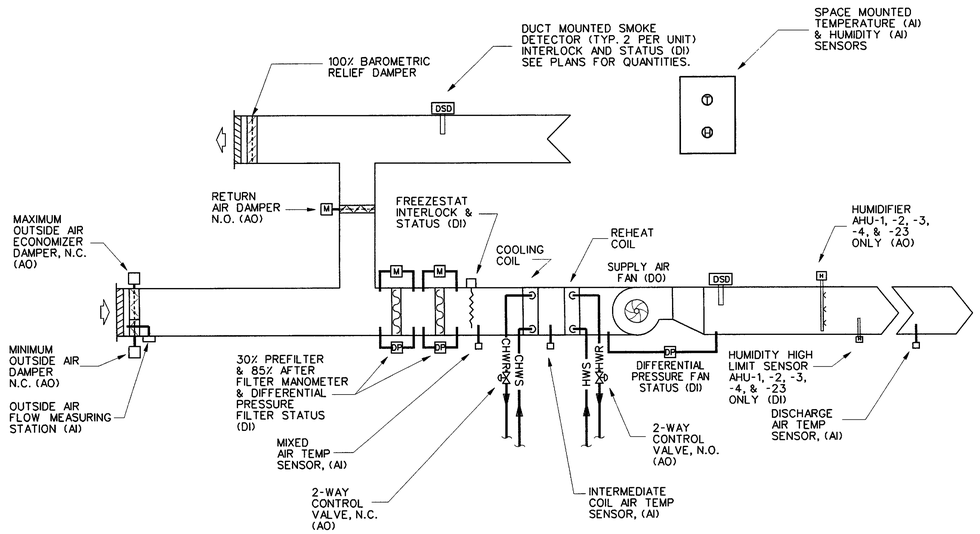


AHU CONTROLS

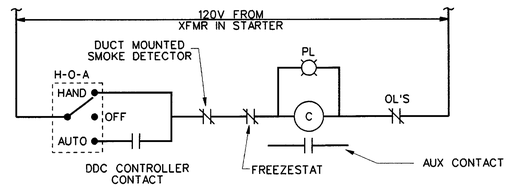
TYPICAL FOR SINGLE ZONE CONSTANT VOLUME UNITS

UNIT TYPE "C"

① AHU-1, 2, 3, 4, 9, 23, 29 ARE UNIT TYPE "C"

PANEL DESIGNATION FT. MEADE - DINFOS	HARDWARE																		SOFTWARE																	
	OUTPUT (O)						INPUT (T,D,V,C)												ALARMS						PROGRAM											
	DIGITAL			ANALOG			DIGITAL					ANALOG							DIGITAL		ANALOG															
AHU CONTROLS SINGLE ZONE CONSTANT VOLUME AIR HANDLING UNITS UNIT TYPE "C"	Control Relay	Solenoid	Contactor	Pneumatic Transducer	Electrical Transducer	4-20MA Module	Pressure Switch	Flow Switch	Switch Closure	Auxiliary Contact	Open/Close	Temperature	Relative Humidity	PSig, PSia, PSid	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	Chiller Optimization	Chilled Water Reset	Position
POINT DESCRIPTION																																			
SUPPLY AIR FAN S/S	●																				●	●	●												
SUPPLY AIR FAN STATUS							●										●																		
SPACE HUMIDITY													●							●	●						●								
SPACE AIR TEMPERATURE												●								●	●						●								
MIXED AIR TEMPERATURE												●								●	●														
INTERMEDIATE COIL AIR TEMP.												●								●	●														
DISCHARGE AIR TEMPERATURE												●								●	●														
OUTSIDE AIR HUMIDITY													●														●								
OUTSIDE AIR TEMPERATURE												●															●								
HUMIDIFIER						●																													
HUMIDIFIER HIGH LIMIT								●									●																		
MAX. OSA DAMPER CTL						●																●	●			●	●		●			●			●
MIN. OSA DAMPER CTL						●																●	●			●	●								●
RETURN AIR DAMPER CONTROL						●																●	●			●	●		●			●			●
OUTSIDE AIRFLOW STATION																●											●								
FILTER (2 THUS)							●											●																	
HOT WATER VALVE CONTROL						●																								●					●
CHILLED WATER VALVE CONTROL						●																					●			●					●
FREEZESTAT																	●																		
DUCT SMOKE DETECTOR																	●																		

NOTE: PROVIDE DYNAMIC GRAPHIC REPRESENTATIVE OF EACH PIECE OF EQUIPMENT



SINGLE ZONE CONSTANT VOLUME CONTROL

SEQUENCE OF OPERATION
SINGLE-ZONE CONSTANT VOLUME AIR-HANDLING UNIT

1. SUPPLY AIR FAN (SAF): THE SUPPLY AIR FAN IS STARTED MANUALLY THROUGH THE HAND POSITION OF THE H-O-A SWITCH. IN THE AUTO POSITION, IF SCHEDULED OR WHEN AIR IS REQUIRED FOR OPTIMUM START OR NIGHT SETBACK (HEATING OR COOLING), THE DDC CONTROLLER WILL ENABLE THE SUPPLY AIR FAN.

2. FAN STATUS: WHEN THE FAN IS ENERGIZED, DIFFERENTIAL PRESSURE SENSOR DETERMINES IF THERE IS AIR MOVEMENT IN THE DUCT. AFTER AN OPERATOR-DEFINED FEEDBACK TIME DELAY, IF THERE IS NO AIR MOVEMENT, 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. MINIMUM OUTSIDE AIR DAMPERS: THE MINIMUM OUTSIDE AIR DAMPERS WILL BE OPENED WHENEVER THE AIR-HANDLING UNIT IS SCHEDULED TO OPERATE, RETURN AIR TEMP IS MINIMUM 65°F, AND THE FAN STATUS INDICATES "ON". MINIMUM OUTSIDE AIR DAMPER SHALL MODULATE AS REQUIRED TO DELIVER SCHEDULED MINIMUM OSA BASED UPON MEASUREMENTS OF OUTSIDE AIRFLOW MEASURING STATION.

4. DISCHARGE AIR CONTROL:
   A. AIR TEMPERATURE CONTROL: THE DDC CONTROLLER WILL MODULATE THE HOT WATER AND CHILLED WATER VALVES INDEPENDENTLY TO MAINTAIN THE SPACE TEMPERATURE SETPOINT. SOFTWARE LOGIC WILL PREVENT SIMULTANEOUS HEATING AND COOLING. 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. HUMIDIFICATION: (UNITS AHU-1,2,3,4, AND 23) THE DDC CONTROLLER WILL ENERGIZE HUMIDIFIER WHEN RETURN HUMIDITY SENSOR REPORTS RH BELOW 40% AND COOLING COIL VALVE IS IN CLOSED POSITION. THE CONTROLLER SHALL DEENERGIZE IF THERE IS A ZONE THERMOSTAT CALL FOR COOLING OPENING COOLING COIL VALVE, OR IF RETURN HUMIDITY SENSOR REPORTS RH GREATER THAN 50%.

   C. DEHUMIDIFICATION: (UNITS AHU-1,2,3,4, AND 23) WHEN RETURN HUMIDITY SENSOR REPORTS RH GREATER THAN 58% AND THE SPACE IS NOT CALLING FOR COOLING OR HEATING, THE DDC CONTROLLER SHALL MODULATE THE COOLING COIL VALVE FROM CLOSED TO OPEN TO DEVELOP A 55 DEGREE INTERMEDIATE AIR TEMPERATURE. SIMULTANEOUSLY THE DDC CONTROLLER SHALL MODULATE THE REHEAT COIL VALVE FROM CLOSED TO OPEN TO DEVELOP 68 OR 72 DEGREE DISCHARGE AIR DEPENDENT ON SEASONAL SETPOINT OF SPACE. A CALL FOR HEATING OR COOLING SHALL REVERT THE CONTROL FROM DEHUMIFICATION TO COOLING OR HEATING AS REQUIRED.

6. 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 MAXIMUM OUTSIDE AIR DAMPER 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 SPACE AIR TEMP. SETPOINT. AS OSA TEMP. DROPS, THE RETURN AIR AND MAX. OSA DAMPER SHALL MODULATE IN TANDEM (CLOSING MAX. OSA DAMPER) TO SATISFY SPACE TEMPERATURE SETPOINT. WHEN MAX. OSA DAMPER CLOSES TO THE FULL CLOSED POSITION, THE REHEAT COIL VALVE WILL MODULATE TO SATISFY SPACE SETPOINT. THE REVERSE SEQUENCE WILL OCCUR AS THE OUTSIDE AIR TEMPERATUR RISES.

7. SAFETIES: SAFETY DEVICES
SAFETY DEVICES (DUCT SMOKE DETECTOR AND FREEZESTAT) ARE INTERLOCKED WITH THE FAN STARTER CIRCUIT. THE DEVICES DISABLE THE SUPPLY FAN. CLOSE THE MINIMUM AND MAXIMUM OSA DAMPERS, AND FULLY OPEN THE RETURN DAMPERS. 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.

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 LIAIBILITIES STATEMENT ON COVER SHEET.

US ARMY ENGINEERING AND SUPPORT CENTER HUNTSVILLE

Symbol	Description	Date	Appr.	Symbol	Description	Date	Appr.

Checked by: WTT
Dwn by: ICT
DAC87-03-D-0006
Approved by:
Chief, Prj. Mgmt. Division

Date: 02/27/04
CADD File Name: 312M802.DGN
ICT Project No. 20312
Plot date: 02/27/04
Plot scale:

TASK ORDER #: FRR004

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DEFENSE INFORMATION SCHOOL FT. MEADE MARYLAND

NEW CONSTANT VOLUME AHU CONTROLS

Sheet reference number: M-805