

**CONSTANT VOLUME AHU - SEQUENCE OF OPERATION**

A PROGRAMMABLE CONTROLLER CAPABLE OF STAND-ALONE OPERATION SHALL CONTROL THE UNIT.

**GENERAL:** THE UNIT IS A CONSTANT VOLUME AHU WITH A DX COIL FOR COOLING, ELECTRIC HEATING COIL IN THE REHEAT POSITIONS, ECONOMIZER COOLING CAPABILITY, AND DEHUMIDIFICATION CONTROL.

**FAN CONTROL (GENERAL):** THE SUPPLY FAN WILL BE CONTROLLED BY A FULL VOLTAGE NON-REVERSING STARTER. WHEN THE SWITCH IS IN THE HAND POSITION, THE FAN WILL RUN CONTINUOUSLY. WHEN THE SWITCH IS IN THE OFF POSITION THE FAN WILL NOT OPERATE.

**UNOCCUPIED MODE:** THE SUPPLY FAN WILL BE INDEXED OFF AND WILL REMAIN OFF UNTIL THE START OF AFTERHOURS MODE OR OCCUPIED MODE. THE RETURN AIR DAMPER WILL REMAIN OPEN AND THE OUTSIDE AIR WILL REMAIN CLOSED.

**AFTERHOURS MODE:** ON A CALL FOR AFTERHOURS OPERATION THE SUPPLY FAN WILL BE ENABLED AND THE UNIT WILL CONTROL AS IF IT WERE IN OCCUPIED MODE. THE UNIT WILL STAY IN AFTERHOURS OVERRIDE UNTIL THE OVERRIDE TIMER EXPIRES OR UNTIL THE START OF AN OCCUPIED CYCLE, WHICHEVER OCCURS FIRST. THE OVERRIDE TIME (2 HRS.) CAN BE ADJUSTED AT THE OPERATOR'S WORKSTATION.

**OCCUPIED MODE:** THE SUPPLY FAN WILL BE ENABLED AND WILL RUN CONTINUOUSLY AND THE OUTSIDE AIR DAMPER WILL MODULATE OPEN TO ITS MINIMUM POSITION, AS SPECIFIED BY THE BALANCE CONTRACTOR.

**SUPPLY AIR TEMPERATURE RESET CONTROL:** HEATING AND COOLING SIGNALS WILL BE GENERATED BASED ON THE DEVIATION OF THE SPACE TEMPERATURE FROM CURRENT SPACE TEMPERATURE HEATING AND COOLING SETPOINTS. THE CURRENT SUPPLY AIR TEMPERATURE SETPOINT WILL RESET LINEARLY BASED ON THESE SIGNALS. ON A DROP IN SPACE TEMPERATURE BELOW THE CURRENT HEATING SETPOINT, THE UNIT WILL ENTER HEATING MODE. AS THE HEATING SIGNAL INCREASES THE CURRENT SUPPLY AIR TEMPERATURE SETPOINT WILL RESET LINEARLY TOWARD THE SUPPLY AIR TEMPERATURE HIGH LIMIT (95°F, ADJ.). ON A RISE IN SPACE TEMPERATURE ABOVE THE CURRENT SPACE TEMPERATURE COOLING SETPOINT, THE UNIT WILL ENTER COOLING MODE. AS THE COOLING SIGNAL INCREASES THE CURRENT SUPPLY AIR TEMPERATURE SETPOINT WILL RESET LINEARLY TOWARD THE SUPPLY AIR TEMPERATURE LOW LIMIT (55°F, ADJ.).

**SPACE TEMPERATURE CONTROL (DX/ELECTRIC):** IN COOLING MODE, STAGES OF MECHANICAL COOLING WILL BE ENABLED AND DISABLED, AS REQUIRED, TO MAINTAIN THE CURRENT SUPPLY AIR TEMPERATURE SETPOINT. IN HEATING MODE, HEAT WILL BE ENABLED AND DISABLED, AS REQUIRED, TO MAINTAIN THE CURRENT SUPPLY AIR TEMPERATURE SETPOINT. ADDITIONAL STAGES OF HEATING/COOLING WILL NOT BE ENABLED OR DISABLED IF THE SUPPLY AIR TEMPERATURE IS WITHIN +/- 5°F OF THE CURRENT SETPOINT. THIS IS DONE TO PREVENT EXCESSIVE CYCLING OF MECHANICAL EQUIPMENT.

**ECONOMIZER CONTROL (DRY BULB CONTROL):** WHEN THE OUTSIDE AIR TEMPERATURE (GLOBAL POINT) IS BETWEEN 55°F AND 50°F (ADJ.) AND THERE IS A REQUEST FOR COOLING THE ECONOMIZER MODE WILL BE ENABLED. DURING ECONOMIZER MODE THE CONTROLLER WILL MODULATE THE DAMPERS AS REQUIRED TO SATISFY THE CURRENT SUPPLY AIR TEMPERATURE SETPOINT. IN THIS MODE THE OUTSIDE AIR DAMPER IS OPEN 100% AND THE SETPOINT CANNOT BE MET, THEN ADDITIONAL COOLING CONTROL WILL BE ENABLED AS SPECIFIED IN THE 'SPACE TEMPERATURE COOLING' SECTION. AS THE SUPPLY AIR TEMPERATURE VARIES WITHIN THE RANGE OF 55°F TO 45°F, THE OUTSIDE AIR DAMPER WILL MODULATE CLOSED AS REQUIRED TO PREVENT FREEZING CONDITIONS.

**DEHUMIDIFICATION SEQUENCE:** ON A RISE IN SPACE HUMIDITY TO 60% RELATIVE HUMIDITY ALL SUPPLY AIR TEMPERATURE RESET SEQUENCES AND ECONOMIZER SEQUENCES SHALL BE OVERRIDDEN. OUTSIDE AIR DAMPERS SHALL RETURN TO THE MINIMUM POSITION REQUIRED TO SATISFY THE SPACE SETPOINTS AND THE HEAT PUMP'S REHEATATION CYCLE SHALL BE CYCLED. STAGES TO MAINTAIN A SAT SETPOINT OF 55°F. IF THE SPACE TEMPERATURE DROPS BELOW SETPOINT, THE HOT GAS REHEAT VALVE WILL OPEN TO PROVIDE REHEAT. UPON SPACE TEMPERATURE CONTINUING TO DROP, THE ELECTRIC HEAT WILL STAGE TO ASSIST.

**SPACE PRESSURE CONTROL (RELIEF DAMPER ONLY):** THE RELIEF DAMPER WILL MODULATE AS REQUIRED TO MAINTAIN THE SPACE PRESSURE SETPOINT (IN INCH, ADJ.).

**ALARMS:** THE FOLLOWING SOFTWARE ALARMS WILL BE GENERATED AND DISPLAYED AT THE OPERATOR'S WORKSTATION:

- SPACE TOO WARM (3°F GREATER THAN COOLING SETPOINT)
- SPACE TOO COLD (3°F LESS THAN HEATING SETPOINT)
- BAD SPACE TEMP SENSOR ALARM (GREATER THAN 120°F OR LESS THAN 40°F)
- HIGH SUPPLY AIR TEMP (5°F GREATER THAN CURRENT SETPOINT)
- LOW SUPPLY AIR TEMP (5°F LESS THAN CURRENT SETPOINT)
- BAD SUPPLY TEMP SENSOR ALARM (GREATER THAN 180°F OR LESS THAN -20°F)
- HIGH MIXED AIR TEMP (GREATER THAN 85°F, ADJ.)
- LOW MIXED AIR TEMP (LESS THAN 45°F, ADJ.)
- BAD MIXED AIR TEMP SENSOR ALARM (GREATER THAN 180°F OR LESS THAN -20°F)
- BAD RETURN AIR TEMP SENSOR ALARM (GREATER THAN 180°F OR LESS THAN -20°F)
- SUPPLY FAN ALARM (COMMAND WITH NO STATUS)
- RETURN FAN ALARM (COMMAND WITH NO STATUS)
- FILTER ALARM (WHEN RUNTIME EXCEEDS 3000 HOURS, (ADJ.))
- FILTER ALARM (WHEN FILTER DIFFERENTIAL IS GREATER THAN 1" WC, MANUALLY ADJUSTABLE)

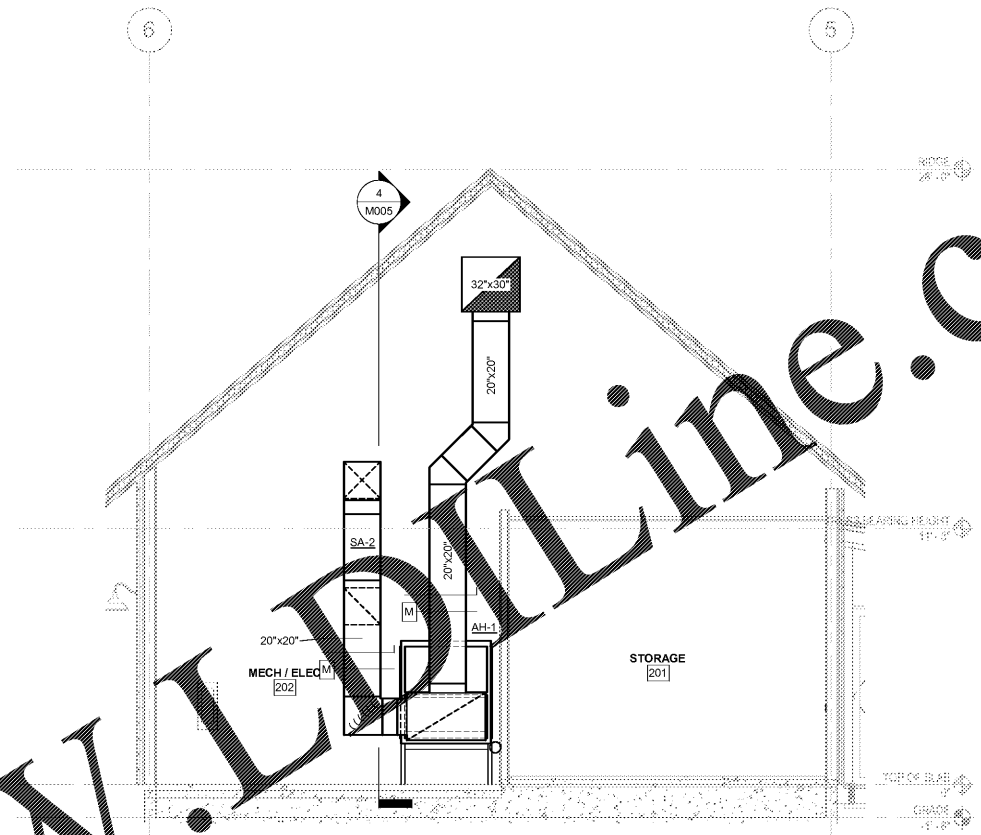
**SAFETIES:** THE FOLLOWING SAFETIES WILL BE MONITORED AS A STATUS INPUT AND WILL BE DISPLAYED AT THE OPERATOR'S WORKSTATION:

- FIRE ALARM/SMOKE DETECTOR. ON A SIGNAL FROM ANY SMOKE DETECTOR ASSOCIATED WITH THE UNIT THE SUPPLY FAN WILL BE DE-ENERGIZED VIA THE FACP RELAY MODULE (HARDWIRED INTERLOCK).
- EMERGENCY STOP SWITCH: AN EMERGENCY STOP SWITCH (ESS) WILL BE INSTALLED AND ACTIVATED LOCALLY. STOP THE SUPPLY FAN. THE STOP SWITCH WILL REQUIRE MANUAL RESET.
- FREEZE STAT: A LOW TEMPERATURE SWITCH (FREEZE STAT) INSTALLED IN THE OUTSIDE AIR STREAM WILL SHUT DOWN THE SUPPLY FAN (HARDWIRED INTERLOCK) AND RETURN ALL DAMPERS AND VALVES TO THEIR NORMAL POSITIONS WHENEVER THE MIXED AIR TEMPERATURE FALLS BELOW SETPOINT (38°F, MANUALLY ADJUSTABLE AND RESET).

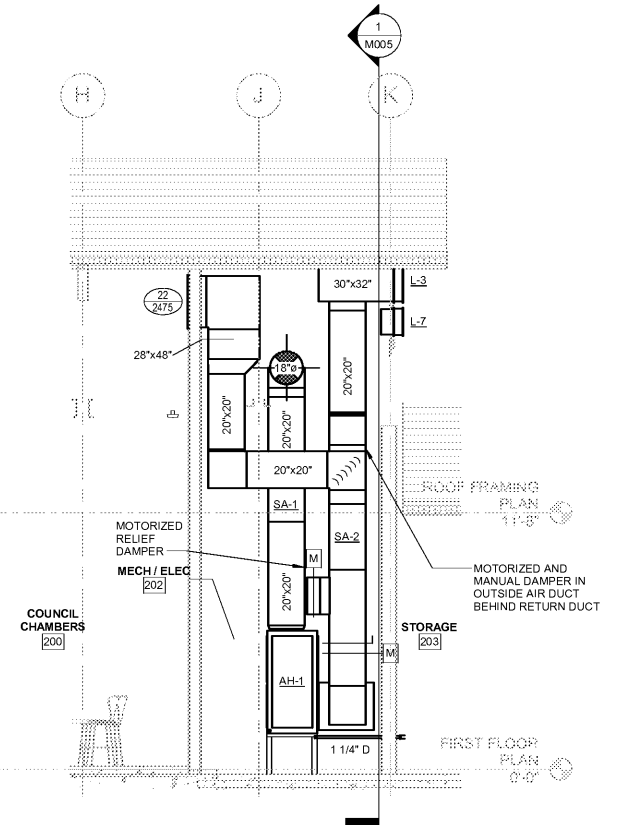
**UNIT SHUTDOWN HARDWARE POSITIONS:** WHEN THE AHU IS COMMANDED OFF, THE DAMPERS WILL BE COMMANDED TO THEIR NORMAL POSITIONS (RETURN AIR DAMPER 'OPEN' TO RETURN AIR AND OUTSIDE AIR DAMPER 'CLOSED' TO OUTSIDE AIR).

**3 AHU SCHEMATIC DIAGRAM AND SEQUENCE OF OPERATION**

M005 NOT TO SCALE



**1 OUTSIDE AIR LOUVER SECTION**  
M005 SCALE: 1/4" = 1'-0"



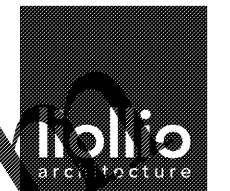
**4 MECH / ELEC 202 SECTION**  
M005 SCALE: 1/4" = 1'-0"

Revision	Date	Description

Town of James Island  
**James Island Town Hall**  
1122/1126 Dilts Bluff Road  
Charleston, SC.

Project Number:	15169-00
Checked By:	MAU
Drawn By:	EAG
Date:	4/3/2017
Scale:	As indicated

**M005**  
**MECHANICAL ELEVATIONS & ENLARGED VIEWS**



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