KLASSKEEPER

Models "KKV" Guide Specifications

Part 1: General

1. The HVAC system is based on the KlassKeeper Bulldog Heat Pump System.

2. The system will automatically provide the availability of heating or cooling functions 24 hours a day, 365 days a year without need for changeover.

3. Model selection and performance shall be in accordance with the schedule on the drawings.

4. Mechanical cooling shall be enabled with Entering Condenser Water below 125°F. The system is designed to operate on 2 GPM/ton.

5. Each unit/chassis shall be pressure tested with Nitrogen on both the refrigerant and fluid (water) circuits followed by a helium leak detection program for both circuits. Units are then attached to the vacuum system for at least 2 hours and monitored.

6. Each unit shall be run tested for a minimum of 15 minutes with a water/glycol solution to ensure 100% functionality in all modes of operation. Individual units/chassis shall be self-contained and complete when shipped from the factory.

7. Units shall be safety certified and bear a seal of approval from one of UL/ULC/ETL or ESA. All units must be AHRI certified and meet ASHRAE 90.1 minimum standard.

8. Manufacturer shall warrant the parts only of each unit for a period of 12 months from the start-up date or 18 months from the unit shipment date whichever occurs first.

9. Commissioning of the BULDOG units(s) shall be performed by a CGC trained technician. A commissioning report shall be provided by the commissioning technician for review and approval by the owner's representative.

10. It is the contractor's responsibility to have the fluid system properly flushed and cleaned prior to commissioning.

11. Alternate proposals shall include consideration for equipment space requirements, pipe and equipment sizing, electrical installation impact, operation costs, sound implications and redesign fees.

Part 2: Mechanical Parts

The KlassKeeper unit consists of three parts; a chassis, a cabinet with integrated ERV and hinged front door, and an optional front discharge air plenum.

1. Cabinets

1.1 The Cabinets are fabricated with heavy gauge galvanized steel with all interior of the cabinet lined with 1/2" acoustic insulation shipped as one complete enclosure.

***(OPTIONAL**) Side panels are available when the cabinet is installed in the conditioned space. Side panel finish matches the front panel finish of light grey paint.

1.2 The supply air openings shall be pre-punched to allow easy field discharge arrangements using field duct work or the optional factory supplied discharge plenum.

***(OPTIONAL)** The factory supplied front discharge plenum standard height is 16" and is available is 2" increment. The plenum ships loose – field installed by others.

1.3 The front door shall be constructed of heavy gauge steel lined with ½" acoustic insulation and finished with baked enamel paint in light grey. It shall provide acoustic dampening, front return air and access to facilitate normal unit maintenance and service.

1.4 A return opening shall be provided in the front panel to allow air to enter at floor level.

1.5 The Cabinet shall be designed for direct application of drywall when the optional finished sides are not ordered.

1.6 The contractor shall ensure unit cabinet is plumb prior to application of drywall.

1.7 The Cabinet shall ship in an enclosed truck to avoid insulation getting wet in transit, tarps not recommended.

2. Chassis

2.1 The chassis must be a complete self-contained unit. Fan and motor integral to cabinet is not acceptable.

2.2 The chassis shall be complete with refrigeration circuit, hydronic circuit, blower assembly, controls and an internal corrosion resistant stainless steel insulated condensate drain pan with condensate drain. P-trap is fashioned by factory provided condensate hose in the field.

2.3 The chassis shall be fabricated with insulated separate blower and compressor sections to minimize compressor sound transmission. Manufacturers shall provide Ultra Quiet Acoustical Package.

2.4 The chassis shall be complete with a control access cover. The cover shall be easily removable to provide access to controls.

2.5 The service panel shall be easily removable and sufficiently large to allow access to all refrigeration components. Contractor shall verify location of service panels and assure access.

2.6 The chassis shall be completely removable by disconnecting supply and return hoses, condensate hose, thermostat terminal block and line voltage plug-in power connection.

2.7 The chassis shall be complete with 3ft flexible hoses rated at 400psi. A clear reinforced condensate hose/trap shall be provided with the chassis. The trap must be visible by simply removing the front access door.

2.8 The plug connection shall provide positive disconnect of main power to chassis.

2.9 The contractor shall ensure chassis including complete operating system, blower and controls is removable with adequate service and access clearance.

2.1 Blower and Motor

2.1.1 The blower shall be statically and dynamically balanced.

2.1.2 The complete blower section including motor shall be easily accessible and removable for service.

2.1.3 The Blower motor shall be direct drive, single phase with integral thermal overload protection.

2.1.4 The Blower shall be direct drive forward curved, DWDI centrifugal blower.

2.1.5 Standard constant Volume EC motor to provide required air flow regardless of the filter loading to maximize efficiency.

2.2 Filter

2.2.1 The filter chamber shall be an integral part of the system located on return air path and should be serviceable from the front of the unit.

2.2.2 The filter shall be standard capacity, 2” pleated type MERV 7-8 shipped with the chassis.

2.3 Heating Loop

2.3.1 The refrigerant circuit shall not operate in the heating mode.

2.3.2 Heating coil shall be aluminum fin and copper tube construction rated to withstand 300 PSI working pressure.

(Optional) The heating coil can be mounted in the reheat position for dehumidification – humidistat by others.

2.4 Valve Configuration – Factory Installed

For variable water flow pumping systems, all units shall be supplied and on/off 2 way cooling valve and a 2 way modulating heating valve.

(Optional) Flow limiting device installed inside the unit to control the amount of water through the unit when it is either in heating or cooling.

3. Integrated ERV

3.1 System Description

3.1.1 The Integrated ERV will consist of a fan box with an exhaust and fresh air fan and an energy recovery heat wheel.

3.1.2 The system will automatically provide fresh air to the space when the KlassKeeper chassis main supply fan operates. The integrated ERV utilizes an exhaust and fresh air fan as well as a passive energy recovery core.

3.1.3 Airflow Systems:

- The exhaust air enters the integrated ERV whenever the exhaust air fan is operational. The ERV fresh air fan draws outside air into the integrated ERV core and heat and moisture from the exhaust air is passed through to the fresh air.
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- The fresh air is released inside the KlassKeeper cabinet and filtered by the Chassis' air filter where the main supply fan draws it into the chassis heat pump and distributes it to the space.

- In the unlikely event of frost build up on the ERV core, a fresh air discharge air temperature sensor will open and momentarily stop the fresh air fan until the air returns to the normal limit.

3.1.4 Model selection and performance shall be in accordance with the schedule on the drawings. The KlassKeeper (024-048) Integrated ERV is designed to exhaust 450 CFM (212 L/s) and draw in 500 cfm (236) of fresh air.

3.1.5 The Integrated ERV exhaust and fresh air openings are out the top of the cabinet for direct duct connection.

3.1.6 Each ERV shall be run tested to verify proper operation.

3.1.7 The KlassKeeper Chassis, and Integrated ERV Heat Wheel assembly shall be safety approved.

3.1.8 Manufacturer shall warrant the parts only of each unit for a period of 12 months from the start-up date or 18 months from the unit shipment date whichever occurs first.

3.1.9 Commissioning of the Bulldog KlassKeeper with the Integrated ERV shall be performed by a factory trained technician. A commissioning report shall be provided by the commissioning technician for review and approval by the owner's representative.

3.1.10 The system shall never be used during the construction phase as fine dust can permeate the ERV core resulting in loss of performance or failure.

3.1.11 The ERV core shall be of the high efficient type and have minimum sensible effectiveness of greater than 70%.

3.1.12 Alternate proposals shall include consideration for equipment space requirements, pipe and equipment sizing, electrical installation impact, operation costs, sound implications and redesign fees.

3.2 ERV Cabinet

3.2.1 The Integrated ERV Cabinet shall be constructed from heavy gauge galvanized steel and has internal channels to direct air from the exhaust and fresh air through the ERV core.

3.2.2 The cabinet shall be internally lined with acoustic insulation.

3.3 ERV Fan Box

The Integrated ERV fan box shall be fabricated from heavy gauge galvanized steel.

3.4 ERV Core

3.4.1 The ERV Core consist of a rotary wheel in an insulated cassette frame complete with seals, drive motor and drive belt.

3.4.2 Energy transfer media shall be constructed of a durable synthetic lightweight polymer

3.4.3 The total energy recovery wheel shall be coated with silica gel desiccant permanently bonded by a patented and proprietary process without the use of binders or adhesives.

3.4.4 The energy recovery wheel shall be UL recognized and performance shall be certified by the wheel manufacturer in accordance with AHRI 1060 and bear the AHRI certified label.

3.5 Blower and Motor

3.5.1 The ERV fresh air and exhaust air blower shall be statically and dynamically balanced.

3.5.2 The complete blower section including motor shall be easily accessible and removable for service.

3.5.3 The blower motor shall be PSC direct drive, single phase with integral thermal overload protection.

3.5.4 The blower wheel shall forward curved, SWSI centrifugal blower.

3.5.5 The fresh air and exhaust air fans speeds are individually controlled by a fan speed controller that is adjustable in the field. The fan speed control may be used to turn off the ERV if required.

3.6 Filter

3.6.1 The fresh and return air entering the ERV core are filtered. The filter chambers shall be serviceable from the front of the unit.

3.6.2 The filter shall be a cleanable flat foam type shipped with the cabinet.

3.7 System

3.7.1 The ERV will operate when signaled to by the inputs to the unit controller and the chassis fan will run on low fan speed or as required for heat, cool or fan.

3.7.2 If the ERV is disabled, the chassis fan will still run as required.

3.7.3 The ERV fan box is powered by line voltage.

3.7.4 The defrost sensor will detect a frost build up on the heat exchanger based on temperature and will terminate the operation of the fresh air fan until the temperature restores to normal limits (above 45°F).

Part 3: Refrigeration Parts

3.1 Refrigeration System

3.1.1 The refrigeration circuit shall be available for operation on non-ozone depleting R 410A refrigerant. Refrigeration circuit does not operate in heating mode. Reversing type heat pump unit manufacturer must supply a life time of Parts and Labour Warranty on the reversing valve.

3.1.2 The refrigeration circuit shall have the following components:

- Thermal Expansion Valve with external equalizer
- Filter dryer
- Sight Glass
- High pressure cut-out
- High pressure service port
- Low pressure cut-out
- Low pressure service port

3.1.3 The service ports shall be located to facilitate field service with unit in place.

3.1.4 All refrigerant piping shall be of type ACR copper pipe.

3.1.5 The refrigerant circuit and components shall be factory assembled in a sealed, leak and performance tested, properly charged system.

3.1.6 The sealed refrigerant circuit shall be certified for 600 PSIG working condensing pressure.

3.2 Compressor

3.2.1 The compressor shall be high efficient sealed hermetic two step scroll compressor.

3.2.2 The compressor shall be externally isolated on rubber mounts and connected to refrigerant circuit with floating piping to minimize sound transmission.

3.2.3 The Compressor motor shall have integral thermal overload protection.

3.2.4 The compressor shall not operate in the heating mode.

3.2.5 The Compressor shall be provided with a 5 minute restart delay to avoid compressor short cycling and low pressure lockout.

3.3 Direct Expansion Evaporator Coil

3.3.1 The Refrigerant to air heat exchanger shall be aluminum fin and copper tube construction rated to withstand 470 PSI refrigerant working pressure.

3.3.2 The coil shall have a maximum face velocity of 500 FPM.

3.3.3 A stainless steel condensate drain pan shall be provided under the coil.

3.4 Water Cooled Condenser Module

The condenser shall be high efficiency refrigerant-to-water heat exchanger of copper inner water tube, minimum ½ " diameter and steel refrigerant outer shell design rated to withstand 600 PSI refrigerant working pressure and 300 PSI water pressure.

Part 4: Control Systems

4.1 System

4.1.1 The unit shall be complete with a standard microprocessor controlled electronic circuit board.

4.1.2 The Control panel shall be supplied with individual 24 VAC control transformer.

4.1.3 The control board shall have LED indicators displaying thermostat call, unit operation and Alarms.

4.1.4 The control board shall operate with one of the following:

- A 24 volt thermostat
- 3rd party provided BACnet controller supplied by others. It can be installed and wired inside the cabinet
- Modbus RTU or Modbus to BACnet gateway

(Optional) A remote alarm contact available for connection to alarm monitor by others – monitored and wired by others.

(Optional) BMS override function available to disable compressor only or disable unit. BMS override and wiring by others – consult factory

(Optional) Condensate High Level Monitor and alarm is available – consult factory

(Optional) The heating coil can be mounted in the reheat position for dehumidification – consult factory

4.2 Alarms

The standard Control Panel shall have the following standard alarms:

- Low Refrigerant Temperature (Tr)
- Low Leaving Water Temperature (Tw)
- Low Discharge Air temperature (Ta)
- Low Refrigerant Pressure
- High Refrigerant Pressure
- High Condensate Level (OPTIONAL)