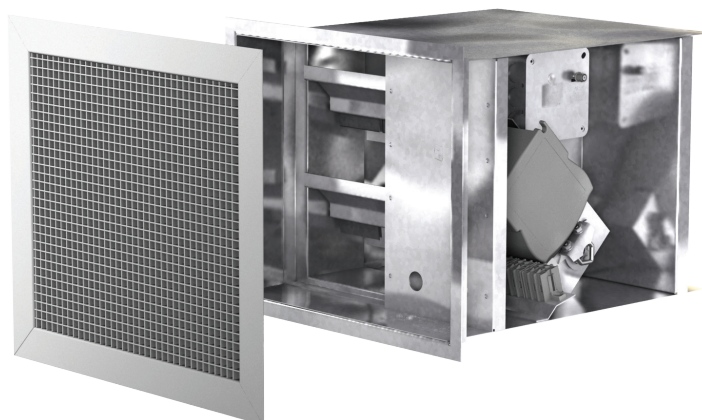


## Installation, Operation and Maintenance Manual

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 instructions apply to 1½ hour rated combination fire smoke dampers mounted in: 1) masonry, block, or stud walls and 2) concrete floors. 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.

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

### 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 100°F (38°C).

### 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.

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## General Information

**“UL CLASSIFIED (see complete marking on product)”**

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

Standard 555 & 555S (Listing #R13317)

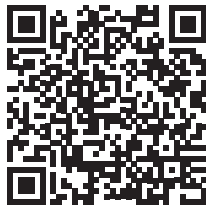
## Installation Supplements

Refer to the appropriate Greenheck installation supplements for special requirements (www.greenheck.com links are underline):

- [Greenheck Test Switch](#)
- [Metal Stud in Shaftwall Partition](#)
- [Resettable Link \(RRL\)](#)
- [Resettable Link with Blade Indicator \(RRL/OCI\)](#)
- [Smoke Detector DUCTSD](#)
- [Temperature Limited Override \(TOR\)](#)

Online version to these installation instructions at [www.greenheck.com](http://www.greenheck.com).

[Grille Access Out of Wall  
Combination Fire Smoke  
Dampers Instructions](#)



## Electrical Guidelines

### 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

### Important!

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.

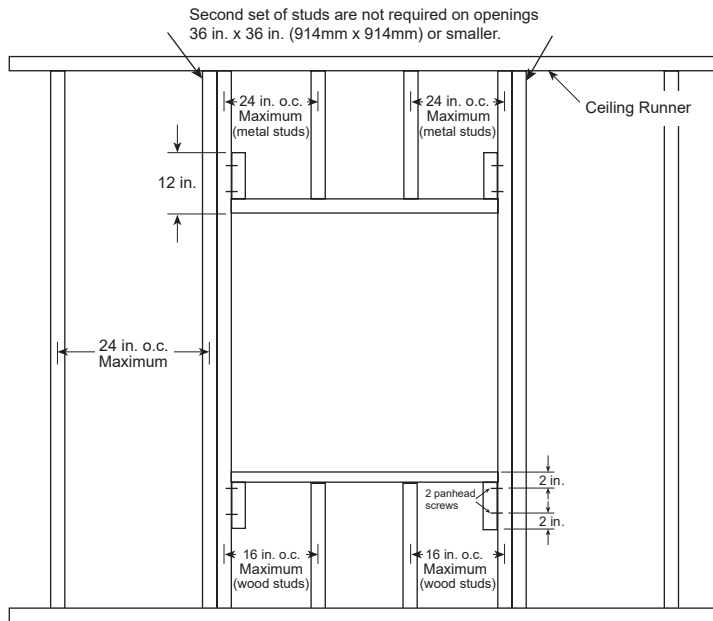
## Pre-Installation Guidelines

The following items will aid in completing the damper installation in a timely and effective manner.

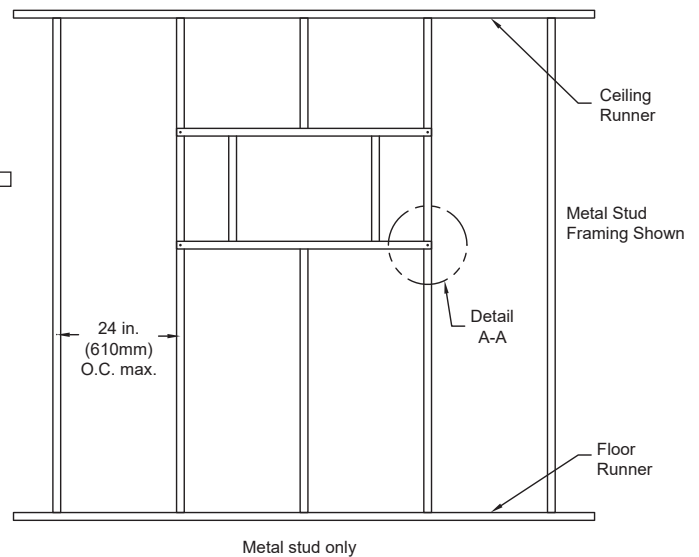
- 1) Check the drawings for proper damper locations within the building. Visually inspect the damper for damage and verify that the Reusable Resettable Link (RRL) is in place or has not activated if provided. These electric links have a button for resetting. If damper is furnished with fusible link, 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 must be installed into duct or opening square and free of twist or other misalignment. Out of square, racked, twisted or misaligned installations can cause excessive leakage and/or torque requirements to exceed damper/actuator design.
- 4) 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) Fire safing materials
  - d) Wall texture
  - e) Paint overspray
- 5) 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 the damper can cause excessive leakage and/or torque requirements to exceed damper/actuator design.
- 6) 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.
- 7) 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).
- 8) The Code Authority Having Jurisdiction (AHJ) must evaluate and provide approval of final installation where variations to these instructions are necessary.

## Preparation of Openings

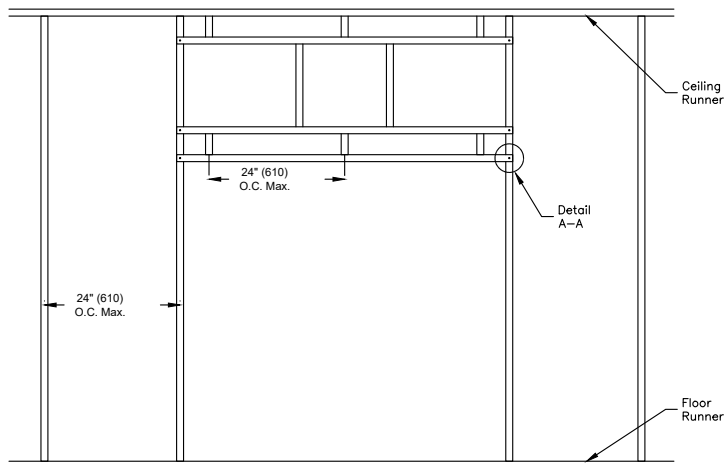
- Frame wall openings as shown below (see **Figure 1, 2, and 2A**).
- Gypsum wall board must be fastened 12 in. (305 mm) on center to all stud and runner flanges surrounding opening.
- Prepare opening between studs and sleeve assembly as shown below (see **Figure 3 & 4**).
- All construction and fasteners must meet the requirements of the appropriate wall design (See UL Fire Resistance Directory) and/or local codes.



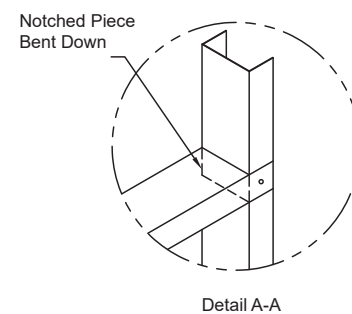
**Figure 1**



**Figure 2**



**Figure 2A**



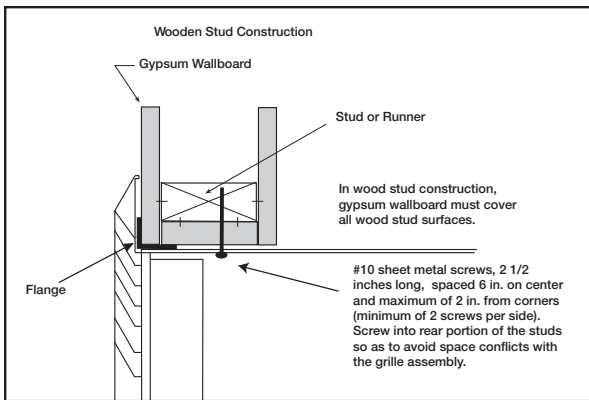


Figure 3 - Wood Stud

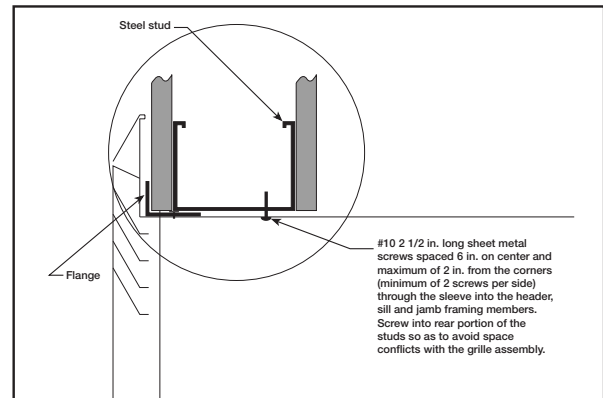


Figure 4 - Metal Stud

## Clearances Required Between Damper Sleeves & Wall/Floor Openings

There is no minimum clearance requirement between the wall/floor opening and the sleeve exterior (with thermal blanket attached). However, to facilitate installation, clearances between the wall/floor opening and the damper sleeve are recommended. Although there is no maximum allowable clearance, the minimum overlap requirements between the wall/floor and the flange/retaining angle must be met. On grille mount installations, the flange must overlap the wall/floor by  $\frac{1}{4}$  in. (6 mm).

On continuous duct installations the retaining angles must overlap the wall/floor by 1 in. (25 mm). No clearances are required between the wall/floor opening and the sleeve. Note that the dampers may not be installed in the plane of the wall using this installation method.

## Inserting Dampers Into Wall/Floor Openings

Figures 5 and 6 shows two approved installations for out of wall/floor dampers:

- 1) Through the grille access and
- 2) Installation in continuous duct

In both installation methods the damper shall not be mounted more than 3½ in. (89 mm) outside the plane of the wall/floor. The actuator and damper can be accessed and serviced by removing the grille and the actuator compartment panel. To provide access to the damper actuator for continuous ductwork, refer to the requirements of NFPA 90A.

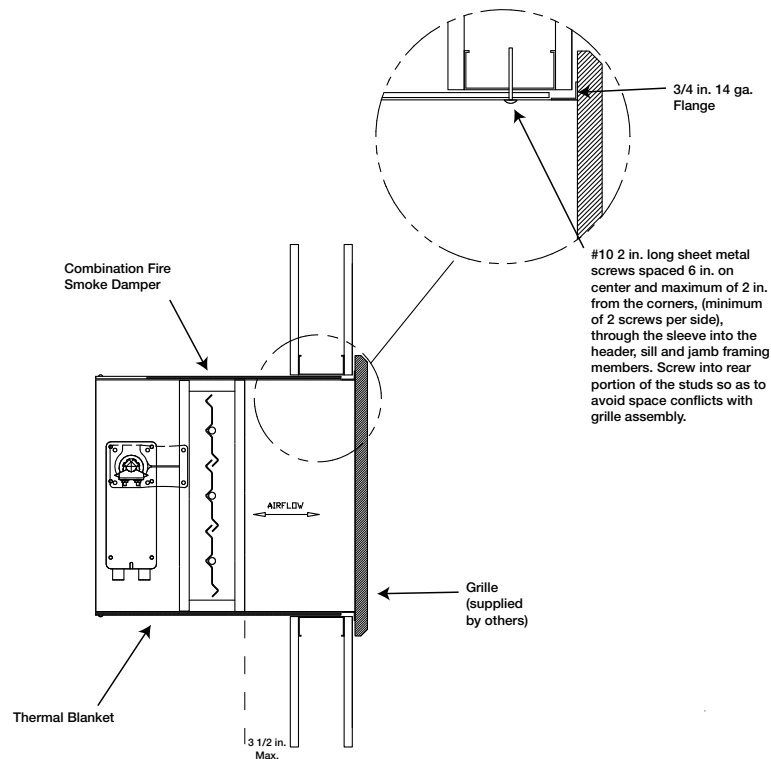


Figure 5: Through the Grille - Duct Terminates

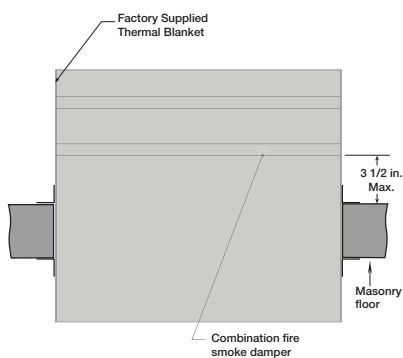


Figure 6: Continuous Duct - Horizontal or Vertical Mount

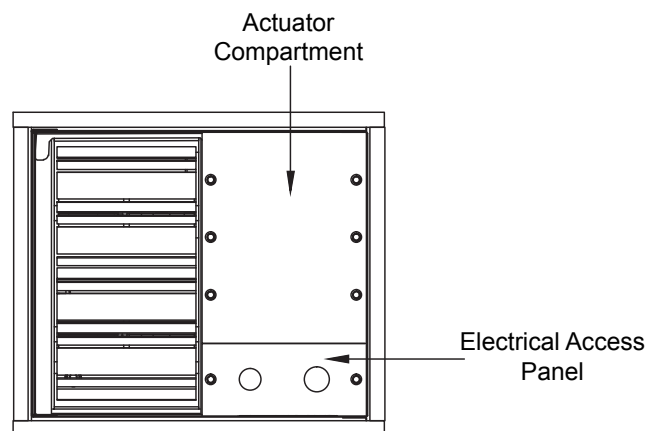


Figure 7: GFSD front view

## Securing the Damper/Sleeve Assembly to Wall/Floor Openings

Damper/sleeve assemblies must be installed in wall openings using flanges and sheet metal screws as illustrated and described below.

- **Grille Mount:**

Flange on front (grille end) of sleeve must be a minimum of 16 ga. (1.5 mm) steel and have  $\frac{3}{4}$  in. (19 mm) minimum flange leg (refer to **Figure 8**). Using #10 (19 mm) sheet metal screws, screw from inside of sleeve through the rear portion of the studs (as shown in **Figure 3 & 4**). Space screws a maximum of 6 in. (152 mm) on center and a maximum of 2 in. (51 mm) from the corners (minimum of 2 screws per side). No retaining angles are required on the side of the wall opposite from the grille.

- **Continuous Duct:**

The retaining angles must be a minimum of 20 ga. (1 mm). The leg of the retaining angle on the damper sleeve shall be a minimum of  $1\frac{1}{4}$  in. (32 mm). 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 1 in. (25 mm). See **Figure 9**.

- Retaining angles must be attached to the sleeve using one or more of the following methods of attachment:

- Tack or spot welds
- #10 ( $\frac{3}{4}$  in. [19 mm] max.) sheet metal screws
- $\frac{1}{4}$  in. (6 mm) bolts and nuts
- $\frac{3}{16}$  in. (5 mm) steel pop rivets

Attachments must be spaced a maximum of 6 in. (152 mm) on center and a maximum of 2 in. (51 mm) from corners. The angles must be attached to all four sides of the sleeve. A minimum of two attachments are required on each side, top and bottom. The angles need not be attached to each other at the corners.

**Caution! Do not tear the thermal blanket during installation.**

**Note:** Thermal blanket is riveted to the damper sleeve and the seam is taped with acrylic adhesive tape, FSK facing tape 152 5CWnt, manufactured by Venture tape Company.

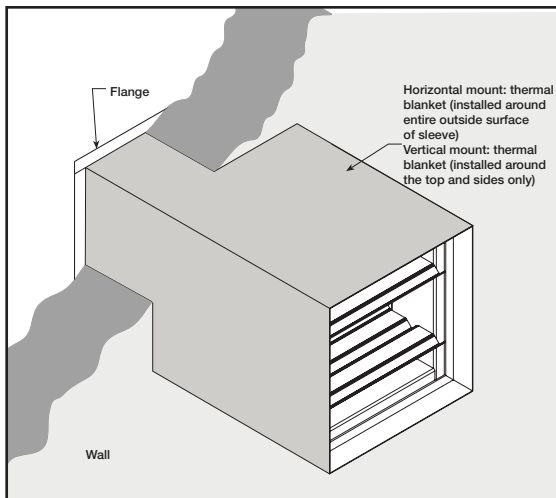


Figure 8: Sleeved Damper with Thermal Blanket (duct termination)

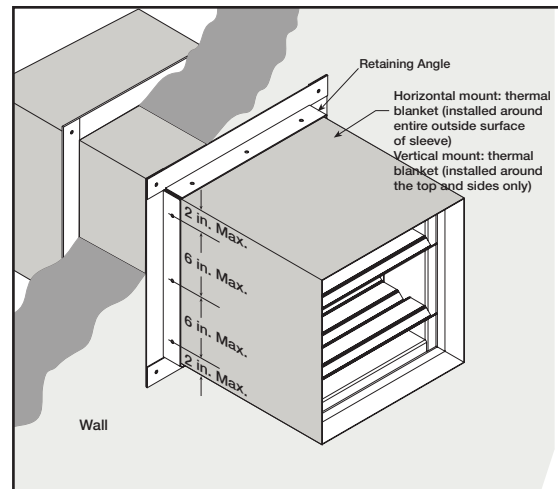


Figure 9: Sleeved Damper with Thermal Blanket (duct continuation).

## Duct to Sleeve Connection

### Sleeve Gauge and Connection Type Requirements

The size of the damper/duct determines the required sleeve gauge and the required duct to sleeve connection (see table on next page). The sleeve thickness must also not be less than the gauge of the connecting duct. Any duct connection other than the breakaway connections described below are considered rigid.

Sleeve Gauge	Duct Dimension	Type of Duct to Sleeve Connection Permitted
14 ga. (0.075 in.) - 10 ga. (0.138 in.) [2 mm - 3.5 mm]	All duct sizes	Rigid or Breakaway
16 ga. (0.060 in.) [1.5 mm]	36 in. (914 mm) max. width 24 in. (610 mm) max. height 24 in. (610 mm) diameter	Rigid or Breakaway
16 ga. (0.060 in.) [1.5 mm]	All duct sizes	Breakaway only
18 ga. (0.048 in.) [1.2 mm]	85 in. (2159 mm) wide and over	
20 ga. (0.036 in.) [0.9 mm]	55 in. - 84 in. wide (1397 mm - 2134 mm)	
22 ga. (.030 in.) [0.76 mm]	31 in. - 54 in. wide (787 mm - 1372 mm)	
24 ga. (0.024) [0.6 mm]	13 in. - 30 in. wide (330 mm - 762 mm)	
26 ga. (0.018 in.) [0.46 mm]	12 in. wide and under (305 mm)	
See Breakaway Connection section for additional information. UL Standard 555 requires all ducts to terminate at fire damper sleeves.		

## Approved Breakaway Connections

All breakaway connections described below may utilize the following duct sealants: PA2084T duct sealant adhesive manufactured by Precision, DP1010 water base duct sealant manufactured by Design Polymerics, Grey Pookie, Ductmate PROseal®, or CL Ward S Seal in accordance with SMACNA recommendations.

### Transverse Joints

The transverse joints shown below are approved as breakaway connections.

- A maximum of two #10 (19 mm) sheet metal screws on each side and on the bottom may be used. The screws should be located in the center of the slip pocket and penetrate both sides of the slip pocket.
- Dampers up to 20 inches (508 mm) high may use transverse joints on the top and bottom and Drive Slip joints (see Figure 10 and 11) on the sides.

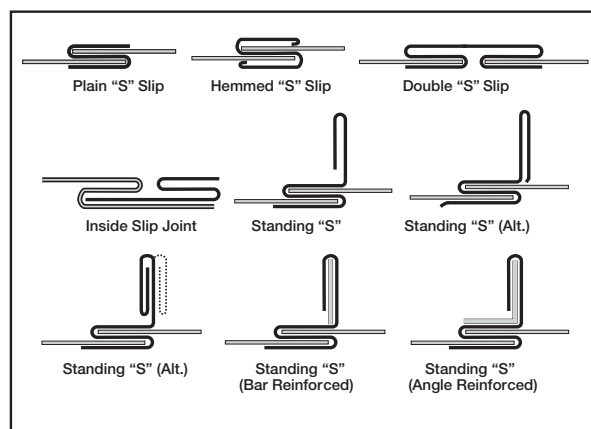


Figure 10



## Round and Oval Duct Breakaway Connections

Factory furnished duct collars, type R and O, are also considered breakaway (see Figure 12).

Round or flat oval ducts connected to Type R or O damper collars shall be attached with #10 (19 mm) sheet metal screws as follows:

- Ducts up to 22 in. (558 mm) wide (or dia.) and less shall have three screws.
- Ducts larger than 22 in. (558 mm) wide (or dia.) up to and including 36 in. (914 mm) wide (or dia.) shall have five screws.

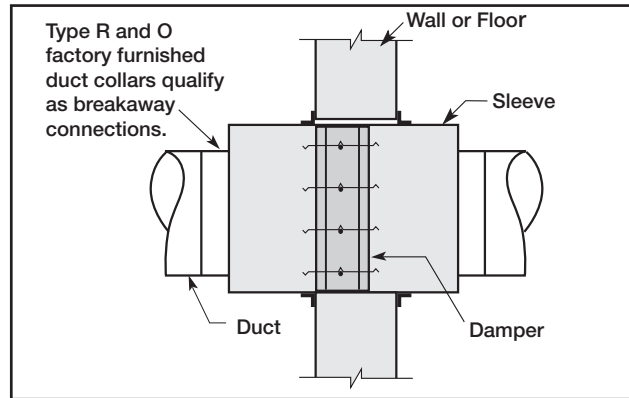


Figure 12: Type R and O Transition

## Manufactured Flanged System Breakaway Connections

Flanged connection systems manufactured by Ductmate, Durodyne, Ward, Nexus, Radiant T-35m, and MEZ are approved as breakaway connections when installed as illustrated (see Figure 13).

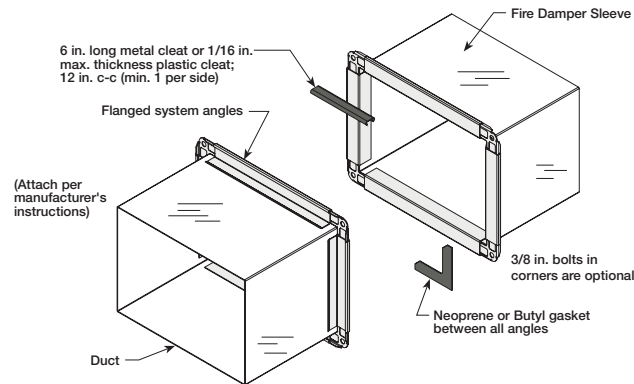
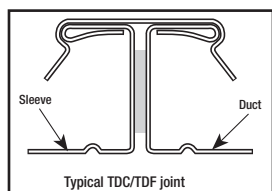


Figure 13

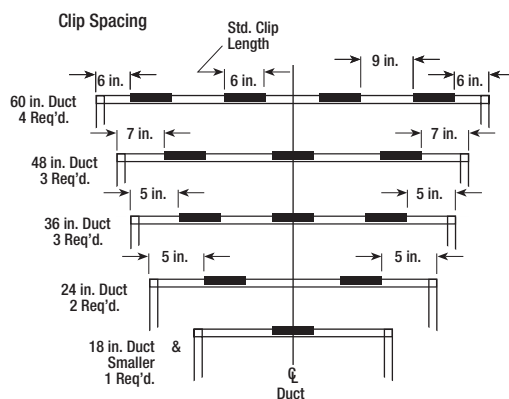
## Proprietary Flanged System Breakaway Connections

(TDC by Lockformer, TDF by Engle)

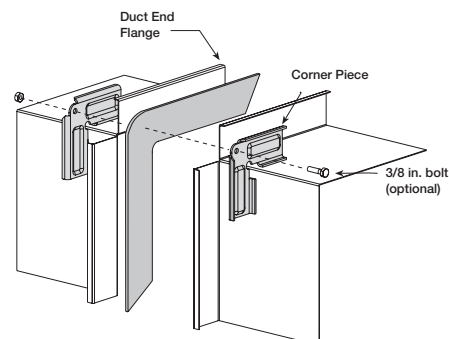
TDC and TDF systems are approved as breakaway connections when installed as described in the TDC or TDF addendum to the SMACNA Duct Construction. Standard 6 in. (152 mm) metal clip may be used with spacing as shown in diagram (see **Figure 14 & 15**). A  $\frac{3}{8}$  in. (9.5 mm) metal bolts and nuts may be used to fasten together corner pieces (see **Figure 16**).



**Figure 14**



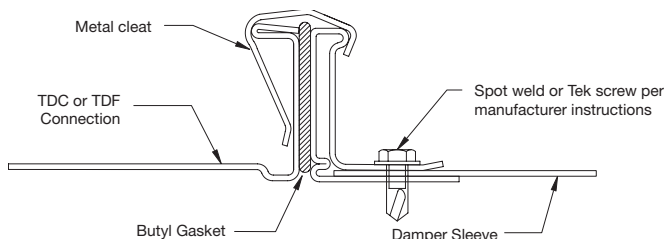
**Figure 15**



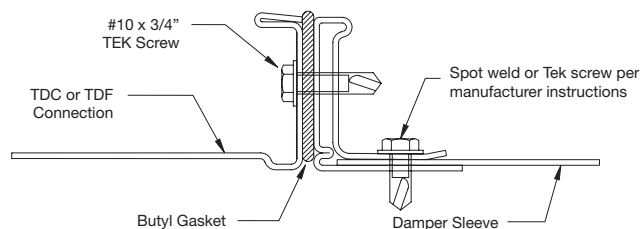
**Figure 16**

## TDC/TDF to Manufactured Flange

Flanged connection systems manufactured by Ductmate, Durodyne, Ward, Nexus, Radiant T-35m, and MEZ can be connected to TDC and TDF system as an alternate breakaway connection. This alternate connection is covered under the UL certification of the damper. See Supplement: Duct-Sleeve Connection (IOM #468502) for more information.



**Figure 17: Metal cleat method**



**Figure 18: Screw method**

# Actuator and Temperature Response Device Connections

## Actuator Connections

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

## Temperature Response Device Connections

**RRL** - The RRL (reusable resettable link) incorporates one thermostat. When the thermostat temperature is reached the sensor interrupts power to the actuator and the actuator's spring return mechanism causes the damper to close. Refer to **Figure 19** for wiring of the RRL thermostat.

**RRL/OCI** - The RRL/OCI contains a RRL (see above) and two single pole single throw switches used to indicate the damper blade position. The switches provide a positive open and closed signal and can be used in conjunction with remote indicator lights. Refer to **Figure 20** for wiring of the RRL/OCI option.

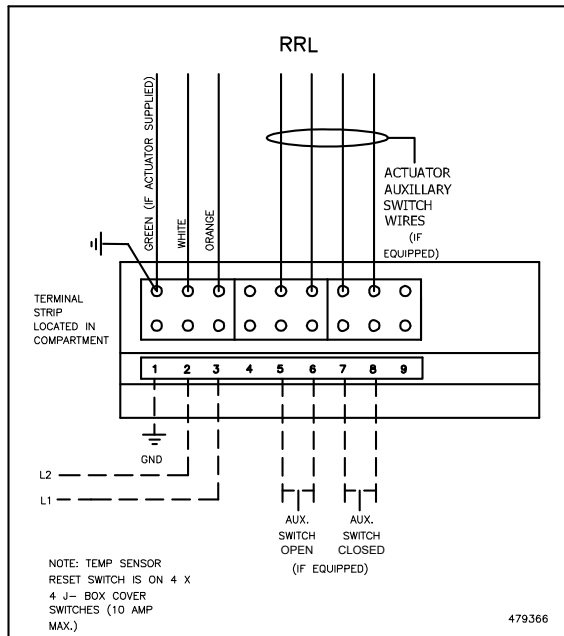


Figure 19: RRL wiring diagram

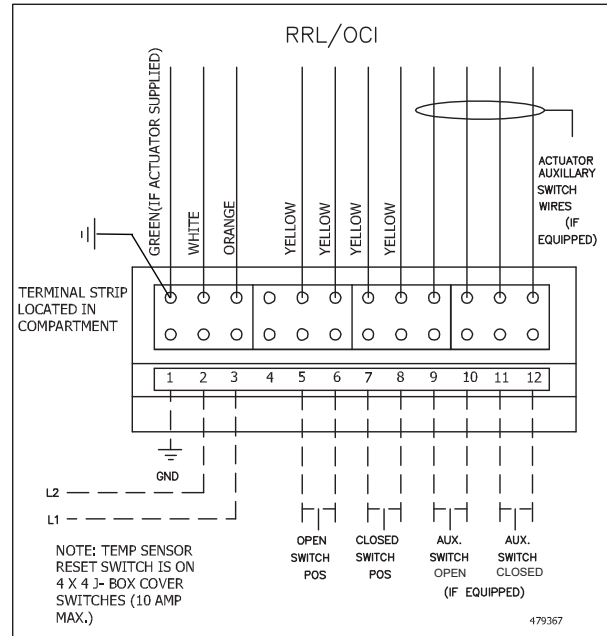


Figure 20: RRL/OCI wiring diagram

**TOR** - The TOR (temperature override device) option incorporates two thermostats with fixed settings (usually 165°F [74°C] and 350°F [177°C]). The primary sensor (the sensor with the lower temperature setting) can be bypassed by an external contact closure allowing the damper to reopen until the secondary temperature is reached (the sensor with the higher temperature setting). See **Figure 21**.

When the temperature of the secondary sensor is exceeded the damper closes and remains closed thereafter.

The TOR assembly also contains two single pole, single throw switch used to indicate damper blade position. The switch provides a positive open and closed signal when used in conjunction with remote indicator lights. See **Figure 21** for wiring of the TOR thermostats and indicator switches.

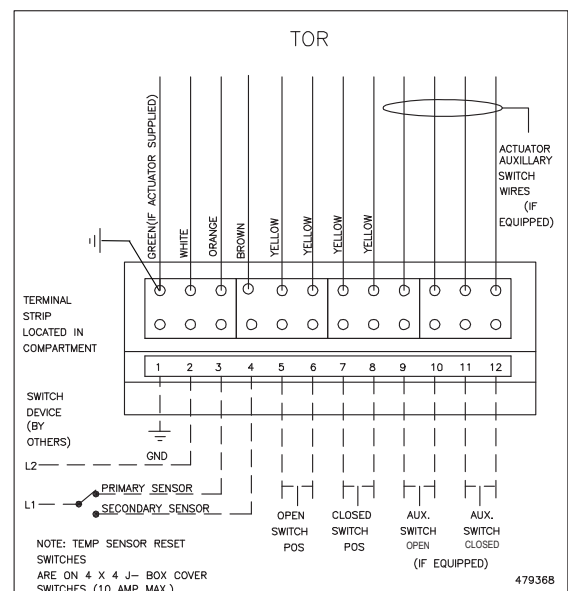


Figure 21: TOR wiring diagram

## Damper Commissioning and Periodic Testing

The International Fire Code (IFC) requires fire dampers to be maintained in accordance with NFPA standard 80 and smoke dampers to be maintained in accordance with NFPA standard 105. NFPA 80 and 105 define the frequency and method for periodically testing life safety dampers.

NFPA 80 & 105 do not require heat to be applied to a damper's fusible link or thermostat during periodic testing. Electric or pneumatic actuated dampers are required to be tested by temporarily removing electrical or pneumatic power from the actuator to ensure the damper fully closes and then fully opens once power is restored. Mechanical and gravity operated dampers utilizing a fusible link are required to be tested by removing the fusible link and allowing the damper to fully close and then manually reopening the damper re-installing the fusible link.

Greenheck's life safety dampers shall not be tested by applying heat with uncontrollable heat sources (i.e. heat guns, torches, etc.) as this can permanently damage the thermostat or other parts of the damper.

## 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 at minimum in accordance with:

- The latest editions of NFPA 80, 90A, 92, 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.

Symptom	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

## Our Commitment

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

