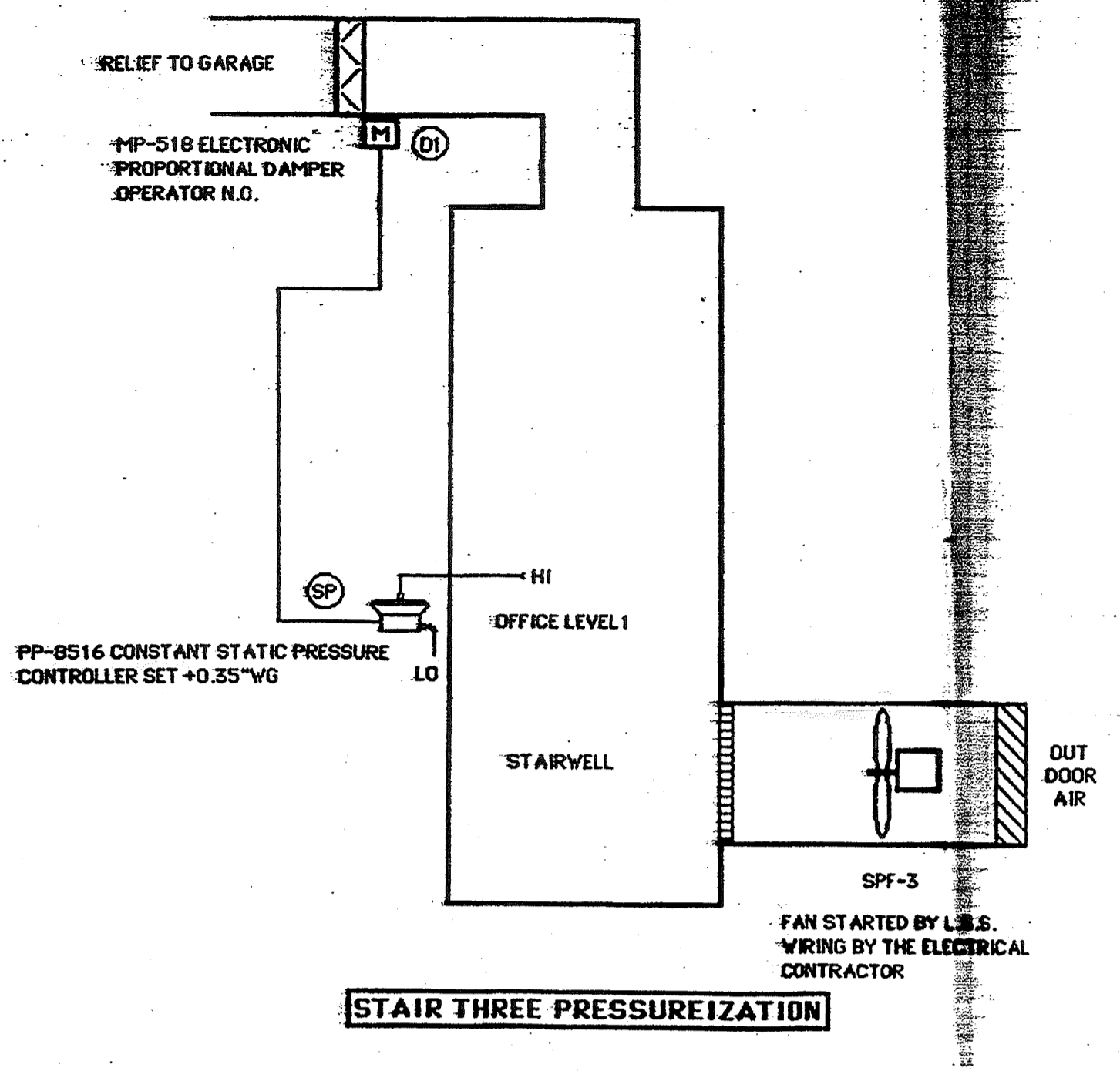
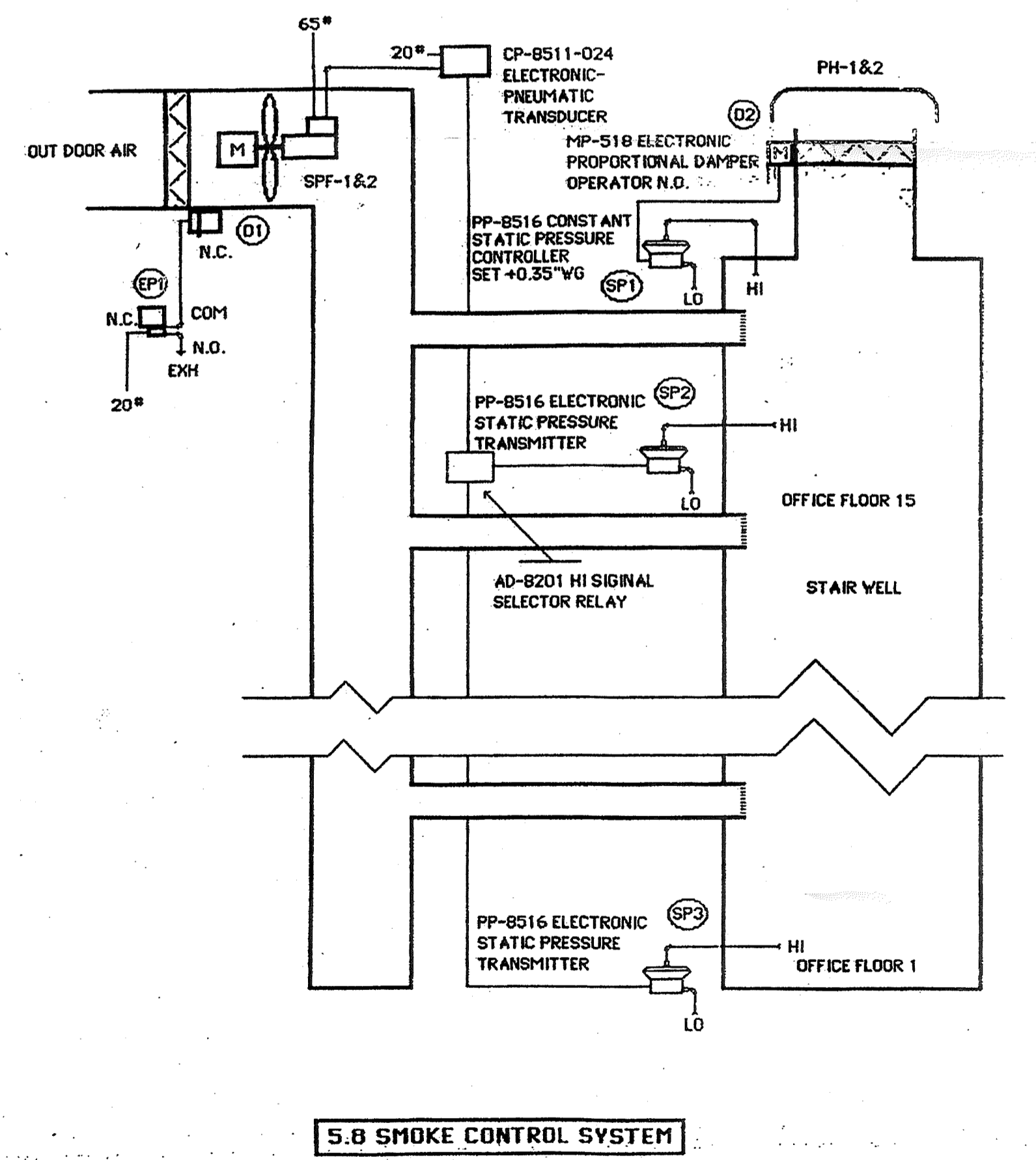


5.6 OUT DOOR AIR SUPPLY FANS OASF 1&2 RCU-16

5.7 BUILDING RELIEF DAMPER CONTROL RCU-16



5.8 SMOKE CONTROL SYSTEM



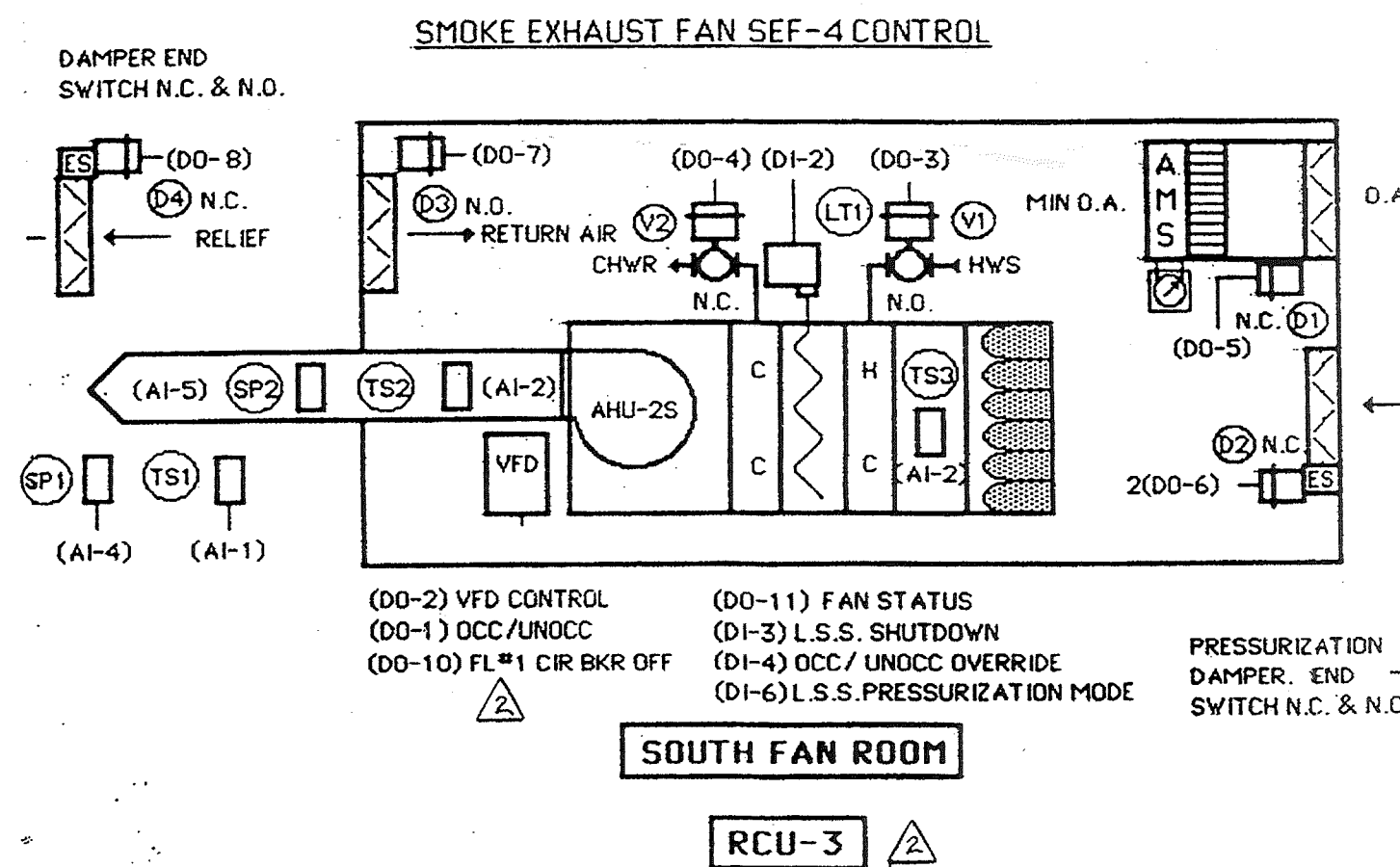
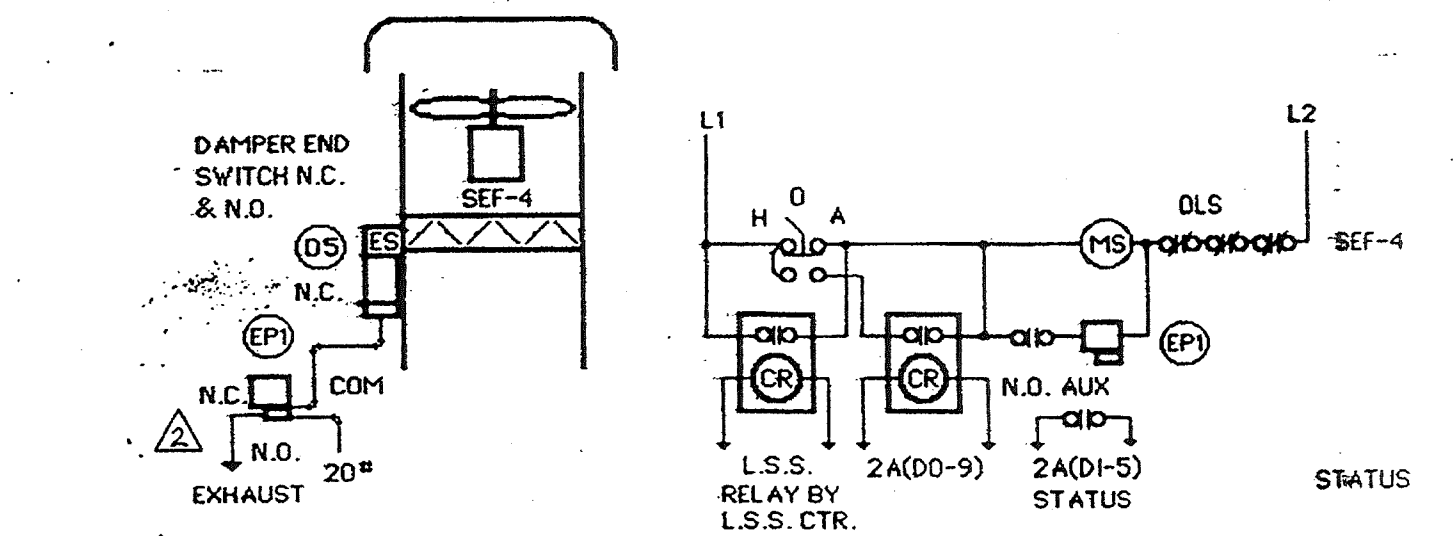
5.8 SMOKE CONTROL SYSTEM

EQUIPMENT SCHEDULE

SYM.	DEVICE NO.	QTY.	DESCRIPTION
D1 & D2	MK-7121	2	DAMPER ACTUATOR
EPI TO EP3	AL-110	3	AIR SOLENOID VALVE
D3	MK-7121	1	DAMPER ACTUATOR
SP1 TO SP3	PP-8516	3	PRESSURE CONTROL
D1	MK-3121	1	DAMPER ACTUATOR
D2	MP-518	1	DAMPER ACTUATOR
SP	PP-8516	1	PRESSURE CONTROL
D1	MP-518	1	DAMPER ACTUATOR
	CP-8511-024	1	P.E. TRANSDUCER
	AD-8201	1	H. SIGNAL SELECT

- RCU-16
- 5.6 OUTSIDE AIR SUPPLY FANS OASF-1 & OASF-2
- A. The CPU shall index the SASF's to the occupied or unoccupied cycle of operation. L.S.S. has override priority.
 - B. Unoccupied Mode:
 1. OASF's remain off and all outside air and pressurization dampers remain closed.
 - C. Occupied Mode:
 1. OASF is started through VFD at minimum speed.
 2. Duct static pressure sensor SP-1 shall through RCU-16, modulate the OASF fan speed as required to maintain +0.10"wg static pressure (adjustable) inside the outside air shaft.
- 5.7 BUILDING RELIEF DAMPER CONTROL
- A. A duct static pressure sensor SP-3 located in the relief/smoke exhaust duct or shaft shall modulate the building relief damper to maintain +0.05"wg (adjustable) positive differential pressure relative to outdoor pressure.
 - B. Building relief damper D-3 shall close when the smoke exhaust fan starts, except for SEF-2,3,4 and 5, where it serves as the fan back draft damper.
 - C. When the L.S.S. starts SEF-1 solenoid air valve EP-3 is energized which bleeds off the branch pressure to the damper operator thereby closing relief damper D-3.
- 5.8 SMOKE CONTROL SYSTEM
- A. Initiation of signals:
 1. Life safety system (L.S.S.) shall initiate all smoke control sequences. All temperature control sequences shall be overridden.
 2. Initial signal from L.S.S. shall, at first shut down all fans, close all return, outside air, pressurization, smoke and relief dampers and open all VAV terminal boxes. Status will be indicated to the L.S.S. control center. Next, fire zone will be established and smoke control sequences will initiate.
 3. Smoke control sequences shall consist of the following:
 - a. Stair pressurization
 - b. Fire zone evacuation
 - c. Adjacent zone pressurization
 - B. Stair pressurization:
 1. L.S.S. shall index all stair pressure fans SPF-1.2 & 3 to the pressurization mode.
 2. Stair static pressure transmitters SP-2 & SP-3 shall through a high signal selector and electric pneumatic transducer position the fan blades to maintain the required stairwell static pressure.
 3. Static pressure controller SP-1 shall modulate relief damper D-2 to maintain +0.35"wg pressure at the top of the stairwells.
 4. SPF-3 shall energize and its stairwell relief damper D-1 shall fall under static pressure controller SP-1 set to maintain +0.35"wg relative to outside.
 - C. Evacuation mode:
 1. On the floor which is the fire zone, the AHU's remain off, return air, pressurization, and outside air dampers remain closed and the smoke/relief damper opens fully.
 2. End switch on smoke damper provides status signal to L.S.S. control center and starts the smoke exhaust fan SEF-1.
 - D. Pressurization mode:
 1. One floor below the fire zone and two floors above the fire zone will be indexed "pressurize" by the L.S.S. Return dampers and the relief/smoke dampers remain closed.
 2. Outside air and pressurization dampers shall open fully. Pressurization damper end switch shall start OASF-1 & OASF-2 supply fans and appropriate AHU's. VFD's shall remain under control. All VAV terminal boxes remain wide open.
 3. Low temperature thermostats (LT) shall be locked out.
 4. Status of dampers and fans will be picked up through damper end switches and aux contacts at the AHU magnetic starters by the electrical and wired to the L.S.S. control center.

		Barber-Colman Co. P.O. Box 575 29 Kripes Road East Granby, CT 06026 (203) 653-9095	
		Field Office	
— REVISIONS —			
DATE	CHANGES	JOB NAME	KEEPER CENTRE
		LOCATION	HARTFORD, CT.
		ARCHITECT	BRENNAN, BEER, GORMAN
		ENGINEER	BURTON & VAN NOLLEN
		CONTRACTOR	H. GRODSKY & CO., INC.
		DRAWN BY	HAC
		CHECKED BY	ROW
		DATE	2-11-86
		DRAWING NO.	# 2 OF 8



RCU-3
5.2 VAV AIR HANDLING UNIT 2 SOUTH

A. General notes:
The unit shall be indexed into six (6) different modes of operation through the CPU, the local RCU or the Life Safety System, L.S.S. The modes are as follows:

- a Unoccupied Mode (by CPU or local RCU)
- b Warm-up Cycle (by CPU or local RCU)
- c Cool-down Cycle (by CPU or local RCU)
- d Occupied Mode (by CPU or local RCU)
- e Pressurization Mode (by L.S.S.)
- f Evacuation Mode (by L.S.S.)

- B. Unoccupied Mode:
1. AHU-2A is stopped through the CPU by de-energizing the Variable Frequency Drive (VFD).
 2. Outside Air Dampers D-1, Pressurization Damper D-2 and Return Damper D-3 close.
 3. Heating valve V-1 and cooling coil valve V-2 close.
 4. Space temperature sensor TS1 indexes the systems to "warm-up" when the space temperature falls below 58° F. or to the "cool-down" mode when the space temperature rises above 85° F.
 5. VAV terminals remain under night setback control.
 6. Status shall be reported to the RCU-2A and CPU through duct static pressure transmitter SP-2, VFD unit "on" auxiliary contact and the AHU unit magnetic starter auxiliary contact.

- C. Warm-up Cycle (space temperature is < 70° F.):
1. CPU, through RCU-2A outdoor air temperature (global function) and space temperature sensor, establish a proper "ramp" for optimal starting time based on time-of-day occupancy.
 2. Return Damper D-3 opens, fan starts, the heating coil valve V-1 opens fully. VAV volume dampers are opened by bleeding off main air pressure through 3-way solenoid valve. The VFD unit remains under control.
 3. When the space temperature reaches 70° F. (adjustable), AHU-2A is indexed to the "occupied cycle" of operation.

- D. Cool-down Cycle (space temperature is > 75° F.):
The operation is the same as warm-up except the cooling coil valve V-2 opens instead of the heating valve.

- E. Occupied Mode:
1. Outside air damper D-1 opens fully. Wide open damper corresponds to 25% of AHU airflow. Maximum damper opening shall be globally adjusted through the CPU. Absolute minimum opening position shall be with the damper 25% open corresponding to 6% of AHU airflow.
 2. AHU discharge air sensor through a P-I loop shall modulate V-1 or V-2 to maintain 55° F.. Supply air temperature is resettable from return air or outside air temperature.
 3. Static pressure transmitters SP-2 shall through the RCU send a P-I signal to the VFD to vary the AHU fan motor to maintain a minimum of 0.8"wg (adjustable) duct static pressure.
 4. A space static pressure sensor SP-1 through a P-I loop shall modulate the relief/smoke damper D-4 to maintain a maximum of 0.05"wg positive differential to outdoor static pressure.

- F. VAV Terminal control (Controls furnished by unit Manufacturer)
1. VAV terminals shall be normally open. When the main air supply is reduced to zero PSIG the terminal shall be open to full air flow.
 2. When the terminal box thermostats (furnished by BC/C) call for cooling the terminal shall be open to flow. When the temperature in the space falls the terminal boxes shall close to air flow.
 3. On the perimeter fan powered terminals, when the VAV damper reaches its minimum setting, an end switch shall energize the plenum air induction fan. There is a three (3) degree (adjustable) dead band on room thermostats T2. When the space temperature drops below the deadband setting the hot water valve V-5 shall modulate open.
 4. During the unoccupied mode, the VAV terminal box thermostats T1 & T2 shall be indexed to night setback by a change in main air pressure from 15" to 20".
 5. During warm-up/cool-down cycle the VAV dampers go to the full open position.
 6. During the pressurization mode the VAV dampers go to the full open position. (The main air EP switch and signal will be provided by the L.S.S. contractor)


- G. Safeties and Permissives:
1. Duct mounted smoke detectors furnished by others shall through hardwire interlock, shut down the AHU fan and initiate an alarm to the L.S.S.
 2. Double pole low limit thermostat LT1 set for 40° F. (adjustable) and mounted on the preheat coil (discharge side) shall shut down the AHU fan, open the heating coil valve fully and initiate a printed alarm at the CPU.
- H. Overrides:
1. L.S.S. shall override all comfort systems and sequences. See smoke control sequence 5.8 for pressurization and evacuation modes.
 2. Unoccupied override shall be through the system RCU through a DI as indicated on the control drawing. (future tenant fitup)
 3. Whenever the Emergency Power Generator comes on line during "Normal" (non-fire) mode, the AHU shall shut down.
 4. Occupied/unoccupied override shall be capable of being manually indexed through a toggle switch on the operators console at the CPU.
- I. Purge Cycle:
- The purge cycle is identical as that described for VAV systems 3 thru 15.
- J. Electrical Power Breaker Control:
- The breaker control is identical as that described for VAV systems 3 thru 15.

SMOKE EXHAUST FAN SEF-4 CONTROL

Smoke exhaust fan SEF-4 shall be started through a L.S.S. signal or through RCU-2A digital output. When the fan starts solenoid air valve EP-1 is energized thereby opening the exhaust damper D-5. When the fan is stopped EP-1 is de-energized and D-5 closes. Fan status is taken from a N.O. auxiliary contact at the motor starter.

EQUIPMENT SCHEDULE

SYM.	DEVICE NO.	QTY.	DESCRIPTION
D1	MK-4421	1	DAMPER ACTUATOR
D2 & D3	MK-3121	2	"
V1	VK-9213-301-4-7	1	VALVE ASSEMBLY
V2	VK-9223-603-4-10	1	"
D4	MK-3121	1	DAMPER ACTUATOR
D5	MK-3121	1	"
EP1	AL-110	1	AIR SOLENOID VALVE
CR	P-127-2-4	1	RELAY
	P-100-4	1	RELAY BASE



Field Office

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REVISIONS		DATE	CHANGES	JOB NAME	LOCATION
		9-16		XEROX CENTRE	HARTFORD, CT.
		12-2-87			
				ARCHITECT	BRENNAN BEER GORMAN
				ENGINEER	BURTON & VAN HOUTEN
				CONTRACTOR	H. GROSSKY & CO., INC.
				DRAWN BY	HAL
				CHECKED BY	RDU
				DATE	2-11-86

DRAWING NO.
#3 of 8