

# Installation Guide

## Mounting

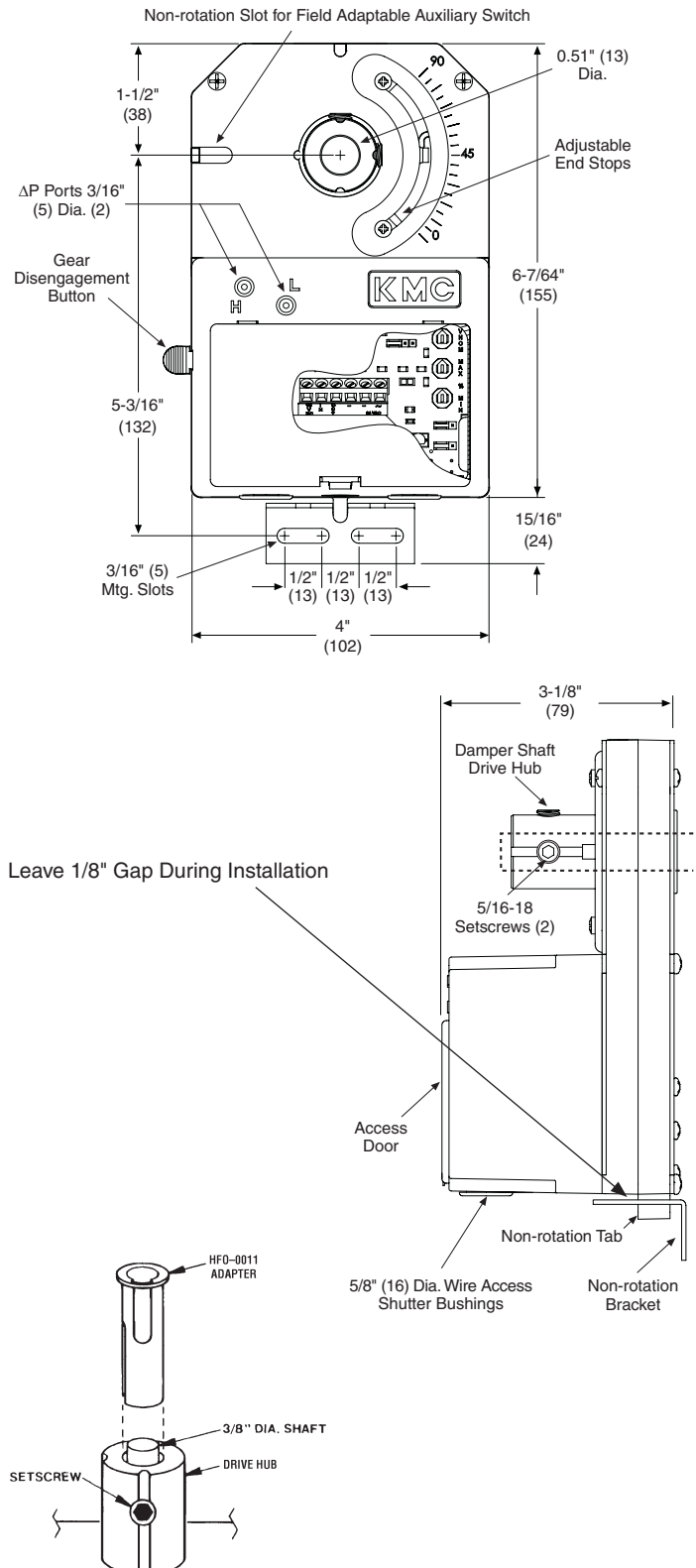
The CSP-5001/5002 is designed to mount on a standard 1/2 in. (13 mm) diameter shaft or a 3/8 in. (9.5 mm) shaft using the optional HFO-0011 adaptor.

### Standard Instructions

1. Slide the CSP-5001/5002 directly onto the 1/2 in. diameter damper shaft. The shaft must extend a minimum of 1-3/4 in. from the mounting surface. (For a 3/8 in. shaft, see the HFO-0011 Adaptor section below.)
2. Place the non-rotation bracket (supplied) on the non-rotation tab. Leave a gap of 1/8" between the bottom surface of the CSP-5001/5002 and the bracket to allow for play during operation (see illustration).
3. Attach the non-rotation bracket to the mounting surface using (2) #8 or #10 self-tapping screws (not included).
4. Depress the gear disengagement button and:
  - A. Rotate the drive hub until the indicator stops at the "90" mark if the damper is clockwise to close.
  - B. Rotate the drive hub to the "0" mark if the damper is counterclockwise to close.
5. Position the damper to full open.
6. Torque the two 5/16-18 setscrews to 75-85 in. lb.
7. Depress the gear disengagement button and rotate the drive hub/damper to the closed position.
8. Loosen the adjustable end stop, position against the damper position indicator, and retighten.

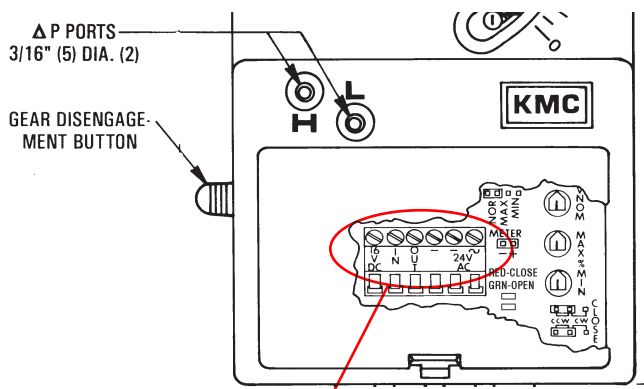
### HFO-0011 Adaptor

1. Mount the CSP-5001/5002 actuator over the 3/8 in. shaft.
2. Slide the HFO-0011 over the shaft into the drive hub of the actuator.
3. Align the adaptor slots with the setscrews.
4. Partially tighten the setscrews.
5. Continue with Step 2 under the Standard Instructions section above.

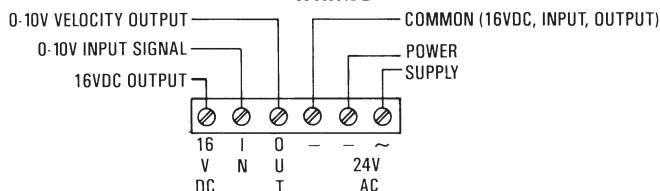


## Wiring

1. Remove the CSP's wiring access door by pulling back on the door's tab and lifting upward.
  2. Access for wire or cable is via two 5/8 in. (16 mm) diameter snap-in shutter bushings located on the rear of the CSP's cover.
  3. Connect conduit to the actuator if required (connectors are not supplied—order separately):
    - A. HMO-4518 for 1/2 in. flexible conduit.
    - B. HMO-4520 compression connector for plenum rated cable.
    - C. HMO-4526 female connector 1/2 in. conduit.
  4. Remove the snap-in shutter bushing and replace with the HMO-4518, HMO-4520, or HMO-4526 if required.
  5. Connect the CSP to a CTE-5100 thermostat:
    - A. Terminal "16 VDC" to thermostat terminal "+".
    - B. Terminal "IN" to thermostat terminal "T1" for cooling or "T2" for heating air flow.
    - C. Terminal "OUT" to thermostat terminal "V1" for velocity readout at thermostat.
    - D. Terminal "-" to thermostat terminal "-".
- NOTE: If minimum and maximum velocity limits will be set at the CSP, then use "T3" for cooling and "T4" for heating.**
- C. Terminal "OUT" to thermostat terminal "V1" for velocity readout at thermostat.
  - D. Terminal "-" to thermostat terminal "-".
6. Connect the CSP to a 24 volt AC, -15/+20%, 50/60 Hz power source:
    - A. Terminal "~" to the phase side of the 24 volt AC transformer.
    - B. Terminal "-" to the neutral or ground side of the transformer.
  7. Replace wiring access door.



### WIRING



## Air Flow Sensor Connection

Using 24 inches of 1/4-inch OD x 0.040-inch wall FR instrument and control tubing, connect the CSP to an SSS-1000 series differential pressure flow sensor:

1. Connect the "H" port to the (high side) "H" of the sensor.
2. Connect the "L" port to the (low side) "L" of the sensor.

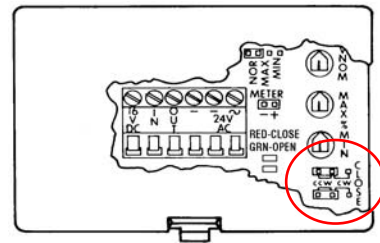
**NOTE:** To maintain a close correlation with the factory calibration (for 0 to 3300 fpm), installations must use **exactly** 24 inches of the tubing without restrictions such as fittings or kinks.

**NOTE:** The SSS-1000 series differential pressure flow sensor must be mounted with the arrow pointing in the direction of the air flow.

## Rotation Setup

The CSP-5001 is factory-set for CCW to close. The CSP-5002 is factory-set for CW to close. To reverse the rotation direction of either controller model:

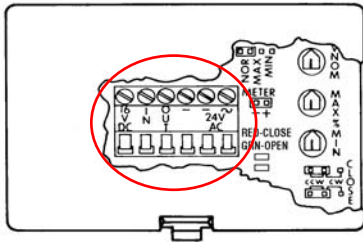
1. Remove the access door by pulling back on the door's tab and lifting upward.
2. Position both jumpers in either the CW or CCW positions as needed. See the diagram.



## Controller Testing

Test the CSP actuator's motor operation:

1. Temporarily disconnect the thermostat reset connection at Terminal "IN".
2. Jumper "IN" terminal to the "16 VDC" terminal. The green Open LED should illuminate. The shaft drive hub should be rotating the damper open. The damper should go to full open unless the maximum limit was set at the CSP, and then the damper will only go to the maximum setting. If the damper is rotating closed, the "Close" jumpers must be changed. Refer to the Rotation Setup section.
3. Jumper "IN" terminal to the "-" terminal. The red Close LED should illuminate. The shaft drive hub should be rotating the damper closed. The damper should go to full closed unless the minimum limit was set at the CSP, and then the damper will only go to the minimum setting. If the damper is rotating open, the "Close" jumpers must be changed. Refer to Rotation Setup section.



NOTE: For system testing guidelines and sample applications, see the CSP-5001/5002 Application Guide.

## Specifications

<b>Supply Voltage</b>	24 VAC $-15/+20\%$ , 50/60 Hz
<b>Input Power</b>	4 VA max.
<b>Output Supply</b>	16 VDC (22 mA)
<b>Output Torque</b>	50 in. lb. min., 70 in. lb. max. (5.6 N•m min., 7.9 N•m max.)
<b>Velocity Range</b>	0 to 3300 fpm (16.76 m/s), dependent on DP pickup, tubing size/length, and connections
<b>Velocity Output</b>	0 to 10 VDC (0 to 100% flow)
<b>Angular Rotation</b>	0° to 95° (both end stops adjustable)
<b>Stroke Time</b>	18° per minute @ 60 Hz, 15° per minute @ 50 Hz
<b>Reset Voltage</b>	0 to 10 VDC
<b>Reset Limits</b>	Adjustable, 0 to 100%
<b>Mounting</b>	Direct to 1/2" (13 mm) diameter shaft or 3/8" (10 mm) diameter with adaptor
<b>Connections</b>	Wire clamp type, 14 to 22 AWG, Cu
<b>Material</b>	Flame-retardant polymer, UL94-5V plenum-rated, black housing with white cover
<b>Weight</b>	2.4 lbs. (1 kg.)
<b>Temperature Limits</b>	
Operating	32° to 120° F (0° to 49° C)
Shipping	-40° to 140° F (-40° to 60° C)

# Controller Calibration

## Minimum and Maximum Flow Limits

Minimum and maximum flow limits are often set at the CTE-5100 series thermostat. (For instructions on setting the flow limits at the thermostat and other information, see the CSP-5001/5002 Application Guide.)

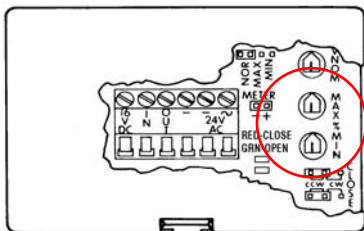
If desired, the minimum and maximum limits can be defined by adjusting the appropriate setpoints within the CSP-5001/5002 controller (see below) instead, but **do not try to set the limits at BOTH the controller and the thermostat (or else the limits will not reflect either the controller's or the thermostat's limits).**

To set the velocity limits at the CSP:

1. Remove the access door by pulling back on the door's tab and lifting upward.
2. Connect a voltmeter to the meter taps (using HSO-5001 test leads).
3. Move the jumper from the NOR (normal) position (two left-most pins) to the MIN position (two right-most pins).
4. Adjust the MIN potentiometer for the desired minimum voltage.

**NOTE: MIN must be adjusted first.**

5. Move the jumper to the MAX position (two center pins).
6. Adjust the MAX potentiometer to the desired maximum voltage.
7. Return the jumper to the NOR position.



## VNOM (CFM) Range Setting

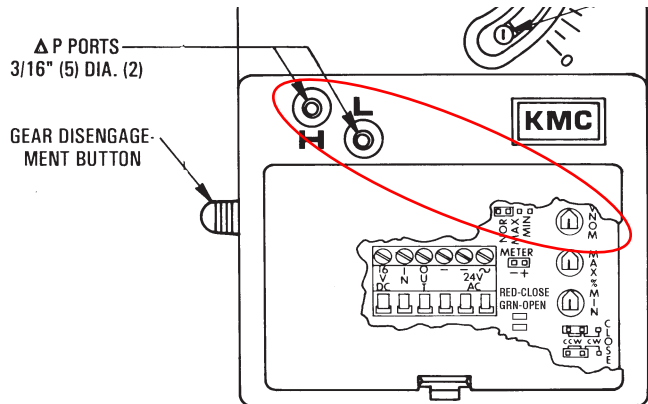
The CSP range is factory-calibrated with the VNOM potentiometer centered. Using any SSS-1002/1003/1004/1005 series velocity pickup, tubing, and reducers, the CSP will have a range of 0-3,300 fpm with a 0-10 volt DC reset control signal.

**Leaving the VNOM at the factory setting is recommended! Changing the VNOM potentiometer from the factory setting will alter the calibration between the "IN" and "OUT" voltages.** However, the VNOM can be adjusted to match 0-10 volts to a specific velocity range if desired.

**NOTE:** In the controller, VNOM stands for "NOMinal Volumetric flow rate."

To set the VNOM range:

1. Remove the access door by pulling back on the door's tab and lifting upward.
2. Supply the desired velocity to the "H" and "L" ports.
3. Connect a voltmeter between the "OUT" and "-" terminals and adjust the VNOM potentiometer until the voltage equals 10 volts DC.



## Maintenance

No routine maintenance is required. Each component is designed for dependable, long-term reliability, and performance. Careful installation will also ensure long-term reliability and performance.

**KMC Controls, Inc.**  
19476 Industrial Drive  
New Paris, IN 46553  
574.831.5250

[www.kmcccontrols.com](http://www.kmcccontrols.com)  
[info@kmcccontrols.com](mailto:info@kmcccontrols.com)