

VERTICAL (CLOSET) HYBRID WATER SOURCE HEAT PUMP CERTIFIE DRAWING

DWG. NO. **Submittal Template VCHW**
REV. - A

PROJECT	DATE	BY	REVISIONS			
PURCHASER	P.O. #	QTY	DATE	BY	DESCRIPTION	
ARCHITECT	SHIPPING DATES					
ENGINEER						
HVAC CONTR.						
GEN. CONTR.						

DESIGNATION	MODEL NUMBER	QTY
TOTAL		

GENERAL NOTES

- 1: PROVIDE UNITS WITH R410A GREEN REFRIGERANT
- 2: PROVIDE 1/2" WASHABLE FILTERS
- 3: PROVIDE OVERFLOW CONDENSATE SWITCH
- 4: PROVIDE STANDARD UNIT-MOUNTED DIGITAL CONTROL BOARD
- 5: PROVIDE PAINTED ACOUSTICAL ACCESS DOOR FRONT PANEL
- 6: PROVIDE INTEGRAL TRAPPED CONDENSATE LINE RUN OUT

CUSTOM NOTES

1:

PERFORMANCE DATA - COOLING

3 GPM/Ton @ 86 EWT		8VCHW09	8VCHW12	8VCHW15	8VCHW18	8VCHW24	8VCHW30	8VCHW36	8VCHW42	8VCHW48	8VCHW60	8VCHW70
Total Capacity	BtuH	9,300	12,200	14,900	19,500	23,500	29,100	35,000	41,500	48,300	60,000	67,000
Sensible Capacity	ButH	6,800	8,900	10,900	14,200	17,200	21,200	25,600	30,600	35,300	43,800	48,900
Airflow	CFM	300	400	500	600	800	1,000	1,200	1,400	1,600	2,000	2,400
Water Flow Rate	GPM	2.3	3	3.8	4.5	6	7.5	9	10.5	12	15	17.5
Fan Power	HP	1/6	1/6	1/6	1/6	1/6	1/4	1/4	1/4	1/2	1/2	1
Fan Power (ECM)	W	125	125	125	125	125	190	190	190	375	375	750
EER w/ ECM		14.5	14.1	14.9	14.6	14.9	15.1	15.6	14.9	14.5	14.9	14.7
EER w/ PSC		14	13.5	14.3	14	14.4	14.5	15	14.2	13.8	14.2	14
WPD	PSI	3.1	2.8	4.4	3.9	6.4	6.5	4.6	6.3	8.3	7.7	16.2

TABLE 1

COOLING CAPACITY RATED @ 80.6°F DB, 66.2°F WB EAT; 86°F EWT

PERFORMANCE DATA - HEATING

Heating @ 3GPM/Ton		8VCHW09	8VCHW12	8VCHW15	8VCHW18	8VCHW24	8VCHW30	8VCHW36	8VCHW42	8VCHW48	8VCHW60	8VCHW70
EWT@120F	BtuH	10,500	16,900	21,000	25,500	28,000	31,200	37,400	43,700	49,900	62,400	72,800
EWT@105F	BtuH	8,500	12,300	15,500	18,600	19,800	21,900	26,300	30,600	35,100	43,800	51,500
EWT@95F	BtuH	6,300	9,200	12,000	15,800	16,700	17,800	21,300	24,900	28,500	35,600	41,500

TABLE 2

HEATING CAPACITY RATED @ 68°F DB, 59°F WB EAT; 68°F EWT

VERTICAL (CLOSET) HYBRID WATER SOURCE HEAT PUMP CERIFIED DRAWING

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UNIT SPECIFICATIONS+

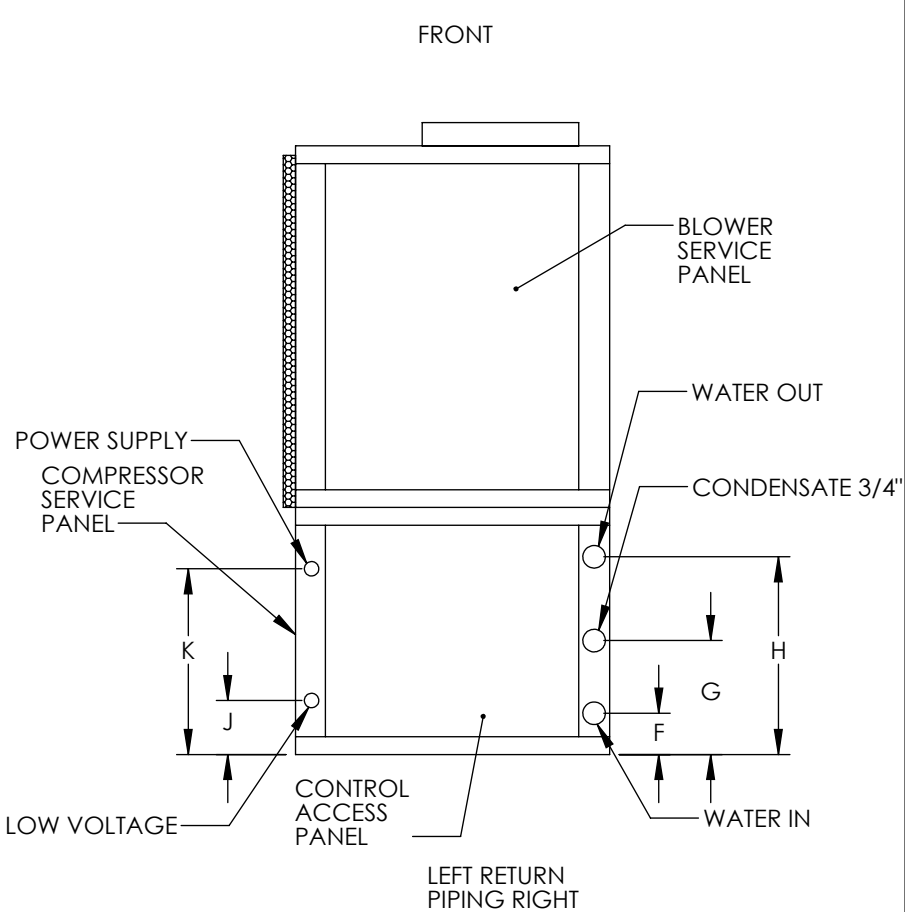
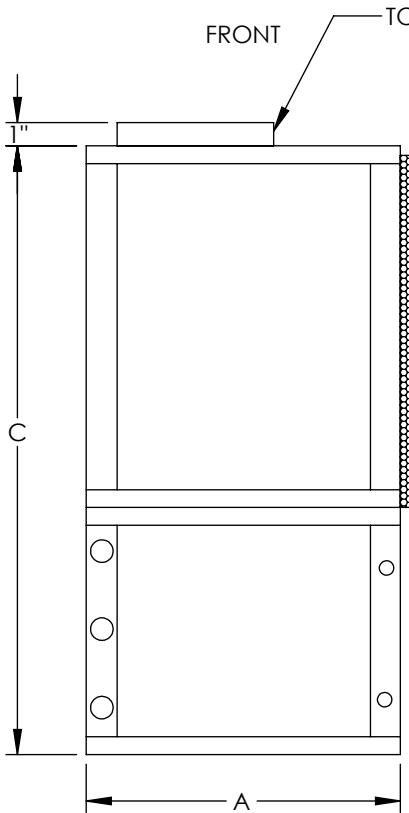
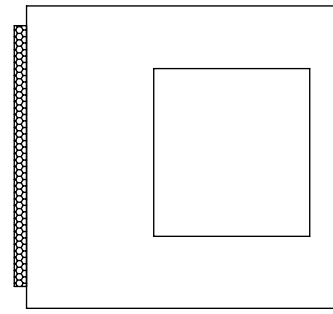
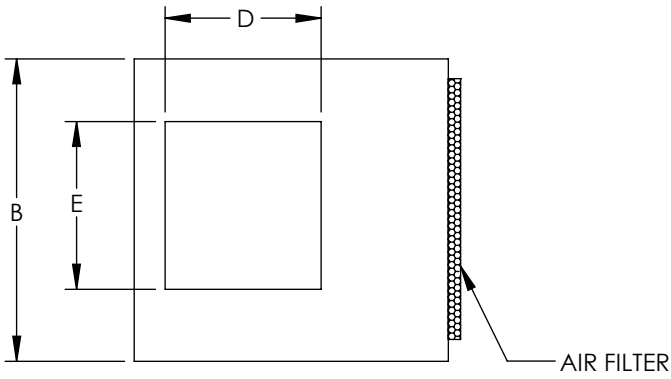
TABLE 3

Physical Data										
Model	8VCHPW09	8VCHPW12	8VCHPW15	8VCHPW19	8VCHPW24	8VCHPW30	8VCHPW36	8VCHPW42	8VCHPW48	8VCHPW60
Compressor (1 Each)	Rotary						Scroll			
Factory Charge R410A (oz)	18	20	25	32	37	42	43	47	54	64
Fan motor HP	1/8	1/8	1/6	1/6	1/3	1/3	1/2	1/2	3/4	3/4
Blower Wheel Size (dia x w)	6x6	7x7	7x7	8x8	8x8	9x7	9x7	9x7	10x10	10x10
Air Coil Face Area (sqft)	1.4	1.4	2.7	2.7	2.7	3.4	3.4	3.4	4.4	4.4
Standard Filter-1"	10x20	10x20	18x24	18x24	18x24	19x27	19x27	19x27	16x22	22x22
Water Connection size	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	3/4"	3/4"	3/4"	3/4"
Condensate Connection Size	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"
Net Weight (Lb)	130	130	180	220	280	300	310	320	330	350

TABLE 4

Unit Size (MBtuH)	Rated Voltage - Phase - Frequency	RLA	LRA	FLA	Total FLA	MCA	MOP	Max Fuse/HACR
9	208/230-1-60	4.7	22.2	1.0	5.7	7.1	11.6	15
12	208/230-1-60	5.1	32.5	1.0	6.1	7.6	12.5	15
15	208/230-1-60	7.7	32	1.2	8.9	11.1	18.5	15
18	208/230-1-60	13.5	58	1.8	15.3	19.1	32.2	30
24	208/230-1-60	14.3	64	2.2	16.5	20.6	34.4	30
30	208/230-1-60	15.1	73	3.0	18.1	22.6	37.0	35
36	208/230-1-60	16.7	79	3.0	19.7	24.6	40.6	40
42	208/230-1-60	17.9	112	3.0	20.9	26.1	43.3	40
48	208/230-1-60	19.3	118	3.4	22.7	28.4	46.8	45
60	208/230-1-60	21.0	124	4.9	25.9	32.4	52.2	50

Template VCHW



RIGHT RETURN
PIPING RIGHT

LEFT RETURN
PIPING RIGHT

UNIT SIZE	A	B	C	D	E	F	G	H	J	K
009-012	22.5	22.5	34.5	8.7	9.6	3.0	7.0	11.0	3.5	11.5
015-019	24.0	25.5	39.5	8.7	9.6	3.0	8.0	13.0	3.5	11.5
024-030	24.0	26.0	47.5	10.7	12.0	3.0	8.0	13.0	3.5	13.5
036	27.0	32.5	50.5	11.0	10.0	3.0	9.0	15.0	3.5	13.5
042-048	28.5	32.5	58.0	11.0	12.5	3.0	10.0	17.0	3.5	13.5
060-070	29.5	32.5	66.0	12.0	13.5	3.0	12.0	21.0	3.5	13.5

MATERIAL:

WEIGHT (LBS):

FINISH:

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: $\pm 1/32$
ANGULAR: MACH \pm ° BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .03$
THREE PLACE DECIMAL $\pm .015$

ICE-AIR LLC.
80 HARTFORD AVENUE
MOUNT VERNON, NY 10553

TITLE: VERTICAL CLOSET HYBRID UNIT DIMENSIONAL DRAWING

MODEL BY:	DATE:	DWG. NO.
DRAWING BY:	DATE:	Submittal Template VCHW

SIZE A	SCALE: NONE DO NOT SCALE DRAWING	SHEET 3 OF 3	REV A
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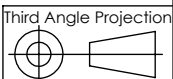
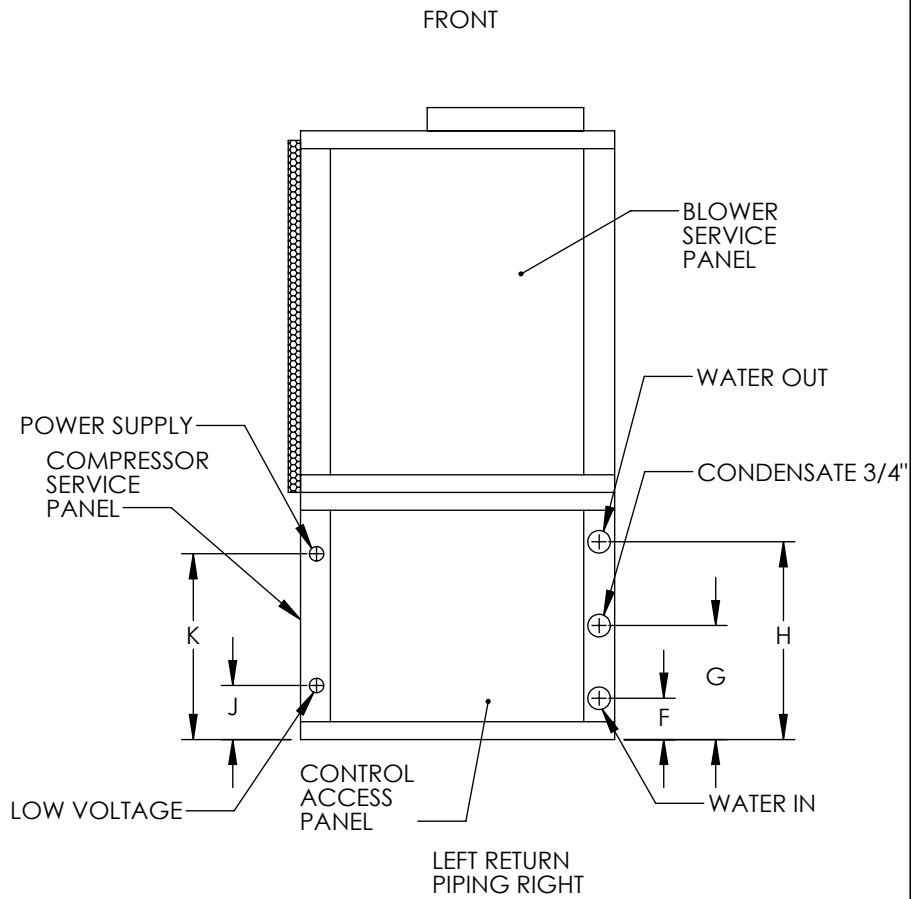
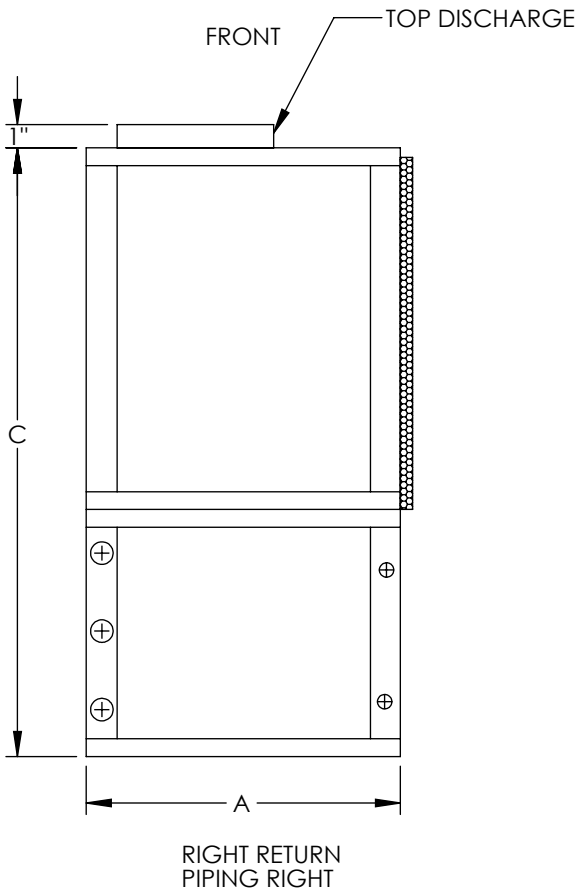
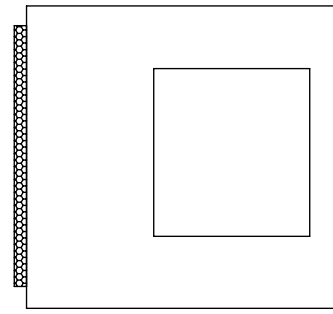
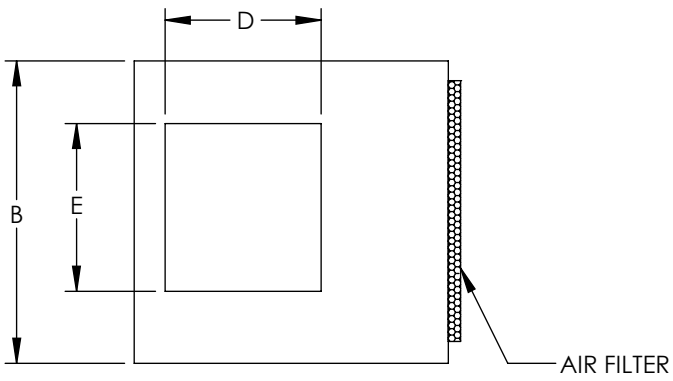


plate VERTICAL CLOSET HYBRID UNIT



UNIT SIZE	A	B	C	D	E	F	G	H	J	K
009-012	22.5	22.5	34.5	8.7	9.6	3.0	7.0	11.0	3.5	11.5
015-019	24.0	25.5	39.5	8.7	9.6	3.0	8.0	13.0	3.5	11.5
024-030	24.0	26.0	47.5	10.7	12.0	3.0	8.0	13.0	3.5	13.5
036	27.0	32.5	50.5	11.0	10.0	3.0	9.0	15.0	3.5	13.5
042-048	28.5	32.5	58.0	11.0	12.5	3.0	10.0	17.0	3.5	13.5
060-070	29.5	32.5	66.0	12.0	13.5	3.0	12.0	21.0	3.5	13.5

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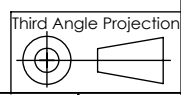
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MODEL VCHW SIZE 009-070
VERTICAL HYBRID WATER COOLED AIR CONDITIONER
SPECIFICATIONS

General:

Furnish and install Ice Air VCHW Vertical-Closet 'Hybrid' Water Cooled Air Conditioners with Hydronic Heat, as indicated on the plans. Equipment shall be completely assembled, internally piped and wired. Capacities and characteristics shall be as listed in the schedule and the specifications that follow.

Vertical Closet Hybrid Water Cooled Air Conditioner:

Units shall be supplied completely factory built for an entering water temperature range from 60° to 100°F as standard. All equipment listed in this section must be rated and certified in accordance with American Heating & Refrigeration Institute / International Standards Organization (ARI / ISO) for performance and Intertek for United States and Canada (ETL/C/US) for safety. All units shall be fully factory run tested in cooling under normal operating conditions and water flow rates as described herein. The refrigeration circuit is tested for leaks using a Halogen sniffer probe. The Heating (Hydronic) coils are pressurized to 300 psi and tested for leaks using forming gas via a handled halogen sniffer probe capable of detecting excessive hydrogen molecules in the air. Serial numbers will be recorded by the factory and, upon request, furnished to Purchaser for ease of unit warranty status.

Basic Unit Construction:

Vertical Units shall have standard Front Return / Top Discharge air flow arrangement. Optional alternate arrangements should be requested from the Seller if required

Compressor section interior surfaces shall be lined with 1/2-inch (12.7mm) thick, dual density, 1-3/4 lb/ft³ (28 kg/m³) acoustic type glass fiber insulation. Air handling section interior surfaces shall be lined with 1/2 in (12.7mm) thick, single density, 1-3/4 lb/ft³ (28 kg/m³) coated fiber insulation for ease of cleaning. Insulation placement shall be designed in a manner that will eliminate any exposed edges to prevent the introduction of glass fibers into the air stream.

Units shall be fabricated from heavy gauge galvanized steel. Interior condensate bearing surfaces shall additionally be coated with a powder coat paint finish.

Standard cabinet panel insulation must meet NFPA 90A requirements, air erosion and mold growth limits of UL-181, stringent fungal resistance test per ASTM-C1071 and ASTM G21, and shall meet zero level bacteria growth per ASTM G22.

All units must have an insulated panel separating the fan compartment from the compressor compartment. Units with the compressor in the air stream are not acceptable. Units shall have a factory installed 1 inch wide filter bracket for ease of filter removal.

Cabinets shall have separate holes and knockouts for entrance of line voltage and low voltage control wiring. All factory-installed wiring passing through factory knockouts and openings shall be protected from sheet metal edges at openings by plastic ferrules. Supply and return water connections shall be copper NPT fittings, and shall be securely mounted flush to the cabinet corner post allowing for connection to a flexible hose without the use of a back-up wrench. All

water connections and electrical knockouts must be in the compressor compartment corner post so as to not interfere with the serviceability of unit. Contractor shall be responsible for any extra costs involved in the installation of units that do not have this feature. Contractor must ensure that units can be easily accessed and removed for servicing and coordinate locations of electrical conduit and lights with the electrical contractor. Units will be supplied with (2) internally factory-mounted two-way water valves to close water supply to coaxial coil and hydronic heating circuit.

Fan and Motor Assembly:

Units shall have a direct-drive centrifugal fan. Units shall be provided with Electronically Commutated Motors. The fan motor on small and medium size units (018-048) shall be isolated from the fan housing by a flexible motor mounting system with rubber type grommets to inhibit vibration. The fan motor on larger units (060 & 070) shall be isolated with flexible rubber type isolation grommets only. The fan and motor assembly must be capable of overcoming the external static pressures as shown on the schedule. Airflow / Static pressure rating of the unit shall be based on a dry coil and a clean filter in place. ***Ratings without filter, or on an ESP less than 0.25 in w.g. (6.35 mm w.g.) shall NOT be acceptable.***

Hydronic Heating:

The refrigeration circuit shall not operate during heating mode. Heating coil shall be aluminum fin and copper tubing type rated to withstand 300 PSI working pressure. Heating coil shall be of sufficient size and tubing routing to supply specified heating capacity at 90o F – 120o F Entering Water Temperatures (EWT). The heating coil will be placed in front of the evaporator coil, so that the cool air leaving the evaporator coil enters directly into the supply air without any interaction with the heating coil. The coils will also be isolated from conductive heat exchange via an air gap and insulated flanges in between.

Refrigerant Circuit:

All units shall contain an HFC 410A sealed refrigerant circuit including a high efficiency scroll or rotary compressor, a thermostatic expansion valve or capillary tube for refrigerant metering, an enhanced corrugated aluminum lanced fin and rifled copper tube refrigerant-to-air heat exchanger, coaxial (tube in tube) refrigerant-to-water heat exchanger, and safety controls including a high pressure switch, low pressure switch (loss of charge), water coil low temperature sensor, and air coil low temperature sensor. Access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service. Activation of any safety device shall prevent compressor operation via a microprocessor lockout circuit. The lockout circuit shall be reset at the contractor supplied disconnect switch.

Hermetic compressors shall be internally sprung. The compressor shall have a dual level vibration isolation system. The compressor will be mounted on vibration isolation grommets to a large heavy gauge compressor mounting tray plate, which is then isolated from the cabinet base with rubber grommets for maximized vibration attenuation. Compressor shall have thermal overload protection. Compressor shall be located in an insulated compartment away from air stream to minimize sound transmission. Compressor blanket shall be provided for sound attenuation.

Refrigerant-to-air heat exchangers shall utilize enhanced corrugated lanced aluminum fins and rifled copper tube construction rated to withstand 600 PSIG refrigerant working pressure. Refrigerant-to-water heat exchangers shall be of copper inner water tube and steel refrigerant

outer tube design, rated to withstand 600 PSIG working refrigerant pressure and 500 PSIG working water pressure. The refrigerant to water heat exchanger shall be “electro-coated” with a low cure epoxy material a minimum of 0.4 mils thick on all surfaces. The black colored coating shall provide a minimum of 1000 hours salt spray protection per ASTM B117-97 on all external steel and copper tubing.

Refrigerant metering shall be accomplished by thermostatic expansion valve or capillary tube. Expansion valves shall be dual port balanced types with external equalizer for optimum refrigerant metering.

Drain Pan:

The drain pan shall be constructed of powder-coated steel to inhibit corrosion. This corrosion protection system shall meet a 1000 hour salt spray test per ASTM B117. Drain pan shall be fully insulated. Drain outlet shall be located at pan as to allow complete and unobstructed drainage of condensate. The unit as standard will be supplied with solid-state electronic condensate overflow protection. *Mechanical float switches will NOT be accepted.*

Vertical units shall be furnished with a PVC slip condensate drain connection and an internal factory installed condensate trap. *If units without an internal trap are used, the contractor is responsible for any extra costs to field install these provisions, and/or the extra costs for his sub-contractor to install these provisions.*

Electrical:

A control box shall be located within the unit compressor compartment and shall contain a 24 VA or 40VA transformer, 24 volt activated, compressor relay, terminal block for thermostat wiring and solid-state controller for complete unit operation. Fan motor wiring shall be routed through this electronic controller. Units shall be name-plated for use with time delay fuses or HACR circuit breakers. Unit controls shall be 24 Volt and provide heating or cooling as required by the remote thermostat / sensor.

Solid State Control System:

Units shall have a solid-state control system. *Units utilizing internal electro-mechanical internal control shall not be acceptable.* The control system shall interface with a heat pump type thermostat. The control system shall have the following features:

- a. Anti-short cycle time delay on compressor operation.
- b. Random start on power up mode.
- c. Low voltage protection.
- d. High voltage protection.
- e. Unit shutdown on high or low refrigerant pressures.
- f. Unit shutdown on low water temperature.
- g. Condensate overflow electronic protection.
- h. Automatic intelligent reset. If a fault occurs three times within 24 hours, the system will temporarily lock out. This temporary lock out will automatically reset itself after 24 hours. If the same alarm is triggered three times again after the temporary lockout in 24 hours, then the system will lockout permanently.
- i. Ability to disable time delays for servicing.
- j. Light emitting diode (LED) on circuit board to indicate high pressure, low pressure, low voltage, high voltage, low water/air temperature cut-out, condensate overflow, and control voltage status.

- k. The low-pressure switch shall not be monitored for the first 120 seconds after a compressor start command to prevent nuisance safety trips.
- l. 24V output to cycle a motorized water valve or other device with compressor contactor.
- m. Water coil low temperature sensing (selectable for water or anti-freeze).
- n. Air coil low temperature sensing.

Warranty:

Ice Air shall warranty equipment for a period of 12 months from start up or 18 months from shipping (which ever occurs first).