



**SEQUENCE OF OPERATION**

**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 AND D-2 SHALL BE FULLY CLOSED AND D-3 SHALL BE FULLY OPEN. WHEN THE UNIT IS "ON" D-1, D-2, AND D-3 SHALL MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

**2. TEMPERATURE CONTROL**

2.1 SUPPLY AIR TEMPERATURE, SENSED BY TT-1, SHALL BE MAINTAINED AT SETPOINT VIA DIGITAL CONTROL PANEL BY MODULATING D-1, D-2, AND D-3, V-1 AND/OR V-2 IN SEQUENCE.

2.2 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY TT-2, IS ABOVE 75°F (ADJ), THE DIGITAL CONTROL PANEL SHALL PREVENT THE MODULATION OF D-1, D-2, AND D-3 AND SHALL ASSUME THE MINIMUM OUTSIDE AIR POSITION (D-1 AND D-2 IN MINIMUM POSITION, D-3 FULLY OPENED). THE DIGITAL CONTROL PANEL SHALL MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY TT-1.

2.3 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY TT-2, IS BELOW 65°F, THE SUPPLY AIR TEMPERATURE SENSED BY TT-1, DAMPER D-3 SHALL FULLY CLOSE AND D-1 AND D-2 SHALL BE FULLY OPEN (MAXIMUM OUTSIDE AIR POSITION). THE DIGITAL CONTROL PANEL SHALL MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY TT-1.

2.4 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY TT-2, IS BELOW THE SUPPLY AIR TEMPERATURE, SENSED BY TT-1, DAMPERS D-1, D-2, AND D-3 SHALL MODULATE TO MAINTAIN THE SCHEDULED SUPPLY AIR TEMPERATURE. IF D-3 IS OPEN, D-1 AND D-2 ARE AT MINIMUM POSITION, V-1 SHALL MODULATE TO MAINTAIN THE SUPPLY AIR TEMPERATURE OF 50°F AND V-2 SHALL MODULATE OPEN TO MAINTAIN THE SUPPLY AIR TEMPERATURE OF 55°F, SENSED BY TT-1.

**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 (FIELD ADJUSTABLE), SENSED BY SPS-1. RESET STATIC PRESSURE BASED ON ACTUAL BUILDING LOAD BY POLLING ALL TERMINAL UNITS.

3.2 THE DIGITAL CONTROL PANEL, USING TOTAL SUPPLY AIR AND RETURN AIR FLOW SIGNALS, SHALL RESET THE RELIEF AIR FAN VARIABLE SPEED MOTOR CONTROLLER (VSMC) TO MAINTAIN A CONSTANT AIR FLOW DIFFERENCE BETWEEN THE SUPPLY AIR AND THE RETURN AIR EQUAL TO MINIMUM OUTSIDE AIR.

3.3 USING HIGH PRESSURE SENSOR SPS-2 LOCATED AT THE SUPPLY FAN DISCHARGE, SHALL PREVENT THE SUPPLY FAN FROM DEVELOPING OVER 3" OF STATIC PRESSURE (FIELD ADJUSTABLE). IF STATIC PRESSURE AT SPS-2 DOES EXCEED 3" THE SUPPLY AIR FAN SHALL STOP. SPS-2 SHALL BE HARDWIRED TO THE SUPPLY FAN VSMC AND UNIT SHALL BE SHUTDOWN IN HAND, AUTO OR BYPASS MODE. SPS-2 WILL REQUIRE MANUAL RESET AT THE DEVICE.

**4. HUMIDITY CONTROL**

4.1 WHEN THE DIGITAL CONTROL PANEL IS NOT CALLING FOR HUMIDITY, SENSED BY RETURN AIR HUMIDITY H-1, 2-WAY "ON-OFF" CONTROL VALVE V-3 SHALL REMAIN CLOSED. WHEN THE DIGITAL CONTROL PANEL IS CALLING FOR HUMIDITY, V-3 SHALL REMAIN OPEN.

4.2 RETURN AIR HUMIDITY SHALL BE MAINTAINED AT SETPOINT OF 35% RH (ADJ) VIA DIGITAL CONTROL PANEL BY MODULATING CONTROL VALVE V-4 TO MAINTAIN THE DESIRED HUMIDITY. THE DCP SHALL OVERRIDE THIS CONTROL TO MAINTAIN HUMIDITY OF 80% AS SENSED BY H-2. DCP SHALL CLOSE VALVE V-3 WHENEVER THE SUPPLY FAN IS OFF. VALVE V-4 SHALL BE INTERLOCKED WITH A TEMPERATURE SWITCH TO KEEP THE HUMIDIFIER OFF UNTIL CONDENSATE TEMPERATURE APPROACHES STEAM TEMPERATURE.

**5. FREEZE PROTECTION**

5.1 IF THE AIR TEMPERATURE AS SENSED BY TT-7 FALLS BELOW 40°F, AN ALARM SHALL BE SENT TO THE BAS.

**6. AUTOMATIC SHUTDOWN/RESTART**

6.1 WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTOR, SD, THE SUPPLY AND RELIEF FANS SHALL SHUT "OFF" AND AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM. ALL SMOKE DAMPERS IN THE SUPPLY AND RETURN DUCTS SHALL CLOSE.

6.2 EXHAUST FANS SERVING AREA OF THE SUPPLY FAN SHALL CONTINUE TO RUN. SUPPLY AND RELIEF FANS SHALL RESTART AND SMOKE DAMPERS SHALL OPEN WHEN FIRE ALARM CIRCUIT IS RESET.

**7. EMERGENCY CONSTANT SPEED OPERATION**

7.1 UPON FAILURE OF THE VSMC, THE SUPPLY AND RELIEF 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.

**1** VARIABLE AIR VOLUME AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR CONTROL DIAGRAM  
NTS

<p>Department of Veterans Affairs Medical Center 5000 W. National Avenue Milwaukee, WI</p>		<p>KEY PLAN: ↑</p>	<p>CONSULTANTS:</p>	<p>PROJECT LEADER:</p> <p>309 N. WATER ST. SUITE 650 MILWAUKEE, WI 53202 PHONE: (414) 258-6004</p>	<p>Drawing Title <b>CONTROL DIAGRAMS</b></p>	<p>Project Title <b>111 EXPAND URGENT CARE</b></p>	<p>Project Number <b>695-402</b></p>	<p>Office of Facilities Management</p>		
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