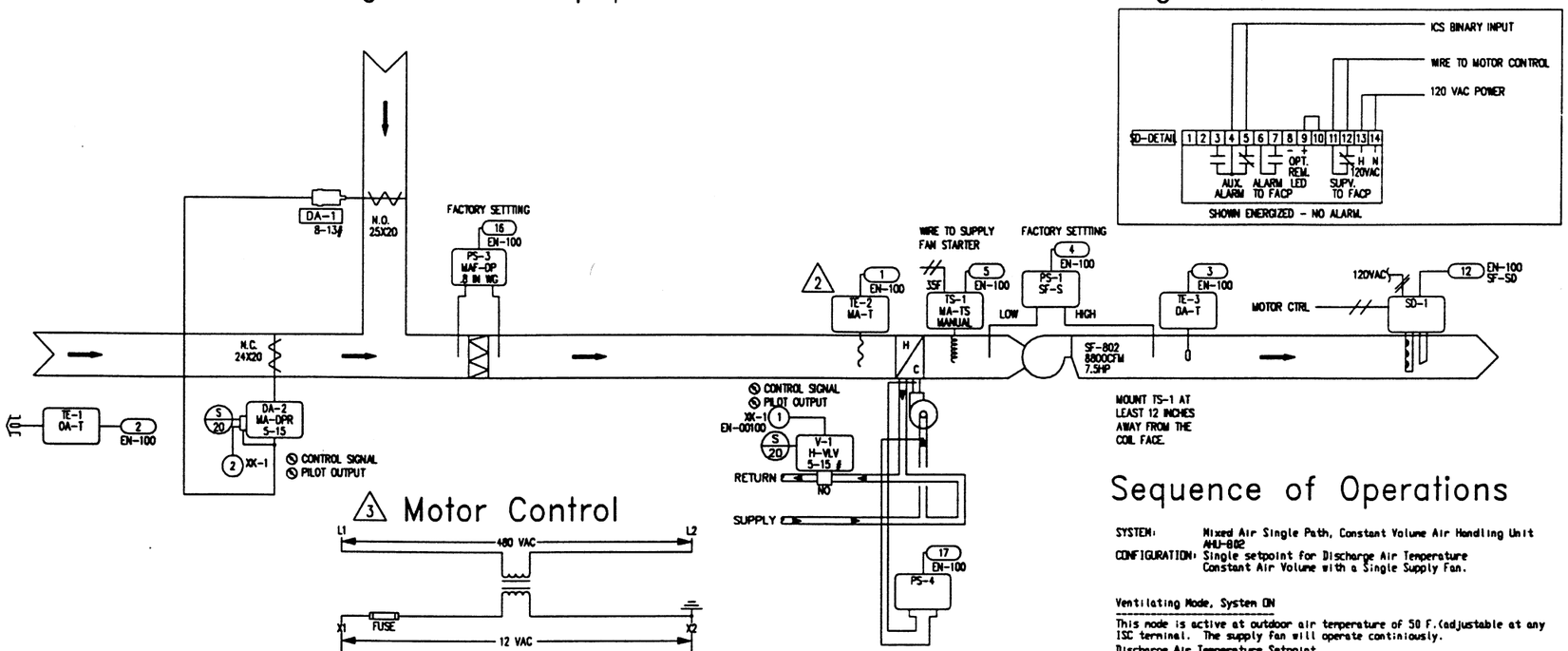
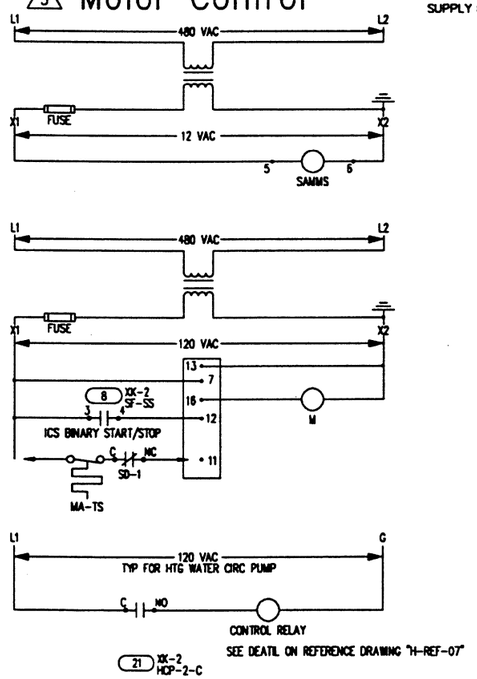
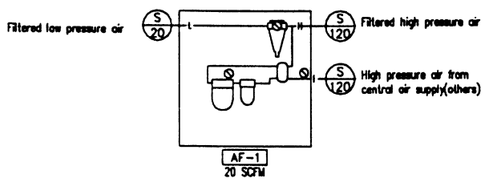
Flow Diagram and Equipment Locations for Air Handling Unit, AHU-802



3 Motor Control



Building 450 Pneumatic Power Supply



Sequence of Operations

SYSTEM: Mixed Air Single Path, Constant Volume Air Handling Unit AHU-802

CONFIGURATION: Single setpoint for Discharge Air Temperature Constant Air Volume with a Single Supply Fan.

Ventilating Mode, System ON

This mode is active at outdoor air temperature of 50 F.(adjustable at any ISC terminal. The supply fan will operate continiously.

Discharge Air Temperature Setpoint

The digital controller, EN-00100 will control the discharge air temperature for a setpoint of 55 F.(adjustable at any ISC terminal)

Discharge Temperature Loop

The discharge cooling deadband is added to the discharge air setpoint. This value establishes the point at which mechanical cooling begins when the controller uses proportional only control. The digital controller will continually adjust the damper and mechanical cooling command in sequence according to the controller's result of the proportional-intergal cooling loop calculation. The digital controller modulates the controlled devices until the discharge air temperature equals the calculated discharge setpoint. The digital controller will continually adjust the heating command according to the controller's result of the proportional-integral heating loop calculation. The digital controller will modulate the heating coil control valve, V-1 until the discharge air temperature equals the setpoint. The controller will provide an output between 0 and 100 percent as the discharge air temperature travels through the proportional bands.
The digital controller will control the mixed air dampers between minimum and 100 percent in the occupied mode and from 0 percent in the unoccupied mode.

Mixed air low limit

The mixed air low limit setpoint and the mixed air low limit proportional band will establish a back off effect to the mixed air damper output command. This happens when the mixed air temperature, TE-2 decreases into the range of the mixed air low limit, 50 F. plus the mixed air low limit proportional band, 5 F. This back-off feature multiplies the damper command by the proportional percentage of the mixed air temperature inside the mixed air low limit proportional band. The mixed air low limit proportional band is reset inversely by 20 degrees between outdoor air temperatures of 40 and -30 degrees F.

Dry Bulb Economizer Switchover

When the outdoor air temperature, TE-1 is greater then the Econo Swithcover setpoint, 68 F.(Adj.) the digital controller commands the mixed air dampers to minimum position(Adj.). When the outdoor air temperature decreases below the Econo Switch Setpoint minus the Econo Switch Differential, the controller modulates the mixed air dampers to provide free cooling. When ECON is on, free cooling is available.

Electric Low Limit

In the event that the heating coil discharge drops below 35 F. (adj.) the supply fan will stop, the mixed air dampers will close through temperature switch, TS-1.

Heating Water Circulating Pumps

The lead heating water circulation pump will be enabled a 10 percent heating valve position output from the digital controller.

Loss of Air Flow

Upon loss of air flow as determined by sensitive differential pressure switch, PS-1, the controlled devices will be commanded to the following states:

- Heating valve, V-1 will remain in control.
- Mixed air dampers, DA-1,2 will be positoned at zero percent.

Ventilating Mode, System OFF

The supply fan will remain off and the controlled devices will be commanded to the positions indicated above under 'Loss of Air Flow'.

Shutdown

Upon a command from the higher level digital controller, NC-8, the AHU digital controller will command all analog outputs to zero percent and will turn off all binary outputs.

Power Fail Restart

The power fail restart will delay the startup of the digital controller for 1 minute after a power failure for controller reset condition. This logic will hold the controller in the sutdown mode until the restart timer has expired.

Sensitive differential pressure switch, PS-3 will close and the AHU digital controller will send a mixed air filter alarm to the ISC network.

Mixed air low limit temperature switch, TS-1 will stop the supply fan and the AHU digital controller will issue an alarm to the ISC network in the event that the heating discharge temperature drops below 35 F.(Adj.)

Supply smoke detector, SD-1 will open a control circuit and the AHU digital contoller will issue and alarm to the ISC network in the event the respective device senses smoke at the location.

AHU-802 points available to view/adjust as global point objects at any ISC terminal.

Point description	Value	ISC object name
- Discharge air temperature and setpoint		
- Ventilating Mode Setpoint	58.0 F.	
- Minimum outside air damper position	15.0 %	
- Dirty filter condition		
- Supply fan status		
- Smoke detector status		

FIELD MATERIAL

DEVICE TAG	QTY	CODE NUMBER	DESCRIPTION
AF-1	1	A-4000-141	FILTER
DA-1	1	D-3153-2	DAMPER ACTUATOR 8-13#
DA-2	1	D-3153-1	DPR ACT 8-13# W/POS
PS-1,PS-3	2	P32AF-2C	SENSITIVE DIFF PRES CTL
	2	FTG1BA-600R	REMOTE MTD PROBE
PS-4	1	P74FA-5C	DIFF PRES SWITCH
TE-1	1	TE-6100-1	TEMP SENSING ELEMENT 17'
TE-2	1	TE-6000-4	SENSOR, 1000 OHM +/- .25%
	1	TE-6001-2	HOUSING F/O O.A.TEMP.
TE-3	1	TE-6000-4	SENSOR, 1000 OHM +/- .25%
	1	TE-6001-1	ELEMENT HOLDER
TS-1	1	A70HA-1C	TEMP CONTROL 4 WIRE, 2-C
V-1	1	----	SEE SCHEDULE
ACC	4	G-2018-5	0-30 PSI, 1 1/2 INCH PRESSURE GAUGE
SD-1	1	DH-1851AC-2	SMOKE DETECTOR
ACC	1	ST-10	SMOKE TUBE
R-1	1	RH2B-UL-120	CONTROL RELAY
ACC	1	SH2B-05	BASE

ANY MATERIAL WITH A (P) PRECEEDING THE DEVICE TAG IS CONSIDERED PROPRIETARY EQUIPMENT AND IS BEING SUPPLIED BY JOHNSON CONTROLS, INC. ALL OTHER MATERIAL IS NON-PROPRIETARY EQUIPMENT.

FILE: AHU-802H

DRAWING TITLE					
MIXED AIR SINGLE PATH AIR HANDLING UNIT, AHU-802 CONSTANT VOLUME BUILDING 450, PNEUMATIC POWER			RECORD		05/11/94 SF
		3	GENERAL		09/08/92 SF
		2	GENERAL		06/30/92 SF
	REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE BY

SALES ENGR	PROJECT MGR	APPL. ENGR	DRAWN	APPROVED
JP	SF	DCS	BY SF DATE 11/11/91	BY DATE

PROJECT		
The Argonne National Labs Advanced Photon Source Campus 9700 Cass Avenue South Argonne, IL 60439	JOHNSON CONTROLS Systems & Services Division	3007 MALMO ROAD ARLINGTON HEIGHTS ILLINOIS 60005 708/364-1500 Main 708/806-4438 Eng

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