**Fire Dampers (Static & Dynamic)**

**Installation Instructions**

**Important General Notes:**
When UL is referred to in this document, it represents UL/ULC. This installation instruction applies to Fire Dampers (static, dynamic, curtain, single and multi-blade types) mounted in the plane of an UL approved fire partition. The dampers are designed for operation in the vertical or horizontal position with blades running horizontal. The dampers are to be installed square and free from twisting or racking.

The dampers shall not be compressed or stretched into the opening. Transportation and installation of the dampers shall be handled with the sleeve or frame. Do not lift the damper with the blades or actuator. Special care shall be given to the damper before installation and after to insure it is protected against dirt, weather, mortar and drywall dust, wall texture and paint. Any of these conditions could cause the damper not to operate correctly and void the warranty. Suitable access to inside duct is to be provided for inspection and replacement of parts such as heat response devices and actuators per NFPA 90A and local authority having jurisdiction. As with all joints, contractor must seal duct-collar connections in the field after installation. PRICE Model numbers which are UL approved to utilize this installation are FD, FD-SL, FD-USL, FD-MB-3V, FD-MB-AF, FD-SB, FDD, FDD-SL, FDD-MB-3V, FDD-MB-AF.

1. **Opening Preparation/Clearances:**
The fire barrier opening shall be larger than the damper to allow for thermal expansion and ease of installation. When steel stud/gypsum or wood stud/gypsum partitions are being used then refer to Fig. 1-3 for additional information and details.

   **A. Dampers Assemblies Using 2 Angles Methods** (see note 4a) shall be a minimum of 1/4" (6mm) per linear foot (305mm) of height and width of sleeved assembly up to a maximum of 1 1/2" (38mm) and a minimum of 1/4" (6mm). For **Static Systems** the maximum single section curtain damper is 60"x60" (1524mm x 1524mm) for vertical mounting and 40" x 40" (1016mm x 1016mm) for horizontal mountings, based on type “A” dampers. The maximum single section multi-blade damper is 36” x 48” (914mm x1219mm) in vertical or horizontal mountings. For **Dynamic Systems** the maximum single section curtain damper is 36” x 36” (914mm x 914mm) in vertical or horizontal mountings and 24” x 24” (610mm x 610mm) in horizontal mountings, based on type “A” dampers. The maximum single section multi-blade damper is 36”x48” (914mm x 1219mm) in vertical or horizontal mountings. This method is acceptable for 1 1/2 and 3 hour fire dampers. See Underwriter’s Laboratories Listings for maximum multiple assembly sizes.

   **B. Dampers Assemblies Using 1 Angle Methods** (see note 4b) shall be a minimum of 1/2" (3mm) per linear foot (305mm) of height and width of sleeved assembly up to a maximum of 1 1/4” (38mm) and a minimum of 1/2 “ (6mm). The maximum single section is the same as in A above. The maximum multi-section is 108”w and 108”h (2743mm x 2743mm) up to 36 square feet (3.345 sq. meters). This method is acceptable for 1 1/2 hour fire dampers mounted in a masonry/concrete or steel stud/gypsum wall only.

   **C. Dampers Assemblies Using No Angles Methods** (see note 4c) shall be a minimum of 1/4" (6mm) and a maximum of 1/2 “(13mm). The maximum single section is the same as in A above. The maximum multi-section is 42” w x 48” h (1067mm x 1219mm). This method is acceptable for 1 1/2 hour fire dampers mounted in a masonry/concrete or steel stud/gypsum wall only.

2. **Damper Sleeves and Breakaway Connections:**
Sleeves shall be of the SAME GAUGE or heavier as the duct to which it is attached, if one of the breakaway connection is used as defined in the SMACNA Fire, Smoke and Radiation Damper Guide for HVAC Systems (Fig. 4-6) and in NFPA 90A. Gauges shall conform to SMACNA or ASHRAE duct standards. Sleeves shall not extend beyond the fire barrier more than 6” (152mm) unless an actuator or factory installed access door is supplied, then the sleeve may extend up to 16” (406mm). Sleeve shall terminate at both sides of wall within dimensions shown. If a rigid connection is used, then the sleeve shall be a minimum of 16 gage for dampers up to 36” (914mm) wide by 24” (610mm) high and 14 gage for dampers exceeding 36”(914mm) wide by 24” (610mm) high.

Round and oval breakaway connections must use either a 4” (102mm) wide draw band or #10 (M5) sheet metal screws spaced equally around the circumference of the duct as follows: 3 screws for duct sizes 22” (559mm) and smaller; 5 screws for duct sizes greater than 22” (559mm) and up to and including 36” (914mm); 8 screws for duct sizes greater than 36” (914mm). Refer to SMACNA Fire, Smoke and Radiation Damper Guide for HVAC Systems for information on Ductmate, Nexus, Ward, TDC and TDF systems and any additional information (Fig. 5-6). A sleeve may not be required if the damper frame is of sufficient size and shape so the mounting angles can be directly fastened to it.

3. **Multi-Section and “Damper to Sleeve” Connections:**
Dampers shall be secured to the sleeve and to each other (when joined to make multiple damper assemblies) with #10 sheet metal screws, 1/4” (6mm) nut and bolts, 1/4”(6mm) tack welds, 3/16”(5mm) steel rivets, spot welds, or clinching (toggle) on 6” (152mm) centers.

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**Fig. 1: Metal Stud/Gypsum Wall Design**

**Fig. 2: Wood Stud/Gypsum Wall Design**

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All Metric dimensions ( ) are soft conversion. Imperial dimensions are converted to metric and rounded to the nearest millimetre.
4. Methods of Securing Damper in Opening:

a. Two Angle (Two Sided) Method: This method is the oldest and most commonly used. This method is approved for use in UL approved concrete/masonry partitions, steel stud/gypsum walls, and wood stud/gypsum walls. In this method 2 sets of angles are used to secure the damper in the opening, one on each side of the partition (see Fig. 7). Two Angle Method is approved for 1 ½ and 3 hour dampers, vertical or horizontal orientation, and any maximum size multi-section UL approved damper (see Underwriter’s Laboratories Listings for maximum assembly sizes). Angles shall be a minimum of 1 1/2” x 1 1/2” (38mm x 38mm) x 16 gauge. Angles are to be fastened to the sleeve on 6” (152mm) centers with #10 (M5) sheet metal screws, 3/16” (5mm) slack pop rivets, 1/8” (13mm) tack welds, or 1/4” (6mm) diameter nut and bolts with not more than 2” (51mm) from each end with a minimum of two connections per side/leg. The angles are to overlap the partition a minimum of 1” (25mm). These angles may be of a unit type construction and may or may not be fastened to each other at the corners. When the duct work terminates at the damper or installation prohibits angles from turning out/away from the wall, the retaining angle shall be reversed (leg turned into the opening) providing the size of the opening is increased by an amount equal to twice the combined thickness of the angle and the height of the screw or bolthead to maintain expansion clearances. See note 1A for information on clearances. See Fig. 7 for detailed drawings of installations.

b. One Angle (Single Sided) Method: In this method 1 set of angles are used to secure the damper in the opening. This method is approved for use in UL approved concrete/masonry partitions and steel stud/gypsum walls. Only one side of the fire partition (see Fig. 8). One Angle Method is approved for 1 ½ hour dampers only, vertical and horizontal (angles on top side only) orientations, and the maximum size shall be 108” (2743mm) wide by 48” (1219mm) high up to the maximum multi-section UL approved damper size (see Underwriter’s Laboratories Listings for maximum assembly sizes). The sleeve flange shall be a minimum of 3/4” (19mm) high by 20 gauge steel. If a flange/angle is added, it shall be a minimum of 1” x 1/2” (25mm x 25mm) by 18 gauge steel and fastened with #10 (M5) bolts or screws, 3/16” (13mm) welds, or 3/8” (5mm) rivets to the sleeve, at a maximum spacing of 6” (152mm) o.c., not more than 2” (51mm) from each end with a minimum of two fasteners per side. The sleeve is to be fastened to the fire partition with: in concrete/masonry partitions with #10 self-tapping concrete anchors or concrete screws on 6” (152mm) centers and must engage the fire partition a minimum of 1” (38mm); in steel stud/gypsum partitions secure the angles to the partition with #10 (M5) screws long enough to penetrate the J-Runners and E-Stud by a minimum of 1/2” (10mm). Use a minimum of two fasteners per side. The angles are to overlap the partition a minimum of 1” (25mm). These angles may be of a unit type construction and may or may not be fastened to each other at the corners. When the duct work terminates at the damper or installation prohibits angles from turning out/away from the wall, the retaining angle shall be reversed (leg turned into the opening) providing the size of the opening is increased by an amount equal to twice the combined thickness of the angle and the height of the screw or bolthead to maintain expansion clearances. Angles can be placed in front of or behind the drywall attaching directly to the steel studs or masonry. PRICE’s Frame Retaining Angles (FRA) can be used in place of the angle mentioned above. See note 1C for information on clearances. See Fig. 8 for detailed drawings of installations.

c. No Angle Method: In this method No angles are used to secure the damper in the opening. This method is approved for use in UL approved concrete/masonry partitions and steel stud/gypsum walls. This method uses a minimum 1/8” (19mm) flange on one end of the sleeve. The damper/sleeve assembly is placed in the opening so that the flange rest flush up to the partition, then the fasteners are placed through the sleeve into the partition (see Fig. 9). No Angle Method is approved for 1 ½ hour dampers only, vertical and horizontal (flange on top side only) orientations, and the maximum size shall be 42” (1067mm) wide by 48” (1219mm) high up to the maximum multi-section UL approved damper size (see Underwriter’s Laboratories Listings for maximum assembly sizes). The sleeve flange shall be a minimum of 3/8” (19mm) high by 20 gauge steel. If a flange/angle is added, it shall be a minimum of 1” x 1/2” (25mm x 25mm) by 18 gauge steel and fastened with #10 (M5) bolts or screws, 3/16” (13mm) welds, or 3/8” (5mm) rivets to the sleeve, at a maximum spacing of 6” (152mm) o.c., not more than 2” (51mm) from each end with a minimum of two fasteners per side. The sleeve flange can be placed in front of or behind the drywall attaching directly to the steel studs or masonry. Be sure to notch the damper when securing it into the partition. Stretching the damper can cause it to bind up and prevent it from operating properly. PRICE’s Frame Retaining Angles (FRA) can be used in place of the angle mentioned above. See note 1C for information on clearances. See Fig. 9 for detailed drawings of installations.
Breakaway Connections

Figure 4 - Traditional Breakaway Style Transverse Joints
Transverse joints illustrated at right have always been approved as breakaway connections. SMACNA testing has also approved the following variations as breakaway connections.

- Standing "S" joints can be applied with no. 10 sheetmetal screws (through joint and duct) subject to the following limitations: Maximum 2 screws in each side and in bottom joint.
- Transverse joints illustrated can be applied as top and bottom joints with Drive Slip - side joints in duct heights up to 20 inches. (508 mm)

Round and Oval Duct Breakaway Connections
Round or flat oval ducts connected to Type R, CR or OC damper collars may use #10 sheetmetal screws as follows:

- Ducts to 22" (559 mm) wide (or dia.) and smaller may use 3 screws.
- Ducts larger than 22" (559 mm) wide (or dia.) and up to 36" (914 mm) dia. may use 5 screws.
- Ducts larger than 36" (914 mm) wide (or dia.) may use 8 screws.

NOTE: All breakaway connections described may have duct sealant applied in accordance with SMACNA recommendations.

Figure 5 - Manufactured Flanged System Breakaway Connections
Flanged connection systems manufactured by Ductmate, Ward, and Nexus are approved as breakaway connections when installed as illustrated.

Figure 6 - Proprietary Flange System Breakaway Connections
TDC and TDF systems are approved as breakaway connections when installed as described in the TDC or TDF addendum to the SMACNA Duct Construction Standards except the corners may not be bolted. Standard 6" (152 mm) metal clip may be used with spacing as shown in diagram.
Manufacturer’s Recommendations
All moving parts of the damper must be inspected and cycled at intervals not greater than every six months and in accordance with the latest edition of NFPA 90A, 92A, local codes and the actuator manufacturer. In addition, fuse links shall be removed and inspected for corrosion. Dry lubricants are recommended.

When UL is referred to in this document, it represents UL/ULC.
FD-RD and FDD-RD Fire Dampers

1. 20 gauge galvanized steel integral sleeve shall be of the SAME GAUGE or heavier as the duct to which it is attached. Gauges shall conform to SMACNA or ASHRAE duct standards. The length of the sleeve extending beyond the wall opening shall not exceed 16” (406 mm) on the operator side or 6” (152 mm) on the opposite side.

2. The connecting duct shall terminate at the integral sleeve and is connected by using either:
   
   (a) a minimum of 3 - #10 sheet metal screws spaced equidistant around the sleeve for 22” (559mm) and smaller duct.
   
   (b) a minimum of 5 - #10 sheet metal screws spaced equidistant around the sleeve for greater than 22” (559mm) duct.
   
   (c) a 4” (102mm) drawband.

3. Clearance between the damper sleeve and the round or square wall opening shall be a minimum of 1/2” (13 mm) and a maximum of 1” (25 mm).

4. Damper will be factory supplied with one retaining plate secured to the damper sleeve on the operator side of the damper.

5. A minimum of 4 equally spaced 20 gauge galvanized steel clip angles shall be attached to both the integral sleeve and the retaining plate. The clip angles shall be attached with 1/8” (3mm) rivets, #10 x 1/2” (13mm) sheet-metal screws, bolts or welds. In metal stud/gypsum applications, the retaining plate may be in front of or behind the gypsum, directly against the metal studs.

6A. Option 1: The damper may be installed in a wood/gypsum, steel stud/gypsum, or masonry fire partition in the vertical or horizontal position (blade shaft running horizontal) with a retaining plate flush against each side of the fire partition. Installation: with the factory installed retaining plate flush to the fire partition, place another retaining plate on the opposite side of the damper sleeve and slide it forward until it becomes flush with the opposite side of the partition. Place the Splice Clip over the cut portion of the retaining plate. Secure it with 4 - #10 sheet metal screws or rivets. Secure the clip angles to the retaining plate and damper sleeve as illustrated.

IMPORTANT
Do Not Cast Damper In Place
Cycle Damper After Installation To Insure Free Movement
Do Not Install Damper Out Of Round
6B. **Option 2:** The damper may also be installed in a steel stud/gypsum, or masonry wall, in a vertical position (blade running horizontal), with a retaining plate on one side of the wall. **Installation:** with the factory installed retaining plate flush to the fire wall, place 8 screws (#10 sheet metal for steel studs long enough to penetrate the metal stud by 1/2" (13mm) minimum or #10 x 1 1/4" (32mm) masonry screws) equidistant around the perimeter of the retaining plate. Screws are placed in each corner and halfway between the corners as shown.

7. Electrical and/or pneumatic connections to damper actuators (if applicable) should be made in accordance with wiring and piping diagrams developed in compliance with applicable codes, ordinances and regulations.

8. Refer to the installation instruction for Drywall Type Construction for the material and opening framing details.

**Manufacturer’s Recommendations**

All moving parts of the damper must be inspected and cycled at intervals not greater than every six months and in accordance with the latest edition of NFPA 90A, 92A, local codes and the actuator manufacturer. In addition, fuse links shall be removed and inspected for corrosion. Dry lubricants are recommended.

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This Installation sheet has been reviewed and accepted by Underwriters Laboratories. When UL is referred to in this document, it represents UL/ULC.
Out of Wall Partitions for Fire Dampers (Static & Dynamic) and Fire Smoke Dampers
Installation Instructions

FD-OW, FDD-OW, FSD-3V-OW, FSD-AF-OW, FSD-3V-FA, FSD-AF-FA

Important General Notes:
When UL is referred to in this document, it represents UL/ULC. This installation instruction applies to Fire Dampers and Combination Fire/Smoke Dampers mounted outside the plane of an UL approved fire partition. Combination Fire /Smoke Dampers are approved for use in Static or Dynamic Systems. The dampers are designed for operation in the vertical or horizontal position with blades running horizontal. The dampers are to be installed square and free from twisting or racking. The dampers shall not be compressed or stretched into the opening. Transportation and installation of the dampers shall be handled with the sleeve or frame. Do not lift the damper with the blades or actuator. Special care shall be given to the damper before installation and after to insure it is protected against dirt, weather, mortar and drywall dust, wall texture and paint. Any of these conditions could cause the damper not to operate correctly and void the warranty. Suitable access to inside duct is to be provided for inspection and replacement of parts such as heat response devices and actuators per NFPA 90A and local authority having jurisdiction. The need to seal the damper in the penetration is not required by Underwriters Laboratories. PRICE dampers have been tested and approved to be mounted without the use of sealants around the perimeter space between the damper and the penetration. As with all joints, contractor must seal duct-collar connections in the field after installation. These dampers must be ordered as an assembly from the factory with the proper PRICE insulation applied to the dampers. PRICE Model numbers which are UL approved to utilize this installation are FD-OW, FDD-OW, FSD-3V-OW-121, FSD-AF-OW-211, FSD-3V-FA-211, FSD-3V-FA-212, FSD-AF-FA-211, FSD-AF-FA-212.

1. Opening Preparation/Clearances:
The fire barrier opening shall be larger than the damper to allow for thermal expansion and ease of installation. When a steel stud/gypsum partition is being used then refer to Figs. 1 and 2 for additional information and details. The opening shall be a minimum of 1/4” (6mm) and a maximum of 1/2” (13mm). The maximum multi-section is 42”w x 48”h (1067mm x 1219mm). This method is acceptable for 1/2 hour fire dampers mounted in a masonry/concrete or steel stud/gypsum wall only.

2. Damper Sleeves and Breakaway Connections:
Sleeves shall be of the SAME GAUGE or heavier as the duct to which it is attached, if one of the breakaway connections is used as defined in the SMACNA Fire, Smoke and Radiation Damper Guide for HVAC Systems (Figs. 1, 2, and 3) and in NFPA 90A. Gauges shall conform to SMACNA or ASHRAE duct standards. Sleeves shall not extend beyond the fire barrier more than 6” (152mm) unless an actuator or factory installed access door is supplied, then the sleeve may extend up to 16” (406mm). Sleeve shall terminate at both sides of wall within dimensions shown. If a rigid connection is used, then the sleeve shall be a minimum of 16 gage for dampers up to 36” (914mm) wide by 24” (610mm) high and 14 gage for dampers exceeding 36” (914mm) wide by 24” (610mm) high. Round and oval breakaway connections must use either a 4” (102mm) wide draw band or #10 (M5) sheet metal screws spaced equally around the circumference of the duct as follows: 3 screws for duct sizes 22” (559mm) and smaller; 5 screws for duct sizes greater than 22” (559mm) and up to and including 36” (914mm); 8 screws for duct sizes greater than 36” (914mm). Refer to SMACNA Fire, Smoke and Radiation Damper Guide for HVAC Systems for information on Ductmate, Nexus, Ward, TDC and TDF systems and any additional information (Figs. 4 and 5). A sleeve may not be required if the damper frame is of sufficient size and shape so the mounting angles can be directly fastened to it.

Manufacturer’s Recommendations
All moving parts of the damper must be inspected and cycled at intervals not greater than every six months and in accordance with the latest edition of NFPA 90A, 92A, local codes and the actuator manufacturer. In addition, fuse links shall be removed and inspected for corrosion. Dry lubricants are recommended.
Out of wall partitions / Breakaway connections

3. Methods of Securing Damper in Opening:
   a. Grille Mount Method: In this method No angles are used to secure the damper in the opening. This method is approved for use in UL approved concrete/masonry partitions and steel stud/gypsum walls. This method uses a minimum 3/4” (19mm) flange on one end of the sleeve. The damper/sleeve assembly is placed in the opening so that the flange rests flush up to the partition, then the fasteners are placed through the sleeve into the partition (see Fig. 6). No Angle Method is approved for 1/2 hour dampers only, vertical and horizontal (flange on top side only) orientations, and the maximum size shall be 42” (1067mm) wide by 48” (1219mm) high up to the maximum multi-section UL approved damper size (see Underwriter’s Laboratories Listings for maximum assembly sizes). The sleeve flange shall be a minimum of 3/4” (19mm) high by 20 gauge steel. If a flange/angle is added, it shall be a minimum of 1” x 1” (25mm x 25mm) by 18 gauge steel and fastened with #10 (M5) bolts or screws, 1/2” (13mm) welds, or 3/16” (5mm) rivets to the sleeve, at a maximum spacing of 6” (152mm) o.c., not more than 2” (51mm) from each end with a minimum of two fasteners per side. The sleeve is to be fastened to the fire partition with: in concrete/ masonry partitions with #10 self-tapping concrete anchors or concrete screws on 6” (152mm) centers and must engage the fire partition a minimum of 1 1/2” (38mm); in steel stud/gypsum partitions secure the angles to the partition with #10 (M5) screws long enough to penetrate the J-Runners and E-Stud by a minimum of 3/8” (10mm). Use a minimum of two fasteners per side. The sleeve flange can be placed in front of or behind the drywall attaching directly to the steel studs or masonry. Be sure to not stretch the damper when securing it into the partition. Stretching the damper can cause it to bind up and prevent it from operating properly. PRICE’s Frame Retaining Angles (FRA) can be used in place of the angle mentioned above. See note 1 for information on clearances. See Fig. 6 for detailed drawings of installations.

   b. Continuous Duct Method: In this method 1 set of angles are used to secure the damper in the opening. This method is approved for use in UL approved concrete/masonry partitions and steel stud/gypsum walls. Only one side of the fire partition will have the angles installed (see Fig. 7). One Angle Method is approved for 1/2 hour dampers only, vertical and horizontal (angles on top side only) orientations, and the maximum size shall be 42” wide x 48” high (1067mm x 1219mm) and up to the maximum multi-section UL approved damper size (see Underwriter’s Laboratories Listings for maximum assembly sizes). Angle shall be a minimum of 1 1/2” x 1 1/2” (38mm x 38mm) by 16 gauge. Angles are to be fastened to the sleeve on 6” (152mm) centers with #10 (M5) sheet metal screws, 1/4” (5mm) steel pop rivets, 1/2” (13mm) tack welds, or 3/16” (6mm) diameter nut and bolts with not more than 2” (51mm) from each end with a minimum of two connections on each side/leg top and bottom. The angles are also to be fastened to the fire partition with: in concrete/masonry partitions with #10 (M5) self-tapping concrete anchors or concrete screws on 6” (152mm) centers and must engage the fire partition a minimum of 1 1/2” (38mm); in steel stud/gypsum partitions secure the angles to the partition with #10 (M5) screws long enough to penetrate the J-Runners and E-Stud by a minimum of 3/8” (10mm). Use a minimum of two fasteners per side. The angles are to overlap the partition a minimum of 1” (25mm). These angles may be of a unit type construction and may or may not be fastened to each other at the corners. When the duct work terminates at the damper or installation prohibits angles from turning out away from the wall, the retaining angle shall be reversed (leg turned into the opening) providing the size of the opening is increased by an amount equal to twice the combined thickness of the angle and the height of the screw or bolt head to maintain expansion clearances. Angles can be placed in front of or behind the drywall attaching directly to the steel studs or masonry. PRICE’s Frame Retaining Angles (FRA) can be used in place of the angle mentioned above. See note 1 for information on clearances. See Fig. 7 for detailed drawings of installations.

4. Actuator Connections (if applicable):
   Electrical and/or pneumatic connections to damper actuators (if provided) should be made in accordance with wiring and piping diagrams developed in compliance with applicable codes, ordinances and regulations. Be sure to check actuator for proper voltage and current draw. Tampering with the actuator’s installation or connecting the actuator to an improper voltage and current may void the warranty.
Out of wall partitions / Breakaway connections

Figure 3 - Traditional Breakaway Style Transverse Joints
Transverse joints illustrated at right have always been approved as breakaway connections. SMACNA testing has also approved the following variations as breakaway connections:
- Standing “S” joints can be applied with #10 sheetmetal screws (through joint and duct) subject to the following limitations: Maximum 2 screws in each side and in bottom joint.
- Transverse joints illustrated can be applied as top and bottom joints with Drive Slip - side joints in duct heights up to 20 inches. (508mm)

Round and Oval Duct Breakaway Connections
Round or flat oval ducts connected to Type R, CR or CO damper collars may use #10 sheetmetal screws as follows:
- Ducts to 22” (559mm) wide (or dia.) and smaller may use 3 screws.
- Ducts larger than 22” (559mm) wide (or dia.) and up to 36” (914mm) dia. may use 5 screws.
- Ducts larger than 36” (914mm) wide (or dia.) may use 8 screws.

NOTE: All breakaway connections described may have duct sealant applied in accordance with SMACNA recommendations.

Figure 4 - Manufactured Flanged System Breakaway Connections
Flanged connection systems manufactured by Ductmate, Ward, and Nexus are approved as breakaway connections when installed as illustrated.

Figure 5 - Proprietary Flange System Breakaway Connections
TDC and TDF systems are approved as breakaway connections when installed as described in the TDC or TDF addendum to the SMACNA Duct Construction Standards except the corners may not be bolted. Standard 6” (152 mm) metal clip may be used with spacing as shown in diagram.

Figure 6 - Clip Spacing

All Metric dimensions ( ) are soft conversion. Imperial dimensions are converted to metric and rounded to the nearest millimetre.
Out of Wall Partitions for Fire Dampers (Static & Dynamic) and Fire Smoke Dampers
Installation Instructions

Out of wall partitions / Breakaway connections

Fig. 6 - Grille Mount (No Angle) Method

With "-OW" or "-FA" Damper

UL Approved Wall Design

3/4" Flange
(Typ. 4 Sides)
20 Ga. St.

Steel Sleeve

Thermal Insulation
Factory Supplied
(Typ. 3 Sides)*

Fire/Smoke Damper
or Curtain Fire Damper

Steel/Gypsum
UL Approved
Wall Design

Gypsum

Fire/Smoke Damper
or Curtain Fire Damper

Gypsum

3/4" Flange
(Typ. 4 Sides)
20 Ga. St.

#10 Sheet Metal
Screws, 6" oc.

Masonry

Concrete Anchors,
6" oc.

Masonry

Fig. 7 - Continuous Duct (One Angle) Method

Steel/Gypsum or Masonry
As Found in the UL File
Resistance Directory

Fire Wall
Factory Installed
Insulation
(Typ. 3 sides)*

Steel/Gypsum
Wall

Steel/Gypsum

Wall

Fire Rated Partition
5" Max.

Factory Installed
Insulation
(Typ. 3 sides)*

Steel/Gypsum

Wall

Masonry

Wall

Factory Installed
Insulation
(Typ. 3 sides)*

Steel/Gypsum

Wall

Masonry

Wall

Fire/Smoke Damper
or Curtain Fire Damper

*Typical 3 sides when mounted vertically as shown, or typical 4 sides when mounted horizontally.

The curtain and airfoil blade type fire damper installation is the same as the 3-V blade type fire damper shown.
This instruction sheet has been reviewed and accepted by Underwriters Laboratories.

When UL is referred to in this document, it represents UL/ULC.
Optional Sealing of Dampers in Fire & Smoke Rated Walls or Floor Openings
Installation Instructions

Only if required by the authority having jurisdiction

Application:
The need to seal the damper in the penetration is not required by Underwriters Laboratories.
PRICE dampers have been tested and approved to be mounted without the use of sealants around the perimeter space between the damper and the penetration. In certain cases, local codes request that this space be sealed to try and keep the integrity of the smoke barrier. These instructions have been produced to give direction where to apply caulk, if required by local codes. Suggested brands of caulk to use are Dow Corning 999, Dow Corning Silastic 732, Nuflex 302 and GE RTV 108 Sealant. Read and follow the sealant manufacturer’s directions. Apply a continuous bead of caulk in the areas shown below. Do Not Apply sealant within the required expansion gap between the damper and the fire rated wall or floor. Allow the sealant to set up and become tack-free before operating the damper. See PRICE’s standard installation instructions for the basic installation of the damper. These instructions are for use following damper installation. Permission from the local codes inspector should be acquired before use of these instructions, to insure conformity with the local codes.

Manufacturer’s Recommendations
All moving parts of the damper must be inspected and cycled at intervals not greater than every six months and in accordance with the latest edition of NFPA 90A, 92A, local codes and the actuator manufacturer. In addition, fuse links shall be removed and inspected for corrosion. Dry lubricants are recommended.

Procedure:
1. Follow PRICE’s standard/general installation instructions for proper installation of the damper in the wall / floor.
2. Clean all areas where the sealant is going to be applied. Remove dirt, oil, grease, or moisture from surface to be sealed. Allow to dry thoroughly.
3. Using G.E. RTV 108, Dow Corning Silastic 732 RTV, Nuflex 302 or Dow Corning 999 Silicone Caulk, apply a continuous bead around the outside perimeter of the retaining angle, sealing them to the fire wall/floor (6). Do not apply caulk between angle and wall/floor. Also apply a continuous bead between the retaining angle and the damper sleeve(7). Be sure to seal the joints/corners of the retaining angles.
4. Be sure not to apply or get sealant within the required expansion gap between the sleeve and the fire wall/floor penetration. This gap is necessary for thermal expansion in the event of a fire.
5. After sealant is applied and before it sets-up, press the surface of the sealant in place to dispel any air. Do not operate the damper until the sealant has become tack-free.

This instruction sheet has been reviewed and accepted by Underwriters Laboratories due to test performed by PRICE.
Curtain Fire Damper Sizing Chart - TYPE B

TYPE B
Single Section

\[ W = \text{Width (Duct)} \]
\[ H = \text{Height (Duct)} \]
\[ X = H + B \]
\[ B = \text{Blade Stack} \]
(see chart)

For dampers one section high:

<table>
<thead>
<tr>
<th>Duct Height (H)</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 20” (508)</td>
<td>2”  (51)</td>
</tr>
<tr>
<td>21” (533) to 32” (813)</td>
<td>3”  (76)</td>
</tr>
<tr>
<td>33” (838) to 42” (1067)</td>
<td>4”  (102)</td>
</tr>
<tr>
<td>43” (1092) to 55” (1397)</td>
<td>5”  (127)</td>
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</tbody>
</table>

For VERTICAL dampers two sections high:

<table>
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<th>Duct Height (H)</th>
<th>B</th>
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<tr>
<td>up to 64” (1626)</td>
<td>3”  (76)</td>
</tr>
<tr>
<td>65” (1651) to 84” (2134)</td>
<td>4”  (102)</td>
</tr>
<tr>
<td>85” (2134) to 115” (2921)</td>
<td>5”  (127)</td>
</tr>
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</table>

For HORIZONTAL dampers two sections high:

<table>
<thead>
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<th>Duct Height (H)</th>
<th>B</th>
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</thead>
<tbody>
<tr>
<td>up to 32” (813)</td>
<td>4”  (102)</td>
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</table>

Note: See maximum section size for relevant hourly rating and mounting position to determine which chart to use.
Curtain Fire Damper Sizing Chart - TYPE C

**TYPE C w/Square Inlet**

![Diagram of TYPE C w/Square Inlet]

\[ H = \text{Height (Duct)} \]
\[ X = H + C \]
\[ C = \text{Blade Stack} \]

(see chart)

**TYPE C w/Round Inlet**

![Diagram of TYPE C w/Round Inlet]

**TYPE C w/Oval Inlet**

![Diagram of TYPE C w/Oval Inlet]

For dampers one section high:

<table>
<thead>
<tr>
<th>Duct Height (H)</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 20&quot; (508)</td>
<td>3&quot; (76)</td>
</tr>
<tr>
<td>21&quot; (533) to 31&quot; (787)</td>
<td>4&quot; (102)</td>
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<tr>
<td>32&quot; (813) to 42&quot; (1067)</td>
<td>5&quot; (127)</td>
</tr>
<tr>
<td>43&quot; (1092) to 54&quot; (1372)</td>
<td>6&quot; (152)</td>
</tr>
<tr>
<td>55&quot; (1397) to 64&quot; (1626)</td>
<td>4&quot; (102)</td>
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<td>65&quot; (1651) to 84&quot; (2134)</td>
<td>5&quot; (127)</td>
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<tr>
<td>85&quot; (2159) to 114&quot; (2896)</td>
<td>6&quot; (152)</td>
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</table>
Curtain Fire Damper Sizing Chart - Examples

**Type A:**
- Width (W) = same as duct
- Height (H) = same as duct
- **e.g.** Duct = 40” x 36” (1016 x 914)
  - Damper* = 40” x 36” (1016 x 914)
  - Opening** = 40½” x 36½” (1029 x 924)

**Type B:**
- Width (W) = same as duct
- Height (H) = same as duct
- Damper Height (X) = H + B (see chart on page 1)
- **e.g.** FD-B-V, 1½ hour
  - Duct = 40” x 36” (1016 x 914)
    - Maximum single section height is 55” (1397) for FDD-B-V, 1½ hour
    - From chart for single section high damper, B = 4” (102)
  - Damper* = 40” x 40” (1016 x 1016)
  - Opening** = 40½” x 40½” (1029 x 1029)
  - **e.g.** FDD-B-H, 3 hour
    - Duct = 24” x 24” (610 x 610)
      - Maximum single section height is 21” (533) for FDD-B-H
      - From chart for horizontal 2 section high damper, B = 4” (102)
    - Damper* = 24” x 28” (610 x 711)
    - Opening** = 24½” x 28½” (616 x 721)

**Type C (square or oval inlet):**
- Width (W) = same as duct
- Height (H) = same as duct
- Damper Width = W + 1” (25)
- Damper Height (X) = H + C (see chart on page 2)
- **e.g.** Duct = 15” x 6” (381 x 152)
  - From chart, for 6” (152) height, C = 3” (76)
  - Damper* = 16” x 9” (406 x 229)
  - Opening** = 16¼” x 9¼” (413 x 235)

**Type C (round inlet):**
- Diameter (D) = same as duct
- Damper Width = D + 1” (25)
- Damper Height (X) = D + C (see chart on page 2)
- **e.g.** Duct = 12” dia. (305)
  - From chart, for 12” (305) height, C = 3” (76)
  - Damper* = 13” x 15” (330 x 381)
  - Opening** = 13¼” x 15¼” (337 x 387)

**Notes:**
- * - Dampers are ordered by nominal duct size. Actual damper dimension will be ¼” (6) undersized on both height and width.
- ** - For exact opening sizes applicable see installation instructions.
- *** - Damper sizing may vary slightly by model. See charts on submittal drawing for each model.
Although the primary purpose of a fire damper is to maintain the fire resistance of a fire separation, its inclusion in the HVAC system of a building necessarily affects the air handling characteristics of the system during the normal operating mode. Fire dampers impose some resistance to air flow and therefore must be considered by the designer in determining the required flow rate (cfm) to each space. The main design considerations are: **Free Area, Flow and Pressure Drop.**

**FREE AREA:**
The total minimum area of the openings in the air outlet or inlet through which air can pass.

**Type A**
Free Area is expressed in sq. ft.

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**Type B**

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**Type C:** All 100% Free Area

**Note:** Above data applies to single section dampers only.
**Performance Characteristics**

**PRESSURE DROP:** A dynamic loss of static pressure as a result of damper obstructions. This is expressed as a measure of the Free Area X Free Area Velocity versus Static Pressure Drop (inches W.G.).

*cfm = Free Area (sq. ft.) x Free Area Velocity (fpm or cfm/sq. ft.)*

---

**Type A**

Static Pressure Drop (In. W. G.)

- 1.0
- 0.8
- 0.6
- 0.4
- 0.2
- 0.0

fpm*

- 6
- 7
- 8
- 9
- 1000
- 2000
- 3000
- 5000

---

**Type B**

Static Pressure Drop (In. W. G.)

- 1.0
- 0.8
- 0.6
- 0.4
- 0.2
- 0.0

fpm*

- 1000
- 2000
- 3000
- 4000
- 5000

---

**Type C**

Static Pressure Drop (In. W. G.)

- 2.0
- 1.6
- 1.2
- 0.8
- 0.4
- 0.0

fpm*

- 1000
- 2000
- 3000
- 4000
- 5000

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### The Controversy

By offering two frame styles, A and B, to accommodate low and medium velocity duct systems, respectively, the fire damper industry has attempted to serve the needs of the HVAC designer. However, this accommodation has inadvertently caused some conflict of interest. To explain, most contractors prefer to use Type A fire dampers whenever possible because of their low cost and ease of installation (a further cost savings versus Type B). Engineers, on the other hand, prefer the more expensive Type B fire dampers because of their superior air handling characteristics.

### Rule of Thumb

As a natural result of these different interests, an industry “Rule of Thumb” developed:

- For low and medium velocity duct up to 12” (305mm) height, use Type B.
- For low and medium velocity ducts over 13” (330mm) height, use Type A.
- For high velocity duct systems, use Type C.

### Third Generation

PRICE's third generation fire damper permits improvement in this guideline. By virtue of our narrow blade profile, we are able to offer greater free area than ordinary Type A's. We are also able to offer a less costly fire damper than the wide blade A's which use more material. In summary, our third generation Type A offers the least costly fire damper with the greatest free area.

### PRESSURE LOSS COMPARISON CURVES

<table>
<thead>
<tr>
<th>Size</th>
<th>% Free Area</th>
<th>Static Pressure Drop at 1500 fpm (inches W.G.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A Old Style</td>
<td>A 3rd Generation</td>
</tr>
<tr>
<td>12 x 12</td>
<td>72%</td>
<td>78%</td>
</tr>
<tr>
<td>20 x 20</td>
<td>74%</td>
<td>83%</td>
</tr>
<tr>
<td>30 x 30</td>
<td>79%</td>
<td>86%</td>
</tr>
<tr>
<td>40 x 40</td>
<td>82%</td>
<td>88%</td>
</tr>
</tbody>
</table>

**SI Units**

To convert cubic feet per minute (cfm) to cubic meters per second (m³/s) multiply by 0.000 471 947.

To convert feet per minute (fpm) to meters per second (m/s) multiply by 0.005 080.

To convert inches of water to pascals (Pa) or newtons per square meter (N/m²), multiply by 249.082.

To convert square inches to square meters, multiply by 0.000 645 16.

To convert inches to meters, multiply by 0.0254.
Model FRA

Model
Frame Retaining Angles FRA

Standard Construction:
16 ga. 1 1/2" x 1 1/2" (38 mm x 38 mm) Formed Galvanized Steel with staked corners.

Sizes: Maximum and minimum sizes correspond to the individual damper model. Check the appropriate submittal sheet or size chart.

Installation:
1. Install damper within fire separation as detailed in the appropriate damper installation instruction sheet. Omit the normal perimeter angles.
2. Place the model FRA angle around the damper sleeve on both sides of the fire separation as shown below.
3. The FRA angles must be attached to the sleeve with #10 sheet metal screws, tack or spot welds, 1/4" (6 mm) bolts and nuts, or 3/16" (5 mm) steel pop rivets. The fasteners must be spaced 6" (152mm) on centers and be a maximum of 2" (51 mm) from the corners. A minimum of two fasteners is required on each top, bottom or side of the damper sleeve.

Application:
PRICE Model FRA Framed Retaining Angles may be used instead of the normal mounting angles being used at present. The model FRA retaining angles can be installed on PRICE curtain fire dampers, multi-bladed fire dampers and combination fire/smoke dampers with 1 1/2 hr. or 3 hr. vertical or horizontal fire ratings. FRA angles are factory supplied two per damper.

Manufacturer's Recommendations
All moving parts of the damper must be inspected and cycled at intervals not greater than every six months and in accordance with the latest edition of NFPA 90A, 92A, local codes and the actuator manufacturer. In addition, fuse links shall be removed and inspected for corrosion. Dry lubricants are recommended.

Specifications are correct at time of printing. However, as part of our 'continuous improvement program,' we reserve the right to make further improvements without notice.