



1 AHU-34 CONTROL DIAGRAM
M-504 N.T.S.

FAYETTEVILLE VAMC BUILDING: 4						POINT LEGEND		SYSTEM OUTPUTS		SYSTEM INPUTS				SYSTEM SOFTWARE/CONTROL										PAGE:																																																																																																																																																																																																																																																				
								BINARY	ANA- LOG	BINARY		ANALOG		ALARM PROCESSING		APPLICATION/FUNCTION																																																																																																																																																																																																																																																												
SYSTEM: VAV AIR HANDLER						POINT ID	ABBREVIATION	PRIORITY/ADD-ALTER #	ELECTRIC DEVICE START/STOP/RESET - OPEN/CLOSE	SPEED COMMAND - START/STOP/RESET	DRIVE POSITION - ALARM	PRESS - HIGH HUMIDITY	COIL TEMPERATURE - PRESSURE	TEMPERATURE - FLOW/TEMP	PERCENT - RATIO	COIL PRESSURE - VACUUM/DIODE	TACTICAL - LOCAL	AREA ALARM PANEL - HIGH LIMIT	HIGH LIMIT	LOW LIMIT	SCHEDULE START/STOP - FUNCTION	TEMP CYCLE	TEMP ECONOMIZER	TEMPERATURE - DEFERRED RESET	TEMPERATURE - DEFERRED RESET	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - FAILURE MODE	PRESSURE/TEMP - 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1. GENERAL FAN/TEMPERATURE CONTROL

- COOLING-OCCUPIED/OVERRIDE:** AHU'S WILL BE INTERLOCKED WITH ASSOCIATED AREA EXHAUST FANS, SO EACH EXHAUST FAN WILL OPERATE WHENEVER ITS ASSOCIATED AHU IS IN OCCUPIED MODE. THE INITIAL AIR PRESSURE SETPOINT SHALL BE 1" WG (ADJUSTABLE). THE AHU RETURN AIR FAN SHALL BE INTERLOCKED WITH THE SUPPLY AIR FAN. THE RETURN AIR FAN SPEED OFFSET SHALL BE DETERMINED DURING THE INITIAL TAB WORK. AS SPACE PRESSURIZATION RISES ABOVE 0.1" WG, THE RELIEF AIR SHALL MODULATE OPEN TO MAINTAIN SPACE PRESSURIZATION AT 0.1" WG (ADJUSTABLE).
- COOLING-UNOCCUPIED:** UNITS SHALL BE DE-ENERGIZED UNLESS THE ZONE TEMPERATURE RISES ABOVE THE SETBACK TEMPERATURE SETPOINT. THE OA AND EA DAMPER SHALL BE CLOSED.
- HEATING-OCCUPIED:** AHU SUPPLY AIR FAN SHALL BE ENERGIZED AND RUN CONTINUOUSLY. OA FLOW WILL BE MAINTAINED AS DESCRIBED IN COOLING-OCCUPIED MODE ABOVE. WHEN MIXED AIR TEMPERATURE DROPS TO 52°F, DISCHARGE AIR TEMPERATURE CONTROLLER THRU DDC CONTROL SHALL MODULATE THE STEAM VALVE TO MAINTAIN 95°F LEAVING AIR TEMPERATURE. THE CHILLED WATER VALVE SHALL BE FULLY CLOSED TO THE COIL.
- HEATING-UNOCCUPIED:** UNIT SHALL BE DE-ENERGIZED UNLESS THE AVERAGE OF THE ZONE TEMPERATURES FALLS BELOW THE SETBACK TEMPERATURE SETPOINT. THE OA AND EA DAMPER SHALL BE CLOSED.
- TRANSITION FROM OCCUPIED TO UNOCCUPIED:** AUTOMATICALLY THRU DDC CONTROL AND PRESET TIME SCHEDULE. SYSTEM SHALL ALSO BE ABLE TO BE RETURNED TO OCCUPIED MODE FROM UNOCCUPIED MODE BY THE OPERATOR WORKSTATION. TRANSITION FROM COOLING TO HEATING SHALL OCCUR WHEN CHILLED WATER CONTROL VALVE IS CLOSED AND MIXED AIR TEMPERATURE FALLS BELOW 52°F.
- UNOCCUPIED OVERRIDE:** A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.

2. SAFETY CONTROL/PROTECTION:

- SMOKE DETECTOR SHALL BE PROVIDED BY FIRE ALARM CONTRACTOR. THROUGH DDC CONTROL IT SHALL DE-ENERGIZE THE ASSOCIATED AHU, ALL ASSOCIATED VAV SUPPLY AND EXHAUST FANS (INCLUDING INTERLOCKS), SIGNAL FIRE ALARM PANEL AND CLOSE THE OUTSIDE AIR DAMPER UPON THE DETECTION OF THE PRODUCTS OF COMBUSTION.
- FREEZE PROTECTION:** IF STEAM HEATING COIL DISCHARGE AIR TEMPERATURE FALLS BELOW 40°F DURING HEATING MODE, THE FREEZESTAT SHALL CLOSE THE OUTSIDE AIR DAMPER, DE-ENERGIZE THE AHU SUPPLY AIR FAN AND FULLY OPEN THE PRIMARY STEAM AND CHILLED WATER VALVES TO COIL.
- PRESSURE PROTECTION:** A HIGH PRESSURE TRANSMITTER LOCATED AT THE SUPPLY FAN DISCHARGE SHALL DE-ENERGIZE THE SUPPLY AIR FAN IF ITS SETPOINT, 5" WG, IS REACHED.
- CONDENSATE HIGH LEVEL PROTECTION:** IF CONDENSATE HIGH LEVEL SWITCH IS ACTIVATED, UNIT SHALL BE DE-ACTIVATED AND AN ALARM INITIATED.

3. ECONOMIZER:

- A COMPARATIVE ENTHALPY ECONOMIZER STRATEGY SHALL BE UTILIZED. THE OUTSIDE AIR DAMPER SHALL MODULATE OPEN AND THE RETURN AIR DAMPER SHALL MODULATE CLOSED WHEN OA ENTHALPY IS LESS THAN RETURN AIR ENTHALPY IN COOLING MODE.

4. MINIMUM OUTSIDE AIR VENTILATION - CARBON DIOXIDE (CO2) CONTROL:

- WHEN IN THE OCCUPIED MODE, THE CONTROLLER SHALL MEASURE THE RETURN AIR CO2 LEVELS AND MODULATE THE OUTSIDE AIR DAMPERS OPEN UPON RISING CO2 CONCENTRATIONS, OVERRIDING NORMAL DAMPER OPERATION TO MAINTAIN A CO2 SETPOINT OF 750 PPM (ADJ)

5. WARM-UP / COOL-DOWN:

- MORNING WARM-UP:** THE UNIT SHALL EMPLOY OPTIMUM START. PRIOR TO OCCUPIED STATUS, THE UNIT SHALL GO INTO MORNING WARM-UP. AHU CW COIL CONTROL VALVE SHALL BE CLOSED TO OPEN THE COIL. THE SUPPLY FAN SHALL BE ENERGIZED AND THE STEAM VALVE SHALL BE FULLY OPEN TO THE COIL UNTIL OCCUPIED SPACE TEMPERATURE SETPOINT IS ACHIEVED. THE UNIT SHALL THEN CYCLE TO MAINTAIN SPACE OCCUPIED TEMPERATURE SETPOINT.
- MORNING COOL-DOWN:** THE UNIT SHALL EMPLOY OPTIMUM START. PRIOR TO OCCUPIED STATUS, THE UNIT SHALL GO INTO MORNING COOL-DOWN. THE OA AND EA DAMPERS SHALL FULLY CLOSE, THE SUPPLY FAN SHALL MODULATE TO MAINTAIN DUCT STATIC PRESSURE, THE CW VALVE SHALL MODULATE TO MAINTAIN A 55°F LEAVING AIR TEMPERATURE AND THE PRIMARY STEAM VALVE SHALL BE FULLY CLOSED TO THE COIL. ASSOCIATED VAV BOX AIR VALVES SHALL INITIALLY BE FULLY OPEN AND THEN MODULATE TO MAINTAIN SPACE OCCUPIED TEMPERATURE SETPOINT. VAV BOX SUPPLY FANS SHALL BE ENERGIZED AND VAV BOX HW VALVES SHALL BE FULLY CLOSED TO THE COIL.

6. ALARMS:

- ALARM FOR DIRTY FILTER WHEN PRESSURE DROP EXCEEDS 0.5" WG ABOVE INITIAL PRESSURE DROP. ALARM IF LEAVING AIR TEMPERATURE EXCEEDS 60°F IN COOLING MODE OR DROPS BELOW 50°F IN HEATING MODE. ALARM IF AHU SUPPLY OR EXHAUST AIR FAN FAILS TO START OR FAILS DURING OPERATION. ALARM IF UNIT DISCHARGE STATIC PRESSURE EXCEEDS 5" WG. ALARM IF CONDENSATE REACHES HIGH LEVEL. ALARM UPON SMOKE DETECTOR ACTIVATION.

7. GRAPHICS AND MONITORING:

- BAS FRONT END SYSTEM SHALL INCLUDE GRAPHICS SHOWING ALL HVAC SYSTEMS, ALARMS AND OTHER POINTS SHOWN ON THE DRAWINGS AND INCLUDED IN THE SPECIFICATIONS AND IN ACCORDANCE WITH VA REQUIREMENTS. VFDs SHALL REPORT OPERATIONAL AND ALARM CONDITIONS TO THE BAS.

8. DDC PANELS:

- PROVIDE NETWORK AREA CONTROL PANELS IN ACCORDANCE WITH THE SPECS TO BE LOCATED IN THE EXISTING RESPECTIVE LOCATIONS TO SERVE AHUS, TERMINAL BOXES, AND OTHER EQUIPMENT.

2 AHU-34 SEQUENCE OF OPERATION
M-504 N.T.S.

Amended Per Owner's Comments No Rev Clouds 10/17/2014 Revisions Date		CONSULTANTS:		PROJECT MANAGER: Raleigh, NC Indianapolis, IN Philadelphia, PA Fort Collins, CO Virginia Beach, VA (919) 858-7420 www.acg-pa.com NC License # C-1848		Project Number 2013121	Scale N.T.S.	Drawing Title MECHANICAL DETAILS - CONTROLS	Project Title REPLACE AIR HANDLING UNITS 3, 14, & 34	VA Project Number 246-13-C-0106	Building Number 1 AND 3	Drawing Number M-504	Date 08/28/2014	Checked DJR	Drawn SPG	Dwg. 13 of 18	Office of Facilities Management
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100% CONSTRUCTION DOCUMENTS