SEQUENCE OF OPERATION FOR AIR HANDLING UNIT FOR SURGICAL SUITE (VAV)

1. GENERAL

1.1 UNIT IS NORMALLY STARTED AND STOPPED REMOTELY AT THE ECC. THE UNIT WILL
NORMALLY OPERATE 24 HOUR/DAY. 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, D-3, D-4 AND SHALL BE FULLY CLOSED. WHEN THE UNIT IS
"ON" D-4, SD-1 AND SD-2 SHALL BE FULLY OPEN, D-1, D-2 AND D-3 SHALL
MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

2. TEMPERATURE CONTROL

2.1 SUPPLY AIR TEMPERATURE SETPOINT (AS SET BY ECC), SENSED BY SENSOR TT-1, SHALL
BE MAINTAINED BY SEQUENCING V-1 AND V-2. HEATING AND COOLING CONTROL VALVES
SHALL BE MODULATED VIA PID CONTROL LOOP TO MAINTAIN THE SUPPLY AIR TEMP.
VALVES V-1 AND V-2 SHALL NOT BE OPENED SIMULTANEOUSLY.

2.2 WHEN THE OUTSIDE AIR ENTHALPY AS CALCULATED BY TT-2 AND MT-2 IS LOWER THAN
THE RETURN AIR ENTHALPY AS CALCULATED BY TT-4 AND MT-1 AND THE OUTSIDE AIR
TEMPERATURE IS LOWER THAN THE RETURN TEMPERATURE THE UNIT ECONOMIZER
MODE SHALL BE ENABLED. WHEN THE ECONOMIZER IS ENABLED DAMPERS D-1, D-2,
AND D-3 SHALL MODULATE TO MAINTAIN THE DISCHARGE AIR SETPOINT AS SENSED BY
THE DISCHARGE AIR SENSOR TT-1.

2.3 WHEN THE OUTSIDE AIR ENTHALPY, OR TEMPERATURE, IS HIGHER THAN THE RETURN AIR
ENTHALPY, OR TEMPERATURE, THE ECONOMIZER SHALL BE DISABLED, DAMPERS D-1
AND D-3 SHALL CLOSE, D-2 SHALL OPEN AND D-4 SHALL MODULATE TO MAINTAIN
THE MINIMUM OUTSIDE AIR CFM SETPOINT.

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
THE TOTAL SUPPLY AIR CFM DURING OCCUPIED MODE. RESET SUPPLY AIR CFM AS EACH 2
POSITION AIR TERMINAL UNIT SWITCHES TO UNOCUPIED MODE.

3.2 THE DIGITAL CONTROL PANEL, USING TOTAL SUPPLY AIR AND RETURN AIR FLOW SIGNALS,
SHALL RESET THE RETURN AIR FAN TO MAINTAIN A CONSTANT FLOW DIFFERENCE
BETWEEN THE SUPPLY AIR AND THE RETURN AIR EQUAL TO MINIMUM OUTSIDE AIR.

3.3 USING HIGH PRESSURE SENSOR PSI LOCATED AT THE SUPPLY FAN DISCHARGE, SHALL
PREVENT THE SUPPLY FAN FROM DEVELOPING OVER 3" (75mm) OF STATIC PRESSURE
(FIELD ADJUSTABLE). IF STATIC PRESSURE AT PSI DOES EXCEED 3" (75mm) THE
SUPPLY AIR FAN SHALL STOP. PSI SHALL BE HARDWIRED TO THE SUPPLY FAN AND UNIT
SHALL BE SHUTDOWN IN HAND, AUTO OR BYPASS MODE. PSI WILL REQUIRE MANUAL
RESET AT THE DEVICE.

3.4 USING LOW PRESSURE SENSOR PSL LOCATE AT THE RETURN FAN INLET, SHALL PREVENT
THE RETURN FAN FROM DEVELOPING OVER - 3" (75mm) OF NEGATIVE STATIC
PRESSURE (FIELD ADJUSTABLE). IF STATIC PRESSURE AT PSL DOES EXCEED - 3" (75mm)
THE RETURN AIR FAN SHALL STOP. PSL SHALL BE HARDWIRED TO THE RETURN FAN
AND UNIT SHALL BE SHUTDOWN IN HAND, AUTO OR BYPASS MODE. PSL WILL REQUIRE
MANUAL RESET.

4. HUMIDITY CONTROL

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

4.2 RETURN AIR HUMIDITY SHALL BE MAINTAINED AT SETPOINT OF 42° F (5.6° C) DIP POINT
(AQD) VIA DIGITAL CONTROL PANEL BY MODULATING CONTROL VALVE V-4 TO MAINTAIN
THE DESIRED HUMIDITY. THE DRYBULB TRANSMITTER T-4 AND HUMIDITY TRANSMITTER H-1
IN RETURN AIR SHALL BE USED TO CALCULATE RETURN AIR DEWPOINT TEMPERATURE.
V-3 SHALL BE CLOSED WHENEVER THE RETURN AIR DEWPOINT IS > 45° F (7° C). OPP
SHALL CLOSE VALVE V-3 WHENEVER THE SUPPLY FAN IS ON, 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 SUPPLY AIR TEMPERATURE AS SENSED BY TT-3 FALLS BELOW 65° F [18° C], AN ALARM
SIGNAL SHALL INDICATE AT THE OCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40° F
[4.4° C], AS SENSED BY THE TSL, THE SUPPLY AND RETURN FANS SHALL SHUT DOWN AND
A CRITICAL ALARM SHALL INDICATE AT THE DIGITAL CONTROL PANEL AND ECC. TSL SHALL
BE HARDWIRED TO THE SUPPLY FAN AND RETURN FAN AND BOTH SHALL BE SHUTDOWN
IN HAND, AUTO OR BYPASS MODE. TSL WILL REQUIRE MANUAL RESET AT THE DEVICE.

6. LOSS OF COOLING PROTECTION

6.1 IF THE AIR TEMPERATURE AS SENSED BY TT-1 RAISES ABOVE 80° F [26° C], AN ALARM
SIGNAL SHALL INDICATE AT THE OCP AND ECC. IF THIS TEMPERATURE RAISES ABOVE 90° F
[32° C], AS SENSED BY TT-1, THE SUPPLY AND RETURN FANS SHALL SHUT DOWN AND A
CRITICAL ALARM SHALL INDICATE AT THE DIGITAL CONTROL PANEL AND ECC.

7. AUTOMATIC SMOKE SHUTDOWN/RESTART

7.1 WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTOR, SO, THE SUPPLY AND RETURN
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.

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

8. EMERGENCY CONSTANT SPEED OPERATION

8.1 UPON FAILURE OF THE 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.