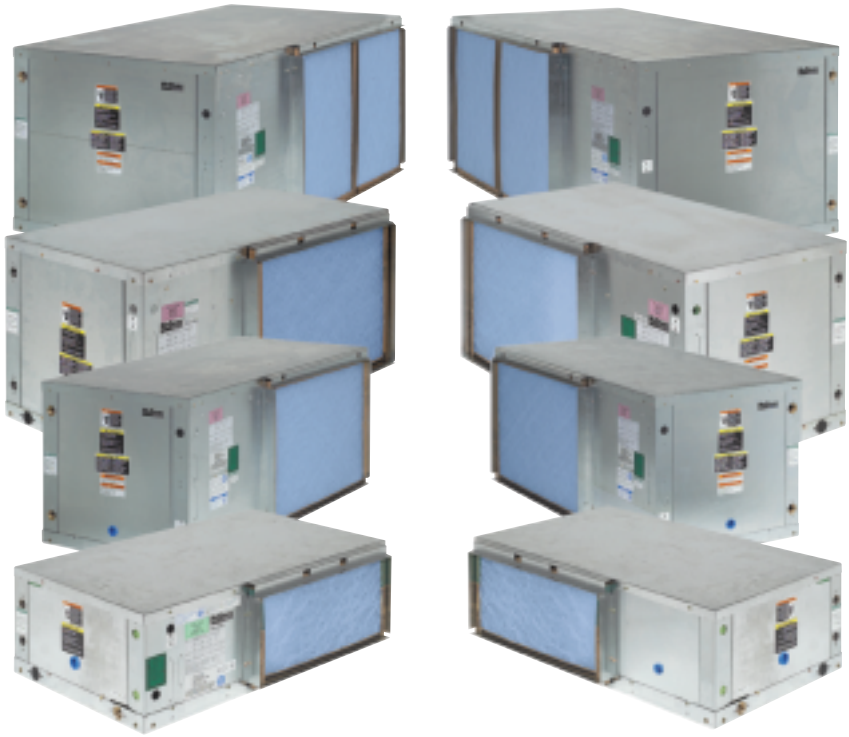
Catalog

1100-1

McQuay Enfinity™ Horizontal Water Source Heat Pumps

Ceiling Concealed
Standard and Extended Range Unit Sizes 1/2 to 5 Tons



McQuay® Air Conditioning

Product Development

McQuay Enfinity™ water source heat pumps have been designed and tested to meet all of your heating and cooling needs with features that deliver low design and installation costs, high energy efficiency, good indoor air quality, easy maintenance, low noise levels, and environmentally friendly operation. Horizontal units are offered in a range of capacities from 1/2 to 5-tons. All sizes are available for Standard Range (Model CCH - 55°F to 110°F) or Extended Range/ Geothermal (Model CCW - 25°F to 110°F) operation.

Our product development team has done their homework, starting with 34 years of building the industry standard in water source heat pumps. McQuay spent the last 2 years researching not only today's market, but the future needs of our customers. Engineers, contractors, owners, service techs, and sales representatives told us what was important.

The result is that the McQuay Enfinity Water Source Heat Pump system delivers the best combination of energy efficiency, compact size, flexibility, low noise, control integration, and indoor air quality features. And McQuay Enfinity Water Source Heat Pumps offer the broadest range of environmentally friendly R-410A refrigerant.

Whether you are designing an energy efficient green building, or retrofitting an existing building to lower your operating costs, McQuay Enfinity heat pumps offer you the flexibility to reduce your installation and operating costs while exceeding all energy codes.

McQuay Air Conditioning plant with over 450,000 square feet of manufacturing space - located in Auburn, New York

Enfinity Design Features

Fan Section

Fan section is separated from the compressor section with an insulated divider panel for maximum sound attenuation. A large removable panel provides easy service access to the blower and motor.

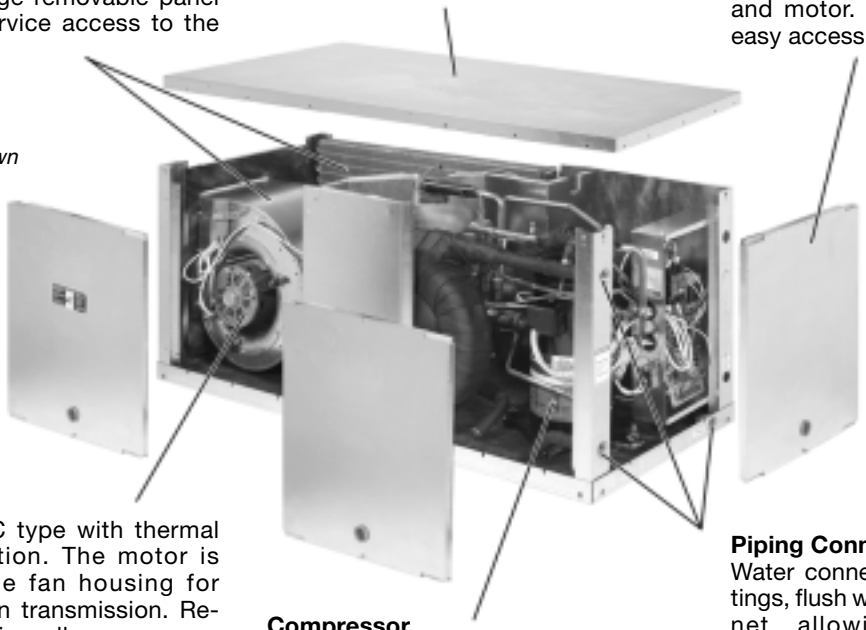
Right Hand Return, End Discharge Shown

Compact Cabinet

Constructed of unpainted G-60 galvanized steel, with the lowest possible profile.

Removable Access Panels

Two side panels provide easy access to compressor compartment, blower and motor. One end panel provides easy access to the unit controls.



Blower Motor

Multi-speed, PSC type with thermal overload protection. The motor is isolated from the fan housing for minimum vibration transmission. Removable orifice ring allows easy removal of blower and motor.

Compressor

Mounted close to the access panel for maximum serviceability and isolated from the bottom panel with rubber isolators.

Piping Connections

Water connections are FPT water fittings, flush with the outside of the cabinet, allowing easy one wrench connection of units. The large condensate connection provides proper condensate removal.

Table of Contents

The information in this manual supersedes and replaces previous (catalogues/manuals)(bulletins) with regards to McQuay Water Source Heat Pump products. Illustrations cover the general appearance of McQuay International products at the time of publication and McQuay International reserves the right to make changes in design and construction at anytime without notice.

Design Advantages

Improving Quality With Design and Construction

Low Design And Installation Costs

- Four configurations for each unit size (left or right return and straight or end discharge) allow you to specify units to fit space requirements and to design the system using minimum ductwork and piping.
- Four cabinet sizes, each with McQuay's low-profile design, make it easy to meet the space requirements of your new construction or replacement application.
- Flush FPT water fittings allow easy, one wrench connection of units and help reduce delays caused by shipping damage.
- Flexible control options that include standalone or network operation with the building automation system of your choice using LonMark® or native BACnet® communications.
- Unit hangers are adjustable on 8 points to provide maximum flexibility to install units around obstructions or use existing hangers from units that are being replaced.

High Energy Efficiency

- High unit EERs result in low operating costs.
- Each unit includes a thermal expansion valve for precise refrigerant flow metering to meet load requirements and increase efficiency at any fluid temperature -including low temperature geothermal applications.
- The coaxial heat exchanger is designed for maximum heat transfer at normal and low water flow rates with minimum pressure drop.
- High efficiency fan motor and low speed fan operation reduce energy consumption.

Good Indoor Air Quality

- A standard, corrosion-free plastic drain pan is double-sloped to eliminate standing water and inhibit microbial growth.
- Optional non-fibrous insulation is available for sensitive applications.

Easy, Low-Cost Maintenance

- Easy access to the unit compressor (2-sides), fan and motor (1-side) and controls (end access).
- A removable orifice ring allows the blower and motor to be removed without removing the blower housing or disconnecting the unit from the ductwork.

Quiet, Environmentally Friendly Operation

- Large fan wheel allows the fan motor to operate at lower speed for quieter operation.
- Heavy gauge cabinet construction and vibration isolated hanger brackets minimize noise and vibration.
- Three quiet compressor selections (depending on voltage and size variations) including rotary (sizes 007 to 012), reciprocating (sizes 019 to 024) and scroll compressors (sizes 030 to 060).
- R-410A refrigerant (sizes 019 to 060) is a safe, non-ozone depleting HFC refrigerant.
- R-22 refrigerant (sizes 007 to 012) is safe and reliable.

Removable Panels Provide Easy Access

Unit Features

Flexible Cabinet Configurations

Cabinet

McQuay Enfinity horizontal water source heat pumps are available in four unique cabinet sizes each with the lowest possible profile to conserve space. The consistent shape and similar parts and assemblies throughout the four cabinets makes layout and installation simple. Water, condensate and duct connections are all in similar locations to simplify installation.

The cabinet is constructed of unpainted G-60 galvanized steel. All water connections and electrical connections are made from the front of the unit. The cabinet front offers a large lift up and out access panel for access to the control box, refrigeration circuit and compressor. A second large access panel on the side of the compressor section also provides easy service access. A third access panel of the same size allows complete service of the blower section without the need to remove the unit. The interiors of the top and side panels and the bottom of the unit are covered with 1/2" (12.7 mm) thick, $1^1/_2$ lb. (681g) density, coated, acoustic type glass fiber insulation.

Cabinet Configurations

McQuay Enfinity horizontal heat pumps offer four configurations to meet your space requirements (Figure 6A - Left Return/End Discharge, Figure 6B - Left Return/Straight Discharge, Figure 6C - Right Return/End Discharge, Figure 6D - Right Return/Straight Discharge). Whether working around obstacles or laying out units down a corridor, the mirror image design of the units will allow you to design the system using minimum ductwork and piping. This helps reduce design, material and installation costs.

For maximum flexibility, the fan discharge can exit from the end or side of the unit. This can be configured at the factory or field converted using interchangeable side and end panels.

Cabinet Configurations – Left Hand

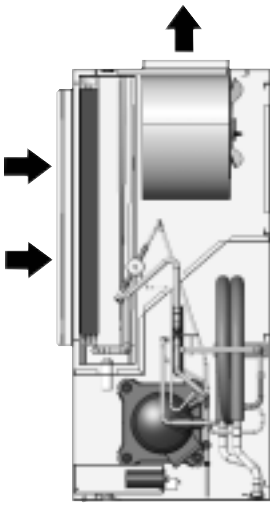


Figure 6A - Left Hand Return with End Discharge

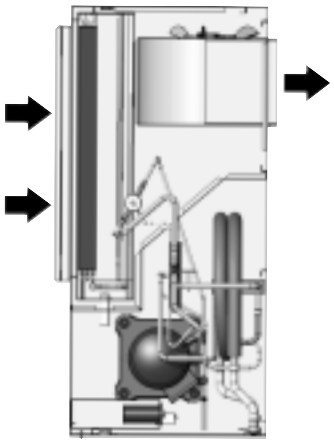


Figure 6B - Left Hand Return with Straight Discharge

Cabinet Configurations – Right Hand

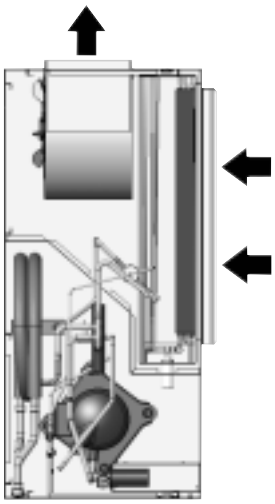


Figure 6C - Right Hand Return with End Discharge

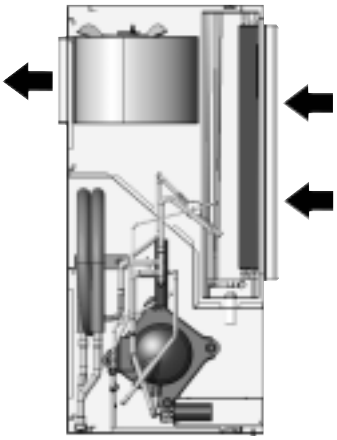
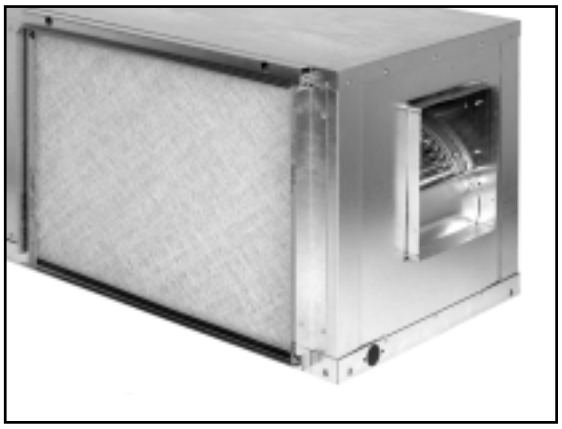


Figure 6D - Right Hand Return with Straight Discharge

Unit Features

Filter Rack

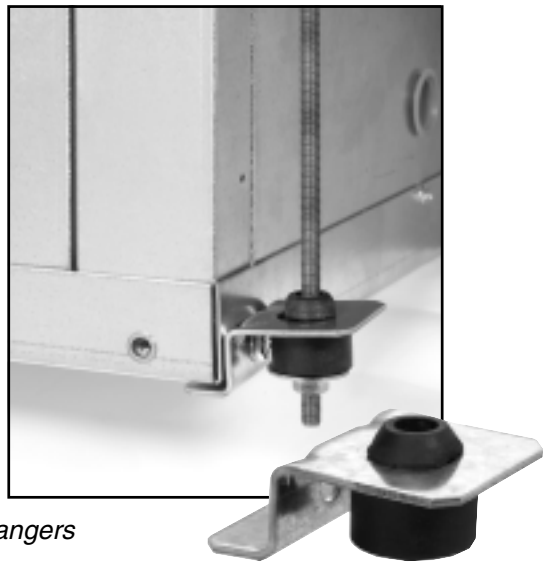
The filter is supported by factory mounted brackets that allow for face removal. Units come standard with a 1" (25.4 mm) thick throwaway filter mounted in a combination filter rack and return air duct collar, thus eliminating field mounted brackets. The filters can be removed from either side or from the front.



Filter Mounting Brackets

Hanger Bracket

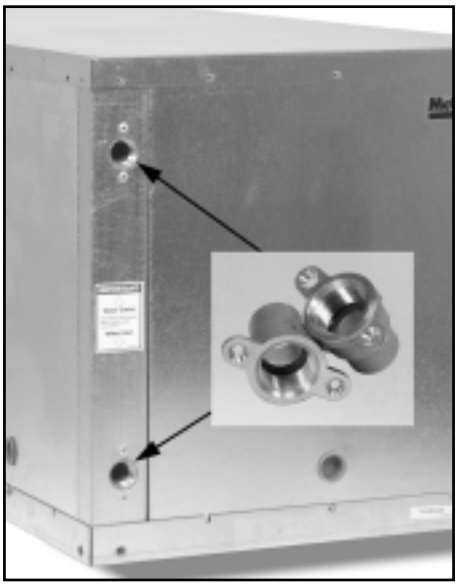
Each unit is furnished with a hanger kit that can be mounted at any one of eight locations. Each cabinet is constructed with a fastener on each side of the corner post, which is an integral part of the cabinet structure. This allows the installer to optimize the placement of the unit and fit the job's hanger rod locations. This can also simplify the replacement of older equipment using existing hanger rods. The kit includes hanger brackets, rubber isolators (for sound and vibration attentuation), washers, bolts and lock washers.



Unit Hangers

Water Connections

The water and condensate connections are FPT fittings, securely mounted flush to the corner post to allow for connection to a flexible hose without the use of a back-up wrench. This helps reduce the time required to connect the unit and helps prevent delays due to shipping damage.



Flush FPT Water Fittings

Electrical

The electrical components are located in the compressor section of the unit. Separate holes are provided on the cabinet to facilitate main power and low voltage control wiring. All wiring connections are made internal to the cabinet for maximum safety. Each unit is rated to accept time delay fuses for branch circuit overcurrent protection. Single phase units are also rated for use with HACR circuit breakers.

Unit Features

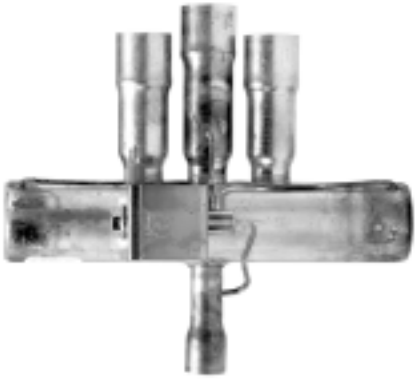
Compressor

McQuay Enfinity water source heat pumps are designed around the most advanced compressors in the industry. A wide variety of compressor types are used to offer the best system design for the dedicated refrigerants and tonnage. This allows McQuay Enfinity water source heat pumps to deliver the widest selection of non-CFC refrigerants, while delivering the rated capacity with low noise levels.

R-410A non-CFC refrigerant is used in 19,000 to 60,000 Btuh units. Sizes 7,000 Btuh to 12,000 Btuh use R-22 refrigerant together with proven Rotary compressor technology. Sizes 19,000 Btuh to 24,000 Btuh use a Reciprocating type compressor. Sizes 30,000 to 60,000 Btuh use a scroll compressor.

Reversing Valve

A 4-way reversing valve is included with all McQuay Enfinity water source heat pumps. The valve is energized in the heating mode and will "fail-safe" to the cooling mode which is the predominant mode of operation for commercial applications.



4-Way Reversing Valve

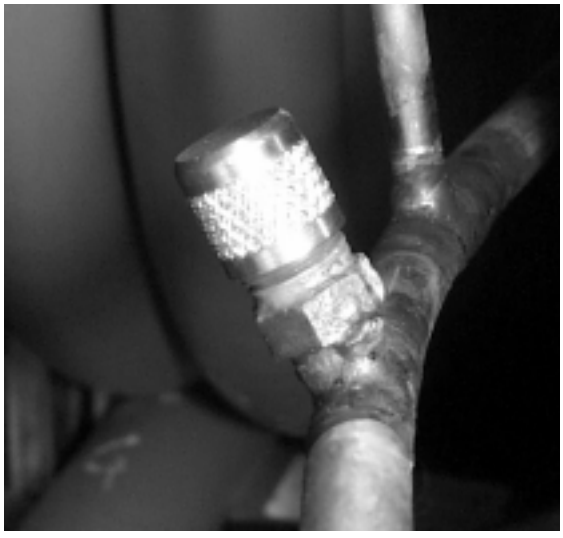
Thermal Expansion Valve

All McQuay Enfinity water source heat pump units include a thermal expansion valve for refrigerant metering. The Thermal Expansion Valve (TXV) allows the unit to operate at optimum efficiency with fluid temperatures ranging from 25°F to 110°F, and entering air temperatures ranging from 40°F to 90°F. The TXV precisely meters the exact amount of refrigerant flow through the system to meet the load and deliver rated heating and cooling capacity.

Thermal Expansion (TXV) Valve

Schrader Connections

Two Schrader valves are located inside the end access panel – one on the low side and one on the high side of the refrigeration circuit – for charging and servicing. All valves are 7/16" SAE fittings regardless of refrigerant type.



Schrader Valve

Unit Features

Fluid-to-Refrigerant Coil

The copper or cupro-nickel (optional) tube-in-tube coaxial heat exchanger used in McQuay Enfinity water source heat pumps are designed for maximum heat transfer at normal and low water flow rates with minimum pressure drop. The inside tube is deeply fluted to enhance heat transfer and minimize fouling. All coaxial coils are tested to 400 psig on the water side and 500 psig on the refrigerant side. Extended range (CCW) units include coil and piping insulation to protect against condensation in low temperature geothermal applications.

Coaxial Heat Exchanger

Air-to-Refrigerant Coil

The air-to-refrigerant heat exchanger is a large face area coil with copper tubes and aluminum fins. The fins are lanced and mechanically bonded to the tubes using finned edges on the inside which expand during assembly to enhance heat transfer capabilities. The maximum working pressure of the heat exchanger is 500 psig. The coil is designed for optimal performance in both heating and cooling while maintaining the benefit of a compact size.

Refrigeration System

Units have a coaxial heat exchanger with a copper inner tube and a steel outer tube. The air coil is a large face area coil with copper tubes and aluminum fins. Safety controls include high pressure and low temperature switch to lock out compressor operation at extreme conditions. For additional protection, units have a 7psi (48 kPa) low pressure switch to protect the compressor from low refrigerant charge. The low setting prevents nuisance trips while providing additional protection.

Blower Section

The blower section includes the blower housing, wheel, motor and drain pan. The blower section is separated from the compressor section with an insulated divider panel for maximum sound attenuation. The large size of the blower wheel allows it to rotate more slowly, reducing motor work to improve efficiency and provide for quiet operation. A large panel provides service access to the blower and motor. All blower/motor assemblies have a removable orifice ring on the housing to accommodate motor and blower removal without disconnecting the unit from the ductwork.

For maximum flexibility, the fan discharge can exit from the end or side of the unit. This can be configured at the factory or field converted using interchangeable side and end panels.

Removable Orifice Ring
for Easy Blower and Motor Removal

Unit Features

Blower Motor

The blower motor is a multi-speed, PSC type with thermal overload protection. The motor is permanently lubricated. All motors are factory wired to maximize performance and efficiency. Unit sizes 19,000 Btuh and larger have a terminal strip on the motor for simple motor speed change without going back to the control box. The motor is isolated from the fan housing using rubber isolators to minimize vibration transmission. All blower/motor assemblies have a removable orifice ring on the housing to accommodate motor and blower removal without disconnecting the unit from the ductwork.

High Efficiency Blower Motor

Blower Housing

The blower housing protrudes through the cabinet allowing adequate material for connection to a flexible duct. For maximum flexibility, the fan discharge can exit from the end or the side of the unit. This can be configured at the factory or can be field converted before installation using interchangeable side and end panels.

Fan Housing Protrudes Through the Cabinet for Connection of Flexible Duct

Drain Pan

All McQuay Enfinity heat pumps come standard with a corrosion-resistant plastic drain pan to promote good indoor air quality. The pan is double sloped for positive draining to reduce the occurence of standing water and prevent microbial growth.

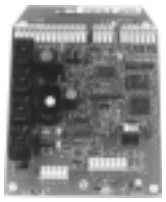
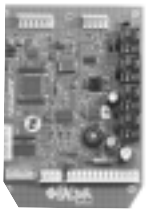
Corrosion-Resistant, Double Sloped Plastic Drain Pan

Control Options – 3 Unique Control Systems

The control box is accessible through a panel on the front of the unit. It houses the major operating electrical controls including the control circuit board, transformer, compressor relay and fan relay. Each component is easily accessed for service or replacement.

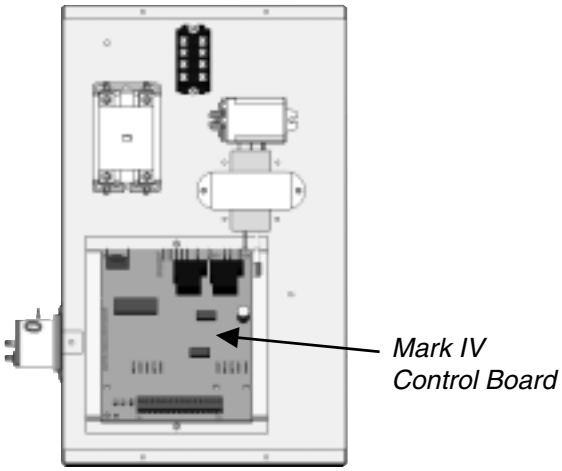
Three unique control systems are offered with McQuay Enfinity water source heat pumps. Mark IV/AC, MicroTech™ 2000 (LonWorks®) or BACnet® unit controllers all provide microprocessor-based control. Each option features direct quick-connect wiring to all unit-controlled components for "clean" wiring inside the control box. Each control circuit board receives power from a 50 VA transformer.

The Mark IV/AC unit controllers can communicate to a higher lever building automation system (BAS) by others or a McQuay MicroTech Loop Water Control (LWC) panel via hardwired terminal strip only. The MicroTech 2000 unit controller is capable of communicating via LonTalk® protocol to a LonWorks communications network by others. The BACnet unit controller is capable of communicating via BACnet protocol to a BACnet BACtalk® BAS communications network by Alerton.

Control	Description	Application	Protocol
Mark IV 	The Mark IV/AC control board is a microprocessor-based control board conveniently located in the unit control box for accessiblity, with a 14-pin low voltage terminal strip.	McQuay Enfinity water source heat pumps with Mark IV/AC controllers are designed to operate as a standalone network, outside of a centralized communications network.	Standalone
MicroTech 2000 	The MicroTech 2000 unit controller is microprocessor-based and is designed to communicate over a LonWorks communications network. The unit controller is factory programmed and tested with all the logic required to monitor and control the unit. The controller sets the unit mode of operation, monitors water and air temperatures, and can communicate fault conditions to a LonWorks communications network.	McQuay Enfinity water source heat pumps with MicroTech 2000 controllers are designed to be linked with a centralized building automation system through a LonWorks communications network for centralized scheduling and management of multiple heat pumps.	LonTalk
BACnet 	The BACnet unit controller is microprocessor-based and is designed to communicate over a BACnet communications network. The unit controller is factory mounted, programmed and tested with all logic required to monitor and control the unit. The controller sets the unit mode of operation, monitors water and air temperatures, and can communicate fault conditions to a BACnet communications network.	McQuay Enfinity water source heat pumps with BACnet controllers are designed to be linked with an Alerton BACtalk centralized building automation system through a BACnet communications network for centralized scheduling and management of multiple heat pumps.	BACnet (Alerton BACtalk BAS)
Loop Water Controller 	The Loop Water Controller (LWC) is a standalone, factory programmed and tested microprocessor-based controller providing control of the heat rejection/heat addition stages and the water circulating pumps for control of a water source heat pump system through solid-state output relays. The controller includes a keypad and display to view all status conditions, temperatures, setpoints and alarm conditions.	Used in traditional single loop systems; closed-circuit evaporative cooler, boiler, primary pump and standby pump systems; or two-loop systems with the heat pump loop having a boiler, primary pump and standby pump separated by a water-to-water heat exchanger to a condenser water loop with an open cooling tower, primary (stage 1) pump and a standby (stage 2) pump.	Standalone (designed to communicate with Mark IV unit controllers)

Control Features – Mark IV/AC Control System

The Mark IV/AC control system is a microprocessor-based control board conveniently located in the unit control box for accessibility. Mark IV/AC controllers include a 14-pin low voltage terminal strip for a hardwired interface for all the necessary field connections. LED's are located in front for quick inspection. The board can be wired for 24-volt AC output to the wall thermostat by using terminals R & C. If a DC voltage output to the thermostat is required, use terminals F & V. This allows you to choose the control output voltage to accommodate controls by others or accessories.



The Mark IV/AC control system has the following operating features (assumes cycle fan operation-not continuous fan operation):

- **Start-up –** The unit will not operate until all the inputs and safety controls are checked for normal conditions.
- **Cooling mode –** On a call for cooling, the compressor and fan will start 0 to 32 seconds later. When the load is satisfied, the compressor and fan shut off immediately.
- **Heating Mode –** On a call for heating, the reversing valve is energized after 60 seconds and the compressor and fan start immediately. When the load is satisfied, the compressor and fan shut off immediately. The reversing valve is de-energized 60 seconds later to eliminate "swish" noise and to allow the compressor to always start up at equalized pressure.
- **Short Cycle Protection & Random Start –** Each time the compressor stops, a new random compressor start-delay time between 180 and 212 seconds is generated. This prevents compressor short cycling and prevents units from starting simultaneously after coming back from an unoccupied cycle.
- **Unoccupied Mode –** A simple "grounded" signal, no power source required, puts the unit into the unoccupied mode for night setback operation. The fan shuts off and the unit controls to the setpoint from the setback bulb of the thermostat. The day heating thermostat control and cooling is locked out. A unique LED status is generated to indicate the unoccupied mode. On a call for heating, the fan and the compressor start after 60 seconds.
- **Override Mode –** A switch on the deluxe automatic changeover thermostat can be activated during the unoccupied mode to put the unit back into the occupied mode for two hours for after-hours heating or cooling.
- **Pump Restart –** A signal from the Mark IV/AC board to our Loop Water Control Panel will restart the water circulating loop pump when the compressor is energized. The signal can be "daisy chained" between 200 units.
- **Load Shed –** A simple grounded signal puts the unit into the load-shed mode. The compressor shuts off and the fan starts on a call for heating and cooling. A unique LED status is generated to indicate the load-shed mode.
- **Brownout Protection –** The Mark IV/AC board measures the input voltage and will suspend compressor and fan operation should the voltage fall below 80% of the normal line voltage. A unique LED status is generated and an output is available to a "fault" LED at the thermostat.
- **Unit Shutdown –** A simple grounded signal puts the unit into the shutdown mode. Compressor and fan operations are suspended. A unique LED status is generated and an output signal is made available for connection to a "fault" LED at the thermostat.
- **Condensate Overflow Protection –** The Mark IV/AC board incorporates a liquid sensor at the top of the drain pan. Upon sensing water flow, cooling operation is suspended. A unique LED status is generated and output is available to a "fault" LED at the thermostat. Heating operation is not suspended.
- **Safety Control –** The Mark IV/AC board receives separate input signals from the refrigerant high-pressure switch and the low suction temperature (freezestat) switch. In a high-pressure situation, compressor operation is suspended. In a low temperature situation, the unit goes into a defrost cycle where the unit is put into cooling operation for 60 seconds until the coaxial heat exchanger is free of ice. Each switch generates its own unique LED status and output is available to a "fault" LED at the thermostat if either situation exists. For additional protection, units have a 7psi (48 kPa) low pressure switch to protect the compressor from low refrigerant charge. The low setting prevents nuisance trips while providing additional protection.

Mark IV/AC LED & fault outputs

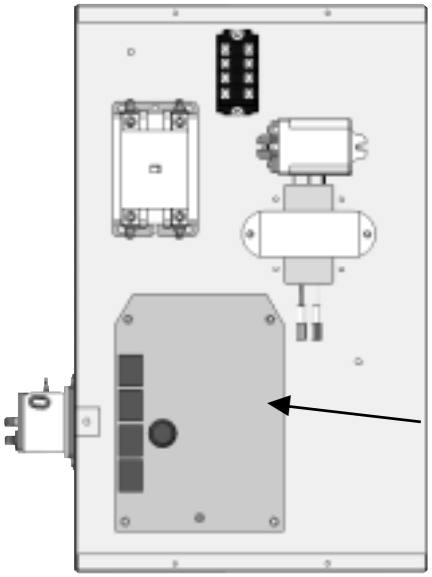
Indication	LED			Fault
	Yellow	Green	Red	Output
Normal Mode	Off	On	Off	Off
Pressure Fault	Off	On	Flash	On
Low Temperature Fault*	Flash	Off	Off	On
Condensate Overflow**	On	Dim	Off	On
Brownout	Off	Flash	Off	On
Load Shed	Off	Off	On	Off
Unoccupied Mode	On	On	Off	Off
Unit Shutdown	Off	Flash	Off	On

* Only in the heating mode ** Only in the cooling mode

Control Features – MicroTech™ 2000 Controller

Each McQuay Enfinity horizontal water source heat pump can be equipped with a MicroTech 2000 water source heat pump unit controller. The controller is microprocessor-based and is designed to communicate over a LonWorks communications network. The unit controller is factory programmed and tested with all the logic required to monitor and control the unit. The controller sets the unit mode of operation, monitors water and air temperatures, and can communicate fault conditions to a LonWorks communications network.

The MicroTech 2000 unit controllers include unit-mounted return air, discharge air and leaving water temperature sensors. Options include a tenant setpoint adjustment knob and tenant override button, and the capability of substituting the return air sensor with a wall-mounted room sensor.



Each unit controller orchestrates the following unit operations:

- Enable heating and cooling to maintain setpoint based on a room sensor.
- Enable fan and compressor operation.
- Monitor all safety controls.
- Monitor discharge air temperature.
- Monitor leaving water temperature.
- Relay status of all vital unit functions.
- Support optional control outputs.

An amber, on-board status LED aids in diagnostics by indicating the water source heat pump operating mode and alarm conditions. If there are no current alarm conditions, the LED will indicate the unit operating mode as shown in the table below. If there are one or more alarm conditions present, the LED will flash to indicate an alarm condition.

MicroTech 2000 heat pumps are designed to be linked with a centralized building automation system through a LonWorks communications network for centralized scheduling and management of multiple heat pumps. Wall-mounted room sensors are available to control the heating and cooling operation of each MicroTech 2000 Water Source Heat Pump Unit Controller. Available room sensors include: room sensor with LED status and tenant override button, room sensor with LED status, timed-override button, and bi-metal thermostat, room sensor with LED status, timed-override button, and setpoint adjustment, and room sensor with LED status, timed-override button, setpoint adjustment and bi-metal thermostat.

MicroTech 2000 Unit Controller LED Indication

Status LED State	Mode
On Continually	Occupied, Occupied Load Shed
On ½ sec., Off 5 ½ sec.	Unoccupied
On 5 ½ sec., Off ½ sec.	Tenant Override, Override Load Shed
Flashing	Alarm Condition

Control Features – BACnet®

McQuay Enfinity horizontal water source heat pumps are available with a factory mounted and tested Alerton BACnet unit controller as a special. The unit controller is factory programmed and tested with all the logic required to control the unit, and is designed to communicate over a BACnet MS/TP communications network to an Alerton BACtalk building automation system (BAS). The controller operates the compressor, fan, and reversing valve as required to maintain the space temperature within the current setpoints. Data regarding equipment status, water and air temperatures, and fault conditions can be monitored by an Alerton BACtalk BAS. Setpoints and other system preferences may be changed remotely using an Alerton BACtalk workstation or Alerton service tool software.

The controller makes operational data and commands available on the Alerton BACtalk network using BACnet objects and properties. Each heat pump controller connects to the BACtalk network using a BACnet MS/TP LAN, which is a simple twisted-pair communications connection that operates at up to 76.8 Kbps. DIP switches on the controller enable the MS/TP MAC address to be set in the range 0-127. A status LED on the unit indicates communication activity on the MS/TP LAN.

BACnet Water Source Heat Pump Controller

Each BACnet-compliant unit includes discharge air and leaving water temperature sensors, as well as all safety sensors, signals, and switches. Wall-mounted room sensors are available from Alerton to control heating and cooling operation. Available sensors include tamper-resistant stainless steel wall sensors with optional push-button for status override; wall-mounted sensors with tenant setpoint adjustment lever and timed-override button; wall-mounted sensors with LED status, timed-override button, tenant setpoint adjustment buttons, password-protected field service access to operational data, and optional humidity sensor; and wall-mounted sensors with LCD and programmable operation.

Each BACnet-compliant controller has the following operating features:

- **Start-up** – The unit will not operate until all the inputs and safety controls are checked for normal conditions.
- **Fan operation** – Fan operation can be customized in software to run continuously during occupied mode, or to cycle ON or OFF appropriately on a call for heating and cooling.
- **Cooling mode** – On a call for cooling, the compressor and fan start immediately. Compressor run-time is calculated as a percent of full cycle time (17 minutes) using proportional-integral control to maximize efficiency.
- **Heating mode** – On a call for heating, the compressor and fan start immediately, and compressor run-time is calculated as a percent of full cycle time (17 minutes) using proportional-integral control to maximize efficiency.
- **Short Cycle Protection and Random Start** – A start delay of 180 seconds plus the compressor's MAC address in seconds prevents short-cycling and simultaneous start-up. A minimum 2-minute on time and 5-minute off time for the compressor further ensures short-cycle protection.
- **Occupied Mode –** A simple software control signal from the building automation system or a wall-mounted unit puts the unit into occupied mode. The unit controls compressor and fan operation to maintain occupied setpoints. High and low limits for occupied setpoints are software configurable.
- **Unoccupied Mode** – A simple software control signal from the building automation system or a wall-mounted unit puts the unit into unoccupied mode for night setback operation. The unit controls compressor and fan operation to maintain unoccupied heating and cooling setpoints, which are also software configurable.
- **After-hours Override Mode** – A simple software control signal from the building automation system or a wall-mounted unit can initiate after-hours heating or cooling in half-hour increments. Maximum override time is software configurable up to 9.5 hours. This feature can also be disabled in software.
- **Reversing valve delay** – When the compressor turns off after heating mode, the reversing valve remains energized for 60 seconds before it returns to the normal cooling position to eliminate swishing. The reversing valve energizes 10 seconds before the compressor.
- **Load Shed** – Load shedding can be orchestrated by the building automation system using the occupied/unoccupied command in software.
- **Brownout Protection** – An onboard sensor measures input voltage and suspends compressor and fan operation if the supply voltage drops below 82% of the normal line voltage for a minimum of 10 seconds, creating an alarm available in software. The alarm automatically resets when the supply voltage returns to above 90% of normal.

Control Features – BACnet®

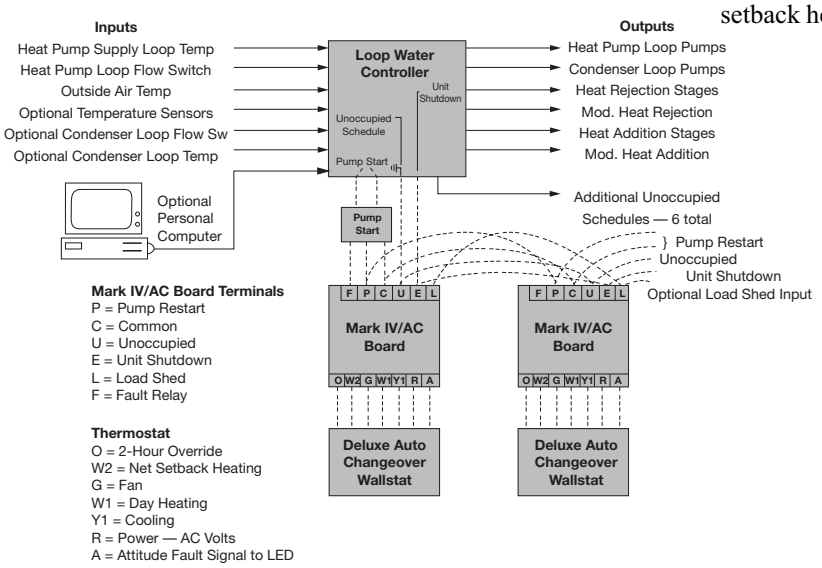
- **Condensate Overflow Protection** – A liquid sensor at the top of the drain pan senses a high water level. Upon sensing water, cooling operation is suspended, while heating operation is allowed. The controller creates an alarm available in software. The alarm automatically resets when the water level returns to normal.
- **Safety Control** – The unit monitors refrigerant pressure and generates separate high-pressure and low-pressure alarms available in software. While either alarm is active, compressor operation is suspended. In a refrigerant low-temperature condition, an alarm occurs and the unit operates in cooling mode for 60 seconds to defrost the heat exchanger, after which compressor operation is suspended. These alarms can be reset in software or by cycling power to the controller.
- **Attained Temperature and Water Temperature Alarms** –Attained temperature, water temperature alarms with software-adjustable setpoints are available in software. The controller samples supply air and records attained temperatures for heating and cooling. If after two hours of operation, the attained temperature does not meet the software-configurable setpoint for heating or cooling as appropriate, a software alarm occurs. The alarm automatically resets when the attained temperature is within setpoints. The controller also monitors leaving water temperature. If the leaving water temperature is outside software-configurable setpoints, compressor operation is suspended and high or low water temperature alarms occur. The alarm automatically resets when the water temperature returns to within 6 deg. F of the setpoint.
- **Unit Self-test Mode** – While the unit is in occupied mode, a self-test can be initiated via software. Upon initiation of the test, compressor operation is suspended for a minimum of five minutes, cooling attained temperatures are cleared, and attained temperature alarms are cleared. The unit then switches to full heat for four minutes and then records the attained supply air temperature. Compressor operation is then suspended for five minutes. The unit then switches to full cooling for four minutes and the attained supply air temperature is recorded. Attained temperature alarms are set if the attained temperatures failed to reach alarm setpoints during heating or cooling.

Control Features – Loop Water Controller

The Loop Water Controller (LWC) is a stand-alone, factory programmed and tested microprocessor-based controller providing control of the heat rejection/heat addition stages and the water circulating pumps for control of a water source heat pump system through solid-state output relays. The controller includes a keypad and display to view all status conditions, temperatures, setpoints and alarm conditions. The display is two lines by sixteen columns and supports a supertwist LCD format. The LWC is designed to be used with the Mark IV unit controllers for standalone operation of the water loop. The LWC does not support serial communications with a higher lever BAS.

The LWC can be used in any of the following applications: a traditional single loop system, a closed-circuit evaporative cooler, boiler, primary pump and standby pump system, or a two-loop system with the heat pump loop having a boiler, primary pump and standby pump separated by a water-to-water heat exchanger to a condenser water loop with an open cooling tower, primary (stage 1) pump and a standby (stage 2) pump. The pumps can be operated as "auto" or "manual" lead-lag. Pump sequencing allows the standby pump to automatically come on upon failure of the lead pump as indicated by a flow switch.

Mark IV/AC Interface



The LWC can control heating and cooling stages from the heat pump loop supply temperature and from the outdoor air temperature for reset of the heat addition setpoint. Other temperatures that can be monitored include: the heat pump loop return temperature, entering and leaving tower temperatures, entering and leaving boiler temperatures, and the storage tank temperature.

Clock schedule outputs are built-in to (1) control the heat pump circulating pump for shutdown at night (can be restarted if outdoor air temperature falls below the setpoint) and (2) provide programmable time schedules for heat pump unit occupied/unoccupied operation. A maximum of six time clock schedule outputs are available.

Two LWC models are available. LWC-16 and LWC-24 provide 9 and 17 configurable outputs, respectively, choosing between heat rejection (cooling) stages, heat addition (heating) stages and time clock schedules. Each heating and cooling output has individual on and off (differential) setpoint adjustment capability. Modulating heating and cooling output signals are available to control tower bypass and two-way or three-way boiler heat addition valves.

Monitored system points include visual and audible notification of low water temperature, high water temperature, or no flow conditions. When an alarm condition occurs, the LWC closes contacts which can be tied to an emergency shutdown signal. A remote alarm panel is available for alarm notification at a remote location. The LWC interfaces with Mark IV/AC controlled heat pump units for a low cost control system. The Mark IV/AC board can receive occupied/unoccupied time clock schedule outputs and an emergency shutdown signal due to an alarm condition. The LWC can receive a signal (pump restart) from the Mark IV/AC board to energize and override the main circulating pump (if it is scheduled off) whenever a compressor operates from a call for night setback heat or from a call for heating or cooling during the two-hour override cycle. Simple "daisy chain" wiring is required between Mark IV/AC board terminals on each water source heat pump.

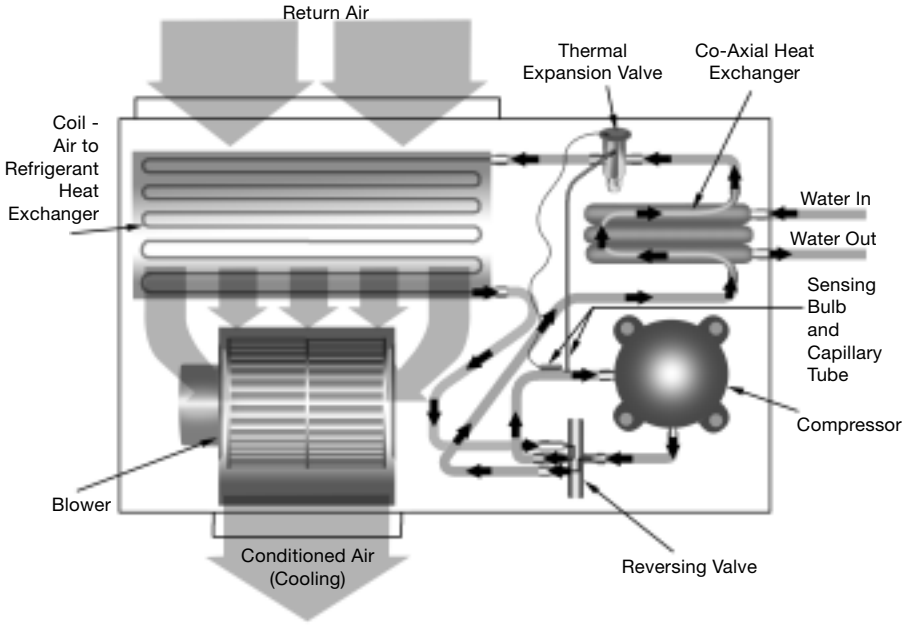
Additional features include a built-in test mode to simulate all control modes, a pre-cool cycle to enable heat rejection earlier for undersized boilers, a preheat cycle to enable heat addition earlier for undersized towers, keypad password protection, and holiday scheduling.

The LWC panel is not designed to communicate with a higher level BAS.

Cooling and Heating Refrigeration Cycles

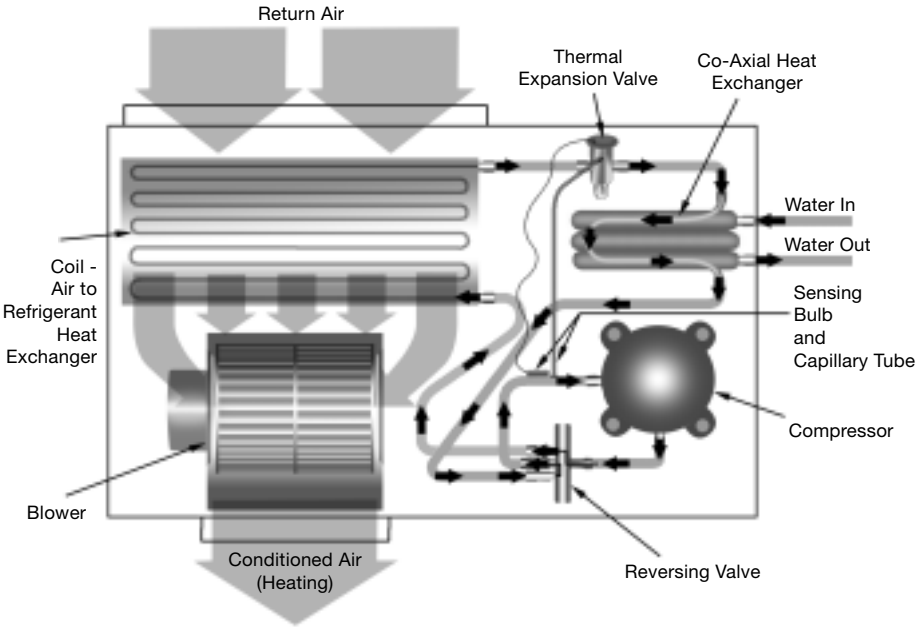
Cooling Refrigeration Cycle

When the wall thermostat is calling for COOLING, the reversing valve directs the flow of the refrigerant, a hot gas, leaving the compressor to the water-to-refrigerant heat exchanger. Here the heat is removed by the water and the hot gas condenses to become a liquid. The liquid then flows through a thermal expansion metering system to the air-to-refrigerant heat exchanger coil. The liquid then evaporates becoming a gas, at the same time absorbing heat and cooling the air passing over the surfaces of the coil. The refrigerant then flows as a low pressure gas through the reversing valve and back to the suction side of the compressor to complete the cycle.



Heating Refrigeration Cycle

When the wall thermostat is calling for HEATING, the reversing valve directs the flow of the refrigerant, a hot gas, leaving the compressor to the air-to-refrigerant heat exchanger coil. Here the heat is removed by the air passing over the surfaces of the coil and the hot gas condenses to become a liquid. The liquid then flows through a capillary thermal expansion metering system to the water-to-refrigerant heat exchanger. The liquid then evaporates becoming a gas, at the same time absorbing heat and cooling the water. The refrigerant then flows as a low pressure gas through the reversing valve and back to the suction side of the compressor to complete the cycle.



Applications – Systems

Water source heat pump systems are one of the most efficient, environmentally friendly systems available for heating and cooling buildings. High-efficiency, self contained units (sizes 7,000 btuh to 290,000 btuh) can be placed in virtually any location within a building. Each unit responds only to the heating or cooling load of the individual zone it serves. This results in an excellent comfort level for occupants, better control of energy use for building owners and low seasonal operating costs. The Air-Conditioning Refrigeration Institute (ARI) and the International Standards Organization (ISO) publish standards so that water source heat pumps are rated for specific applications. The ARI/ISO loop options shown in this catalog are typical water source heat pump loop choices available in today's market. These systems offer benefits ranging from low cost installation to the highest energy efficient system available in the market today.

Boiler / Tower Applications: ARI 320 / ISO 13256-1

A "Boiler/Tower" application uses a simple two-pipe water circulating system that adds heat, removes heat or transfers rejected heat to other units throughout the building. The water temperature for heating is generally maintained between 65°F – 70°F and is usually provided by a natural gas or electric boiler located in a mechanical room. The condensing water temperature, during cooling months, is maintained between 85°F and 95°F and requires the use of a cooling tower to dissipate waste heat. Cooling towers can be located on the roof, or inside or adjacent to the building. This application can be the lowest cost of the loop options available.

Note: ASHRAE 90.1 standards require that circulating pumps over 10 HP will require use of "variable frequency drive" equipment and pipe insulation to be used whenever water temperatures are below 60 degrees and above 105 degrees. See ASHRAE 90.1 Standards for details.

Boiler/Tower Application

Open Loop Well Water Applications: ARI 325 / ISO 13256-1

"Open Loop" well water systems use ground water to remove or add heat to the interior water loop. The key benefit of an open loop system is the constant water temperature, usually 50°F to 60°F, which provides efficient operation at a low first cost. Most commercial designers incorporate a heat exchanger to isolate the building loop from the well water. Using heat exchangers reduces maintenance issues while still allowing the transfer of heat from unit to unit as with the "Boiler/Tower System". A successful design provides an ample amount of groundwater (approximately 2 GPM per ton) and adequate provisions for discharging water back to the aquifer or surface. Open Loop applications are commonly used in coastal areas where soil characteristics allow reinjection wells to return the water back to the aquifer. Note that some states have requirements on the depths of return water reinjection wells. Also, bad water quality can increase problems with heat exchanger scaling. Suspended solids can erode the heat exchanger. Strainers can be used to contain suspended solids.

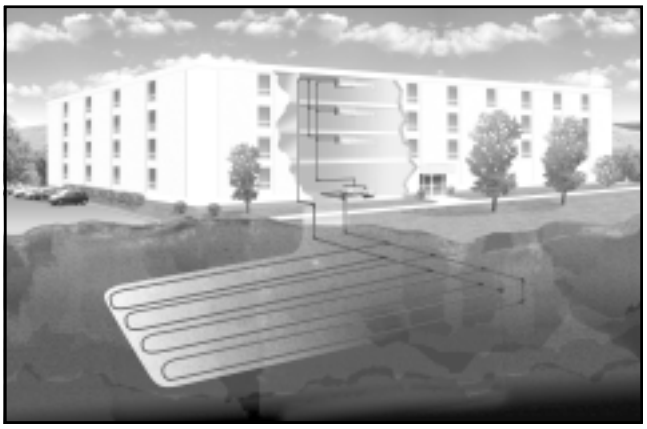
Open Loop Well Application

Closed Loop Geothermal Applications ARI 330/ISO 13256-1

"Vertical Closed Loop" applications are installed by drilling vertical bore holes into the earth and inserting a plastic polyethylene supply / return pipe into the holes. The vertical wells are connected in parallel reverse return fashion to allow the water from the building to circulate evenly throughout the borefield. The circulating fluid dissipates heat to the ground in a similar manner as a "tower" and adds heat back to the loop like a boiler. If properly designed, the loop field can maintain the loop temperatures necessary to condition the building without the use of a boiler or a tower. Loop temperatures usually range from 37°F to 95°F in Northern climates. Southern applications can see temperatures ranging from 40°F to 100°F. The number of bore holes and their depth should be determined by using commercial software that is specifically designed for vertical geothermal applications. Typical bore depths of a vertical loop range from 150 to 400 feet and generally require about 250 feet of surface area per ton of cooling.

Vertical Loop Application

A closed loop "Horizontal" geothermal application is similar to a vertical loop application with the exception that the loops are installed in trenches approximately 5 feet below the ground surface. The piping may be installed using a "four-pipe" or "six-pipe" design and could require 1,500 to 2,000 square feet of surface area per ton of cooling. Loop temperatures for a commercial application can range from 35°F to 95°F in Northern climates. Southern climates can see temperatures ranging from 40°F to 100°F. Horizontal loops are generally not applied in urban areas because land use and costs can be prohibitive. New advances in installation procedures have improved the assembly time of horizontal loops while keeping the first cost lower than a vertical loop.



Horizontal Loop Application

A "Surface Water" or "Lake" closed loop system is a geothermal loop that is directly installed in a lake or body of water that is near the building. In many cases, the body of water is constructed on the building site to meet drainage or aesthetic requirements. Surface loops use bundled polyethylene coils that are connected in same manner as a vertical or horizontal loop using a parallel reverse return design. The size and the depth of the lake is critical and commercial design services should be used to certify that a given body of water is sufficient to withstand the building loads. Loop temperatures usually range from 35°F to 90°F and prove to be the best cooling performer and lowest cost loop option of the three geothermal loops. Some applications may not be good candidates due to public access or debris problems from flooding.

Surface Water Loop Application

Typical Horizontal Installation

Unit Location

It is important to leave enough space for service personnel to perform maintenance or repair. The location of the horizontal unit should allow for easy removal of the filter and access panels. A minimum 18" (46 cm) clearance should be allowed on each side of the unit for service and maintenance access and the unit should not be installed above any piping. Always be sure to leave at least one side of the filter rack unobstructed so that the service personnel will be able to slide the filter out. Each unit is suspended from the ceiling by four 3/8" threaded rods fastened to the unit by a hanger bracket and rubber isolator. The design should place the unit directly below the structural members so that it is securely anchored.

Designers should avoid installing units directly above spaces where building occupants will reside (i.e. above office desks or classrooms) to reduce the requirement for noise attenuation. Units should also not be placed above high traffic areas because service access may be limited during occupied hours. For example, units are typically installed above the hallway drop ceiling in Schools and the supply and return air is routed directly into classrooms. Local Code code may require fire dampers to be used with this application.

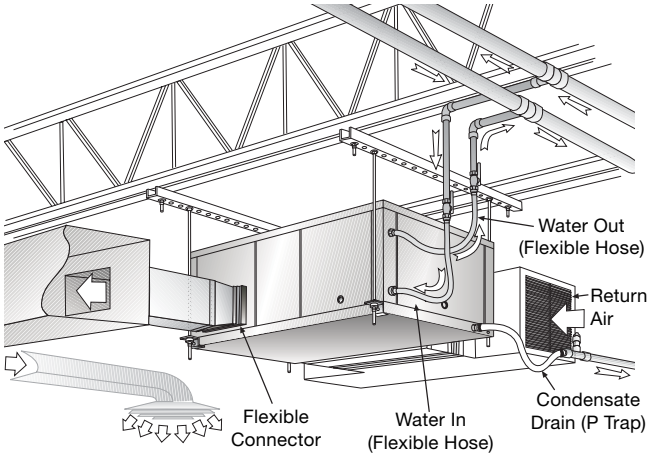
Piping

The WSHP unit is typically connected to the supply / return piping using a "direct return" piping system which includes a flow control device so that flow requirements are met for each zone. A short, high pressure "flexible hose" is used to connect the unit to the building's hard piping and acts as a sound attenuator for both the unit operating noise and hydraulic pumping noise. One end of the hose has a swivel fitting to facilitate removal of the unit for replacement or service. Supply and return shutoff valves should be included in the design to allow removal of a unit without the need to shut down the entire heat pump system. The return valve may be used for balancing and will typically have a "memory stop" so that it can be reopened to the proper position for the flow required. Fixed flow devices are commercially available and can be installed to eliminate the need for memory stop shut off valves. Pressure / Temperature ports should be included to allow the service technician to measure water flow and unit operation.

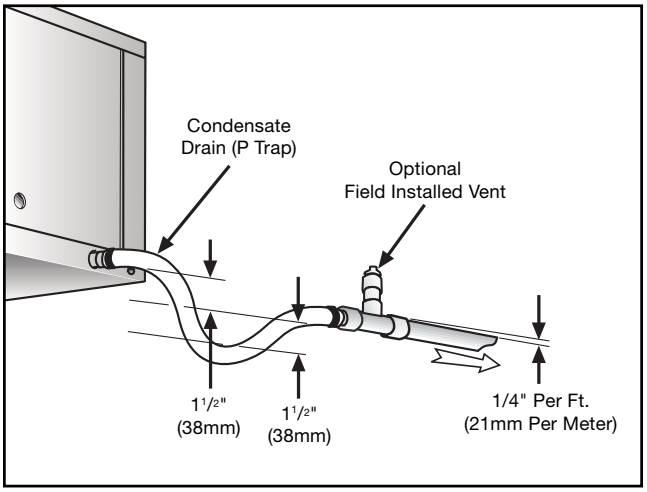
Condensate Drain Piping

Condensate piping can be made of steel, copper or PVC pipe. In most cases the use of PVC pipe eliminates the need for insulation to be wrapped around the pipe to prevent sweating. A threaded factory supplied condensate fitting allows the connection of PVC, flexible vinyl hose or steel braided hose.

The condensate piping must be trapped at the unit and pitched away from the unit not less than 1 /4" per foot. A vent is required after the trap so that the condensate will drain away from the unit. The vent can also act as a clean out when the trap becomes clogged. To avoid having waste gases entering the building, the condensate drain should not be directly piped to a drain/waste/vent stack. See local codes for the correct application of condensate piping to drains.



Typical Ceiling Installation



Typical Condensate Piping

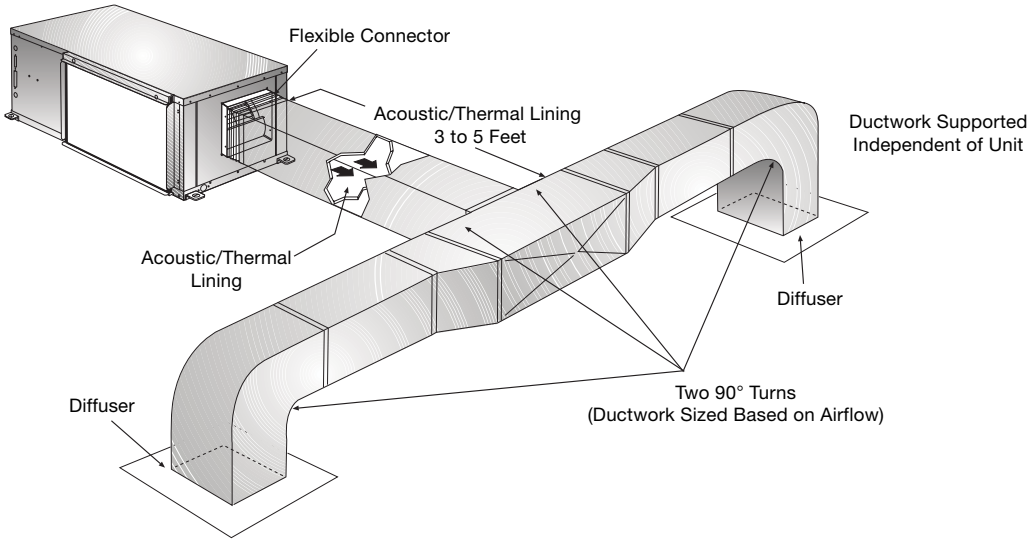
Ductwork and Sound Attenuation Considerations

Ductwork is normally applied to ceiling mounted heat pumps on the discharge side of the unit. A discharge collar is provided on all models of horizontal units for fastening the ductwork. The use of a flexible connector is recommended between the discharge collar and duct transformation to help with sound attenuation from the cabinet and to simplify disconnection of the unit from the ceiling ductwork. If return ductwork is to be used, a flexible connector should also be attached to the filter rack collar to help with sound attenuation and removal of the unit. Return plenum ducting should be at least 12 inches away from the coil so that the coil is evenly loaded with return air.

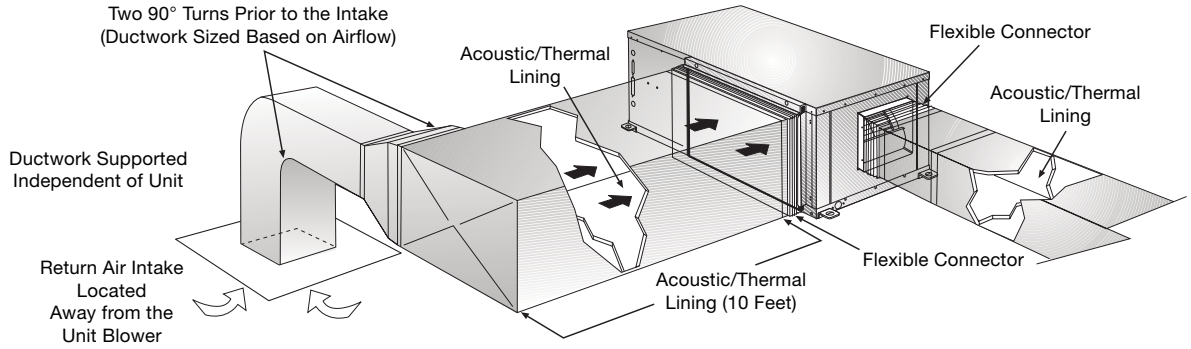
As a general recommendation, the interiors of the duct should be lined with an acoustic / thermal lining that is a minimum 1 /2 inch thickness for entire duct run. For maximum attenuation, the last five diameters of duct before each register should be lined with a one-inch thick sound blanket. Elbows, tees and dampers can create turbulence or distortion in the airflow, so a straight length of duct 5 to 10 times duct width is recommended to smooth out airflow before the next fitting. Designing diffusers directly from the bottom of a trunk duct can also produce noise and volume control dampers should be located several duct widths upstream from air outlet.

For Hotel, Motel, Dormitory or Nursing Home applications which use a single duct discharge, a velocity of 500 to 600 fpm is suggested. These applications typically have static pressures as low as 0.05 inches of water and duct lengths approximately six feet in length. The discharge duct must be fully lined and have a square elbow without turning vanes. Return air for these applications should enter through a "low" sidewall filter grille and route up the stud space to a ceiling plenum. For horizontal heat pumps mounted from the ceiling, an attenuator box is sometimes placed at the return air opening to attenuate line-of-sight sound transmission through return openings.

Suggested Supply Ducting per ASHRAE and SMACNA Publications



Suggested Return Ducting per ASHRAE and SMACNA Publications



Applications – Unit Selection

Achieving optimal performance with water source heat pump systems requires both accurate system design and proper equipment selection. A building load program should be used to determine the heating and cooling loads of each zone prior to making equipment selections. With this information, McQuay SelectTools™ software selection program for Water Source Heat Pumps can be used to provide fast, accurate and complete selections of all McQuay water source heat pump products. SelectTools software is available by contacting your local McQuay Representative.

While it is encouraged that you use McQuay SelectTools software for all unit selections, manual selections can be accomplished using the same zone load information and the capacity tables available in this catalog.

Boiler / Tower Application Manual Selections:

The following example illustrates a typical selection for a zone in a boiler/tower system for a commercial building.

A building load program determines that this zone needs 38,255 BTUH of total cooling, 31,832 BTUH of sensible cooling and 36,988 BTUH of total heating. The water temperatures for the boiler/tower system are 90°F for cooling and 70°F for heating. The return air temperature is 80°F dry bulb with 67°F wet bulb for cooling and 70°F for heating.

Zone requirements:

Total Cooling Load	=	38,255 BTUH
Sensible Cooling Load	=	31,832 BTUH
Total Heating Load	=	36,988 BTUH
Air Flow Required	=	1510 CFM
Return Air Cooling	=	80°FDB/ 67°FWB
Return Air - Heating	=	70°FDB

Since a McQuay Enfinity Model CCH 036 produces approximately 36,000 BTUH of cooling, it is not sufficient for this zone and a model CCH 042 should be considered. Model CCH is chosen because it is specifically designed for a boiler/tower application. Typical water flow rates for boiler/tower applications are 2.0 to 2.5 GPM per ton and in this example no antifreeze is used.

Selection:

Model ..... CCH 042 (Boiler / Tower model)

Total Cooling Capacity @ 90 EWT = 40,816 BTUH
Sensible cooling capacity @ 90 EWT = 32,704 BTUH
Total Heating Capacity @ 70 EWT = 52,019 BTUH
CFM = 1510 @ .5 ESP (Wet Coil)
Water Flow required to meet capacity = 8 GPM
Water Pressure drop = 6.9 (FT. H2O)

Final Selection ..... CCH 042

Geothermal Applications:

The following example illustrates the same zone in a geothermal application.

The load requirements for the zone are the same as the above example – 38,255 BTUH of total cooling and 31,832 BTUH of sensible cooling and 36,988 BTUH of heating. Geothermal loop software programs are available to help determine the size of the loop field based on:

- Desired entering water temperatures for the system.
- Specific acreage available for the loop which produces specific min/max loop temps for the unit selection.

Entering water temperatures for geothermal systems can be as high as 90 to 100 degrees and as low as 30 degrees based on the geographical location of the building. Water flow rates are typically 2.5 to 3 GPM per ton and the use of antifreeze is required in most northern applications.

Zone requirements:

Total Cooling Load	=	38,255 BTUH
Sensible Cooling Load	=	31,832 BTUH
Total Heating Load	=	36,988 BTUH
Air Flow Required	=	1510 CFM
Return Air Cooling	=	80 DB / 67 WB
Return Air - Heating	=	70 DB

A McQuay Enfinity Model CCW is chosen for this geothermal application. Model CCW offers insulated water piping for condensation considerations and a different freezestat setting to allow entering water temperatures lower than 40°F (with antifreeze). Output capacities should be recalculated using the antifreeze reduction tables that are shown on page 49. The Model CCW 042 is first considered but may not meet the heating load because of the reduced entering water temperatures (35°F) and an antifreeze solution of 21 % propylene (see page 49).

Selection:

Model ..... CCW 042 (Geothermal model)

Total Cooling Capacity @ 100 EWT = 40,434 BTUH x .980 = 39,625
Sensible cooling capacity @ 100 EWT = 32,164 BTUH x .980 = 31,520
Total Heating Capacity @ 35 EWT = 38,335 BTUH x .975 = 37,377 CFM
= 1510 @ .6 ESP (Dry Coil)
Water Flow required to meet capacity = 10.8 GPM
Water Pressure drop = 12.7x1.5= 14.61 (FT. H2O)

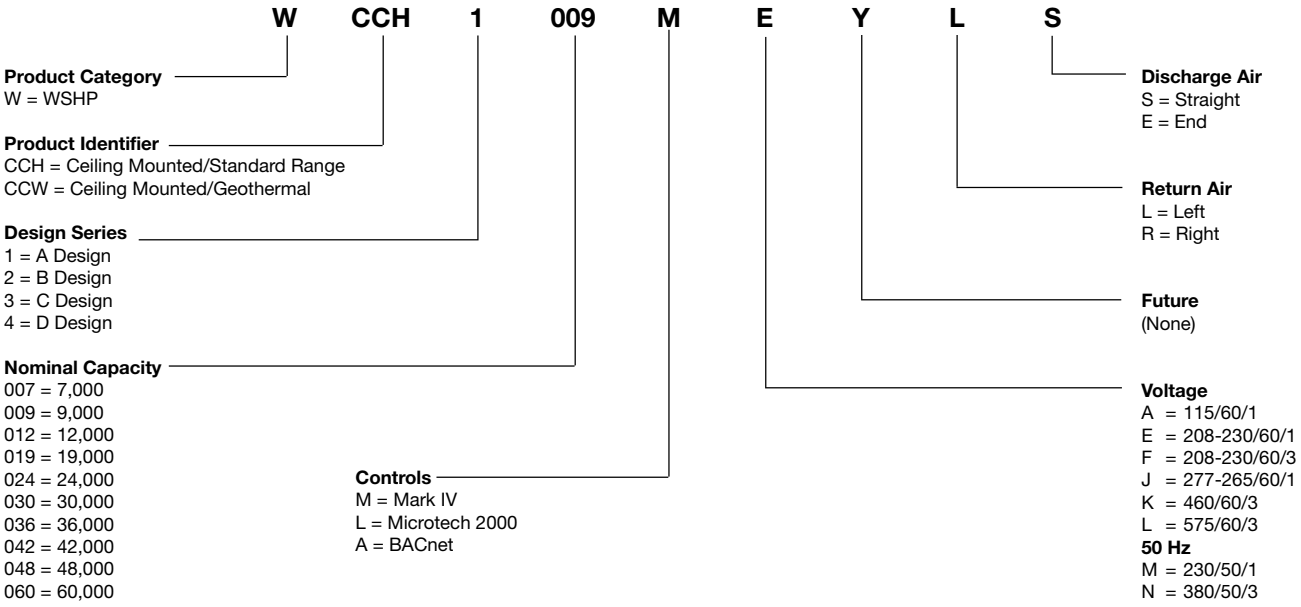
Final Selection ..... CCW 042

Note:
In applications where the zone may be a corner office or have excessive glass area, the heating load could be greater than the heating output capacity of the CCW 042 model (say 41,985 BTUH). The choices are to upsize the unit to the next model available (048), or add an electric duct heater to supplement the output of the 042 unit.

Model Nomenclature

NOTE: For illustration purposes only. Not all options available with all models.
Please consult McQuay Sales Representative for specific availability.

McQuay WSHP Product Model Nomenclature



ISO Performance Data – Water Loop

Water Loop Performance Data per ISO Standard 13256-1.

Unit Size	Airflow		Waterflow		Voltage	Cooling				Heating		
	CFM	L/S	GPM	L/S		BTU/HR	Watts	EER	COP	BTU/HR	Watts	COP
007	230	109	1.4	0.09	115-1-60 208/230-1-60 265-1-60	6800	1991	12.7	3.7	9000	2635	4.7
009	300	142	2.2	0.14	115-1-60 208/230-1-60 265-1-60	8500	2489	12.2	3.6	11200	3279	4.3
012	400	189	3.1	0.20	115-1-60 208/230-1-60 265-1-60	11700	3426	12.3	3.6	15200	4451	4.2
019	630	297	5.2	0.33	208/230-1-60 265-1-60	19900	5827	14.4	4.2	25000	7320	4.9
024	800	378	5.9	0.37	208/230-1-60 265-1-60 208/230-3-60 460-3-60	23200	6793	13.9	4.1	29200	8550	4.8
030	1000	472	7.2	0.45	265-1-60 208/230-3-60 460-3-60	28800	8433	15.0	4.4	37400	10951	5.0
036	1200	566	8.8	0.56	208/230-1-60 208/230-3-60 460-3-60	34600	10131	13.9	4.1	44700	13089	4.6
042	1400	661	10.7	0.68	208/230-1-60 208/230-3-60	42900	12562	14.9	4.4	52500	156373	4.9
048	1600	755	11.6	0.73	208/230-1-60	46400	13586	14.2	4.2	58700	17188	4.6
060	2000	944	14.8	0.93	208/230-1-60 208/230-3-60 460-3-60	60100	17598	14.0	4.1	75000	21961	4.7

Notes:
EER = Energy Efficiency Ratio COP = Coefficient of Performance L/s = Liters per second

Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.
Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

ISO Performance Data – Ground Loop

Ground Loop Performance Data per ISO Standard 13256-1.

Unit Size	Airflow		Waterflow		Voltage	Cooling				Heating		
	CFM	L/S	GPM	L/S		BTU/HR	Watts	EER	COP	BTU/HR	Watts	COP
007	230	109	1.4	0.09	115-1-60 208/230-1-60 265-1-60	7400	2167	15.0	4.4	5700	1669	3.4
009	300	142	2.2	0.14	115-1-60 208/230-1-60 265-1-60	9000	2835	14.2	4.2	7500	2196	3.2
012	400	189	3.1	0.20	115-1-60 208/230-1-60 265-1-60	12500	3660	14.5	4.2	9800	2870	3.2
019	630	297	5.2	0.33	208/230-1-60 265-1-60	21600	6325	17.0	5.0	14700	4304	3.6
024	800	378	5.9	0.37	208/230-1-60 265-1-60 208/230-3-60 460-3-60	25100	7350	16.6	4.8	18300	5358	3.7
030	1000	472	7.2	0.45	208/230-1-60 265-1-60 208/230-3-60 460-3-60	30200	8843	17.4	5.1	24000	7027	3.7
036	1200	566	8.8	0.56	208/230-1-60 208/230-3-60 460-3-60	36200	10600	16.0	4.7	29600	8667	3.4
042	1400	661	10.7	0.68	208/230-1-60 208/230-3-60	43700	12796	17.1	5.0	35000	10248	3.7
048	1600	755	11.6	0.73	208/230-1-60	48800	14289	16.0	4.7	38100	11156	3.5
060	2000	944	14.8	0.93	208/230-1-60 208/230-3-60 460-3-60	62400	18271	16.1	4.7	50100	14670	3.5

Notes:
EER = Energy Efficiency Ratio COP = Coefficient of Performance L/S = Liters per second

Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 77°F (25°C) entering water temperature.
Heating capacity is based on 68°F (20°C) entering air temperature and 32°F (0°C) entering water temperature.

ISO Performance Data – Ground Source

Ground Source Performance Data per ISO Standard 13256-1.

Unit Size	Airflow		Waterflow		Voltage	Cooling				Heating		
	CFM	L/S	GPM	L/S		BTU/Hr	Watts	EER	COP	BTU/Hr	Watts	COP
007	230	109	1.4	0.09	115-1-60 208/230-1-60 265-1-60	7800	2284	20.2	5.9	6900	2020	4.0
009	300	142	2.2	0.14	115-1-60 208/230-1-60 265-1-60	9700	2840	18.6	5.5	9400	2752	3.9
012	400	189	3.1	0.20	115-1-60 208/230-1-60 265-1-60	13700	4012	19.1	5.6	12600	3689	3.8
019	630	297	5.2	0.33	208/230-1-60 265-1-60	24600	7203	23.3	6.8	19900	5827	4.3
024	800	378	5.9	0.37	208/230-1-60 265-1-60 208/230-3-60 460-3-60	28500	8345	22.5	6.6	24000	7027	4.3
030	1000	472	7.2	0.45	208/230-1-60 265-1-60 208/230-3-60 460-3-60	32800	9604	23.1	6.8	30600	8960	4.3
036	1200	566	8.8	0.56	208/230-1-60 208/230-3-60 460-3-60	39800	11654	21.2	6.2	37600	11010	4.1
042	1400	661	10.7	0.68	208/230-1-60 208/230-3-60	47900	14026	23.0	6.7	43600	12767	4.4
048	1600	755	11.6	0.73	208/230-1-60 208/230-1-60	52400	15343	21.0	6.2	48400	14172	4.1
060	2000	944	14.8	0.93	208/230-3-60 460-3-60	67100	19648	20.6	6.0	61100	17891	4.7

Notes:
EER = Energy Efficiency Ratio COP = Coefficient of Performance L/S = Liters per second

Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 59°F (15°C) entering water temperature.
Heating capacity is based on 68°F (20°C) entering air temperature and 50°F (10°C) entering water temperature.

Electrical Data

Unit Size	Power			Compressor		Fan Motor FLA	Total Unit RLA	Minimum Voltage	Min. Circuit Ampacity	Max Fuse Size
	Voltage	HZ	Phase	RLA	LRA					
007	115	60	1	7.2	36.2	0.94	8.1	104	9.9	15
	208/230	60	1	3.9	17.7	0.46	4.3	197	5.3	15
	265/277	60	1	3.2	15.0	0.38	3.6	239	4.4	15
	230	50	1	3.2	15.0	0.46	3.7	207	4.5	15
009	115	60	1	9.6	45.6	1.88	11.5	104	13.9	20
	208/230	60	1	5.2	22.2	0.83	6.0	197	7.3	15
	265/277	60	1	4.3	18.8	0.65	4.9	239	6.0	15
	230	50	1	4.3	18.8	0.81	5.1	207	6.2	15
012	115	60	1	12.4	58.4	1.88	14.3	104	17.4	25
	208/230	60	1	6.6	27.9	0.83	7.4	197	9.1	15
	265/277	60	1	5.1	22.2	0.65	5.8	239	7.1	15
	230	50	1	5.1	22.2	0.81	6.0	207	7.2	15
019	208/230	60	1	8.3	48.0	3.00	11.3	197	13.4	20
	265/277	60	1	7.1	44.0	3.00	10.1	197	11.8	15
	230	50	1	7.1	44.0	2.50	9.6	197	11.3	15
024	208/230	60	1	9.3	48.0	3.00	12.3	197	14.6	20
	265/277	60	1	7.7	44.0	3.00	10.7	197	12.6	20
	208/230	60	3	6.4	58.0	3.00	9.4	197	11.0	15
	460	60	3	3.5	30.0	1.70	5.2	197	6.1	15
	230	50	1	7.7	44.0	2.50	10.2	197	12.1	15
030	208/230	60	1	14.7	72.5	3.00	17.7	197	21.4	35
	265/277	60	1	12.5	61.0	3.00	15.5	239	18.6	30
	208/230	60	3	10.4	63.0	3.00	13.4	187	16.1	25
	460	60	3	4.5	31.0	1.70	6.2	414	7.3	15
	380	50	3	4.5	31.0	1.70	6.2	342	7.3	15
036	208/230	60	1	15.8	83.0	3.50	19.3	197	23.3	35
	208/230	60	3	11.5	77.0	3.50	15.0	187	17.9	25
	460	60	3	5.1	35.0	1.60	6.7	414	8.0	15
	380	50	3	5.1	35.0	1.60	6.7	342	8.0	15
042	208/230	60	1	19.2	104.0	3.40	22.6	197	27.4	45
	208/230	60	3	13.5	88.0	3.40	16.9	197	20.2	30
048	208/230	60	1	23.1	134.0	5.30	28.4	197	34.1	50
060	208/230	60	1	27.6	158.0	5.30	32.9	197	39.8	60
	208/230	60	3	18.1	137.0	5.30	23.4	197	28.0	45
	460	60	3	9.0	62.0	2.00	11.0	414	13.2	20
	380	50	3	9.0	62.0	2.00	11.0	342	13.2	20

Cooling Capacity Data – Unit Size 007

EWT	GPM	WPD	System						ISO			
			EA	LWT	Total	Sensible	KW	EER	TOT	kW	EER	THR
30	0.9	1.2	75/63	50.8	8009	5962	0.32	24.8	8132	0.29	28.3	9106
			80/67	52.3	8667	6179	0.33	26.5	8790	0.29	30.2	9781
			85/71	53.9	9359	6377	0.33	28.4	9482	0.29	32.2	10481
	1.4	2.9	75/63	43.5	8250	6074	0.27	30.4	8373	0.24	35.1	9176
			80/67	44.5	8960	6304	0.27	33.0	9083	0.24	38.1	9907
			85/71	45.6	9710	6515	0.27	35.6	9833	0.24	41.1	10647
	1.9	5.4	75/63	39.9	8366	6128	0.24	34.2	8489	0.22	39.4	9208
			80/67	40.7	9102	6365	0.24	37.5	9225	0.21	43.3	9944
			85/71	41.6	9881	6582	0.24	40.9	10004	0.21	47.1	10717
40	0.9	1.2	75/63	60.6	7727	5833	0.38	20.6	7850	0.34	23.1	8993
			80/67	62.1	8353	6046	0.38	22.1	8476	0.34	24.7	9633
			85/71	63.6	9016	6244	0.38	23.7	9139	0.35	26.5	10306
	1.4	2.9	75/63	53.4	7971	5945	0.33	24.1	8094	0.30	27.2	9092
			80/67	54.4	8647	6170	0.33	26.2	8770	0.30	29.6	9771
			85/71	55.4	9361	6378	0.33	28.4	9484	0.30	32.0	10487
	1.9	5.4	75/63	49.9	8090	6000	0.31	26.4	8213	0.28	29.6	9133
			80/67	50.6	8787	6230	0.30	28.8	8910	0.28	32.4	9830
			85/71	51.4	9531	6444	0.30	31.5	9654	0.27	35.3	10564
50	0.9	1.2	75/63	70.3	7416	5692	0.42	17.5	7539	0.39	19.4	8853
			80/67	71.7	8016	5905	0.43	18.7	8139	0.39	20.7	9457
			85/71	73.2	8646	6102	0.43	20.1	8769	0.39	22.2	10100
	1.4	2.9	75/63	63.2	7670	5807	0.38	19.9	7793	0.35	22.2	8970
			80/67	64.2	8311	6028	0.38	21.6	8434	0.35	24.0	9616
			85/71	65.2	8993	6235	0.38	23.4	9116	0.35	26.0	10298
	1.9	5.4	75/63	59.8	7793	5863	0.36	21.4	7916	0.34	23.6	9022
			80/67	60.5	8454	6088	0.36	23.4	8577	0.33	25.8	9683
			85/71	61.3	9159	6299	0.36	25.5	9282	0.33	28.1	10377
60	0.9	1.2	75/63	80	7092	5546	0.47	15.0	7215	0.44	16.5	8683
			80/67	81.3	7661	5758	0.48	16.1	7784	0.44	17.7	9265
			85/71	82.7	8260	5956	0.48	17.3	8383	0.44	18.9	9875
	1.4	2.9	75/63	73	7343	5659	0.44	16.8	7466	0.40	18.5	8809
			80/67	73.9	7954	5879	0.44	18.3	8077	0.40	20.1	9423
			85/71	74.9	8602	6086	0.44	19.7	8725	0.40	21.7	10080
	1.9	5.4	75/63	69.7	7465	5714	0.42	17.9	7588	0.39	19.5	8875
			80/67	70.3	8097	5939	0.42	19.5	8220	0.39	21.3	9501
			85/71	71.1	8770	6150	0.41	21.2	8893	0.38	23.1	10179
70	0.9	1.2	75/63	89.6	6750	5393	0.52	13.0	6873	0.48	14.2	8496
			80/67	90.8	7290	5606	0.52	13.9	7413	0.49	15.2	9047
			85/71	92.2	7859	5806	0.53	14.9	7982	0.49	16.2	9636
	1.4	2.9	75/63	82.8	7000	5505	0.49	14.4	7123	0.45	15.7	8634
			80/67	83.6	7581	5725	0.49	15.6	7704	0.45	17.0	9213
			85/71	84.6	8195	5932	0.49	16.8	8318	0.45	18.3	9843
	1.9	5.4	75/63	79.5	7120	5558	0.47	15.2	7243	0.44	16.5	8700
			80/67	80.1	7722	5783	0.47	16.5	7845	0.44	17.9	9293
			85/71	80.8	8360	5994	0.47	17.9	8483	0.44	19.4	9943
80	0.9	1.2	75/63	99.1	6394	5236	0.57	11.3	6517	0.53	12.2	8294
			80/67	100.3	6906	5450	0.57	12.1	7029	0.54	13.1	8822
			85/71	101.7	7445	5652	0.58	12.9	7568	0.54	14.0	9388
	1.4	2.9	75/63	92.5	6646	5347	0.53	12.4	6769	0.50	13.5	8435
			80/67	93.3	7191	5566	0.54	13.4	7314	0.50	14.5	8994
			85/71	94.2	7774	5774	0.54	14.5	7897	0.50	15.7	9591
	1.9	5.4	75/63	89.3	6765	5400	0.52	13.0	6888	0.49	14.1	8502
			80/67	89.9	7331	5623	0.52	14.1	7454	0.49	15.2	9073
			85/71	90.6	7935	5834	0.52	15.3	8058	0.49	16.5	9682
85	0.9	1.2	75/63	103.9	6212	5156	0.59	10.5	6335	0.56	11.4	8188
			80/67	105.1	6709	5371	0.60	11.2	6832	0.56	12.1	8705
			85/71	106.4	7233	5574	0.60	12.0	7356	0.57	12.9	9262
	1.4	2.9	75/63	97.4	6458	5265	0.56	11.6	6581	0.53	12.5	8330
			80/67	98.2	6992	5485	0.56	12.4	7115	0.53	13.5	8874
			85/71	99	7559	5694	0.56	13.4	7682	0.53	14.5	9454
	1.9	5.4	75/63	94.2	6582	5319	0.54	12.1	6705	0.51	13.1	8398
			80/67	94.8	7130	5541	0.54	13.1	7253	0.52	14.1	8956
			85/71	95.4	7718	5753	0.54	14.2	7841	0.52	15.2	9550
90	0.9	1.2	75/63	108.7	6027	5075	0.62	9.8	6150	0.58	10.6	8083
			80/67	109.9	6510	5291	0.62	10.4	6633	0.59	11.3	8599
			85/71	111.1	7020	5496	0.63	11.1	7143	0.60	12.0	9136
	1.4	2.9	75/63	102.2	6271	5182	0.58	10.7	6394	0.55	11.6	8223
			80/67	103	6790	5404	0.59	11.6	6913	0.55	12.5	8755
			85/71	103.8	7341	5614	0.59	12.4	7464	0.56	13.4	9322
	1.9	5.4	75/63	99.1	6389	5234	0.57	11.3	6512	0.54	12.1	8291
			80/67	99.7	6926	5459	0.57	12.2	7049	0.54	13.0	8836
			85/71	100.3	7498	5672	0.57	13.1	7621	0.54	14.1	9416
100	0.9	1.2	75/63	118.2	5650	4911	0.67	8.5	5773	0.63	9.1	7871
			80/67	119.4	6105	5129	0.68	9.0	6228	0.64	9.7	8371
			85/71	120.5	6586	5338	0.69	9.6	6709	0.65	10.3	8878
	1.4	2.9	75/63	111.9	5889	5015	0.63	9.3	6012	0.60	10.0	8005
			80/67	112.7	6379	5239	0.64	10.0	6502	0.61	10.7	8515
			85/71	113.5	6899	5452	0.65	10.7	7022	0.61	11.5	9058
	1.9	5.4	75/63	108.8	6004	5065	0.62	9.7	6127	0.59	10.4	8071
			80/67	109.4	6512	5292	0.62	10.5	6635	0.59	11.2	8596
			85/71	110	7051	5507	0.63	11.2	7174	0.60	12.0	9148
110	0.9	1.2	75/63	127.8	5265	4743	0.72	7.3	5388	0.69	7.8	7674
			80/67	128.9	5693	4965	0.73	7.7	5816	0.70	8.3	8143
			85/71	130	6147	5178	0.75	8.2	6270	0.71	8.8	8636
	1.4	2.9	75/63	121.6	5498	4845	0.69	8.0	5621	0.66	8.6	7790
			80/67	122.3	5960	5072	0.70	8.6	6083	0.66	9.2	8285
			85/71	123.1	6449	5288	0.70	9.1	6572	0.67	9.8	8799
	1.9	5.4	75/63	118.6	5610	4894	0.67	8.3	5733	0.64	8.9	7852
			80/67	119.2	6088	5123	0.68	9.0	6211	0.65	9.6	8356
			85/71	119.7	6596	5341	0.68	9.6	6719	0.66	10.3	8882

Heating Capacity Data – Unit Size 007

EWT	GPM	WPD	System					ISO			
			EA	LWT	Capacity	KW	COP	TOT	kW	COP	THA
20	0.9	1.2	60.0	13.0	4897	0.46	3.1	4774	0.42	3.3	3317
			70.0	13.3	4868	0.49	2.9	4745	0.46	3.0	3170
			80.0	13.7	4793	0.52	2.7	4670	0.48	2.8	3000
	1.4	2.9	60.0	15.2	5113	0.47	3.2	4990	0.43	3.4	3512
			70.0	15.5	5064	0.50	3.0	4941	0.47	3.1	3347
			80.0	15.7	4979	0.53	2.8	4856	0.49	2.9	3157
	1.9	5.4	60.0	16.4	5231	0.47	3.3	5108	0.44	3.4	3620
			70.0	16.6	5173	0.50	3.0	5050	0.47	3.1	3443
			80.0	16.8	5078	0.53	2.8	4955	0.50	2.9	3242
30	0.9	1.2	60.0	21.6	5610	0.48	3.4	5487	0.44	3.6	3967
			70.0	22.0	5556	0.51	3.2	5433	0.48	3.3	3785
			80.0	22.4	5469	0.55	2.9	5346	0.51	3.1	3582
	1.4	2.9	60.0	24.3	5885	0.49	3.5	5762	0.45	3.7	4223
			70.0	24.5	5811	0.52	3.3	5688	0.49	3.4	4014
			80.0	24.9	5702	0.56	3.0	5579	0.52	3.1	3786
	1.9	5.4	60.0	25.6	6035	0.49	3.6	5912	0.46	3.8	4364
			70.0	25.9	5949	0.53	3.3	5826	0.50	3.4	4140
			80.0	26.1	5829	0.56	3.0	5706	0.53	3.1	3897
40	0.9	1.2	60.0	30.0	6392	0.50	3.8	6269	0.46	4.0	4697
			70.0	30.5	6310	0.54	3.5	6187	0.50	3.6	4473
			80.0	31.0	6209	0.57	3.2	6086	0.54	3.3	4233
	1.4	2.9	60.0	33.2	6739	0.50	3.9	6616	0.47	4.1	5022
			70.0	33.5	6630	0.54	3.6	6507	0.51	3.7	4768
			80.0	33.9	6502	0.58	3.3	6379	0.55	3.4	4498
	1.9	5.4	60.0	34.8	6926	0.51	4.0	6803	0.48	4.2	5201
			70.0	35.1	6802	0.55	3.6	6679	0.52	3.8	4925
			80.0	35.3	6659	0.59	3.3	6536	0.56	3.4	4636
50	0.9	1.2	60.0	38.3	7239	0.51	4.1	7116	0.48	4.4	5491
			70.0	38.9	7133	0.56	3.8	7010	0.52	3.9	5229
			80.0	39.5	7008	0.60	3.4	6885	0.56	3.6	4952
	1.4	2.9	60.0	41.9	7664	0.52	4.3	7541	0.49	4.5	5893
			70.0	42.4	7522	0.56	3.9	7399	0.53	4.1	5592
			80.0	42.8	7364	0.61	3.5	7241	0.58	3.7	5278
	1.9	5.4	60.0	43.8	7898	0.52	4.4	7775	0.50	4.6	6115
			70.0	44.2	7733	0.57	4.0	7610	0.54	4.1	5794
			80.0	44.5	7558	0.61	3.6	7435	0.59	3.7	5456
60	0.9	1.2	60.0	46.5	8144	0.53	4.5	8021	0.49	4.8	6345
			70.0	47.1	8007	0.58	4.1	7884	0.54	4.3	6044
			80.0	47.8	7856	0.62	3.7	7733	0.59	3.9	5728
	1.4	2.9	60.0	50.6	8660	0.54	4.7	8537	0.51	5.0	6829
			70.0	51.1	8478	0.59	4.2	8355	0.55	4.4	6488
			80.0	51.6	8285	0.63	3.8	8162	0.60	4.0	6126
	1.9	5.4	60.0	52.8	8934	0.54	4.8	8811	0.51	5.0	7099
			70.0	53.2	8729	0.59	4.3	8606	0.56	4.5	6725
			80.0	53.6	8525	0.64	3.9	8402	0.61	4.0	6340
70	0.9	1.2	60.0	54.5	9108	0.55	4.9	8985	0.51	5.1	7254
			70.0	55.2	8932	0.60	4.4	8809	0.56	4.6	6913
			80.0	56.0	8761	0.65	4.0	8638	0.61	4.1	6555
	1.4	2.9	60.0	59.3	9704	0.56	5.1	9581	0.52	5.4	7830
			70.0	59.8	9493	0.61	4.6	9370	0.57	4.8	7438
			80.0	60.4	9280	0.66	4.1	9157	0.63	4.3	7025
	1.9	5.4	60.0	61.8	10038	0.56	5.2	9915	0.53	5.5	8147
			70.0	62.2	9796	0.61	4.7	9673	0.58	4.9	7720
			80.0	62.6	9552	0.67	4.2	9429	0.64	4.3	7286
80	0.9	1.2	60.0	62.5	10109	0.56	5.3	9986	0.53	5.5	8206
			70.0	63.3	9915	0.62	4.7	9792	0.58	4.9	7823
			80.0	64.1	9707	0.67	4.2	9584	0.64	4.4	7429
	1.4	2.9	60.0	67.8	10806	0.58	5.5	10683	0.54	5.8	8875
			70.0	68.4	10559	0.63	4.9	10436	0.60	5.1	8434
			80.0	69.0	10307	0.69	4.4	10184	0.65	4.6	7983
	1.9	5.4	60.0	70.6	11195	0.58	5.6	11072	0.55	5.9	9246
			70.0	71.1	10917	0.64	5.0	10794	0.61	5.2	8771
			80.0	71.6	10633	0.69	4.5	10510	0.67	4.6	8285
85	0.9	1.2	60.0	66.4	10628	0.57	5.4	10505	0.54	5.7	8691
			70.0	67.3	10413	0.63	4.9	10290	0.59	5.1	8294
			80.0	68.2	10206	0.68	4.4	10083	0.65	4.6	7879
	1.4	2.9	60.0	72.1	11383	0.59	5.7	11260	0.55	6.0	9412
			70.0	72.7	11109	0.64	5.1	10986	0.61	5.3	8949
			80.0	73.3	10847	0.70	4.5	10724	0.67	4.7	8475
	1.9	5.4	60.0	75.1	11795	0.59	5.8	11672	0.56	6.1	9811
			70.0	75.6	11492	0.65	5.2	11369	0.62	5.4	9310
			80.0	76.1	11201	0.71	4.6	11078	0.68	4.8	8799
90	0.9	1.2	60.0	70.3	11153	0.58	5.6	11030	0.55	5.9	9196
			70.0	71.2	10939	0.64	5.0	10816	0.60	5.3	8792
			80.0	72.2	10701	0.70	4.5	10578	0.66	4.7	8339
	1.4	2.9	60.0	76.3	11964	0.60	5.9	11841	0.56	6.2	9966
			70.0	77.0	11668	0.65	5.2	11545	0.62	5.5	9473
			80.0	77.6	11393	0.72	4.7	11270	0.68	4.8	8977
	1.9	5.4	60.0	79.5	12401	0.60	6.0	12278	0.57	6.3	10386
			70.0	80.0	12079	0.66	5.3	11956	0.63	5.5	9860
			80.0	80.5	11773	0.73	4.8	11650	0.70	4.9	9324

Cooling Capacity Data – Unit Size 009

EWT	GPM	WPD	System						ISO			
			EA	LWT	Total	Sensible	KW	EER	TOT	kW	EER	THR
30	1.2	2.2	75/63	47.0	10139	7638	0.49	20.9	10356	0.42	24.4	11755
			80/67	48.1	10887	7878	0.49	22.1	11104	0.43	25.8	12530
			85/71	49.3	11676	8101	0.49	23.6	11893	0.43	27.5	13325
	2.8	4.8	75/63	41.4	10397	7759	0.44	23.4	10614	0.39	27.5	11885
			80/67	42.2	11190	8009	0.45	24.9	11407	0.39	29.1	12694
			85/71	43.0	12016	8235	0.45	26.6	12233	0.39	31.0	13553
	2.3	7.9	75/63	39.0	10512	7813	0.42	24.9	10729	0.37	28.9	11933
			80/67	39.6	11316	8064	0.43	26.4	11533	0.38	30.6	12759
			85/71	40.3	12171	8297	0.43	28.2	12388	0.38	32.7	13631
40	1.2	2.2	75/63	56.7	9744	7455	0.54	18.0	9961	0.48	20.8	11543
			80/67	57.8	10458	7695	0.54	19.3	10675	0.48	22.2	12272
			85/71	58.9	11211	7919	0.54	20.7	11428	0.48	23.8	13026
	2.8	4.8	75/63	51.3	10007	7577	0.51	19.8	10224	0.45	22.9	11688
			80/67	52.0	10763	7825	0.51	21.2	10980	0.45	24.5	12458
			85/71	52.8	11561	8056	0.51	22.8	11778	0.45	26.3	13256
	2.3	7.9	75/63	48.9	10124	7631	0.49	20.7	10341	0.44	23.7	11747
			80/67	49.5	10896	7882	0.49	22.2	11113	0.44	25.4	12538
			85/71	50.1	11715	8116	0.49	24.0	11932	0.44	27.3	13349
50	1.2	2.2	75/63	66.4	9318	7259	0.59	15.8	9535	0.53	18.0	11283
			80/67	67.4	9992	7498	0.59	16.9	10209	0.53	19.3	11975
			85/71	68.4	10716	7727	0.59	18.2	10933	0.53	20.7	12682
	2.8	4.8	75/63	61.1	9581	7379	0.56	17.1	9798	0.50	19.5	11446
			80/67	61.8	10300	7628	0.56	18.4	10517	0.50	20.9	12169
			85/71	62.5	11062	7861	0.56	19.9	11279	0.50	22.6	12922
	2.3	7.9	75/63	58.7	9700	7434	0.55	17.8	9917	0.49	20.1	11516
			80/67	59.3	10437	7686	0.55	19.1	10654	0.49	21.6	12257
			85/71	59.9	11216	7921	0.54	20.7	11433	0.49	23.3	13031
60	1.2	2.2	75/63	76.0	8864	7053	0.64	13.9	9081	0.58	15.7	10982
			80/67	76.9	9505	7295	0.64	14.9	9722	0.58	16.8	11632
			85/71	77.9	10188	7526	0.64	16.0	10405	0.58	18.1	12312
	2.8	4.8	75/63	70.8	9125	7171	0.61	14.9	9342	0.55	16.9	11158
			80/67	71.5	9806	7420	0.61	16.0	10023	0.55	18.1	11841
			85/71	72.2	10531	7657	0.61	17.4	10748	0.55	19.6	12548
	2.3	7.9	75/63	68.5	9241	7224	0.60	15.4	9458	0.55	17.3	11235
			80/67	69.0	9938	7475	0.60	16.6	10155	0.55	18.6	11925
			85/71	69.6	10685	7715	0.59	18.0	10902	0.54	20.2	12658
70	1.2	2.2	75/63	85.5	8373	6833	0.69	12.2	8590	0.63	13.7	10648
			80/67	86.4	8979	7079	0.69	13.1	9196	0.63	14.7	11258
			85/71	87.3	9623	7314	0.69	14.0	9840	0.62	15.8	11896
	2.8	4.8	75/63	80.5	8635	6950	0.66	13.0	8852	0.60	14.7	10829
			80/67	81.1	9279	7202	0.66	14.0	9496	0.60	15.7	11469
			85/71	81.8	9964	7442	0.66	15.2	10181	0.60	17.0	12137
	2.3	7.9	75/63	78.3	8754	7004	0.65	13.4	8971	0.60	15.0	10909
			80/67	78.8	9413	7258	0.65	14.5	9630	0.60	16.2	11563
			85/71	79.3	10117	7499	0.64	15.7	10334	0.59	17.5	12251
80	1.2	2.2	75/63	95.0	7849	6600	0.74	10.6	8066	0.68	11.9	10295
			80/67	95.9	8424	6853	0.74	11.4	8641	0.68	12.7	10881
			85/71	96.7	9028	7093	0.74	12.2	9245	0.68	13.7	11472
	2.8	4.8	75/63	90.2	8111	6716	0.71	11.4	8328	0.66	12.7	10473
			80/67	90.8	8719	6973	0.71	12.2	8936	0.65	13.7	11089
			85/71	91.4	9363	7217	0.71	13.2	9580	0.65	14.7	11711
	2.3	7.9	75/63	88.0	8229	6769	0.70	11.7	8446	0.65	13.0	10552
			80/67	88.5	8852	7027	0.70	12.6	9069	0.65	14.0	11181
			85/71	89.0	9513	7273	0.70	13.7	9730	0.64	15.1	11819
85	1.2	2.2	75/63	99.8	7585	6483	0.77	9.9	7802	0.70	11.1	10111
			80/67	100.6	8136	6736	0.77	10.6	8353	0.71	11.8	10680
			85/71	101.4	8720	6979	0.77	11.4	8937	0.71	12.7	11258
	2.8	4.8	75/63	95.0	7842	6597	0.74	10.6	8059	0.68	11.8	10287
			80/67	95.6	8429	6855	0.74	11.4	8646	0.68	12.7	10885
			85/71	96.2	9051	7101	0.74	12.3	9268	0.68	13.7	11490
	2.3	7.9	75/63	92.9	7955	6647	0.73	10.9	8172	0.68	12.1	10367
			80/67	93.4	8560	6908	0.73	11.8	8777	0.68	13.0	10977
			85/71	93.8	9202	7157	0.72	12.7	9419	0.67	14.0	11601
90	1.2	2.2	75/63	104.5	7313	6363	0.79	9.2	7530	0.73	10.3	9926
			80/67	105.3	7842	6617	0.80	9.9	8059	0.73	11.0	10480
			85/71	106.1	8410	6864	0.80	10.6	8627	0.74	11.7	11043
	2.8	4.8	75/63	99.8	7566	6475	0.77	9.9	7783	0.71	11.0	10098
			80/67	100.4	8132	6734	0.77	10.6	8349	0.71	11.8	10677
			85/71	101.0	8733	6983	0.77	11.4	8950	0.71	12.7	11269
	2.3	7.9	75/63	97.8	7680	6526	0.76	10.2	7897	0.70	11.2	10176
			80/67	98.2	8261	6787	0.76	10.9	8478	0.70	12.1	10768
			85/71	98.7	8880	7038	0.75	11.8	9097	0.70	13.0	11372
100	1.2	2.2	75/63	114.0	6744	6112	0.85	7.9	6961	0.79	8.8	9555
			80/67	114.8	7236	6373	0.86	8.4	7453	0.80	9.3	10079
			85/71	115.5	7758	6624	0.86	9.0	7975	0.80	9.9	10616
	2.8	4.8	75/63	109.5	6993	6222	0.83	8.5	7210	0.77	9.4	9719
			80/67	110.0	7519	6487	0.83	9.1	7736	0.77	10.0	10264
			85/71	110.6	8075	6741	0.83	9.7	8292	0.77	10.7	10824
	2.3	7.9	75/63	107.5	7110	6274	0.81	8.7	7327	0.76	9.6	9790
			80/67	107.9	7645	6538	0.82	9.4	7862	0.76	10.3	10341
			85/71	108.3	8218	6794	0.82	10.1	8435	0.76	11.1	10921
110	1.2	2.2	75/63	123.5	6158	5850	0.92	6.7	6375	0.86	7.4	9196
			80/67	124.2	6609	6116	0.93	7.1	6826	0.87	7.8	9689
			85/71	124.9	7087	6375	0.94	7.5	7304	0.88	8.3	10189
	2.8	4.8	75/63	119.1	6401	5959	0.89	7.2	6618	0.84	7.9	9341
			80/67	119.6	6886	6230	0.90	7.6	7103	0.84	8.4	9858
			85/71	120.1	7395	6490	0.91	8.2	7612	0.85	9.0	10376
	2.3	7.9	75/63	117.2	6509	6008	0.88	7.4	6726	0.83	8.1	9407
			80/67	117.6	7008	6280	0.89	7.9	7225	0.83	8.7	9930
			85/71	118.0	7534	6541	0.89	8.5	7751	0.84	9.3	10463

Heating Capacity Data – Unit Size 009

EWT	GPM	WPD	System					ISO			
			EA	LWT	Capacity	KW	COP	TOT	kW	COP	THR
20	1.2	2.2	60	11.3	6415	0.59	3.2	6198	0.52	3.5	4400
			70	11.9	6359	0.65	2.9	6142	0.59	3.1	4125
			80	12.4	6265	0.70	2.6	6048	0.64	2.8	3840
	2.8	4.8	60	13.9	6759	0.60	3.3	6542	0.55	3.5	4680
			70	14.3	6676	0.66	2.9	6459	0.61	3.1	4380
			80	14.7	6542	0.72	2.7	6325	0.66	2.8	4071
	2.3	7.9	60	15.1	6928	0.61	3.3	6711	0.56	3.5	4819
			70	15.4	6828	0.67	3.0	6611	0.62	3.1	4506
			80	15.7	6677	0.72	2.7	6460	0.67	2.8	4183
30	1.2	2.2	60	19.8	7335	0.63	3.4	7118	0.57	3.6	5155
			70	20.4	7244	0.69	3.1	7027	0.63	3.3	4854
			80	21.0	7115	0.74	2.8	6898	0.68	3.0	4543
	2.8	4.8	60	22.8	7735	0.65	3.5	7518	0.60	3.7	5490
			70	23.2	7602	0.71	3.1	7385	0.65	3.3	5157
			80	23.7	7442	0.76	2.9	7225	0.70	3.0	4812
	2.3	7.9	60	24.2	7927	0.66	3.5	7710	0.61	3.7	5656
			70	24.5	7783	0.72	3.2	7566	0.67	3.3	5306
			80	24.9	7600	0.77	2.9	7383	0.72	3.0	4944
40	1.2	2.2	60	28.2	8284	0.68	3.6	8067	0.62	3.8	5953
			70	28.9	8154	0.74	3.3	7937	0.67	3.5	5622
			80	29.6	7987	0.79	3.0	7770	0.73	3.1	5275
	2.8	4.8	60	31.6	8745	0.70	3.7	8528	0.64	3.9	6351
			70	32.1	8568	0.75	3.3	8351	0.69	3.5	5981
			80	32.6	8362	0.80	3.1	8145	0.75	3.2	5593
	2.3	7.9	60	33.2	8968	0.71	3.7	8751	0.65	3.9	6552
			70	33.6	8765	0.76	3.4	8548	0.71	3.5	6157
			80	34.1	8541	0.81	3.1	8324	0.76	3.2	5749
50	1.2	2.2	60	36.5	9249	0.72	3.8	9032	0.65	4.0	6797
			70	37.2	9082	0.77	3.5	8865	0.71	3.7	6428
			80	38.0	8888	0.83	3.2	8671	0.76	3.3	6042
	2.8	4.8	60	40.4	9771	0.73	3.9	9554	0.68	4.1	7266
			70	40.9	9556	0.79	3.6	9339	0.73	3.7	6851
			80	41.5	9312	0.84	3.2	9095	0.78	3.4	6418
	2.3	7.9	60	42.2	10035	0.74	4.0	9818	0.69	4.2	7495
			70	42.7	9784	0.80	3.6	9567	0.74	3.8	7060
			80	43.2	9527	0.85	3.3	9310	0.80	3.4	6601
60	1.2	2.2	60	44.7	10250	0.75	4.0	10033	0.69	4.3	7689
			70	45.5	10030	0.80	3.7	9813	0.74	3.9	7280
			80	46.4	9806	0.86	3.3	9589	0.80	3.5	6846
	2.8	4.8	60	49.1	10831	0.76	4.2	10614	0.70	4.4	8233
			70	49.7	10568	0.82	3.8	10351	0.76	4.0	7770
			80	50.3	10284	0.87	3.4	10067	0.82	3.6	7286
	2.3	7.9	60	51.2	11118	0.77	4.2	10901	0.72	4.5	8505
			70	51.7	10830	0.82	3.9	10613	0.77	4.0	8012
			80	52.2	10525	0.88	3.5	10308	0.83	3.6	7498
70	1.2	2.2	60	52.8	11253	0.77	4.3	11036	0.71	4.6	8623
			70	53.7	11007	0.83	3.9	10790	0.77	4.1	8170
			80	54.7	10742	0.89	3.5	10525	0.83	3.7	7693
	2.8	4.8	60	57.7	11915	0.78	4.5	11698	0.72	4.7	9249
			70	58.4	11601	0.84	4.1	11384	0.78	4.3	8737
			80	59.1	11288	0.90	3.7	11071	0.84	3.8	8198
	2.3	7.9	60	60.0	12234	0.79	4.6	12017	0.73	4.8	9564
			70	60.6	11897	0.84	4.1	11680	0.79	4.3	9018
			80	61.2	11552	0.91	3.7	11335	0.86	3.9	8450
80	1.2	2.2	60	60.8	12277	0.79	4.6	12060	0.72	4.9	9597
			70	61.8	11986	0.85	4.2	11769	0.78	4.4	9101
			80	62.9	11696	0.91	3.8	11479	0.85	4.0	8577
	2.8	4.8	60	66.3	13012	0.79	4.8	12795	0.73	5.1	10319
			70	67.0	12651	0.85	4.3	12434	0.80	4.6	9749
			80	67.8	12305	0.92	3.9	12088	0.86	4.1	9155
	2.3	7.9	60	68.9	13363	0.79	4.9	13146	0.74	5.2	10678
			70	69.5	12984	0.86	4.4	12767	0.80	4.7	10075
			80	70.2	12604	0.93	4.0	12387	0.87	4.2	9443
85	1.2	2.2	60	64.8	12794	0.79	4.7	12577	0.73	5.1	10099
			70	65.8	12484	0.85	4.3	12267	0.79	4.6	9580
			80	66.9	12177	0.92	3.9	11960	0.86	4.1	9033
	2.8	4.8	60	70.5	13567	0.80	5.0	13350	0.74	5.3	10870
			70	71.3	13194	0.86	4.5	12977	0.80	4.8	10270
			80	72.1	12820	0.93	4.0	12603	0.87	4.2	9649
	2.3	7.9	60	73.3	13945	0.80	5.1	13728	0.74	5.4	11251
			70	73.9	13534	0.86	4.6	13317	0.81	4.8	10620
			80	74.6	13136	0.93	4.1	12919	0.88	4.3	9957
90	1.2	2.2	60	68.8	13303	0.79	4.9	13086	0.73	5.2	10608
			70	69.9	12985	0.86	4.4	12768	0.79	4.7	10066
			80	71.0	12661	0.93	4.0	12444	0.87	4.2	9496
	2.8	4.8	60	74.7	14126	0.80	5.2	13909	0.74	5.5	11431
			70	75.6	13731	0.86	4.7	13514	0.80	4.9	10810
			80	76.5	13339	0.94	4.2	13122	0.88	4.4	10154
	2.3	7.9	60	77.6	14521	0.79	5.4	14304	0.74	5.6	11835
			70	78.3	14087	0.86	4.8	13870	0.81	5.0	11176
			80	79.1	13672	0.94	4.3	13455	0.89	4.4	10483

Cooling Capacity Data – Unit Size 012

EWT	GPM	WPD	System						ISO			
			EA	LWT	Total	Sensible	KW	EER	TOT	kW	EER	THR
30	1.7	5.2	75/63	48.8	14206	10066	0.62	23.0	14361	0.58	24.9	16404
			80/67	50.1	15330	10416	0.61	25.1	15485	0.57	27.2	17499
			85/71	51.4	16514	10739	0.60	27.5	16669	0.56	29.7	18674
	2.6	12.2	75/63	42.5	14734	10299	0.55	26.6	14889	0.53	28.2	16714
			80/67	43.4	15914	10653	0.54	29.7	16069	0.51	31.5	17828
			85/71	44.3	17187	10989	0.52	33.2	17342	0.49	35.3	19035
	3.2	18.4	75/63	40.2	14926	10384	0.53	28.3	15081	0.52	29.0	16821
			80/67	40.9	16129	10741	0.51	31.8	16284	0.50	32.7	17945
			85/71	41.7	17409	11072	0.48	36.0	17564	0.48	36.9	19158
40	1.7	5.2	75/63	58.4	13558	9783	0.69	19.7	13713	0.65	21.2	16007
			80/67	59.7	14662	10148	0.69	21.4	14817	0.65	22.9	17091
			85/71	61.0	15820	10484	0.68	23.2	15975	0.64	24.8	18249
	2.6	12.2	75/63	52.3	14084	10013	0.63	22.3	14239	0.61	23.5	16318
			80/67	53.1	15241	10381	0.62	24.6	15396	0.59	25.9	17451
			85/71	54.0	16468	10722	0.61	27.1	16623	0.58	28.6	18649
	3.2	18.4	75/63	50.0	14272	10096	0.61	23.4	14427	0.60	24.0	16447
			80/67	50.7	15454	10467	0.60	26.0	15609	0.59	26.6	17578
			85/71	51.5	16709	10811	0.58	28.9	16864	0.57	29.6	18793
50	1.7	5.2	75/63	67.9	12885	9492	0.76	17.0	13040	0.72	18.2	15562
			80/67	69.2	13947	9864	0.76	18.3	14102	0.72	19.6	16658
			85/71	70.5	15064	10209	0.76	19.8	15219	0.72	21.1	17764
	2.6	12.2	75/63	62.0	13386	9709	0.71	18.9	13541	0.68	19.9	15902
			80/67	62.8	14522	10092	0.70	20.7	14677	0.68	21.7	17012
			85/71	63.7	15716	10446	0.69	22.6	15871	0.67	23.7	18182
	3.2	18.4	75/63	59.8	13571	9789	0.69	19.8	13726	0.68	20.2	16030
			80/67	60.5	14730	10175	0.68	21.7	14885	0.67	22.2	17132
			85/71	61.2	15948	10531	0.67	23.9	16103	0.66	24.4	18341
60	1.7	5.2	75/63	77.4	12176	9187	0.82	14.8	12331	0.78	15.7	15082
			80/67	78.6	13199	9568	0.83	15.9	13354	0.79	16.9	16141
			85/71	79.9	14269	9922	0.84	17.0	14424	0.80	18.0	17240
	2.6	12.2	75/63	71.6	12666	9398	0.78	16.3	12821	0.75	17.0	15426
			80/67	72.5	13760	9790	0.78	17.7	13915	0.75	18.5	16501
			85/71	73.3	14904	10150	0.78	19.2	15059	0.75	20.0	17654
	3.2	18.4	75/63	69.5	12847	9476	0.76	16.9	13002	0.75	17.3	15541
			80/67	70.2	13967	9872	0.76	18.4	14122	0.75	18.8	16651
			85/71	70.9	15138	10235	0.75	20.1	15293	0.75	20.5	17811
70	1.7	5.2	75/63	86.8	11440	8873	0.89	12.9	11595	0.85	13.7	14562
			80/67	88.0	12411	9260	0.90	13.8	12566	0.86	14.6	15578
			85/71	89.3	13438	9624	0.91	14.7	13593	0.87	15.6	16662
	2.6	12.2	75/63	81.3	11912	9075	0.85	14.1	12067	0.82	14.7	14888
			80/67	82.1	12962	9476	0.85	15.2	13117	0.83	15.8	15968
			85/71	82.9	14057	9845	0.86	16.4	14212	0.83	17.1	17098
	3.2	18.4	75/63	79.2	12088	9150	0.83	14.5	12243	0.82	14.9	15007
			80/67	79.9	13160	9553	0.84	15.7	13315	0.83	16.1	16109
			85/71	80.6	14286	9928	0.84	17.1	14441	0.83	17.4	17264
80	1.7	5.2	75/63	96.2	10668	8544	0.95	11.3	10823	0.91	11.9	13997
			80/67	97.4	11597	8942	0.97	12.0	11752	0.93	12.7	15001
			85/71	98.6	12563	9313	0.98	12.8	12718	0.94	13.5	16026
	2.6	12.2	75/63	90.9	11128	8740	0.91	12.2	11283	0.89	12.7	14335
			80/67	91.6	12126	9149	0.92	13.1	12281	0.90	13.7	15376
			85/71	92.4	13172	9529	0.93	14.1	13327	0.91	14.7	16468
	3.2	18.4	75/63	88.9	11305	8815	0.90	12.6	11460	0.89	12.9	14455
			80/67	89.5	12317	9223	0.91	13.6	12472	0.90	13.9	15513
			85/71	90.2	13394	9608	0.92	14.6	13549	0.91	14.9	16625
85	1.7	5.2	75/63	100.9	10274	8376	0.98	10.5	10429	0.94	11.1	13700
			80/67	102.0	11179	8779	1.00	11.2	11334	0.96	11.8	14681
			85/71	103.2	12116	9154	1.02	11.9	12271	0.98	12.6	15694
	2.6	12.2	75/63	95.6	10727	8569	0.94	11.4	10882	0.92	11.9	14039
			80/67	96.4	11693	8980	0.96	12.2	11848	0.93	12.7	15067
			85/71	97.2	12719	9368	0.97	13.1	12874	0.95	13.6	16134
	3.2	18.4	75/63	93.7	10892	8640	0.93	11.7	11047	0.92	12.0	14162
			80/67	94.4	11887	9056	0.94	12.6	12042	0.93	12.9	15207
			85/71	95.0	12933	9444	0.95	13.6	13088	0.95	13.8	16294
90	1.7	5.2	75/63	105.5	9877	8206	1.01	9.8	10032	0.97	10.4	13393
			80/67	106.7	10756	8614	1.03	10.5	10911	0.99	11.0	14360
			85/71	107.8	11661	8992	1.05	11.1	11816	1.01	11.7	15351
	2.6	12.2	75/63	100.4	10318	8395	0.97	10.6	10473	0.95	11.0	13733
			80/67	101.2	11261	8811	0.99	11.4	11416	0.97	11.8	14743
			85/71	102.0	12245	9199	1.01	12.2	12400	0.98	12.6	15790
	3.2	18.4	75/63	98.5	10488	8468	0.96	10.9	10643	0.95	11.2	13857
			80/67	99.2	11448	8884	0.98	11.7	11603	0.97	12.0	14882
			85/71	99.8	12460	9276	0.99	12.6	12615	0.98	12.9	15949
100	1.7	5.2	75/63	114.8	9073	7858	1.06	8.6	9228	1.02	9.1	12780
			80/67	115.9	9881	8269	1.09	9.1	10036	1.05	9.6	13691
			85/71	117.0	10729	8658	1.11	9.6	10884	1.07	10.1	14633
	2.6	12.2	75/63	110.0	9490	8040	1.03	9.2	9645	1.01	9.6	13105
			80/67	110.7	10367	8461	1.05	9.8	10522	1.03	10.2	14067
			85/71	111.4	11289	8859	1.08	10.5	11444	1.05	10.9	15066
	3.2	18.4	75/63	108.2	9644	8106	1.02	9.4	9799	1.01	9.7	13215
			80/67	108.8	10544	8531	1.04	10.1	10699	1.03	10.4	14204
			85/71	109.4	11494	8932	1.06	10.8	11649	1.05	11.1	15223
110	1.7	5.2	75/63	124.1	8244	7485	1.11	7.4	8399	1.07	7.8	12130
			80/67	125.1	8993	7909	1.14	7.9	9148	1.10	8.3	12990
			85/71	126.2	9775	8309	1.17	8.3	9930	1.13	8.8	13896
	2.6	12.2	75/63	119.5	8641	7666	1.09	7.9	8796	1.06	8.3	12444
			80/67	120.2	9454	8098	1.11	8.5	9609	1.09	8.8	13356
			85/71	120.9	10308	8505	1.14	9.0	10463	1.12	9.4	14316
	3.2	18.4	75/63	117.8	8793	7734	1.08	8.2	8948	1.07	8.4	12559
			80/67	118.3	9623	8166	1.10	8.7	9778	1.10	8.9	13488
			85/71	118.9	10503	8577	1.13	9.3	10658	1.12	9.5	14456

Heating Capacity Data – Unit Size 012

EWT	GPM	WPD	System					ISO			
			EA	LWT	Capacity	KW	COP	TOT	kW	COP	THR
20	1.7	5.2	60	15.3	8288	0.78	3.1	8133	0.74	3.2	5636
			70	15.7	7893	0.80	2.9	7738	0.76	3.0	5170
			80	16.2	7493	0.82	2.7	7338	0.78	2.7	4685
	2.6	12.2	60	16.8	8592	0.79	3.2	8437	0.76	3.2	5899
			70	17.1	8178	0.81	3.0	8023	0.78	3.0	5413
			80	17.5	7750	0.84	2.7	7595	0.81	2.7	4898
	3.2	18.4	60	17.3	8710	0.79	3.2	8555	0.78	3.2	6002
			70	17.6	8286	0.82	3.0	8131	0.81	3.0	5506
			80	17.8	7846	0.84	2.7	7691	0.83	2.7	4978
30	1.7	5.2	60	24.2	9697	0.83	3.4	9542	0.79	3.5	6863
			70	24.6	9312	0.86	3.2	9157	0.82	3.3	6382
			80	25.1	8912	0.88	3.0	8757	0.84	3.0	5897
	2.6	12.2	60	26.0	10073	0.84	3.5	9918	0.82	3.6	7194
			70	26.3	9648	0.87	3.2	9493	0.85	3.3	6670
			80	26.7	9220	0.90	3.0	9065	0.87	3.0	6155
	3.2	18.4	60	26.7	10219	0.85	3.5	10064	0.84	3.5	7323
			70	27.0	9780	0.88	3.3	9625	0.87	3.2	6784
			80	27.2	9340	0.90	3.0	9185	0.89	3.0	6256
40	1.7	5.2	60	33.0	11155	0.88	3.7	11000	0.84	3.8	8150
			70	33.5	10748	0.92	3.4	10593	0.88	3.5	7620
			80	34.0	10355	0.95	3.2	10200	0.91	3.3	7115
	2.6	12.2	60	35.2	11584	0.90	3.8	11429	0.87	3.9	8529
			70	35.5	11165	0.93	3.5	11010	0.91	3.6	7983
			80	35.9	10716	0.97	3.3	10561	0.94	3.3	7419
	3.2	18.4	60	36.0	11752	0.90	3.8	11597	0.89	3.8	8679
			70	36.3	11319	0.94	3.5	11164	0.93	3.5	8116
			80	36.6	10871	0.97	3.3	10716	0.96	3.3	7552
50	1.7	5.2	60	41.8	12634	0.93	4.0	12479	0.89	4.1	9465
			70	42.3	12237	0.97	3.7	12082	0.93	3.8	8919
			80	42.9	11814	1.01	3.4	11659	0.97	3.5	8356
	2.6	12.2	60	44.4	13149	0.94	4.1	12994	0.92	4.1	9927
			70	44.7	12711	0.99	3.8	12556	0.96	3.8	9334
			80	45.1	12248	1.03	3.5	12093	1.01	3.5	8727
	3.2	18.4	60	45.3	13345	0.95	4.1	13190	0.94	4.1	10102
			70	45.7	12891	1.00	3.8	12736	0.99	3.8	9491
			80	46.0	12407	1.04	3.5	12252	1.03	3.5	8863
60	1.7	5.2	60	50.5	14142	0.97	4.3	13987	0.93	4.4	10818
			70	51.1	13721	1.03	3.9	13566	0.99	4.0	10221
			80	51.7	13282	1.07	3.6	13127	1.03	3.7	9614
	2.6	12.2	60	53.5	14723	0.99	4.4	14568	0.97	4.4	11341
			70	53.9	14273	1.04	4.0	14118	1.02	4.1	10708
			80	54.3	13785	1.09	3.7	13630	1.07	3.7	10049
	3.2	18.4	60	54.6	14948	1.00	4.4	14793	0.99	4.4	11544
			70	55.0	14471	1.05	4.0	14316	1.04	4.0	10883
			80	55.3	13972	1.10	3.7	13817	1.09	3.7	10209
70	1.7	5.2	60	59.3	15676	1.02	4.5	15521	0.98	4.6	12202
			70	59.9	15227	1.08	4.1	15072	1.04	4.3	11551
			80	60.6	14757	1.13	3.8	14602	1.09	3.9	10886
	2.6	12.2	60	62.6	16320	1.04	4.6	16165	1.01	4.7	12784
			70	63.1	15830	1.10	4.2	15675	1.07	4.3	12085
			80	63.5	15324	1.16	3.9	15169	1.13	3.9	11378
	3.2	18.4	60	63.9	16569	1.04	4.7	16414	1.03	4.6	13010
			70	64.3	16061	1.11	4.3	15906	1.10	4.2	12290
			80	64.7	15533	1.16	3.9	15378	1.16	3.9	11560
80	1.7	5.2	60	68.0	17203	1.06	4.8	17048	1.02	4.9	13586
			70	68.7	16743	1.13	4.4	16588	1.09	4.5	12896
			80	69.4	16232	1.19	4.0	16077	1.15	4.1	12163
	2.6	12.2	60	71.7	17914	1.08	4.9	17759	1.05	4.9	14230
			70	72.2	17402	1.15	4.4	17247	1.12	4.5	13482
			80	72.7	16842	1.22	4.1	16687	1.19	4.1	12695
	3.2	18.4	60	73.2	18188	1.09	4.9	18033	1.08	4.9	14480
			70	73.6	17655	1.16	4.5	17500	1.15	4.5	13707
			80	74.0	17075	1.22	4.1	16920	1.22	4.1	12897
85	1.7	5.2	60	72.3	17958	1.08	4.9	17803	1.04	5.0	14271
			70	73.0	17486	1.15	4.5	17331	1.11	4.6	13556
			80	73.8	16968	1.22	4.1	16813	1.18	4.2	12804
	2.6	12.2	60	76.3	18714	1.10	5.0	18559	1.07	5.1	14958
			70	76.8	18187	1.17	4.5	18032	1.15	4.6	14181
			80	77.3	17604	1.24	4.1	17449	1.22	4.2	13357
	1.7	18.4	60	77.8	19000	1.11	5.0	18845	1.10	5.0	15218
			70	78.2	18450	1.18	4.6	18295	1.17	4.6	14416
			80	78.7	17846	1.25	4.2	17691	1.24	4.2	13568
90	1.7	5.2	60	76.7	18724	1.10	5.0	18569	1.06	5.1	14967
			70	77.4	18234	1.18	4.5	18079	1.14	4.7	14222
			80	78.2	17702	1.25	4.2	17547	1.21	4.3	13443
	2.6	12.2	60	80.9	19513	1.12	5.1	19358	1.10	5.2	15686
			70	81.4	18972	1.20	4.6	18817	1.17	4.7	14882
			80	81.9	18362	1.27	4.2	18207	1.25	4.3	14018
	1.7	18.4	60	82.4	19810	1.13	5.1	19655	1.12	5.1	15957
			70	82.9	19244	1.21	4.7	19089	1.20	4.7	15125
			80	83.4	18613	1.28	4.3	18458	1.27	4.2	14237

Cooling Capacity Data – Unit Size 019

EWT	GPM	WPD	System						ISO			
			EA	LWT	Total	Sensible	KW	EER	TOT	kW	EER	THR
30	2.5	1.6	75/63	53.4	24815	17766	1.14	21.8	25215	1.02	24.6	28735
			80/67	54.9	26711	18313	1.13	23.6	27111	1.02	26.6	30625
			85/71	56.5	28697	18807	1.12	25.6	29097	1.01	28.9	32584
	3.9	4.0	75/63	45.7	26535	18581	1.05	25.3	26935	0.94	28.6	30158
			80/67	46.8	28615	19146	1.03	27.9	29015	0.92	31.6	32215
			85/71	47.9	30851	19672	1.00	30.9	31251	0.89	35.1	34329
	4.8	6.0	75/63	43.0	27193	18898	1.02	26.7	27593	0.92	30.1	30714
			80/67	43.9	29386	19488	0.99	29.7	29786	0.89	33.5	32818
			85/71	44.8	31683	20012	0.95	33.2	32083	0.85	37.5	35023
40	2.5	1.6	75/63	62.5	23465	17138	1.22	19.3	23865	1.10	21.7	27669
			80/67	64.0	25311	17713	1.22	20.8	25711	1.10	23.4	29494
			85/71	65.6	27238	18234	1.21	22.5	27638	1.10	25.2	31413
	3.9	4.0	75/63	55.1	25058	17880	1.13	22.3	25458	1.02	25.0	28927
			80/67	56.1	27099	18481	1.11	24.4	27499	1.00	27.4	30925
			85/71	57.2	29227	19018	1.09	26.8	29627	0.98	30.2	33013
	4.8	6.0	75/63	52.5	25654	18161	1.09	23.5	26054	0.99	26.2	29431
			80/67	53.3	27753	18767	1.07	25.9	28153	0.97	28.9	31473
			85/71	54.3	29982	19320	1.05	28.7	30382	0.95	32.1	33628
50	2.5	1.6	75/63	71.7	22124	16524	1.30	17.0	22524	1.19	19.0	26568
			80/67	73.2	23876	17109	1.31	18.3	24276	1.19	20.4	28364
			85/71	74.7	25734	17653	1.31	19.7	26134	1.19	21.9	30227
	3.9	4.0	75/63	64.5	23569	17186	1.21	19.5	23969	1.10	21.7	27729
			80/67	65.5	25511	17799	1.20	21.2	25911	1.10	23.7	29651
			85/71	66.6	27576	18366	1.19	23.2	27976	1.08	25.8	31692
	4.8	6.0	75/63	62.0	24111	17437	1.18	20.5	24511	1.08	22.7	28140
			80/67	62.8	26138	18067	1.17	22.4	26538	1.07	24.9	30163
			85/71	63.7	28268	18638	1.15	24.6	28668	1.05	27.4	32247
60	2.5	1.6	75/63	80.8	20730	15896	1.39	14.9	21130	1.27	16.6	25464
			80/67	82.3	22415	16503	1.40	16.0	22815	1.29	17.7	27216
			85/71	83.7	24197	17069	1.41	17.1	24597	1.30	19.0	29030
	3.9	4.0	75/63	73.9	22055	16493	1.30	16.9	22455	1.20	18.8	26532
			80/67	74.9	23927	17130	1.30	18.4	24327	1.20	20.3	28411
			85/71	75.9	25907	17719	1.30	20.0	26307	1.19	22.1	30385
	4.8	6.0	75/63	71.5	22553	16719	1.27	17.7	22953	1.17	19.6	26936
			80/67	72.3	24487	17365	1.27	19.3	24887	1.17	21.3	28857
			85/71	73.1	26541	17963	1.26	21.1	26941	1.16	23.3	30891
70	2.5	1.6	75/63	90.0	19323	15272	1.48	13.1	19723	1.36	14.5	24372
			80/67	91.3	20917	15891	1.50	13.9	21317	1.39	15.4	26063
			85/71	92.8	22606	16473	1.52	14.9	23006	1.40	16.4	27822
	3.9	4.0	75/63	83.3	20557	15819	1.40	14.7	20957	1.29	16.2	25328
			80/67	84.3	22336	16470	1.41	15.9	22736	1.30	17.5	27172
			85/71	85.2	24225	17079	1.41	17.2	24625	1.30	18.9	29055
	4.8	6.0	75/63	81.0	21011	16022	1.37	15.3	21411	1.27	16.8	25689
			80/67	81.8	22852	16683	1.37	16.6	23252	1.27	18.2	27581
			85/71	82.6	24810	17300	1.37	18.1	25210	1.27	19.8	29514
80	2.5	1.6	75/63	99.1	17906	14652	1.57	11.4	18306	1.45	12.6	23255
			80/67	100.4	19418	15288	1.60	12.2	19818	1.48	13.4	24867
			85/71	101.8	21013	15886	1.62	12.9	21413	1.51	14.2	26558
	3.9	4.0	75/63	92.6	19087	15168	1.49	12.8	19487	1.39	14.1	24186
			80/67	93.6	20750	15823	1.51	13.7	21150	1.40	15.1	25916
			85/71	94.6	22509	16437	1.53	14.8	22909	1.42	16.2	27745
	4.8	6.0	75/63	90.5	19467	15336	1.47	13.3	19867	1.37	14.5	24484
			80/67	91.2	21217	16013	1.48	14.3	21617	1.38	15.6	26272
			85/71	92.0	23050	16639	1.49	15.5	23450	1.39	16.9	28153
85	2.5	1.6	75/63	103.6	17194	14343	1.61	10.7	17594	1.50	11.7	22670
			80/67	104.9	18659	14985	1.65	11.3	19059	1.53	12.4	24265
			85/71	106.3	20206	15592	1.68	12.0	20606	1.56	13.2	25921
	3.9	4.0	75/63	97.4	18297	14822	1.54	11.9	18697	1.44	13.0	23552
			80/67	98.3	19938	15496	1.57	12.7	20338	1.46	13.9	25266
			85/71	99.2	21648	16119	1.58	13.7	22048	1.48	14.9	27054
	4.8	6.0	75/63	95.2	18696	14996	1.52	12.3	19096	1.42	13.4	23869
			80/67	95.9	20397	15681	1.54	13.3	20797	1.44	14.5	25626
			85/71	96.7	22181	16316	1.55	14.3	22581	1.45	15.6	27488
90	2.5	1.6	75/63	108.1	16480	14035	1.66	9.9	16880	1.54	10.9	22093
			80/67	109.4	17894	14682	1.69	10.6	18294	1.58	11.6	23654
			85/71	110.7	19393	15298	1.73	11.2	19793	1.61	12.3	25275
	3.9	4.0	75/63	102.1	17542	14494	1.59	11.0	17942	1.48	12.1	22949
			80/67	103.0	19118	15168	1.62	11.8	19518	1.51	12.9	24628
			85/71	103.9	20789	15805	1.64	12.7	21189	1.53	13.8	26381
	4.8	6.0	75/63	99.9	17925	14660	1.57	11.4	18325	1.47	12.5	23255
			80/67	100.7	19558	15344	1.59	12.3	19958	1.49	13.4	24977
			85/71	101.4	21294	15989	1.61	13.3	21694	1.51	14.4	26776
100	2.5	1.6	75/63	117.2	15018	13406	1.74	8.6	15418	1.63	9.5	20913
			80/67	118.4	16351	14075	1.79	9.2	16751	1.67	10.0	22406
			85/71	119.7	17750	14707	1.83	9.7	18150	1.71	10.6	23986
	3.9	4.0	75/63	111.4	16012	13834	1.68	9.5	16412	1.58	10.4	21724
			80/67	112.3	17493	14524	1.72	10.2	17893	1.61	11.1	23329
			85/71	113.2	19057	15176	1.75	10.9	19457	1.64	11.9	25003
	4.8	6.0	75/63	109.4	16368	13987	1.66	9.8	16768	1.56	10.7	22012
			80/67	110.1	17901	14685	1.69	10.6	18301	1.59	11.5	23657
			85/71	110.9	19526	15346	1.72	11.4	19926	1.62	12.3	25377
110	2.5	1.6	75/63	126.2	13555	12772	1.82	7.5	13955	1.70	8.2	19693
			80/67	127.4	14788	13458	1.87	7.9	15188	1.76	8.7	21129
			85/71	128.6	16081	14109	1.92	8.4	16481	1.81	9.1	22609
	3.9	4.0	75/63	120.8	14476	13173	1.77	8.2	14876	1.66	9.0	20463
			80/67	121.6	15848	13877	1.81	8.7	16248	1.71	9.5	21990
			85/71	122.5	17303	14547	1.85	9.3	17703	1.75	10.1	23611
	4.8	6.0	75/63	118.9	14804	13314	1.75	8.4	15204	1.65	9.2	20734
			80/67	119.6	16227	14026	1.79	9.1	16627	1.69	9.8	22300
			85/71	120.3	17735	14701	1.83	9.7	18135	1.73	10.5	23961

Heating Capacity Data – Unit Size 019

EWT	GPM	WPD	System					ISO			
			EA	LWT	Capacity	KW	COP	TOT	kW	COP	THA
20	2.5	1.6	60	14.4	13137	1.14	3.4	12737	1.02	3.6	9248
			70	14.9	12421	1.18	3.1	12021	1.06	3.3	8397
			80	15.5	11707	1.21	2.8	11307	1.10	3.0	7561
	3.9	4.0	60	16.1	13807	1.17	3.5	13407	1.06	3.7	9829
			70	16.5	13012	1.21	3.2	12612	1.10	3.4	8896
			80	16.9	12211	1.24	2.9	11811	1.13	3.1	7971
	4.8	6.0	60	16.8	14061	1.18	3.5	13661	1.08	3.7	10051
			70	17.1	13232	1.22	3.2	12832	1.12	3.4	9083
			80	17.4	12401	1.25	2.9	12001	1.15	3.0	8127
30	2.5	1.6	60	23.1	15424	1.23	3.7	15024	1.11	4.0	11243
			70	23.6	14708	1.26	3.4	14308	1.15	3.6	10392
			80	24.2	13994	1.30	3.2	13594	1.19	3.4	9556
	3.9	4.0	60	25.3	16253	1.25	3.8	15853	1.15	4.1	11974
			70	25.7	15458	1.29	3.5	15058	1.19	3.7	11041
			80	26.1	14657	1.33	3.2	14257	1.22	3.4	10116
	4.8	6.0	60	26.1	16567	1.26	3.8	16167	1.16	4.1	12251
			70	26.4	15738	1.31	3.5	15338	1.21	3.7	11283
			80	26.7	14907	1.34	3.3	14507	1.24	3.4	10327
40	2.5	1.6	60	31.7	17827	1.31	4.0	17427	1.19	4.3	13368
			70	32.3	17079	1.36	3.7	16679	1.24	3.9	12449
			80	32.9	16325	1.40	3.4	15925	1.29	3.6	11532
	3.9	4.0	60	34.3	18785	1.34	4.1	18385	1.23	4.4	14222
			70	34.7	17962	1.39	3.8	17562	1.28	4.0	13220
			80	35.2	17136	1.44	3.5	16736	1.33	3.7	12226
	4.8	6.0	60	35.3	19151	1.35	4.2	18751	1.25	4.4	14548
			70	35.6	18293	1.40	3.8	17893	1.30	4.0	13509
			80	36.0	17444	1.45	3.5	17044	1.35	3.7	12491
50	2.5	1.6	60	40.2	20274	1.38	4.3	19874	1.27	4.6	15558
			70	40.9	19518	1.44	4.0	19118	1.33	4.2	14590
			80	41.6	18728	1.50	3.6	18328	1.39	3.9	13596
	3.9	4.0	60	43.3	21425	1.41	4.4	21025	1.31	4.7	16597
			70	43.8	20563	1.48	4.1	20163	1.37	4.3	15514
			80	44.3	19672	1.54	3.7	19272	1.43	3.9	14413
	4.8	6.0	60	44.4	21850	1.43	4.5	21450	1.33	4.7	16982
			70	44.8	20935	1.49	4.1	20535	1.39	4.3	15843
			80	45.2	20029	1.56	3.8	19629	1.46	4.0	14723
60	2.5	1.6	60	48.7	22806	1.45	4.6	22406	1.34	4.9	17851
			70	49.5	22001	1.53	4.2	21601	1.41	4.5	16794
			80	50.2	21184	1.60	3.9	20784	1.48	4.1	15730
	3.9	4.0	60	52.3	24127	1.49	4.8	23727	1.38	5.0	19057
			70	52.8	23222	1.56	4.4	22822	1.46	4.6	17888
			80	53.3	22296	1.64	4.0	21896	1.53	4.2	16704
	4.8	6.0	60	53.6	24608	1.50	4.8	24208	1.40	5.1	19498
			70	54.0	23679	1.58	4.4	23279	1.48	4.6	18298
			80	54.4	22716	1.65	4.0	22316	1.55	4.2	17075
70	2.5	1.6	60	57.2	25399	1.52	4.9	24999	1.40	5.2	20224
			70	58.0	24546	1.60	4.5	24146	1.49	4.8	19078
			80	58.7	23685	1.69	4.1	23285	1.57	4.3	17927
	3.9	4.0	60	61.2	26861	1.55	5.1	26461	1.44	5.4	21572
			70	61.8	25914	1.64	4.6	25514	1.53	4.9	20316
			80	62.3	24944	1.73	4.2	24544	1.62	4.4	19043
	4.8	6.0	60	62.7	27412	1.56	5.1	27012	1.46	5.4	22081
			70	63.1	26423	1.65	4.7	26023	1.55	4.9	20777
			80	63.6	25424	1.74	4.3	25024	1.64	4.5	19471
80	2.5	1.6	60	65.6	28019	1.58	5.2	27619	1.46	5.5	22644
			70	66.4	27134	1.67	4.8	26734	1.56	5.0	21425
			80	67.3	26237	1.77	4.3	25837	1.66	4.6	20195
	3.9	4.0	60	70.1	29654	1.61	5.4	29254	1.50	5.7	24165
			70	70.7	28646	1.71	4.9	28246	1.60	5.2	22805
			80	71.3	27619	1.81	4.5	27219	1.71	4.7	21430
	4.8	6.0	60	71.8	30260	1.62	5.5	29860	1.52	5.8	24731
			70	72.3	29210	1.73	5.0	28810	1.63	5.2	23321
			80	72.8	28138	1.83	4.5	27738	1.73	4.7	21897
85	2.5	1.6	60	69.7	29304	1.60	5.4	28904	1.49	5.7	23838
			70	70.6	28440	1.71	4.9	28040	1.59	5.2	22616
			80	71.5	27514	1.81	4.5	27114	1.70	4.7	21337
	3.9	4.0	60	74.5	31036	1.64	5.6	30636	1.53	5.9	25456
			70	75.2	30022	1.75	5.0	29622	1.64	5.3	24068
			80	75.8	28959	1.85	4.6	28559	1.75	4.8	22635
	4.8	6.0	60	76.3	31696	1.65	5.6	31296	1.55	5.9	26075
			70	76.8	30613	1.76	5.1	30213	1.66	5.3	24611
			80	77.4	29504	1.87	4.6	29104	1.77	4.8	23126
90	2.5	1.6	60	73.3	25860	1.55	4.9	25460	1.43	5.2	20574
			70	74.8	29727	1.74	5.0	29327	1.62	5.3	23796
			80	75.7	28793	1.85	4.6	28393	1.73	4.8	22487
	3.9	4.0	60	79.0	32440	1.66	5.7	32040	1.55	6.0	26774
			70	79.6	31403	1.78	5.2	31003	1.67	5.4	25340
			80	80.3	30301	1.89	4.7	29901	1.78	4.9	23847
	4.8	6.0	60	80.8	33102	1.67	5.8	32702	1.57	6.1	27396
			70	81.4	32016	1.79	5.2	31616	1.69	5.5	25906
			80	81.9	30868	1.91	4.7	30468	1.81	4.9	24361

Cooling Capacity Data – Unit Size 024

EWT	GPM	WPD	System						ISO			
			EA	LWT	Total	Sensible	KW	EER	TOT	kW	EER	THR
30	4	4.2	75/63	47.0	29148	21496	1.15	25.4	29759	0.98	30.3	33092
			80/67	48.1	31399	22199	1.13	27.8	32010	0.96	33.3	35316
			85/71	49.3	33762	22841	1.11	30.4	34373	0.94	36.5	37614
	5	6.5	75/63	43.7	29779	21791	1.07	27.8	30390	0.91	33.3	33468
			80/67	44.6	32109	22505	1.04	30.8	32720	0.89	37.0	35722
			85/71	45.6	34554	23153	1.01	34.2	35165	0.85	41.2	38088
	6.6	11.3	75/63	40.5	30414	22090	0.99	30.7	31025	0.86	36.1	33854
			80/67	41.2	32805	22806	0.95	34.5	33416	0.82	40.7	36148
			85/71	42.0	35347	23469	0.91	39.1	35958	0.77	46.5	38519
40	4	4.2	75/63	56.6	27881	20909	1.29	21.6	28492	1.12	25.3	32295
			80/67	57.7	30076	21634	1.28	23.4	30687	1.12	27.5	34470
			85/71	58.9	32356	22291	1.27	25.4	32967	1.10	29.9	36738
	5	6.5	75/63	53.4	28484	21187	1.23	23.3	29095	1.07	27.3	32687
			80/67	54.4	30756	21924	1.21	25.5	31367	1.05	29.9	34913
			85/71	55.3	33136	22595	1.18	28.0	33747	1.03	32.9	37234
	6.6	11.3	75/63	50.3	29108	21477	1.15	25.2	29719	1.02	29.1	33067
			80/67	51.0	31456	22224	1.13	28.0	32067	0.99	32.3	35345
			85/71	51.7	33917	22902	1.09	31.1	34528	0.96	36.0	37716
50	4	4.2	75/63	66.2	26494	20274	1.43	18.5	27105	1.26	21.4	31395
			80/67	67.3	28618	21020	1.43	20.0	29229	1.26	23.1	33508
			85/71	68.4	30845	21708	1.43	21.5	31456	1.26	24.9	35746
	5	6.5	75/63	63.1	27103	20552	1.37	19.7	27714	1.21	22.8	31803
			80/67	64.0	29297	21305	1.37	21.5	29908	1.21	24.8	33963
			85/71	64.9	31609	22002	1.35	23.4	32220	1.19	27.0	36261
	6.6	11.3	75/63	60.0	27723	20836	1.31	21.2	28334	1.18	24.1	32169
			80/67	60.7	29978	21593	1.29	23.2	30589	1.16	26.3	34431
			85/71	61.5	32381	22301	1.27	25.5	32992	1.14	29.0	36766
60	4	4.2	75/63	75.7	25058	19624	1.57	16.0	25669	1.40	18.3	30397
			80/67	76.7	27091	20385	1.58	17.2	27702	1.41	19.7	32451
			85/71	77.9	29242	21097	1.59	18.4	29853	1.42	21.1	34647
	5	6.5	75/63	72.7	25635	19885	1.52	16.9	26246	1.36	19.3	30819
			80/67	73.6	27755	20660	1.52	18.3	28366	1.36	20.9	32939
			85/71	74.5	29984	21379	1.52	19.8	30595	1.36	22.5	35176
	6.6	11.3	75/63	69.8	26232	20155	1.46	18.0	26843	1.33	20.2	31214
			80/67	70.4	28421	20938	1.45	19.6	29032	1.32	22.0	33367
			85/71	71.2	30738	21667	1.44	21.3	31349	1.31	23.9	35704
70	4	4.2	75/63	85.1	23538	18945	1.70	13.9	24149	1.53	15.8	29273
			80/67	86.2	25494	19728	1.72	14.8	26105	1.55	16.9	31334
			85/71	87.3	27523	20450	1.74	15.9	28134	1.57	18.0	33453
	5	6.5	75/63	82.3	24104	19197	1.65	14.6	24715	1.49	16.6	29692
			80/67	83.2	26136	19991	1.66	15.7	26747	1.50	17.8	31806
			85/71	84.0	28273	20731	1.67	16.9	28884	1.51	19.1	33961
	6.6	11.3	75/63	79.4	24690	19459	1.60	15.4	25301	1.47	17.2	30106
			80/67	80.1	26781	20256	1.61	16.7	27392	1.48	18.6	32273
			85/71	80.8	29004	21007	1.61	18.0	29615	1.48	20.1	34484
80	4	4.2	75/63	94.6	21964	18248	1.82	12.1	22575	1.65	13.7	28129
			80/67	95.6	23826	19050	1.85	12.9	24437	1.68	14.5	30077
			85/71	96.5	25796	19807	1.87	13.8	26407	1.70	15.5	32176
	5	6.5	75/63	91.8	22507	18488	1.78	12.7	23118	1.62	14.3	28531
			80/67	92.6	24435	19296	1.80	13.6	25046	1.64	15.2	30532
			85/71	93.5	26453	20050	1.82	14.5	27064	1.66	16.3	32641
	6.6	11.3	75/63	89.1	23051	18728	1.74	13.3	23662	1.60	14.8	28927
			80/67	89.7	25066	19553	1.75	14.3	25677	1.62	15.8	31006
			85/71	90.4	27166	20316	1.76	15.4	27777	1.63	17.0	33169
85	4	4.2	75/63	99.2	21157	17894	1.88	11.3	21768	1.71	12.7	27496
			80/67	100.2	22951	18697	1.91	12.0	23562	1.74	13.5	29422
			85/71	101.3	24831	19451	1.95	12.8	25442	1.78	14.3	31420
	5	6.5	75/63	96.6	21688	18127	1.84	11.8	22299	1.68	13.3	27904
			80/67	97.4	23575	18948	1.87	12.6	24186	1.71	14.1	29887
			85/71	98.2	25524	19706	1.89	13.5	26135	1.74	15.1	31945
	6.6	11.3	75/63	93.9	22221	18362	1.80	12.3	22832	1.67	13.7	28306
			80/67	94.5	24182	19194	1.82	13.3	24793	1.69	14.7	30360
			85/71	95.2	26230	19968	1.84	14.2	26841	1.71	15.7	32477
90	4	4.2	75/63	103.9	20340	17535	1.94	10.5	20951	1.77	11.9	26861
			80/67	104.9	22076	18345	1.98	11.2	22687	1.81	12.6	28745
			85/71	105.9	23897	19108	2.01	11.9	24508	1.84	13.3	30702
	5	6.5	75/63	101.3	20856	17761	1.90	11.0	21467	1.74	12.3	27263
			80/67	102.1	22670	18584	1.93	11.7	23281	1.78	13.1	29206
			85/71	102.9	24577	19357	1.96	12.5	25188	1.81	14.0	31225
	6.6	11.3	75/63	98.7	21376	17990	1.86	11.5	21987	1.73	12.7	27665
			80/67	99.3	23286	18832	1.89	12.3	23897	1.76	13.6	29664
			85/71	100.0	25261	19609	1.91	13.2	25872	1.78	14.5	31745
100	4	4.2	75/63	113.3	18667	16803	2.05	9.1	19278	1.88	10.3	25543
			80/67	114.2	20289	17628	2.10	9.7	20900	1.93	10.8	27337
			85/71	115.1	21983	18407	2.14	10.3	22594	1.97	11.5	29199
	5	6.5	75/63	110.8	19143	17011	2.02	9.5	19754	1.86	10.6	25923
			80/67	111.5	20849	17853	2.06	10.1	21460	1.90	11.3	27784
			85/71	112.3	22630	18644	2.10	10.8	23241	1.94	12.0	29710
	6.6	11.3	75/63	108.3	19644	17231	1.98	9.9	20255	1.85	10.9	26322
			80/67	108.9	21421	18082	2.02	10.6	22032	1.89	11.7	28234
			85/71	109.5	23287	18884	2.06	11.3	23898	1.92	12.4	30224
110	4	4.2	75/63	122.5	16940	16037	2.15	7.9	17551	1.98	8.9	24154
			80/67	123.4	18443	16885	2.21	8.4	19054	2.04	9.3	25857
			85/71	124.4	20009	17685	2.26	8.8	20620	2.09	9.8	27644
	5	6.5	75/63	120.2	17399	16242	2.12	8.2	18010	1.96	9.2	24526
			80/67	120.9	18970	17098	2.18	8.7	19581	2.02	9.7	26304
			85/71	121.7	20615	17907	2.23	9.3	21226	2.07	10.3	28140
	6.6	11.3	75/63	117.8	17870	16451	2.09	8.5	18481	1.96	9.4	24908
			80/67	118.4	19518	17319	2.14	9.1	20129	2.01	10.0	26724
			85/71	119.0	21233	18134	2.19	9.7	21844	2.06	10.6	28637

Heating Capacity Data – Unit Size 024

EWT	GPM	WPD	System					ISO			
			EA	LWT	Capacity	KW	COP	TOT	kW	COP	THA
20	4	4.2	60	15.8	16120	1.44	3.3	15509	1.27	3.6	11208
			70	16.2	15400	1.49	3.0	14790	1.32	3.3	10313
			80	16.6	14680	1.53	2.8	14069	1.37	3.0	9438
	5	6.5	60	16.5	16461	1.45	3.3	15850	1.29	3.6	11508
			70	16.9	15714	1.50	3.1	15103	1.34	3.3	10583
			80	17.2	14966	1.55	2.8	14355	1.39	3.0	9677
	6.6	11.3	60	17.3	16821	1.46	3.4	16210	1.33	3.6	11826
			70	17.5	16059	1.52	3.1	15448	1.38	3.3	10884
			80	17.8	15274	1.56	2.9	14663	1.43	3.0	9937
30	4	4.2	60	24.8	18888	1.53	3.6	18277	1.36	3.9	13660
			70	25.2	18102	1.59	3.3	17491	1.42	3.6	12685
			80	25.6	17292	1.64	3.1	16681	1.47	3.3	11707
	5	6.5	60	25.7	19291	1.55	3.7	18680	1.39	3.9	14020
			70	26.1	18473	1.60	3.4	17862	1.44	3.6	13009
			80	26.4	17637	1.65	3.1	17026	1.49	3.3	12003
	6.6	11.3	60	26.7	19743	1.56	3.7	19132	1.43	3.9	14425
			70	26.9	18872	1.62	3.4	18261	1.48	3.6	13359
			80	27.2	17999	1.67	3.2	17388	1.53	3.3	12312
40	4	4.2	60	33.8	21751	1.62	3.9	21140	1.45	4.3	16230
			70	34.2	20944	1.69	3.6	20333	1.52	3.9	15185
			80	34.6	20115	1.75	3.4	19504	1.58	3.6	14136
	5	6.5	60	34.9	22231	1.63	4.0	21620	1.47	4.3	16663
			70	35.2	21383	1.70	3.7	20772	1.54	3.9	15573
			80	35.6	20529	1.77	3.4	19918	1.61	3.6	14494
	6.6	11.3	60	36.0	22729	1.65	4.0	22118	1.51	4.3	17113
			70	36.3	21855	1.72	3.7	21244	1.59	3.9	15991
			80	36.6	20950	1.79	3.4	20339	1.65	3.6	14858
50	4	4.2	60	42.7	24657	1.70	4.3	24046	1.53	4.6	18864
			70	43.2	23854	1.78	3.9	23243	1.61	4.2	17771
			80	43.6	22996	1.86	3.6	22385	1.69	3.9	16640
	5	6.5	60	44.0	25220	1.71	4.3	24609	1.55	4.6	19377
			70	44.4	24368	1.80	4.0	23757	1.64	4.2	18229
			80	44.8	23489	1.88	3.7	22878	1.72	3.9	17073
	6.6	11.3	60	45.3	25810	1.73	4.4	25199	1.60	4.6	19916
			70	45.6	24921	1.82	4.0	24310	1.68	4.2	18724
			80	45.9	23976	1.90	3.7	23365	1.77	3.9	17498
60	4	4.2	60	51.6	27632	1.77	4.6	27021	1.60	4.9	21583
			70	52.1	26778	1.87	4.2	26167	1.70	4.5	20389
			80	52.6	25886	1.97	3.9	25275	1.80	4.1	19173
	5	6.5	60	53.1	28265	1.79	4.6	27654	1.63	5.0	22164
			70	53.5	27370	1.89	4.2	26759	1.73	4.5	20922
			80	53.9	26457	1.99	3.9	25846	1.83	4.1	19679
	6.6	11.3	60	54.6	28948	1.80	4.7	28337	1.67	5.0	22793
			70	54.9	27986	1.91	4.3	27375	1.78	4.5	21477
			80	55.3	27011	2.01	3.9	26400	1.87	4.1	20166
70	4	4.2	60	60.4	30660	1.84	4.9	30049	1.67	5.3	24369
			70	61.0	29747	1.96	4.5	29136	1.79	4.8	23066
			80	61.6	28795	2.07	4.1	28184	1.90	4.3	21741
	5	6.5	60	62.1	31360	1.86	4.9	30749	1.70	5.3	25014
			70	62.6	30406	1.98	4.5	29795	1.82	4.8	23662
			80	63.1	29405	2.09	4.1	28794	1.93	4.4	22282
	6.6	11.3	60	63.9	32091	1.88	5.0	31480	1.74	5.3	25690
			70	64.2	31091	2.00	4.6	30480	1.86	4.8	24283
			80	64.6	30035	2.11	4.2	29424	1.98	4.4	22842
80	4	4.2	60	69.3	33677	1.91	5.2	33066	1.74	5.6	27158
			70	69.9	32743	2.04	4.7	32132	1.87	5.0	25784
			80	70.5	31725	2.16	4.3	31114	1.99	4.6	24344
	5	6.5	60	71.2	34451	1.93	5.2	33840	1.77	5.6	27874
			70	71.7	33458	2.06	4.8	32847	1.90	5.1	26433
			80	72.2	32379	2.18	4.3	31768	2.03	4.6	24926
	6.6	11.3	60	73.1	35252	1.94	5.3	34641	1.81	5.6	28618
			70	73.5	34201	2.08	4.8	33590	1.95	5.1	27110
			80	73.9	33069	2.21	4.4	32458	2.07	4.6	25541
85	4	4.2	60	73.7	35179	1.94	5.3	34568	1.77	5.7	28550
			70	74.3	34230	2.08	4.8	33619	1.91	5.2	27137
			80	75.0	33203	2.21	4.4	32592	2.04	4.7	25661
	5	6.5	60	75.7	36009	1.96	5.4	35398	1.80	5.8	29321
			70	76.2	34992	2.10	4.9	34381	1.94	5.2	27831
			80	76.8	33864	2.23	4.4	33253	2.07	4.7	26250
	6.6	11.3	60	77.8	36841	1.98	5.5	36230	1.85	5.8	30094
			70	78.2	35763	2.12	4.9	35152	1.99	5.2	28534
			80	78.6	34581	2.25	4.5	33970	2.12	4.7	26891
90	4	4.2	60	78.1	36698	1.97	5.4	36087	1.81	5.9	29961
			70	78.8	35708	2.12	4.9	35097	1.95	5.3	28483
			80	79.4	34663	2.26	4.5	34052	2.09	4.8	26966
	5	6.5	60	80.2	37540	1.99	5.5	36929	1.83	5.9	30745
			70	80.8	36489	2.14	5.0	35878	1.98	5.3	29197
			80	81.3	35346	2.28	4.5	34735	2.12	4.8	27576
	6.6	11.3	60	82.4	38431	2.01	5.6	37820	1.88	5.9	31575
			70	82.8	37324	2.16	5.1	36713	2.03	5.3	29960
			80	83.3	36088	2.30	4.6	35477	2.17	4.8	28240

Cooling Capacity Data – Unit Size 030

EWT	GPM	WPD	System						ISO			
			EA	LWT	Total	Sensible	KW	EER	TOT	kW	EER	THR
30	4	2.0	75/63	48.1	31442	24228	1.37	23.0	32080	1.19	27.1	36215
			80/67	49.3	33677	25058	1.39	24.2	34315	1.21	28.4	38548
			85/71	50.5	36018	25836	1.42	25.4	36656	1.24	29.6	40977
	6	4.5	75/63	42.2	32352	24629	1.20	26.9	32990	1.03	32.0	36543
			80/67	43.0	34710	25475	1.22	28.6	35348	1.05	33.8	38977
			85/71	43.8	37183	26266	1.23	30.2	37821	1.06	35.6	41519
	8	7.9	75/63	39.2	32790	24822	1.11	29.7	33428	0.96	34.9	36668
			80/67	39.8	35235	25688	1.11	31.6	35873	0.97	37.1	39171
			85/71	40.4	37824	26503	1.12	33.7	38462	0.98	39.4	41774
40	4	2.0	75/63	58.0	30573	23848	1.52	20.2	31211	1.34	23.4	35852
			80/67	59.1	32743	24683	1.54	21.2	33381	1.36	24.6	38107
			85/71	60.3	35028	25473	1.57	22.3	35666	1.39	25.7	40477
	6	4.5	75/63	52.1	31444	24229	1.37	23.0	32082	1.20	26.8	36215
			80/67	52.9	33745	25086	1.38	24.5	34383	1.21	28.4	38577
			85/71	53.7	36169	25891	1.40	25.9	36807	1.23	30.0	41057
	8	7.9	75/63	49.1	31917	24437	1.28	24.9	32555	1.14	28.7	36393
			80/67	49.7	34293	25307	1.29	26.5	34931	1.15	30.5	38805
			85/71	50.4	36768	26112	1.30	28.2	37406	1.16	32.4	41343
50	4	2.0	75/63	67.8	29625	23435	1.67	17.7	30263	1.49	20.3	35408
			80/67	68.9	31736	24281	1.70	18.7	32374	1.51	21.4	37630
			85/71	70.1	33961	25083	1.72	19.7	34599	1.54	22.4	39929
	6	4.5	75/63	62.0	30494	23814	1.53	19.9	31132	1.36	22.9	35838
			80/67	62.8	32726	24677	1.54	21.2	33364	1.37	24.3	38097
			85/71	63.6	35084	25493	1.56	22.5	35722	1.39	25.7	40525
	8	7.9	75/63	59.0	30959	24017	1.45	21.3	31597	1.31	24.2	36011
			80/67	59.6	33243	24884	1.46	22.7	33881	1.32	25.8	38325
			85/71	60.2	35671	25708	1.47	24.2	36309	1.33	27.4	40830
60	4	2.0	75/63	77.6	28603	22992	1.83	15.6	29241	1.65	17.7	34952
			80/67	78.7	30656	23851	1.86	16.5	31294	1.68	18.7	37099
			85/71	79.8	32818	24667	1.89	17.4	33456	1.71	19.6	39337
	6	4.5	75/63	71.9	29475	23370	1.69	17.4	30113	1.52	19.8	35363
			80/67	72.6	31639	24242	1.71	18.5	32277	1.54	21.0	37571
			85/71	73.4	33935	25073	1.73	19.6	34573	1.56	22.2	39937
	8	7.9	75/63	68.9	29923	23565	1.62	18.4	30561	1.48	20.7	35581
			80/67	69.5	32152	24447	1.63	19.7	32790	1.49	22.1	37813
			85/71	70.1	34511	25283	1.65	21.0	35149	1.50	23.5	40254
70	4	2.0	75/63	87.4	27514	22521	2.01	13.7	28152	1.83	15.4	34457
			80/67	88.4	29509	23397	2.04	14.5	30147	1.86	16.2	36546
			85/71	89.5	31560	24213	2.07	15.3	32198	1.89	17.1	38724
	6	4.5	75/63	81.7	28387	22899	1.87	15.2	29025	1.70	17.1	34853
			80/67	82.4	30488	23785	1.89	16.2	31126	1.72	18.1	37033
			85/71	83.2	32677	24616	1.90	17.2	33315	1.73	19.2	39318
	8	7.9	75/63	78.8	28838	23094	1.80	16.0	29476	1.65	17.9	35062
			80/67	79.4	30997	23987	1.81	17.2	31635	1.66	19.1	37290
			85/71	80.0	33282	24836	1.82	18.3	33920	1.67	20.3	39600
80	4	2.0	75/63	97.1	26352	22021	2.21	11.9	26990	2.03	13.3	33943
			80/67	98.2	28277	22911	2.24	12.6	28915	2.06	14.1	35994
			85/71	99.2	30243	23738	2.27	13.3	30881	2.09	14.8	38105
	6	4.5	75/63	91.6	27235	22401	2.06	13.2	27873	1.89	14.8	34338
			80/67	92.3	29264	23300	2.08	14.1	29902	1.91	15.7	36459
			85/71	93.0	31369	24144	2.10	15.0	32007	1.93	16.6	38637
	8	7.9	75/63	88.7	27678	22592	1.98	14.0	28316	1.84	15.4	34529
			80/67	89.3	29774	23502	2.00	14.9	30412	1.85	16.5	36678
			85/71	89.8	31948	24353	2.01	15.9	32586	1.86	17.5	38927
85	4	2.0	75/63	102.0	25745	21759	2.32	11.1	26383	2.14	12.3	33734
			80/67	103.0	27602	22644	2.35	11.8	28240	2.17	13.0	35720
			85/71	104.1	29551	23489	2.38	12.4	30189	2.20	13.7	37797
	6	4.5	75/63	96.5	26628	22139	2.16	12.3	27266	1.99	13.7	34073
			80/67	97.2	28607	23041	2.18	13.1	29245	2.01	14.6	36176
			85/71	97.9	30671	23892	2.20	13.9	31309	2.03	15.4	38319
	8	7.9	75/63	93.7	27094	22340	2.08	13.0	27732	1.94	14.3	34274
			80/67	94.2	29140	23252	2.10	13.9	29778	1.95	15.3	36378
			85/71	94.7	31266	24106	2.11	14.8	31904	1.96	16.2	38586
90	4	2.0	75/63	106.9	25115	21488	2.44	10.3	25753	2.25	11.4	33502
			80/67	107.9	26928	22378	2.47	10.9	27566	2.28	12.1	35453
			85/71	108.9	28839	23234	2.50	11.6	29477	2.31	12.7	37455
	6	4.5	75/63	101.4	26008	21872	2.27	11.5	26646	2.10	12.7	33849
			80/67	102.1	27962	22786	2.29	12.2	28600	2.12	13.5	35848
			85/71	102.8	29979	23643	2.31	13.0	30617	2.14	14.3	37967
	8	7.9	75/63	98.6	26461	22068	2.19	12.1	27099	2.04	13.3	33991
			80/67	99.1	28480	22991	2.20	12.9	29118	2.06	14.2	36075
			85/71	99.7	30562	23853	2.22	13.8	31200	2.07	15.1	38242
100	4	2.0	75/63	116.7	23788	20914	2.70	8.8	24426	2.52	9.7	33034
			80/67	117.6	25509	21818	2.73	9.4	26147	2.55	10.3	34887
			85/71	118.6	27324	22689	2.76	9.9	27962	2.58	10.8	36824
	6	4.5	75/63	111.2	24701	21309	2.52	9.8	25339	2.35	10.8	33340
			80/67	111.9	26548	22229	2.53	10.5	27186	2.36	11.5	35273
			85/71	112.6	28496	23111	2.55	11.2	29134	2.38	12.2	37306
	8	7.9	75/63	108.5	25164	21509	2.43	10.4	25802	2.28	11.3	33506
			80/67	109.0	27073	22436	2.44	11.1	27711	2.29	12.1	35482
			85/71	109.5	29088	23323	2.46	11.8	29726	2.31	12.9	37563
110	4	2.0	75/63	126.5	22318	20273	3.01	7.4	22956	2.82	8.1	32617
			80/67	127.4	23964	21204	3.03	7.9	24602	2.85	8.6	34371
			85/71	128.3	25677	22093	3.07	8.4	26315	2.88	9.1	36204
	6	4.5	75/63	121.1	23273	20691	2.80	8.3	23911	2.63	9.1	32884
			80/67	121.7	25039	21632	2.82	8.9	25677	2.65	9.7	34722
			85/71	122.4	26897	22535	2.84	9.5	27535	2.67	10.3	36656
	8	7.9	75/63	118.4	23756	20900	2.70	8.8	24394	2.55	9.6	33030
			80/67	118.8	25584	21848	2.71	9.4	26222	2.57	10.2	34913
			85/71	119.3	27508	22755	2.73	10.1	28146	2.58	10.9	36897

Heating Capacity Data – Unit Size 030

EWT	GPM	WPD	System					ISO			
			EA	LWT	Capacity	KW	COP	TOT	kW	COP	THR
20	4	2.0	60	13.6	20701	1.89	3.2	20063	1.71	3.4	13999
			70	13.9	20801	2.10	2.9	20163	1.92	3.1	13328
			80	14.3	20942	2.34	2.6	20304	2.16	2.8	12571
	6	4.5	60	15.5	21647	1.91	3.3	21009	1.74	3.5	14881
			70	15.7	21664	2.12	3.0	21026	1.95	3.2	14127
			80	16.0	21705	2.36	2.7	21067	2.19	2.8	13299
	8	7.9	60	16.5	22189	1.92	3.4	21551	1.77	3.6	15399
			70	16.7	22163	2.12	3.1	21525	1.98	3.2	14599
			80	16.9	22156	2.37	2.7	21518	2.22	2.8	13725
30	4	2.0	60	22.4	23391	1.93	3.5	22753	1.75	3.8	16556
			70	22.8	23387	2.15	3.2	22749	1.96	3.4	15785
			80	23.2	23428	2.39	2.9	22790	2.21	3.0	14932
	6	4.5	60	24.6	24529	1.95	3.7	23891	1.78	3.9	17645
			70	24.9	24447	2.16	3.3	23809	1.99	3.5	16785
			80	25.2	24417	2.41	3.0	23779	2.24	3.1	15853
	8	7.9	60	25.8	25192	1.96	3.8	24554	1.81	4.0	18292
			70	26.0	25061	2.17	3.4	24423	2.03	3.5	17377
			80	26.3	24981	2.42	3.0	24343	2.27	3.1	16374
40	4	2.0	60	31.1	26307	1.98	3.9	25669	1.79	4.2	19359
			70	31.5	26219	2.19	3.5	25581	2.01	3.7	18498
			80	32.0	26207	2.44	3.1	25569	2.26	3.3	17548
	6	4.5	60	33.7	27695	1.99	4.1	27057	1.82	4.3	20691
			70	34.0	27521	2.21	3.6	26883	2.04	3.9	19714
			80	34.3	27390	2.46	3.3	26752	2.29	3.4	18668
	8	7.9	60	35.1	28515	2.01	4.2	27877	1.86	4.4	21476
			70	35.3	28273	2.22	3.7	27635	2.08	3.9	20435
			80	35.6	28080	2.47	3.3	27442	2.33	3.5	19325
50	4	2.0	60	39.7	29501	2.02	4.3	28863	1.84	4.6	22413
			70	40.2	29319	2.24	3.8	28681	2.06	4.1	21440
			80	40.6	29198	2.49	3.4	28560	2.31	3.6	20396
	6	4.5	60	42.6	31193	2.04	4.5	30555	1.87	4.8	24021
			70	43.0	30883	2.27	4.0	30245	2.10	4.2	22928
			80	43.3	30664	2.52	3.6	30026	2.35	3.7	21749
	8	7.9	60	44.3	32149	2.06	4.6	31511	1.91	4.8	24964
			70	44.5	31779	2.28	4.1	31141	2.13	4.3	23791
			80	44.8	31488	2.54	3.6	30850	2.39	3.8	22543
60	4	2.0	60	48.2	32967	2.07	4.7	32329	1.89	5.0	25721
			70	48.7	32692	2.30	4.2	32054	2.11	4.4	24625
			80	49.2	32481	2.56	3.7	31843	2.38	3.9	23466
	6	4.5	60	51.5	34902	2.10	4.9	34264	1.93	5.2	27641
			70	51.9	34544	2.33	4.3	33906	2.16	4.6	26405
			80	52.3	34196	2.59	3.9	33558	2.42	4.1	25087
	8	7.9	60	53.4	36114	2.12	5.0	35476	1.97	5.3	28750
			70	53.7	35633	2.35	4.4	34995	2.20	4.7	27436
			80	54.0	35169	2.61	3.9	34531	2.47	4.1	26028
70	4	2.0	60	56.5	36652	2.13	5.0	36014	1.95	5.4	29239
			70	57.1	36312	2.36	4.5	35674	2.18	4.8	28039
			80	57.7	35979	2.63	4.0	35341	2.45	4.2	26757
	6	4.5	60	60.3	38965	2.17	5.3	38327	2.00	5.6	31461
			70	60.7	38475	2.41	4.7	37837	2.24	5.0	30100
			80	61.2	37986	2.67	4.2	37348	2.50	4.4	28645
	8	7.9	60	62.4	40196	2.19	5.4	39558	2.04	5.7	32829
			70	62.8	39768	2.43	4.8	39130	2.28	5.0	31305
			80	63.1	39210	2.70	4.3	38572	2.56	4.4	29742
80	4	2.0	60	64.8	40384	2.19	5.4	39746	2.01	5.8	32987
			70	65.4	40130	2.44	4.8	39492	2.26	5.1	31640
			80	66.1	39726	2.72	4.3	39088	2.53	4.5	30219
	6	4.5	60	69.0	43289	2.25	5.6	42651	2.08	6.0	35570
			70	69.5	42651	2.49	5.0	42013	2.32	5.3	34014
			80	70.0	42047	2.77	4.4	41409	2.60	4.7	32400
	8	7.9	60	71.4	44957	2.29	5.8	44319	2.14	6.1	37036
			70	71.8	44137	2.53	5.1	43499	2.38	5.4	35418
			80	72.2	43416	2.81	4.5	42778	2.66	4.7	33673
85	4	2.0	60	68.9	42591	2.24	5.6	41953	2.06	6.0	34919
			70	69.5	42132	2.48	5.0	41494	2.30	5.3	33506
			80	70.2	41637	2.76	4.4	40999	2.58	4.7	32014
	6	4.5	60	73.4	45570	2.30	5.8	44932	2.13	6.2	37635
			70	73.9	44868	2.55	5.2	44230	2.38	5.5	36038
			80	74.4	44151	2.83	4.6	43513	2.66	4.8	34339
	8	7.9	60	75.9	47267	2.33	5.9	46629	2.19	6.2	39271
			70	76.3	46452	2.58	5.3	45814	2.44	5.5	37543
			80	76.8	45608	2.87	4.7	44970	2.72	4.8	35701
90	4	2.0	60	72.9	44706	2.28	5.7	44068	2.10	6.2	36893
			70	73.6	44187	2.53	5.1	43549	2.35	5.4	35412
			80	74.4	43625	2.81	4.5	42987	2.63	4.8	33844
	6	4.5	60	77.7	47894	2.35	6.0	47256	2.18	6.4	39809
			70	78.2	47112	2.60	5.3	46474	2.43	5.6	38132
			80	78.8	46303	2.88	4.7	45665	2.71	4.9	36313
	8	7.9	60	80.4	49385	2.38	6.1	48747	2.24	6.4	41596
			70	80.8	48794	2.64	5.4	48156	2.50	5.7	39708
			80	81.3	47886	2.93	4.8	47248	2.78	5.0	37761

Cooling Capacity Data – Unit Size 036

EWT	GPM	WPD	System						ISO			
			EA	LWT	Total	Sensible	KW	EER	TOT	kW	EER	THR
30	5.0	3.1	75/63	47.7	38574	29301	1.65	23.4	39215	1.47	26.7	44312
			80/67	48.9	41388	30303	1.68	24.6	42029	1.50	28.0	47235
			85/71	50.1	44308	31228	1.72	25.8	44949	1.54	29.2	50301
	7.5	7.0	75/63	41.9	39384	29659	1.50	26.2	40025	1.35	29.7	44629
			80/67	42.7	42324	30684	1.53	27.6	42965	1.38	31.2	47718
			85/71	43.6	45442	31650	1.56	29.1	46083	1.41	32.7	50903
	9.7	11.7	75/63	39.2	39741	29818	1.43	27.8	40382	1.31	30.7	44764
			80/67	39.9	42786	30873	1.46	29.4	43427	1.34	32.4	47898
			85/71	40.6	45894	31819	1.49	30.9	46535	1.37	34.0	51163
40	5.0	3.1	75/63	57.6	37483	28819	1.83	20.5	38124	1.65	23.1	43819
			80/67	58.7	40203	29823	1.86	21.7	40844	1.68	24.3	46664
			85/71	59.9	43026	30753	1.89	22.8	43667	1.71	25.5	49610
	7.5	7.0	75/63	51.8	38316	29186	1.69	22.7	38957	1.54	25.4	44182
			80/67	52.6	41165	30213	1.71	24.0	41806	1.56	26.8	47136
			85/71	53.4	44143	31166	1.74	25.4	44784	1.59	28.2	50206
	9.7	11.7	75/63	49.2	38702	29357	1.63	23.8	39343	1.51	26.1	44381
			80/67	49.8	41609	30393	1.65	25.3	42250	1.53	27.6	47393
			85/71	50.4	44660	31358	1.67	26.7	45301	1.55	29.2	50495
50	5.0	3.1	75/63	67.4	36312	28305	2.01	18.0	36953	1.83	20.1	43271
			80/67	68.5	38902	29299	2.04	19.1	39543	1.86	21.2	45984
			85/71	69.6	41647	30245	2.07	20.1	42288	1.89	22.4	48833
	7.5	7.0	75/63	61.7	37145	28670	1.88	19.8	37786	1.72	21.9	43679
			80/67	62.5	39909	29705	1.90	21.0	40550	1.74	23.2	46484
			85/71	63.3	42770	30658	1.92	22.3	43411	1.77	24.6	49479
	9.7	11.7	75/63	59.1	37539	28844	1.82	20.7	38180	1.70	22.4	43843
			80/67	59.7	40352	29883	1.83	22.0	40993	1.72	23.9	46761
			85/71	60.3	43287	30849	1.85	23.3	43928	1.74	25.3	49757
60	5.0	3.1	75/63	77.2	35005	27734	2.21	15.8	35646	2.03	17.5	42667
			80/67	78.2	37524	28746	2.24	16.8	38165	2.06	18.5	45252
			85/71	79.4	40180	29707	2.26	17.7	40821	2.09	19.6	48028
	7.5	7.0	75/63	71.6	35894	28122	2.08	17.3	36535	1.92	19.0	43052
			80/67	72.3	38509	29141	2.10	18.4	39150	1.94	20.2	45775
			85/71	73.1	41293	30115	2.12	19.5	41934	1.96	21.4	48659
	9.7	11.7	75/63	69.0	36296	28298	2.02	18.0	36937	1.90	19.5	43261
			80/67	69.6	38970	29326	2.03	19.2	39611	1.91	20.7	46019
			85/71	70.2	41820	30308	2.05	20.4	42461	1.93	22.0	48968
70	5.0	3.1	75/63	87.0	33639	27138	2.43	13.8	34280	2.26	15.2	42049
			80/67	88.0	36064	28164	2.46	14.7	36705	2.28	16.1	44567
			85/71	89.1	38630	29142	2.48	15.6	39271	2.31	17.0	47221
	7.5	7.0	75/63	81.4	34513	27519	2.29	15.1	35154	2.14	16.5	42454
			80/67	82.1	37062	28562	2.31	16.1	37703	2.15	17.5	45018
			85/71	82.9	39757	29553	2.32	17.1	40398	2.17	18.6	47838
	9.7	11.7	75/63	78.9	34921	27697	2.23	15.7	35562	2.11	16.9	42623
			80/67	79.4	37523	28746	2.24	16.8	38164	2.12	18.0	45257
			85/71	80.0	40278	29743	2.25	17.9	40919	2.14	19.2	48134
80	5.0	3.1	75/63	96.7	32170	26501	2.68	12.0	32811	2.51	13.1	41406
			80/67	97.7	34519	27549	2.71	12.7	35160	2.53	13.9	43871
			85/71	98.8	36953	28534	2.74	13.5	37594	2.56	14.7	46442
	7.5	7.0	75/63	91.3	33093	26901	2.53	13.1	33734	2.37	14.2	41782
			80/67	91.9	35528	27950	2.54	14.0	36169	2.39	15.1	44338
			85/71	92.7	38127	28959	2.56	14.9	38768	2.40	16.1	46960
	9.7	11.7	75/63	88.7	33498	27077	2.46	13.6	34139	2.34	14.6	41960
			80/67	89.3	35990	28134	2.47	14.6	36631	2.35	15.6	44561
			85/71	89.8	38647	29148	2.48	15.6	39288	2.36	16.6	47224
85	5.0	3.1	75/63	101.6	31411	26172	2.82	11.1	32052	2.65	12.1	41108
			80/67	102.6	33718	27231	2.85	11.8	34359	2.67	12.9	43543
			85/71	103.6	36099	28224	2.88	12.6	36740	2.70	13.6	46026
	7.5	7.0	75/63	96.2	32308	26561	2.66	12.2	32949	2.50	13.2	41463
			80/67	96.8	34717	27627	2.67	13.0	35358	2.52	14.0	43948
			85/71	97.6	37219	28630	2.69	13.8	37860	2.53	14.9	46581
	9.7	11.7	75/63	93.7	32734	26746	2.59	12.7	33375	2.47	13.5	41642
			80/67	94.2	35195	27818	2.60	13.6	35836	2.48	14.5	44158
			85/71	94.8	37770	28830	2.61	14.5	38411	2.49	15.4	46800
90	5.0	3.1	75/63	106.5	30631	25834	2.97	10.3	31272	2.80	11.2	40822
			80/67	107.5	32895	26904	3.00	11.0	33536	2.82	11.9	43231
			85/71	108.5	35220	27905	3.03	11.6	35861	2.85	12.6	45653
	7.5	7.0	75/63	101.1	31537	26226	2.80	11.3	32178	2.65	12.2	41156
			80/67	101.8	33906	27305	2.81	12.0	34547	2.66	13.0	43596
			85/71	102.4	36365	28321	2.83	12.8	37006	2.68	13.8	46143
	9.7	11.7	75/63	98.6	31956	26408	2.72	11.7	32597	2.61	12.5	41319
			80/67	99.1	34377	27492	2.73	12.6	35018	2.62	13.4	43794
			85/71	99.7	36899	28514	2.74	13.4	37540	2.63	14.3	46385
100	5.0	3.1	75/63	116.4	29010	25130	3.31	8.8	29651	3.13	9.5	40389
			80/67	117.3	31142	26208	3.34	9.3	31783	3.16	10.1	42603
			85/71	118.2	33383	27240	3.37	9.9	34024	3.19	10.7	44956
	7.5	7.0	75/63	111.0	29934	25532	3.12	9.6	30575	2.96	10.3	40664
			80/67	111.6	32184	26622	3.13	10.3	32825	2.97	11.0	42947
			85/71	112.3	34553	27664	3.15	11.0	35194	2.99	11.8	45386
	9.7	11.7	75/63	108.5	30355	25714	3.03	10.0	30996	2.91	10.6	40729
			80/67	109.0	32687	26822	3.04	10.8	33328	2.92	11.4	43117
			85/71	109.5	35091	27859	3.05	11.5	35732	2.93	12.2	45600
110	5.0	3.1	75/63	126.2	27284	24375	3.71	7.4	27925	3.53	7.9	39952
			80/67	127.1	29298	25472	3.73	7.8	29939	3.56	8.4	42091
			85/71	128.0	31422	26528	3.76	8.4	32063	3.59	8.9	44331
	7.5	7.0	75/63	120.9	28241	24795	3.48	8.1	28882	3.33	8.7	40161
			80/67	121.5	30378	25904	3.50	8.7	31019	3.34	9.3	42377
			85/71	122.1	32636	26970	3.51	9.3	33277	3.36	9.9	44703
	9.7	11.7	75/63	118.4	28671	24982	3.39	8.5	29312	3.27	9.0	40268
			80/67	118.9	30865	26098	3.39	9.1	31506	3.28	9.6	42518
			85/71	119.4	33182	27168	3.40	9.7	33823	3.29	10.3	44886

Heating Capacity Data – Unit Size 036

EWT	GPM	WPD	System					ISO			
			EA	LWT	Capacity	KW	COP	TOT	kW	COP	THR
20	5.0	3.1	60	13.6	25479	2.42	3.1	24838	2.24	3.3	17066
			70	14.0	25611	2.69	2.8	24970	2.51	2.9	16204
			80	14.3	25767	3.01	2.5	25126	2.83	2.6	15233
	7.5	7.0	60	15.5	26399	2.43	3.2	25758	2.28	3.3	17956
			70	15.8	26455	2.71	2.9	25814	2.55	3.0	16995
			80	16.0	26536	3.02	2.6	25895	2.87	2.6	15939
	9.7	11.7	60	16.5	26870	2.44	3.2	26229	2.32	3.3	18394
			70	16.7	26884	2.72	2.9	26243	2.60	3.0	17401
			80	16.9	26924	3.03	2.6	26283	2.91	2.6	16303
30	5.0	3.1	60	22.5	28715	2.47	3.4	28074	2.29	3.6	20180
			70	22.8	28727	2.75	3.1	28086	2.57	3.2	19181
			80	23.2	28799	3.07	2.8	28158	2.89	2.9	18084
	7.5	7.0	60	24.7	29873	2.48	3.5	29232	2.33	3.7	21270
			70	25.0	29789	2.77	3.2	29148	2.61	3.3	20176
			80	25.3	29751	3.09	2.8	29110	2.93	2.9	18984
	9.7	11.7	60	25.8	30452	2.49	3.6	29811	2.38	3.7	21831
			70	26.0	30320	2.77	3.2	29679	2.66	3.3	20684
			80	26.3	30234	3.10	2.9	29593	2.98	2.9	19441
40	5.0	3.1	60	31.2	32305	2.52	3.8	31664	2.34	4.0	23575
			70	31.6	32174	2.81	3.4	31533	2.63	3.5	22441
			80	32.1	32111	3.13	3.0	31470	2.95	3.1	21223
	7.5	7.0	60	33.8	33657	2.54	3.9	33016	2.39	4.1	24901
			70	34.1	33447	2.83	3.5	32806	2.67	3.6	23653
			80	34.4	33284	3.16	3.1	32643	3.00	3.2	22311
	9.7	11.7	60	35.1	34381	2.55	3.9	33740	2.44	4.1	25583
			70	35.3	34097	2.84	3.5	33456	2.72	3.6	24273
			80	35.6	33878	3.17	3.1	33237	3.05	3.2	22873
50	5.0	3.1	60	39.8	36095	2.58	4.1	35454	2.40	4.3	27241
			70	40.2	35880	2.87	3.7	35239	2.69	3.8	25966
			80	40.8	35714	3.21	3.3	35073	3.03	3.4	24603
	7.5	7.0	60	42.8	37795	2.61	4.2	37154	2.45	4.4	28845
			70	43.1	37422	2.90	3.8	36781	2.74	3.9	27428
			80	43.5	37119	3.24	3.4	36478	3.08	3.5	25928
	9.7	11.7	60	44.3	38643	2.62	4.3	38002	2.50	4.4	29657
			70	44.5	38197	2.91	3.8	37556	2.80	3.9	28176
			80	44.8	37854	3.25	3.4	37213	3.13	3.5	26607
60	5.0	3.1	60	48.3	40223	2.65	4.5	39582	2.47	4.7	31156
			70	48.8	39873	2.94	4.0	39232	2.77	4.2	29737
			80	49.4	39569	3.29	3.5	38928	3.11	3.7	28229
	7.5	7.0	60	51.7	42229	2.68	4.6	41588	2.53	4.8	33073
			70	52.1	41757	2.98	4.1	41116	2.83	4.3	31477
			80	52.5	41284	3.33	3.6	40643	3.17	3.8	29807
	9.7	11.7	60	53.4	43232	2.70	4.7	42591	2.58	4.8	34031
			70	53.7	42659	3.00	4.2	42018	2.88	4.3	32388
			80	54.1	42145	3.35	3.7	41504	3.23	3.8	30621
70	5.0	3.1	60	56.7	44648	2.73	4.8	44007	2.55	5.1	35333
			70	57.3	44119	3.03	4.3	43478	2.85	4.5	33752
			80	57.9	43719	3.38	3.8	43078	3.21	3.9	32074
	7.5	7.0	60	60.6	46943	2.77	5.0	46302	2.61	5.2	37542
			70	61.0	46283	3.08	4.4	45642	2.92	4.6	35788
			80	61.5	45723	3.43	3.9	45082	3.28	4.0	33948
	9.7	11.7	60	62.5	48161	2.79	5.1	47520	2.68	5.2	38680
			70	62.8	47425	3.10	4.5	46784	2.98	4.6	36822
			80	63.2	46723	3.46	4.0	46082	3.34	4.0	34889
80	5.0	3.1	60	65.0	49289	2.81	5.1	48648	2.63	5.4	39725
			70	65.7	48666	3.13	4.6	48025	2.95	4.8	37969
			80	66.4	48075	3.49	4.0	47434	3.31	4.2	36138
	7.5	7.0	60	69.4	51959	2.87	5.3	51318	2.71	5.5	42275
			70	69.8	51146	3.19	4.7	50505	3.03	4.9	40313
			80	70.4	50409	3.55	4.2	49768	3.40	4.3	38267
	9.7	11.7	60	71.5	53384	2.90	5.4	52743	2.78	5.6	43596
			70	71.9	52431	3.22	4.8	51790	3.10	4.9	41519
			80	72.3	51589	3.59	4.2	50948	3.47	4.3	39382
85	5.0	3.1	60	69.1	51694	2.86	5.3	51053	2.68	5.6	41985
			70	69.8	51010	3.18	4.7	50369	3.01	4.9	40141
			80	70.6	50377	3.55	4.2	49736	3.38	4.3	38213
	7.5	7.0	60	73.7	54605	2.92	5.5	53964	2.77	5.7	44702
			70	74.3	53659	3.25	4.8	53018	3.09	5.0	42639
			80	74.8	52831	3.62	4.3	52190	3.47	4.4	40492
	9.7	11.7	60	76.0	56077	2.96	5.6	55436	2.84	5.7	46119
			70	76.4	55043	3.28	4.9	54402	3.17	5.0	43937
			80	76.9	54086	3.66	4.3	53445	3.54	4.4	41655
90	5.0	3.1	60	73.2	54157	2.91	5.4	53516	2.74	5.7	44284
			70	74.0	53371	3.24	4.8	52730	3.06	5.0	42353
			80	74.8	52692	3.62	4.3	52051	3.44	4.4	40328
	7.5	7.0	60	78.1	57267	2.99	5.6	56626	2.83	5.9	47171
			70	78.6	56221	3.31	5.0	55580	3.15	5.2	45044
			80	79.2	55296	3.69	4.4	54655	3.54	4.5	42748
	9.7	11.7	60	80.5	58826	3.02	5.7	58185	2.91	5.9	48685
			70	81.0	57724	3.35	5.1	57083	3.23	5.2	46417
			80	81.4	56622	3.73	4.4	55981	3.62	4.5	43985

Cooling Capacity Data – Unit Size 042

EWT	GPM	WPD	System						ISO			
			EA	LWT	Total	Sensible	KW	EER	TOT	kW	EER	THR
30	6	3.9	75/63	47.9	47646	35239	1.81	26.3	48634	1.54	31.7	54024
			80/67	49.1	51146	36412	1.84	27.7	52134	1.57	33.2	57627
			85/71	50.3	54730	37468	1.88	29.1	55718	1.60	34.7	61359
	8	6.9	75/63	43.4	48224	35494	1.68	28.6	49212	1.43	34.4	54161
			80/67	44.3	51823	36686	1.71	30.3	52811	1.46	36.3	57869
			85/71	45.3	55547	37771	1.74	31.9	56535	1.49	38.1	61710
	10.8	12.7	75/63	40.0	48641	35678	1.58	30.8	49629	1.38	36.1	54212
			80/67	40.6	52318	36888	1.60	32.7	53306	1.40	38.1	58003
			85/71	41.4	56150	37995	1.63	34.6	57138	1.42	40.2	61930
40	6	3.9	75/63	57.8	46467	34721	2.04	22.8	47455	1.76	26.9	53607
			80/67	58.9	49798	35868	2.07	24.1	50786	1.79	28.4	57058
			85/71	60.1	53297	36939	2.10	25.4	54285	1.82	29.8	60679
	8	6.9	75/63	53.4	47144	35018	1.92	24.6	48132	1.66	29.0	53853
			80/67	54.3	50569	36179	1.94	26.1	51557	1.68	30.6	57404
			85/71	55.2	54193	37270	1.96	27.6	55181	1.71	32.3	61121
	10.8	12.7	75/63	49.9	47638	35235	1.82	26.2	48626	1.62	30.1	54013
			80/67	50.6	51178	36425	1.84	27.8	52166	1.63	31.9	57639
			85/71	51.3	54861	37517	1.86	29.5	55849	1.65	33.7	61439
50	6	3.9	75/63	67.6	45058	34105	2.27	19.9	46046	1.99	23.1	53032
			80/67	68.7	48297	35266	2.30	21.0	49285	2.02	24.4	56324
			85/71	69.9	51679	36345	2.33	22.2	52667	2.05	25.7	59839
	8	6.9	75/63	63.3	45790	34425	2.15	21.3	46778	1.90	24.7	53341
			80/67	64.1	49124	35597	2.17	22.6	50112	1.92	26.2	56733
			85/71	65.0	52623	36691	2.19	24.0	53611	1.94	27.7	60308
	10.8	12.7	75/63	59.9	46354	34671	2.06	22.5	47342	1.85	25.6	53520
			80/67	60.5	49761	35853	2.07	24.0	50749	1.87	27.2	57042
			85/71	61.2	53359	36962	2.09	25.6	54347	1.88	28.8	60737
60	6	3.9	75/63	77.4	43525	33439	2.52	17.3	44513	2.24	19.9	52302
			80/67	78.5	46635	34603	2.54	18.4	47623	2.27	21.0	55529
			85/71	79.6	49896	35696	2.57	19.4	50884	2.30	22.2	58892
	8	6.9	75/63	73.1	44277	33765	2.40	18.5	45265	2.14	21.1	52674
			80/67	74.0	47502	34948	2.41	19.7	48490	2.16	22.5	55921
			85/71	74.8	50885	36056	2.43	20.9	51873	2.18	23.8	59437
	10.8	12.7	75/63	69.8	44839	34010	2.30	19.5	45827	2.10	21.8	52937
			80/67	70.4	48168	35214	2.31	20.8	49156	2.11	23.3	56260
			85/71	71.1	51644	36333	2.33	22.2	52632	2.13	24.7	59858
70	6	3.9	75/63	87.2	41828	32707	2.79	15.0	42816	2.51	17.1	51525
			80/67	88.2	44832	33889	2.81	15.9	45820	2.54	18.1	54651
			85/71	89.3	47978	35002	2.84	16.9	48966	2.57	19.1	57901
	8	6.9	75/63	83.0	42633	33054	2.66	16.0	43621	2.41	18.1	51883
			80/67	83.8	45718	34240	2.68	17.1	46706	2.42	19.3	55094
			85/71	84.6	48989	35367	2.70	18.2	49977	2.44	20.5	58445
	10.8	12.7	75/63	79.7	43249	33320	2.56	16.9	44237	2.36	18.8	52170
			80/67	80.3	46421	34518	2.57	18.0	47409	2.37	20.0	55451
			85/71	80.9	49776	35652	2.59	19.2	50764	2.38	21.3	58888
80	6	3.9	75/63	96.9	40047	31943	3.09	13.0	41035	2.81	14.6	50746
			80/67	97.9	42935	33143	3.11	13.8	43923	2.84	15.5	53742
			85/71	98.9	45936	34268	3.14	14.6	46924	2.87	16.4	56939
	8	6.9	75/63	92.8	40831	32279	2.95	13.8	41819	2.70	15.5	51078
			80/67	93.6	43821	33491	2.97	14.8	44809	2.71	16.5	54162
			85/71	94.4	46959	34635	2.99	15.7	47947	2.73	17.5	57373
	10.8	12.7	75/63	89.5	41460	32549	2.85	14.6	42448	2.64	16.1	51360
			80/67	90.1	44537	33773	2.86	15.6	45525	2.65	17.1	54554
			85/71	90.7	47772	34927	2.87	16.6	48760	2.67	18.3	57783
85	6	3.9	75/63	101.8	39081	31530	3.25	12.0	40069	2.98	13.5	50340
			80/67	102.8	41915	32743	3.28	12.8	42903	3.01	14.3	53346
			85/71	103.8	44833	33873	3.31	13.5	45821	3.04	15.1	56370
	8	6.9	75/63	97.7	39894	31878	3.11	12.8	40882	2.85	14.3	50706
			80/67	98.4	42850	33109	3.13	13.7	43838	2.87	15.3	53712
			85/71	99.2	45909	34258	3.15	14.6	46897	2.89	16.2	56836
	10.8	12.7	75/63	94.5	40532	32151	3.00	13.5	41520	2.80	14.8	50945
			80/67	95.0	43549	33384	3.01	14.5	44537	2.81	15.9	54037
			85/71	95.6	46720	34549	3.03	15.4	47708	2.82	16.9	57253
90	6	3.9	75/63	106.7	38118	31120	3.43	11.1	39106	3.16	12.4	49967
			80/67	107.7	40891	32343	3.46	11.8	41879	3.18	13.2	52885
			85/71	108.7	43737	33482	3.49	12.5	44725	3.21	13.9	55882
	8	6.9	75/63	102.6	38939	31470	3.28	11.9	39927	3.02	13.2	50283
			80/67	103.4	41816	32704	3.30	12.7	42804	3.04	14.1	53267
			85/71	104.1	44785	33856	3.32	13.5	45773	3.06	14.9	56348
	10.8	12.7	75/63	99.4	39578	31742	3.17	12.5	40566	2.96	13.7	50545
			80/67	99.9	42539	32987	3.18	13.4	43527	2.97	14.6	53574
			85/71	100.5	45598	34147	3.19	14.3	46586	2.99	15.6	56779
100	6	3.9	75/63	116.5	36115	30268	3.83	9.4	37103	3.55	10.4	49390
			80/67	117.4	38723	31498	3.86	10.0	39711	3.58	11.1	52091
			85/71	118.4	41463	32673	3.89	10.7	42451	3.61	11.8	54955
	8	6.9	75/63	112.5	36950	30623	3.66	10.1	37938	3.40	11.1	49657
			80/67	113.2	39700	31878	3.68	10.8	40688	3.42	11.9	52426
			85/71	113.9	42518	33048	3.70	11.5	43506	3.44	12.6	55369
	10.8	12.7	75/63	109.3	37600	30899	3.53	10.7	38588	3.33	11.6	49785
			80/67	109.8	40434	32164	3.54	11.4	41422	3.34	12.4	52704
			85/71	110.4	43351	33344	3.55	12.2	44339	3.35	13.2	55714
110	6	3.9	75/63	126.4	34028	29381	4.28	7.9	35016	4.01	8.7	48794
			80/67	127.2	36482	30626	4.31	8.5	37470	4.04	9.3	51397
			85/71	128.1	39058	31820	4.35	9.0	40046	4.07	9.8	54107
	8	6.9	75/63	122.3	34875	29741	4.09	8.5	35863	3.84	9.3	49002
			80/67	123.0	37444	31000	4.11	9.1	38432	3.86	10.0	51678
			85/71	123.7	40142	32204	4.13	9.7	41130	3.88	10.6	54473
	10.8	12.7	75/63	119.2	35533	30021	3.95	9.0	36521	3.75	9.7	49180
			80/67	119.7	38192	31291	3.96	9.6	39180	3.76	10.4	51914
			85/71	120.2	40988	32504	3.98	10.3	41976	3.77	11.1	54776

Heating Capacity Data – Unit Size 042

EWT	GPM	WPD	System					ISO			
			EA	LWT	Capacity	KW	COP	TOT	kW	COP	THR
20	6	3.9	60	13.9	30579	2.62	3.4	29591	2.34	3.7	21016
			70	14.2	30746	2.92	3.1	29758	2.65	3.3	19999
			80	14.5	30947	3.27	2.8	29959	2.99	2.9	18890
	8	6.9	60	15.2	31361	2.63	3.5	30373	2.38	3.7	21739
			70	15.5	31445	2.94	3.1	30457	2.68	3.3	20657
			80	15.7	31586	3.28	2.8	30598	3.02	3.0	19484
	10.8	12.7	60	16.4	32011	2.64	3.6	31023	2.44	3.7	22360
			70	16.6	32042	2.95	3.2	31054	2.74	3.3	21221
			80	16.8	32130	3.29	2.9	31142	3.09	3.0	19990
30	6	3.9	60	22.7	34561	2.68	3.8	33573	2.40	4.1	24780
			70	23.1	34584	2.99	3.4	33596	2.72	3.6	23605
			80	23.5	34616	3.34	3.0	33628	3.06	3.2	22336
	8	6.9	60	24.4	35459	2.69	3.9	34471	2.44	4.1	25667
			70	24.6	35394	3.00	3.5	34406	2.75	3.7	24411
			80	24.9	35380	3.35	3.1	34392	3.10	3.3	23069
	10.8	12.7	60	25.7	36251	2.71	3.9	35263	2.50	4.1	26426
			70	25.9	36106	3.02	3.5	35118	2.81	3.7	25103
			80	26.1	36076	3.37	3.1	35088	3.16	3.2	23691
40	6	3.9	60	31.5	38775	2.74	4.1	37787	2.47	4.5	28833
			70	31.9	38633	3.06	3.7	37645	2.78	4.0	27490
			80	32.3	38589	3.42	3.3	37601	3.14	3.5	26066
	8	6.9	60	33.4	39957	2.76	4.2	38969	2.51	4.6	29900
			70	33.7	39693	3.08	3.8	38705	2.82	4.0	28457
			80	34.1	39564	3.44	3.4	38576	3.18	3.6	26938
	10.8	12.7	60	35.0	40843	2.77	4.3	39855	2.57	4.5	30818
			70	35.2	40565	3.09	3.8	39577	2.89	4.0	29301
			80	35.5	40328	3.45	3.4	39340	3.25	3.5	27691
50	6	3.9	60	40.2	43304	2.81	4.5	42316	2.54	4.9	33129
			70	40.7	43029	3.14	4.0	42041	2.86	4.3	31613
			80	41.2	42821	3.50	3.6	41833	3.23	3.8	30008
	8	6.9	60	42.4	44635	2.83	4.6	43647	2.58	5.0	34397
			70	42.8	44228	3.16	4.1	43240	2.90	4.4	32771
			80	43.1	43897	3.52	3.6	42909	3.27	3.8	31081
	10.8	12.7	60	44.2	45759	2.85	4.7	44771	2.65	5.0	35487
			70	44.5	45323	3.18	4.2	44335	2.97	4.4	33753
			80	44.8	44882	3.54	3.7	43894	3.34	3.8	31948
60	6	3.9	60	48.9	48028	2.88	4.9	47040	2.61	5.3	37667
			70	49.4	47613	3.22	4.3	46625	2.94	4.6	35943
			80	49.9	47265	3.59	3.9	46277	3.32	4.1	34156
	8	6.9	60	51.3	49550	2.91	5.0	48562	2.65	5.4	39145
			70	51.7	49038	3.24	4.4	48050	2.99	4.7	37297
			80	52.2	48564	3.62	3.9	47576	3.37	4.1	35384
	10.8	12.7	60	53.4	50921	2.93	5.1	49933	2.73	5.4	40387
			70	53.7	50214	3.26	4.5	49226	3.06	4.7	38445
			80	54.0	49649	3.64	4.0	48661	3.44	4.1	36421
70	6	3.9	60	57.5	52740	2.96	5.2	51752	2.68	5.6	42403
			70	58.0	52450	3.31	4.6	51462	3.03	5.0	40475
			80	58.6	51887	3.69	4.1	50899	3.42	4.4	38489
	8	6.9	60	60.2	54508	2.99	5.3	53520	2.73	5.7	44085
			70	60.7	54019	3.33	4.7	53031	3.08	5.0	42001
			80	61.2	53377	3.72	4.2	52389	3.47	4.4	39874
	10.8	12.7	60	62.5	56278	3.02	5.5	55290	2.82	5.8	45463
			70	62.9	55418	3.36	4.8	54430	3.16	5.1	43316
			80	63.3	54646	3.75	4.3	53658	3.55	4.4	41062
80	6	3.9	60	66.0	57895	3.05	5.6	56907	2.77	6.0	47249
			70	66.6	57382	3.40	4.9	56394	3.12	5.3	45134
			80	67.3	56668	3.79	4.4	55680	3.52	4.6	42935
	8	6.9	60	69.1	60134	3.08	5.7	59146	2.83	6.1	49151
			70	69.6	59246	3.44	5.1	58258	3.18	5.4	46867
			80	70.1	58332	3.83	4.5	57344	3.58	4.7	44513
	10.8	12.7	60	71.6	61851	3.11	5.8	60863	2.91	6.1	50747
			70	72.0	60796	3.47	5.1	59808	3.26	5.4	48324
			80	72.5	59757	3.87	4.5	58769	3.66	4.7	45823
85	6	3.9	60	70.3	60538	3.09	5.7	59550	2.81	6.2	49748
			70	70.9	59917	3.45	5.1	58929	3.17	5.4	47503
			80	71.6	59104	3.85	4.5	58116	3.57	4.8	45194
	8	6.9	60	73.5	62620	3.13	5.9	61632	2.87	6.3	51760
			70	74.0	61897	3.49	5.2	60909	3.23	5.5	49333
			80	74.6	60913	3.89	4.6	59925	3.64	4.8	46843
	10.8	12.7	60	76.2	64684	3.17	6.0	63696	2.96	6.3	53432
			70	76.6	63529	3.52	5.3	62541	3.32	5.5	50863
			80	77.1	62364	3.93	4.7	61376	3.72	4.8	48233
90	6	3.9	60	74.5	63161	3.14	5.9	62173	2.86	6.4	52257
			70	75.2	62481	3.50	5.2	61493	3.23	5.6	49894
			80	75.9	61563	3.91	4.6	60575	3.63	4.9	47463
	8	6.9	60	77.9	65375	3.18	6.0	64387	2.92	6.5	54377
			70	78.5	64527	3.54	5.3	63539	3.29	5.7	51825
			80	79.1	63478	3.95	4.7	62490	3.70	4.9	49203
	10.8	12.7	60	80.7	67285	3.21	6.1	66297	3.01	6.5	56161
			70	81.2	66287	3.58	5.4	65299	3.38	5.7	53454
			80	81.7	65041	3.99	4.8	64053	3.79	5.0	50651

Cooling Capacity Data – Unit Size 048

EWT	GPM	WPD	System						ISO			
			EA	LWT	Total	Sensible	KW	EER	TOT	kW	EER	THR
30	6	3.9	75/63	50.6	51300	40159	2.27	22.6	52392	1.96	26.7	58928
			80/67	52.0	54962	41442	2.31	23.8	56054	2.00	28.0	62784
			85/71	53.3	58799	42632	2.35	25.1	59891	2.04	29.3	66706
	9	8.8	75/63	43.8	52435	40689	2.06	25.5	53527	1.79	29.9	59410
			80/67	44.8	56356	42041	2.09	27.0	57448	1.82	31.6	63466
			85/71	45.8	60409	43265	2.12	28.5	61501	1.85	33.3	67608
	12.6	17.2	75/63	39.9	53060	40983	1.93	27.5	54152	1.75	31.0	59624
			80/67	40.6	57105	42364	1.95	29.2	58197	1.77	32.9	63796
			85/71	41.3	61360	43640	1.98	31.1	62452	1.79	34.8	68115
40	6	3.9	75/63	60.4	49876	39496	2.50	20.0	50968	2.19	23.2	58273
			80/67	61.7	53400	40775	2.54	21.1	54492	2.23	24.4	61936
			85/71	63.0	56972	41919	2.58	22.1	58064	2.27	25.6	65715
	9	8.8	75/63	53.7	51068	40050	2.30	22.2	52160	2.03	25.6	58831
			80/67	54.6	54814	41379	2.33	23.5	55906	2.06	27.1	62688
			85/71	55.6	58713	42598	2.36	24.9	59805	2.09	28.6	66686
	12.6	17.2	75/63	49.9	51747	40367	2.19	23.7	52839	2.00	26.4	59109
			80/67	50.5	55586	41710	2.21	25.2	56678	2.02	28.0	63124
			85/71	51.2	59649	42965	2.23	26.8	60741	2.04	29.7	67187
50	6	3.9	75/63	70.2	48303	38769	2.74	17.6	49395	2.44	20.3	57504
			80/67	71.4	51659	40036	2.78	18.6	52751	2.47	21.3	60979
			85/71	72.7	55181	41224	2.82	19.6	56273	2.51	22.4	64584
	9	8.8	75/63	63.6	49579	39359	2.55	19.4	50671	2.28	22.2	58167
			80/67	64.5	53143	40666	2.58	20.6	54235	2.31	23.5	61779
			85/71	65.4	56772	41841	2.60	21.8	57864	2.33	24.8	65614
	12.6	17.2	75/63	59.8	50249	39670	2.44	20.6	51341	2.26	22.8	58447
			80/67	60.4	53950	41009	2.46	21.9	55042	2.27	24.2	62256
			85/71	61.1	57752	42223	2.48	23.3	58844	2.29	25.7	66127
60	6	3.9	75/63	79.9	46640	38005	3.01	15.5	47732	2.70	17.7	56611
			80/67	81.1	49821	39261	3.04	16.4	50913	2.74	18.6	59975
			85/71	82.3	53182	40454	3.08	17.3	54274	2.77	19.6	63492
	9	8.8	75/63	73.4	47879	38574	2.81	17.0	48971	2.54	19.3	57252
			80/67	74.2	51272	39873	2.83	18.1	52364	2.56	20.4	60769
			85/71	75.1	54875	41106	2.86	19.2	55967	2.59	21.6	64427
	12.6	17.2	75/63	69.7	48633	38922	2.70	18.0	49725	2.51	19.8	57652
			80/67	70.3	52132	40237	2.71	19.2	53224	2.53	21.0	61241
			85/71	70.9	55792	41461	2.73	20.4	56884	2.55	22.3	64978
70	6	3.9	75/63	89.7	44777	37155	3.30	13.6	45869	3.00	15.3	55771
			80/67	90.8	47872	38445	3.34	14.3	48964	3.03	16.1	58993
			85/71	92.0	51065	39644	3.38	15.1	52157	3.07	17.0	62375
	9	8.8	75/63	83.3	46080	37749	3.09	14.9	47172	2.82	16.7	56432
			80/67	84.0	49353	39065	3.11	15.9	50445	2.84	17.8	59724
			85/71	84.9	52761	40293	3.14	16.8	53853	2.87	18.8	63286
	12.6	17.2	75/63	79.5	46828	38092	2.97	15.8	47920	2.79	17.2	56731
			80/67	80.1	50205	39423	2.99	16.8	51297	2.80	18.3	60182
			85/71	80.7	53739	40669	3.00	17.9	54831	2.82	19.4	63842
80	6	3.9	75/63	99.4	42854	36281	3.64	11.8	43946	3.34	13.2	54938
			80/67	100.5	45827	37593	3.68	12.5	46919	3.38	13.9	58073
			85/71	101.6	48929	38832	3.72	13.2	50021	3.41	14.7	61313
	9	8.8	75/63	93.1	44197	36890	3.41	13.0	45289	3.14	14.4	55508
			80/67	93.8	47317	38213	3.43	13.8	48409	3.16	15.3	58768
			85/71	94.6	50580	39460	3.45	14.7	51672	3.18	16.2	62157
	12.6	17.2	75/63	89.4	44936	37227	3.28	13.7	46028	3.09	14.9	55835
			80/67	89.9	48173	38571	3.29	14.6	49265	3.11	15.9	59114
			85/71	90.5	51607	39851	3.31	15.6	52699	3.12	16.9	62673
85	6	3.9	75/63	104.3	41849	35826	3.84	10.9	42941	3.53	12.2	54540
			80/67	105.3	44765	37152	3.87	11.6	45857	3.57	12.9	57631
			85/71	106.5	47797	38404	3.91	12.2	48889	3.61	13.6	60815
	9	8.8	75/63	98.0	43173	36426	3.59	12.0	44265	3.32	13.4	55085
			80/67	98.7	46245	37766	3.61	12.8	47337	3.34	14.2	58230
			85/71	99.5	49458	39033	3.63	13.6	50550	3.36	15.1	61546
	12.6	17.2	75/63	94.3	43966	36786	3.45	12.8	45058	3.26	13.8	55409
			80/67	94.9	47121	38132	3.46	13.6	48213	3.28	14.7	58696
			85/71	95.4	50471	39418	3.48	14.5	51563	3.29	15.7	62037
90	6	3.9	75/63	109.1	40817	35360	4.04	10.1	41909	3.74	11.2	54167
			80/67	110.2	43674	36700	4.08	10.7	44766	3.78	11.9	57216
			85/71	111.3	46637	37965	4.12	11.3	47729	3.81	12.5	60342
	9	8.8	75/63	102.9	42157	35965	3.78	11.2	43249	3.51	12.3	54660
			80/67	103.6	45172	37321	3.80	11.9	46264	3.53	13.1	57829
			85/71	104.4	48327	38604	3.82	12.7	49419	3.55	13.9	61019
	12.6	17.2	75/63	99.2	42933	36317	3.63	11.8	44025	3.45	12.8	54972
			80/67	99.8	46044	37683	3.64	12.6	47136	3.46	13.6	58155
			85/71	100.3	49317	38979	3.66	13.5	50409	3.47	14.5	61477
100	6	3.9	75/63	119.0	38671	34392	4.52	8.6	39763	4.21	9.4	53591
			80/67	120.0	41412	35766	4.55	9.1	42504	4.25	10.0	56429
			85/71	121.0	44231	37058	4.59	9.6	45323	4.29	10.6	59415
	9	8.8	75/63	112.7	40041	35010	4.21	9.5	41133	3.94	10.4	53912
			80/67	113.4	42937	36396	4.23	10.2	44029	3.96	11.1	56923
			85/71	114.1	45949	37705	4.25	10.8	47041	3.98	11.8	60027
	12.6	17.2	75/63	109.1	40826	35364	4.04	10.1	41918	3.86	10.9	54173
			80/67	109.6	43813	36758	4.05	10.8	44905	3.87	11.6	57240
			85/71	110.2	46945	38081	4.06	11.6	48037	3.88	12.4	60417
110	6	3.9	75/63	128.8	36379	33358	5.08	7.2	37471	4.77	7.9	53070
			80/67	129.8	38947	34748	5.11	7.6	40039	4.81	8.3	55800
			85/71	130.8	41660	36090	5.15	8.1	42752	4.85	8.8	58640
	9	8.8	75/63	122.6	37811	34004	4.72	8.0	38903	4.45	8.7	53358
			80/67	123.3	40588	35426	4.74	8.6	41680	4.47	9.3	56195
			85/71	124.0	43423	36753	4.76	9.1	44515	4.49	9.9	59158
	12.6	17.2	75/63	119.0	38611	34365	4.53	8.5	39703	4.34	9.1	53503
			80/67	119.5	41476	35793	4.54	9.1	42568	4.35	9.8	56450
			85/71	120.0	44424	37130	4.55	9.8	45516	4.36	10.4	59482

Heating Capacity Data – Unit Size 048

EWT	GPM	WPD	System					ISO			
			EA	LWT	Capacity	KW	COP	TOT	kW	COP	THR
20	6	3.9	60	13.2	32658	3.07	3.1	31566	2.76	3.3	22563
			70	13.6	32761	3.44	2.8	31669	3.13	3.0	21428
			80	14.0	32870	3.87	2.5	31778	3.56	2.6	20072
	9	8.8	60	15.2	33880	3.09	3.2	32788	2.82	3.4	23757
			70	15.5	33886	3.45	2.9	32794	3.18	3.0	22498
			80	15.8	33898	3.88	2.6	32806	3.61	2.7	21052
	12.6	17.2	60	16.5	34675	3.10	3.3	33583	2.91	3.4	24508
			70	16.7	34613	3.47	2.9	33521	3.28	3.0	23196
			80	16.9	34558	3.89	2.6	33466	3.71	2.6	21684
30	6	3.9	60	21.9	36952	3.13	3.5	35860	2.83	3.7	26686
			70	22.3	36879	3.50	3.1	35787	3.20	3.3	25393
			80	22.8	36888	3.93	2.7	35796	3.63	2.9	23929
	9	8.8	60	24.3	38464	3.16	3.6	37372	2.89	3.8	28138
			70	24.6	38293	3.53	3.2	37201	3.26	3.3	26727
			80	24.9	38164	3.96	2.8	37072	3.69	2.9	25146
	12.6	17.2	60	25.8	39443	3.18	3.6	38351	2.99	3.8	29084
			70	26.0	39192	3.54	3.2	38100	3.36	3.3	27586
			80	26.3	38986	3.98	2.9	37894	3.79	2.9	25928
40	6	3.9	60	30.6	41642	3.21	3.8	40550	2.91	4.1	31127
			70	31.0	41397	3.59	3.4	40305	3.28	3.6	29674
			80	31.5	41281	4.02	3.0	40189	3.72	3.2	28079
	9	8.8	60	33.4	43426	3.25	3.9	42334	2.98	4.2	32879
			70	33.7	43058	3.62	3.5	41966	3.35	3.7	31281
			80	34.0	42814	4.06	3.1	41722	3.79	3.2	29532
	12.6	17.2	60	35.1	44633	3.27	4.0	43541	3.08	4.1	34018
			70	35.3	44187	3.64	3.6	43095	3.46	3.7	32321
			80	35.6	43817	4.08	3.1	42725	3.89	3.2	30480
50	6	3.9	60	39.1	46591	3.30	4.1	45499	3.00	4.4	35869
			70	39.6	46218	3.68	3.7	45126	3.38	3.9	34244
			80	40.1	45950	4.13	3.3	44858	3.82	3.4	32488
	9	8.8	60	42.3	48753	3.34	4.3	47661	3.07	4.5	37966
			70	42.7	48253	3.72	3.8	47161	3.45	4.0	36186
			80	43.1	47789	4.17	3.4	46697	3.90	3.5	34237
	12.6	17.2	60	44.3	49713	3.36	4.3	48621	3.18	4.5	39362
			70	44.6	49546	3.75	3.9	48454	3.57	4.0	37403
			80	44.9	48984	4.19	3.4	47892	4.01	3.5	35366
60	6	3.9	60	47.6	51920	3.40	4.5	50828	3.10	4.8	40907
			70	48.1	51362	3.79	4.0	50270	3.48	4.2	39090
			80	48.7	50905	4.24	3.5	49813	3.93	3.7	37152
	9	8.8	60	51.2	54458	3.45	4.6	53366	3.18	4.9	43397
			70	51.6	53765	3.84	4.1	52673	3.57	4.3	41338
			80	52.0	53149	4.29	3.6	52057	4.02	3.8	39208
	12.6	17.2	60	53.5	55888	3.48	4.7	54796	3.29	4.9	44989
			70	53.8	55307	3.87	4.2	54215	3.69	4.3	42816
			80	54.1	54558	4.33	3.7	53466	4.14	3.8	40546
70	6	3.9	60	55.9	57190	3.50	4.8	56098	3.20	5.1	46238
			70	56.5	56749	3.91	4.3	55657	3.60	4.5	44158
			80	57.2	56183	4.37	3.8	55091	4.06	4.0	42048
	9	8.8	60	60.0	60474	3.57	5.0	59382	3.30	5.3	49017
			70	60.5	59538	3.96	4.4	58446	3.69	4.6	46819
			80	61.0	58753	4.43	3.9	57661	4.16	4.1	44455
	12.6	17.2	60	62.6	62451	3.61	5.1	61359	3.43	5.2	50879
			70	63.0	61373	4.01	4.5	60281	3.82	4.6	48500
			80	63.3	60382	4.48	4.0	59290	4.29	4.0	45987
80	6	3.9	60	64.2	63284	3.63	5.1	62192	3.32	5.5	51701
			70	64.9	62455	4.03	4.5	61363	3.73	4.8	49501
			80	65.6	61625	4.51	4.0	60533	4.20	4.2	47154
	9	8.8	60	68.8	66743	3.70	5.3	65651	3.43	5.6	54945
			70	69.3	65599	4.10	4.7	64507	3.83	4.9	52490
			80	69.9	64544	4.58	4.1	63452	4.31	4.3	49874
	12.6	17.2	60	71.7	68695	3.74	5.4	67603	3.56	5.6	57079
			70	72.1	67662	4.15	4.8	66570	3.97	4.9	54463
			80	72.5	66494	4.63	4.2	65402	4.45	4.3	51648
85	6	3.9	60	68.3	66278	3.69	5.3	65186	3.39	5.6	54525
			70	69.1	65363	4.10	4.7	64271	3.79	5.0	52217
			80	69.8	64484	4.58	4.1	63392	4.28	4.3	49748
	9	8.8	60	73.2	69467	3.75	5.4	68375	3.48	5.8	58046
			70	73.7	68692	4.18	4.8	67600	3.91	5.1	55396
			80	74.3	67579	4.66	4.3	66487	4.39	4.4	52681
	12.6	17.2	60	76.2	72341	3.82	5.6	71249	3.64	5.7	60212
			70	76.6	70880	4.23	4.9	69788	4.05	5.1	57453
			80	77.1	69577	4.71	4.3	68485	4.53	4.4	54579
90	6	3.9	60	72.4	69024	3.75	5.4	67932	3.44	5.8	57436
			70	73.2	68318	4.17	4.8	67226	3.86	5.1	54971
			80	74.0	67341	4.65	4.2	66249	4.35	4.5	52418
	9	8.8	60	77.6	73258	3.84	5.6	72166	3.57	5.9	61036
			70	78.1	71824	4.25	4.9	70732	3.98	5.2	58340
			80	78.7	70593	4.74	4.4	69501	4.47	4.6	55486
	12.6	17.2	60	80.8	75699	3.89	5.7	74607	3.71	5.9	63434
			70	81.2	74134	4.31	5.0	73042	4.12	5.2	60521
			80	81.6	72699	4.80	4.4	71607	4.61	4.5	57454

Cooling Capacity Data – Unit Size 060

EWT	GPM	WPD	System						ISO			
			EA	LWT	Total	Sensible	KW	EER	TOT	kW	EER	THR
30	8.0	5.8	75/63	49.2	66328	49986	2.70	24.5	67678	2.34	29.0	75695
			80/67	50.5	71218	51644	2.77	25.7	72568	2.40	30.2	80828
			85/71	51.9	76347	53180	2.84	26.9	77697	2.47	31.4	86205
	12.0	13.0	75/63	42.8	67577	50552	2.37	28.5	68927	2.07	33.2	75823
			80/67	43.8	72772	52292	2.43	30.0	74122	2.13	34.8	81261
			85/71	44.7	78217	53894	2.49	31.5	79567	2.19	36.3	86918
	15.8	22.6	75/63	39.7	68133	50805	2.20	31.0	69483	2.02	34.3	75781
			80/67	40.5	73475	52586	2.24	32.8	74825	2.07	36.1	81349
			85/71	41.2	79084	54225	2.30	34.5	80434	2.12	37.9	87156
40	8.0	5.8	75/63	59.2	64559	49188	3.09	20.9	65909	2.72	24.2	75184
			80/67	60.4	69231	50821	3.15	22.0	70581	2.78	25.4	80075
			85/71	61.7	74103	52329	3.21	23.1	75453	2.84	26.6	85198
	12.0	13.0	75/63	52.8	65927	49805	2.80	23.6	67277	2.50	26.9	75605
			80/67	53.7	70867	51498	2.84	25.0	72217	2.54	28.4	80749
			85/71	54.6	76084	53080	2.89	26.4	77434	2.59	29.9	86081
	15.8	22.6	75/63	49.8	66575	50098	2.64	25.2	67925	2.47	27.5	75742
			80/67	50.4	71693	51842	2.68	26.8	73043	2.51	29.1	80988
			85/71	51.1	77023	53437	2.72	28.3	78373	2.55	30.7	86472
50	8.0	5.8	75/63	69.0	62468	48251	3.46	18.1	63818	3.09	20.6	74398
			80/67	70.2	66936	49876	3.51	19.1	68286	3.14	21.7	78990
			85/71	71.4	71634	51400	3.56	20.1	72984	3.20	22.8	83915
	12.0	13.0	75/63	62.8	63983	48929	3.19	20.0	65333	2.90	22.6	74995
			80/67	63.6	68711	50606	3.23	21.3	70061	2.93	23.9	79867
			85/71	64.5	73692	52175	3.27	22.5	75042	2.97	25.3	85012
	15.8	22.6	75/63	59.7	64724	49263	3.06	21.2	66074	2.88	22.9	75239
			80/67	60.4	69534	50946	3.09	22.5	70884	2.91	24.3	80257
			85/71	61.0	74665	52542	3.12	23.9	76015	2.95	25.8	85505
60	8.0	5.8	75/63	78.8	60213	47247	3.83	15.7	61563	3.47	17.8	73321
			80/67	79.9	64477	48870	3.88	16.6	65827	3.51	18.7	77790
			85/71	81.1	68972	50406	3.93	17.6	70322	3.56	19.7	82467
	12.0	13.0	75/63	72.6	61792	47949	3.57	17.3	63142	3.28	19.3	74022
			80/67	73.4	66304	49617	3.61	18.4	67654	3.31	20.5	78670
			85/71	74.3	71074	51191	3.64	19.5	72424	3.35	21.6	83649
	15.8	22.6	75/63	69.6	62555	48290	3.45	18.2	63905	3.27	19.5	74360
			80/67	70.2	67184	49978	3.47	19.4	68534	3.30	20.8	79114
			85/71	70.9	72093	51572	3.50	20.6	73443	3.33	22.1	84214
70	8.0	5.8	75/63	88.5	57773	46167	4.22	13.7	59123	3.85	15.3	72174
			80/67	89.6	61844	47802	4.27	14.5	63194	3.90	16.2	76450
			85/71	90.7	66144	49357	4.32	15.3	67494	3.95	17.1	80934
	12.0	13.0	75/63	82.5	59407	46889	3.96	15.0	60757	3.66	16.6	72948
			80/67	83.2	63707	48557	3.99	16.0	65057	3.69	17.6	77422
			85/71	84.0	68267	50144	4.03	17.0	69617	3.73	18.7	82135
	15.8	22.6	75/63	79.5	60182	47233	3.84	15.7	61532	3.67	16.8	73321
			80/67	80.1	64605	48923	3.86	16.7	65955	3.69	17.9	77797
			85/71	80.7	69298	50527	3.89	17.8	70648	3.71	19.0	82726
80	8.0	5.8	75/63	98.0	55174	45024	4.63	11.9	56524	4.26	13.3	71032
			80/67	99.3	59074	46684	4.69	12.6	60424	4.32	14.0	75112
			85/71	100.4	63177	48264	4.74	13.3	64527	4.37	14.8	79405
	12.0	13.0	75/63	92.3	56803	45740	4.37	13.0	58153	4.07	14.3	71712
			80/67	93.0	60932	47433	4.40	13.8	62282	4.10	15.2	76030
			85/71	93.8	65286	49040	4.44	14.7	66636	4.14	16.1	80462
	15.8	22.6	75/63	89.4	57610	46095	4.24	13.6	58960	4.07	14.5	72117
			80/67	89.9	61855	47806	4.26	14.5	63205	4.09	15.4	76512
			85/71	90.5	66337	49428	4.29	15.5	67687	4.12	16.4	81032
85	8.0	5.8	75/63	103.1	53804	44425	4.87	11.1	55154	4.50	12.2	70339
			80/67	104.1	57629	46104	4.92	11.7	58979	4.55	13.0	74415
			85/71	105.2	61581	47678	4.97	12.4	62931	4.60	13.7	78627
	12.0	13.0	75/63	97.1	55550	45189	4.58	12.1	56900	4.29	13.3	71136
			80/67	97.8	59498	46855	4.62	12.9	60848	4.32	14.1	75285
			85/71	98.6	63767	48480	4.65	13.7	65117	4.35	15.0	79666
	15.8	22.6	75/63	94.3	56276	45508	4.46	12.6	57626	4.29	13.4	71468
			80/67	94.8	60422	47227	4.48	13.5	61772	4.31	14.3	75725
			85/71	95.4	64803	48862	4.50	14.4	66153	4.33	15.3	80203
90	8.0	5.8	75/63	107.9	52423	43821	5.11	10.3	53773	4.75	11.3	69744
			80/67	108.9	56158	45515	5.16	10.9	57508	4.80	12.0	73765
			85/71	110.0	60011	47104	5.22	11.5	61361	4.85	12.6	77809
	12.0	13.0	75/63	102.1	54099	44553	4.82	11.2	55449	4.52	12.3	70564
			80/67	102.8	58039	46269	4.85	12.0	59389	4.55	13.0	74564
			85/71	103.5	62143	47884	4.89	12.7	63493	4.59	13.8	78844
	15.8	22.6	75/63	99.2	54905	44906	4.68	11.7	56255	4.51	12.5	70843
			80/67	99.7	58999	46654	4.70	12.6	60349	4.53	13.3	75026
			85/71	100.2	63244	48288	4.72	13.4	64594	4.55	14.2	79414
100	8.0	5.8	75/63	117.7	49570	42577	5.66	8.8	50920	5.29	9.6	68785
			80/67	118.6	53076	44284	5.71	9.3	54426	5.34	10.2	72459
			85/71	119.6	56733	45910	5.77	9.8	58083	5.40	10.8	76358
	12.0	13.0	75/63	111.9	51254	43311	5.33	9.6	52604	5.03	10.5	69281
			80/67	112.5	55017	45059	5.36	10.3	56367	5.06	11.1	73219
			85/71	113.2	58906	46701	5.40	10.9	60256	5.10	11.8	77298
	15.8	22.6	75/63	109.1	52067	43666	5.18	10.1	53417	5.01	10.7	69611
			80/67	109.6	55933	45425	5.20	10.8	57283	5.03	11.4	73611
			85/71	110.1	59946	47081	5.23	11.5	61296	5.06	12.1	77775
110	8.0	5.8	75/63	127.5	46565	41267	6.29	7.4	47915	5.92	8.1	67812
			80/67	128.4	49855	42999	6.34	7.9	51205	5.98	8.6	71348
			85/71	129.3	53311	44665	6.41	8.3	54661	6.04	9.1	75047
	12.0	13.0	75/63	121.7	48291	42020	5.92	8.2	49641	5.62	8.8	68316
			80/67	122.4	51810	43779	5.95	8.7	53160	5.65	9.4	71997
			85/71	123.0	55516	45467	5.99	9.3	56866	5.69	10.0	75866
	15.8	22.6	75/63	118.9	49110	42377	5.75	8.5	50460	5.57	9.1	68580
			80/67	119.4	52737	44149	5.77	9.1	54087	5.60	9.7	72332
			85/71	119.9	56564	45848	5.80	9.8	57914	5.63	10.3	76286

Heating Capacity Data – Unit Size 060

EWT	GPM	WPD	System					ISO			
			EA	LWT	Capacity	KW	COP	TOT	kW	COP	THA
20	8.0	5.8	60	13.1	43511	3.96	3.2	42161	3.59	3.4	29711
			70	13.5	43680	4.40	2.9	42330	4.03	3.1	28244
			80	13.9	43730	4.87	2.6	42380	4.51	2.8	26576
	12.0	13.0	60	15.2	45192	3.99	3.3	43842	3.69	3.5	31264
			70	15.4	45197	4.43	3.0	43847	4.13	3.1	29672
			80	15.7	45107	4.90	2.7	43757	4.61	2.8	27873
	15.8	22.6	60	16.2	46072	4.01	3.4	44722	3.84	3.4	32101
			70	16.4	46007	4.45	3.0	44657	4.27	3.1	30437
			80	16.7	45843	4.92	2.7	44493	4.75	2.7	28580
30	8.0	5.8	60	21.9	49219	4.06	3.6	47869	3.70	3.8	35074
			70	22.3	49199	4.51	3.2	47849	4.14	3.4	33422
			80	22.7	49052	4.99	2.9	47702	4.62	3.0	31577
	12.0	13.0	60	24.3	51143	4.10	3.7	49793	3.80	3.8	36933
			70	24.6	50971	4.54	3.3	49621	4.24	3.4	35119
			80	24.9	50742	5.02	3.0	49392	4.73	3.1	33134
	15.8	22.6	60	25.6	52233	4.11	3.7	50883	3.94	3.8	37937
			70	25.8	51937	4.56	3.3	50587	4.38	3.4	36037
			80	26.0	51627	5.04	3.0	50277	4.87	3.0	33966
40	8.0	5.8	60	30.5	55184	4.16	3.9	53834	3.79	4.2	40761
			70	31.0	54946	4.61	3.5	53596	4.24	3.7	38906
			80	31.4	54686	5.10	3.1	53336	4.74	3.3	36856
	12.0	13.0	60	33.3	57535	4.20	4.0	56185	3.90	4.2	42996
			70	33.7	57069	4.65	3.6	55719	4.35	3.8	40950
			80	34.0	56646	5.14	3.2	55296	4.85	3.3	38707
	15.8	22.6	60	34.8	58775	4.22	4.1	57425	4.05	4.2	44180
			70	35.1	58245	4.67	3.7	56895	4.50	3.7	42019
			80	35.3	57680	5.16	3.3	56330	4.99	3.3	39700
50	8.0	5.8	60	39.1	61520	4.26	4.2	60170	3.90	4.5	46788
			70	39.6	61068	4.72	3.8	59718	4.35	4.0	44686
			80	40.1	60634	5.23	3.4	59284	4.86	3.6	42434
	12.0	13.0	60	42.3	64295	4.31	4.4	62945	4.01	4.6	49417
			70	42.7	63632	4.77	3.9	62282	4.47	4.1	47090
			80	43.1	62962	5.27	3.5	61612	4.98	3.6	44618
	15.8	22.6	60	44.0	65379	4.32	4.4	64029	4.15	4.5	50918
			70	44.3	64953	4.79	4.0	63603	4.62	4.0	48402
			80	44.6	64203	5.30	3.5	62853	5.13	3.6	45816
60	8.0	5.8	60	47.6	68237	4.38	4.6	66887	4.01	4.9	53159
			70	48.2	67509	4.84	4.1	66159	4.47	4.3	50782
			80	48.7	66885	5.36	3.7	65535	4.99	3.8	48289
	12.0	13.0	60	51.2	71437	4.43	4.7	70087	4.13	5.0	56232
			70	51.7	70475	4.89	4.2	69125	4.60	4.4	53614
			80	52.1	69669	5.42	3.8	68319	5.12	3.9	50879
	15.8	22.6	60	53.2	73175	4.46	4.8	71825	4.29	4.9	57903
			70	53.5	72119	4.93	4.3	70769	4.75	4.4	55126
			80	53.8	71112	5.45	3.8	69762	5.28	3.9	52219
70	8.0	5.8	60	56.0	74887	4.49	4.9	73537	4.12	5.2	59885
			70	56.6	74352	4.97	4.4	73002	4.60	4.6	57211
			80	57.3	73455	5.50	3.9	72105	5.14	4.1	54419
	12.0	13.0	60	60.1	78656	4.56	5.1	77306	4.26	5.3	63464
			70	60.6	77790	5.04	4.5	76440	4.74	4.7	60475
			80	61.1	76653	5.58	4.0	75303	5.28	4.2	57410
	15.8	22.6	60	62.3	80696	4.60	5.1	79346	4.43	5.3	65396
			70	62.6	79647	5.08	4.6	78297	4.91	4.7	62237
			80	63.0	78368	5.62	4.1	77018	5.45	4.1	59012
80	8.0	5.8	60	64.3	82255	4.63	5.2	80905	4.26	5.6	66894
			70	65.0	81519	5.12	4.7	80169	4.76	4.9	63898
			80	65.8	80323	5.67	4.2	78973	5.30	4.4	60845
	12.0	13.0	60	68.9	86658	4.71	5.4	85308	4.41	5.7	71002
			70	69.4	85429	5.21	4.8	84079	4.91	5.0	67629
			80	70.0	84017	5.76	4.3	82667	5.47	4.4	64222
	15.8	22.6	60	71.3	89352	4.77	5.5	88002	4.60	5.6	73144
			70	71.7	87615	5.26	4.9	86265	5.09	5.0	69646
			80	72.2	85940	5.82	4.3	84590	5.64	4.4	66045
85	8.0	5.8	60	68.5	86140	4.70	5.4	84790	4.33	5.7	70470
			70	69.2	85163	5.21	4.8	83813	4.84	5.1	67335
			80	70.0	83961	5.76	4.3	82611	5.40	4.5	64109
	12.0	13.0	60	73.3	91118	4.81	5.6	89768	4.51	5.8	74782
			70	73.9	89448	5.31	4.9	88098	5.01	5.2	71292
			80	74.4	87811	5.87	4.4	86461	5.57	4.5	67707
	15.8	22.6	60	75.8	93632	4.87	5.6	92282	4.69	5.8	77182
			70	76.3	91710	5.37	5.0	90360	5.19	5.1	73447
			80	76.7	89929	5.93	4.4	88579	5.76	4.5	69639
90	8.0	5.8	60	72.6	90015	4.78	5.5	88665	4.42	5.9	74114
			70	73.4	88927	5.30	4.9	87577	4.93	5.2	70819
			80	74.2	87601	5.86	4.4	86251	5.50	4.6	67428
	12.0	13.0	60	77.7	95370	4.91	5.7	94020	4.61	6.0	78705
			70	78.3	93494	5.41	5.1	92144	5.11	5.3	75001
			80	78.9	91673	5.98	4.5	90323	5.68	4.7	71242
	15.8	22.6	60	80.4	98029	4.97	5.8	96679	4.80	5.9	81176
			70	80.8	95875	5.47	5.1	94525	5.30	5.2	77300
			80	81.3	93924	6.05	4.6	92574	5.88	4.6	73280

Performance Data – Operating Limits

Air Limits - °F (English units)

	Standard Units		Extended Range Units	
	Cooling	Heating	Cooling	Heating
Min Ambient Air	50°F	50°F	40°F	40°F
Normal Ambient Air	80°F	70°F	80°F	70°F
Max Ambient Air	100°F	85°F	100°F	85°F
Min Ent Air ①, ②	50°F	50°F	50°F	40°F
Normal Ent Air db/wb	80/67°F	70°F	80/67°F	70°F
Max Ent Air db/wb ①, ②	100/83°F	80°F	100/83°F	80°F

Air Limits - °C (SI units)

	Standard Units		Extended Range Units	
	Cooling	Heating	Cooling	Heating
Min Ambient Air	10°C	10°C	5°C	5°C
Normal Ambient Air	27°C	21°C	27°C	21°C
Max Ambient Air	38°C	29°C	38°C	29°C
Min Ent Air ①, ②	10°C	10°C	10°C	5°C
Normal Ent Air db/wb	27/19°C	21°C	27/19°C	21°C
Max Ent Air db/wb ①, ②	38/28°C	27°C	38/28°C	27°C

Water - °F (English units)

	Standard Units		Extended Range Units	
	Cooling	Heating	Cooling	Heating
Min Ent Water ①, ②	55°F	55°F	30°F	20°F
Normal Ent Water	85°F	70°F	77°F	40°F
Max Ent Water	110°F	90°F	110°F	90°F

Water - °C (SI units)

	Standard Units		Extended Range Units	
	Cooling	Heating	Cooling	Heating
Min Ent Water ①, ②	13°C	13°C	-1°C	-6°C
Normal Ent Water	29°C	21°C	25°C	4°C
Max Ent Water	43°C	21°C	43°C	32°C

① At ARI flow rate

② Maximum and minimum values may not be combined. If one value is at maximum or minimum, the other two conditions may not exceed the normal condition for standard units. Extended range units may combine any two maximum conditions, but not more than two, with all other conditions being normal conditions.

Environment

This equipment is designed for indoor installation only. Sheltered locations such as attics, garages, etc., generally will not provide sufficient protection against extremes in temperature and/or humidity, and equipment performance, reliability, and service life may be adversely affected.

Power supply

A voltage variation of +10% of nameplate utilization voltage is acceptable. Three-phase system imbalance shall not exceed 2%.

Additional information for initial start-up only

Standard units:

Units are designed to start in an ambient of 50°F (10°C), with entering air at 50°F (10°C), with entering water at 70°F (21°C), with both air and water at the flow rates used in the ARI Standard 320-86 rating test, for initial start-up in winter.

Note: *This is not a normal or continuous operating condition. It is assumed that such a start-up is for the purpose of bringing the building space up to occupancy temperature.*

Extended range units:

Extended range heat pump conditioners are designed to start in an ambient of 40°F (5°C), with entering air at 40°F (5°C), with entering water at 40°F (5°C), with both air and water at the flow rates used in the ARI Standard 320-86 rating test, for initial start-up in winter.

Note: *This is not a normal or continuous operating condition. It is assumed that such a start-up is for the purpose of bringing the building space up to occupancy temperature.*

Correction Factors

Airflow Correction Factors

	Percent of Nominal Airflow						
	85	90	95	100	105	110	115
Total Cooling Capacity	0.972	0.982	0.993	1.00	1.007	1.010	1.013
Sensible Cooling Capacity	0.926	0.948	0.974	1.00	1.027	1.055	1.066
kW - Cooling	0.977	0.984	0.993	1.00	1.011	1.018	1.028
Total Heat of Rejection	0.975	0.983	0.991	1.00	1.008	1.015	1.018
Total Heating Capacity	0.967	0.978	0.990	1.00	1.009	1.017	1.024
kW - Heating	1.009	1.006	1.003	1.00	0.997	0.995	0.993
Total Heat of Absorbtion	0.967	0.976	0.989	1.00	1.010	1.019	1.025

Antifreeze Correction Factors

Ethylene Glycol

	10%	20%	30%	40%	50%
Cooling Capacity	0.9950	0.9920	0.9870	0.9830	0.9790
Heating Capacity	0.9910	0.9820	0.9770	0.9690	0.9610
Pressure Drop	1.0700	1.1300	1.1800	1.2600	1.2800

Propylene Glycol

	10%	20%	30%	40%	50%
Cooling Capacity	0.9900	0.9800	0.9700	0.9600	0.9500
Heating Capacity	0.9870	0.9750	0.9620	0.9420	0.9300
Pressure Drop	1.0700	1.1500	1.2500	1.3700	1.4200

Methanol

	10%	20%	30%	40%	50%
Cooling Capacity	0.9980	0.9720	–	–	–
Heating Capacity	0.9950	0.9700	–	–	–
Pressure Drop	1.0230	1.0570	–	–	–

Ethanol

	10%	20%	30%	40%	50%
Cooling Capacity	0.9910	0.9510	–	–	–
Heating Capacity	0.9950	0.9600	–	–	–
Pressure Drop	1.0350	0.9600	–	–	–

General Data

Physical Data

Unit Size	007	009	012	019	024
Fan Wheel - D x W (In.)	6.3 x 6.0	6.3 x 6.0	6.2 x 7.4	9.5 x 7.1	9.5 x 7.1
Fan Motor Horsepower	1/20	1/8	1/8	1/3	1/3
Coil Face Area (Sq. Ft.)	0.97	0.97	1.11	2.75	2.75
Coil Rows	3	3	3	3	3
Refrigerant Charge (Oz.)	16	16	18	37	37
Filter, (Qty.) Size (In.)	(1) 10 x 20			(1) 18 x 24	
Water Connections, Female NPT (In.)	1/2	1/2	1/2	1/2	1/2
Condensate Connections, Female NPT (In.)	3/4	3/4	3/4	3/4	3/4
Weight, Operate (Lbs.)	98	100	100	196	196
Weight, Shipping (Lbs.)	120	122	122	214	214

Unit Size	030	036	042	048	060
Fan Wheel - D x W (In.)	9.5 x 7.1	9.5 x 7.1	12.9 x 11.1	12.9 x 11.1	12.9 x 11.1
Fan Motor Horsepower	1/3	1/2	1/2	3/4	3/4
Coil Face Area (Sq. Ft.)	3.43	3.43	3.43	3.43	6.11
Coil Rows	3	3	3	3	3
Refrigerant Charge (Oz.)	44	44	52	52	72
Filter, (Qty.) Size (In.)	(1) 19 x 27	(1) 19 x 27	(2) 16 x 22.5		(2) 22 x 22
Water Connections, Female NPT (In.)	3/4	3/4	3/4	3/4	3/4
Condensate Connections, Female NPT (In.)	3/4	3/4	3/4	3/4	3/4
Weight, Operate (Lbs.)	226	224	293	298	332
Weight, Shipping (Lbs.)	244	242	314	319	351

Fan Performance

60 cycle, 208 volts, single phase (includes allowance for dry coil and filter)

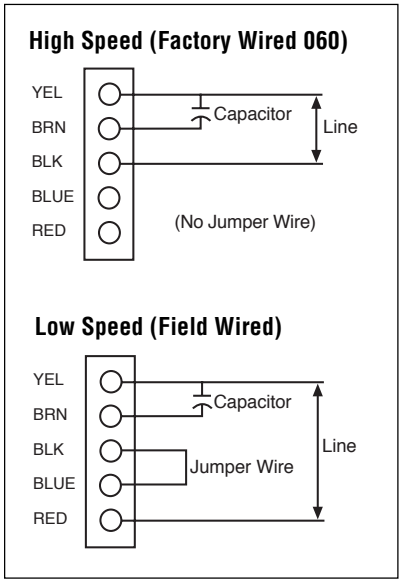
Size	Speed	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75
007	*High	300	290	280	270	260	250	240	230	210	190	170	160	—	—
009	*High	440	430	420	410	400	380	370	350	340	320	300	290	—	—
012	Low	360	350	340	330	320	300	290	270	250	230	—	—	—	—
012	*High	460	440	430	410	400	380	360	340	320	300	270	—	—	—
019	*Low	1030	1020	1010	1000	990	970	950	920	900	870	830	780	710	630
019	High	1230	1210	1190	1170	1150	1120	1090	1060	1030	990	950	910	860	790
024	Low	—	—	1030	1020	1000	980	950	930	900	870	840	800	750	—
024	*High	1240	1210	1180	1150	1120	1090	1040	1010	980	940	900	850	790	—
030	Low	—	—	—	1010	1010	1000	980	970	950	930	900	870	830	—
030	*High	1260	1250	1240	1230	1220	1190	1170	1140	1120	1090	1050	1020	960	—
036	Low	—	—	1240	1230	1210	1190	1160	1130	1100	1080	—	—	—	—
036	*High	1510	1490	1460	1440	1410	1380	1350	1320	1280	1240	1200	—	—	—
042	Low	—	—	—	—	—	—	1450	1450	1440	1380	1320	1230	1090	—
042	*High	2230	2190	2140	2100	2050	1990	1920	1830	1730	1620	1510	1380	1220	—
048	Low	2140	2120	2080	2030	1990	1940	1880	1820	1760	1690	1600	1390	1190	—
048	*High	—	—	2240	2210	2160	2100	2030	1960	1880	1800	1710	1620	1380	—
060	Low	2250	2200	2160	2110	2060	2010	1940	1870	1800	1730	1650	1550	1450	—
060	*High	2420	2370	2310	2260	2200	2140	2080	2000	1920	1840	1750	1660	1550	—

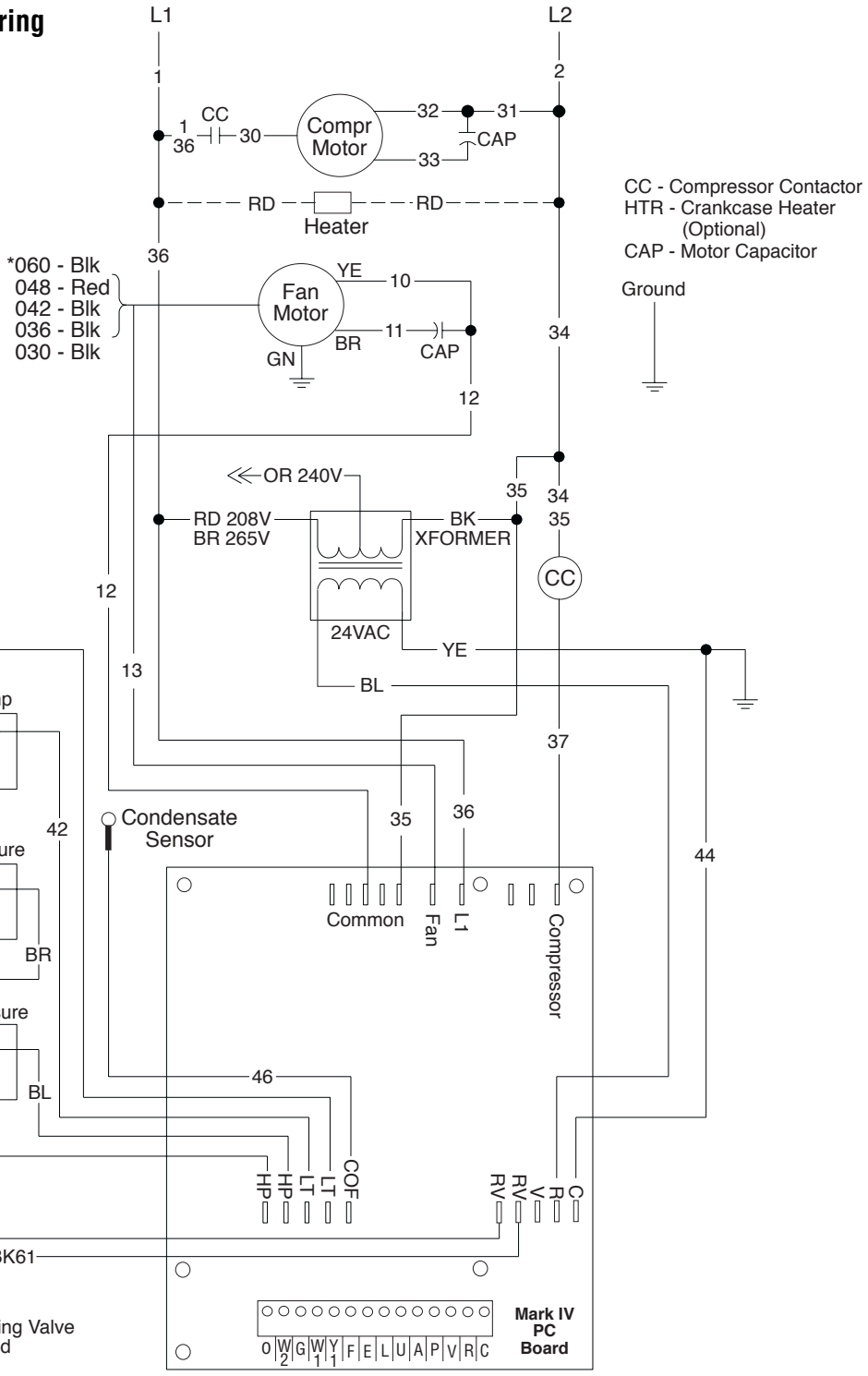
* Above fan selections are as wired from the factory.
For wet coil, calculate face velocity (cfm/ coil face area, sq. ft.). Add the following static to the external static pressure for the corresponding face velocity: 300 fpm = 0.05", 400 fpm = 0.10", 500 fpm = 0.14". Re-enter table at the increased external static pressure to determine final cfm.

Typical Wiring Diagrams

Mark IV/AC unit wiring diagram, 007 thru 060

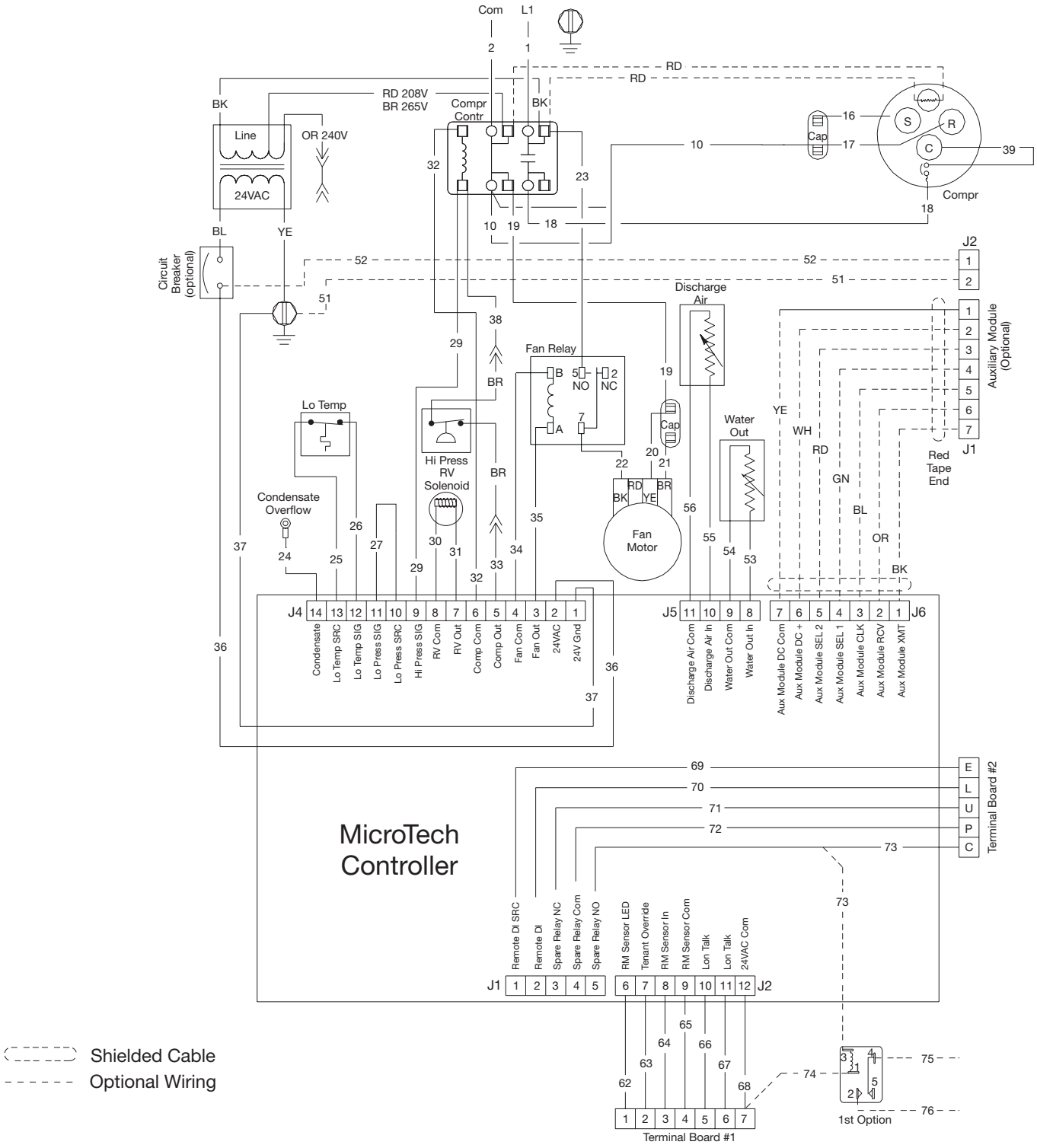
Note
*** Size 060, 460V Fan Motor Wiring**





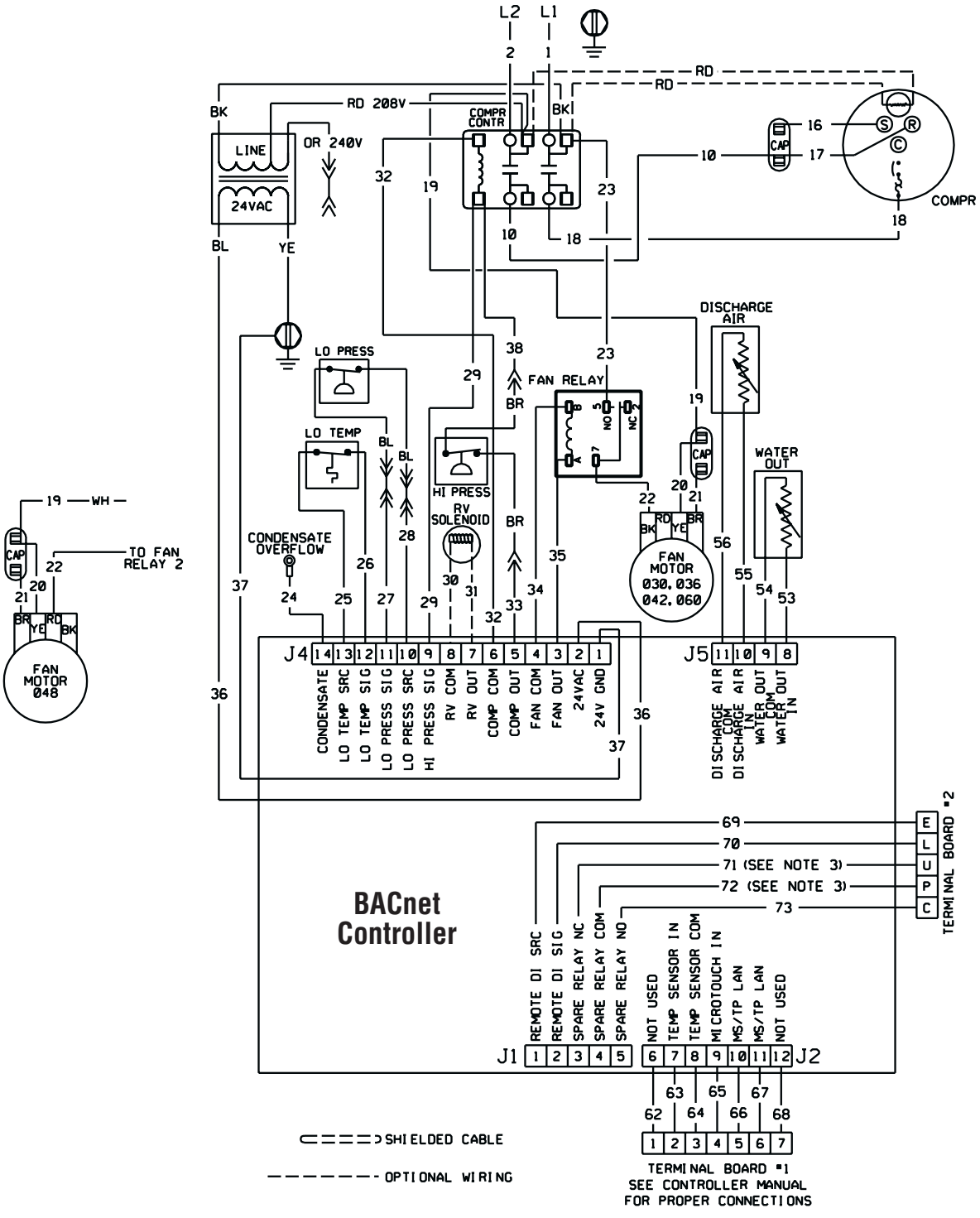
Typical Wiring Diagrams

MicroTech™ 2000 unit wiring diagram, 007 thru 060



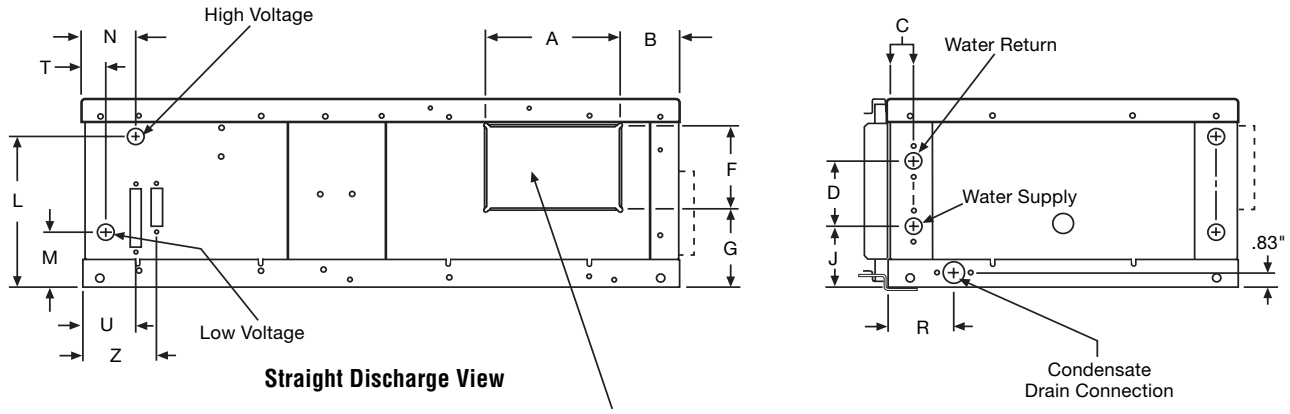
Typical Wiring Diagrams

BACnet® unit wiring diagram, 007 thru 060

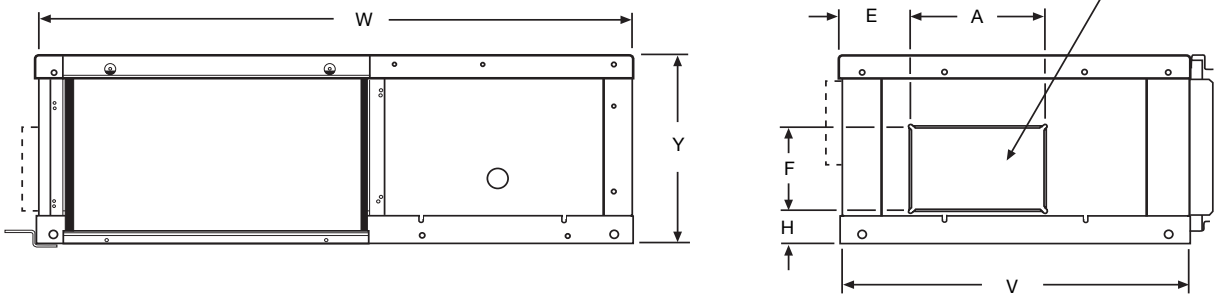


Dimensional Data – Sizes 007, 009, 012

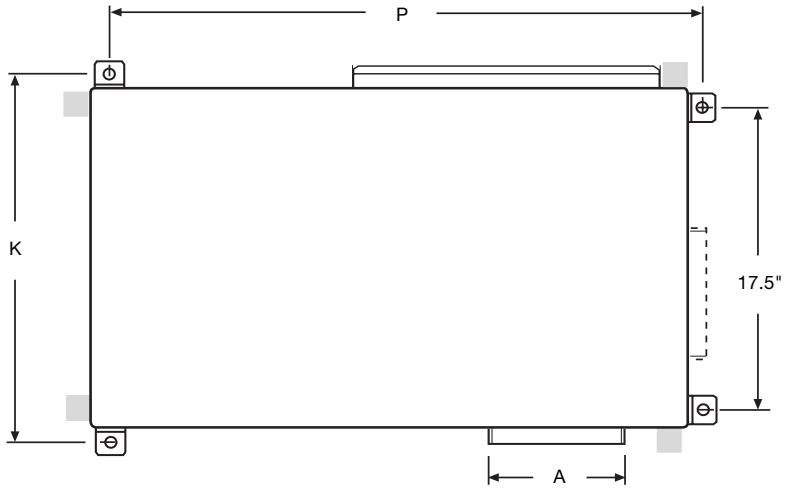
Left Hand Return – End and Straight Discharge



Straight Discharge View



End Discharge View



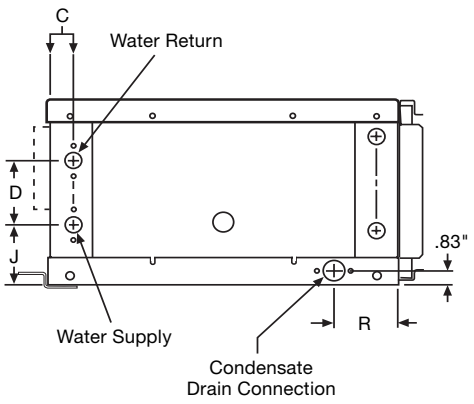
= Optional Hanger Bracket Positions

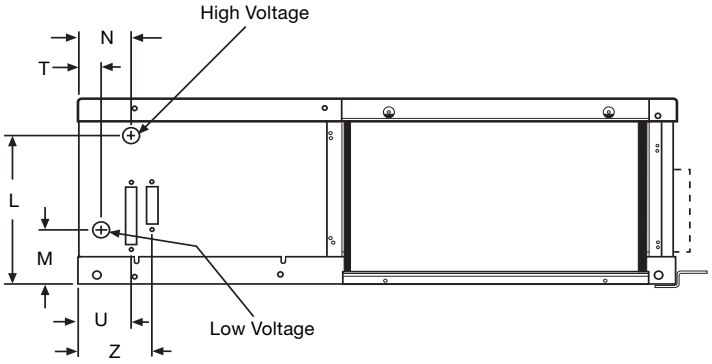
Overall Unit Dimensions = 20"W x 34"L x 11"H

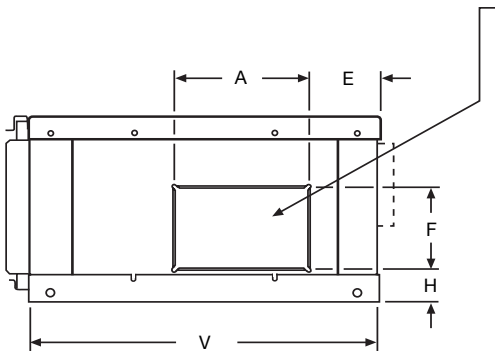
Unit Size	Unit Size 007 - 012 Dimensions (Inches)																				
007-009	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	U	V	W	Y	Z
	7.55	3.25	1.45	3.83	4.12	4.95	5.00	1.80	3.60	22	8.93	3.23	3.00	34	3.73	1.25	3.00	20	34	11	4.32
012	9.60	2.80	1.45	3.83	3.75	4.80	5.00	1.80	3.60	22	8.93	3.23	3.00	34	3.73	1.25	3.00	20	34	11	4.32

Dimensional Data – Sizes 007, 009, 012

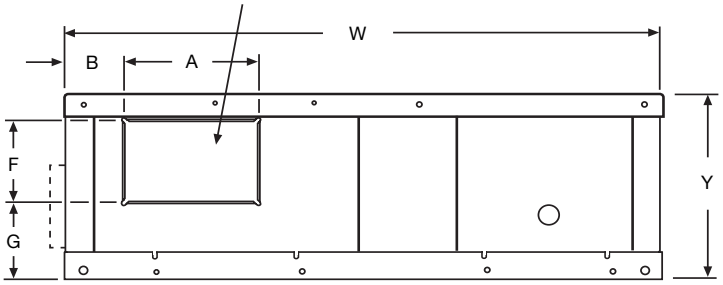
Right Hand Return – End and Straight Discharge



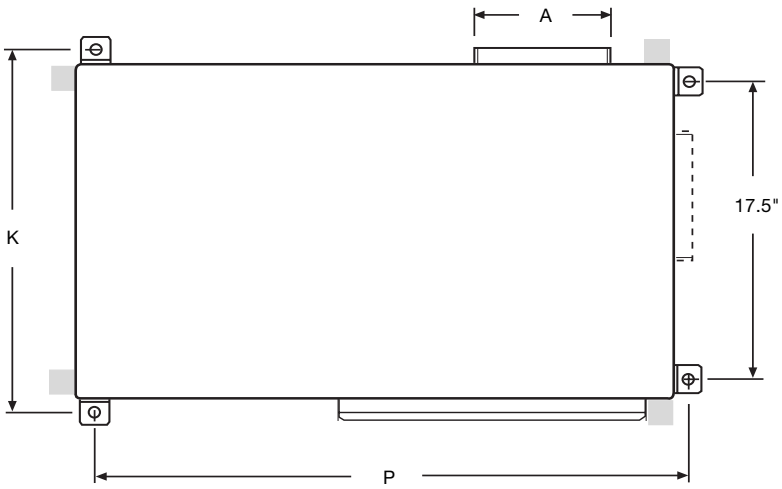




End Discharge View



Straight Discharge View



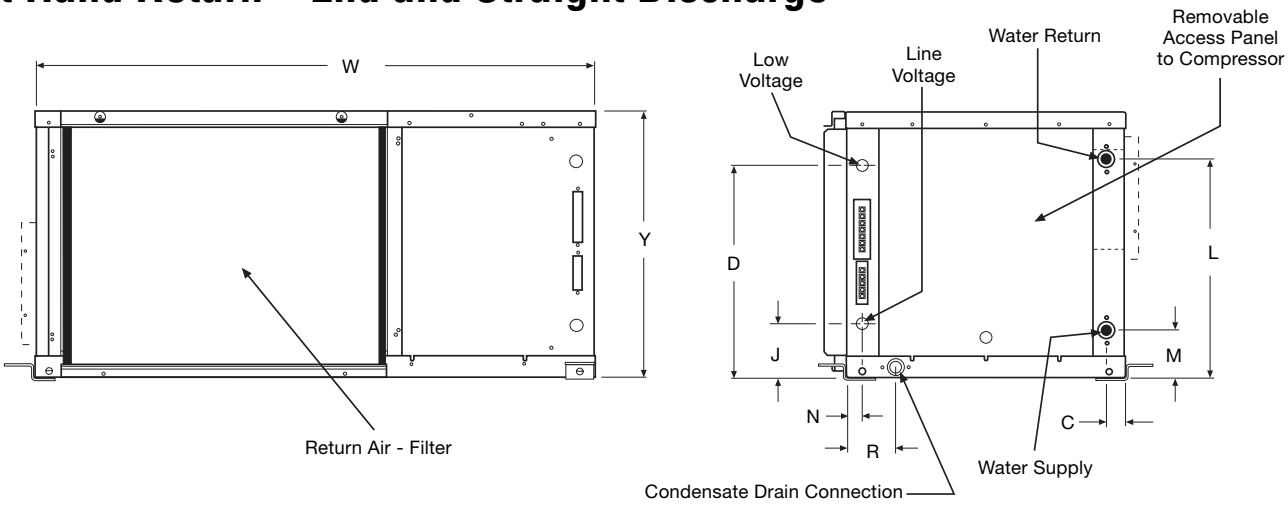
= Optional Hanger Bracket Positions

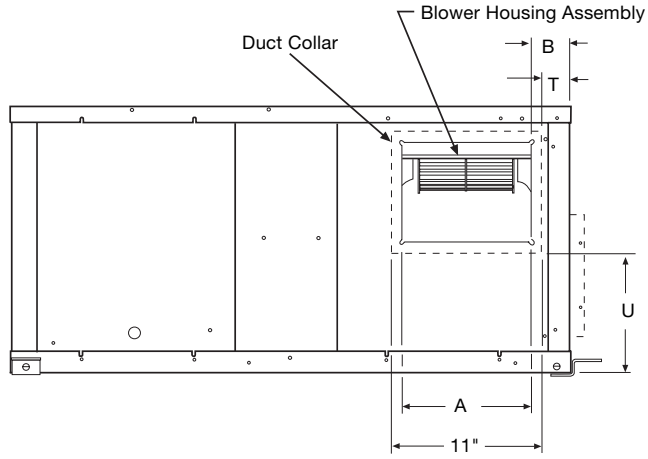
Overall Unit Dimensions = 20"W x 34"L x 11"H

Unit Size	Unit Size 007 - 012 Dimensions (Inches)																				
007-009	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	U	V	W	Y	Z
	7.55	3.25	1.45	3.83	4.12	4.95	5.00	1.80	3.60	22	8.93	3.23	3.00	34	3.73	1.25	3.00	20	34	11	4.32
012	9.60	2.80	1.45	3.83	3.75	4.80	5.00	1.80	3.60	22	8.93	3.23	3.00	34	3.73	1.25	3.00	20	34	11	4.32

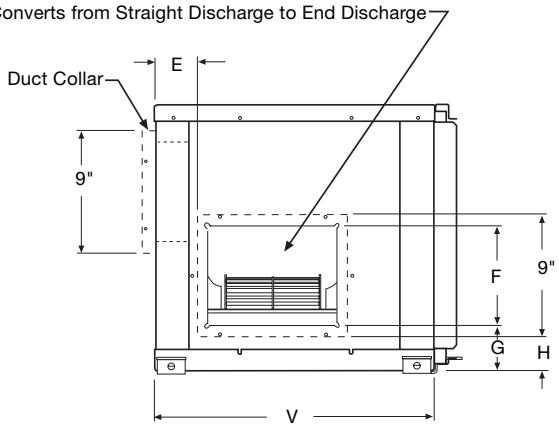
Dimensional Data – Sizes 019, 024

Left Hand Return – End and Straight Discharge

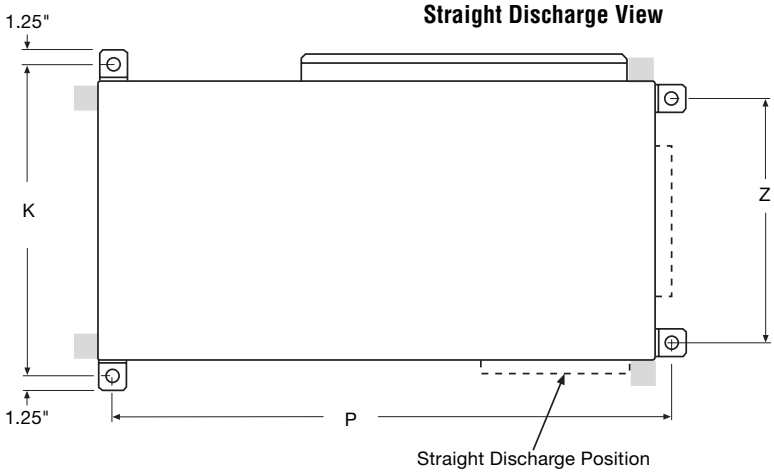




Straight Discharge View



End Discharge View



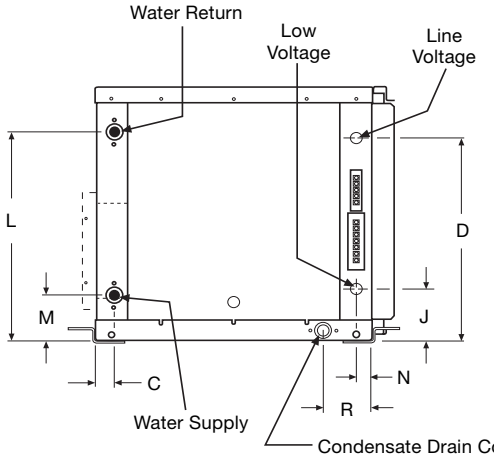
= Optional Hanger Bracket Positions

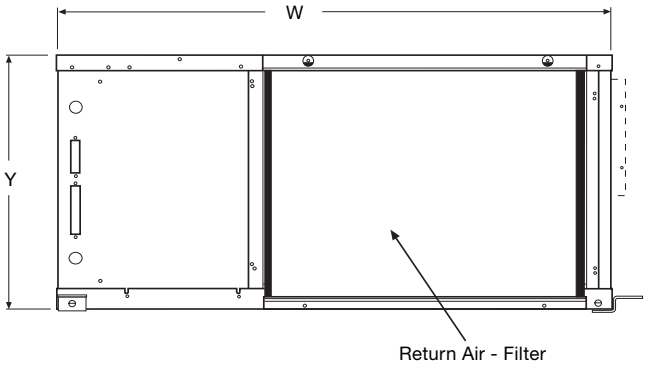
Overall Unit Dimensions = 20"W x 40"L x 19"H

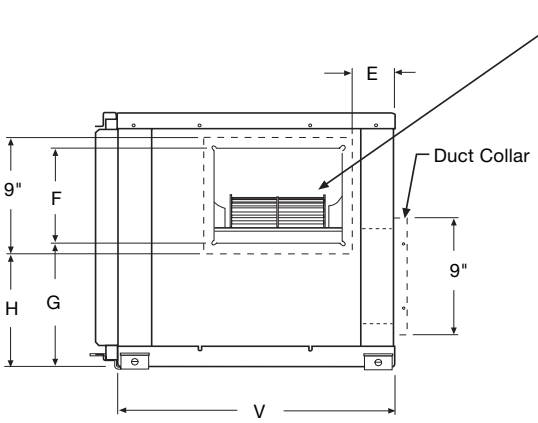
Unit Size	Unit Size 015 - 024 Dimensions (Inches)																				
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	U	V	W	Y	Z
019	9.26	3.00	1.45	15.30	2.95	7.12	3.15	2.15	3.67	22	15.43	3.60	1.26	40	3.73	2.07	8.30	20	40	19	17.5
024	9.26	3.00	1.45	15.30	2.95	7.12	3.15	2.15	3.67	22	15.43	3.60	1.26	40	3.73	2.07	8.30	20	40	19	17.5

Dimensional Data – Sizes 019, 024

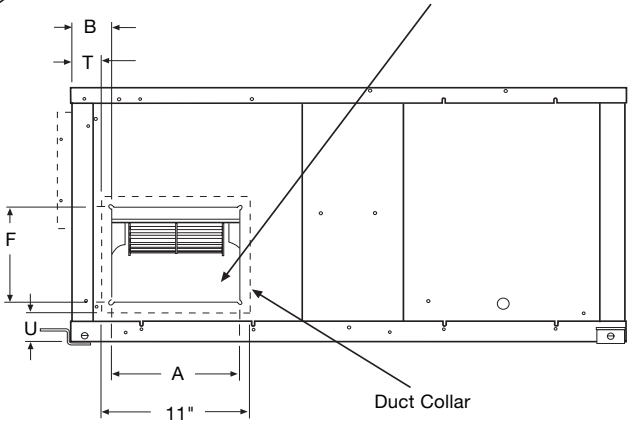
Right Hand Return – End and Straight Discharge



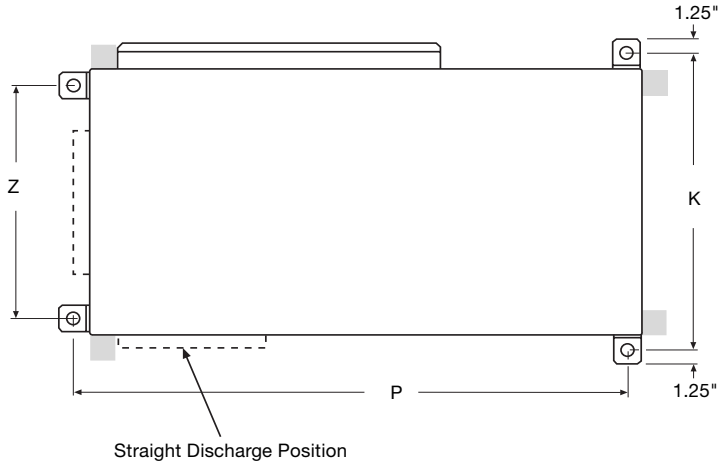




End Discharge View



Straight Discharge View



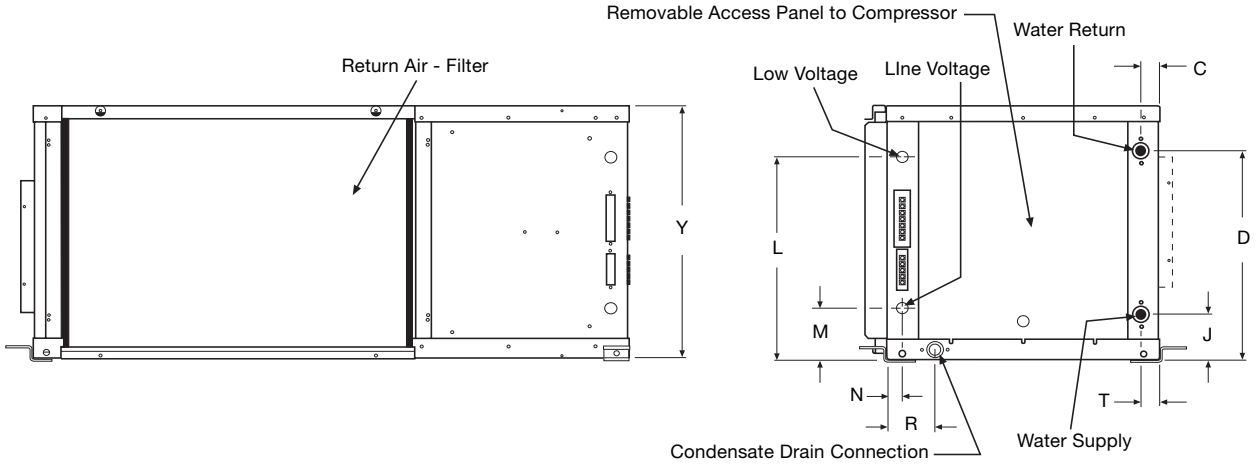
= Optional Hanger Bracket Positions

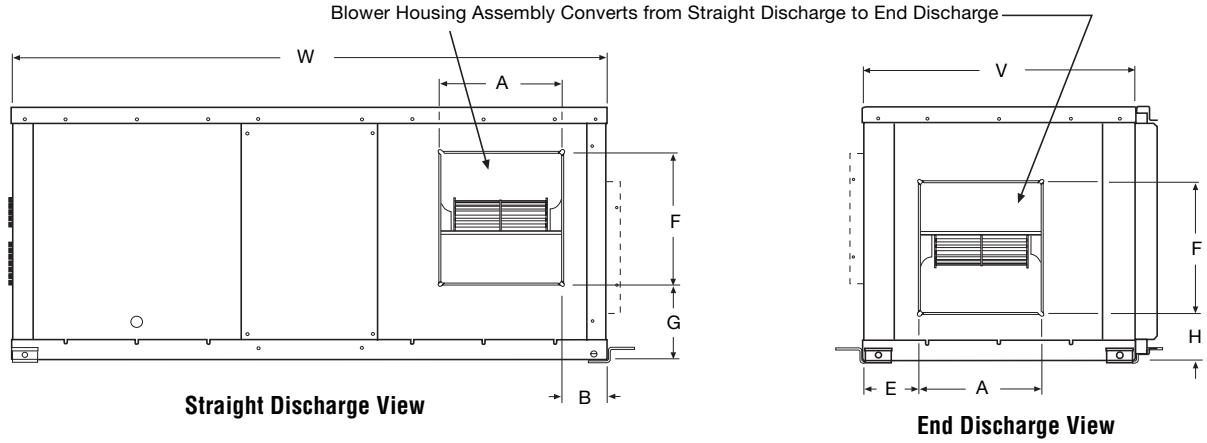
Overall Unit Dimensions = 20"W x 40"L x 19"H

Unit Size	Unit Size 015 - 024 Dimensions (Inches)																				
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	U	V	W	Y	Z
019	9.26	3.00	1.45	15.30	2.95	7.12	9.22	8.30	3.67	22	15.43	3.60	1.26	40	3.73	2.07	2.15	20	40	19	17.5
024	9.26	3.00	1.45	15.30	2.95	7.12	9.22	8.30	3.67	22	15.43	3.60	1.26	40	3.73	2.07	2.15	20	40	19	17.5

Dimensional Data – Sizes 030, 036

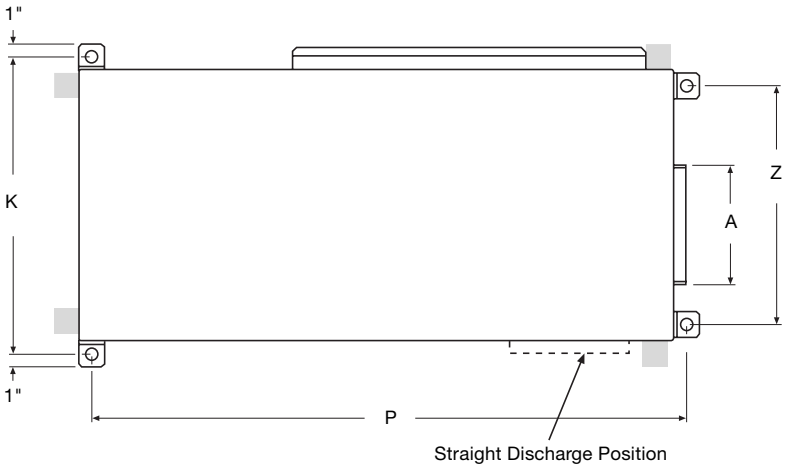
Left Hand Return – End and Straight Discharge





Straight Discharge View

End Discharge View



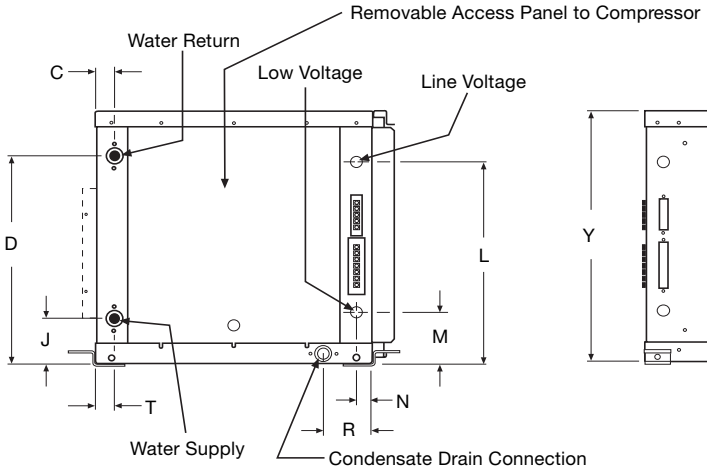
= Optional Hanger Bracket Positions

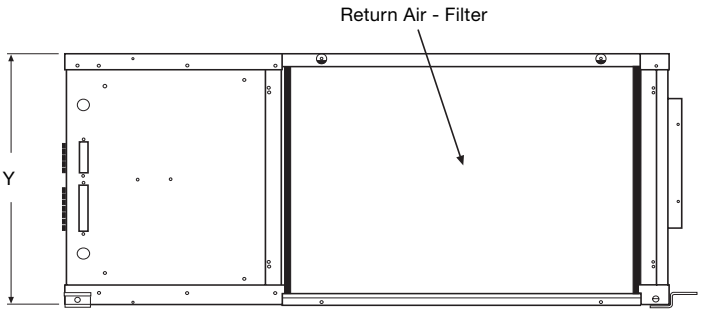
Overall Unit Dimensions = 21"W x 46"L x 20"H

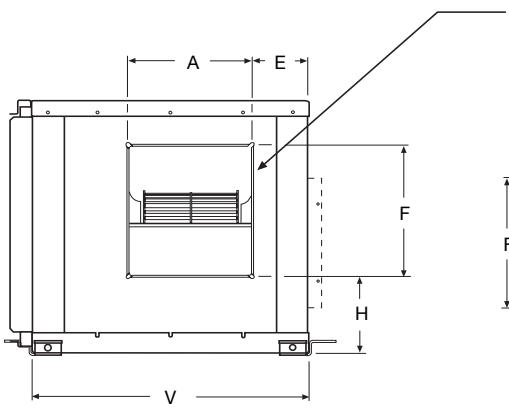
Unit Size	Unit Size 030 - 036 Dimensions (Inches)																			
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	V	W	Y	Z
030	9.29	3.45	1.45	16.43	4.32	10.23	6.15	4.06	3.60	23	15.93	4.10	1.25	46	3.74	1.45	21	46	20	18.5
036	9.29	3.45	1.45	16.43	4.32	10.23	6.15	4.06	3.60	23	15.93	4.10	1.25	46	3.74	1.45	21	46	20	18.5

Dimensional Data – Sizes 030, 036

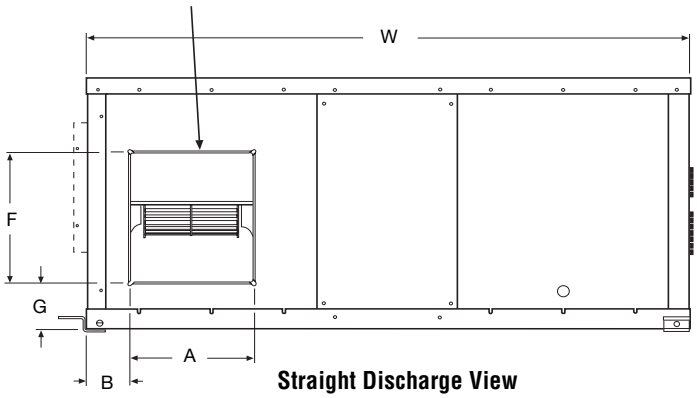
Right Hand Return – End and Straight Discharge



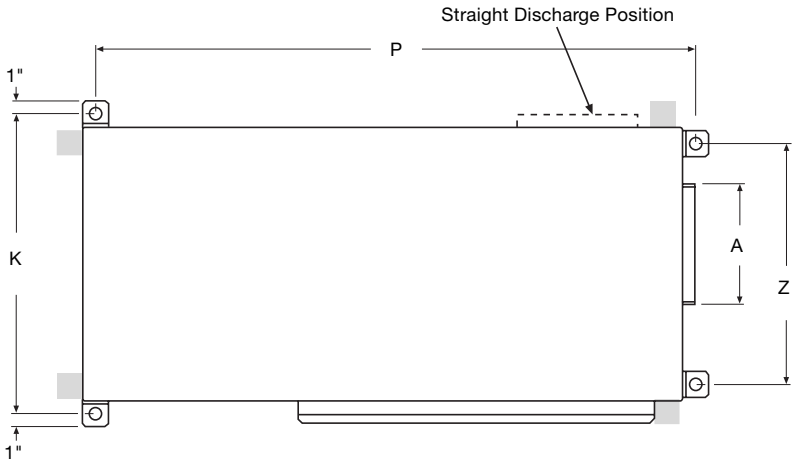




End Discharge View



Straight Discharge View



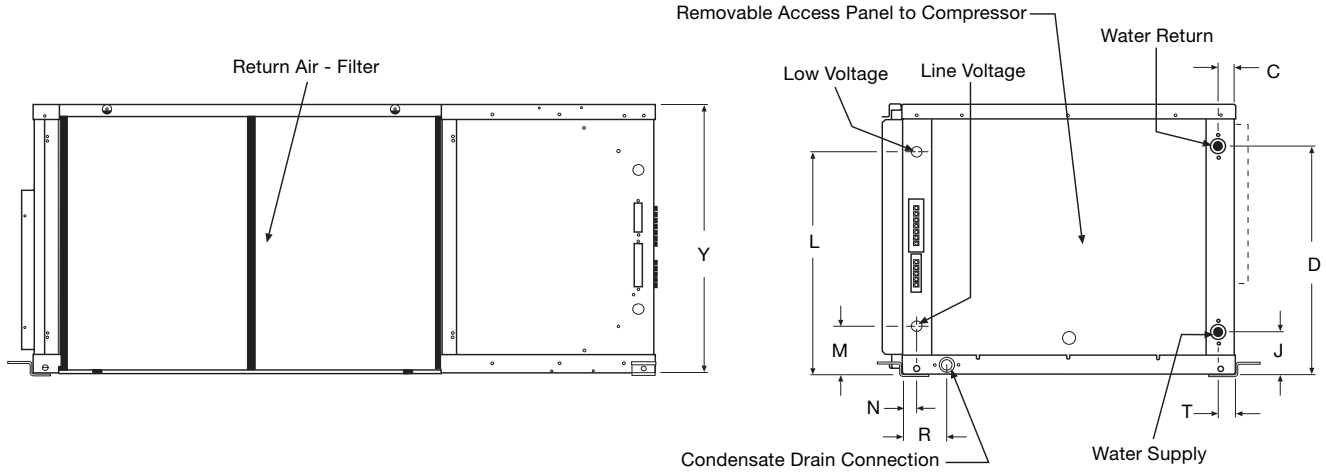
= Optional Hanger Bracket Positions

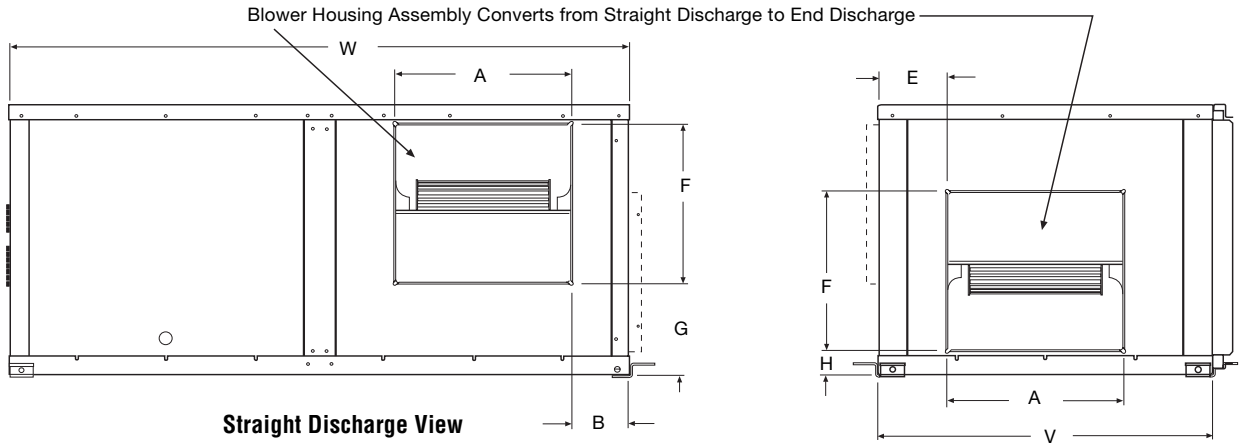
Overall Unit Dimensions = 21"W x 46"L x 20"H

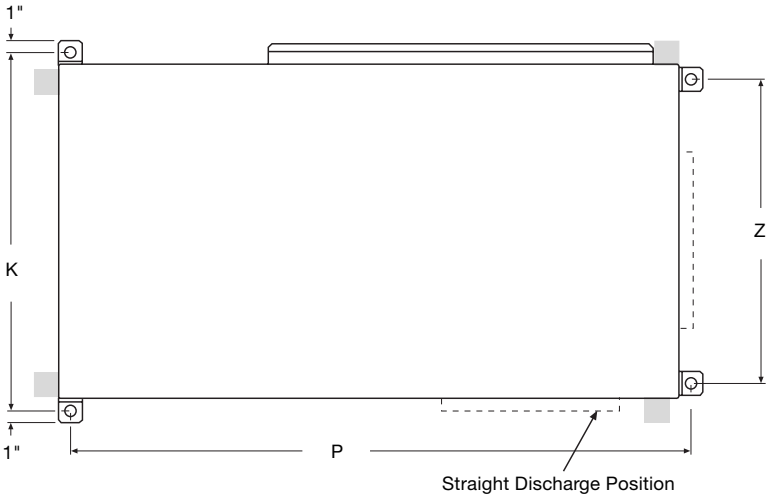
Unit Size	Unit Size 030 - 036 Dimensions (Inches)																			
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	V	W	Y	Z
030	9.29	3.45	1.45	16.43	4.32	10.23	4.06	6.15	3.60	23	15.93	4.10	1.25	46	3.74	1.45	21	46	20	18.5
036	9.29	3.45	1.45	16.43	4.32	10.23	4.06	6.15	3.60	23	15.93	4.10	1.25	46	3.74	1.45	21	46	20	18.5

Dimensional Data – Sizes 042, 048, 060

Left Hand Return – End and Straight Discharge





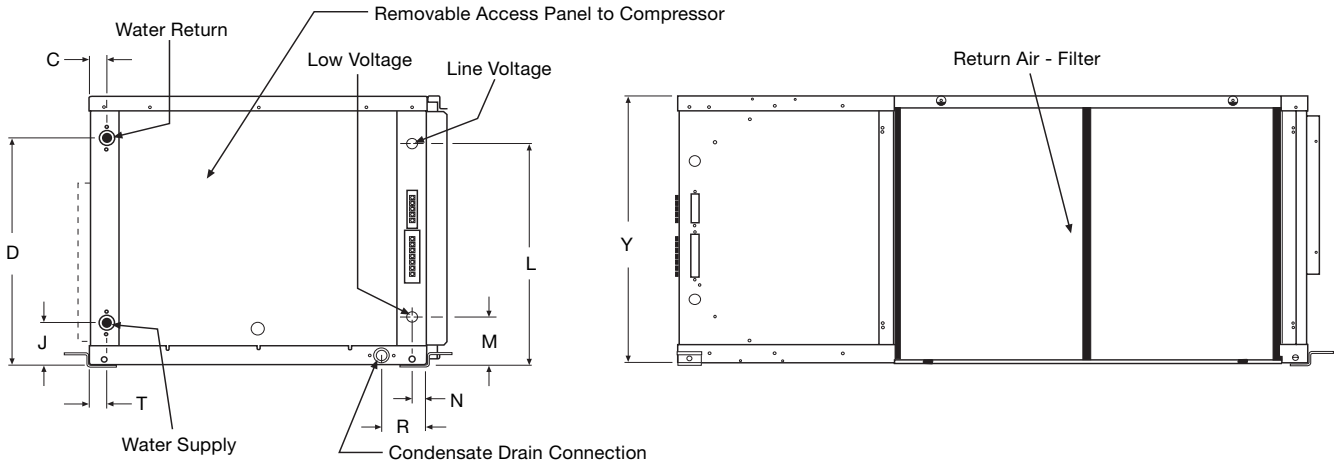


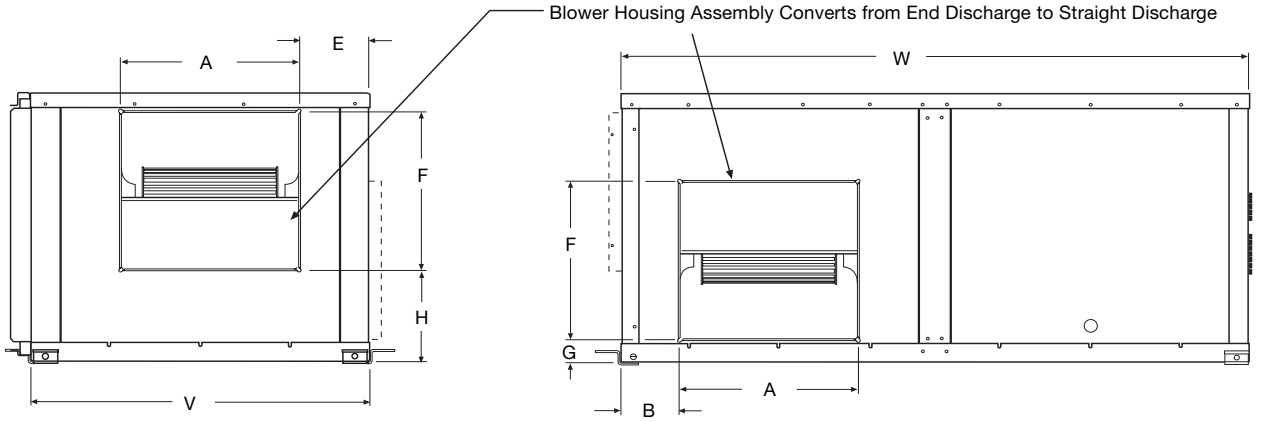
Overall Unit Dimensions = 28"W x 52"L x 23"H

Unit Size	Unit Size 042 - 060 Dimensions (Inches)																			
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	V	W	Y	Z
042, 048	14.68	4.96	1.45	19.43	5.84	13.43	8.06	1.95	3.60	30	17.43	5.60	1.25	52	3.74	1.45	28	52	23	25.5
060	14.68	4.96	1.45	19.43	5.84	13.43	8.06	1.95	3.60	30	17.43	5.60	1.25	52	3.74	1.45	28	52	23	25.5

Dimensional Data – Sizes 042, 048, 060

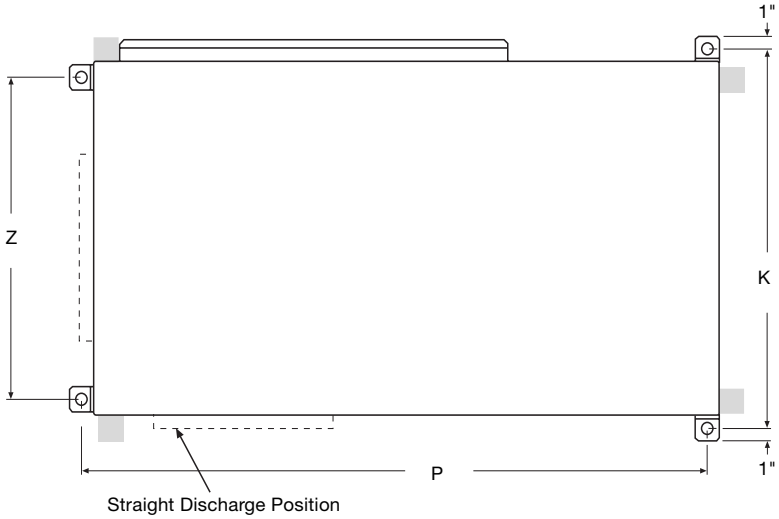
Right Hand Return – End and Straight Discharge





End Discharge View

Straight Discharge View



= Optional Hanger Bracket Positions

Overall Unit Dimensions = 28"W x 52"L x 23"H

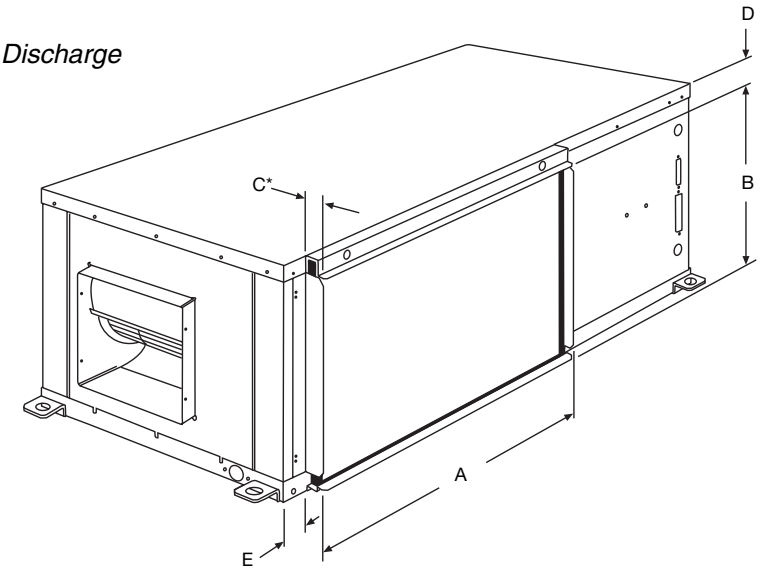
Unit Size	Unit Size 042 - 060 Dimensions (Inches)																			
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	V	W	Y	Z
042, 048	14.68	4.96	1.45	19.43	5.84	13.43	1.95	8.06	3.60	30	17.43	5.60	1.25	52	3.74	1.45	28	52	23	25.5
060	14.68	4.96	1.45	19.43	5.84	13.43	1.95	8.06	3.60	30	17.43	5.60	1.25	52	3.74	1.45	28	52	23	25.5

Dimensional Data

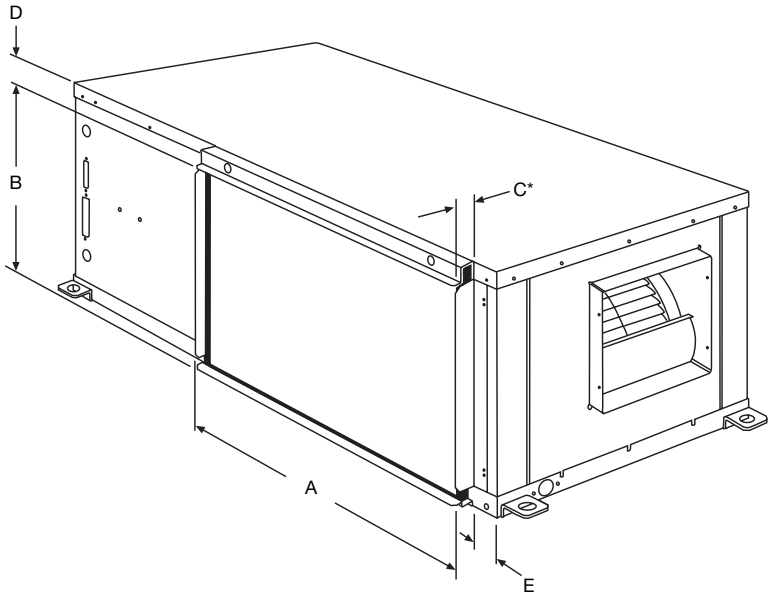
Filter Rack/Return Air Duct Collar

Unit Sizes 007 thru 060

Left Hand Return, End Discharge



Right Hand Return, End Discharge (Mirror Image)



English units

Unit size	Dimensions (inches)					
	A	B	C*		D	E
			STD	OPT		
007, 009, 012	20.15	8.87	1.87	–	1.00	1.24
019, 024	24.07	16.67	1.87	–	1.06	1.46
030, 036	27.32	18	1.66	–	1.06	2.16
042, 048	32.07	21.55	1.66	–	1.06	2.16
060	44.20	20.98	1.66	–	1.06	2.16

SI units

Unit size	Dimensions (millimeters)					
	A	B	C*		D	E
			STD	OPT		
007, 009, 012	512	225	47	–	27	31
019, 024	611	423	47	–	27	37
030, 036	694	457	42	–	27	55
042, 048	815	418	42	–	27	55
060	1123	533	42	–	27	55

*Standard filter is 1" (25 mm) and optional filter is 2" (51mm).

Accessories – Field Installed

Wall mounted thermostats are available for Mark IV/AC units in automatic or manual changeover styles. All include a fan switch for constant "on" operation or "automatic" for cycle operation with the compressor. All thermostats are 24-volt type and have dual Fahrenheit and Celsius temperature setpoint scales. Thermostat accessories include universal guard and locking cover. Individual thermostats include:

Standard Manual Changeover

Single setpoint lever for one-stage heating and cooling. System "heat-off-cool" switch and fan "on-off" switch.

Standard Manual & Automatic Changeover

Dual setpoint levers for one-stage or two-stage heating or cooling operation. System "heat-off-auto-cool" switch and fan "on-auto" switch. Includes LED for "fault."

Deluxe Automatic Changeover

Dual setpoint levers for one-stage or two-stage heating or cooling, with night setback operation. Night setback temperature setpoint is 12°F (-6.6°C) below daytime heat setting. System "off-auto" switch and fan "on-auto" switch. Override switch (spring loaded fan switch) puts unit back into occupied daytime heat and cool setpoints. Includes LED for "fault."

Programmable Micro-electronic Manual & Automatic Changeover

This thermostat can be wired for either one-stage or two-stage unit operation, and is complete and ready for installation. Liquid Crystal display (LCD) is backlit and easy to read. Selectable F or C temperature display, automatic or manual changeover as well. Setpoints= are permanently held in memory (no batteries used) and retained during power outages. Display updates every minute. Features include 7-day programmability, four settings per day, keyboard lock code, time delay and adjustable deadband. System "heat-auto-cool-off" and fan "on-auto" switches.

Non-programmable Electronic Manual & Automatic Changeover

This thermostat can be wired for either one-stage or two-stage unit operation, and is complete and ready for installation. Liquid Crystal display (LCD) is backlit and easy to read. Selectable F or C temperature display, automatic or manual changeover as well. Setpoints are permanently held in memory (no batteries used) and retained during power outages. Display updates every minute.

Accessories – Field Installed

Supply and return water hoses

Available as fire rated construction in 2 or 3 foot (610 mm or 914 mm) lengths. Fire rated hoses have a synthetic polymer core with an outer rated covering of galvanized steel. Fittings are steel. Assembly is “fire rated” and tested according to UL 94 with a VO rating and ASTM 84. Each hose has MPT connections. Fire rated hoses have a swivel connection at one end. Hoses are available in 3/4" (19 mm) to match the FPT fittings on the unit.

Supply and Return Water Hoses

Condensate hose

Available as a long clear plastic hose with the necessary clamps and a MPT hose fitting for connection to the FPT field piping.

Condensate Hose Kit

Combination balancing and shutoff (ball) valves

Constructed of brass and rated at 400 psig (2758 kPa) maximum working pressure. Valves have a built-in adjustable memory stop to eliminate rebalancing. Valves have FPT connections on both ends for connection to the water hose and to the field piping.

Shut off Ball Valve

Motorized Valve

Used for variable pumping applications, the valve is wired in the compressor circuit and piped in the return water line from the unit. It opens when the compressor is on and closes when the compressor is off. The valve is rated for 300 psig (2070 kPa).

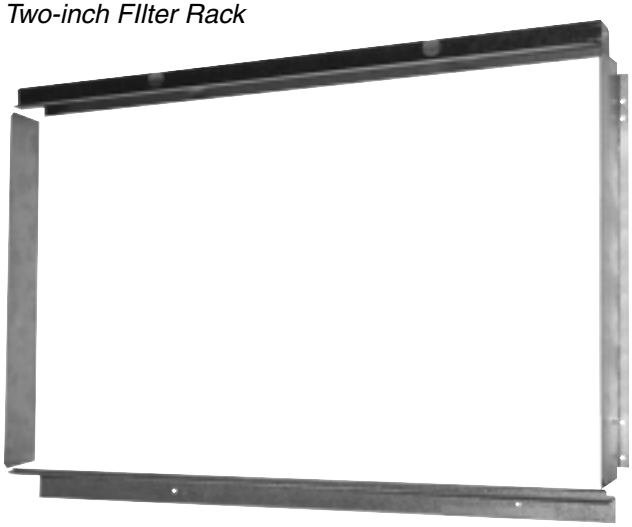
2-Way Molorized Valve

Accessories – Field Installed

Two-inch filter rack

Available as a field installed kit and provides a 1" (25 mm) deep collar for connection of return air ductwork. The kit also allows for a 2" (51 mm) thick filter. The kit consists of four sheet metal brackets and fasteners. The brackets replace the ones shipped with the unit and can be fastened to allow for side or bottom filter removal.

Two-inch FIlter Rack



Boilerless System Kit

Eliminates the need for a boiler in the system water loop. The boilerless system control board senses the entering water temperature to the unit and locks out compressor heating operation if the water temperature falls below the adjustable setpoint. Contacts are provided to energize a field supplied electric heater downstream of the unit on a call for heating.

Field Installed Controls

- A motorized valve relay and control valve assembly includes a relay, valve and wire harness. The valve opens when the compressor is on and closes when the compressor is off.
- A multiple unit control panel allows a single thermostat to control up to three units in parallel.
- An auxiliary relay controls optional devices when the fan is operating. The relay has SPDT contacts.

Engineering Guide Specifications

Units shall be supplied completely factory assembled, piped, internally wired, fully charged with [HCFC-22 (sizes 007-012)] [HFC 410A (sizes 019-060)] and capable of operation with an entering water temperature range from [55°F to 110°F on models CCH] [25° to 110°F (-6.7°C to 49°C) on models CCW]. All equipment must be rated and certified in accordance with ARI / ISO 13256-1, UL, UL_C and have correct ARI / ISO and UL_C labels mounted on side of the cabinets. Each unit shall be fully run tested at the factory. The installing Contractor shall be responsible for furnishing and installing McQuay Water Source Heat Pumps as indicated on the plans.

Casing and Cabinet

The cabinet shall be fabricated from heavy gauge G-60 galvanized sheet metal with interior surfaces lined with 1/2 inch thick, 1-1/2 lb. [coated glass fiber insulation] [closed-cell non-fibrous insulation]. The insulation shall have a flame spread of less than 25 and a smoke developed classification of less than 50 per ASTM E-84 and UL 723. All fiberglass shall be coated and have exposed edges tucked under flanges to prevent the introduction of glass fibers into the air stream. All insulation must meet NFPA 90A.

Horizontal Units shall be configured in one of the following airflow arrangements:

- Left Return/End Discharge
- Left Return/Straight Discharge
- Right Return/End Discharge
- Right Return/Straight Discharge

Horizontal units must be capable of being field converted from side to end discharge (or the reverse) without unit modifications or additional parts. All units shall have a factory-installed 1" duct flange on the discharge of the blower and must have a minimum of two access panels to provide access to the compressor compartment and /one access to the blower compartment. Unit shall have an insulated panel separating the blower compartment from the compressor compartment. Units are to ship with heavy metal brackets, rubber isolators, fasteners and washers to suspend and isolate the unit from the building. The installing contractor is to fasten the hanging brackets in the field.

Cabinets shall have separate openings and knockouts for entrance of line voltage and low voltage control wiring. Supply and return water connections shall be brass FPT fittings and shall be securely mounted flush to the cabinet corner post allowing for connection to a flexible hose without the use of a back-up wrench. Unit shall have a plastic “dual-sloped” drain pan with a drain connection being flush mounted to the unit casing. It is the installing contractor’s responsibility to provide sufficient clearance so that units can be easily removed for servicing.

Filters

- Unit shall have a 1" (25 mm thick [throwaway] [30%]filter and a factory-installed combination filter rack/return air duct collar. The filters shall be removable from the side or from the bottom.
- Unit shall have a 2" (51mm) thick [throwaway] [30%] filter and field-installed combination filter rack/return air duct collar. The bottom bracket shall be capable of being relocated for bottom filter removal.

Refrigerant Circuit

Units shall have a sealed refrigerant circuit which includes a [rotary (sizes 007 to 012)] [reciprocating (sizes 019 to 024] [scroll (sizes 030 to 060)] compressor, a thermostatic expansion valve, an aluminum fin and rifled copper tube refrigerant-to-air heat exchanger, a reversing valve and a water-to-refrigerant coaxial heat exchanger. The coaxial coils shall be made of [copper] [cupronickel] and shall be deeply fluted to enhance heat transfer and minimize fouling and scaling. The coil shall have a working pressure of 400 psig on the waterside of the unit, 500 psig on the refrigerant side for R-410A, and 400 psig on R-22 units.

Refrigerant metering shall be regulated by a thermostatic expansion valve (TXV) only. Reversing valve shall be four-way solenoid activated refrigerant valve, which fails in the cooling “dominant” operation. Safety controls include a high-pressure switch, a low-pressure switch, and a low refrigerant temperature sensor. Refrigerant gauge access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service. Activation of any safety switch shall prevent the compressor from operating. Units shall be capable of being reset only by interrupting the power supply to the unit. Unit shall not be able to be reset from the wall thermostat.

Drain Pan

The condensate pan shall be constructed of high impact plastic to prevent corrosion and sweating. The bottom of the drain pan shall be sloped on two planes to provide complete drainage of water from the pan. The unit shall be supplied with a standard solid-state electronic condensate overflow protection.

Fan and Motor Assembly – Units 5 tons and smaller shall have a direct drive centrifugal fan. The fan housing shall have a removable orifice ring to facilitate fan motor and fan wheel removal. The fan housing shall protrude through the cabinet to facilitate field duct connection. The fan motor shall be a PSC type isolated from the fan housing and thermal overload protection. Units above one ton shall have a terminal strip mounted on the fan motor to facilitate motor speed change.

The fan and motor assembly must be capable of overcoming the external static pressures as shown on the schedule.

Electrical

A control box shall be located within the unit and shall contain controls for compressor, reversing valve and fan motor operation and shall have a 50 VA transformer, circuit breaker in the low voltage circuit, and a terminal block for low voltage field wiring connections. Unit shall be nameplated to accept time delay fuses or HACR circuit breaker for branch overcurrent protection of the power source. Unit control system shall provide heating or cooling as required by the set points of the wall thermostat. The unit control scheme shall provide for fan operation simultaneous with compressor operation (fan interlock) regardless of the thermostat type. The unit shall be capable of providing an output signal to an LED on the thermostat or to a central monitoring panel to indicate a "fault" condition from the activation of any one of the safety switches.

Solid-State Control System

Mark IV/AC Control System – Unit shall have a microprocessor- based control system. The unit control logic shall provide heating and cooling operation as required by the setpoints on the wall thermostat. The control system shall provide the following:

1. The use of standard mercury bulb type or programmable wall thermostats.
2. Fan operation simultaneous with the compressor (fan interlock) regardless of thermostat logic.
3. Time delay compressor operation.
4. Delayed de-energization of the reversing valve for quiet reversing valve operation.
5. Compressor short cycle protection of a minimum of three minutes before restart is possible.
6. Random unit startup after coming off on unoccupied mode.
7. Single grounded wire connection for activation of the unoccupied, load shed or unit shutdown modes.
8. Night setback temperature setpoint input signal from the wall thermostat.
9. Override signal from wall thermostat to override unoccupied mode for 2 hours.
10. Brownout protection to suspend unit operation if the supply voltage drops below 80% of normal.
11. Condensate overflow protection to suspend cooling operation in an event of a full drain pan.
12. Suspended compressor operation upon activation of the refrigerant pressure switch(es).
13. Cooling operation activated for 60 seconds upon activation of the low suction temperature (freezestat) switch - defrost cycle.
14. Method of defeating compressor, reversing valve and fan time delays for fast service diagnostics.

MicroTech™ 2000 Control System – Unit shall have a microprocessor-based control system. The unit control logic shall communicate over a LonWorks communications network. The unit controller is factory programmed and tested with all the logic required to monitor and control heating and cooling operation. The controller sets the unit mode of operation, monitors water and air temperatures, and can communicate fault conditions to a LonWorks communications network. The MicroTech 2000 unit controllers include unit-mounted return air, discharge air and leaving water temperature sensors. Options include a tenant setpoint adjustment knob and tenant override button, and the capability of substituting the return air sensor with a wall-mounted room sensor.

Each unit controller performs the following unit operations:

- Enable heating and cooling to maintain setpoint based on a room sensor.
- Enable fan and compressor operation.
- Monitor all safety controls.
- Monitor discharge air temperature.
- Monitor leaving water temperature.
- Relay status of all vital unit functions.
- Support optional control outputs.

An amber, on-board status LED aids in diagnostics by indicating the water source heat pump operating mode and alarm conditions. If there are no current alarm conditions, the LED will indicate the unit operating mode. If there are one or more alarm conditions present, the LED will flash to indicate an alarm condition. MicroTech 2000 heat pumps are designed to be linked with a centralized building automation system through a LonWorks communications network for centralized scheduling and management of multiple heat pumps.

Wall-mounted room sensors are available to control the heating and cooling operation of each MicroTech 2000 Water Source Heat Pump Unit Controller. Available room sensors include: room sensor with LED status and tenant override button, room sensor with LED status, timed-override button, and bi-metal thermostat, room sensor with LED status, timed-override button, and setpoint adjustment, and room sensor with LED status, timed-override button, setpoint adjustment and bi-metal thermostat.

BACnet® Control System - Unit shall have a microprocessor- based control system. The unit control logic shall communicate over a BACnet MS/TP communications network to an Alerton BACtalk building automation system (BAS).LonWorks communications network. The unit controller is factory programmed and tested with all the logic required to monitor and control heating and cooling operation. The controller operates the compressor, fan, and reversing valve as required to maintain the space temperature within the current setpoints. Data regarding equipment status, water and air temperatures, and fault conditions can be monitored by an Alerton BACtalk BAS. Setpoints and other system preferences may be changed remotely using an Alerton BACtalk workstation or Alerton service tool software.

Each BACnet-compliant unit includes discharge air and leaving water temperature sensors, as well as all safety sensors, signals, and switches. Wall-mounted room sensors are available from Alerton to control heating and cooling operation.

Each BACnet-compliant controller has the following operating features:

- Start-up
- Fan
- Cooling mode
- Heating
- Short Cycle Protection and Random Start
- Occupied
- Unoccupied
- After-hours Override
- Reversing valve delay
- Load Shed
- Brownout Protection
- Condensate Overflow Protection
- Safety
- Attained Temperature and Water Temperature Alarms
- Unit Self-test

Available sensors include tamper-resistant stainless steel wall sensors with optional push-button for status override; wall-mounted sensors with tenant setpoint adjustment lever and timed-override button; wall-mounted sensors with LED status, timed-override button, tenant setpoint adjustment buttons, password-protected field service access to operational data, and optional humidity sensor; and wall-mounted sensors with LCD and programmable operation.

Field Installed Accessories:

Thermostat Options:

- **Manual changeover wall thermostat -** for one-stage or two-stage heating and cooling operation. Sub-base shall have system "heat-off-cool" and fan "on-auto" switches.
- **Deluxe automatic changeover wall thermostat -** for one stage heating, one stage cooling, one stage night setback heating operation 12°F (-6.6°C) below daytime heat setpoint and built-in override switch to activate the two-hour override function of the Mark IV board. Sub-base shall have system "off-auto" and fan "on-auto-(override)" switches with LED for "fault."
- **Automatic and manual changeover wall thermostat –** for one stage heating and one stage cooling operation. Sub-base shall have system "off-auto" and fan "on-auto" switches with LED for "fault."
- **Programmable wall thermostat –** for one stage heating, one stage cooling, night setup, night setback and day/night time clock operation. The thermostat shall have system "on-off," temperature "heat-auto-cool" and fan "on-auto" switches.
- **Non Programmable Electronic –** Premier white, mounts horizontal, system switch; Off-Heat-Auto-Cool and fan switch; On-Auto.

Flexible Hoses:

Two fire rated flexible hoses with ASTM ratings of Flame Spread 25, Fuel Contribution 25 and Smoke Density 50 for connection to unit and field piping. Hose shall be covered with stainless steel.

Valves – Combination balancing and shutoff valve with adjustable memory stop.

Automatic Flow Devices:

The automatic flow device kit shall be a Hays Mesurflo® automatic flow control valve, two ball valves, two flexible hoses, a high flow Y-strainer, and may include a strainer blow-down and various other accessories. The automatic flow control valve shall be factory set to a rated flow, and shall automatically control the flow to within 10% of the rated value over a 40 to 1 differential pressure, operating range (2 to 80 PSID). Operational temperature shall be rated from fluid freezing, to 225°F -. The valve body shall be constructed from hot forged brass UNS C37700 per ASTM B-283 latest revision.

Field Installed Controls

- **Motorized valve relay and control valve.** The assembly shall include a relay, valve and wire harness. The valve shall open when the compressor is on and close when the compressor is off.
- **Multiple unit control panel –** allows a single thermostat to control up to three units in parallel.
- **Auxiliary relay –** controls optional devices when the fan is operating. The relay shall have SPDT contacts.

Notes

Notes

McQuay Water Source Heat Pumps
Quality Products, Flexible Configurations

This document contains the most current product information as of this printing. For the most up-to-date product information, please go to **www.mcquay.com.**

McQuay International

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