

Versatec

Water-to-Water Heat Pumps

- 3, 5, 7, 10 Ton Capacity

[Design Features](#)

[Dimensional Data](#)

[Physical Data](#)

[Applications](#)

[Performance Data](#)

[Engineering Guide Specifications](#)



Versatec



Versatec Series water-to-water heat pumps are an excellent choice to provide water heating and water cooling for a wide range of applications. Whether the product is used for pools, radiant floor heating, ice melt, aquaculture, chilled water applications, tempering outside air, industrial process water, or to provide precisely heated or cooled water for fan coils or other applications, Versatec Series products are designed to perform to the highest standards in the industry.

Available in four sizes (3, 5, 7, and 10 tons), Versatec water-to-water heat pumps can be selected in VX (extended range operation) or VL (standard range operation). These units deliver heated or chilled water from the same compact machine. Electromechanical controls with a compressor control module are standard. For units used with an automation control system, a microprocessor controlled unit can be selected. An external unit-mounted fault indicator light is standard. The cabinet is fully insulated and constructed of heavy gauge galvanized steel with a corrosion resistant polyester powder coat paint finish. Enhanced heat exchangers (copper or optional cupronickel), along with Scroll compressors provide high efficiency performance.

Versatec Series water-to-water units are safety listed with ETL.

As a leader in the industry, WaterFurnace is dedicated to innovation, quality and customer satisfaction. In fact, every unit built is exposed to a wide range of quality control procedures throughout the assembly process and is then subjected to a rigorous battery of computerized run tests to certify that it meets or exceeds performance standards for efficiency and safety, and will perform flawlessly at startup. As further affirmation of our quality standards, each unit carries our exclusive Quality Assurance emblem, signed by the final test technician.

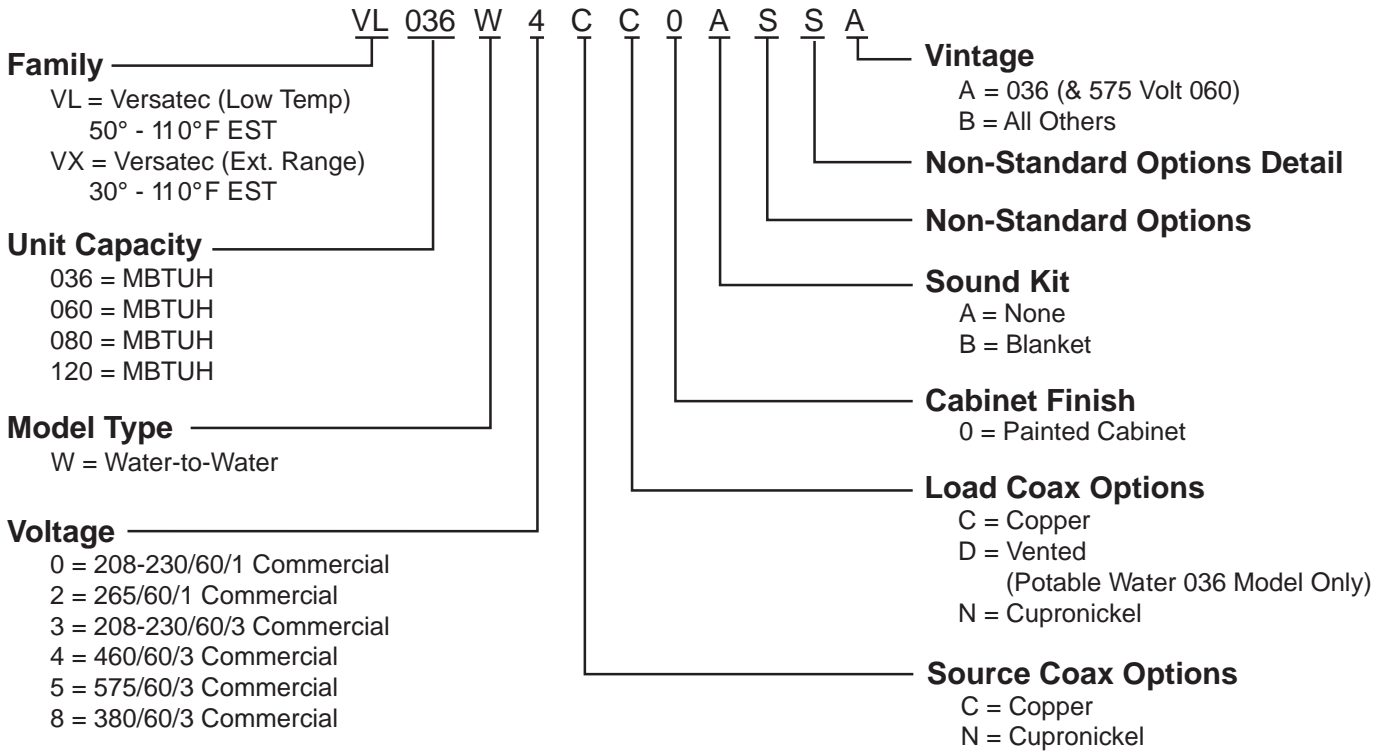
WaterFurnace International's corporate headquarters and manufacturing facility is located in Fort Wayne, IN. A scenic three-acre pond located in front of the building serves as our geothermal heating and cooling source to comfort-condition our 110,000 square feet of manufacturing and office space. As a pioneer, and now a leader in the industry, the team of WaterFurnace engineers, customer support staff and skilled assembly technicians is dedicated to providing the finest comfort systems available.

High efficiency, performance, flexibility, reliability and control are the hallmarks of the Versatec water-to-water heat pumps from WaterFurnace. By choosing or specifying WaterFurnace Versatec products, you can be assured that your customer is investing in a product that's truly "Smarter from the Ground Up".

Table of Contents

Model Nomenclature	4
Design Features	5
Physical Dimensions	6
Physical Data	6
Electrical Data	7
Applications	8-13
Unit Selection Calculations	14-16
Reference Calculations	17
Legend & Notes	17
Capacity Data	18-25
Wiring Schematics	26-28
Engineering Guide Specifications	29
Accessories and Other Options	30

Model Nomenclature



Design Features

Flexibility

- VX models designed to operate with entering source water temperatures of 30°F to 110°F
- VL models designed to operate with entering source water temperatures of 50°F to 110°F
- Source side flow rates as low as 1.5 gpm/ton for well water (50°F min. EWT)
- Heated or chilled water from the same machine
- Modularized design for optimum capacity matching and staging
- Stackable for space conservation
- Compact size allows passage through 36" wide doors
- Fast response lessens system changeover time on two-pipe fan-coil systems
- Replacement for low efficiency water-cooled chillers
- Replacement for electric boilers
- Used for tempering of outside air

Efficiency

- High cooling EERs
- High heating COPs

Quality

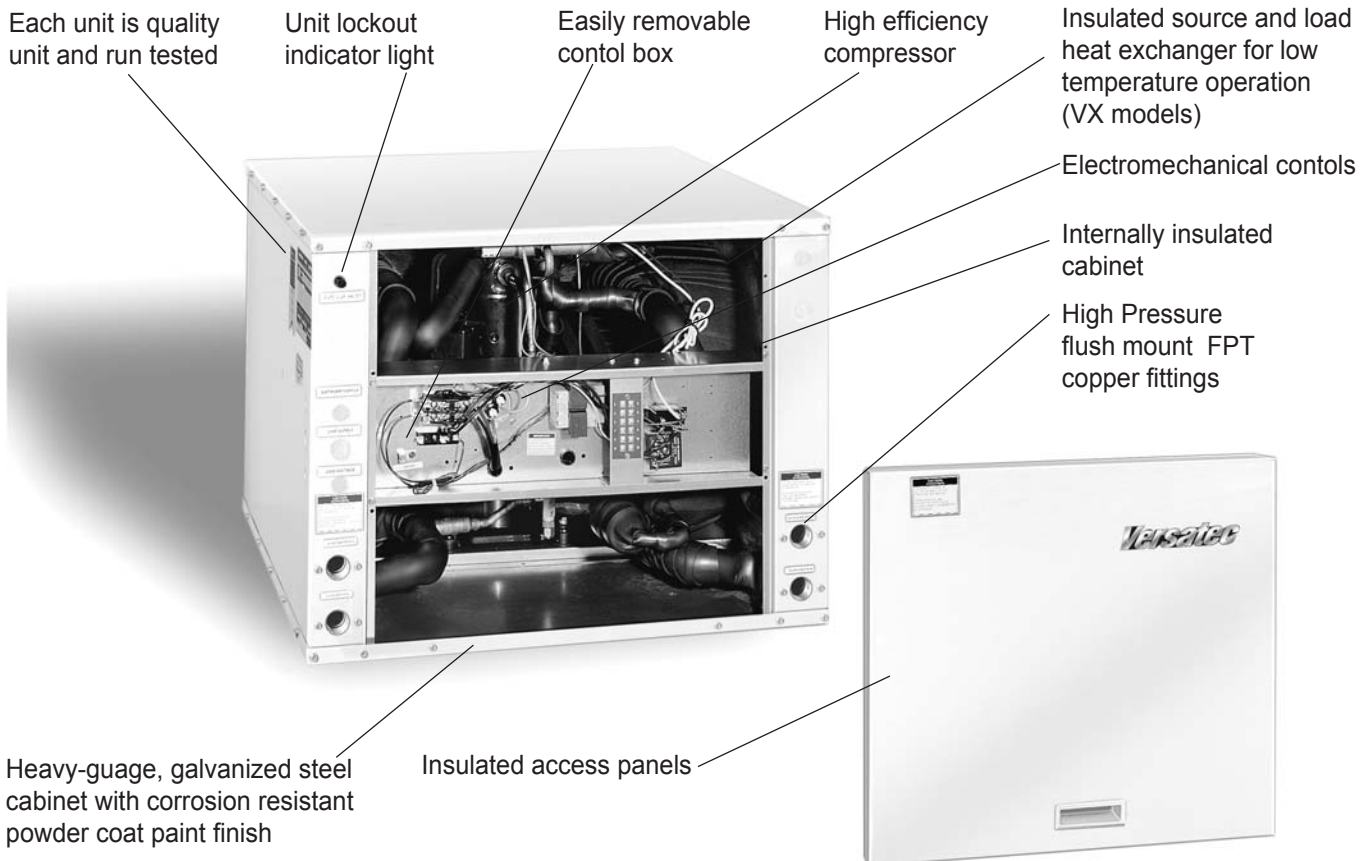
- Long-life hermetic scroll compressors
- Bidirectional thermostatic expansion valve
- Heavy duty FPT flush mounted liquid fittings
- Insulated components to prevent sweating (VX series only)
- Environmentally-friendly HCFC 22
- Compressor control module with integral lockout relay circuit and anti-short cycle relay
- Liquid line filter-dryer
- 24 VAC-75 VA controls transformer with circuit breaker

Options

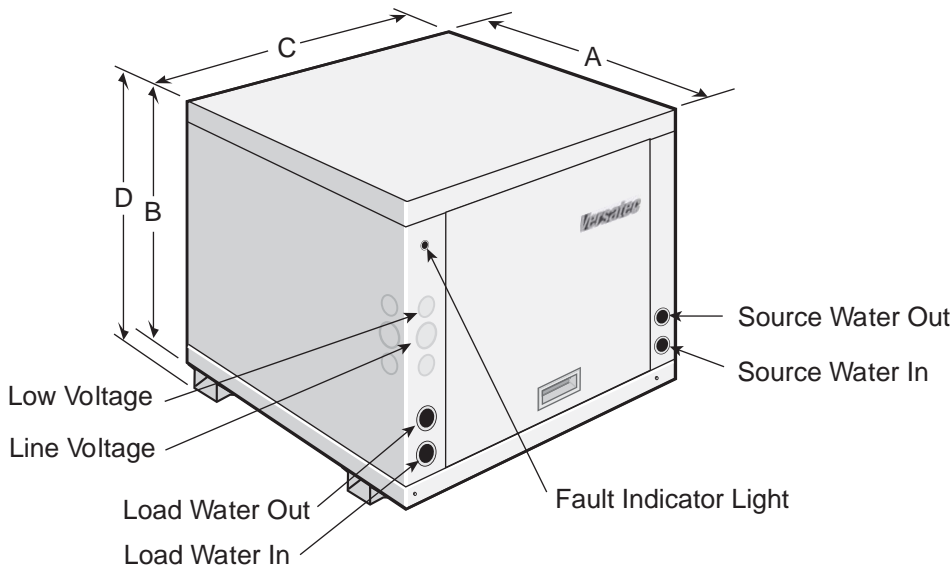
- Microprocessor controls (special option)
- 90/10 cupronickel coax for load and/or source
- Sound attenuation package
- Double wall vented load coax for potable water (036 only)

Accessories (Field Installed)

- ARI 320 tower/boiler loop control panel
- Earth loop pump kit
- Solenoid Valve



Physical Dimensions



MODEL	A	B	C	D	Water Connections	
					Load	Source
V036W	30.5 [77.5]	23.5 [59.7]	30.5 [77.5]	- -	0.75 [1.9]	0.75 [1.9]
V060W	30.5 [77.5]	23.5 [59.7]	30.5 [77.5]	- -	1 [2.54]	1 [2.54]
V080W	30 [76.2]	23.5 [59.7]	37.75 [95.9]	24.25 [61.6]	1.25 [3.2]	1.25 [3.2]
V120W	30 [76.2]	23.5 [59.7]	37.75 [95.9]	24.25 [61.6]	1.25 [3.2]	1.25 [3.2]

Notes: Dimensions are in inches [cm] .
All water connections FPT.

Rev. 11/23/05

Physical Data

Model	V036W	V060W	V080W	V120W
Compressor	Scroll	Scroll	Scroll	Scroll
Ref. Charge - R22 (oz.)	49.0 [1.39]	84.0 [2.38]	120.0 [3.4]	170.0 [4.82]
Unit Weight (lbs.)	244.0 [110.7]	275.0 [124.7]	445.0 [201.8]	460.0 [208.7]

Notes: Ref. Charge-- Ounces, [kg]
Unit Weight-- Pounds, [kg]

Rev. 11/23/05

Electrical Data

Model	Voltage Code	Rated Voltage	Voltage Min/Max	Compressor				Total Unit FLA	Min Circ Amp	Max Fuse/HACR
				Qty	MCC	RLA	LRA			
VL/VX 036W	1	208-230/60/1	197/254	1	21.0	15.0	72.5	13.5	18.8	30
	2	265/60/1	239/292	1	18.0	11.5	61.0	11.5	14.4	25
	3	208-230/60/3	197/254	1	14.0	9.0	63.0	9.0	11.2	20
	4	460/60/3	414/506	1	7.0	4.5	31.0	4.5	5.6	10
VL/VX 060W	1	208-230/60/1	197/254	1	31.0	19.9	137.0	19.9	24.8	40
	3	208-230/60/3	197/254	1	23.0	14.7	91.0	14.7	18.4	30
	4	460/60/3	414/506	1	11.0	7.1	50.0	7.1	8.8	15
	5	575/60/3	518/633	1	8.0	5.1	37.0	5.1	6.4	10
VL/VX 080W	3	208-230/60/3	197/254	1	29.5	18.9	146.0	18.9	23.6	40
	8	380/60/3	342/418	1	17.9	11.5	88.4	11.5	14.4	25
	4	460/60/3	414/506	1	14.8	9.5	73.0	9.5	11.9	20
	5	575/60/3	518/633	1	11.8	7.6	58.4	7.6	9.5	15
VL/VX 120W	3	208-230/60/3	197/254	1	47.0	30.1	225.0	30.1	37.7	60
	8	380/60/3	342/418	1	26.0	16.6	140.0	16.6	20.1	35
	4	460/60/3	414/506	1	24.2	15.5	114.0	15.5	19.4	30
	5	575/60/3	518/633	1	18.9	12.1	80.0	12.1	15.1	25

Notes: All fuses type "D" time delay (or HACR circuit breaker in USA)

Rev. 08/06

Applications

Heating with hot water is versatile because there are many ways of distributing the heat through the building. The options range from heavy cast iron radiators seen in older buildings to modern, baseboard-style convection radiation, and from invisible radiant floor heating to forced air systems using fan coil units.

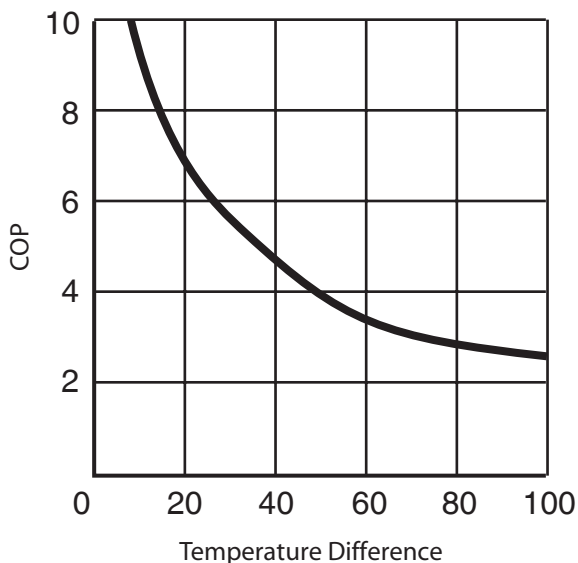
A boiler is often used to make domestic hot water and to heat swimming pools or hot tubs.

The various distribution systems have all been used successfully with a geothermal heat pump system. When designing or retrofitting an existing hydronic heating system, however, the water temperature produced by the heat pump is a major consideration.

Heat pumps using R-22 refrigerant are not designed to produce water above 130°F. The efficiency decreases as the temperature difference (ΔT) between the heat load (generally the earth loop) and the supply water (to the distribution system) increases. Figure 1 illustrates the effect of source and load temperatures on the system. The heating capacity of the heat pump also decreases as the temperature difference increases.

When using the various types of hydronic heat distribution systems, the temperature limits of the geothermal system must be considered. In new construction, the distribution system can easily be designed with the temperature limits in mind. In retrofits, care must be taken to address the operating temperature limits of the existing distribution system.

Figure 1: As the ΔT increases, the Coefficient of Performance (COP) decreases. When the system produces 130° F water from a 30° F earth loop, the ΔT is 100° F, and the COP is approximately 2.5. If the system is producing water at 90° F, the ΔT is 60° F and the COP rises to about 3.8, an increase of over 50%.



Baseboard Radiation

In existing systems, baseboard radiation is typically designed to operate with 160° to 240°F water or steam. Baseboard units are typically copper pipe with aluminum fins along the length of the pipe, as shown in Figure 2. A decorative cover is normally fitted over the fin tube.

The operation of a baseboard radiation system depends on setting up a convection current in the room: air is warmed by the fin tube, rises and is displaced by cool air.

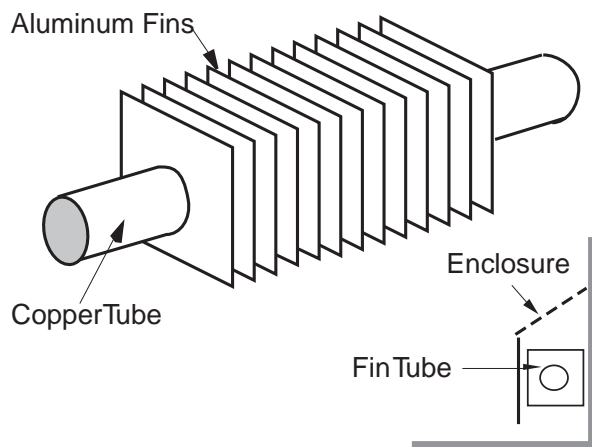
The heating capacity of a baseboard system is a factor of the area of copper tube and fins exposed to the air and the temperature difference between the air and the fin tube. The velocity and volume of water flowing through the baseboard affects the temperature of the copper and fins. Baseboard units are normally rated in heat output/length of baseboard at a standard water temperature and flow. Manufacturers can provide charts which will give the capacities at temperatures and flows below the standard. Figure 3 shows approximate heating capacities for fin tube radiation using water from 100 to 130°F water.

Baseboards are available using two or three fin tubes tiered above one another in the same cabinet. With the additional surface area, the air can be heated enough to set up a convection current with water temperatures as low as 110° to 130°F (see Figure 3).

It is important to ensure that the heat output of the system is adequate to meet the heat loss of the room or building at the temperatures the geothermal system is capable of producing.

Baseboard radiation is limited to space heating. Cooling is typically provided by a separate, forced air distribution system.

Figure 2: Baseboard radiators are typically constructed of copper tube with closely spaced aluminum fins attached to provide more surface area to dissipate heat. Some of the factors affecting the amount of heat given off by fin tube radiators are the water temperature, water velocity, air temperature, and fin spacing and size.



Applications (cont.)

The heating capacity (Btuh/linear foot) of baseboard radiators drop as the water temperature is reduced. The heating capacity of most baseboard radiators is rated using 200°F water, 65°F air temperature. Listed in Figure 3 is the range of heating capacities of baseboard radiators at the standard temperatures and the range of capacities when the temperatures are reduced to the operating range of a heat pump system. Some of the factors that affect the capacity of a radiator are:

- Size of the fins - range from 2.75" x 3" to 4" x 4"
- Fin spacing - 24 to 48/foot
- Diameter of copper tube - range from .75" to 2"
- Fin material - aluminum or steel
- Configuration and height of the enclosure
- Height unit is mounted from the floor
- Water flow through the radiator

Generally, the smaller fins with fewer fins/foot will have lower heating capacity. Larger copper tube diameter and aluminum fins will have a higher capacity. Higher water flow will increase capacity. Adding a second fin tube to the same enclosure will increase the capacity by 50 to 60%. Adding two fin tubes will increase the capacity by 75 to 80%.

Figure 3: Heating output per linear foot

Average Water Temp.	Entering Air Temperatures		
	55° F	65° F	70° F
110° F	190-380	160-320	150-300
120° F	240-480	205-410	195-390
130° F	295-590	265-532	245-490

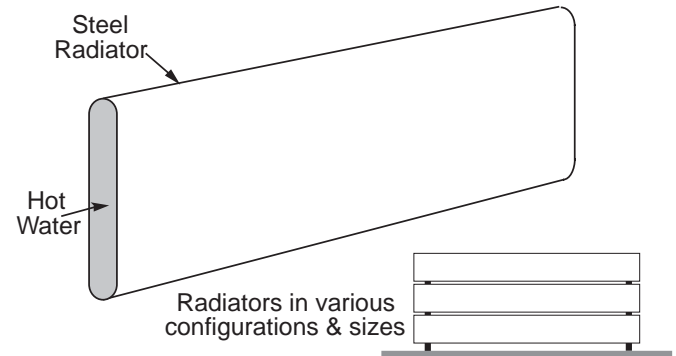
Cast Iron Radiation

Retrofit applications for hydronic/geothermal heat pump systems are often required to work with existing cast iron radiators or their replacements (see Figure 4). Typically, cast iron radiator systems operate with water temperatures of 125° to 160°F.

These temperatures are higher than geothermal water-to-water heat pumps are capable of providing. Cast iron radiators can work with geothermal systems, provided the heat output of the radiators will meet the maximum heat loss of the building at the lower temperatures.

If the insulation of the building has been upgraded since the original installation, it is possible that the lower temperatures will be able to meet the reduced heat loss of the building.

Figure 4: Baseboard System



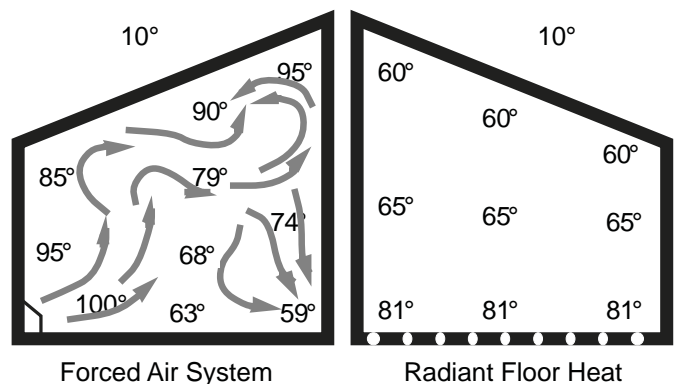
Radiant Floor Heating

Radiant floor heating has been the system of choice in many parts of Europe for some time. Manufacturers have developed tubing designed for installation in concrete floors and raised wood floors.

Floor heating systems have several benefits in residential, commercial and industrial heating applications. In a building with a radiant floor heating system, the entire floor acts as a heat source for the room. People feel comfortable with lower air temperatures if their feet are warm. Typically the space will feel comfortable with air temperatures as low as 65°F. Since the heat loss of a building is directly related to the temperature difference (ΔT) between the inside and outside, a lower ΔT means the heat loss is lower.

Air temperatures in a room with a forced air heating system tend to be warmer nearer to the ceiling than the floor (see Figure 5). The hot air rises and creates a greater pressure imbalance between the inside and outside. The infiltration increases, resulting in a higher heat loss. Air temperatures in a room with radiant floor heating tend to be warmer at the floor than the ceiling, helping to cut down on infiltration in the building. The energy savings in a building with radiant floor heating can range from 10 to 20%.

Figure 5: Temperature Comparison



Applications (cont.)

A floor heat system can be designed to heat a building with water temperatures as low as 90°F.

Figure 1 shows how a geothermal system operates more efficiently with a lower ΔT between the source and the load. With only a 60°F temperature difference, a geothermal heat pump will operate at COPs over 4, about 20% higher than a forced air geothermal system in the same installation.

Some of the factors affecting the heating capacity of a floor heating system are as follows:

- The type of finish flooring
- The spacing of the pipe
- The water flow through the pipe
- The temperature of the supply water
- The floor material (wood, concrete or poured Gypcrete™)
- Insulation value under the floor
- The piping layout

The spacing of the pipe in residential applications can vary from 4" to 12". If the spacing is too large, the temperature of the floor can vary noticeably. In industrial applications, variation in the floor temperature is not as important, and the spacing is related directly to the heat output required.

Radiant floor heating systems work well with geothermal heat pump systems. For efficient operation, the system must be designed with the lowest possible water temperatures.

There are some drawbacks with a radiant floor heating system. Air conditioning is only possible by adding a second system using forced air. This can add substantial cost to an installation where air conditioning is also needed. A separate air handling system is needed to clean the air or to introduce fresh air.

Industrial buildings, especially those with high ceilings and large overhead doors, have an advantage with a radiant floor heating system. Heat is stored in the concrete floor, and when a door is opened, the stored heat is immediately released to the space. The larger the ΔT between the air in the space and the floor, the quicker the floor releases its heat to the space.

Maintenance garages benefit from radiant floor heating systems. Cold vehicles brought into the garage are warmed from underneath. The snow melts off the vehicle and dries much more quickly than when heated from above.

Some pipe manufacturers include an oxygen diffusion barrier in the pipe to prevent oxygen diffusion through the pipe. Good system design and careful installation, however, will eliminate virtually all of the problems encountered with air in the system. Like earth loop design, it is important to design the system to facilitate flushing the air initially and ensuring that the flows can be balanced properly.

Fan Coil Units & Air Handlers

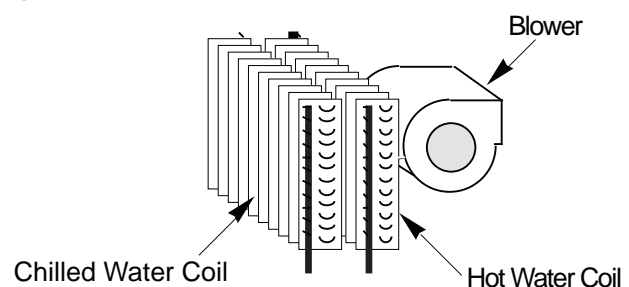
Fan coil units, air handlers, force flow units, etc. are all basically a hot water radiator or coil (usually copper piping with aluminum fins) with a fan or blower to move the air over the coil (see Figure 6). The term "fan coil units" typically applies to smaller units that are installed in the zone or area in which heating (or cooling) is needed. They are available in many different configurations, sizes and capacities. Fan coil units are designed to be connected to a ductwork system and can be used to replace a forced air furnace. Other units are designed for use without ductwork and are mounted in a suspended ceiling space with only a grill showing in place of a ceiling tile. Some can be mounted on a wall under a window, projecting 8" to 10" into the room or even flush to the wall surface, mounted between wall studs. Some are available with or without finished, decorative cabinets. For industrial applications, inexpensive "unit heaters" are available, with only a coil and an axial fan. Fan coil units and unit heaters are normally available with air handling capacities of 200 to 2,000 cfm.

The term "air handler" normally applies to larger units, mounted in mechanical rooms, mechanical crawl spaces or rooftops. They typically have an air handling capacity of over 2,000 cfm and are available for capacities of up to 50,000 cfm. Air handlers are typically built for a specific installation and are available with many different types of heating and cooling coils. They can include additional coils for heating make-up air, dehumidification and exhaust air heat recovery.

Fan coils and air handlers typically have one or two coils and a blower. Air is heated by hot water circulated through the hot water coil. Chilled water is circulated through the coil if air conditioning is needed. Blowers can be provided to fit various applications, with or without ductwork. Unit heaters typically use axial fans in applications where ductwork is not needed.

Fan coil units and air handlers are used in many different applications. They have been used to heat buildings using water temperatures as low as 90° to 100°F. New systems can be designed to operate very efficiently with a geothermal system.

Figure 6: Fan Coils



Applications (cont.)

Cooling with a Hydronic System

Cooling a building with an existing radiant hydronic heating system can be a challenge. If baseboard, cast iron radiators or a radiant floor heating system is cooled lower than the dew point, condensation will form on the floor or drip off the radiators.

There is generally minimal ductwork for ventilation or no ductwork in existing buildings with radiant hydronic heat. Typically, cooling is provided with separate units where it is needed. This is often done using through-the-wall or window air conditioners, ductless split air conditioning units, or rooftop units.

A water-to-water heat pump system can provide water to ducted or unducted fan coil units. The system can provide chilled water to cool the building, as well as hot water for the heating system when needed.

A limited amount of cooling can be done by circulating chilled water through the piping in the floor. This can be effective in buildings with high solar loads or lighting loads, where much of the heat gain is radiant heat being absorbed by the floor. Cooling fresh air used for ventilation as it is brought into the building, using a chilled water coil, can sometimes provide the additional cooling needed. Care must be taken to avoid cooling the floor below the dew point because condensation may form on the floor.

Buildings with fan coil units and air handlers can generally be easily retrofitted for cooling. Often it is simply a matter of adding a cooling coil to the existing air handlers and fan coil units. Water-to-water heat pumps can provide hot water for the heating coils as well as chilled water for the air conditioning.

Integrated Systems

In large buildings, there are often simultaneous heating and cooling demands. Internal gains from the occupants, the lighting, or large solar gains will require cooling when outdoor temperatures are below freezing. At the same time, the perimeter areas may need to be heated.

In buildings with fairly balanced heating and cooling loads, a hydronic/geothermal system can provide a significant efficiency advantage. When a heat pump is making hot water, it will take heat from the building when cooling is needed. When cooling is not needed, heat will be taken from the earth loop.

While cooling, heat is rejected directly into another part of the building making the heat virtually free. If it can't be used, it is stored in the ground loop. Figures 7, 8 and 9 show the basic mechanical layout of an integrated system.

In a retrofit situation when replacing a conventional boiler, care must be taken to ensure that any air handlers or fan coil units in the building will heat the building with water temperatures below 130°F.

Figure 7: Hydronic System - heating and cooling

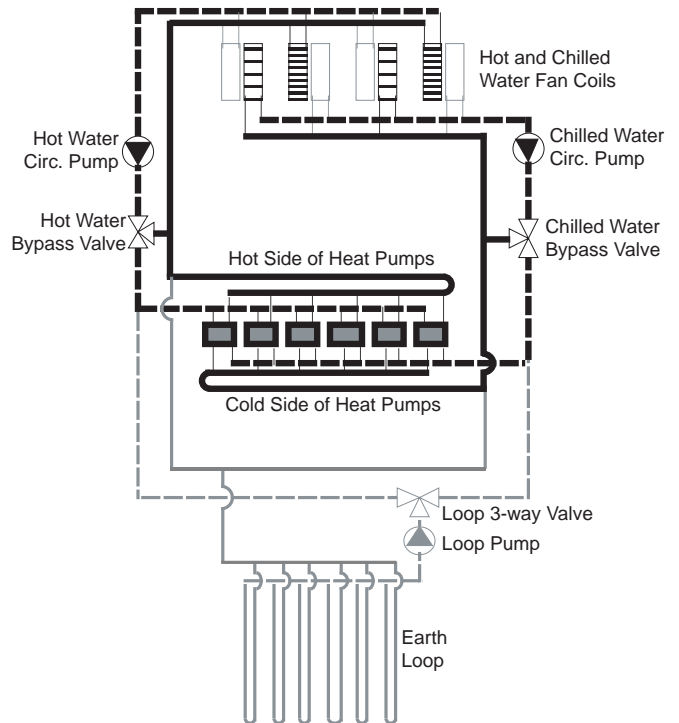
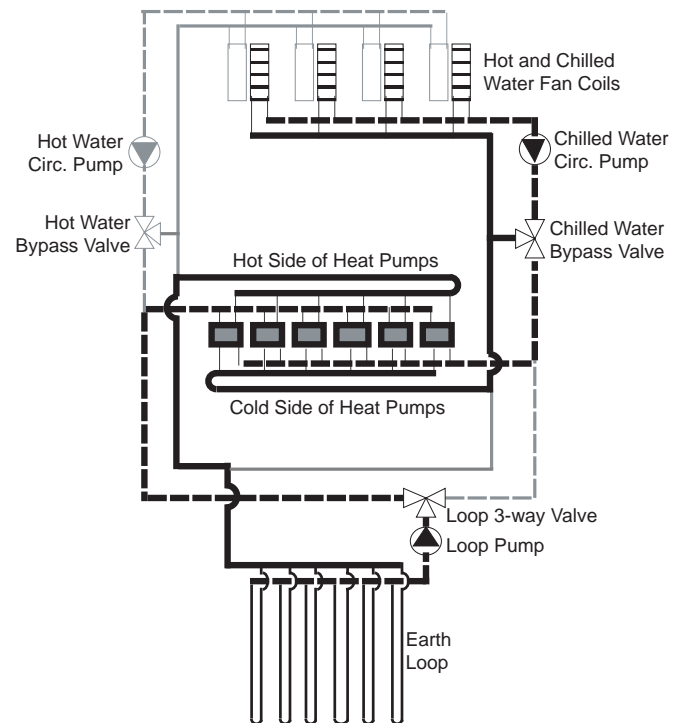


Figure 8: Hydronic System - cooling only

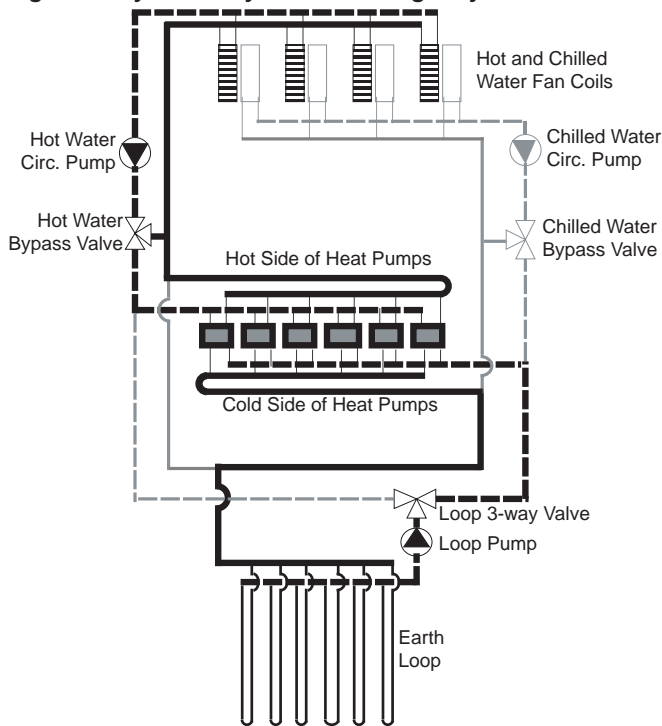


Applications (cont.)

When heating and cooling are needed simultaneously, the heat pumps are making chilled water for the cooling coils and are rejecting the heat into hot water circulated through the heating coils. The ground loop is not used. One compressor is providing both heating and cooling. The effective COP while heating and cooling simultaneously is approximately 7.5 to 8 because heat is a by-product of cooling, and chilled water is by-product of heating.

When heating is not needed, heat is rejected to the ground loop. When cooling and rejecting heat into the loop, the system operates at a COP of about 4.5 (EER of 15.4).

Figure 9: Hydronic System - Heating only



Thermal Storage

Hydronic/geothermal systems lend themselves to thermal storage systems. Thermal storage can be especially effective when used with an integrated system as described in the previous section.

A building can use a system that operates water-to-water heat pumps during the night to heat the building. The primary heat source is an ice storage system. While the heat pumps are heating the building, they are building ice. The following day, the ice is used to chill water to air condition the building.

When ice is built up, the heat pumps can still heat the building using an earth loop as the heat source. It is also possible to use the earth loop to absorb heat from the building during peak air conditioning periods, if necessary.

This allows the use of lower, nighttime electric power rates to heat the building. The air conditioning for the building is accomplished using only pumps to circulate water and move the air. The compressors do not run during the day when the power rates are much higher.

When cooling is not needed, the heat source for the system is the ground loop. With a 40°F loop temperature, the system will operate at a COP of approximately 3.5.

The efficiency of a system depends on how well the different components work together. The distribution system must be designed to heat and cool the building comfortably. The components must then all be controlled efficiently.

Controls

The control of a mechanical system determines how it functions. For the building to work efficiently and comfortably, the building owner or manager must understand what the system is doing and how to control it.

As Figure 1 shows, the efficiency of a heat pump is a factor of the difference in temperature between the source and the load. The heat loss or heat gain of a building varies with the weather and the use of the building. As the outdoor temperature decreases, the heat loss of the building increases. When the ventilation system is started up, the heating or cooling loads increase. As the occupancy increases, lighting or the solar gain increases, and the cooling load increases. At times the building may require virtually no heating or cooling.

With hydronic heating and cooling distribution equipment, whether it is baseboard radiation, fan coil units or radiant floor heating, the output of the equipment is directly related to the temperature and velocity of the water flowing through it. Baseboard radiation puts out approximately 50% less heat with 110° F water than with 130° F water. The same is true with fan coil units and radiant floor heating.

If a system is designed to meet the maximum heat loss of a building with 130°F water, it follows that if the heat loss is 50% lower when the outdoor temperature is higher and the building has high internal gains because of lighting and occupancy, the lower heat loss can be met with 110° F water. This greatly increases the COP of the heat pumps.

The same control strategy is equally effective in cooling. During peak loads, water chilled to 40° F may be needed; at other times 55° F water will provide adequate cooling. Significant increases in the EER can be achieved. Latent loads must always be considered when using warmer water.

Applications (cont.)

Piping Design

A significant portion of the operating cost of a heating system is the energy to get the heat where it is needed. The cost of operating pumps and fans must always be considered in the design phase. The operating cost of circulation pumps for the earth loop side of a heat pump system can be 15% to 25% of the total system operating cost.

The sizing of the supply and return lines from the boiler to the distribution systems are a major factor in determining the pump horsepower. The effect of pipe sizing can be seen in Figure 10.

Figure 10: Pressure Drop Data

	40' PD	60' PD
Heat Dist. Pump	2 hp	3 hp
Earth Loop Pump	3 hp	5 hp
Heat Pumps	50 hp	50 hp
Total hp	55 hp	58 hp

Designing the indoor piping system and the earth loop with a pressure drop of 40' to 60' of head has a significant effect on the effect on the operating cost. A typical 50-ton hydronic/geothermal system would require a flow of approximately 100 gpm for the heat distribution and 150 gpm for the loop. An increase in the pressure drop from 40' to 60' adds 3 hp to the pumps, an increase of 5.5%.

Variable-Speed Pumping

In a large building there are few times when heating or cooling is needed in the entire building. In systems with numerous heating (or cooling) zones, several zones may not require heating or air conditioning.

The total amount of heating (or cooling) delivered to the building is a factor of the amount of heated or chilled water delivered to the distribution system (fan coil units, air handlers, baseboard and cast iron radiators, radiant floor heating etc.)

If the amount of heated or chilled water pumped is reduced by lowering flow to areas that do not require conditioning, the pumping horsepower can be reduced significantly.

A variable speed pumping system installed on the earth loop of the geothermal system at the WaterFurnace factory in Fort Wayne, Indiana, reduced the heating and air conditioning costs by approximately 20% annually. The variable speed pumping system affects only the cost of circulating the liquid through the earth loop.

Using variable speed pumping on both the loop side and the distribution side of a hydronic/geothermal system would have an even greater effect on the total operating costs.

Unit Selection Calculations

Example #1: Selecting a single unit to heat and/or cool

A) Determine System Design Conditions:

1. The “source” (heat source/heat sink) side: This could be an earth loop, boiler/tower loop, well water, process water, condenser water, etc. The source liquid can be 30°F to 110°F entering the unit (VX models).
2. The “load” side: This could be a water coil(s) in an air handler unit(s), a fan coil unit(s), hydronic baseboard, in-slab piping, swimming pool, etc. The load liquid can be 30°F to 120°F entering the unit.
3. The load side of multiple units can be plumbed together in either parallel or series style to accomplish certain tasks.
 - a. Always use parallel flow for the source sides.
 - b. Use parallel flow for the load sides with the following needs:
 - Heating and/or cooling capacity greater than the largest single unit can provide.
 - To do staging of capacity.
 - To reduce the pressure drop through the load side of the units, even when a single unit might meet capacity.
 - c. Use series flow for the load sides with the following needs:
 - Leaving liquid temperature (LLT) greater than a single unit can produce on cooling. However, do not drop the entering liquid temperature (ELT) of any unit below 30°F.

B) Unit Selection Parameters:

	Load Side		Source Side	
	Heat	Cool	Heat	Cool
Entering Water (liquid) Temp.	110°F ELT	50°F ELT	50°F EST	80°F EST
Water (liquid) Flow Rate*	8.0 GPM	11.0 GPM	8.0 GPM	8.0 GPM
Water (liquid) Pressure Drop	12.0 ft hd	12.0 ft hd	7.0 ft hd	7.0 ft hd
Unit Electrical	230/1/60			
Coax Material	Cupronickel		Copper	

Notes: *As low as 1.5 GPM/ton for constant temperature liquid like well water that is in the 45°F to 60°F range to as high as 3.0 GPM/ton for variable temperature liquid.

C) Determine Unit Requirements:

	Load Side			Source Side	
	TC/HC	ELT	GPM	EST	GPM
Cooling	43,000 3.6 tons	50°F	11	80°F	8
Heating	54,000 4.5 tons	110°F	8	50°F	8

D) Initial Selection:

Refer to the performance data tables (pages 18-25) and select possible units.

Unit possibility #1: V060W 5 ton unit (pages 20 and 21) - using interpolation

	Load Side								Source Side			
	ELT	GPM	PD (ft hd)	TC/HC	KW	HR/HE	EER/COP	LLT	EST	GPM	PD	LST
Cooling	50	11.0	11.2	43,900	2.91	53,800	15.1	41.80	70	8.0	6.70	83.90
	50	11.0	11.2	42,600	3.24	53,650	13.4	42.05	80	8.0	6.25	93.85
	50	11.0	11.2	41,300	3.56	53,500	11.6	42.03	90	8.0	5.80	103.8
Heating	100	8.0	5.20	54,500	4.28	39,900	3.7	113.7	50	8.0	7.50	40.00
	110	8.0	5.05	54,350	4.77	38,050	3.4	123.6	50	8.0	7.50	40.45
	120	8.0	4.90	54,200	5.26	36,200	3.0	133.5	50	8.0	7.50	40.90

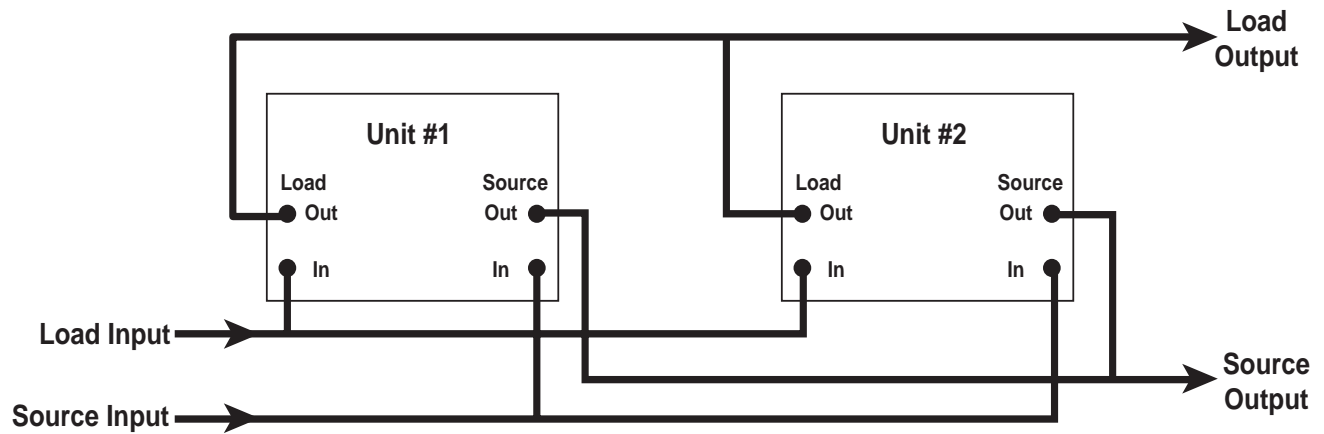
E) Final Results:

VX060W (Refer to Model Nomenclature on page 4.) Total Cooling Capacity (TC) = 42,600 BTUH (within 1% of needed capacity). Total Heating Capacity (HC) = 54,350 BTUH. Since the LLT/LST are above freezing, no antifreeze is required.

Unit Selection Calculations (cont.)

Example #2: Selecting multiple units to accomplish a heating and/or cooling task by piping the load sides in parallel flow

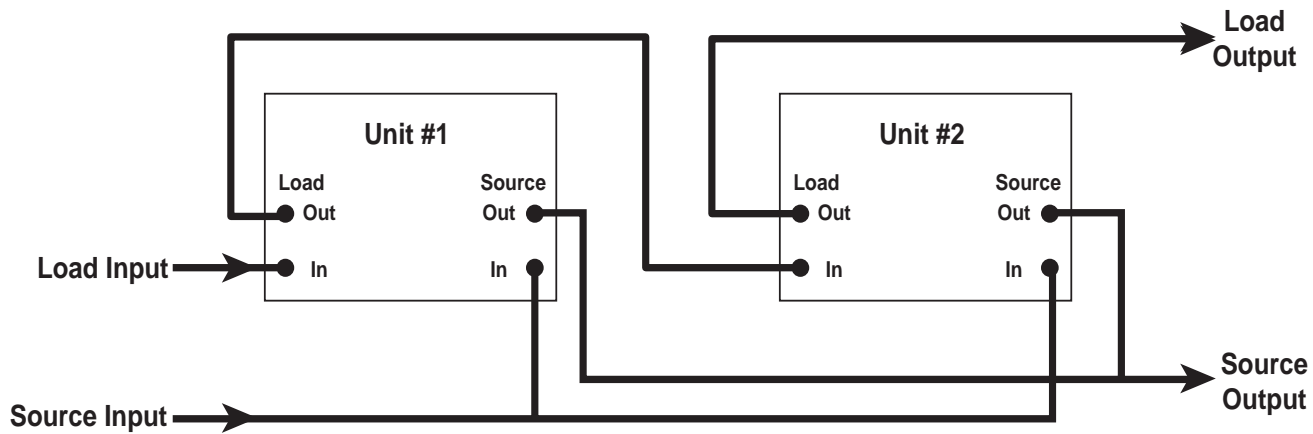
By adding together the capacities of two units, increased capacities can be met, while the overall system pumping pressure drop is lowered, perhaps lowering the pump horsepower. In addition, by cycling one unit, capacity reduction can be accomplished.



Unit Selection Calculations (cont.)

Example #3: Selecting multiple units to accomplish a cooling task by piping the load sides in series flow

This arrangement satisfies the requirement of achieving a 20°F drop in load liquid temperature. By piping the load sides in series, the LLT of the first unit becomes the ELT of the second unit. The overall system pumping pressure drop is increased and therefore requires increased pump horsepower. If at anytime, a 10°F drop would satisfy process requirements, one unit could be cycled off, but the pumping penalty would still remain.



Reference Calculations

Heating Calculations:

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

Cooling Calculations:

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

Legends and Notes

ELT = entering load fluid temperature to heat pump
 SWPD = source coax water pressure drop
 LLT = leaving load fluid temperature from heat pump
 PSI = pressure drop in pounds per square inch
 LGPM = load flow in gallons per minute
 FT HD = pressure drop in feet of head
 LWPD = load coax water pressure drop
 LWT = leaving water temperature
 EWT = entering water temperature

kW = kilowatts
 EST = entering source fluid temperature to heat pump
 HE = heat extracted in MBTUH
 LST = leaving source fluid temperature from heat pump
 HC = total heating capacity in MBTUH
 COP = coefficient of performance, heating [HC/(kW x 3.413)]
 EER = energy efficiency ratio, cooling
 TC = total cooling capacity in MBTUH
 HR = heat rejected in MBTUH

VO36W

Heating Capacity Data

ELT °F	EST °F	LOAD FLOW			SOURCE FLOW - 5 GPM							SOURCE FLOW - 7 GPM							SOURCE FLOW - 9 GPM									
		Flow GPM	PD		LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	Source PD		LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	Source PD		LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	Source PD	
			PSI	FT HD							PSI	FT HD							PSI	FT HD							PSI	FT HD
60	30	5.0	1.6	3.7	69.5	23.1	1.53	17.9	4.4	22.8	1.7	3.9	69.9	23.8	1.53	18.6	4.6	24.1	3.5	8.1	70.4	24.5	1.52	19.4	4.7	25.4	5.3	12.2
		7.0	3.7	8.5	67.4	23.0	1.49	17.9	4.5	22.8	1.7	3.9	67.8	23.7	1.49	18.6	4.7	24.1	3.5	8.1	68.1	24.4	1.49	19.3	4.8	25.4	5.3	12.2
		9.0	5.1	11.8	65.4	22.9	1.45	17.9	4.6	22.8	1.7	3.9	65.6	23.5	1.45	18.6	4.8	24.1	3.5	8.1	65.8	24.2	1.45	19.2	4.9	25.4	5.3	12.2
	50	5.0	1.6	3.7	72.9	31.1	1.59	25.7	5.7	39.3	1.6	3.7	73.3	32.2	1.58	26.8	6.0	41.4	3.4	7.9	73.7	33.3	1.58	27.9	6.2	43.5	5.2	12.0
		7.0	3.7	8.5	70.1	31.1	1.53	25.8	5.9	39.3	1.6	3.7	70.4	32.2	1.53	26.9	6.1	41.4	3.4	7.9	70.8	33.3	1.53	28.0	6.4	43.5	5.2	12.0
		9.0	5.1	11.8	67.3	31.0	1.48	26.0	6.1	39.3	1.6	3.7	67.5	32.1	1.48	27.1	6.3	41.4	3.4	7.9	67.8	33.2	1.48	28.2	6.6	43.4	5.2	12.0
	70	5.0	1.6	3.7	75.9	39.1	1.64	33.5	7.0	55.9	1.6	3.7	76.4	40.6	1.64	35.0	7.2	58.7	3.3	7.6	77.0	42.0	1.64	36.4	7.5	61.6	5.0	11.6
		7.0	3.7	8.5	72.5	39.1	1.58	33.8	7.3	55.8	1.6	3.7	73.0	40.7	1.59	35.2	7.5	58.7	3.3	7.6	73.4	42.2	1.59	36.7	7.8	61.5	5.0	11.6
		9.0	5.1	11.8	69.2	39.2	1.52	34.0	7.6	55.7	1.6	3.7	69.5	40.8	1.53	35.5	7.8	58.6	3.3	7.6	69.9	42.3	1.55	37.1	8.0	61.5	5.0	11.6
	90	5.0	1.6	3.7	78.8	47.1	1.70	41.3	8.1	72.5	1.5	3.5	79.6	48.9	1.70	43.1	8.4	76.1	3.2	7.4	80.3	50.8	1.70	45.0	8.7	79.6	4.9	11.3
		7.0	3.7	8.5	74.9	47.2	1.63	41.7	8.5	72.3	1.5	3.5	75.5	49.2	1.63	43.6	8.8	76.0	3.2	7.4	76.1	51.1	1.63	45.5	9.2	79.6	4.9	11.3
		9.0	5.1	11.8	71.0	47.4	1.56	42.1	8.9	72.2	1.5	3.5	71.5	49.4	1.56	44.1	9.3	75.9	3.2	7.4	71.9	51.4	1.56	46.1	9.7	79.5	4.9	11.3
110																												
80	30	5.0	1.5	3.5	89.6	23.0	1.90	16.5	3.5	23.5	1.7	3.9	89.9	23.6	1.90	17.1	3.6	24.7	3.5	8.1	90.1	24.2	1.90	17.7	3.7	25.9	5.3	12.2
		7.0	3.3	7.6	87.5	22.9	1.85	16.6	3.6	23.5	1.7	3.9	87.7	23.5	1.85	17.2	3.7	24.7	3.5	8.1	87.8	24.1	1.86	17.8	3.8	25.9	5.3	12.2
		9.0	5.0	11.6	85.3	22.8	1.80	16.7	3.7	23.5	1.7	3.9	85.5	23.4	1.81	17.2	3.8	24.7	3.5	8.1	85.6	24.0	1.81	17.8	3.9	25.9	5.3	12.2
	50	5.0	1.5	3.5	92.6	30.7	1.97	24.0	4.6	40.3	1.6	3.7	93.0	31.7	1.97	24.9	4.7	42.2	3.4	7.9	93.4	32.6	1.98	25.9	4.8	44.0	5.2	12.0
		7.0	3.3	7.6	89.9	30.6	1.90	24.1	4.7	40.2	1.6	3.7	90.2	31.6	1.91	25.1	4.9	42.1	3.4	7.9	90.5	32.6	1.92	26.1	5.0	44.0	5.2	12.0
		9.0	5.0	11.6	87.1	30.6	1.84	24.3	4.9	40.2	1.6	3.7	87.4	31.6	1.85	25.3	5.0	42.1	3.4	7.9	87.6	32.6	1.86	26.2	5.1	44.0	5.2	12.0
	70	5.0	1.5	3.5	95.7	38.4	2.03	31.5	5.5	57.0	1.6	3.7	96.2	39.7	2.04	32.8	5.7	59.6	3.3	7.6	96.7	41.1	2.05	34.1	5.9	62.2	5.0	11.6
		7.0	3.3	7.6	92.3	38.3	1.96	31.7	5.7	57.0	1.6	3.7	92.7	39.7	1.97	33.0	5.9	59.6	3.3	7.6	93.1	41.1	1.98	34.4	6.1	62.2	5.0	11.6
		9.0	5.0	11.6	88.9	38.3	1.88	31.9	6.0	56.9	1.6	3.7	89.3	39.7	1.89	33.3	6.2	59.5	3.3	7.6	89.6	41.2	1.90	34.7	6.3	62.1	5.0	11.6
	90	5.0	1.5	3.5	98.7	46.1	2.10	38.9	6.4	73.8	1.5	3.5	99.3	47.8	2.11	40.6	6.6	77.1	3.2	7.4	100.0	49.6	2.13	42.3	6.8	80.4	4.9	11.3
		7.0	3.3	7.6	94.7	46.1	2.01	39.2	6.7	73.7	1.5	3.5	95.2	47.9	2.02	41.0	6.9	77.0	3.2	7.4	95.8	49.7	2.04	42.7	7.2	80.3	4.9	11.3
		9.0	5.0	11.6	90.7	46.1	1.92	39.5	7.0	73.6	1.5	3.5	91.2	47.9	1.93	41.3	7.3	76.9	3.2	7.4	91.6	49.8	1.95	43.1	7.5	80.2	4.9	11.3
110																												
100	30	5.0	1.4	3.2	109.4	22.9	2.49	14.4	2.7	24.3	1.7	3.9	109.6	23.4	2.49	14.9	2.8	25.3	3.5	8.1	109.8	23.8	2.49	15.3	2.8	26.4	5.3	12.2
		7.0	3.1	7.2	107.3	22.8	2.44	14.5	2.7	24.2	1.7	3.9	107.5	23.3	2.44	15.0	2.8	25.3	3.5	8.1	107.6	23.8	2.44	15.5	2.9	26.4	5.3	12.2
		9.0	4.7	10.9	105.2	22.7	2.39	14.6	2.8	24.2	1.7	3.9	105.3	23.3	2.39	15.1	2.9	25.3	3.5	8.1	105.4	23.8	2.39	15.7	2.9	26.4	5.3	12.2
	50	5.0	1.4	3.2	112.4	30.3	2.56	21.6	3.5	41.2	1.6	3.7	112.7	31.1	2.56	22.4	3.6	42.9	3.4	7.9	113.1	32.0	2.57	23.3	3.7	44.6	5.2	12.0
		7.0	3.1	7.2	109.7	30.2	2.49	21.7	3.6	41.2	1.6	3.7	109.9	31.1	2.49	22.6	3.7	42.9	3.4	7.9	110.2	32.0	2.49	23.4	3.8	44.6	5.2	12.0
		9.0	4.7	10.9	107.0	30.1	2.41	21.8	3.7	41.1	1.6	3.7	107.2	31.0	2.42	22.7	3.8	42.8	3.4	7.9	107.4	31.9	2.42	23.6	3.9	44.6	5.2	12.0
	70	5.0	1.4	3.2	115.4	37.7	2.63	28.7	4.2	58.1	1.6	3.7	115.9	38.9	2.64	29.9	4.3	60.5	3.3	7.6	116.3	40.2	2.65	31.2	4.5	62.8	5.0	11.6
		7.0	3.1	7.2	112.1	37.6	2.54	28.9	4.3	58.1	1.6	3.7	112.4	38.8	2.54	30.1	4.5	60.4	3.3	7.6	112.8	40.1	2.55	31.4	4.6	62.8	5.0	11.6
		9.0	4.7	10.9	108.7	37.4	2.44	29.1	4.5	58.0	1.6	3.7	109.0	38.7	2.45	30.4	4.6	60.4	3.3	7.6	109.3	40.0	2.46	31.6	4.8	62.8	5.0	11.6
	90	5.0	1.4	3.2	118.5	45.1	2.71	35.9	4.9	75.1	1.5	3.5	119.0	46.7	2.72	37.5	5.0	78.1	3.2	7.4	119.6	48.4	2.73	39.1	5.2	81.1	4.9	11.3
		7.0	3.1	7.2	114.5	44.9	2.59	36.1	5.1	75.0	1.5	3.5	114.9	46.6	2.60	37.7	5.3	78.0	3.2	7.4	115.4	48.2	2.61	39.3	5.4	81.0	4.9	11.3
		9.0	4.7	10.9	110.5	44.7	2.47	36.3	5.3	74.9	1.5	3.5	110.8	46.4	2.48	38.0	5.5	77.9	3.2	7.4	111.2	48.1	2.49	39.6	5.7	81.0	4.9	11.3
110																												
120	30	5.0	1.3	3.0	129.1	22.8	3.07	12.3	2.2	25.0	1.7	3.9	129.3	23.1	3.07	12.6	2.2	25.9	3.5	8.1	129.5	23.5	3.07	13.0	2.2	26.8	5.3	12.2
		7.0	3.0	6.9	127.1	22.7	3.02	12.4	2.2	24.9	1.7	3.9	127.2	23.1	3.02	12.8	2.2	25.9	3.5	8.1	127.4	23.5	3.02	13.2	2.3	26.8	5.3	12.2
		9.0	4.5	10.4	125.1	22.7	2.98	12.5	2.2	24.9	1.7	3.9	125.2	23.2	2.97	13.0	2.3	25.9	3.5	8.1	125.3	23.6	2.97	13.5	2.3	26.9	5.3	12.2
	50	5.0	1.3	3.0	132.2	29.9	3.15	19.1	2.8	42.1	1.6	3.7	132.5	30.6	3.15	19.9	2.8	43.6	3.4	7.9	132.8	31.4	3.16	20.6	2.9	45.1	5.2	12.0
		7.0	3.0	6.9	129.5	29.7	3.07	19.3	2.8	42.1	1.6	3.7	129.7	30.5	3.07	20.0	2.9	43.6	3.4	7.9	129.9	31.3	3.07	20.8	3.0	45.1	5.2	12.0
		9.0	4.5	10.4	126.8	29.6	2.99	19.4	2.9	42.0	1.6	3.7	127.0	30.4	2.99	20.2	3.0	43.6	3.4	7.9	127.1	31.2	2.99	21.0	3.1	45.1	5.2	12.0
	70	5.0	1.3	3.0	135.2	37.0	3.24	26.0	3.4	59.3	1.6	3.7	135.6	38.1	3.24	27.1	3.5	61.4	3.3	7.6	136.0	39.3	3.24	28.2	3.6	63.5	5.0	11.6
		7.0	3.0	6.9	131.9	36.8	3.12	26.1	3.5	59.2	1.6	3.7	132.2	37.9	3.12	27.3	3.6	61.3	3.3	7.6	132.5	39.1	3.13	28.4	3.7	63.4	5.0	11.6
		9.0	4.5	10.4	128.5	36.5	3.00	26.3	3.6	59.2	1.6	3.7	128.7	37.7	3.01	27.4	3.7	61.3	3.3	7.6	129.0	38.9	3.01	28.6	3.8	63.4	5.0	11.6
	90	5.0	1.3	3.0	138.3	44.1	3.32	32.8	3.9	76.4	1.5	3.5	138.8	45.6	3.32	34.3	4.0	79.1	3.2	7.4	139.2	47.2	3.33	35.8	4.2	81.8	4.9	11.3
		7.0	3.0	6.9	134.2	43.8	3.17																					

V036W

Cooling Capacity Data

ELT °F	EST °F	LOAD FLOW			SOURCE FLOW - 5 GPM								SOURCE FLOW - 7 GPM								SOURCE FLOW - 9 GPM								
		Flow GPM	PD		LLT °F	TC kBTUH	Power kW	HR kBTUH	EER	LST °F	Source PD		LLT °F	TC kBTUH	Power kW	HR kBTUH	EER	LST °F	Source PD		LLT °F	TC kBTUH	Power kW	HR kBTUH	EER	LST °F	Source PD		
			PSI	FT							HD	PSI							FT	HD							PSI	FT	HD
30	50	5.0	1.7	3.9	22.4	18.5	1.33	23.0	13.9	59.5	1.6	3.7	22.4	18.3	1.29	22.7	14.2	56.7	3.9	9.0	22.5	18.2	1.25	22.4	14.5	55.1	5.2	12.0	
		7.0	4.0	9.2	24.3	19.2	1.35	23.8	14.3	59.8	1.6	3.7	24.4	19.0	1.30	23.4	14.6	56.9	3.9	9.0	24.5	18.7	1.26	23.0	14.8	55.3	5.2	12.0	
		9.0	5.3	12.2	25.4	19.9	1.36	24.6	14.7	60.1	1.6	3.7	25.5	19.8	1.32	24.3	15.0	57.1	3.9	9.0	25.5	19.6	1.27	23.9	15.4	55.5	5.2	12.0	
	60	5.0	1.7	3.9	22.7	17.7	1.52	22.9	11.9	69.4	1.6	3.7	22.8	17.6	1.47	22.6	12.2	66.7	3.7	8.5	22.8	17.4	1.43	22.3	12.4	65.1	5.1	11.8	
		7.0	4.0	9.2	24.6	18.4	1.53	23.6	12.3	69.7	1.6	3.7	24.6	18.2	1.49	23.3	12.5	66.9	3.7	8.5	24.7	18.0	1.44	22.9	12.7	65.2	5.1	11.8	
		9.0	5.3	12.2	25.6	19.1	1.54	24.4	12.6	70.0	1.6	3.7	25.7	18.9	1.50	24.0	12.9	67.1	3.7	8.5	25.7	18.8	1.45	23.7	13.2	65.4	5.1	11.8	
	80	5.0	1.7	3.9	23.4	16.1	1.89	22.6	8.6	89.3	1.6	3.6	23.4	16.0	1.84	22.3	8.8	86.6	3.4	7.7	23.5	15.8	1.79	21.9	9.0	85.0	5.0	11.4	
		7.0	4.0	9.2	25.1	16.8	1.90	23.2	8.9	89.6	1.6	3.6	25.2	16.2	1.85	22.5	8.9	86.6	3.4	7.7	25.4	15.5	1.80	21.7	8.8	85.0	5.0	11.4	
		9.0	5.3	12.2	26.0	17.4	1.91	23.9	9.3	89.9	1.6	3.6	26.0	17.3	1.86	23.6	9.4	87.0	3.4	7.7	26.1	17.1	1.82	23.3	9.6	85.3	5.0	11.4	
	100																												
	50	50	5.0	1.6	3.7	39.5	25.6	1.35	30.2	18.9	62.4	1.6	3.7	39.4	25.6	1.31	30.1	19.5	58.9	3.9	9.0	39.4	25.7	1.27	30.1	20.2	56.9	5.2	12.0
			7.0	3.9	9.0	42.2	26.6	1.36	31.2	19.5	62.9	1.6	3.7	42.1	26.7	1.32	31.2	20.2	59.2	3.9	9.0	42.1	26.7	1.28	31.1	20.9	57.1	5.2	12.0
9.0			5.2	12.0	43.7	27.6	1.38	32.3	20.1	63.3	1.6	3.7	43.7	27.7	1.33	32.2	20.8	59.5	3.9	9.0	43.6	27.7	1.29	32.1	21.6	57.4	5.2	12.0	
60		5.0	1.6	3.7	39.8	24.6	1.57	30.0	16.1	72.4	1.6	3.7	39.8	24.7	1.52	29.9	16.6	68.8	3.7	8.5	39.8	24.8	1.47	29.8	17.2	66.8	5.1	11.8	
		7.0	3.9	9.0	42.5	25.6	1.58	31.0	16.6	72.8	1.6	3.7	42.4	25.7	1.53	30.9	17.2	69.1	3.7	8.5	42.4	25.8	1.48	30.8	17.8	67.1	5.1	11.8	
		9.0	5.2	12.0	43.9	26.6	1.59	32.0	17.1	73.2	1.6	3.7	43.9	26.7	1.54	31.9	17.7	69.4	3.7	8.5	43.9	26.8	1.49	31.8	18.4	67.3	5.1	11.8	
80		5.0	1.6	3.7	40.6	22.8	2.00	29.6	11.6	92.2	1.6	3.6	40.6	22.8	1.94	29.4	12.0	88.7	3.4	7.7	40.5	22.9	1.87	29.3	12.4	86.7	5.0	11.4	
		7.0	3.9	9.0	43.0	23.7	2.01	30.5	12.0	92.6	1.6	3.6	43.0	23.8	1.95	30.4	12.4	89.0	3.4	7.7	43.0	23.8	1.88	30.3	12.9	86.9	5.0	11.4	
		9.0	5.2	12.0	44.4	24.6	2.02	31.5	12.4	93.0	1.6	3.6	44.3	24.7	1.96	31.4	12.8	89.2	3.4	7.7	44.3	24.8	1.90	31.2	13.3	87.2	5.0	11.4	
100																													
70		50	5.0	1.6	3.7	56.8	31.9	1.51	37.1	21.1	65.3	1.6	3.7	57.2	31.1	1.45	36.0	21.4	60.6	3.9	9.0	57.5	30.3	1.39	35.0	21.7	58.0	5.2	12.0
			7.0	3.5	8.1	60.2	33.2	1.53	38.4	21.8	65.8	1.6	3.7	60.5	32.2	1.46	37.2	22.0	61.0	3.9	9.0	60.8	31.2	1.40	36.0	22.2	58.2	5.2	12.0
	9.0		5.0	11.6	62.1	34.5	1.54	39.8	22.4	66.4	1.6	3.7	62.4	33.3	1.48	38.4	22.6	61.3	3.9	9.0	62.6	32.1	1.41	36.9	22.7	58.5	5.2	12.0	
	60	5.0	1.6	3.7	56.7	32.2	1.68	37.9	19.3	75.6	1.6	3.7	56.9	31.7	1.62	37.2	19.8	71.0	3.7	8.5	57.1	31.2	1.55	36.5	20.3	68.4	5.1	11.8	
		7.0	3.5	8.1	60.1	33.5	1.70	39.3	19.9	76.2	1.6	3.7	60.3	32.8	1.63	38.4	20.3	71.3	3.7	8.5	60.5	32.2	1.56	37.6	20.8	68.6	5.1	11.8	
		9.0	5.0	11.6	62.0	34.8	1.71	40.6	20.5	76.8	1.6	3.7	62.2	34.0	1.64	39.6	20.9	71.7	3.7	8.5	62.4	33.2	1.57	38.6	21.3	68.8	5.1	11.8	
	80	5.0	1.6	3.7	57.1	31.3	2.06	38.4	15.4	95.8	1.6	3.6	57.1	31.3	1.99	38.1	16.0	91.2	3.4	7.7	57.1	31.3	1.91	37.8	16.7	88.7	5.0	11.4	
		7.0	3.5	8.1	60.4	32.6	2.07	39.7	15.9	96.4	1.6	3.6	60.4	32.6	2.00	39.4	16.5	91.6	3.4	7.7	60.4	32.6	1.92	39.1	17.2	89.0	5.0	11.4	
		9.0	5.0	11.6	62.2	33.9	2.09	41.0	16.5	96.9	1.6	3.6	62.2	33.9	2.01	40.7	17.1	92.0	3.4	7.7	62.2	33.9	1.93	40.4	17.7	89.3	5.0	11.4	
	100																												
	90	50	5.0	1.5	3.5	72.1	43.5	1.52	48.7	28.6	70.1	1.6	3.7	72.4	42.7	1.45	47.6	29.4	64.0	3.9	9.0	72.7	41.9	1.38	46.6	30.4	60.7	5.2	12.0
			7.0	3.2	7.4	76.6	45.4	1.55	50.6	29.4	70.9	1.6	3.7	77.1	43.9	1.47	48.9	29.9	64.4	3.9	9.0	77.5	42.4	1.40	47.2	30.4	60.8	5.2	12.0
9.0			4.9	11.3	79.2	47.2	1.57	52.6	30.1	71.7	1.6	3.7	79.7	45.1	1.49	50.2	30.3	64.8	3.9	9.0	80.2	42.9	1.41	47.7	30.4	60.9	5.2	12.0	
60		5.0	1.5	3.5	72.6	42.3	1.72	48.2	25.0	79.9	1.6	3.7	72.8	41.7	1.65	47.4	25.8	73.9	3.7	8.5	73.0	41.2	1.57	46.5	26.7	70.7	5.1	11.8	
		7.0	3.2	7.4	74.8	43.2	1.74	49.2	25.4	80.3	1.6	3.7	75.1	42.3	1.66	48.0	26.0	74.1	3.7	8.5	75.4	41.4	1.58	46.8	26.7	70.7	5.1	11.8	
		9.0	4.9	11.3	76.1	44.2	1.75	50.1	25.7	80.7	1.6	3.7	76.4	42.9	1.67	48.6	26.2	74.3	3.7	8.5	76.7	41.7	1.58	47.1	26.7	70.8	5.1	11.8	
80		5.0	1.5	3.5	73.5	39.9	2.13	47.2	19.0	99.3	1.6	3.6	73.6	39.8	2.04	46.8	19.8	94.0	3.4	7.7	73.6	39.8	1.94	46.4	20.7	89.9	5.0	11.4	
		7.0	3.2	7.4	77.3	41.6	2.14	48.9	19.6	100.0	1.6	3.6	77.3	41.5	2.05	48.4	20.5	94.7	3.4	7.7	77.4	41.4	1.95	48.0	21.4	90.6	5.0	11.4	
		9.0	4.9	11.3	80.1	43.2	2.16	50.6	20.3	100.8	1.6	3.6	80.1	43.1	2.06	50.1	21.1	95.3	3.4	7.7	80.2	43.0	1.97	49.7	22.1	91.3	5.0	11.4	
100																													

Notes: Multiple flow rates for source side and load side are shown. When selecting units and designing the system, actual operating parameters must fall within the temperature and flow rate ranges shown on the table. Using temperature/flow rate combinations outside the range of the table will result in performance problems. For 3 phase capacity, multiply above data by .948. For 3 phase power, multiply above data by .943.

Rev. 11/22/2005

VO60W

Heating Capacity Data

ELT °F	EST °F	LOAD FLOW			SOURCE FLOW - 8 GPM							SOURCE FLOW - 11 GPM							SOURCE FLOW - 14 GPM									
		Flow GPM	PD		LLT °F	HC KBTUH	Power kW	HE KBTUH	COP	LST °F	Source PD		LLT °F	HC KBTUH	Power kW	HE KBTUH	COP	LST °F	Source PD		LLT °F	HC KBTUH	Power kW	HE KBTUH	COP	LST °F	Source PD	
			PSI	FT HD							PSI	FT HD							PSI	FT HD							PSI	FT HD
60	30	8.0	2.6	6.0	70.2	39.7	2.34	31.7	5.0	21.8	3.5	8.1	70.6	40.9	2.32	33.0	5.2	23.8	6.4	14.7	70.9	42.2	2.29	34.3	5.4	24.9	9.2	21.3
		11.0	4.3	9.9	67.4	39.3	2.28	31.5	5.0	21.9	3.5	8.1	67.6	40.5	2.27	32.8	5.2	23.9	6.4	14.7	67.8	41.8	2.26	34.1	5.4	25.0	9.2	21.3
		14.0	6.1	14.1	65.7	38.8	2.22	31.3	5.1	21.9	3.5	8.1	65.9	40.1	2.22	32.5	5.3	23.9	6.4	14.7	66.1	41.4	2.22	33.8	5.5	25.0	9.2	21.3
	50	8.0	2.6	6.0	73.7	53.2	2.47	44.7	6.3	38.5	3.3	7.6	74.1	54.8	2.44	46.5	6.6	41.3	5.9	13.6	74.6	56.5	2.41	48.2	6.9	42.9	8.5	19.6
		11.0	4.3	9.9	70.0	53.4	2.39	45.2	6.5	38.4	3.3	7.6	70.3	55.1	2.38	46.9	6.8	41.2	5.9	13.6	70.6	56.8	2.36	48.7	7.0	42.8	8.5	19.6
		14.0	6.1	14.1	67.9	53.5	2.31	45.7	6.8	38.2	3.3	7.6	68.1	55.3	2.31	47.4	7.0	41.1	5.9	13.6	68.4	57.1	2.31	49.2	7.2	42.8	8.5	19.6
	70	8.0	2.6	6.0	77.2	66.6	2.59	57.8	7.5	55.1	3.0	6.9	77.7	68.7	2.56	59.9	7.9	58.8	5.4	12.4	78.2	70.7	2.53	62.1	8.2	60.9	7.7	17.8
		11.0	4.3	9.9	72.6	67.4	2.47	59.0	8.0	54.8	3.0	6.9	73.0	69.6	2.47	61.2	8.3	58.5	5.4	12.4	73.4	71.7	2.47	63.3	8.5	60.7	7.7	17.8
		14.0	6.1	14.1	70.1	68.3	2.40	60.1	8.3	54.5	3.0	6.9	70.4	70.5	2.40	62.3	8.6	58.3	5.4	12.4	70.7	72.8	2.40	64.5	8.9	60.5	7.7	17.8
	90	8.0	2.6	6.0	80.6	80.1	2.64	71.0	8.9	71.7	2.9	6.7	81.3	82.5	2.64	73.5	9.1	76.2	5.2	12.0	81.9	85.0	2.64	76.0	9.4	78.8	7.4	17.1
		11.0	4.3	9.9	75.3	81.5	2.57	72.7	9.3	71.3	2.9	6.7	75.8	84.1	2.57	75.4	9.6	75.9	5.2	12.0	76.3	86.7	2.57	78.0	9.9	78.5	7.4	17.1
		14.0	6.1	14.1	72.2	83.0	2.50	74.5	9.7	70.8	2.9	6.7	72.6	85.7	2.50	77.2	10.1	75.5	5.2	12.0	73.0	88.4	2.50	79.9	10.4	78.2	7.4	17.1
110																												
80	30	8.0	2.4	5.5	90.0	39.0	2.87	29.2	4.0	22.5	3.5	8.1	90.4	40.2	2.87	30.4	4.1	24.3	6.4	14.7	90.7	41.4	2.87	31.6	4.2	25.3	9.2	21.3
		11.0	4.1	9.5	87.2	38.5	2.82	28.8	4.0	22.6	3.5	8.1	87.4	39.7	2.82	30.1	4.1	24.4	6.4	14.7	87.7	40.9	2.82	31.3	4.2	25.4	9.2	21.3
		14.0	5.8	13.4	85.6	38.0	2.77	28.5	4.0	22.6	3.5	8.1	85.8	39.2	2.77	29.8	4.1	24.4	6.4	14.7	86.0	40.5	2.78	31.0	4.3	25.4	9.2	21.3
	50	8.0	2.4	5.5	93.4	51.9	3.01	41.6	5.0	39.3	3.3	7.6	93.8	53.5	3.01	43.2	5.2	41.9	5.9	13.6	94.2	55.1	3.01	44.8	5.4	43.4	8.5	19.6
		11.0	4.1	9.5	89.7	51.8	2.95	41.8	5.2	39.2	3.3	7.6	90.0	53.5	2.95	43.4	5.3	41.9	5.9	13.6	90.3	55.1	2.95	45.1	5.5	43.4	8.5	19.6
		14.0	5.8	13.4	87.6	51.8	2.88	41.9	5.3	39.2	3.3	7.6	87.9	53.5	2.89	43.6	5.4	41.8	5.9	13.6	88.1	55.2	2.89	45.3	5.6	43.3	8.5	19.6
	70	8.0	2.4	5.5	96.7	64.8	3.16	54.0	6.0	56.1	3.0	6.9	97.2	66.8	3.16	56.0	6.2	59.5	5.4	12.4	97.3	68.8	3.16	58.0	6.4	61.5	7.7	17.8
		11.0	4.1	9.5	93.3	65.2	3.08	54.7	6.2	55.9	3.0	6.9	92.6	67.3	3.08	56.8	6.4	59.4	5.4	12.4	93.8	69.4	3.08	58.8	6.6	61.3	7.7	17.8
		14.0	5.8	13.4	89.9	65.6	3.00	55.4	6.4	55.7	3.0	6.9	90.0	67.7	3.00	57.5	6.6	59.2	5.4	12.4	90.3	69.9	3.01	59.6	6.8	61.2	7.7	17.8
	90	8.0	2.4	5.5	100.0	77.7	3.31	66.5	6.9	72.9	2.9	6.7	100.7	80.2	3.31	68.9	7.1	77.1	5.2	12.0	101.3	82.6	3.31	71.3	7.3	79.5	7.4	17.1
		11.0	4.1	9.5	94.7	78.6	3.21	67.6	7.2	72.6	2.9	6.7	95.2	81.1	3.21	70.1	7.4	76.9	5.2	12.0	95.7	83.6	3.21	72.6	7.6	79.3	7.4	17.1
		14.0	5.8	13.4	91.7	79.4	3.11	68.8	7.5	72.3	2.9	6.7	92.1	82.0	3.12	71.4	7.7	76.6	5.2	12.0	92.5	84.6	3.12	74.0	7.9	79.1	7.4	17.1
110																												
100	30	8.0	2.3	5.3	109.8	38.2	3.71	25.5	3.0	23.4	3.5	8.1	110.1	39.4	3.71	26.7	3.1	25.0	6.4	14.7	110.5	40.6	3.71	27.9	3.2	25.9	9.2	21.3
		11.0	3.9	9.0	107.1	37.6	3.64	25.2	3.0	23.5	3.5	8.1	107.3	38.8	3.64	26.4	3.1	25.0	6.4	14.7	107.5	40.0	3.65	27.6	3.2	25.9	9.2	21.3
		14.0	5.5	12.7	105.5	37.1	3.57	24.9	3.0	23.6	3.5	8.1	105.6	38.3	3.57	26.1	3.1	25.1	6.4	14.7	105.8	39.5	3.58	27.3	3.2	26.0	9.2	21.3
	50	8.0	2.3	5.3	113.0	50.6	3.87	37.4	3.8	40.4	3.3	7.6	113.4	52.2	3.87	39.0	4.0	42.7	5.9	13.6	113.9	53.7	3.87	40.5	4.1	44.0	8.5	19.6
		11.0	3.9	9.0	109.4	50.3	3.77	37.4	3.9	40.4	3.3	7.6	109.7	51.9	3.78	39.0	4.0	42.7	5.9	13.6	110.0	53.5	3.78	40.6	4.1	44.0	8.5	19.6
		14.0	5.5	12.7	107.4	50.0	3.68	37.4	4.0	40.4	3.3	7.6	107.6	51.6	3.69	39.1	4.1	42.7	5.9	13.6	107.8	53.3	3.69	40.7	4.2	44.0	8.5	19.6
	70	8.0	2.3	5.3	116.2	63.0	4.02	49.3	4.6	57.3	3.0	6.9	116.7	65.0	4.02	51.3	4.7	60.4	5.4	12.4	117.2	66.9	4.02	53.2	4.9	62.2	7.7	17.8
		11.0	3.9	9.0	111.8	63.0	3.91	49.6	4.7	57.2	3.0	6.9	112.2	65.0	3.91	51.6	4.9	60.3	5.4	12.4	112.6	67.0	3.91	53.6	5.0	62.1	7.7	17.8
		14.0	5.5	12.7	109.3	62.9	3.80	49.9	4.9	57.1	3.0	6.9	109.6	65.0	3.80	52.0	5.0	60.3	5.4	12.4	109.9	67.0	3.81	54.0	5.2	62.0	7.7	17.8
	90	8.0	2.3	5.3	119.4	75.4	4.18	61.2	5.3	74.2	2.9	6.7	120.0	77.8	4.18	63.5	5.5	78.1	5.2	12.0	120.6	80.1	4.18	65.9	5.6	80.3	7.4	17.1
		11.0	3.9	9.0	114.2	75.6	4.04	61.8	5.5	74.1	2.9	6.7	114.6	78.0	4.04	64.2	5.7	78.0	5.2	12.0	115.1	80.4	4.05	66.6	5.8	80.2	7.4	17.1
		14.0	5.5	12.7	111.2	75.8	3.91	62.4	5.7	73.9	2.9	6.7	111.5	78.3	3.91	64.9	5.9	77.8	5.2	12.0	111.9	80.8	3.92	67.4	6.0	80.1	7.4	17.1
110																												
120	30	8.0	2.1	4.9	129.6	37.4	4.56	21.9	2.4	24.4	3.5	8.1	129.9	38.6	4.56	23.0	2.5	25.7	6.4	14.7	130.4	39.7	4.56	24.2	2.6	26.4	9.2	21.3
		11.0	3.7	8.5	127.4	36.8	4.46	21.6	2.4	24.4	3.5	8.1	127.1	38.0	4.47	22.8	2.5	25.7	6.4	14.7	128.0	39.2	4.47	23.9	2.6	26.5	9.2	21.3
		14.0	5.2	12.0	125.2	36.2	4.37	21.3	2.4	24.5	3.5	8.1	125.5	37.4	4.38	22.5	2.5	25.8	6.4	14.7	125.7	38.6	4.39	23.6	2.6	26.5	9.2	21.3
	50	8.0	2.1	4.9	132.7	49.3	4.72	33.2	3.1	41.4	3.3	7.6	133.1	50.9	4.72	34.8	3.2	43.5	5.9	13.6	133.5	52.4	4.72	36.3	3.3	44.7	8.5	19.6
		11.0	3.7	8.5	129.1	48.8	4.60	33.1	3.1	41.5	3.3	7.6	129.4	50.3	4.60	34.6	3.2	43.5	5.9	13.6	129.7	51.9	4.61	36.2	3.3	44.7	8.5	19.6
		14.0	5.2	12.0	127.1	48.2	4.48	32.9	3.2	41.5	3.3	7.6	127.3	49.8	4.49	34.5	3.3	43.5	5.9	13.6	127.6	51.4	4.50	36.0	3.3	44.7	8.5	19.6
	70	8.0	2.1	4.9	135.8	61.2	4.88	44.6	3.7	58.5	3.0	6.9	136.3	63.1	4.88	46.5	3.8	61.3	5.4	12.4	136.6	65.0	4.88	48.4	3.9	62.9	7.7	17.8
		11.0	3.7	8.5	132.4	60.7	4.74	44.5	3.8	58.5	3.0	6.9	131.7	62.7	4.74	46.5	3.9	61.3	5.4	12.4	133.0	64.6	4.75	48.4	4.0	62.9	7.7	17.8
		14.0	5.2	12.0	128.9	60.2	4.59	44.5	3.8	58.5	3.0	6.9	129.2	62.2	4.60	46.5	4.0	61.3	5.4	12.4	129.4	64.2	4.61	48.4	4.1	62.9	7.7	17.8
	90	8.0	2.1	4.9	138.8	73.1	5.05	55.9	4.2	75.6	2.9	6.7	139.4	75.4	5.05	58.2	4.4	79.1	5.2	12.0	140.0	77.7	5.05	60.4	4			

VO60W

Cooling Capacity Data

ELT °F	EST °F	LOAD FLOW			SOURCE FLOW - 8 GPM							SOURCE FLOW - 11 GPM							SOURCE FLOW - 14 GPM										
		Flow GPM	PD		LLT °F	TC kBTUH	Power kW	HR kBTUH	EER	LST °F	Source PD		LLT °F	TC kBTUH	Power kW	HR kBTUH	EER	LST °F	Source PD		LLT °F	TC kBTUH	Power kW	HR kBTUH	EER	LST °F	Source PD		
			PSI	FT HD							PSI	FT HD							PSI	FT HD							PSI	FT HD	PSI
30	50	8.0	2.8	6.5	21.6	32.6	2.02	39.5	16.1	60.2	3.2	7.4	21.6	32.7	1.99	39.5	16.4	57.4	5.7	13.2	21.6	32.8	1.96	39.5	16.7	55.8	8.1	18.7	
		11.0	5.4	12.5	23.6	34.0	2.05	41.0	16.6	60.6	3.2	7.4	23.9	32.5	2.02	39.4	16.1	57.4	5.7	13.2	24.2	31.0	1.98	37.7	15.6	55.6	8.1	18.7	
		14.0	8.0	18.5	24.8	35.4	2.07	42.5	17.1	60.9	3.2	7.4	24.8	35.5	2.04	42.5	17.4	58.0	5.7	13.2	24.8	35.6	2.01	42.5	17.8	56.3	8.1	18.7	
	60	8.0	2.8	6.5	21.9	31.2	2.32	39.1	13.8	70.1	3.1	7.0	21.9	31.4	2.28	39.1	14.1	67.3	5.5	12.7	21.9	31.5	2.24	39.1	14.3	65.8	7.9	18.2	
		11.0	5.4	12.5	23.9	32.6	2.34	40.6	14.3	70.5	3.1	7.0	24.0	31.9	2.30	39.7	14.1	67.5	5.5	12.7	24.1	31.2	2.26	38.9	14.0	65.7	7.9	18.2	
		14.0	8.0	18.5	25.0	34.0	2.35	42.0	14.7	70.8	3.1	7.0	25.0	34.1	2.32	42.0	15.0	67.9	5.5	12.7	25.0	34.2	2.28	42.0	15.3	66.2	7.9	18.2	
	80	8.0	2.8	6.5	22.6	28.5	2.90	38.4	10.0	89.9	2.7	6.2	22.6	28.7	2.85	38.4	10.2	87.2	5.1	11.8	22.6	28.9	2.79	38.4	10.5	85.7	7.5	17.3	
		11.0	5.4	12.5	24.4	29.8	2.92	39.7	10.4	90.2	2.7	6.2	24.5	29.4	2.86	39.2	10.5	87.4	5.1	11.8	24.5	29.1	2.81	38.7	10.5	85.7	7.5	17.3	
		14.0	8.0	18.5	25.4	31.0	2.93	41.0	10.7	90.6	2.7	6.2	25.4	31.2	2.88	41.0	11.0	87.7	5.1	11.8	25.4	31.4	2.83	41.0	11.3	86.0	7.5	17.3	
	100																												
	50	50	8.0	2.5	5.8	38.9	43.2	2.52	51.9	17.1	63.4	3.2	7.4	39.0	42.5	2.45	50.9	17.4	59.5	5.7	13.2	39.2	41.8	2.37	49.9	17.6	57.3	8.1	18.7
			11.0	4.9	11.3	41.5	45.1	2.55	53.8	17.7	63.9	3.2	7.4	41.7	44.3	2.47	52.8	17.9	59.9	5.7	13.2	41.8	43.6	2.40	51.8	18.2	57.6	8.1	18.7
14.0			7.2	16.6	43.1	47.0	2.58	55.8	18.2	64.4	3.2	7.4	43.2	46.2	2.50	54.7	18.5	60.3	5.7	13.2	43.3	45.4	2.42	53.7	18.7	57.9	8.1	18.7	
60		8.0	2.5	5.8	39.2	42.0	2.73	51.3	15.5	73.2	3.1	7.0	39.3	41.5	2.65	50.5	15.7	69.5	5.5	12.7	39.4	41.0	2.58	49.8	16.0	67.3	7.9	18.2	
		11.0	4.9	11.3	41.8	43.8	2.76	53.2	16.0	73.7	3.1	7.0	41.9	43.3	2.68	52.4	16.3	69.8	5.5	12.7	42.0	42.7	2.60	51.6	16.6	67.6	7.9	18.2	
		14.0	7.2	16.6	43.3	45.6	2.78	55.1	16.5	74.2	3.1	7.0	43.4	45.1	2.70	54.3	16.8	70.2	5.5	12.7	43.4	44.5	2.62	53.5	17.1	67.9	7.9	18.2	
80		8.0	2.5	5.8	39.8	39.4	3.15	50.2	12.6	92.9	2.7	6.2	39.8	39.4	3.06	49.8	12.9	89.3	5.1	11.8	39.9	39.4	2.98	49.5	13.3	87.3	7.5	17.3	
		11.0	4.9	11.3	42.3	41.1	3.17	51.9	13.1	93.4	2.7	6.2	42.3	41.1	3.08	51.6	13.4	89.7	5.1	11.8	42.3	41.1	3.00	51.3	13.8	87.6	7.5	17.3	
		14.0	7.2	16.6	43.7	42.8	3.19	53.7	13.5	93.8	2.7	6.2	43.7	42.8	3.10	53.4	13.9	90.0	5.1	11.8	43.7	42.8	3.02	53.1	14.3	87.8	7.5	17.3	
100																													
70		50	8.0	2.3	5.3	57.0	50.3	2.46	58.7	20.4	65.1	3.2	7.4	57.3	49.3	2.36	57.3	20.9	60.7	5.7	13.2	57.6	48.2	2.26	55.9	21.3	58.2	8.1	18.7
			11.0	4.4	10.2	60.2	52.5	2.48	61.0	21.2	65.7	3.2	7.4	60.4	51.4	2.38	59.5	21.6	61.2	5.7	13.2	60.6	50.3	2.28	58.1	22.1	58.6	8.1	18.7
	14.0		6.5	15.0	61.9	54.7	2.50	63.3	21.9	66.3	3.2	7.4	62.1	53.6	2.40	61.7	22.3	61.6	5.7	13.2	62.3	52.4	2.29	60.2	22.9	58.9	8.1	18.7	
	60	8.0	2.3	5.3	56.8	51.1	2.78	60.6	18.6	75.6	3.1	7.0	57.0	50.4	2.65	59.5	19.2	71.1	5.5	12.7	57.2	49.7	2.53	58.3	19.8	68.6	7.9	18.2	
		11.0	4.4	10.2	60.0	53.4	2.80	62.9	19.3	76.2	3.1	7.0	60.1	52.6	2.67	61.7	19.9	71.6	5.5	12.7	60.3	51.8	2.55	60.5	20.5	68.9	7.9	18.2	
		14.0	6.5	15.0	61.8	55.6	2.82	65.2	19.9	76.8	3.1	7.0	61.9	54.8	2.69	64.0	20.5	72.0	5.5	12.7	62.0	54.0	2.56	62.7	21.2	69.2	7.9	18.2	
	80	8.0	2.3	5.3	56.7	51.5	3.31	62.8	15.6	96.2	2.7	6.2	56.8	51.4	3.18	62.2	16.3	91.7	5.1	11.8	56.8	51.3	3.05	61.7	17.0	89.1	7.5	17.3	
		11.0	4.4	10.2	59.9	53.7	3.33	65.1	16.2	96.8	2.7	6.2	59.9	53.6	3.20	64.5	16.9	92.1	5.1	11.8	60.0	53.6	3.07	64.0	17.6	89.4	7.5	17.3	
		14.0	6.5	15.0	61.8	55.9	3.35	67.4	16.8	97.4	2.7	6.2	61.8	55.9	3.22	66.8	17.5	92.5	5.1	11.8	61.8	55.8	3.08	66.3	18.2	89.8	7.5	17.3	
	100																												
	90	50	8.0	2.0	4.6	73.9	62.4	2.79	72.0	22.4	68.5	3.2	7.4	74.3	61.1	2.51	69.6	24.4	63.1	5.7	13.2	74.6	59.8	2.22	67.3	26.9	59.9	8.1	18.7
			11.0	3.9	9.0	77.8	65.1	2.82	74.8	23.1	69.3	3.2	7.4	78.1	63.7	2.53	72.4	25.2	63.6	5.7	13.2	78.3	62.4	2.24	70.0	27.8	60.3	8.1	18.7
14.0			5.7	13.2	80.0	67.9	2.85	77.6	23.8	70.0	3.2	7.4	80.2	66.4	2.56	75.1	26.0	64.1	5.7	13.2	80.4	65.0	2.26	72.7	28.7	60.7	8.1	18.7	
60		8.0	2.0	4.6	73.8	62.8	3.02	73.1	20.9	78.8	3.1	7.0	74.1	61.9	2.77	71.3	22.5	73.4	5.5	12.7	74.3	60.9	2.52	69.5	24.5	70.2	7.9	18.2	
		11.0	3.9	9.0	77.7	65.5	3.04	75.9	21.6	79.6	3.1	7.0	77.9	64.6	2.79	74.1	23.3	73.9	5.5	12.7	78.1	63.6	2.54	72.2	25.3	70.6	7.9	18.2	
		14.0	5.7	13.2	79.9	68.3	3.07	78.7	22.3	80.3	3.1	7.0	80.1	67.2	2.81	76.8	24.1	74.4	5.5	12.7	80.2	66.2	2.56	75.0	26.2	71.0	7.9	18.2	
80		8.0	2.0	4.6	73.6	63.5	3.47	75.4	18.4	99.4	2.7	6.2	73.7	63.4	3.29	74.6	19.4	94.0	5.1	11.8	73.7	63.3	3.11	73.9	20.5	90.9	7.5	17.3	
		11.0	3.9	9.0	77.6	66.3	3.49	78.2	19.1	100.2	2.7	6.2	77.6	66.2	3.31	77.5	20.1	94.5	5.1	11.8	77.6	66.0	3.13	76.7	21.2	91.3	7.5	17.3	
		14.0	5.7	13.2	79.8	69.0	3.51	81.0	19.7	100.9	2.7	6.2	79.9	68.9	3.33	80.3	20.8	95.0	5.1	11.8	79.9	68.8	3.15	79.5	22.0	91.7	7.5	17.3	
100																													

Notes: Multiple flow rates for source side and load side are shown. When selecting units and designing the system, actual operating parameters must fall within the temperature and flow rate ranges shown on the table. Using temperature/flow rate combinations outside the range of the table will result in performance problems. For 3 phase capacity, multiply above data by .948. For 3 phase power, multiply above data by .943.

Rev. 11/22/2005

V080W

Heating Capacity Data

ELT °F	EST °F	LOAD FLOW			SOURCE FLOW - 10 GPM								SOURCE FLOW - 16 GPM								SOURCE FLOW - 22 GPM										
		Flow GPM	PD		LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	Source PD			LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	Source PD			LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	Source PD		
			PSI	FT							HD	PSI	FT							HD	PSI	FT							HD	PSI	FT
60	30	10.0	2.8	6.5	72.4	60.1	3.36	48.6	5.2	20.0	3.0	6.9	72.9	62.5	3.40	50.9	5.4	22.5	6.0	13.9	73.4	64.9	3.45	53.2	5.5	25.0	9.0	20.8			
		16.0	5.6	12.9	67.7	60.1	3.17	49.3	5.5	19.8	3.0	6.9	68.1	62.6	3.22	51.6	5.7	22.4	6.0	13.9	68.4	65.1	3.27	53.9	5.8	24.9	9.0	20.8			
		22.0	8.4	19.4	65.6	60.1	2.99	49.9	5.9	19.7	3.0	6.9	65.9	62.6	3.04	52.3	6.0	22.3	6.0	13.9	66.1	65.2	3.09	54.7	6.2	24.9	9.0	20.8			
	50	10.0	2.8	6.5	76.5	80.0	3.37	68.6	7.0	35.9	2.8	6.5	77.4	84.4	3.43	72.7	7.2	39.3	5.7	13.1	78.3	88.8	3.50	76.9	7.4	42.8	8.5	19.6			
		16.0	5.6	12.9	70.3	80.0	3.23	69.0	7.2	35.8	2.8	6.5	70.8	83.6	3.28	72.4	7.5	39.3	5.7	13.1	71.2	87.2	3.32	75.8	7.7	42.9	8.5	19.6			
		22.0	8.4	19.4	67.5	80.0	3.10	69.4	7.6	35.7	2.8	6.5	67.8	82.7	3.12	72.1	7.8	39.3	5.7	13.1	68.0	85.5	3.15	74.7	8.0	43.0	8.5	19.6			
	70	10.0	2.8	6.5	80.6	100.0	3.37	88.5	8.7	51.8	2.7	6.2	81.9	106.4	3.46	94.6	9.0	56.2	5.4	12.4	83.3	112.8	3.55	100.7	9.3	60.6	8.0	18.5			
		16.0	5.6	12.9	72.9	99.9	3.30	88.7	8.9	51.7	2.7	6.2	73.5	104.6	3.33	93.2	9.2	56.3	5.4	12.4	74.1	109.2	3.37	97.7	9.5	60.8	8.0	18.5			
		22.0	8.4	19.4	69.4	99.9	3.22	88.9	9.1	51.7	2.7	6.2	69.6	102.8	3.21	91.8	9.4	56.4	5.4	12.4	69.9	105.7	3.20	94.8	9.7	61.1	8.0	18.5			
90																															
110																															
80	30	10.0	2.6	6.0	92.1	58.6	4.43	43.5	3.9	21.0	3.0	6.9	92.5	60.8	4.47	45.6	4.0	23.3	6.0	13.9	93.0	63.1	4.51	47.7	4.1	25.5	9.0	20.8			
		16.0	5.4	12.5	87.5	58.6	4.30	43.9	4.0	20.9	3.0	6.9	87.8	60.8	4.34	46.0	4.1	23.2	6.0	13.9	88.1	63.1	4.39	48.1	4.2	25.5	9.0	20.8			
		22.0	8.2	18.9	85.5	58.6	4.17	44.4	4.1	20.9	3.0	6.9	85.7	60.9	4.22	46.5	4.2	23.1	6.0	13.9	85.9	63.1	4.26	48.6	4.3	25.4	9.0	20.8			
	50	10.0	2.6	6.0	96.0	77.5	4.62	61.7	4.9	37.3	2.8	6.5	96.8	81.4	4.68	65.4	5.1	40.4	5.7	13.1	97.6	85.3	4.74	69.1	5.3	43.5	8.5	19.6			
		16.0	5.4	12.5	90.0	77.5	4.45	62.3	5.1	37.2	2.8	6.5	90.4	80.8	4.50	65.5	5.3	40.4	5.7	13.1	90.8	84.2	4.55	68.6	5.4	43.6	8.5	19.6			
		22.0	8.2	18.9	87.3	77.4	4.28	62.8	5.3	37.0	2.8	6.5	87.5	80.2	4.32	65.5	5.4	40.3	5.7	13.1	87.8	83.0	4.37	68.1	5.6	43.6	8.5	19.6			
	70	10.0	2.6	6.0	99.9	96.4	4.80	80.0	5.9	53.5	2.7	6.2	101.0	102.0	4.89	85.3	6.1	57.5	5.4	12.4	102.2	107.5	4.97	90.5	6.3	61.5	8.0	18.5			
		16.0	5.4	12.5	92.4	96.3	4.59	80.7	6.1	53.4	2.7	6.2	93.0	100.8	4.66	84.9	6.3	57.5	5.4	12.4	93.6	105.2	4.72	89.1	6.5	61.6	8.0	18.5			
		22.0	8.2	18.9	89.0	96.2	4.38	81.3	6.4	53.2	2.7	6.2	89.3	99.6	4.43	84.5	6.6	57.5	5.4	12.4	89.6	102.9	4.47	87.7	6.7	61.8	8.0	18.5			
90																															
110																															
100	30	10.0	2.4	5.5	111.8	57.0	5.50	38.3	3.0	22.1	3.0	6.9	112.2	59.1	5.54	40.2	3.1	24.1	6.0	13.9	112.6	61.2	5.58	42.2	3.2	26.0	9.0	20.8			
		16.0	5.2	12.0	107.4	57.1	5.43	38.6	3.1	22.0	3.0	6.9	107.6	59.1	5.47	40.5	3.2	24.0	6.0	13.9	107.9	61.1	5.50	42.3	3.3	26.0	9.0	20.8			
		22.0	8.0	18.5	105.4	57.1	5.36	38.9	3.1	22.0	3.0	6.9	105.5	59.1	5.39	40.7	3.2	24.0	6.0	13.9	105.7	61.0	5.43	42.5	3.3	26.0	9.0	20.8			
	50	10.0	2.4	5.5	115.5	74.9	5.87	54.9	3.7	38.7	2.8	6.5	116.2	78.3	5.93	58.1	3.9	41.5	5.7	13.1	116.9	81.7	5.99	61.3	4.0	44.3	8.5	19.6			
		16.0	5.2	12.0	109.7	74.9	5.66	55.6	3.9	38.5	2.8	6.5	110.1	78.0	5.72	58.5	4.0	41.4	5.7	13.1	110.5	81.2	5.79	61.4	4.1	44.2	8.5	19.6			
		22.0	8.0	18.5	107.0	74.9	5.45	56.3	4.0	38.4	2.8	6.5	107.3	77.7	5.52	58.9	4.1	41.3	5.7	13.1	107.6	80.6	5.59	61.5	4.2	44.2	8.5	19.6			
	70	10.0	2.4	5.5	119.1	92.8	6.23	71.6	4.4	55.2	2.7	6.2	120.1	97.5	6.31	76.0	4.5	58.9	5.4	12.4	121.1	102.3	6.40	80.4	4.7	62.5	8.0	18.5			
		16.0	5.2	12.0	111.9	92.7	5.89	72.6	4.6	55.0	2.7	6.2	112.5	96.9	5.98	76.5	4.8	58.7	5.4	12.4	113.0	101.2	6.07	80.5	4.9	62.5	8.0	18.5			
		22.0	8.0	18.5	108.7	92.6	5.54	73.7	4.9	54.8	2.7	6.2	109.0	96.3	5.64	77.1	5.0	58.6	5.4	12.4	109.4	100.1	5.74	80.5	5.1	62.5	8.0	18.5			
90																															
110																															
120	30	10.0	2.2	5.1	131.4	55.5	6.57	33.1	2.5	23.2	3.0	6.9	131.8	57.4	6.61	34.9	2.5	24.9	6.0	13.9	132.2	59.4	6.64	36.7	2.6	26.6	9.0	20.8			
		16.0	5.0	11.6	127.2	55.6	6.56	33.2	2.5	23.2	3.0	6.9	127.4	57.4	6.59	34.9	2.6	24.9	6.0	13.9	127.6	59.2	6.62	36.6	2.6	26.6	9.0	20.8			
		22.0	7.8	18.0	125.2	55.7	6.54	33.4	2.5	23.1	3.0	6.9	125.4	57.3	6.57	34.9	2.6	24.9	6.0	13.9	125.5	58.9	6.60	36.4	2.6	26.6	9.0	20.8			
	50	10.0	2.2	5.1	134.9	72.4	7.12	48.1	3.0	40.1	2.8	6.5	135.5	75.3	7.17	50.8	3.1	42.5	5.7	13.1	136.1	78.2	7.23	53.5	3.2	45.0	8.5	19.6			
		16.0	5.0	11.6	129.3	72.3	6.87	48.9	3.1	39.9	2.8	6.5	129.7	75.2	6.94	51.6	3.2	42.4	5.7	13.1	130.1	78.2	7.02	54.2	3.3	44.9	8.5	19.6			
		22.0	7.8	18.0	126.8	72.3	6.62	49.7	3.2	39.8	2.8	6.5	127.0	75.2	6.71	52.3	3.3	42.3	5.7	13.1	127.3	78.1	6.81	54.9	3.4	44.9	8.5	19.6			
	70	10.0	2.2	5.1	138.4	89.3	7.66	63.1	3.4	57.0	2.7	6.2	139.2	93.1	7.74	66.7	3.5	60.2	5.4	12.4	140.0	97.0	7.82	70.3	3.6	63.4	8.0	18.5			
		16.0	5.0	11.6	131.5	89.1	7.18	64.6	3.6	56.7	2.7	6.2	132.0	93.1	7.30	68.2	3.7	60.0	5.4	12.4	132.5	97.2	7.42	71.8	3.8	63.3	8.0	18.5			
		22.0	7.8	18.0	128.3	88.9	6.70	66.1	3.9	56.4	2.7	6.2	128.7	93.1	6.86	69.7	4.0	59.8	5.4	12.4	129.1	97.3	7.01	73.4	4.1	63.1	8.0	18.5			
90	10.0	2.2	5.1	141.9	106.1	8.21	78.1	3.8	73.9	2.6	6.0	142.9	111.0	8.31	82.6	3.9	77.9	5.2	12.0	143.9	115.8	8.41	87.1	4.0	81.8	7.8	18.0				
	16.0	5.0	11.6	133.6	105.8	7.49	80.3	4.1	73.4	2.6	6.0	134.3	111.0	7.65	84.9	4.3	77.5	5.2	12.0	135.0	116.2	7.81	89.5	4.4	81.6	7.8	18.0				
	22.0	7.8	18.0	129.9	105.6	6.78	82.4	4.6	73.0	2.6	6.0	130.4	111.0	7.00	87.2	4.6	77.2	5.2	12.0	130.9	116.5	7.22	91.9	4.7	81.4	7.8	18.0				
110																															

Notes: Multiple flow rates for source side and load side are shown. When selecting units and designing the system, actual operating parameters must fall within the temperature and flow rate ranges shown on the table. Using temperature/flow rate combinations outside the range of the table will result in performance problems. For 3 phase capacity, multiply above data by .948. For 3 phase power, multiply above data by .943.

Rev. 11/22/2005

V080W

Cooling Capacity Data

ELT °F	EST °F	LOAD FLOW			SOURCE FLOW - 10 GPM								SOURCE FLOW - 16 GPM								SOURCE FLOW - 22 GPM								
		Flow GPM	PD		LLT °F	TC kBTUH	Power kW	HR kBTUH	EER	LST °F	Source PD		LLT °F	TC kBTUH	Power kW	HR kBTUH	EER	LST °F	Source PD		LLT °F	TC kBTUH	Power kW	HR kBTUH	EER	LST °F	Source PD		
			PSI	FT HD							PSI	FT HD							PSI	FT HD							PSI	FT HD	PSI
30	50	10.0	2.8	6.5	18.5	55.8	2.95	65.9	18.9	63.6	2.7	6.2	18.7	54.8	2.93	64.8	18.7	58.3	5.4	12.5	18.9	53.7	2.90	63.6	18.5	56.0	8.1	18.7	
		16.0	6.2	14.3	22.2	60.6	3.03	71.0	20.0	64.6	2.7	6.2	22.4	59.2	3.97	69.3	20.0	58.9	5.4	12.5	22.6	57.8	2.90	67.7	19.9	56.3	8.1	18.7	
		22.0	9.6	22.2	23.9	65.4	3.11	76.0	21.0	65.7	2.7	6.2	24.0	63.6	3.01	73.9	21.2	59.5	5.4	12.5	24.2	61.9	2.90	71.8	21.3	56.7	8.1	18.7	
	60	10.0	2.8	6.5	19.5	50.8	3.18	61.6	16.2	72.7	2.7	6.1	19.7	49.9	3.18	60.8	15.9	67.8	5.3	12.1	19.9	49.1	3.18	59.9	15.7	65.6	7.9	18.1	
		16.0	6.2	14.3	22.9	54.7	3.29	65.9	16.9	73.6	2.7	6.1	23.1	53.9	3.24	64.9	16.9	68.4	5.3	12.1	23.2	53.0	3.18	63.9	16.9	66.0	7.9	18.1	
		22.0	9.6	22.2	24.5	58.7	3.41	70.3	17.5	74.5	2.7	6.1	24.6	57.8	3.30	69.1	17.8	68.9	5.3	12.1	24.7	57.0	3.19	67.8	18.1	66.4	7.9	18.1	
	80	10.0	2.8	6.5	21.6	40.6	3.62	53.0	11.3	90.9	2.6	5.9	21.5	41.3	3.67	53.8	11.4	86.9	4.9	11.4	21.3	42.0	3.73	54.7	11.4	85.1	7.3	16.9	
		16.0	6.2	14.3	24.5	42.9	3.81	55.9	11.4	91.5	2.6	5.9	24.3	44.3	3.78	57.2	11.9	87.4	4.9	11.4	24.1	45.7	3.75	58.5	12.3	85.5	7.3	16.9	
		22.0	9.6	22.2	25.8	45.2	4.00	58.8	11.5	92.1	2.6	5.9	25.6	47.3	3.88	60.6	12.3	87.8	4.9	11.4	25.4	49.5	3.77	62.3	13.3	85.8	7.3	16.9	
	100																												
	50	50	10.0	2.7	6.2	36.0	68.1	3.27	79.3	20.8	66.4	2.7	6.2	35.9	68.6	3.17	79.4	21.7	60.2	5.4	12.5	35.8	69.1	3.06	79.5	22.6	57.5	8.1	18.7
			16.0	5.9	13.6	40.7	72.0	3.33	83.4	21.7	67.2	2.7	6.2	40.7	72.3	3.21	83.3	22.5	60.7	5.4	12.5	40.6	72.6	3.10	83.2	23.5	57.8	8.1	18.7
22.0			9.1	21.0	42.9	76.0	3.38	87.5	22.5	68.0	2.7	6.2	42.9	76.1	3.26	87.2	23.4	61.2	5.4	12.5	42.9	76.2	3.13	86.9	24.4	58.1	8.1	18.7	
60		10.0	2.7	6.2	36.5	65.7	3.61	78.0	18.4	76.1	2.7	6.1	36.4	66.1	3.53	78.1	19.0	70.1	5.3	12.1	36.3	66.4	3.45	78.2	19.6	67.3	7.9	18.1	
		16.0	5.9	13.6	41.1	69.3	3.70	81.9	19.0	76.9	2.7	6.1	41.0	69.6	3.59	81.9	19.7	70.6	5.3	12.1	41.0	70.0	3.49	81.8	20.4	67.7	7.9	18.1	
		22.0	9.1	21.0	43.2	72.9	3.79	85.8	19.6	77.7	2.7	6.1	43.1	73.2	3.65	85.6	20.4	71.0	5.3	12.1	43.1	73.5	3.52	85.5	21.2	68.0	7.9	18.1	
80		10.0	2.7	6.2	37.5	60.8	4.29	75.4	14.3	95.6	2.6	5.9	37.4	61.0	4.26	75.5	14.5	89.7	4.9	11.4	37.4	61.2	4.24	75.6	14.6	87.1	7.3	16.9	
		16.0	5.9	13.6	41.8	63.8	4.45	78.9	14.5	96.3	2.6	5.9	41.7	64.2	4.36	79.0	14.9	90.2	4.9	11.4	41.7	64.6	4.27	79.1	15.3	87.4	7.3	16.9	
		22.0	9.1	21.0	43.7	66.8	4.60	82.5	14.7	97.0	2.6	5.9	43.7	67.4	4.45	82.5	15.3	90.6	4.9	11.4	43.6	68.0	4.29	82.6	16.0	87.7	7.3	16.9	
100																													
70		50	10.0	2.6	6.0	53.9	78.1	3.46	89.9	22.6	68.5	2.7	6.2	54.3	76.1	3.30	87.4	23.1	61.3	5.4	12.5	54.7	74.1	3.14	84.9	23.6	58.0	8.1	18.7
			16.0	5.6	12.9	59.6	81.0	3.49	92.9	23.2	69.1	2.7	6.2	59.9	78.7	3.32	90.1	23.7	61.6	5.4	12.5	60.1	76.5	3.16	87.2	24.2	58.2	8.1	18.7
	22.0		8.6	19.9	62.1	83.8	3.52	95.8	23.8	69.8	2.7	6.2	62.4	81.3	3.35	92.7	24.3	61.9	5.4	12.5	62.6	78.8	3.18	89.6	24.8	58.4	8.1	18.7	
	60	10.0	2.6	6.0	53.6	79.6	3.88	92.8	20.7	79.1	2.7	6.1	54.0	77.8	3.72	90.4	21.1	71.7	5.3	12.1	54.3	75.9	3.56	88.1	21.6	68.3	7.9	18.1	
		16.0	5.6	12.9	59.3	82.7	3.93	96.1	21.2	79.8	2.7	6.1	59.6	80.5	3.75	93.3	21.7	72.0	5.3	12.1	59.9	78.4	3.58	90.6	22.2	68.5	7.9	18.1	
		22.0	8.6	19.9	62.0	85.7	3.99	99.4	21.7	80.5	2.7	6.1	62.2	83.3	3.79	96.3	22.2	72.4	5.3	12.1	62.4	80.9	3.60	93.1	22.7	68.7	7.9	18.1	
	80	10.0	2.6	6.0	53.6	79.3	4.69	95.3	17.1	99.7	2.6	5.9	53.8	78.5	4.54	94.0	17.4	92.1	4.9	11.4	54.0	77.6	4.40	92.6	17.8	88.7	7.3	16.9	
		16.0	5.6	12.9	59.3	82.9	4.80	99.3	17.4	100.5	2.6	5.9	59.5	81.6	4.61	97.4	17.9	92.5	4.9	11.4	59.6	80.4	4.42	95.5	18.4	88.9	7.3	16.9	
		22.0	8.6	19.9	61.9	86.4	4.91	103.2	17.8	101.3	2.6	5.9	62.0	84.8	4.67	100.8	18.3	93.0	4.9	11.4	62.2	83.2	4.44	98.4	18.9	89.2	7.3	16.9	
	100																												
	90	50	10.0	2.5	5.8	69.2	101.0	3.74	113.7	27.0	73.5	2.7	6.2	70.7	93.8	3.48	105.6	26.9	63.6	5.4	12.5	72.2	86.5	3.22	97.5	26.9	59.1	8.1	18.7
			16.0	5.4	12.5	76.8	102.8	3.74	115.5	27.5	73.8	2.7	6.2	77.7	95.2	3.48	107.0	27.3	63.8	5.4	12.5	78.7	87.6	3.22	98.6	27.2	59.2	8.1	18.7
22.0			8.2	18.9	80.2	104.6	3.74	117.3	28.0	74.2	2.7	6.2	80.9	96.6	3.48	108.5	27.8	64.0	5.4	12.5	81.7	88.6	3.22	99.6	27.5	59.3	8.1	18.7	
60		10.0	2.5	5.8	59.2	99.9	4.19	114.2	24.2	83.6	2.7	6.1	70.5	94.5	3.93	107.9	24.4	73.9	5.3	12.1	71.6	89.0	3.67	101.5	24.6	69.5	7.9	18.1	
		16.0	5.4	12.5	76.8	102.5	4.21	116.9	24.7	84.1	2.7	6.1	77.6	96.5	3.94	109.9	24.8	74.2	5.3	12.1	78.3	90.5	3.67	103.0	24.9	69.7	7.9	18.1	
		22.0	8.2	18.9	80.2	105.1	4.23	119.5	25.2	84.6	2.7	6.1	80.8	98.5	3.95	112.0	25.2	74.4	5.3	12.1	81.4	91.9	3.67	104.4	25.3	69.8	7.9	18.1	
80		10.0	2.5	5.8	59.6	97.9	5.08	115.2	19.4	103.8	2.6	5.9	70.2	96.0	4.82	112.4	20.1	94.5	4.9	11.4	70.6	94.0	4.56	109.6	20.8	90.3	7.3	16.9	
		16.0	5.4	12.5	76.9	102.0	5.15	119.6	20.0	104.7	2.6	5.9	77.2	99.1	4.86	115.7	20.6	94.9	4.9	11.4	77.6	96.3	4.57	111.9	21.2	90.5	7.3	16.9	
		22.0	8.2	18.9	80.1	106.1	5.21	123.9	20.5	105.5	2.6	5.9	80.4	102.3	4.89	119.0	21.1	95.3	4.9	11.4	80.8	98.5	4.58	114.1	21.7	90.7	7.3	16.9	
100																													

Notes: Multiple flow rates for source side and load side are shown. When selecting units and designing the system, actual operating parameters must fall within the temperature and flow rate ranges shown on the table. Using temperature/flow rate combinations outside the range of the table will result in performance problems. For 3 phase capacity, multiply above data by .948. For 3 phase power, multiply above data by .943.

Rev. 11/22/2005

V120W

Heating Capacity Data

ELT	EST	LGPM	LWPD			SOURCE 16.0 GPM						SWPD			SOURCE 22.0 GPM						SWPD			SOURCE 28.0 GPM						SWPD										
			PSI	FT HD		LLT	HC	KW	HE	COP	LST	PSI	FT HD		LLT	HC	KW	HE	COP	LST	PSI	FT HD		LLT	HC	KW	HE	COP	LST	PSI	FT HD									
60	30	20	16.0	2.6	6.0	70.7	82.7	4.58	67.0	5.3	21.4	4.1	9.5	71.0	85.5	4.63	69.7	5.4	23.0	7.2	16.6		71.4	88.3	4.69	72.3	5.5	24.7	10.0	23.1										
		22.0	5.4	12.5	67.7	82.6	4.50	67.2	5.4	21.3	4.4	10.2	68.0	84.8	4.56	69.3	5.5	23.0	7.2	16.6		68.2	87.1	4.61	71.4	5.5	24.7	10.0	23.1											
		28.0	8.1	18.7	66.1	82.5	4.43	67.4	5.5	21.3	4.4	10.2	66.2	84.2	4.48	68.9	5.5	23.1	7.2	16.6		66.3	85.9	4.54	70.4	5.5	24.8	10.0	23.1											
60	40	20	16.0	2.6	6.0	72.6	97.9	4.77	81.7	6.0	29.5	4.3	9.9	73.1	101.5	4.83	85.0	6.2	31.5	7.0	16.2		73.5	105.1	4.90	88.4	6.3	33.5	9.8	22.6										
		22.0	5.4	12.5	69.2	97.8	4.67	81.9	6.1	29.4	4.3	9.9	69.5	100.9	4.73	84.8	6.2	31.5	7.0	16.2		69.7	104.0	4.80	87.6	6.4	33.5	9.8	22.6											
		28.0	8.1	18.7	67.2	97.7	4.57	82.2	6.3	29.4	4.3	9.9	67.4	100.3	4.63	84.5	6.3	31.5	7.0	16.2		67.6	103.0	4.70	86.9	6.4	33.6	9.8	22.6											
60	50	20	16.0	2.6	6.0	74.6	113.2	4.96	96.3	6.7	37.6	4.1	9.5	75.1	117.5	5.04	100.3	6.8	40.0	6.9	15.9		75.7	121.9	5.11	104.4	7.0	42.3	9.6	22.2										
		22.0	5.4	12.5	70.6	113.1	4.83	96.6	6.9	37.6	4.1	9.5	71.0	117.0	4.91	100.3	7.0	40.0	6.9	15.9		71.3	120.9	4.98	103.9	7.1	42.3	9.6	22.2											
		28.0	8.1	18.7	68.3	112.9	4.71	96.9	7.0	37.5	4.1	9.5	68.6	116.5	4.78	100.2	7.1	39.9	6.9	15.9		68.8	120.0	4.85	103.5	7.2	42.4	9.6	22.2											
60	60	20	16.0	2.6	6.0	76.6	128.5	5.15	110.9	7.3	45.7	4.0	9.2	77.2	133.6	5.24	115.7	7.5	48.4	6.7	15.5		77.9	138.6	5.33	120.5	7.6	51.1	9.4	21.7										
		22.0	5.4	12.5	72.0	128.3	5.00	111.3	7.5	45.7	4.0	9.2	72.5	133.1	5.08	115.7	7.7	48.4	6.7	15.5		72.9	137.9	5.17	120.2	7.8	51.1	9.4	21.7											
		28.0	8.1	18.7	69.4	128.1	4.85	111.6	7.7	45.6	4.0	9.2	69.8	132.6	4.93	115.8	7.9	48.4	6.7	15.5		70.1	137.1	5.01	120.0	8.0	51.2	9.4	21.7											
60	70	20	16.0	2.6	6.0	78.5	143.7	5.34	125.5	7.9	53.8	3.8	8.8	79.3	149.6	5.44	131.0	8.1	56.9	6.5	15.0		80.0	155.4	5.54	136.5	8.2	59.9	9.2	21.3										
		22.0	5.4	12.5	73.5	143.5	5.16	125.9	8.1	53.8	3.8	8.8	74.0	149.2	5.26	131.2	8.3	56.9	6.5	15.0		74.5	154.8	5.35	136.5	8.5	59.9	9.2	21.3											
		28.0	8.1	18.7	70.6	143.4	4.99	126.3	8.4	53.7	3.8	8.8	71.0	148.8	5.08	131.4	8.6	56.8	6.5	15.0		71.4	154.2	5.17	136.5	8.7	59.9	9.2	21.3											
80	30	20	16.0	2.4	5.5	90.6	82.2	6.13	61.2	3.9	22.1	4.4	10.2	90.9	84.5	6.20	63.4	4.0	23.6	7.2	16.6		91.2	86.8	6.26	65.5	4.1	25.2	10.0	23.1										
		22.0	5.1	11.8	87.7	82.3	6.05	61.7	4.0	22.1	4.4	10.2	87.9	84.4	6.10	63.6	4.1	23.6	7.2	16.6		88.1	86.5	6.15	65.5	4.1	25.2	10.0	23.1											
		28.0	7.8	18.0	86.1	82.4	5.96	62.1	4.1	22.0	4.4	10.2	86.2	84.3	6.00	63.8	4.1	23.6	7.2	16.6		86.3	86.1	6.03	65.6	4.2	25.2	10.0	23.1											
80	40	20	16.0	2.4	5.5	92.4	96.4	6.35	74.8	4.5	30.4	4.3	9.9	92.8	99.5	6.42	77.6	4.5	32.2	7.0	16.2		93.2	102.5	6.49	80.4	4.6	34.1	9.8	22.6										
		22.0	5.1	11.8	89.0	96.5	6.24	75.2	4.5	30.3	4.3	9.9	89.3	99.3	6.29	77.9	4.6	32.2	7.0	16.2		89.6	102.6	6.35	80.5	4.7	34.1	9.8	22.6											
		28.0	8.1	18.7	87.1	96.6	6.12	75.7	4.6	30.2	4.3	9.9	87.3	99.2	6.17	78.2	4.7	32.2	7.0	16.2		87.5	101.8	6.21	80.6	4.8	34.1	9.8	22.6											
80	50	20	16.0	2.4	5.5	94.3	110.7	6.57	88.3	4.9	38.6	4.1	9.5	94.8	114.5	6.64	91.8	5.0	40.8	6.9	15.9		95.2	118.2	6.72	95.3	5.2	43.0	9.6	22.2										
		22.0	5.1	11.8	90.4	110.7	6.43	88.8	5.0	38.6	4.1	9.5	90.7	114.3	6.49	92.1	5.2	40.8	6.9	15.9		91.0	117.9	6.56	95.5	5.3	43.0	9.6	22.2											
		28.0	8.1	18.7	88.2	110.7	6.29	89.2	5.2	38.5	4.1	9.5	88.4	114.1	6.34	92.5	5.3	40.7	6.9	15.9		88.7	117.5	6.39	95.7	5.4	43.0	9.6	22.2											
80	60	20	16.0	2.4	5.5	96.1	125.0	6.78	101.8	5.4	46.9	4.0	9.2	96.7	129.5	6.87	106.5	5.5	49.4	6.7	15.5		97.3	133.9	6.95	110.2	5.6	51.9	9.4	21.7										
		22.0	5.1	11.8	91.7	124.9	6.62	102.3	5.5	46.8	4.0	9.2	92.1	129.2	6.69	106.4	5.7	49.3	6.7	15.5		92.5	133.6	6.76	110.5	5.8	51.9	9.4	21.7											
		28.0	8.1	18.7	89.2	124.8	6.45	102.8	5.7	46.8	4.0	9.2	89.5	129.0	6.51	106.8	5.8	49.3	6.7	15.5		89.8	133.2	6.57	110.8	5.9	51.8	9.4	21.7											
80	70	20	16.0	2.4	5.5	97.9	139.3	7.00	115.4	5.8	55.1	3.8	8.8	98.6	144.4	7.09	120.2	6.0	58.0	6.5	15.0		99.3	149.6	7.18	125.1	6.1	60.8	9.2	21.3										
		22.0	5.1	11.8	93.0	139.1	6.81	115.9	6.0	55.1	3.8	8.8	93.5	144.2	6.89	120.7	6.1	57.9	6.5	15.0		94.0	149.3	6.97	125.5	6.3	60.8	9.2	21.3											
		28.0	8.1	18.7	90.2	138.9	6.61	116.4	6.2	55.0	3.8	8.8	90.6	143.9	6.68	121.1	6.3	57.9	6.5	15.0		91.0	148.9	6.75	125.9	6.5	60.7	9.2	21.3											
100	30	20	16.0	2.2	5.1	110.5	81.7	7.68	55.4	3.1	22.9	4.4	10.2	110.8	83.5	7.76	57.0	3.2	24.3	7.2	16.6		111.0	85.4	7.84	58.6	3.2	25.7	10.0	23.1										
		22.0	4.9	11.3	107.7	82.0	7.59	56.1	3.2	22.8	4.4	10.2	107.9	83.9	7.63	57.9	3.2	24.2	7.2	16.6		108.1	85.9	7.68	59.7	3.3	25.6	10.0	23.1											
		28.0	7.5	17.3	106.1	82.3	7.50	56.8	3.2	22.7	4.4	10.2	106.2	84.4	7.51	58.7	3.3	24.1	7.2	16.6		106.4	86.4	7.52	60.7	3.4	25.5	10.0	23.1											
100	40	20	16.0	2.2	5.1	112.2	94.9	7.93	67.9	3.5	31.3	4.3	9.9	112.6	97.5	8.00	70.1	3.6	33.0	7.0	16.2		112.9	100.0	8.08	72.4	3.6	34.7	9.8	22.6										
		22.0	4.9	11.3	108.9	95.2	7.80	68.5	3.6	31.2	4.3	9.9	109.2	97.8	7.85	71.0	3.6	32.9	7.0	16.2		109.4	100.4	7.90	73.4	3.7	34.6	9.8	22.6											
		28.0	7.5	17.3	107.0	95.4	7.68	69.2	3.6	31.1	4.3	9.9	107.2	98.0	7.70																									

V120W

Cooling Capacity Data

ELT °F	EST °F	LOAD FLOW			SOURCE FLOW - 16 GPM								SOURCE FLOW - 22 GPM								Source Flow - 28 GPM								
		Flow GPM	PD		LLT °F	TC kBTUH	Power kW	HR kBTUH	EER	LST °F	Source PD		LLT °F	TC kBTUH	Power kW	HR kBTUH	EER	LST °F	Source PD		LLT °F	TC kBTUH	Power kW	HR kBTUH	EER	LST °F	Source PD		
			PSI	FT HD							PSI	FT HD							PSI	FT HD							PSI	FT HD	PSI
30	50	16.0	3.0	6.9	21.1	69.4	4.63	85.2	15.0	61.0	4.2	9.7	20.7	71.8	4.57	87.4	15.7	58.2	7.0	16.2	20.4	74.3	4.51	89.7	16.5	56.6	9.8	22.6	
		22.0	6.1	14.1	23.3	71.2	4.86	87.1	15.3	61.2	4.2	9.7	23.1	73.8	4.59	89.4	16.1	58.4	7.0	16.2	22.9	76.3	4.53	91.7	16.9	56.8	9.8	22.6	
		28.0	9.3	21.5	24.6	73.1	4.70	89.1	15.5	61.5	4.2	9.7	24.4	75.7	4.62	91.4	16.4	58.6	7.0	16.2	24.2	78.3	4.54	93.8	17.2	56.9	9.8	22.6	
	60	16.0	3.0	6.9	21.5	66.3	5.16	83.9	13.0	70.8	4.1	9.5	21.2	68.6	5.10	86.0	13.7	68.1	6.8	15.8	20.9	70.9	5.03	88.1	14.3	66.5	9.6	22.1	
		22.0	6.1	14.1	23.6	68.3	5.20	86.0	13.3	71.1	4.1	9.5	23.4	70.7	5.12	88.2	14.0	68.3	6.8	15.8	23.1	73.1	5.05	90.4	14.7	66.7	9.6	22.1	
		28.0	9.3	21.5	24.8	70.3	5.23	88.1	13.6	71.4	4.1	9.5	24.6	72.8	5.15	90.4	14.3	68.5	6.8	15.8	24.5	75.3	5.07	92.6	15.1	66.8	9.6	22.1	
	80	16.0	3.0	6.9	22.3	60.0	6.22	81.2	9.8	90.5	3.9	8.9	22.0	62.1	6.15	83.1	10.2	87.8	6.5	14.9	21.7	64.2	6.08	85.0	10.7	86.3	9.1	20.9	
		22.0	6.1	14.1	24.2	62.3	6.26	83.7	10.1	90.8	3.9	8.9	23.9	64.6	6.18	85.7	10.6	88.0	6.5	14.9	23.7	66.8	6.10	87.6	11.1	86.5	9.1	20.9	
		28.0	9.3	21.5	25.2	64.7	6.30	86.2	10.4	91.1	3.9	8.9	25.1	67.0	6.22	88.2	10.9	88.3	6.5	14.9	24.9	69.3	6.13	90.3	11.4	86.6	9.1	20.9	
	100																												
	50	50	16.0	2.8	6.5	37.8	94.6	5.10	112.0	18.5	64.4	4.2	9.7	37.7	95.3	4.99	112.3	19.1	60.5	7.0	16.2	37.6	96.0	4.88	112.7	19.7	58.3	9.8	22.6
			22.0	5.8	13.4	41.0	96.2	5.13	113.7	18.7	64.7	4.2	9.7	41.0	96.5	5.01	113.6	19.3	60.6	7.0	16.2	40.9	96.8	4.89	113.5	19.8	58.4	9.8	22.6
28.0			8.8	20.3	42.8	97.8	5.16	115.4	19.0	64.9	4.2	9.7	42.8	97.6	5.03	114.8	19.4	60.8	7.0	16.2	42.8	97.5	4.90	114.2	19.9	58.4	9.8	22.6	
60		16.0	2.8	6.5	38.1	92.3	5.67	111.7	16.5	74.4	4.1	9.5	38.0	93.0	5.54	111.9	17.0	70.5	6.8	15.8	37.9	93.7	5.42	112.2	17.5	68.3	9.6	22.1	
		22.0	5.8	13.4	41.2	94.2	5.70	113.7	16.7	74.6	4.1	9.5	41.1	94.6	5.57	113.6	17.2	70.6	6.8	15.8	41.1	94.9	5.44	113.4	17.7	68.4	9.6	22.1	
		28.0	8.8	20.3	42.9	96.1	5.74	115.7	17.0	74.9	4.1	9.5	42.9	96.1	5.59	115.2	17.4	70.8	6.8	15.8	42.9	96.1	5.45	114.7	17.8	68.4	9.6	22.1	
80		16.0	2.8	6.5	38.7	87.8	6.80	111.0	13.0	94.3	3.9	8.9	38.6	88.4	6.65	111.1	13.4	90.4	6.5	14.9	38.5	89.0	6.50	111.2	13.8	88.2	9.1	20.9	
		22.0	5.8	13.4	41.5	90.3	6.85	113.6	13.3	94.6	3.9	8.9	41.5	90.7	6.69	113.5	13.7	90.6	6.5	14.9	41.5	91.2	6.53	113.4	14.1	88.4	9.1	20.9	
		28.0	8.8	20.3	43.2	92.7	6.89	116.3	13.6	95.0	3.9	8.9	43.2	93.0	6.72	116.0	14.0	90.9	6.5	14.9	43.1	93.3	6.55	115.6	14.4	88.5	9.1	20.9	
100																													
70		50	16.0	2.7	6.2	57.3	98.5	5.33	116.7	18.5	65.0	4.2	9.7	57.5	97.0	5.17	114.7	18.8	60.7	7.0	16.2	57.7	95.5	5.01	112.6	19.1	58.3	9.8	22.6
			22.0	5.5	12.7	60.7	99.6	5.35	117.9	18.6	65.2	4.2	9.7	60.8	97.9	5.18	115.6	18.9	60.8	7.0	16.2	61.0	96.2	5.02	113.3	19.2	58.3	9.8	22.6
	28.0		8.3	19.2	62.6	100.8	5.37	119.1	18.8	65.3	4.2	9.7	62.7	98.8	5.20	116.5	19.0	60.9	7.0	16.2	62.9	96.8	5.02	114.0	19.3	58.4	9.8	22.6	
	60	16.0	2.7	6.2	56.7	102.9	6.00	123.3	17.3	75.9	4.1	9.5	56.9	101.4	5.81	121.2	17.6	71.4	6.8	15.8	57.1	99.9	5.63	119.1	17.9	68.8	9.6	22.1	
		22.0	5.5	12.7	60.2	104.3	6.03	124.8	17.4	76.1	4.1	9.5	60.4	102.5	5.83	122.4	17.7	71.5	6.8	15.8	60.6	100.8	5.64	120.0	18.0	68.8	9.6	22.1	
		28.0	8.3	19.2	62.2	105.7	6.06	126.3	17.6	76.3	4.1	9.5	62.4	103.6	5.85	123.6	17.8	71.6	6.8	15.8	62.5	101.6	5.65	120.9	18.1	68.9	9.6	22.1	
	80	16.0	2.7	6.2	56.1	108.2	7.33	133.2	14.9	97.2	3.9	8.9	56.2	107.0	7.09	131.2	15.2	92.3	6.5	14.9	56.4	105.8	6.86	129.2	15.5	89.5	9.1	20.9	
		22.0	5.5	12.7	59.7	110.2	7.37	135.3	15.1	97.4	3.9	8.9	59.8	108.6	7.13	133.0	15.3	92.5	6.5	14.9	60.0	107.1	6.89	130.6	15.7	89.6	9.1	20.9	
		28.0	8.3	19.2	61.7	112.1	7.42	137.5	15.2	97.7	3.9	8.9	61.9	110.3	7.17	134.7	15.5	92.6	6.5	14.9	62.0	108.4	6.91	132.0	15.8	89.7	9.1	20.9	
	100																												
	90	50	16.0	2.5	5.8	75.1	115.9	5.59	134.9	20.7	67.4	4.2	9.7	75.6	111.5	5.37	129.8	20.8	62.2	7.0	16.2	76.2	107.1	5.14	124.6	20.8	59.2	9.8	22.6
			22.0	5.2	12.0	79.1	116.5	5.60	135.6	20.8	67.5	4.2	9.7	79.5	111.9	5.37	130.2	20.8	62.2	7.0	16.2	80.0	107.2	5.14	124.7	20.9	59.2	9.8	22.6
28.0			7.8	18.0	81.4	117.1	5.61	136.3	20.9	67.6	4.2	9.7	81.7	112.2	5.38	130.6	20.9	62.2	7.0	16.2	82.1	107.3	5.14	124.9	20.9	59.2	9.8	22.6	
60		16.0	2.5	5.8	56.9	120.1	6.34	141.8	19.1	78.3	4.1	9.5	75.0	116.2	6.09	136.9	19.3	72.8	6.8	15.8	75.5	112.2	5.84	132.1	19.4	69.7	9.6	22.1	
		22.0	5.2	12.0	78.7	121.0	6.37	142.8	19.2	78.4	4.1	9.5	79.1	116.8	6.10	137.6	19.3	72.9	6.8	15.8	79.5	112.5	5.84	132.4	19.4	69.8	9.6	22.1	
		28.0	7.8	18.0	81.0	121.9	6.39	143.8	19.3	78.5	4.1	9.5	81.4	117.4	6.12	138.2	19.4	73.0	6.8	15.8	81.7	112.8	5.85	132.7	19.4	69.8	9.6	22.1	
80		16.0	2.5	5.8	55.8	128.6	7.85	155.4	16.5	100.0	3.9	8.9	73.8	125.5	7.54	151.3	16.8	94.2	6.5	14.9	74.2	122.5	7.23	147.1	17.0	90.8	9.1	20.9	
		22.0	5.2	12.0	77.8	130.1	7.90	157.0	16.6	100.2	3.9	8.9	78.1	126.6	7.57	152.4	16.8	94.3	6.5	14.9	78.5	123.0	7.25	147.8	17.1	90.9	9.1	20.9	
		28.0	7.8	18.0	80.3	131.6	7.95	158.7	16.6	100.4	3.9	8.9	80.6	127.6	7.61	153.5	16.9	94.4	6.5	14.9	80.9	123.6	7.27	148.4	17.1	90.9	9.1	20.9	
100																													

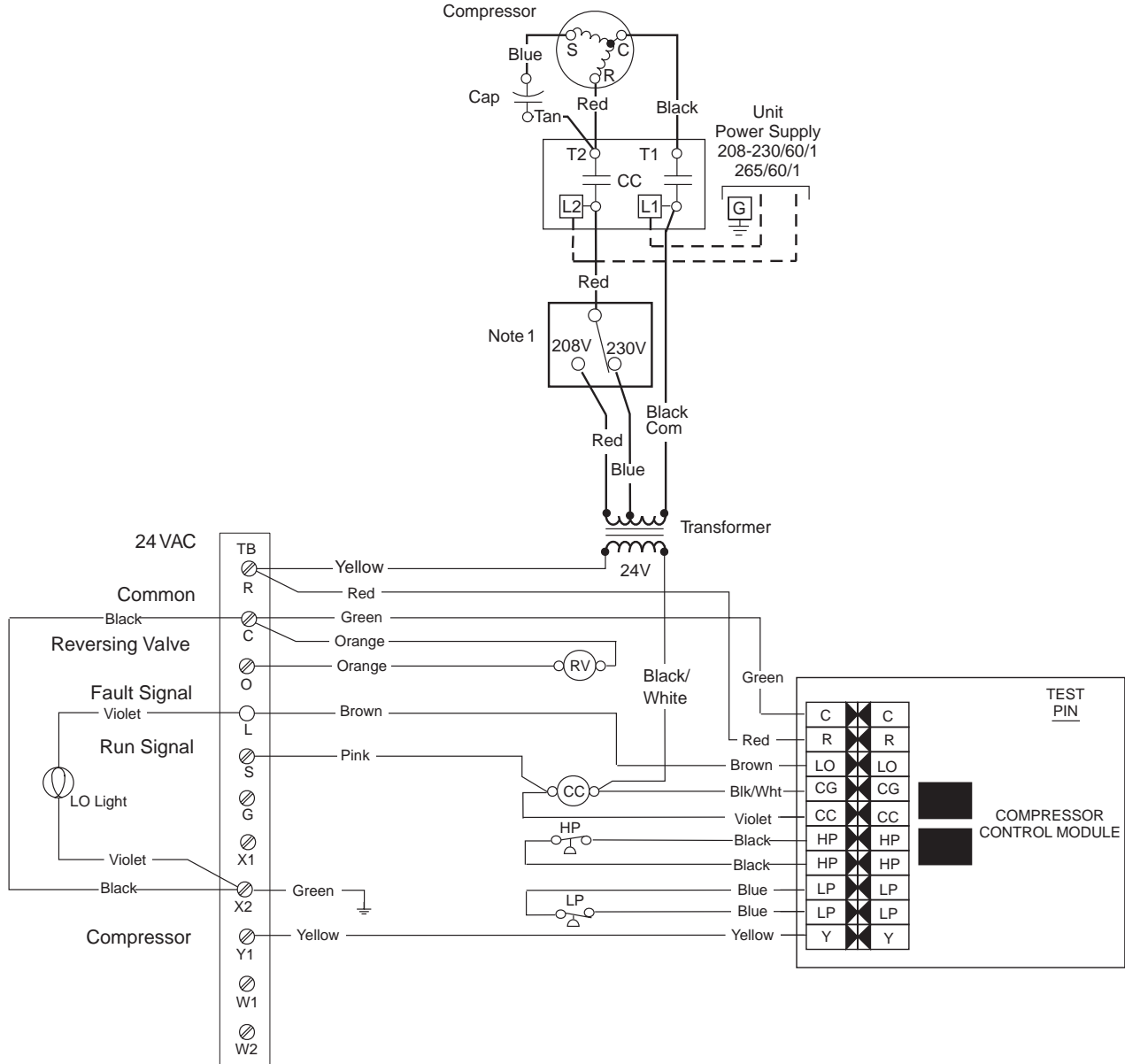
Notes: Multiple flow rates for source side and load side are shown. When selecting units and designing the system, actual operating parameters must fall within the temperature and flow rate ranges shown on the table. Using temperature/flow rate combinations outside the range of the table will result in performance problems. For 3 phase capacity, multiply above data by .948. For 3 phase power, multiply above data by .943.

Rev. 11/22/2005

Wiring Schematics

Versatec Series Water-to-Water - 208-230/60/1

97P641-16 8/21/02



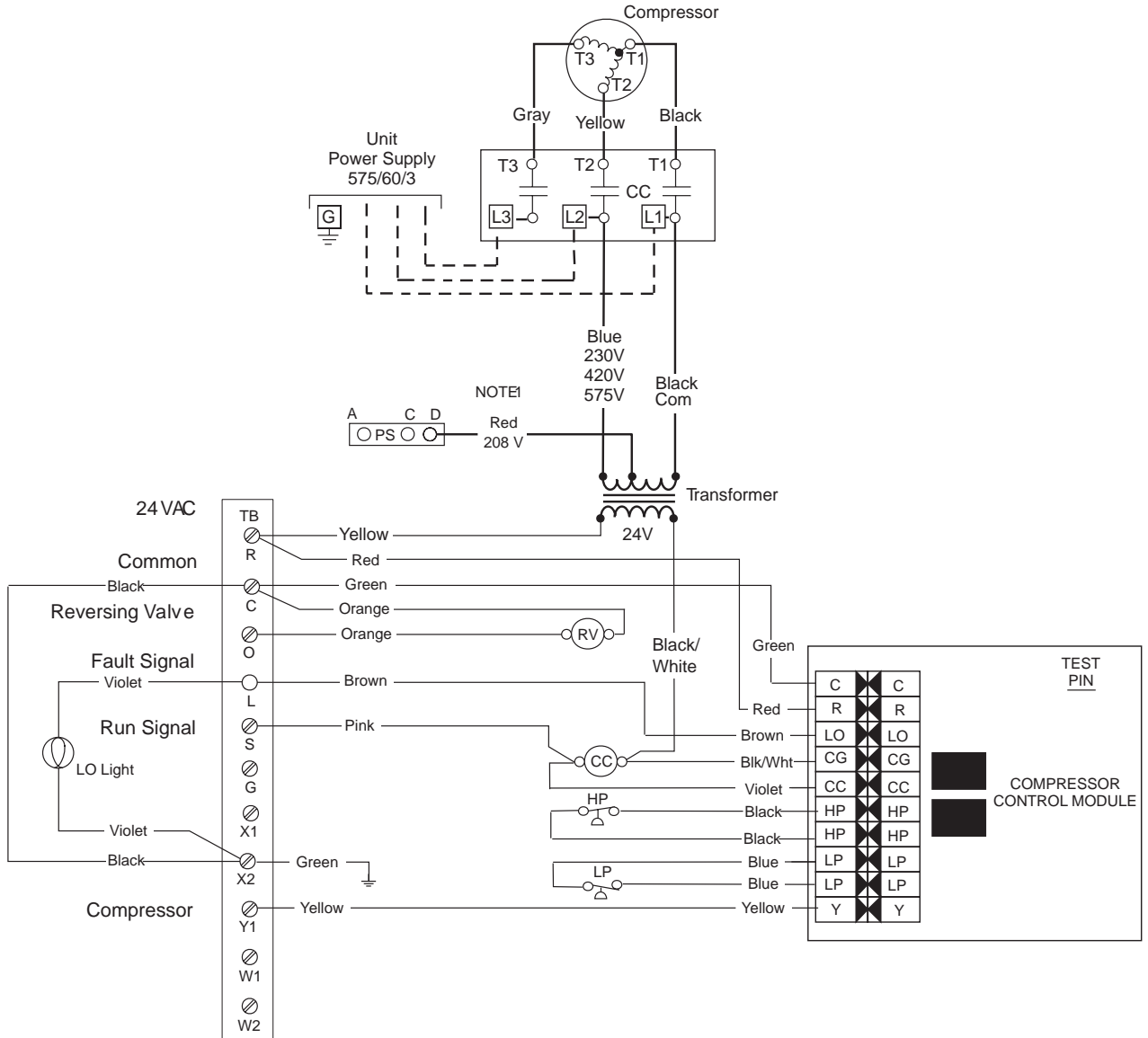
Legend			
	Factory low voltage wiring	CCM - Compressor Control Module	
	Factory line voltage wiring	CC - Compressor contactor	
	Field low voltage wiring	HP - High pressure switch	
	Field line voltage wiring	LP - Low pressure switch	
	Optional block	RV - Reversing valve coil	
	Quick connect terminal	TB - Terminal board	
	Screw terminal - field connection		

Notes:
1 - For 208V - 230V operation place transformer switch to desired voltage. (Not available on 265 V)

Wiring Schematics (cont.)

Versatec Series Water-to-Water - 208-230, 480, 575/60/3

97P641-14 8/21/02

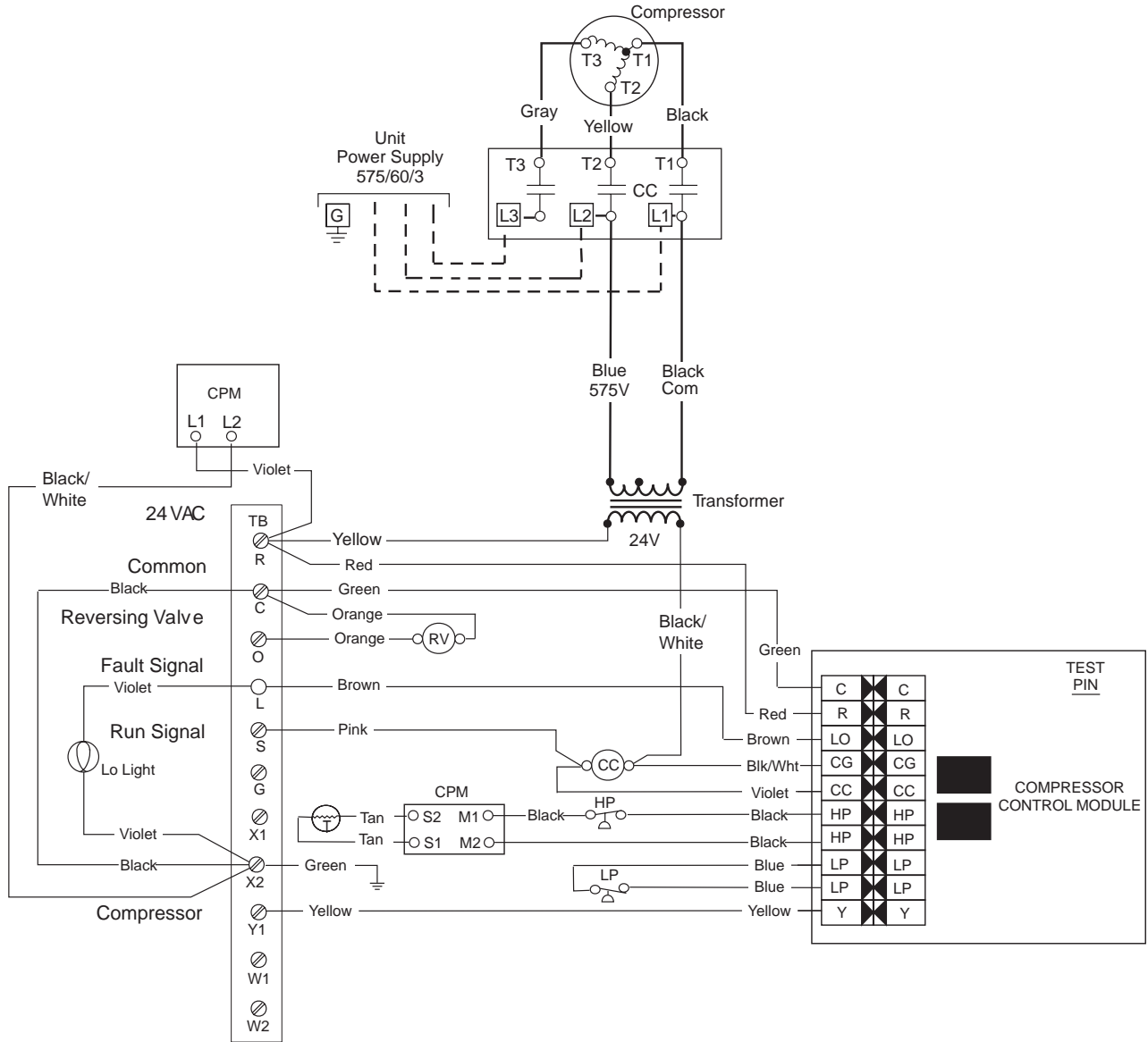


Legend			
<ul style="list-style-type: none"> — Factory low voltage wiring — Factory line voltage wiring Field low voltage wiring --- Field line voltage wiring - - - - - Optional block ○ Quick connect terminal ⊗ Screw terminal - field connection 	<ul style="list-style-type: none"> CCM - Compressor Control Module CC - Compressor contactor HP - High pressure switch LP - Low pressure switch RV - Reversing valve coil TB - Terminal board 	<ul style="list-style-type: none"> L1 Field wire lug ⊕ Ground ⊢ Relay Contacts - N.O., N.C. P Polarized connector 	<ul style="list-style-type: none"> ⊗ Switch - High pressure ⊗ Switch - Low pressure ⊗ Relay coil ⊗ Capacitor
			<p>Notes:</p> <p>1- Switch blue and red wires for 208V operation</p>

Wiring Schematics (cont.)

Versatec Series Water-to-Water - 575/60/3

97P641-12 10/10/02



Legend			
<ul style="list-style-type: none"> — Factory low voltage wiring — Factory line voltage wiring ----- Field low voltage wiring - - - - - Field line voltage wiring ----- Optional block ○ Quick connect terminal ⊗ Screw terminal - field connection 	<ul style="list-style-type: none"> CCM - Compressor Control Module CC - Compressor contactor HP - High pressure switch LP - Low pressure switch RV - Reversing valve coil TB - Terminal board CPM - Compressor Protection Module 	<ul style="list-style-type: none"> [L1] Field wire lug ⊕ Ground ⎓ Relay Contacts - N.O., N.C. P Polarized connector 	<ul style="list-style-type: none"> ⊗ Switch - High pressure ⊙ Switch - Low pressure ⊙ Relay coil
			Notes:

Engineering Guide Specifications

General

The liquid source water-to-water heat pump shall be a single packaged reverse-cycle heating/cooling unit. The unit shall be listed by a nationally recognized safety-testing laboratory or agency, such as ETL Testing Laboratory. Each unit shall be computer run-tested at the factory. Each unit shall be pallet mounted and stretch wrapped.

The units shall be warranted by the manufacturer against defects in materials and workmanship for a period of 18 months from ship date. Optional extended warranties providing coverage for five years shall be available.

Casing and Cabinet

The cabinet shall be fabricated from heavy-gauge galvanized steel with a durable powder coat painted finish. The interior shall be insulated with 1/2-inch thick, multi-density, coated glass fiber with edges sealed or tucked under flanges. All units shall have 7/8-inch and 1-1/8-inch knockouts for entrance of low and line voltage wiring.

Refrigerant Circuit

All units shall contain a sealed refrigerant circuit including a hermetic motor-compressor, bidirectional thermal expansion valve assembly, reversing valve, two (2) coaxial tube water-to-refrigerant heat exchangers, factory-installed high- and low-pressure safety switches and service ports, and a liquid line filter-dryer.

Compressors shall be designed for heat pump duty with internal isolation and mounted on rubber vibration isolators. Compressor motors shall have overload protection and shall be three-phase or single-phase PSC type.

The water-to-refrigerant heat exchangers shall be a coaxial type constructed of a convoluted copper (optional cupronickel) inner tube and a steel outer tube capable of withstanding 450 PSIG working pressure on the refrigerant and water sides. The thermal expansion valve assembly shall provide proper superheat over the liquid temperature range with minimal "hunting." The assembly shall operate bidirectionally without the use of check valves. Externally mounted pressure controlled water regulating flow valves are not acceptable.

Refrigerant suction lines shall be insulated to prevent condensation at low liquid temperatures (VX series only).

Electrical

Controls and safety devices will be factory wired and mounted within the unit. Controls shall include compressor contactor, 24VAC-75VA transformer with built-in circuit breaker, reversing valve coil, and compressor control module (CCM). A terminal block with screw terminals will be provided for field control wiring. To prevent short cycling when the safety controls are activated, the (CCM) shall provide a lockout circuit that requires resetting of low voltage supply or main circuit breaker. A lockout indicating light shall be provided on the outside of the cabinet.

Piping

All supply and return water connections shall be FPT flush-mounted copper threaded fittings mechanically fastened to the unit cabinet, eliminating the need for backup wrenches when making field piping connections. All water piping shall be insulated to prevent condensation at low liquid temperatures (VX models).

Accessories and Other Options

Solenoid Valve (Field Installed)

To accommodate the need to stop liquid flow through either side of the water-to-water unit, a 24 VAC solenoid valve (24 VA maximum current draw) shall be furnished. Dual solenoid or larger current valves may overload the unit's transformer and may require a separate transformer. It/they shall be wired to the heat pump so as to be energized whenever there is a call for compressor operation. The solenoid valve(s) will be quick opening and spring returned closed. Slow opening valves will be acceptable only if equipped with an end switch to permit compressor operation only after full opening. The body size of the valve(s) shall match the water connection size(s) of the heat pump.

Earth Loop Pump Kit (Field Installed)

A specially designed one- or two-pump module shall provide all liquid flow, fill and connection requirements for independent single unit systems, 230/1/60 only. The one-

pump module is good to 20 feet of head at 16.0 GPM while the two-pump module is good to 40 feet of head at 16.0 GPM.

Accessory Power Relay (Field Installed)

A 240 volt-power supply relay (energized with compressor) with in-line fusing shall be provided. The relay may be factory wired. (Only available on 208/230V single-phase units and requires neutral line at unit). Used to control some accessories.

Hanger Kit (Field Installed 036 & 060 models only)

The hanger kit accessory consists of galvanized steel brackets, bolts, lock washers, and rubber isolators. It shall be designed to fasten to the unit bottom panel for suspension from 3/8" threaded rods (by others).

Freeze Protection Kits

FPK - Freeze protection Kit 39° F +1-2°.

FPKCL - Freeze protection Kit 20° F +1-2°.



Manufactured by
WaterFurnace International, Inc.
9000 Conservation Way
Fort Wayne, IN 46809
www.waterfurnace.com

WFI has a policy of continuous product research and development and reserves the right to change design and specifications without notice.
©2007 WFI.

Product:	Versatec
Type:	Water-to-Water Heat Pumps
Size:	3, 5, 7, 10 Tons
Document Type:	Specification Catalog
Part Number:	SP1355
Release Date:	05/07
Supercedes:	SP1355 (08/06)