



CLASSROOM UNIT VENTILATOR GEOTHERMAL HEAT PUMP WITH ENERGY RECOVERY

Specifications

Overview:

Temspec's Geothermal Heat Pump (GHP) incorporates the industry leading design features of Temspec's classroom Unit Ventilators with the additional capability of utilizing the economic advantages of water source heat pump technology.

A pioneer in the development of vertical classroom unit ventilators for single zone air conditioning, Temspec's GHP has available a 100% economizer mode as well as numerous environmentally preferred features such as an energy recovery ventilator package. These unitary heat pumps provide for easy installation and maintenance.

General Specification:

The water source heat pump shall be a vertical design with a small footprint. It shall be self contained excluding the external water loop but including optional supplementary heating such as electric resistance and hot water. The unit shall be ducted or freeblow through a top acoustical plenum. The unit is available with 100% economizer capability and an optional energy recovery enthalpy wheel (ERW) to minimize energy costs. With its hot gas reheat coil option and the desiccant coating on the ERW, the GHP provides enhanced dehumidification capabilities.

The unit shall be fully assembled and tested prior to shipment. It shall comply with ASHRAE 90.1 – 2007 and 62.1 – 2010 and be constructed in accordance with UL 1995 / CSA C22.2 No. 236 Standard (Heating and Cooling Equipment), and a label shall be affixed to the unit listing the product code under which it is registered.

Cabinet:

The unit cabinet shall be 14ga, formed unibody construction for rigidity. The finish shall be a durable powder coat – textured finish, color as per the Architect's instruction. The cabinet shall be fully lined with 1 " closed cell insulation. The return air grille shall be heavy duty steel. The unit shall have a draw through configuration. For easy maintenance, access to the internal components shall be through the front of the unit.

Compressor:

For higher efficiency, the unit shall contain a two stage scroll compressor with a crankcase heater and internal high pressure safety. A diagnostic module for compressor protection shall be included. The system shall be factory charged with R410A refrigerant. The compressor shall be mounted in such a way as to have double vibration isolation from the unit structure.

**Refrigeration Circuit:**

Capacity matched thermal expansion valves along with check valves shall be factory installed at each heat exchanger. A reversing valve shall be installed to ensure the proper operation for both cooling and heating modes. The refrigerant that shall be used in the system will be R410A. High and low pressure switches (auto reset low-pressure and manual reset high pressure) as well as a moisture indicating sight glass and service ports shall be factory installed.

Indoor Coil:

The indoor coil shall be formed with 3/8" copper tube mechanically bonded to aluminum fins. The coil capacities shall be as shown in the equipment submittals. An acrylic coated galvanized steel (optional stainless steel), double sloped drain pan shall be provided. A "P" trap will be included below the drain pan.

Water Side Heat Exchanger:

The water to refrigerant heat exchanger shall be a tube in shell design. The coil shall be insulated to prevent condensation. Left, right and back water side connections can be provided at the bottom of the unit. A freeze protection sensor shall be attached to the fluid exit side of the tube in the shell heat exchanger. If the temperature goes below the low temperature set point, the compressor shall be disabled.

Supply Air Fans/Motors:

The internal supply fan assembly shall include two direct drive electronically commutated motors (ECM) and blowers (one each for nominal 36 MBtu/h unit) mounted on rubber isolation grommets. The ECM motors shall be programmable for high efficiency and low audible sound. The motors consist of a brushless, permanently lubricated ball bearing construction for maintenance free operation.

Filter:

The filters shall be of the manufacturer's standard 1 " disposable type (optional 2") and shall have a minimum MERV 8 rating (efficiency reporting value).

Access Panels:

Internal components shall be easily accessible through front access panels which shall either be side hinged or removable. The hinge shall not protrude beyond the front surface of the unit and the hinged panel shall be secured when closed by two fast lead captive fasteners. The fasteners shall ensure a tight air seal for the panels. The bottom removable access panel shall have four fast lead captive fasteners.

Line Voltage:

All internal line voltage wiring shall be by the unit manufacturer with a single power connection point. A single suitably rated unfused service disconnect switch shall be factory installed within the unit. Voltages include 208-230 VAC 60 Hz 1 or 3 phase or 480 VAC + Neutral 60 Hz 3 phase. A suitably rated remote circuit breaker shall be provided and installed by the electrical contractor.

Control Panel:

A control panel (without the controller) shall be factory provided and installed. It shall be located at eye height (approximately 5.5 ft) behind the front access panel for easy maintenance and service and shall include a 24-volt transformer with the required contactors' relays and circuit protection.

**Outdoor / Return Air Mixing Dampers, ERV Dampers, Exhaust Dampers:**

All the unit dampers shall have airfoil section extruded aluminum blades. Flap dampers are NOT acceptable. The dampers shall have flexible seal blade tips and jamb seals.

Energy Recovery Module (Optional):

The ER module shall include an ARI certified energy recovery enthalpy wheel with a desiccant coating for energy efficiency and dehumidification. Supply and exhaust fans shall provide up to a nominal 450 cfm. of fresh air. Supply and return disposable filters shall be removable from the front of the unit. Also included are a set of actuated aluminum dampers that close when the wheel is not active to ensure leakage does not occur between the building exterior and interior of the cabinet.

Factory Installed Controls (Optional):

Control items shall be furnished by the controls contractor for factory mounting and shall function as described in the controls specifications. Controls are to arrive at the factory well before scheduled production and are to be freight, duty and customs pre-paid by the controls contractor.

Factory Supplied Controls (Optional):

The control system shall be a stand alone, seven day programmable thermostat with economizer feature. The control can be selected to be BACNet or LonWorks compatible.

100 % Power Exhaust (Optional):

A powered exhaust module with actuated aluminum damper, direct drive fan and ECM motor shall be incorporated and shall operate in tandem with the outdoor air damper to be able to provide up to 100 % power exhaust.

Auxiliary Electric Heating (Optional):

The electric heating coil shall have wire nickel-chrome elements carried in floating ceramic bushings. Auto-reset high limit switches shall be factory installed and a higher switching point manual reset high limit shall also be provided within the unit. The coil shall be rated for ____ kW (up to 18 kW) at a supply voltage ____ Volts ____ phase 60 Hz. Each coil stage shall have an electromagnetic contactor to energize the coil and shall have an SSR control (optional) or maximum 2 stage capability. *An electric heating coil mounted in a plenum that is field installed above the unit is not acceptable.*

Hot Water Heating Coil (Optional):

A hot water heating coil shall be installed inside of the unit. The coil shall have 1/2" OD copper tube with aluminum fins. The coil supply and return headers shall be copper pipe, stubbed out for sweat connection. The coil shall be factory pressure tested at not less than 350 p.s.i. A manual air vent and drain cock shall be factory installed. The coil capacity shall be as shown in the equipment schedule. *A hot water coil mounted in a plenum that is field installed above the unit is not acceptable.*

Hot Gas Reheat (Optional):

A hot gas reheat coil shall be provided and a solenoid valve factory installed. Available for all the units for higher dehumidification capabilities.

Hot Gas Bypass (Optional):

A hot gas bypass device shall be factory installed for capacity unloading in cooling mode in addition to a 2 stage scroll compressor.

**Condensate Pump (Optional):**

A condensate pump shall be factory installed within the unit. The head capacity of the pump shall be a minimum of ____ ft.

Water Control Valve (Optional):

Two-way, two-position motorized valve shall be internally mounted to provide unit isolation when the compressor is not energized.

Piping Options (Optional):

Piping options shall be fitted inside the unit by the factory and easily accessible from the front of the unit. May include one or all of the following:

- Automatic flow control valve with P/T ports and ball valve (shut off)
- Strainer with P/T ports, blow down valve and ball valve (shut off)
- Flexible, stainless steel braided hose kit with 1" pipe connections

Exterior Wall Louver & Sleeve (Optional):

The louver shall have aluminum extruded 45 degree blades. If provided by contractor shall be coordinated with manufacturer. The louver shall have a 1/2" bird-screen attached to the inner face. The louver shall be mill finished or selected from manufacturer's standard color chart. The manufacturer shall provide a wall sleeve to suit the wall thickness, including an air flow separator to prevent mixing of the fresh air intake and exhaust air.

Top Extension (Optional):

The unit manufacturer shall provide a color matched top extension for the cabinet, size to suit the ceiling height.

Raised Base (Optional):

The unit manufacturer shall provide a color matched raised base, height as shown on the plans.

Side Pipe Cover (Optional):

The unit manufacturer shall provide a pipe cover assembly, color matched to the unit. The cover shall be the depth of the unit, height to suit.

Extended Compressor Warranty (Optional):

The compressor may carry an extended warranty, which shall warrant the compressor for an additional four years after the standard one year warranty. The compressor warranty applies to parts only.

Replacement Filters (Optional):

One set of replacement filters shall be supplied for each unit.

Installation:

The unit ventilator shall be installed plumb. Foam sealing tape shall be installed around the perimeter of the opening in the back of the unit before moving the unit into position against the wall. The exterior louver shall be caulked.