

Installation Guide

CSC–2000 Series Overview

The CSC–2000s are differential-pressure (ΔP), sub-master controllers with adjustable minimum and maximum airflow settings. A master controller, typically a room thermostat, resets the CSC velocity setpoint.

CSC–2000s are available as direct acting for normally open VAV terminal units, and reverse acting for normal closed VAV terminal units. Each unit is equipped with separate adjustment knobs for minimum and maximum airflow settings. CSC–2001/2002s are equipped with 0–10 reference dials, while all others have blind adjustments. Calibrate all models using standard airflow measuring equipment.

The spring range of the actuator does not matter to the controller. However, sufficient main air is required to provide the actuator with enough force to operate the damper/linkage.

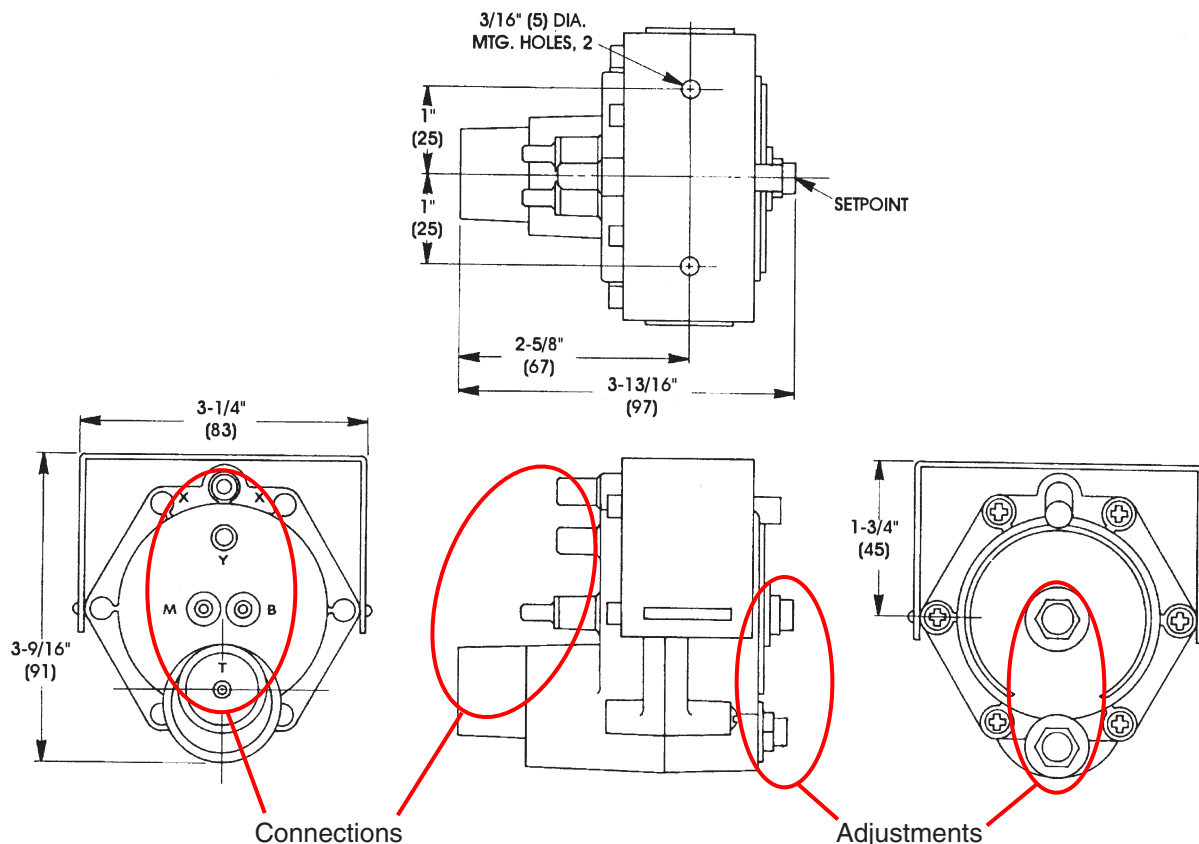
Any sequencing with other controllers, valves, or pneumatic-electric relays must be sequenced with the controller’s reset range, **not** the actuator’s spring range.

These controllers are typically used on single-duct applications but may be found in dual-duct applications. When working on dual-duct applications it may be necessary to work on one duct at a time while closing off the other.

The CSC–2000 series controllers are position sensitive. See the Mounting section on the next page for the proper vertical/horizontal orientation for the different models.

▲ CAUTION

Pneumatic devices must be supplied with clean, dry control air. Any other medium (e.g., oil or moisture contamination) will cause the device to fail.

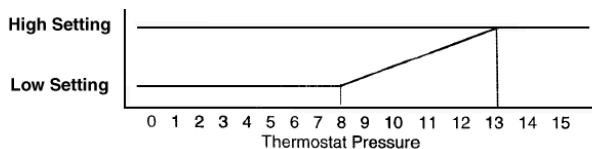


Specifications

Output Sensitivity	0 to 1" range unit, 5 psig/0.02" wg (35 kPa/5 Pa) 0 to 2" range units, 5 psig/0.04"wg (35 kPa/10 Pa)
Main Air Pressure	15 to 30 psig (103 to 207 kPa)
Max. Signal Pressure	6" wg (1493 Pa) applied to either port (X or Y)
Material	ABS (beige or gray) UL Flame Class 94 HB
Output Capability	0 to supply pressure
Weight	7.5 oz. (213 grams)
Temperature Limits	
Operating	40° to 120° F (4° to 49° C)
Shipping	-40° to 140° F (-40° to 60° C)

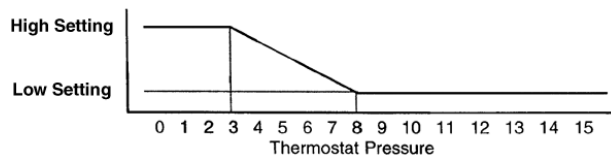
Direct Acting BEIGE units (CSC-2001/2003/2007/2009/2017) are designed for normally open dampers with direct-acting thermostats for cooling and reverse-acting thermostats for heating.

FLOW CHARACTERISTICS



Reverse Acting GRAY units (CSC-2002/2004/2008/2010/2018) are designed for normally closed dampers with reverse-acting thermostats for cooling and direct-acting thermostats for heating.

FLOW CHARACTERISTICS



For additional specifications of particular models, see the CSC-2000 Data Sheet.

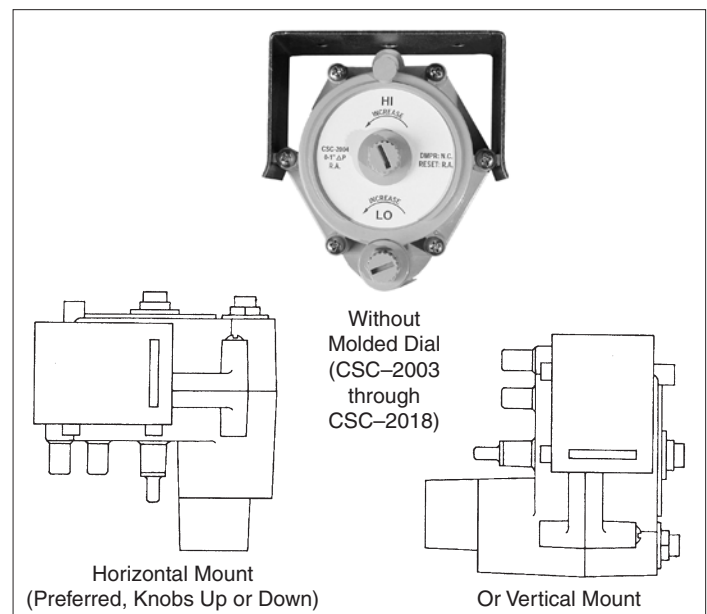
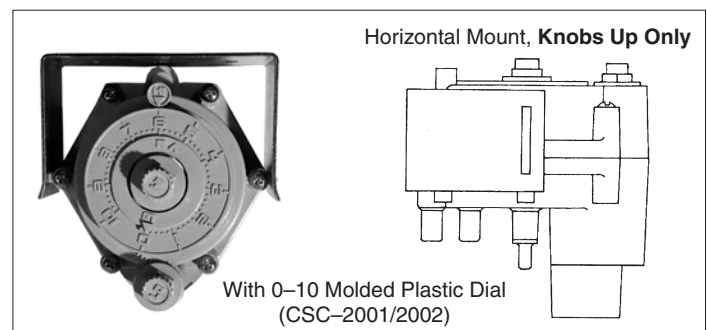
Mounting

As close to the flow sensor pickup as is feasible, fasten the mounting bracket to the mounting surface with two self-threading screws in the two 3/16 in. (5 mm) holes. (Make sure to leave enough room to make connections.)

The CSC-2000 series are position sensitive:

- **The minimum and maximum flow limits must be set (calibrated) in the same position the controller will be mounted.**
- The CSC-2001/2002 (with 0-10 molded plastic dials) must be mounted **horizontally with dial adjustment knobs facing up.**
- The CSC-2003 through CSC-2018 (no molded dials) may be mounted **horizontally (preferred),** with the adjustment knobs up or down, **or mounted vertically** (the diaphragm inside must be in a horizontal or vertical plane).

NOTE: If replacing a CSC-2001-22 or CSC-2002-22 (designed for vertical mount and now obsolete), use the CSC-2001 or CSC-2002 as appropriate and mount dials face up or use the CSC-2003 or CSC-2004 as appropriate and mount vertically or horizontally.



Connections

All Units

For all models of the CSC-2000 Series use 1/4 in. (6 mm) O.D. "FR" tubing for the following connections:

1. Connect the main air supply to port "M".
2. Connect the actuator to port "B".
3. Connect the thermostat to port "T".

Beige Units

Use 3/8 in. O.D. "FR" tubing **with a maximum length of 24 in.** to connect:

1. High pressure to port "X".
2. Low pressure to port "Y".

Gray Units

Use 3/8 in. O.D. "FR" tubing **with a maximum length of 24 in.** to connect:

1. Low pressure to port "X".
2. High pressure to port "Y".

⚠ CAUTION

Pneumatic devices must be supplied with clean, dry control air. Any other medium (e.g., oil or moisture contamination) will cause the device to fail.

Troubleshooting

The CSC-2000 series are position sensitive. Be sure to mount the controller with the correct orientation. See the Mounting section.

NOTE: If the controller is calibrated in a position other than the final mounting position, the calibration (minimum and maximum flow limits) will be off.

To minimize issues related to pressure, always use 3/8 in. tubing for the "X" and "Y" ports and keep the tubing lengths as short as possible. If the sensor has 1/4 in. fittings, use 3/8 in. tubing and adapters at the sensor.

Some older style flow sensors may have restrictive openings for the low pressure pickup. Replacement of the flow sensor pickup may be necessary.

Adjustments and Calibration

GRAY Controllers (Reverse Acting)

1. Check that there is 0 psi at the "T" Port.
2. Use a flow hood or "tee" a Magnehelic® (or equivalent) differential pressure gauge between the controller and the ΔP pick-up.
3. **The "HI" flow setting limit (center knob) must be set first.** Temporarily adjust the thermostat for a branch pressure lower than the 3 psig reset start point (maximum cooling); typically 1 psig or less is best. Removing the thermostat branch line would be another acceptable method. Adjust the "HI" knob (center knob) counterclockwise to increase or clockwise to decrease ΔP limit. Normally one-half turn will cause a 0.1 ΔP change. Allow for reaction time. Depending on actuator size and position, timing will vary. To position an actuator/damper from closed to open may take several minutes.
4. The "LO" flow setting limit must be set after the "HI". Temporarily adjust the thermostat for a branch pressure higher than the 8 psig reset stop point (minimum cooling); typically 12 psig or greater is best. Removing the thermostat branch line and teeing-in to the main air line would be another acceptable method. Adjust the "LO" knob (outside knob) counterclockwise to increase or clockwise to decrease ΔP limit. Normally one-half turn will cause a 0.1 ΔP change. Allow for reaction time.
5. Recheck the "HI" and the "LO" settings at least twice, verify settings, and fine tune each time if necessary. This procedure will remove internal component tensions and confirm settings.
6. Reconnect the thermostat branch line if necessary, and adjust the thermostat to the desired room temperature setpoint.

NOTE: The "LO" adjustment limits the travel of the reset mechanism. Therefore, the reset span will be less than 5 psig, the upper limit being less than 8 psig.

NOTE: Always make adjustments in the same plane/orientation as the one in which the unit will operate.

NOTE: For principles of operation and sample applications, see the CSC-2000 Applications Guide.

BEIGE Controllers (Direct Acting)

1. Check that there is 0 psi at the “T” Port.
2. Use a flow hood or “tee” a Magnehelic® (or equivalent) differential pressure gauge between the controller and the ΔP pick-up.
3. **The “LO” flow setting limit (center knob) must be set first.** Temporarily adjust the thermostat for a branch pressure lower than the 8 psig reset start point (minimum cooling); typically 6 psig or less is best. Removing the thermostat branch line would be another acceptable method. Adjust the “LO” knob (center knob) clockwise to increase or counterclockwise to decrease ΔP limit. Normally one-half turn will cause a 0.1 ΔP change. Allow for reaction time. Depending on actuator size and position, timing will vary. To position an actuator/damper from closed to open may take several minutes.

NOTE: If the “LO” flow setting limit must be set at “0” (zero minimum), do not turn the “LO” knob fully counterclockwise. The knob will adjust three to four full turns after a zero minimum is reached. Turning the “LO” knob fully counterclockwise will result in a negative reset condition. This means that when the controller is beginning to reset at 8 psig from the thermostat, it must first overcome the negative adjustment and will not begin to reset until a higher thermostat reset pressure is reached. This negative reset will also reduce the effective range of the controller by reducing the high end and narrowing the reset span. If a zero minimum is required, adjust the “LO” knob until the controller just begins to crack the damper open, then back-off **one-fourth** turn and verify zero airflow.

4. The “HI” flow setting limit (outer knob) must be set after the “LO”. Temporarily adjust the thermostat for a branch pressure higher than the 13 psig reset stop point (maximum cooling); typically 17 psig or greater is best. Removing the thermostat branch line and teeing-in to the main air line would be another acceptable method. Adjust the “HI” knob (outer knob) clockwise to increase or counterclockwise to decrease ΔP limit. Nominally one-half turn will cause a 0.1 ΔP change. Allow for reaction time.

5. Recheck the “LO” and the “HI” settings at least twice, verify settings, and fine tune each time if necessary. This procedure will remove internal component tensions and confirm settings.
6. Reconnect the thermostat branch line if necessary, and adjust the thermostat to the desired room temperature setpoint.

NOTE: The “HI” adjustment limits the travel of the reset mechanism. Therefore, the reset span will be less than 5 psig, the upper limit being less than 13 psig.

NOTE: Always make adjustments in the same plane/orientation as the one in which the unit will operate.

Maintenance

No routine maintenance is required. Each component is designed and manufactured for reliability and performance. Careful installation and use will ensure long-term dependability.

▲ CAUTION

Pneumatic devices must be supplied with clean, dry control air. Any other medium (e.g., oil or moisture contamination) will result in the device’s eventual failure.

More Information

For additional **specifications** of particular models, see the CSC-2000 Data Sheet.

For **principles of operation** and **sample applications**, see the CSC-2000 Applications Guide.

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