FAN COIL UNIT SEQUENCE OF OPERATION

A. SYSTEM CONTROL

1. THE FAN COIL UNIT SHALL BE MANUALLY INDEXED TO THE AUTOMATIC MODE AT THE STARTER H–O–A SWITCH.
2. THE FAN COIL UNIT SHALL BE ENERGIZED VIA REMOTE SIGNAL FROM THE BAS.
3. WHEN THE UNIT IS DEENERGIZED, ALL CONTROLS SHALL RETURN TO THEIR NORMAL POSITIONS READY FOR RESTARTING. COOLING AND HEATING COIL VALVES SHALL CLOSE.
4. A FAILURE OF THE FAN COIL UNIT SUPPLY FAN, AS SERVED BY ITS CURRENT SERVING RELAY SHALL BE ALARMED TO THE BAS. UPON SEEING FAILURE, THE BAS SHALL INDICATE ALARM, DISABLE THE UNIT AND RETURN ALL CONTROLS TO THEIR NORMAL POSITION.
5. THE BAS SHALL DETERMINE THE CONTROL MODE FOR THE FAN COIL UNIT, HEATING, DEADBAND OR COOLING, BY COMPARING THE SPACE TEMPERATURE TO THE HEATING TEMPERATURE SETPOINT (70°F–ADJ) AND THE COOLING TEMPERATURE SETPOINT (75°F–ADJ).
6. THE FAN COIL UNIT SHALL BE IN COOLING MODE WHEN THE SPACE TEMPERATURE EQUALS OR IS GREATER THAN THE COOLING TEMPERATURE SETPOINT.
7. THE FAN COIL UNIT SHALL BE IN HEATING MODE WHEN THE SPACE TEMPERATURE EQUALS OR IS LESS THAN THE HEATING TEMPERATURE SETPOINT.
8. THE FAN COIL UNIT SHALL BE IN DEADBAND MODE WHEN THE SPACE TEMPERATURE IS BETWEEN THE COOLING AND HEATING TEMPERATURE SETPOINTS.

B. TEMPERATURE CONTROL

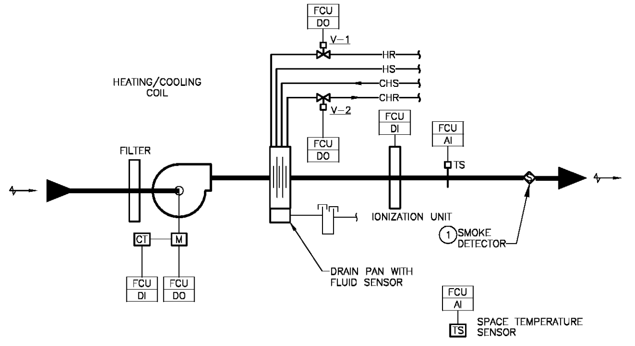
1. THE INDOOR FAN COIL UNIT SHALL BE CONTROLLED TO MAINTAIN THE OCCUPIED AND UNOCCUPIED INDOOR SPACE TEMPERATURE SETPOINTS. THE FAN COIL UNIT SUPPLY FAN SHALL ENERGIZE IN OCCUPIED MODE AND DEENERGIZE IN UNOCCUPIED MODE.
2. WHEN IN COOLING MODE, THE HEATING WATER VALVE V–2 SHALL BE FULLY CLOSED. UPON A RISE IN SPACE TEMPERATURE, THE COOLING COIL VALVE V–1 SHALL MODULATE OPEN TO MAINTAIN THE SETPOINT. UPON A DROP IN SPACE TEMPERATURE, THE REVERSE SHALL OCCUR.
3. WHEN IN HEATING MODE, THE COOLING COIL VALVE V–1 SHALL BE FULLY CLOSED. UPON A DROP IN SPACE TEMPERATURE, THE HEATING VALVE SHALL MODULATE OPEN TO MAINTAIN THE SETPOINT. UPON A RISE IN SPACE TEMPERATURE, THE REVERSE SHALL OCCUR.
4. WHEN IN THE DEADBAND MODE, THE CHILLED AND HEATING WATER VALVES SHALL BE FULLY CLOSED.

C. SMOKE CONTROL

1. UPON AN INITIATION SIGNAL FROM THE FIRE ALARM SYSTEM, OR UPON THE ASSOCIATED DEDICATED OUTDOOR AIR HANDLING UNIT. BEING DEENERGIZED BY ITS SMOKE CONTROL SEQUENCE, THE FAN COIL UNIT SHALL DEENERGIZE. WHEN THE FIRE/SMOKE ALARM IS RELEASED THE FAN COIL UNIT SHALL ENERGIZE AND ALL CONTROLS RETURN TO NORMAL.
2. FOR UNITS GREATER THEN 2000 CFM, ANY AIR DISTRIBUTION (HVAC) SMOKE DETECTOR SHALL, ON THE DETECTION OF PRODUCTS OF COMBUSTION, SHUT DOWN THE RESPECTIVE SUPPLY FAN SERVING THAT DISTRIBUTION SYSTEM AND CLOSE ALL SYSTEM DAMPERS IN ACCORDANCE WITH IBC CHAPTER 606. ALL HVAC SMOKE DETECTORS SHALL BE CONNECTED TO THE FIRE ALARM SYSTEM, AS A SUPERVISORY ALARM ONLY, IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA–72 – NATIONAL FIRE ALARM CODE.

D. ALARM

1. A WATER–LEVEL DETECTION DEVICE CONFORMING TO UL 508 SHALL BE PROVIDED THAT WILL SHUT OFF THE FAN COIL UNIT IN THE EVENT THAT THE PRIMARY DRAIN IS BLOCKED. THE DEVICE SHALL BE INSTALLED IN THE PRIMARY DRAIN LINE, OR IN THE EQUIPMENT–SUPPLIED DRAIN PAN, LOCATED AT A POINT HIGHER THAN THE PRIMARY DRAIN LINE CONNECTION AND BELOW THE OVERFLOW RIM OF SUCH PAN. UPON ACTIVATION OF THE WATER LEVEL DETECTION DEVICE, THE CEMS SHALL INDICATE ALARM, DISABLE THE UNIT AND RETURN ALL CONTROLS TO THEIR NORMAL POSITION.
2. UPON SIGNAL OF HIGH WATER DETECTION THE BAS SHALL DEENERGIZE THE FAN COIL UNIT.



NOTES:

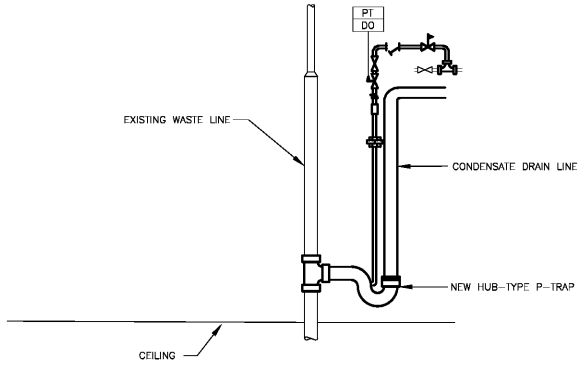
① SMOKE DETECTOR IN DUCTWORK TO REMAIN.

FAN COIL UNIT ①

TRAP PRIMER SEQUENCE OF OPERATION:

A. THE TRAP PRIMER SOLENOID VALVE SHALL BE CONTROLLED VIA THE BAS.

B. UPON A CALL TO OPEN FROM THE BAS, THE SOLENOID VALVE SHALL OPEN, PRIMING THE P–TRAP WITH WATER FROM THE CONNECTED DOMESTIC WATER LINE. UPON A CALL TO CLOSE, THE SOLENOID VALVE SHALL CLOSE, PREVENTING WATER FROM ENTERING THE P–TRAP FROM THE DOMESTIC WATER LINE.

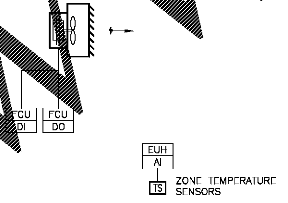


TRAP PRIMER ③

ELECTRIC UNIT HEATER SEQUENCE OF OPERATION:

A. THE UNIT HEATER SHALL BE CONTROLLED VIA THE BAS.

B. THE SPACE TEMPERATURE SENSOR SHALL CYCLE THE UNIT HEATER FAN AND HEATING ELEMENT TO MAINTAIN ITS SETTING OF 50 DEGREES (ADJ). WHEN THE SPACE TEMPERATURE DROPS BELOW ITS SETPOINT, THE TEMPERATURE SENSOR CONTACTS SHALL CLOSE, THE HEATING ELEMENT AND FAN SHALL ENERGIZE. WHEN THE SPACE TEMPERATURE EXCEEDS THE SETPOINT TEMPERATURE, THE THERMOSTAT CONTACTS SHALL OPEN AND THE HEATING ELEMENT AND FAN SHALL DE–ENERGIZE. THE CYCLE SHALL REPEAT ITSELF THROUGH THE HEATING SEASON AS NEEDED.



ELECTRIC UNIT HEATER ④

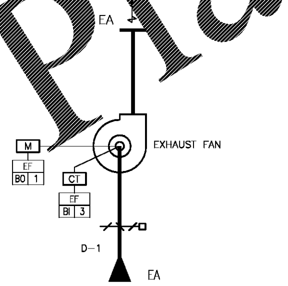
EXHAUST FAN SEQUENCE OF OPERATION:

A. SYSTEM CONTROL

1. THE EXHAUST FANS SHALL BE ENERGIZED VIA REMOTE SIGNAL FROM THE BAS. THE BAS SHALL DETERMINE AND OPERATE THE UNIT ON AN OPTIMAL OCCUPIED AND UNOCCUPIED SCHEDULE WITH A 365 DAY/24 HOUR GRAPHIC INTERFACE SCHEDULE PROGRAM.
2. WHEN THE EXHAUST FAN IS DEENERGIZED THROUGH THE BAS, ALL CONTROLS SHALL RETURN TO THEIR NORMAL POSITION READY FOR RESTARTING. THE EXHAUST FAN SHALL DEENERGIZE AND, AFTER AN ADJUSTABLE INTERVAL, ISOLATION DAMPER D–1 SHALL CLOSE.
3. WHEN ENERGIZED, EXHAUST FAN SHALL START AND RUN CONTINUOUSLY AFTER ISOLATION DAMPER D–1 HAS BEEN PROVEN OPEN AND THE AIR HANDLING UNIT SERVING THE FLOOR IS ENERGIZED.

B. ALARMS & FAILURE MODES

1. A FAILURE OF THE EXHAUST FAN, AS SENSED BY ITS RESPECTIVE CURRENT TRANSDUCERS, SHALL BE ALARMED TO THE BAS. UPON SENSING FAILURE, THE BAS SHALL INDICATE ALARM AND DISABLE THE FAILED FAN.

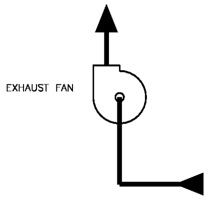


GENERAL EXHAUST FAN ②

KILN EXHAUST FAN SEQUENCE OF OPERATION:

A. KILN EXHAUST FAN IS INTERLOCKED WITH KILN OPERATION.

B. WHEN THE KILN IS DEENERGIZED, ALL CONTROLS SHALL RETURN TO THEIR NORMAL POSITION READY FOR RESTARTING. THE KILN EXHAUST FAN SHALL DEENERGIZE AFTER AN ADJUSTABLE INTERVAL.



KILN EXHAUST FAN ⑤

INPUT/OUTPUT SUMMARY

INPUTS						
MONITOR/CONTROL POINTS	AI – ANALOG INPUT	AO – ANALOG OUTPUT	DI – DIGITAL INPUT	DO – DIGITAL OUTPUT	MODBUS RTU/BACNET	
OUTSIDE AIR						
TEMPERATURE	X					
HUMIDITY	X					
GAS METER (PULSE FROM UTILITY)			X			
GENERATOR						
STATUS (RUNNING/STANDBY) ***			X			
ALARM ***			X			
OPERATING STATUS VARIABLES					X	
TYPICAL PUMP						
PUMP START/STOP				X		
PUMP STATUS			X			
PUMP VFD SPEED		X				
PUMP VFD DATA					X	
PUMP VFD BYPASS SIGNAL				X		
TYPICAL GAS BOILER						
BOILER MONITORING					X	
BOILER START/STOP				X		
BOILER ALARM			X			
BOILER PUMP START/STOP				X		
BOILER PUMP STATUS			X			
BOILER HEADER WATER TEMPERATURE	X					
BOILER SUPPLY TEMPERATURE	X					
BOILER SETPOINT ADJUSTMENT		X				
TYPICAL P–TRAP OR FLOOR DRAIN						
SOLENOID VALVE OPEN/CLOSE				X		
BOILER EMERGENCY CUTOFF BUTTON			X			
HVAC EMERGENCY CUTOFF BUTTON (IN ADMIN)			X			
TYPICAL ELECTRICAL UNIT HEATER						
ZONE TEMPERATURE	X					
HEATER ENABLE/DISABLE				X		
HEATER STATUS			X			

INPUTS						
MONITOR/CONTROL POINTS	AI – ANALOG INPUT	AO – ANALOG OUTPUT	DI – DIGITAL INPUT	DO – DIGITAL OUTPUT	MODBUS RTU/BACNET	
TYP. EXHAUST FAN						
ZONE TEMP (FOR FANS FOR TEMP CONTROL)	X					
FAN START/STOP				X		
FAN STATUS			X			
TYP. FAN COIL UNIT						
SPACE TEMPERATURE	X					
DISCHARGE AIR TEMPERATURE	X					
SUPPLY FAN START/STOP				X		
SUPPLY FAN STATUS			X			
COOLING START STOP				X		
HEAT START/STOP				X		
IONIZATION UNIT STATUS			X			
UNIT ALARM SIGNAL			X			
TYPICAL CHILLER (AIR COOLED)						
CHILLER START/STOP				X		
CHILLER DEMAND LIMIT SETPOINT		X				
CHILLED WATER RESET		X				
CHILLED WATER SUPPLY TEMPERATURE	X					
CHILLED WATER RETURN TEMPERATURE	X					
CHILLED WATER PUMP S/S				X		
CHILLED WATER PUMP STATUS			X			
CHILLED WATER PUMP SPEED		X				

GENERAL NOTES:

1. PROVIDE MULTIPLE STAGES OF CONTROL FOR UNITS WITH MULTIPLE STEPS OF CAPACITY.
2. WIRE THRU SMOKE DETECTORS FOR UNITS WITH OVER 2000 CFM, THAT SERCE CORRIDORS, AND/OR THAT HAVE ASSOCIATED SMOKE DAMPERS TO SHUT DOWN THE UNIT AND CLOSE THE SMOKE DAMPERS WHEN SMOKE IS PRESENT.
3. CO2 SENSORS RECOMMENDED FOR RTUS SERVING NON–ADMIN AREAS.
4. THE I/O POINT GRID TAKES PRIORITY WITH ANY SCOPE DISCREPANCIES.

*** FLAGGED POINTS ARE FED FROM THE MAIN ALC PANEL WHICH IS ON THE GENERATOR.

5. INCLUDE BATTERY BACKUP ON MAIN PANEL.

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FULTON COUNTY SCHOOL SYSTEM

RIVER EVES ELEMENTARY SCHOOL - RENOVATION

9000 EVES ROAD
ROSWELL, GA 30076

PROJECT NO: 18046.00

	50% CD'S	08/07/2018
	PERMIT SET	09/20/2018
	95% CD'S	11/08/2018
	BID SET	12/03/2018

DANIEL NOTO

CONTRACT DOCUMENT
ISSUED FOR
CONSTRUCTION

SHEET TITLE
MECHANICAL
CONTROL
DIAGRAMS

SHEET NUMBER
M301