

# Standard Installation

## Combination Fire/Smoke Damper Models: MR1, MR2, CR1, CR2, AR1, AR2

## Smoke Damper Models: KR1, KR2, SR1, SR2, UR1, UR2

### APPLICATION

These dynamically rated fire/smoke and smoke dampers are intended to restrict the passage of smoke. The dynamically rated fire/smoke dampers are also intended to restrict the passage of fire. 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 inlets or outlets.

The fire/smoke 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.

The smoke 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. It can be mounted within the plane of a smoke barrier, but can also be mounted out of the plane of a smoke barrier. When mounted out of the plane of the smoke barrier, it is to be installed within 24" of the barrier and before any duct inlets or outlets.

### MULTIPLE PANEL SIZE LIMITATIONS

Actuation		Electric					
Orientation		Horizontal			Vertical		
Assembly		Max Panel 250°	Max Panel 350°	Multiple Panel	Max Panel 250°	Max Panel 350°	Multiple Panel
Model	CR1, MR1, AR1, CR2, MR2, AR2	24"Wx24"H	24"Wx24"H	not available	24"Wx24"H	24"Wx24"H	not available
	SR1, KR1, UR1, SR2, KR2, UR2	24"Wx24"H	24"Wx24"H	not available	24"Wx24"H	24"Wx24"H	not available

Actuation		Pneumatic					
Orientation		Horizontal			Vertical		
Assembly		Max Panel 250°	Max Panel 350°	Multiple Panel	Max Panel 250°	Max Panel 350°	Multiple Panel
Model	CR1, MR1, AR1, CR2, MR2, AR2	24"Wx24"H	24"Wx24"H	not available	24"Wx24"H	24"Wx24"H	not available
	SR1, KR1, UR1, SR2, KR2, UR2	24"Wx24"H	24"Wx24"H	not available	24"Wx24"H	24"Wx24"H	not available

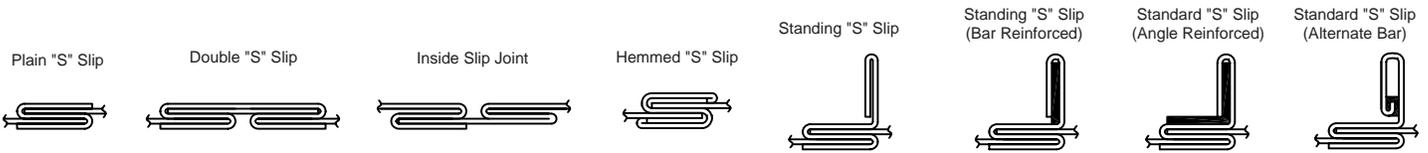
### SUPPLEMENTAL INSTALLATION INSTRUCTIONS / SUBMITTAL DATA

- Sleeve Extension
- Electric or Pneumatic Heat Response Device (SD-EHRD or SD-PHRD)
- Integral Dual Position Indication (SD-IDPI)
- Electric or Pneumatic Sensotherm (SD-ESOT or SD-PSOT)
- Flow-Rated Smoke Detector (SM-501)
- No-Flow Smoke Detector (2151)
- Transitions (SD-TRFS)

# INSTALLATION INSTRUCTION

## INSTALLATION

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 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. See additional instructions, which detail damper actuator sequence of operations.
3. **Multiple Panel / Multiple Section Assembly:** Not available.
4. **Sleeves:** Sleeves are required for the proper installation of fire rated dampers, and are factory mounted. 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.
5. **Expansion Clearance:** Expansion clearance is not required for fire rated damper sizes smaller than or equal to 24"W x 24"H and is not required for any leakage-only rated dampers. For all sizes, the opening width and height shall be no more than 1" larger than the damper width and height.  
**Example:** For a damper with exact outside dimensions of 24"W x 24"H, the gap at the top plus the gap at the bottom must be < 1.0". The gap at the left side plus the gap at the right side must be <1.0". The damper can be located anywhere in the opening and need not be centered.
6. **Retaining Angle Attachment:** Fire rated dampers are approved for one side retaining only, but have the option for two side retaining. Leakage-only rated dampers do not require attachment to the barrier, but have the option for one or two side retaining.  
**For one side retaining:**  
 Factory-attached perimeter retaining angles shall be fastened to the barrier on 6" maximum centers and 4<sup>1</sup>/<sub>2</sub>" maximum from each corner (a minimum of one fastener is required per side). \*Pre-punched holes in the factory-attached perimeter retaining angles are not intended for use as a mounting pattern.
  - A. In masonry construction, 3/16" diameter "tapcon" or equal fasteners with a minimum of 1<sup>1</sup>/<sub>2</sub>" penetration are required.
  - B. In metal framed openings, fine thread drywall screws with a minimum of 1" penetration into the framing are required.
  - C. In wood framed openings, course thread drywall screws with a minimum of 1" penetration into the framing are required.**For two side retaining:**  
 The factory-attached perimeter retaining angles shall be mounted as described above for one side retaining. The second set of perimeter retaining angles shall be flush against the wall. 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 of the damper to the sleeve only, with 3/16" diameter steel or stainless steel nuts and bolts or by tack welding with beads 1/2" ± 1/4" in length or with #10 steel or stainless steel sheet metal screws or 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). Perimeter retaining angles shall be a minimum of 1-1/2" x 7/8" x 16-GA steel. 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. The second set of perimeter retaining angles and their mounting fasteners are not typically supplied with the damper.
7. **Caulking:** Caulk shall be one of the following: Dow Corning RTV732, Silco Sil-Bond RTV 4500, General Electric IS808, or Novagard RTV300. Caulking is allowed between the retaining angles and the damper sleeve, and between the retaining angles and the face of the floor or wall construction. Caulking is not allowed between the damper sleeve and the wall or floor inside the opening.  
  
 Breakaway flange caulking shall be Design Polymeric's DP1010 or Precision's PA2084T.
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 24" wide or 24" high or 22" diameter. 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 standard factory supplied sleeve is 20-GA galvanized steel and assumes that a breakaway type duct connection will be employed.



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

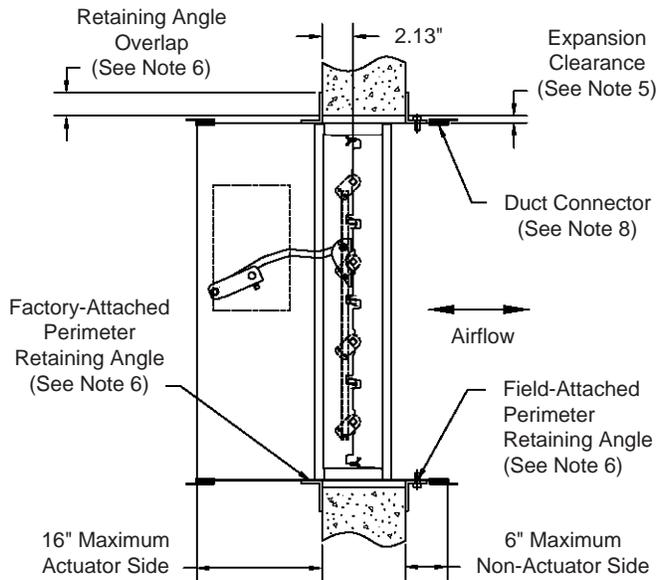
1. Round duct diameter is no larger than 22".
  2. Oval duct size is no larger than 22"W x 22"H.
  3. Duct gauges conform to the SMACNA or ASHRAE standard.
  4. An oval duct or round duct less than or equal to 22" is attached to the transition collar with #8 sheet metal screws (a minimum of 4 fasteners 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.
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.



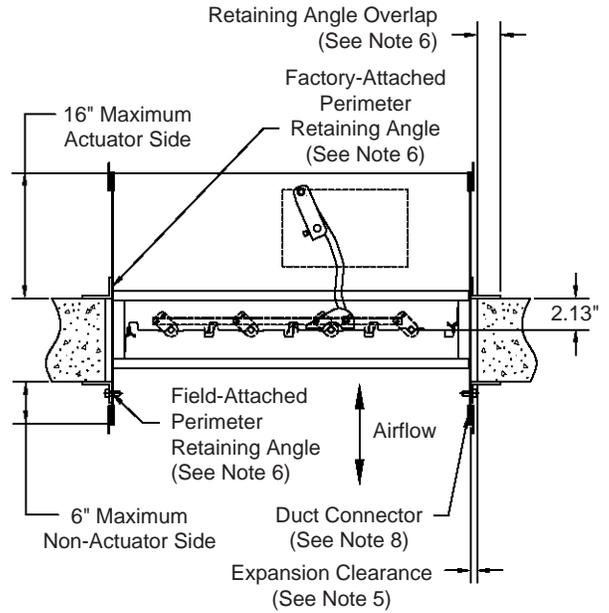
## STANDARD MOUNTING DETAILS

### Fire/Smoke Vertical or Horizontal

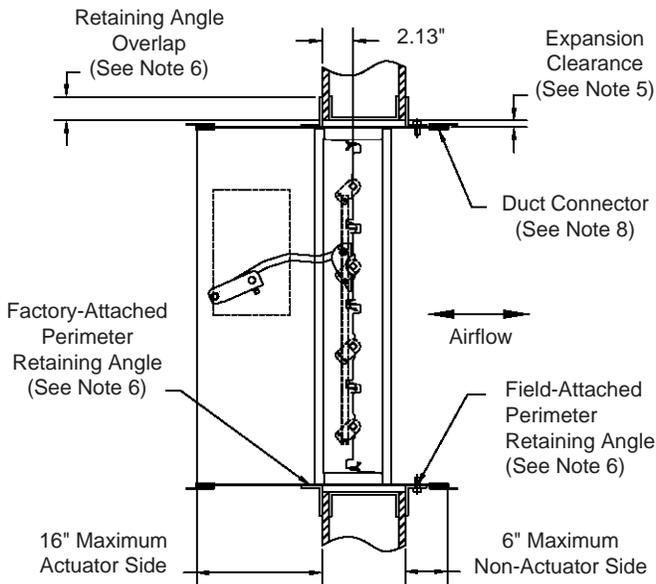
#### Vertical, 1 or 2-Side Retaining, Masonry



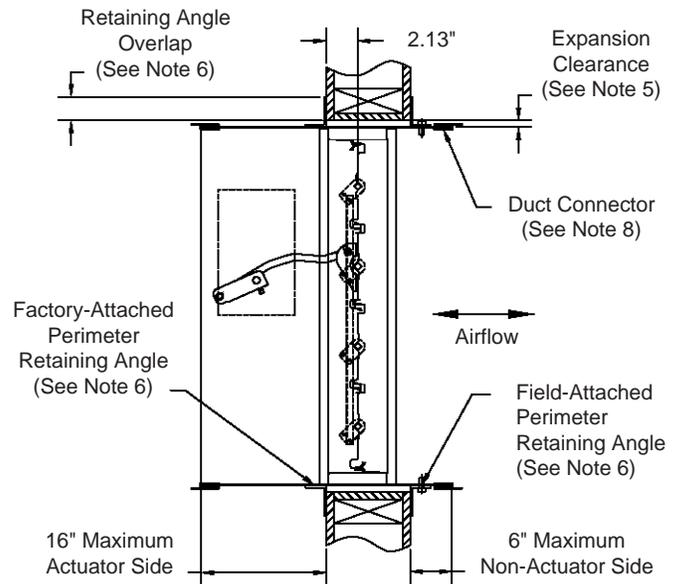
#### Horizontal, 1 or 2-Side Retaining, Masonry



#### Vertical, 1 or 2-Side Retaining, Metal Stud

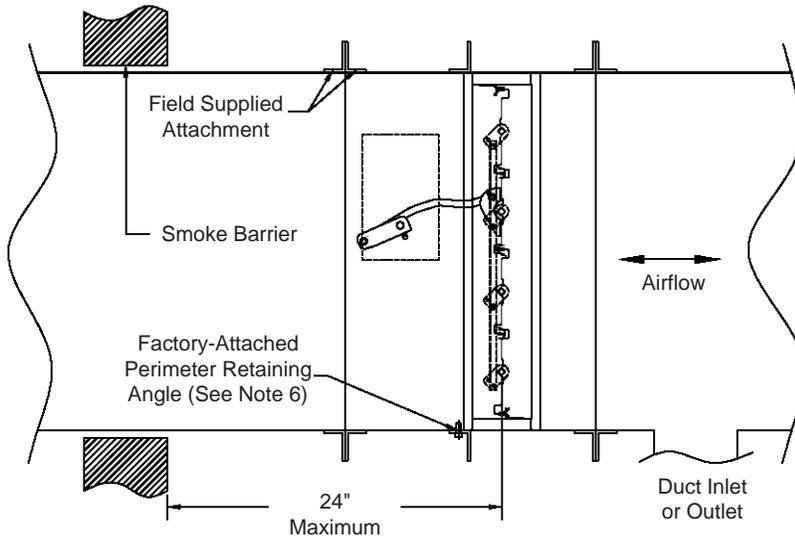


#### Vertical, 1 or 2-Side Retaining, Wood Stud



STANDARD MOUNTING DETAILS

Smoke Only, Vertical or Horizontal

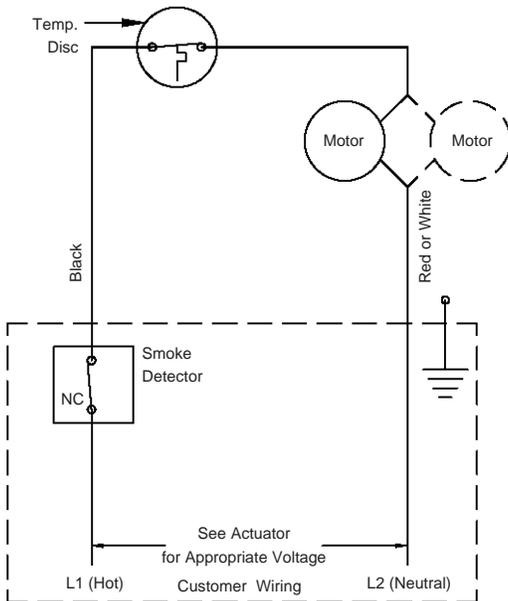


ELECTRIC WIRING SCHEMATICS

Notes

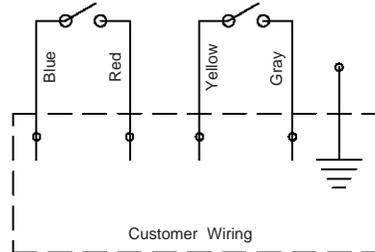
1. All wiring to be in accordance with N.E.C. (NFPA 70).
2. Refer to actuator label for appropriate voltage.
3. Connect incoming ground to the actuator assembly.
4. If the actuator remains electrically energized, yet the damper remains in the closed position, check to ensure that the reset button on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

Electric Heat Response Device (EHRD)  
(EHRD, Fire/Smoke Only)



\*Temperature disc shown in circuit is present in FR dampers only.

Integral Dual Position Indication (IDPI)



Integral Dual Position Indication (IDPI) Wiring Chart			
actuator mounting location	damper full open	damper full close	damper mid-stroke
	closed circuit		
external left	red / blue	yellow / gray	none
external right	yellow / gray	red / blue	none
internal left	yellow / gray	red / blue	none
internal right	red / blue	yellow / gray	none

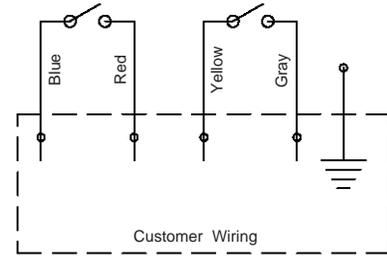
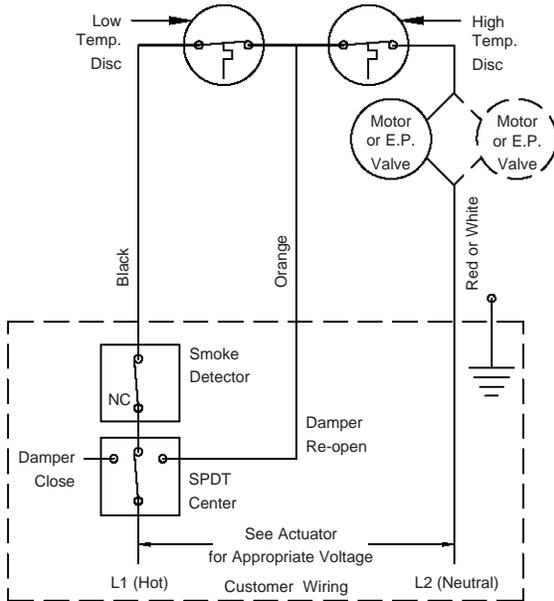
\* This wiring is opposite if the actuator is rotated 90°, so that it is parallel to the duct.



# INSTALLATION INSTRUCTION

## ELECTRIC WIRING SCHEMATICS (CONT.)

### Electric/Pneumatic Sensotherm (ESOT/PSOT) with included Integral Dual Position Indication (IDPI) Fire/Smoke Damper Only



Integral Dual Position Indication (IDPI) Wiring Chart			
actuator mounting location	damper full open	damper full close	damper mid-stroke
	closed circuit		
external left	red / blue	yellow / gray	none
external right	yellow / gray	red / blue	none
internal left	yellow / gray	red / blue	none
internal right	red / blue	yellow / gray	none

\* This wiring is opposite if the actuator is rotated 90°, so that it is parallel to the duct.

### 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 master 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 (MCS) switch to damper lead L1.  
**Note:** If a smoke detector 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. Install IDPI (if used) per the schematic.
6. Replace enclosure cover.

#### CIRCUIT TEST

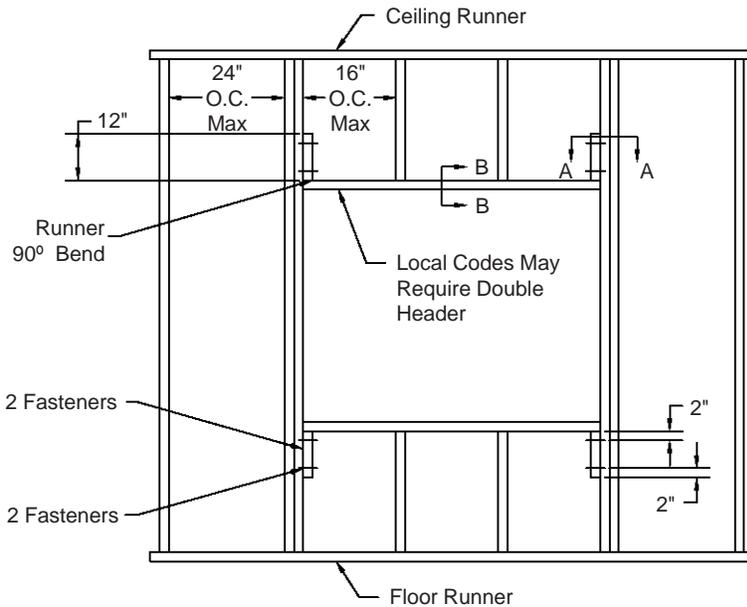
1. Place (MCS) switch in damper close position.
2. Apply power.  
**Result:** The closed indicator light (if used) should be on and the damper blades closed.
3. Transfer (MCS) switch to damper re-open position.  
**Result:** The damper blades should open; the closed indicator light (if used) should go off and the open indicator light (if used) should go on.
4. Transfer (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)

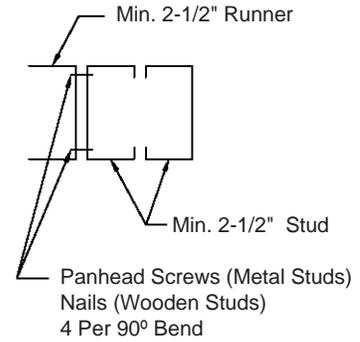
1. **MCS closed position:** Damper will close regardless of whether the thermal switch device has activated or not and regardless of the command from the smoke system.
2. **MCS re-open position:** If the damper has not been exposed to an elevated temperature higher than its rating, the damper will open. Also, the damper will open regardless of whether the low temperature thermal disc (165°F or 212°F) has activated or not and regardless of a command from additional sensing devices, such as a smoke detector.

**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 thermal 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.

**FRAMING DETAILS (METAL OR WOOD 1 HOUR AND 2 HOUR RATED BARRIERS)**

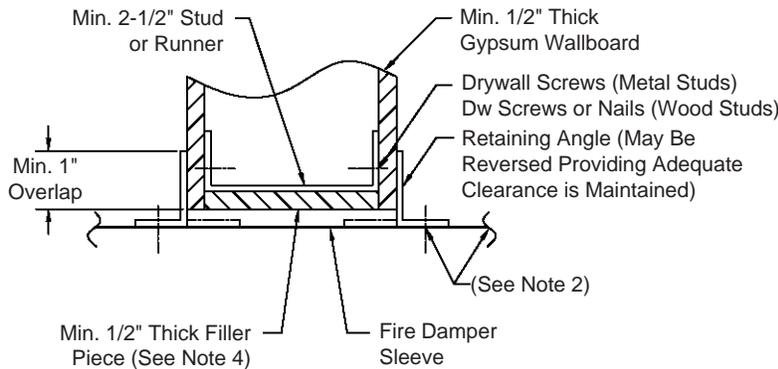


**Section A-A**



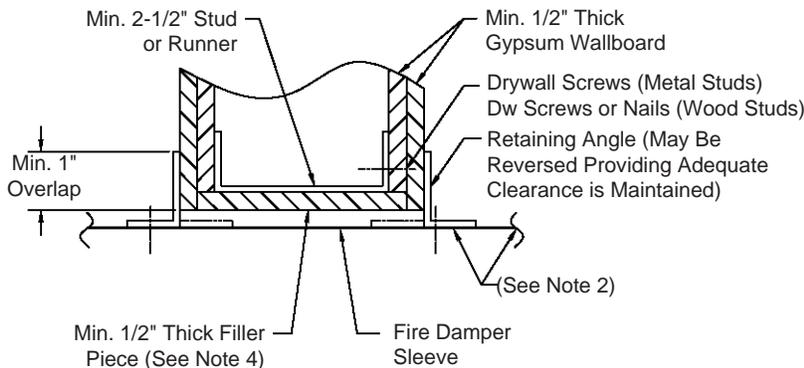
**Section B-B**

(1 Hour Rated Fire Barrier)



**Section B-B**

(2 Hour Rated Fire Barrier)



**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. Single jamb studding acceptable for openings 24"W x 24"H and smaller.

