



## CEILING RADIATION DAMPERS INSTALLATION INSTRUCTIONS

### Models Covered by These Instructions:

Butterfly Type: **CD-RD(-A), CD-RD(-A)/T, CD-S/R(-A)**

Fabric Blade Type: **CFS(-2F), CFSX (-2F), CFSR-1, CFSR-2, CFSM**

Hinged Type: **CD-P**

These installation instructions apply to ceiling radiation dampers mounted in 3 hour rated ceiling with supports from (1) a ceiling grid system, (2) ductwork above, or (3) structure above. Each type of damper support system is described with damper being mounted in conjunction with various air devices.

## CEILING RADIATION DAMPER APPLICATION

**Application:** Underwriters' Laboratories (UL/ULC) labeled ceiling radiation dampers are designed to function as a heat barrier in air handling duct outlets penetrating fire resistive membrane ceilings. They provide the necessary protection for air inlet and outlet penetrations in assemblies up to 3 hours, which are designed incorporating a "hinged door" damper. They are intended to restore and maintain the fire resistive integrity of the assembly and are for use in lieu of hinged door type dampers. Our UL/ULC labeled ceiling radiation dampers may be substituted for hinged door type dampers in individual ceiling designs as defined in UL's Fire Resistance Directory. For ceiling construction, refer to the UL Fire Resistance Directory.

**General Notes:** All assembly components such as hanger wires, diffuser pans, duct drops, sleeves, and ducts shall be constructed on steel. The instructions shown in these details are of a general nature. Actual installation must also conform to the UL Design as listed in the UL Fire Resistance Directory. Ceiling penetrations should be located within ceiling tiles or panels without necessitating cuts in the ceiling suspension main runners or cross tees. If required, a maximum of one cross runner or cross tee may be cut to enable proper damper location and installation. Each cut end shall be supported by a min. 12 SWG vertical hanger wire. Hanger wires shall not be sprayed. A 1/2" clearance must be maintained between the opening and the cut end of the runner or cross tee. In installations where the ceiling opening is greater than 1" larger (in any direction) than the ceiling damper, a thermal blanket (Ck-2000) shall be used to cover the exposed steel pan of the grille. If flex duct is used, it must be Class O or I type, bearing the UL listing mark. All butterfly type dampers are shipped from the factory with the blades closed. Even though one type of damper is shown in each drawing, all dampers mount in the same manner as the one shown, see Detail A.

**Connection Notes:** Attachment at locations, such as grille/damper and damper/duct, shall be min. #8 sheet metal screws, 3/16" steel rivets, 1/4" tack welds, or 1/4" nut and bolts. Fasteners for square/rectangular connections shall be a minimum of one per side spaced on a maximum of 6" centers. Fasteners for round connections shall be a minimum of 3 evenly spaced around the diameter up to a maximum of 6" on center. The connection of the damper and grille can be such that the damper slides over the neck of the grille or inside the throat of the grille. While installing fasteners, take special care so they do not interfere with the operation of the damper blades. When hanger wires are used, they must hang vertically and not be splayed, they are to be perpendicular to ceiling.

**Thermal Blanket:** In those installations where the opening in the ceiling membrane is larger than the ceiling damper (more than 1" in any dimension), a Thermal Insulating Blanket CK-2000-1 or CK-2000-1-B must be installed by laying over the exposed surface of the air inlet or outlet device. The Thermal Blanket rests upon and protects exposed portions of the air device and may fit inside adjacent Tee Bars (if any), or overhang the tee bar as with model CFSX.

**Fusible Link:** All CD models (Butterfly Type) are shipped from the factory with the blades closed. The fusible link must be installed at time of installation such that the blades are held open as shown at the right, Detail B. Model CD-P must have link installed after installation to duct or structural member above, (See Figure 3)

## DAMPERS SUPPORTED BY A CEILING GRID SYSTEM

Exposed Tee Bar ceiling grid systems often use "Lay In" supply and return grilles. With attention to the following requirements, the ceiling grid system provides all required support for installation of "Lay In" style ceiling dampers and the grilles.

Ceiling openings up to a 24" x 24" (576 sq. in.) maximum are allowable. Maximum size limits of each individual ceiling damper model must be observed.

The four corners of the tee bar containing the air device (or the midpoint of the adjacent cross-tees) shall be directly supported from the structural members of the floor or roof above it by 12 SWG minimum vertical hanger wires. When the duct extends over the intersections of the grid members, 16 ga. x 1-1/2" steel channels with 9/16" minimum flanges shall be used to ensure that the grid is supported from structural members by 12 SWG minimum hanger wires. All UL Classified ceiling assemblies require lay-in ceiling panels be cut to fill the remainder of hole openings larger than 24" x 24" and shall provide a minimum of 3/8" bearing on the ceiling grid members.

## Lay-In Diffuser Non-Ducted or Flex Duct Applications (Figures 1 and 1A)

Lay-In diffuser installs directly into exposed Tee bar grid system.

Ceiling damper attaches to diffuser neck (See Figure 1)

Thermal Blanket may be required (See Thermal Blanket Above)

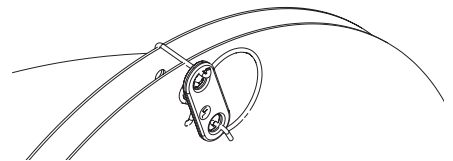
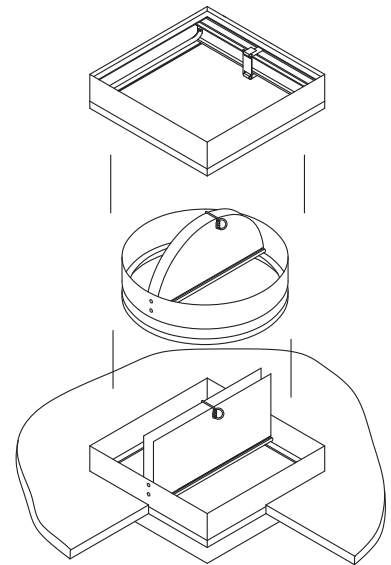
If flexible duct is used (See General Notes Above)

it shall be fastened to the diffuser neck with a steel clamp or

#16 SWG minimum wire.

- (1) The flexible air duct shall not rest on the back surface of the ceiling grid or panels (provide a minimum of 4" clearance).
- (2) The flexible air duct shall not interfere with the closing of the ceiling damper.

Detail A



Detail B

Figure 1

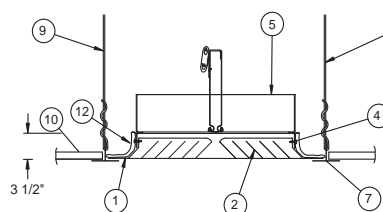
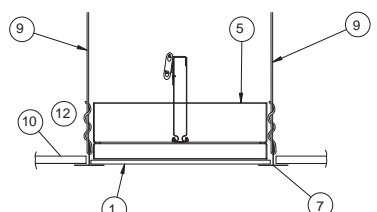


Figure 1A



**For Models CFSX (See Fig. 1, Page 1)**

Damper is supported directly by the grid system and may lay on top of perforated metal (or similar) grille core material. Skirt material must overhang the Tee bars around perimeter of the damper.

*Lay-In Diffuser With Steel Duct Drop (Figure 2)*

Lay-In Diffuser with steel duct drop installs directly into exposed Tee bar grid system. Thermal Blanket is required (See Thermal Blanket Page 1). Connection of ceiling radiation damper, diffuser neck, and steel duct drop (See Connection Note Page 1) may be satisfied in two ways:  
 (1) Ceiling radiation damper and diffuser neck may be connected directly to the duct drop (See Detail C)  
 – OR –  
 (2) Ceiling radiation damper may be connected directly to the diffuser neck and then the duct drop connected to the damper (See Detail D)

ITEM	DESCRIPTION
1.	Grille Frame (Steel)
2.	Diffuser or Grille Core (Metallic or Non-Metallic)
3.	Sheet Metal Duct
4.	#8 Sheet Metal Screw
5.	Ceiling Radiation Damper
6.	16 MSG X 1-1/2" Channel
7.	Ceiling Grid (UL Classified)
8.	Duct Drop
9.	12 SWG Steel Wire
10.	Acoustical Lay-In Panels (UL Classified)
11.	Rigid Gypsum/Drywall Wall Board Ceiling (UL Classified)
12.	Thermal Blanket, CK-2000-1 (-B)

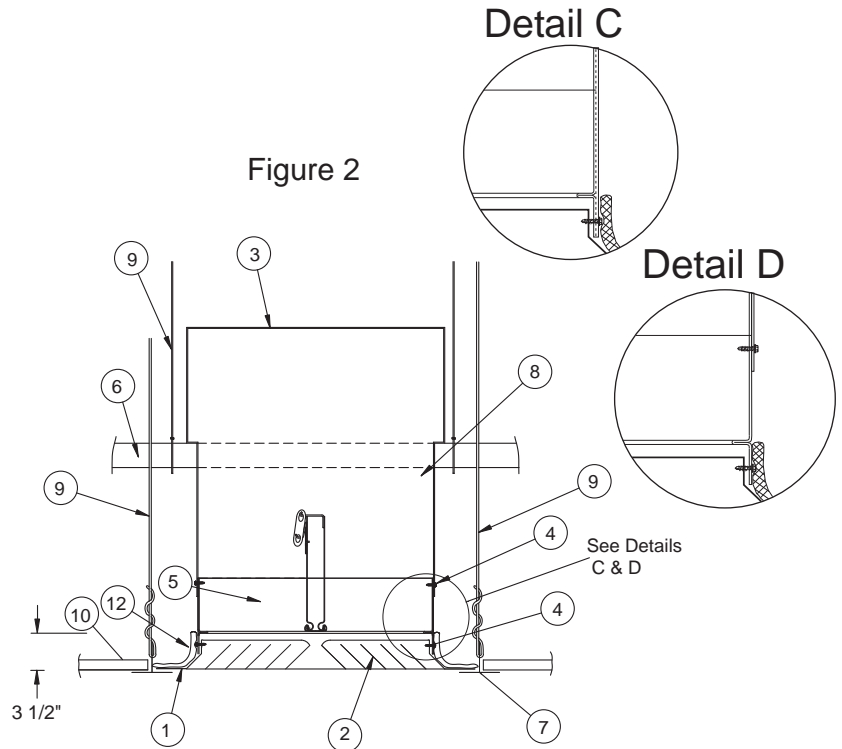


Figure 3

*Hinge Door Applications (Figure 3)*

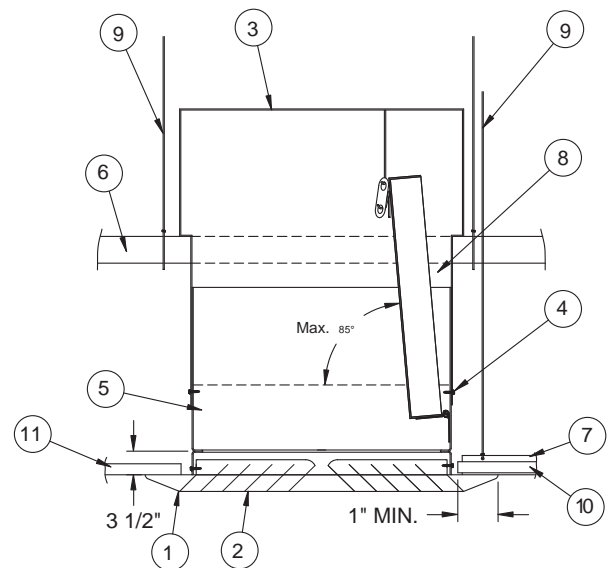
**For Model CD-P**

Ceiling radiation damper is the same size as the ceiling opening and installs directly into the exposed Tee bar grid system opening. Damper is supported directly by the grid system and may lay on top of perforated metal (or similar) grille core material. Fusible Link support wire must attach to duct or ceiling supports above.

*DAMPERS SUPPORTED BY DUCTWORK ABOVE*

**Note:** When main ducts are supported by 16 ga. x 1-1/2" steel channels (with 9/16" minimum flanges) located 1" to 3" from and on both sides of a steel duct drop and these channels are suspended by #12 SWG wire from structure above, the steel duct drop provides all required support for ceiling damper and grilles. Air device flange must overlap the ceiling membrane by a minimum of one inch.

Follow guidelines on Page 1 when preparing opening in the ceiling membrane and making connections.



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*Surface Mounted Grilles (Figure 4)*

Maximum size of permitted opening equals maximum size of available listed ceiling radiation dampers.

Opening in ceiling membrane (See Page 1) may be up to one inch larger than the nominal size of the ceiling radiation damper (i.e. a 12" x 12" (nominal) ceiling radiation damper could have a maximum ceiling membrane opening of 13" x 13").

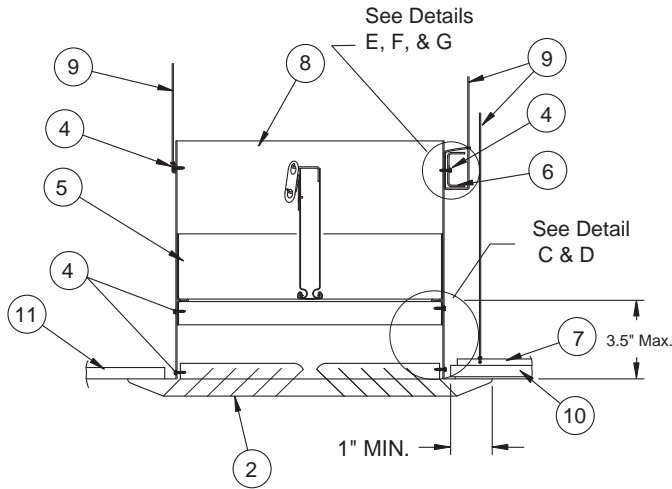
Connection of ceiling radiation damper, grille, and steel duct drop may be satisfied in two ways.

(1) Ceiling radiation damper and grille may be connected directly to the duct drop (See Detail C)

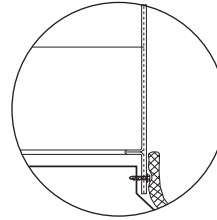
– OR –

(2) Ceiling radiation damper may be connected directly to the grille and then the duct drop connected to the damper (See Detail D)

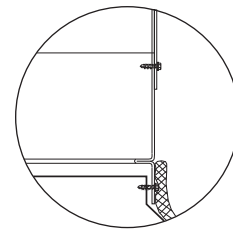
Figure 4



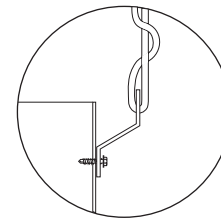
Detail C



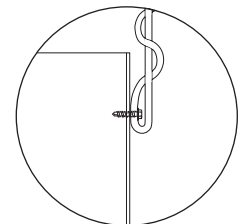
Detail D



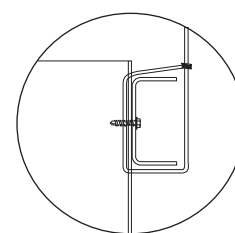
Detail E



Detail F



Detail G



*Recess Mounted Grilles (Figure 5)*

Opening in ceiling membrane is more than one inch larger than nominal size of ceiling damper (i.e. if the radiation damper is 12" x 12" (nominal), the ceiling membrane opening is larger than 13" x 13") A Thermal blanket is required.

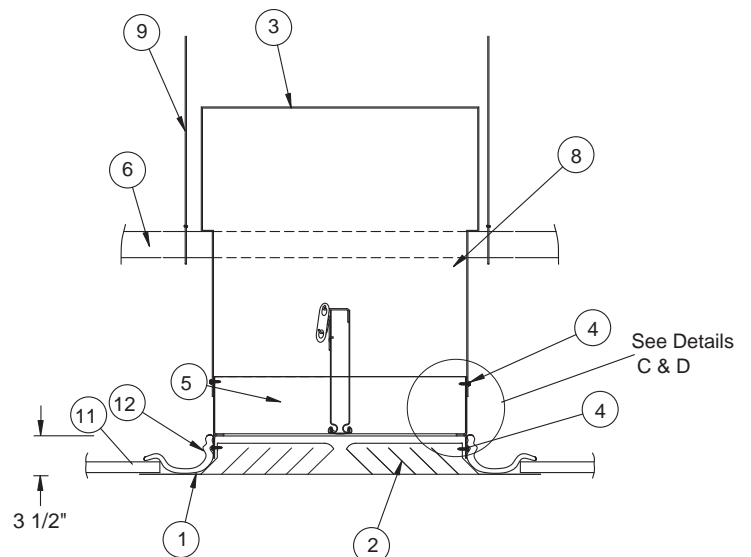
Connection of ceiling radiation damper, grille, and steel duct drop may be satisfied in two ways.

(1) Ceiling radiation damper and grille may be connected directly to the duct drop (See Detail C)

– OR –

(2) Ceiling radiation damper may be connected directly to the grille and then the duct drop connected to the damper (See Detail D)

Figure 5



**DAMPERS SUPPORTED DIRECTLY FROM STRUCTURE ABOVE**

**Note:** Ceiling radiation dampers and grilles may also be supported directly from the structure above using one or more of the methods described in Figures 6, and 7. When channels are to be used as support, they must be 16 ga. x 1-1/2" steel channels with 9/16" minimum flanges (2 required per damper on opposite sides). Grille flange must overlap the ceiling membrane by a minimum of one inch.

Refer to guidelines on Page 1 when preparing opening in the ceiling membrane and making connections.

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## Ducted and Ductless Surface Mounted Grilles (Figure 6)

Maximum size of permitted opening equals maximum size of available listed ceiling radiation dampers.

Opening in ceiling membrane may be up to one inch larger than the nominal size of the ceiling radiation damper (i.e. a 12" x 12" (nominal) ceiling damper could have a maximum ceiling membrane opening of 13" x 13")

Connection of ceiling radiation damper and grille may be satisfied in three ways

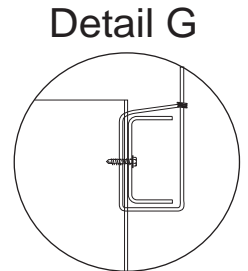
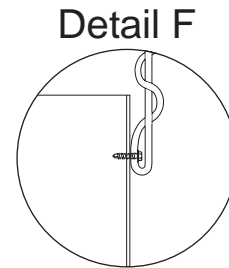
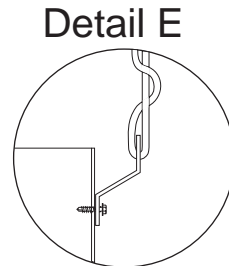
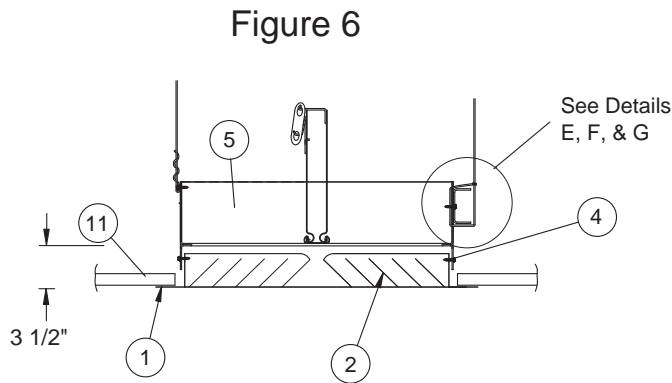
(1) Ceiling radiation damper may be connected directly to the grille and supported by steel channel (See Detail G)

- OR -

(2) Ceiling radiation damper may be connected directly to the grille and supported by hanger straps (See Detail E)

- OR -

(3) Ceiling radiation damper may be connected directly to the grille and supported by direct suspension with wires looped around screws through holes in the damper frame before tying (See Detail F)



## Ducted and Ductless Recess Mounted Grilles (Figure 7)

Opening in ceiling membrane is more than one inch larger than nominal size of ceiling damper (i.e. if the ceiling radiation damper is 12" x 12" (nominal) the ceiling membrane opening is larger than 13" x 13") Maximum size of opening is 24" x 24" (576 sq. in.)

Thermal blanket is required (See Thermal Blanket Page 1)

Connection of ceiling radiation damper and air device neck may be satisfied in three ways

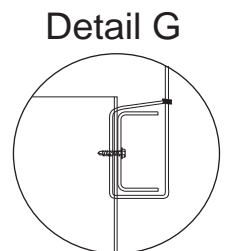
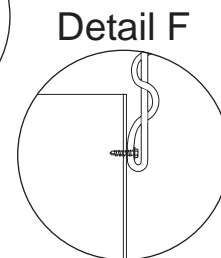
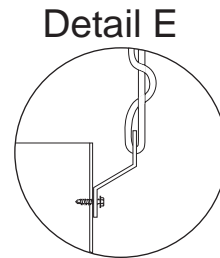
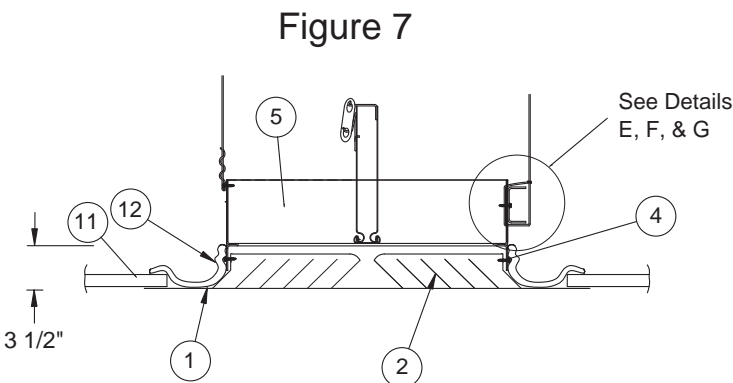
(1) Ceiling radiation damper may be connected directly to the grille and supported by steel channel (See Detail G)

- OR -

(2) Ceiling radiation damper may be connected directly to the grille and supported by hanger snaps (See Detail E)

- OR -

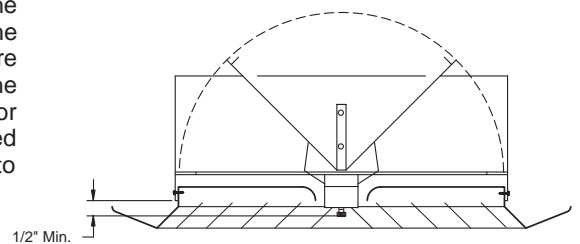
(3) Ceiling radiation damper may be connected directly to the grille and supported by direct suspension with wires looped through holes in the damper frame before tying (See Detail F)



## Adjustable Control Volume Damper Option (-A)

When the adjustable volume control damper options is added as an accessory to the damper (Butterfly Models Only), then special consideration needs to be given to the distance between the damper lower frame and the grille it is being mounted to. There needs to be a minimum of 1/2" distance between the ceiling damper frame and the grille center core (See Detail H). Before installing damper in ceiling, check for clearances and freedom of movement of adjustable feature when damper is placed on grille. Also check to see that when the link melts, that the sides are free to fall to the side and allow the damper blades to close.

Detail H  
Adjustable Control Volume Option



## Special Applications

NOTE: When it is necessary to install the ceiling damper more than 3-3/4" from the finished ceiling, an additional application of CK2000-1-B Thermal Blanket is recommended. A strip of CK-2000-1-B Thermal Blanket should be wrapped around the duct drop or damper frame (overlapping one inch minimum) to completely insulate the additional exposed metal surface, this additional CK-2000-1-B material must be held in place with suitable steel clamp or 16 SWG steel wire.

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