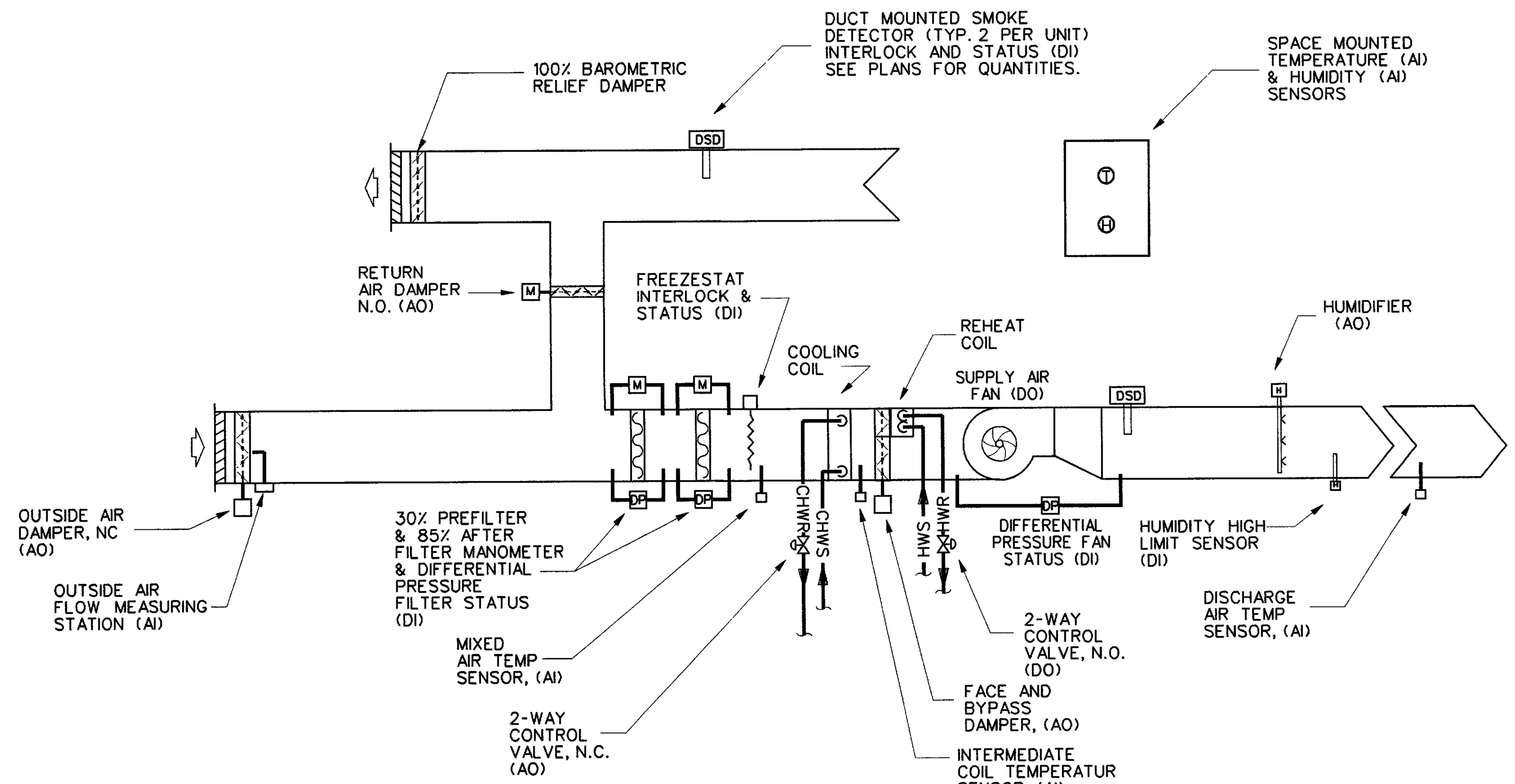


AHU CONTROLS

SINGLE ZONE CONSTANT VOLUME UNIT - AHU-22

UNIT TYPE "A"

PANEL DESIGNATION FT. MEADE - DINFOS

AHU CONTROLS SINGLE ZONE CONSTANT VOLUME AIR HANDLING UNITS UNIT TYPE "A"

HARDWARE

POINT DESCRIPTION	OUTPUT (O) DIGITAL: Control Relay	Solenoid	Contactor	OUTPUT (O) ANALOG: Pneumatic Transducer	Electrical Transducer	4-20MA Module	INPUT (T,D,V,C) DIGITAL: Pressure Switch	Flow Switch	Switch Closure	Auxiliary Contact	Open/Close	INPUT ANALOG: Temperature	Relative Humidity	PSIg, PSIa, PSId	Position	Flow
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									●							
OSA DAMPER CTL (2 THUS)						●										
RETURN AIR DAMPER CONTROL						●										
FACE & BYPASS DAMPER CTL						●										
OUTSIDE AIRFLOW STATION																●
FILTER (2 THUS)							●									
HOT WATER VALVE CONTROL		●														
CHILLED WATER VALVE CONTROL						●										
FREEZESTAT																
DUCT SMOKE DETECTOR																

SOFTWARE

POINT DESCRIPTION	ALARMS DIGITAL: Equipment Status	Maintenance	ALARMS ANALOG: High Limit	Low Limit	Run Time	PROGRAM: 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
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	●																
OSA DAMPER CTL (2 THUS)						●	●			●	●		●				●
RETURN AIR DAMPER CONTROL						●	●			●	●		●				●
FACE & BYPASS DAMPER CTL													●				●
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

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.

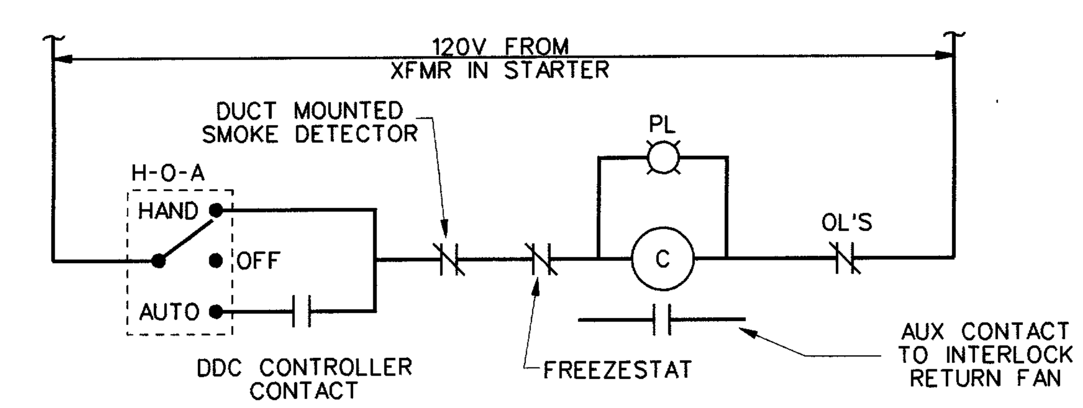
2. FAN STATUS: WHEN THE FAN IS ENERGIZED, DIFFERENTIAL PRESSURE SENSOR DETERMINES IF THERE IS AIR MOVEMENT IN THE DUCT. AFTER AN OPERATOR-DEFINED FEEDBACK TIME DELAY, IF THERE IS NO AIR MOVEMENT, AN ALARM WILL BE GENERATED. ONCE THE TIME DELAY HAS PASSED, IF THE FAN STATUS INDICATES OFF (FIRE ALARM/FREEZESTAT, 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 CHILLED WATER VALVE AS REQUIRED TO SATISFY SPACE COOLING REQUIREMENTS. ON A CALL FOR HEATING FROM THE SPACE THERMOSTAT, COOLING COIL VALVE SHALL INDEX TO THE CLOSED POSITION, HEATING COIL VALVE WILL OPEN AND FACE AND BYPASS DAMPER SHALL DIVERT FLOW ACROSS HEATING COIL AS REQUIRED TO SATISFY SPACE HEATING DEMAND. THE OPPOSITE SHALL OCCUR WHEN SPACE CALLS FOR COOLING. SOFTWARE LOGIC SHALL PREVENT SIMULTANEOUS HEATING AND COOLING EXCEPT AS REQUIRED FOR DEHUMIDIFICATION. THE DISCHARGE AIR TEMPERATURE SENSOR SHALL PREVENT DISCHARGE AIR TEMPERATURES FROM EXCEEDING OPERATOR DEFINED LIMITS SET FOR HEATING AND COOLING MODES (INITIALLY SET AT 49°F COOLING AND 90°F HEATING). FREQUENCY OF MODE CHANGE SHALL BE OPERATOR DEFINED AND INITIALLY SET AT NOT LESS THAN 5 MINUTE INTERVAL.
   B. HUMIDIFICATION: (UNIT AHU-22) THE DDC CONTROLLER WILL ENERGIZE HUMIDIFIER WHEN SPACE HUMIDITY SENSOR REPORTS RH BELOW 35% 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 SPACE HUMIDITY SENSOR REPORTS RH GREATER THAN 50%.
   C. DEHUMIDIFICATION: (UNIT AHU-22) WHEN SPACE 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 50°F INTERMEDIATE COIL AIR TEMPERATURE. SIMULTANEOUSLY THE DDC CONTROLLER SHALL OPEN THE REHEAT COIL VALVE FROM CLOSED TO OPEN AND MODULATE THE FACE AND BYPASS DAMPER 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 SPACE AIR ENTHALPY. WHEN THE ECONOMIZER IS ENABLED, THE DDC CONTROLLER WILL MODULATE IN CONCERT THE 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 OSA DAMPER SHALL MODULATE IN TANDEM (CLOSING OSA TO THE MIN. DAMPER POSITION) TO SATISFY SPACE TEMPERATURE SETPOINT. WHEN OSA DAMPER CLOSES TO THE MINIMUM POSITION, THE REHEAT COIL VALVE WILL OPEN AND FACE AND BYPASS WILL MODULATE TO SATISFY SPACE SETPOINT OR MINIMUM DISCHARGE TEMPERATURE.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.



SINGLE ZONE CONSTANT VOLUME CONTROL

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US ARMY ENGINEERING AND SUPPORT CENTER HUNTSVILLE

Symbol | Description | Date | Appr.

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ICT — I.C. Thomasson Associates, Inc. NASHVILLE, TENNESSEE PHONE (615) 346-3400
Checked by: WTT | Date: 02/27/04
Dwn by: ICT | CADD File Name: 3121M803.DGN
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DEFENSE INFORMATION SCHOOL

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EXISTING CONSTANT VOLUME CONTROLS

Sheet reference number: M-803