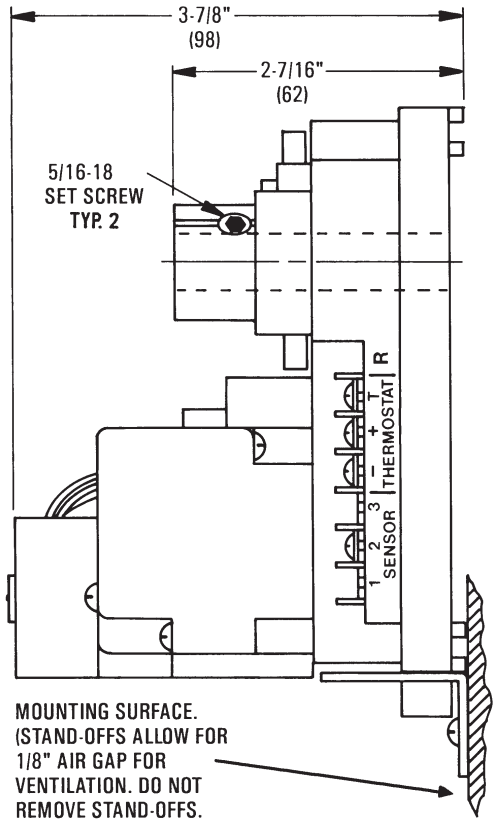
Installation Guide

Mounting



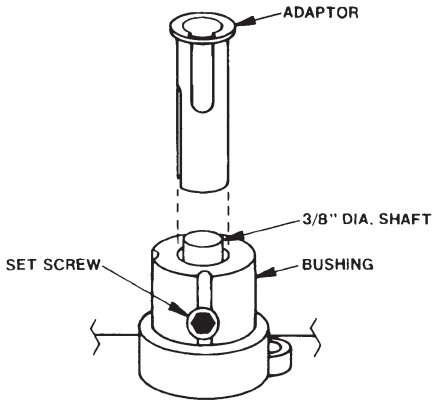
These controller-actuators are designed to mount on a standard 1/2 in. (13 mm) diameter shaft or a 3/8 in. (9.5 mm) shaft using the optional HFO-0011 adaptor.

On a 1/2" Shaft

1. Set the CSP-4000 unit in the desired location.
2. Slide the CSP-4000 directly on to the 1/2" diameter damper shaft. (For a 3/8" shaft, see the *On a 3/8" Shaft* section.)
3. Tighten the two 5/16"–18 setscrews (see diagram).
4. Place the non-rotation bracket (supplied) on the non-rotation tab.
5. Attach the anti-rotation bracket to the mounting surface using #8 or #10 self tapping screws (not included).
6. Check that the standoffs (on the anti-rotation bracket) provide a 1/8" air gap behind the unit.
7. See the *Air Flow Sensor Connection* section.

On a 3/8" Shaft (with an HFO-0011 Adaptor)

1. Mount the controller-actuator over the 3/8" shaft.
2. Slide the HFO-0011 over the shaft into the drive hub of the actuator.
3. Align the adaptor slots with the setscrews and tighten the setscrews.



4. Continue with Step 4 under the *On a 1/2" Shaft* section.

Air Flow Sensor Connection

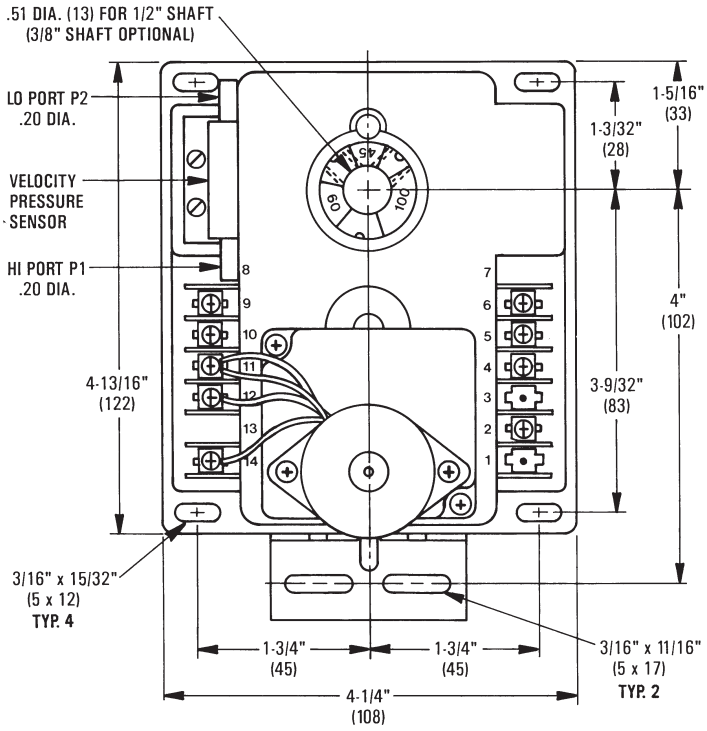
Using 1/4-inch OD x 0.040-inch wall FR instrument and control tubing, connect the controller-actuator to a pitot tube or flow sensor. To use an SSS-1000 series differential pressure flow sensor:

1. Connect two short pieces of **3/8"** OD tubing between the sensor and two HFO-0108 1/4-to-3/8" adapters.
2. Connect the "P1" (high side) port to the adapter leading to the "H" of the sensor. (See note below about an air filter.)*
3. Connect the "P2" (low side) port to the adapter leading to the "L" of the sensor.

NOTE: The SSS-1000 series sensor must be mounted with the arrow pointing in the direction of the air flow. Tubing should be without restrictions such as kinks.

*NOTE: KMC strongly recommends installing an in-line air filter to minimize dust contamination. To install the optional accessory **HFO-0034 air filter**, connect the filter between the P1 (high) port and the "H" (high) of the sensor (with 1/4" tubing).

Connections and Wiring



Terminals:

1 & 3 (No connection).

2 **Live Air Flow Velocity Readout**, 1–6 VDC (measured between 2 and 4).*

4 **Thermostat Terminal (–)**, Ground Reference.*

5 **Thermostat Terminal (+)**, 9.1 VDC @ 22 mA.*

6 **Thermostat Terminal T1** for Cooling Reset **or T2** for Heating Reset.

7, 8, & 13 (Unused).

9 **24 VAC (– common)**. (Connect to earth ground if transformer secondary must be grounded.)

10 **24 VAC (~ phase)** –15%/+20% (20.4 to 28.8 VAC 50/60 Hz) @ 3 VA required.

11 (Motor Common).

12 **Motor Drive** to *increase*** velocity. **DO NOT APPLY VOLTAGE TO THIS TERMINAL.***

14 **Motor Drive** to *decrease*** velocity. **DO NOT APPLY VOLTAGE TO THIS TERMINAL.***

*⚠ CAUTION

Do not short terminals 12 and 14, 4 and 5, or 2 and 4. Do not connect voltage to terminals 12 or 14.

**NOTE: Increase and decrease depend on whether the unit is CW to close or CCW to close. See the *Rotation and Override* section.

Adjustments and Calibration

Each CSP-4000 is calibrated at the factory. No further calibration is needed.

Connect a voltmeter "+" to terminal 2 and "–" to terminal 4 to check the live air flow velocity.

Rotation and Override

If desired, the **rotation direction can be reversed** by swapping the red and blue motor wires according to the following table:

Rotation to Close	Motor Wire to Terminal 12	Motor Wire to Terminal 14
CCW	Red	Blue
CW	Blue	Red

NOTE: Motor wires must remain connected to terminal screws (11, 12, and 14) due to components beneath terminals.

To **manually drive** the controller/damper **open or closed** (with 24 VAC on terminals 9 and 10), remove the wiring to terminal 6, and temporarily jumper terminal 6 to:

- Terminal 5 (9.1 VDC) = Open
- Terminal 4 (– VDC) = Closed

NOTE: Depending on the actuator, full rotation may take three to six minutes since the actuator rotates at 18° per minute. A magnetic slip-clutch inside the actuator allows motor to continue running even when end-stops have been reached.

Maintenance

A periodic inspection of the air filter is recommended. Replace the filter if it appears clogged.

The electric motors are permanently lubricated and all internal gear-train components are oil impregnated. Careful installation will help ensure long-term reliability and performance.

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