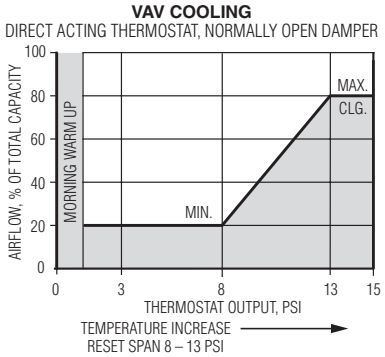
Standard Control Sequences

Pneumatic • Pressure Independent • 3000 Controller

The sequences illustrated feature the 3000 controller and a constant 5 psi reset span which does not vary with minimum and maximum settings. For a more detailed explanation of control options and terminology, refer to the engineering section in the back of this catalog.

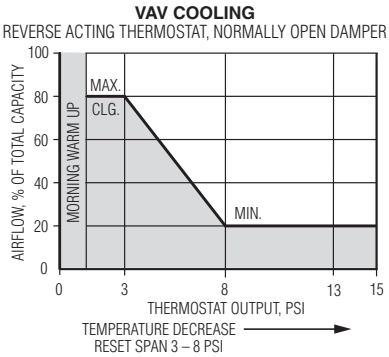
Control Sequence 1P3
Direct Acting, Normally Open

- When main control air is off, damper is fully open. Morning warm-up setting (if required) with warm air from system supplied at full flow rate.
- Main control air on – controller is activated. Begins modulating cold airflow on thermostat demand.
- Increase in room temperature increases thermostat output pressure (thus increasing airflow).
- Minimum airflow is maintained between 0 and 8 psi thermostat signal.
- Further increase in room temperature will increase thermostat signal from 8 to 13 psi which will increase airflow. At 13 psi and above, preset maximum airflow is maintained.
- If main control air fails, damper fails open.



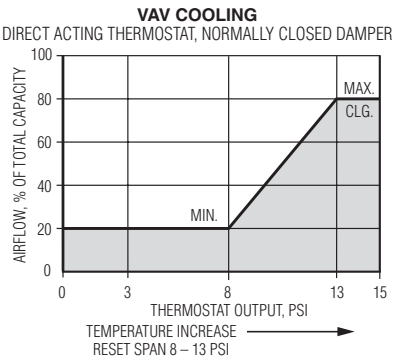
Control Sequence 2P3
Reverse Acting, Normally Open

- When main control air is off, damper is fully open. Morning warm-up setting available if required.
- Main control air on – controller is activated. Begins modulating cold airflow according to thermostat output.
- Decrease in room temperature increases thermostat output pressure (thus decreasing airflow).
- Maximum airflow is maintained between 0 and 3 psi thermostat signal.
- Further decrease in room temperature will increase thermostat signal from 3 to 8 psi which will decrease airflow to room. At 8 psi and above, minimum airflow is maintained.
- If main control air fails, damper fails open.



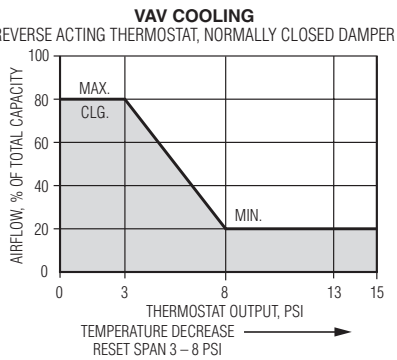
Control Sequence 3P3
Direct Acting, Normally Closed

- When main control air is off, damper is closed.
- Main control air on – controller is activated. Begins modulating cold airflow according to thermostat demand.
- Increase in room temperature increases thermostat output pressure (thus increasing airflow).
- Minimum airflow is maintained between 0 and 8 psi thermostat signal.
- Further increase in room temperature will increase thermostat signal from 8 to 13 psi which in turn increases airflow to room. At 13 psi and above, preset maximum airflow is maintained.
- If main control air fails, damper fails closed.



Control Sequence 4P3
Reverse Acting, Normally Closed

- When main control air is off, damper is closed.
- Main control air on – controller is activated. Begins modulating cold airflow according to thermostat demand.
- Decrease in room temperature increases thermostat output pressure (thus decreasing airflow).
- Maximum airflow is maintained between 0 and 3 psi thermostat signal.
- Further decrease in room temperature will increase thermostat output pressure from 3 to 8 psi which will decrease airflow to room. At 8 psi and above, minimum airflow is maintained.
- If main control air fails, damper fails closed.



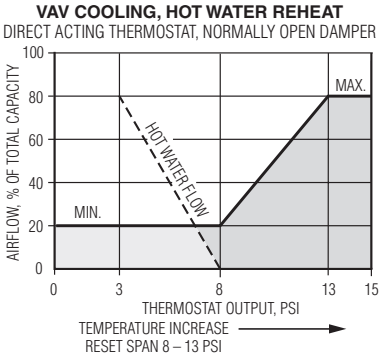
Standard Control Sequences

Pneumatic • Pressure Independent • 3000 Controller

Control Sequence 1P3
D.A.N.O. - Hot Water Reheat N.O.

- When main control air is off, damper is fully open.
- Main control air on – controller is activated and begins modulating on thermostat demand.
- Increase in room temperature modulates hot water valve towards closed position (at 8 psi). Minimum airflow is maintained between 0 and 8 psi thermostat signal.
- Further increase in room temperature will increase thermostat signal from 8 to 13 psi which will increase airflow to maximum cooling.
- If main control air fails, damper fails open and hot water valve fails open.

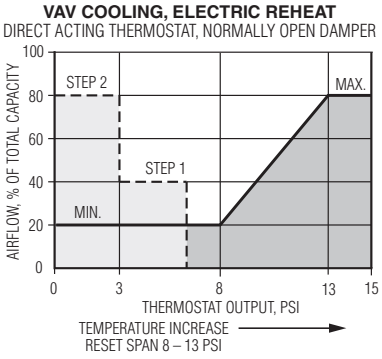
Hot water reheat coils may also be sequenced with 2P3, 3P3 and 4P3.



Control Sequence 1P3
D.A.N.O. - Electric Reheat N.C.

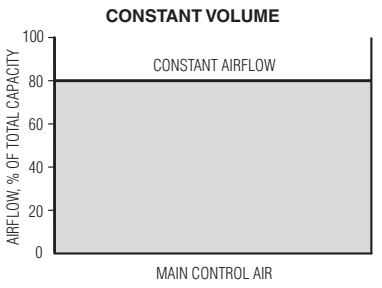
- When main control air is off, damper is fully open.
- Main control air on – controller is activated and begins modulating on thermostat demand.
- Increase in room temperature de-energizes the electric reheat coil one step at a time. Minimum airflow is maintained between 0 and 8 psi thermostat signal. At 8 psi, electric reheat is off.
- Further increase in room temperature will increase thermostat output signal from 8 to 13 psi which will increase airflow to maximum cooling.
- If main control air fails, damper fails open and P.E. switch for electric heater is closed (energized).

Electric reheat coils may also be sequenced with 2P3, 3P3 and 4P3.



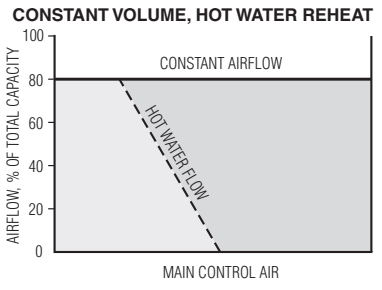
Control Sequence 7P3
C.V.N.C.

- When main control air is off, damper is closed.
- Main control air on – controller maintains preset constant airflow regardless of duct pressure or room temperature.
- A room thermostat is not used.
- If main control air fails, damper fails closed.
- A normally open damper assembly is optional.



Control Sequence 8P3
C.V. - Hot Water Reheat N.O.

- When main air is off, damper is open.
- Main control air is on – controller maintains preset constant airflow regardless of duct pressure or room temperature.
- As room temperature increases, a room thermostat modulates the hot water valve towards the closed position, or opens it on temperature drop.
- If main control air fails, damper fails open and hot water valve fails open.



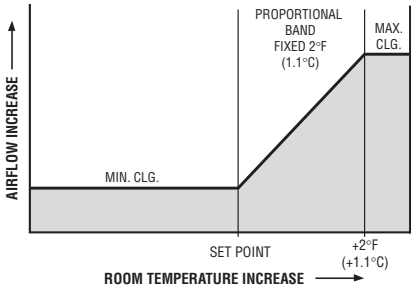
Standard Control Sequences

Analog Electronic • Pressure Independent

Control Sequence 1 EL
Cooling Only

The operating sequence for a cooling application is as follows:

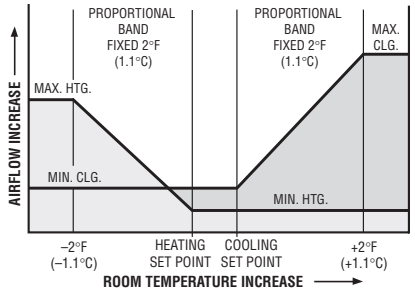
1. On a rise in space temperature, the thermostat regulates the controller/actuator to increase the airflow. At 2°F (1.1°C) above thermostat set point, the maximum airflow is maintained at a preselected setting.
2. On a decrease in space temperature, the thermostat regulates the controller/actuator to reduce airflow. At thermostat set point, the minimum airflow is maintained at a preselected setting.
3. Airflow is held constant in accordance with thermostat demand. Any changes in duct air velocity due to static pressure fluctuations are sensed and compensated for, resulting in pressure independent control.



Control Sequence 3 EL
Cooling/Heating with Auto – Changeover

The heating/cooling thermostat features separate temperature set points and separate min./max. velocity limits for heating and cooling operation. The automatic changeover relay energizes either the heating or cooling mode of the thermostat in response to the duct temperature. The operating sequence is as follows:

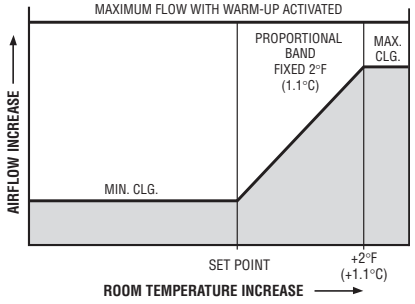
1. At a duct temperature above 77°F (25°C), the heating side of the thermostat is energized.
2. On a decrease in space temperature, the thermostat regulates the controller/actuator to increase the airflow. At 2°F (1.1°C) below thermostat heating set point, the maximum airflow is maintained at a preselected setting on a rise in space temperature, the thermostat regulates the controller/actuator to decrease the airflow. At a space temperature above thermostat heating set point, the minimum airflow is maintained at a preselected setting.
3. At a duct temperature below 77°F (25°C), the cooling side of the thermostat is energized.
4. On a rise in space temperature, the thermostat regulates the controller/actuator to increase the airflow. At 2°F (1.1°C) above thermostat cooling set point, the maximum airflow is maintained at a preselected setting. On a decrease in space temperature, the thermostat regulates the controller/actuator to reduce the airflow. At thermostat cooling set point, the minimum airflow is maintained at a preselected setting.
5. During both the heating and cooling cycle, airflow is held constant in accordance with thermostat demand. Any changes in duct air velocity due to static pressure fluctuations are sensed and compensated for, resulting in pressure independent control.



Control Sequence 4 EL
Cooling with Morning Warm-Up

The operating sequence is as follows:

1. On a rise in space temperature, the thermostat regulates the controller/actuator to increase the airflow. At 2°F (1.1°C) above thermostat set point, the maximum airflow is maintained at a preselected setting.
2. On a decrease in space temperature, the thermostat regulates the controller/actuator to reduce airflow. At thermostat set point, the minimum airflow is maintained at a preselected setting.
3. Airflow is held constant in accordance with thermostat demand. Any changes in duct air velocity due to static pressure fluctuations are sensed and compensated for, resulting in pressure independent control.
4. When duct airflow temperature is above 77°F (25°C) (warm-up cycle), the inlet sensor switches a relay module and the actuator will drive the damper fully open for unrestricted maximum airflow.



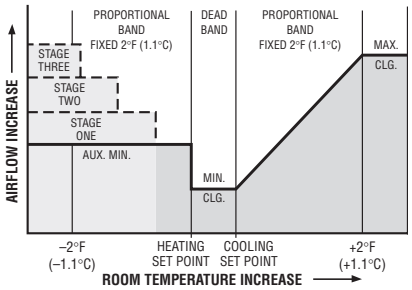
Standard Control Sequences

Analog Electronic • Pressure Independent

Control Sequence 5 EL
Cooling with Electric Reheat and Auxiliary Minimum Flow

The reheat thermostat features a separate temperature set point and a separate auxiliary flow limit for reheat control. The reheat relay energizes up to three stages of electric reheat in response to the thermostat. The operating sequence for a reheat application is as follows:

1. On a rise in space temperature, the thermostat regulates the controller/actuator to increase the airflow. At 2°F (1.1°C) above thermostat set point, the maximum airflow is maintained at a preselected setting.
2. On a decrease in space temperature, the thermostat regulates the controller/actuator to reduce the airflow. At thermostat set point, the minimum airflow is maintained at a preselected setting.
3. On a further decrease in space temperature the heating side of the thermostat is activated, automatically initiating the auxiliary flow limit. Airflow is maintained at the preselected auxiliary setting.
4. Up to three stages of reheat are energized in sequence in response to the thermostat. The first stage is energized 0.7°F (0.4°C) below the heating set point. The optional second and third stage are enegized at 1.3°F and 1.9°F (0.7°C and 1.1°C) below heating, respectively.
5. Airflow is held constant in accordance with thermostat demand. Any changes in duct air velocity due to static pressure fluctuations are sensed and compensated for, resulting in pressure independent control.

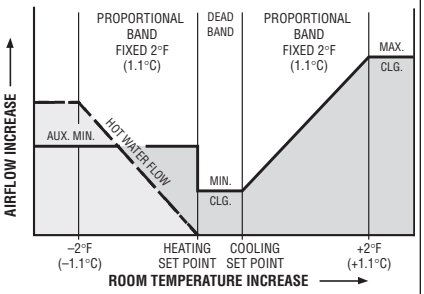


Control Sequence 8 EL
Cooling with Proportional Hot Water Reheat and Auxiliary Minimum Flow

The cooling/reheat thermostat features separate temperature set points and an auxiliary flow limit for desired airflow across the reheat coil. Airflow is held constant in accordance with thermostat demand. Any changes in duct air velocity due to static pressure fluctuations are sensed and compensated for, resulting in pressure independent control.

The sequence of operation is as follows:

1. As the room temperature increases, the room thermostat modulates the cold airflow from the minimum to the maximum setting. At 2°F (1.1°C) above cooling set point, maximum airflow is maintained. On a decrease in room temperature, the damper modulates to the minimum position.
2. On a decrease in room temperature below heating set point, the heating side of the thermostat is activated, automatically indexing the auxiliary minimum setting and the proportional hot water reheat valve (0 – 10 Vdc, by others) begins to modulate open.
3. At a room temperature of 2°F (1.1°C) below the thermostat heating set point, the hot water valve is fully open.
4. On an increase in room temperature, the reverse sequence occurs.



The following additional control sequences are also available (Contact your Nailor representative for further information):

- 6 EL • Cooling With Electric Reheat Plus Morning Warm-up.
- 7 EL • Cooling With On/Off Hot Water Reheat and Auxiliary Minimum Flow (24 Vac N.C. valve, by others).
- 9 EL • Cooling With On/Off Auxillary Heat (Perimeter Radiation).
- 10 EL • Constant Volume Operation.