

SEQUENCE OF OPERATION FOR VARIABLE AIR VOLUME
AIR HANDLING UNIT WITH 100% 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, D-3, SHALL BE FULLY CLOSED. WHEN THE UNIT IS "ON" D-1, SD-1 AND SD-2 SHALL BE FULLY OPEN.

2. TEMPERATURE CONTROL

2.1. SUPPLY AIR TEMPERATURE SETPOINT SHALL BE INCREMENTALLY RESET BETWEEN AN ADJUSTABLE LOW AND HIGH LIMIT TO MAINTAIN THE RETURN AIR HUMIDITY AND TEMPERATURE BETWEEN A CERTAIN RANGE (TBD). HOWEVER, IF THE OUTSIDE AIR DEWPOINT IS ABOVE 55° F OR THE OUTSIDE AIR TEMPERATURE IS ABOVE 65° F (ADJUSTABLE), THE SUPPLY AIR TEMPERATURE SETPOINT SHOULD NOT EXCEED 57° F (ADJUSTABLE).

3. AIR FLOW CONTROL

3.1. THE SUPPLY AIR FLOW SHALL BE CONTROLLED BY THE DIGITAL CONTROL PANEL (DGP) 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 ATUS.

3.2. THE DIGITAL CONTROL PANEL, USING TOTAL SUPPLY AIR FLOW SIGNALS TO MAINTAIN A CONSTANT AIR FLOW DIFFERENCE BETWEEN THE SUPPLY AIR EQUAL TO 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.

3.4. THE EXHAUST FAN SHALL BE CONTROLLED BY THE DGP, MODULATING THE EXHAUST FAN VARIABLE SPEED MOTOR CONTROLLER TO MAINTAIN SUPPLY AIRFLOW LESS EXHAUST.

4. HUMIDITY CONTROL

4.1. WHEN THE DIGITAL CONTROL PANEL IS NOT CALLING FOR HUMIDITY, SENSED BY SUPPLY 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.

5. FREEZE PROTECTION

5.1. IF THE AIR TEMPERATURE AS SENSED BY TT-3 FALLS BELOW 45°F [7°C], AN ALARM SIGNAL SHALL INDICATE AT THE DCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40°F [4.4°C], AS SENSED BY THE TSL, THE SUPPLY FAN SHALL SHUT DOWN AND A CRITICAL ALARM SHALL INDICATE AT THE DIGITAL CONTROL PANEL AND ECC. TSL SHALL BE HARDWIRED TO THE SUPPLY FAN VFD AND UNIT SHALL BE SHUTDOWN IN HAND, AUTO OR BYPASS MODE. TSL WILL REQUIRE MANUAL RESET AT THE DEVICE.

6. AUTOMATIC SHUTDOWN/RESTART

6.1. 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. ALL SMOKE DAMPERS IN THE SUPPLY DUCT SHALL CLOSE.

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

7. EMERGENCY CONSTANT SPEED OPERATION

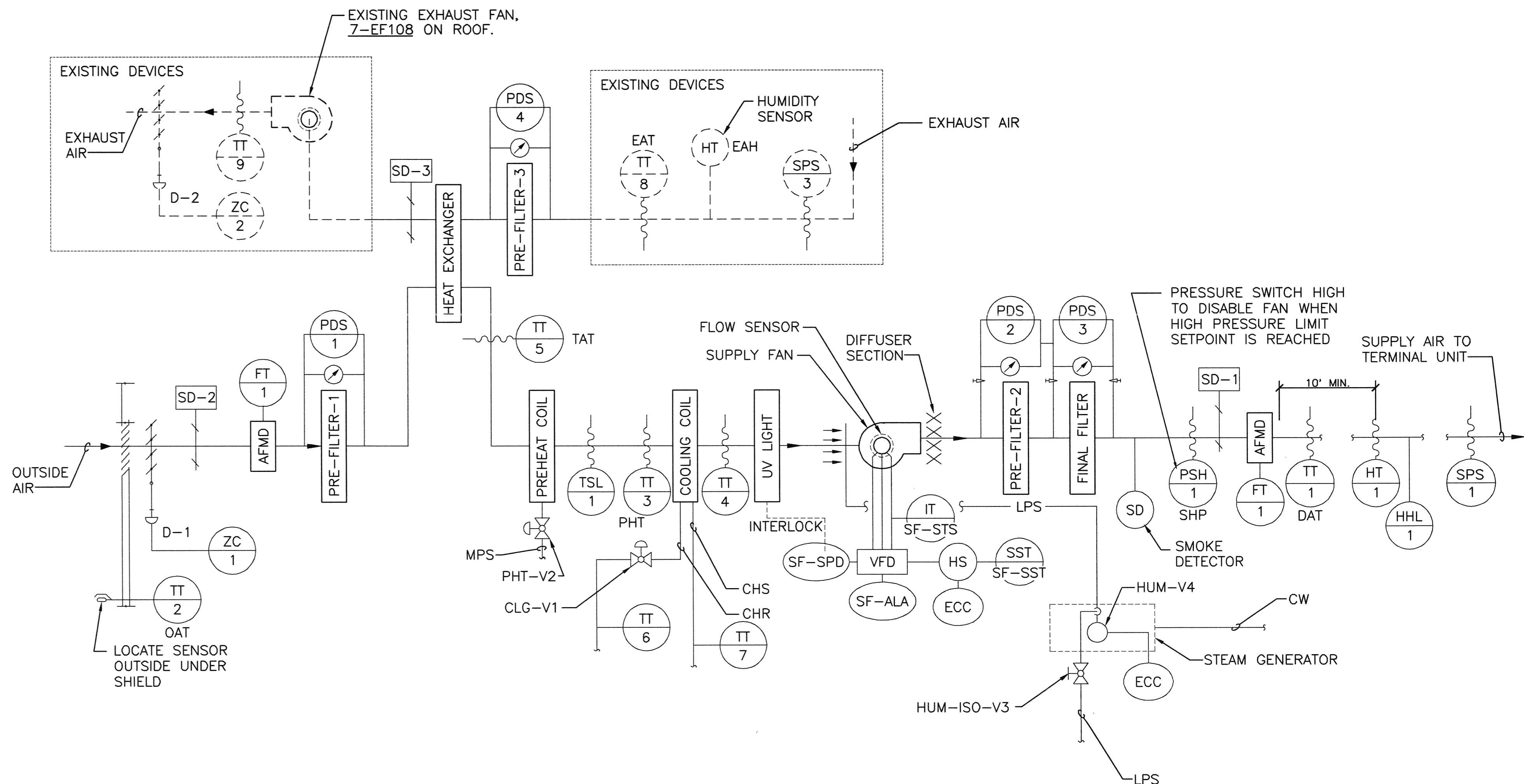
7.1. UPON FAILURE OF THE VSMC, THE SUPPLY FAN SHALL BE STARTED/STOPPED MANUALLY AT THE DIGITAL CONTROL PANEL OR THE ECC THROUGH THE BY-PASS STARTER. FANS SHALL THEN BE OPERATED AT CONSTANT SPEED.

PDS-1, PDS-2, PDS-3, PDS-4:
PROVIDE A SINGLE DIAL-TYPE DIFFERENTIAL PRESSURE GAUGE WITH AIR SAMPLING TUBING AND THREE ISOLATION BALL VALVES TO MEASURE STATIC PRESSURE ACROSS PRE-FILTER-1 AND FINAL FILTER AND THE TOTAL STATIC PRESSURE DROP ACROSS BOTH FILTER SECTIONS.

PROVIDE A SINGLE DIAL-TYPE DIFFERENTIAL PRESSURE GAUGE AT PRE-FILTER-2 AND PRE-FILTER-3.

PROVIDE DEDICATED DDC PRESSURE DIFFERENTIAL SWITCH FOR EACH FILTER SECTION. THE DDC SWITCH SHALL INTERFACE WITH THE ECC SYSTEM TO PROVIDE A REMOTE MAINTENANCE ALARM, WHEN THE PRESSURE DROP EXCEEDS THE SWITCH ALARM SETTING.

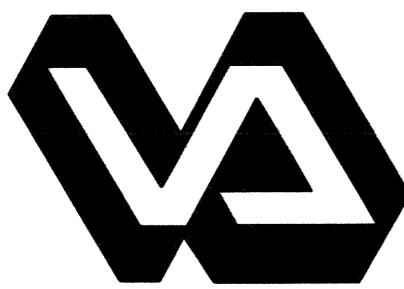
| JOB: 502-90C BUILDING: VA ALEXANDRIA BID PKG A POINTS LIST | | | POINT LEGEND | SYSTEM OUTPUTS | | SYSTEM INPUTS | | SYSTEM SOFTWARE/CONTROL | | PAGE: |
|---|----------|--------------|------------------------|--------------------------|-------------|---------------|------------|-------------------------|----------------------|------------|
| | | | | BINARY | ANA- LOG | BINARY | ANALOG | ALARM PROCESSING | APPLICATION/FUNCTION | |
| SYSTEM: 7-AHU108 | | | PRIORITY/ALTERNATE NO. | ELECTRIC DIS- CONNECT | WATER FLOW | WATER FLOW | WATER FLOW | WATER FLOW | WATER FLOW | WATER FLOW |
| SYSTEM COMPONENT: | POINT ID | ABBREVIATION | WATER FLOW | WATER FLOW | WATER FLOW | WATER FLOW | WATER FLOW | WATER FLOW | WATER FLOW | WATER FLOW |
| EXHAUST AIR TEMPERATURE | AI-1 | EAT (TT-8) | | | | | | | | |
| EXHAUST AIR HUMIDITY | AI-2 | EAH (HT-2) | | | | | | | | |
| EXHAUST AIR FLOW (CFM) | AI-3 | EAF (FT-2) | | | | | | | | |
| TEMPERED AIR TEMPERATURE | AI-4 | TAT (TT-5) | | | | | | | | |
| PRE-HEAT TEMPERATURE | AI-5 | PHT (TT-3) | | | | | | | | |
| COOLING COIL TEMPERATURE | AI-6 | CCT (TT-4) | | | | | | | | |
| DISCHARGE AIR TEMPERATURE | AI-7 | DAT (TT-1) | | | | | | | | |
| DISCHARGE STATIC PRESSURE | AI-8 | DSP (SPS-1) | | | | | | | | |
| DISCHARGE AIR HUMIDITY | AI-9 | DAH (HT-1) | | | | | | | | |
| SUPPLY AIR FLOW (CFM) | AI-10 | SAF (FT-1) | | | | | | | | |
| OUTSIDE AIR TEMPERATURE | AI-11 | OAT (TT-2) | | | | | | | | |
| CHILLED WATER SUPPLY TEMP | AI-12 | OAT (TT-6) | | | | | | | | |
| CHILLED WATER RETURN TEMP | AI-13 | OAT (TT-7) | | | | | | | | |
| FINAL EXHAUST TEMPERATURE | AI-14 | TT-9 | | | | | | | | |
| EXHAUST LOW PRESSURE | BI-1 | ELP (PSL) | | | | | | | | |
| EXHAUST FAN STATUS | BI-2 | EF-ST5 | | | | | | | | |
| SUPPLY FAN STATUS | BI-3 | SF-ST5 | | | | | | | | |
| MIXED AIR LOW LIMIT | BI-4 | TSL-1 | | | | | | | | |
| STATIC PRESSURE HIGH LIMIT | BI-5 | SPS-2 | | | | | | | | |
| HUMIDITY HIGH LIMIT | BI-6 | HHL-1 | | | | | | | | |
| SUPPLY FAN VSMC ALARM | BI-7 | SF-ALA | | | | | | | | |
| EXHAUST FAN VSMC ALARM | BI-8 | EF-ALA | | | | | | | | |
| EXHAUST FAN VSMC | AO-1 | EF-SPD | | | | | | | | |
| SUPPLY FAN VSMC | AO-2 | SF-SPD | | | | | | | | |
| OUTSIDE AIR DAMPER | AO-3 | OAD (D-1) | | | | | | | | |
| EXHAUST AIR DAMPER | AO-4 | EAD (D-2) | | | | | | | | |
| PRE-HEAT VALVE V-2 | AO-5 | PHT-V2 | | | | | | | | |
| COILING VALVE V-1 | AO-6 | CLG-V1 | | | | | | | | |
| STEAM HUMIDIFIER VALVE V-4 | AO-7 | HUM-V4 | | | | | | | | |
| EXHAUST FAN START/STOP | BO-1 | EF-SST | | | | | | | | |
| SUPPLY FAN START/STOP | BO-2 | SF-SST | | | | | | | | |
| STEAM ISOLATION VALVE V-3 | BO-3 | HUM-ISO-V3 | | | | | | | | |



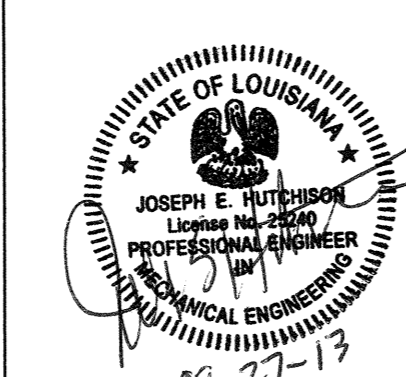
F5 7-AHU108 CONTROL DIAGRAM
SCALE: NONE

**BUILDING AUTOMATION
SYSTEM SHALL BE AN
EXTENSION OF EXISTING
SYSTEM.**

| REVISION NO. | REVISION DESCRIPTION |
|--------------|----------------------|
| 1 | |
| 2 | |
| 3 | |
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| Recommended Approvals: | |
|------------------------|------------------------------------|
| 1. MEDICAL DIRECTOR | 6. OPERATIONS SERVICE LINE MANAGER |
| 2. ASSOCIATE DIRECTOR | 7. INFECTION CONTROL MANAGER |
| 3. CHIEF OF STAFF | 8. SAFETY MANAGER |
| 4. ASSOC. DIRECTOR | 9. GENERAL ENGINEER |
| 5. SERVICE LINE MGRS. | 10. COR |

| | | | | |
|--|-----------------|--|----------------------------|------------------------------|
| Drawing Title MECHANICAL CONTROL DIAGRAM | | Project Title DESIGN BUILDING 7 AIR HANDLER UPGRADE - PROJECT A: 7-AHU107 & 7-AHU108 | | Date SEPT. 27, 2013 |
| FINAL BID DOCUMENTS | | Building Number 7 | AutoCAD File Name | Project Number 502-12-201 |
| Checked HSH | Reviewed LHM | Const. Contract No. | DRAWING No. M702 | |

Veterans
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