attached to the transition collar with #8 sheet metal screws (a minimum of 4 fasteners per connection). A round duct diameter greater than 24" is attached to the transition collar with #10 sheet metal screws (a minimum of 5 fasteners per connection).

Dampers with round/oval transitions that fall outside of these restrictions must use a 4" wide drawband connection as shown in the SMACNA Fire, Smoke, and Radiation Damper Installation Guide.



**INSTALLATION INSTRUCTION****INSTALLATION INSTRUCTIONS**

(Continued from Page 2)

**7. Caulking:** Caulk that is exposed to the airstream (ie on the inside of the damper sleeve) shall be one of the following: Dow Corning RTV732, Silco Sil-Bond RTV 4500, General Electric IS808, or Novagard RTV300. Breakaway flange caulking shall be Design Polymeric's DP1010 or Precision's PA2084T. Caulk that is not exposed to the airstream (ie on the outside of the damper sleeve) can be of any type that is certified (UL Classified) to have a flame/smoke developed index of 25/50 or less (re: UL723) and is approved by the local authority having jurisdiction. Caulking is allowed on any external/exposed portions of the damper sleeve, but is not permitted to be in the annular space between the fire barrier and the damper sleeve.

**8. Duct Connections:** All connecting ducts shall not be continuous, but shall terminate at the fire damper sleeve. Duct connections not listed as breakaways shall be considered rigid. For rigid type duct connections, the sleeve shall be a minimum of 16 GA. on dampers not exceeding 36" wide or 24" high or 24" diameter and 14 GA. on larger units. Maximum sleeve thickness shall not exceed 10 GA. galvanized steel. Dampers supplied with thinner sleeves require a breakaway connection. The following breakaway duct-to-sleeve connections may be used: Plain "S" Slip, Double "S" Slip, Inside Slip, Hemmed "S" Slip, Standing "S" Slip, Standing "S" Slip (Bar Reinforced), Standing "S" Slip (Angle Reinforced), and Standing "S" Slip (Alternate Bar). Breakaway joints shall have no more than two No. 10 sheet metal screws on each side and on the bottom. The screws shall penetrate both sides of the slip pocket. When a breakaway joint is used along the top and bottom duct connection, a flat drive slip no longer than 20 inches is permitted on the two sides. The damper is normally supplied with a factory attached sleeve (see Note 4 when field supplied sleeve). The standard factory supplied sleeve is 20 GA. galvanized steel (18 GA. on dampers wider or higher than 84") and assumes that a breakaway type duct connection will be employed.

**9. Maintenance:** Dampers shall be maintained at intervals as stated in NFPA 90A and 92A. Local codes or building conditions may require more frequent inspections and maintenance. A duct access door is to be located on the jackshaft side of each damper for periodic inspection and maintenance. Access to the damper shall be provided and be large enough to allow for inspection and maintenance. For small duct size, a removable duct may be necessary. The access is to be located on the jackshaft side of the damper. After the damper is installed, it shall be cycled and inspected to insure proper operation.

**Periodic Inspection and Performance Testing:**

Although the required frequency of this periodic operation testing varies by local jurisdiction, most local requirements reference one of two national standards, either NFPA 80 or NFPA 105. NFPA 80 covers the requirements for fire dampers and NFPA 105 covers the requirements for smoke dampers. Both documents contain the following frequency requirements for periodic operation testing: Each damper shall be tested and inspected one year after installation. The test and inspection frequency shall then be every 4 years, except in hospitals, where the frequency shall be every 6 years.

**Performance Testing Depends On Site Requirements.****A recommended procedure follows:**

- A. Visually confirm that the damper is in the full open position.
- B. Ensure that all obstructions, including hands, are out of the path of the damper blades and then remove electric power or air pressure from the actuator to allow the actuator's spring return feature to close the damper.
- C. Visually confirm that the damper closed completely.
- D. Reapply electric power or air pressure to reopen the damper.
- E. Visually confirm that the damper is in the full-open position.

**NOTE:** If lubrication is applied, it shall be of a dry type.

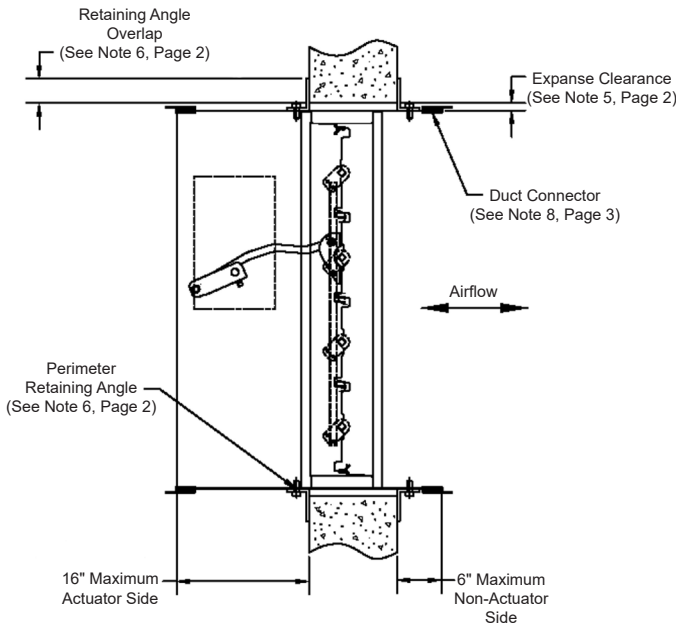


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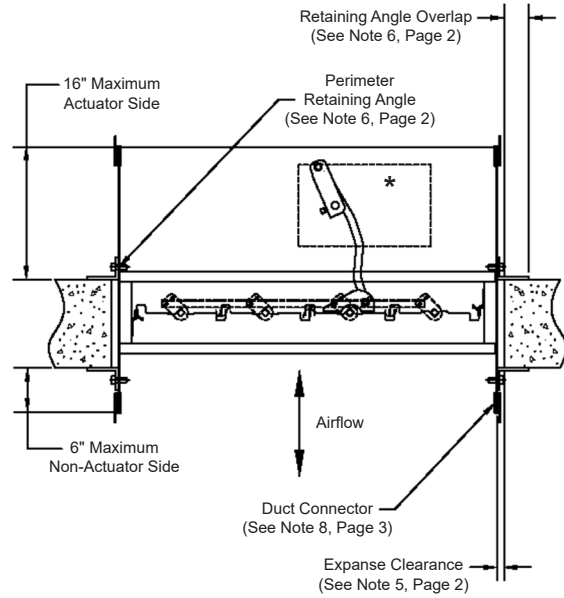
# INSTALLATION INSTRUCTION

## STANDARD MOUNTING DETAILS

### Vertical, 2-Side Retaining, Masonry

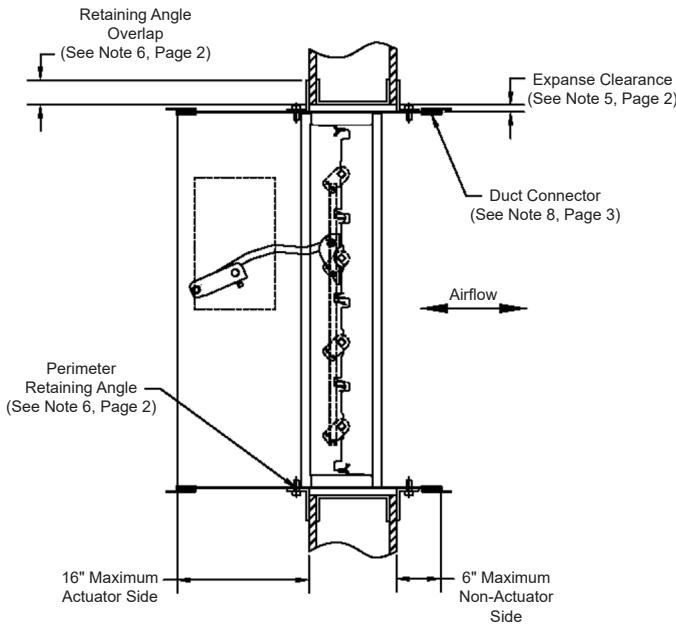


### Horizontal, 2-Side Retaining, Masonry

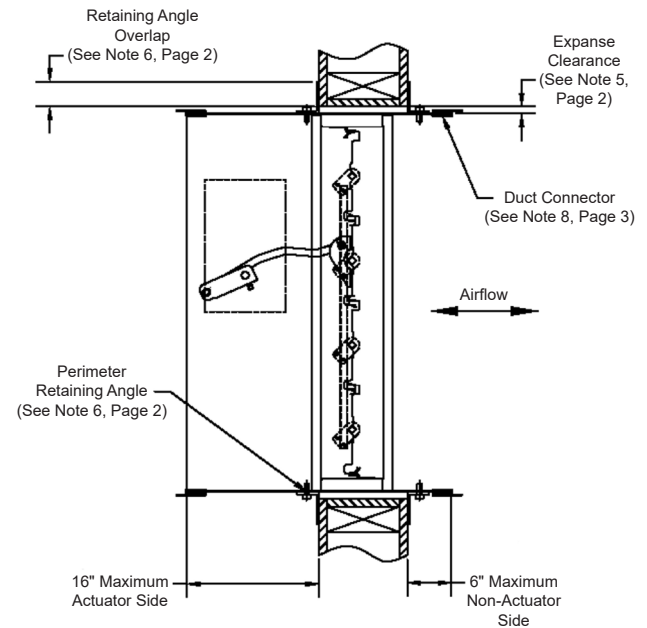


\* When floor mounted, the actuator is to be mounted on the top side.  
 Exception: Model FA, CA, MA, and UA can have the actuator mounted below the floor as well, for dampers no larger than 32" wide by 36" high.

### Vertical, 2-Side Retaining, Metal Stud



### Vertical, 2-Side Retaining, Wood Stud



## MULTIPLE PANEL / MULTIPLE SECTION INSTALLATION DETAILS

### Combination Fire/Smoke Dampers (Non-modulating)

1. Damper assemblies ordered without factory mounted sleeves are limited in size, so that the entire assembly ships as a single section.
2. Multiple panel high damper assemblies are electrically/pneumatically, but not mechanically linked between top and bottom panels if assembled within a common sleeve. Large sizes may require multiple sleeve sections - multiple sleeve sections are not mechanically or electrically/pneumatically linked.
3. Multiple panel wide damper assemblies are mechanically and electrically/pneumatically linked if assembled within a common sleeve. Large sizes may require multiple sleeve sections - multiple sleeve sections are not mechanically or electrically/pneumatically linked.
4. Damper assembly sections that are not mechanically or electrically/pneumatically linked each have their own heat response device and their own supply connection point, such that they operate independently. Multiple actuators within a linked section are factory wired/plumbed together.
5. Damper assembly sections that are mechanically and electrically/pneumatically linked share a single heat response device and a single supply connection point. Multiple actuators within a linked section are factory wired/plumbed together.
6. Damper assemblies that ship in multiple sections shall be fastened together using 1/4" diameter steel bolts, lockwashers, and nuts. Fasteners shall be on 6" maximum centers on both faces of the frame.

### Combination Fire/Smoke Dampers (Modulating)

1. Multiple panel modulating damper assemblies will ship from the factory as a complete unit and must be ordered with sleeves.
2. Multiple panel high modulating damper assemblies are both electrically and mechanically linked between top and bottom sections at the factory.

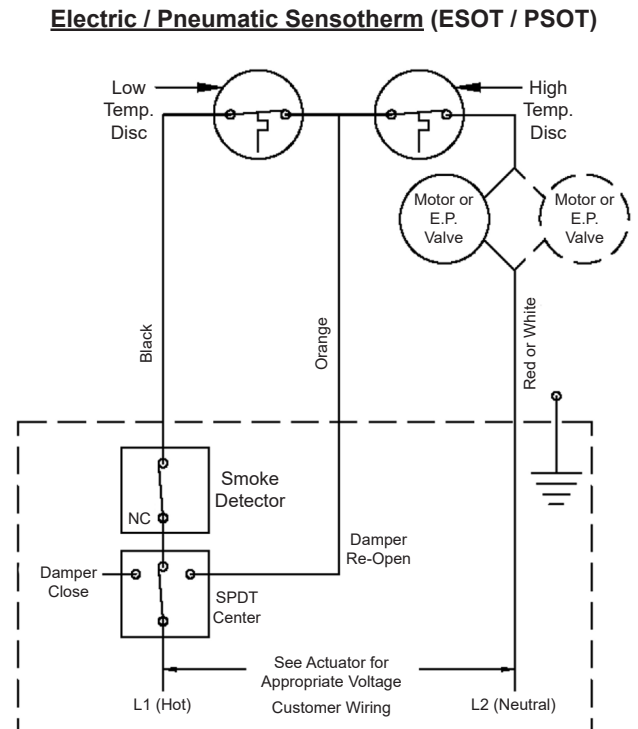
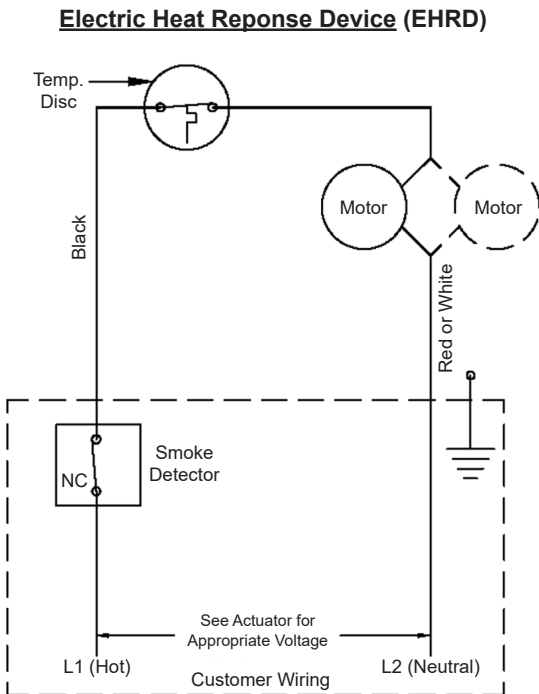
### Fire Damper

1. Damper assemblies ordered without factory mounted sleeves are limited in size, so that the entire assembly ships as a single section.
2. Multiple panel high damper assemblies are not mechanically linked between top and bottom panels.
3. Multiple panel wide damper assemblies are not mechanically linked between panels.
4. Damper assembly sections that are not mechanically linked each have their own heat response device, such that they operate independently.
5. Damper assemblies that ship in multiple sections shall be fastened together using 1/4" diameter steel bolts, lockwashers, and nuts. Fasteners shall be on 6" maximum centers on both faces of the frame.

## ELECTRIC WIRING SCHEMATICS

### Notes

1. All wiring to be in accordance with N.E.C. (NFPA 70).
2. Refer to actuator label for appropriate voltage.
3. Connect incoming ground to the actuator assembly.
4. If the actuator remains electrically energized, yet the damper remains in the closed position, check to ensure that the reset button on the heat response device is depressed.



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# INSTALLATION INSTRUCTION

## ELECTRIC WIRING SCHEMATICS

### ESOT/PSOT Wiring, Test, and Operating Instructions

Damper is supplied with one low temperature thermal disc and one high temperature thermal disc. All dampers require a control switch (supplied by others) for re-openable operation.

#### Customer Wiring

1. Connect input power lead L1 from the normal closed position lead of the Master Control Switch (MCS) (or Remote Test Box, refer to SD-TEST) to damper lead L1.

**Note:** If a smoke damper or other sensing device is to be employed, its NC contact set should be wired in series between the MCS position switch normal wire and lead L1.

2. Connect incoming lead L2 to damper lead L2.
3. Connect the reopen switch lead from MCS to orange damper lead.
4. Connect the incoming ground lead to the wiring enclosure.
5. If used, install position indication switch (refer to SD-SWITCH) per the schematic.
6. Replace enclosure cover.

#### Circuit Test

1. Place Master Control Switch in damper close position.
2. Apply power.
 

**Result:** The closed indicator light (if used) should be on and the damper blades closed.
3. Transfer the MCS switch to damper re-open position.
 

**Result:** The damper blades should open; the closed indicator light (if used) should go off and the open indicator light (if used) should go on.
4. Transfer the MCS switch to the normal position.
 

**Result:** The damper blades should remain open and the open indicator light (if used) should remain on.
5. Transfer the MCS switch to the closed position.
 

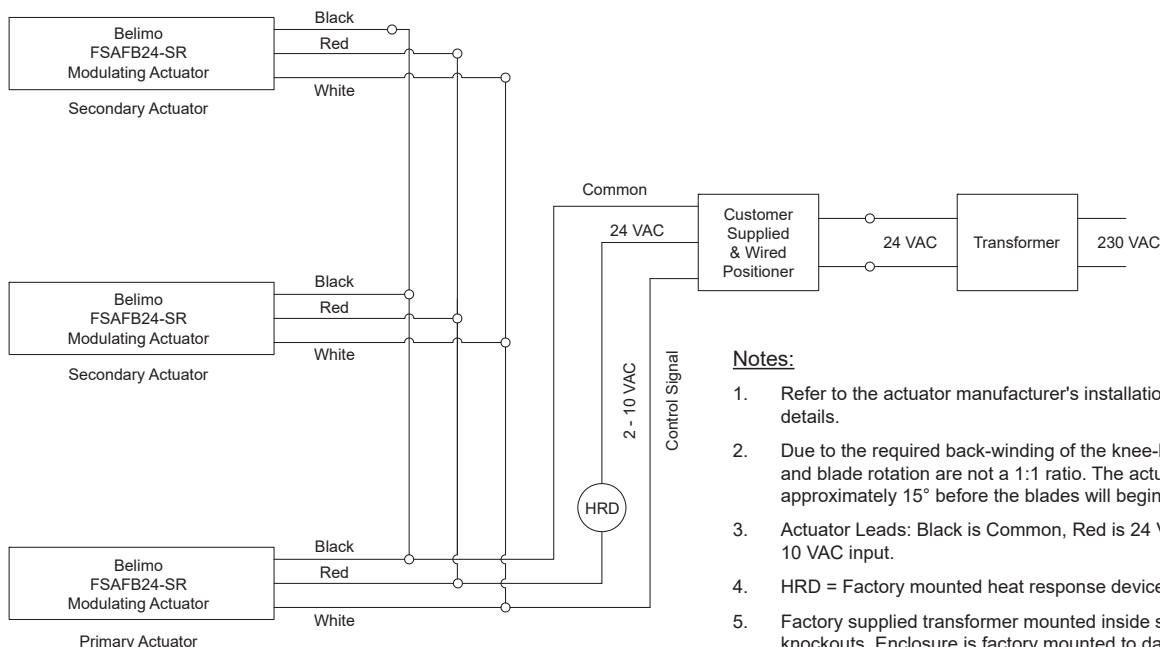
**Result:** The damper blades should close; the open indicator light (if used) should go off and the closed indicator light (if used) should go on.

#### Emergency Operation (Smoke Management)

1. **MCS Closed Position:** Damper will close regardless of whether the thermal switch device has activated or not and regardless of the command for the smoke system.
2. **MCS Re-Open Position:** If the damper has not been exposed to an elevated temperature higher than its rating, the damper will open. Also, the damper will open regardless of whether the low temperature disc (165°F or 212°F) has activated or not and regardless of a command from additional sensing devices, such as a smoke detector.
3. Refer to SI-SDET for more information on smoke detectors.

**Note:** If the Master Control Switch (MCS) is in the re-open position and the high temperature thermal disc has not been tripped, the damper will remain open regardless of whether the low temperature disc and/or other sensing devices have tripped or not. If the damper has been exposed to an elevated temperature higher than its temperature degradation rating, or if the electrical or pneumatic supply has been disconnected, the damper will close and remain closed regardless of any MCS position.

### MODULATING ACTUATOR WIRING INSTRUCTIONS



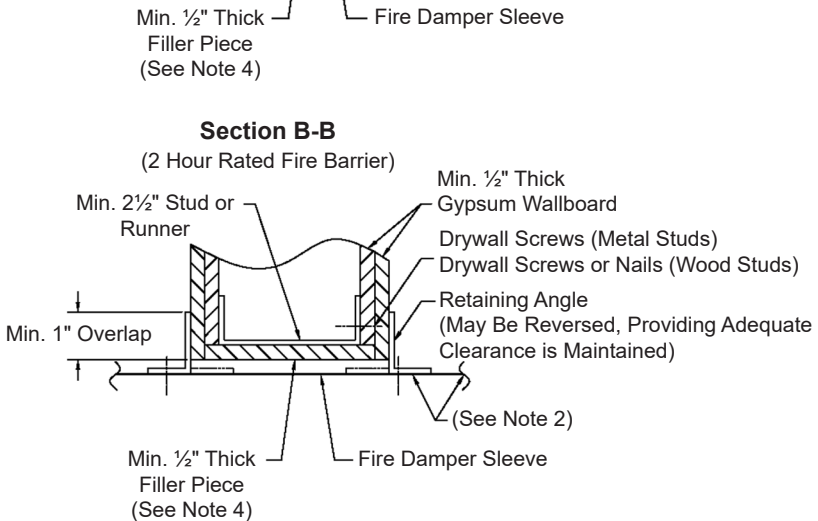
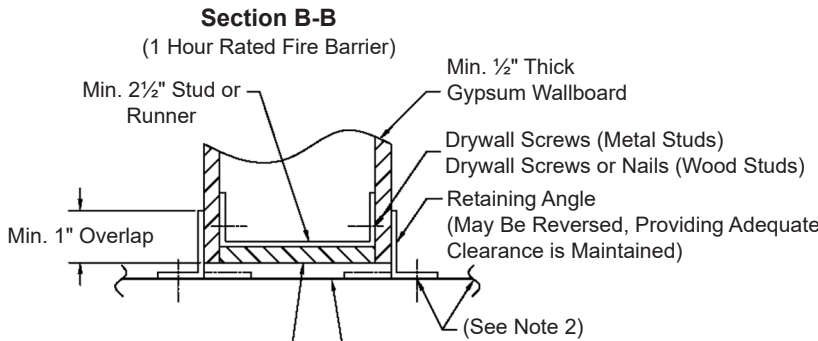
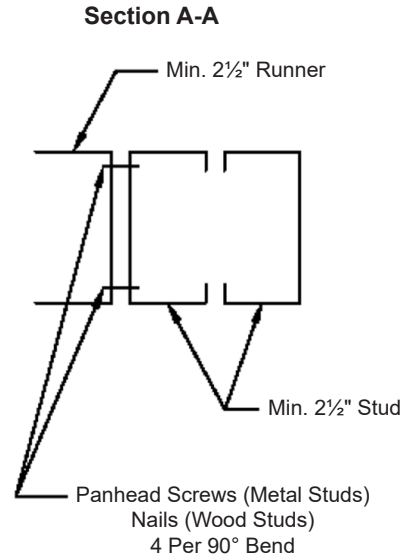
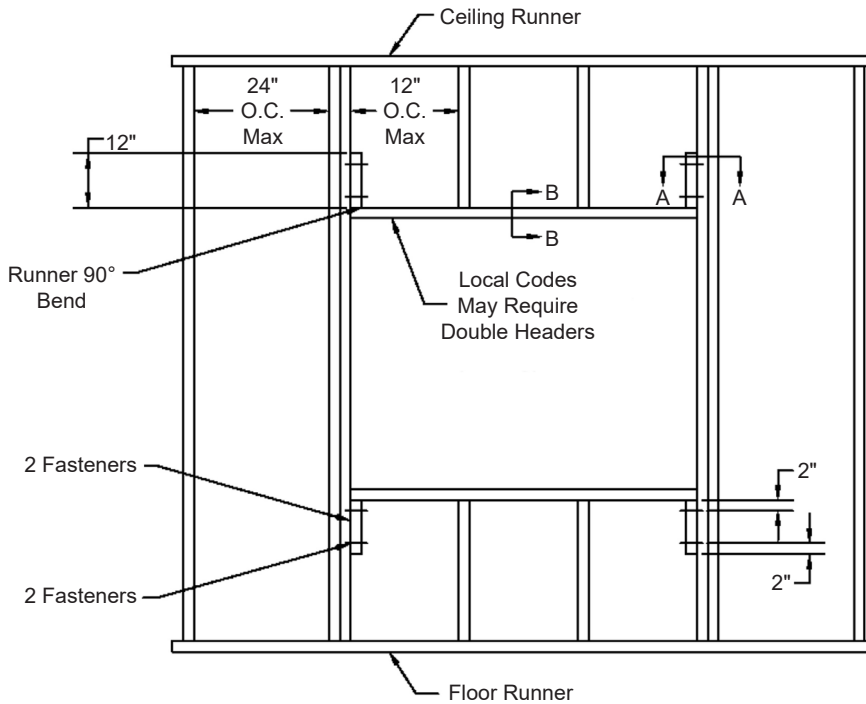
#### Notes:

1. Refer to the actuator manufacturer's installation instructions for full details.
2. Due to the required back-winding of the knee-lock, the actuator and blade rotation are not a 1:1 ratio. The actuator will rotate approximately 15° before the blades will begin to move.
3. Actuator Leads: Black is Common, Red is 24 VAC hot, White is 2 - 10 VAC input.
4. HRD = Factory mounted heat response device.
5. Factory supplied transformer mounted inside steel enclosure with knockouts. Enclosure is factory mounted to damper sleeve in near proximity to primary actuator. Transformer to be field wired to customer supplied positioner.
6. Secondary actuator(s) are factory wired to primary actuator.
7. Signal change must be at least 0.15V and actuator should be drive to 2V or less once a day to ensure synchronization.



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## FRAMING DETAILS (METAL OR WOOD, 1 HOUR OR 2 HOUR RATED BARRIERS)



**NOTES:**

1. These illustrated partition designs have successfully been tested in conjunction with 1 1/2 hour classified fire dampers, for additional designs, reference Underwriters Laboratories, Inc. Fire Resistance Directory. Specific framing requirements of openings may vary with the Local Authority that has jurisdiction. Specific framing requirements should be provided in the architectural and structural drawings.
2. Reference the damper's installation instructions regarding the approved method of attaching the damper to the sleeve, attaching the retaining angles to the sleeve, required expansion clearances, sleeve gauge, etc. Type of framing does not affect the stated required expansion clearance.
3. Gypsum panels surrounding the opening are to be fastened to all stud and runner flanges, 12" O.C. maximum.
4. When wooden studs are used, filler pieces must be installed around the entire opening. Filler pieces are optional when metal studs are used (consult local codes to determine if filler pieces are required). Filler pieces are to be double screwed (or nailed to wooden studs) on 12" max. centers to the web of runners and studs.
5. Double jamb studding shown and required when opening width or length exceeds 36". Single jamb studding acceptable for openings 36"W x 36"H and smaller.



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