

MODEL 8650 SUREFLOW™ FACE VELOCITY CONTROLLER

INSTALLATION INSTRUCTIONS

WARNING: The Model 8650 Face Velocity Controller must be wired to 24 VAC only. Wiring the unit to 110 VAC will cause serious damage to the unit and void the warranty.

The Velocity Sensor must reference room air. This means that if the fume hood side walls extend to the ceiling, a Model 8691 Fume Hood Sensor Venting Kit must be installed (Figure 6).

The purpose of these instructions is to guide the installer through the installation of the TSI Model 8650 SUREFLOW™ Face Velocity Controller. The installation instructions cover all control versions: electric actuator/damper and motor speed versions. Unless specified otherwise, figures and instructions apply to all versions. Please read these instructions thoroughly before beginning installation. The instructions begin with Figure 1, which shows a typical SUREFLOW™ installation, followed by a component list, and then some very important installation notes.

The order of installation presented in the instructions is a guideline. The piece parts may be installed in any order.



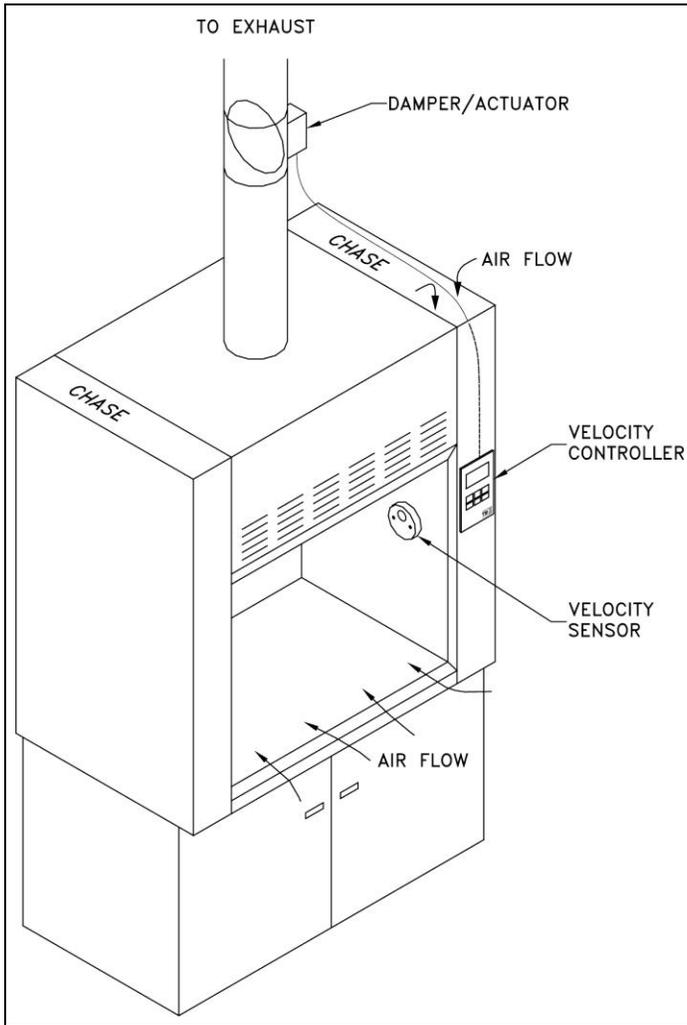


Figure 1: Typical Installation of SUREFLOW™ Components - Damper Version

Component List

Part Number	Qty	Description
800320	1	Velocity Sensor
800325	1	Sensor Cable Assembly
800xxx	1	Velocity Controller (depends on model)
800420	1	Transformer
800414	1	Transformer Cable

Damper versions have:

none	1	Damper sized to Fume Hood
800199	1	Controller Output Cable
800360	1	Electric Actuator

Velocity Sensor Installation

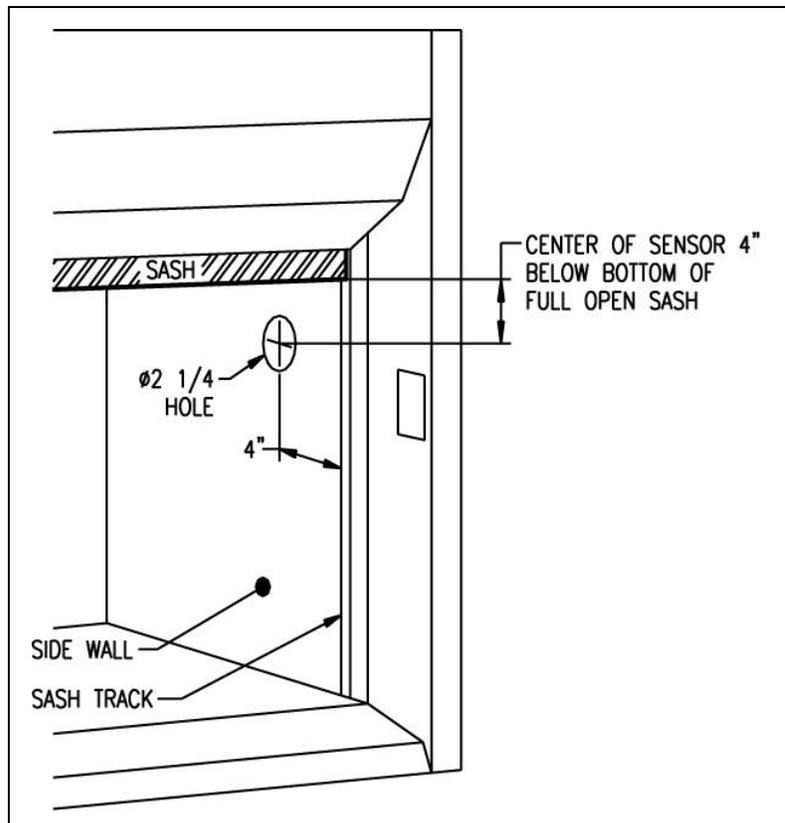


Figure 2: Velocity Sensor Location

WARNING: Do **not** alter the length of the 800325 SENSOR CABLE ASSEMBLY (Cable with 4-pin connectors on each end). 800320 VELOCITY SENSOR must be referenced to room air. If the fume hood panel extends to the ceiling, a **Model 8691** Sensor Venting Kit must be installed (see Figure 6).

1. Determine VELOCITY SENSOR location. Use Figure 2 as a guideline.
2. VELOCITY SENSOR is mounted to liner wall inside of hood.
3. Drill 2¼ inch hole through the fume hood liner wall at this location.
4. Install MOUNTING PLATES to fume hood liner wall using 2 of the 8-32 × 5/8-inch screws provided. The MOUNTING PLATES must be installed as shown in Figure 4.
5. Plug SENSOR CABLE ASSEMBLY into the VELOCITY SENSOR.
6. Thread SENSOR CABLE ASSEMBLY through the mounting plates down to the VELOCITY CONTROLLER electrical rough-in box. The space between the fume hood liner wall and outer sheet metal panel works well as a chase. Leave 8 inches of slack at the VELOCITY CONTROLLER end (**DO NOT CUT SENSOR CABLE LENGTH**).
7. For CE compliance, a ferrite bead must be installed on the wire running to the digital communications, either RS-485 or Lon Mark®. The ferrite bead should be 2 inches (5.1 cm) away from the Model 8650 end of the communications wire (Figure 3).
8. Mount the VELOCITY SENSOR to the MOUNTING PLATE using the remaining two 8-32 × 5/8-inch screws provided (Figure 4).
9. The mounted VELOCITY SENSOR must look like Figure 5.

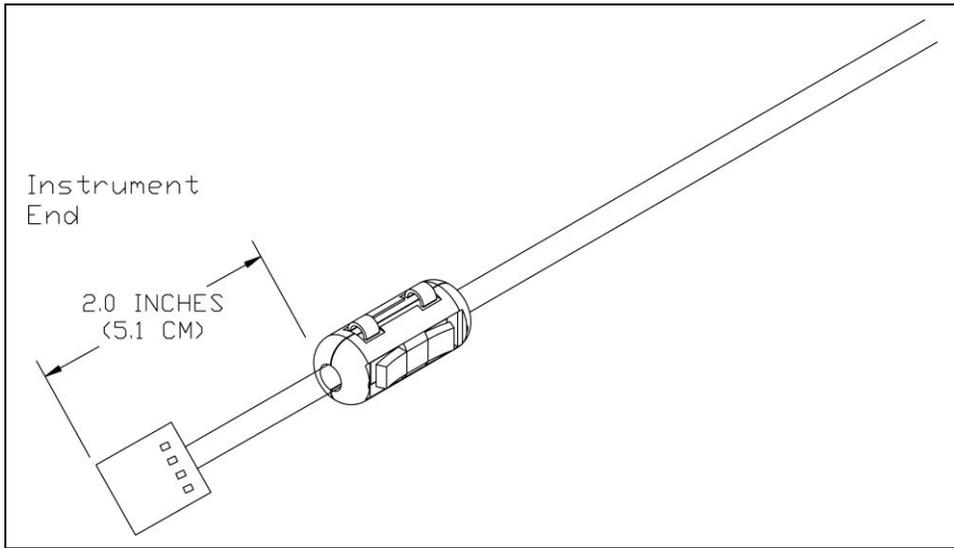


Figure 3: Ferrite Bead Location

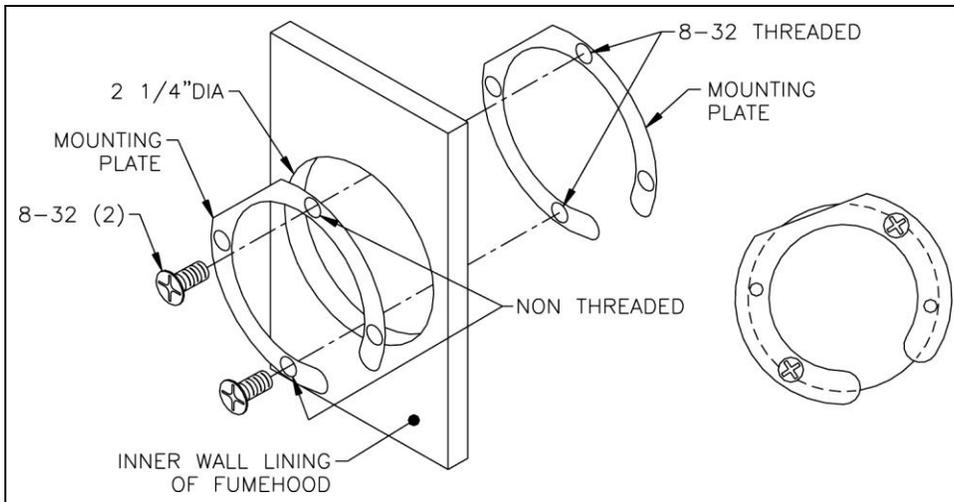


Figure 4: Mounting Plates

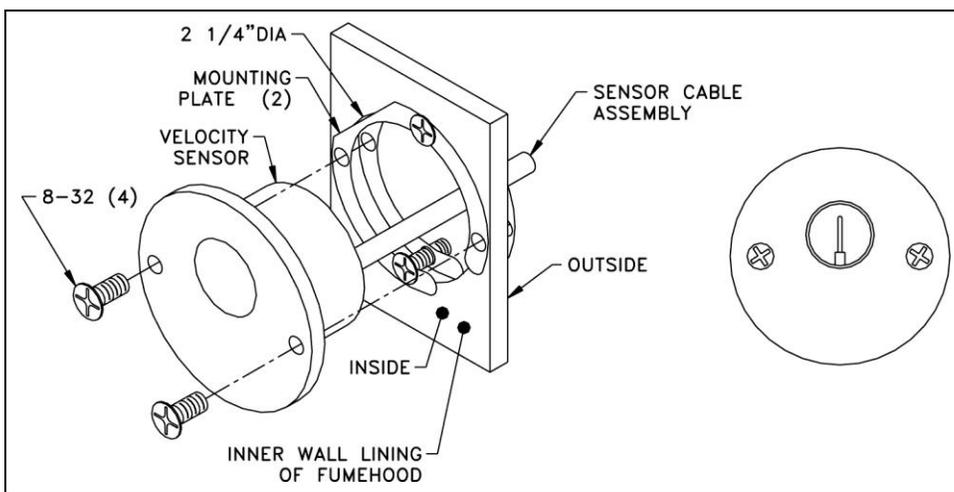


Figure 5: Mounted Velocity Sensor

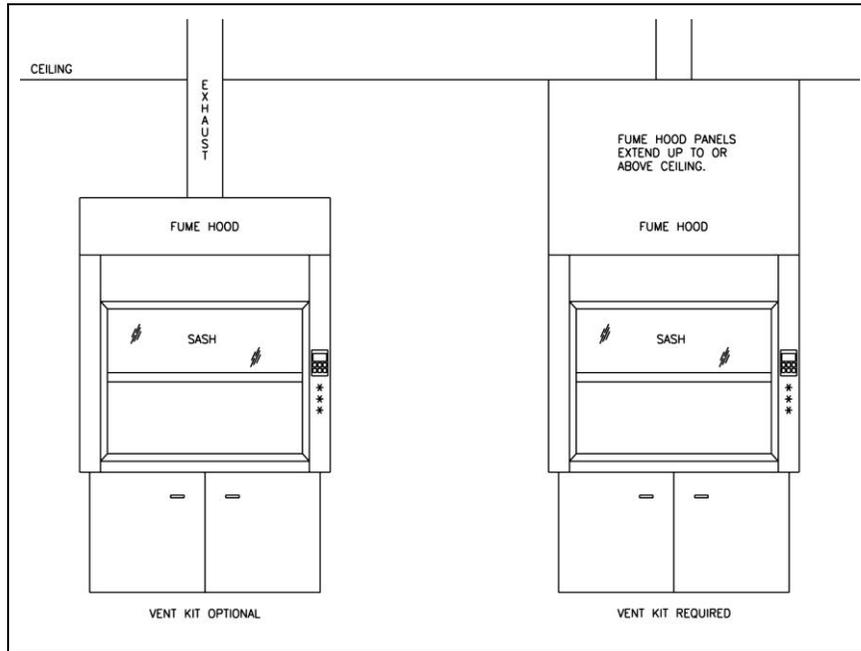


Figure 6: Fume Hood Sensor Venting Kit

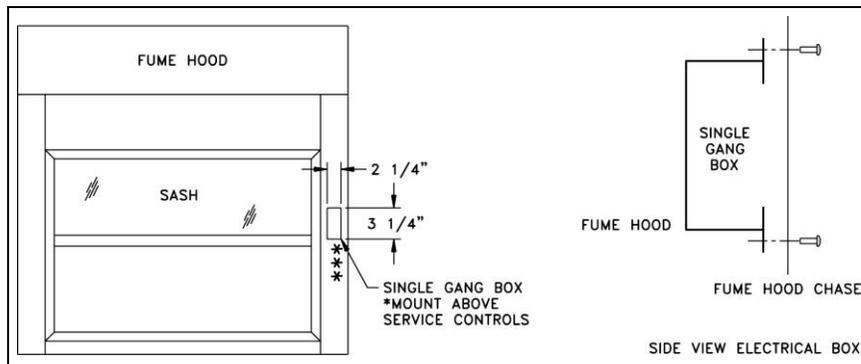


Figure 7: SUREFLOW™ Controller Mounting

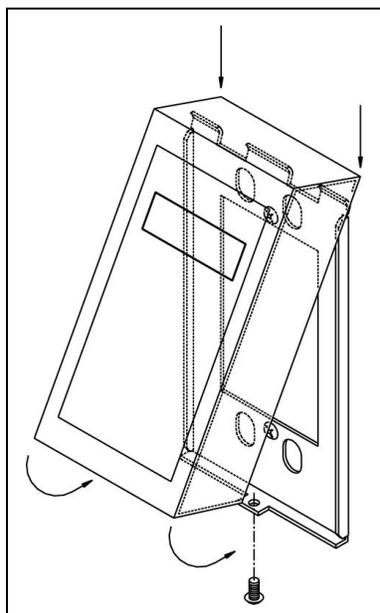


Figure 8: Final Controller Mounting

Velocity Controller Installation

Velocity Controller Rough-in

WARNING: The velocity sensor and velocity controller must mount on the same side of the fume hood (Figure 1).

1. Select the mounting location of the VELOCITY CONTROLLER. The controller is typically mounted above the services controls (see Figure 1).
2. Cut a hole at this location, sized to mount a standard single gang electrical box (2¼" wide × 3¼" long) (Figure 7).
3. Mount a single gang electrical box. The electrical box must be mounted inside the fume hood face panel (Figure 7).

Velocity Controller Wiring

WARNING: The Model 8650 Face Velocity Controller must be wired to 24 VAC only. Wiring the unit to 110 VAC will cause serious damage to the unit and void the warranty.

Do **not** connect more than 24 VAC to any terminal.

Do **not** apply voltage to the RS-485 output or analog output. Severe damage may occur to the unit if voltage is applied.

1. Attach mounting bracket to single gang electrical box per Figure 7.
2. Remove the connectors from the back of the VELOCITY CONTROLLER.
3. Refer to the wiring diagrams, Damper Versions (Figure 10) and Motor Versions (Figure 9), for proper wiring installation.

WARNING: Controller must be wired exactly as wiring diagram shows. Making modifications to the wiring may severely damage unit.

4. If additional pins need to be wired, refer to building prints for proper wiring diagram.
5. Plug the connectors into the VELOCITY CONTROLLER.
6. Plug sensor cable assembly into the VELOCITY CONTROLLER.
7. SUREFLOW™ Controller is attached to mounting bracket by sliding top of controller down on bracket and then snapping in bottom of controller case. The bottom mounting tab goes inside the controller box (Figure 8).

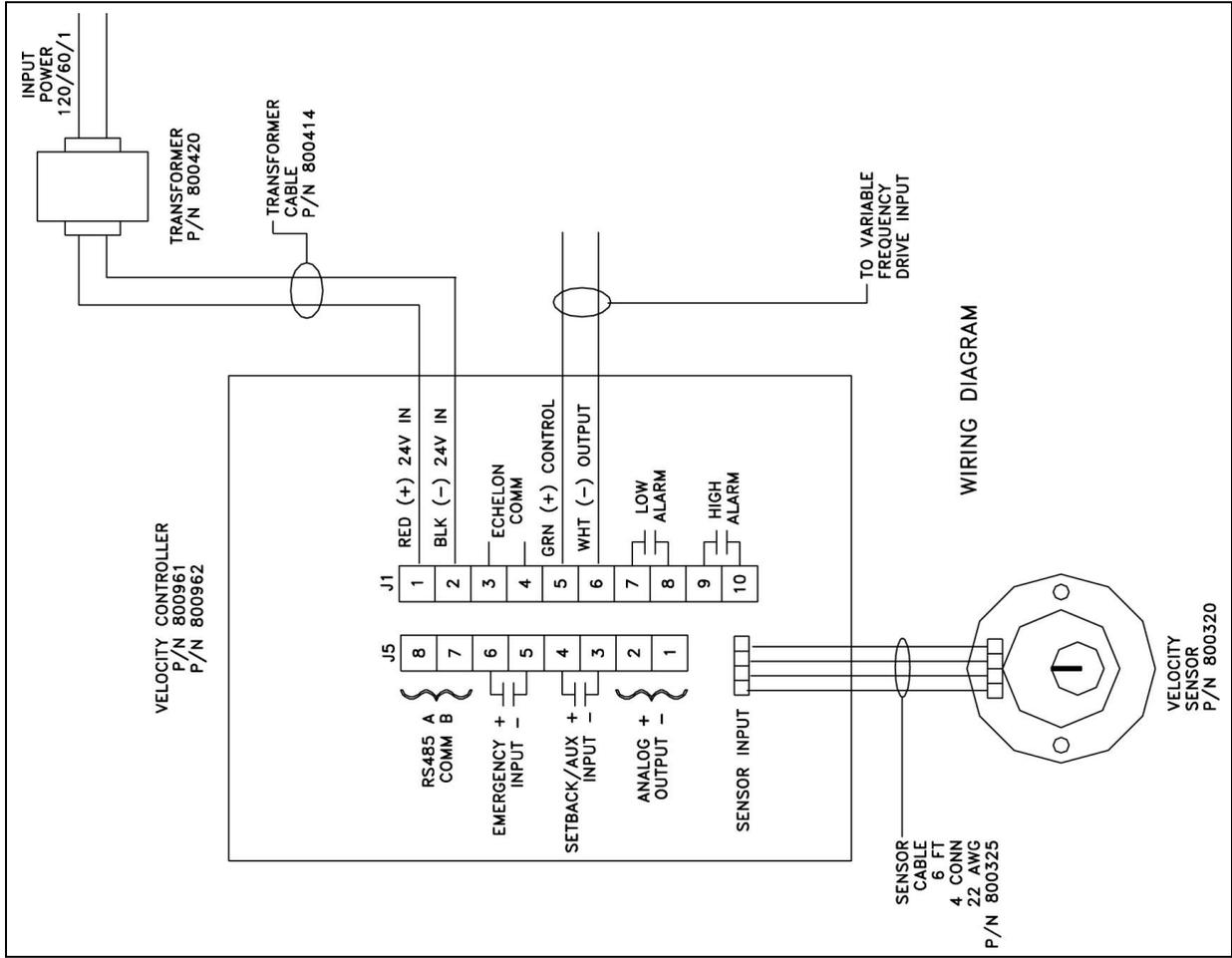


Figure 9: Wiring Diagram - Motor

24 VAC Transformer Installation

WARNING: Make sure no power is applied until all wiring is complete. Follow all applicable electrical codes, and have qualified personnel install the transformer.

NOTE: 115 Volt, single phase, 60-Hertz power source is required to power the 800420 TRANSFORMER. If TSI Transformer is not installed, a regulated 24 volt, single phase, 60 Hertz power source is required to power the controller.

1. **Damper Version**—Mount a standard 4" × 4" × 1½" electrical box at a convenient location within 20 feet of the DAMPER/ACTUATOR.
2. **Motor Version**—Mount a standard 4" × 4" × 1½" electrical box, at a convenient location within 20 feet of the VELOCITY CONTROLLER (typically on the wall behind the fume hood).
3. Run 115 Volt, single phase, 60-Hertz line voltage (115 VAC) to electrical box. Follow all applicable electrical codes.
4. Connect 115 VAC line voltage HOT wire to BLACK wire on TRANSFORMER and NEUTRAL wire to WHITE wire on TRANSFORMER (Figure 11). Connect the RED wire on 800414 TRANSFORMER CABLE to either YELLOW wire on the TRANSFORMER and the BLACK wire to the remaining YELLOW wire.
5. Screw the TRANSFORMER to the electrical box.
6. **Damper Version**—Run TRANSFORMER CABLE from the TRANSFORMER electrical box to the DAMPER/ACTUATOR box leaving at least 8 inches of cable for connections.
7. **Motor Version**—Run TRANSFORMER CABLE from the TRANSFORMER electrical box to the VELOCITY CONTROLLER electrical box leaving at least 8 inches of cable for connections.

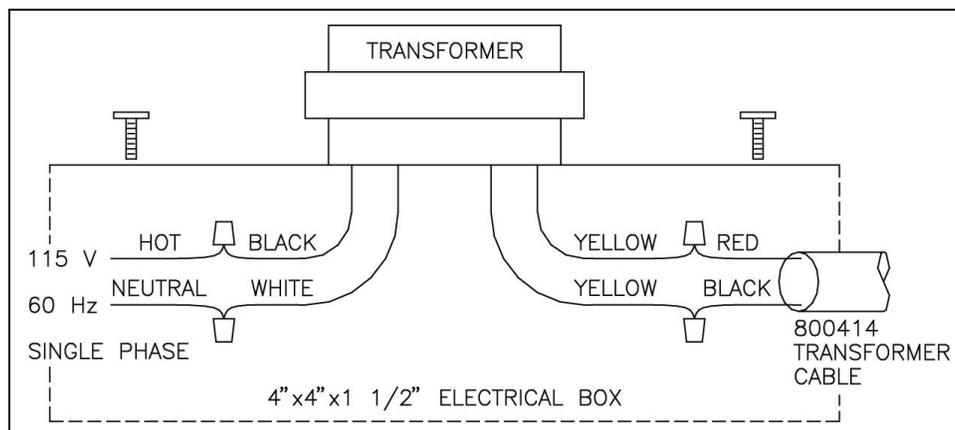


Figure 11: Transformer Installation

TSI Actuator/Damper Installation

WARNING: Building prints normally determine damper location and mounting configuration. They supersede the guidelines below.

1. The actuators are shipped mounted to the damper. No adjustments are needed prior to mounting the assembly.
2. The damper must be installed with the damper shaft parallel to the ground (Figure 12).
3. Slip-fit dampers mount **INSIDE** the ductwork. Flanged dampers bolt to the duct work. No ductwork can be inside of dampers or interfere with damper rotation.
4. Rivet slip-fit damper to ductwork to ensure damper rotates correctly. Alternate: Use 1-inch or shorter screws. Make sure screws do **not** interfere with damper blade rotation; damper rotates outside of damper sleeve. Bolt flanged dampers securely to ductwork but do **not** "force" damper to fit (deforms damper).

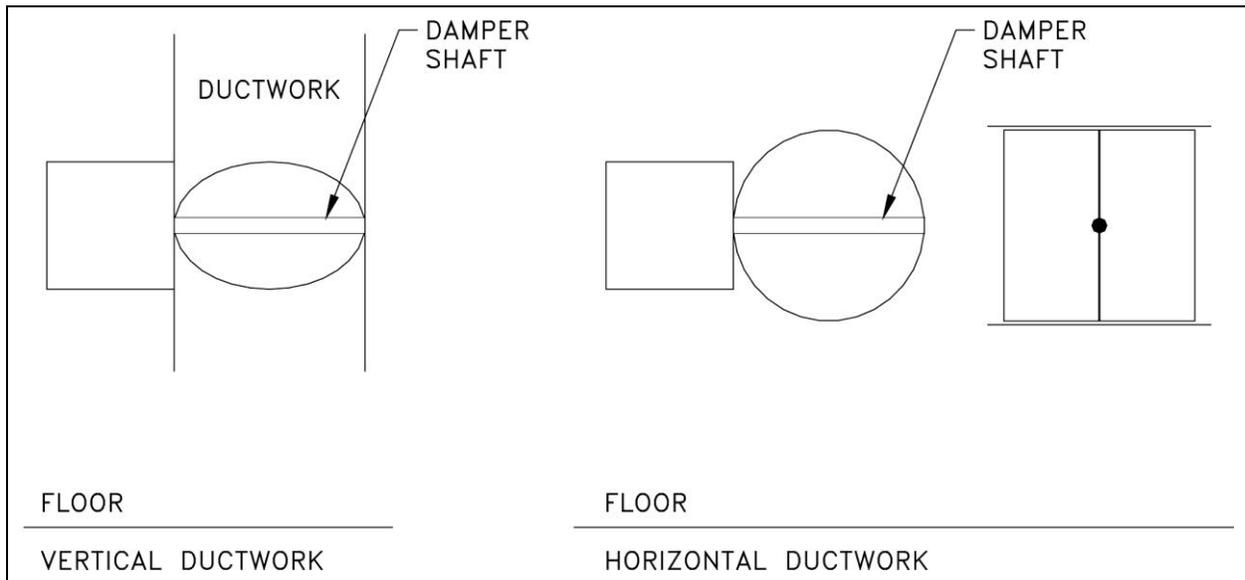


Figure 12: Proper Damper Mounting

If you need assistance installing the system, call TSI Customer Service at 651-490-2811 or 800-874-2811.



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