

VARIABLE VOLUME SYSTEM

START-STOP PROGRAMMING SHALL BE ACCOMPLISHED THROUGH THE MICROPROCESSOR LOCATED IN THE BUILDING MAINTENANCE ENGINEER'S OFFICE. THIS SYSTEM WILL NORMALLY OPERATE CONTINUOUSLY 24-HOURS A DAY. DURING THE "ON" CYCLE OF OPERATION, THE AIR HANDLING SUPPLY AIR FANS AND EXHAUST AIR FAN WILL RUN CONTINUOUSLY, WITH UNIT CONTROLS FUNCTIONING AS SPECIFIED. DURING THE "OFF" CYCLE OF OPERATION, THE OUTDOOR AIR DAMPERS AND EXHAUST AIR DAMPERS WILL REMAIN CLOSED AND THE RETURN AIR DAMPER WILL OPEN AND SUPPLY AND EXHAUST FANS WILL BE SHUT DOWN.

DURING THE "ON" CYCLE OF OPERATION THE CONTROL OF THE PRIMARY AIR TEMPERATURE WILL BE ACCOMPLISHED BY POSITIONING OF THE RETURN AIR, OUTDOOR AIR AND EXHAUST AIR DAMPERS, AND THE CHILLED WATER COIL THREE-WAY VALVE IN SEQUENCE.

DURING INITIAL START-UP OF THE FAN SYSTEM, THE MINIMUM OUTDOOR AIR DAMPER WILL OPEN.

TWO-POSITION BOILS THERMOSTAT WITH ITS BOILS MOUNTED IN THE OUTSIDE AIR. THIS CONTROLLER WILL OVERRIDE THE DISCHARGE AIR CONTROL AND RETURN, OUTDOOR AIR AND EXHAUST DAMPERS TO MINIMUM OUTSIDE AIR POSITION AND SHUT OFF THE EXHAUST FAN WHEN THEN OUTDOOR AIR TEMPERATURE EXCEEDS 70°F.

TRANSMITTER IN THE DISCHARGE AIR, THROUGH A PANEL MOUNTED RECEIVER-CONTROLLER, WILL POSITION THE OUTDOOR AIR AND RETURN AIR DAMPERS AND THE CHILLED WATER COIL THREE-WAY VALVE TO MAINTAIN A DISCHARGE AIR TEMPERATURE OF 53°F, ADJUSTABLE.

LOW LIMIT THERMOSTAT IN THE MIXED AIR, WILL OVERRIDE ALL OTHER CONTROLS TO PREVENT THE MIXED AIR TEMPERATURE FROM DROPPING BELOW 45°F, ADJUSTABLE.

PANEL MOUNTED RECEIVER-CONTROLLER WILL TAKE THE LOWEST SIGNAL FROM THREE (3) STATIC PRESSURE TRANSMITTERS. THE SUPPLY DUCT STATIC PRESSURE WILL MAINTAIN A PRESSURE OF 1.5" W.G., ADJUSTABLE, BY POSITIONING THE VARIABLE BLADE PITCH CONTROLLERS ON THE SUPPLY AIR FANS. A HIGH LIMIT PRESSURE CONTROL WITH ITS SENSOR IN THE IMMEDIATE DISCHARGE OF THE VARIABLE VOLUME SYSTEM WILL STOP THE FANS IF THE STATIC PRESSURE EXCEEDS THE PRESCRIBED SETPOINT. INDEX THE SUPPLY FAN VARIABLE BLADE PITCH CONTROLLERS TO ALWAYS START UP AT 0" AIR VOLUME

THE EXHAUST AIR DAMPER AND EXHAUST AIR FAN WILL BE INTERLOCKED TO OPERATE ONLY WHEN THE VAV SYSTEM SUPPLY AIR FAN IS IN OPERATION. EXHAUST AIR FAN OPERATION WILL BE CONTROLLED BY A STATIC PRESSURE CONTROLLER WITH ITS STATIC PRESSURE PROBE MONITORING THE CONTROLLED SPACE. WHEN THE SYSTEM IS IN OPERATION AND THE MAXIMUM OUTDOOR AIR DAMPER IS APPROXIMATELY 30% OPEN, THE EXHAUST DAMPER WILL OPEN, THE EXHAUST FAN WILL START AND EXHAUST STATIC CONTROL WILL BE PLACED INTO OPERATION. THE STATIC PRESSURE CONTROL WILL MODULATE THE EXHAUST FAN VARIABLE PITCH BLADES AS REQUIRED TO MAINTAIN .10 TO .15" W.G. STATIC PRESSURE. THE VARIABLE PITCH BLADES WILL BE INTERLOCKED TO ALWAYS START UP AT 0" AIR VOLUME.

SUPPLY AIR FAN AND EXHAUST AIR FAN STATIC PRESSURE SENSORS (TRANSDUCERS) WILL BOTH BE REFERENCED TO OUTDOOR ATMOSPHERIC PRESSURE.

A MANUAL RESET TYPE FREEZE PROTECTION THERMOSTAT WILL BE LOCATED ACROSS THE INLET SIDE OF THE COOLING COIL, TO SHUT DOWN THE AIR SYSTEM AND CLOSE THE OUTDOOR AND EXHAUST AIR DAMPERS IN THE EVENT THE INCOMING AIR TEMPERATURE SHOULD FALL BELOW 35°F ADJUSTABLE. ONE (1) FREEZE PROTECTION THERMOSTAT FOR EACH TWENTY SQUARE FOOT OF COIL AREA.

THE BUILDING FIRE ALARM SYSTEM AND THE SMOKE DETECTOR WILL BE INTERLOCKED IN THE RETURN SYSTEM TO SHUT DOWN AIR SYSTEM UPON ACTIVATION OF EITHER FIRE ALARM SYSTEM OR SMOKE DETECTOR OR FROM MANUAL OPERATION OF FIREMAN'S CONTROL PANEL. SYSTEM WILL BE CAPABLE OF BEING PLACED IN FIRE MODE OPERATION FROM FIREMAN'S CONTROL PANEL. IN FIRE MODE OPERATION, THE SUPPLY FAN WILL SHUT DOWN, THE EXHAUST FAN WILL OPERATE, THE OUTSIDE AIR AND RETURN AIR DAMPERS SHALL CLOSE AND EXHAUST AIR DAMPER SHALL OPEN. FIRE MODE OPERATION WILL OVERRIDE ALL SAFETY AND OPERATING CONTROLS.

*VAD*

DISHWASHER EXHAUST FAN CONTROL

THE DISHWASHER EXHAUST FAN AND MOTORIZED EXHAUST AIR DAMPER WILL BE CONTROLLED BY A SWITCH.

MECHANICAL ROOM AND ELEVATOR MACHINE ROOM EXHAUST FAN

REVERSE ACTING ROOM THERMOSTAT, WHICH WILL ON A RISE IN SPACE TEMPERATURE, OPEN THE EXHAUST AIR DAMPER AND THE OUTDOOR AIR INTAKE DAMPER. WHEN THE EXHAUST AIR DAMPER HAS REACHED THE FULL OPEN POSITION, THE EXHAUST FAN WILL START. ON A FALL IN SPACE TEMPERATURE BELOW THE SETTING OF THE ROOM THERMOSTAT, THE EXHAUST FAN WILL STOP, THE EXHAUST AIR DAMPER AND OUTDOOR AIR DAMPER WILL CLOSE.

ELECTRICAL ROOM EXHAUST FAN (FOR ELECTRICAL ROOMS ON NINTH AND TENTH FLOOR)  
REVERSE ACTING THERMOSTAT TO CYCLE EXHAUST FAN TO MAINTAIN SETPOINT.

ELEVATOR MACHINE ROOM 003

REVERSE ACTING THERMOSTAT TO CYCLE EXHAUST FAN TO MAINTAIN SETPOINT.

EMERGENCY GENERATOR

MOTORIZED OUTDOOR AIR EXHAUST AIR AND RETURN AIR DAMPERS FOR THE EMERGENCY GENERATOR. WHENEVER THE EMERGENCY GENERATOR STARTS, THE OUTDOOR AIR INTAKE WILL OPEN. A ROOM THERMOSTAT IN THE MECHANICAL ROOM WILL POSITION THE EXHAUST AIR AND THE RETURN AIR DAMPER ACTUATORS TO MAINTAIN SETPOINT. DURING THIS PERIOD, THE OUTDOOR AIR WILL REMAIN IN THE FULL OPEN POSITION. ON EMERGENCY GENERATOR SHUTDOWN, THE OUTDOOR AIR DAMPER WILL GO CLOSED, THE EXHAUST AIR DAMPERS WILL GO CLOSED, AND THE RETURN AIR DAMPER WILL BE FULL OPEN.

ENTRANCE VESTIBULES 101 AND 155

HEATING ROOM THERMOSTAT WHICH SHALL CYCLE THE UNIT FAN AND A TWO-WAY, 2-POSITION HEATING CONTROL VALVE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE.

CHILLED WATER PUMP CONTROL EXISTING PHASE II MECHANICAL EQUIPMENT ROOM

THE CHILLED WATER PUMPS PROVIDED IN THE PHASE II MECHANICAL EQUIPMENT ROOM, WILL BE STARTED AND STOPPED FROM CARPCON AT 701 HOLMES STREET. ONE OF THE TWO PUMPS WILL SERVE AS A MAIN PUMP AND THE OTHER WILL SERVE AS A STANDBY PUMP. WHENEVER ONE OF THE PUMPS IS INDEXED TO BE STARTED, IF FOR SOME REASON IT DOES NOT START AS INDICATED BY A FLOW SWITCH IN THE COMMON DISCHARGE OF THE TWO PUMPS, THE SECOND PUMP WILL START AFTER A PERIOD OF 60 SECONDS HAS ELAPSED. START/STOP AND FLOW ALARM FUNCTIONS WILL BE CONNECTED FOR EACH PUMP TO CARPCON AT 701 HOLMES STREET.

BOILER WATER PUMP CONTROL EXISTING PHASE II MECHANICAL EQUIPMENT ROOM

THERE ARE TWO MAIN BOILER WATER PUMPS TO BE LOCATED IN THE EXISTING PHASE II MECHANICAL EQUIPMENT ROOM. ONE PUMP WILL BE A MAIN PUMP AND THE OTHER STANDBY PUMP. THE OPERATING PUMP WILL RUN YEAR-ROUND. CONTROLS WILL BE ADDED SO THAT WHEN ONE PUMP IS STARTED, IF IT SHOULD FAIL TO OPERATE AS SENSED BY A FLOW SWITCH IN THE COMMON DISCHARGE, THE SECOND PUMP WILL START AFTER A PERIOD OF 60 SECONDS HAS ELAPSED. START/STOP AND FLOW ALARM FUNCTIONS WILL BE CONNECTED FOR EACH PUMP TO CARPCON AT 701 HOLMES STREET.

DOMESTIC WATER TEMPERATURE CONTROL (TYPICAL OF 2)

PANEL MOUNTED RECEIVER-CONTROLLER WITH ITS ELEMENT LOCATED IN THE HOT WATER STORAGE TANK WHICH WILL CONTROL A 3-WAY HOT WATER VALVE IN THE BOILER WATER SYSTEM AS REQUIRED TO MAINTAIN A CONSTANT 195°F, ADJUSTABLE, DOMESTIC HOT STORAGE WATER TEMPERATURE.

HEAT EXCHANGER CONTROLLER

THE HOT WATER SUPPLY TEMPERATURE WILL BE RESET IN AN INVERSE RATIO TO OUTSIDE AIR TEMPERATURE BY A PANEL MOUNTED RECEIVER-CONTROL MODULATING IN PARALLEL THE BOILER WATER 3-WAY VALVES ON EACH OF THE HEAT EXCHANGERS. CONTROL SETTINGS WILL BE FULLY ADJUSTABLE AS TO RATIO AND TEMPERATURE SETTINGS. THE BOILER WATER 3-WAY VALVES WILL BE INTERLOCKED WITH THE HOT WATER PUMPS TO THAT THEY REMAIN CLOSED WHENEVER THE PUMPS ARE NOT OPERATING. RESET SCHEDULE AS FOLLOWS:

WATER TEMPERATURE	
180°F	0
173	10
167	20
161	30
155	40
150	50
146	60
142	70
130	80
80°F	180
130°F	150

FAN POWERED VAV BOXES WITH HOT WATER HEAT EACH FAN POWERED VAV BOX, WILL HAVE A DUAL PRESSURE DAY-NIGHT, HEAT-COOL ROOM THERMOSTAT AND DAMPER CONTROL MOTOR.

DURING THE "DAY" (OCCUPIED) CYCLE, THE VAV BOX FAN WILL BE ENERGIZED, AND RUN CONTINUOUSLY, THROUGH A PRESSURE-ELECTRIC SWITCH AND A ZONE DAY-NIGHT SIGNAL LINE. DAY-NIGHT CYCLES WILL BE INDEXED FROM THE MICROPROCESSOR PANEL LOCATED IN THE BUILDING ENGINEER'S OFFICE. SIX (6) ZONES OF OCCUPIED-UNOCCUPIED FOR THE FAN POWERED BOXES. PE SWITCH AND SIGNAL LINE WILL BE FURNISHED TO POSITIVELY TURN ON AND OFF VAV BOX FAN.

RETURN AIR FANS

THE RETURN AIR FANS SERVING THE THREE TWO-BAY SUITES ON THE SECOND FLOOR WILL BE PLACED ON THE SAME CONTROL ZONE AS THEIR RESPECTIVE FAN TERMINAL UNITS. THEY WILL RUN WHEN THEIR FAN TERMINAL UNITS RUN AND STOP WHEN THEY STOP.

DURING THE "DAY" (OCCUPIED) CYCLE THE ROOM THERMOSTAT WILL MAINTAIN SPACE TEMPERATURE BY MODULATING THE BOX DAMPER AND POSITIONING THE TWO-WAY PROPORTIONAL HOT WATER VALVE. UPON DEMAND FOR MAXIMUM COOLING, THE HEATING COIL VALVE WILL BE CLOSED AND THE BOX DAMPER WILL ALLOW FULL FLOW OF PRIMARY AIR THROUGH THE BOX INTO THE CONTROLLED SPACE. WHEN SPACE TEMPERATURE BEGINS TO FALL BELOW THE SETTING OF THE ROOM THERMOSTAT THE PRIMARY AIR DAMPER WILL MODULATE TO ITS MINIMUM POSITION. IF THE SPACE TEMPERATURE CONTINUES TO FALL BELOW ROOM THERMOSTAT SETTING, THE THERMOSTAT WILL POSITION THE HEATING COIL VALVE OPEN.

DURING "NIGHT" (UNOCCUPIED) CYCLE THE VAV BOX PRIMARY AIR DAMPER WILL BE 100% CLOSED AND ITS FAN SHUT DOWN THROUGH THE PRESSURE-ELECTRIC SWITCH AND DAY/NIGHT SIGNAL LINE. WHEN THE SPACE TEMPERATURE FALLS BELOW THE "NIGHT" SETTING OF THE ROOM THERMOSTAT, THE THERMOSTAT WILL CYCLE THE BOX FAN AND HEATING COIL VALVE OPEN TO PROVIDE HEATED RECIRCULATED AIR TO MAINTAIN THE DESIRED "NIGHT" SPACE TEMPERATURE. ROOM THERMOSTATS WILL BE INDEXED FROM "DAY-NIGHT" CYCLES OF OPERATION BY A ZONE "DAY-NIGHT" CONTROL LINE.

HOTEL - MAKE-UP AIR SYSTEM  
THE HOTEL MAKE-UP AIR SYSTEM WILL BE STARTED AND STOPPED FROM THE MICROPROCESSOR PANEL LOCATED IN THE BUILDING ENGINEER'S OFFICE. THIS SYSTEM WILL NORMALLY OPERATE CONTINUOUSLY 24 HRS A DAY. DURING THE "ON" CYCLE OF OPERATION, THE MAKE-UP AIR UNIT SUPPLY FAN AND THE TOILET EXHAUST FANS WILL RUN CONTINUOUSLY.

UPON INITIAL START-UP WHEN GOING FROM "OFF" CYCLE TO "ON" CYCLE OF OPERATION, THE OUTDOOR AIR DAMPER AND THE EXHAUST DAMPER ON THE TOILET EXHAUST ON THE 1ST FLOOR WILL FIRST OPEN TO 100% OPEN POSITION THEN THE SUPPLY AIR FAN AND THE EXHAUST FAN ON THE 1ST FLOOR AND THE REMAINING TOILET EXHAUST FAN WILL BE ALLOWED TO START.

PREHEAT COIL DISCHARGE AIR TEMPERATURE WILL BE MAINTAINED BY MODULATING THE 3-WAY MIXING VALVE AS REQUIRED OFF A DISCHARGE AIR CONTROLLER. THE PREHEAT COIL HOT WATER PUMPS ARE MAIN AND STANDBY. SHOULD EITHER THE MAIN PUMP FAIL TO START AS SENSED BY A FLOW SWITCH IN THE COMMON HOT WATER SUPPLY AFTER A PERIOD OF 60 SECONDS, THE STANDBY PUMP WILL START. THE PREHEAT COIL PUMPS WILL OPERATE BELOW 50°F OUTSIDE AIR TEMPERATURE AND WILL BE OFF ABOVE 50°F.

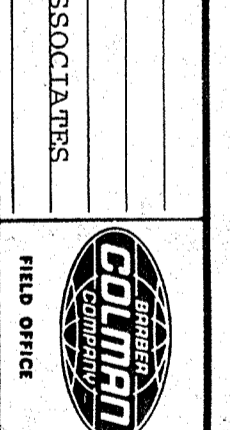
A MANUAL TYPE FREEZE PROTECTION TYPE THERMOSTAT WILL BE LOCATED ACROSS THE INLET SIDE OF THE COOLING COIL TO SHUT DOWN THE MAKE-UP AIR UNIT SUPPLY FAN, CLOSE THE OUTDOOR AIR INTAKE DAMPER, OPEN THE PREHEAT COIL VALVE, AND THE HEATING COIL VALVE FOR FULL FLOW OF WATER THROUGH THEIR RESPECTIVE COILS IN THE EVENT INCOMING AIR TEMPERATURE SHOULD FALL BELOW 35°F, ADJUSTABLE. ONE FREEZE PROTECTION THERMOSTAT FOR EACH 20 SQ. FT. OF COIL AREA.

4694

SO THAT THE SUPPLY FAN DRAWS AIR FROM THE SUPPLY DUCT SYSTEM AND EXHAUSTS IT TO THE FAN ROOM OUTSIDE AIR INTAKE.

REVISIONS	
DATE	CHANGES

JOB NAME	CAPITOL PLAZA HOTEL
LOCATION	FRANKFORT, KY.
ARCHITECT	N/A
ENGINEER	CARRIER & POSTER & ASSOCIATES
CONTRACTOR	STEWART MECHANICAL



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CHECKED	L.G.
DATE	10-26-83
	83-74943-14

GENERAL NOTES AND EQUIPMENT SCHEDULE

FAN COIL UNIT HOT WATER TEMPERATURE CONTROL

HOT WATER TEMPERATURE BEING SUPPLIED TO THE FAN COIL UNIT SYSTEM IN THE CHILLED-HOT WATER SUPPLY PIPE WILL BE MAINTAINED BY A PROPORTIONING 2-WAY HOT WATER CONTROL VALVE IN THE HOT WATER SUPPLY LINE AND A PROPORTIONING 2-WAY HOT WATER CONTROL VALVE IN THE HOT WATER RETURN LINE. HOT WATER TEMPERATURE WILL BE MAINTAINED BY A PANEL MOUNTED RESET RECEIVER-CONTROLLER, RECEIVING ITS SIGNAL FROM A TRANSMITTER IN THE OUTDOOR AIR. TEMPERATURE LIMITS WILL BE PROVIDED SO THAT THE DISCHARGE TEMPERATURE CANNOT EXCEED 130°F. RESET SCHEDULE AS FOLLOWS:  
OUTSIDE AIR  
WATER TEMPERATURE

40°F	100%	40	120
0°F	130%	20	115
		0	130

FAN COIL UNIT SYSTEM CHANGEVER CONTROL

THE CHANGEVER FROM HOT WATER TO CHILLED WATER AND CHILLED WATER TO HOT WATER SERVING THE FAN COIL UNIT SYSTEM WILL BE ACCOMPLISHED BY POSITIONING A CHILLED WATER VALVE IN THE CHILLED WATER SUPPLY LINE AND A CHILLED WATER VALVE IN THE CHILLED WATER RETURN LINE AND THE HOT WATER VALVE IN THE HOT WATER SUPPLY LINE AND THE HOT WATER VALVE IN THE HOT WATER RETURN LINE.

THE TWO-POSITION CHILLED WATER VALVES WILL BE CLOSED AND A DEADBAND WILL EXIST BEFORE THE HOT WATER VALVES ARE ALLOWED TO OPEN. THE HOT WATER VALVES WILL BE CLOSED FOR CHANGEVER, A DEADBAND WILL THEN EXIST BEFORE THE CHILLED WATER SUPPLY AND RETURN VALVES ARE ALLOWED TO OPEN. CHANGEVER BETWEEN THE HOT AND CHILLED WATER VALVES WILL BE BY AN OUTDOOR AIR CONTROLLER SET TO CHANGE OVER TO HOT WATER AT 35°F AND BACK TO CHILLED WATER AT 40°F OUTSIDE TEMPERATURE. BOTH SET POINTS WILL BE ADJUSTABLE FOR CHANGE OVER TO HOT WATER AND CHANGE OVER TO CHILLED WATER. A DEAD BAND OF 5 DEGREES OFF OUTSIDE TEMPERATURE WILL EXIST BETWEEN CHANGEVER POINTS.

CHILLED-HOT WATER PUMP CONTROL

THE CHILLED-HOT WATER PUMPS WILL RUN CONTINUOUSLY. THERE WILL BE A MAIN PUMP AND A STANDBY PUMP. IN THE EVENT OF MAIN PUMP FAILURE, AS SENSED BY A FLOW SWITCH IN THE COMMON DISCHARGE OF THE TWO PUMPS, THE STANDBY PUMP SHALL BE INITIATED AFTER 60 SECONDS OF NO FLOW OPERATION.

EXISTING DUAL DUCT SYSTEM

HEATS AND EQUIPMENT TO ENABLE SYSTEM TO AUTOMATICALLY GO TO FIRE MODE DOWN UPON ACTIVATION OF FIRE ALARM SYSTEM, FIRE SPRT IN RETURN AIR SYSTEM, OR FROM MANUAL OPERATION OF FIREMAN'S CONTROL PANEL. SYSTEM WILL BE CAPABLE OF BEING PLACED IN FIRE MODE OPERATION FROM THE FIREMAN'S CONTROL PANEL. IN FIRE MODE OPERATION THE SUPPLY FAN SHALL SHUT DOWN, THE EXHAUST FAN WILL SHUT DOWN, THE OUTSIDE AIR AND RETURN AIR DAMPERS WILL CLOSE AND THE EXHAUST DAMPER WILL CLOSE. FIRE MODE OPERATION WILL OVERRIDE ALL SAFETY AND OPERATING CONTROLS.

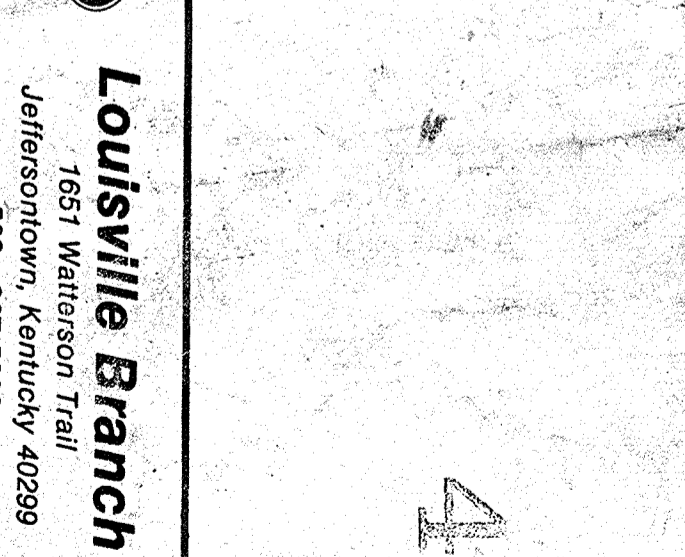
EXISTING TEMPERATURE CONTROLS IN AREAS B-4 AND B-5 OF THE CAPITOL PLAZA COMPLEX  
A ROOM THERMOSTAT WILL CONTROL THE RELOCATED DUAL DUCT BOXES AS REQUIRED TO MAINTAIN ROOM TEMPERATURE. UNIT HEATERS AND CABINET UNIT HEATERS  
SAME AS FOR ENTRANCES VESTIBULE 101 & 155.

TEMPERATURE CONTROL SEQUENCE

CONTROL VALVE MODULATES HOT WATER FLOW TO CONTROL A CONSTANT POOL RETURN WATER TEMPERATURE (80°F SWIMMING POOL, 95°F WHIRLPOOL, ADJUSTABLE). A HIGH LIMIT START IN THE SUPPLY WATER OVERRIDES CONTROL IN REQUIRED TO PREVENT SUPPLY WATER TEMPERATURE FROM EXCEEDING SETPOINT (95°F SWIMMING POOL, 107°F WHIRLPOOL, ADJUSTABLE).

REVISIONS	
DATE	CHANGES
3-27-84	1/6 E.L.I.T.

JOB NAME	CAPITOL PLAZA HOTEL
LOCATION	FRANKFORT, KY.
ARCHITECT	N/A
ENGINEER	CARRIER & POSTER & ASSOCIATES
CONTRACTOR	STEWART MECHANICAL



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