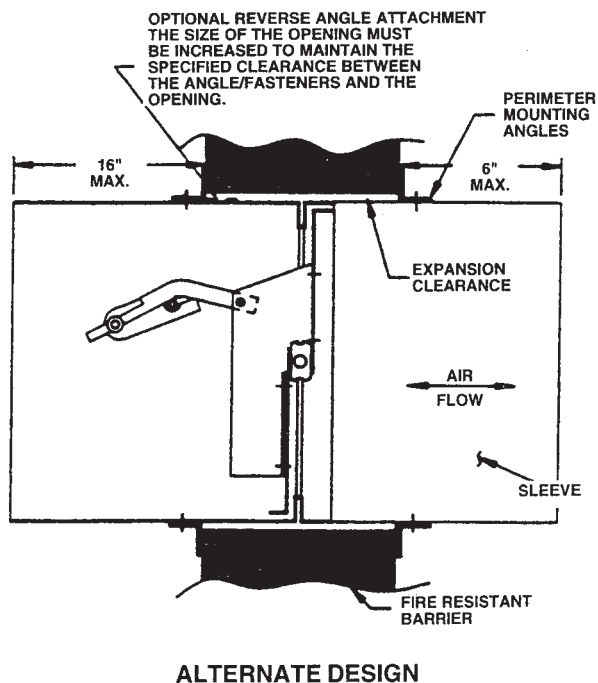
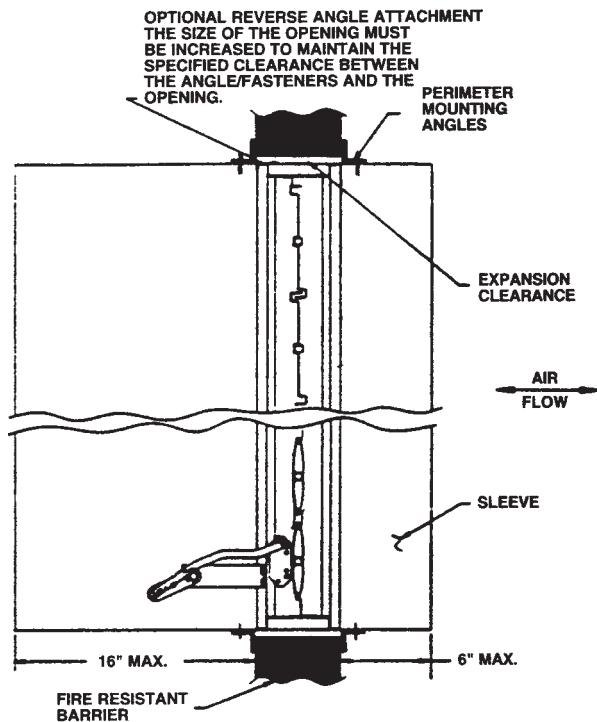


INSTALLATION INSTRUCTIONS FIRE/LEAKAGE RATED DAMPER

**MODELS: AS1, AS2, UA1, UA2,
AS1M, AS2M, AND MD17**

TYPICAL WALL INSTALLATION



These dynamically rated fire/smoke and fire dampers are factory sealed into the provided sleeve and must be positioned so that it is within the fire rated masonry, block or gypsum wallboard barrier, when the damper is intended to be used as a fire rated damper. When the damper is to be used as a leakage rated damper only, it is to be installed within 24" of the smoke barrier and be upstream of any duct outlets.

This damper may be mounted in the vertical or horizontal position with the damper blades running horizontal. These dampers may be mounted right side up or upside down.

Dampers are supplied with factory mounted actuators (except Model MD17) 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.

A duct access door is to be located on the jackshaft side of each damper.

MOUNTING:

1. 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. 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.
3. The damper is normally supplied with a factory attached sleeve (see Note 11 when field supplied sleeve). Duct connections to the sleeve will be either of the breakaway or rigid types that are listed below. The following determines if the connections are to be rigid or breakaway. For rigid type duct connections, 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 will not exceed 10 GA galvanized steel. Dampers supplied with thinner sleeves will require a breakaway connection of the types listed in Note 5. The standard factory supplied sleeve is 20 GA galvanized steel (18 GA on dampers wider than 84") and assumes that a breakaway type duct connection will be employed.
4. Duct connections not listed as breakaways (See Note 5) shall be considered rigid. 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.



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MOUNTING (cont.)

5. 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).
6. All connecting ducts shall not be continuous but shall terminate at the fire damper sleeve. Connecting ducts are attached to the damper sleeve as instructed by Notes 3, 4 and 5.
7. The opening in the wall for the fire/leakage rated damper shall be sized so as to provide expansion clearance between the sleeve and the opening of a minimum of $\frac{1}{8}$ " per foot of overall damper/sleeve width and height. The maximum opening size shall not exceed $\frac{1}{8}$ " per foot plus 1"; minimum total clearance shall be at least $\frac{1}{4}$ " larger than the overall assembly. Perimeter mounting angles shall increase in size, proportionately, so there will be a minimum of 1" of overlap on the wall, including at the corners, and the angles shall be flush against the wall.
8. Fasten the perimeter mounting angles on all four sides and on both faces of the damper to the sleeve only, with $\frac{1}{4}$ " 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 a maximum of 6" on center and shall have a connection not more than 3" from each corner, (1" on the alternate assembly). Perimeter mounting angles shall be a minimum of 1- $\frac{1}{2}$ " x $\frac{7}{8}$ " 16 gauge steel. Corners of angles are not welded together for dampers whose width or height exceeds 24". For dampers 24" x 24" or smaller, the corners of the perimeter mounting angles can be welded. Some local codes may not allow welded corners. Perimeter angles and their mounting fasteners are not normally supplied with the damper. Attachment of these angles must not restrict operation of the damper.
9. Caulking is allowed between the mounting angles and the damper sleeve, and between the mounting angles and the floor or wall construction. Caulk shall be one of the following: Dow Corning RTV732, General Electric IS808 or Novagard RTV300. Caulking is not allowed between the damper sleeve and the wall or floor inside the opening.
10. Dampers shall be maintained in intervals as stated in NFPA 90A and 92A unless local codes require more frequent inspections.
11. Single panel dampers with factory mounted internal actuators can be supplied without sleeves. See Note 2 for required sleeve gauge thickness. Field supplied sleeve is attached to 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 to be staggered on each side of the damper frame at 6" maximum centers and 3- $\frac{1}{2}$ " maximum from each corner.

MULTIPLE PANEL SIZE LIMITATIONS

MODEL AS-Vertical Mount

ACTUATOR TYPE	MAX. W x H SINGLE SECTION(in.)	MAX. W x H MULTIPLE PANEL ASSEMBLY (in.)	MAX. PANELS WIDE & QTY. OF ACTUATORS
GGD121, 221, 321 331-2792	36" X 48"	72" x 48"	2

MODEL AS-Horizontal Mount

ACTUATOR TYPE	MAX. W x H SINGLE SECTION (in.)	MAX. W x H MULTIPLE PANEL ASSEMBLY (in.)	MAX. PANELS WIDE & QTY. OF ACTUATORS
GGD121, 221, 321 331-2792	36" X 48"	108" x 48"	3

MODEL UA-Vertical Mount

ACTUATOR TYPE	MAX. W x H SINGLE SECTION (in.)	MAX. W x H MULTIPLE PANEL ASSEMBLY (in.)	MAX. PANELS WIDE & QTY. OF ACTUATORS
MS4209, 4309 MS8209, 8309	32" x 24"	96" x 24"	3
MS4120, 8120 331-2792	32" x 48"	96" x 48"	3

MODEL UA-Horizontal Mount

ACTUATOR TYPE	MAX. W x H SINGLE SECTION (in.)	MAX. W x H MULTIPLE PANEL ASSEMBLY (in.)	MAX. PANELS WIDE & QTY. OF ACTUATORS
MS4209, 4309 MS8209, 8309	32" x 24"	96" x 24"	3
MS4120, 8120 331-2792	32" x 48"	96" x 48"	3

MODEL MD17xC-Vertical and Horizontal Mount

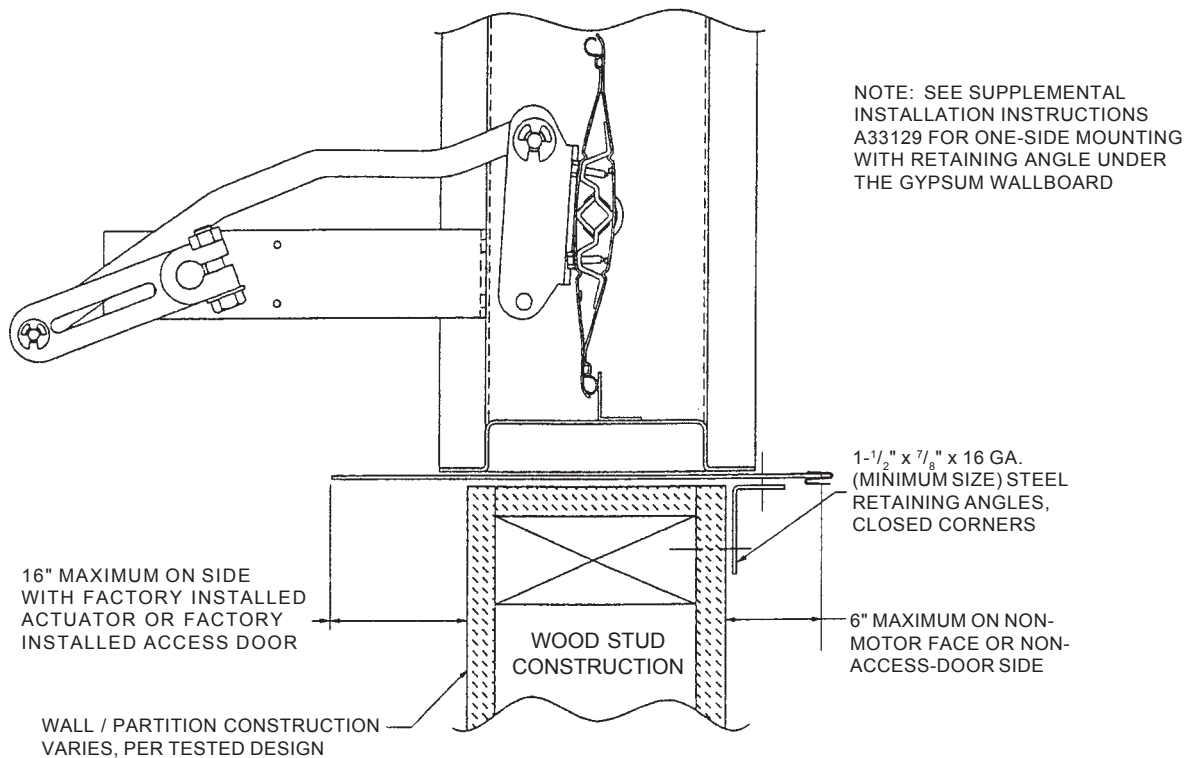
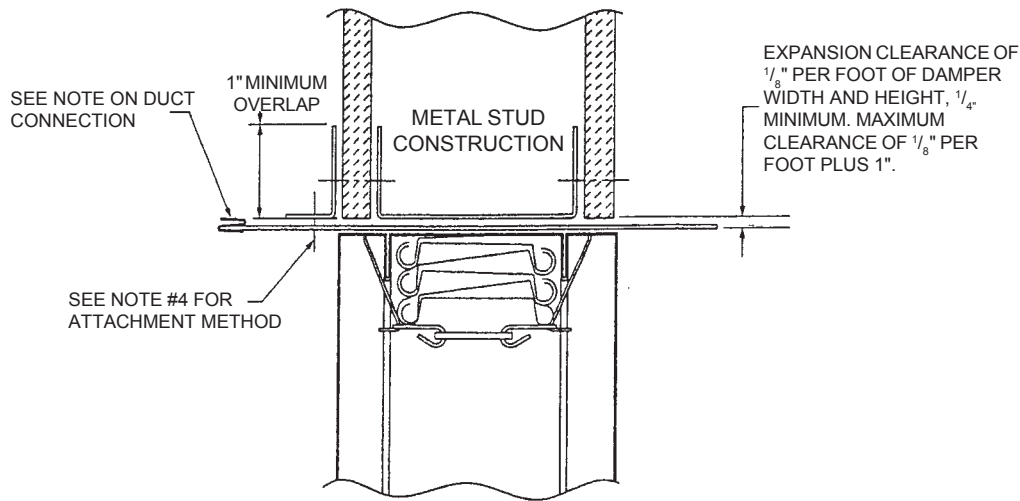
ACTUATOR TYPE	MAX. W x H SINGLE SECTION (in.)	MAX. W x H MULTIPLE PANEL ASSEMBLY (in.)	MAX. PANELS WIDE & QTY. OF ACTUATORS
Spring / Fuse Link	36" x 48"	72" x 48"	2

MODEL ASxxxC—Vertical Mount

ACTUATOR TYPE	MAX. W x H SINGLE SECTION (in.)	MAX. W x H MULTIPLE PANEL ASSEMBLY (in.)	MAX. PANELS WIDE & QTY. OF ACTUATORS
MS4209, 4309 MS8209, 8309 FSNF 120, 24	36" x 36" 48" x 24"	108" x 36" 96" x 24"	3 2
MS4120, 8120	36" x 48" 48" x 36"	108" x 48" 96" x 36"	3 2
GGD121, 221, 321 331-2792	36" X 48"	108" x 48"	3
331-2961, 331-2995	36" x 36"	108" x 36"	3

MODEL ASxxxC—Horizontal Mount

ACTUATOR TYPE	MAX. W x H SINGLE SECTION(in.)	MAX. W x H MULTIPLE PANEL ASSEMBLY (in.)	MAX. PANELS WIDE & QTY. OF ACTUATORS
MS4209, 4309 MS8209, 8309 FSNF 120, 24 331-2961, 331-2995	36" x 36"	72" x 36"	2
MS4120, 8120 GGD121, 221, 321 331-2792	36" X 48"	72" x 48"	2



ONE SIDE MOUNTING, ANGLES OUTSIDE GYPSUM WALLBOARD

APPLICATION

These instructions illustrate alternate mounting of Classified fire and fire/smoke dampers to a rated wall or partition from one side only. The steel retaining angles are on the outside face of the gypsum board and on the outside of the masonry or concrete wall or partition.

1. This installation is limited to the following:
 - A. Two hour or less rated wall or partition.
 - B. Vertically mounted damper.
 - C. Wood stud/metal stud gypsum board construction as well as masonry/concrete construction.
 - D. Maximum size damper of 48" wide x 36" high or 36" wide x 48" high.
2. See page 7 for opening framing details.
3. Closed plane of damper blades must be within the plane of the rated wall or partition.

4. Steel retaining angles must be attached to both the damper sleeve and to the partition framing on all four sides of this one face mounting method.

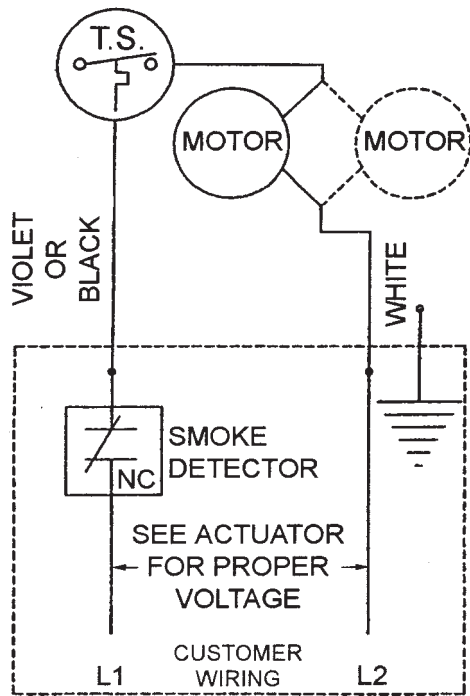
A. Damper sleeve to retaining angles attached 6" maximum on-centers, 3" maximum from each corner, minimum of two fasteners per side by the following means:

1. $\frac{3}{16}$ " diameter steel bolts and nuts,
2. Welding, $\frac{1}{2}$ " long beads,
3. #10 steel sheet metal screws,
4. $\frac{3}{16}$ " diameter steel rivets.

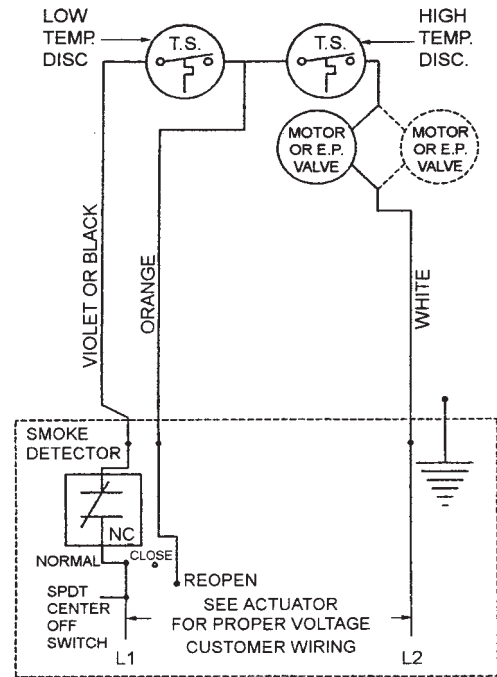
B. Retaining angles to gypsum board wall framing attached using drywall screws 6" maximum on-centers, 3" maximum from each corner, minimum of two fasteners per side.

C. Retaining angles to concrete or masonry attached using $\frac{3}{16}$ " steel masonry fasteners 6" maximum on-centers, 3" maximum from each corner, minimum of two fasteners per side.

ELECTRIC WIRING SCHEMATICS



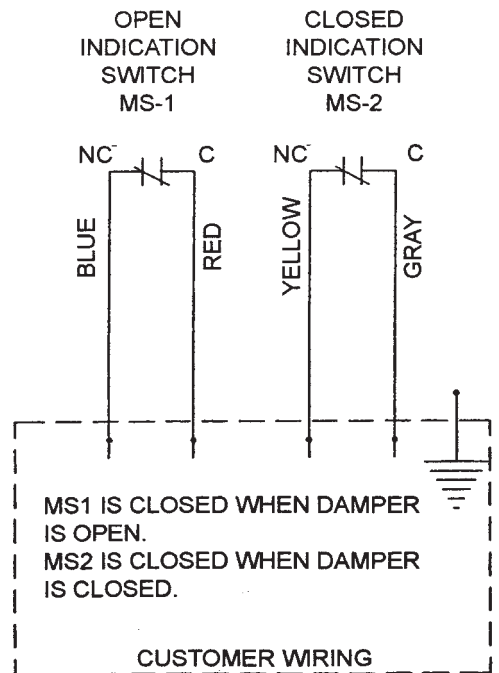
This schematic is used for dampers supplied with a single thermal switch.



This schematic is used for dampers supplied with the Sens-O-Therm, reopenable feature (two thermal switches).

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 is electrically energized yet the damper remains in the closed position, check that the reset button on the heat response device is depressed.
5. Optional auxiliary blade position indication switches are rated at 1A, 1/3HP, 125VAC. These snap action switches are intended to make or break a circuit and will not provide variable or proportional resistance.



This schematic is used to wire auxiliary blade position indication switches.

INSTALLATION INSTRUCTIONS FOR ELECTRIC OR PNEUMATIC REOPENABLE (SENS-O-THERM) FIRE/ LEAKAGE RATED DAMPERS WITH POSITION INDICATOR SWITCHES. DAMPER IS SUPPLIED WITH ONE HIGH LIMIT AND ONE LOW LIMIT THERMAL DISC. ALL DAMPERS REQUIRE A MASTER CONTROL SWITCH FOR REOPENABLE OPERATION. SEE PAGE 5 FOR WIRING SCHEMATIC.

CUSTOMER WIRING

- a. Connect input power L1 from the normal position lead of the (MCS) switch to damper lead L1.

NOTE:

If a smoke detector or other sensing device is to be employed, its N.C. contact set should be wired in series between the (MCS) position switch normal wire and Lead L1.

- b. Connect incoming L2 to damper L2
- c. Connect the reopen switch lead from (MCS) to orange damper lead.
- d. Connect the incoming ground to the wiring enclosure.
- e. Replace enclosure cover.

EMERGENCY OPERATION (SMOKE MANAGEMENT):

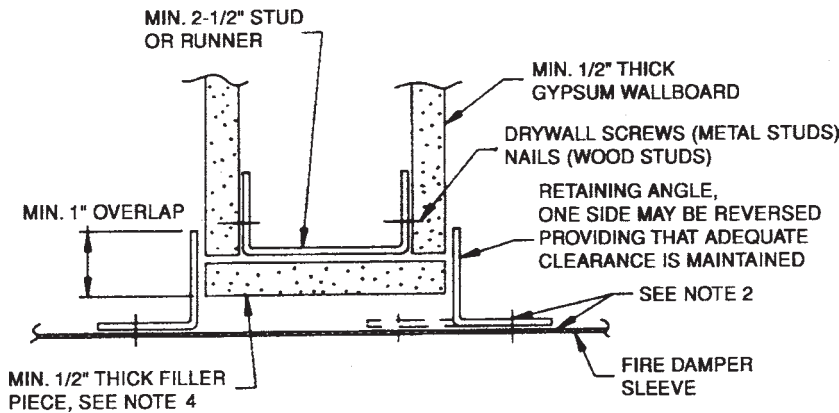
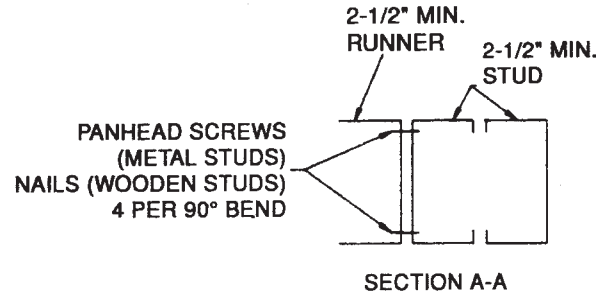
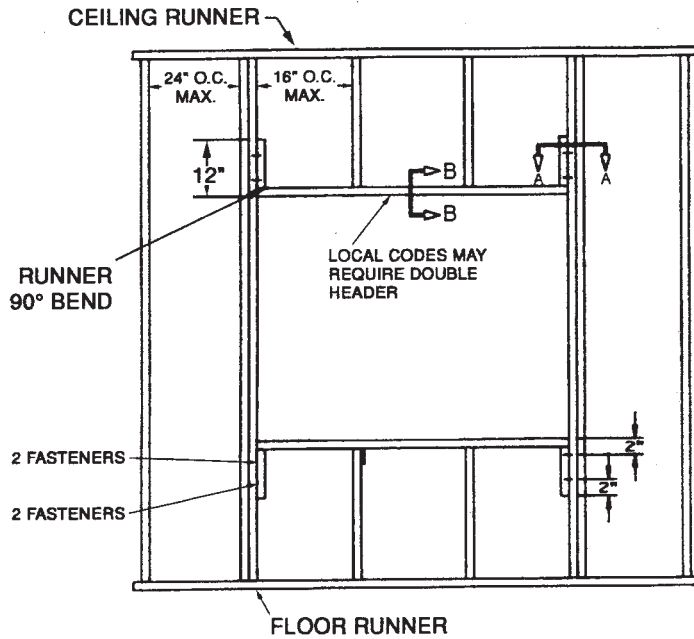
1. **MCS closed position**--Damper will close regardless of whether the thermal switch device has activated or not and regardless of the command from the smoke system.
2. **MCS reopen position**--If the damper has not been exposed to an elevated temp. higher than its rating, the damper will open. Also, the damper will open regardless of whether the low limit thermal switch either (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 reopen position and the high temperature thermodisc has not been tripped, the damper will remain open regardless of whether the low temperature thermodisc 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.

CIRCUIT TEST

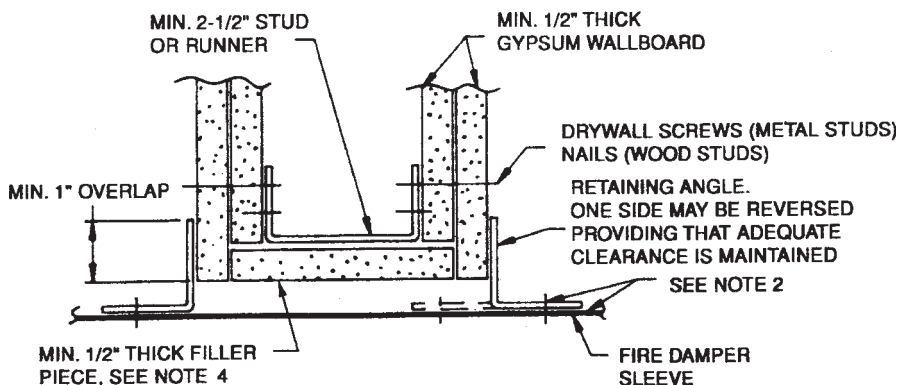
1. Place (MCS) switch in center closed position.
2. Apply power.
RESULT: The closed indicator light (if used) should now be on and the damper blades closed.
3. Transfer (MCS) switch to reopen position.
RESULT: The damper blades should open; the closed indicator light (if used) should go off and the open 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 come on.
6. To check the general function of the thermal device, and if the circuit test steps 1 through 5 have checked out, proceed as follows:
 - a. Transfer (MCS) switch to normal position.
 - b. Hold a lit match or a pocket lighter near the face of the low temperature thermal switch.
RESULT: A faint click should be heard and the damper blades should close.
 - c. Upon cooling, reset the thermal switch; the damper will power open.

INSTALLATION INSTRUCTIONS FOR 1-1/2 HOUR UL CLASSIFIED FIRE DAMPERS INSTALLED INTO METAL OR WOOD FRAMED 1 HOUR AND 2 HOUR RATED DRYWALL PARTITIONS



1 HOUR RATED PARTITION WALL

SECTION B-B



2 HOUR RATED PARTITION WALL

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" x 36" and smaller.

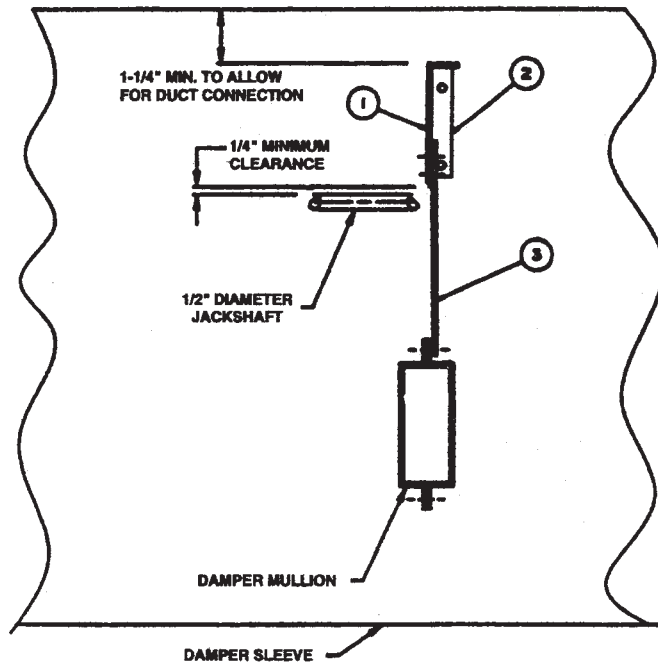
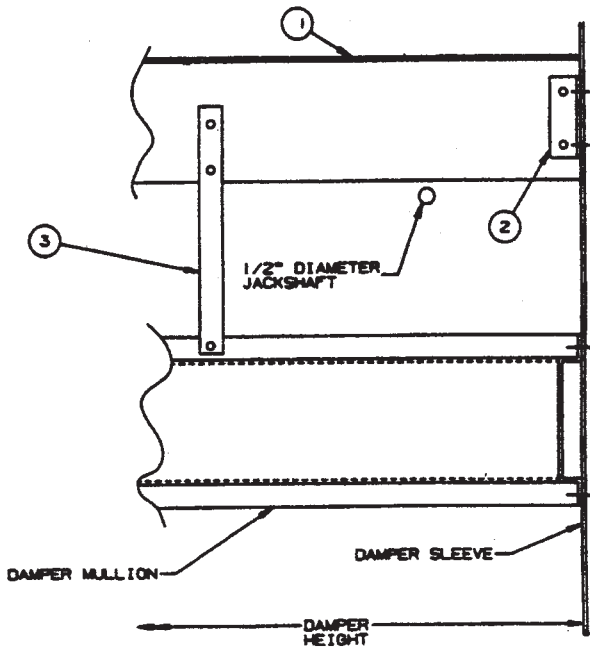
FABRICATION AND INSTALLATION INSTRUCTIONS FOR MULLION ANGLE WHEN HORIZONTALLY MOUNTED

PURPOSE:

This factory or field fabricated angle/strap assembly reinforces the damper mullion to prevent excessive mullion deflection during exposure to a fire.

WHEN REQUIRED:

This angle/strap assembly is centered above the damper mullion (located where two damper panels butt together) when the damper is mounted horizontally. This reinforcement is required only on multiple panel assemblies when the damper height (dimension perpendicular to blade span) exceeds 26 inches.



- ① 4" x 1" x 16GA (minimum required size) galvanized steel angle, length of angle same as inside sleeve height.
- ② 16 GA (minimum thickness) tab (stitch welded) or angle (stitch welded or mechanically attached with two fasteners -- see below) to each end of angle which permits angle assembly to be stitch welded or mechanically attached to the sleeve. Fasteners to be steel, No. 10 S.M.S., $\frac{3}{16}$ " dia. rivets, or No. 10 bolts; two at each tab.
- ③ 8" x $\frac{3}{4}$ " x 20GA (minimum required size) galvanized steel strap attached to damper mullion with one fastener, attached to angle with two fasteners (see note 2 for type of fastener). Number of straps required:
 - A. All single panel and multiple panel assemblies not exceeding 26" in height do not require a mullion angle.
 - B. Multiple panel assemblies exceeding 26" but not exceeding 36" in height require one strap centered along the damper height.
 - C. Multiple panel assemblies exceeding 36" in height require two straps, 6" to each side of the damper mid-height.