SpaceKeeper Vertical - Model "SKV" Guide Specifications – 8000 btu/h – 100 000 btu/h

Part 1: General

1.1 The HVAC system is based on BULLDOG Heat Pump System.

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

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

1.4 Mechanical cooling shall be enabled with Entering Condenser Water below 125^{o}F. The system is designed to operate on 2 GPM/ton.

1.5 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.

1.6 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.

1.7 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.

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.

1.9 Commissioning of the BULLDOG unit(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.

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

1.11 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

2.1 Housing

2.1.1 The housing of the unit shall be constructed based on a frame and panel principle with removable panels for maximum service access.

2.1.2 Painted exterior panels is available on units sized 008 – 060. Painted exterior panels are standard on units sized 070-100.

2.1.3 The unit shall be fabricated with heavy gauge steel with all Interior of cabinet lined with 1/2” acoustic insulation.

2.1.4 The supply air opening shall be complete with discharge duct collar.

2.1.5 The service panels shall be easily removable and sufficiently large to allow access to all components.

2.2 Blower and Motor

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

2.2.2 The blower shall be statically and dynamically balanced.

2.2.3 The blower shall be directly driven by an EC motor that has an integral thermal overload protection for units up to size 060.

2.2.4 The blower shall be belt driven by a three-phase motor with integral thermal overload protection and equipped with a variable frequency drive (VFD) for unit sized 070 - 100. The belt drive blower motor fan speed shall be adjustable by means of the VFD.

2.2.5 The fan motor shall be open drip proof on all direct drive types and shall be totally enclosed fan cooled for belt driven types.

2.3 Filter

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

2.3.2 The filter shall be standard capacity, 1 inch thick “Disposable” type shipped with unit sizes 008-060 and 2” MERV 8 standard on sizes 070-100.

***(Optional)** MERV 8 (on sizes 008-060) & MERV 13 filters.

***(Optional** Ducted Filter Box.

2.4 Hydronic Heating Loop

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

2.4.2 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.

***(Optional)** For cooling only units, the heating coil can be omitted.

***(Optional)** Electric Element heater added for additional heat capacity. Element heater will be supplied with a self-resetting thermal safety switch and non-resetting thermal safety fuse (or non-resetting bi-metal thermal safety switch).

Part 3: Refrigeration Parts

3.1 Refrigeration System

3.1.1 The refrigeration circuit shall be available for operation on non-ozone depleting R454b refrigerant. Refrigeration circuit does not operate in heating mode.

3.1.2 The refrigeration circuit shall have the following components:

- Thermal Expansion Valve with external equalizer
- Filter dryer
- High pressure cut-out
- High pressure service port
- Low pressure cut-out
- Low pressure service port
- Refrigerant Sight glass (on models 070 and up)

***(Optional)** Sight Glass on units up to size 060

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 efficiency sealed hermetic rotary type for sizes 008 – 018 and hermetic scroll type for sizes 020 and above.

***(Optional)** Sizes 024 – 060 can be ordered with two-stage hermetic scroll compressors.

***(Optional)** Sizes 070 – 100 can be ordered with tandem scroll set or dual refrigeration circuits.

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 insulated condensate drain pan shall be provided under the coil.

3.3.4 The units are shipped with an internally mounted trap supplied by the factory.

3.4 Water Cooled Condenser Module

3.4.1 The condenser shall be of the brazed plate type that can withstand pressure up to 600 psi. A 20-mesh size strainer will be installed as standard.

3.4.2 The connections shall be female pipe thread mounted flush to the cabinet exterior.

***(Optional)** Stainless steel braided flexible Supply/ Return 24” hoses are available upon request.

3.5 Valve Configuration – Factory Installed

3.5.1 All units shall be supplied with two 2-way control valves (1 for heating and 1 for cooling) for variable water flow pumping systems. If the system is bottom fed, all units at the top of each riser shall only be wired for continuous water flow.

***(Optional)** Flow limiting device available upon request.

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 panel shall have LED indicators displaying thermostat call, unit operation and alarms.

4.1.4 Units with R454b refrigerant charge more than 62.5 oz are equipped with refrigerant leak detector sensor and a board that in case of a leak detection it will disconnect the compressor and run the circulation fan.

4.1.5 The control board shall operate with:

- A 24-volt thermostat
- Onboard fuse protection

4.1.6 A remote alarm contact is available for connection to alarm monitor by others – monitored and wired by others.

4.1.7 BMS override function available to disable compressor only or disable unit. BMS override and wiring by others.

4.1.8 Condensate High Level Monitor and alarm is available.

***(Optional)** Different types of BULLDOG thermostats are available upon request.

4.2 Alarms

The standard Control Panel shall have the following standard alarms:

- Low Coil Temperature
- High Leaving Water Temperature
- Low Discharge Air Temperature
- Low Refrigerant Pressure
- High Refrigerant Pressure
- High Condensate Level