Installation, Operation and Maintenance Manual

These instructions apply to 1½ and 3 hour rated fire and 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/or UL 555S.

Note: Combination fire smoke and fire 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).

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.

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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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 and has not activated if provided. These electric links have a button for resetting. 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. 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 the 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.
Preparation of Openings

• Frame wall openings as shown below (see Figure 1 & 2).
• Gypsum wall board must be fastened 12 in. (305mm) 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](image1.png)
Second set of studs are not required on openings 36 in. x 36 in. (914mm x 914mm) or smaller.

![Figure 2](image2.png)
Metal stud only

![Figure 3](image3.png)
Wooden Stud Construction

In wood stud construction, gypsum wallboard must cover all wood stud surfaces.

![Figure 4](image4.png)
Metal Stud Construction

In metal stud construction, exposed steel surfaces need not be covered with gypsum wallboard.

Multi-Blade Fire and Combination Fire Smoke Dampers
Clearances Required Between Damper Sleeves & Wall/Floor Openings

Two-sided Angle Installation
Two sided angle installations require clearances for thermal expansion between the damper sleeve and the wall/floor opening. The minimum required clearances are:

- For galvanized steel fire dampers and sleeves: 1/8 in. per foot (3mm per .3 m) of damper width and 1/8 in. per foot (3mm per .3 m) height with a minimum clearance of 1/4 in. (6mm). The total gap may be up to 6 in. (152mm), 3 in. (76mm) per side, as long as the retaining angles overlap the wall/floor by a minimum of 1 in. (25mm).
- For stainless steel fire/smoke dampers and stainless steel or galvanized sleeves: 3/16 in. per foot (5mm per .3 m) of damper width and height with a minimum clearance of 1/4 in. (6mm), maximum of 2 in. (51mm).

Example:
A 12 in. x 12 in. (305mm x 305mm) will require a minimum clearance of 1/4 in. (6mm) width and 1/4 in. (6mm) on height
A 48 in. x 12 in. (1219mm x 305mm) damper will required a minimum clearance of 1/2 in. (13mm) on width and 1/4 in. (6mm) on height.

These are total clearances (ignoring fastener heads) and do not need to be equally spaced around the damper. Although the minimum requirements are listed above, for ease of installation the following are the recommended clearances for galvanized dampers:

- Width/Height of 48 in. (1219 mm) or less - 1/2 in. (13mm) clearance
- Width/Height between 48.01 in. (1220 mm) and 96 in. (2438 mm): 1 in. (25mm) clearance
- Width/Height greater than 96 in. (2438 mm): 1 1/2 in. (38 mm) clearance

Single Side Angle Installation
On vertical mount single side angle installations there are no minimum clearance requirements between the wall opening and the damper sleeve. However, to facilitate installation, clearances between the wall opening and the damper sleeve are recommended.

On horizontal mount single side angle installations a minimum clearance is required between the outside of the damper sleeve and the floor opening of 1/8 in. per foot (3mm per .3m) of damper width and 1/8 in. per foot (3mm per .3m) height with a minimum clearance of 1/4 in. (6mm).

Installing Multiple Section Damper 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 below).

Some multiple section high damper assemblies require additional structural support between the damper frames. The following multiple section high damper assemblies require the use of either a support mullion between the damper frames as shown in Figure 5 or individual sleeves around each row of dampers as shown in Figure 6:

- All horizontal mount dampers
- All vertical mount dampers over 72 in. (1829mm) high and greater than 2 sections wide
- All vertical mount dampers rated for more than 4 in. wg (1 kPa)
- All vertical mount dampers that use fusible links as a closure device

The damper sections must be attached together with #10 (¾ in. max. [19mm]) sheet metal screws, ¼ in. (6mm) diameter nuts and bolts, tack or spot welds, or ⅜ in. (48mm) diameter steel pop rivets. Attachments must be spaced a maximum of 6 in. (152mm) on centers and a maximum of 2 in. (51mm) from corners. Attachments must be made on front face and back face (air entering and air exiting side) of damper sections.

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.
Support mullion:
- 14 ga. 5 in. wide for vertical mount dampers;
- 12 ga. 9 in. wide for horizontal mount dampers

**Multiple Section Damper Wiring**

Dampers greater than 84 in. (2134mm) high will ship in two ship sections. Conduit whips from ship section will need to be wired to junction box on ship section with the closure device (see Figure 7).

When smoke and fire smoke dampers are ordered with an open/close blade position indicating device (included with the OCI, RRL/OCI, and TOR accessories) one device is provided per row of damper sections. For example, a two section high damper assembly will be provided with two open/closed indicating devices.

Note that all damper sections on a given row are operated by a single jackshaft and thus forced to operate in unison. On two section high dampers, although the two open/closed indicators are not factory wired together, it is common industry practice to field wire the two open switches in series and the two closed switches in series so that the system monitoring the damper will detect a fault if either row of dampers fails to reach the end of stroke condition.

**Maximum Assembly Tables**

<table>
<thead>
<tr>
<th>Damper Model</th>
<th>Maximum Overall Size for Multi-Section Dampers (inches)</th>
<th>Maximum Overall Size for Multi-section Dampers (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFD-210</td>
<td>36 x 36 or 32 x 50</td>
<td>128 x 96</td>
</tr>
<tr>
<td>DFDAF-310</td>
<td>32 x 50</td>
<td>144 x 96</td>
</tr>
<tr>
<td>FSD-211, 212, 213</td>
<td>36 x 48 or 32 x 50</td>
<td>144 x 96</td>
</tr>
<tr>
<td>FSD-211M, 212M</td>
<td>30 x 36</td>
<td>144 x 72</td>
</tr>
<tr>
<td>FSD-231M</td>
<td>36 x 36</td>
<td>72 x 48</td>
</tr>
<tr>
<td>FSD-311, 312</td>
<td>32 x 50</td>
<td>144 x 96</td>
</tr>
<tr>
<td>FSD-311M, 312M</td>
<td>32 x 50</td>
<td>128 x 96</td>
</tr>
<tr>
<td>FSD-331, DFDAF-330</td>
<td>30 x 48</td>
<td>144 x 96</td>
</tr>
<tr>
<td>IMO-310</td>
<td>32 x 50</td>
<td>NA</td>
</tr>
<tr>
<td>IMO-311</td>
<td>32 x 50</td>
<td>NA</td>
</tr>
<tr>
<td>SEDFD-210, SEDFD-211</td>
<td>24 x 30</td>
<td>48 x 30</td>
</tr>
<tr>
<td>SSFSD-211</td>
<td>24 x 30</td>
<td>48 x 30</td>
</tr>
</tbody>
</table>

**Vertical Mount**

<table>
<thead>
<tr>
<th>Damper Model</th>
<th>Maximum Single Section Size (inches)</th>
<th>Maximum Overall Size for Multi-section Dampers (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFD-210</td>
<td>36 x 36 or 32 x 50</td>
<td>128 x 100</td>
</tr>
<tr>
<td>DFDAF-310</td>
<td>32 x 50</td>
<td>128 x 100</td>
</tr>
<tr>
<td>FSD-211, 212, 213</td>
<td>36 x 48 or 32 x 50</td>
<td>128 x 100</td>
</tr>
<tr>
<td>FSD-311, 311M, 312, 312M</td>
<td>32 x 50</td>
<td>128 x 100</td>
</tr>
<tr>
<td>FSD-311V</td>
<td>50 x 32</td>
<td>100 x 32</td>
</tr>
<tr>
<td>FSD-331, DFDAF-330</td>
<td>32 x 36 or 30 x 48</td>
<td>120 x 96</td>
</tr>
<tr>
<td>IMO-311</td>
<td>32 x 50</td>
<td>NA</td>
</tr>
<tr>
<td>SEDFD-210, SSDFD-210</td>
<td>24 x 30 or 22 x 36</td>
<td>48 x 30</td>
</tr>
<tr>
<td>SEFSD-211</td>
<td>24 x 30 or 22 x 36</td>
<td>88 x 72</td>
</tr>
</tbody>
</table>

Note: FSD model dampers fitted with a fusible link closure device are limited to single section sizes.
Inserting Damper into Wall/Floor Openings

Insert the sleeved damper assembly into the prepared opening. Refer to label on outside of sleeve for the recommended location of the damper in the wall or floor (see Dimension A and Detail 1, Figure 8).

Special attention must be paid to ensure the following:

1) The $C_L$ (centerline) of the damper frame remains within the plane of the wall or floor
2) Attachments made through the retaining angle do not penetrate the ‘No Screw’ area designated on the damper sleeve.
3) The sleeve does not extend more than 16 in. (406mm) beyond the wall or floor on the actuator side of the damper and 6 in. (152mm) on the side opposite the actuator. The sleeve may also extend up to 16 in. (406mm) beyond the wall or floor if the damper has a factory supplied access door.

**Figure 8:** Properly Installed Combination fire smoke damper

Most fire and combination fire smoke dampers come with factory supplied sleeves. For field supplied sleeves, see the Field Supplied Sleeves supplement at www.greenheck.com. The following are recommended sleeve lengths for various wall thicknesses:

<table>
<thead>
<tr>
<th>Wall Thickness Dimension ($T_W$)</th>
<th>Recommended Sleeve Length Dimension ($L$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - 6 in. (102mm - 152mm)</td>
<td>16 in. (406mm)</td>
</tr>
<tr>
<td>7 - 10 in. (178mm - 254mm)</td>
<td>21 in. (533mm)</td>
</tr>
<tr>
<td>11 - 13 in. (279mm - 330mm)</td>
<td>24 in. (610mm)</td>
</tr>
</tbody>
</table>
Securing the Damper/Sleeve Assembly to Wall/Floor Openings

All fire and combination fire smoke dampers may utilize the two sided angle installation method described below. 1½ hour rated fire and combination fire smoke dampers may use the single sided angle installation method up to the following maximum sizes:

- Vertical mount: 80 in. W x 50 in. H (2032mm W x 1270mm H), 50 in. W x 80 in. H (1270mm W x 2032mm H), or 40 in. W x 100 in. H (1016mm W x 2540mm).
- Horizontal mount: 144 in. W x 96 in. H (3658mm W x 2438mm H)

**Retaining Angle Gauge:** Retaining angles for 1½ hour rated dampers with a width and height 48 in. (1219mm) or less must be a minimum of 20 ga. (1mm). Retaining angles for all 3 hour rated dampers and all dampers with a width or height greater than 48 in. (1219mm) must be a minimum of 16 gauge (1.5mm).

**Retaining Angle Size:** The leg of the retaining angle on the damper sleeve shall be a minimum of 1¼ in. (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 1 in. (25mm).

**Retaining Angle Attachment to Sleeve:** 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
- #10 (¼ in. [19mm] max.) sheet metal screws
- ¼ in. (6mm) bolts and nuts
- ⅜ in. (5mm) steel pop rivets

A minimum of two connections per side, top, and bottom, 12 in. (305mm) O.C. maximum for openings of 48 in. W x 36 in. H (1219mm x 914mm) and less. Dampers greater than 48 in. wide (1219mm) or 36 in. high (914mm) require the connections to be no more than 6 in. (152mm) on center.

The angles must be attached to all 4 sides of the sleeve. Ensure that fasteners do not interfere with the operation of the damper. The angles need not be attached to each other at the corners.

**Retaining Angle Attachment to Wall/Floor:**

**Two sided Angle Method:** For two sided angle installations the retaining angles shall not be attached to the wall/floor (see Figure 9).

**Single Sided Angle Method:** For single side installations the retaining angles must be attached to the wall/floor (see Figures 10-13). For metal stud partitions only, the single-side mounting angle may be directly attached to the metal stud prior to the installation of the drywall.

- Retaining angles must be attached to the partition using one of the methods shown below:
  - Drywall screws of a length such that the screw engages the steel stud/track by ⅛ in. (13mm) (steel framing).
  - Drywall screws of a length such that the screw engages the wood stud by 1¼ in. (44mm) (wood framing).
  - Steel anchors or self tapping concrete screws penetrating masonry or block 1¼ in. (31mm).

A minimum of two connections per side are required. Additional connections made at a maximum of 12 in. (305mm) O.C. maximum for openings of 48 in. W x 36 in. H (1219mm x 914mm) and less. Dampers greater than 48 in. wide (1219mm) or 36 in. high (914mm) require the connections to be no more than 6 in. (152mm) O.C.
Securing the Damper/Sleeve Assembly to Wall/Floor Openings cont.......

Figure 10: Single Side Angle With Steel Stud Wall - Angle Over Wallboard

Figure 11: Single Side Angle With Wood Stud Wall

Figure 12: Single Side Angle With Steel Stud Wall - Angle Under Wallboard

Figure 13: Single Side Angle With Masonry or Concrete Wall and Floor

Grille Installations (Dampers up to 36 in. x 36 in. [914mm x 914mm])

Retaining angles used in conjunction with grille installations must be a minimum of \(\frac{3}{8}\) in. x 1 in. (15mm x 25mm) 16 gauge (1.5mm) steel. Space screws a maximum of 6 in. (152mm) on center and a maximum of 2 in. (51mm) from the corners (minimum of 2 screws per side). See Figure 14 and Figure 15.

Note: Screws used to attach grille are allowed to penetrate reversed angle leg.
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 to the right). 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.

<table>
<thead>
<tr>
<th>Sleeve Gauge</th>
<th>Duct Dimension</th>
<th>Type of Duct to Sleeve Connection Permitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 ga. (0.075 in.) - 10 ga. (0.138 in.) [2mm - 3.5mm]</td>
<td>All duct sizes</td>
<td>Rigid or Breakaway</td>
</tr>
<tr>
<td>16 ga. (0.060 in.) [1.5mm]</td>
<td>36 in. (914mm) max. width 24 in. (610mm) max. height 24 in. (610mm) diameter</td>
<td>Rigid or Breakaway</td>
</tr>
<tr>
<td>16 ga. (0.060 in.) [1.5mm]</td>
<td>All duct sizes</td>
<td></td>
</tr>
<tr>
<td>18 ga. (0.048 in.) [1.2mm]</td>
<td>85 in. (2159mm) wide and over</td>
<td>Breakaway only</td>
</tr>
<tr>
<td>20 ga. (0.036 in.) [0.9mm]</td>
<td>55 in. - 84 in. wide (1397mm - 2134mm)</td>
<td></td>
</tr>
<tr>
<td>22 ga. (0.030 in.) [0.76mm]</td>
<td>31 in. - 54 in. wide (787mm - 1372mm)</td>
<td></td>
</tr>
<tr>
<td>24 ga. (0.024 in.) [0.6mm]</td>
<td>13 in. - 30 in. wide (330mm - 762mm)</td>
<td></td>
</tr>
<tr>
<td>26 ga. (0.018 in.) [0.46mm]</td>
<td>12 in. wide and under (305mm)</td>
<td></td>
</tr>
</tbody>
</table>

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 Polymetrics, 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 (19mm) 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 (508mm) high may use transverse joints on the top and bottom and Drive Slip joints (see Figure 17) on the sides.

![Figure 16 - Transverse Joints](image1)

![Figure 17 - Drive Slip Joint](image2)
Approved Breakaway Connections....

Round and Oval Duct Breakaway Connections
Factory furnished duct collars, type R and O, are also considered breakaway (see Figure 18).

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

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

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 19).

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 6 in. (152mm) metal clip may be used with spacing as shown in diagram (see Figure 20 & 21). 3/8 in. (9.5mm) metal bolts and nuts may be used to fasten together corner pieces (see Figure 22).
Actuator and Temperature Response Device Connections

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).

Temperature Response Device Connections
RRL - The RRL (resettable link device) incorporates a single 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 23 for wiring of the RRL thermostat.

OCI - The OCI (open or closed indicator) option contains 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 24 for wiring of the OCI option.

RRL/OCI - The RRL/OCI performs the function of an RRL and OCI (see description above). Refer to Figure 25 for wiring of the RRL/OCI option.

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 26.

The TOR assembly contains two single pole single throw switches used to indicate damper blade position. The switches provide a positive open and closed signal and can be used in conjunction with remote indicator lights. See Figure 26 for wiring of the TOR thermostats and indicator switches.

If either the TOR or the RRL is ordered with a pneumatic actuator, an EP switch is required with an appropriate electric power circuit to allow the electric thermostat to control the pneumatic actuator.

Ratings (Figure 23, 24, 25, & 26)
Integral Switch Type: Single Pole, double throw
Electrical Capacity: 10 Amps, 1/3 hp, 120 or 240 Vac
½ Amp, 125 Vdc;
¼ Amp 250 Vdc
5 Amps, 120 Vac “L” (lamp load)
1.0 Amps, 24 Vac
1.5 Amps, 24 Vdc
Temperature Limit: 165°F (standard primary sensor)
212°F (optional primary sensor)
250°F (secondary sensor)*
350°F (secondary sensor)*
* based on actuator temperature rating

Figure 23: RRL Wiring

Figure 24: OCI

Figure 25: RRL/OCI

Figure 26: TOR
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 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.

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

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.