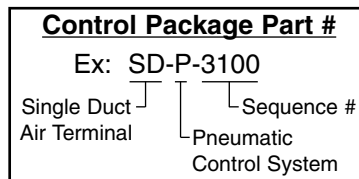


Table 26: Pneumatic Control Sequences

Control Package #	Pressure Independent	Pressure Dependent	Direct Acting Thermostat	Reverse Acting Thermostat	Damper Normally Open	Damper Normally Closed	Reheat	Morning Warm Up	Summer/Winter Changeover	VAV Cooling & VAV Heating	Dual Minimum (Summer/Winter)	Dual Minimum (Reheat)	Constant Volume	Two Level Constant Volume	Static Pressure Control
SD-P-2100 SD-P-3100	•		•		•		○								
SD-P-3200	•		•		•		○								
SD-P-3300	•			•	•		○								
SD-P-2400 SD-P-3400	•			•		•	○								
SD-P-2120 SD-P-3120	•		•		•		○	•							
SD-P-3220	•		•		•		○	•							
SD-P-3320	•			•	•		○	•							
SD-P-2420 SD-P-3420	•			•		•	○	•							
SD-P-2140 SD-P-3140	•		•		•		○		•						
SD-P-3240	•		•		•		○		•						
SD-P-3340	•			•	•		○		•						
SD-P-2440 SD-P-3440	•			•		•	○		•						
SD-P-2160 SD-P-3160	•		•		•		○			•					
SD-P-3260	•		•		•		○			•					
SD-P-3360	•			•	•		○			•					
SD-P-2460 SD-P-3460	•			•		•	○			•					
SD-P-2175 SD-P-3175	•		•		•		○				•				
SD-P-3275	•		•		•		○				•				
SD-P-3375	•			•	•		○				•				
SD-P-2475 SD-P-3475	•			•		•	○				•				
SD-P-2180 SD-P-3180	•		•		•		○					•			
SD-P-2280 SD-P-3280	•			•		•	○					•			
SD-P-2181 SD-P-3181	•				•		○						•		
SD-P-2281 SD-P-3281	•					•	○						•		
SD-P-0001	•	•			•										
SD-P-0002	•		•	•											
SD-P-0003					•										•
SD-P-0004						•									•

Note:
• – standard
○ – optional



**VAV Cooling
Pressure Dependent**

Control Packages

SD-P-0001, 0002
SD-A-0001

Sequence of Operation

As the room air temperature increases above the thermostat setpoint, the actuator rotates the terminal damper in response to the thermostat signal towards the open position. If desired, the maximum damper position can be set in the field.

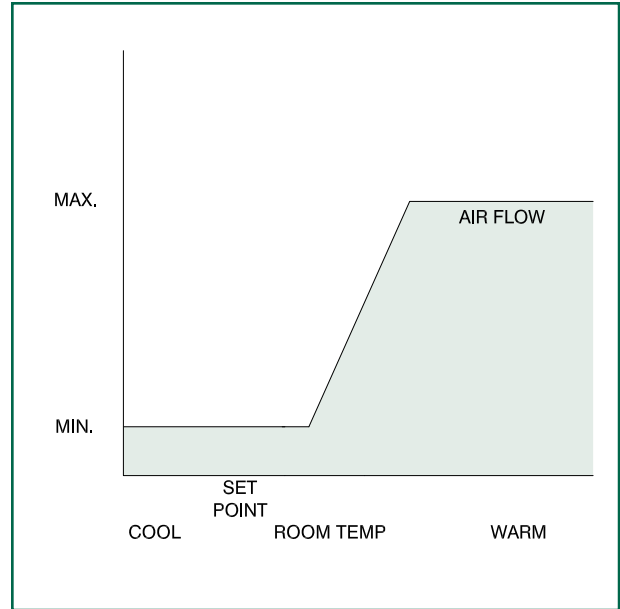
As the room air temperature decreases below the thermostat setpoint, the actuator rotates the terminal damper in response to the thermostat signal towards the closed position. If desired (electronic controls only), the minimum damper position can be set in the field.

Control Package Contents

All pneumatic control packages listed above include the damper actuator. Thermostats are not included.

All electronic control packages listed above include the damper actuator and room thermostat.

Note: Not recommended for optional hot water or electric heat.



**VAV Cooling
(optional hot water or electric heating)
Pressure Independent**

Control Packages

SD-P-2100 and 2400
SD-P-3100 through 3400
SD-A-5000 through 5004

Sequence of Operation

As the room air temperature increases above the thermostat's setpoint, the actuator rotates the terminal's damper in response to the controller's signal towards the open position up to the maximum airflow setting.

As the room air temperature decreases below the thermostat's setpoint, the actuator rotates the terminal's damper in response to the controller's signal towards the closed position down to the minimum airflow setting.

The controller's signal is determined by comparing the signals from the thermostat and flow sensor to provide the required airflow regardless of the inlet static pressure conditions.

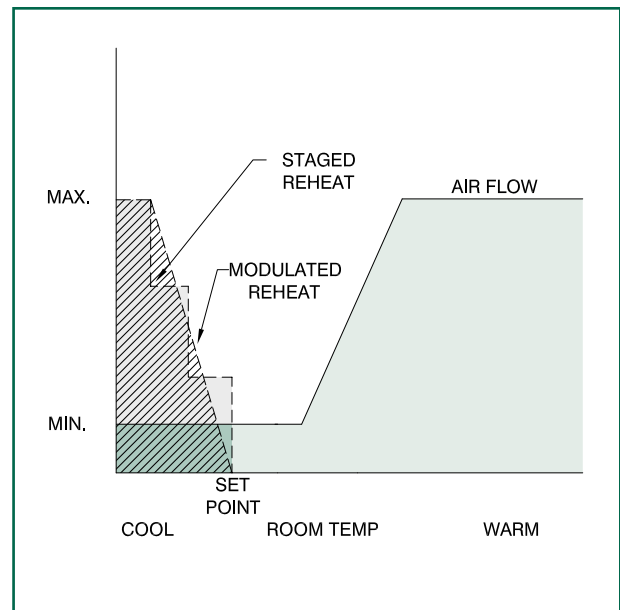
On units provided with heating coils, the heat is activated as the room temperature continues to fall below the thermostat's setpoint after having reached the minimum airflow setting. The airflow remains at the minimum setting while in the heating mode.

Control Package Contents

All pneumatic control packages listed above include the damper actuator and pressure independent controller. Thermostats are not included.

All electronic control packages listed above include the damper actuator, pressure independent controller and room thermostat. A trigger relay is provided with all electronic control packages where hot water (on-off) or electric heating coils are provided.

Control valves for the hot water coils are not included in the control package.



VAV Cooling and Morning Warm-up
(optional hot water or electric heating)
Pressure Independent

Control Packages
SD-P-2120 and 2420
SD-P-3120 through 3420
SD-A-5020 through 5024

Sequence of Operation
As the room air temperature increases above the thermostat's setpoint, the actuator rotates the terminal's damper in response to the controller's signal towards the open position up to the maximum airflow setting.

As the room air temperature decreases below the thermostat's setpoint, the actuator rotates the terminal's damper in response to the controller's signal towards the closed position down to the minimum airflow setting.

The controller's signal is determined by comparing the signals from the thermostat and flow sensor to provide the required airflow regardless of the inlet static pressure conditions.

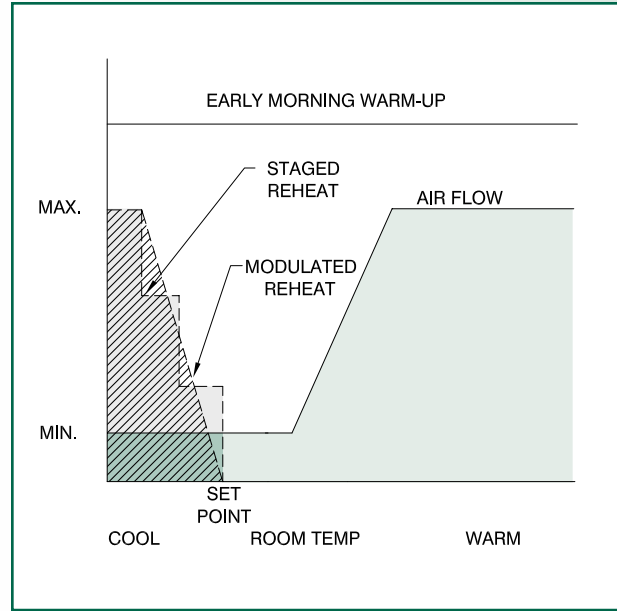
On units provided with heating coils, the heat is activated as the room temperature continues to fall below the thermostat's setpoint after having reached the minimum airflow setting. The airflow remains at the minimum setting while in the heating mode.

In response to a change in main pressure (with pneumatic controls) or a remote 24 volt signal (with electronic controls), the actuator rotates the damper to the fully open position for morning warm-up.

Control Package Contents

All pneumatic control packages listed above include the damper actuator, pressure independent controller and diverting relay. Thermostats are not included.

All electronic control packages listed above include the damper actuator, pressure independent controller, SPDT relay and room



thermostat. A trigger relay is provided with all electronic control packages where hot water (on-off) or electric heating coils are provided.

Control valves for the hot water coils are not included in the control package.

VAV Cooling and VAV Heating
(optional hot water or electric heating)
Pressure Independent

Control Packages
SD-P-2160 and 2460
SD-P-3160 through 3460
SD-A-5040 through 5044

Sequence of Operation
In the cooling mode as the room air temperature increases above the thermostat setpoint, the actuator rotates the terminal damper in response to the controller's signal towards the open position up to the maximum airflow setting.

As the room air temperature decreases below the thermostat setpoint, the actuator rotates the terminal damper in response to the controller's signal towards the closed position down to the minimum airflow setting.

The controller's signal is determined by comparing the signals from the thermostat and flow sensor to provide the required airflow regardless of the inlet static pressure conditions.

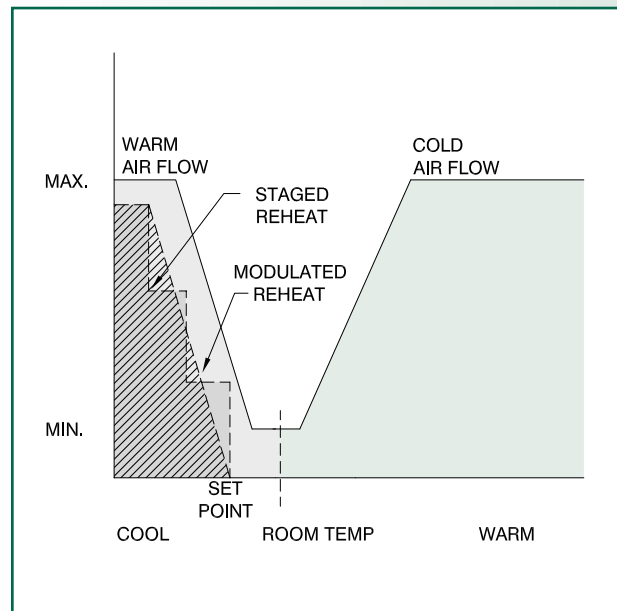
As the room temperature continues to fall below the thermostat setpoint and the minimum airflow setting is reached, the heat is activated. As the demand for heat increases, the airflow increases above the minimum setting up to the maximum airflow setting.

In the heating mode in response to a change in main pressure (pneumatic controls) or from a signal from the unit temperature sensor (electronic controls) indicating warm supply air, the actuator rotates the damper in the opposite direction to the cooling mode in response to changes in the room temperature. As the demand for heat increases, the airflow increases above the minimum setting up to the maximum airflow setting.

Control Package Contents

All pneumatic control packages listed above include the damper actuator, pressure independent controller, high pressure selector and reversing relay. Thermostats are not included.

All electronic control packages listed above include the damper



actuator, pressure independent control, temperature sensor, heat/cool changeover module and room thermostat. A trigger relay is provided with all electronic control packages where hot water (on-off) or electric heating coils are provided.

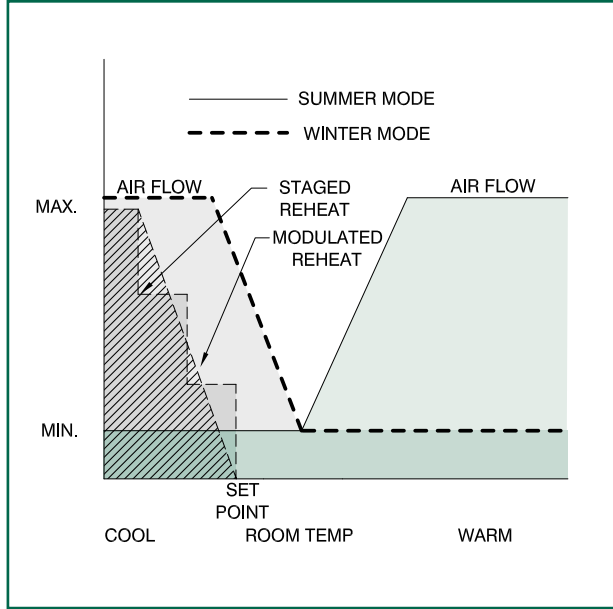
Control valves for the hot water coils are not included in the control package.

**VAV Summer/Winter Changeover
(optional hot water or electric heating)
Pressure Independent**

Control Packages
SD-P-2140 and 2440
SD-P-3140 through 3440
(for electronic control, see VAV Cooling and VAV Heating)

Sequence of Operation
In the summer mode as the room air temperature increases above the thermostat's setpoint, the actuator rotates the terminal's damper in response to the controller's signal towards the open position up to the maximum airflow setting.
As the room air temperature decreases below the thermostat's setpoint, the actuator rotates the terminal's damper in response to the controller's signal towards the closed position down to the minimum airflow setting.
The controller's signal is determined by comparing the signals from the thermostat and flow sensor to provide the required airflow regardless of the inlet static pressure conditions.
On units provided with heating coils, the heat is activated as the room temperature continues to fall below the thermostat's setpoint. In the winter mode in response to a change in main pressure, the actuator rotates the damper in the opposite direction to the summer mode in response to changes in the room temperature. As the demand for heat increases, the airflow increases above the minimum setting up to the maximum airflow setting.

Control Package Contents
All pneumatic control packages listed above include the damper actuator, pressure independent controller, diverting relay and reversing relay. Thermostats are not included.
Control valves for the hot water coils are not included in the control package.

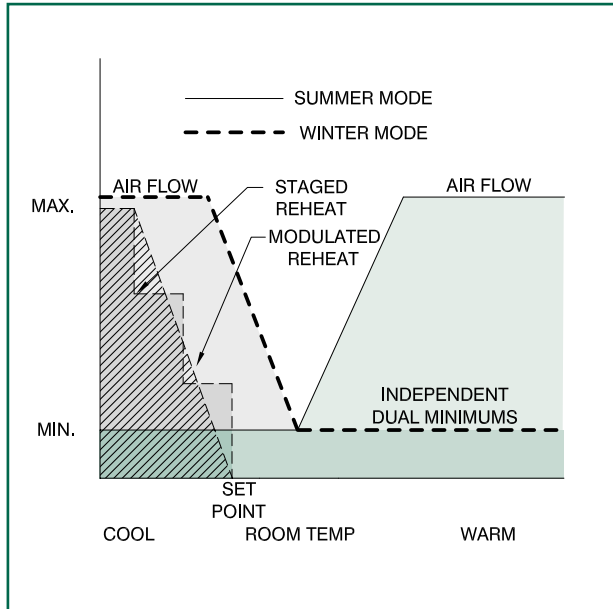


**VAV Cooling with Dual Minimums and
Summer/Winter Changeover
(optional hot water or electric heating)
Pressure Independent**

Control Packages
SD-P-3170 through 3470

Sequence of Operation
In the summer mode as the room air temperature increases above the thermostat setpoint, the actuator rotates the terminal damper in response to the controller's signal towards the open position up to the maximum airflow setting.
As the room air temperature decreases below the thermostat setpoint, the actuator rotates the terminal damper in response to the controller's signal towards the closed position down to the minimum airflow setting.
The controller's signal is determined by comparing the signals from the thermostat and flow sensor to provide the required airflow regardless of the inlet static pressure conditions.
In the winter mode in response to a change in main pressure (pneumatic controls), the actuator rotates the damper in the opposite direction to the summer mode in response to changes in the room temperature. The minimum airflow settings can be different for the summer and winter modes.
On units provided with heating coils, the heat is activated as the room temperature continues to fall below the thermostat setpoint.

Control package Contents
All pneumatic control packages listed above include the damper actuator, pressure independent controller, high pressure selector, reversing relay, diverting relays and pressure regulating valve. Thermostats are not included.
Control valves for the hot water coils are not included in the control package.



VAV Cooling with Dual Minimums
(optional hot water or electric heating)
Pressure Independent

Control Packages
SD-P-2175 and 2475
SD-P-3175 through 3475
SD-A-5001 through 5004

Sequence of Operation
As the room air temperature increases above the thermostat setpoint, the actuator rotates the terminal damper in response to the controller's signal towards the open position up to the maximum airflow/damper position setting.

As the room air temperature decreases below the thermostat setpoint, the actuator rotates the terminal damper in response to the controller's signal towards the closed position down to the minimum flow setting/damper position..

The controller's signal is determined by comparing the signals from the thermostat and flow sensor to provide the required airflow regardless of the inlet static pressure conditions.

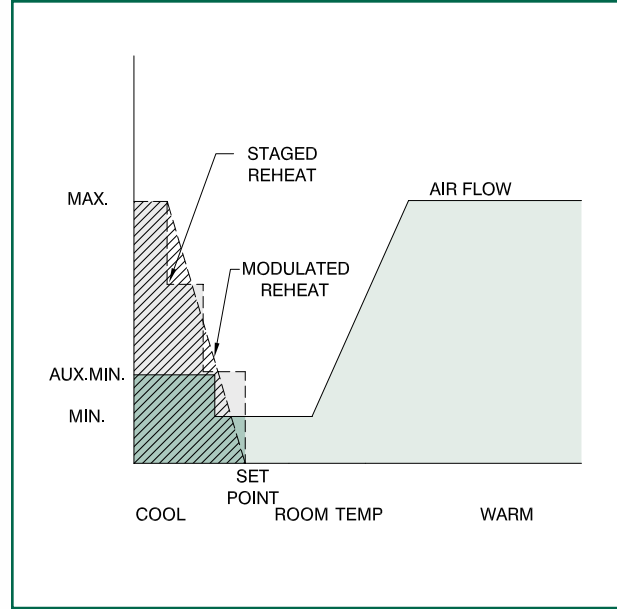
On units provided with heating coils, the heat is activated as the room temperature continues to fall below the thermostat setpoint. A second minimum airflow setting can be different in the heating mode.

Control Package Contents

All pneumatic control packages listed above include the damper actuator, pressure independent controller, diverting relay, low or high pressure selector and pressure regulating valve. Thermostats are not included.

All electronic control packages listed above include the damper actuator, pressure independent controller and room thermostat. The second different minimum airflow setting for the heating mode can be set in the field by installing a jumper between two terminals in the room thermostat. A trigger relay is provided with all electronic control packages where hot water (on-off) or electric heating coils are provided.

Control valves for the hot water coils are not included in the control package.



Constant Volume
(optional hot water or electric heating)
Pressure Independent

Control Packages
SD-P-2180 and 2280
SD-P-3180 and 3280
SD-A-5080 through 5084

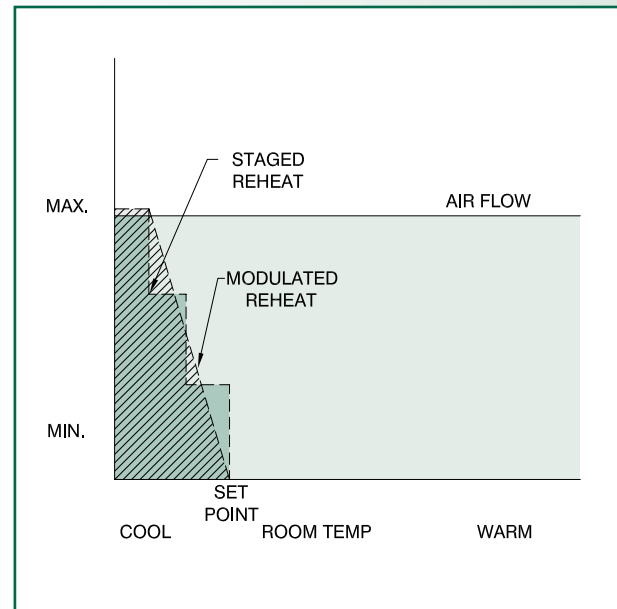
Sequence of Operation
The damper is rotated in response to the controller's signal to provide a constant volume of airflow regardless of changes in the terminal inlet static pressure.
The controller's signal is determined by the flow sensor signal.

Control Package Contents

All pneumatic control packages listed above include the damper actuator and pressure independent controller. Thermostats are not included.

All electronic control packages listed above include the damper actuator and pressure independent controller. Thermostats are included (only when a heating coil is provided). A trigger relay is provided with all electronic control packages where hot water (on-off) or electric heating coils are provided.

Control valves for the hot water coils are not included in the control package.



**Two level Constant Volume
(optional hot water or electric heating)
Pressure Independent**

Control Packages

SD-P-2181 and 2281
SD-P-3181 and 3281
SD-A-5085

Sequence of Operation

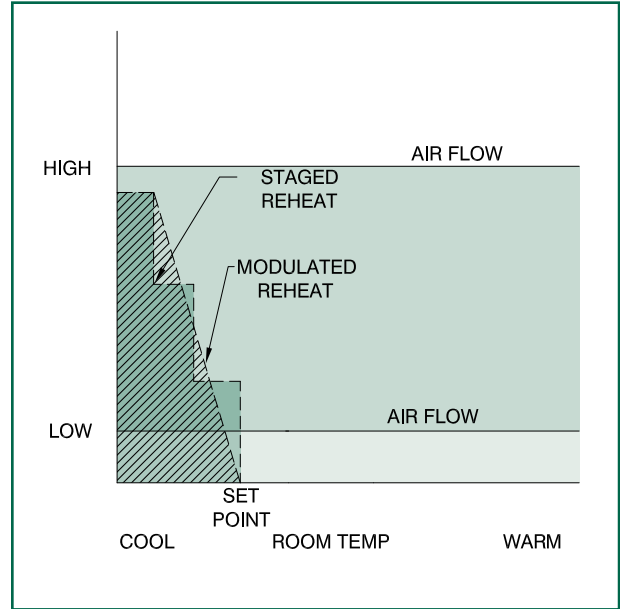
The damper is rotated in response to the controller's signal to provide a constant volume of airflow regardless of changes in the terminal inlet static pressure.
In response to a change in main pressure (with pneumatic controls) or a remote signal (with electronic controls), a second constant volume setting is maintained.
The controller's signal is determined by the flow sensor signal.

Control Package Contents

All pneumatic control packages listed above include the damper actuator, pressure independent controller (and reversing relay in P2281). Thermostats are not included.

All electronic control packages listed above include the damper actuator and pressure independent controller. Thermostats are included. A trigger relay is provided with all electronic control packages where hot water (on-off) or electric heating coils are provided.

Control valves for the hot water coils are not included in the control package.



Static Pressure Control

Control Packages

SD-P-0003, 0004
SD-A-5090

Sequence of Operation

The damper is rotated to maintain a constant inlet static pressure.

Control Package Contents

The control packages listed above include the damper actuator and pressure independent controller. Duct pressure sensor and thermostats are not included.

