

DESCRIPTION

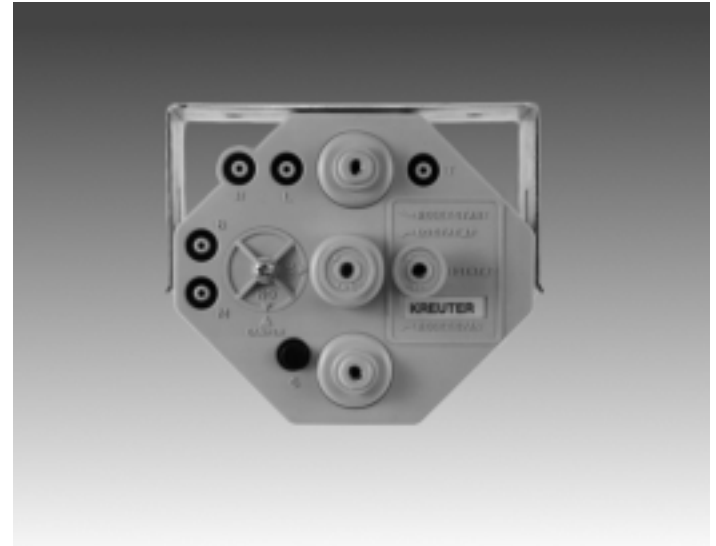
The CSC-3000 series Reset Volume Controllers are designed for use on variable air volume terminals units in HVAC systems.

It is a submaster air velocity controller whose velocity setpoint is reset between an adjustable minimum and maximum limit by a master controller, typically a room thermostat.

The CSC-3000 series are used for either direct or reverse acting reset for normally open or normally closed VAV terminal units. It has a factory set reset start point and reset span which can be field adjusted. The reset span is always constant no matter what minimum and maximum limits have been set.

SPECIFICATIONS

1" Range	
Differential Pressure	0 to 1" wg (249 Pa)
Minimum Setpoint	0 to 1" wg (249 Pa)
Maximum Setpoint	Minimum to 1" wg (249 Pa)
2" Range	
Differential Pressure	0 to 2" wg (498 Pa)
Minimum Setpoint	0 to 2" wg (498 Pa)
Maximum Setpoint	Minimum to 2" wg (498 Pa)
Reset Pressure Span	
Factory set @ 5 psig (35 kPa), field adjustable 0 to 10 psig (69 kPa)	
Reset Start Point	
Field adjustable 0 to 10 psig (69 kPa)	
Output Sensitivity	
1" Models	5 psi/.02" wg (35 kPa/5 Pa)
2" Models	5 psi/.04" wg (35 kPa/10 Pa)
Damper Action	
Factory set @ N.O., field adjustable for N.C. or N.O.	
Thermostat Action	
Direct or reverse action for heating or cooling	
Main Air Pressure 15 to 30 psig (103 to 207 kPa)	
Maximum Signal Pressure	
6" wg (1493 Pa) applied to either port (H or L)	
Air Consumption	
28.8 scim @ 20 psig (7.87 mL/s @ 138 kPa)	
EXCEPT Model CSC-3025-10:	
46.1 scim @ 20 psig (12.59 mL/s @ 138 kPa)	
Ambient Limits	
Operating	40°F to 120°F (4°C to 49°C)
Shipping	-40° to 140°F (-40°C to 60°C)
Material	
ABS Cicolac + T, UL 94 Flame Class 94HB	
Weight	11 oz. (312 grams)



MODELS

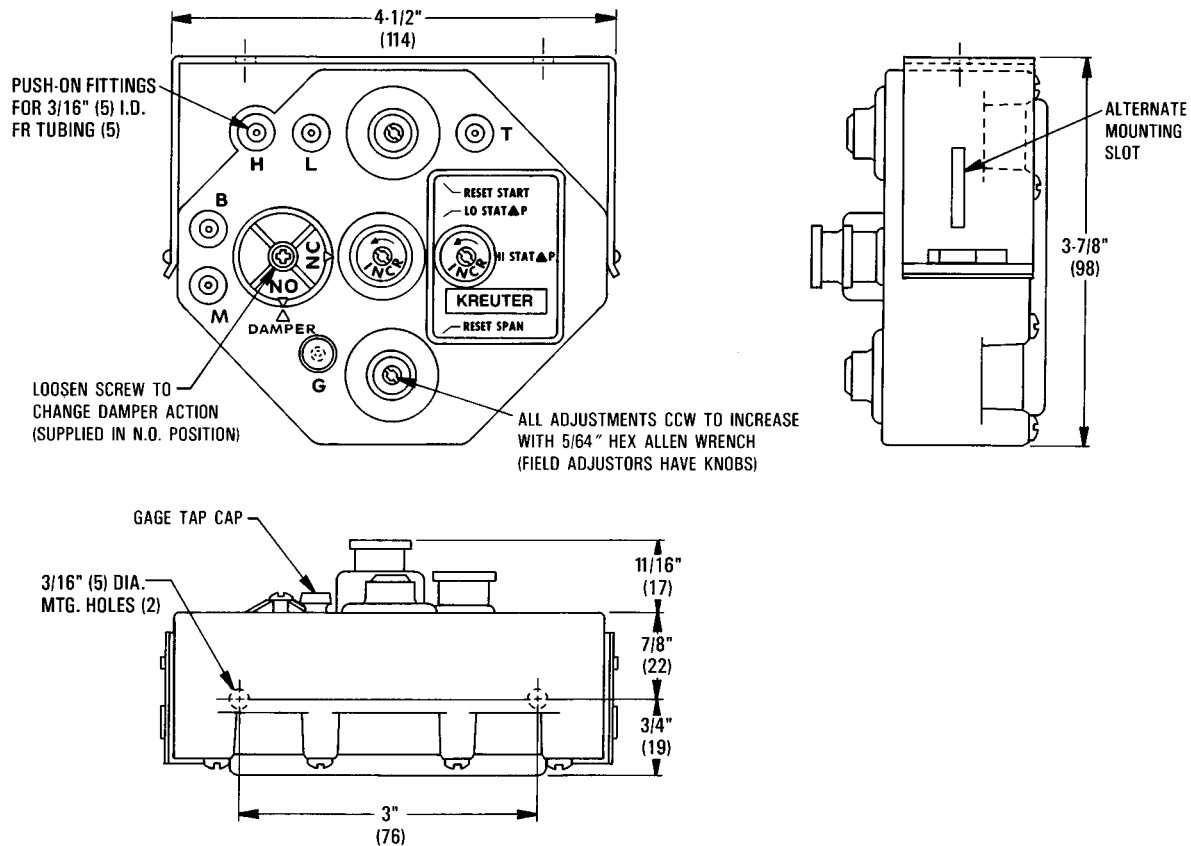
- CSC-3011-101"; 8 psig start; w/bracket
- CSC-3016-102"; 8 psig start; w/bracket
- CSC-3017-101"; 8 psig start; w/o bracket
- CSC-3021-101"; 3 psig start; w/bracket
- CSC-3023-101"; 10 psig start; w/bracket
- CSC-3025-102"; 8 psig start; w/bracket

ORDERING

Specify: Model Number, accessory number if required
Order From: Local KMC Controls representative or, KMC Controls, Kreuter Manufacturing Co., Inc.

DIMENSIONS

DIMENSIONS IN INCHES (MM)



INSTALLATION-CALIBRATION

The CSC-3000 series may be mounted on a horizontal or vertical plane. Other angular positions are NOT recommended. Calibrate the device in the same plane as it will be mounted.

Damper action is factory set at N.O. . To field select N.C. , loosen damper selection switch screw and align N.C. pointer with DAMPER pointer and tighten screw.

Thermostat reset start point is factory set. To field adjust, remove gauge tap cap at G and attach a 0 to 30 psi pressure gauge and observe pressure reading. Adjust thermostat pressure at T port to desired start point. Adjust RESET START until gauge pressure begins to increase slightly. Replace gauge tap cap.

Thermostat reset span is factory set at 5 psi. To field adjust reset span, remove gauge tap cap at G and attach a 0 to 30 psi pressure gauge. Adjust thermostat pressure at T port to 20 psi. Adjust RESET SPAN until gauge pressure is equal to the desired reset span (this is total span pressure, not ending span pressure). Deviation from the factory set 5 psi reset span will effect the differential pressure range of the CSC-3000 series.

An increase or decrease of the reset span will directly or proportionally effect the differential pressure range. Replace gauge tap cap.

Normally open or normally closed damper with direct or reverse acting thermostat:

1. Adjust LO STAT to desired air flow with 0 psi at T port;
2. Adjust HI STAT to desired air flow with 20 psi at T port.

NOTE:

LO STAT is always calibrated first, with 0 psi on the T port. This air flow setting will be the desired minimum for DA/Cooling or RA/Heating applications, or maximum for RA/Cooling or DA/Heating applications.

HI STAT is always calibrated second, with 20 psi on the T port. This air flow setting will be the desired maximum for DA/Cooling or RA/Heating applications, or minimum for RA/Cooling or DA/Heating applications.

These devices should be supplied with clean, dry control air. No attempt should be made to use any other medium.

MAINTENANCE

No routine maintenance is required. Each component s design and material selection assures dependable long-term reliability and performance. Careful installation will also enhance long-term reliability and performance.

TECHNICAL BULLETIN

CSC-3000 SERIES MULTI-FUNCTIONAL RESET VOLUME CONTROLLER

DESCRIPTION

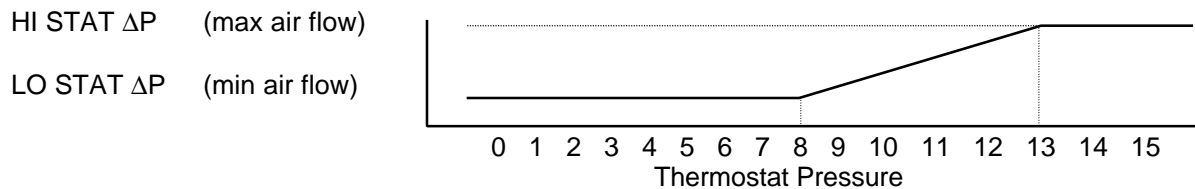
These controllers are for use on Normally Open or Normally Closed dampers. These are differential pressure (ΔP) sub-master controllers reset by a master controller. The master controller is typically a room thermostat. These controllers have an adjustable RESET START POINT which is KMC Controls factory set at 8 psig and an adjustable RESET SPAN which is KMC Controls factory set at 5 psig, that combined provide a reset range of 8 to 13 psig. The Damper selector is also KMC Controls factory set on "NO" for Normally Open dampers. 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 done with the controller's reset range, NOT the actuator's spring range. The controllers are used on single and 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.

AVAILABLE MODELS

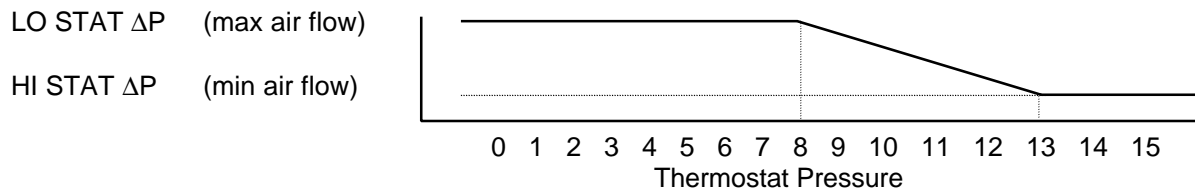
1. CSC-3011-10; 0 to 1" ΔP , 28.8 scim air consumption.
2. CSC-3016-10; 0 to 2" ΔP , 28.8 scim air consumption.
3. CSC-3017-10; same as CSC-3011-10 supplied less a mounting bracket.
4. CSC-3020-10; same as CSC-3016-10 supplied less a mounting bracket.
5. CSC-3021-10; same as CSC-3011-10 except with 3 psig RESET START.
6. CSC-3023-10; same as CSC-3011-10 except with 10 psig RESET START.
7. CSC-3025-10; 0 to 2" ΔP , 46.1 scim air consumption.
8. CSC-3026-10; same as CSC-3016-10 except with 3 psig RESET START.

FACTORY SET FLOW CHARACTERISTICS

Cooling Adjustments for Direct Acting Thermostat (Heating Adj. for Reverse Acting)



Cooling Adjustments for Reverse Acting Thermostat (Heating Adj. For Direct Acting)



RESET START ADJUSTMENT

The RESET START pressure setting is KMC Controls factory set at 8 psig. The RESET START pressure setting may have been changed. To check the RESET START, or to set a new RESET START, remove the rubber cap on the “G” port and connect an accurate gauge. The more accurate the gauge, the more accurate the settings. Input a precisely known pressure on the “T” port. Subtract the “G” port pressure from the “T” port pressure; this pressure equals the RESET START. Example: Adjust 11 psig input pressure at the “T” port and read 3 psig at the “G” port; 11 psig minus 3 psig is 8 psig, therefore 8 psig equals the RESET START. Note: “T” port pressure must be greater than the “G” port pressure. Turn the RESET START clockwise to increase or counterclockwise to decrease the RESET START pressure setting.

RESET SPAN ADJUSTMENT

The RESET SPAN pressure setting is KMC Controls factory set at 5 psig and can be field adjusted from 0 to 10 psig. The RESET SPAN pressure setting may have been changed. To check the RESET SPAN pressure setting, or to set a new RESET SPAN, remove the rubber cap on the “G” port and connect an accurate gauge. The more accurate gauge, the more accurate the settings. Adjust the thermostat for maximum branch pressure to the “T” port, or tee the “T” port in to the main air line. Turn the RESET SPAN counterclockwise to increase or clockwise to decrease the gauge pressure at the “G” port until equal to the desired RESET SPAN pressure setting. Changing the RESET SPAN will affect the effective range of the controller and will affect the HI STAT ΔP setting.

**COOLING APPLICATION WITH A DIRECT ACTING THERMOSTAT
OR
HEATING APPLICATION WITH REVERSE ACTING THERMOSTAT**

1. The controller must be firmly mounted in its bracket on the terminal unit.
2. The controller must be piped as follows:
 - ¼" O.D. tubing; "T" port to the thermostat branch signal.
 - ¼" O.D. tubing; "M" port to a clean and dry main air supply (15 to 30 psig).
 - ¼" O.D. tubing; "B" port to the damper actuator.
 - ¼" O.D. tubing; "H" port to the total pressure on the ΔP pick-up (high).
 - ¼" O.D. tubing; "L" port to the static pressure on the ΔP pick-up (low).
3. Use a flow hood, or "tee" a magnahelic between the controller and the ΔP pick-up.
4. The LO STAT ΔP for the Minimum Air Flow Limit must be set first. Remove the "G" port cap. This allows the internal reset mechanism to be at the internal start point. Do not misplace the "G" port cap. The "G" port cap must be in place to check and set the HI STAT ΔP . Adjust the "LO STAT ΔP " knob counterclockwise to increase or clockwise to decrease ΔP limit. Nominally one-half turn will net a 0.08" ΔP change. Allow for reaction time. Depending on actuator size and position, timing will vary. To position an actuator/damper from closed to open could require a couple minutes.

If the "LO STAT ΔP " Limit must be set at "0" (zero minimum), do not turn the "LO STAT ΔP " knob fully clockwise. The knob will adjust one and one-half turns after a zero minimum is reached. Turning the "LO STAT ΔP " knob fully clockwise will result in a negative reset condition. This means that when the controller begins to reset at the RESET START pressure setting it must first overcome the negative adjustment and will not begin to reset from "0" 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; narrowing the RESET SPAN. If a zero minimum is required, adjust the "LO STAT ΔP " knob until the controller just begins to crack the damper open, then back-off one-quarter turn and verify zero air flow.

5. The "HI STAT ΔP " for the Maximum Air Flow Limit must be set after the "LO STAT ΔP " Limit is set. Temporarily adjust the thermostat for a branch pressure higher than the reset stop point (RESET START pressure plus the RESET SPAN pressure), typically 2 psig greater than the reset stop point will be adequate. Removing the thermostat branch line and teeing in to the main air line would be another acceptable method. Be certain the "G" port cap is in place. Adjust the "HI STAT ΔP " knob counterclockwise to increase or clockwise to decrease ΔP limit. Nominally one-half turn will net a 0.08" ΔP change. Allow for reaction time.
6. Recheck the "LO STAT ΔP " Limit and the "HI STAT ΔP " Limit settings at least twice, verify settings and fine tune each time if necessary. This procedure will remove internal forces and confirm settings. Removing and replacing the "G" port cap, with a "T" port pressure greater than the reset stop point, will allow toggling between the LO STAT ΔP AND HI STAT ΔP settings. Adjust the thermostat to the desired room temperature setpoint. Be certain to reconnect the thermostat branch line if this method was utilized.

**COOLING APPLICATION WITH A REVERSE ACTING THERMOSTAT
OR
HEATING APPLICATION WITH DIRECT ACTING THERMOSTAT**

1. The controller must be firmly mounted in its bracket on the terminal unit.
2. The controller must be piped as follows:
 - ¼" O.D. tubing; "T" port to the thermostat branch signal.
 - ¼" O.D. tubing; "M" port to a clean and dry main air supply (15 to 30 psig).
 - ¼" O.D. tubing; "B" port to the damper actuator.
 - ¼" O.D. tubing; "H" port to the total pressure on the ΔP pick-up (high).
 - ¼" O.D. tubing; "L" port to the static pressure on the ΔP pick-up (low).
3. Use a flow hood, or "tee" a magnahelic between the controller and the ΔP pick-up.
4. The LO STAT ΔP for the Maximum Air Flow must be set first. Remove the "G" port cap. This allows the internal reset mechanism to be at the internal start point. Do not misplace the "G" port cap. The "G" port cap must be in place to check and set the HI STAT ΔP . Adjust the "LO STAT ΔP " knob counterclockwise to increase or clockwise to decrease ΔP limit. Nominally one-half turn will net a 0.08" ΔP change. Allow for reaction time. Depending on actuator size and position, timing will vary. To position an actuator/damper from closed to open could require a couple minutes.

If the "LO STAT ΔP " Limit must be set at "0" (zero minimum), do not turn the "LO STAT ΔP " knob fully clockwise. The knob will adjust one and one-half turns after a zero minimum is reached. Turning the "LO STAT ΔP " knob fully clockwise will result in a negative reset condition. This means that when the controller begins to reset at the RESET START pressure setting it must first overcome the negative adjustment and will not begin to reset from "0" 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; narrowing the RESET SPAN. If a zero minimum is required, adjust the "LO STAT ΔP " knob until the controller just begins to crack the damper open, then back-off one-quarter turn and verify zero air flow.

5. The "HI STAT ΔP " for the Minimum Air Flow Limit must be set after the "LO STAT ΔP " Limit is set. Temporarily adjust the thermostat for a branch pressure higher than the reset stop point (RESET START pressure plus the RESET SPAN pressure), typically 2 psig greater than the reset stop point will be adequate. Removing the thermostat branch line and teeing in to the main air line would be another acceptable method. Be certain the "G" port cap is in place. Adjust the "HI STAT ΔP " knob counterclockwise to increase or clockwise to decrease ΔP limit. Nominally one-half turn will net a 0.08" ΔP change. Allow for reaction time.
6. Recheck the "LO STAT ΔP " Limit and the "HI STAT ΔP " Limit settings at least twice, verify settings and fine tune each time if necessary. This procedure will remove internal forces and confirm settings. Removing and replacing the "G" port cap, with a "T" port pressure greater than the reset stop point, will allow toggling between the LO STAT ΔP AND HI STAT ΔP settings. Adjust the thermostat to the desired room temperature setpoint. Be certain to reconnect the thermostat branch line if this method was utilized.

RESET OPERATION

The thermostat signal is piped to the “T” port of the controller. The thermostat signal is dead-ended into the RESET START relay. The “RESET START relay” is basically an offset relay which offsets the RESET START point of the thermostat signal to the controller’s internal RESET START point which is fixed at 0 psig. The RESET START relay sends a proportional signal to the RESET SPAN relay directly proportional to the thermostat signal piped to the “T” port. The RESET SPAN relay is basically a high signal limiter which limits the reset signal. The RESET SPAN sets this reset limit. The controller’s internal reset will always be “0 psig” to “the RESET SPAN pressure setting”. This internal reset pressure can be monitored at the “G” port. Connecting a gauge to the “G” port will be required to check, or set, the RESET START and RESET SPAN pressures. Use an accurate gauge. The more accurate the gauge, the more accurate the pressure settings.

RESET START sets the pressure that the controller begins to be reset by the thermostat. The KMC Controls factory RESET START setting is 8 psig. The RESET START can be field adjusted from 0 to 10 psig. The thermostat reset mechanism begins to reposition the reset lever when the internal reset pressure is greater than 0 psig. To set the RESET START;

1. Connect a gauge to the “G” port.
2. Connect a pressure regulator to the “T” port. Adjust the pressure regulator to the desired thermostat RESET START point pressure ± 0.1 psi.
3. Turn the RESET START knob, clockwise to increase pressure or counterclockwise to decrease pressure, until the pressure at the “G” port is + 0.1 psig.

The above method can be difficult to set due to gauge accuracy’s. An easier method would be to adjust the pressure regulator to the desired RESET START point pressure plus “X.0” psi. Turn the RESET START knob until the pressure at the “G” port is “X.0” psig. This additional pressure can not be greater than the RESET SPAN pressure setting.

RESET SPAN sets the thermostat’s effective reset range for the controller. The KMC Controls factory RESET SPAN setting is 5 psig. The RESET SPAN can be field adjusted from 0 to 10 psig. The RESET SPAN pressure plus the RESET START pressure equals the pressure that the reset stop occurs. The thermostat reset mechanism begins to reposition the reset lever when the internal reset pressure is greater than 0 psig, and will continue to reposition the reset lever until the pressure is equal to the RESET SPAN pressure setting. To set the RESET SPAN;

1. Connect a gauge to the “G” port.
2. Connect 20 psig to the “T” port.
3. Turn the RESET SPAN knob, counterclockwise to increase pressure or clockwise to decrease pressure, until the pressure measured at the “G” port equals the desired RESET SPAN pressure.

PRESSURE INDEPENDENT OPERATION

Differential pressure is sensed via a ΔP pick-up mounted ahead of the damper (vav terminal inlet). The ΔP pick-up is a dual pressure pick-up sensing both Total Pressure and Static Pressure. The Total Pressure is connected to the "H" port and the Static Pressure is connected to the "L" port. These two pressures are compared across the static diaphragm which then positions a reset lever relative to the differences of the two pressures, the force of the LO STAT ΔP spring, and the position of the HI STAT setting.

Turning the LO STAT ΔP knob counterclockwise (to increase) repositions the reset lever away from the normally open nozzle and towards the normally closed nozzle. LO STAT ΔP adjustments must be done with the "T" port pressure being less than the RESET START pressure.

1. "NO" DAMPER selection (normally open dampers); Turning the LO STAT ΔP knob counterclockwise (increase) will reposition the reset lever away from the normally open nozzle decreasing the "B" port pressure increasing air flow through the terminal unit.
2. "NC" DAMPER selection (normally closed dampers); Turning the LO STAT ΔP knob counterclockwise (increase) will reposition the reset lever towards the normally closed nozzle increasing the "B" port pressure increasing the air flow through the terminal unit.

Turning the HI STAT ΔP knob counterclockwise (to increase) repositions the reset lever towards the nozzles. HI STAT ΔP adjustments must be done with the "T" port pressure being greater than the RESET START pressure plus the RESET SPAN pressure. Removing and replacing the "G" port cap, with a "T" port pressure greater than the reset stop point, will allow toggling between the LO STAT ΔP AND HI STAT ΔP settings. This procedure will remove internal forces and confirm settings

1. "NO" DAMPER selection (normally open dampers); Direct Reset calibration - turning the HI STAT ΔP knob counterclockwise (increase) will reposition the reset lever pivot decreasing the "B" port pressure for direct reset, increasing air flow through the terminal unit.
2. "NO" DAMPER selection (normally open dampers); Reverse Reset calibration - turning the HI STAT ΔP knob counterclockwise (increase) will reposition the reset lever pivot decreasing the "B" port pressure for reverse reset, increasing the air flow through the terminal unit.
3. "NC" DAMPER selection (normally closed dampers); Direct Reset calibration - turning the HI STAT ΔP knob counterclockwise (increase) will reposition the reset lever pivot increasing the "B" port pressure for direct reset, increasing the air flow through the terminal unit.
4. "NC" DAMPER selection (normally closed dampers); Reverse Reset calibration - turning the HI STAT ΔP knob counterclockwise (increase) will reposition the reset lever pivot.

MULTI-FUNCTIONAL RESET VOLUME CONTROLLER CSC-30XX SERIES

