

H.V.A.C. SPECIFICATIONS

GENERAL:

- A. Entire system shall be installed to meet all applicable Local, State and National Codes, current requirements of NFPA, State of Georgia Heating and Air Conditioning Code and National Electric Code.
B. HVAC Subcontractor shall have a current Class II Conditioned Air Contractors License for the state in which the project is being constructed.
C. These specifications and all accompanying HVAC drawings are intended to provide for all labor, materials, and equipment necessary for the installation of a complete and functioning HVAC system.
D. All equipment shall be installed in accordance with the manufacturer's written instructions. Installing contractor shall furnish fully functioning systems.
E. The accompanying drawings are schematic only and are not intended to show all fittings, transitions, connections, offsets, etc. unless specifically shown. Install work as closely as possible to conform to the structural conditions, equipment, and work of other trades and the intent of the drawings, without addition cost to the owner.
F. Drawings shall not be scaled. Refer to architectural drawings for dimensions. Refer to drawings of other trades and coordinate all equipment be installed in accordance with manufacturer's installation instructions.
G. Existing work is not necessarily installed as shown on the plans. Contractor is responsible for verifying actual job site conditions prior to ordering equipment and fabricating duct. Any discrepancies found shall be reported to the Owner/Engineer.
H. Furnish 3000 psi 6-inch-thick concrete pad for equipment where designated on the plan. Pads shall be reinforced with 6" x 6" 1010 wire and shall have chamfered edges. Concrete pads shall extend 6" beyond all sides of unit.
I. All equipment shall be labeled with black plastic engraved equipment tags with minimum 1" lettering.
J. Furnish Owner 3 bound copies of Operating and Maintenance Instructions on each piece of HVAC equipment at project closeout.
K. Furnish formal training to familiarize the Owner in the operation and maintenance of all the HVAC Systems including controls.

SHOP DRAWINGS:

- A. Submit pdf or 6 hard copy sets of Shop Drawings for approval of all HVAC equipment, accessories, insulation materials, and controls to be used on this project. Shop drawings shall be submitted before any materials or equipment incorporated in this work has been ordered. Shop drawings shall include the name and address of the manufacturer with items to be furnished and capacities and characteristics clearly marked.
B. Contractor shall obtain written approval from the engineer/ architect for the use of substitute materials claimed as equal to those specified 10 days prior to the bid date.
C. Equipment of greater or larger power, dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, conduit, motors, bases, and equipment spaces are increased. No additional costs will be approved for these increases, if larger equipment is approved. If minimum energy ratings or efficiencies of the equipment are specified, the equipment must meet the design requirements and commissioning requirements.
D. The equipment listed on the Drawings is considered basis of design equipment and has been used for the physical arrangement of the mechanical systems. When other equipment listed in the specifications as acceptable, equal or equipment which has received "prior approval" is used, it shall be the Contractor's responsibility to provide structural, ductwork, electrical, service clearances, or other changes required to accommodate the substituted equipment. Changes to use non basis of design equipment shall be made at no additional cost to the Owner. Submit a list of required changes along with all prior approval requests and shop drawing submittals.
E. Approval of shop drawings and or submitted data shall not relieve the contractor of the responsibility to comply with the requirements and intent of the plans and specifications with regard to dimensions, capacities, quantities, performance characteristics, etc.

DEMOLITION

- A. General requirements: the work includes the demolition or removal of all construction identified on the drawings necessary to accomplish the work. The drawings define the scope of the work but it is not intended that all items of demolition work be specifically indicated. After carefully reviewing the contract drawings and specifications to determine the intent, the contractor shall visit the site and determine the extent of the demolitions work required to properly complete the work under contract.
B. Protection of material and work: before beginning any cutting or demolition work, the contractor shall carefully survey the existing work and examine the drawings and specifications to determine the extent of work required. The contractor shall take all necessary precautions to insure against damage to existing work to remain in place, to be reused or to remain the property of the owner. Any damage to such work shall be required to be replaced at no additional cost to the owner.

ELECTRICAL:

- A. All line and low voltage control wiring shall be furnished by the HVAC Contractor. Provide complete wiring diagrams and all switches, starters, controls, relays, etc. necessary for a complete system. Run all wiring in EMT raceways.
B. Voltage and phase of mechanical equipment requiring power shall be designated by the Owner. Model numbers listed in mechanical equipment schedule shall not be construed to indicate electrical characteristics.
C. Piping, equipment, and other mechanical installations shall not be located within 42" of the front or 36" of the side of any electrical switchboards, panelboards, power panels, motor control centers, electrical transformers or similar electrical equipment. Piping and ductwork shall not pass through or above electrical equipment rooms except as required to serve those rooms.

DUCTWORK:

- A. Low Pressure, Metal: Fabricate of galvanized steel as per SMACNA Manual for HVAC Duct Construction Standards, tables 1-3 through 1-19 including associated details. Use water based joint and seam sealant, resistant to UV light when cured, UL 723 listed, and complying with NFPA requirements for class 1 ducts to seal joints. Duct tape is not an acceptable product. Seal duct in accordance with ASHRAE standard 90.1.
B. Low Pressure round duct shall be rated for 1 inch positive pressure per SMACNA (snap-lock ductwork is acceptable).
C. Insulated flexible round duct: Shall be Flexmaster Type 3M or equal products by Thermoflex, Cleveflex or Alco. Reinforced with steel wire helix encapsulated in the inner liner with silver mylar, glass reinforced outer jacket. Rated for 10" wg, positive pressure. Minimum R value = 6.0. Met UL 181 Class 1 air duct requirements. Flexible duct shall not exceed 4 feet in length and shall be supported 3 feet maximum on center with 3" wide by 26 gauge galvanized hangers. Duct shall be secured to branch ducts and outlets with stainless steel worm drive strap or nylon self-locking strap around the inner liner only.
D. All ductwork shall be supported in accordance with SMACNA Standards.

DUCT ACCESSORIES:

- A. Turning Vanes: Use single thick vanes in square elbows. Fabricate according to SMACNA HVAC Duct Construction Standards, Figures 2-2 through 2-7.
B. Manual Dampers: For rectangular duct. Opposed blade, constructed with galvanized gauge steel blades and equal to SMACNA DCS Fig. 2-15. End of damper operating rod shall be square to accommodate damper operator. Manual dampers 12" or smaller in height may be single blade type equal to SMACNA DCS Fig 2-14 constructed of galvanized sheet metal.
C. Round damper shall be SMACNA DCS Fig 2-14 with blade gauge as follows: 8" and smaller = 22 gauge, 9" - 12" = 20 gauge, 14" and larger = 18 gauge.
D. Access Doors: As per SMACNA Fig. 2-12.
E. Grille and register connections: As per SMACNA Fig. 2-16.
F. Fire dampers shall be curtain type and dynamically rated, U.L. Classified for 1 1/2 or 2 hour (as indicated on architectural) fire resistance.

PIPING:

- A. Refrigerant piping shall be ACR nitrogen charged tubing with joints made with Sil-Flo or equivalent high temperature (1200 degrees F.) brazing compound. Bleed dry nitrogen through piping during brazing process. After satisfactory leak test piping and system shall be evacuated and charged in accordance with the manufacturer's printed instructions.
B. Condensate drain piping: Type "L" drawn-temper copper tubing with soldered joints.

H.V.A.C. SPECIFICATIONS CONTINUED:

INSULATION:

- A. Ductwork: Insulate lined and unlined supply, outdoor air, and return ductwork within building envelope with 3/4 lb. 2" thick fiberglass blanket insulation with FSK jacket. (Use 3" insulation for duct outside of building envelope) Lap all joints 2" minimum, staple 4" o.c. and seal with vapor barrier adhesive reinforced with fiber glass mesh ("glas-fab"). Use Stik-clips 24" on center on bottom of 30" wide and larger ducts. Insulate top of all air device surfaces.
B. Refrigerant Pipe: Insulate with 3/4" thick flexible elastomeric insulation. Seal all joints with adhesive. Slip whole sections of insulation on piping before pipe joints are made. Miter all elbows. Miter all elbows. Paint outdoor insulation two coats of manufacturer's recommended coating.
C. Duct Liner: 1 1/2 lbs. density, 1" thick with surface coated to prevent glass fibers from getting into airstream. Flame spread rating less than 25 and smoke spread rating less than 50. Adhere liner and cover entire surface with thick coat of adhesive that complies with NFPA 90A and ASTM C916. Fasten liner with weld pins 12" o.c. in accordance with SMACNA Duct Liner Application Standard.
D. Air conditioning Condensate Piping: 3/8" flexible elastomeric insulation for interior applications.

HANGERS:

- A. Support pipe from structure above with Grinnell CT-99 hanger, all thread rod and Fig. 86 C-clamp. Provide supplementary steel for upper attachment. Hangers shall fit around insulated pipe and shall have 24-gauge galvanized sheet metal saddle.

TESTS:

- A. Refrigerant Piping: Pressure test with dry nitrogen to 200 psig in accordance with ASME B31.5, Chapter VI. Perform final tests at 27-psig vacuum and 200 psig using halide torch or electronic leak detector. Test to no leakage.
B. Heat Pump Units: Record all motor and heater nameplate amps and running amps during Heating and Cooling cycle (below 60 degrees F. cooling). Complete manufacturer's installation and startup checks. Furnish startup sheets to owner at project closeout.
C. Air Side: Record air quantities at supply outlets, return grilles, exhaust grilles, and outside air duct. All airflow quantities shall be balanced to be within + or - 10% of design air quantity. Test and balance shall be performed by an AABC certified agent. Submit reports on AABC forms to engineer to review.

SPLIT SYSTEM HEAT PUMP:

- A. Unit shall be of size, type and capacity as indicated on the Drawings and shall be manufactured by Carrier. Equal units by Lennox or Trane will be acceptable.
B. The following accessories shall be furnished: Condenser Coil Guard, 5-minute Anti-Recycle Timer, Hard Start Kit for Single Phase Units, Crankcase Heater, Outdoor Thermostat for each Auxiliary Heat Stage, Defrost Thermostat for Indoor Coil, Low Ambient Controls, Outdoor air thermostat to prevent resistant heat from energizing above 45 degrees F.
C. Auxiliary electric heaters shall be of size and capacity as indicated on the Drawings and meet the requirements of the National Electric Code and Underwriters Laboratories.

DUCTLESS SPLIT SYSTEM HEAT PUMP:

- A. Unit shall be of size, type and capacity as indicated on the Drawings and shall be manufactured by Carrier. Equal units by Daikin McQuay or Mitsubishi will be acceptable.
B. Unit shall be a split system design with Variable Speed Inverter Compressor technology. The system shall consist of a horizontal discharge, single phase outdoor unit, a matched capacity indoor section that shall be equipped with a wired wall-mounted, wireless wall-mounted or wireless handheld remote controller.
C. The following accessories shall be furnished: Condenser Coil Guard, 5-minute Anti-Recycle Timer, Hard Start Kit for Single Phase Units, Defrost Thermostat for Indoor Coil.

ENERGY RECOVERY VENTILATOR

- A. The ERV unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, control circuit board and blowers with motors, filters, and insulated foam air guides. Each unit will have an automatic by-pass damper system for economic operation under certain conditions. The unit shall have factory installed control board with functions for local, remote, and optional control modes.
B. Unit Cabinet: The cabinet shall be fabricated of galvanized steel, and covered with polyurethane foam insulation as necessary with mounting points securely attached.
C. Blowers: The unit shall be furnished with two (2) direct drive centrifugal blowers running simultaneously supplying and extracting at the same rate for balanced ventilation air flow. The blower motors shall be directly connected to the blower wheels and have permanently lubricated bearings. The blowers and motors shall be mounted for quiet operation.
D. Heat Exchanger: The heat exchanger element shall be constructed of specially treated porous fiber media separated by corrugated layers to allow total heat (sensible and latent) energy recovery from the exhaust air to the supply air or to pre-heat supplemental outdoor exhaust air as determined by design conditions. The unit element shall have protective filters installed at both the supply and exhaust sides with an access cover to allow easy maintenance.
E. Filter: The ERV shall be equipped with factory installed air filters located at each intake face (both supply and exhaust sides) of the core to clean the air and prevent clogging.
F. Mounting: Mounting of the ERV shall be as indicated in the plans and drawings. The ERV shall not require a condensate pan or receptacle nor condensate drain or piping. Mounting may be horizontal or vertical and the unit may be installed as required by ductwork connection.
G. Electrical: The units will require a 208-230Volt, 1 Phase 60Hz power supply.
H. Control: A 30vdc fuzzy logic signal generated by the mini-split system via a 2 conductor non polar shielded, jacketed control wire to be interlocked with ductless units. Control with Time Clock.

EXHAUST FANS:

- A. Exhaust fans shall be of size, type and capacity as shown on the drawings and shall be manufactured by Greenheck. Equal products by I/g, Acme, Penn. Jenn-Air or Ingersoll Rand are acceptable.
B. Ceiling Mounting shall be furnished with speed controller, disconnect switch, ceiling grille.

GRAVITY HOODS:

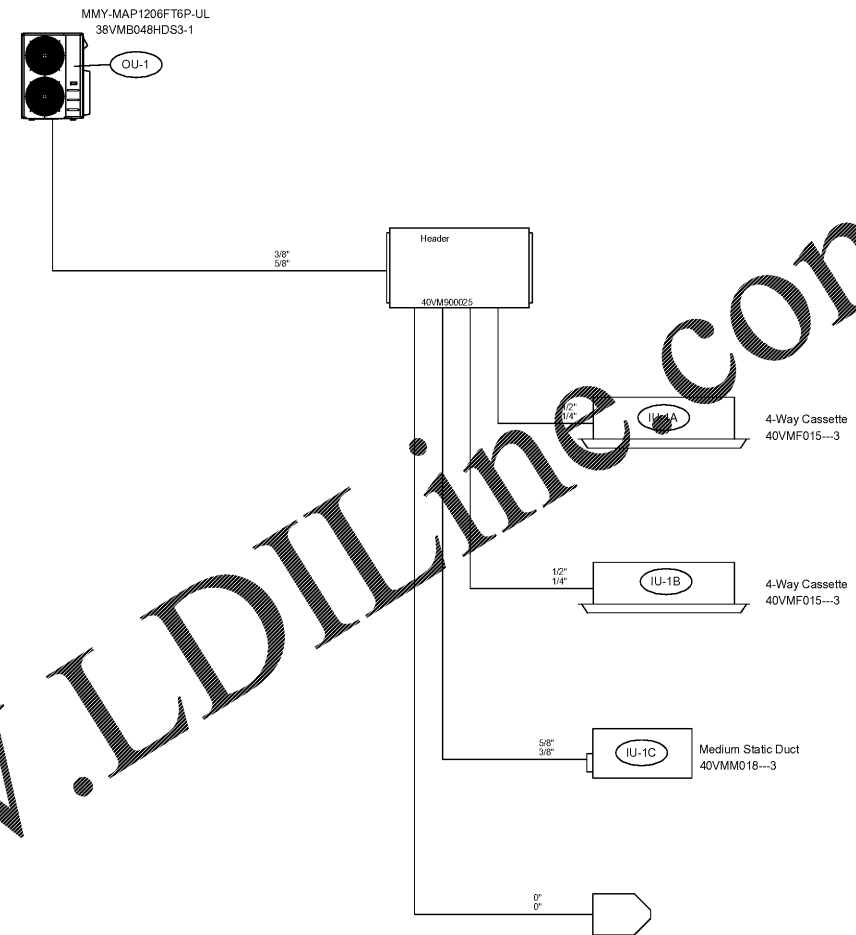
- A. Ventilator shall be stationary unit of type indicated on the drawings, all aluminum construction with curb base. Ventilator shall be provided with matching stainless steel curb. Secure ventilator to roof curb with cadmium-plated steel screws, minimum of two on each side.

CONTROLS:

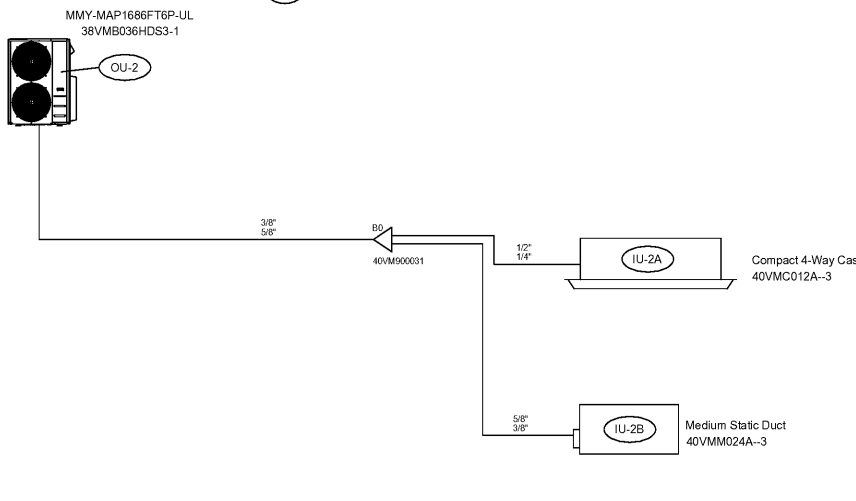
- A. Installation shall be in accordance with HVAC equipment manufacturer's wiring diagrams. Control components shall form a fully functional system.
B. HVAC unit thermostats shall be manufacturer's standard Wi-Fi programmable model having an Off-Em-Ht-Heat-Auto-Cool System switch and an Auto-On Fan switch. Provide multi-stage heating and cooling thermostat where controlled unit has multi-stage capability. Outdoor thermostat shall prevent strip heat from being energized above 45 degrees F. (Emergency heat position not required for non-heat pump unit.) Basis of design = Carrier Infinity thermostat model SYSTXCC.
C. Sequence of Operation:

Heat pump units: Units shall be controlled by programmable heat pump thermostats. The compressor, heat/cool reversing valve and supply fan shall energize in heating or cooling mode as required to satisfy the thermostat set point. When the compressor is unable to meet the heating requirements, the auxiliary strip heat shall energize. When outdoor air temperature is above 45°F (adjustable), resistance heat shall not be energized. Occupied and unoccupied set points shall be coordinated with the owner.

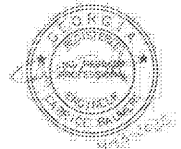
Fans: Refer to fan schedule. Where fans are indicated to be interlocked with the room lights furnish starters/contactors as required for control operation.



1 VRF IU/OU-1 PIPING SCHEMATIC
M4.1 SCALE: NONE



2 VRF IU/OU-2 PIPING SCHEMATIC
M4.1 SCALE: NONE



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HVAC SPECIFICATIONS & PIPING SCHEMATICS

ADDITION AND RENOVATIONS TO THE BURKE COUNTY SENIOR CENTER
717 WEST 6TH STREET, WAYNESBORO, GEORGIA

PROJECT NUMBER 201903

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