HEAT CONTROLLER LLC

ENGINEERING DESIGN GUIDE

R410A Water-to-Water Series:

HWW Water-Source Heat Pumps

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Unit Features

THE MODULAR WATER-TO-WATER (HWW) SERIES

The HWW Water-to-Water Series offers high efficiency and high capacity with advanced features, quiet operation and application flexibility at competitive prices. The HWW Series can be used for radiant floor heating, snow/ice melt, chilled water for fan coils, industrial process control, potable hot water generation*, hot/chilled water for make-up air, and many other types of HVAC and industrial applications that require cost effective heated or chilled water.

The HWW Series exceeds ASHRAE 90.1 efficiencies, and also uses R-410A zero ozone depletion refrigerant, making it an extremely environmentally-friendly option.

The HWW Series provides high capacity in a small footprint, which saves mechanical room space. The HWW Series has an extended range refrigerant circuit (refrigerant and water circuit insulation is standard), capable of ground loop (geothermal) applications as well as water loop (boiler-tower) applications. Standard features are many. Microprocessor controls, galvanized steel cabinet, polyester powder coat paint and TXV refrigerant metering device are just some of the features of the flexible HWW Series. The uniquely-designed coaxial heat exchangers are designed for many years of reliable operation.

Heat Controller's dual-isolated compressor mounting and heavy gauge steel cabinet helps make the HWW Series the quietest large capacity water-to-water unit on the market. Scroll compressor(s) operate quietly, and provide part load operation (size 100) for capacity control. For ease of installation and service, access to the refrigeration service and electrical control panel is located at the front of the unit, allowing units to be installed side-by-side for large capacity applications (see below).

The HWW Series water-to-water heat pumps are designed to meet the challenges of today's HVAC demands with a high efficiency, high value solution.

*Requires field supplied secondary heat exchanger.

UNIT FEATURES

- Size 036, 060 & 120
- Copeland scroll compressor(s)
- Exclusive single side service access (front of unit) allows multiple units to be installed side-by-side for large capacity installations
- Top water connections, staggered for ease of manifolding multiple units
- Exceeds ASHRAE 90.1 efficiencies
- Heavy gauge galvanized steel construction with polyester powder coat paint and stainless steel front access panels
- Insulated compressor compartment
- Small footprint
- TXV metering devices
- Extended range (20 to 110°F, -6.7 to 43.3°C) operation
- Microprocessor controls standard (optional DXM and/or DDC controls)
- LonWorks, BACnet, Modbus and Johnson N2 compatibility options for DDC controls
- Compressor "run" and "fault" lights on the front of the cabinet
- Seven safeties standard
- Copper or Cupro-Nickel heat exchanger options

Selection Procedure

Reference Calculations

Heating

$$LWT = EWT - \frac{HE}{GPM \times 500}$$

Cooling

$$LWT = EWT + \frac{HR}{GPM \times 500}$$

Legend and Glossary of Abbreviations

BTUH = BTU (British Thermal Unit) per hour
CFM = airflow, cubic feet/minute
COP = coefficient of performance = BTUH output/BTUH input
DB = dry bulb temperature (°F)
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)
EER = energy efficiency ratio = BTUH output/Watt input
MPT = male pipe thread
ESP = external static pressure (inches w.g.)
EWT = entering water temperature
GPM = water flow in U.S. gallons/minute
HE = total heat of extraction, BTUH
HC = air heating capacity, BTUH
HR = total heat of rejection, BTUH
HWC = hot water generator (desuperheater) capacity, Mbtuh
FPT = female pipe thread
KW = total power unit input, kilowatts
LAT = leaving air temperature, °F
LC = latent cooling capacity, BTUH
LWT = leaving water temperature, °F
MBTUH = 1000 BTU per hour
S/T = sensible to total cooling ratio
SC = sensible cooling capacity, BTUH
TC = total cooling capacity, BTUH
WB = wet bulb temperature (°F)
WPD = waterside pressure drop (psi & ft. of hd.)

Conversion Table - to convert inch-pound (English) to S-I (Metric)

Water Flow	Water Pressure Drop
Water Flow (L/s) = gpm x 0.0631	PD (kPa) = PD (ft of hd) x 2.99

Selection Procedure

Step 1: Determine the actual heating and/or cooling loads at the applicable source (building loop) water temperature/flow rate and load water temperature/flow rate. The source heat exchanger is the condenser in cooling/evaporator in heating; the load heat exchanger is the evaporator in cooling/condenser in heating.

Step 2: Obtain the following design parameters: Entering source/load water temperature, source/load water flow rate in GPM and water flow pressure drop. Water flow rate is generally between 2.25 and 3.00 GPM/ton for closed loop (boiler/tower and geothermal) systems, and between 1.5 and 2.0 GPM/ton for open loop (well water) systems. Unit water pressure drop should be kept as close as possible to each other to make water balancing easier. Go to the appropriate tables and find the proper indicated water flow and water temperature.

Step 3: Determine application requirements. Water-to-water applications are almost always designed for a particular installation, which will change how the data tables are used for unit selection. For example, a water-to-water unit used for radiant floor heating on a geothermal closed loop is significantly different in unit selection from a water-to-water unit on a boiler/tower application used for generating chilled water for fan coil units. It is especially important to note that the load water flow rate must be maintained above minimum flow rates as shown in the data tables for proper refrigerant circuit operation and unit longevity. For example, most radiant floor applications require buffer (storage) tanks because the flow rate through the floor is usually lower than the minimum flow rate for the water-to-water unit. Therefore, selection of the heat pump is dependent upon maintaining a certain tank temperature and unit load flow rate. There would be a pump between the heat pump and the buffer tank, and a pump(s) between the buffer tank and radiant floor to maintain design flow rate on both sides.

Step 4: Enter tables at the design source water temperature and flow rate. Choose the appropriate load water temperature and flow rate. Read the total heating or cooling capacities (Note: interpolation is permissible; extrapolation is not).

Step 5: If the units selected are not within 10% of the load calculations, then review what effect changing the GPM and water temperature would have on the capacities. If the desired capacity cannot be achieved, select the next larger or smaller unit and repeat the procedure.

Example Equipment Selection for Heating

Step 1 Load Determination:

Assume we have determined that the application will be heating only (radiant floor) for a large commercial warehouse, and that the appropriate heating load at design conditions is as follows:

Total heating.....210,000 BTUH

Step 2 Design Conditions:

Entering source temperature.....30°F (geothermal closed loop)

Source flow rate.....53 GPM

Entering load temperature.....100°F

Load flow rate.....53 GPM

Steps 3, 4, 5 HP Selection:

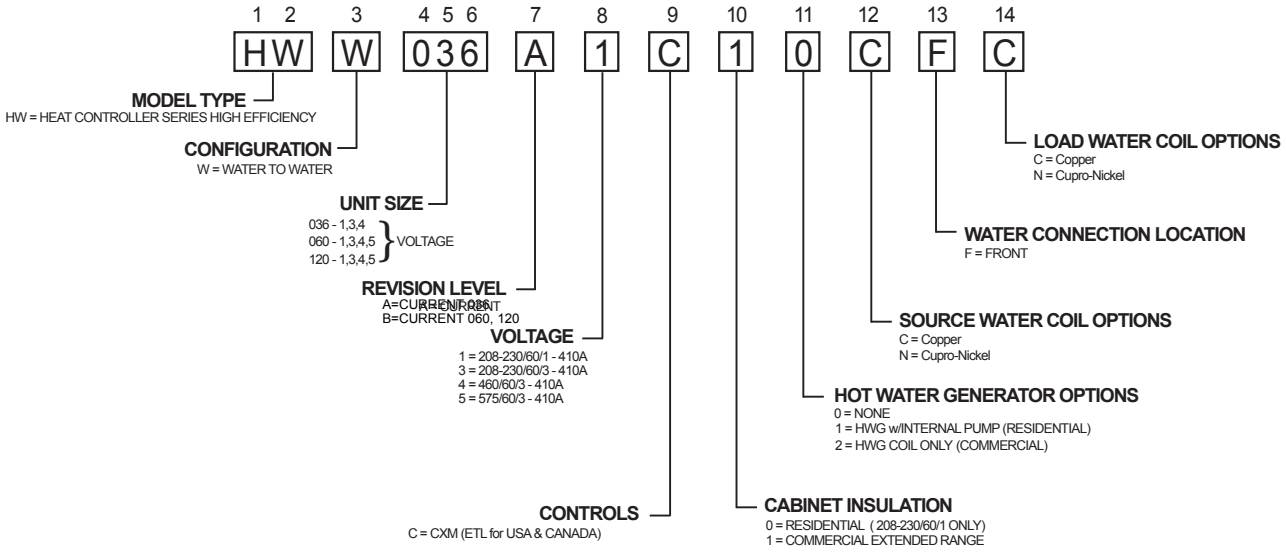
We enter the tables at design source water temperature and flow rate, and select the appropriate load water temperature and flow rate. A TMW340 at design conditions supplies 211,100 BTUH, which meets the design heating load requirement.

HWW HIGH EFFICIENCY Water-to-Water R-410A Heat Pumps

Entering Water Temperature Range: 20 - 110° F (-6.7 - 43.3° C)

Sizes 036, 060 & 120

HWW Model Structure



Basic Unit Description:

The basic unit price includes sealed heat pump refrigerant circuit.

- **Cabinetry -** Heavy gauge galvanized steel with polyester powder coat paint - multiple removable panels for service access - interior surfaces lined with 1/2 inch dual density acoustic type glass fiber insulation - IPT water connections - high and low voltage knockouts.
- **Controls -** Solid state control system with seven standard safeties including anti-short cycle, over voltage, under voltage, high refrigerant pressure, loss of refrigerant charge, low source water temperature, low load water temperature - run and fault lights on cabinet exterior - alarm contact for remote monitoring of fault condition (field selectable for dry contact or 24vac).
- **Refrigerant Circuit -** Compressor(s) - coaxial source and load heat exchangers - revering valve(s) - filter drier(s) - thermal expansion valve(s) - high pressure and loss charge swit ches - high and low side Schrader ports for service - non-ozone depleting R-410A refrigerant.
- **Compressor(s)-** High efficiency scroll compressor - internally sprung and externally isolated using dual vibration isolation system for quiet operation. Mounting system includes rubber grommet mounts between the compressor and a mounting tray then another set of rubber mounts between the mounting tray and unit base pan.
- **Reversing Valve -** 4-way pilot operated, solenoid activated in cooling mode.
- **Safety Agency Listing -** Product is ETL Listed.
- **Application -** May be applied in water loop heat pump, ground water heat pump, and ground loop heat pump applications.

Performance Data
AHRI/ASHRAE/ISO 13256-2

HWW 036-120 Performance Data ASHRAE/AHRI/ISO 13256-2 English (I-P) Units

Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling		Heating		Cooling		Heating		Cooling		Heating	
	Indoor 53.6°F Outdoor 86°F		Indoor 104°F Outdoor 68°F		Indoor 53.6°F Outdoor 59°F		Indoor 104°F Outdoor 50°F		Indoor 53.6°F Outdoor 77°F		Indoor 104°F Outdoor 32°F	
	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP
HWW036	32,300	14.60	43,100	4.90	36,200	23.10	35,300	4.00	33,300	16.40	27,400	3.10
HWW060	52,800	14.30	72,700	4.70	56,600	20.30	60,300	4.00	55,600	16.20	48,500	3.10
HWW120	105,600	14.10	145,400	4.60	113,200	20.10	120,600	3.90	111,200	16.10	97,000	3.10

All HWW036 ratings @ 9GPM load w/9GPM source.
All HWW060 ratings @ 15GPM load w/15GPM source.
All HWW120 ratings @ 30GPM load w/30GPM source.
All ratings based upon operation at lower voltage of dual voltage rated models.

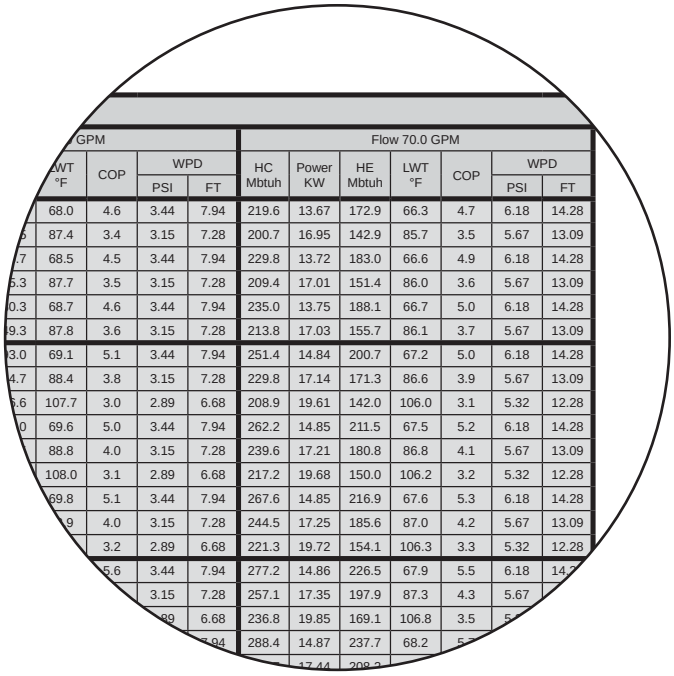
HWW 036-120 Performance Data ASHRAE/AHRI/ISO 13256-2 Metric (S-I) Units

Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling		Heating		Cooling		Heating		Cooling		Heating	
	Indoor 12°C Outdoor 30°C		Indoor 40°C Outdoor 20°C		Indoor 12°C Outdoor 15°C		Indoor 40°C Outdoor 10°C		Indoor 12°C Outdoor 25°C		Indoor 40°C Outdoor 0°C	
	Capacity kW	EER W/W	Capacity kW	COP	Capacity kW	EER W/W	Capacity kW	COP	Capacity kW	EER W/W	Capacity kW	COP
HWW036	9.47	4.28	12.64	4.90	10.62	6.77	10.35	4.00	9.77	4.81	8.04	3.10
HWW060	15.48	4.19	21.32	4.70	16.60	5.95	17.68	4.00	16.31	4.75	14.22	3.10
HWW120	30.97	4.13	42.64	4.60	33.20	5.89	35.37	3.90	32.61	4.71	28.45	3.10

All HWW036 ratings @ 0.57 l/s load w/ 0.57 l/s source.
All HWW060 ratings @ 0.95 l/s load w/0.95 l/s source.
All HWW120 ratings @ 1.89 l/s load w/1.89 l/s source.
All ratings based upon operation at lower voltage of dual voltage rated models.

Performance Data
Selection Notes

For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 40°F [4.4°C] when the JW3 jumper is not clipped (see example below). Otherwise, appropriate levels of a proper antifreeze should be used in systems with leaving water temperatures of 40ºF [4.4°C] or below and the JW3 jumper should be clipped. This is due to the potential of the refrigerant temperature being as low as 32°F [0°C] with 40°F [4.4°C] LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for standard range equipment or systems without antifreeze.



GPM					Flow 70.0 GPM						
LWT °F	COP	WPD		HC Mbtuh	Power KW	HE Mbtuh	LWT °F	COP	WPD	
		PSI	FT						PSI	FT
68.0	4.6	3.44	7.94	219.6	13.67	172.9	66.3	4.7	6.18	14.28
87.4	3.4	3.15	7.28	200.7	16.95	142.9	85.7	3.5	5.67	13.09
68.5	4.5	3.44	7.94	229.8	13.72	183.0	66.6	4.9	6.18	14.28
87.7	3.5	3.15	7.28	209.4	17.01	151.4	86.0	3.6	5.67	13.09
68.7	4.6	3.44	7.94	235.0	13.75	188.1	66.7	5.0	6.18	14.28
87.8	3.6	3.15	7.28	213.8	17.03	155.7	86.1	3.7	5.67	13.09
69.1	5.1	3.44	7.94	251.4	14.84	200.7	67.2	5.0	6.18	14.28
88.4	3.8	3.15	7.28	229.8	17.14	171.3	86.6	3.9	5.67	13.09
107.7	3.0	2.89	6.68	208.9	19.61	142.0	106.0	3.1	5.32	12.28
69.6	5.0	3.44	7.94	262.2	14.85	211.5	67.5	5.2	6.18	14.28
88.8	4.0	3.15	7.28	239.6	17.21	180.8	86.8	4.1	5.67	13.09
108.0	3.1	2.89	6.68	217.2	19.68	150.0	106.2	3.2	5.32	12.28
69.8	5.1	3.44	7.94	267.6	14.85	216.9	67.6	5.3	6.18	14.28
9	4.0	3.15	7.28	244.5	17.25	185.6	87.0	4.2	5.67	13.09
	3.2	2.89	6.68	221.3	19.72	154.1	106.3	3.3	5.32	12.28
	5.6	3.44	7.94	277.2	14.86	226.5	67.9	5.5	6.18	14.2
		3.15	7.28	257.1	17.35	197.9	87.3	4.3	5.67	
		89	6.68	236.8	19.85	169.1	106.8	3.5	5	
			7.94	288.4	14.87	237.7	68.2	5.7		
					17.44	208.2				

Example:

At 50°F EWT (Entering Water Temperature) and 1.5 gpm/ton, a 3 ton unit has a HE of 22,500 Btuh. To calculate LWT, rearrange the formula for HE as follows:
HE = TD x GPM x 500, where HE = Heat of Extraction (Btuh); TD = temperature difference (EWT - LWT) and GPM = U.S. Gallons per Minute.

TD = HE / (GPM x 500)

TD = 22,500 / (4.5 x 500)

TD = 10°F

LWT = EWT - TD

LWT = 50 - 10 = 40°F

In this example, as long as the EWT does not fall below 50°F, the system will operate as designed. For EWTs below 50°F, higher flow rates will be required (open loop systems, for example, require at least 2 gpm/ton when EWT is below 50°F).

Performance Data
HWW036 (60Hz I-P) - Cooling

SOURCE				LOAD																					
EWT °F	Flow			EWT °F	Flow 4.5 GPM							Flow 6.8 GPM							Flow 9.0 GPM						
	GPM	WPD			TC Mb-tuh	Power kW	HR Mbtuh	LWT °F	EER	WPD		TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD		TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD	
		PSI	FT							PSI	FT						PSI	FT						PSI	FT
50	4.5	1.3	3.1	50	32.5	1.49	37.6	35.6	21.8	0.6	1.4	34.5	1.52	39.7	39.8	22.7	1.4	3.2	35.3	1.5	40.5	42.1	23.2	2.6	5.9
				60	36.8	1.53	42.0	43.6	24.1	0.5	1.2	38.4	1.54	43.6	48.6	24.9	1.3	3.1	39.2	1.5	44.5	51.3	25.3	2.5	5.8
				70	40.4	1.55	45.7	52.0	26.0	0.5	1.1	41.6	1.56	47.0	57.7	26.6	1.3	2.9	42.4	1.6	47.8	60.6	27.0	2.4	5.6
				80	43.2	1.57	48.6	60.8	27.5	0.4	0.9	44.2	1.58	49.6	66.9	28.0	1.2	2.8	44.8	1.6	50.3	70.0	28.1	2.3	5.4
				90	45.1	1.58	50.5	69.9	28.6	0.3	0.8	46.2	1.60	51.7	76.3	28.9	1.1	2.6	46.6	1.6	52.1	79.7	28.9	2.2	5.1
	6.8	3.4	7.8	50	32.9	1.41	37.7	35.4	23.3	0.6	1.4	34.9	1.44	39.8	39.7	24.2	1.4	3.2	35.8	1.4	40.7	42.0	24.8	2.6	5.9
				60	37.3	1.45	42.2	43.4	25.7	0.5	1.2	38.9	1.46	43.9	48.5	26.6	1.3	3.1	39.7	1.5	44.7	51.2	27.1	2.5	5.8
				70	40.9	1.47	46.0	51.8	27.8	0.5	1.1	42.2	1.48	47.2	57.5	28.4	1.3	2.9	42.9	1.5	48.0	60.5	28.8	2.4	5.6
				80	43.8	1.49	48.9	60.5	29.4	0.4	0.9	44.8	1.50	49.9	66.7	29.9	1.2	2.8	45.4	1.5	50.6	69.9	30.0	2.3	5.4
				90	45.7	1.50	50.8	69.7	30.5	0.3	0.8	Operation not recommended													
	9.0	6.0	13.9	50	33.3	1.33	37.8	35.2	25.1	0.6	1.4	35.4	1.35	40.0	39.5	26.1	1.4	3.2	36.2	1.4	40.9	41.9	26.8	2.6	5.9
				60	37.8	1.36	42.4	43.2	27.8	0.5	1.2	39.4	1.37	44.0	48.3	28.7	1.3	3.1	40.2	1.4	44.9	51.1	29.2	2.5	5.8
				70	41.5	1.38	46.2	51.6	30.0	0.5	1.1	42.7	1.39	47.5	57.3	30.7	1.3	2.9	43.5	1.4	48.3	60.3	31.1	2.4	5.6
				80	44.3	1.40	49.1	60.3	31.7	0.4	0.9	45.4	1.41	50.2	66.6	32.3	1.2	2.8	46.0	1.4	50.8	69.8	32.5	2.3	5.4
				90	46.3	1.41	51.1	69.4	33.0	0.3	0.8														
70	4.5	1.0	2.3	50	30.1	1.96	36.8	36.6	15.3	0.6	1.4	32.1	1.95	38.8	40.5	16.4	1.4	3.2	33.0	2.0	39.7	42.7	16.7	2.6	5.9
				60	34.1	1.98	40.9	44.8	17.2	0.5	1.2	37.6	1.96	44.3	48.9	19.2	1.3	3.1	36.6	2.0	43.3	51.9	18.7	2.5	5.8
				70	39.0	2.01	45.9	52.7	19.4	0.5	1.1	41.7	1.98	48.5	57.6	21.0	1.3	2.9	39.9	2.0	46.7	61.1	19.9	2.4	5.6
				80	42.7	2.03	49.7	61.0	21.1	0.4	1.0	45.4	2.01	52.3	66.5	22.5	1.2	2.8	42.9	2.0	49.8	70.5	21.1	2.3	5.4
				90	46.2	2.05	53.2	69.5	22.5	0.3	0.8														
	6.8	2.8	6.5	50	30.5	1.86	36.8	36.5	16.4	0.6	1.4	32.5	1.85	38.8	40.4	17.5	1.4	3.2	33.4	1.9	39.8	42.6	17.8	2.6	5.9
				60	34.6	1.88	41.0	44.6	18.4	0.5	1.2	38.1	1.86	44.4	48.7	20.4	1.3	3.1	37.1	1.9	43.4	51.8	19.9	2.5	5.8
				70	39.5	1.90	46.0	52.4	20.8	0.5	1.1	42.3	1.88	48.7	57.5	22.4	1.3	2.9	40.4	1.9	46.9	61.0	21.3	2.4	5.6
				80	43.3	1.93	49.9	60.8	22.5	0.4	0.9	46.0	1.91	52.5	66.4	24.1	1.2	2.8	43.4	1.9	50.0	70.3	22.5	2.3	5.4
				90	46.8	1.95	53.4	69.2	24.0	0.3	0.8														
	9.0	5.1	11.9	50	30.8	1.74	36.8	36.3	17.7	0.6	1.4	32.9	1.74	38.8	40.2	19.0	1.4	3.2	33.8	1.8	39.8	42.5	19.3	2.6	5.9
				60	35.0	1.76	41.0	44.4	19.9	0.5	1.2	38.6	1.75	44.5	48.6	22.1	1.3	3.1	37.5	1.7	43.5	51.7	21.5	2.5	5.8
				70	40.0	1.78	46.1	52.2	22.4	0.5	1.1	42.8	1.77	48.8	57.3	24.2	1.3	2.9	40.9	1.8	47.0	60.9	23.0	2.4	5.6
				80	43.8	1.81	50.0	60.5	24.3	0.4	0.9	46.6	1.79	52.7	66.2	26.0	1.2	2.8	44.0	1.8	50.2	70.2	24.3	2.3	5.4
				90	47.4	1.83	53.6	68.9	26.0	0.3	0.8														
90	4.5	0.8	1.8	50	27.0	2.55	35.7	38.0	10.6	0.6	1.4	28.9	2.59	37.7	41.4	11.1	1.4	3.2	29.7	2.6	38.4	43.4	11.5	2.6	5.9
				60	31.1	2.58	39.9	46.2	12.1	0.5	1.2	34.0	2.60	42.8	49.9	13.1	1.3	3.1	33.6	2.6	42.3	52.5	13.1	2.5	5.8
				70	36.2	2.60	45.1	53.9	13.9	0.5	1.1	38.9	2.62	47.8	58.5	14.9	1.3	2.9	37.4	2.6	46.2	61.7	14.4	2.4	5.6
				80	40.5	2.62	49.4	62.0	15.5	0.4	0.9	42.9	2.65	52.0	67.3	16.2	1.2	2.8	41.1	2.6	50.0	70.9	15.6	2.3	5.4
				90	44.2	2.64	53.2	70.4	16.7	0.3	0.8														
	6.8	2.4	5.4	50	27.3	2.42	35.6	37.9	11.3	0.6	1.4	29.3	2.46	37.7	41.3	11.9	1.4	3.2	30.0	2.4	38.4	43.3	12.3	2.6	5.9
				60	31.5	2.44	39.8	46.0	12.9	0.5	1.2	34.4	2.46	42.8	49.8	14.0	1.3	3.1	34.0	2.4	42.3	52.4	14.0	2.5	5.8
				70	36.7	2.47	45.1	53.7	14.9	0.5	1.1	39.4	2.48	47.9	58.3	15.9	1.3	2.9	37.8	2.5	46.2	61.6	15.4	2.4	5.6
				80	41.0	2.49	49.5	61.8	16.5	0.4	0.9	43.5	2.51	52.1	67.1	17.3	1.2	2.8	41.6	2.5	50.1	70.8	16.7	2.3	5.4
				90	44.7	2.50	53.3	70.1	17.9	0.3	0.8														
	9.0	4.5	10.3	50	27.7	2.27	35.4	37.7	12.2	0.6	1.4	29.6	2.31	37.5	41.2	12.9	1.4	3.2	30.4	2.3	38.2	43.2	13.3	2.6	5.9
				60	31.9	2.29	39.7	45.8	13.9	0.5	1.2	34.8	2.31	42.7	49.7	15.1	1.3	3.1	34.4	2.3	42.2	52.3	15.1	2.5	5.8
				70	37.2	2.31	45.1	53.5	16.1	0.5	1.1	39.9	2.33	47.8	58.2	17.1	1.3	2.9	38.3	2.3	46.2	61.5	16.6	2.4	5.6
				80	41.5	2.33	49.5	61.5	17.8	0.4	0.9	44.0	2.35	52.1	67.0	18.7	1.2	2.8	42.1	2.3	50.1	70.6	18.0	2.3	5.4
				90	45.3	2.35	53.3	69.9	19.3	0.3	0.8														
110	4.5	0.6	1.4	50	23.3	3.27	34.4	39.7	7.1	0.6	1.4	24.9	3.33	36.2	42.6	7.5	1.4	3.2	25.3	3.3	36.7	44.4	7.6	2.6	5.9
				60	27.7	3.30	39.0	47.7	8.4	0.5	1.2	29.4	3.33	40.8	51.3	8.8	1.3	3.1	30.2	3.3	41.6	53.3	9.1	2.5	5.8
				70	32.1	3.33	43.5	55.7	9.6	0.5	1.1	33.9	3.34	45.3	60.0	10.2	1.3	2.9	34.9	3.3	46.3	62.3	10.4	2.4	5.6
				80	36.4	3.34	47.8	63.8	10.9	0.4	0.9	38.4	3.36	49.8	68.6	11.4	1.2	2.8	39.4	3.4	50.9	71.3	11.7	2.3	5.4
	6.75	2.0	4.7	50	23.5	3.10	34.1	39.5	7.6	0.6	1.4	25.2	3.16	36.0	42.5	8.0	1.4	3.2	25.7	3.2	36.4	44.3	8.1	2.6	5.9
				60	28.1	3.14	38.8	47.5	9.0	0.5	1.2	29.8	3.16	40.6	51.2	9.4	1.3	3.1	30.6	3.2	41.4	53.2	9.7	2.5	5.8
				70	32.5	3.16	43.3	55.6	10.3	0.5	1.1	34.3	3.17	45.1	59.8	10.8	1.3	2.9	35.3	3.2	46.2	62.2	11.1	2.4	5.6
				80	36.9	3.17	47.7	63.6	11.6	0.4	0.9	38.8	3.19	49.7	68.5	12.2	1.2	2.8	39.9	3.2	50.8	71.1	12.5	2.3	5.4
	9.0	4.0	9.2	50	23.8	2.91	33.8	39.4	8.2	0.6	1.4	25.5	2.96	35.6	42.4	8.6	1.4	3.2	26.0	3.0	36.1	44.2	8.8	2.6	5.9
				60	28.4	2.94	38.5	47.4	9.7	0.5	1.2	30.2	2.96	40.3	51.1	10.2	1.3	3.1	31.0	3.0	41.1	53.1	10.4	2.5	5.8
				70	32.9	2.96	43.0	55.4	11.1	0.5	1.1	34.8	2.97	44.9	59.7	11.7	1.3	2.9	35.8	3.0	45.9	62.1	12.0	2.4	5.6
				80	37.4	2.97	47.5	63.4	12.6	0.4	0.9	39.3	2.99	49.5	68.3	13.1	1.2	2.8	40.4	3.0	50.6	71.0	13.5	2.3	5.4
120	6.75	1.9	4.4	50	20.7	3.55	32.8	40.8	5.8	0.6	1.4	22.1	3.60	34.4	43.4	6.1	1.4	3.2	22.5	3.6	34.9	45.0	6.2	2.6	5.9
				60	25.3	3.59	37.6	48.7	7.1	0.5	1.2	26.9	3.61	39.2	52.0	7.5	1.3	3.1	27.6	3.6	39.9	53.9	7.6	2.5	5.8
				70	30.0	3.60	42.3	56.7	8.3	0.5	1.1	31.7	3.61	44.0	60.6	8.8	1.3	2.9	32.6	3.6	45.0	62.8	9.0	2.4	5.6
				80	34.4	3.61	46.8	64.7	9.5	0.4	0.9	36.2	3.64	48.6	69.3	9.9	1.2	2.8	37.2	3.6	49.7	71.7	10.2	2.3	5.4
	9.0	3.8	8.8	50	21.0	3.39	32.6	40.7	6.2	0.6	1.4	22.5	3.45	34.2	43.3	6.5	1.4	3.2	22.9	3.5	34.7	44.9	6.6	2.6	5.9
				60	25.7	3.43	37.4	48.6	7.5	0.5	1.2	27.3	3.45	39.1	51.9	7.9	1.3	3.1	28.0	3.5	39.8	53.8	8.1	2.5	5.8
				70	30.5	3.45	42.2	56.5	8.8	0.5	1.1	32.2	3.46	44.0	60.5	9.3	1.3	2.9	33.1	3.5	44.9	62.6	9.5	2.4	5.6

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas. Calculation to determine percentage of antifreeze required on load side.

Performance Data
HWW036 (60Hz I-P) - Heating

SOURCE				LOAD																					
EWT °F	Flow			EWT °F	Flow 4.5 GPM							Flow 6.8 GPM							Flow 9.0 GPM						
	GPM	WPD			HC Mbtuh	Power KW	HE Mbtuh	LWT °F	COP	WPD		HC Mbtuh	Power KW	HE Mbtuh	LWT °F	COP	WPD		HC Mbtuh	Power KW	HE Mbtuh	LWT °F	COP	WPD	
		PSI	FT							PSI	FT						PSI	FT						PSI	FT
20	9.0	7.7	17.9	60	26.1	1.53	20.9	71.6	5.0	0.5	1.2	26.4	1.45	21.5	67.8	5.3	1.3	3.1	26.5	1.41	21.7	65.9	5.5	2.5	5.8
				80	25.7	1.96	19.0	91.4	3.8	0.4	0.9	25.9	1.86	19.6	87.7	4.1	1.2	2.8	25.9	1.81	19.8	85.8	4.2	2.3	5.4
				100	25.0	2.56	16.3	111.1	2.9	0.3	0.7	25.0	2.42	16.7	107.4	3.0	1.1	2.5	24.9	2.36	16.9	105.5	3.1	2.1	4.9
30	4.5	1.7	4.0	60	27.1	1.54	21.9	72.1	5.2	0.5	1.2	27.5	1.45	22.5	68.1	5.5	1.3	3.1	27.6	1.42	22.7	66.1	5.7	2.5	5.8
				80	26.7	1.97	20.0	91.9	4.0	0.4	0.9	27.0	1.86	20.6	88.0	4.2	1.2	2.8	27.0	1.81	20.8	86.0	4.4	2.3	5.4
				100	26.1	2.56	17.3	111.6	3.0	0.3	0.7	26.1	2.43	17.8	107.7	3.2	1.1	2.5	26.0	2.36	18.0	105.8	3.2	2.1	4.9
				120	25.1	3.32	13.8	131.2	2.2	0.2	0.5	24.9	3.14	14.2	127.4	2.3	0.9	2.1	24.7	3.06	14.3	125.5	2.4	1.8	4.3
	6.8	4.1	9.4	60	28.4	1.54	23.2	72.6	5.4	0.5	1.2	28.8	1.46	23.8	68.5	5.8	1.3	3.1	28.9	1.42	24.1	66.4	6.0	2.5	5.8
				80	27.9	1.97	21.2	92.4	4.2	0.4	0.9	28.2	1.87	21.8	88.4	4.4	1.2	2.8	28.2	1.82	22.0	86.3	4.6	2.3	5.4
				100	27.1	2.57	18.3	112.0	3.1	0.3	0.7	27.2	2.43	18.9	108.0	3.3	1.1	2.5	27.1	2.37	19.0	106.0	3.4	2.1	4.9
				120	25.9	3.33	14.6	131.5	2.3	0.2	0.5	25.7	3.15	15.0	127.6	2.4	0.9	2.1	25.6	3.07	15.1	125.7	2.4	1.8	4.3
	9.0	7.1	16.4	60	29.2	1.54	23.9	73.0	5.5	0.5	1.2	29.6	1.46	24.6	68.8	5.9	1.3	3.1	29.7	1.42	24.8	66.6	6.1	2.5	5.8
				80	28.6	1.98	21.9	92.7	4.2	0.4	0.9	28.9	1.87	22.5	88.6	4.5	1.2	2.8	28.9	1.82	22.7	86.4	4.7	2.3	5.4
				100	27.7	2.58	18.9	112.3	3.2	0.3	0.7	27.8	2.44	19.5	108.2	3.3	1.1	2.5	27.7	2.37	19.6	106.2	3.4	2.1	4.9
				120	26.4	3.34	15.0	131.7	2.3	0.2	0.5	26.2	3.16	15.4	127.8	2.4	0.9	2.1	26.1	3.08	15.6	125.8	2.5	1.8	4.3
40	4.5	1.5	3.5	60	30.7	1.41	25.9	71.5	6.4	0.5	1.2	31.2	1.33	26.7	67.9	6.9	1.3	3.1	31.3	1.30	26.9	66.0	7.1	2.5	5.8
				80	30.6	1.81	24.4	90.8	4.9	0.4	0.9	31.0	1.72	25.1	87.4	5.3	1.2	2.8	31.1	1.67	25.3	85.6	5.4	2.3	5.4
				100	29.9	2.39	21.7	109.7	3.7	0.3	0.7	30.1	2.27	22.4	106.6	3.9	1.1	2.5	30.1	2.21	22.6	105.0	4.0	2.1	4.9
				120	28.8	3.17	18.0	128.0	2.7	0.2	0.5	28.7	3.00	18.5	125.5	2.8	0.9	2.1	28.6	2.92	18.6	124.1	2.9	1.8	4.3
	6.8	3.7	8.6	60	32.6	1.48	27.5	72.2	6.4	0.5	1.2	33.1	1.40	28.3	68.4	6.9	1.3	3.1	33.3	1.37	28.6	66.4	7.1	2.5	5.8
				80	32.1	1.90	25.6	91.4	4.9	0.4	0.9	32.5	1.80	26.3	87.8	5.3	1.2	2.8	32.6	1.75	26.6	85.9	5.4	2.3	5.4
				100	31.1	2.49	22.6	110.0	3.7	0.3	0.7	31.3	2.36	23.3	106.9	3.9	1.1	2.5	31.3	2.30	23.5	105.2	4.0	2.1	4.9
				120	29.7	3.26	18.6	128.3	2.7	0.2	0.5	29.7	3.09	19.1	125.7	2.8	0.9	2.1	29.6	3.01	19.3	124.3	2.9	1.8	4.3
	9.0	6.5	15.1	60	34.5	1.55	29.2	73.0	6.5	0.5	1.2	35.0	1.47	30.0	68.9	7.0	1.3	3.1	35.2	1.43	30.3	66.7	7.2	2.5	5.8
				80	33.6	1.99	26.8	91.9	4.9	0.4	0.9	34.0	1.89	27.6	88.2	5.3	1.2	2.8	34.1	1.84	27.8	86.2	5.4	2.3	5.4
				100	32.3	2.59	23.5	110.4	3.7	0.3	0.7	32.5	2.45	24.2	107.2	3.9	1.1	2.5	32.5	2.39	24.4	105.4	4.0	2.1	4.9
				120	30.7	3.36	19.2	128.5	2.7	0.2	0.5	30.6	3.18	19.8	125.9	2.8	0.9	2.1	30.5	3.09	20.0	124.4	2.9	1.8	4.3
50	4.5	1.3	3.1	60	35.9	1.55	30.6	76.0	6.8	0.5	1.2	36.5	1.47	31.5	70.8	7.3	1.3	3.1	36.7	1.43	31.8	68.2	7.5	2.5	5.8
				80	35.0	2.00	28.2	95.6	5.1	0.4	0.9	35.5	1.89	29.0	90.5	5.5	1.2	2.8	35.6	1.84	29.3	87.9	5.7	2.3	5.4
				100	33.8	2.60	24.9	115.0	3.8	0.3	0.7	34.0	2.46	25.6	110.1	4.1	1.1	2.5	34.0	2.39	25.9	107.6	4.2	2.1	4.9
				120	32.2	3.36	20.7	134.3	2.8	0.2	0.5	32.1	3.18	21.3	129.5	3.0	0.9	2.1	32.1	3.09	21.5	127.1	3.0	1.8	4.3
				130	Operation not recommended							31.1	3.59	18.8	139.2	2.5	0.8	1.9	30.9	3.50	19.0	136.9	2.6	1.7	3.9
	6.75	3.4	7.8	60	37.7	1.56	32.4	76.8	7.1	0.5	1.2	38.4	1.48	33.3	71.4	7.6	1.3	3.1	38.5	1.44	33.6	68.6	7.9	2.5	5.8
				80	36.6	2.00	29.8	96.3	5.4	0.4	0.9	37.1	1.89	30.7	91.0	5.7	1.2	2.8	37.3	1.84	31.0	88.3	5.9	2.3	5.4
				100	35.2	2.60	26.3	115.6	4.0	0.3	0.7	35.5	2.46	27.1	110.5	4.2	1.1	2.5	35.5	2.40	27.3	107.9	4.3	2.1	4.9
				120	33.4	3.37	21.9	134.8	2.9	0.2	0.5	33.4	3.19	22.5	129.9	3.1	0.9	2.1	33.3	3.10	22.7	127.4	3.1	1.8	4.3
				130								32.2	3.60	19.9	139.5	2.6	0.8	1.9	32.0	3.51	20.1	137.1	2.7	1.7	3.9
	9.0	6.0	13.9	60	38.6	1.56	33.3	77.2	7.2	0.5	1.2	39.3	1.48	34.3	71.7	7.8	1.3	3.1	39.5	1.44	34.6	68.8	8.0	2.5	5.8
				80	37.5	2.01	30.7	96.7	5.5	0.4	0.9	38.0	1.90	31.6	91.3	5.9	1.2	2.8	38.2	1.85	31.9	88.5	6.1	2.3	5.4
				100	36.0	2.61	27.1	116.0	4.0	0.3	0.7	36.3	2.47	27.9	110.8	4.3	1.1	2.5	36.3	2.40	28.1	108.1	4.4	2.1	4.9
				120	34.0	3.37	22.5	135.1	3.0	0.2	0.5	34.1	3.19	23.2	130.1	3.1	0.9	2.1	34.0	3.11	23.4	127.6	3.2	1.8	4.3
				130								32.8	3.61	20.5	139.7	2.7	0.8	1.9	32.6	3.52	20.6	137.3	2.7	1.7	3.9

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas. Calculation to determine percentage of antifreeze required on source side.

Table Continued on Next Page

Performance Data
HWW036 (60Hz I-P) - Heating

Continued From Previous Page

SOURCE				LOAD																					
EWT °F	Flow			EWT °F	Flow 4.5 GPM							Flow 6.8 GPM							Flow 9.0 GPM						
	GPM	WPD			HC Mbtuh	Power KW	HE Mbtuh	LWT °F	COP	WPD		HC Mbtuh	Power KW	HE Mbtuh	LWT °F	COP	WPD		HC Mbtuh	Power KW	HE Mbtuh	LWT °F	COP	WPD	
		PSI	FT							PSI	FT						PSI	FT						PSI	FT
60	4.5	1.2	2.7	60	39.0	1.57	33.6	77.3	7.3	0.5	1.2	39.7	1.48	34.6	71.8	7.8	1.3	3.1	39.9	1.44	34.9	68.9	8.1	2.5	5.8
				80	38.6	2.01	31.8	97.2	5.6	0.4	0.9	39.2	1.90	32.7	91.6	6.0	1.2	2.8	39.3	1.85	33.0	88.7	6.2	2.3	5.4
				100	37.6	2.61	28.7	116.7	4.2	0.3	0.7	38.0	2.47	29.6	111.3	4.5	1.1	2.5	38.0	2.40	29.8	108.5	4.6	2.1	4.9
				120	36.0	3.37	24.5	136.0	3.1	0.2	0.5	36.1	3.19	25.2	130.7	3.3	0.9	2.1	36.0	3.11	25.4	128.0	3.4	1.8	4.3
				130	Operation not recommended							34.8	3.61	22.5	140.3	2.8	0.8	1.9	34.7	3.51	22.7	137.7	2.9	1.7	3.9
	6.75	3.1	7.1	60	40.6	1.57	35.3	78.1	7.6	0.5	1.2	41.4	1.49	36.3	72.3	8.2	1.3	3.1	41.6	1.45	36.6	69.2	8.4	2.5	5.8
				80	40.2	2.01	33.4	97.9	5.9	0.4	0.9	40.8	1.90	34.3	92.1	6.3	1.2	2.8	41.0	1.85	34.6	89.1	6.5	2.3	5.4
				100	39.1	2.61	30.2	117.4	4.4	0.3	0.7	39.5	2.47	31.0	111.7	4.7	1.1	2.5	39.5	2.41	31.3	108.8	4.8	2.1	4.9
				120	37.2	3.38	25.7	136.5	3.2	0.2	0.5	37.3	3.20	26.4	131.1	3.4	0.9	2.1	37.3	3.11	26.6	128.3	3.5	1.8	4.3
				130								35.9	3.62	23.6	140.6	2.9	0.8	1.9	35.8	3.52	23.8	138.0	3.0	1.7	3.9
	9.0	5.6	12.8	60	41.5	1.57	36.1	78.4	7.7	0.5	1.2	42.2	1.49	37.2	72.5	8.3	1.3	3.1	42.4	1.45	37.5	69.4	8.6	2.5	5.8
				80	41.0	2.01	34.1	98.2	6.0	0.4	0.9	41.6	1.91	35.1	92.3	6.4	1.2	2.8	41.8	1.86	35.5	89.3	6.6	2.3	5.4
				100	39.8	2.62	30.9	117.7	4.5	0.3	0.7	40.2	2.48	31.8	111.9	4.8	1.1	2.5	40.3	2.41	32.0	109.0	4.9	2.1	4.9
				120	37.8	3.38	26.3	136.8	3.3	0.2	0.5	38.0	3.20	27.0	131.2	3.5	0.9	2.1	37.9	3.12	27.3	128.4	3.6	1.8	4.3
				130								36.5	3.62	24.1	140.8	3.0	0.8	1.9	36.4	3.53	24.4	138.1	3.0	1.7	3.9
70	4.5	1.0	2.3	60	42.1	1.58	36.7	78.7	7.8	0.5	1.2	42.9	1.49	37.8	72.7	8.4	1.3	3.1	43.1	1.46	38.1	69.6	8.7	2.5	5.8
				80	42.4	2.02	35.5	98.8	6.2	0.4	0.9	43.0	1.91	36.5	92.7	6.6	1.2	2.8	43.2	1.86	36.8	89.6	6.8	2.3	5.4
				100	41.6	2.62	32.7	118.5	4.7	0.3	0.7	42.1	2.48	33.6	112.5	5.0	1.1	2.5	42.2	2.41	33.9	109.4	5.1	2.1	4.9
				120	39.8	3.38	28.3	137.7	3.5	0.2	0.5	40.0	3.20	29.1	131.9	3.7	0.9	2.1	40.0	3.12	29.4	128.9	3.8	1.8	4.3
				130								38.6	3.62	26.3	141.4	3.1	0.8	1.9	38.5	3.53	26.5	138.6	3.2	1.7	3.9
	6.75	2.8	6.5	60	43.6	1.58	38.2	79.4	8.1	0.5	1.2	44.4	1.50	39.3	73.2	8.7	1.3	3.1	44.7	1.46	39.7	69.9	9.0	2.5	5.8
				80	43.8	2.02	36.9	99.5	6.4	0.4	0.9	44.5	1.91	38.0	93.2	6.8	1.2	2.8	44.7	1.86	38.4	89.9	7.0	2.3	5.4
				100	43.0	2.62	34.0	119.1	4.8	0.3	0.7	43.5	2.49	35.0	112.9	5.1	1.1	2.5	43.6	2.42	35.3	109.7	5.3	2.1	4.9
				120	41.0	3.39	29.5	138.2	3.5	0.2	0.5	41.3	3.21	30.3	132.2	3.8	0.9	2.1	41.3	3.13	30.6	129.2	3.9	1.8	4.3
				130								39.7	3.63	27.3	141.8	3.2	0.8	1.9	39.7	3.54	27.6	138.8	3.3	1.7	3.9
	9.0	5.1	11.9	60	44.3	1.59	38.9	79.7	8.2	0.5	1.2	45.1	1.50	40.0	73.4	8.8	1.3	3.1	45.4	1.46	40.4	70.1	9.1	2.5	5.8
				80	44.5	2.02	37.6	99.8	6.4	0.4	0.9	45.2	1.92	38.7	93.4	6.9	1.2	2.8	45.4	1.87	39.1	90.1	7.1	2.3	5.4
				100	43.6	2.63	34.6	119.4	4.9	0.3	0.7	44.1	2.49	35.6	113.1	5.2	1.1	2.5	44.2	2.42	36.0	109.8	5.4	2.1	4.9
				120	41.6	3.40	30.0	138.5	3.6	0.2	0.5	41.8	3.22	30.9	132.4	3.8	0.9	2.1	41.8	3.13	31.1	129.3	3.9	1.8	4.3
				130								40.2	3.64	27.8	141.9	3.2	0.8	1.9	40.2	3.54	28.1	138.9	3.3	1.7	3.9
80	4.5	0.9	2.0	60	45.3	1.59	39.8	80.1	8.3	0.5	1.2	46.1	1.51	41.0	73.7	9.0	1.3	3.1	46.4	1.47	41.4	70.3	9.3	2.5	5.8
				80	46.2	2.03	39.2	100.5	6.7	0.4	0.9	46.9	1.92	40.4	93.9	7.2	1.2	2.8	47.1	1.87	40.8	90.5	7.4	2.3	5.4
				100	45.7	2.63	36.7	120.3	5.1	0.3	0.7	46.3	2.49	37.8	113.7	5.4	1.1	2.5	46.4	2.42	38.1	110.3	5.6	2.1	4.9
				120	43.8	3.40	32.2	139.5	3.8	0.2	0.5	44.1	3.22	33.2	133.1	4.0	0.9	2.1	44.2	3.13	33.5	129.8	4.1	1.8	4.3
				130								27.9	3.61	15.6	138.3	2.3	0.8	1.9	27.7	3.51	15.7	136.2	2.3	1.7	3.9
	6.75	2.6	5.9	60	46.6	1.59	41.2	80.7	8.6	0.5	1.2	47.5	1.51	42.4	74.1	9.2	1.3	3.1	47.8	1.47	42.8	70.6	9.5	2.5	5.8
				80	47.5	2.03	40.6	101.1	6.9	0.4	0.9	48.3	1.92	41.7	94.3	7.4	1.2	2.8	48.5	1.87	42.1	90.8	7.6	2.3	5.4
				100	46.9	2.64	37.9	120.9	5.2	0.3	0.7	47.5	2.50	39.0	114.1	5.6	1.1	2.5	47.7	2.43	39.4	110.6	5.8	2.1	4.9
				120	44.9	3.40	33.3	140.0	3.9	0.2	0.5	45.3	3.22	34.3	133.4	4.1	0.9	2.1	45.3	3.14	34.6	130.1	4.2	1.8	4.3
				130								28.5	3.62	16.1	138.4	2.3	0.8	1.9	28.3	3.52	16.3	136.3	2.4	1.7	3.9
	9.0	4.8	11.0	60	47.1	1.60	41.7	81.0	8.7	0.5	1.2	48.1	1.51	42.9	74.2	9.3	1.3	3.1	48.3	1.47	43.3	70.7	9.6	2.5	5.8
				80	48.0	2.03	41.1	101.3	6.9	0.4	0.9	48.8	1.93	42.3	94.5	7.4	1.2	2.8	49.0	1.88	42.7	90.9	7.7	2.3	5.4
				100	47.4	2.64	38.4	121.1	5.3	0.3	0.7	48.1	2.50	39.5	114.2	5.6	1.1	2.5	48.2	2.43	39.9	110.7	5.8	2.1	4.9
				120	45.4	3.41	33.7	140.2	3.9	0.2	0.5	45.7	3.23	34.7	133.5	4.2	0.9	2.1	45.8	3.14	35.0	130.2	4.3	1.8	4.3

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas. Calculation to determine percentage of antifreeze required on source side.

Performance Data
HWW060 (60Hz I-P) - Cooling

SOURCE				LOAD																				
EWT °F	Flow			EWT °F	Flow 7.5 GPM							Flow 11.25 GPM							Flow 15.0 GPM					
	GPM	WPD			TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD		TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD		TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD	
		PSI	FT							PSI	FT						PSI	FT						PSI	FT
50	7.5	1.3	2.9	50	52.6	2.20	60.1	38.2	23.9	1.4	3.3	53.5	2.23	61.1	41.0	24.0	3.5	8.0	55.3	2.25	63.0	42.5	24.6	4.8	11.0
				60	53.2	2.22	60.8	47.1	23.9	1.4	3.2	54.1	2.25	61.7	50.5	24.1	3.3	7.7	55.9	2.27	63.7	52.4	24.7	4.6	10.6
				70	53.8	2.24	61.4	56.0	24.0	1.3	3.0	54.7	2.26	62.4	60.0	24.1	3.2	7.4	56.6	2.29	64.4	62.2	24.7	4.4	10.1
				80	55.5	2.24	63.2	64.7	24.7	1.2	2.9	56.4	2.27	64.1	69.4	24.9	3.1	7.1	58.4	2.29	66.2	72.0	25.5	4.3	9.8
				90	57.2	2.25	64.9	73.5	25.5	1.2	2.7	58.1	2.27	65.9	78.9	25.6	3.0	6.9	60.2	2.29	68.0	81.8	26.3	4.1	9.5
	11.25	3.4	7.9	50	53.4	2.23	61.0	38.0	24.0	1.4	3.3	54.1	2.25	61.8	40.8	24.1	3.5	8.0	56.0	2.27	63.8	42.3	24.7	4.8	11.0
				60	55.5	2.25	63.1	46.7	24.7	1.4	3.2	56.2	2.27	64.0	50.1	24.8	3.3	7.7	58.2	2.29	66.0	52.0	25.4	4.6	10.6
				70	57.5	2.26	65.3	55.4	25.4	1.3	3.0	58.3	2.29	66.1	59.4	25.5	3.2	7.4	60.4	2.31	68.3	61.6	26.1	4.4	10.2
				80	58.1	2.27	65.8	64.3	25.6	1.2	2.9	58.9	2.29	66.7	69.0	25.7	3.1	7.1	60.9	2.31	68.8	71.5	26.4	4.3	9.8
				90	58.6	2.27	66.3	73.2	25.8	1.2	2.7	59.4	2.29	67.2	78.5	25.9	3.0	6.9	61.5	2.31	69.4	81.4	26.6	4.1	9.5
	15.0	6.2	14.2	50	55.6	2.25	63.2	35.8	24.7	1.4	3.3	56.5	2.27	64.2	40.3	24.9	3.5	8.0	57.9	2.29	65.8	42.1	25.2	4.8	11.1
				60	57.5	2.27	65.2	45.0	25.3	1.4	3.2	58.7	2.29	66.6	49.8	25.6	3.3	7.7	61.5	2.31	69.4	51.5	26.6	4.6	10.6
				70	59.4	2.29	67.2	54.1	26.0	1.3	3.0	61.0	2.31	68.9	59.3	26.4	3.2	7.4	65.1	2.33	73.1	60.9	27.9	4.4	10.1
				80	60.3	2.29	68.1	63.5	26.4	1.2	2.9	61.8	2.31	69.7	68.7	26.7	3.1	7.1	65.8	2.34	73.8	70.8	28.2	4.2	9.8
				90	61.3	2.29	69.1	72.8	26.7	1.2	2.7	62.6	2.31	70.5	78.1	27.0	3.0	6.9	66.6	2.34	74.6	80.7	28.5	4.1	9.4
70	7.5	1.1	2.5	50	49.1	2.82	58.7	38.1	17.4	1.4	3.3	50.3	2.85	60.0	41.1	17.7	3.5	8.0	52.0	2.88	61.8	42.9	18.1	4.7	11.0
				60	53.2	2.84	62.9	46.4	18.7	1.4	3.2	54.5	2.87	64.3	50.0	19.0	3.3	7.7	56.3	2.90	66.2	52.3	19.4	4.6	10.5
				70	57.2	2.86	67.0	54.8	20.0	1.3	3.0	58.7	2.89	68.5	59.1	20.3	3.2	7.4	60.6	2.92	70.6	61.7	20.8	4.4	10.1
				80	59.3	2.92	69.3	63.4	20.3	1.2	2.9	60.8	2.95	70.9	68.3	20.6	3.1	7.1	62.9	2.98	73.0	71.4	21.1	4.3	9.8
				90	61.4	2.98	71.6	71.9	20.6	1.2	2.7	63.0	3.01	73.3	77.6	20.9	3.0	6.9	65.1	3.04	75.5	81.1	21.4	4.1	9.5
	11.25	3.0	6.9	50	50.2	2.85	59.9	38.0	17.6	1.4	3.3	51.4	2.88	61.2	41.0	17.8	3.5	8.0	53.1	2.91	63.0	42.8	18.3	4.8	11.0
				60	54.5	2.87	64.3	46.2	19.0	1.4	3.2	55.9	2.90	65.8	49.8	19.3	3.3	7.7	57.7	2.93	67.7	52.1	19.7	4.6	10.6
				70	58.9	2.89	68.8	54.5	20.4	1.3	3.0	60.4	2.92	70.3	58.8	20.7	3.2	7.4	62.4	2.94	72.4	61.4	21.2	4.4	10.2
				80	60.8	2.95	70.8	63.1	20.6	1.2	2.9	62.3	2.98	72.4	68.1	20.9	3.1	7.1	64.4	3.01	74.6	71.1	21.4	4.3	9.9
				90	62.6	3.01	72.9	71.7	20.8	1.2	2.7	64.2	3.04	74.5	77.3	21.1	3.0	6.9	66.3	3.07	76.8	80.8	21.6	4.1	9.6
	15.0	5.5	12.8	50	51.2	2.88	61.0	36.9	17.8	1.4	3.3	53.3	2.91	63.2	40.8	18.3	3.5	8.0	54.3	2.94	64.3	42.6	18.5	4.8	11.0
				60	55.6	2.90	65.5	45.4	19.2	1.4	3.2	57.6	2.93	67.6	49.6	19.7	3.3	7.7	59.4	2.96	69.5	51.8	20.1	4.6	10.6
				70	60.1	2.92	70.1	53.9	20.6	1.3	3.0	61.9	2.94	72.0	58.5	21.0	3.2	7.4	64.5	2.97	74.6	61.1	21.7	4.4	10.1
				80	62.3	2.98	72.5	62.7	20.9	1.2	2.9	64.1	3.01	74.4	67.8	21.3	3.1	7.1	67.1	3.04	77.5	70.6	22.1	4.2	9.8
				90	64.6	3.04	74.9	71.5	21.3	1.2	2.7	66.3	3.07	76.8	77.1	21.6	3.0	6.9	69.8	3.10	80.3	80.2	22.5	4.1	9.5
80	7.5	1.0	2.3	50	47.3	3.13	58.0	38.0	15.1	1.4	3.3	48.7	3.16	59.5	41.1	15.4	3.5	8.0	50.3	3.19	61.2	43.1	15.8	4.7	10.9
				60	53.1	3.15	63.9	46.1	16.9	1.4	3.2	54.7	3.18	65.6	49.8	17.2	3.3	7.7	56.5	3.21	67.5	52.3	17.6	4.6	10.5
				70	58.9	3.17	69.7	54.2	18.6	1.3	3.0	60.7	3.20	71.6	58.6	19.0	3.2	7.4	62.7	3.23	73.7	61.5	19.4	4.4	10.1
				80	61.3	3.25	72.4	62.7	18.8	1.2	2.9	63.1	3.29	74.3	67.8	19.2	3.1	7.1	65.1	3.32	76.5	71.1	19.6	4.3	9.8
				90	63.6	3.34	75.0	71.1	19.0	1.2	2.7	65.4	3.38	77.0	76.9	19.4	3.0	6.9	67.6	3.41	79.2	80.7	19.8	4.1	9.6
	11.25	2.8	6.5	50	48.5	3.16	59.3	38.0	15.3	1.4	3.3	50.0	3.19	60.9	41.1	15.6	3.5	8.0	51.6	3.23	62.6	43.0	16.0	4.8	11.1
				60	54.1	3.18	64.9	46.0	17.0	1.4	3.2	55.7	3.21	66.6	49.7	17.3	3.3	7.7	57.5	3.24	68.6	52.2	17.7	4.6	10.6
				70	59.6	3.20	70.5	54.0	18.7	1.3	3.0	61.4	3.23	72.4	58.4	19.0	3.2	7.4	63.4	3.26	74.5	61.3	19.4	4.4	10.2
				80	62.1	3.29	73.4	62.5	18.9	1.2	2.9	64.0	3.32	75.3	67.6	19.3	3.1	7.1	66.1	3.35	77.5	70.9	19.7	4.3	9.9
				90	64.6	3.38	76.2	71.0	19.1	1.2	2.7	66.6	3.41	78.2	76.8	19.5	3.0	6.9	68.7	3.45	80.5	80.6	19.9	4.2	9.6
	15.0	5.3	12.1	50	49.0	3.19	59.9	37.4	15.3	1.4	3.3	51.7	3.23	62.7	41.0	16.0	3.5	8.0	52.4	3.26	63.5	42.9	16.1	4.8	11.0
				60	54.7	3.21	65.7	45.6	17.0	1.4	3.2	57.1	3.24	68.1	49.5	17.6	3.3	7.7	58.3	3.28	69.5	52.0	17.8	4.6	10.6
				70	60.5	3.23	71.5	53.8	18.7	1.3	3.0	62.4	3.26	73.5	58.1	19.1	3.2	7.4	64.2	3.30	75.4	61.1	19.5	4.4	10.1
				80	63.3	3.32	74.7	62.3	19.1	1.2	2.9	65.3	3.35	76.7	67.4	19.5	3.1	7.1	67.8	3.39	79.3	70.5	20.0	4.3	9.8
				90	66.2	3.41	77.9	70.8	19.4	1.2	2.7	68.2	3.45	79.9	76.7	19.8	3.0	6.9	71.4	3.48	83.2	80.0	20.5	4.1	9.6

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas. Calculation to determine percentage of antifreeze required on load side.

Table Continued on Next Page

Performance Data
HWW060 (60Hz I-P) - Cooling

Continued From Previous Page

SOURCE				LOAD																					
EWT °F	Flow			EWT °F	Flow 7.5 GPM							Flow 11.25 GPM							Flow 15.0 GPM						
	GPM	WPD			TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD		TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD		TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD	
		PSI	FT							PSI	FT						PSI	FT						PSI	FT
90	7.5	0.9	2.1	50	44.8	3.57	57.0	38.7	12.5	1.4	3.3	46.3	3.61	58.6	41.6	12.8	3.5	8.0	47.5	3.65	59.9	43.4	13.0	4.7	10.9
				60	50.7	3.61	63.0	46.8	14.0	1.4	3.2	52.3	3.65	64.8	50.3	14.3	3.3	7.7	53.7	3.68	66.3	52.6	14.6	4.5	10.5
				70	56.6	3.65	69.0	54.9	15.5	1.3	3.0	58.4	3.69	70.9	59.1	15.8	3.2	7.4	59.9	3.72	72.6	61.8	16.1	4.4	10.1
				80	59.6	3.73	72.4	63.4	16.0	1.2	2.9	61.5	3.77	74.4	68.2	16.3	3.1	7.1	63.1	3.81	76.1	71.3	16.6	4.3	9.8
				90	62.7	3.82	75.7	71.9	16.4	1.2	2.7	64.7	3.86	77.9	77.3	16.8	3.0	6.9	66.4	3.90	79.7	80.9	17.0	4.1	9.6
	11.25	2.7	6.1	50	45.9	3.61	58.2	38.6	12.7	1.4	3.3	47.4	3.65	59.8	41.5	13.0	3.5	8.0	48.6	3.68	61.2	43.4	13.2	4.8	11.0
				60	51.8	3.65	64.3	46.7	14.2	1.4	3.2	53.5	3.68	66.0	50.2	14.5	3.3	7.7	54.9	3.72	67.6	52.5	14.7	4.6	10.6
				70	57.7	3.69	70.3	54.8	15.7	1.3	3.0	59.6	3.72	72.3	58.9	16.0	3.2	7.4	61.1	3.76	73.9	61.6	16.2	4.4	10.2
				80	60.7	3.77	73.6	63.2	16.1	1.2	2.9	62.6	3.81	75.7	68.0	16.4	3.1	7.1	64.3	3.85	77.4	71.1	16.7	4.3	9.9
				90	63.7	3.86	76.9	71.7	16.5	1.2	2.7	65.7	3.90	79.0	77.1	16.9	3.0	6.9	67.4	3.94	80.9	80.6	17.1	4.1	9.6
	15.0	5.0	11.6	50	46.5	3.65	59.0	38.1	12.8	1.4	3.3	48.6	3.68	61.1	41.4	13.2	3.5	8.0	49.5	3.72	62.2	43.3	13.3	4.7	10.9
				60	52.4	3.68	64.9	46.2	14.2	1.4	3.2	54.2	3.72	66.9	50.1	14.6	3.3	7.7	55.8	3.76	68.6	52.4	14.8	4.6	10.5
				70	58.2	3.72	70.9	54.3	15.6	1.3	3.0	59.8	3.76	72.7	58.7	15.9	3.2	7.4	62.0	3.80	75.0	61.5	16.3	4.4	10.1
				80	61.6	3.81	74.6	62.9	16.2	1.2	2.9	63.4	3.85	76.6	67.8	16.5	3.1	7.1	65.8	3.89	79.0	70.8	16.9	4.3	9.8
				90	65.1	3.90	78.4	71.6	16.7	1.2	2.7	67.0	3.94	80.5	77.0	17.0	3.0	6.9	69.5	3.98	83.1	80.2	17.5	4.1	9.5
110	7.5	0.8	1.8	50	39.8	4.46	55.0	39.9	8.9	1.4	3.3	41.3	4.50	56.7	42.5	9.2	3.5	8.0	41.7	4.55	57.3	44.1	9.2	4.7	10.9
				60	45.8	4.54	61.3	48.2	10.1	1.4	3.2	47.5	4.58	63.1	51.2	10.4	3.3	7.7	48.0	4.63	63.8	53.2	10.4	4.5	10.4
				70	51.8	4.62	67.5	56.4	11.2	1.3	3.0	53.7	4.66	69.6	60.0	11.5	3.2	7.4	54.3	4.71	70.4	62.4	11.5	4.3	10.0
				80	56.4	4.69	72.4	64.9	12.0	1.2	2.9	58.5	4.74	74.7	69.0	12.3	3.1	7.1	59.1	4.79	75.5	71.7	12.3	4.2	9.8
				90	61.0	4.77	77.3	73.4	12.8	1.2	2.7	63.3	4.82	79.7	78.0	13.1	3.0	6.9	64.0	4.87	80.6	81.1	13.1	4.2	9.6
	11.25	2.4	5.6	50	40.6	4.50	56.0	39.9	9.0	1.4	3.3	42.2	4.55	57.7	42.4	9.3	3.5	8.0	42.6	4.60	58.3	44.1	9.3	4.8	11.0
				60	47.3	4.58	62.9	48.1	10.3	1.4	3.2	49.0	4.63	64.8	51.2	10.6	3.3	7.7	49.6	4.68	65.5	53.2	10.6	4.6	10.5
				70	53.9	4.66	69.8	56.3	11.6	1.3	3.0	55.9	4.71	72.0	59.9	11.9	3.2	7.4	56.5	4.76	72.7	62.2	11.9	4.4	10.1
				80	57.9	4.74	74.0	64.7	12.2	1.2	2.9	60.0	4.79	76.4	68.8	12.5	3.1	7.1	60.7	4.84	77.2	71.5	12.5	4.2	9.8
				90	61.8	4.82	78.3	73.1	12.8	1.2	2.7	64.1	4.87	80.8	77.7	13.2	3.0	6.9	64.8	4.92	81.6	80.8	13.2	4.1	9.5
	15.0	4.6	10.7	50	41.5	4.55	57.1	39.4	9.1	1.4	3.3	42.3	4.60	58.0	42.4	9.2	3.5	8.0	43.8	4.64	59.7	44.0	9.4	4.7	10.8
				60	47.6	4.63	63.4	47.4	10.3	1.4	3.2	48.5	4.68	64.5	51.1	10.4	3.3	7.7	50.7	4.72	66.8	53.1	10.7	4.5	10.5
				70	53.7	4.71	69.8	55.3	11.4	1.3	3.0	54.7	4.76	70.9	59.9	11.5	3.2	7.4	57.6	4.80	74.0	62.2	12.0	4.4	10.2
				80	58.3	4.79	74.6	64.2	12.2	1.2	2.9	59.7	4.84	76.2	68.7	12.3	3.1	7.1	61.7	4.89	78.4	71.4	12.6	4.3	9.8
				90	62.8	4.87	79.4	73.0	12.9	1.2	2.7	64.8	4.92	81.6	77.6	13.2	3.0	6.9	65.8	4.97	82.8	80.7	13.2	4.1	9.5
120	7.5	0.7	1.7	50	37.0	5.04	54.2	40.3	7.3	1.4	3.3	38.5	5.09	55.9	43.2	7.6	3.5	8.0	39.3	5.14	56.8	44.7	7.6	4.7	10.9
				60	42.7	5.13	60.2	48.6	8.3	1.4	3.2	44.4	5.18	62.1	52.0	8.6	3.3	7.7	45.3	5.23	63.2	53.8	8.7	4.5	10.5
				70	48.4	5.21	66.2	56.9	9.3	1.3	3.0	50.4	5.27	68.3	60.8	9.6	3.2	7.4	51.4	5.32	69.5	62.9	9.7	4.3	10.0
				80	53.0	5.31	71.1	65.2	10.0	1.2	2.9	55.1	5.36	73.4	69.7	10.3	3.1	7.1	56.2	5.42	74.7	72.1	10.4	4.2	9.7
				90	57.5	5.40	76.0	73.5	10.6	1.2	2.7	59.9	5.46	78.5	78.6	11.0	3.0	6.9	61.1	5.51	79.9	81.3	11.1	4.1	9.4
	11.25	2.4	5.5	50	37.2	5.09	54.6	40.3	7.3	1.4	3.3	38.8	5.14	56.3	43.1	7.5	3.5	8.0	39.6	5.19	57.3	44.6	7.6	4.8	11.1
				60	43.2	5.18	60.8	48.5	8.3	1.4	3.2	44.9	5.23	62.8	51.9	8.6	3.3	7.7	45.8	5.28	63.8	53.7	8.7	4.6	10.6
				70	49.1	5.27	67.0	56.7	9.3	1.3	3.0	51.1	5.32	69.2	60.6	9.6	3.2	7.4	52.1	5.37	70.4	62.7	9.7	4.4	10.1
				80	53.6	5.36	71.9	65.0	10.0	1.2	2.9	55.8	5.42	74.3	69.6	10.3	3.1	7.1	57.0	5.47	75.6	72.0	10.4	4.2	9.8
				90	58.2	5.46	76.9	73.4	10.7	1.2	2.7	60.6	5.51	79.4	78.5	11.0	3.0	6.9	61.8	5.57	80.9	81.3	11.1	4.1	9.5
	15.0	4.5	10.3	50	38.5	5.14	56.0	40.0	7.5	1.4	3.3	40.1	5.19	57.8	42.9	7.7	3.5	8.0	40.8	5.25	58.7	44.5	7.8	4.7	11.0
				60	44.4	5.23	62.2	48.2	8.5	1.4	3.2	46.4	5.28	64.4	51.7	8.8	3.3	7.7	47.3	5.34	65.5	53.6	8.9	4.6	10.5
				70	50.3	5.32	68.4	56.5	9.5	1.3	3.0	52.7	5.37	71.1	60.5	9.8	3.2	7.4	53.8	5.43	72.3	62.6	9.9	4.4	10.1
				80	54.9	5.42	73.4	64.9	10.1	1.2	2.9	57.5	5.47	76.2	69.5	10.5	3.1	7.1	58.6	5.53	77.5	71.9	10.6	4.2	9.8
				90	59.6	5.51	78.4	73.3	10.8	1.2	2.7	62.3	5.57	81.3	78.5	11.2	3.0	6.9	63.4	5.63	82.6	81.2	11.3	4.1	9.5

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas. Calculation to determine percentage of antifreeze required on load side.

Performance Data
HWW060 (60Hz I-P) - Heating

SOURCE				LOAD																					
	Flow				Flow 7.5 GPM							Flow 11.25 GPM							Flow 15.0 GPM						
EWT °F	GPM	WPD PSI	WPD FT	EWT °F	HC Mbtuh	Power kW	HE Mbtuh	LWT °F	COP	WPD PSI	WPD FT	HC Mbtuh	Power kW	HE Mbtuh	LWT °F	COP	WPD PSI	WPD FT	HC Mbtuh	Power kW	HE Mbtuh	LWT °F	COP	WPD PSI	WPD FT
20	15.0	7.3	16.9	60	41.1	2.43	32.8	71.5	5.0	1.4	3.2	41.3	2.38	33.2	67.4	5.1	3.3	7.7	41.5	2.33	33.5	65.3	5.2	6.0	13.8
				80	40.5	3.17	29.6	91.2	3.7	1.2	2.9	40.6	3.11	30.0	87.2	3.8	3.1	7.1	40.7	3.05	30.3	85.3	3.9	5.6	13.0
				100	39.7	4.11	25.6	110.8	2.8	1.1	2.6	39.7	4.03	25.9	106.9	2.9	2.9	6.7	39.7	3.95	26.2	105.1	2.9	5.3	12.3
30	7.5	1.5	3.5	60	47.8	2.52	39.2	73.3	5.6	1.4	3.2	48.0	2.47	39.6	68.6	5.7	3.3	7.7	48.3	2.42	40.0	66.3	5.8	6.0	13.8
				80	46.9	3.28	35.7	92.9	4.2	1.2	2.9	47.1	3.21	36.1	88.4	4.3	3.1	7.1	47.2	3.15	36.5	86.1	4.4	5.6	13.0
				100	45.8	4.22	31.4	112.4	3.2	1.1	2.6	45.9	4.14	31.8	108.1	3.3	2.9	6.7	45.9	4.05	32.1	105.9	3.3	5.3	12.3
				120	44.6	5.36	26.3	131.9	2.4	1.1	2.4	44.5	5.25	26.6	127.7	2.5	2.8	6.4	44.4	5.14	26.9	125.7	2.5	5.1	11.7
	11.25	4.0	9.2	60	50.0	2.56	41.3	73.6	5.7	1.4	3.2	50.3	2.51	41.7	68.9	5.9	3.3	7.7	50.5	2.46	42.1	66.6	6.0	6.0	13.8
				80	49.0	3.33	37.6	93.3	4.3	1.2	2.9	49.1	3.26	38.0	88.7	4.4	3.1	7.1	49.3	3.20	38.4	86.5	4.5	5.6	13.0
				100	47.8	4.29	33.2	112.8	3.3	1.1	2.6	47.9	4.21	33.5	108.4	3.3	2.9	6.7	47.9	4.12	33.9	106.2	3.4	5.3	12.3
				120	46.6	5.45	28.0	132.1	2.5	1.1	2.4	46.5	5.34	28.3	128.0	2.6	2.8	6.4	46.4	5.23	28.6	125.9	2.6	5.1	11.7
	15.0	6.9	15.9	60	52.0	2.61	43.1	73.9	5.8	1.4	3.2	52.2	2.55	43.5	69.1	6.0	3.3	7.7	52.5	2.50	43.9	66.8	6.1	6.0	13.8
				80	50.9	3.39	39.3	93.4	4.4	1.2	2.9	51.1	3.32	39.7	88.9	4.5	3.1	7.1	51.2	3.25	40.1	86.6	4.6	5.6	13.0
				100	49.6	4.36	34.7	112.9	3.3	1.1	2.6	49.7	4.28	35.1	108.6	3.4	2.9	6.7	49.7	4.19	35.4	106.4	3.5	5.3	12.3
				120	48.1	5.54	29.2	132.3	2.5	1.1	2.4	48.0	5.43	29.5	128.2	2.6	2.8	6.4	47.9	5.32	29.8	126.1	2.6	5.1	11.7
40	7.5	1.4	3.2	60	54.4	2.61	45.5	75.0	6.1	1.4	3.2	54.7	2.56	46.0	69.7	6.3	3.3	7.7	55.1	2.51	46.5	67.2	6.4	6.0	13.8
				80	53.4	3.38	41.8	94.6	4.6	1.2	2.9	53.6	3.31	42.3	89.6	4.7	3.1	7.1	53.8	3.25	42.7	87.0	4.9	5.6	13.0
				100	52.0	4.33	37.2	114.0	3.5	1.1	2.6	52.1	4.24	37.6	109.2	3.6	2.9	6.7	52.2	4.16	38.0	106.7	3.7	5.3	12.3
				120	50.4	5.46	31.8	133.4	2.7	1.1	2.4	50.3	5.35	32.1	128.7	2.8	2.8	6.4	50.3	5.24	32.4	126.4	2.8	5.1	11.7
	11.25	3.7	8.5	60	57.4	2.65	48.3	75.5	6.4	1.4	3.2	57.7	2.59	48.8	70.1	6.5	3.3	7.7	58.0	2.54	49.3	67.5	6.7	6.0	13.8
				80	55.9	3.42	44.2	95.1	4.8	1.2	2.9	56.1	3.36	44.7	90.0	4.9	3.1	7.1	56.4	3.29	45.1	87.4	5.0	5.6	13.0
				100	54.3	4.38	39.4	114.5	3.6	1.1	2.6	54.4	4.30	39.8	109.7	3.7	2.9	6.7	54.5	4.21	40.2	107.1	3.8	5.3	12.3
				120	52.6	5.53	33.7	133.8	2.8	1.1	2.4	52.6	5.42	34.1	129.1	2.8	2.8	6.4	52.5	5.31	34.4	126.8	2.9	5.1	11.7
	15.0	6.5	15.1	60	59.2	2.68	50.1	75.9	6.5	1.4	3.2	59.6	2.63	50.6	70.5	6.6	3.3	7.7	59.9	2.58	51.1	67.9	6.8	6.0	13.8
				80	57.8	3.47	46.0	95.3	4.9	1.2	2.9	58.0	3.40	46.4	90.3	5.0	3.1	7.1	58.3	3.33	46.9	87.6	5.1	5.6	13.0
				100	56.1	4.44	40.9	114.7	3.7	1.1	2.6	56.2	4.35	41.3	109.9	3.8	2.9	6.7	56.3	4.27	41.7	107.3	3.9	5.3	12.3
				120	54.0	5.60	34.9	134.0	2.8	1.1	2.4	54.0	5.49	35.2	129.3	2.9	2.8	6.4	54.0	5.38	35.6	127.0	2.9	5.1	11.7
50	7.5	1.3	2.9	60	61.1	2.70	51.9	76.8	6.6	1.4	3.2	61.5	2.65	52.4	70.8	6.8	3.3	7.7	61.8	2.60	53.0	68.1	7.0	6.0	13.8
				80	59.8	3.48	47.9	96.3	5.0	1.2	2.9	60.1	3.41	48.4	90.8	5.2	3.1	7.1	60.3	3.34	48.9	87.8	5.3	5.6	13.0
				100	58.2	4.43	43.0	115.6	3.8	1.1	2.6	58.3	4.34	43.5	110.4	3.9	2.9	6.7	58.5	4.26	43.9	107.5	4.0	5.3	12.3
				120	56.2	5.55	37.2	134.9	3.0	1.1	2.4	56.2	5.44	37.6	129.7	3.0	2.8	6.4	56.2	5.33	38.0	127.2	3.1	5.1	11.7
				130	Operation not recommended							55.2	6.16	34.2	139.8	2.6	2.7	6.2	55.1	6.03	34.5	137.2	2.7	5.0	11.5
	11.25	3.4	7.9	60	64.7	2.73	55.4	77.4	6.9	1.4	3.2	65.1	2.68	56.0	71.3	7.1	3.3	7.7	65.5	2.62	56.5	68.5	7.3	6.0	13.8
				80	62.8	3.52	50.8	96.9	5.2	1.2	2.9	63.1	3.45	51.4	91.3	5.4	3.1	7.1	63.4	3.38	51.9	88.3	5.5	5.6	13.0
				100	60.8	4.48	45.5	116.2	4.0	1.1	2.6	61.0	4.39	46.0	110.9	4.1	2.9	6.7	61.1	4.30	46.5	108.0	4.2	5.3	12.3
				120	58.6	5.61	39.4	135.4	3.1	1.1	2.4	58.6	5.50	39.8	130.2	3.1	2.8	6.4	58.6	5.39	40.2	127.7	3.2	5.1	11.7
				130								57.9	6.22	36.7	139.9	2.7	2.7	6.2	57.8	6.09	37.1	137.3	2.8	5.0	11.5
	15.0	6.2	14.2	60	66.5	2.76	57.1	78.0	7.1	1.4	3.2	66.9	2.70	57.7	71.9	7.3	3.3	7.7	67.3	2.65	58.3	69.0	7.4	6.0	13.8
				80	64.7	3.55	52.6	97.2	5.3	1.2	2.9	65.0	3.48	53.1	91.6	5.5	3.1	7.1	65.3	3.41	53.6	88.6	5.6	5.6	13.0
				100	62.5	4.52	47.1	116.4	4.1	1.1	2.6	62.7	4.43	47.6	111.1	4.1	2.9	6.7	62.9	4.34	48.0	108.2	4.2	5.3	12.3
				120	60.0	5.67	40.6	135.6	3.1	1.1	2.4	60.0	5.55	41.0	130.5	3.2	2.8	6.4	60.0	5.44	41.4	127.9	3.2	5.1	11.7
				130								58.8	6.28	37.3	140.3	2.7	2.7	6.2	58.7	6.15	37.7	137.7	2.8	5.0	11.5

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas. Calculation to determine percentage of antifreeze required on source side.

Table Continued on Next Page

Performance Data
HWW060 (60Hz I-P) - Heating

Continued From Previous Page

SOURCE				LOAD																					
	Flow				Flow 7.5 GPM							Flow 11.25 GPM							Flow 15.0 GPM						
EWT °F	GPM	WPD		EWT °F	HC Mbtuh	Power kW	HE Mbtuh	LWT °F	COP	WPD		HC Mbtuh	Power kW	HE Mbtuh	LWT °F	COP	WPD		HC Mbtuh	Power kW	HE Mbtuh	LWT °F	COP	WPD	
		PSI	FT							PSI	FT						PSI	FT						PSI	FT
60	7.5	1.2	2.7	60	64.9	2.76	55.5	78.5	6.9	1.4	3.2	65.2	2.70	56.0	71.7	7.1	3.3	7.7	65.6	2.65	56.6	68.6	7.3	6.0	13.8
				80	64.8	3.54	52.7	98.1	5.4	1.2	2.9	65.1	3.47	53.3	91.8	5.5	3.1	7.1	65.4	3.40	53.8	88.6	5.6	5.6	13.0
				100	63.7	4.49	48.3	117.6	4.2	1.1	2.6	63.9	4.40	48.8	111.5	4.3	2.9	6.7	64.1	4.31	49.4	108.4	4.4	5.3	12.3
				120	61.4	5.60	42.3	136.7	3.2	1.1	2.4	61.5	5.48	42.8	130.9	3.3	2.8	6.4	61.6	5.37	43.2	128.0	3.4	5.1	11.7
				130	Operation not recommended							60.2	6.21	39.1	140.8	2.8	2.7	6.2	60.0	6.02	39.5	137.9	2.9	5.0	11.5
	11.25	3.2	7.3	60	67.7	2.78	58.2	79.0	7.1	1.4	3.2	68.1	2.73	58.8	72.2	7.3	3.3	7.7	68.5	2.67	59.4	69.1	7.5	6.0	13.8
				80	67.7	3.58	55.5	98.7	5.5	1.2	2.9	68.0	3.51	56.0	92.3	5.7	3.1	7.1	68.3	3.44	56.6	89.1	5.8	5.6	13.0
				100	66.4	4.54	50.9	118.1	4.3	1.1	2.6	66.6	4.45	51.5	112.0	4.4	2.9	6.7	66.9	4.36	52.0	108.9	4.5	5.3	12.3
				120	64.0	5.67	44.6	137.2	3.3	1.1	2.4	64.1	5.56	45.1	131.3	3.4	2.8	6.4	64.2	5.45	45.6	128.5	3.5	5.1	11.7
				130								63.1	6.27	41.7	141.0	3.0	2.7	6.2	62.9	6.08	42.2	138.1	3.0	5.0	11.5
	15.0	5.8	13.5	60	70.0	2.81	60.4	79.4	7.3	1.4	3.2	70.4	2.76	61.0	72.6	7.5	3.3	7.7	70.8	2.70	61.6	69.5	7.7	6.0	13.8
				80	70.0	3.62	57.7	99.0	5.7	1.2	2.9	70.4	3.54	58.3	92.6	5.8	3.1	7.1	70.7	3.47	58.9	89.4	6.0	5.6	13.0
				100	68.8	4.60	53.1	118.3	4.4	1.1	2.6	69.0	4.50	53.6	112.2	4.5	2.9	6.7	69.2	4.41	54.2	109.1	4.6	5.3	12.3
				120	66.2	5.75	46.6	137.4	3.4	1.1	2.4	66.3	5.63	47.1	131.6	3.4	2.8	6.4	66.4	5.52	47.5	128.7	3.5	5.1	11.7
				130															64.6	6.14	43.6	138.4	3.1	5.0	11.5
70	7.5	1.1	2.5	60	68.6	2.81	59.0	80.1	7.2	1.4	3.2	69.0	2.76	59.6	72.6	7.3	3.3	7.7	69.5	2.70	60.2	69.2	7.5	6.0	13.8
				80	69.8	3.61	57.5	100.0	5.7	1.2	2.9	70.2	3.53	58.1	92.8	5.8	3.1	7.1	70.5	3.46	58.7	89.4	6.0	5.6	13.0
				100	69.2	4.55	53.6	119.5	4.5	1.1	2.6	69.4	4.46	54.2	112.6	4.6	2.9	6.7	69.7	4.37	54.8	109.3	4.7	5.3	12.3
				120	66.7	5.64	47.4	138.5	3.5	1.1	2.4	66.8	5.52	47.9	132.0	3.5	2.8	6.4	66.9	5.41	48.5	128.9	3.6	5.1	11.7
				130															65.0	6.01	44.5	138.6	3.2	5.0	11.5
	11.25	3.0	6.9	60	70.7	2.84	61.0	80.7	7.3	1.4	3.2	71.2	2.78	61.7	73.2	7.5	3.3	7.7	71.6	2.73	62.3	69.7	7.7	6.0	13.8
				80	72.5	3.64	60.1	100.5	5.8	1.2	2.9	72.9	3.57	60.7	93.3	6.0	3.1	7.1	73.2	3.50	61.3	89.9	6.1	5.6	13.0
				100	72.1	4.61	56.3	119.9	4.6	1.1	2.6	72.3	4.52	56.9	113.1	4.7	2.9	6.7	72.6	4.43	57.5	109.7	4.8	5.3	12.3
				120	69.4	5.73	49.9	139.0	3.5	1.1	2.4	69.6	5.62	50.4	132.4	3.6	2.8	6.4	69.7	5.51	50.9	129.3	3.7	5.1	11.7
				130															68.0	6.07	47.3	138.9	3.3	5.0	11.5
	15.0	5.5	12.8	60	73.5	2.87	63.7	80.9	7.5	1.4	3.2	73.9	2.81	64.3	73.4	7.7	3.3	7.7	74.4	2.75	65.0	70.0	7.9	6.0	13.8
				80	75.4	3.68	62.8	100.7	6.0	1.2	2.9	75.8	3.61	63.5	93.5	6.2	3.1	7.1	76.2	3.53	64.1	90.1	6.3	5.6	13.0
				100	75.1	4.67	59.1	120.2	4.7	1.1	2.6	75.3	4.57	59.7	113.3	4.8	2.9	6.7	75.6	4.48	60.3	109.9	4.9	5.3	12.3
				120	72.5	5.83	52.6	139.2	3.6	1.1	2.4	72.6	5.71	53.1	132.7	3.7	2.8	6.4	72.7	5.60	53.6	129.5	3.8	5.1	11.7
				130															70.4	6.13	49.5	139.2	3.4	5.0	11.5
80	7.5	1.0	2.3	60	72.4	2.87	62.6	81.7	7.4	1.4	3.2	72.8	2.81	63.2	73.5	7.6	3.3	7.7	73.3	2.75	63.9	69.8	7.8	6.0	13.8
				80	74.8	3.67	62.3	101.8	6.0	1.2	2.9	75.2	3.60	62.9	93.9	6.1	3.1	7.1	75.6	3.52	63.6	90.2	6.3	5.6	13.0
				100	74.7	4.61	58.9	121.4	4.8	1.1	2.6	75.0	4.51	59.6	113.8	4.9	2.9	6.7	75.3	4.42	60.2	110.2	5.0	5.3	12.3
				120	71.9	5.68	52.5	140.4	3.7	1.1	2.4	72.1	5.56	53.1	133.2	3.8	2.8	6.4	72.3	5.45	53.7	129.8	3.9	5.1	11.7
				130															69.9	6.00	49.4	139.4	3.4	5.0	11.5
	11.25	2.8	6.5	60	73.7	2.89	63.9	82.3	7.5	1.4	3.2	74.2	2.84	64.5	74.1	7.7	3.3	7.7	74.7	2.78	65.2	70.3	7.9	6.0	13.8
				80	77.3	3.71	64.7	102.3	6.1	1.2	2.9	77.7	3.63	65.3	94.3	6.3	3.1	7.1	78.2	3.56	66.0	90.6	6.4	5.6	13.0
				100	77.7	4.67	61.8	121.8	4.9	1.1	2.6	78.0	4.58	62.4	114.2	5.0	2.9	6.7	78.4	4.49	63.0	110.6	5.1	5.3	12.3
				120	74.8	5.79	55.1	140.7	3.8	1.1	2.4	75.0	5.68	55.7	133.5	3.9	2.8	6.4	75.2	5.56	56.2	130.1	4.0	5.1	11.7
				130															73.1	6.06	52.4	139.7	3.5	5.0	11.5
	15.0	5.3	12.1	60	76.9	2.92	67.0	82.4	7.7	1.4	3.2	77.4	2.87	67.6	74.2	7.9	3.3	7.7	77.9	2.81	68.3	70.4	8.1	6.0	13.8
				80	80.7	3.74	68.0	102.5	6.3	1.2	2.9	81.2	3.67	68.7	94.5	6.5	3.1	7.1	81.6	3.60	69.3	90.8	6.7	5.6	13.0
				100	81.3	4.74	65.2	122.0	5.0	1.1	2.6	81.7	4.64	65.8	114.4	5.2	2.9	6.7	82.0	4.55	66.5	110.8	5.3	5.3	12.3
				120	78.7	5.91	58.5	141.0	3.9	1.1	2.4	78.9	5.79	59.1	133.8	4.0	2.8	6.4	79.1	5.68	59.7	130.4	4.1	5.1	11.7
				130															76.3	6.12	55.4	139.9	3.6	5.0	11.5

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas. Calculation to determine percentage of antifreeze required on source side.

Performance Data
HWW120 (60Hz I-P) - Cooling

SOURCE				LOAD																					
	Flow				Flow 15.0 GPM							Flow 22.5 GPM							Flow 30.0 GPM						
EWT °F	GPM	WPD		EWT °F	TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD		TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD		TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD	
		PSI	FT							PSI	FT						PSI	FT						PSI	FT
50	15.0	1.4	3.2	50	105.2	4.41	120.3	38.2	23.9	1.6	3.7	106.9	4.45	122.1	41.0	24.0	3.8	8.8	110.7	4.50	126.0	42.5	24.6	6.8	15.7
				60	106.4	4.45	121.6	47.1	23.9	1.5	3.5	108.1	4.49	123.4	50.5	24.1	3.7	8.4	111.9	4.54	127.4	52.4	24.7	6.6	15.2
				70	107.6	4.48	122.9	56.0	24.0	1.4	3.3	109.3	4.53	124.8	60.0	24.1	3.5	8.1	113.1	4.57	128.7	62.2	24.7	6.4	14.7
				80	111.0	4.49	126.3	64.7	24.7	1.4	3.2	112.8	4.53	128.3	69.4	24.9	3.4	7.9	116.7	4.58	132.4	72.0	25.5	6.2	14.3
				90	114.4	4.49	129.8	73.5	25.5	1.3	3.0	116.3	4.54	131.8	78.9	25.6	3.3	7.6	120.3	4.58	136.0	81.8	26.3	6.0	13.9
	22.5	3.8	8.7	50	106.8	4.45	122.0	38.0	24.0	1.6	3.7	108.3	4.50	123.6	40.8	24.1	3.8	8.8	112.1	4.54	127.6	42.3	24.7	6.8	15.7
				60	110.9	4.49	126.2	46.7	24.7	1.5	3.5	112.5	4.54	128.0	50.1	24.8	3.7	8.4	116.4	4.58	132.0	52.0	25.4	6.6	15.2
50				70	115.1	4.53	130.5	55.4	25.4	1.4	3.3	116.7	4.57	132.3	59.4	25.5	3.5	8.1	120.8	4.62	136.5	61.6	26.1	6.4	14.7
				80	116.1	4.53	131.6	64.3	25.6	1.4	3.2	117.7	4.58	133.4	69.0	25.7	3.4	7.9	121.9	4.62	137.6	71.5	26.4	6.2	14.3
				90	117.2	4.54	132.6	73.2	25.8	1.3	3.0	118.8	4.58	134.5	78.5	25.9	3.3	7.6	123.0	4.63	138.8	81.4	26.6	6.0	13.9
	30.0	6.8	15.6	50	111.1	4.50	126.5	35.8	24.7	1.6	3.7	113.0	4.54	128.5	40.3	24.9	3.8	8.8	115.9	4.59	131.5	42.1	25.2	6.8	15.7
				60	114.9	4.54	130.4	45.0	25.3	1.5	3.5	117.5	4.58	133.1	49.8	25.6	3.7	8.4	123.0	4.63	138.8	51.5	26.6	6.6	15.2
				70	118.8	4.57	134.4	54.1	26.0	1.4	3.3	122.0	4.62	137.8	59.3	26.4	3.5	8.1	130.2	4.67	146.1	60.9	27.9	6.4	14.7
				80	120.7	4.58	136.3	63.5	26.4	1.4	3.2	123.6	4.62	139.4	68.7	26.7	3.4	7.9	131.7	4.67	147.6	70.8	28.2	6.2	14.3
				90	122.5	4.58	138.2	72.8	26.7	1.3	3.0	125.2	4.63	141.0	78.1	27.0	3.3	7.6	133.2	4.68	149.1	80.7	28.5	6.0	13.9
70	15.0	1.2	2.7	50	98.2	5.64	117.5	38.1	17.4	1.6	3.7	100.6	5.70	120.1	41.1	17.7	3.8	8.8	104.0	5.76	123.7	42.9	18.1	6.8	15.7
				60	106.3	5.68	125.7	46.4	18.7	1.5	3.5	109.0	5.74	128.6	50.0	19.0	3.7	8.4	112.6	5.79	132.4	52.3	19.4	6.6	15.2
				70	114.4	5.71	133.9	54.8	20.0	1.4	3.3	117.3	5.77	137.0	59.1	20.3	3.5	8.1	121.3	5.83	141.2	61.7	20.8	6.4	14.7
				80	118.7	5.83	138.6	63.4	20.3	1.4	3.2	121.7	5.89	141.8	68.3	20.6	3.4	7.9	125.7	5.95	146.1	71.4	21.1	6.2	14.3
				90	122.9	5.95	143.2	71.9	20.6	1.3	3.0	126.0	6.02	146.5	77.6	20.9	3.3	7.6	130.2	6.08	151.0	81.1	21.4	6.0	13.9
	22.5	3.3	7.6	50	100.3	5.70	119.8	38.0	17.6	1.6	3.7	102.7	5.76	122.4	41.0	17.8	3.8	8.8	106.2	5.82	126.0	42.8	18.3	6.8	15.7
				60	109.1	5.74	128.7	46.2	19.0	1.5	3.5	111.7	5.79	131.5	49.8	19.3	3.7	8.4	115.5	5.85	135.4	52.1	19.7	6.6	15.2
70				70	117.9	5.77	137.6	54.5	20.4	1.4	3.3	120.7	5.83	140.6	58.8	20.7	3.5	8.1	124.8	5.89	144.9	61.4	21.2	6.4	14.7
				80	121.6	5.89	141.7	63.1	20.6	1.4	3.2	124.5	5.95	144.9	68.1	20.9	3.4	7.9	128.7	6.01	149.2	71.1	21.4	6.2	14.3
				90	125.2	6.02	145.8	71.7	20.8	1.3	3.0	128.3	6.08	149.1	77.3	21.1	3.3	7.6	132.6	6.14	153.6	80.8	21.6	6.0	13.9
	30.0	6.1	14.1	50	102.4	5.76	122.0	36.9	17.8	1.6	3.7	106.6	5.82	126.4	40.8	18.3	3.8	8.8	108.5	5.88	128.6	42.6	18.5	6.8	15.7
				60	111.3	5.79	131.1	45.4	19.2	1.5	3.5	115.2	5.85	135.2	49.6	19.7	3.7	8.4	118.8	5.91	138.9	51.8	20.1	6.6	15.2
				70	120.2	5.83	140.1	53.9	20.6	1.4	3.3	123.9	5.89	144.0	58.5	21.0	3.5	8.1	129.0	5.95	149.3	61.1	21.7	6.4	14.7
				80	124.7	5.95	145.0	62.7	20.9	1.4	3.2	128.3	6.01	148.8	67.8	21.3	3.4	7.9	134.3	6.07	155.0	70.6	22.1	6.2	14.3
				90	129.1	6.08	149.9	71.5	21.3	1.3	3.0	132.6	6.14	153.6	77.1	21.6	3.3	7.6	139.5	6.20	160.7	80.2	22.5	6.0	13.9
80	15.0	1.1	2.5	50	94.7	6.26	116.1	38.0	15.1	1.6	3.7	97.5	6.33	119.1	41.1	15.4	3.8	8.8	100.7	6.39	122.5	43.1	15.8	6.8	15.7
				60	106.3	6.30	127.8	46.1	16.9	1.5	3.5	109.4	6.36	131.1	49.8	17.2	3.7	8.4	113.0	6.42	134.9	52.3	17.6	6.6	15.2
				70	117.9	6.33	139.5	54.2	18.6	1.4	3.3	121.4	6.39	143.2	58.6	19.0	3.5	8.1	125.3	6.46	147.4	61.5	19.4	6.4	14.7
				80	122.5	6.51	144.7	62.7	18.8	1.4	3.2	126.1	6.57	148.6	67.8	19.2	3.4	7.9	130.3	6.64	152.9	71.1	19.6	6.2	14.3
				90	127.1	6.69	149.9	71.1	19.0	1.3	3.0	130.9	6.75	153.9	76.9	19.4	3.3	7.6	135.2	6.82	158.4	80.7	19.8	6.0	13.9
	22.5	3.1	7.1	50	97.1	6.33	118.7	38.0	15.3	1.6	3.7	99.9	6.39	121.7	41.1	15.6	3.8	8.8	103.2	6.45	125.2	43.0	16.0	6.8	15.7
				60	108.2	6.36	129.9	46.0	17.0	1.5	3.5	111.4	6.42	133.3	49.7	17.3	3.7	8.4	115.0	6.49	137.1	52.2	17.7	6.6	15.2
80				70	119.3	6.39	141.1	54.0	18.7	1.4	3.3	122.8	6.46	144.8	58.4	19.0	3.5	8.1	126.8	6.52	149.1	61.3	19.4	6.4	14.7
				80	124.3	6.57	146.7	62.5	18.9	1.4	3.2	127.9	6.64	150.6	67.6	19.3	3.4	7.9	132.1	6.71	155.0	70.9	19.7	6.2	14.3
				90	129.3	6.75	152.3	71.0	19.1	1.3	3.0	133.1	6.82	156.4	76.8	19.5	3.3	7.6	137.5	6.89	161.0	80.6	19.9	6.0	13.9
	30.0	5.8	13.4	50	98.0	6.39	119.8	37.4	15.3	1.6	3.7	103.4	6.45	125.4	41.0	16.0	3.8	8.8	104.8	6.52	127.1	42.9	16.1	6.8	15.7
				60	109.5	6.42	131.4	45.6	17.0	1.5	3.5	114.1	6.49	136.3	49.5	17.6	3.7	8.4	116.6	6.55	139.0	52.0	17.8	6.6	15.2
				70	120.9	6.46	143.0	53.8	18.7	1.4	3.3	124.8	6.52	147.1	58.1	19.1	3.5	8.1	128.4	6.59	150.9	61.1	19.5	6.4	14.7
				80	126.7	6.64	149.3	62.3	19.1	1.4	3.2	130.6	6.71	153.5	67.4	19.5	3.4	7.9	135.6	6.78	158.7	70.5	20.0	6.2	14.3
				90	132.4	6.82	155.7	70.8	19.4	1.3	3.0	136.3	6.89	159.8	76.7	19.8	3.3	7.6	142.7	6.96	166.5	80.0	20.5	6.0	13.9
90	15.0	1.0	2.3	50	89.7	7.15	114.1	38.7	12.5	1.6	3.7	92.5	7.22	117.2	41.6	12.8	3.8	8.8	95.0	7.29	119.8	43.4	13.0	6.8	15.7
				60	101.4	7.22	126.0	46.8	14.0	1.5	3.5	104.6	7.30	129.5	50.3	14.3	3.7	8.4	107.4	7.37	132.5	52.6	14.6	6.6	15.2
				70	113.1	7.30	138.0	54.9	15.5	1.4	3.3	116.7	7.37	141.9	59.1	15.8	3.5	8.1	119.8	7.45	145.2	61.8	16.1	6.4	14.7
				80	119.3	7.47	144.8	63.4	16.0	1.4	3.2	123.1	7.54	148.8	68.2	16.3	3.4	7.9	126.3	7.62	152.3	71.3	16.6	6.2	14.3
				90	125.4	7.64	151.5	71.9	16.4	1.3	3.0	129.4	7.72	155.8	77.3	16.8	3.3	7.6	132.8	7.80	159.4	80.9	17.0	6.0	13.9
	22.5	2.9	6.7	50	91.8	7.22	116.4	38.6	12.7	1.6	3.7	94.7	7.29	119.6	41.5	13.0	3.8	8.8	97.2	7.37	122.4	43.4	13.2	6.8	15.7
				60	103.6	7.30	128.5	46.7	14.2	1.5	3.5	106.9	7.37	132.1	50.2	14.5	3.7	8.4	109.7	7.44	135.1	52.5	14.7	6.6	15.2
90				70	115.4	7.37	140.6	54.8	15.7	1.4	3.3	119.1	7.45	144.5	58.9	16.0	3.5	8.1	122.2	7.52	147.9	61.6	16.2	6.4	14.7
				80	121.4	7.54	147.2	63.2	16.1	1.4	3.2	125.3	7.62	151.3	68.0	16.4	3.4	7.9	128.5	7.70	154.8	71.1	16.7	6.2	14.3
				90	127.4	7.72	153.7	71.7	16.5	1.3	3.0	131.5	7.80	158.1	77.1	16.9	3.3	7.6	134.9	7.87	161.7	80.6	17.1	6.0	13.9
	30.0	5.5	12.7	50	93.0	7.29	117.9	38.1	12.8	1.6	3.7	97.2	7.37	122.3	41.4	13.2	3.8	8.8	99.1	7.44	124.5	43.3	13.3	6.8	15.7
				60	104.7	7.37	129.9	46.2	14.2	1.5	3.5	108.4	7.44	133.8	50.1	14.6	3.7	8.4	111.6	7.52	137.2	52.4	14.8	6.6	15.2
				70	116.4	7.45	141.8	54.3	15.6	1.4	3.3	119.7	7.52	145.3	58.7	15.9	3.5	8.1	124.0	7.60	149.9	61.5	16.3	6.4	14.7
				80	123.3	7.62	149.3	62.9	16.2	1.4	3.2	126.9	7.70	153.1	67.8	16.5	3.4	7.9	131.5	7.78	158.0	70.8	16.9	6.2	14.3
				90	130.2	7.80	156.8	71.6	16.7	1.3	3.0	134.1	7.87	160.9	77.0	17.0	3.3	7.6	139.0	7.95	166.2	80.2	17.5	6.0	13.9

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas. Calculation to determine percentage of antifreeze required on load side.

Table Continued on Next Page

Performance Data
HWW120 (60Hz I-P) - Cooling

Continued From Previous Page

SOURCE				LOAD																					
	Flow				Flow 15.0 GPM							Flow 22.5 GPM							Flow 30.0 GPM						
EWT °F	GPM	WPD		EWT °F	TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD		TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD		TC Mbtuh	Power kW	HR Mbtuh	LWT °F	EER	WPD	
		PSI	FT							PSI	FT						PSI	FT						PSI	FT
110	15.0	0.8	2.0	50	79.6	8.92	110.0	39.9	8.9	1.6	3.7	82.6	9.01	113.3	42.5	9.2	3.8	8.8	83.5	9.10	114.5	44.1	9.2	6.8	15.7
				60	91.6	9.08	122.6	48.2	10.1	1.5	3.5	95.0	9.17	126.3	51.2	10.4	3.7	8.4	96.1	9.26	127.6	53.2	10.4	6.6	15.2
				70	103.6	9.23	135.1	56.4	11.2	1.4	3.3	107.4	9.32	139.3	60.0	11.5	3.5	8.1	108.6	9.42	140.8	62.4	11.5	6.4	14.7
				80	112.8	9.39	144.8	64.9	12.0	1.4	3.2	117.0	9.48	149.4	69.0	12.3	3.4	7.9	118.3	9.58	151.0	71.7	12.3	6.2	14.3
				90	122.0	9.55	154.6	73.4	12.8	1.3	3.0	126.6	9.64	159.5	78.0	13.1	3.3	7.6	128.0	9.74	161.2	81.1	13.1	6.0	13.9
	22.5	2.7	6.2	50	81.3	9.01	112.0	39.9	9.0	1.6	3.7	84.3	9.10	115.4	42.4	9.3	3.8	8.8	85.2	9.19	116.6	44.1	9.3	6.8	15.7
				60	94.5	9.17	125.8	48.1	10.3	1.5	3.5	98.0	9.26	129.6	51.2	10.6	3.7	8.4	99.1	9.35	131.0	53.2	10.6	6.6	15.2
				70	107.8	9.32	139.6	56.3	11.6	1.4	3.3	111.8	9.42	143.9	59.9	11.9	3.5	8.1	113.0	9.51	145.5	62.2	11.9	6.4	14.7
				80	115.7	9.48	148.1	64.7	12.2	1.4	3.2	120.0	9.58	152.7	68.8	12.5	3.4	7.9	121.3	9.68	154.4	71.5	12.5	6.2	14.3
				90	123.7	9.64	156.6	73.1	12.8	1.3	3.0	128.3	9.74	161.5	77.7	13.2	3.3	7.6	129.7	9.84	163.3	80.8	13.2	6.0	13.9
	30.0	5.1	11.7	50	83.1	9.10	114.1	39.4	9.1	1.6	3.7	84.7	9.19	116.1	42.4	9.2	3.8	8.8	87.6	9.28	119.3	44.0	9.4	6.8	15.7
				60	95.2	9.26	126.8	47.4	10.3	1.5	3.5	97.0	9.35	128.9	51.1	10.4	3.7	8.4	101.4	9.45	133.7	53.1	10.7	6.6	15.2
				70	107.4	9.42	139.5	55.3	11.4	1.4	3.3	109.3	9.51	141.8	59.9	11.5	3.5	8.1	115.2	9.61	148.0	62.2	12.0	6.4	14.7
				80	116.5	9.58	149.2	64.2	12.2	1.4	3.2	119.5	9.68	152.5	68.7	12.3	3.4	7.9	123.4	9.77	156.8	71.4	12.6	6.2	14.3
				90	125.6	9.74	158.9	73.0	12.9	1.3	3.0	129.6	9.84	163.1	77.6	13.2	3.3	7.6	131.7	9.94	165.6	80.7	13.2	6.0	13.9
120	15.0	0.8	1.8	50	74.0	10.08	108.4	40.3	7.3	1.6	3.7	77.0	10.18	111.8	43.2	7.6	3.8	8.8	78.6	10.28	113.7	44.7	7.6	6.8	15.7
				60	85.4	10.25	120.4	48.6	8.3	1.5	3.5	88.9	10.36	124.2	52.0	8.6	3.7	8.4	90.7	10.46	126.4	53.8	8.7	6.6	15.2
				70	96.8	10.42	132.4	56.9	9.3	1.4	3.3	100.8	10.53	136.7	60.8	9.6	3.5	8.1	102.8	10.64	139.1	62.9	9.7	6.4	14.7
				80	105.9	10.62	142.1	65.2	10.0	1.4	3.2	110.2	10.72	146.8	69.7	10.3	3.4	7.9	112.5	10.83	149.4	72.1	10.4	6.2	14.3
				90	115.1	10.81	151.9	73.5	10.6	1.3	3.0	119.7	10.92	157.0	78.6	11.0	3.3	7.6	122.2	11.03	159.8	81.3	11.1	6.0	13.9
	22.5	2.6	6.0	50	74.5	10.18	109.2	40.3	7.3	1.6	3.7	77.5	10.28	112.6	43.1	7.5	3.8	8.8	79.1	10.39	114.6	44.6	7.6	6.8	15.7
				60	86.3	10.36	121.6	48.5	8.3	1.5	3.5	89.8	10.46	125.5	51.9	8.6	3.7	8.4	91.6	10.57	127.7	53.7	8.7	6.6	15.2
				70	98.1	10.53	134.0	56.7	9.3	1.4	3.3	102.1	10.64	138.4	60.6	9.6	3.5	8.1	104.2	10.74	140.8	62.7	9.7	6.4	14.7
				80	107.3	10.72	143.9	65.0	10.0	1.4	3.2	111.7	10.83	148.6	69.6	10.3	3.4	7.9	113.9	10.94	151.3	72.0	10.4	6.2	14.3
				90	116.5	10.92	153.7	73.4	10.7	1.3	3.0	121.2	11.03	158.9	78.5	11.0	3.3	7.6	123.7	11.14	161.7	81.3	11.1	6.0	13.9
	30.0	4.9	11.3	50	76.9	10.28	112.0	40.0	7.5	1.6	3.7	80.2	10.39	115.7	42.9	7.7	3.8	8.8	81.7	10.49	117.5	44.5	7.8	6.8	15.7
				60	88.8	10.46	124.4	48.2	8.5	1.5	3.5	92.8	10.57	128.9	51.7	8.8	3.7	8.4	94.6	10.67	131.0	53.6	8.9	6.6	15.2
				70	100.6	10.64	136.9	56.5	9.5	1.4	3.3	105.5	10.74	142.1	60.5	9.8	3.5	8.1	107.6	10.85	144.6	62.6	9.9	6.4	14.7
				80	109.9	10.83	146.8	64.9	10.1	1.4	3.2	115.1	10.94	152.4	69.5	10.5	3.4	7.9	117.2	11.05	154.9	71.9	10.6	6.2	14.3
				90	119.2	11.03	156.8	73.3	10.8	1.3	3.0	124.7	11.14	162.7	78.5	11.2	3.3	7.6	126.9	11.25	165.3	81.2	11.3	6.0	13.9

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas. Calculation to determine percentage of antifreeze required on load side.

Performance Data
HWW120 (60Hz I-P) - Heating

SOURCE				LOAD																							
	Flow				Flow 15.0 GPM							Flow 22.5 GPM							Flow 30.0 GPM								
EWT °F	GPM	WPD		EWT °F	HC Mbtuh	Power kW	HE Mbtuh	LWT °F	COP	WPD		HC Mbtuh	Power kW	HE Mbtuh	LWT °F	COP	WPD		HC Mbtuh	Power kW	HE Mbtuh	LWT °F	COP	WPD			
		PSI	FT							PSI	FT						PSI	FT						PSI	FT		
20	30.0	8.0	18.6	60	82.2	4.86	65.6	71.5	5.0	1.5	3.5	82.6	4.76	66.3	67.4	5.1	3.3	7.7	82.9	4.67	67.0	65.3	5.2	6.0	13.8		
				80	80.9	6.34	59.3	91.2	3.7	1.4	3.2	81.1	6.22	59.9	87.2	3.8	3.1	7.1	81.3	6.09	60.5	85.3	3.9	5.6	13.0		
				100	79.3	8.23	51.3	110.8	2.8	1.3	2.9	79.3	8.06	51.8	106.9	2.9	2.9	6.7	79.3	7.90	52.4	105.1	2.9	5.3	12.3		
30	15.0	1.7	3.9	60	95.6	5.04	78.4	73.3	5.6	1.5	3.5	96.0	4.94	79.2	68.6	5.7	3.3	7.7	96.5	4.84	80.0	66.3	5.8	6.0	13.8		
				80	93.8	6.55	71.5	92.9	4.2	1.4	3.2	94.1	6.42	72.2	88.4	4.3	3.1	7.1	94.4	6.29	73.0	86.1	4.4	5.6	13.0		
				100	91.7	8.44	62.9	112.4	3.2	1.3	2.9	91.8	8.27	63.5	108.1	3.3	2.9	6.7	91.9	8.11	64.2	105.9	3.3	5.3	12.3		
				120	89.1	10.71	52.6	131.9	2.4	1.2	2.7	89.0	10.50	53.2	127.7	2.5	2.8	6.4	88.8	10.29	53.7	125.7	2.5	5.1	11.7		
	22.5	4.4	10.1	60	100.0	5.13	82.5	73.6	5.7	1.5	3.5	100.5	5.02	83.4	68.9	5.9	3.3	7.7	101.0	4.92	84.2	66.6	6.0	6.0	13.8		
				80	97.9	6.66	75.2	93.3	4.3	1.4	3.2	98.3	6.53	76.0	88.7	4.4	3.1	7.1	98.6	6.40	76.8	86.5	4.5	5.6	13.0		
				100	95.7	8.58	66.4	112.8	3.3	1.3	2.9	95.8	8.41	67.1	108.4	3.3	2.9	6.7	95.9	8.24	67.8	106.2	3.4	5.3	12.3		
				120	93.2	10.89	56.0	132.1	2.5	1.2	2.7	93.0	10.67	56.6	128.0	2.6	2.8	6.4	92.9	10.46	57.2	125.9	2.6	5.1	11.7		
	30.0	7.6	17.5	60	103.9	5.21	86.1	73.9	5.8	1.5	3.5	104.4	5.11	87.0	69.1	6.0	3.3	7.7	105.0	5.01	87.9	66.8	6.1	6.0	13.8		
				80	101.8	6.77	78.7	93.4	4.4	1.4	3.2	102.1	6.64	79.5	88.9	4.5	3.1	7.1	102.5	6.50	80.3	86.6	4.6	5.6	13.0		
				100	99.2	8.73	69.4	112.9	3.3	1.3	2.9	99.3	8.55	70.1	108.6	3.4	2.9	6.7	99.4	8.38	70.8	106.4	3.5	5.3	12.3		
				120	96.1	11.08	58.3	132.3	2.5	1.2	2.7	95.9	10.85	58.9	128.2	2.6	2.8	6.4	95.8	10.64	59.5	126.1	2.6	5.1	11.7		
40	15.0	1.5	3.5	60	108.9	5.22	91.1	75.0	6.1	1.5	3.5	109.5	5.12	92.0	69.7	6.3	3.3	7.7	110.1	5.02	93.0	67.2	6.4	6.0	13.8		
				80	106.7	6.76	83.6	94.6	4.6	1.4	3.2	107.1	6.62	84.5	89.6	4.7	3.1	7.1	107.6	6.49	85.4	87.0	4.9	5.6	13.0		
				100	104.0	8.65	74.5	114.0	3.5	1.3	2.9	104.2	8.48	75.3	109.2	3.6	2.9	6.7	104.4	8.31	76.1	106.7	3.7	5.3	12.3		
				120	100.7	10.91	63.5	133.4	2.7	1.2	2.7	100.7	10.69	64.2	128.7	2.8	2.8	6.4	100.6	10.48	64.9	126.4	2.8	5.1	11.7		
	22.5	4.1	9.3	60	114.7	5.29	96.7	75.5	6.4	1.5	3.5	115.4	5.19	97.7	70.1	6.5	3.3	7.7	116.0	5.08	98.7	67.5	6.7	6.0	13.8		
				80	111.8	6.85	88.5	95.1	4.8	1.4	3.2	112.3	6.71	89.4	90.0	4.9	3.1	7.1	112.7	6.58	90.3	87.4	5.0	5.6	13.0		
				100	108.6	8.77	78.7	114.5	3.6	1.3	2.9	108.8	8.59	79.5	109.7	3.7	2.9	6.7	109.1	8.42	80.3	107.1	3.8	5.3	12.3		
				120	105.2	11.06	67.4	133.8	2.8	1.2	2.7	105.1	10.84	68.1	129.1	2.8	2.8	6.4	105.1	10.62	68.8	126.8	2.9	5.1	11.7		
	30.0	7.2	16.6	60	118.5	5.36	100.2	75.9	6.5	1.5	3.5	119.1	5.26	101.2	70.5	6.6	3.3	7.7	119.8	5.15	102.2	67.9	6.8	6.0	13.8		
				80	115.6	6.94	91.9	95.3	4.9	1.4	3.2	116.1	6.80	92.8	90.3	5.0	3.1	7.1	116.5	6.67	93.8	87.6	5.1	5.6	13.0		
				100	112.1	8.89	81.8	114.7	3.7	1.3	2.9	112.3	8.71	82.6	109.9	3.8	2.9	6.7	112.6	8.54	83.5	107.3	3.9	5.3	12.3		
				120	108.0	11.21	69.8	134.0	2.8	1.2	2.7	108.0	10.98	70.5	129.3	2.9	2.8	6.4	107.9	10.76	71.2	127.0	2.9	5.1	11.7		
50	15.0	1.4	3.2	60	122.2	5.40	103.8	76.8	6.6	1.5	3.5	122.9	5.30	104.9	70.8	6.8	3.3	7.7	123.7	5.19	106.0	68.1	7.0	6.0	13.8		
				80	119.6	6.97	95.8	96.3	5.0	1.4	3.2	120.1	6.83	96.8	90.8	5.2	3.1	7.1	120.7	6.69	97.9	87.8	5.3	5.6	13.0		
				100	116.3	8.87	86.1	115.6	3.8	1.3	2.9	116.6	8.69	87.0	110.4	3.9	2.9	6.7	117.0	8.52	87.9	107.5	4.0	5.3	12.3		
				120	112.3	11.11	74.4	134.9	3.0	1.2	2.7	112.4	10.89	75.2	129.7	3.0	2.8	6.4	112.5	10.67	76.1	127.2	3.1	5.1	11.7		
				130	Operation not recommended							110.3	12.31	68.3	139.8	2.6	2.7	6.2	110.2	12.06	69.1	137.2	2.7	5.0	11.5		
	22.5	3.8	8.7	60	129.4	5.46	110.8	77.4	6.9	1.5	3.5	130.2	5.35	111.9	71.3	7.1	3.3	7.7	131.0	5.24	113.1	68.5	7.3	6.0	13.8		
				80	125.7	7.04	101.7	96.9	5.2	1.4	3.2	126.3	6.90	102.7	91.3	5.4	3.1	7.1	126.8	6.76	103.8	88.3	5.5	5.6	13.0		
				100	121.6	8.96	91.0	116.2	4.0	1.3	2.9	121.9	8.78	92.0	110.9	4.1	2.9	6.7	122.3	8.60	92.9	108.0	4.2	5.3	12.3		
				120	117.2	11.22	78.9	135.4	3.1	1.2	2.7	117.2	11.00	79.7	130.2	3.1	2.8	6.4	117.3	10.78	80.5	127.7	3.2	5.1	11.7		
				130								115.8	12.43	73.4	139.9	2.7	2.7	6.2	115.7	12.19	74.1	137.3	2.8	5.0	11.5		
	30.0	6.8	15.6	60	133.0	5.51	114.2	78.0	7.1	1.5	3.5	133.8	5.40	115.3	71.9	7.3	3.3	7.7	134.6	5.30	116.5	69.0	7.4	6.0	13.8		
				80	129.4	7.11	105.1	97.2	5.3	1.4	3.2	130.0	6.97	106.2	91.6	5.5	3.1	7.1	130.6	6.83	107.3	88.6	5.6	5.6	13.0		
				100	125.0	9.05	94.2	116.4	4.1	1.3	2.9	125.4	8.87	95.1	111.1	4.1	2.9	6.7	125.7	8.69	96.1	108.2	4.2	5.3	12.3		
				120	119.9	11.34	81.2	135.6	3.1	1.2	2.7	120.0	11.11	82.1	130.5	3.2	2.8	6.4	120.0	10.89	82.9	127.9	3.2	5.1	11.7		
				130								117.5	12.56	74.7	140.3	2.7	2.7	6.2	117.4	12.31	75.4	137.7	2.8	5.0	11.5		
60	15.0	1.3	3.0	60	129.7	5.51	110.9	78.5	6.9	1.5	3.5	130.5	5.40	112.1	71.7	7.1	3.3	7.7	131.3	5.30	113.2	68.6	7.3	6.0	13.8		
				80	129.6	7.09	105.4	98.1	5.4	1.4	3.2	130.2	6.95	106.5	91.8	5.5	3.1	7.1	130.9	6.81	107.6	88.6	5.6	5.6	13.0		
				100	127.3	8.98	96.7	117.6	4.2	1.3	2.9	127.7	8.80	97.7	111.5	4.3	2.9	6.7	128.2	8.63	98.7	108.4	4.4	5.3	12.3		
				120	122.8	11.19	84.7	136.7	3.2	1.2	2.7	123.0	10.97	85.6	130.9	3.3	2.8	6.4	123.2	10.75	86.5	128.0	3.4	5.1	11.7		
				130								120.5	12.42	78.1	140.8	2.8	2.7	6.2	120.1	12.04	79.0	137.9	2.9	5.0	11.5		
	22.5	3.5	8.1	60	135.5	5.57	116.4	79.0	7.1	1.5	3.5	136.3	5.46	117.6	72.2	7.3	3.3	7.7	137.1	5.35	118.8	69.1	7.5	6.0	13.8		
				80	135.3	7.16	110.9	98.7	5.5	1.4	3.2	136.0	7.02	112.1	92.3	5.7	3.1	7.1	136.7	6.88	113.2	89.1	5.8	5.6	13.0		
				100	132.9	9.09	101.9	118.1	4.3	1.3	2.9	133.3	8.90	102.9	112.0	4.4	2.9	6.7	133.7	8.73	104.0	108.9	4.5	5.3	12.3		
				120	128.0	11.34	89.3	137.2	3.3	1.2	2.7	128.2	11.12	90.2	131.3	3.4	2.8	6.4	128.3	10.89	91.2	128.5	3.5	5.1	11.7		
				130								126.3	12.54	83.5	141.0	3.0	2.7	6.2	125.9	12.17	84.4	138.1	3.0	5.0	11.5		
	30.0	6.4	14.8	60	140.0	5.63	120.8	79.4	7.3	1.5	3.5	140.8	5.51	122.0	72.6	7.5	3.3	7.7	141.7	5.40	123.2	69.5	7.7	6.0	13.8		
				80	140.1	7.23	115.4	99.0	5.7	1.4	3.2	140.8	7.09	116.6	92.6	5.8	3.1	7.1	141.5	6.95	117.7	89.4	6.0	5.6	13.0		
				100	137.6	9.19	106.2	118.3	4.4	1.3	2.9	138.0	9.01	107.3	112.2	4.5	2.9	6.7	138.5	8.83	108.4	109.1	4.6	5.3	12.3		
				120	132.4	11.50	93.2	137.4	3.4	1.2	2.7	132.6	11.27	94.1	131.6	3.4	2.8	6.4	132.7	11.04	95.1	128.7	3.5	5.1	11.7		
				130															129.1	12.29	87.2	138.4	3.1	5.0	11.5		

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas. Calculation to determine percentage of antifreeze required on source side.

Table Continued on Next Page

Performance Data
HWW120 (60Hz I-P) - Heating

Continued From Previous Page

SOURCE				LOAD																				
	Flow				Flow 15.0 GPM							Flow 22.5 GPM							Flow 30.0 GPM						
EWT °F	GPM	WPD		EWT °F	HC Mbtuh	Power kW	HE Mbtuh	LWT °F	COP	WPD		HC Mbtuh	Power kW	HE Mbtuh	LWT °F	COP	WPD		HC Mbtuh	Power kW	HE Mbtuh	LWT °F	COP	WPD	
		PSI	FT							PSI	FT						PSI	FT						PSI	FT
70	15.0	1.2	2.7	60	137.2	5.62	118.0	80.1	7.2	1.5	3.5	138.1	5.51	119.3	72.6	7.3	3.3	7.7	138.9	5.40	120.5	69.2	7.5	6.0	13.8
				80	139.6	7.21	115.0	100.0	5.7	1.4	3.2	140.3	7.07	116.2	92.8	5.8	3.1	7.1	141.1	6.93	117.4	89.4	6.0	5.6	13.0
				100	138.3	9.01	107.3	119.5	4.5	1.3	2.9	138.8	8.92	108.4	112.6	4.6	2.9	6.7	139.4	8.74	109.6	109.3	4.7	5.3	12.3
				120	133.3	11.27	94.9	138.5	3.5	1.2	2.7	133.6	11.05	95.9	132.0	3.5	2.8	6.4	133.9	10.83	96.9	128.9	3.6	5.1	11.7
				130															130.0	12.02	88.9	138.6	3.2	5.0	11.5
	22.5	3.3	7.6	60	141.5	5.68	122.1	80.7	7.3	1.5	3.5	142.3	5.57	123.3	73.2	7.5	3.3	7.7	143.2	5.46	124.6	69.7	7.7	6.0	13.8
				80	145.0	7.29	120.1	100.5	5.8	1.4	3.2	145.7	7.14	121.4	93.3	6.0	3.1	7.1	146.5	7.00	122.6	89.9	6.1	5.6	13.0
				100	144.1	9.22	112.7	119.9	4.6	1.3	2.9	144.7	9.03	113.9	113.1	4.7	2.9	6.7	145.2	8.85	115.0	109.7	4.8	5.3	12.3
				120	138.9	11.46	99.7	139.0	3.5	1.2	2.7	139.1	11.24	100.8	132.4	3.6	2.8	6.4	139.4	11.01	101.8	129.3	3.7	5.1	11.7
				130															136.1	12.15	94.6	138.9	3.3	5.0	11.5
	30.0	6.1	14.1	60	146.9	5.74	127.3	80.9	7.5	1.5	3.5	147.8	5.62	128.6	73.4	7.7	3.3	7.7	148.7	5.50	129.9	70.0	7.9	6.0	13.8
				80	150.8	7.36	125.7	100.7	6.0	1.4	3.2	151.6	7.21	126.9	93.5	6.2	3.1	7.1	152.3	7.07	128.2	90.1	6.3	5.6	13.0
				100	150.1	9.33	118.3	120.2	4.7	1.3	2.9	150.7	9.15	119.5	113.3	4.8	2.9	6.7	151.3	8.97	120.7	109.9	4.9	5.3	12.3
				120	144.9	11.66	105.1	139.2	3.6	1.2	2.7	145.2	11.43	106.2	132.7	3.7	2.8	6.4	145.5	11.20	107.3	129.5	3.8	5.1	11.7
				130															140.8	12.27	98.9	139.2	3.4	5.0	11.5
80	15.0	1.1	2.5	60	144.7	5.73	125.2	81.7	7.4	1.5	3.5	145.6	5.62	126.5	73.5	7.6	3.3	7.7	146.5	5.51	127.8	69.8	7.8	6.0	13.8
				80	149.6	7.34	124.6	101.8	6.0	1.4	3.2	150.4	7.19	125.9	93.9	6.1	3.1	7.1	151.2	7.05	127.2	90.2	6.3	5.6	13.0
				100	149.3	9.21	117.9	121.4	4.8	1.3	2.9	149.9	9.03	119.1	113.8	4.9	2.9	6.7	150.6	8.85	120.4	110.2	5.0	5.3	12.3
				120	143.8	11.35	105.1	140.4	3.7	1.2	2.7	144.2	11.13	106.2	133.2	3.8	2.8	6.4	144.5	10.91	107.3	129.8	3.9	5.1	11.7
				130															139.8	12.00	98.9	139.4	3.4	5.0	11.5
	22.5	3.1	7.1	60	147.5	5.79	127.7	82.3	7.5	1.5	3.5	148.4	5.67	129.0	74.1	7.7	3.3	7.7	149.3	5.56	130.3	70.3	7.9	6.0	13.8
				80	154.7	7.41	129.4	102.3	6.1	1.4	3.2	155.5	7.26	130.7	94.3	6.3	3.1	7.1	156.3	7.12	132.0	90.6	6.4	5.6	13.0
				100	155.4	9.34	123.5	121.8	4.9	1.3	2.9	156.0	9.16	124.8	114.2	5.0	2.9	6.7	156.7	8.97	126.1	110.6	5.1	5.3	12.3
				120	149.7	11.59	110.2	140.7	3.8	1.2	2.7	150.1	11.35	111.3	133.5	3.9	2.8	6.4	150.4	11.13	112.5	130.1	4.0	5.1	11.7
				130															146.2	12.13	104.9	139.7	3.5	5.0	11.5
	30.0	5.8	13.4	60	153.9	8.85	133.9	82.4	7.7	1.5	3.5	154.8	5.73	135.3	74.2	7.9	3.3	7.7	155.8	5.62	136.6	70.4	8.1	6.0	13.8
				80	161.5	7.49	135.9	102.5	6.3	1.4	3.2	162.3	7.34	137.3	94.5	6.5	3.1	7.1	163.2	7.19	138.7	90.8	6.7	5.6	13.0
				100	162.7	9.48	130.3	122.0	5.0	1.3	2.9	163.3	9.29	131.6	114.4	5.2	2.9	6.7	164.0	9.10	133.0	110.8	5.3	5.3	12.3
				120	157.4	11.82	117.1	141.0	3.9	1.2	2.7	157.8	11.59	118.3	133.8	4.0	2.8	6.4	158.2	11.36	119.4	130.4	4.1	5.1	11.7
				130															152.5	12.25	110.7	139.9	3.6	5.0	11.5

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas. Calculation to determine percentage of antifreeze required on source side.

Antifreeze Correction Table

Antifreeze Type	Antifreeze %	Cooling			Heating		WPD Corr. Fct. EWT 30°F
		EWT 90°F			EWT 30°F		
		Total Cap	Sens Cap	Power	Htg Cap	Power	
Water	0	1.000	1.000	1.000			1.000
Propylene Glycol	5	0.995	0.995	1.003	0.989	0.997	1.070
	15	0.986	0.986	1.009	0.968	0.990	1.210
	25	0.978	0.978	1.014	0.947	0.983	1.360
Methanol	5	0.997	0.997	1.002	0.989	0.997	1.070
	15	0.990	0.990	1.007	0.968	0.990	1.160
	25	0.982	0.982	1.012	0.949	0.984	1.220
Ethanol	5	0.998	0.998	1.002	0.981	0.994	1.140
	15	0.994	0.994	1.005	0.944	0.983	1.300
	25	0.986	0.986	1.009	0.917	0.974	1.360
Ethylene Glycol	5	0.998	0.998	1.002	0.993	0.998	1.040
	15	0.994	0.994	1.004	0.980	0.994	1.120
	25	0.988	0.988	1.008	0.966	0.990	1.200

Physical Data

Model	HWW036	HWW060	HWW120
Compressor (qty)	Scroll (1)		Scroll (2)
Factory Charge HFC-410A (lbs) [kg] Per Circuit	4.5 [2.04]	5.5 [2.49]	5.5 [2.49]
Commercial FPT (in) Load/Source	¾	1	1½
HWG Water In/Out FPT (in)	½		
Weight - Operating, (lbs) [kg]	348 [158]	360 [163]	726 [329]
Weight - Packaged, (lbs) [kg]	373 [169]	385 [175]	770 [349]
Water Volume (Source)			
Gallons (LIters)	0.96 (3.64)	1.33 (5.04)	2.65 (10.02)

Dual isolated compressor mounting
Balanced port expansion valve (TXV)
Compressor on (green) and fault (red) light

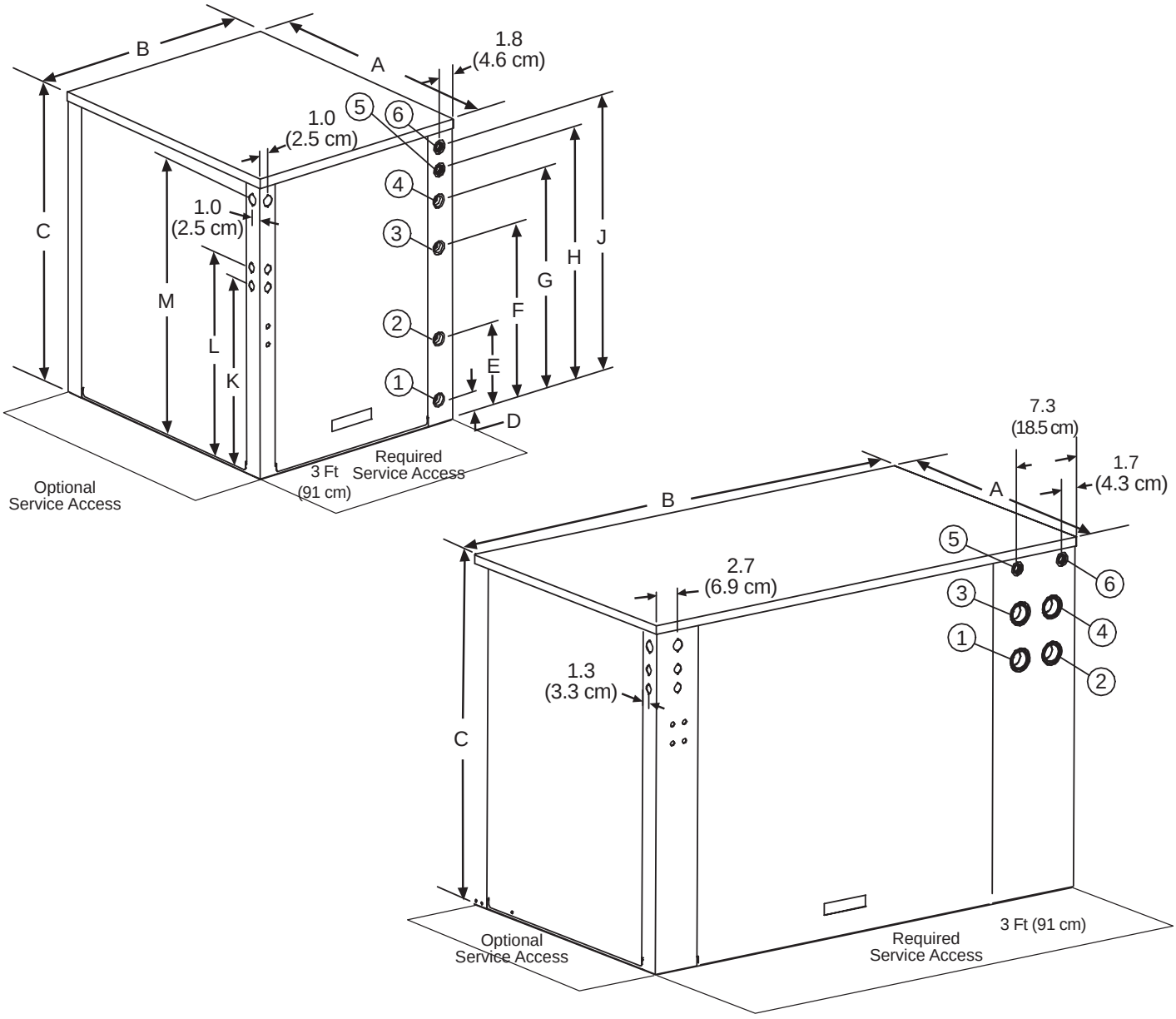
Unit Maximum Water Working Pressure	
Options	**Max Working Pressure PSIG [kPa]**
Base Unit	300 [2,068]

Electrical Data

Model	Voltage Code	Voltage	Min/Max Voltage	Compressor			Total Unit FLA	Min Circuit Amps	Max Fuse/ HACR
				QTY	RLA	LRA			
HWW036	G	208-230/60/1	187/254	1	16.7	79	16.7	20.8	35
	E	265/60/1	239/292	1	13.5	72	13.5	16.8	30
	H	208-230/60/3	187/254	1	10.4	73	10.4	13.1	20
	F	460/60/3	414/506	1	5.8	38	5.8	7.2	15
	N	575/60/3	518/633	1	3.8	36.5	3.8	4.7	15
HWW060 B	G	208-230/60/1	187/254	1	26.3	134	26.3	32.9	50
	H	208-230/60/3	187/254	1	15.6	110	15.6	19.5	35
	F	460/60/3	414/506	1	7.8	52	7.8	9.8	15
	N	575/60/3	518/633	1	5.8	38.9	5.8	7.3	15
HWW120 B	G	208-230/60/1	187/254	2	26.3	134	52.6	59.2	80
	H	208-230/60/3	187/254	2	15.6	110	31.2	35.1	50
	F	460/60/3	414/506	2	7.8	52	15.6	17.6	25
	N	575/60/3	518/633	2	5.8	38.9	11.6	13.1	15

HACR circuit breaker in USA only

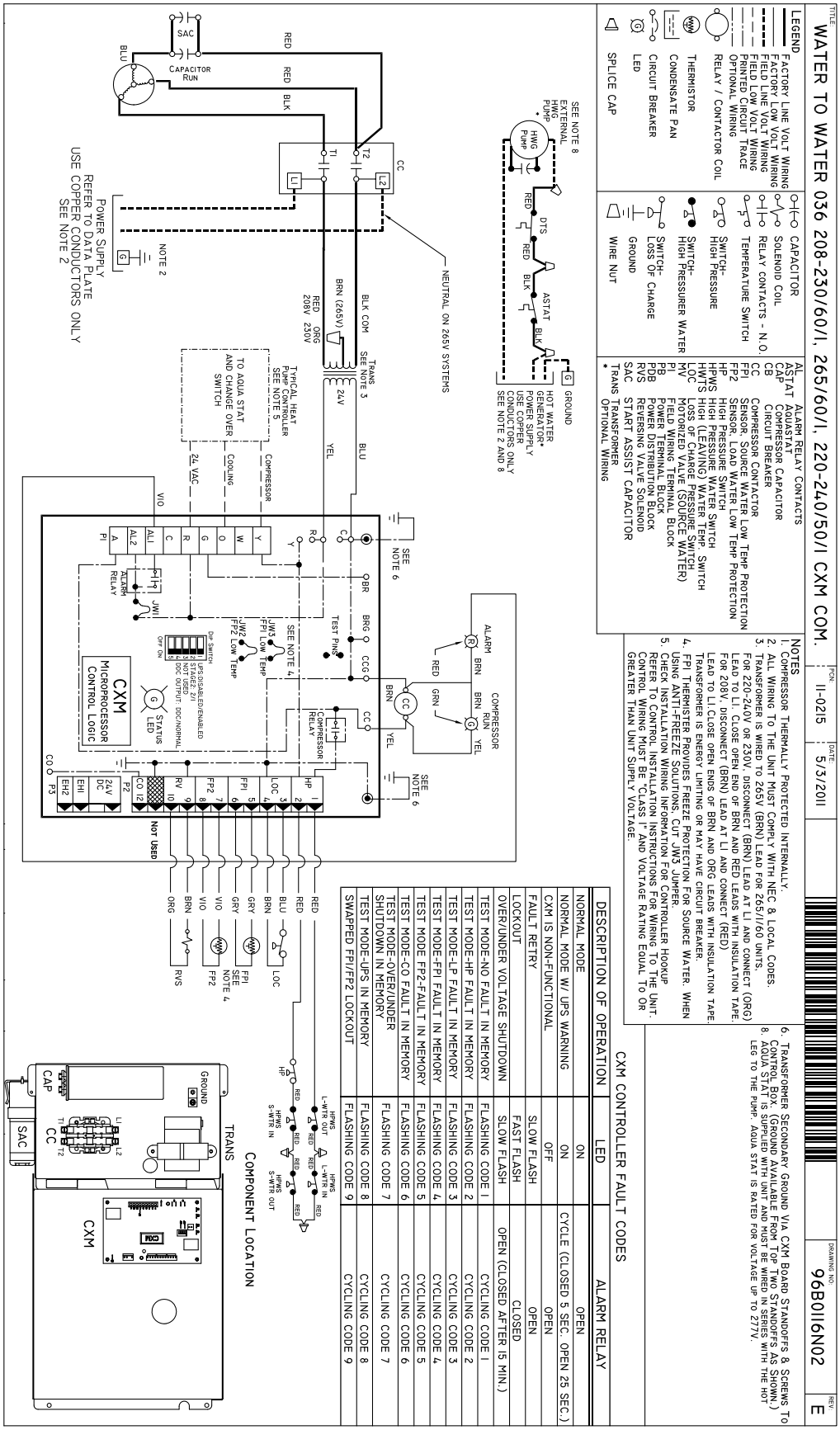
HWW0036-120 Dimensional Data



Water to Water		Overall Cabinet			Water Connections						Electric Access Plugs		
					1	2	3	4	5	6			
		A Depth	B Width	C Height	D Source (Outdoor) Water In	E Source (Outdoor) Water Out	F Load (Indoor) Water In	G Load (Indoor) Water Out	H HWG Return In	J HWG Water Out	K Low Voltage	L External Pump	M Power Supply
036-060	in.	30.6	25.4	33	2.7	9.4	19.4	24.5	27.9	30.4	20.9	22.9	30.9
	cm.	77.8	64.5	83.8	6.9	23.9	49.3	62.2	70.9	77.2	53.1	58.2	78.5
120	in.	30.6	52.9	37	25.2	25.2	30.1	30.1	34.9	34.9	29.9	31.9	34.4
	cm.	77.8	134.4	94	64.0	64.0	76.5	76.5	88.6	88.6	75.9	81.0	87.4

HACR circuit breaker in USA only

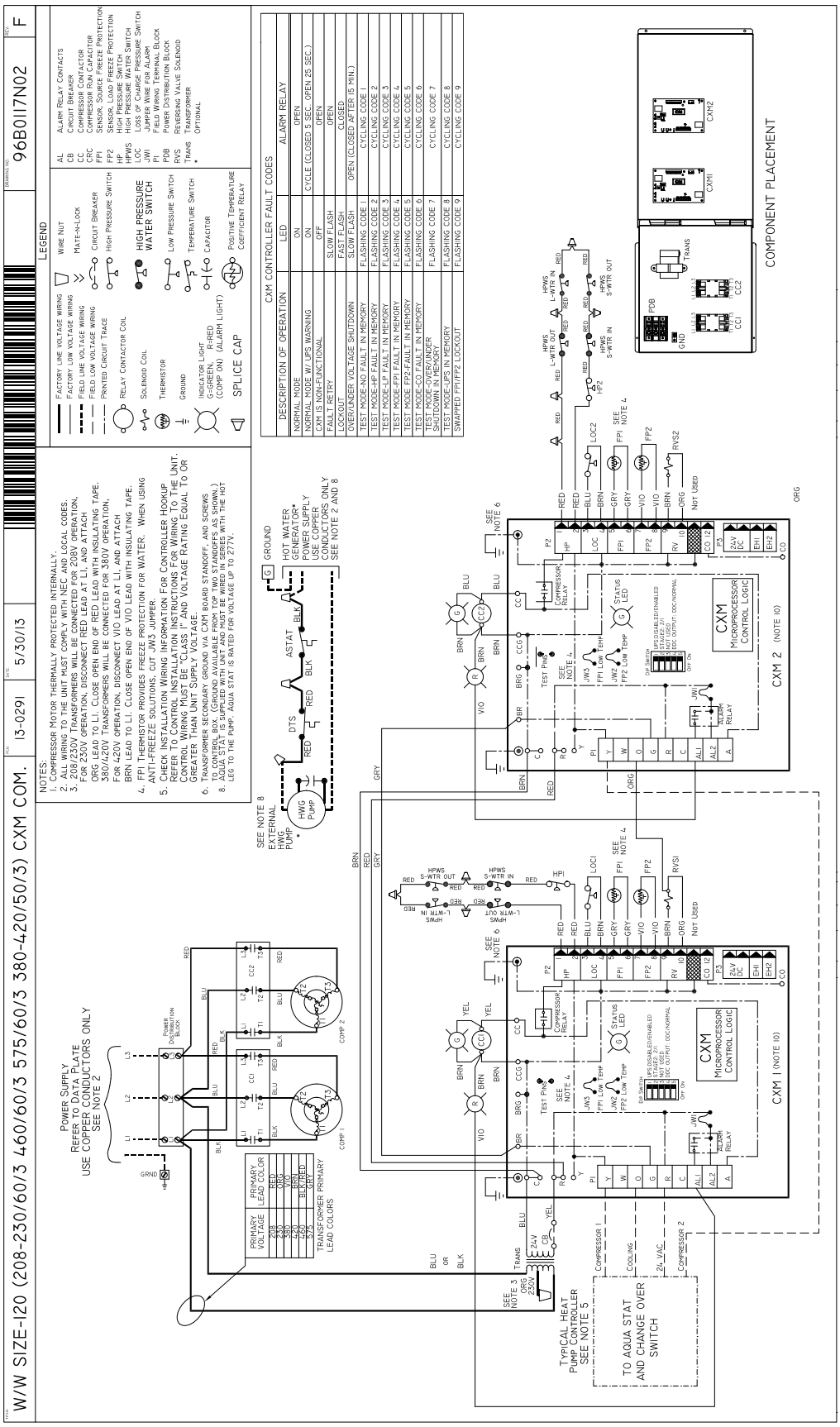
Typical Wiring Diagram
Single Phase HWW036 Units with CXM



CXM CONTROLLER FAULT CODES

DESCRIPTION OF OPERATION	LED	ALARM RELAY
NORMAL MODE	ON	OPEN
NORMAL MODE W/ UPS WARNING	ON	CYCLE (CLOSED 5 SEC. OPEN 25 SEC.)
CXM IS NON-FUNCTIONAL	OFF	OPEN
FAULT RETRY	SLOW FLASH	OPEN
LOCKOUT	FAST FLASH	CLOSED
OVER/UNDER VOLTAGE SHUTDOWN	SLOW FLASH	OPEN (CLOSED AFTER 15 MIN.)
TEST MODE-NO FAULT IN MEMORY	FLASHING CODE 1	CYCLING CODE 1
TEST MODE-HP FAULT IN MEMORY	FLASHING CODE 2	CYCLING CODE 2
TEST MODE-LP FAULT IN MEMORY	FLASHING CODE 3	CYCLING CODE 3
TEST MODE-FPI FAULT IN MEMORY	FLASHING CODE 4	CYCLING CODE 4
TEST MODE FP2-FAULT IN MEMORY	FLASHING CODE 5	CYCLING CODE 5
TEST MODE-CO FAULT IN MEMORY	FLASHING CODE 6	CYCLING CODE 6
TEST MODE-OVER/UNDER SHUTDOWN IN MEMORY	FLASHING CODE 7	CYCLING CODE 7
TEST MODE-UPS IN MEMORY	FLASHING CODE 8	CYCLING CODE 8
SWAPPED FPI/FP2 LOCKOUT	FLASHING CODE 9	CYCLING CODE 9

Typical Wiring Diagram
Three Phase HWW036 Units with CXM



HWW Series 60Hz
Engineering Specifications – Page 1

General:
Furnish and install Heat Controller HWW Water Source Heat Pumps as indicated on the plans. Equipment shall be completely assembled, piped and internally wired. Capacities and characteristics as listed in the schedule and the specifications that follow.

Units shall be supplied completely factory built capable of operating over an entering water temperature range from 20° to 120°F (-6.7° to 48.9°C) as standard. Equivalent units from other manufacturers may be proposed provided approval to bid is given 10 days prior to bid closing. All equipment listed in this section must be rated in accordance with Air-Conditioning, Heating and Refrigeration Institute/International Standards Organization (AHRI/ISO 13256-2). All equipment must be tested, investigated, and determined to comply with the requirements of the standards for Heating and Cooling Equipment UL-1995 for the United States and CAN/CSA-C22.2 NO.236 for Canada, by Intertek Testing Laboratories (ETL). The units shall have AHRI/ISO and ETL-US-C labels.

All units shall be fully quality tested by factory run testing under normal operating conditions as described herein. Quality control system shall automatically perform via computer: triple leak check, pressure tests, evacuation and accurately charge system, perform detailed heating and cooling mode tests, and quality cross check all operational and test conditions to pass/fail criteria. Detailed report card will ship with each unit displaying status for critical tests and components**. NOTE: If unit fails on any cross check, it shall not be allowed to ship. Serial numbers will be recorded by factory and furnished to contractor on report card for ease of unit warranty status. Units tested without water flow are not acceptable.**

Basic Construction:
All units must have multiple removable panels for serviceability of compressor compartment. **Units having only one access panel shall not be acceptable.**

The heat pumps shall be fabricated from heavy gauge galvanized steel with powder coat paint finish. Both sides of the steel shall be painted for added protection. All interior surfaces shall be lined with 1/2 inch (12.7mm) thick, 1-1/2 lb/ft3 (24 kg/m3) acoustic type glass fiber insulation. Insulation placement shall be designed in a manner that will eliminate any exposed edges.

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. **Unit insulation must meet these stringent requirements or unit(s) will not be accepted.**

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 FPT fittings. 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 removed for servicing and coordinate locations of electrical conduit and lights with the electrical contractor.

Unit(s) shall have exterior indicator lights showing, 1) compressor operation (on/off) and 2) unit “fault” status. Contractor shall be responsible for providing control circuitry and indicator lights for units not providing this feature.

Refrigerant Circuit:
Units shall have sealed, isolated refrigerant circuit(s), each including a high efficiency scroll compressor designed for heat pump operation, a thermostatic expansion valve for refrigerant metering, a reversing valve, load and source coaxial (tube in tube) refrigerant to water heat exchangers, and safety controls including a high pressure switch, low pressure switch (loss of charge), and low water temperature sensors. 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. **Units with brazed plate heat exchangers will not be accepted.**

Unit shall be supplied with extended range insulation, which adds closed cell insulation to internal water lines, and provides insulation on suction side refrigeration tubing including refrigerant to water heat exchangers.

Hermetic compressors shall be internally sprung. The compressors shall have a dual level vibration isolation system. The compressors will be mounted on specially engineered sound-tested EPDM vibration isolation grommets to a large heavy gauge compressor mounting plate, which is then isolated from the cabinet base with rubber grommets for maximized vibration attenuation. Compressors shall have thermal overload protection.

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Refrigerant to water heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design, rated to withstand 625 PSIG (4309 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 cathodic epoxy material a minimum of 0.4 mils thick (0.4 – 1.5 mils range) 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. The material shall be formulated without the inclusion of any heavy metals and shall exhibit a pencil hardness of 2H (ASTM D3363-92A), crosshatch adhesion of 4B-5B (ASTM D3359-95), and impact resistance of 160 in-lbs (184 kg-cm) direct (ASTM D2794-93). **For all models except 170 & 340, which are powder coated.**

Option: The unit will be supplied with cupro-nickel coaxial water to refrigerant heat exchanger (specify source and/or load heat exchanger).

Electrical:
A control box shall be located within the unit compressor compartment and shall contain a 75VA transformer with load side short circuit and overload protection via a built in circuit breaker, 24 volt activated, 3 pole compressor contactor, terminal block for thermostat wiring and solid-state controller for complete unit operation. Reversing valve 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 aquastat / sensor. Units with two compressors (120 and 340) shall have a solid-state time delay relay and random start to prevent both compressors from starting simultaneously.

Solid State Control System (CXM):
Units shall have a solid-state control system. Units utilizing electro-mechanical control shall not be acceptable. The control system microprocessor board shall be specifically designed to protect against building electrical system noise contamination, EMI, and RFI interference. 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. Automatic intelligent reset. Unit shall automatically reset the unit 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.
h. Ability to defeat time delays for servicing.
i. Light emitting diode (LED) on circuit board to indicate high pressure, low pressure, low voltage, high voltage, low water temperature cut-out, and control voltage status.
j. The low-pressure switch shall not be monitored for the first 120 seconds after a compressor start command to prevent nuisance safety trips.
k. 24V output to cycle a motorized water valve or other device with compressor contactor.
l. Unit Performance Sentinel (UPS). The UPS warns when the heat pump is running inefficiently.
m. Source water coil low temperature sensing (selectable for water or antifreeze).
p. Load water coil low temperature sensing.

NOTE: Units not providing the 7 safety protections of anti-short cycle, low voltage, high voltage, high refrigerant pressure, low pressure (loss of charge), source water coil low temperature cut-out, and load water coil low temperature sensing control will not be accepted.

FIELD INSTALLED OPTIONS

A variety of field installed accessories (hose kits, valves, etc.) are available dependent of the application. Contact your local distributor for more information

Notes:

Due to ongoing product improvements, specifications and dimensions are subject to change and correction without notice or incurring obligations. Determining the application and suitability for use of any product is the responsibility of the installer. Additionally, the installer is responsible for verifying dimensional data on the actual product prior to beginning any installation preparations.

Incentive and rebate programs have precise requirements as to product performance and certification. All products meet applicable regulations in effect on date of manufacture; however, certifications are not necessarily granted for the life of a product. Therefore, it is the responsibility of the applicant to determine whether a specific model qualifies for these incentive/rebate programs.

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