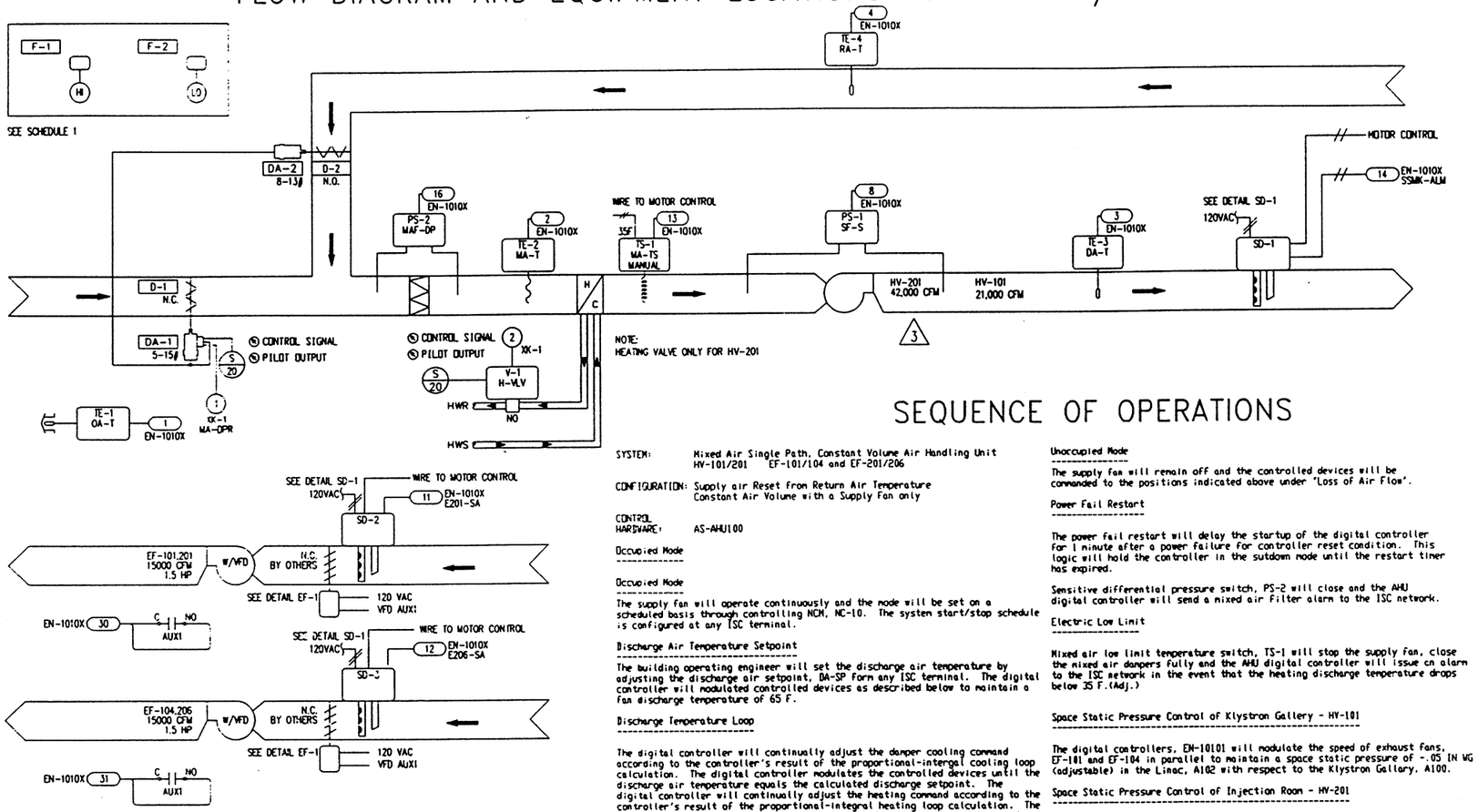
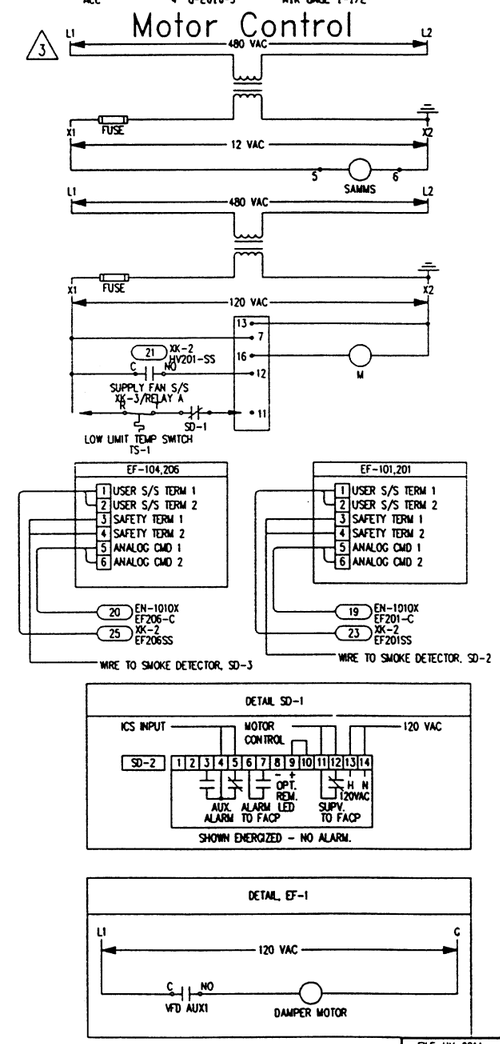
FLOW DIAGRAM AND EQUIPMENT LOCATIONS FOR HV-101/201



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.

FIELD MATERIAL

DEVICE TAG	QTY	CODE NUMBER	DESCRIPTION
DA-1	2	D-3153-1	DPR ACT 8-13# W/POS
DA-2	2	D-3153-2	DAMPER ACTUATOR 8-13#
F-1-F-2	4	FTG18A-600R	REMOTE MTD PROBE
	4	T-4002-124	MOUNTING
	4	T-4000-2139	COVER
PS-1-PS-2	4	P32AF-2C	SENSITIVE DIFF PRES CTL
	8	FTG18A-600R	REMOTE MTD PROBE
SD-1-SD-3	6	D4185IAC-2	DUCT DETECTOR, ION.
	6	ST-10	SAMPLING TUBE FOR
TE-1	2	TE-6000-4	SENSOR, 1000 OHM +/- .25%
	2	TE-6001-2	HOUSING F/O O.A.TEMP.
TE-2	2	TE-6100-1	TEMP SENSING ELEMENT 17'
TE-3-TE-4	4	TE-6000-4	SENSOR, 1000 OHM +/- .25%
	4	TE-6001-1	ELEMENT HOLDER
TS-1	2	A70HA-1C	TEMP CONTROL 4 WIRE, 2-C
V-1	2	----	SEE VALVE SCHEDULE
ACC	4	G-2010-5	AIR GAGE 1-1/2'



SEQUENCE OF OPERATIONS

SYSTEM: Mixed Air Single Path, Constant Volume Air Handling Unit
HV-101/201 EF-101/104 and EF-201/206

CONFIGURATION: Supply air Reset from Return Air Temperature
Constant Air Volume with a Supply Fan only

CONTROL HARDWARE: AS-AHU100

Occupied Mode

Occupied Mode

The supply fan will operate continuously and the mode will be set on a scheduled basis through controlling NCM, NC-10. The system start/stop schedule is configured at any ISC terminal.

Discharge Air Temperature Setpoint

The building operating engineer will set the discharge air temperature by adjusting the discharge air setpoint, DA-SP form any ISC terminal. The digital controller will modulated controlled devices as described below to maintain a fan discharge temperature of 65 F.

Discharge Temperature Loop

The digital controller will continually adjust the damper cooling command 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, mixed air dampers, DA-1-DA-2 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.

The smoke detectors' condition SD-1-SD-3 will be monitored by the digital controller. The alarm contact will close in the event that smoke is detected in the the supply or return ductwork and an alarm will be sent to the ICS network, 'Supply(or return) smoke detected'.

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 plus the mixed air low limit proportional band. 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.

Warm-up/Cooldown

The warm-up/cooldown mode initiation will take place through a command from the higher level digital controller, NC-10 on a schedule basis. When mode active the AHU digital controller will start the fan system and will control at the occupied mode setpoints without the operation of the mixed air dampers. After the controller switches into the occupied mode, the mixed air system will be enabled.

Loss of Air Flow

Upon loss of air flow as determined by sensitive differential pressure switch, PS-1 and 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 positioned at zero percent.

Unoccupied Mode

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

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-2 will close and the AHU digital controller will send a mixed air Filter alarm to the ISC network.

Electric Low Limit

Mixed air low limit temperature switch, TS-1 will stop the supply fan, close the mixed air dampers fully 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.)

Space Static Pressure Control of Klystron Gallery - HV-101

The digital controllers, EN-10101 will modulate the speed of exhaust fans, EF-101 and EF-104 in parallel to maintain a space static pressure of -.05 IN WG (adjustable) in the Linac, A102 with respect to the Klystron Gallery, A100.

Space Static Pressure Control of Injection Room - HV-201

The digital controllers, EN-10108 will modulate the speed of exhaust fans, EF-201 and EF-206 in parallel to maintain a space static pressure of -.05 IN WG (adjustable) in the Par Enc, A105 with respect to the Injection Room, B100.

The following point objects will be adjustable from any ICS terminal:

- -Discharge air setpoint, HV-101, 201
- -HV-101,201 occupied/unoccupied mode
- -Space Static Setpoints in the Linac and the Par

The following point objects will be monitored/alarmed at any ICS terminal:

- -Differential space static pressures for the Klyston Gallery and Injection Room
- -Electric low limit temperature switch, TS-1 status
- -Mixed air filter differential pressure alarm, PS-2
- -Supply fan status, PS-1
- -Smoke detectors, SD-1, SD-2 and SD-3 status
- -Exhaust fan, EF-101/204 and EF-201/206 setpoint and actual flow(feedback variable).

SCHEDULE 1

Static Sampling Point Locations

System	Enclosure	Static Point-Tube No.	Reference Point-Tube No.
HV-101	EN-10101	Linac, A102 - 10A	Kly Gallery,A100 - 11A
HV-201	EN-10108	Par Enc, A105 - 10B	Inj Room, B100 - 11B

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FILE: HV-201A
DCODE: 19930628.1437

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
		AS BUILTS		06/28/93	DCS
	4	STATIC CTRL		09/02/93	SF

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

DRAWING TITLE
Flow Diagram and Equipment Locations, Single Path, Mixed Air, Constant Volume Heating/ Ventilating Unit, HV-101/201

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