

# Installation, Operation & Maintenance

**OTO**

Curved Slot Swirl Diffusers

Last Revision 2016-08



## INTRODUCTION

EffectiV HVAC manufactures and supplies high quality, top-performing air distribution products and other HVAC products. EffectiV 's unique ceiling air diffusers allow Engineers, Designers to answer specific architectural and performance needs. EffectiV diffusers effectively address common comfort issues and help improve the overall energy efficiency of HVAC systems. We provide new solutions to old problems and ultimately facilitate building operators' task of keeping everyone happy.

EffectiV HVAC Inc. is the exclusive supplier of MADEL® products in the US and Canada. We have adapted some of MADEL® 's most amazing products to North American standards and we keep them in stock in our Montreal, Canada facility. Other MADEL® products can also be ordered as needed.

We thrive on supplying only the best quality products to help improve comfort, performance, interior design and energy efficiency. We fully stand behind our products performance and quality.

## WE WANT TO HEAR FROM YOU

You love our products, or maybe there's something you don't like? You have an idea of how to improve installation or usability?

Whether you have a question, suggestion or comment, we'd love to hear from you!

Installers and Operators' input is very valuable to us. Please call us at 1-844-375-3885 (Toll Free) or email us at [info@effectiv-hvac.com](mailto:info@effectiv-hvac.com) to give us your feedback.

## 1. RECEIVING MATERIALS

Diffusers and plenums must be inspected for shipping damage on delivery. The diffuser faces are individually wrapped and packed multiple faces per box. Any damaged box should be inspected and its content unpacked. If any shipping damage is found, report it immediately to the carrier and make sure it appears in writing on the bill of lading.

Diffusers and plenums should be stored in a dry and clean indoor location and multiple pallets should not be stacked.

Boxes and pallets should be handled gently in order to avoid unreparable bends, bumps and scratches.

## 2. INSTALLATION

### OTO Curved Slot Swirl Diffusers

OTO Series can be installed in false ceilings (square diffusers only), drywall and open ceilings.

#### 2.1. Installation in False Ceiling (T-Bar Lay-In)

2.1.1. Fix the crossbar inside the plenum by inserting each end of the crossbar into the pre-punched tabs. Pull the crossbar towards the bottom.

2.1.2. Attach the plenum to the building structure with four metal cables, using the attachment holes (anti-seismic tabs) located at each corner of the top of the plenum. The base of the plenum should lay on the t-bar.

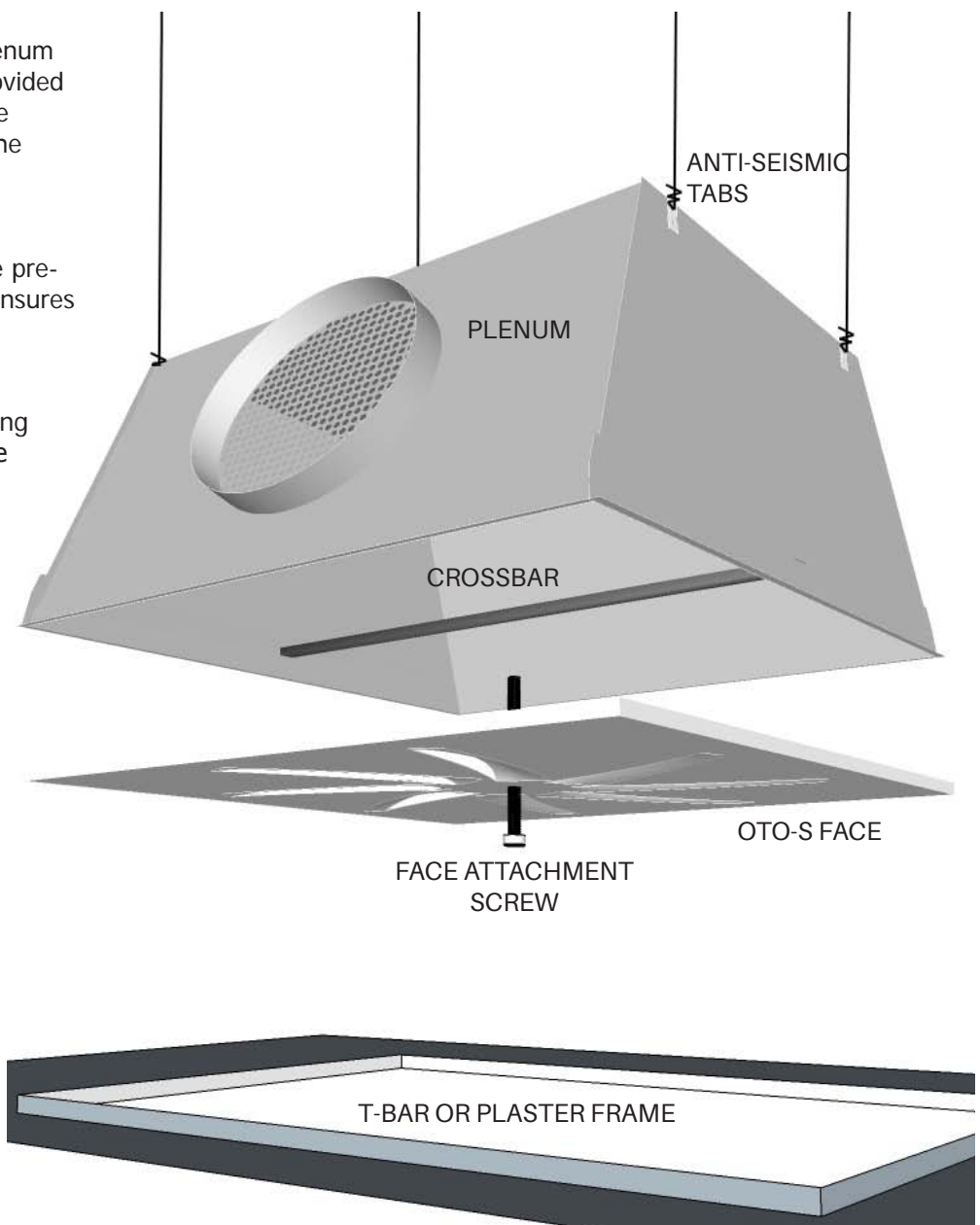
2.1.3. Attach the diffuser's face to the plenum using the long face attachment screw provided with the plenum. Tighten the screw in the crossbar until the face lays perfectly on the plenum edges.

**IMPORTANT:** do not overtight, too much pressure could create face distortion. The pre-installed gasket on the back of the face ensures air-tight installations with the face barely touching the plenum.

2.1.4. Make sure that the suspended ceiling is firmly anchored and that it matches the diffuser's face dimension.

2.1.5. Gently pull down the assembled diffuser and let it lay in the t-bar.

**NOTE:** Some damper systems may require additional installation steps. For more information, refer to section 3. Balancing of Air Volume.

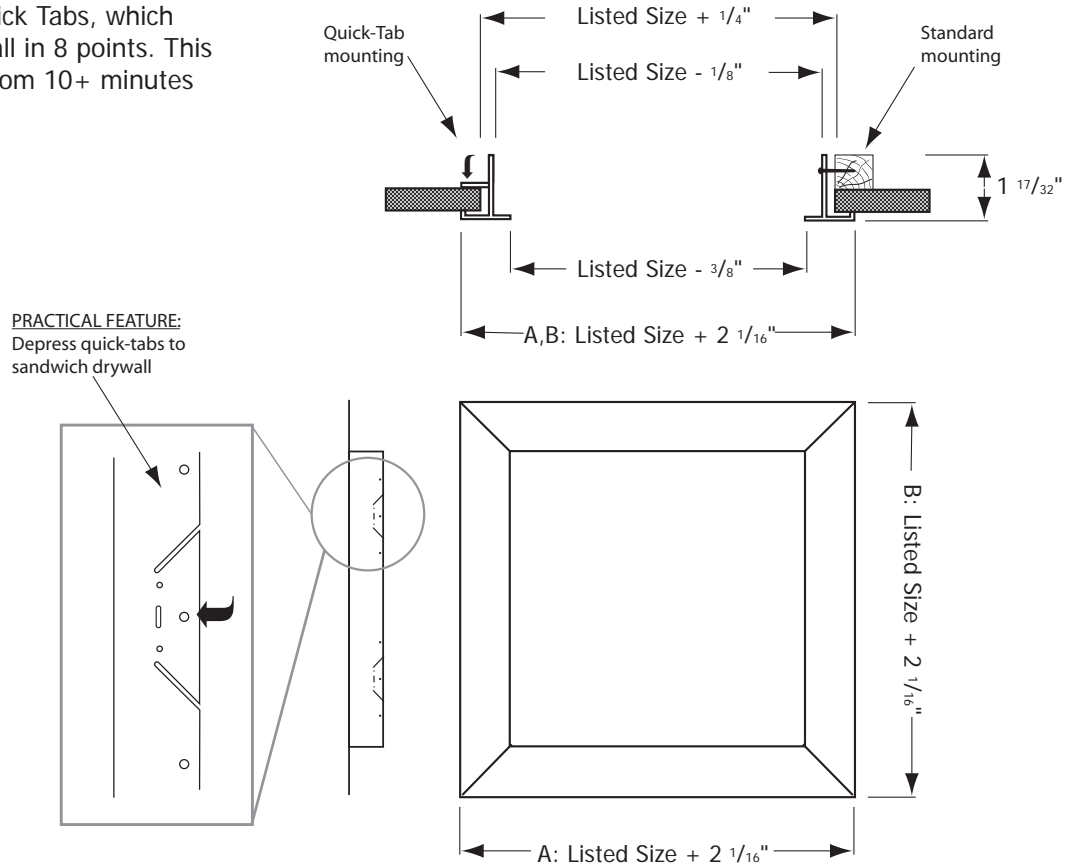
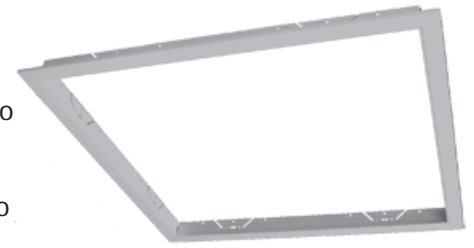


## 2.2. Installation in Gypsum Using a Plaster Frame

When installing a square diffuser into a drywall or gypsum ceiling, it is recommended to use a Plaster Frame for easier access inside the ceiling after the installation.

Our unique plaster frame can be installed the old fashion way - screwing the frame into studs - which requires pre-installing studs at the right positions in the ceiling.

It can also be installed using our Quick Tabs, which can be folded to sandwich the drywall in 8 points. This method can bring installation time from 10+ minutes down to less than a minute.



2.2.1. Cut a hole in the drywall 1/4" larger than the listed size of the diffuser - i.e. for OTO-S 24 the listed size is 24" therefore you need to cut a hole 24 1/4" x 24 1/4".

2.2.2. Install the plaster frame in hole, using either studs and screws or sandwiching the drywall with the Quick Tabs.

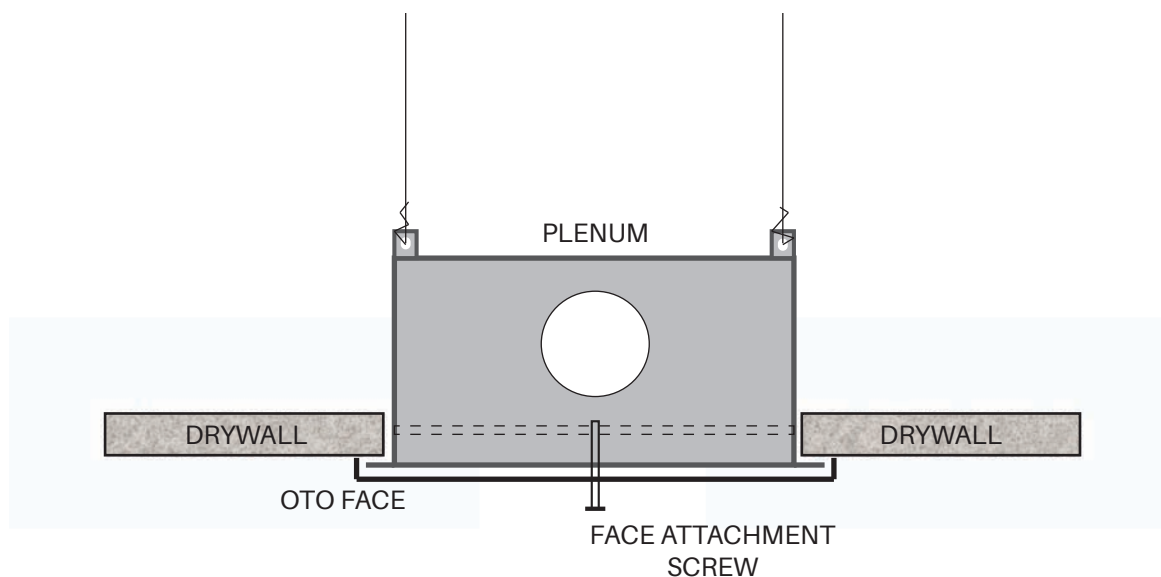
2.2.3. Once the plaster frame is in place, you can proceed as if it was a standard lay-in installation. Follow the steps 2.1.1. through 2.1.5. for installation in false ceiling.

**NOTE:** Some damper systems may require additional installation steps. For more information, refer to section 3. Balancing of Air Volume.

## 2.3. Installation Directly into Gypsum - Without Using a Plaster Frame

Although it is recommended to use plaster frames for square diffusers, some will prefer not having an additional frame for aesthetic reasons.

Plaster frames are also not available for round diffusers and therefore they must be installed using this procedure.



2.3.1. Cut a hole in the gypsum  $1/2''$  narrower than the listed size of the diffuser - i.e. for OTO-S 24 the listed size is 24" therefore you need to cut a hole  $23\ 1/2'' \times 23\ 1/2''$ .

2.3.2. Fix the crossbar inside the plenum by inserting each end of the crossbar into the pre-punched tabs. Pull the crossbar towards the bottom.

2.3.3. Attach the plenum to the building structure with four metal cables, using the attachment holes (anti-seismic tabs) located at each corner of the top of the plenum. The base or flange of the plenum should lay underneath the drywall.

2.3.4. Attach the diffuser's face to the plenum using the long face attachment screw provided with the plenum. Tighten the screw in the crossbar until the face lays perfectly on the drywall.

**IMPORTANT:** do not overtight, too much pressure could create face distortion. The pre-installed gasket on the back of the face ensures air-tight installations with the face barely touching the plenum.

**NOTE:** Some damper systems may require additional installation steps. For more information, refer to section 3. Balancing of Air Volume.

## 2.4. Installation on Metal Duct in Open Ceilings

2.4.1. Fix the crossbar inside the plenum by inserting each end of the crossbar into the pre-punched tabs. Pull the crossbar towards the bottom. (Not needed with PERFAIR-CT Conical Plenum in which the bar is already fixed)

2.4.2. Insert the plenum's collar into the duct opening. The collar diameter is 1/8" narrower than the duct diameter for a tight fit. Make sure the collar is fully inserted.

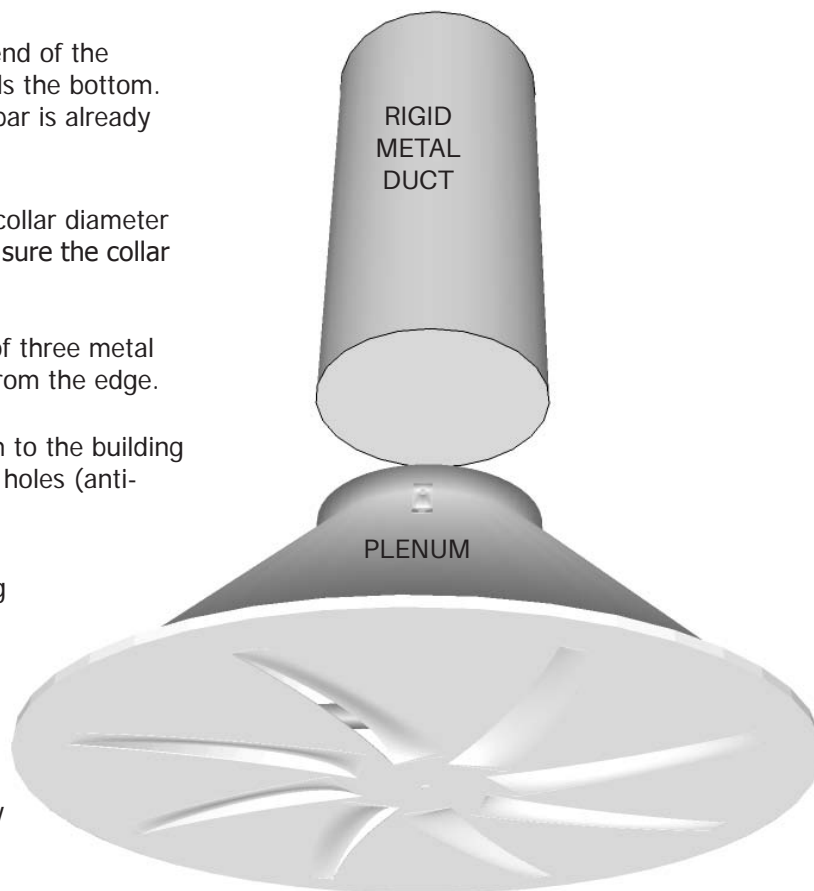
2.4.3. Secure the plenum inside the duct using a minimum of three metal screws equally spread around the diameter and 1/2" away from the edge.

2.4.4. Some building codes may require securing the plenum to the building structure. If so, attach three metal cables in the attachment holes (anti-seismic tabs).

2.4.5. Attach the diffuser's face to the plenum using the long face attachment screw provided with the plenum. Tighten the screw in the crossbar until the face lays perfectly on the drywall.

**IMPORTANT:** do not overtight, too much pressure could create face distortion. The pre-installed gasket on the back of the face ensures air-tight installations with the face barely touching the plenum.

**NOTE:** Some damper systems may require additional installation steps. For more information, refer to section 3. Balancing of Air Volume.



### 3. BALANCING OF AIR VOLUME

PERFAIR plenums come with a choice of five integrated air balancing systems.

#### 3.1. Perforated Swivel Damper / Air Equalizer (R)

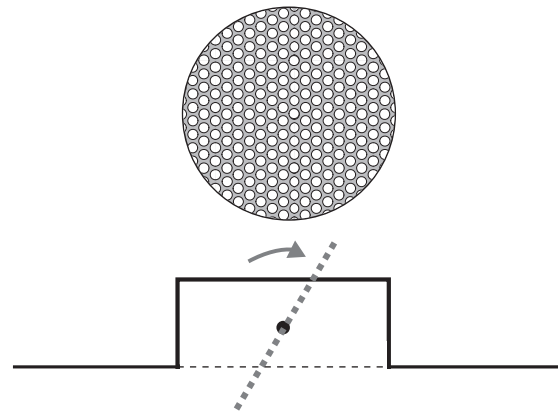
Simply rotate the perforated plate between a 0 degree and a 90 degree angle to obtain the desired free area and required volume of air.

0 degree or 180 degree angles (flat with the collar opening) are fully closed and will allow for approximately 50% of air flowing through.

A 90 degree angle (perpendicular to the collar opening) is fully open and will allow for 100% of air flowing through.

Any in-between will allow between 50% and 100% of airflow.

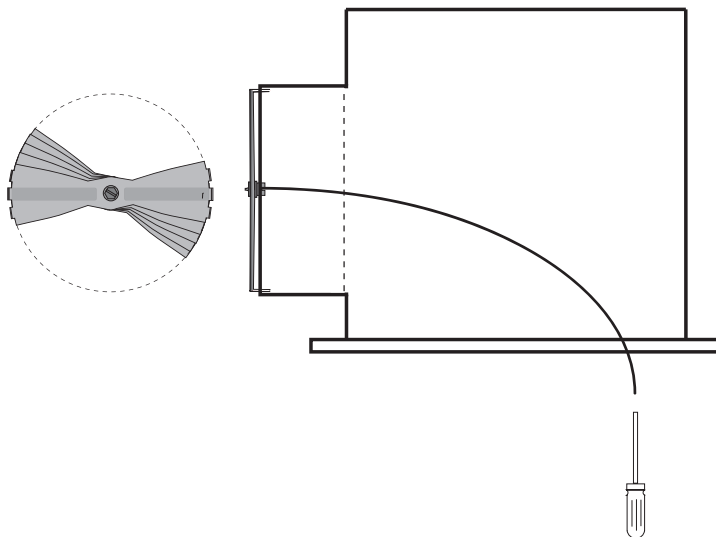
**IMPORTANT:** the perforated damper also acts as an air equalizer. Therefore if there is an angle in the duct entering the plenum, please make sure that the flat part of the damper is always facing the angle of the duct when possible. This will help ensure optimal air equalizing.



#### 3.2. Cable-Operated Damper Through Face (MRT)

Dampers may be adjusted by applying a Square Nut driver or a ¼" hex socket to the male square adjustment end of the cable. Once set, dampers will hold their settings up through the design velocity limits.

For aesthetical reasons the cable may be pushed back through the diffusion vane and hidden behind the face after balancing. It is however recommended to mark the diffusion vane behind which the cable is hidden in order to facilitate future balancing.



### 3.3. Cable-Operated Damper Through Drywall or Tile (MRT2)

#### DAMPER INSTALLATION

MRT2 cable dampers ship separately from the plenum and must be properly installed.

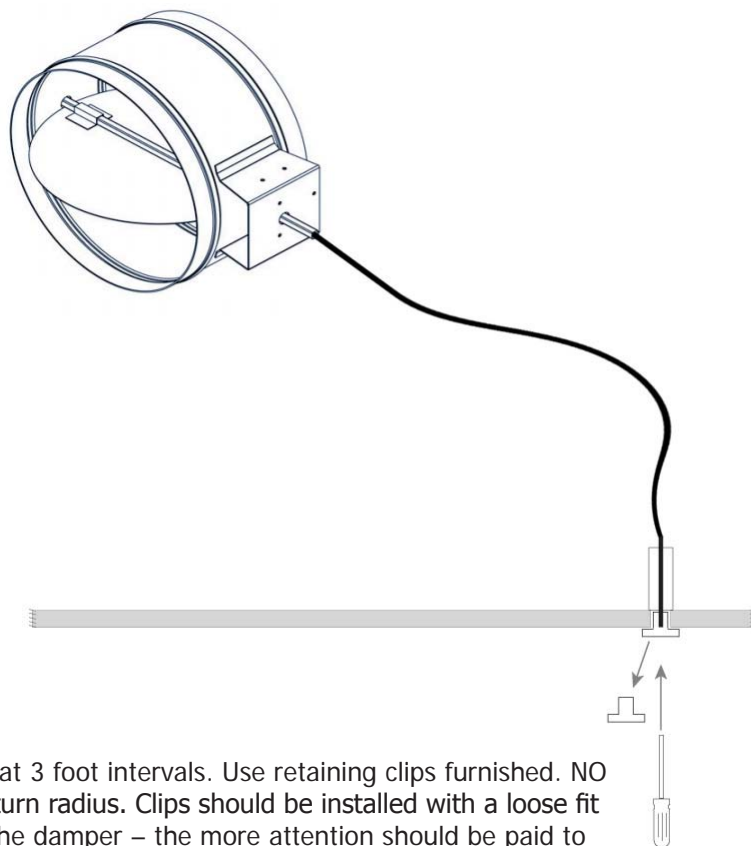
1. Prior to installing damper in duct, check to make sure blades operate freely with no binding or restriction.

2. Screw or rivet damper to plenum. Make sure that fasteners do not interfere with blade operation and that damper is not racked.

3. Adjust worm gear rotation so that set screws will be accessible when in position. Align square shafts so as to catch set screws directly on flats. Set screws are 90° opposed.

4. Slip worm gear assembly over shaft. Tighten (2) set screws onto damper shaft with 1/8" Allen key, then secure to plenum. Assembly mounts horizontally or vertically as required for best cable run. Test for free operation by rotating cable. Do not attempt to rotate worm gear by pushing on damper blade.

5. Support cables as required at all changes in direction and at 3 foot intervals. Use retaining clips furnished. **NO DRAPING** – cables should be taut or nearly so. 4" minimum turn radius. Clips should be installed with a loose fit to allow cable rotation. The longer the cable and the larger the damper – the more attention should be paid to cable support.

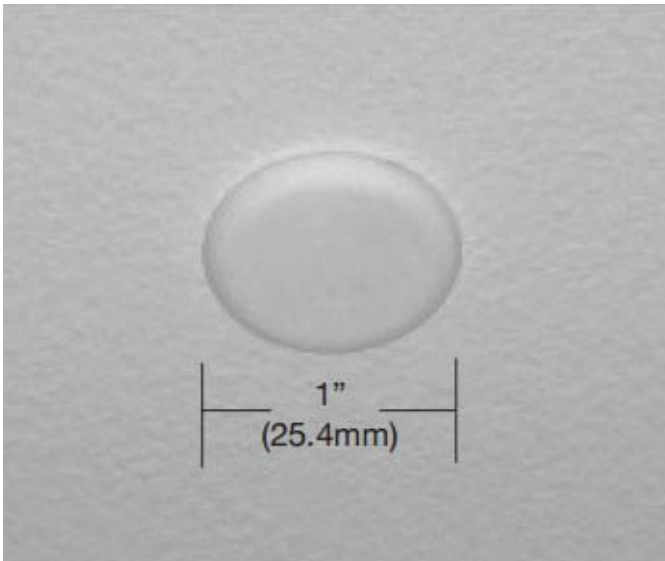


6. Attach the mounting bracket to the structural member so that the bottom of the bracket is flush with the underside of the ceiling.



7. Drill a 1/2" diameter hole in the ceiling location that lines up with the centerline of the cable. (23/32" [18mm] from stud). Install ceiling drywall.





8. Select the appropriate RT-CCM cap for the cover (.500" to .750" or .760" to 1.25" ceiling thickness) and attach to exposed cable.

9. TEST individual damper operation to evaluate cable support scheme prior to ceiling close-up. NOTE: Use cable to operate the damper, DO NOT attempt to rotate cable by pushing on damper blade.

## OPERATION

Damper may be adjusted with a quality  $\frac{1}{4}$ " nut driver or hex socket wrench. (Thin blade screwdriver if ordered.) Often cable end may be pulled out several inches to ease adjustment.

Worm gear has a 20-1 ratio; therefore a 90 degree blade rotation requires five (minimum) complete rotations.

Damper will hold set position. Gear design will not allow reverse movement from the damper end.



### 3.4. Electro-Balanced Damper With Remote Control, Cable Through Face (EB)

#### INSTALLATION

Electro-Balanced Cable Damper with remote control and cable through face comes pre-installed on PERFAIR plenums.

All you have to do is pull the cable through a diffusion vane before fixing the face to the plenum. Once the face is installed and air balancing is done, gently push the cable back through the diffusion vane to hide it behind the face. It is however recommended to mark the diffusion vane behind which the cable is hidden in order to facilitate finding the cable when re-balancing is needed.

#### OPERATION

Dampers are adjusted by connecting the grey male-to-male wire tether (supplied with the remote) to the hand held remote control and the damper motor connector. Turn on the remote using the slide switch on the side of the housing. The green on/off LED will illuminate. Press the rocker switch on the remote control to operate the damper. Right toggle opens the damper, left toggle closes the damper.

**If the LED array blinks alternating red and green, there is an open connection. Check to make sure the remote control male connectors are pushed all the way in.**

The LED array will indicate approximate blade position for dampers with 90° open/close cycles. To use this feature, the damper must first be set to a full open or closed position. Then as you operate the remote, the LEDs will light up in sequence. There are 10 LEDs. If five are lit, the damper is 50% open.

The on/off LED will flash to indicate low battery condition. The remote will continue to operate the damper but battery replacement will be needed soon. The Duracell 9V battery can be replaced by removing the battery cover on the back of the remote housing. It is not necessary to remove the belt clip to replace the battery.



### 3.5. Electro-Balanced Damper With Remote Control, Cable Through Wall (EB2)

#### DAMPER INSTALLATION

EB2 cable dampers ship separately from the plenum and must be properly installed.

1. Prior to installing damper in duct, check to make sure blades operate freely with no binding or restriction. Blade interference or damper shaft interference with blade stop hardware may falsely signal to the remote control that the damper blade is in a full open or full closed position (in contact with the blade stop). This will result in the motor being turned off by the remote.

2. Secure the damper to duct. Make sure that fasteners do not interfere with blade operation and that damper is not racked.

3. Route wiring to the connector termination point. Excess cable can be bundled using the wire tie provided.

4. Before closing the ceiling, TEST the unit to verify smooth damper operation and system connectivity:

4.1. Connect the damper drive connector to the hand held remote control using the grey male-to-male connector cable supplied with the remote.

4.2. Turn on the remote using the slide switch on the side of the housing. The green on/off LED will illuminate.

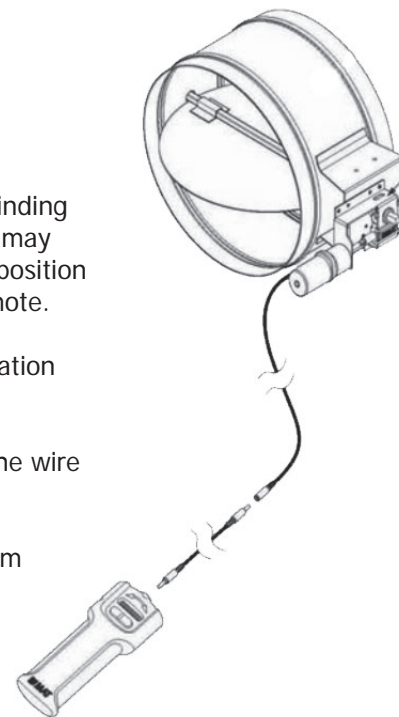
4.3. Operate the rocker switch on the remote control to ensure smooth damper operation through the open/close cycle. Right toggle opens the damper, left toggle closes the damper.

- If the LED array on the remote control flashes red then green, connectivity has been broken. Check for sliced wiring or a loose connection at the motor. NOTE: If wiring or connectors are damaged in the field, they can be replaced quickly. Contact your sales rep for replacement components.

- If your damper has blade stops, the remote will turn off the motor when the damper blade contacts the stops. If the remote control turns the damper drive off prior to the damper reaching a full open or full closed position, check to make sure that there are no fasteners interfering with damper blade operation.

5. The LED array will indicate approximate blade position for dampers with 90° open/close cycle. To use this feature, the damper must first be set to a full open or closed position. Then as you operate the remote, the LEDs will light up in sequence. There are 10 LEDs. If five are lit, the damper is 50% open.

6. The universal damper drive connectors can be terminated in a wall or ceiling using various surface termination fixtures: See separate installation instructions for these items below.

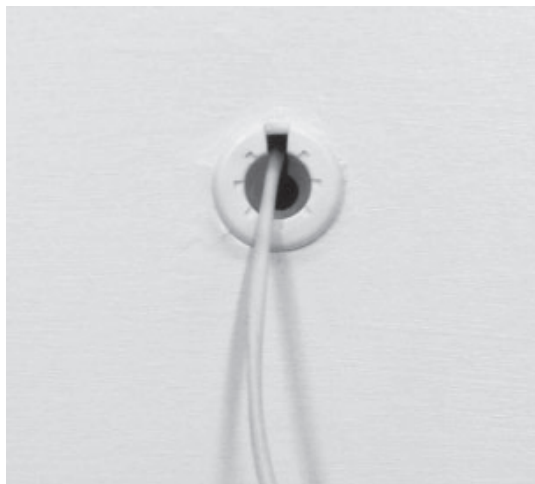


## SINGLE PORT WALL PLATE INSTALLATION

- a. Drill a 7/8" dia. hole in the wall.
- b. Drop connector thru the wall to room side.



- c. Slide wiring into "Part B" through the slot opening along the side of the part.



- d. Push Part B into the wall opening until the flange is flush with the wall.



- e. Place the connector into Part A and locate the ribs so they are aligned with the slot in Part B.

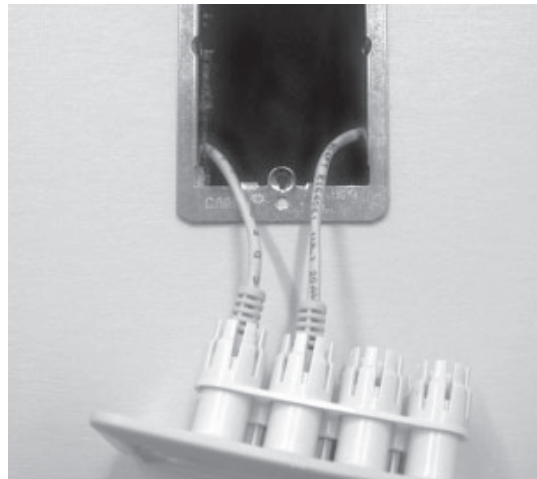


- f. With connector pushed all the way into Part A, push Part A into the opening until it snaps into place.

## MULTI (8) PORT WALL PLATE INSTALLATION



a. Use attached caddy instructions to prep the wall opening and install the mounting plate.



b. Route all connectors through the wall opening (paying attention to identify the connectors by location). Push connector into designated wall plate port until it snaps into place.

c. Label the connector locations on the back side of the wall plate cover.



d. Push excess cable back into wall opening and insert wall plate. Secure with screws included.



e. Install cover.

## OPERATION

Dampers are adjusted by connecting the grey male-to-male wire tether (supplied with the remote) to the hand held remote control and the damper motor connector. Turn on the remote using the slide switch on the side of the housing. The green on/off LED will illuminate. Press the rocker switch on the remote control to operate the damper. Right toggle opens the damper, left toggle closes the damper.

**If the LED array blinks alternating red and green, there is an open connection. Check to make sure the remote control male connectors are pushed all the way in.**

The LED array will indicate approximate blade position for dampers with 90° open/close cycles. To use this feature, the damper must first be set to a full open or closed position. Then as you operate the remote, the LEDs will light up in sequence. There are 10 LEDs. If five are lit, the damper is 50% open.

The on/off LED will flash to indicate low battery condition. The remote will continue to operate the damper but battery replacement will be needed soon. The Duracell 9V battery can be replaced by removing the battery cover on the back of the remote housing. It is not necessary to remove the belt clip to replace the battery.

## 5. MAINTENANCE

OTO Curved Slot Swirl Diffusers require no periodic maintenance other than standard cleaning. Soft cloth or duster are recommended in order to remove dust without scratching the diffuser's paint.

