The new addition (except for the Town Hall Meeting Room) will be supplied tempered ventilation served by RTU-1. Each heat pump shall be connected to an outdoor 30 ton VRF air-cooled condenser. The auditorium and stage will be supplied tempered ventilation served by AHU-2.

Concessions
Ticketing

The new addition (except for the Town Hall Meeting Room) will be supplied tempered ventilation served by RTU-1. Each heat pump shall be connected to an outdoor 30 ton VRF air-cooled condenser. The auditorium and stage will be supplied tempered ventilation served by AHU-2.

H 3
H 4

Typical fin tube radiator to provide supplemental heat.

30 ton VRF condensing section consisting of (2) 15 ton modules serving the indoor heat pump terminal units.

42"x14" 42"x14"

Duct mounted humidifier
Duct mounted electric heating coil

Ductless cooling unit for environmental control of vault (typical for all vaults)

Typical floor mounted VRF heat pump unit to provide primary heating & cooling. Stairwells & entryways to be heated by hot water cabinet unit heaters (typical).

Vestibules & stairwells to be heated by hot water cabinet unit heaters (typical).
The existing building, except for the auditorium, will be supplied tempered ventilation served by AHU-1. Each occupied space will be a heat pump system serving the space with a heat exchanger. Each heat pump shall be connected to an outdoor 30 ton VRF air-cooled heat pump condensing unit.

The new addition, except for the Town Hall meeting room, will be supplied tempered ventilation served by RTU-1. Each occupied space will be a heat pump system serving the space with a heat exchanger. Each heat pump shall be connected to an outdoor 30 ton VRF air-cooled heat pump condensing unit.

Typical ceiling mounted radiant panel to provide supplemental heat.

Typical ceiling mounted supply diffuser to provide code-required ventilation air supplied by associated air handling unit.

Typical ceiling mounted return register.

Concrete supply line to outdoor air handling unit.

TYPICAL WALL MOUNTED HEAT PUMP TERMINAL UNIT PROVIDING PRIMARY HEATING & COOLING.

Condensate drain line to nearest mop sink or exterior splash block.

Typical condensate pump.

REFRIGERANT PIPING SIZED PER UNIT MANUFACTURER'S RECOMMENDATIONS.

TYPICAL CEILING MOUNTED SUPPLY DIFFUSER TO PROVIDE CODE-REQUIRED VENTILATION AIR SUPPLIED BY ASSOCIATED AIR HANDLING UNIT.

TYPICAL CEILING MOUNTED RETURN REGISTER.

TYPICAL WALL MOUNTED HEAT PUMP TERMINAL UNIT PROVIDING PRIMARY HEATING & COOLING.

CONDENSATE DRAIN LINE TO NEAREST MOP SINK OR EXTERIOR SPLASH BLOCK.

TYPICAL CONDENSATE PUMP.

TYPICAL FIN TUBE RADIATOR TO PROVIDE SUPPLEMENTAL HEAT.

TYPICAL WALL MOUNTED HEAT PUMP TERMINAL UNIT PROVIDING PRIMARY HEATING & COOLING.

TYPICAL WALL MOUNTED HEAT PUMP TERMINAL UNIT PROVIDING PRIMARY HEATING & COOLING.

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TYPICAL WALL MOUNTED HEAT PUMP TERMINAL UNIT PROVIDING PRIMARY HEATING & COOLING.
INDOOR AIR-HANDLING UNIT OF THE 100% OA DESIGN WITH ENERGY RECOVERY SERVING THE EXISTING BUILDING WITH APPROXIMATELY 1,500 CFM, 52 MBH HOT WATER COIL HEATING, 6 TON DX COOLING SECTION.

INDOOR AIR-HANDLING UNIT OF THE 100% OA DESIGN WITH ENERGY RECOVERY SERVING THE EXISTING BUILDING WITH APPROXIMATELY 3,500 CFM, 143 MBH HOT WATER COIL HEATING, 12.5 TON DX COOLING SECTION.

ROOFTOP AIR-HANDLING UNIT OF THE 100% OA DESIGN WITH ENERGY RECOVERY SERVING THE EXISTING BUILDING WITH APPROXIMATELY 2,800 CFM, 70 MBH HOT WATER COIL HEATING, 9 TON DX COOLING SECTION.

ROOFTOP AIR-HANDLING UNIT OF THE 100% OA DESIGN WITH ENERGY RECOVERY SERVING THE EXISTING BUILDING WITH APPROXIMATELY 1,500 CFM, 52 MBH HOT WATER COIL HEATING, 6 TON DX COOLING SECTION.

42"x14"

26"x10"

EXHAUST DUCT UP TO CUPOLA

INTAKE LOUVER WITH A MINIMUM OF 10 SQ. FT. OF FREE AREA.

REFRIGERANT PIPING SIZED PER UNIT MANUFACTURER ROUTED IN ATTIC SPACE
### HVAC Design Data

#### HEAT PUMP TERMINAL UNITS - INDOOR (VRF)

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<th>No.</th>
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<th>CFM</th>
<th>WPD</th>
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#### AIR COOLED CONDENSING UNITS

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#### AIR CONDITIONING DESIGN DATA

- **Design Area:**
  - **System:**
    - **Type:**
      - **Capacity (M-Bh):**
        - **Summer:**
          - **W.B.:**
            - **D.B.:**
        - **Winter:**
          - **W.B.:**
            - **D.B.:**

#### HOT WATER BOILER

- **Model:**
  - **CV:**
  - **CFM:**
  - **WPD:**
  - **HP:**
  - **VOLT:**
  - **PH:**
  - **RPM:**

#### GLYCOL FEEDERS

- **Model:**
  - **CV:**
  - **CFM:**
  - **WPD:**
  - **HP:**
  - **VOLT:**
  - **PH:**
  - **RPM:**

#### WATER PUMPS

- **Model:**
  - **CV:**
  - **CFM:**
  - **WPD:**
  - **HP:**
  - **VOLT:**
  - **PH:**
  - **RPM:**

#### EXPANSION TANKS

- **Model:**
  - **CV:**
  - **CFM:**
  - **WPD:**
  - **HP:**
  - **VOLT:**
  - **PH:**
  - **RPM:**

#### UNIT HEATERS (HEATING HOT WATER)

- **Model:**
  - **CV:**
  - **CFM:**
  - **WPD:**
  - **HP:**
  - **VOLT:**
  - **PH:**
  - **RPM:**

#### UNIT HEATERS (ELECTRIC)

- **Model:**
  - **CV:**
  - **CFM:**
  - **WPD:**
  - **HP:**
  - **VOLT:**
  - **PH:**
  - **RPM:**

### Additional Notes
- **Air-handling Unit Selections Based on "Greenheck":**
- **Electrical:**
  - **Pump:**
    - **Model:**
      - **CV:**
      - **CFM:**
      - **WPD:**
      - **HP:**
      - **VOLT:**
      - **PH:**
      - **RPM:**

---

### HVAC Schedule

- **Date:**
- **Scale:**
- **Drawn By:**
- **Reviewed By:**
- **Project No.:**
- **Coateset Town Hall - Schematic Design**
- **Town of Cohasset**
- **Schedules I - HVAC**

---

**Author:**

**3/6/2018 5:19:33 PM**
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**Ductless Cooling Unit Systems**

- **Units**
  - Style: CFM, ESP, TYPE
  - No.: SPEED, NO.
  - Manuf.: UNIT, MANUF.
  - Drive: TIP, SYST., PH
  - VHP: TYPE, CONTROL
  - Remarks: RPM

**Registers**

- Style: REGISTER
- No.: DIFFUSER
- Located: DIFFUSERS
- HUMIDIFIERS
- ELECTRIC HEATING
- RADIANT HEATING
- CONDENSATE PUMPS
- CHEMICAL SHOT FEEDERS
- SOUND ATTENUATORS
- EXHAUST FANS
- CONDENSER UNITS
- EVAPORATOR UNITS
- CONDENSER ASSOCIATED
- HEATING MBH
- HEATING MBH
- EVAPORATOR MBH
- MAX FUSE
- V PH
- CW COOLING MBH
- CONDENSER MBH
- MAX A.P.D. (PSI)
- NO.
- COIL
- TYPE
- PH
- V
- MAX SERVICE FPM
- 66 Hz
- 1 kHz
- 2 kHz
- 4 kHz
- 8 kHz
- DCUe-1
- DCUe-2
- DCUe-3
- EHC-1
- EHC-2
- EHC-3
- VPUMP
- PH
- TAG
- MODEL
- COOLING MBH
- MAX. FUSE
- V PH
- CFM
- COOLING MBH
- CONDENSER
- FA-1000AL
- MANUF. UNIT
- No.
- CF-1
- NO. SERVICE
- HHW
- 5.0
- SELECTION BASED ON "VECTOR"
**NOT TO SCALE**

**MODULAR PANEL IN T-BAR CEILING DETAIL**

**EXPANSION GAP DETAIL**

**TYPICAL WALL TRANSFER GRILLE W/ FIRE DAMPER**

**PIPING DETAIL-HEATING-HOT WATER**

**TYPICAL HORIZONTAL UNIT HEATER**

**SINGLE CIRCUIT RADIANT HEATING PANEL PIPING DETAIL**

**DIFFUSER/GRILLE CONNECTION TO BRANCH**

**PIPE / DUCT PENETRATION THROUGH ROOF DETAIL**

**MEMBRANE ROOF**

**NOT FOR CONSTRUCTION**

---

**Notes:**

1. Connection only to design or coordination to one set of drawings.

---

**Details:**

- **Diffuser/Grille Connection to Branch**
  - Air vent (typical)
  - Modulating control valve
  - Balancing valve. Each circuit shall have a minimum flow of 0.5 gpm.

- **Single Circuit Radiant Heating Panel Piping Detail**
  - To drawing
  - Typical isolation valve
  - Insulation
  - Pressure treated wood nailer

- **Typical Tee Duct Connection**
  - To drawing
  - Insulation
  - Membrane roof

- **Pipe / Duct Penetration Through Roof Detail**
  - To drawing
  - Insulation
  - Pressure treated wood nailer
  - Build up structural mastics

---

**Notes:**

- **Air Flow**
  - To drawing
  - Fire damper
  - Balanced ventilation

- **Typical Wall Transfer Grille W/ Fire Damper**
  - To drawing
  - Fire damper
  - Balanced ventilation
  - On wall elements

---

**Symbols:**

- **Room Thermostat**
  - To drawing
  - Ball valve
  - Union
  - Aqualast
  - Room thermostat

---

**References:**

- **SMACNA Standards**
  - Duct gauge per
  - 45° branch duct connection
  - Stainless steel hose clamp
  - Cuff
  - Volume Control Damper located as close to main as possible

---

**Construction Notes:**

- **Stainless Steel Hose Clamp**
  - To drawing
  - 45° branch duct connection
  - Cuff
  - Volume Control Damper located as close to main as possible

---

**Diagram Details:**

- **Riser Tube**
  - To drawing
  - Insulation
  - Pressure treated wood nailer
  - Sealing mastic around joint

---

**Additional Notes:**

- **Fire Damper**
  - To drawing
  - Balanced ventilation
  - Wall elements

---

**Contact Information:**

- **McGinley Kalsow & Associates, Inc.**
  - 4 Highland Ave., Cohasset, MA 02025
  - 617.625.8901 - www.mcginleykalsow.com

---

**Scale:**

- 1/8" = 1'-0"
REFRIGERANT PIPING DIAGRAM

JOIST CLAMP - CONCENTRIC TYPE AS REQUIRED

BEAM CLAMP - CONCENTRIC TYPE AS REQUIRED

BOTTOM CHORD OF STEEL JOIST

NOTE: THE DEPTHS ABOVE DEPICT ALLOWABLE CONNECTIONS TO BE USED DURING CONSTRUCTION. EXTERNAL EQUALIZER JOINTS SHALL BE PROVIDED WHERE THE ABOVE CONDITIONS ARE NOT POSSIBLE.

JOIST AND BEAM ATTACHMENTS

REMOVABLE CORE TYPE (TYP)

NOT FOR CONSTRUCTION

DATE: 02/27/18

Scale: 1/8" = 1'-0"

Author: Checker: Reviewed By: Project No: 1762.00

Cohasset Town Hall - Schematic Design

Cohasset, MA

NOT TO SCALE

Details IV - HVAC

McGinley Kalsow & Associates, Inc.
41 Highland Ave.
Cohasset, MA
02025
617.625.8901 - www.mcginleykalsow.com

6/15/05 3:08:12 AM

HRIU & DCLU OUTDOOR EQUIPMENT SUPPORT SYSTEM

Chemical Shot Feeder Piping Detail

Externally-Pressurized Inline Expansion Joint Detail

No. 3 2 4   Broadw a y,   P. O.  B ox  4 5 2 4 8

S om ervil le,    M A    0 2 1 4   5
617.625.8901  -   www.mcginleykalsow.com

Details IV - HVAC

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Cohasset, MA
02025
617.625.8901 - www.mcginleykalsow.com

Details IV - HVAC

HRU & DCUc OUTDOOR EQUIPMENT SUPPORT SYSTEM

NOT TO SCALE

Chemical Shot Feeder Piping Detail

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Details IV - HVAC

HRU & DCUc OUTDOOR EQUIPMENT SUPPORT SYSTEM

NOTE:

FOR ROOF FLASHING, REFER TO ARCHITECTURAL DRAWINGS FOR DETAILED INSTRUCTIONS.

LIQUID SUCTION SERVICE VALVE (TYP)

SUCTION ACCUMULATOR

SIZE TO SUIT APPLICATION

VALVE-SPORLAN TYPE SVE, THERMOSTATIC EXPANSION

AIRFLOW EXTERNAL EQUALIZER (TYP)

REMOTE BULB ISOLATION VALVE

E V A P O R A T O R  C O IL

TRAP (TYP)

SITE GLASS (TYP)

SOLENOID VALVE

LIQUID LINE FILTER DRYER: REMOVABLE CORE TYPE (TYP)

REFRIGERANT PIPING: PROVIDE SUCTION LINES WITH ISOLATION VALVE, SUCTION ACCUMULATOR AND CHARGING CONNECTION. LIQUID LINE WITH SITE GLASS HAVING DOUBLE PORTS WITH CAPS, ETC FOR ADDITIONAL QUANTITIES, SIZES & INSTALLATION REQUIREMENTS. INSULATE PER SPECIFICATIONS. SIZING PER MANUFACTURER. PROVIDE ALUMINUM JACKET ON EXTERIOR PIPING.

PIPING INDICATED IS FOR SINGLE CIRCUIT; CONTRACTOR SHALL PROVIDE ADDITIONAL PIPING, VALVES, INSULATION, ETC FOR ADDITIONAL CIRCUITS & HOT GAS BYPASS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND GUIDELINE REQUIREMENTS & SPECIFICATIONS. CONFIRM, VERIFY & COORDINATE W/ UNIT MANUFACTURER FOR ALL PIPING QUANTITIES, SIZES & INSTALLATION REQUIREMENTS.

CONSTRUCTION AND MOUNTING EQUIPMENT shall be coordinated with any equipment by the HVAC contractor prior to engineering support.

HRU & DCUc OUTDOOR EQUIPMENT SUPPORT SYSTEM

NOTE:

FOR ROOF FLASHING, REFER TO ARCHITECTURAL DRAWINGS FOR DETAILED INSTRUCTIONS.

LIQUID SUCTION SERVICE VALVE (TYP)

SUCTION ACCUMULATOR

SIZE TO SUIT APPLICATION

VALVE-SPORLAN TYPE SVE, THERMOSTATIC EXPANSION

AIRFLOW EXTERNAL EQUALIZER (TYP)

REMOTE BULB ISOLATION VALVE

E V A P O R A T O R  C O IL

TRAP (TYP)

SITE GLASS (TYP)

SOLENOID VALVE

LIQUID LINE FILTER DRYER: REMOVABLE CORE TYPE (TYP)

REFRIGERANT PIPING: PROVIDE SUCTION LINES WITH ISOLATION VALVE, SUCTION ACCUMULATOR AND CHARGING CONNECTION. LIQUID LINE WITH SITE GLASS HAVING DOUBLE PORTS WITH CAPS, ETC FOR ADDITIONAL QUANTITIES, SIZES & INSTALLATION REQUIREMENTS. INSULATE PER SPECIFICATIONS. SIZING PER MANUFACTURER. PROVIDE ALUMINUM JACKET ON EXTERIOR PIPING.

PIPING INDICATED IS FOR SINGLE CIRCUIT; CONTRACTOR SHALL PROVIDE ADDITIONAL PIPING, VALVES, INSULATION, ETC FOR ADDITIONAL CIRCUITS & HOT GAS BYPASS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND GUIDELINE REQUIREMENTS & SPECIFICATIONS. CONFIRM, VERIFY & COORDINATE W/ UNIT MANUFACTURER FOR ALL PIPING QUANTITIES, SIZES & INSTALLATION REQUIREMENTS.

CONSTRUCTION AND MOUNTING EQUIPMENT shall be coordinated with any equipment by the HVAC contractor prior to engineering support.

HRU & DCUc OUTDOOR EQUIPMENT SUPPORT SYSTEM

NOTE:

FOR ROOF FLASHING, REFER TO ARCHITECTURAL DRAWINGS FOR DETAILED INSTRUCTIONS.

LIQUID SUCTION SERVICE VALVE (TYP)

SUCTION ACCUMULATOR

SIZE TO SUIT APPLICATION

VALVE-SPORLAN TYPE SVE, THERMOSTATIC EXPANSION

AIRFLOW EXTERNAL EQUALIZER (TYP)

REMOTE BULB ISOLATION VALVE

E V A P O R A T O R  C O IL

TRAP (TYP)

SITE GLASS (TYP)

SOLENOID VALVE

LIQUID LINE FILTER DRYER: REMOVABLE CORE TYPE (TYP)

REFRIGERANT PIPING: PROVIDE SUCTION LINES WITH ISOLATION VALVE, SUCTION ACCUMULATOR AND CHARGING CONNECTION. LIQUID LINE WITH SITE GLASS HAVING DOUBLE PORTS WITH CAPS, ETC FOR ADDITIONAL QUANTITIES, SIZES & INSTALLATION REQUIREMENTS. INSULATE PER SPECIFICATIONS. SIZING PER MANUFACTURER. PROVIDE ALUMINUM JACKET ON EXTERIOR PIPING.

PIPING INDICATED IS FOR SINGLE CIRCUIT; CONTRACTOR SHALL PROVIDE ADDITIONAL PIPING, VALVES, INSULATION, ETC FOR ADDITIONAL CIRCUITS & HOT GAS BYPASS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND GUIDELINE REQUIREMENTS & SPECIFICATIONS. CONFIRM, VERIFY & COORDINATE W/ UNIT MANUFACTURER FOR ALL PIPING QUANTITIES, SIZES & INSTALLATION REQUIREMENTS.

CONSTRUCTION AND MOUNTING EQUIPMENT shall be coordinated with any equipment by the HVAC contractor prior to engineering support.
VAULT HVAC SYSTEM

REFER TO SPECIFICATION

REQUIREMENTS

HUMIDIFIER

DDC CONTROLLER

PUMP

DESKTOP

WIRING BY ATC CONTRACTOR.

ELECTRIC REHEAT

Schematic Design

Cohasset, MA

Cohasset, MA

Schematic Design

Cohasset, MA

Cohasset, MA

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HEAT RECOVERY VRF SYSTEMS (HPT/HRU)

ALL CONDENSATE DRAIN PANS ASSOCIATED WITH EQUIP TO BE INTERLOCKED WITH HOISTWAY MANUFACTURER'S OVERFLOW DRAINAGE AND TO VACUUM SYSTEM TO PREVENT FLOODING.

ALARM

VARIABLE FREQUENCY DRIVE AND ECM INTERFACE

CURRENT VFD STATUS AND OPERATING CONDITIONS SHALL BE MONITORED.

WIRING BETWEEN SPLIT UNITS

ALL CONDENSATE DRAIN PANS ASSOCIATED WITH EQUIP TO BE MONITORED.

DRAFTLESS COOLING UNITS (DCU)

ALL CONDENSATE DRAIN PANS ASSOCIATED WITH EQUIP TO BE MONITORED.

ELEVATOR MACHINE ROOM VENTILATION/AC CONTROL

MOTORIZED DAMPER SHALL MODULATE OPEN TO MAINTAIN ELEVATOR MACHINE ROOM SPACE TEMP OF (80° F, ADJ.); MD SHALL FAIL OPEN UPON LOSS OF POWER OR OPEN AS COMMANDED BY FIRE ALARM SYSTEM.

IF ELEVATOR MACHINE ROOM TEMPERATURE RISES ABOVE 85 °F, THE DCU AC SYSTEM SHALL OPERATE TO MAINTAIN SPACE TEMPERATURE SETPOINT AND HOISTWAY MD SHALL CLOSE.

NOTE #1: ALL POINTS INDICATED ABOVE SHALL BE POINT MAPPED AND PROGRAMMED INTO THE BMS VIA BACNET COMPATIBLE CONTROLLER.

NOT FOR CONSTRUCTION

Date: 02/27/18
Scale: 1/8" = 1'-0"
Drawn By: Reader
Reviewed By: Checker
Project No: 1762.00

Controls III - HVAC

M3.2

THE BOILER PLANT SHALL ALLOW FOR TWO BOILERS TO CONTROL BUILDING HEATING HOT WATER SUPPLY TEMPERATURE. EACH BOILER SHALL BE ALLOWED TO RUN AND STAGE AS DETERMINED BY THE BOILER BURNER MANAGEMENT CONTROL SYSTEM (FURNISHED BY ATC CONTRACTOR, COORDINATED WITH BOILER/BURNER MANUFACTURER FOR A COMPLETE SYSTEM FUNCTIONALITY). AN ADJUSTABLE BOILER TEMPERATURE WATER RESET SCHEDULE, THROUGH THE BURNER MANAGEMENT CONTROL SYSTEM, WILL RESET THE HEATING HOT WATER SUPPLY TEMPERATURE TO MAINTAIN A SUPPLY WATER OF 150 DEGREES AT A 7 DEGREE OUTSIDE AIR TEMPERATURE. AS THE OUTSIDE AIR TEMPERATURE RISES, THE BOILER SUPPLY WATER TEMPERATURE WILL BE REDUCED BY A TEMPERATURE OF 65 DEGREES.

NOT FOR CONSTRUCTION

Date: 02/27/18
Scale: 1/8" = 1'-0"
Drawn By: 
Reviewed By: 
Author: Checker
Project No: 1762.00

Controls IV - HVAC

M3.3
THE VARIABLE AIR VOLUME AIR HANDLING UNIT CONSISTS OF A SUPPLY AIR AND EXHAUST AIR FAN WITH VFD, RECOVERY WHEEL WITH VFD, MODULATING GAS FURNACE AND DX COOLING. THE UNIT SHALL BE DDC THE UNIT IS SCHEDULED FOR AUTOMATIC OPERATION ON A TIME OF DAY BASIS FOR OCCUPIED AND PANEL BY DIV 260000 OCCUPIED/UNOCCUPIED SCHEDULES.

The variable volume air handling unit consists of a supply air and exhaust air fan with VFD, recovery wheel with VFD, modulating gas furnace and DX cooling. The unit shall be DDC. The unit is scheduled for automatic operation on a time of day basis for occupied and panel by DIV 260000 occupied/unoccupied schedules.

The unit operates in occupied, unoccupied, warm-up, cool-down and safety modes as follows:

- **Occupied Mode**: The outside and exhaust air dampers close and the recirculation damper opens. The energy recovery wheel is off. Once the recirculation damper end-switches make contact, the disabled. The HHW valve modulate up to 100% to maintain a discharge air temperature of 45°C (60°F ADJ). Is not maintained, the recirculation damper shall open, the outdoor air damper and exhaust air dampers remain closed and the energy recovery wheel shall be off. When the recirculation damper is open, the outdoor air damper shall open and the exhaust air damper shall close.

- **Unoccupied Mode**: The outside and exhaust air dampers close and the recirculation damper opens. The energy recovery wheel is off. When the recirculation damper end-switches make contact, the unit shall modulate its fan speed to 100% until the space humidity and/or temperature setpoint is maintained for 30 minutes (ADJ.).

- **Warm-Up Mode**: When the outside air humidity is above 60% RH the split DX system shall sub-cool the incoming outside air to 53°C (60°F ADJ.) and utilize the hot gas reheat coil if the average space temperature setpoint of 80°F (ADJ.) is not maintained, the recirculation damper shall open, the outdoor air damper and exhaust air dampers remain closed and the energy recovery wheel shall be off. When the recirculation damper is open, the outdoor air damper shall open and the exhaust air damper shall close.

- **Cool-Down Mode**: The outside and exhaust air dampers close and the recirculation damper opens. The energy recovery wheel is off. Once the recirculation damper end-switches make contact, the HHW valve modulate up to 100% to maintain a discharge air temperature of 45°C (60°F ADJ.) Is not maintained, the recirculation damper shall open, the outdoor air damper and exhaust air dampers remain closed and the energy recovery wheel shall be off. When the recirculation damper is open, the outdoor air damper shall open and the exhaust air damper shall close.

- **Safety Mode**: The outside air damper and exhaust air damper shall remain closed and the recirculation damper shall close. The energy recovery wheel is off. Once the recirculation damper end-switches make contact, the HHW valve modulate up to 100% to maintain a discharge air temperature of 45°C (60°F ADJ.) Is not maintained, the recirculation damper shall open, the outdoor air damper and exhaust air dampers remain closed and the energy recovery wheel shall be off. When the recirculation damper is open, the outdoor air damper shall open and the exhaust air damper shall close.

- **Economizer Mode**: The economizer shall be disabled when the outside air enthalpy is greater than the return air enthalpy. The economizer shall be enabled when the outside air enthalpy is less than the return air enthalpy.

- **Humidity Control**: The humidity controller shall maintain the space humidity setpoint & run for heat recovery whenever:
  - The unit return air temperature is 5°F (ADJ.) or more below the outside air temperature.

- **Temperature Control**: The temperature controller shall maintain the space temperature setpoint & run for cooling whenever:
  - The sensor shows a setpoint deviation of 4°F (ADJ.) or more below the sensor.

- **Smoking Detection**: The smoking detector shall activate if the supply air contains smoke. The smoking detector shall provide an alarm if the supply air contains smoke.

- **Fire Protection**: The fire protection system shall be activated if the supply air contains smoke. The fire protection system shall provide an alarm if the supply air contains smoke.

- **Smoke Detector**: The smoke detector shall be activated if the supply air contains smoke. The smoke detector shall provide an alarm if the supply air contains smoke.

- **Supplementary Equipment**: The supplementary equipment shall be activated if the supply air contains smoke. The supplementary equipment shall provide an alarm if the supply air contains smoke.

- **Condensation Control**: The condensation controller shall be activated if the supply air contains smoke. The condensation controller shall provide an alarm if the supply air contains smoke.

- **Malfunction Detection**: The malfunction detector shall be activated if the supply air contains smoke. The malfunction detector shall provide an alarm if the supply air contains smoke.

- **Automatic Control**: The automatic control system shall be activated if the supply air contains smoke. The automatic control system shall provide an alarm if the supply air contains smoke.

- **Emergency Shut Down**: The emergency shut down system shall be activated if the supply air contains smoke. The emergency shut down system shall provide an alarm if the supply air contains smoke.

- **Main Power Failure**: The main power failure system shall be activated if the supply air contains smoke. The main power failure system shall provide an alarm if the supply air contains smoke.

- **Backup Power**: The backup power system shall be activated if the supply air contains smoke. The backup power system shall provide an alarm if the supply air contains smoke.

- **Maintenance**: The maintenance system shall be activated if the supply air contains smoke. The maintenance system shall provide an alarm if the supply air contains smoke.

- **Supervisory Control**: The supervisory control system shall be activated if the supply air contains smoke. The supervisory control system shall provide an alarm if the supply air contains smoke.

- **Supervisory Equipment**: The supervisory equipment system shall be activated if the supply air contains smoke. The supervisory equipment system shall provide an alarm if the supply air contains smoke.

- **Supplementary Monitoring**: The supplementary monitoring system shall be activated if the supply air contains smoke. The supplementary monitoring system shall provide an alarm if the supply air contains smoke.

- **Condition Monitoring**: The condition monitoring system shall be activated if the supply air contains smoke. The condition monitoring system shall provide an alarm if the supply air contains smoke.

- **Alarm Monitoring**: The alarm monitoring system shall be activated if the supply air contains smoke. The alarm monitoring system shall provide an alarm if the supply air contains smoke.

- **Fault Monitoring**: The fault monitoring system shall be activated if the supply air contains smoke. The fault monitoring system shall provide an alarm if the supply air contains smoke.