## COPY RM. 135 C-1 5 C-2 R2-30/16 1250 ART ROOM CONFERENCE ROOM TOILE MECH. EQUIP RM. 125 CONF. RM ADMINISTRATION NEW CHASE BY MC. PAINT TO MATCH EXISTING ASST. PRINCIPAL ADMIN. ASST. HVAC PLAN MES-M124 SCALE: 1/8" = 1'-0"

12

17

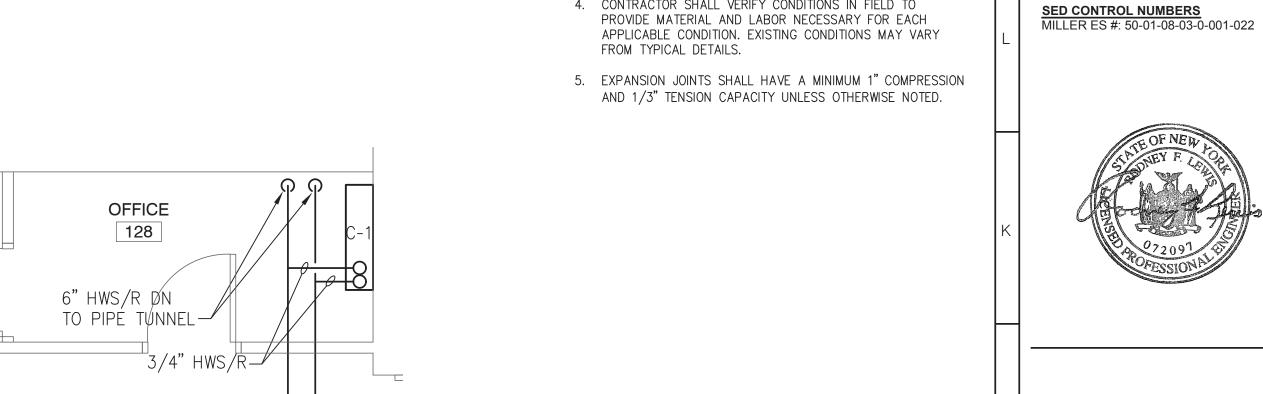
## **KEYED NOTES**

 $\bigcirc$  1 NOT USED.

- 2 EXISTING CONVECTOR HOUSING TO REMAIN. REPLACE ALL STEAM PIPING AND HEATING ELEMENTS WITH HYDRONIC. PROVIDE LINE
- SIZE MODULATING THERMOSTATIC VALVE WITH DDC ACTUATOR.  $\overline{\langle 3 \rangle}$  PROVIDE FINNED TUBE RADIATION (FTR-1) AND ENCLOSURE. SEE DETAIL 9/MES-M501. ENCLOSURE TO GO FROM UV TO WALL.
- ACTIVE FÍN TO COME WITHIN 12 INCHES OF EACH END. FIELD VERIFY DIMENSIONS. PROVIDE WITH UNIT VENTILATOR. PIPING TO BE SUPPLIED FROM PIPE TUNNEL BELOW. CONNECT TO EXISTING LOUVER. PROVIDE
- UNIT VENTILATOR WITH FALSE BACK AND INSULATED PIPE ENCLOSURE.
- 5 PROVIDE CONVECTOR. PIPING TO BE SUPPLIED FROM PIPE TUNNEL BELOW.

## GENERAL NOTES

- 1. UNLESS OTHERWISE NOTED, UV'S SHALL REUSE EXISTING OA LOUVER/GRILLE. PROVIDE AN AIRTIGHT ADAPTER TO FIT THE UV'S OA INLET.
- 2. EXISTING FLOOR TILES CONTAIN ASBESTOS MATERIALS. IF THE ACM MUST BE DISTURBED TO PENETRATE FLOOR OR ANY OTHER REASON, COORDINATE WORK WITH OWNER AND ENGINEER. OWNER SHALL PROVIDE THE ABATEMENT BY CERTIFIED PERSONNEL.
- 3. WHEN SETTING UV'S OR CASEWORK LEVEL FLOOR AS NECESSARY WITH NON ACM FLOOR TILES.
- 4. CONTRACTOR SHALL VERIFY CONDITIONS IN FIELD TO PROVIDE MATERIAL AND LABOR NECESSARY FOR EACH



TOILET

ET-1

3)" LPC

8"LPS─

EXISTING BOILER

EXISTING RAIL FR

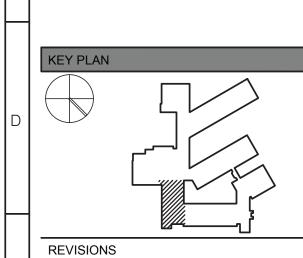
2 HVAC MECH. EQUIP RM. PLAN
MES-M124 SCALE: Custom

6"HWS∕R—



NANUET MILLER ES **HYDRONIC** CONVERSION 2020

103 Church St, Nanuet, NY 10954



	No.	Description	Date
	2	ADDENDUM 2	04/06/20
С			
l R I			

**ISSUED:** ISSUE FOR BID

**DATE:** MARCH 15, 2021 SCALE: As indicated

SHEET NAME: HVAC PLAN

SHEET NUMBER:

Schenectady, NY 12305

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NEW YORK OKLAHOMA NORTH

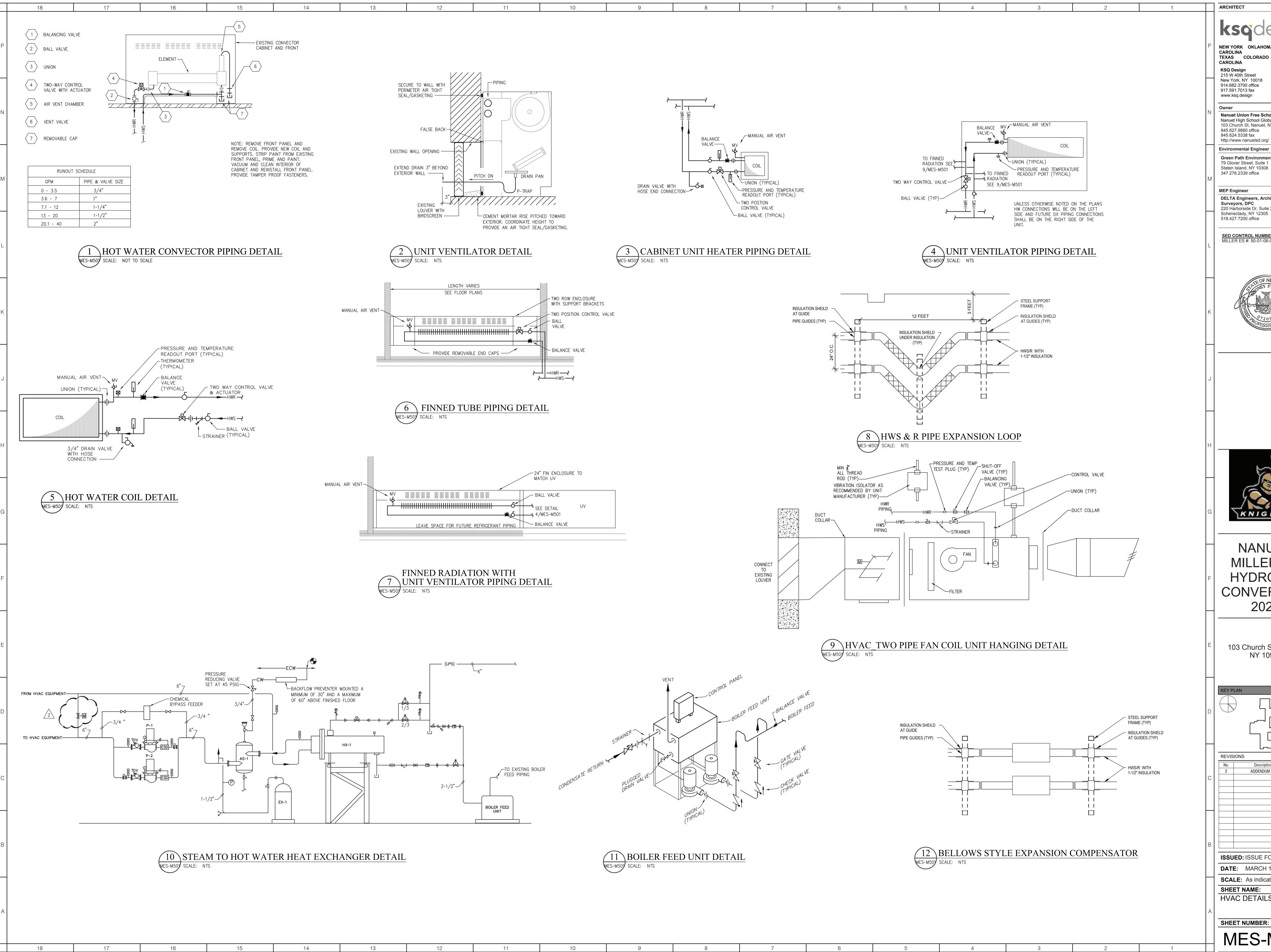
TEXAS COLORADO SOUTH

Nanuet Union Free School District

Nanuet High School Global Learning Commons 103 Church St, Nanuet, NY 10954

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MEP Engineer DELTA Engineers, Architects, & Land Surveyors, DPC 220 Harborside Dr, Suite 202

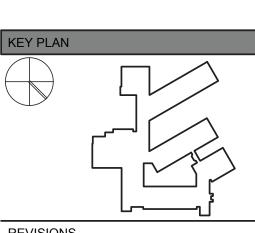
SED CONTROL NUMBERS
MILLER ES #: 50-01-08-03-0-001-022





NANUET MILLER ES **HYDRONIC** CONVERSION 2020

103 Church St, Nanuet, NY 10954



ADDENDUM 2

**ISSUED:** ISSUE FOR BID

**DATE:** MARCH 15, 2021

SCALE: As indicated

SHEET NAME: HVAC DETAILS

SHEET NUMBER:

B. LOCAL SPACE TEMPERATURE SENSOR SHALL BE CAPABLE OF SETPOINT ADJUSTMENT WITHIN A EMS DEFINED ADJUSTABLE RANGE. THE LOCAL SESNOR SHALL

ALSO BE CAPABLE OF OVERRIDING THE EMS UNOCCUPIED SCHEDULE TO ALLOW THE UNIT TO OPERATE TEMPORARILY IN THE OCCUPIED MODE FOR A EMS

1. THE ENERGY MANAGEMENT SYSTEM (EMS) SHALL INITIATE THE OCCUPIED / UNOCCUPIED MODE BASED ON TIME OF DAY SCHEDULE OR PROGRAMMED START.

2. UPON A CALL FOR HEAT AS SENSED BY ROOM TEMPERATURE SENSOR, MODULATE HEATING COIL 2-WAY VALVE TO MAINTAIN SPACE TEMP SETPOINT (70F ADJ)

17

A. PROVIDE FIELD MOUNTED DIRECT DIGITAL CONTROL (DDC) WITH LOW VOLTAGE ACTUATION.

HOT WATER COIL SEQUENCE OF OPERATION

DEFINED ADJUSTABLE RANGE.

E. SAFETIES AND ALARMS:

THE EXISTING UNIT IS TO REMAIN ESSENTIALLY UNCHANGED.

A. UNOCCUPIED SETPOINT 62°F (ADJUSTABLE) B. OCCUPIED SETPOINT 68°F (ADJUSTABLE)

INITIATE A SPECIFIC ALARM AT THE EMS:

ALARM SHALL BE GENERATED.

C. UPON A CALL FOR HEAT THE 2-WAY CONTROL VALVE SHALL MODULATE OPEN.

A. THE HOT WATER COIL IS TO OPERATE AS PART OF AN EXISTING H&V UNIT. THE CONTROL SEQUENCE OF

B. LOCAL SPACE TEMPERATURE SENSOR SHALL BE CAPABLE OF SETPOINT ADJUSTMENT WITH AN EMS

D. FREEZE PROTECTION IF THE OA TEMPERATURE IS LESS THAN 38°F (ADJUSTABLE) THE CONTROL VALVE

A. THE FOLLOWING SAFETIES, EACH WITH INDIVIDUAL RESETS, SHALL SHUTDOWN THE UV AND I

1. FREEZESTAT - IF ANY POINT ON THE FREEZESTAT SENSOR IS AT 36°F OR LOWER AND

2. HIGH SPACE TEMPERATURE ALARM - IF THE SPACE TEMPERATURE RISES 5 DEGREES

3. LOW SPACE TEMPERATURE ALARM - IF THE SPACE TEMPERATURE DROPS 3 DEGREES

4. UPON ACTIVATION OF THE BUILDING FIRE DETECTION SYSTEM, DISABLE FANS AND

6 HOT WATER COIL SEQUENCE OF OPERATION

ABOVE THE SETPOINT (ADJUSTABLE) FOR FIVE MINUTES OR LONGER WHILE HOT WATER IS

BELOW THE SETPOINT (ADJUSTABLE) FOR FIVE MINUTES OR LONGER WHILE HOT WATER

SHALL OPEN TO A MINIMUM OF 10% REGARDLESS OF THE SPACE TEMPERATURE.

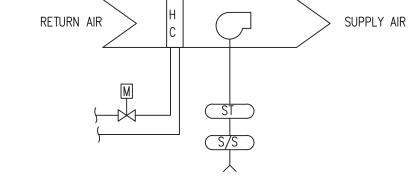
CIRCULATING AN ALARM SHALL BE GENERATED.

IS CIRCULATING AN ALARM SHALL BE GENERATED.

OUTSIDE AIR DAMPERS SHALL CLOSE.

DEFINED ADJUSTABLE PERIOD (0.5 TO 12 HOURS).

C. OCCUPIED MODE:



- A. PROVIDE FIELD MOUNTED DIRECT DIGITAL CONTROL (DDC) WITH LOW VOLTAGE ACTUATION.
- B. LOCAL SPACE TEMPERATURE SENSOR SHALL BE CAPABLE OF SETPOINT ADJUSTMENT WITHIN A EMS DEFINED ADJUSTABLE RANGE. THE LOCAL SESNOR SHALL ALSO BE CAPABLE OF OVERRIDING THE EMS UNOCCUPIED SCHEDULE TO ALLOW THE UNIT TO OPERATE TEMPORARILY IN THE OCCUPIED MODE FOR A EMS
- DEFINED ADJUSTABLE PERIOD (0.5 TO 12 HOURS).
- 1. THE ENERGY MANAGEMENT SYSTEM (EMS) SHALL INITIATE THE OCCUPIED / UNOCCUPIED MODE BASED ON TIME OF DAY SCHEDULE OR PROGRAMMED START. 2. UPON A CALL FOR HEAT AS SENSED BY ROOM TEMPERATURE SENSOR, ENERGIZE SUPPLY FAN AND MODULTE HEATING COIL 2-WAY VALVE TO MAINTAIN SPACE TEMP SETPOINT (70F ADJ)

OUTSIDE AIR

RETURN AIR

1. PROVIDE FIELD MOUNTED DIRECT DIGITAL CONTROL (DDC) WITH LOW VOLTAGE ACTUATION. 2. THE ENERGY MANAGEMENT SYSTEM (EMS) SHALL DEFINE THE OCCUPIED / UNOCCUPIED SCHEDULE.

THROUGH ITS NORMAL OCCUPIED CYLCE FOR THE DATE AND TIME SCHEDULED.

C. THE 2-WAY CONTROL VALVE SHALL MODULATE TO MAINTAIN SPACE TEMPERATURE

E. THE 2-WAY CONTROL VALVE SHALL MODULATE TO MAINTAIN SPACE TEMPERATURE.

i. THE SETPOINT TEMPERATURE SHALL REVERT TO THE UNOCCUPIED VALUE.

i. THE OUTSIDE AIR DAMPER SHALL CLOSE, AND THE AHU FAN SHUT DOWN.

ii. FOR 30 MINUTES THE EXHAUST FAN AND AHU FAN SHALL CONTINUE TO RUN.

ii. THE EXHAUST FAN SHALL SHUT DOWN AND THE ASSOCIATED DAMPER CLOSE.

iii. THE 2-WAY CONTROL VALVE SHALL MODULATE TO MAINTAIN SPACE TEMPERATURE

iii. IF THE OA TEMPERATURE IS ABOVE 40°F., THE HEATING CONTROL VALVE SHALL CLOSE.

A. THE FOLLOWING SAFETIES, EACH WITH INDIVIDUAL RESETS, SHALL INITIATE AN ALARM AT THE EMS:

i. IF THE FAN FAILS TO START OR RUN UPON COMMAND AN ALARM SHALL BE GENERATED.

WATER IS CIRCULATING AN ALARM SHALL BE GENERATED.

1. THE HEAT EXCHANGER (HX-1) CONTROL VALVE OPERATION SHALL BE SCHEDULED. THE CONTROL VALVES 5 & 6 SHALL MODULE TO MAINTAIN THE HOT WATER SUPPLY TEMPERATURE SETPOINT BASED ON THE FOLLOWING RESET SCHEDULE. VALVE 5 SHALL BE RATED FOR 1/3 OF FULL LOAD AND 6 FOR 2/3. THE VALVES SHALL BE OPERATED SEQUENTIALLY AS THE DEMAND INCREASES. IF THE DEMAND IS GREATER THAN 2/3 FULL LOAD THEN VALVE 6 SHALL BE FULL OPEN AND VALVE 5

OUTSIDE AIR TEMPERATURE BOILER SUPPLY TEMPERATURE

FROM ITS SCHEDULED SETPOINT, AND ALARM SHALL BE GENERATED.

180F

2. WHENEVER THE OUTSIDE AIR TEMPERATURE DROPS BELOW 65F(ADJ) THE LEAD DISTRIBUTION PUMP(P-1) SHALL START AND RUN CONTINUOUSLY. IF THE LEAD PUMP FAILS TO PROVE

DRIVE TO MAINTAIN THE DISTRIBUTION SYSTEM DOWNSTREAM PRESSURE SETPOINT(ADJ). THE

4. IF UNDER LOW LOAD CONDITION, WITH THE PUMP AT MINIMUM FLOW THE DOWNSTREAM PRESSURE EXCEEDS THE SETPOINT THE BYPASS VALVE SHALL MODULATE OPEN TO MAINTAIN THE PRESSURE

OPERATION, THE STANDBY PUMP(P-2) SHALL BECOME THE LEAD PUMP AND AN ALARM SHALL BE GENERATED. THE LEAD AND STANDBY PUMPS SHALL BE ALTERNATED WEEKLY TO EQUALIZE RUN

DOWNSTREAM PRESSURE SETPOINT SHALL BE RESET BY THE BALANCING CONTRACTOR TO MAINTAIN

SHALL MODULATE TO MEET THE LOAD.

35F AND ABOVE OF AND BELOW

SETPOINT AT ANY CRITICAL ZONES.

iv. IF THE OA TEMPERATURE IS LESS THAN 40° F. THE HEATING CONTROL VALVE SHALL OPEN.

THE ENTIRE AIRSTREAM ACROSS THE COIL. THE AHU FAN SHALL SHUT DOWN ONCE THE SPACE TEMPERATURE IS ACHIEVED.

CONTROL VALVE SHALL GO TO FULL HEAT POSITION, THE AHU AND EXHAUST FANS SHALL SHUT DOWN UNTIL THE ALARM IS CLEARED.

1 \AIR HANDLING UNIT SEQUENCE OF OPERATION

ii. IF THE ASSOCIATED EXHAUST FAN FAILS TO START OR RUN UPON COMMAND AN ALARM SHALL BE GENERATED.

B. THE ASSOCIATED EXHAUST FAN DAMPER SHALL OPEN AND UPON PROOF THE EXHAUST FAN SHALL RUN CONTINUOUSLY.

A. THE SPACE SETPOINT TEMPERATURE SHALL GO TO THE OCCUPIED VALUE.

C. THE SETPOINT TEMPERATURE SHALL RESET TO THE OCCUPIED VALUE. D. THE OUTSIDE AIR DAMPER SHALL OPEN TO THE MINIMUM POSITION.

OUTSIDE AIR DAMPER SHALL MODULATE TO FULL OPEN.

B. AT THE END OF THE POST OCCUPANCY PURGE:

SHALL BE GENERATED.

MES-M701/SCALE: NTS

B. THE EMS OPERATOR SHALL BE ABLE TO SCHEDULE SPEC IAL EVENTS IN ADVANCE. EVENTS MAY BE SINGLE OR MULTIPLE OCCURANCE. ONCE DEFINED THE AHU SHALL RUN

F. IF THE OUTSIDE AIR TEMPERATURE IS GREATER THAN 65° BUT LESS THAN THE SPACE TEMPERATURE AND THE SPACE TEMPERATURE IS GREATER THAN THE SETPOINT THE

v. IF THE SPACE TEMPERATURE DROPS BELOW THE SETPOINT FOR 10 MINUTES THE AHU FAN SHALL START, AND THE FACE AND BYPASS DAMPERS SHALL DIVERT

iii. FREEZESTAT -- IF ANY POINT ON THE FREEZE STAT IS LOWER THAN 36° F AN ALARM SHALL BE GENERATED. THE OUTSIDE AIR DAMPER SHALL CLOSE, THE 2-WAY

iv. HIGH SPACE TEMPERATURE ALARM - IF THE SPACE TEMPERATURE RISES 5° F ABOVE THE SETPOINT FOR A PERIOD OF FIVE MINUTES OR LONGER WHILE HOT

v. LOW SPACE TEMPERATURE ALARM - IF THE SPACE TEMPERATURE DROPS 3° F BELOW THE SETPOINT FOR A PERIOD OF FIVE MINUTES OR LONGER AND ALARM

vi. THE FIRE ALARM SYSTEM SHALL DISABLE ALL FANS AND SHUT DOWN THE AHU. THE AHU SHALL REMAIN DISABLED AHU THE FIRE ALARM IS CLEARED AND

3. LOCAL SPACE TEMPERATURE SENSOR SHALL BE CAPABLE OF SETPOINT ADJUSTMENT WITHIN AN EMS DEFINED RANGE. LOCAL SENSOR SHALL ALSO BE CAPABLE OF 2 HOUR

4. WARM UP MODE: 30 MINUTES BEFORE THE START OF THE OCCUPIED SCHEDULE THE AIR HANDLING UNIT (AHU) SHALL START WITH THE FOLLOWING PARAMETERS:

AIR HANDLING UNIT SEQUENCE OF OPERATION

A. ALL EMS SETPOINTS ARE ADJUSTABLE.

OVERRIDE OF THE EMS DEFINED UNOCCUPIED SCHEDULE.

B. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED

A. THE AHU FAN SHALL RUN CONTINUOUSLY.

6. UNOCCUPIED CYCLE:

7. SAFETIES AND ALARMS:

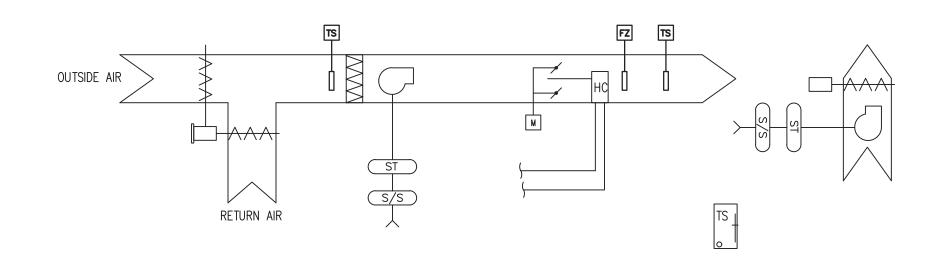
A. POST OCCUPANCY PURGE:

1. UPON ACTIVATION OF THE BUILDING FIRE DETECTION SYSTEM, DISABLE FAN.

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FINNED TUBE, CONVECTOR SEQUENCE OF OPERATION

CABINET UNIT HEATER SEQUENCE OF OPERATION



UNIT VENTILATOR SEQUENCE OF OPERATION

- 1. PROVIDE FIELD MOUNTED DIRECT DIGITAL CONTROL (DDC) WITH LOW VOLTAGE ACTUATION.
- 2. THE ENERGY MANAGEMENT SYSTEM (EMS) SHALL DEFINE THE OCCUPIED / UNOCCUPIED SCHEDULE.
- A. ALL EMS SETPOINTS ARE ADJUSTABLE.
- 3. LOCAL SPACE TEMPERATURE SENSOR SHALL BE CAPABLE OF SETPOINT ADJUSTMENT WITHIN AN EMS DEFINED RANGE. LOCAL SENSOR SHALL ALSO BE CAPABLE OF 2 HOUR OVERRIDE OF THE EMS DEFINED UNOCCUPIED SCHEDULE.
- 4. WARM UP MODE: 30 MINUTES BEFORE THE START OF THE OCCUPIED SCHEDULE THE UNIT VENTILATOR SHALL START WITH THE FOLLOWING PARAMETERS:
- A. THE SPACE SETPOINT TEMPERATURE SHALL GO TO THE OCCUPIED VALUE.
- B. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED
- C. THE FACE AND BYPASS DAMPERS SHALL MODULATE TO MAINTAIN SPACE TEMPERATURE.
- 5. OCCUPIED MODE: A. THE UNIT VENTILATOR FAN SHALL RUN CONTINUOUSLY.
- B. THE ASSOCIATED EXHAUST FAN DAMPER SHALL OPEN AND UPON PROOF THE EXHAUST FAN SHALL RUN CONTINUOUSLY.
- C. THE SETPOINT TEMPERATURE SHALL RESET TO THE OCCUPIED VALUE.
- D. THE OUTSIDE AIR DAMPER SHALL OPEN TO THE MINIMUM POSITION.
- E. THE FACE AND BYPASS DAMPERS SHALL MODULATE TO MAINTAIN SPACE TEMPERATURE. F. IF THE OUTSIDE AIR TEMPERATURE IS GREATER THAN 65° BUT LESS THAN THE SPACE TEMPERATURE AND THE SPACE TEMPERATURE IS GREATER THAN THE SETPOINT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULL OPEN.
- 6. UNOCCUPIED CYCLE:
  - A. POST OCCUPANCY PURGE: i. THE SETPOINT TEMPERATURE SHALL REVERT TO THE UNOCCUPIED VALUE.
  - ii. FOR 30 MINUTES THE EXHAUST FAN AND UNIT VENTILATOR FAN SHALL CONTINUE TO RUN.
  - iii. THE FACE AND BYPASS DAMPERS SHALL MODULATE TO MAINTAIN SPACE TEMPERATURE.
  - B. AT THE END OF THE POST OCCUPANCY PURGE:
  - i. THE OUTSIDE AIR DAMPER SHALL CLOSE, AND THE UNIT VENTILATOR FAN SHUT DOWN. ii. THE EXHAUST FAN SHALL SHUT DOWN AND THE ASSOCIATED DAMPER CLOSE.
  - iii. IF THE OA TEMPERATURE IS ABOVE 40°F., THE HEATING CONTROL VALVE SHALL CLOSE. iv. IF THE OA TEMPERATURE IS LESS THAN 40° F. THE HEATING CONTROL VALVE SHALL OPEN.
  - v. IF THE SPACE TEMPERATURE DROPS BELOW THE SETPOINT FOR 10 MINUTES THE UNIT VENTILATOR FAN SHALL START, AND THE FACE AND
  - BYPASS DAMPERS SHALL DIVERT THE ENTIRE AIRSTREAM ACROSS THE COIL. THE UNIT VENTILATOR FAN SHALL SHUT DOWN ONCE THE SPACE TEMPERATURE IS ACHIEVED.
- 7. SAFETIES AND ALARMS:
- A. THE FOLLOWING SAFETIES, EACH WITH INDIVIDUAL RESETS, SHALL INITIATE AN ALARM AT THE EMS:
  - i. IF THE FAN FAILS TO START OR RUN UPON COMMAND AN ALARM SHALL BE GENERATED. ii. IF THE ASSOCIATED EXHAUST FAN FAILS TO START OR RUN UPON COMMAND AN ALARM SHALL BE GENERATED.
  - iii. FREEZESTAT -- IF ANY POINT ON THE FREEZE STAT IS LOWER THAN 36° F AN ALARM SHALL BE GENERATED. THE OUTSIDE AIR DAMPER CLOSE, THE FACE AND BYPASS DAMPER SHALL GO TO FULL HEAT POSITION, THE UNIT VENTILATOR AND EXHAUST FANS SHALL SHUT DOWN
  - iv. HIGH SPACE TEMPERATURE ALARM IF THE SPACE TEMPERATURE RISES 5° F ABOVE THE SETPOINT FOR A PERIOD OF FIVE MINUTES OR
  - LONGER WHILE HOT WATER IS CIRCULATING AN ALARM SHALL BE GENERATED.
  - v. LOW SPACE TEMPERATURE ALARM IF THE SPACE TEMPERATURE DROPS 3° F BELOW THE SETPOINT FOR A PERIOD OF FIVE MINUTES OR
  - vi. THE FIRE ALARM SYSTEM SHALL DISABLE ALL FANS AND SHUT DOWN THE UNIT VENTILATOR. THE UNIT VENTILATOR SHALL REMAIN

UNIT VENTILATOR WITH SEQUENCE OF OPERATION

DISABLED UNIT VENTILATOR THE FIRE ALARM IS CLEARED AND RESET.

GENERAL NOTES

ALL NEW CONTROLS SHALL BE DDC AND COMMUNICATE EITHER DIRECTLY OR VIA BACNET TO THE EXISTING SIEMENS HEAD END. PROVIDE FULL GRAPHICS INTERFACE.

CAROLINA TEXAS COLORADO SOUTH CAROLINA

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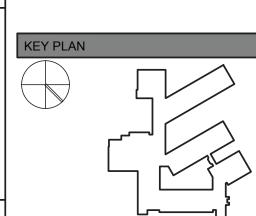
518.427.7200 office

<u>SED CONTROL NUMBERS</u> MILLER ES #: 50-01-08-03-0-001-022





103 Church St, Nanuet



REVISIONS

ADDENDUM 2

**ISSUED:** ISSUE FOR BID

**DATE:** MARCH 15, 2021 **SCALE:** As indicated

SHEET NAME: HVAC SEQUENCES OF

**OPERATION** 

SHEET NUMBER:

4 HEAT EXCHANGER SEQUENCE OF OPERATION WES-M701 SCALE: NTS

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