



ComfortID™ ZONE PRESSURE CONTROL VARIABLE AIR VOLUME COOLING CONTROL PACKAGE NO. 4145

Application:

For pressure control of a single zone when a single duct cooling only variable air volume (VAV) terminal is used to supply air to the zone and a single return damper (must be equipped with control package 4150) is used to control the return / exhaust airflow from the zone.

The single duct units are designed to provide accurate variable air volume (VAV) temperature control with a minimum amount of energy consumption. A typical application is shown in Fig. 1. These terminals require a low minimum inlet static pressure, permitting the use of smaller, more energy efficient fan systems. A wall-mounted space temperature (SPT) sensor located in each zone will sense load requirements and activate the control sequence to accommodate cooling or heating. Load requirements, sound level acceptability, and measurement accuracy govern terminal sizing. In pressure control applications, the supply and return terminals should never operate below 20% of nominal airflow design. The return terminal sizing is additionally dependent on the design differential airflow which must be maintained (return terminal may be larger for negative pressure applications or small for positive pressure applications). This control package provides the following sequences of operations:

A. Cooling: (refer to numbers on flow diagram [Fig.2]).

- 1-2 indicates that maximum supply airflow is established by the user-defined maximum cooling airflow set point until the zone comes under control at 2. The return airflow will be maintained at the user-configured delta airflow.
2. Beginning at 2, the supply flow is regulated over a throttling range by the supply damper until the minimum

cooling airflow set point is reached at 3. The minimum cooling airflow set point cannot be set below the design delta airflow value if a positive pressure is required in the zone. The return damper will track the supply airflow and maintain the zone's return airflow at a constant differential from the supply.

3. 3-4 indicates that, should the zone temperature continue to fall the damper will hold the user-defined minimum cooling airflow set point. The return damper will maintain the return airflow at the user-defined delta.

NOTE: If positive pressure is required in the zone, the minimum cooling and heating airflow set points cannot be set below the design delta airflow.

B. Heating: (when the primary air source is providing heated air, determined by receiving a heating signal from the air source equipped with CCN controls or a primary air temperature sensor is installed to detect the air source is providing heated primary air. Refer to numbers on flow diagram)

1. Upon receiving a heating signal generated by the air source equipped with CCN controls (or a primary air temperature sensor is installed to detect that the air source is heating), should the zone temperature fall below the occupied heating set point, the Heating mode is in effect at 4'.
2. The supply damper is throttled between the user-defined minimum heating airflow set point at 4' and the user-defined maximum heating airflow set point at 6. The minimum heating airflow set point cannot be set below the design delta airflow value if a positive pressure is required in the zone. The return damper

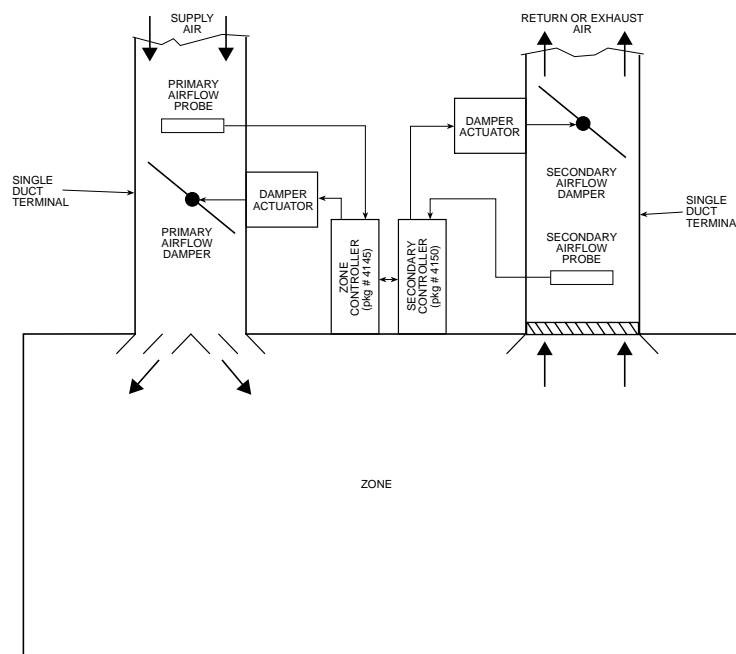


Figure 1 - Zone Pressurization Application

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will track the supply airflow and maintain the zone's return airflow at a constant differential from the supply.

3. The control may be configured to provide constant volume heating. In that case the supply damper will maintain the minimum heating airflow set point at 4' to supply a constant volume of heated air to the zone. The minimum heating airflow set point cannot be set below the design delta airflow value if a positive pressure is required in the zone. The return damper will maintain the zone's return airflow at a constant differential from the supply.

C. Morning warm-up: (if configured to provide variable volume heating) upon receiving a morning warm-up signal generated by the primary air supply equipped with CCN controls, the supply damper will go to the maximum heating airflow set point if the zone temperature is below the occupied heating set point at 6. This allows the warm primary air to be delivered to the zone. As the zone temperature rises above the occupied heating set point, the damper will move toward the minimum heating airflow set point at 4'. The return damper will track the supply airflow and maintain the zone's return airflow at a constant differential from the supply.

D. Unoccupied time period: (cooling)
 When the unoccupied period is reached, the user-defined occupied cooling set point is reset upward to a user-defined unoccupied cooling set point. The supply and return dampers will throttle in the same manner (as per A) during the unoccupied period, using the unoccupied cooling set point.

E. Unoccupied time period: (heating)
 When the unoccupied period is reached, the user-defined occupied heating set point is reset downward to a user-defined unoccupied heating set point. The supply and return dampers will operate in the same manner (as per B) during the unoccupied period, using the unoccupied heating set point.

F. Demand controlled ventilation (option):
 Whenever the zone is occupied and the air source is not heating (determined by receiving a cooling signal from the air source equipped with CCN controls or a primary air temperature sensor is installed to detect the air source is operating in the Cooling mode), the control will monitor a CO₂ sensor (optional) and determine if ventilation is adequate. The zone CO₂ level is compared to the ventilation set point. If the CO₂ level is above the set point

(insufficient ventilation), the supply airflow set point is increased appropriately to maintain proper ventilation. Should the zone's temperature fall below the heating set point, the control will suspend the ventilation override until the zone's temperature recovers. During the ventilation override, the return damper will track the supply airflow and maintain the zone's return airflow at a constant differential from the supply.

G. Damper override:
 The damper override function is energized through the use of a field-supplied smoke control panel connected to the air source equipped with CCN controls. The smoke control panel and installation must be in accordance with UL864 and local codes. The damper override function overrides the supply and return airflow settings used by the logic. When the air source is in the Pressurization mode, it will cause the supply terminal to provide the configured maximum cooling airflow and to fully close return/exhaust terminal damper. When the air source is in the Evacuation mode, it will cause the supply terminal to fully close the terminal damper and cause the return air terminal to provide the configured maximum return airflow (maximum cooling plus or minus the configured delta).

H. Nighttime free cooling:
 The logic calculates nighttime free cooling (NTFC) temperature set point halfway between the occupied heating and occupied cooling temperature set points. Upon receiving a NTFC signal generated by the air source equipped with CCN controls (or a primary air temperature sensor is installed to detect the air source is operating in the NTFC mode), the supply damper will throttle between the maximum and minimum cooling airflow set points as required to maintain the zone's NTFC temperature set point. The return damper will track the supply airflow and maintain the zone's return airflow at a constant differential from the supply.

- J. Primary air source shuts off:**
1. The supply and return damper will fully close and the control will recalibrate both supply and return airflow transducers.
 2. If the primary air source remains off (no supply air), both dampers will be repositioned to at least 50% open to allow the air sources to restart properly (note that the return air source must be interlocked to operate with the supply air source).

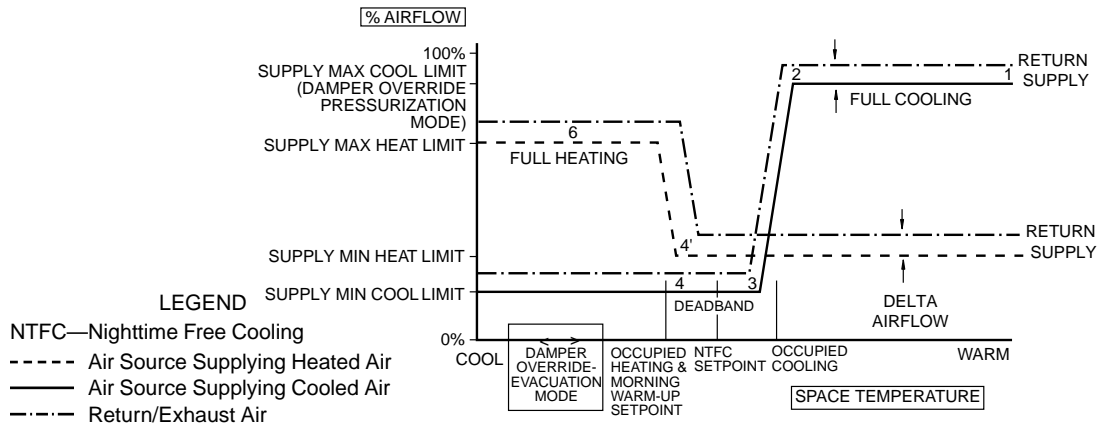
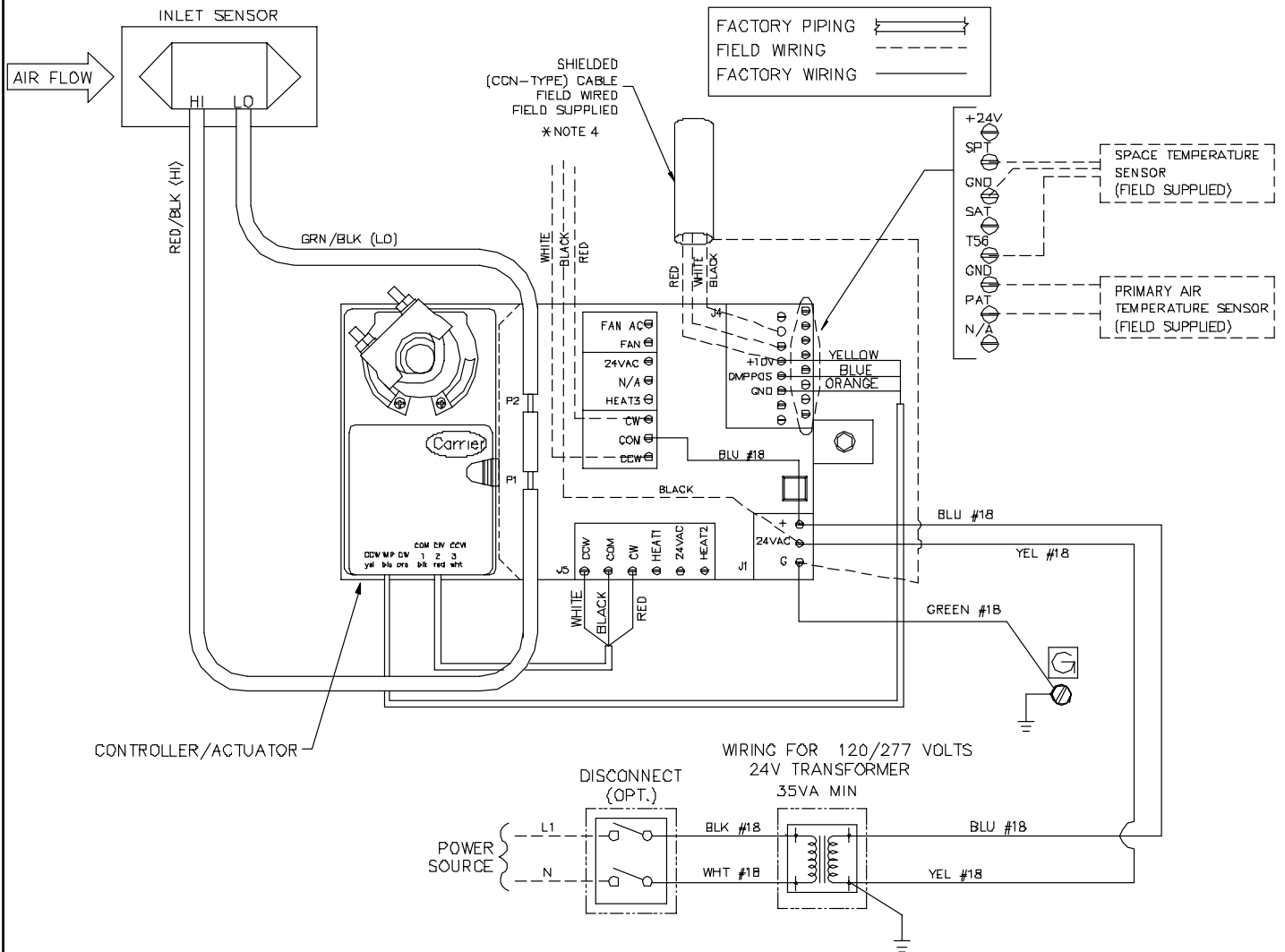


Figure 2 - Sequence of Operation for Single Duct Zone Pressure Control – Cooling-Only (Negative Zone Pressure shown)



Notes:

1. For 35E units the Actuator is configured CW to close, except for 22" inlet units configuration is CCW to close.
2. **CAUTION:**
Electric shock may result. Disconnect unit prior to servicing unit.
3. These controls have been wired to comply with UL-1995.
4. Refer to control package 4150 for return/exhaust control wiring.

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