

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, SD-1, SD-2, SHALL BE FULLY CLOSED. WHEN THE UNIT IS "ON" D-1, D-2, SD-1 AND SD-2 SHALL BE FULLY OPEN AND PROVED BY AN END SWITCH ON EACH DAMPER. D-2 AND D-3 SHALL MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

2. TEMPERATURE CONTROL

- 2.1. SUPPLY AIR TEMPERATURE (SAT) SETPOINT SHALL BE RESET LINEARLY BETWEEN AN ADJUSTABLE LOW AND HIGH LIMIT AS THE OUTSIDE AIR DRY BULB TEMPERATURE (OAT) VARIES. WHEN THE OUTSIDE AIR TEMPERATURE IS ABOVE 85 DEGREES, THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE 53.0°F. WHEN THE OAT IS LESS THAN 45° F, RESET THE SAT SETPOINT TO 60° F (ADJUSTABLE).
- 2.2. THE SUPPLY AIR TEMPERATURE AS SENSED BY TT-1, SHALL BE MAINTAINED AT SETPOINT VIA DIGITAL CONTROL PANEL (DCP) BY MODULATING V-1 OR D-2 AND D-3 IN SEQUENCE.
- 2.3. THE DIGITAL CONTROL PANEL (DCP) SHALL MODULATE V-1 TO MAINTAIN THE SAT AS SENSED BY TT-1.
- 2.4. THE PREHEAT VALVE, V-2 SHALL MODULATE TO MAINTAIN A SAT AT 52°F (ADJUSTABLE). THE PREHEAT VALVE, V-2 SHALL BE CLOSED WHEN THE OAT OR THE MIXED AIR TEMPERATURE (MAT) IS GREATER THAN 50°F (ADJUSTABLE).
- 2.5. NOTE THAT THE EXISTING OA LOUVER, OA DUCT, RELIEF AIR DUCT AND RELIEF AIR CHASE ARE NOT SIZED FOR 100% OA ECONOMIZER. STILL THE SYSTEM SHALL UTILIZE OA COOLING TO THE EXTENT POSSIBLE.

3. AIR FLOW CONTROL

- 3.1. THE SUPPLY AIR FLOW SHALL BE CONTROLLED BY THE DIGITAL CONTROL PANEL (DCP) MODULATING THE SUPPLY FAN VARIABLE SPEED MOTOR CONTROLLER TO MAINTAIN APPROXIMATELY 1.5" OF DUCT STATIC PRESSURE (FIELD ADJUSTABLE), AS SENSED BY SPS-1. RESET STATIC PRESSURE BASED ON ACTUAL BUILDING LOAD BY POLLING ALL ATUs.
- 3.2. THE DCP, USING TOTAL SUPPLY AIR AND RETURN AIR FLOW SIGNALS, SHALL RESET THE RETURN AIR FAN VSMC TO MAINTAIN A CONSTANT AIR FLOW DIFFERENCE BETWEEN THE SUPPLY AIR AND THE RETURN AIR EQUAL TO THE EXHAUST AIRFLOW.
- 3.3. HIGH PRESSURE SENSOR SHP LOCATED AT THE SUPPLY FAN DISCHARGE, SHALL PREVENT THE SUPPLY FAN FROM DEVELOPING OVER 3.5" OF STATIC PRESSURE (FIELD ADJUSTABLE). IF STATIC PRESSURE AT SHP DOES EXCEED 3" THE SUPPLY AIR FAN SHALL STOP. SHP SHALL BE HARDWIRED TO THE SUPPLY FAN VSMC AND UNIT SHALL BE SHUTDOWN IN HAND, AUTO OR BYPASS MODE. SHP SHALL REQUIRE MANUAL RESET AT THE DEVICE.
- 3.4. THE RETURN FAN SPEED SHALL BE MODULATED TO MAINTAIN AN AIRFLOW DIFFERENTIAL WITH A FAN SPEED DIFFERENTIAL OVERRIDE.

4. STATIC PRESSURE CONTROL

- 4.1. THE STATIC PRESSURE SETPOINT SHALL BE RESET LINEARLY BETWEEN AN ADJUSTABLE LOW AND HIGH LIMIT BASED ON VA AIR TERMINAL UNIT (BOX) DAMPER POSITIONS.
- 4.2. A SEPARATE SCHEDULE WITH A DIFFERENT STATIC PRESSURE LOW AND HIGH LIMIT SETPOINTS SHALL BE UTILIZED DURING UNOCCUPIED PERIODS.

5. FREEZE PROTECTION

- 5.1. IF THE AIR TEMPERATURE AS SENSED BY TT-3 FALLS BELOW 45°F, AN ALARM SIGNAL SHALL INDICATE AT THE DCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40°F, 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 VFD AND UNIT SHALL BE SHUTDOWN IN HAND/AUTO OR BYPASS MODE. TSL WILL REQUIRE MANUAL RESET AT THE DEVICE.

6. AUTOMATIC SHUTDOWN/RESTART

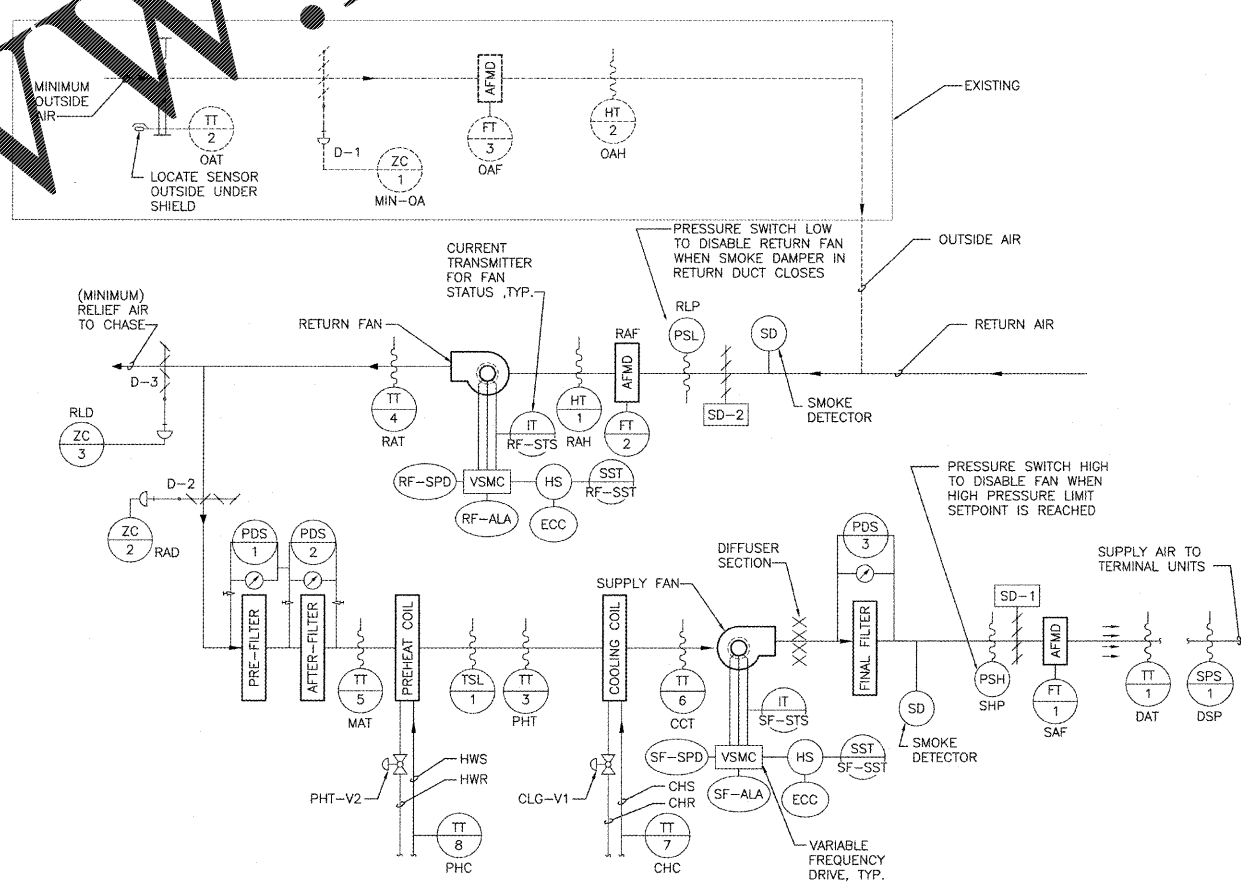
- 6.1. WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTOR, SD, THE SUPPLY AND RETURN FANS SHALL SHUT "OFF" AND AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM. ALL SMOKE DAMPERS IN THE SUPPLY AND RETURN DUCTS SHALL CLOSE.
- 6.2. EXHAUST FANS SERVING AREA OF THE SUPPLY FAN SHALL CONTINUE TO RUN. SUPPLY AND RETURN FANS SHALL RESTART AND SMOKE DAMPERS SHALL OPEN WHEN FIRE ALARM CIRCUIT IS RESET.

7. EMERGENCY CONSTANT SPEED OPERATION

- 7.1. 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.

PDS-1, PDS-2, PDS-3:
 PROVIDE A SINGLE DIAL-TYPE DIFFERENTIAL PRESSURE GAUGE WITH AIR SAMPLING TUBING AND THREE ISOLATION BALL VALVES TO MEASURE STATIC PRESSURE ACROSS PREFILTER AND AFTER FILTER AND THE TOTAL STATIC PRESSURE DROP ACROSS BOTH FILTER SECTIONS.
 PROVIDE A SINGLE DIAL-TYPE DIFFERENTIAL PRESSURE GAUGE AT FINAL FILTER.
 PROVIDE DEDICATED DDC PRESSURE DIFFERENTIAL SENSOR 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:	POINT LEGEND	SYSTEM OUTPUTS			SYSTEM INPUTS		SYSTEM SOFTWARE/CONTROL		PAGE:
		BINARY	ANA-LOG	BINARY	ANALOG	ALARM PROCESSING	APPLICATION/FUNCTION		
SYSTEM:									
SYSTEM COMPONENT:	POINT ID	ABBREVIATION	PRIORITY/ALTERNATE ID	START/STOP/OPERATION	START/STOP/OPERATION	START/STOP/OPERATION	START/STOP/OPERATION	START/STOP/OPERATION	REMARKS
RETURN AIR TEMPERATURE	AI-1	RAT (TT-4)							
RETURN AIR HUMIDITY	AI-2	RAH (HT-1)							
RETURN AIR FLOW (CFM)	AI-3	RAF (FT-2)							
MIXED AIR TEMPERATURE	AI-4	MAT (TT-5)							
PRE-HEAT TEMPERATURE	AI-5	PHT (TT-3)							
COOLING COIL TEMPERATURE	AI-6	CCT (TT-6)							
CHILLED WATER TEMPERATURE	AI-7	CHC (TT-7)							
HOT WATER TEMPERATURE	AI-8	PHC (TT-8)							
DISCHARGE AIR TEMPERATURE	AI-9	DAT (TT-1)							
SA DUCT STATIC PRESSURE	AI-10	DSP (SPS-1)							
SUPPLY AIR FLOW (CFM)	AI-11	SAF (FT-1)							
OUTSIDE AIR TEMPERATURE	AI-12	OAT (TT-2)							
OUTSIDE AIR HUMIDITY	AI-13	OAH (HT-2)							
OUTSIDE AIR FLOW (CFM)	AI-14	OAF (FT-3)							
FILTER PRESSURE DROP	AI-15	PDS-1							
FILTER PRESSURE DROP	AI-16	PDS-2							
FILTER PRESSURE DROP	AI-17	PDS-3							
RETURN LOW PRESSURE	BI-1	RLP (PSL)							
RETURN FAN STATUS	BI-2	RF-SST							
SUPPLY FAN STATUS	BI-3	SF-SST							
MIXED AIR LOW LIMIT	BI-4	TSL-1							
STATIC PRESSURE HIGH LIMIT	BI-5	SPS-2							
SUPPLY FAN VSMC ALARM	BI-6	SF-ALA							
RETURN FAN VSMC ALARM	BI-7	RF-ALA							
RETURN AIR SMOKE DETECTOR	BI-8	RAD							
SUPPLY AIR SMOKE DETECTOR	BI-9	SAD							
RETURN FAN VSMC SPEED	AO-1	RF-SST							FULL COMMUNICATION
SUPPLY FAN VSMC SPEED	AO-2	SF-SST							FULL COMMUNICATION
MIN. OUTSIDE AIR DAMPER	AO-3	MIN-OA							
RETURN AIR DAMPER	AO-4	RAD (D-2)							
RELIEF AIR DAMPER	AO-5	RLD (D-3)							
PRE-HEAT VALVE V-2	AO-6	PHT-V2							
COOLING VALVE V-1	AO-7	CLG-V1							
RETURN FAN START/STOP	BO-1	RF-SST							
SUPPLY FAN START/STOP	BO-2	SF-SST							
RETURN AIR SMOKE DAMPER	BO-3	SD-2							
SUPPLY AIR SMOKE DAMPER	BO-4	SD-1							

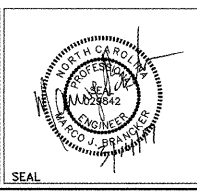


(F7) AIR SYSTEM CONTROL SCHEMATIC
 SCALE: NONE

BUILDING AUTOMATION SYSTEM SHALL BE AN EXTENSION OF EXISTING CONTROLS SYSTEM. CONTROLS CONTRACTOR SHALL COORDINATE WITH THE VA AND SYSTEMS INTEGRATOR FOR FULL DDC SYSTEM FUNCTIONALITY AT THE ENGINEERING CONTROL CENTER (ECC)

REVISION	DESCRIPTION

Department of Veterans Affairs
 Charlie Norwood
 VA Medical Center
 1 Freedom Way
 Augusta, Ga. 30904



Architect/Engineer Address
Harrell Saltrick & Hopper
 Design & Management Solutions for the Built Environment
 8015 TOWER POINT DRIVE
 CHARLOTTE, NC 28227
 P 704.614.1330
 F 704.331.0833
 WWW.HSH-ARCH.COM
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 4051 PROJECT # 12019

Recommended Approvals:	
1. MEDICAL CENTER DIRECTOR	6. OPERATIONS SERVICE LINE MANAGER
2. ASSISTANT 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
 100%
 CONSTRUCTION DOCUMENTS
 FULLY SPRINKLERED

Project Title
RENOVATE MENTAL HEALTH UNITS
 Drawn
 Building Number
 AutoCAD File Name
 Checked
 Reviewed
 Const. Contract No.

Date
 February 10, 2017
 Project Number
 509-12-104
 DRAWING No.
M701

