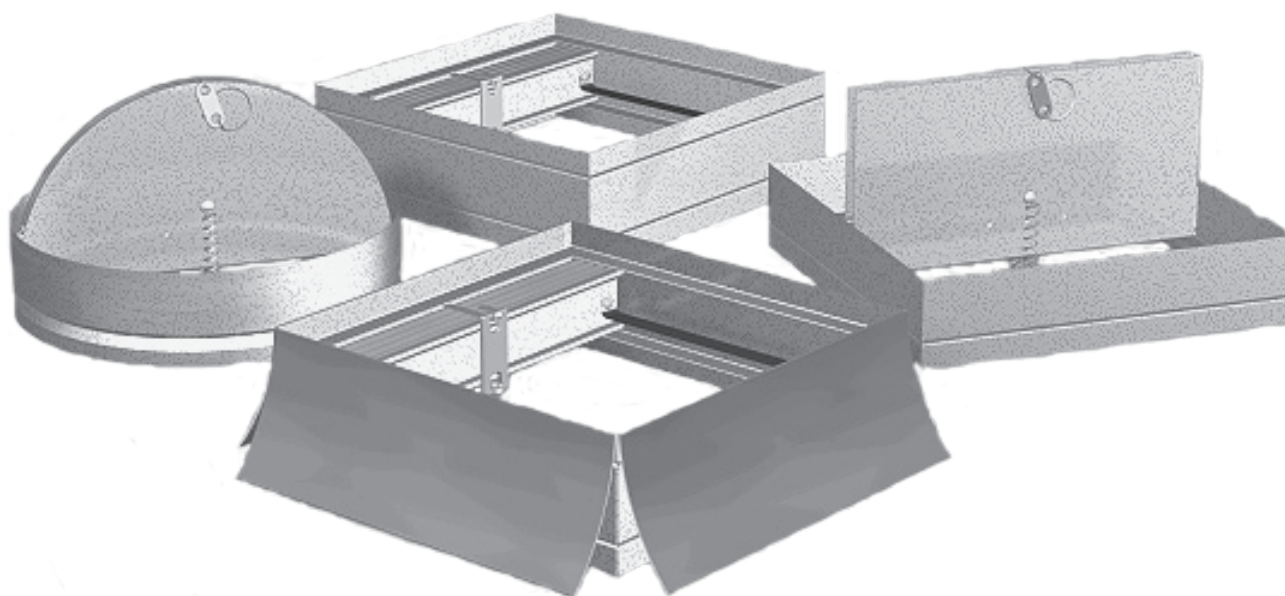


INSTALLATION INSTRUCTION BOOKLET FOR CEILING RADIATION DAMPERS



Instructions included in this booklet:

IOM #	Description	Page(s)
453343	CRD series	2-9
460637	CRD Wood Truss with Gypboard Ceiling - ETL (Warnock Hersey)	10-12

KIT # 826252
Ceiling Radiation
Dampers

Installation, Operation and Maintenance Manual

Please read and save these instructions for future reference. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with these instructions will result in voiding of the product warranty and may result in personal injury and/or property damage.

These installation instructions apply to a 3 hour rated ceiling radiation dampers (aka ceiling dampers) mounted in a 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.



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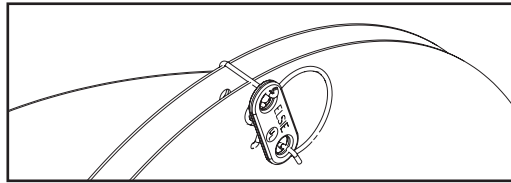
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General Information

- Application:** Model CRD-1, CRD-1LP, CRD-2, CRD-60, and CRD-60B are UL labeled ceiling radiation dampers. When installed as shown, they provide appropriate protection for air inlet or outlet penetrations in the ceiling membrane of floor/ceiling and roof/ceiling assemblies with fire resistance ratings of up to 3 hours. Use of these UL and ETL labeled ceiling damper eliminates the need to use “hinged door” type dampers or other alternate protection methods for specific floor/ceiling and roof/ceiling designs shown in the UL FIRE RESISTANCE DIRECTORY (FRD).
- System Components:** All system components (ducts, duct drops, hanger wires, sleeves, and diffuser pan) must be constructed of steel. The diffuser core may be non-ferrous. Grilles may be non-metallic. Flexible duct (if used) must be Class 1 or Class 0) type, bearing the UL listing mark. Maximum length of flex duct shall not exceed 14 feet. The installations and air devices shown in these instructions must also incorporate any specific requirements in the FRD. Note that both “Design Information - General” and individual ceiling/floor or ceiling/roof design listings apply.
- Ceiling Penetrations:** Ceiling penetration 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 runner or cross tee may be cut to enable proper damper location and installation. Each cut end shall be supported by a minimum 12 SWG vertical hanger wire. A ½ in. clearance must be maintained between the air inlet/outlet and the cut end of the runner or cross tee.
- Connections:** Connections must be made using #8 sheet metal screws, ⅜ in. tubular steel rivets, tack, or spot welds. Use a minimum of one connection per side for rectangular or square dampers and three equally spaced connections for round dampers. Space fasteners a maximum of 6 in. apart. Any W or H dimension larger than 12 in. requires a minimum of two connections per side. All screws or rivet attachments shall be placed a minimum of ⅜ in. from the edge of the damper frame, duct drop, diffuser, or grille frame. When making connections, the ceiling radiation damper may slide over the neck or inside the neck of the diffuser, grille, or inlet/outlet device.
Important: Connections to the damper frame must not interfere with the damper blade operation.

General Information....

5. **Thermal Blanket:** In those installation where the opening in the ceiling membrane is larger than the ceiling damper (more than 1 in. any dimension), a thermal insulating blanket (Model TB or QB) 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).
6. **Fusible Link:** All CRD models 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.



Dampers Supported by a Ceiling Grid System

Exposed Tee Bar ceiling grid systems often use “ Lay In” style air inlets and outlets. With attention to the following requirements, the ceiling grid system provides all required support for installation of “Lay In” style ceiling dampers and air inlets and/or outlets.

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

The four corners of the grid module 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 by 12 SWG minimum vertical hanger wires. When the duct extends over the intersections of the grid members, 16 ga. x 1½ in. steel channels with ⅝ in. 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 panels be cut to fill the remainder of the hole openings larger than 24 in. x 24 in. and shall provide a minimum of ⅜ in. bearing on the ceiling grid members.

Lay-In Diffuser Applications

Lay-In Diffuser

- Lay-in diffuser installs directly into exposed Tee bar grid system.
- Ceiling damper attaches to the diffuser neck (see General Information, Connections).
- Thermal blanket required (see General Information, Thermal Blanket).
- If flexible duct is used, it shall be fastened to the diffuser neck with a steel clamp or #16 SWG minimum wire. (See General Information, System Components)

Note:

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

Models CRD-1, CRD-1LP, CRD-2, and CRD-60 may be installed as shown in **Figure 1** (Model CRD-2 illustrated)

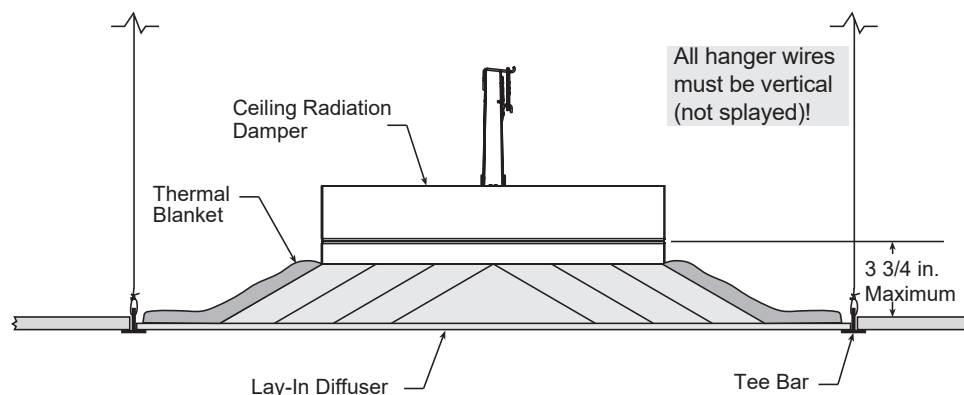


Figure 1

Lay-In Diffuser with Steel Duct Drop

- Lay-In diffuser with steel duct drop installs directly into exposed Tee bar grid system
- Thermal blanket required (see General Information, Thermal Blanket).
- Connection of ceiling radiation damper, diffuser neck, and steel duct drop (see General Information, Connections) may be satisfied in two ways:
 - 1) Ceiling radiation damper and diffuser neck may be connected directly to the duct drop (see **Detail A, Figure 2**).
 - 2) Ceiling radiation damper may be connected directly to the diffuser neck and then the duct drop connected to the damper (see **Detail B, Figure 2**).

Models CRD-1, CRD-1LP, CRD-2, and CRD-60 may be installed as shown in **Figure 2** (Model CRD-1 and CRD-1LP as illustrated).

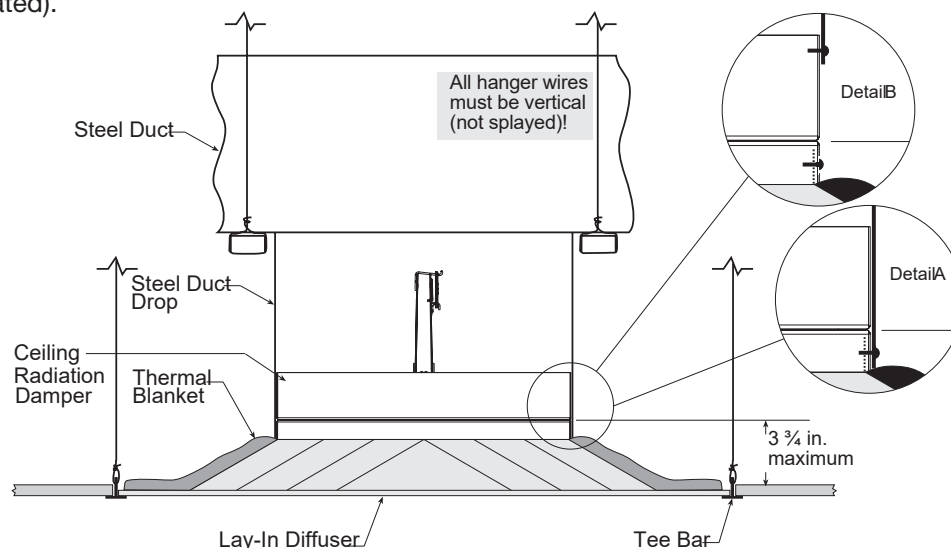


Figure 2

Unducted Ceiling Plenum Return Air Applications

Models: CRD-1, CRD-1LP, CRD-3, & CRD-60

- 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 the top of the perforated metal (or similar) grille core material.
- Models CRD-1, CRD-1LP, CRD-3 and CRD-60 may be installed as shown in **Figure 3** (Model CRD-3 illustrated).

For Model CRD-60X

- 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 the top of the perforated metal (or similar) grille core material.
- Skirt material must overhang the Tee bars around perimeter of the damper.

Models CRD-60X may be installed as shown in **Figure 4**.

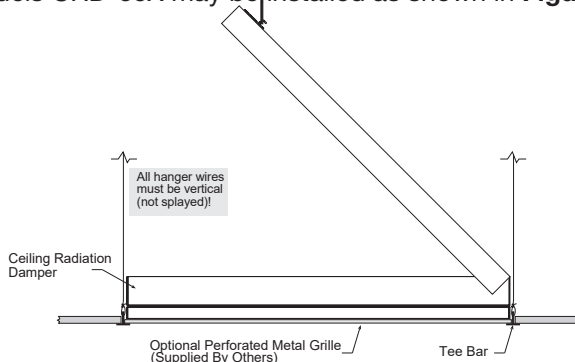


Figure 3

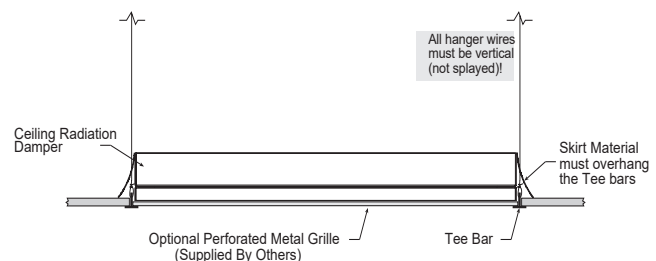


Figure 4

Dampers Supported from Ductwork Above

Note About Support

When main ducts are supported by 16 ga. x 1½ in. steel channels (with ⅝ in. minimum flanges) located 1 in. to 3 in. 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 air inlet or outlet devices. Air device flange must overlap the ceiling membrane by a minimum of one inch.

Follow guidelines under General Information (Ceiling Penetrations and Connections) when preparing opening in the ceiling membrane and making connections.

Surface Mounted Air Inlet or Outlet Devices

- A maximum size of permitted opening equals maximum size of available listed ceiling radiation dampers.
- Opening in ceiling membrane (See General Information, Ceiling Penetrations) may be up to one inch larger than the nominal size of the ceiling radiation damper (i.e. 12 in. x 12 in. nominal ceiling radiation damper could have a maximum ceiling membrane opening of 13 in. x 13 in.).
- Connection of ceiling radiation damper, air device neck, and steel duct drop (see General Information, Connections) may be satisfied in two ways:
 1. Ceiling radiation damper and air device neck may be connected directly to the duct drop (see **Detail A, Figure 5**).
 2. Ceiling radiation damper may be connected directly to the air device neck and then the duct drop connected to the damper (see **Detail B, Figure 5**).

Non-Ferrous Air Devices - Air devices that have non-ferrous frames.

Ceiling membrane opening that utilize non-ferrous devices require one of the following:

1. The steel duct drop should extend to the bottom surface of the ceiling membrane and the opening in the ceiling membrane (see General Information, Ceiling Penetrations) should be equal to the outside of the duct drop (see **Detail C, Figure 5**).
2. A steel angle should be attached to the bottom of the ceiling radiation damper and span the gap from the ceiling radiation damper to the bottom of the ceiling membrane. the steel angle should overlap the ceiling membrane. The steel angle should overlap the ceiling membrane (see **Detail D, Figure 5**).

Models CRD-1, CRD-1LP, CRD-2, and CRD-60 may be installed as shown in **Figure 5** (Model CRD-1 & CRD-1LP illustrated).

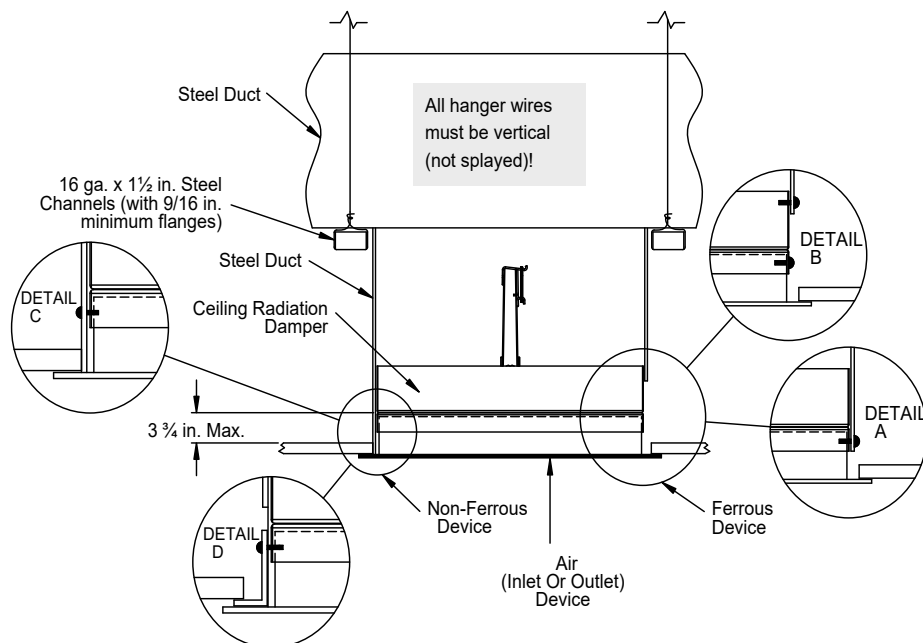


Figure 5

Recess Mounted Air Inlet or Outlet Devices

- Opening in ceiling membrane (see General Information, Ceiling Penetrations) is more than one inch larger than nominal size of ceiling damper (i.e. if the radiation is 12 in. x 12 in. nominal, the ceiling membrane opening is larger than 13 in. x 13 in.).
- Thermal blanket is required (see General Information, Thermal Blanket).
- Connection of ceiling radiation damper, air device neck, and steel duct drop (see General Information, Connections) may be satisfied in two ways:
 1. Ceiling radiation damper and air device neck may be connected directly to the duct drop (see **Detail A, Figure 6**).
 2. Ceiling radiation damper may be connected directly to the air device neck and then the duct drop connected to the damper (see **Detail B, Figure 6**).

Models CRD-1, CRD-1LP, CRD-2, and CRD-60 may be installed as shown in **Figure 6** (Model CRD-1 and CRD-1LP illustrated).

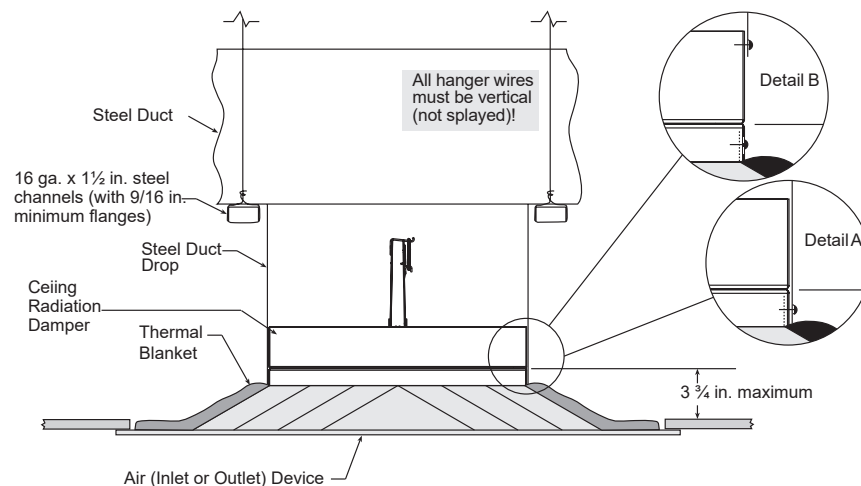


Figure 6

Dampers Supported Directly From Structure

A Note About Support

Ceiling radiation dampers and air inlet or outlet devices may also be supported directly from the structure above using one or more of the methods described in **Figures 7, 8, 9, or 10**. When channels are to be used as support, they must be 16 ga. x 1 1/2 in. steel channels with 9/16 in. minimum flanges (2 required per damper on opposite sides). Air device flange must overlap the ceiling membrane by a minimum of one inch.

Follow guidelines in General Information (Ceiling Penetrations and Connections) when preparing opening in the ceiling membrane and making connections.

Ducted Surface Mounted Air Inlet or Outlet Devices

- Maximum size of permitted opening equals maximum size of available listed ceiling radiation dampers.
- Opening in ceiling membrane (see General Information, Ceiling Penetrations) may be up to one inch larger than the nominal size of the ceiling radiation damper (i.e. 12 in. x 12 in. nominal ceiling radiation damper could have a maximum ceiling membrane opening of 13 in. x 13 in.).
- Steel channel is connected directly to ceiling radiation damper (see General Information, Connections).
- Connection of ceiling radiation, air device neck, and steel duct drop (see General Information, Connections) may be satisfied in two ways:
 1. Ceiling radiation damper and air device neck may be connected directly to the duct drop (see **Detail A, Figure 7**).
 2. Ceiling radiation damper may be connected directly to the air device neck and then the duct drop connected to the damper (see **Detail B, Figure 7**).

Non-Ferrous Air Devices - Air devices that have non-ferrous frames.

Ceiling membrane openings that utilize non-ferrous devices require one of the following:

1. The steel duct drop should extend to the bottom surface of the ceiling membrane and the opening in the ceiling membrane (see General information, Ceiling Penetrations) should be equal to the outside of the duct drop (see **Detail C, Figure 7**). Models CRD-1, CRD-1LP, CRD-2, and CRD-60 may be installed as shown in **Figure 7** (Model CRD-1 & CRD-1LP illustrated).
2. A steel angle should be attached to the bottom of the ceiling radiation damper and span the gap from the ceiling radiation damper to the bottom of the ceiling membrane (see **Detail D, Figure 7**).

Models CRD-1, CRD-1LP, CRD-2, and CRD-60 may be installed as shown in Figure 7 (Model CRD-1 & CRD-1LP illustrated).

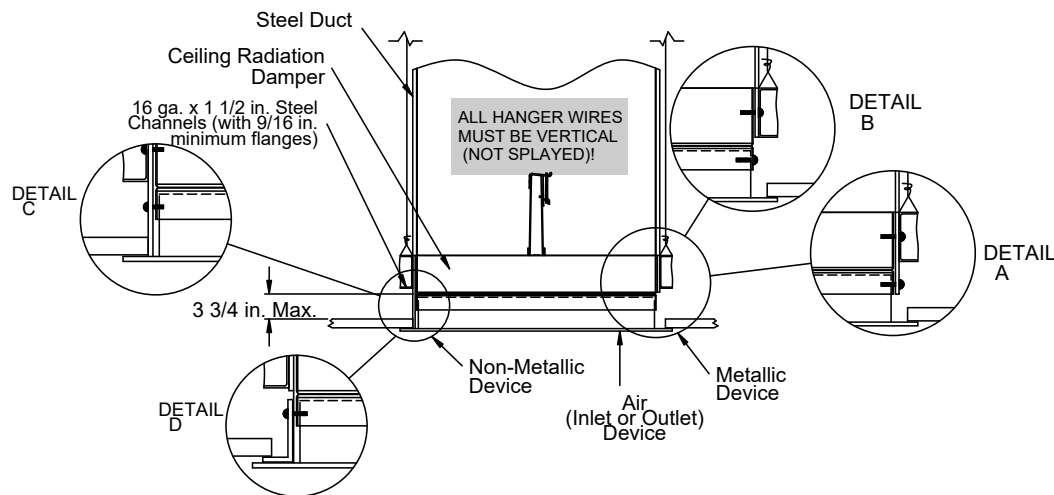


Figure 7

Ducted Recess Mounted Air Inlet or Outlet Devices

- Opening in ceiling membrane is more than one inch larger than nominal size of ceiling damper (i.e. if the ceiling damper radiation damper is 12 in. x 12 in. nominal the ceiling membrane opening is larger than 13 in. x 13 in.).
- Maximum size of opening is 24 in. x 24 in. (576 sq. in.).
- Thermal blanket is required. (see General Information, Thermal Blankets).
- Connection of ceiling radiation damper, air device neck, and steel duct drop (see General Information, Connections) may be satisfied in two ways:
 1. Ceiling radiation damper and air device neck may be connected directly to the duct drop (see **Detail A, Figure 8**).
 2. Ceiling radiation damper may be connected directly to the air device neck and then the duct drop connected to the damper (see **Detail B, Figure 8**).

Models CRD-1, CRD-1LP, CRD-2, and CRD-60 may be installed as shown in Figure 8 (Model CRD-1 & CRD-1LP illustrated).

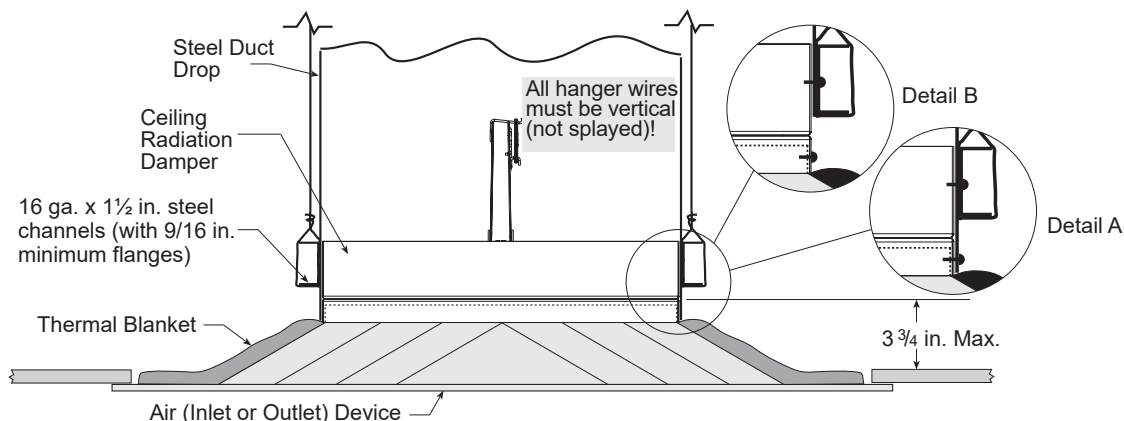


Figure 8

Unducted Surface Mounted Air Inlet or Outlet Devices

- Maximum size of permitted opening and 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. 12 in. x 12 in. nominal ceiling radiation damper could have a maximum ceiling membrane of 13 in. x 13 in.).
- Connection of ceiling radiation damper and air device neck (see General Information, Connections) may be satisfied in three ways:
 1. Ceiling radiation damper may be connected directly to the air device neck and supported by steel channel (see **Detail A, Figure 9**).
 2. Ceiling radiation damper may be connected directly to the air device neck and supported by hanger straps (see **Detail B, Figure 9**).
 3. Ceiling radiation damper may be connected directly to the air device neck and supported by direct suspension with wires looped through the holes in the damper frame before tying (see **Detail C, Figure 9**).

Non-Ferrous Air Devices - Air devices that have non-ferrous frames.

Ceiling membrane openings that utilize non-ferrous devices require one of the following:

1. A steel extension should extend from the ceiling radiation damper to the bottom surface of the ceiling membrane (see General Information, Ceiling Penetrations) should be equal to the outside of the steel extension (see **Detail D, Figure 9**).
2. A steel angle should be attached to the bottom of the ceiling radiation damper and span the gap from the ceiling radiation damper to the bottom of the ceiling membrane. The steel angle should overlap the ceiling membrane (see **Detail E, Figure 9**).

Models CRD-1, CRD-1LP, CRD-2, and CRD-60 may be installed as shown in Figure 9 (Model CRD-1 & CRD-1LP illustrated).

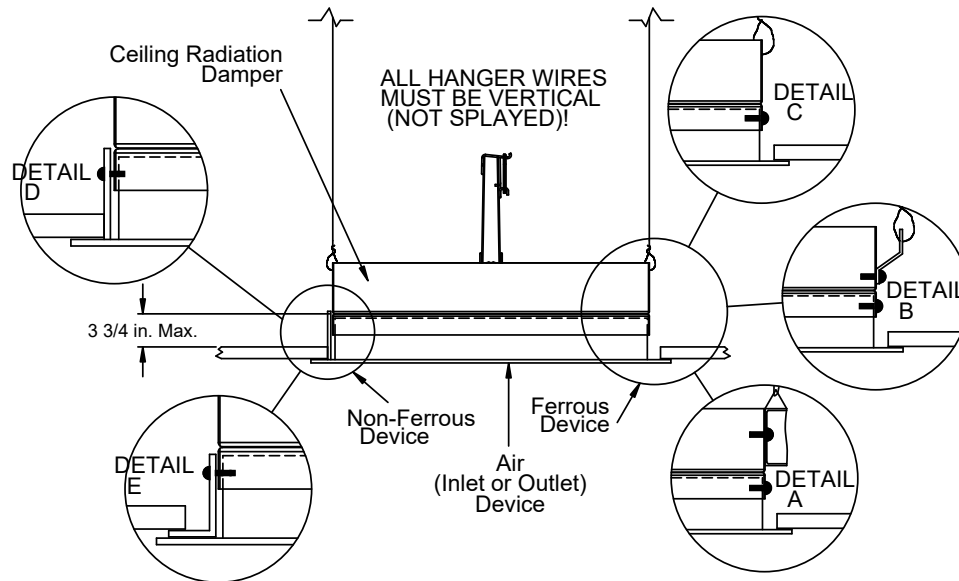


Figure 9

Unducted Recess Mounted Air Inlet or Outlet Devices

- 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 in. x 12 in. nominal, the ceiling membrane opening is larger than 13 in. x 13 in.).
- Maximum size of opening is 24 in. x 24 in. (576 sq. in.)
- Thermal blanket is required. (see General Information, Thermal Blankets)
- 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 air device neck and supported by steel channel (see **Detail A, Figure 10**).
 2. Ceiling radiation damper may be connected directly to the air device neck and supported by hanger straps (see **Detail B, Figure 10**).
 3. Ceiling radiation damper may be connected directly to the air device neck and supported by direct suspension with wires looped through holes in the damper frame before typing (see **Detail C, Figure 10**).

Models CRD-1, CRD-1LP, CRD-2, and CRD-60 may be installed as shown in Figure 10 (model CRD-1 & CRD-1LP illustrated).

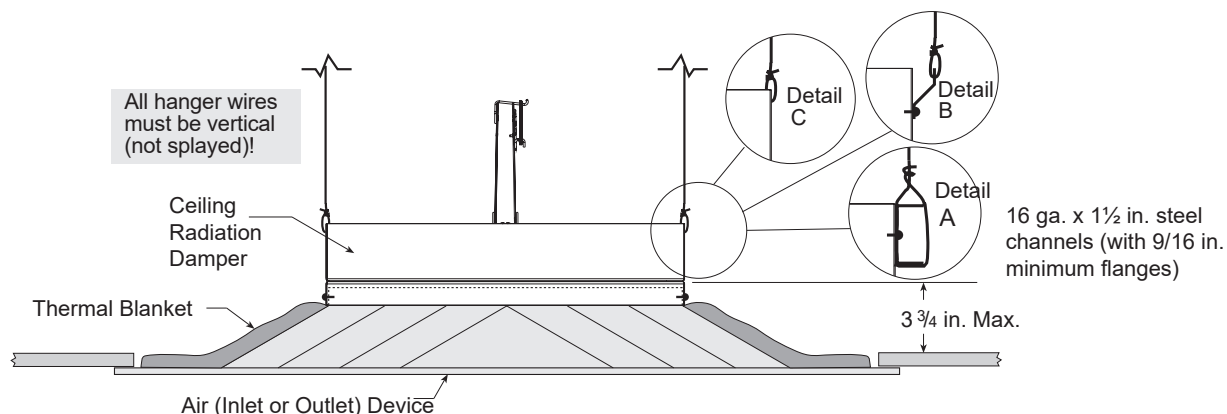


Figure 10

Our Commitment

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Product warranties can be found online at Greenheck.com, either on the specific product page or in the literature section of the website at Greenheck.com/Resources/Library/Literature.



Installation, Operation and Maintenance Manual

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C#5005978

Dampers Installed in Gypboard Ceiling

Wood Truss with Gypboard Ceiling

- 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 in. x 12 in. (nominal) ceiling radiation damper could have a maximum ceiling membrane opening of 13 in. x 13 in.).
- Connection of ceiling radiation damper:
 1. Measure the actual spacing between the wood framing members and cut the vertical leg of the mounting angle to length plus six inches. Two mounting angles are required. Fold up three inches at 90° at both ends of the mounting angle and attach it to the wood frame with minimum of two each #6 penny nails or #8 screws.
 2. The damper is attached to the mounting angle by sheet metal screws (minimum of two screws per angle for rectangular dampers and minimum of one screw per angle for round dampers).
 3. On the sides opposite the retaining angles, a three inch long (minimum) mounting angle is required. Make attachments as shown in Figure 1; make two attachments minimum per mounting angle for rectangular dampers and one attachment minimum per mounting angle for round dampers. Bottom leg of mounting angle rests on the ceiling material.
 4. See **Figure 1** for further details.
- **Figure 2 and Figure 3** show top views of a rectangular and round damper installation, respectively.
- **Figure 4** shows the installation of a damper, with top and bottom extensions which extends three inches above and below the rated ceiling.
- Fiberglass or metal duct may be attached to either the top or bottom of the damper or both.
- If flexible duct is used, it shall be fastened to the diffuser neck with a steel clamp or #16 SWG minimum wire or cable ties.

Models CRD-1, CRD-1LP, and CRD-2 may be installed as shown in **Figure 1** and **Figure 4**.

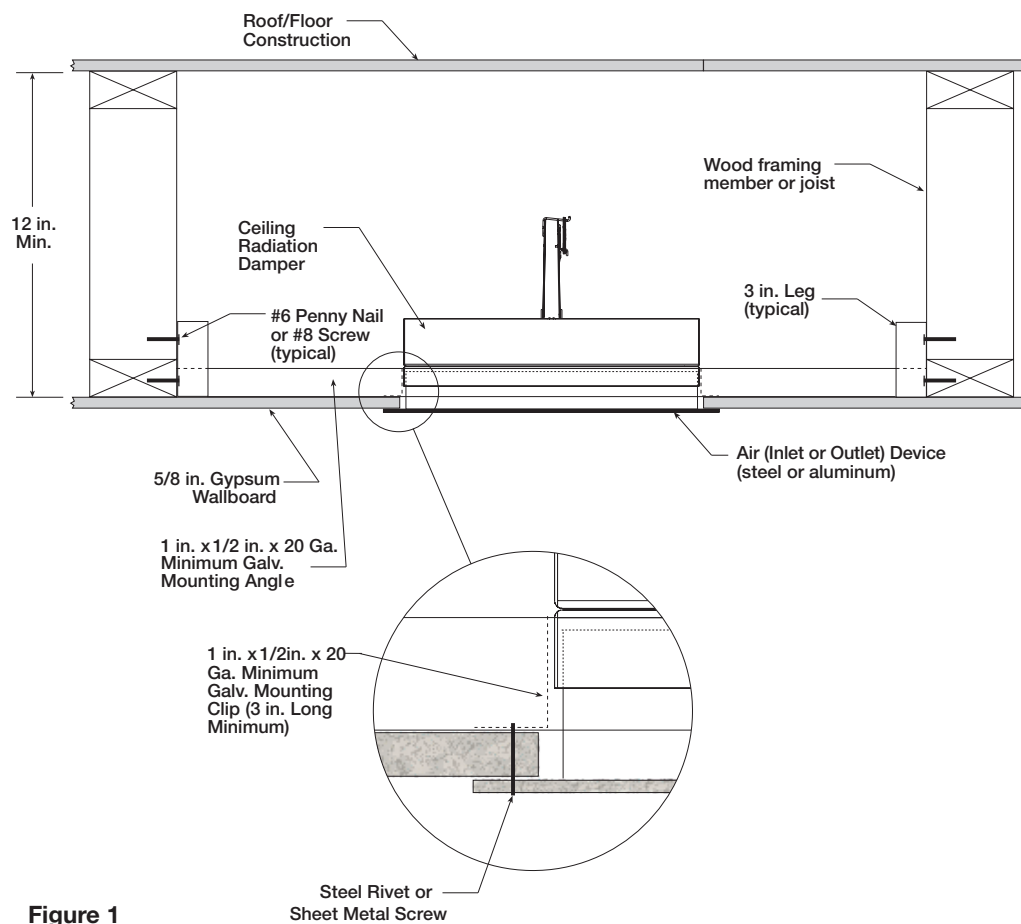


Figure 1

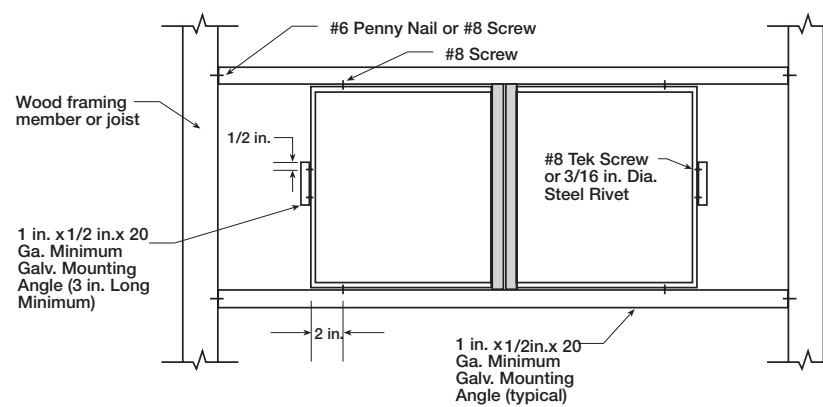


Figure 2

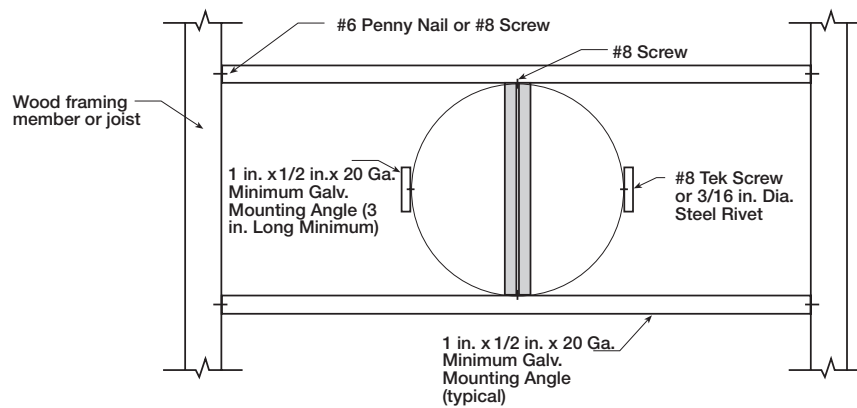


Figure 3

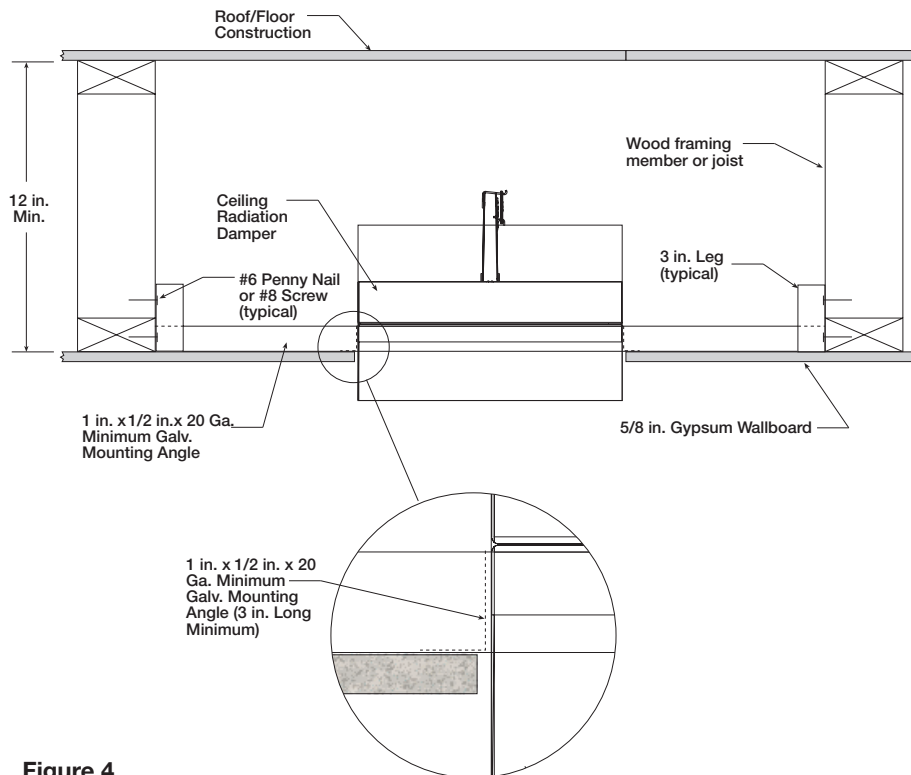


Figure 4

Our Commitment

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