ICE AIR® LLC
80 HARTFORD AVENUE, MOUNT VERNON, NY 10553
WEBSITE: http://www.ice-air.com
TEL: (914) 668-4700; FAX: (914)668-5643

CONSOLE HYBRID WATER CERTIFIED DRAWING

DWG. NO.
Submittal Template CHW(01-25-19)
REV. -

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

DESIGNATION	MODEL NUMBER	QTY
TOTAL		

UNIT SPECIFICATIONS+

PERFORMANCE DATA (COOLING)

TABLE 1

MODEL	5CHW07	5CHW09	5CHW13	8CHW07	8CHW09	8CHW13	8CHW16	8CHW19
COOLING CAPACITY	7,700	9,900	12,800	7,700	9,900	12,800	17,400	20,000
SENSIBLE COOLING	6,600	8,500	10,800	6,600	8,500	10,800	13,300	16,000
AIRFLOW (CFM)	300	400	450	300	400	450	500	550
WATER FLOW (GPM)	1.75	2.25	3.25	1.75	2.25	3.25	4	4.75
EER w/ECM	15.3	14.5	14.3	15.3	14.5	14.3	13.9	14.1
EER w/PSC	14.5	13.9	13.7	14.5	13.9	13.7	13.3	13.5

BTUH @ 80.6°F, 66.2°F WB EAT 86F° EWT @ 3 GPM/TON

PERFORMANCE DATA HEATING

TABLE 2

MODEL	5CHW07	5CHW09	5CHW13	8CHW07	8CHW09	8CHW13	8CHW16	8CHW19
EWT 95F	7,700	9,200	13,100	7,700	9,200	13,100	14,500	18,100
EWT 105F	8,300	9,700	13,800	8,300	9,700	13,800	15,300	19,100
EWT 110F	8,800	10,200	14,500	8,800	10,200	14,500	16,000	20,000

BTUH @ 68°F DB, 62°F WB EAT @ 3 GPM/TON

GENERAL NOTES

CUSTOM NOTES
1:

PHYSICAL DATA

TABLE 3

MODEL	5CHW07	5CHW09	5CHW13	8HPW07	8HPW09	8CHW13	8CHW16	8CHW19
COMPRESSOR TYPE (1 EA)	ROTARY							
REFRIGERANT	R410A							
REFRIGERANT FACTORY CHARGE (oz)	16	17.6	24.7	16	17.6	24.7	24.7	30.0
FAN MOTOR (HP)	1/20	1/20	1/12	1/20	1/12	1/12	1/8	1/6
BLOWER WHEEL SIZE (DIAMETERXWIDTH) (IN)	1 @ 5.25" X 6.25"						2 @ 5.25" X 6.25"	
AIR COIL DIMENSION (IN)	19.5X10.0	19.5X10.0	19.5X10.0	19.5X10.0	19.5x10.0	19.5X10.0	27.5X10.0	27.5X10.0
STANDARD FILTER-1/2" (IN)	22.75X10.0	22.75X10.0	22.75X10.0	22.75X10.0	22.75x10.0	22.75X10.0	30.75X10.0	30.75X10.0
WEIGHT (LB)	170	175	180	170	175	180	190	210

TYPICAL WATER SIDE DATA

TABLE 4

MODEL	5CHW07	5CHW09	5CHW13	8CHW07	8CHW09	8CHW13	8CHW16	8CHW19
FLOW RATE (GPM)	1.75	2.25	3.25	1.75	2.25	3.25	4	4.75
WATER CONNECTION SIZE (IN)	1/2 NPT							
CONDENSATE HOSE CONNECTION SIZE (IN)	3/4 ID							

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UNIT SPECIFICATIONS+

ELECTRICAL DATA

TABLE 5

MODEL	VOLTAGE/HZ-PHASE	TOTAL UNIT FLA	MIN CIRCUIT AMPS	MAX FUSE/HACR
5CHW07	115/60-1	5.1	7.57	15
5CHW09	115/60-1	7.3	8.7	15
5CHW13	115/60-1	15.5	19.0	30
8CHW07	208-230/60-1	2.8	5.0	15
8CHW09	208-230/60-1	5.2	6.2	15
8CHW13	208-230/60-1	5.8	6.9	15
8CHW16	208-230/60-1	8.5	10.1	15
8CHW19	208-230/60-1	10.2	12.3	20

AIR FLOW CORRECTION TABLE

TABLE 6

	% OF RATED AIR FLOW	70%	75%	80%	85%	90%	95%	100%	105%
COOLING FACTORS	TOTAL CAPACITY	0.92	0.93	0.95	0.96	0.97	0.99	1.00	1.02
	SENSIBLE CAPACITY	0.80	0.83	0.87	0.90	0.93	0.97	1.00	1.04
	POWER	0.97	0.97	0.98	0.99	0.99	1.00	1.00	1.01
	HEAT REJECTION	0.94	0.95	0.96	0.97	0.98	0.99	1.00	1.01
HEATING FACTORS	HEATING CAPACITY	0.94	0.95	0.96	0.97	0.98	0.99	1.00	1.01
	POWER	1.08	1.06	1.05	1.04	1.02	1.01	1.00	0.99
	HEAT EXTRACTION	0.93	0.95	0.96	0.97	0.98	0.99	1.00	1.01

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UNIT SPECIFICATIONS+

AIR TEMPERATURE CORRECTION TABLE

TABLE 7

HEATING								
EAT DB (°F)	45	50	55	60	65	70	75	80
HEATING CAPACITY FACTOR	1.11	1.09	1.06	1.04	1.02	1.00	0.98	0.95
POWER FACTOR	0.77	0.81	0.86	0.91	0.95	1.00	1.05	1.10
HEAT EXTRACTION FACTOR	1.18	1.14	1.11	1.07	1.04	1.00	0.96	0.92

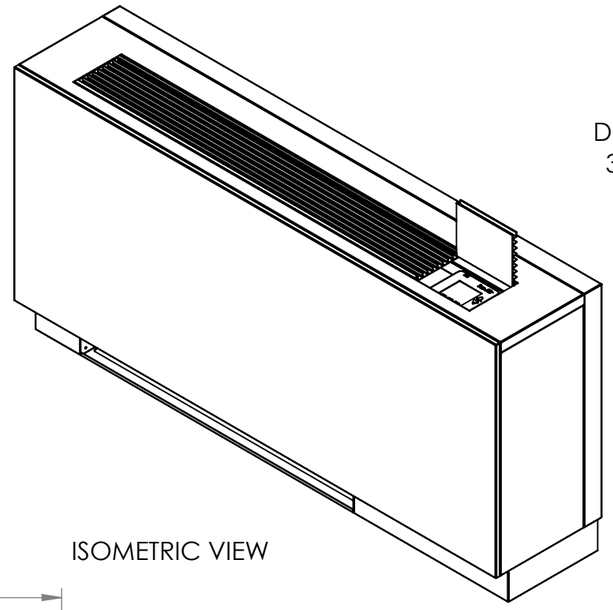
TABLE 8

COOLING						
EAT WB (°F)		60	65	67	70	75
TOTAL CAPACITY FACTOR		0.85	0.96	1.00	1.06	1.17
SENSIBLE CAPACITY FACTOR EAT DB	70	0.85	0.62	0.52	-	-
	75	1.09	0.86	0.76	0.62	-
	80	1.33	1.09	1.00	0.86	0.63
	85	*	1.33	1.23	1.09	0.85
	90	*	*	1.48	1.34	1.10
	95	*	*	*	1.56	1.32
POWER FACTOR		1.00	1.00	1.00	1.00	1.01
HEAT REJECTION FACTOR		0.90	0.97	1.00	1.05	1.12

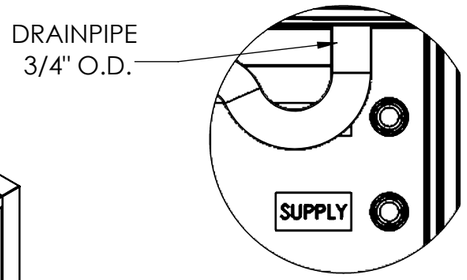
DB - DRY BULB AIR TEMPERATURE
WB - WET BULB AIR TEMPERATURE
EAT - ENTERING AIR TEMPERATURE
ALL TEMPERATURES ARE IN °F
* = SENSIBLE CAPACITY EQUALS TOTAL CAPACITY

SAB-9395

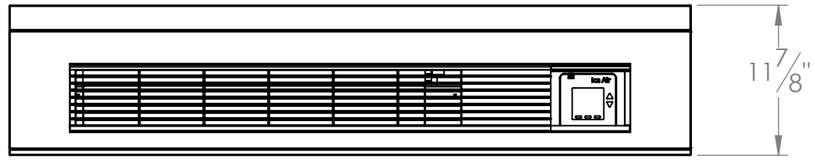
REVISIONS			
REV.	DESCRIPTION	BY	DATE



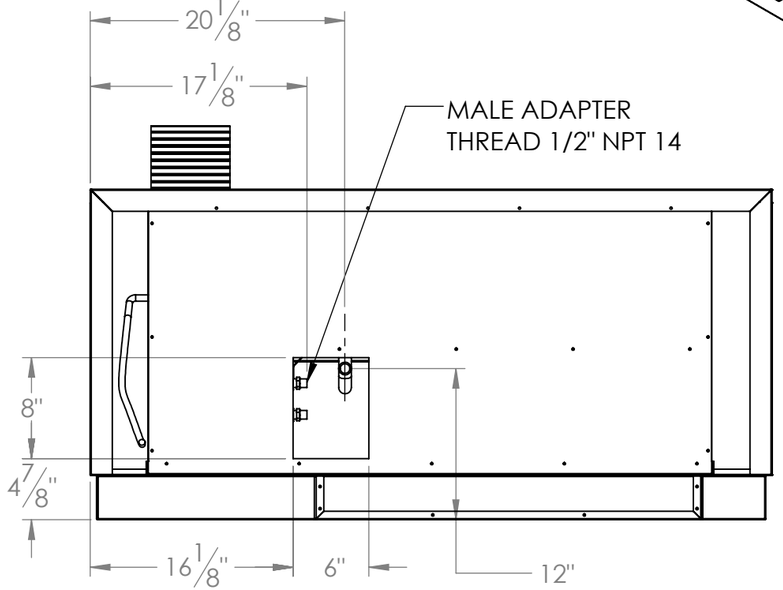
ISOMETRIC VIEW



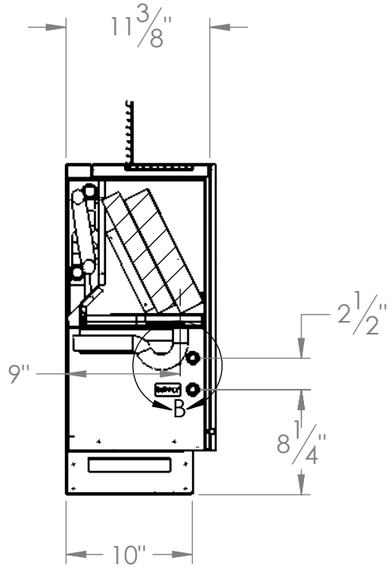
DETAIL B
SCALE 1 : 4



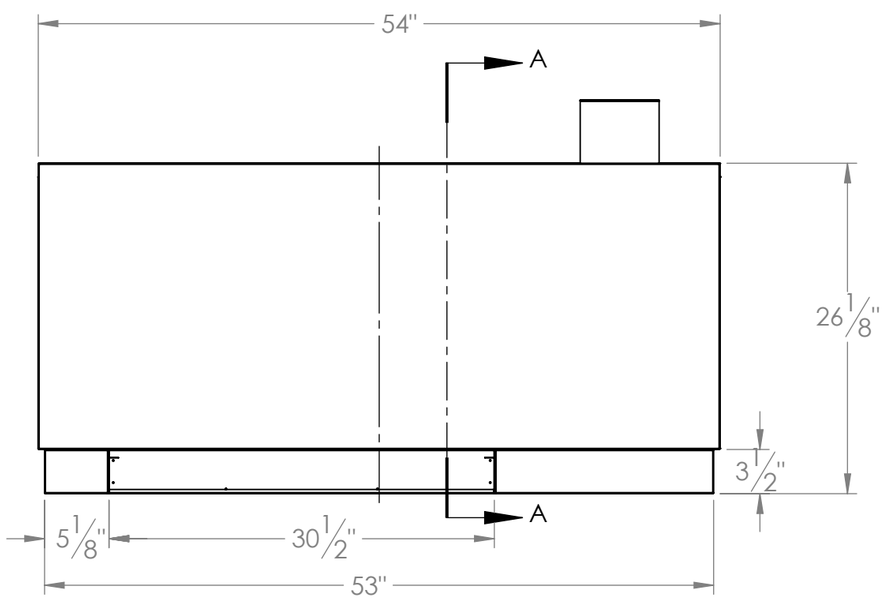
TOP VIEW



REAR VIEW



SECTION A-A
SCALE 1 : 12



FRONT VIEW

MATERIAL:	**ICE-AIR LLC.** 80 HARTFORD AVENUE MOUNT VERNON, NY 10553
WEIGHT (LBS): 160.15	
FINISH: N/A	TITLE: HYBRID C-WSHP FLAT TOP WITH NON-REMOVABLE CHASSIS GENERAL ASS'Y
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± 1/32 ANGULAR: MACH ± ° BEND ± 1° TWO PLACE DECIMAL ± .03 THREE PLACE DECIMAL ± .015	MODEL BY: VP — DATE: 03/26/14 — DWG. NO. SAB-9395 DRAWING BY: — DATE:
	SIZE B — SCALE: NONE DO NOT SCALE DRAWING — SHEET 1 OF 1 — REV

Third Angle Projection

8 7 6 5 4 3 2 1

Ice Air LLC

CONSOLE, MODEL "8CHW" SIZE [09-19] HYBRID WATER COOLED A/C SPECIFICATIONS

January 28, 16

General:
Provide Ice Air "CHW" Series Console Hybrid Water Source Heat Pumps, as indicated on the Project plans. Equipment shall be delivered completely assembled and internally wired, and shall meet the capacities and characteristics listed in the Equipment Schedule and the project Mechanical Specifications.

Console Hybrid Water Cooled A/C:
In cooling mode, units shall operate within the entering water temperature range of **60° to 100°F**. All equipment listed in this section must be rated in accordance with American Refrigeration Institute / International Standards Organization (ARI / ISO) standards and shall be safety listed by Environmental Testing Laboratories for United States and Canada (ETL-US-C). The units shall have ETL-US-C labels. All units shall be factory tested under normal operating conditions and water flows.

Basic Construction:
Hybrid Console Water Source Heat Pump unit shall consist of the Heat Pump Chassis, containing the water-to-air refrigerant system, fan / motor assembly (air handling system), and unit mounted digital controls (optional wall mount controls available); supply, return and condensate connections are centrally located for ease of installation. The chassis shall be attached to a powder coated sub base and be contained within a powder coated room cabinet with integral grille and control access door.

Room Cabinet:
The cabinet, wall mounting hardware and sub-base shall be constructed of heavy gauge galvanized steel with a baked powder coat paint finish. Corrosion protection system shall meet the stringent 1000 hour salt spray test per ASTM B117. Color will be Antique or Arctic White as standard. The easily removable cabinet enclosure allows for easy service to the chassis, piping compartment and control compartment. Return air opening will have a painted punched grille to conceal the opening. Color to be approved by architect.

Cabinet shall contain an extruded aluminum clear anodized air discharge grille and matching control access door.

All interior surfaces of Cabinet shall be lined with 1/2 inch (12.7mm) thick, dual density, 2 lb/ft^3 (32 kg/m^3) acoustic flexible blanket type glass fiber insulation with a non-woven, anti-microbial treated mat face. 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.

Standard insulation must meet NFPA Fire Hazard Classification requirements 25/50 per ASTM E84, UL 723, CAN/ULC S102-M88 and NFPA 90A requirements; air erosion and mold growth limits of UL-181; fungal resistance test per ASTM-C1071 and ASTM G21; and shall meet zero level bacteria growth per ASTM G22.

Return Air Filter shall be 1/2" (12.7mm) permanent cleanable type media for bottom return units (units with subbase).

Water Connections:
Water connections between chassis and the cabinet shall be accomplished via a hose kit with a stainless-steel braid. Hose kit shall have brass fittings with stainless-steel ferrules. Hose ends shall be solid External NPT which connects to mating fitting on cabinet shut off ball valve(s), and Internal NPSM (National Pipe Straight Mechanical) swivel end with fiber or EPDM washer which connects to mating threaded end connection on chassis. The hose kit shall be rated for 350 psi (2412 kPa) design working pressure.

Chassis:

High Capacity Hot Water Coil
Provide integral unit mounted high capacity Hydronic Heating Coil consisting of lanced aluminum fins and a (rifled) copper tube water-to-air heat exchanger. Hydronic coil to contain sufficient tubing rows and multiple circuits to meet heating capacities required at specified entering water temperatures and flow rates.

Valve Package:
All chassis will have a factory installed valve package. The valve package consists of 2- 2 way motorized valves: 1- normally open for heating and 1- normally closed for cooling and 1- auto flow valve, set to allow the specified GPM flow rate to the chassis.

Fan and Motor Assembly:
Fan and motor assembly shall be assembled on fan deck with quick electrical disconnecting means to provide and facilitate easy field servicing. The fan motor shall be 2-speed cooling/ 2-speed heating, permanently lubricated, ECM type, with internal thermal overload protection. The fan motor shall include a torsionally flexible motor mounting system or saddle mount system with resilient rings to inhibit vibration induced high noise levels associated with "hard wire belly band" motor mounting.

Refrigerant Circuit:
All units shall contain a sealed refrigerant circuit employing R410A green refrigerant and including a high efficiency rotary compressor designed for heat pump operation, thermostatic expansion valve or capillary tube refrigerant metering device, refrigerant-to-air heat exchanger, reversing valve, coaxial (tube in tube) refrigerant-to-water heat exchanger, and safety controls. Safety controls shall include 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.

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.

Refrigerant-to-air heat exchanger shall utilize enhanced corrugated lanced aluminum fins and rifled copper tube construction rated to withstand 600 PSIG (4136 kPa) 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 (4136 kPa) working refrigerant pressure and 450 PSIG (3101 kPa) 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 (0.4 – 1.5 mils range) on all surfaces.

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. Reversing valve shall be four-way solenoid activated refrigerant valve, which shall default to heating mode should the solenoid fail to function. If the reversing valve solenoid defaults to cooling mode, an additional low temperature thermostat must be provided to prevent over-cooling an already cold room.

Piping:
Provide integral universal ½" NPT piping connections. Units shall be shipped with plugs on piping connections, and field installer shall remove the plugs on the field piping side. Water piping shall terminate in the same location regardless of the connection and valve options.

Drain Pan:
The drain pan shall be constructed of galvanized steel with full powder coat paint application to further inhibit corrosion. Drain pan shall be fully insulated. Drain outlet shall be located at pan as to allow complete and unobstructed drainage of condensate. Drain hose shall contain an integral P Trap. The unit will be supplied with a solid-state electronic condensate overflow protection.

Electrical:
Controls shall include an LCD or digital display for display of temperature and set point. (See Thermostat section below for Controls operations and settings).

A control box shall be located above the unit compressor compartment and shall contain operating controls as outlined in the paragraph above, 24VAC transformer, double-pole compressor relay, and solid-state controller for complete unit operation. Reversing valve and 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. A unit-mounted *digital* thermostat with a remote bulb measuring return air temperature shall control the compressor operation for heating and cooling. Control shall be equipped with a fan switch (provides options to cycle fan with compressor or provide continuous fan) and a fault indicator light. Chassis will have a hard wiring LCDI plug for easy disconnect.

Solid State Control System:
Units shall have a solid-state control system. 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. Unit shall automatically reset 5 minutes after trip if the fault has cleared. If a fault occurs 3 times sequentially without thermostat meeting temperature, then lockout requiring manual reset will occur.
i. Ability to disable time delays for servicing.
j. Light emitting diodes (LEDs) 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 free from defects in material and workmanship for a period of 12 months from start up.

Thermostats:
The thermostat shall be an Ice Air electronic type thermostat as selected below with the described features:

Single Stage Auto Changeover Programmable 7 or 5/2 Day
Thermostat shall be 7 or 5 day/2 day programmable (with up to 4 set points per day), single stage (2H/2C), manual changeover with HEAT-OFF-COOL system settings and fan ON-AUTO settings. Thermostat shall have an LCD display with temperature, set-point(s), mode, and status indication. The temperature indication shall be selectable for ºF or ºC. The thermostat shall provide permanent memory of set-point(s) without batteries. Thermostat shall provide convenient override feature to temporarily change set point. Thermostat to be NYSERDA MPP compliant.