

Enfinity™ Console Water Source Heat Pumps 1/2 to 1½ Ton

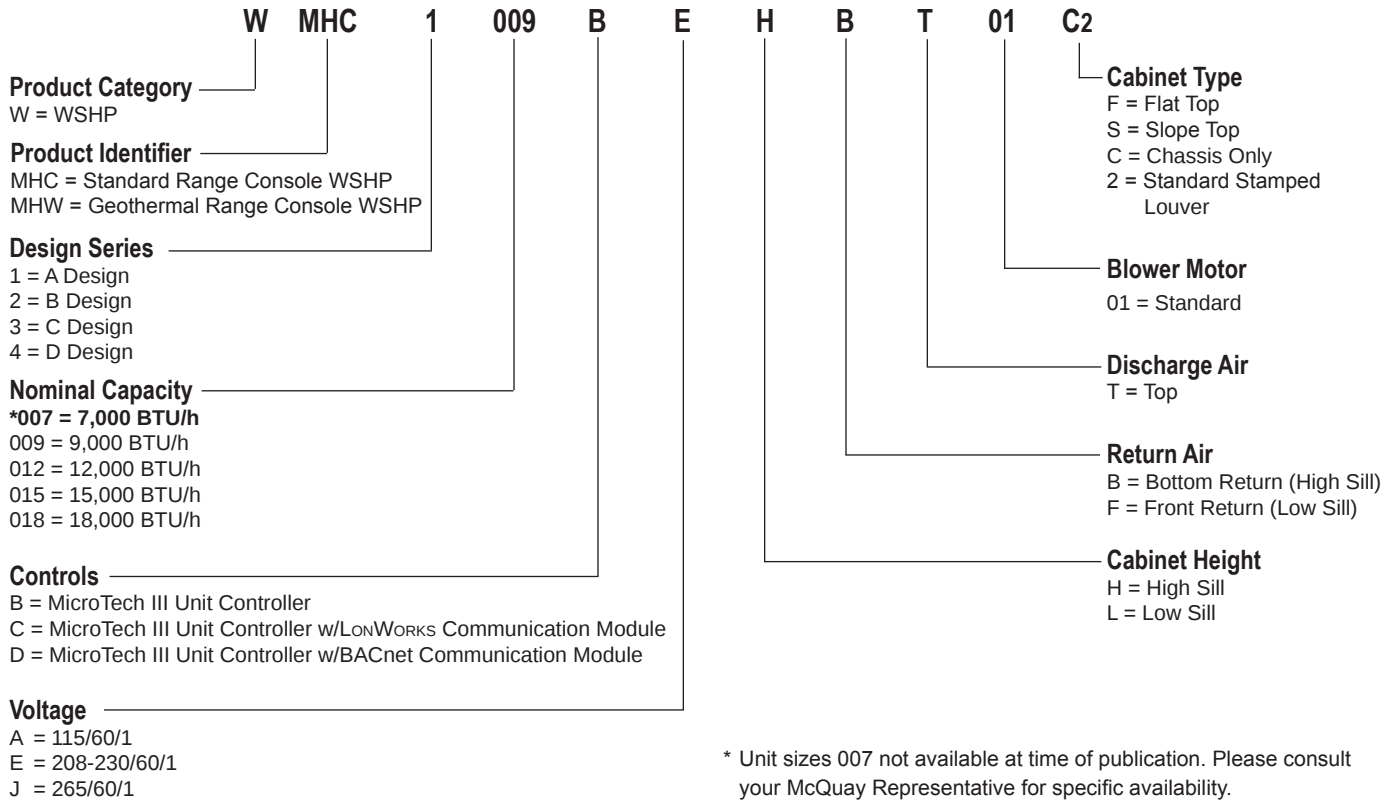
R-410A Models MHC Standard Range &
MHW Geothermal Range

Size 007–018



Model Nomenclature

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



Console Water Source Heat Pumps – Sizes *007-018 (1/2 to 1½ Tons)



- Model MHC (Standard Range: 55°F to 110°F)
- Model MHW (Geothermal Range: 30°F to 110°F)



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The information in this manual supersedes and replaces previous catalogues 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.

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Introduction

Enfinity™ Water Source Heat Pumps

More than 30 years ago, McQuay designed the first complete line of water source heat pumps for high efficiency, individually-zoned comfort control in offices, schools, assisted living facilities, manufacturing facilities and other commercial buildings. Our reputation for outstanding reliability and quiet operation has been reinforced in thousands of successful installations.

Enfinity water source heat pumps incorporate the best of our past and the best of what's new. Using feedback from building owners, consulting engineers, contractors and service engineers, we designed Enfinity products to give you maximum flexibility to design, install, operate and maintain the ideal water source heat pump system for your building project. And we incorporated non-ozone depleting R-410A refrigerant, which—along with high Energy Efficiency Ratios (EER's)—helps preserve our environment and precious energy resources.

With Enfinity Water Source Heat Pumps, you benefit from:

High efficiency that minimizes environmental impact and lowers operating costs

- Units exceed ASHRAE Standard 90.1 minimum requirements
- Standard range or geothermal application flexibility

Engineered For Flexibility and Performance

- Two cabinet sizes, each with McQuay's subtle aesthetic and small footprint design, make it easy to meet the space requirements of your new construction or replacement application.
- MicroTech® unit controller with Open Choices™ feature allows easy, low cost integration with the Building Automation System (BAS) of your choice.

- Factory-installed, unit-mounted thermostats save time and money versus installing wall-mounted thermostats.
- Wide range of factory-installed options, including electric heat, motorized valves and thermostat options help you meet more specific application requirements with minimum design or installation time and expense.

Easy, Low-Cost Maintenance

- Easy access to the unit compressor (end panel), fan section and coil (front panel) and unit controls (left or right end panel).
- A easily removable blower motor allows the tangential fan wheel to remain in the housing during motor replacement.
- A hinged control box allows easy access to the piping compartment.

Quiet Operation

- New Gentleflo™ fan wheel allows the fan motor to operate at lower speed for quieter operation.
- High efficiency rotary compressor mounted on a mass plate system reduces noise due to vibration.

Superior Indoor Air Quality (IAQ)

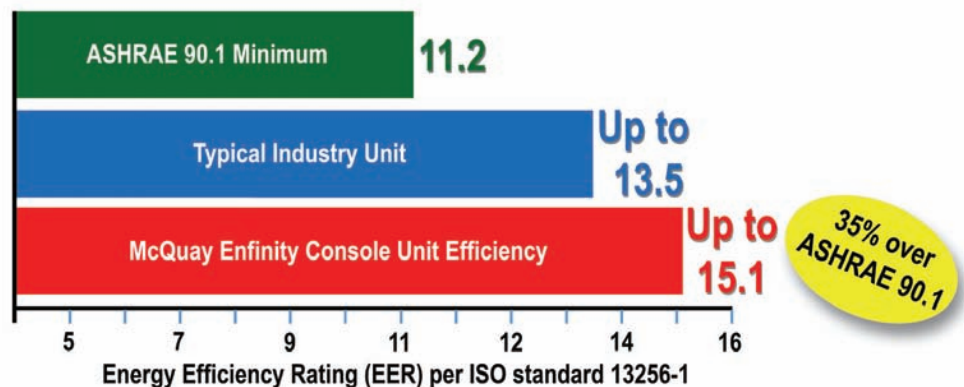
- Removable, non-corrosive and double-sloped polymer drain pan promotes positive condensate drainage.
- Optional closed-cell insulation prevents insulation fibers from entering the air stream.

R-410A Refrigerant With Zero Ozone Depletion Potential or Phase-Out Date

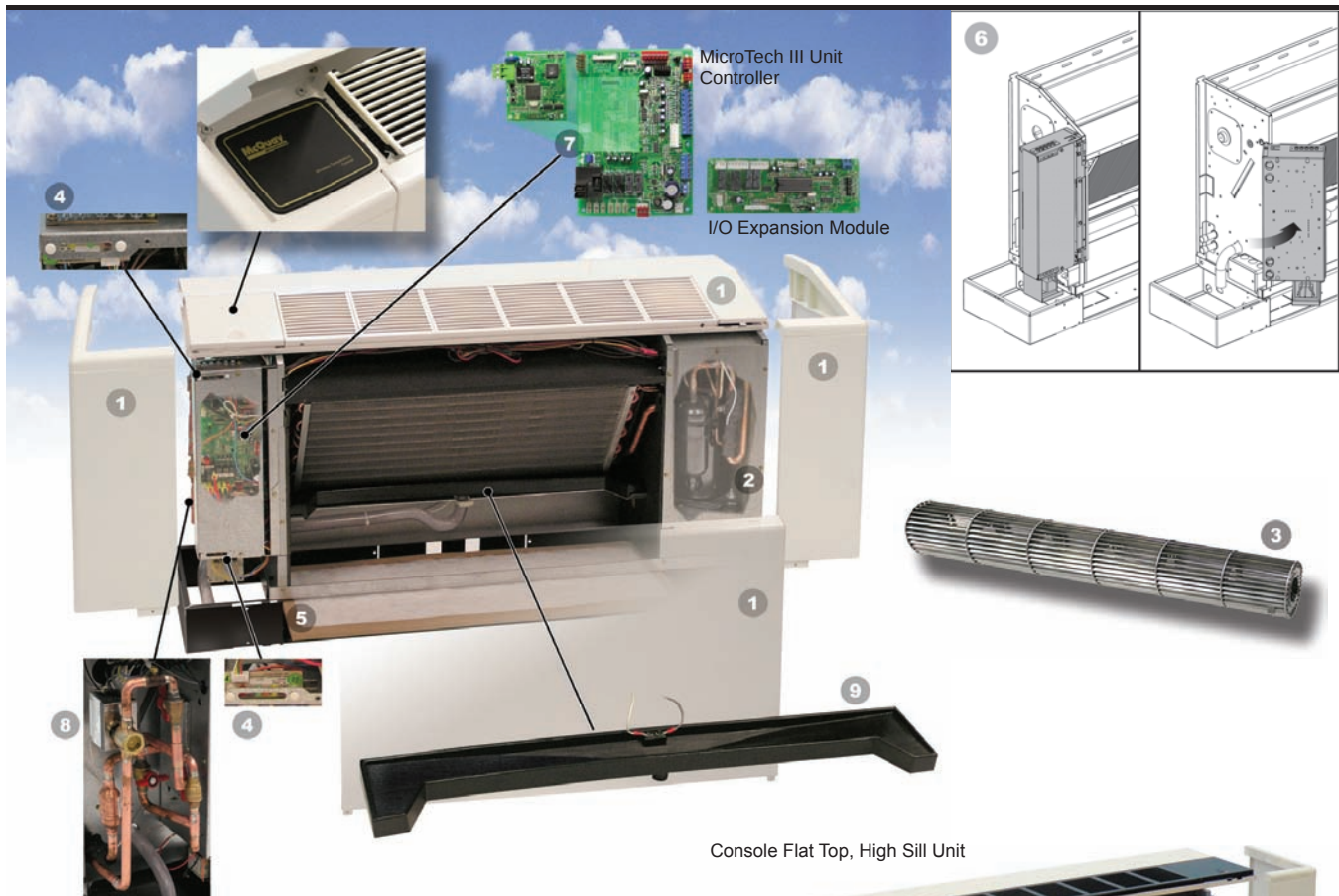
- R-410A is classified as A1/A1 – lower toxicity, no flame propagation – per ASHRAE Standard 31.

Improved Efficiency

35% greater efficiency than the minimum required by ASHRAE 90.1, for units less than 17,000 Btuh per ISO Standard 13256-1 for Boiler/Tower applications.



Console Unit Features & Options



Console Flat Top, High Sill Unit

1. **Cabinets** – Selectable flat top or slope top cabinet configuration with multiple grille options. Individual panels-top, front and end panels are designed for easy removal and provides easy access to unit components for service and maintenance.
2. **Compressor** - High efficiency rotary type, using R-410A refrigerant with zero ozone depletion potential or phase-out date.
3. **Gentleflo™ Fan** – User selectable, multi-speed tangential fan system provides high efficiency and very quiet operation suitable for noise sensitive applications.
4. **LED Annunciator** – LED status lights display fault conditions to provide easy troubleshooting and diagnosis. Accessed by removing the left or right end panel to the control enclosure.
5. **Filter**– Units come standard with a 1/2" (12.7mm) thick disposable filter that is easy to access and replace without removing panels.
6. **Hinged Control Box**– Provides added accessibility to plumbing end compartment for easier access for service.
7. **MicroTech® III Unit Controller** – Designed for flexibility, the main control board is used in standalone applications. An optional I/O expansion module can be used to control electric heat and multiple fan speeds. A separate LONWORKS® or BACnet® communication module can be easily snapped onto the board to accommodate the building automation system of your choice.

8. **2-Way Motorized Valve Packages (Option)** – Factory installed or field-installed for variable pumping applications. Other valve options available upon request.
9. **Double-Sloped Drain Pan** – Made of durable, non-corrosive polymer, promotes positive condensate drainage for superior Indoor Air Quality (IAQ). Drain Pan is easy to remove for cleaning.

Air Dampers (Field-installed Accessory) – Motorized or manually operated outside air dampers provide ventilation air.

Unit Flexibility– Selectable for standard (boiler/tower) or extended range (geothermal) applications to achieve the highest efficiency for your application requirements.

Console Design Features

Configuration

Console water source heat pumps are available in five cooling capacity sizes, from 1/2 through 1½ tons, (1757 to 5274 watts). Each is available in four different configurations.

Flat top units meet the traditional requirements for a rugged unit. Slope top units offer a more modern look. The high silhouette unit is 25" (635mm) high and the low silhouette unit is only 22½" (572mm) high. The overall unit dimensions are very compact; unit sizes 007 through 012 are 46" (1168mm) long and sizes 015 through 018 are 54" (1372mm) long. All units are a constant 10¾" (273mm) deep for minimum floor space and a consistent "look" for all unit sizes.

All units incorporate a slide-out chassis concept which allows it to be installed easily or removed and replaced quickly when service is required to minimize downtime for the space the unit serves. The cabinet is made up of individual panels, each of which can be easily removed to expose the chassis for field hook-up of water and electrical connections. The chassis easily slides off the subbase for service or changeout.

Cabinet

All cabinets are painted with optional Antique Ivory or Cupola White baked enamel finish for an aesthetically pleasing appearance that matches room decor. The discharge grilles and subbase can be Oxford Brown or match the cabinetry on flat top or slope top units.

The shallow 22° slope top cabinet is constructed of 18-gauge steel. The top and side corners and grille are constructed of tough, impact-resistant ABS polycarbonate. The grille extends to the front and sides for a smooth look as well as providing a curtain stop in back. The discharge grilles can be rotated to direct the air in an 11° angle from the vertical and can be reversed for a 33° discharge angle. The control door has a finger slot and simply lifts up for access to the thermostat. Overall, the slope top unit allows minimal airflow interference from curtains and objects resting on the cabinet, while at the same time providing a rugged, aesthetically pleasing look.

The flat top cabinet is constructed of 18-gauge steel with grille options that meet basic needs with its rugged construction and its 11° discharge angle.

Chassis

The chassis houses the fan section, refrigerant circuit and controls. The air enters through the bottom of the chassis, through the subbase or through the front panel in low sill units.

The refrigeration system includes a rotary compressor, reversing valve, coaxial heat exchanger, capillary tubes, air coil, high and low side access valves, and safety controls.

Access to the compressor is through a removable end panel. The compressor is isolated from the unit with external vibration mounts, mass plate/viscoelastic dampening material and the compartment is totally insulated to make the quietest console unit on the market. Safety controls include low temperature (freezestat) and refrigerant high pressure switches. The control box is hinged for easy access to all of the controls. The MicroTech III unit controller offers both standalone or communicating (LONWORKS or BACnet) control options.

Each uses a printed circuit board for clean wiring and a low voltage control circuit with a 50 VA transformer. See "Controls" section for more detailed information. Main power is made to a chassis-mounted 2" x 4" (51mm x 102mm) junction box.

The fan section employs McQuay's Gentleflo tangential system fan and efficient, two-speed PSC motor for selectable airflow and/or noise level. Access to the fan wheel is made through the top panel. The motor is secured to the chassis with three screws for easy service.

Water piping connections are 1/2" FPT fittings which terminate in the outward position in the piping compartment for easy access. Unique left- and right-hand piping (includes condensate and electrical) locations are available. The 3/4" (19mm) I.D. flexible clear vinyl condensate drain tube is internally trapped and extends 14" (356mm) into the piping compartment for easy connection. Piping (electrical and condensate also) can enter through the back wall or through the floor within the subbase. The chassis allows for a piping compartment between the chassis and the cabinet.

Optional Factory Installed Features

Boilerless system electric heat eliminates the need for a boiler in the heat pump water loop. An electric heater is added to the discharge side of the fan scroll. If the entering water temperature falls to 58°F (15°C) the thermostat locks out compressor operation. On a call for heat, the electric heater is energized. When the entering water temperature raises, the unit will resume compressor operation on a call for heat. An emergency heat switch allows electric heating if the compressor should ever fail. Each unit has various heater sizes to select from. Not available on 115 volt units. Not CSA listed.

Control Options – Control Choices And Added Functionality

The control box is accessible through the left or right end corner panel. It houses the major operating electrical controls including the MicroTech® III unit controller, transformer, compressor relay and fan relay. Each component is easily accessed for service or replacement.

Four unique control choices are offered with the MicroTech III unit controller:

- Standalone operation using a MicroTech III unit controller
- MicroTech III unit controller with I/O Expansion module

- MicroTech III unit controller with a Lonworks® communication module
- MicroTech III unit controller with a BACnet® communication module

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.

Control	Description	Application	Protocol
MicroTech III  (Standalone) Unit Controller	The MicroTech III unit controller is a standalone microprocessor-based control board conveniently located in the unit control box for accessibility. The board is designed to provide standalone control of a Water Source Heat Pump using a wall thermostat or a wall mounted temperature sensor. Each unit controller is factory programmed, wired, and tested. For added functionality an optional I/O expansion module interconnects to the MicroTech III controller for complete control and operation of your McQuay water source heat pump.	Each unit controller is factory programmed, wired, and tested for complete control of single zone, standalone operation of your McQuay Water Source Heat Pump.	Unit-mounted or wall-mounted thermostat
I/O Expansion Module 	The I/O Expansion Module is an extension of the Microtech III unit controller and provides additional functionality. It is required on all units with an LED annunciator and provides operation of the boilerless electric heat feature.	Allows for: • Monitoring of entering water temperature for boilerless electric heat control. • Outputs for optional electric heat •	Unit-mounted or wall-mounted thermostat
LONWORKS  Communication Module	The MicroTech III unit controller can accept a plug-in LonWorks communication module to provide network communications and added functionality to easily integrate with an existing BAS. The communication module can be factory- or field-installed and is tested with all logic required to monitor and control the unit.	Designed to be linked with a centralized building automation system (BAS) through a LONWORKS communications network for centralized scheduling and management of multiple heat pumps.	LONMARK 3.4
BACnet  Communication Module	The MicroTech III unit controller can accept a plug-in BACnet communication module to provide network communications and added functionality to easily integrate with an existing BAS. The communication module can be factory- or field-installed and is tested with all logic required to monitor and control the unit.	Designed to be linked with a centralized building automation system (BAS) through a BACnet communications network for centralized scheduling and management of multiple heat pumps.	BACnet

Control Features – MicroTech® III Unit Controller

The MicroTech III Unit Controller is a microprocessor-based control board conveniently located in the unit control box for easy access through a removable access panel. The standalone unit controller is a hard wired interface and provides all the necessary field connections. The board can be wired for 24-volt AC output to the wall thermostat by using terminals R & C. An LED annunciator is located on the front corner of the unit chassis to quickly check the operating status of the unit.

MicroTech III 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 30 seconds later. When the load is satisfied, the compressor and fan shut off.
- **Heating Mode** – On a call for heating, the reversing valve is energized after 60 seconds and the compressor and fan start. When the load is satisfied, the compressor and fan shut off. The reversing valve is de-energized 60 seconds later.
- **Short Cycle Protection & Random Start** – Each time the compressor stops, a new random compressor start-delay time between 180 and 240 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 between terminals U and C (no power source required), puts the unit into the unoccupied mode for night setback operation.
- **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.
- **Motorized Valve/Pump Restart** – The IV/PR (H8) terminals on the The MicroTech III unit controller are used to energize (open) a motorized valve or start a water pump to get water circulating prior to starting the compressor on call for heating or cooling. The IV/PR (H8) terminal may be “daisy chained” between 200 units.
- **Brownout Protection** – The MicroTech III unit controller measures the input voltage and will suspend compressor and fan operation if the voltage falls below 80% of the unit nameplate rated value. 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 MicroTech III unit controller 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.
- **Remote Reset of Automatic Lockouts** – The Remote Reset feature provides the means to remotely reset automatic lockouts generated by high-pressure and/or low-temperature faults. When the MicroTech III unit controller is in automatic lockout due to one of these faults, and the cause of the fault condition has been alleviated, energizing the O-terminal for 10 seconds or more will force the control board to clear the lockout. A unit power cycle can also be used to clear an automatic lockout if the conditions causing the fault have been alleviated.
- **Intelligent Reset** – The Fault Retry feature helps to minimize nuisance trips of automatic lockouts caused by high-pressure and/or low-temperature faults. This feature clears faults the first two times they occur within a 24-hour period and triggers an automatic lockout on the 3rd fault. The retry count is reset to zero every 24 hours.
- **Equipment Protection Control** – The MicroTech III unit controller receives separate input signals from the refrigerant high-pressure switch and the low suction line temperature sensor. 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.

Note: Most unit fault conditions are the result of operating the equipment outside the unit specifications.

MicroTech III unit controller LED & fault outputs

Mode / Fault	Status LED's			Thermostat Alarm Light Output-Terminal “A”
	Yellow	Green	Red	
Occupied, Bypass, Standby, or Tenant Override	Off	On	Off	Energized
Unoccupied	On	On	Off	Energized
Condensate Overflow	On	Off	Off	De-energized
High Pressure 1 Fault	Off	Off	Flash	De-energized
Low Pressure 1 Fault	Off	Off	On	De-energized
Low Temperature 1 Fault	Flash	Off	Off	De-energized
Brownout	Off	Flash	Off	De-energized
Emergency Shutdown	Off	Flash	Off	De-energized
Room/Return Air or Low Temp Sensor 1 Failure	Flash	Flash	On	De-energized
Service Test Mode Enabled ¹	On	On	Off	De-energized
Serial EEPROM Corrupted	On	On	On	De-energized
Network “Offline” Received	Off	Off	Off	De-energized

¹ Compressor relay/compressor terminal is labeled COMP, switched line of the same electric input as any of the L1 terminals.

Control Features – MicroTech III with I/O Expansion Module

I/O Expansion Module



The I/O Expansion Module is a factory installed option. It is an extension of the MicroTech III unit controller and provides extra functionality.

The I/O Expansion Module has 2 main purposes:

- The I/O Expansion Module has outputs to control electric heat on a standard Water Source Heat Pump.
- The I/O Expansion Module has an independent LED annunciator to identify operational fault conditions for the electric heater.

I/O Expansion Module LED & Fault Outputs

Mode / Fault	Status LED's			Thermostat Alarm Light Output Terminal "A"
	Yellow	Green	Red	
Invalid Configuration Jumper Setting	Flash	Flash	Off	De-energized
Base Board Communication Fail	Off	Flash	Flash	N/A
High Pressure #2 Fault	Off	Off	Flash	De-energized
Low Pressure #2 Fault	Off	Off	On	De-energized
Low Suction Temp #2 Fault	Flash	Off	Off	De-energized
Sensor Failures Low Suction Low Suction Temp #2, ¹ EWT (w/ Boilerless EH only)	Flash	Flash	On	De-energized
² Service Test Mode Enabled	Flash	Flash	Flash	De-energized
Unoccupied Mode	On	On	Off	Energized
Occupied, Bypass, Standby, or Tenant Override Modes	Off	On	Off	Energized
Normal Operation	Off	On	Off	De-energized

Note: Mode / Faults are listed in order of priority.

¹ Boilerless electric heat only

² Alarm/fault LED indications take precedence over service test mode LED indication. The controller shall use service test mode if the service test mode jumper is installed, even if the LED's indicate an alarm/fault.

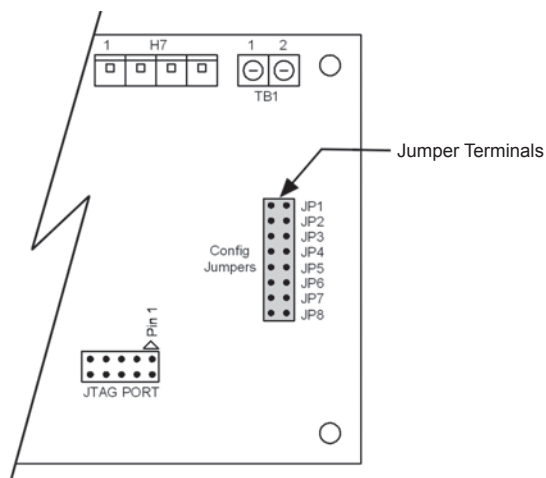
■ = Not used with Console Water Source Heat Pump unit.

I/O Expansion Module Configuration Jumper Settings

Jumper	Description	Options
JP1	Number of Compressors	Open for single compressor Shorted for dual compressor
JP2	Hot Gas/ Water Reheat	Open to disable reheat Shorted to enable reheat
JP3 & JP4	Supplemental Heat Type	JP3 and JP4 open for no supplemental heat JP3 open, JP4 shorted for boilerless electric heat JP3 and JP4 shorted is an invalid setting
JP5 & JP6	Fan Speed Selection	JP5 and JP6 open for single-speed fan JP5 open, JP6 shorted for three-speed fan JP5 shorted and JP6 open for two-speed fan JP 5 and JP6 shorted is an invalid setting
JP7	Compressor Speed Type	Open for single-speed compressor Shorted for two-speed compressor
JP8	Future Spare	

■ = Not used with Console Water Source Heat Pump unit.

I/O Expansion Module Configuration Jumper Terminals



Adding an I/O Expansion Module (with an interconnect cable) to the unit controller allows the operation of boilerless electric heat with the Console Water Source Heat Pump.

Features

Standard Heat Pumps / Single Circuit Units

- Monitors entering water temperature for boilerless electric heat control

Control Features – MicroTech III with Communication Module

MicroTech III Unit Controller with LONWORKS or BACnet Communication Module

Each McQuay Console Water Source Heat Pump can be equipped with a LonWorks or BACnet communication module. The LONWORKS module is LonMark 3.4 certified and designed to communicate over a LonWorks communications network to a Building Automation System (BAS). The BACnet module is designed to communicate over a BACnet MS/TP communications network to a building automation system. Both controllers are microprocessor-based and can be factory or field-installed.

The control modules are programmed and tested with all the logic required to monitor and control the unit. Optional wall sensors may be used with the communication modules to provide limited local control of the Console Water Source Heat Pump. The MicroTech III unit controller monitors water and air temperatures and passes information to the communication module. The module communicates with the BAS, to provide network control of the Water Source Heat Pump.

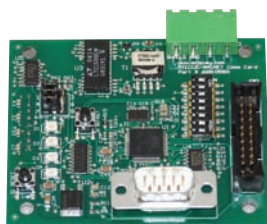
MicroTech III LONWORKS Communication Module

The LONWORKS communication module is designed for units that are integrated into a LONWORKS communication network for centralized scheduling and management of multiple heat pumps.



MicroTech III BACnet Communication Module

Designed to be linked with a centralized building automation system (BAS) through a BACnet communications network for centralized scheduling and management of multiple heat pumps.



MicroTech III Unit Controller with Communication Modules Features

The MicroTech III Unit Controller with LONWORKS or BACnet Communication Module orchestrates the following unit operations:

- Enable heating and cooling to maintain space temperature setpoint based on a room sensor setting
- Enable fan and compressor operation
- Monitors all equipment protection controls
- Monitors room and discharge air temperatures
- Monitors leaving water temperature
- Relays status of all vital unit functions

An amber, on-board status LED indicates the status of the MicroTech III LONWORKS or BACnet module.

The MicroTech III unit controller includes:

- A unit-mounted return air sensor
- A unit-mounted discharge air sensor
- A leaving water temperature sensor

The communication modules provide network access to setpoints for operational control

Available wall sensors include:

- Room sensor
- Room sensor with LED status and tenant override button
- Temperature sensor with LED status, timed-override button, and $\pm 3^{\circ}\text{F}$ setpoint adjustment
- Room sensor with LED status, timed-override button, 55° to 90°F setpoint adjustment

Applications – Systems

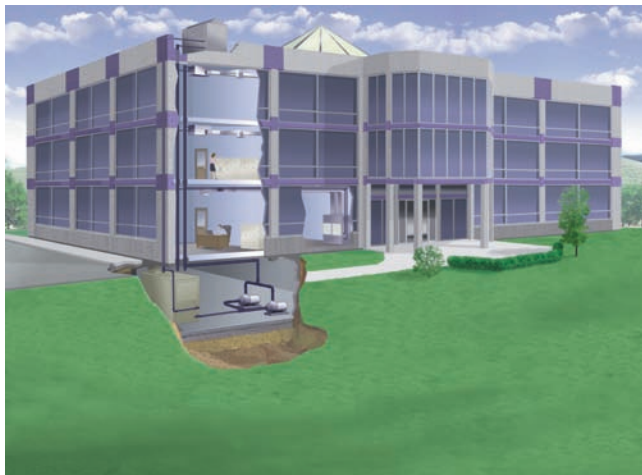
Water source heat pump systems are one of the most efficient, environmentally friendly systems available for heating and cooling buildings. High-efficiency, self contained units (sizes 7,000 btuh to 420,000 btuh) can be placed in virtually any location within a building. Each unit responds only to the heating or cooling load of the individual zone it serves. This permits an excellent comfort level for occupants, better control of energy use for building owners and lower 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 efficiency 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.

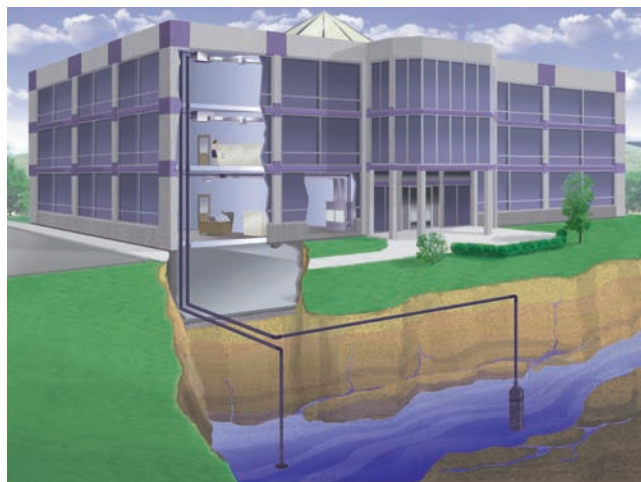
Boiler/Tower Application



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 can reduce 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, and such wells must be approved by the United States Environmental Protection Agency. 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



Applications – Systems

Closed Loop Geothermal Applications ARI 330/ISO 13256-1

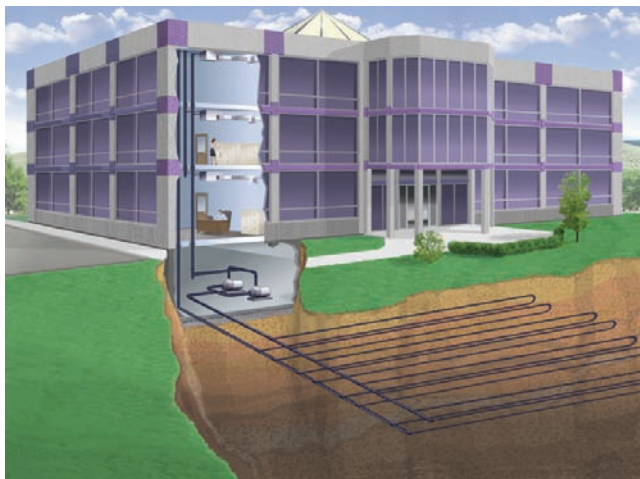
“Vertical Closed Loop” applications are installed by drilling vertical bore holes into the earth and inserting a plastic polyethylene supply/return pipe into the holes. The vertical wells are connected in parallel reverse return fashion to allow the water from the building to circulate evenly throughout 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 the same manner as a vertical or horizontal loop using a parallel reverse return design. The size and the depth of the lake is critical. 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



Applications Considerations

Typical Console Installation



Unit Location

The Console Water Source Heat Pump is typically installed on an exterior wall.

Locate a Console unit to allow for easy removal of the filter and access panels. Allow a minimum of 18" (46 cm) clearance on each side of the unit for service and maintenance access.

To reduce noise emissions, install a field-provided 1/4 inch thick, rubber isolator pad below the entire base of the unit. The pad should be equal to the overall foot-print size of the unit to provide sound dampening of the unit while in operation. The unit must sit flat on the floor to prevent unwanted noise and vibration.

Piping

The console water source heat pump unit is typically connected to the supply / return piping using a “reverse 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 hydronic pumping noise. One end of the hose has a swivel fitting to facilitate removal of the unit for replacement or service. Include supply and return shutoff valves 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. Include Pressure / Temperature ports to allow the service technician to measure water flow and unit operation.

Condensate Drain

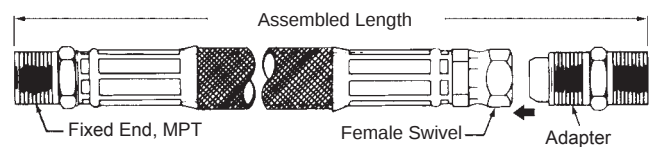
The factory provided condensate drain trap on the console unit is located inside the end cabinet. Condensate removal piping must be pitched away from the unit not less than 1/4" per foot. A vent is required after the trap so that the condensate will drain away from the unit. The vent can also act as a clean out if 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.

McQuay has available optional fire-rated flexible hoses to better facilitate supply and return piping connections. These flexible hoses reduce vibration between the unit and the rigid piping system.

Fire Rated Supply or Return Hoses



Hose Type	Nominal Length	Max. Recommended Working Pressure	Minimum Burst Pressure @ 70° to 90°	Minimum Bend Radius
1/2" MPT Supply & Return	9"	400 psig	1200 psig	2½"
	12"	400 psig	1200 psig	2½"
	18"	400 psig	1200 psig	2½"
	24"	400 psig	1200 psig	2½"



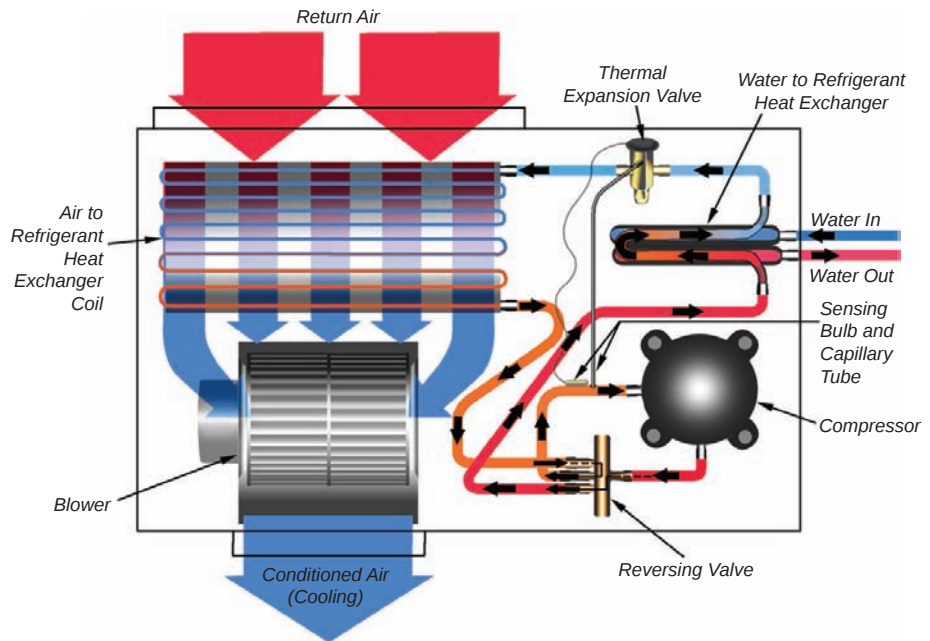
Applications – Systems

Typical Cooling and Heating Refrigeration Cycles

Note: For standard heat pump operation only

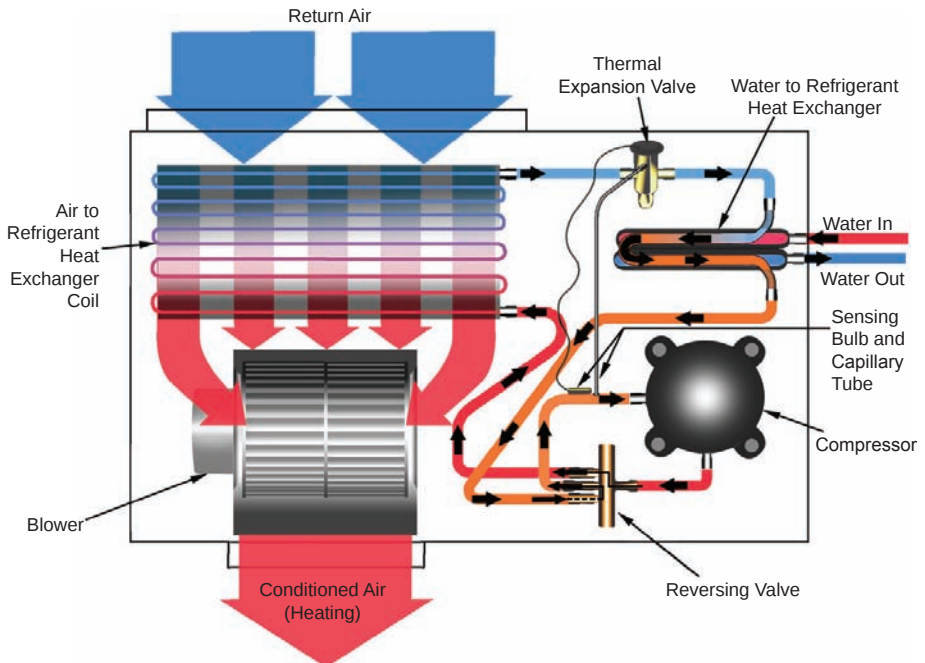
Cooling Refrigeration Cycle

When the wall thermostat calls for COOLING, the reversing valve directs the flow of the refrigerant, a hot gas, from the compressor to the water-to-refrigerant heat exchanger. There, the heat is removed by the water, and the hot gas condenses to become a liquid. The liquid then flows through a thermal expansion valve to the air-to-refrigerant heat exchanger coil. The liquid then evaporates and becomes 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 calls for HEATING, the reversing valve directs the flow of the refrigerant, a hot gas, from the compressor to the air-to-refrigerant heat exchanger coil. There, the heat is removed by the air passing over the surfaces of the coil and the hot gas condenses and becomes a liquid. The liquid then flows through a thermal expansion valve to the water-to-refrigerant heat exchanger. The liquid then evaporates and becomes 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 – Unit Selection

Achieving optimal performance with water source heat pump systems requires both accurate system design and proper equipment selection. Use a building load program to determine the heating and cooling loads of each zone prior to making equipment selections. With this information, the 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 we recommend 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 10,430 BTUH of total cooling, 6,950 BTUH of sensible cooling and 9,150 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	=	10,430 BTUH
Sensible Cooling Load	=	6,950 BTUH
Total Heating Load	=	9,150 BTUH
Air Flow Required	=	275 CFM
Return Air Cooling	=	80°FDB/ 67°FWB
Return Air - Heating	=	70°FDB

Since a McQuay Model MHC 009 produces approximately 10,000 BTUH of cooling, it is not sufficient for this zone and a model MHC 012 should be considered. Model MHC 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 MHC 012 (Boiler / Tower model)

Total Cooling Capacity @ 90 EWT	=	11,511 BTUH
Sensible cooling capacity @ 90 EWT	=	7,660 BTUH
Total Heating Capacity @ 70 EWT	=	14,160 BTUH
CFM = 275		
Water Flow required to meet capacity	=	8 GPM
Water Pressure drop	=	2.5 (FT. H2O)
Final Selection		MHC 012

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 – 10,430 BTUH of total cooling and 6,950 BTUH of sensible cooling and 9,150 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°F and as low as 30°F 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	=	10,430 BTUH
Sensible Cooling Load	=	6,950 BTUH
Total Heating Load	=	9,150 BTUH
Air Flow Required	=	275 CFM
Return Air Cooling	=	80 DB / 67 WB
Return Air - Heating	=	70 DB

A McQuay Model MHW is chosen for this geothermal application. Model MHW offers insulated water piping for condensation considerations and a different freeze stat 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 34. The Model MHW 012 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 34).

Selection:

Model MHC 012 (Geothermal model)

Total cooling capacity @ 100 EWT	=	10,555 BTUH x .980 = 10,344
Sensible cooling capacity @ 100 EWT	=	7,257 BTUH x .980 = 7,112
Total heating capacity @ 35 EWT	=	9,430 BTUH x .975 = 9,240 Btuh
CFM = 284		
Water Flow required to meet capacity	=	2.4 GPM
Water Pressure drop = 2.5 x 1.5	=	3.75 (FT. H2O)
Final Selection		MHC 012

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 MHC 012 model (say 7,800 BTUH). The choices are to upsize the unit to the next model available (015).

Cooling Capacity Data – Console Unit Size 009

EWT	GPM	WPD	System							ISO			
			EA		LWT	TOT	SEN	kW	EER	TOT	kW	EER	THR
30	1.1	3.1	75	63	52.6	11850	8350	0.273	43.3	11660	0.275	42.4	12590
			80	67	54.2	12770	8560	0.256	49.9	12580	0.258	48.9	13450
			85	71	55.8	13750	8740	0.236	58.2	13560	0.238	57.0	14360
	1.8	5.0	75	63	44.0	12170	8500	0.204	59.6	11990	0.211	56.8	12690
			80	67	44.9	13140	8710	0.175	74.9	12950	0.182	71.1	13560
			85	71	45.9	14180	8900	0.141	100.6	14000	0.148	94.7	14490
	2.5	7.0	75	63	40.1	12300	8560	0.175	70.3	12110	0.192	63.1	12730
			80	67	40.8	13290	8780	0.141	94.1	13100	0.158	82.9	13610
			85	71	41.5	14360	8970	0.100	143.1	14180	0.117	120.9	14540
40	1.1	3.1	75	63	62.3	11310	8110	0.369	30.6	11130	0.371	30.0	12350
			80	67	63.8	12200	8330	0.361	33.8	12010	0.363	33.1	13210
			85	71	65.5	13140	8520	0.350	37.5	12960	0.352	36.8	14110
	1.8	5.0	75	63	53.8	11660	8270	0.310	37.6	11470	0.317	36.2	12510
			80	67	54.8	12590	8490	0.291	43.3	12410	0.298	41.7	13380
			85	71	55.8	13590	8680	0.268	50.6	13400	0.275	48.7	14300
	2.5	7.0	75	63	50.0	11790	8330	0.284	41.5	11610	0.301	38.5	12570
			80	67	50.7	12740	8550	0.261	48.8	12560	0.278	45.2	13440
			85	71	51.4	13760	8740	0.234	58.9	13570	0.251	54.2	14360
50	1.1	3.1	75	63	71.8	10750	7870	0.450	23.9	10570	0.452	23.4	12040
			80	67	73.3	11600	8090	0.452	25.7	11420	0.453	25.2	12890
			85	71	75.0	12500	8280	0.450	27.8	12320	0.451	27.3	13790
	1.8	5.0	75	63	63.5	11100	8020	0.401	27.7	10920	0.408	26.8	12240
			80	67	64.5	12000	8250	0.393	30.5	11820	0.400	29.6	13110
			85	71	65.5	12960	8450	0.380	34.1	12780	0.387	33.0	14030
	2.5	7.0	75	63	59.8	11240	8080	0.380	29.6	11060	0.397	27.9	12310
			80	67	60.5	12160	8310	0.367	33.2	11980	0.384	31.2	13190
			85	71	61.2	13150	8520	0.350	37.6	12960	0.367	35.3	14120
60	1.1	3.1	75	63	81.2	10180	7620	0.520	19.6	9990	0.522	19.2	11680
			80	67	82.7	10980	7850	0.529	20.8	10800	0.531	20.3	12520
			85	71	84.3	11840	8050	0.536	22.1	11660	0.537	21.7	13390
	1.8	5.0	75	63	73.2	10530	7770	0.479	22.0	10340	0.486	21.3	11910
			80	67	74.2	11390	8000	0.479	23.8	11200	0.486	23.0	12770
			85	71	75.2	12310	8210	0.477	25.8	12120	0.484	25.1	13680
	2.5	7.0	75	63	69.6	10670	7830	0.461	23.1	10490	0.478	21.9	11990
			80	67	70.3	11550	8070	0.458	25.2	11370	0.475	23.9	12860
			85	71	71.0	12490	8280	0.451	27.7	12310	0.468	26.3	13780
70	1.1	3.1	75	63	90.5	9580	7370	0.577	16.6	9400	0.578	16.3	11260
			80	67	92.0	10350	7600	0.594	17.4	10170	0.595	17.1	12080
			85	71	93.6	11170	7810	0.609	18.3	10980	0.611	18.0	12940
	1.8	5.0	75	63	82.8	9940	7520	0.545	18.2	9750	0.551	17.7	11520
			80	67	83.7	10750	7760	0.554	19.4	10570	0.561	18.8	12360
			85	71	84.7	11630	7970	0.560	20.7	11450	0.567	20.2	13260
	2.5	7.0	75	63	79.3	10080	7580	0.530	19.0	9890	0.547	18.1	11620
			80	67	80.0	10920	7820	0.537	20.3	10730	0.554	19.4	12470
			85	71	80.7	11820	8040	0.539	21.9	11630	0.556	20.9	13380
80	1.1	3.1	75	63	99.7	8980	7120	0.621	14.5	8790	0.623	14.1	10790
			80	67	101.1	9700	7350	0.645	15.0	9520	0.647	14.7	11590
			85	71	102.7	10470	7570	0.668	15.7	10290	0.670	15.4	12430
	1.8	5.0	75	63	92.3	9330	7260	0.597	15.6	9140	0.604	15.1	11070
			80	67	93.3	10100	7510	0.615	16.4	9920	0.622	16.0	11900
			85	71	94.2	10930	7730	0.630	17.3	10750	0.637	16.9	12770
	2.5	7.0	75	63	89.0	9470	7320	0.586	16.2	9280	0.603	15.4	11170
			80	67	89.7	10270	7570	0.601	17.1	10080	0.618	16.3	12020
			85	71	90.4	11120	7790	0.614	18.1	10930	0.631	17.3	12910
85	1.1	3.1	75	63	104.6	8800	7040	0.654	13.5	8610	0.655	13.1	10710
			80	67	105.7	9370	7230	0.666	14.1	9190	0.668	13.8	11320
			85	71	107.2	10120	7450	0.693	14.6	9930	0.694	14.3	12150
	1.8	5.0	75	63	97.1	9020	7130	0.619	14.6	8830	0.625	14.1	10820
			80	67	98.0	9770	7380	0.641	15.3	9580	0.647	14.8	11640
			85	71	99.0	10580	7610	0.660	16.0	10390	0.667	15.6	12510
	2.5	7.0	75	63	93.8	9150	7190	0.609	15.0	8970	0.626	14.3	10930
			80	67	94.5	9930	7440	0.629	15.8	9750	0.645	15.1	11770
			85	71	95.2	10760	7670	0.645	16.7	10580	0.662	16.0	12650
90	1.1	3.1	75	63	109.2	8520	6930	0.673	12.7	8330	0.675	12.3	10480
			80	67	110.5	9180	7160	0.701	13.1	8990	0.703	12.8	11230
			85	71	111.7	9760	7330	0.714	13.7	9580	0.716	13.4	11860
	1.8	5.0	75	63	101.8	8700	7000	0.637	13.6	8520	0.644	13.2	10560
			80	67	102.7	9430	7250	0.663	14.2	9250	0.670	13.8	11370
			85	71	103.7	10210	7480	0.687	14.9	10030	0.693	14.5	12220
	2.5	7.0	75	63	98.6	8840	7060	0.629	14.0	8650	0.646	13.4	10670
			80	67	99.3	9590	7310	0.653	14.7	9410	0.669	14.1	11500
			85	71	100.0	10400	7540	0.674	15.4	10210	0.691	14.8	12370

Cooling Capacity Data – Console Unit Size 009

EWT	GPM	WPD	System							ISO			
			EA		LWT	TOT	SEN	kW	EER	TOT	kW	EER	THR
100	1.1	3.1	75	63	118.3	7930	6690	0.705	11.3	7750	0.706	11.0	9990
			80	67	119.6	8550	6920	0.738	11.6	8370	0.740	11.3	10720
			85	71	121.0	9210	7140	0.771	11.9	9020	0.773	11.7	11470
	1.8	5.0	75	63	111.5	8250	6820	0.689	12.0	8060	0.696	11.6	10260
			80	67	112.3	8910	7060	0.718	12.4	8730	0.724	12.1	11020
			85	71	113.2	9620	7280	0.746	12.9	9440	0.753	12.5	11810
	2.5	7.0	75	63	108.4	8370	6870	0.682	12.3	8190	0.699	11.7	10360
			80	67	109.0	9060	7110	0.708	12.8	8870	0.725	12.2	11130
			85	71	109.5	9660	7290	0.720	13.4	9470	0.737	12.9	11770
110	1.1	3.1	75	63	127.4	7330	6450	0.729	10.1	7150	0.731	9.8	9450
			80	67	128.6	7910	6690	0.767	10.3	7720	0.769	10.0	10150
			85	71	130.0	8510	6910	0.805	10.6	8330	0.807	10.3	10870
	1.8	5.0	75	63	120.9	7640	6570	0.717	10.6	7460	0.724	10.3	9730
			80	67	121.8	8260	6820	0.752	11.0	8080	0.759	10.6	10460
			85	71	122.6	8920	7050	0.786	11.3	8740	0.793	11.0	11230
	2.5	7.0	75	63	118.0	7770	6620	0.712	10.9	7580	0.729	10.4	9840
			80	67	118.6	8410	6870	0.745	11.3	8220	0.762	10.8	10590
			85	71	119.2	9090	7100	0.778	11.7	8900	0.794	11.2	11370

Capacity Tables Notes:

EWT = Entering Water Temperature (°F)

LWT = Leaving Water Temperature (°F)

COP = Coefficient of Performance

WPD = Water Pressure Drop (Ft. Hd)

TOT = Total Heat (Btu)

THA = Total Heat of Absorption (Btu)

EA = Entering Air Temperature (°F)

SEN = Sensible Heat (Btu)

THR = Total Heat of Rejection (Btu)

kW = Kilowatts

GPM = Gallons Per Minute

Heating Capacity Data – Console Unit Size 009

EWT	GPM	WPD	System					ISO			
			EA	LWT	TOT	kW	COP	TOT	kW	COP	THA
20	1.1	3.1	60	12.3	5740	0.551	3.05	6020	0.553	3.19	4260
			70	13.0	5610	0.633	2.60	5890	0.635	2.72	3900
			80	13.7	5520	0.730	2.22	5800	0.732	2.32	3530
	1.8	5.0	60	15.1	5930	0.552	3.14	6200	0.558	3.26	4440
			70	15.5	5780	0.634	2.67	6050	0.639	2.77	4060
			80	16.0	5670	0.730	2.28	5940	0.735	2.37	3670
	2.5	7.0	60	16.4	6010	0.553	3.18	6280	0.564	3.26	4520
			70	16.7	5850	0.634	2.70	6130	0.645	2.78	4130
			80	17.1	5700	0.730	2.29	5980	0.740	2.36	3700
30	1.1	3.1	60	20.8	6650	0.560	3.48	6920	0.562	3.60	5130
			70	21.4	6510	0.640	2.98	6780	0.642	3.09	4760
			80	22.2	6380	0.731	2.56	6650	0.733	2.66	4360
	1.8	5.0	60	24.1	6890	0.564	3.58	7160	0.569	3.68	5360
			70	24.5	6730	0.643	3.07	7000	0.648	3.16	4970
			80	25.0	6570	0.732	2.63	6840	0.738	2.72	4550
	2.5	7.0	60	25.7	6990	0.565	3.62	7260	0.576	3.69	5460
			70	26.0	6820	0.644	3.11	7100	0.655	3.18	5060
			80	26.3	6650	0.733	2.66	6930	0.744	2.73	4630
40	1.1	3.1	60	29.1	7600	0.573	3.88	7870	0.575	4.01	6040
			70	29.8	7460	0.653	3.35	7730	0.655	3.46	5660
			80	30.5	7300	0.740	2.89	7570	0.742	2.99	5240
	1.8	5.0	60	33.0	7890	0.576	4.01	8160	0.582	4.11	6320
			70	33.5	7740	0.657	3.45	8010	0.662	3.54	5930
			80	33.9	7560	0.744	2.98	7830	0.750	3.06	5490
	2.5	7.0	60	34.9	8020	0.578	4.06	8290	0.589	4.12	6440
			70	35.2	7860	0.659	3.49	8130	0.670	3.56	6040
			80	35.6	7670	0.746	3.01	7950	0.757	3.08	5600
50	1.1	3.1	60	37.4	8580	0.585	4.30	8850	0.587	4.42	6980
			70	38.0	8450	0.668	3.70	8720	0.670	3.81	6600
			80	38.8	8290	0.755	3.22	8560	0.757	3.31	6180
	1.8	5.0	60	41.9	8940	0.590	4.44	9210	0.595	4.53	7330
			70	42.3	8790	0.673	3.82	9060	0.679	3.91	6930
			80	42.8	8600	0.760	3.31	8880	0.766	3.39	6480
	2.5	7.0	60	44.0	9090	0.591	4.50	9360	0.602	4.55	7480
			70	44.4	8930	0.675	3.87	9200	0.686	3.93	7060
			80	44.7	8740	0.762	3.36	9010	0.773	3.41	6610
60	1.1	3.1	60	45.5	9600	0.597	4.71	9870	0.599	4.83	7970
			70	46.2	9470	0.684	4.06	9750	0.686	4.16	7580
			80	47.0	9310	0.773	3.53	9580	0.775	3.62	7150
	1.8	5.0	60	50.7	10020	0.600	4.89	10300	0.606	4.98	8390
			70	51.2	9880	0.690	4.20	10150	0.695	4.28	7970
			80	51.7	9690	0.780	3.64	9970	0.786	3.71	7510
	2.5	7.0	60	53.2	10220	0.603	4.97	10490	0.614	5.01	8570
			70	53.5	10060	0.692	4.25	10330	0.703	4.30	8140
			80	53.9	9860	0.783	3.69	10130	0.794	3.74	7660
70	1.1	3.1	60	53.6	10660	0.606	5.15	10940	0.608	5.27	9010
			70	54.4	10530	0.698	4.42	10800	0.701	4.52	8590
			80	55.2	10370	0.792	3.83	10640	0.794	3.92	8150
	1.8	5.0	60	59.4	11180	0.610	5.36	11450	0.616	5.44	9510
			70	59.9	11010	0.705	4.57	11280	0.711	4.65	9050
			80	60.5	10810	0.800	3.96	11090	0.806	4.03	8570
	2.5	7.0	60	62.2	11400	0.612	5.46	11670	0.623	5.49	9730
			70	62.6	11210	0.707	4.64	11490	0.718	4.69	9250
			80	63.0	11010	0.803	4.02	11280	0.814	4.06	8750
80	1.1	3.1	60	61.6	11790	0.615	5.62	12060	0.617	5.73	10110
			70	62.4	11630	0.713	4.78	11900	0.715	4.88	9650
			80	63.3	11450	0.811	4.14	11730	0.813	4.23	9170
	1.8	5.0	60	68.1	12380	0.617	5.87	12650	0.623	5.95	10700
			70	68.6	12190	0.719	4.97	12460	0.724	5.04	10190
			80	69.2	11970	0.819	4.28	12250	0.824	4.35	9670
	2.5	7.0	60	71.2	12650	0.619	5.98	12920	0.630	6.01	10960
			70	71.6	12440	0.721	5.05	12710	0.732	5.08	10430
			80	72.1	12200	0.822	4.35	12470	0.833	4.39	9890
85	1.1	3.1	60	65.5	12350	0.617	5.86	12630	0.619	5.97	10670
			70	66.4	12190	0.719	4.97	12460	0.721	5.06	10200
			80	67.3	12010	0.819	4.29	12280	0.821	4.38	9700
	1.8	5.0	60	72.4	13010	0.621	6.13	13280	0.627	6.20	11310
			70	73.0	12790	0.724	5.17	13060	0.730	5.24	10780
			80	73.6	12560	0.827	4.45	12830	0.832	4.52	10230
	2.5	7.0	60	75.7	13290	0.622	6.26	13560	0.633	6.28	11600
			70	76.1	13060	0.727	5.26	13330	0.738	5.29	11040
			80	76.6	12810	0.830	4.52	13080	0.841	4.55	10470

Heating Capacity Data – Console Unit Size 009

EWT	GPM	WPD	System					ISO			
			EA	LWT	TOT	kW	COP	TOT	kW	COP	THA
90	1.1	3.1	60	69.4	12950	0.621	6.10	13220	0.623	6.21	11250
			70	70.3	12760	0.724	5.16	13030	0.726	5.26	10750
			80	71.3	12560	0.827	4.45	12830	0.829	4.54	10230
	1.8	5.0	60	76.6	13650	0.624	6.40	13920	0.630	6.47	11950
			70	77.3	13420	0.730	5.38	13690	0.736	5.45	11390
			80	77.9	13160	0.835	4.62	13430	0.840	4.68	10810
	2.5	7.0	60	80.1	13950	0.625	6.54	14220	0.636	6.55	12250
			70	80.6	13700	0.732	5.48	13970	0.743	5.51	11660
			80	81.1	13420	0.837	4.70	13700	0.848	4.73	11060

Capacity Tables Notes:

EWT = Entering Water Temperature (°F)

LWT = Leaving Water Temperature (°F)

COP = Coefficient of Performance

WPD = Water Pressure Drop (Ft. Hd)

TOT = Total Heat (Btu)

THA = Total Heat of Absorption (Btu)

EA = Entering Air Temperature (°F)

SEN = Sensible Heat (Btu)

THR = Total Heat of Rejection (Btu)

kW = Kilowatts

GPM = Gallons Per Minute

Cooling Capacity Data – Console Unit Size 012

EWT	GPM	WPD	System						ISO				
			EA		LWT	TOT	SEN	kW	EER	TOT	kW	EER	THR
30	1.6	1.6	75	63	48.4	14210	9170	0.287	49.6	13930	0.292	47.8	14910
			80	67	49.7	15340	9350	0.259	59.3	15070	0.264	57.1	15960
			85	71	51.1	16580	9510	0.225	73.6	16310	0.230	70.8	17080
	2.4	2.5	75	63	42.4	14470	9300	0.224	64.6	14190	0.239	59.3	14980
			80	67	43.2	15650	9490	0.186	84.0	15370	0.201	76.4	16030
			85	71	44.2	16930	9700	0.140	120.9	16650	0.155	107.3	17170
	3.2	3.3	75	63	39.3	14610	9470	0.194	75.3	14340	0.228	62.9	15010
			80	67	39.9	15770	9550	0.152	104.0	15500	0.185	83.6	16050
			85	71	40.6	17070	9720	0.101	169.3	16790	0.135	124.9	17180
40	1.6	1.6	75	63	58.3	13680	8910	0.399	34.3	13410	0.404	33.2	14750
			80	67	59.6	14790	9090	0.380	38.9	14510	0.385	37.7	15780
			85	71	61.0	15970	9250	0.358	44.6	15700	0.363	43.3	16900
	2.4	2.5	75	63	52.3	13960	9040	0.342	40.9	13690	0.357	38.4	14840
			80	67	53.1	15100	9240	0.314	48.1	14830	0.329	45.1	15890
			85	71	54.1	16340	9410	0.280	58.3	16070	0.295	54.4	17020
	3.2	3.3	75	63	49.2	14080	9100	0.314	44.8	13810	0.348	39.7	14880
			80	67	49.9	15240	9300	0.282	54.0	14970	0.316	47.4	15930
			85	71	50.6	16500	9480	0.243	67.9	16230	0.277	58.7	17060
50	1.6	1.6	75	63	68.1	13130	8640	0.500	26.3	12860	0.505	25.5	14510
			80	67	69.3	14200	8830	0.492	28.9	13920	0.497	28.0	15550
			85	71	70.7	15340	8990	0.479	32.0	15070	0.484	31.1	16650
	2.4	2.5	75	63	62.1	13420	8780	0.449	29.9	13150	0.464	28.3	14640
			80	67	63.0	14530	8980	0.431	33.7	14250	0.447	31.9	15690
			85	71	63.9	15720	9150	0.409	38.5	15440	0.424	36.4	16800
	3.2	3.3	75	63	59.1	13550	8840	0.425	31.9	13280	0.459	28.9	14690
			80	67	59.8	14670	9040	0.403	36.5	14400	0.436	33.0	15740
			85	71	60.5	15890	9220	0.375	42.4	15610	0.409	38.2	16860
60	1.6	1.6	75	63	77.7	12560	8360	0.593	21.2	12280	0.598	20.5	14220
			80	67	79.0	13580	8550	0.593	22.9	13310	0.598	22.2	15250
			85	71	80.4	14680	8720	0.590	24.9	14410	0.594	24.2	16330
	2.4	2.5	75	63	72.0	12850	8500	0.547	23.5	12580	0.562	22.4	14380
			80	67	72.8	13920	8700	0.539	25.9	13650	0.554	24.7	15420
			85	71	73.7	15070	8880	0.526	28.6	14800	0.541	27.3	16520
	3.2	3.3	75	63	69.0	12990	8560	0.525	24.7	12720	0.559	22.8	14440
			80	67	69.7	14080	8770	0.513	27.4	13800	0.547	25.2	15490
			85	71	70.4	15250	8950	0.496	30.8	14970	0.529	28.3	16600
70	1.6	1.6	75	63	87.4	11950	8070	0.675	17.7	11680	0.680	17.2	13870
			80	67	88.6	12930	8270	0.685	18.9	12660	0.690	18.4	14880
			85	71	90.0	13990	8440	0.691	20.2	13710	0.696	19.7	15950
	2.4	2.5	75	63	81.7	12260	8210	0.636	19.3	11980	0.651	18.4	14060
			80	67	82.6	13280	8420	0.637	20.9	13010	0.652	19.9	15090
			85	71	83.5	14390	8600	0.634	22.7	14110	0.649	21.7	16180
	3.2	3.3	75	63	78.8	12400	8280	0.616	20.1	12120	0.650	18.7	14140
			80	67	79.5	13440	8490	0.614	21.9	13170	0.648	20.3	15180
			85	71	80.2	14570	8680	0.607	24.0	14300	0.640	22.3	16280
80	1.6	1.6	75	63	96.4	10960	7600	0.746	14.7	10680	0.751	14.2	13100
			80	67	96.9	11550	7440	0.756	15.3	11280	0.761	14.8	13600
			85	71	99.5	13260	8160	0.781	17.0	12980	0.786	16.5	15510
	2.4	2.5	75	63	91.4	11630	7920	0.713	16.3	11360	0.728	15.6	13670
			80	67	92.3	12610	8130	0.724	17.4	12340	0.740	16.7	14690
			85	71	93.2	13670	8320	0.732	18.7	13400	0.747	17.9	15770
	3.2	3.3	75	63	88.6	11770	7980	0.696	16.9	11500	0.730	15.7	13760
			80	67	89.3	12780	8200	0.705	18.1	12500	0.738	16.9	14790
			85	71	90.0	13860	8390	0.708	19.6	13590	0.742	18.3	15880
85	1.6	1.6	75	63	101.0	10530	7400	0.779	13.5	10250	0.783	13.1	12770
			80	67	102.4	11520	7660	0.800	14.4	11240	0.805	14.0	13820
			85	71	104.2	12880	8010	0.821	15.7	12610	0.826	15.3	15250
	2.4	2.5	75	63	95.9	10930	7590	0.748	14.6	10660	0.763	14.0	13080
			80	67	97.1	12270	7980	0.764	16.1	11990	0.779	15.4	14460
			85	71	98.0	13300	8170	0.776	17.1	13020	0.791	16.5	15530
	3.2	3.3	75	63	93.3	11110	7670	0.733	15.2	10840	0.767	14.1	13210
			80	67	94.2	12430	8050	0.745	16.7	12160	0.779	15.6	14570
			85	71	94.8	13490	8250	0.754	17.9	13220	0.788	16.8	15660
90	1.6	1.6	75	63	105.6	10090	7200	0.808	12.5	9820	0.813	12.1	12420
			80	67	106.9	11050	7470	0.834	13.3	10780	0.839	12.9	13460
			85	71	108.3	12080	7700	0.858	14.1	11810	0.863	13.7	14570
	2.4	2.5	75	63	100.7	10490	7390	0.781	13.4	10220	0.796	12.8	12740
			80	67	101.6	11510	7660	0.800	14.4	11240	0.815	13.8	13820
			85	71	102.8	12920	8030	0.818	15.8	12640	0.833	15.2	15280
	3.2	3.3	75	63	98.1	10670	7470	0.768	13.9	10400	0.801	13.0	12880
			80	67	98.8	11720	7750	0.783	15.0	11450	0.817	14.0	13980
			85	71	99.7	13110	8100	0.797	16.4	12840	0.831	15.4	15410

Cooling Capacity Data – Console Unit Size 012

EWT	GPM	WPD	System							ISO			
			EA		LWT	TOT	SEN	kW	EER	TOT	kW	EER	THR
100	1.6	1.6	75	63	114.7	9190	6790	0.859	10.7	8920	0.864	10.3	11670
			80	67	116.0	10100	7070	0.893	11.3	9830	0.898	10.9	12690
			85	71	117.4	11080	7320	0.926	12.0	10800	0.930	11.6	13760
	2.4	2.5	75	63	110.1	9580	6970	0.838	11.4	9310	0.854	10.9	12000
			80	67	111.0	10560	7260	0.867	12.2	10280	0.882	11.7	13060
			85	71	111.9	11590	7520	0.892	13.0	11320	0.907	12.5	14180
	3.2	3.3	75	63	107.7	9770	7050	0.828	11.8	9490	0.862	11.0	12150
			80	67	108.3	10760	7350	0.853	12.6	10490	0.887	11.8	13230
			85	71	109.1	11830	7610	0.875	13.5	11560	0.909	12.7	14370
110	1.6	1.6	75	63	123.7	8250	6350	0.898	9.2	7980	0.902	8.8	10840
			80	67	125.0	9110	6650	0.940	9.7	8840	0.945	9.4	11840
			85	71	126.3	10030	6920	0.982	10.2	9750	0.987	9.9	12890
	2.4	2.5	75	63	119.4	8630	6530	0.883	9.8	8360	0.898	9.3	11180
			80	67	120.3	9560	6840	0.921	10.4	9280	0.936	9.9	12230
			85	71	121.2	10540	7110	0.956	11.0	10260	0.971	10.6	13320
	3.2	3.3	75	63	117.2	8810	6610	0.876	10.1	8540	0.910	9.4	11340
			80	67	117.8	9760	6920	0.912	10.7	9490	0.945	10.0	12400
			85	71	118.5	10770	7200	0.943	11.4	10500	0.977	10.7	13520

Capacity Tables Notes:

EWT = Entering Water Temperature (°F)

LWT = Leaving Water Temperature (°F)

COP = Coefficient of Performance

WPD = Water Pressure Drop (Ft. Hd)

TOT = Total Heat (Btu)

THA = Total Heat of Absorption (Btu)

EA = Entering Air Temperature (°F)

SEN = Sensible Heat (Btu)

THR = Total Heat of Rejection (Btu)

kW = Kilowatts

GPM = Gallons Per Minute

Heating Capacity Data – Console Unit Size 012

EWT	GPM	WPD	System					ISO			
			EA	LWT	TOT	kW	COP	TOT	kW	COP	THA
20	1.6	1.6	60	12.9	7450	0.645	3.38	7730	0.650	3.48	5750
			70	13.4	7270	0.732	2.91	7540	0.737	3.00	5320
			80	14.0	7110	0.832	2.50	7380	0.837	2.58	4880
	2.4	2.5	60	15.1	7680	0.649	3.46	7950	0.664	3.50	5960
			70	15.5	7460	0.736	2.97	7740	0.751	3.02	5500
			80	15.8	7280	0.834	2.56	7550	0.849	2.61	5040
	3.2	3.3	60	16.3	7780	0.651	3.50	8050	0.685	3.44	6060
			70	16.5	7560	0.737	3.00	7830	0.771	2.98	5590
			80	16.8	7360	0.835	2.58	7630	0.869	2.57	5120
30	1.6	1.6	60	21.5	8660	0.667	3.80	8930	0.672	3.89	6890
			70	22.1	8440	0.753	3.29	8720	0.757	3.37	6430
			80	22.6	8230	0.848	2.84	8510	0.853	2.92	5950
	2.4	2.5	60	24.1	8920	0.672	3.89	9190	0.688	3.92	7130
			70	24.5	8690	0.757	3.36	8960	0.772	3.40	6660
			80	24.9	8460	0.851	2.91	8730	0.866	2.95	6160
	3.2	3.3	60	25.5	9050	0.675	3.93	9320	0.708	3.85	7260
			70	25.8	8820	0.759	3.40	9090	0.793	3.36	6780
			80	26.1	8570	0.854	2.94	8840	0.887	2.92	6260
40	1.6	1.6	60	30.0	9890	0.693	4.18	10160	0.698	4.26	8040
			70	30.6	9700	0.778	3.65	9970	0.783	3.73	7610
			80	31.2	9460	0.871	3.18	9730	0.876	3.25	7100
	2.4	2.5	60	33.1	10210	0.701	4.27	10490	0.716	4.29	8350
			70	33.5	10010	0.785	3.73	10290	0.800	3.76	7900
			80	33.9	9750	0.877	3.25	10020	0.892	3.29	7370
	3.2	3.3	60	34.7	10370	0.704	4.31	10640	0.738	4.22	8490
			70	35.0	10160	0.789	3.77	10430	0.822	3.72	8040
			80	35.3	9880	0.880	3.29	10160	0.913	3.26	7500
50	1.6	1.6	60	38.5	11150	0.722	4.53	11420	0.727	4.61	9220
			70	39.0	10990	0.809	3.98	11260	0.813	4.05	8810
			80	39.7	10750	0.900	3.50	11020	0.904	3.57	8310
	2.4	2.5	60	42.1	11530	0.730	4.63	11810	0.745	4.64	9580
			70	42.4	11360	0.818	4.07	11630	0.833	4.09	9160
			80	42.8	11120	0.909	3.58	11390	0.924	3.61	8640
	3.2	3.3	60	43.9	11720	0.734	4.68	12000	0.768	4.58	9760
			70	44.2	11550	0.823	4.11	11820	0.856	4.04	9320
			80	44.5	11290	0.913	3.62	11560	0.947	3.58	8800
60	1.6	1.6	60	47.0	12440	0.749	4.87	12720	0.754	4.94	10440
			70	47.5	12310	0.842	4.28	12580	0.847	4.35	10030
			80	48.1	12090	0.935	3.79	12370	0.939	3.86	9550
	2.4	2.5	60	51.0	12900	0.759	4.98	13170	0.774	4.98	10860
			70	51.3	12740	0.852	4.38	13020	0.868	4.40	10440
			80	51.7	12510	0.945	3.88	12780	0.961	3.90	9930
	3.2	3.3	60	53.1	13110	0.763	5.03	13380	0.796	4.92	11070
			70	53.4	12950	0.857	4.43	13230	0.891	4.35	10630
			80	53.7	12720	0.951	3.92	12990	0.985	3.86	10120
70	1.6	1.6	60	55.4	13790	0.776	5.21	14060	0.781	5.28	11710
			70	55.9	13650	0.875	4.57	13930	0.880	4.64	11280
			80	56.5	13440	0.970	4.06	13720	0.975	4.12	10790
	2.4	2.5	60	59.8	14320	0.785	5.34	14590	0.800	5.34	12210
			70	60.2	14160	0.887	4.68	14430	0.902	4.69	11750
			80	60.6	13940	0.985	4.14	14210	1.000	4.16	11240
	3.2	3.3	60	62.2	14580	0.790	5.41	14860	0.824	5.28	12460
			70	62.5	14400	0.893	4.73	14680	0.926	4.64	11980
			80	62.8	14170	0.991	4.19	14440	1.025	4.13	11460
80	1.6	1.6	60	63.6	15190	0.799	5.57	15460	0.804	5.63	13040
			70	64.2	15030	0.907	4.86	15300	0.912	4.92	12570
			80	64.9	14830	1.009	4.31	15100	1.013	4.36	12060
	2.4	2.5	60	68.6	15800	0.808	5.73	16080	0.823	5.72	13630
			70	69.0	15610	0.918	4.98	15880	0.933	4.98	13110
			80	69.5	15370	1.022	4.41	15640	1.037	4.42	12570
	3.2	3.3	60	71.3	16110	0.812	5.81	16390	0.846	5.67	13930
			70	71.6	15900	0.924	5.04	16170	0.958	4.94	13390
			80	72.0	15640	1.029	4.45	15910	1.063	4.38	12820
85	1.6	1.6	60	67.8	15900	0.809	5.76	16180	0.814	5.82	13730
			70	68.4	15730	0.921	5.01	16000	0.925	5.07	13230
			80	69.0	15520	1.026	4.43	15790	1.031	4.49	12700
	2.4	2.5	60	73.0	16580	0.819	5.93	16850	0.834	5.92	14380
			70	73.4	16360	0.933	5.14	16630	0.948	5.14	13820
			80	73.9	16090	1.040	4.53	16370	1.055	4.54	13240
	3.2	3.3	60	75.8	16900	0.822	6.02	17170	0.856	5.88	14690
			70	76.1	16660	0.938	5.20	16930	0.972	5.11	14110
			80	76.5	16380	1.047	4.58	16650	1.081	4.51	13510

Heating Capacity Data – Console Unit Size 012

EWT	GPM	WPD	System					ISO			
			EA	LWT	TOT	kW	COP	TOT	kW	COP	THA
90	1.6	1.6	60	71.8	16650	0.820	5.95	16920	0.825	6.01	14440
			70	72.5	16450	0.934	5.16	16720	0.939	5.21	13900
			80	73.2	16210	1.042	4.55	16480	1.047	4.61	13350
	2.4	2.5	60	77.3	17360	0.828	6.14	17640	0.844	6.12	15140
			70	77.8	17120	0.947	5.29	17400	0.962	5.29	14540
			80	78.3	16830	1.057	4.66	17100	1.072	4.67	13930
	3.2	3.3	60	80.3	17710	0.832	6.23	17980	0.866	6.08	15480
			70	80.7	17440	0.951	5.37	17710	0.985	5.27	14850
			80	81.1	17120	1.062	4.72	17400	1.095	4.65	14210

Capacity Tables Notes:

EWT = Entering Water Temperature (°F)

LWT = Leaving Water Temperature (°F)

COP = Coefficient of Performance

WPD = Water Pressure Drop (Ft. Hd)

TOT = Total Heat (Btu)

THA = Total Heat of Absorption (Btu)

EA = Entering Air Temperature (°F)

SEN = Sensible Heat (Btu)

THR = Total Heat of Rejection (Btu)

kW = Kilowatts

GPM = Gallons Per Minute

Cooling Capacity Data – Console Unit Size 015

EWT	GPM	WPD	System							ISO			
			EA		LWT	TOT	SEN	kW	EER	TOT	kW	EER	THR
30	2.0	2.5	75	63	50.6	19740	12970	0.400	49.4	19460	0.407	47.8	20820
			80	67	52.2	21440	13270	0.374	57.2	21160	0.382	55.4	22430
			85	71	54.0	23330	13650	0.344	67.7	23050	0.352	65.5	24230
	3.0	5.3	75	63	44.0	20400	13290	0.314	64.9	20120	0.337	59.7	21210
			80	67	45.2	22310	13860	0.271	82.2	22040	0.294	74.9	22990
			85	71	46.4	24420	14800	0.220	111.0	24150	0.243	99.4	24920
	4.0	9.0	75	63	40.5	20370	13270	0.315	64.6	20100	0.368	54.6	21190
			80	67	41.4	22470	14070	0.250	89.7	22200	0.303	73.3	23050
			85	71	42.4	24280	13960	0.179	135.3	24000	0.232	103.5	25150
40	2.0	2.5	75	63	60.0	18640	12410	0.531	35.1	18370	0.539	34.1	20130
			80	67	61.6	20310	12810	0.518	39.2	20030	0.525	38.2	21760
			85	71	63.2	22040	13050	0.500	44.1	21770	0.507	42.9	23430
	3.0	5.3	75	63	53.6	19210	12680	0.465	41.3	18930	0.488	38.8	20490
			80	67	54.7	21020	13110	0.430	48.9	20740	0.453	45.8	22190
			85	71	55.8	22880	13390	0.397	57.6	22600	0.420	53.8	23940
	4.0	9.0	75	63	50.2	19210	12680	0.465	41.3	18930	0.517	36.6	20490
			80	67	51.0	21110	13160	0.418	50.5	20840	0.471	44.3	22240
			85	71	52.0	23180	13530	0.362	64.1	22900	0.414	55.3	24120
50	2.0	2.5	75	63	69.2	17460	11850	0.645	27.1	17190	0.652	26.4	19310
			80	67	70.8	19060	12220	0.645	29.5	18790	0.653	28.8	20910
			85	71	72.5	20780	12540	0.640	32.4	20500	0.648	31.7	22610
	3.0	5.3	75	63	63.1	17990	12100	0.597	30.2	17720	0.620	28.6	19690
			80	67	64.2	19820	12550	0.571	34.7	19540	0.594	32.9	21430
			85	71	65.4	21640	12920	0.550	39.3	21370	0.573	37.3	23180
	4.0	9.0	75	63	59.8	17990	12100	0.597	30.2	17720	0.649	27.3	19690
			80	67	60.7	19840	12560	0.568	34.9	19570	0.620	31.5	21450
			85	71	61.6	21820	12960	0.528	41.4	21540	0.580	37.1	23290
60	2.0	2.5	75	63	78.4	16310	11320	0.745	21.9	16040	0.752	21.3	18470
			80	67	79.9	17790	11670	0.756	23.5	17520	0.763	23.0	19980
			85	71	81.6	19410	12010	0.763	25.4	19140	0.770	24.8	21630
	3.0	5.3	75	63	72.5	16710	11500	0.711	23.5	16430	0.734	22.4	18760
			80	67	73.6	18460	11960	0.699	26.4	18180	0.722	25.2	20470
			85	71	74.8	20280	12350	0.688	29.5	20010	0.711	28.1	22260
	4.0	9.0	75	63	69.4	16710	11500	0.711	23.5	16430	0.764	21.5	18760
			80	67	70.2	18460	11960	0.699	26.4	18180	0.751	24.2	20470
			85	71	71.2	20410	12400	0.676	30.2	20140	0.729	27.6	22350
70	2.0	2.5	75	63	87.7	15290	10850	0.834	18.3	15010	0.841	17.9	17730
			80	67	89.1	16630	11190	0.853	19.5	16360	0.860	19.0	19130
			85	71	90.7	18110	11510	0.872	20.8	17830	0.879	20.3	20660
	3.0	5.3	75	63	82.0	15550	10970	0.811	19.2	15270	0.834	18.3	17920
			80	67	83.0	17120	11390	0.813	21.1	16840	0.836	20.2	19490
			85	71	84.2	18880	11800	0.808	23.4	18600	0.831	22.4	21230
	4.0	9.0	75	63	79.0	15550	10970	0.811	19.2	15270	0.864	17.7	17920
			80	67	79.8	17120	11390	0.813	21.1	16840	0.865	19.5	19490
			85	71	80.6	18890	11810	0.807	23.4	18620	0.859	21.7	21250
80	2.0	2.5	75	63	97.2	14460	10490	0.908	15.9	14180	0.915	15.5	17120
			80	67	98.5	15630	10790	0.937	16.7	15360	0.944	16.3	18390
			85	71	99.9	16950	11080	0.965	17.6	16680	0.972	17.2	19800
	3.0	5.3	75	63	91.5	14600	10550	0.893	16.3	14330	0.916	15.6	17230
			80	67	92.5	15960	10920	0.909	17.5	15690	0.932	16.8	18630
			85	71	93.5	17520	11290	0.918	19.1	17250	0.941	18.3	20230
	4.0	9.0	75	63	88.6	14600	10550	0.893	16.3	14330	0.946	15.2	17230
			80	67	89.4	15960	10920	0.909	17.5	15690	0.962	16.3	18630
			85	71	90.2	17520	11290	0.918	19.1	17250	0.971	17.8	20230
85	2.0	2.5	75	63	102.0	14110	10330	0.940	15.0	13840	0.947	14.6	16880
			80	67	103.2	15220	10620	0.974	15.6	14950	0.981	15.2	18100
			85	71	104.5	16450	10900	1.006	16.3	16170	1.014	16.0	19420
	3.0	5.3	75	63	96.4	14240	10390	0.928	15.3	13960	0.951	14.7	16970
			80	67	97.2	15470	10720	0.951	16.3	15200	0.974	15.6	18280
			85	71	98.2	16920	11070	0.967	17.5	16640	0.990	16.8	19770
	4.0	9.0	75	63	93.5	14240	10390	0.928	15.3	13960	0.981	14.2	16970
			80	67	94.2	15470	10720	0.951	16.3	15200	1.004	15.1	18280
			85	71	94.9	16920	11070	0.967	17.5	16640	1.020	16.3	19770
90	2.0	2.5	75	63	106.7	13760	10180	0.967	14.2	13490	0.974	13.8	16610
			80	67	107.9	14850	10470	1.008	14.7	14580	1.015	14.4	17830
			85	71	109.2	16010	10740	1.045	15.3	15730	1.052	15.0	19100
	3.0	5.3	75	63	101.2	13870	10230	0.959	14.5	13600	0.982	13.8	16690
			80	67	102.1	15060	10560	0.989	15.2	14790	1.012	14.6	17980
			85	71	103.0	16380	10870	1.012	16.2	16110	1.035	15.6	19370
	4.0	9.0	75	63	98.4	13870	10230	0.959	14.5	13600	1.011	13.4	16690
			80	67	99.0	15060	10560	0.989	15.2	14790	1.041	14.2	17980
			85	71	99.7	16380	10870	1.012	16.2	16110	1.064	15.1	19370

Cooling Capacity Data – Console Unit Size 015

EWT	GPM	WPD	System							ISO			
			EA		LWT	TOT	SEN	kW	EER	TOT	kW	EER	THR
100	2.0	2.5	75	63	116.2	13050	9870	1.010	12.9	12770	1.018	12.6	16020
			80	67	117.4	14080	10170	1.061	13.3	13800	1.068	12.9	17220
			85	71	118.6	15180	10440	1.110	13.7	14900	1.117	13.3	18470
	3.0	5.3	75	63	110.8	13110	9900	1.007	13.0	12840	1.030	12.5	16080
			80	67	111.7	14250	10240	1.050	13.6	13980	1.073	13.0	17360
			85	71	112.6	15480	10550	1.088	14.2	15210	1.111	13.7	18710
	4.0	9.0	75	63	108.1	13110	9900	1.007	13.0	12840	1.060	12.1	16080
			80	67	108.8	14250	10240	1.050	13.6	13980	1.102	12.7	17360
			85	71	109.4	15480	10550	1.088	14.2	15210	1.140	13.3	18710
110	2.0	2.5	75	63	125.5	12310	9560	1.042	11.8	12030	1.049	11.5	15370
			80	67	126.7	13280	9860	1.100	12.1	13000	1.107	11.7	16530
			85	71	127.9	14320	10140	1.157	12.4	14040	1.165	12.1	17750
	3.0	5.3	75	63	120.4	12320	9560	1.042	11.8	12050	1.065	11.3	15390
			80	67	121.2	13400	9910	1.095	12.2	13130	1.118	11.7	16640
			85	71	122.1	14570	10230	1.145	12.7	14300	1.168	12.2	17970
	4.0	9.0	75	63	117.8	12320	9560	1.042	11.8	12050	1.094	11.0	15390
			80	67	118.4	13400	9910	1.095	12.2	13130	1.147	11.4	16640
			85	71	119.1	14570	10230	1.145	12.7	14300	1.197	11.9	17970

Capacity Tables Notes:

EWT = Entering Water Temperature (°F)

LWT = Leaving Water Temperature (°F)

COP = Coefficient of Performance

WPD = Water Pressure Drop (Ft. Hd)

TOT = Total Heat (Btu)

THA = Total Heat of Absorption (Btu)

EA = Entering Air Temperature (°F)

SEN = Sensible Heat (Btu)

THR = Total Heat of Rejection (Btu)

kW = Kilowatts

GPM = Gallons Per Minute

Heating Capacity Data – Console Unit Size 015

EWT	GPM	WPD	System					ISO			
			EA	LWT	TOT	kW	COP	TOT	kW	COP	THA
20	2.0	2.5	60	13.4	8980	0.807	3.26	9260	0.814	3.33	6660
			70	14.0	8860	0.964	2.69	9130	0.972	2.75	6040
			80	14.7	8840	1.184	2.19	9110	1.192	2.24	5350
	3.0	5.3	60	15.6	9050	0.806	3.29	9330	0.829	3.29	6730
			70	16.0	8860	0.964	2.69	9130	0.987	2.71	6040
			80	16.5	8840	1.184	2.19	9110	1.207	2.21	5350
	4.0	9.0	60	16.7	9050	0.806	3.29	9330	0.858	3.18	6730
			70	17.0	8860	0.964	2.69	9130	1.017	2.63	6040
			80	17.4	8840	1.184	2.19	9110	1.237	2.16	5350
30	2.0	2.5	60	22.0	10450	0.802	3.82	10730	0.809	3.88	8140
			70	22.6	10270	0.940	3.20	10540	0.947	3.26	7520
			80	23.2	10160	1.113	2.68	10440	1.120	2.73	6880
	3.0	5.3	60	24.4	10790	0.803	3.93	11060	0.826	3.92	8470
			70	24.9	10510	0.938	3.28	10780	0.961	3.28	7770
			80	25.4	10270	1.110	2.71	10550	1.133	2.73	7000
	4.0	9.0	60	25.8	10840	0.804	3.95	11120	0.856	3.80	8520
			70	26.2	10510	0.938	3.28	10780	0.991	3.19	7770
			80	26.5	10270	1.110	2.71	10550	1.162	2.66	7000
40	2.0	2.5	60	30.3	12080	0.811	4.36	12350	0.818	4.42	9730
			70	31.0	11820	0.938	3.69	12090	0.945	3.75	9080
			80	31.7	11620	1.091	3.12	11890	1.098	3.17	8390
	3.0	5.3	60	33.3	12520	0.814	4.51	12790	0.837	4.48	10170
			70	33.7	12220	0.940	3.81	12490	0.963	3.80	9470
			80	34.2	11970	1.091	3.21	12240	1.114	3.22	8740
	4.0	9.0	60	34.9	12740	0.816	4.57	13010	0.869	4.39	10370
			70	35.2	12410	0.942	3.86	12690	0.994	3.74	9660
			80	35.6	12060	1.090	3.24	12340	1.143	3.16	8840
50	2.0	2.5	60	38.6	13830	0.826	4.90	14100	0.833	4.96	11440
			70	39.3	13520	0.951	4.16	13790	0.958	4.22	10730
			80	40.0	13240	1.093	3.55	13510	1.100	3.60	10010
	3.0	5.3	60	42.0	14400	0.831	5.07	14670	0.854	5.03	11990
			70	42.5	14040	0.956	4.30	14320	0.979	4.28	11240
			80	43.1	13710	1.095	3.67	13980	1.118	3.66	10470
	4.0	9.0	60	43.9	14680	0.833	5.16	14950	0.886	4.94	12260
			70	44.3	14300	0.958	4.37	14570	1.011	4.22	11490
			80	44.7	13930	1.097	3.72	14210	1.149	3.62	10690
60	2.0	2.5	60	46.8	15710	0.844	5.45	15980	0.851	5.50	13260
			70	47.5	15360	0.970	4.64	15630	0.977	4.68	12510
			80	48.3	15010	1.108	3.97	15290	1.115	4.01	11730
	3.0	5.3	60	50.7	16410	0.850	5.66	16680	0.873	5.60	13940
			70	51.3	16000	0.978	4.79	16270	1.001	4.76	13130
			80	51.8	15600	1.116	4.10	15880	1.139	4.08	12300
	4.0	9.0	60	52.9	16760	0.853	5.75	17030	0.906	5.51	14280
			70	53.3	16330	0.982	4.87	16600	1.034	4.70	13440
			80	53.7	15900	1.119	4.16	16170	1.172	4.04	12590
70	2.0	2.5	60	54.8	17690	0.860	6.03	17960	0.867	6.07	15190
			70	55.6	17300	0.993	5.10	17570	1.001	5.14	14380
			80	56.4	16910	1.133	4.37	17180	1.140	4.42	13550
	3.0	5.3	60	59.3	18560	0.869	6.26	18830	0.892	6.18	16030
			70	59.9	18100	1.002	5.29	18370	1.025	5.25	15150
			80	60.5	17640	1.142	4.53	17920	1.165	4.50	14260
	4.0	9.0	60	61.8	18980	0.872	6.38	19260	0.924	6.10	16450
			70	62.2	18490	1.006	5.38	18760	1.059	5.19	15530
			80	62.7	18000	1.147	4.60	18280	1.200	4.46	14600
80	2.0	2.5	60	62.7	19790	0.878	6.60	20060	0.885	6.64	17240
			70	63.6	19360	1.018	5.57	19630	1.025	5.61	16370
			80	64.5	18920	1.159	4.78	19190	1.167	4.82	15480
	3.0	5.3	60	67.8	20810	0.885	6.89	21090	0.908	6.80	18240
			70	68.4	20310	1.027	5.79	20580	1.050	5.74	17290
			80	69.1	19800	1.173	4.95	20080	1.196	4.92	16320
	4.0	9.0	60	70.6	21340	0.891	7.02	21610	0.943	6.71	18750
			70	71.1	20800	1.033	5.90	21070	1.085	5.69	17760
			80	71.6	20250	1.179	5.03	20520	1.231	4.88	16750
85	2.0	2.5	60	66.6	20870	0.886	6.90	21140	0.893	6.93	18290
			70	67.5	20420	1.029	5.81	20690	1.036	5.85	17390
			80	68.4	19960	1.175	4.98	20240	1.182	5.01	16470
	3.0	5.3	60	72.0	22000	0.895	7.20	22270	0.918	7.11	19400
			70	72.7	21460	1.039	6.05	21740	1.062	6.00	18410
			80	73.3	20920	1.187	5.16	21190	1.210	5.13	17390
	4.0	9.0	60	75.0	22560	0.898	7.36	22830	0.950	7.04	19950
			70	75.5	21990	1.046	6.16	22270	1.099	5.94	18910
			80	76.0	21410	1.194	5.25	21690	1.247	5.09	17860

Heating Capacity Data – Console Unit Size 015

EWT	GPM	WPD	System					ISO			
			EA	LWT	TOT	kW	COP	TOT	kW	COP	THA
90	2.0	2.5	60	70.5	21990	0.895	7.20	22260	0.902	7.23	19390
			70	71.4	21510	1.039	6.06	21780	1.047	6.10	18450
			80	72.4	21020	1.189	5.18	21290	1.196	5.22	17490
	3.0	5.3	60	76.2	23210	0.903	7.53	23480	0.926	7.42	20590
			70	76.9	22650	1.053	6.30	22930	1.076	6.24	19550
			80	77.6	22070	1.202	5.38	22350	1.225	5.34	18500
	4.0	9.0	60	79.3	23820	0.907	7.69	24100	0.959	7.36	21190
			70	79.9	23210	1.057	6.44	23490	1.109	6.20	20100
			80	80.4	22600	1.210	5.47	22870	1.263	5.31	19000

Capacity Tables Notes:

EWT = Entering Water Temperature (°F)

LWT = Leaving Water Temperature (°F)

COP = Coefficient of Performance

WPD = Water Pressure Drop (Ft. Hd)

TOT = Total Heat (Btu)

THA = Total Heat of Absorption (Btu)

EA = Entering Air Temperature (°F)

SEN = Sensible Heat (Btu)

THR = Total Heat of Rejection (Btu)

kW = Kilowatts

GPM = Gallons Per Minute

Cooling Capacity Data – Console Unit Size 018

EWT	GPM	WPD	System							ISO			
			EA		LWT	TOT	SEN	kW	EER	TOT	kW	EER	THR
30	2.4	3.6	75	63	48.4	20850	13490	0.536	38.9	20580	0.542	38.0	22370
			80	67	49.7	22490	13780	0.490	45.9	22220	0.496	44.8	23860
			85	71	51.0	24260	14040	0.432	56.2	23990	0.438	54.8	25440
	3.6	7.7	75	63	42.3	21080	13620	0.451	46.7	20800	0.468	44.4	22330
			80	67	43.1	22820	13940	0.361	63.1	22540	0.379	59.5	23770
			85	71	43.9	24620	14170	0.273	90.2	24350	0.290	83.8	25290
	4.8	13.2	75	63	39.2	21080	13620	0.451	46.7	20800	0.491	42.4	22330
			80	67	39.8	22820	13940	0.361	63.1	22540	0.401	56.2	23770
			85	71	40.4	24680	14200	0.248	99.4	24410	0.288	84.7	25270
40	2.4	3.6	75	63	58.2	19970	13000	0.706	28.3	19700	0.712	27.7	22030
			80	67	59.5	21540	13280	0.685	31.4	21270	0.691	30.8	23530
			85	71	60.8	23220	13520	0.654	35.5	22940	0.659	34.8	25100
	3.6	7.7	75	63	52.1	20180	13120	0.641	31.5	19910	0.658	30.2	22030
			80	67	53.0	21850	13440	0.583	37.5	21570	0.600	35.9	23510
			85	71	53.8	23600	13700	0.522	45.2	23330	0.539	43.3	25060
	4.8	13.2	75	63	49.1	20180	13120	0.641	31.5	19910	0.681	29.2	22030
			80	67	49.7	21850	13440	0.583	37.5	21570	0.623	34.6	23510
			85	71	50.4	23650	13720	0.504	46.9	23380	0.544	43.0	25060
50	2.4	3.6	75	63	67.9	19080	12530	0.844	22.6	18810	0.849	22.2	21570
			80	67	69.1	20580	12800	0.843	24.4	20300	0.848	23.9	23060
			85	71	70.4	22190	13040	0.832	26.7	21920	0.838	26.2	24640
	3.6	7.7	75	63	62.0	19280	12640	0.795	24.3	19010	0.812	23.4	21620
			80	67	62.8	20880	12950	0.762	27.4	20600	0.780	26.4	23110
			85	71	63.7	22580	13210	0.724	31.2	22300	0.742	30.1	24680
	4.8	13.2	75	63	59.0	19280	12640	0.795	24.3	19010	0.835	22.8	21620
			80	67	59.6	20880	12950	0.762	27.4	20600	0.802	25.7	23110
			85	71	60.2	22610	13230	0.714	31.7	22340	0.754	29.6	24690
60	2.4	3.6	75	63	77.5	18180	12070	0.953	19.1	17910	0.958	18.7	21020
			80	67	78.7	19610	12340	0.966	20.3	19340	0.972	19.9	22480
			85	71	80.0	21130	12570	0.977	21.6	20860	0.982	21.2	24040
	3.6	7.7	75	63	71.7	18360	12160	0.917	20.0	18080	0.935	19.3	21080
			80	67	72.5	19890	12470	0.908	21.9	19610	0.925	21.2	22580
			85	71	73.4	21520	12740	0.888	24.2	21250	0.906	23.5	24150
	4.8	13.2	75	63	68.8	18360	12160	0.917	20.0	18080	0.957	18.9	21080
			80	67	69.4	19890	12470	0.908	21.9	19610	0.948	20.7	22580
			85	71	70.0	21540	12750	0.885	24.3	21260	0.925	23.0	24150
70	2.4	3.6	75	63	87.0	17290	11590	1.047	16.5	17010	1.052	16.2	20410
			80	67	88.2	18640	11870	1.069	17.4	18370	1.074	17.1	21840
			85	71	89.5	20090	12120	1.089	18.4	19810	1.095	18.1	23350
	3.6	7.7	75	63	81.4	17430	11670	1.019	17.1	17160	1.037	16.5	20470
			80	67	82.2	18890	11990	1.023	18.5	18610	1.041	17.9	21940
			85	71	83.1	20450	12280	1.021	20.0	20180	1.038	19.4	23500
	4.8	13.2	75	63	78.5	17430	11670	1.019	17.1	17160	1.059	16.2	20470
			80	67	79.1	18890	11990	1.023	18.5	18610	1.063	17.5	21940
			85	71	79.8	20450	12280	1.021	20.0	20180	1.061	19.0	23500
80	2.4	3.6	75	63	96.5	16380	11110	1.136	14.4	16100	1.141	14.1	19780
			80	67	97.7	17660	11400	1.162	15.2	17390	1.168	14.9	21150
			85	71	98.9	19030	11650	1.189	16.0	18760	1.195	15.7	22610
	3.6	7.7	75	63	91.1	16490	11170	1.114	14.8	16220	1.132	14.3	19830
			80	67	91.8	17880	11500	1.125	15.9	17600	1.143	15.4	21250
			85	71	92.7	19360	11790	1.133	17.1	19090	1.151	16.6	22760
	4.8	13.2	75	63	88.3	16490	11170	1.114	14.8	16220	1.154	14.1	19830
			80	67	88.9	17880	11500	1.125	15.9	17600	1.165	15.1	21250
			85	71	89.5	19360	11790	1.133	17.1	19090	1.173	16.3	22760
85	2.4	3.6	75	63	101.3	15920	10880	1.181	13.5	15650	1.186	13.2	19470
			80	67	102.4	17170	11170	1.208	14.2	16900	1.214	13.9	20800
			85	71	103.6	18500	11420	1.237	15.0	18230	1.242	14.7	22220
	3.6	7.7	75	63	95.9	16020	10930	1.162	13.8	15750	1.179	13.4	19510
			80	67	96.7	17370	11260	1.174	14.8	17090	1.192	14.3	20890
			85	71	97.5	18810	11550	1.185	15.9	18540	1.203	15.4	22370
	4.8	13.2	75	63	93.2	16020	10930	1.162	13.8	15750	1.202	13.1	19510
			80	67	93.7	17370	11260	1.174	14.8	17090	1.214	14.1	20890
			85	71	94.4	18810	11550	1.185	15.9	18540	1.225	15.1	22370
90	2.4	3.6	75	63	106.1	15460	10640	1.228	12.6	15190	1.233	12.3	19150
			80	67	107.1	16680	10930	1.254	13.3	16400	1.260	13.0	20450
			85	71	108.3	17970	11190	1.283	14.0	17700	1.289	13.7	21840
	3.6	7.7	75	63	100.7	15550	10680	1.211	12.8	15270	1.229	12.4	19190
			80	67	101.5	16850	11010	1.223	13.8	16580	1.241	13.4	20530
			85	71	102.3	18260	11310	1.236	14.8	17990	1.253	14.4	21970
	4.8	13.2	75	63	98.0	15550	10680	1.211	12.8	15270	1.251	12.2	19190
			80	67	98.6	16850	11010	1.223	13.8	16580	1.263	13.1	20530
			85	71	99.2	18260	11310	1.236	14.8	17990	1.276	14.1	21970

Cooling Capacity Data – Console Unit Size 018

EWT	GPM	WPD	System							ISO			
			EA		LWT	TOT	SEN	kW	EER	TOT	kW	EER	THR
100	2.4	3.6	75	63	115.6	14540	10160	1.337	10.9	14270	1.342	10.6	18570
			80	67	116.6	15680	10460	1.355	11.6	15410	1.361	11.3	19770
			85	71	117.7	16900	10730	1.381	12.2	16620	1.386	12.0	21060
	3.6	7.7	75	63	110.4	14590	10180	1.325	11.0	14320	1.342	10.7	18580
			80	67	111.1	15820	10520	1.328	11.9	15550	1.346	11.6	19820
			85	71	111.9	17140	10830	1.338	12.8	16870	1.356	12.4	21170
	4.8	13.2	75	63	107.8	14590	10180	1.325	11.0	14320	1.365	10.5	18580
			80	67	108.3	15820	10520	1.328	11.9	15550	1.368	11.4	19820
			85	71	108.9	17140	10830	1.338	12.8	16870	1.378	12.2	21170
110	2.4	3.6	75	63	125.2	13610	9690	1.473	9.2	13340	1.479	9.0	18070
			80	67	126.1	14670	9980	1.477	9.9	14400	1.482	9.7	19140
			85	71	127.1	15800	10250	1.492	10.6	15530	1.498	10.4	20320
	3.6	7.7	75	63	120.1	13640	9700	1.467	9.3	13360	1.484	9.0	18070
			80	67	120.8	14770	10020	1.454	10.2	14500	1.471	9.9	19160
			85	71	121.5	16000	10340	1.454	11.0	15730	1.471	10.7	20390
	4.8	13.2	75	63	117.6	13640	9700	1.467	9.3	13360	1.506	8.9	18070
			80	67	118.1	14770	10020	1.454	10.2	14500	1.494	9.7	19160
			85	71	118.6	16000	10340	1.454	11.0	15730	1.493	10.5	20390

Capacity Tables Notes:

EWT = Entering Water Temperature (°F)

LWT = Leaving Water Temperature (°F)

COP = Coefficient of Performance

WPD = Water Pressure Drop (Ft. Hd)

TOT = Total Heat (Btu)

THA = Total Heat of Absorption (Btu)

EA = Entering Air Temperature (°F)

SEN = Sensible Heat (Btu)

THR = Total Heat of Rejection (Btu)

kW = Kilowatts

GPM = Gallons Per Minute

Heating Capacity Data – Console Unit Size 018

EWT	GPM	WPD	System					ISO			
			EA	LWT	TOT	kW	COP	TOT	kW	COP	THA
20	2.4	3.6	60	12.8	11560	1.001	3.38	11830	1.007	3.44	8760
			70	13.1	11300	1.055	3.14	11580	1.060	3.20	8360
			80	13.5	11090	1.131	2.87	11360	1.137	2.93	7930
	3.6	7.7	60	15.0	11880	1.017	3.42	12150	1.034	3.44	9040
			70	15.3	11600	1.070	3.18	11880	1.088	3.20	8610
			80	15.5	11360	1.146	2.90	11630	1.164	2.93	8150
	4.8	13.2	60	16.2	12030	1.024	3.44	12300	1.064	3.39	9170
			70	16.4	11740	1.077	3.19	12010	1.117	3.15	8730
			80	16.6	11480	1.153	2.92	11760	1.193	2.89	8260
30	2.4	3.6	60	21.5	13290	1.073	3.63	13570	1.078	3.69	10290
			70	21.9	13000	1.133	3.36	13270	1.138	3.41	9820
			80	22.3	12720	1.213	3.07	13000	1.218	3.12	9310
	3.6	7.7	60	24.2	13670	1.085	3.69	13940	1.102	3.70	10620
			70	24.4	13340	1.146	3.41	13620	1.163	3.43	10120
			80	24.7	13050	1.226	3.12	13320	1.244	3.14	9590
	4.8	13.2	60	25.6	13850	1.090	3.72	14120	1.130	3.66	10790
			70	25.8	13520	1.152	3.44	13790	1.192	3.39	10280
			80	26.0	13210	1.233	3.14	13480	1.273	3.10	9730
40	2.4	3.6	60	30.1	15070	1.121	3.94	15350	1.126	3.99	11920
			70	30.6	14740	1.191	3.62	15010	1.197	3.67	11380
			80	31.1	14410	1.278	3.30	14690	1.284	3.35	10810
	3.6	7.7	60	33.2	15530	1.131	4.02	15800	1.148	4.03	12350
			70	33.5	15160	1.203	3.69	15430	1.221	3.70	11760
			80	33.9	14800	1.291	3.36	15080	1.309	3.37	11150
	4.8	13.2	60	34.8	15750	1.135	4.06	16020	1.175	3.99	12550
			70	35.1	15360	1.208	3.72	15630	1.248	3.67	11950
			80	35.3	14990	1.298	3.38	15260	1.338	3.34	11320
50	2.4	3.6	60	38.7	16910	1.156	4.29	17190	1.161	4.33	13660
			70	39.2	16530	1.238	3.91	16800	1.244	3.96	13040
			80	39.7	16170	1.335	3.55	16440	1.340	3.59	12390
	3.6	7.7	60	42.2	17460	1.165	4.39	17740	1.182	4.40	14180
			70	42.5	17050	1.251	3.99	17320	1.268	4.00	13520
			80	42.9	16650	1.350	3.61	16920	1.367	3.62	12820
	4.8	13.2	60	44.0	17730	1.169	4.44	18010	1.209	4.36	14440
			70	44.3	17300	1.257	4.03	17570	1.296	3.97	13750
			80	44.6	16880	1.357	3.64	17150	1.397	3.60	13030
60	2.4	3.6	60	47.1	18840	1.186	4.66	19120	1.191	4.70	15500
			70	47.7	18430	1.283	4.21	18700	1.288	4.25	14800
			80	48.3	18020	1.392	3.79	18290	1.397	3.83	14070
	3.6	7.7	60	51.1	19490	1.195	4.78	19770	1.213	4.77	16120
			70	51.5	19030	1.297	4.30	19310	1.315	4.30	15360
			80	51.9	18580	1.410	3.86	18860	1.427	3.87	14580
	4.8	13.2	60	53.2	19810	1.201	4.83	20090	1.240	4.74	16430
			70	53.5	19340	1.305	4.34	19610	1.345	4.27	15640
			80	53.8	18870	1.419	3.90	19140	1.459	3.84	14840
70	2.4	3.6	60	55.5	20860	1.218	5.01	21130	1.224	5.06	17420
			70	56.1	20410	1.332	4.49	20680	1.338	4.53	16630
			80	56.8	19960	1.455	4.02	20240	1.461	4.06	15820
	3.6	7.7	60	59.9	21650	1.233	5.14	21920	1.251	5.13	18160
			70	60.4	21140	1.353	4.58	21420	1.370	4.58	17310
			80	60.9	20650	1.480	4.09	20920	1.497	4.09	16440
	4.8	13.2	60	62.3	22020	1.241	5.20	22300	1.281	5.10	18520
			70	62.6	21500	1.363	4.62	21770	1.403	4.55	17630
			80	63.0	20980	1.492	4.12	21250	1.532	4.06	16730
80	2.4	3.6	60	63.8	22990	1.262	5.33	23260	1.268	5.37	19420
			70	64.5	22500	1.395	4.73	22780	1.400	4.77	18540
			80	65.2	22020	1.533	4.21	22290	1.538	4.25	17650
	3.6	7.7	60	68.7	23900	1.286	5.44	24170	1.304	5.43	20260
			70	69.2	23360	1.424	4.81	23640	1.442	4.80	19310
			80	69.8	22830	1.568	4.27	23110	1.585	4.27	18360
	4.8	13.2	60	71.3	24360	1.299	5.49	24640	1.339	5.39	20690
			70	71.8	23800	1.440	4.84	24070	1.480	4.76	19700
			80	72.2	23230	1.586	4.29	23500	1.626	4.24	18700
85	2.4	3.6	60	67.9	24080	1.291	5.46	24350	1.296	5.50	20430
			70	68.7	23590	1.433	4.82	23870	1.438	4.86	19520
			80	69.4	23100	1.580	4.28	23370	1.585	4.32	18590
	3.6	7.7	60	73.1	25080	1.321	5.56	25350	1.338	5.55	21340
			70	73.6	24520	1.469	4.89	24800	1.487	4.89	20340
			80	74.2	23970	1.620	4.33	24240	1.638	4.33	19330
	4.8	13.2	60	75.9	25570	1.337	5.60	25840	1.377	5.50	21780
			70	76.3	24990	1.489	4.92	25260	1.529	4.84	20750
			80	76.7	24410	1.642	4.35	24680	1.682	4.30	19710

Heating Capacity Data – Console Unit Size 018

EWT	GPM	WPD	System					ISO			
			EA	LWT	TOT	kW	COP	TOT	kW	COP	THA
90	2.4	3.6	60	72.0	25210	1.325	5.57	25490	1.330	5.61	21460
			70	72.8	24700	1.476	4.90	24980	1.482	4.94	20500
			80	73.6	24190	1.632	4.34	24470	1.637	4.38	19530
	3.6	7.7	60	77.5	26290	1.363	5.65	26570	1.380	5.64	22430
			70	78.1	25720	1.521	4.95	25990	1.538	4.95	21380
			80	78.6	25140	1.681	4.38	25410	1.698	4.38	20330
	4.8	13.2	60	80.4	26820	1.383	5.68	27090	1.423	5.58	22900
			70	80.9	26210	1.544	4.97	26490	1.584	4.90	21810
			80	81.3	25610	1.707	4.39	25880	1.747	4.34	20720

Capacity Tables Notes:

EWT = Entering Water Temperature (°F)

LWT = Leaving Water Temperature (°F)

COP = Coefficient of Performance

WPD = Water Pressure Drop (Ft. Hd)

TOT = Total Heat (Btu)

THA = Total Heat of Absorption (Btu)

EA = Entering Air Temperature (°F)

SEN = Sensible Heat (Btu)

THR = Total Heat of Rejection (Btu)

kW = Kilowatts

GPM = Gallons Per Minute

Performance Data

Water Loop

Rated in Accordance with ISO Standard 13256-1 Boiler/Tower

Unit Size	Airflow		Waterflow		Voltage	Cooling				Heating		
	CFM	L/S	GPM	L/S		Btuh/hr	Watts	EER	COP	Btuh/hr	Watts	COP
007	*	*	*	*	115-60-1	*	*	*	*	*	*	*
					208/230-60-1							
					265/277-60-1							
009	347	164	2.43	0.153	115-60-1	9170	651	14.1	4.1	11000	686	4.7
					208/230-60-1							
					265/277-60-1							
012	275	130	2.90	0.183	115-60-1	11600	776	14.9	4.4	13900	894	4.6
					208/230-60-1							
					265/277-60-1							
015	559	264	3.70	0.233	208/230-60-1	14500	964	15.1	4.4	18200	1031	5.2
					265/277-60-1							
					208/230-60-1	16400	1223	13.4	3.9	20900	1379	4.4
018	421	199	4.61	0.291	265/277-60-1							

*Not available at time of publication. Please consult your McQuay Representative for specific availability

Ground Loop

Rated in Accordance with ISO Standard 13256-1

Unit Size	Airflow		Waterflow		Voltage	Cooling				Heating		
	CFM	L/S	GPM	L/S		Btuh/hr	Watts	EER	COP	Btuh/hr	Watts	COP
007	*	*	*	*	115-60-1	*	*	*	*	*	*	*
					208/230-60-1							
					265/277-60-1							
009	347	164	2.43	0.153	115-60-1	9730	602	16.2	4.7	7030	627	3.3
					208/230-60-1							
					265/277-60-1							
012	275	130	2.90	0.183	115-60-1	12300	700	17.5	5.1	9000	780	3.4
					208/230-60-1							
					265/277-60-1							
015	559	264	3.70	0.233	208/230-60-1	15400	885	17.3	5.1	10900	940	3.4
					265/277-60-1							
					208/230-60-1	17300	1132	15.3	4.5	13700	1189	3.4
018	421	199	4.61	0.291	265/277-60-1							

*Not available at time of publication. Please consult your McQuay Representative for specific availability

Ground Source

Rated in Accordance with ISO Standard 13256-1

Unit Size	Airflow		Waterflow		Voltage	Cooling				Heating		
	CFM	L/S	GPM	L/S		Btuh/hr	Watts	EER	COP	Btuh/hr	Watts	COP
007	*	*	*	*	115-60-1	*	*	*	*	*	*	*
					208/230-60-1							
					265/277-60-1							
009	347	164	2.43	0.153	115-60-1	11000	465	23.8	7.0	9060	657	3.0
					208/230-60-1							
					265/277-60-1							
012	275	130	2.90	0.183	115-60-1	13500	555	24.3	7.1	11600	841	4.1
					208/230-60-1							
					265/277-60-1							
015	559	264	3.70	0.233	208/230-60-1	17600	716	24.6	7.2	14400	987	4.3
					265/277-60-1							
					208/230-60-1	19000	928	20.4	6.0	17400	1277	4.0
018	421	199	4.61	0.291	265/277-60-1							

*Not available at time of publication. Please consult your McQuay Representative for specific availability

Performance Data

Electrical – Standard Static Motor

Unit Size	Voltage-Hz-Phase	Compressor		Fan Motor FLA	Total Unit FLA	Min. Voltage	Min. Circuit Amps	Max. Fuse Size
		RLA	LRA					
007	115-60-1	*	*	*	*	*	*	*
	208/230-60-1	*	*	*	*	*	*	*
	265/277-60-1	*	*	*	*	*	*	*
009	115-60-1	8.0	50	0.50	8.50	104	10.5	15.0
	208/230-60-1	3.7	22	0.25	4.0	187	4.9	6.0
	265/277-60-1	3.5	22	0.23	3.7	239	4.6	6.0
012	115-60-1	9.5	50	0.50	10.0	104	12.4	20.0
	208/230-60-1	4.7	25	0.25	5.0	187	6.1	10.0
	265/277-60-1	4.2	22	0.23	4.4	239	5.5	6.0
015	208/230-60-1	5.6	29	0.33	5.9	187	7.3	10.0
	265/277-60-1	5.0	28	0.33	5.3	239	6.6	10.0
018	208/230-60-1	7.4	33	0.33	7.7	187	9.6	15.0
	265/277-60-1	6.0	28	0.33	6.3	239	7.8	10.0

* Not available at time of publication. Please consult your McQuay Representative for specific availability.

Electrical – Standard Static Motor and Optional Electric Heater (Heat Pump Not Running)

Unit Size	Voltage-Hz-Phase	Electric Heater FLA	Fan Motor FLA	Total Unit FLA	Min. Voltage	Min. Circuit Amps	Max. Fuse Size
007	115-60-1	*	*	*	*	*	*
	208/230-60-1	*	*	*	*	*	*
	265/277-60-1	*	*	*	*	*	*
009	115-60-1	*	*	*	*	*	*
	208/230-60-1	10.7	0.25	11.0	187	13.7	15.0
	265/277-60-1	12.3	0.23	12.5	239	15.7	20.0
012	115-60-1	*	*	*	*	*	*
	208/230-60-1	10.7	0.25	11.0	187	13.7	15.0
	265/277-60-1	12.3	0.23	12.5	239	15.7	20.0
015	208/230-60-1	14.6	0.3	14.9	187	18.6	20.0
	265/277-60-1	16.8	0.3	17.1	239	21.4	25.0
018	208/230-60-1	14.6	0.33	14.9	187	18.6	20.0
	265/277-60-1	16.8	0.33	17.1	239	21.4	25.0

* Not available at time of publication. Please consult your McQuay Representative for specific availability.

Unit Physical Data

Unit Size		*007	009	012	015	018
Fan Wheel - D x W (In.)		4 $\frac{7}{8}$ x 27 $\frac{1}{4}$	4 $\frac{7}{8}$ x 27 $\frac{1}{4}$	4 $\frac{7}{8}$ x 27 $\frac{1}{4}$	4 $\frac{7}{8}$ x 35 $\frac{3}{8}$	4 $\frac{7}{8}$ x 35 $\frac{3}{8}$
Fan Motor Horsepower		1/30	1/30	1/30	1/18	1/18
Coil Face Area (Sq. Ft.)		1.67	1.67	1.67	2.22	2.22
Coil Rows		2	2	3	2	3
Refrigerant Charge (Oz.)		17.6	19.2	22	29.9	32
Filter, (Qty.) Size (In.)	Low Sill	(1) 23 $\frac{3}{4}$ W x 8 $\frac{3}{4}$ D			(1) 31 $\frac{3}{4}$ W x 8 $\frac{3}{4}$ D	
	High Sill	(1) 29 $\frac{1}{4}$ W x 9 $\frac{3}{4}$ D			(1) 37 $\frac{1}{4}$ W x 9 $\frac{3}{4}$ D	
Water Connections, Female NPT (In.)		5/8 O.D.	5/8 O.D.	5/8 O.D.	5/8 O.D.	5/8 O.D.
Condensate Connections, Female NPT (In.)		3/4 I.D.	3/4 I.D.	3/4 I.D.	3/4 I.D.	3/4 I.D.
Weight, Operating (Lbs.)		142	144	146	166	171
Weight, Shipping (Lbs.)		162	164	166	196	201

* Not available at time of publication. Please consult your McQuay Representative for specific availability.

Performance Data

Fan Performance

Airflow Vs. CFM - Standard Static Motor

Unit Size	Fan Speed	Cooling		Heating	
		SCFM	L/s	SCFM	L/s
007	Low	*	*	*	*
	High	*	*	*	*
009	Low	258	122	264	124
	High	347	164	355	167
012	Low	243	115	256	121
	High	275	130	300	142
015	Low	340	160	376	177
	High	559	265	619	292
018	Low	316	149	338	160
	High	421	199	450	212

*Not available at time of publication. Please consult your McQuay Representative for specific availability

Operating Limits

Air Limits - °F (English units)

	Standard Range Units		Geothermal 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. Entering Air ^{1,2}	50°F	50°F	50°F	40°F
Normal Entering Air db/wb	80/67°F	70°F	80/67°F	70°F
Max Entering Air db/wb ^{1,2}	100/83°F	80°F	100/83°F	80°F

Air Limits - °C (SI units)

	Standard Range Units		Geothermal 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. Entering Air ^{1,2}	10°C	10°C	10°C	5°C
Normal Entering Air db/wb	27/19°C	21°C	27/19°C	21°C
Max Entering Air db/wb ^{1,2}	38/28°C	27°C	38/28°C	27°C

Water - °F (English units)

	Standard Range Units		Geothermal Range Units	
	Cooling	Heating	Cooling	Heating
Min. Entering Water ^{1,2}	55°F	55°F	30°F	20°F
Normal Entering Water	85°F	70°F	77°F	40°F
Max Entering Water	110°F	90°F	110°F	90°F

Water - °C (SI units)

	Standard Range Units		Geothermal Range Units	
	Cooling	Heating	Cooling	Heating
Min. Entering... Water ^{1,2}	13°C	13°C	-1°C	-6°C
Normal Entering Water	29°C	21°C	25°C	4°C
Max Entering Water	43°C	32°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 voltage is acceptable. Three-phase system imbalance shall not exceed 2%.

Additional Information for Initial Start-Up Only

Standard Range 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 ISO 13256-1 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.

Geothermal Range Units:

Geothermal 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 ISO 13256-1 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.

Performance Data

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 Absorption	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

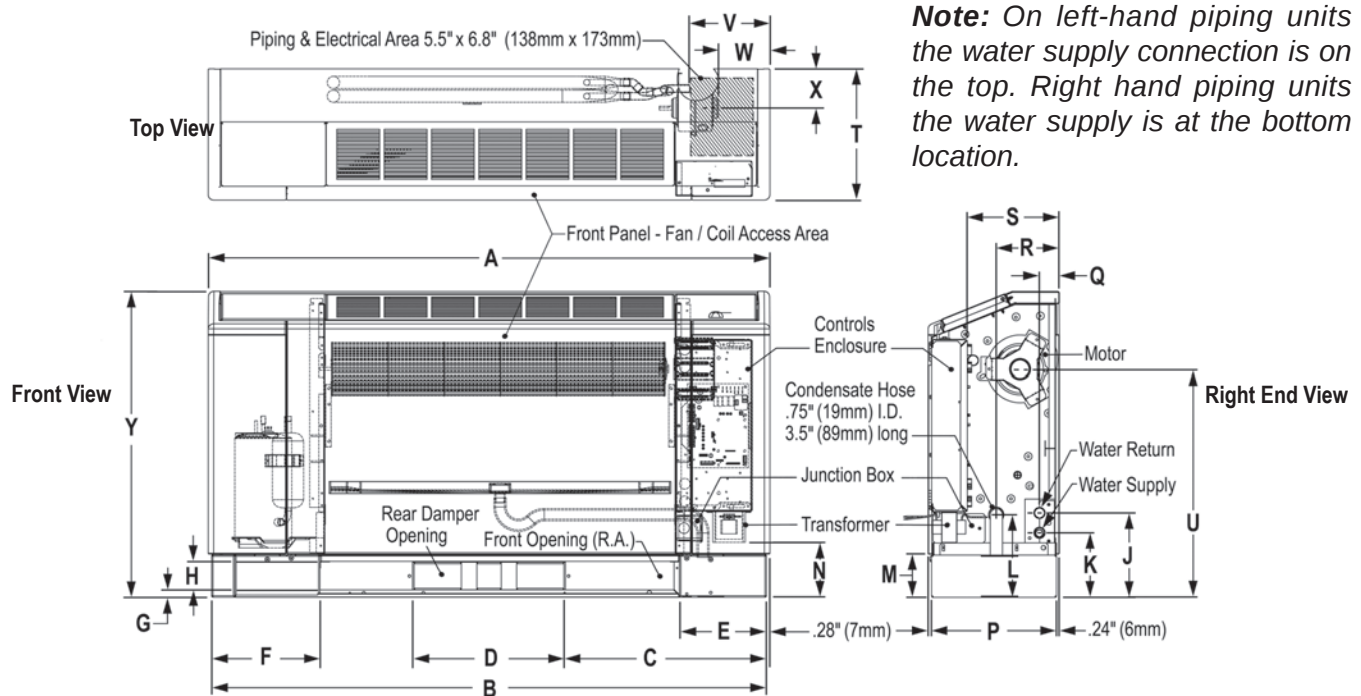
	10%	20%	30%	40%	50%
Cooling Capacity	0.9980	0.9720	—	—	—
Heating Capacity	0.9950	0.9700	—	—	—
Pressure Drop	1.0230	1.0570	—	—	—

Ethanol

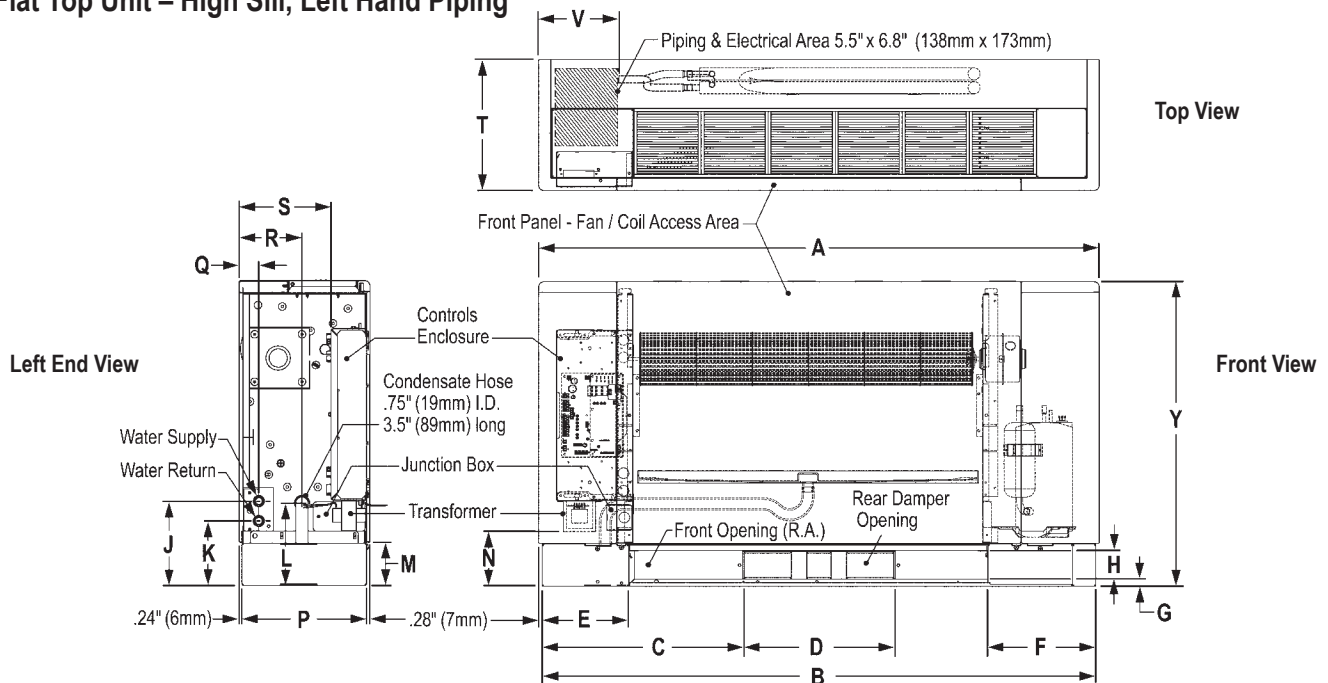
	10%	20%	30%	40%	50%
Cooling Capacity	0.9910	0.9510	—	—	—
Heating Capacity	0.9950	0.9600	—	—	—
Pressure Drop	1.0350	0.9600	—	—	—

Dimensional Data – Unit Size 007 - 012

Slope Top Unit – High Sill, Right Hand Piping



Flat Top Unit – High Sill, Left Hand Piping



Dimensions

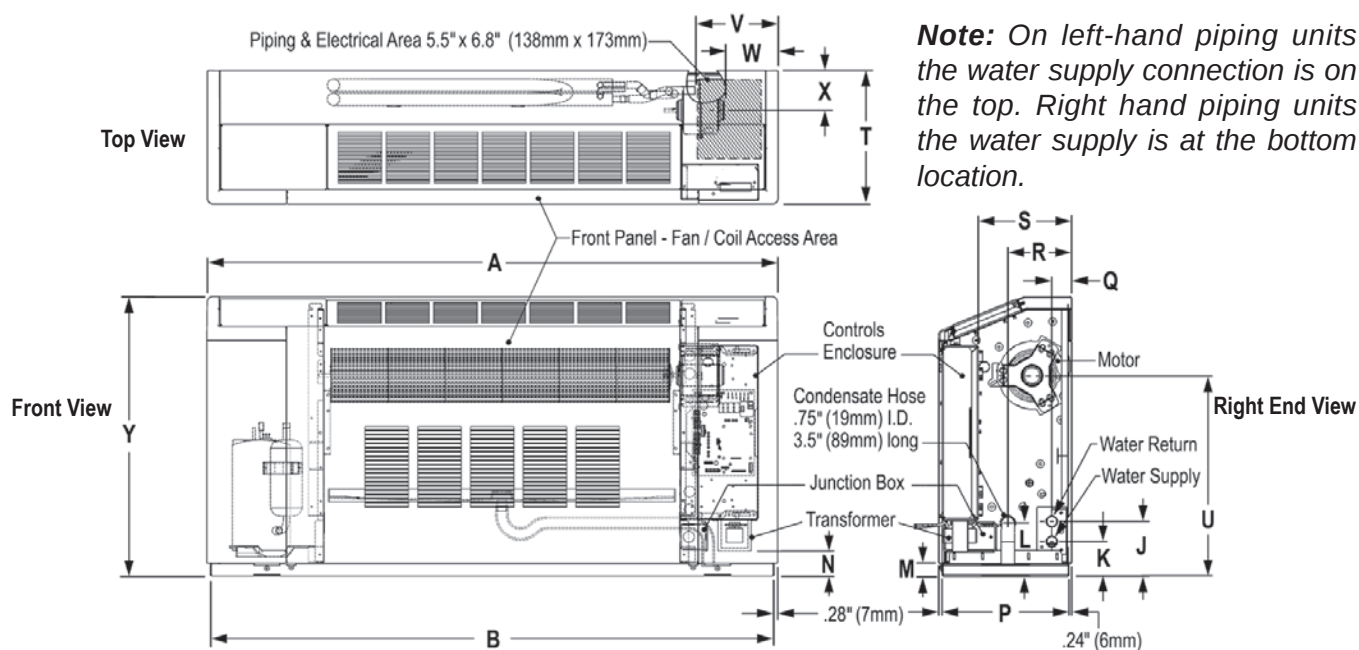
Unit Size	A	B	C	D	E	F	G	H	J	K	L	M
*007-012	46\" (1168mm)	45½\" (1153mm)	16½\" (418mm)	12½\" (318mm)	7\" (181mm)	8⅞\" (225mm)	0.6\" (14mm)	2¼\" (57mm)	6⅞\" (175mm)	5⅛\" (132mm)	6¾\" (172mm)	3½\" (90mm)
N	P	Q	R	S	T	U	V	W	X	Y		
4¼\" (108mm)	10¼\" (260mm)	1⅜\" (41mm)	5¼\" (134mm)	7½\" (192mm)	10¾\" (273mm)	18¾\" (476mm)	6⅞\" (168mm)	6\" (152mm)	3¼\" (83mm)	25\" (635mm)		

Note: Dimensions are approximate

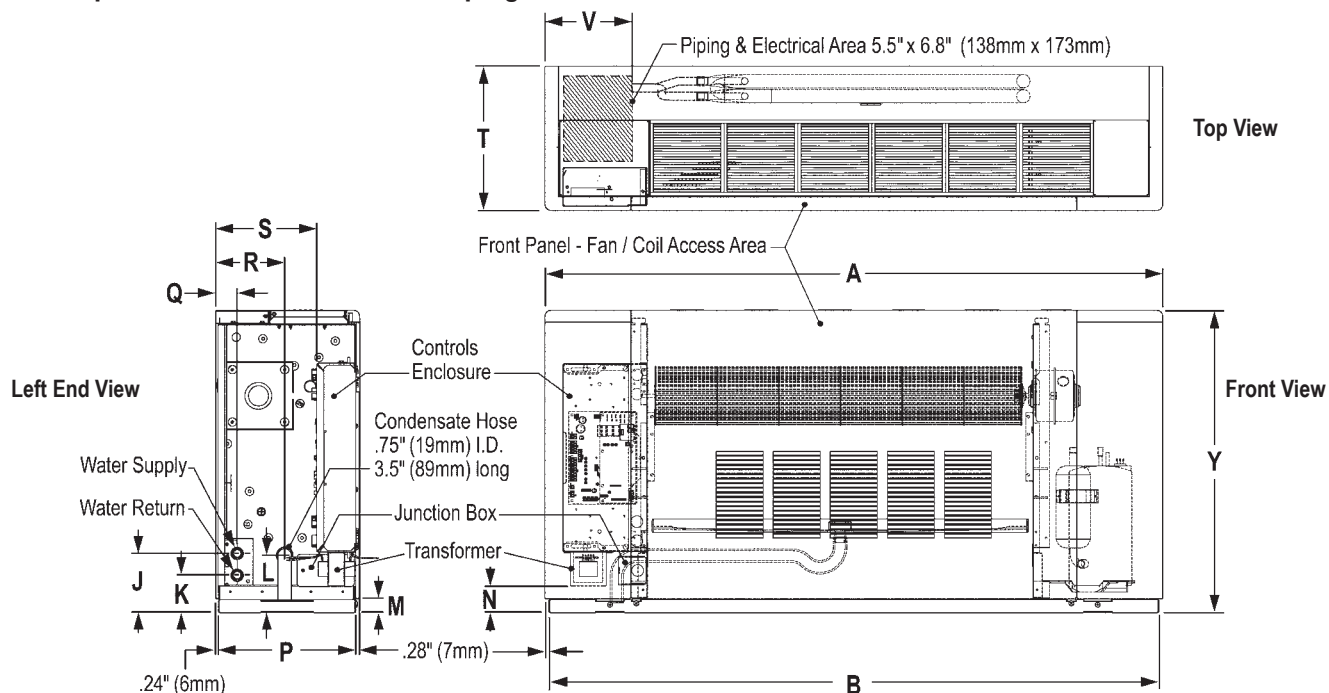
*Unit size 007 not available at time of publication. Please consult your McQuay Representative for specific availability.

Dimensional Data – Unit Size 007 - 012

Slope Top Unit – Low Sill, Right Hand Piping



Flat Top Unit – Low Sill, Left Hand Piping



Dimensions

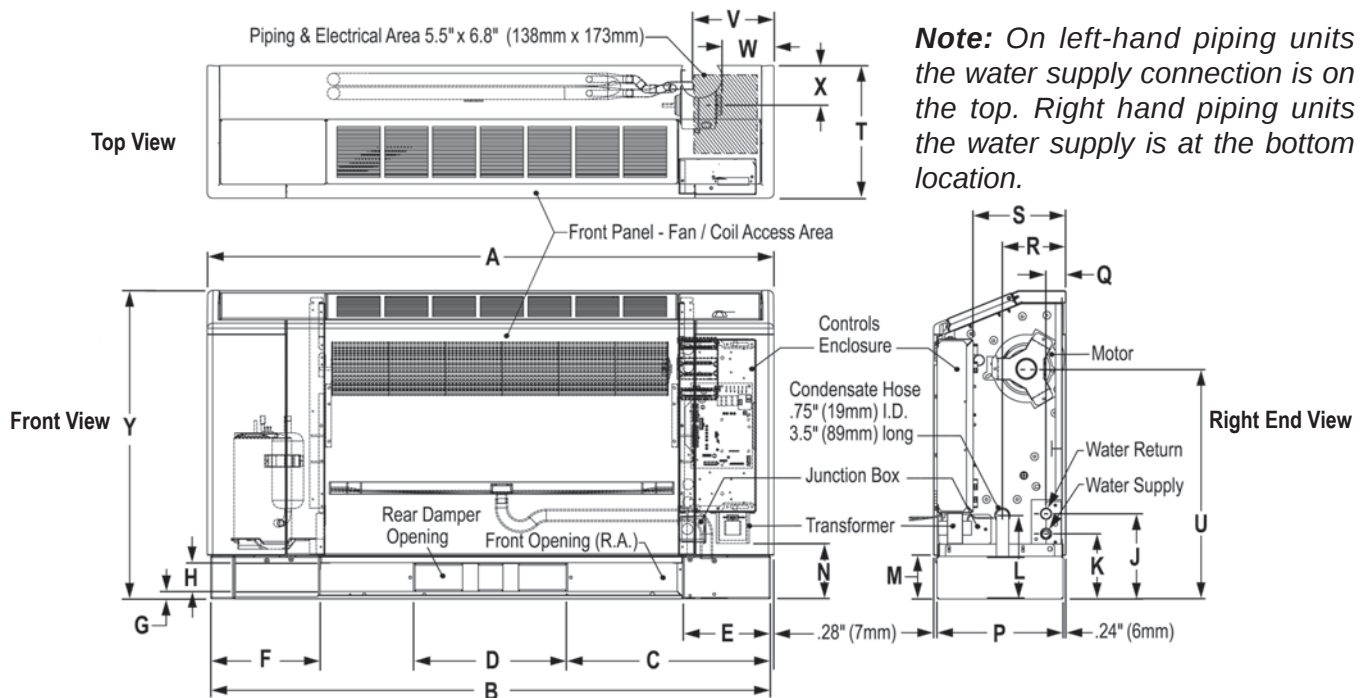
Unit Size	A	B	J	K	L	M	N	P	Q	R	S	T
*007-012	46" (1168mm)	45 3/4" (1153mm)	4 3/8" (111mm)	2 3/4" (70mm)	4 1/4" (108mm)	1" (26mm)	1 3/4" (45mm)	10 1/4" (260mm)	1 3/5" (41mm)	5 1/5" (131mm)	7 1/2" (192mm)	10 3/4" (273mm)
U	V	W	X	Y								
16 1/4" (413mm)	6 5/8" (168mm)	6" (152mm)	3 1/4" (83mm)	22 1/2" (572mm)								

Note: Dimensions are approximate

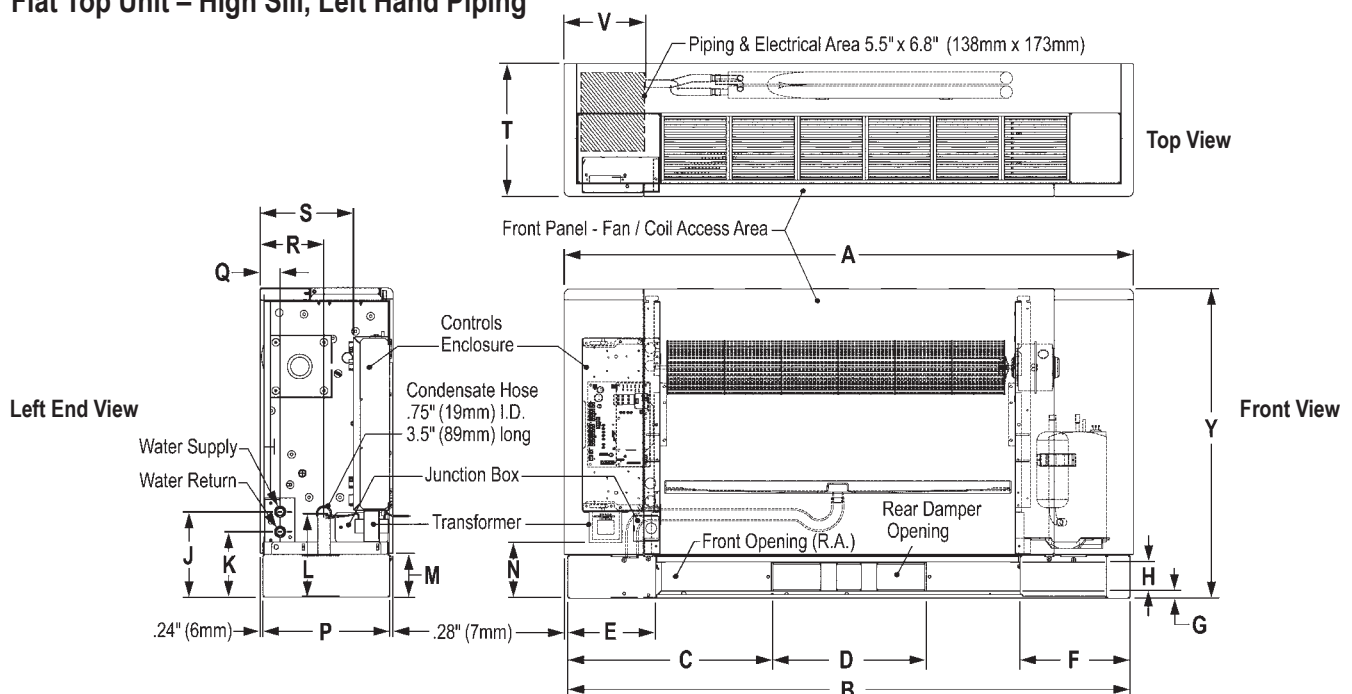
*Unit size 007 not available at time of publication. Please consult your McQuay Representative for specific availability.

Dimensional Data – Unit Size 015 - 018

Slope Top Unit – High Sill, Right Hand Piping



Flat Top Unit – High Sill, Left Hand Piping



Dimensions

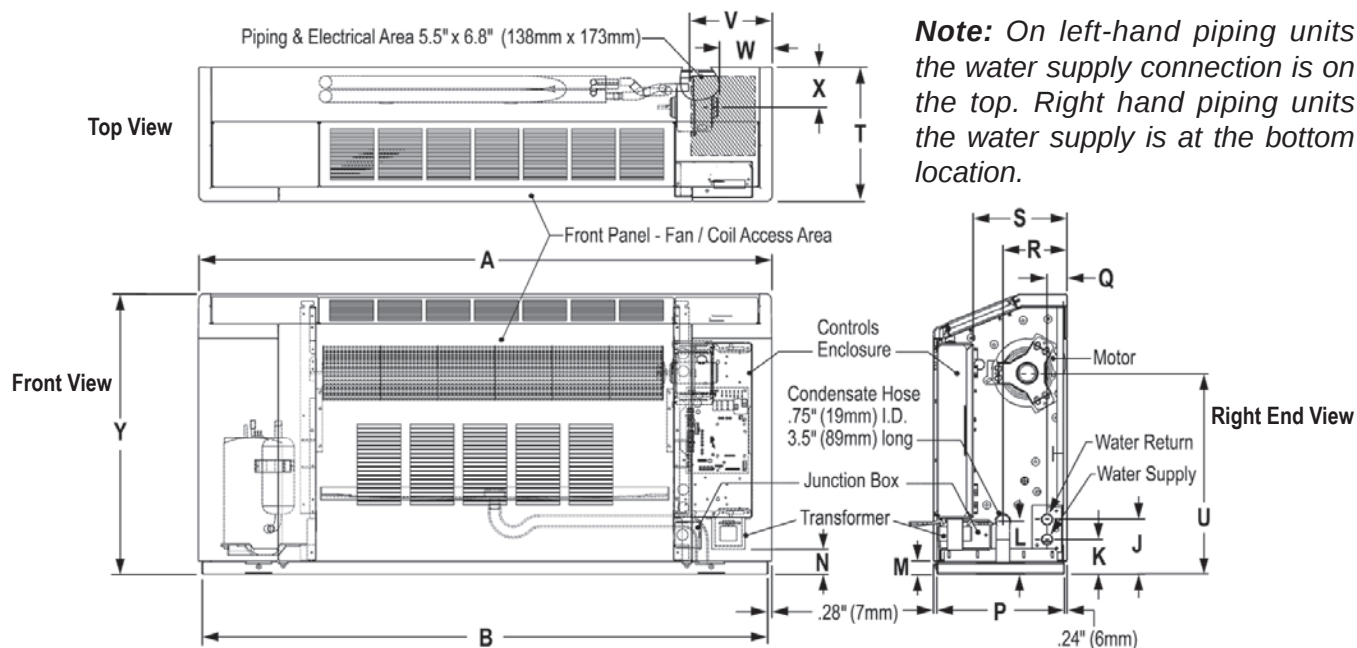
Unit Size	A	B	C	D	E	F	G	H	J	K	L	M
015-018	54" (1372mm)	53 3/4" (1356mm)	20 1/2" (519mm)	12 1/2" (318mm)	7" (181mm)	8 7/8" (225mm)	0.6" (14mm)	2 1/4" (57mm)	6 7/8" (175mm)	5 1/5" (132mm)	6 3/4" (172mm)	3 1/2" (90mm)
	N	P	Q	R	S	T	U	V	X	Y		
	4 1/4" (108mm)	10 1/4" (260mm)	1 3/5" (41mm)	5 1/4" (134mm)	7 1/2" (192mm)	10 3/4" (273mm)	18 3/4" (476mm)	6 5/8" (168mm)	6" (152mm)	3 1/4" (83mm)	25" (635mm)	

Note: Dimensions are approximate

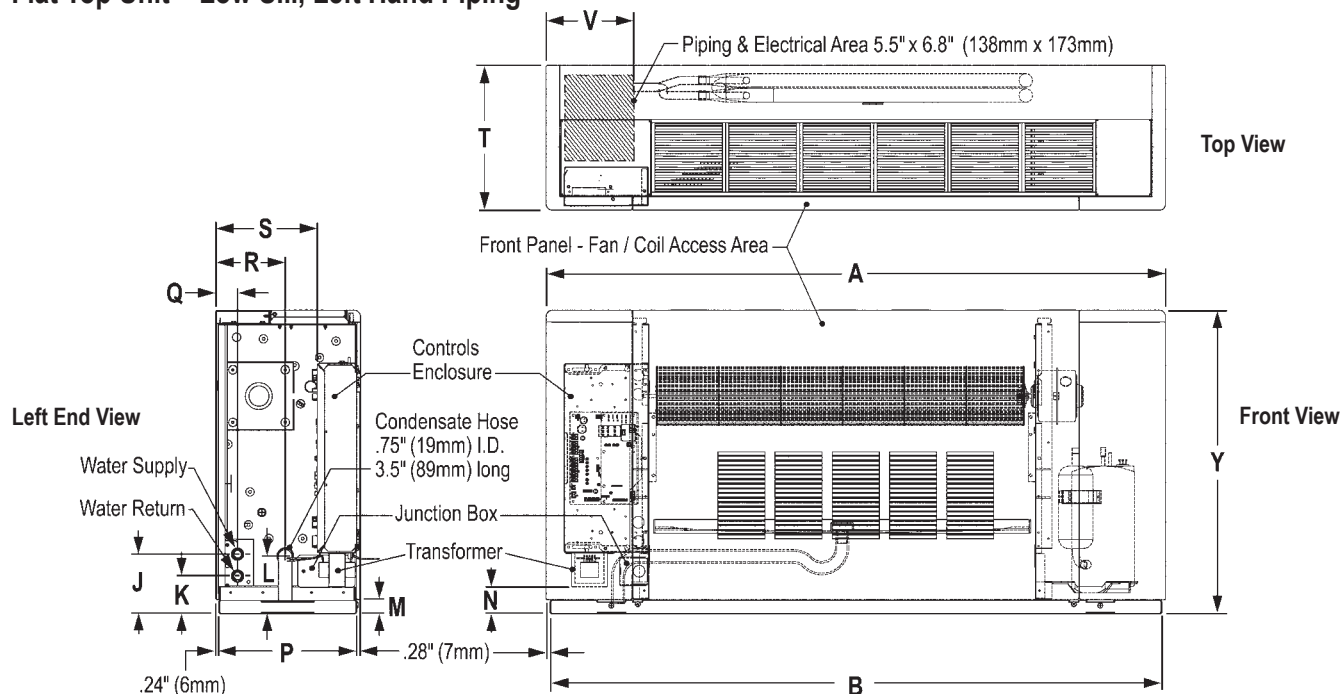
*Unit size 007 not available at time of publication. Please consult your McQuay Representative for specific availability.

Dimensional Data – Unit Size 015 - 018

Slope Top Unit – Low Sill, Right Hand Piping



Flat Top Unit – Low Sill, Left Hand Piping



Dimensions

Unit Size	A	B	J	K	L	M	N	P	Q	R	S	T
015-018	54" (1372mm)	53 3/4" (1356mm)	4 3/8" (111mm)	2 3/4" (70mm)	4 1/4" (108mm)	1" (26mm)	1 3/4" (45mm)	10 1/4" (260mm)	1 3/5" (41mm)	5 1/4" (134mm)	7 1/2" (192mm)	10 3/4" (273mm)
U	V	W	X	Y								
16 1/4" (413mm)	6 5/8" (168mm)	6" (152mm)	3 1/4" (83mm)	22 1/2" (572mm)								

Note: Dimensions are approximate

*Unit size 007 not available at time of publication. Please consult your McQuay Representative for specific availability.

Accessories

These easy-to-operate comfort command centers bring you a complete range of deluxe features. Features that enable you to match temperature programming to your application, provide added convenience, and help save energy and money. All packed into an extra rugged, highly reliable design that will look and perform like new for years to come.

Thermostats and Wall Sensors

Easy-to-operate comfort command centers provide a complete range of deluxe features.

Wall-Mounted Programmable Electronic Thermostat (P/N 668810301)

1 Heat/1 Cool, Auto Changeover, Hardwired



- 7-Day, 5- 2-Day 5-1-1 Day Programmable
- Configurable
- Single-Stage Heat/Cool Systems
- Single-Stage Heat Pump Systems
- Large Display With Backlight
- Selectable Fahrenheit or Celsius
- SimpleSet™ Field Programming
- Status Indicator Light
- Relay Outputs (minimum voltage drop in thermostat)
- Remote Sensor Compatible
- Ideally Suited for:
 - Residential (New Construction/Replacement)
 - Light Commercial

Specifications–668810301

Electrical rating: • 24 VAC (18-30 VAC)

- 1 amp maximum per terminal
- 3 amp maximum total load

Temperature control range: 45°F to 90°F (7°C to 32°C) Accuracy: ± 1°F (± 0.5°C)

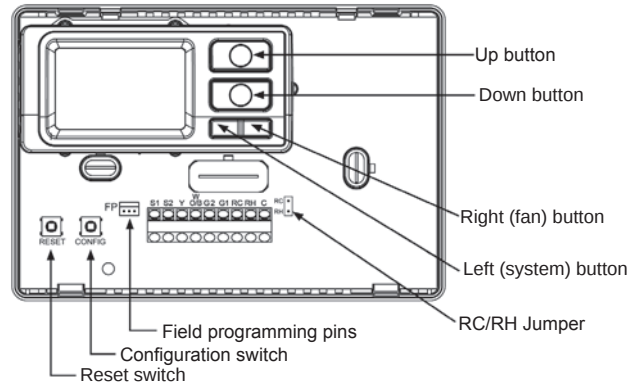
System configurations: 1-stage heat, 1-stage cool, heat pump

Timing: Anti-short Cycle: 4 minutes
Backlight Operation

Terminations: S1, S2, Y, W/O/B, G2, G1, RC, RH, C

For detailed installation, operation and application refer to Operation & Application Guide LIA303

Figure 14. Thermostat Parts Diagram - Part No. 668810301



Non-Programmable Electronic Thermostat (P/N 668811201)

1 Heat/1 Cool, Auto Changeover, Fan Speed Control, Hardwired



- Configurable
- Single-Stage Heat/Cool Systems
- Single-Stage Heat Pump Systems
- Fan Speed Control
- Large Display With Backlight
- Selectable Fahrenheit or Celsius
- SimpleSet™ Field Programming
- Status Indicator Light
- Relay Outputs (minimum voltage drop in thermostat)
- Remote Sensor Compatible
- Ideally Suited for:
 - Residential (New Construction/Replacement)
 - Light Commercial

Accessories

Specifications–668811201

Electrical rating: • 24 VAC (18-30 VAC)

- 1 amp maximum per terminal
- 3 amp maximum total load

Temperature control range: 45°F to 90°F (7°C to 32°C) Accuracy: $\pm 1^\circ\text{F}$ ($\pm 0.5^\circ\text{C}$)

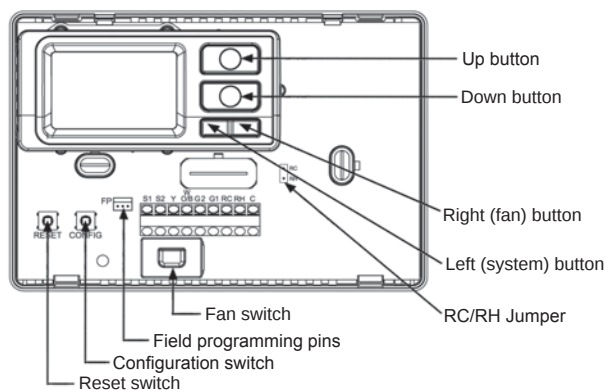
System configurations: 1-stage heat, 1-stage cool, heat pump

Timing: Anti-short Cycle: 4 minutes
Backlight Operation

Terminations: S1, S2, Y, W/O/B, G2, G1, RC, RH, C

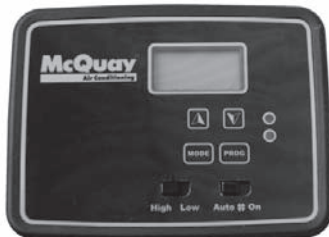
For detailed installation, operation and application refer to Operation & Application Guide LIAF014

Figure 15. Thermostat Parts Diagram - Part No. 668811201



Programmable Electronic Thermostat (P/N 668811101)

7-Day Programmable, Auto Changeover, Fan Speed Control, Hardwired



- 7-Day Programmable
- Single Stage Heat Pump/Non-Heat Pump Systems
- Backlit Display
- Single Stage Heat/Cool Systems
- Field Calibration
- Auto Changeover

- Button Lockout Function
- Two Speed Fan Control
- SimpleSet™ Programming
- Remote Temperature Sensor Capability
- Title 24 Compliant / No Batteries Required
- Relay Outputs (minimum voltage drop in thermostat)
- Ideally Suited for:
 - Residential (New Construction/Replacement)
 - Light Commercial

Specifications–668811101

Electrical rating: • 24 VAC (18-30 VAC)

- 1 amp maximum per terminal
- 3 amp maximum total load

Temperature control range: 45°F to 90°F (7°C to 32°C) Accuracy: $\pm 1^\circ\text{F}$ ($\pm 0.5^\circ\text{C}$)

System configurations: 1-stage heat, 1-stage cool, heat pump

Timing: Anti-short Cycle: 5 minutes
Backlight Operation: 10 seconds

Terminations: C, RH, RC, W, Y, B, O G1, G2, S1, S2

For detailed installation, operation and application refer to Operation & Application Guide LIAF015

Non-Programmable Electronic Thermostat (P/N 668811001)

Non-Programmable, Auto Changeover, Fan Speed Control, Hardwired



- Single Stage Heat Pump/Non-Heat Pump Systems
- Backlit Display
- Single Stage Heat/Cool Systems
- Field Calibration
- Auto Changeover
- Button Lockout Function
- Two Speed Fan Control
- Remote Temperature Sensor Capability

Accessories

- Title 24 Compliant / No Batteries Required
- Relay Outputs (minimum voltage drop in thermostat)
- Ideally Suited for:
 - Residential (New Construction/Replacement)
 - Light Commercial

Specifications-668811001

Electrical rating: • 24 VAC (18-30 VAC)

- 1 amp maximum per terminal
- 3 amp maximum total load

Temperature control range: 45°F to 90°F (7°C to 32°C) Accuracy: $\pm 1^\circ\text{F}$ ($\pm 0.5^\circ\text{C}$)

System configurations: 1-stage heat, 1-stage cool, heat pump

Timing: Anti-short Cycle: 5 minutes

Backlight Operation: 10 seconds

Terminations: C, RH, RC, W, Y, B, O G1, G2, S1, S2

For detailed installation, operation and application refer to Operation & Application Guide LIAF016

MicroTech III Water Source Heat Pump Room Temperature Sensors

Room temperature sensors provide electronic sensing of room temperatures at wall locations. All sensor models feature a thermistor (10k Ω), a green LED for unit status and tenant override button. Setpoint adjustment potentiometer, heat and fan mode switches are optional features.



Sensor 668900801

- Set Point Adjustment
- LED
- Override feature

The fast, easy solution for temperature sensing problems.



Sensor 667720401
(Standard Sensor Only)



Sensor 669088101

- Status LED
- Override Button

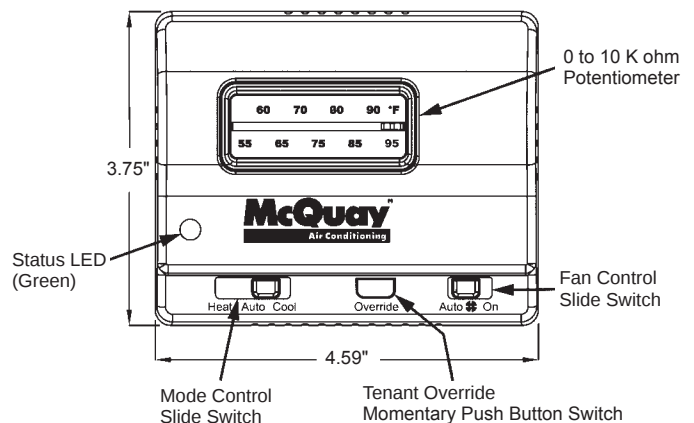
Feature	Sensor Part Numbers		
	669088101	668900801	669088201
Tenant Override Button	Yes	Yes	Yes
SPT Adj. Pot	No	Yes	Yes
Status LED	Yes	Yes	Yes
Fan and Mode Switches	No	¹ Yes	² Yes

Notes:

¹ 55° to 95°F (13° to 35°C)

² -3° to +3°F (-1.5° to +1.5°C)

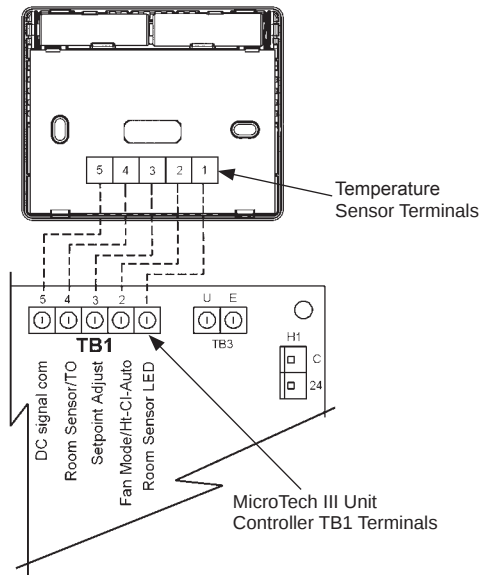
Room Temperature Sensor User Interface



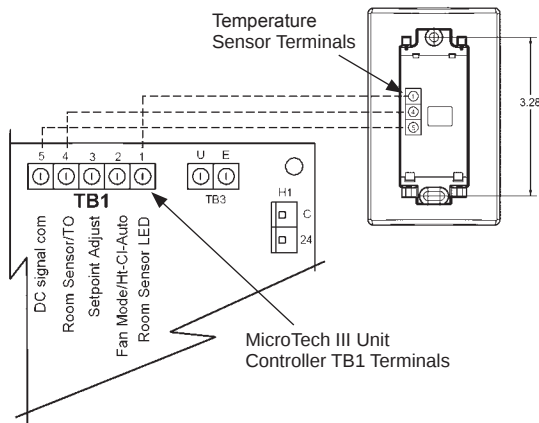
Accessories

Optional Water Source Heat Pump Room Temperature Sensors Wiring

Part No.s 668900801, 669088201



Part No. 669088101



Wireless Temperature Control (T9000)

The T9000 Wireless Temperature Control is designed to provide precision temperature control without the installation labor and expense of wiring.

- Powered by AA batteries
- Mounts in any suitable location that will provide good temperature control.
- Large LCD display provides the user with current room temperature, set point temperature, time, program interval, and other system status information.

For detailed installation, operation refer to Operation & Maintenance Bulletin OM 984.



The second part of the T9000 system is called a Remote Control Node or "RCN". An RCN interfaces with specific desired HVAC equipment, and communicates with its thermostat using unlicensed 900 MHz, radio frequency energy. At the time of installation, the T9000 thermostat is linked to one or more RCN controls. The thermostat and RCN that have been linked will not interfere with, or be affected by, any other thermostat or RCN in adjacent rooms, apartments, or neighboring homes.

Remote Control Node (RCN)

Used with the Wireless Temperature Control, the RCN interfaces with specific HVAC equipment, and communicates with its thermostat using unlicensed 900 MHz, radio frequency energy. Contact your local McQuay Representative for details.



Accessories

Supply and Return Water Hoses

Available as fire rated construction in lengths of 9", 12" or 24". Fire rated hoses have a synthetic polymer core with an outer rated covering of stainless 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



Combination Balancing and Shutoff 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



2-Way 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.

2-Way Motorized Valve

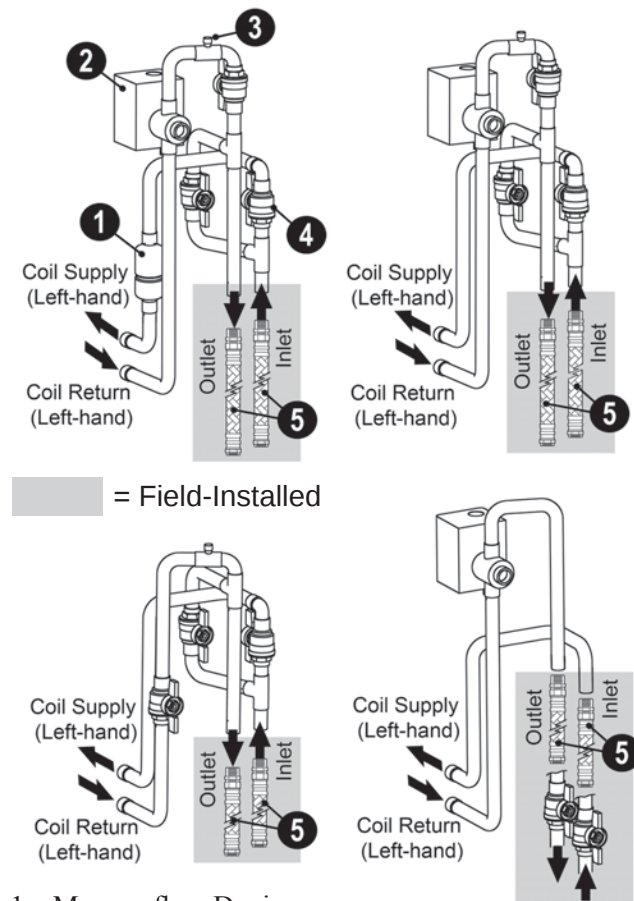


- A motorized valve relay and control valve assembly includes a relay, valve and wire harness. The valve opens when the compressor is turned on and closes when the compressor is off. The valve is rated for 300 psig (2070 kPa).
- A multiple unit control panel allows a single wall-mounted thermostat to control up to three units in a common space.
- An auxiliary relay controls optional devices when the fan is operating. The relay has SPDT contacts.

Piping Packages

Piping packages can be ordered as a factory installed option. Motorized valves can be ordered as a field-installed accessory.

Typical Left Hand Piping Package Configurations



1. Measureflow Device
2. 2-Way Motorized Isolation Valve
3. Air Bleed Vent
4. Supply, Return and Bypass Hand Valve
5. Inlet-Outlet Flexible Hoses (Field-installed)

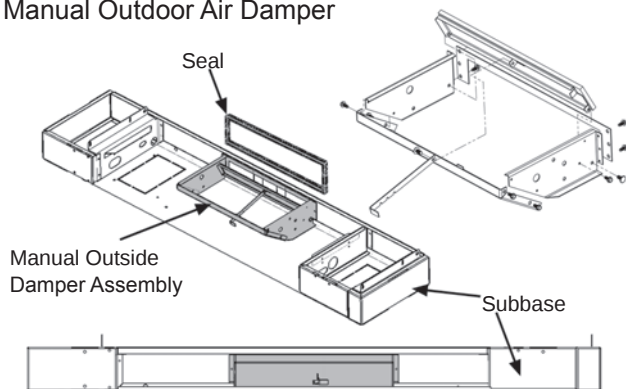
Note: On left-hand piping units the water supply connection is on the top. Right hand piping units the water supply is at the bottom location.

Accessories

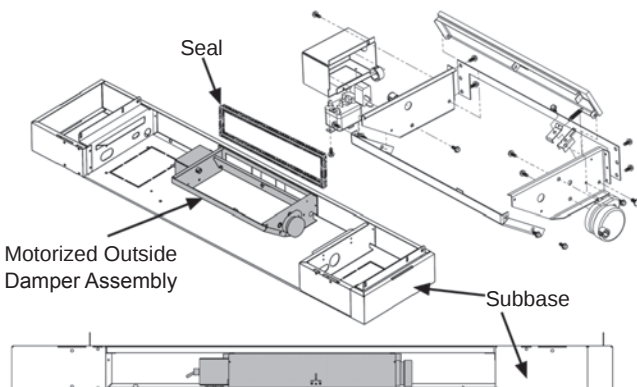
Outdoor Air Dampers

Manually operated or Motorized outside air damper assemblies are available to order as field-installed accessories and provide ventilation air.

Manual Outdoor Air Damper

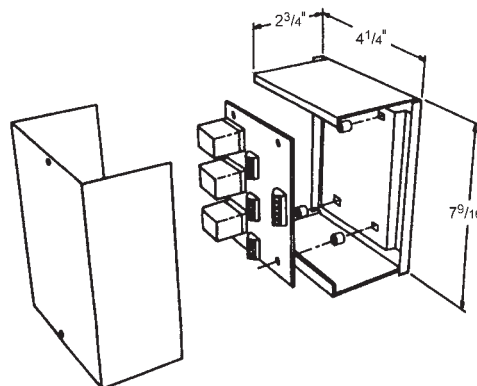


Motorized Outdoor Air Damper



Multiple Unit Control Panel (MUCP)

Multiple Unit Control Panel and Board



The Multiple Unit Control Panel (MUCP) is an accessory used when up to 3-units are controlled from a single thermostat. Console units must have the MUCP field-installed in a remote location, typically close to the units and convenient for service access.

Note: The MUCP control board does not fit inside the console unit control box.

A maximum of 2 boards may be used together if up to 6-units must be connected and controlled from a single thermostat.

Note: Multi-speed operation is only available with the optional unit-mounted fan speed switch.

Multiple Unit Control Panel Circuit Board



The multiple unit control board provides the components necessary to protect the MicroTech III unit controller from electrical damage that may occur when using standard off-the-shelf relays.

This version of the board uses VAC relays and should not be used in combination with any other accessories or equipment that require VDC connections to the “G”, “W1”, or “Y1” terminals.

Typical Wiring Diagrams

Unit-Mounted – With MicroTech III Unit Controller for Sizes 007-015 – 208/230/60Hz/1-Phase

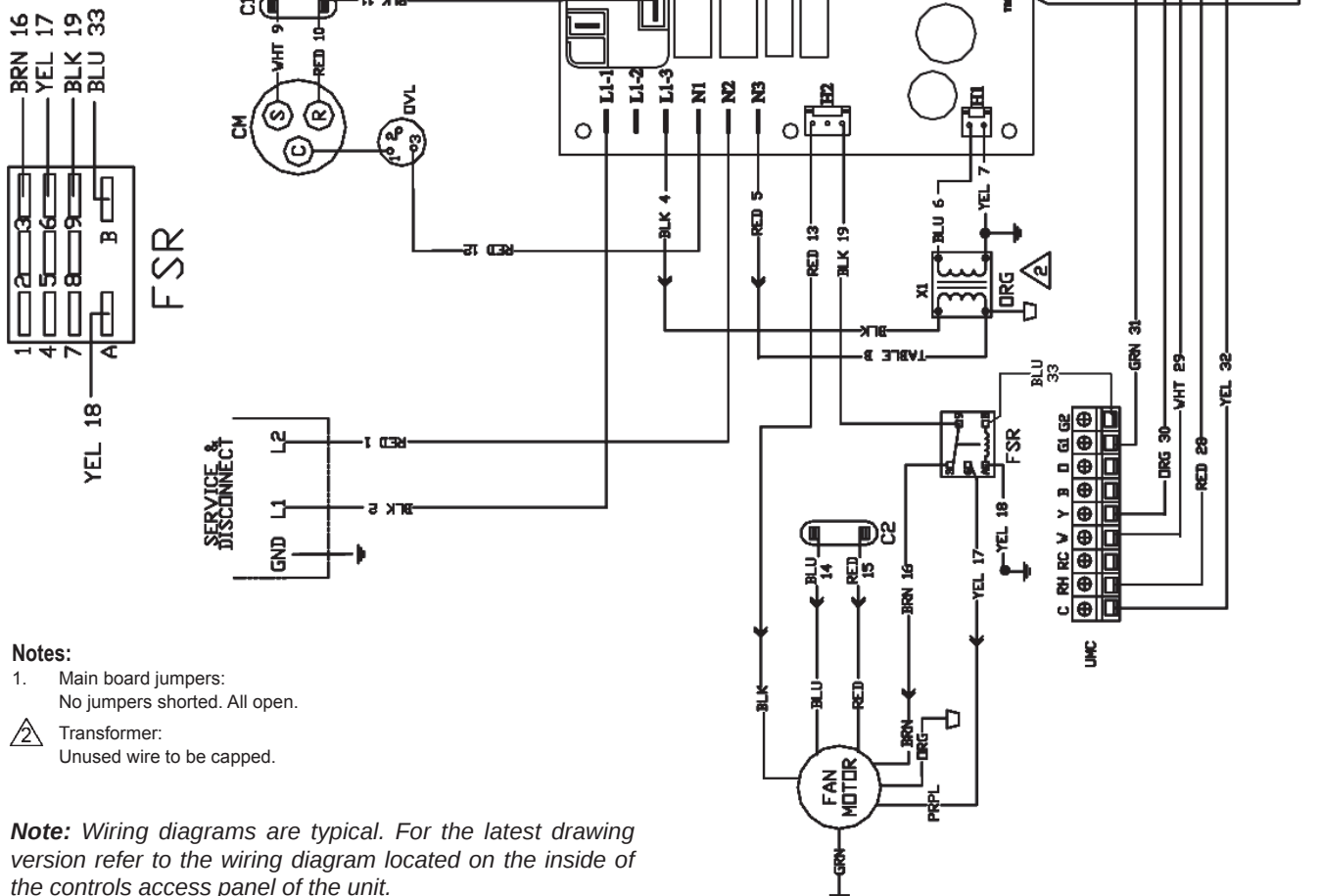
Drawing No. 668814803

Legend

Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DPG	Drain Pan Ground
FSR	Fan Speed Relay
HP	High Pressure Switch
LED1	LED Annunciator / Harness
MIII	MicroTech III Main Board
OVL	Compressor Overload Protector
RV	Reversing Valve Solenoid
SLTS	Suction Line Temp Sensor
T1	EG2UPC Terminal Strip
UMT	Unit-Mounted Thermostat
X1	Transformer

Table B

208V	RED
230V	ORG



Typical Wiring Diagrams

Unit-Mounted – With MicroTech III Unit Controller With Electric Heat for Size 018 208/230/60Hz/1-Phase

Drawing No. 668814811

Legend

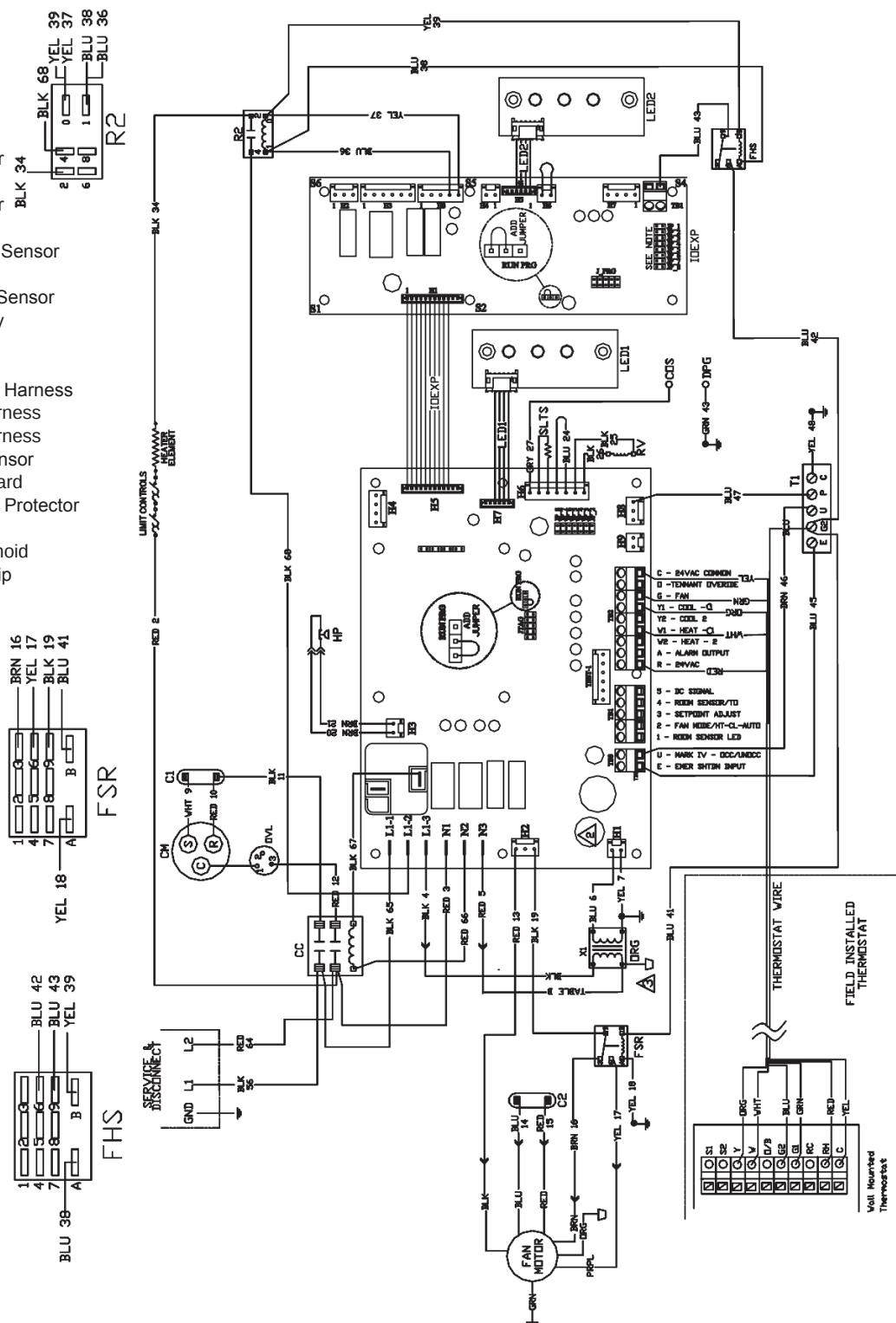
Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
CC	Compressor Contactor
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DPG	Drain Pan Ground
EWT	Entering Water Temp Sensor
FHS	Fan High Speed Relay
FSR	Fan Speed Relay
HP	High Pressure Switch
IOEXP	I/O Expansion Board / Harness
LED1	LED Annunciator / Harness
LED2	LED Annunciator / Harness
SLTS	Suction Line Temp Sensor
MIII	MicroTech III Main Board
OVL	Compressor Overload Protector
R2	Relay - Electric Heat
RV	Reversing Valve Solenoid
T1	EG2UCP Terminal Strip
TB1	Terminal Block
X1	Transformer

Table B	
208V	RED
230V	ORG

Notes:

1. Main board jumpers:
No jumpers shorted. All open.
2. I/O Expansion board jumpers:
Jumper JP4 shorted.

3. Transformer:
Unused wire to be capped.



Note: Wiring diagrams are typical. For the latest drawing version refer to the wiring diagram located on the inside of the controls access panel of the unit.

Typical Wiring Diagrams

Wall-Mounted – MicroTech III Unit Controller with BACnet Module For All Units without Electric Heat – 265/277/60Hz/1-Phase

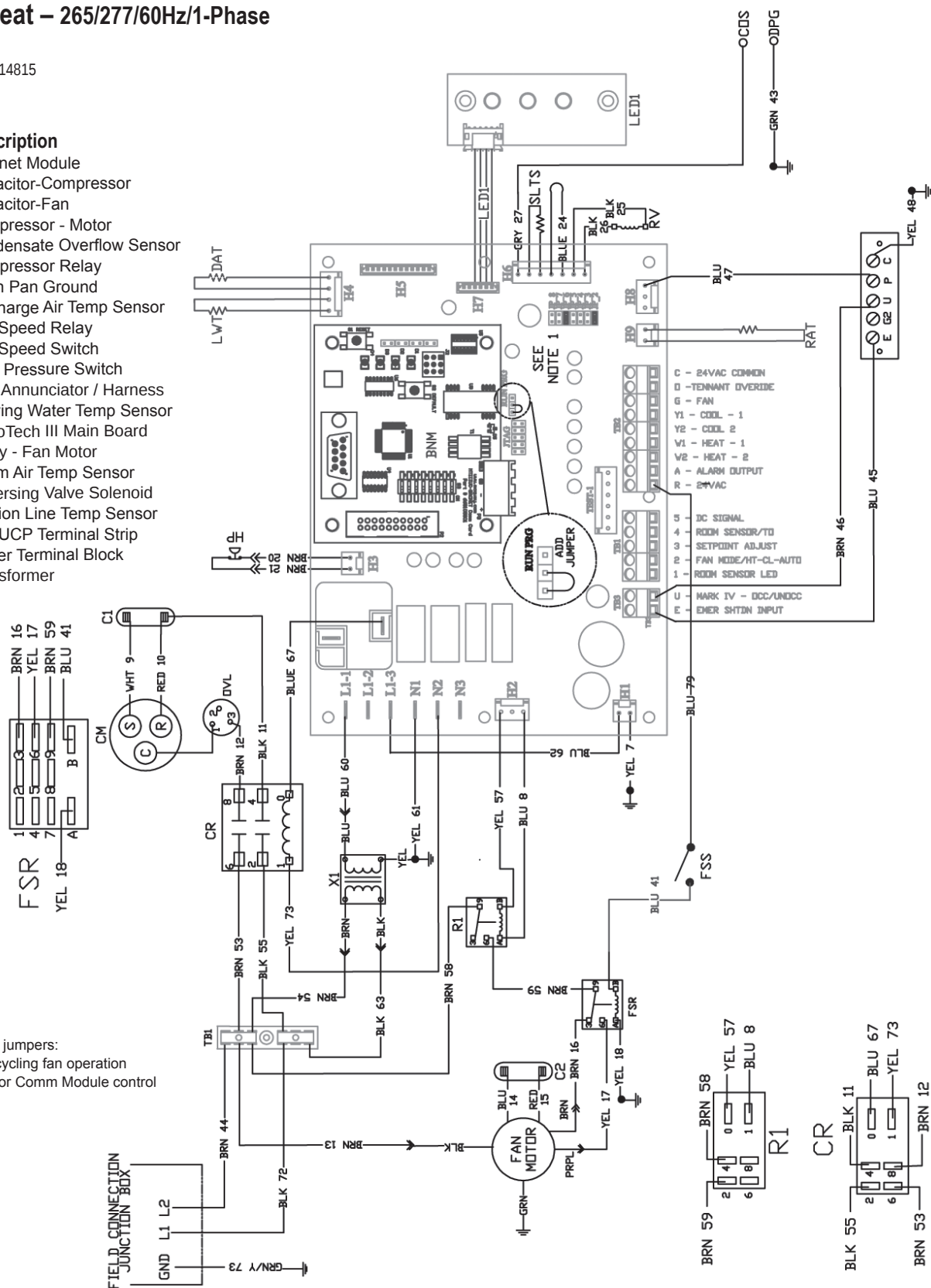
Drawing No. 668814815

Legend

Item	Description
BNM	BACnet Module
C1	Capacitor-Compressor
C2	Capacitor-Fan
CM	Compressor - Motor
COS	Condensate Overflow Sensor
CR	Compressor Relay
DPG	Drain Pan Ground
DAT	Discharge Air Temp Sensor
FSR	Fan Speed Relay
FSS	Fan Speed Switch
HP	High Pressure Switch
LED1	LED Annunciator / Harness
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
R1	Relay - Fan Motor
RAT	Room Air Temp Sensor
RV	Reversing Valve Solenoid
SLTS	Suction Line Temp Sensor
T1	EG2UCP Terminal Strip
TB1	Power Terminal Block
X1	Transformer

Notes:

- Main board jumpers:
Short JP2 cycling fan operation
Short JP6 for Comm Module control



Note: Wiring diagrams are typical. For the latest drawing version refer to the wiring diagram located on the inside of the controls access panel of the unit.

Engineering Guide Specifications

General

Contractor shall furnish and install Water Source Heat Pump units as indicated on plans. Each unit shall be listed in the ARI directory of certified products, ISO rated and CETL or CE listed. Each unit shall be fully run tested at the factory. Each unit shall ship in its own corrugated box. The unit shall consist of a subbase for floor mounting, a cabinet front, a left and right end corner panel and a slide-out chassis for attachment to the back wall and floor mounting on the subbase. The chassis shall include the refrigeration system, fan assembly and all controls.

The unit shall be capable of being shipped as a (choose one):

- ☐ complete unit including subbase, cabinet front, left and right end corner panels and chassis.
- ☐ chassis only for spare unit or future installation.

Cabinet and Chassis

The cabinet shall be fabricated from 18 or 20-gauge steel and include multiple holes/slots for attachment to the wall and floor. The cabinet sections shall be finished in Antique Ivory or Cupola White baked enamel. The subbase shall be finished in Oxford Brown or to match the cabinet color. The cabinet shall be insulated. The chassis shall house the refrigeration system, water piping, fan assembly and all controls. Panels shall provide access to the fan compartment and the compressor/control box compartment. The filter shall be a 1/2" (25mm) throwaway type with front removal from the subbase.

The chassis shall be fully insulated and incorporate a non-corrosive condensate pan. The drain hose shall have a formed condensate trap.

The cabinet shall be 10³/₄" (273mm) maximum depth and shall (choose one):

- ☐ have a 22° slope top angle and an opening in the subbase for return air with a maximum height of 25" (635mm).
- ☐ have a flat top and an opening in the subbase for return air with a maximum height of 25" (635mm).

(Choose one:)

- ☐ The slope top cabinet shall incorporate adjustable discharge grilles and thermostat cover with flush mounting to the front and sides of the cabinet. The discharge grille shall direct the air at an 11° angle from the vertical and be field reversible for a 33° discharge angle. The grille shall be constructed of fire retardant ABS polycarbonate. The left and right cabinet access end corner panels shall be Antique Ivory or Cupola White and be constructed of polycarbonate to match the discharge grilles and control door.

The flat top unit shall (choose one):

- ☐ incorporate a one-piece stamped, painted steel grille. The grille shall be painted Oxford Brown or match the cabinet color.
- ☐ incorporate no cabinet and a duct collar on the chassis for installation into a field supplied custom cabinet enclosure.

Refrigerant Circuit

Each unit shall have a sealed refrigerant circuit including a compressor, capillary expansion tube(s), finned tube heat exchanger, reversing valve, water-to-refrigerant coaxial heat exchanger, high and low side access valves, and safety controls.

Compressor shall be rotary type with external vibration mounts and thermal overload protection. The finned tube coil shall be constructed of aluminum fins bonded to copper tubes. The coaxial heat exchanger shall be constructed of a copper inner tube and a steel outer tube and be U.L. listed. The heat exchanger shall be rated for 400 psig (2759 kPa) on the water side and 450 psig (3104 kPa) on the refrigerant side.

Safety controls shall include a low suction temperature (freezestat) switch and a high refrigerant pressure switch to lock out compressor operation. Unit shall be capable of being reset only by interrupting the power supply to the unit. Manual reset of the safety switch at the unit shall not be allowed. Unit shall be capable of starting at entering air of 40°F (5°C) and entering water at 70°F (21°C) with both air and water flow rates at the ARI rating conditions.

Electrical

A control box with removable top cover shall be located on the right or left side of the chassis and shall contain controls for compressor, reversing valve and fan motor operation and a 50 VA transformer. The chassis shall have a 2" x 4" (51mm x mm) junction box mounted on the side to facilitate main power wiring and be capable of being located on the left or right side of the chassis. Unit shall be nameplated to accept time delay fuses or HACR circuit breaker for branch overcurrent protection of the power source.

Engineering Guide Specifications

Fan and Motor Assembly

Unit shall have a direct-drive tangential fan wheel. The fan housing shall be insulated with closed-cell insulation to help attenuate noise. The motor shall be thermally protected, two-speed, PSC type and be connected to the chassis. The motor shall have a plug connection and be connected to the chassis with three screws for easy removal and service.

Piping

The supply and return lines shall be 5/8" O.D. copper tubing and terminate away from the side of the chassis. The internally trapped condensate shall be a 3/4" (19mm) I.D. clear flexible vinyl tube protruding 14" (356mm) out of the chassis for connection at the floor or at the back wall. The supply, return and condensate tubing shall be capable of terminating at the left or right side of the chassis.

Thermostat / Space Sensor Options

The thermostat shall be (choose one):

- | | |
|---|---|
| ☐ unit-mounted non-programmable w/LCD display. | ☐ wall-mounted sensor. |
| ☐ unit-mounted 7-day programmable w/LCD display. | ☐ wall-mounted sensor w/status LED and night setback override. |
| ☐ wall-mounted non-programmable w/LCD display. | ☐ wall-mounted sensor w/setpoint adjustment (55° F to 95°F). |
| ☐ wall-mounted 7-day programmable w/LCD display. | ☐ wall-mounted sensor w/setpoint adjustment (-3° F to +3°F). |
| ☐ wireless non-programmable. | |
| ☐ wireless 7-day programmable. | |

MicroTech III Unit Controller

Unit shall have a microprocessor based control system and provide random start, compressor short cycle protection, grounded signal input (one each) for activation of unoccupied or emergency shutdown modes, LED fault status, optimal two-hour override of the unoccupied mode, brownout protection, condensate overflow protection, remote reset of automatic lockouts, fault retry to minimize nuisance trips, defrost cycle and pump restart relay output.

The control system type shall have an option of, (choose one):

- ☐ unit-mounted non-programmable w/LCD display, Hi-Lo-auto fan speed control.
- ☐ unit-mounted 7-day programmable w/LCD display, Hi-Lo-auto fan speed control.
- ☐ wall-mounted non-programmable w/LCD display, Hi-Lo-auto fan speed control.
- ☐ wall-mounted 7-day programmable w/LCD display, Hi-Lo-auto fan speed control.
- ☐ wall-mounted space temperature sensor/setpoint adjustment (55° F to 95°F), auto- On fan speed control.
- ☐ wall-mounted space temperature sensor/setpoint adjustment (-3° F to +3°F), auto- On fan speed control.
- ☐ wall-mounted sensor, no setpoint adjustment.
- ☐ wall-mounted sensor, night setback override button and LED status light.
- ☐ wireless thermostat and receiver, non-programmable, Hi-Lo-auto fan speed control.
- ☐ wireless thermostat and receiver, 7-day programmable, Hi-Lo-auto fan speed control.

Optional Boilerless System Electric Heat

Unit shall have a factory mounted electric heater and control system. A unit-mounted entering water temperature thermostat shall lock out compressor heating operation at 58°F (15°C). On a call for heating, the electric heater shall be activated. When the entering water temperature rises, the unit shall resume normal compressor heating operation. An emergency heat switch shall provide heating only from the electric heater in the event of a compressor failure.

Optional Outside Air Damper Kit

The damper is located in the back of the subbase for outside air intake and shall be operated manually from the subbase. Damper can be configured for manual adjustment or motorized control.

Engineering Guide Specifications

Optional Plug Cord Kit

The chassis shall incorporate a plug cord for connection to a unit-mounted receptacle/fused disconnect switch box in the subbase under the chassis. The plug cord shall electrically mate to the receptacle.

Optional Receptacle/Fused Disconnect Kit

The permanent portion of the cabinet shall have a receptacle and fused disconnect switch to facilitate main power electrical connection permitting chassis removal without disconnecting main power wiring.

Optional Motorized Valve Package

The return water line shall have a motorized water valve. The valve shall operate in conjunction with compressor operation; valve opens before compressor is turned on. The valve shall have a maximum rating of 150 psig (1035 kPa).

Field-Installed Accessories

Optional Flexible Hoses

Each unit can be supplied with two steel fire-rated hoses for connection to unit and field piping. Hose assembly shall be rated at 500 psig (3494 kPa).

Optional Ball Valves

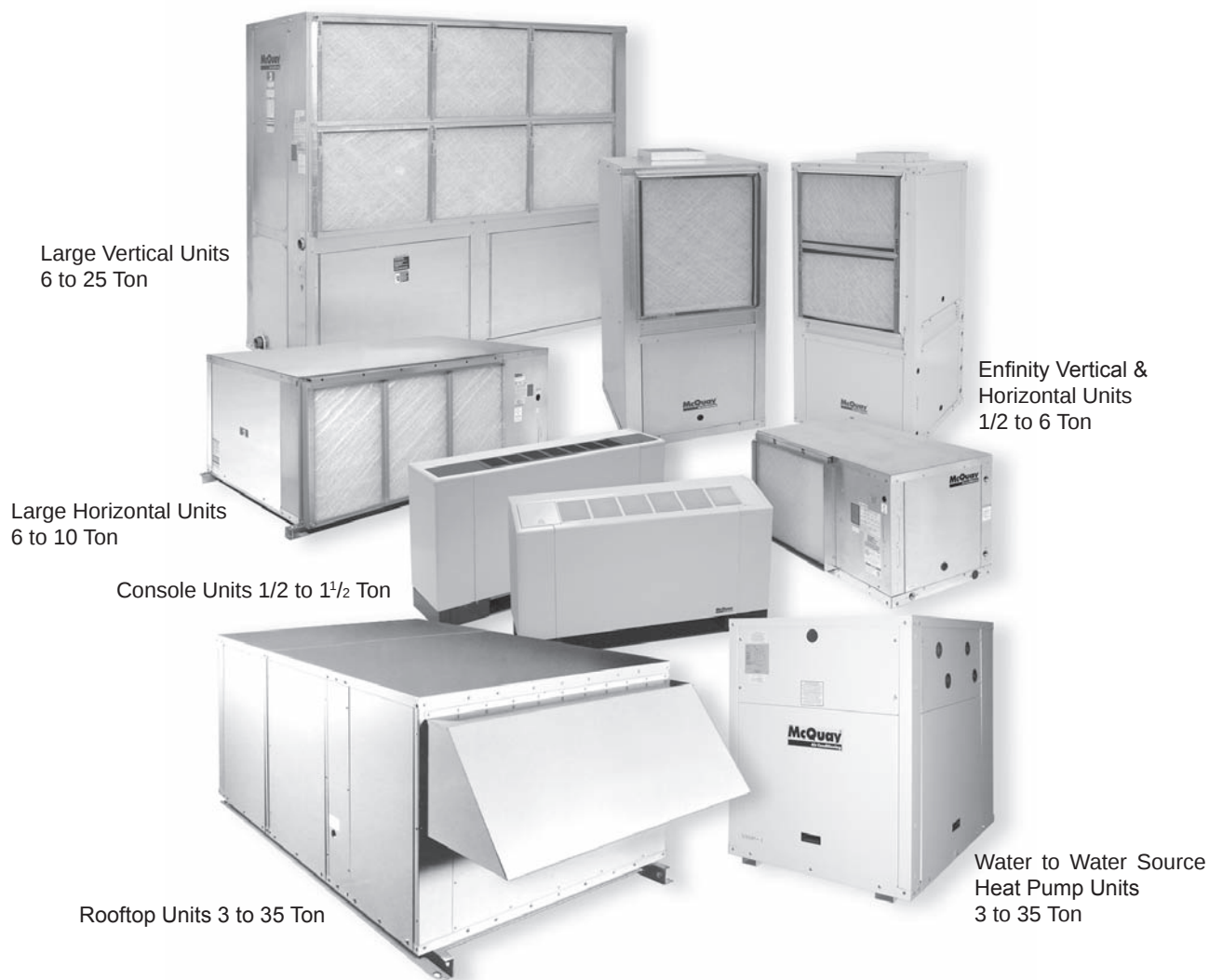
Each unit can be supplied with two combination balancing and shutoff valves with adjustable memory stop.

Optional Filter Kits

12-pk. filter kits available from selection software.

McQuay Water Source Heat Pumps

Quality Products, Flexible Configurations



Warranty

All McQuay equipment is sold pursuant to its standard terms and conditions of sale, including Limited Product Warranty. Consult your local McQuay Representative for warranty details. Refer to Form 933-43285Y. To find your local McQuay Representative, go to www.mcquay.com.

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.

Products Manufactured in an ISO Certified Facility.

