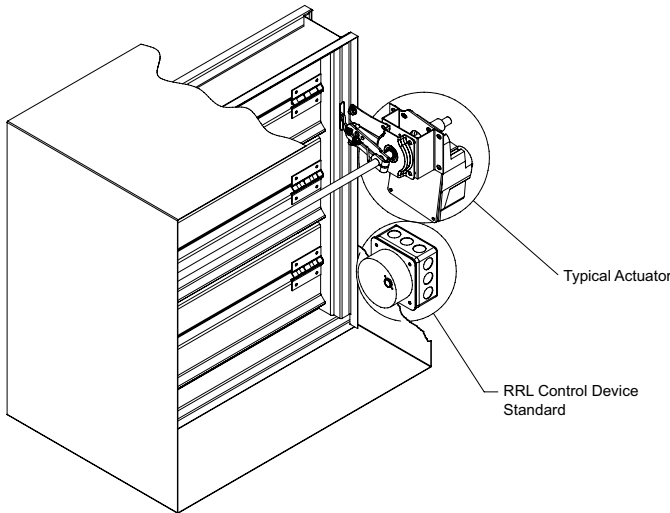




Part Number 464087
FSD-MXXX, DFD-MXXX SERIES
1 1/2 and 3 Hour

Fire & Combination Fire Smoke Dampers
(with factory installed sleeve and actuator)
Vertical and Horizontal Mount

Installation, Operation, and Maintenance Instructions



FSD-MXXX, DFD-MXXX Series Dampers are intended for installation in accordance with combination fire smoke damper requirements established by:

National Fire Protection Association

NFPA Standards 80, 90A, 92A, 92B, 101, & 105

IBC International Building Codes

“UL CLASSIFIED (see complete marking on product)”

“UL CLASSIFIED to Canadian safety standards (see complete marking on product)”

UL Standard 555 & 555S (Classification #R13317)

RECEIVING AND HANDLING

Upon receiving dampers, check for both obvious and hidden damage. If damage is found, record all necessary information on the bill of lading and file a claim with the final carrier. Check to be sure that all parts of the shipment, including accessories, are accounted for.

Dampers must be kept dry and clean. Indoor storage and protection from dirt, dust and the weather is highly recommended. Do not store at temperatures in excess of 38°C.

Electrical Guidelines

All wiring shall be done in accordance with the National Electrical Code ANSI/NFPA-70 latest edition, any local codes that may apply, and wiring diagrams developed in compliance with the job or project design and specifications.

Safety Caution!

Electrical input may be needed for this equipment. This work should be performed by a qualified electrician. Verify power before wiring actuator. Greenheck is not responsible for any damage to, or failure of the unit caused by incorrect field wiring. To avoid causing death or serious bodily harm to building occupants, follow all instructions carefully. Dampers must close completely to preserve the integrity of the fire smoke separation.

WARRANTY

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the purchase date. Any units or parts which prove to be defective during the warranty period will be repaired or replaced at our option. Greenheck shall not be liable for damages resulting from misapplication or misuse of its products. Greenheck will not be responsible for any installation or removal costs. Greenheck will not be responsible for any service work or backcharges without prior written authorization.

SAFETY WARNING:

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating, and maintenance instructions thoroughly before installing or servicing this equipment.

Due to continuing research, Greenheck reserves the right to change specifications without notice.

This manual is the property of the owner, and is required for future maintenance. Please leave it with the owner when the job is complete.

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Pre-Installation Guidelines

The basic intent of a proper installation is to secure the fire or fire smoke damper in, not to, the opening in such a manner as to prevent distortion and disruption of damper operation. This is accomplished by allowing the fire or fire smoke damper in rated separation openings to expand and for the connecting duct to separate in the event of the collapse of the hanging system. The following items will aid in completing the damper installation in a timely and effective manner.

- 1) Check the schedules for proper damper locations within the building. Visually inspect the damper for damage and verify that the Reusable Resettable Link (RRL) is in place or has not activated. Never install a fire damper without the proper UL approved RRL in place. (RRL is standard control option. These electric links have a button for resetting.) If damper is furnished with fusible link, visually inspect the link to verify its not missing or broken. Replace link as necessary.
- 2) Lift or handle damper using sleeve or frame. Do not lift damper using blades or actuators.
- 3) Damper has label on outside of sleeve indicating a 'No Screw' area. Do not install screws into this area as screws may interfere with unexposed blade linkage and prevent damper blades from opening and/or closing.
- 4) Damper has label indicating position of damper and sleeve assembly in the wall. Install accordingly to comply with manufacturer's appropriate UL Classification file number.
- 5) Damper must be installed into duct or opening square and free of twist or other misalignment. Damper must not be squeezed or stretched into duct or opening. Out of square, racked, twisted or misaligned installations can cause excessive leakage and/or torque requirements to exceed damper/actuator design.
- 6) Damper and actuator must be kept clean and protected from dirt, dust and other foreign materials prior to and after installation. Examples of such foreign materials include but are not limited to:
 - a) Mortar dust
 - b) Drywall dust
 - c) Firesafing materials
 - d) Wall texture
 - e) Paint overspray
- 7) Damper should be sufficiently covered as to prevent overspray if wall texturing or spray painting will be performed within 5 feet of the damper. Excessive dirt or foreign material deposits on damper can cause excessive leakage and/or torque requirements to exceed damper/actuator design.
- 8) Caulking is not necessary, nor is it allowed, between the damper sleeve and the wall or floor opening (annular space). However, caulking may be applied to the retaining angles.
- 9) ACCESS: Suitable access (such that RRL's and actuators can be maintained, etc.) must be provided for damper inspection and servicing. Where it is not possible to achieve sufficient size access, it will be necessary to install a removable section of duct. (Refer to NFPA 90A).
- 10) The Code Authority Having Jurisdiction (AHJ) must evaluate and provide approval of final installation where variations to these instructions are necessary.

Installation - Failure to follow these instructions will void all warranties.

These instructions apply to 1½ and 3 hour rated combination fire smoke dampers mounted (blades must be horizontal) in: 1) masonry, block or stud walls and 2) concrete floors or ceilings. Specific requirements in these instructions are mandatory. Dampers must be installed in accordance with these instructions to meet the requirements of UL 555 and UL 555S. The installation of the damper and all duct connections to the damper sleeve shall conform to the latest editions of NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems, and the SMACNA Fire, Smoke and Radiation Damper Installation Guide, and U.L. Classifications R13317.

Note: Combination fire smoke dampers are manufactured and labelled for either vertical or horizontal installation. The dampers must be installed in accordance with labelling.

1. CLEARANCES REQUIRED BETWEEN FIRE DAMPER SLEEVES AND WALL/FLOOR OPENINGS

Fire damper and sleeve assemblies expand during periods of intense heat. Therefore, it is essential that openings in walls or floors be larger than the fire/smoke damper and sleeve assembly to allow for this expansion. Minimum clearances required between the outside of fire damper sleeve assemblies and wall/floor openings are:

- Galvanized steel fire dampers and sleeves: 3mm per .3 meter of damper width and height with a minimum

clearance of 6mm, maximum of 38mm. Recommended clearances, for width and/or height dimensions of:

- 1) 1219mm or less: 13mm clearance
- 2) More than 1219mm and 2438mm or less: 25mm clearance
- 3) More than 2438mm: 38mm clearance

These are total clearances (ignoring fastener heads) and do not need to be equally spaced around the damper. Refer to Section 4 and Figure 6 for additional installation considerations.

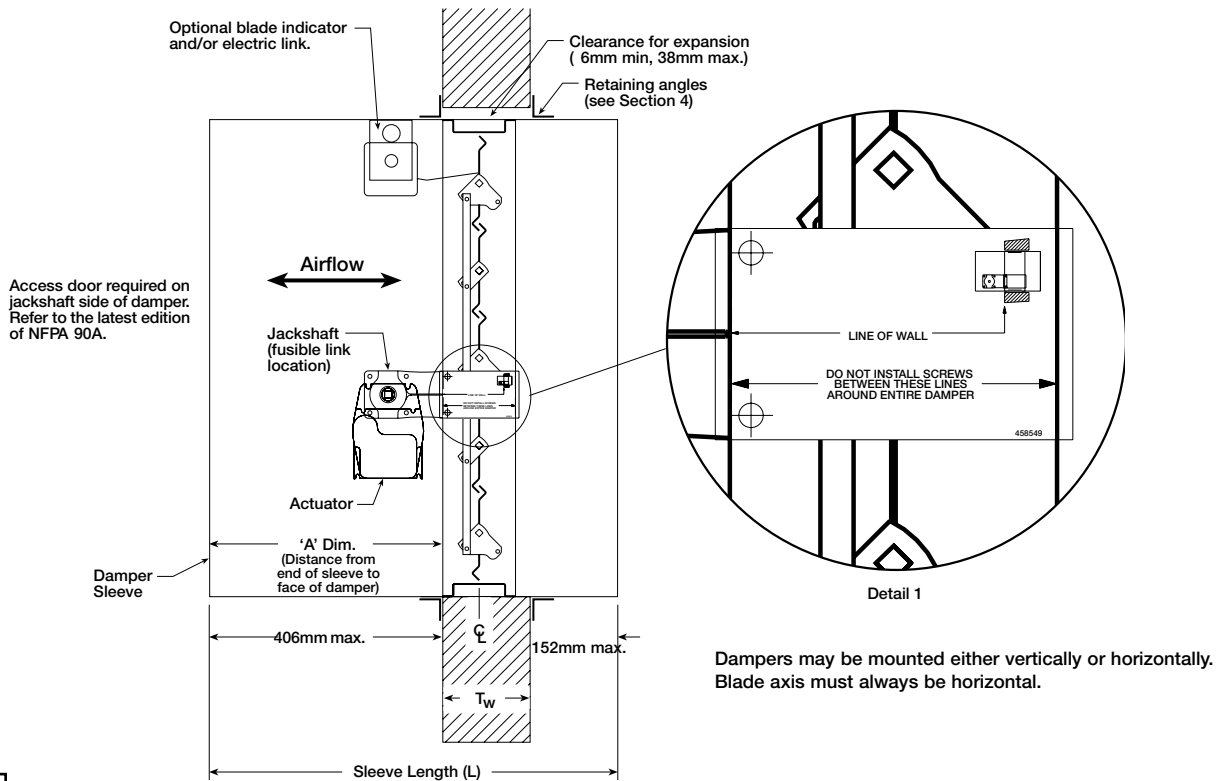


Fig. 1

Example:
 A 305mm x 305mm damper will require a minimum clearance of 6mm.
 A 914mm x 305mm damper will require a minimum clearance of 13mm on width and 6mm on height.

2. SLEEVE LENGTH AND WALL THICKNESS

Insert the sleeved damper assembly into the prepared opening, to appropriate depth (refer to label on outside of sleeve for location of damper in wall; see Page 3, Dimension A and Detail 1, Fig. 1).

Recommended maximum and minimum insertion depth can be exceeded if:

- 1) The operation of the damper is not impeded and
- 2) The \varnothing of the damper frame remains within the plane of the wall and
- 3) Attachments made through the retaining angle do not penetrate the 'No Screw' area designated on the damper sleeve.

IMPORTANT SAFETY DANGER! : To avoid causing death or serious bodily harm to building occupants, do not penetrate the 'No Screw' area designated on the damper sleeve or the damper may not close properly.

The sleeve may extend a maximum of 406mm beyond the wall or floor on the actuator side of the damper and a maximum of 152mm on the opposite side. Recommended standard sleeve lengths for various wall thicknesses are:

Wall Thickness Dimension (T _w)	Sleeve Length Dimension (L)
102mm - 152mm	406mm
178mm - 254mm	533mm
279mm - 330mm	610mm

3. DUCT TO SLEEVE CONNECTIONS

Dampers are supplied with sleeves and actuators from the factory and can be installed without the need for additional field installed sleeves.

Thickness of factory furnished sleeve determines the type of duct to sleeve connections required (see table below). Any duct connection other than the breakaway connections described on page 7 are considered rigid. Factory furnished duct collars, type R and O, are also considered breakaway (see Fig. 2)

4. SECURING THE DAMPER/SLEEVE ASSEMBLY TO WALL AND FLOOR OPENINGS (for single side retaining angle instructions, see supplements)

Damper/sleeve assemblies must be installed in wall and floor openings using retaining angles on at least one side of the wall or floor as described below:

- Retaining angles for 1½ hour rated dampers with a width and height 1219mm or less must be a minimum of 1mm. Retaining angles for all 3 hour rated dampers and all dampers with a width or height greater than 1219mm must be a minimum of 1.5mm. The leg of the retaining angle on the damper sleeve shall be a minimum of 32mm. The leg of the retaining angle on the wall/floor shall be long enough to cover the annular space and overlap the wall/floor by a minimum of 25mm.
- Retaining angles must be attached to the damper using one or more of the following methods of attachment (refer to label on outside of sleeve for 'No Screw' area):
 - Tack or spot welds
 - M4.8 (19mm max.) sheet metal screws
 - M6 bolts and nuts
 - 5mm steel pop rivets

A minimum of two connections per side, top, and bottom, 305mm O.C. maximum for openings of 1219mm W x 914mm H and less, and 152mm O.C. for openings 2032mm W x 1270mm H, 1270mm W x 1829mm H, and 1016mm W x 1829mm H or less. The angles must be attached to all 4 sides of the sleeve. Ensure that attachment device does not interfere with the operation of the damper and the free movement of the damper blades. The angles need not be attached to each other at the corners. Do not secure the retaining angle to the fire separation.

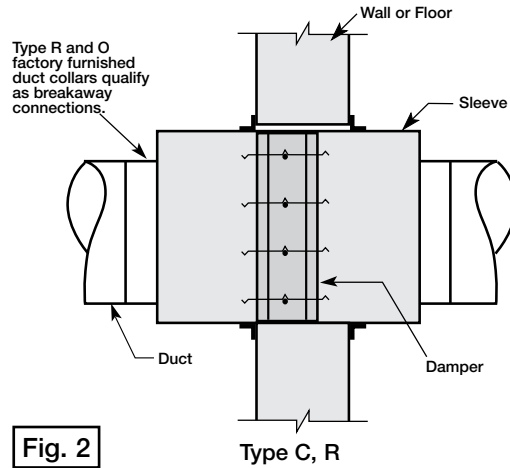


Fig. 2

Sleeve Gauge	Duct Dimension	Type of Duct to Sleeve Connection Permitted
1.5mm	914mm max. width 610mm max. height	Rigid only
1.5mm	All duct sizes	Breakaway only
.5 mm .6mm .7mm 1mm 1.2mm	305mm wide and under 306mm - 762mm wide 763mm - 1372mm wide 1373mm- 2134mm wide 2135mm wide and over	Breakaway only

See page 7 for additional information on breakaway sleeve connections. Sleeve thickness must not be less than the gauge of the connecting duct. UL Standard 555 requires all ducts to terminate at fire damper sleeves.

Horizontal Mount		
Damper Model	Maximum Single Section Size	Maximum Overall Size for Multi-Section Dampers
DFD-M210	914 x 914 or 813 x 1270	1626 x 1270
DFD-M230	914 x 914 or 813 x 1219	1626 x 1219
FSD-M211	914 x 1219 or 813 x 1270	3658 x 2438
FSD-M231	914 x 914 or 813 x 1219	1829 x 1219

Vertical Mount		
Damper Model	Maximum Single Section Size	Maximum Overall Size for Multi-Section Dampers
DFD-M210	914 x 914 or 813 x 1270	1626 x 1270
DFD-M230	914 x 914 or 813 x 1219	1626 x 1219
FSD-M211	914 x 1219 or 813 x 1270	3251 x 2540
FSD-M231	914 x 914 or 813 x 1219	1829 x 1219

4. SECURING THE DAMPER/SLEEVE ASSEMBLY TO WALL AND FLOOR OPENINGS (continued)

- Retaining angles should not be fastened to the wall/floor material. The angles should only sandwich the wall/floor and allow for damper expansion during periods of intense heat.

5. ACTUATOR CONNECTIONS

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

6. INSTALLING MULTIPLE DAMPER SECTION ASSEMBLIES

A damper assembly is not restricted to a maximum number of sections, but must not exceed the section sizes and overall sizes shown (see chart).

Two section high dampers require reinforcement using a 1.9mm thick, 127mm wide mullion as shown in **Figure 4** below, or two individually sleeved units stacked vertically, shown below in **Figure 5**. When using two individually sleeved units, the sleeve acts as the mullion, therefore no mullion is required.

Note: Dampers ordered for individual installation may not be installed together. The full assembly size must be specified at the time the dampers are ordered.

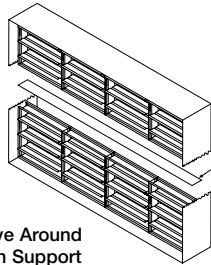


Fig. 4
Single Sleeve Around Outside with Support Mullion

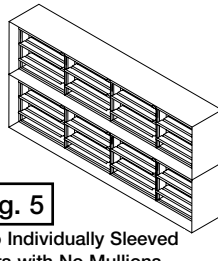


Fig. 5
Two Individually Sleeved Units with No Mullions

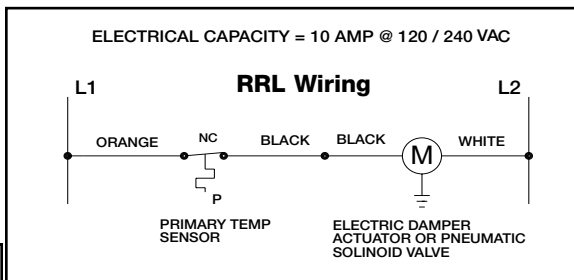


Fig. 6

NOTE: FSD model dampers fitted with a fusible link closure device are limited to single section sizes. Dampers with a fusible link and spring assembly closure device may not be used for multiple section applications.

The damper sections must be attached together with M4.8 (19mm max.) sheet metal screws, M6 diameter nuts and bolts, tack or spot welds, or 5mm diameter steel pop rivets. Attachments must be spaced a minimum of 152mm on centers and a maximum of 51mm from corners. (see **Fig. 3**) Attachments must be made on front face and back face (air entering and air exiting side) of damper sections.

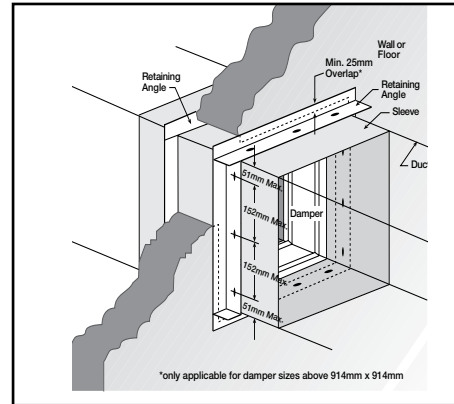


Fig. 3 Both vertical and horizontal damper installations are typified by these drawings.

7. CONNECTION AND OPERATION OF TEMPERATURE RESPONSE DEVICES (RRL STANDARD, OCI OPTION, AND TOR OPTION)

RRL - Dampers will be supplied with a thermostat-type temperature response device, as a standard. The device is a RRL (resettable link device), which only incorporates one thermostat and therefore the damper remains closed as soon as its sensor temperature is reached. The RRL does not contain blade indication switches. Refer to **Figure 6** for wiring of the RRL thermostat.

PRV - The PRV (pneumatic relief valve) option is heat responsive device used with pneumatic actuators. The PRV activates when temperature in excess of the temperature of the fusible link are detected. When the fusible link melts, air from the actuator is exhausted to close the dampers. Pneumatic actuators are to be piped per local code.

RATINGS

Integral Switch Type: Single Pole, double throw

Electrical Capacity: 10 Amps, 1/3 hp, 120 or 240 Vac
1/2 Amp, 125 Vdc; 1/4 Amp 250 Vdc
5 Amps, 120 Vac "L" (lamp load)
1.0 Amps, 24 Vac
1.5 Amps, 24 Vdc

Temperature Limit: 74° C (standard primary sensor)
100° C (optional primary sensor)
121° C (secondary sensor)
177° C (secondary sensor)

8. Recommended Preparation of Openings in Wood and Metal Stud Walls

- Frame wall openings as shown below. (see Fig. 9 & 10)
- Double vertical studs are not required for openings 914mm x 914mm or smaller.
- Gypsum wall board must be fastened 305mm on center to all stud and runner flanges surrounding opening. (see Fig. 11)
- All construction and fasteners must meet the requirements of the appropriate wall design (See UL Fire Resistance Directory) and/or local codes.

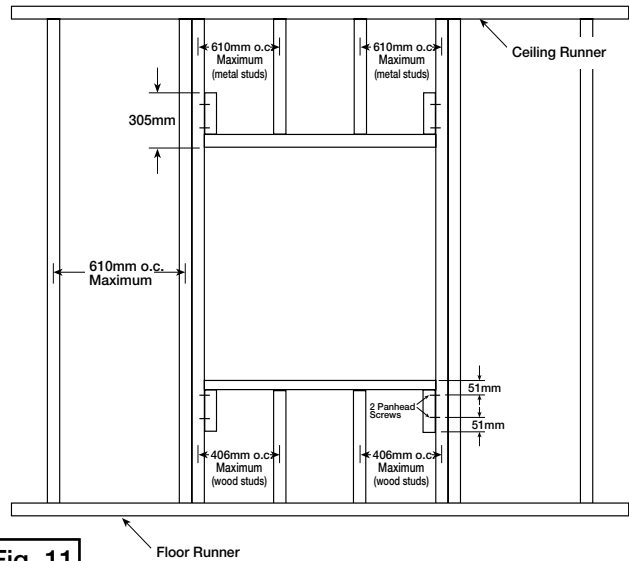


Fig. 11

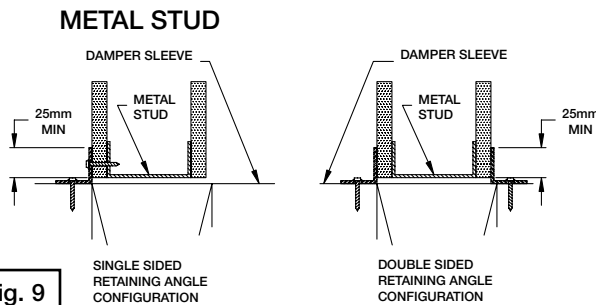


Fig. 9

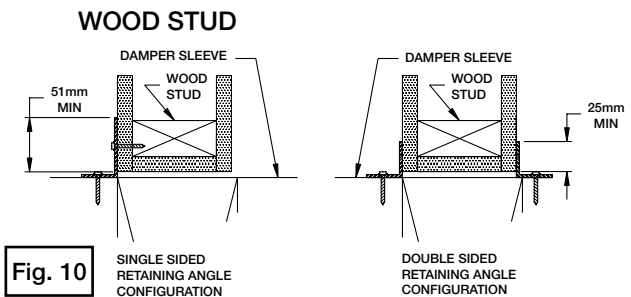


Fig. 10

9. Breakaway Connections

Traditional Breakaway Style Transverse Joints

Transverse joints illustrated at right have always been approved as breakaway connections.

- The breakaway connections shown to the right can be applied with M4.8 sheet metal screws (through joint and duct) subject to the following limitations: Maximum two 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 508mm.



Fig. 12

Round and Oval Duct Breakaway Connections

Round or flat oval ducts connected to Type R or O damper collars shall be attached with M4.8 sheet metal screws as follows:

- Ducts to 559mm wide (or dia.) and smaller shall have three screws.
- Ducts larger than 559mm wide (or dia.) up to and including 914mm wide (or dia.) shall have five screws.

NOTE: All breakaway connections described may have duct sealant applied, PA2084T duct sealant adhesive manufactured by Precision or DP1010 water base duct sealant by Design Polymetrics, Grey Pookie or Ductmate PROseal® in accordance with SMACNA recommendations.

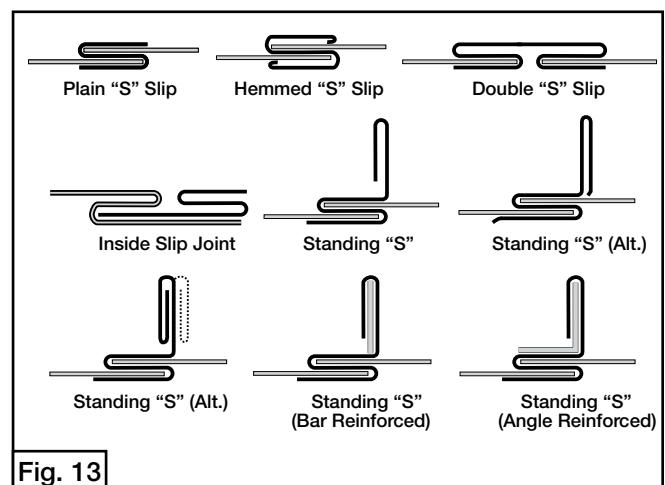


Fig. 13

Traditional

Manufactured

Manufactured Flanged System Breakaway Connections

Flanged connection systems manufactured by Ductmate, Ward, and Nexus are approved as breakaway connections when installed as illustrated.

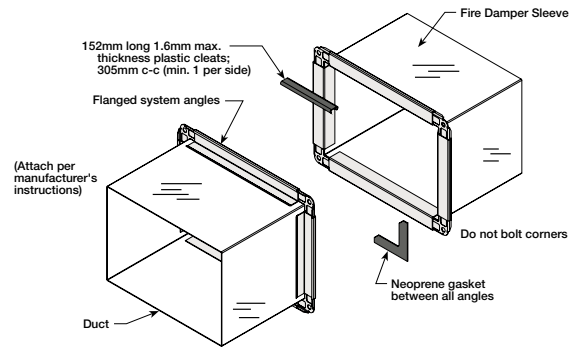


Fig. 14

Proprietary

Proprietary Flange System Breakaway Connections

(TDC by Lockformer, TDF by Engle) TDC and TDF systems are approved as breakaway connections when installed as described in the TDC or TDF addendum to the SMACNA Duct Construction. Standard 152mm metal clip may be used with spacing as shown in diagram.

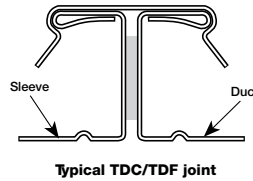


Fig. 15

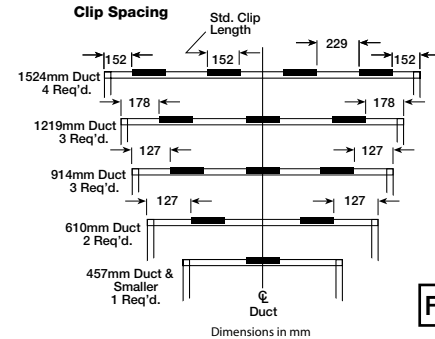


Fig. 16

Damper Maintenance

Dampers do not typically require maintenance as long as they are kept dry and clean. If cleaning is necessary, use mild detergents or solvents. If lubrication is desired for components such as axle bearings, jackshaft bearings and jamb seals, do not use oil-based lubricants or any other lubricants that attract contaminants such as dust.

Dampers and their actuator(s) must be maintained, cycled, and tested a minimum of every six months and in accordance with:

- The latest editions of NFPA 80, 90A, 92A, 92B, 101, 105, UL864, AMCA 503-03 and local codes.
- Actuator manufacturer recommendations.

Damper Troubleshooting

The following is a possible cause and correction list for common concerns with the dampers.

Sympton	Possible Cause	Corrective Action
Damper does not fully open and/or close	Frame is 'racked' causing blades to bind on jamb seals	Adjust frame such that it is square and plumb
	Actuator linkage loose	Close damper, disconnect power, adjust and tighten linkage
	Defective motor	Replace
	Screws in damper linkage	Damper installed too far into wall. Move out to line as designated on damper label
	Contaminants on damper	Clean with a non-oil based solvent (see Damper Maintenance)
RRL or TOR sensor tripped	Heat	Push reset button located on backside of RRL or TOR
Damper does not operate	No power supplied to the actuator	Add power supply

