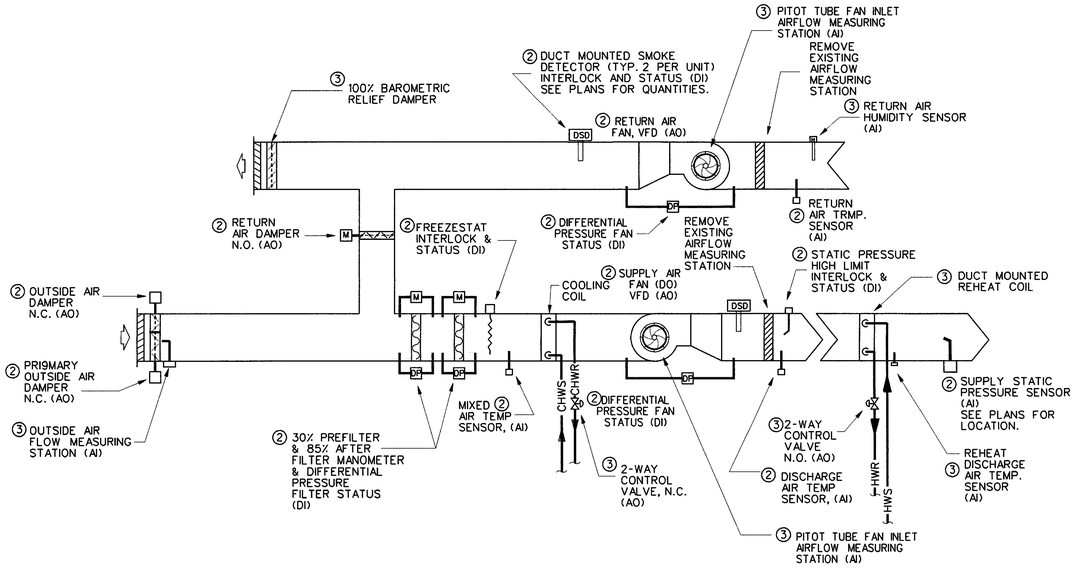


AHU CONTROLS

TYPICAL FOR VARIABLE AIR VOLUME UNITS

UNIT TYPE "B"

(1) EXISTING AHU-7, -8, -19, -20, & 26 ARE UNIT TYPE B.

(2) FIELD VERIFY EXISTING CONTROL DEVICE. NOTIFY ENGINEER IF DISCREPANCY IS DISCOVERED.

(3) PROVIDE (a) BAROMETRIC RELIEF DAMPER, (b) OSA AIRFLOW MONITOR. SEE SCHEDULE, (c) CONTROL VALVE AND ACTUATOR AND (d) PITOT TUBE FAN INLET AIRLOW MEASURING STATION.

PANEL DESIGNATION FT. MEADE - DINFOS	HARDWARE																				SOFTWARE															
	OUTPUT (O)						INPUT (T,D,V,C)														ALARMS						PROGRAM									
	DIGITAL			ANALOG			DIGITAL						ANALOG								DIGITAL		ANALOG													
AHU CONTROLS VARIABLE AIR VOLUME AIR HANDLING UNIT UNIT TYPE "B"	Control Relay	Solenoid	Contactor	Pneumatic Transducer	Electricail Transducer	4-20MA Module	Differential Pressure	Flow Switch	Pres. Switch Closure	Auxiliary Contact	Open/Close	Contact Closure	Temperature	Relative Humidity	Pressure	Position	Flow				Equipment Status	Maintenance	High Limit	Low Limit	Run Time		Scheduled	Optimum Start/Stop	Duty Cycling	Demand Limiting	Day/Night Setback	Economizer	Ventilation/Recirculation	Temperature Control	Hot Water Reset	Supply Static Pressure	Speed Control	Position
POINT DESCRIPTION																																				
SUPPLY AIR FAN S/S	●																							●			●	●								
SUPPLY AIR FAN STATUS							●														●															
RETURN AIR FAN STATUS							●														●															
SUPPLY STATIC PRESSURE														●									●	●										●	●	
SUPPLY PRESSURE HIGH LIMIT									●												●		●													
SUPPLY FAN VFD						●																	●	●											●	●
RETURN FAN VFD						●																	●	●											●	
SUPPLY AIRFLOW STATION															●																					
RETURN AIRFLOW STATION															●																				●	
RETURN AIR TEMPERATURE													●																	●						
RETURN AIR HUMIDITY														●																●						
MIXED AIR TEMPERATURE													●																							
UNIT DISCHARGE AIR TEMP.													●										●	●												
REHEAT COIL AIR TEMPERATURE													●										●	●												
OUTSIDE AIR HUMIDITY														●																●						
OUTSIDE AIR TEMPERATURE													●																	●						
OSA DAMPER CTL (2 THUS)						●																					●	●		●	●		●			●
RETURN AIR DAMPER CONTROL						●																					●	●		●	●		●			●
OUTSIDE AIRFLOW STATION															●																					
FILTER (2 THUS)							●														●															
HOT WATER VALVE CONTROL						●																									●					●
CHILLED WATER VALVE CONTROL						●																									●		●			●
DUCT SMOKE DETECTOR												●									●															
FREEZESTAT												●									●															

NOTE: PROVIDE DYNAMIC GRAPHIC REPRESENTATIVE OF EACH PIECE OF EQUIPMENT

SEQUENCE OF OPERATION
VARIABLE AIR VOLUME AIR-HANDLING UNIT

1. SUPPLY AIR FAN (SAF): THE SUPPLY AIR FAN VARIABLE FREQUENCY DRIVE (VFD) IS MANUALLY ENABLED WHEN THE VFD H-O-A SWITCH IS IN THE HAND POSITION. IN THE AUTO POSITION, WHEN AIR IS REQUIRED FOR OPTIMUM START OR NIGHT SETBACK (HEATING OR COOLING) OR IF THE AIR-HANDLING UNIT IS SCHEDULED TO RUN. THE DDC CONTROLLER WILL ENABLE THE SUPPLY FAN VFD.

2. FAN STATUS: ALL FANS CONTROLLED BY VFDs WILL START AT A MINIMUM SPEED (CFM) AND STATUS SWITCHES WILL BE COORDINATED WITH THE MINIMUM FAN OUTPUT.

   WHEN THE FAN IS TURNED ON, THE FAN STATUS DETERMINES IF THERE IS AIR MOVEMENT IN THE DUCT. AFTER AN OPERATOR-DEFINED FEEDBACK TIME DELAY, IF THERE IS NO AIR MOVEMENT IN THE DUCT, AN ALARM WILL BE GENERATED. ONCE THE TIME DELAY HAS PASSED, IF THE FAN STATUS INDICATES OFF (FIRE ALARM/FREEZESTAT, OVERLOADS, MANUAL SHUTDOWN) AND THE FAN IS COMMANDED ON, AN ALARM WILL BE GENERATED.

3. RETURN AIR FAN (RAF): THE RESPECTIVE RETURN AIR FAN VFD IS INTERLOCKED WITH THE SUPPLY FAN VFD TO BE ENABLED WHEN THE SUPPLY FAN VFD IS ENABLED. STATUS IS MONITORED TO GENERATE AN ALARM IF THE SUPPLY FAN VFD IS ENABLED BUT THE RETURN FAN STATUS INDICATES OFF AFTER THE PROOF FEEDBACK TIME DELAY HAS EXPIRED.

4. OUTSIDE AIR DAMPERS: THE PRIMARY OUTSIDE AIR DAMPER SHALL OPEN TO THE MINIMUM POSITION AS DETERMINED BY OSA FLOW MONITOR WHEN THE AIR-HANDLING UNIT IS SCHEDULED. RETURN AIR TEMP IS MIN. 65°F, AND THE FAN STATUS INDICATES "ON". OUTSIDE AIR DAMPER SHALL MODULATE AS REQUIRED TO DELIVER SCHEDULED MINIMUM OSA BASED UPON MEASUREMENTS OF OUTSIDE AIRFLOW MEASURING STATION.

5. DISCHARGE AIR CONTROL:
   A. AIR TEMPERATURE CONTROL: THE DDC CONTROLLER WILL MODULATE THE CHILLED WATER VALVE AS REQUIRED TO MAINTAIN THE SCHEDULED DISCHARGE AIR TEMPERATURE SETPOINT. WHEN COOLING COIL VAVLE IS IN THE CLOSED POSITION AND OSA IS TRACKING MINIMUM OSA AND DISCHARGE AIR TEMPERATUR IS 2°F BELOW UNIT SCHEDULED DISCHARGE AIR TEMPERATURE, REHEAT COIL VALVE SHALL MODULATE AS REQUIRED TO MAINTAIN DISCHARGE AIR SETPOINT. SOFTWARE LOGIC WILL PREVENT SIMULTANEOUS HEATING AND COOLING. WHEN THE MIXED AIR TEMPERATURE DROPS BELOW 25°F, THE COOLING COIL VALVE SHALL OPEN TO THE 50% OPEN POSITION FOR FREEZE PROTECTION. THE DISCHARGE AIR TEMPERATURE SENSOR WILL PREVENT DISCHARGE AIR TEMPERATURES FROM EXCEEDING LIMITS SET FOR HEATING MODE AND COOLING MODE. LIMITS FOR EACH MODE WILL BE OPERATOR DEFINED. MODE CHANGE FREQUENCY WILL BE OPERATOR DEFINED.

   B. DISCHARGE TEMPERATURE RESET: WHEN THE UNIT IS IN THE SCHEDULED UNOCCUPIED MODE, COOLING COIL VALVE SHALL MODULATE AS REQUIRED TO MAINTAIN A DISCHARGE AIR TEMPERATURE OF 72°F WITH ALL ASSOCIATED VAV TERMINAL DEVICES INDEXED TO THE MINIMUM CFM POSITION. UPON A CALL FOR COOLING FROM ANY VAV ZONE (SPACE TEMP. GREATER THAN 85°F), THE DISCHARGE TEMP. SHALL RETURN TO SCHEDULED VALUE FOR 15 MINUTES AND THEN RETURN TO 72°F. WHEN THE UNIT RETURN AIR HUMIDITY SENSOR INDICATES RH GREATER THAN 58%, THE DISCHARGE AIR TEMP. SHALL RETURN TO THE SCHEDULED VALUE FOR 15 MINUTES AND THEN RETURN TO 72°F.

6. SUPPLY DUCT STATIC PRESSURE CONTROL: THE DDC CONTROLLER WILL AUTOMATICALLY MODULATE THE SUPPLY FAN VFD WHEN THE VFD CONTROLLER SWITCH IS IN AUTOMATIC POSITION. SUPPLY FAN VFD WILL BE CONTROLLED MANUALLY WHEN THE VFD CONTROLLER SWITCH IS IN THE LOCAL POSITION. THE VFD WILL MODULATE BETWEEN THE MINIMUM AND MAXIMUM SPEED (CFM) SETTINGS TO MAINTAIN THE SUPPLY DUCT STATIC PRESSURE SETPOINT (INITIALLY SET AT 1.5" W.C., ADJUSTABLE).

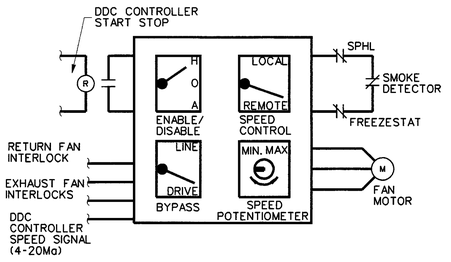
7. FAN TRACKING CONTROL:
   A. (FOR RETURN FAN CONTROL): THE DDC CONTROLLER WILL AUTOMATICALLY MODULATE THE RETURN FAN VFD WHEN THE VFD CONTROLLER SWITCH IS IN THE AUTOMATIC POSITION. RETURN FAN VFD WILL BE CONTROLLED MANUALLY WHEN THE VFD CONTROLLER SWITCH IS IN THE HAND POSITION. THE VFD WILL MODULATE BETWEEN A MINIMUM AND MAXIMUM SPEED (CFM) TO MAINTAIN FAN TRACKING RELATIONSHIP WITH SUPPLY FAN AS INDICATED IN THE SCHEDULE BELOW.

AHU	RETURN FAN SETTING AT SUPPLY FAN MAX. (CFM)
7	11647
8	2491
19	8452
20	21212
26	20417

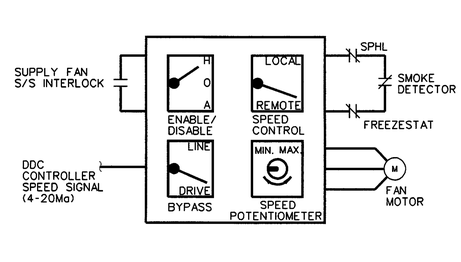
   B. (FOR EXHAUST FAN): THE DDC CONTROLLER SHALL ENERGIZE THE ASSOCIATED EXHAUST FAN(S) ONLY WHEN MINIMUM OUTSIDE AIR DAMPER IS OPEN. SEE EXHAUST FAN INTERLOCK SCHEDULE.

8. ECONOMIZER COOLING: ECONOMIZER COOLING IS ENABLED WHENEVER THE OUTSIDE AIR ENTHALPY IS LESS THAN THE RETURN AIR ENTHALPY. WHEN THE ECONOMIZER IS ENABLED, THE DDC CONTROLLER WILL MODULATE IN CONCERT THE OUTSIDE AIR DAMPERS TO THE FULL OPEN POSITION AND THE RETURN AIR DAMPER TO THE FULL CLOSED POSITION AND THE COOLING COIL VALVE WILL MODULATE AS REQUIRED TO MAINTAIN THE DISCHARGE AIR TEMP. SETPOINT, AS OSA TEMP. DROPS, THE RETURN AIR AND OSA DAMPERS SHALL MODULATE IN TANDEM (CLOSING MAX. OSA DAMPERS) TO MAINTAIN SCHEDULED AHU DISCHARGE SETPOINT. WHEN OSA DAMPER CLOSES TO THE MINIMUM OSA POSITION, THE ECONOMIZER MODE SHALL END.

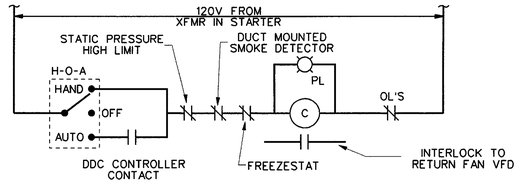
9. SAFETIES: SAFETY DEVICES (DUCT SMOKE DETECTOR, FREEZESTAT, STATIC PRESSURE HIGH LIMIT) ARE INTERLOCKED WITH THE FAN STARTER CIRCUIT. THE DEVICES DISABLE THE SUPPLY FAN AND RETURN FAN VFDs, CLOSE THE OUTSIDE AIR DAMPER, AND FULLY OPENS THE RETURN DAMPER. ALL SAFETIES SHALL HAVE AUXILIARY CONTACTS SUCH THAT WHEN ACTIVATED THE DDC CONTROLLER WILL GENERATE AN ALARM. ANY FIRE ALARM SYSTEM SIGNAL GENERATED IN THE BUILDING SHALL CAUSE THE DDC SYSTEM TO SHUT DOWN ALL AHUs.



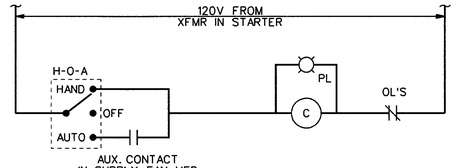
SUPPLY FAN VFD



RETURN FAN VFD



VARIABLE AIR VOLUME CONTROL



RETURN FAN CONTROL

THESE DOCUMENTS HAVE BEEN PREPARED PRIMARILY BASED ON INFORMATION PROVIDED BY OTHERS. I.C. THOMASSON HAS NOT VERIFIED THE ACCURACY OF ALL INFORMATION PROVIDED BY OTHERS. SEE LIMIT OF LIABILITIES STATEMENT ON COVER SHEET.

US ARMY ENGINEERING AND SUPPORT CENTER HUNTSVILLE

Symbol	Description	Date	Appr.	Symbol	Description	Date	Appr.

Date: 02/27/04
CADD File Name: 312M804.DGN
ICT Project No. 203121
Plot date: 02/27/04
Plot scale:
Checked by: WTT
Dwn by: ICT
DACA87-03-D-0006
Approved by:
Chief, Prj Mgmt. Division

TASK ORDER #: FRR004

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DEFENSE INFORMATION SCHOOL FT. MEADE MARYLAND

EXISTING VARIABLE VOLUME AHU CONTROLS

Sheet reference number: M-804