

## SEQUENCE OF OPERATION FOR VARIABLE AIR VOLUME AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR

## 1. GENERAL

1.1. UNIT IS NORMALLY STARTED AND STOPPED REMOTELY AT THE ECC. H-O-A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" POSITIONS SHALL BE USED ONLY FOR MAINTENANCE. WHEN THE UNIT IS "OFF" D-1 SHALL BE FULLY CLOSED. WHEN THE UNIT IS "ON" D-1 SHALL OPEN TO MINIMUM OUTSIDE AIR POSITION.

1.2 FREEZESTAT AND SMOKE DETECTOR SHALL BE WIRED TO REMAIN IN CIRCUIT WITH STARTER IN HAND POSITION.

## 2. TEMPERATURE CONTROL

2.1 SUPPLY AIR TEMPERATURE (SAT), SENSED BY T-1, SHALL BE MAINTAINED AT THE (ADJUSTABLE) 55° SETPOINT VIA DIGITAL CONTROL PANEL.

2.2 WHEN THE OUTSIDE AIR TEMPERATURE (OAT) IS ABOVE THE ECONOMIZER ENABLE SETPOINT (ADJUSTABLE), THE AHU SHALL BE IN THE MECHANICAL COOLING MODE. THE CONTROLLER SHALL OPEN D-1 (TO MINIMUM OUTSIDE AIR) AND D-2 SHALL BE FULLY OPEN. THE CONTROLLER SHALL MODULATE V-2 TO MAINTAIN SAT SETPOINT.

2.3 WHEN THE OAT IS BELOW THE ECONOMIZER ENABLE SETPOINT (ADJUSTABLE), THE CONTROLLER SHALL USE THE ECONOMIZER AS THE FIRST STAGE OF COOLING. THE CONTROLLER WILL MODULATE D-1 AND D-2 TO MAINTAIN A MIXED AIR SETPOINT. IF D-1 IS FULLY OPEN AND THE SA SETPOINT CAN'T BE MAINTAINED, V-2 SHALL MODULATE TO MAINTAIN SA SET POINT.

2.4 WHEN THE ECONOMIZER IS ACTIVE, V-1 AND V-2 SHALL MODULATE AS NEEDED TO MAINTAIN THE THE SAT SETPOINT. AND ADJUSTABLE DEADBAND SHALL BE USED AROUND THE SAT SETPOINT.

2.5 WHEN IN HEATING MODE. MODULATE V-1 TO PROVIDE 85° SA SETPOINT (ADJUSTABLE).

### 3. AIR FLOW CONTROL

3.1 THE SUPPLY AIR FLOW SHALL BE CONTROLLED BY THE DIGITAL CONTROL PANEL MODULATING THE SUPPLY FAN VARIABLE SPEED MOTOR CONTROLLER TO MAINTAIN 1.0" OF DUCT STATIC PRESSURE (ADJUSTABLE), SENSED BY SPS-1 (SEE PLANS FOR LOCATION).

3.2 THE RETURN AIR DAMPER (D-2) SHALL OPEN AND CLOSE IN OPPOSITION TO THE OUTSIDE AIR DAMPER (D-1). WHEN OUTSIDE AIR DAMPER IS FULLY OPEN, RETURN AIR DAMPER SHALL BE FULLY CLOSED.

3.3 HIGH PRESSURE SENSOR SPS-H LOCATED AT THE SUPPLY FAN DISCHARGE SHALL PREVENT THE SUPPLY FAN FROM DEVELOPING OVER 3 INCHES (ADJUSTABLE) OF STATIC PRESSURE. IF STATIC PRESSURE AT SPS-H EXCEEDS 3 INCHES (ADJUSTABLE) , SUPPLY FAN SHALL SHUT OFF. THE SPS-H WILL BE HARD WIRED THROUGH THE FAN MOTOR CONTROLLER. SUPPLY FAN SHALL BE SHUTDOWN IN HAND, AUTO, AND BYPASS MODES. SPS-2 WILL REQUIRE MANUAL RESET AT THE DEVICE.

#### 4. FREEZE PROTECTION

4.1.1 IF THE AIR TEMPERATURE AS SENSED BY T-4 FREEZESTAT FALLS BELOW 45°F (ADJUSTABLE), AN ALARM SIGNAL SHALL INDICATE AT THE DCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40°F (ADJUSTABLE), THE SUPPLY FAN SHALL SHUT DOWN AND A CRITICAL ALARM SIGNAL INDICATE AT THE DIGITAL CONTROL PANEL AND ECC. FREEZESTAT SHALL BE HARDWIRED TO THE SUPPLY FAN MOTOR CONTROLLER AND UNIT SHALL BE SHUTDOWN IN HAND, AUTO AND BYPASS MODE. FREEZESTAT WILL REQUIRE MANUAL RESET AT THE DEVICE.

## 5. AUTOMATIC SHUTDOWN/RESTART

5.1 WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTOR, SD, THE SUPPLY FAN SHALL SHUT "OFF" AND AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM.

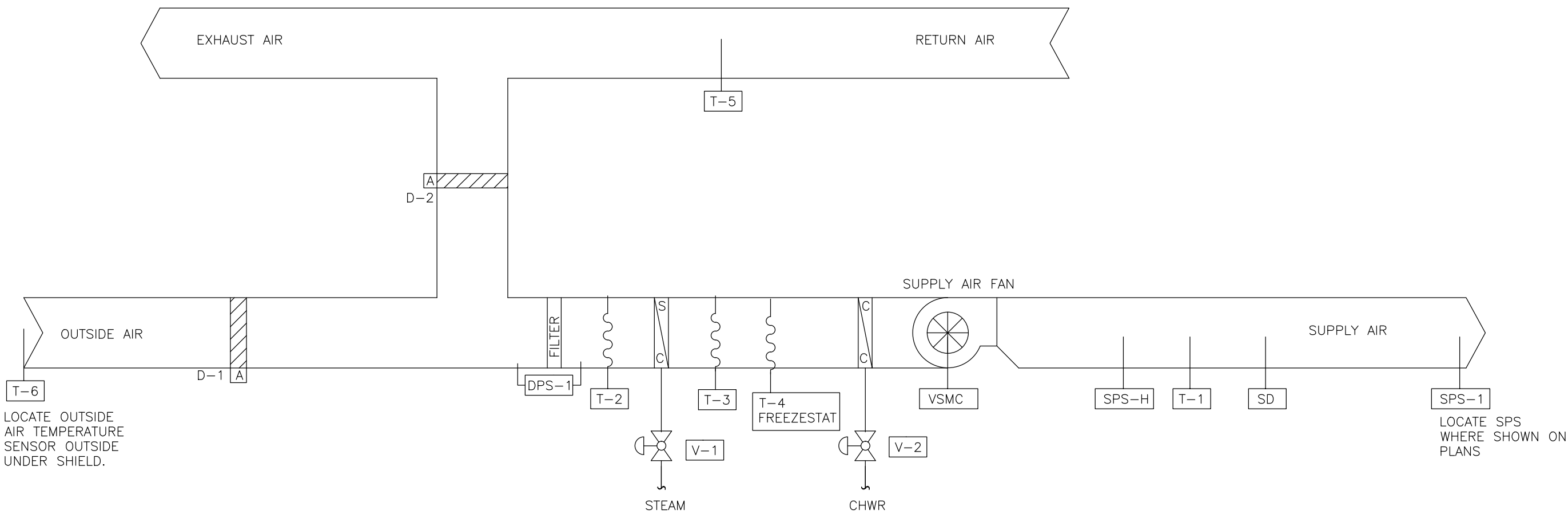
5.2 EXHAUST FANS SERVING AREA OF THE SUPPLY FAN SHALL CONTINUE TO RUN. SUPPLY FAN SHALL RESTART WHEN FIRE ALARM CIRCUIT IS RESET.

## 6. EMERGENCY CONSTANT SPEED OPERATION

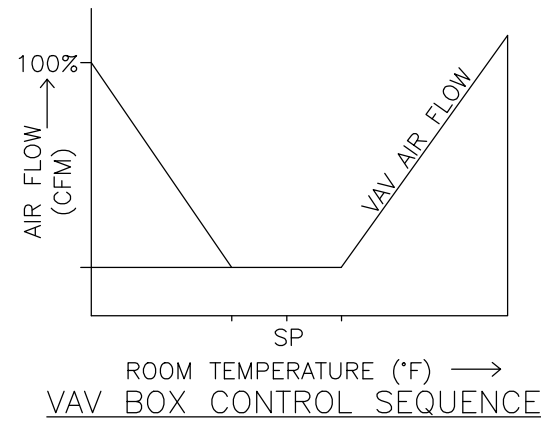
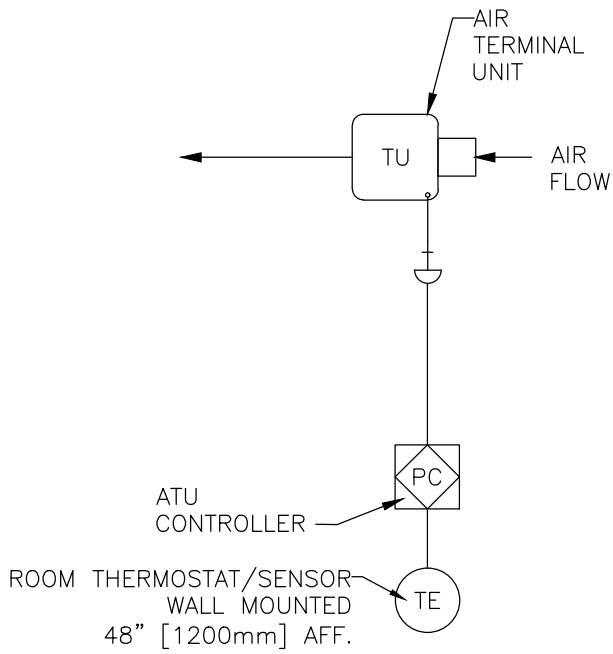
6.1 UPON FAILURE OF THE VARIABLE SPEED MOTOR CONTROLLER (VSMC), THE SUPPLY AND RETURN FANS SHALL BE STARTED/STOPPED MANUALLY AT THE DIGITAL CONTROL PANEL OR THE ECC THROUGH THE BY-PASS STARTER. FANS SHALL THEN BE OPERATED AT CONSTANT SPEED.

## 7. FILTERS

7.1 DPS-1 SHALL SIGNAL ECC OF A DIRTY FILTER UPON SENSING PRESSURE DIFFERENTIAL (ADJUSTABLE).

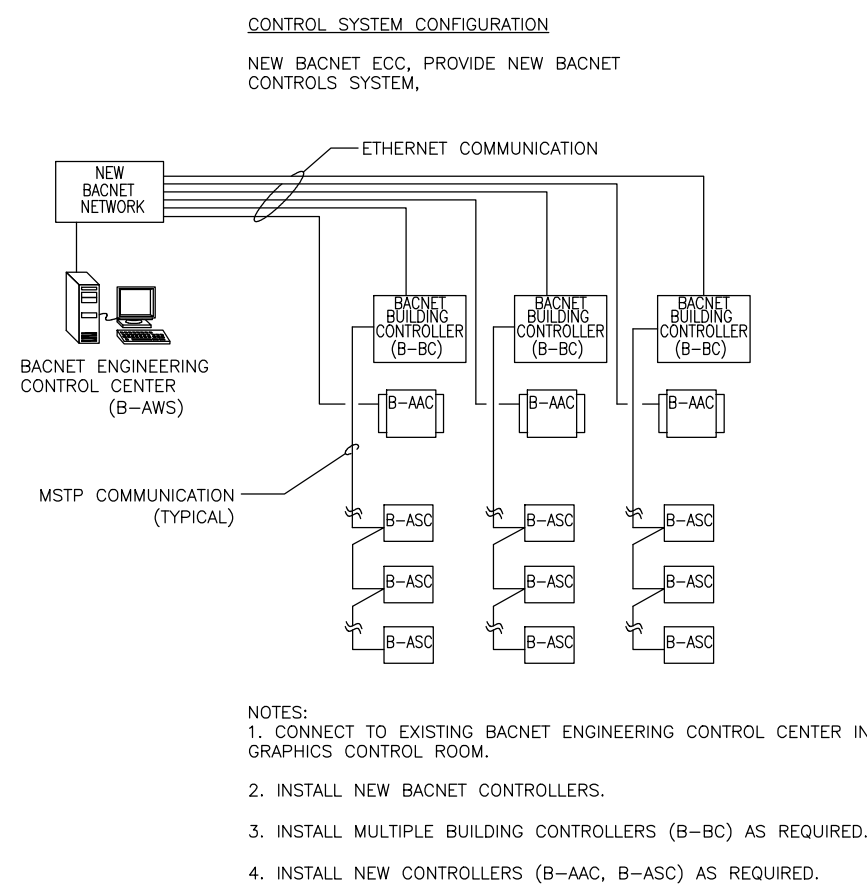


## VARIABLE AIR VOLUME AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR CONTROL DIAGRAM



- A. SET POINTS SHALL BE SET AS FOLLOWS:  
COOLING 75°F (ADJ)  
HEATING 70°F(ADJ)  
DEADBAND OF 5° F BETWEEN HEATING AND  
COOLING SET POINTS WILL BE MAINTAINED.
- B. UPON FALL IN SPACE TEMPERATURE THE  
VAV DAMPER WILL MODULATE TO MINIMUM  
POSITION.
- C. THE REVERSE SHALL OCCUR ON THE RISE  
IN SPACE TEMPERATURE.
- D. REVERSE OPERATION IN HEATING MODE.

### VARIABLE VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM



## AMENDMENTS

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## CONTROLS

REPLACE MECH  
EQUIPMENT AND  
MOTORS

SCALE: - NO SCALE

DATE MAR 2012

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**Figure 1**

DRAWING NO.

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