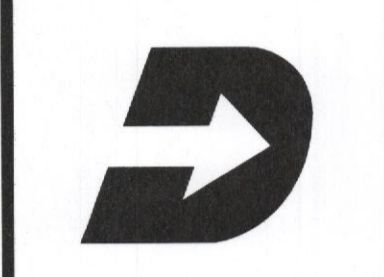


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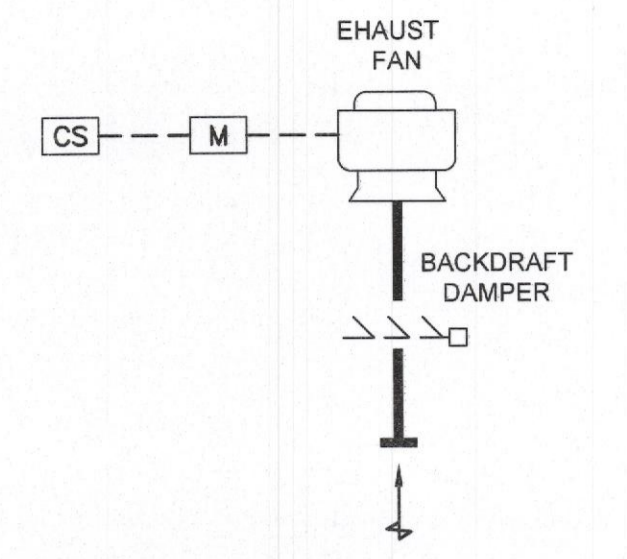
SHEET TITLE:
**MECHANICAL
SCHEMATIC AND
CONTROL DIAGRAMS**

DRAWING DATE:
01 APRIL 2017
DRAWN BY: MVM
REVIEWED BY: MGH
PROJECT # 2889
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M-201
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SEQUENCE OF OPERATION

1. TOILET EXHAUST FAN STARTER SHALL BE MANUALLY INDEED TO THE AUTOMATIC MODE AT THE STARTER HAND-OFF-AUTO SWITCH.
2. EXHAUST FANS SHALL BE INTERLOCKED TO START AND RUN WITH THE ROOFTOP AIR HANDLING UNIT. STARTING OF THE AIR HANDLING UNIT SUPPLY FAN SHALL START THE EXHAUST FAN.



2 TOILET EXHAUST FAN SCHEMATIC AND CONTROL DIAGRAM
S NONE

MASTER COOLING, HEATING, AND DEHUMIDIFICATION CONTROL

1. AIR HANDLING UNIT SHALL PROVIDE HEATED AND COOLED AIR TO MAINTAIN ACCEPTABLE INDOOR DESIGN CONDITIONS. THE AIR HANDLING UNIT MANUFACTURER INTERNAL CONTROL SYSTEM SHALL MAKE ALL HEATING AND COOLING DECISIONS IN RESPONSE TO DEVICES MEASURING SPACE TEMPERATURE. THE INTERNAL CONTROLS SHALL AUTOMATICALLY MODULATE THE EVAPORATOR COOLING COIL AND GAS-FIRED HEAT EXCHANGER TO MAINTAIN SPACE TEMPERATURE SETPOINTS.

TEMPERATURE CONTROL SEQUENCES

1. REFER TO FLOOR PLANS FOR LOCATIONS OF TEMPERATURE TRANSMITTERS, PANELS, DAMPERS, AND EQUIPMENT. WHERE DEVICES ARE NOT INDICATED, HOWEVER, REQUIRED BY THE SEQUENCES, DEVICES SHALL BE PROVIDED BY THE CONTRACTOR AND LOCATED IN AS DIRECTED BY THE OWNER.
2. AIR HANDLING UNIT MANUFACTURER SHALL PROVIDE SMOKE OR HEAT DETECTION DEVICES AS REQUIRED BY NFPA STANDARD 90A AND THE APPLICABLE MECHANICAL CODE. DETECTION DEVICES SHALL BE FACTORY MOUNTED. CONTROL AND POWER WIRING FOR DETECTION DEVICES SHALL BE PROVIDED BY DIVISION 16. DETECTION DEVICES SHALL PROVIDE AUTOMATIC SHUTDOWN OF THE HVAC SYSTEM IN ACCORDANCE WITH NFPA 90A AND THE APPLICABLE MECHANICAL CODE.
- ALL SAFETIES SHALL BE HARDWIRED.
4. REFER TO FLOOR PLANS AND EQUIPMENT SCHEDULES FOR LOCATIONS AND NUMBER OF UNITS.

SEQUENCE OF OPERATION

1. SYSTEM CONTROL
 - A. AIR HANDLING UNIT SHALL BE ENERGIED AND DE-ENERGIED BY A PROGRAMMABLE SPACE THERMOSTAT AND OPERATE ON AN OPTIMAL OCCUPIED/UNOCCUPIED SCHEDULE WITH A 65 DAY/24 HOUR GRAPHIC INTERFACE SCHEDULE PROGRAM.
 - B. WHEN THE AIR HANDLING UNIT IS DE-ENERGIED, CONTROLS SHALL RETURN TO THEIR NORMAL POSITIONS READY FOR RESTARTING. OUTSIDE AIR AND RETURN AIR DAMPERS SHALL CLOSE AND THE REFRIGERATION CIRCUIT, HEAT EXCHANGER AND SUPPLY FAN SHALL DE-ENERGIE.
 - C. A FAILURE OF THE SUPPLY FAN MOTOR, AS SENSED BY ITS CURRENT SWITCH, SHALL DE-ENERGIE THE UNIT AND SHALL ALARM AT THE UNIT CONTROLLER.
2. COOLING MODE
 - A. THE GAS HEAT EXCHANGER SHALL BE DE-ENERGIED DURING THE COOLING MODE.
 - B. THE SUPPLY AIR FAN SHALL RUN CONTINUOUSLY DURING THE OCCUPIED MODE.
 - C. THE AIR HANDLING UNIT INTERNAL CONTROL SYSTEM SHALL ENERGIE AND CONTROL THE DIRECT EXPANSION REFRIGERATION CIRCUIT AND STAGE COMPRESSORS TO MAINTAIN THE OCCUPIED MODE COOLING DISCHARGE TEMPERATURE SETPOINT.
 - D. DURING THE UNOCCUPIED MODE, THE AIR HANDLING UNIT SHALL BE DE-ENERGIED. DAMPERS AND CONTROLS SHALL RETURN TO NORMAL POSITIONS READY FOR RESTARTING. WHILE IN THE UNOCCUPIED MODE, THE AIR HANDLING UNIT SHALL ENERGIE WHEN THE ONE TEMPERATURE RISES ABOVE THE UNOCCUPIED TEMPERATURE SETPOINT OF 80°F (ADJUSTABLE) AND SHALL CONTINUE TO OPERATE UNTIL THE ONE TEMPERATURE REACHES 75°F (ADJUSTABLE).

HEATING MODE

- A. THE REFRIGERANT SYSTEM SHALL BE DE-ENERGIED DURING THE HEATING MODE.
- B. THE SUPPLY AIR FAN SHALL RUN CONTINUOUSLY DURING THE OCCUPIED MODE.
- C. OUTSIDE AIR, RETURN AIR, AND RELIEF AIR DAMPERS SHALL OPEN TO MINIMUM POSITIONS.
- D. THE AIR HANDLING UNIT INTERNAL CONTROL SYSTEM SHALL ENERGIE AND SEQUENCE STAGES OF THE HEAT EXCHANGER TO MAINTAIN THE OCCUPIED HEATING MODE DISCHARGE TEMPERATURE SETPOINT.
- E. DURING THE UNOCCUPIED MODE, THE AIR HANDLING UNIT SHALL BE DE-ENERGIED. DAMPERS AND CONTROLS SHALL RETURN TO NORMAL POSITIONS READY FOR RESTARTING. WHILE IN THE UNOCCUPIED MODE, THE AIR HANDLING UNIT SHALL ENERGIE WHEN THE ONE TEMPERATURE FALLS BELOW THE UNOCCUPIED TEMPERATURE SETPOINT OF 60°F (ADJUSTABLE) AND SHALL CONTINUE TO OPERATE UNTIL THE ONE TEMPERATURE REACHES 65°F (ADJUSTABLE).

ECONOMIZER

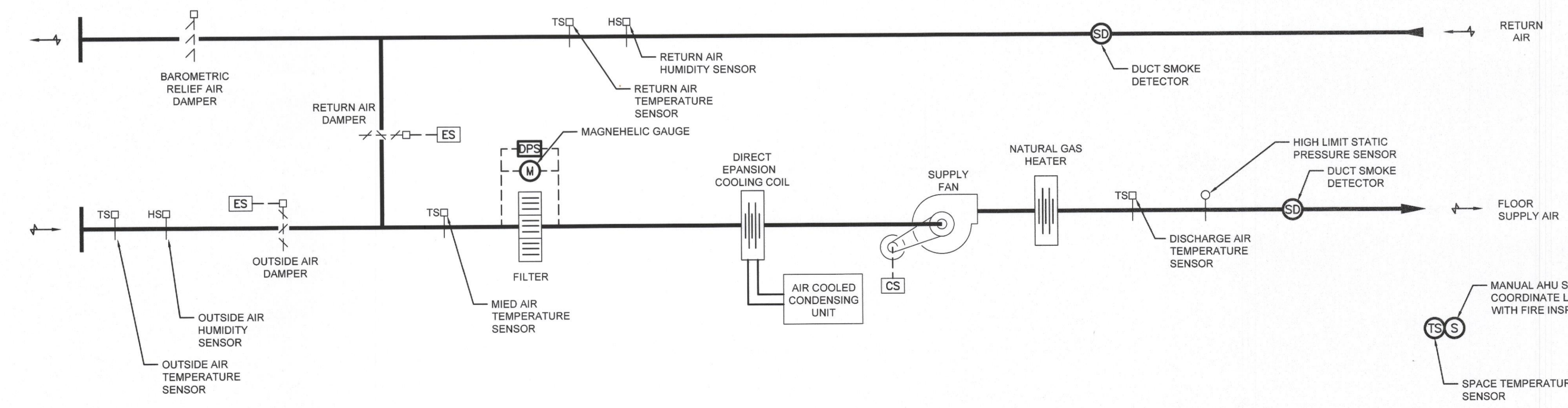
- A. SUPPLY AIR FAN SHALL BE RUNNING. RETURN AIR DAMPER SHALL BE OPEN AND OUTSIDE AIR DAMPER SHALL BE OPEN TO MINIMUM POSITION. OUTSIDE AIR AND RETURN AIR DAMPERS SHALL, THROUGH THE UNIT CONTROLLER, BE UNDER DIFFERENTIAL ENTHALPY CONTROL WHICH SHALL COMPARE THE CALCULATED ENTHALPY OF THE RETURN AIR AND OUTSIDE AIR. THE ECONOMIZER CYCLE SHALL BE ENABLED WHEN THE ENTHALPY DIFFERENTIAL IS GREATER THAN 7 BTU/LB ADJUSTABLE. THE ECONOMIZER CYCLE SHALL BE DISABLED WHEN THE CALCULATED ENTHALPY DIFFERENTIAL IS EQUAL TO THE DIRECT EXPANSION REFRIGERATION CIRCUITS AND GAS HEATING SEQUENCES.

SMOKE CONTROL

- A. UPON THE DETECTION OF PRODUCTS OF COMBUSTION, AIR HANDLING SYSTEM SMOKE DETECTORS SHALL DE-ENERGIE THE AIR HANDLING UNIT IN ACCORDANCE WITH NFPA STANDARD 90A. AIR HANDLING SYSTEM SMOKE DETECTORS SHALL BE CONNECTED TO THE FIRE ALARM SYSTEM AS A SUPERVISORY SIGNAL ONLY, IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA STANDARD 72, NATIONAL FIRE ALARM CODE.
- B. SMOKE DETECTORS SHALL BE HARDWIRED.

FILTERS

- A. DIFFERENTIAL PRESSURE TRANSMITTERS INSTALLED ACROSS THE FILTER BANK SHALL ALARM AT THE UNIT CONTROLLER WHEN THE HIGH DIFFERENTIAL PRESSURE SETPOINT IS REACHED.



1 ROOFTOP AIR HANDLING UNIT SCHEMATIC AND CONTROL DIAGRAM
S NONE